PROJECT MANUAL

New Operations Building

New Caney Independent School District

New Caney, Texas

Huckabee | MORE THAN ARCHITECTS

MORE THAN ARCHITECTS

PROJECT MANUAL

Project Name:	New Operations Building		
Client Name:	New Caney Independent School District	Location:	New Caney, Texas
Project Number:	1971-05-01	Date:	September 17, 2025

All inquiries shall be forwarded to Jordan Tripp, Huckabee; Jordan.tripp@huckabee-inc.com; 800.687.1229.

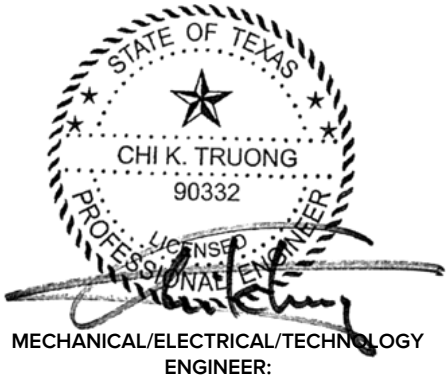
PROJECT TEAM



ARCHITECT:
Huckabee & Associates, Inc.
Derek R. Bankston, AIA 31169
800.687.1229



CIVIL ENGINEER:
Auric Engineers, LLC, TX F-20740
Sean P. Rooney, P.E.
713.405.1901



MECHANICAL/ELECTRICAL/TECHNOLOGY ENGINEER:
LTY Engineers
Chi Truong
281.945.8888



STRUCTURAL ENGINEER:
CJG Engineers., F-170
Hunter Kornegay
713.780.3345

Huckabee

TABLE OF CONTENTS

DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS
00 2216 REQUEST FOR COMPETTITIVE SEAL PROPOSALS
00 3132 GEOTECHNICAL DATA
00 5200 AGREEMENT FORM-A101-2017
00 5400 AGREEMENT FORM-A101-2017 EXHIBIT A
00 7200 GENERAL CONDITIONS-A201-2017

DIVISION 01 - GENERAL REQUIREMENTS
01 1400 WORK RESTRICTIONS
01 2100 ALLOWANCES
01 2200 UNIT PRICES
01 2300 ALTERNATES
01 3000 ADMINISTRATIVE REQUIREMENTS
01 3216 CONSTRUCTION PROGRESS SCHEDULE
01 4000 QUALITY REQUIREMENTS
01 4100 REGULATORY REQUIREMENTS
01 4339 MOCK-UP WALL CONSTRUCTION
01 4516 OBSERVATION PROCEDURES
01 4533 TESTING AND INSPECTION SERVICES
01 5000 TEMPORARY FACILITIES AND CONTROLS
01 5713 EROSION AND SEDIMENTATION CONTROL
01 5719 INDOOR AIR QUALITY CONTROLS
01 6000 PRODUCT REQUIREMENTS
01 6210 SCHEDULE OF MATERIALS AND COLORS
01 7000 EXECUTION AND CLOSEOUT REQUIREMENTS
01 7800 CLOSEOUT SUBMITTALS
01 7900 DEMONSTRATION AND TRAINING

DIVISION 02 - EXISTING CONDITIONS
02 4100 DEMOLITION

DIVISION 03 - CONCRETE
03 1000 CONCRETE FORMING AND ACCESSORIES
03 2000 CONCRETE REINFORCING
03 3000 CAST-IN-PLACE CONCRETE
03 3543 BONDED ABRASIVE POLISHED CONCRETE FLOORS
03 5216 LIGHTWEIGHT INSULATING CONCRETE

DIVISION 04 – MASONRY
04 0100 MAINTENANCE OF MASONRY
04 0511 MASONRY MORTARING AND GROUTING
04 2000 UNIT MASONRY

DIVISION 05 – METALS
05 1200 STRUCTURAL STEEL FRAMING
05 2100 STEEL JOIST FRAMING
05 3100 STEEL DECKING
05 4000 COLD-FORMED METAL FRAMING
05 5000 METAL FABRICATIONS
05 5100 METAL STAIRS
05 5133 METAL LADDERS
05 5213 PIPE AND TUBE RAILINGS

DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES
06 1000 ROUGH CARPENTRY
06 2000 FINISH CARPENTRY
06 8316 FIBERGLASS REINFORCED PANELING

DIVISION 07 - THERMAL AND MOISTURE PROTECTION
07 1300 SHEET WATERPROOFING
07 2100 THERMAL INSULATION
07 2119 FOAMED-IN-PLACE INSULATION
07 2500 WEATHER BARRIERS
07 5113 THREE-PLY MODIFIED BUILT-UP BITUMINOUS ROOFING
07 6200 SHEET METAL FLASHING AND TRIM
07 7200 ROOF ACCESSORIES
07 8400 FIRESTOPPING
07 9200 JOINT SEALANTS
07 9513 EXPANSION JOINT COVER ASSEMBLIES

DIVISION 08 - OPENINGS
08 1113 HOLLOW METAL DOORS AND FRAMES
08 1416 FLUSH WOOD DOORS
08 3100 ACCESS DOORS AND PANELS
08 3323 OVERHEAD COILING DOORS
08 4313 ALUMINUM-FRAMED STOREFRONTS
08 5659 SERVICE AND TELLER WINDOW UNITS
08 7100 DOOR HARDWARE
08 8000 GLAZING
08 8856 SECURITY GLAZING
08 9100 LOUVERS

DIVISION 09 - FINISHES
09 2116 GYPSUM BOARD ASSEMBLIES
09 2226 SUSPENSION SYSTEMS
09 3000 TILING
09 5100 ACOUSTICAL CEILINGS
09 6429 PLATFORM FLOORING
09 6500 RESILIENT FLOORING
09 6723 RESINOUS FLOORING
09 6816 SHEET CARPETING
09 9000 PAINTING AND COATING

DIVISION 10 - SPECIALTIES
10 0100 MISCELLANEOUS SPECIALTIES
10 1100 VISUAL DISPLAY UNITS
10 1400 SIGNAGE
10 2113.19 PLASTIC TOILET COMPARTMENTS
10 2213 WIRE MESH PARTITIONS
10 2239 FOLDING PANEL PARTITIONS
10 2600 WALL AND DOOR PROTECTION
10 2800 TOILET, BATH, AND LAUNDRY ACCESSORIES
10 4400 FIRE PROTECTION SPECIALTIES
10 5100 LOCKERS
10 5613 METAL STORAGE SHELVING
10 7300 PROTECTIVE COVERS
10 7500 FLAGPOLES

DIVISION 11 - EQUIPMENT
11 1126 VEHICLE –WASHING EQUIPMENT
11 1319.13 LOADING DOCK LEVELERS
11 2336 COMMERCIAL APPLIANCES
11 3013 RESIDENTIAL APPLIANCES

DIVISION 12 - FURNISHINGS
12 3200 MANUFACTURED WOOD CASEWORK
12 3600 COUNTERTOPS

DIVISION 13 - SPECIAL CONSTRUCTION
13 3419 METAL BUILDING SYSTEMS

DIVISION 14 - CONVEYING EQUIPMENT
14 2400 HYDRAULIC ELEVATORS

DIVISION 21 – FIRE SUPPRESSION
21 1313 FIRE SPRINKLER

DIVISION 22 – PLUMBING
22 0000 GENERAL PLUMBING
22 0100 COORDINATION DRAWINGS
22 0553 IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT
22 0719 PLUMBING PIPING INSULATION
22 0800 PLUMBING SYSTEMS TECHNICAL COMMISSIONING REQUIREMENTS
22 1111 NATURAL GAS PIPING
22 1116 DOMESTIC WATER PIPING
22 1119 DOMESTIC WATER PIPING SPECIALTIES
22 1316 SANITARY WASTE AND VENT PIPING
22 1319 SANITARY WASTE PIPING SPECIALTIES
22 1413 STORM DRAINAGE PIPING
22 1426 ROOF DRAINS
22 1500 COMPRESSED AIR PIPING
22 3413 INSTANTANEOUS TANKLESS GAS DOMESTIC WATER HEATERS
22 4200 PLUMBING FIXTURES
22 5000 VEHICLE FUELING AND FLUID SYSTEMS

DIVISION 23 - HEATING, VENTILATING AND AIR-CONDITIONING (HVAC)

23 0000 GENERAL HVAC
23 0100 COORDINATION DRAWINGS
23 0513 HVAC MOTORS
23 0548 VIBRATION CONTROLS FOR HVAC PIPING AND EQUIPMENT
23 0553 IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT
23 0593 TESTING AND BALANCING
23 0713 DUCT INSULATION
23 0719 HVAC PIPE INSULATION
23 0800 HVAC SYSTEMS TECHNICAL COMMISSIONING REQUIREMENTS
23 0801 COMMISSIONING AGENT REQUIREMENTS
23 0923 AUTOMATED TEMPERATURE CONTROLS
23 0993 SEQUENCE OF OPERATIONS FOR HVAC CONTROLS
23 2113 HYDRONIC PIPING
23 2123 HVAC HYDRONIC PUMPS
23 2300 REFRIGERANT PIPING
23 2513 HYDRONIC SYSTEMS WATER TREATMENT
23 2913 MOTOR STARTERS AND CONTROLLERS
23 2923 VARIABLE SPEED MOTOR CONTROLLERS
23 3113 METAL HVAC DUCTS
23 3300 AIR DUCT ACCESSORIES
23 3319 AIR DUCT SILENCERS
23 3410 HIGH VOLUME LOW SPEED FANS (HVLS)
23 3416 HVAC FANS
23 3513 SHOP DUST COLLECTION AND EXHAUST SYSTEMS
23 3600 AIR TERMINAL UNITS
23 3713 DIFFUSERS REGISTERS AND GRILLES
23 4100 AIR HANDLING UNIT FILTERS
23 5200 CONDENSING HIGH EFFICIENCY BOILER SYSTEM
23 6313 AIR-COOLED CONDENSING UNITS & DX-SPLIT SYSTEM
23 6426 AIR-COOLED WATER CHILLERS
23 7313 INDOOR AIR HANDLING UNITS
23 8239 UNIT HEATERS

DIVISION 26 – ELECTRICAL

26 0000 GENERAL ELECTRICAL
26 0100 COORDINATION DRAWINGS
26 0500 ELECTRICAL WIRING
26 0526 GROUNDING AND BONDING OF ELECTRICAL SYSTEMS
26 0800 ELECTRICAL AND LIFE SAFETY SYSTEMS TECHNICAL COMMISSIONING REQUIREMENTS
26 0923 STAND-ALONE LIGHTING CONTROL DEVICES AND EQUIPMENT
26 0926 LIGHTING CONTROL PANELBOARDS
26 2213 LOW VOLTAGE DISTRIBUTION TRANSFORMERS
26 2413 SWITCHBOARDS
26 2416 PANELBOARDS
26 2726 WIRING DEVICES
26 2816 ENCLOSED SWITCHES AND CIRCUIT BREAKERS
26 2913 MOTOR STARTERS AND CONTROLLERS
26 3213 EMERGENCY GENERATORS
26 3623 AUTOMATIC TRANSFER SWITCHES
26 4313 TRANSIENT VOLTAGE SUPPRESSION
26 5113 INTERIOR LIGHTING FIXTURES, LAMPS AND BALLASTS
26 5600 EXTERIOR LIGHTING

DIVISION 27 – COMMUNICATIONS
27 1000 STRUCTURED CABLING SYSTEM
27 4116 INTEGRATED AUDIO VIDEO SYSTEMS AND EQUIPMENT

DIVISION 28 – ELECTRICAL SAFETY AND SECURITY
28 0000 ACCESS CONTROL SYSTEM
28 1000 INTRUSION DETECTION SYSTEM
28 2000 CCTV SURVEILLANCE SYSTEM – NETWORK CCTV SYSTEM
28 3100 FIRE ALARM SYSTEM
28 5129 EMERGENCY RADIO COMMUNICATION SYSTEM

DIVISION 31 - EARTHWORK
31 1100 CLEARING AND GRUBBING
31 2213 SITE GRADING
31 2310 BUILDING EXCAVATION AND FILL
31 2333 TRENCHING BACKFILLING AND COMPACTION
31 3116 TERMITE CONTROL
31 3213.19 LIME STABILIZATION
31 3213.26 LIME FLY ASH OR FLY ASH STABILIZATION
31 4133 TRENCH SAFETY
31 6329 DRILLED CONCRET PIERS AND SHAFTS

DIVISION 32 - EXTERIOR IMPROVEMENTS
32 1313 CONCRETE SITE PAVING
32 1723.13 PAINTED PAVEMENT MARKINGS
32 3113 CHAIN LINK FENCES AND GATES
32 3123 VEHICULAR GATE OPERATORS
32 9200 TURF AND GRASSES

DIVISION 33 – UTILITIES
33 1000 WATER DISTRIBUTION
33 3000 SANITARY SEWER
33 4000 STORM DRAINAGE

END OF SECTION

NEW CANEY ISD

REQUEST FOR COMPETITIVE SEALED PROPOSALS
CSP JOB #872-2023

Project: New Operations Building, to include operations, maintenance, transportation, food service, and custodial, new warehouse, new freestanding bus wash, and additions to the Mechanic Shop and Tire Storage Building.

Location:
21026 Loop 494
New Caney, TX. 77357

ISSUED BY (Owner):

New Caney Independent School District
22784 Hwy 59S Building E
Porter, TX 77365

SUBMIT INQUIRIES TO:

Name: Isai (Jesse) Lemus, Project Manager
22784 Hwy 59S Building E, Porter, TX 77365
Email: ilemus@newcaneyisd.org

New Caney ISD website: www.newcaneyisd.org

SECTION 1 – PROJECT OVERVIEW

Project Overview and Scope: New Caney Independent School District ("NCISD," "District," "Owner") is seeking **Competitive Sealed Proposals** from qualified proposers to provide construction services for the New Operations Building, to include operations, maintenance, transportation, food service, and custodial, new warehouse, new freestanding bus wash, and additions to the Mechanic Shop and Tire Storage Building Project at 21026 Loop 494, New Caney, TX. 77537. The project scope of work consists of a new 45,218 square feet Operations Building; new 31,011 square feet warehouse; new 2,648 square feet bus wash; the addition of 2,954 square feet onto the existing bus mechanic's shop; and the addition of 1,000 square feet onto the existing tire shop.

Estimated Budget: The estimated construction budget for this project is **$28,500,000.00**.

Award/Contract Approval: This procurement, any award under this procurement, and the resulting contract, if any, is subject to approval by the NCISD Board. Subsequent to required approval, the only person authorized to commit NCISD contractually is the Superintendent or his designee. This solicitation is an invitation for sealed proposals and neither this solicitation nor the response or the proposal from any prospective proposer/contractor shall create a contractual relationship that would bind NCISD until such time as both NCISD and the selected proposer/contractor sign a legally binding contract, which includes, without limitation, the terms required by NCISD.

Pre-Proposal Meeting: Pre-Proposal meeting agenda will include review of topics that may affect proper preparation and submittal of proposals and is scheduled for 1:00 p.m. on October 2, 2025, at 22784 Hwy 59S Building E, Porter, TX 77365. Attendance at the pre-proposal meeting is not mandatory, but all proposers are highly encouraged to attend.

Proposal Deadline; Opening Time/Location: Sealed proposals for the construction work to be performed as required and/or contemplated under this request for competitive sealed proposals and as described herein and in the construction documents will be received no later than October 14, 2025, by 2:00 p.m. **Sealed Alternate Proposals for the construction work to be performed as required and/or contemplated under this request for competitive sealed proposals and as described herein and in the construction documents will be received no later than October 14, 2025 by 3:00 p.m. Proposals will be publicly opened and read aloud at 3:05 p.m. on October 14, 2025.**

Proposals shall be submitted by hard copies delivered by U.S. Postal mail, courier, or hand delivery to NCISD on or before the date and time set to receive proposals. Proposers shall submit 1 original and 1 copy of proposals in a sealed envelope and are responsible for ensuring that their proposals are time-stamped to evidence timely submission. Hard copies of proposals will only be accepted at NCISD's Facilities and Construction Building, located at 22784 Hwy 59S Building E, Porter, TX 77365, between the hours of 8 a.m. and 3 p.m., Monday through Friday, on NCISD business days.

Proposals that have been opened may not be changed for the purpose of correcting an error in the price. Other than price, a proposer may have the right to change any other error or mistake in the proposal as may be permitted by applicable law and subject to the approval of NCISD, unless such change would be in contravention of statutory or common law requirements or unless such change would give an unfair advantage to the proposer making such change.

Contract Term: Actual work to be performed and the schedule for performance under this solicitation will be upon the terms, conditions, and timelines agreed upon by NCISD and the selected contractor. **Time is of the essence for this project. All Work listed in the construction documents shall be substantially completed no later than February 16, 2027. Final completion shall be completed no later than thirty (30) days following Substantial Completion date.**

Reservations and Waivers: This procurement solicitation shall be in accordance with applicable law and NCISD policies and general terms, including the following:

1. This Request for Competitive Sealed Proposals does not obligate NCISD to award a contract or pay any costs incurred by the proposer in the preparation and submittal of a proposal. NCISD assumes no financial responsibility for any costs incurred by proposers in developing and submitting proposals, participating in pre-bid meetings, or any other costs incurred by proposers in connection with this procurement solicitation.

2. **NCISD, IN ITS SOLE DISCRETION, RESERVES THE RIGHT TO ACCEPT ANY PROPOSAL AND/OR REJECT ANY AND ALL PROPOSALS OR A PART OF A PROPOSAL, WITHOUT REASON OR CAUSE, SUBMITTED IN RESPONSE TO THIS SOLICITATION.**

3. **NCISD RESERVES THE RIGHT TO REJECT ANY NON-RESPONSIVE OR CONDITIONAL PROPOSAL.**

4. **NCISD RESERVES THE RIGHT TO WAIVE ANY FORMALITIES, IRREGULARITIES, AND/OR TECHNICALITIES IN THIS SOLICITATION, THE CONSTRUCTION AND/OR PROCUREMENT DOCUMENTS, AND/OR ANY PROPOSALS RECEIVED OR SUBMITTED.**

5. **BY SUBMITTING A PROPOSAL, PROPOSER AGREES TO WAIVE ANY CLAIM IT HAS OR MAY HAVE AGAINST NEW CANEY INDEPENDENT SCHOOL DISTRICT, AND/OR NCISD'S BOARD MEMBERS, ADMINISTRATORS, EMPLOYEES, AND/OR AGENTS ARISING OUT OF OR IN CONNECTION WITH (1) THE ADMINISTRATION, EVALUATION, OR RECOMMENDATION OF ANY PROPOSAL; (2) ANY REQUIREMENTS UNDER THE SOLICITATION, PROCUREMENT PACKAGE, OR RELATED DOCUMENTS; (3) THE REJECTION OF ANY PROPOSAL OR ANY PART OF ANY PROPOSAL; AND/OR (4) THE AWARD OF A CONTRACT, IF ANY.**

6. NCISD reserves the right to withdraw/cancel this solicitation at any time for any reason, remove any scope component for any reason and to issue such clarifications, modifications and/or amendments as deemed appropriate by NCISD, in its sole discretion.

7. A response to this procurement solicitation is an offer to contract with NCISD based upon the terms, conditions, scope of work, and specifications contained in this procurement solicitation and the construction documents. A contract is not formed unless and until a proposal is accepted and awarded by NCISD after approval by the NCISD Board of Trustees. NCISD will utilize the AIA Document A101-2017 contract, as modified by NCISD, along with the AIA Document A201 General and Supplementary Conditions, as modified by NCISD. NCISD's modifications to the AIA Documents are included herein as Attachment Exhibit C. Any exceptions to NCISD's modifications to the AIA Documents must be clearly indicated in the proposer's submission. Each Proposer, by making its proposal, represents that the Proposer has read, understands, and agrees to NCISD's modifications to the AIA Documents.

8. A proposal that has been submitted may be withdrawn prior to the deadline for submission of proposals.

9. Proposals received will become a part of NCISD's official files without further obligation to the respondents.

10. Respondents shall not, under penalty of law, offer any gratuities, favors, or anything of monetary value to any officer or employee of NCISD, or to any consultant, employee, or member of NCISD for the purpose of or having the effect of influencing favorable disposition toward their own proposal or any other proposal submitted hereunder.

11. No employee, officer or member of NCISD shall participate in the selection, development of a response to this procurement solicitation, award or administration of a contract resulting from this procurement solicitation if a conflict of interest, real or apparent, would be involved.

12. Proposers shall not engage in any activity that will restrict or eliminate competition. This does not preclude joint ventures or subcontracts.

SECTION 2 – INSTRUCTIONS TO PROPOSERS

1. **Definitions:**

Procurement Documents include the procurement requirements and the proposed contract documents. The procurement requirements consist of this Request for Competitive Sealed Proposals, including its exhibits and attachments, and all addenda. The proposed Contract Documents consist of the AIA Document A101-2017 contract, as modified by NCISD; Exhibit A to the AIA Document A101-2017, Insurance and Bonds, as modified by NCISD; AIA Document A201 General Conditions, as modified by NCISD; the Drawings and Specifications. The AIA Documents, as modified by NCISD, are included herein as Exhibit C.

2. **Review of Construction Documents**

A complete set of documents (collectively, "Procurement Documents") shall be used in preparing a proposal; neither NCISD nor NCISD's architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete sets of construction and/or procurement documents. Each prospective proposer should carefully review the construction documents and take such steps as may be reasonably necessary to ascertain the resulting contract performance requirements. Failure to do so will not relieve proposers from the responsibility of estimating properly the difficulty/level of effort or cost of successfully performing any resulting contract. After the proposals have been opened, NCISD shall have the right to review the proposals and examine the credentials and qualifications of each proposer to determine whether any or all of the proposals are responsive and to make a determination as to whether any one or more proposers are qualified, responsible contractors.

Proposers shall carefully study and compare the Procurement Documents with each other, shall examine the site and local conditions, and shall at once report to the architect errors, inconsistencies, or ambiguities discovered.

3. **Explanation to Proposers; Questions; Registration with Architect**

Any explanation desired by a prospective proposer regarding the meaning or interpretation of the Procurement Documents must be requested in writing and with sufficient time allowed (a minimum of ten (10) calendar days before the date set to receive proposals) for a response to reach prospective proposers before the submission of their proposals. Any NCISD interpretations, corrections, and/or changes to the procurement or construction documents will be in the form of an addendum. Interpretations, corrections and changes of the Procurement Documents made in any other manner will not be binding, and Proposers shall not rely upon them.

All such addenda shall be posted where the original procurement documents were placed, including on the Architect's website https://moregroup-inc.com/construction/. Receipt of any addenda issued by NCISD shall be acknowledged by the proposer with the proposal submission.

Procurement Documents may be obtained from the issuing office designated in the Advertisement for Sealed Proposals in the number and for the deposit sum, if any, stated therein. The deposit will be refunded to Proposers who return the Procurement Documents to the issuing office in good condition and in good order within ten days after proposal opening. The cost of replacement of missing or damaged Procurement Documents will be deducted from the deposit. A Proposer receiving a Contract award may retain the Procurement Documents and the Proposer's deposit will be refunded.

- Additional complete sets of Procurement Documents, if available, may be obtained by Proposers and sub-proposers from the issuing office for the cost of reproduction and mailing, which costs are not refundable.

It shall be understood by entities obtaining additional sets and paying the reproduction and mailing costs that such additional sets remain the Owner's exclusive property and shall be returned to the office from where the Procurement Documents were issued.

All questions and/or requests for information must be sent directly to the architect and responsible party/consultant via email:

1. Architectural/General – **Huckabee & Associates, Inc.** **Derek Bankston**
   1700 City Plaza Drive, Suite 125
   Spring, TX 77389 Email: derek.bankston@huckabee-inc.com

2. Civil – **Auric Engineers, LLC** **Sean Rooney**
   520 Post Oak Blvd., Suite 895
   Houston, TX 77027 Email: sean.rooney@auricengineers.com

3. MEP – **LTY Engineers, PLLC** **Sean McLeod**
   840 Gessner Road, Suite 325
   Houston, TX 77024 Email: sean.mcleod@lty-engineers.com

4. Structural – **CJG Engineers** **Hunter Kornegay**
   6051 North Course Dr. Suite 375
   Houston TX, 77072 Email: hkornegay@cjgengineers.com

All questions and/or requests for information shall be responded to in writing by return email only to the original sender, if there are no changes to the Contract Documents.

For all proposers preparing to submit a proposal for the work enumerated in the construction documents to NCISD, please **register with NCISD's architectural firm for this project**: Huckabee & Associates, Inc., Attn: Derek Bankston, 1700 City Plaza Drive, Suite 125, Spring, Texas 77389; derek.bankston@huckabee-inc.com; (713) 292-6925. This registration will allow NCISD to maintain a proposer list and have the opportunity to submit responses to proposers' questions/requests for information equally with all proposers.

Prospective proposers are responsible for obtaining issued addenda to the request for competitive sealed proposals to ensure they have the most current and complete Procurement Documents.

4. **General Requirements**
   a. NCISD is seeking proposals from qualified, responsible contractors to provide construction services.
   b. The contractor must have the administrative and fiscal capability as well as experience to provide and manage the services requested.
   c. The contractor must comply with all applicable federal, state, and local laws, ordinances, rules, regulations and orders of all authorities having jurisdiction over the contract.
   d. The contractor must be adequately insured and bonded.
   e. The contractor must employ qualified personnel with adequate training and experience and in adequate numbers.

5. **Proposer Eligibility for Contract Award**

In order for a proposer to be eligible to be awarded a contract, the proposal must be responsive to the solicitation and NCISD must be able to determine that the proposer is responsible to perform the resulting contract satisfactorily.

Responsive proposals are those that comply with all material aspects of the solicitation, conform to the Procurement Documents, and meet the requirements set forth in this solicitation. Proposals that do not comply with the terms and conditions of the solicitation will be rejected as non-responsive.

Each proposer shall complete, and submit with the proposal, the applicable forms contained in the solicitation. When a special license or permit is required by Federal, State or Local law or ordinance or required by a company or otherwise to perform the work, the proposer must be properly licensed prior to submitting a proposal to NCISD and must furnish evidence of such licensing or credentials with the proposal.

Responsible proposers, at a minimum, must meet all of the following requirements:

- Be an experienced contractor who has served as a prime contractor on similar construction projects for schools/governmental entities and be knowledgeable about requirements for construction of and building elements for schools including, without limitation, applicable building code requirements;
- Provide a warranty and support for any equipment installed as part of the construction services;
- Possess or is able to obtain adequate financial resources as required to perform under any contract resulting from this procurement solicitation;
- Have a responsible safety record, as detailed in this procurement solicitation;
    - Proposers must submit with their sealed proposal the following evidence of proposer's safety record: proposer's OSHA (Occupational Safety and Health Administration) inspection logs for the last three years, a loss analysis from the proposer's insurance carrier, and a loss history covering all lines of insurance coverage carried by the proposer.
- **Be able to obtain payment and performance bonds of the types and in the amounts described in this procurement solicitation;**
    - Proposers must provide a letter of statement from a bonding company that the proposer general contractor is eligible to obtain both payment and performance bonds of the types described in this procurement solicitation**. Proposers must include such letters in their proposals.**
    - Payment and performance bonds shall be provided after the proposal/contract award in order to proceed with contract execution.
    - Proposers shall include the related bond cost within their proposal amount.
- **Comply with all prevailing wage rate requirements;**
    - The contractor who is awarded a contract resulting from this procurement solicitation must pay not less than the prevailing wage rates determined by NCISD to a worker employed by it in the execution of a contract and must keep a record of such, as detailed in this procurement solicitation.
- **Be able to obtain all required permits.**
    - All permit costs, inspection costs by governmental authorities having jurisdiction and associated fees, including but not necessarily limited to, building permits, sprinkler permits, canopy permits, fence permits, etc. will be paid by the selected proposer.
    - Proposers shall include the related permitting and inspection costs within their proposal amount.
- Submit all required proposal forms. If there are any missing proposal form pages, proposers may be disqualified.
- Be able to comply with the required performance schedule, taking into consideration all existing business commitments;
- Have necessary management and technical capability to perform any resulting contract;
- Be qualified as an established firm regularly engaged in the type of business to provide the items/work required by this solicitation;
- Be registered to do business in the State of Texas;
- Be in good standing with the State of Texas;

- Be otherwise qualified and eligible to receive a contract award under applicable laws and regulations.

Proposals deviating or taking exceptions to the solicitation requirements may not be considered. A person is not eligible to be considered for award of this solicitation or any resulting contract or to be a subcontractor of the proposer or prime contractor if the person assisted in the development of this solicitation or any part of this solicitation or if the person participated in a project related to this solicitation when such participation would give the person special knowledge that would give that person or a prime contractor an unfair advantage over other proposers.

6. **Preparation for Proposal; Proposal Submittal**

a. A proposal shall be complete, must include information provided on the attached forms, and may include any other forms or documents to support the proposal submitted by the contractor and shall be signed by an authorized official of the company submitting the proposal. The person signing the proposal shall initial any changes or erasures appearing on the proposal forms.

b. Proposers may respond to this CSP by submitting hard copies of proposals. A proposal shall be submitted by delivering proposals no later than the exact date/time and at the place indicated in the solicitation. The required documentation and forms must be completed, signed, scanned, and enclosed in Proposer's sealed envelope. Hard copies of proposals will only be accepted at NCISD's Facilities and Construction Building, located at 22784 Hwy 59S Building E, Porter, TX 77365, between the hours of 8 a.m. and 3 p.m., Monday through Friday, on NCISD business days. The envelope shall identify the name and address of the proposer and shall contain the proposal security and other required documents.

c. All proposal packages must be sealed and must be clearly marked with the following:
   - Proposer's name, address and telephone number
   - Project Description/Title
   - Proposal Opening Date/Time

   All hard copies of proposals shall be submitted to:

NEW CANEY INDEPENDENT SCHOOL DISTRICT
Attn: Isai (Jesse) Lemus
NCISD Facilities and Construction Building
22784 Hwy 59S Building E
Porter, TX 77365

c. Proposal security shall be submitted with each proposal in the amount of ten percent (10%) of the Base Proposal amount.

7. **Selection Criteria**
In accordance with Sections 2269.153, 2269.155, and 2269.055 of the Texas Government Code, NCISD will evaluate proposals on the basis of the following selection criteria:

Selection Criteria Weight Table	
Detailed Methodology for Scoring	**Criteria Weight**
Price – Proposed Price Proposers will receive an assigned share of the total available points for this criterion based on the total monetary value of the Proposal according to banded point categories shown in the "Table of Awarded Points," below. A formula will be used as follows to determine the award band for proposals based on each proposer's percentage above the low bid: Percentage Above Low Bid=(Your combination of fees and general conditions/lowest proposed combination of fees and general conditions. The result of the formula will be used to proportion the points awarded based on the "Table of Awarded Points," below.	**50**
Proposer's Experience & Reputation The Owner will consider the proposer's experience and reputation and the proposer's answers to the Questionnaire, including, but not limited to, the record of past performance, general reputation of the proposer, and the proposer's knowledge, reliability, character, integrity, skill, and stability; the proposer's experience rehabilitating commercial buildings inside Montgomery County, the proposer's experience with NCISD, and the proposer's reputation for handling warranty work. Proposer's references (listed in proposer's A305) will be reviewed and evaluated.	**15**
Quality of Proposer's services Proposer demonstrates consistent and average past and current workload to staff ratio, showing ability to adequately staff the work and company stability. Proposer shows no or limited past history of claims, suits, and failure to perform. Proposer shows ability to maintain cost with no cost increases. Proposer has a record of timely completion of work, compliance with laws, and warranty service. Owner will consider the answers to the Questionnaire which relate to the quality of the Proposer's services.	**15**
Whether Proposer's financial capability is appropriate to the size and scope of the project Proposer's financial and technical resources will be evaluated. Proposer has a positive asset to liability ratio and adequate bonding capacity. Evaluation of Proposer's responses to Financial Information Questionnaire of this RFP.	**5**
Proposer's Proposed Personnel Proposer's individual personnel proposed for the work in the RFP demonstrate similar project experience by showing high proportion of Montgomery County school district/governmental entity work, the proposer's experience rehabilitating commercial buildings, projects of comparable cost, complexity, and timeframe to the work in the RFP. Organizational approach to the project is clear. Owner will review and evaluate the answers to the Questionnaire and resumes in proposer's A305.	**5**
Proposer's Safety Record NCISD will consider the safety record of the proposer in determining to whom to award a contract resulting from this procurement solicitation. The safety record shall be as defined in this RFP.	**2**
Proposer's Ability to Complete Project on Time Proposer's ability to complete project on time; Proposer's proposed construction schedule meets or exceeds the Substantial Completion and Final Completion dates set forth herein.	**5**
Proposer's Performance in Responding to Warranty Proposer has a positive demonstrated performance in responding to warranty claims.	**3**
Total	**100**

Table of Awarded Points

Percentage Above Low	Percentage of Available Points Allocated
0% to 0.0125%	100.00%
0.0126% to 0.25%	99.00%
0.26% to 0.51%	97.50%
0.52% to 0.77%	96.00%
0.78% to 1.03%	94.50%
1.04% to 1.29%	93.00%
1.3% to 1.55%	91.50%
1.56% to 1.81%	90.00%
1.82% to 2.07%	88.50%
2.08% to 2.33%	86.50%
2.34% to 2.59%	84.50%
2.6% to 2.85%	82.50%
2.86% to 3.11%	80.50%
3.12% to 3.37%	78.50%
3.38% to 3.63%	77.50%
3.64% to 3.89%	76.50%
3.9% to 4.15%	75.50%
4.16% to 4.41%	74.50%
4.42% to 4.67%	73.50%
4.68% to 4.93%	72.50%
4.94% to 5.19%	71.50%
5.2% to 5.45%	70.50%
5.46% to 5.71%	69.50%
5.72% to 5.97%	68.50%
5.98% to 6.23%	67.50%
6.24% to 6.49%	66.50%
6.5% to 6.75%	65.50%
6.76% to 7.01%	62.50%
7.02% to 7.27%	59.50%
7.28% to 7.53%	56.50%
7.54% to 7.79%	53.50%
7.8% to 8.05%	50.50%
8.06% to 8.31%	47.50%
8.32% to 8.57%	44.50%
8.58% to 8.83%	41.50%
8.84% to 9.09%	38.50%
9.1% to 9.35%	35.50%
9.36% to 9.61%	32.50%
9.62% to 9.87%	29.50%
9.88% to 10.13%	26.50%
10.14% to 10.24%	23.50%
10.25% to 11%	17.50%
11.01% to 12%	11.50%
12.01% to 13%	5.50%
13.01% to 100%	0.00%

8. **Terms and Conditions**

This procurement solicitation shall be in accordance with applicable law, including Subchapter D of Chapter 2269 of the Texas Government Code (Competitive Sealed Proposal Method of Procurement), NCISD policy, and the following terms and conditions of this procurement solicitation:

a. Contract Award. Award of a contract, if any, will be made to the proposer who submits the proposal that offers the best value for NCISD, based on (a) the selection criteria in this request for competitive sealed proposals and the weighted value for those criteria listed in this procurement solicitation; and (b) NCISD's ranking evaluation. Tex. Gov't Code § 2269.155(a). NCISD must first attempt to negotiate a contract with the selected proposer. NCISD and its architect and/or engineer may discuss with the selected proposer options for a scope or time modification and any price change associated with the modification. Tex. Gov't Code § 2269.155(b). If NCISD is unable to negotiate a satisfactory contract with the selected proposer, NCISD must, formally and in writing, end negotiations with that proposer and proceed to the next proposer in the order of the selection ranking until a contract is reached or all proposals are rejected. Tex. Gov't Code § 2269.155(c).

b. Taxes. NCISD is exempt from taxation, and no proposal shall include any costs for taxes to be assessed against NCISD.

c. Appropriated Funds. The purchase of services and/or products that arises from this solicitation is contingent upon the availability of appropriated funds. In addition to other termination rights contained in the resulting contract, if any, NCISD shall have the right to terminate the resulting contract at the end of the current or each succeeding NCISD fiscal year if funds are not appropriated by NCISD's Board of Trustees for the next fiscal year that would permit continuation of the resulting contract. If funds are withdrawn or do not become available, NCISD reserves the right to terminate the contract by giving the contractor a thirty (30) day written notice of its intention to terminate without penalty or any further obligations on the part of NCISD or the contractor. Upon termination of the contract, NCISD shall not be responsible for any payment of any service or product received that occurs after the end of the current contract period or the effective date of termination, whichever is the earlier to occur.

d. Insurance. Contractor must obtain and keep in effect during the term of the contract, insurance coverage in the below-listed types and minimum amounts. As evidence of insurance coverage, **Contractor must furnish to NCISD certificate(s) of insurance as detailed in Exhibit A to the AIA Document A 101-2017 (see Section A. 3.1.1)**.

Type of Coverage	Amount of Coverage
Liability, Builders Risk, and other insurance	As detailed in Exhibit A to the AIA Document A101-2017, Insurance and Bonds, as modified by NCISD
Workers Compensation & Employers Liability Insurance	As detailed in Exhibit A hereto and Exhibit A to the AIA Document A101-2017, Insurance and Bonds, as modified by NCISD

Contractor must perform the duties and responsibilities pertaining to required workers' compensation coverages, as detailed in Exhibit A and in Exhibit A to the AIA Document A101-2017, Insurance and Bonds, as modified by NCISD.

Contractor shall provide NCISD with a certificate of coverage for each person providing services on the project, prior to that person's beginning work on the project. This provision includes all persons or entities

performing all or part of the services the contractor has undertaken to perform on the project, regardless of whether that person contracts directly with the contractor and regardless of whether that person has employees. This includes, but is not limited to, independent contractors, subcontractors, leasing companies, motor carriers, owner-operators, employees of any such entity, or employees of any entity furnishing persons to perform services on the contract. Services include, but are not limited to, providing, hauling, or delivering equipment or materials, or providing labor, transportation, or other services related to a project. Services do not include activities unrelated to the project, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets.

Contractor shall provide NCISD with a new certificate of coverage showing extension of coverage:

(1) Before the end of the coverage period, if the contractor's current certificate shows that the coverage period ends during the duration of the project; and
(2) No later than seven days after the expiration of the coverage for each other person providing services on the project whose current certificate shows that the coverage period ends during the duration of the project.

e. Performance and Payment Bonds. The successful contractor, before beginning the work under any contract resulting from this procurement solicitation, is required to execute a performance bond and a payment bond as detailed in Exhibit A to the AIA Document A101-2017, Insurance and Bonds, as modified by NCISD (enclosed herein as Exhibit C).

Proposers must provide, with their proposals, a letter of statement from a bonding company that the proposer general contractor is eligible to obtain both payment and performance bonds of the types described in this procurement solicitation.

f. Prevailing Wage Rates. A worker, laborer, or mechanic employed on a public work by or on behalf of NCISD shall be paid: (1) not less than the general prevailing rate of per diem wages for work of a similar character in the locality in which the work is performed; and (2) not less than the general prevailing rate of per diem wages for legal holiday and overtime work.

The NCISD Board has determined the general prevailing rate of per diem wages in the locality in which the public work is to be performed for each craft or type of worker needed to execute the contract and the prevailing rate for legal holiday and overtime work. Attached hereto as Exhibit B are the prevailing wage rates adopted by the NCISD Board.

The contractor who is awarded a public works contract by NCISD or a subcontractor of the contractor shall pay not less than the prevailing wage rates determined by NCISD to a worker employed by it in the execution of the public works contract. A contractor or subcontractor who violates the requirement to pay prevailing wage rates shall pay to NCISD, $60 for each worker employed for each calendar day or part of the day that the worker is paid less than the wage rates stipulated in the public works contract; NCISD shall specify this penalty in the public works contract.

Obligation to keep Prevailing Wage Rates Records. A contractor and subcontractor employed on an NCISD public works contract shall keep a record showing:

(1) the name and occupation of each worker employed by the contractor or subcontractor in the construction of the public work; and
(2) the actual per diem wages paid to each worker.

The record shall be open at all reasonable hours to inspection by NCISD officers and agents. Tex. Gov't Code § 2258.024.

g. Permitting; Inspections. Contractor and all subcontractors shall maintain all required licenses, certifications, permits, and any other documentation necessary to perform the contract resulting from this procurement solicitation. Contractor must comply with all state and local building code requirements.

h. Safety Record of Proposer. NCISD will consider the safety record of the proposer in determining to whom to award a contract resulting from this procurement solicitation. The safety record shall be defined as a proposer's OSHA (Occupational Safety and Health Administration) inspection logs for the last three years, a loss analysis from the proposer's insurance carrier, and a loss history covering all lines of insurance coverage carried by the proposer. *See* NCISD Policy CVB (Local).

Proposers shall submit with their proposals:

a. Proposer's OSHA (Occupational Safety and Health Administration) inspection logs for the last three years,
b. a loss analysis from the proposer's insurance carrier, and
c. a loss history covering all lines of insurance coverage carried by the proposer.

i. Conflict of Interest. NCISD is required to comply with Texas Local Government Code Chapter 176, Disclosure of Certain Relationships with Local Government Officers. House Bill 23 significantly changed Chapter 176 as well as the required disclosures and the corresponding forms. As of September 1, 2015, any company who does business with NCISD or who seeks to do business with NCISD must fill out the new Conflict of Interest Questionnaire (CIQ) whether or not a conflict of interest exists. *See* Attachment D – Proposer Certification Forms.

j. Discrepancies. Any discrepancies within the Construction Documents, including between the Drawings and Specifications, or errors must be reported to the architect for interpretation. The architect will at all times endeavor to explain and interpret all discrepancies, but does not bind itself for any interpretation not in writing. In the event of discrepancies which have not been interpreted in writing or conflicts within the Contract Documents, including drawings and specifications, the Proposer shall consider that the greater value or quantity shall apply and the submitted Competitive Sealed Proposal shall reflect this fact.

k. Materials. Any reference in the Construction Documents to materials, products, equipment, fixtures, etc., shall not be construed as limiting competition in any manner; however, only the architect/engineer shall have the authority to determine whether a material is equal. No substitution will be allowed unless authorized in writing by the architect or engineer. See below section regarding Substitutions.

Where a definite material is specified, it is to set a standard, unless so noted that NO substitution allowed. Manufacturers of products not named in the Construction Documents will be required to show evidence satisfactory to the architect/engineer, that their product is equal in construction, similar in design, and will serve the intended purpose as the item specifically named.

l. Substitutions. The materials, products and equipment described in the Construction Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution. **No substitution will be considered prior to receipt of Proposals unless written request for approval has been received by the Architect at least ten days prior to the date for receipt of Proposals.** Such requests shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation. A statement setting forth changes in other materials, equipment or other portions of the Work, including changes in the work of other contracts that incorporation of the proposed substitution would require, shall be included. The burden of proof of the merit of the proposed substitution is upon the Proposer. The Architect's decision of approval or disapproval of a proposed

substitution shall be final. If the Architect approves a proposed substitution prior to receipt of Proposals, such approval will be set forth in an Addendum. Proposer shall not rely upon approvals made in any other manner. No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

m. Appeal/Protest Process. Any Proposer who submitted a proposal may appeal NCISD's award, if the appeal is based on deviations from laws, rules, regulations, or NCISD Board policies. NCISD Board Policy GF (Local) applies to any Proposer wishing to appeal a proposal and/or award of a contract. In accordance with Policy GF (Local), a Proposer shall submit a complaint/appeal form by hand-delivery, fax, or U.S. mail, to NCISD's Executive Director of Operations. Complaints/appeals must be received by the close of business on or before the 15th NCISD business day after award of the contract. In the event Proposer is unsure about the award of the contract, it is the Proposer's responsibility to contact NCISD on the next business day after the award is announced and verify details concerning the award.

8. **Proposal Format**

All proposals must include the following:

1. Title Page
2. Table of Contents
3. Business Identification
4. Compliance with Procurement Documents
5. Evidence to be used for evaluation/selection criteria
6. All required documentation and attachments (see #9, below)

Documentation must be complete.

9. **Required Documentation and Attachments**

The documentation and attachments listed below are required to be included with the proposal. All forms must be completed and signed.

Include the following for the Base Proposal:

1. Proof of Insurance – certificates of insurance of the types and amounts described in this procurement solicitation, including in Exhibit A and in Exhibit A to the AIA Document A101-2017, Insurance and Bonds, as modified by NCISD (enclosed as Exhibit C hereto)
2. Letter of statement from a bonding company that the proposer is eligible to obtain both payment and performance bonds of the types described in this procurement solicitation
3. Proposal security – Proposal security shall be submitted with each proposal in the amount of ten percent (10%) of the proposed amount
4. A list of proposed subcontractors for the Project:
    1. Concrete
    2. Masonry
    3. Structural Steel (Fabricator & Erector)
    4. Cold-formed Metal Framing & Gypsum Board Assemblies
    5. Roofing
    6. Waterproofing
    7. Hardware
    8. Curtainwall & Glazing Systems
    9. Fire Suppression
    10. Plumbing
    11. HVAC

12. Electrical
13. Communications
14. Electronic Access Control System
15. Video Surveillance System
16. Fire Detection and Alarm
17. Earthwork
18. Utilities
19. Tiling/Flooring/Carpet
20. Paint
21. Acoustic Ceilings

5. Proof of Proposer's Safety Record – Proposers must submit:
   a. Proposer's OSHA (Occupational Safety and Health Administration) inspection logs for the last three years,
   b. a loss analysis from the proposer's insurance carrier, and
   c. a loss history covering all lines of insurance coverage carried by the proposer.

6. Attachment A – Proposal Form – Base Proposal and Certification of Proposer; Alternate Proposals
7. Attachment B – Proposer Questionnaire and Qualification Statement
8. Attachment C – Proposer Certification Forms
9. Attachment D – Asbestos-Free Materials and Inspection
10. Attachment E – Acknowledgement of Final Completion Documents
11. Attachment F – W-9 Form
12. Attachment G – Criminal History Certification Form

10. **Documents to be submitted PRIOR to Proposal**

Each Proposer must submit the following items in duplicate, to the office of the Architect no later than 5:00 p.m. on October 10, 2025:

a. A properly executed and current Contractor's Qualification Statement, AIA Document A305, and Contractor's references with the names of contact persons, telephone numbers and email addresses on the form included as **Attachment 1**;
b. A resume for the Proposer's proposed Project Manager, stating his/her qualifications and experience on projects of similar scope and size; and
c. A resume for the Proposer's proposed Project Superintendent, stating his/her qualifications and experience on projects of similar scope and size.

Exhibit A – NCISD's Required Workers' Compensation Insurance Coverages

NCISD shall use the following language for bid specifications and contracts for building or construction, without any additional words or changes, except those required to accommodate the specific document in which they are contained or to impose stricter standards of documentation.

A copy of a certificate of insurance, a certificate of authority to self-insure issued by the Texas Department of Insurance (TDI), or a coverage agreement (DWC-81, DWC-82, DWC-83, or DWC-84), showing statutory workers' compensation insurance coverage for the person's or entity's employees providing services on a project is required for the duration of the project.

Duration of the project includes the time from the beginning of the work on the project until the contractor's/person's work on the project has been completed and accepted by the governmental entity.

Persons providing services on the project ("subcontractor" in Texas Labor Code 406.096) include all persons or entities performing all or part of the services the contractor has undertaken to perform on the project, regardless of whether that person contracted directly with the contractor and regardless of whether that person has employees. This includes, without limitation, independent contractors, subcontractors, leasing companies, motor carriers, owner-operators, employees of any such entity, or employees of any entity that furnishes persons to provide services on the project.

Services include, without limitation, providing, hauling, or delivering equipment or materials, or providing labor, transportation, or other service related to a project. Services do not include activities unrelated to the project, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets.

The contractor shall provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code 401.011(44) for all employees of the contractor providing services on the project for the duration of the project.

The contractor must provide a certificate of coverage to the governmental entity prior to being awarded the contract.

If the coverage period shown on the contractor's current certificate of coverage ends during the duration of the project, the contractor must, prior to the end of the coverage period, file a new certificate of coverage with the governmental entity showing that coverage has been extended.

The contractor shall obtain from each person providing services on a project, and provide to the governmental entity:

1. A certificate of coverage, prior to that person beginning work on the project, so the governmental entity will have on file certificates of coverage showing coverage for all persons providing services on the project; and

2. No later than seven days after receipt by the contractor, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project.

The contractor shall retain all required certificates of coverage for the duration of the project and for one year thereafter.

The contractor shall notify the governmental entity in writing by certified mail or personal delivery, within ten days after the contractor knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the project.

The contractor shall post on each project site a notice, in the text, form, and manner prescribed by the TDI, informing all persons providing services on the project that they are required to be covered, and stating how a person may verify coverage and report lack of coverage.

The contractor shall contractually require each person with whom it contracts to provide services on a project, to:

1. Provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code 401.011(44) for all of its employees providing services on the project for the duration of the project;

2. Provide to the contractor, prior to that person beginning work on the project, a certificate of coverage showing that coverage is being provided for all employees of the person providing services on the project for the duration of the project;

3. Provide the contractor, prior to the end of the coverage period, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project.

4. Obtain from each other person with whom it contracts, and provide to the contractor:

    a. A certificate of coverage, prior to the other person beginning work on the project; and
    b. A new certificate of coverage showing extension of coverage, prior to the end of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of the project;

5. Retain all required certificates of coverage on file for the duration of the project and for one year thereafter;

6. Notify the governmental entity in writing by certified mail or personal delivery, within ten days after the person knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the project; and

7. Contractually require each person with whom it contracts to perform as required by items 1–6, with the certificates of coverage to be provided to the person for whom they are providing services.

By signing this contract or providing or causing to be provided a certificate of coverage, the contractor is representing to the governmental entity that all employees of the contractor who will provide services on the project will be covered by workers' compensation coverage for the duration of the project, that the coverage will be based on proper reporting of classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate insurance carrier or, in the case of a self-insured, with the TDI's Division of Self-Insurance Regulation. Providing false or misleading information may subject the contractor to administrative penalties, criminal penalties, civil penalties, or other civil actions.

The contractor's failure to comply with any of these provisions is a breach of contract by the contractor that entitles the governmental entity to declare the contract void if the contractor does not remedy the breach within ten days after receipt of notice of breach from the governmental entity.

The coverage requirement recited above does not apply to sole proprietors, partners, and corporate officers who are excluded from coverage in an insurance policy or certificate of authority to self-insure that is delivered, issued for delivery, or renewed on or after January 1, 1996.

Prevailing Wage Rate Determination Information

The following information is from Chapter 2258 Texas Government Code:

Sec. 2258.021. Right to be Paid Prevailing Wage Rates.

(a) A worker employed on a public work by or on behalf of the state or a political subdivision of the state shall be paid:

(1) not less than the general prevailing rate of per diem wages for work of a similar character in the locality in which the work is performed; and

(2) not less than the general prevailing rate of per diem wages for legal holiday and overtime work.

(b) Subsection (a) does not apply to maintenance work.

(c) A worker is employed on a public work for the purposes of this section if the worker is employed by a contractor or subcontractor in the execution of a contract for the public work with the state, a political subdivision of the state, or any officer or public body of the state or a political subdivision of the state.

Sec. 2258.023. Prevailing Wage Rates to be paid by Contractor and Subcontractor; Penalty.

(a) The contractor who is awarded a contract by a public body or a subcontractor of the contractor shall pay not less than the rates determined under Section 2258.022 to a worker employed by it in the execution of the contract.

(b) A contractor or subcontractor who violates this section shall pay to the state or a political subdivision of the state on whose behalf the contract is made, $60 for each worker employed for each calendar day or part of the day that the worker is paid less than the wage rates stipulated in the contract. A public body awarding a contract shall specify this penalty in the contract.

(c) A contractor or subcontractor does not violate this section if a public body awarding a contract does not determine the prevailing wage rates and specify the rates in the contract as provided by Section 2258.022.

(d) The public body shall use any money collected under this section to offset the costs incurred in the administration of this chapter.

(e) A municipality is entitled to collect a penalty under this section only if the municipality has a population of more than 10,000.

Sec. 2258.051. Duty of Public Body to Hear Complaints and Withhold Payment.

A public body awarding a contract, and an agent or officer of the public body, shall:

take cognizance of complaints of all violations of this chapter committed in the execution of the contract; and

(1) withhold money forfeited or required to be withheld under this chapter from the payments to the contractor under the contract, except that the public body may not withhold money from other than the final payment without a determination by the public body that there is good cause to believe that the contractor has violated this chapter.

Prevailing Wage Rates – School Construction Trades

June 2, 2025 – Texas Gulf Coast Area

CLASSIFICATION	2022 HOURLY RATE
ASBESTOS WORKER	$27.20
BRICKLAYER; MASON	$24.90
CARPENTER; CASEWORKER	$23.13
CARPET LAYER; FLOOR INSTALLER	$26.20
CONCRETE FINISHER	$23.83
DATA COMM/TELE COMM	$24.33
DRYWALL INSTALLER; CEILING INSTALLER	$24.33
ELECTRICIAN	$29.86
ELEVATOR MECHANIC	$39.78
FIREPROOFING INSTALLER	$22.99
GLAZIER	$23.25
HEAVY EQUIPMENT OPERATOR	$22.17
INSULATOR	$21.95
IRONWORKER	$26.50
LABORER, HELPER	$19.81
LATHERER; PLASTERER	$22.75
LIGHT EQUIPMENT OPERATOR	$28.75
METAL BUILDING ASSEMBLER	$24.00
PAINTER; WALL COVERING INSTALLER	$20.17
PIPEFITTER	$29.82
PLUMBER	$27.98
ROOFER	$22.50
SHEET METAL WORKER	$29.96
SPRINKLER FITTER	$23.00
STEEL ERECTOR	$26.00
TERRAZZO WORKER	$22.75
TILE SETTER	$22.00
WATERPROOFER; CAULKER	$24.00

This document was developed by PBK Architects, Inc., in strict accordance with Chapter 2258 of the Texas Government Code.

CLASSIFICATION	DEFINITION
ASBESTOS WORKER	Worker who removes and disposes of asbestos materials.
BRICKLAYER; MASON	Craftsman who works with masonry products, stone, brick, block, or any material substituting those materials and accessories.
CARPENTER; CASEWORKER	Worker who build wood structures or structures of any material which has replaces wood. Includes rough and finish carpentry, hardware and trim.
CARPET LAYER; FLOOR INSTALLER	Worker who installs carpets and /or floor coverings, vinyl tile.
CONCRETE FINISHER	Worker who floats, trowels, and finishes concrete.
DATA COMM/TELE COMM	Worker who installs data/telephone and television cable and associate equipment and accessories.
DRYWALL; CEILING INSTALLER	Worker who installs metal framed walls and ceiling, drywall coverings, ceiling grids, and ceilings.
ELECTRICIAN	Skilled craftsman who installs or repairs electrical wiring and devices. Includes fire alarm systems and HVAC electrical controls.
ELEVATOR MECHANIC	Craftsman skilled in the installation and maintenance of elevators.
FIREPROOFING INSTALLER	Worker who sprays or applies fire proofing materials.
GLAZIER	Worker who installs glass, glazing, and glass framing.
HEAVY EQUIPMENT OPERATOR	Includes but not limited to: all CAT tractors, all derrick-powered, all power operated cranes, back-hoes, back-fillers, power operated shovels, winch trucks, and all trenching machines.
INSULATOR	Worker who applies, sprays, or installs insulation.
IRONWORKER	Skilled craftsman who erects structural steel framing, and installs structural concrete Rebar.
LABORER, HELPER	Worker qualified for only unskilled or semi-skilled work. Lifting, carrying materials or tools, hauling, digging, clean up.
LATHERER; PLASTERER	Worker who installs metal framing and lath. Worker who applies plaster to lathing and installs associated accessories.
LIGHT EQUIPMENT OPERATOR	Includes but not limited to , air compressors, truck crane drivers, flex planes, building elevators, form graders, concrete mixers less than 14cf), conveyers.
METAL BUILDING ASSEMBLER	Worker who assembles pre-made metal buildings.
PAINTER; WALL COVERING INSTALLER	Worker who prepares wall surfaces and applies paint and/or wall coverings, tape, and bedding.
PIPEFITTER	Trained worker who installs piping systems, chilled water piping and hot water (boiler) piping, pneumatic tubing controls, chillers, boilers, and associated mechanical equipment.
PLUMBER	Skilled craftsman who installs domestic hot and cold water piping, waste piping, storm system piping, water closets, sinks, urinals, and related work.
ROOFER	Worker who installs roofing materials, Bitumen (asphalt and coal tar) felts, flashings, all types of roofing membranes, and associated products.
SHEET METAL WORKER	Worker who installs sheet metal products, Roof metal, flashings and curbs, ductwork, mechanical equipment, and associated metals.
SPRINKLER FITTER	Worker who installs fire sprinklers systems and fire protectant equipment.
STEEL ERECTOR	Worker who erects and dismantles structural steel frames of buildings and other structures.
TERRAZZO WORKER	Craftsman who places and finishes Terrazzo
TILE SETTER	Worker who prepares wall and/or floor surfaces and applies ceramic tiles to these surfaces.
WATERPROOFER; CAULKER	Worker who applies water proofing material to buildings. Products include sealant, caulk, sheet membranes, and liquid membranes, sprayed, rolled or brushed.

Exhibit C – AIA Documents A101-2017, Exhibit A to the AIA Document A101-2017, Insurance and Bonds; and A201-2017, all as amended by NCISD

See Separate Exhibit C, attached

Attachment 1 – Contractor References

Project: New Operations Building, to include operations, maintenance, transportation, food service, and custodial, new warehouse, new freestanding bus wash, and additions to the Mechanic Shop; Project #: 872-2023

General Contractor Name: _____

***Submit with AIA A305 These Projects are to have been completed with-in the last 5 years.**

Project Name:	
Description:	Completion Date:
Contract Amount: $	Square Footage:
OWNER	**ARCHITECT**
Contact Name:	Contact Name:
Phone Number:	Phone Number:
Email Address:	Email Address:

Project Name:	
Description:	Completion Date:
Contract Amount: $	Square Footage:
OWNER	**ARCHITECT**
Contact Name:	Contact Name:
Phone Number:	Phone Number:
Email Address	Email Address:

Project Name:	
Description:	Completion Date:
Contract Amount: $	Square Footage:
OWNER	**ARCHITECT**
Contact Name:	Contact Name:
Phone Number:	Phone Number:
Email Address:	Email Address:

Project Name:	
Description:	Completion Date:
Contract Amount: $	Square Footage:
OWNER	**ARCHITECT**
Contact Name:	Contact Name:
Phone Number:	Phone Number:
Email Address:	Email Address:

Project Name:	
Description:	Completion Date:
Contract Amount: $	Square Footage:
OWNER	**ARCHITECT**
Contact Name:	Contact Name:
Phone Number:	Phone Number:
Email Address:	Email Address:

ATTACHMENT A: PROPOSAL FORM PART 1- BASE PROPOSAL

PROJECT TITLE: **New Caney Independent School District's New Operations Building, to include operations, maintenance, transportation, food service, and custodial, new warehouse, new freestanding bus wash, and additions to the Mechanic Shop**
Location: 21026 Loop 494, New Caney, TX. 77357

Name of Proposer/Contractor: _____
Address: _____ _____
Telephone: _____
Fax: _____
E-mail: _____

Receipt of Addenda: _____ _____

Substantial completion for the entire Project shall be: _____ (Proposer to insert date)

1	**Total Proposal Amount Base Proposal:**	_____ amount written (this governs)	$_____
2	**Unit Pricing (Site Concrete):**	Add/Delete 60" Wide Sidewalks Add/Delete Non-Traffic Concrete Flatwork Add/Delete 6" Concrete Curb Add/Delete 6" Reinforced Concrete Paving Add/Delete 7" Reinforced Concrete Paving	_____ Lin Foot (LF) _____Sq Foot (SF) _____Lin Foot (LF) _____Sq Foot (SF) _____Sq Foot (SF)

The undersigned hereby proposes to furnish all labor, materials, supervision and any other services necessary to complete the above-referenced project for the proposal amount(s) listed.

Proposal prices are firm for acceptance by NCISD for 60 days from the date opening of proposals has occurred.

Signed By: _____

Name: _____
(Type or Print)

Title: _____
(Type or Print)

ATTEST: _____
(Secretary, if Proposer is a Corporation)
SEAL:
(If Corporation)

ATTACHMENT A: PROPOSAL FORM PART 2- ALTERNATE PROPOSALS

PROJECT TITLE: **New Caney Independent School District's New Operations Building, to include operations, maintenance, transportation, food service, and custodial, new warehouse, new freestanding bus wash, and additions to the Mechanic Shop**
Location: 21026 Loop 494, New Caney, TX. 77357

Name of Proposer/Contractor: _____
Address: _____ _____
Telephone: _____
Fax: _____
E-mail: _____

1a	**Alternate No. 1c: Air Cooled Chillers by Daikin**	_____ amount written (this governs)	$_____
1b	**Alternate No. 1d: Air Cooled Chillers by JCI/York**	_____ amount written (this governs)	$_____
2	**Alternate No. 3: Lighting Controls**	_____ amount written (this governs)	$_____
	Base Bid Adjustment :	_____ amount written (this governs)	$_____

The undersigned hereby proposes to furnish all labor, materials, supervision and any other services necessary to complete the above-referenced project for the proposal amount(s) listed.

Proposal prices are firm for acceptance by NCISD for 60 days from the date opening of proposals has occurred.

Signed By: _____

Name: _____
(Type or Print)

Title: _____
(Type or Print)

ATTEST: _____
(Secretary, if Proposer is a Corporation)
SEAL:
(If Corporation)

CERTIFICATION OF PROPOSER

The undersigned Proposer has carefully examined all instructions, requirements, specifications, terms and conditions of this procurement solicitation and the construction documents and certifies:

1. It is a reputable company regularly engaged in providing construction services necessary to meet the requirements, specifications, terms and conditions of the procurement solicitation.
2. The Proposer has visited the site, become familiar with local conditions under which the Work is to be performed and has correlated the Proposer's personal observations with the requirements of the proposed Contract Documents.
3. It has the necessary experience, knowledge, abilities, skills, and resources to satisfactorily perform the requirements, specifications, terms and conditions of this procurement solicitation. Further, if awarded, the Proposer agrees to perform the requirements, specifications, terms and conditions of this procurement solicitation and to obtain final completion for the entire project on or before **March 18, 2027**.
4. Proposer proposes to furnish all labor, materials, supervision and any other services necessary to complete the project for the proposal amount(s) listed on Attachment A. The Proposal is based upon the materials, equipment and systems required by the Procurement Documents without exception. The undersigned certifies that the amount(s) contained in Attachment A have been carefully checked and are submitted as correct and final.
5. All statements, information, and representations prepared and submitted in response to this procurement solicitation are current, complete, true, and accurate. Proposer acknowledges that NCISD will rely on such statements, information, and representations in selecting the successful proposer. Proposer shall be bound by all statements, representations, warranties, and guarantees made in its proposal.
6. It is not currently barred or suspended from doing business with the Federal government, any of the members represented, or any of their respective agencies.
7. That all of the requirements of this procurement solicitation and the construction documents have been read and understood, including any amendments/addenda. In addition, compliance with all requirements, terms and conditions will be assumed by NCISD if not otherwise noted in the proposal.
8. The individual signing below has authority to submit this proposal on behalf of Proposer.

PROJECT TITLE:	**NCISD – New Operations Building**		
PROPOSER NAME:			
AUTHORIZED SIGNATURE:			
PRINT NAME:			
TITLE:			
DATE:			
ADDRESS:			
CITY, STATE, ZIP CODE:			
PHONE:		**FAX:**	
EMAIL ADDRESS:			
WEBSITE URL:			

ATTACHMENT B – BUSINESS QUESTIONNAIRE & QUALIFICATION STATEMENT

FIRM NAME: _____

CONTACT PERSON'S NAME AND PHONE NUMBER:

_____

Do you or any officer, partner, owner, sales representative, and/or spouse work for New Caney Independent School District? ☐ Yes ☐ No

If yes, please specify: _____

Please indicate how you became aware of this procurement.
Source: _____

I. ORGANIZATION

1. Type of Organization

_____ Individual _____ Sole Proprietorship
_____ Partnership _____ Corporation, Incorporated in _____

2. Federal Employer Identification Number: _____

3. Number of persons currently employed: _____

4. How many years has your organization been in business as a contractor? _____

5. How many years has your organization been in business under its present business name? _____

List any other or former names your organization has operated under:
_____

6. If your organization is a corporation, answer the following:

Date of incorporation: _____

State of incorporation: _____

President's name: _____

Vice-president's name: _____

7. If your organization is a partnership, answer the following:

Date of organization: _____

Type of partnership (if applicable): _____

Names(s) of general partner(s): _____

8. If your organization is individually owned, answer the following:

   Date of organization: _____

   Name of owner: _____

9. If the form of your organization is other than those listed above, describe it and name the principals/owners: _____

II. LICENSING

1. List the jurisdiction(s) and trade categories in which your organization is legally qualified to do business, and indicate registration or license numbers, if applicable.

   _____
   _____

2. List the jurisdiction(s) in which your organization's partnership or trade name is filed.

   _____

III. EXPERIENCE

1. List the categories of work that your organization normally performs with its own forces.

   _____
   _____

2. Claims and Suits: (If the answer to any of the questions below is yes, please attach details.)

   Has your organization ever failed to complete any work awarded to it?
   ☐ Yes ☐ No

   Are there any judgments, claims, arbitration proceedings or suits pending or outstanding against your organization or its officers? ☐ Yes ☐ No

   Has your organization filed any lawsuits or requested arbitration with regard to construction contracts within the last five years? ☐ Yes ☐ No

3. On a separate sheet, list major construction projects your organization has in progress, giving the name of the project, owner, architect, contract amount, percent complete, and scheduled completion date.

Personnel

4. Given the scope and schedule of the Project, identify key personnel who would work on the Project including the Project Manager, Superintendent, and Estimator. Provide a resume and references for each individual, including information on projects they have worked on that are similar to this RFP. What assurances can you provide that these team members will be available for project start?

5. Describe, in detail, the proposed Project assignments and lines of authority and communication for each team member you anticipate to be directly involved in the Project. Indicate the estimated percentage of time these team members will be involved in the Project.
6. Provide a description of your firm's home office location, satellite office locations, number and types of equipment available to support this Project.

IV. FINANCING

Name of Proposer's Financial Institution: _____

Contact Person: _____

Title: _____

1. Attach a financial statement, preferably audited, including your organization's latest balance sheet and income statement showing the following items:

    a. Current Assets (e.g., cash, joint venture accounts, accounts receivable, notes receivable, accrued income, deposits, materials inventory and prepaid expenses)
    b. Net Fixed Assets
    c. Other Assets
    d. Current Liabilities (e.g., accounts payable, notes payable, accrued expenses, provisions for income taxes, advances, accrued salaries and accrued payroll taxes)
    e. Other Liabilities (e.g., capital, capital stock, authorized and outstanding shares par values, earned surplus and retained earnings)

2. Name and address of firm/individual preparing attached financial statement, and date thereof:
    _____

3. Is the attached financial statement for the identical organization (proposer) named on page one?
    ☐ Yes ☐ No

    If no, explain the relationship and financial responsibility of the organization whose financial statement is provided (e.g., parent-subsidiary):
    _____

4. Will the organization whose financial statement is attached act as a guarantor of the contract for construction? ☐ Yes ☐ No

ATTACHMENT C – PROPOSER CERTIFICATION FORMS

CERTIFICATION OF RESIDENCY

The State of Texas has a law concerning non-resident vendors. This law can be found in Texas Education Code under Chapter 2252, Subchapter A. This law makes it necessary for NCISD to determine the residency of its Vendors. In part, this law reads as follows:

Section: 2252.001: "Non-resident bidder" refers to a person who is not a resident. "Resident bidder" refers to a person whose principal place of business is in this state, including a vendor whose ultimate parent company or majority owner has its principal place of business in this state.

Section: 2252.002: "A governmental entity may not award a governmental contract to a non resident bidder unless the nonresident underbids the lowest bid submitted by a resident bidder by an amount that is not less than the amount by which a resident bidder would be required to underbid the nonresident bidder to obtain a comparable contract in the state in which the nonresident's principal place of business is located."

Company submitting bid is a resident bidder: ☐ Yes ☐ No

City and state of vendor's principal place of business: _____

Contractor's Name/Company Name:

Address, City, State, and Zip Code: _____

Phone Number:_____Fax Number: _____

Printed Name and Title of Authorized Representative:_____

Email Address: _____

Signature of Authorized Representative: _____

Date: _____

CERTIFICATION REGARDING TERRORIST ORGANIZATIONS

Vendor hereby certifies that it is not a company identified on the Texas Comptroller's list of companies known to have contracts with, or provide supplies or services to, a foreign organization designated as a Foreign Terrorist Organization by the U.S. Secretary of State.

_____ Initials of Authorized Representative of Vendor

CERTIFICATION REGARDING BOYCOTTING OF ISRAEL

If (a) Vendor is not a sole proprietorship; (b) Vendor has ten (10) or more full-time employees; and (c) this Agreement has a value of $100,000 or more, the following certification shall apply; otherwise, this certification is not required. Pursuant to Chapter 2270 of the Texas Government Code, the Vendor hereby certifies and verifies that neither the Vendor, nor any affiliate, subsidiary, or parent company of the Vendor, if any (the "Vendor Companies"), boycotts Israel, and the Vendor agrees that the Vendor and Vendor Companies will not boycott Israel during the term of this Agreement. For purposes of this Agreement, the term "boycott" shall mean and include refusing to deal with, terminating business activities with, or otherwise taking any action that is intended to penalize, inflict economic harm on, or limit commercial relations with Israel, or with a person or entity doing business in Israel or in an Israeli-controlled territory, but does not include an action made for ordinary business purposes.

_____ Initials of Authorized Representative of Vendor, if applicable

CERTIFICATION REGARDING CONTRACTING INFORMATION

If Vendor is not a governmental body and (a) this Agreement has a stated expenditure of at least $1 million in public funds for the purchase of goods or services by NCISD; or (b) this Agreement results in the expenditure of at least $1 million in public funds for the purchase of goods or services by NCISD in a fiscal year of NCISD, the following certification shall apply; otherwise, this certification is not required. As required by Tex. Gov't Code § 552.374(b), the following statement is included in the RFP and the Agreement (unless the Agreement is (1) related to the purchase or underwriting of a public security; (2) is or may be used as collateral on a loan; or (3) proceeds from which are used to pay debt service of a public security of loan): "The requirements of Subchapter J, Chapter 552, Government Code, may apply to this RFP and Agreement and the contractor or vendor agrees that the contract can be terminated if the contractor or vendor knowingly or intentionally fails to comply with a requirement of that subchapter." Pursuant to Subchapter J, Chapter 552, Texas Government Code, the Vendor hereby certifies and agrees to (1) preserve all contracting information related to this Agreement as provided by the records retention requirements applicable to NCISD for the duration of the Agreement; (2) promptly provide to NCISD any contracting information related to the Agreement that is in the custody or possession of the Vendor on request of NCISD; and (3) on completion of the Agreement, either (a) provide at no cost to NCISD all contracting information related to the Agreement that is in the custody or possession of Vendor, or (b) preserve the contracting information related to the Agreement as provided by the records retention requirements applicable to NCISD.

_____ Initials of Authorized Representative of Vendor, if applicable

Vendor agrees to comply with all federal, state, and local laws, rules, regulations and ordinances, as applicable. It is further acknowledged that vendor certifies compliance with all provisions, laws, acts, regulations, etc. as specifically noted above.

Vendor's Name/Company Name: _____
Address, City, State, and Zip Code: _____
Phone Number: _____ Fax Number: _____
Printed Name and Title of Authorized Representative: _____
Email Address: _____
Signature of Authorized Representative: _____
Date: _____

NCISD CONFLICT OF INTEREST DISCLOSURE STATEMENT

New Caney Independent School District (NCISD) is required to comply with Texas Local Government Code Chapter 176, Disclosure of Certain Relationships with Local Government Officers. House Bill 23 significantly changed Chapter 176 as well as the required disclosures and the corresponding forms. As of September 1, 2015, any vendor who does business with NCISD or who seeks to do business with NCISD must fill out the new Conflict of Interest Questionnaire (CIQ) whether or not a conflict of interest exists. A conflict of interest exists in the following situations:

1) If the vendor has an employment or other business relationship with a local government officer of NCISD or a family member of the officer, as described by section 176.003(a)(2)(A) of the Texas Local Government Code; or
2) If the vendor has given a local government officer of NCISD, or a family member of the officer, one or more gifts with the aggregate value of $100, excluding any gift accepted by the officer or a family member of the officer if the gift is: (a) a political contribution as defined by Title 15 of the Election Code; or (b) a gift of food accepted as a guest; or
3) If the vendor has a family relationship with a local government officer of NCISD.

"Vendor" means a person who enters or seeks to enter into a contract with a local governmental entity. The term includes an agent of a vendor. The term includes an officer or employee of a state agency when that individual is acting in a private capacity to enter into a contract. The term does not include a state agency except for Texas Correctional Industries. *Texas Local Government Code 176.001(7).*

"Business relationship" means a connection between two or more parties based on commercial activity of one of the parties. The term does not include a connection based on: (A) a transaction that is subject to rate or fee regulation by a federal, state, or local governmental entity or an agency of a federal, state, or local governmental entity; (B) a transaction conducted at a price and subject to terms available to the public; or (C) a purchase or lease of goods or services from a person that is chartered by a state or federal agency and that is subject to regular examination by, and reporting to, that agency. *Texas Local Government Code 176.001(3).*

"Family relationship" means a relationship between a person and another person within the third degree by consanguinity or the second degree by affinity, as those terms are defined by Subchapter B, Chapter 573, Government Code. *Texas Local Government Code 176.001(2-a).*

"Local government officer" means: (A) a member of the governing body of a local governmental entity; (B) a director, superintendent, administrator, president, or other person designated as the executive officer of a local governmental entity; or (C) an agent of a local governmental entity who exercises discretion in the planning, recommending, selecting, or contracting of a vendor. *Texas Local Government Code 176.001(4).*

- ***NCISD Board of Trustees and Superintendent include:***

Creg Mixon, President	Ty Trout
Elizabeth Harrell, Vice-President	Dennis Alters
Wendy Sharp, Secretary	Beth Prykryl
Angela Tompkins, Assistant Secretary	Matt Calvert, Superintendent

- ***Current local government officers include, but are not limited to:***

Brandy Chelette	Richard Ressler
Christie Gates	Loree Munro
Blake Carroll	Scott Powers
Kristi Shofner	Nicole Land
Cesar Condarco	

If no conflict of interest exists, you must fill out Box 1 and type N/A on Box 3 of the CIQ form, sign and date it. In the event of changed circumstances, an updated CIQ must be filed within seven (7) business days after the vendor becomes aware that a conflict of interest exists.

CONFLICT OF INTEREST QUESTIONNAIRE

FORM CIQ

For vendor doing business with local governmental entity

This questionnaire reflects changes made to the law by H.B. 23, 84th Leg., Regular Session.

This questionnaire is being filed in accordance with Chapter 176, Local Government Code, by a vendor who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the vendor meets requirements under Section 176.006(a).

By law this questionnaire must be filed with the records administrator of the local governmental entity not later than the 7th business day after the date the vendor becomes aware of facts that require the statement to be filed. *See* Section 176.006(a-1), Local Government Code.

A vendor commits an offense if the vendor knowingly violates Section 176.006, Local Government Code. An offense under this section is a misdemeanor.

OFFICE USE ONLY

Date Received

1 **Name of vendor who has a business relationship with local governmental entity.**

2 ☐ **Check this box if you are filing an update to a previously filed questionnaire.** (The law requires that you file an updated completed questionnaire with the appropriate filing authority not later than the 7th business day after the date on which you became aware that the originally filed questionnaire was incomplete or inaccurate.)

3 **Name of local government officer about whom the information is being disclosed.**

_____
Name of Officer

4 **Describe each employment or other business relationship with the local government officer, or a family member of the officer, as described by Section 176.003(a)(2)(A). Also describe any family relationship with the local government officer. Complete subparts A and B for each employment or business relationship described. Attach additional pages to this Form CIQ as necessary.**

A. Is the local government officer or a family member of the officer receiving or likely to receive taxable income, other than investment income, from the vendor?

☐ Yes ☐ No

B. Is the vendor receiving or likely to receive taxable income, other than investment income, from or at the direction of the local government officer or a family member of the officer AND the taxable income is not received from the local governmental entity?

☐ Yes ☐ No

5 **Describe each employment or business relationship that the vendor named in Section 1 maintains with a corporation or other business entity with respect to which the local government officer serves as an officer or director, or holds an ownership interest of one percent or more.**

6 ☐ Check this box if the vendor has given the local government officer or a family member of the officer one or more gifts as described in Section 176.003(a)(2)(B), excluding gifts described in Section 176.003(a-1).

7

_____ _____
Signature of vendor doing business with the governmental entity Date

CONFLICT OF INTEREST QUESTIONNAIRE
For vendor doing business with local governmental entity

A complete copy of Chapter 176 of the Local Government Code may be found at http://www.statutes.legis.state.tx.us/Docs/LG/htm/LG.176.htm. For easy reference, below are some of the sections cited on this form.

Local Government Code § 176.001(1-a): "Business relationship" means a connection between two or more parties based on commercial activity of one of the parties. The term does not include a connection based on:

(A) a transaction that is subject to rate or fee regulation by a federal, state, or local governmental entity or an agency of a federal, state, or local governmental entity;

(B) a transaction conducted at a price and subject to terms available to the public; or

(C) a purchase or lease of goods or services from a person that is chartered by a state or federal agency and that is subject to regular examination by, and reporting to, that agency.

Local Government Code § 176.003(a)(2)(A) and (B):

(a) A local government officer shall file a conflicts disclosure statement with respect to a vendor if:

***

(2) the vendor:

(A) has an employment or other business relationship with the local government officer or a family member of the officer that results in the officer or family member receiving taxable income, other than investment income, that exceeds $2,500 during the 12-month period preceding the date that the officer becomes aware that

(i) a contract between the local governmental entity and vendor has been executed; or

(ii) the local governmental entity is considering entering into a contract with the vendor;

(B) has given to the local government officer or a family member of the officer one or more gifts that have an aggregate value of more than $100 in the 12-month period preceding the date the officer becomes aware that:

(i) a contract between the local governmental entity and vendor has been executed; or

(ii) the local governmental entity is considering entering into a contract with the vendor.

Local Government Code § 176.006(a) and (a-1)

(a) A vendor shall file a completed conflict of interest questionnaire if the vendor has a business relationship with a local governmental entity and:

(1) has an employment or other business relationship with a local government officer of that local governmental entity, or a family member of the officer, described by Section 176.003(a)(2)(A);

(2) has given a local government officer of that local governmental entity, or a family member of the officer, one or more gifts with the aggregate value specified by Section 176.003(a)(2)(B), excluding any gift described by Section 176.003(a-1); or

(3) has a family relationship with a local government officer of that local governmental entity.

(a-1) The completed conflict of interest questionnaire must be filed with the appropriate records administrator not later than the seventh business day after the later of:

(1) the date that the vendor:

(A) begins discussions or negotiations to enter into a contract with the local governmental entity; or

(B) submits to the local governmental entity an application, response to a request for proposals or bids, correspondence, or another writing related to a potential contract with the local governmental entity; or

(2) the date the vendor becomes aware:

(A) of an employment or other business relationship with a local government officer, or a family member of the officer, described by Subsection (a);

(B) that the vendor has given one or more gifts described by Subsection (a); or

(C) of a family relationship with a local government officer.

NCISD CERTIFICATE OF INTERESTED PARTIES – FORM 1295

NCISD is required to comply with HB 1295, which amended the Texas Government Code by adding Section 2252.908, Disclosure of Interested Parties. Section 2252.908 applies to a contract of NCISD that (1) requires an action or vote by the NCISD Board of Trustees before the contract may be signed; (2) has a value of at least $1 million; or (3) is for services that would require a person to register as a lobbyist under Tex. Gov't Code Chapter 305. If applicable, the business entity must submit a Disclosure of Interested Parties (Form 1295) to NCISD at the time business entity submits the signed contract. The Form 1295 requirement does not apply to: (1) a contract with a publicly traded business entity or wholly owned subsidiary of the same; (2) an electric utility; or (3) a gas utility. The Texas Ethics Commission has adopted rules requiring the business entity to file Form 1295 electronically with the Texas Ethics Commission. The following **definitions** apply:

(1) ***"Business Entity"*** means an entity recognized by law through which business is conducted, including a sole proprietorship, partnership, or corporation. TEX. GOV'T CODE § 2252.908(1).

(2) ***"Interested Party"*** means a person:
   a) who has a controlling interest in a business entity with whom NCISD contracts; or
   b) who actively participates in facilitating the contract or negotiating the terms of the contract, including a broker, intermediary, adviser, or attorney for the business entity. TEX. GOV'T CODE § 2252.908(3).

(3) ***"Controlling interest"*** means:
   a) an ownership interest or participating interest in a business entity by virtue of units, percentage, shares, stock, or otherwise that exceeds 10 percent;
   b) membership on the board of directors or other governing body of a business entity of which the board or other governing body is composed of not more than 10 members; or
   c) service as an officer of a business entity that has four or fewer officers, or service as one of the four officers most highly compensated by a business entity that has more than four officers. *Subsection (c) does not apply to an officer of a publicly held business entity or its wholly owned subsidiaries.* TEX. ETHICS COMM. RULE 46.3(c).

(4) ***"Intermediary"*** means a person who actively participates in the facilitation of the contract or negotiating the contract, including a broker, adviser, attorney, or representative of or agent for the business entity who:
   a) receives compensation from the business entity for the person's participation;
   b) communicates directly with the governmental entity or state agency on behalf of the business entity regarding the contract; and
   c) is not an employee of the business entity. TEX. ETHICS COMM. RULE 46.3(e).

As a "business entity," vendors must:

(1) **complete Form 1295 electronically** with the Texas Ethics Commission using the online filing application, which can be found at https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm
- **All vendors must complete Form 1295, even if no interested parties exist**
- In Section 2, insert "New Caney Independent School District"
- In Section 3, insert the NCISD CSP # for this proposal

(2) **print a copy of the completed form** (make sure that it has a computer-generated certification number in the "Office Use Only" box)

(3) have an authorized agent of the business entity **sign the form**

(4) **submit** the completed Form 1295 by **attaching the form to your proposal.**

NCISD must acknowledge the receipt of the filed Form 1295 by notifying the Texas Ethics Commission of the receipt of the filed Form 1295 no later than the 30th day after receipt. After NCISD acknowledges the Form 1295, the Texas Ethics Commission will post the completed Form 1295 to its website with seven business days after receiving notice from NCISD.

FELONY CONVICTION NOTICE FORM

FELONY CONVICTION NOTIFICATION

State of Texas Legislative Senate Bill No. 1 Section 44.034, Notification of Criminal History, Subsection (a), states "a person or business entity that enters into an agreement with a school district must give advance notice to the district if the person or an owner or operator of the business entity has been convicted of a felony. The notice must include a general description of the conduct resulting in the conviction of a felony".

Subsection (b) states "a school district may terminate the agreement with a person or business entity if the district determines that the person or business entity failed to give notice as required by Subsection (a), or misrepresented the conduct resulting in the conviction. The district must compensate the person or business entity for services performed before the termination of the contract".

Subsection (c) states "this section does not apply to a publicly held corporation".

I, the undersigned agent for the firm named below, certify that the information concerning notification of felony convictions has been reviewed by me and the information furnished is true to the best of my knowledge.

Contractor's Name/Company Name: _____

Authorized Official's Name (Printed or Typed): _____

You must select one and sign below:

☐ Firm is a publicly held corporation; therefore the above reporting requirement does not apply per Section 44.034, Texas Education Code, Subsection (c).

☐ Contractor/Firm **is not** owned nor operated by anyone who has been convicted of a felony.

☐ Contractor/Firm **is** operated or owned by the following individual(s) who has/have been convicted of a felony:

Name of Individual(s): _____

Detail of Conviction(s): _____

(Attach additional pages if necessary.)

Signature of Company Official: _____

Date: _____

CONFIDENTIALITY DECLARATION FORM

INFORMATION SUBMITTED TO NCISD IN CONNECTION WITH THIS PROCUREMENT SOLICITATION OR THE AGREEMENT IS GOVERNED BY TEXAS GOVERNMENT CODE, CHAPTER 552

As a governmental body, NCISD is subject to the Texas Public Information Act found in Chapter 552, Texas Government Code. Proposals and other information submitted to NCISD in connection with this procurement solicitation or the Agreement may be subject to release as public information. If a Vendor believes that part(s) of its proposal or any other information submitted by Vendor to NCISD in connection with this procurement solicitation or the Agreement contain confidential, proprietary, and/or trade secret information or otherwise may be excepted from disclosure under Texas law, the Vendor must clearly and conspicuously mark the applicable information as "CONFIDENTIAL."

Marking information as "CONFIDENTIAL" does not guarantee that the information will be withheld from disclosure. If NCISD receives a request for public information involving information that Vendor has clearly and conspicuously marked as "CONFIDENTIAL," NCISD will respond pursuant to Chapter 552, Texas Government Code, which may or may not require that NCISD provide notice of the request to Vendor. Vendor understands and agrees that it is solely responsible for submitting to the Attorney General of Texas each reason why the requested information should be withheld and a letter, memorandum, or brief in support of that reason. NCISD assumes no obligation or responsibility relating to the disclosure or nondisclosure of information submitted by Vendors, and **Vendor hereby waives any claim against and releases from liability NCISD, its respective officers, employees, agents, and attorneys with respect to disclosure of information provided under or in connection with this procurement solicitation or the Agreement or otherwise created, assembled, maintained, or held by Vendor or NCISD and determined by NCISD, the Attorney General of Texas, or a court of law to be subject to disclosure under the Texas Public Information Act**. Further, even if Vendor marks information as "CONFIDENTIAL," **Vendor expressly agrees that NCISD may disclose Vendor's proposal, including, but not limited to, pricing information, to other governmental entities.**

Please check **ONLY ONE** of the following options:

- ☐ **Declaration of Confidentiality – Vendor HAS clearly and conspicuously marked information contained in its proposal and/or other information submitted by Vendor to NCISD in connection with this procurement solicitation or the Agreement as "CONFIDENTIAL." Vendor declares that the information marked by Vendor as "CONFIDENTIAL" contains confidential, proprietary, and/or trade secret information and is excepted from disclosure under Chapter 552, Texas Government Code.**

- ☐ **Waiver of Confidentiality – Vendor HAS NOT marked any information contained in its proposal and/or other information submitted by Vendor to NCISD in connection with this procurement solicitation or the Agreement as "CONFIDENTIAL." Vendor certifies that it has not submitted any confidential, proprietary, and/or trade secret information to NCISD and that its proposal and all other information—including any pricing information—submitted by Vendor to NCISD in connection with this procurement solicitation or the Agreement is subject to disclosure under Chapter 552, Texas Government Code. Vendor hereby expressly waives any claim of confidentiality with respect to its proposal and/or any other information—including any pricing information—submitted by Vendor to NCISD in connection with this procurement solicitation or the Agreement.**

_____
Vendor Name

_____ _____
Printed Name of Authorized Officer/Representative of Vendor **Title**

_____ _____
Signature **Date**

ATTACHMENT D – ASBESTOS-FREE MATERIALS AND INSPECTION

If awarded the project, the Contractor shall be responsible for ensuring that no asbestos containing building materials are used in the construction. The Contractor shall take whatever measures it deems necessary to ensure that all employees, suppliers, fabricators, and subcontractors, comply with this requirement.

At Final Completion the Contractor shall provide a certification letter certifying that the work does not contain asbestos containing building materials.

I hereby certify that I have read, understood and agree to the terms mentioned in this document.

Signature:_____

Printed Name & Title: _____

Company Name: _____

Date: _____

ATTACHMENT E – ACKNOWLEDGEMENT OF FINAL COMPLETION DOCUMENTS

If awarded this project, the General Contractor shall provide the following items at the project's final completion stage. The retainage shall not be released until all of the items have been fulfilled.

1. Completion of all discrepancies (punch list items) noted at the time of Substantial Completion
2. Submission of record drawings and specifications, and other record documents as required by contract documents.
3. Completion of all Owner training
4. Submission of all contractually-required attic stock and spare parts
5. Submission of all final Operation & Maintenance documents and other closeout deliverables
6. Submission of consent of surety to release retainage and final payment application.
7. Submission and approval of all remaining change order proposals, claims, and applications for payment
8. Payment of all costs incurred for equipment, material, labor and services against the Project
9. Submission of Asbestos Free Materials certification letter and certifications for lead and PCB's.
10. No liens have been attached against the project
11. No suits are pending by reason of Work on the Project Under the Contract for Construction
12. All workers' compensation claims are covered by Workers' Compensation Insurance as required by law
13. All insurance required of the Contractor beyond final payment, if any, is in effect and will not be cancelled or allowed to be expired without notice to the owner
14. All public liability claims are adequately covered by insurance and that the builder shall save, protect, defend, indemnify, and hold the Owner harmless from and against any and all claims which arise as direct or indirect result of any transaction, event occurrence, or omission related to performance of the work completed under said Contract for Construction
15. All Work and Material Warranties Provided.
16. Unconditional Final Payment Release and Waiver Document Provided.
17. All inspections by governmental authorities having jurisdiction over the project must have been finalized and any remedial work required by those authorities must also be completed. .
18. Certificate of Occupancy Provided.

I hereby certify that I have acknowledged and agree to provide the items listed in this document during the final completion stage if I were to be awarded with this project.

Signature: _____

Printed Name & Title: _____

Company Name: _____

Date: _____

Form **W-9**
(Rev. October 2018)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

► Go to *www.irs.gov/FormW9* for instructions and the latest information.

Give Form to the requester. Do not send to the IRS.

Print or type. See Specific Instructions on page 3.

1 Name (as shown on your income tax return). Name is required on this line; do not leave this line blank.

2 Business name/disregarded entity name, if different from above

3 Check appropriate box for federal tax classification of the person whose name is entered on line 1. Check only **one** of the following seven boxes.

☐ Individual/sole proprietor or single-member LLC ☐ C Corporation ☐ S Corporation ☐ Partnership ☐ Trust/estate

☐ Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=Partnership) ► _____

Note: Check the appropriate box in the line above for the tax classification of the single-member owner. Do not check LLC if the LLC is classified as a single-member LLC that is disregarded from the owner unless the owner of the LLC is another LLC that is **not** disregarded from the owner for U.S. federal tax purposes. Otherwise, a single-member LLC that is disregarded from the owner should check the appropriate box for the tax classification of its owner.

☐ Other (see instructions) ►

4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3):

Exempt payee code (if any) _____

Exemption from FATCA reporting code (if any) _____

(Applies to accounts maintained outside the U.S.)

5 Address (number, street, and apt. or suite no.) See instructions.

Requester's name and address (optional)

6 City, state, and ZIP code

7 List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the instructions for Part I, later. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN*, later.

Note: If the account is in more than one name, see the instructions for line 1. Also see *What Name and Number To Give the Requester* for guidelines on whose number to enter.

Social security number

			–		–				

or

Employer identification number

		–							

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
3. I am a U.S. citizen or other U.S. person (defined below); and
4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions for Part II, later.

Sign Here **Signature of U.S. person** ► **Date** ►

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. For the latest information about developments related to Form W-9 and its instructions, such as legislation enacted after they were published, go to *www.irs.gov/FormW9*.

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following.

- Form 1099-INT (interest earned or paid)
- Form 1099-DIV (dividends, including those from stocks or mutual funds)
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
- Form 1099-S (proceeds from real estate transactions)
- Form 1099-K (merchant card and third party network transactions)
- Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)
- Form 1099-C (canceled debt)
- Form 1099-A (acquisition or abandonment of secured property)

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See What is backup withholding, *later.*

Cat. No. 10231X Form **W-9** (Rev. 10-2018)

By signing the filled-out form, you:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),

2. Certify that you are not subject to backup withholding, or

3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income, and

4. Certify that FATCA code(s) entered on this form (if any) indicating that you are exempt from the FATCA reporting, is correct. See *What is FATCA reporting,* later, for further information.

Note: If you are a U.S. person and a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

Definition of a U.S. person. For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien;
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States;
- An estate (other than a foreign estate); or
- A domestic trust (as defined in Regulations section 301.7701-7).

Special rules for partnerships. Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax under section 1446 on any foreign partners' share of effectively connected taxable income from such business. Further, in certain cases where a Form W-9 has not been received, the rules under section 1446 require a partnership to presume that a partner is a foreign person, and pay the section 1446 withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid section 1446 withholding on your share of partnership income.

In the cases below, the following person must give Form W-9 to the partnership for purposes of establishing its U.S. status and avoiding withholding on its allocable share of net income from the partnership conducting a trade or business in the United States.

- In the case of a disregarded entity with a U.S. owner, the U.S. owner of the disregarded entity and not the entity;
- In the case of a grantor trust with a U.S. grantor or other U.S. owner, generally, the U.S. grantor or other U.S. owner of the grantor trust and not the trust; and
- In the case of a U.S. trust (other than a grantor trust), the U.S. trust (other than a grantor trust) and not the beneficiaries of the trust.

Foreign person. If you are a foreign person or the U.S. branch of a foreign bank that has elected to be treated as a U.S. person, do not use Form W-9. Instead, use the appropriate Form W-8 or Form 8233 (see Pub. 515, Withholding of Tax on Nonresident Aliens and Foreign Entities).

Nonresident alien who becomes a resident alien. Generally, only a nonresident alien individual may use the terms of a tax treaty to reduce or eliminate U.S. tax on certain types of income. However, most tax treaties contain a provision known as a "saving clause." Exceptions specified in the saving clause may permit an exemption from tax to continue for certain types of income even after the payee has otherwise become a U.S. resident alien for tax purposes.

If you are a U.S. resident alien who is relying on an exception contained in the saving clause of a tax treaty to claim an exemption from U.S. tax on certain types of income, you must attach a statement to Form W-9 that specifies the following five items.

1. The treaty country. Generally, this must be the same treaty under which you claimed exemption from tax as a nonresident alien.

2. The treaty article addressing the income.

3. The article number (or location) in the tax treaty that contains the saving clause and its exceptions.

4. The type and amount of income that qualifies for the exemption from tax.

5. Sufficient facts to justify the exemption from tax under the terms of the treaty article.

Example. Article 20 of the U.S.-China income tax treaty allows an exemption from tax for scholarship income received by a Chinese student temporarily present in the United States. Under U.S. law, this student will become a resident alien for tax purposes if his or her stay in the United States exceeds 5 calendar years. However, paragraph 2 of the first Protocol to the U.S.-China treaty (dated April 30, 1984) allows the provisions of Article 20 to continue to apply even after the Chinese student becomes a resident alien of the United States. A Chinese student who qualifies for this exception (under paragraph 2 of the first protocol) and is relying on this exception to claim an exemption from tax on his or her scholarship or fellowship income would attach to Form W-9 a statement that includes the information described above to support that exemption.

If you are a nonresident alien or a foreign entity, give the requester the appropriate completed Form W-8 or Form 8233.

Backup Withholding

What is backup withholding? Persons making certain payments to you must under certain conditions withhold and pay to the IRS 24% of such payments. This is called "backup withholding." Payments that may be subject to backup withholding include interest, tax-exempt interest, dividends, broker and barter exchange transactions, rents, royalties, nonemployee pay, payments made in settlement of payment card and third party network transactions, and certain payments from fishing boat operators. Real estate transactions are not subject to backup withholding.

You will not be subject to backup withholding on payments you receive if you give the requester your correct TIN, make the proper certifications, and report all your taxable interest and dividends on your tax return.

Payments you receive will be subject to backup withholding if:

1. You do not furnish your TIN to the requester,

2. You do not certify your TIN when required (see the instructions for Part II for details),

3. The IRS tells the requester that you furnished an incorrect TIN,

4. The IRS tells you that you are subject to backup withholding because you did not report all your interest and dividends on your tax return (for reportable interest and dividends only), or

5. You do not certify to the requester that you are not subject to backup withholding under 4 above (for reportable interest and dividend accounts opened after 1983 only).

Certain payees and payments are exempt from backup withholding. See *Exempt payee code,* later, and the separate Instructions for the Requester of Form W-9 for more information.

Also see *Special rules for partnerships,* earlier.

What is FATCA Reporting?

The Foreign Account Tax Compliance Act (FATCA) requires a participating foreign financial institution to report all United States account holders that are specified United States persons. Certain payees are exempt from FATCA reporting. See *Exemption from FATCA reporting code,* later, and the Instructions for the Requester of Form W-9 for more information.

Updating Your Information

You must provide updated information to any person to whom you claimed to be an exempt payee if you are no longer an exempt payee and anticipate receiving reportable payments in the future from this person. For example, you may need to provide updated information if you are a C corporation that elects to be an S corporation, or if you no longer are tax exempt. In addition, you must furnish a new Form W-9 if the name or TIN changes for the account; for example, if the grantor of a grantor trust dies.

Penalties

Failure to furnish TIN. If you fail to furnish your correct TIN to a requester, you are subject to a penalty of $50 for each such failure unless your failure is due to reasonable cause and not to willful neglect.

Civil penalty for false information with respect to withholding. If you make a false statement with no reasonable basis that results in no backup withholding, you are subject to a $500 penalty.

Criminal penalty for falsifying information. Willfully falsifying certifications or affirmations may subject you to criminal penalties including fines and/or imprisonment.

Misuse of TINs. If the requester discloses or uses TINs in violation of federal law, the requester may be subject to civil and criminal penalties.

Specific Instructions

Line 1

You must enter one of the following on this line; **do not** leave this line blank. The name should match the name on your tax return.

If this Form W-9 is for a joint account (other than an account maintained by a foreign financial institution (FFI)), list first, and then circle, the name of the person or entity whose number you entered in Part I of Form W-9. If you are providing Form W-9 to an FFI to document a joint account, each holder of the account that is a U.S. person must provide a Form W-9.

a. **Individual.** Generally, enter the name shown on your tax return. If you have changed your last name without informing the Social Security Administration (SSA) of the name change, enter your first name, the last name as shown on your social security card, and your new last name.

Note: ITIN applicant: Enter your individual name as it was entered on your Form W-7 application, line 1a. This should also be the same as the name you entered on the Form 1040/1040A/1040EZ you filed with your application.

b. **Sole proprietor or single-member LLC.** Enter your individual name as shown on your 1040/1040A/1040EZ on line 1. You may enter your business, trade, or "doing business as" (DBA) name on line 2.

c. **Partnership, LLC that is not a single-member LLC, C corporation, or S corporation.** Enter the entity's name as shown on the entity's tax return on line 1 and any business, trade, or DBA name on line 2.

d. **Other entities.** Enter your name as shown on required U.S. federal tax documents on line 1. This name should match the name shown on the charter or other legal document creating the entity. You may enter any business, trade, or DBA name on line 2.

e. **Disregarded entity.** For U.S. federal tax purposes, an entity that is disregarded as an entity separate from its owner is treated as a "disregarded entity." See Regulations section 301.7701-2(c)(2)(iii). Enter the owner's name on line 1. The name of the entity entered on line 1 should never be a disregarded entity. The name on line 1 should be the name shown on the income tax return on which the income should be reported. For example, if a foreign LLC that is treated as a disregarded entity for U.S. federal tax purposes has a single owner that is a U.S. person, the U.S. owner's name is required to be provided on line 1. If the direct owner of the entity is also a disregarded entity, enter the first owner that is not disregarded for federal tax purposes. Enter the disregarded entity's name on line 2, "Business name/disregarded entity name." If the owner of the disregarded entity is a foreign person, the owner must complete an appropriate Form W-8 instead of a Form W-9. This is the case even if the foreign person has a U.S. TIN.

Line 2

If you have a business name, trade name, DBA name, or disregarded entity name, you may enter it on line 2.

Line 3

Check the appropriate box on line 3 for the U.S. federal tax classification of the person whose name is entered on line 1. Check only one box on line 3.

IF the entity/person on line 1 is a(n) . . .	THEN check the box for . . .
• Corporation	Corporation
• Individual • Sole proprietorship, or • Single-member limited liability company (LLC) owned by an individual and disregarded for U.S. federal tax purposes.	Individual/sole proprietor or single-member LLC
• LLC treated as a partnership for U.S. federal tax purposes, • LLC that has filed Form 8832 or 2553 to be taxed as a corporation, or • LLC that is disregarded as an entity separate from its owner but the owner is another LLC that is not disregarded for U.S. federal tax purposes.	Limited liability company and enter the appropriate tax classification. (P= Partnership; C= C corporation; or S= S corporation)
• Partnership	Partnership
• Trust/estate	Trust/estate

Line 4, Exemptions

If you are exempt from backup withholding and/or FATCA reporting, enter in the appropriate space on line 4 any code(s) that may apply to you.

Exempt payee code.

- Generally, individuals (including sole proprietors) are not exempt from backup withholding.
- Except as provided below, corporations are exempt from backup withholding for certain payments, including interest and dividends.
- Corporations are not exempt from backup withholding for payments made in settlement of payment card or third party network transactions.
- Corporations are not exempt from backup withholding with respect to attorneys' fees or gross proceeds paid to attorneys, and corporations that provide medical or health care services are not exempt with respect to payments reportable on Form 1099-MISC.

The following codes identify payees that are exempt from backup withholding. Enter the appropriate code in the space in line 4.

1—An organization exempt from tax under section 501(a), any IRA, or a custodial account under section 403(b)(7) if the account satisfies the requirements of section 401(f)(2)

2—The United States or any of its agencies or instrumentalities

3—A state, the District of Columbia, a U.S. commonwealth or possession, or any of their political subdivisions or instrumentalities

4—A foreign government or any of its political subdivisions, agencies, or instrumentalities

5—A corporation

6—A dealer in securities or commodities required to register in the United States, the District of Columbia, or a U.S. commonwealth or possession

7—A futures commission merchant registered with the Commodity Futures Trading Commission

8—A real estate investment trust

9—An entity registered at all times during the tax year under the Investment Company Act of 1940

10—A common trust fund operated by a bank under section 584(a)

11—A financial institution

12—A middleman known in the investment community as a nominee or custodian

13—A trust exempt from tax under section 664 or described in section 4947

The following chart shows types of payments that may be exempt from backup withholding. The chart applies to the exempt payees listed above, 1 through 13.

IF the payment is for . . .	THEN the payment is exempt for . . .
Interest and dividend payments	All exempt payees except for 7
Broker transactions	Exempt payees 1 through 4 and 6 through 11 and all C corporations. S corporations must not enter an exempt payee code because they are exempt only for sales of noncovered securities acquired prior to 2012.
Barter exchange transactions and patronage dividends	Exempt payees 1 through 4
Payments over $600 required to be reported and direct sales over $5,000[1]	Generally, exempt payees 1 through 5[2]
Payments made in settlement of payment card or third party network transactions	Exempt payees 1 through 4

[1] See Form 1099-MISC, Miscellaneous Income, and its instructions.

[2] However, the following payments made to a corporation and reportable on Form 1099-MISC are not exempt from backup withholding: medical and health care payments, attorneys' fees, gross proceeds paid to an attorney reportable under section 6045(f), and payments for services paid by a federal executive agency.

Exemption from FATCA reporting code. The following codes identify payees that are exempt from reporting under FATCA. These codes apply to persons submitting this form for accounts maintained outside of the United States by certain foreign financial institutions. Therefore, if you are only submitting this form for an account you hold in the United States, you may leave this field blank. Consult with the person requesting this form if you are uncertain if the financial institution is subject to these requirements. A requester may indicate that a code is not required by providing you with a Form W-9 with "Not Applicable" (or any similar indication) written or printed on the line for a FATCA exemption code.

A—An organization exempt from tax under section 501(a) or any individual retirement plan as defined in section 7701(a)(37)

B—The United States or any of its agencies or instrumentalities

C—A state, the District of Columbia, a U.S. commonwealth or possession, or any of their political subdivisions or instrumentalities

D—A corporation the stock of which is regularly traded on one or more established securities markets, as described in Regulations section 1.1472-1(c)(1)(i)

E—A corporation that is a member of the same expanded affiliated group as a corporation described in Regulations section 1.1472-1(c)(1)(i)

F—A dealer in securities, commodities, or derivative financial instruments (including notional principal contracts, futures, forwards, and options) that is registered as such under the laws of the United States or any state

G—A real estate investment trust

H—A regulated investment company as defined in section 851 or an entity registered at all times during the tax year under the Investment Company Act of 1940

I—A common trust fund as defined in section 584(a)

J—A bank as defined in section 581

K—A broker

L—A trust exempt from tax under section 664 or described in section 4947(a)(1)

M—A tax exempt trust under a section 403(b) plan or section 457(g) plan

Note: You may wish to consult with the financial institution requesting this form to determine whether the FATCA code and/or exempt payee code should be completed.

Line 5

Enter your address (number, street, and apartment or suite number). This is where the requester of this Form W-9 will mail your information returns. If this address differs from the one the requester already has on file, write NEW at the top. If a new address is provided, there is still a chance the old address will be used until the payor changes your address in their records.

Line 6

Enter your city, state, and ZIP code.

Part I. Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. If you are a resident alien and you do not have and are not eligible to get an SSN, your TIN is your IRS individual taxpayer identification number (ITIN). Enter it in the social security number box. If you do not have an ITIN, see *How to get a TIN* below.

If you are a sole proprietor and you have an EIN, you may enter either your SSN or EIN.

If you are a single-member LLC that is disregarded as an entity separate from its owner, enter the owner's SSN (or EIN, if the owner has one). Do not enter the disregarded entity's EIN. If the LLC is classified as a corporation or partnership, enter the entity's EIN.

Note: See *What Name and Number To Give the Requester,* later, for further clarification of name and TIN combinations.

How to get a TIN. If you do not have a TIN, apply for one immediately. To apply for an SSN, get Form SS-5, Application for a Social Security Card, from your local SSA office or get this form online at *www.SSA.gov*. You may also get this form by calling 1-800-772-1213. Use Form W-7, Application for IRS Individual Taxpayer Identification Number, to apply for an ITIN, or Form SS-4, Application for Employer Identification Number, to apply for an EIN. You can apply for an EIN online by accessing the IRS website at *www.irs.gov/Businesses* and clicking on Employer Identification Number (EIN) under Starting a Business. Go to *www.irs.gov/Forms* to view, download, or print Form W-7 and/or Form SS-4. Or, you can go to *www.irs.gov/OrderForms* to place an order and have Form W-7 and/or SS-4 mailed to you within 10 business days.

If you are asked to complete Form W-9 but do not have a TIN, apply for a TIN and write "Applied For" in the space for the TIN, sign and date the form, and give it to the requester. For interest and dividend payments, and certain payments made with respect to readily tradable instruments, generally you will have 60 days to get a TIN and give it to the requester before you are subject to backup withholding on payments. The 60-day rule does not apply to other types of payments. You will be subject to backup withholding on all such payments until you provide your TIN to the requester.

Note: Entering "Applied For" means that you have already applied for a TIN or that you intend to apply for one soon.

Caution: A disregarded U.S. entity that has a foreign owner must use the appropriate Form W-8.

Part II. Certification

To establish to the withholding agent that you are a U.S. person, or resident alien, sign Form W-9. You may be requested to sign by the withholding agent even if item 1, 4, or 5 below indicates otherwise.

For a joint account, only the person whose TIN is shown in Part I should sign (when required). In the case of a disregarded entity, the person identified on line 1 must sign. Exempt payees, see *Exempt payee code,* earlier.

Signature requirements. Complete the certification as indicated in items 1 through 5 below.

1. Interest, dividend, and barter exchange accounts opened before 1984 and broker accounts considered active during 1983. You must give your correct TIN, but you do not have to sign the certification.

2. Interest, dividend, broker, and barter exchange accounts opened after 1983 and broker accounts considered inactive during 1983. You must sign the certification or backup withholding will apply. If you are subject to backup withholding and you are merely providing your correct TIN to the requester, you must cross out item 2 in the certification before signing the form.

3. Real estate transactions. You must sign the certification. You may cross out item 2 of the certification.

4. Other payments. You must give your correct TIN, but you do not have to sign the certification unless you have been notified that you have previously given an incorrect TIN. "Other payments" include payments made in the course of the requester's trade or business for rents, royalties, goods (other than bills for merchandise), medical and health care services (including payments to corporations), payments to a nonemployee for services, payments made in settlement of payment card and third party network transactions, payments to certain fishing boat crew members and fishermen, and gross proceeds paid to attorneys (including payments to corporations).

5. Mortgage interest paid by you, acquisition or abandonment of secured property, cancellation of debt, qualified tuition program payments (under section 529), ABLE accounts (under section 529A), IRA, Coverdell ESA, Archer MSA or HSA contributions or distributions, and pension distributions. You must give your correct TIN, but you do not have to sign the certification.

What Name and Number To Give the Requester

For this type of account:	Give name and SSN of:
1. Individual	The individual
2. Two or more individuals (joint account) other than an account maintained by an FFI	The actual owner of the account or, if combined funds, the first individual on the account[1]
3. Two or more U.S. persons (joint account maintained by an FFI)	Each holder of the account
4. Custodial account of a minor (Uniform Gift to Minors Act)	The minor[2]
5. a. The usual revocable savings trust (grantor is also trustee)	The grantor-trustee[1]
b. So-called trust account that is not a legal or valid trust under state law	The actual owner[1]
6. Sole proprietorship or disregarded entity owned by an individual	The owner[3]
7. Grantor trust filing under Optional Form 1099 Filing Method 1 (see Regulations section 1.671-4(b)(2)(i)(A))	The grantor*
For this type of account:	**Give name and EIN of:**
8. Disregarded entity not owned by an individual	The owner
9. A valid trust, estate, or pension trust	Legal entity[4]
10. Corporation or LLC electing corporate status on Form 8832 or Form 2553	The corporation
11. Association, club, religious, charitable, educational, or other tax-exempt organization	The organization
12. Partnership or multi-member LLC	The partnership
13. A broker or registered nominee	The broker or nominee
14. Account with the Department of Agriculture in the name of a public entity (such as a state or local government, school district, or prison) that receives agricultural program payments	The public entity
15. Grantor trust filing under the Form 1041 Filing Method or the Optional Form 1099 Filing Method 2 (see Regulations section 1.671-4(b)(2)(i)(B))	The trust

[1] List first and circle the name of the person whose number you furnish. If only one person on a joint account has an SSN, that person's number must be furnished.

[2] Circle the minor's name and furnish the minor's SSN.

[3] You must show your individual name and you may also enter your business or DBA name on the "Business name/disregarded entity" name line. You may use either your SSN or EIN (if you have one), but the IRS encourages you to use your SSN.

[4] List first and circle the name of the trust, estate, or pension trust. (Do not furnish the TIN of the personal representative or trustee unless the legal entity itself is not designated in the account title.) Also see *Special rules for partnerships,* earlier.

***Note:** The grantor also must provide a Form W-9 to trustee of trust.

Note: If no name is circled when more than one name is listed, the number will be considered to be that of the first name listed.

Secure Your Tax Records From Identity Theft

Identity theft occurs when someone uses your personal information such as your name, SSN, or other identifying information, without your permission, to commit fraud or other crimes. An identity thief may use your SSN to get a job or may file a tax return using your SSN to receive a refund.

To reduce your risk:

- Protect your SSN,
- Ensure your employer is protecting your SSN, and
- Be careful when choosing a tax preparer.

If your tax records are affected by identity theft and you receive a notice from the IRS, respond right away to the name and phone number printed on the IRS notice or letter.

If your tax records are not currently affected by identity theft but you think you are at risk due to a lost or stolen purse or wallet, questionable credit card activity or credit report, contact the IRS Identity Theft Hotline at 1-800-908-4490 or submit Form 14039.

For more information, see Pub. 5027, Identity Theft Information for Taxpayers.

Victims of identity theft who are experiencing economic harm or a systemic problem, or are seeking help in resolving tax problems that have not been resolved through normal channels, may be eligible for Taxpayer Advocate Service (TAS) assistance. You can reach TAS by calling the TAS toll-free case intake line at 1-877-777-4778 or TTY/TDD 1-800-829-4059.

Protect yourself from suspicious emails or phishing schemes. Phishing is the creation and use of email and websites designed to mimic legitimate business emails and websites. The most common act is sending an email to a user falsely claiming to be an established legitimate enterprise in an attempt to scam the user into surrendering private information that will be used for identity theft.

The IRS does not initiate contacts with taxpayers via emails. Also, the IRS does not request personal detailed information through email or ask taxpayers for the PIN numbers, passwords, or similar secret access information for their credit card, bank, or other financial accounts.

If you receive an unsolicited email claiming to be from the IRS, forward this message to *phishing@irs.gov*. You may also report misuse of the IRS name, logo, or other IRS property to the Treasury Inspector General for Tax Administration (TIGTA) at 1-800-366-4484. You can forward suspicious emails to the Federal Trade Commission at *spam@uce.gov* or report them at *www.ftc.gov/complaint*. You can contact the FTC at *www.ftc.gov/idtheft* or 877-IDTHEFT (877-438-4338). If you have been the victim of identity theft, see *www.IdentityTheft.gov* and Pub. 5027.

Visit *www.irs.gov/IdentityTheft* to learn more about identity theft and how to reduce your risk.

Privacy Act Notice

Section 6109 of the Internal Revenue Code requires you to provide your correct TIN to persons (including federal agencies) who are required to file information returns with the IRS to report interest, dividends, or certain other income paid to you; mortgage interest you paid; the acquisition or abandonment of secured property; the cancellation of debt; or contributions you made to an IRA, Archer MSA, or HSA. The person collecting this form uses the information on the form to file information returns with the IRS, reporting the above information. Routine uses of this information include giving it to the Department of Justice for civil and criminal litigation and to cities, states, the District of Columbia, and U.S. commonwealths and possessions for use in administering their laws. The information also may be disclosed to other countries under a treaty, to federal and state agencies to enforce civil and criminal laws, or to federal law enforcement and intelligence agencies to combat terrorism. You must provide your TIN whether or not you are required to file a tax return. Under section 3406, payers must generally withhold a percentage of taxable interest, dividend, and certain other payments to a payee who does not give a TIN to the payer. Certain penalties may also apply for providing false or fraudulent information.

Ch. 22 Criminal History Records Contractor Certification; Contractor/Subcontractor Employees

Background: Texas Education Code Chapter 22 requires that criminal history records be obtained regarding covered employees of entities that contract with a school district to provide services to the school district ("Contractors") and entities that contract with school district contractors ("Subcontractors"). Covered employees with disqualifying criminal histories are prohibited from serving at a school district. Contractors/Subcontractors shall (1) complete this form certifying compliance with the requirements of Texas Education Code Chapter 22 to NCISD; and (2) require that each of their subcontractors complies with the requirements of Texas Education Code Chapter 22.

Criminal history records will be obtained by either the Contractor/Subcontractor or NCISD, as follows:

(1) Contractor/Subcontractor: The only Contractors/Subcontractors who will be granted access to obtain criminal history record information are those "qualified school contractors" that (1) contract or subcontract to provide services to NCISD; and (2) are determined eligible by the Texas Department of Public Safety (DPS) to obtain criminal history record information under the National Child Protection Act of 1993 (34 U.S.C. § 40101 *et seq.*) (NCPA), specifically, those contractors/subcontractors who provide "care or care placement services" and are based in Texas, for an employee, applicant for employment, or volunteer of the "qualified school contractor." All "qualified school contractors" are required to obtain their covered employees' criminal histories, certify compliance to NCISD, and obtain similar certifications from their subcontractors. Before or immediately after employing or securing the services of a person who is a "covered employee" (as defined below) the Contractor/Subcontractor shall send or ensure that the employee sends to DPS all information that is required by DPS for obtaining the person's national criminal history record information, which may include (but is not limited to) a complete set of the person's fingerprints and a recent electronic digital image photograph of the person, as required by DPS. DPS shall obtain the person's national criminal history record information and report the results through the criminal history clearinghouse as provided by Texas Government Code 411.0845. For more information or to set up an account, Contractor/Subcontractor should contact the Texas Department of Public Safety's Crime Records Service at 512.424.2474. Contractor/Subcontractor shall obtain all criminal history record information that relates to all covered employees through the criminal history clearinghouse as provided by Texas Government Code 411.0845. In addition, Contractor/Subcontractor shall require that each of its subcontracting entities obtains all criminal history record information that relates to its covered employees, if the subcontracting entity is also a "qualified school contractor." Contractor/Subcontractor shall: (1) provide NCISD with a fitness determination (as set forth below) as to each covered employee, based on all criminal history record information obtained; and (2) certify to NCISD that Contractor/Subcontractor has received all criminal history record information relating to a person who is employed by or under a current offer of employment by Contractor/Subcontractor.

(2) NCISD: All Contractors/Subcontractors who are not "qualified school contractors" (in other words, all Contractors/Subcontractors who do not provide "care or care placement services" or are not based in Texas) are required to follow the instructions listed below, so that NCISD may obtain their covered employees' criminal history record information, as applicable. Contractor/Subcontractor shall also require that any of its subcontracting entities that are not "qualified school contractors" follow the instructions listed below, so that NCISD may obtain their covered employees' criminal history record information. **Contractor/Subcontractor is responsible for the payment of all fingerprinting costs. Should NCISD pay any costs of fingerprinting Contractor/Subcontractor employees, Contractor agrees to reimburse NCISD for such costs; in the event Contractor fails to reimburse NCISD for the costs of fingerprinting Contractor/Subcontractor employees,**

Contractor agrees that NCISD may deduct such costs from any payment due and owing by NCISD to Contractor.

Definitions:

- Covered employees: Employees of a Contractor/Subcontractor who have or will have continuing duties related to the service to be performed at a school district and have or will have direct contact with students. NCISD will be the final arbiter of what constitutes *continuing duties* and *direct contact* with students.

- Continuing duties related to contracted services: Work duties that are performed pursuant to a contract to provide services to a school entity on a regular, repeated basis rather than infrequently or one-time only. *See* 19 Tex. Admin. Code §153.1101(2).

- Direct contact with students: The contact that results from activities that provide substantial opportunity for verbal or physical interaction with students that is not supervised by a certified educator or other professional district employee. Contact with students that results from services that do not provide substantial opportunity for unsupervised interaction with a student or students, such as addressing an assembly, officiating a sports contest, or judging an extracurricular event, is not, by itself, direct contact with students. However, direct contact with students does result from any activity that provides substantial opportunity for unsupervised contact with students, which might include, without limitation, the provision of coaching, tutoring, or other services to students. *See* 19 Tex. Admin. Code § 153.1101(7).

- Public Works Contractor: An entity that contracts directly or subcontracts with an entity that contracts with a school district to provide construction services to the school district.

- Exception for Certain Public Works Contractors' Employees and Applicants: The criminal history record information requirements outlined above do not apply to an employee or applicant for employment of a public works contractor (as defined above) if: (1) the public work does not involve the construction, alteration, or repair of an instructional facility as defined by Texas Education Code Section 46.001; (2) the employee's duties will be completed not later than the seventh (7th) day before a new instructional facility will be used for instruction; or (3) for an existing instructional facility, the work area contains sanitary facilities and is separated from all areas used by students by a secure barrier fence at least six (6) feet high, and the Contractor adopts, informs employees of, and enforces a policy prohibiting employees and any subcontractor's employees from interacting with students or entering areas used by students.

Disqualifying criminal history:

- (1) a conviction or other criminal history information designated by NCISD; or (2) a felony or misdemeanor offense that would prevent a person from being employed under Texas Education Code § 22.085(a), that is: (a) conviction of a felony offense under Title 5, Texas Penal Code if at the time of the offense, the victim was under 18; (b) conviction of or placement on deferred adjudication community supervision for an offense for which a defendant is required to register as a sex offender under Chapter 62, Texas Code of Criminal Procedure; or (c) conviction of an offense under federal law or the laws of another state that is equivalent to (a) or (b).

Types of Criminal History Record Information:

- National criminal history record information from the Texas Department of Public Safety criminal

history clearinghouse. NCISD and/or Contractor/Subcontractor may obtain from any law enforcement or criminal justice agency all criminal history record information that relates to a covered employee.

On behalf of__("Contractor/Subcontractor"), I, the undersigned authorized signatory for Contractor/Subcontractor, certify to New Caney Independent School District ("NCISD") (and, in the case of a Subcontractor, certify to Contractor and NCISD) that [**check one**]:

[ ] **OPTION A: Contractor/Subcontractor certifies that none of the employees of Contractor/Subcontractor are *covered employees*, as defined above.** For each covered employee who is employed by or under a current offer of employment by Contractor/Subcontractor, Contractor/Subcontractor certifies to NCISD that it will timely complete the "Contractor Criminal History Background Check Certification" form and submit such to NCISD. If this box is checked, I further certify that Contractor/Subcontractor has taken precautions or imposed conditions to ensure that its employees will not become *covered employees*. Contractor/Subcontractor will ensure that these precautions or conditions continue to exist throughout the time that the contracted services are provided. If NCISD, in its sole discretion, determines that employees of Contractor/Subcontractor are *covered employees*, as defined above, Contractor/Subcontractor will provide NCISD with the name, date of birth, and any other requested information of such covered employees so that NCISD may obtain criminal history record information on the covered employees, upon request by NCISD.

Or

[ ] **OPTION B: Contractor/Subcontractor certifies that some or all of the employees of Contractor/Subcontractor are *covered employees*, but the criminal history record information requirements do not apply to its employees or applicants for employment because:**

(1) Contractor/Subcontractor is a public works contractor (an entity that contracts directly or subcontracts with an entity that contracts with a school district to provide construction services to the school district); **and**

(2) the public work does not involve the construction, alteration, or repair of an instructional facility as defined by Texas Education Code Section 46.001; the employee's duties will be completed not later than the seventh (7th) day before a new instructional facility will be used for instruction; **or** for an existing instructional facility, the work area contains sanitary facilities and is separated from all areas used by students by a secure barrier fence at least six (6) feet high, and the Contractor adopts, informs employees of, and enforces a policy prohibiting employees and any subcontractor's employees from interacting with students or entering areas used by students.

If this option is selected, Contractor/Subcontractor further certifies to NCISD that:

(a) Contractor/Subcontractor shall ensure that the conditions or precautions that resulted in the determination that the criminal history record information requirements do not apply to its employees or applicants for employment continue to exist throughout the time that the contracted services are provided;

(b) For each covered employee who is employed by or under a current offer of employment by Contractor/Subcontractor, Contractor/Subcontractor will timely complete the "Contractor Criminal History Background Check Certification" form and submit such to NCISD; and

(c) If NCISD, in its sole discretion, determines that the conditions in paragraph (1) and/or (2) above are not satisfied as to Contractor/Subcontractor, Contractor/Subcontractor will provide NCISD with the name, date of birth, and any other requested information of its covered employees so

that NCISD may obtain criminal history record information on the covered employees, upon request by NCISD.

Or

[ ] **OPTION C: Contractor/Subcontractor certifies that some or all of the employees of Contractor/Subcontractor are *covered employees*, and Contractor/ Subcontractor is a "qualified school contractor."** For each covered employee who is employed by or under a current offer of employment by Contractor/Subcontractor, Contractor/Subcontractor certifies to NCISD that it will timely complete the "Contractor Criminal History Background Check Certification" form and submit such to NCISD. If this option is selected, I further certify that:

(1) Contractor/Subcontractor certifies to NCISD that Contractor/Subcontractor has received all criminal history record information relating to a person who is employed by or under a current offer of employment by Contractor/Subcontractor. Contractor/Subcontractor provides NCISD with the following fitness determination as to each covered employee, based on all criminal history record information obtained: None of the covered employees has a disqualifying criminal history.

(2) If Contractor/Subcontractor at any time receives information that a covered employee subsequently has a reported disqualifying criminal history, Contractor/Subcontractor will immediately remove the covered employee from contract duties and notify NCISD in writing within 3 business days.

(3) Upon request by NCISD, Contractor/Subcontractor will provide NCISD with the name, date of birth, and any other requested information of covered employees so that NCISD may obtain criminal history record information on the covered employees.

Or

[ ] **OPTION D: Contractor/Subcontractor certifies that some or all of the employees of Contractor/Subcontractor are *covered employees*, and Contractor/Subcontractor is not a "qualified school contractor."** If this option is selected, I further certify that:

(1) For each covered employee **who is employed by or under a current offer of employment by Contractor/Subcontractor**, **Contractor/Subcontractor certifies to NCISD that will timely complete the "Contractor Criminal History Background Check Certification" form and submit such to NCISD**, providing the following information regarding each covered employee as required by DPS in order to provide criminal history record information, so that NCISD may obtain the covered employees' criminal history record information: (a) Full name (first, middle, and last); (b) Date of birth; (c) Sex; (d) Social Security number; (e) number assigned to any form of unexpired identification card issued by Texas or another state, the District of Columbia, or a U.S. territory that includes the person's photograph; (f) if the employee has ever been fingerprinted by a public school district in Texas (and if so, the name of the school district); and (g) the person's written consent to the release of his or her criminal history record information.

(2) Contractor/Subcontractor shall provide NCISD's "Texas Fingerprint Service Code Form" document to all covered employees and ensure that they schedule fingerprinting appointments in a timely manner. Contractor/Subcontractor shall be solely responsible to send or ensure that each covered employee sends to DPS all information that may be required by DPS for obtaining national criminal history record information, which may include, but is not limited to, a complete set of the person's fingerprints and a recent electronic digital image photograph of the person. Any covered employee whose criminal history record information is not received by NCISD at least ten (10) NCISD business days prior to the start of the services

to be performed by Contractor/Subcontractor at NCISD is subject to exclusion from service, in NCISD's sole discretion, until his or her criminal history record information can be obtained and reviewed by NCISD. **Contractor/Subcontractor is responsible for the payment of all fingerprinting costs.** Because Contractor/Subcontractor is not a "qualified school contractor," it will not be permitted to view the criminal history record information obtained by NCISD.

(3) DPS shall obtain the person's national criminal history record information and report the results through the criminal history clearinghouse as provided by Texas Government Code 411.0845. Contractor/Subcontractor agrees that NCISD will obtain all criminal history record information that relates to a covered employee through the criminal history clearinghouse as provided by Texas Government Code 411.0845. Contractor/Subcontractor agrees that NCISD will review each covered employee's criminal history record information, together with the employee's qualifications, background, and experience, based on information gathered by NCISD through the procurement and/or contracting processes, to determine, in NCISD's sole discretion, whether any covered employee(s) should be prohibited from serving at NCISD. NCISD will notify Contractor/Subcontractor of its determination.

(4) If NCISD at any time receives information that a covered employee subsequently has a reported disqualifying criminal history or should be prohibited from serving at NCISD, in NCISD's sole discretion, for any other reason, including, but not limited to, the employee's qualifications, background, and experience, based on information gathered by NCISD through the procurement and/or contracting processes, NCISD will notify Contractor/Subcontractor of its determination. Contractor/Subcontractor will immediately remove the covered employee from contract duties.

Upon contract award and/or initiation of PO/contract from NCISD, the winning proposer/Contractor shall complete NCISD's "Contractor Criminal History Background Check Certification" form, providing the following information regarding each covered employee as required by DPS in order to provide criminal history record information, so that NCISD may obtain the covered employees' criminal history record information: (a) Full name (first, middle, and last); (b) Date of birth; (c) Sex; (d) Social Security number; (e) number assigned to any form of unexpired identification card issued by Texas or another state, the District of Columbia, or a U.S. territory that includes the person's photograph; (f) if the employee has ever been fingerprinted by a public school district in Texas (and if so, the name of the school district); and (g) the person's written consent to the release of his or her criminal history record information. Contractor/Subcontractor shall be solely responsible to send or ensure that each covered employee sends to DPS all information that may be required by DPS for obtaining national criminal history record information, which may include, but is not limited to, a complete set of the person's fingerprints and a recent electronic digital image photograph of the person.

If, during the term of the contract with NCISD, Contractor/Subcontractor employs additional covered employees or assigns new covered employees to perform services at NCISD, Contractor shall immediately notify NCISD and provide NCISD with all of the information listed in the preceding paragraph as to each additional covered employee, so that NCISD may obtain the additional covered employees' criminal history record information. If, during the term of the contract with NCISD, Contractor/Subcontractor ceases to employ a covered employee in connection with an NCISD contract, whose information was previously provided to NCISD, Contractor/Subcontractor shall immediately notify NCISD of the same and provide NCISD with each former covered employee's (a) Full name (first, middle, and last); (b) Date of birth; (c) Sex; (d) Social Security number; and (e) number assigned to any form of unexpired identification card

issued by Texas or another state, the District of Columbia, or a U.S. territory that includes the person's photograph, so that NCISD may unsubscribe from that individual's criminal history record.

If NCISD, in its sole discretion, objects to the assignment of a covered employee for any reason, including, but not limited to, on the basis of the covered employee's criminal history record information and/or insufficient qualifications, lack of experience, and the like, based on information gathered by NCISD through the procurement and/or contracting processes, Contractor/Subcontractor agrees to discontinue using that covered employee to provide services at NCISD.

I also certify to NCISD (and, in the case of a Subcontractor, certify to Contractor and NCISD) on behalf of Contractor/Subcontractor that Contractor/Subcontractor has required its subcontractors to comply with Texas Education Code, Chapter 22 and obtained certifications from its subcontractors of such compliance. Noncompliance or misrepresentation regarding this certification may be grounds for contract termination.

_____	_____	_____
Signature	Title	Date

SECTION 00 3132
GEOTECHNICAL DATA

PART 1 - GENERAL

1.01 SUMMARY

A. Related Documents: General and Supplementary Conditions of the Contract, Division 01 General Requirements, and Drawings are applicable to this Section.

1.02 INVESTIGATION

A. An investigation of subsurface soil conditions at the building site was authorized by the Owner, and these investigations were made by Terracon, draft report number 97255039 dated August 14, 2025.

1.03 REPORT

A. The complete report of the testing laboratory follows this section and is provided for information only.

B. Report and log of borings are available for Contractor's information but is not a warranty of subsurface conditions, nor is it a part of the Contract Documents.

1.04 RESPONSIBILITY

A. Bidders are expected to examine the site and subsurface investigation reports and then decide for themselves the character of the materials to be encountered.

B. The Owner and Architect assume no responsibility for variations of subsoil quality or conditions.

C. The Owner and the Architect assume no responsibility for any conclusions or interpretations made on the basis of subsurface information contained in the contract documents.

PART 2 - NOT USED

PART 3 - NOT USED

END OF SECTION

New Caney ISD Transportation Center Expansion

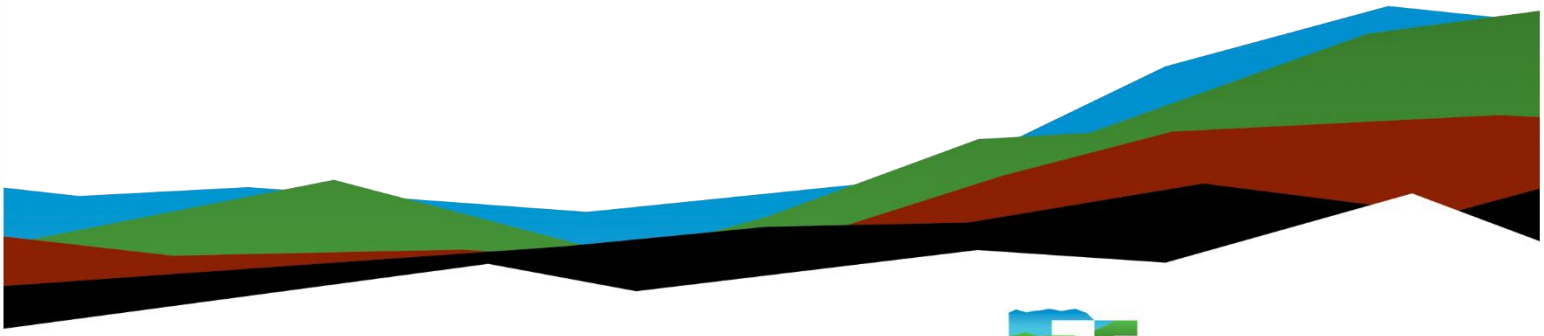
Geotechnical Engineering Report

New Caney, Texas

August 14, 2025 | Terracon Project No. 97255039

Prepared for:

New Caney Independent School District
22784 Highway 59 South, Building E
Porter, Texas 77365



Terracon
Explore with us

Nationwide
Terracon.com

- Facilities
- Environmental
- Geotechnical
- Materials

11133 I-45 South, Building T
Conroe, Texas 77302
P (936) 539-1384
Terracon.com

August 14, 2025

New Caney Independent School District
22784 Highway 59 South, Building E
Porter, Texas 77365

Attn: Mr. Jesse Lemus – QA/QC Manager
P: (346) 731-4232
E: ilemus@newcaneyisd.org

Re: Geotechnical Engineering Report
New Caney ISD Transportation Center Expansion
21026 TX-494 Loop
New Caney, Texas
Terracon Project No. 97255039

Dear Mr. Lemus:

We have completed the scope of Geotechnical Engineering Services for the above referenced project in general accordance with Terracon Document No. P97255039.Revision 1 dated May 8, 2025. A draft report for this project dated July 22, 2025 was previously submitted to the design team for review. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork and the design and construction of foundations, floor slabs, underground utilities, pavements, and a detention pond for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,

Terracon Consultants, Inc.
(Texas Firm Registration No.: F-3272)

Kelvin Castillo Dilone
Kelvin Castillo Dilone
Staff Engineer

Rebecca C. Rice
Rebecca C. Rice, P.E.
Geotechnical Services Manager



Anna Shidlovskaya
Anna Shidlovskaya, P.E., Ph.D.
Project Engineer

Table of Contents

Introduction **1**
Project Description **1**
Site Conditions **4**
Geotechnical Characterization **5**
Geology 5
Subsurface Profile 5
Groundwater Conditions 6
Seismic Site Class **6**
Geotechnical Overview **7**
Earthwork **8**
Site Preparation 8
Fill Material Types 9
Utility Trench Backfill 10
Grading and Drainage 11
Wet Weather/Soft Subgrade Considerations 11
Demolition Considerations 12
Shallow Foundations **13**
Design Recommendations – Slab-on-Grade Foundation System 13
Design Recommendations – Shallow Spread/Strip Footings 15
Construction Considerations – Shallow Foundations 16
Design Recommendations – Drilled-and-Underreamed Footings 17
Construction Considerations – Drilled-and-Underreamed Footings 18
Grade Beams – Drilled-and-Underreamed Footings 19
Foundation Construction Monitoring 20
Construction Adjacent to Existing Building 20
Underground Utility Construction Considerations **22**
Temporary Groundwater Control 22
Excavation Considerations 22
Uplift Pressures 23
Lateral Earth Pressures 24
Utility Bedding 24
Utility Backfill 24
Pavements **25**
Detention Pond **29**
Slope Stability Analyses 30
Lateral Earth Pressures 32
Excavations and Temporary Groundwater Control 33
Potential Use of Excavated Soils 33
Erosion Control 33
General Comments **34**

Figures

GeoModel
Slope Stability Analysis Results

Attachments

Exploration and Testing Procedures
Site Location and Exploration Plan
Exploration and Laboratory Results
Supporting Information

Note: This report was originally delivered in a web-based format. **Blue Bold** text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the terracon logo will bring you back to this page. For more interactive features, please view your project online at **client.terracon.com**.

Refer to each individual Attachment for a listing of contents.

Introduction

Terracon Consultants, Inc. (Terracon) is pleased to submit our geotechnical engineering report for the proposed transportation center expansion to be located at 21026 TX-494 Loop in New Caney, Texas. This project was authorized by Mr. Richard Ressler, Director of Facilities and Planning, through signature of the "Professional Services" between New Caney ISD and Terracon on May 16, 2025. The purpose of these services was to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Groundwater conditions
- Seismic site classification per IBC
- Site preparation and earthwork
- Foundation design and construction
- Floor slab design and construction
- Seismic site classification
- Utility construction considerations
- Pavement design and construction
- Detention pond construction considerations
- Bearing pressure and lateral earth pressures for retaining walls

The geotechnical engineering Scope of Services for this project included the advancement of 17 test borings to depths that ranged approximately from 5 to 30 feet below existing grade, laboratory testing, engineering analysis, and preparation of this report.

Drawings showing the site and boring locations are shown on the **Site Location** and **Exploration Plan**, respectively. The results of the laboratory testing performed on soil samples obtained from the site during our field exploration are included on the boring log in the **Exploration and Laboratory Results** section.

Project Description

Our initial understanding of the project was provided in our proposal and was discussed during project planning. A period of collaboration has transpired since the project was initiated, and our final understanding of the project conditions is as follows:

Item	Description
Information Provided	A description of the project was provided by NCISD during a phone call and via email on April 17, 2025. In addition, a site plan was provided by Huckabee, the Architect for the project, via email on April 17, 2025. On April 28, 2025 a phone call was made by NCISD to reduce the scope of work from the original request. On May 7, 2025, Huckabee sent additional details via email concerning the proposed improvements to the project site. On May 16, 2025 a phone call was made by NCISD to add recommendations for the exterior building expansion located in the southwest portion of the site. On June 5, 2025, Auric Engineers provided additional information regarding the design and increase in depth of the detention pond. In addition, the "Overall Civil Site Plan" drawing, dated May 23, 2025 and the "Boundary & Topographic Survey" drawing, dated May 22, 2025 was provided to us by Auric Engineers. On July 7, 2025, a cross-section drawing of the detention pond, dated May 23, 2025 was provided via email by Auric Engineers.

Item	Description
Project Description	The project includes the following improvements within the existing NCISD transportation center: ■ A one- to two-story transportation and operation building with a footprint area of about 22,300 square feet to be located in the west portion of the site. ■ A warehouse building with a footprint area of about 29,400 square feet to be located in the east portion of the site. ■ An exterior storage building expansion with a footprint area of about 700 square feet to be located in the southwest portion of the site. ■ A bus wash with a footprint area of about 3,000 square feet to be located south of the warehouse building. ■ A dry-bottom detention pond with a footprint area of about 27,500 square feet, with a maximum depth of 15 feet below existing grade and sideslope declinations no steeper than 3(horizontal):1(vertical) located in the northwest portion of the property. We understand a portion of the detention pond will be constructed with retaining walls. The vertical-walls are planned to be either cast-in-place cantilevered retaining walls or segmented block gravity walls. ■ Underground utilities with a maximum depth of 10 feet below existing grade. ■ Associated parking and driveway areas
Finished Floor Elevation[1]	■ Transportation and operation and warehouse buildings: 100.0 feet (one to three feet of fill is currently planned). ■ Exterior storage building expansion: 101.82 feet to match the finished floor elevation of the existing building (one to two feet of fill is currently planned).
Pavement Finished Subgrade Elevation	Within approximately one to three feet above existing grade or to match the existing pavement elevation.
Maximum Loads	In the absence of information provided by the design team, we will use the following loads in estimating settlement based on our experience with similar projects. ■ Columns: 150 to 200 kips ■ Slabs: 125 pounds per square foot (psf)

Item	Description
Building Code	2018 IBC
Anticipated Foundation Systems	■ Transportation and operation and warehouse buildings: Either shallow spread/strip footings or drilled-and-underreamed footings with a grade-supported floor slab. ■ Exterior storage building expansion: a conventionally-reinforced, monolithically-poured slab-on-grade.
Pavements	We understand a rigid (concrete) pavement section is being considered.
Anticipated Traffic	Consists of primarily passenger vehicles and buses in the parking areas and passenger vehicles combined with garbage trucks, buses, and large multi-axle delivery trucks from time-to-time in driveway areas.

1. Provided by Auric Engineers.

Terracon should be notified if any of the above information is inconsistent with the planned construction, especially the grading limits, as modifications to our recommendations may be necessary.

Site Conditions

The following description of site conditions is derived from our site visit in association with the field exploration.

Item	Description
Parcel Information	The project is located within the existing NCISD transportation center at 21026 TX-494 Loop in New Caney, Texas. See **Site Location**
Existing Improvements	None known within the area of the proposed improvements on the west portion of the site. Scattered trees are located in the east portion of the site with an existing single-story residential home.
Current Ground Cover	At the time of our site visit and field program, the west portion of the site was bare graded, while the east portion consisted of grass and a gravel driveway. Concrete driveways and parking lot areas on the southwest portion of the site.
Existing Topography	Based on the topographic map provided by Auric Engineers, we understand the ground surface elevations range about 95 to 101 feet across the site.

Geotechnical Characterization

Geology

Based on the geologic maps published by the Bureau of Economic Geology, the site for the proposed project is located on the upper Lissie formation, sometimes denoted the Montgomery formation. The upper Lissie formation is heterogeneous, containing interbedded layers of clay, sand and silt. This formation was deposited in mid-Pleistocene time in shallow coastal river channels and flood plains.

The coastal plain in this region has a complex tectonic geology, several major features of which are: Gulf Coastal geosyncline, salt domes, and major sea level fluctuations during the glacial stages, subsidence and geologic faulting activities. Most of these geologic faulting activities have ceased for millions of years, but some are still active. A detailed geologic fault investigation and study of the site geology are beyond the scope of this report.

Subsurface Profile

We have developed a general characterization of the subsurface conditions based upon our review of the subsurface exploration, laboratory data, geologic setting and our understanding of the project. This characterization, termed GeoModel, forms the basis of our geotechnical calculations and evaluation of the site. Conditions observed at each exploration point are indicated on the individual logs. The individual logs can be found in the **Exploration and Laboratory Results** and the GeoModel can be found in the **Figures** attachment of this report.

As part of our analyses, we identified the following model layers within the subsurface profile. For a more detailed view of the model layer depths at each boring location, refer to the GeoModel.

Model Layer	Layer Name	General Description
1	**Silty Sand and Clayey Sand**	Dark gray and tan, very loose to loose, with trace, gravel, and clay pockets
2	**Sandy Lean Clay**	Tan, light gray, dark gray, and reddish brown, very soft to very stiff, with trace roots, ferrous stains, and sand pockets
3	**Fat Clay and Sandy Fat Clay**	Tan, light gray, and reddish brown, medium stiff to very stiff, with sand and silt pockets, ferrous stains, calcareous nodules, and slickensides

Groundwater Conditions

Borings B-1 through B-17 were advanced using dry drilling techniques to the boring termination depths that ranged from approximately 5 to 30 feet in an effort to evaluate groundwater conditions at the time of our field program. Groundwater was not observed in borings B-1 through B-17 during or upon completion of drilling. Information regarding groundwater measurements can be found on the boring logs in the **Exploration and Laboratory Results** section.

These water level observations provide an approximate indication of the groundwater conditions existing on the site at the time the observations were made. Longer-term observations using cased holes or piezometers, sealed from the influence of surface water, would be required for a better evaluation of the groundwater conditions on this site.

Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff, and other factors not evident at the time the borings were performed. Therefore, groundwater levels during construction or at other times in the life of the improvements may be within the depths explored. Also, trapped or "perched" water could be present within the sand or silt seams within native clay soils and/or in cohesionless soils above lower permeability clay soil layers. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project.

Seismic Site Class

The seismic design requirements for buildings and other structures are based on Seismic Design Category. Site Classification is required to determine the Seismic Design Category for a structure. The Site Classification is based on the upper 100 feet of the site profile defined by a weighted average value of either shear wave velocity, standard penetration resistance, or undrained shear strength in accordance with Section 20.4 of ASCE 7 and the International Building Code (IBC). Based on the soil properties observed at the site and as described on the exploration logs and results, our professional opinion is that a **Seismic Site Classification of D** be considered for the project. Subsurface explorations at this site extended to a maximum depth of 30 feet. The site properties below the boring depths to 100 feet were estimated based on our experience and knowledge of geologic conditions of the general area. Additional deeper borings or geophysical testing may be performed to confirm the conditions below the current boring depth.

Geotechnical Overview

Based on the information obtained from our subsurface exploration, the site can be developed for the proposed project. A summary of our findings and recommendations is provided below.

Expansive soils were observed at this site. This report provides recommendations to help reduce the effects of soil shrinkage and expansion. However, even if these procedures are followed, some movement and distress in the buildings should be anticipated. The severity of distress will increase if any modification of the site results in excessive wetting or drying of the expansive soils. Eliminating the risk of movement associated with expansive soils may not be feasible. However, this risk can be significantly reduced if the buildings are designed as a structural slab over a void space with the structural loads supported by a foundation system terminated below the active zone. Terracon can provide recommendations for this option, if requested.

Construction operations may encounter difficulties due to the wet or soft surface soils becoming a general hindrance to equipment due to rutting and pumping of the soil surface, especially during and soon after periods of wet weather. Soft soils were observed in portions of the site at the ground surface during our field program.

The surficial soils observed in portions of the site exhibited low plasticities and a high silt and sand content. If wet and/or soft conditions are present at the time of construction, remedial efforts may be necessary for preparation of the surficial soils in the building and pavement areas to create a working surface. Remedial effort options are discussed in the **Wet Weather/Soft Subgrade Considerations** section of this report.

Demolition of the existing structures, utilities, pavements, etc. will be performed to facilitate the construction of the proposed structure planned at this site. Special care should be exercised to demolish and remove the existing structures, foundation elements, pavements, utilities, and any buried structure to minimize disturbance of the subgrade and potential detrimental effects on construction of the proposed development at this site.

A foundation system consisting of a conventionally-reinforced, monolithically-poured slab-on-grade foundation system may be utilized to support the proposed exterior storage building expansion planned at this site.

We understand the proposed transportation and operation and warehouse buildings at this site are planned to be supported on a foundation system consisting of either shallow spread/strip footings or drilled-and-underreamed footings with a grade-supported floor slab. These types of foundations may be utilized to support the proposed structures planned at this site provided the subgrade is prepared as discussed in this report.

A minimum 60-inch thick select fill pad should be placed under the proposed buildings to provide uniform support to the floor slab and reduce the estimated Potential Vertical Rise (PVR) of the subgrade to approximately one inch or less.

Based on the soil conditions observed at boring B-8 and B-9, which was drilled in the proposed detention pond area, these soils should support sideslopes for the anticipated maximum excavation depth of 15 feet with sideslope declinations of 3(horizontal):1(vertical) or flatter. We understand a portion of the detention pond will be constructed with retaining walls. The vertical-walls are planned to be either cast-in-place cantilevered retaining walls or segmented block gravity walls.

The utility bedding and backfill should conform to Montgomery County or other appropriate standards on bedding and backfill.

Rigid pavement sections vary from 5.0 to 7.0 inches of reinforced concrete with chemically treated subgrade.

The **General Comments** section provides an understanding of the report limitations. The recommendations contained in this report are based upon the results of field and laboratory testing (presented in the **Exploration and Laboratory Results**), engineering analyses, and our current understanding of the proposed project. The **General Comments** section provides an understanding of the report limitations.

Earthwork

Earthwork is anticipated to include demolition, clearing and grubbing, excavations, and fill placement. The following sections provide recommendations for use in the preparation of specifications for the work. Recommendations include critical quality criteria, as necessary, to render the site in the state considered in our geotechnical engineering evaluation for foundations, floor slabs, and pavements.

Site Preparation

Construction areas should be stripped of vegetation, topsoil, trees, existing pavements and other debris/unsuitable surface material. Roots of trees to be removed within the construction areas should be grubbed to full depths. Care should be taken to replace or recompact all soil removed or loosened by the removal of tree roots and stumps as recommended in subsequent paragraphs. Proper site drainage should be maintained during construction so that ponding of surface runoff does not occur and cause construction delays and/or inhibit site access.

Demolition of existing structures and their below-grade portions, pavements/flatwork, utilities, etc. should be addressed as recommended in **Demolition Considerations**.

Once final subgrade elevations have been achieved, the exposed subgrade should be proofrolled with a 20 ton pneumatic roller or equivalent equipment, such as a fully loaded dump truck, to detect weak zones in the subgrade. Weak areas detected during proofrolling, as well as zones containing organic matter and/or debris, should be removed and replaced with soils exhibiting similar classification, moisture content, and density as the adjacent in-situ soils. Proofrolling should be performed under the direct observation of the Geotechnical Engineer or his/her representative and may be waived at the discretion of the Geotechnical Engineer.

Subsequent to proofrolling, and just prior to placement of fill, the exposed subgrade within the construction area should be evaluated for moisture and density. If the moisture and/or density do not meet the criteria described in **Fill Compaction Requirements** for on-site soils, the subgrade should be scarified to a minimum depth of 6 inches, moisture adjusted, and compacted to at least 95 percent of the Standard Effort (ASTM D 698) maximum dry density.

Fill Material Types

Select fill and on-site soils to be used at this site for grade adjustments should meet the following criteria:

Fill Type	USCS Classification	Acceptable Location for Placement
Select fill soils	CL and/or SC (10≤PI≤20)	Must be used to construct the select fill pad under the floor slabs and for all grade adjustments within the building areas.
On-site soils[1]	Varies	The on-site soils appear suitable for use as fill within the pavement areas, provided they are free of organics and debris.

1. The utilization of on-site silty/sandy soils may present difficulties during construction due to the increased sand and silt content of these soils, especially during and soon after periods of wet weather. If the utilization of the silty/sandy soils as fill is planned in the pavement areas, treatment of these soils with lime-flyash should produce a material that would be more suitable for use as fill.

If blended or mixed soils are intended for use as select fill, Terracon should be contacted to provide additional recommendations. Blended or mixed soils do not occur naturally. These soils are a blend of sand and clay and will require mechanical mixing at the site with a pulvimixer. If these soils are not mixed thoroughly to break down the clay clods and blend-in the sand to produce a uniform soil matrix, the fill material may be detrimental to the performance of the foundations. If blended soils are used, we recommend that additional samples of the blended soils as well as the clay clods, be obtained prior to and during earthwork operations to evaluate if the blended soils can be

used in lieu of select fill. The actual type and amount of mechanical mixing at the site will depend on the amount of clay and sand, and properties of the clay.

Fill Compaction Requirements

Select fill and on-site soils should meet the following compaction requirements.

Item	Description
Fill lift thickness	The fill soils should be placed on prepared surfaces in lifts not to exceed 8 inches loose measure.
Compaction Requirements	■ Select fill and on-site soils should be compacted to at least 95 percent of the Standard Effort (ASTM D 698) maximum dry density. ■ The select fill and on-site sandy soils should be moisture adjusted to within 2 percent of the optimum moisture content. ■ The on-site clay soils should be moisture conditioned to between optimum and +4 percent of optimum moisture content.

Prior to any filling operations, samples of the proposed borrow and on-site materials should be obtained for laboratory moisture-density testing. The tests will provide a basis for evaluation of fill compaction by in-place density testing. A qualified soil technician should perform sufficient in-place density tests during the filling operations to evaluate that proper levels of compaction, including dry unit weight and moisture content, are being attained.

Utility Trench Backfill

Utility trenches are a common source of water infiltration and migration. All utility trenches that penetrate beneath the structures should be effectively sealed to restrict water intrusion and flow through the trenches, which could migrate below the structure. The trench should provide an effective trench plug that extends at least 5 feet out from the face of the structure exterior. The plug material should consist of clay compacted at a water content at or above the soils optimum water content. The clay fill should be placed to completely surround the utility line and be compacted in accordance with recommendations in this report.

Grading and Drainage

All grades must provide effective drainage away from the proposed buildings during and after construction. Water permitted to pond next to the buildings can result in distress in the buildings. These greater movements can result in unacceptable differential slab movements, cracked slabs and walls, and roof leaks. Slabs and foundation performances described in this report are based on effective drainage for the life of the buildings and cannot be relied upon if effective drainage is not maintained.

Exposed ground should be sloped away from the structures for at least 10 feet beyond the perimeter of the buildings. After construction and landscaping, we recommend verifying final grades to document that effective drainage has been achieved. Grades around the buildings should also be periodically inspected and adjusted as necessary, as part of the buildings' maintenance program.

Planters located within 10 feet of the proposed buildings should be self-contained to prevent water accessing the building and pavement subgrade soils. Locate sprinkler mains and spray heads a minimum of 5 feet away from the building lines. Low-volume, drip-style landscaped irrigation should not be used near the building. Collect roof runoff in drains or gutters. Discharge roof drains and downspouts onto pavements and/or flatworks which slope away from the buildings or extend down spouts a minimum of 10 feet away from the buildings.

Flatworks will be subject to post construction movement. Maximum grades practical should be used for flatwork to prevent water from ponding. Allowances in final grades should also consider post-construction movement of flatwork, particularly if such movement would be critical. Where flatwork abuts the building, effectively seal and maintain joints to prevent surface water infiltration.

Wet Weather/Soft Subgrade Considerations

Due to the high silt and sand content and low plasticities of the surficial soils in portions of the site, proper compaction may be difficult to achieve. In addition, construction during and soon after wet weather periods may encounter difficulties due to wet and soft surficial soils becoming a general hindrance to equipment as a result of rutting and/or pumping of the soil surface. This condition is primarily due to their lack of cohesion (low clay content) and little to no confining pressure near the ground surface. Clearing activities can worsen site conditions. If practical, we recommend that clearing and earthwork be planned during the drier summer months. If the subgrade cannot be adequately compacted to the minimum densities as described above, one of the following methods should be used to improve the soils: 1) removal and replacement with select fill, 2) chemical treatment of the soil to dry the subgrade, or 3) drying by natural means if the schedule allows.

Based on our experience with similar soils, chemical treatment is an efficient and effective method to increase the supporting value of wet and soft subgrade such as that observed at this site. Chemical treatment may be necessary to depths of approximately one to two feet or greater of the near-surface silty/sandy soils, depending on the condition of the subgrade at the time of construction. We suggest that a cost be included in the construction budget for chemical treatment of the soils using a lime-flyash mixture to aid drying and improve the condition of the soil if the soil is wet and/or soft at the time of construction. We recommend that this cost be in the form of a contingency or allowance to be used if needed. Terracon should be contacted for additional recommendations if chemical treatment of the soils is planned due to soft and/or wet subgrade.

Demolition Considerations

Special care should be exercised to demolish and remove any existing structures, pavements, and utilities to minimize disturbance of the subgrade and potential detrimental effects on construction of the proposed development at this site.

We anticipate that the existing structures are supported on either shallow spread footings or grade beams and/or drilled footings. Shallow footings and grade beams should be removed and the excavation backfilled with properly placed and compacted select fill. If drilled footings are present, we recommend the shafts be broken off at an elevation about 24 inches below the bottom of the proposed grade beam depth. If portions of drilled footings are left in place, they should be surveyed and superimposed on the proposed development plans to evaluate the potential for obstructions to the new development. Terracon should be contacted if drilled footings are planned to be excavated and completely removed. Complete removal of drilled footings will require significant earthwork activities to backfill the resulting excavations in such a manner as to make the site suitable for new construction.

All utilities and associated bedding material that are planned to be abandoned should be completely removed from within the new building and pavement areas. As an alternate to complete removal, the existing utilities may be abandoned in-place if they do not interfere with the planned construction. If the utilities are abandoned in-place, they should be properly pressure-grouted to completely fill the utility.

The excavations resulting from foundation and utility removal should be backfilled in accordance with the recommendations provided in **Earthwork**. If situations are encountered where compaction of fill would not be efficient because of the size or location of an excavation, the use of cement stabilized sand or flowable fill may be considered as a suitable alternative to select fill. The compressive strength of the cement stabilized sand or flowable fill utilized should be maintained between 50 to 100 pounds per square inch (psi).

Although not observed during our field activities, the potential exists that other types of buried structures (wells, cisterns, etc.) could exist on this site. These buried structures will need to be addressed on an individual basis if encountered during construction.

Shallow Foundations

Based on the subsurface conditions observed during our field and laboratory programs, a conventionally-reinforced, monolithically poured-slab-on-grade foundation system may be utilized to support the proposed exterior storage building expansion planned at this site, provided the subgrade site has been prepared in accordance with the requirements noted in **Earthwork**. We also understand that the proposed transportation and operation and warehouse buildings at this site are planned to be supported on a foundation system consisting of either shallow spread/strip footings or drilled-and-underreamed footings with a grade-supported floor slab. Recommendations for these types of foundation systems are provided in the following sections, along with other geotechnical considerations for this project.

Design Recommendations – Slab-on-Grade Foundation System

Based on the drawings provided by Auric Engineers, we understand that the finished floor elevations for the proposed exterior storage building expansion will likely be 101.82 feet to match the finished floor elevation of the existing building. If cuts and/or significant fills are planned, Terracon should be notified to review and/or modify our recommendations given in this subsection.

The near-surface soils at this site generally exhibited a high expansion potential. These soils can subject the lightly loaded slabs to significant movements (due to shrinking and swelling) with fluctuations in their moisture content. This movement potential is influenced primarily by the properties of the subgrade soils, as well as the moisture content of the subgrade at the time of construction, overburden pressures, and the stability of the moisture contents throughout the life of the building. Based on the information developed from our field and laboratory programs and on method TEX-124-E in the Texas Department of Transportation (TxDOT) Manual of Testing Procedures, we estimate that the subgrade soils at this site exhibit a Potential Vertical Rise (PVR) of up to approximately 2¼ inches. Therefore, we highly recommend that the near-surface soils be prepared as stated below to reduce the potential for slab movement associated with volumetric changes of the near-surface clay soils due to moisture variations to a more acceptable level. The actual movements could be greater if poor drainage, ponded water, and/or other sources of moisture are allowed to infiltrate beneath the building after construction.

The most common method of subgrade preparation to reduce the potential expansion of the subgrade would be to provide a pad of properly placed and compacted select fill beneath the building area. The corresponding decrease in the potential soil moments is primarily a function of the fill pad thickness and the moisture levels of the underlying clay subgrade. While the indicated preparations do not eliminate the potential for soil moment, the magnitude of such movements should be reduced to more acceptable levels. To provide uniform support to the grade-supported slab and to reduce the estimated PVR to approximately one inch, we recommend that a minimum of 60 inches of properly placed and compacted select fill material be constructed immediately beneath the grade supported slab. The select fill pad should extend a minimum of 5 feet beyond the edge of the proposed building. The final exterior grade adjacent to the structures should be sloped to promote effective drainage away from the building.

Select fill soils should be utilized for all grade adjustments within the proposed grade-supported structure areas. The subgrade soils and select fill pad soils should be prepared as outlined in **Earthwork**, which contains material and placement requirements for select fill, as well as other subgrade preparation recommendations.

The subgrade soils for flatwork outside the structures which will be sensitive to movement should be prepared as discussed previously. This preparation will be important on surrounding paving immediately adjacent to the structures. If these adjacent flatwork areas are not prepared as stated above for the structure areas, the estimated PVR for these areas could approach those indicated previously for in-situ conditions. If the soils swell in those areas, this movement could result in significant distress to the adjacent paving and possibly result in reversed drainage (flow of runoff toward the structure) around the perimeter of the structures.

Based upon the above recommendations, the grade beams of the slab-on-grade foundation should bear within properly placed and compacted select fill soils, provided that the select fill pad and subgrade soils are prepared as outlined in **Earthwork**.

The slab-on-grade foundation may be designed using the following parameters provided that the structure subgrade is prepared as discussed above:

Description	Design Parameters
Select fill pad	Minimum thickness of 60 inches
Estimated PVR [1]	Approximately one inch or less
Climatic rating	25
Design Plasticity Index [1]	27
Soil Support Index [1]	0.91
Minimum grade beam embedment depth	18 inches below exterior grade

Description	Design Parameters
Allowable bearing capacity	Dead Load Plus Sustained Live Load: 1,000 psf Total Net Load: 1,500 psf
Modulus of subgrade reaction	75 pci

1. Design parameters based on a minimum 60-inch thick select fill pad.

The parameters indicated for the above design conditions are based on criteria published by the Building Research Advisory Board (B.R.A.B.) and Wire Reinforcing Institute (W.R.I.). The B.R.A.B. and W.R.I. methods are essentially empirical design techniques and the parameters provided are based on our interpretation of the project soil borings and criteria published in the B.R.A.B. and W.R.I. design manuals.

The slab-on-grade foundation system should be designed using B.R.A.B., W.R.I., or other appropriate method to tolerate the anticipated soil movement and provide satisfactory support to the proposed structures. The foundation should have adequate interior and exterior grade beams, if necessary, to provide sufficient rigidity to the foundation system such that the slab deflections that result are considered tolerable to the supported structures. Grade beams may be thickened and widened at column locations to serve as spread footings at areas of concentrated loadings. The minimum grade beam depth recommendation provided above is to reduce surface water migration below the foundation elements and develop end bearing and is not based on structural considerations.

Post construction settlements for the described slab-on-grade foundation system should be about one inch, provided that the subgrade soils are prepared as outlined herein and that the select fill is properly placed and compacted in accordance with the recommendations contained in this report. Settlement response of the foundation system is expected to be influenced more by the quality of construction and fill placement than by soil-structure interaction.

Design Recommendations – Shallow Spread/Strip Footings

Item	Description
Minimum embedment depth[1]	4 feet below existing grade (grade at the time of our field program)
Allowable bearing pressures[2] **(individual footings)**	Net dead plus sustained live load – 2,000 psf Net total load – 3,000 psf
Allowable bearing pressures[3] **(strip footing)**	Net dead plus sustained live load – 1,600 psf Net total load – 2,000 psf
Approximate post-construction settlement[4]	Approximately one inch

Item	Description
Estimated post-construction differential settlement[5]	Approximately ½ of post-construction settlement
Allowable passive pressure[6]	750 psf
Allowable frictional resistance[7]	250 psf
Uplift resistance[8]	Foundation Weight (150 pcf) & Soil Weight (120 pcf)

1. The footings should bear upon either properly placed and compacted select fill soils or undisturbed native soils.
2. Whichever condition yields a larger bearing area.
3. Defined as a footing at least twice as long as it is wide.
4. This estimated post-construction settlement of the shallow footings is based on proper construction practices being followed. A clear distance between footings of one footing size of the larger of the two footings should not produce overlapping stress distributions and would essentially behave as independent foundations.
5. The post-construction differential settlements may result from variances in subsurface conditions, loading conditions, and construction procedures. The settlement response of the footings will be more dependent upon the quality of construction than upon the response of the subgrade to the foundation loads.
6. The passive pressure along the exterior face of the footings should be neglected within the upper 4 feet due to surface effects and the presence of fill and expansive soils unless pavement is provided up to the edge of the structures. For interior footings, the allowable passive pressure may be used for the entire depth of the footing.
7. To be utilized on the base of the footings.
8. Structural uplift loads on the shallow footings may be resisted by the weight of the foundation plus the weight of any soil directly above the foundation. The ultimate uplift capacity of shallow footings should be reduced by an appropriate factor of safety to compute allowable uplift capacity.

Construction Considerations – Shallow Foundations

Excavations for shallow footings and grade beams should be performed with equipment capable of providing a relatively clean bearing area. The bottom 6 inches of the foundation and grade beam excavations should be completed with a smooth-mouthed bucket or by hand labor. The excavations should be neatly excavated and properly formed. Debris in the bottom of the excavation should be removed prior to steel placement. Based on the groundwater observations obtained during our field program (refer to **Groundwater Conditions**), significant groundwater seepage is not anticipated for shallow footings or grade beams at the recommended bearing depth. However, water should not be allowed to accumulate at the bottom of the foundation excavations. To reduce the potential for groundwater seepage into the excavations and to minimize

disturbance to the bearing area, we recommend that concrete and steel be placed as soon as possible after the excavations are completed. Excavations should not be left open overnight. The bearing surface of the shallow footings should be evaluated immediately prior to placing concrete or a seal slab.

A thin seal slab of lean concrete (approximately 2 to 4 inches thick) should be placed at the bottom of the footing excavation to protect the bearing surface of the footings from disturbance and/or infiltration of ground/surface water if the footing cannot be poured within the same day of excavation.

Design Recommendations – Drilled-and-Underreamed Footings

Item	Description
Minimum embedment depth[1]	10 feet below existing grade (grade at the time of our field program)
Allowable bearing pressures[2]	Net dead plus sustained live load – 4,200 psf Net total load – 6,300 psf
Maximum underream-to-shaft diameter ratio	3:1
Minimum underream-to-shaft diameter ratio[3]	2:1
Estimated uplift pressure due to post-construction heave of the clay soils[4]	1,000 psf
Minimum percentage of steel[5]	0.5 percent
Approximate post-construction settlement[6]	one inch or less
Estimated differential settlement[7]	Approximately ½ of post-construction settlement
Allowable passive pressure[8]	1,000 psf
Uplift resistance[9]	Foundation Weight (150 pcf) & Soil Weight (120 pcf)

1. The footings should extend through the fill soils and bear within the native undisturbed clay soils.
2. Whichever condition yields a larger bearing area.
3. This minimum underream-to-shaft diameter ratio should result in a large enough diameter of the underream to overcome uplift forces on the footing without causing local soil failure to the overlying soils.
4. The magnitude of uplift is difficult to predict and will vary with in-situ moisture contents. This uplift pressure can be approximated over the entire perimeter of the shaft above the top of the underream up to the bottom of the select fill pad.

Item	Description

5. The footings should contain sufficient vertical reinforcing steel throughout the entire shaft length to resist uplift (tensile) forces due to post-construction heave of the clay soils. The amount of reinforcing steel required can be computed by assuming that the dead load of the structure surcharges the footing, that the above estimated tensile force acts vertically on the shaft, and that the underream acts as a rigid anchor.
6. This estimated post-construction settlement of the drilled-and-underreamed footings is without considering the effect of stress distribution from adjacent foundations and assuming proper construction practices are being followed. A clear distance between the footings of one underream diameter of the larger footing should be provided between the underreams to develop the recommended bearing pressures and to control settlements. If a clearance of one diameter cannot be maintained in every case, the above bearing capacities should be reduced by 20 percent for a clearance between one half and one underream diameters. Underreams closer than a clearance of one half of an underream diameter are not recommended.
7. The differential settlement will result from variances in subsurface conditions, loading conditions and construction procedures, such a cleanliness of the bearing area or flowing water in the shaft.
8. For footings placed against an undisturbed vertical face of the in-situ soils. Lateral resistance of the drilled-and-underreamed footings is primarily developed by passive resistance of the soils against the side of the footing. Due to surface effects and the presence of fill and expansive soils, the lateral resistance of the upper 4 feet of the soils at the surface for exterior footings should be neglected unless area paving is provided up to the edge of the building.
9. Structural uplift loads on the drilled-and-underreamed footings will be resisted by the dead weight of the footings and supported structure plus the weight of a soil wedge above the footing. The soil wedge can be assumed to extend upward from the bottom of the underream at a slope of 4 vertical to 1 horizontal.

Construction Considerations – Drilled-and-Underreamed Footings

Drilled excavations to a depth of 10 feet below existing grade will be necessary for installation of drilled-and-underreamed footings for the proposed buildings planned at this site. The excavations should be performed with equipment capable of providing a relatively clean bearing area. The presence of secondary structures such as silt and sand pockets, ferrous and calcareous nodules, slickensides, etc., can cause sloughing during footing excavation. Thus, the drilling contractor should have casing available in the event that sloughing causes improperly formed shafts.

Based on our groundwater observations (refer to **Groundwater Conditions**), groundwater is not expected to be a major concern during construction at the recommended bearing depth. However, depending on climatic conditions, groundwater levels may vary from the levels observed during our field program. Water must not be allowed to accumulate in the bottom of the footing excavations. The contractor should be prepared to remove water from the drilled footings, if necessary. To reduce the

potential for water seepage into the footing excavation and to minimize disturbance to the bearing area, we recommend that concrete and steel be placed as soon as possible after footing excavations are completed. Preferably, footing excavations should be backfilled with concrete within about 2 to 4 hours of completion of the drilling and in no case should an excavation be left open overnight. The concrete placed in the excavations should have a 6-inch slump with a plus or minus one inch tolerance. The bottom of each footing excavation should be free of all loose materials and/or water, and the bearing surface should be evaluated immediately prior to placing concrete.

Based on the available field and laboratory data, the underreams constructed as described in this report should remain stable for a short period of time. However, if underreams are marginally stable due to water seepage and/or the presence of sloughing soils, successful construction of underreamed footings may be possible by performing the sequence of construction without interruption, that is, each footing drilled, underreamed, and backfilled with concrete in one continuous operation. The contractor must coordinate the operation very closely to have concrete on site at the time each footing is drilled and underreamed so that no shaft or underream is drilled without concrete standing by, ready to be placed. Additional measures to reduce the potential for caving of the underream would be to limit the underream-to-shaft diameter ratio to 2.5:1 or 2:1 or to install straight shaft footings in isolated problem areas. If straight-shaft footings are planned at the site, Terracon should be contacted for additional recommendations.

Grade Beams – Drilled-and-Underreamed Footings

Grade beams associated with the drilled-and-underreamed footings should be designed to span between the footings without subgrade support. Often, a vertical void of about 6 to 8 inches is provided beneath the grade beams in clay soils such as those observed at this site. However, recent experience indicates that the voids beneath the grade beams often fill with water, providing moisture to the surrounding subgrade. Therefore, provided that the subgrade is prepared as recommended in this report, grade beams may be constructed without a void at this site. However, due to the underlying clay soils, nominal upward movement of the grade beams may occur during moisture variations of the subgrade.

If construction of voids beneath the grade beams is planned, proper construction of the voids and soil retainers is very important. If a cardboard carton system is used on this project, we recommend that the carton form supplier provide, during the initial concrete operations, a representative to instruct the work force on the proper installation methods for both the forms and the concrete. In addition, measures should be implemented to provide proper surface drainage away from the structures to reduce the potential for water to access the voids.

Backfill against the outside face of the grade beams should consist of select fill used to prepare the building pad. The select fill should be uniformly compacted to at least 95 percent of the Standard Effort (ASTM D 698) maximum dry density at a moisture content within 2 percent of optimum moisture content.

Foundation Construction Monitoring

The performance of the foundation systems will be highly dependent upon the quality of construction. Thus, we recommend that subgrade preparation, fill compaction, and foundation installation be observed full time by an experienced Terracon soil technician under the direction of our Geotechnical Engineer. During foundation construction, the base of the footing excavations should be observed to evaluate the condition of the subgrade. We would be pleased to develop a plan for compaction and foundation installation observation to be incorporated in the overall quality control program.

Construction Adjacent to Existing Building

Based on the information provided to us, we understand that the exterior storage building expansion is planned to be built immediately adjacent and connected to the existing storage building. Due to the independence of the existing and proposed foundation systems, differential movements may occur between the foundation systems. The magnitude of the differential movement will be primarily dependent upon the stability of the moisture content of the near-surface soils, the quality of foundation construction and subgrade preparation utilized for the building additions, and the performance of the foundation system of the existing structure. Therefore, any members or connections of the new building additions which are common to the adjacent existing structure should be designed such that they are tolerant to differential movements whenever possible.

Floor Slabs

As stated previously, we understand finished floor elevation for the exterior storage building expansion will likely be 101.82 feet to match the finished floor elevation of the existing building. Based on our review of the topographic survey provided by Auric Engineers on June 5, 2025, existing grades within the exterior storage building expansion range from about 100 feet to 101 feet. Therefore, we understand finished floor elevation of the proposed exterior storage building expansion is planned to be about one to two feet above existing grade. We understand finished floor elevation for the proposed transportation and operation and warehouse buildings are planned to be about 100 feet. Existing grades within the building range from about 97 feet to 99 feet. Therefore, we understand finished floor elevation of the proposed transportation and operation and warehouse buildings is planned to be about one to three above existing

grade. If the grading is planned to be altered from what has been previously described, Terracon should be notified to review and/or modify our recommendations given in this subsection.

The near surface soils observed at this site generally exhibited a moderate to high expansion potential. These soils can subject the interior floor slab of the buildings to significant movements (due to shrinking and swelling) with fluctuations in their moisture content. This movement potential is influenced primarily by the properties of the subgrade soils, as well as the moisture content of the subgrade at the time of construction, overburden pressures, and the stability of the moisture contents throughout the life of the buildings. Based on the information developed from our field and laboratory programs and on method TEX-124-E in the Texas Department of Transportation (TxDOT) Manual of Testing Procedures, we estimate that the subgrade soils at this site exhibit a Potential Vertical Rise (PVR) of up to approximately 2¾ inches. Therefore, we highly recommend that the near-surface soils be prepared as stated below to reduce the potential for slab movement associated with volumetric changes of the near-surface clay soils due to moisture variations to a more acceptable level. The actual movements could be greater if poor drainage, ponded water, and/or other sources of moisture are allowed to infiltrate beneath the building after construction.

The most common method of subgrade preparation to reduce potential expansion of the subgrade would be to provide a pad of properly placed and compacted select fill beneath the grade-supported floor slabs. The corresponding decrease in the potential soil movements is primarily a function of the fill pad thickness and the moisture levels of the underlying clay subgrade. While the indicated preparations do not eliminate the potential for soil movement, the magnitude of such movements should be reduced to more acceptable levels. To provide uniform support to the floor slab and to reduce the estimated PVR to approximately one inch or less, we recommend that a minimum 60 inches of properly placed and compacted select fill material be constructed immediately beneath the buildings. The select fill pad should extend a minimum of 5 feet beyond the edge of the building areas. The final exterior grade adjacent to the building should be sloped to promote effective drainage away from the building.

Select fill should be utilized for all grade adjustments within the proposed building areas. The subgrade and select fill soils should be prepared as outlined in **Earthwork**, which contains material and placement requirements for select fill, as well as other subgrade preparation recommendations.

The subgrade soils for flatwork outside of the buildings which will be sensitive to movement should be prepared as discussed previously. This preparation will be important on surrounding sidewalks and paving immediately adjacent to the buildings. If these adjacent flatwork areas are not prepared as stated above for the building areas, the estimated PVR for these areas could approach those indicated previously for in-situ conditions. If the soils swell in these areas, this movement could result in significant

distress to the adjacent sidewalks and paving and possibly result in reversed drainage (flow of runoff toward the structure) around the perimeter of the buildings.

Underground Utility Construction Considerations

We understand that the maximum embedment depth of underground utilities is planned to be approximately 10 feet below existing grade. The utility construction considerations are provided below based on the soil and groundwater conditions observed during our field and laboratory programs.

Temporary Groundwater Control

As stated previously, groundwater was not observed in borings B-1 through B-17 during or upon completion of drilling. Excavations for the underground utilities that extend into near-surface silt/sand and clayey soils can likely be completed without advance dewatering. Groundwater in clays is typically controlled by sumps and pumps positioned at the bottom of the excavation.

The suggested method given above serves as a guideline for groundwater control. Other appropriate means may be required for groundwater control during construction. Control of groundwater should be accomplished in a manner that will preserve the strength of the soils, will not cause instability of the excavation, and will not result in damage to existing structures, if any. If necessary, the water should be lowered in advance of excavation by wellpoints, deep wells, eductors, or similar methods. Open pumping should not be permitted if it results in boils, loss of fines, softening of the subgrade, or excavation instability. Wellpoints, deep wells, and eductors should be installed with suitable screen and filter so that pumping of fines does not occur.

As stated previously, the groundwater levels will fluctuate with seasonal and climatic changes and should be evaluated just prior to construction. To further evaluate the groundwater at the time of construction, piezometers can be set just prior to construction. As an alternative, test pits may be excavated to the planned utility depth. Based on the results, the contractor should determine effective methods of groundwater management prior to starting excavation operations.

Excavation Considerations

For this project, either excavated side slopes or vertical cut excavations are feasible. For excavations deeper than 5 feet, the contractor should use a trench box or shoring and bracing as necessary to maintain a safe and clean excavation which meets Occupational Safety and Health Administration (OSHA) requirements.

Excavations must be performed and evaluated under the supervision of the contractor's designated Competent Person. The Competent Person, (as defined by the OSHA Standard, 29 CFR Part 1926.650 to .652, Subpart P - Excavations), must evaluate the excavations at the time of construction activity to safeguard workers and also determine the OSHA Soil Classification at the time of construction based on the soils observed in the excavation. All outfall structure related excavations should meet HCFCD Specification Section No. 02316 – Structural Excavating and Backfilling and OSHA requirements.

As a safety measure, no equipment should be operated within 5 feet of the edge of the excavation and no materials should be stockpiled within a horizontal distance equal to the excavation depth for the utility line. Excavations should not approach closer than a horizontal distance equal to the excavation depth from existing structures without some form of protection for the existing facilities. The maximum height of stockpiled material should not be greater than 4 feet. Proper berming or ditching should be performed to divert any surface runoff away from the excavation.

Excavations should be performed with equipment capable of providing a relatively clean bearing area. Excavating equipment should not disturb the soil beneath the design excavation bottom and should not leave loose soil in the excavation. The excavation bottom should be properly sloped to allow water infiltrating into the excavation to be collected at a convenient location along the edge of the excavation. Water should not be allowed to stand within the bearing area. The bearing surface should be protected against disturbance and deterioration by completing the utility construction operations as quickly as possible.

Uplift Pressures

Uplift forces on below-grade structures such as manholes will be generated by a difference in water level in the soil adjacent to the structure and inside the structure. If the backfill around any buried structure is a sand or silt material, the backfill will approach saturation during periods of heavy rainfall and the effective static water level will be at the surface. The uplift pressures will be resisted by adhesion or skin friction of the soil to the structure wall and by the dead weight of the structure. An allowable skin friction for an engineered clay fill compacted to a minimum of 95 percent of the material's Standard Effort (ASTM D 698) maximum dry unit weight may be considered to be 300 psf. The upper 4 feet of skin friction should be neglected for a clay backfill due to potential for soil shrinkage away from the structure. Sand backfill, compacted to at least 70 percent of the maximum relative density (ASTM D 4253 and 4254), may be considered to have an allowable skin friction of zero at the surface varying linearly 70 psf at depth of 10 feet below grade.

An alternate design method would be to place a heel extending out from the utility foundation into the backfill and rely on the weight of the soil above the heel on a 4-vertical to 1-horizontal slope to resist the uplift forces. The unit weight of soil above and

below the water table for a properly compacted backfill will be 120 pcf and 60 pcf, respectively. The preparation of the upper 3 feet of soil immediately above the heel is critical to reduce the possibility of an upward bearing failure. The entire thickness of fill should be compacted to the above recommended values.

If the underground structures are installed by excavating from the inside and allowing the structure to sink under its own weight, the soil contact may be very low immediately after construction due to the annulus created during construction. In this case, the uplift pressure must be resisted by structural dead weight or by restoring the contact between the soil and the structure. If the annulus is open, grouting would be one means to restore skin frictional resistance. If grouted, a nominal allowable skin friction of 100 psf may be used to compute uplift resistance.

Lateral Earth Pressures

Backfill around embedded structures will impose active to at-rest earth pressures against the embedded walls. Design lateral earth pressures for backfill are estimated to be equivalent to a fluid pressure of 90 pounds per cubic foot (pcf) for clean sand backfill and 110 pcf for in-situ native clay backfill. These pressures include hydrostatic pressures but do not include surcharge forces imposed by construction or vehicular loading. The lateral pressure produced by surcharge may be computed as 50 percent of the vertical surcharge pressure applied as a constant pressure over the full depth of the buried structure. A minimum 2-foot compacted clay seal should be placed at the top of sand backfill to reduce the amount of infiltration of surface water.

Utility Bedding

The subgrade and bedding for all storm and sewer lines should conform to the latest Montgomery County specifications or other appropriate standards for utility bedding details. For excavations extending below groundwater or where wet sand conditions are encountered, modified bedding details for wet conditions should be used unless the sands can be successfully dewatered to produce a dry, stable trench bottom, then the details for ordinary pipe bedding may be used.

The excavations should be inspected to detect any variation in soil conditions from that found in our field and laboratory programs. Any changes noted in the soil stratigraphy should be brought to the attention of Terracon so they can then be assessed and changes to the required bedding details can be made.

Utility Backfill

The type of fill placed above the utility bedding will depend on whether the surface above the utility line is covered with pavement or will consist of unpaved ground. If the

surface is to be unpaved ground then the backfill may consist of the excavated, in-situ soils. The in-situ soils used as backfill should be placed in thin lifts, moisture conditioned to within 3 percent of optimum moisture content, and compacted to at least 95 percent of the material's maximum dry density as determined by the Standard Effort (ASTM D 698). Within pavement areas, the backfill should consist of cement treated sand to within 12 inches of the top of the subgrade compacted to at least 95 percent of the material's Standard Effort (ASTM D 698) maximum dry density. The upper 12 inches may consist of clean soils compacted to at least 95 percent of the material's Standard Effort (ASTM D 698) maximum dry density within 2 percent of optimum moisture content.

Prior to any filling operations, samples of the proposed borrow materials should be obtained for laboratory moisture-density testing. The tests will provide a basis for evaluation of fill compaction by in-place density testing. A qualified soil technician should perform sufficient in-place density tests during the filling operations to evaluate that proper levels of compaction are being attained.

Pavements

Once the subgrade is properly prepared, a rigid pavement system may be considered for this project as planned. Detailed traffic loads and frequencies were not available. However, we understand that traffic will primarily consist of passenger vehicles and buses in the parking areas and passenger vehicles combined with garbage trucks, buses, and large multi-axle delivery trucks from time-to-time in driveway areas.

Tabulated in the following table are the assumed traffic frequencies and loads used to design pavement sections for this project. When actual traffic conditions have been determined Terracon should be contacted to review the information to consider a need for revision of the pavement design and related recommendations.

Pavement Area	Traffic Design Index[1]	Description
Automobile Parking Areas	DI-1	Light traffic (Few vehicles heavier than passenger cars, no regular use by heavily loaded two axle trucks.) (EAL[2] < 6)
Driveways (Light Duty)	DI-2	Medium to light traffic (Similar to DI-1 including not over 50 loaded two axle trucks or lightly loaded larger vehicles per day. No regular use by heavily loaded trucks with three or more axles.) (EAL = 6-20)
Driveways and Truck/Bus Traffic Areas (Medium Duty)	DI-3	Medium traffic (Including not over 300 heavily loaded two axle trucks/buses plus lightly loaded trucks with three or more axles and no more than 30 heavily loaded trucks with more than three axles per day.) (EAL = 21-75)

1. Based on NSSGA traffic design indices.

2. Equivalent daily 18-kip single-axle load applications.

The top 6 inches of the finished subgrade soils directly beneath the pavements should be chemically treated with lime or a mixture of lime and flyash. The decision about the type and proper amount of additive should be made after the subgrade is open for inspection. Chemical treatment will increase the supporting value of the subgrade and decrease the effect of moisture on subgrade soils. These 6 inches of treatment is a required part of the pavement design and is not a part of the site and subgrade preparation for wet/soft subgrade conditions.

Listed below are pavement component thicknesses, which may be used as a guide for pavement systems at the site for the traffic classifications stated herein. These systems were derived based on general characterization of the subgrade. Specific testing (such as CBR's, resilient modulus tests, etc.) was not performed for this project to evaluate the support characteristics of the subgrade.

Rigid Pavement Section			
Component	**Material Thickness, Inches**		
	DI-1	**DI-2**	**DI-3**
Reinforced concrete	5.0	6.0	7.0
Treated subgrade	6.0	6.0	6.0

Waste dumpster areas and bus driveways should be constructed of at least 7 inches of reinforced concrete pavement. The concrete pad areas should be designed so that the vehicle wheels of the collection truck are supported on the concrete while the dumpster is being lifted to support the large wheel loading imposed during waste collection.

Presented below are our recommended material requirements for the various pavement sections.

Reinforced Concrete Pavement – The materials and properties of reinforced concrete pavement should meet applicable requirements in the ACI Manual of Concrete Practice. The portland cement concrete mix should have a minimum 28-day compressive strength of 3,500 psi.

If river gravel is planned to be utilized in the portland cement concrete mix, Terracon should be contacted for additional services. The presence of river gravel in the portland cement concrete mix can result in excessive cracking and distress to the concrete pavement.

Reinforcing Steel – ACI recommendations indicate that distributed steel reinforcement is not necessary when the pavement is properly jointed to form short panel lengths that will help reduce intermediate cracking. Provided the concrete pavement is designed and constructed as stated herein, the installation of reinforcing steel is optional and should

be evaluated by the design team. Proper layout and installation of the joints within the pavement is critical to help control intermediate cracking.

If reinforcing steel is planned to be utilized in the concrete pavement by the design team, the following amount of reinforcing steel should be used as a guideline:

DI-1: #3 bars spaced at 18 inches or #4 bars spaced at 24 inches on centers in both directions.
DI-2: #3 bars spaced at 12 inches or #4 bars spaced at 18 inches on centers in both directions.
DI-3: #4 bars spaced at 18 inches on centers in both directions.

Control Joint Spacing – ACI recommendations indicate that control joints should be spaced at a maximum spacing of 30 times the thickness of the pavement for unreinforced parking lot pavements. Furthermore, ACI recommends a maximum control joint spacing of 12.5 feet for 5-inch pavements and a maximum control joint spacing of 15 feet for 6-inch or thicker pavements. Sawcut control joints should be cut within 4 to 12 hours of concrete placement to help control the formation of plastic shrinkage cracks as the concrete cures. The depth of the joint should be at least one-quarter of the slab depth when using a conventional saw or one inch when using early entry saws. The width of the cut should be in accordance with the joint sealant manufacturer recommendations.

Expansion Joint Spacing – ACI recommendations indicate that regularly spaced expansion joints may be deleted from concrete pavements. Therefore, the installation of expansion joints is optional and should be evaluated by the design team.

Construction Joints – When concrete is planned to be placed at different times, we recommend the use of a construction joint between paving areas. The construction joint should consist of a butt joint (not a keyway joint).

Concrete Curing Compound – A concrete curing compound, such as a Type 2 membrane curing compound conforming to TxDOT DMS-4650, "Hydraulic Cement Concrete Curing Materials and Evaporation Retardants" or equivalent, should be applied to the concrete surface immediately after placement of the concrete in accordance with TxDOT 2014 Standard Specifications Item 360.

Dowels at Expansion/Construction Joints – The dowels at expansion/construction joints should be spaced at 12-inch centers and consist of the following:

DI-1: 5/8-inch diameter, 12-inches long with 5-inch embedment.
DI-2: 3/4-inch diameter, 14-inches long with 6-inch embedment.
DI-3: 7/8-inch diameter, 14-inches long with 6-inch embedment.

Lime Treated Subgrade –The on-site medium to high plasticity soils (PI>20) should be treated with lime in accordance with the TXDOT 2014 Standard Specifications Item 260. The amount of lime should be determined for subgrade soils by conducting laboratory tests just prior to construction. Based on the classification test results, we anticipate that about 5 to 7 percent lime by dry weight may be used for estimating and planning. The percentages are given as application by dry weight and are typically equivalent to about 25 to 35 pounds of lime per square yard per 6-inch depth. The pulverization, mixing and curing of the lime treated subgrade is of particular importance in clay soils. The subgrade should be compacted to a minimum of 95 percent of the Standard Effort (ASTM D 698) maximum dry density at a moisture content between optimum and 4 percent wet of the optimum moisture content.

Lime-Flyash Treated Subgrade – The on-site silt/sandy soils and low plasticity soils (PI≤20) should be treated with lime-flyash in accordance with TxDOT 2014 Standard Specifications Item 265. Based on the classification test results, we recommend about 2 to 3 percent lime and 7 to 8 percent flyash by dry weight be used for estimating and planning. The percentages are given as application by dry weight and are typically equivalent to about 10 to 15 pounds of lime and 35 to 40 pounds of flyash per square yard per 6-inch depth. Lime-flyash is also available pre-mixed, typically in percentages of 20 to 30 percent lime and 70 to 80 percent flyash. These pre-mixed products may be used if preferred at a rate of 50 pounds per square yard per 6-inch depth. The actual quantity of lime-flyash should be determined at the time of construction based on laboratory testing conducted using bulk samples of the subgrade soils. The subgrade should be compacted to at least 95 percent of the Standard Effort (ASTM D 698) maximum dry density at a moisture content within 2 percent of the optimum moisture content.

Preferably, traffic should be kept off the treated subgrade for 7 days to facilitate curing of the soil-chemical mixture. In addition, the subgrade is not suitable for heavy construction traffic prior to paving.

The pavement design methods described above are intended to provide structural sections with adequate thickness over a particular subgrade such that wheel loads are reduced to a level the subgrade can support. The support characteristics of the subgrade for pavement design do not account for shrink/swell movements of an expansive clay subgrade such as the soils encountered at this site. Thus, the pavement may be adequate from a structural standpoint, yet still experience cracking and deformation due to shrink/swell related movement of the subgrade. Post-construction subgrade movements and some cracking of pavements are not uncommon for subgrade conditions such as those observed at this site. Reducing moisture changes in the subgrade is important to reduce shrink/swell movements. Although chemical treatment will help to reduce such movement/cracking, this movement/cracking cannot be economically eliminated.

Related civil design factors such as subgrade drainage, shoulder support, cross-sectional configurations, surface elevations and environmental factors which will significantly affect the service life must be included in the preparation of the construction drawings and specifications. Normal periodic maintenance will be required.

Long-term pavement performance will be dependent upon several factors, including maintaining subgrade moisture levels and providing for preventative maintenance. The following recommendations should be implemented to help promote long-term pavement performance:

- The subgrade and the pavement surface should be designed to promote proper surface drainage, preferably at a minimum grade of 2 percent;
- Install joint sealant and seal cracks immediately;
- Extend curbs into the treated subgrade for a depth of at least 4 inches to help reduce moisture migration into the subgrade soils beneath the pavement section; and
- Place compacted, low permeability clayey backfill against the exterior side of the curb and gutter.

Preventative maintenance should be planned and provided for the pavements at this site. Preventative maintenance activities are intended to slow the rate of pavement deterioration, and consist of both localized maintenance (e.g. crack and joint sealing and patching) and global maintenance (e.g. surface sealing). Prior to implementing any maintenance, additional engineering observations are recommended to determine the type and extent of preventative maintenance.

Detention Pond

Based on the information provided to us, we understand a dry-bottom detention pond with a footprint area of about 27,500 square feet and a maximum depth of 15 feet below existing grade and sideslope declinations no steeper than 3(horizontal):1(vertical) is planned to be located in the northwest portion of the property. We understand a portion of the detention pond will be constructed with retaining walls. The vertical-walls are planned to be either cast-in-place cantilevered retaining walls or segmented block gravity walls.

The cantilevered retaining wall footing should bear in undisturbed native fat clay at a depth of at least 3 feet below the bottom of the pond with a shear key located at the outer end of the heel embedded at least 3 feet below the bottom of the footing resting in undisturbed native fat clay.

The gravity wall should bear in undisturbed native fat clay at a depth at least 5 feet below the bottom of the pond. The gravity wall should be at least 5 feet thick.

The wall footing for both the gravity wall and cantilevered retaining wall may be designed for a net allowable bearing pressure of 2,000 psf. An allowable frictional resistance of 250 psf can be utilized on the base of the footings. This allowable bearing pressure and frictional resistance is based on the assumption that the base of the foundation excavation is relatively dry, undisturbed and clean of loose soil. The bearing surface should be evaluated immediately prior to placing concrete.

The following paragraphs present our recommendations regarding allowable sideslopes, excavation and groundwater control, erosion concerns, and potential use of excavated soils as fill.

Slope Stability Analyses

Slope stability analyses were performed utilizing a commercial slope stability software program, SLIDE2 v. 9.02 (Rocscience). This software calculates the factor of safety against slope failure using a two-dimensional limiting equilibrium method. The slope stability analyses were performed for the short-term and long-term conditions for the pond configurations presented above.

- Short-Term – This condition was analyzed to evaluate the stability of the retaining walls immediately after construction is complete. For the short-term cases, we assumed groundwater to be at the bottom of the pond during construction. Short-term (total stress) soil parameters were utilized because the soil is not anticipated to have had time to drain since completion of construction. A surcharge of 150 psf was also imposed at the top of the detention pond banks. The concrete cantilevered retaining wall is assumed to be a structural component of infinite strength (as defined in SLIDE) to withstand lateral earth pressure from the retained soil. The gravity wall is assumed to be a structural component with unit weight 120 pcf, cohesion 15,000 psf, and angle of internal friction of 34 degrees. The cement stabilized sand for the gravity wall is assumed to have an angle of internal friction of 40 degrees.

- Long-Term – The long-term case represents steady-state piezometric and stress conditions. For the long-term case, the analyses were performed considering the water at the bottom of the pond. When a slope is excavated, altered stress conditions create pore pressure changes within the slope and the undrained strength of the bank soils is mobilized. With time, the soil pore pressures adjust to the imposed stress and piezometric conditions, and the bank soils rely on their available strength for long-term stability. Therefore, effective stress soil parameters were used in these analyses. A surcharge of 150 psf was also imposed at the top of the detention pond. The concrete cantilevered retaining wall is assumed to be a structural component of infinite strength (as defined in SLIDE) to withstand lateral earth pressure from the retained soil. The gravity wall is assumed to be a structural component with a unit weight of 120 pcf, cohesion of

15,000 psf, and angle of internal friction of 34 degrees. The cement stabilized sand for the gravity wall is assumed to have an angle of internal friction of 40 degrees.

Based on the field and laboratory test results and our past experience with similar soils, the strength parameters in the following table was used in the slope stability analyses.

Detention Pond Soil Parameters for Slope Stability Analyses						
Soil Description	Depth (feet) [1]	Total Unit Weight (pcf)	Short-Term		Long-Term	
			c (psf)	φ (deg)	c′ (psf)	φ′ (deg)
Sandy Lean Clay	0 to 6	125	1,500	0	150	20
Fat Clay	6 to 30	130	2,000	0	200	16

1. Below existing grade.

Where,

c	Unconsolidated-Undrained Cohesion
φ	Unconsolidated-Undrained Friction Angle
c′	Consolidated-Drained Cohesion
φ'	Consolidated-Drained Friction Angle

The results of the analyses are summarized in the following table. We also analyzed the slope with a maximum depth of 15 feet below existing grade and sideslope declination of 3(horizontal):1(vertical).

Cross-section	Height (ft)	Computed Factor of Safety	
		Short-Term	Long-Term
Segmented block gravity wall	15	5.1	1.5
Cantilevered retaining wall	15	5.1	1.5
3(horizontal):1(vertical) slope	15	6.0	1.9
Minimum Acceptable Factor of Safety		**1.3**	**1.5**

The computed factors of safety for the short-term failure mode were greater than 1.3 and the long-term failure mode was about 1.5, for the proposed retaining wall configurations analyzed, which are considered acceptable. Additional slope stability analyses should be performed if the depth of the proposed detention pond increases or the proposed retaining wall configurations are changed. The internal stability of the wall should be performed by the structural engineer.

Lateral Earth Pressures

Lateral earth pressures imposed on retaining walls will depend on the type of backfill soil and ability of the walls to deflect (yield). Presented below are at-rest, active, and passive earth pressure coefficients for various backfill types adjacent to below-grade and above-grade walls. At-rest earth pressures are recommended in cases where negligible wall yield is expected (such as structural below-grade walls). Active earth pressures may be utilized in cases where the walls can exhibit a certain degree of horizontal movement (such as cantilevered retaining walls).

Soil Type	Estimated Total Unit Weight (pcf)	Lateral Earth Pressure Coefficient		
		At-Rest, K_o	Active, K_a	Passive, K_p
On-Site Clay Soils[4]	120	0.7	0.6	---[1]
Select Fill	120	0.7	0.5	2.0[2]
Clean Sand or Gravel	120	0.5	0.3	3.0[2]

1. Passive resistance for on-site undisturbed clay soils may be taken as 1,000 psf.
2. Passive coefficients represent ultimate values. Appropriate safety factors should be applied.
3. The passive pressure along the exterior face of the footings should be neglected within the upper 3 feet due to surface effects.
4. Fat clay soils, such as those observed in Boring B-8 and B-9 are not recommended for use as backfill for the retaining walls.

The equivalent fluid pressures for at-rest, active, and passive conditions are itemized in the following table.

Soil Type	Equivalent Fluid Weight, (pcf) (Drained Condition)		
	At-Rest	Active	Passive [1]
On-Site Clay Soils	100	75	---[1]
Select Fill	84	60	240[2]
Clean Sand or Gravel	60	36	360[2]

1. Passive resistance for on-site undisturbed clay soils may be taken as 1,000 psf.
2. Passive coefficients represent ultimate values. Appropriate safety factors should be applied.

These pressures do not include hydrostatic pressures nor do they include surcharge forces imposed by construction, vehicular, or pedestrian loading. A wall drain is recommended for collection and removal of water from behind the wall. A 2-foot compacted clay soil should be placed at the top of sand backfill to reduce the amount of infiltration of surface water.

For the granular values to be valid, the granular backfill must extend out and up from the base of the wall at an angle of at least 45 and 60 degrees from vertical for the active and passive cases, respectively.

The compactive effort should be controlled during backfill operations since overcompaction can produce lateral earth pressures in excess of at-rest magnitudes. Backfill should be compacted to at least 95 percent of the Standard Effort (ASTM D 698) maximum dry density. Backfill within 5 feet of the walls should be compacted with hand tampers or small equipment to reduce horizontal pressure on the wall. To achieve 95 percent of the Standard Effort (ASTM D 698) maximum dry density with hand or small equipment in this area, placement of the fill in 4-inch lifts may be necessary. A 2-foot compacted clay soil cap should be placed at the top of granular backfill to reduce the amount of infiltration of surface water.

Excavations and Temporary Groundwater Control

Excavations and groundwater control are discussed in the **Underground Utility Construction Considerations** section in this report.

Potential Use of Excavated Soils

The subsurface soils observed at borings B-8 and B-9, which were drilled within the area of the proposed detention pond, generally consisted high plasticity sandy lean clay and fat clay soils (with Atterberg plasticity indices that ranged from 27 to 34 percent). These soils may be used for grade adjustments in the pavement areas provided they are free of organics and debris. The clay fill soils should be compacted as outlined in **Fill Compaction Requirements** in the **Earthwork** section.

Erosion Control

If water flow is permitted along the sideslopes of the pond, the surficial soils will likely erode, causing gradual steepening and subsequent sloughing of the sideslopes. Therefore, the sideslopes should be protected against sheet flow down the banks or concentrated high velocity water flow. Measures to protect the sideslopes may include slope paving, rip-rap, geofabrics, backslope swale drains, or even vegetation with an aggressive root system. Backslope drains and swales should be constructed as soon as

practical to prevent overback runoff. Routine maintenance of the sideslopes should be performed to reconstruct areas where sloughing and/or erosion have occurred.

General Comments

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Variations will occur between exploration point locations, across the site, or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly affect excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety and cost estimating including excavation support and dewatering requirements/design are the responsibility of others. Construction and site development have the potential to affect adjacent properties. Such impacts can include damages due to vibration, modification of groundwater/surface water flow during construction, foundation movement due to undermining or subsidence from excavation, as well as noise or air quality concerns. Evaluation of these items on

nearby properties are commonly associated with contractor means and methods and are not addressed in this report. The owner and contractor should consider a preconstruction/precondition survey of surrounding development. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

Figures

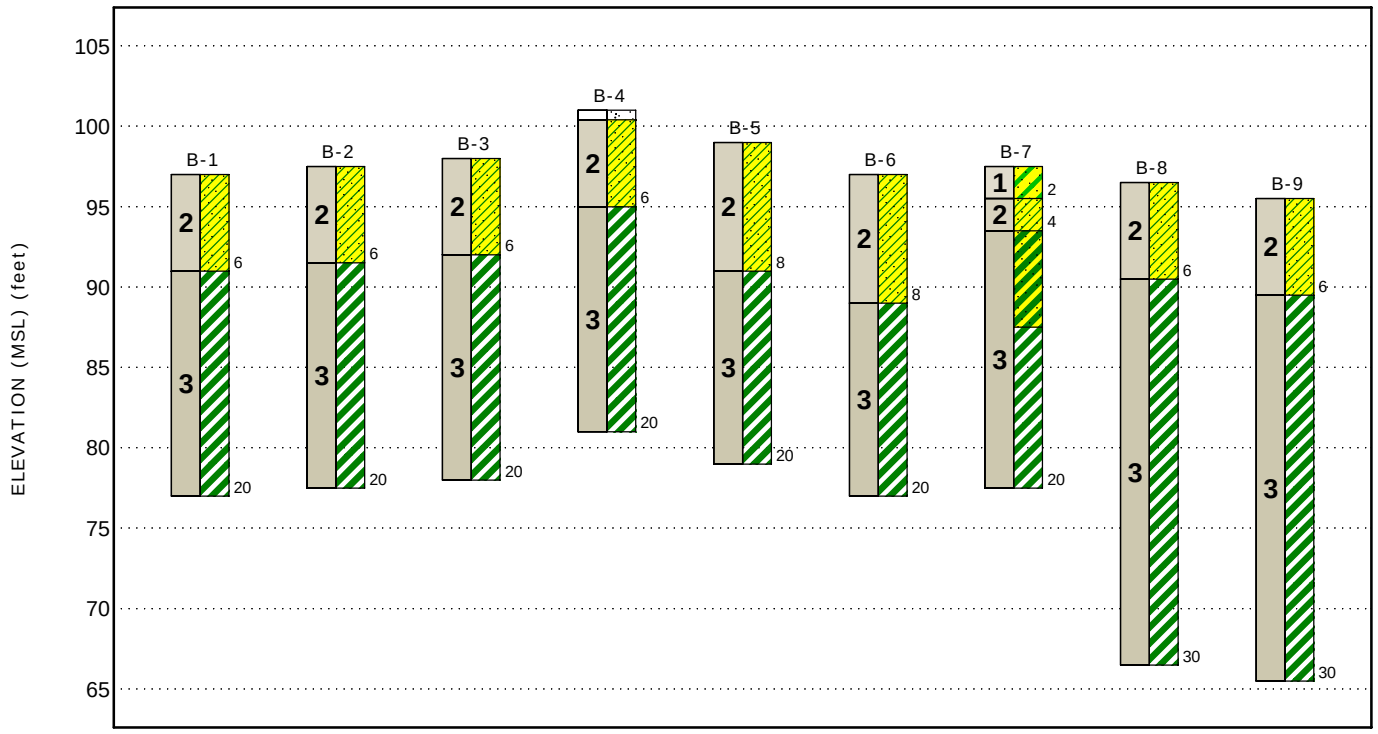
Contents:

GeoModel (2 pages)
Slope Stability Analysis Results (6 pages)

New Caney ISD Transportation Center Expansion
21026 TX-494 Loop | New Caney, Texas
Terracon Project No. 97255039

11133 Interstate 45 S Ste T
Conroe, TX

GeoModel



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description
1	Silty Sand and Clayey Sand	dark gray and tan, very loose to loose, with trace roots, gravel, and clay pockets
2	Sandy Lean Clay	tan, light gray, dark gray, and reddish brown, very soft to very stiff, with trace roots, ferrous stains, and sand pockets
3	Fat Clay and Sandy Fat Clay	tan, light gray, and reddish brown, medium stiff to very stiff, with sand and silt pockets, ferrous stains, calcareous nodules, and slickensides

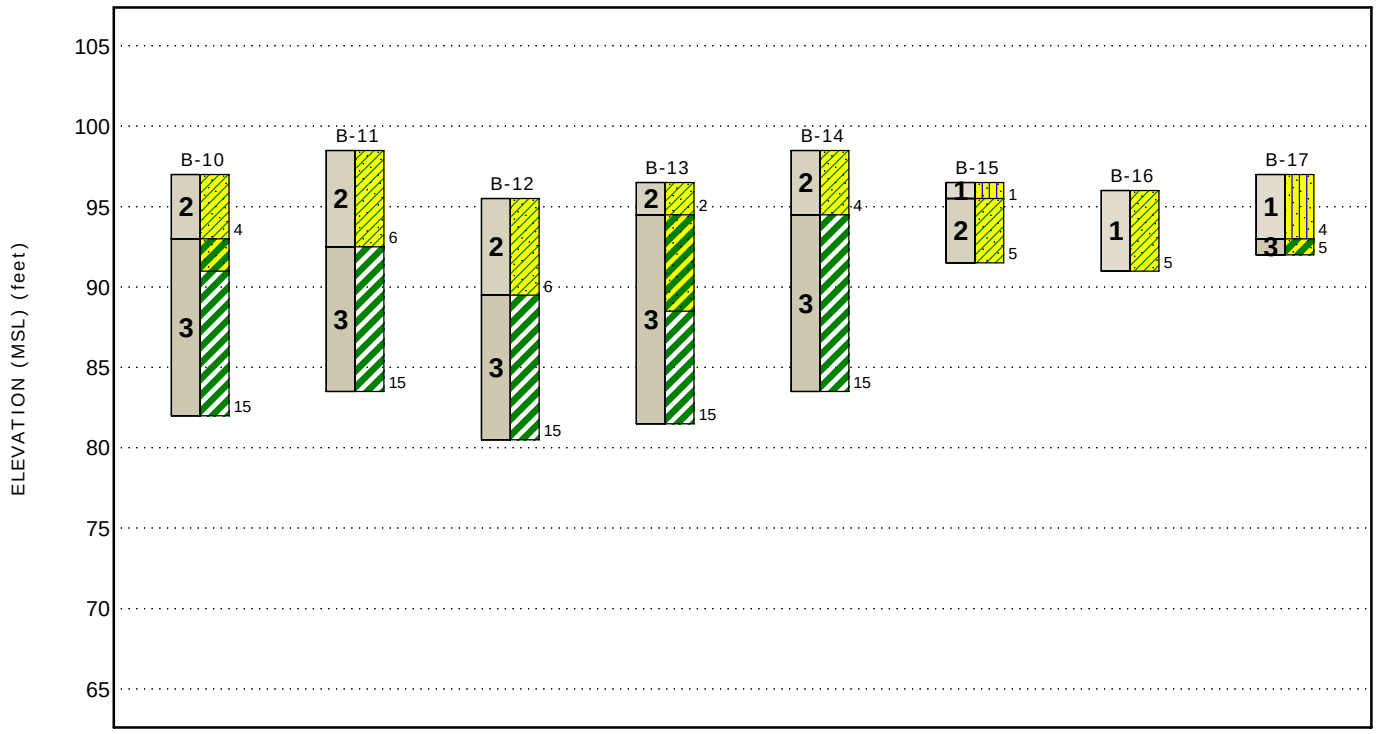
Legend	
Sandy Lean Clay	Fat Clay
Concrete	Clayey Sand
Sandy Fat Clay	

NOTES:
Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project. Numbers adjacent to soil column indicate depth below ground surface.

New Caney ISD Transportation Center Expansion
21026 TX-494 Loop | New Caney, Texas
Terracon Project No. 97255039

Terracon
11133 Interstate 45 S Ste T
Conroe, TX

GeoModel

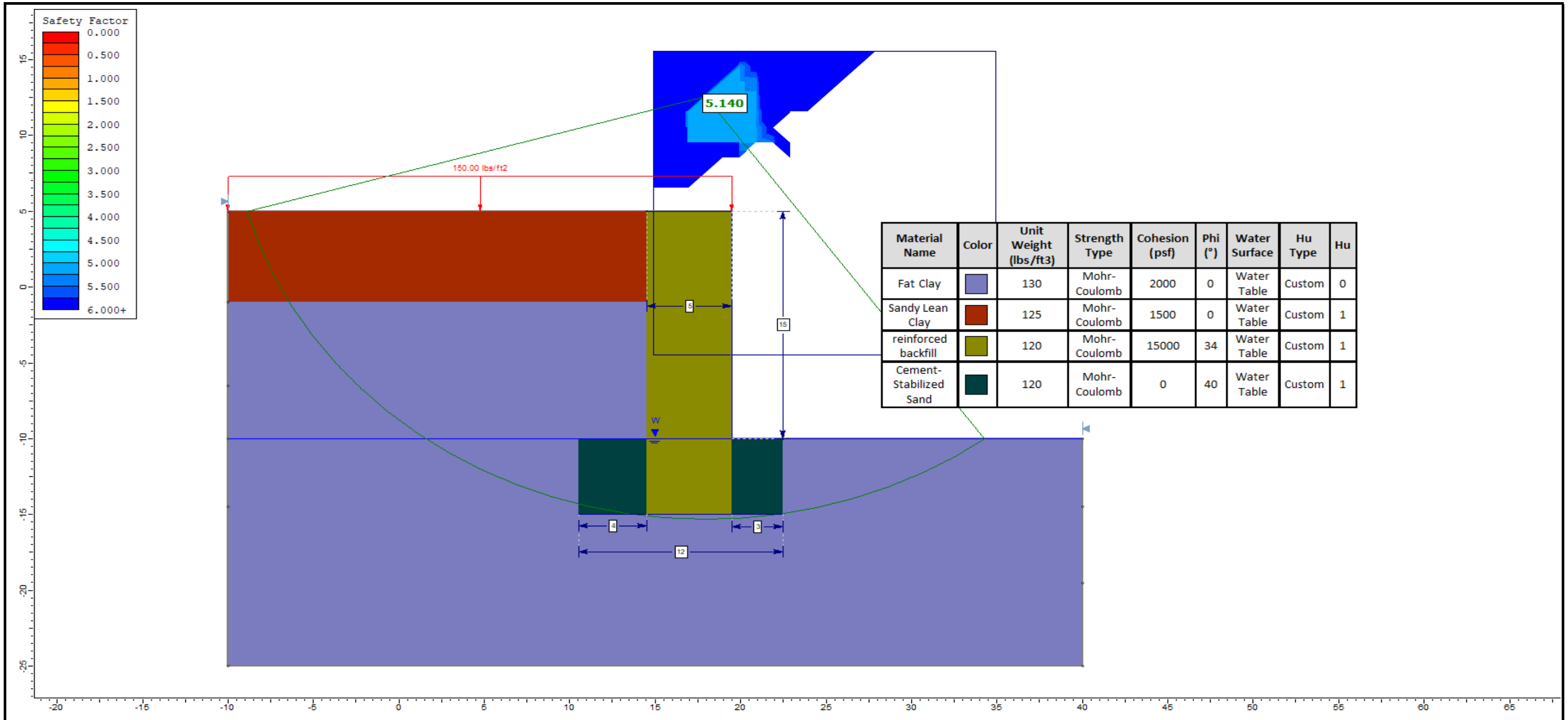


This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description
1	Silty Sand and Clayey Sand	dark gray and tan, very loose to loose, with trace roots, gravel, and clay pockets
2	Sandy Lean Clay	tan, light gray, dark gray, and reddish brown, very soft to very stiff, with trace roots, ferrous stains, and sand pockets
3	Fat Clay and Sandy Fat Clay	tan, light gray, and reddish brown, medium stiff to very stiff, with sand and silt pockets, ferrous stains, calcareous nodules, and slickensides

Legend	
Sandy Lean Clay	Sandy Fat Clay
Fat Clay	Silty Sand

NOTES:
Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project. Numbers adjacent to soil column indicate depth below ground surface.



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (°)	Water Surface	Hu Type	Hu
Fat Clay		130	Mohr-Coulomb	2000	0	Water Table	Custom	0
Sandy Lean Clay		125	Mohr-Coulomb	1500	0	Water Table	Custom	1
reinforced backfill		120	Mohr-Coulomb	15000	34	Water Table	Custom	1
Cement-Stabilized Sand		120	Mohr-Coulomb	0	40	Water Table	Custom	1

Consulting Engineers & Scientists

Slope Stability Analysis: Short-Term

Segmented Block Gravity Wall

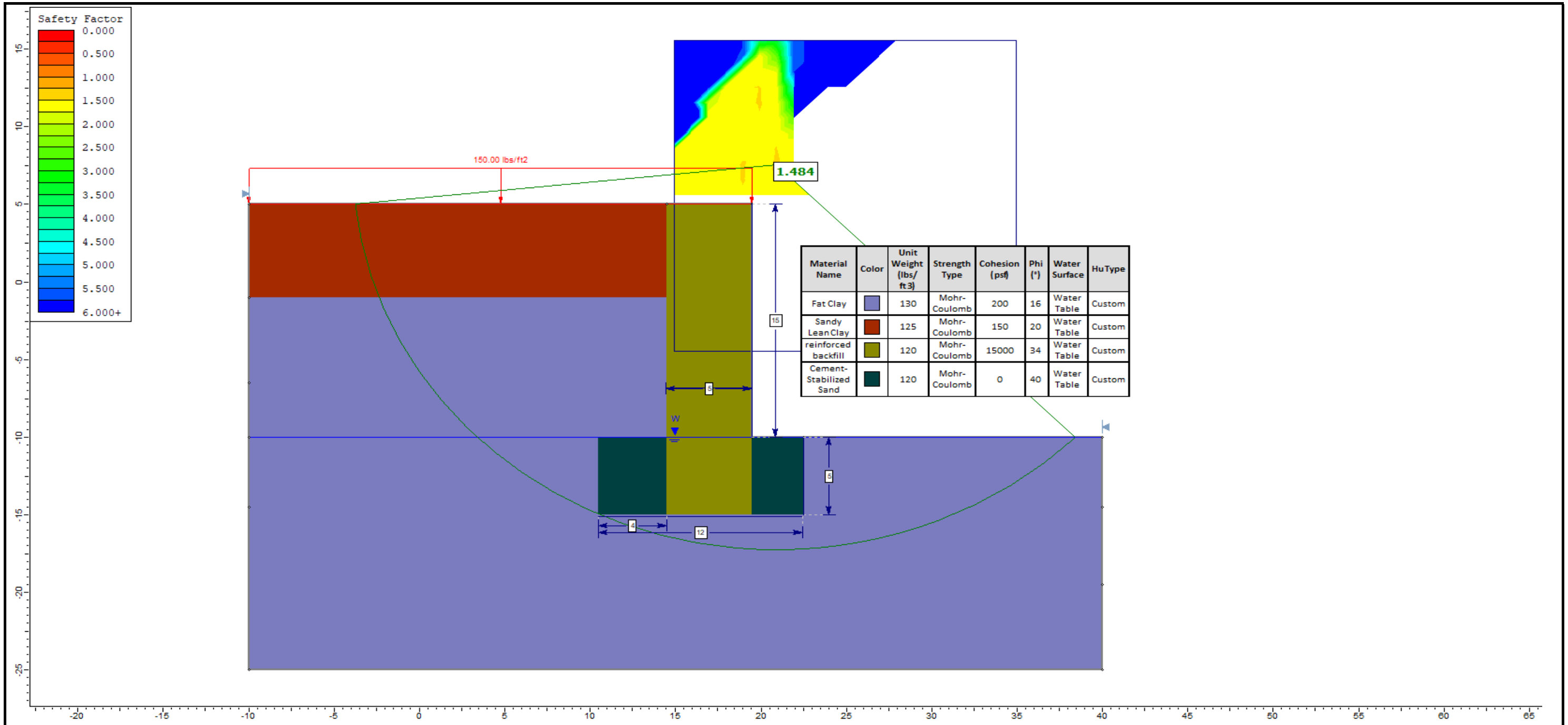
Drawn by: KDC

Reviewed by: AS

Approved by: RCR

New Caney ISD Transportation Center Expansion, New Caney, Texas

Project Number: 97255039



Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (°)	Water Surface	HuType
Fat Clay		130	Mohr-Coulomb	200	16	Water Table	Custom
Sandy Lean Clay		125	Mohr-Coulomb	150	20	Water Table	Custom
reinforced backfill		120	Mohr-Coulomb	15000	34	Water Table	Custom
Cement-Stabilized Sand		120	Mohr-Coulomb	0	40	Water Table	Custom

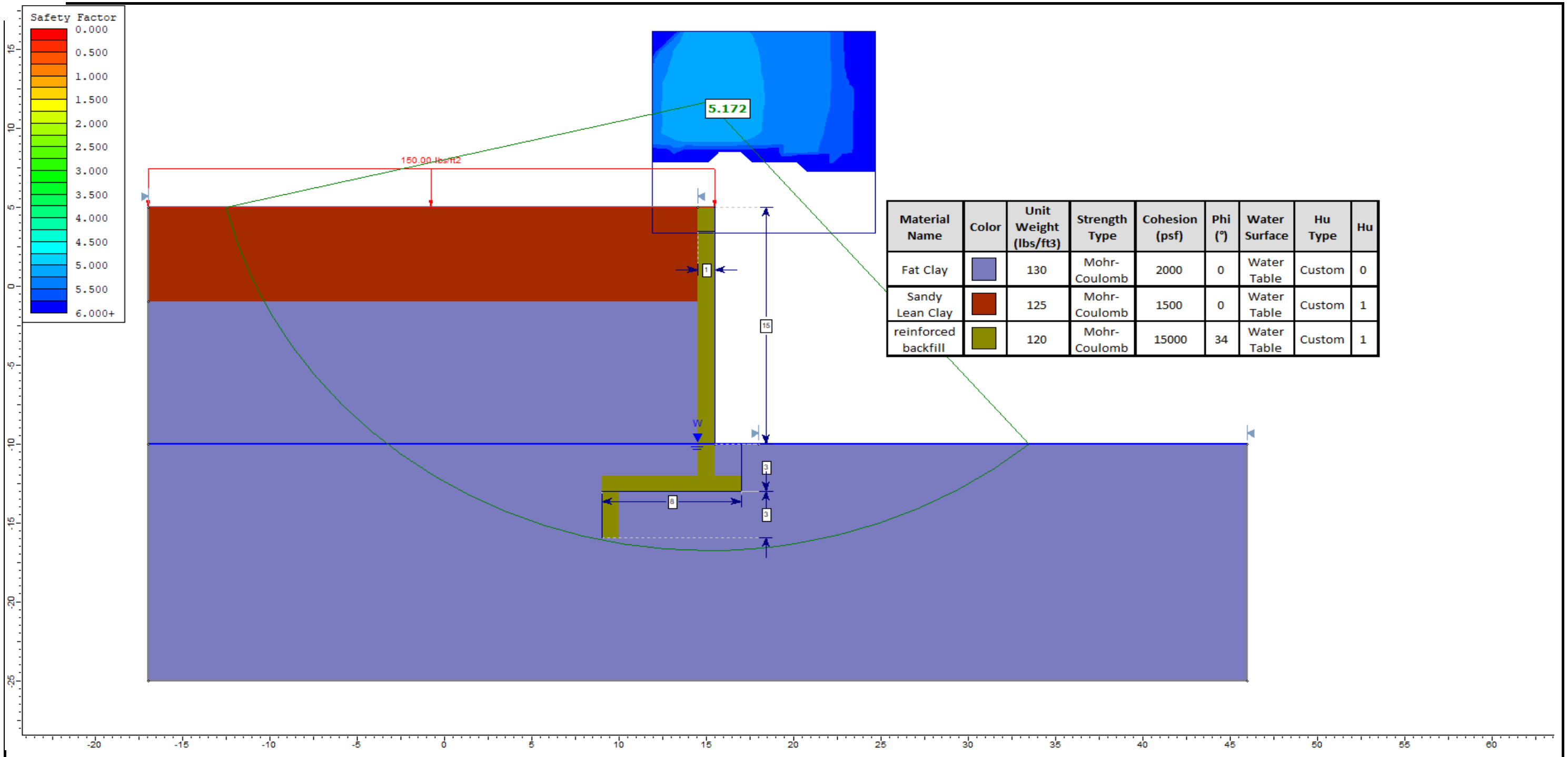
Terracon

Consulting Engineers & Scientists

Slope Stability Analysis: Long-Term

Segmented Block Gravity Wall

Drawn by: KDC	New Caney ISD Transportation Center Expansion, New Caney, Texas	
Reviewed by: AS		
Approved by: RCR	Project Number: 97255039	



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (°)	Water Surface	Hu Type	Hu
Fat Clay		130	Mohr-Coulomb	2000	0	Water Table	Custom	0
Sandy Lean Clay		125	Mohr-Coulomb	1500	0	Water Table	Custom	1
reinforced backfill		120	Mohr-Coulomb	15000	34	Water Table	Custom	1

Consulting Engineers & Scientists

Slope Stability Analysis: Short-Term

Cantilevered Retaining Wall

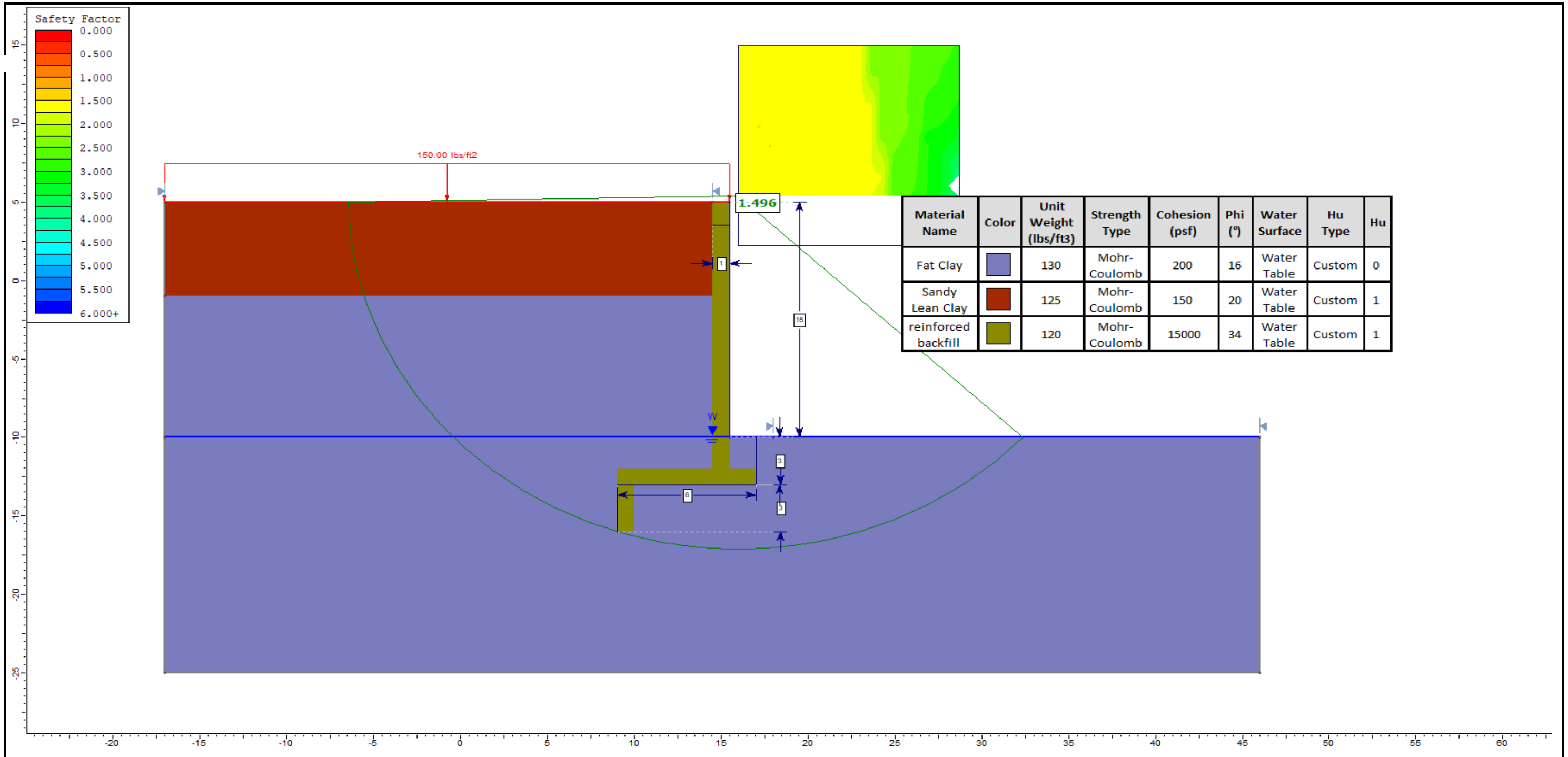
Drawn by: KDC

Reviewed by: AS

Approved by: RCR

New Caney ISD Transportation Center Expansion, New Caney, Texas

Project Number: 97255039



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (°)	Water Surface	Hu Type	Hu
Fat Clay		130	Mohr-Coulomb	200	16	Water Table	Custom	0
Sandy Lean Clay		125	Mohr-Coulomb	150	20	Water Table	Custom	1
reinforced backfill		120	Mohr-Coulomb	15000	34	Water Table	Custom	1

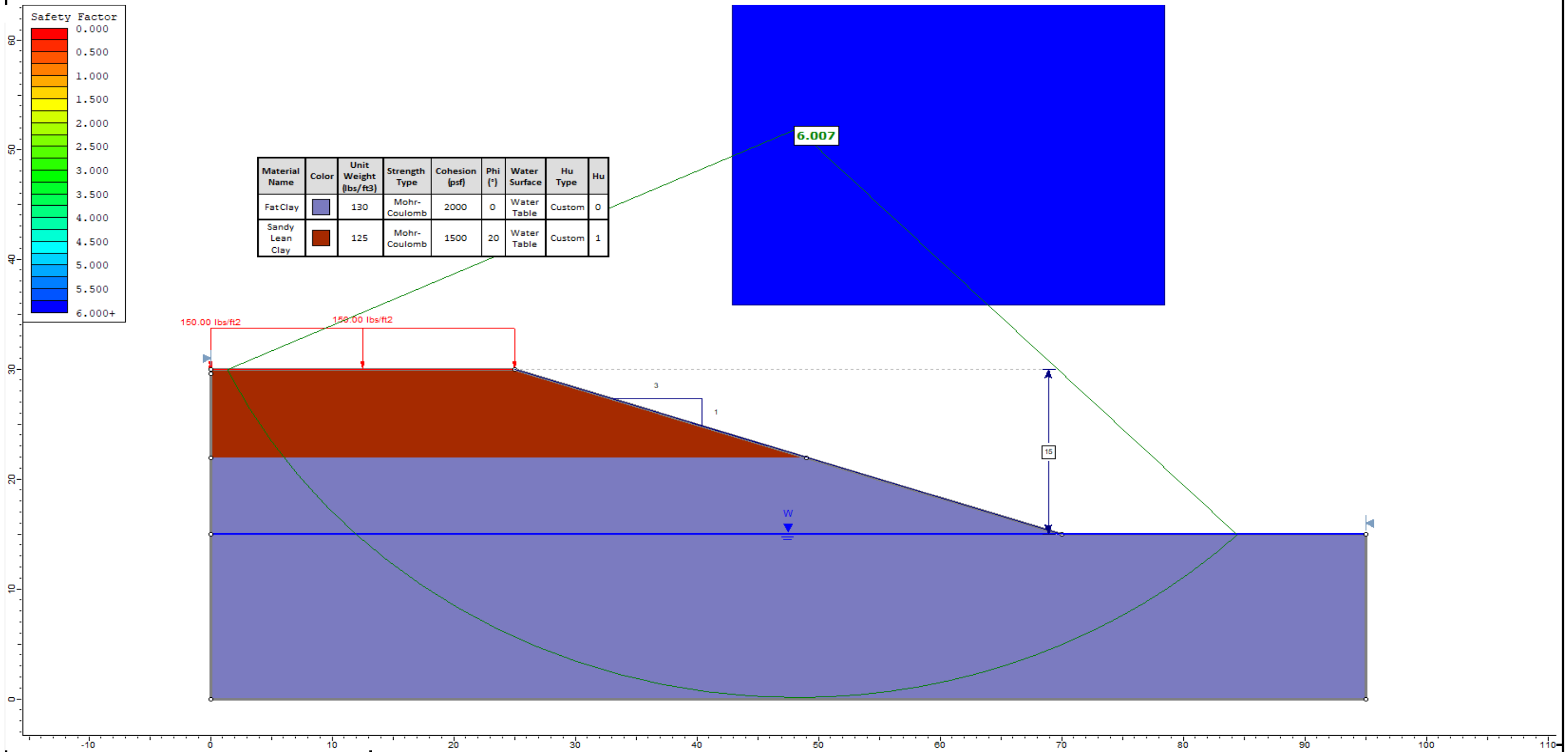
Terracon

Consulting Engineers & Scientists

Slope Stability Analysis: Long-Term

Cantilevered Retaining Wall

Drawn by: KDC	New Caney ISD Transportation Center Expansion, New Caney, Texas	
Reviewed by: AS		
Approved by: RCR	Project Number: 97255039	



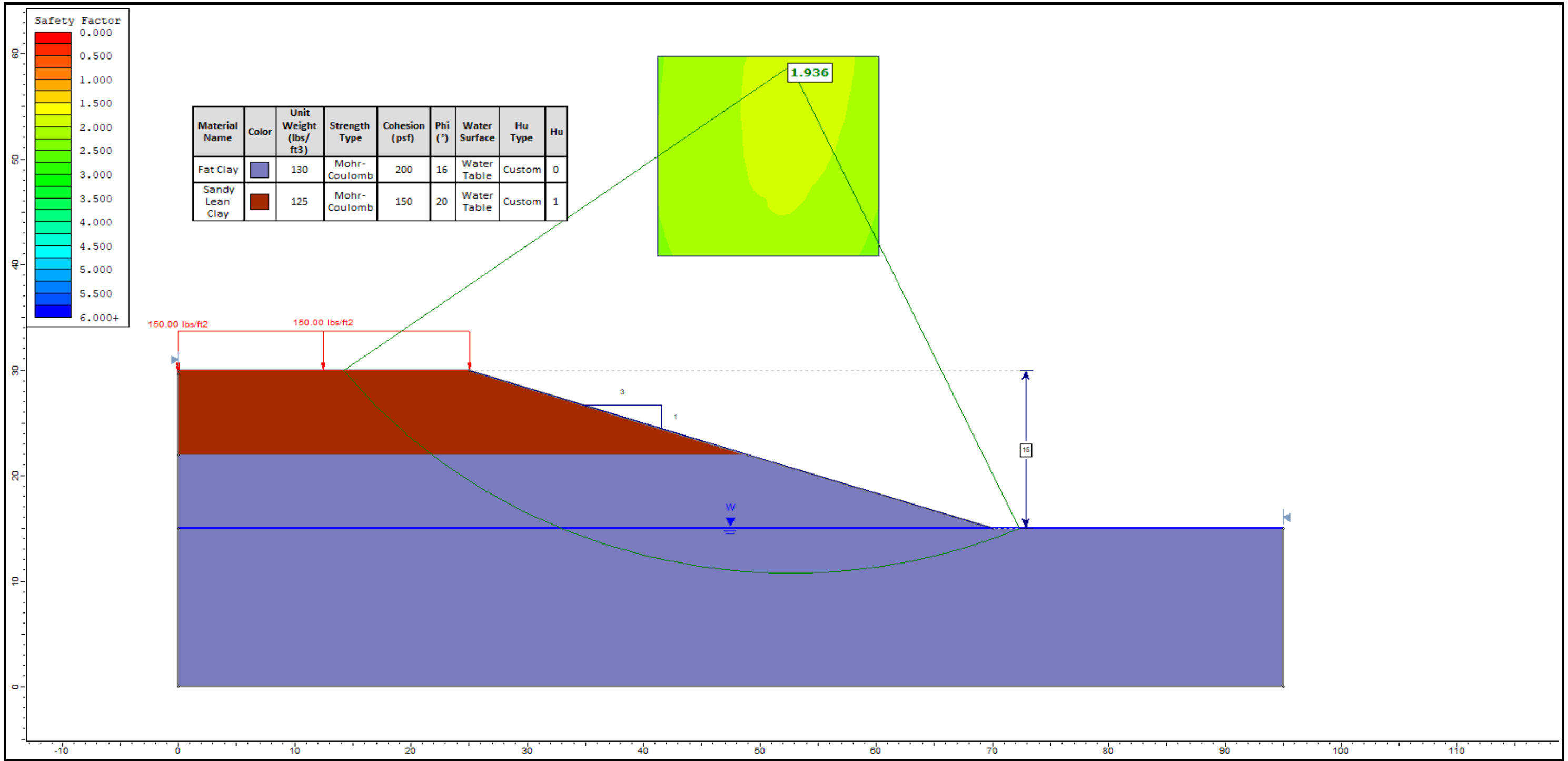
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (°)	Water Surface	Hu Type	Hu
Fat Clay		130	Mohr-Coulomb	2000	0	Water Table	Custom	0
Sandy Lean Clay		125	Mohr-Coulomb	1500	20	Water Table	Custom	1

Consulting Engineers & Scientists

Slope Stability Analysis: Short-Term

3(horizontal) to 1(vertical) slope

Drawn by: KDC	New Caney ISD Transportation Center Expansion, New Caney, Texas
Reviewed by: AS	
Approved by: RCR	Project Number: 97255039



Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (°)	Water Surface	Hu Type	Hu
Fat Clay		130	Mohr-Coulomb	200	16	Water Table	Custom	0
Sandy Lean Clay		125	Mohr-Coulomb	150	20	Water Table	Custom	1

Consulting Engineers & Scientists

Slope Stability Analysis: Long-Term

3(horizontal) to 1(vertical) slope

Drawn by: KDC	New Caney ISD Transportation Center Expansion, New Caney, Texas	
Reviewed by: AS		
Approved by: RCR	Project Number: 97255039	

Attachments

Exploration and Testing Procedures

Field Exploration

Number of Borings	Approximate Boring Depth (feet)	Location
6 (B-1 through B-3, and B-5 through B-7)	20	Building/bus wash areas
1 (B-4)	20	Exterior storage area
2 (B-8 and B-9)	30	Detention pond area
5 (B-10 through B-14)	15	Parking/driveway area/utilities
3 (B-15 through B-17)	5	Parking/driveway area

Boring Layout and Elevations: Terracon personnel provided the boring layout using handheld GPS equipment (estimated horizontal accuracy of about ±20 feet) and referencing existing site features. Approximate ground surface elevations were obtained by interpolation from the topographic survey dated May 22, 2025 provided by Auric Engineers. If elevations and a more precise boring layout are desired, we recommend borings be surveyed following completion of fieldwork.

Subsurface Exploration Procedures: We advanced the borings with a track-mounted rotary drill rig using continuous flight augers (solid stem). Six samples were obtained in the upper 12 feet of each boring and at intervals of 5 feet thereafter. In the thin-walled tube sampling procedure, a thin-walled, seamless steel tube with a sharp cutting edge was pushed hydraulically into the soil to obtain a relatively undisturbed sample. In the split-barrel sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon was driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths. For safety purposes, all borings were backfilled with auger cuttings after their completion. Pavements were patched with pre-mixed concrete.

An automatic SPT hammer was used in advancing the split-spoon sampler at the borings. A greater efficiency is typically achieved with the automatic hammer compared to the conventional safety hammer operated with a cathead and rope. Published correlations between the SPT N-values and soil properties are based on the lower efficiency cathead and rope method. The higher efficiency of an automatic SPT hammer

affects the SPT N-value by increasing the penetration per hammer blow over what would be obtained using the cathead and rope method.

We also observed the boreholes while drilling and at the completion of drilling for the presence of groundwater. Groundwater was not observed at these times in the boreholes.

The sampling depths, penetration distances, and other sampling information was recorded on the field boring logs. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by a Geotechnical Engineer. Our exploration team prepared field boring logs as part of the drilling operations. These field logs included visual classifications of the materials observed during drilling and our interpretation of the subsurface conditions between samples. Final boring logs were prepared from the field logs. The final boring logs represent the Geotechnical Engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

Laboratory Testing

The project engineer reviewed the field data and assigned laboratory tests. The laboratory testing program included the following types of tests:

- Moisture Content
- Dry Unit Weight
- Unconfined Compression
- Atterberg Limits
- Percent Passing the No. 200 Sieve

The laboratory testing program included examination of soil samples by an engineer. Based on the results of our field and laboratory programs, we described and classified the soil samples in accordance with the Unified Soil Classification System.

Samples not tested in the laboratory will be stored for a period of 30 days subsequent to the submittal of this report and will be discarded after this period unless we are notified otherwise.

Site Location and Exploration Plan

Contents:

Site Location
Exploration Plan

Note: All attachments are one page unless noted above.

Site Location

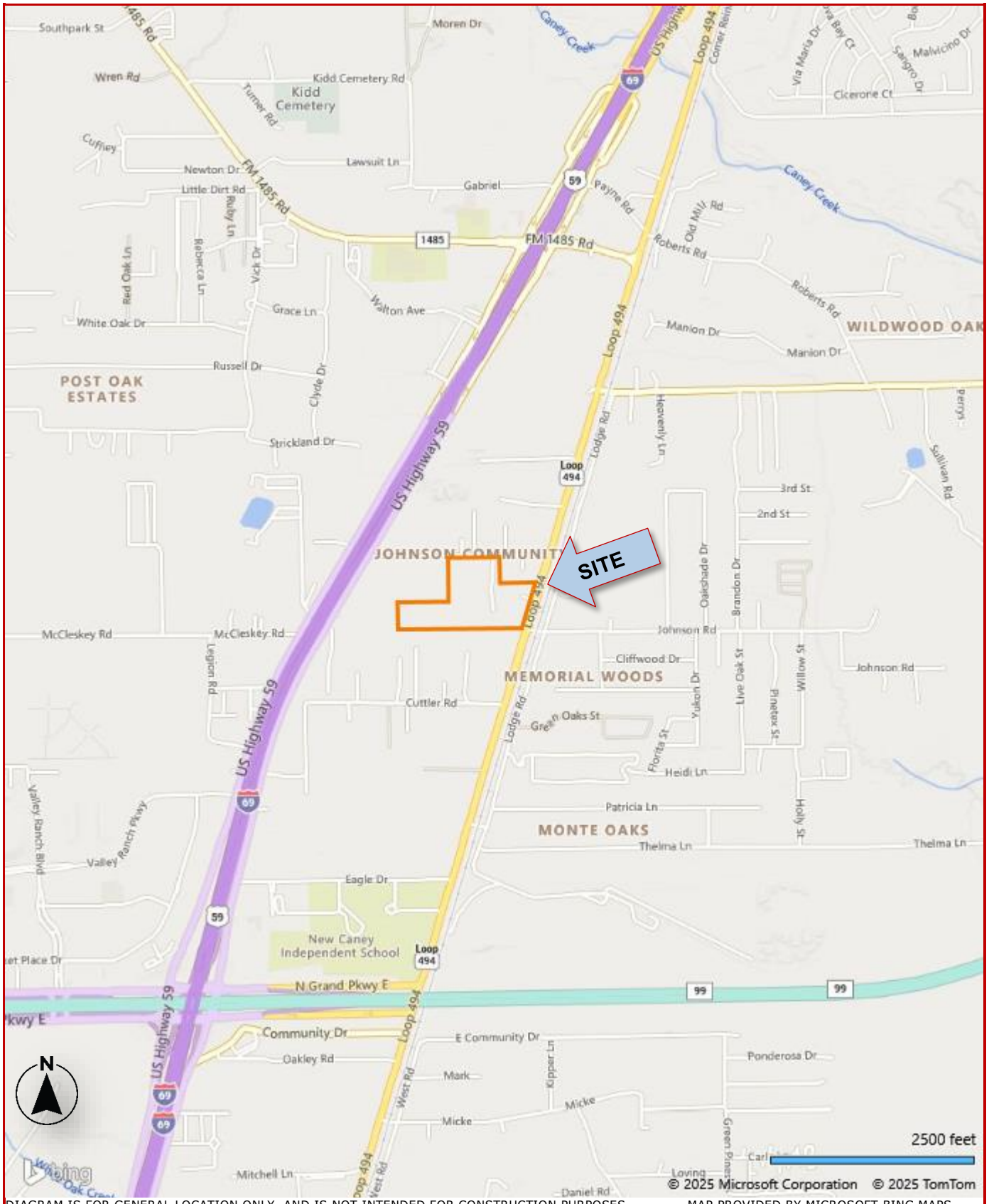


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

Exploration Plan

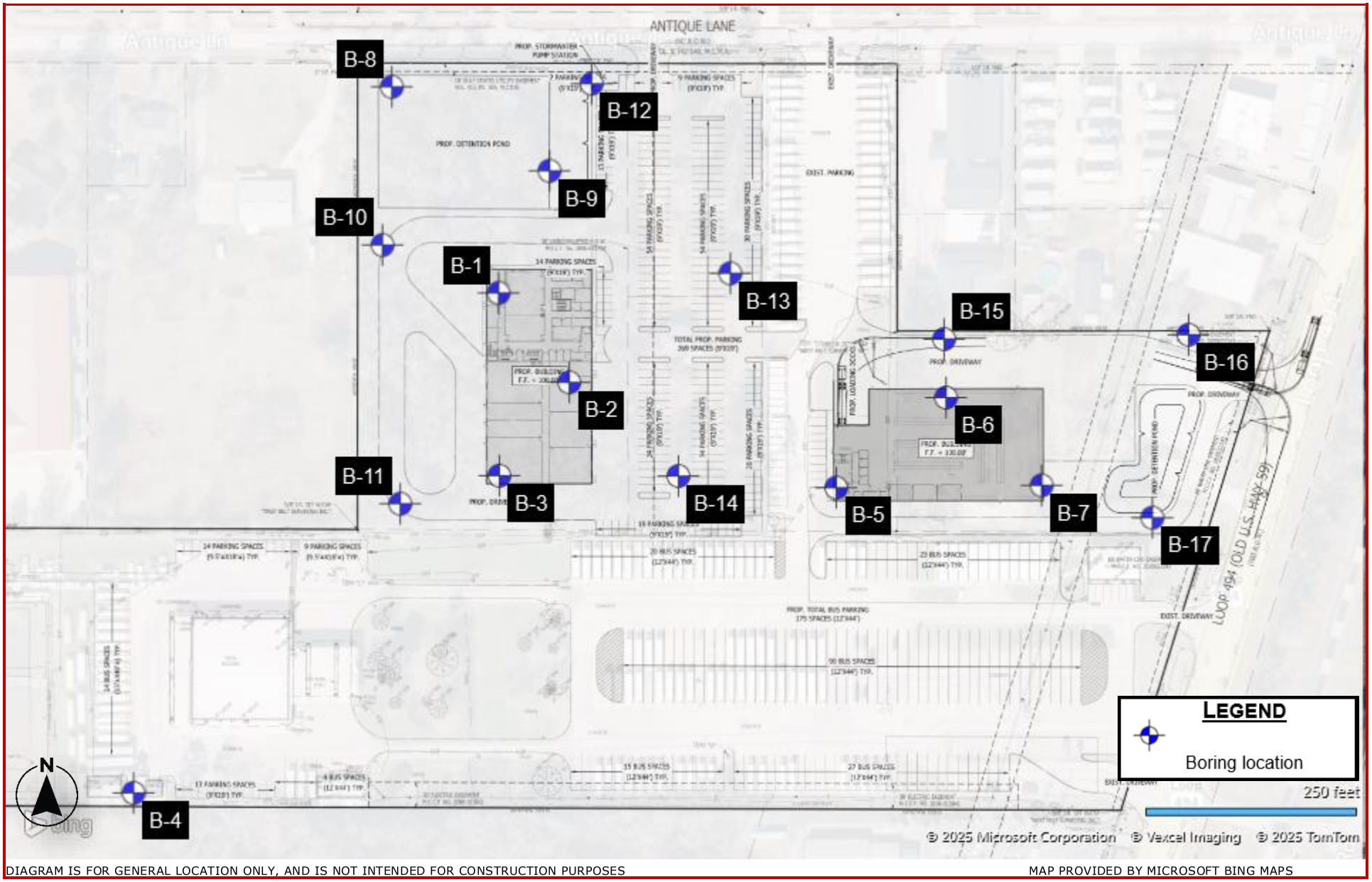


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

Exploration and Laboratory Results

Contents:

Boring Logs (B-1 through B-17)

Note: All attachments are one page unless noted above.

New Caney ISD Transportation Center Expansion
21026 TX-494 Loop | New Caney, Texas
Terracon Project No. 97255039

Terracon
11133 Interstate 45 S Ste T
Conroe, TX

Boring Log No. B-1

Location: See Exploration Plan

Latitude: 30.1438° Longitude: -95.2185°

Depth (Ft.) Elevation: 97 (Ft.)

Model Layer	Graphic Log	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Strength Test: Test Type	Strength Test: Compressive Strength (tsf)	Strength Test: Strain (%)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits: LL-PL-PI	Percent Fines
2		0			1.0 (HP)							
					1.25 (HP)				15.8		41-12-29	
		5			1.0 (HP)							
					2.0 (HP)							
					4.5 (HP)							
		10			4.5 (HP)	UC	2.49	1.4	25.0	98	75-25-50	
3												
					4.5 (HP)							
		15										
					4.0 (HP)							
		20										

SANDY LEAN CLAY (CL), tan and light gray, medium stiff to stiff
- with scattered roots, 0 to 2 feet
- reddish brown, with ferrous stains, 2 to 6 feet
- with sand pockets, 4 to 6 feet

6.0 91

FAT CLAY (CH), tan and light gray, very stiff
- with ferrous stains, 6 to 8 feet
- with calcareous nodules, 6 to 18 feet
- with slickensides below 8 feet
- reddish brown and light gray below 10 feet

20.0 77

Boring Terminated at 20 Feet

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
Groundwater not observed during or upon completion of drilling

Drill Rig
Track

Driller
Terracon

Logged by
G. Yeager

Boring Started
06-04-2025

Boring Completed
06-04-2025

Notes

Advancement Method
Dry auger to 20 feet.

Abandonment Method
Boring backfilled with auger cuttings upon completion.

New Caney ISD Transportation Center Expansion
21026 TX-494 Loop | New Caney, Texas
Terracon Project No. 97255039

Terracon
11133 Interstate 45 S Ste T
Conroe, TX

Boring Log No. B-2

Location: See Exploration Plan

Latitude: 30.1435° Longitude: -95.2183°

Depth (Ft.) Elevation: 97.5 (Ft.)

Model Layer	Graphic Log	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Strength Test: Test Type	Strength Test: Compressive Strength (tsf)	Strength Test: Strain (%)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits: LL-PL-PI	Percent Fines
2		0			0.5 (HP)				20.6		43-12-31	
					1.0 (HP)							
		5			2.0 (HP)							
3					3.0 (HP)	UC	3.73	5.6	8.9	121	59-15-44	
		10			4.5 (HP)							
					4.5 (HP)							
					4.5 (HP)							
		15										
					4.5 (HP)							
		20										

SANDY LEAN CLAY (CL), dark gray and tan, soft to stiff
- with scattered roots, 0 to 2 feet

6.0 91.5

FAT CLAY (CH), tan and light gray, very stiff, with ferrous stains
- with calcareous nodules, 6 to 13 feet
- with slickensides, 8 to 10 feet
- reddish brown below 8 feet

20.0 77.5

Boring Terminated at 20 Feet

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
Groundwater not observed during or upon completion of drilling

Drill Rig
Track

Driller
Terracon

Logged by
G. Yeager

Boring Started
06-04-2025

Boring Completed
06-04-2025

Notes

Advancement Method
Dry auger to 20 feet.

Abandonment Method
Boring backfilled with auger cuttings upon completion.

New Caney ISD Transportation Center Expansion
21026 TX-494 Loop | New Caney, Texas
Terracon Project No. 97255039

Terracon
11133 Interstate 45 S Ste T
Conroe, TX

Boring Log No. B-3

Location: See Exploration Plan

Latitude: 30.1432° Longitude: -95.2185°

Depth (Ft.) Elevation: 98 (Ft.)

Model Layer	Graphic Log	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Strength Test: Test Type	Strength Test: Compressive Strength (tsf)	Strength Test: Strain (%)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits: LL-PL-PI	Percent Fines
2		0			1.0 (HP)				21.7		44-14-30	
					3.0 (HP)							
		5			4.5 (HP)	UC	3.97	13.9	15.7	116	43-12-31	
3					4.5 (HP)							
					4.5 (HP)				22.8		67-20-47	
		10			4.5 (HP)							
					4.5 (HP)							
		15										
					4.5 (HP)							
		20										

SANDY LEAN CLAY (CL), dark gray and tan, medium stiff to very stiff
- with scattered roots, 0 to 2 feet

6.0 92

FAT CLAY (CH), tan, reddish brown, and light gray, very stiff, with calcareous nodules and slickensides

- with ferrous stains, 6 to 8 feet

20.0 78

Boring Terminated at 20 Feet

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
Groundwater not observed during or upon completion of drilling

Drill Rig
Track

Driller
Terracon

Logged by
G. Yeager

Boring Started
06-04-2025

Boring Completed
06-04-2025

Notes

Advancement Method
Dry auger to 20 feet.

Abandonment Method
Boring backfilled with auger cuttings upon completion.

New Caney ISD Transportation Center Expansion
21026 TX-494 Loop | New Caney, Texas
Terracon Project No. 97255039

Terracon
11133 Interstate 45 S Ste T
Conroe, TX

Boring Log No. B-4

Location: See Exploration Plan

Latitude: 30.1422° Longitude: -95.2199°

Depth (Ft.) Elevation: 101 (Ft.)

Model Layer	Graphic Log	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Strength Test: Test Type	Strength Test: Compressive Strength (tsf)	Strength Test: Strain (%)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits: LL-PL-PI	Percent Fines
		0.6 PAVEMENT, about 7 inches of concrete 100.4										
2		SANDY LEAN CLAY (CL), tan and dark gray, medium stiff to very stiff			1.5 (HP)				15.9		30-11-19	
					0.75 (HP)							
		- with sand pockets, 4 to 6 feet		5	2.0 (HP)	UC	2.52	15	15.6	117	38-12-26	
		6.0 95										
3		FAT CLAY (CH), tan, reddish brown, and light gray, stiff to very stiff, with calcareous nodules			2.0 (HP)							
					2.0 (HP)							
				10	1.5 (HP)							
					2.0 (HP)							
				15								
					2.5 (HP)							
		20.0 81		20								
		Boring Terminated at 20 Feet										

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
Groundwater not observed during or upon completion of drilling

Drill Rig
Track

Driller
Terracon

Notes

Advancement Method
Dry auger to 20 feet.

Logged by
J. Richardson

Boring Started
06-11-2025

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Boring Completed
06-11-2025

New Caney ISD Transportation Center Expansion
21026 TX-494 Loop | New Caney, Texas
Terracon Project No. 97255039

Terracon
11133 Interstate 45 S Ste T
Conroe, TX

Boring Log No. B-5

Location: See Exploration Plan

Latitude: 30.1432° Longitude: -95.2173°

Depth (Ft.) Elevation: 99 (Ft.)

Model Layer	Graphic Log	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Strength Test: Test Type	Strength Test: Compressive Strength (tsf)	Strength Test: Strain (%)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits: LL-PL-PI	Percent Fines
2					4.5 (HP)							
					4.5 (HP)							
		5			3.0 (HP)	UC	1.34	15	15.7	110	39-12-27	
					1.0 (HP)							
					1.0 (HP)							
		10			1.5 (HP)	UC	0.91	1.7	29.1	95	77-22-55	
3												
					2.5 (HP)							
		15										
					3.5 (HP)							
		20										

SANDY LEAN CLAY (CL), dark gray and tan, stiff to very stiff
- with scattered roots, 0 to 2 feet
- light gray and tan, with sand pockets, 6 to 8 feet

8.0 91

FAT CLAY (CH), light gray and tan, medium stiff to very stiff
- with sand pockets, 8 to 10 feet
- with ferrous stains and slickensides below 10 feet
- with calcareous nodules, 10 to 13 feet
- reddish brown, tan, and light gray below 13 feet

20.0 79

Boring Terminated at 20 Feet

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
Groundwater not observed during or upon completion of drilling

Drill Rig
Track

Driller
Terracon

Notes

Advancement Method
Dry auger to 20 feet.

Logged by
J. Richardson

Boring Started
06-11-2025

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Boring Completed
06-11-2025

Terracon
11133 Interstate 45 S Ste T
Conroe, TX

Boring Log No. B-6

Location: See Exploration Plan

Latitude: 30.1435° Longitude: -95.2169°

Depth (Ft.) Elevation: 97 (Ft.)

Model Layer	Graphic Log	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Strength Test: Test Type	Strength Test: Compressive Strength (tsf)	Strength Test: Strain (%)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits: LL-PL-PI	Percent Fines
2					1.0 (HP)				11.0		23-13-10	
					1.25 (HP)							
		5			0.25 (HP)				20.6			
					2.0 (HP)	UC	1.50	9.7	17.2	110	45-12-33	
3					2.0 (HP)							
		10			2.5 (HP)							
					3.0 (HP)	UC	2.05	2.1	28.2	97		
		15										
					3.5 (HP)							
		20										

SANDY LEAN CLAY (CL), dark gray and tan, very soft to stiff
- with sand pockets, 0 to 6 feet
- tan and light gray 6 to 8 feet

8.0 89

FAT CLAY (CH), tan and light gray, stiff to very stiff, with calcareous nodules
- with silt pockets, 8 to 10 feet
- with ferrous stains, 8 to 13 feet
- reddish brown, tan, and light gray, with slickensides below 13 feet

20.0 77

Boring Terminated at 20 Feet

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
Groundwater not observed during or upon completion of drilling

Drill Rig
Track

Driller
Terracon

Logged by
J. Richardson

Boring Started
06-11-2025

Boring Completed
06-11-2025

Notes

Advancement Method
Dry auger to 20 feet.

Abandonment Method
Boring backfilled with auger cuttings upon completion.

New Caney ISD Transportation Center Expansion
21026 TX-494 Loop | New Caney, Texas
Terracon Project No. 97255039

Terracon
11133 Interstate 45 S Ste T
Conroe, TX

Boring Log No. B-7

Location: See Exploration Plan

Latitude: 30.1432° Longitude: -95.2165°

Depth (Ft.) Elevation: 97.5 (Ft.)

Model Layer	Graphic Log		Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Strength Test: Test Type	Strength Test: Compressive Strength (tsf)	Strength Test: Strain (%)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits: LL-PL-PI	Percent Fines
1		CLAYEY SAND (SC), dark gray and tan, very loose, with scattered roots 2.0 95.5				0.25 (HP)							
2		SANDY LEAN CLAY (CL), tan, medium stiff 4.0 93.5				1.0 (HP)	UC	0.68	10.8	18.7	109	33-13-20	
3		SANDY FAT CLAY (CH), tan and reddish brown, stiff to very stiff - with ferrous stains, 4 to 8 feet - light gray and tan, 6 to 10 feet 10.0 87.5	5			1.5 (HP)							
						3.0 (HP)							
						2.5 (HP)							
		FAT CLAY (CH), reddish brown, light gray, and tan, medium stiff to very stiff, with calcareous nodules, slickensides, and ferrous stains	10			2.0 (HP)	UC	0.82	1.7	27.6	96	68-19-49	
						3.5 (HP)							
			15										
						3.5 (HP)							
		20.0 77.5	20										
		Boring Terminated at 20 Feet											

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
Groundwater not observed during or upon completion of drilling

Drill Rig
Track

Driller
Terracon

Logged by
J. Richardson

Boring Started
06-11-2025

Boring Completed
06-11-2025

Notes

Advancement Method
Dry auger to 20 feet.

Abandonment Method
Boring backfilled with auger cuttings upon completion.

New Caney ISD Transportation Center Expansion
21026 TX-494 Loop | New Caney, Texas
Terracon Project No. 97255039

Terracon
11133 Interstate 45 S Ste T
Conroe, TX

Boring Log No. B-8

Location: See Exploration Plan

Latitude: 30.1445° Longitude: -95.2189°

Depth (Ft.) Elevation: 96.5 (Ft.)

Model Layer	Graphic Log	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Strength Test: Test Type	Strength Test: Compressive Strength (tsf)	Strength Test: Strain (%)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits: LL-PL-PI	Percent Fines
2		SANDY LEAN CLAY (CL), dark gray and tan, soft to medium stiff			2-3-4 N=7							
					0.5 (HP)				20.8		47-13-34	
		- with sand pockets, 4 to 6 feet			1.0 (HP)							
		6.0			2.5 (HP)							
3		FAT CLAY (CH), tan and light gray, very stiff, with slickensides and ferrous stains			4.5 (HP)							
		- with calcareous nodules, 6 to 18 feet			4.0 (HP)							
		- light gray and reddish brown below 8 feet										
					4.5 (HP)	UC	3.41	2.6	15.9	114	68-20-48	86.1
					4.0 (HP)							
					3.5 (HP)							
					4.5 (HP)							
		30.0										
		Boring Terminated at 30 Feet										
		66.5										

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
Groundwater not observed during or upon completion of drilling

Drill Rig
Track

Hammer Type
Automatic

Driller
Terracon

Logged by
G. Yeager

Boring Started
06-04-2025

Boring Completed
06-05-2025

Notes

Advancement Method
Dry auger to 30 feet.

Abandonment Method
Boring backfilled with auger cuttings upon completion.

New Caney ISD Transportation Center Expansion
21026 TX-494 Loop | New Caney, Texas
Terracon Project No. 97255039

Terracon
11133 Interstate 45 S Ste T
Conroe, TX

Boring Log No. B-9

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 30.1442° Longitude: -95.2184° Depth (Ft.) Elevation: 95.5 (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Strength Test: Test Type	Strength Test: Compressive Strength (tsf)	Strength Test: Strain (%)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits: LL-PL-PI	Percent Fines
2		SANDY LEAN CLAY (CL), tan and light gray, medium stiff to stiff, with scattered roots				2.0 (HP)							
		- with ferrous stains, 2 to 6 feet				1.5 (HP)							
		- with sand pockets, 4 to 6 feet	5			1.0 (HP)				18.3		39-12-27	
		6.0 89.5											
3		FAT CLAY (CH), reddish brown and light gray, very stiff, with slickensides - with ferrous stains and calcareous nodules, 6 to 13 feet				4.5 (HP)							
			10			4.5 (HP)							
						4.5 (HP)							
			15			4.5 (HP)							
						4.5 (HP)	UC	2.20	0.9	20.4	108	62-18-44	88.9
			20										
						4.5 (HP)							
			25										
		- with ferrous stains below 28 feet				4.5 (HP)							
		30.0 65.5											
		Boring Terminated at 30 Feet	30										

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
Groundwater not observed during or upon completion of drilling

Drill Rig
Track

Driller
Terracon

Logged by
G. Yeager

Boring Started
06-04-2025

Boring Completed
06-05-2025

Notes

Advancement Method
Dry auger to 30 feet.

Abandonment Method
Boring backfilled with auger cuttings upon completion.

New Caney ISD Transportation Center Expansion
21026 TX-494 Loop | New Caney, Texas
Terracon Project No. 97255039

Terracon
11133 Interstate 45 S Ste T
Conroe, TX

Boring Log No. B-10

Location: See Exploration Plan
Latitude: 30.1440° Longitude: -95.2190°

Model Layer	Graphic Log	Depth (Ft.)	Elevation: 97 (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Strength Test: Test Type	Strength Test: Compressive Strength (tsf)	Strength Test: Strain (%)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits: LL-PL-PI	Percent Fines
2		0.0	SANDY LEAN CLAY (CL), tan and light gray, soft, with scattered roots and ferrous stains				0.5 (HP)							
							0.5 (HP)				17.2		46-12-34	
		4.0	93											
3		4.0	SANDY FAT CLAY (CH), tan and light gray, very stiff, with ferrous stains	5			2.5 (HP)							
		6.0	91											
		6.0	FAT CLAY (CH), reddish brown and light gray, very stiff, with slickensides, ferrous stains, and calcareous nodules				2.5 (HP)							
							4.5 (HP)							
				10			4.5 (HP)							
							4.5 (HP)							
		15.0	82	15										
			Boring Terminated at 15 Feet											

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
Groundwater not observed during or upon completion of drilling

Drill Rig
Track

Driller
Terracon

Logged by
G. Yeager

Boring Started
06-04-2025

Boring Completed
06-04-2025

Notes

Advancement Method
Dry auger to 15 feet.

Abandonment Method
Boring backfilled with auger cuttings upon completion.

New Caney ISD Transportation Center Expansion
21026 TX-494 Loop | New Caney, Texas
Terracon Project No. 97255039

Terracon
11133 Interstate 45 S Ste T
Conroe, TX

Boring Log No. B-11

Location: See Exploration Plan

Latitude: 30.1431° Longitude: -95.2189°

Depth (Ft.) Elevation: 98.5 (Ft.)

Model Layer	Graphic Log	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Strength Test: Test Type	Strength Test: Compressive Strength (tsf)	Strength Test: Strain (%)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits: LL-PL-PI	Percent Fines
2					0.5 (HP)				18.6		33-12-21	
					1.0 (HP)							
		5			1.5 (HP)							
					4.5 (HP)							
					4.5 (HP)							
3		10			4.5 (HP)	UC	3.40	0.9	24.9	102	83-24-59	
					4.5 (HP)							
		15										

SANDY LEAN CLAY (CL), tan and light gray, soft to stiff

6.0 92.5

FAT CLAY (CH), tan and light gray, very stiff, with slickensides and calcareous nodules
- with ferrous stains, 6 to 8 feet
- reddish brown and light gray below 8 feet

15.0 83.5

Boring Terminated at 15 Feet

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
Groundwater not observed during or upon completion of drilling

Drill Rig
Track

Driller
Terracon

Notes

Advancement Method
Dry auger to 15 feet.

Logged by
G. Yeager

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Boring Started
06-04-2025

Boring Completed
06-04-2025

Terracon
11133 Interstate 45 S Ste T
Conroe, TX

Boring Log No. B-12

Location: See Exploration Plan

Latitude: 30.1445° Longitude: -95.2182°

Depth (Ft.) Elevation: 95.5 (Ft.)

Model Layer	Graphic Log	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Strength Test: Test Type	Strength Test: Compressive Strength (tsf)	Strength Test: Strain (%)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits: LL-PL-PI	Percent Fines
2					1.5 (HP)							
					1.5 (HP)				18.0		42-12-30	
		5			0.75 (HP)							
3					3.0 (HP)							
					4.5 (HP)							
		10			4.5 (HP)							
					4.5 (HP)							
		15										

SANDY LEAN CLAY (CL), tan and light gray, medium stiff to stiff
- with sand pockets, 0 to 2 feet

6.0 89.5

FAT CLAY (CH), reddish brown and light gray, very stiff, with slickensides
- with ferrous stains and calcareous nodules, 6 to 10 feet

15.0 80.5

Boring Terminated at 15 Feet

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
Groundwater not observed during or upon completion of drilling

Drill Rig
Track

Driller
Terracon

Notes

Advancement Method
Dry auger to 15 feet.

Logged by
G. Yeager

Boring Started
06-05-2025

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Boring Completed
06-05-2025

New Caney ISD Transportation Center Expansion
21026 TX-494 Loop | New Caney, Texas
Terracon Project No. 97255039

Terracon
11133 Interstate 45 S Ste T
Conroe, TX

Boring Log No. B-13

Location: See Exploration Plan
Latitude: 30.1439° Longitude: -95.2177°

Model Layer	Graphic Log	Depth (Ft.) / Elevation: 96.5 (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Strength Test: Test Type	Strength Test: Compressive Strength (tsf)	Strength Test: Strain (%)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits: LL-PL-PI	Percent Fines
2		SANDY LEAN CLAY (CL), tan, soft 2.0 / 94.5				0.5 (HP)				19.9		36-12-24	
3		SANDY FAT CLAY (CH), tan and reddish brown, stiff to very stiff				1.5 (HP)							
			5			2.0 (HP)							
		- light gray, with ferrous stains, 6 to 8 feet 8.0 / 88.5				3.0 (HP)							
		FAT CLAY (CH), reddish brown and light gray, stiff to very stiff, with slickensides - with ferrous stains, 8 to 10 feet				1.5 (HP)	UC	1.21	5.2	25.4	97	67-20-47	
			10			2.5 (HP)							
						3.5 (HP)							
		15.0 / 81.5	15										
		Boring Terminated at 15 Feet											

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
Groundwater not observed during or upon completion of drilling

Drill Rig
Track

Driller
Terracon

Logged by
G. Yeager

Boring Started
06-05-2025

Boring Completed
06-05-2025

Notes

Advancement Method
Dry auger to 15 feet.

Abandonment Method
Boring backfilled with auger cuttings upon completion.

New Caney ISD Transportation Center Expansion
21026 TX-494 Loop | New Caney, Texas
Terracon Project No. 97255039

Terracon
11133 Interstate 45 S Ste T
Conroe, TX

Boring Log No. B-14

Location: See Exploration Plan

Latitude: 30.1432° Longitude: -95.2179°

Depth (Ft.) Elevation: 98.5 (Ft.)

Model Layer	Graphic Log	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Strength Test: Test Type	Strength Test: Compressive Strength (tsf)	Strength Test: Strain (%)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits: LL-PL-PI	Percent Fines
2					1.5 (HP)							
					1.0 (HP)				19.5		47-13-34	
3		5			1.0 (HP)							
					3.5 (HP)							
					4.5 (HP)							
		10			4.5 (HP)							
					4.5 (HP)							
		15										

SANDY LEAN CLAY (CL), dark gray and tan, medium stiff to stiff, with scattered roots
- with sand pockets and ferrous stains, 0 to 2 feet
- light gray and tan 2 to 4 feet

4.0 94.5

FAT CLAY (CH), tan and light gray, medium stiff to very stiff, with slickensides

- with ferrous stains, 6 to 10 feet
- with calcareous nodules, 6 to 13 feet
- reddish brown and light gray below 8 feet

15.0 83.5

Boring Terminated at 15 Feet

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
Groundwater not observed during or upon completion of drilling

Drill Rig
Track

Driller
Terracon

Logged by
G. Yeager

Boring Started
06-04-2025

Boring Completed
06-04-2025

Notes

Advancement Method
Dry auger to 15 feet.

Abandonment Method
Boring backfilled with auger cuttings upon completion.

New Caney ISD Transportation Center Expansion
21026 TX-494 Loop | New Caney, Texas
Terracon Project No. 97255039

Terracon
11133 Interstate 45 S Ste T
Conroe, TX

Boring Log No. B-15

Location: See Exploration Plan

Latitude: 30.1437° Longitude: -95.2169°

Depth (Ft.) Elevation: 96.5 (Ft.)

Model Layer	Graphic Log	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Strength Test: Test Type	Strength Test: Compressive Strength (tsf)	Strength Test: Strain (%)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits: LL-PL-PI	Percent Fines
1		1.0			0.5 (HP)				15.5		28-10-18	
2					1.0 (HP)							
		5.0			1.0 (HP)							
		5										

1.0 — SILTY SAND (SM), tan and dark gray, loose, with clay pockets — 95.5

SANDY LEAN CLAY (CL), tan and dark gray, medium stiff

- with sand pockets below 4 feet

5.0 — 91.5

Boring Terminated at 5 Feet

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
Groundwater not observed during or upon completion of drilling

Drill Rig
Track

Driller
Terracon

Logged by
J. Richardson

Boring Started
06-11-2025

Boring Completed
06-11-2025

Notes

Advancement Method
Dry auger to 5 feet.

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Terracon
11133 Interstate 45 S Ste T
Conroe, TX

Boring Log No. B-16

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 30.1437° Longitude: -95.2160° Depth (Ft.) Elevation: 96 (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Strength Test: Test Type	Strength Test: Compressive Strength (tsf)	Strength Test: Strain (%)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits: LL-PL-PI	Percent Fines
1		SANDY LEAN CLAY (CL), dark gray and tan, soft to stiff, with sand pockets - with scattered roots, 0 to 2 feet				2.0 (HP)				12.3		28-11-17	
		- with ferrous stains, 2 to 4 feet				1.0 (HP)							
		5.0 91				0.5 (HP)							
		Boring Terminated at 5 Feet	5										

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
Groundwater not observed during or upon completion of drilling

Drill Rig
Track

Driller
Terracon

Notes

Advancement Method
Dry auger to 5 feet.

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Logged by
J. Richardson

Boring Started
06-11-2025

Boring Completed
06-11-2025

New Caney ISD Transportation Center Expansion
21026 TX-494 Loop | New Caney, Texas
Terracon Project No. 97255039

Terracon
11133 Interstate 45 S Ste T
Conroe, TX

Boring Log No. B-17

Location: See Exploration Plan

Latitude: 30.1431° Longitude: -95.2161°

Depth (Ft.) Elevation: 97 (Ft.)

Model Layer	Graphic Log	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Strength Test: Test Type	Strength Test: Compressive Strength (tsf)	Strength Test: Strain (%)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits: LL-PL-PI	Percent Fines
1												
					1.0 (HP)				13.0		NP	47.5
		4.0 / 93										
3					1.5 (HP)							
		5.0 / 92										
		5										

SILTY SAND (SM), tan and dark gray, loose - with trace gravel and clay pockets, 0 to 2 feet

SANDY FAT CLAY (CH), tan, light gray, and reddish brown, stiff

Boring Terminated at 5 Feet

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
Groundwater not observed during or upon completion of drilling

Drill Rig
Track

Driller
Terracon

Logged by
J. Richardson

Boring Started
06-11-2025

Boring Completed
06-11-2025

Notes

Advancement Method
Dry auger to 5 feet.

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Supporting Information

Contents:

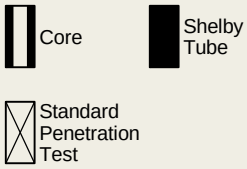
General Notes
Unified Soil Classification System

Note: All attachments are one page unless noted above.

Terracon
11133 Interstate 45 S Ste T
Conroe, TX

General Notes

Sampling



Water Level



Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.

Field Tests

N	Standard Penetration Test Resistance (Blows/Ft.)
(HP)	Hand Penetrometer
(T)	Torvane
(DCP)	Dynamic Cone Penetrometer
UC	Unconfined Compressive Strength
(PID)	Photo-Ionization Detector
(OVA)	Organic Vapor Analyzer

Descriptive Soil Classification

Soil classification as noted on the soil boring logs is based Unified Soil Classification System. Where sufficient laboratory data exist to classify the soils consistent with ASTM D2487 "Classification of Soils for Engineering Purposes" this procedure is used. ASTM D2488 "Description and Identification of Soils (Visual-Manual Procedure)" is also used to classify the soils, particularly where insufficient laboratory data exist to classify the soils in accordance with ASTM D2487. In addition to USCS classification, coarse grained soils are classified on the basis of their in-place relative density, and fine-grained soils are classified on the basis of their consistency. See "Strength Terms" table below for details. The ASTM standards noted above are for reference to methodology in general. In some cases, variations to methods are applied as a result of local practice or professional judgment.

Location And Elevation Notes

Exploration point locations as shown on the Exploration Plan and as noted on the soil boring logs in the form of Latitude and Longitude are approximate. See Exploration and Testing Procedures in the report for the methods used to locate the exploration points for this project. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

Strength Terms

Relative Density of Coarse-Grained Soils
(More than 50% retained on No. 200 sieve.)
Density determined by Standard Penetration Resistance

Relative Density	Standard Penetration or N-Value (Blows/Ft.)
Very Loose	0 - 3
Loose	4 - 9
Medium Dense	10 - 29
Dense	30 - 50
Very Dense	> 50

Consistency of Fine-Grained Soils
(50% or more passing the No. 200 sieve.)
Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance

Consistency	Unconfined Compressive Strength Qu (tsf)	Standard Penetration or N-Value (Blows/Ft.)
Very Soft	less than 0.25	0 - 1
Soft	0.25 to 0.50	2 - 4
Medium Stiff	0.50 to 1.00	4 - 8
Stiff	1.00 to 2.00	8 - 15
Very Stiff	2.00 to 4.00	15 - 30
Hard	> 4.00	> 30

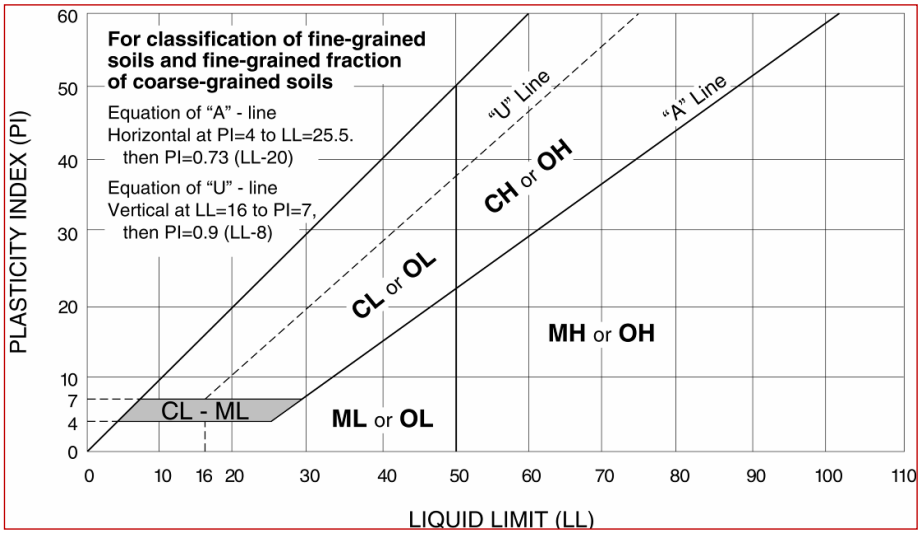
Relevance of Exploration and Laboratory Test Results

Exploration/field results and/or laboratory test data contained within this document are intended for application to the project as described in this document. Use of such exploration/field results and/or laboratory test data should not be used independently of this document.

Unified Soil Classification System

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]				Soil Classification	
				Group Symbol	Group Name [B]
Coarse-Grained Soils: More than 50% retained on No. 4 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	Cu≥4 and 1≤Cc≤3 [E]	GW	Well-graded gravel [F]
			Cu<4 and/or [Cc<1 or Cc>3.0] [E]	GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH	GM	Silty gravel [F, G, H]
			Fines classify as CL or CH	GC	Clayey gravel [F, G, H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	Cu≥6 and 1≤Cc≤3 [E]	SW	Well-graded sand [I]
			Cu<6 and/or [Cc<1 or Cc>3.0] [E]	SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH	SM	Silty sand [G, H, I]
			Fines classify as CL or CH	SC	Clayey sand [G, H, I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots above "A" line [J]	CL	Lean clay [K, L, M]
			PI < 4 or plots below "A" line [J]	ML	Silt [K, L, M]
		Organic:	$\frac{LL\ oven\ dried}{LL\ not\ dried} < 0.75$	OL	Organic clay [K, L, M, N]
					Organic silt [K, L, M, O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above "A" line	CH	Fat clay [K, L, M]
			PI plots below "A" line	MH	Elastic silt [K, L, M]
		Organic:	$\frac{LL\ oven\ dried}{LL\ not\ dried} < 0.75$	OH	Organic clay [K, L, M, P]
					Organic silt [K, L, M, Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor			PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve.
[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.
[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.
[E] $Cu = D_{60}/D_{10}$ $Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$
[F] If soil contains ≥ 15% sand, add "with sand" to group name.
[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.
[H] If fines are organic, add "with organic fines" to group name.
[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.
[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.
[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.
[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.
[N] PI ≥ 4 and plots on or above "A" line.
[O] PI < 4 or plots below "A" line.
[P] PI plots on or above "A" line.
[Q] PI plots below "A" line.



DRAFT

AIA® Document A101™ – 2017

Standard Form of Agreement Between Owner and Contractor

where the basis of payment is a Stipulated Sum

AGREEMENT made as of the «*TBD* » day of « *TBD*» in the year «2025»
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)

«New Caney Independent School District
22784 Hwy 59 S
Building "E"
Porter, Texas 77365 »« »

and the Contractor:
(Name, legal status, address and other information)

«*TBD* »« »
« »
« »
« »

for the following Project:
(Name, location and detailed description)

«New Caney ISD Administration Building »

The Architect:
(Name, legal status, address and other information)

«Glaus, Pyle, Schomer, Burns & DeHaven, Inc. dba GPD Group
2121 Sage Road #240
Houston, Texas 77056 »« »

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

The parties should complete A101™–2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201™–2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

ELECTRONIC COPYING of any portion of this AIA® Document to another electronic file is prohibited and constitutes a violation of copyright laws as set forth in the footer of this document.

AIA Document A101™ – 2017. Copyright © 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1967, 1974, 1977, 1987, 1991, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 20:59:58 on 08/25/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9ADA03)

TABLE OF ARTICLES

1 THE CONTRACT DOCUMENTS

2 THE WORK OF THIS CONTRACT

3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

4 CONTRACT SUM

5 PAYMENTS

6 DISPUTE RESOLUTION

7 TERMINATION OR SUSPENSION

8 MISCELLANEOUS PROVISIONS

9 ENUMERATION OF CONTRACT DOCUMENTS

EXHIBIT A INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

§ 1.1 The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), all sections of the Project Manual, including Drawings, Specifications, and Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and written Modifications signed by both parties that are issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. As used in the Contract Documents, the terms "AIA Document A201 – 2017", "General Conditions", "General Conditions of the Contract for Construction" or "A201-2017" shall refer to the General Conditions document that pertains to the Project, as modified or amended by the Owner for the Project. This Agreement represents the entire and integrated agreement between the Owner and the Contractor and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents and their order of precedence, other than a Modification, appear in Article 9.

§ 1.2 The Board of Trustees, by majority vote, is the only representative of the Owner, an independent school district, having the power to enter into or amend a contract, to approve and execute a Change Order valued at or above $50,000 or Construction Change Directive that would increase the Contract Sum more than $50,000, or to agree to an extension to the date of Substantial or Final Completion.

§ 1.3 The Board designates the authorized representatives identified in Paragraph 8.3 to act on its behalf in other respects.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:
(Check one of the following boxes.)

[«X»] Established as follows:
(Insert a date or a means to determine the date of commencement of the Work.)

«The date of commencement shall be the day that the Contractor receives a Notice to Proceed from the Owner, which may precede the date of execution of this Agreement. If a Building Permit is not available or other approvals are not available for the entire Project, the Contractor must commence work on those portions of the Project that do

AIA Document A101™ – 2017. Copyright © 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1967, 1974, 1977, 1987, 1991, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 20:59:58 on 08/25/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9ADA03)

not require a Building Permit or other approvals on receipt of a Notice to Proceed. Work at the Project site shall not begin until Owner has received all required payment and performance bonds and insurance. »

If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

§ 3.3 Substantial and Final Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:
(Check one of the following boxes and complete the necessary information.)

[« X »] By the following date: «October 24, 2026»

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:

Portion of Work	Substantial Completion Date
« »	

§ 3.3.3 If the Contractor fails to achieve Substantial Completion or Final Completion as provided in this Section 3.3, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

§ 3.3.4 Subject to adjustments of the Contract Time as provided in the Contract Documents, Final Completion shall be nine (9) calendar days after the date of Substantial Completion.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be « *TBD* » ($ « *TBD* »), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 Alternates

§ 4.2.1 Alternates, if any, included in the Contract Sum:

Item	Price
« *TBD* »	

§ 4.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.
(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance
« »		

§ 4.3 Allowances, if any, included in the Contract Sum:
(Identify each allowance.)

Item	Price
«Owner Contingency Allowance »	$0.00

§ 4.3.1 The Contract Sum contains an Owner's Contingency / Owner Betterment Allowance. This contingency is for the sole use of the Owner to be used for changes in the scope of the Work and for the betterment of the Project. Owner's authorized representative may approve any expenditure from Owner's Contingency without further Board approval. If the Owner's Contingency is not expended or not fully expended, then any unused portion shall belong to the Owner and shall be credited to the Owner in calculating final payment.

AIA Document A101™ – 2017. Copyright © 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1967, 1974, 1977, 1987, 1991, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 20:59:58 on 08/25/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9ADA03)

§ 4.4 Unit prices, if any:
(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit ($0.00)
« *TBD* »		

§ 4.5 Liquidated damages.
§ 4.5.1 The Work to be performed under this Agreement shall be substantially completed by the date set forth in the Agreement, or by such dates thereafter as may be established in any written extensions granted under Article 8 of the General Conditions. The parties hereto agree that time is of the essence of this Contract and in all phases of the Work, and that actual and direct damages would be suffered by the Owner if the Contractor does not substantially or finally complete all Work called for in the Contract Document by the specified dates. Such actual and direct damages are, and will continue to be, impracticable and extremely difficult to determine. Execution of this Agreement under these specifications shall constitute the agreement by Owner and Contractor that the amounts stated herein are the minimum value of the costs and actual and direct damages caused by failure of Contractor to complete the Work within the allotted or agreed extended times of Substantial or Final Completion, that such sums are liquidated direct damages and as all not be constructed to be as a penalty, and that such sums may be deducted from payments due Contractor if such delay occurs. It is therefore expressly agreed, as a part of the consideration inducing the Owner to execute this Contract, that the Owner may deduct from any payment(s) due to the Contractor a sum equal to One Thousand Dollars ($1,000.00) for each and every Calendar Day beyond the date set forth in the Agreement for Substantial Completion or Final Completion of the Work included in the Contract Documents. It is expressly understood that said sum per day is agreed upon as a real, justified, and fair estimate of the pecuniary damages which will be sustained by the Owner in the event that the Work is not substantially or finally completed within the agreed time, or with the legally extended time, if any, otherwise provided for herein. Said sum shall be considered as liquidated damages only, and in no sense shall be considered a penalty or forfeiture, said damage being caused by, but not limited to, additional compensation for personnel, attorneys fees, architectural fees, engineering fees, program management fees, inspection fees, storage costs, food service costs, transportation costs, utilities costs, costs of temporary facilities, loss of interest on money, and other miscellaneous increased costs, all of which are difficult of exact ascertainment. Failure to complete the Work within the designated or agreed extended dates of Substantial or Final Completion, shall be construed as a breach of this Agreement.

§ 4.5.2 Such damages shall be in addition to, and not in lieu of, any other rights or remedies Owner may have against Contractor for failure to timely achieve Final Completion, and damages for failure to achieve Substantial Completion and failure to achieve Final Completion shall run concurrently. If the Work is not finally completed by the time stated in the Agreement, or as extended, no payments for Work completed beyond that time shall be made until the Project reaches Final Completion.»

§ 4.6 Other:
(Insert provisions for bonus or other incentives, if any, that might result in a change to the Contract Sum.)

«n/a »

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month.

§ 5.1.3 Refer to AIA A201, as modified by the Owner for the project, for Payments.

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum, less any unused Owner's contingency, among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Architect may require, but shall contain as a minimum, individual line items for each section of the table of contents of the Project Manual

AIA Document A101™ – 2017. Copyright © 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1967, 1974, 1977, 1987, 1991, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 20:59:58 on 08/25/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9ADA03)

separated by material costs and labor costs. Additionally, General Conditions costs shall be separated into individual line items. Each Application for Payment shall also include a list, with backup data, of how each payment shall be spent, including a list detailing which subcontractors and suppliers will be paid out of funds paid by the Owner and the amount of such payments to subcontractors and suppliers. Additionally, beginning with the second application for payment, proof of each payment to Contractor's subcontractors and suppliers for payment within 61-days after payment. The Application for Payment shall be submitted on a schedule of values basis. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 In accordance with AIA Document A201™–2017, as modified by the Owner for the Project, General Conditions of the Contract for Construction, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be provided using the AIA G702 and G703 format and computed as follows:

§ 5.1.6.1 The amount of each progress payment shall first include:

- **.1** That portion of the Contract Sum properly allocable to completed Work;
- **.2** That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and
- **.3** That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.6.2 The amount of each progress payment shall then be reduced by:

- **.1** The aggregate of any amounts previously paid by the Owner;
- **.2** The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201–2017, as modified by the Owner for the Project;
- **.3** Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
- **.4** For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2017 as modified by the Owner for the Project; and
- **.5** Retainage withheld pursuant to Section 5.1.7.

§ 5.1.6.3 If Owner is entitled to deduct liquidated damages, or any other damages or amounts provided in the Contract Documents, including clean-up fees, then Owner shall be entitled to deduct such liquidated damages, amounts and fees at any time.

§ 5.1.6.4 If Contractor fails or refuses to complete the Work, or has unsettled claims with Owner, any payment to Contractor shall be subject to deduction for such amounts as the Architect and Program Manager, if applicable, shall determine as the cost for completing incomplete Work and the value of unsettled claims.

§ 5.1.6.5 Payments shall be made on account of materials and equipment (a) incorporated in the Work, (b) suitably stored at the Project site, or (c) suitably stored at some off-site location provided the following conditions are met for off-site storage:

- **.1** The location must be agreed to, in writing, by the Owner and Surety;
- **.2** The location must be a bonded warehouse;
- **.3** The surety must agree, in writing, to each request for payment; and
- **.4** The Contractor must bear the cost of the Owner's and Architect's expenses related to visiting the off-site storage area.

Payment for materials and/or equipment stored on or off the site shall be conditioned upon submission by the Contractor of bills of sale or such other procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance (naming the Owner as additional insured) and transportation to the site for those materials and equipment

AIA Document A101™ – 2017. Copyright © 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1967, 1974, 1977, 1987, 1991, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 20:59:58 on 08/25/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9ADA03)

stored off the site. Under no circumstances will the Owner reimburse the Contractor for down payments, deposits, or other advance payments for materials or equipment

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Final Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due:
(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

«Five percent (5%) »

§ 5.1.7.1.1 The following items are not subject to retainage:
(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)

«None. »

§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as follows:
(If the retainage established in Section 5.1.7.1 is to be modified prior to Substantial Completion of the entire Work, including modifications for Substantial Completion of portions of the Work as provided in Section 3.3.2, insert provisions for such modifications.)

«No reduction allowed »

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, upon Final Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted at Final Completion shall not include retainage as follows:
(Insert any other conditions for release of retainage upon Final Completion.)

«n/a »

§ 5.1.8 If Final Completion of the Work is materially delayed through no fault of the Contractor, the Owner shall pay the Contractor any additional amounts payable in accordance with Article 9 of AIA Document A201–2017, as modified by the Owner for the Project.

§ 5.1.9 Except with the Owner's prior written approval or as otherwise provided in in Section 9.3.2 of the AIA Document A201-2017, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site. If the Contractor wishes to bill for materials or equipment which cannot be stored on site, the Contractor shall, along with the request for approval, provide evidence of purchase, evidence of delivery in good order without damage, and a certificate of insurance specifically covering the material identified by way of serial numbers, bill of lading, and copy of signature of receipt of materials and photography showing material. The Contractor shall also require, at the Owner's request, proof that the facility at which the materials or equipment is stored is bonded. Security and protection from theft and damage remains on the Contractor as the first line of accountability and financial responsibility. Delays due to issues arising from stored materials shall not be considered as reasonable justification to release the Contractor from meeting the schedule unless the Owner agrees to such delay in writing in advance of any delay.

§ 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, minus disputed sums, authorized deductions, and liquidated damages, shall be made by the Owner to the Contractor after

.1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct nonconforming Work as provided in Article 12 of AIA Document A201–2017, as modified by the Owner for the project, and to satisfy other requirements, if any, which extend beyond final payment;

.2 the Contractor has provided all documents required by Section 3.5 et seq. and 9.10.2 of AIA Document A201-2017; and

.3 a final Certificate for Payment has been issued by the Architect.

AIA Document A101™ – 2017. Copyright © 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1967, 1974, 1977, 1987, 1991, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 20:59:58 on 08/25/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9ADA03)

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than 45 days after Owner's Board's vote or other required approval pursuant to applicable Owner policy. Undisputed amounts unpaid after the date on which payment is due shall bear interest pursuant to Texas Government Code Section 2251.025.

§ 5.3 Interest

Undisputed payments due and unpaid under the Contract shall bear interest at the rate established by Texas Government Code Chapter 2251.

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document A201–2017, as modified by the Owner for the Project, unless the parties appoint below another individual, not a party to this Agreement, to serve as the Initial Decision Maker.
(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

§ 6.2 Binding Dispute Resolution

For any Claim or dispute between the parties, the method of binding dispute resolution shall be as follows:
(Check the appropriate box.)

[«X »] Litigation in a court of competent jurisdiction

If the Owner and Contractor do not select a method of binding dispute resolution, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2017, as amended by the Owner for the Project.

§ 7.1.1 If the Contract is terminated for the Owner's convenience in accordance with Article 14 of AIA Document A201–2017, as amended by the Owner for the Project, then the Owner shall pay the Contractor a termination fee as follows:
(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner's convenience.)

«As described in AIA Document A201-2017, as amended by the Owner for the Project. »

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2017, as amended by the Owner for the Project.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2017 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner's Designated representative:
(Name, address, email address, and other information)
The Owner's Board of Trustees, by majority vote at a duly noticed and lawfully called public meeting, is the only representative of Owner, a Texas independent school district organized under the laws of the State of Texas, having the power to enter into a contract, to execute a change order requiring an increase in an amount of $50,000 or more, to the Contract Sum, or to agree to an extension to the contractual completion date, unless this authority is lawfully delegated. The Board may designate in writing an authorized representative (or representatives), as appropriate, to act on its behalf during the course of construction. Such authorized representative shall have authority to act on behalf of the Owner concerning decisions that do not require a majority vote of the Board of Trustees and shall have the authority to bind the Owner only to the extent expressly authorized or delegated by the Board of Trustees. The authorized representative shall have no implied authority. Such authorized representative shall also bring recommendations to the Board of Trustees on any matter requiring Board approval. In the event that changes in the

AIA Document A101™ – 2017. Copyright © 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1967, 1974, 1977, 1987, 1991, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 20:59:58 on 08/25/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9ADA03)

scope of the Work are required before the Board's next regularly scheduled meeting or in order to facilitate and expedite the timely completion of the Work, the Board's authorized representative shall have authority to approve construction changes that do not exceed $50,000.00 in increased costs. Any such change shall be confirmed in writing between the Contractor and the Board's authorized representative and notice of such approved changes shall be given to the Board at its next regularly scheduled meeting. The Board shall act as soon as reasonably possible to avoid unnecessary delays in the construction completion date. Except as expressly authorized by the Owner or the Contract Documents, the Architect does not have the authority to bind the Owner. The term "Owner" means the Owner or the Owner's authorized representative.

§ 8.3 The Owner's authorized representative:

«Superintendent of Schools »

§ 8.3 The Contractor's representative:
(Name, address, email address, and other information)

« *TBD* »
« »
« »

§ 8.4 The Contractor's representative shall be changed without ten days' prior notice to the other party.

§ 8.5 Insurance and Bonds
§ 8.5.1 The Contractor shall purchase and maintain insurance as set forth in Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A101™–2017 Exhibit A, and elsewhere in the Contract Documents.

§ 8.6 All notices required to be given under the Contract must be in writing. Any notice required or permitted to be given under the Contract shall be deemed delivered, whether or not actually received, three days after it is deposited in the U.S. Mail, when sent by certified mail, return receipt requested, postage prepaid, and correctly addressed to the party at the address provided in this Agreement. Notice given in any other manner shall be deemed delivered when actually received. Either party may change its address for notice by giving notice of the change of address in accordance with this provision. The Architect must be copied on notices sent to the Owner.

§ 8.7 Other provisions:

§ 8.7.1 The subject of this Contract is a public school facility which is governed by School Facilities Standards promulgated by the State Board of Education and said project must be constructed in compliance with these Standards. Upon request, Owner, its authorized agent, its Architect, and/or its Engineer shall make available information related to the School Facilities Standards necessary for compliance with said Standards.

§ 8.7.2 The Owner is an organization exempt from Texas taxes. Owner shall not be responsible for sales, consumer, use, and similar taxes on labor, materials, equipment, systems, and other items purchased for the project which Owner would ordinarily be exempt.

§ 8.7.3 All provisions in the Contract Documents that mandate arbitration are expressly deleted and rendered null and void.

§ 8.7.4 Subcontracts, purchase orders and rental agreements entered into by the Contractor shall contain provisions permitting assignment to the Owner upon default by Contractor under the Contract Documents. If the Owner accepts such assignment, the Owner shall be responsible for the payment of amounts which would have been reimbursable to Contractor under this Agreement and for which payment has not already been made to the Contractor. Contractor shall be responsible for the payment of any other amounts payable under the Contract. If the Owner elects not to accept the assignment of any subcontract, purchase order or rental agreement which would have constituted a Cost of the Work had this agreement not been terminated, the Contractor shall terminate such subcontract, purchase order or rental agreement.

AIA Document A101™ – 2017. Copyright © 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1967, 1974, 1977, 1987, 1991, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 20:59:58 on 08/25/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9ADA03)

§ 8.7.5 Unless the context of this Agreement otherwise clearly requires, references to the plural include the singular, the term "including" is not limiting and the terms "hereof," "herein," "hereunder" and similar terms in the Contract Documents refer to the Contract Documents as a whole and not to any particular provision thereof, unless stated otherwise. Additionally, the parties hereto acknowledge that they have carefully reviewed this Agreement and have been advised by counsel of their choosing with respect thereto, and that they understand its contents and agree that this Agreement shall not be construed more strongly against any part hereto regardless of who is responsible for its preparation.

§ 8.7.6 In the event of any suit or action arising out of or in connection with any of the Contract Documents, the prevailing party in such proceedings shall be entitled to recover reasonable attorney fees and court costs.

§ 8.7.7 Any provision in the Contract Documents to the contrary notwithstanding, if any of the facilities to be constructed or modified under this Agreement or the Contract require the issuance of a Certificate of Occupancy or other regulatory approval, then Substantial Completion of any such facilities shall not be deemed to have been attained for those facilities prior to the date on which an unconditional Certificate of Occupancy or other regulatory approval is obtained.

§ 8.7.8 If the building will be used or occupied by the Owner or members of the public, the Contractor shall be responsible for maintaining safe routes of travel from sidewalks and parking areas to the building, and shall reroute access as necessary to maintain safe access during construction at no additional cost beyond the agreed contract amount.

§ 8.7.9 By signing this Agreement or providing or causing to be provided a certificate of coverage, the Contractor is certifying to the Owner that all employees of the Contractor who will provide services on the Project will be covered by workers' compensation coverage for the duration of the Project. Contractor is also representing that it will require all subcontractors to provide workers' compensation coverage on all employees who will provide services on the Project for the duration of the Project and to provide written certifications of such coverage to the Contractor. The Contractor will provide the certifications to Owner. Providing false or misleading information may subject the Contractor to administrative penalties, criminal penalties, civil penalties, or other civil actions. The Contractor's failure to comply with any of these provisions is a breach of contract by the Contractor which entitles the Owner to declare the contract void if the Contractor does not remedy the breach within ten days after receipt of notice of breach from the Owner.

§ 8.7.10 The Contractor shall, as a condition precedent to allowing any subcontractor to proceed with any work on the Project, either require that the subcontractor provide proof of the existence of workers' compensation coverage for its employees, or, at the Contractor's sole discretion, provide for coverage of the subcontractor's employees under the Contractor's workers' compensation insurance coverage. The Contractor shall maintain records of all required certificates of insurance provided by the subcontractors, and shall forward copies to the Owner and the Architect.

§ 8.7.11 Warranty. The Contractor shall be responsible for the coordination of warranty work, if any during the first year after Substantial Completion of the Entire Work.

§ 8.7.12 No provision of this Agreement shall waive any immunity or defense. No provision of this Agreement is a waiver of any immunity or a consent to suit.

§ 8.7.13 The Owner's competitive procurement solicitation documents/packet and the response of the Contractor to same are incorporated herein by reference as if copied verbatim. The Contractor agrees to comply with all requirements incorporated or included in the competitive procurement solicitation documents/packet by the Owner

§ 8.7.14 The Contractor shall record the progress of the Project. On a monthly basis, or as otherwise agreed to by the Owner, the Contractor shall submit written progress reports to the Owner and Architect, showing percentages of completion and other information required by the Owner. The Contractor shall also keep, and make available to the Owner and Architect, a daily log containing a record for each day of weather, portions of the Work in progress and accomplished, Subcontractors working on the site, number of workers on site, identification of equipment on site, problems that might affect progress of the work, accidents, injuries, and other information required by the Owner.

AIA Document A101™ – 2017. Copyright © 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1967, 1974, 1977, 1987, 1991, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 20:59:58 on 08/25/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9ADA03)

The log shall be available to the Owner and Architect at any time during work hours and shall be presented for discussion at the project progress meetings.

§ 8.7.15 If (a) Contractor is not a sole proprietorship; (b) Contractor has ten (10) or more full-time employees; and (c) this Agreement has a value of $100,000 or more, the following certification shall apply; otherwise, this certification is not required. Pursuant to Chapter 2270 of the Texas Government Code, the Contractor hereby certifies and verifies that neither the Contractor, nor any affiliate, subsidiary, or parent company of the Contractor, if any (the "Contractor Companies"), boycotts Israel, and the Architect agrees that the Contractor and Contractor Companies will not boycott Israel during the term of this Agreement. For purposes of this Agreement, the term "boycott" shall mean and include refusing to deal with, terminating business activities with, or otherwise taking any action that is intended to penalize, inflict economic harm on, or limit commercial relations with Israel, or with a person or entity doing business in Israel or in an Israeli-controlled territory, but does not include an action made for ordinary business purposes.

§ 8.7.16 Contractor verifies and affirms that it is not a foreign terrorist organization as identified on the list prepared and maintained by the Texas Comptroller of Public Accounts. If Contractor misrepresents its inclusion on the list, then such omission or misrepresentation shall void this Agreement.

§ 8.7.17 If Contractor is not a governmental body and (a) this Agreement has a stated expenditure of at least $1 million in public funds for the purchase of goods or services by Owner; or (b) this Agreement results in the expenditure of at least $1 million in public funds for the purchase of goods or services by Owner in a fiscal year of Owner, the following certification shall apply; otherwise, this certification is not required. As required by Tex. Gov't Code § 552.374(b), the following statement is included in the RFP and the Agreement (unless the Agreement is (1) related to the purchase or underwriting of a public security; (2) is or may be used as collateral on a loan; or (3) proceeds from which are used to pay debt service of a public security of loan): "The requirements of Subchapter J, Chapter 552, Government Code, may apply to this RFP and Agreement and the Contractor agrees that the Contract can be terminated if the Contractor knowingly or intentionally fails to comply with a requirement of that subchapter." Pursuant to Subchapter J, Chapter 552, Texas Government Code, the Contractor hereby certifies and agrees to (1) preserve all contracting information related to this Agreement as provided by the records retention requirements applicable to Owner for the duration of the Agreement; (2) promptly provide to Owner any contracting information related to the Agreement that is in the custody or possession of the Contractor on request of Owner; and (3) on completion of the Agreement, either (a) provide at no cost to Owner all contracting information related to the Agreement that is in the custody or possession of Contractor, or (b) preserve the contracting information related to the Agreement as provided by the records retention requirements applicable to Owner.

§ 8.7.18 If (a) Contractor is not a sole proprietorship; (b) Contractor has ten (10) or more full-time employees; and (c) this Agreement has a value of $100,000 or more that is to be paid wholly or partly from public funds, the following certification shall apply; otherwise, this certification is not required. Pursuant to TEX. GOV'T CODE Ch. 2274 of SB 13 (87th session), Contractor hereby certifies and verifies that Contractor, or any wholly owned subsidiary, majority-owned subsidiary, parent company, or affiliate of these entities or business associations, if any, does not boycott energy companies and will not boycott energy companies during the term of the Contract. For purposes of this Agreement, the term "company" shall mean an organization, association, corporation, partnership, joint venture, limited partnership, limited liability partnership, or limited liability company, that exists to make a profit. The term "boycott energy company" shall mean "without an ordinary business purpose, refusing to deal with, terminating business activities with, or otherwise taking any action intended to penalize, inflict economic harm on, or limit commercial relations with a company because the company (a) engages in the exploration, production, utilization, transportation, sale, or manufacturing of fossil fuel-based energy and does not commit or pledge to meet environmental standards beyond applicable federal and state law, or (b) does business with a company described by paragraph (a)." *See* TEX. GOV'T CODE § 809.001(1).

§ 8.7.19 If (a) Contractor is not a sole proprietorship; (b) Contractor has at least ten (10) full-time employees; (c) this Agreement has a value of at least $100,000 that is paid wholly or partly from public funds; (d) the Contract is not excepted under TEX. GOV'T CODE § 2274.003 of SB 19 (87th leg.); and (e) Owner has determined that Contractor is not a sole-source provider or Owner has not received any bids from a company that is able to provide this written verification, the following certification shall apply; otherwise, this certification is not required. Pursuant to TEX. GOV'T CODE Ch. 2274 of SB 19 (87th session), Contractor hereby certifies and verifies that Contractor, or association, corporation, partnership, joint venture, limited partnership, limited liability partnership, or limited liability company, including a wholly owned subsidiary, majority-owned subsidiary parent company, or affiliate of

AIA Document A101™ – 2017. Copyright © 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1967, 1974, 1977, 1987, 1991, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 20:59:58 on 08/25/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9ADA03)

these entities or associations, that exists to make a profit, does not have a practice, policy, guidance, or directive that discriminates against a firearm entity or firearm trade association and will not discriminate during the term of this contract against a firearm entity or firearm trade association. For purposes of this Agreement, "discriminate against a firearm entity or firearm trade association" shall mean, with respect to the entity or association, to: "(1) refuse to engage in the trade of any goods or services with the entity or association based solely on its status as a firearm entity or firearm trade association; (2) refrain from continuing an existing business relationship with the entity or association based solely on its status as a firearm entity or firearm trade association; or (3) terminate an existing business relationship with the entity or association based solely on its status as a firearm entity or firearm trade association. *See* TEX. GOV'T CODE § 2274.001(3) of SB 19. "Discrimination against a firearm entity or firearm trade association" does not include: "(1) the established policies of a merchant, retail seller, or platform that restrict or prohibit the listing or selling of ammunition, firearms, or firearm accessories; and (2) a company's refusal to engage in the trade of any goods or services, decision to refrain from continuing an existing business relationship, or decision to terminate an existing business relationship to comply with federal, state, or local law, policy, or regulations or a directive by a regulatory agency, or for any traditional business reason that is specific to the customer or potential customer and not based solely on an entity's or association's status as a firearm entity or firearm trade association." *See* TEX. GOV'T CODE § 2274.001(3) of SB 19.

§ 8.7.20 Owner is prohibited from entering into a contract or other agreement relating to critical infrastructure that would grant to Contractor direct or remote access to or control of critical infrastructure in this state, excluding access specifically allowed by Owner for product warranty and support purposes. Contractor certifies that neither it nor its parent company nor any affiliate of Contractor or its parent company, is (1) owned by or the majority of stock or other ownership interest of the company is held or controlled by individuals who are citizens of China, Iran, North Korea, Russia, or a designated country; (2) a company or other entity, including governmental entity, that is owned or controlled by citizens of or is directly controlled by the government of China, Iran, North Korea, Russia, or a designated country; or (3) headquartered in China, Iran, North Korea, Russia, or a designated country. For purposes of this Contract, "critical infrastructure" means "a communication infrastructure system, cybersecurity system, electric grid, hazardous waste treatment system, or water treatment facility." *See* TEX. GOV'T CODE § 2274.0101(2) of SB 1226 (87th leg.). Contractor verifies and certifies that Contractor will not grant direct or remote access to or control of critical infrastructure, except for product warranty and support purposes, to prohibited individuals, companies, or entities, including governmental entities, owned, controlled, or headquartered in China, Iran, North Korea, Russia, or a designated country, as determined by the Governor.

§ 8.7.21 Program Manager shall have, and is hereby granted by Owner, full and complete power, authority, and discretion to act for, and in the name, place, and stead of, Owner in carrying out and discharging the responsibilities and obligations of Program Manager under the Agreement between the Owner and Program Manager; provided, however, that Program Manager shall have no right or authority, express or implied, to commit or otherwise obligate Owner in any manner whatsoever except to the extent specifically provided in the Agreement between the Owner and the Program Manager or specifically authorized in writing by Owner. In no event shall Program Manager be authorized to execute any documents, agreements, or other instruments on behalf of Owner without written approval by Owner. In no event shall Program Manager have the authority to modify completion dates of the Project Schedule without written approval by Owner. Program Manager shall have the authority to modify interim milestones dates not affecting the completion dates specified in the Agreements between the parties. In no event shall Program Manager have the authority to modify contract value of the Project without written approval by Owner. Program Manager shall have the authority to modify budgets, contingencies, allowances and similar accounting tasks not affecting the contract value specified in the Agreements between the parties. In no event shall Program Manager have the authority to relax or to bind the Owner to codes and standards imposed by the Authorities Having Jurisdiction, unless authorized in writing by the Owner.

§ 8.7.22 The Contractor shall utilize online project management software in the manner required by Owner.

§ 8.8 Governing Law and Venue

§ 8.8.1 Section 13.1 of the General Conditions document pertaining to the Project, as modified by the Owner, shall apply to the Agreement, the Contract, and the Contract documents in all respects. No provision of this Agreement is a waiver of any immunity, defense, or a consent to suit.

§ 8.8.2 Venue

To the maximum extent permitted by applicable law, the parties expressly agree that the exclusive venue and place of trial for any action brought under or in connection with or in any way related to the Work, the Project, the

AIA Document A101™ – 2017. Copyright © 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1967, 1974, 1977, 1987, 1991, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 20:59:58 on 08/25/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9ADA03)

Agreement, the Contract, or any of the Contract Documents shall be in the state district courts of Montgomery County, Texas, and the parties hereby waive any and all objections to the agreed-upon venue as stated herein. The Contract, including but not limited to the Agreement and all other Contract Documents, is performable entirely in Montgomery County, Texas.

§ 8.9 Severability

If any provision or part of the Contract Documents is held to be illegal, invalid, or unenforceable under any present or future law or regulation, such provision shall be fully severable and the Contract Documents shall be construed and enforced as if such illegal, invalid or unenforceable provision had never comprised a part of the Contract Documents. The remaining provisions of the Contract Documents shall remain in full force and effect and shall not be affected by the illegal, invalid, or unenforceable provision or by its severance.

§ 8.10 Information and Services Required of the Owner

§ 8.10.1 Pursuant to the requirements of the Texas Business and Commerce Code section 56.054(e)(3), the Owner represents that funds are available and have been authorized for the full contract amount of the work.

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents; in the event of any inconsistency or conflict between or among the documents that comprise this Agreement, the order of precedence shall be:

.1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor, as modified by Owner for the Project

.2 Exhibit A, Insurance and Bonds

.3 AIA Document A201™–2017, General Conditions of the Contract for Construction, as modified by the Owner for the project

.4 AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:

(Insert the date of the E203-2013 incorporated into this Agreement.)

.5 Drawings

Number	Title	Date
« *TBD* »		

.6 Specifications

Section	Title	Date	Pages
« *TBD* »			

.7 Addenda, if any:

Number	Date	Pages
« *TBD* »		

Portions of Addenda relating to bidding or competitive purchasing requirements are not part of the Contract Documents unless the bidding or competitive purchasing requirements are also enumerated in this Article 9.

.8 Other Exhibits: None.

(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

.9 Other documents, if any, listed below:

(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201™–2017 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

AIA Document A101™ – 2017. Copyright © 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1967, 1974, 1977, 1987, 1991, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 20:59:58 on 08/25/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9ADA03)

.1 Owner's competitive procurement solicitation documents, including Owner's required certifications/Vendor Packet.

.2 The Project Manual for the Project, including all sections to same, whether issued or created prior to or after the execution of this Agreement.

.3 Statutory Payment and Performance Bonds.

.4 Certificates of Insurance required of the Contractor.

.5 All documents listed or described in Section 1.1.1 of AIA Document A201-2017, as amended by the Owner.

.6 Scale/Schedule of Prevailing Wages (attached as Exhibit A to the AIA Document A201–2017, General Conditions of the Contract for Construction, as modified by the Owner for the Project) and incorporated herein as if fully set forth.

.7 Any modifications to this Agreement or to the Contract or any Contract Documents approved by the Parties.

.8 Any documents stated in this Agreement as being a part of or incorporated into this Agreement or the Contract

.9 Portion(s) of Contractor's responses and proposals to Owner's competitive procurement solicitation documents that were accepted by Owner.

This Agreement entered into as of the day and year first written above.

« »	« »
OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
«Matthew Calvert Superintendent New Caney Independent School District »« »	«*TBD* »« »
(Printed name and title)	*(Printed name and title)*
(Date)	*(Date)*

DRAFT

AIA Document A101™ – 2017. Copyright © 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1967, 1974, 1977, 1987, 1991, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 20:59:58 on 08/25/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9ADA03)

DRAFT

AIA® Document A101™ – 2017
Exhibit A

Insurance and Bonds

This Insurance and Bonds Exhibit is part of the Agreement, between the Owner and the Contractor, dated the «*TBD*» day of « *TBD* » in the year «2025»

for the following **PROJECT**:
(Name and location or address)

«New Caney ISD Project »

THE OWNER:
(Name, legal status and address)

«New Caney Independent School District
22784 Hwy 59 S
Building "E"
Porter, Texas 77365 »

THE CONTRACTOR:
(Name, legal status and address)

« *TBD* »

TABLE OF ARTICLES

A.1 GENERAL

A.2 OWNER'S INSURANCE

A.3 CONTRACTOR'S INSURANCE AND BONDS

A.4 SPECIAL TERMS AND CONDITIONS

ARTICLE A.1 GENERAL

The Owner and Contractor shall purchase and maintain insurance, and provide bonds, as set forth in this Exhibit. As used in this Exhibit, the term General Conditions refers to AIA Document A201™–2017, General Conditions of the Contract for Construction, as amended. Nothing contained in this Exhibit shall limit or waive Contractor's legal or contractual responsibilities to Owner or others.

ARTICLE A.2 OWNER'S INSURANCE

§ A.2.1 General

Prior to commencement of the Work, the Owner shall secure the insurance, and provide evidence of the coverage, required under this Article A.2.

§ A.2.2 Liability Insurance

§ A.2.2.1 The Owner shall be responsible for purchasing and maintaining the Owner's usual general liability insurance.

§ A.2.2.2 The Owner shall be responsible for purchasing and maintaining property and casualty insurance no later than the date on which Owner begins to occupy or use any

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document is intended to be used in conjunction with AIA Document A201™–2017, General Conditions of the Contract for Construction. Article 11 of A201™–2017 contains additional insurance provisions.

ELECTRONIC COPYING of any portion of this AIA® Document to another electronic file is prohibited and constitutes a violation of copyright laws as set forth in the footer of this document.

AIA Document A101™ – 2017 Exhibit A. Copyright © 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 18:40:57 on 06/15/2018 under Order No.0954726034 which expires on 06/23/2019, and is not for resale.
User Notes: (1381511009)

completed or partially-completed portions of the Work. If Owner occupies or uses any completed or partially-completed portion of the Work on any stage, then such occupancy or use must be consented to by the insurer and authorized by public authorities having jurisdiction over the Work, pursuant to Paragraphs (partial occupancy or use - 201) and A.2.3.4. To the extent of overlap between Owner's property insurance and Contractor's builder's risk insurance, Contractor's builder's risk shall be primary and non-contributory.

§ A.2.2.3 The Architect shall be responsible for purchasing and maintaining the Architect's liability and worker's compensation insurance as provided in the AIA Document B102- 2017, as amended.

ARTICLE A.3 CONTRACTOR'S INSURANCE AND BONDS

§ A.3.1 General

§ A.3.1.0 The Contractor and the Contractor's Subcontractors shall purchase and maintain such insurance as will protect them and the Owner from claims which may arise out of, or result from, the Contractor's operations under the Contract whether such operations be by Contractor or by any Subcontractor, or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, including the following:

§ A.3.1.0.1 Claims under state and federal employee benefit acts that are applicable to the Work to be performed, including private entities performing work at the site, and exempt from the coverage on account of number of employees or occupation, which entities shall maintain voluntary compensation coverage at the same limits specified for mandatory coverage for the duration of the Project (see Sections A.3.2.5 and A.3.1.12);
§ A.3.1.0.2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
§ A.3.1.0.3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
§ A.3.1.0.4 Claims for damages insured by usual personal injury liability coverage;
§ A.3.1.0.5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
§ A.3.1.0.6 Claims for damages because of bodily injury, death of a person, or property damage arising out of ownership, maintenance, or use of a motor vehicle;
§ A.3.1.0.7 Claims for bodily injury or property damage arising out of completed operations;
§ A.3.1.0.8 Claims involving contractual liability insurance applicable to the Contractor's obligations under the Contract Documents, including under Section 3.18 indemnification); and
§ A.3.1.0.9 Claims for damages to the Work itself, through builder's risk insurance, pursuant to Section A.3.2.13.

§ A.3.1.1 Certificates of Insurance. The Contractor shall provide original certificates of insurance acceptable to the Owner evidencing compliance with the requirements in this Article A.3 at the following times: (1) prior to commencement of the Work; (2) upon renewal or replacement of each required policy of insurance; and (3) upon the Owner's written request. The Contractor (and each Subcontractor) shall maintain the insurance coverages specified herein at all times during the term of the Contract or such later date specified herein. An additional certificate evidencing continuation of any insurance coverages that are required to remain in force after final payment, including coverage for completed operations, shall be submitted with the final Application for Payment and thereafter upon renewal or replacement of such coverage until the expiration of the periods required by Section A.3.2.1 and Section A.3.3.1. The certificates will show the Owner, its trustees, officers, employees, agents, and representatives as an additional insured or named insured when such coverages are required under the Contract Documents. All certificates required hereunder shall be in form and content satisfactory to Owner and shall include copies of all required insurance policies, declarations, and endorsements, containing all generally applicable conditions, definitions, and exclusions related to the Project.

§ A.3.1.1.1 Certificates must include a provision stating that coverages afforded under the policies will not be terminated, materially modified, or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Owner;
§ A.3.1.1.2 Certificates must be written by an insurance company or companies satisfactory to owner and licensed to do business in the State of Texas by the Texas Department of Insurance, with a rating of not less

AIA Document A101™ – 2017 Exhibit A. Copyright © 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 18:40:57 on 06/15/2018 under Order No.0954726034 which expires on 06/23/2019, and is not for resale.
User Notes: (1381511009)

than A-X in the latest available A.M. Best Key Rating Guide, Property-Casualty, and that permits waivers of subrogation; and

§ A.3.1.1.3 Certificates must be evidenced on an original ACORD Certificate of Insurance 25-S (7/90), AIA Document G715 current edition, each signed and with an original signature of the Authorized Representative, naming Owner as a certificate holder and attaching all endorsements required herein. Policy exclusions and restrictions should be clearly explained on the Certificate or in an attached letter from the Issuing Agency. Blank areas on the Certificate should have "not covered" written across the printed areas when coverage is not provided.

§ A.3.1.2 Deductibles. The Contractor shall disclose to the Owner any deductible applicable to any insurance required to be provided by the Contractor, and the Contractor shall be responsible for losses within the deductible. If the Owner is damaged by the failure of the Contractor to maintain such insurance and to so notify the Owner then the Contractor shall bear all reasonable costs properly attributable thereto.

§ A.3.1.3 Additional Insured Obligations. All insurance required herein shall name the Owner, its officers, employees, representatives and agents, as an additional insured, except Contractor's Worker's Compensation insurance. To the fullest extent permitted by law, the Contractor shall cause the commercial general liability coverage to include (1) the Owner, its trustees officers, employees, agents, and representatives, the Architect, the Program Manager, and the Architect's and/or Program Manager's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner, its trustees officers, employees, agents, and representatives as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions for which loss occurs during completed operations. All insurance required herein shall be, by endorsement, primary and non-contributory insurance with respect to the Owner, its trustees officers, employees, agents, and representatives and shall apply to both ongoing and completed operations. Owner insurance shall be excess, secondary, and non-contributing. The Commercial General Liability coverage provided by Contractor shall be endorsed to provide such primary and non-contributing liability. If the additional insured has other insurance which is applicable to the loss, such other insurance shall be on an excess or contingent basis. To the extent commercially available, the additional insured coverage shall be no less than that provided by Insurance Services Office, Inc. (ISO) forms CG 20 10 07 04, CG 20 37 07 04, and, with respect to the Architect and the Architect's consultants, CG 20 32 07 04, unless otherwise required by Owner.

§ A.3.1.4 No Work will be commenced and no equipment or materials can be shipped until all requirements of this Article have been satisfied, satisfactory evidence of insurance has been provided, and all insurance is in full force and effect. Contractor shall notify Owner and Architect in writing of any proposed nonconformity with these requirements, and shall notify Owner and Architect in writing of any insurance changes which occur during the terms required under the Contract Documents. Any deviation from these requirements can only be approved by Owner's Board of Trustees, unless otherwise delegated. Any nonconformity may be grounds for termination or modification of the Contract. To the extent that Contractor is unable to procure the insurance designated herein because the insurance is not reasonably available or is cost-prohibitive, then Contractor shall provide written notice to Owner's Board of Trustees. Said lack of insurance may then be grounds for termination or modification of the Contract.

§ A.3.1.5 All insurance shall be written on an occurrence basis, if available, and shall contain a waiver of subrogation in favor of Owner on all claims arising out of the Project. The policies shall provide such waivers of subrogation by endorsement or otherwise. The Contractor waives all rights of subrogation against Owner, it employees, officers, trustees, and agents, for damages caused by fire or other perils to the extent covered by insurance pursuant to Article A.3, except such rights as they may have to proceeds of such insurance held by the Owner as a fiduciary or as an insured. Contractor, as appropriate, shall require of separate Contractors, Subcontractors, and Sub-subcontractors, agents, and employees of any of them, by appropriate written agreements, similar waivers, each in favor of the Owner. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this Section A.3.1.5 shall not prohibit this waiver of subrogation. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, or did not pay the insurance premium directly or indirectly; and whether or not the person or entity had an insurable interest in the property damaged.

§ A.3.1.6 Any failure of Contractor to comply with the reporting provisions of the policies shall not affect the coverage provided to the Owner, its officers, employees, representatives or agents.

AIA Document A101™ – 2017 Exhibit A. Copyright © 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 18:40:57 on 06/15/2018 under Order No.0954726034 which expires on 06/23/2019, and is not for resale.
User Notes: (1381511009)

§ A.3.1.7 All workers on the Project must be covered by the required insurance policies of the Contractor or a Subcontractor.

§ A.3.1.8 Contractor and its subcontractors shall not commence the shipment of equipment or materials or commence the Work at the site until all of the insurance coverage required of Contractor and its subcontractors are in force and the necessary certificates and statements pursuant to Article A.3 have been received by Owner and the Architect has issued a written notice to proceed.

§ A.3.1.9 As an alternative and at Owner's sole option and expense, Owner may elect to furnish or to arrange for Contractor any part or all of the insurance required by this Article A.3. If Owner so elects, it shall notify, in writing, Contractor and issue a Change Order therefor, but no adjustment to the scheduled completion date or the Contract Sum shall be allowed.

§ A.3.1.10 The Contractor shall furnish Owner all information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, amendments, renewals, notices, cancellations, and additional endorsements as required under the Contract Documents or as they are provided to Contractor, whichever is earlier.

§ A.3.1.11 The insurance required by Article A.3 shall be written for not less than the limits specified in the Contract Documents or the limits required by law, whichever coverage is greater. The stipulated limits of liability aggregate coverages shall be for this Project.

§ A.3.1.12 Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

§ A.3.1.13 In the event of partial or full occupancy by the Owner prior to Substantial Completion of the Project, the Contractor shall notify the property insurance carrier and obtain a "Use and Occupancy" waiver to prevent cancellation, lapse, reduction, or other invalidation of such insurance by occupancy. Certificates of endorsements for this wavier shall be furnished by the Owner and the Architect.

§ A.3.1.14 The Owner as fiduciary shall have power to adjust and settle a loss with property insurers. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor under the insurance proceeds after notification of a Change in the Work in accordance with Article 7 of the General Conditions. The Contractor shall, as soon as the claim under the policy is settled, proceed with all due diligence with the rebuilding or reparation and shall not be entitled to any payment in respect thereto other than the said moneys received from insurance, but an extension of time for completion shall be allowed by the Architect for a just and reasonable period. All monies received under any such policies are to be paid to the Contractor by installments on the certificates of the Architect and to be applied in or towards the rebuilding or reparation of the work destroyed or injured. The Contractor shall pay all subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements shall require subcontractors to make payment to their sub-subcontractors in similar manner.

§ A.3.1.15 If the Contractor fails to purchase and maintain the required insurance, with all of the coverages and in the amounts described in the Contract Documents, the Contractor shall inform the Owner in writing prior to commencement of the Work. Upon receipt of notice from the Contractor, the Owner, in its sole discretion, may delay commencement of the Work and may obtain insurance that will protect the interests of the Owner, its trustees, officers, employees, agents, and representatives in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted to minimize the effect of any such failure on the Owner. In the event the Contractor fails to procure coverage, the Contractor waives all rights against the Owner, its trustees, officers, employees, agents, and representatives to the extent the loss would have been covered by the insurance to have been procured by the Contractor. The cost of the insurance shall be charged to the Contractor by a Change Order. If the Contractor does not provide written notice, and the Owner is damaged by the failure or neglect of the Contractor to purchase or maintain the required insurance, the Contractor shall reimburse the Owner for all reasonable costs and damages attributable thereto. Contractor, as appropriate, shall require of

AIA Document A101™ – 2017 Exhibit A. Copyright © 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 18:40:57 on 06/15/2018 under Order No.0954726034 which expires on 06/23/2019, and is not for resale.
User Notes: (1381511009)

separate Contractors, Subcontractors, and Sub-subcontractors, agents, and employees of any of them, by appropriate written agreements, similar obligations and liabilities, each in favor of the Owner.

§ A.3.2 Contractor's Required Insurance Coverage

§ A.3.2.1 The Contractor shall purchase and maintain the following types and limits of insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance without interruption from the date of commencement of the Work until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:

(If the Contractor is required to maintain insurance for a duration other than the expiration of the period for correction of Work, state the duration.)

§ A.3.2.2 Commercial General Liability

§ A.3.2.2.1

Commercial General Liability insurance for the Project written on an occurrence form with:

§ A.3.2.2.1.1 Policy limits of not less than:

§ A.3.2.2.1.1.1 Each Occurrence	One Million Dollars ($1,000,000) each occurrence Two Million Dollars ($2,000,000) aggregate (a designated Construction Project general aggregate limit shall be provided)
§ A.3.2.2.1.1.2 Medical Expense (per person)	Ten Thousand Dollars ($10,000) each occurrence (included with the per occurrence limits for Bodily Injury and Property Damage limits)
§ A.3.2.2.1.1.3 Products & Completed Operations	Two Million Dollars ($2,000,000) aggregate (to be maintained for a period of two years after Final Payment; Contractor shall continue to provide evidence of such coverage to Owner on an annual basis during this period and Owner shall be named by endorsement as an Additional Insured for such coverage)
§ A.3.2.2.1.1.4 Personal and Advertising Injury	One Million Dollars ($1,000,000) each person
§ A.3.2.2.1.1.5 Fire, Lightning, or Explosion	One Million Dollars ($1,000,000)

§ A.3.2.2.1.2 Coverages including the following:

§ A.3.2.2.1.2.1 Occurrence Basis
§ A.3.2.2.1.2.2 Premises Operations
§ A.3.2.2.1.2.3 Contractual Liability Coverage (including insurance sufficient to cover Contractor's contractual indemnities)
§ A.3.2.2.1.2.4 Explosion, collapse, and underground (X, C, and U) coverage
§ A.3.2.2.1.2.5 Products/Completed Operations coverage for Contractor, its Subcontractors, and Owner
§ A.3.2.2.1.2.6 Broad Form Property Damage
§ A.3.2.2.1.2.7 Independent Contractors
§ A.3.2.2.1.2.8 General Aggregate Per Project Endorsement

§ A.3.2.2.1.3 All of the coverages which may be included in coverages A, B and C contained in the Standard Texas Form Commercial General Liability Policy, without deletion. Such policy must be issued upon an "occurrence," as distinguished from a "claims made," basis and shall be continued for a period of one (1) year after the completion of the Services for the Project.

§ A.3.2.2.2 The Contractor's Commercial General Liability policy under this Section A.3.2.2 shall not contain an exclusion or restriction of coverage for the following:

AIA Document A101™ – 2017 Exhibit A. Copyright © 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 18:40:57 on 06/15/2018 under Order No.0954726034 which expires on 06/23/2019, and is not for resale.
User Notes: (1381511009)

.1 Claims by one insured against another insured, if the exclusion or restriction is based solely on the fact that the claimant is an insured, and there would otherwise be coverage for the claim.

.2 Claims for property damage to the Contractor's Work arising out of the products-completed operations hazard where the damaged Work or the Work out of which the damage arises was performed by a Subcontractor.

.3 Claims for bodily injury other than to employees of the insured.

.4 Claims for indemnity under Section 3.18 of the General Conditions arising out of injury to employees of the insured.

.5 Claims or loss excluded under a prior work endorsement or other similar exclusionary language.

.6 Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language.

.7 Claims related to residential, multi-family, or other habitational projects, if the Work is to be performed on such a project.

.8 Claims related to roofing, if the Work involves roofing.

.9 Claims related to exterior insulation finish systems (EIFS), synthetic stucco or similar exterior coatings or surfaces, if the Work involves such coatings or surfaces.

.10 Claims related to earth subsidence or movement, where the Work involves such hazards.

.11 Claims related to explosion, collapse and underground hazards, where the Work involves such hazards.

§ A.3.2.3 Comprehensive Automobile Liability Insurance covering vehicles owned, hired, and non-owned vehicles used, by or on behalf of the Contractor, with minimum combined single limit of not less than « One Million Dollars» ($ « 1,000,000.00 ») per occurrence or $500,000.00 Bodily Injury (per person), $1,000,000.00 Bodily Injury (per accident), and $500,000.00 Property Damage (per accident), for bodily injury, death of any person, and property damage arising out of the ownership, maintenance and use of those motor vehicles along with any other statutorily required automobile coverage. Owner and its trustees, officers, representatives, agents, and employees shall be endorsed as Additional Insureds, ATIMA (As Their Interests May Appear).

§ A.3.2.4 Excess (Umbrella) Liability Insurance of one times the Contract amount for all contracts with the following minimum and maximum: not less than Five Million Dollars ($5,000,000) Each Occurrence and Five Million Dollars ($5,000,000) Aggregate, with Aggregate Per Project Endorsement, and maximum limit of Twenty-Five Million Dollars ($25,000,000). The Umbrella shall provide coverage over the Workers' Compensation, General Liability and Comprehensive Automobile Liability Insurance Coverages. The Owner, the Architect and all Consultants listed on the Title Page of the Project Manual shall be listed as Additional Insureds on the Contractor's policy associated with the Project. Provisions shall be included for Waiver of Subrogation against the Owner and Architect and its Consultants.

§ A.3.2.5 Workers' Compensation not less than statutory limits mandated by state and federal laws with All States endorsement. All liability arising out of Contractor's employment of workers and anyone for whom Contractor shall be liable for Worker's Compensation Claims. Worker's compensation is required and no alternative form of insurance shall be permitted. Waiver of Subrogation in favor of Owner and Program Manager required.

§ A.3.2.5.1 A copy of a certificate of insurance, a certificate of authority to self-insure issued by the Texas Workers' Compensation Commission, or a coverage agreement (TWCC-81, TWCC-82, TWCC- 83, or TWCC-84), showing statutory Workers' Compensation insurance coverage for the person's or entity's employees providing services on a Project is required for the duration of the Project. Duration of the Project includes the time from the beginning of the work on the Project until the Contractor's/person's work on the Project has been completed and accepted by the governmental entity.

§ A.3.2.5.2 Persons providing services on the Project ("Subcontractor" in Texas Labor Code 406.096) include all persons or entities performing all or part of the services the Contractor has undertaken to perform on the Project, regardless of whether that person contracted directly with the Contractor and regardless of whether that person has employees. This includes, without limitation, independent Contractors, subcontractors, leasing companies, motor carriers, Owner- operators, employees of any such entity, or employees of any entity that furnishes persons to provide services on the Project.

AIA Document A101™ – 2017 Exhibit A. Copyright © 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 18:40:57 on 06/15/2018 under Order No.0954726034 which expires on 06/23/2019, and is not for resale.
User Notes: (1381511009)

§ A.3.2.5.3 Services include, without limitation, providing, hauling, or delivering equipment or materials, or providing labor, transportation, or other service related to a Project. Services do not include activities unrelated to the Project, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets.

§ A.3.2.5.4 The Contractor shall provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code Section 401.011(44) for all employees of the Contractor providing services on the Project for the duration of the Project.

§ A.3.2.5.5 The Contractor must provide a certificate of coverage to the governmental entity prior to being awarded the contract.

§ A.3.2.5.6 If the coverage period shown on the Contractor's current certificate of coverage ends during the duration of the Project, the Contractor must, prior to the end of the coverage period, file a new certificate of coverage with the governmental entity showing that coverage has been extended.

§ A.3.2.5.7 The Contractor shall obtain from each person providing services on a Project, and provide to the governmental entity:

§ A.3.2.5.7.1 A certificate of coverage, prior to that person beginning work on the Project, so the governmental entity will have on file certificates of coverage showing coverage for all persons providing services on the Project; and

§ A.3.2.5.7.2 No later than seven (7) days after receipt by the Contractor, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the Project.

§ A.3.2.5.8 The Contractor shall retain all required certificates of coverage for the duration of the Project and for one (1) year thereafter.

§ A.3.2.5.9 The Contractor shall notify the governmental entity in writing by certified mail or personal delivery, within ten (10) days after the Contractor knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the Project.

§ A.3.2.5.10 The Contractor shall post on each Project site a notice, in the text, form, and manner prescribed by the Texas Workers' Compensation Commission, informing all persons providing services on the Project that they are required to be covered, and stating how a person may verify coverage and report lack of coverage.

§ A.3.2.5.11 The Contractor shall contractually require each person with whom it contracts to provide services on a Project, to:

§ A.3.2.5.11.1 Provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code 401.011(44) for all of its employees providing services on the Project for the duration of the Project;

§ A.3.2.5.11.2 Provide to the Contractor, prior to that person beginning work on the Project, a certificate of coverage showing that coverage is being provided for all employees of the person providing services on the Project for the duration of the Project;

§ A.3.2.5.11.3 Provide the Contractor, prior to the end of the coverage period, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the Project;

§ A.3.2.5.11.4 Obtain from each other person with whom it contracts, and provide to the Contractor:

§ A.3.2.5.11.4.1 A certificate of coverage, prior to the other person beginning work on the Project; and

§ A.3.2.5.11.4.2 A new certificate of coverage showing extension of coverage, prior to the end of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of the Project;

§ A.3.2.5.11.5 Retain all required certificates of coverage on file for the duration of the Project and for one (1) year thereafter;

AIA Document A101™ – 2017 Exhibit A. Copyright © 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 18:40:57 on 06/15/2018 under Order No.0954726034 which expires on 06/23/2019, and is not for resale.
User Notes: (1381511009)

§ A.3.2.5.11.6 Notify the governmental entity in writing by certified mail or personal delivery, within ten (10) days after the person knew, or should have known, of any change that materially affects the provision of coverage of any person providing services on the Project; and
§ A.3.2.5.11.7 Contractually require each person with whom it contracts to perform as required by items a-f, with the certificates of coverage to be provided to the person for whom they are providing services.

§ A.3.2.5.12 By signing this contract or providing or causing to be provided a certificate of coverage, the Contractor is representing to the governmental entity that all employees of the Contractor who will provide services on the Project will be covered by Workers' Compensation coverage for the duration of the Project, that the coverage will be based on proper reporting of classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate insurance carrier or, in the case of a self-insured, with the Commission's Division of Self-Insurance Regulation. Providing false or misleading information may subject the Contractor to administrative penalties, criminal penalties, civil penalties, or other civil actions.

§ A.3.2.5.13 The Contractor's failure to comply with any of these provisions is a breach of contract by the Contractor that entitles the governmental entity to declare the contract void if the Contractor does not remedy the breach within ten (10) days after receipt of notice of breach from the governmental entity.

§ A.3.2.5.14 The coverage requirement recited above does not apply to sole proprietors, partners, and corporate officers who are excluded from coverage in an insurance policy or certificate of authority to self-insure that is delivered, issued for delivery, or renewed on or after January 1, 1996. 28 TAC 110.110(i)

§ A.3.2.6 Employers' Liability with policy limits not less than statutory limits mandated by state and federal laws, including, at a minimum, « One Million Dollars » ($ « 1,000,000 ») Bodily Injury with Accident - each accident, « One Million Dollars » ($ « 1,000,000 ») Bodily Injury by Disease - each employee, and « One Million Dollars » ($ « 1,000,000 ») Bodily Injury by Disease - policy limit. A waiver of subrogation shall be granted in favor of the Owner.

§ A.3.2.7 Jones Act, and the Longshore & Harbor Workers' Compensation Act, as required, if the Work involves hazards arising from work on or near navigable waterways, including vessels and docks.

§ A.3.2.8 If the Contractor is required to furnish professional services as part of the Work, the Contractor shall procure Professional Liability insurance covering performance of the professional services, with policy limits of not less than « » ($ « ») per claim and « » ($ « ») in the aggregate.

§ A.3.2.9 If the Work involves the transport, dissemination, use, or release of pollutants, the Contractor shall procure Pollution Liability insurance, with policy limits of not less than « » ($ « ») per claim and « » ($ « ») in the aggregate.

§ A.3.2.10 Coverage under Sections A.3.2.8 and A.3.2.9 may be procured through a Combined Professional Liability and Pollution Liability insurance policy, with combined policy limits of not less than « » ($ « ») per claim and « » ($ « ») in the aggregate.

§ A.3.2.11 Insurance for maritime liability risks associated with the operation of a vessel, if the Work requires such activities, with policy limits of not less than « » ($ « ») per claim and « » ($ « ») in the aggregate.

§ A.3.2.12 Insurance for the use or operation of manned or unmanned aircraft, if the Work requires such activities, with policy limits of not less than « » ($ « ») per claim and « » ($ « ») in the aggregate.

§ A.3.2.13 Contractor shall, at its expense, obtain and, during the progress of the Work, maintain full builder's risk "all-risks" or equivalent insurance policy, including boiler and machinery insurance, on said Work in the amount of the initial Contract Sum (or, if the Project is a Construction Manager at Risk project, Guaranteed Maximum Price), plus value of subsequent Contract Modifications and labor performed and cost of materials and equipment supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis.

AIA Document A101™ – 2017 Exhibit A. Copyright © 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 18:40:57 on 06/15/2018 under Order No.0954726034 which expires on 06/23/2019, and is not for resale.
User Notes: (1381511009)

§ A.3.2.13.1 For any claim made against the builder's risk insurance, the deductible shall not exceed $2,500 for a Contract Sum (or Guaranteed Maximum Price if the Project is a Construction Manager at Risk project) of less than $4 million. For a Contract Sum (or Guaranteed Maximum Price if the Project is a Construction Manager at Risk project) of $4 million or more, the deductible shall not exceed $5,000.

§ A.3.2.13.2 Coverage shall insure against the perils of fire (with extended coverage) and physical loss or damage, including, without limitation or duplication of coverage, lightning, collapse, earthquake, flood, wind storm, hurricane, hail, explosion, riot, civil commotion, smoke, aircraft, land vehicles, theft, vandalism, malicious mischief, falsework, testing and start-up, temporary structures, debris removal including demolition occasioned by enforcement of any applicable legal requirements, ensuing loss or resulting damage from error, omission, or deficiency in construction methods, design, specifications, workmanship, or materials, and all other perils, and shall include all work incorporated in the building and all materials for the same in or about the premises, including materials stored on-site, off-site and in transit, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss, including claim preparation expenses.

§ A.3.2.13.3 If the Work involves remodeling an existing structure or constructing an addition to an existing structure, the Contractor shall purchase and maintain, until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, "all-risks" property insurance, on a replacement cost basis, protecting the existing structure against direct physical loss or damage from the causes of loss identified in Section A.3.2.13.2, notwithstanding the undertaking of the Work. The Contractor shall be responsible for all co-insurance penalties.

§ A.3.2.13.4 Form of policy to be used shall be "Completed Value Builder's Risk". Both the Owner and the Contractor shall be a named insured under the policy or policies, and the insurance shall also include the interests of Contractor, subcontractors, and sub-subcontractors. Contractor shall furnish certified copies of the required policy or policies, with receipts for premiums paid for such insurance, to the Owner and the Architect.

§ A.3.2.13.5 Contractor shall be responsible for maintaining said builder's risk insurance until the date of Final Completion and shall continue such insurance following Final Completion or, if necessary, replace such insurance policy with property insurance written for the total value of the Project that shall remain in effect until expiration of the period for correction of the Work set forth in Section 12.2.2 of the General Conditions.

§ A.3.2.13.6 If this policy excludes Employee Theft or Dishonesty coverage, including Third Parties, Contractor shall obtain separate coverage sufficient to protect Owner's interest and in an amount agreeable to Owner.

§ A.3.3 Contractor's Other Insurance Coverage

§ A.3.3.1 Insurance selected and described in this Section A.3.3 shall be purchased by Contractor (and each Subcontractor, as applicable) from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor (and each Subcontractor, as applicable) shall maintain the required insurance without interruption from the date of commencement of the Work until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:

(If the Contractor is required to maintain any of the types of insurance selected below for a duration other than the expiration of the period for correction of Work, state the duration.)

§ A.3.3.2 The Contractor shall purchase and maintain the following types and limits of insurance in accordance with Section A.3.3.1.

(Select the types of insurance the Contractor is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. Where policy limits are provided, include the policy limit in the appropriate fill point.)

[« »] **§ A.3.3.2.2 Railroad Protective Liability Insurance**, with policy limits of not less than « » ($ « ») per

AIA Document A101™ – 2017 Exhibit A. Copyright © 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 18:40:57 on 06/15/2018 under Order No.0954726034 which expires on 06/23/2019, and is not for resale.
User Notes: (1381511009)

claim and « » ($ « ») in the aggregate, for Work within fifty (50) feet of railroad property.

[« »] **§ A.3.3.2.3 Asbestos Abatement Liability Insurance**, with policy limits of not less than « » ($ « ») per claim and « » ($ « ») in the aggregate, for liability arising from the encapsulation, removal, handling, storage, transportation, and disposal of asbestos-containing materials.

[« »] **§ A.3.3.2.4** Insurance for physical damage to property while it is in storage and in transit to the construction site on an "all-risks" completed value form.

[« »] **§ A.3.3.2.5** Property insurance on an "all-risks" completed value form, covering property owned by the Contractor and used on the Project, including scaffolding and other equipment.

[« »] **§ A.3.3.2.6 Other Insurance**
(List below any other insurance coverage to be provided by the Contractor and any applicable limits.)

Coverage	Limits

§ A.3.4 Performance Bond and Payment Bond
The Contractor shall provide surety bonds, from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located, as follows:
(Specify type and penal sum of bonds.)

Type	Penal Sum ($0.00)
Payment Bond	100% of the Contract Sum/Guaranteed Maximum Price
Performance Bond	100% of the Contract Sum/Guaranteed Maximum Price

Payment and Performance Bonds shall be in a form approved by the Owner.

§ A.3.4.1 Each bond shall be of a penal sum equal to 100% of the Contract Sum, or Guaranteed Maximum Price if the Project is a Construction Manager at Risk project, whichever is applicable; provided, however, no limitation herein shall limit Contractor's liability under the Contract Documents. The Contractor shall file copies of each bond with the county clerk and furnish the Owner with a file receipt. The bonds shall remain in full force throughout the contractual correction period of the Agreement. Except as provided below, such bonds shall be delivered to the Owner and the Architect prior to commencement of the Work. All bonds will be reviewed by the Architect for compliance with the Contract Documents. In the event that the Architect has any questions concerning the sufficiency of the bonds, the bonds will be referred to the Owner or the Owner's Representative with Architect's recommendation. The Work will not be started until the bonds and issuing companies have been accepted as satisfactory by the Owner. (If a fixed contract amount or Guaranteed Maximum Price has not been determined at the time the contract is awarded, then the penal sums of the payment and performance bonds delivered to the Owner must each be in an amount equal to the Project budget, as specified in the request for qualifications or request for sealed proposals. The Construction Manager at Risk shall deliver the bonds not later than the tenth day after the date the Construction Manager at Risk executes the Contract, unless the Construction Manager at Risk furnished a bid bond or other financial security acceptable to the District to ensure that the Construction Manager will furnish the required payment and performance bonds when the Guaranteed Maximum Price is established.)

§ A.3.4.2 All bonds shall fully comply with Texas Insurance Code Section 3503.001 et seq. and Texas Government Code Chapter 2253, or their successors, and shall be issued by a surety company acceptable to the Owner and licensed, listed and authorized to issue bonds in the State of Texas by the Texas Department of Insurance, with appropriate underwriting limitation, on the U.S. Treasury Department Circular No. 570 (Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies). The surety company shall have a rating of not less than "A-X" according to the latest posted ratings on the A.M. Best website,

AIA Document A101™ – 2017 Exhibit A. Copyright © 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 18:40:57 on 06/15/2018 under Order No.0954726034 which expires on 06/23/2019, and is not for resale.
User Notes: (1381511009)

www.ambest.com. The surety company shall provide, if requested, information on bonding capacity and other projects under coverage and shall provide proof to establish adequate financial capacity for this Project. Should the bond amount be in excess of ten percent (10%) of the surety company's capital and surplus, then the surety company issuing the bond shall certify that the surety company has acquired reinsurance, in a form and amount acceptable to the Owner, to reinsure the portion of the risk that exceeds ten percent (10%) of the surety company's capital and surplus with one or more reinsurers who are duly authorized and admitted to do business in Texas and that the amount reinsured by a reinsurer does not exceed ten percent (10%) of the reinsurer's capital and surplus. Contractor shall immediately notify the Owner and Architect in writing if there is any change in: the rating; insolvency or receivership in any State; bankruptcy; right to do business in the State; or status of Contractor's sureties at any time until Final Completion.

§ A.3.4.3 All bonds shall be originals. The Contractor shall require the attorney-in-fact who executes the required Bonds on behalf of the Surety to affix thereto a certified and current copy of the power-of-attorney. The name, address, and telephone number of a contact person for the bonding company shall be provided.

§ A.3.4.4 Bonds shall guarantee the faithful performance of all of the covenants, stipulations, and agreements of the Contract. Bonds shall be signed by an agent, resident in the State of Texas. If at any time during the continuance of the Contract, the Owner determines that the Contractor is unable to complete the Work in accordance with the Contract Documents, any of the Contractor's bonds become insufficient, the surety becomes insolvent, or the surety's rating drops below the required level, then the Owner shall have the right to require from the Contractor additional and sufficient sureties or other security acceptable to the Owner, which the Contractor shall furnish to the satisfaction of the Owner within ten (10) days after notice to do so. These contractual remedies are in addition to all remedies available by law. In default thereof, all payment or money due to the Contractor may be withheld until the Contractor provides additional surety or security.

Claims must be sent to the Contractor and his Surety, in accordance with Texas Government Code, Chapter 2253. The Owner will furnish in accordance with such Article, a copy of the payment bond, as provided therein, to claimants upon request. All claimants are cautioned that no lien exists on the funds unpaid to the Contractor on such Contract, and that reliance on notices sent to the Owner may result in loss of their rights against the Contractor and/or his Surety. The Owner is not responsible in any manner to a claimant for collection of unpaid bills, and accepts no responsibility because of any representation by any agent or employee.

ARTICLE A.4 SPECIAL TERMS AND CONDITIONS

Special terms and conditions that modify this Insurance and Bonds Exhibit, if any, are as follows:

«None. »

DRAFT

AIA Document A101™ – 2017 Exhibit A. Copyright © 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 18:40:57 on 06/15/2018 under Order No.0954726034 which expires on 06/23/2019, and is not for resale.
User Notes: (1381511009)

DRAFT

AIA® Document A201™ – 2017

General Conditions of the Contract for Construction

making

for the following PROJECT:
(Name and location or address)

«New Caney ISD Project »

THE OWNER:
(Name, legal status and address)

«New Caney Independent School District
22784 Hwy 59 S
Building "E"
Porter, Texas 77365 »« »

THE ARCHITECT:
(Name, legal status and address)

«--- »« »

THE PROGRAM MANAGER:
(Name, legal status and address)

«n/a »

The Owner may retain Program Manager(s) to carry out some of the functions of the administration of the Owner's construction program. The Contractor, Architect, and Program Manager (when applicable) shall cooperate with each other in the performance of their respective functions. The management and reporting systems used by the Owner and/or Program Manager, including the assignment of the Program Manager, may be changed by Owner during the Project.

TABLE OF ARTICLES

1 GENERAL PROVISIONS

2 OWNER

3 CONTRACTOR

4 ARCHITECT

5 SUBCONTRACTORS

6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

7 CHANGES IN THE WORK

8 TIME

9 PAYMENTS AND COMPLETION

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

For guidance in modifying this document to include supplementary conditions, see AIA Document A503™, Guide for Supplementary Conditions.

ELECTRONIC COPYING of any portion of this AIA® Document to another electronic file is prohibited and constitutes a violation of copyright laws as set forth in the footer of this document.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

10 PROTECTION OF PERSONS AND PROPERTY

11 INSURANCE AND BONDS

12 UNCOVERING AND CORRECTION OF WORK

13 MISCELLANEOUS PROVISIONS

14 TERMINATION OR SUSPENSION OF THE CONTRACT

15 CLAIMS AND DISPUTES

DRAFT

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

INDEX
(Topics and numbers in bold are Section headings.)

Acceptance of Nonconforming Work
9.6.6, 9.9.3, **12.3**
Acceptance of Work
9.6.6, 9.8.2, 9.9.3, 9.10.1, 9.10.3, 12.3
Access to Work
3.16, 6.2.1, 12.1
Accident Prevention
10
Acts and Omissions
3.2, 3.3.2, 3.12.8, 3.18, 4.2.3, 8.3.1, 9.5.1, 10.2.5, 10.2.8, 13.3.2, 14.1, 15.1.2, 15.2
Addenda
1.1.1
Additional Costs, Claims for
3.7.4, 3.7.5, 10.3.2, 15.1.5
Additional Inspections and Testing
9.4.2, 9.8.3, 12.2.1, **13.4**
Additional Time, Claims for
3.2.4, 3.7.4, 3.7.5, 3.10.2, 8.3.2, **15.1.6**
Administration of the Contract
3.1.3, **4.2**, 9.4, 9.5
Advertisement or Invitation to Bid
1.1.1
Aesthetic Effect
4.2.13
Allowances
3.8
Applications for Payment
4.2.5, 7.3.9, 9.2, **9.3**, 9.4, 9.5.1, 9.5.4, 9.6.3, 9.7, 9.10
Approvals
2.1.1, 2.3.1, 2.5, 3.1.3, 3.10.2, 3.12.8, 3.12.9, 3.12.10.1, 4.2.7, 9.3.2, 13.4.1
Arbitration
8.3.1, 15.3.2, **15.4**
ARCHITECT
4
Architect, Definition of
4.1.1
Architect, Extent of Authority
2.5, 3.12.7, 4.1.2, 4.2, 5.2, 6.3, 7.1.2, 7.3.4, 7.4, 9.2, 9.3.1, 9.4, 9.5, 9.6.3, 9.8, 9.10.1, 9.10.3, 12.1, 12.2.1, 13.4.1, 13.4.2, 14.2.2, 14.2.4, 15.1.4, 15.2.1
Architect, Limitations of Authority and Responsibility
2.1.1, 3.12.4, 3.12.8, 3.12.10, 4.1.2, 4.2.1, 4.2.2, 4.2.3, 4.2.6, 4.2.7, 4.2.10, 4.2.12, 4.2.13, 5.2.1, 7.4, 9.4.2, 9.5.4, 9.6.4, 15.1.4, 15.2
Architect's Additional Services and Expenses
2.5, 12.2.1, 13.4.2, 13.4.3, 14.2.4
Architect's Administration of the Contract
3.1.3, 3.7.4, 15.2, 9.4.1, 9.5
Architect's Approvals
2.5, 3.1.3, 3.5, 3.10.2, 4.2.7
Architect's Authority to Reject Work
3.5, 4.2.6, 12.1.2, 12.2.1
Architect's Copyright
1.1.7, 1.5
Architect's Decisions
3.7.4, 4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 4.2.14, 6.3, 7.3.4, 7.3.9, 8.1.3, 8.3.1, 9.2, 9.4.1, 9.5, 9.8.4, 9.9.1, 13.4.2, 15.2
Architect's Inspections
3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 13.4
Architect's Instructions
3.2.4, 3.3.1, 4.2.6, 4.2.7, 13.4.2
Architect's Interpretations
4.2.11, 4.2.12
Architect's Project Representative
4.2.10
Architect's Relationship with Contractor
1.1.2, 1.5, 2.3.3, 3.1.3, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2, 3.5, 3.7.4, 3.7.5, 3.9.2, 3.9.3, 3.10, 3.11, 3.12, 3.16, 3.18, 4.1.2, 4.2, 5.2, 6.2.2, 7, 8.3.1, 9.2, 9.3, 9.4, 9.5, 9.7, 9.8, 9.9, 10.2.6, 10.3, 11.3, 12, 13.3.2, 13.4, 15.2
Architect's Relationship with Subcontractors
1.1.2, 4.2.3, 4.2.4, 4.2.6, 9.6.3, 9.6.4, 11.3
Architect's Representations
9.4.2, 9.5.1, 9.10.1
Architect's Site Visits
3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.5.1, 9.9.2, 9.10.1, 13.4
Asbestos
10.3.1
Attorneys' Fees
3.18.1, 9.6.8, 9.10.2, 10.3.3
Award of Separate Contracts
6.1.1, 6.1.2
Award of Subcontracts and Other Contracts for Portions of the Work
5.2
Basic Definitions
1.1
Bidding Requirements
1.1.1
Binding Dispute Resolution
8.3.1, 9.7, 11.5, 13.1, 15.1.2, 15.1.3, 15.2.1, 15.2.5, 15.2.6.1, 15.3.1, 15.3.2, 15.3.3, 15.4.1
Bonds, Lien
7.3.4.4, 9.6.8, 9.10.2, 9.10.3
Bonds, Performance, and Payment
7.3.4.4, 9.6.7, 9.10.3, **11.1.2**, 11.1.3, **11.5**
Building Information Models Use and Reliance
1.8
Building Permit
3.7.1
Capitalization
1.3
Certificate of Substantial Completion
9.8.3, 9.8.4, 9.8.5
Certificates for Payment
4.2.1, 4.2.5, 4.2.9, 9.3.3, **9.4**, 9.5, 9.6.1, 9.6.6, 9.7, 9.10.1, 9.10.3, 14.1.1.3, 14.2.4, 15.1.4
Certificates of Inspection, Testing or Approval

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

13.4.4
Certificates of Insurance
9.10.2
Change Orders
1.1.1, 3.4.2, 3.7.4, 3.8.2.3, 3.11, 3.12.8, 4.2.8, 5.2.3, 7.1.2, 7.1.3, **7.2**, 7.3.2, 7.3.7, 7.3.9, 7.3.10, 8.3.1, 9.3.1.1, 9.10.3, 10.3.2, 11.2, 11.5, 12.1.2
Change Orders, Definition of
7.2.1
CHANGES IN THE WORK
2.2.2, 3.11, 4.2.8, **7**, 7.2.1, 7.3.1, 7.4, 8.3.1, 9.3.1.1, 11.5
Claims, Definition of
15.1.1
Claims, Notice of
1.6.2, 15.1.3
CLAIMS AND DISPUTES
3.2.4, 6.1.1, 6.3, 7.3.9, 9.3.3, 9.10.4, 10.3.3, **15**, 15.4
Claims and Timely Assertion of Claims
15.4.1
Claims for Additional Cost
3.2.4, 3.3.1, 3.7.4, 7.3.9, 9.5.2, 10.2.5, 10.3.2, **15.1.5**
Claims for Additional Time
3.2.4, 3.3.1, 3.7.4, 6.1.1, 8.3.2, 9.5.2, 10.3.2, **15.1.6**
Concealed or Unknown Conditions, Claims for
3.7.4
Claims for Damages
3.2.4, 3.18, 8.3.3, 9.5.1, 9.6.7, 10.2.5, 10.3.3, 11.3, 11.3.2, 14.2.4, 15.1.7
Claims Subject to Arbitration
15.4.1
Cleaning Up
3.15, 6.3
Commencement of the Work, Conditions Relating to
2.2.1, 3.2.2, 3.4.1, 3.7.1, 3.10.1, 3.12.6, 5.2.1, 5.2.3, 6.2.2, 8.1.2, 8.2.2, 8.3.1, 11.1, 11.2, **15.1.5**
Commencement of the Work, Definition of
8.1.2
Communications
3.9.1, **4.2.4**
Completion, Conditions Relating to
3.4.1, 3.11, 3.15, 4.2.2, 4.2.9, 8.2, 9.4.2, 9.8, 9.9.1, 9.10, 12.2, 14.1.2, 15.1.2
COMPLETION, PAYMENTS AND
9
Completion, Substantial
3.10.1, 4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, 9.8, 9.9.1, 9.10.3, 12.2, 15.1.2
Compliance with Laws
2.3.2, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 10.2.2, 13.1, 13.3, 13.4.1, 13.4.2, 13.5, 14.1.1, 14.2.1.3, 15.2.8, 15.4.2, 15.4.3
Concealed or Unknown Conditions
3.7.4, 4.2.8, 8.3.1, 10.3
Conditions of the Contract
1.1.1, 6.1.1, 6.1.4
Consent, Written
3.4.2, 3.14.2, 4.1.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3, 13.2, 15.4.4.2
Consolidation or Joinder
15.4.4
CONSTRUCTION BY OWNER OR BY
SEPARATE CONTRACTORS
1.1.4, **6**
Construction Change Directive, Definition of
7.3.1
Construction Change Directives
1.1.1, 3.4.2, 3.11, 3.12.8, 4.2.8, 7.1.1, 7.1.2, 7.1.3, **7.3**, 9.3.1.1
Construction Schedules, Contractor's
3.10, 3.11, 3.12.1, 3.12.2, 6.1.3, 15.1.6.2
Contingent Assignment of Subcontracts
5.4, 14.2.2.2
Continuing Contract Performance
15.1.4
Contract, Definition of
1.1.2
CONTRACT, TERMINATION OR
SUSPENSION OF THE
5.4.1.1, 5.4.2, 11.5, **14**
Contract Administration
3.1.3, 4, 9.4, 9.5
Contract Award and Execution, Conditions Relating to
3.7.1, 3.10, 5.2, 6.1
Contract Documents, Copies Furnished and Use of
1.5.2, 2.3.6, 5.3
Contract Documents, Definition of
1.1.1
Contract Sum
2.2.2, 2.2.4, 3.7.4, 3.7.5, 3.8, 3.10.2, 5.2.3, 7.3, 7.4, **9.1**, 9.2, 9.4.2, 9.5.1.4, 9.6.7, 9.7, 10.3.2, 11.5, 12.1.2, 12.3, 14.2.4, 14.3.2, 15.1.4.2, **15.1.5, 15.2.5**
Contract Sum, Definition of
9.1
Contract Time
1.1.4, 2.2.1, 2.2.2, 3.7.4, 3.7.5, 3.10.2, 5.2.3, 6.1.5, 7.2.1.3, 7.3.1, 7.3.5, 7.3.6, 7, 7, 7.3.10, 7.4, 8.1.1, 8.2.1, 8.2.3, 8.3.1, 9.5.1, 9.7, 10.3.2, 12.1.1, 12.1.2, 14.3.2, 15.1.4.2, 15.1.6.1, 15.2.5
Contract Time, Definition of
8.1.1
CONTRACTOR
3
Contractor, Definition of
3.1, 6.1.2
Contractor's Construction and Submittal
Schedules
3.10, 3.12.1, 3.12.2, 4.2.3, 6.1.3, 15.1.6.2
Contractor's Employees
2.2.4, 3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2, 10.3, 11.3, 14.1, 14.2.1.1
Contractor's Liability Insurance
11.1

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

Contractor's Relationship with Separate Contractors and Owner's Forces
3.12.5, 3.14.2, 4.2.4, 6, 11.3, 12.2.4
Contractor's Relationship with Subcontractors
1.2.2, 2.2.4, 3.3.2, 3.18.1, 3.18.2, 4.2.4, 5, 9.6.2, 9.6.7, 9.10.2, 11.2, 11.3, 11.4
Contractor's Relationship with the Architect
1.1.2, 1.5, 2.3.3, 3.1.3, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2, 3.5.1, 3.7.4, 3.10, 3.11, 3.12, 3.16, 3.18, 4.2, 5.2, 6.2.2, 7, 8.3.1, 9.2, 9.3, 9.4, 9.5, 9.7, 9.8, 9.9, 10.2.6, 10.3, 11.3, 12, 13.4, 15.1.3, 15.2.1
Contractor's Representations
3.2.1, 3.2.2, 3.5, 3.12.6, 6.2.2, 8.2.1, 9.3.3, 9.8.2
Contractor's Responsibility for Those Performing the Work
3.3.2, 3.18, 5.3, 6.1.3, 6.2, 9.5.1, 10.2.8
Contractor's Review of Contract Documents
3.2
Contractor's Right to Stop the Work
2.2.2, 9.7
Contractor's Right to Terminate the Contract
14.1
Contractor's Submittals
3.10, 3.11, 3.12, 4.2.7, 5.2.1, 5.2.3, 9.2, 9.3, 9.8.2, 9.8.3, 9.9.1, 9.10.2, 9.10.3
Contractor's Superintendent
3.9, 10.2.6
Contractor's Supervision and Construction Procedures
1.2.2, 3.3, 3.4, 3.12.10, 4.2.2, 4.2.7, 6.1.3, 6.2.4, 7.1.3, 7.3.4, 7.3.6, 8.2, 10, 12, 14, 15.1.4
Coordination and Correlation
1.2, 3.2.1, 3.3.1, 3.10, 3.12.6, 6.1.3, 6.2.1
Copies Furnished of Drawings and Specifications
1.5, 2.3.6, 3.11
Copyrights
1.5, **3.17**
Correction of Work
2.5, 3.7.3, 9.4.2, 9.8.2, 9.8.3, 9.9.1, 12.1.2, **12.2**, 12.3, 15.1.3.1, 15.1.3.2, 15.2.1
Correlation and Intent of the Contract Documents
1.2
Cost, Definition of
7.3.4
Costs
2.5, 3.2.4, 3.7.3, 3.8.2, 3.15.2, 5.4.2, 6.1.1, 6.2.3, 7.3.3.3, 7.3.4, 7.3.8, 7.3.9, 9.10.2, 10.3.2, 10.3.6, 11.2, 12.1.2, 12.2.1, 12.2.4, 13.4, 14
Cutting and Patching
3.14, 6.2.5
Damage to Construction of Owner or Separate Contractors
3.14.2, 6.2.4, 10.2.1.2, 10.2.5, 10.4, 12.2.4
Damage to the Work
3.14.2, 9.9.1, 10.2.1.2, 10.2.5, 10.4, 12.2.4
Damages, Claims for
3.2.4, 3.18, 6.1.1, 8.3.3, 9.5.1, 9.6.7, 10.3.3, 11.3.2, 11.3, 14.2.4, 15.1.7
Damages for Delay
6.2.3, 8.3.3, 9.5.1.6, 9.7, 10.3.2, 14.3.2
Date of Commencement of the Work, Definition of
8.1.2
Date of Substantial Completion, Definition of
8.1.3
Day, Definition of
8.1.4
Decisions of the Architect
3.7.4, 4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 6.3, 7.3.4, 7.3.9, 8.1.3, 8.3.1, 9.2, 9.4, 9.5.1, 9.8.4, 9.9.1, 13.4.2, 14.2.2, 14.2.4, 15.1, 15.2
Decisions to Withhold Certification
9.4.1, **9.5**, 9.7, 14.1.1.3
Defective or Nonconforming Work, Acceptance, Rejection and Correction of
2.5, 3.5, 4.2.6, 6.2.3, 9.5.1, 9.5.3, 9.6.6, 9.8.2, 9.9.3, 9.10.4, 12.2.1
Definitions
1.1, 2.1.1, 3.1.1, 3.5, 3.12.1, 3.12.2, 3.12.3, 4.1.1, 5.1, 6.1.2, 7.2.1, 7.3.1, 8.1, 9.1, 9.8.1, 15.1.1
Delays and Extensions of Time
3.2, **3.7.4**, 5.2.3, 7.2.1, 7.3.1, **7.4**, **8.3**, 9.5.1, **9.7**, 10.3.2, **10.4**, 14.3.2, **15.1.6**, 15.2.5
Digital Data Use and Transmission
1.7
Disputes
6.3, 7.3.9, 15.1, 15.2
Documents and Samples at the Site
3.11
Drawings, Definition of
1.1.5
Drawings and Specifications, Use and Ownership of
3.11
Effective Date of Insurance
8.2.2
Emergencies
10.4, 14.1.1.2, **15.1.5**
Employees, Contractor's
3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2, 10.3.3, 11.3, 14.1, 14.2.1.1
Equipment, Labor, or Materials
1.1.3, 1.1.6, 3.4, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1, 4.2.6, 4.2.7, 5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1, 10.2.4, 14.2.1.1, 14.2.1.2
Execution and Progress of the Work
1.1.3, 1.2.1, 1.2.2, 2.3.4, 2.3.6, 3.1, 3.3.1, 3.4.1, 3.7.1, 3.10.1, 3.12, 3.14, 4.2, 6.2.2, 7.1.3, 7.3.6, 8.2, 9.5.1, 9.9.1, 10.2, 10.3, 12.1, 12.2, 14.2, 14.3.1, 15.1.4
Extensions of Time
3.2.4, 3.7.4, 5.2.3, 7.2.1, 7.3, 7.4, 9.5.1, 9.7, 10.3.2, 10.4, 14.3, 15.1.6, **15.2.5**
Failure of Payment
9.5.1.3, **9.7**, 9.10.2, 13.5, 14.1.1.3, 14.2.1.2
Faulty Work
(See Defective or Nonconforming Work)
Final Completion and Final Payment
4.2.1, 4.2.9, 9.8.2, **9.10**, 12.3, 14.2.4, 14.4.3

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

Financial Arrangements, Owner's
2.2.1, 13.2.2, 14.1.1.4
GENERAL PROVISIONS
1
Governing Law
13.1
Guarantees (See Warranty)
Hazardous Materials and Substances
10.2.4, **10.3**
Identification of Subcontractors and Suppliers
5.2.1
Indemnification
3.17, **3.18**, 9.6.8, 9.10.2, 10.3.3, 11.3
Information and Services Required of the Owner
2.1.2, **2.2**, 2.3, 3.2.2, 3.12.10.1, 6.1.3, 6.1.4, 6.2.5, 9.6.1, 9.9.2, 9.10.3, 10.3.3, 11.2, 13.4.1, 13.4.2, 14.1.1.4, 14.1.4, 15.1.4
Initial Decision
15.2
Initial Decision Maker, Definition of
1.1.8
Initial Decision Maker, Decisions
14.2.4, 15.1.4.2, 15.2.1, 15.2.2, 15.2.3, 15.2.4, 15.2.5
Initial Decision Maker, Extent of Authority
14.2.4, 15.1.4.2, 15.2.1, 15.2.2, 15.2.3, 15.2.4, 15.2.5
Injury or Damage to Person or Property
10.2.8, 10.4
Inspections
3.1.3, 3.3.3, 3.7.1, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 12.2.1, 13.4
Instructions to Bidders
1.1.1
Instructions to the Contractor
3.2.4, 3.3.1, 3.8.1, 5.2.1, 7, 8.2.2, 12, 13.4.2
Instruments of Service, Definition of
1.1.7
Insurance
6.1.1, 7.3.4, 8.2.2, 9.3.2, 9.8.4, 9.9.1, 9.10.2, 10.2.5, **11**
Insurance, Notice of Cancellation or Expiration
11.1.4, 11.2.3
Insurance, Contractor's Liability
11.1
Insurance, Effective Date of
8.2.2, 14.4.2
Insurance, Owner's Liability
11.2
Insurance, Property
10.2.5, 11.2, 11.4, 11.5
Insurance, Stored Materials
9.3.2
INSURANCE AND BONDS
11
Insurance Companies, Consent to Partial Occupancy
9.9.1
Insured loss, Adjustment and Settlement of
11.5
Intent of the Contract Documents
1.2.1, 4.2.7, 4.2.12, 4.2.13
Interest
13.5
Interpretation
1.1.8, 1.2.3, **1.4**, 4.1.1, 5.1, 6.1.2, 15.1.1
Interpretations, Written
4.2.11, 4.2.12
Judgment on Final Award
15.4.2
Labor and Materials, Equipment
1.1.3, 1.1.6, **3.4**, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1, 5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1, 10.2.4, 14.2.1.1, 14.2.1.2
Labor Disputes
8.3.1
Laws and Regulations
1.5, 2.3.2, 3.2.3, 3.2.4, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 9.9.1, 10.2.2, 13.1, 13.3.1, 13.4.2, 13.5, 14, 15.2.8, 15.4
Liens
2.1.2, 9.3.1, 9.3.3, 9.6.8, 9.10.2, 9.10.4, 15.2.8
Limitations, Statutes of
12.2.5, 15.1.2, 15.4.1.1
Limitations of Liability
3.2.2, 3.5, 3.12.10, 3.12.10.1, 3.17, 3.18.1, 4.2.6, 4.2.7, 6.2.2, 9.4.2, 9.6.4, 9.6.7, 9.6.8, 10.2.5, 10.3.3, 11.3, 12.2.5, 13.3.1
Limitations of Time
2.1.2, 2.2, 2.5, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2.7, 5.2, 5.3, 5.4.1, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3, 9.4.1, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 12.2, 13.4, 14, 15, 15.1.2, 15.1.3, 15.1.5
Materials, Hazardous
10.2.4, **10.3**
Materials, Labor, Equipment and
1.1.3, 1.1.6, 3.4.1, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1, 5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1.2, 10.2.4, 14.2.1.1, 14.2.1.2
Means, Methods, Techniques, Sequences and Procedures of Construction
3.3.1, 3.12.10, 4.2.2, 4.2.7, 9.4.2
Mechanic's Lien
2.1.2, 9.3.1, 9.3.3, 9.6.8, 9.10.2, 9.10.4, 15.2.8
Mediation
8.3.1, 15.1.3.2, 15.2.1, 15.2.5, 15.2.6, **15.3**, 15.4.1, 15.4.1.1
Minor Changes in the Work
1.1.1, 3.4.2, 3.12.8, 4.2.8, 7.1, **7.4**
MISCELLANEOUS PROVISIONS
13
Modifications, Definition of
1.1.1
Modifications to the Contract
1.1.1, 1.1.2, 2.5, 3.11, 4.1.2, 4.2.1, 5.2.3, 7, 8.3.1, 9.7, 10.3.2
Mutual Responsibility
6.2
Nonconforming Work, Acceptance of

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

9.6.6, 9.9.3, **12.3**
Nonconforming Work, Rejection and Correction of
2.4, 2.5, 3.5, 4.2.6, 6.2.4, 9.5.1, 9.8.2, 9.9.3, 9.10.4, 12.2
Notice
1.6, 1.6.1, 1.6.2, 2.1.2, 2.2.2., 2.2.3, 2.2.4, 2.5, 3.2.4, 3.3.1, 3.7.4, 3.7.5, 3.9.2, 3.12.9, 3.12.10, 5.2.1, 7.4, 8.2.2 9.6.8, 9.7, 9.10.1, 10.2.8, 10.3.2, 11.5, 12.2.2.1, 13.4.1, 13.4.2, 14.1, 14.2.2, 14.4.2, 15.1.3, 15.1.5, 15.1.6, 15.4.1
Notice of Cancellation or Expiration of Insurance
11.1.4, 11.2.3
Notice of Claims
1.6.2, 2.1.2, 3.7.4, 9.6.8, 10.2.8, **15.1.3**, 15.1.5, 15.1.6, 15.2.8, 15.3.2, 15.4.1
Notice of Testing and Inspections
13.4.1, 13.4.2
Observations, Contractor's
3.2, 3.7.4
Occupancy
2.3.1, 9.6.6, 9.8
Orders, Written
1.1.1, 2.4, 3.9.2, 7, 8.2.2, 11.5, 12.1, 12.2.2.1, 13.4.2, 14.3.1
OWNER
2
Owner, Definition of
2.1.1
Owner, Evidence of Financial Arrangements
2.2, 13.2.2, 14.1.1.4
Owner, Information and Services Required of the
2.1.2, **2.2**, 2.3, 3.2.2, 3.12.10, 6.1.3, 6.1.4, 6.2.5, 9.3.2, 9.6.1, 9.6.4, 9.9.2, 9.10.3, 10.3.3, 11.2, 13.4.1, 13.4.2, 14.1.1.4, 14.1.4, 15.1.4
Owner's Authority
1.5, 2.1.1, 2.3.32.4, 2.5, 3.4.2, 3.8.1, 3.12.10, 3.14.2, 4.1.2, 4.2.4, 4.2.9, 5.2.1, 5.2.4, 5.4.1, 6.1, 6.3, 7.2.1, 7.3.1, 8.2.2, 8.3.1, 9.3.2, 9.5.1, 9.6.4, 9.9.1, 9.10.2, 10.3.2, 11.4, 11.5, 12.2.2, 12.3, 13.2.2, 14.3, 14.4, 15.2.7
Owner's Insurance
11.2
Owner's Relationship with Subcontractors
1.1.2, 5.2, 5.3, 5.4, 9.6.4, 9.10.2, 14.2.2
Owner's Right to Carry Out the Work
2.5, 14.2.2
Owner's Right to Clean Up
6.3
Owner's Right to Perform Construction and to Award Separate Contracts
6.1
Owner's Right to Stop the Work
2.4
Owner's Right to Suspend the Work
14.3
Owner's Right to Terminate the Contract
14.2, 14.4
Ownership and Use of Drawings, Specifications and Other Instruments of Service
1.1.1, 1.1.6, 1.1.7, **1.5**, 2.3.6, 3.2.2, 3.11, 3.17, 4.2.12, 5.3
Partial Occupancy or Use
9.6.6, **9.9**
Patching, Cutting and
3.14, 6.2.5
Patents
3.17
Payment, Applications for
4.2.5, 7.3.9, 9.2, **9.3**, 9.4, 9.5, 9.6.3, 9.7, 9.8.5, 9.10.1, 14.2.3, 14.2.4, 14.4.3
Payment, Certificates for
4.2.5, 4.2.9, 9.3.3, **9.4**, 9.5, 9.6.1, 9.6.6, 9.7, 9.10.1, 9.10.3, 14.1.1.3, 14.2.4
Payment, Failure of
9.5.1.3, **9.7**, 9.10.2, 13.5, 14.1.1.3, 14.2.1.2
Payment, Final
4.2.1, 4.2.9, **9.10**, 12.3, 14.2.4, 14.4.3
Payment Bond, Performance Bond and
7.3.4.4, 9.6.7, 9.10.3, **11.1.2**
Payments, Progress
9.3, **9.6**, 9.8.5, 9.10.3, 14.2.3, 15.1.4
PAYMENTS AND COMPLETION
9
Payments to Subcontractors
5.4.2, 9.5.1.3, 9.6.2, 9.6.3, 9.6.4, 9.6.7, 14.2.1.2
PCB
10.3.1
Performance Bond and Payment Bond
7.3.4.4, 9.6.7, 9.10.3, **11.1.2**
Permits, Fees, Notices and Compliance with Laws
2.3.1, **3.7**, 3.13, 7.3.4.4, 10.2.2
PERSONS AND PROPERTY, PROTECTION OF
10
Polychlorinated Biphenyl
10.3.1
Product Data, Definition of
3.12.2
Product Data and Samples, Shop Drawings
3.11, **3.12**, 4.2.7
Progress and Completion
4.2.2, **8.2**, 9.8, 9.9.1, 14.1.4, 15.1.4
Progress Payments
9.3, **9.6**, 9.8.5, 9.10.3, 14.2.3, 15.1.4
Project, Definition of
1.1.4
Project Representatives
4.2.10
Property Insurance
10.2.5, **11.2**
Proposal Requirements
1.1.1
PROTECTION OF PERSONS AND PROPERTY
10
Regulations and Laws

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

1.5, 2.3.2, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 9.9.1, 10.2.2, 13.1, 13.3, 13.4.1, 13.4.2, 13.5, 14, 15.2.8, 15.4
Rejection of Work
4.2.6, 12.2.1
Releases and Waivers of Liens
9.3.1, 9.10.2
Representations
3.2.1, 3.5, 3.12.6, 8.2.1, 9.3.3, 9.4.2, 9.5.1, 9.10.1
Representatives
2.1.1, 3.1.1, 3.9, 4.1.1, 4.2.10, 13.2.1
Responsibility for Those Performing the Work
3.3.2, 3.18, 4.2.2, 4.2.3, 5.3, 6.1.3, 6.2, 6.3, 9.5.1, 10
Retainage
9.3.1, 9.6.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3
Review of Contract Documents and Field Conditions by Contractor
3.2, 3.12.7, 6.1.3
Review of Contractor's Submittals by Owner and Architect
3.10.1, 3.10.2, 3.11, 3.12, 4.2, 5.2, 6.1.3, 9.2, 9.8.2
Review of Shop Drawings, Product Data and Samples by Contractor
3.12
Rights and Remedies
1.1.2, 2.4, 2.5, 3.5, 3.7.4, 3.15.2, 4.2.6, 5.3, 5.4, 6.1, 6.3, 7.3.1, 8.3, 9.5.1, 9.7, 10.2.5, 10.3, 12.2.1, 12.2.2, 12.2.4, **13.3**, 14, 15.4
Royalties, Patents and Copyrights
3.17
Rules and Notices for Arbitration
15.4.1
Safety of Persons and Property
10.2, 10.4
Safety Precautions and Programs
3.3.1, 4.2.2, 4.2.7, 5.3, **10.1**, 10.2, 10.4
Samples, Definition of
3.12.3
Samples, Shop Drawings, Product Data and
3.11, **3.12**, 4.2.7
Samples at the Site, Documents and
3.11
Schedule of Values
9.2, 9.3.1
Schedules, Construction
3.10, 3.12.1, 3.12.2, 6.1.3, 15.1.6.2
Separate Contracts and Contractors
1.1.4, 3.12.5, 3.14.2, 4.2.4, 4.2.7, 6, 8.3.1, 12.1.2
Separate Contractors, Definition of
6.1.1
Shop Drawings, Definition of
3.12.1
Shop Drawings, Product Data and Samples
3.11, **3.12**, 4.2.7
Site, Use of
3.13, 6.1.1, 6.2.1
Site Inspections
3.2.2, 3.3.3, 3.7.1, 3.7.4, 4.2, 9.9.2, 9.4.2, 9.10.1, 13.4
Site Visits, Architect's
3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.5.1, 9.9.2, 9.10.1, 13.4
Special Inspections and Testing
4.2.6, 12.2.1, 13.4
Specifications, Definition of
1.1.6
Specifications
1.1.1, **1.1.6**, 1.2.2, 1.5, 3.12.10, 3.17, 4.2.14
Statute of Limitations
15.1.2, 15.4.1.1
Stopping the Work
2.2.2, 2.4, 9.7, 10.3, 14.1
Stored Materials
6.2.1, 9.3.2, 10.2.1.2, 10.2.4
Subcontractor, Definition of
5.1.1
SUBCONTRACTORS
5
Subcontractors, Work by
1.2.2, 3.3.2, 3.12.1, 3.18, 4.2.3, 5.2.3, 5.3, 5.4, 9.3.1.2, 9.6.7
Subcontractual Relations
5.3, 5.4, 9.3.1.2, 9.6, 9.10, 10.2.1, 14.1, 14.2.1
Submittals
3.10, 3.11, 3.12, 4.2.7, 5.2.1, 5.2.3, 7.3.4, 9.2, 9.3, 9.8, 9.9.1, 9.10.2, 9.10.3
Submittal Schedule
3.10.2, 3.12.5, 4.2.7
Subrogation, Waivers of
6.1.1, **11.3**
Substances, Hazardous
10.3
Substantial Completion
4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, **9.8**, 9.9.1, 9.10.3, 12.2, 15.1.2
Substantial Completion, Definition of
9.8.1
Substitution of Subcontractors
5.2.3, 5.2.4
Substitution of Architect
2.3.3
Substitutions of Materials
3.4.2, 3.5, 7.3.8
Sub-subcontractor, Definition of
5.1.2
Subsurface Conditions
3.7.4
Successors and Assigns
13.2
Superintendent
3.9, 10.2.6
Supervision and Construction Procedures
1.2.2, **3.3**, 3.4, 3.12.10, 4.2.2, 4.2.7, 6.1.3, 6.2.4, 7.1.3, 7.3.4, 8.2, 8.3.1, 9.4.2, 10, 12, 14, 15.1.4
Suppliers
1.5, 3.12.1, 4.2.4, 4.2.6, 5.2.1, 9.3, 9.4.2, 9.5.4, 9.6, 9.10.5, 14.2.1
Surety

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

5.4.1.2, 9.6.8, 9.8.5, 9.10.2, 9.10.3, 11.1.2, 14.2.2, 15.2.7
Surety, Consent of
9.8.5, 9.10.2, 9.10.3
Surveys
1.1.7, 2.3.4
Suspension by the Owner for Convenience
14.3
Suspension of the Work
3.7.5, 5.4.2, 14.3
Suspension or Termination of the Contract
5.4.1.1, 14
Taxes
3.6, 3.8.2.1, 7.3.4.4
Termination by the Contractor
14.1, 15.1.7
Termination by the Owner for Cause
5.4.1.1, **14.2,** 15.1.7
Termination by the Owner for Convenience
14.4
Termination of the Architect
2.3.3
Termination of the Contractor Employment
14.2.2

TERMINATION OR SUSPENSION OF THE CONTRACT
14
Tests and Inspections
3.1.3, 3.3.3, 3.7.1, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 10.3.2, 12.2.1, **13.4**
TIME
8
Time, Delays and Extensions of
3.2.4, 3.7.4, 5.2.3, 7.2.1, 7.3.1, 7.4, **8.3**, 9.5.1, 9.7, 10.3.2, 10.4, 14.3.2, 15.1.6, 15.2.5
Time Limits
2.1.2, 2.2, 2.5, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2, 5.2, 5.3, 5.4, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3, 9.4.1, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 12.2, 13.4, 14, 15.1.2, 15.1.3, 15.4
Time Limits on Claims
3.7.4, 10.2.8, 15.1.2, 15.1.3
Title to Work
9.3.2, 9.3.3
UNCOVERING AND CORRECTION OF WORK
12
Uncovering of Work
12.1
Unforeseen Conditions, Concealed or Unknown
3.7.4, 8.3.1, 10.3
Unit Prices
7.3.3.2, 9.1.2
Use of Documents
1.1.1, 1.5, 2.3.6, 3.12.6, 5.3
Use of Site
3.13, 6.1.1, 6.2.1
Values, Schedule of
9.2, 9.3.1
Waiver of Claims by the Architect
13.3.2
Waiver of Claims by the Contractor
9.10.5, 13.3.2, **15.1.7**
Waiver of Claims by the Owner
9.9.3, 9.10.3, 9.10.4, 12.2.2.1, 13.3.2, 14.2.4, **15.1.7**
Waiver of Consequential Damages
14.2.4, 15.1.7
Waiver of Liens
9.3, 9.10.2, 9.10.4
Waivers of Subrogation
6.1.1, **11.3**
Warranty
3.5, 4.2.9, 9.3.3, 9.8.4, 9.9.1, 9.10.2, 9.10.4, 12.2.2, 15.1.2
Weather Delays
8.3, 15.1.6.2
Work, Definition of
1.1.3
Written Consent
1.5.2, 3.4.2, 3.7.4, 3.12.8, 3.14.2, 4.1.2, 9.3.2, 9.10.3, 13.2, 13.3.2, 15.4.4.2
Written Interpretations
4.2.11, 4.2.12
Written Orders
1.1.1, 2.4, 3.9, 7, 8.2.2, 12.1, 12.2, 13.4.2, 14.3.1

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect or the Owner. All sections of the Project Manual shall be a part of the Contract Documents. The solicitation documents used by the Owner, including advertisement or Requests for bids or Proposals, Instructions to Bidders, other information furnished by the Owner in anticipation of receiving bids or proposals, and Addenda relating to such solicitation documents, except to the extent that the proposal has been modified by the terms of the Contract shall be a part of the Contract Documents. Any reference to any Contract Documents shall mean the document as amended and/or supplemented for this Project.

§ 1.1.2 The Contract

The Contract Documents form the Contract for Construction (the "Contract") and are as fully a part of the Contract as if attached hereto or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. After execution of the original Contract Documents, the Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants, or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.2.1 To be effective, all Contract Documents requiring signatures must be signed first by the Contractor and then by the Owner's authorized representative, after approval by Owner's Board of Trustees, unless otherwise delegated. If an approved Contract Document requiring signature has not been signed, then the missing signature shall be provided within a reasonable period of time. Failure to sign an approved Contract Document after notice and a reasonable opportunity to sign shall be considered a material breach of the Contract. Contractor's signing of the Agreement shall be considered as signing all Contract Documents identified therein.

§ 1.1.2.2 After execution of the original Contract Documents, the Contract may thereafter be amended or modified only by a written Modification signed by Contractor, approved by Owner's Board of Trustees, unless otherwise delegated, and signed by an authorized representative of Owner's Board of Trustees. As a material consideration for the making of the Contract, Modifications to the Contract shall not be construed against the maker of said Modifications.

§ 1.1.2.3 In the event of conflict, the order of precedence of the Contract Documents shall be as listed in the Agreement. Terms and conditions contained in the Agreement shall take precedence over terms and conditions contained in the General Conditions, and the terms and conditions in the General Conditions shall take precedence over all other terms and conditions contained in the other Contract Documents, except for Exhibit A, "Insurance and Bonds," attached to the Agreement, which shall take precedence over the General Conditions. An enumeration of the Contract Documents and their order of precedence, other than a Modification, appear in Article 9 of the AIA A101, as modified by the Owner for the Project

§ 1.1.2.4 Any reference to the Agreement, General Conditions, or any other Contract Document shall mean the document as amended and/or supplemented for this Project.

§ 1.1.3 The Work

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project. The Work includes all of Contractor's responsibilities as to all labor, parts, supplies, skill, supervision, transportation services, storage requirements, and other facilities and things necessary, proper or incidental to the carrying out and completion of the terms of the Contract Documents and all other items of cost or value needed to produce, construct, and fully complete the public Work identified by the Contract Documents. The Contract

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

Documents include all Construction Documents, such as Drawings and Specifications that establish in detail the quality levels of materials and systems required for the Project. The Construction Documents shall reflect all agreements between Owner and Architect concerning Owner's budgetary constraints, programmatic needs, and expectations as to quality, functionality of systems, maintenance costs, and usable life of equipment and facilities. Said Construction Documents shall reflect the Owner's educational program and educational specifications, the State educational adequacy, safety, and security standards in 19 TAC Section 61.1040, and any other standards to which the Architect is subject pursuant to applicable law or contract. The Architect shall provide Construction Documents which are sufficient for Owner to complete construction of the Project.

§ 1.1.4 The Project

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by Separate Contractors.

§ 1.1.5 The Drawings

The Drawings are the graphic and pictorial portions of the Contract Documents, wherever located and whenever issued, showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

§ 1.1.6 The Specifications

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 Instruments of Service

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials or documents, including those in electronic form, prepared by the Architect and the Architect's consultants and shall set forth in detail the requirements for construction of the Project.

§ 1.1.8 Initial Decision Maker

The Initial Decision Maker is the person identified in the Agreement to render initial decisions or recommendations on Claims in accordance with Section 15.2. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

§ 1.1.9 Project Manual

The Project Manual is a volume assembled for the Work which includes the bidding or proposal requirements, sample forms, Conditions of the Contract and Specifications.

§ 1.1.10 Project Manual Addenda

Project Manual Addenda are written, or graphic instruments issued prior to the execution of the Contract, which modify or interpret the bidding or proposal documents, including Drawings and Specifications, by additions, deletions, clarifications, or corrections. Addenda will become part of the Contract Documents when the Agreement is executed. The Contractor and Subcontractors shall include all addenda items on their copies of the Drawings and Specifications.

§ 1.1.11 The terms "bids" or "bidding" shall include any kind of competitive purchasing/procurement under Texas Government Code Chapter 2269.

§ 1.1.12 Abbreviations

AIA:	American Institute of Architects
AIEE:	American Institute of Electrical Engineers
ACI:	American Concrete Institute
AHERA:	Asbestos Hazardous Emergency Response Act
AISI:	American Iron and Steel Institute
AISC:	American Institute of Steel Construction
ANSI:	American National Standards Institute
ASA:	American Standards Association

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

ASTM:	American Society of Testing Materials
AWSC:	American Welding Society Code
CERCLA:	Comprehensive Environmental Response, Compensation, and Liability Act
EPA:	Environmental Protection Agency
FS:	Federal Specification
NEC:	National Electrical Code
NIC:	Not in Contract (indicates work not to be done by this Contractor under this Agreement)
OSHA:	Occupational Safety and Health Administration
SPR:	Simplified Practice Recommendation
TAS:	Texas Accessibility Standards
UL:	Underwriters Laboratories, Inc.

§ 1.1.13 Miscellaneous Other Words

§ 1.1.13.1 Calendar Days: The days of the Gregorian calendar. The Contract Time is established in Calendar Days and extensions of time granted for Regular Work Days lost, if any, will be converted to Calendar Days.

§ 1.1.13.2 Holidays: The days officially recognized by the construction industry in this area as a holiday; limited to the observance days of New Year's Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day and the day after, and Christmas Day.

§ 1.1.13.3 Regular Work Days: All calendar days except holidays and Sundays. Requests for extensions of time shall be requested on the basis of Regular Work Days

§ 1.1.13.4 Anticipated Adverse Weather Days: An allowance of Regular Work Days established as probable days lost due to weather delays; said allowance to be included in the Contractor's Completion Time.

§ 1.1.13.5 Adverse Weather Days: Regular Work Days when rain, flooding, snow, unusually high winds, excessively wet grounds, or similar circumstances prevent progress on Critical Path portions of the Work. The Contractor will be entitled to an extension of the Contract Time for the net additional time, if any, which results from deducting the amount of Anticipated Adverse Weather Days from the total amount of approved Adverse Weather Days.

§ 1.1.13.5.1 Further, Adverse Weather is defined as the occurrence of one or more of the following conditions within a twenty-four (24) hour day that prevents construction activity exposed to weather conditions or access to the site:

1. Precipitation (rain, snow, or ice) in excess of twenty-five one hundredths of an inch (0.25") liquid measure, hereafter referred to as Standard Baseline.
2. Temperatures that do not rise above that required for the day's construction activity, if such temperature requirement is specified or accepted as standard industry practice.
3. Sustained wind in excess of twenty-five (25) m.p.h.
4. "dry-out" or "mud" days resulting from precipitation that occur beyond the standard baseline; only if there is a hindrance to site access or sitework and Contractor has taken all reasonable accommodations to avoid such hindrance; and, at a rate no greater than 1 make-up day for each day or consecutive days of precipitation beyond the Anticipated Adverse Weather Days that total 1.0 inch or more, liquid measure.
5. Adverse weather prevents work on the project for fifty percent (50%) or more of the Contractor's scheduled work day and critical path construction activities were included in the day's schedule, including a weekend day or holiday if Contractor has scheduled construction activity that day.

§ 1.1.13.6 Net Days: Actual Adverse Weather Days experienced to date less Anticipated Adverse Weather Days anticipated to date. Actual Instruction Days experienced to date less Anticipated Instruction Days anticipated to date.

§ 1.1.13.7 Instruction Days: Regular Work Days when the Owner operations prevent progress on Critical Path portions of the Work. The Contractor will be entitled to an extension of the Contract Time for the net additional time, if any, which results from deducting the amount of Anticipated Instruction Days from the total amount of approved Instruction Days.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

§ 1.1.13.8 The term "business day" is a day the Owner's Administration Building is scheduled to be open for normal business purposes, unless closed by the Owner's Superintendent of Schools or designee for inclement weather or other reason. Days on which the Administration Building is normally closed are Thanksgiving Break, Winter Break, Spring Break, and Summer Break, as well as other federal, state or local days specified in the calendar approved by the Owner's Board of Trustees on an annual basis. A business day does not include a day on which the Owner's Administration Building is open only for the purposes of conducting candidate filing, early voting, elections, or other special events.

§ 1.1.13.9 The term "Direct Labor Cost" means the actual and verifiable salaries and wages (basic, premium and incentive) paid to personnel, but does not include indirect payroll related costs or fringe benefits (Labor Cost Burden).

§ 1.1.13.10 The term "Labor Cost Burden" means the actual and verifiable cost of customary and statutory benefits including, but not limited to, social security contributions, unemployment, excise and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. Labor Cost Burden excludes all forms of general liability policy premiums and deductibles, safety training, tuition cost reimbursement, small tool expense, and union dues. The Owner reserves the right to request evidence of Labor Cost Burden at any time from Contractor and Subcontractors.

§ 1.1.14 The term "Compensable Change" means circumstances involving the performance of Extra Work:

1 that are the result of

(1) Differing Site Conditions,

(2) amendments or additions to Applicable Laws, which amendments or additions are enacted after the execution of the Agreement,

(3) a Change requested by Owner in accordance with the conditions of authorization applicable to Compensable Changes set forth in Article 7, below, or

(4) other circumstances involving a Change in the Work for which Contractor is given under the Contract Documents a specific and express right to a Change Order to the Contract Price;

2 that are not caused, in whole or in part, by an act or omission of Contractor or a Subcontractor, of any Tier, constituting negligence, willful misconduct, or violation of an Applicable Law, or by a failure of Contractor of a Subcontractor, of any Tier, to comply with the Contract Documents;

.3 for which a Change Order is neither prohibited by nor waived under the terms of the Contract Documents; and

.4 that if performed would require Contractor to incur additional and unforeseeable Allowable Costs that would not have been required to be incurred in the absence of such circumstances.

§ 1.1.15 The term "Compensable Delay" means a Delay to the critical path of activities affecting Contractor's ability to achieve Substantial Completion of the entirety of the Work within the Contract Time:

1 that is the result of

(a) a Compensable Change,

(b) the willful negligence of Owner, Architect, a Owner Consultant or a Separate Contractor,

(c) a breach by Owner of an obligation under the Contract Documents, or

(d) other circumstances involving Delay for which Contractor is given under the Contract Documents a specific and express right to a Change Order adjusting the Contract Price;

2 that is not caused, in whole or in part, by an act or omission of Contractor or a Subcontractor, of any Tier, constituting negligence, willful misconduct, or a violation of an Applicable Law, or a failure by Contractor or any Subcontractor, of any Tier, to comply with the Contract Documents; and

3 for which a Change Order to the Contract Time is neither prohibited by nor waived under the terms of the Contract Documents.

§ 1.1.16 The term "Excusable Delay" means a Delay, other than a Compensable Delay, to Contractor's ability to achieve Substantial Completion or Final Completion of the Work within the Contract Time that is: (1) not caused, in whole or in part, by an act or omission of Contractor or a Subcontractor, of any Tier, constituting negligence, willful misconduct, a violation of an Applicable Law or a failure by Contractor or any Subcontractor, of any Tier, to comply with the Contract Documents; (2) unforeseeable, unavoidable and beyond the control of Contractor and the Subcontractors, of every Tier; and (3) the result of a Force Majeure Event. Without limitation to the foregoing, neither the bankruptcy, insolvency nor financial inability of Contractor or a Subcontractor, of any Tier, nor any

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

failure by a Subcontractor, of any Tier, to perform any obligation imposed by contract or Applicable Laws shall constitute a ground for Excusable Delay.

§ 1.1.17 The term "Unexcused Delay" means any Delay that is not a Compensable Delay or Excusable Delay or that constitutes a Compensable Delay or Excusable Delay for which Contractor is not entitled to a Change Order to the Contract Time, including, without limitation, the following: (1) Delay caused by an act or omission of Contractor or a Subcontractor, of any Tier, constituting negligence, willful misconduct, a violation of an Applicable Law or a failure by Contractor or any Subcontractor, of any Tier, to comply with the Contract Documents; (2) Delay for which Contractor has failed to provide a timely and complete Notice of Delay or Request for Extension; or (3) Delay associated with any circumstances where the costs or risk associated with such circumstances are designated in the Contract Documents as being at Contractor's risk or Contractor's Own Expense.

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 1.2.1.2 During the course of the Work, should any conflict be found in or between the Contract Documents, the Contractor shall be deemed to have estimated the Work on the basis of the greater quantity or better quality, or the most stringent requirement, unless the Contractor obtained a decision in writing from the Architect as to what shall govern before the submission of the Contractor's proposal. The Architect, in case of such conflict, may interpret or construe the documents so as to obtain the most substantial and complete performance of the Work consistent with the Contract Documents and reasonably inferable therefrom, in the best interest of Owner, and the Architect's decision shall be final. The terms and conditions of this clause shall not relieve any party of any other obligation under the Contract Documents.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.2.4 Relation of Specifications and Drawings

General Requirements in the Specifications govern the execution of all Specifications. Summary paragraphs present a brief indication of the Work, but do not limit the Work as later detailed. The Drawings and Specifications are correlative and have equal authority and priority. Should the Drawings and Specifications have internal inconsistencies, then the Contractor shall base the bids and construction on the most expensive combination of quality and quantity of Work indicated. If Drawings and Specifications are not in concurrence regarding quantity or quality, Contractor shall request interpretation from the Architect. For purposes of construction, the Architect shall determine in writing the appropriate Work, after the Contractor brings the inconsistency to the Architect's attention. Failure to report an inconsistency shall be evidence that Contractor has elected to proceed in the more expensive manner.

§ 1.2.4.1 Drawings are in part diagrammatic, and do not necessarily show complete details of construction, materials, or their performance, or installation, and do not necessarily show how construction details or other items of work or fixtures or equipment may affect any particular installation. These shall be ascertained by the Contractor from the Architect and correlated to bring the parts together to a complete whole.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

§ 1.2.4.2 All dimensions shall be verified by field measurements and all work laid out to permit pipes, valves, ductwork, lights, panels, other items of construction, to be located as closely as possible to locations shown. All items shall be checked before installation to determine that they can be concealed properly, if appropriate, and that they clear any structural components, supports for other items, and cabinets and equipment or other mechanical, electrical or architectural items having fixed locations.

§ 1.2.4.3 Work shall be laid out to assure ready accessibility to valves, fittings, and other items requiring servicing, adjustment or checking.

§ 1.2.4.4 Actual physical dimensions of specified stock items shall govern over dimensions shown for work to receive stock items. Custom items or modified stock items shall be fabricated to dimensions shown, or to fit into other dimensioned work.

§ 1.2.4.5 If Work is required in a manner which makes it impossible to produce the specified quality of Work, or should errors, omissions, or discrepancies exist in the Contract Documents, the Contractor shall request in writing an interpretation before proceeding with Work. If Contractor fails to make such a written request, no excuse or claim will thereafter be entertained for failure to carry out Work in a satisfactory manner as specified by Contract Documents. Should conflict occur in or between Drawings and Specifications which should reasonably have been ascertained by the Contractor, Contractor is deemed to have estimated and included in the Contract Sum the more expensive way of doing the Work.

§ 1.2.5 Materials, Equipment and Processes

The mechanical, electrical, and plumbing drawings show the general arrangement and extent of the Work. Exact location and arrangement of the various parts shall be determined with the approval of the Architect after equipment has been selected and as the Work progresses.

§ 1.2.5.1 All Work shall, insofar as possible, be installed in such a manner as will not interfere with architectural or structural portions of the building. Should changes become necessary because of a failure of the Contractor to comply with the bidding instructions concerning equipment requiring area not shown on the Construction Documents, the Contractor shall be fully responsible for completing any required modifications or eliminating any interferences. The Contractor shall be required to submit material data and drawings on all equipment, which may vary from the Drawings and Project Manual, and any interferences must be eliminated before Work proceeds.

§ 1.2.5.2 Where in the Project Manual, Specifications, and Drawings, certain products, manufacturer's trade names, or catalog numbers are given, it is done for the express purpose of establishing a standard of function, dimension, appearance, and quality of design, in harmony with the Work, and is not intended for the purpose of limiting competition. Where particular items are specified, products of those named manufacturers are required unless Contractor submits for consideration proposed substitutions of materials, equipment or processes from those set out in the Contract Documents. Submittals of proposed substitutions should contain sufficient information to allow the Architect and Owner to determine if the proposed substitution is in fact equal to or better than the requirements in the Contract Documents. Contractor shall bear all risk caused by submitting substitutions, including all costs. The Owner may approve substitutions only when the substitution is clearly provided by the Contract to be equal in performance characteristics to the requirements of the Contract Documents, equally compatible with the existing installations, and complementary to the architectural design for the Work. Certain specified construction and equipment details may not be regularly included as part of the named manufacturer's standard catalog equipment but shall be obtained by the Contractor from the manufacturer as required for the proper evaluation and/or functioning of the equipment. Reasonable minor variations in equipment are expected and will be acceptable, if approved in advance by the Architect and Owner; however, indicated and specified performance and material requirements are the minimum. The Owner and the Architect reserve the right to determine the equality of equipment and materials that deviate from any of the indicated and specified requirements. Materials or equipment shall not be substituted unless the Architect has specifically accepted such substitution for use on this Project in writing.

§ 1.2.5.3 Diagrammatic indications of piping, ducts, conduit, and other similar items are subject to adjustment to obtain required grading, passage over, under or around obstructions, to avoid exposure to finished areas, or unsightly, obstructing conditions. Contractor shall be responsible for coordination of these adjustments and recommending alternate solutions whenever design details affect construction feasibility, costs, or schedules. All manufactured articles, materials, and equipment shall be incorporated into the Work in accordance with the manufacturer's written or printed directions and instructions unless otherwise indicated in the Contract Documents.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

§ 1.2.6 Standards and Requirements

When the Work is governed by reference to standards, building codes, manufacturers' instructions, or other documents, unless otherwise specified, the current edition as of the date of execution of the Agreement shall apply. Requirements of public authorities apply as minimum requirements only and do not supersede more stringent specified requirements.

§ 1.2.7 Errors in Construction Documents

The Owner and Contractor agree that the Contract Documents may not be free from errors, inconsistencies, or omissions. The Contractor stipulates and agrees that the Owner has no duty to discover any errors, inconsistencies, or omissions in the Drawings, Plans, Specifications and other Construction Documents, and has no duty to notify Contractor of same. Owner makes no warranty as to the completeness, adequacy, and accuracy of any Drawings, Plans, Specifications or other Construction Documents, either express or implied. Execution of the Contract by the Contractor is a representation that the Contractor has thoroughly reviewed and become familiar with the Contract Documents and that the Contractor is not aware of any errors, inconsistencies, or omissions in the Contract Documents which would delay the Contractor in the performance of the Contract Work. The Contractor shall not be entitled to any damages or increase in the Contract Sum due to delays or disruptions to the Work.

§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service

§ 1.5.1 All ownership rights, whether common law, statutory, or other reserved rights, including copyright ownership, of the Instruments of Service/Construction Documents, are controlled by the Agreement between the Owner and the Architect. The Contractor, Subcontractors, Sub-subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service or Construction Documents. The Owner holds perpetual right to use all of the Instruments of Service / Construction Documents for this Project. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of any reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the copyright holder. All copies of the Instruments of Service and Construction Documents, except the Contractor's record set, shall be returned or suitably accounted for to the copyright holder upon completion of the Work.

§ 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered to the individual for which it was intended in person, by registered or certified mail, return receipt requested, by courier service providing proof of delivery, or by electronic transmission (facsimile or email), with electronic confirmation of receipt, if a method for electronic transmission is set forth in the Agreement. For notices delivered by electronic transmission and received after 5:00 p.m. on a day on which the recipient's offices are open, or on a weekend, Holiday, or other day on which the recipient's offices are closed, notice shall be deemed to have been duly served on the next day on which the recipient's offices are open.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, return receipt requested, or by courier providing proof of delivery.

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form, including, in the Owner's sole discretion, using AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data. Notwithstanding any provision herein to the contrary, if the parties agree to an exchange of electronic data/CAD files, such transfer shall be in accordance with the following requirements: the seals and signatures shall be removed from any Drawings or Project Manual and the following statement substituted: The record copy of this Drawing or Project Manual is on file at the Architect's office. This electronic document is released for the purposes of reference, coordination and/or facility management under the authority of Texas Registration Number Architect License No. (insert License #). Any modification of this Drawing or Project Manual shall be in compliance with the Texas Board of Architectural Examiner's rules.

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in Section 1.7, above, or any use of Contract Documents or any other information or documentation in digital form inconsistent with those protocols set forth in Section 1.7, above, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

§ 1.9 Parties to Consult

§ 1.9.1 Representatives of the Owner, Contractor, and Architect shall meet periodically at mutually agreed upon intervals for the purpose of establishing procedures to facilitate cooperation, communication and timely responses among the participants. By participating in this arrangement, the parties do not intend to create additional contractual obligations or modify the legal relationships which may otherwise exist.

§ 1.9.2 Contractor acknowledges that the Contract Sum reflects Owner's absolute budgetary limit for the Costs of the Work. Should the Contractor become aware of circumstances with respect to the Work that, if not addressed or remedied would lead to a cost overrun, it shall immediately notify Owner and Architect of the existence of such circumstances and its recommendation for addressing the circumstances, including any possible elimination or offset of the cost overrun. If at any time circumstances arise that might result in the Contract Sum being exceeded, the Owner, Contractor and Architect shall consult and revise the Drawings and Project Manual (including, but not limited to consideration of substitutions of materials) in such fashion as to cause the Work as revised to be accomplished for the Contract Sum; provided that no such revision shall result in a material diminishment of the square footage of the instructional facilities.

ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. All parties understand that only the Board of Trustees acting as a body corporate has the authority to bind the Owner with respect to all matters requiring the Board's approval under current policy of the Board of Trustees, including, but not limited to, a Change Order or Construction Change Directive modifying the Contract Sum or an extension to the date of Substantial or Final Completion. The Board of Trustees may designate in writing one or more persons to represent the Owner and act on its behalf for such matters, as well as day-to-day operations under the Contract, in accordance with the current policy of the Board of Trustees; however, such representatives shall have the authority to bind the Owner only to the extent expressly authorized by the Owner and shall have no implied authority. Neither Architect nor Contractor may rely upon the direction of an employee of Owner who has not been designated as set forth herein, and Owner shall not be responsible, financially or otherwise, for actions taken by the Architect or Contractor in reliance upon direction from unauthorized persons. Except as otherwise provided in Section 4.2.1, the Architect does not have the authority to bind the Owner with respect to matters requiring Owner's approval or authorization. The Owner has contracted with the Architect who will carry out the functions of administration of the Project and the initial arbiter of Claims as identified in Section 15.2.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

§ 2.1.2 The presence of the Owner, the Owner's representative(s) or Architect at the Work site does not imply acceptance or approval of the Work.

§ 2.1.3 The Owner may require that the Contractor use and/or respond to certain Owner-furnished forms or inquiries during the course of the Project. From time to time, there may be future revisions, changes, additions or deletions to these forms. The fact that the Owner modifies and increases reasonable reporting requirements shall not serve as the basis for a claim for additional time or compensation by the Contractor.

§ 2.2 Intentionally deleted.

§ 2.2.4 Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities. Contractor shall pay for all permit fees and inspection fees required for performance of the Work other than inspection and testing fees which the Owner contracts for separately with a third party, and Certificates of Occupancy fees. All of such fees shall be considered Cost of the Work unless the Contractor is required to pay for them without reimbursement due to the Contractor's fault under other provisions of the Contract Documents.

§ 2.3.2 The Owner shall retain an architect lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.3 If the employment of the Architect terminates, the Owner shall employ a successor whose status under the Contract Documents shall be that of the Architect. Owner shall notify Contractor if a new Architect has been employed by Owner.

§ 2.3.4 If requested in writing to do so by the Contractor prior to the start of the Work, the Owner may, at the Owner's sole discretion, furnish surveys known to the Owner describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. Owner does not guarantee the accuracy of surveys provided, including the locations of utility lines, cables, pipes, or pipelines, or the presence or absence of easements. The Contractor shall not be entitled to rely on the accuracy of information furnished by the Owner and shall exercise proper diligence and take appropriate precautions relating to the safe performance of the Work. THE OWNER DOES NOT IN ANY WAY REPRESENT, WARRANT OR GUARANTY TO CONTRACTOR OR TO ANY OTHER PERSON THE RELIABILITY, CONSTRUCTABILITY, COMPLETENESS, OR ACCURACY OF ANY SURVEYS, REPORTS, STUDIES, TESTS, ARCHITECTURAL OR ENGINEERING PLANS, OR SIMILAR INFORMATION PROVIDED BY OWNER IN CONNECTION WITH THIS CONTRACT, NOR DOES THE OWNER REPRESENT, WARRANT OR GUARANTY THAT SUCH INFORMATION IS FREE FROM DEFECTS, ERRORS OR DEFICIENCIES, AND ALL SUCH REPRESENTATIONS, WARRANTIES AND GUARANTIES ARE HEREBY EXPRESSLY DENIED AND DISCLAIMED. The Owner shall not be liable to the Contractor or any other person for breach of warranty or misrepresentation in the event of any errors or deficiencies in such information provided to the Contractor by the Owner. The Owner's provision of a survey will not relieve the Contractor from its obligations to examine the site or exercise proper precautions relating to the safe performance of the Work.

§ 2.3.5 Information or services required of the Owner by the Contract Documents shall be furnished by the Owner within a reasonable time following actual receipt of a written request. Absent such timely request by Contractor,

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

any Claim based upon lack of such information or services shall be waived. The Owner shall not be required to expend any funds to obtain such information unless Owner agrees to do so.

§ 2.3.6 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one .pdf copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2. The cost of reproductions will be borne by the Contractor.

§ 2.4 Owner's Right to Stop the Work

If the Contractor fails to correct non-conforming or defective Work as required by Section 12.2, or fails to complete the Work on time as required by the Contract or is in default of any of its material obligations hereunder, the Owner, by a written order signed by an agent specifically so empowered by the Owner, may order the Contractor to stop the Work or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to any duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity. This right shall be in addition to, and not in restriction of, the Owner's rights under Section 12.2.

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a three-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Owner or Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the actual cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's and other consultants' additional services and expenses made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner within thirty (30) days after receipt of written notice from the Owner therefor. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

ARTICLE 3 CONTRACTOR

§ 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative. If the Work is performed under a Construction Manager at Risk delivery method, the term "Contractor" shall include the Construction Manager or its authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents and in a good and workmanlike manner except to the extent the Contract Documents expressly specify a higher degree of finish or workmanship. Workmanship shall be of a quality to produce first class results. This shall mean that all material shall be installed in a true and straight alignment, level and plumb, patterns shall be uniform, and jointing of materials shall be flush and level unless otherwise directed in writing by the Architect. All labor shall be performed in the best manner by laborers, workers, and mechanics skilled in their respective trades.

§ 3.1.3 The Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, activities of the Owner (or Owner's Program Manager, if applicable), or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.1.4 By submission of a proposal, the Contractor represents and warrants the following to the Owner (in addition to the other representations and warranties contained in the Contract Documents), as an inducement to the Owner to execute this Contract, which representations and warranties shall survive the execution and delivery of the Contract and the Final Completion of the Work: (1) that the Contractor is financially solvent, able to pay its debts as they mature, and possessed of sufficient working capital to complete the Work and perform its obligations under the Contract Documents; (2) that the Contractor is able to furnish the plant, tools, materials, supplies, equipment, and

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

labor required to timely complete the Work and perform its obligations hereunder and that the Contractor is sufficiently experienced and competent to do so; (3) that the Contractor is authorized to do business in the State where the Project is located and properly licensed by all necessary governmental, public, and quasi- public authorities having jurisdiction over the Contractor, the Work, or the site of the Project; and (4) that the execution of the Contract and its performance thereof are within the Contractor's duly-authorized powers.

§ 3.1.5 Pursuant to Texas Education Code Section 44.034, Contractor must give advance written notice to the Owner if the Contractor or an owner or operator of the Contractor has been convicted of a felony. The Owner may terminate the Contract if the Owner determines that the Contractor failed to give such notice or misrepresented the conduct resulting in the conviction. This paragraph requiring advance notice does not apply to a publicly-held corporation.

§ 3.1.6 Contractor, its Subcontractors, Sub-subcontractors, suppliers, and other vendors shall bear responsibility for compliance with all applicable state and federal laws, regulations, guidelines, and ordinances applicable to the Work, including but not limited to, laws concerned with labor, equal employment opportunity, safety, minimum wages, and prevailing wage rates. Contractor further recognizes that the Owner and Architect do not owe the Contractor or any Subcontractor, Sub-subcontractor, supplier, or other vendor any duty to supervise or direct its work so as to protect such party from the consequences of its own conduct. Without limiting the foregoing, the Owner reserves the right to utilize one or more of its employees to function in the capacity of the Owner's inspector, whose primary function will be daily inspections, checking pay requests, construction timelines, and storage of supplies and materials.

§ 3.1.7 The Contractor shall disclose the existence and extent of any financial interests, whether direct or indirect, such Contractor may have in any Subcontractor, Sub-subcontractor, supplier, and other vendor which the Contractor may propose for the Project.

§ 3.1.8 It is understood and agreed that the relationship of Contractor to Owner shall be that of an independent contractor. Nothing contained the Contract or inferable therefrom shall be deemed or construed to: (1) make Contractor the agent, servant or employee of the Owner; or (2) create any partnership, joint venture, or other association between Owner and Contractor. Any direction or instruction by Owner in respect of the Work shall relate to the results the Owner desires to obtain from the Work and shall in no way affect Contractor's independent contractor status as described herein.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents. Contractor also represents by its execution of the Contract, that the Contractor has thoroughly reviewed all of the Contract Documents and that based on such review and to the best knowledge of Contractor as a contractor, not as a design professional, that said Contract Documents are sufficient to enable the Contractor to determine the Contract Sum and that the Contract Documents are sufficient to enable it to perform the Work described in the Contract Documents, and otherwise to fulfill all its obligations hereunder in accordance with the terms of the Contract. The Contractor further acknowledges and declares that it has visited and examined the site (but only as to visible surface conditions or conditions ascertainable from the results of any subsurface tests required or provided in connection with this Project, or other reports and documents available to the Contractor) and reasonably examined the physical, legal and other conditions affecting the Work including, without limitation, all soil, subsurface, water, survey and engineering reports and studies delivered to or obtained by Contractor and the conditions described in this Section 3.2.1. In connection therewith, Contractor, by execution of the Contract will be representing and warranting to Owner that it has, by careful examination, satisfied itself as to the conditions and limitations under which the Work is to be performed, including, without limitation, (1) the location, layout and nature of the Project site and surrounding areas, (2) generally prevailing climatic and weather conditions, (3) anticipated labor supply and costs, (4) availability and cost of materials, tools and equipment and (5) other similar issues. In arriving at the Contract Sum, the Contractor has, as an experienced and prudent manager and contractor, exercised its reasonable judgment and expertise to include the impact of such circumstances upon the Contract Sum.

.1 Claims for additional compensation or time because of the failure of the Contractor to familiarize itself with visible surface conditions at the site or other conditions under which the Work is to be performed will not be allowed.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

.2 The Owner assumes no responsibility or liability for the physical condition or safety of the Project site or any improvements located on the Project Site. The Contractor shall be solely responsible for providing a safe place for the performance of the Work. The Owner shall not be required to make any adjustment in the Contract Sum, Guaranteed Maximum Price, if applicable, or Contract Time in connection with any failure by the Contractor or any Subcontractor to comply with the requirements of this Section 3.2.

.3 The Contractor represents that the Subcontractors, manufacturers and suppliers engaged or to be engaged by it are and will be familiar with the requirements for performance by them of their obligations. All contracts with subcontractors and suppliers shall be in writing. and shall reflect the terms of this Contract which directly or indirectly affect subcontractors or suppliers, including Owner's right to withhold payment, retainage requirements, and Owner's rights and liability on termination of this Contract. The Contractor shall require compliance with the terms and provisions of the Contract Documents applicable to them, including, without limitation, the requirement for subcontractors to comply with the prevailing wage rates established in the Contract, to maintain worker's compensation coverage on employees, and to provide certification of such coverage to Contractor.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor. In addition, as part of the Contractor's preconstruction services, in reviewing the Contract Documents, the Contractor shall endeavor to detect any errors, omissions, or inconsistencies in the design and other documents which affect the performance or constructability of the Work. The Contractor shall promptly report to the Architect and the Owner any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents. The Contractor shall make a reasonable attempt to interpret the Contract Documents before asking the Architect for assistance in interpretation or initiating a Request for Information (RFI). The Contractor shall not ask the Architect for observation of Work prior to the Contractor's field superintendent's personal inspection of the Work. If, in the opinion of the Architect or the Owner, the Contractor does not make a reasonable effort to comply with the above requirements or such information was available to the Contractor from a careful study and comparison of the Contract Documents, field conditions, Owner-provided information, Contractor-prepared coordination drawings, or prior Project correspondence or documentation, and this causes the Architect or its Consultants to expend additional time in the discharge of the duties imposed by the Contract Documents, then the Contractor shall bear the cost of compensation for the Architect's and its consultants' additional services and expenses made necessary by the Contractor's failure and the Owner shall be entitled to deduct such amounts from the Contract Sum. The Architect will give the Contractor prior notice of intent to bill for additional services and expenses before additional services are performed or additional expenses are incurred.

.1 The exactness of grades, elevations, dimensions, or locations given on any Drawings issued by the Architect, or the work installed by other contractors, is not guaranteed by the Owner. The Contractor shall, therefore, satisfy itself as to the accuracy of all grades, elevations, dimensions, and locations. In all cases of interconnection of its Work with existing or other work, it shall verify at the site all dimensions relating to such existing or other work. Any errors due to the Contractor's failure to so verify all such grades, elevations, dimensions, or locations shall be promptly rectified by the Contractor without any additional cost to the Owner.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect and the Owner any nonconformity in the Contract Documents with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities that is discovered by or made known to the Contractor as a request for information in such form as the Architect or Owner may require. The Owner is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall notify the Owner prior to incurring such additional cost or expending such additional time, or if Contractor cannot reasonably provide notice prior to incurring costs or expending additional time, then as soon thereafter as reasonably possible, but not later than 10 Calendar Days, and may submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to Section 15.1.7, as would have been avoided if the Contractor had performed such obligations including any extra efforts as required to bring the project back into alignment with the original schedule. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and limitations of the Contractor's ability to satisfactorily perform the Work or to honor an applicable warranty, and limitations of or interference with the Owner's intended use, caused by products or systems specified except when: (1) such errors, inconsistencies, omissions, differences, nonconformities, or limitations are the fault of Contractor, in whole or in part, (2) the Contractor failed to discover such errors, inconsistencies, omissions, differences, or nonconformities due to its failure to properly perform the obligations of Section 3.2.2 or 3.2.3, (3) the Contractor recognized such errors, inconsistencies, omissions, differences, nonconformities, or limitations and failed to report them to the Architect and the Owner, or (4) the Contractor should have detected such errors, inconsistencies, omissions, differences, nonconformities, or limitations as part of Contractor's performance of its obligations under the Contract Documents, including the performance of Contractor's preconstruction services.

§ 3.2.5 Notwithstanding the delivery of a survey or other documents by the Owner, prior to performing any Work, Contractor shall, if applicable, independently determine the location of all utility lines as shown and located on the plans and specifications, including telephone company lines and cables, sewer lines, water pipes, gas lines, electrical lines, including, but not limited to, all buried pipelines and buried telephone cables, and shall perform the Work in such a manner so as to avoid damaging any such lines, cables, pipes, and pipelines. Contractor shall be responsible for any damage done to such utility lines, cables, pipes and pipelines during its Work, and shall be responsible for any loss, damage, or extra expense resulting from such damage. Repairs shall be made immediately to restore all service. Any delay for such break shall be attributable to Contractor. In addition, Contractor shall, if applicable, review the appropriate AHERA and hazardous materials surveys for the particular site(s) involved in the Project, and shall notify all Subcontractors and Sub-subcontractors of the necessity to review said surveys. Contractor shall perform the Work in such a manner as to avoid damaging, exposing, or dislodging any asbestos-containing materials that are clearly identified and located in AHERA and other hazardous material surveys. Before performing any portion of the Work, the Contractor shall fully investigate all physical aspects of the Project site and verify all dimensions, measurements, property lines, grades and elevations, existing improvements, and general suitability of existing conditions at the Project site. If applicable, Contractor shall comply with U.S. Environmental Protection Agency rules concerning renovating, repairing or painting work in schools built prior to 1978 involving lead-based paint.

§ 3.2.6 If the Contractor has knowledge that any of the products or systems specified will perform in a manner that will limit the Contractor's ability to satisfactorily perform the Work or to honor an applicable warranty, or will result in a limitation of or interference with the Owner's intended use, then the Contractor shall promptly notify the Architect and Owner in writing, providing substantiation for its position.

§ 3.2.7 The Contractor shall arrange meetings prior to commencement of the Work of all major Subcontractors to allow the Subcontractors to demonstrate an understanding of the Contract Documents to the Architect and to allow the Subcontractors to ask for interpretations, when necessary. The Contractor and each Subcontractor shall evaluate and satisfy themselves as to the conditions and limitations under which the Work is to be performed, including: (1) The location, condition, layout, drainage and nature of the Project site and surrounding areas; (2) Generally prevailing climatic conditions; (3) Anticipated labor supply and costs; (4) Availability and cost of materials, tools and equipment; and (5) Other similar issues.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. Contractor shall not proceed with that portion of the Work without further written instructions from the Architect. If the Contractor is then instructed to proceed without acceptance of changes proposed by the Contractor, the Contractor shall not be responsible for any resulting loss or damage to the extent that the acceptance of Contractor's proposed alternative means, methods, techniques, sequences, or procedures would have avoided such loss or damage.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.2.1 Contractor shall, before any duties are performed on Owner's property where students are present (and with respect to additional employees/applicants hired or assigned to perform services on Owner's property during the term of the Contract with Owner, before or immediately after employing or securing the services of such additional employee/applicant), and at least annually thereafter, comply with all requirements relating to criminal history information required by Texas Education Code Chapter 22, unless Owner, in its sole discretion, determines in writing that an exception applies under Section 22.0834(a-1) of the Texas Education Code regarding certain employees/applicants of public works contractors, subject to Contractor's and all Subcontractors' compliance with Section 22.0834 of the Texas Education Code. Before beginning any Work on the Project, Contractor will provide written certifications and fitness determinations and all information requested by Owner to the Owner (including, without limitation, all covered employees' written consent to the release of their criminal history record information to Owner, so that the Owner may obtain criminal history record information on such individuals). In addition, Contractor shall certify to Owner that Contractor has complied with all applicable statutory requirements as of that date. The form of certification by the Contractor shall be supplied by the Owner and must be supplemented by the Contractor as required by law, or as requested by Owner. Upon request by Owner, Contractor will provide, in writing, updated certifications and fitness determinations and the names and any other requested information regarding individuals to whom Chapter 22 applies (including, without limitation, such individuals' written consent to the release of their criminal history record information to Owner), so that the Owner may obtain criminal history record information on such individuals. Contractor shall be solely responsible to send or ensure that each covered employee sends to the Texas Department of Public Safety (DPS) all information that may be required by DPS for obtaining national criminal history record information, which may include, but is not limited to, a complete set of the person's fingerprints and a recent electronic digital image photograph of the person. Contractor shall assume all expenses associated with obtaining criminal history record information. It shall be the responsibility of the Contractor and the entities with which the Contractor contracts to ensure compliance with this provision.

§ 3.3.2.1.1 Subcontractors or any Subcontracting entity, as defined by Texas Education Code Chapter 22, shall be required by the terms of their contract with Contractor or any other contracting entity (as defined in Texas Education Code Chapter 22), and by Texas law, to comply with all requirements relating to criminal history record information on their employees, agents, or applicants, to give required certifications and fitness determinations and provide all information requested by Owner to Owner and the contracting entities (including, without limitation, such individuals' written consent to the release of their criminal history record information to Owner, so that the Owner may obtain criminal history record information on such individuals), and to obtain required certifications/fitness determinations/compliance from the subcontracting entity's subcontractors. Subcontractors shall be solely responsible to send or ensure that each covered employee sends to DPS all information that may be required by DPS for obtaining national criminal history record information, which may include, but is not limited to, a complete set of the person's fingerprints and a recent electronic digital image photograph of the person.

§ 3.3.2.1.2 Contractor/Subcontractor will not assign any "covered employees" with a "disqualifying criminal history," as those terms are defined below, to work on the Project. If Contractor/Subcontractor at any time receives information that a covered employee has a reported disqualifying criminal history, then Contractor/Subcontractor will immediately remove the covered employee from the Project and notify the Owner in writing within three (3) business days. If Owner at any time, in its sole discretion, objects to the assignment of a covered employee for any reason, including, but not limited to, on the basis of the covered employee's criminal history record information and/or insufficient qualifications, lack of experience, and the like, based on information gathered by Owner through

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

the procurement and/or contracting processes, Contractor/Subcontractor agrees to discontinue using that covered employee to provide services on Owner's Project. If Contractor/Subcontractor has (1) taken precautions or imposed conditions to ensure that the employees of Contractor or any Subcontractor will not become covered employees, or (2) certified to Owner conditions or precautions resulting in the determination that the criminal history record information requirements do not apply to its employees or applicants for employment (pursuant to the exception for certain employees/applicants of public works contractors under Texas Education Code Section 22.0834(a-1)), Contractor/Subcontractor shall ensure that the precautions or conditions continue to exist throughout the time that the contracted services are provided.

§ 3.3.2.1.3 For the purposes of this Section 3.3.2.1, "covered employees" means employees, agents or Subcontractors of Contractor or a Subcontractor who have or will have continuing duties related to the service to be performed on Owner's Project and have or will have direct contact with Owner's students. "Disqualifying criminal history" means: (1) a conviction or other criminal history information designated by Owner; or (2) a felony or misdemeanor offense that would prevent a person from being employed under Texas Education Code § 22.085(a), that is: (a) conviction of a felony offense under Title 5, Texas Penal Code if at the time of the offense, the victim was under 18; (b) conviction of or placement on deferred adjudication community supervision for an offense for which a defendant is required to register as a sex offender under Chapter 62, Texas Code of Criminal Procedure; or (c) conviction of an offense under federal law or the laws of another state that is equivalent to (a) or (b). Owner shall be solely responsible for making the final determination of what constitutes direct contact with Owner's students and what constitutes a disqualifying criminal history.

§ 3.3.2.2 Contractor shall enforce the Owner's alcohol-free, drug- free, tobacco-free, harassment-free and weapon-free policies and zones, which will require compliance with those policies and zones by Contractor's employees, Subcontractors, and all other persons carrying out the Contract. Contractor shall require all construction workers, whether Contractor's own forces or the forces of Contractor's Subcontractors, while on Owner's property, to refrain from committing any criminal conduct, using tobacco products, possessing or drinking alcoholic beverages, possessing or using illegal drugs or any controlled substance, carrying or possessing weapons, speaking profane and/or offensive language, or engaging in any inappropriate interactions of any nature whatsoever with Owner's students or employees, including talking, touching, staring or otherwise contributing to a hostile or offensive environment for Owner's students or employees. The Contractor shall further ensure that no on-site fraternization shall occur between personnel under the Contractor's and Subcontractor's direct or indirect supervision and Owner's students or employees or the general public. Sexual harassment is strictly forbidden. Any employee of the Contractor or a Subcontractor who is found to have engaged in any such conduct shall be subject to appropriate disciplinary action by the Contractor or Subcontractor, including immediate removal from the job site.

§ 3.3.2.3 All areas of campus, other than the defined construction area, shall be off limits to Contractor's forces, unless their work assignment specifies otherwise. Contractor shall also require adequate and appropriate dress, including wearing shirts at all times, and "badging" of Contractor's employees, Subcontractors, and all other persons carrying out the Work on the job site for identification. Contractor shall ensure that all construction workers, whether Contractor's own forces or the forces of Contractor's Subcontractors, wear identification tags on the front of their persons during all times that they are on Owner's property. Such identification tags shall contain a current photograph and the worker's name in a typeface large enough to be seen from a reasonable distance. Contractor shall furnish to Owner (and update, as appropriate) photo identification of all workers and employees.

§ 3.3.2.4 Contractor shall require all construction workers, whether Contractor's own forces or the forces of Contractor's Subcontractors, to park their personal motor vehicles on Owner's property only in the parking places designated by the Owner's campus principal or other facility administrator. Any vehicles not parked in the appropriate locations shall be towed at the vehicle owner's sole expense.

§ 3.3.2.5 Contractor shall follow, and shall require all employees, agents and subcontractors to follow, the tree ordinance of the municipality in which the Project is located. In addition, if not covered by the municipal tree ordinance, Contractor shall barricade and protect all trees on the Project, which shall be included in the Cost of the Work.

§ 3.3.2.6 Contractor shall institute a theft deterrence program designed to restrict construction worker access to properties of Owner that are currently in use, to maintain supervision of Contractor's and Contractor's Subcontractor's forces, and to reimburse the Owner or those persons suffering a theft loss which results from

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

Contractor's forces or Contractor's Subcontractor's forces' actions, omissions, or failure to secure the Work or connecting or adjacent property. All such programs shall be paid as General Conditions.

§ 3.3.2.7 Any individual found by Owner to have violated the standards of conduct or restrictions set forth in Section 3.3.2 is subject to immediate removal from the job site and, in Owner's sole discretion, permanent removal from the Project or all construction on any of Owner's property. Repeated removal of Contractor's or Contractor's Subcontractor's forces, or one serious infraction, shall constitute a material breach of the Contract justifying the immediate termination by Owner pursuant to Article 14. THE CONTRACTOR HEREBY RELEASES, INDEMNIFIES AND HOLDS HARMLESS THE OWNER FROM AND AGAINST CONTRACTOR'S AND ANY SUBCONTRACTOR'S FORCES' NON-COMPLIANCE WITH THE STANDARDS OF CONDUCT OR RESTRICTIONS SET FORTH IN SECTION 3.3.2, NON-COMPLIANCE WITH CRIMINAL LAW, AND NON-COMPLIANCE WITH IMMIGRATION LAW OR REGULATIONS. Contractor shall place similar language in its subcontract agreements, requiring its Subcontractors and Sub-subcontractors to be responsible for their own forces, and Contractor shall cooperate with the Owner to ensure Subcontractor and Sub-subcontractor compliance.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work. Copies of inspection reports, photographs or other related records shall be made available to the Owner for review if requested. Reports and documentation shall be formatted and developed in a logical format indicating dates, time of day, findings and the person performing the inspection.

§ 3.3.4 The Contractor shall review Subcontractor safety programs, procedures, and precautions in connection with performance of the Work. However, the Contractor's duties shall not relieve any Subcontractor(s) or any other person or entity (e.g., a supplier), including any person or entity with whom the Contractor does not have a contractual relationship, of their responsibility or liability relative to compliance with all applicable federal, state, and local laws, rules, regulations, and ordinances which shall include the obligation to provide for the safety of their employees, persons, and property and the requirements to maintain a work environment free of recognized hazards. The foregoing notwithstanding, the requirements of this Section are not intended to impose upon the Contractor any additional obligations that the Contractor would not have under any applicable state or federal laws, including, but not limited to, any rules, regulations, or statutes pertaining to the Occupational Safety and Health Administration.

§ 3.3.5 The Contractor has the responsibility to ensure that all materials suppliers and Subcontractors, Sub-subcontractors, suppliers, and their agents, and employees adhere to the Contract Documents, and that they order materials on time, taking into account the current market and delivery conditions and that they provide materials on time. The Contractor shall properly and efficiently coordinate the timing, scheduling, and routing of its Work with that of all trades, Subcontractors, and others on the Project including deliveries, storage, installations and construction utilities. The Contractor shall be responsible for the space requirements, locations, and routing of all materials and equipment required under the Agreement or other Contract Documents. In areas and locations where the proper and most effective space requirements, locations, and routing cannot be made as indicated, the Contractor shall meet with all others involved, before installation, to plan the most effective and efficient method of overall installation.

§ 3.3.6 Contractor acknowledges that the Work may be performed in connection with a facility which may be currently occupied and in use. It is imperative that Contractor's operations and the performance of the Work not interfere with, interrupt, disturb, or disrupt Owner's normal operations or facilities. Contractor agrees to and shall comply with all rules, regulations and requirements of the Owner and the facility on which the Work is to be performed, and shall take all steps necessary to protect and guard the safety of the employees, students and invitees of Owner. Contractor shall exercise the utmost skill and judgment to ensure that continuing construction activity will not interfere with the use, occupancy and quiet enjoyment of facilities in use on the site. Contractor recognizes that the ongoing activities in proximity with its construction activities shall result in the need for prompt and effective coordination of its services with those involved in the ongoing utilization of the premises. Such coordination and adequate site access shall be the responsibility of Contractor. When Work occurs in existing facilities, Contractor understands and accepts the cost and schedule impacts associated with work in existing facilities and the potential delays and disruptions to the progress of the Work and has considered such delays and disruptions in the Contract Sum. The Contractor shall perform all the Work in such a manner as to cause minimum interference with the operations of the Owner and other Contractors and Subcontractors on the site, and shall take, and cause the Contractor's and its Subcontractor's employees, agents, licensees and permittees to take all necessary precautions to protect the Work and the site and all persons and property thereon from damage or injury. Contractor shall not

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

request access to the Project, or request the presence of the Owner or presence of Owner's Consultants during non-working times unless the Contractor has demonstrated full-time, fully staffed performance of the Work during Regular Work Days. Owner shall not be obligated to comply with properly submitted requests.

§ 3.3.7 Representatives of the Owner, Contractor, and Architect shall meet periodically at mutually agreed upon intervals, for the purpose of establishing procedures to facilitate cooperation, communication, and timely responses among the participants. By participating in this arrangement, the parties do not intend to create additional contractual obligations or modify the legal relationships which may otherwise exist.

§ 3.3.8 The Owner may require that the Contractor use and/or respond to certain Owner-furnished forms or inquiries during the course of the Project. From time to time, there may be future revisions, changes, additions or deletions to these forms. The fact that the Owner modifies and increases reasonable reporting requirements shall not serve as the basis for a claim for additional time or compensation by the Contractor.

§ 3.3.9 In the event Contractor shall fall behind schedule at any time, for any reason, Owner shall be entitled to direct acceleration or resequencing of the Work to bring the Work back on schedule. Contractor shall be entitled to compensation for such acceleration only (a) to the extent necessitated by excusable and compensable delays, and (b) to the extent of premium pay and additional equipment cost actually incurred by Contractor. In the event Contractor determines that the Scheduled Completion Date cannot be met by resequencing the Work, then Contractor shall immediately provide to the Owner, and in any event within seven (7) days after the date of receipt of any request by Owner for resequencing or acceleration, a plan to complete the Work in the shortest possible time. No approval by the Owner of any plan for resequencing or acceleration of the Work submitted by Contractor pursuant to this paragraph shall constitute a waiver by Owner of any damages or losses which Owner may suffer by reason of such resequencing or the failure of Contractor to meet the Scheduled Completion Date.

§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.1.1 The Contractor and any Subcontractor or Sub-subcontractor on the Project shall properly classify, as an employee or an independent contractor, in accordance with the Fair Labor Standards Act, its implementing regulations, and Texas Labor Code Section 214.008, any individual the Contractor, Subcontractor, or Sub-subcontractor directly retains and compensates for services performed in connection with the Contract. Any Contractor, Subcontractor, or Sub-subcontractor who fails to properly classify such an individual may be subject to the penalties of Texas Labor Code Sec. 214.008(c).

§ 3.4.1.2 Attention is called to the Government Code, Chapter 2258, Prevailing Wage Rates. Among other things, this Article provides that it shall be mandatory upon the Contractor, and upon any Subcontractor and Sub-Subcontractor under the Contractor, to pay all laborers, workers, and mechanics employed or utilized by them in the execution of the Contract not less than the prevailing rates of per diem wages for work of a similar character in the locality at the time of construction.

§ 3.4.1.3 In accordance therewith Texas Government Code Section 2258 et seq.; Texas Labor Code Section 62.051 et seq, the Owner has established a scale of prevailing wages which is incorporated in the Contract Documents, and not less than this established scale must be paid on the Project. Any workers not included in the schedule shall be properly classified and paid not less than the rate of wages prevailing in the locality of the Work at the time of construction. Wages listed are minimum rates only, and payment greater than the prevailing wage is not prohibited. No claims for additional compensation above the Contract Sum shall be considered by the Owner because of payments of wage rates in excess of the applicable rates provided herein. If no schedule of prevailing wage rates is included in the Contract Documents, then the parties shall, at a minimum, use the wage rates determined by the U.S. Department of Labor for projects located in the County in which the Project is located in accordance with the Davis-Bacon Act, 40 USC3141-3148, which can be accessed on the internet at https://sam.gov/content/wage-determinations, or the wage rates determined by any local contractor association, whichever is higher..

§ 3.4.1.4 The Contractor and each Subcontractor and Sub-Subcontractor shall keep a record showing the name and occupation of each worker employed by the Contractor, Subcontractor, or Sub-subcontractor in the construction of

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

the Work and the actual per diem wages paid to each worker. Owner reserves the right to receive and review payroll records, payment records, and earning statements of employees of Contractor, and of Contractor's Subcontractors and Sub-subcontractors. These records shall be maintained and made accessible for no less than three (3) years following the date of Final Completion.

§ 3.4.1.5 A Contractor or Subcontractor or Sub-Subcontractor who violates the requirements of Sections 3.4.1.2 or 3.4.1.3 shall pay to Owner the sum of Sixty Dollars and No/100 ($60.00) for each laborer, worker, or mechanic employed for each calendar day or part of the day that the laborer, worker, or mechanic is paid less than the wage rate stipulated in the scale of prevailing wages applicable to the Project, as required by Texas Government Code Section 2258.023(b).

§ 3.4.1.6 In the event of a complaint of a breach of the requirements in Sections 3.1.6 or 3.4.1, et seq, the Owner shall have the right to make a determination as provided by law, and to retain any amount due under the Contract pending a final determination of the violation. Owner may conduct, at its discretion, wage-related interviews of any worker at the sites of the Work without prior warning to the Contractor or Subcontractor or Sub-Subcontractor.

§ 3.4.1.7 In the event of a strike or stoppage of Work resulting from a dispute involving or affecting the labor employed by the Contractor or any of its Subcontractors or Sub-subcontractors, Owner may, at its option and without any notice required by the Contract, terminate the Contract for default unless the Contractor remedies the strike of Work or Work stoppage or other disruption within twenty (20) calendar days after the dispute arises.

§ 3.4.1.8 The Contractor shall require all Subcontractors and Sub-Subcontractors to comply with the provisions of this Section 3.4.1 and its subparts.

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the prior written consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive. Any such substitution request shall be made to the Architect within fifteen (15) days after execution of the Contract.

.1 Substitutions and alternates may be rejected without explanation and will be considered only under one or more of the following conditions: (i) the proposal is required for compliance with interpretation of code requirements or insurance regulations then existing; (ii) specified products are unavailable through no fault of the Contractor; (iii) and when, in the judgment of the Owner or the Architect, a substitution would be substantially in the Owner's best interests in terms of cost, time, or other considerations.

.2 The Contractor must submit to the Architect and the Owner (i) a full explanation of the proposed substitution and submittal of all supporting data, including technical information, catalog cuts, warranties, test results, installation instructions, operating procedures, and other like information necessary for a complete evaluation for the substitution; (ii) a written explanation of the reasons the substitution is necessary, including the benefits to the Owner and the Work in the event the substitution is acceptable; (iii) the adjustment, if any, in the Contract Sum; (iv) the adjustment, if any, in the Contract Time and the construction schedule; and (v) an affidavit stating the (a) proposed substitution conforms to and meets all requirements of the pertinent Specifications and the requirements shown on the Drawings, and (b) the Contractor accepts the warranty and correction obligations and will coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be completed in all respects as if originally specified by the Architect. Proposals for substitutions shall be submitted in triplicate to the Architect and the Owner in sufficient time to allow the Architect and the Owner no less than twenty-one (21) Business Days for review, unless a shorter time is agreed upon in writing. No substitutions will be considered or allowed without the Contractor's submittals of complete substantiating data and information as stated herein.

.3 Whether or not the Owner or the Architect accepts any proposed substitution, the Contractor shall reimburse the Owner for any fees charged by the Architect or other consultants for evaluating each proposed substitute.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly qualified by training and experience and skilled in tasks assigned to them. The Contractor shall only employ or use labor in connection with the Work capable of working harmoniously with all trades, crafts, and any other individuals associated with the Project. The Contractor shall furnish Owner, on request, resumes of the Contractor's key personnel involved in the day-to-day Work on the Project, as well as a list of all engineers, consultants, subcontractors and suppliers involved in construction. At the written request of the Owner or Architect, the Contractor shall not use in the performance of the Work any engineer, consultant, or employee of the Contractor, Subcontractor or Sub-subcontractor reasonably deemed by Owner to be incompetent, careless, unqualified to perform the Work assigned to him, insubordinate, in violation of any provision in the Contract Documents, or otherwise unsatisfactory to Owner. Contractor shall engage sufficient workers on the Project at all times for the proper coordination and performance of the Work in the time periods required by the Contract. This provision is applicable to Subcontractors, Sub-subcontractors and their employees.

§ 3.4.4 Identification of Employees. Contractor shall require all construction workers, whether Contractor's own forces, or the forces of Contractor's subcontractors, to wear identification tags on the front of their persons during all times that they are on Owner's property. Such identification tags shall have identification of the construction worker by number or other identifying medium in a typeface large enough to be seen from eight feet away if requested to do so.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. The Contractor further warrants that the Work will be performed and completed in a good and workmanlike manner, continuously and diligently in accordance with the Contract Documents, all applicable building codes, and generally accepted standards of engineering and construction practice for construction of projects similar to the Project, except to the extent the Contract Documents expressly specify a higher degree of finish or workmanship, in which case the standard shall be the higher standard. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse by parties other than Contractor, alterations to the Work not executed by the Contractor, improper or insufficient maintenance (unless such maintenance is Contractor's responsibility), improper operation by parties other than the Contractor, or normal wear and tear and normal usage, but such exclusions shall only apply after Owner has taken occupancy of the portion of the Project at issue. If required by the Architect or the Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. Warranties shall become effective on a date established by the Owner and Architect in accordance with the Contract Documents. Notwithstanding anything in the Contract Documents to the contrary, Owner and Contractor expressly agree that the warranties stated herein shall mean the individual warranties associated with each particular Work or designated portion thereof within the Project, and each such individual warranty shall run from the date of Substantial Completion of the entire Work (unless otherwise expressly provided in the applicable Contract Documents for that particular Work). Such warranty shall be maintained notwithstanding that certain systems may be activated prior to Substantial Completion as required for the satisfactory completion of the Project. Contractor's warranties herein shall be interpreted to require Contractor to replace defective materials and equipment and re-execute defective Work which is disclosed to the Contractor by the Owner within a period of one (1) year after Substantial Completion of the entire Work or designated portion thereof or, if latent defect, within one (1) year after discovery thereof by Owner. The Contractor shall perform all work reasonably required, to correct Work with errors, omissions, defects or deviations from what is required by the Contract Documents, at no cost to Owner. The warranties set out in this subparagraph are not exclusive of any other warranties, remedies or guarantees set out in other places in the Contract Documents or implied under applicable law, but are in addition to and not in limitation of any other such warranties, remedies, or guarantees.

§ 3.5.2 The Contractor agrees to assign to the Owner at the time of Final Completion of the Work, such assignment to be effective no later than Final Completion, any and all third-party warranties relating to materials, equipment, machinery, components, and labor used in the Work and further agrees to perform the Work in such manner so as to preserve any and all such third-party warranties. Contractor shall take no action or fail to act in any way which results in the termination or expiration of any such third-party warranties or which otherwise results in prejudice to the rights of Owner under such warranties. Contractor's warranties shall in no way limit or abridge the warranties of the manufacturers and suppliers of equipment and systems which are to comprise a portion of the Work and all such

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

warranties shall be in form and substance as required by the Contract Documents. Contractor agrees to provide all notices required for the effectiveness of such warranties and shall include provisions in the contracts with Subcontractors and Sub-subcontractors and other providers and manufacturers of such systems and equipment whereby Owner shall have a direct right, but not a duty, of enforcement of such warranty obligations.

§ 3.5.3 The warranty(ies) provided in Section 3.5 and its subparts, including but not limited to Section 3.5.1, shall be interpreted to require Contractor to address failure, errors, omissions, defects, deviations, or other nonconformities of materials, products, or workmanship, defective materials and equipment and re-execute defective Work which is disclosed to the Contractor by the Owner or discovered by the Owner within a period of one (1) year after Substantial Completion of the entire Work or, if latent defect, within one (1) year after discovery thereof by Owner. Upon written notice from the Owner of any defects covered by warranty, the Contractor shall promptly remedy any such defects. If Contractor does not respond to Owner's written notice, either by beginning corrective work or notifying Owner in writing stating when work will begin, within ten (10) days of receipt of the notice or such shorter time as required in the Contract Documents, the Owner may take measures to correct the defects and Contractor will be obligated to reimburse the Owner's costs. Any measures taken by Owner to correct defects due to Contractor's failure to timely respond to Owner's written notice shall not operate to void or otherwise alter any warranties issued by, for, or through the Contractor. If notice of defects covered by warranty is given in writing to the Contractor on a timely basis, the obligation to provide the warranty work will extend beyond the applicable warranty period until the warranty defect is remedied and accepted by the Owner. The provisions of this subparagraph shall be in addition to, and not in lieu of, any other rights and remedies available to Owner. The Owner will determine and assign the warranty priority as follows:

§ 3.5.3.1 Priority 1 - A complete shutdown situation. Owner is unable to operate. Safety or loss of building contents anticipated.. Unless shorter response durations exist in the Contract Documents, the Contractor shall provide warranty repair service within 8-hours' notice for warranty notice for the following:

1. Cooler and freezer equipment;
2. Chiller and pumps;
3. Boiler and pump;
4. Lift station;
5. Generator;
6. Elevator;
7. Roof leaks
8. Fire alarm and fire sprinkler malfunction

§ 3.5.3.2 Priority 2 - A major component of Owner ability to operate is affected. Some aspects of the operation can continue but issue is a major problem. Unless shorter response durations exist in the Contract Documents, the Contractor shall provide warranty repair service within 24-hours' notice.

§ 3.5.3.3 Priority 3 – Owner operation is unaffected, but the issue is affecting efficient operation by one or more people. Unless shorter response durations exist in the Contract Documents, the Contractor shall provide warranty repair service within 5-working days' notice.

§ 3.5.3.4 Priority 4 – The issue is an inconvenience or annoying but there are clear workarounds or alternates. Unless shorter response durations exist in the Contract Documents, the Contractor shall provide warranty repair service within 10-working days' notice.

§ 3.5.4 The Contractor shall issue in writing to the Owner as a condition precedent to final payment a "General Warranty" reflecting the terms and conditions of Sections 3.5.1, 3.5.2, and 3.5.3 for all Work under the Contract Documents. This General Warranty shall be assignable.

§ 3.5.5 Except when a longer warranty time is called for in the Contract Documents or is otherwise provided by law, the General Warranty shall be for twelve (12) months from the date of Substantial Completion of the entire Work and shall be in form and content otherwise satisfactory to the Owner. Contractor shall maintain a complete and accurate schedule of the date(s) of Substantial Completion, date(s) upon which the one-year warranty will expire, and date(s) of Final Completion. Contractor agrees to provide notice of the warranty expiration date to Owner and Architect at least one month prior to the expiration of the one-year warranty period. Prior to termination of the one year warranty period, Contractor shall accompany the Owner and Architect on re-inspection of the Work/building and be responsible for correcting any deficiencies not caused by the Owner or by the use of the

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

building which are observed or reported during the re-inspection. Additionally, for a period beginning at Substantial Completion of any phase of the Work and extending twelve (12) months beyond Final Completion of any phase of the Work, upon request of the Owner, the Contractor shall, not less than once a month, attend a meeting with the Owner to review the facility operations and performance to identify defects, warranty issues, and proposed corrections; and to make appropriate written recommendations to the Owner. For extended warranties required by various sections, i.e. roofing, compressors, mechanical equipment, Owner will notify the Contractor of deficiencies and Contractor shall start remedying these defects within three (3) days of initial notification from Owner. Contractor shall prosecute the work without interruption until accepted by the Owner and the Architect, even though such prosecution should extend beyond the limit of the warranty period. If Contractor fails to provide notice of the expiration of the one-year warranty period at least one month prior to the expiration date, Contractor's warranty obligations described in this paragraph shall continue until such inspection is conducted and any deficiencies found in the inspection are corrected.

§ 3.5.6 Warranties shall become effective on a date established by the Owner and Architect in accordance with the Contract Documents. This date shall be the Date of Substantial Completion of the entire Work, unless otherwise provided in any Certificate of Partial Substantial Completion approved by the parties, except for work to be completed or corrected after the date of Substantial Completion and prior to final payment. Warranties for work to be completed or corrected after the date of Substantial Completion and prior to final payment shall become effective on the later of the date the work is completed or corrected and accepted by the Owner and Architect or the date of final payment.

§ 3.5.7 In the event an item under warranty fails, the Contractor shall extend the original warranty period by a length of time equal to the elapsed time which occurs from the notification in writing by the Owner or a warranty claim until acknowledgement by the Owner that the claim has been resolved.

§ 3.5.8 The warranties of Contractor in this Section 3.5 and its subparts shall in no way limit or abridge the warranties of the suppliers or manufacturers of equipment or systems which are to comprise a portion of the Work, and all of such warranties shall be in form and substance as required by the Contract Documents. Contractor shall not engage in any act or conduct, whether by commission or omission that results in the termination or expiration of such third party warranties or which otherwise operates to prejudice the rights of Owner under such warranties.

§ 3.5.9 When deemed necessary by the Owner and prior to installation of any item specifically made subject to a performance standard or regulatory agency standard under any provision of the Contract Documents, Contractor shall furnish proof of conformance to the Architect. Proof of conformance shall be in the form of: (1) an affidavit from the manufacturer certifying that the item is in conformance with the applicable standards; or (2) an affidavit from a testing laboratory certifying that the product has been tested within the past year and is in conformance with the applicable standards; or (3) such further reasonable proof as is required by the Architect. Contractor shall also certify that the Project has been constructed in general conformance with the Architect's or Engineer's plans, specifications, and Construction Documents, as modified from time to time pursuant to the terms of the Contract Documents. Contractor shall complete all applicable certifications required by 19 Texas Administrative Code Section 61.1036-1040.

§ 3.6 Taxes

Contractor shall pay all applicable local, county and state taxes, income tax, compensation tax, social security and withholding payments as required by law. Owner is an exempt entity under the tax laws of the State of Texas, and Contractor shall not include in the Contract Sum or any Modification any amount for any taxes from which the Owner is exempt by virtue of its status as a governmental entity and/or as a Texas independent school district. The Owner represents that this Project is eligible for exemption from the State Sales Tax on tangible personal property and material incorporated in the Project, provided that the Contractor fulfills the requirements of the Limited Sale, Excise and Use Tax Rules and Regulations. For the purpose of establishing exemption, it is understood and agreed that the Contractor may be required to segregate materials and labor costs at the time a Contract is awarded. Contractor will accept a Certificate of Exemption from the Owner. Contractor shall obtain Certificates of Resale from its suppliers. Failure of Contractor or any Subcontractor or Sub-subcontractor to obtain Certificates of Resale from their suppliers shall make the Contractor, Subcontractor, or Sub-subcontractor responsible for absorbing the tax, without compensation from Owner. CONTRACTOR HEREBY RELEASES, INDEMNIFIES AND HOLDS HARMLESS OWNER FROM ANY AND ALL CLAIMS AND DEMANDS MADE AS A RESULT OF THE FAILURE OF CONTRACTOR OR ANY SUBCONTRACTOR OR SUB-SUBCONTRACTOR TO COMPLY WITH THE PROVISIONS OF ANY OR ALL SUCH LAWS AND REGULATIONS.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

§ 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 After the Architect has filed the plans and specifications with the Texas Department of Licensing and Regulation, the Architect shall notify Contractor that Contractor may make and submit the applications for the building permit. Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded. The Contractor shall procure (as required by the Contract Documents) all certificates of inspection, use; occupancy, permits and licenses, pay all charges, deposits and fees and give all notices necessary and incidental to the due and lawful prosecution of the Work, Certificates of inspection, use and occupancy shall be delivered to the Architect upon completion of the Work in sufficient time for occupation of the Project in accordance with the approved schedule for the Work. The costs of such procurement, payment and delivery are included within the Contract Sum, and constitute Costs of the Work unless otherwise provided by the Contract Documents.

§ 3.7.1.1 The Contractor shall be responsible for timely notification to and coordination with all utility companies regarding the provision of services to the Project. The Contractor shall immediately inform the Architect when the Owner's participation is required, and the Architect will notify the Owner. Connections for temporary and permanent utilities, utility district/company inspections, tap charges, water meter charges, and any other similar fees assessed by jurisdictional authorities having control over the Project, as well as payment for temporary utilities services required for the Work, whether the Work is new construction or renovation of an existing facility, are the direct responsibility of the Contractor, without reimbursement from Owner, unless otherwise agreed in writing. If the Work is new construction, then payment for temporary and permanent utility services shall be the direct responsibility of the Contractor, without reimbursement from Owner, until the later of completion of commissioning or Substantial Completion.

§ 3.7.1.2 After consultation with the Owner, the Contractor shall obtain all permits and approvals for itself and the Owner, and pay all fees and expenses, if any, associated with National Pollutant Discharge Elimination System (NPDES) regulations administered by the Environmental Protection Agency (EPA) and local authorities, if applicable, that require completion of documentation and/or acquisition of a "Land Disturbing Activities Permit" for the Project. Also after consultation with the Owner, the Contractor shall obtain all permits and approvals, and pay all fees and expenses, if any, associated with Storm Water Pollution Prevention and Pollution Control Plan (SWPPP) regulations administered by the Texas Commission on Environmental Quality (TCEQ) and local authorities. Contractor shall coordinate processing all forms and fees with the Owner. Contractor's obligations under this Section may or may not require it to obtain or perform engineering services during the pre-construction phase to prepare proper drainage for the construction site. Any drainage alterations made by Contractor during the construction process, which require the issuance of a permit, shall be at Contractor's sole cost. Reimbursable expenses shall not include any fines or penalties assessed against the Contractor, Contractor's Subcontractors or Sub-subcontractors, the Project, or the Owner

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work. In addition, Contractor shall authorize posting of any notices concerning the Workers Compensation insurance carried by other parties involved in the Project, including without limitation, Architect, at the same location where Contractor posts notices regarding Workers Compensation. If applicable, the Contractor shall procure and obtain all bonds required of the Owner or the Contractor by the municipality in which the Project is located or by any other public or private body with jurisdiction over the Project. In connection with such bonds, the Contractor shall prepare all applications, supply all necessary back-up material and furnish the surety with any required personal undertakings. The Contractor shall also obtain and pay all charges for all approvals for street closings, traffic control, parking meter removal and other similar matters as may be necessary or appropriate from time to time for the performance of the Work.

§ 3.7.3 If the Contractor performs Work when Contractor knows or reasonably should have known it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, the Contract Documents, or lawful orders of public authorities, the Contractor shall assume all responsibility for such Work and shall bear the costs attributable to correction.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

§ 3.7.4 Concealed or Unknown Conditions

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and within forty-eight (48) hours after first observance of the conditions. Contractor agrees that this is a reasonable notice requirement. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend to the Owner that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor, stating the reasons. The Owner will then consider the facts and the reports of the Architect and the Owner will make the final determination of action. If the Contractor disputes the Owner's determination, the Contractor may submit a Claim as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect in writing. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all Allowances stated in the Contract Documents. Items covered by Allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct. The inclusion of any Allowance or Contingency is solely for the benefit of the Owner. Expenditure of any Allowance or Contingency may only be made with prior written approval of the Owner and according to the procedures of Article 7. Owner's authorized representative may approve any expenditure from Allowances without further Board approval. If the Allowances or Contingency are not expended or not fully expended, then any unused portion shall belong to the Owner and shall be credited to the Owner in calculating Final Payment.

§ 3.8.2 Calculation of costs or credits for Allowances shall be as described in article 7.1.4.

§ 3.8.3 Materials and equipment under an Allowance shall be selected by the Owner with reasonable promptness.

§ 3.8.4 When performing Work under Allowances, Contractor shall solicit and receive not less than three written proposals, unless the requirement to obtain proposals is waived by the Owner in advance, and shall provide the Work as directed by the Architect, upon Owner's written approval, on the basis of the best value to the Owner.

§ 3.9 Superintendent and Project Manager

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site at all times during performance of the Work. In addition, the Contractor may employ a project manager and necessary assistants who may supervise several Project sites. The list of all supervisory personnel, including the project manager and superintendent, that the Contractor intends to use on the Project and a chain-of-command organizational chart shall be submitted to the Owner and Architect. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor. Important communications shall be similarly confirmed in writing. Other communications shall be similarly confirmed on written request in each case. Questions about plan interpretation or directions shall be submitted to the Architect in the form of a written request for information and the Architect shall respond to such request for information in a reasonable and timely fashion. Contractor's selection of project manager or superintendent(s) shall be approved by Owner. The Contractor shall not engage supervisory personnel or utilize an organization and chain-of-command other than as approved by Owner and Architect, and Contractor shall not replace the project manager or superintendent(s) without Owner's consent or until a replacement project manager or superintendent(s) has been selected in accordance with this Section. The Owner may reject or require removal of any job superintendent, project manager or employee of the Contractor, Subcontractor or Sub-Subcontractor involved in the Project.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

§ 3.9.2 Contractor's superintendent shall be present full-time on the site as soon as possible after commencement of the Work, and shall remain assigned to the Work, throughout the course of the Work until items requiring completion or correction, identified at Substantial Completion pursuant to Section 9.8, have been completed or corrected. From Substantial Completion until Final Completion, the superintendent shall be on the site to ensure that Final Completion occurs within the number of days required by the Agreement.

§ 3.9.3 Contractor's project manager, while not required to be present full-time at the site, shall remain assigned to the Work, and be available on an as-needed basis throughout the course of the Work until items requiring completion or correction, identified at Substantial Completion pursuant to Section 9.8, have been completed or corrected in accordance with the Construction Documents.

§ 3.9.4 Owner shall be notified not less than 24 hours before any time that superintendent will not be present at the site for any reason except periodic illness. If the reason is due to illness, then Owner shall be notified at the beginning of that day. Owner shall be notified of the identity of the acting superintendent. In the event the superintendent is absent from the site and notice has not been provided nor has an acting superintendent been assigned to the Work, then an amount equal to the superintendent's daily rate shall be deducted from the amount owed to the Contractor under General Conditions for such day.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, but in no case prior to the first application for payment, shall submit for the Owner's and Architect's review and approval a Contractor's construction schedule for the Work. The schedule shall be transmitted in the form of Microsoft Project in the native file format. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion and Final Completion; (2) an apportionment of the Work by construction activity; (3) the time required for completion of each portion of the Work; (4) predecessors and successors; (5) phases; (6) baseline start and stop dates; (7) actual start and stop dates; (8) current start and stop dates; (9) delays; (10) critical path; (11) submittals; (12) extensions of the Contract Time authorized by Change Orders, (13) anticipated Adverse Weather Days, (14) Anticipated Instructional Days, and (15) Owner activities. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project and, upon such revision, shall be submitted to Architect and Owner for their review and approval. In no case will the schedule be updated less frequently than each application for payment. The Contractor's schedule may be considered when evaluating a request for additional time.

.1 If any updated schedule exceeds the time limits set forth in the Contract Documents for completion of the Work, the Contractor shall include with the updated schedule a statement of the reasons for the anticipated delay in completion of the Work and the Contractor's planned course of action for completing the Work within the time limits, inclusive of previously accepted time extensions, set forth in the Contract Documents. If the Contractor asserts that the failure of the Owner or the Architect to provide information to the Contractor is the reason for anticipated delay in completion, the Contractor shall also specify what information is required from the Owner or Architect.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect's and Owner's approval. The Architect's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule to prioritize submittals in a manner that aligns with the critical path, key milestone and activities of the Project, (2) indicate compliance with the requirement that the Contractor attain at least 80% completion of the submittals (by quantity) by the time the Contract Sum to date has attained 20% total completed and stored to date, and (3) allow the Architect and Owner reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals, and the Owner may withhold progress payments until the conditions of this Article are satisfied. The process of approving Contractor's schedules and updates to Contractor's schedule shall not constitute a warranty by the Owner that any non-Contractor milestones or activities will occur as set out on Contractor's schedule. Approval of a Contractor's schedule does not constitute a commitment by the Owner to furnish any Owner-furnished information or material any earlier than Owner would otherwise be obligated to furnish that information or material under the Contract Documents

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to and approved by the Owner and Architect. Submission of any schedule under this Contract constitutes a representation by the Contractor that: (1) the schedule represents the sequence in which the Contractor intends to prosecute the remaining Work; (2) the schedule represents the actual sequence and durations used to prosecute the completed Work; (3) that to the best of its knowledge and belief the Contractor is able to complete the remaining Work in the sequence and time indicated; and, (4) that the Contractor intends to complete the remaining Work in the sequence and time indicated.

§ 3.10.4 The Contractor shall hold weekly progress meetings at the Project site, or at such other time and frequency as are acceptable to the Owner.

§ 3.10.5 If reasonably required by Owner, Contractor shall also prepare and furnish project cash flow projections, manning data for critical activities, and schedules for the purchase and delivery of all critical equipment and material, together with periodic updating thereof.

§ 3.10.6 The Contractor shall recommend to the Owner and to the Architect a schedule for procurement of long-lead time items which will constitute part of the Work as required to meet the project schedule.

§ 3.10.7 In addition to the requirements of the Contract Documents, the Contractor's submittal schedule shall include submittals required for Substantial and Final Completion, as described by the Contract Documents, including but not limited to (1) individual specification section-required warranties, (2) certificates, (3) statements, (4) third-party tests.

§ 3.10.8 The Owner's need for delivery of completed Work, or portions thereof, is largely controlled by the necessities of the school calendar and operations of school programs within the calendar year. Those needs are reflected in scheduled completion dates and milestone dates set out in the Contract Documents. The Contractor shall perform the Work in such a way as to not interfere with school operations and the importance of meeting milestones and completion dates is not exclusive.

§ 3.11 Documents and Samples at the Site

§ 3.11.1 The Contractor shall make available, at the Project site, one record copy of the Contract Documents, including Drawings, Specifications, Addenda, Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, including concealed mechanical, electrical and plumbing items inside of the facility and underground utilities at the site, and one record copy of the approved Shop Drawings, field test records, inspection certificates or records, manufacturers' certificates, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner at all times. At the completion of the Project, all such documents and records shall be delivered to the Architect, with all changes made during construction, in an editable CAD format agreed to at the beginning of the Project along with (3) full sets of hard copy drawings and one digital copy in PDF format, for submittal to the Owner upon completion of the Work as a record of the Work as constructed, and shall be signed by the Contractor certifying to Owner thereby that they show complete and "as-built" conditions, stating sizes, kinds of materials, vital piping, conduit locations, and similar matters. These documents are to be considered part of the Work beyond the General Conditions. Other than Project identification, the documents shall not bear any professional seal or information or any reference to those firms providing professional services to the Owner, except for historical or reference purposes. This shall be completed and up to date within (30) working days from Substantial Completion and shall be a condition precedent to Final Payment.

§ 3.11.2 Contractor shall at all times maintain job records, including, but not limited to, invoices, payment records, payroll records, daily reports, logs, diaries, and job meeting minutes, applicable to the Project. Contractor shall make such reports and records available to inspection by the Owner, Architect, or their respective agents, within five (5) working days of request by Owner, Architect, or their respective agents.

§ 3.11.3 In addition to any other requirement in the Contract Documents and prior to installation, at Owner's or Architect's request, Contractor shall furnish or cause a Subcontractor or Sub-subcontractor to furnish, for the Owner's and Architect's written approval, a physical sample of each specified item, product, fixture or device which is visible by the general public and/or attached to an architecturally-finished surface. Samples shall be suitably

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

labeled, adequately protected and properly stored at the site. Samples which are approved and undamaged will be considered to be suitable for incorporation into the Work.

§ 3.12 Shop Drawings, Product Data and Samples

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.4.1 Submittals shall be submitted at the earliest possible time in order to expedite delivery of critical or long lead time items. For more complex systems and equipment (such as structural steel; doors, windows and hardware; casework; mechanical, electrical, and plumbing systems and equipment; food service equipment; sound systems and the like), the Contractor shall schedule at least 10 business days for the Architect or his Consultants' review and submittals shall be sequenced logically in accordance with the schedule, required fabrication and installation time. For submittals delivered by electronic transmission and received after 5:00 p.m. on a day on which the recipient's offices are open, or on a weekend, Holiday, or other day on which the recipient's offices are closed, submittals shall be deemed to have been duly served on the next day on which the recipient's offices are open.

§ 3.12.4.2 The Contractor shall be prepared to submit color Samples on any key items (such as quarry tile, vinyl wall covering, etc.) within fifteen (15) days of the award of Subcontract(s). All color Samples required for the Work shall be received by the Architect no later than sixty (60) days of the date of the approval of the Contract Sum. Once samples of all key items are received, the Architect will finalize color selections.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect and Owner, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the submittal schedule approved by the Architect and Owner or, in the absence of an approved submittal schedule, as required under the Contract Documents. At a minimum, Contractor shall submit all submittals with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of Separate Contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents. If, in the opinion of the Architect or Owner, the Shop Drawings are (a) incomplete, (b) indicate an inadequate understanding of the Work covered by the Shop Drawings, or (c) indicate a lack of study and review by the Contractor prior to submittal to the Architect, the Shop Drawings will be returned, unchecked, to the Contractor for correction of these deficiencies and subsequent resubmittal. The Architect's review of Contractor's submittals shall be limited to examination of an initial submittal and one (1) re-submittal. The Architect's review of additional submittals will be made only with the consent of the Owner after notification by the Architect. The Owner shall be entitled to reimbursement from the Contractor of amounts paid to the Architect for evaluation of such additional re-submittals.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been approved by the Architect and/or Owner.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's or Owner's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Architect and Owner of such deviation at the time of submittal and (1) the Architect has given written approval of the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's or Owner's approval thereof except for any such errors or omissions which are within the Architect's statutory or contractual design responsibility..

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law; however, the Contractor represents and warrants that all Shop Drawings shall be prepared by persons and entities possessing expertise and experience in the trade for which the Shop Drawings are prepared and, if required by the Architect or applicable law, by a licensed architect or engineer.

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Architect at the time and in the form specified by the Architect.

§ 3.12.10.3 A registered architect must prepare plans and specifications for all the Work, as governed by the Texas Occupations Code Chapter 1051; and a registered engineer must prepare plans, specifications and estimates for all Work governed by Texas Occupations Code Chapter 1001. In the event that Contractor retains a licensed design professional under the terms of this section, Contractor shall require that the licensed design professional carry commercial general liability and errors and omissions insurance coverage in the same amounts and forms as required of the Architect on this Project. In the event that the licensed design professional retained by the Contractor will be conducting on-site services or observations, the licensed design professional shall also carry worker's compensation insurance and comprehensive automobile liability in the same amounts and forms as required of the Architect on this Project.

§ 3.12.11 The Contractor shall provide composite drawings within four (4) weeks of corresponding submittals approval showing how all piping, ductwork, lights, conduit and equipment, etc. will fit into the ceiling space allotted, including clearances required by the manufacturer, by Code, or in keeping with good construction practice. Space for all trade elements must be considered on the same drawing. Drawings shall be 1/4" per foot minimum scale and shall include invert elevations, elevation views and sections required to meet the intended purpose. Trades

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

required to participate include, but are not necessarily limited to structural, mechanical, plumbing, fire sprinkler, electrical, data and special systems.

§ 3.13 Use of Site

§ 3.13.1 The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.13.2 Only materials and equipment which are to be used directly in the Work shall be brought to and stored on the Project site by the Contractor. After equipment is no longer required for the Work, it shall be promptly removed from the Project site. Protection of construction material and equipment stored at the Project site from weather, theft, damage and all other adversity is solely the responsibility of the Contractor.

§ 3.13.3 The Contractor and any entity for whom the Contractor is responsible shall not erect any sign on the Project site without the prior consent of the Owner.

§ 3.13.4 Contractor shall ensure that the Work, at all times, is performed in a manner that affords the Owner reasonable access, both vehicular and pedestrian, to the site of the Work and all adjacent areas. The Work shall be performed, to the fullest extent possible, in such a manner that public areas adjacent to the site of the Work shall be free from all debris, building material and equipment likely to cause hazardous conditions. Without limitation of any other provision of the Contract Documents, Contractor shall use its best efforts to minimize any interference with the occupancy or beneficial use of any area and buildings adjacent to the site or the Work. Prior to the start of any Work which may impact or otherwise affect beneficial use or occupancy of an existing facility, the Contractor shall provide a work plan for such Work that identifies and controls any interruption for approval by the Owner. Work in this situation shall not proceed until an agreed plan of Work is approved in writing by the Owner.

§ 3.13.5 Without prior written approval of the Owner, the Contractor shall not permit any workers to use any existing facilities at the Project site, including, without limitation, lavatories, toilets, entrance and parking areas other than those designated by the Owner. Without limitation of any other provision of the Contract Documents, the Contractor shall use its best efforts to comply with all rules and regulations promulgated by the Owner in connection with the use and occupancy of the Project site.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly; provided, however, that any such cutting, fitting or patching can only be performed if the cutting, fitting or patching results in Work that is in accordance with the Contract Documents. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or Separate Contractors by cutting, patching, or otherwise altering such construction, or by excavation. Structural members shall not be cut and air duct shapes, piping sizes and related system designed elements shall not be changed or modified except with written permission of the Architect. The Contractor shall not cut or otherwise alter construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its consent to cutting or otherwise altering the Work.

§ 3.14.3 After installation of the Work, Contractor shall carefully fit around, close up, repair, patch and paint such Work to match adjoining surfaces by use of proper tools and new materials using workers skilled in the required trades. All patching must include replacement or repair of any fire rated assembly to its full rating as required by current codes and standards at the point of Work or as may be required by the building official.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor, on a daily basis, shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. Contractor shall, not less than one time each week, clean up by removing rubbish, including old and surplus materials, to include dirt, debris, or trash. At no time shall trash, dirt or other debris be allowed to remain in any wall cavity, ceiling plenum, crawl space or concealed space. Immediately after unpacking materials, all packing case lumber or other packing materials, wrapping or other

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

like flammable waste shall be collected and removed from the building and premises. Contractor shall provide on-site containers for the collection of waste materials, debris and rubbish, and shall periodically remove waste materials, debris and rubbish from the Work and dispose of all such materials at legal disposal areas away from the site. At completion of the Work, the Contractor shall remove all waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project and shall clean, sweep, mop, brush and polish, as appropriate, the interior of the improvements or renovated areas, including but not limited to, any floors, carpeting, ducts, fixtures, and ventilation units operated during construction. Contractor shall clean exterior gutters, drainage, walkways, driveways and roofs of debris. All cleaning operations shall be scheduled so as to ensure that contaminants resulting from the cleaning process will not fall on newly-coated or newly-painted surfaces. Care shall be taken by all workers not to mark, soil, or otherwise deface any finish. In the event that any finish becomes defaced in any way as a result of such activities, the Contractor or any of his Subcontractors or Sub-subcontractors shall clean and restore such surfaces to their original condition.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner, at its discretion, may perform the clean-up and withhold costs incurred from funds due to Contractor or, if the costs incurred are in excess of the funds due to the Contractor, may require the Contractor to reimburse the Owner for the costs incurred.

§ 3.15.3 The Contractor shall be responsible for the protection of the Work. Prior to the Architect's inspection for Substantial Completion, the Contractor shall clean exterior and interior surfaces exposed to view; remove temporary labels, stains, putty, soil, paint and foreign substances from all surfaces, including glass and painted surfaces; polish transparent and glossy surfaces; clean equipment and fixtures to a sanitary condition; replace air filters in mechanical equipment; clean roofs, gutters, and downspouts; remove obstructions and flush debris from drainage systems; clean site; sweep paved areas and rake clean other surfaces; remove trash and surplus materials from the site; clean and polish all floors; clean and polish all hardware; and repair all Work damaged during cleaning.

§ 3.15.4 Prior to Final Completion, in addition to any additional final cleaning work specified in the Contract Documents (including the Specifications), Contractor shall: (1) employ skilled workers for final cleaning; (2) remove grease, mastic adhesive, dust, dirt, stains, fingerprints, labels and other foreign materials from all sight-exposed interior and exterior surfaces; (3) wash and shine glazing and mirrors; (4) polish glossy surfaces to a clear shine; (5) vacuum clean carpeted and similar soft surfaces; (6) clean (damp mop with clean mop and water) resilient and hard surface floors repeating as necessary until no visible residue remains on floors; (7) clean plumbing fixtures to a sanitary condition; (8) clean surfaces of all equipment and remove excess lubrication; (9) clean permanent filters and replace disposable filters in ventilating systems if units were operated during construction and clean ducts, blowers and coils; (10) clean light fixtures; (11) remove waste, foreign matter and debris from roofs, gutters, area ways and drainage ways; (12) remove waste, debris and surplus materials from the site; (13) remove stains, spills and foreign substances from paved areas; and (14) broom clean exterior concrete and paved surfaces and rake clean the grounds.

§ 3.16 Access to Work

The Contractor shall provide the Owner and Architect, and their designated representatives, with access to the Work in preparation and progress wherever located. Upon request of the Architect or Owner, the Contractor shall accompany the Architect or Owner on an inspection of the Work. The presence of the Owner, Architect or their representatives does not constitute acceptance or approval of the Work.

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees with respect to the Contract or the Work. THE CONTRACTOR SHALL DEFEND SUITS OR CLAIMS FOR INFRINGEMENT OF COPYRIGHTS AND PATENT RIGHTS, WAIVE AND RELEASE ANY CLAIMS AGAINST THE OWNER AND ARCHITECT WITH RESPECT THERETO, AND INDEMNIFY AND HOLD HARMLESS THE OWNER AND ARCHITECT FROM ANY LOSS ON ACCOUNT THEREOF, PROVIDED, HOWEVER, THAT CONTRACTOR SHALL NOT BE RESPONSIBLE TO ARCHITECT FOR DEFENSE OR LOSS WHEN A PARTICULAR DESIGN, PROCESS, OR PRODUCT OF A PARTICULAR MANUFACTURER OR MANUFACTURERS IS REQUIRED BY THE CONTRACT DOCUMENTS, OR WHERE THE COPYRIGHT VIOLATIONS ARE CONTAINED IN DRAWINGS, SPECIFICATIONS, OR OTHER DOCUMENTS PREPARED BY THE ARCHITECT. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless notice of such infringement is promptly furnished to the Owner and Architect in writing.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

§ 3.18 Indemnification

§ 3.18.1 TO THE FULLEST EXTENT PERMITTED BY LAW, THE CONTRACTOR SHALL WAIVE AND RELEASE CLAIMS AGAINST AND SHALL DEFEND, INDEMNIFY AND HOLD HARMLESS THE OWNER, ITS TRUSTEES, OFFICERS, AND CONSULTANTS, ARCHITECT, ARCHITECT'S CONSULTANTS, AND AGENTS AND EMPLOYEES OF ANY OF THEM FROM AND AGAINST CLAIMS, DAMAGES, LOSSES, CAUSES OF ACTION, SUITS, JUDGMENTS, AND EXPENSES, INCLUDING BUT NOT LIMITED TO ATTORNEYS' FEES, ARISING OUT OF OR RESULTING FROM PERFORMANCE OF THE WORK, PROVIDED THAT SUCH CLAIM, DAMAGE, LOSS, OR EXPENSE IS ATTRIBUTABLE TO BODILY INJURY, SICKNESS, DISEASE OR DEATH, OR TO INJURY TO OR DESTRUCTION OF TANGIBLE PROPERTY (INCLUDING THE WORK ITSELF), INCLUDING LOSS OF USE RESULTING THEREFROM, BUT ONLY TO THE EXTENT CAUSED IN WHOLE OR IN PART BY THE ACTS OR OMISSIONS OF THE CONTRACTOR, A SUBCONTRACTOR, ANYONE DIRECTLY OR INDIRECTLY EMPLOYED BY THEM, ANYONE THEY CONTROL OR EXERCISE CONTROL OVER, OR ANYONE FOR WHOSE ACTS THEY MAY BE LIABLE, REGARDLESS OF WHETHER OR NOT SUCH CLAIM, DAMAGE, LOSS, OR EXPENSE IS CAUSED IN PART BY ANY ACTS OR OMISSIONS OF OWNER OR OWNER'S CONSULTANTS OR ANY OTHER PARTY INDEMNIFIED HEREUNDER. SUCH OBLIGATION SHALL NOT BE CONSTRUED TO NEGATE, ABRIDGE, OR REDUCE OTHER RIGHTS OR OBLIGATIONS OF INDEMNITY THAT WOULD OTHERWISE EXIST AS TO A PARTY OR PERSON DESCRIBED IN THIS SECTION 3.18. ALL COSTS AND EXPENSES SO INCURRED BY ANY OF THE INDEMNIFIED PARTIES IN THAT EVENT SHALL BE REIMBURSED BY CONTRACTOR, AND ANY COSTS AND EXPENSES SO INCURRED BY INDEMNIFIED PARTIES SHALL BEAR INTEREST UNTIL REIMBURSED BY CONTRACTOR, AT THE POST-JUDGMENT INTEREST RATE PROVIDED TO BE PAID UNDER THE LAWS OF THE STATE OF TEXAS.

§ 3.18.2 IN CLAIMS AGAINST ANY PERSON OR ENTITY INDEMNIFIED UNDER THIS SECTION 3.18 BY AN EMPLOYEE OF THE CONTRACTOR, A SUBCONTRACTOR, A SUB-SUBCONTRACTOR, ANYONE DIRECTLY OR INDIRECTLY EMPLOYED BY THEM, OR ANYONE FOR WHOSE ACTS THEY MAY BE LIABLE, THE INDEMNIFICATION OBLIGATION UNDER SECTION 3.18.1 SHALL NOT BE LIMITED BY A LIMITATION ON AMOUNT OR TYPE OF DAMAGES, COMPENSATION, OR BENEFITS PAYABLE BY OR FOR THE CONTRACTOR OR A SUBCONTRACTOR UNDER INSURANCE POLICIES, WORKERS' COMPENSATION ACTS, DISABILITY BENEFIT ACTS, OR OTHER EMPLOYEE BENEFIT ACTS.

§ 3.18.3

THE OBLIGATIONS OF THE CONTRACTOR UNDER THIS SECTION 3.18 SHALL NOT EXTEND TO THE LIABILITY OF THE ARCHITECT, THE ARCHITECT'S CONSULTANTS, AND AGENTS AND EMPLOYEES OF ANY OF THEM, CAUSED BY OR RESULTING FROM: (1) DEFECTS IN PLANS, DESIGNS, OR SPECIFICATIONS PREPARED, APPROVED, OR USED BY THE ARCHITECT OR ENGINEER; OR (2) NEGLIGENCE OF THE ARCHITECT OR ENGINEER IN THE RENDITION OR CONDUCT OF PROFESSIONAL DUTIES CALLED FOR OR ARISING OUT OF THE CONSTRUCTION CONTRACT AND THE PLANS, DESIGNS, OR SPECIFICATIONS THAT ARE A PART OF THE CONSTRUCTION CONTRACT; AND (3) ARISING FROM: (A) PERSONAL INJURY OR DEATH; (B) PROPERTY DAMAGE; OR (C) ANY OTHER EXPENSE THAT ARISES FROM PERSONAL INJURY, DEATH, OR PROPERTY DAMAGE, OR AS OTHERWISE LIMITED BY TEXAS CIVIL PRACTICE & REMEDIES CODE SECTION 130.001 ET SEQ.

§ 3.18.4 CONTRACTOR SHALL BE RESPONSIBLE FOR AND SHALL HOLD OWNER FREE AND HARMLESS FROM LIABILITY RESULTING FROM LOSS OF OR DAMAGE TO CONTRACTOR'S OR ITS SUBCONTRACTOR'S OR SUB-SUBCONTRACTOR'S CONSTRUCTION TOOLS AND EQUIPMENT AND RENTED ITEMS WHICH ARE USED OR INTENDED FOR USE IN PERFORMING THE WORK REGARDLESS OF WHETHER SUCH LOSS OR DAMAGE IS CAUSED IN PART BY AN ACT OR OMISSION OF OWNER OR ITS AGENTS, OFFICERS, OR EMPLOYEES. THIS PROVISION SHALL APPLY, WITHOUT LIMITATION, TO LOSS OR DAMAGE OCCURRING AT THE WORK SITE OR WHILE SUCH ITEMS ARE IN TRANSIT TO OR FROM THE WORK SITE AND IS IN ADDITION TO CONTRACTOR'S OBLIGATIONS UNDER SECTION 3.18.1.

§ 3.18.5 THE OWNER MAY CAUSE ANY SEPARATE CONTRACTOR WHO MAY HAVE A CONTRACT WITH THE OWNER TO PERFORM CONSTRUCTION OR INSTALLATION WORK IN THE AREAS WHERE WORK WILL BE PERFORMED UNDER THIS AGREEMENT, TO AGREE TO INDEMNIFY AND TO HOLD THE OWNER AND THE CONTRACTOR HARMLESS FROM ALL CLAIMS FOR BODILY INJURY AND

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

PROPERTY DAMAGE TO THE SAME EXTENT AS IS PROVIDED IN SECTION 3.18.1 ABOVE. LIKEWISE, CONTRACTOR AGREES TO INDEMNIFY AND TO HOLD THE OWNER'S SEPARATE CONTRACTORS HARMLESS FROM ALL CLAIMS FOR BODILY INJURY AND PROPERTY DAMAGE TO THE SAME EXTENT AS PROVIDED IN SECTION 3.18.1 ABOVE.

§ 3.18.6 THE CONTRACTOR AGREES TO WAIVE ANY AND ALL CLAIMS IT MAY HAVE AGAINST THE OWNER, CONNECTED WITH, RESULTING FROM, OR ARISING OUT OF, CLAIMS AND SUITS COVERED BY THE INDEMNIFICATION AGREEMENT CONTAINED HEREIN AND AGREES THAT ANY INSURANCE POLICY SHALL PROVIDE FOR THE WAIVER OF SUBROGATION RIGHTS AGAINST THE OWNER.

§ 3.18.7 To the extent allowed by law, the Contractor agrees to insure the indemnity and hold harmless clauses contained in this Section 3.18, including its subparts, with insurance policies, approved by the Owner, and issued by a carrier authorized to do business in the State of Texas, in the minimum amounts set out in Article 11 and/or Section 11.1 of these General Conditions.

§ 3.18.8 The provisions of Section 3.18 in its entirety, including all of its subparts, shall survive the completion, termination, or expiration of the Contract, howsoever caused, and no payment, partial payment, nor issuance of a certificate of Substantial Completion nor a certificate of Final Completion nor acceptance of occupancy in whole or in part of the Work shall waive or release any of the provisions of Section 3.18 and its subparts.

§ 3.19 Antitrust Violation

To permit the Owner to recover damages suffered in antitrust violations, Contractor hereby assigns to Owner any and all claims for overcharges associated with this Contract which violate the antitrust laws of the United States, 15 U.S.C.A. Section 1 et seq. The Contractor shall include this provision in its agreements with each Subcontractor, Sub-subcontractor and supplier. Each Subcontractor shall include such provisions in agreements with sub-subcontractors and suppliers.

§ 3.20 Record Drawings

§ 3.20.1 At the completion of the Project, the Contractor shall submit complete "as built" drawings, with all changes made during construction, including concealed mechanical, electrical and plumbing items inside of the facility and underground utilities at the site. The drawings shall be submitted in an editable native file format agreed to at the beginning of the project along with (3) full sets of hard copy drawings and one digital copy in PDF format. These documents are to be considered part of the Work beyond the General Conditions. The documents shall not bear any professional seal or information other than project identification. This shall be completed and up to date within (30) working days from Substantial Completion.

ARTICLE 4 ARCHITECT

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

§ 4.1.2 The Owner shall notify the Contractor when duties, responsibilities, and limitations of authority of the Architect have been modified.

§ 4.1.3 Except as expressly provided herein, the Contractor shall not be relieved of Contractor's obligation to perform the Work in strict accordance with the Contract Documents by the duties, responsibilities, or activities of the Architect.

§ 4.2 Administration of the Contract

§ 4.2.1 The Architect or its authorized representative will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues a recommendation that the Final Payment is due, and, with the Owner's concurrence, from time to time during the one-year period for correction of Work described in Section 12.2.. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents or expressly authorized by the Owner in writing.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

§ 4.2.2 Architect or its authorized representative shall visit the site at least twice per week (or more per week when deemed necessary by the Owner or when necessary to protect Owner's interests) and at other intervals appropriate to the stage of construction, to inspect the progress, quantity and quality of the Work completed, to reject any observed nonconforming Work, and to determine if the Work is being performed in a manner indicating that the Work, when completed, will be in accordance with the Contract Documents and on time. Furthermore, a minimum of two job site meetings per month from commencement of construction through Final Completion will be initiated by the Architect and attended by the Contractor. Attendees will include the Owner, the Contractor's project manager and/or superintendent, Architect's project representative, and Architect. The Architect, Owner and their representatives shall at all times have access to the Work. Architect or its authorized representative will provide on-site observations prior to and during all concrete pours that contribute to the structural integrity of the building, including all pours of concrete piers, footings, grade beams, floor slabs, and concrete superstructure components, if applicable. In addition, Architect or its authorized representative will provide on-site observations prior to covering up or closing up of portions of the construction which, if covered, would conceal problems with the structural integrity of the Project. Contractor shall provide notice and shall not close or cover said Work until said observations have occurred. Contractor or Architect will advise Owner of the need for any third party laboratory or testing services to assist the Architect and Owner. On the basis of the on- site observations by Architect, Architect shall keep Owner and Contractor informed of the progress and quality of the Work, through Architect's field reports, and shall guard Owner against defects and deficiencies in the Work. Architect shall promptly notify Owner and Contractor orally regarding any defect or nonconforming Work, which shall be followed by notice in writing of defects or nonconforming Work noted and corrective actions taken or recommended. The Architect, however, shall not have control over or responsibility for the Contractor's construction means, methods, techniques, sequences, procedures, or safety programs, but this does not relieve Architect of Architect's responsibilities under the Contract. Any services by Contractor made necessary by Contractor's construction defect or nonconforming Work shall be performed at no additional cost to Owner.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, Sub-subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work. The Contractor shall reimburse the Owner for compensation paid to the Architect for additional site visits made necessary by the fault, neglect, or request of the Contractor.

§ 4.2.4 Communications

Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized by the Owner or Architect, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors, Sub subcontractors, and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols. Notwithstanding the foregoing, Owner reserves the right to communicate directly with the Contractor and Subcontractors.

§ 4.2.5 As further provided in the Contract Documents, based on the Architect's evaluations of the Work progress and quality of the Work and of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts, which shall be further subject to the Owner's review, modification, approval, or rejection.

§ 4.2.6 The Architect and Owner each has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect or the Owner considers it necessary or advisable, the Architect and/or the Owner will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. Testing or inspections required by this section shall be conducted subject to the requirements of Chapter 2269 of the Texas Government Code. However, neither this authority of the Architect or the Owner nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect or the Owner to the Contractor, Subcontractors, Sub subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work, or constitute approval or acceptance of Work that is deficient or does not meet the requirements of the Contract

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

Documents. Architect and/or Contractor shall promptly notify, orally and in writing, the other party and Owner of any fault or defect in the Project or Construction Documents or nonconformance with the Contract Documents they may respectively discover (or reasonably should have discovered using ordinary diligence) and each, upon discovery of the defect or nonconformance, shall be responsible for notifying the other party and Owner of those corrective actions they respectively take; provided, however, Contractor shall have no duty to notify Owner of discoveries made or actions taken by Architect. If Architect or Contractor fails to disclose, in writing, any known defects in the Project or Construction Documents it discovers or reasonably should discover using ordinary diligence, the non-disclosing party (Architect and/or Contractor) shall be liable for the consequences of such defects resulting from the failure to disclose. In the event of a disagreement between the Architect and Contractor, the Owner will make the final determination after reviewing all of the information.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents and all applicable laws, statutes, codes and requirements applicable to Architect's design services. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness as to cause no delay in the Work or in the activities of the Owner, Contractor, or Separate Contractors, while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is conducted for the general purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component. If any submittal does not comply with the requirements of the Contract Documents, then Architect shall require Contractor to come into compliance. The Architect shall promptly report in writing to the Contractor and Owner any errors, inconsistencies and/or omissions discovered by the Architect in the Shop Drawings, Product Data and Samples.

§ 4.2.8 The Architect shall review, prepare and make recommendations to Owner regarding all Change Orders and Construction Change Directives for the Owner's approval and execution in accordance with the Contract Documents, accompanied by all supporting documentation. The Architect may authorize minor changes in the Work not involving an adjustment in Contract Sum or an extension of the Contract Time which are consistent with the intent of the Contract Documents. If necessary, the Architect shall prepare, reproduce and distribute Drawings and Specifications to describe Work to be added, deleted or modified, as provided in Section 7.4. The Architect shall accept requests by the Owner, and shall review properly prepared, timely requests by the Contractor for changes in the Work, including adjustments to the Contract Sum or Contract Time. A properly prepared request for a change in the Work by the Contractor shall be accompanied by sufficient supporting data and information to permit the Architect to make a reasonable determination without extensive investigation or preparation of additional drawings or specifications. If the Architect determines that requested changes in the Work are not materially different from the requirements of the Contract Documents and do not change the Contract Sum or Contract Time, then the Architect may issue an order for a minor change in the Work with prior written notice to the Owner, or recommend to the Owner that the requested change be denied. The Architect is not authorized to approve changes involving major systems such as: Heating, Ventilation and Air Conditioning ("HVAC"); roof; foundation; outward appearance; color schemes; floor plans; building materials; drainage; or mechanical equipment without Owner's prior written consent.

§ 4.2.9 The Architect will conduct inspections and, in consultation with the Owner, determine the date or dates of Substantial Completion and the date of Final Completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10. In the event Architect is required to perform more than two inspection(s) to determine the date or dates of Substantial Completion or Final Completion due to Contractor's failure to meet the conditions for such completion, Contractor shall be responsible for paying or reimbursing Owner for the cost of any Additional Services charged by Architect or Consultants under the agreement between Owner and Architect.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Contractor of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 4.2.11 The Architect will interpret and make recommendations on matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor, which shall be copied to the other.. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. The Owner will make the final determination of all matters concerning performance after consultation with the Architect.

§ 4.2.12 Interpretations or recommendations of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and recommendations, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either, and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Owner's decisions on matters relating to aesthetic effect shall be final if (a) they are consistent with the intent expressed in the Contract Documents, and (b) the Owner gives its written consent.

§ 4.2.14 Contractor is allowed a reasonable number of requests for information that are initiated by Contractor and if Contractor exceeds that reasonable amount, as determined by the Architect, in its sole discretion, Contractor shall pay the Architect's fee for review of any additional requests for information. The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information. In the event of a disagreement between the Architect and Contractor, the Owner will make the final determination after reviewing all of the information.

§**4.2.15** The Contractor shall not cover up work without the Architect and Owner performing an observation of such work. The Contractor shall be responsible for any and all associated costs to allow for observation of the work, uncovered, by the Architect and Owner. If the Contractor covers work without either the consent of the Architect and Owner or without providing the Architect and Owner with reasonable opportunity to observe the work, whether or not such work is found to be acceptable by the Architect or Owner, the Contractor shall repair such work at no cost to the Owner.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site, away from the site, or otherwise to furnish labor or materials. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a Separate Contractor or the subcontractors of a Separate Contractor. The term "Subcontractor" includes persons supplying materials or equipment for the Work.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site, away from the site, or otherwise to furnish labor or materials.. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor. The term "Sub-subcontractor" includes persons supplying materials or equipment for the Work.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Architect may notify the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection. All Subcontractors shall be procured in accordance with Texas Education Code Chapter 44, Subchapter B, and Texas

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

Government Code Chapter 2269, as applicable. If Contractor is a Construction Manager at Risk, all trade contractors and Subcontractors shall be procured in accordance with Sections 2269.255 and 2269.256 of the Texas Government Code. A notice of no reasonable objection shall in no way relieve the Contractor from full responsibility for performance and completion of the Work and its obligations under the Contract Documents. The Contractor shall be fully responsible for the performance of its Subcontractors, and Sub-subcontractors, including those recommended or approved by the Owner.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable and timely objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. When the parties agree on a proposed substitute Subcontractor or if the Owner requires use of a specific Subcontractor, then the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required. "Reasonable Objection" shall include, but not be limited to, Owner or Architect's prior experience of unsatisfactory work performed by the Subcontractor or debarment of the Subcontractor.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, Sub subcontractor person, or entity for one previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.2.5 The Owner may require the Contractor to change any subcontractor or supplier previously approved by it, if such a change is due to failure of subcontractor to perform in accordance with the requirements of the Contract. If Owner requires removal of a subcontractor for such failure to perform, and Contractor reasonably objects to such removal, then Owner will pay any actual increase in the cost between the new subcontractor and the subcontractor replaced incurred by Contractor, taking into account any amounts which Contractor withholds or recovers in damages from the replaced subcontractor. If Contractor requests such payment from Owner, Contractor shall provide Owner with satisfactory proof of such additional costs incurred by Contractor.

§ 5.2.6 Contractor shall be fully responsible for the performance of its subcontractors, including those selected or approved by the Owner.

§ 5.3 Subcontractual Relations

§ 5.3.1 By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work that the Contractor, by these Contract Documents, assumes toward the Owner and Architect. The terms and conditions of the Contract Documents shall be incorporated by reference into each subcontract agreement, except as provided below. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors. Each Subcontractor and Sub-subcontractor shall provide proof of insurance to Contractor consistent with the Contractor's insurance to Owner and in amount commensurate with the Work to be performed by the Subcontractor or Sub-subcontractor.

§ 5.3.2 Neither the Owner nor the Architect shall be obligated to pay or to ensure the payment of any monies to Subcontractors or Sub-subcontractor due to any non-payment to the Contractor, non-payment of Subcontractors by the Contractor, or non-payment of Sub-subcontractors by Subcontractors.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

§ 5.3.3 The Contractor shall require any potential Subcontractor to disclose to the Contractor any ownership interest or familial relationship between the Contractor, the Architect or the Owner and the potential Subcontractor prior to entering into a subcontract. Contractor shall report to Owner all such disclosures and the Owner shall have the right, in its sole discretion, to reject any such affiliated Subcontractor.

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for any unperformed portion of the Work is assigned by the Contractor to the Owner, provided that

- **.1** assignment is effective only after termination of the Contract either in accordance with Article 14 or abandonment of the Project by the Contractor and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor;
- **.2** assignment is subject to the prior rights and obligations of the surety, if any, obligated under bonds relating to the Contract;
- **.3** such assignment shall not constitute a waiver by Owner of any of its rights against Contractor, because of defaults, delays and defects for which a Subcontractor or material vendor may also be liable; and
- **.4** the Subcontractor provides bonds as required by law of prime contractors, and by Owner.

If the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract, provided, however, that Owner does not assume Contractor's obligations or liabilities for defaults occurring prior to Owner's assumption, or for the payment to the Subcontractor or supplier for Work, if payment for such Work has previously been made to Contractor. Such liabilities or obligations shall remain with Contractor. Owner shall only be responsible for compensating Subcontractors for Work performed or materials furnished from and after the date on which the Owner gives written notice of its acceptance of the subcontract agreement. Owner shall not be responsible for any Work performed or materials furnished by Subcontractors prior to the date of Owner's written notice of acceptance.

§ 5.4.2 Such assignment shall not constitute a waiver by Owner of any of its rights against Contractor, including, but not limited to, claims for defaults, delays or defects for which a Subcontractor, Sub-subcontractor, or vendor may also be liable.

§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity.

§ 5.4.4 All subcontracts shall state that they will be assignable to the Bond Trustee or his designee, if funding for the Project is obtained through bond proceeds.

§ 5.5 Notice of Subcontractor Default

Contractor shall promptly notify Owner and Architect in writing of any material defaults by any Subcontractor or Sub-subcontractor. Notwithstanding any provision contained in Article 5 to the contrary, it is hereby acknowledged and agreed that Owner has in no way agreed, expressly or implicitly, nor will Owner agree, to allow any Subcontractor, Sub- subcontractor or other materialman or worker employed by Contractor the right to obtain a personal judgment or to create a mechanic's or materialman's lien against Owner for the amount due from the Owner or the Contractor.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction and to Award Separate Contracts

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained for the Project. The Owner further reserves the right to perform other non-Project-related construction work, maintenance and repair work, and school program operations at the site and near the site during the time period of the Work.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each Separate Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual agreement and submit such revisions to the Owner for the Owner's approval. The construction schedules, if approved by the Owner, shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same rights that the Contractor has under the Conditions of the Contract.

§ 6.2 Mutual Responsibility

§ 6.2.1 It shall be the responsibility of the Contractor to assist, review, and coordinate the scheduling of work performed by any of the Owner's Separate Contractors. In addition, the Contractor shall be responsible for coordinating and providing all construction administration necessary for the Work and the work of any of Owner's Separate Contractors. The Contractor shall afford the Owner and Separate Contractors reasonable site access and opportunity for introduction and storage or staging of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents. Contractor shall be responsible for coordination between Contractor's Subcontractors, Sub-subcontractors and Owner's Separate Contractors. Contractor shall review Owner's contract with Owner's Separate Contractors and become familiar with the requirements and scope of services contained therein.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Architect and Owner in writing of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work and shall promptly report in writing to the Architect and Owner if Owner's Separate Contractors otherwise fail in any way to timely perform their services or negatively impact Contractor's schedule or ability to perform the Work. Failure of the Contractor to notify the Architect and Owner of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work and is performed in a timely manner. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not actually known to Contractor and are not reasonably apparent.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a Separate Contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for actual costs the Contractor incurs because of a Separate Contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.3.1 If the Architect is required to provide contingent additional services as provided in the Agreement between the Owner and the Architect, specifically relating to additional compensation for the Architect for evaluating an excessive number of claims submitted by the Contractor or others in connection with the Work in accordance with the Owner's Agreement with the Architect, then such services shall be paid for by the Contractor through the Owner, unless the contingent additional services result from negligence or an omission by the Architect.

§ 6.2.3.2 If the Architect provides services in connection with a legal proceeding, except when the Architect is a party thereto, and the Owner requests the Architect in writing to provide such services, then the cost of such services shall be paid for by the party whose act or omission was a proximate cause of the problem that led to the requirement to provide such services. Such services shall be paid for by such party through the Owner, who upon receipt of same shall reimburse the Architect.

§ 6.2.3.3 All construction costs resulting from the Contractor's negligence, lack of oversight, inattention to detail, failure to investigate or failure to follow the Contract Documents, will be borne by the Contractor.

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractor as provided in Section 10.2.5.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

§ 6.2.5 The Owner and each Separate Contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14. If such Separate Contractor initiates a claim or legal or any other proceedings against the Owner on account of any damage alleged to have been caused by the Contractor, the Owner shall notify the Contractor, who shall defend such proceedings at its own expense, and if any judgment or award against the Owner arises therefrom, based on Contractor's act or omissions or the act or omissions of Contractor's employees, Subcontractor, Sub subcontractor, or parties for whom Contractor has liability, the Contractor shall pay or satisfy it and shall reimburse the Owner for all attorneys' fees and court and other costs which the Owner has incurred over and above those paid for directly by the Contractor.

§ 6.2.6 The Contractor shall be responsible for any delays to a Separate Contractor caused by the Contractor or its Subcontractors, Sub-subcontractors, or suppliers.

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and then allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents. A properly prepared written request for a change in the Work by Contractor shall be accompanied by sufficient supporting data and information to permit the Architect to make a recommendation to Owner.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor, and Architect. A Construction Change Directive requires the approval of the Owner and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued, subject to the Owner's approval, by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work. Contractor shall not make any claim for an adjustment to the Contract Sum or Contract Time due to: a change in the materials used; a change in the specified manner of constructing and/or installing the Work; or additional labor, services, or materials, beyond that actually required by the terms of the Contract Documents, unless made pursuant to a written order or directive from Owner authorizing Contractor to proceed with a Change in the Work. No claim for an adjustment to Contract Sum or Contract Time shall be valid unless so ordered or directed.

§ 7.1.4 Calculation of costs or credits for Changes, minor changes, Proposals, Contingency expenditures and Allowance expenditures:

1. When calculating the Cost of the Work for Changes, minor changes, Proposals, Contingency expenditures and Allowances, the Contractor shall furnish and include substantiation to satisfaction of the Owner of the following from Subcontractors:

Description of Subcontractor Cost of the Work Element

A	Bare Material Costs
B	Labor Hours
C	Direct Labor Costs (See Article 1 Definitions)
D	Labor Cost Burden (See Article 1 Definitions)
E	Equipment
F	Work performed by Sub-subcontractor (if any), where Sub-subcontractor Overhead and Profit shall not exceed 10%
G	Subcontractor's Overhead and Profit, which shall not exceed 10% of A through F
H	Contractor's Overhead and Profit, which shall not exceed 10% of A through G
I	Cost of the Work (Sum of A through H)

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

2. When Contractor self performs work, when calculating the Cost of the Work for Changes, minor changes, Proposals, Contingency expenditures and Allowances, the Contractor shall furnish and include substantiation to satisfaction of the Owner of the following:

Description of Contractor Cost of the Work Element

A Bare Material Costs

B Labor Hours

C Direct Labor Costs (See Article 1 Definitions)

D Labor Cost Burden (See Article 1 Definitions)

E Equipment

F Contractor's Overhead and Profit, which shall not exceed 10% of A through E

G Cost of the Work (Sum of A through F)

No additional Fee or General Conditions cost shall apply to self-performed Work.

3. By Unit Prices stated in the Contract Documents or subsequently agreed upon. Additional mark-ups for overhead and profit will not be allowed in Unit Price Work.

§ 7.1.4.1 The Contractor, upon receipt of written notification by the Owner or the Architect of a proposed item of change in the Work, shall prepare within 10 Calendar Days a Change Proposal in such form or forms as directed by the Owner or the Architect.

.1 Each separate Change Proposal shall be numbered consecutively and shall include all cost related to the proposed Change in the Work, including any disruption or impact on performance.

.2 The Subcontractor's itemized accounting shall be included with the Change Proposal;

.3 If a Change Proposal is returned to the Contractor for additional information or if the scope of the proposed Change in the Work is modified by additions, deletions or other revisions, the Contractor shall revise the Change Proposal accordingly and resubmit the revised Change Proposal to the Architect and the Owner;

.4 A revised Change Proposal shall be the original Change Proposal number suffixed by the letter "R" to designate a revision in the original Change Proposal. If additional revisions to a revised Change Proposal are necessary, each subsequent revision shall be identified by an appropriate numeral suffix immediately following the "R" suffix;

.5 Upon written approval of a Change Proposal by Owner, the Architect and the Contractor, the Architect will prepare an Allowance Expenditure Authorization or Change Order authorizing such change in the Work; and

.6 The Contractor shall request extensions of Contract Time due to changes in the Work only at the time of submitting its Change Proposal. Contractor's failure to do so shall represent a waiver of any right to request a Contract Time extension. Any request for extensions of Contract Time must be substantiated through the demonstration of the impact of the proposed item of change in the Work to the critical path schedule for the Project.

§ 7.1.4.2 Formal Notice of Essence. Contractor recognizes and acknowledges that timely submission of a formal Change Proposal, whether or not the circumstances of the Change may be known to the Owner or available to Owner through other means, is not a mere formality but is of crucial importance to the ability of Owner to promptly identify, prioritize, evaluate and mitigate the potential effects of Changes. Any form of informal notice, whether verbal or written (including, without limitation, statements in Requests for Information, statements at regular job meetings or entries on monthly reports, daily logs or job meeting minutes), that does not strictly comply with the formal requirements of Paragraph 7.1.4.1, above, shall therefore be insufficient.

§ 7.1.5 In accordance with Texas Education Code §44.0411 if the Contract Sum is $1,000,000.00 or more, or if the Contract Sum is less than $1,000,000.00, and any Change Order, Construction Change Directives, or other Changes in the Work would increase the Contract Sum to $1,000,000.00 or more, the total of all Change Orders, Construction Change Directives, or other Changes in the Work may not increase the Contract Sum by more than 25% of the original Contract Sum. Any Change Order, Construction Change Directive, or other Change in the Work that would exceed that limit is void and of no effect.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

§ 7.2 Change Orders

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor, and Architect stating their agreement upon all of the following:

.1 The change in the Work;

.2 The amount of the adjustment, if any, in the Contract Sum; and

.3 The extent of the adjustment, if any, in the Contract Time.

§7.2.2 In no event shall a single change, or the aggregate of all changes, result in the total costs, reimbursements and fees exceeding the Contract Sum or be the basis of a change in the Contract Time unless and until such change has been authorized by a Change Order executed and issued by the Owner in accordance with the Contract Documents prior to the commencement of such modified or changed Work. Changes in the Work may be made without notice to Contractor's sureties and absence of such notice shall not relieve such sureties of any of their obligations to Owner.

§7.2.3 Contractor stipulates that acceptance of a Change Order by the Contractor shall constitute full accord and satisfaction for any and all Claims, whether direct or indirect, including but not limited to, impact or delay damages, arising from the subject matter of the Change Order and attorney's fees and costs arising from a dispute with a Subcontractor or Sub-subcontractor over the Change Order.

§ 7.2.4 Methods used in determining adjustments to the Contract Sum may include those listed in Section 7.3.3.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and, if required by the Owner, the Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

.1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;

.2 Unit prices stated in the Contract Documents or subsequently agreed upon (additional mark-ups for overhead, profit and fees will not be allowed);

.3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee subject to the limitations of Section 7.1; or

.4 As provided in Section 7.3.4 subject to the limitations of Section 7.1.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall make a recommendation of the amount by which the Contractor's direct costs have actually been increased over the direct cost of performing the Work without the Change in the Work. all subject to the approval of the Owner. The Contractor shall keep and present, in such form as the Architect or Owner may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

.1 Actual costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;

.2 Actual costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;

.3 Actual rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others at rates that are no greater than market rates in the locale of the Work at the time of the Work. Unless otherwise established in the Contract, the rental value of the Contractor's own equipment shall not be more than the normal local rental rate for similar equipment; and

.4 Actual costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change Work, except that sales, use or similar taxes to which the Owner is exempt shall not be included in the calculation of costs; and

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

.5 Actual additional costs of supervision and field office personnel directly attributable to the change only if the adjustment causes an extension of the Contract Time.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved regardless of the Contractor's agreement with or disagreement with the adjustment in the Contract Sum or Contract Time or the method for determining them, and shall promptly advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost plus the Contractor's allocated percent of profit and overhead as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified, which shall be further subject to the Owner's review, modification, approval, or rejection. The Architect's interim determination of cost, as modified and/or approved by the Owner, shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of the Contractor to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work

The Architect may, subject to Owner approval, order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum, Allowances, Contingencies or Contract Time, the Contractor shall notify the Architect in writing and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum, Allowances, Contingencies or Contract Time and written instruction from the Architect to proceed, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time. The Owner shall also retain authority to order such minor changes in the Work. The Contractor shall carry out such written orders promptly. Minor changes in the Work shall not include changes that involve the outward appearance of the structure, color schemes, floor plans, building materials, landscaping, or mechanical equipment.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect and approved by the Owner in accordance with Section 9.8. The date of Final Completion is the date certified by the Architect and Owner in

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

accordance with Section 9.10. Unless otherwise agreed in writing by the Owner, the Contractor agrees that Final Completion shall occur by the date set forth in the Agreement, or by such dates thereafter as may be established in any written extensions granted under Article 8 of the General Conditions.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor stipulates that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner's approval of such insurance..

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.2.4 The Contractor is subject to liquidated damages, as specified in the Agreement, if the Work is not completed by the date of Substantial Completion and/or the date of Final Completion.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an authorized employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by fire, governmental actions, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's reasonable control which do not arise through the action or inaction of Contractor or its Subcontractor, Sub-subcontractor or suppliers, could not have been reasonably anticipated, and could not have been avoided through the exercise of reasonable care or prudent construction management by the Contractor; (4) by delay authorized in writing by the Owner; or (5) by other causes that the Contractor asserts, and the Architect and Owner determine, justify delay, then the Contract Time may be extended in writing for such reasonable time as the Architect and Owner may determine. The foregoing notwithstanding, the Contractor shall not be entitled to an extension of time for changes in the Work required due to Contractor fault, or which extend beyond the time extension provided in a Change Order. Nothing in this provision will limit the rights of Owner under other provisions of this Contract. Any provision of the Contract Documents to the contrary notwithstanding, it is expressly agreed that the extension of the Contract Time shall be Contractor's sole remedy for any delay unless the same shall have been caused by acts constituting intentional interference by the Owner which materially interfere with Contractor's performance of the Work, and then only to the extent that such acts continue after Contractor's reasonable prior written notice to Owner of such interference.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15. A disagreement concerning time extensions shall not relieve the Contractor from performing the Work required by the Contract Documents and shall not be cause for the Contractor to suspend Work on the Project.

§ 8.3.3 The Contract does not permit the recovery of damages, including, without limitation, extended home office overhead expenses, general conditions or other consequential damages, by the Contractor for delay or disruption or for extensions of time due to bad weather, acts of God, supply chain issues, or market escalation. Contractor agrees that Contractor shall be fully compensated for all delays solely by an extension of time. Owner's exercise of any of its rights under the Contract Documents, including without limitation, its rights under Article 7, Changes in the Work, regardless of the extent or number of such changes or Owner's exercise of any of its remedies of suspension of the Work or requirement of correction or re-execution of any defective Work, shall not, under any circumstances, be construed as interference with Contractor's performance of the Work and shall not entitle the Contractor to any additional compensation.

§ 8.3.4 In the event of inexcusable delay by Contractor, Owner may direct that the Work be accelerated by means of overtime, additional crews or additional shifts or re-sequencing of the Work. All such acceleration shall be at no cost to Owner.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

§ 8.3.5 In the event that Contractor does not complete the Work within the Contract Time, then in addition to any other costs and damages (liquidated or otherwise) for which Contractor is responsible, Contractor will provide, at its expense, any bonds required by governmental authorities to enable Owner to secure a Certificate of Occupancy (if required) even though there are items of Work which are incomplete.

§ 8.3.6 The Contractor's claims related to time shall be made in accordance with applicable provisions of the Contract Documents or they shall be deemed waived.

§ 8.3.7 Any provision of the Contract Documents to the contrary notwithstanding, it is expressly agreed that the extension of the Contract Time shall be Contractor's sole remedy for any delay unless the same shall have been caused by acts constituting interference by the Owner which interfere with Contractor's performance of the work, and then only to the extent that such acts continue after Contractor's written notice to Owner of such interference. Owner's exercise of any of its rights under the Contract Documents or Owner's exercise of any of its remedies of suspension of the Work or requirement or correction or re-execution of any defective Work shall not, under any circumstances, be construed as interference with Contractor's performance of the Work.

§ 8.3.8 Concurrent Delays. For purposes of the calculations provided for in this Paragraph 8.3.8, the words "concurrent delay", "concurrently delay" or "occur concurrently" mean the portion of two or more Delays affecting the critical path to Substantial Completion that are overlapping or co-existent. Contractor's right to a Contract Adjustment of the Contract Time (pursuant to Subparagraphs 8.3.8.1, 8.3.8.2 and 8.3.8.3, below) and Contract Price (pursuant to Subparagraphs 8.3.8.4, 8.3.8.5 and 8.3.8.6, below) shall, in the case of concurrent delays, be calculated in accordance with the following:

§ 8.3.8.1 If an Excusable Delay and a Compensable Delay occur concurrently, the maximum extension of the Contract Time shall be the number of Days from the commencement of the first Delay to the cessation of the Delay which ends last.

§ 8.3.8.2 If an Unexcused Delay occurs concurrently with either an Excusable Delay or a Compensable Delay, the maximum extension of the Contract Time shall be the number of Days, if any, by which such Excusable Delay or Compensable Delay exceeds the number of Days of such Unexcused Delay.

§ 8.3.8.3 If an Unexcused Delay occurs concurrently with both an Excusable Delay and a Compensable Delay, the maximum extension of the Contract Time shall be the number of Days, if any, by which such Excusable Delay and Compensable Delay, as determined pursuant to Subparagraph 8.3.8.1, above, exceeds the number of Days of such Unexcused Delay.

§ 8.3.8.4 If an Unexcused Delay occurs concurrently with a Compensable Delay, the maximum period of time for which Contractor shall be entitled to a Change Order to the Contract Price in accordance with the Agreement shall be the number of Days, if any, by which such Compensable Delay exceeds the number of Days of such Unexcused Delay.

§ 8.3.8.5 If a Compensable Delay occurs concurrently with an Excusable Delay, the maximum period of time for which Contractor shall be entitled to a Change Order to the Contract Price in accordance with the Agreement shall be the number of Days, if any, by which such Compensable Delay exceeds the number of Days of such Excusable Delay.

§ 8.3.8.6 If an Unexcused Delay occurs concurrently with both an Excusable Delay and a Compensable Delay, the maximum period of time for which Contractor shall be entitled to a Change Order to the Contract Price in accordance with the Agreement shall be the number of Days, if any, by which such Compensable Delay exceeds the number of Days of such Unexcused Delay.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

§ 9.1.1 The Contract Sum, or if the Project is a Construction Manager at Risk Project, Guaranteed Maximum Price, is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices may, by mutual written agreement, be equitably adjusted.

§ 9.1.3 Notwithstanding anything to the contrary contained in the Contract Documents, the Owner may withhold any payment to the Contractor hereunder if and for so long as the Contractor fails to perform any of its material obligations hereunder or otherwise is in default under any of the provisions of the Contract Documents, subject to the requirements of applicable law.

§ 9.2 Schedule of Values

§ 9.2.1 Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a Schedule of Values to the Architect and the Owner before the first Application for Payment, or in the case of a Guaranteed Maximum Price, within 15 days after establishing the Guaranteed Maximum Price, allocating the entire Contract Sum to the various portions of the Work, minimally separating the entire Contract Sum into categories matching the sections of the Project Manual. The Schedule of Values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect and the Owner. This Schedule, unless objected to by the Architect or Owner, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the Schedule of Values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the Architect or Owner, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment. The Schedule of Values shall be prepared in such a manner that each major item of Work, whether done by Contractor's own forces or subcontracted, is shown as a single line item on AIA Documents G702 and G703, Application and Certificate for Payment. If the Contractor is a Construction Manager at Risk, then the Contractor's fee and general conditions shall be specifically shown, and AIA Documents G732 and G703 shall be used.

§ 9.2.2 In order to facilitate the review of Applications for Payment, the Schedule of Values shall be submitted on AIA Documents G702 and G703 (or G732 and G703, as applicable), and shall include the following:

.1 Contractor's cost for Contractor's fee (if applicable) bonds and insurance, mobilization, general conditions, etc. shall be listed as individual line items.

.2 Contractor's costs for various construction items shall be detailed, generally categorized by specification section, and further by type of application. For example, concrete work shall be subdivided into footings, grade beams, floor slabs, paving, etc.

.3 On major subcontracts, such as mechanical, electrical and plumbing, the schedule shall indicate line items and amounts in detail (for example: underground, major equipment, fixtures, installation fixtures, start-up, etc.).

.4 Costs for subcontract work shall be listed without any additional mark-up of Contractor's costs for overhead, profit or supervision.

.5 If payment for stored materials is requested prior to installation, then material and labor shall be listed as separate line items.

.6 Contractor shall provide a report of actual versus projected reimbursable expenses (general conditions), updated monthly.

§ 9.3 Applications for Payment

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors, Sub subcontractors, and suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 Contractor agrees that, for purposes of Texas Government Code Sections 2251.021 and 2251.042, receipt of the Application for Payment by the Architect shall not be construed as receipt of an invoice by the Owner. Contractor further agrees that Owner's receipt of the Certificate for Payment from the Architect shall be construed as receipt of an invoice by the Owner, for purposes of Texas Government Code Sections 2251.021 and 2251.042.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor has not been invoiced by a Subcontractor, Sub-subcontractor, or supplier, unless Contractor has self-performed the Work.

§ 9.3.1.3 Until Final Completion of the Work, the Owner shall withhold retainage as provided in the Contract Documents, except that Owner shall not pay amounts for which the Architect refuses to certify payment, or the Owner refuses to pay, as provided herein in Section 9.4.3 or 9.5. The retainage shall be paid with the Final Payment.

§ 9.3.1.4 All progress payment requests shall be accompanied by (i) an itemization of all Subcontractors, Sub subcontractors, and material suppliers, the amounts due each and the amounts to be paid out of said progress payment to each of them and (ii) by unconditional lien waivers releasing all liens and lien rights with respect to Work for which Owner has made payment under a prior progress payment request in a form reasonably satisfactory to Owner from Contractor and all its subcontractors and material suppliers with contracts in excess of $25,000.00 (Evidence of prior progress payment shall apply to progress payments 61-days or older). When Contractor submits its request for payment of retainage, Contractor shall submit "All Bills Paid" affidavits and unconditional final lien waivers fully releasing all liens and lien rights with respect to the Work in a form reasonably satisfactory to Owner from Contractor and all its Subcontractors, Sub subcontractors, and material suppliers with contracts in excess of $25,000.00. Applications for Payment shall be certified as correct by Contractor. When requested by Owner or when required by the Davis-Bacon Act, each Application for Payment shall also be accompanied by Certified Payrolls and such other affidavits, certificates, information, data and schedules as Owner may reasonably require. The Owner is not required to make any payment to Contractor to the extent reasonably necessary to protect Owner. In addition to the other requirements of this Article, the initial Application for Payment shall be proceeded or accompanied by the following:

1. List of subcontractors,
2. Schedule of values,
3. Contractor's construction schedule (preliminary if not final),
4. If applicable, Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor,
5. Products list (preliminary if not final),
6. Schedule of unit prices,
7. Submittal schedule (preliminary if not final),
8. List of Contractor's staff assignments,
9. List of Contractor's principal consultants,
10. Copies of building permits,
11. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work,
12. Initial progress report,
13. Report of preconstruction conference,
14. Certificates of insurance and insurance policies,
15. Performance and payment bonds,
16. Data needed to acquire Owner's insurance, and
17. Initial settlement survey and damage report if required

In addition to the other requirements of this Article, each subsequent Application for Payment shall be accompanied by:

1. Updated Microsoft Project schedule meeting the requirements of Section 3.10,
2. Log of Adverse Weather Days, and Instructional Days, including backup documentation,
3. Where Unit Costs are in use, measurements for payments will be made only for actual measured and/or computed length, area, solid contents, number, and weight, unless other provisions are made in the Contract Documents. Payment on a unit price basis will not be made for Work outside finished dimensions shown in the Contract Documents. Include costs for waste, overages and tolerances in the unit price for that line item, and
4. Measurements for unit price quantities will be verified by the Architect/Engineer in conjunction with the General Contractor via inspection of the Work prior to submittal of interim Applications for Payment

§ 9.3.2 Payments will be made on the basis of invoices for specific materials or equipment incorporated in the Work and specific materials or equipment (1) suitably stored at the site or (2) suitably stored at some off-site location, provided the following conditions are met for off-site storage:

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

.1 The location must be agreed to, in writing, by the Owner and Surety.

.2 The location must be a bonded warehouse.

.3 The Contractor's Surety must agree, in writing, to the amounts included in each Application for Payment.

.4 The Contractor must bear the cost of the Owner's and Architect's expenses related to visiting the off-site storage area and reviewing the stored contents. Contractor acknowledges that Architect's time is an additional service and shall compensate Architect directly for same.

.5 Payment shall not include any charges for overhead or profit on stored materials.

.6 Payments for materials or equipment stored on or off the site shall be conditioned upon submission by the Contractor of bills of sale or such other procedures satisfactory to the Owner to establish the Owner's title to such materials or equipment or otherwise protect the Owner's interest, including applicable insurance (naming the Owner as insured and naming the specific materials or equipment stored and their location) and transportation to the site for those materials and equipment stored off the site. Under no circumstances will the Owner reimburse the Contractor for down payments, deposits, or other advance payments for materials or equipment until the materials or equipment are delivered to Owner's site. Failure to follow these procedures shall result in nonpayment for storage of or insurance on stored materials and equipment. Failure to follow these procedures shall also result in nonpayment of materials and equipment until said materials and equipment are incorporated into the Work.

§ 9.3.3 The Contractor warrants that title to all Work, materials, and equipment covered by an Application for Payment will irrevocably pass to the Owner no later than the time of Owner's payment to Contractor of the invoiced cost. Such title shall be free and clear of all liens, claims, security interests or encumbrances. No Work, material or equipment covered by an Application for Payment shall be subject to an agreement under which an interest is retained or an encumbrance is attached by the seller, the Contractor, or other party. The Contractor further warrants that, upon submittal of an Application for Payment, all Work, materials, and equipment for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, Sub-subcontractors, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work. CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD OWNER HARMLESS FROM AND AGAINST ANY LIENS, CLAIMS, SECURITY INTERESTS OR ENCUMBRANCES FILED BY THE CONTRACTOR, SUBCONTRACTORS, OR ANYONE CLAIMING BY, THROUGH OR UNDER THE CONTRACTOR OR SUBCONTRACTOR FOR WORK, MATERIALS, EQUPMENT, OR OTHER ITEMS COVERED BY PAYMENTS MADE BY THE OWNER TO CONTRACTOR.

§ 9.3.4 Contractor shall submit monthly Applications for Payment electronically, or, if requested by Owner, in writing, to both the Architect and Program Manager, if applicable, in quadruplicate using AIA Documents G702 and G703 Application and Certificate of Payment (or G732 and G703, if applicable) and Continuation Sheet. All blanks in the form must be completed and signatures of Contractor and Notary Public must be original on each form. The Architect and Program Manager, if applicable, may require any additional information deemed necessary and appropriate to substantiate the Application for Payment. Materials that are verified to be on the jobsite or other approved location for use in the Project may also be incorporated into the Application for Payment. Incomplete or inaccurate Applications for Payment shall be returned to the Contractor by the Architect for completion and/or correction. Owner shall have no responsibility for payment of same if the Application for Payment is incomplete or inaccurate.

§ 9.3.5 By signing each Application for Payment, the Contractor stipulates and certifies to the following: that the information presented is true, correct, accurate and complete; that the Contractor has made the necessary detailed examinations, audits and arithmetic verifications; that the submitted Work has been completed to the extent represented in the Applications for Payment; that the materials, equipment, and supplies identified in the Applications for Payment have been purchased, paid for and received; that the Subcontractors, Sub-subcontractors, and suppliers have been paid as identified in the Applications for Payment or that Contractor has been invoiced for same; that Contractor has made the necessary on-site inspections to confirm the accuracy of the Applications for Payment; that there are no known mechanics' or materialmens' liens outstanding at the date of this requisition; all due and payable bills with respect to the Work have been paid to date or are included in the amount requested in the current application; that, except for such bills not paid but so included, there is no known basis for the filing of any mechanics' or materialmens' liens on the Work; that the Payment Application includes only Work self-performed by

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

Contractor or for which Contractor has been invoiced; and that releases from all Subcontractors, Sub-subcontractors, suppliers, and materialmen have been obtained in such form as to constitute an effective release of lien under the laws of the State of Texas covering all Work performed and for which payment has been made by the Owner to the Contractor. Contractor understands that documents submitted to Owner become government documents under the laws of the State of Texas. Contractor further understands that falsification of Contractor's Application for Payment may constitute a violation of the penal laws of the State of Texas, including, but not limited to, Texas Penal Code Sections 32.46, 37.09, and 37.10, and may justify termination of Contractor's Contract with Owner.

§ 9.3.6 Contractor's request for payment of the retainage may be made only upon expiration of thirty (30) calendar days after Final Completion. The request shall be accompanied by the Contractor's Affidavit of Payment of Debts and Claims or a comparable affidavit on a form acceptable to Owner. This document must be executed under oath and notarized. Per Tex. Gov't Code Section 2252.032(f), on application to Owner for final payment and release of retainage, Owner may withhold retainage if there is a bona fide dispute between Owner and the Contractor and the reason for the dispute is that labor, services, or materials provided by the Contractor, or by a person under the direction or control of the Contractor, failed to comply with the express terms of the Contract or if the surety on any outstanding surety bond executed for the Contract does not agree to the release of retainage. Owner shall provide to Contractor written notice of the basis on which Owner is withholding retainage under this section.

§ 9.4 Certificates for Payment

§ 9.4.1 The Architect and Program Manager, if applicable, will, within seven (7) days after receipt of the Contractor's Application for Payment, either (1) certify, sign and issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) certify, sign and issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner in writing with a detailed statement of the Architect's reasons for withholding certification and disputing in part certification in accordance with Texas Government Code Section 2251.042(a) and as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner in writing with a detailed statement of the Architect's reason for withholding certification in whole in accordance with Texas Government Code Section 2251.042(a) and as provided in Section 9.5.1; or (4) return the Payment Application to the Contractor as provided in Section 9.3.4. Architect's written reason(s) for withholding certification shall be submitted in accordance with, and construed as, the notice required by Texas Government Code Section 2251.042 *et seq*. The Owner shall have the right to reject, modify, or approve the Architect's Certificate for Payment in whole or in part, and shall have the right to make the final determination of the payment to be made to the Contractor. The Owner shall pay the undisputed amounts certified by the Architect and Program Manager, if applicable, to the Contractor within forty-five (45) days of receipt of the Certificate for Payment from the Architect and Program Manager, if applicable, unless otherwise provided in the Contract Documents. Undisputed amounts unpaid after the date on which payment is due shall bear interest pursuant to Texas Government Code Section 2251.025.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed in writing to the Owner by the Architect. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors, Sub subcontractors, and suppliers and other data unless requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum. Such examinations, audits, and verifications, if required by the Owner, will be performed by the Owner's auditors, accountants or other representatives acting in the sole interest of the Owner. By submitting the Contractor's Applications for Payment, the Contractor is certifying that the information presented is true, correct, accurate and complete; that he has made the necessary detailed examinations, audits and arithmetic verifications; that the submitted Work has been completed to the extent represented in the Applications for Payment; that the materials and supplies identified in the previous Applications for Payment have been purchased, paid for and received; that the subcontractors have been paid as identified in the previous Applications for Payment; and that he has made the necessary on-site inspections to confirm the accuracy of the Applications for Payment; that there are no known mechanic's or material men's liens

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

outstanding at the date of requisition; that all due and payable bills with respect to the Work have been paid to date or are included in the amount requested in the current application; that except for such bills not paid but so included, there is no known basis for the filing of mechanic's or material men's liens; and that releases from all subcontractors and material men have been obtained in such form as to constitute an effective release of lien under the laws of the State of Texas causing all Work performed and for which payment has been made by the Owner to the Contractor. In certifying the Contractor's Applications for Payment, the Architect represents that he has observed the progress of the Work, critically evaluated, reviewed and certified that the amounts requested are valid and correct. The issuance of a certificate for payment shall not be a representation by the Architect that the Architect has made exhaustive or continuous on-site inspections or that the Architect has made examinations to ascertain how or for what purposes the Contractor has used amounts previously paid on account of the Contract. Such examinations, audits and verifications, if required by the Owner, will be performed by the Owner's accountants or other representatives of the Owner acting in the sole interest of the Owner. The Contractor acknowledges that the Owner may authorize minor changes to the work and that those minor changes may be funded in full or in part from contingencies or allowances which are represented in Applications for Payment and supporting documents. The Owner will rely upon the accuracy of the Application for Payment and supporting documentation furnished by the Contractor in authorizing minor changes and expenditures against Allowances. Therefore, the Contractor agrees that any arithmetic error made by the Contractor in any Application for Payment and supporting documents such as contingency logs or allowance balances shall not create an obligation on the part of the Owner to pay additional sums to correct previously approved Applications for Payment. **CONTRACTOR SHALL INDEMNIFY AND HOLD OWNER HARMLESS FROM ANY LIENS, CLAIMS, SECURITY INTERESTS OR ENCUMBRANCES FILED BY THE CONTRACTOR, SUBCONTRACTORS, OR ANYONE CLAIMING BY, THROUGH OR UNDER THE CONTRACTOR OR SUBCONTRACTOR FOR ITEMS COVERED BY PAYMENTS MADE BY THE OWNER TO CONTRACTOR.**

§ 9.4.3 The issuance of a Certificate for Payment shall constitute a recommendation to the Owner regarding the amount to be paid and shall be a prerequisite to any payment being made by the Owner to the Contractor. The Certificate of Payment is not binding on the Owner, and the Owner may rely on other provisions of the Contract Documents, as well as the Architect's Certificate, and on other information known to the Owner to determine the amount to be paid to or withheld from the Contractor.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including, but not limited to, loss resulting from acts and omissions described in Section 3.3.2, because of

- **.1** defective Work not remedied;
- **.2** third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- **.3** failure of the Contractor to make payments properly to Subcontractors, Sub subcontractors, or suppliers for labor, materials or equipment;
- **.4** reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- **.5** damage to the Owner or a Separate Contractor;
- **.6** reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;
- **.7** failure to carry out the Work in accordance with the Contract Documents;
- **.8** failure to submit a written plan indicating action by the Contractor to regain the time schedule for completion of Work within the Contract Time; or
- **.9** failure to provide any submittals or documentation required under the Contract Documents in a timely manner, including a schedule of values and a construction schedule.

§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

§ 9.5.3 When the reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.4 Notwithstanding any provision contained within this Article, if the Work has not attained Substantial Completion or Final Completion by the required dates, subject to extensions of time allowed under these General Conditions, then Architect may withhold any further Certificate for Payment to Contractor to the extent necessary to preserve sufficient funds to complete the construction of the Project and to cover liquidated damages. The Owner shall not be deemed to be in breach of the Contract Documents by reason of the withholding of any payment which Owner is entitled to withhold pursuant to any provision of the Contract Documents or withholding in reliance on any such Contract Document provision in good faith, or withholding, in good faith, in reliance on information that has come to the attention of the Owner that Owner reasonably believes constitutes sufficient reason to withhold payment, and no interest shall accrue in connection with the withheld payment(s) determined to have been properly withheld.

§ 9.5.5 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Contractor shall reflect such payment on its next Application for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment for undisputed amounts, the Owner shall review the Application for Payment and the Architect's Certificate and shall make payment or withhold payment in the manner and within the time provided in the Contract Documents, and shall notify Contractor within 21 days if Owner disputes the Architect's Certificate for Payment, pursuant to Texas Government Code Section 2251.042 et seq, listing the specific reasons for nonpayment. Payments to the Contractor shall not be construed as releasing the Contractor or his Surety from any obligations under the Contract Documents..

§ 9.6.2 The Contractor will receive the payments made by Owner and will hold such payments in trust to be applied first to the payment of Subcontractors, Sub-subcontractors, suppliers and any other parties furnishing labor, materials, equipment or services for the Work in accordance with the provisions of their subcontracts. The Contractor shall pay each Subcontractor, Sub-subcontractor, and supplier, no later than seven days after receipt of payment from the Owner and before using any part of the payment from the Owner for any other purpose, the amount to which such party is entitled, reflecting percentages actually retained from payments to the Contractor on account of such party's portion of the Work, and shall, if requested, provide the Owner with evidence of such payment. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner, and if the Owner so requests, shall provide to the Owner copies of such Subcontractor payments. If the Contractor has failed to make payment promptly to the Contractor's Subcontractors, Sub-subcontractor, or for materials or labor used in the Work for which the Owner has made payment to the Contractor, the Owner shall be entitled to withhold payment to the Contractor, in part or in whole, to the extent necessary to protect the Owner. This Section is subject to the provisions of Texas Business and Commerce Code Chapter 56, as applicable to Owner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. The Owner shall have the right at all times to contact Subcontractors, Sub subcontractors, and material and equipment suppliers to ascertain whether they have been properly paid. Progress payments may, in the discretion of Owner, be made in the form of checks payable jointly to the Contractor and such parties. In the event Owner receives any notices of non-payment from parties furnishing labor, materials, equipment or services for the Work, progress payments and/or Final Payment may, in the discretion of Owner, be made in the form of checks payable jointly to the Contractor and such parties for such amounts as the Contractor agrees or the Owner determines are due. Notwithstanding any other provision in the Contract Documents, neither the Owner nor Architect shall have an obligation to pay, or to see to

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

the payment of money to, a Subcontractor Sub-subcontractor or supplier. Action on the part of the Owner to require Contractor to pay a Subcontractor, Sub-subcontractor, or supplier shall not impose any liability on Owner.

§ 9.6.5 The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 The Contractor shall, as a condition precedent to any obligation of the Owner under the Contract, provide to the Owner payment and performance bonds in the full penal amount of the Contract in accordance with the terms and provisions of the Contract Documents, including Article 11 herein, and in accordance with Texas Government Code Chapter 2253. Payments received by the Contractor from the Owner for Work properly performed by Subcontractors, Sub subcontractors, or provided by suppliers shall be held in trust by the Contractor for the benefit of those Subcontractors, Sub subcontractors, or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner may notify the Contractor. The Contractor acknowledges that no lien rights exist with respect to public property.

§ 9.6.9 Contractor shall not withhold as a retainage a greater percentage from Subcontractors or materialmen than the percentage that Owner withheld as retainage from payments to Contractor.

§ 9.7 Failure of Payment

§ 9.7.1 Pursuant to Texas Government Code Section 2251.051, if the Owner does not pay the Contractor any payment certified by the Architect, which is undisputed, due and owing after the date the payment is due under the Contract Documents, then the Contractor may, upon ten (10) additional days' notice to the Owner and Architect that payment has not been made and the Contractor intends to suspend performance for nonpayment, may, subject to applicable law, stop the Work until payment of the undisputed amount owing has been received. If the Owner provides written notice to the Contractor that: 1) payment has been made; or 2) a bona fide dispute for payment exits, listing the specific reasons for nonpayment, then Contractor shall be liable for damages resulting from suspension of the Work. If a reason specified is that labor, services, or materials provided by the Contractor are not provided in compliance with the Contract Documents, then the Contractor shall be provided a reasonable opportunity to cure the noncompliance or to compensate Owner for any failure to cure the noncompliance. No amount shall be added to the Contract Sum as a result of a dispute between Owner and Contractor unless and until such dispute is resolved in Contractor's favor.

§ 9.7.2 If the Architect does not issue a Certificate for Payment within seven (7) days after receipt of the Contractor's Application for Payment, through no fault of the Contractor, then the Contractor shall provide written notice to the Owner, and the Owner shall have fourteen (14) Business Days after receipt of such notice to provide or obtain a Certificate for Payment. If Owner fails to provide or obtain the Certificate for Payment, then the Contractor may, upon fourteen (14) additional Business Days' written notice to the Owner and Architect, stop the Work until payment of the undisputed amount owing has been received.

§ 9.7.3 If the Owner is entitled to reimbursement or payment from the Contractor under or pursuant to the Contract Documents, such payment shall be made promptly upon demand by the Owner. Notwithstanding anything contained in the Contract Documents to the contrary, if the Contractor fails to promptly make any payment due to Owner, pursuant to the Contract, or the Owner incurs any costs or expenses to cure any default of the Contractor or to correct defective Work, then the Owner shall have an absolute right to offset such amount against the Contract Sum and may, in the Owner's sole discretion and without waiving any other remedies, elect either to:

.1 deduct an amount equal to that to which the Owner is entitled from any payment then or thereafter due to Contractor from the Owner; or

.2 issue a written notice to the Contractor reducing the Contract Sum by an amount equal to that to which the Owner is entitled.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use; all Project systems included in the Work or designated portion thereof have been successfully tested and are fully operational; system demonstrations have been performed; and a certificate of occupancy shall have been issued before Substantial Completion can be achieved. The Work will not be considered suitable for Substantial Completion review until all required governmental inspections and certifications required of the Work have been made, approved, and posted; designated initial demonstration and instruction of Owner's personnel in the operation of Project systems has been completed; all final finishes set out within the Contract Documents are in place as required by the Specifications, and there shall have been a completion of and acceptance by Owner of all major punch-list items and a majority of minor items are of a cosmetic nature, so that the Owner could occupy or otherwise utilize the Project on that date and the completion of the Work by the Contractor would not materially interfere or hamper the Owner's (or those claiming by, through or under the Owner) normal business operations. All work that could interfere with the Owner's use following Substantial Completion shall be performed by the Contractor after hours at no additional expense to the Owner. As a further condition of Substantial Completion acceptance, the Contractor shall certify that all remaining Work will be completed by the date of Final Completion stated in the Contract Documents. In the event Substantial Completion is not achieved by the designated date, or as it may be extended, Owner may withhold payment of any further sums due until Substantial Completion is achieved. Owner shall also be entitled to deduct out of any sums due to Contractor any or all Liquidated Damages due Owner in accordance with the Contract Documents. In addition to the requirements of the Contract Documents, it is expressly understood that the establishment of Substantial Completion is subject to the following:

1. All fire alarm system components must be completed and demonstrated to the Owner.
2. Local fire marshal approval certificate must be delivered to the Owner.
3. All Project systems included in the Work or designated portion thereof have been successfully tested and are fully operational.
4. All HVAC air and water balancing must be complete.
5. All Energy Management Systems must be complete and fully operational and demonstrated to the Owner.
6. All school communications equipment, building security/access control, and telephone systems must be complete and demonstrated to the Owner.
7. All final lockset cores and keys must be installed, transmitted to the Owner, and labeled with a bitting list.
8. All room plaques, signage, and wayfinding signage must be complete.
9. All Owner demonstrations and training must be completed, including kitchen equipment, HVAC equipment, plumbing equipment, and electrical equipment.
10. All final finishes set out within the Contract Documents are in place as required by the Specifications.
11. All exterior clean-up and landscaping must be complete.
12. All final interior clean-up must be complete.
13. A final Certificate of Occupancy and/or Certificate of Completion conforming to the requirements of the location jurisdictional authority must be signed by the Contractor and delivered to the Owner.
14. All operation and maintenance manuals must be submitted to the Architect, approved by the Architect, and delivered to the Owner.
15. Temporary facilities and utility services have been removed.
16. If required, Flood elevation certificate furnished and accepted by all authorities having jurisdiction, including but not limited to the County in which the Project is located.
17. If required, Windstorm (WPI-8) certificate furnished and accepted by all authorities having jurisdiction, including but not limited to the County in which the Project is located.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall, using the Owner's Project Management Software, prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to Final Payment. The punch list shall contain an area or room description, and a photograph of each deficiency listed in the punch list and a space for contractor and architect to individually indicate the date of the correction and observation of the correction, respectively. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. The Architect and/or Owner shall have the right to add additional items to be completed or corrected to the comprehensive list submitted by the Contractor.

§ 9.8.2.1 The Contractor's Project Manager or superintendent shall participate in the preparation of the Contractor's punch list that is submitted to the Architect and Owner for supplementation. Upon receipt, the Architect shall

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

perform a spot review to determine the adequacy and completeness of the Contractor's punch list. Should the Architect determine that the Contractor's punch list lacks sufficient detail or requires extensive supplementation, the punch list will be returned to the Contractor for further inspection and revision. The date of Substantial Completion will be delayed until the punch list submitted is a reasonable representation of the Work to be done.

§ 9.8.2.2 Upon receipt of an acceptable Contractor's punch list, the Contractor's Superintendent or Project Manager shall accompany the Architect, his Consultants and the Owner (at his discretion) during their inspections and the preparation of verbal or written additions to the Contractor's punch list. The Contractor's Project Manager or Superintendent shall record or otherwise take notes of all supplementary items and incorporate into the Final Punch List. A typed addition to the supplements to the punch list will be made by the Contractor. This procedure will produce a Final Punch List that has the Contractor's, Architect's, Consultant's and Owner's comments incorporated in only one list using the Owner's Project Management Software. Delay in the preparation of the Final Punch List shall not be cause for a claim for additional cost or extension of time as the Contractor's superintendent shall have been in attendance during the inspections of the Architect and its consultants and will have been expected to have taken appropriate own notes.

§ 9.8.2.3 The Contractor's Project Manager or Superintendent shall have been in attendance during the inspections of the Architect and his Consultants and will have been expected to take his own notes for addition to the Final Punch List.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, then the Architect shall so notify the Contractor and Owner in writing, and the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect or Owner. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion. Architect is obligated under the agreement between Owner and Architect to make only a limited number of site visits to determine dates of Substantial Completion. Any fee which Owner incurs for additional site visits of Architect for determination of Substantial Completion will be at the expense of Contractor. Owner will deduct amount of Architect's compensation for re-inspection services from Final Payment or, at the Owner's discretion, may require the Contractor to reimburse the Owner for such costs directly.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare, sign, and issue to Owner a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the Final Punch List accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate.

§ 9.8.5.1 After the date of Substantial Completion of the Project as evidenced by the Certificate of Substantial Completion, the work to correct all deficiencies contained in the punch list attached to the Certificate of Substantial Completion shall be completed by the date set forth in the Agreement, or by such dates thereafter as may be established in any written extensions granted under Article 8 of the General Conditions. Failure by the Contractor to complete such corrections within the stipulated time will be reported to the Contractor's surety. In the report of deficiency the Contractor and surety will be informed that, should correction remain incomplete for ninety (90) additional days, the Owner will initiate action to complete corrective work out of the remaining contract funds in accordance with Article 14.2. Additional costs of the Owner, Architect, and other consultants incurred because of the Contractor's failure to complete the correction of deficiencies by the date set forth in the Agreement, or by such dates thereafter as may be established in any written extensions granted under Article 8 of the General Conditions, will be deducted from the funds remaining to be paid to the Contractor. Should corrective work following Substantial Completion require more than one re-inspection after notification by the Contractor that corrections are complete; the cost of subsequent inspections shall also be deducted from funds remaining unpaid to the Contractor.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

§ 9.8.5.2 The issuance of a Partial Certificate of Substantial Completion shall not relieve the Contractor from the obligation to obtain Substantial Completion for the portions of the project not included in the Partial Certificate of Substantial Completion by the dates indicated in this Agreement. The issuance of a Partial Certificate of Substantial Completion shall not relieve the Contractor from the assessment of liquidated damages for the portions of the project not included in the Partial Certificate of Substantial Completion by the dates indicated in this Agreement.

§ 9.8.6 Retainage is not due to the Contractor until thirty-one (31) days after Final Completion of the Work as set out in Section 9.10. After the Certificate of Substantial Completion is accepted by the Owner, the Owner may, at its sole discretion and upon acceptance and consent of surety, make payment of retainage on all or a part of the Work accepted. Final Completion includes submittal of all required closeout and record documents The Contractor's request for retainage payment shall be accompanied by the Contractor's Affidavit of Payment of Debts and Claims or a comparable affidavit on a form acceptable to Owner. This document must be executed under oath and notarized.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer, if such consent is necessary, and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided that the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect and Owner as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect or Owner. Contractor agrees that the Owner may place and install as much equipment and furnishings as is possible before completion or partial completion of portions of the Work.

§ 9.9.2 Immediately prior to such partial occupancy, use, or installation, the Owner, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon in writing, partial occupancy or use of a portion or portions of the Work or installation of furnishings and equipment shall not constitute acceptance of Work not complying with the requirements of the Contract Documents nor shall it constitute evidence of Substantial Completion or Final Completion.

§ 9.9.4 In the event that Owner takes partial occupancy or installs furnishings and equipment prior to Substantial Completion of the Project, Contractor shall obtain an endorsement to Contractor's Builder's Risk Policy to provide extended coverage for partial occupancy if the Contractor's Builder's Risk Coverage required by Article 11 would not otherwise provide such coverage.

§ 9.9.5 Non-Triggering of Substantial Completion by Owner Occupancy: The parties expressly acknowledge and agree that any occupancy or use of the Project, or any portion thereof, by the Owner prior to formal acknowledgment of Substantial Completion as defined in the Contract Documents does not constitute or imply the attainment of Substantial Completion. Any necessity or decision by the Owner to occupy the Project, or any portion thereof, prior to the Contractor's full completion of all contractual obligations does not accelerate or alter the Contractor's duties or the standards for Substantial Completion. The Contractor remains fully obligated to achieve Substantial Completion according to the terms set forth in the Contract Documents, irrespective of any such early occupancy or use by the Owner. The Owner's occupancy, whether full or partial, will not trigger or cause Substantial Completion or affect any rights or obligations that arise upon Substantial Completion, including but not limited to, commencement of any warranties or guarantees, or the period for final completion.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 When all of the Work is finally completed and all required documentation has been submitted, and the Contractor is ready for a final inspection, it shall notify the Owner and the Architect thereof in writing. Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance, the Architect will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

Contract fully performed, the Contractor shall issue its final Application for Payment. Upon the Architect's agreement and approval, the Architect will promptly prepare, sign, and issue a Owner's Certificate of Final Completion and final Certificate for Payment certifying to the Owner that best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance, including all retainage, found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled. Owner may rely on other provisions of the Contract Documents, as well as the Architect's certifications, in determining the payment to be made to Contractor. Final Payment shall be made by the Owner in accordance with Owner's regular schedule for payments. The Architect is obligated under the agreement between Owner and Architect to make only a limited number of site visits to determine Final Completion. Any fee which Owner incurs for additional site visits of Architect for determination of Final Completion will be at the expense of Contractor. Owner will deduct amount of Architect's compensation for re-inspection services from final payment or, at the Owner's discretion, may require the Contractor to reimburse the Owner for such costs directly.

§ 9.10.2 Neither Final Payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) using AIA Document G706, an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) evidence satisfactory to Owner that insurance required by the Contract Documents to remain in force after Final Payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) using AIA Document G707, Consent of Surety, if any, to Final Payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) except for amounts currently withheld by the Owner, other data establishing payment or satisfaction of obligations, such as AIA Document G706A, notarized subcontractor lien releases, and other receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract or the Work, to the extent and in such form as may be designated by the Owner. If a Subcontractor, Sub-subcontractor, or supplier refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees. In addition, the following items must be completed and received by the Owner before Final Payment will be due:

.1 Written certifications required by Sections 10.5, 10.6, and 10.7.
.2 Final List of Subcontractors (AIA Document G705);
.3 Contractor's certificate(s) required by 19 Tex. Admin. Code 61.1036-61.1040, as applicable;
.4 Contractor's and other required warranties, organized as required elsewhere in the Contract Documents;
.5 Maintenance and Instruction Manuals;
.6 Owner's Final Completion Certificate; and
.7 Record drawings and "as built" drawings as required elsewhere in the Contract Documents.

Documents identified as affidavits must be notarized. All manuals will contain an index listing the information submitted. The index section will be divided and identified by tabbing each section as listed in the index. Upon request, the Architect will furnish the Contractor with blank copies of the forms listed above. Final Payment shall be paid by the Owner to the Contractor within thirty (30) days after Owner's Board of Trustees has voted to accept the Work and approve Final Payment, unless otherwise delegated.

Owner, Architect, Contractor, and prime subcontractors, if applicable, shall certify compliance with all applicable school facility standards required in 19 TAC Section 61.1040 subsections (d) and (g)-(k). 19 TAC Section 61.1040(f).

Per 19 TAC Section 61.1040(6)(f)(C), Contractor shall certify the following:

(i) Process certifications. To ensure construction quality and performance of contract terms, the Contractor and prime subcontractors, if applicable, shall certify compliance that the Project has been built in conformance with the contract documents.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

(ii) Certifications related to construction quality standards under subsection (j) of 19 TAC Section 61.1040.

To ensure compliance with construction quality standards, the Contractor and prime subcontractors, if applicable, shall certify compliance at the completion of a capital improvement project that the Project has been built in conformance with the contract terms and performance standards specified by the Contract Documents for the Contractor and for any of its subcontractors or subconsultants of any tier, which shall include certification of compliance with any subsequent change order documents approved by the Owner and Architect.

Where a third-party code compliance officer is required by subsection (j) of 19 TAC Section 61.1040 to ensure that a third-party code compliance officer does not find any violations of the provisions of the required construction codes identified in subsection (j)(1) of 19 TAC Section 61.1040 that are not enforced by a state or local authority having jurisdiction, Owner shall require that a third-party code compliance officer issue a third-party certificate of occupancy. Where a local authority having jurisdiction enforces some of the required construction codes, a third-party code compliance officer shall not issue a third-party certificate of occupancy until either the local authority having jurisdiction has issued a certificate of occupancy or the local authority having jurisdiction indicates in writing to the third-party code compliance officer that the local authority having jurisdiction does not issue certificates of occupancy.

Certifications related to safety and security standards under subsection (k) of 19 TAC Section 61.1040. To provide a safe and secure environment, the Contractor and prime subcontractors, if applicable, shall certify compliance that the Project has been built in reasonable accordance with the safety and security directives provided by the school district and reflected in the Contract Documents prepared by the Architect.

Special provisions for a Construction Manager-Agent. For projects that use the construction manager agent contracting method established in Texas Government Code Chapter 2269, Subchapter E, the Construction Manager Agent and each construction prime contractor must provide certification in accordance with clause (i) of 19 TAC Section 61.1040, and each shall certify the scope of work for which they are contractually responsible.

§ 9.10.3 If, after Substantial Completion of the Work, Final Completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting Final Completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect and, if necessary, written consent of the surety, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted, less retainage. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing Final Payment, except that it shall not constitute a waiver of Claims by Owner. Nothing in this subsection is intended to limit or reduce Owner's rights and remedies in the event of a Contractor default.

§ 9.10.4 The making of Final Payment shall not constitute a waiver of Claims by the Owner.

§ 9.10.5 Acceptance of Final Payment by the Contractor, a Subcontractor, Sub-subcontractor, or a supplier, shall constitute a waiver of claims by that payee except those previously asserted pursuant to Article 15 made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

§ 10.1.1 The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract and shall conform to all provisions of the "Manual of Accident Prevention in Construction", published by the Associated General Contractors of America, Inc., latest edition, and the Contractor further agrees to fully comply with all safety standards required by the Occupational Safety and Health Administration ("OSHA") 29 USC Section 651 et seq., and all amendments thereto. However, the Contractor's performance of its obligations under Article 10 shall not relieve any Subcontractor, Sub-subcontractor, supplier, or any other person or entity, of their responsibilities for the safety of persons and property and for compliance with all applicable federal, state and local laws, rules, regulations, and ordinances, nor shall any such party be relieved from the obligation to provide for the safety of their employees, persons and property and their requirements to maintain a work environment free of recognized hazards.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

§ 10.1.2 Contractor's employees, agents, Subcontractors, Sub-subcontractors, suppliers or anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, shall not perform any service for Owner while under the influence of any amount of alcohol or any controlled substance, or use, possess, distribute, or sell alcoholic beverages while on Owner's premises. No person shall use, possess, distribute, or sell illicit or unprescribed controlled drugs or drug paraphernalia; misuse legitimate prescription drugs; or act in contravention of warnings on medications while performing the Work or on Owner's premises.

§ 10.1.3 Contractor has adopted or will adopt its own policy to assure a drug-free and alcohol-free workplace while on Owner's premises or performing the Work. Contractor will remove any of its employees, agents, Subcontractors, Sub-subcontractors, suppliers, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, from performing the Work any time there is suspicion of alcohol and/or drug use, possession, or impairment involving such person, and at any time an incident occurs where drug or alcohol use could have been a contributing factor. Owner has the right to require Contractor to remove any person from performing the Work any time cause exists to suspect alcohol or drug use. In such cases, the person so removed may only be considered for return to work after the Contractor certifies as a result of a for-cause test, conducted immediately following removal that said person was in compliance with this Contract. Contractor will not use any person to perform the Work who fails or refuses to take, or tests positive on, any for-cause alcohol or drug test.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to

.1 employees on the Work, school personnel, students, and other persons on or off Owner's premises who may be affected thereby, including the installation of fencing between the Work site and the occupied portion of a connecting or adjacent educational or other facility;

.2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, a Sub-subcontractor, or a supplier; and

.3 other property at the site or adjacent thereto, such as other buildings and their contents, fencing, trees, shrubs, lawns, walks, athletic fields, facilities and tracks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

The Contractor shall also do all things necessary to protect the Owner's premises and all persons from damage and injury, when all or a portion of the Work is suspended for any reason. Contractor's obligations under Section 10.2 as to each portion of the Project shall continue until Owner takes full possession of and occupies that portion of the Project.

§ 10.2.2 The Contractor shall comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, bearing on safety of persons or property or their protection from damage, injury, or loss. The Contractor shall promptly report in writing to the Owner and Architect all accidents arising out of or in connection with the Work which cause death, bodily injury, or property damage, giving full details and statements of any witnesses. In addition, if death, serious bodily injuries, or serious property damages are caused, the accident shall be reported immediately by telephone or messenger to the Owner and the Architect.

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including installing fencing, posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards. The Contractor shall also be responsible, at the Contractor's sole cost and expense, for all measures necessary to protect any property adjacent to the Project and improvements therein. Any damage to such property or improvements shall be promptly repaired by the Contractor. Contractor shall provide reasonable fall protection safeguards and provide approved fall protection safety equipment for use by all exposed Contractor employees.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel and shall only conduct such activities after giving reasonable advance written notice of the presence or use of such materials, equipment or methods to Owner and Architect. The storage

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

of explosives on Owner's property is prohibited. The use of explosive materials on Owner's property is prohibited unless expressly approved in advance in writing by Owner and Architect..

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not load or permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 The Contractor shall be responsible for taking all precautions necessary to protect the Work in place from any foreseeable weather conditions which could cause any potential damage to portions or all Work in place or to other portions of the Project. The Contractor shall be responsible for performing all repairs and/or replacement of any Work that results from foreseeable weather conditions, and shall also be responsible for all repairs and/or replacement of any other portions of the Project to the extent such repairs and/or replacement are required as a result of Contractor's failure to properly secure the Work or otherwise take precautions with respect to the Work as required under this Section 10.2.8.

§ 10.2.9 Injury or Damage to Person or Property
If either party to the Contract suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts and omissions such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding twenty-one (21) days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter. Provided, however, Contractor understands that, under Texas law, Owner has tort immunity.

§ 10.2.10 The performance of the foregoing services shall not relieve the Subcontractors of their responsibilities for the safety of persons and property and for compliance with all applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to the conduct of the Work.

§ 10.2.11 The Contractor shall be responsible for taking all precautions necessary to protect the Work in place from any foreseeable weather conditions which could cause any potential damage to portions or all Work in place. The Contractor shall be responsible for performing all repairs and/or replacement of any Work that results from foreseeable weather conditions.

§ 10.3 Hazardous Materials and Substances
§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner and Architect of the condition. The Contractor shall have no responsibility to initially discover the presence of such hazardous materials on the project site, but shall have an affirmative duty to immediately report to the Owner the existence of such materials actually known by the Contractor or the Contractor's subcontractors to be present on the project site. Provided, however, that these limitations shall not apply if the Contractor places or allows such hazardous materials to be placed on the Project site. If Contractor encounters polychlorinated biphenyl (PCB), and the specifications require the PCB's removal, the Contractor shall remove the PCB and store it in marked containers at the jobsite provided by the

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

Owner. If PCBs are found which are leaking, then Contractor shall stop work on the affected fixture and shall contact Owner for removal and disposal of the leaking PCBs.

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume within a reasonable time to be determined upon written agreement of the Owner and Contractor. The Contractor may be entitled to an equitable adjustment regarding the Date of Substantial Completion and/or Final Completion to the extent of any delay directly attributable to efforts to remove or safely contain a material or substance as required hereunder. If Contractor is engaged by Owner to remove and/or contain a material or substance as required under Section 10.3, Owner and Contractor shall mutually agree, in writing, on a Change Order to reflect payment for such work.

§ 10.3.3 IF CONTRACTOR IMPORTS HAZARDOUS MATERIALS ONTO THE PROJECT SITE, THEN CONTRACTOR HEREBY AGREES TO DEFEND, INDEMNIFY AND HOLD HARMLESS THE OWNER, ITS CONSULTANTS, TRUSTEES, OFFICERS, AGENTS AND EMPLOYEES, AGAINST ANY CLAIMS ARISING OUT OF OR RELATED TO SUCH IMPORTATION, INCLUDING BUT NOT LIMITED TO COSTS AND EXPENSES THE OWNER INCURS FOR REMEDIATION OF A MATERIAL OR SUBSTANCE THE CONTRACTOR BRINGS TO THE SITE, AS PROVIDED FOR IN SECTION 3.18.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all actual cost and expense thereby incurred.

§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

§ 10.5 Materials Containing Asbestos, Lead or PCB's

§ 10.5.1 As part of submittals under the section in the Project Manual related to Contract Closeout, and prior to Final Payment and payment of retainage, the Contractor and, as applicable, each Subcontractor, Sub-subcontractor and supplier shall submit all applicable Safety Data Sheets (SDS) and a notarized statement on company or other official letterhead certifying to the best of their information, knowledge and belief, that no lead, asbestos, asbestos-containing (or, under reasonably foreseeable conditions, releasing) materials or PCBs in excess of amounts allowed by Local/State standards, laws, codes, rules and regulations; the Federal Environmental Protection Agency (EPA) standards and/or the Federal Occupational Safety and Health Administration (OSHA) standards, whichever is most restrictive, have been used or incorporated into the Work, and lead or lead-bearing (or, under reasonably foreseeable conditions, releasing) materials have not been incorporated into potable water systems. As used in this statement, the term "potable water systems" shall include, without limitation, those water systems for drinking fountains, all sinks, showers, bath tubs, residential and commercial kitchen equipment, ice machines, and hose bibs, as applicable

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

to the Project. The notarized statement shall further state that, should any such materials be found in any of the Work in contravention of the notarized statement, then Contractor shall be responsible for taking all necessary corrective action to remove those materials from the Work, at no additional cost to the Owner. The notarized statement shall be dated, shall reference this specific Project, and shall be signed by not less than two (2) officers of the Contractor or the applicable Subcontractor, Sub-subcontractor, or supplier.

§ 10.5.2 To the best knowledge of the Owner, the Architect and his consultants, no products or materials containing asbestos or polychlorinated biphenyl (PCB) or other toxic substances have been specified for this Project. In the event the Contractor, its Subcontractors, Sub-subcontractors, or suppliers become aware that any products or materials specified, ordered, scheduled for or already incorporated in the Work on this Project, contain any hazardous material, whether stated in the Contract Documents or not, the situation shall be reported immediately to the Owner and Architect in writing. An acceptable, equal substitute for the product or material in question shall be proposed by the Contractor, and the product or material in question, if already onsite or incorporated in the Work, shall be removed from the site immediately and returned to the supplier or manufacturer.

§ 10.5.3 Final Payment and payment of retainage shall not be made until the information and notarized statements required under Section 10.5 have been received by Owner.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, its trustees, officers, employees, agents, and representatives, Architect, and Architect's consultants, the Program Manager, if applicable, shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

§ 11.1.2 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 11.1.3 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance. Without limiting or waiving Owner's right to earlier notice of any modification, termination, or expiration of insurance coverages as provided in the Contract Documents, immediately upon the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation, expiration, or other lapse,. Upon receipt of written notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Owner's Insurance

§ 11.2.1 The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner shall be responsible for purchasing and maintaining property and casualty insurance no later than the date of Substantial Completion and such dates of Owner responsibility shall be documented in the Certificate of Substantial Completion. If Owner occupies or uses any completed or partially-completed portion of the Work at any stage, then such occupancy or use must be consented to by the insurer and authorized by public authorities having jurisdiction over the Work. To the extent of overlap between Owner's property insurance and Contractor's builder's risk insurance, if any, Contractor's builder's risk shall be primary and non-contributory.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If the Contract Documents specify, or the Architect or Owner requests, that certain Work shall not be covered until the Architect has had an opportunity to examine such Work, the Contractor shall notify the Architect in writing a minimum of 48 hours prior to covering up any such Work in progress in order for the Architect to make proper field observations of the Work in place. The Contractor shall place no concrete, fill-in ditches, or cover up walls or ceilings without first contacting the Architect as noted above and receiving approval. If a portion of the Work is covered contrary to the Architect's or Owner's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect or Owner, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered and the Contract Documents do not specify otherwise and the Architect or Owner has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor may be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate for the actual cost to uncover and replace such Work. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, and replacement, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense. The Owner may make emergency repairs to the Work or take such other measures necessary under the circumstances, if the Contractor does not promptly respond to a notice of defect or nonconforming Work. Contractor shall be responsible to Owner for this cost if the reason for the repairs is attributable to the Contractor. If payments then or thereafter due to the Contractor are not sufficient to cover such costs, then the Contractor shall pay the difference to the Owner on demand.

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the entire Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such nonconforming condition. The Owner shall give such notice promptly after discovery of the condition. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5. Nothing contained in this Section 12.2 is intended to limit or modify any obligations under the law or under the Contract Documents, including any warranty obligations, expressed or implied.

§ 12.2.2.1.1 If the Contractor fails to perform the corrective Work, then Owner may perform corrective Work, at Contractor's cost. If Owner performs corrective Work, then Owner may, but is not obligated to, also remove nonconforming Work and store the salvageable materials or equipment at Contractor's expense. If the Contractor does not pay all costs incurred by Owner within ten (10) days after written notice, then Owner may, upon ten (10) additional days' written notice, sell the removed materials and equipment in accordance with Owner's policies, and shall account for the proceeds thereof, after deducting costs and damages that should have been borne by the Contractor, including compensation for the Architect's services and expenses made necessary thereby. If such proceeds of sale do not cover costs which the Contractor should have borne, then the Contractor shall pay the difference to the Owner.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

§ 12.2.2.3 The one-year period for correction of Work shall be extended by corrective Work performed by the Contractor pursuant to this Section 12.2, but only as to that corrected Work.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.2.6 Contractor shall replace, repair, or restore any parts of the Project or furniture, fixtures, equipment, or other items placed therein (whether by Owner or any other party) that are injured or damaged by any such parts of the Work that do not conform to the requirements of the Contract Documents or by defects in the Work.

§ 12.2.7 The provisions of this Section 12.2 apply to Work done by Subcontractors and Sub-subcontractors of the Contractor as well as Work done directly by employees of the Contractor. The provisions of this Section 12.2 shall not apply to corrective work attributable solely to the acts or omissions of any Separate Contractor of Owner (unless Contractor is acting in such capacities). The cost to Contractor of performing any of its obligations under this Section 12.2 to the extent not covered by insurance shall be borne by Contractor.

§ 12.2.8 If, however, Owner and Contractor deem it inexpedient to require the correction of Work damaged or not done in accordance with the Contract Documents, then an equitable deduction from the Contract Sum shall be made by agreement between Contractor and Owner. Until such agreement, Owner may withhold such sums as Owner deems just and reasonable from moneys, if any, due Contractor. The agreement shall not be unreasonably delayed by the Owner and the amount of money withheld shall be based on estimated actual cost of the correction to Owner.

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not Final Payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the laws of the State of Texas, and any litigation shall be conducted in state district court. Mandatory and exclusive venue for any disputes shall be in Montgomery County, or, if no county is specified, then the county in which the Owner's main administrative office is located.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to the other party hereto and to partners, successors, assigns and legal representatives of such other party in respect to covenants, agreements, and obligations contained in the Contract Documents. Except as expressly provided otherwise in the Contract Documents, neither party to the Contract shall assign the Contract, in whole or in part, without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The invalidity of any part or provision of the Contract Documents shall not impair or affect in any manner whatsoever the validity, enforceability or effect of the remainder of the Contact Documents.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

§ 13.3 Rights and Remedies

§ 13.3.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

§ 13.3.2 No action or failure to act by the Owner, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made at appropriate times as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities having jurisdiction. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals, which shall be included in the Cost of the Work. Provided, however, per Texas Government Code Chapter 2269, Owner shall bear all costs of inspection services, the testing of construction materials engineering, and the verification testing services necessary for acceptance of the facility by the Owner with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded.

§ 13.4.2 If the Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including, but not limited to, those of repeated procedures and compensation for the Architect's services and expenses, shall be at the Contractor's expense.

§ 13.4.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect, with copy to the Owner.

§ 13.4.5 If the Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.5 Interest

Undisputed payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate provided by Texas Government Code Section 2251.025. Any such payment shall be deemed overdue on the thirty-first day after Owner received Architect's invoice or Contractor's Certificate for Payment from the Architect, if Owner's Board of Trustees meets more than once per month. Any such payment shall be deemed overdue on the forty-sixth day after Owner receives Architect's invoice or Contractor's Certificate for Payment from the Architect, if Owner's Board of Trustees meets once a month or less frequently. No interest shall be due on sums properly retained by Owner, except as provided by law, or on disputed sums unpaid by Owner.

§ 13.6 Equal Opportunity in Employment

§ 13.6.1 The Contractor and the Contractor's Subcontractors and Sub-subcontractors shall not discriminate against any employee or applicant for employment in the performance of the Agreement, with respect to hire, tenure, terms, conditions and privileges of employment, or a matter directly or indirectly related to employment, because of race, color, religion, age (except where based on a bona fide occupational qualification), disability, sex except where based on a bona fide occupational qualification), national origin, ancestry, or any other basis protected by law. The

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

Contractor agrees to post in conspicuous places, available to employees and applicants, notices setting forth the Contractor's nondiscrimination policies. Contractor further agrees that every subcontract entered into for the performance of the Agreement will contain a provision requiring non-discrimination in employment herein specified. Breach of this covenant may be regarded as a material breach of the Agreement.

§ 13.6.2 The Contractor and the Contractor's Subcontractors and Sub-subcontractors shall, in all solicitations or advertisements for employees placed by them or on their behalf, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, age, disability, sex, national origin, ancestry, or any other basis protected by law.

§ 13.7 Records

§ 13.7.1 Contractor shall at all times through the date of Final Completion, maintain Job Records, including, but not limited to, invoices, payment records, payroll records, daily reports, diaries, logs, instructions, drawings, receipts, subcontracts, purchase orders, vouchers, memoranda, other financial data and job meeting minutes applicable to the Project, in a manner which maintains the integrity of the documents. Job Records must be retained by Contractor for at least twelve (12) years after the date of Final Completion of the Project. Within ten (10) days of Owner's request, Contractor shall make such Job Records available for inspection, copying and auditing by the Owner, Architect or their respective representatives, at Owner's central office.

§ 13.7.2 If Contractor is a Construction Manager at Risk, then Contractor shall also maintain, in accordance with the provisions of Section 13.7.1, the following: subcontract files, including proposals of successful and unsuccessful bidders, bid recaps and subcontractor payments; original estimates; estimating work sheets; general ledger entries detailing cash and trade discounts received; insurance rebates and dividends; and any other supporting evidence deemed necessary by the Owner to substantiate charges related to the Contract.

§ 13.7.3 Contractor shall keep a full and detailed financial accounting system and shall exercise such controls as may be necessary for proper financial management under this Contract; the accounting and control systems shall be satisfactory to the Owner and shall be subject to the provisions of Section 13.7.1.

§ 13.7.4 Contractor shall keep all Construction Documents related to the Project, subject to the provisions of Section 13.7.1, provided, however, Contractor shall not destroy said documents until Contractor has confirmed with Owner in writing that Owner has obtained a copy of all as-built drawings.

§ 13.7.5 In the event that an audit by the Owner reveals any errors/overpayments by the Owner, then the Contractor shall refund to the Owner the full amount of such overpayments within thirty (30) days of such audit findings, or the Owner, at its option, reserves the right to deduct such amounts owed to the Owner from any payments due to the Contractor.

§ 13.8 Proprietary Interests and Confidential Information

§ 13.8.1 Neither Architect nor Contractor shall use the image or likeness of Owner's Project or Owner's official logo or emblem and any other trademark, service mark, or copyrighted or otherwise protected information of Owner, without Owner's prior written consent. Contractor and Architect shall not have any authority to advertise or claim that Owner endorses Architect or Contractor's services, without Owner's prior written consent.

§ 13.8.2 Neither Architect nor Contractor shall disclose any confidential information which comes into the possession of Architect or Contractor at any time during the Project, including but not limited to, the location and deployment of security devices, security access codes, student likenesses, student record information or employee information.

§ 13.8.3 The parties acknowledge that, as a public entity in the State of Texas, Owner is subject to, and must comply with, certain open records laws and other disclosure requirements, including, but not limited to, the Texas Public Information Act, Texas Government Code Chapter 552, et seq., subpoenas, and court orders. Nothing in the Contract shall be construed as prohibiting Owner from disclosing any information related to or in connection with the Contract in accordance with such requirements, and Contractor hereby waives any claim against and releases from liability Owner, its trustees, officers, employees, agents, and attorneys with respect to any such disclosure.

§ 13.9 The Architect may appoint an employee or other person to assist it during the construction. These representatives will be instructed to assist the Contractor in interpreting the Contract Documents; however, such

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

assistance shall not relieve the Contractor from any responsibility as set forth by the Contract Documents. The fact that the Architect's Representative may have allowed Work not in accordance with the Contract Documents shall not prevent the Architect or the Owner from insisting that the faulty Work be corrected to conform with the Contract Documents and the Contractor shall correct same.

§ 13.10 The Contractor and its employees, agents, consultants, suppliers and subcontractors shall abide by all Owner policies and procedures regarding campus access.

§ 13.11 Contractor hereby certifies that it is not a company identified on the Texas Comptroller's list of companies known to have contracts with, or provide supplies or services to, a foreign organization designated as a Foreign Terrorist Organization by the U.S. Secretary of State under federal law. Contractor hereby certifies and verifies that neither it, nor any of its affiliates, subsidiaries, or its parent company, if any (the "Contractor Companies"), boycott Israel, and Contractor agrees that it and the Contractor Companies will not boycott Israel during the term of the Contract. For purposes of the Contract, the term "boycott" shall mean and include refusing to deal with, terminating business activities with, or otherwise taking any action that is intended to penalize, inflict economic harm on, or limit commercial relations specifically with Israel, or with a person or entity doing business in Israel or in an Israeli-controlled territory, but does not include an action made for ordinary business purposes.

§ 13.12 In accordance with Texas Government Code § 2269.054, the Contract Documents shall not be construed to deny or diminish the right of any person to work because of the person's membership or other relationship status with respect to any organization.

It is expressly understood that this Contract is not written for the benefit of third parties.

§13.12 Certificate of Nonsegregated Facility

§13.12.1 This section is applicable to Contracts and Subcontracts exceeding $10,000.00 that are not exempt from the provisions of the Equal Opportunity Clause.

§13.12.2 By the signing of this Contract, the Contractor signifies that it does not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. It certifies further that it will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it will not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The undersigned agrees that a violation of this certification constitutes a breach of this Contract. As used in this certification, the term "segregated facilities" means any waiting rooms, Work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise. The Contractor further agrees that (except where it obtained identical certifications from proposed consultants for specific time period) it will obtain identical certifications from proposed Subcontractors prior to the award of a contract exceeding $10,000.00 that are not exempt from the provisions of the Equal Opportunity Clause; that it will retain such certifications in its files; and that it will forward the following notice to such proposed Subcontractors (except where the proposed Subcontractors have submitted identical certifications for specific time periods): Notice to Prospective Subcontractors of requirement for certification of nonsegregated facilities. A certification of nonsegregated facilities, as required by the May 19, 1967 Order (32 FR 7439, May 19, 1967) on elimination of segregated facilities, by the Secretary of Labor, must be submitted prior to the award of a contract exceeding $10,000.00 which is not exempt from the provisions of the Equal Opportunity Clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually). The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.11.

§ 13.13 In accordance with Texas Business & Commerce Code § 116.0001, as soon as practicable after beginning construction of the project, Contractor shall visibly post the following information at the entrance to the construction site: (1) the name and contact information of the Contractor; and (2) a brief description of the project.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of ninety (90) consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

.1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;

.2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped;

.3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment of undisputed sums due on an approved Certificate for Payment within the time stated in the Contract Documents; or

.4 The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, then, after the applicable time period, the Contractor may, upon ten (10) business days' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed and for proven unrecoverable loss with respect to materials, equipment, tools, and construction equipment and machinery incurred to the date of termination.

§ 14.1.4 If the Work is stopped for a period of ninety (90) consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters material to the progress of the Work, the Contractor may, upon twenty (20) additional business days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

.1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;

.2 fails to make payment to Subcontractors, Sub subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors, Sub subcontractors or suppliers;

.3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority;

.4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

.5 fails to furnish the Owner, upon request, with assurances satisfactory to the Owner, evidencing the Contractor's ability to complete the Work in compliance with all the requirements of the Contract Documents;

.6 engages in worker misconduct in violation of Article 3.3.2 or engages in conduct that would constitute a violation of state or federal criminal law, including but not limited to, the laws prohibiting certain gifts to public servants, or engages in conduct that would constitute a violation of the Owner's ethics or conflict of interest policies; or

.7 fails to proceed continuously and diligently with the construction and completion of the Work, except as permitted under the Contract Documents.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, and subject to any prior rights of the surety, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven (7) days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

.1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

.2 Accept assignment of subcontracts pursuant to Section 5.4; and

.3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished. Any further payment shall be limited to amounts earned to the date of termination.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance of the Contract Sum, the Contractor and/or its Surety shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.2.5 The parties hereby agree that: 1) if an order for relief is entered on behalf of the Contractor, pursuant to Chapter 11 of the U.S. Bankruptcy Code; 2) if any other similar order is entered under any debtor relief laws; 3) if Contractor makes an assignment for the benefit of one or more of its creditors; 4) if a receiver is appointed for the benefit of its creditors; or 5) if a receiver is appointed on account of its insolvency, any such event could impair or frustrate Contractor's performance of the Contract. Accordingly, it is agreed that upon occurrence of any such event, Owner shall be entitled to request of Contractor or its successor in interest adequate assurance of future performance in accordance with the terms and conditions of the Contract Documents. Failure to comply with such request within ten (10) days of delivery of the request shall entitle Owner to terminate the Contract and to the accompanying rights set forth in Subparagraphs 14.2.1 through 14.2.6. In all events, pending receipt of adequate assurance of performance and actual performance in accordance with the Contract Documents, Owner shall be entitled to proceed with the Work with Owner's own forces or with other Contractors on a time and material or other appropriate basis, the cost of which will be charged against the Contract Sum.

§ 14.2.6 As required by Texas Government Code Chapter 2253, if a Performance Bond has been furnished and the Contractor is declared by the Owner to be in default under the Contract, then the Surety shall promptly perform the Work, in full accordance with the plans, specifications and Contract Documents. Unless otherwise agreed in writing between the Surety and the Owner, the Surety shall complete the Work by the Surety entering into a Contract acceptable to Owner, with a contractor acceptable to Owner, and shall obtain new Payment and Performance Bonds as required by law.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time may, by mutual written agreement, be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. Adjustment of the Contract Sum may include profit, upon written agreement of the parties. No adjustment shall be made to the extent

.1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or

.2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of notice from the Owner of such termination for the Owner's convenience, the Contractor shall

.1 cease operations as directed by the Owner in the notice;

.2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

.3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

§ 14.4.3 In case of such termination for the Owner's convenience, the Owner shall pay the Contractor for Work properly executed and for proven unrecoverable loss with respect to materials, equipment, tools, and construction equipment and machinery incurred to the date of termination. Such payment shall not cause the Contract Sum to be exceeded. Such payment shall not include overhead and profit for Work not executed.

§ 14.4.4 Upon determination by a Court of competent jurisdiction that termination of the Contractor pursuant to Section 14.2 was wrongful, such termination will be deemed converted to a termination for convenience pursuant to Section 14.4, and Contractor's remedy for wrongful termination shall be limited to the recovery of the payments permitted for termination for convenience as set forth in Section14.4.

§ 14.5 Termination by the Owner for Non-Appropriation

§ 14.5.1 If the Contract is a multi-year contract funded through Owner's current general funds that are not bond funds, the parties agree that the Contract is a commitment of Owner's current revenue only. As such, notwithstanding any contrary provision of the Contract, any payment obligation(s) of Owner created by the Contract shall be conditioned upon the availability of funds that are duly appropriated and allocated for such purpose. If such funds are not available, as determined by Owner in its sole discretion, Owner shall have the right to terminate the Contract, without default, penalty, or further obligation or liability to Contractor, effective at the end of the period for which such funds are available. In the event this provision is exercised, Owner shall provide written notice of non-appropriation, specifying the effective date of termination, to Contractor as soon as is reasonably practicable.

§ 14.5.2 Upon receipt of notice from the Owner of such termination for non-appropriation, the Contractor shall

.1 cease operations as directed by the Owner in the notice;

.2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

.3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.5.3 In case of such termination for non-appropriation, to the extent that funds have been duly appropriated and allocated for such purpose and are available, the Owner shall pay the Contractor for Work properly executed and for proven unrecoverable loss with respect to materials, equipment, tools, and construction equipment and machinery incurred to the date of termination. Such payment shall not cause the Contract Sum to be exceeded. Such payment shall not include overhead and profit for Work not executed.

ARTICLE 15 CLAIMS AND DISPUTES OF CONTRACTOR

§ 15.1 Claims

§ 15.1.1 Definition

General: A Claim is a demand or assertion by the Contractor seeking, as a matter of right, payment of money, interpretation of the Contract terms, a change in the Contract Time, or other relief with respect to the terms of the Contract, the Work, or the Project. The responsibility to substantiate Claims shall rest with the Contractor. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

§ 15.1.1.1 Claim for Non-Damages Definition: A demand or assertion by the Contractor seeking, as a matter of contractual right, relief such as an increase in the Contract Time, an increase in the Contract Sum, or other contract-based remedies. A Claim does not automatically include a separate cause of action for damages unless specifically stated otherwise.

§ 15.1.1.2 Claim for Damages Definition: Any portion of a Claim in which the Contractor is seeking monetary damages as a legal remedy (i.e., an actual cause of action under applicable law, such as breach of contract), rather than (or in addition to) a Contract adjustment for time or price or some other relief that does not constitute legal damages.

§ 15.1.2 Time Limits on Litigation

The Contractor shall commence all litigation against the Owner and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement, if any, and within the period specified by applicable law, but in any

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

case not more than 8 years after the date of Substantial Completion of the Work, unless extended in accordance with Texas Civil Practice & Remedies Code Section 16.009. The Contractor waives all claims not commenced in accordance with this Section 15.1.2.

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claim for Non-Damages: Claims for Non-Damages by the Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by written notice to the Owner and to the Architect. Claims by the Contractor under this Section 15.1.3.1 shall be initiated within twenty-one (21) calendar days after occurrence of the event giving rise to such Claim or within twenty-one (21) calendar days after the Contractor first knew or should have known of the condition giving rise to the Claim, whichever is earlier. Claims must be initiated by written notice titled "Notice of Claim for Non-Damages" ("Notice") and sent to the Architect and Owner's designated representative. The Notice shall clearly set out the specific matter of complaint, and the impact or damages which may occur or have occurred as a result thereof, to the extent that the impact or damages can be assessed at the time of the Notice. If the impact or damages cannot be assessed as of the date of the Notice then the Notice shall be amended at the earliest date that is reasonably possible. It is imperative that Owner receive timely specific Notice of any potential problem identified by Contractor in order that the problem can be mitigated or resolved promptly.

§ 15.1.3.2 Claim for Damages: Any claim or portion of a claim for damages by the Contractor where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by written notice to the Owner and to the Architect. Claims by the Contractor under this Section 15.1.3.2 shall be initiated within ninety-one (91) calendar days after occurrence of the event giving rise to such Claim or within ninety-one (91) calendar days after the Contractor first knew or should have known of the condition giving rise to the Claim for Damages, whichever is earlier. Claims must be initiated by written notice titled "Notice of Claim for Damages" ("Notice") and sent to the Architect and Owner's designated representative. The Notice shall clearly set out the specific matter of complaint, and the impact or damages which may occur or have occurred as a result thereof, to the extent that the impact or damages can be assessed at the time of the Notice. If the impact or damages cannot be assessed as of the date of the Notice then the Notice shall be amended at the earliest date that is reasonably possible. It is imperative that Owner receive timely specific Notice of any potential problem identified by Contractor in order that the problem can be mitigated or resolved promptly. Any claim or portion of a Claim for Damages by the Contractor that has not been made the specific subject of a Notice within ninety-one (91) days after the occurrence of the event giving rise to such claim or within ninety-one (91) days after the Contractor first knew or should have known of the condition giving rise to the Claim, whichever is earlier, shall be waived. Pursuant to Texas Civil Practices and Remedies Code Section 16.071, Contractor agrees that this is a reasonable notice requirement.

§ 15.1.3.2 Claims by Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the Owner. In such event, no decision by the Initial Decision Maker is required. Such Claims are subject to the definitions and notice requirements in § 15.1.1.1, § 15.1.1.2, § 15.1.3.1 and § 15.1.3.2, including the 21-day notice for Claims for Non-Damages and the 91-day notice for Claims for Damages.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make undisputed payments for Work performed in accordance with the Contract Documents.

§ 15.1.4.2 The Contract Sum and Contract Time may be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

§ 15.1.5 Claims for Additional Cost Or an Increase in the Contract Sum

If the Contractor wishes to make a Claim for additional cost or for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given to Owner and Architect. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4. The Architect will promptly investigate such Claim and report findings and a recommended resolution in writing to the Owner and Contractor. If the Claim is approved by Owner's Board of Trustees, or Owner's representative if otherwise delegated and provided for herein, then Contractor shall proceed with the execution of the Work that is the subject matter of the Claim. If the Claim is

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

rejected by the Owner, then Contractor may pursue alternative dispute resolution or other legal remedies as provided for in the Contract Documents. Under no circumstances shall a claim for additional cost or for an increase in the Contract Sum resulting from supply chain issues or market escalation be approved by Owner.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, such a Claim shall be documented in accordance with Article 8 and notice as provided in Section 15.1.3 shall be given. The Contractor's Claim shall include an estimate of the probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.6.2 Claims for increase in the contract time shall set forth in detail the circumstances that form the basis for the Claim, the date upon which each cause of delay began to affect the progress of the Work, the date upon which each cause of delay ceased to affect the progress of the Work and the number of days increase in the Contract Time claimed as a consequence of each such cause of delay. Additionally, any Claim for additional time based on adverse weather conditions shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated, and had an adverse effect on the scheduled construction.

1. Weather data in the table below shall form the baseline for establishing Anticipated Adverse Weather Days per month associated with the Project schedule duration.

Anticipated Adverse Weather Days	
Month	Total of Weather Days Allowed
January	6
February	6
March	5
April	4
May	6
June	7
July	6
August	6
September	6
October	6
November	6
December	6

a. The Anticipated Adverse Weather Days shall be submitted with the Contractor's Construction Schedule for documenting future weather events and is considered to be part of the Project duration forming the Contract Time.

2. When the Project requires work in an occupied building, Instruction Days in the table below shall form the baseline for establishing Instruction Days per month associated with the Project schedule duration.

Anticipated Instruction Days	
Month	Total of Instruction Days Allowed
January	0
February	0
March	0

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

April	4
May	4
June	0
July	0
August	0
September	0
October	0
November	0
December	0

a. The Anticipated Instruction Days shall be submitted with the Contractor's Construction Schedule for documenting future Instruction Days and is considered to be part of the Project duration forming the Contract Time.

3. Submission for Time Extension

a. Although the Contractor is required to document the occurrence and effect of Adverse Weather or Instruction Days on the Work, it does not relieve the Contractor/Architect of its responsibility to investigate and determine if an excusable delay has occurred.

b. The schedule of Anticipated Adverse Weather Days and Instruction Days included in the Contract is established in Work Days. Similarly, actual weather data should be collected and recorded on a Work Day basis. Monthly summaries should be maintained indicating actual Adverse Weather conditions or Instruction Days and the impact on Work activities.

c. To determine if a given month experienced Adverse Weather Days or Instruction Days, the number of actual Adverse Weather Days or Instruction Days is subtracted from the Anticipated Adverse Weather Days or Anticipated Instruction Days. If the number of Adverse Weather Days or Instruction Days is greater than the Anticipated Adverse Weather Days or Anticipated Instruction Days for a given month, then the Contractor has experienced unusually severe weather or Work disruption for the given month. If the number of Adverse Weather Days or Instruction Days is less than the Anticipated Adverse Weather Days or Anticipated Instruction Days for a given month, then the Net Days shall accumulate to the remaining months and shall be treated as float to the Project. Float time contained in the Contractor's Construction Schedule is not for the exclusive benefit of the Contractor or the Owner, but belongs to the Project and may be consumed by either party as needed on a first-used basis.

d. THE DETERMINATION THAT UNUSUALLY SEVERE WEATHER OR INSTRUCTION DAYS OCCURRED DOES NOT AUTOMATICALLY MEAN THAT THE CONTRACTOR RECEIVES A TIME EXTENSION FOR THE DIFFERENCE OF DAYS BETWEEN THE ANTICIPATED AND ACTUAL ADVERSE WEATHER DELAY OR INSTRUCTION DAYS. Further analysis is necessary to determine if the unusually severe weather or Instructional Days delayed Work activities critical to Contract completion. The Contractor's progress schedule must be evaluated to make this determination. If it is found that unusually severe weather or Instructional Days delayed the Contract, a Contract Modification shall be issued.

e. Claims for increase in the Contract Time shall set forth in writing the detail noting the circumstances that form the basis for the claim, the date upon which each cause of delay began to affect the progress of the Work, the date upon which each cause of delay ceased to affect the progress of the Work and the number of days increase in the Contract Time claimed as a consequence of each such cause of delay. The Contractor shall bear the entire economic risk of all weather delays and Instruction Days disruptions and shall not be entitled to any increase in the Contract Price by reason of such delays or disruptions. Requests for an extension of time pursuant to this Subparagraph shall be submitted to the Architect in writing not later than with each Application for Payment and shall include documentation demonstrating the nature and duration of the delays or disruptions. Where appropriate, a revised construction schedule indicating all the activities affected by the circumstances shall be included with the documentation.

f. The parties agree that the reconciliation of the change attributable to Adverse Weather or Instruction Days will occur at the time of Project Final Completion.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

§ 15.1.6.3 No extension of time shall be made to the Contractor because of hindrances or delays from any cause which is the fault of Contractor or Contractor's Subcontractors, Sub-subcontractors, or suppliers or otherwise under Contractor's control. Claims for extension of time may only be considered because of Adverse Weather Days, or hindrances or delays which are the fault of Owner and/or under Owner's control, but only to the extent that Substantial Completion of the Project is adjusted beyond the original Substantial Completion date. Claims for extension of time because of hindrances or delays not the fault of either Contractor or Owner shall be considered, but only to the extent that Substantial Completion of the Project exceeds the Substantial Completion date established for the Work. Unless otherwise delegated, Board approval shall be required for any extension of time. Contractor shall only be entitled to time extensions per the terms of the Contract Documents.

§ 15.1.7 Waiver of Claims for Consequential Damages

The Contractor waives all Claims against Owner for consequential damages arising out of or relating to this Contract, including, but not limited to, any amount owed as compensation for the increased cost to perform the Work as a direct result of Owner-caused delays or acceleration.

§ 15.2 Resolution of Claims and Disputes

§ 15.2.1 Claims by the Contractor against the Owner, including those alleging an error or omission by the Architect, shall be referred initially to the Architect for written recommendation. An initial recommendation by the Architect shall be required as a condition precedent to mediation or litigation of all Claims by the Contractor arising prior to the date Final Payment is due, unless thirty (30) days have passed after the Claim has been referred to the Architect with no recommendation having been rendered by the Architect.

§ 15.2.2 The Architect will review Claims and within ten (10) days of the receipt of a Claim take one of the following actions: (1) request additional supporting data from the Contractor, or (2) make a written recommendation to the Owner, with a copy to the Contractor.

§ 15.2.3 In evaluating Claims, the Architect may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Architect in making a written recommendation.

§ 15.2.4 If the Architect requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten (10) days (or in the case of Owner, ten (10) business days) after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Architect when the response or supporting data will be furnished, or (3) advise the Architect that no supporting data will be furnished.

§ 15.2.5 Following receipt of the Architect's written recommendation regarding a Claim, the Owner and Contractor shall attempt to reach agreement as to any adjustment to the Contract Sum and/or Contract Time. If no agreement can be reached, then either party may request mediation of the dispute pursuant to Section 15.3.

§ 15.2.6 Upon receipt of a Claim against the Contractor or at any time thereafter, the Architect or the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Architect or the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.3 Alternative Dispute Resolution

§ 15.3.1 Any Claim arising out of or related to the Contract, except Claims relating to aesthetic effect and except those waived under the terms of the Contract Documents, may upon mutual written agreement, after written recommendation by the Architect or thirty (30) days after submission of the Claim to the Architect, be subject to mediation at the request of either party. Owner and Contractor expressly agree that mediation shall not be a condition precedent to the initiation of any litigation arising out of such Claim. Claims for injunctive relief shall not be subject to this Section.

§ 15.3.2 The parties may endeavor to resolve their Claims by mediation. A request for mediation shall be made in writing to the other party to the Contract. Mediation shall be subject to and in accordance with Chapter 154 of the Texas Civil Practice & Remedies Code. Mediation shall be conducted by a mutually-agreed-upon mediator. In the event that the parties are unable to agree on a mediator, then the mediation shall be conducted by the Center for Public Policy Dispute Resolution at the University of Texas School of Law.

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved.** **WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

§ 15.3.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the county where the Owner's main administrative office is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be reduced to writing, considered for approval by the Owner's Board of Trustees, signed by the parties if approved by the Board of Trustees, and, if signed, shall thereafter be enforceable as provided by the laws of the State of Texas.

§ 15.3.4 Any claim not resolved in mediation shall be subject to litigation pursuant to Section 13.1.

§ 15.4 No Arbitration

Notwithstanding anything to the contrary in the Contract Documents or in any document forming a part hereof, there shall be no mandatory arbitration for any dispute arising hereunder.

§ 15.5 Contractor stipulates that Owner is a political subdivision of the State of Texas, and, as such, enjoys immunities from suit and liability provided by the Constitution and laws of the State of Texas. Nothing in the Contract shall be construed as a waiver or relinquishment of any governmental immunities or defenses on behalf of Owner, its trustees, officers, employees, or agents as a result of the execution of the Contract or performance of the functions or obligations described therein.

§ 15.6 In any adjudication under this Agreement, attorneys' fees may be awarded as provided by law.

ARTICLE 16 ADDITIONAL PROVISIONS

§ 16.1 These general conditions incorporate by reference the following documents:
Exhibit A: Wage Rate Determination

DRAFT

AIA Document A201™ – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This draft was produced by AIA software at 12:09:24 on 02/19/2018 under Order No. which expires on 01/01/0001, and is not for resale.
User Notes: (3B9AD9F6)

SECTION 01 1400
WORK RESTRICTIONS

PART 1 – GENERAL

1.01 DESCRIPTION

A. Work Included:
   1. Contractor shall comply with the following requirements concerning scope and work restrictions.
   2. If the Contractor believes that meeting the restrictions in this section would cause a delay to the intended schedule, they shall issue an RFI requesting specific modifications to that specific Work Restriction that would permit construction to continue without delay and indicating the reasons for the request. If construction proceeds without meeting any of the restriction requirements or obtaining approval for a modification of these requirements, the Contractor shall be responsible for all costs associated with removing and replacing all construction that occurred in violation of the Work Restrictions, if directed to by the Architect, without any increase in approved construction costs or schedule for the project.

B. Related Work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 01 of these Specifications.
   2. The work of other contracts is described in various contract documents prepared therefore, some of which are in the possession of the Owner and are available for inspection by interested parties.

C. Specific Project Restrictions:
   1. Before project completion and a certificate of occupancy is issued, Contractor shall provide fully established grass at locations including but not limited to all disturbed areas, under items that have been stored on site, construction trailers and storage units.
   2. Contractor may begin construction on or about October 10, 2025 and shall be substantially complete on December 16, 2026.

END OF SECTION

SECTION 01 2100
ALLOWANCES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Cash allowances.

B. Payment and modification procedures relating to allowances.

1.02 CASH ALLOWANCES

A. Cash Allowances shall be included in the contract sum.

B. Contractor's costs for products, delivery, installation, labor, insurance, payroll, taxes, bonding, equipment rental, overhead and profit will not be included in Change Orders authorizing expenditure of funds from this Cash Allowance. These costs shall be included in base contract sum unless noted otherwise

C. Costs Not Included in Cash Allowances: Productdelivery to site and handling at the site, including unloading, uncrating, and storage; protection of products from elements and from damage; and labor for installation and finishing. These costs shall be included in base contract sum unless noted otherwise.

D. Architect Responsibilities:
   1. Consult with Contractor for consideration and selection of products, suppliers, and installers.
   2. Select products in consultation with Owner and transmit decision to Contractor.
   3. Prepare Change Order.

E. Contractor Responsibilities:
   1. Assist Architect in selection of products, suppliers, and installers.
   2. Obtain proposals from suppliers and installers and offer recommendations.
   3. On notification of which products have been selected, execute purchase agreement with designated supplier and installer.
   4. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.

F. Differences in costs will be adjusted by Change Order.

G. At closeout of Contract, funds remaining in Cash Allowance will be credited to Owner by Change Order.

1.03 CONTINGENCY ALLOWANCE

A. Contingency Allowance shall be included in the contract sum.

B. Contractor's costs for products, delivery, installation, labor, insurance, payroll, taxes, bonding, equipment rental, overhead and profit will not be included in Change Orders authorizing expenditure of funds from this Contingency Allowance.

C. At closeout of Contract, funds remaining in Contingency Allowance will be credited to Owner by Change Order.

1.04 ALLOWANCES SCHEDULE

A. Section 01 5000 - Temporary Facilities and Control: Include the stipulated sum of $1,500 for purchase of project identification sign.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 2200
UNIT PRICES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Measurement and payment criteria applicable to Work performed under a unit price payment method.

1.02 COSTS INCLUDED

A. Unit Prices included on the Bid Form shall include full compensation for all required labor, products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit.

1.03 MEASUREMENT OF QUANTITIES

A. Measurement methods delineated in the individual specification sections complement the criteria of this section. In the event of conflict, the requirements of the individual specification section govern.

B. Take all measurements and compute quantities. Measurements and quantities will be verified by Architect.

C. Assist by providing necessary equipment, workers, and survey personnel as required.

D. Measurement by Weight: Concrete reinforcing steel, rolled or formed steel or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook or scale weight.

E. Measurement by Volume: Measured by cubic dimension using mean length, width and height or thickness.

F. Measurement by Area: Measured by square dimension using mean length and width or radius.

G. Linear Measurement: Measured by linear dimension, at the item centerline or mean chord.

1.04 PAYMENT

A. Payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities of Work that is incorporated in or made necessary by the Work and accepted by the Architect, multiplied by the unit price.

B. Unit prices may apply on any additions to, or deductions from the work, which prices shall include overhead, profit, taxes, and all other related costs. The unit prices shall be installed, in-place prices for materials/systems as specified. The quoted unit prices will be valid, and the quoted unit prices will be in force on any work. A singular cost shall be provided below to be used for both additions and deductions. If different prices are provided for additions and deductions the average of the absolute values will be used. The materials and work shall be in compliance with the specifications. The Contractor shall not be compensated for work that is not authorized by the Architect or Owners Laboratory (e.g. over drilling of piers and additional concrete and reinforcement for over drilled piers)

1.05 SCHEDULE OF UNIT PRICES

UNIT PRICING MATERIAL/SYSTEM	UNITS	COST ($)/UNIT
Excavation (Dirt or Caliche)	Cubic Yard	
Excavation (Rock)	Cubic Yard	
Backfilling (On Site)	Cubic Yard	

Utility backfill per the Foundation and Soil Preperation Notes on Sheet S0.0	Cubic Yard	
Building backfill with repurposed on-site soils per the Foundation and Soil Preperation Notes on Sheet S0.0	Cubic Yard	
Building backfill with select fill per the Foundation and Soil Preperation Notes on Sheet S0.0	Cubic Yard	
Reinforcing Steel, Straight or Bent Per the General Notes on S0.0	Pound	
Structural Steel Per the General Notes on S0.0	Pound	
Concrete Grout Per the General Notes on S0.0	Cubic Yard	
Concrete Masonry Units Per the General Notes on S0.0	Units	
Concrete Per the General Notes on S0.0 (Excluding piers, see below)	Cubic Yard	
Temporary Casing for Drilling Geothermal Wells (4" Diameter)	Lineal Foot	
Uncased Drilled Piers - Complete including reinforcing, concrete, accessories, drilling		
18" Diameter	Lineal Foot	
24" Diameter	Lineal Foot	
30" Diameter	Lineal Foot	
Cased Drilled Piers - Complete including reinforcing, concrete, accessories, drilling and casing		
18" Diameter	Lineal Foot	
24" Diameter	Lineal Foot	
30" Diameter	Lineal Foot	
Auger Cast Grout Piles - Complete including reinforcing, grout, accessories and drilling		
16" Diameter	Lineal Foot	
18" Diameter	Lineal Foot	

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 2300
ALTERNATES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Description of Alternates.

B. Procedures for pricing Alternates.

1.02 RELATED REQUIREMENTS

A. Document 00 0119-Request for Competitive Sealed Proposals.

1.03 PROCEDURES

A. Proposers are required to submit alternate proposals to add work or to deduct work from the base proposal as described below. Failure to submit alternate amounts in spaces provided on proposal form is basis for disqualification of proposal.

B. The successful proposer shall not modify, withdraw or cancel any of the alternate proposals or any part thereof for 45 days after date of receipt of proposals, unless specifically noted otherwise.

C. Contractor shall be responsible for any changes in the work affected by acceptance of these alternates. Include within the alternative proposal prices all costs, including materials, installations, and fees.

D. Claims for additional dollars resulting from changes caused by the alternates will not be allowed.

E. Refer to the drawings and project manual for items of work affected by alternates.

F. Alternates will be exercised at the option of the Owner.

G. Coordinate related work and modify surrounding work as required to complete the Work, including changes under each alternate, when acceptance is designated in the Owner - Contractor Agreement.

1.04 ACCEPTANCE OF ALTERNATES

A. Indicate variation of proposal price for alternates described below and list on the proposal form or any supplement to it, which requests a 'difference' in proposal price by adding to or deducting from the base proposal price or by indicating "No Charge".

B. Indicating "No Bid" as an alternate is unacceptable and is reason for rejection of the proposal.

C. Alternates quoted on Bid / Proposal Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in the Owner-Contractor Agreement.

D. Coordinate related work and modify surrounding work to integrate the Work of each Alternate.

1.05 SCHEDULE OF ALTERNATES

A. Alternate Number 1A:
   1. Air Cooled Rotary Screw Chillers by JCI/York.
      a. Base bid is to provide no chiller. Electrical feeders and all associated piping, housekeeping pad, controls, etc. required for complete chiller installation shall be included in base bid.
      b. Alternate: Provide chiller as manufactured by JCI/York that meets the specified requirements.

B. Alternate Number 1B:
   1. Air Cooled Rotary Chillers by Daikin.

a. Base bid is to provide no chiller. Electrical feeders and all associated piping, housekeeping pad, controls, etc. required for complete chiller installation shall be included in base bid.
b. Alternate: Provide chiller as manufactured by Daikin that meets the specified requirements.

C. Alternate Number 2: Lighting Controls.
1. This Alternate shall be priced during the bidding process. The lighting controls shall be broken out from the light fixture package for bidding.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 3000
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General administrative requirements.

B. Electronic document submittal service.

C. Preconstruction meeting.

D. Schedule of Values.

E. Progress meetings.

F. Submittal Schedule.

G. Submittals for review and project closeout.

H. Number of copies of submittals.

I. Submittal procedures.

J. Progress Payments.

K. Contractor's Daily Field Report.

L. Request For Information.

1.02 RELATED REQUIREMENTS

A. Section 01 1100 - Summary of Work

B. Section 01 3216 - Construction Progress Schedule: Form, content, and administration of schedules.

C. Section 01 6000 - Product Requirements: General product requirements.

D. Section 01 7000 - Execution and Closeout Requirements: Additional coordination requirements.

E. Section 01 7800 - Closeout Submittals: Project record documents; operation and maintenance data; warranties and bonds.

1.03 GENERAL ADMINISTRATIVE REQUIREMENTS

A. The Notice to Proceed shall not be issued by the Architect until the Agreement (or Amendment, if Contractor is a Construction Manager at Risk) including final GMP and all exclusions or other post Proposal agreements, have been signed and approved as well as all required payment and performance bonds and insurance, and furnished to the Architect.

B. Comply with requirements of Section 01 7000 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.

C. Make the following types of submittals to Architect:
   1. Requests for Information (RFI).
   2. Requests for substitution.
   3. Shop drawings, product data, and samples.
   4. Test and inspection reports.
   5. Design data.
   6. Manufacturer's instructions and field reports.
   7. Applications for payment and change order requests.
   8. Progress schedules.
   9. Coordination drawings.
   10. Correction Punch List and Final Correction Punch List for Substantial Completion.
   11. Closeout submittals.

12. Warranty request and corrective action descriptions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 ELECTRONIC DOCUMENT SUBMITTAL SERVICE

A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF) format, as appropriate to the document, and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.
   1. This includes submittals for review, information, requests for information (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), field reports and meeting minutes, preliminary closeout for review, final project record documents closeout submittal and any other document any participant wishes to make part of the project record.
   2. Contractor and Architect are required to use this service at no cost to the Contractor.
   3. It is Contractor's responsibility to submit documents in allowable format.
   4. Subcontractors, suppliers, and Architect's consultants will be permitted to use the service at no charge.
   5. Users of the service need an email address, internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com), unless such software capability is provided by the service provider.
   6. Paper document transmittals will not be reviewed.
   7. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.

B. Submittal Service: The selected service is:
   1. Newforma Info Exchange: https://newforma.huckabee-inc.com/UserWeb
      a. Contractor will receive a username and password upon award of the project.

C. Training: External user tutorials are availible at www.newforma.com/external-users-tutorials. The awarded General Contractor will be required to become familiar with the program prior to Notice to Proceed being issued.

D. Project Closeout: Architect will determine when to terminate the service for the project. Contractor is responsible for providing digital and hard copies of the final project record documents closeout submittal to the Owner. Should Owner forgo hard copies, Contractor shall submit a credit to the Owner.

3.02 PRECONSTRUCTION MEETINGS

A. A Kick-Off Pre-Construction meeting will be scheduled to be held upon notification by the Architect.
   1. Provide attendance by authorized representatives of the Contractor and major subcontractors.
   2. The Architect will advise other parties, including the Owner, and request their attendance.
   3. The Architect shall arrange, preside, and record the minutes of the pre-construction meeting.
   4. A pre-construction meeting agenda will be issued by the Architect at the meeting.
   5. Agenda items to be discussed include:
      a. Self introductions
      b. Design concept, scope, and objectives
      c. Communications
      d. Contractor’s responsibilities
      e. Documentation and notification

f. Progress Meetings
g. Submittals/Substitutions
h. Project Administration
i. Project Closeout
j. Warranty Phase

B. Foundation Pre-Construction Meeting
1. Before beginning any work on-site (other than job trailer installation and/or removal of on-site vegetation) the Contractor shall schedule and host a “Foundation Pre-Construction” meeting (in person or on a conference call) with the Architect’s Construction Observer, a representative of the Special Inspection and Testing Agency (SITA), the Code-Required Structural Observer, a representative of the Structural Engineer, the Superintendent of Construction, Contractor’s Project Manager, and all foremen for subcontractors with work related to the foundation.

C. Quality Control Pre-Construction Meeting
1. Within one week after the “Foundation Pre-Construction Meeting”, the Contractor shall schedule and host a “Quality Control Pre-Construction Meeting” following the Agenda in Section 01 4533.

D. Framing Pre-Construction Meeting: The Contractor shall not be permitted to install any portion of the superstructure above the foundation until the Contractor has scheduled and held a "General Framing Preconstruction Meeting" in which the following people attend: A representative of the Architect, a representative of the Structural Engineer, the Special Inspection and Testing Agency (SITA), the Superintendent of construction, the Contractor's Project Manager, and all foremen for subcontractors with work related to the framing.

E. Trade Start Up Meetings:
1. The Owner shall be included in all TSUM's.
a. The Manufactures Representative shall be included in selected TSUM's
2. Agenda items to be discussed include:
a. Earthwork
b. Foundation / Concrete
c. Quality Control Meeting:
1) Special Inspections
2) SITA
3) Cx
4) Third Party
d. Site Utilities
e. Closeout Meeting Kickoff
f. Electrical
g. Plumbing
h. Framing
i. Structural Steel/Erection
j.
k. Masonry
l. Fireproofing
m. Building Envelope/Roofing
n. Weather Barrier
o. Waterproofing
p. Glazing
q. Door Hardware/Access Control
r. Low Voltage
1) Data & Technology
2) Security

3) PA
4) Local Sound
5) Theatrical A/V

s. Kitchen Equipment
t. Exterior Finishes
1) Canopies
2) Metal Panels
3) Plaster
4) Specialty Finishes
u. Interior Finishes
1) Flooring
2) Paint
3) Ceilings
4) Acoustical Panels
5) Specialty Finishes
v. Athletic Fields
w. Irrigations
x. Landscaping
y. Owner Provided Items / Specialty Equipment

3.03 SCHEDULE OF VALUES AND DRAWDOWN SCHEDULE

A. Within twenty-one (21) calendar days following Notice to Proceed, the Contractor shall submit a Schedule of Values (using the breakdown of the Construction Schedule activities) for review by the Owner's Representatives. The Schedule of Values will allocate a dollar value (cost) for each activity of the Construction Schedule. Each activity cost allocation shall include a labor, equipment and material cost and a pro rata contribution to overhead and profit. The sum of all activity costs shall be equal to the total Contract Sum. Each activity cost shall be coded with a cost code corresponding to the subcontractor responsible for the Work so that subtotals for each division of the Work can be prepared.

B. Within twenty-one (21) calendar days following Notice to Proceed, the Contractor shall submit a Drawdown Schedule showing anticipated monthly payments from the Owner for coordination of allocated funds for the Project.

C. Within thirty (30) calendar days following Notice to Proceed, the Contractor shall participate in a conference with the Owner's Representatives to review, evaluate and approve the Schedule of Values and Drawdown Schedule. The approved Schedule of Values and Drawdown Schedule shall, in the best judgment of the Contractor, the Project Manager, and the Architect represent a fair, reasonable, and equitable dollar (cost) allocation for each activity on the Construction Schedule.

3.04 PROGRESS MEETINGS

A. Schedule and administer jobsite meetings throughout progress of the Work in intervals agreed to at the Preconstruction Meeting.

B. Contractor will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings. Agendas and prior meeting minutes shall be distributed 24 hours prior to meeting.

C. Attendance Required: Job superintendent, major Subcontractors and suppliers (as invited), Owner, Architect, as appropriate to agenda topics for each meeting. Representation should be consistent throughout project.

D. Agenda:
1. Review minutes of previous meetings.
2. Review of work progress.

3. Field observations, problems, and decisions.
4. Identification of problems that impede, or will impede, planned progress.
5. Review of submittals schedule and status of submittals.
6. Review of off-site fabrication and delivery schedules.
7. Maintenance of progress schedule.
8. Corrective measures to regain projected schedules.
9. Planned progress during succeeding work period.
10. Coordination of projected progress.
11. Maintenance of quality and work standards.
12. Effect of proposed changes on progress schedule and coordination.
13. Status of Request for Information (RFI).
14. Status of Request for Change Proposal (RFP).
15. Other business relating to work.
16. Construction forecast for 3 weeks.
17. Weather Delay Requests.
18. Quality Control.

E. Record minutes and distribute typewritten copies within two days after meeting to participants, with one copy to Architect, Owner, participants, and those affected by decisions made.
   1. Unless published minutes are challenged in writing prior to the next regularly scheduled progress meeting, they will be accepted as properly stating the activities and decisions of the meeting.
   2. Persons challenging published minutes shall reproduce and distribute copies of the challenge to all indicated recipients of the particular set of minutes.
   3. Challenge to minutes shall be settled as priority portion of "old business" at the next regularly scheduled meeting.

3.05 SUBMITTAL SCHEDULE

A. Within twenty-one (21) business days following the Notice to Proceed, the Contractor shall submit a Submittal Schedule for review by the Architect and Owner. This schedule shall coincide with the approved Construction Schedule accommodating the submittal review and material selection times as required by Architect, Owner or Owner's Representatives. In the event a submittal schedule is not provided and approved by the Architect, Owner, or the Owner's Representative at the submission of the 2nd pay application, the 2nd pay application will be held until the submittal schedule is complete as noted above.

B. This schedule shall list all required submittals, product data, and samples for the project. Each item to be submitted shall include the date to be submitted, review time and the scheduled installation date. All submittals shall be listed and sequenced within the Submittal Schedule in accordance with the approved Construction Schedule.

C. The Architect and Owner will review the Submittal Schedule, provide revision comments and return it to the Contractor within fourteen (14) business days. If revisions are required, the Contractor shall then resubmit a revised Submittal Schedule to the Architect and Owner within fourteen (14) business days and thereafter until approved,

D. Submittals, product data and samples submitted out of sequence to the approved Submittal Schedule or Construction Schedule will be subject to return as unchecked and required to be resubmitted at a date coinciding with these schedules. The Submittal Schedule is advisory only and shall not relieve the Contractor of the responsibility for accomplishing the Work within each and every Contract required Milestone and Completion date. Omissions and errors in the approved Submittal Schedule shall not excuse the Contractor from providing required submittals, product data or samples, nor excuse the Contractor from meeting the Contract required Milestones and Completion date.

3.06 SUBMITTAL DEFINITIONS AND REQUIREMENTS

A. Shop Drawing
   1. Shop drawings, diagrams, schedules and other data specifically prepared for the work by the contractor, subcontractor, manufacturer, or supplier to illustrate some portion of the work.

B. Product Data
   1. Product data are illustrations, standard schedules, performance charts, instructions, and brochures, furnished by the contractor to illustrate materials or equipment to illustrate some portion of the work.

C. Sample
   1. Physical examples which illustrate materials for some portion of the work evaluated for product compliance.

D. Color Sample
   1. Physical examples which illustrate color or texture for use in color selection.

E. Submittal
   1. The submittal is the compilation of the shop drawing, product data, sample, color sample as requested by the specifications.

3.07 SUBMITTALS FOR REVIEW

A. Submittals to the Architect which are not listed below will not be reviewed by the Architect and will not be returned to the Contractor. Submittals required by specification section which are not listed in this section shall be reviewed by the Contractor.

B. The Architects review of the Contractors submittal shall be limited to examination of an initial submittal and one resubmittal. The Architect's review of additional submittals, beyond that of the initial and resubmittal, will be made only with prior written approval of the Owner after notification by the Architect.

C. Contractors review of submittals shall be consistent with A201 – General Conditions. Areas of deviation from the Contract Documents will be represented by revision clouds, Green in color, made by the General Contractor on the associated PDF document. In the event there are no clouded areas identified, it can be assumed that the associated submittal has been reviewed in full by the General Contractor and are deemed approved. No further review by the Architect is required.

D. Samples
   1. Contractor shall submit all products which require a color selection. Contractor shall only submit actual product sample. Remainder of submittal shall be retained by contractor. Refer to color sample procedures below.
   2. Provide sample identical to the precise article proposed to be provided. If actual sample is not provided for substitution review, submittal will be rejected.
   3. Unless otherwise specified, submit one sample which will be retained by the Architect.
   4. Samples will be reviewed only for aesthetic, color, or finish selection.

E. The Contractor may require his subcontractors to provide drawings, setting diagrams, and similar information to help coordinate the project, but such data shall remain between the Contractor and his subcontractors and will not be reviewed by the Architect.

F. Where required by specification sections, provide submittals to the Contractor for review and approval. Contractor shall maintain a copy of all submittals at the project site.

G. Fax submittals are not acceptable.

H. Upon request by the Architect, Contractor shall submit additional items as required.
   1. Only the following listed items shall be submitted to the Architect for review:
      a. Section 03 1000 – Concrete Forming and Accessories

1) Shop Drawings - Construction joint plan

b. Section 03 2000 – Concrete Reinforcing
   1) Shop Drawings - Anchor bolt setting plan
   2) Shop Drawings - Grade beam, and slab reinforcing steel

c. Section 03 3000 – Cast-In-Place Concrete
   1) Concrete Mix Designs
   2) Accessory products - Documentation indicated section 03 3000

d. Section 03 5216 - Lightweight Insulating Concrete
   1) Shop drawings with seal of professional engineer (Texas).

e. Section 04 0511 - Mortar and Masonry Grout
   1) All proposed mortar and grout mix designs

f. Section 04 2000 - Unit Masonry
   1) Reinforcement Shop Drawings

g. Section 05 1200 - Structural Steel Framing
   1) Shop drawings.

h. Section 05 2100 – Steel Joist Framing
   1) Shop drawings.

i. Section 05 3100 - Steel Decking
   1) Product Data - Deck type and finish
   2) Shop Drawings

j. Section 05 4000 – Cold-Formed Metal Framing
   1) Shop drawings with seal of professional engineer (Texas).

k. Section 05 5100 – Metal Stairs
   1) Shop drawings with seal of professional engineer (Texas).

l. Division 07 - Thermal and Moisture Protection
   1) Product Data – all components required per spec section.
   2) Shop Drawings – all components required per spec section.

m. Division 08 - Openings
   1) Product Data – all components required per spec section.
   2) Shop Drawings – all components required per spec section.

n. Section 09 6429 – Wood Strip and Plank Flooring
   1) Product Data – all components required per spec section.
   2) Shop drawings – all components required per spec section.

o. Section 09 6566 – Resilient Athletic Flooring
   1) Product Data – all components required per spec section.
   2) Shop drawings – Court layouts/markings.

p. Section 10 1400 – Signage
   1) Shop Drawings and sign copy layout
   2) Product Samples

q. Section 10 5100 – Lockers
   1) Product Data – all components required per spec section.
   2) Shop Drawings – all components required per spec section.

r. Section 10 7300 – Protective Coverings
   1) Shop drawings with seal of professional engineer (Texas).

s. Section 11 2336 – Commercial Appliances
   1) Product Data – all components required per spec section.

t. Section 11 3013 – Residential Appliances
   1) Product Data – all components required per spec section.

u. Section 12 3200 - Manufactured Wood Casework
   1) Product Data – all components required per spec section.
   2) Shop Drawings – all components required per spec section.

v. Section 12 3600 - Countertops
   1) Product Data – all components required per spec section.
   2) Shop Drawings – all components required per spec section.
w. Section 13 3419 – Metal Building Systems
   1) Shop drawings with seal of professional engineer (Texas).
x. Section 14 2400 – Hydraulic Elevators
   1) Product Data – all components required per spec section.
   2) Shop Drawings – all components required per spec section.
y. Divisions 21, 22, 23, 26, 27, 28
   1) Product Data – all components required per spec section.
   2) Shop Drawings – all components required per spec section.
z. Division 31 - Earthwork
   1) Product Data – all components required per spec section.
   2) Shop Drawings – all components required per spec section.
aa. Division 32 - Exterior Improvements
   1) Product Data – all components required per spec section.
   2) Shop Drawings – all components required per spec section.
bb. Division 33 - Utilities
   1) Product Data – all components required per spec section.
   2) Shop Drawings – all components required per spec section.

2. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.
3. Samples will be reviewed only for aesthetic, color, or finish selection.
4. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 - Closeout Submittals.

3.08 SUBMITTALS FOR PROJECT CLOSEOUT

A. Within sixty (60) days following the Notice to Proceed, the Contractor shall submit a list of Expected Closeout Documents for review by the Architect. This list shall include project record documents, operation and maintenance data, warranties, bonds, contract forms, health/safe environment data, attic stock sign offs, Owner training, certifications and inspections, and other types as indicated. All items on the list shall be titled with spec section number and general description - Example: "09 3000 Tiling - 1 year warranty".

B. The Architect will review the list of Expected Closeout Documents, provide revision comments and return it to the Contractor within fourteen (14) business days. If revisions are required, the Contractor shall then resubmit a revised list to the Architect and Owner within fourteen (14) business days and thereafter until approved.

C. Contractor may submit Closeout Documents by Specification Division in full as scopes of work are completed.

D. Submit Correction Punch List for Substantial Completion.

E. Submit Final Correction Punch List for Substantial Completion.

F. Submit for Owner's benefit during and after project completion.

G. See Section’s 01 7000 and 01 7800 for additional details.

3.09 NUMBER OF COPIES OF SUBMITTALS

A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.

B. Extra Copies at Project Closeout: See Section 01 7800.

C. Samples: Submit one sample as specified in individual specification sections which will be retained by Architect. All other samples required by the individual specification section shall be retained by the Contractor.
   1. After review, Contractor shall produce duplicates if needed for other purposes.
   2. The Architect's sample will not be returned to Contractor.
   3. The Contractor shall transmit all submittals to the Owner and Architect concurrently for review. All submittals shall be returned through the Architects office following inclusion of Consultant and Owner comment.

3.10 SUBMITTAL PROCEDURES

A. General Requirements:
   1. Transmit using approved form.
   2. Acceptable Manufacturers
      a. Manufacturers submitted shall be as per the acceptable manufacturers listed in each specification. For additional manufacturers requiring approval, reference Section 01 6000 – Product Requirements.
   3. Sequentially identify each item. For revised submittals use original number and a sequential alphabetical suffix.
   4. Submittals shall be numbered as follows:
      a. Number shall be Architects project number followed by the appropriate specification section - consecutive submittal number for section.
      b. Example - 1234-01-01 Tiling 09 3000 - 5.
      c. When material is re-submitted for any reason, transmit under a new letter of transmittal and with a new transmittal number.
      d. On re-submittals, cite the original submittal number for reference.
      e. On at least the first page of each submittal, and elsewhere as required for positive identification, show the submittal number in which the item was included.
      f. When multiple projects are administered under one contract, contractor shall submit separate submittals for each project. Failure to submit separately will result in a rejected submittal review.
      g. Unless otherwise specified, make submittals in groups containing all associated items to assure that information is available for checking each item when it is received.
         1) Partial submittals may be rejected as not complying with the provisions of the Contract.
         2) The Contractor may be held liable for delays so occasioned.
         3) Multiple projects bid under a single prime shall package submittals separately for each project.
   5. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
   6. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
      a. Submittals from sources other than the Contractor, or without Contractor's stamp will not be acknowledged, reviewed, or returned.
   7. Deliver each submittal on date noted in submittal schedule, unless an earlier date has been agreed to by all affected parties, and is of the benefit to the project.
      a. Upload submittals in electronic form to Electronic Document Submittal Service website.
   8. Schedule submittals to expedite the Project, and coordinate submission of related items.
      a. For each submittal for review, allow 14 days excluding delivery time to and from the Contractor.

9. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
10. Provide space for Contractor and Architect review stamps.
11. When revised for resubmission, identify all changes made since previous submission.
12. Revisions:
    a. Make revisions required by the Architect.
    b. If the Contractor considers any required revision to be a change, he shall so notify the Architect as provided for in the General Conditions.
    c. Make only those revisions directed or approved by the Architect.
    d. The contractor shall be responsible for delays caused by rejection of inadequate or incorrect submittals.
13. Distribute reviewed submittals. Instruct parties to promptly report inability to comply with requirements.
14. Incomplete submittals will not be reviewed, unless they are partial submittals for distinct portion(s) of the work, and have received prior approval for their use.
15. Submittals not requested will not be recognized or processed.

B. Shop Drawing Procedures:
1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
2. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.

3.11 ELECTRONIC DRAWING FILE REQUEST

A. Upon Award of Contract:
1. At the pre-construction meeting, Awarded Prime Contractor shall bring the executed electronic file release form for the original contract documents. The agreement forms can be found at the end of this Section. Upon the Prime Contractor executing and submitting the agreement to the Architect, the Architect will provide the Contractor one (1) electronic copy of the Revit® BIM Model file(s) **at no charge** within five (5) working days. **Note that CAD files associated with the work can be accessed and exported from the model provided to the General Contractor through the use of Revit® software; therefore, individual CAD files will not be provided by the Architect or its consultants**. Files and Formats to be as follows
    a. Civil: Overall master file in AutoCAD format.
        1) Overall site plan with utility and grading information
        2) All details, detail annotation and references are omitted and not part of the AutoCAD file.
    b. Structural: BIM Model (Revit) and associated working plan views.
        1) Plan views contain overall and enlarged plan section view set up of foundation, second floor framing and roof framing only. All plan views contain grids, dimensions and general annotation.
        2) All details, detail annotation and references are omitted and not part of the model file.
    c. Architectural: BIM Model (Revit) and associated working plan views.
        1) Project Specific BIM Dataset will include information pertaining to the Architectural Building Information Model including model(s), schedules, views, sheets, and details.
        2) All “working” views will be omitted and Huckabee title blocks will be replaced with Huckabee CONTRACTOR Title Block
    d. Mechanical, Electrical and Plumbing: BIM Model (Revit) and associated working plan views.

1) Plan views contain overall and enlarged section plan view set up of mechanical, electrical lighting, electrical power and plumbing plans only.
2) All details, detail annotation and references are omitted and not part of the model file.

e. Technology: BIM Model (Revit) and associated working plan views.
1) Plan views contain overall and enlarged section plan view set up showing all device locations and general annotation.
2) All details, detail annotation and references are omitted and not part of the model file.
3) Electronic files for Technology drawings will only be released to the Prime Contractor but will require signatures from both the Prime Contractor and the Technology Subcontractor on an additional Technology/Security release form.

2. The Revit® file provided to the Awarded Prime Contractor is NOT FOR CONSTRUCTION PURPOSES, but for convenience only. This BIM Model will consist of the original model utilized for base bid. It is the responsibility of the Awarded Prime Contractor to coordinate all accepted alternates, addenda, Requests for Information, Proposal Requests and any other changes realized during construction. The Architect will not provide up-to-date drawings sets or updated BIM Models to the Awarded Prime Contractor unless otherwise stated within the Owner/Architect agreement. If “conformed” documents are required by the Owner/Architect agreement they will be provided in (PDF) Portable Document Format. Conformed Construction Documents are the Construction Documents modified to include any addenda issued during the bidding or negotiation process. The AIA does not use the terms “conform set” or “conformed set” in its documents.
3. TO THE EXTENT CONFORMED CONSTRUCTION DOCUMENTS ARE PROVIDED TO THE CONTRACTOR REGARDING THE PROJECT, THE FOLLOWING PROVISIONS SHALL APPLY:
a. The Conformed Construction Documents and related information contained therein, are provided for the Contractor’s (CONTRACTOR) convenience only, and does not relieve the CONTRACTOR from the requirements of Contract Documents which were issued for bid including any addenda. Specifically, to the extent that any discrepancy or conflict exists between the Issue for Bid documents including any Addenda (collectively referred to as the “Bid and Addenda Documents”) on the one hand, and the Conformed Construction Documents on the other, the Bid and Addenda Documents shall control unless otherwise specified in writing by the Architect. Field verification of existing and as-built conditions are required as part of the submittal process as specified in this Section 01 3000 Administrative Requirements and Section 01 7000 Execution and Closeout Requirements.
b. CONTRACTOR shall not to use such drawings, documents, or other data, in whole or in part, for any purpose or project other than the “PROJECT” in the preparation of shop drawings and other submittals.
c. CONTRACTOR acknowledges that such drawings, documents, and other data are subject to change or modification. CONTRACTOR shall be responsible for updating any drawings, documents or other data obtained prior to use by them for any purpose.
d. Any Conformed Construction Documents, including any drawings, documents, or other data related thereto, are provided, “AS IS” without representation or warranty by Architect, either express or implied.

e. CONTRACTOR acknowledges that Conformed Construction Documents are being provided by ARCHITECT as a courtesy to CONTRACTOR, at their specific request, and accordingly CONTRACTOR DOES HEREBY AGREE TO RELEASE, HOLD HARMLESS, DEFEND AND INDEMNIFY ARCHITECT AND THE NEW CANEY ISD (OWNER), FROM ANY AND ALL CLAIMS, DEMANDS, OR CAUSES OF ACTION, WHICH CONTRACTOR, OR ANY THIRD PARTY, MAY HAVE BY REASON OF ANY INJURY OR DAMAGE SUSTAINED BY CONTRACTOR OR SUCH THIRD PARTTY ARISING OUT OF OR IN ANY WAY RELATED TO THE USE OF SUCH CONFORMED CONSTRUCTION DOCUMENTS.

3.12 PROGRESS PAYMENTS

A. The submission and approval of progress updates and the reports calculating the value of work done for any given pay period for each activity based on the percentage complete for that activity less the amount previously paid for past percentages complete and percent of retainage shall be an integral part and basic element of the application upon which Progress Payments shall be made pursuant to the provisions of the General Conditions and/or Supplementary Conditions. The Contractor shall be entitled to progress payments only as determined from the current updated and approved Construction Schedule. Contractor shall submit (3) three original sets for the first and final applications for payment, with all original signatures of AIA form G702 and G703 (form G702/CMa is not acceptable). All other payment applications shall be submitted electronically as described in paragraph 3.01 Electronic Document Submittal Service.
   1. The initial and subsequent cost reports which are developed from the schedule of values shall include the following activity information:
      a. Activity number and activity description.
      b. Percentage of value of work in place against Total Value.
      c. Total cost of each activity.
      d. Value of work in place this period.
      e. Value of work in place to date.
      f. Value of uncompleted work.
      g. Value of stored material not in place.
      h. The cost report will be submitted as supporting documentation to the Contractor’s application for payment. The application for payment shall be submitted as required by the Contract Documents.
      i. Identify scopes of work (campuses/buildings) when applicable with a clear and concise heading.
      j. Separate scopes of work with the appropriate heading per the 2016 MasterFormat standard.
      k. “Description of Work” shall be identified by specification number and heading per 2016 MasterFormat standard while separating the “Labor” and “Material” costs throughout each line item in the scope of Work.
      l. Include all associated contingencies and allowances expenditures.
         1) All contingency and allowance expenditures shall be listed sequentially and follow the same guidelines as noted below. “Description of Work” shall reflect the pricing exercise and identify contingency or allowance.
         2) Reference the example AIA Document G703 found at the end of this Section.
      m. In the event the Work is completed without the use of 100% of the the associated funds in the contract, column "H" or "Balance to Finish" shall represent the total dollar amount being credited back to the owner via AIA G701

3.13 CONTRACTOR’S DAILY FIELD REPORT

A. Daily reports shall be used to record a chronological, day-to-day account of the work force, the respective activities performed, the weather conditions, and any specific events that take place on the Project.

B. The Daily Report shall not be used as a communication tool. Any situations requiring specific action shall be brought to the attention of the appropriate party by means of written correspondence, memoranda, or meeting minutes.

C. Photographs shall be used with the Daily Report to clarify or confirm statements and concerns.

D. The Contractor shall produce a Daily Report including the following information:
   1. Date.
   2. Weather, temperature, wind, and precipitation.
   3. Number of workers on site, listed by Subcontractor and Trade.
   4. Material and equipment deliveries.
   5. Construction quantities placed.
   6. General description of the Work accomplished.
   7. Specific problems encountered.
   8. Meetings held.
   9. List of visitors to the site and their companies.
   10. Construction photographs.

E. NOTE: Provide Owner with copies of signed Daily Report at weekly progress meetings.

3.14 REQUEST FOR INFORMATION

A. Contract document interpretations or clarifications shall be submitted by the Contractor to the Architect in the form of a written request for information (RFI).
   1. The Contractor shall provide potential solutions for the RFI when submitted.

B. RFIs shall be numbered sequentially and shall include only one question or related questions per RFI. If the Contractor's question or request for interpretation is already clearly defined or discernible in the contract documents, the RFI may be returned unanswered and the Architect may be entitled to additional compensation (from the Contractor) for review time.

C. If the Contractor believes there may be additional contract cost or time incurred, it shall be stated in the RFI. If additional contract cost or time is required based on the RFI, the Architect will issue appropriate documentation for the proposed change. All changes in work shall be accomplished by approved change order only.

D. The Architect will respond to the RFI in a reasonable and timely manner, within approximately seven (7) business days from the date the RFI is received and stamped by the Architect's office. No extension of contract cost or time will be allowed due to a delayed RFI submittal or the response to an RFI.

3.15 DEVELOPMENT OF ADVERSE WEATHER DATA

A. Unless adverse weather data is defined elsewhere in the contract for construction, provide as follows;

B. Collection of Adverse Weather Data
   1. Weather data obtained from the National Oceanic and Atmospheric Administration (NOAA) shall form the baseline for estimating anticipated delays and project durations and determining the occurrence of unusually severe weather. Data shall be collected and compiled as follows:
      a. Contractor shall compile the number of days per month that the anticipated weather is expected to be adverse by analysis of NOAA. The last 5 years of consecutive data shall be used to establish the baseline of rain days per month associated with the project schedule duration. However, in the absence of 5 years of data, a shorter period may be used.
      b. The compiled data shall be submitted with the Contractors Construction Schedule for documenting future weather events.

2. Adverse Weather is defined as the occurrence of one or more of the following conditions within a twenty-four (24) hour day that prevents the Critical Path of construction activity exposed to weather conditions or access to the site:
   a. Precipitation (rain, snow, or ice) in excess of one-quarter inch (0.25”) liquid measure.
   b. Temperatures that do not rise above that required for the day’s construction activity, if such temperature requirement is specified or accepted as standard industry practice.
   c. Sustained wind in excess of twenty-five (25) m.p.h.
   d. Contractor shall take into account that certain construction activities are more affected by adverse weather and seasonal conditions than other activities, and that “dry-out” or “mud” days are not eligible to be counted as Weather Delay Day until the standard baseline is exceeded. Hence, Contractor should allow for an appropriate number of additional days associated with the Standard Baseline days in which such applicable construction activities are expected to be prevented and suspended.
3. A Weather Delay Day may be counted if adverse weather prevents work on the project for fifty percent (50%) or more of the contractor’s scheduled work day and Critical Path construction activities were included in the day’s schedule, including a weekend day or holiday if Contractor has scheduled construction activity that day.

C. Submission for Time Extension
1. Although the contractor is required to document the occurrence and effect of adverse weather on the work, it does not relieve the Contractor/Architect of its responsibility to investigate and determine if an excusable delay has occurred.
2. The schedule of anticipated adverse weather delays included in the contract is established in work days. Similarly, actual weather data should be collected and recorded on a work day basis. Monthly summaries should be maintained indicating actual adverse weather conditions and the impact on work activities.
3. To determine if any particular month experienced unusually severe weather, the number of actual adverse delay days is compared to that as provided by the NOAA database. If the number of actual delay days is greater than that in the contract the contractor has experienced unusually severe weather.
4. THE DETERMINATION THAT UNUSUALLY SEVERE WEATHER OCCURRED DOES NOT AUTOMATICALLY MEAN THAT THE CONTRACTOR RECEIVES A TIME EXTENSION FOR THE DIFFERENCE OF DAYS BETWEEN THE ANTICIPATED AND ACTUAL ADVERSE WEATHER DELAY DAYS. Further analysis is necessary to determine if the unusually severe weather delayed work activities critical to contract completion. The contractor's progress schedule must be evaluated to make this determination. If it is found that unusually severe weather delayed the contract, a contract modification shall be issued pursuant to Gov. Code 2269
5. Claims for increase in the contract time shall set forth in writing the detail noting the circumstances that form the basis for the claim, the date upon which each cause of delay began to affect the progress of the work, the date upon which each cause of delay ceased to affect the progress of the work and the number of days increase in the contract time claimed as a consequence of each such cause of delay. The Contractor shall bear the entire economic risk of all weather delays and disruptions, and shall not be entitled to any increase in the Contract Price by reason of such delays or disruptions. Requests for an extension of time pursuant to this Subparagraph shall be submitted to the Architect in writing not later than the fifteenth (15th) day of the month following the month during which the delays or disruptions occurred, and shall include documentation demonstrating the nature and duration of the delays or disruptions. Where appropriate, a revised construction schedule indicating all the activities affected by the circumstances shall be included with the documentation.

END OF SECTION

Huckabee

a MORE group brand

ELECTRONIC DOCUMENT RELEASE FORM

Date	

Transmitting Party	Huckabee
Address	
Phone	888.801.6673
Representative	

Receiving Party	
Address	
Phone	
Representative	

Project Name	
Project Number	

This Agreement is made in reference to the electronic drawing plan files for {Recipient} with {Receiving Firm.}

At your request, Huckabee will provide electronic files for your convenience and use in the preparation services performed related to the {Project Name}, subject to the following terms and conditions:

Data contained on these electronic files is part of Huckabee's instruments of service and is confidential and shall not be used by you or anyone else receiving this data through or from you for any purposes other than as a convenience in the preparation of drawings related to your scope of work. These electronic files are not contract documents or accurate record drawings, and significant difference may exist between these electronic files and the actual physical conditions of the facility and/or property.

You agree to assume all liability and risks associated therewith any use of these electronic files in the preparation of contract documents for the new project scope. With the use of these electronic files you agree to the fullest extent permitted by law to hold harmless and indemnify Huckabee and its consultants from and against all claims, liabilities, losses, damages, and costs, including but not limited to attorney's fees, arising there from or in connection therewith. Under no circumstances shall delivery of the electronic files for use by you be deemed a sale by Huckabee, and Huckabee makes no warranties, either expressed or implied for any particular purpose.

Copyrights are a form of intellectual property protection provided by federal law. Huckabee expressly retains ownership of all reports, drawings, plans, specifications, electronic files (including CAD/Revit/ BIM models and files), field data, notes and other documents and instruments prepared by Huckabee and/or our Consultant(s) as instruments of service. Huckabee and applicable Consultants shall retain all common law, statutory and other reserved rights, including, without limitation, all copyrights thereto.

We do not mark all documents or digital files with copyright and we are not required to. You are hereby notified that our work (including digital) is protected by copyright, inherently identifying Huckabee as copyright owner and represented by publication date occurrence. This notice clarifies our work shall not be infringed upon by proper notice, disallowing any defendant to claim “innocent infringement.”

File Type:

- ☐ Construction
- ☐ Clash Detection
- ☐ Timeline Simulation
- ☐ Logistics Planning
- ☐ Quantity Extraction / Cost Estimating
- ☐ Shop Drawings
- ☐ Bidding
- ☐ Other

File Format:

- ☐ Revit (.rvt) File Name
- ☐ Navisworks (.nwc/.nwd/.nwf) File Name
- ☐ AutoCAD (.dwg) File Name File Name
- ☐ IFC (enter format type) File Name
- ☐ Design Review (.dwf) File Name
- ☐ Other

Accepted:

_____

Signature and Printed Name of Transmitting Party DATE

_____

Signature and Printed Name of Receiving Party DATE

SECTION 01 3216
CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preliminary schedule.

B. Construction progress schedule, bar chart type.

1.02 RELATED SECTIONS

A. Section 01 1000 - Summary of Work.

1.03 REFERENCE STANDARDS

A. AGC (CPSM) - Construction Planning and Scheduling Manual; 2004.

B. M-H (CPM) - CPM in Construction Management - Project Management with CPM; 2016, with Addendum (2021).

1.04 SUBMITTALS

A. Within 14 days after date established in Notice to Proceed, submit preliminary schedule defining planned operations.

B. If preliminary schedule requires revision after review, submit revised schedule within 7 days.

C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
   1. Include written certification that major Subcontractors have reviewed and accepted proposed schedule.

D. Within 10 days after joint review, submit complete schedule.

E. Submit updated schedule with each Application for Payment.

F. Submit the number of opaque reproductions that Contractor requires, plus two copies that will be retained by Architect.

G. Submit under transmittal letter form specified in Section 01 3000 - Administrative Requirements

H. Approval by the Owner and Owner's Representatives of the Contractor's Construction Schedule is advisory only and shall not relieve the Contractor of the responsibility for accomplishing the Work within each and every Contract-required Milestone and Completion date. Omissions and errors in the approved Construction Schedule shall not excuse performance, which is not in compliance with the Contract. Approval by the Owner and Owner's Representatives in no way makes the Owner or Owner's Representatives an insurer of the Construction Schedule's success or liable for time or cost overruns flowing from its shortcomings. The Owner hereby disclaims any obligation or liability by reason of Owner or Owner's Representatives approval of or acquiescence to the Construction Schedule.

I. It is to be expressly understood and agreed by the Contractor that the schedule is an estimate to be revised from time to time as progress proceeds, and that the Owner does not guarantee that Contractor can start work activities on the early or late start dates or complete work activities on the early finish or late finish date shown in the schedule, or as same may be updated or revised; nor does the Owner or Owner's Representative guarantee that Contractor can proceed at all times in the sequence established by said schedule. If Contractor's schedule indicates that Owner or a separate contractor is to perform an activity by a specific date, or within a certain duration, Owner or any separate contractor under contract with Owner shall not be bound to said date or duration unless Owner expressly and specifically agrees, in writing, to same; the Owner's and / or the Owner's Representative's overall review and approval or acceptance of the schedule does not constitute an agreement to specific dates, duration or sequences for activities of the Owner or any separate contractor.

1.05 QUALITY ASSURANCE

A. Scheduler: Contractor's personnel or specialist Consultant specializing in CPM scheduling with three years minimum experience in scheduling construction work of a complexity comparable to this Project, and having use of computer facilities capable of delivering a detailed graphic printout within 48 hours of request.

B. Contractor's Administrative Personnel: three years minimum experience in using and monitoring CPM schedules on comparable projects.

1.06 SCHEDULE FORMAT

A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.

B. Diagram Sheet Size: Width required.

C. Sheet Size: Multiples of 8-1/2 x 11 inches.

D. Scale and Spacing: To allow for notations and revisions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRELIMINARY SCHEDULE

A. Prepare preliminary schedule in the form of a horizontal bar chart.

3.02 CONTENT

A. Critical Path Method (CPM) to show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.

B. Identify each item by specification section number.

C. Identify work of phases, separate stages or proposed occupancies and other logically grouped activities.

D. Provide sub-schedules for each stage of Work identified in Section 01 1000 - Summary.

E. Include contract milestone dates and completion dates as specified in the contract.

F. Provide sub-schedules to define critical portions of the entire schedule.

G. Include conferences and meetings in schedule.

H. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.

I. Provide separate schedule of submittal dates for shop drawings, product data, and samples, owner-furnished products, products identified under Allowances, and dates reviewed submittals will be required from Architect. Indicate decision dates for selection of finishes.

J. Indicate delivery dates for owner-furnished products and Owner furniture or equipment scheduled for salvage and/or relocation in project.

K. Indicate testing of materials.

L. Indicate activity periods for punch list.

M. Indicate the work to be performed during the facility's scheduled holidays, weekends, or summer recess periods.

N. Coordinate content with schedule of values specified in Section 01 3000.

O. Provide legend for symbols and abbreviations used.

3.03 BAR CHARTS

A. Include a separate bar for each major portion of Work or operation.

B. Identify the first work day of each week.

C. The schedule diagram shall be a time-scaled drawing.

D. The Construction Schedule Detailed Reports, initial submittal and subsequent updates or revisions, shall indicate each of the following:
   1. Description of activity including activity number/numbers.
   2. Estimated duration time or remaining duration for each activity.
   3. Early start date for each activity.
   4. Late start date for each activity.
   5. Early finish date for each activity.
   6. Late finish date for each activity.
   7. Float available for each path of activities containing float.
   8. Actual start date for each activity begun.
   9. Actual finish date for each activity completed.
   10. Identification of all critical path activities in the mathematical analysis.
   11. The critical path for the Project, with said path of activities being clearly and easily recognizable on the time-scaled graphic diagram, and the relationship between all non-critical activities and activities on the critical path shall be clearly shown on the graphic diagram.
   12. The dollar value of each activity in relation to the schedule of values. This may be shown on a separate cost report.
   13. The responsibility code for the Contractor or Subcontractor performing each activity or portion thereof.
   14. The percentage complete of each activity in progress or complete.

3.04 SCHEDULE OF OFF-SITE ACTIVITIES

A. The Contractor shall include in his Construction Schedule all procurement related activities which lead to the delivery of materials to the site in a timely manner. Upon written approval by the Project Manager, these activities may be submitted as a separate Off-Site Activities Schedule, properly correlated to the Construction Schedule. The schedule of off-site activities shall include, but is not limited to, the following:
   1. Dates for submittals, ordering, manufacturing or fabricating, and delivery of equipment and materials. Long lead items requiring more than one month between ordering and delivery to site shall be clearly noted;
   2. All significant activities to be performed by the Contractor during the fabrication and erection/installation in a Contractor's plant or on a job site, including materials/equipment purchasing, delivery; and
   3. Contractor's drawings and submittals to be prepared and submitted to the architect.

B. The Contractor shall be solely responsible for expediting the delivery of all material to be furnished by him so that the construction progress shall be maintained according to the current schedule for the Work.

C. The Owner's Representatives shall be advised, in writing, by the Contractor whenever it is anticipated by the Contractor that the delivery date of any material and/or equipment furnished by the Contractor for installation will be later than the delivery date shown on the schedule, subject to schedule updates.

D. Submittals, equipment orders and similar items are to be treated as schedule activities, and shall be given appropriate activity numbers.

3.05 FLOAT TIME

A. Float or slack time is defined as the amount of time between the earliest start date and the latest start date or between the earliest finish date and the latest finish date of an activity or a chain of activities on the Construction Schedule. Float or slack time is not for the exclusive use or benefit of either the Contractor or the Owner. Contractor's work' shall proceed according to early start dates, and the Owner's Representatives shall have the right to reserve and apportion float time according to the needs of the Project. The Contractor acknowledges and agrees that actual delays, affecting paths of activities containing float time, will not have any affect upon Contract completion times, providing that the actual delay does not exceed the float time associated with those activities.

B. Extensions of time for performance as described in the Contract Documents will be granted only to the extent that time adjustment for the activity or activities affected by any condition or event which entitles the Contractor to a time extension exceed the total float or slack along the path of activities affected at the time of Notice to Proceed of a Change Order or the commencement of any delay or condition for which an adjustment is warranted under the Contract Document.

3.06 SCHEDULE UPDATES AND REPORTS

A. Every month, in conjunction with the monthly application for payment, the Contractor shall submit an updated graphic diagram and an updated detailed schedule report from the Construction Schedule and updated Record Documents. Contractors Application for Payment shall not be approved for payment unless schedule is attached and Record Documents are current. The schedule shall be updated to show actual progress and the effect of delays and other events. The actual start and finish dates shall be included in the detailed report, as well as the actual dates of the Milestone events.

B. The content of the updated Construction Schedule shall be equal to that noted in Section 1.02 Construction Schedule.

C. The updated Construction Schedule submitted by Contractor shall not show a completion date later than the Contract Completion Date, subject to any time extensions approved by Owner.

3.07 REVIEW AND EVALUATION OF SCHEDULE

A. Participate in joint review and evaluation of schedule with Architect at each submittal.

B. Evaluate project status to determine work behind schedule and work ahead of schedule.

C. After review, revise as necessary as result of review, and resubmit within 7 days.

3.08 UPDATING SCHEDULE

A. Maintain schedules to record actual start and finish dates of completed activities.

B. Indicate progress of each activity to date of revision, with projected completion date of each activity.

C. Update diagrams to graphically depict current status of Work.

D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.

E. Indicate changes required to maintain Date of Substantial Completion.

F. Submit reports required to support recommended changes.

G. Provide narrative report to define problem areas, anticipated delays, and impact on the schedule. Report corrective action taken or proposed and its effectincluding the effects of changes on schedules of separate contractors.

3.09 RECOVERY SCHEDULE

A. Should the Contractor's Construction Schedule indicate that the progress of the work is behind schedule to the extent that any of the mandatory specific or milestone dates or completion dates are in jeopardy the Contractor shall be required to, at no extra cost to the Owner, prepare and submit to the Owner's Representatives within 72 hours, a Recovery Plan, in a form and detail appropriate to the need and explain and display how he intends to reschedule those activities to regain compliance with the Construction Schedule.

3.10 SCHEDULE REVISIONS

A. Should the Contractor, after approval of the initial Construction Schedule, desire to change his plan in construction, he shall submit his required revisions to the Owner's Representatives along with a written statement of the revisions including a description of the logic for rescheduling the work, methods of maintaining adherence to intermediate Milestones and Specific Dates and the reasons for the revisions. The Contractor shall revise his schedule to include the effect of changes, acts of God, and other conditions or events, which have affected the Schedule. If the requested changes are acceptable to the Owner and Owner's Representatives, the changes will be incorporated into the Construction Schedule in the next reporting period.

B. When the Owner orders changes by change Order which have the potential to impact the Contract Milestones or Specific Dates stipulated in the Supplemental Conditions, a Schedule will be prepared by the Contractor and provided to the Owner's Representatives for concurrence or revision. After the proposed schedule revision has been mutually agreed upon, it will be incorporated into the Construction Schedule. Change Order logic will affect only those activities and performance data directly concerned. Adjustments in Scheduled intermediate Completion Dates or for the Contract as a whole will be considered only to the extent that there is insufficient remaining float to absorb these changes.

C. Any change to the approved Construction Schedule must be approved, in writing, by the Owner and Contractor.

D. Neither the updating or revision of Contractor's Construction Schedule nor the submission, updating, change or revision of any report or schedule submitted to Owner's Representatives by Contractor under this Section nor Owner's review or non-objection of any such report or schedule shall have the effect of amending or modifying, in any way, the Contract Time, any Contract Completion Date, or Contract Milestone Dates or of modifying or limiting in any way Contractor's obligations under this Contract.

3.11 REQUESTED TIME ADJUSTMENT SCHEDULE

A. The updated Construction Schedule submitted by Contractor shall not show a completion date later then the Contract Time, subject to any time extensions approved by Owner:

1. Provided, however, that if Contractor believes he is entitled to an extension of the Contract Time under the Contract Documents, Contractor shall submit to Owner's Representatives, with each progress payment update, a separate schedule analysis (entitled "Requested Time Adjustment Schedule") indicating suggested adjustments in the Contract Time which should, in the opinion of Contractor, be made in accordance with the Contract Documents by time extension, due to changes, delays or conditions occurring during the past month or previously, or which are expected or contemplated by Contractor (whether such conditions are excusable under the Contract or are alleged to be due to Contractor or Owner fault); this separate schedule, if submitted, shall be time-scaled utilizing a computer generated and computer-drawn Schedule analysis schedule, unless otherwise approved by the Owner's Representative and shall be accompanied or preceded by a formal time extension request as required by the Contract and a detailed narrative justifying the time extension requested.

B. The time extension request shall include schedule forecasts that predict the actual Project Completion Date, and any separable portions thereof specified by Owner plus a forecast of the actual achievement of any milestones listed in the Owner-Contractor Agreement.

C. To the extent any time extension requests are ending at the time of any update in the Construction Schedule, the “Requested Time Adjustment Schedule” shall also be updated each month, to reflect any adjustments made by Contractor in the logic, sequence or duration of any activities in the Construction Schedule, or any time extensions previously granted by Owner, and to reflect actual or expected progress, in order that the “Requested Time Adjustment Schedule” shall clearly and accurately reflect Contractor’s Actual intention and proposed time adjustments as of the latest update.

D. Neither the Owner, the Project Manager or the Architect shall have any obligation to consider any time extension request unless the requirements of the Contract Documents, and specifically, but not limited to these requirements, are complied with; and Owner shall not be responsible or liable to Contractor for any constructive acceleration due to failure of Owner to grant time extensions under the Contract Documents should Contractor fail to substantially comply with the submission requirements and the justification requirements of this Contract for time extension requested. Contractor’s failure to perform in accordance with the Construction Schedule shall not be excused, nor be chargeable to Owner, because Contractor has submitted time extension requests or the "Requested Time Adjustment Schedule”.

3.12 DISTRIBUTION OF SCHEDULE

A. Distribute copies of updated schedules to Contractor's project site file, to subcontractors, suppliers, Architect, Owner, and other concerned parties.

B. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

END OF SECTION

SECTION 01 4000
QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Submittals.

B. Quality assurance.

C. References and standards.

D. Testing and inspection agencies and services.

E. Contractor's construction-related professional design services.

F. Contractor's design-related professional design services.

G. Control of installation.

H. Mock-ups.

I. Tolerances.

J. Manufacturers' field services.

K. Defect Assessment.

1.02 RELATED REQUIREMENTS

A. Document 00 3132 - Geotechnical Data

B. Section 01 4516 - Contractor Quality Control. Testing and Inspection services.

C. Section 01 4533 - Code-Required Quality Control.

1.03 CONTRACTOR'S CONSTRUCTION-RELATED PROFESSIONAL DESIGN SERVICES

A. Coordination: Contractor's professional design services are subject to requirements of project's Conditions for Construction Contract.

B. Provide such engineering design services as may be necessary to plan and safely conduct certain construction operations.

1.04 CONTRACTOR'S DESIGN-RELATED PROFESSIONAL DESIGN SERVICES

A. Coordination: Contractor's professional design services are subject to requirements of project's Conditions for Construction Contract. Contractor, and its Delegated Design Professional, shall be responsible for coordinating with the Design-Related Professional Design Services with the Architect.

B. Base design on performance and/or design criteria indicated in individual specification sections. Design shall be coordinated with and or compatible with all other applicable elements, materials, products, and or components in the Contract Documents.
   1. Submit a Request for Information to Architect if the criteria indicated are not sufficient to perform required design services.
   2. Submit a Request for Information for any issue necessary to fully and properly coordinate and complete the design in accordance with the Contract Documents.

C. Contractor's Delegated Design Professional shall be responsible for code compliance of all aspects of the Delegated Design whether or not all codes and or their specific code requirements are specifically identified and or called out in the Contract Documents.

D. Contractor shall coordinate with, and obtain written approval from, the Architect for any Delegated Design results that modify the original intent of the Contract Documents regarding occupancy, aesthetics, function, performance, or any design feature.

E. Contractor shall promptly provide written notification to the Architect when Contractor becomes aware of any errors and or omissions regarding the Contractor's professional design services.

F. The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by the Contractor or the Delegated Design Professional. The Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

G. Shop drawing sheets that include engineering information designed by the Contractor's Delegated Design Engineer shall be signed and sealed in accordance with the Texas Engineering Practice Act. Sheets that do not provide information designed by the Contractor's Engineer do not require being signed and sealed. Calculation packages require a signed and sealed cover sheet only. Any submittals requiring to be signed and sealed that are received without the signature and seal will be rejected without review.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures, including but not limited to submittal review responsibilities.

1.06 QUALITY ASSURANCE

A. Designer Qualifications: Where professional engineering design services and design data submittals are specifically required of Contractor by Contract Documents, provide services of a Professional Engineer experienced in design of this type of work and licensed in Texas.
   1. The General Contractor or Construction Manager shall comply with the Texas Professional Services Procurement Act when selecting an Engineer for Delegated Design Services.

1.07 REFERENCES AND STANDARDS

A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Comply with reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.

C. Obtain, review and comply with copies of standards where required by product specification sections.

D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.

E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

F. Neither the contractual relationships, duties, or responsibilities of the Owner, Architect, Contractor or any of their respective subconsultants or subcontractors shall be altered from Contract Documents by mention or inference otherwise in any reference document.

1.08 TESTING AND INSPECTION AGENCIES AND SERVICES

A. A Special Inspection and Testing Agency (SITA) will perform field quality control tests and inspections, as specified in specification Section 01 4516 - Contractor's Quality Control and Section 01 4533 - Code-Required Quality Control.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.

D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 MOCK-UPS

A. Before installing portions of the Work where mock-ups are required, construct mock-ups for each form of construction and finish required, using materials indicated for the completed Work. The purpose of mock-up is to demonstrate the proposed range of aesthetic effects and workmanship.

B. Integrated Exterior Mock-ups: Construct integrated exterior mock-up. Coordinate installation of exterior envelope materials and products as required in individual Specification Sections. See Section 04 2000-Unit Masonry for additional mock-up requirements for field sample panels and integrated envelope and wall assembly.

C. Integrated Room Mock-ups: Construct integrated room mock-ups for one room type of each classroom, office, and restroom. Mock-ups shall include the scope per contract documents along with Owner furnished equipment.

D. Obtain Owner and Architect's approval of mock-ups before starting work, fabrication, or construction.
   1. Make corrections as necessary until Owner and Architect's approval is issued.

3.03 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate beyond the maximum overall allowable tolerance level.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

3.04 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.

B. Submit qualifications of observer to Architect 30 days in advance of required observations.
   1. Observer subject to approval of Architect.
   2. Observer subject to approval of Owner.

C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.05 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not complying with specified requirements.

B. If, in the opinion of Architect and Owner, it is not practical to remove and replace the Work, Owner will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01 4100
REGULATORY REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY OF REFERENCE STANDARDS

A. Related Documents: General and Supplementary Conditions of the Contract, Division 01 General Requirements, and Drawings are applicable to this Section.

B. Section Includes, but is not limited to:
   1. Permits and fees.
   2. Code and regulatory compliance for the associated Work.

C. 2012 TAS - Texas Accessibility Standards; 2012.

D. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

1.02 RELATED REQUIREMENTS

A. Section 01 4000 - Quality Requirements.

1.03 PERMITS AND FEES

A. The Owner will pay for all City and/or State Building Submission Permits, Impact Fees, and other Building Fees related to the project. The Contractor and Subcontractors will be responsible for obtaining all required Montgomerty County building permits, fire permits, trade permits and/or license fees.

B. Once General Contractor is in possession of the final construction permits (building permits), Contractor shall be responsible for submitting to the AHJ, approved request for pricing (RFP), change orders, or other documents that contain significant changes to the contract until construction is complete. Contractor shall pay for permits or fees associated with any required changes.

1.04 BUILDING CODES

A. Building Code Compliance: Reference drawings for year editions used in document design.
   1. Building Code – International Building Code
   2. Plumbing Code – International Plumbing Code
   3. Mechanical Code – International Mechanical Code
   4. Electrical Code – National Electrical Code
   5. Life Safety Code – NFPA 101

B. Energy Code Compliance
   1. Energy Code – International Energy Code.
   2. Contractor shall provide, at the jobsite office, one copy of the completed energy code review.
   3. Contractor shall notify energy code plan review company for all required energy inspections.
      a. Milestones for inspections shall be as follows:
         1) Envelope: Building cladding is substantially complete, windows are delivered and installed, roof insulation has been installed and if possible is visible, interior finish of exterior walls has not been installed so any exterior wall insulation is visible
         2) ME rough-in: Mechanical ductwork is substantially installed, equipment is set, lighting fixtures are installed, ceiling is open (equivalent to an above-ceiling inspection)
         3) Final: Final verification of all mechanical, lighting, controls, envelope as installed and commissioned. Envelope penetrations (e.g. doors, windows) are closed, roof is complete.
      b. Contact Information:

1) Building Solutions
9401 Lyndon B. Johnson Freeway, Suite 410
Dallas, Texas, 75243
Phone: 214.221.9145

C. Accessibility Compliance
1. Accessibility requirements are from the 2010 ADA Standards for Accessible Design, and the 2012 TAS Texas Accessibility Standards of the Architectural Barriers Act.
2. The information contained in this section is provided to identify the modifications provided for users who are not served by adult standards. It shall be the Contractors responsibility to be familiar with the standards and to apply the standards to all aspects of the project. Any apparent conflict between current standards and the drawings shall be brought to the architect's attention for clarification. The information in the drawings does not release the contractor from full compliance with the latest TAS requirements.
3. Contractor shall provide, at the jobsite office, one copy of the 2012 Texas Accessibility Standard (TAS) regulations as prepared by the Texas Department of Licensing and Regulation, concerning handicap accessibility. The Contractor shall conform to the regulations as set forth in the TAS. Copies can be obtained at Texas Department of Licensing and Regulation, P.O. Box 12157, Austin, TX; 512-539-5669 / Fax 512-539-5690; www.license.state.tx.us. Copies may be downloaded from http://www.license.state.tx.us/ab/abtas.htm.
4. Federal Register:
a. Vol. 56, No. 144, July 26, 1991, Rules and Regulations; Appendix A to part 36 – Standards for Accessible Design.
b. 5 U.S.C. 552(a) and 1 C.F.R. part 51, Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Building Elements Designed for Children's Use.
5. Texas Accessibility Standards
a. The Elimination of Architectural Barriers Texas Government Code, Chapter 469, effective March 15, 2012.

1.05 ACCESSIBILITY REQUIREMENTS

A. General
1. All general TAS standards apply and staff-use areas and spaces for the use of students above the age of 12 shall be designed for adult users. In facilities for younger students, adult-use spaces will commonly be identified by their name (MEN, WOMEN, STAFF TLT, etc). Juvenile-use spaces will be likewise identified (BOYS, GIRLS, STU TLT, etc.).
2. Besides the transition to adult dimensions for students above the age of 12, some requirements vary additionally, depending on age. Refer to the tables enclosed for the varying heights and spacing required.
3. Age/Grade ranges are interpreted as follows:
a. Ages 3 years and 4 years / Pre-Kindergarten
b. Ages 5 years thru 8 years / Kindergarten thru 3rd Grade
c. Ages 9 years thru 12 years / 4th Grade thru 7th Grade
d. Over 12 years / 8th Grade thru Adult

B. Dimensional Tolerances
1. Contractor is reminded that while the TAS guidelines allow for "construction and manufacturing tolerances" there is no "definition" of what that tolerance is, therefore, where TAS gives a single absolute dimension, every effort should be made to equal that dimension. Where TAS provides a dimensional range, or a minimum or a maximum, there is NO construction tolerance. Any dimension less than the minimum or more than the maximum will be rejected upon inspection and subject to correction.

1.06 QUALITY ASSURANCE

A. Contractor's Designer Qualifications: Refer to Section - 01 4000 - Quality Requirements.

PART 2 PRODUCTS

2.01 GENERAL

A. Contractor shall note that no regulatory agency designates products with a formal “ADA Approved” designation. Contractor shall be responsible for ensuring all products are reviewed for accessibility compliance.

PART 3 EXECUTION

3.01 REPAIR

A. Non-Compliant Work
   1. The Contractor shall be responsible for removing and correcting all work that is found to be in non-compliance.
   2. The Contractor shall perform all work at no expense to the Owner.
   3. The Contractor shall be responsible to perform all repairs regardless of the date at which the non-compliant items are found.

B. The work shall be performed such that there will be no disruption to the Owner schedule.

END OF SECTION

SECTION 01 4339
MOCK-UP WALL CONSTRUCTION

PART 1 – GENERAL

1.01 DESCRIPTION

A. An Envelope Pre-construction meeting shall be held with all of the subcontractors responsible for erecting the envelope related materials.
   1. Attendees shall include (but are not limited to): General Contractor, framing and sheathing subcontractor, masonry subcontractor, weather barrier subcontractor, storefront and glazing subcontractor, roofing and sheet metal subcontractors, metal wall panel subcontractors, mechanical and electrical subcontractors, and any other trade that will install products in the exterior building envelope, or penetrate through the exterior envelope.

B. Work includes: Constructing in-place mock-up, including all reviewed submittals required by the Contract Documents, to establish compliance with the design intent as well as the specified requirements to provide a complete and watertight facility.

C. Providing a photo manifest of as-built conditions as the mock-up is being constructed. Photos shall be kept at the job site during construction for reference. All Photos shall be documented on a plan of the mock up, where they were taken.

D. Mock-up fabrication must be completed and reviewed and approved by the Owner and Architect prior to starting installation of building envelope construction.

1.02 RELATED REQUIREMENTS

A. Individual sections of these specifications for each material indicated for use in the mock-up wall construction.

1.03 SUBMITTALS

A. Section 01 3000 – Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate dimensions, layout, joints, construction details, methods of anchorage, etc. as required for items to be installed in the mock-up wall construction.

C. All submittals for materials required in the mock-up walls shall be approved prior to beginning work on the mock-up wall construction.

D. Provide a compatibility matrix of all envelope materials to be used on the project.

E. Provide required test reports for envelope materials.

1.04 PURPOSE

A. The mock-up wall panels are to be constructed as indicated on the drawings, including toothed masonry construction to allow exposed flashings, etc. Construction of the mock-up walls are intended to:
   1. Provide an acceptable quality standard for the completed work.
   2. Identify color and finish selections of the various materials used, as well as the acceptable range of color and variations within those materials.
   3. Establish the required coordination between trades and the sequence of necessary installations to provide a complete and watertight building envelope.

1.05 QUALITY ASSURANCE

A. Coordination of product submittals and construction installation:
   1. Prior to each submittal, carefully review and coordinate all aspects of each item being submitted.
   2. Verify that each item being submitted is in conformance in all respects with the specified requirements.

3. By affixing the Contractor's signature to each submittal for the mock-up, the contractor certifies that this coordination has been performed.
4. Contractor shall construct the site built mock-up with the same manner of specified construction as the new construction.
5. Contractor shall construct the site built mock-up with the same workmanship and quality as being implemented on the new construction.
6. All material to be installed shall be reviewed by architect and consultants for conformance.

PART 2 – PRODUCTS

2.01 MOCK-UP REQUIREMENTS

A. Build in-place mock-ups to verify selections made under sample submittals and to demonstrate aesthetic effects and qualities of materials and execution. Mock-up wall construction shall be coordinated by the General Contractor and constructed by the subcontractor responsible for the actual construction work. All conditions and materials to be used on the job shall be included in the mock-up. Build mock-ups to comply with the listed requirements, using materials indicated for the completed Work. Construction of mock-up shall be complete 60 days minimum, prior to installation of cladding materilas at the primary structure. Mock-ups to be constructed in stages based upon construction activities and reviews during Trade Start Up Meetings (TSUM's).

B. Contractor shall start the construction of the mock-up based on, but not limited to, the following list:
   1. Foundation if subgrade is present
   2. Waterproofing membrane
   3. Damproofing material
   4. Flexible Through-Wall Flashing Membrane
   5. Metal Through-Wall Flashing
   6. Preformed Flashing Pieces
   7. Face Brick with Mortar and Weeps
   8. CMU with mortar and weeps
   9. ICF Wall Systems with Weather Barrier
   10. Wall Ties
   11. Weather Barrier
   12. Portland Cement Plaster
   13. Metal Panels, Wall and Soffit
   14. Metal Roof Panels
   15. Low Slope Roof System
   16. Weeps
   17. Window Unit with flexible flashing membrane
   18. Louver Unit

C. Samples and Manufacturer's Submittals: Submit prior to delivery or installation.
   1. Samples of all building system components including all specified accessories.
   2. Submit samples of proposed warranties complete with any addenda necessary to meet the warranty requirements as specified.
   3. Submit latest edition of manufacturer's specifications and installation procedures. Submit only those items applicable to this project.
   4. A written statement from the materials manufacturer approving the installer, specifications and drawings as described and/or shown for this project and stating the intent to guarantee the completed project.
   5. Follow submitted shop drawings, product data of all sheet metal.

D. Scale and Measurements: Make Shop Drawings accurately to a scale sufficiently large enough to show all pertinent aspects of the item and its method of connection to the work.

E. Shop Drawings and Product Data: Provide manufacturer's approved details of all conditions, projection conditions, and any additional special job conditions which require details other than indicated in the drawings.
   1. Manufacturer's Details: All termination details and other details normally required by the manufacturer's Technical Specifications, including both standard details and special details, shall be furnished by the Contractor and shall be approved in writing by the manufacturer, the company project manager, and the Owner's representative prior to final installation.

F. Provide manufacturer's approved details, of all perimeter conditions, project conditions, and any additional special job conditions which require details other than indicated in the drawings.

2.02 MANUFACTURER'S LITERATURE

A. Work provided on the mock-up shall follow all of the submitted literature from manufacturers.

B. Manufacturer’s literature shall be the minimum for basis of design and shall be in conjunction with construction documents. All manufacturers' warranties shall remain in effect as specified.

2.03 SAMPLES

A. Provide sample or samples identical to the precise article proposed to be provided.

2.04 COLORS AND PATTERNS

A. Unless the precise color and pattern are specifically called out in the Contract Documents, and whenever a choice of color or pattern is available in the specified products, submit accurate color and pattern charts to the Architect/Project Manager for selection in advance of the Envelope Pre-Construction meeting.

B. Contractor shall coordinate with Architect for exact layout or design of patterns and textures and how they are to be installed on the mock-up.

PART 3 – EXECUTION

3.01 ENVELOPE PRE-CONSTRUCTION MEETING

A. Begin construction of mock-up wall prior to envelope pre-construction meeting, at location determined by Architect. Progress should be sufficient to review installation of weather barrier and flashings as part of envelope pre-construction meeting.

B. Convene a minimum of one week prior to initiation of the mock-up wall construction. Size and location of in-place mock-up to be determined at this meeting.

C. Verify that all required submittals have been approved and that color/finish selections have been made.

D. Establish coordination between trades and establish sequencing of material installations to ensure a complete and watertight assembly.

E. Distribute meeting minutes and agreed upon sequencing to all subcontractors.

F. Construct mock-up walls in accordance with the established procedures and installation sequencing.

3.02 INSTALLATION OF MATERIALS

A. Contractor shall install all materials on mock-up in same manner required for the main structure. Refer to specification sections for basis of design of all material being installed on this mock-up.

B. During installation, Contractor shall maintain a photo manifest of mock-up construction for Architect and Owner to review.

C. Quality of installation is of utmost importance and shall be monitored for completeness and conformance with the design intent and manufacturer's installation recommendations.

D. Once mock-up is complete, it shall be reviewed by the Architect and Owner's Representative for conformance to construction documents.

E. Contractor shall install material in same sequencing as required by industry standards.

3.03 INSTALLATION OF WINDOWS AND ASSOCIATED FLASHING

A. Installer shall coordinate the installation of the window with associated trades to maintain proper compatibility of material.

B. Installation shall be in accordance with referenced specifications.

C. Install all perimeters flashing as detailed to create a sealed air and watertight condition.

D. Once window flashing and weather barrier have been installed, but prior to the installation of cladding, Contractor shall notify Architect, Owner and Consultants for review for conformance and shall coordinate a water test of surrounding flashings per Division 08. Contractor shall notify Architect, Owner and Consultants to observe the testing. All tests shall be in accordance with referenced specifications.

3.04 INSTALLATION OF FLASHING AT THROUGH-WALL LOCATION

A. Installer shall coordinate the installation of the wall flashing with associated trades to maintain proper compatibility of material.

B. Installation shall be in accordance with referencing specifications.

C. Once flashing has been installed, Contractor shall notify Architect, Owner and Consultants for review for conformance.

3.05 QUALITY ASSURANCE

A. Air Barriers
   1. Conduct wet film thickness readings throughout application of the membrane to confirm compliance with manufacturers requirements.
   2. At transitions between materials provided by different manufacturers provide adhesion testing of the air/weather barrier by a third party agency per ASTM D4541, *Test Method for Pull-off Strength for Coatings Using Portable Adhesion Testers* at a minimum of (1) location for each transition condition;
      a. The manufacturer shall provide the minimum pull off strength in pounds per square inch (psi). In the event that the manufacturer cannot provide this data, the minimum pull off strength considered "passing' shall be 100 pounds per square inch.

B. Sealant Joints
   1. Provide sealant adhesion testing, with and without primer, at various substrate conditions, as required by the specifications and/or manufacturer's instructions included as part of the product submittals.
   2. Submit report to Architect.

C. Glazing Systems
   1. Provide specified testing of the glazing system by a third party testing agency. Provide minimum of one (1) test per each specification section. In the event multiple tests are specified, the most stringent test shall be required at the mock-up condition.

3.06 CONSTRUCTION SCHEDULE

A. Once installation sequences have been determined and mock-up wall construction has been approved, modify the Construction Schedule to reflect the established sequencing of material installations and testing requirements. Distribute revised schedule.

END OF SECTION

SECTION 01 4516
OBSERVATION PROCEDURES

PART 1 – GENERAL

1.01 DESCRIPTION

A. CONDITIONS OF THE CONTRACT, SECTIONS AA THROUGH CB AND DIVISION 1 APPLY TO THIS SECTION.

B. Refer to Section AB – Instructions to Proposers, Section AS – Subcontractor / Manufacturer Prequalification, and Section 01 25 00 – Request for Substitution Procedures.

C. Scope of Work:
   1. 01 The Contractor shall coordinate and cooperate with Architect and Architect's Consultants as required for on-site observations and monitoring of the Work.

D. Related Work:
   1. Section 01 31 29 – Notification of Architect Requirements
   2. Section 01 45 23 – Testing and Inspection Services

1.02 RELATED REQUIREMENTS

A. Coordination, scheduling and implementation of inspections and testing required by laws, ordinances, rules, regulations, orders or approvals, or public authorities required for interim and final approval of the Work shall be the sole responsibility of the Contractor.

B. Contractor shall maintain a log of all required governmental interim and final inspections throughout the progress of the Work.

PART 2 – PRODUCTS

2.01 GENERAL

A. Throughout the progress of the Work, the Owner's A/E consultants shall make regular site visits and prepare observation reports.

B. Contractor and requested subcontractors shall be present for all A/E observations. Coordinate with A/E field representatives as required.

C. Contractor shall coordinate all trades as required to address issue or deficiencies identified on the observation reports.

2.02 OBSERVATION REPORTS

A. Upon completion of on-site observations by the Architect and Architect's Consultants, documentation of the Observation shall be furnished to the Contractor.

B. Observation report items that reflect instructions for corrective measures shall be addressed / corrected by the Contractor in a timely manner.
   1. Upon completion of corrective measures, Contractor shall detail corrective measures, including date(s) of work and date(s) of Contractor's verification of completeness on the observation report(s) and return a copy the Architect and Consultant as appropriate.
   2. Wherever possible, Contractor's written documentation shall include all corrective work identified to be addressed on the observation report. Minimize piece meal responses as much as possible.
   3. A complete history of Contractor's observation responses shall be required to be submitted as a condition of project close-out.

PART 3 – GENERAL – PROJECT CONSULTANT OBSERVATIONS

3.01 DESCRIPTION

1. The Contractor shall allow in his Proposal the coordination and scheduling of Observations to be performed by the Owner's project consultants; including the Architect, MEP Engineer, Structural Engineer, Food Service Consultant, Theater Consultant, Technology Consultant and Special Systems Consultants as they may apply to this Work.

B. All project consultant observation services shall be performed by designees of the relative consultant; upon which the Contractor may rely as to the capability and thoroughness of the observation being performed. Upon request by the Contractor, the names of A/E field representatives performing specific observations shall be furnished by the Architect.

C. The Owner shall pay for the observation services of the project consultants in accordance with the Owner – Architect Agreement and the requirements of the Contract Documents. Excessive observations and re-observations resulting from the Contractor's actions as described in this section, shall be paid for by the Contractor directly to the affected Consultant.

D. The Contractor shall cooperate with the Owner's project consultants in all matters pertaining to required observations of the work as described in the Contract Documents. The Owner retains the option to add to or delete any or all observations specified herein; and thereby accept the relative work without observation.

E. Refer to Section 01 31 29 – Notification of Architect Requirements for additional information.

3.02 RELATED REQUIREMENTS

A. Conditions of the Contract, AIA Document A201, and Supplementary Conditions to the General Conditions for the Construction Contract, Specification section CB.

B. Respective Sections of Specifications describing the required consultant observations.

3.03 AUTHORITIES AND DUTIES OF THE A/E FIELD REPRESENTATIVES

A. The project consultant representatives are not authorized to revoke, alter, relax, increase, or release the Contractor from any requirement of the Contract Documents without written notice furnished to the Contractor by the Architect.

B. When it appears that the material, assembly or work performed by the Contractor fails to fulfill Contract requirements, the project consultant representative shall promptly notify the General Contractor, Architect and Owner.

C. The project consultant representative(s) shall promptly distribute copies of the observation reports. Standard distribution shall include copies of all reports to the Owner, Architect, and General Contractor.

3.04 PROJECT CONSULTANT OBSERVATION GUIDELINES AND PROCEDURES

A. Project Consultants shall make all observations required in the Contract Documents and requested by the Contractor and Owner.

B. For each material, assembly or phase observation required in the Contract Documents, and upon request by the Contractor, the project consultant(s) shall perform the following observations as required in the Owner – Architect Agreement; and shall be at the expense of the Owner in accordance with the Owner – Architect Agreement.:

1. Initial observation to determine compliance with the Contract Documents.
2. Observation to determine deficiencies where the initial observation results do not show 100% compliance with the Contract Documents. At the consultant's discretion, this observation may be performed concurrent with the initial observation.
3. Re-observation to determine 100% compliance with the Contract Documents.

C. In the event the observation series described above does not result in 100% approval of the material, assembly or phase being inspected, all subsequent re-observations required to achieve 100% approval shall be at the sole expense of the Contractor to be paid directly to the project consultant based on the consultant's standard hourly rates for time expended, including travel to and from the site.

D. Recognizing the size and complexity of work included in a project may be sufficiently large enough to require the project to be divided into scope areas, each such area shall be considered separate and stand-alone with respect to paragraph 3.4-B above.
   1. Requests by the Contractor for project consultant observations of partial scope completion areas shall be considered observations of the entire scope area with respect to paragraph 3.4-B above; and subsequent observations of the remaining portions of the same scope area shall be paid for directly to the Consultant by the Contractor.
   2. Consultants shall invoice the Contractor on a monthly basis, and payment shall be due upon the Contractor's receipt of the invoice.

E. The Contractor shall bear the responsibility of requesting and scheduling all project consultant observations required by the Contract Documents. The Contractor shall give the project consultant a minimum of forty-eight (48) hours' notice prior to the requested observation.
   1. No extension of Contract Time shall be granted for untimely observations due to the Contractor's failure of proper observation request notification.

F. Observations voluntarily made by project consultants at their discretion, not specifically requested by the Contractor, shall not count as one of the observations described in paragraph 3.4-B above, nor shall the Contractor be liable for any related expenses.

END OF SECTION

SECTION 01 4533
TESTING AND INSPECTION SERVICES

PART 1 - GENERAL

1.01 DESCRIPTION

A. CONDITIONS OF THE CONTRACT, SECTIONS AA THROUGH CB AND DIVISION 1 APPLY TO THIS SECTION.

B. Refer to Section AB – Instructions to Proposers, Section AS – Subcontractor / Manufacturer Prequalification, and Section 01 25 00 – Request for Substitution Procedures.

C. Scope of Work:
   1. The Contractor shall allow in his proposal the coordination and supervision of tests to be performed by an independent laboratory selected by the Owner.
   2. All testing laboratory services shall be provided and paid for by the Owner outside of this Contract.
   3. A testing lab shall be selected by the Owner, and the Contractor shall be notified as soon as possible.
   4. The Contractor shall cooperate with the testing laboratory in all matters pertaining to the work. The Owner retains the option to add to or delete any or all testing specified herein.

D. Related Work:
   1. Section 01 31 29 – Notification of Architect Requirements
   2. Section 01 45 16 – Observation Procedures
   3. Conditions of the Contract: Inspections and testing required by laws, ordinances, rules, regulations, orders or approvals, or public authorities.
   4. Respective Sections of Specifications: Certification of products.
   5. Each Specification Section Listed: Laboratory test required and standards for testing.

E. Testing laboratory inspection, sampling and testing is required for: 01 Division 03 – Concrete
   1. Section 03 3000 – Cast-In-Place Concrete:
      a. Compressive strength test.
   2. Section 04 20 00 – Unit Masonry:
      a. Non-Structural Mortar/Grout – (1) test every 2000 sq feet.
      b. Structural-Bearing Mortar/Grout, Steel Reinforcement inspection and test every 2000 sq feet.
   3. Section 05 12 00 – Structural Steel Framing
   4. Section 31 23 33 – Trenching and Backfilling
   5. Section 31 32 13.19 – Lime Soil Stabilization
   6. Electrical, plumbing and mechanical tests required in relative Sections.
   7. As requested by the Owner or Architect.
   8. Required special inspections by code.

1.02 AUTHORITIES AND DUTIES OF THE TESTING LABORATORY

A. The testing laboratory shall provide testing services under a separate agreement with the Owner or Architect, who shall be responsible for the costs of initial testing – pass or fail.
   1. The Contractor shall be responsible for costs of all re-tests required to achieve passing results.
   2. The Contractor shall be responsible for charges of the testing lab for expenses incurred for cancelled and / or mis-scheduled testing requests.
   3. The testing lab shall invoice Contractor direct for all re-tests of failed initial tests; and send copies of the invoices to the Architect and Owner for record.
   4. The testing lab and Contractor shall be responsible to negotiate and execute a separate agreement if required by the testing lab for charges described above.

B. The laboratory is not authorized to revoke, alter, relax, enlarge, or release any requirement of the Specifications, or to approve or accept any portion of the work.
   1. When it appears that the material furnished or work performed by the Contractor fails to fulfill specification requirements, the testing laboratory shall promptly notify the Contractor, Architect and Owner of work being tested of such deficiencies.

C. The laboratory shall promptly distribute copies of the laboratory test and inspection reports. Standard distribution shall include copies of all reports to the Owner, Architect, and Contractor.
   1. The structural engineer, civil engineer, MEP engineer, concrete supplier, and any outside consultants shall receive copies of the testing results regarding their particular phase of the project.
   2. Electronic distribution of test reports / results is mandatory.

D. The testing lab is required to furnish a report of the status of testing performed as it relates to anticipated expenses described in the Agreement with the testing lab. Reports shall be furnished at most bi-monthly to the Owner and Architect.
   1. Report information shall include verification that Owner paid testing progress corresponds with anticipated expenses.
   2. The testing lab shall be required to notify the Architect and Owner immediately if / when the testing lab anticipates exceeding the lump sum fee agreed to by the Owner.
   3. Such notification must occur prior to expensing 75% of the testing lab fee.

1.03 TESTING LABORATORY CONTRACTUAL RELATIONSHIPS

A. The Owner shall contract with the Testing Laboratory outside the Owner-Contractor Agreement.

B. The Owner shall pay for the initial laboratory services / tests – pass or fail.

C. In the case of a failed test that does not meet the specified requirements, the Contractor shall be responsible for payment directly to the Testing Laboratory for all services / re- testing required to achieve a passing result.
   1. The Owner shall not be invoiced for services or re-testing associated with failed initial tests.

D. The Owner shall not be responsible for Contractor's mismanagement or mis-scheduling of the Testing Laboratory that results in cost to the Testing Laboratory that do not result in Testing Laboratory performing its intended function (i.e. Contractor cancellation of Testing Laboratory services previously called for).

E. The Testing Laboratory record and document all retesting of failed initial tests and charges due to the mismanagement or mis-scheduling of the Contractor.

F. The Testing Laboratory is responsible for making separate arrangements with the Contractor for invoicing reimbursement of mismanaged services and re-testing associated with failed initial tests. Such expenses shall not be invoiced to the Owner.

1.04 TESTING LABORATORY GUIDELINES AND PROCEDURES

A. Technicians scheduled to perform specific testing services must be qualified to review and perform other services that overlap (i.e., earthwork, foundation inspections, rebar inspection, and concrete), when scheduled concurrently at the project site.

B. Technician time for services performed will be reimbursed at a regular time rate. Compensation at the overtime rate will be considered for any hours over eight hours spent at the job site on a single day, field testing services performed on a Saturday or Sunday, and any field services performed on a recognized holiday. Overtime must receive prior approval from the Owner.

C. Concrete design mixes will receive a cursory review with any discrepancies reported to the Architect.

D. Report distribution shall include the Owner, Architect, Contractor, Civil Engineer, Structural Engineer, and others requesting or requiring review of the specific testing results.

E. Job site trips solely for cylinder pick-up shall be minimized. Whenever possible, cylinder / specimen pick-up shall be conducted when a technician is scheduled to be on-site for other testing work.

F. The Contractor shall bear the responsibility of scheduling all testing services. The Contractor and the testing laboratory shall assume full responsibility to coordinate the testing services. Cancellations and/or failed tests will be reimbursable to the Owner by the responsible party for the cancellation or failure of a test or service.

1.05 REFERENCES

A. Concrete:
1. ASTM C31/C31M – Standard Practice for Making and Curing Concrete Test Specimens in the Field.
2. ASTM C138 – Standard Test Method for Density (Unity Weight), Yield, and Air Content (Gravimetric) of Concrete.
3. ASTM C143 – Standard Test method for Slump of Hydraulic Cement Concrete.
4. ASTM C173 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
5. ASTM C231 – Standard Test method for Air Content of Freshly Mixed Concrete by the Pressure Method.
6. ASTM C1064 – Standard Test Method for Temperature of Freshly Mixed Hydraulic-Mixed Cement Concrete.
7. ACI 301 – Specifications for Structural Concrete for Buildings.

1.06 TESTS CONDUCTED

A. Cast-In-Place Concrete:
1. Review proposed concrete design mixes.
2. Cast four (4) concrete test cylinders for each 100 cubic yards, or fraction thereof, placed on any day for all other types of concrete.
3. Strength level of an individual class of concrete shall be considered satisfactory when both of the following criteria are met:
   a. The arithmetic average of any three consecutive strength tests equal or exceed f'c.
   b. No individual strength test (average of two cylinders) falls below f'c by more than 500 psi.
4. Conduct slump testing of concrete at intervals equal to test cylinders are made.

B. Test Specimens:
1. Concrete Cylinder Specimens: Break one (1) at 7 days and two (2) at 28 days. If the 28-day break average exceeds minimum specified requirements, discard the fourth cylinder. If the 28-day break average is below specified minimum, hold and break the fourth cylinder at 56 days; or process as directed by the structural Engineer.

PART 2 – GOVERNMENTAL INSPECTIONS AND CONTRACTOR TESTING

2.01 GOVERNMENTAL INSPECTIONS

1. The Contractor shall allow in his Proposal the application, coordination, scheduling and cost of all on-site inspections to be performed by governmental authorities having jurisdiction which are required for approval of the Work and occupancy of the building; including, but limited to:
   a. City departments
   b. County departments
   c. Flood Control Districts
2. Municipal Utility Districts
3. Health Departments
4. Fire Marshal Offices

B. The Contractor shall also cooperate with Owner for all observations required by the Owner.
   1. The Contractor shall make all corrective measures in accordance with instructions received from the governing authority inspector having jurisdiction, as required to receive 100% approval for the work being inspected.

C. The Contractor shall record and keep record of all governmental agency tests and inspections; including deficiencies noted by the agency, and corrective action(s) taken to receive final approval of the agency.

D. The Contractor shall bear all costs for initial inspections, re-inspections and any other expenses related to on-site inspections made by governing authorities.

E. No allowance shall be made for additional Contract Time, nor an increase in the Contract Sum for any unanticipated expenses or delays resulting from failed governmental inspection or resulting re-inspections required to obtain agency approval(s).

PART 3 – OWNER CONSULTANT OBSERVATIONS AND INSPECTIONS

3.01 GENERAL

A. Throughout the progress of the Work, the Owner's A/E consultants shall make regular site visits and prepare observation reports.

B. Refer to specification section 01 31 29 – Notification of Architect Requirements for specific observations required by the Architect, and the scheduling of such observations.

C. Contractor and A/E requested subcontractors shall be present for all A/E observations. Coordinate with A/E field representatives as required.

D. Contractor shall coordinate all trades as required to address issue or deficiencies identified on the observation reports.

E. Upon completion of corrective measures, Contractor shall note corrective measures, including date(s) on the observation report(s) and distribute the Architect.

3.02 TEXAS DEPARTMENT OF LICENSING AND REGULATION (TDLR)

A. The Owner /Architect shall be responsible for interfacing with Texas Department of Licensing and Registration (TDLR) regarding state approval for compliance with Texas Accessibility Standards.

B. The Owner /Architect shall make the initial submission of the Contract Documents for review.

C. TAS review comments affecting the Work shall be incorporated into the Work as directed by the Architect either by Addendum, Change Proposal Request, Minor Change or Clarification.

D. During the progress of the Work, the Contractor shall bring to the Architect's attention any portion of the Work that may be questionably compliant with TDLR / TAS.

E. The Architect shall coordinate and manage the TAS inspection of the completed project.
   1. TAS required corrective measures due to design issues shall be paid for by the Architect.
   2. TAS required corrective issues due to Contractor issues (materials, installation, etc.) shall be paid for by the Contractor.

F. All corrective work shall be completed within thirty (30) days after notification unless otherwise agreed upon by the Owner.

END OF SECTION

SECTION 01 5000
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary utilities.

B. Temporary sanitary facilities.

C. Temporary Controls: Barriers, enclosures, and fencing.

D. Security requirements.

E. Vehicular access and parking.

F. Waste removal facilities and services.

G. Project identification sign.

H. Field offices.

1.02 RELATED REQUIREMENTS

A. Section 01 2100 - Allowances

1.03 TEMPORARY UTILITIES

A. Provide and pay for all electrical power, lighting, water, heating and cooling, and ventilation required for construction purposes including review and inspection of work.

B. New permanent facilities may not be used.

1.04 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.

B. Use of existing facilities is not permitted.

C. New permanent facilities may not be used during construction operations.

D. Maintain daily in clean and sanitary condition.

E. At end of construction, return facilities to same or better condition as originally found.

1.05 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas., to allow for owner's use of siteProtect existing facilities and adjacent properties from damage from construction operations and demolition. Implement safety precautions that comply with all regulatory requirements.

B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.

C. Provide protection for plants designated to remain. Replace damaged plants.

D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.06 FENCING

A. Construction: Commercial grade chain link fence.

B. Provide 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks.

C. On sites where students are present, no work shall commence prior to fence being in place.

1.07 EXTERIOR ENCLOSURES

A. Provide temporary weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

1.08 SECURITY

A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

B. Coordinate with Owner's security program.

1.09 VEHICULAR ACCESS AND PARKING

A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.

B. Coordinate access and haul routes with governing authorities and Owner.

C. Provide and maintain access to fire hydrants, free of obstructions.

D. Provide means of removing mud from vehicle wheels before entering streets.

E. Designated existing on-site roads may be used for construction traffic.

F. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

G. Do not allow vehicle parking on existing pavement.

1.10 WASTE REMOVAL

A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.

B. If materials to be recycled or re-used on the project must be stored on-site, provide suitable and secure non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.

C. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.11 PROJECT IDENTIFICATION

A. No later than ten (10) days after the Notice to Proceed, and prior to start of construction, provide a job sign at the job site.

B. Request sign layout and details from the Architect.

C. Reference Section 01 2100 - Allowances for cash allowance for project sign.

D. Contractor shall be responsible to pick up sign.

E. Provide project identification sign of design and construction indicated on drawings.

F. Erect on site at location indicated.

G. No other signs are allowed without Architect's permission except those required by law.

1.12 FIELD OFFICES

A. Office: Weathertight, with lighting, electrical outlets, heating, cooling and ventilating equipment, and equipped with sturdy furniture, drawing rack .

B. Provide space for Project meetings, with table and chairs to accommodate 6 persons.

C. Provide separate work station similarly equipped and furnished, for use of Architect..

D. Locate offices a minimum distance of 50 feet from existing and new structures.

1.13 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials, prior to final punch list and review inspection.

B. Remove underground installations to a minimum depth of 3 feet. Grade site as indicated.

C. Clean and repair damage caused by installation or use of temporary work.

D. Restore existing facilities used during construction to original condition.

E. Restore new permanent facilities used during construction to specified condition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 5713
EROSION AND SEDIMENTATION CONTROL

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. This Section pertains to the implementation, maintenance inspection, and termination of storm water pollution prevention control measures including, but not limited to, erosion and sediment controls, storm water management plans, waste collection and disposal, off-site vehicle tracking, and other appropriate practices shown on the Storm Water Pollution Prevention Plan (SWPP PLAN), on the plans or required by the Texas Pollutant Discharge Elimination System (TPDES) General Permit TXR150000.

B. The Contractor is responsible for meeting all local, state and federal regulations regarding erosion control including the applicable provisions of the National Pollution Discharge Elimination System, Phase II, regulations from the Clean Water Act.

1.02 DEFINITIONS

A. Commencement of Construction Activities: The exposure of soil resulting from activities such as clearing, grading, and excavation activities, as well as other construction related activities (e.g., stock piling of fill material, demolition).

B. Large Construction Activity: Project that:
   1. Disturbs five acres or more, or
   2. Disturbs less than five acres but is part of a larger common plan of development that will disturb five acres or more of land.

C. Small Construction Activity: Project that:
   1. Disturbs one or more acres but less than five acres, or
   2. Disturbs less than one acre but is part of a larger common plan of development that will ultimately disturb one or more acres but less than five acres.

D. TPDES Operator:
   1. Operator - The person or persons associated with a large or small construction activity that is either a primary or secondary as defined below:
      a. Primary Operator – the person or persons associated with a large or small construction activity that meets either of the following two criteria:
         i. The persons have operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or
         ii. The person or persons have day-to-day operational control of those activities at a construction site that are necessary to ensure compliance with a storm water pollution prevention plan (SWPP PLAN) for the site or other permit conditions (e.g., they are authorized to direct workers at a site to carry out activities required by the SWPP PLAN or comply with other permit conditions).
      b. Secondary Operator – The person whose operational control is limited to the employment of other operators or to the ability to approve or disapprove changes to plans and specifications. A secondary operator is also defined as a primary operator if there are no other operators at the construction site.

E. Best Management Practices (BMP's): Physical facilities schedules of activities, prohibition of practices, maintenance procedures, and other management practices, when properly designed, installed, and maintained, will be effective to prevent or reduce the discharge of pollution

associated with construction activities. BMP's also include treatment requirements, operating procedures, and practices to control site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

F. Block Sodding: Sodding for erosion control and for final stabilization shall consist of providing and planting Bermuda grass, San Augustine grass, or other acceptable sod along or across such areas as are designated on the drawings and in accordance with the specification requirements herein outlined.

G. Hydromulch Seeding: Seeding, followed by the application of a mulch erosion control blanket shall consist of preparing the ground, sowing of seeds, application of a fertilizer, and stabilization with mulch consisting of a biodegradable fiber along and across such areas as are designated on the plans and in accordance with these specifications

H. Silt Fence: The reinforced filter fabric barrier consists of geotextile fabric supported by a net reinforced fence stretched across and attached to supporting posts or frame and entrenched. Work shall be performed during construction operations and prior to final stabilization to control erosion and sedimentation as designated on the plans and in accordance with these specifications.

I. Inlet Protection Barriers: The inlet protection barrier consists of a geotextile fabric (filter fabric) supported by a net reinforced fence structure and constructed around a storm drain inlet, catch basin, or culvert. An alternative design of the inlet protection barrier, as approved by the Engineer, consists of fiber rolls placed around a frame, staked in place (or weighted down with clean gravel bags), and constructed around a storm drain inlet, catch basin or culvert. This work shall be performed during construction operations and prior to final stabilization to control erosion and sedimentation. As designated on the plans and in accordance with these specifications.

J. Sediment Basins: A sediment basin is a temporary basin or dam constructed across a waterway or excavated location to intercept sediment-laden runoff and to trap and retain the sediment. A sediment basin is usually installed at points of discharge from drainage areas greater than 5 acres. Work shall be performed during construction operations and prior to final stabilization to control erosion and sedimentation as designated on the plans and in accordance with these specifications.

K. Stabilized Construction Access: This work shall consist of the installation of temporary erosion protection and sediment control stabilized construction access - type I, rock, utilized during construction operations and prior to final stabilization, in accordance with these specifications and construction drawings.

L. Rock Filter Dams: Rock filter dams are temporary berms constructed of stone to intercept and slow storm water runoff to retain sediment on the construction site.
   1. Depending upon the type of rock filter dam specified in the construction plans as Type 1, 2, 3, or 4, the aggregate fill may be unwrapped, wrapped in twisted hexagonal wire mesh, or confined in a gabion wire basket. Applications of Rock Filter Dams are as follows:
      a. Type 1 dams may be used at toe of slopes, around inlets, in small ditches, and at dike or swale outlets. Type 1 dams are recommended for erosion and sediment control from a drainage area of 5 acres or less.
      b. Type 2 dams may be used in ditches and at dike or swale outlets.
      c. Type 3 dams may be used in stream flow.
      d. Type 4 sack gabions may be used in ditches and smaller channels to form an erosion and sediment control dam

1.03 REGULATORY REQUIREMENTS

A. Contractor shall comply with all current, applicable codes and regulations.

B. Contractor shall comply with all Standard Specifications and Details of Authorities having Jurisdiction for work in the right-of-way or easements.

C. Prior to commencement of work, the Contractor shall be responsible for obtaining, at the contractors own expense, all construction permits necessary to complete the project according to the plans and specifications.

1.04 SUBMITTALS

A. Submit a copy of the Storm Water Pollution Prevention Plan (SWPP Plan).

B. Submit a copy of the Notice of Intent (NOI).

C. Submit a copy of the Notice of Termination (NOT).

D. Submit manufacturer's literature for product specifications and installation instructions.

E. Submit manufacturer’s catalog sheets and other product data on geotextile or filter fabrics, outlet pipe, perforated riser and connectors.

F. Submit proposed methods, equipment, materials, and sequence of operations for storm-water pollution prevention structures.

G. Submit shop drawings for inlet baskets.

1.05 QUALITY ASSURANCE

A. Codes and Standards: Perform earthwork complying with requirements of authorities having jurisdiction.

PART 2 – PRODUCTS

2.01 SUSTAINABLE MATERIALS

A. Contractor shall strive to utilize sustainable materials, which include rapidly renewable materials, regional materials, regionally manufactured materials, regionally extracted materials, recycled contents.

2.02 GRASS

A. Materials for erosion control seeding shall conform to the requirements of 32 92 13 – Hydromulch Seeding.

B. Materials for erosion control seeding shall conform to the requirements of 32 92 00 – Turf and Grasses.

2.03 BANK SAND BACKFILL

A. Durable bank run sand classified as SP, SW, or SM by Unified Soil Classification System (ASTM D 2487) meeting following requirements:

1. Less than 15 percent passing number 200 sieve when tested in accordance with ASTM D 1140. Amount of clay lumps or balls may not exceed 2 percent.
2. Material passing number 40 sieve shall meet the following requirements when tested in accordance with ASTM D 4318: PI not exceeding 7.

2.04 WATER

A. Water used for mixing or curing shall be reasonably clean and free of oil, salt, acid, alkali, sugar, vegetable matter or other substances injurious to the finished product.

B. Water sources other than the local municipal domestic water supply must be approved by the Owner's Representative.

C. If onsite reclaimed water sources are used, tanks and appurtenances must be clearly marked with the words "non-potable" water.

2.05 STABILIZED CONSTRUCTION ACCESS

A. Provide crushed aggregate for long- and short-term construction exits. Furnish aggregates that are clean, hard, durable, and free from adherent coatings such as salt, alkali, dirt, clay, loam, shale, soft or flaky materials, and organic and injurious matter. Use 4 to 8-inches aggregate for Type 1. Use 2 to 4-inches aggregate for Type 3.

2.06 SILT FENCE

A. Woven or nonwoven geotextile filter fabric made of polypropylene, polyethylene, ethylene, or polyamide material, in continuous rolls of longest practical length.

B. Grab Strength: 100 psi in any principal direction (ASTM D-4632), CBR puncture strength >200 psi (ASTM D-3786), and equivalent opening size between 50 and 140.

C. Furnish ultraviolet inhibitors and stabilizers for minimum 6 months of expected usable construction life at temperature range of 0 degrees F to 120 degrees F.

D. Provide net reinforcement of at least 12.5 gauge (SWG) galvanized welded wire mesh, with a maximum opening size of 2 × 4 in., at least 24 in. wide, unless otherwise shown on the plans.

E. TenCate Geosynthetics, Contech Engineered Solutions, or equivalent.

2.07 INLET PROTECTION BARRIERS

A. Geotextile shall be per the requirements of paragraph 2.6 of this section.

B. Provide net reinforcement of at least 12.5 gauge (SWG) galvanized welded wire mesh, with a maximum opening size of 2 × 4 in., at least 24 in. wide, unless otherwise shown on the plans.

C. Barrier Stakes: Nominal 2 by 2 inch moisture-resistant treated wood or steel posts (min. of 1.25 lbs. per linear foot and Brinell Hardness greater than 140) with safety caps on top; length as required for minimum 12 inch bury and full height of filter fabric.

2.08 DROP INLET BASKET

A. Provide steel frame members in accordance with ASTM A36.

B. Construct top frame of basket with two short sides of 2 inch by 2 inch and single long side of 1 inch by 1 inch, 1/8 inch angle iron. Construct basket hangers of 2 inch by 1/4 inch iron bars. Construct bottom frame of 1 inch by 1/4 inch iron bar or 1/4 inch plate with center 3 inches removed. Use minimum 1/4 inch diameter iron rods or equivalent for sides of inlet basket.

C. Weld aminimum of 14 rods in place between top frame/basket hanger and bottom frame. Exact dimensions for top frame and insert basket will be determined based on dimensions of type of inlet being protected.

2.09 SANDBAGS

A. Provide woven material made of polypropylene, polyethylene, or polyamide material.
   1. Minimum unit weight of four ounces per square yard.
   2. Minimum grab strength of 100 lbs in any principal direction (ASTM D4632).
   3. Mullen burst strength exceeding 300 lbs (ASTM D4833).
   4. Ultraviolet stability exceeding 70 percent. After 500 hours of exposure (ASTM 4355).
   5. Size: Length: 18 to 24 inches. Width: 12 to 18 inches. Thickness: 6 to 8 inches. Weight: Approximately 40 to 50 pounds not to exceed 75 pounds.

2.10 BAGGED GRAVEL BARRIER

A. Provide a bagged gravel barrier.
   1. Minimum unit weight of four ounces per square yard.
   2. Minimum grab strength of 100 lbs in any principal direction (ASTM D4632).
   3. Mullen burst strength exceeding 300 lbs (ASTM D4833).
   4. Ultraviolet stability exceeding 70 percent. After 500 hours of exposure (ASTM 4355).
   5. Size: Length:18 to 24 inches. Width: 12 to 18 inches. Thickness: 6 to 8 inches. Weight: Approximately 40 to 50 pounds not to exceed 75 pounds.

2.11 ROCK FILTER DAM

A. Materials. Geotextile fabric shall consist of a woven monofilament or spunbond nonwoven fibers consisting of long-chain synthetic polymers composed of at least 95 percent by weight of polyolefins. Geotextile fabric shall equal or exceed the following average roll values or as directed by the Engineer:
   1. Minimum average roll value.
      a. Elongation ³ 50 percent.
      b. Grab Strength – 200 pounds.
      c. Puncture Strength – 75 pounds.
      d. UV Stability (retained strength) – 50 percent after 500 hours of exposure.
   2. Maximum average roll value.
      a. Apparent Opening Size (AOS) – 0.6 mm/#30 US sieve.

B. Geotextile fabric shall be resistant to commonly encountered soil chemicals, mildew, rot, insects, and deterioration resulting from exposure to sunlight or heat. Geotextile fabric shall provide an expected useable life comparable to the anticipated construction period.

C. Aggregate for the rock filter dams shall consist of crushed stone. Aggregate particles shall be composed of clean, hard, durable materials free from adherent coatings, salt, alkali, dirt, clay, loam, shale, soft or flaky materials or organic and injurious matter. Aggregate shall be cubic or rounded form, not elongated, flat, shapes. Spalls, fragments, and chips shall not exceed 5 percent by weight. Crushed concrete may be substituted for the crushed stone. Aggregate size shall depend upon the type of rock filter dam specified in the construction plans. Aggregate size based on type of rock filter dam is as follows:
   1. Type 1:

a. Used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets for a drainage area of 5 acres or less.
b. 3 inches to 5 inches, open-graded.

2. Type 2:
   a. Used in ditches and at dike or swale outlets.
   b. 3 inches to 5 inches, open-graded.
3. Type 3:
   a. Used in stream flow.
   b. 4 inches to 8 inches, open-graded.
4. Type 4:
   a. Sack gabions may be used in ditches and smaller channels to form an erosion and sediment control dam.
   b. 3 inches to 5 inches, open-graded.

D. Mesh is required for reinforced type rock filter dams. Mesh shall be 20 gauge galvanized double twisted hexagonal wire mesh with 1-inch diameter hexagonal openings. Mesh wire shall be zinc coated prior to being double twisted. Reinforcing spiral binders, lacing wire, and stiffeners shall be made of wire having the same coating material and same wire size as the wire mesh. Gabion wire baskets shall equal or exceed the requirements of the wire mesh.

PART 3 – EXECUTION

3.01 PREPERATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Protect existing site improvements to remain from damage during construction. Restore damaged improvements to their original condition, as acceptable to Owner.

C. Plan Work to minimize the time areas are to be exposed without vegetative cover.

D. Prepare a SWPP Plan following the requirements of the Construction General Permit and the requirements of the local MS4. If conflicts exist between the Construction General Permit and the requirements of the MS4, the more stringent requirements will apply.

1. Update or revise the SWPPP as needed during the construction following the requirements of the Construction General Permit.
2. Submit the SWPPP and any updates or revisions to the Owner's Representative for review and address comments prior to commencing, or continuing, construction activities.

E. Notice of Intent for Large Construction Activity
1. Fill out, sign, and date TCEQ Notice of Intent (NOI) form for Storm Water Discharges Associated with Construction Activity under the TPDES Construction General Permit (TXR 150000) for the Contractor and Owner.
2. Transmit the signed Contractor's and Owner's copy of the NOI, along the required fees to the TCEQ. Provide a copy of the documents to the Owner's Representative.
3. Submission of the Notice of Intent form by the Contractor and Owner is required a minimum of seven days before Commencement of Construction Activities.

F. Construction Site Notice for Small Construction Activity
1. Fill out, sign, and date the Construction Site Notice, contained in the TPDES General Permit TXR 150000.
2. Transmit the signed Construction Site Notice to Owner's Representative at least seven days prior to Commencement of Construction Activity.

G. Certification Requirements
   1. Complete the Large Construction Site “Primary Operator” Notice.
   2. Contractor shall complete the Large Construction Site “Secondary Operator” Notice and provide it to the Owner and Subcontractor’s for signature.
   3. Submit properly completed certification forms to the Owner’s Representative for review before beginning construction operations.
   4. Conduct inspections in accordance with TCEQ requirements. Use the EPA NPDES Construction Inspection Form to record maintenance inspections and repairs.

H. Post the following notices from effective date of the SWPP Plan until date of final site stabilization as defined in the Construction General Permit:
   1. Post the TPDES permit number for Large Construction Activity, with a signed TCEQ Construction Site Notice for large or Small Construction Activity. Signed copies of the Contractor’s and Owner’s NOI, as applicable, must also be posted.
   2. Post notices near the main entrance of the construction site in a prominent place where it is safely and readily available for viewing by General Public, Local, State, and Federal Authorities. Post name and telephone number of Contractor’s local contact person, brief project description and location of the SWPP PLAN.
      a. If posting near a main entrance is not feasible due to safety concerns, coordinate posting of notice with The Owner’s Representative to conform to requirements of the Construction General Permit.
      b. If Project is a linear construction project (e.g.: road, utilities, etc.), post notice in a publicly accessible location near active construction. Move notice as necessary.
   3. Post a notice to equipment and vehicles operators, instructing them to stop, check, and clean tires of debris and mud before driving onto traffic lanes. Post at each stabilized construction access area.
   4. Post a notice of waste disposal procedures in a readily visible location on site.

I. Keep a copy of this document and the SWPP Plan in a readily accessible location at the construction site from Commencement of Construction Activity until submission of the Notice of Termination (NOT) for Storm Water Discharges Associated with Construction Activity under TPDES Construction General Permit (TXR 150000). Contractors with day-to-day operational control over SWPP Plan implementation shall have a copy of the SWPP PLAN available at a central location, on-site, for the use of all operators and those identified as having responsibilities under the SWPP Plan. Upon submission of the NOT, submit all required forms and a copy of the SWPP Plan with all revisions to the Owner’s Representative.

3.02 GENERAL

A. Use all means necessary to control dust on or near the site resulting from the performance of the Work. Thoroughly moisten all surfaces to prevent dust being a nuisance to the public, adjacent uses, and concurrent work on site. Moisture level during compaction operations shall not exceed that amount as specified by Geotechnical Engineer.

B. Install erosion control systems at the site's boundary at locations where stormwater runoff will leave the site prior to starting any clearing, stripping, or earthwork operations.

C. Properly dispose of solid waste, paints, solvents, cleaning compounds, etc.

D. Store construction materials in designated areas away from drainageways and low areas.

E. Construct containment berms and utilize drip pans at fuel and liquid storage tanks and containers.

3.03 INSTALLATION OF EROSION CONTROL DEVICES

A. Install erosion control devices to protect adjacent and downstream properties from damage and pollution resulting from erosion caused by the work of this Contract. Implement erosion control measures indicated on drawings and additional erosion control measures necessary to prevent damage to adjacent and downstream properties.

B. Install silt fence located along perimeter of site or grading limits immediately following site clearing operations specified under Division 31 Section 31 11 00 – Clearing and Grubbing.
   1. Install silt fence fabric from a continuous roll for the length of the silt fence whenever possible to minimize the number of joints. Create joints in fabric by securely fastening fabric at the support post with overlap extending to the next post.
   2. Drive support post into ground not less than 18 inches.
   3. Excavate a 4-inch wide by 4-inch deep trench on up-slope side of silt fence.
      a. Line trench with silt fence fabric material.
      b. Backfill trench with soil or gravel.

C. Install inlet protection barriers at all inlets.

D. Stabilized Construction Access
   1. Provide stabilized construction roads and access at construction, staging, parking, storage, and disposal areas to keep street clean of mud carried by construction vehicles and equipment. Construct erosion and sediment controls in accordance with Drawings, Specification and any requirements of the authority having jurisdiction.
   2. Place the exit over a foundation course, if necessary. Grade the foundation course or compacted subgrade to direct runoff from the construction exits to a sediment trap.
   3. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as required.
   4. Construct to a depth of at least 8 in. using crushed aggregate as shown on the plans or as directed.

3.04 STORAGE OF SOIL MATERIALS

A. Stockpile borrow materials and satisfactory excavated soil materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

B. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

C. Stockpile Topsoil may not exceed 6 feet in height.

3.05 FIELD QUALITY CONTROL

A. Testing shall be the responsibility of the Owner and costs of initial testing shall be paid by Owner. Cost of all subsequent testing necessary due to non-compliance with specifications shall be paid by Contractor.

B. Density Test:
   1. Frequency and scope of testing shall be established by Geotechnical Engineer, and as required by local jurisdictional authority. If Geotechnical Engineer has not established a frequency of testing in the Geotechnical Report, testing shall be at every 100 linear foot of trench at a minimum of one per lift and a minimum of one per day.
   2. Tests shall be performed in accordance with the referenced Standards.

3. Laboratory tests for moisture density relations shall be determined in accordance with ASTM D 1557. A minimum of one test shall be performed for each major soils type. In addition, sufficient number of retests or check points shall be performed to evaluate accuracy of maximum density values being used.
4. Field in-place density shall be determined in accordance with ASTM Test Methods D 1556 or D 2922, and the moisture-density relations shall be determined in accordance with ASTM Test Method D 1557.
5. Reopen improperly compacted trenches to depth directed, then refill and compact to the specified density at no additional cost to Owner

3.06 DRAINAGE CONTROLS

A. Provide all necessary temporary apparatus, pumps, curbs or ditches as required to divert or convey water from any source away from the Work. Do not allow water from any source to accumulate within or damage trenches.

END OF SECTION 01 571313

SECTION 01 5719
INDOOR AIR QUALITY CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Construction procedures to promote adequate indoor air quality after construction.

B. Testing indoor air quality before commencement of construction; existing building areas only.

C. Testing indoor air quality after completion of construction.

1.02 PROJECT GOALS

A. Dust and Airborne Particulates: Prevent deposition of dust and other particulates in HVAC ducts and equipment.
   1. Cleaning of ductwork is not contemplated under this Contract.
   2. Contractor shall bear the cost of cleaning required due to failure to protect ducts and equipment from construction dust.
   3. Establish condition of existing ducts and equipment prior to start of alterations.

B. Airborne Contaminants: Procedures and products have been specified to minimize indoor air pollutants.
   1. Furnish products meeting the specifications.
   2. Avoid construction practices that could result in contamination of installed products leading to indoor air pollution.

1.03 REFERENCE STANDARDS

A. ASHRAE Std 52.2 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size; 2017.

B. ASHRAE Std 129 - Measuring Air-Change Effectiveness.; 1997 (Reaffirmed 2002).

C. ASTM E779 - Standard Test Method for Determining Air Leakage Rate by Fan Pressurization; 2010.

D. SMACNA (OCC) - IAQ Guidelines for Occupied Buildings Under Construction; 2007.

1.04 DEFINITIONS

A. Adsorptive Materials: Gypsum board, acoustical ceiling tile and panels, carpet and carpet tile, fabrics, fibrous insulation, and other similar products.

B. Contaminants: Gases, vapors, regulated pollutants, airborne mold and mildew, and the like, as specified.

C. Particulates: Dust, dirt, and other airborne solid matter.

D. Wet Work: Concrete, plaster, coatings, and other products that emit water vapor or volatile organic compounds during installation, drying, or curing.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Indoor Air Quality Management Plan: Describe in detail measures to be taken to promote adequate indoor air quality upon completion; use SMACNA (OCC) as a guide.
   1. Submit not less than 60 days before enclosure of building.
   2. Identify potential sources of odor and dust.
   3. Identify construction activities likely to produce odor or dust.
   4. Identify areas of project potentially affected, especially occupied areas.
   5. Evaluate potential problems by severity and describe methods of control.
   6. Describe construction ventilation to be provided, including type and duration of ventilation, use of permanent HVAC systems, types of filters and schedule for replacement of filters.

7. Describe cleaning and dust control procedures.
8. Describe coordination with commissioning procedures.

C. Interior Finishes Installation Schedule: Identify each interior finish that either generates odors, moisture, or vapors or is susceptible to adsorption of odors and vapors, and indicate air handling zone, sequence of application, and curing times.

D. Duct and Terminal Unit Inspection Report.

E. Indoor Air Quality Testing Plan: Identify:
1. Testing agency qualifications.
2. Locations and scheduling of air sampling.
3. Test procedures, in detail.
4. Test instruments and apparatus.
5. Sampling methods.

F. Indoor Air Quality Testing Reports: Show:
1. Location where each sample was taken, and time.
2. Test values for each air sample.
3. HVAC operating conditions.
4. Certification of test equipment calibration.
5. Other conditions or discrepancies that might have influenced results.
6. Interpretation of test results.
7. Recommendations for improvement of indoor air quality or retesting.

1.06 QUALITY ASSURANCE

A. Firm Qualifications: The indoor air quality testing firm must have a minimum of five years experience specifically in the indoor environmental quality field and must have indoor environmental testing and consulting capabilities. Firm should be a licensed mold assessment company (ACO) through the Texas Department of Licensing and Regulation (TDLR), and should have a minimum of one mold assessment consultant (MAC) on staff. Additionally, the firm's consultants should maintain current certification in indoor environmental consulting (i.e. Certified Indoor Environmental Consultant (CIEC) through the American Council for Accredited Certification (ACAC) or other certifying association. The firm should employ a LEED-Accredited Professional, certified by the United States Green Building Council (USGBC).

B. Laboratory Qualifications: The microbiology testing laboratory utilized by the consulting firm should have a minimum of five years experience, be a licensed mold analysis laboratory through the Texas Department of Licensing and Regulation (TDLR), and should employ a degreed mycologist. The industrial hygiene laboratory utilized by the consulting firm should have a minimum of five years experience, and be accredited by the American Industrial Hygiene Association (AIHA).

PART 2 PRODUCTS

2.01 MATERIALS

A. Low VOC Materials: See other sections for specific requirements for materials with low VOC content.

B. Auxiliary Air Filters: MERV of 8, minimum, when tested in accordance with ASHRAE Std 52.2.

PART 3 EXECUTION

3.01 CONSTRUCTION PROCEDURES

A. Prevent the absorption of moisture and humidity by adsorptive materials by:
1. Sequencing the delivery of such materials so that they are not present in the building until wet work is completed and dry.
2. Delivery and storage of such materials in fully sealed moisture-impermeable packaging.
3. Provide sufficient ventilation for drying within reasonable time frame.

B. Begin construction ventilation when building is substantially enclosed.

C. If extremely dusty or dirty work must be conducted inside the building, shut down HVAC systems for the duration; remove dust and dirt completely before restarting systems.

D. When working in a portion of an occupied building, prevent movement of air from construction area to occupied area. Provide pre-construction air filters to all return air registers in adjacent occupied areas.

E. Use of HVAC equipment and ductwork for ventilation during construction is not permitted:
   1. Provide temporary ventilation equivalent to 1.5 air changes per hour, minimum.
   2. Exhaust directly to outside.
   3. Seal HVAC air inlets and outlets immediately after duct installation.

F. Do not store construction materials or waste in mechanical or electrical rooms.

G. Prior to use of return air ductwork without intake filters clean up and remove dust and debris generated by construction activities.
   1. Inspect duct intakes, return air grilles, and terminal units for dust.
   2. Clean plenum spaces, including top sides of lay-in ceilings, outsides of ducts, tops of pipes and conduit.
   3. Clean tops of doors and frames.
   4. Clean mechanical and electrical rooms, including tops of pipes, ducts, and conduit, equipment, and supports.
   5. Clean return plenums of air handling units.
   6. Remove intake filters last, after cleaning is complete.

H. Do not perform dusty or dirty work after starting use of return air ducts without intake filters.

I. Use other relevant recommendations of SMACNA (OCC) for avoiding unnecessary contamination due to construction procedures.

3.02 INDOOR AIR QUALITY TESTING (IAQ)

A. On-site Observations
   1. A minimum of two (2) visits for renovations and up to six (6) site visits for new construction will be made to the site to conduct on-site observations during the construction phase relative to water intrusion issues or other building conditions that might cause future degradation to indoor air quality. These observations may include but are not limited to landscape grade and drainage, foundation height, exterior wall sealing, roof and wall enclosure penetrations, water or moisture intrusion, plumbing, storage and condition of absorbent building materials, sealing and hygiene of HVAC systems, control of particulates, etc.
   2. This phase may also include a review of specifications for building products such as paint, adhesives, carpet, and cabinetry for products that might degrade future indoor air quality when installed.
   3. A written report will be submitted to the Architect or Owner's representative after each on-site observation. The report will include project conditions on the day of inspection along with cited potential problems areas and photo-documentation as needed.
      a. Critical Condition Report: If a condition is cited that may cause potential microbial contamination in area that is ready to be sealed or covered, a verbal report will be communicated to the Architect or Owner's representative within one business day so the Contractor can have the condition corrected before work is continued.
      b. Standard Report: A written report will be submitted to the Architect or Owner's representative within ten (10) working days of the site visit.

B. Pre-Construction Inspection and Sampling: Perform indoor air quality testing before starting construction, as base line for evaluation of post-construction testing.

1. If the construction project is an addition to an existing facility, pre-construction inspection and sampling will be conducted to determine baseline conditions within the existing facility.
2. The testing conducted in item C-2 of the pre-occupancy testing below will be conducted in areas of the existing facility that will be adjoining the new construction.
3. During construction activities on-site observations will include any impact to the indoor air quality of the existing facility.

C. Pre-Occupancy Inspection and Sampling: Perform indoor air quality testing before occupancy.
1. After substantial completion of the facility and before non-fixed furnishings are delivered, the firm will conduct an IAQ inspection and perform representative sampling for indoor air quality parameters. These measurements will establish background pre-occupancy conditions, and will be evaluated for acceptable levels. All samples collected will be area screening samples to determine the presence of the parameters of interest. If the screening results indicate significant positive results, additional investigation may be required.
2. The air quality sampling includes the collection of samples for the determination of populations and concentrations of total fungal bioaerosols in the ambient air. The sampling also includes the collection of chemical samples for fixed gas analysis for total volatile organic compounds (TVOCs), methane, carbon dioxide, and carbon monoxide. Additional real-time monitoring will be conducted for the following parameters: temperature, relative humidity, carbon dioxide, carbon monoxide, TVOCs, ozone, and large (2.5 to 10 microns) and small particulates (<2.5 microns).
3. Testing in a school facility will include the collection of samples in representative areas of the classroom wings (to include a minimum of 20% of the classrooms), and if part of the new construction, in the cafeteria, library, administration offices, gymnasium, and locker rooms. Additionally, two outdoor samples will be collected on each day of testing for comparison purposes.
4. If significant areas of rubber-backed carpeting and/or composite fixed furnishings are present in the facility, testing will also be conducted in representative areas for 4-phenylcyclohexene and formaldehyde in the ambient air. This testing will not be conducted if carpeting and fixed furnishings have been installed which are certified to be free of these chemicals.
5. Testing for radon should be conducted only for subterranean structures or in geographical areas where radon has been previously documented on a reoccurring basis.
6. Testing for lead-based paint and asbestos-containing materials will not be conducted unless there is an indication that lead-based paint and/or asbestos-containing materials may be present in the existing structure, and that it may be impacted by the new construction activities. Historical asbestos testing records, asbestos management plans, or lead-based paint surveys may be provided in lieu of testing.
7. A report of findings and any recommendations will be provided within fifteen (15) working days of the sampling event.

D. Do not start pre-occupancy indoor air quality testing until:
1. All construction is complete, including interior finishes.
2. HVAC systems have been tested, adjusted, and balanced for proper operation.
3. Cleaning of inside of HVAC ductwork, if specified elsewhere, has been completed.
4. New HVAC filtration media have been installed.

E. Post-Occupancy Inspection and Sampling:
1. At five (5) months and eleven (11) months following substantial completion, but prior to the one (1) year project inspection, the testing conducted in item C-2 of the pre-occupancy testing above will be repeated.
2. A report of findings and any recommendations will be provided within fifteen (15) working days of the sampling event.

F. Indoor Air Quality Acceptance Criteria
   1. Upon completion of the project, the indoor air quality testing firm will provide a report of findings to the Architect or Owner's representative indicating any IAQ parameters that do not meet the acceptance criteria.
   2. The following criteria will be used to determine acceptance:
      a. Fungal Bioaerosols - measure in relation to outdoor air, generally not higher than outdoor air, and containing indoor populations and concentrations of fungi that are considered normal and typical. Use professional judgment of testing firm.
      b. Carbon Monoxide - measure in ppm, in relation to outdoor air. Not more than 2 ppm over outdoor air levels, and less than 9 ppm.
      c. Carbon Dioxide - measure in ppm, in relation to outdoor air. Not more than 700 ppm higher than outdoor air.
      d. Methane - measure in ppm. Not more than 5 ppm.
      e. Total Volatile Organic Compounds (TVOCs) - measure in ppm as methane, or micrograms per cubic meter (µg/m3) - not more than outdoor air, and less than 5 ppm (calculated as methane) or 3,000 µg/m3.
      f. Total Particulates - measure in total particle counts per cubic foot - total particle counts generally less than one-half (1/2) of outdoor air. Particle counts broken down to small (<2.5 microns) and large (2.5 to 10 microns).
      g. Radon - less than 2 picoCuries per liter (pCi/L).
      h. Ozone - nor more than outdoor air, and less than 0.1 ppm.
      i. Formaldehyde - measure in parts per million (ppm) - less than 0.050 ppm.
      j. 4-Phenylcyclohexene(if rubber-backed products) - measure in micrograms per cubic meter (µg/m3) - not more than 6.5 µg/m3.
      k. Lead - have paint supplier or contractor provide documentation of lead-free paint.

G. If air samples show concentrations higher than those specified, ventilate with 100 percent outside air and retest at no cost to Owner.

END OF SECTION

SECTION 01 6000
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General product requirements.

B. Re-use of existing products.

C. Transportation, handling, storage and protection.

D. Product option requirements.

E. Substitution limitations.

F. Procedures for Owner-supplied products.

G. Maintenance materials, including extra materials, spare parts, tools, and software.

1.02 RELATED REQUIREMENTS

A. Section 01 4000 - Quality Requirements: Product quality monitoring.

1.03 REFERENCE STANDARDS

A. 16 CFR 260.13 - Guides for the Use of Environmental Marketing Claims; Federal Trade Commission; Recycled Content; Current Edition.

B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 SUBMITTALS

A. Shop drawings, product data, and samples under provisions of Section 01 3000.

PART 2 PRODUCTS

2.01 EXISTING PRODUCTS

A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by Contract Documents.

B. Unforeseen historic items encountered remain the property of the Owner; notify Owner promptly upon discovery; protect, remove, handle, and store as directed by Owner.

C. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.

D. Specific Products to be Reused: The reuse of certain materials and equipment already existing on the project site is not prohibited.
   1. If reuse of other existing materials or equipment is desired, submit substitution request.
   2. All items called for on the drawings to be salvaged, removed and relocated shall be inventoried, removed and stored until such time as they are to be installed in their new location. The inventory list shall be given to the Owner and shall include an itemized list that includes quantities, descriptions and condition of each item. These items are considered to be in good operating condition at the time the contract is signed, and shall remain the property of Owner. These items shall be properly protected by the contractor and removed by him, complete, including all appurtenances and reinstalled in their new location in good working order with any modifications called for by the drawings.

2.02 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by Contract Documents.

B. Where other criteria are met, Contractor shall give preference to products that:
   1. Are extracted, harvested, and/or manufactured closer to the location of the project.

2. Have longer documented life span under normal use.
3. Are made of recycled materials.
4. If made of wood, are made of sustainably harvested wood, wood chips, or wood fiber.

C. Provide interchangeable components of the same manufacture for components being replaced unless noted otherwise in the contract documents.

2.03 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

2.04 MAINTENANCE MATERIALS

A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.

B. Deliver to Project site and place in location as directed; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION PROCEDURES

A. All substitutions shall be submitted on the Architects form as described in paragraph 3.03.

B. Product Substitution - Prior to Bid
1. No products shall be used on the project unless they are specified or have received prior approval.
2. Products to be reviewed prior to bid shall be submitted and reviewed under the provisions of this section.
3. Substitution request including all required documentation must be delivered to the Architect’s office no later than ten (10) calendar days prior to the proposal date designated in the project manual. Requests submitted late will not be considered.
4. No product will be considered “as equal” to the product specified until it has been included as an allowable substitution, in a written Addendum to the project.

C. Product Substitution - Post Contract Award
1. Product substitutions are not allowed except for the following provisions:
   a. Product is required for compliance with interpretation with code compliance.
   b. Product specified is unavailable.
   c. Product proposed will provide a credit to the Owner.
      1) Contractor shall provide amount of proposed savings on the substitution request form.
   d. Product proposed will provide a substantial benefit to the Owner’s schedule.
      1) Contractor shall clearly delineate the positive impact to the project schedule.
   e. Product supplier contractor default.
      1) Written documentation will be required to substantiate request.
2. Substitution request including all required documentation must be delivered to the Architect’s office no later than fifteen (15) calendar days after execution of the Contract.
3. Reimbursement of Architect's costs
   a. In the event substitutions are proposed to the Architect after the Contract has been awarded, the Architect will record all time used by him and by his consultants in evaluation of each such proposed substitution.
   b. Whether or not the Architect approves a proposed substitution, the Contractor promptly upon receipt of the Architect's billing shall reimburse the Architect at the rate of two and one-half times the direct cost to the Architect and his consultants for all time spent by them in evaluating the proposed substitution.

3.02 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Proposed product substitution shall comply with all applicable codes. Products not conforming to codes shall be removed and replaced at Contractors expense.

B. Coordination of substitutions:
   1. Prior to each product substitution, carefully review and coordinate all aspects of each item being submitted.
   2. Verify that each item and the submittal for it conform in all respects with the specified requirements.
   3. By submitting the substitution request form with each submittal, the contractor certifies that this coordination has been performed.

C. Substitutions:
   1. The Contract is based on the standards of quality established in the Contract Documents.
   2. Products specified by reference to standard specifications such as ASTM and similar standards do not require further approval.
   3. Do not substitute materials, equipment, or methods unless such substitution has been specifically approved in writing for this Work by the Architect.

D. Coordination of Materials and Installation
   1. General contractor shall install all fire protection, electrical and data wiring in conduit as high as possible and above mechanical ductwork. General contractor shall install all fire protection, electrical, data, and wiring in conduit in areas designated on the plans while coordinating structure, mechanical equipment/ductwork, lighting, building controls, and architectural systems. The proposed layout of these systems and conduit shall be reviewed with and accepted by the architect prior to installation. Systems and conduit shall group in the area designated by the construction documents in an orderly and clean installation. Final locations and conditions of these systems and conduit shall only be accepted by the architect upon review after installation.

E. Miscellaneous Materials
   1. If proposed product substitution requires additional materials or accessories for installation in the project, Contractor shall be responsible for all costs.

F. Finishes
   1. Proposed product substitution shall not decrease the selection of colors or finishes.

G. Storage and Handling
   1. Include within the Contractor's quality assurance program such procedures as are required to assure full protection of work and materials.

H. Warranty
   1. Warranty of product shall not be less than that of specified product.

3.03 PRODUCT SUBSTITUTION REQUEST FORM

A. The Architect’s “Substitution Request Form” must be used for each product submitted for consideration. The form is attached following this Section.

B. The Individual or Firm requesting a substitution must document that the requested substitution is equal or superior to the specified product. Failure to provide clear, accurate, and adequate documentation will be grounds for rejection. Any re-submittal will be handled as a new request.

C. Required documentation shall consist of applicable information which would aid the Architect in making an informed decision. Include side by side product comparisons, technical data, laboratory test results, product drawings, etc. References shall include three projects, which are from one to two years old, and three projects older than five years. Provide a list of references with the owners contact name and phone number.

D. If use of the proposed product would result in changes to the design of the building, the submittal shall describe fully the changes required to the drawings or project manual. Any cost differences resulting from modifications to the drawings and project manual and the cost of making the changes shall be borne by the Product Supplier.

E. Incomplete forms shall be rejected. The decision of the Architect is final.

3.04 OWNER-SUPPLIED PRODUCTS

A. Owner's Responsibilities:
   1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.
   2. Arrange and pay for product delivery to site.
   3. On delivery, inspect products jointly with Contractor.
   4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
   5. Arrange for manufacturers' warranties, inspections, and service.

B. Contractor's Responsibilities:
   1. Review Owner reviewed shop drawings, product data, and samples.
   2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
   3. Handle, store, install and finish products.
   4. Repair or replace items damaged after receipt.
   5. Coordinate dimensions of Owner furnished materials and equipment with drawings and specifications prior to installation to ensure proper fit in conjunction with other Contractor supplied materials and equipment.

3.05 TRANSPORTATION AND HANDLING

A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.

B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.

C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

D. Transport and handle products in accordance with manufacturer's instructions.

E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged in manufacturer's original container with labels intact and legible.
   1. Maintain packaged materials with seals unbroken and labels intact until time of use.
   2. Promptly remove damaged material and unsuitable items from the job site, and promptly replace with material meeting the specified requirements, at no additional cost to the Owner.

G. The Architect may reject as non-complying such material and products that do not bear identification and satisfactory to the Architect as to manufacturer, grade, quality, and other pertinent information.

H. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.

I. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.06 STORAGE AND PROTECTION

A. Provide protection of stored materials and products against theft, casualty, or deterioration.

B. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.

C. Store and protect products in accordance with manufacturers' instructions. Failure to comply will result in rejection of products for use on job.

D. Store with seals and labels intact and legible.

E. Arrange storage of materials and products to allow for visual inspection for the purpose of determination of quantities, amounts, and unit counts.

F. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.

G. For exterior storage of fabricated products, place on sloped supports above ground.

H. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.

I. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.

J. Comply with manufacturer's warranty conditions, if any.

K. Do not store products directly on the ground.

L. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

M. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

N. Prevent contact with material that may cause corrosion, discoloration, or staining.

O. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

P. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

Q. In event of damage, promptly make replacements and repairs to the approval of the Architect and at no additional cost to the Owner.

R. Additional time required to secure replacements and to make repairs will not be considered by the Architect to justify an extension in the Contract Time of Completion.

END OF SECTION

MORE THAN ARCHITECTS

INSTRUCTIONS FOR USE OF SUBSTITUTION REQUEST FORM

STEPS

1. Substitution request **including all required documentation** must be emailed to the Project Leader at the Architects office no later than the date indicated in the specifications. Requests submitted late will not be considered. Contact information can be found on the Huckabee website bidding section under the specific project at: www.huckabee-inc.com/construction/

2. The Huckabee "Substitution Request Form" must be used for each project submitted for consideration.

3. The Individual or Firm requesting a substitution must document that the requested substitution is equal or superior to the specified product. Failure to provide clear, accurate, and adequate documentation will be grounds for rejection. Any re-submittal will be handled as a new request.

4. Required documentation shall consist of applicable information which would aid the Architect in making an informed decision. Include **side-by-side product comparisons**, technical data, laboratory test results, product drawings, etc. References shall include three projects which are from one to two years old, and three projects older than five years. Provide a list of references with the owner's contact name and telephone number.

5. If use of the proposed product would result in changes to the design of the building, the submittal shall describe fully the changes required to the drawings or specifications. Any cost differences resulting from modifications to the drawings and specifications and the cost of making the changes shall be borne by the Product Supplier.

6. **No** product will be considered "as equal" to the product specified until it has been included as an allowable substitution in a written Addendum to the project.

7. The decision of the Architect is final.

MORE THAN ARCHITECTS

SUBSTITUTION REQUEST FORM

Architect Project No:_____ Bid Date:_____ Date of Request:_____

Project Name: _____

SUBSTITUTION REQUEST BY:

Firm:_____

Address:_____

_____

Phone: _____

Fax: _____

We hereby request that the following Substitution be allowed in lieu of the Product specified on the above project.

ARCHITECT / ENGINEERS RESPONSE:

☐ APPROVED ☐ APPROVED AS NOTED

☐ NOT APPROVED ☐ SUBMITTED TOO LATE

☐ FAILED TO PROVIDE ADEQUATE INFORMATION

REMARKS:_____

_____

BY:_____DATE:_____

SPECIFIED PRODUCT_____ **SPECIFICATION SECTION** _____

PROPOSED PRODUCT SUBSTITUTION_____

This request includes the following: attached Technical Data, Laboratory Tests and proposed changes to the Drawings and Specifications, which the proposed Substitution will require for proper installation.

_____

_____

The Firm requesting the Substitution agrees to pay for changes to the building design, including Architectural, Engineering, and detailing costs caused by the requested Substitution. ☐ YES ☐ NO ☐ NOT APPLICABLE

What effect does the Substitution have on other trades? _____

_____

What effect does Substitution have on Construction Schedule? _____

_____

Differences between proposed Substitution and specified item? _____

_____

Manufacturer's guarantees of the proposed and specified items are: _____ Same _____ Different
(If different, explain on attachment)

The undersigned state that the function, appearance and quality are equivalent or superior to the specified item.

_____
SIGNATURE

_____ _____
TITLE DATE

Huckabee

SECTION 01 6210
SCHEDULE OF MATERIALS AND COLORS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Information and procedures for color submission for color schedule.

B. Schedule of Materials and Colors for pre-selected colors.

1.02 COLOR SCHEDULE PROCEDURES - PRE-BID SELECTED

A. Contractor shall hold color samples requiring color selections until all are received. Only then shall the actual color samples be submitted to the Architect for selection. Colors samples matching color schedule shall not be submitted until field sample verifications are required.
   1. Contractor shall submit a complete transmittal letter with each related group of items. Each sample shall be properly labeled with the name of the project, contractor, manufacturer, and date of submission. Incomplete color submittals will be returned to the Contractor.
   2. The Contractor shall allow two (2) weeks after all colors are submitted for final Owner approval.

1.03 COLOR SCHEDULE PROCEDURES - POST-BID SELECTED

A. Contractor shall hold all color samples until all items requiring color selections are received. Only then shall the actual color samples be submitted to the Architect for selection.
   1. Colors are noted on the drawings, and as specified. Where colors are not specified, Architect will select color with final color schedule.
   2. Contractor shall submit a complete transmittal letter with each related group of items. Each sample shall be properly labeled with the name of the project, contractor, manufacturer, and date of submission. Incomplete color submittals will be returned to the Contractor.
   3. The Contractor shall allow five (5) weeks after all colors are submitted for final Owner approval.

1.04 COLORS AND PATTERNS

A. Unless the precise color and pattern is specifically called out in the Contract Documents, and whenever a choice of color or pattern is available in the specified products, submit accurate color and pattern charts to the Architect for selection.

B. Verify all graphics with the Architect before proceeding. Graphics may need to be adjusted to reflect the same composition as that shown on the drawings.

1.05 SUBMITTALS

A. Field Samples
   1. Once colors are selected, and received at the job site and prior to application or installation, the Contractor shall submit one (1) sample of each item to the Architect for verification of color and pattern.
   2. The Contractor shall allow five (5) working days from date of receipt of submission for verification notification.

1.06 SCHEDULING

A. Contractor shall submit all products in a timely manner to avoid project delays for long lead time items.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers listed or named in a product or system specification are those manufacturers considered capable of manufacturing products conforming to the specification requirements.

B. The “listing” or “naming” of a manufacturer does not imply “acceptance” or “approval” of any standard product of that manufacturer.

C. Products listed or named manufacturers proposed for use shall be comparable in all respects to specified make or model number designation of named products and shall meet or exceed specification requirements of type, function, color, and quality.

D. Where products are specified by naming model number and manufacturers only, the named products establish a standard of quality. Refer to individual specification sections for additional manufacturers and procedures.

2.02 MATERIALS - GENERAL

A. Colors, Textures, and Patterns: Where manufacturer's standard products are indicated for and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements:
   1. Provide selections made by Architect from manufacturer's full range of standard colors, textures, and patterns for products of type indicated.
   2. Provide trim and accessories that match color and finish unless noted otherwise.
   3. Where contractor is submitting a substitution, contractor shall provide color equal to that specified. Substituted colors are not considered approved unless published in writing in Addendum prior to bid. If substituted product does not match specified color, contractor shall provide custom color as required at no additional cost to the owner.

PART 3 - EXECUTION

3.01 APPLICATION

A. Paint any vents, grilles, piping, columns, etc. the same color as the wall or graphic unless noted otherwise.

B. Unless otherwise noted, all accent paint shall terminate at an inside corner. If wall terminates at storefront, wrap paint to meet edge of storefront.

C. All exposed concrete shall be sealed.

3.02 SCHEDULE OF MATERIALS AND COLORS

A. General Notes:
   1. All paint colors are subject to last shade adjustments.
   2. The Contractor shall submit samples of all finishes for comparison and approval of colors to the items listed in the color schedule.
   3. Where multiple buildings occur in one project, all materials and finishes may not apply to all buildings. Refer to the drawings for material and finish locations.
   4. The General Contractor shall verify all colors selections and numbers and note any drawings changes that may have occurred. Notify the Architect of any discrepancies found within 14 days.
   5. Notes stating "See Drawings for Locations" refer to the Construction Documents.
   6. Where note “pending submittal” occurs, Contractor shall submit samples of the material that meets the Standards outlined in the appropriate specification for Architect’s review and selection. For materials with more than one color, texture or pattern available, Contractor shall submit the Manufacturer’s full range of colors, texture and patterns.
   7. If there is a conflict between the product, material or color specified in this Legend and the product's specification Section within the Division, notify the Architect immediately. The Schedule of Materials and Colors shall govern unless a written clarification is given.

B. See DRAWINGS for Schedule of Materials and Colors for specific product details and requirements.

END OF SECTION

SECTION 01 7000
EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Requirements for alterations work, including selective demolition, except removal, disposal, and/or remediation of hazardous materials and toxic substances.

C. Pre-installation meetings.

D. Cutting and patching.

E. Surveying for laying out the work.

F. Cleaning and protection.

G. Starting of systems and equipment.

H. Demonstration and instruction of Owner personnel.

I. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.

J. General requirements for maintenance service.

K. Administration of Warranty Phase.

1.02 RELATED REQUIREMENTS

A. Section 01 1000 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.

B. Section 01 3000 - Administrative Requirements: Submittals procedures, Electronic document submittal service.

C. Section 01 4000 - Quality Requirements: Testing and inspection procedures.

D. Section 01 5000 - Temporary Facilities and Controls: Temporary exterior enclosures.

E. Section 01 7900 - Demonstration and Training: Demonstration of products and systems to be commissioned and where indicated in specific specification sections

F. Individual Product Specification Sections:
   1. Advance notification to other sections of openings required in work of those sections.
   2. Limitations on cutting structural and load bearing members.

1.03 REFERENCE STANDARDS

A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
   1. On request, submit documentation verifying accuracy of survey work.
   2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in compliance with Contract Documents.
   3. Submit surveys and survey logs for the project record.

C. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
   1. Structural integrity of any element of Project.
   2. Integrity of weather exposed or moisture resistant element.

3. Efficiency, maintenance, or safety of any operational element.
4. Visual qualities of sight exposed elements.
5. Work of Owner or separate Contractor.
6. Include in request:
    a. Identification of Project.
    b. Location and description of affected work.
    c. Necessity for cutting or alteration.
    d. Description of proposed work and products to be used.
    e. Effect on work of Owner
    f. Date and time work will be executed.

1.05 QUALIFICATIONS

A. For demolition work, employ a firm specializing in the type of work required.
    1. Minimum of 5 years of documented experience.

B. For surveying work, employ a land surveyor registered in Texas and acceptable to Architect. Submit evidence of surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate. Employ only individual(s) trained and experienced in collecting and recording accurate data relevant to ongoing construction activities,

C. For field engineering, employ a professional engineer of the discipline required for specific service on Project, licensed in Texas. Employ only individual(s) trained and experienced in establishing and maintaining horizontal and vertical control points necessary for laying out construction work on project of similar size, scope and/or complexity.

D. For design of temporary shoring and bracing, employ a Professional Engineer experienced in design of this type of work and licensed in Texas.

1.06 PROJECT CONDITIONS

A. Use of explosives is not permitted.

B. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

C. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

D. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

E. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
    1. Provide dust-proof enclosures to prevent entry of dust generated outdoors.
    2. Provide dust-proof barriers between construction areas and areas continuing to be occupied by Owner.

F. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
    1. Minimize amount of bare soil exposed at one time.
    2. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
    3. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
    4. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

G. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
    1. Outdoors: Limit conduct of especially noisy exterior work to the hours of 8 am to 5 pm.

2. Indoors: Limit conduct of especially noisy interior work to 8 am to 5 pm.

H. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.
1. Pest Control Service: Monthly treatments.

I. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

J. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

1.07 COORDINATION

A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Notify affected utility companies and comply with their requirements.

C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

F. Coordinate completion and clean-up of work of separate sections.

G. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

G. Prior to start of work, photo and/or video document all portions of the building.

3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 PREINSTALLATION MEETINGS

A. When required in individual specification sections, Contractor will convene a preinstallation meeting at the site prior to commencing work of the section.

B. Require attendance of parties directly affecting, or affected by, work of the specific section. Contractor, subcontractor, and manufacturer's representative shall be present.

C. Notify Architect seven (7) days in advance of meeting date.

D. Prepare agenda and preside at meeting:
   1. Review approved submittals.
   2. Review conditions of examination, preparation and installation procedures.
   3. Review coordination with related work.
   4. Installation schedule.

E. Record minutes and distribute copies within two days after meeting to participants, with one copies to Architect, Owner, participants, and those affected by decisions made.

F. Pre-installation meeting shall not be scheduled until approved submittals are verified by the Contractor.

3.04 LAYING OUT THE WORK

A. Verify locations of survey control points prior to starting work.

B. Promptly notify Architect of any discrepancies discovered.

C. Contractor shall locate and protect survey control and reference points.

D. Control datum for survey is that indicated on drawings.

E. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

F. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

G. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.

H. Utilize recognized engineering survey practices.

I. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
   1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
   2. Grid or axis for structures.
   3. Building foundation, column locations, ground floor elevations.

J. Periodically verify layouts by same means.

K. Maintain a complete and accurate log of control and survey work as it progresses.

3.05 GENERAL INSTALLATION REQUIREMENTS

A. In addition to compliance with regulatory requirements, conduct construction operations in compliance with NFPA 241, including applicable recommendations in Appendix A.

B. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

C. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

D. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

E. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

F. Make neat transitions between different surfaces, maintaining texture and appearance.

3.06 NOTIFICATION OF ARCHITECT

A. The Contractor shall notify the Architect a minimum of 48 hours prior to the covering up of any work in progress, in order for the architect to make proper field observations of the work in place. The Contractor shall place NO concrete, fill-in ditches, or cover up walls or ceilings without first contacting the Architect, as noted above and receiving approval.

3.07 ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
   1. Verify that construction and utility arrangements are as indicated.
   2. Report discrepancies to Architect before disturbing existing installation.
   3. Beginning of alterations work constitutes acceptance of existing conditions.

B. Keep areas in which alterations are being conducted separated from other areas that are still occupied.
   1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01 5000 in locations indicated on drawings.
   2. Provide sound retardant partitions of construction indicated on drawings in locations indicated on drawings.

C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
   1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.
   2. Insulate existing ducts or pipes that are exposed to outdoor ambient temperatures by alterations work.

D. Remove existing work as indicated and as required to accomplish new work.
   1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
   2. Remove items indicated on drawings.
   3. Relocate items indicated on drawings.
   4. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
   5. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.

E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, Telecommunication, and Technology): Remove, relocate, and extend existing systems to accommodate new construction.
   1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
   2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
   3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
      a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
      b. Provide temporary connections as required to maintain existing systems in service.
   4. Verify that abandoned services serve only abandoned facilities.
   5. Remove abandoned pipe, ducts, conduits, and equipment including those above acoustical lay-in ceilings and gypsum board/hard ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.

F. Protect existing work to remain.
   1. Prevent movement of structure; provide shoring and bracing if necessary.
   2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   3. Repair adjacent construction and finishes damaged during removal work.

G. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
   1. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect.
   2. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
   3. Where a change of plane of 1/4 inch or more occurs in existing work, submit recommendation for providing a smooth transition for Architect review and request instructions.

H. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.

I. Refinish existing surfaces as indicated:
   1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
   2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.

J. Clean existing systems and equipment.

K. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.

L. Do not begin new construction in alterations areas before demolition is complete.

M. Comply with all other applicable requirements of this section.

3.08 CUTTING AND PATCHING

A. Whenever possible, execute the work by methods that avoid cutting or patching.

B. See Alterations article above for additional requirements.

C. Perform whatever cutting and patching is necessary to:
   1. Complete the work.
   2. Fit products together to integrate with other work.
   3. Provide openings for penetration of mechanical, electrical, and other services.
   4. Match work that has been cut to adjacent work.
   5. Repair areas adjacent to cuts to required condition.
   6. Repair new work damaged by subsequent work.
   7. Remove samples of installed work for testing when requested.
   8. Remove and replace defective and non-complying work.

D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

E. Employ skilled and experienced installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

G. Restore work with new products in accordance with requirements of Contract Documents.

H. Fit work air tight at interior and weathertight at exterior to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 8400, to full thickness of the penetrated element.

J. Patching:
   1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
   2. Match color, texture, and appearance.
   3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.09 PROGRESS CLEANING

A. General:
   1. Retain stored items in an orderly arrangement allowing maximum access, not impeding traffic or drainage, and providing required protection of materials.
   2. Do not allow accumulation of scrap, debris, waste material, and other items not required for construction of this Work.
   3. At least twice each month, and more often if necessary, completely remove all scrap, debris, and waste material from the job site.
   4. Provide adequate storage for all items awaiting removal from the job site, observing requirements for fire protection and protection of the ecology.

B. Site:
   1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris, and waste material. Remove such items to the place designated for their storage.
   2. Weekly, and more often if necessary, inspect all arrangements of materials stored on the site. Restack, tidy, or otherwise service arrangements to meet the requirements of subparagraph A.1 above.
   3. Maintain the site in a neat and orderly condition at all times.

C. Structures:
   1. Weekly, and more often if necessary, inspect the structures and pick up all scrap, debris, and waste material. Remove such items to the place designated for their storage.
   2. Weekly, and more often if necessary, sweep interior spaces clean.
      a. "Clean", for the purpose of this subparagraph, shall be interpreted as meaning free from dust and other material capable of being removed by use of reasonable effort and a hand-held broom.
   3. As required preparatory to installation of succeeding materials, clean the structures or pertinent portions thereof to the degree of cleanliness recommended by the manufacturer of the succeeding material, using equipment and materials required to achieve the necessary cleanliness.
   4. Following the installation of finish floor materials, clean the finish floor daily (and more often if necessary) at all times while work is being performed in the space in which finish materials are installed. Damaged floors will be removed and replaced.
      a. "Clean", for the purpose of this subparagraph, shall be interpreted as meaning free from foreign material which, in the opinion of the Architect, may be injurious to the finish floor material.

3.10 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

B. Provide special protection where specified in individual specification sections.

C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

G. Prohibit traffic from landscaped areas.

H. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.11 SYSTEM STARTUP

A. Coordinate with General Commissioning Requirements per Mechanical Specifications.

B. Coordinate schedule for start-up of various equipment and systems.

C. Notify Architectand Owner 14 days prior to start-up of each item.

D. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.

E. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

F. Verify that wiring and support components for equipment are complete and tested.

G. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.

H. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

I. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.12 DEMONSTRATION AND INSTRUCTION

A. See Section 01 7900 - Demonstration and Training.

B. Refer to individual specification sections for more specific demonstration and training requirements.

3.13 ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

B. Testing, adjusting, and balancing HVAC systems: See Division 23 for specific requirements.

3.14 FINAL CLEANING

A. "Clean", for the purpose of this Article, and except as may be specifically provided otherwise, shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials.

B. The Contractor shall have initial cleaning complete prior to the Architect performing the “Punch List” walkthrough. The building shall be thoroughly (ready for occupancy) cleaned prior to the Owner acceptance (Substantial Completion) of the building.

C. Prior to completion of the Work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste. Conduct final progress cleaning as described in the Article above.

D. Site:
   1. Unless otherwise specifically directed by the Architect, broom clean paved areas on the site and public paved areas adjacent to the site. Powerwash paved surfaces, as required, to remove any stains caused by construction materials, vehicles, or workers, as approved by the Architect, and at no additional cost to the Owner.
   2. Completely remove resultant debris.

E. Structures:
   1. Exterior:
      a. Visually inspect exterior surfaces and remove all traces of soil, waste materials, smudges, and other foreign matter.
      b. Remove all traces of splashed materials from adjacent surfaces.
      c. If necessary to achieve a uniform degree of cleanliness, hose down the exterior of the structure.
      d. In the event of stubborn stains not removable with water, the Architect may require light sandblasting or other cleaning at no additional cost to the Owner.
   2. Interior:
      a. Visually inspect all interior surfaces (floors, walls, ceilings, fixtures, furniture, appliances, and equipment) and remove all traces of soil, waste materials, smudges, and other foreign matter.
      b. Remove all traces of splashed material from adjacent surfaces.
      c. Remove paint droppings, spots, stains, and dirt from finished surfaces.
   3. Glass: Clean inside and outside.
   4. Polished surfaces: To surfaces requiring routine application of buffed polish, apply the polish recommended by the manufacturer of the material being polished.

F. Schedule final cleaning as approved by the Architect to enable the Owner to accept a completely clean Work.

3.15 CLEANING DURING OWNER'S OCCUPANCY

A. Should the Owner occupy the Work or any portion thereof prior to its completion by the Contractor and acceptance by the Owner, responsibilities for interim and final cleaning shall be as determined by the Architect in accordance with the General Conditions of the Contract.

3.16 CLOSEOUT PROCEDURES

A. Project Closeout
   1. No later than 60 days prior to Project Completion, as scheduled on the Contractors Critical Path Schedule, the Contractor shall:
      a. Develop a Project Completion List for any and all tasks that remain along with a schedule for the completion of each. This list and schedule shall be written and delivered to the Owner and Architect.
      b. Provide “hands-on” training to the Owner of all major systems as identified in Section 01 7800 – Closeout Submittals

B. Substantial Completion
   1. Prior to requesting inspection by the Architect, use adequate means to assure that the Work is completed in accordance with the specified requirements and is ready for the requested inspection.
   2. No later than 30 days prior to the scheduled Substantial Completion date the Contractor shall call for a project walk through to determine if the project is substantially complete.
      a. The Contractor shall prepare and submit a list of deficiency items as required by Paragraph 9.8.2 of the General Conditions. This list shall be submitted to the Architect a minimum of 7 days prior to the scheduled walk through.
      b. The Contractor shall provide copies of the complete TAB (Commissioning) report and verification that all repairs have been made and that the systems are operational. This report and verification shall be submitted to the Architect a minimum of 7 days prior to the scheduled walk through.
      c. The Contractor shall obtain the Certificate of Occupancy from the AHJ and supply a copy to the Architect a minimum of 7 days prior to the scheduled walk through and before substantial completion will be issued.
      d. On the scheduled date of the walk through and after receipt of the deficiency list (punch list) the Architect will inspect the project to determine the status of completion.
      e. Following inspection of the work, the Architect determines that the work is not substantially complete:
         1) The Architect promptly will so notify the Contractor, in writing, giving the reasons therefore.
         2) The Contractor shall remedy the deficiencies and notify the Architect when ready for re-inspection. The Architect will make only one trip to re-inspect the project.
         3) The Architect shall be entitled to reimbursement of costs on an hourly basis for time spent to re-inspect the project. Rate for reimbursement shall be two hundred dollars per hour ($200.00/hr) including travel time and shall be charged against the Contractors retainage held for this work.
   3. When the Architect concurs that the Work is substantially complete:
      a. The Architect will prepare a "Certificate of Substantial Completion" on AIA Form G704, accompanied by the Contractor's list of items to be completed or corrected, as verified by the Architect.
      b. The Architect will submit the Certificate to the Owner and to the Contractor for their written acceptance of the responsibilities assigned to them in the Certificate.

C. Final Completion
   1. Prepare and submit the notice required by the first sentence of Paragraph 9.10.1 of the General Conditions.
   2. Verify that the Work is complete including, but not necessarily limited to, the items mentioned in Paragraph 9.8.2 of the General Conditions.
   3. Certify that:
      a. Contract Documents have been reviewed;
      b. Work has been inspected for compliance with the Contract Documents;

c. Work has been completed in accordance with the Contract Documents;
d. Equipment and systems have been tested as required, and are operational;
e. Work is completed and ready for final inspection.

4. The Architect will make an inspection to verify status of completion.
5. Should the Architect determine that the Work is incomplete or defective:
   a. The Architect promptly will so notify the Contractor, in writing, listing the incomplete or defective work.
   b. Remedy the deficiencies promptly, and notify the Architect when ready for re-inspection.
6. When the Architect determines that the Work is acceptable under the Contract Documents, he will request the Contractor to make closeout submittals.

D. Closeout Submittals
1. Closeout submittals as described in Section 01 7800 and Architect approval secured.
2. Refer attached Check List.
3. Contractor shall deliver all attic stock referenced in specifications. Attic stock shall be delivered to owners designated location. Contractor shall obtain a signed receipt of delivery.
4. Contractor shall obtain Certificate of Occupancy from the AHJ and submit a copy to the Architect.

E. Release of Funds
1. Retainage for the project will be held until project closeout is complete as verified by the items in paragraph above and the attached Check List including the completion of all Punch List items.
2. The Architect will estimate the cost of each item on the Punch List, withholding funds for each which shall be separate from the retainage. These funds will be released to the Contractor as items are completed and verified on the Punch List.
3. THE RETAINAGE WILL NOT BE RELEASED UNTIL CERTIFICATE OF OCCUPANCY FROM THE AHJ HAS BEEN SUBMITTED TO THE ARCHITECT.
4. THE RETAINAGE WILL NOT BE RELEASED UNTIL THE PROJECT CLOSEOUT IS COMPLETE.

F. Final adjustment of accounts
1. Submit a final statement of accounting to the Architect, showing all adjustments to the Contract Sum.
2. If so required, the Architect will prepare a final Change Order showing adjustments to the Contract Sum which were not made previously by Change Orders.

FINAL ACCEPTANCE CHECKLIST

DATE:_____

PROJECT NAME:_____

OWNER'S NAME:_____

COMPLETED BY:_____

TO:_____

COPY TO:_____

THE FOLLOWING CHECKLIST IS COMPLETED AND THEREFORE THE PROJECT IS READY FOR FINAL PAYMENT AS OUTLINED IN THE CONTRACT DOCUMENTS.

Received Final Payment Request and Release of Claims.			
Final Change Order Completed and Signed By All.			
Contractor's Affidavit of Payment of Debts and Claims.			
Consent of Surety To Final Payment.			
All Operation & Maintenance Manuals Received.			
Final Record Drawings Received.			
All Guarantees and Warranties Received.			
Punchlist Fully Cleared (Attached Copy).			
Air Quality and Commissioning Completed and All Items Addressed and Corrected.			
Written Acknowledgement of Lead and Asbestos Free.			
All Attic Stock Delivered to Owner.			
Certificate of Occupancy Obtained From AHJ			

EXPLANATION OF ANY OUTSTANDING ISSUES OR DEFICIENCIES:_____

_____

_____

HEREBY SUBMITTED FOR REVIEW:

SIGNED:_____ **DATE:**_____

3.17 MAINTENANCE

A. Provide service and maintenance of components indicated in specification sections.

B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.

1. Review warranty request procedures with the Architect and Owner no less than two weeks prior to Date of Substantial Completion.
2. All work performed and completed during the Contractor's one year warranty period shall be noted as complete and signed off on accordingly on a warranty request form as agreed upon by Owner and Architect. The form will be provided to the Contractor for each item requested for maintenance or repair and is required to be returned, once the work is complete, in the same originally sent document format with cause and corrective action described in detail. All work during the Contractor's one year warranty period shall be communicated by the Contractor to both the Owner and Architect.
3. Contractor shall maintain a complete and accurate schedule of the dates of Substantial Completion, dates upon which the one year warranty on each phase or building which is substantially complete will expire, and dates of Final Completion. Contractor agrees to provide notice of the warranty expiration date to Owner and Architect at least one month prior to the expiration of the one year warranty period on each building or each phase of the building, which has been substantially completed. Prior to termination of the one year warranty period, Contractor shall accompany the Owner and Architect on review of the building and be responsible for correcting any reasonable deficiencies not caused by the Owner or by the use of the building which are observed or reported during the review. For extended warranties required by various sections, i.e. roofing, compressors, mechanical equipment, Owner will notify the Contractor of deficiencies and Contractor shall start remedying these defects within three (3) days of initial notification from Owner. Contractor shall prosecute the work without interruption until accepted by the Owner and the Architect, even though such prosecution should extend beyond the limit of the warranty period.

C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION

SECTION 01 7800
CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Procedures for digital project records.

B. Project Record Documents.

C. Operation and Maintenance Data.

D. Closeout Documents.

1.02 RELATED REQUIREMENTS

A. Section 01 3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.

B. Section 01 7000 - Execution and Closeout Requirements: Contract closeout procedures.

C. Section 01 7900 - Demonstration and Training: Training requirements.

D. Individual Product Sections: Specific requirements for operation and maintenance data.

E. Individual Product Sections: Warranties required for specific products or Work.

F. Individual Product Sections: Specific requirements for demonstration and training.

1.03 SUBMITTALS

A. Submittal Procedure

1. Within sixty (60) days following the Notice to Proceed, the Contractor shall submit a list of Expected Closeout Documents for review by the Architect. This list shall include project record documents, operation and maintenance data, warranties, bonds, contract forms, health/safe environment data, attic stock sign offs, Owner training, certifications and inspections, and other types as indicated. All items on the list shall be titled with spec section number and general description - Example: "09 3000 Tiling - 1 year warranty".
2. The Architect will review the list of Expected Closeout Documents, provide revision comments and return it to the Contractor within fourteen (14) business days. If revisions are required, the Contractor shall then resubmit a revised list to the Architect and Owner within fourteen (14) business days and thereafter until approved.
3. Contractor may submit Closeout Documents by Specification Division in full as scopes of work are completed.
4. Within sixty (60) calendar days of substantial completion, Contractor shall submit closeout submittals as required in accordance with this section and secure Architect’s approval.
5. Contractor shall provide cover page with space for Contractor and Architect review stamps for each submission.
6. The Architect's approval of the current status of Project Record Documents may be a prerequisite to the Architect's approval of requests for progress payment and request for final payment under the Contract.
7. Prior to submitting each request for progress payment, secure the Architect's approval of the current status of the Project Record Documents.
8. Prior to submitting request for final payment, Contractor shall submit the final Project Record Documents to the Architect and secure approval.
9. Contractor shall submit a complete set of closeout documents for each project where multiple projects are combined under a single proposal package.
10. Review and Final Submission of Closeout Submittals
    a. Participate in review meetings as required.
    b. Documents shall be reviewed and verified by contractor prior to submission to the Architect.

c. Review submittal with Owner and Architect prior to final submittal for review and electronic archiving.
d. Number shall be Architects project number followed by the appropriate specification section - consecutive submittal number for section.
(Example - 1234-01-01 Tiling 09 3000 - 5)
When material is re-submitted for any reason, transmit under a new letter of transmittal and with a new transmittal number. On re-submittals, cite the original submittal number for reference.
e. Contractor shall allow 14 days from date of submission for Preliminary Architectural Review excluding delivery time to and from the Contractor.
f. The contractor shall be responsible for delays caused by rejection of inadequate or incorrect submittals.
g. Submittals received by Architect without General Contractor's stamp will be rejected.
h. Make changes required from the Preliminary Architectural Review and deliver the Final Project Record Documents to and secure approval from the Architect. When revised for resubmission, identify all changes made since previous submission.
i. Contractor will pay all associated cost in preparing close-out documents.

11. Closeout Submittals Requirements.
    a. Closeout and Record Documents as required by this section shall be provided to the Owner upon completion of the project. Submit the number as outlined below:
        1) Project Record Documents - Drawings and Project Manual
            (a) One (1) copy on USB Flash Drive
        2) Closeout Documents – Including Operation and Maintenance Manuals
            (a) One (1) copy on USB Flash Drive
    b. Electronic Submittal Format.
        1) The digital file shall be set up using a non-proprietary “PDF” format.
        2) All data shall be indexed/book marked and hyperlinked to associated data.
        3) Data shall be searchable by key word. All data shall allow printing of material.
        4) Electronic submittal shall follow the format shown in Part 3.
        5) Under paragraph 3.05 Assembly of Operations and Maintenance Manuals, all items shall be organized as specified.
    c. Training Session Submittal Format.
        1) Refer to Section 01 7900 - Demonstration and Training.

B. Project Record Documents: Submit documents to and secure approval from Architect prior to request for final Application for Payment.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

A. All record documents shall be maintained on site in digital format; record actual revisions to the Work, including but no limited to:
    1. Drawings.
    2. Specifications.
    3. Addenda.
    4. RFIs.
    5. Change Orders and other modifications to the Contract.
    6. Reviewed shop drawings, product data, and samples.
    7. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Contractor shall maintain and protect the record documents with backups and/or any other means necessary to ensure the integrity of the digital files.

D. In the event of loss of recorded data, use means necessary to again secure the data to the Architect's approval.
   1. Such means shall include, if necessary in the opinion of the Architect, removal and replacement of concealing materials.
   2. In such case, provide replacements to the standards originally required by the Contract Documents.

E. Record information concurrent with construction progress. Record Documents shall be current and submitted with each pay application.

F. Specifications: Record at each product section description of actual products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and modifications.

G. Record Drawings and Shop Drawings: Mark each item to record actual construction including:
   1. On the cover sheet of the Project Manual and the Drawings, provide the following statement, “RECORD DOCUMENTS- The changes noted herein are indicated in color and are designated by a revision delta (RD). The changes are recorded by [Contractor Name], [Date].”
   2. Prior to construction, insert all addenda to the record documents, both drawings and specifications as modified.
   3. Making entries on Drawings.
      a. Using colored markings, clearly describe the change by graphic line and note as required.
      b. Date all entries.
      c. Call attention to the entry by a "cloud" drawn around the area or areas affected. Add delta triangle with the letters “RD” inside the triangle.
      d. In the event of overlapping changes, use different colors for the overlapping changes.
   4. In addition to field changes, mark the record documents with areas modified by RFIs and change orders and hyperlink to the corresponding data.
   5. Schematic layouts.
      a. In some cases on the Drawings, arrangements of conduits, circuits, piping, ducts, and similar items, are shown schematically and is not intended to portray precise physical layout.
      b. Clearly identify the item by accurate note such as "cast iron drain," "copper water", and the like.
         1) Show, by symbol or note, the vertical location of the item ("under slab", "in ceiling plenum," "exposed," and the like).
         2) Make all identification sufficiently descriptive that it may be related reliably to the Specifications.
   6. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   7. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
   8. Field changes of dimension and detail.
   9. Details not on original Contract drawings.

3.02 OPERATION AND MAINTENANCE DATA

A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

A. For Each Product, Applied Material, and Finish:
   1. Product data, with catalog number, size, composition, and color and texture designations.
   2. Information for re-ordering custom manufactured products.

B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

D. Additional information as specified in individual product specification sections.

E. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

A. Refer to Divisions 21, 22, 23, 26, 27 and 28 for system requirements.

3.05 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

A. Assemble operation and maintenance data into organized file folders for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.

B. Where systems involve more than one specification section, provide separate folder for each system.

C. Cover: Identify each USB Flash Drive with the title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

D. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants,Contractor and subcontractors, with names of responsible parties organized by division with project scopes listed for each company.

E. Tables of Contents: List every item using the same identification as on the content section and hyperlinked accordingly; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.

F. Contents: Prepare final project record closeout documents for delivery to Owner in PDF file format as follows:
   1. FILE FOLDER: XXXX-XX OWNER'S NAME - PROJECT NAME - CLOSEOUT SUBMITTAL
      a. FILE FOLDER: 01 Table of Contents
         1) PDF File: Table of Contents
      b. FILE FOLDER: 02 Project Directory
         1) PDF File: Project Directory (organized as below):
            (a) Design Team
            (b) General Contractor
            (c) Sub-Contractors and Principal Vendors (organized by Division with project scope(s) listed for each Company)
      c. FILE FOLDER: 03 Contract Forms (organized and titled as below):

1) PDF FILE: Substantial Completion, AIA G704
2) PDF FILE: Payment and Performance Bond
3) PDF FILE: Certificates of Liability Insurance
4) PDF FILE: Contractor's Affidavit of Payment of Debts and Claims, AIA G706
5) PDF FILE: Contractor's Affidavit of Release of Liens, AIA G706A
6) PDF FILE: Consent of Surety to Final Payment, AIA G707
7) PDF FILE: Contractor and Sub-contractors' Release or Waiver of Liens
8) FILE FOLDER: Change Orders
   (a) PDF FILES: (separate files for each Change Order, organized and titled in numerical order)

d. FILE FOLDER: 04 Certifications and Inspections (organized and titled as below):
1) PDF FILE: The correspondence from the Geotechnical Engineer, required by Section 01 1400 at the beginning of construction, indicating that the Construction Documents conform with their recommendations.
2) PDF FILE: The correspondence from the Special Inspection and Testing Agency (SITA), required by Section 01 1400 at the beginning of construction, indicating that the SITA accepted the responsibility to perform the specified SITA scope and meet the specified SITA qualifications
3) PDF FILE: The correspondence from the Commissioning Agent (CxA), required by Section 01 1400 at the beginning of construction, indicating that the CxA accepted the responsibility to perform the specified SITA scope and meet the specified SITA qualifications
4) PDF FILE: The "Acknowledgement of Contractor's Responsibilities Related to Code-Required Quality Control" required by Section 01 4533 at the beginning of construction.
5) PDF FILE: The meeting minutes from the Quality Control Pre-Construction Meeting, with a list of all attendees.
6) PDF FILE: The Peer Review reports required by Section 01 1400, addressed to the AHJ, indicating that the contract document and all addenda have been reviewed for conformance with the Chapters required by ICC 500-2014.
7) PDF FILE: The written verification required by Section 01 1400 that the School Safety and Security Committee indicated that the contract documents were acceptable with regards to the planning and intended operations and maintenance of the facility.
8) PDF FILE: A copy of the notarized installation certification from the Storm Door and Shutter Installer, as required by Section 08 3906.
9) PDF FILE: A copy of the notarized installation certification from the Storm Louver Installer, as required by Section 08 9129.
10) PDF FILE: A copy of the notarized installation certification from the Storm Window Installer, as required by Section 08 4333.
11) PDF FILE: A copy of the written correspondence from the Contractor to the AHJ submitting the "Final Reports of Quality Control" required by Section 01 4533 from the SITA, CxA, and Code-Required Structural Observer. The copy of this correspondence shall include the actual reports and not just be a cover letter.
12) PDF FILE: The "Final Report of Quality Control" required by Section 01 4533 from the SITA
13) PDF FILE: The "Final Report of Quality Control" required by Section 01 4533 from the CxA
14) PDF FILE: The "Final Report of Quality Control" required by Section 01 4533 from the Code-Required Structural Observer
15) PDF FILE: The "Final Report of Quality Control" required by Section 01 4533 from the Structural Engineer

16) PDF FILE: The “Final Report of Quality Control” required by Section 01 4533 from the Mechanical Engineer
17) PDF FILE: The “Final Report of Quality Control” required by Section 01 4533 from the Electrical Engineer
18) PDF FILE: The list of attendees at the School Safety and Security Committee Walk-Through of the Tornado Shelter, as required by Section 01 1400.
19) PDF FILE: Certificates of Occupancy
20) PDF FILE: TEA Certificate of Project Compliance. File may be downloaded at https://tea.texas.gov/sites/default/files/cert_pre2004.pdf. Sample form is attached following this Section.
21) PDF FILE: Final Fire Inspection
22) PDF FILE: Final Health Inspection
23) PDF FILE: Final Elevator Inspection
24) PDF FILE: Final Building Inspection
25) PDF FILE: Accessibility Review Report
26) PDF FILE: Energy Code Compliance Letter
27) PDF FILE: HVAC Test and Balance Reports
28) PDF FILE: Backflow Test Report
29) PDF FILE: Data Testing Results
30) FLW FILE: Data Testing Results (Native)

e. FILE FOLDER: 05 Health/Safe Environment Data (organized and titled as below):
   1) PDF FILE: Asbestos-, Lead- and Hazardous-Free Material Certificates or Letter
   2) PDF FILE: Material Safety Data Sheets (MSDS) (organized by Division)
   3) PDF FILE: Indoor Air Quality Test Reports
f. FILE FOLDER: 06 Additional Project Information
   1) FILE FOLDER: Requests for Information
      (a) PDF FILES (separate files for each RFI, organized and titled in numerical order)
   2) FILE FOLDER: Requests for Proposals
      (a) PDF FILES (separate files for each RFP, organized and titled in numerical order)
   3) FILE FOLDER: Approved Submittals
      (a) PDF FILES (separate files for each Submittal, organized and titled in numerical order by specification section)
g. FILE FOLDER: 07 Attic Stock
   1) PDF FILES: Attic Stock Sign-Off Sheets (separate files for each, showing Owner receipt, and organized and titled in numerical order by Specification Section)
h. FILE FOLDER: 08 Demonstration and Training
   1) FILE FOLDER: Sign-In Sheets
      (a) PDF FILES: (separate files for each, organized and titled in numerical order by Specification Section)
   2) FILE FOLDER: Training Videos
      (a) All training videos organized and titled in numerical order by Specification Section
i. FILE FOLDER: 09 Project Record Documents
   1) PDF FILE: Project Record Specifications Manual (organized and bookmarked by Division and by Specification Section) - include and hyperlink all Addenda, RFIs, RFPs, and In-Field Changes stamped as "As-Built" or "Record Documents".
   2) PDF FILE: Project Record As-Built Drawings (organized and bookmarked by Sheet Number) - include and hyperlink all Addenda, RFIs, RFPs, and In-Field Changes stamped as "As-Built" or "Record Documents".
j. FILE FOLDER: 10 Warranties

1) FILE FOLDERS: (separate file folders, organized and titled by Division)
   (a) PDF FILES: (all warranty PDF files organized under each Division file folder and titled by Company Name)
   (b) PDF FILE: List of all warranties extending past one year. Include company name and contact information.

k. FILE FOLDER: 11 Operation and Maintenance Manuals
   1) PDF FILE: Keying Schedule
   2) PDF FILE: Shop Drawings (separate files for each, organized and titled by Specification Section)
   3) FILE FOLDER: Manuals
      (a) FILE FOLDERS: (separate file folders, organized and titled by Division)
      (b) PDF FILES: (all Manuals PDF files organized under each Division file folder and titled by Specification Section and scope)

3.06 CHANGES SUBSEQUENT TO ACCEPTANCE

A. The Contractor has no responsibility for recording changes in the Work subsequent to Final Completion, except for changes resulting from work performed under Warranty.

3.07 CERTIFICATION OF PROJECT COMPLIANCE

CERTIFICATION OF PROJECT COMPLIANCE	Completion of this form is required under provisions of 61.1036(c)(3)(F) TAC for all public school district construction projects.

1. PROJECT INFORMATION DISTRICT:

Facility: ARCHITECT/ENGINEER:

Address: CONTRACTOR/CM:

City: CONTRACT DATE:

DATE DISTRICT AUTHORIZED PROJECT:

BRIEF DESCRIPTION OF PROJECT:

2. CERTIFICATION OF DESIGN AND CONSTRUCTION

The intent of this document is to assure that the school district has provided to the architect/engineer the required information and the architect/engineer has reviewed the School Facilities Standards as required by the State of Texas, and used his/her reasonable professional judgment and care in the architectural/engineering design and that the contractor has constructed the project in a quality manner in general conformance with the design requirements and that the school district certifies to project completion.

3. The District certifies that the educational program and educational specifications of this facility along with the identified building code to be used have been provided to the architect/engineer.

DISTRICT: **BY:** **DATE:**

4. The Architect/Engineer certifies the above information was received from the school district, and that the building(s) were designed in accordance with the applicable building codes. Further, the facility has been designed to meet or exceed the design criteria relating to space (minimum square footage), educational adequacy, and construction quality as contained in the School Facilities Standards as adopted by the Commissioner of Education, July 9, 2003, and as provided by the district.

ARCHITECT/ENGINEER: BY: DATE:

5. The Contractor certifies that this project has been constructed in general conformance with the construction documents as prepared by the architect/engineer listed above.

CONTRACTOR/CM: BY: DATE:

6. The District certifies completion of the project (as defined by the architect/engineer and contractor).

DISTRICT: BY: DATE:

SECTION 01 7900
DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.01 SUMMARY

A. Demonstration of products and systems to be commissioned and requiring routine maintenance where indicated in specific specification sections.

B. Training of Owner personnel in operation and maintenance is required for:
   1. All software-operated systems.
   2. HVAC systems and equipment.
   3. Plumbing equipment.
   4. Electrical systems and equipment.
   5. Conveying systems.
   6. Landscape irrigation.
   7. Audio and Visual systems.
   8. Lighting systems.
   9. Security systems and Access Controls.
   10. Fire Alarm systems.
   11. Kitchen Equipment.
   12. Resinous Flooring
   13. Items specified in individual product Sections.

C. Training of Owner personnel in care, cleaning, maintenance, and repair is required for:
   1. Roofing, waterproofing, and other weather-exposed or moisture protection products.
   2. Finishes, including flooring, wall finishes, ceiling finishes.
   3. Fixtures and fittings.
   4. Items specified in individual product Sections.

1.02 RELATED REQUIREMENTS

A. Section 01 7800 - Closeout Submittals: Operation and maintenance manuals.

B. Other Specification Sections: Additional requirements for demonstration and training.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures; except:
   1. Make all submittals specified in this section, and elsewhere where indicated for commissioning purposes, directly to the Architect and New Caney ISD.
   2. Submittals indicated as "Draft" are intended for the use of Owner in preparation of overall Training Plan; submit in editable electronic format, latest version of Microsoft Word required.

B. Draft Training Plans: Owner will designate personnel to be trained; tailor training to needs and skill-level of attendees.
   1. Submit not less than four weeks prior to start of training.
   2. Revise and resubmit until acceptable.
   3. Provide an overall schedule showing all training sessions.
   4. Include at least the following for each training session:
      a. Identification, date, time, and duration.
      b. Description of products and/or systems to be covered.
      c. Name of firm and person conducting training; include qualifications.
      d. Intended audience, such as job description.
      e. Objectives of training and suggested methods of ensuring adequate training.
      f. Methods to be used, such as classroom lecture, live demonstrations, hands-on, etc.
      g. Media to be used, such a slides, hand-outs, etc.

h. Training equipment required, such as projector, projection screen, etc., to be provided by Contractor.

C. Training Manuals: Provide training manual for each attendee; allow for minimum of two attendees per training session.
1. Include applicable portion of O&M manuals.
2. Include copies of all hand-outs, slides, overheads, video presentations, etc., that are not included in O&M manuals.
3. Provide one extra copy of each training manual to be included with operation and maintenance data.

D. Training Reports:
1. Identification of each training session, date, time, and duration.
2. Sign-in sheet showing names and job titles of attendees.
3. List of attendee questions and written answers given, including copies of and references to supporting documentation required for clarification; include answers to questions that could not be answered in original training session.
4. Include New Caney ISD's formal acceptance of training session.

E. Video Recordings: Submit digital video recording of each demonstration and training session for Owner's subsequent use.
1. Format: DVD Disc.
2. Label each disc and container with session identification and date.
3. Provide sign-off sheets in the closeout documents indicating the individuals who were in attendance at each of the training sessions.

1.04 QUALITY ASSURANCE

A. Instructor Qualifications: Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.
1. Provide as instructors the most qualified trainer of those contractors and/or installers who actually supplied and installed the systems and equipment.
2. Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 DEMONSTRATION - GENERAL

A. Demonstrations conducted during system start-up do not qualify as demonstrations for the purposes of this section, unless approved in advance by Owner.

B. Demonstrations conducted during Functional Testing need not be repeated unless Owner personnel training is specified.

C. Demonstration may be combined with Owner personnel training if applicable.

D. Operating Equipment and Systems: Demonstrate operation in all modes, including start-up, shut-down, seasonal changeover, emergency conditions, and troubleshooting, and maintenance procedures, including scheduled and preventive maintenance.
1. Perform demonstrations not less than two weeks prior to Substantial Completion.
2. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

E. Non-Operating Products: Demonstrate cleaning, scheduled and preventive maintenance, and repair procedures.
1. Perform demonstrations not less than two weeks prior to Substantial Completion.

3.02 TRAINING - GENERAL

A. Conduct training on-site unless otherwise indicated.

B. Owner will provide classroom and seating at no cost to Contractor.

C. Do not start training until Functional Testing is complete, unless otherwise specified or approved by the New Caney ISD.

D. Provide training in minimum two hour segments.

E. The New Caney ISD is responsible for determining that the training was satisfactorily completed.

F. Training schedule will be subject to availability of Owner's personnel to be trained; re-schedule training sessions as required by Owner; once schedule has been approved by Owner failure to conduct sessions according to schedule will be cause for Owner to charge Contractor for personnel "show-up" time.

G. Review of Facility Policy on Operation and Maintenance Data: During training discuss:
   1. The location of the O&M manuals and procedures for use and preservation; backup copies.
   2. Typical contents and organization of all manuals, including explanatory information, system narratives, and product specific information.
   3. Typical uses of the O&M manuals.

H. Product- and System-Specific Training:
   1. Review the applicable O&M manuals.
   2. For systems, provide an overview of system operation, design parameters and constraints, and operational strategies.
   3. Review instructions for proper operation in all modes, including start-up, shut-down, seasonal changeover and emergency procedures, and for maintenance, including preventative maintenance.
   4. Provide hands-on training on all operational modes possible and preventive maintenance.
   5. Emphasize safe and proper operating requirements; discuss relevant health and safety issues and emergency procedures.
   6. Discuss common troubleshooting problems and solutions.
   7. Discuss any peculiarities of equipment installation or operation.
   8. Discuss warranties and guarantees, including procedures necessary to avoid voiding coverage.
   9. Review recommended tools and spare parts inventory suggestions of manufacturers.
   10. Review spare parts and tools required to be furnished by Contractor.
   11. Review spare parts suppliers and sources and procurement procedures.

I. Be prepared to answer questions raised by training attendees; if unable to answer during training session, provide written response within three days.

J. Contractor must have written approval from the Owner and Architect to forgo any required trainings.

END OF SECTION

SECTION 02 4100
DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Building demolition .

B. Selective demolition of built site elements.

C. Abandonment and removal of existing utilities and utility structures.

1.02 RELATED REQUIREMENTS

A. Section 01 5000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.

B. Section 01 6000 - Product Requirements: Handling and storage of items removed for salvage and relocation.

C. Section 01 7000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.

1.03 REFERENCE STANDARDS

A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction including deep foundation elements remaining.

1.05 QUALITY ASSURANCE

A. Demolition Firm Qualifications: Company specializing in the type of work required.
   1. Minimum of 5 years of documented experience.

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.01 SCOPE

A. Remove the entire building(s) as indicated on the drawings.

B. Remove allother paving and curbs within construction limits indicated on drawings.

C. Within area of new construction, remove foundation walls and footings to a minimum of 4 feet below finished grade.

D. Outside area of new construction, remove foundation walls and footings to a minimum of 2 feet below finished grade.

E. Remove portions of existing concrete slabs as indicated on drawings.

F. Remove portions of existing walls as indicated on the drawings.

G. Remove portions of existing ceilings as indicated on the drawings.

H. Remove fences and gates.

I. Remove other items indicated, for salvage, relocation, and recycling.

J. Fill excavations, open pits, and holes in ground areas generated as result of removals, using specified fill; compact fill as required so that required rough grade elevations do not subside within one year after completion.

3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with other requirements specified in Section 01 7000.

B. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
   1. Obtain required permits.
   2. Comply with applicable requirements of NFPA 241.
   3. Use of explosives is not permitted.
   4. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
   5. Provide, erect, and maintain temporary barriers and security devices.
   6. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
   7. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
   8. Do not close or obstruct roadways or sidewalks without permit.
   9. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
   10. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.

C. Do not begin removal until receipt of notification to proceed from Owner.

D. Prior to submitting proposal, Contractor shall request a list from the Owner stating items which shall be removed by the Owner prior to demolition.

E. Included with the demolition proposal, Contractor shall provide a written declaration of items that will be salvaged from the site. Each item shall be itemized and a monetary value assigned. Credit value of salvaged items shall be included in calculation of proposal. Declaration shall be reviewed by the Owner to determine that the declaration complies with state requirements and local Board policy in regards to disposing of public property.

F. All items called for on the drawings to be salvaged, removed and relocated shall be inventoried, removed and stored until such time as they are to be installed in their new location. The inventory list shall be given to the Owner and shall include an itemized list that includes quantities, descriptions and condition of each item. These items are considered to be in good operating condition at the time the contract is signed, and shall remain the property of Owner. These items shall be properly protected by the contractor and removed by him, complete, including all appurtenances and reinstalled in their new location in good working order with any modifications called for by the drawings.

G. All items noted on the drawings to be removed and delivered to the Owner shall be cataloged with a written description and delivered to Owner at a location designated by the Owner.

H. Do not begin removal until built elements to be salvaged or relocated have been removed.

I. Do not begin removal until vegetation to be relocated has been removed and specified measures have been taken to protect vegetation to remain.

J. Protect existing structures and other elements that are not to be removed.
   1. Provide bracing and shoring.
   2. Prevent movement or settlement of adjacent structures.
   3. Stop work immediately if adjacent structures appear to be in danger.

K. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

L. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.

M. Partial Removal of Paving and Curbs: Neatly saw cut at right angle to surface.

3.03 EXISTING UTILITIES

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.

E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.

F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

G. Unused underground piping may be abandoned in place provided it is completely drained and capped; remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

H. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.

3.04 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. Remove from site all materials not to be reused on site; do not burn or bury.

C. Leave site in clean condition, ready for subsequent work.

D. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 03 1000
CONCRETE FORMING AND ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Formwork for cast-in place concrete.

B. Form accessories.

1.02 RELATED REQUIREMENTS

A. Section 03 2000 - Concrete Reinforcing.

B. Section 03 3000 - Cast-in-Place Concrete.

1.03 REFERENCE STANDARDS

A. ACI 117 - Specification for Tolerances for Concrete Construction and Materials 2010 (Reapproved 2015).

B. ACI 301 - Specifications for Concrete Construction 2020.

C. ACI 318 - Building Code Requirements for Structural Concrete 2019 (Reapproved 2022).

D. ACI 347R - Guide to Formwork for Concrete 2014 (Reapproved 2021).

E. PS 1 - Structural Plywood 2019.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on void form materials and installation requirements.

C. Shop Drawings: Indicate pertinent dimensions, materials, bracing, arrangement of joints and ties, and minimum soil retainer bearing lengths above the bottom of the grade beam and below the bottom of the void as calculated per the formwork accessories section below.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver prefabricated forms and installation instructions in manufacturer's packaging.

B. Store prefabricated forms off ground in ventilated and protected manner to prevent deterioration from moisture.

C. Protect plastic foam products from damage and exposure to sunlight.

PART 2 PRODUCTS

2.01 FORMWORK - GENERAL

A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.

B. Design and construct concrete that complies with design with respect to shape, lines, and dimensions.

C. Comply with relevant portions of ACI 301, ACI 301, and ACI 301.

2.02 WOOD FORM MATERIALS

A. Wood forms for unexposed concrete surfaces - No. 2 Common Southern Yellow Pine Lumber or other material of equal qualifications of sufficient thickness to be capable of sustaining the loads to be imposed thereon, dressed to uniformly smooth contact surfaces.

B. Wood forms for exposed concrete surfaces - Commercial Standard Douglas Fir, moisture-resistant, concrete form plywood with one smooth face.

2.03 FORMWORK ACCESSORIES

A. Form Release Agent: Capable of releasing forms from hardened concrete without staining or discoloring concrete or forming bugholes and other surface defects, compatible with concrete and form materials, and not requiring removal for satisfactory bonding of coatings to be applied.
   1. Composition: Colorless mineral oil-based compound.

B. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

C. Joint Filler: Nonextruding, resilient asphalt impregnated fiberboard or felt, complying with ASTM D 1751, 1/2 inch thick and full depth of slab less 1/2 inch .

D. Soil Retainers: Shall be provided where specified and shown on the drawings to prevent migration of backfill under suspended foundation elements.

E. Retainers shall be composed of high density polyethylene materials that are not adversely affected by moisture. They must be flexible, impact resistant and have sufficient strength to resist lateral loads applied by soil.
   1. Unless noted otherwise in the Geotechnical Report, soil retainers shall extend a minimum of the minimum Manufacturer recommended distance above the bottom of the grade beam plus the Potential Vertical Movement (PVM) or Potential Vertical Rise (PVR) of the soil and the minimum Manufacturer recommended distance below the void space plus the PVM or PVR. Reference the General Notes on the Structural Drawings for the PVM/PVR. When determining the soil retainer height, it is permitted for the Manufacturer to provide a minimum height that does not already account for some degree of expansive soil movement as their recommended minimum, and then add the expansive soil movement specified here to that minimum height to determine the final specified soil retainer height. In the submittal, the Manufacturer shall state whether their recommended minimum height already includes expansive soil movement. Soil retainers shall not be attached to concrete. Waler ties shall be twisted off to allow soil retainers to rise the specified void depth.
   2. Use 3/8" thickness for void spaces 8" and less. Use 1/2" thickness for void spaces greater than 8" but less than 12". Use 3/4" thickness for void spaces equal to 12". Soil retainers shall be equal to the following:
      a. BackFill Retainer by SureVoid Products, Inc. (installing this product vertically as recommended by the manufacturer)
      b. Subsititutions: See section 01 6000 - Product Requirements.
   3. For void spaces greater than 12" but less than or equal to 16", retainers shall be ribbed and made from high density polyethylene. Soil retainers shall be equal to the following:
      a. Motzblock by M&M Construction specialties (installing this product at an angle as recommended by the manufacturer)
      b. SureRetainer by VoidForm Products, Inc. (installing this product at an angle as recommended by the manufacturer)
      c. Substitutions: See section 01 6000 - Product Requirements.

F. Waterstops: See section 03 3000 - Cast-in-Place Concrete.

G. Expanded Polystyrene (EPS) Geofoam:
   1. Lightweight expanded polystyrene with a minimum compressive strength of 2.2 pounds per square inch (psi) at a 1% deformation.
   2. Geofoam shall be in compliance with ASTM D 6817.
   3. Geofoam shall be shaped to provide continuous support for raised slabs or to act as a lightweight fill material at locations indicated on the drawings.
   4. Manufacturers:
      a. Foam-Control EPS Geofoam, AFM Corporation: www.geofoam.com
      b. InsulFoam GF, Insulfoam, LLC.: www.insulfoam.com
      c. Therma Foam: www.thermafoam.com

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.02 EARTH FORMS

A. Earth formed grade beams allowed only where noted in the Structural Drawings. Grade beams shall be FORMED ON ALL structural slabs and exposed conditions. Hand trim sides and bottom of earth forms. Remove loose soil prior to placing concrete.

3.03 ERECTION - FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.

B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

D. Refer to the Civil Drawings for construction joint requirements at flatwork.

E. Construction joints for Structural concrete: Contractor shall obtain written approval for all construction joints not shown on Drawings for structural concrete. The Contractor shall locate construction joints in grade beams as shown on the Structural Drawings, with keyways and continuous reinforcement through the joint. The Contractor shall not be permitted to install a construction joint in any structurally suspended slabs unless less the joint is located over a grade beam providing a minimum of 4 inches of bearing on each side of the grade beam and unless the Architect approves of the location, which generally is acceptable if the joint is primarily located at least 1 inch under a wall. Slab construction joints shall have a keyway and shall have continuous slab reinforcement running through the joint.

F. Construction joints: Locate construction joints in concrete as indicated. Contractor shall obtain written approval for all construction joints not shown on Drawings for structural concrete. Distance between construction joints shall be arranged so that the greatest horizontal dimension (including diagonal measurement) for slab pours shall not exceed 200 feet. Provide keyways and extra dowels at all joints. Provide longitudinal keys at joints.

G. Expansion joints: Expansion joints shall consist of joint fillers with sealant. Install filler strips 3/4" below finished surfaces. Clean grooves when surface is dry of foreign matter, loose particles and concrete protrusions; then fill approximately flush with joint sealant to be slightly concave after drying. Finish edges of exposed concrete along expansion joints around all fixed objects within or abutting concrete.

H. All penetrations through concrete beams including grade beams shall be sleeved. Refer to MEP specifications for sleeve material type.

I. If formwork is placed after reinforcement, resulting in insufficient concrete cover over reinforcement, request instructions from Architect/Engineer before proceeding.

3.04 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.05 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 117, unless otherwise indicated.

B. Construct and align formwork for elevator hoistway in accordance with ASME A17.1.

3.06 FIELD QUALITY CONTROL

A. A special inspections and testing agency (SITA) will perform field quality control tests and inspections, as specified in Sections 01 4516 and 01 4533.

B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and to verify that supports, fastenings, wedges, ties, and items are secure.

C. Do not reuse wood formwork more than 2 times for concrete surfaces to be exposed to view. Do not patch formwork.

3.07 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

C. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.

END OF SECTION

SECTION 03 2000
CONCRETE REINFORCING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Reinforcing steel for cast-in-place concrete.

B. Supports and accessories for steel reinforcement.

1.02 RELATED REQUIREMENTS

A. Section 03 1000 - Concrete Forming and Accessories.

B. Section 03 3000 - Cast-in-Place Concrete.

1.03 REFERENCE STANDARDS

A. ACI 301 - Specifications for Concrete Construction 2020.

B. ACI 318 - Building Code Requirements for Structural Concrete 2019 (Reapproved 2022).

C. ACI SP-66 - ACI Detailing Manual 2004.

D. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2022.

E. ASTM A706/A706M - Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement 2022a.

F. CRSI (DA4) - Manual of Standard Practice 2018, with Errata (2019).

G. CRSI (P1) - Placing Reinforcing Bars, 10th Edition 2019.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, location of splices and embedded metal assemblies.

C. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.

D. Reports: Submit certified copies of mill test report of reinforcement materials analysis.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 318, ACI 318, ACI 301, ACI 318, and ACI 318.
   1. Maintain one copy of each document on project site.

B. Provide Architect with access to fabrication plant to facilitate inspection of reinforcement. Provide notification of commencement and duration of shop fabrication in sufficient time to allow inspection.

C. Welders' Certificates: Submit certifications for welders employed on the project, verifying AWS qualification within the previous 12 months.

PART 2 PRODUCTS

2.01 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).
   1. Deformed billet-steel bars.
   2. Unfinished.
   3. Splicing of pier reinforcement shall not be permitted.

B. Weldable Reinforcing Steel: ASTM A 706, deformed low-alloy steel bars.
   1. Unfinished.

C. Steel Welded Wire Reinforcement (WWR): Plain Type; 1.
   1. Form: Flat Sheets.

D. Reinforcement Accessories:
   1. Tie Wire: Annealed, minimum 16 gage, 0.0508 inch.
   2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement. At slabs, supports shall not be further than 48 inches apart, each way.
   3. Chairs or Bar Supports for slab on grade and grade beams shall be:
      a. Dayton – Aztec Castle Chairs
      b. OCM Craddle Chairs
      c. Or as specified on the Structural Drawings
      d. NO SUBSITITUIONS
   4. Provide plastic or plastic coated steel components for placement within 1-1/2 inches of weathering surfaces.

2.02 FABRICATION

A. Fabricate concrete reinforcing in accordance with ACI SP-66 - ACI Detailing Manual.

B. Welding of reinforcement is not permitted, unless explicitly indicated on Structural Drawings

C. Locate reinforcing splices not indicated on drawings at point of minimum stress.
   1. Review locations of splices with Architect.
   2. Approved patented type splices (No Electric Arc Welding Permitted) may be used instead of lap splices.
   3. Any bar may be field bent one time without notfiying the Structural Engineer, unless noted otherwise on the Structural Drawings. Reinforcement smaller than #4 bars shall be cold bent. Reinforcement greater than #4 bars shall be bent with heat in the field. Heating shall be controlled by temperature indicating crayons and shall reach a maximum temperature of 1500 degrees Farenheit. Reinforcement shall not be artificially cooled until temperature has reduced naturally to below 600 degrees Farenheit. Bends shall be gradual and care shall be taken to prevent heating or cracking of concrete. If reinforcement must be field bent more than once, the Contractor shall issue an RFI indicating which bars need to be field bent additionally.

PART 3 EXECUTION

3.01 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position.

B. Do not displace or damage vapor barrier.

C. Accommodate placement of formed openings.

D. Placement of reinforcing steel shall be done in cooperation with requirements of other trades. No cutting of reinforcement or displacement of bars shall be done by any of the trades without the consent of the Architect, and then only when adequate reinforcement is provided to replace the design requirements.

E. Use templates to locate all column and footing dowels.

F. Maintain concrete cover around reinforcing as indicated on drawings.

G. Bond and ground all reinforcement to requirements of Section 26 0526.

3.02 FIELD QUALITY CONTROL

A. A special inspections and testing agency (SITA) will perform field quality control tests and inspections, as specified in Sections 01 4516 and 01 4533.

END OF SECTION

SECTION 03 3000
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete building frame members.

B. Concrete for composite floor construction.

C. Elevated concrete slabs.

D. Floors and slabs on grade.

E. Concrete Floor Topping and Feathering Material.

F. Joint devices associated with concrete work.

G. Miscellaneous concrete elements, including equipment pads, equipment pits, light pole bases, flagpole bases, thrust blocks, and manholes.

H. Concrete curing.

1.02 COORDINATION OF CIVIL AND STRUCTURAL CONCRETE SPECIFICATIONS

A. This specification section applies to all concrete designs provided on the Structural Drawings. For clarification, this specification section applies to interior and exterior concrete designs provided on the Structural Drawings (possibly including but not limited to sidewalks, patios, pavement, ramps, stairs, retaining walls, etc.). For exterior concrete designs not shown on the Structural Drawings but shown on the Civil Drawings, the provisions of this specification section only applies when there is not a conflicting specification elsewhere in in the Project Manual or Civil Drawings.

1.03 RELATED REQUIREMENTS

A. Section 03 1000 - Concrete Forming and Accessories: Forms and accessories for formwork.

B. Section 03 2000 - Concrete Reinforcing.

1.04 REFERENCE STANDARDS

A. ACI 117 - Specification for Tolerances for Concrete Construction and Materials 2010 (Reapproved 2015).

B. ACI 301 - Specifications for Concrete Construction 2020.

C. ACI 302.1R - Guide to Concrete Floor and Slab Construction 2015.

D. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete 2000 (Reapproved 2009).

E. ACI 305R - Guide to Hot Weather Concreting 2020.

F. ACI 306R - Guide to Cold Weather Concreting 2016.

G. ACI 308R - Guide to External Curing of Concrete 2016.

H. ACI 318 - Building Code Requirements for Structural Concrete 2019 (Reapproved 2022).

I. ACI 347R - Guide to Formwork for Concrete 2014 (Reapproved 2021).

J. ASTM C33/C33M - Standard Specification for Concrete Aggregates 2018.

K. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens 2021.

L. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete 2022a.

M. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete 2020.

N. ASTM C150/C150M - Standard Specification for Portland Cement 2022.

O. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method 2016.

P. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete 2010a (Reapproved 2016).

Q. ASTM C330/C330M - Standard Specification for Lightweight Aggregates for Structural Concrete 2017a.

R. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete 2019, with Editorial Revision (2022).

S. ASTM C618 - Standard Specification for Coal Ash and Raw or Calcined Natural Pozzolan for Use in Concrete 2023, with Editorial Revision.

T. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing 2017.

U. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types) 2018.

V. ASTM E154/E154M - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover 2008a (Reapproved 2019).

W. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.

X. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs 2017.

Y. ASTM F 1249

Z. COE CRD-C 48 - Handbook for Concrete and Cement Standard Test Method for Water Permeability of Concrete 1992.

AA. COE CRD-C 572 - Handbook for Concrete and Cement Corps of Engineers Specifications for Polyvinylchloride Waterstop 1974.

BB. NSF 61 - Drinking Water System Components - Health Effects 2022, with Errata.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. The Contractor shall submit all proposed mix designs to the Architect for review before use. Each mix design shall clearly identify where the Contractor proposes use, such as indicating “Drilled Piers”, “Auger Cast-In-Place Piles”, “Concrete Columns”, “Insulating Concrete Formed Walls”, "Cast-In-Place Concrete Retaining Walls", "Precast Tilt Wall Panels", “Light Pole Bases”, “Grade Beams”, “Interior Slabs on Grade & Interior Slabs on Metal Deck”, “Interior Slabs on Void Boxes and Interior Slabs on Temporary Formwork”, “Exterior Slabs on Grade, Exterior Slabs on Metal Deck and Miscellaneous Concrete”, “Exterior Slabs on Void Boxes and Exterior Slabs on Temporary Formwork”, "Storm Shelter Roof Topping Slab", “Greenhouse Foundations”, “Freezer Slabs & Cooler Slabs”, “Crawlspace Mudslab”, etc. Failure to clearly identify where mixes are proposed for use is a suitable reason for rejection. To expedite approval it is suggested that all mix designs related to Structural items be submitted separately from all mix designs related to Civil items as these two categories are reviewed by different parties. Furthermore, to expedite approval, it shall be permitted to email Structural Mix Designs directly to the Structural Engineer or Record and request approval.

C. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
   1. For curing compounds, refer to Submission requirements below before products shall be permitted and provide letters of acceptance from the flooring subcontractor and provide data on method of removal in the event of incompatibility with floor covering adhesives.
   2. For vapor barriers, submit all of the following:
      a. Product data and installation instructions.

b. Documentation from the manufacturer or patent-holder indicating that:
   1) The product is a minimum 15 mil product;
   2) The product is suitable for installation in contact with soil or granular fill under concrete slabs;
   3) Where a concrete-adhering tape is specified for use (e.g. over voidforms), both the vapor barrier product manufacturer or patent-holder and the concrete-adhering tape manufacturer or patent-holder have indicated that the concrete-adhering tape is compatible with the submitted vapor barrier product, and that test data indicates the tape will adhere to the concrete with a minimum 12 pounds per linear inch of tape.

c. Documentation from an independent agency indicating that:
   1) The independent agency is a testing firm or professional engineering firm which shares no ownership with the product manufacturer or patent-holder;
   2) The independent agency randomly selected the samples for testing from one or more warehouses (or other distribution locations) and then shipped the samples to one or more testing laboratories;
   3) Testing was completed within four years before construction proposals are due for this project, by one or more independent testing laboratories;
   4) The testing fully complied with ASTM E 1745 or identifying any deviations from ASTM E 1745 (including deviations from any documents referenced by ASTM E 1745), with permeance testing having at least two sample replicates (instead of the three required by ASTM E 1745) for each of the five permeance testing scenarios required (baseline and the four conditions required by ASTM E 154 Sections 8, 11, 12 and 13);
   5) The puncture, tensile strength and permeance results of the testing comply with the requirements for a 15 mil, Class A vapor barrier according to ASTM E 1745; and,
   6) The average permeance of all samples tested for each of the five permeance testing scenarios is less than or equal to 0.010 Perms [grains/(sq ft*hr*in.Hg)] (with the permeance results being considered to the nearest 0.001 Perm) per ASTM F 1249 or ASTM E 96 after mandatory conditioning tests per ASTM E 154 Sections 8, 11, 12 and 13.

D. Samples: Submit samples of underslab vapor barrier and tape to be used if making a substitution request.

E. Test Reports: Submit report for each test or series of tests specified.

F. Manufacturer's Installation Instructions: For concrete accessories, indicate installation procedures and interface required with adjacent construction.

G. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

1.06 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301 and ACI 318.
   1. Maintain one copy of each document on site.

B. Follow recommendations of ACI 305R when concreting during hot weather.

C. Follow recommendations of ACI 306R when concreting during cold weather.

PART 2 PRODUCTS

2.01 FORMWORK

A. Comply with requirements of Section 03 1000.

2.02 REINFORCEMENT MATERIALS

A. Comply with requirements of Section 03 2000.

2.03 CONCRETE MATERIALS

A. Cement: ASTM C150 or ASTM C 1157, Type I/II Portland type.
   1. Acquire cement for entire project from same source.

B. Fine and Coarse Aggregates: ASTM C33/C33M.
   1. Acquire aggregates for entire project from same source.
   2. Fine aggregate:
      a. Provide washed natural or manufactured sand having strong, hard, durable particles, and containing not more than 2% by weight of deleterious matter such as clay lumps, mica, shale, or schist.
   3. Coarse aggregate:
      a. Provide coarse aggregate consisting of clean, hard, find grained, sound crushed rock or washed gravel, or a combination of both, containing not more than 5% by weight of flat, chip-like, thin, elongated, friable, or laminated pieces, nor more than 2% by weight of shale or cherty material.
      b. Use coarse aggregate of the largest practicable size for each condition of placement, subject to the following maximum size limitations:
         1) Do not exceed 3/4 of the clear distance between reinforcing bars, 1/5 of the narrowest dimension between sides of forms, or 1/3 the depth of any slab section.
      c. For each slab mix design submittal (excluding pavement designed by the Civil Engineer and shown on the Civil Drawings): The concrete supplier shall provide a combined (coarse and fine) sieve analysis for the proposed aggregate blend, using sieve data measured within the past 3 months. It shall be permitted for the concrete supplier to submit a combined sieve analysis that is calculated based on individual sieve analyses. The combined sieve analysis shall show the percent retained on each sieve (not the cumulative percent retained) and shall meet the following requirements:
         1) Sizes: 1", 3/4", 1/2", 3/8", #4, #8, #16, #30, #50, #100.
         2) No sized other than those listed shall be on the analysis.
         3) 0% to 5% shall be retained on the top (largest) size.
         4) 1.5% to 5% shall be retained on the #100 sieve.
         5) 2% to 20% shall be retained on all intermediate sieves.
         6) The percent retained on each intermediate sieve shall not be greater than 1.2 times the percent retained on any adjacent intermediate sieve.
         7) If the percent retained requirements above cannot be met by using multiple aggregate piles from the plant, the Contractor shall assume for bidding purposes that outside sources will be required.
         8) Requests for variances are permitted to be submitted to the Engineer for consideration.

C. Fly Ash: ASTM C618 C or F

D. Water: ASTM C94/C94M or potable.

E. Concrete Floor Topping and Feathering Material:
   1. At feathered locations, provide cement-based self-leveling underlayment.
   2. Provide manufacturer's recommended primer for standard absorbent concrete.
   3. Aggregate shall be well graded, washed gravel (1/8" to 1/4" or larger) for use when underlayment is installed over 1 1/2" thick.
   4. Water shall be clean, potable, and sufficiently cool (not warmer than 70°F).
   5. Acceptable Manufacturers: Subject to compliance with requirements herein, provide products from one of the following manufacturers.
      a. Ardex Engineered Cements: www.ardex.com
      b. (Level-Right) Maxxon Corporation: www.level-right.com

c. Bonsal American: www.bonsal.com
d. Substitutions: See Section 01 6000 - Product Requirements.

2.04 ADMIXTURES

A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

B. Dispense in compliance with manufacturer's recommendations with particular attention to possible undesirable chemical reaction between products when mixed in concentrated form.

C. Air Entrainment Admixture: ASTM C260/C260M.

D. High Range Water Reducing Admixture: ASTM C494/C494M Type F.
1. Manufacturers:
a. MasterGlenium 1466 by BASF Corporation.
b. Substitutions: See Section 01 6000 - Product Requirements.

E. Mid-Range Water Reducing Admixture: Complying with ASTM C494/C494M Type A and/or Type F and having a maximum of 25% lignosulfonates.
1. Manufacturers:
a. POLYHEED 1020 by Degussa Admixtures
b. SIKAMENT 686 by Sika (214) 878-3669
c. PLASTOL 341 by Euclid Chemical Co. (216) 531-9222
d. POZZOLITH 200N by BASF Corporation
e. MasterGlenium 1466 by BASF Corporation
f. Substitutions: See Section 01 6000 - Product Requirements. A letter from the manufacturer will be required indicating that the material does not have more than 25% lignosulfonates.

2.05 ACCESSORY MATERIALS

A. Underslab Vapor Barrier shall meet all of the following requirements:
1. The product shall be a minimum 15 mil product.
2. The product shall be suitable for installation in contact with soil or granular fill under concrete slabs according to the manufacturer or patent-holder.
3. Within four years before construction proposals are due for this project, an independent agency (a testing firm or professional engineering firm which shares no ownership with the product manufacturer or patent-holder) shall have randomly selected the samples for testing from one or more warehouses (or other distribution locations) and then shipped the samples to one or more testing laboratories which then completed testing in compliance with ASTM E 1745 having at least two sample replicates (instead of the three required by ASTM E 1745) for each of the five permeance testing scenarios required (baseline and the four conditions required by ASTM E 154 Sections 8, 11, 12 and 13), with the puncture, tensile strength and permeance results of the testing complying with the requirements for a 15 mil, Class A vapor barrier according to ASTM E 1745, and the average permeance of all samples tested for each of the five permeance testing scenarios being less than or equal to 0.010 Perms [grains/(sq ft*hr*in.Hg)] (with the permeance results being considered to the nearest 0.001 Perm) per ASTM F 1249 or ASTM E 96 after mandatory conditioning tests per ASTM E 154 Sections 8, 11, 12 and 13.
a. Manufacturers:
1) Stego Wrap (Basis of Design)
2) Tex-Trude Xtreme
3) WR Meadows Perminator

4. Accessory Products: At slabs on grade and over the subgrade of all crawlspaces, install vapor barrier manufacturer's recommended tape for sealing seams and penetrations in vapor barrier. At slabs poured over carton void forms, install the vapor barrier over the Masonite and tape all joints (and tape the perimeter of the vapor barrier under the slab area) with a concrete-adhering tape that bonds to the concrete with a minimum tensile strength of 12 pounds per linear inch. A letter or other documentation from the manufacturer or patent-holder of the vapor barrier and the manufacturer or patent-holder of any concrete-adhering tape required for this project shall be submitted to the Architect indicating that both products are compatible. At all areas where vapor barrier is installed, install the vapor barrier manufacturer's recommended adhesive, mastic, prefabricated boots, etc.

2.06 BONDING AND JOINTING PRODUCTS

A. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059/C1059M, Type II.

B. Epoxy Bonding System:
   1. Complying with ASTM C881/C881M and of Type required for specific application.

C. Waterstops: Self-sealing, non-swelling preformed joint sealant.
   1. Single component, self-sealing adhesive compound, extruded in a square cross-section between two quick-release protective wrappers.
      a. Meets Federal Specification SSS-210
      b. Certified NSF/ANSI Standard 61 for use in potable water systems
      c. Manufacturers:
         1) Henry Company; Synko-Flex Waterstop: www.us.henry.com
         2) Substitutions: See Section 01 6000 - Product Requirements.

D. Reglets: See Section 03 1000 - Concrete Forming and Accessories

E. Joint Filler: See Section 03 1000 - Concrete Forming and Accessories

F. Slab Construction Joint Devices: See Section 03 1000 - Concrete Forming and Accessories

2.07 CURING MATERIALS

A. Evaporation Reducer: Liquid thin-film-forming compound that reduces rapid moisture loss caused by high temperature, low humidity, and high winds; intended for application immediately after concrete placement.
   1. Manufacturers:
      a. W. R. Meadows, Inc; Evapre or Evapre-RTU: www.wrmeadows.com/#sle.

B. At all building slabs, except locations where a "sealer" is shown on the Architectural Drawings: Wet Curing with Potable Water that is not detrimental to concrete.
   1. All interior slab areas shall be water cured for a minimum of five (5) days.
   2. Maintain complete and visible wetness of slab areas by suitable means (sprinklers, drip hoses, water/curing blankets, etc.) for a minimum of five (5) days.
   3. Unless otherwise approved as a substitution request, Proposers shall assume for Proposal purposes that curing compounds shall not be used anywhere on this project and that only wet curing shall be permitted. However, if requested as a substitution request, the Architect may elect to permit water based curing compounds at certain locations if the Contractor verifies that the warranty will be met: Curing Compound, Naturally Dissipating, Clear, water-based, liquid membrane-forming compound, that dissipates within 3 to 5 weeks; complying with ASTM C309.Note: Many flooring installer Subcontractors will no longer warranty flooring if any kind of curing compound is used! It is the Contractor's responsibility for verifying compatibility of flooring materials and adhesives with any proposed curing compound before proposing curing compounds.

C. At all building slabs where a "sealer" is shown on the Architectural Drawings: Curing and Sealing Compound, Semi-Gloss: Liquid, membrane-forming, dries clear, non-yellowing acrylic-based polymer; complying with ASTM C1315 Type 1 Class A.
   1. Vehicle: Solvent-based.
   2. Solids by Mass: 25 percent, minimum.
   3. VOC Content: Ozone Transport Commission (OTC) compliant.
   4. Manufacturers:
      a. BASF; MasterKure CC 250 SB: www.master-builders-solutions.basf.us
      b. W.R. Meadows, Inc.; CS-309-25 OTC: www.wrmeadows.com.
      c. Substitutions: See Section 01 6000 - Product Requirements.

2.08 CONCRETE MIX DESIGN REQUIREMENTS

A. Note to Building Official: The specified air contents for this project are based on the interpretation that all concrete on this project is under Exposure Category F0 conditions in which Freezing and Thawing concerns are "Not Applicable". The International Building Code requires that air contents of concrete be within ranges specified by ACI 318 for various Exposure Categories depending on the probability of exposure to moisture before freezing, and probability of cycles of freezing and thawing. ACI Commentary describes F0 as concrete that will not be exposed to cycles of freezing; F1, exposed to cycles of freezing and thawing that will be occasionally exposed to moisture before freezing; F2, exposed to cycles of freezing and thawing that is in continuous contact with moisture before freezing; and F3, similar to F2 with exposure to deicing chemicals. The "not applicable" interpretation for this project is based on the very limited number of freeze thaw cycles that are likely to occur at this project and based on the consideration that high air contents can cause problems such as cracking and surface delamination.

B. Refer to the schedule of mixes at the end of this specification section for requirements specific to different applications. It shall be permitted to submit to the Engineer any desired proprietary designs which deviate from the schedule of mixes if and only if all deviations from the schedule are clearly noted and if test data is provided indicating the performance of the concrete with regard to slump versus time, strength versus time, and air content.

C. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.

D. Establish required average strength for each type of concrete on the basis of field experience, as specified in ACI 301. It shall be an obligation of the Contractor to produce and deposit concrete that will exceed specified strength twenty-eight days after placing. Concrete falling below specified strength required by ACI 318, as shown by cylinder test shall be removed by the Contractor and be replaced with concrete at specified strength at no cost to the Owner unless otherwise approved by the Engineer after evaluation.

E. Concrete must be procured from a ready-mixed concrete plant. The method of production, concrete materials and concrete shall be stored handled and mixed in conformance with all requirements of ASTM C94, which apply to the particular method selected.

F. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.

G. Aggregate: As specified in Section 2.03 B.

2.09 MIXING

A. Transit Mixers: Comply with ASTM C94/C94M.

B. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 PREPARATION

A. Formwork: Comply with requirements Section 03 1000 - Concrete Forming and Accessories.

B. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in according to bonding agent manufacturer's instructions.
   1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.
   2. Use latex bonding agent only for non-load-bearing applications.
   3. At intersections of pours for concrete walls and beams (including foundation elements such as grade beams), install a 1 1/2" deep keyway that is a minimum of 1/3 the thickness and 1/3 the height (unless otherwise noted) and roughen the exposed surface of the first pour with a minimum 1/4" amplitude.

C. Where new concrete with integral waterproofing is to be bonded to previously placed concrete, prepare surfaces to be treated in accordance with waterproofing manufacturer's instructions. Saturate cold joint surface with clean water, and remove excess water before application of coat of waterproofing admixture slurry. Apply slurry coat uniformly with semi-stiff bristle brush at rate recommended by waterproofing manufacturer.

D. Vapor Barrier: At exterior floor slabs where indicated on the Structural Drawings Sheets and Notes and at all interior floor slabs, a vapor barrier under the floor slab shall be installed in accordance with ASTM E 1643 and as indicated in Part 2 of this Specification Section. Lap joints minimum 6 inches. Repair damaged vapor retarder before covering.
   1. Install compactible granular fill before placing vapor barrier at areas where slabs are poured on grade. Do not place sand between the vapor barrier and the slab.
   2. All slab pipe penetrations shall receive a vapor barrier boot. Mastic materials are not acceptable.

3.03 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS

A. Comply with requirements of Section 03 2000 - Concrete Reinforcing.

3.04 PLACING CONCRETE

A. Place concrete in accordance with ACI 304R.

B. Place concrete for floor slabs in accordance with ACI 302.1R.

C. Notify Architect not less than 48 hours prior to commencement of placement operations.

D. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

E. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

3.05 SLAB JOINTING

A. Locate joints as indicated on drawings.

B. Anchor joint fillers and devices to prevent movement during concrete placement.

C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.

D. Repair underslab vapor retarder damaged during placement of concrete reinforcing. Repair with vapor retarder material; lap over damaged areas minimum 6 inches and seal watertight.

E. Separate slabs on grade from vertical surfaces with joint filler as indicated on drawings.

F. Place joint filler in floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.

G. Extend joint filler from bottom of slab to within 1/2 inch of finished slab surface. Conform to Section 07 9200 for finish joint sealer requirements.

H. Install joint devices in accordance with manufacturer's instructions.

I. Install construction joint devices in coordination with floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.

J. Install joint device anchors for expansion joint assemblies specified in Section 07 9513. Maintain correct position to allow joint cover to be flush with floor and wall finish.

K. Apply sealants in joint devices in accordance with Section 07 9200.

L. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

M. Place concrete continuously between predetermined expansion, control, and construction joints.

N. Deposit concrete continuously or in layers of such thickness that no concrete will be deposited on concrete that has hardened sufficiently to cause formation of seams or planes of weakness within sections.

O. Do not interrupt successive placement; do not permit cold joints to occur.

P. Placing of concrete in supported elements shall not be started until concrete previously placed in columns and walls is no longer plastic.

Q. Consolidate concrete by vibration, spading or rodding, so that concrete is thoroughly worked around reinforcement, around embedded items and into corners or forms, eliminating all air or stone pockets that may cause honeycombing, pitting or planes or weakness.

R. Place saw-cuts in slabs-on-grade and topping slabs in saw cut pattern indicated. Saw-cuts in slab over void space are not permitted.

S. Saw cut slab-on-grade and topping slab joints within 4 hours after placing. Use maximum 3/16 inch thick blade, cut into slab 1/4 depth of slab thickness. Saw-cuts in slab over void space are not permitted.

T. Screed slabs on grade level, maintaining surface flatness of maximum 1/4 inch in 10 ft.

3.06 SEPARATE FLOOR TOPPINGS

A. Prior to placing floor topping, roughen substrate concrete surface and, roughen substrate concrete surface and remove deleterious material. Broom and vacuum clean.

B. Place required dividers, edge strips, reinforcing, and other items to be cast in.

C. Apply bonding agent to substrate in accordance with manufacturer's instructions.

D. Apply sand and cement slurry coat on base course, immediately prior to placing toppings.

E. Place concrete floor toppings to required lines and levels.

F. Screed toppings level, maintaining surface flatness of maximum 1:1000.

3.07 FLOOR FLATNESS AND LEVELNESS TOLERANCES

A. Maximum Variation of Surface Flatness:
   1. Exposed Concrete Floors: 1/8 inch in 10 feet.
   2. Under Seamless Resilient Flooring: 1/8 inch in 10 feet.
   3. Under Carpeting: 1/8 inch in 10 feet.

B. Correct the slab surface if tolerances are less than specified.

C. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

3.08 CONCRETE FINISHING

A. Repair surface defects, including tie holes, immediately after removing formwork.

B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.

C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as indicated on drawings and as follows:
   1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
   2. Grout Cleaned Finish: Wet areas to be cleaned and apply grout mixture by brush or spray; scrub immediately to remove excess grout. After drying, rub vigorously with clean burlap, and keep moist for 36 hours.

D. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
   1. Surfaces to Receive Thick Floor Coverings: "Wood float" as described in ACI 302.1R; thick floor coverings include quarry tile, ceramic tile, and Portland cement terrazzo with full bed setting system.
   2. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include carpeting, resilient flooring, seamless flooring, resinous matrix terrazzo, thin set quarry tile, and thin set ceramic tile.
   3. Other Surfaces to Be Left Exposed: "Steel trowel" as described in ACI 302.1R, minimizing burnish marks and other appearance defects.
   4. Broom Finish: Ramps, stair treads, sidewalks, porches and docks, concrete pads, Storm Shelter Roof Topping and bases for mechanical equipment. Steel trowel smooth. Brush after troweling with a soft bristle broom to create non skid surfaces perpendicular to the direction of travel.
   5. Interior slabs to receive direct applied finish flooring: Provide a troweled smooth matte finish. Moisture mitigation required due to over troweling concrete slabs shall be at the contractor’s risk and responsibility and shall not be at any additional cost to the owner. Slab finish shall not be troweled to a mirror finish. Failure to follow this may result in charges to roughen slab to allow moisture mitigation. These charges shall not be borne by the owner.

E. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1:100 nominal.

3.09 CURING AND PROTECTION

A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
   1. Normal concrete: Not less than seven days.

C. Formed Surfaces: Cure by moist curing with forms in place for full curing period.

D. Surfaces Not in Contact with Forms:

1. Floor and Roof Slabs To Receive Adhesive-Applied Flooring or Roofing: Curing compounds and other surface coatings are usually considered unacceptable by flooring manufacturers, adhesive manufacturers, and roofing installers. If use of such materials is desired by the Contractor, the Contractor shall either obtain the approval of the flooring manufacturer and adhesive manufacturers, or roofing installer prior to use. Alternatively, the Contractor shall remove the surface coating after curing to flooring manufacturer's or roofing installer's satisfaction. Unless otherwise approved as a substitution request, the Contractor shall assume during bidding that curing compounds shall not be used anywhere on this project and that only wet curing shall be permitted. However, if requested by the Contractor as a substitution request or during construction, the Architect may elect to permit this material at certain locations. Generally, the Architect will require a letter from the flooring subcontractor or roofing installer guaranteeing that the curing compound is compatible with the flooring adhesive and flooring materials or roofing system.
2. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
    a. Ponding: Maintain 100 percent coverage of water over floor slab areas, continuously for 4 days.
    b. Spraying: Spray water over floor slab areas and maintain wet.
    c. Saturated Burlap: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place.

3.10 FIELD QUALITY CONTROL

A. A Special Inspection and Testing Agency (SITA) will perform field quality control tests and inspections, as specified in Sections 01 4516 and 01 4533.

B. Provide free access to concrete operations at project site and cooperate with appointed firm.

C. Tests of concrete and concrete materials may be performed at any time to ensure compliance with specified requirements.

3.11 DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.

B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.

C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

3.12 PROTECTION

A. Do not permit traffic over unprotected concrete floor surface until fully cured.

3.13 SCHEDULE - CONCRETE MIX DESIGN REQUIREMENTS

A. "Grade Beam and Pilasters" Mix: 3,000 psi 28 day concrete, 4" to 6" slump, 4.5% +/- 1.5% air content using air entraining agent as required, minimum 5 sacks of cement per cubic yard, up to 20% replacement of cement with Class C or Class F fly ash permitted. Mid range water reducing agents permitted, high range water reducing agents permitted.

B. "Interior Slabs on Grade and Interior Slabs on Metal Deck" Mix: 3,000 psi 28 day concrete, maximum water to cement ratio of 0.45, 5" to 6" slump (Note: This is more stringent than the default ACI tolerance for slump), 1.5% +/- 1.5% air content, air entraining agent not permitted, minimum 5 sacks of cement per cubic yard with up to 20% replacement using Class F fly ash permitted, mid range water reducing agents permitted, high range water reducing agents not permitted. The slab aggregate gradation requirements in Section 2.03 B shall apply. If any portion of concrete is will be permanently in contact with exterior elements, Miscellaneous Concrete mix design shall apply.

END OF SECTION

SECTION 03 3543
BONDED ABRASIVE POLISHED CONCRETE FLOORS

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Products and procedures for bonded abrasive polishing concrete floors using multi-step wet/dry mechanical process, and accessories indicated, specified, or required to complete polishing.

1.02 DEFINITIONS

A. Terminology: As defined by CPAA.

B. Polished Concrete: The act of changing a concrete floor surface, with or without aggregate exposure, to achieve a specified level of gloss.

C. Bonded Abrasive Polished Concrete: The multi-step operation of mechanically grinding, honing, polishing of a concrete floor surface with bonded abrasives to cut a concrete floor surface and to refine each cut to the maximum potential to achieve a specified level of finished gloss as defined by the CPAA.

1.03 SUBMITTALS

A. Product Data: Manufacturer’s technical literature for each product indicated, specified, or required. Include manufacturer's technical data, application instructions, and recommendations.

B. Installer Qualifications: Data for company, principal personnel, experience, and training specified in PART 1 “Quality Assurance” Article.

C. Field Quality Control – Dynamic Coefficient of Friction Test Reports: Reports of testing specified in PART 3 “Field Quality Control” Article.

D. Field Quality Control – Static Coefficient of friction test reports: report of testing specified in Part 3 “Field Quality Control” article.

E. Maintenance Data: For inclusion in maintenance manual required by Division 01.
   1. Include instructions for maintenance of installed work, including methods and frequency recommended for maintaining optimum condition under anticipated use.
   2. Include precautions against cleaning products and methods which may be detrimental to finishes and performance.

1.04 QUALITY ASSURANCE

A. Polisher Qualifications:
   1. Experience: Company experienced in performing specified work similar in design, products, and extent to scope of this Project; with a record of successful in-service performance; and with sufficient production capability, facilities, and personnel to produce specified work.
   2. Supervision: Maintain competent supervisor who is at Project during times specified work is in progress, and is currently certified as Craftsman - Level I or higher by CPAA.
   3. Manufacturer Qualification: Approved by manufacturer to apply liquid applied products.

B. Walkway Auditor: Certified by CPAA or NFSI to test bonded abrasive polished concrete floors for dynamic and static coefficient of friction according to ANSI B101.1 and B101.3.

C. Coefficient of Friction: Achieve following coefficient of friction by field quality control testing in accordance to the following standards:
   1. ANSI B101.1 Static Coefficient of Friction - Achieve a minimum of .42 for level floor surfaces.
   2. ANSI B101.3 Dynamic Coefficient of Friction - Achieve a minimum of .35 for level floor surfaces.

D. Field Mock-up: Before performing work of this Section, provide following field mock-up to verify selections made under submittals and to demonstrate aesthetic effects of polishing. Approval does not constitute approval of deviations from Contract Documents, unless Architect specifically approves deviations in writing.
   1. Form, reinforce, and cast concrete slab for 10 foot square field mock-up.
   2. Concrete shall be same mix design as scheduled for Project.
   3. Placement and finishing work shall be performed by same personnel as will place and finish concrete for Project.
   4. Mock-up shall be representative of work to be expected.
   5. Perform grinding, honing, and polishing work as scheduled for Project using same personnel as will perform work for Project.
   6. Approval is for following aesthetic qualities:
      a. Compliance with approved submittals.
      b. Compliance with specified aggregate exposure.
      c. Compliance with specified finished gloss level.
   7. Obtain Architect's approval before starting work on Project.
   8. Protect and maintain approved field mock-ups during construction in an undisturbed condition as a standard for judging completed work.

E. Pre-Installation of Concrete Conference: Prior to placing concrete for areas scheduled for polishing, conduct conference at Project to comply with requirements of applicable Division 01 Sections.
   1. Required Attendees:
      a. Owner.
      b. Architect.
      c. Contractor, including supervisor.
      d. Concrete producer.
      e. Concrete finisher, including supervisor.
      f. Concrete polisher, including supervisor.
      g. Technical representative of liquid applied product manufacturers.
      h. Walkway auditor.
   2. Minimum Agenda: Polisher shall demonstrate understanding of work required by reviewing and discussing procedures for, but not limited to, following:
      a. Tour field mock-up and representative areas of required work, discuss and evaluate for compliance with Contract Documents, including substrate conditions, surface preparations, sequence of procedures, and other preparatory work performed by other installers.
      b. Review Contract Document requirements.
      c. Review approved submittals and field mock-up.
      d. Review procedures, including, but not limited to:
      e. Applicable Division 03 Section on cast-in-place concrete
         1) Specific mix design.
         2) Specified curing methods/procedures.
         3) Projected 3, 10, and 28 day compression strength test related to specified aggregates exposure for finished floor and project phasing.
         4) Protection of concrete substrate during construction and prior to polishing process
         5) Project phasing and scheduling for each step of grinding, honing and polishing operations including, but not limited to:
            (a) Quality of qualified personnel committed to project.
            (b) Quality and size of grinders committed to project.
            (c) Proper disposal of concrete slurry and/or concrete dust.
         6) Details of each step of grinding, honing, and polishing operations.

(a) Application of liquid applied products.
(b) Protecting polished concrete floors after polishing work is complete.

3. Reports: Record discussions, including decisions and agreements reached, and furnish copy of record to each party attending.

1.05 FIELD CONDITIONS

A. Damage and Stain Prevention: Take precautions to prevent damage and staining of concrete surfaces to be polished.
1. Prohibit use of markers, spray paint, and soapstone.
2. Prohibit improper application of liquid membrane film forming curing compounds.
3. Prohibit vehicle parking over concrete surfaces.
4. Prohibit pipe-cutting operations over concrete surfaces.
5. Prohibit storage of any items over concrete surfaces for not less than 28 days after concrete placement.
6. Prohibit ferrous metals storage over concrete surfaces.
7. Protect from petroleum, oil, hydraulic fluid, or other liquid dripping from equipment working over concrete surfaces.
8. Protect from acids and acidic detergents contacting concrete surfaces.
9. Protect from painting activities over concrete surfaces.

B. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting liquid applied product application.

PART 2 – PRODUCTS

2.01 LIQUID APPLIED PRODUCTS

A. Liquid Densifier: An Aqueous solution of Silicon Dioxide dissolved in one of the following Hydroxides that penetrates into the concrete surface and reacts with the Calcium Hydroxide to provide a permanent chemical reaction that hardens and densifies the wear surface of the cementitious portion of the concrete. All of the following have the same chemistry varying only by the alkali used for solubility of the Silicon Dioxide.
1. Sodium Silicate
2. Potassium Silicate
3. Lithium Silicate
4. Alkalis solution of Colloidal Silicates or Silica

2.02 ACCESSORIES

A. Repair Material: A product that is designed to repair cracks and surface imperfections. The specified material must have sufficient bonding capabilities to adhere after the polishing to the concrete surface and provide abrasion resistance equal to or greater than the surrounding concrete substrate.

B. Grout Material: A thin mortar used for filling spaces. Acceptable products shall be:
1. Epoxy, urethane, poluyrea, or polyaspartic resins.
2. Latex or acrylic binders mixed with cement dust from previous grinding steps.
3. Silicate binders mixed with cement dust from previous grinding steps.

C. Protective Cover: Non-woven, puncture and tear resistant, polypropylene fibers laminated with a multi-ply, textured membrane, not less than 18 mils in thickness.

2.03 POLISHING EQUIPMENT

A. Field Grinding and Polishing Equipment:
1. A multiple head, counter rotating, walk behind or ride on machine, of various size and weights, with diamond tooling affixed to the head for the purpose of grinding concrete. Excludes janitorial maintenance equipment.

2. If dry grinding, honing, or polishing, use dust extraction equipment with flow rate suitable for dust generated, with squeegee attachments.
3. If wet grinding, honing, or polishing, use slurry extraction equipment suitable for slurry removal and containment prior to proper disposal.

B. Edge Grinding and Polishing Equipment: Hand-held or walk-behind machines which produces same results, without noticeable differences, as field grinding and polishing equipment.

C. Burnishing Equipment: High speed walk-behind or ride-on machines capable of generating 1000 to 2000 revolutions per minute and with sufficient head pressure of not less than 20 pounds to raise floor temperature by 20 degrees F.

D. Diamond Tooling: Abrasive tools that contain industrial grade diamonds within a bonded matrix (such as metallic, resinous, ceramic, etc) that are attached to rotating heads to refine the concrete substrate.
1. Bonded Abrasive: Abrasive medium that is held within a bonding that erodes away to expose new abrasive medium as it is used.
2. Metal Bond Tooling: Diamond tooling that contains industrial grade diamonds with a metallic bonded matrix that is attached to rotating heads to refine the concrete substrate. These tools are available in levels of soft, medium, and hard metallic matrices that are matched with contrasting concrete substrates (i.e. hard matrix/soft concrete, medium matrix/medium concrete, soft matrix/hard concrete) and are typically used in the grinding and early honing stages of the polishing process.
3. Resin Bond Tooling: Diamond tooling that contains industrial grade diamonds within a resinous bonded matrix (poly-phenolic, ester-phenolic, thermoplastic-phenolic) that is attached to rotating heads to refine the concrete substrate. Resin bond tooling does not have the soft/medium/hard characteristics of metal bond tooling and are typically used for the later honing and polishing stages of the polishing process.
4. Hybrid Tooling: Diamond tooling that combines metal bond and resin bond that has the characteristics of both types of tooling. These types of tools are typically used as either transitional tooling from metal bond tools to resin bond tools or as a first cut tool on smooth concrete surfaces.
5. Transitional Tooling: Diamond tooling that is used to refine the scratch pattern of metal bond tooling prior to the application of resin bond tooling in an effort to extend the life of resin bond tooling and to create a better foundation for the polishing process.
6. Abrasive Pad: An abrasive pad, resembling a typical floor maintenance burnishing pad, that has the capability of refining the concrete surface on a microscopic level that may or may not contain industrial grade diamonds. These pads are typically used for the maintenance and/or restoration of previously installed polished concrete flooring.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Acceptance of Surfaces and Conditions:
1. Examine substrates to be polished for compliance with requirements and other conditions affecting performance.
   a. Concrete Finished Floor Flatness according to applicable Division 03 Section on cast-in-place concrete.
   b. Concrete curing methods according to applicable Division 03 Section on cast-in-place concrete.
   c. Concrete Compression strength per according to applicable Division 03 Section on cast-in-place concrete.

B. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents.

C. Starting work within a particular area will be construed as acceptance of surface conditions.

3.02 PREPARATION

A. Cleaning New Concrete Surfaces:
   1. Prepare and clean concrete surfaces.
   2. Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, paint splatter, and other contaminants incompatible with liquid applied products and polishing.

3.03 POLISHING CONCRETE FLOORS

A. Perform all polishing procedures to ensure a consistent appearance from wall to wall.

B. Initial Grinding:
   1. Use grinding equipment with metal or semi-metal bonded tooling.
   2. Begin grinding in one direction using sufficient size equipment and diamond tooling to meet specified aggregate exposure class.
   3. Make sequential passes with each pass perpendicular to previous pass using finer grit tool with each pass, up to 100 grit metal bonded tooling.
   4. Achieve maximum refinement with each pass before proceeding to finer grit tools.
   5. Clean floor thoroughly after each pass using dust extraction equipment properly fitted with squeegee attachment or walk behind auto scrubber suitable to remove all visible loose debris and dust.
   6. Continue grinding until aggregate exposure matches approved field mock-ups.

C. Treating Surface Imperfections:
   1. Mix patching compound or grout material with dust created by grinding operations, manufacturer's tint, or sand to match color of adjacent concrete surfaces.
   2. Fill surface imperfections including, but not limited to, holes, surface damage, small and micro cracks, air holes, pop-outs, and voids with grout to eliminate micro pitting in finished work.
   3. Work compound and treatment until color differences between concrete surface and filled surface imperfections are not reasonably noticeable when viewed from 10 feet away under lighting conditions that will be present after construction.

D. Liquid Densifier Application: Apply undiluted to point of rejection, remove excess liquid, and allow curing according to manufacturers instructions.

E. Grout Grinding:
   1. Use grinding equipment and appropriate grit and bond diamond tooling.
   2. Apply grout, forced into the pore structure of the concrete substrate, to fill surface imperfections.
   3. Clean floor thoroughly after each pass using dust extraction equipment properly fitted with squeegee attachment or walk behind auto scrubber suitable to remove all visible loose debris and dust.

F. Honing:
   1. Use grinding equipment with hybrid or resin bonded tooling.
   2. Hone concrete in one direction starting with a 100 grit tooling and make as many sequential passes as required to remove scratches, each pass perpendicular to previous pass, up to 400 grit tooling reaching maximum refinement with each pass before proceeding to finer grit tooling.
   3. Clean floor thoroughly after each pass using dust extraction equipment properly fitted with squeegee attachment or walk behind auto scrubber suitable to remove all visible loose debris and dust.

G. Polishing:
   1. Use polishing equipment with resin-bonded tooling.
   2. Begin polishing in one direction starting with 800 grit tooling.

3. Make sequential passes with each pass perpendicular to previous pass using finer grit tooling with each pass until the specified level of gloss has been achieved.
4. Achieve maximum refinement with each pass before proceeding to finer grit pads.
5. Clean floor thoroughly after each pass using dust extraction equipment properly fitted with squeegee attachment or walk behind auto scrubber suitable to remove all visible loose debris and dust.
6. Stain Protection: Uniformly apply and remove excessive liquid according to manufacturer's instructions. Final film thickness should be less than .05 mils after cure.
7. Final Polish: Using burnishing equipment and finest grit abrasive pads, burnish to uniform reflective sheen matching approved field mock-up.

H. Final Polished Concrete Floor Finish:
1. Aggregate Exposure Class B - Fine / Sand Aggregate Finish: Remove not more than 1/16 inch of concrete surface by grinding and polishing resulting in majority of exposure displaying fine aggregate with no, or small amount of, medium aggregate at random locations.
2. Finished Gloss Level 3 - Semi-Polished Appearance:
   a. Procedure: Recommended not less than 4 steps with full refinement of each diamond tool with one application of densifier.
   b. Gloss Measurement: Determine the specular gloss by incorporating the following:
      1) Reflective Clarity Reading: Not less than 65 according to ASTM D5767 prior to the application of sealers.
      2) Reflective Sheen Reading: Not less than 35 according to ASTM D523 prior to the application of sealers.

3.04 FIELD QUALITY CONTROL

A. Field Testing: Engage a qualified walkway auditor to perform field testing to determine if polished concrete floor finish complies with specified coefficient of friction;
1. ANSI B101.1 for static coefficient of friction
2. ANSI B101.3 for dynamic coefficient of friction

3.05 CLOSEOUT ACTIVITIES

A. Maintenance Training: CPAA Craftsman shall train Owner's designated personnel in proper procedures for maintaining polished concrete floor.

3.06 PROTECTION

A. Covering: After completion of polishing, protect polished floors from subsequent construction activities with protective covering.

END OF SECTION

SECTION 03 5216
LIGHTWEIGHT INSULATING CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Insulating concrete fill over structural roof decking.

B. Perimeter joint filler.

1.02 RELATED REQUIREMENTS

A. Section 05 3100 - Steel Decking

B. Section 06 1000 - Rough Carpentry

C. Section 07 6200 - Sheet Metal Flashing and Trim

D. Section 07 7200 - Roof Accessories

1.03 REFERENCE STANDARDS

A. ASTM C138/C138M - Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete; 2017a.

B. ASTM C150/C150M - Standard Specification for Portland Cement; 2022.

C. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2018.

D. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a (Reapproved 2016).

E. ASTM C332 - Standard Specification for Lightweight Aggregates for Insulating Concrete; 2017.

F. ASTM C495/C495M - Standard Test Method for Compressive Strength of Lightweight Insulating Concrete; 2012.

G. ASTM C796/C796M - Standard Test Method for Foaming Agents for Use in Producing Cellular Concrete Using Preformed Foam; 2012.

H. ASTM C869/C869M - Standard Specification for Foaming Agents Used in Making Preformed Foam for Cellular Concrete; 2011 (Reapproved 2016).

I. Factory Mutual Engineering and Research - FM, Norwood, MA
   1. Factory Mutual Research Corporation Approval Guide

J. Underwriters Laboratories - UL, Northbrook, IL
   1. Underwriters Laboratories Fire Resistance Directory

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week prior to commencing work of this section.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate layout of slopes, drain locations, and interruptions.

C. Product Data: Provide physical characteristics, thermal values, product limitations.

D. Certificates: Certify that products of this section meet or exceed specified requirements and that densities, indicated thicknesses, and thermal values have been achieved.

E. Manufacturer's Installation Instructions: Indicate mix instructions.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience .

B. The contractor must be certified in writing prior to bid by the supplier to install the proposed lightweight insulating concrete system.

C. Provide a lightweight insulating concrete system meeting the following fire resistance standards:
   1. Tested by Underwriters Laboratories in accordance with the procedures of ASTM E 119 and listed in the most recent Underwriters Laboratories Fire Resistance Directory.
   2. Tested by Factory Mutual Research and listed in the most recent Factory Mutual Approval Guide as non-combustible or Class 1.

D. The lightweight insulating concrete system and proposed roof membrane system shall meet the following wind uplift standards:
   1. Tested by Factory Mutual Research for 1-90 windstorm classification.

1.07 FIELD CONDITIONS

A. Apply roofing and insulation in dry weather.

B. Do not proceed with roof construction during inclement weather or when precipitation is predicted 30% or more possibility.

C. Do not apply insulation over wet or moist deck or in foggy conditions.

D. Days with wind speeds of 30 mph or greater shall be considered "Bad Weather" days.

E. Do not place insulating concrete mix at ambient temperatures lower than 40 degrees F without heating mix water to 90 to 100 degrees F. The mix temperature should not exceed 100ºF at point of placement.

F. Do not install the lightweight insulating concrete system when air temperatures are below 32ºF

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Lightweight Insulating Concrete:
   1. Basis of Design: Celcore: www.celcoremaxflow.com.
   2. Elastizell Corp. of America: www.elastizell.com/#sle.
   3. Siplast, Insulcel.: www.siplast.com
   4. Merlecrete: www.aerixindustries.com.
   5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 REGULATORY REQUIREMENTS

A. Comply with applicable codes for combustibility requirements.

2.03 MATERIALS

A. Cement: ASTM C150/C150M, Portland Type I - Normal, gray color.

B. Lightweight Aggregate: ASTM C332; Group I, vermiculite.

C. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

D. Foaming Agent: Comply with ASTM C869/C869M, when tested according to ASTM C796/C796M.

E. Air Entrainment Agent: ASTM C260/C260M, type recommended by lightweight aggregate manufacturer.

F. Vermiculite aggregate proposed for use shall be certified as being asbestos free.

2.04 CONCRETE MIX

A. Test for compressive strength in accordance with ASTM C495/C495M, for wet density in accordance with ASTM C138/C138M, and for dry density after oven drying.

B. Mix Design: Mix shall be 1:6 with 125 to 225 psi at 28 days compressive strength; 44 to 60 PCF cast density, and 22 to 28 PCF dry density.

C. Provide concrete mix with the following properties:
   1. Cast Density: 36 to 44 pounds per cubic foot.
   2. Compressive Strength: 28 day compressive strength of 200 pounds per square inch

2.05 ACCESSORIES

A. Reinforcement:
   1. ASTM A1064/A1064M steel welded wire reinforcement, galvanized, sizes as indicated.

B. Perimeter Joint Filler: Glass fiber strips, compressible to 50 percent original thickness under load of 25 psi with full recovery.

C. Vents: Type recommended by lightweight aggregate manufacturer.

D. Insulation: Expanded Polystyrene Insulation Board (Holey Board): Expanded polystyrene (EPS) insulation board having a nominal density of 1 pcf (16 kg/m³) defined as Type I by ASTM C 578 and containing approximately 3% open area. Each bundle of board shall be delivered to the job site with clear identification as to manufacturer and shall carry the Factory Mutual approval label and the Underwriter's Laboratories Classified label on each bundle.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify joints in precast roof members are grouted or taped to prevent seepage of wet insulating concrete.

3.02 PREPARATION

A. Install 1 inch thick expansion joint filler at:
   1. Perimeter of roof decking.
   2. Around penetrations through deck.
   3. Every 100 ft of deck surface dimension.
   4. Each change of deck direction on metal roof deck surfaces.

3.03 INSTALLATION

A. Slurry deck surface; place insulation; use mix to fill holes and breaks.

B. Place insulating concrete and screed surface to achieve minimum 2 inch thickness.

C. Slope top surface to 1/4 inch/foot or as indicated on the drawings for roof surface drainage.

3.04 CURING

A. Cure in accordance with lightweight aggregate manufacturer's instructions. It should not be left exposed longer than 5-7 days following the open air cure period.

B. Protect insulating concrete from excess evaporation of surface moisture.

C. During low humidity conditions, sprinkle water over concrete surface to aid hydration and curing.

3.05 FIELD QUALITY CONTROL

A. Conduct a base ply fastener pull test 3 or more days following the application of the lightweight insulating concrete to ensure a minimum withdrawal resistance of 40 pounds per fastener (18 kg).

END OF SECTION

SECTION 04 0100
MAINTENANCE OF MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Final cleaning of masonry surfaces.

B. Replacement of masonry units.

C. Repointing mortar joints.

D. Repair of damaged masonry.

1.02 RELATED REQUIREMENTS

A. Section 04 0511 - Masonry Mortaring and Grouting.

B. Section 04 2000 - Unit Masonry: Brick and Block masonry units.

C. Section 04 4313 - Stone Masonry Veneer.

1.03 REFERENCE STANDARDS

A. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2016.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week prior to commencing work of this section.
   1. Require attendance of parties directly affecting work of this section.
   2. Review conditions of installation, installation procedures, and coordination with related work.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on cleaning compounds and cleaning solutions.
   1. Cleaning Plan: Written description of cleaning process, including materials, methods, equipment, and sequencing of work.

C. Applicator Qualifications: Submit qualifications of applicator.
   1. Certification stating applicator is experienced in the application of the specified products.
   2. List of recently completed masonry cleaning projects, including project name and location, names of owner and architect, description of cleaning products used and substrates, applicable local environmental regulations, and application procedures.

D. Environmental Regulations: Submit description for testing, handling, treatment, containment, collection, transport, disposal, and discharge of hazardous wastes and cleaning effluents. Describe any hazardous materials to be cleaned from substrates. Submit applicable local environmental regulations.

E. Protection: Submit description for protecting surrounding areas, landscaping, building occupants, pedestrians, vehicles, and non-masonry surfaces during the work from contact with masonry cleaners, residues, rinse water, fumes, wastes, and cleaning effluents.

F. Surface Preparation: Submit description for surface preparation of substrates to be completed before application of masonry cleaners.

G. Application: Submit description for application procedures of masonry cleaners.

1.06 QUALITY ASSURANCE

A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.

B. Manufacturer Qualifications:

1. Manufacturer capable of providing field service representation during installation and who will approve the installer and application method.

C. Installer Qualifications:
1. Installer experienced in performing this type of work and who has specialized in work similar to the type required for this project.

D. Pre-installation Meetings
1. Comply with provisions of Section 01 3000 - Administrative Requirements.
a. Applicator and Product representative shall be present during meeting.

1.07 MOCK-UP

A. Test Panels:
1. Before full-scale application, test products to be used on test panels.
2. Review manufacturer's product data sheets to determine suitability of each product for each surface.
3. Apply products using manufacturer-approved application methods, determining actual requirements for application.
4. After 48 hours, review effectiveness of cleaning or treatment, compatibility with substrates, and ability to achieve desired results.
5. Obtain approval by Architect and Owner of workmanship, color, and texture before proceeding with work.
6. Test Panels: Inconspicuous sections of actual construction.
a. Location and number as selected by Architect.
b. Size; 4 feet by 4 feet.
c. Repair unacceptable work to the satisfaction of the Architect and Owner.

B. Acceptable panel and procedures employed will become the standard for work of this section.

C. Mock-up may remain as part of the Work.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver masonry neatly stacked and tied on pallets. Store clear of ground with adequate waterproof covering.

B. Store cleaning materials in manufacturer's packaging.

1.09 FIELD CONDITIONS

A. Do not apply products under conditions outside manufacturer's requirements, which include:
1. Surfaces that are frozen; allow complete thawing prior to installation.
2. Surface and air temperatures below 40 degrees F.
3. Surface and air temperatures above 95 degrees F.
4. When surface or air temperature is not expected to remain above 40 degrees F for at least 8 hours after application.
5. Wind conditions that may blow materials onto surfaces not intended to be treated.
6. Less than 24 hours after a rain or 6 hours before rain is expected after installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Restoration and Cleaning Chemicals:
1. Diedrich Technologies, Inc: www.diedrichtechnologies.com/#sle.
2. PROSOCO: www.prosoco.com.
3. Substitutions: See Section 01 6000 - Product Requirements.

2.02 CLEANING MATERIALS

A. Water: Clean, potable, and free of oils, acids, alkalis, salts, and organic matter. Use to rinse masonry surfaces and dilute concentrated cleaners.

B. Cleaning Agent: Product types listed are manufactured by Prosoco, inc. as basis of design.

MATERIAL	COLOR/TEXTURE	CLEANER
Brick	Red	600 Detergent
	Light	Vana Trol
	Dark	Vana Trol
	Pavers	600 Detergent
	Glazed	Vana Trol
CMU	Split Face	Custom Masonry Cleaner
	Burnished/Ground Face	Light Duty Concrete Cleaner
Cast Stone	Integral Color	Light Duty Concrete Cleaner
Architectural Concrete	Natural Color	Light Duty Concrete Cleaner
	Textured	Heavy Duty Concrete Cleaner

2.03 MORTAR MATERIALS

A. Comply with requirements of Section 04 0511.

2.04 MASONRY MATERIALS

A. Unit Masonry: Section 04 2000.

B. Cast Stone Masonry: Section 04 7200

C. Stone Veneer: Section 04 4313.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces to be cleaned and restored are ready for work of this section.

B. Do not begin until test panels have been approved by Architect.

3.02 PREPARATION

A. Protect surrounding elements from damage due to restoration procedures.

B. Carefully remove and store removable items located in areas to be restored, including fixtures, fittings, finish hardware, and accessories; reinstall upon completion.

C. Separate areas to be protected from restoration areas using means adequate to prevent damage.

D. Cover existing landscaping with tarpaulins or similar covers.

E. Mask immediately adjacent surfaces with material that will withstand cleaning and restoration procedures.

F. Close off adjacent occupied areas with dust proof and weatherproof partitions.

G. Protect roof membrane and flashings from damage with 1/2 inch plywood laid on roof surfaces over full extent of work area .

H. When using cleaning methods that involve water or other liquids, install drainage devices to prevent runoff over adjacent surfaces unless those surfaces are impervious to damage from runoff.

I. Do not allow cleaning runoff to drain into sanitary or storm sewers.

3.03 REBUILDING

A. Cut out damaged and deteriorated masonry with care in a manner to prevent damage to any adjacent remaining materials.

B. Support structure as necessary in advance of cutting out units.

C. Cut away loose or unsound adjoining masonry and mortar to provide firm and solid bearing for new work.

D. Build in new units following procedures for new work specified in other section(s).

E. Mortar Mix: Colored and proportioned to match existing work.

F. Ensure that anchors, ties, reinforcing, and flashings are correctly located and built in.

G. Install built in masonry work to match and align with existing, with joints and coursing true and level, faces plumb and in line. Build in all openings, accessories and fittings.

3.04 REPOINTING

A. Perform repointing prior to cleaning masonry surfaces.

B. Cut out loose or disintegrated mortar in joints to minimum 1/2 inch depth or until sound mortar is reached.

C. Use power tools only after test cuts determine no damage to masonry units will result.

D. Do not damage masonry units.

E. When cutting is complete, remove dust and loose material by brushing.

F. Premoisten joint and apply mortar. Pack tightly in maximum 1/4 inch layers. Form a smooth, compact concave joint to match existing.

G. Moist cure for 72 hours.

3.05 CLEANING OF MASONRY

A. Comply with provisions of Section 01 7000 - Execution and Closeout Requirements.

B. Clean all exposed surfaces of new masonry of excess mortar, efflorescence, stains, and job dirt, using materials specified.

C. Clean from top down; prevent cleaning materials and rinse water from contacting non-cementitious materials.

D. Clean in accordance with manufacturer's instructions and recommendations, product data, and container label instructions.

E. Mix materials in strict accordance with manufacturer's instructions; do not dilute unless permitted by manufacturer.

F. Prevent overspray, wind drift, and splash onto surfaces not to be treated.

G. No high pressure washers are allowed.

H. Low pressure spray for wetting and rinsing is permitted. Pressure should be in the range of 400-700 psi. Equipment should produce 4-6 gallons of water per minute using a 15-40 degree fan tip (no fan tip less than a 15-degree is allowed).

3.06 AGING

A. Rub in new masonry work to match, as close as possible, adjacent original work.
   1. Use carbon black in small amounts, rubbing in well with burlap rags.

B. After each application, dust off surplus and wash down with low pressure hose. Allow surface to dry before proceeding with succeeding applications.

C. Continue process until acceptance.

3.07 FIELD QUALITY CONTROL

A. Inspection:
   1. Inspect the masonry cleaning work with the Contractor, Architect, applicator, and product representative, and compare with test panel results approved by the Architect. Determine if the substrates are suitably clean.

B. Manufacturers' Field Services
   1. Provide the services of the manufacturer's authorized field representative to verify that installed products comply with manufacturer's requirements and with the standard established by the Architect-approved test panels.

3.08 CLEANING

A. Immediately remove stains, efflorescence, or other excess resulting from the work of this section.

B. Remove excess mortar, smears, and droppings as work proceeds and upon completion.

C. Clean surrounding surfaces.

D. Repair, restore, or replace to the satisfaction of the Architect, all materials, landscaping, and non-masonry surfaces damaged by exposure to the cleaning process.

END OF SECTION

SECTION 04 0511
MASONRY MORTARING AND GROUTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Mortar for masonry.

B. Grout for masonry.

1.02 RELATED REQUIREMENTS

A. Section 04 0100 - Maintenance of Masonry: Bedding and pointing mortar for masonry restoration work.

B. Section 04 2000 - Unit Masonry: Installation of mortar and grout.

1.03 REFERENCE STANDARDS

A. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2016.

B. ASTM C5 - Standard Specification for Quicklime for Structural Purposes; 2010.

C. ASTM C91/C91M - Standard Specification for Masonry Cement; 2018.

D. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2023.

E. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2018.

F. ASTM C150/C150M - Standard Specification for Portland Cement; 2022.

G. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2018.

H. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019a, with Editorial Revision.

I. ASTM C387/C387M - Standard Specification for Packaged, Dry, Combined Materials for Concrete and High Strength Mortar; 2015.

J. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2018.

K. ASTM C476 - Standard Specification for Grout for Masonry; 2020.

L. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2020.

M. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; 2016.

N. ASTM C1019 - Standard Test Method for Sampling and Testing Grout; 2016.

O. ASTM C1072 - Standard Test Method for Measurement of Masonry Flexural Bond Strength; 2013, with Editorial Revision (2014).

P. ASTM C1148 - Standard Test Method for Measuring the Drying Shrinkage of Masonry Mortar; 1992a (Reapproved 2014).

Q. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms; 2016.

R. ASTM E514/E514M - Standard Test Method for Water Penetration and Leakage Through Masonry; 2014a.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Include design mix and indicate whether the Proportion or Property specification of ASTM C270 is to be used.

1. Where a water repellent admixture is specified, submit documentation showing that water repellent admixture is compatible with the water repellent used by the masonry brick/block manufacturer.

C. Samples: Submit two samples of mortar, illustrating mortar color and color range.

D. Reports: Submit reports on mortar indicating compliance of mortar to property requirements of ASTM C270 and test and evaluation reports per ASTM C780.

E. Reports: Submit reports on grout indicating conformance of component grout materials to requirements of ASTM C476and test and evaluation reports to requirements of ASTM C1019 and ASTM C939.

F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

G. Manufacturer's Installation Instructions: Submit packaged dry mortar manufacturer's installation instructions, if packaged dry mortars are used.

1.05 QUALITY ASSURANCE

A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.
   1. Maintain one copy of each document on project site.

1.06 PRECONSTRUCTION TESTING

A. Testing will be conducted by an independent test agency, in accordance with provisions of Section 01 4000 - Quality Requirements.

B. Mortar Mixes: Test mortars prebatched by weight in accordance with ASTM C780 recommendations for preconstruction testing.
   1. Test results will be used to establish optimum mortar proportions and establish quality control values for construction testing.

C. Grout Mixes: Test grout batches in accordance with ASTM C1019 procedures.
   1. Test results will be used to establish optimum grout proportions and establish quality control values for construction testing.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Maintain packaged materials clean, dry, and protected against dampness, freezing, and foreign matter.

1.08 FIELD CONDITIONS

A. Temperature and Humidity
   1. During cold weather construction do not lay masonry units unless the temperature is 40 degrees Fahrenheit and rising.
   2. During hot weather construction (ambient air temperature exceeds 100 degrees Fahrenheit or 90 degrees Fahrenheit with wind velocity greater than 8 mph) do not spread mortar beds more than 4 feet ahead of masonry and set brick masonry within 1 minute of spreading mortar. Fog spray cure twice daily at four hour intervals for three days during hot weather.
   3. Protect masonry construction from direct exposure to wind and sun when erected in ambient air temperature of greater than 99 degrees Fahrenheit in the shade, with relative humidity less than 50 percent.
   4. During hot weather protect brick masonry units from sun until units are ready to be placed in the wall.

PART 2 PRODUCTS

2.01 MORTAR AND GROUT APPLICATIONS

A. At Contractor's option, mortar and grout may be field-mixed from packaged dry materials or made from factory premixed dry materials with addition of water only.

B. Mortar Color: Natural gray unless otherwise indicated.

1. Where colored mortar is specified it is recommended that factory premixed mortar be used. Mortar color shall be consistent throughout the project with the sample produced and approved on the mock-up wall.

C. Mortar Mix Designs: ASTM C270, Proportion Specification.
1. Masonry below grade and in contact with earth: Type S.
2. Exterior Masonry Veneer: Type S.
3. Exterior, Loadbearing Masonry: Type N.
4. Exterior, Non-loadbearing Masonry: Type N.
5. Exterior Repointing Mortar: Type N with maximum 2 percent ammonium stearate or calcium stearate per cement weight.
6. Interior, Loadbearing Masonry: Type S.
7. Interior, Non-loadbearing Masonry: Type N.
8. Pointing Mortar for Prefaced or Specially Faced Unit Masonry: One part Portland cement, 1/8 part hydrated lime, and two parts graded (80 mesh) aggregate, proportioned by volume. Add aluminum tristearate, calcium stearate, or ammonium stearate equal to 2 percent of Portland cement by weight.
9. Glass Unit Masonry: Type N mortar and Type O pointing mortar.

D. Grout Mix Designs:
1. Refer to Contract Documents for grout strength and slump requirements. Provide premixed or job mixed grout in acordance with ASTM C94/C94M. It is permitted to provide fine or coarse grout in accordance with the table below:

Grout Type	Maximum Grout Pour Height	Minimum Clear Width of Grout Space	Minimum Clear Grout Space Dimensions for Grouting Cells of Hollow Units
Fine	1'-0" 5'-0" 12'-0" 24'-0"	3/4" 2" 2 1/2" 3"	1 1/2" x 2" 2" x 3" 2 1/2" x 3" 3" x 3"
Coarse	1'-0" 5'-0" 12'-0" 24'-0"	1 1/2" 2" 2 1/2" 3"	1 1/2" x 3" 2 1/2" x 3" 3" x 3" 3" x 4"

2. Grout shall be poured in maximum lift heights (increment of grout height within a pour height) and maximum grout heights (total height of masonry to be poured prior to the erection of additional masonry) noted below:
   a. Grout in partially grouted walls shall be placed in pour heights equal to the bond beam spacing not to exceed 5'-4". Pour heights are permitted to be increased up to 12'-8" provided the following conditions are met:
      1) The masonry has cured for a minimum of 4 hours.
      2) Grout slump is maintained between 10 in and 11 in.
      3) No intermediate reinforced bond beams are placed between the top and the bottom of the pour height.
   b. Grout in fully grouted walls are permitted to be poured per the maximum pour heights provided in the table above. Lift heights shall not exceed 5'-4" except that it permitted to increase lift heights to 12'-8" provided the following conditions are met:
      1) The masonry has cured for a minimum of 4 hours.
      2) Grout slump is maintained between 10 in and 11 in.
   c. Grout in lintel beams shall be placed in lift heights equal to the full depth of the beam unless noted otherwise.

2.02 MATERIALS

A. Packaged Dry Material for Mortar for Unit Masonry: Premixed Portland cement, hydrated lime, and sand; complying with ASTM C387/C387M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.
   1. Color: Mineral pigments added as required to produce approved color sample.

B. Packaged Dry Material for Grout for Masonry: Premixed cementitious materials and dried aggregates; capable of producing grout of the specified strength in accordance with ASTM C476 with the addition of water only.

C. Portland Cement: ASTM C150/C150M.
   1. Type: Type I - Normal; ASTM C150/C150M.
   2. Color: Color as required to produce approved color sample.

D. Masonry Cement: ASTM C91/C91M.
   1. Type: Type N; ASTM C91/C91M.

E. Hydrated Lime: ASTM C207, Type S.

F. Quicklime: ASTM C5, non-hydraulic type.

G. Mortar Aggregate: ASTM C144.

H. Grout Aggregate: ASTM C404.

I. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979/C979M.
   1. Pigment:
      a. Face Brick: Natural Gray
      b. Brick Pool Coping: Match Brick
      c. Architectural CMU: Match Unit
      d. Cast Stone/CSMU: Match Unit
      e. Existing Construction: Match existing mortar color.
   2. Manufacturers:
      a. Quikrete Companies: www.quikrete.com
      b. Amerimix, an Oldcastle brand, Bonsal American: www.amerimix.com
      c. TXI: www.txi.com.
      d. Substitutions: See Section 01 6000 - Product Requirements.

J. Water: Clean and free from deleterious acids, alkalies, and organic matter.

K. Integral Water Repellent Admixture: Polymeric liquid or powder admixture added to mortar at the time of manufacture.
   1. Performance of Mortar with Integral Water Repellent:
      a. Water Permeance: When tested per ASTM E514/E514M and for a minimum of 72 hours:
         1) No water visible on back of wall above flashing at the end of 24 hours.
         2) No flow of water from flashing equal to or greater than 0.032 gallons per hour at the end of 24 hours.
         3) No more than 25 percent of wall area above flashing visibly damp at end of test.
      b. Flexural Bond Strength: ASTM C1072; minimum 10 percent increase.
      c. Compressive Strength: ASTM C1314; maximum 5 percent decrease.
      d. Drying Shrinkage: ASTM C1148; maximum 5 percent increase in shrinkage.
   2. Required only at all single wythe exterior masonry wall applications and in conjunction with hollow brick used on the back of parapet walls.
   3. At single wythe exterior concrete masonry, water repellent admixture shall be compatible with the water repellent used by the masonry unit manufacturer.

2.03 MORTAR MIXING

A. Thoroughly mix mortar ingredients using mechanical batch mixer, in accordance with ASTM C270 and in quantities needed for immediate use.

B. Maintain sand uniformly damp immediately before the mixing process.

C. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio; mix in accordance with manufacturer's instructions, uniform in coloration.

D. No Admixtures are allowed except water repellents where required.

E. Do not use anti-freeze compounds to lower the freezing point of mortar.

F. If water is lost by evaporation, re-temper only within two hours of mixing.

2.04 GROUT MIXING

A. Mix grout in accordance with ASTM C94/C94M.

B. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476 for fine and coarse grout.

C. No Admixtures are allowed except water repellents where required.

D. Do not use anti-freeze compounds to lower the freezing point of grout.

PART 3 EXECUTION

3.01 PREPARATION

A. Plug clean-out holes for grouted masonry with matching masonry units. Brace masonry to resist wet grout pressure.

3.02 INSTALLATION

A. Contractor shall note that the dimensions shown on the floor plans and plan details are in some instances nominal masonry dimensions. The contractor is responsible for coordinating the masonry layout to provide 3/8” joints. If conflict occurs, contractor shall contact Architect prior to installing masonry.

B. Site Verification of Conditions
   1. Examine the area and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.
   2. Verify that wall ties, and reinforcement are properly located.
   3. Verify that flashings are properly located and intact.

C. Mortar and Grout
   1. Head joints: Regardless of thickness, completely fill with mortar or grout. Do not slush full.
   2. Except at the finishing course, stop grout approximately 1" below the top of the last course.
   3. At the finishing course, bring the last grout pour flush with the top of the brick.
   4. Whenever possible, grout from the inside face of the masonry.
   5. Take extreme care to prevent grout or mortar staining the face of masonry to be left exposed or unpainted.
   6. Protect sills, ledges, offsets, door jambs, corners, and similar points from damage and from collecting mortar or grout.
   7. Immediately remove mortar and grout from areas where they are not scheduled to be placed.
   8. All mortar shall be hard and durable after curing. Scratchable mortar is not acceptable.
   9. Perform grouting in strict accordance with the provisions of the Building Code.
   10. Solidly fill vertical cells containing reinforcement.

11. Consolidate grout at time of pour by puddling with a mechanical vibrator, filling all cells of the masonry, and then reconsolidating later by puddling before the plasticity is lost.

D. Install mortar and grout to requirements of section(s) in which masonry is specified.

E. Work grout into masonry cores and cavities to eliminate voids.

F. Do not install grout in lifts greater than 16 inches without consolidating grout by rodding.

G. Do not displace reinforcement while placing grout.

H. Remove excess mortar from grout spaces.

3.03 FIELD QUALITY CONTROL

A. A Special Inspection and Testing Agency (SITA) will perform field quality control tests and inspections, as specified in Sections 01 4516 and 01 4533.

END OF SECTION

SECTION 04 2000
UNIT MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Clay facing brick.

B. Reinforcement and anchorage.

C. Flashings.

D. Lintels.

E. Accessories.

1.02 RELATED REQUIREMENTS

A. Section 03 2000 - Concrete Reinforcing: Reinforcing steel for grouted masonry.

B. Section 04 0100 - Maintenance of Masonry.

C. Section 04 0511 - Masonry Mortaring and Grouting.

D. Section 05 5000 - Metal Fabrications: fabricated steel items.

E. Section 06 1000 - Rough Carpentry: Nailing strips built into masonry.

F. Section 07 2100 - Thermal Insulation: Insulation for cavity spaces.

G. Section 07 2500 - Weather Barriers: Water-resistive barriers or air barriers applied to the exterior face of the backing sheathing or masonry.

H. Section 07 6200 - Sheet Metal Flashing and Trim: Metal through-wall masonry flashings.

I. Section 07 8400 - Firestopping: Firestopping at penetrations of fire-rated masonry and at top of fire-rated walls.

J. Section 07 9200 - Joint Sealants: Sealing control and expansion joints.

1.03 REFERENCE STANDARDS

A. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale); 2017a.

B. BIA Technical Notes No. 13 - Ceramic Glazed Brick Exterior Walls; 2017.

C. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2016.

D. NCMA TEK 19-7 - Characteristics of Concrete Masonry Units with Integral Water Repellent, 2008

E. UL (FRD) - Fire Resistance Directory; Current Edition.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Pre-installation Meetings
   1. Comply with provisions of Section 01 3000 - Administrative Requirements.
   2. Not less than one week prior to commencing all masonry related items a pre-installation conference shall be held at the site. Attendance is mandatory for all trades affected by this section. The general contractor shall be responsible for coordinating this conference with all affected trades (Including but not limited to jobsite superintendent, masonry contractor, masonry foreman, waterproofing and flashing contractor, concrete block insulator and architect). The architect will conduct the business of this meeting. All masonry work that takes place prior to this conference shall be marked as rejected and shall be removed, no exceptions.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.

C. Shop Drawings: Indicate pertinent dimensions, materials, anchorage, masonry reinforcement, size and type of fasteners, and accessories for brick/blockwork support system.

D. Samples: Submit four samples of facing brick and architectural masonry units to illustrate color, texture, and extremes of color range. Sample shall be of actual unit specified to be installed.

E. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

1.06 QUALITY ASSURANCE

A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.
   1. Maintain one copy of each document on project site.

B. At all units (concrete masonry, stone, cast stone or other) for which an integral water repellent was specified to be in the units, perform the Water Droplet Test as recommended in the performance criteria of NCMA TEK 19-7 associated with the Water Droplet Test Method.

C. Certifications
   1. Do not commence placement of masonry until mortar mix designs have been reviewed and approved by the Testing Laboratory and all governmental agencies having jurisdiction and until copies are at the job site.

1.07 MOCK-UP

A. Field Sample (Panels for texture and color approvals only)
   1. In an area on the site where approved by the Architect, provide sample masonry panels.
      a. Make each sample panel approximately 4'-0" high and 6'-0" long.
      b. Provide one sample panel for each combination of masonry units, bond pattern, mortar color, and joint type used in the Work.
      c. For renovation projects, locate panel adjacent to existing building to allow side by side viewing of both existing building and panel. Panel shall be located in an area that receives both direct sun and shade.
      d. Revise as necessary to secure approval from Owner and Architect.
      e. Completely demolish and remove from the job site upon completion and acceptance of the work.

B. Mock-Ups (Wall for quality control purposes)
   1. A mock-up wall shall be constructed only after the pre-installation conference.
   2. The Architect shall select a section of exterior wall within the building that shall be used for a wall mock-up to determine quality of workmanship for the entire project. The mock-up shall consist of approximately 50 lineal feet of exterior wall and shall include straight wall, corners, control and expansion joints, window installation, anchors and reinforcing, and flashings. This mock-up shall incorporate all aspects of the accepted masonry sample panel as well including proper cleaning techniques. Cleaning agent manufacturer’s representative shall be on site to observe and instruct the cleaning portion.
   3. Installation of all materials and products into the wall shall be in accordance with all applicable specifications as noted in the project manual and as shown on the drawings.
   4. Upon completion and acceptance of the wall mock-up and quality of workmanship, the wall shall be photographically documented by the Contractor as a record. Provide one copy of photos to each the Owner, the Architect and the Contractor. The wall shall then be incorporated into the project and shall be the standard for all masonry work on the project.
   5. No work shall proceed until the mock-up wall is approved.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

B. All masonry products stored on site shall be properly covered from the weather to prevent deterioration and moisture penetration. Broken or damaged masonry products shall be rejected. Do not double-stack pallets.

C. Storage and protection of masonry embedded flashing;
   1. Comply with manufacturer's recommendations for storage and handling of each product.
   2. Wall Flashing and Surface Conditioner shall be delivered in the original, unopened manufacturer’s containers with all labeling information fully visible.
   3. On-Site Storage of unopened cartons shall be such that the material is kept dry and is not stored at temperatures in excess of 100 deg. F. Pallets of cartons should not be double stacked for on-site storage.
   4. Surface Conditioner is non-flammable. Refer to product label before use.

D. Acceptance at Site
   1. Deliver materials in manufacturer's unopened containers, fully identified with name, brand, type, and grade.
   2. Materials with missing or illegible identification shall be rejected.

PART 2 PRODUCTS

2.01 BRICK UNITS

A. Basis of Design: Cloud Ceramics: www.cloudceramics.com.

B. Acceptable Manufacturers: The following manufacturers are acceptable to provide products of this section provided proposed products meet or exceed all specified requirements.
   1. Acme Brick Company: www.brick.com
   2. Elgin Butler Company: www.elginbutler.com.
   3. Endicott Clay Products Co: www.endicott.com.
   4. General Shale Brick: www.generalshale.com.
   5. Meridian Brick LLC : www.meridianbrick.com/#sle.
   6. Interstate Brick: www.interstatebrick.com
   7. Sioux City Brick: www.siouxcitybrick.com
   8. Summit Brick: www.summitbrick.com
   9. Cloud Ceramics: www.cloudceramics.com.
   10. Substitutions: See section 01 6000 - Product Requirements.

C. Facing Brick: ASTM C216, Type FBS Smooth, Grade SW.
   1. Color and texture: Refer to Section 01 6210 – Schedule of Materials and Colors.
   2. Nominal size: King Size.
   3. Special shapes: Provide special shapes at all intersections not equal to 90 degrees to conform to the brick selected or of the same type and finish in the brick allowance. Where solid brick are noted on the plans, provide brick of appropriate size without cores.
   4. Compressive strength: As measured in accordance with ASTM C67.

2.02 MORTAR AND GROUT MATERIALS

A. Mortar and Grout: As specified in Section 04 0511.

2.03 REINFORCEMENT AND ANCHORAGE

A. Manufacturers:
   1. Blok-Lok Limited: www.blok-lok.com/#sle.
   2. Hohmann & Barnard, Inc: www.h-b.com/sle.
   3. PROSOCO, Inc: www.prosoco.com.
   4. WIRE-BONDwww.wirebond.com/#sle.

5. Substitutions: See Section 01 6000 - Product Requirements.

B. In addition to all other specification requirements, veneer anchors shall be designed by a professional engineer licensed in Texas, hired by the Contractor, where the horizontal distance is greater than 4 1/2 inches between the inside face of the masonry veneer (e.g. brick, concrete masonry, cast stone, etc...) and the outside face of the structural backup system (e.g. CMU, ICF, face of cold formed metal framing members, etc...).

C. Reinforcing Steel: Type specified in Section 03 2000; size as indicated on drawings; uncoated finish.

D. Wire reinforcement: Reinforced hot dip galvanized wall reinforcing in conformance with ASTM A951, for high tensile steel. hot-dipped galvanized to comply with ASTM A153, Class BMill-galvanized wire reinforcement shall not be permitted on any part of the project. 9 gage wire, deformed to develop minimum surface bond of 527 PSI when cast in ASTM Class A mortar cubes. Provide rod spacings and veneer anchor dimensions to locate rods and veneer anchors in mortar to comply with the requirements of the applicable version of the Masonry Standards Joint Committee document TMS 402, referring to the construction drawings for dimensions of wythe thicknesses and dimensions between wythes.

E. Veneer anchor wires: Reinforced hot dip galvanized wire in conformance with ASTM A951, for high tensile steel, hot-dipped galvanized to comply with ASTM A153, Class B. Mill-galvanized wire reinforcement shall not be permitted on any part of the project. 9 gage wire. Provide rod spacings and veneer anchor dimensions to locate rods and veneer anchors in mortar to comply with the requirements of the applicable version of the Masonry Standards Joint Committee document TMS 402, referring to the construction drawings for dimensions of wythe thicknesses and dimensions between wythes.

F. All fasteners used to connectmasonry ties and similar products through the weather barrier shall have neoprene washers.

G. Masonry Veneer Anchors with Stud Backup Systems: Install a two piece anchored adjustable wire tie system at 16" on center each way, with screws as recommended by the manufacturer and as required by the applicable version of TMS 402.
   1. Exterior stud walls with masonry veneer:
      a. HB-213X Adjustable Veneer Anchor as manufactured by Hohmann & Barnard, Inc.
      b. Substitutions: See Section 01 6000 - Product Requirements.

2.04 FLASHINGS

A. Through Wall Flashing Materials: Products as specified in Sections 07 2500 and 07 6200.

2.05 ACCESSORIES

A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
   1. Manufacturers:
      a. Blok-Lok Limited: www.blok-lok.com.
      b. Hohmann & Barnard, Inc: www.h-b.com/sle.
      c. WIRE-BOND: www.wirebond.com/#sle.
      d. Substitutions: See Section 01 6000 - Product Requirements.

B. Joint Filler: Closed cell polyethylene; oversized 50 percent to joint width; self expanding; 1/2 inch wide by maximum lengths available.
   1. Manufacturers:
      a. Hohmann & Barnard, Inc: www.h-b.com/sle.
      b. WIRE-BOND: www.wirebond.com/#sle.
      c. Substitutions: See Section 01 6000 - Product Requirements.

C. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
   1. Mortar Diverter: Semi-rigid mesh designed for installation at flashing locations.
      a. Manufacturers:
         1) Hohmann & Barnard, Inc; Mortar Trap: www.h-b.com/sle.
         2) Mortar Net Solutions; MortarNet: www.mortarnet.com/#sle.
         3) Substitutions: See Section 01 6000 - Product Requirements.

D. Nailing Strips: Softwood lumber, preservative treated; as specified in Section 06 1000.

E. Weeps:
   1. Type: Molded PVC grilles, insect resistant.

F. Cavity Vents:
   1. Type: Molded PVC grilles, insect resistant.

G. Bond Break Material - Provide one layer of 6 mil polyethylene equal to “Visqueen Vapour Barrier” as a bond breaker between all clay masonry and CMU in the same wythe. Rake joint back 3/8” and provide continuous sealant at joint.

2.06 LINTELS

A. All exterior masonry veneer supports over openings shall be as shown on the Structural Drawings.

PART 3 EXECUTION

3.01 EXAMINATION

A. Contractor shall note that the dimensions shown on the floor plans and plan details are nominal masonry dimensions. The contractor is responsible for coordinating the masonry layout to provide 3/8” joints. If conflict occurs, contractor shall contact Architect prior to installing masonry.

B. Verify that field conditions are acceptable and are ready to receive masonry.

C. Verify that related items provided under other sections are properly sized and located.

D. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.02 PREPARATION

A. Direct and coordinate placement of metal anchors supplied for installation under other sections.

B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

C. Surface Preparation for Masonry Units
   1. Do not commence installation until foundations are clean, rough, and level.
   2. Remove all laitance and foreign material from top of foundation.
   3. Verify that the foundation elevation is such that the bed joint thickness will be between 3/8" and 1/2", and that the foundation edge is true to line.
   4. Clean projecting dowels free from loose scale, dirt, concrete, and other material that will inhibit bond.
   5. Verify that dowels are in proper location.

D. Surface Preparation for Rubberized Asphalt Flashing
   1. Apply primer by brush or heavy nap, natural-material roller at rate recommended by manufacturer prior to flashing installation. Allow primer to dry completely before flashing application.

E. Collection System and Weeps

1. Clean flashing and weep holes so they are free of mortar droppings and debris immediately prior to installing collection system or weep.
2. Remove projecting mortar and other protrusions from substrate.
3. Remove mortar and debris from cavity spaces, wall ties, and reinforcing.

3.03 COLD AND HOT WEATHER REQUIREMENTS

A. Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

B. During cold weather construction do not lay masonry units unless the temperature is 40 degrees Fahrenheit and rising.

C. During hot weather construction (ambient air temperature exceeds 100 degrees Fahrenheit or 90 degrees Fahrenheit with wind velocity greater than 8 mph) do not spread mortar beds more than 4 feet ahead of masonry and set brick masonry within 1 minute of spreading mortar. Fog spray cure twice daily at four hour intervals for three days during hot weather.

D. Protect masonry construction from direct exposure to wind and sun when erected in ambient air temperature of greater than 99 degrees Fahrenheit in the shade, with relative humidity less than 50 percent.

E. During hot weather protect brick masonry units from sun until units are ready to be placed in the wall.

3.04 COURSING

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Bed joints in masonry units shall course out with bed joints in adjacent masonry wythes at vertical intervals of 16”.

D. Cut out and repoint defective joints.

E. On all joints exposed to the weather, tool and make smooth, solid, and watertight.

F. All joints shall be thumbprint hard prior to tooling.

G. Use 18” sled on bed joints, brush wall, and retool joints.

H. Brick Units:
1. Bond: Running.
2. Coursing: Three units and three mortar joints to equal 8 inches.
3. Mortar Joints: Concave.

3.05 PLACING AND BONDING

A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

B. Lay hollow masonry units with face shell bedding on head and bed joints.

C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.

D. Remove excess mortar and mortar smears as work progresses.

E. Remove excess mortar with water repellent admixture promptly. Do not use acids, sandblasting or high pressure cleaning methods.

F. Interlock intersections and external corners, except for units laid in stack bond.

G. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

H. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

I. Cut mortar joints flush where wall tile is scheduled or resilient base is scheduled.

J. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.

K. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

L. Brick and CMU wythes shall be laid in a true and straight alignment. Exterior masonry shall be laid-up separately.

M. Unless otherwise indicated on the Drawings, install masonry plumb, level, and true to line, with square angles and corners. Do not commence installation of the work until horizontal and vertical alignment of the foundation is within 1" plumb and the lines shown on the Drawings.

N. Use line blocks whenever possible. When it is absolutely necessary to use a line pin, fill the hole immediately after the pin is withdrawn.

O. Use only masonry that are clean and free from dust and other foreign matter and lay only dry masonry units.

P. Do not use bonding headers on grouted masonry unless specifically so directed by the Architect.

Q. Masonry with cracks and or chipped faces will be rejected if non-compliant with the limits noted in ASTM C216. If such units are discovered in the finished wall, the Contractor shall remove the units and replace with new units at no cost to the Owner.

R. Lay only dry concrete masonry units.

S. Accurately fit the units to plumbing, ducts, openings, and other interfaces, neatly patching all holes.

T. Keep the walls continually clean, preventing grout and mortar stains. If grout does run over, clean immediately.

U. Bed joints: A complete mortar-to-unit bond is required on all masonry.
   1. Avoid fins of bed joints protruding into grout space or cavity.
      a. If they occur, leave in place if not projecting more than the bed joint thickness.
      b. Do not, in any case, cut off and drop into the grout space or cavity.

V. Head joints: Regardless of thickness, completely fill with mortar or grout. Do not slush full.

W. Lay both Wythes of the wall to a line.

X. Provide reinforcement as shown on the drawings, fully embedded in grout and not in mortar or mortar joints. Provide required metal accessories to insure adequate alignment of steel during grout filling operations.

Y. At locations where items are mounted on/against split face CMU (i.e. door/window jambs, fire extinguisher cabinets, electric water coolers, etc.), grind split face CMU to allow flush, level installation.

Z. Do not hard pack mortar around any structural members. No exceptions. Leave gap small enough to provide a uniform sealant joint.

3.06 WEEPS/CAVITY VENTS

A. Place weep vents in head joints at exterior wythe of cavity wall located immediately above all flashings, ledges, heads of lintels and low roof to high wall conditions spaced 24 inches on center for clay and stone masonry units and 32 inches on center for concrete masonry units, unless otherwise shown. Leave the side of the masonry units clear from mortar (unbuttered) forming the vent space.
   1. Place the vent material into joint, directly on top of flashing material, prior to installing the second masonry unit.

2. Install the weep vents as the wall is being erected so joints do not become filled with mortar or debris.
3. Install a minimum of two weeps above each exterior door/window.

B. Install cavity vents in veneer walls at 24 or 32 inches on center horizontally near top of walls.

3.07 CAVITY MORTAR CONTROL

A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.

B. For cavity walls, build inner wythe ahead of outer wythe to accommodate accessories.

C. Install 1 continuous row at base of wall and over all wall openings directly on flashing. To prevent mortar bridging between the outer wythe and inner wall, install flashing extending from the bottom of the collection system to at least 6" above the top of the collection system.

D. Install with the offset edge pointing up the wall.

E. Lay the first 1 or 2 courses of masonry at flashing level, then install the collection system continuously by placing it against the inside of the openings. No fasteners or adhesives are required.

F. Compress the collection system horizontally so it can be forced into cavities slightly smaller than its nominal thickness without affecting performance. When forcing the collection system into a cavity, be sure mortar has set sufficiently to resist outward pressure from product.

3.08 REINFORCEMENT AND ANCHORAGE - GENERAL

A. Refer to the Structural and Architectural Drawings for reinforcement required in masonry.

B. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center.

C. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.

D. Place continuous joint reinforcement in first and second joint below top of walls.

E. Lap joint reinforcement ends minimum 6 inches.

F. Do not install masonry anchors at locations where fasteners will penetrate through wall flashing.

G. Do not use reinforcement having any of the following defects.
1. Bar lengths, depths, or bends exceeding the specified tolerances.
2. Bends or kinks not indicated on the Drawings or required for the Work.
3. Bars with cross-section reduced due to excessive rust or other causes.

H. Masonry Tie Installation: Set wall plate in full bed of compatible sealant over substrate. Install fasteners to engage structural framing/masonry, ensuring fasteners are installed snug and straight. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 16 inches horizontally and 16 inches vertically.

3.09 MASONRY FLASHINGS

A. Coordinate masonry work with installation of metal and membrane through wall flashings in accordance with Sections 07 2500 and 07 6200.

B. Laying Masonry Walls at Flashings:
1. Provide a solid surface at flashing areas using inverted lintels, solid or filled masonry units. Flash at all breaks in wall face where cells are not grouted.
2. At wall base flashings, place mortar bed on top of flashing.

3.10 CONTROL AND EXPANSION JOINTS

A. Locate 3/8” wide expansion and control joints as indicated on the drawings. However in no case shall they exceed 20’-0” in distance. Contractor shall ensure that joints occur at intervals no more than as noted above and notify the Architect for coordination of placement if additional joints are required. Keep vertical joints straight, true and continuous from top to bottom of masonry.
   1. Expansion joints shall be completely free of mortar and the joint reinforcement shall not continue across the expansion joint. Keep vertical joints straight, true and continuous from top to bottom of masonry. Detail joint as shown on the drawings
   2. At control joints horizontal reinforcing shall run continuous through joint. Detail joint as shown on the drawings.

B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

C. Form expansion joint as detailed on drawings.

3.11 TOLERANCES

A. Maximum Variation from Alignment of Columns: 1/4 inch.

B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.

C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.

D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.

E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.

F. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft.

G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.12 CUTTING AND FITTING

A. Cut and fit for chases, pipes, conduit, sleeves, and grounds. Coordinate with other sections of work to provide correct size, shape, and location.

B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.13 FIELD QUALITY CONTROL

A. A Special Inspection and Testing Agency (SITA) will perform field quality control tests and inspections, as specified in Sections 01 4516 and 01 4533.

3.14 CLEANING

A. Remove excess mortar and mortar droppings.

B. Replace defective mortar. Match adjacent work.

C. Clean soiled surfaces with cleaning solution.

D. Use non-metallic tools in cleaning operations.

3.15 PROTECTION

A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

B. The masonry walls shall be covered at the end of each workday and when work is not in progress. The walls shall be covered with heavy plastic sheeting or water repellent tarps and shall extend a minimum of 2’-0” down each side of the wall and be securely held in place.

END OF SECTION

SECTION 05 1200
STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Structural steel framing members and support members.

B. Base plates, shear stud connectors and expansion joint plates.

C. Grouting under base plates.

1.02 RELATED REQUIREMENTS

A. Section 05 2100 - Steel Joist Framing.

B. Section 05 3100 - Steel Decking: Support framing for small openings in deck.

C. Section 05 5000 - Metal Fabrications: Steel fabrications affecting structural steel work.

1.03 REFERENCE STANDARDS

A. AISC (MAN) - Steel Construction Manual 2017.

B. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges 2022.

C. AISC S303 - Code of Standard Practice for Steel Buildings and Bridges 2016.

D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.

E. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless 2022.

F. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished 2018.

G. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes 2021a.

H. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing 2021.

I. ASTM A514/A514M - Standard Specification for High-Yield-Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding 2022.

J. ASTM A992/A992M - Standard Specification for Structural Steel Shapes 2022.

K. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable 2021a.

L. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength 2018a.

M. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength 2020.

N. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination 2020.

O. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020, with Errata (2022).

P. RCSC (HSBOLT) - Specification for Structural Joints Using High-Strength Bolts; Research Council on Structural Connections 2020.

Q. UL (FRD) - Fire Resistance Directory Current Edition.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings:

1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
2. Connections and the calculations for the design of these connections.
3. Indicate cambers and loads.
4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.
5. Shop drawing sheets that include engineering information designed by the Contractor's Delegated Design Engineer shall be signed and sealed in accordance with the Texas Engineering Practice Act. Sheets that do not provide information designed by the Contractor's Engineer do not require being signed and sealed. Calculation packages require a signed and sealed cover sheet only. Any submittals requiring to be signed and sealed that are received without the signature and seal will be rejected without review.

C. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements.

D. Mill Test Reports: Indicate structural strength, destructive test analysis and non-destructive test analysis.

E. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.05 QUALITY ASSURANCE

A. Fabricate structural steel members in accordance with AISC (MAN) "Steel Construction Manual."

B. Maintain one copy of each document on site.

C. Fabricator: Company specializing in performing the work of this section with minimum three years ofdocumented experience.

D. Erector: Company specializing in performing the work of this section with minimum three years of documented experience.

E. Design connections not detailed on drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in Texas.

PART 2 PRODUCTS

2.01 MATERIALS

A. Steel Angles and Plates: ASTM A36/A36M.

B. Steel W Shapes and Tees: ASTM A992/A992M.

C. Cold-Formed Structural Tubing: ASTM A500/A500M, Grade B.

D. Hot-Formed Structural Tubing: ASTM A501/A501M, seamless or welded.

E. Steel Bars: ASTM A108Grade 50.

F. Steel Plate: ASTM A514/A514M.

G. Steel Sheet: ASTM A1011/A1011M, Designation SS, Grade 30 hot-rolled, or ASTM A1008/A1008M, Designation SS, Grade 30 cold-rolled.

H. Pipe: ASTM A53/A53M, Grade B, Finish black.

I. Shear Stud Connectors: Made from ASTM A108 Grade 1015 bars.

J. High-Strength Structural Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, with matching compatible ASTM A563 or ASTM A563M nuts and ASTM F436/F436M washers.

K. Headed Anchor Rods: ASTM F 1554, Grade 55, plain as indicated on the drawings.

L. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

M. Sliding Bearing Plates: Teflon coated.

N. Grout: Non-shrink, non-metallic aggregate type, complying with ASTM C 1107/C 1107M and capable of developing a minimum compressive strength of 7,000 psi at 28 days.

O. Shop and Touch-Up Primer: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.

P. Touch-Up Primer for Galvanized Surfaces: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.

2.02 FABRICATION

A. Shop fabricate to greatest extent possible.

B. Space shear stud connectors at as indicated on the drawings.

C. Continuously seal joined members by intermittent welds and plastic filler. Grind exposed welds smooth.

D. Fabricate connections for bolt, nut, and washer connectors.

E. Develop required camber for members.

2.03 FINISH

A. Prepare structural component surfaces in accordance with SSPC SP 3, Power Tool Cleaning.

B. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or high strength bolted.

2.04 SOURCE QUALITY CONTROL

A. If any steel fabrication occurs off-site (at a fabrication shop) that is not an AISC certified fabrication shop, the Steel Fabricator shall pay for the SITA to perform the special inspections or testing required by Section 01 4533 for all such off-site steel fabrication. Source quality control testing is not required for any steel provided by an AISC certified steel fabrication shop.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.

3.02 ERECTION

A. Erect structural steel in compliance with AISC 303.

B. Allow for erection loads, and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.

C. Field weld components and shear studs indicated on shop drawings.

D. Use carbon steel bolts only for temporary bracing during construction, unless otherwise specifically permitted on drawings. Install high-strength bolts in accordance with RCSC (HSBOLT) "Specification for Structural Joints Using High-Strength Bolts".

E. Do not field cut or alter structural members without approval of Architect.

F. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

G. Grout solidly between column plates and bearing surfaces, complying with manufacturer's instructions for nonshrink grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.

3.03 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

3.04 FIELD QUALITY CONTROL

A. A Special Inspection and Testing Agency (SITA) will perform field quality control tests and inspections, as specified in Sections 01 4516 and 01 4533.

END OF SECTION

SECTION 05 2100
STEEL JOIST FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Open web steel joistsand shear stud connectors, with bridging, attached seats and anchors.

B. Loose bearing members, such as plates or angles, and anchor bolts for site placement.

C. Supplementary framing for floor and roof openings greater than 18 inches.

1.02 RELATED REQUIREMENTS

A. Section 05 1200 - Structural Steel Framing: Grouting base plates and bearing plates. Superstructure framing.

B. Section 05 1200 - Structural Steel Framing: Superstructure framing.

C. Section 05 3100 - Steel Decking: Support framing for openings less than 18 inches in decking.

D. Section 05 5000 - Metal Fabrications: Non-framing steel fabrications attached to joists.

1.03 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.

B. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished 2018.

C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.

D. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength 2021.

E. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020, with Errata (2022).

F. SJI 100 - Standard Specifications for K-Series, LH-Series, and DLH-Series Open Web Steel Joists, and for Joist Girders 2020.

G. SJI (SPEC) - Catalog of Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders 2011.

H. SJI Technical Digest No. 9 - Handling and Erection of Steel Joists and Joist Girders 2008.

I. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer 2004.

J. SSPC-SP 2 - Hand Tool Cleaning 2018.

K. UL (FRD) - Fire Resistance Directory Current Edition.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate standard designations, joist coding, configurations, sizes, spacings, cambers, locations of joists, joist leg extensions, bridging, connections, and attachments.

C. Shop drawing sheets that include engineering information designed by the Contractor’s Delegated Design Engineer shall be signed and sealed in accordance with the Texas Engineering Practice Act. Sheets that do not provide information designed by the Contractor’s Engineer do not require being signed and sealed. Calculation packages require a signed and sealed cover sheet only. Any submittals requiring to be signed and sealed that are received without the signature and seal will be rejected without review.

D. Welders' Certificates: Submit manufacturer's certificates, certifying welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.05 QUALITY ASSURANCE

A. Design connections not detailed on drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in Texas.

B. Perform Work, including that for headers and other supplementary framing, in accordance with SJI 100 Standard Specifications Load Tables and SJI Technical Digest No. 9.

C. Manufacturer Qualifications: Company specializing in performing the work of this section with minimum three yearsdocumented experience.

D. Erector Qualifications: Company specializing in performing the work of this section with minimum three yearsdocumented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Transport, handle, store, and protect products to SJI requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Steel Joists:
   1. Canam Group Inc: www.canam-steeljoists.ws
   2. Nucor-Vulcraft Group: www.vulcraft.com/#sle.
   3. New Mellennium Building Systems, LLC: www.newmill.com
   4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MATERIALS

A. Open Web Joists: SJI Type K Joists:
   1. Provide bottom and top chord extensions as indicated.
   2. Minimum End Bearing on Steel Supports: As shown on the drawings.
   3. Minimum End Bearing on Concrete or Masonry Supports: As shown on drawings.
   4. Finish: Shop primed.

B. Anchor Bolts, Nuts and Washers: ASTM A307 hot-dip galvanized per ASTM A153/A153M Class C.

C. Shear Stud Connectors: Made from ASTM A108 Grade 1015 bars.

D. Structural Steel For Supplementary Framing and Joist Leg Extensions: ASTM A 36/A 36M.

E. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

F. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.03 FABRICATION

A. Frame special sized openings in joist web framing as detailed.

2.04 FINISH

A. Shop prime joists as specified.
   1. Do not prime surfaces that will be fireproofed, field welded, or in contact with concrete.

B. Prepare surfaces to be finished in accordance with SSPC-SP 2.

2.05 SOURCE QUALITY CONTROL

A. For joist fabrication that occurs at a joist fabrication shop that is not an SJI certified joist fabrication shop, the Joist Fabricator shall pay for the SITA to perform the special inspections or testing required by Section 01 4533 for all such off-site steel fabrication. Source quality control testing is not required for any joists provided by an SJI certified joist fabrication shop.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions prior to beginning work.

3.02 ERECTION

A. Erect joists with correct bearing on supports.

B. Allow for erection loads. Provide sufficient temporary bracing to maintain framing safe, plumb, and in true alignment.

C. Coordinate the placement of anchors for securing loose bearing members furnished as part of the work of this section.

D. After joist alignment and installation of framing, field weld joist seats to steel bearing surfaces.

E. Position and field weld joist chord extensions and wall attachments as detailed.

F. Install supplementary framing for floor and roof openings greater than 18 inches.

G. Do not permit erection of decking until joists are braced, bridged, and secured or until completion of erection and installation of permanent bridging and bracing.

H. Do not field cut or alter structural members without approval of joist manufacturer.

I. After erection, prime welds, damaged shop primer, and surfaces not shop primed , except surfaces specified not to be primed.

3.03 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch.

B. Maximum Offset From True Alignment: 1/4 inch.

3.04 FIELD QUALITY CONTROL

A. A Special Inspection and Testing Agency (SITA) will perform field quality control tests and inspections, as specified in Sections 01 4516 and 01 4533.

END OF SECTION

SECTION 05 3100
STEEL DECKING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Acoustical roof deck.
B. Roof deck.
C. Composite floor deck.
D. Metal form deck.
E. Supplementary framing for openings up to and including 18 inches.
F. Bearing plates and angles.
G. Stud shear connectors.
H. Acoustical insulation in roof deck flutes.

1.02 RELATED REQUIREMENTS

A. Section 03 2000 - Concrete Reinforcing.
B. Section 03 3000 - Cast-in-Place Concrete: Concrete topping over metal deck.
C. Section 05 1200 - Structural Steel Framing: Support framing for openings larger than 18 inches and shear stud connectors.
D. Section 05 5000 - Metal Fabrications: Steel angle concrete stops at deck edges.
E. Section 09 9000 - Painting and Coating

2.01 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
B. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished 2018.
C. ASTM A510/A510M - Standard Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel, and Alloy Steel 2020.
D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2022.
E. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable 2021a.
F. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel 2023.
G. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020, with Errata (2022).
H. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel 2018, with Errata (2022).
I. FM (AG) - FM Approval Guide Current Edition.
J. ICC-ES AC43 - Acceptance Criteria for Steel Deck Roof and Floor Systems 2016.
K. ICC-ES AC70 - Acceptance Criteria for Fasteners Power Driven into Concrete, Steel and Masonry Elements 2016.
L. SDI (DM) - Publication No.30, Design Manual for Composite Decks, Form Decks, and Roof Decks 2007.
M. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic) 2019.
N. UL (FRD) - Fire Resistance Directory Current Edition.

2.02 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittals procedures.

B. Product Data: Provide deck profile characteristics, dimensions, structural properties, and finishes.

C. Shop Drawings: Indicate deck plan, support locations, projections, openings, reinforcement, pertinent details, and accessories.

D. Shop drawing sheets that include engineering information designed by the Contractor's Delegated Design Engineer shall be signed and sealed in accordance with the Texas Engineering Practice Act. Sheets that do not provide information designed by the Contractor's Engineer do not require being signed and sealed. Calculation packages require a signed and sealed cover sheet only. Any submittals requiring to be signed and sealed that are received without the signature and seal will be rejected without review.

E. Certificates: Certify that products furnished meet or exceed specified requirements.

F. Submit manufacturer's installation instructions.

G. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

2.03 QUALITY ASSURANCE

A. Design deck layout, spans, fastening, and joints under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in Texas.

B. Installer Qualifications: Company specializing in performing the work of this Section with minimum three years of experience.

2.04 DELIVERY, STORAGE, AND HANDLING

A. Cut plastic wrap to encourage ventilation.

B. Separate sheets and store deck on dry wood sleepers; slope for positive drainage.

PART 2 PRODUCTS

3.01 MANUFACTURERS

A. Steel Deck:
   1. Canam Steel Corporation: www.canam-steeljoists.ws.
   2. CSM Metal Deck: www.metaldecking.com
   3. Nucor-Vulcraft Group: www.vulcraft.com.
   4. New Mellennium Building Systems, LLC: www.newmill.com
   5. Substitutions: See Section 01 6000 - Product Requirements.

3.02 STEEL DECK

A. Acoustical Roof Deck:
   1. Type "BA": Non-composite type, steel sheet with plain vertical flute faces perforated with 1/8 inch diameter holes staggered 3/8 inch on center and inert, non-organic glass fiber sound absorbing batts placed in the rib opening.
   2. Type "NA": Non-composite type, steel sheet with plain vertical flute faces perforated with 1/8 inch diameter holes staggered 3/8 inch on center and inert, non-organic glass fiber sound absorbing batts placed in the rib opening.
   3. Type "Toris A": As manufactured by Epic Metals (or Equal).
   4. Type "Toris 4A": As manufactured by Epic Metals (or Equal).
   5. Steel Sheet:
      a. Ungalvanized Steel Sheet: ASTM A1008/1008M, Designation SS, Grade 33, Type 1. (typical) except where metal roof deck is to receive cementitious fireproofing.

b. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230, with G90/Z275 galvanized coating where metal roof deck is to receive cementitious fireproofing.

6. Primer: Shop coat of manufacturer's standard primer paint over cleaned and phosphatized substrate. See Section 09 9000 - 'Painting and Coating for any additional requirements'.
7. Structural Properties:
   a. Span Design: Triple.
8. Minimum Metal Thickness, Excluding Finish 20 gage (unless noted otherwise on the Structural Drawings).
9. Nominal Height:
   a. Type "BA": 1-1/2"
   b. Type "Toris A": 2-1/2"
   c. Type "NA": 3"
   d. Type "Toris 4A": 4"
10. Profile: Fluted.
   a. Type "BA": Fluted SDI WR
   b. Type "Toris A": Fluted As manufactured by Epic Metals (or Equal)
   c. Type "NA" : Fluted SDI Deep WR
   d. Type "Toris 4A": Fluted As manufactured by Epic Metals (or Equal)
11. Formed Sheet Width:
   a. Type "BA": 36 inch
   b. Type "Toris A": 24 inch
   c. Type "NA": 24 inch
   d. Type "Toris 4A": 24 inch
12. Deck Attachments: Unless noted otherwise on the Structural Drawings:
   a. Side Joints: Lapped, mechanically fastened. 2 #10 TEK screws at each deck span
   b. End Joints/Fasteners and Intermediate Support Fasteners:
      1) Type "BA": 5/8" puddle welds on a 36/7 pattern
      2) Type "Toris A": 3/4" Arc puddle welds on a 24/4 pattern
      3) Type "NA": puddle welds on a 24/4 pattern
      4) Type "Toris 4A": 3/4" Arc puddle welds on a 24/4 pattern
   c. Side Support Fasteners: Welds matching end joint fastener at 6" on center.

B. Roof Deck:
1. Type "B": Non-composite type, fluted steel sheet
2. Type “CSV”: Non-composite type, fluted steel sheet with vents in bottom of flutes
3. Type "Toris": As manufactured by Epic Metals (or Equal)
4. Type "N": Non-composite type, fluted steel sheet
5. Type "Toris 4": As manufactured by Epic Metals (or Equal)
6. Steel Sheet:
   a. Ungalvanized Steel Sheet: ASTM A1008/1008M, Designation SS, Grade 33, Type 1. (typical) except where metal roof deck is to receive cementitious fireproofing.
   b. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230, with G90/Z275 galvanized coating where metal roof deck is to receive cementitious fireproofing.
7. Primer: Shop coat of manufacturer's standard primer paint over cleaned and phosphatized substrate. See Section 09 9000 - 'Painting and Coating' for any additional requirements.
8. Structural Properties:
   a. Span Design: Triple.
9. Minimum Metal Thickness, Excluding Finish: 22 gage (unless noted otherwise on the Structural Drawings).
10. Nominal Height:

a. Type "B": 1-1/2"
b. Type “CSV”: 15/16”
c. Type "Toris": 2-1/2"
d. Type "N": 3"
e. Type "Toris 4": 4"

11. Profile:
    a. Type "B": Fluted; SDI WR
    b. Type “CSV”: Fluted
    c. Type "Toris": As manufactured by Epic Metals (or Equal)
    d. Type "N": Fluted; SDI Deep WR
    e. Type "Toris 4": As manufactured by Epic Metals (or Equal)
12. Formed Sheet Width:
    a. Type "B": 36 inch
    b. Type “CSV”: 32 or 36 inches
    c. Type "Toris" 24 inch
    d. Type "N": 24 inch
    e. Type "Toris 4": 24 inch
13. Deck Attachment (Unless noted otherwise on the Structural Drawings):
    a. Side Joints: Lapped, mechanically fastened. (3) #10 TEK screws at each deck span
    b. End Joints/Fasteners and Intermediate Support Fasteners: Lapped, welded
        1) Type "B": 5/8" puddle welds on a 36/7 pattern
        2) Type "Toris": 3/4" Arc puddle welds on a 24/4 pattern
        3) Type "N": 5/8" puddle welds on a 24/4 pattern
        4) Type "Toris 4": 3/4" Arch puddle welds on a 24/4 pattern
    c. Side Support Fasteners: Welds matching End joint fasteners at 6" on center

C. Composite Floor Deck: Fluted steel sheet embossed to interlock with concrete:
1. Galvanized Steel Sheet: Structural Steel (SS) Grade 33/230, with G60/Z180 galvanized coating.
2. Minimum Base Metal Thickness: 18 gage, 0.0474 inch.
3. Nominal Height: 1-1/2” inches.
4. Profile: Fluted. Equal to 1.5VLI as manufactured by Vulcraft
5. Formed Sheet Width: 36 inch.
6. Side Joints: Lock seam with button punches as required by deck manufacturer for construction purposes but not greater than 36" OC.
7. End Joints/Fasteners and Intermediate Support Fasteners: Lapped, welded. 5/8" diameter puddle welds on a 36/4 pattern
8. Side Support Fasteners: 5/8" diameter puddle welds at 9" on center.
9. See Section 09 9000 - 'Painting and Coating' for any additional requirements for finish where composite floor deck occurs over crawl space.

D. Metal Form Deck: Corrugated sheet steel:
1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230, with G60/Z180 galvanized coating.
2. Minimum Metal Thickness, Excluding Finish: 22 gage unless noted otherwise on the structural drawings
3. Nominal Height: 1 inch.
4. Profile: Fluted. Equal to 1.0 C as manufactured by Vulcraft
5. Formed Sheet Width: 33 inch.
6. Side Joints: Lapped, mechanically fastened with 2 #10 TEK screws per span.
7. End Joints: Lapped, mechanically fastened with #12 TEK screws on a 33/4 pattern.

3.03 ACCESSORY MATERIALS

A. Bearing Plates and Angles: ASTM A36/A36M steelunfinished.

B. Stud Shear Connectors: Made from ASTM A 108 Grade 1015 bars.

C. Welding Materials: AWS D1.1/D1.1M.

D. Fasteners: Galvanized hardened steel, self tapping.

E. Powder Actuated Mechanical Fasteners: Steel; with knurled shank and forged ballistic point. Comply with applicable requirements of ICC-ES AC70.
   1. Design Requirements: Provide number and type of fasteners that comply with the applicable requirements of SDI (DM) design method for roof deck and floor deck applications and ICC-ES AC43.
   2. Material: Steel; ASTM A510/A510M.
      a. Hardness: Rockwell C 54.5, minimum.
      b. Tensile Strength: 285 kips per square inch, minimum.
      c. Shear Strength: 175 kips per square inch, minimum.
      d. Washers:
         1) Steel Bar Joist Framing Applications: 0.472 inch diameter, minimum.
         2) Exposed Roof Deck Applications: 0.591 inch diameter, minimum.
      e. Corrosion Resistance:
         1) Steel Bar Joist Framing Applications: ASTM B633, SC1, Type III zinc electroplate..
         2) Exposed Roof Deck Applications: Provide manufacturer's standard stainless steel sealing caps with bonded neoprene washer over each fastener.

F. Mechanical Fasteners: Steel; hex washer head, self-drilling, self-tapping.
   1. Design Requirements for Sidelap Connections: Provide number and type of fasteners that comply with the applicable requirements of SDI (DM) design method for roof deck and floor deck applications and ICC-ES AC43.
   2. Fasteners for Steel Roof Decks Protected with Waterproofing Membrane: ASTM B633, SC1, Type III zinc electroplate.
   3. Fasteners for Exposed Steel Roof Deck Application: Manufacturer's standard stainless steel with bonded neoprene washer.

G. Weld Washers: Mild steel, uncoated, 3/4 inch outside diameter, 1/8 inch thick.

H. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, complying with VOC limitations of authorities having jurisdiction.

I. Flute Closures: Closed cell foam rubber, 1 inch thick; profiled to fit tight to the deck.

J. Acoustical Insulation: Glass fiber type, minimum 1.1 lb/cu ft density; profiled to suit deck.

3.04 FABRICATED DECK ACCESSORIES

A. Sheet Metal Deck Accessories: Metal closure strips, wet concrete stops, and cover plates, 20 gage, 0.0359 inch thick sheet steel; of profile and size as indicated; finished same as deck.

B. Cant Strips: Formed sheet steel, 20 gage, 0.0359 inch minimum thickness, 45 degree slope, 3-1/2 inch nominal width and height, flange for attachment.

C. Roof Sump Pans: Formed sheet steel, 14 gage, 0.0747 inch minimum thickness, flat bottom, sloped sides, recessed 1-1/2 inches below roof deck surface, bearing flange 3 inches wide, sealed watertight.

D. Floor Drain Pans: Formed sheet steel, 14 gage, 0.0747 inch minimum thickness, flat bottom, sloped sides, recessed 1-1/2 inches below floor deck surface, bearing flange 3 inches wide, sealed watertight.

PART 3 EXECUTION

4.01 EXAMINATION

A. Verify existing conditions prior to beginning work.

4.02 FIELD QUALITY CONTROL

A. A Special Inspection and Testing Agency (SITA) will perform field quality control tests and inspections, as specified in Sections 01 4516 and 01 4533.

B. Before roof insulation placement, the deck shall be inspected for tears, dents, or other damage that may prevent the deck from acting as a tight and substantial form. Replace decking which has been damaged or permanently deflected.

C. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint. Paint all disturbed galvanized deck and welds.

4.03 INSTALLATION

A. Erect metal deck in accordance with SDI Design Manual. Align and level.

B. On concrete surfaces provide minimum 4 inch bearing.

C. On steel supports provide minimum 1-1/2 inch bearing.

D. Fasten deck to steel support members at ends and intermediate supports as indicated in section 2.02, parallel with the deck flute and at every other transverse flute using methods indicated on drawings.
   1. Welding: Use fusion welds through weld washers.
   2. Place and secure special deep fluted sections for integral concrete bridging.

E. At mechanically fastened male/female side laps fasten as indicated in section 2.02.

F. Drive mechanical sidelap connectors completely through adjacent lapped sheets; positively engage adjacent sheets with minimum three-thread penetration.

G. At welded male/female side laps weld at 18 inches on center maximum.

H. Weld deck in accordance with AWS D1.3/D1.3M.

I. At deck openings greater than 8 inches, provide support per Structural Drawings. Place angles perpendicular to flutes; extend minimum two flutes beyond each side of opening and fusion weld to deck at each flute.

J. Where deck (other than cellular deck electrical raceway) changes direction, install 6 inch minimum wide sheet steel cover plates, of same thickness as deck, fusion weld 12 inches on center maximum, unless alternative detail is provided in the Structural Drawings.

K. At floor edges, install concrete stops upturned to top surface of slab, to contain wet concrete. Provide stops of sufficient strength to remain stationary without distortion.

L. At openings between deck and walls, columns, and openings, provide sheet steel closures and angle flashings to close openings.

M. Close openings above walls and partitions perpendicular to deck flutes with double row of foam cell closures.

N. Place metal cant strips in position and mechanically attach.

O. Position roof drain pans with flange bearing on top surface of deck. Fusion weld at each deck flute.

P. Position floor drain pans with flange bearing on top surface of deck. Fusion weld at each deck flute.

Q. Weld stud shear connectors through steel deck to structural members below.

R. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up primer.

END OF SECTION

SECTION 05 4000
COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Formed steel stud exterior wall and interior wall framing, both load-bearing and non-load-bearing, including soffit framing and other non-structural miscellaneous framing.

B. Formed steel joist and purlin framing and bridging.

1.02 RELATED REQUIREMENTS

A. Section 05 1200 - Structural Steel Framing.

B. Section 05 3100 - Steel Decking.

C. Section 06 1000 - Rough Carpentry: Wood blocking and miscellaneous framing.

1.03 REFERENCE STANDARDS

A. AISI S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members; 2012.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.

D. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2021.

E. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories; 2020.

F. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2023).

G. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with work of other sections that is to be installed in or adjacent to the metal framing system, including but not limited to structural anchors, cladding anchors, utilities, insulation, and firestopping.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on standard framing members; describe materials and finish, product criteria, limitations.

C. Product Data: Provide manufacturer's data on factory-made framing connectors, showing compliance with requirements.

D. Shop Drawings: Indicate component details, framed openings, bearing, anchorage, loading, welds, and type and location of fasteners, and accessories or items required of related work.
   1. Indicate stud, floor joist, ceiling joist, roof rafter, and roof truss layout.
   2. Describe method for securing studs and all of the cold formed metal framing to tracks and any other boundary supports all framing connections.
   3. Design data:

a. Shop drawing sheets that include engineering information designed by the Contractor's Delegated Design Engineer shall be signed and sealed in accordance with the Texas Engineering Practice Act. Sheets that do not provide information designed by the Contractor's Engineer do not require being signed and sealed. Calculation packages require a signed and sealed cover sheet only. Any submittals requiring to be signed and sealed that are received without the signature and seal will be rejected without review.

E. Manufacturer's Installation Instructions: Indicate special procedures, conditions requiring special attention .

1.06 QUALITY ASSURANCE

A. Designer Qualifications: Design framing system under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in Texas.

B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, and with minimum five years of documented experience.

C. Installer Qualifications: Company specializing in performing the work of this section with minimum five years documented experience and approved by manufacturer.

1.07 MOCK-UP

A. Provide mock-up of exterior framed wall, including components specified elsewhere, such as insulation, sheathing, window frame, door frame, exterior wall finish, and interior wall finish.

B. Mock-Up Size: 4 by 4 feet, including corner condition.

C. Location: As directed.

D. Mock-up may not remain as part of the Work.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Framing:
1. CEMCO: www.cemcosteel.com.
2. ClarkDietrich Building Systems: www.clarkdietrich.com.
3. MarinoWARE: www.marinoware.com/#sle.
4. Mill Steel Company: www.millsteelframing.com
5. Telling Industries, LLC: www.buildstrong.com.
6. Substitutions: See Section 01 6000 - Product Requirements.

B. Framing Connectors and Accessories:
1. Same manufacturer as metal framing.
2. Simpson Strong Tie: www.strongtie.com.
3. Substitutions: See Section 01 6000 - Product Requirements.

2.02 FRAMING SYSTEM

A. Provide primary and secondary framing members, straight and curved track, bridging, bracing, plates, gussets, clips, fittings, reinforcement, and fastenings as required to provide a complete framing system.

B. Design Requirements: Provide completed framing system having the following characteristics:
1. Design: Calculate structural characteristics of cold-formed steel framing members according to AISI S100-12.
2. Structural Performance: Design, engineer, fabricate, and erect to withstand specified design loads for project conditions within required limits.
3. Design Loads: As indicated on the drawings.
4. Wind and Live load deflection meeting the following, unless otherwise indicated:
a. Floors: Maximum vertical deflection under live load of 1/360 of span.

b. Roofs: Maximum vertical deflection under live load of 1/180 over areas without a ceiling, 1/240 over areas with a nonplaster ceiling and 1/360 over areas with a plaster ceiling.
c. Interior Walls that have no exposure to exterior wind pressures: Maximum horizontal deflection under interior wind pressures of 1/360 of span.
d. Exterior Walls: Maximum horizontal deflection under service level Components and Cladding wind load of 1/600 of span where masonry veneer or plaster is outside of the stud wall and 1/360 of span where metal panel or flexible finishes are outside of the stud wall.

5. Able to tolerate movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
6. Able to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

C. Shop fabricate framing system to the greatest extent possible.

D. Deliver to site in largest practical sections.

E. Provide 16 gauge horizontal bridging on all exterior stud framing; 5'-0" o.c. maximum.

F. Provide manufacturer recommended clips to secure bridging to studs.

2.03 FRAMING MATERIALS

A. Studs and Track: ASTM C955; studs formed to channel, "C", or "Sigma" shape with punched web; U-shaped track in matching nominal width and compatible height.
1. Gage and depth: Minimum 16 gage thickness for exterior walls, and depth as shown on the drawings. Minimum 20 gage thickness for interior walls, and depth as shown on the drawings. Minimum 20 gage thickness at 8 inches on center (or 18 gage at 16 inches on center), for interior walls where scheduled finishes require the application of grout or mortar, and depth as shown on the drawings.The Cold Formed Metal Framing Engineer must design to district standards of 16 gage at 16 inches on center for exterior walls. NO EXCEPTIONS!.
2. Provide double stud construction (fastened together) at all window and door openings.
3. Galvanized in accordance with ASTM A653/A653M, G60/Z180 coating.
4. Provide components fabricated from ASTM A 1008/A 1008M, Designation SS steel.

B. Joists and Purlins: Fabricated from ASTM A653/A653M steel sheet, with G60/Z180 hot dipped galvanized coating.
1. Base Metal: Structural Steel (SS), Grade 33/230.
2. Gage and depth: Minimum 18 gauge thick, and depth as shown on the drawings. The Cold Formed Metal Framing Engineer may increase the gage and decrease the spacing as required for design but may not increase the depth as shown on the drawings.

C. Framing Connectors: Factory-made, formed steel sheet.
1. Structural Performance: Maintain load and movement capacity required by applicable code, when evaluated in accordance with AISI S100-12.
2. Movement Connections: Provide mechanical anchorage devices that accommodate movement using slotted holes, shouldered screws or screws and anti-friction or stepped bushings, while maintaining structural performance of framing. Provide movement connections at the following locations:
a. Where continuous studs bypass elevated floor slab, connect stud to slab in manner allowing vertical and horizontal movement of slab without affecting studs; allow for minimum movement of 1/2 inch.
b. Where top of stud wall terminates below structural floor or roof, connect studs to structure in manner allowing vertical and horizontal movement of slab without affecting studs; allow for minimum movement of 1/2 inch.

c. Provide top track with long leg track and head of wall movement connectors; minimum track length of 12 feet.

3. Fixed Connections: Provide non-movement connections for tie-down to foundation, floor-to-floor tie-down, roof-to-wall tie-down, joist hangers, gusset plates, and stiffeners.

2.04 FASTENERS

A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Hot dip galvanized per ASTM A153/A153M.

B. Anchorage Devices: Powder actuated, Drilled expansion bolts, and Screws with sleeves.

C. Welding: Comply with AWS D1.1/D1.1M.

2.05 ACCESSORIES

A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.

B. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20 Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that building framing components are ready to receive work.

B. Verify field measurements and adjust installation as required.

3.02 INSTALLATION OF STUDS

A. Install components in accordance with ASTM C1007 requirements and ASTM C1007 requirements.

B. Align floor and ceiling tracks; locate to wall layout. Secure in place with fasteners at maximum 24 inches on center. Coordinate installation of sealant with floor and ceiling tracks.

C. Place studs at 16 inches on center, maximum; not more than 2 inches from abutting walls and at each side of openings. Connect studs to tracks using fastener method.

D. Construct corners using minimum of three studs. Install double studs at wall openings, door and window jambs.

E. Install load bearing studs full length in one piece. Splicing of studs is not permitted.

F. Install load bearing studs, brace, and reinforce to develop full strength and achieve design requirements.

G. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.

H. Install intermediate studs above and below openings to align with wall stud spacing.

I. Provide deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing.

J. Attach cross studs to studs for attachment of fixtures anchored to walls.

K. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.

L. Touch-up field welds and damaged galvanized surfaces with primer.

M. Add Note: M. All light gauge steel studs shall be fastened to the bottom and top track at both the inboard and outboard track flanges.

3.03 INSTALLATION OF JOISTS AND PURLINS

A. Install framing components in accordance with manufacturer's instructions.

B. Make provisions for erection stresses. Provide temporary alignment and bracing.

C. Place joists at 16 inches on center; not more than 2 inches from abutting walls. Connect joists to supports using fastener method.

D. Set floor and ceiling joists parallel and level, with lateral bracing and bridging.

E. Locate joist end bearing directly over load bearing studs or provide load distributing member to top of stud track.

F. Provide web stiffeners at reaction points.

G. Touch-up field welds and damaged galvanized surfaces with primer.

3.04 TOLERANCES

A. Maximum Variation from True Position: 1/4 inch.

B. Maximum Variation of any Member from Plane: 1/4 inch.

END OF SECTION

SECTION 05 5000
METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shop fabricated steel items.

B. Downspout boots.

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.

B. Section 04 2000 - Unit Masonry: Placement of metal fabrications in masonry.

C. Section 05 1200 - Structural Steel Framing: Structural steel column anchor bolts.

D. Section 05 2100 - Steel Joist Framing: Structural joist bearing plates, including anchorage.

E. Section 05 3100 - Steel Decking: Bearing plates for metal deck bearing, including anchorage.

F. Section 05 5100 - Metal Stairs.

G. Section 05 5133 - Metal Ladders.

H. Section 05 5213 - Pipe and Tube Railings.

I. Section 09 9000 - Painting and Coating.

1.03 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

B. ASTM A48/A48M - Standard Specification for Gray Iron Castings; 2003 (Reapproved 2016).

C. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.

D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

E. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

F. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2013.

G. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2021.

H. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.

I. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2018a.

J. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2019, with Editorial Revision (2020).

K. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.

L. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2023).

M. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).

N. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

O. SSPC-SP 2 - Hand Tool Cleaning; 2024.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
   1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

C. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

1.05 QUALITY ASSURANCE

A. Design miscellaneous steel and iron under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in Texas.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

A. Steel Sections: Shapes, bar and plate shall conform to ASTM A 36/A 36M. Light gauge structural steel shall conform to ASTM A924, latest revision. All material shall be straight, free from mill scale, rust, pitting and dents that will detract from finished appearance when painted.

B. Steel Tubing: ASTM A500/A500M Grade C cold-formed structural tubing.

C. Plates: ASTM A283/A283M.

D. Pipe: ASTM A 53/A 53M, Grade B Schedule 40, black finish.

E. Exterior Pipe: ASTM A 53/A 53M, Grade B Schedule 40, hot-dip galvanized finish.

F. Slotted Channel Framing: ASTM A653/A653M, Grade 33.

G. Slotted Channel Fittings: ASTM A1011/A1011M.

H. Mechanical Fasteners: Same material as or compatible with materials being fastened; type consistent with design and specified quality level.

I. Sheet Metal shall be open hearth, full pickled, cold rolled, annealed, patent leveled, entirely free from scale, waves and other defects.

J. Bolts, Nuts, and Washers: ASTM F3125/F3125M, galvanized to ASTM A153/A153M where connecting galvanized components.

K. Rivets shall conform to ASTM A-141, latest revision.

L. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

M. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction. Touch-up as needed after installation at all exposed finished

N. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 FABRICATION

A. All workmanship must be first-class in all respects and any members not presenting a finished and workmanlike appearance will be rejected. All finished members shall be free from twists, bends and open joints. Work shall conform to all applicable requirement of AISC.

B. All members shall be true to length so that assembly may be done without fillers, except where same are required as detailed. There shall be no projecting edges or corners where different members are assembled. On exposed surfaces, welds shall be ground smooth and flush with parent metal. All coping, blocking or mitering shall be done with care. Sharp edges and corners caused by shearing or other tooling shall be eased where exposed.

C. All details and connections shall be close fitting and carefully made and fitted, and special care shall be exercised to produce a thoroughly neat and workmanlike appearance. All detail pieces shall be made in exact accordance with Detail Drawings with all projecting corners clipped and all filler pieces made flush. Provide all lugs, clips, connections, bolts, etc., necessary to complete fabrication and erection.

D. Unless otherwise shown on Drawings, all bolts remaining in the finished, exposed work shall have countersunk heads; nuts shall be hexagonal. Bolts shall be of proper length to permit full thread in the nut, but shall not project more than 1/4" beyond the face of the nut. Screws shall be countersunk Phillips head.

E. The Contractor shall provide all holes in his work required for the connection of the work of other trades.

F. There shall be no flame cutting of members in the field without the consent of the Architect. If consent is given, burned flame cut members shall be finished to an acceptable appearance that shall be equal of a sheared finish.

G. Burning shapes to length in the shop with a standard flame cutting machine will be permitted. Burning of holes will NOT be permitted in the shop or in the field.

H. Anchors for frames, floor angles and other miscellaneous iron members shown anchored into concrete or masonry shall be strap iron, bent to shape, or deformed bent bars welded to backs of members, extended with bent end for building in as conditions required and of sizes and spacing as noted. Where the size and spacing are not noted, anchors shall not be less than 1-1/2" x 1/4" for concrete and 1-1/2" x 1/8" for masonry to fit the jointing of the adjacent brick or masonry block work. Unless otherwise noted on the Drawings, anchors shall be spaced 3'-0" or less o.c.

I. Where anchors and plates or clips are to be built in for attachment of later work, bolts shall be placed in the plates or clips and welded to back with threaded ends extended as required.

J. For attaching work to masonry or concrete, where anchors or inserts cannot be built-in, provide approved type of cinch anchors and machine bolts or screws. Holes shall be accurately drilled.

K. Fit and shop assemble items in largest practical sections, for delivery to site.

L. Fabricate items with joints tightly fitted and secured.

M. Continuously seal joined members by intermittent welds and plastic filler.

N. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

O. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

P. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.03 FABRICATED ITEMS

A. Bollards (Fixed): Steel pipe, concrete filled, prefabricated or hand formed crowned cap, or as detailed; hot dipped galvanized finish.

B. Bollards (Removable with Ground Sleeves): Model RP3506 with cam lock as manufactured by TrafficGuard: www.trafficguard.net.

C. Premanufactured downspout boots shall be fabricated from 16 gauge galvanized steel and field painted to match downspouts. See drawings for details.

D. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking, joists, and masonry; hot dipped galvanized finish.

E. Lintels: As detailed; prime paint finish. Hot dipped galvanized finish at all exterior locations.

F. Door Frames for Overhead Door Openings and Wall Openings: Channel and Angle sections; prime paint finish.

G. Elevator Hoistway Divider Beams: Beam sections; prime paint finish.

H. Stainless Steel Wall Protection: 18-8, Type 302, polished to 180 grit, no. 4 finish, patent leveled, entirely free from scale, waves and other defects.
   1. Stainless steel joint joints and seams: Heli-arc welded. free of pits and flaws, ground smooth, and polished to a no. 4 finish.
   2. The 'grain' direction or horizontal stainless-steel surfaces: Longitudinal. The polishing procedure at right-angle corners of fixtures shall provide a mitered appearance.

2.04 UTILITY TRENCH, DRAINS AND CASTINGS

A. In fabricating items which will be exposed to view, limit materials to those which are free from surface blemishes, pitting, rolled trade names, and roughness.

B. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

C. Manufactures:
   1. ACO Drain systems: www.acodrain.us
   2. Barry Pattern and Foundry: www.barrycraft.com.
   3. Neenah Foundry Company: www.nfco.com.
   4. Substitutions: See Section 01 6000 - Product Requirements.

D. Provide trench drain assembly equal to ACO drain, K100 Neutral Channel with galvanized steel edge rail and galvanized steel brick slot drain.
   1. Provide 1 access cover per 50'-0" of run or 1 access cover minimum.

2.05 DOWNSPOUT BOOTS

A. Downspout Boots: Smooth interior without boxed corners or choke points; include integral lug slots, integral cleanout, cleanout cover, and tamper proof fasteners.
   1. Basis of design: Model # SO by Piedmont Pipe Manufacturing: www.piedmontpipe.com.
   2. Length: 36 inch minimum.
   3. Configuration: Angular.
   4. Material: Stainless steel.
   5. Provide tamper proff removable clean out cover.

2.06 FINISHES - STEEL

A. Prime paint steel items.
   1. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.

B. Prepare surfaces to be primed in accordance with SSPC-SP2.

C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

D. Prime Painting: One coat.

E. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating.

F. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

G. All steel exposed to weather, set in concrete shall be painted with cold galvanized zinc, specification of U.S. Navy MIL-P-21035, U.S. Air Force MIL-P-26915A, equal to Hot Dip galvanized in cathodic protection.

2.07 FABRICATION TOLERANCES

A. Squareness: 1/8 inch maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch.

C. Maximum Misalignment of Adjacent Members: 1/16 inch.

D. Maximum Bow: 1/8 inch in 48 inches.

E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.01 EXAMINATION

A. The Contractor shall examine the construction to which his work is to be applied and shall notify the Architect in writing if deficiencies exist which are detrimental to the proper and timely installation of any work required under this section.

3.02 PREPARATION

A. The contractor shall examine the drawings and specifications with respect to the work shown or required under this section and related sections so as to insure the completeness of all work. Supplementary parts necessary to complete each item of miscellaneous iron and steel required under this section, such as bent plates, beams, columns, sleeves, clips, brackets, hangers, anchors, bolts and other fastenings and supports, though such parts are not shown on drawings or specified herein, shall be included.

B. The Contractor shall coordinate and schedule the work of this section with the work of other trades. Anchors, sleeves, framing, fastenings and other miscellaneous items to be embedded in concrete or masonry or required for securing miscellaneous iron and steel work to other construction, shall be furnished as required and so as not to delay the progress of the work.

C. The Contractor shall obtain field measurements of adjoining work as required to locate and fit the work of this section. He will be held responsible for the accurate fitting of his material to the building.

D. Storage and Handling: Miscellaneous steel shall be handled and delivered to the job in a manner that will prevent damage to the material. Store in a dry place, under cover, well protected from weather and all elements that will cause deterioration.

E. Clean and strip primed steel items to bare metal where site welding is required.

F. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.03 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects. All parts shall be secured in a rigid and substantial manner and methods or attachment shall be concealed wherever practicable.

B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Field weld components as indicated.

D. Perform field welding in accordance with AWS D1.1/D1.1M.

E. Obtain approval prior to site cutting or making adjustments not scheduled.

F. After erection, prime welds, abrasionsand surfaces not shop primed or galvanized , except surfaces to be in contact with concrete.

G. Other trades will set and build in items of miscellaneous iron which are to be built into masonry or concrete, such as loose lintels, seat angles, door frames, curbs, sleeve inserts, brackets, lugs, anchors, etc. as required to complete all parts of the work.

H. All such items shall be fabricated and delivered by the miscellaneous iron trade, complete with bolts, anchors, clips, etc., ready for the other trades to set. This trade shall consult with the trades concerned and make delivery to the points designated by the latter to expedite the installation of delivered materials in their current locations and shall furnish setting drawings where required.

I. Where frames, curbs, and similar work are composed of several parts, only those parts upon which anchors occur will, unless otherwise specified, be set and built-in by the other trades ready to receive further field assembly by the miscellaneous iron contractor.

J. Where necessary to secure miscellaneous iron work to the structure by means of welding, expansion bolts, cinch anchors and similar connections, this trade shall, unless otherwise specified, do the work of laying out and installing such connections, installing the miscellaneous iron work and bolting up.

K. All other items of miscellaneous iron shall be furnished and completely installed and connections made by this trade.

L. Throughout the work of this trade, anchors and inserts shall be provided wherever possible for building in the adjoining work. Where lugs are shown or specified for building into adjoining masonry, the parts having lugs shall be erected in place before the masonry is built. Elsewhere, the work shall be brought to the building in as large pieces as practicable and attached to anchors or inserts during erection.

M. All parts of work exposed to view shall be left clean, smooth and neatly finished.

N. All freestanding steel handrails shall be embedded in the concrete slab unless noted otherwise.

O. Shelf angles and supports for masonry, etc., and slab edge plates shall be furnished and installed as shown.

P. All shelf angles shall be punched for bolts. Furnish and install bolts as required.

3.04 WELDING

A. All welding on steel, both shop and field, shall be done by the electric method in accordance with the American Welding Society specifications. Welder shall be especially skilled in this class of work and qualified by successfully passing the American Welding Society tests and have a current certificate.

B. Welds shall be solid and homogeneously a part of the metals joined and free from pits or incorporated slag and scale. Surfaces of welds shall be smooth and regular and shall be full area indicated or required to develop the required strength of the joints. Where exposed, welds shall be ground smooth and flush with the parent metal, so as to be imperceptible after painting.

C. If directed by Architect, welds, selected at random, shall be tested by an approved laboratory and any welds not complying with the specifications shall be removed and replaced with satisfactory work. The cost of test shall be borne by the Contractor in all cases in which welding fails to comply with the specifications, otherwise by Owner. The cost of replacing condemned welds, plus the cost of replacing other materials damaged incidental thereto, shall be borne by the Contractor.

D. Galvaweld: All welds on galvanized surfaces performed after galvanizing shall be Galvaweld coated.

3.05 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

SECTION 05 5100
METAL STAIRS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Stairs with concrete treads.

B. Stairs with metal treads.

C. Stairs with grating treads.

D. Stairs with precast terrazzo treads

E. Structural steel stair framing and supports.

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Placement of metal anchors in concrete.

B. Section 04 2000 - Unit Masonry: Placement of metal fabrications in masonry.

C. Section 05 5000 - Metal Fabrications.

1.03 REFERENCE STANDARDS

A. AISC 201 - AISC Certification Program for Structural Steel Fabricators, Standard for Steel Building Structures; 2006.

B. ASTM A6/A6M - Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling; 2017.

C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

D. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.

E. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

F. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

G. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2013.

H. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2021.

I. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2014.

J. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.

K. ASTM A786/A786M - Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates; 2015.

L. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2021.

M. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2018a.

N. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2019, with Editorial Revision (2020).

O. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.

P. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2023).

Q. NAAMM AMP 510 - Metal Stairs Manual; 1992.

R. SSPC-SP 2 - Hand Tool Cleaning; 2024.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.
   1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
   2. Include the design engineer's seal and signature on each sheet of shop drawings.
   3. Shop drawing sheets that include engineering information designed by the Contractor’s Delegated Design Engineer shall be signed and sealed in accordance with the Texas Engineering Practice Act. Sheets that do not provide information designed by the Contractor’s Engineer do not require being signed and sealed. Calculation packages require a signed and sealed cover sheet only. Any submittals requiring to be signed and sealed that are received without the signature and seal will be rejected without review.

C. Design Data: As required by authorities having jurisdiction.

D. Welders' Certificates.

E. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is certified under AISC 201.

1.05 QUALITY ASSURANCE

A. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in Texas, or personnel under direct supervision of such an engineer.

B. Welder Qualifications: Show certification of welders employed on the Work, verifying AWS qualification within the previous 12 months.

C. Fabricator Qualifications:
   1. A qualified steel fabricator that is certified by the American Institute for Steel Construction (AISC) under AISC 201.

PART 2 PRODUCTS

2.01 METAL STAIRS - GENERAL

A. Metal Stairs: Provide stairs of the design specified, complete with landing platforms, vertical and horizontal supports, railings, and guards, fabricated accurately for anchorage to each other and to building structure.
   1. Handrails: Comply with applicable accessibility requirements of ADA Standards.
   2. Structural Design: Provide complete stair and railing assemblies complying with the applicable local code.
   3. Dimensions: As indicated on drawings.
   4. Shop assemble components; disassemble into largest practical sections suitable for transport and access to site.
   5. No sharp or rough areas on exposed travel surfaces and surfaces accessible to touch.
   6. Separate dissimilar metals using paint or permanent tape.

B. Metal Jointing and Finish Quality Levels:

1. Commercial: Exposed joints as inconspicuous as possible, whether welded or mechanical; underside of stair not covered by soffit IS considered exposed to view.
   a. Welded Joints: Intermittently welded on back side, filled with body putty, and sanded smooth and flush.
   b. Welds Exposed to View: Ground smooth and flush.
   c. Mechanical Joints: Butted tight, flush, and hairline.
   d. Bolts Exposed to View: Countersunk flat or oval head bolts; no exposed nuts.
   e. Exposed Edges and Corners: Eased to small uniform radius.
   f. Metal Surfaces to be Painted: Sanded or ground smooth, suitable for satin or matte finish.

C. Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.

D. Anchors and Related Components: Same material and finish as item to be anchored, except where specifically indicated otherwise; provide all anchors and fasteners required.

2.02 METAL STAIRS WITH CONCRETE TREADS

A. Jointing and Finish Quality Level: Commercial, as defined above.

B. Risers: Closed.

C. Treads: Metal pan with field-installed concrete fill.
   1. Concrete Depth: 2 inches, minimum.
   2. Tread Pan Material: Steel sheet.
   3. Tread Pan Thickness: As required by design; 14 gage, 0.075 inch minimum. For lengths over 5'-6" use 12 gage. Where terrazzo is used as a finish on the treads provide 10 gauge risers for all tread lengths.
   4. Pan Anchorage to Stringers: Continuously welded, from top or bottom.
   5. Concrete Reinforcement: Welded wire mesh.
   6. Concrete Finish: Steel troweled.

D. Risers: Same material and thickness as tread pans.
   1. Riser/Nosing Profile: Sloped riser with rounded nosing as specified in Section 05 5516.

E. Stringers: Rolled steel channels, HSS members, and or as indicated on drawings.
   1. Stringer Depth: As indicated on drawings.

F. Landings: Same construction as treads, supported and reinforced as required to achieve design load capacity.

G. Railings: As specified in Section 05 5213 and/or Section 05 7000. Reference drawings for locations of each ytpe where required.

H. Finish: Shop- or factory-prime painted.

I. Under Side of Stair: Exposed to view, to be finished same as specified for other exposed to view surfaces.

2.03 METAL STAIRS WITH METAL TREADS

A. Jointing and Finish Quality Level: Commercial, as defined above.

B. Risers: Closed.

C. Treads: Checkered steel plate. See section 05 5305 - Metal Gratings and Floor Plates.
   1. Tread Thickness: 1/4 inch, minimum.
   2. Anchorage to Stringers: Welded to carrier angles welded or bolted to stringers.

D. Risers: Steel sheet.
   1. Riser/Nosing Profile: Sloped riser with rounded nosing of minimum radius.

E. Stringers: Rolled steel channels, HSS members, and or as indicated on drawings.

1. Stringer Depth: As indicated on drawings.

F. Landings: Same construction as treads, supported and reinforced as required to achieve design load capacity.

G. Railings: As specified in Section 05 5213 and/or Section 05 7000. Reference drawings for locations of each ytpe where required.

H. Finish: Shop- or factory-prime painted.

2.04 METAL STAIRS WITH GRATING TREADS

A. Jointing and Finish Quality Level: Commercial, as defined above.

B. Risers: Closed.

C. Treads: Steel bar grating.
1. Grating Type: Welded.
2. Bearing Bar Depth: 1 inch, minimum.
3. Top Surface: Standard.
4. Nosing: Checkered plate.
5. Nosing Width: 1-1/4 inch, minimum.
6. Anchorage to Stringers: End plates welded to grating, bolted to stringers.

D. Stringers: Rolled steel channels, HSS members, and or as indicated on drawings.
1. Stringer Depth: As indicated on drawings.

E. Landings: Same construction as treads, supported and reinforced as required to achieve design load capacity.

F. Railings: As specified in Section 05 5213 and/or Section 05 7000. Reference drawings for locations of each ytpe where required.

G. Finish: Galvanized after fabrication.

2.05 METAL STAIRS WITH PRECAST TERRAZZO TREADS AND RISERS

A. Jointing and Finish Quality Level: Commercial, as defined above.

B. Treads and Risers: Precast Terrazzo. See section 09 6623 - Resinous Matrix Terrazzo Flooring.
1. Anchorage to Stringers: Welded to carrier angles welded to stringers.

C. Stringers: Rolled steel channels, HSS members, and or as indicated on drawings.
1. Stringer Depth: As indicated on drawings.

D. Landings: As required by design; 12 gage minimum, supported and reinforced as required to achieve design load capacity.

E. Railings: As specified in Section 05 5213 and/or Section 05 7000. Reference drawings for locations of each ytpe where required.

F. Finish: Shop- or factory-prime painted.

2.06 MATERIALS

A. Steel Sections: ASTM A36/A36M.

B. Steel Tubing: ASTM A500/A500M or ASTM A501/A501M structural tubing, round and shapes as indicated.

C. Steel Plates: ASTM A6/A6M or ASTM A283/A283M.

D. Pipe: ASTM A53/A53M Grade B Schedule 40, black finish.

E. Ungalvanized Steel Sheet: Hot- or cold-rolled, except use cold-rolled where finished work will be exposed to view.
1. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Designation CS (commercial steel).

2. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Designation CS (commercial steel).

F. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230 with G40/Z120 coating.

G. Checkered Plate: ASTM A786/A786M, rolled steel floor plate; manufacturer's standard pattern.

H. Concrete Fill: Type specified in Section 03 3000.

I. Concrete Reinforcement: Mesh type as detailed, galvanized.

2.07 ACCESSORIES

A. Steel Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, and galvanized to ASTM A153/A153M where connecting galvanized components.

B. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

C. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.08 SHOP FINISHING

A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

B. Do not prime surfaces in direct contact with concrete or where field welding is required.

C. Prime Painting: Use specified shop- and touch-up primer.
1. Preparation of Steel: In accordance with SSPC-SP 2 Hand Tool Cleaning.
2. Number of Coats: One.

D. Galvanizing: Hot-dip galvanize to minimum requirements of ASTM A123/A123M.
1. Touch up abraded areas after fabrication using specified touch-up primer for galvanized surfaces.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

A. When field welding is required, clean and strip primed steel items to bare metal.

B. Supply items required to be cast into concrete and embedded in masonry with setting templates.

3.03 INSTALLATION

A. Install components plumb and level, accurately fitted, free from distortion or defects.

B. Provide anchors, plates, angles, hangers, and struts required for connecting stairs to structure.

C. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

D. Provide welded field joints where specifically indicated on drawings. Perform field welding in accordance with AWS D1.1/D1.1M.

E. Other field joints may be either welded or bolted provided the result complies with the limitations specified for jointing quality levels.

F. Obtain approval prior to site cutting or creating adjustments not scheduled.

G. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.04 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

END OF SECTION

SECTION 05 5133
METAL LADDERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shop-fabricated metal ladders.

B. Prefabricated ship ladders.

C. Ladder safety systems.

1.02 RELATED REQUIREMENTS

A. Section 05 5000 - Metal Fabrications

B. Section 09 9000 - Painting and Coating

1.03 REFERENCE STANDARDS

A. 29 CFR 1910.23 - Ladders; current edition.

B. 29 CFR 1910.28 - Duty to have Fall Protection and Falling Object Protection; Current Edition.

C. 29 CFR 1910.29 - Fall Protection Systems and Falling Object Protection - Criteria and Practices; Current Edition.

D. 29 CFR 1910.140 - Personal fall protection systems; Current Edition.

E. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).

F. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements; 2008.

G. ANSI/ASSP Z359.11 - Safety Requirements for Full Body Harnesses; 2014.

H. ANSI/ASSP Z359.12 - Connecting Components for Personal Fall Arrest Systems; 2009.

I. ANSI/ASSP Z359.16 - Safety Requirements for Climbing Ladder Fall Arrest Systems; 2016.

J. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

K. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

L. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.

M. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

N. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2013.

O. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2021.

P. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2019, with Editorial Revision (2020).

Q. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.

R. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2023).

S. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).

T. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

U. SSPC-SP 2 - Hand Tool Cleaning; 2024.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's data sheets on each ladder safety system product to be used, including installation instructions.

C. Shop Drawings:
   1. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
   2. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

D. Certificate: Provide documentation that ladder safety system products of this section meet or exceed cited 29 CFR 1910.28, 29 CFR 1910.29, ANSI/ASSP Z359.16, and ANSI A14.3 requirements.

E. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

1.05 QUALITY ASSURANCE

A. Design miscellaneous steel and iron under direct supervision of a Professional Engineer experienced in design of this work and licensed in Texas.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

A. Steel Sections: ASTM A36/A36M.

B. Steel Tubing: ASTM A500/A500M Grade B cold-formed structural tubing.

C. Plates: ASTM A283/A283M.

D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.

E. Mechanical Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.

F. Bolts, Nuts, and Washers: ASTM F3125/F3125M, galvanized to ASTM A153/A153M where connecting galvanized components.

G. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

H. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

I. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 FABRICATION

A. Fit and shop assemble items in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Continuously seal joined members by intermittent welds and plastic filler.

D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.03 FABRICATED LADDERS

A. Ladders: Steel; in compliance with ANSI A14.3; with mounting brackets and attachments; prime paint finish.
   1. Side Rails: 3/8 by 2 inches members spaced at 20 inches.
   2. Rungs: One inch diameter solid round bar spaced 12 inches on center.
   3. Space rungs 7 inches from wall surface.
   4. Comply with 29 CFR 1910.28 for fixed ladders that extend more than 24 feet above a lower level.
   5. Provide ladders at elevator pit, roof hatch, floor hatch and roof-to-roof ladders where noted on the drawings or where required by code.

2.04 PREFABRICATED LADDERS

A. Prefabricated Ship Ladder: Welded metal unit complying with ANSI A14.3; factory fabricated to greatest degree practical and in the largest components possible.
   1. Components: Manufacturer's standard rails, rungs, treads, handrails. returns, platforms and safety devices complying with the requirements of the MATERIALS article of this section.
   2. Materials: Aluminum; ASTM B211/B211M 6063 alloy, T52 temper.
   3. Incline: 60 degrees.
   4. Finish: Manufacturer's standard clear anodized coating, comply with AAMA 611, Class 1.
   5. Basis of Design:
      a. Ships ladder shall be equal to Model #521-10-LP as manufactured by O'Keefe's, Inc..
   6. Manufacturers:
      a. Alaco Ladder Company: www.alacoladder.com.
      b. ACL Industries, Inc: www.aclindustries.com.
      c. O'Keeffe's Inc: www.okeeffes.com/#sle.
      d. Precision Ladders, LLC: www.precisionladders.com/#sle.
      e. Substitutions: See Section 01 6000 - Product Requirements.

2.05 LADDER SAFETY SYSTEMS

A. Ladder Safety System: Comply with 29 CFR 1910.28 (b)(9)(i-iv), 29 CFR 1910.29, 29 CFR 1926.1053, and Section 7 of ANSI A14.3; ladder safety system allows the worker to climb up and down using both hands; does not require the employee continuously, hold, push, or pull any part of the system while climbing.
   1. Install on new fixed ladders over 24 feet in height.
   2. Anchorage: Fixed ladder meeting requirements of 29 CFR 1910.23.
   3. Flexible Carrier: Fixed 3/8 inch diameter galvanized steel wire rope lifeline with shock absorber and top, bottom and intermediate supports.
   4. Rigid Carrier: Fixed galvanized steel U-shaped slotted track with top, bottom and intermediate supports.
   5. Fall Arrester: Stainless steel and aluminum manual pass-through carrier sleeve fall arrester; compatible with carrier.

B. Personal Fall Arrest System Components; 29 CFR 1910.140:
   1. Body Support: Full body harness meeting requirements of ANSI/ASSP Z359.11; equipped with front or hip D-rings for attachment to climbing ladder fall arrest system.
   2. Connecting Means: Connecting hardware, such as a locking carabiner, meeting requirements of ANSI/ASSP Z359.12; compatible with fall arrester and body support harness.

2.06 FINISHES - STEEL

A. Prime paint steel items.
   1. Do not prime surfaces in direct contact with concrete.

2. Do not prime surfaces where field welding is required.

B. Prepare surfaces to be primed in accordance with SSPC-SP2.

C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

D. Prime Painting: One coat.

E. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating.

F. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

2.07 FABRICATION TOLERANCES

A. Squareness: 1/8 inch maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch.

C. Maximum Misalignment of Adjacent Members: 1/16 inch.

D. Maximum Bow: 1/8 inch in 48 inches.

E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

B. Confirm that the ladder structure to which the ladder safety system is installed is capable of withstanding the loads applied by the system in the event of a fall.

3.02 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.03 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Install ladder safety system in accordance with manufacturer's instructions.

C. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

D. Field weld components as indicated.

E. Perform field welding in accordance with AWS D1.1/D1.1M.

F. Obtain approval prior to site cutting or making adjustments not scheduled.

G. After erection, prime welds, abrasions, and surfaces not shop primed , except surfaces to be in contact with concrete.

3.04 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

SECTION 05 5213
PIPE AND TUBE RAILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wall mounted handrails.

B. Stair or ramp railings and guardrails.

C. Free-standing railings at steps.

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Placement of anchors in concrete.

B. Section 04 2000 - Unit Masonry: Placement of anchors in masonry.

C. Section 05 5100 - Metal Stairs: Attachment plates for handrails specified in this section.

D. Section 09 9000 - Painting and Coating: Paint finish.

1.03 REFERENCE STANDARDS

A. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.

B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

C. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2021.

D. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).

E. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.

1.05 QUALITY ASSURANCE

A. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in Texas, or personnel under direct supervision of such an engineer.

B. Welder Qualifications: Show certification of welders employed on the Work, verifying AWS qualification within the previous 12 months.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Handrails and Railings Accessories:
   1. C.R. Laurence Co., Inc., Blumcraft: www.crl-arch.com.
   2. Julius Blum & Company: www.juliusblum.com.
   3. The Wagner Companies, Braun: www.wagnercompanies.com.
   4. Substitutions: See Section 01 6000 - Product Requirements.

B. Epoxy Grout:
   1. W.R. Meadows: EG-96 HP
   2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 RAILINGS - GENERAL REQUIREMENTS

A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of applicable local code.

B. Design railing assembly, wall rails, and attachments to resist the following forces at any point without damage or permanent set as required by OSHA, the Local Building Code and Texas Accessibility Standards. Test in accordance with ASTM E 935.
   1. Handrains and Gaurdrails: 50plf lateral force and a 200lb concentrated lateral force in any direction.
   2. Grab Bars, Shower Seats, and Dressing Room Bench Seats: 250lb concentrated lateral force in any direction.

C. Allow for expansion and contraction of members and building movement without damage to connections or members.

D. Provide non-expansive epoxy grout (mounding up) all around and under each vertical pipe. No gypsum based grout allowed.

E. Handrail Dimensions: See drawings for configurations and heights.
   1. Top Rails and Wall Rails: 1-1/2 inches diameter, round.
   2. Intermediate Rails: 1-1/2 inches diameter, round.
   3. Posts: 1-1/2 inches diameter, round at 4'-0" on center.
   4. Balusters: 3/4 inch diameter, round.

F. Guardrail Dimensions: See drawings for configurations and heights.
   1. Top Rails: 1-1/2 or 2 inches diameter, round. Reference drawing for configuration used.
   2. Intermediate Rails: 1-1/2 inches diameter, round.
   3. Posts: 1-1/2 or 2 inches diameter, round. Reference drawing for configuration used.
      a. 1-1/2" post shall be at 2'-0" on center.
      b. 2" post shall be at 4-0" on center.
   4. Balusters: 3/4 inch diameter, round.

G. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.
   1. For anchorage to concrete, provide inserts to be cast into concrete, for bolting anchors.
   2. For anchorage to masonry, provide brackets to be embedded in masonry, for bolting anchors.
   3. For anchorage to stud walls, provide backing plates, for bolting anchors.
   4. Posts: Provide adjustable flanged brackets.

H. Provide mechanical and welding fittings where indicated to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.

2.03 STEEL RAILING SYSTEM

A. Steel Tube: ASTM A500/A500M Grade B cold-formed structural tubing at interior locations.

B. Steel Pipe: ASTM A 53/A 53M, Grade B Schedule 40, primed for painted finish at interior locations.

C. Steel Pipe: ASTM A 53/A 53M, Grade B Schedule 40, galvanized finish at exterior installation.

D. Brackets and Accessories
   1. For wall mounted handrail brackets for steel handrails provide and install wall brackets equal to J.G. Braun #4591. Provide handrail returns equal to J.G. Braun 1100-1.
   2. For wall mounted handrail brackets for wood handrails provide and install Julius Blum #29 stainless two-piece wall bracket.

3. For exterior wall mounted handrail brackets for steel handrails provide and install galvanized wall brackets equal to J.G. Braun #4591. Provide handrail returns equal to J.G. Braun 1100-1.

E. Welding Fittings: Factory- or shop-welded from matching pipe or tube; seams continuously welded; joints and seams ground smooth.

F. Exposed Fasteners: Flush countersunk screws or bolts; consistent with design of railing.

G. Straight Splice Connectors: Steel concealed spigots.

H. Galvanizing: In accordance with requirements of ASTM A123/A123M.
1. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20 Type I - Inorganic.
2. Provide 'blow holes' in tube for complete galvanized treatment of railings.

I. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.04 FABRICATION

A. Accurately form components to suit specific project conditions and for proper connection to building structure.

B. Fit and shop assemble components in largest practical sizes for delivery to site.

C. Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.

D. Welded Joints:
1. Exterior Components: Continuously seal joined pieces by continuous welds. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.
2. Interior Components: Continuously seal joined pieces by continuous welds.
3. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply items required to be cast into concrete, embedded in masonry, or placed in partitions with setting templates, for installation as work of other sections.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.

C. Anchor railings securely to structure.

D. At each vertical post set in concrete cores, provide non-expansive epoxy grout. No gypsum based grout allowed.

E. Field weld anchors as indicated on drawings. Touch-up welds with primer. Grind welds smooth.

F. Conceal anchor bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.

3.04 TOLERANCES

A. Maximum Variation From Plumb: 1/8 inch per floor level, non-cumulative.

B. Maximum Offset From True Alignment: 1/8 inch.

C. Maximum Out-of-Position: 1/8 inch.

END OF SECTION

SECTION 06 1000
ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Non-structural dimension lumber framing.
B. Structural Composite Lumber
C. Sheathing.
D. Roofing nailers.
E. Roofing cant strips.
F. Preservative treated wood materials.
G. Fire retardant treated wood materials.
H. Miscellaneous framing and sheathing.
I. Concealed wood blocking, nailers, and supports.
J. Miscellaneous wood nailers, furring, and grounds.
K. Cabinet and casework bases.

1.02 RELATED REQUIREMENTS

A. Section 05 1200 - Structural Steel Framing: Prefabricated beams and columns for support of wood framing.
B. Section 05 5000 - Metal Fabrications: Miscellaneous steel connectors and support angles for wood framing.
C. Section 07 2500 - Weather Barriers
D. Section 07 7200 - Roof Accessories: Prefabricated roof curbs.

1.03 REFERENCE STANDARDS

A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
C. ASTM D2898 - Standard Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing; 2010 (Reapproved 2017).
D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023.
E. AWPA U1 - Use Category System: User Specification for Treated Wood; 2022.
F. PS 1 - Structural Plywood; 2019.
G. PS 20 - American Softwood Lumber Standard; 2020.
H. SPIB (GR) - Grading Rules; 2014.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide technical data on insulated sheathing, wood preservative materials, application instructions, and vendor.

C. Structural Composite Lumber: Submit manufacturer's published structural data including span tables, marked to indicate which sizes and grades are being used; if structural composite lumber is being substituted for dimension lumber or timbers, submit grading agency structural tables marked for comparison.

D. Samples: For rough carpentry members that will be exposed to view, submit three samples, 12by12 inch in size illustrating wood grain, color, and general appearance.

E. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.

1.05 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
   1. For lumber and plywood pressure treated with waterborne chemicals, place spacers between each bundle to provide air circulation.
   2. Identify plywood sheathing as to grade, use, span rating and exposure classification by the mark of the APA The Engineered Wood Association.
   3. Use extreme care when off-loading lumber to prevent damage, splitting and breaking of materials. Split or broken plywood sheathing will not be accepted for use in the work of this Section.

B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. Species: Spruce-Pine-Fir (South), unless otherwise indicated.
   2. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
   3. Lumber of other species or grades is acceptable provided structural and appearance characteristics are equivalent to or better than products specified.

2.02 DIMENSION LUMBER

A. Grading Agency: Southern Pine Inspection Bureau, Inc; SPIB (GR).

B. Sizes: Nominal sizes as indicated on drawings, S4S.

C. Moisture Content: 19 percent maximum.

D. Stud Framing (2 by 2 through 2 by 6):
   1. Species: Southern Yellow Pine.
   2. Grade: No. 2.

E. Joist and Rafter Framing (2 by 6 through 4 by 16):
   1. Species: Southern Yellow Pine..
   2. Grade: No. 2.

F. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
   1. Lumber: S4S, No. 2 or Standard Grade, Southern Yellow Pine..
   2. Boards: No. 2 or Standard Grade.

2.03 STRUCTURAL COMPOSITE LUMBER

A. System Description
   1. Design Requirements: Design gate system to withstand Miami/Dade County 110 MPH steady wind and 130 MPH gusting wind tests.

B. Warranties
   1. Furnish manufacturer's 10-year warranty providing coverage against checking, splitting, splintering, rotting, structural damage from termites and fungal decay of composite wood.

C. Materials
   1. Composite Wood:
      a. Reclaimed wood and plastic with integral coloring; free from toxic chemicals and preservatives.

D. Components
   1. Gate System: as detailed on the drawings.
      a. Components:
         1) Pickets
         2) Top and bottom rails.
         3) Bottom rail inserts.
      b. Surface texture: Smooth.
      c. Color: as selected by Architect.

E. Accessories
   1. Fasteners: Galvanized or corrosion-resistant coated steel.
   2. Provide stainless steel where used at fire retardant or pressure treated wood.

F. Manufacturers:
   1. Trex Company: www.trex.com
   2. iLevel by Weyerhaeuser: www.ilevel.com.
   3. Boise Cascade: www.bc.com.
   4. Georgia-Pacific Corp.: www.gp.com.
   5. Substitutions: See Section 01 6000 - Product Requirements.

2.04 EXPOSED BOARDS

A. Submit manufacturer's certificate that products meet or exceed specified requirements, in lieu of grade stamping.

B. Moisture Content: S-dry (19 percent maximum).

C. Surfacing: S4S.

D. Species: Southern Yellow Pine..

E. Grade: No. 2, 2 Common, or Construction.

2.05 CONSTRUCTION PANELS

A. Applications: Thickness as noted on the drawings
   1. Plywood Concealed From View But Located Within Exterior Enclosure: PS 1, C-C Plugged or better, Exterior grade.
   2. Plywood Exposed to View But Not Exposed to Weather: PS 1, A-D, or better.
   3. Other Locations: PS 1, C-D Plugged or better.

2.06 ACCESSORIES

A. Fasteners and Anchors:
   1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, stainless steel for fire retardant treated locations, unfinished steel elsewhere.
   2. Drywall Screws: Bugle head, hardened steel, power driven type, length three times thickness of sheathing.
   3. Anchors: Expansion shield and lag bolt type for anchorage to solid masonry or concrete.

B. Fasteners at Roof Nailers:

1. Wood Substrate: #10 stainless steel flat head screws, length as necessary to penetrate underlying wood support members a minimum of 1 1/4 inch. Each fastener to have a minimum pull out resistance of 100 pounds.
   a. Bent plate for attaching vertical lumber at curbs: 18 gauge galvanized steel (G90) bent plate, fastened with stainless steel pancake head screws.
2. Metal Substrate: No. 12 Factory Mutual approved, fluorocarbon coated roofing screw.
3. Concrete or masonry surfaces: Series 400 stainless steel anchor with expansion shank, length as recommended by manufacturer for minimum 1,000 pound pull-out resistance.
4. Lightweight Fill Substrate: OMG Lite-Deck Fasteners (or approved equivalent) #TSFQ4, minimum length sufficient to provide manufacturer's minimum embedment into substrate for published resistances.
   a. Shank diameter 0.312" minimum, thread diameter of 0.375" minimum.
   b. Fastener shall be coated with a corrosion resistant coating. When subjected to 30 Kesternich cycles (DIN 50018),the fastener must show less than 15% red rust and surpass Factory Mutual Approval Standard 4470.

C. Die-Stamped Connectors: Hot dipped galvanized steel, sized to suit framing conditions.
   1. For contact with preservative treated wood in exposed locations, provide minimum G185 galvanizing complying with ASTM A653/A653M.

D. Joist Hangers: Hot dipped galvanized steel, sized to suit framing conditions.
   1. For contact with preservative treated wood in exposed locations, provide minimum G185 galvanizing complying with ASTM A653/A653M.

E. Water-Resistive Barrier: As specified in Section 07 2500.

2.07 FACTORY WOOD TREATMENT

A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
   1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
   2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

B. Fire Retardant Treatment:
   1. Exterior Type: AWPA U1, Category UCFB, Commodity Specification H, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes both before and after accelerated weathering test performed in accordance with ASTM D2898.
      a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
      b. Treat all exterior rough carpentry items.
      c. Do not use treated wood in direct contact with the ground.
   2. Interior Type A: AWPA U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
      a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
      b. Treat rough carpentry items as indicated .
      c. Do not use treated wood in applications exposed to weather or where the wood may become wet.

C. Preservative Treatment:
   1. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
      a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
      b. Treat lumber exposed to weather.
      c. Treat lumber in contact with roofing, flashing, or waterproofing.
      d. Treat lumber in contact with masonry or concrete.
      e. Treat lumber in other locations as indicated.
   2. Preservative Pressure Treatment of Plywood Above Grade: AWPA U1, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative.
      a. Kiln dry plywood after treatment to maximum moisture content of 19 percent.
      b. Treat plywood in contact with roofing, flashing, or waterproofing.
      c. Treat plywood in contact with masonry or concrete.
      d. Treat plywood in other locations as indicated.
   3. Preservative Pressure Treatment of Lumber in Contact with Soil: AWPA U1, Use Category UC4A, Commodity Specification A using waterborne preservative.
      a. Preservative for Field Application to Cut Surfaces: As recommended by manufacturer of factory treatment chemicals for brush-application in the field.
      b. Restrictions: Do not use lumber or plywood treated with chromated copper arsenate (CCA) in exposed exterior applications subject to leaching.
   4. Copper Azole Type-C (CA-C) with minimum rate of 0.15 PCF.
   5. Micronized Copper Azole Type-C (MCA) with minimum rate of 0.15 PCF.

PART 3 EXECUTION

3.01 PREPARATION

A. Where wood framing bears on cementitious foundations, install full width sill flashing continuous over top of foundation, lap ends of flashing minimum of 4 inches and seal.

B. Install sill gasket under sill plate of framed walls bearing on foundations; puncture gasket cleanly to fit tightly around protruding anchor bolts.

C. Coordinate installation of rough carpentry members specified in other sections.

3.02 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.03 FRAMING INSTALLATION

A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength.

B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.

C. Install structural members full length without splices.

D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes.

E. Install horizontal spanning members with crown edge up and not less than 3 inches of bearing at each end.

F. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.

G. Provide bridging at joists in excess of 8 feet span at mid-span. Fit solid blocking at ends of members.

H. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

3.04 BLOCKING, NAILERS, AND SUPPORTS

A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.

C. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.

D. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.

E. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

F. Provide the following specific non-structural framing and blocking:
1. Cabinets and shelf supports.
2. Wall brackets.
3. Handrails.
4. Grab bars.
5. Towel and bath accessories.
6. Wall-mounted door stops.
7. Chalkboards and marker boards.
8. Wall paneling and trim.
9. Joints of rigid wall coverings that occur between studs.
10. Metal shelving.
11. Television brackets.
12. Tackboards.
13. Toilet partitions.
14. Urinal screens.
15. Any items that secure/fasten to drywall, including MEP items (panels etc.)

G. All cabinet bases to be constructed with treated dimensional lumber.

3.05 ROOF-RELATED CARPENTRY

A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.

B. Provide wood curb at all roof openings except where prefabricated curbs are specified and where specifically indicated otherwise. Form corners by alternating lapping side members.
1. Install new wood where indicated to provide total height of a minimum of 12 inches above the finished roof surface, allowing for height of insulation system, crickets, and coverboard, as applicable.
2. Fasten securely to substrate.
3. Treat surfaces exposed by cutting as recommended by preservative manufacturer.
4. Fasten wood curb to nailer prior to installation with appropriate wood nailer fastener on 12-inch centers.

C. Secure all roof nailers at copings and edges with two staggered rows of fasteners, spaced 12" o.c. maximum at wood or light gauge steel substrates, and 24" o.c. maximum at concrete, grouted masonry, or structural steel substrates.

3.06 INSTALLATION OF CONSTRUCTION PANELS

A. General: Comply with applicable recommendations contained in APA Form No. E30, "APA Design/Construction Guide: Residential & Commercial," for types of structural-use panels and applications indicated.
   1. Comply with "Code Plus" provisions of above-referenced guide.

B. Comply with system manufacturer's written instructions for installing plywood.
   1. Install plywood sheathing continuously, with the strength of the axis of the panel across supports. Plywood sheathing shall be installed with offset joints. Butt end joints over supports, providing a space of 1/16" at panel ends and 1/8" at panel edges.
   2. Fasten each layer of plywood sheathing using #13-14 Dekfast screws with Phillips drive truss heads in a noncorrosive base material in sufficient length to penetrate the metal decking by 1/2". Use a screw pattern of 6" spacing along exterior edges and a 12" interior grid pattern per UL90 class 580 uplift. Provide a minimum of 32 fasteners per sheet. Plywood shall be fastened as an independent system for the insulation. Where drawings indicate multiple layers of plywood, stagger second layer in both directions from pattern below. At curved roof structures, plywood shall conform to the radius of the structure.
   3. Within 40 feet in any direction of any 4-hour firewall, install fire-retardant treated plywood sheathing.
   4. Provide metal clip supports between sheets at center spans unless tongue and groove plywood sheathing is used.
   5. Cover plywood sheathing as soon as possible with specified underlayment for protection against excessive moisture prior to roofing application.
   6. Do not install plywood sheathing in adverse weather conditions. Plywood sheathing may be rejected by the Architect, whether or not it has been installed, for excessive warp, twist, crook, mildew, fungus, or mold as well as for improper curing and firming prior to installation. Wet or damaged plywood sheathing will be rejected.

3.07 SITE APPLIED WOOD TREATMENT

A. Apply preservative treatment compatible with factory applied treatment at site-sawn cuts, complying with manufacturer's instructions.

B. Allow preservative to dry prior to erecting members.

3.08 TOLERANCES

A. Framing Members: 1/8 inch from true position, maximum.

B. Surface Flatness of Floor: 1/8 inch in 10 feet maximum, and 3/8 inch in 30 feet maximum.

C. Variation from Plane (Other than Floors): 1/8 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.09 CLEANING

A. Waste Disposal: Comply with the requirements of Section 01 7000.
   1. Comply with applicable regulations.
   2. Do not burn scrap on project site.

B. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

SECTION 06 2000
FINISH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Finish carpentry items.

1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Support framing, grounds, and concealed blocking.

B. Section 08 1416 - Flush Wood Doors.

C. Section 09 9000 - Painting and Coating: Painting and finishing of finish carpentry items.

1.03 REFERENCE STANDARDS

A. ANSI A135.4 - Basic Hardboard; 2012 (Reaffirmed 2020).

B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).

C. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 4.0; 2021.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.

B. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data:
   1. Provide data on fire retardant treatment materials and application instructions.
   2. Provide instructions for finish hardware.

C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
   1. Scale of Drawings: 1-1/2 inch to 1 foot, minimum.
   2. Provide information as required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).

D. Samples: Submit two samples of finish plywood, 6 by 6 inch in size illustrating wood grain and specified finish.

E. Samples: Submit two samples of wood trim 6 inches long.

1.06 QUALITY ASSURANCE

A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.
   1. Company with at least one project within the past 5 years with value of woodwork within 20 percent of cost of woodwork for this project.
   2. Single Source Responsibility: Provide and install this work from single fabricator.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver factory-fabricated units to project site in original packages, containers or bundles bearing brand name and identification.

B. Store finish carpentry items under cover, elevated above grade, and in a dry, well-ventilated area not exposed to heat or sunlight.

C. Protect from moisture damage.

D. Handle materials and products to prevent damage to edges, ends, or surfaces.

PART 2 PRODUCTS

2.01 FINISH CARPENTRY ITEMS

A. Quality Standard: Premium Grade, in accordance with the latest edition of the AWI/AWMAC/WI (AWS), unless noted otherwise.

B. Surface Burning Characteristics: Provide materials having fire and smoke properties as required by applicable code. Particleboard is not acceptable.

C. Interior Woodwork Items:
   1. Moldings, Bases, Casings, and Miscellaneous Trim: As detailed on the drawings.

2.02 LUMBER MATERIALS

A. Hardwood Lumber: As noted on the drawings, with a maximum moisture content of 6 percent, of quality suitable for transparent finish.

2.03 SHEET MATERIALS

A. Hardwood Plywood: Face species as indicated, plain sawn, book matched, veneer core, glue type as recommended for application.

B. Hardboard: ANSI A135.4; Pressed wood fiber with resin binder, Class 1 - Tempered, 1/4 inch thick, smooth one side (S1S).

C. Pegboard: Pressed wood fiber with resin binder, standard grade; 1/4 inch thick, with holes spaced at 1 inch on center in both directions.

2.04 FASTENINGS

A. Adhesive for Purposes Other Than Laminate Installation: Suitable for the purpose; not containing formaldehyde or other volatile organic compounds.

B. Fastening:
   1. Install items straight, true, level, plumb, and firmly anchored in place.
   2. Where blocking or backing is required, coordinate as necessary with other trades to ensure placement of required backing and blocking in a timely manner.
   3. Nail trim with finish nails of proper dimension to hold the member firmly in place without splitting the wood.
   4. Nail exterior trim with galvanized nails, making joints to exclude water and setting in waterproof glue or the sealant described in Section 07 9200 - Joint Sealants of these Specifications.

2.05 FINISHING

A. Sand work smooth and set exposed nails and screws.

B. Apply wood filler in exposed nail and screw indentations.

C. On items to receive transparent finishes, use wood filler that matches surrounding surfaces and is of type recommended for the applicable finish.

D. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and Section 09 9000-Painting and Coating.

E. Back prime woodwork items to be field finished, prior to installation.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify adequacy of backing and support framing.

B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.02 INSTALLATION

A. Install work in accordance with the latest edition of the AWI/AWMAC/WI (AWS) requirements for grade indicated.

B. Set and secure materials and components in place, plumb and level.

C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.

D. Install components with nails at 8 inch on center.

3.03 PREPARATION FOR SITE FINISHING

A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.

B. Site Finishing: See Section 09 9000.

C. Before installation, prime paint surfaces of items or assemblies to be in contact with cementitious materials.

3.04 TOLERANCES

A. Maximum Variation from True Position: 1/16 inch.

B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

END OF SECTION

SECTION 06 8316
FIBERGLASS REINFORCED PANELING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fiberglass reinforced plastic panels.

B. Trim.

1.02 REFERENCE STANDARDS

A. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics; 2010 (Reapproved 2018).

B. ASTM D2583 - Standard Test Method for Indentation Hardness of Rigid Plastics by Means of Barcol Impressor; 2013a.

C. ASTM D5319 - Standard Specification for Glass-Fiber Reinforced Polyester Wall and Ceiling Panels; 2017.

D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023.

E. FM 4880 - Approval Standard for Class 1 Fire Rating of Building Panrels or Interior Finish Materials; 2015.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.

C. Samples: Submit two samples 8 by 10 inch in size illustrating material and surface design of panels.

D. Submit Material Safety Data Sheets for the following items:
   1. All mastics, glues and adhesives
   2. Sealant (interior use only)

1.04 DELIVERY, STORAGE, AND HANDLING

A. Store panels flat, indoors, on a clean, dry surface. Remove packaging and allow panels to acclimate to room temperature for 48 hours prior to installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Fiberglass Reinforced Plastic Panels:
   1. Crane Composites, Inc: www.cranecomposites.com/#sle.
   2. Marlite, Inc: www.marlite.com/#sle.
   3. Nudo Products, Inc: www.nudo.com/#sle.
   4. Panolam Industries International, Inc: www.panolam.com/#sle.
   5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PANEL SYSTEMS

A. Wall Panels at drywall partitions behind service sinks:
   1. Panel Size: 4 by 8 feet.
   2. Panel Thickness: 0.075 inch.
   3. Surface Design: Smooth.
   4. Color: White.
   5. Attachment Method: Adhesive only, with trim and sealant in joints.

2.03 MATERIALS

A. Panels: Fiberglass reinforced plastic (FRP), complying with ASTM D5319.
   1. Surface Burning Characteristics: Maximum flame spread index of 25 and smoke developed index of 450; when system tested in accordance with ASTM E84.
   2. Class 1 fire rated when tested in accordance with FM 4880.
   3. Scratch Resistance: Barcol hardness score greater than 50, when tested in accordance with ASTM D2583.
   4. Impact Strength: Greater than 6 ft lb force per inch, when tested in accordance with ASTM D256.

B. Trim: Vinyl; color coordinating with panel.

C. Adhesive: Type recommended by panel manufacturer.

D. Sealant: Type recommended by panel manufacturer; white.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions and substrate flatness before starting work.

B. Verify that substrate conditions are ready to receive the work of this section.

3.02 INSTALLATION - WALLS

A. Install panels in accordance with manufacturer's instructions.

B. Cut and drill panels with carbide tipped saw blades, drill bits, or snips.

C. Apply adhesive to the back side of the panel using trowel as recommended by adhesive manufacturer.

D. Apply panels to wall with seams plumb and pattern aligned with adjoining panels.

E. Install panels with manufacturer's recommended gap for panel field and corner joints.

F. Place trim on panel before fastening edges, as required.

G. Fill channels in trim with sealant before attaching to panel.

H. Install trim with adhesive and screws or nails, as required.

I. Seal gaps at floor, ceiling, and between panels with applicable sealant to prevent moisture intrusion.

J. Remove excess sealant after paneling is installed and prior to curing.

END OF SECTION

SECTION 07 1300
SHEET WATERPROOFING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Installation of blindside and pre-applied sheet waterproofing systems at locations as indicated on drawings.

1.02 RELATED SECTIONS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Section 033000 – Cast-In-Place Concrete

1.03 REFERENCES

A. Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method

1.04 SUBMITTALS

A. General: Submit in accordance with Section 01 3000.

B. Product Data: Submit manufacturer's product literature and installation instructions for each material specified.
   1. Include material descriptions and tested physical and performance properties of waterproofing.
   2. Include project-specific construction details and shop drawings showing transitions to adjacent construction materials, including, but not limited to: pre-applied membrane to post-applied membrane and post-applied membrane to underslab vapor retarder.
   3. Include manufacturer’s written instructions for evaluating, preparing and treating substrate.

C. Subcontractor’s approval by Manufacturer: Submit document stating manufacturer's acceptance of subcontractor as an Approved Applicator for the specified materials.

D. Submit list of proposed project personnel, including Subcontractor’s Project Manager, Supervisor, and Foreman, with a list of completed waterproofing projects for each. Indicate date of each project with a general description of the type of waterproofing installed and the facility size and use.

E. Warranty: Submit a sample warranty identifying the terms and conditions stated in Section 1.7.

1.05 QUALITY ASSURANCE

A. Applicator Qualifications:
   1. Applicator shall be experienced in applying the same or similar materials and shall be specifically approved in writing by the membrane system manufacturer for a minimum of five (5) years prior to the bid date.
   2. Applicator shall provide a full time supervisor at all times that the work of this Section is in progress. Supervisor shall have a minimum of three (3) years of successful project experience supervising projects of similar materials and scope, and shall be an employee of the Applicator.

B. Pre-Application Conference:
   1. Prior to beginning work, Contractor shall convene a conference to review project conditions with Owner, Architect, Waterproofing Consultant, Manufacturer's Representative, Concrete Subcontractor, and any other affected trades.
   2. Agenda will include discussion of:

a. Review waterproofing requirements including surface preparation, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, testing and inspection procedures, quality assurance documentation, protection and repairs, schedules, and coordination with other work.

C. NOTE: If additional site visits are required by Architect's Consultant as a result of noncompliant waterproofing system installation, these shall be provided at Contractor's expense.

1.06 WARRANTY

A. Installer's Warranty: Two (2) Years, from date of completion and acceptance of the work required by this section, agreeing to promptly replace or otherwise repair defective waterproofing materials.

B. Manufacturer's Warranty: Upon completion and acceptance of the work required by this section, the manufacturer will issue a ten (10) year materials warranty, agreeing to promptly replace or otherwise repair defective materials.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to project site in original, factory-sealed, unopened containers bearing manufacturer's name and label intact and legible with following information.
1. Name of material.
2. Manufacturer's stock number and date of manufacture.
3. Material safety data sheet.

B. Store materials in protected and well-ventilated area, within the manufacturer's acceptable range of temperatures.

1.08 PROJECT CONDITIONS

A. Do not apply membrane if temperature is less than 40 degrees F (unless approved by membrane manufacturer), if precipitation is imminent, or the surface is wet or has frost.

B. Coordinate waterproofing work with other trades to ensure adequate illumination, ventilation, and dust-free environment during application and curing of membrane. The applicator shall have sole right of access to the specified areas for the time needed to complete the application and allow the membrane to cure adequately.

C. Coordination between various trades is essential to avoid unnecessary damage to the membrane.

D. Protect adjoining surfaces not to be coated against damage or soiling. Protect plants, vegetation and animals which might be affected by waterproofing operations.

E. Applicator shall provide applicable protective clothing and respiratory protection gear.

F. Maintain work area in a neat and orderly condition, removing empty containers, rags, and rubbish daily from the site.

PART 2 - PRODUCTS

2.01 MATERIALS, GENERAL

A. Source Limitations for Waterproofing System: Obtain waterproofing materials and protection/drainage panels from single source from single source manufacturer.

2.02 BLINDSIDE (PRE-APPLIED) WATERPROOFING SYSTEMS

A. CCW-MiraPLY-H by Carlisle Coatings and Waterproofing

B. Pre-Prufe 300R Plus by GCP Applied Technologies

C. TREMproof Amphibia by Tremco Commercial Sealants and Waterproofing

D. Approved pre-bid equivalent. Substitutions after bid date will not be considered.

2.03 POST-APPLIED SHEET MEMEBRANE WATERPROOFING SYSTEMS

A. CCW-MiraDRI 860/861 by Carlisle Coatings and Waterproofing

B. Bituthene 4000 by GCP Applied Technologies

C. TREMproof 560 by Tremco Commercial Sealants and Waterproofing

D. Approved pre-bid equivalent. Substitutions after bid date will not be considered.

2.04 ACCESSORY PRODUCTS

A. Provide the following accessories, supplied by and recommended by waterproofing membrane manufacturer.
   1. Seam Tape and detailing tapes
   2. Primers: suitable for substrate encountered and membrane specified, as recommended by waterproofing membrane manufacturer.
   3. Surface Conditioner: liquid, waterborne surface conditioner as recommended by waterproofing membrane manufacturer.
   4. Termination, Detail, Lap, and Membrane Sealants by waterproofing membrane manufacturer.
   5. Liquid Membrane: Elastomeric, two-component liquid, cold fluid applied, of trowel grade or low viscosity.
   6. Reinforcing Fabric.
   7. Termination Bar: 1” stainless steel or aluminum termination bar, holes pre-punched at six inches maximum on center.
   8. Waterstop: Self-adhering butyl rubber/bentonite joint compound, CCW Mirastop, GCP Adcor ES, Tremco Superstop, or equivalent, provided by waterproofing system manufacturer. Basis of design: Synko-Flex waterstop by Henry.
   9. Protection/Drainage Composite Course: waterproofing manufacturer’s geo-textile-faced, molded sheet drainage panel and protection board for vertical surfaces, as recommended by the manufacturer.
   10. Cleaner: Manufacturer’s standard membrane cleaner.
   11. Reinforcing Membrane/Flashing provided by manufacturer.

PART 3 - EXECUTION

3.01 WATERSTOP INSTALLATION

A. Prior to installing any concrete components creating a discontinuity at surfaces to receive waterproofing, provide installation of waterstop at horizontal member, in accordance with manufacturer requirements.

3.02 INSPECTION – GENERAL

A. Before any waterproofing work is started the waterproofing applicator shall thoroughly examine all surfaces for any deficiencies. Should any deficiencies exist, the architect, owner, or general contractor shall be notified in writing and corrections made prior to membrane installation.

B. All work shall be performed in accordance with manufacturer application instructions.

3.03 INSPECTION FOR BLINDSIDE WATERPROOFING

A. Verify that the compacted subgrade is dry, smooth, sound, and ready to receive waterproofing sheet.
   1. The substrate must be relatively even without noticeable high spots or depressions, relatively smooth, free of protrusions, debris, sharp edges or foreign materials and must be free of accumulated water, ice and snow.
   2. Gaps or voids greater than 2 inches in lagging or excavated substrate shall be filled with non-shrink grout prior to proceeding with waterproofing installation.

3.04 INSPECTION FOR POST-APPLIED SHEET MEMBRANE WATERPROOFING

A. Verify that concrete has cured and aged for minimum time period recommended in writing by waterproofing manufacturer.

B. Verify that substrate is visibly dry and within the moisture limits recommended in writing by manufacturer.

3.05 BLINDSIDE WATERPROOFING INSTALLATION

A. Install membrane in full accordance with manufacturer installation requirements and recommendations, except where more stringent requirements are provided in the Drawings and/or Specifications.

B. Apply the blindside membrane with bonding surface of the membrane facing inward toward area where the concrete will be poured. Fasten top edge of membrane to formwork as needed. Location and spacing of fasteners shall be per manufacturer requirements.

C. Carefully position successive sheets to overlap the previous sheet by 3 in. minimum along the lap line, or the minimum lap required by the manufacturer if greater than 3 inches. Ensure the product lays flat with no openings.
   1. End laps must be staggered and installed shingle fashion toward the exterior side of the membrane.
   2. Surface of lap area shall be cleaned per manufacturer’s instructions prior to adhesion of materials.

D. Remove release liner (if present) on the lap edge of the sheet and mate the two sheets together. Lap area shall be rolled with firm hand pressure.

E. After full installation completely remove the plastic liner (if present) prior to concrete placement. Within 24 hours of concrete pour, reinspect waterproofing membrane surface for debris and damage.
   1. Remove dust and other materials observed, by using pressurized air or water as required to provide a clean membrane system, in full accordance with manufacturer’s requirements.
   2. Repair all damage observed immediately and in full accordance with manufacturer’s requirements.
   3. Do not pour concrete in areas where membrane is damaged or where laps are not fully sealed. Do not pour concrete in areas that have not been inspected by Engineer.

3.06 SURFACE PREPARATION FOR POST-APPLIED SHEET MEMBRANE WATERPROOFING

A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.

B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.

C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids.

E. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks.
   1. Install sheet strips of width according to manufacturer's written instructions and center over treated construction and contraction joints and cracks exceeding a width of 1/16 inch (1.6 mm).

F. Bridge and cover isolation joints, expansion joints, and discontinuous deck-to-wall and deck-to-deck joints with overlapping sheet strips of widths according to manufacturer's written instructions.

1. Invert and loosely lay first sheet strip over center of joint. Firmly adhere second sheet strip to first and overlap to substrate.

G. Corners: Prepare, prime, and treat inside and outside corners:
   1. Install membrane strips centered over vertical inside corners. Install 3/4-inch (19-mm) fillets of liquid membrane on horizontal inside corners and as follows:
      a. At footing-to-wall intersections, extend liquid membrane in each direction from corner or install membrane strip centered over corner.

H. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through waterproofing and at drains and protrusions.

3.07 POST-APPLIED SHEET MEMBRANE WATERPROOFING INSTALLATION

A. Install membrane in full accordance with manufacturer installation requirements and recommendations, except where more stringent requirements are provided in the Drawings and/or Specifications.

B. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by sheet waterproofing in same day. Reprime areas exposed for more than 24 hours.

C. Apply and firmly adhere sheets over area to receive waterproofing. Accurately align sheets and maintain uniform 2-1/2-inch- (64-mm-) minimum lap widths and end laps. Overlap and seal seams, and stagger end laps to ensure watertight installation.
   1. When ambient and substrate temperatures range between 25 and 40 deg F (minus 4 and plus 5 deg C), install self-adhering, modified bituminous sheets produced for low-temperature application. Do not use low-temperature sheets if ambient or substrate temperature is higher than 60 deg F (16 deg C).

D. Apply continuous sheets over already-installed sheet strips, bridging substrate cracks, construction, and contraction joints.

E. Seal edges of sheet-waterproofing terminations with mastic.

F. Install sheet-waterproofing and auxiliary materials to tie into adjacent waterproofing and vapor barrier per manufacturers' recommendations and approved Shop Drawings.

G. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Slit and flatten fishmouths and blisters. Patch with sheet waterproofing extending 6 inches (150 mm) beyond repaired areas in all directions.

H. Install protection/drainage composite after waterproofing installation has been observed by Waterproofing Consultant.

3.08 MOLDED-SHEET DRAINAGE PANEL INSTALLATION

A. Place and secure molded-sheet drainage panels, with geotextile facing away from wall or deck substrate, according to manufacturer's written instructions. Use adhesives or other methods that do not penetrate waterproofing. Lap edges and ends of geotextile to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction.

3.09 PROTECTION, REPAIR, AND CLEANING

A. Protect waterproofing from damage and wear during remainder of construction period.

B. Protect installed materials from damage due to UV light, harmful weather exposures, physical abuse, and other causes.

C. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.

D. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION

SECTION 07 2100
THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Board insulation at masonry exterior wall behind masonry veneer, MCM and metal panel wall finish.

B. Batt insulation in exterior wall construction.

C. Semi-Rigid Board/Blanket insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

D. Acoustical batt insulation for interior walls and above ceilings.

E. Mineral wool insulation for fire safing.

1.02 RELATED REQUIREMENTS

A. Section 07 2200 - Roof and Deck Insulation: Insulation specified as part of roofing system.

B. Section 07 8400 - Firestopping: Insulation as part of fire-rated through-penetration assemblies.

C. Section 09 2982 – Gypsum Board.

D. Section 09 5100 – Acoustical Ceilings.

1.03 REFERENCE STANDARDS

A. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2013 (Reapproved 2019).

B. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2014 (Reapproved 2019).

C. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2017.

D. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2023.

E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023.

F. ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C; 2019a.

G. BIA - The Brick Industry Association; Tech Note on Brick Construction, 28B Revised II.

H. ICC (IECC) - International Energy Conservation Code 2015.

I. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components; 2019.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements. Provide documentation that proposed insulation has been successfully tested per NFPA 285 with each specific exterior wall assembly for the project. Provide documentation of required detailing for proposed insulation board at openings in the exterior walls to comply with NFPA 285 requirements.

D. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

E. Closeout Submittals:
   1. Submit under provisions of Section 01 7800 – Closeout Submittals
   2. Submit Material Safety Data Sheets under provisions of Section 01 7800 – Closeout Procedures for the following items:
      a. All mastics, glues, and adhesives.
      b. Thermal insulation (excluding fiberglass, foam, rubber).

1.05 FIELD CONDITIONS

A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 PRODUCTS

2.01 FOAM BOARD INSULATION MATERIALS

A. Polyisocyanurate (ISO) Board Insulation with Facers Both Sides, installed on masonry wall, behind MCM or metal wall panels where indicated: Rigid cellular foam, complying with ASTM C1289; Type I, aluminum foil both faces; Class 1 or 2.
   1. Classifications:
      a. Type I: Faced with aluminum foil on both major surfaces of core foam.
         1) Class 1 or Class 2 - Glass fiber reinforced or non-reinforced core foam.
   2. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
   3. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
   4. Complies with fire resistance requirements indicated on drawings as part of an exterior non-load-bearing exterior wall assembly when tested in accordance with NFPA 285.
   5. Compressive Strength: 25 psi at vertical locations.
   6. Board Size: 48 by 96 inch, cut to fit locations indicated. Thickness as noted on the drawings.
   7. Thermal Resistance: R-value of 6.0 per inch, minimum.
   8. Board Edges: As tested to be in compliance with NFPA 285.
   9. Manufacturers:
      a. Atlas Roofing Corporation: www.atlasroofing.com/sle.
      b. Carlisle Coatings & Waterproofing, Inc: www.carlisleccw.com/sle.
      c. Dow Chemical Company: www.dow.com/sle.
      d. Firestone Building Products: www.firestonebpco.com.
      e. GAF: www.gaf.com/sle.
      f. Hunter Panels, LLC: www.hunterxci.com.
      g. Johns Manville: www.jm.com/sle.
      h. Ox Engineered Products: www.oxengineeredproducts.com/#sle.
      i. Rmax Inc: www.rmax.com.
      j. Substitutions: See Section 01 6000 - Product Requirements.

2.02 FIBERBOARD INSULATION MATERIALS

A. Glass Fiber Semi-Rigid Board/Blanket Insulation: Low density board, in accordance with ASTM C553, Type III.
   1. Provide in shim spaces, crevices in exterior wall/roof and expansion joints as detailed on the drawings.
   2. Facing: None, unfaced.
   3. Flame Spread Index: 25 or less, when tested with facing, if any, in accordance with ASTM E84.
   4. Smoke Developed Index: 50 or less, when tested with facing, if any, in accordance with ASTM E84.
   5. Board Size: 24 by 48 inch.
   6. Board Thickness: 1 inch.

7. Board Edges: Square.
8. Maximum Density: 1.6 pounds per cubic foot, nominal.
9. Manufacturers:
    a. CertainTeed Corporation: www.certainteed.com.
    b. Johns Manville: www.jm.com.
    c. Knauf Insulation: www.knaufnorthamerica.com
    d. Owens Corning Corporation: www.ocbuildingspec.com.
    e. Substitutions: See Section 01 6000 - Product Requirements.

2.03 BATT INSULATION MATERIALS

A. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C665; friction fit.
    1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
    2. Smoke Developed Index: 50 or less, when tested in accordance with ASTM E84.
    3. Combustibility: Non-combustible, when tested in accordance with ASTM E136.
    4. Formaldehyde Content: Zero.
    5. Thermal Resistance: R-value of 11.0 at 3.5" and 19.0 at 6".
    6. Facing: Unfaced.
    7. Manufacturers:
        a. CertainTeed Corporation: www.certainteed.com.
        b. Johns Manville: www.jm.com.
        c. Knauf Insulation: www.knaufnorthamerica.com
        d. Owens Corning Corporation: www.ocbuildingspec.com/sle.
        e. Substitutions: See Section 01 6000 - Product Requirements.

B. Acoustical Batt Insulation:
    1. Provide sound attenuation batts within interior walls and above ceilings, where indicated.
    2. Glass fiber composition, unfaced.
        a. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
        b. Smoke Developed Index: 50 or less, when tested in accordance with ASTM E84.
        c. Thickness: 3.5 or 6 inch, nominal for given location.
        d. Facing: Unfaced.
    3. Manufacturers:
        a. CertainTeed Corporation: www.certainteed.com.
        b. Johns Manville: www.jm.com.
        c. Knauf Insulation: www.knaufnorthamerica.com.
        d. Owens Corning Corporation: www.ocbuildingspec.com.
        e. Substitutions: See Section 01 6000 - Product Requirements.

2.04 FIRE SAFING INSULATION

A. Mineral Fiber Batt Insulation (Mineral Wool): Flexible or semi-rigid preformed batt or blanket, complying with ASTM C665; friction fit; unfaced flame spread index of 0 (zero) when tested in accordance with ASTM E84.
    1. Smoke Developed Index: 0 (zero), when tested in accordance with ASTM E84.
    2. Where indicated or required, provide as fire safing of through penetrations, joint systems and perimeter containment in rated assemblies.
    3. Size and Density: As required to prevent passage of fire between floors or through walls for rating stated.
    4. Manufacturers:
        a. Johns Manville: www.jm.com/#sle.
        b. ROCKWOOL (ROXUL, Inc): www.rockwool.com/#sle.
        c. Thermafiber, Inc: www.thermafiber.com/#sle.
        d. Substitutions: See Section 01 6000 - Product Requirements.

2.05 ACCESSORIES

A. Air Barrier Sheet or Air Barrier Coating: See Section 07 2500.

B. Nails or Staples: Steel wire; electroplated or galvanized; type and size to suit application, prohibited for use with foam or high density rigid mineral fiber insulation boards.

C. Insulation Pins: Insulation manufacturer's standard stainless steel pins with perforated plates, intended for installation in adhesive.

D. Adhesive: Type recommended by insulation manufacturer for application.
   1. Adhesives used to attach exterior insulation to air barrier shall be approved by air barrier manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.

B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.02 BOARD INSTALLATION AT EXTERIOR WALLS

A. Install Iboard insulation on masonry walls, behind MCM or Metal Wall Panels in accordance with fire resistance requirements shown on the drawings and as part of an exterior non-load-bearing exterior wall assembly when tested in accordance with NFPA 285.
   1. Protect edges at door and window openings or other penetrations as tested in accordance with NFPA 285.
   2. Blind fastening of insulation through the air/weather barrier is prohibited. Securement of installation boards shall be provided with adhesives or furring installed at the air/weather barrier surface prior to installation of boards.

B. Install boards horizontally on walls.
   1. Place boards to maximize adhesive contact.
   2. Butt edges and ends tightly to adjacent boards and protrusions. Stagger board joints.
   3. Do not alter brick ties.

C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

D. Do not alter brick ties when installing rigid insulation.

3.03 BATT INSTALLATION

A. Install insulation in accordance with manufacturer's instructions.

B. Install in exterior wall spaces without gaps or voids. Do not compress insulation.

C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

E. Wall Sound Insulation: Install Insulation in all metal stud walls unless noted otherwise. Where wall continue to deck, provide sound insulation full height of wall.

F. Ceilling Sound Insulation: Install above the entirety of all offices, restrooms, and workrooms and any other areas defined on the drawings.

G. Coordinate work of this section with construction of air barrier seal specified in Section 07 2500.

3.04 PROTECTION

A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 07 2119
FOAMED-IN-PLACE INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Foamed-in-place insulation.
   1. On underside of structure in crawl space.

1.02 REFERENCE STANDARDS

A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2021.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023.

C. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials; 2013.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week prior to commencing work of this section.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide product description, insulation properties, overcoat properties, and preparation requirements.

C. Certificates: Certify that products of this section meet or exceed specified requirements.

D. Manufacturer's Installation Instructions: Indicate special procedures, and perimeter conditions requiring special attention.

1.05 QUALITY ASSURANCE

A. Provide insulation produced by a single and approved manufacturer.

B. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with not less than five years of documented experience.

C. Applicator Qualifications: Company specializing in performing work of the type specified, with minimum five years of documented experience.

1.06 MOCK-UPS

A. Locate where directed.

B. Accepted mock-up may remain as part of the Work.

1.07 FIELD CONDITIONS

A. Do not apply foam when temperature is below that specified by the manufacturer for ambient air and substrate.

B. Do not apply foam when temperature is within 5 degrees F of dew point.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Foamed-In-Place Insulation: On underside of structure and crawl space;
   1. Carlisle Spray Foam Insulation: www.carlislesfi.com/#sle.
   2. Henry Company: www.henry.com/#sle.
   3. Huntsman Building Solutions: www.huntsmanbuildingsolutions.com/#sle.
   4. Johns Manville: www.jm.com/#sle.
   5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MATERIALS

A. Foamed-In-Place Insulation: On underside of structure in crawl space, provide Low-density, flexible, open celled, water vapor permeable polyurethane foam; foamed on-site, using blowing agent of water or non-ozone-depleting gas.
   1. Regulatory Requirements: Comply with applicable code for flame and smoke, concealment, and fire protection requirements.
   2. Thermal Resistance: R-value of 3.7, minimum, per 1 inch thickness at 75 degrees F mean temperature when tested in accordance with ASTM C518.
   3. Air Permeance: 0.04 cfm per square foot, maximum, when tested at intended thickness in accordance with ASTM E2178 at 1.57 psf.
   4. Surface Burning Characteristics: Flame spread/smoke developed index of 25/450, maximum, when tested in accordance with ASTM E84.
   5. Basis of Design:
      a. Huntsman Building Solutions; Classic Ultra Select: www.huntsmanbuildingsolutions.com/#sle.

2.03 ACCESSORIES

A. Primer: As required by insulation manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify work within construction spaces or crevices is complete before insulation application.

B. Verify that surfaces are clean, dry, and free of matter that may inhibit insulation adhesion.

3.02 PREPARATION

A. Mask and protect adjacent surfaces from over spray or dusting.

B. Apply primer in accordance with manufacturer's instructions.

3.03 APPLICATION

A. Apply insulation in accordance with manufacturer's instructions.

B. Apply insulation by spray method, to a uniform monolithic density without voids.

C. Patch damaged areas.

D. Where applied to voids and gaps assure space for expansion to avoid pressure on adjacent materials that may bind operable parts.

E. Trim excess away for applied trim or remove as required for continuous sealant bead.

3.04 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements for additional requirements.

B. Field inspections will be performed by an independent testing agency under provisions of Section 01 4000 - Quality Requirements.

C. Inspection will include verification of insulation thickness and density.

3.05 PROTECTION

A. Do not permit subsequent construction work to disturb applied insulation.

END OF SECTION

SECTION 07 2500
WEATHER BARRIERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Air Barriers: Materials that form a system to stop passage of air through exterior walls, joints between exterior walls and roof, joints around frames of openings in exterior walls, and joints at base of wall.

B. Membrane Through Wall Flashings: Self-adhered membrane flashings that comprise part of the air barrier system, intended by the air barrier manufacturer for use in masonry veneer wall construction.

1.02 RELATED REQUIREMENTS

A. Section 03 1119 - Insulating Concrete Forming

B. Section 04 2000 - Unit Masonry: Coordination of through wall flashing and masonry ties.

C. Section 07 6200 - Sheet Metal Flashing and Trim: Metal flashings installed in conjunction with weather barriers.

D. Section 07 9200 - Joint Sealants: Sealing building expansion joints.

1.03 DEFINITIONS

A. Weather Barrier: Assemblies that form either water-resistive barriers, air barriers, or vapor retarders.

B. Air Barrier: Air tight barrier made of material that is relatively air impermeable but water vapor permeable, both to the degree specified, with sealed seams and with sealed joints to adjacent surfaces. Note: For the purposes of this specification, vapor impermeable air barriers are classified as vapor retarders.

1.04 REFERENCE STANDARDS

A. ASTM C297/C297M - Standard Test Method for Flatwise Tensile Strength of Sandwich Constructions; 2016.

B. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2017.

C. ASTM D4541 - Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers; 2017.

D. ASTM E2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies; 2017.

E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023.

F. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2022a, with Editorial Revision (2023).

G. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials; 2013.

H. ICC-ES AC212 - Acceptance Criteria for Water-Resistive Coatings Used as Water-Resistive Barriers over Exterior Sheathing; 2015.

I. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components; 2019.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work. Preinstallation conference shall include the Owner, Architect, General Contractor, Manufacturer's Representative and Applicator. Agenda for meeting shall include but not be limited to the following:
   1. Review of submittals.
   2. Review of surface preparation, minimum curing period and installation procedures.
   3. Review of special details and flashings.
   4. Sequence of construction, responsibilities and schedule for subsequent operations.
   5. Review of mock-up requirements.
   6. Review of inspection, testing, protection and repair procedures.

B. Coordination of trades
   1. The Architect, General Contractor and Applicator shall evaluate adjacent materials such as windows, doors, etc. for conformance to project details. Adjacent trades shall provide scaled shop drawings for review by the Architect.
   2. The General Contractor shall make provision for installation of air seals between the primary air barrier and other wall components (penetrations, etc.) in order to maintain continuity of an air barrier system.
   3. The Applicator shall provide protection of rough openings before installing windows, doors, and other penetrations through the wall.

1.06 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on material characteristics, performance criteria, and limitations.

C. Shop Drawings: Provide drawings of special joint conditions.

D. Manufacturer's Installation Instructions: Indicate preparation, installation methods, and storage and handling criteria.

E. Air/water-resistive barrier membrane manufacturer shall provide an ICC-ES Evaluation Report confirming compliance with AC212 Acceptance Criteria for Water-Resistive Coatings used as Water-Resistive Barriers over Exterior Sheathing or Masonry or ICF.

F. ABAA Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.

G. ABAA Installer Qualification: Submit documentation of current contractor accreditation and current installer certification; keep copies of each contractor accreditation and installer certification on site during and after installation, and present on-site documentation upon request.

1.07 QUALITY ASSURANCE

A. Air Barrier Association of America (ABAA) Evaluated Materials Program; www.airbarrier.org/#sle: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture, and use secondary materials approved in writing by primary material manufacturer.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience and approved by manufacturer. Air barrier Subcontractor(s) shall be accredited minimum of three years at the time of bidding and during the complete installation period by the Air Barrier Association of America (ABAA).

C. Components used in this section shall be sourced from one manufacturer, including membrane, air barrier sealants, primers, mastics, self-adhered flashings and adhesives as listed and approved as an evaluated air barrier assembly by the Air Barrier Association of America.

D. Manufacturer is required to make regular inspections for warranty requirements and provide inspection notes.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the job site in undamaged and original packaging indicating the name of the manufacturer and product.

B. All pail goods shall bear the ABAA Evaluated Air Barrier label

C. Store roll materials on end in original packaging.

D. Keep all products stored at above 40°F. Apply to a substrate with a surface T°F of 40°F and rising. DO NOT ALLOW PRODUCT TO FREEZE.

E. Protect rolls from direct sunlight until ready for use.

F. Do not double stack pail goods.

1.09 MOCK-UP

A. Mockups: Before beginning installation of air/water-resistive barrier, provide air/water-resistive barrier work for exterior wall assembly mockups, incorporating backup wall construction, external cladding, window, door frame and sill, insulation, roof tie-in and flashing to demonstrate surface preparation, crack and joint treatment, and sealing of gaps, terminations, and penetrations of air barrier membrane.
   1. Coordinate construction of mockup to permit inspection by Owner's testing agency of air/water-resistive barrier before external insulation and cladding is installed.
   2. If Architect determines mockups do not comply with project requirements, reconstruct mockups and apply air/water-resistive barrier until mockups are approved.
   3. Contractor shall provide an in-place mockup of each type of expansion joint transitions between air barrier and roofing systems, and at angle changes, prior to proceeding with this work. Failure to provide mockup for review and approval will result in required removal of cladding as required to allow observation by A/E.

B. Install air barrier materials in mock-up specified in Section 04 2000.

C. Provide air/water leakage testing for air barrier materials and flashings located at mockup window systems per Division 8 Sections.

1.10 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by the materials manufacturers before, during and after installation.

1.11 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide manufacturers 10 year material warranty.
   1. Ensure all manufacturers installation guidelines, specifications, details and warranty requirements are met.
   2. Warranty period shall be 10 years from date of substantial completion.

PART 2 PRODUCTS

2.01 WEATHER BARRIER ASSEMBLIES

A. General: Air/water-resistive barrier shall be capable of performing as a continuous vapor-permeable air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. At wall cladding transitions, the air/water-resistive barrier shall form a continuous air barrier and shall make provision for water drainage, either by creation of an unobstructed drainage plane that extends across the cladding transition or by flashing to discharge to the exterior at the transition. Air barrier assemblies shall be capable of accommodating substrate movement and sealing substrate expansion and control joints, construction material changes, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits, or interruption of the drainage plane.

B. Air Barrier shall be compatible with glass-mat faced gypsum, masonry and expanded polystyrene (ICF) wall systems.

C. The weather barrier assembly, including but not limited to, fluid applied air/water-resistive barrier membrane, sheathing fabric, transition membrane and flashing primer shall be obtained or approved as a single-source from the membrane manufacturer to ensure system compatibility and integrity.

D. Air Barrier:
   1. On outside surface of inside wythe of exterior masonry cavity walls use air barrier coating on wall surface and related thru-wall flashings, flashings for rough openings, windows, doors, base flashings and terminations to the roof.
   2. On outside surface of sheathing of exterior walls use air barrier coating on wall surface and related thru-wall flashings, flashings for rough openings, windows, doors, base flashings and terminations to the roof.
   3. On outside surface of ICF wall systems use air barrier coating on wall surface and related thru-wall flashings, flashings for rough openings, windows, doors, base flashings and terminations to the roof

2.02 AIR BARRIER MATERIALS (WATER VAPOR PERMEABLE AND WATER-RESISTIVE)

A. Air Barrier, Fluid Applied: Vapor permeable waterproofing.
   1. Air Barrier Coating:
      a. Assembly Performance: Provide a continuous air barrier in the form of an assembly tested in accordance with ASTM E2357
      b. Dry Film Thickness (DFT): Shall be minimum thickness as specified in the manufacturer written instructions for the substrate being applied and to produce a smooth pinhole-free surface and as required to achieve warranty.
      c. Air Permeance: 0.004 cubic feet per minute per square foot, maximum, when tested in accordance with ASTM E2178.
      d. Water Vapor Permeance: 10 perms, minimum, when tested in accordance with ASTM E96/E96M, Procedure B.
      e. Ultraviolet (UV) and Weathering Resistance: Approved in writing by manufacturer for up to six months of weather exposure after application.
      f. Tensile bond: Minimum 15 psi or exceeds strength of substrate when tested in accordance with ASTM C297/C297M.
      g. Pull Adhesion: Minimum 110kPa (16psi) or substrate failure in accordance with ASTM D4541 for the substrate being applied.
      h. Multi-Story Wall Assembly Burn Test: For multi-story buildings where required by code, Air Barrier, as a component of a wall assembly, shall have passed a NFPA 285 complete wall fire test.
      i. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.
      j. Nail Sealability: Pass, when tested in accordance with ASTM D1970/D1970M.

k. VOC Content: 50 g per L or less.
l. Code Acceptance: Comply with applicable requirements of ICC-ES AC212.
m. Sealants, Tapes and Accessories: As recommended by coating manufacturer.
n. Manufactures and Products:
1) Design of Fluid applied weather barrier is based upon the products manufactured by Henry Company, 17 MR Fluid Applied.
2) The following Manufacturers are acceptable for use in this section provided all specified requirements are met or exceeded.
(a) Acrylic, Water-Based:
(1) Barritech VP by Carlisle Coatings and Waterproofing, Inc: www.carlisleccw.com
(2) Air-Bloc, 17MR by Henry Company: www.henry.com
(3) Spray Wrap MVP by PROSOCO, Inc: www.prosoco.com
(4) Wall Guardian by STS Coatings, Inc.: www.stscoatings.com
(5) ExoAir 230 by Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com
(6) Air Shield LMP by W.R. Meadows: www.wrmeadows.com.
3) Substitutions: See Section 01 6000 - Product Requirements.

B. Rigid Insulation Adhesive: Henry Air-Bloc 21 or as approved by the manufacturer for compatibility.

2.03 ACCESSORIES

A. Sealants, Flashings, and Accessories for Sealing Weather Barrier and Sealing Weather Barrier to Adjacent Substrates: As specified or as recommended by weather barrier manufacturer.

B. All materials must be compatible with weather barrier.

C. Self-adhered Membrane Through Wall Flashing:
1. Thickness: 40 mils minimum.
2. Provide air barrier manufacturer’s flexible, self-sealing through-wall flashing with silicone release sheet and associated accessories for:
a. Flashing at spandrels and cavities; under copings, band courses, and sill
b. Over lintels and shelf angles
c. At low roof to high wall conditions and all other wall conditions necessary to provide a watertight wall assembly.
3. Manufacturers: Flashings shall be provided by the air barrier manufacturer, or explicitly approved in writing by the air barrier manufacturer for use as part of their warranted air barrier system.
4. Accessories:
a. Provide manufacturer’s surface conditioner and primer.
b. Termination Mastic:
1) Description: Manufacturer’s approved mastic with 200 g/l max. VOC Content.
c. Provide stainless steel type 304 termination bar equal to Hohmann & Barnard model T2-FTS with pre-punched holes at 8-inches on center max.
d. Refer to Section 07 6200 for metal through wall flashing drip edges and flashings.

D. Liquid Flashing: One part, fast curing, non-sag, elastomeric, gun grade, trowelable liquid flashing.

E. Transition Membrane, Seam and Window Flashing and High Temperature Rated Membrane: Peel and stick flashing membrane film bonded to sealant.
1. Thickness: 25 mil, 0.025 inch minimum.
2. Roll Width: 4, 6, 8 inch, as required for application.
3. Coordinate installation with the Masonry Contractor and other provisions as required in Section 04 2000 - Unit Masonry.

F. Thinners and Cleaners: As recommended by material manufacturer.

G. Backer Rod: ASTM C 1330, Type B (bicellular material with a surface skin).

H. Rigid insulation adhesive based upon Henry Air-Bloc 21 insulation adhesive.

I. Building joint sealant based upon Henry HE925 BES Sealant. Moisture cure, medium modulous polymer modified sealing compound.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and conditions are ready to accept the work of this section.

B. Walls
   1. Substrates
      a. Wall sheathing must be securely fastened per applicable building code and sheathing manufacturer's requirements.
      b. Examine surfaces to receive air/water resistive barrier and verify that substrate and adjacent materials are dry, clean, sound, and free of releasing agents, paint, or other residue or coatings. Verify substrate is flat, free of fins or planar irregularities greater than 1/4" in 10'. Verify that no excess mortar exists on masonry ties, shelf angles and other obstructions.
      c. Verify that concrete is visibly dry and free of moisture.
      d. Verify that masonry joints are struck flush and completely filled with mortar.
   2. Flashings
      a. All flashings must be installed in accordance with specific design and building code requirements. Where appropriate, end-dams must be provided.
      b. Openings must be flashed prior to window/door, HVAC, etc. installation. Windows and openings shall be flashed according to design and building code requirements.
      c. Individual windows that are ganged to make multiple units require continuous head flashing and the joints between the units must be fully sealed.
   3. Kick-out flashing
      a. Kick-out flashing must be installed leak-proof and angled (min 100°) to allow for proper drainage and water diversion.
   4. Air Seals
      a. Install between the primary air/weather barrier and other wall components (penetrations, etc.) in order to maintain continuity of the air barrier system

C. Report all unsatisfactory conditions to the General Contractor. Application of fluid-applied air/water-resistive barrier shall not proceed until all unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. General: No additives are permitted unless specified in product mixing instructions. Close containers when not in use. Prepare in a container that is clean and free of foreign substances. Do not use a container which has contained or been cleaned with a petroleum-based product. Clean tools and equipment with water immediately after use. Dried material can only be removed mechanically.

B. Sheathing joints or joints in ICF less than 1/2" shall be treated with liquid flashing as reccommended by the manufacturer.

C. Sheathing joints or joints in ICF over 1/2" shall be treated with transition material or as reccommended by the manufacturer.

D. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.

E. Clean and prime substrate surfaces to receive adhesives and sealants in accordance with manufacturer's instructions.

3.03 INSTALLATION

A. Install materials in accordance with manufacturer's instructions.

B. Air Barriers: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
   1. Apply additional membrane and/or sealant at all masonry wall ties and zee subframing fastened through air barrier for claddings.

C. Apply sealants and adhesives within recommended application temperature ranges. Consult manufacturer if temperature is out of this range.

D. Coatings:
   1. Prepare substrate in manner recommended by coating manufacturer; treat joints in substrate and between dissimilar materials as recommended by manufacturer.
   2. Where exterior masonry veneer is to be installed, install masonry anchors before installing weather barrier over masonry; seal around anchors air tight.
   3. Use flashing to seal to adjacent construction and to bridge joints.

E. Membrane Through Wall Flashings at Masonry:
   1. General:
      a. Whether or not specifically indicated, install membrane flashings to divert water to exterior at all locations where downward flow of water will be interrupted.
      b. Install metal through wall flashing in accordance with Section 07 6200. Metal flashing shall be continuous including at elevation changes (i.e. steps).
   2. Mockup:
      a. Contractor shall provide an in-place mockup for review by Architect and Consultant of complete through wall flashing system, including stainless steel drip edges, incorporating end dams at a typical termination of flashing.
      b. Failure to provide mockup or review of through wall flashing materials prior to installation of insulation and masonry may result in removal and reinstallation of materials at Contractor’s expense, as required to observe installed conditions at flashings.
      c. Through wall flashings that are improperly installed or installed in the wrong position, regardless of whether cladding has been installed or not, shall be removed by the Contractor and new flashings installed to the proper condition at no cost to the Owner.
   3. Preparation:
      a. Install flashing to dry surfaces when air and surface temperatures are 40ºF and above.
      b. All flashings shall be installed to produce a fully watertight assembly.
      c. Prepare the masonry surfaces so that they are smooth and free of obstructions where installing flashings. Apply the surface conditioner per the manufacturers written recommendations for proper adhesion of the flashings.
      d. Precut pieces of flashing to easily handled lengths for each location.
   4. Installation:
      a. Remove release paper and position flashing carefully before placing it against the surface.
      b. When properly positioned, place against surface by pressing firmly into place by hand roller. Fully adhere flashing to substrate to prevent water from migrating under flashing.
      c. Overlap adjacent pieces 6” and roll all seams with a steel hand roller.
      d. Install prefabricated external and internal corners and end dams.

e. Extend the flashing from 1/2” inside the face of the exterior wall, through the exterior masonry wythe, and up the cavity space a minimum of 6" above the top of the cavity drainage system. Install termination bar at top of flashing and seal with mastic. Strip in air barrier over through wall flashing.
f. Apply a bead or trowel coat of mastic along flashing top edge, seams, cuts, and penetrations for a completely watertight condition.
g. Membrane flashing shall not be permanently exposed to sunlight.

5. Transitions:
   a. At all flashing terminations to openings, expansion joints, and changes in height, provide metal and membrane formed end dams with all seams sealed watertight.
   b. Provide compressible filler at the end of all flashings at steel lintels.
6. Protection:
   a. Do not expose flashing membrane to sunlight for more than thirty (30) days prior to enclosure.
   b. Do not allow the surface of the flashing membrane to come in contact with incompatible materials, including but not limited to polysulfide sealants, creosote, uncured coal tar products or EPDM.

F. Openings and Penetrations in Exterior Weather Barriers:
1. Install flashing extending a minimum 3 inches onto vertical wall and into rough opening with transition membrane.
2. Hollow Metal Door Frames: Seal door frame to wall surface with transition membrane.
3. Perimeter wood nailers at wall openings: Cover all exposed surfaces of wood nailers with transition membrane. Extend membrane over ICF, sheathing, masonry and metal framing.
4. Aluminum frames: Seal frames to the wall surface with transition membrane.
5. Service and Other Penetrations: Form flashing around penetrating item and seal to weather barrier surface.
6. Cladding Attachment Penetrations: provide application of butyl tape to the base of all masonry ties and subgirts installed with fasteners through weather barrier.

G. Expansion Joints in Exterior Weather Barriers:
1. Expansion joints are required at all structural expansion joints and along slip tracks in metal stud framing systems at walls. Provide manufacturer’s recommended detailing at other locations with potential movement, including control joints in concrete masonry wall systems.
2. Coordinate installation of new infill wall materials after removal of any existing cladding materials, to ensure that expansion joint at weather barrier plane is in line with expansion joint at exterior cladding.
3. Install weather barrier materials at new infill wall, provide sealed termination bar secured at 6” o.c., extending a minimum of 4 inches onto the existing backup wall and weather barrier system. Ensure that all terminations of new weather barrier at existing is air- and water-tight.
4. Install insulation and fire rated materials at gap as indicated in the Drawings or required for wall construction.
5. Provide transition membrane and backer rod at gap as indicated in the Drawings, fully stripped in with fluid applied weather barrier system in full accordance with manufacturer details and requirements.
6. Expansion joints at air barrier system shall be sealed air and watertight to expansion joint materials in roofing systems, with compatible materials.

3.04 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for additional requirements.

B. Do not cover installed weather barriers until required inspections have been completed. Contractor is responsible for coordinating all inspections with Architect, Owner and weather barrier manufacturer.

C. Obtain approval of installation procedures by the weather barrier manufacturer based on a mock-up installed in place, prior to proceeding with remainder of installation.

D. Take digital photographs of each portion of the installation prior to covering up.

E. Weather Barrier Protection and Failure Protocol:
   1. Contractor failure to provide the protection specified will result in the following, at no cost to the Owner:
      a. Replacement of all failed materials in full accordance with manufacturer requirements, to dry substrates. Failure is defined as inadequate adhesion, chemical deterioration, or blisters (entrapped air). After replacement the Contractor shall provide the above specified protection until completion of roofing materials.

3.05 PROTECTION

A. Do not leave materials exposed to weather longer than recommended by manufacturer.

END OF SECTION

SECTION 07 5113
THREE-PLY MODIFIED BUILT-UP BITUMINOUS ROOFING

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. SBS modified bitumen membrane roofing.

B. All roofing and flashing work shall be completed as shown on the drawings and here-in specified, and shall be installed in strict accordance with the Roofing Manufacturer's specifications and details. It is the Roofing Contractor's responsibility to insure that all roofing details and installations comply with the manufacturer's specifications in order to secure the full roofing warranty as specified. Any modifications in roofing details shall be submitted with shop drawings for Architect's approval.

1.02 RELATED SECTIONS

A. Related Work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Section in Division 1 of these specifications.

B. Section 01 4500 – Quality Control.

C. Section 03 5213 - Lightweight Insulated Concrete.

D. Section 06 1000 – Rough Carpentry.

E. Section 07 6200 – Sheet Metal Flashing and Trim.

F. Section 07 7200 – Roof Accessories.

1.03 REFERENCES

A. American Society for Testing and Materials (ASTM) – Latest Edition:
   1. D 41 Asphalt Primer Used in Roofing and Waterproofing.
   2. D 312 Asphalt Bitumen Used in Roofing.
   3. D 4586 Asphalt Roof Cement, Asbestos Free, SBS compatible.
   4. D 5147 Asphalt Modified Flashing/Cap Sheet
   5. D 6163 Asphalt Modified Flashing/Cap Sheet
   6. ASTM D4601 Base Sheet

B. National Roofing Contractor's Association (NRCA): Roofing and Waterproofing Manual, Fifth Edition, 2001.

C. FM Global Loss Prevention Data Sheets 1-28 through 1-54, Latest Edition.

D. ASCE 7-(per governing building code). - American Society Of Civil Engineers "Minimum Design Loads for Buildings and Other Structures"

E. Underwriters Laboratory Building Materials Directory, Latest Edition.

1.04 QUALITY ASSURANCE

A. Applicator:
   1. A Qualified firm that is approved, authorized or licensed by roofing system manufacturer to install manufacturer's product and is eligible to receive manufacturer's warranty.
   2. Single applicator with minimum of five years previous successful experience in installations of similar systems.

B. Regulatory Requirements:
   1. New Roof System shall be classified by Underwriters Laboratories Inc., UL 90, as a "Class A " rated roof covering.
   2. System shall meet the minimum Wind Uplift Requirements per ASCE 7-(per governing building code)for approved assembly.

3. Follow local, state, and federal requirements, safety standards, and codes.
4. Refer to applicable building codes for roofing system installation requirements and limitations. When conflict exists, the more restrictive document will govern.

C. Pre-installation Conference:
1. Two weeks prior to roofing installation, conduct pre-installation conference at project site.
2. Attendance: Owner, Architectural Observer, Roof Consultant, Contractor, project superintendent, roof applicator, and roof manufacturer's technical representative.
3. Agenda:
   a. Scheduling of roofing operation.
   b. Daily production anticipated.
   c. Designation of key individuals and their respective responsibilities.
   d. Processing procedures of field and change orders.
   e. Review of staging and material storage locations.
   f. Accommodations for temporary services (water, power).
   g. Coordination of work by other trades.
   h. Protection of completed roofing.
   i. Emergency rain protection procedures.
   j. Discussion of process for manufacturer's inspection and acceptance of completed roofing and flashings.
   k. Manufacturer's deck inspection to be performed.

D. Installation:
1. Installation shall be in accordance with procedures and standards set forth by National Roofing Contractors Association.
2. Installation shall be in accordance with manufacturer's current published application procedures and general recommendations of National Roofing Contractor's Association. Follow Underwriters Laboratories' requirements acceptable for use with specified products or systems.
3. Roofing shall be as described in this section and shall be provided and approved by roof system manufacturer. Materials not manufactured or provided by manufacturer shall have written approval from manufacturer stating that materials are acceptable and are compatible with other materials and systems required.

E. There shall be no deviations made from manufacturer's published specification, this specification, or approved shop drawings without prior written approval of Architect, Architectural Observer, Roof Consultant and Roof Membrane Manufacturer’s representative.

F. Perform work on this section in accordance with best standards of practice relating to trades involved.

G. Pullout Tests: Conduct pullout test on deck using appropriate fastener prior to roof system installation. Submit pullout results for manufacturer's review to determine specific fastening pattern for this project.

H. Material Manufacturer's Inspection Paid for By Contractor: Minimum of two inspection shall be made during Project schedule by authorized representative of roof system manufacturer to ensure that said Project is installed in accordance with manufacturer's requirements. Manufacturer shall provide written report to the Architect within five days of each inspection stating acceptance of Contractor procedures and outlining items of non-compliance with manufacturer's requirements.

I. Material Manufacturer's Final Inspection:
1. Manufacturer's authorized representative shall provide final inspection at completion of project to ensure that project has been completed in accordance with manufacturer's requirements. Upon approval and acceptance of the entire project, the manufacturer's warranty shall be written, executed, and furnished to Owner.

2. Contractor shall pay for manufacturer's final inspection and additional inspections.

J. Laboratory Testing and Samples:
   1. At Owner's request, obtain 3 field samples of completed roof membrane and assembly. Take samples at locations designated by Owner's Representative, Architectural Observer, and test for compliance with requirements on Contract Documents and with manufacturer's published performance criteria. Test shall be performed by nationally recognized testing laboratory in accordance with accepted ASTM methods. Contractor shall assume costs for extraction and patch of samples. Owner will assume costs for testing of field sample.
   2. If, for any reason, areas that are tested by Owner fail to meet manufacturer's requirements, then subsequent expense for retesting of those areas will be borne by Contractor.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original, unopened containers or packages with labels intact and legible. Any materials delivered to the site must be covered for weather protection. Any materials arriving at the job site unprotected will be rejected. All materials must be tarped and on pallets.

B. Store materials in accordance with manufacturer's recommendations.

C. Store rolled goods on clean, raised platforms. Store other materials in dry area, protected from water and direct sunlight.

D. Provide continuous protection of materials against deterioration for duration of project.

E. Any material becoming wet or damaged will be rejected and shall be removed from the jobsite immediately. Any insulation found to be improperly stored at the jobsite shall be considered wet at the discretion of the Engineer and removed from the jobsite.

F. Materials Stored on Roof Levels for Immediate Use:
   1. Distribute to prevent concentrated loads that would impose excessive strain on deck or structural members.
   2. Positively secure to prevent displacement by wind.
   3. Tarp for protection from exposure.

1.06 PROJECT CONDITIONS

A. Environmental Requirements:
   1. Apply roofing in dry weather.
   2. Do not install roofing in inclement weather or when rain is predicted (40 % or more possibility) or when ambient temperature is below 40 degrees Fahrenheit. No roofing shall be performed when the wind is above 25 mph without written permission from the Engineer. Roof deck shall be dry and free from any moisture, ice or other deleterious materials prior to roofing.
   3. Do not expose stored roofing materials and accessories to constant temperature in excess of 180 degrees Fahrenheit.

B. Restore to original condition or replace work and materials damaged during handling.

C. Emergency Equipment: Maintain on site equipment necessary to apply emergency temporary seals in event of sudden storms or inclement weather.

1.07 SEQUENCING AND SCHEDULING

A. Coordinate roofing schedule with work of other trades.

B. Notify manufacturer's representative forty-eight hours in advance for deck acceptance.

C. Apply roof installation with respect to deck slope. Avoid situations where excessive drainage could pass into completed roofing.

D. Maintain communication with roofing manufacturer's representative to inform of progress and to schedule periodic sample testing.

E. On Parapet Wall Conditions, roofing may not proceed until all walls are complete.

F. All penetrations shall be made in roof prior to beginning with roof installation.

1.08 WARRANTY

A. Manufacturer's Warranty: Manufacturer's twenty (20) year "non-prorated, no dollar limit" system warranty shall cover product quality, performance and workmanship, including roofing and membrane flashings. Warranty shall include membrane from roof surface up into parapet cap with out exclusions. Warranty shall include full cost of repair and replacement. The manufacturer's warranty shall commence upon the project's date of substantial completion.

B. Contractor's Warranty: In addition, Contractor shall furnish written warranty agreeing to replace failing roofing or flashing due to defective material or workmanship. Warranty shall include other work performed by Contractor but which may be described in other sections including, but not limited to, Sealants and Caulking, Sheet Metal, Insulation and Fasteners, and Roof Drains and Accessories, Base Flashings and Expansion Joint Covers. Warranty shall include membrane from roof surface up into parapet cap with out exclusions. Warranty period is five (5) years from the date of the project's substantial completion.

C. Installer's Warranty: (5) years from the date of the project's substantial completion.

1.09 SUBMITTALS

A. Shop drawings, product data, and samples under provisions of Section 01 3000 – Administrative Procedures.

B. Submit the following items:
   1. Contractor's executed insurance certificate.
   2. Detailed project sequencing, staging, material loading, manpower plans, and detailed project construction schedule for approval.
   3. Sample of warranty that is to be issued upon project completion.
   4. Original Sweets Brochure, hard copy or electronic format of all pertinent materials, i.e., roofing felt, flashing membrane, cricket insulation layout, and applicable attachment layout by an approved entity. Samples of all materials not supplied or prior approved by the roofing membrane manufacturer shall be submitted to the manufacturer for written approval prior to installation start. Approved applicator must submit a roof drawing indicating which details will be employed in the project and six (6) copies of all roofing materials to be provided for the project. These drawings shall be approved by the membrane manufacturer and Architect for approval prior to work start.
   5. Copies of the architect's original detail drawings are not acceptable for submittals of detail drawings.
   6. Contractor shall submit written statement that their company or any subcontractor they may use is not employing workers classified as undocumented workers on this project.
   7. Samples of all materials not supplied or prior approved by the roofing membrane manufacturer shall be submitted to the manufacturer for written approval prior to installation start. Approved applicator must submit a roof drawing indicating which details will be employed in the project. These drawings shall be approved by the Architect prior to work start.

C. Closeout Submittals:
   1. Submit under provisions of Section 01 7800 – Closeout Submittals.
   2. Submit Material Safety Data Sheets under provisions of Section 01 7800 – Closeout Submittals for the following items:
      a. All mastics, glues, and adhesives
      b. Thermal insulation (excluding fiberglass, foam, rubber)
      c. Sealant (interior use only)

PART 2 – PRODUCTS

2.01 MANUFACTURER

A. Basis of Design: Johns-Manville International, Inc: www.jm.com.

B. Acceptable Manufacturer:
   1. GAF Materials Corporation. Must meet Basis of Design.
   2. Firestone: www.firestonebp.com. Must meet Basis of Design.

C. Products furnished for roofing system shall be products of single manufacturer.

D. System description
   1. Roof system shall be a three-ply modified cap system, Class A roof, consisting of a fiberglass reinforced cap, white in color, a mid-layer hot mopped to a mechanically attached, venting base layer over light weight insulating concrete.
   2. The roof system shall be sloped a minimum of 1/4”/ft.
   3. The design of the roofing systems shall comply with the NRCA Roofing and Waterproofing Manual.

2.02 PRIMARY MATERIALS

A. Roofing Membrane Assembly: 3-ply roof membrane assembly consisting of two plies of a prefabricated, reinforced, homogeneous Styrene-Butadiene-Styrene (SBS) block copolymer modified asphalt base membrane, applied over a prepared substrate followed by a white granulated polyester reinforced fire rated finish ply. Both base ply reinforcement mats shall be impregnated/saturated and coated each side with an SBS modified bitumen blend. The assembly shall possess waterproofing capability, such that a phased roof application, with only the modified bitumen base plies in place, can be achieved for prolonged periods of time without detriment to the watertight integrity of the entire roof system.

B. Modified Bitumen Base Sheet (Mechanically Attached):
   1. Shall be a fiberglass reinforced Styrene-Butadiene-Styrene (SBS) modified asphalt coated sheet having a minimum weight of 30 lb/sq, 3sq per roll coverage.

C. Modified Bitumen Interply Base Ply Sheet (Hot Asphalt Attached):
   1. Shall be a high performance, heavy duty modified bitumen base ply consisting of a fiberglass scrim/ fiberglass mat impregnated and coated with high quality Styrene-Butadiene-Styrene (SBS) modified bitumen to comply with requirements of ASTM D 6163 Type I, Grade S, 1-1/2 sq per roll coverage.

D. Modified Bitumen Finish Ply (Torch of Hot Asphalt Applied):
   1. Shall be a high performance, heavy duty modified bitumen finish ply consisting of a lightweight fibrous 250gm polyester mat impregnated and coated with high quality Styrene-Butadiene-Styrene (SBS) modified bitumen, surfaced with ceramic granules to comply with requirements of ASTM D 6163 Type I, Grade G. Granular color to be approved by Owner/ Owner/Representative. Sheet shall be fire rated with 1 sq coverage per roll.

E. Flashing Membrane Assembly.
   1. Shall be a high performance, modified bitumen sheet consisting of a fiberglass scrim/fiberglass mat composite impregnated and coated with high quality Styrene-Butadiene-Styrene (SBS) modified bitumen granular surfaced.

F. Asphalt Bitumen: ASTM D312, Type IV as dictated by roof slope and as acceptable by roofing manufacturer to comply with warranty requirements.

2.03 FASTENERS

A. Base Sheet Fasteners for Lightweight Decks shall be a Zonalite Base Ply fastener with disks, or an approved equal, shall be of sufficient length for maintaining a 40 pound withdrawal strength, and shall be approved for use by the Primary Roofing Material Manufacturer.

B. Nails: flat head ring shank, galvanized steel; length as required to provide 1-inch penetration minimum into substrate.

C. Concrete and Masonry Substrate:
   1. Round head stainless steel drive pin and neoprene washer with lead expansion anchor, FS FF-S-325, group IV, Type II.
   2. Acceptable Product: Rawl Plug, The Rawl Plug Company, Inc.

2.04 RELATED MATERIALS

A. Asphalt Primer: ASTM D41; approved by roof system manufacturer.

B. Aluminum Compression Bar:
   1. Aluminum strip shall be extruded channel bar with a mill finish, width one inch (1"), thickness 0.100" ± .008", leg height one-fourth inch (1/4") top and bottom, leg angle ninety degrees (90), for perimeter and curb anchorage, having predrilled holes six inches (6") on center, as manufactured by Olympic Fasteners, or approved equal.

C. Asphaltic Plastic Cement: Approved by roof system manufacturer, SBS compatible.
   1. Inclines Up to ½" Per Foot: ASTM D4586, Type I.
   2. Inclines Exceeding ½" Per Foot: ASTM D4586, Type II.

D. Cant Strip:
   1. Non-Structural: Perlite, solid.
   2. Structural: Fire retardant treated wood.
   3. Cant Height Above Substrate: 3-5/8" minimum.

E. Edge Sealant: Rubberized Neoprene based sealant.

F. Roof Drains:
   1. Primary Roof Drains and secondary roof drains as specified shall be as specified in Division 22 – Plumbing Piping in sizes as indicated on the plumbing drawings. The furnishing of the roof drains will be the responsibility of the Plumbing Contractor and specified in Division 22.

G. Wood Nailers and Blockings: Reference Section 06 1000 – Rough Carpentry
   1. Where lumber or plywood is indicated or specified as “treated”, comply with applicable requirements of the American Wood Preservers Association (AWPA) Standard C2 for Lumber and C9 for Plywood.
   2. Pressure treated wood components shall be with “water-borne” preservatives only, and to comply with the American Wood Preservers Bureau (AWPA) LP-2 Directive.

H. Walk Tread: Shall be pre-formed, skid-resistant surface, constructed with modified asphalt, a minimum 32” x 32” surfaced with ceramic granules (Color as approved by owner) for use around all mechanical and HVAC equipment.

I. Fiberglass Coated Membrane: A non-rotting, non-absorbent woven fiberglass membrane having a vinyl coating designed for membrane reinforcement for all roof repairs. Compatible with either tar or asphalt bituminous, having ten (10) open-weave squares per inch.

J. Sealant: Shall be a one-component urethane non-sag, gun grade sealant designed for use in active exterior joints, and shall meet or exceed Federal Specification No. 1 TT-S-00230C, Type II, Class A, ASTM C920. Where joint surfaces are contained or are contaminated with bituminous materials, provide manufacturer's modified-type sealant (modified with coal-tar or asphalt as required), or approved equal.

K. Pitch Pan Sealant: Shall be one-part, self-leveling polyurethane sealant meeting Federal specification No. TT-S-00230C, Type I, Class A, ASTM C920, Type S, Grade P, Class 25, for use in new pitch pans, or approved equal.

L. Granules: Granules of color scheme matching the granule surfacing of the finished ply.

M. Granule Powder: A finely graded dust as supplied or approved by the membrane manufacturer, used for covering of bitumen overruns over the foil surfaced membrane.

N. Termination bar: Aluminum strip shall be extruded channel bar with a mill finish, width one inch (1"), thickness 0.100" ± .008", leg height one-fourth inch (1/4") top and bottom, leg angle ninety degrees (90), for perimeter and curb anchorage, having predrilled holes six inches (6") on center. Install where perimeter flashings exceed 24”.

2.05 MISCELLANEOUS MATERIALS

A. Best grade or quality approved by roofing manufacturer for specific application.

2.06 ASBESTOS CONTAINING MATERIALS

A. No asbestos containing materials shall be used on jobsite or incorporated into work.

PART 3 - EXECUTION

3.01 GENERAL

A. Perform work of this Section in accordance with best standards of practice relating to trades involved.

B. Follow local, state and federal regulations, safety standards and codes. When conflict exists, the more restrictive document shall govern.

C. Follow insurance underwriter's requirements acceptable for use with specified products or systems.

D. Roofing application shall only be performed when ambient temperature is greater than 40 F and rising, and shall include wind and wind chill factors.

E. Do not apply roofing materials unless asphalt application temperatures can be maintained within the equiviscous temperature (EVT) range; or when water in any form (i.e., rain, dew, ice, frost, snow, etc.) is present on the deck. Do not heat asphalt above finished blowing temperature, flash point or 525 degrees Fahrenheit.
   1. The equiviscous temperature (EVT) is defined by the NRCA as the temperature at which a bitumen attains the proper viscosity for built-up membrane application.
   2. The EVT range is defined by the NRCA as the recommended bitumen application temperature range. The range is approximately 25 degrees Fahrenheit above or below the EVT. The EVT range is measured in the mop cart or mechanical spreader just prior to the application of bitumen to the substrate.
   3. The proper viscosity for mop application is 125 centipoise. The proper viscosity for mechanical spreader application is 75 centipoise. If both mop and mechanical application is used, the proper viscosity for both is 75 centipoise.

F. Consider roof system manufacturer's technical specifications part of this specification and use as reference for specific application procedures and recommendations.

G. Complete roofing, flashing, sheet metal, and other related items daily with exception taken to finish ply.

3.02 EXAMINATION OF SURFACES

A. Examine roof deck and related surfaces, and verify that there are not conditions such as inadequate anchorage, foreign materials, moisture, ridges, or other conditions which would prevent satisfactory installation of roofing system. Verify proper slopes prior to roof membrane installation.

B. Correct conditions requiring correction or completion prior to installation of roofing system. Notify Owner's Representative (Architectural Observer, Contractor Officer) of unacceptable conditions.

C. Do not proceed until defects are corrected.

D. Verify location of interior ducts, electrical lines, piping, conduit, an similar obstructions. Perform work in manner to avoid contact with above mentioned items.

E. Verify debris has been removed.

F. Start of work under this Part Three constitutes acceptance of deck substrate and site conditions by roofing contractor.

3.03 PREPARATION

A. Existing Roofing:
   1. Minimize traffic and take precautions to protect existing roof membrane.
   2. Provide plywood walkway set on minimum 1" insulation when hauling debris over existing roof membrane.

B. Sleeves and Curbs: Clean, secure, and extend sleeves, curbs, ducts and other work which pass through roof as required to receive new roofing system.

C. Seal openings, projections, and penetrations in substrate to prevent bitumen migration into building. Damage to building or interior caused by bitumen migration shall be corrected by Contractor at his expense. At locations where perforated roof decks occur, protect interior flooring.

D. Prior to application of membrane, remove foreign matter from substrate. Debris between substrate and roof membrane is not acceptable.

E. Carefully broom clean substrate immediately prior to roofing application.

3.04 SUBSTRATE PREPARATION

A. Base Sheet Securement to Prepared Substrate: Lay the base sheet over the entire area to be roofed, lapping sides and end per manufacturer's requirements. Using the specified fasteners fasten the base sheet in accordance with fastening pattern of FM requirements and recommendations of the material manufacturer.

3.05 ROOF MEMBRANE INSTALLATION

A. Install roof membrane materials in accordance with manufacturer's current published application instructions.

B. Asphalt: Apply asphalt bitumen in accordance with EVT concept. Asphalt temperature shall be within 25 degrees of EVT at point of application. If this approximate temperature cannot be maintained at point of application, operations shall be discontinued. Asphalt shall not be heated above finished blowing temperature or maximum temperature of 525 degrees Fahrenheit .Minimum application temperature shall be 400 degrees F.

C. Apply all layers of roofing free of wrinkles, creases or fishmouths. Exert sufficient pressure on the roll during application to ensure prevention of air pockets. Apply all layers of roofing perpendicular to the slope of the deck.

D. Base Sheet shall be mechanically fastened per ASTM D4601. Fully bond second ply to the prepared base Sheet, utilizing minimum 3 inch side and end laps. Apply each sheet directly behind the asphalt adhesive applicator. Cut a dog-ear angle at the end laps on overlapping selvage edges. Using a clean trowel, apply top pressure to top seal T-laps immediately following sheet application. Stagger end laps a minimum of 3 feet.

E. Fully bond the finish ply to the 2 base ply's, utilizing minimum 3 inch side and end laps. Apply each sheet directly behind the asphalt adhesive applicator. Stagger end laps of the finish ply a minimum 3 feet. Cut a dog-ear angle at the end laps on overlapping selvage edges. Using a clean trowel, apply top pressure to top seal T-laps immediately following sheet application. Stagger side laps of the finish ply a minimum 12 inches from side laps in the underlying base ply. Stagger end laps of the finish ply a minimum 3 feet from end laps in the underlying base ply.

F. Granule Embedment: Broadcast mineral granules over all bitumen overruns on the finish ply surface, while the bitumen is still hot or the adhesive is soft, to ensure a monolithic surface color.

G. Backnailing:
   1. Provide wood nailer, minimum 2” x 4” secured to deck in areas where decking slope exceeds 2" per foot.
   2. Nailer strips shall match thickness of roof insulation and provide securement for both insulation and roof membrane.
   3. Place nailer strips and backnail roof membrane in accordance with manufacturer's recommendations based upon slope and location.

H. Foot and equipment traffic over felt should be held to absolute minimum during application and until asphalt has sufficiently cooled to prevent bitumen displacement.

3.06 MODIFIED BITUMEN BASE FLASHING

A. Place cant strips on top of roof insulation or nailer. Nail to deck and to wall or vertical nailer where possible. If not possible to nail, secure by applying plastic roof cement.

B. Apply flashings only after built-up roofing membrane is in place.

C. Flashing Application - masonry surfaces: Flash masonry parapet walls and curbs using the reinforcing sheet and the metal foil flashing membrane. After the base ply has been applied to the top of the cant, fully adhere the reinforcing sheet, utilizing minimum 3 inch side laps and extend a minimum of 3 inches onto the base ply surface and 3 inches up the parapet wall above the cant. After the final roofing ply has been applied to the top of the cant, prepare the surface area that is to receive flashing coverage by torch heating granular surfaces or by application of asphalt primer; allowing primer to dry thoroughly.
   1. Torch apply the metal foil-faced flashing into place using three foot widths (cut off the end of roll) always lapping the factory selvage edge. Stagger the laps of the metal foil flashing layer from lap seams in the reinforcing layer. Extend the flashing sheet a minimum of 4 inches beyond the toe of the cant onto the prepared surface of the finished roof and up the wall to the desired flashing height. Exert pressure on the flashing sheet during application to ensure complete contact with the wall/roof surfaces, preventing air pockets; this can be accomplished by using a damp sponge or shop rag. Check and seal all loose laps and edges. Nail the top edge of the flashing on 9 inch centers. (See manufacturer's schematic for visual interpretation)

D. Flashing Application - wood surfaces: Flash wood or plywood parapet walls and curbs using the reinforcing sheet and the metal foil flashing membrane. The reinforcing sheet shall have minimum 3 inch side laps and extend a minimum of 3 inches onto the base ply surface and to the top of the parapet wall or curb. Nail the reinforcing sheet through the field of the sheet to the vertical wood surface on 12 inch centers from the top of the cant to top of the wall or curb. Fully adhere the remainder of the flashing reinforcing sheet that extends over the cant and roof level. After the final roofing ply has been applied to the top of the cant, prepare the surface area that is to receive flashing coverage by torch heating granular surfaces or by application of asphalt primer; allowing primer to dry thoroughly. Torch apply the metal foil-faced flashing into place using three foot widths (cut off the end of roll) always lapping the factory selvage edge. Extend the flashing sheet a minimum of 4 inches beyond the toe of the cant onto the prepared surface of the finished roof and up the wall to the desired flashing height. Exert pressure on the flashing sheet during application to ensure complete contact with the wall/roof surfaces, preventing air pockets; this can be accomplished by using a damp sponge or shop rag. Check and seal all loose laps and edges. Attach the top edge of the flashing on 6 inch centers.

E. Use of Granule Powder: Broadcast powder over all bitumen overruns on the membrane surface while the bitumen is still hot to ensure a monolithic surface color.

F. Mechanically attach top edge of modified bitumen membrane flashing with screws, waterproof washers, and aluminum compression bar. Fastener spacing shall be 6" on center. Nailing top edge of modified bitumen membrane is not accepted.

G. Prime flashing surfaces with asphalt primer and permit to dry prior to application of modified bitumen membrane flashing. Apply asphalt primer at one gallon per 100 square feet minimum.

H. Metal surfaces are not acceptable for application of base flashing membrane.

I. Inside and Outside Corners: Cut out and install oval boot at inside and outside corners in accordance with manufacturer's requirements.

J. Extend hot asphalt ½" minimum beyond side, field, or end lap.

K. Fully bond flashing to substrate. Ensure flashing material conforms and adheres to vertical cant and horizontal substrates.

L. Bond flashing materials to substrate 100 percent.

3.07 METAL FLANGE FLASHINGS

A. Sheet metal flanges shall be 4" wide and flat, without creases or bends.

B. Set flanges in bed of plastic cement at one gallon per 100 linear foot of 4" wide flange.

C. Nail flanges 3" on center and stagger.

D. Prime metal surfaces with asphalt primer on both sides and permit to dry prior to application of modified bitumen flashing strip. Apply asphalt primer at one gallon per 100 sq. feet minimum.

E. Extend modified bitumen flashing strip 4" minimum beyond edge of sheet metal flange.

3.08 ROOF DRAIN FLASHING

A. Prime drain ring and apply 3" wide bed of roof cement to rim.

B. Extend all field plies beyond inside edge of clamp ring, fully imbedded in hot asphalt.

C. On top of field plies, set 36" sq. sheet of 4 lb. lead in bed of plastic cement.

D. Prime lead sheet and install modified bitumen sheet that extends 6" beyond lead flashing on each side.

E. Install deck clamp, clamp ring, bolts, fasteners and strainer, tightening all bolts to obtain full compression.

3.09 VENT FLASHINGS

A. Refer to sheet metal specification for fabrication and installation procedures.

B. Refer to "METAL FLANGE FLASHINGS" of this Section for flashing procedure.

3.10 PIPE FLASHINGS

A. Refer to sheet metal specification for fabrication and installation procedures.

B. Refer to "METAL FLANGE FLASHINGS" of this Section for flashing procedures.

3.11 DAILY SEAL

A. Install temporary water cut-offs at completion of each day's work and remove upon resumption of work.

B. Ensure that water does not flow beneath completed sections of membrane system, including completion of flashings, terminations, and daily seals. When possible, install starting at highest point of project area, working to lowest point.

C. Temporarily seal loose membrane edge with hot asphalt. Exercise caution to ensure that membrane is sealed near drains in manner to prevent water migration below membrane and not to impede drainage.

D. Install primary two-ply night seal beneath daily night seal in such manner to seal both new and existing roof system to roof deck to prevent moisture migration from either old roof or new roof.

E. Install daily night seals by extending new roof membrane beyond insulation and sealing to existing deck surface using hot asphalt.

F. When work is resumed, remove and dispose of membrane where asphalt or other sealants were previously applied before resuming installation.

3.12 WALK TREAD

A. Provide and install the manufacturers walk tread, a minimum of 32” x 32” continuously around each mechanical unit over the adhered aggregate surface.

B. Upon the completion of the aggregate surfacing, sweep back all loose aggregate from the area, and embed each walk tread to the adhered aggregate surface with an ample quantity of plastic roof cement.

3.13 FIELD QUALITY CONTROL

A. Follow procedures required by roof system manufacturer for samples, at Owner's request.

B. Repair sampled areas by filling in cut out area with material to match original construction. Feather in patch consisting of same number of plies as in roof specification following manufacturer's procedures.

C. Correct deficiencies in roof determined by roof sample analysis and as prescribed by roof system manufacturer. Costs for additional samples required will be borne by Contractor.

D. Water Testing: Perform water flood test of completed roof areas involved or associated with work under this Contract. Contractor shall, at his expense, correct deficiencies in these areas causing water leakage into facility or water retention on roof surface.

E. All roof membrane deficiencies i.e., fishmouths, dry laps, irregular or contaminated surfaces, etc. shall be corrected at the direction of the Owner, Architect, and/or Roof Consultant with a minimum of two plies of the specified felt and asphalt bitumen, and in accordance with manufacturer's recommended procedures at no cost to Owner.

3.14 ADJUSTING

A. Restore to original condition or replace work or materials damaged during handling of roofing materials.

3.15 CLEANING

A. Remove trash, debris, equipment, and parts from jobsite.

B. Remove stains from walls, walkways, and driveways.

C. Leave building interior free of roofing materials, debris, stains, bitumen, and drippage.

3.16 PROTECTION

A. Provide special protection or avoid traffic on completed work.

END OF SECTION

SECTION 07 6200
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fabricated sheet metal items, including flashings, counterflashings, gutters, and downspouts.

1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Wood nailers for sheet metal work.

1.03 REFERENCE STANDARDS

A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).

B. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.

C. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.

D. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.

E. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.

F. ASTM B749 - Standard Specification for Lead and Lead Alloy Strip, Sheet, and Plate Products; 2014.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before starting work of this section.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

C. Submit 12 inch long, completely finished units of specified factory-fabricated products exposed as finished work.

1.06 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA (ASMM) requirements and standard details, except as otherwise indicated.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

B. Prevent contact with materials that could cause discoloration or staining.

1.08 WARRANTY

A. Manufacturer’s Warranty: Provide manufacturer’s 20-year, non-prorated warranty covering color fade, chalking and film integrity for all “Kynar 500”: pre-finished metal.

B. Contractor’s Warranty: Provide Owner a written warranty which shall warrant sheet metal work to be free of leaks and defects in materials and workmanship for five (5) years after date of final acceptance by Owner.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Sheet Metal Manufacturers

1. Metal Building Components, Inc.: www.mbci.com
2. Petersen Aluminum Corporation: www.pac-clad.com
3. Vincent Brass and Aluminum Company: vincentmetals.com
4. Substitutions: See Section 01 6000 - Product Requirements

2.02 SHEET MATERIALS

A. At copings, edge metal, and flashing surfaces which are visible from ground: Stainless steel, ASTM A446, Grade A, G90 zinc coating, 24 gauge, or prefinished (Kynar 500).

B. At all flashings and counter flashings which are not visible from ground: Galvanized steel, ASTM A446, Grade A, G90 zinc coating, 24 gauge. For replacement equipment, stainless steel shall be used on permanent installations such as thru-wall and vertical expansion when approved by the Owner.

C. Aluminum: ASTM B209 (ASTM B209M); 0.032 inch thick; anodized finish of color as selected.
   1. Clear Anodized Finish: AAMA 611 AA-M12C22A41 Class I clear anodic coating not less than 0.7 mils thick.
   2. Color Anodized Finish: AAMA 611 AA-M12C22A42/44 Class I integrally or electrolytically colored anodic coating not less than 0.7 mils thick.

D. Pre-Finished Aluminum: ASTM B209 (ASTM B209M); 0.032 inch thick; plain finish shop pre-coated with fluoropolymer coating.
   1. Fluoropolymer Coating: High Performance Organic Finish, AAMA 2604; multiple coat, thermally cured fluoropolymer finish system.
   2. Color: As selected by Architect from manufacturer's full line of colors. Provide custom colors when needed to match other materials shown on the drawings or referenced in the Schedule of Materials and Colors.

E. Lead: ASTM B749, 2.5 lb/sq ft thick.

F. Stainless Steel: ASTM A666 Type 304, soft temper, 0.015 inch thick; smooth No. 4 finish.

2.03 ACCESSORIES

A. Fasteners: Same material and finish as flashing metal , with soft neoprene washers.
   1. Mechanical Fasteners
      a. Nails: Compatible with material fastened, flathead, wire, barbed, slating type.
      b. Washers: Lead or neoprene.
      c. Screws: Self-tapping sheet metal type compatible with material fastened.
      d. Rivets: Stainless steel and cadmium plated material, closed end, type and size as recommended by sheet metal manufacturer.
      e. Concrete and Masonry Fasteners
         1) Round-head stainless steel screw and neoprene washer with lead expansion anchor, FS FF-S-325, Group IV, Type II.
         2) Acceptable Product: Rawl Plug, The Rawl Plug Company, Inc.

B. Flashing Underlayment
   1. Grace Ultra and Vycor, a self-adhering membrane composed of high density, cross-laminated polyethylene film coated on one side with butyl rubber adhesive, and covered with a disposable silicone-coated release sheet, and conforms to the following physical properties:
   2. Color: Gray-Black
   3. Thickness: 0.76 mm (30 mil); ASTM D 3767 Method A
   4. Tensile Strength: 250 psi; ASTM D 412
   5. Elongation: 250%; ASTM D 412
   6. Low Temperature Flex: Unaffected at -20F
   7. Adhesion to Plywood: 525 N/m; ASTM D 903; (3.0 lb/in width)
   8. Permeance (Max): 2.9 ng/msPa; ASTM E 96

9. Material Weight: 1.1 kg/m (0.22lb/sq ft)

C. Mastic Sealant: One- or Two-Part Polyurethane; non-hardening, non-skinning, nondrying, non-migrating sealant.

D. Bituminous Coating: FS TT-C-494 or SSPC Paint 12, solvent type bituminous mastic, nominally free of sulfur, compounded for 15 mil dry film thickness per coat.

E. Adhesives: Type recommended by flashing sheet manufacturer for waterproof and weather resistant seaming and adhesive application of flashing sheet.

F. Metal Accessories: Sheet metal clips, straps, anchoring devices and similar accessory units as required for installation of work, matching or compatible with material being installed, non-corrosive, size and gauge required for performance.

G. Elastic Flashing Filler: Closed cell polyethylene or other soft closed cell material recommended by elastic flashing manufacturer as filler under flashing loops to ensure movement with minimum stress on flashing sheet.

H. Reglets: Metal or plastic units of type and profile indicated, compatible with flashing indicated, non-corrosive.

I. Flux: Phosphoric acid type, manufacturer’s standard. For use with steel or copper: Rosin flux

2.04 FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Fabricate cleats of same material as sheet, minimum four inches wide, interlocking with sheet.

C. Form pieces in longest possible lengths.

D. Hem exposed edges on underside 1/2 inch; miter and seam corners.

E. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

F. Lap joints 1-inch minimum. Rivet and solder joints on parts that are to be permanently and rigidly assembled.

G. Expansion Provisions: Where lapped or bayonet type expansion provisions in work cannot be used or would not be sufficiently waterproof or weatherproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant concealed within joints.

H. Sealant Joints: Where movable, non-expansion type joints are indicated or required for proper performance or work, form metal to provide for proper installation of Elastomeric sealant in compliance with SMACNA standards.

I. Tin edges of copper sheet to be soldered; solder shop formed metal joints, and after soldering, remove flux, wipe and wash solder joints clean; provide weathertight joints.

J. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.

K. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

L. Fabricate flashings to allow toe to extend 2 inches over roofing gravel. Return and brake edges.

2.05 FABRICATED ITEMS

A. Coping Cap Flashings:
   1. Stainless steel, ASTM A446, Grade A, G90 zinc coating, 24 gauge, or prefinished (Kynar 500)
   2. Provide expansion slip joints at maximum 10 feet on center.

B. Flashings and Counterflashings:

1. Minimum 24 gauge hot-dip galvanized steel formed in maximum 10 feet lengths.
2. All flashings and counterflashings exposed to view shall be Kynar 500 pre-finished galvanized steel

C. Drip Flashing:
1. Drip flashing shall be minimum 24 gauge Kynar 500 pre-finished galvanized steel formed in maximum 10 ft. lengths.

D. Roof Penetrations and Umbrella Counterflashing: Minimum 24 gauge hot-dip galvanized steel two piece construction, fabricated in accordance with approved shop drawings.

E. Metal Edge:
1. Minimum 24 gauge Kynar 500 pre-finished galvanized steel formed in maximum 10 ft. lengths.
2. Provide expansion slip joints at maximum 10 ft. on center.

F. Continuous Cleats: 22ga. continuous strips, hot dipped galvanized sheet metal.

G. Vent Pipe, Heat Vent Hoods, Sleeves, Pitch Pans, and Accessories: Minimum 24 gauge pre-finished, or hot-dip grip galvanized steel.

H. Gutters, Downspouts: Minimum 26 gauge Kynar 500 pre-finished galvanized steel. Lap joints minimum 3 inch. Seal laps with structural sealant and rivet. Coordinate downspouts with steel boots per drawings. Provide expansion joints in gutters per SMACNA guidelines, 50'-0" o.c. max.
1. Down Spout Boots: Stainless Steel, Piedmont Model #SO, min. 36” length.
a. Provide tamper proof, removable clean out cover.

I. Expansion and Control Joints: 24 gauge hot-dip galvanized steel formed in 10 ft. maximum lengths where possible. Fabricate in accordance with SMACNA reference details, Ref. Plate 5-5a, 5-5b for field installations; Ref. Plates 5-6a & 5-6b for wall conditions.

J. Vent Stack, Soil Vent, Flashing: 4 pound lead. Fabricate and install in accordance with approved shop drawings.

K. Vent Pipe Flashing: 24 gauge hot-dip galvanized steel.

L. Roof Drain Flashing: 2.5 pound lead sheet, minimum 36” x 36” square. Fabricate and install as shown in NRCA Roofing and Waterproofing Manual.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.

B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION

A. Install starter and edge strips, and cleats before starting installation.

B. Install surface mounted reglets true to lines and levels, and seal top of reglets with sealant.

C. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

3.03 INSTALLATION

A. Install sheet metal with lines, arises, and angles sharp and true, and plane surfaces free from objectionable wave, warp, or buckle. Exposed edges of sheet metal shall be folded back to form ¼ inch hem on concealed side from view. Finished work shall be free from water retention and leakage under all weather conditions. Pre-fabricated corners or transitions are required at changes in direction, elevation, or plane and at intersections. Locate field joints not less than 12 inches, nor more than 3 feet from actual corner. Laps shall be 1 inch, riveted and soldered at following locations: Prefabricated corners; transitions; changes in direction, elevation, and plane; and at intersections.

B. Anchor units of work securely in place to prevent damage or distortion from wind or buckling. Provide for thermal expansion of metal units; conceal fasteners where possible; and set units true to line and level as indicated. Install work with laps, joints and seams which are permanently watertight and weather proof.

C. Install fabricated sheet metal items in accordance with manufacturer's installation instructions and recommendations and with SMACNA Architectural Sheet Metal Manual.

D. Separations: Provide for separation of metal from non-compatible metal or corrosive substrates by coating concealed surfaces with zinc chromate, bituminous coating, or other permanent separation at locations or contact as recommended by manufacturer or fabricator. Do not use materials incompatible with roofing system.

E. Continuous Cleat: At exposed edges of gravel guards, fascias, coping cap and metal edge gravel guard and where required otherwise, attach galvanized continuous cleat nailed staggered at six (6) inches on center. Nails shall be annular threaded galvanized nails, with a minimum of 1.5 inches in length, and seated on the vertical flange of the cleat. Cleat shall be one gauge heavier than adjacent sheet metal item or a minimum of 22 gauge.

F. Flanges: Bed flanges of work in thick coat of bituminous roofing cement where required for waterproof performance.

G. Coping: Minimum 24 gauge pre-finished galvanized steel.

H. Coping Cap Flashings
   1. Install over underlayment and slip sheet.
   2. Lock bottom flanges to edge strips.
   3. Join sheets in accordance with SMACNA details.
   4. Fasten back of coping with fasteners and neoprene washers 8 inches on center through pre-drilled slotted holes.

I. Flashings and Counterflashings
   1. Extend flanges into reglet and securely fasten.
   2. Where nailing is required, nail at 6 inches on center.
   3. Overlap 4 inches on base flashing; lap ends at 3 inches.
   4. Or, depending on other construction, install counterflashing in reglets, either by snap in seal arrangement or by wedging in place with lead wedges at 8 inches on center for anchorage and filling reglet with elastomeric sealant as indicated and as required for specific exposure.
   5. All sheet metal counterflashing shall include a galvanized hook strip, placed a minimum of three feet on center or as required by local code or wind uplift requirement.

J. Metal Edge
   1. Install with allowance for movement between sections and seal with six (6) inch minimum cover plates.
   2. Extend flanges 4 inches onto roof surface.
   3. Install sealant between flange and substrate.
   4. Fasten 3 inches on center in two staggered rows.

K. Roof Penetration Hoods and Umbrella Counterflashings
   1. Install watertight hood or umbrella counterflashing at sleeves and penetration locations, such as pipes and conduit penetration roof, and at equipment supports and over pitch pans.
   2. Set umbrella counterflashing in sealant.
   3. Fully solder connections and seams and install in accordance with approved shop drawings.
   4. Tighten draw bands.
   5. Seal top of umbrella counterflashing with sealant.

L. Reglets
   1. Install reglets to receive counterflashing in manner and by methods indicated.
   2. Where shown in concrete, furnish reglets to trades of concrete work for installation as part of work in Division 3 Sections.
   3. Where shown in masonry, furnish reglets to trades of masonry work for installation as part of work in Division 4 Sections.

M. Expansion Joint Flanges
   1. Nail flanges of expansion joint units to curb nailers at maximum spacing of 6 inches.
   2. Fabricate seams at joints between units with minimum 3 inches overlap to form continuous waterproof system.

N. Drip Flashing
   1. Install over Rosin Paper.
   2. Furnish drip flashing to trades of masonry work for installation as part of work in specifications, Division 04 Sections.

O. Rooftop Unit Receiver Trim
   1. Install receiver flashing at rooftop units. Receiver clip shall allow RTU to be set on curb prior to roof membrane installation. Refer to drawings for detail.

3.04 CLEANING

A. Remove flux and residual acid immediately by neutralizing with baking soda and washing with clean water. Leave work clean and free of stains, scrap, and debris.

B. Clean exposed metal surfaces, removing substances which might cause corrosion of metal or deterioration of finishes.

C. Prime soldered area of phosphatized metal after cleaning to prevent rusting.

3.05 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for field inspection requirements.

B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

END OF SECTION

SECTION 07 7200
ROOF ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Manufactured curbs and equipment rails.

B. Equipment rails.

C. Roof hatches, manual and automatic operation, including smoke vents.

D. Pipe Stands.

1.02 RELATED REQUIREMENTS

A. Section 05 3100 - Steel Decking.

B. Section 07 6200 - Sheet Metal Flashing and Trim: Roof accessory items fabricated from sheet metal.

1.03 REFERENCE STANDARDS

A. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

B. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

C. FM (AG) - FM Approval Guide; current edition.

D. UL (DIR) - Online Certifications Directory; Current Edition.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used.
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
   4. Maintenance requirements.
   5. For smoke hatches, submit evidence of approval by evaluation agency specified.

C. Certificate: For smoke hatches, provide certificate of approval from authority having jurisdiction.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Remove protective wrapping immediately after installation.

C. Store products under cover and elevated above grade.

D. The contractor shall thoroughly inspect product upon receipt and report damaged material immediately to delivering carrier and note such damage on the carrier’s freight bill of lading.

1.06 WARRANTY

A. Comply with requirements of Section 01 7800 – Closeout Submittals.

B. Submit a written warranty, executed by the Contractor, Installer, and Manufacturer, agreeing to repair or replace roof accessories that fail in materials or workmanship within the specified warranty period.
   1. Roof Scuttle Warranty Period: Five (5) years after date of Substantial Completion.
   2. Automatic Smoke/Fire Vent Warranty Period: Five (5) years after date of Substantial Completion.

3. Roof Pipe Stands Warranty Period: One (1) year after date of Substantial Completion.

PART 2 PRODUCTS

2.01 ROOF CURBS

A. Manufacturers:
   1. Thybar Corporation: www.thybar.com.
   2. Substitutions: See Section 01 6000 - Product Requirements.

B. Roof Curbs Mounting Assemblies: Factory fabricated hollow sheet metal construction, internally reinforced, and capable of supporting superimposed live and dead loads and designated equipment load with fully mitered and sealed corner joints welded or mechanically fastened, and integral counterflashing with top and edges formed to shed water.
   1. Roof Curb Mounting Substrate: Curb substrate consists of standing seam metal roof panel system.
   2. Sheet Metal Material:
      a. Aluminum: 0.080 inch minimum thickness, with 3003 alloy, and H14 temper.
   3. Galvanized Steel: Hot-dip zinc coated steel sheet complying with ASTM A653/A653M, SS Grade 33; G60 coating designation; 18 gage, 0.048 inch thick.
   4. Fabricate curb bottom and mounting flanges for installation directly on metal roof panel system to match slope and configuration of system.
      a. Extend side flange to next adjacent roof panel seam and comply with seam configurations and seal connection, providing at least 6 inch clearance between curb and metal roof panel flange allowing water to properly flow past curb.
      b. Where side of curb aligns with metal roof panel flange, attach fasteners on upper slope of flange to curb connection allowing water to flow past below fasteners, and seal connection.
      c. Maintain at least 12 inch clearance from curb, and lap upper curb flange on underside of down sloping metal roof panel, and seal connection.
      d. Lap lower curb flange overtop of down sloping metal roof panel and seal connection.
   5. Provide layouts and configurations indicated on drawings.
   6. Curb shall be sized to allow space for flashing. Reference drawings for flashing detail. Roof curb shall allow for units to be set prior to roof material completion. Coordinate curb size with Mechanical drawings.

C. Curbs Adjacent to Roof Openings: Provide curb on each side of opening, with top of curb horizontal for equipment mounting.
   1. Provide preservative treated wood nailers along top of curb.
   2. Insulate inside curbs with 1-1/2 inch thick fiberglass insulation.
   3. Height Above Roof Deck: 18 inches, minimum.
   4. Model TC-2 for equipment support curbs.
   5. Model TC-3 for roof curbs.

D. Equipment Rail Curbs: Straight curbs on each side of equipment, with top of curbs horizontal and level with each other for equipment mounting.
   1. Equipment supports shall span a minimum of two structural members.
   2. Model TEMS-3 for equipment rails

2.02 ROOF HATCHES, MANUAL AND AUTOMATIC OPERATION

A. Roof Hatch Manufacturers:
   1. Babcock-Davis: www.babcockdavis.com/sle.
   2. Bilco Company: www.bilco.com/sle.
   3. Elmdor Stonemen: www.elmdorstoneman.com/#sle.
   4. Milcor, Inc: www.milcorinc.com.
   5. Nystrom, Inc: www.nystrom.com/#sle.

6. Substitutions: See Section 01 6000 - Product Requirements.

B. Roof Hatches and Smoke Vents: Factory-assembled aluminum frame and cover with finish coat of paint, complete with operating and release hardware. Color as selected.
   1. Style: Provide flat metal covers unless otherwise indicated.
      a. Basis of Design: Bilco Scuttle Type S, size width: 3'-0" x length: 2'-6". Length denotes hinge side. The roof scuttle shall be single leaf. The roof scuttle shall be pre-assembled from the manufacturer.
   2. Mounting: Provide frames and curbs suitable for mounting conditions as indicated on drawings.

C. Smoke and Heat Vents: Where "smoke" or "smoke/heat" operation is indicated, provide following additional features and omit manual operation for access.
   1. Basis of Design: Bilco Fire vent Type DSH, size: width (60”) x length (120”). Length denotes hinge side. The roof fire vent shall be double leaf. The roof fire vent shall be preassembled from the manufacturer.
   2. Smoke Release Mechanism: Automatic opening on melting of replaceable UL (DIR) listed fusible link at 165 deg F.
   3. UL (DIR) or FM (AG) listed as automatically operated smoke and heat vent.

D. Frames and Curbs: One-piece curb and frame with integral cap flashing to receive roof flashings; extended bottom flange to suit mounting.
   1. Insulation: Manufacturer's standard; 1 inch rigid glass fiber, located on outside face of curb.
   2. Curb Height: 12 inches from finished surface of roof, minimum.

E. Metal Covers: Flush, insulated, hollow metal construction.
   1. Capable of supporting 40 psf live load.
   2. Insulation: Manufacturer's standard 1 inch rigid glass fiber.
   3. Gasket: EPDM, continuous around cover perimeter.
   4. Entire scuttle shall be weather tight with fully welded corner joints on cover and curb.

F. Safety Railing System: Manufacturer's standard accessory safety rail system mounted directly to curb. Provide where hatch is located within 10' of the roof edge or as required by OSHA standards.
   1. Comply with 29 CFR 1910.23, with a safety factor of two.
   2. Posts and Rails: Fiberglass reinforced polymer.
   3. Gate: Same material as railing; automatic closing with latch.
   4. Finish: Manufacturer's standard; molded in integral safety yellow.
   5. Gate Hinges and Post Guides: ASTM B221 (ASTM B221M), 6063 alloy, T5 temper aluminum.
   6. Mounting Brackets: Hot dipped galvanized steel, 1/4 inch thick, minimum.
   7. Fasteners: Stainless steel, Type 316.

G. Hardware: Steel, zinc coated and chromate sealed, unless otherwise indicated or required by manufacturer.
   1. Lifting Mechanisms: Compression spring operator with shock absorbers that automatically opens upon release of latch; capable of lifting covers despite 10 psf load.
   2. Hinges: Heavy duty pintle type.
   3. Hold open arm with vinyl-coated handle for manual release.
   4. Latch: Upon closing, engage latch automatically and reset manual release.
   5. Manual Release: Pull handle on interior.
   6. Smoke Hatches: Manual release operation not to disturb automatic release mechanisms; easy resetting by Owner's maintenance personnel; provide latch designed to prevent relatching unless automatic release mechanism has been properly reset for automatic operation.

7. Locking: Padlock hasp on interior.

2.03 PIPE STANDS

A. Acceptable Manufacturers: Subject to compliance with requirements herein, provide products from one of the following manufacturers.
   1. Miro Industries, Inc.: www.miroind.com
   2. MAPA Products: www.mapaproducts.com
   3. Substitutions: See Section 01 6000 - Product Requirements.

B. Gas Piping
   1. Provide a "roller-bearing" pipe support used to support roof-mounted gas piping. Pipes rest on a self-lubricating roller system which is made of a stainless steel rod and a sturdy polycarbonate resin roller. The pipe support base is made of polycarbonate resin, the roller rod is made of glass-filled nylon, and all metal parts are made of stainless steel. Pipe stand will accommodate up to 4" pipe (inside diameter) up to 5" outside diameter pipes. Pipes shall be supported at a minimum distance of 6” off of the roof deck.
   2. Product Requirements
      a. Load Weight: Maximum load weight may not exceed 125 lbs. per pipestand.
      b. Model Number: 4-RAH – Miro Industries
      c. Size: Base - 9" x 15.12", with adjustment from 2.75" to 7.0" above roof membrane.
      d. Spacing: Not to exceed ten (10) foot centers.

C. Condensate Piping
   1. Provide a threaded rod "clamp" pipe support used to support roof-mounted condensate piping. Pipes are stabilized by a rubber cushion provides vibration isolator. System is made of a stainless steel rod and pipe clamp. The pipe support base is made of Molded 33% Fiberglass Reinforced 6/6 nylon. Support pad is .125 ml black Neoprene.
   2. Pipe stand will accommodate up to 2" copper pipe. Pipes shall be supported at a minimum distance of 6” off of the roof deck.
   3. Product Requirements
      a. Load Weight: Maximum load weight may not exceed 75 lbs. per pipestand.
      b. Model Number: MS-1 – MAPA Products
      c. Threaded rod: 3/8” - Grade 304 SS ATR
      d. Size: Base – 8” Octagonal, with an adjustment from 6" to 10" above roof membrane.
      e. Spacing: Not to exceed ten (10) foot centers.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using methods recommended by manufacturer for achieving acceptable results for applicable substrate under project conditions.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions, in manner that maintains roofing system weather-tight integrity.

B. Pipe Stands
   1. Pipe stand shall be adjusted in height to distribute load evenly.
   2. Provide an additional sheet of roofing material under all pipe stands.
   3. All loose aggregate shall be removed from the area directly beneath the pipe stand.

3.04 CLEANING

A. Clean installed work to like-new condition.

3.05 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 07 8400
FIRESTOPPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Firestopping systems.

B. Firestopping of all joints and penetrations in fire-resistance rated and smoke-resistant assemblies, whether indicated on drawings or not , and other openings indicated.

1.02 RELATED REQUIREMENTS

A. Section 01 1400 - Work Restrictions

B. Section 01 4533 - Code-Required Quality Control

C. Section 01 7000 - Execution and Closeout Requirements: Cutting and patching.

D. Section 09 2982 - Gypsum Board: Gypsum wallboard fireproofing.

1.03 REFERENCE STANDARDS

A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2022.

B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2013a (Reapproved 2017).

C. ASTM E2307 - Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus; 2015b, with Editorial Revision (2016).

D. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015 (Reapproved 2021)e1.

E. ITS (DIR) - Directory of Listed Products; Current Edition.

F. FM 4991 - Approval Standard for Firestop Contractors; 2013.

G. FM (AG) - FM Approval Guide; current edition.

H. SCAQMD 1168 - Adhesive and Sealant Applications; 1989, with Amendment (2022).

I. UL 1479 - Standard for Fire Tests of Penetration Firestops; Current Edition, Including All Revisions.

J. UL (FRD) - Fire Resistance Directory; Current Edition.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.

C. Product Data: Provide data on product characteristics, performance ratings, and limitations.

D. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.

E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

F. Certificate from authority having jurisdiction indicating approval of materials used.

G. Installer Qualification: Submit qualification statements for installing mechanics.

1.05 QUALITY ASSURANCE

A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with ASTM E119 and ASTM E814.

1. Listing in UL (FRD), FM (AG), or ITS (DIR) will be considered as constituting an acceptable test report.
2. Valid evaluation report published by ICC Evaluation Service, Inc. (ICC-ES) at www.icc-es.org will be considered as constituting an acceptable test report.
3. Submission of actual test reports is required for assemblies for which none of the above substantiation exists.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

C. Installer Qualifications: Company specializing in performing the work of this section and:
1. Approved by Factory Mutual Research Corporation under FM 4991

1.06 FIELD CONDITIONS

A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation; maintain minimum temperature before, during, and for three days after installation of materials.

B. Provide ventilation in areas where solvent-cured materials are being installed.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Firestopping Manufacturers:
1. 3M Fire Protection Products: www.3m.com/firestop/#sle.
2. A/D Fire Protection Systems Inc: www.adfire.com/#sle.
3. Everkem Diversified Products, Inc: www.everkemproducts.com/#sle.
4. Hilti, Inc: www.us.hilti.com/#sle.
5. Nelson FireStop Products: www.nelsonfirestop.com/#sle.
6. Specified Technologies Inc: www.stifirestop.com/#sle.
7. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com/#sle.
8. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MATERIALS

A. Firestopping Materials: Any materials meeting requirements.

B. Volatile Organic Compound (VOC) Content: Provide products having VOC content lower than that required by SCAQMD 1168.

C. Mold and Mildew Resistance: Provide firestoppping materials with mold and mildew resistance rating of zero(0) in accordance with ASTM G21.

D. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.

E. Fire Ratings: Refer to drawings for required systems and ratings.

2.03 FIRESTOPPING ASSEMBLY REQUIREMENTS

A. Perimeter Fire Containment Firestopping: Use system that has been tested according to ASTM E2307 to have fire resistance F Rating equal to required fire rating of floor assembly.

B. Head-of-Wall Joint System Firestopping at Joints Between Fire-Rated Wall Assemblies and Non-Rated Horizontal Assemblies: Use system that has been tested according to ASTM E2837 to have fire resistance F Rating equal to required fire rating of floor or wall, whichever is greater.

C. Floor-to-Floor, Wall-to-Wall, and Wall-to-Floor Joints, Except Perimeter, Where Both Are Fire-Rated: Use system that has been tested according to ASTM E1966 or UL 2079 to have fire resistance F Rating equal to required fire rating of the assembly in which the joint occurs.

D. Through Penetration Firestopping: Use system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.

2.04 FIRESTOPPING SYSTEMS

A. Firestopping: Any material meeting requirements.
   1. Fire Ratings: Use system that is listed by FM (AG), ITS (DIR), or UL (FRD) and tested in accordance with ASTM E814, ASTM E119, or UL 1479 with F Rating equal to fire rating of penetrated assembly and minimum T Rating Equal to F Rating and in compliance with other specified requirements.

B. Sealants or caulking materials for use with non-combustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT), the following products are acceptable:
   1. Hilti FS-ONE Intumescent Firestop Sealant
   2. Hilti CP 604 Self-Leveling Firestop Sealant
   3. Hilti CP 620 Fire Foam
   4. Hilti CP 606 Flexible Firestop Sealant
   5. Hilti CP 601s Elastomeric Firestop Sealant
   6. 3M Fire Stop Sealant 2000
   7. 3M Fire Barrier CP25 WB
   8. Tremco Tremstop Fyre-Sil Sealant

C. Sealants or caulking materials for use with sheet metal ducts, the following products are acceptable:
   1. Hilti CP 601s Elastomeric Firestop Sealant
   2. Hilti CP 606 Flexible Firestop Sealant
   3. Hilti FS-ONE Intumescent Firestop Sealant

D. Sealants, caulking or spray materials for use with fire-rated construction joints and other gaps, the following products are acceptable:
   1. Hilti CFS-SP WB Firestop Joint Spray
   2. Hilti CP 601s Elastomeric Firestop Sealant
   3. Hilti CP 606 Flexible Firestop Sealant
   4. Hilti CP 604 Self-Leveling Firestop Sealant
   5. 3M Firestop Sealant 2000
   6. Tremco Tremstop Fyre-Sil Sealant

E. Intumescent sealants or caulking materials for use with combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe, the following products are acceptable:
   1. Hilti FS-ONE Intumescent Firestop Sealant
   2. 3M Fire Barrier CP25 WB
   3. Tremco Tremstop WBM Intumescent Firestop Sealant

F. Intumescent sealants, caulking or putty materials for use with flexible cable or cable bundles, the following products are acceptable:
   1. Hilti FS-ONE Intumescent Firestop Sealant
   2. Hilti CP 618 Firestop Putty Stick
   3. 3M Fire Barrier CP25 WB
   4. Tremco Tremstop WBM Intumescent Firestop Sealant

G. Intumescent sealants, caulking or putty materials for use with flexible cable or cable bundles, the following products are acceptable:
   1. Hilti FS-ONE Intumescent Firestop Sealant
   2. Hilti CP 618 Firestop Putty Stick
   3. 3M Fire Barrier CP25 WB

4. Tremco Tremstop WBM Intumescent Firestop Sealant

H. Non curing, re-penetrable intumescent sealants, caulking or putty materials for use with flexible cable or cable bundles, the following products are acceptable:
   1. Hilti CP 618 Firestop Putty Stick

I. Non curing, re-penetrable intumescent sealants, caulking or putty materials for use with flexible cable or cable bundles, the following products are acceptable:
   1. Hilti CP 618 Firestop Putty Stick

J. Wall opening protective materials for use with UL listed metallic and specified nonmetallic outlet boxes, the following products are acceptable:
   1. Hilti CP 617 Firestop Putty Pad

K. Firestop collar or wrap devices attached to assembly around combustible plastic pipe (closed and open piping systems), the following products are acceptable:
   1. Hilti CP 642 Firestop Collar
   2. Hilti CP 643 Firestop Collar
   3. Hilti CP 645 Firestop Wrap Strip
   4. 3M Fire Barrier PPD Plastic Pipe Device

L. Cast-in place firestop devices for use with non-combustible and combustible plastic pipe (closed and open piping systems) penetrating concrete floors, the following products are acceptable:
   1. Hilti CP 680 Cast-In Place Firestop Device
   2. Hilti CP 681 Tub Box Kit for use with tub installations

M. Materials used for large size/complex penetrations made to accommodate multiple steel and cooper pipes, electrical busways in raceways, the following products are acceptable:
   1. Hilti FS 635 Trowelable Firestop Compound
   2. Hilti FS 657 FIRE BLOCK
   3. Hilti CP 620 Fire Foam
   4. 3M Firestop Foam 2001
   5. 3M Fire Barrier CS-195 Composite Sheet

N. Cables passing through fire-rated floors or walls shall pass through fire-rated wiring devices which contain an intumescent insert material that adjusts automatically to cable additions or subtractions.
   1. Hilti FS 657 FIRE BLOCK
   2. Specified Technologies Inc., EZ-PATH Fire Rated Pathway

O. Sealants or caulking materials used for openings between structurally separate sections of wall and floors, the following products are acceptable:
   1. Hilti CP 672 Firestop Spray
   2. Hilti CP 601s Elastomeric Firestop Sealant
   3. Hilti CP 606 Flexible Firestop Sealant
   4. Hilti CP 604 Self-Leveling Firestop Sealant
   5. 3M Fire Barrier CP 25 WB

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify openings are ready to receive the work of this section.

3.02 PREPARATION

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other materials that could adversely affect bond of firestopping material.

B. Remove incompatible materials that could adversely affect bond.

C. Install backing materials to prevent liquid material from leakage.

3.03 INSTALLATION

A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.

B. Do not cover installed firestopping until inspected by authorities having jurisdiction.

C. Install labeling required by code.

3.04 FIELD QUALITY CONTROL

A. A Special Inspection and Testing Agency (SITA) will perform field quality control tests and inspections, as specified in Sections 01 4516 and 01 4533.

B. Repair or replace penetration firestopping and joints at locations where inspection results indicate firestopping or joints do not meet specified requirements.

3.05 CLEANING

A. Clean adjacent surfaces of firestopping materials.

3.06 PROTECTION

A. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 07 9200
JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Self-leveling pourable joint sealants.

B. Joint backings and accessories.

1.02 RELATED REQUIREMENTS

A. Section 01 4000 – Quality Requirements

B. Section 03 3000 – Cast-In-Place Concrete

C. Section 04 2000 – Unit Masonry

D. Section 07 6200 – Sheet Metal Flashing and Trim

1.03 REFERENCE STANDARDS

A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2015 (Reapproved 2022).

B. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications; 2022.

C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.

D. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.

E. ASTM C1311 - Standard Specification for Solvent Release Sealants; 2022.

F. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2018.

G. ASTM C1521 - Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints; 2019 (Reapproved 2020).

H. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2015 (Reapproved 2021).

I. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2016 (Reapproved 2021).

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Submit manufacturer's technical datasheets for each product to be used; include the following:
   1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
   2. List of backing materials approved for use with the specific product.
   3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
   4. Substrates the product should not be used on.
   5. Substrates for which use of primer is required.

C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.

D. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

E. Samples for Verification: Where custom sealant color is specified, obtain directions from Architect and submit at least two physical samples for verification of color of each required sealant.

F. Executed warranty.

G. Submit Material Safety Data Sheets under provisions of Section 01 7800 – Closeout Submittals for the following items:
   1. All mastics, glues, and adhesives
   2. Sealant (interior use only)

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten (10) years experience.

B. Installer Qualifications: Company specializing in performing the work of this section and with at least five (5) years of experience.

C. Field Adhesion Tests of Joints: Test for adhesion using most appropriate method in accordance with ASTM C1521, or another applicable method as recommended by manufacturer.
   1. All joint sealants shall be field tested for proper adhesion to the joint substrates prior to installation. Do not proceed with the work until job site tests have been approved by the Architect.
   2. Locate and provide test joints for each type of joint sealant, and substrate as directed by the Architect.
   3. Acceptable test joints will be used as the standard for all joint sealant work on the project.
      a. Sealants which fail to adhere to the substrates shall be removed and replaced at no extra cost to the Owner.

1.06 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

B. Installer's Warranty: Correct defective work within a five (5) year period after Date of Substantial Completion.

C. Manufacturer Warranty:
   1. Silicone Exterior Joint Sealants: Twenty (20) years.
   2. Polyurethane Exterior Joint Sealants: Minimum five (5) years.
   3. All warranties shall include coverage for installed sealants and accessories that fail to achieve watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Nonsag Sealants:
   1. Dow Chemical Company: consumer.dow.com/en-us/industry/ind-building-construction.html/#sle.
   2. Hilti, Inc: www.us.hilti.com/#sle.
   3. Master Builders Solutions: www.master-builders-solutions.com
   4. Momentive Performance Materials, Inc (formerly GE Silicones): www.momentive.com/#sle.
   5. Pecora Corporation: www.pecora.com/#sle.
   6. Sika Corporation: www.usa-sika.com/#sle.
   7. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com/#sle.
   8. Substitutions: See Section 01 6000 - Product Requirements.

B. Self-Leveling Sealants:
   1. Dow Chemical Company: consumer.dow.com/en-us/industry/ind-building-construction.html/#sle.
   2. Master Builders Solutions: www.master-builders-solutions.com
   3. Pecora Corporation: www.pecora.com/#sle.

4. Sika Corporation: www.usa-sika.com/#sle.
5. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com/#sle.
6. Substitutions: See Section 01 6000 - Product Requirements.

2.02 JOINT SEALANT APPLICATIONS

A. Scope:
   1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to:
      a. Wall expansion and control joints.
      b. Joints between door, window, and other frames and adjacent construction.
      c. Joints between different exposed materials.
      d. Openings below ledge angles in masonry.
      e. Other joints indicated below.
   2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
      a. Joints between door, window, and other frames and adjacent construction.
      b. In sound-rated wall and ceiling assemblies, gaps at electrical outlets, wiring devices, piping, and other openings; between wall/ceiling and other construction; and other flanking sound paths.
         1) Exception: Such gaps and openings in gypsum board and plaster finished stud walls and suspended ceilings.
         2) Exception: Through-penetrations in sound-rated assemblies that are also fire-rated.
      c. Saw cut joints to be sealed prior to application of clear concrete floor sealer.
      d. Other joints indicated below.
   3. Do not seal the following types of joints:
      a. Intentional weep holes in masonry.
      b. Joints indicated to be treated with manufactured expansion joint cover, or some other type of sealing device.
      c. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
      d. Joints where installation of sealant is specified in another section.
      e. Joints between suspended panel ceilings/grid and walls.

B. Exterior Joint Sealant Schedule:
   1. Joint Type EJS-1: Vertical joints in exterior walls: Silicone, non-sag, non-staining sealant, minimum of Class 50, unless otherwise indicated.
   2. Joint Type EJS-2: Lap Joints in Sheet Metal Fabrications: Butyl rubber, non-curing.
   3. Joint Type EJS-3: Lap Joints between Manufactured Metal Panels: Butyl rubber, non-curing.
   4. Joint Type EJS-4: Control and Expansion Joints in Concrete Paving: Self-leveling polyurethane "traffic-grade" sealant.

C. Interior Joint Sealant Schedule: Use non-sag polyurethane sealant, unless otherwise indicated. Interior sealants shall be tamper resistant.
   1. Joint Type IJS-1: Wall and Ceiling Joints in Non-Wet Areas: Acrylic emulsion latex sealant.
   2. Joint Type IJS-2: Wall and Ceiling Joints in Wet Areas: Non-sag polyurethane sealant for continuous liquid immersion.
   3. Joint Type IJS-3: Floor Joints in Wet Areas: Non-sag polyurethane " -traffic-grade" sealant suitable for continuous liquid immersion.
   4. Joint Type IJS-4: Wall, Ceiling, and Floor Joints Where Tamper-Resistance is Required: Non-sag tamper-resistant polyurethane sealant.

5. Joint Type IJS-5: Joints between Fixtures in Wet Areas and Floors, Walls, and Ceilings: Mildew-resistant silicone sealant; white.
6. Joint Type IJS-6: In Sound-Rated Assemblies: Acrylic emulsion latex sealant.
7. Joint Type IJS-7: Narrow Control Joints in Interior Concrete Slabs: Self-leveling polyurethane sealant.
8. Joint Type IJS-8: Other Floor Joints: Self-leveling polyurethane "traffic-grade" sealant.

D. Interior Wet Areas: Bathrooms, restrooms, kitchens, food service areas, and food processing areas; fixtures in wet areas include plumbing fixtures, food service equipment, countertops, cabinets, and other similar items.

E. Sound-Rated Assemblies: Walls and ceilings identified as STC-rated, sound-rated, or acoustical.

F. Areas Where Tamper-Resistance is Required: As indicated on drawings.

2.03 SELF-LEVELING JOINT SEALANTS

A. Type IJS-7 - Self-Leveling Polyurethane Sealant: ASTM C920, Grade P, Uses M and A; single or multi-component; explicitly approved by manufacturer for traffic exposure; not expected to withstand continuous water immersion .
1. Movement Capability: Plus and minus 25 percent, minimum.
2. Hardness Range: 35 to 55, Shore A, when tested in accordance with ASTM C661.
3. Color: Gray.
4. Service Temperature Range: Minus 40 to 180 degrees F.

B. Type IJS-8 at horizontal expansion joint locations - Self-Leveling Polyurethane Sealant for Horizontal Expansion Joints: ASTM C920, Grade P, Uses T, M and O; multi-component; explicitly approved by manufacturer for horizontal expansion joints.
1. Movement Capability: Plus and minus 25 percent, minimum.
2. Hardness Range: 30 to 35, Shore A, when tested in accordance with ASTM C661.
3. Color: Limestone.
4. Tensile Strength: 200 to 250 psi in accordance with ASTM D412.

C. Type EJS-4, IJS-8 - Self-Leveling Polyurethane Sealant for Continuous Water Immersion: Polyurethane; ASTM C920, Grade P, Uses M and A; single or multi-component; explicitly approved by manufacturer for traffic exposure and continuous water immersion.
1. Movement Capability: Plus and minus 25 percent, minimum.
2. Hardness Range: 35 to 55, Shore A, when tested in accordance with ASTM C661.
3. Color: Gray.
4. Service Temperature Range: Minus 40 to 180 degrees F.

D. Type IJS-6 - High Quality Latex-Based Sound Sealant: ASTM C834, Type OP an opaque sealant, and Grade 0 Degrees C (32 Degrees F) meets requirements for low-temperature flexibility.
1. Color: White.

E. Type EJS-4 locations as applicable - Semi-Self-Leveling Polyurethane Sealant: Intended for expansion joints in sidewalks, swimming pool decks, plazas, floors and other horizontal surfaces with up to 6 percent slope.
1. Composition: Single or multicomponent.
2. Durometer Hardness, Type A: 35 to 45, minimum, when tested in accordance with ASTM D2240.
3. Color: Match adjacent finished surfaces.

F. Sealant colors to be approved by owner.

G. All exposed slab saw cuts/control joints are to be sealed with appropriate sealant type.

2.04 ACCESSORIES

A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
   1. Horizontal: ASTM C1330; Type C - Closed Cell Polyethylene.
   2. Vertical: ASTM C1330; Type B - Bi-Cellular Polyethylene.
   3. Closed Cell and Bi-Cellular: 25 to 33 percent larger in diameter than joint width.

B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.

C. Masking Tape: Self-adhesive, nonabsorbent, nonstaining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.

D. Joint Cleaner: Noncorrosive and nonstaining type, type recommended by sealant manufacturer; compatible with joint forming materials.

E. Primers: Type recommended by sealant manufacturer to suit application; nonstaining.

F. Flexible Polyurethane Foam: Single-component, gun grade, and low-expanding.
   1. Color: White.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that joints are ready to receive work.

B. Verify that backing materials are compatible with sealants.

C. Verify that backer rods are of the correct size.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

E. Concrete Floor Joints That Will Be Exposed in Completed Work: Test joint filler in an inconspicuous area to verify that it does not stain or discolor slab. All saw cut control joints to be cleaned, caulked and filled.

3.03 INSTALLATION

A. Install this work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Provide joint sealant installations complying with ASTM C1193.

C. Install acoustical sealant application work in accordance with ASTM C919.

D. Measure joint dimensions and size joint backers to achieve the following, unless otherwise indicated:
   1. Width/depth ratio of 2:1.
   2. Neck dimension no greater than 1/3 of the joint width.
   3. Surface bond area on each side not less than 75 percent of joint width.

E. Install bond breaker backing tape where backer rod cannot be used.

F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.

G. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.

H. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

I. Concrete Floor Joint Filler: After full cure, shave joint filler flush with top of concrete slab.

END OF SECTION

SECTION 07 9513
EXPANSION JOINT COVER ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Expansion joint cover assemblies for floor, wall, ceiling, and soffit surfaces.

1.02 RELATED REQUIREMENTS

A. Section 03 1000 - Concrete Forming and Accessories: Placement of joint cover assembly frames in formwork.

B. Section 04 2000 - Unit Masonry: Placement of joint cover assembly frames in masonry.

1.03 REFERENCE STANDARDS

A. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

B. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

C. ASTM B308/B308M - Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles; 2020.

D. ITS (DIR) - Directory of Listed Products; Current Edition.

E. UL (DIR) - Online Certifications Directory; Current Edition.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Installation Templates: For frames and anchors to be embedded in concrete or masonry, furnish templates to relevant installers; include installation instructions and tolerances.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide joint assembly profiles, profile dimensions, anchorage devices and available colors and finish.

C. Shop Drawings: Indicate joint and splice locations, miters, layout of the work, effected adjacent construction and anchorage locations.

D. Samples: Submit two samples six inch long, illustrating profile, dimension, color, and finish selected of each specified product.

E. Manufacturer's Installation Instructions: Indicate rough-in sizes and required tolerances for item placement.

F. Submit Material Safety Data Sheets under provisions of Section 01 7800 – Closeout Submittals for the following items:
   1. All mastics, glues, and adhesives
   2. Thermal insulation (excluding fiberglass, foam, rubber)
   3. Fireproofing
   4. Sealant (interior use only)

G. Certificates - Material test reports from qualified independent testing laboratory indicating and interpreting test results relative to compliance of fire-rated expansion joint assemblies with requirements indicated.

1.06 QUALITY ASSURANCE

A. Materials and work shall conform to the latest edition of reference specifications specified here-in and to all applicable codes and requirements of local authorities having jurisdiction.

B. Fire Performance Characteristics - Where indicated, provide expansion joint cover assemblies identical to those of assemblies whose fire resistance has been determined per ANSI/UL 263, NFPA 251, U.B.C. 43-1, or rated period by Underwriters Laboratories, Inc.
   1. Fire Rating - Not less than the rating of adjacent construction.

C. Loading Characteristics - Standard floor covers should be designed to withstand a maximum point load of 500 lbs. without damage or permanent deformation. Heavy-duty covers should withstand a point load of 2,000 lbs.

D. Single-Source Responsibility - Obtain expansion joint cover assemblies from one source from a single manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Expansion Joint Cover Assemblies:
   1. Balco; a CSW Industrials Company: www.balcousa.com
   2. Construction Specialties, Inc: www.c-sgroup.com.
   3. EMSEAL Joint Systems, Ltd: www.emseal.com/#sle.
   4. Erie Metal Specialties, Inc.: www.eriemetal.com.
   5. Inpro: www.inprocorp.com/#sle.
   6. MM Systems Corp: www.mmsystemscorp.com.
   7. Nystrom, Inc: www.nystrom.com.
   8. Watson Bowman Acme Corp.: www.watsonbowmanacme.com.
   9. Substitutions: See Section 01 6000 - Product Requirements.

2.02 EXPANSION JOINT COVER ASSEMBLY APPLICATIONS

A. Floor Joints at all types of Floor Finish :
   1. C-S Group; Model GFT-100 X 2 Floor to Floor Transition
   2. C-S Group; Model GFTW-100 X 2 Floor to Wall Transition
   3. C-S Group; Model PC-100 Floor to Floor Plate Cover

B. Floor Joints at all types of Floor Finish at existing concrete floor slab locations:
   1. C-S Group; Model GFPS-100 Floor to Floor Transition
   2. C-S Group; Model GFPSW-100 Floor to Wall Transition

C. Wall Joints at all types of Walls, Surface Mounted:
   1. C-S Group; Model ASM-100 Flat
   2. C-S Group; Model ASMC-100 Corner Transition

D. Ceiling Joints at Suspended Acoustic Ceiling Finish:
   1. C-S group; Model HC-100 Flat
   2. C-S Group; Model HCW-100 Wall to Ceiling Transition

E. Ceiling Joints at Gypsum Board Ceiling Finish:
   1. C-S Group; Model FWF-100 Flat
   2. C-S Group; Model FWFC-100 Wall to Ceiling Transition

F. Interior/Exterior Fire-Rated Wall Joints Subject to Thermal Movement:
   1. Manufacturers:
      a. EMSEAL Joint Systems, Ltd; Emshield WFR2 System: www.emseal.com/#sle.
      b. Substitutions: See Section 01 6000 - Product Requirements.

G. Parking/Bridge Deck Joints:
   1. Manufacturers:
      a. EMSEAL Joint Systems, Ltd; Emshield DFR2 system: www.emseal.com/#sle.
      b. Substitutions: See Section 01 6000 - Product Requirements.

2.03 EXPANSION JOINT COVER ASSEMBLIES

A. Expansion Joint Cover Assemblies - General: Factory-fabricated and assembled; designed to completely fill joint openings, sealed to prevent passage of air, dust, water, smoke; suitable for traffic expected.
   1. Joint Dimensions and Configurations: As indicated on drawings.
   2. Joint Cover Sizes: Selected to suit joint width and configuration, based on manufacturer's published recommendations and limitations.
   3. Lengths: Provide covers in full lengths required; avoid splicing wherever possible.
   4. Anchors, Fasteners, and Fittings: Provided by cover manufacturer.

B. Floor Joint Covers: Coordinate with indicated floor coverings.
   1. If floor covering is not indicated, obtain instructions from Architect before proceeding.
   2. If style is not indicated, provide extruded aluminum frame both sides, resilient seals, and minimize exposed metal.

C. Resilient Seal Type Covers: Having flat exposed surface without crevices that could collect dirt; designed to withstand expected movement without extrusion of seal from joint assembly; for floors, provide style that is flush with top of floor covering; for exterior joints, weathertight.

D. Sliding Cover Plate Type Covers: Provide plate with beveled edges and neat fit that does not collect dirt.

E. Covers In Gypsum Board Assemblies: Provide style with anchoring wings that can be completely covered by joint compound.

F. Covers In Fire Rated Assemblies: Provide cover assembly having fire rating equivalent to that of assembly into which it is installed.
   1. Acceptable Evaluation Agencies: UL (DIR) and ITS (DIR).

2.04 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper; or ASTM B308/B308M, 6061 alloy, T6 temper.
   1. Exposed Finish Outdoors: Natural anodized.
   2. Exposed Finish at Floors: Mill finish or natural anodized.
   3. Exposed Finish at Walls and Ceilings: Natural anodized.

B. Resilient Seals:
   1. For Ceilings: Any resilient material, flush, pleated, or hollow gasket.
   2. Color: Floor: Gray Ceilings: White.

C. All joints specified for 1" wide. Wider joints, if indicated on the drawings, shall be same model series.

D. Anchors and Fasteners: As recommended by cover manufacturer.

E. Ferrous Metal Anchors: Galvanized where embedded in concrete or in contact with cementitious materials.

F. Threaded Fasteners: Aluminum.

G. Backing Paint for Aluminum Components in Contact with Cementitious Materials: Asphaltic type.

H. Provide manufacturers associated fire barrier at fire rated walls and floors.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine the area and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

B. Verify that joint preparation and dimensions are acceptable and in accordance with manufacturer's requirements.

C. Verify that frames and anchors installed by others are in correct locations and suitable for installation of remainder of assembly.

3.02 PREPARATION

A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

3.03 INSTALLATION

A. Install components and accessories in accordance with manufacturer's instructions.

B. Align work plumb and level, flush with adjacent surfaces.

C. Rigidly anchor to substrate to prevent misalignment.

3.04 PROTECTION

A. Do not permit traffic over unprotected floor joint surfaces.

B. Provide strippable coating to protect finish surface.

END OF SECTION

SECTION 08 1113
HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Non-fire-rated hollow metal doors and frames.

B. Hollow metal frames for wood doors.

C. Fire-rated hollow metal doors and frames.

D. Thermally insulated hollow metal doors with frames.

E. Hollow metal borrowed lites glazing frames.

F. Accessories, including glazing, louvers, matching panels, and removable stops and astragals.

1.02 RELATED REQUIREMENTS

A. Section 08 7100 - Door Hardware.

B. Section 08 8000 - Glazing: Glass for doors and borrowed lites.

C. Section 09 9000 - Painting and Coating: Field painting.

1.03 REFERENCE STANDARDS

A. 2012 TAS - Texas Accessibility Standards; 2012.

B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

C. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2017.

D. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.

E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.

F. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2021.

G. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2018a.

H. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2016.

I. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

J. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.

K. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.

L. NAAMM HMMA 840 - Guide Specifications For Receipt, Storage and Installation of Hollow Metal Doors and Frames; 2007.

M. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2014.

N. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2019.

O. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2013.

P. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced standards/guidelines.

C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.

D. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.

E. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.

F. Submit Material Safety Data Sheets under provisions of Section 01 7800 – Closeout Submittals for the following items:
   1. All mastics, glues, and adhesives
   2. Thermal insulation (excluding fiberglass, foam, rubber)
   3. Sealant (interior use only)
   4. Fire doors (insulating material)

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years documented experience.

B. Maintain at project site copies of reference standards relating to installation of products specified.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Hollow Metal Doors and Frames:
   1. Ceco Door, an Assa Abloy Group company: www.assaabloydss.com/#sle.
   2. Curries, an Assa Abloy Group company: www.assaabloydss.com/#sle.
   3. Deansteel Manufacturing, Inc.: www.deansteel.com.
   4. Fleming Door Products, an Assa Abloy Group company: www.assaabloydss.com/#sle.
   5. Mesker, dormakaba Group: www.meskeropeningsgroup.com/#sle.
   6. Pearland Industries, Inc.: www.pearlandindustries.com
   7. Republic Doors, an Allegion brand: www.republicdoor.com/#sle.
   8. Rocky Mountain Metals, Inc.: www.rockymountainmetals.com.
   9. Steelcraft, an Allegion brand: www.allegion.com/sle.
   10. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

A. Requirements for Hollow Metal Doors and Frames:
   1. Steel Sheet: Comply with one or more of the following requirements; galvannealed steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
   2. Accessibility: Comply with ICC A117.1, 2012 TAS and ADA Standards.
   3. Typical Door Face Sheets: Flush.

4. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
5. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
6. Zinc Coating for Typical Interior and/or Exterior Locations: Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvannealed) by the hot-dip process in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness, unless noted otherwise for specific hollow metal doors and frames.
    a. Based on NAAMM HMMA Custom Guidelines: Provide at least A25/ZF75 (galvannealed) for interior applications, and at least A60/ZF180 (galvannealed) or G60/Z180 (galvanized) for corrosive locations.

B. Hollow Metal Panels: Same construction, performance, and finish as doors.

C. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

D. Doors at interior locations shall be manufactured of cold rolled, or annealed steel. Doors must be of continuously welded, seamless construction with all angles, molds, returns and miters neatly welded and all weld beads ground smooth for finishing.

E. Doors at exterior locations shall be manufactured of A60 galvannealed or G60 hot dipped galvanized steel. Doors must be of continuously welded, seamless construction with all angles, molds, returns, and miters neatly welded and all weld beads ground smooth for finishing. All exterior doors shall seal tightly and not allow insect pests easy access to the buildings.

F. Face sheets of 16 gauge steel reinforced and sound-deadened by 22 gauge formed steel vertical stiffeners spaced not less than 6” o.c. and attached to face sheets by spot welds not less than 5” o.c. Vertical stiffeners at exterior door locations shall be galvannealed or hot dip galvanized. Voids between vertical stiffeners shall be filled with fiberglass batting.

G. Top and bottom edges closed with continuous recessed steel channels, of not less than 16 gauge, spot welded to both faces. Top edge of exterior doors sealed flush with welded in place closing channel to exclude water.

H. Overlapping steel astragals for pairs of labeled doors as required by manufacturer to meet codes.

I. Doors and frames are to be prepared to receive mortise type hardware and at hinge, lock, latch, and all other hardware locations, reinforcing plates shall be spot welded to the inner surface of the jambs, where applicable. Hinge reinforcements shall not be less than 7 gauge steel. All top hinge reinforcements to incorporate manufacturer’s optional high frequency hinge reinforcement or full jamb depth hinge reinforcement. All other hardware reinforcements shall be not less than 12 gauge steel. Where door closers or brackets are to be installed, reinforcing plates shall be not less than 12 gauge steel. Twenty-four gauge galvanized steel plaster guards are to be spot welded over the hardware reinforcing plates. Provide 12 gauge reinforcement, for full height of door leaf, welded inside throat of frame to door rabbet wherever continuous geared hinges are scheduled. Provide 1/2” polystyrene, Celotex, or similar material, adhesive attached to the continuous hinge reinforcement inside the throat of the frame wherever continuous geared hinges are scheduled. Necessary holes for field installation of mortise type hardware shall be drilled and tapped from templates, which are to be furnished to the frame manufacturer by the hardware contractor. Provide suitable reinforcements for surface applied hardware, but no drilling or tapping is to be done at the factory for application of surface applied hardware. Prepare frames for silencers.

J. All glazing trim shall either be an integral part of the door face on the secure side with a removable bead flush with the opposite door face or metal glass light trim with a projection not to exceed 3/32” from either door face,

2.03 FULL AND TWO-LIGHT DOORS

A. Doors at interior locations shall be manufactured of cold rolled, or annealed steel. Doors must be of welded, seamless tubular stile and rail construction with all angles, tube intersections, molds, returns and miters neatly welded and all weld beads ground smooth for finishing. Visible seams on door faces are not acceptable.

B. Doors at exterior locations shall be manufactured of A60 galvannealed or G60 hot dipped galvanized steel. Doors must be of welded, seamless tubular stile and rail construction with all angles, tube intersections, molds, returns and miters neatly welded and all weld beads ground smooth for finishing. Visible seams on door faces are not acceptable.

C. Face sheets of 16 gauge steel. Voids in tubular members shall be filled with fiberglass batting.

D. Vertical stiles, top rail, and intermediate rail (if detailed) shall be of 6” nominal construction. Tubular construction of top rail shall provide a flush top surface to exclude water and moisture. Bottom rail shall be of 12” nominal construction.

2.04 HOLLOW METAL DOORS

A. Exterior Doors: Thermally insulated.
   1. Core Material: Manufacturers standard core material/construction and in compliance with requirements.
   2. Door Thermal Resistance: R-Value of 6 minimum.
   3. Door Thickness: 1-3/4 inch, nominal.
   4. Top Closures: Flush with top of faces and edges.
   5. Weatherstripping: Refer to Section 08 7100.

B. Interior Doors, Non-Fire Rated:
   1. Door Core Material: Vertical steel stiffeners.
   2. Door Thickness: 1-3/4 inch, nominal.

C. Fire-Rated Doors:
   1. Fire Rating: As indicated on drawings, tested in accordance with UL 10C ("positive pressure").
      a. Temperature-Rise Rating (TRR) Across Door Thickness: In accordance with local building code and authorities having jurisdiction.
      b. Provide units listed and labeled by UL (Underwriters Laboratories) - UL (BMD).
      c. Attach fire rating label to each fire rated unit.
   2. Core Material: Vertical steel stiffeners.
   3. Door Thickness: 1-3/4 inch, nominal.

2.05 HOLLOW METAL FRAMES

A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.

B. Exterior Door Frames: Full profile/continuously welded type.
   1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A40/ZF120 coating.
   2. Frame Metal Thickness: 14 gage, 0.067 inch, minimum.
   3. All angles, molds, returns and miters neatly welded and all weld beads ground smooth for finishing.
   4. Weatherstripping: Separate, see Section 08 7100.

C. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.
   1. Frame Metal Thickness: 14 gage, 0.067 inch or 16 gage, 0.053 inch, minimum.

2. Three-sided frames for single doors up to and including 4’-0” in width shall be manufactured of 16 gauge steel. Frames for pairs of doors 6’-0” and over, all sidelight frames, and all borrowed light frames shall be manufactured of 14 gauge steel. All angles, molds, returns and miters neatly welded and all weld beads ground smooth for finishing.

D. Door Frames, Fire-Rated: Full profile/continuously welded type.
1. Fire Rating: Same as door, labeled.
2. Frame Metal Thickness: 14 gage, 0.067 inch or 16 gage, 0.053 inch, minimum.
3. Three-sided frames for single doors up to and including 4’-0” in width shall be manufactured of 16 gauge steel. Frames for pairs of doors 6’-0” and over, all sidelight frames, and all borrowed light frames shall be manufactured of 14 gauge steel. All angles, molds, returns and miters neatly welded and all weld beads ground smooth for finishing.

E. Mullions for Pairs of Doors: Fixed, except where removable is indicated, with profile similar to jambs.
1. All two-piece mullions shall be factory welded to form a single-piece, inseparable section before assembly into a frame unit.

F. Transom Bars: Fixed, of profile same as jamb and head.

2.06 FINISHES

A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

2.07 ACCESSORIES

A. Louvers: Roll formed steel with concealed frame; finish same as door components ; factory-installed.
1. Style: Standard straight slat blade.
2. Fasteners: Exposed tamper proof fasteners.

B. Glazing: As specified in Section 08 8000.

C. Removable Stops: Formed sheet steel, shape as indicated on drawings, mitered corners; prepared for countersink style tamper proof screws.

D. Astragals for Double Doors: Specified in Section 08 7100.

E. Mechanical Fasteners for Concealed Metal-to-Metal Connections: Self-drilling, self-tapping, steel with electroplated zinc finish.

F. Grout for Frames: Portland cement grout with maximum 4 inch slump for hand troweling; thinner pumpable grout is prohibited.

G. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions. Omit silencers on exterior doors.

H. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

I. For each jamb in masonry construction, provide 3 or more 16 gauge adjustable jamb anchors of the T-anchor type or of the wire masonry anchor type spaced not more than 30” apart.

J. For each jamb in steel stud construction, provide 3 or more 18 gauge drywall type jamb anchors.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Verify that finished walls are in plane to ensure proper door alignment.

D. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

E. Verify exterior substrates and weather barriers have been completed to ensure proper air/water tight transition is maintained.

3.02 PREPARATION

A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.03 INSTALLATION

A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.

B. Install fire rated units in accordance with NFPA 80.

C. Where practicable, place frames prior to construction of enclosing walls and ceilings.

D. Set frames accurately into position, plumbed, aligned, and braced securely until permanent anchors are set.

E. Coordinate frame anchor placement with wall construction.

F. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.

G. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.

H. At in-place construction, set frames and secure to adjacent construction with machine screws and suitable anchorage devices. Provide “Z” fillers at each screw location.

I. Fit and hang doors to maintain specified clearances. Metal hinge shims are acceptable to maintain clearances.

J. Install door hardware as specified in Section 08 7100.

K. Comply with glazing installation requirements of Section 08 8000.

L. Coordinate installation of electrical connections to electrical hardware items.

M. Immediately after erection, sand smooth all rusted and damaged areas of prime coat, and apply touch-up of compatible air-drying primer.

N. Touch up damaged factory finishes.

3.04 TOLERANCES

A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.

B. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.05 ADJUSTING

A. Adjust for smooth and balanced door movement.

B. Adjust sound control doors so that seals are fully engaged when door is closed.

C. Test sound control doors for force to close, latch, and unlatch; adjust as necessary in compliance with requirements.

END OF SECTION

SECTION 08 1416
FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Flush wood doors; flush and flush glazed configuration; fire-rated, non-rated, and acoustical.

B. High pressure decorative laminate facing

1.02 RELATED REQUIREMENTS

A. Section 01 6210 - Schedule of Materials and Colors

B. Section 08 1113 - Hollow Metal Doors and Frames.

C. Section 08 8000 - Glazing.

1.03 REFERENCE STANDARDS

A. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).

B. ASTM E413 - Classification for Rating Sound Insulation; 2016.

C. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).

D. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

E. ITS (DIR) - Directory of Listed Products; Current Edition.

F. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

G. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2019.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.

C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.

D. Samples: Submit two samples of door veneer, 6 by 6 inches in size illustrating wood grain, stain color, and sheen.

E. Test Reports: Show compliance with specified requirements for the following:
   1. Sound-retardant doors and frames; sealed panel tests are not acceptable.

F. Samples: Submit three samples of door veneer, 6 by 6 inch in size illustrating plastic laminate pattern and color.

G. Manufacturer's Installation Instructions: Indicate special installation instructions.

H. Specimen warranty.

I. Warranty, executed in Owner's name.

J. Closeout Submittals
   1. Submit under provisions of Section 01 7800 – Closeout Submittals.
   2. Submit Material Safety Data Sheets under provisions of Section 01 7800 – Closeout Submittals for the following items:
      a. All mastics, glues, and adhesives
      b. Sealant (interior use only)
      c. Fire doors (insulating material)

1.05 QUALITY ASSURANCE

A. Maintain one copy of the specified door quality standard on site for review during installation and finishing.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than five years of documented experience.
   1. Company with at least one project within past five years with value of woodwork within at least 20 percent of cost of woodwork for this project.

C. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

D. Certifications
   1. Fire Ratings Compliance: Fire-rated wood doors to comply with NFPA-80, Positive Pressure Testing UBC 7-2-97 and/or UL10C, and requirements according to building code standards having local jurisdiction.
   2. Label Certification: All doors requiring fire-rating shall carry either UL or ITS (Warnock Hersey) metal label stating:
      a. Name and Logo of Listing Agency
      b. Name of Door Manufacturer
      c. Compliance with UBC 7-2-97 and/or UL10C
      d. Temperature rise rating
      e. Compliance with “S” label and/or UL 1784 requirements at all 20-minute rated doors and elsewhere as required by the building code and/or the AHJ
      f. Hourly rating

1.06 DELIVERY, STORAGE, AND HANDLING

A. Package, deliver and store doors in accordance with specified quality standard.

B. Store doors flat and off the floor on a level surface in a dry, well-ventilated building. Do not store on edge. Protect doors from dirt, water and abuse.

C. Accept doors on site in manufacturer's packaging, and inspect for damage.

D. Protect doors with resilient packaging sealed with heat shrunk plastic; do not store in damp or wet areas or areas where sunlight might bleach veneer; seal top and bottom edges with tinted sealer if stored more than one week, and break seal on site to permit ventilation.

E. Do not subject interior doors to extremes in either heat or humidity. HVAC systems should be operational and balanced, providing a temperature range of 50 to 90 degrees Fahrenheit and 30% to 50% relative humidity.

1.07 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

B. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, telegraphing core construction, and repair or replacement of the door as originally furnished.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. High Pressure Decorative Laminate (HPDL) Faced Doors:
   1. AJW Architectural Products: www.ajw.com/#sle.
   2. Oregon Door: www.oregondoor.com/#sle.
   3. Masonite Architectural: www.architectural.masonite.com/#sle.
   4. Poncraft Door Co: www.poncraft.com/#sle.
   5. VT Industries, Inc: www.vtindustries.com/#sle.
   6. Substitutions: See Section 01 6000 - Product Requirements.

2.02 DOORS AND PANELS

A. Doors: See drawings for locations and additional requirements.
   1. Quality Standard: Premium Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS), unless noted otherwise.
   2. High Pressure Decorative Laminate (HPDL) Faced Doors: 5-ply unless otherwise indicated.

B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
   1. Provide solid core doors at each location.
   2. Fire Rated Doors: Tested to ratings as indicated on drawings in accordance with ICC (IBC) - Positive Pressure; Underwriters Laboratories Inc. (UL) labeled.
   3. Sound Retardant Doors: Minimum STC of 45, calculated in accordance with ASTM E413, tested in accordance with ASTM E90.
   4. High pressure decorative laminate (HPDL) finish as indicated on drawings.

2.03 DOOR AND PANEL CORES

A. Non-Rated Solid Core and 20 Minute Rated Doors: Type structural composite lumber core (SCLC), plies and faces as indicated.

B. Fire-Rated Doors: Mineral core type, or fire resistant composite core (FD), plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.

C. Sound-Rated Doors: Equivalent to type, with particleboard core (PC) construction as required to achieve STC rating specified; plies and faces as indicated above.

2.04 DOOR FACINGS

A. High Pressure Decorative Laminate (HPDL) Facing for Fire Doors: NEMA LD 3, SGF; color as selected; See Section 01 6210, Schedule of Materials and Colors.

B. High Pressure Decorative Laminate (HPDL) Facing for Non-Fire-Rated Doors: NEMA LD 3, HGS; color as selected; See Section 01 6210, Schedule of Materials and Colors.

C. Facing Adhesive: Type I - waterproof.

2.05 DOOR CONSTRUCTION

A. Fabricate doors in accordance with door quality standard specified.

B. Cores Constructed with stiles and rails:
   1. Provide solid blocks at Lock edge, top of door for closer, and exit devices for hardware reinforcement.
   2. Provide solid blocking for other throughbolted hardware.
   3. Mineral core veneer doors should have a minimum of 1/2” stile on hinge edge of door. Veneer shall be 5 ply.

C. Where supplementary protective edge trim is required, install trim after veneer facing has been applied full-width.

D. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.

E. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.

F. Cut and configure exterior door edge to receive recessed weatherstripping devices.

G. Provide edge clearances in accordance with the quality standard specified.

2.06 ACCESSORIES

A. Hollow Metal Door Frames: See Section 08 1113.

B. Metal Louvers:

1. Material and Finish: Roll formed steel; pre-painted finish to color as selected.

C. Glazing: See Section 08 8000.

D. Glazing Stops: Rolled steel channel shape, mitered corners; prepared for countersink style tamper proof screws.

E. Door lite frame shall be powdercoated in a color acceptable to owner or must be painted to owner's choice of color. Coordinate with 09 9000-Painting and Coating.

F. Astragals for Fire-Rated Double Doors: Steel, T shaped, overlapping and recessed at face edge, specifically for double doors.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.02 INSTALLATION

A. Install doors in accordance with manufacturer's instructions and specified quality standard.
1. Install fire-rated doors in accordance with NFPA 80 and ITS (DIR) requirements.

B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.

C. Use machine tools to cut or drill for hardware.

D. Coordinate installation of doors with installation of frames and hardware.

E. Coordinate installation of glazing.

F. Install door louvers plumb and level.

G. Location of glazing stop to be coordinated for inset blinds. Where scheduled by the architect to occur. Coordinate with Architect & Owner.

3.03 TOLERANCES

A. Comply with specified quality standard for fit and clearance tolerances.

B. Comply with specified quality standard for telegraphing, warp, and squareness.

3.04 ADJUSTING

A. Adjust doors for smooth and balanced door movement.

B. Adjust closers for full closure.

END OF SECTION

SECTION 08 3100
ACCESS DOORS AND PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wall- and ceiling-mounted access units.

1.02 RELATED REQUIREMENTS

A. Section 09 9000 - Painting and Coating: Field paint finish.

1.03 REFERENCE STANDARDS

A. ITS (DIR) - Directory of Listed Products; Current Edition.

B. UL (FRD) - Fire Resistance Directory; Current Edition.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.

C. Shop Drawings: Indicate exact position of each access door and/or panel unit.

D. Manufacturer's Installation Instructions: Indicate installation requirements, rough-in dimensions, and operation features.

E. Project Record Documents: Record actual locations of each access unit.

F. Closeout Submittals
   1. Submit under provisions of Section 01 7800 – Closeout Submittals.
   2. Submit Material Safety Data Sheets under provisions of Section 01 7800 – Closeout Submittals for the following items:
      a. All mastics, glues and adhesives
      b. Sealant (interior use only)
      c. Fire doors (insulating material)

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years experience.

PART 2 PRODUCTS

2.01 ACCESS DOORS AND PANELS ASSEMBLIES

A. Wall-Mounted Units:
   1. Panel Material: Steel.
   2. Size: 24 by 24 inch, unless otherwise indicated.
      a. 10 x 10 inches at single valve access and at all roof drain locations on first floor.
   3. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.
   4. Wall Mounting Criteria: Provide surface-mounted face frame and door surface flush with frame surface.
   5. Gypsum Board Mounting Criteria: Provide drywall bead frame with door surface flush with wall surface.
   6. Plaster Mounting Criteria: Provide drywall bead frame with door surface flush with wall surface.
   7. Masonry Mounting Criteria: Provide surface-mounted frame with door surface flush with frame surface.

8. Finish and color to be coordinated with owner and architect.

B. Wall-Mounted Units in Wet Areas:
   1. Material: Stainless steel.
   2. Size: 24 by 24 inch, unless otherwise indicated.
   3. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.
   4. Wall Mounting Criteria: Provide surface-mounted face frame and door surface flush with frame surface.
   5. Gypsum Board Mounting Criteria: Provide drywall bead frame with door surface flush with wall surface.
   6. Plaster Mounting Criteria: Provide drywall bead frame with door surface flush with wall surface.
   7. Masonry Mounting Criteria: Provide surface-mounted frame with door surface flush with frame surface.

C. Fire-Rated Wall-Mounted Units:
   1. Wall Fire-Rating: As indicated on drawings.
   2. Panel Material: Steel.
   3. Size: 24 by 24 inch, unless otherwise indicated.
   4. Door/Panel: Insulated double-surface panel, with tool-operated spring or cam lock and no handle.

D. Ceiling-Mounted Units:
   1. Panel Material: Aluminum extrusion with gypsum board inlay.
   2. Size - Lay-In Grid Ceilings: To match module of ceiling grid.
   3. Size in Other Ceilings: 24 by 24 inch, unless otherwise indicated.
   4. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.

E. Fire-Rated Ceiling-Mounted Units:
   1. Ceiling Fire-Rating: As indicated on drawings.
   2. Panel Material: Steel.
   3. Size: 24 by 24 inch, unless otherwise indicated.
   4. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.

2.02 WALL- AND CEILING-MOUNTED ACCESS UNITS

A. Manufacturers:
   1. ACUDOR Products Inc: www.acudor.com/#sle.
   2. Babcock-Davis: www.babcockdavis.com/sle.
   3. Best Access Doors: www.bestaccessdoors.com/#sle.
   4. Cendrex, Inc: www.cendrex.com/#sle.
   5. Elmdor: www.elmdor.com/#sle.
   6. MIFAB, Inc: www.mifab.com/#sle.
   7. Larsen's Manufacturing Company; www.larsensmfg.com.
   8. Nystrom, Inc: www.nystrom.com/sle.
   9. Substitutions: See Section 01 6000 - Product Requirements.

B. Provide ceiling access doors and panels at each interior suspended fan coil A/C Unit, plumbing valves, and other concealed mechanical or electrical equipment requiring access for service or maintenance as specified herein, and as needed for a complete and proper installation.

C. Wall- and Ceiling-Mounted Units: Factory-fabricated door and frame, fully assembled units with corner joints welded, filled and ground flush; square and without rack or warp; coordinate requirements with type of installation assembly being used for each unit.
   1. Style: Exposed frame with door surface flush with frame surface.
      a. Gypsum Board Mounting Criteria: Use drywall bead type frame.
      b. Plaster Mounting Criteria: Use plaster bead type frame.

2. Door Style: Single thickness with rolled or turned in edges.
3. Frames: 16-gauge, 0.0598-inch minimum thickness.
4. Single Steel Sheet Door Panels: 16-gauge, 0,0625-inch minimum thickness.
5. Insulation: Non-combustible mineral wool or glass fiber.
6. Units in Fire-Rated Assemblies: Fire rating as required by applicable code for fire-rated assembly that access doors are being installed.
    a. Provide products listed by ITS (DIR) or UL (FRD) as suitable for purpose indicated.
    b. Provide certificate of compliance from authorities having jurisdiction indicating approval of fire rated doors.
7. Stainless Steel Finish: No.4 brushed finish.
8. Steel Primed and Factory Finish: Polyester powder coat; color as selected by Architect from manufacturer's standard colors.
9. Size: As indicated.
10. Hardware:
    a. Hinge, Fire-Rated-Units: Continuous coil spring, self closing, self latching steel hinges with non-removable pin.
    b. Hinges for Non-Fire-Rated Units: Continuous spring steel hinges with removable pin..
    c. Handle: No handle.
    d. Latch/Lock: Cylinder lock-operated cam latch, two keys for each unit.
    e. Number of Locks/Latches Required: As recommended by manufacturer for size of unit.
    f. Inside Latch Release: Mechanism that allows door/panel to be opened from inside.
    g. Gasketing: Extruded neoprene, around perimeter of door panel.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that rough openings are correctly sized and located.

B. Begin installation only after substrates have been properly prepared, and if the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to proceeding with this work.

B. Prepare surfaces using methods recommended by manufacturer for applicable substrates in accordance with project conditions.

3.03 INSTALLATION

A. Install units in accordance with manufacturer's instructions.

B. Install frames plumb and level in openings, and secure units rigidly in place.

C. Position units to provide convenient access to concealed equipment when necessary.

END OF SECTION

SECTION 08 3323
OVERHEAD COILING DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Exterior opening coiling doors.

B. Interior non-fire-rated coiling doors.

1.02 RELATED REQUIREMENTS

A. Section 07 9200 - Joint Sealants: Sealing joints between frames and adjacent construction.

B. Division 26 - Electrical

1.03 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.

C. ICC (IECC) - International Energy Conservation Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide general construction, electrical equipment, and component connections and details.

C. Shop Drawings: Indicate pertinent dimensioning, anchorage methods, hardware locations, and installation details.

D. Samples: Submit two slats, 3 by 6 inches in size illustrating shape, color and finish texture.

E. Manufacturer's Installation Instructions: Indicate installation sequence and procedures, adjustment and alignment procedures.

F. Manufacturer's qualification statement.

G. Installer's qualification statement.

H. Maintenance Data: Indicate lubrication requirements and frequency and periodic adjustments required.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years documented experience and approved by manufacturer.

1.06 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Submit a written warranty, executed by the Contractor, Installer, and Manufacturer, agreeing to repair or replace doors that fail in materials or workmanship within the specified warranty period.
   1. Warranty Period: One (1) year after date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Overhead Coiling Doors:
   1. C.H.I. Overhead Doors: www.chiohd.com/#sle.

2. Clopay Building Products: www.clopaydoor.com/#sle.
3. Cornell Iron Works, Inc: www.cornelliron.com/#sle.
4. Raynor Garage Doors: www.raynor.com/#sle.
5. The Cookson Company: www.cooksondoor.com/#sle.
6. Wayne-Dalton, a Division of Overhead Door Corporation: www.wayne-dalton.com/#sle.
7. Substitutions: See Section 01 6000 - Product Requirements.

2.02 COILING DOORS

A. Exterior Opening Coiling Doors: Steel slat curtain.
   1. Capable of withstanding positive and negative design wind loads of 20 psf, without undue deflection or damage to components.
   2. Sandwich slat construction with insulated core of foamed-in-place polyurethane insulation; minimum R-value of 8.0.
   3. Air Infiltration – Maximum air leakage of 1.00 cfm/ft^2 in accordance with the ICC (IECC) International Energy Conservation Code.
   4. Nominal Slat Size: 3 inches wide by required length.
   5. Finish: Factory powder coated, color as selected. See Section 01 6210-Schedule of Materials and Colors.
   6. Guide, Angles: Powder coated to match curtain.
   7. Hood Enclosure: Manufacturer's standard; Powder coated to match curtain.
      a. Provide mechanism cover for all exposed moving operator components.
   8. Mounting: Surface mounted.

B. Interior Non-Fire-Rated Coiling Doors: Steel slat curtain.
   1. Single thickness slats.
   2. Nominal Slat Size: 2-1/2 inches wide by required length.
   3. Finish: Factory powder coated, color as selected. See Section 01 6210-Schedule of Materials and Colors.
   4. Guides, Angles: Powder coated to match curtain.
   5. Hood Enclosure: Manufacturer's standard; Powder coated to match curtain.
      a. Provide mechanism cover for all exposed moving operator components.
   6. Mounting: Surface mounted.

2.03 MATERIALS AND COMPONENTS

A. Metal Curtain Construction: Interlocking slats.
   1. Slat Ends: Alternate slats fitted with end locks to act as wearing surface in guides and to prevent lateral movement.
   2. Curtain Bottom for Slat Curtains: Fitted with angles or aluminum extrusions to provide reinforcement and positive contact in closed position.
   3. Weatherstripping for Exterior Doors: Moisture and rot proof, resilient type, located at jamb edges, bottom of curtain, and lintel brush seal where curtain enters hood enclosure of exterior doors.
   4. Steel Slats: Minimum thickness, 22 gauge, 0.03 inch; ASTM A653/A653M galvanized steel sheet. Provide 20 gauge slats where opening size dictates.
      a. Galvanizing: Minimum G60 coating.

B. Guides - Angle: ASTM A36/A36M metal angles, size as required for door configuration.

C. Hood Enclosure and Trim: Internally reinforced to maintain rigidity and shape.
   1. Minimum thickness; 24 gauge, 0.024 inch.
   2. Powder coated to match curtain.
   3. Provide mechanism cover for all exposed moving operator components.

D. Lock Hardware:

1. Cylindrical Locking Mechanism: Latchset lock cylinder and core per owners patented key system requirements. Field verify recess for lock cylinder and core to ensure proper fit.
2. Provide deep recessed box with W.A. Rotary momentary switch enclosed.

E. Roller Shaft Counterbalance: Steel pipe and helical steel spring system, capable of producing torque sufficient to ensure smooth operation of curtain from any position and capable of holding position at mid-travel; with adjustable spring tension; requiring 25 lb nominal force to operate.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that opening sizes, tolerances and conditions are acceptable.

3.02 INSTALLATION

A. Install units in accordance with manufacturer's instructions.

B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.

C. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.

D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.

E. Install enclosure and perimeter trim.

3.03 TOLERANCES

A. Maintain dimensional tolerances and alignment with adjacent work.

B. Maximum Variation From Plumb: 1/16 inch.

C. Maximum Variation From Level: 1/16 inch.

D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch per 10 feet straight edge.

3.04 ADJUSTING

A. Adjust operating assemblies for smooth and noiseless operation.

3.05 CLEANING

A. Clean installed components.

B. Remove labels and visible markings.

END OF SECTION

SECTION 08 4313
ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aluminum-framed storefront, with vision glass.

B. Aluminum doors and frames.

1.02 RELATED REQUIREMENTS

A. Section 08 7100 - Door Hardware: Hardware items other than specified in this section.

B. Section 08 8000 - Glazing: Glass and glazing accessories.

1.03 REFERENCE STANDARDS

A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.

B. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2015.

C. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).

D. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

E. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

F. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

G. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.

H. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.

I. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

J. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

K. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).

L. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.

M. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2016).

N. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference; 2015.

O. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with installation of other components that comprise the exterior enclosure.

B. Preinstallation Meeting: Conduct a preinstallation meeting two weeks before starting work of this section; require attendance by all affected installers.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware, internal drainage details.

C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.
   1. Include design engineer's stamp or seal on shop drawings for attachments and anchors.

D. Shop drawing sheets that include engineering information designed by the Contractor's Delegated Design Engineer shall be signed and sealed in accordance with the Texas Engineering Practice Act. Sheets that do not provide information designed by the Contractor's Engineer do not require being signed and sealed. Calculation packages require a signed and sealed cover sheet only. Any submittals requiring to be signed and sealed that are received without the signature and seal will be rejected without review.

E. Samples: Accompanying the Shop Drawings, submit:
   1. Sample of each exposed member.
   2. Samples of finish, showing complete range of color from darkest to lightest proposed for use on this Work.
   3. Samples, when approved by the Architect, will be used to verify that the installed finish is within the approved range.

F. Design Data: Provide framing member structural and physical characteristics, engineering calculations, and dimensional limitations stamped and signed by a Structural Engineer licensed in the State of Texas.

G. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.

H. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.

I. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

A. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in Texas.

B. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least five years of documented experience.

C. Installer Qualifications: Company specializing in performing work of type specified and with at least five years of documented experience.

D. Provide district standard door sizes as shown in the drawings. However, if district standard standard door component sizes are larger than manufacturer component standard, then manufacturer to stack standard component pieces accordingly to achieve design intent.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Handle products of this section in accordance with AAMA CW-10.

B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.08 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a two year period after Date of Substantial Completion.

C. Provide two year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.

D. Provide two year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 BASIS OF DESIGN -- FRAMING FOR INSULATING GLAZING (EXTERIOR)

A. Center-Set Style, Thermally-Broken:
   1. Basis of Design: Oldcastle BuildingEnvelope.
   2. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep.

B. Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of one of the manufacturers listed below:
   1. Arcadia, Inc.: www.arcadiainc.com
   2. Atlas Architectural Metals, Inc.: www.atlasarchmetals.com.
   3. Columbia Commercial Building Products: ccbpwin.com.
   4. C.R. Laurence Company, Inc; U.S. Aluminum: www.crl-arch.com/sle.
   5. EFCO, a Pella Company: www.efcocorp.com/sle.
   6. Kawneer Company, Inc.: www.kawneer.com.
   7. Manko Window Systems, Inc.: www.mankowindows.com.
   8. Oldcastle BuildingEnvelope: www.oldcastlebe.com.
   9. Trulite Glass & Aluminum Solutions, LLC: www.trulite.com.
   10. Tubelite, Inc.: www.tubeliteinc.com
   11. YKK AP America Inc: www.ykkap.com.

C. Substitutions: See Section 01 6000 - Product Requirements.

2.02 BASIS OF DESIGN -- FRAMING FOR MONOLITHIC GLAZING (INTERIOR)

A. Center-Set Style:
   1. Basis of Design: Oldcastle BuildingEnvelope.
   2. Vertical Mullion Dimensions: 1 3/4 inches wide by 4 1/2 inches deep.

B. Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of one of the manufacturers listed below:
   1. Arcadia, Inc.: www.arcadiainc.com
   2. Atlas Architectural Metals, Inc.: www.atlasarchmetals.com.
   3. Columbia Commercial Building Products: ccbpwin.com.
   4. C.R. Laurence Company, Inc; U.S. Aluminum: www.crl-arch.com/sle.
   5. EFCO, a Pella Company: www.efcocorp.com/sle.
   6. Kawneer Company, Inc.: www.kawneer.com.
   7. Manko Window Systems, Inc.: www.mankowindows.com.
   8. Oldcastle BuildingEnvelope: www.oldcastlebe.com.
   9. Trulite Glass and Aluminum Solutions, LLC: www.trulite.com.
   10. Tubelite, Inc.: www.tubeliteinc.com
   11. YKK AP America Inc: www.ykkap.com.

C. Substitutions: See Section 01 6000 - Product Requirements.

2.03 BASIS OF DESIGN -- SWINGING DOORS

A. Wide Stile, Insulating Glazing, Not Thermally-Broken:
   1. Basis of Design: Oldcastle Rugged Series.
   2. Thickness: 2 inches.

B. Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of one of the manufacturers listed below:

1. Arcadia, Inc.: www.arcadiainc.com
2. Atlas Architectural Metals, Inc.: www.atlasarchmetals.com.
3. Columbia Commercial Building Products: ccbpwin.com.
4. C.R. Laurence Company, Inc; U.S. Aluminum: www.crl-arch.com/sle.
5. EFCO, a Pella Company: www.efcocorp.com/sle.
6. Kawneer Company, Inc.: www.kawneer.com.
7. Manko Window Systems, Inc.: www.mankowindows.com.
8. Oldcastle BuildingEnvelope: www.oldcastlebe.com.
9. Trulite Glass & Aluminum Solutions, LLC: www.trulite.com.
10. Tubelite, Inc.: www.tubeliteinc.com
11. YKK AP America Inc: www.ykkap.com.

C. Substitutions: See Section 01 6000 - Product Requirements.

2.04 STOREFRONT

A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
   1. Finish: Class I natural anodized.
      a. Factory finish all surfaces that will be exposed in completed assemblies.
   2. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
   3. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
   4. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
   5. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
   6. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
   7. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
   8. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glazing and inner sheet of infill panel and heel bead of glazing compound.
   9. Preparation for Window Treatments: Provide reinforced interior horizontal head rail.

B. Performance Requirements:
   1. General Requirements
      a. Drawings are diagrammatic and do not purport to identify nor solve problems of thermal or structural movement, glazing, anchorage or moisture disposal.
      b. Requirements shown by details are intended to establish basic dimension of units, sight lines and profiles of members.
      c. Provide concealed fastening.
      d. Provide entrance and storefront systems, including necessary modifications, to meet specified requirements and maintaining visual design concepts.
      e. Attachment considerations are to take into account site peculiarities and expansion and contraction movements so there is no possibility of loosening, weakening or fracturing connection between units and building structure or between units themselves.

f. Anchors, fasteners and braces shall be structurally stressed not more than 50% of allowable stress when maximum loads are applied.
g. Provide for expansion and contraction without detriment to appearance or performance.
h. Assemblies shall be free from rattles, wind whistles and noise due to thermal and structural movement and wind pressure.
i. Not Permitted: Vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system.
j. Coordinate all door hardware with Section 08 7100 – Door Hardware.

2. Frame calculations shall be designed by a registered engineer in the State of Texas. Manufacturer is responsible for system reinforcing.
3. Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
   a. Design Wind Loads: Comply with requirements of ASCE 7.
   b. Member Deflection: Limit member deflection to 1/175 in any direction, with full recovery of glazing materials.
4. Water Penetration Resistance on Manufactured Assembly: No uncontrolled water on interior face, when tested in accordance with ASTM E331 at pressure differential of 8 psf.
5. Air Leakage Laboratory Test: Maximum of 0.06 cu ft/min sq ft of wall area, when tested in accordance with ASTM E283 at 6.27 psf pressure differential across assembly.
6. Thermal Requirements:
   a. Framing systems shall accommodate expansion and contraction movement due to surface temperature differentials of 180º F without causing buckling, stress on glass, failure of joint seals, excessive stress on structural elements, reduction of performance, or other detrimental effects.
   b. Ensure doors function normally within limits of specified temperature range.
   c. Thermal Break with a 1/4" separation consisting of a two part chemically curing, high density polyurethane which is mechanically and adhesively joined to aluminum storefront sections.

2.05 COMPONENTS

A. Aluminum Framing Members: Tubular aluminum sections, drainage holes and internal weep drainage system.
   1. Framing members for interior applications need not be thermally broken.
   2. Glazing Stops: Flush.
   3. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.
   4. High Performance Sub Sill.

B. Aluminum Subframing and Subsills: Extruded aluminum, thermally broken to match framing members where required, integrate with framing member drainage system.
   1. Finish: Same as storefront.
   2. Subframing: At perimeter of units, where indicated.
   3. Flat Fillers: At head and jambs of exterior units where no subframing is indicated.
   4. Sub-sills: At high-performance sills at exterior units.

C. Glazing: As specified in Section 08 8000.

D. Swing Doors: Glazed aluminum.
   1. Thickness: 2 inches. with 3/16 inch wall thickness
   2. Top Rail: 8 inches wide.
   3. Vertical Stiles: 6 inches wide.
   4. Mid Rail: 8 inches wide.

5. Bottom Rail: 10 inches wide.
6. Glazing Stops: Square.
7. Finish: Same as storefront.

2.06 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M).

B. Sheet Aluminum: ASTM B209 (ASTM B209M).

C. Structural Steel Sections: ASTM A36/A36M; galvanized in accordance with requirements of ASTM A123/A123M.

D. Internal Reinforcing:
1. ASTM A36 for carbon steel; or ASTM B308 for structural aluminum.
2. Shapes and sizes to suit installation.
3. Shop coat steel components after fabrication with alkyd type zinc chromate primer complying with FS TT-P-645.

E. Anchorage Devices:
1. Manufacturer's standard formed or fabricated steel or aluminum assemblies of shapes, plates, bars or tubes.

F. Fasteners:
1. Aluminum, non-magnetic stainless steel or other materials warranted by manufacturer to be non-corrosive and compatible with components being fastened.
2. Do not use exposed fasteners, except where unavoidable for application of hardware.
3. For exposed locations, provide countersunk Phillips head screws with finish matching items fastened.
4. For concealed locations, provide manufacturer's standard fasteners.
5. Provide nuts or washers of design having means to prevent disengagement; deforming of fastener threads is unacceptable.

G. Exposed Flashings: Aluminum sheet, 20 gage, 0.032 inch minimum thickness; finish to match framing members.

H. Glazing Reducer:
1. 451-VG-029 Snap-in 1/4" infill adapter or equal by the frame manufacturer for storefront located at interior locations.

I. Glazing Gaskets:
1. Compression type design, replaceable, molded or extruded, of neoprene, or ethylene propylene diene monomer (EPDM).
2. Conform to ASTM C509 or C864.
3. Profile and hardness as required to maintain uniform pressure for watertight seal.
4. Provide in manufacturer's standard black color.

J. Weatherstripping:
1. Wool pile conforming to AAMA 701.2; or extruded EPDM elastomeric conforming to ASTM C509 or C864.
2. Provide EPDM or vinyl-blade gasket weatherstripping in bottom door rail, adjustable for contact with threshold.

K. "Anti-Walk" Edge Blocking: "W" shaped EPDM blocks for use in keeping glazing material stationary under vibration or seismic loading.

L. Baffles (at weep holes): Type as recommended by system manufacturer and shown in published installation instructions.

M. Glazing Accessories: As specified in Section 08 8000.

N. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.

2.07 FINISHES

A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

B. Touch-Up Materials: As recommended by coating manufacturer for field application.

2.08 FABRICATION

A. Coordination of Fabrication:
   1. Check actual frame or door openings required in construction work by accurate field measurements before fabrication.
   2. Fabricate units to withstand loads which will be applied when system is in place.

B. General:
   1. Conceal fasteners wherever possible.
   2. Reinforce work as necessary for performance requirements and for support to structure.
   3. Comply with Section 08 8000 for glazing requirements.

C. Aluminum Framing:
   1. Provide members of size, shape and profile indicated, designed to provide for glazing from interior.
   2. Fabricate frame assemblies with joints straight and tight fitting.
   3. Maintain accurate relation of planes and angles, with hairline fit of contacting members.
   4. Seal horizontals and direct moisture accumulation to exterior.
   5. Provide flashings and other materials used internally or externally that are corrosive resistant, non-staining, non-bleeding and compatible with adjoining materials.
   6. Provide manufacturer's extrusions and accessories to accommodate expansion and contraction due to temperature changes without being detrimental to appearance or performance.
   7. Make provisions in framing for minimum edge clearance, nominal edge cover and nominal pocket width for thickness and type of glazing or infill used in accordance with recommendations of manufacturer.
   8. Provide tight fitting, injection molded, plastic water deflectors at all intermediate horizontals.
   9. Provide thermally broken aluminum backer plate at perimeter of all windows and individual sealed aluminum caps at the top of all vertical window frame mullions.
   10. Provide fully soldered/sealed end dams at ends of subsill system.

D. Entrance Doors:
   1. Fabricate with mechanical joints using internal reinforcing plates and shear blocks attached with fasteners and by welding.
   2. Provide extruded aluminum glazing stops of square design, permanently anchored on security side and removable on opposite side.

E. Welding:
   1. Comply with recommendations of the American Welding Society.
   2. Use recommended electrodes and methods to avoid distortion and discoloration.
   3. Grind exposed welds smooth and flush with adjacent surfaces; restore mechanical finish.

F. Flashings: Form from sheet aluminum with same finish as extruded sections. Apply finish after fabrication. Material thickness as required to suit condition without deflection or "oil-canning".

2.09 HARDWARE

A. Receive hardware supplied in accordance with Section 08 7100 – Door Hardware and install in accordance with requirements of this Section.

B. Cut, reinforce, drill and tap frames and doors as required to receive hardware.

C. Comply with hardware manufacturer's templates and instructions.

D. Use concealed fasteners wherever possible.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work.

B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

3.02 INSTALLATION

A. Install wall system in accordance with manufacturer's instructions.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Verify exterior substrates and weather barriers have been completed to ensure proper air/water tight transition is maintained.

D. Provide alignment attachments and shims to permanently fasten system to building structure.

E. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

F. Provide thermal isolation where components penetrate or disrupt building insulation.

G. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.

H. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.

I. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

J. Install operating sash.

K. Set thresholds in bed of sealant and secure.

L. Install hardware using templates provided.

M. Install glass and infill panels in accordance with Section 08 8000, using glazing method required to achieve performance criteria.

N. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 TOLERANCES

A. Maximum Variation from Plumb: 0.06 inch per 3 feet non-cumulative or 0.06 inch per 10 feet, whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.04 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for general testing and inspection requirements.

B. Air/Water Leakage Testing: Provide chamber test per ASTM E1105 at 10% of glazing area per building, to be performed at mockup, 35% and 50% completion.
   1. Testing to be performed at 0.67 times the ASTM E331 rated pressure provided by the manufacturer for the system, not less than 5.6 psf.

C. Water-Spray Test: Provide water spray quality test of installed storefront components in accordance with AAMA 501.2 during construction process and before installation of interior finishes.
   1. Perform a minimum of two tests in each designated area as indicated on drawings.
   2. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.

3.05 ADJUSTING

A. Test door operating functions. Adjust closing and latching speeds and other hardware in accordance with manufacturer's instructions to ensure smooth operation.

B. Adjust operating hardware for smooth operation.

3.06 CLEANING

A. Remove protective material from pre-finished aluminum surfaces.

B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, and take care to remove dirt from corners and to wipe surfaces clean.

3.07 PROTECTION

A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

SECTION 08 5659
SERVICE AND TELLER WINDOW UNITS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Service and teller window units.

1.02 RELATED REQUIREMENTS

A. Section 07 9200 - Joint Sealants: Sealing joints between frames and adjacent construction.

1.03 REFERENCE STANDARDS

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

B. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

C. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

D. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate work with adjacent materials specified in other sections and as indicated on drawings and approved shop drawings.

B. Preinstallation Meeting: Prior to start of installation arrange a meeting on site to familiarize installer and installers of related work with requirements relating to this work.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturer's product data for specified products indicating materials, operation, glazing, finishes, and installation instructions.

C. Shop Drawings: Indicate configuration, sizes, rough-in, mounting, anchors and fasteners, and installation clearances.

D. Samples for Selection of Finishes: (when color anodized is specified)
   1. Applied Finishes: Color charts for factory finishes.
   2. Color Anodized Finishes: Frame member sections showing range of color to be expected in finished work.

E. Manufacturer Qualification Statement.

F. Installer Qualification Statement.

G. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with at least five years documented experience, and with ability to provide test reports showing that their standard manufactured products meet the specified requirements.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver units in manufacturer's original packaging and unopened containers with identification labels intact.

B. Store units in area protected from exposure to weather and vandalism.

1.08 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide manufacturer's warranty agreeing to repair or replace units and their components that fail in materials or workmanship within one year from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 SERVICE AND TELLER WINDOW UNITS

A. Manufacturers :
   1. Provide either the product identified as "Basis of Design" or an equivalent product of the manufacturers listed below.
      a. Basis of Design: Quikserv Corp[<>]: www.quikserv.com/sle.
   2. C. R. Laurence Co., Inc.: www.crlaurence.com
   3. Easi-Serv Products: www.easi-serv.com/#sle.
   4. Basis of Design: Quikserv Corp: www.quikserv.com/sle.
   5. Ready Access, Inc: www.ready-access.com.

B. Location: Built within interior wall, as indicated on drawings.

C. Window Type: Sliding, single horizontal.
   1. Operation: Manual, self-closing.
   2. Mounting: Flush with the wall surface.
   3. Window Size: As indicated on drawings.
   4. Material: Aluminum.
      a. Finish: Color anodized, dark bronze.

D. Glazing: Single (monolithic), clear.
   1. Tempered safety glazing.

2.02 ASSEMBLY COMPONENTS

A. Windows: Factory-fabricated, finished, and glazed, with extruded aluminum frame and glazing stops; complete with hardware and anchors.
   1. Provide window units that are re-glazable from the secure side without dismantling the non-secure side of framing.
   2. Rigidly fit and secure joints and corners with internal reinforcement. Make joints and connections flush, hairline, and weatherproof. Fully weld corners.
   3. Apply factory finish to exposed surfaces.
   4. Apply bituminous paint to concealed metal surfaces in contact with cementitious or dissimilar materials.
   5. Self-Closing Operation: Manual open and self-closing with auto-locking handles and magnetic hold-open device.

2.03 MATERIALS

A. Aluminum Extrusions: Minimum 1/8 inch thick frame and sash material complying with ASTM B221 and ASTM B221M.
   1. Finish: Class I color anodized.

B. Stainless Steel: Type 304 with No. 3 - Coarse finish.

C. Concealed Steel Items: Galvanized in accordance with ASTM A123/A123M to thickness Grade 85, 2.0 ounces per square foot.
   1. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20 zinc rich.

D. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.

2.04 FINISHES

2.05 ACCESSORIES

A. Hardware and Security Devices for Sliding Windows:
   1. Locks: Jamb mounted keyed locks.
   2. Bottom Sills: Provide full bottom track.
   3. Handles: Manufacturer's standard profile and finish.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that window openings are ready for installation of windows.

B. Verify that correct embedded anchors are in place and in proper location; repair or replace anchors as required to achieve satisfactory installation.

C. Notify Architect if conditions are not suitable for installation of units; do not proceed until conditions are satisfactory.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install units in correct orientation (inside/outside or secure/non-secure).

C. Anchor units securely in manner so as to achieve performance specified.

D. Set sill members and sill flashing in continuous bead of sealant.

E. Separate metal members from concrete and masonry using bituminous paint or with products recommended in writing by the manufacturer for this purpose.

F. Remove and replace defective work.

3.03 ADJUSTING

A. Adjust operating components for smooth operation while also maintaining a secure, weather-tight enclosure and a tight fit at the contact points; lubricate operating hardware.

3.04 CLEANING

A. Remove protective material from factory finished surfaces.

B. Clean exposed surfaces promptly after installation without damaging finishes.

3.05 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain operable units.
   1. Instructor: Manufacturer's training personnel.
   2. Location: At project site.
   3. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.

3.06 PROTECTION

A. Provide temporary protection to ensure that service and teller windows are without damage upon Date of Substantial Completion.

END OF SECTION

SECTION 08 7100
DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes commercial door hardware for the following:

1. Swinging doors.
2. Other doors to the extent indicated.

B. Door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.
2. Cylinders specified for doors in other sections.

C. Related Sections:

1. Division 08 Section “Hollow Metal Doors and Frames”.
2. Division 08 Section “Flush Wood Doors”.
3. Division 08 Section “Aluminum-Framed Entrances and Storefronts”.

D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ICC/IBC - International Building Code.
3. NFPA 70 - National Electrical Code.
4. NFPA 80 - Fire Doors and Windows.
5. NFPA 101 - Life Safety Code.
6. NFPA 105 - Installation of Smoke Door Assemblies.
7. State Building Codes, Local Amendments.

E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:

1. ANSI/BHMA Certified Product Standards - A156 Series.
2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
3. ANSI/UL 294 - Access Control System Units.
4. UL 305 - Panic Hardware.
5. ANSI/UL 437- Key Locks.

1.3 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing, fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
3. Content: Include the following information:

    a. Type, style, function, size, label, hand, and finish of each door hardware item.
    b. Manufacturer of each item.
    c. Fastenings and other pertinent information.
    d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
    e. Explanation of abbreviations, symbols, and codes contained in schedule.
    f. Mounting locations for door hardware.
    g. Door and frame sizes and materials.
    h. Warranty information for each product.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.

D. Informational Submittals:

1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

1.4 CLOSEOUT SUBMITTALS

A. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

B. Project Record Documents: Provide record documentation of as-built door hardware sets in digital format (.pdf, .docx, .xlsx, .csv) and as required in Division 01, Project Record Documents.

1.5 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).

C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.

1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.

F. Each unit to bear third party permanent label indicating compliance with the referenced testing standards.

G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:

1. Function of building, purpose of each area and degree of security required.
2. Plans for existing and future key system expansion.
3. Requirements for key control storage and software.
4. Installation of permanent keys, cylinder cores and software.
5. Address and requirements for delivery of keys.

H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s),

Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.

1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
3. Review sequence of operation narratives for each unique access controlled opening.
4. Review and finalize construction schedule and verify availability of materials.
5. Review the required inspecting, testing, commissioning, and demonstration procedures

I. At completion of installation, provide written documentation that components were applied according to manufacturer's instructions and recommendations and according to approved schedule.

1.6 DELIVERY, STORAGE AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.7 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.8 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship

within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking, or breakage.
2. Faulty operation of the hardware.
3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
4. Electrical component defects and failures within the systems operation.

C. Warranty Period: Unless otherwise indicated, warranty shall be one year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Hardware shall not have any visible manufacturer names on exposed materials, except cylinders, when the door is in a closed position.

2.2 BUTT HINGES

A. Hinges: ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.

1. Quantity: Provide the following hinge quantity:

   a. Two Hinges: For doors with heights up to 60 inches.
   b. Three Hinges: For doors with heights 61 to 90 inches.
   c. Four Hinges: For doors with heights 91 to 120 inches.
   d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

   a. Widths up to 3’0”: 4-1/2” standard or heavy weight as specified.
   b. Sizes from 3’1” to 4’0”: 5” standard or heavy weight as specified.

3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

   a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
   b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.

4. Hinge Options: Comply with the following:

   a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for all out-swinging lockable doors.

5. Manufacturers:

a. Ives (IV) - 5BB Series, 5-knuckle.
b. McKinney (MK) - TA/T4A Series, 5-knuckle.

2.3 DOOR OPERATING TRIM

A. Flush Bolts and Surface Bolts: Provide products conforming to ANSI/BHMA A156.3 and A156.16, Grade 1.

1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
2. Furnish dust proof strikes for bottom bolts.
3. Surface bolts to be minimum 8” in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.
5. Manufacturers:

a. Ives (IV).
b. Rockwood (RO).

B. Coordinators: ANSI/BHMA A156.3 door coordinators consisting of active-leaf, hold-open lever and inactive-leaf release trigger. Model as indicated in hardware sets.

1. Manufacturers:

a. Rockwood (RO).

C. Door Push Plates and Pulls: ANSI/BHMA A156.6 door pushes and pull units of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.

1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
4. Pulls shall be provided with a 10” clearance from the finished floor on the push side to accommodate wheelchair accessibility.
5. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets. When through-bolt fasteners are in the same location as a push plate, countersink the fasteners flush with the door face allowing the push plate to sit flat against the door.
6. Manufacturers:

a. Ives (IV).
b. Rockwood (RO).

2.4 CYLINDERS AND KEYING

A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.

B. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:

1. Threaded mortise cylinders with rings and cams to suit hardware application.
2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
4. Tubular deadlocks and other auxiliary locks.
5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
6. Keyway: Match Facility Standard.

C. Patented Cylinders: ANSI/BHMA A156.5, Grade 1 Certified Products Directory (CPD) listed cylinders employing a utility patented and restricted keyway requiring the use of a patented key. Cylinders are to be protected from unauthorized manufacture and distribution by manufacturer's United States patents.

1. Patented key systems shall not be established with products that have an expired patent. Expired systems shall only be specified and supplied to support existing systems.
2. Manufacturers:

    a. Schlage (SC) - Everest D.

D. Keying System: Each type of lock and cylinders to be factory keyed.

1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
3. Existing System: Field verify and key cylinders to match Owner's existing system.

E. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Two (2)
2. Master Keys (per Master Key Level/Group): Five (5).
3. Construction Keys (where required): Ten (10).

F. Construction Keying: Provide temporary keyed construction cores.

G. Key Registration List (Bitting List):

1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
2. Provide transcript list in writing or electronic file as directed by the Owner.

2.5 KEY CONTROL

A. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.

1. Manufacturers:

a. Lund Equipment (LU).
b. MMF Industries (MM).
c. Telkee (TK).

P. Electronic Key Management System: Provide an electronic key control system with Stand-alone Plug and Play features including advanced RFID technology. Touchscreen interface with PIN access for keys individually locked in place. Minimum 1,000 system users and 21 iFobs for locking receptors. System shall have a minimum 250,000 audit events screen displayed or ability to be exported via USB port.

1. Manufacturers:

a. Medeco (MC).

2.6 MORTISE LOCKS AND LATCHING DEVICES

A. Mortise Locksets, Grade 1 (Heavy Duty): Provide ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed mortise locksets. Listed manufacturers shall meet all functions and features as specified herein.

1. Manufacturers:

a. Sargent Manufacturing (SA) - 8200 Series.
b. Schlage (SC) - L9000 Series.

2.7 CYLINDRICAL LOCKS AND LATCHING DEVICES

A. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Operational Grade 1 Certified Products Directory (CPD) listed cylindrical locksets. Listed manufacturers shall meet all functions and features as specified herein.

1. Manufacturers:

a. Sargent Manufacturing (SA) - 10X Line.
b. Schlage (SC) - ND Series.

2.8 DEADLOCKS AND LATCHES

A. Mortise Deadlocks, Small Case: ANSI/BHMA A156.36, Grade 1, small case mortise type deadlocks constructed of heavy gauge wrought corrosion resistant steel. Steel or stainless steel bolts with a 1" throw and hardened steel roller pins. Deadlocks to be products of the same source manufacturer and keyway as other specified locksets.

1. Manufacturers:

a. Sargent Manufacturing (SA) - 4870 Series.
b. Schlage (SC) - L460 Series.

2.9 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.
2. Strikes for Bored Locks and Latches: BHMA A156.2.
3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
4. Dustproof Strikes: BHMA A156.16.

2.10 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1. Exit devices shall have a five-year warranty.
2. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
3. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer’s catalog and template book for specific requirements.
4. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
5. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
6. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.

    a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
    b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.

7. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.

8. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2” wide stiles.
9. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
10. Rail Sizing: Provide exit device rails factory sized for proper door width application.
11. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed exit devices. Listed manufacturers shall meet all functions and features as specified herein.

1. Manufacturers:

a. Sargent Manufacturing (SA) - 80 Series.
b. Von Duprin (VD) - 35A/98 XP Series.

2.11 SURFACE DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.

1. Heavy duty surface mounted door closers shall have a 30-year warranty.

2. Manufacturers:

a. LCN Closers (LC) - 4040 Series.
b. Sargent Manufacturing (SA) - 351 Series.

2.12 ARCHITECTURAL TRIM

A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1” LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
3. Where plates are applied to fire rated doors with the top of the plate more than 16” above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer’s catalog and template book for specific requirements for size and applications.
4. Protection Plates: ANSI/BHMA A156.6 protection plates (kick, armor, or mop), fabricated from the following:

    a. Stainless Steel: 300 grade, 050-inch thick.

5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
6. Manufacturers:

    a. Rockwood (RO).

2.13 DOOR STOPS AND HOLDERS

A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

1. Manufacturers:

    a. Ives (IV).
    b. Rockwood (RO).

2.14 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NFPA 252, Standard Methods of Fire Tests of Door Assemblies.

D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

F. Manufacturers:

1. Pemko (PE).
2. Zero (ZE).

2.15 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.16 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware

C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.

1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
2. DHI TDH-007-20: Installation Guide for Doors and Hardware.
3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

D. Push Plates and Door Pulls: When through-bolt fasteners are in the same location as a push plate, countersink the fasteners flush with the door face allowing the push plate to sit flat against the door.

E. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

F. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

A. Field Inspection (Punch Report): Reference Division 01 Sections “Closeout Procedures”. Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.

1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

B. Clean adjacent surfaces soiled by door hardware installation.

C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

1. Quantities listed are for each pair of doors, or for each single door.
2. The supplier is responsible for handing and sizing all products.
3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.

B. Manufacturer’s Abbreviations:

1. MK - McKinney
2. OT - Other
3. PE - Pemko

4. SU - Securitron
5. RO - Rockwood
6. SA - SARGENT
7. SC - Schlage

Hardware Sets

Set: 1.0
Doors: A100A
Description: Pair - Exterior - Aluminum Storefront - Exit Device

6	Hinge, Full Mortise, Hvy Wt	T4A3386 NRP	US32D	MK
1	Mullion	L980S	PC	SA
1	Mounting Kit	98-2579		SA
1	Rim Exit Device	LC 16 TB 43 8804	US32D	SA
1	Rim Exit Device	16 TB 43 8810	US32D	SA
4	Permanent Core	23-030 Everest 29 -T	.626	SC
4	Construction Core	23-030-ICX		SC
4	Cylinder	As required	.626	SC
1	Vandal Resistant Trim	VRT22	US32D	RO
1	Vandal Resistant Trim	VRT22 C	US32D	RO
2	Surface Closer	TB 351 P10	EN	SA
1	Rain Guard	346C x Frame Width		PE
2	Sweep	3452CNB TKSP8		PE
1	Panic Threshold	2005AT x Opening Width		PE
1	Perimeter Seals	By the frame manufacturer		OT

Set: 2.0
Doors: D100
Description: Sgl- Exterior - Aluminum Storefront - Exit Device

6	Hinge, Full Mortise, Hvy Wt	T4A3386 NRP	US32D	MK
1	Rim Exit Device	LC 16 TB 43 8804	US32D	SA
2	Permanent Core	23-030 Everest 29 -T	.626	SC
2	Construction Core	23-030-ICX		SC
2	Cylinder	As required	.626	SC
1	Vandal Resistant Trim	VRT22 C	US32D	RO
1	Surface Closer	TB 351 P10	EN	SA
1	Rain Guard	346C x Frame Width		PE
1	Sweep	3452CNB TKSP8		PE
1	Panic Threshold	2005AT x Opening Width		PE
1	Perimeter Seals	By the frame manufacturer		OT

Set: 5.0
Doors: B111.A
Description: Pair - Exterior - Exit Device

6	Hinge, Full Mortise, Hvy Wt	T4A3386 NRP	US32D	MK
1	Mullion	L980S	PC	SA
1	Mounting Kit	98-2579		SA
1	Rim Exit Device	LC 16 TB 43 8804	US32D	SA
1	Rim Exit Device	16 TB 43 8810	US32D	SA
4	Permanent Core	23-030 Everest 29 -T	.626	SC

4	Construction Core	23-030-ICX		SC
3	Cylinder	As required	.626	SC
1	Vandal Resistant Trim	VRT22	US32D	RO
1	Vandal Resistant Trim	VRT22 C	US32D	RO
2	Surface Closer	TB 351 P10	EN	SA
1	Kick Plate	K1050 10" x 2" LDW B4E CSK	US32D	RO
1	Astragal Set (2)	303AS		PE
1	Gasketing	2891AS (head & jambs)		PE
1	Rain Guard	346C x Frame Width		PE
2	Sweep	3452CNB TKSP8		PE
1	Panic Threshold	2005AT x Opening Width		PE

Set: 6.0
Doors: A111B, A113B, A115B, A116B, A120A, A130B, B102.B, B103.C, B104.D, B105.D, B107.D, B108.B, B109.D, D118D, D118F
Description: Sgl - Exterior - Exit Device x NL

3	Hinge, Full Mortise, Hvy Wt	T4A3386 NRP	US32D	MK
1	Rim Exit Device	LC 16 TB 43 8804	US32D	SA
2	Permanent Core	23-030 Everest 29 -T	.626	SC
2	Construction Core	23-030-ICX		SC
2	Cylinder	As required	.626	SC
1	Vandal Resistant Trim	VRT22 C	US32D	RO
1	Surface Closer	TB 351 P10	EN	SA
1	Kick Plate	K1050 10" x 2" LDW B4E CSK	US32D	RO
1	Gasketing	2891AS (head & jambs)		PE
1	Rain Guard	346C x Frame Width		PE
1	Sweep	3452CNB TKSP8		PE
1	Panic Threshold	2005AT x Opening Width		PE

Set: 14.1
Doors: A104A
Description: Pair - INT - Aluminum Storefront - Exit Device

6	Hinge, Full Mortise, Hvy Wt	T4A3386 NRP	US32D	MK
1	Mullion	L980S	PC	SA
1	Mounting Kit	98-2579		SA
1	Rim Exit Device	LC 16 TB 43 8804	US32D	SA
1	Rim Exit Device	16 TB 43 8810	US32D	SA
4	Permanent Core	23-030 Everest 29 -T	.626	SC
4	Construction Core	23-030-ICX		SC
4	Cylinder	As required	.626	SC
1	Vandal Resistant Trim	VRT22	US32D	RO
1	Vandal Resistant Trim	VRT22 C	US32D	RO
2	Surface Closer	TB 351 P10	EN	SA
1	Perimeter Seals	By the frame manufacturer		OT

Set: 15.0
Doors: A104B, D102A, D102B, D112
Description: Int Pair - Classroom Exit Closer

6	Hinge (heavy weight)	T4A3786	US26D	MK
1	Mullion	L980S	PC	SA
1	Mounting Kit	98-2579		SA

2	Rim Exit Device, Classroom	LC 16 TB 43 8813 ETL	US32D	SA
5	Permanent Core	23-030 Everest 29 -T	.626	SC
5	Construction Core	23-030-ICX		SC
5	Cylinder	As required	.626	SC
2	Surface Closer	TB 351 P10	EN	SA
2	Kick Plate	K1050 10" x 2" LDW B4E CSK	US32D	RO
2	Silencer	608		RO

Set: 16.1
Doors: D116
Description: Int - Pair - Class Funvtion - MFB - Closer

6	Hinge, Full Mortise	TA2714	US26D	MK
1	Dust Proof Strike	570	US26D	RO
2	Manual Flush Bolt	555 / 557 12" / 72" AFF	US26D	RO
1	Classroom Lock	SF 10XG37 LL	US26D	SA
1	Permanent Core	23-030 Everest 29 -T	.626	SC
1	Construction Core	23-030-ICX		SC
1	Surface Closer	TB 351 P10	EN	SA
2	Kick Plate	K1050 10" x 2" LDW B4E CSK	US32D	RO
2	Door Stop	441CU	US26D	RO
2	Astragal Set (2)	303AS		PE
1	Gasketing	2891AS (head & jambs)		PE

Set: 19.0
Doors: A113A, A127, D110A
Description: Int - Pair - Storeroom - MFB

6	Hinge, Full Mortise	TA2714	US26D	MK
1	Dust Proof Strike	570	US26D	RO
2	Manual Flush Bolt	555 / 557 12" / 72" AFF	US26D	RO
1	Storeroom/Closet Lock	SF 10XG04 LL	US26D	SA
1	Permanent Core	23-030 Everest 29 -T	.626	SC
1	Construction Core	23-030-ICX		SC
2	Door Stop	441CU	US26D	RO
2	Silencer	608		RO

Set: 20.0
Doors: A115A, A116A
Description: Int - Pair - Storeroom - Auto FB - Closer - Gasket

6	Hinge, Full Mortise	TA2714	US26D	MK
1	Dust Proof Strike	570	US26D	RO
1	Flush Bolt (Selt-latching)	2845 / 2945 (as required)	US26D	RO
1	Storeroom/Closet Lock	SF 10XG04 LL	US26D	SA
1	Permanent Core	23-030 Everest 29 -T	.626	SC
1	Construction Core	23-030-ICX		SC
1	Coordinator (W/mtg plates)	2672 x Mtg Brkts	Black	RO
2	Surface Closer	TB 351 P10	EN	SA
2	Kick Plate	K1050 10" x 2" LDW B4E CSK	US32D	RO
2	Astragal Set (2)	303AS		PE
1	Astragal	357SP X S88D		PE
1	Gasketing	2891AS (head & jambs)		PE

Set: 24.0
Doors: A118A, A118B, A119A, A119B, C152A, C152B
Description: Sgl - Exit Device - Typical Classroom - closer

3	Hinge (heavy weight)	T4A3786	US26D	MK
1	Rim Exit Device, Classroom	LC 16 TB 43 8813 ETL	US32D	SA
2	Permanent Core	23-030 Everest 29 -T	.626	SC
2	Construction Core	23-030-ICX		SC
2	Cylinder	As required	.626	SC
1	Surface Closer	TB 351 P10	EN	SA
1	Kick Plate	K1050 10" x 2" LDW B4E CSK	US32D	RO
3	Silencer	608		RO

Set: 29.0
Doors: A111A, A129A, C140A, C151A
Description: Sgl - Exit Device - Passage - closer - gasket

3	Hinge (heavy weight)	T4A3786	US26D	MK
1	Exit Device (passage)	43 TB 8815 ETL (12- as required)	US32D	SA
1	Surface Closer	TB 351 P10	EN	SA
1	Kick Plate	K1050 10" x 2" LDW B4E CSK	US32D	RO
1	Door Stop	441CU	US26D	RO
1	Gasketing	2891AS (head & jambs)		PE

Notes: At stairwell, closer is on stair side.

Set: 31.0
Doors: A103A, A103B, A122, A133A, A133B, B102.A, B103.A, B104.A, B104.B, B105.A, B105.B, B107.A, B108.A, B109.A, C105, C153, C154
Description: Sgl - Classroom Function - Closer

3	Hinge, Full Mortise	TA2714	US26D	MK
1	Classroom Lock	SF 10XG37 LL	US26D	SA
1	Permanent Core	23-030 Everest 29 -T	.626	SC
1	Construction Core	23-030-ICX		SC
1	Surface Closer	TB 351 P10/O As Required	EN	SA
1	Door Stop	441CU	US26D	RO
3	Silencer	608		RO

Set: 32.0
Doors: D107, D114, D115, D117A
Description: Sgl - Classroom Function - Closer - Gasket

3	Hinge, Full Mortise	TA2714	US26D	MK
1	Classroom Lock	SF 10XG37 LL	US26D	SA
1	Permanent Core	23-030 Everest 29 -T	.626	SC
1	Construction Core	23-030-ICX		SC
1	Surface Closer	TB 351 P10/O As Required	EN	SA
1	Door Stop	441CU	US26D	RO
1	Gasketing	S88D		PE

Set: 35.0
Doors: A102A, A102B
Description: Sgl - Alum - Classroom Function - Closer

3	Hinge, Full Mortise	TA2714	US26D	MK
1	Classroom Lock	SF 10XG37 LL	US26D	SA
1	Permanent Core	23-030 Everest 29 -T	.626	SC
1	Construction Core	23-030-ICX		SC
1	Surface Closer	TB 351 P10	EN	SA
1	Door Stop	441CU	US26D	RO
1	Perimeter Seals	By the frame manufacturer		OT

Set: 37.0
Doors: A112
Description: Sgl - Storeroom - Closer / stop - Gasket

3	Hinge, Full Mortise	TA2714	US26D	MK
1	Storeroom/Closet Lock	SF 10XG04 LL	US26D	SA
1	Permanent Core	23-030 Everest 29 -T	.626	SC
1	Construction Core	23-030-ICX		SC
1	Surface Closer	TB 351 P10	EN	SA
1	Kick Plate	K1050 10" x 1" LDW B4E CSK	US32D	RO
1	Gasketing	2891AS (head & jambs)		PE

Set: 38.0
Doors: B106.A, B106.B, B109A, B109B, B109C, B109D, C106, C108, C120, C122, D103, D110B
Description: Sgl - Storeroom - Closer - Gasket

3	Hinge, Full Mortise	TA2714	US26D	MK
1	Storeroom/Closet Lock	SF 10XG04 LL	US26D	SA
1	Permanent Core	23-030 Everest 29 -T	.626	SC
1	Construction Core	23-030-ICX		SC
1	Surface Closer	TB 351 P10/O As Required	EN	SA
1	Kick Plate	K1050 10" x 1" LDW B4E CSK	US32D	RO
1	Gasketing	2891AS (head & jambs)		PE

Set: 39.0
Doors: A114, A124, A125, A126
Description: Sgl - Storeroom - Closer

3	Hinge, Full Mortise	TA2714	US26D	MK
1	Storeroom/Closet Lock	SF 10XG04 LL	US26D	SA
1	Permanent Core	23-030 Everest 29 -T	.626	SC
1	Construction Core	23-030-ICX		SC
1	Surface Closer	TB 351 P10	EN	SA
1	Kick Plate	K1050 10" x 1" LDW B4E CSK	US32D	RO
1	Door Stop	441CU	US26D	RO
3	Silencer	608		RO

Set: 41.0
Doors: A109, A123, C116, D113
Description: Sgl - Storeroom Custodian

3	Hinge, Full Mortise	TA2714	US26D	MK
1	Storeroom/Closet Lock	SF 10XG04 LL	US26D	SA
1	Permanent Core	23-030 Everest 29 -T	.626	SC
1	Construction Core	23-030-ICX		SC

1	Kick Plate	K1050 10" x 2" LDW B4E CSK	US32D	RO
1	Door Stop	441CU	US26D	RO
3	Silencer	608		RO

Set: 47.0
Doors: A108, A110
Description: Sgl - Push/Pull - DB - Gang RR/Locker

3	Hinge (heavy weight)	T4A3786	US26D	MK
1	Public Toilet Deadlock	LC 4878	US26D	SA
2	Permanent Core	23-030 Everest 29 -T	.626	SC
2	Construction Core	23-030-ICX		SC
2	Cylinder	As required	.626	SC
1	Push Plate	70E	US32D	RO
1	Door Pull	111 Mtg-Type 1	US32D	RO
1	Surface Closer	TB 351 P10/O As Required	EN	SA
1	Kick Plate	K1050 10" x 1" LDW B4E CSK	US32D	RO
1	Door Stop	441CU	US26D	RO
3	Silencer	608		RO

Set: 48.0
Doors: C138, C139
Description: Sgl - Push/Pull - DB - Closer/stop - Gang RR/Locker

3	Hinge (heavy weight)	T4A3786	US26D	MK
1	Public Toilet Deadlock	LC 4878	US26D	SA
2	Permanent Core	23-030 Everest 29 -T	.626	SC
2	Construction Core	23-030-ICX		SC
2	Cylinder	As required	.626	SC
1	Push Plate	70E	US32D	RO
1	Door Pull	111 Mtg-Type 1	US32D	RO
1	Surface Closer	TB 351 P10/O As Required	EN	SA
1	Kick Plate	K1050 10" x 1" LDW B4E CSK	US32D	RO
1	Door Stop	441CU	US26D	RO
3	Silencer	608		RO

Set: 52.0
Doors: A105, A106, A107, A131, A132, A134, A135, C101, C102, C103, C104, C107, C109, C110, C111, C112, C113, C115, C117, C118, C119, C121, C123, C124, C125, C126, C128, C129, C130, C131, C132, C133, C134, C135, C136, C137, C141, C142, C143, C144, C145, C146, C147, C148, C149, C150, D104, D105, D106
Description: Sgl - Office Function

3	Hinge, Full Mortise	TA2714	US26D	MK
1	Entry/Office Lock	SF 10XG05 LL	US26D	SA
1	Permanent Core	23-030 Everest 29 -T	.626	SC
1	Construction Core	23-030-ICX		SC
1	Door Stop	441CU	US26D	RO
3	Silencer	608		RO

Set: 60.0
Doors: A101, C101A
Description: Sgl - Privacy

3	Hinge, Full Mortise	TA2714	US26D	MK
1	Privacy Lock	10XU65 LL	US26D	SA
1	Door Stop	441CU	US26D	RO
3	Silencer	608		RO

Set: 61.0
Doors: D108, D109
Description: Sgl - Staff Privacy (Lounge)

3	Hinge, Full Mortise	TA2714	US26D	MK
1	Privacy Lock	V21 8265 LL	US26D	SA
1	Surface Closer	TB 351 P10/O As Required	EN	SA
1	Door Stop	441CU	US26D	RO
3	Silencer	608		RO

Set: 61.1
Doors: B100, B101
Description: Sgl - Staff Privacy - (Cooridor)

3	Hinge, Full Mortise	TA2714	US26D	MK
1	Dormitory/Exit Lock	LC V21 8225 LL	US32D	SA
1	Permanent Core	23-030 Everest 29 -T	.626	SC
1	Construction Core	23-030-ICX		SC
1	Cylinder	As required	.626	SC
1	Surface Closer	TB 351 P10/O As Required	EN	SA
1	Door Stop	441CU	US26D	RO
3	Silencer	608		RO

Set: 64.0
Doors: SOB103, SOB104, SOB105, SOB106.C, SOB107.B, SOB107.C, SOD117B, SOD118A, SOD118B, SOD118C, SOD118E, SOD119A
Description: Coiling Grille

1	Cylinder	As required	626	SC
1	Permanent Core	23-030 Everest 29 -T	.626	SC
1	Construction Core	23-030-ICX		SC
1	Balance Hardware	By the door manufacturer		OT

Notes: Confirm cylinder type required.

Set: 1000.0
Doors: A117A, B106A, B106B, D101
Description: Door not found

1	Door Not Found	Not Found		OT

END OF SECTION 087100

SECTION 08 8000
GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Insulated glass units.

B. Glazing units.

C. Glazing compounds.

1.02 RELATED REQUIREMENTS

A. Section 07 9200 - Joint Sealants: Sealants for other than glazing purposes.

B. Section 08 1113 - Hollow Metal Doors and Frames: Glazed lites in doors and borrowed lites.

C. Section 08 1416 - Flush Wood Doors: Glazed lites in doors.

D. Section 08 4313 - Aluminum-Framed Storefronts: Glazing provided as part of storefront assembly.

E. Section 08 4413 - Glazed Aluminum Curtain Walls: Glazing provided as part of wall assembly.

F. Section 08 8300 - Mirrors.

G. Section 08 8723 - Security Films.

H. Section 08 8813 - Fire-Rated Glazing.

I. Section 08 8856-Security Glazing.

1.03 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.

B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015 (Reaffirmed 2020).

C. ASTM C1036 - Standard Specification for Flat Glass; 2021.

D. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.

E. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2019.

F. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.

G. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass; 2015.

H. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2016.

I. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2010.

J. GANA (GM) - GANA Glazing Manual; 2008.

K. GANA (SM) - GANA Sealant Manual; 2008.

L. GANA (LGRM) - Laminated Glazing Reference Manual; 2009.

M. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use; 1990 (2016).

N. NFRC 100 - Procedure for Determining Fenestration Product U-factors; 2017.

O. NFRC 200 - Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength; 2014a.

P. NFRC 300 - Standard Test Method for Measurement of Masonry Flexural Bond Strength; 2013, with Editorial Revision (2014).

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by each of the affected installers.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data on Insulating Glass Unit, Glazing Unit, and Plastic Film Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.

C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.

D. Samples: Submit two samples 4 by 6 inch in size of glass units.

E. Certificate: Certify that products of this section meet or exceed specified requirements.

F. Manufacturer's qualification statement.

G. Installer's qualification statement.

H. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with GANA (GM), GANA (SM), GANA (LGRM), and IGMA TM-3000 for glazing installation methods.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years of documented experience.
   1. Provide certified glass products through ANSI accredited certifications that include plant audits and independent laboratory performance testing.
      a. Insulating Glass Certification Council (IGCC).
      b. Safety Glazing Certification Council (SGCC).

C. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years documented experience and approved by manufacturer.

1.07 MOCK-UPS

A. See Section 01 4000 - Quality Requirements for additional requirements.

B. Provide on-site glazing mock-up with the specified glazing components.

C. Locate where directed.

D. Mock-ups may remain as part of the Work.

1.08 FIELD CONDITIONS

A. Do not install glazing when ambient temperature is less than 40 degrees F.

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.09 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

B. Insulating Glass Units: Provide a ten (10) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.

C. Laminated Glass: Provide a ten (10) year manufacturer warranty to include coverage for delamination, including providing products to replace failed units.

D. Submit a written warranty, executed by the entrance manufacturer, agreeing to repair or replace units that fail in workmanship within specified warranty period. Failures include, but are not limited to:
   1. Structural and performance failures, including excessive deflection, excessive leaker, air infiltration beyond specified requirements.
   2. Faulty operation of hardware directly related to items listed above.
   3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

E. Manufacturer's warranty period shall be five (5) years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Glass Fabricators:
   1. Oldcastle BuildingEnvelope: www.obe.com.
   2. Viracon, Inc: www.viracon.com/#sle.
   3. Other Fabricators as approved by the Float Glass Manufacturer.
   4. Substitutions: See Section 01 6000 - Product Requirements.

B. Float Glass Manufacturers:
   1. AGC Glass North America, Inc: www.agcglass.com/#sle.
   2. Guardian Glass, LLC: www.guardianglass.com/#sle.
   3. Pilkington North America Inc: www.pilkington.com/na/#sle.
   4. Saint Gobain North America: www.saint-gobain.com/#sle.
   5. Vitro Architectural Glass (formerly PPG Glass): www.vitroglazings.com/#sle.
   6. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES

A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
   1. Design Pressure: Calculated in accordance with applicable codes.
   2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
   3. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
   4. Glass thicknesses listed are minimum. Deflection shall be no greater than the thickness of the glass. Final glazing thickness shall comply with all specification reference standards and glazing manufacturer recommendations for span width and height of each installation.

B. Weather-Resistive Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure water-resistive barrier, vapor retarder, and/or air barrier.

C. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
   1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
   2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
   3. Solar Optical Properties: Comply with NFRC 300 test method.

D. Fully Tempered Safety Glass: Shall meet impact resistance per ANSI Z97.1 - Class A, or 16 CFR 1201 - Category II criteria for safety glazing used in hazardous locations.

2.03 GLASS MATERIALS

A. Float Glass: Provide float glass based glazing unless otherwise indicated.

1. Kind FT - Fully Tempered Type: Complies with ASTM C1048.
2. Fully Tempered Safety Glass: Shall meet impact resistance per ANSI Z97.1 - Class A, or 16 CFR 1201 - Category II criteria for safety glazing used in hazardous locations.
3. Tinted Type: ASTM C1036, Class 2 - Tinted, Quality - Q3, with color and performance characteristics as indicated.
4. Thicknesses: Glass thicknesses listed are minimum. Deflection shall be no greater than the thickness of the glass. Final glazing thickness shall comply with all specification reference standards and glazing manufacturer recommendations for span width and height of each installation.

B. Laminated Glass: Float glass laminated in accordance with ASTM C1172.
1. Laminated Safety Glass: Complies with ANSI Z97.1 - Class A or 16 CFR 1201 - Category II impact test requirements.
2. Polyvinyl Butyral (PVB) Interlayer: 0.030 inch thick, minimum.

2.04 INSULATED GLASS UNITS

A. Manufacturers:
1. Glass: Any of the manufacturers specified for float glass, unless specifically required by manufacturer's tested assembly.

B. Fabricator: Certified by glass manufacturer for type of glass, coating, and treatment involved and capable of providing specified warranty.

C. Insulated Glass Units: Types as indicated.
1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
2. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
3. Metal-Edge Spacers: Aluminum, bent and soldered corners.
4. Spacer Color: Aluminum.
5. Edge Seal:
   a. Dual-Sealed System: Provide polyisobutylene sealant as primary seal applied between spacer and glass panes, and silicone sealant as secondary seal applied around perimeter.
   b. Color: Black.
6. Space between lites filled with air.
7. Purge interpane space with dry air, hermetically sealed.
8. Capillary Tubes: Provide tubes from air space for insulating glass units without inert type gas that have a change of altitude greater than 2500 feet between point of fabrication and point of installation to permit pressure equalization of air space.
   a. Capillary Tubes: Tubes to remain open and be of length and material type in accordance with insulating glass fabricator's requirements.

D. Type IGU - Insulated Glass Units:
1. Applications: Exterior glazing unless otherwise indicated.
2. Outboard Lite: Fully tempered float glass, 1/4 inch thick, minimum.
   a. Tint: Light Gray Appearance.
   b. Coating: Low-E (passive type), on #2 surface.
      1) Basis of Design: Solarban 70 on Optigray by Vitro Architectural Glass.
3. Metal edge spacer.
4. Inboard Lite: Fully tempered float glass, 1/4 inch thick, minimum.
   a. Tint: Clear.
5. Total Thickness: 1 inch.
6. Thermal Transmittance (U-Value), Winter - Center of Glass: 0.28, maximum.
7. Visible Light Transmittance (VLT): 46 percent, nominal.

8. Solar Heat Gain Coefficient (SHGC): 0.23, maximum.
9. Visible Light Reflectance, Outside: 9 percent, maximum.
10. Glazing Method: Dry glazing method, gasket glazing.

E. Type IGLSA - Insulated Glass Laminated SAfety:
1. Applications: Where indicated on the drawings.
2. Outboard Lite: Fully tempered float glass, 1/4 inch thick, minimum.
   a. Tint: Light Gray Appearance.
   b. Coating: Low-E (passive type), on #2 surface.
      1) Basis of Design: Solarban 70 on Optigray by Vitro Architectural Glass..
3. Metal edge spacer.
4. Laminated Inboard Lite, Outer Pane: Fully tempered float glass, 1/4 inch thick.
   a. Tint: Clear.
5. Interlayer: Polyvinyl butyral (PVB); 0.090 inch thick.
6. Laminated Inboard Lite, Inner Pane: Fully tempered float glass, 1/4 inch thick.
   a. Tint: Clear.
7. Total Thickness: 1-5/16 inch.
8. Performance Criteria:
   a. Fully Tempered Safety Glass: Complies with ANSI Z97.1 - Class A, or 16 CFR 1201 - Category II criteria safety glazing used in hazardous locations.
9. Thermal Transmittance (U-Value), Winter - Center of Glass: 0.28, maximum.
10. Visible Light Transmittance (VLT): 36 percent, minimum.
11. Solar Heat Gain Coefficient (SHGC): 0.23, maximum.
12. Visible Light Reflectance, Outside: 9 percent, maximum.
13. Glazing Method: Dry glazing method, gasket glazing.

2.05 GLAZING UNITS

A. Type GTC - Glass Tempered Clear:
1. Applications: Interior glazing unless otherwise indicated.
2. Glass Type: Fully tempered float glass.
3. Tint: Clear.
4. Thickness: 1/4 inch, minimum.

B. Type GLSA - Glass Laminated SAfety:
1. Applications: Locations as indicated on drawings.
2. Tint: Clear.
3. Thickness: 1/2 inch, nominal.
   a. Outer Lite: Fully Tempered glass.
   b. Interlayer: Polyvinyl butyral (PVB), thickness as required to meet performance criteria.
   c. Inside Lite: Tempered glass.

2.06 GLAZING COMPOUNDS

A. Butyl Sealant: Single component; ASTM C920 Grade NS, Class 12-1/2, Uses M and A, Shore A hardness of 10 to 20; black color.

B. Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; nonbleeding, nonstaining; ASTM C920 Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; color as selected.

2.07 ACCESSORIES

A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness. Length of 0.1 inch for each square foot of glazing or minimum 4 inch by width of glazing rabbet space minus 1/16 inch by height to suit glazing method and pane weight and area.

B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness. Minimum 3 inch long by one half the height of the glazing stop by thickness to suit application, self adhesive on one face.

C. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.

D. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; color black.

E. Glazing Clips: Manufacturer's standard type.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.

B. Verify that the minimum required face and edge clearances are being provided.

C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.

D. Verify that sealing between joints of glass framing members has been completed effectively.

E. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.03 INSTALLATION, GENERAL

A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.

B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.

C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.

D. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.

E. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.

F. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, and paint.

3.04 INSTALLATION - DRY GLAZING METHOD (GASKET GLAZING)

A. Application - Exterior and/or Interior Glazed: Set glazing infills from either the exterior or the interior of the building.

B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.

D. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.05 CLEANING

A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.

B. Remove nonpermanent labels immediately after glazing installation is complete.

C. Clean glass and adjacent surfaces after sealants are fully cured.

D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.06 PROTECTION

A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION

SECTION 08 8856
SECURITY GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Glass Units: Laminated Security.

1.02 RELATED REQUIREMENTS

A. Section 07 9200 - Joint Sealants: Sealants for other than glazing purposes.

B. Section 08 1113 - Hollow Metal Doors and Frames: Glazed lites in doors and borrowed lites.

C. Section 08 1416 - Flush Wood Doors: Glazed lites in doors.

D. Section 08 4313 - Aluminum-Framed Storefronts: Glazing provided as part of storefront assembly.

E. Section 08 4413 - Glazed Aluminum Curtain Walls: Glazing provided as part of wall assembly.

1.03 REFERENCE STANDARDS

A. 5-aa1 - Certification Standards for Retrofitting and Reinforcing of Standard Commercial Entry Systems, Windows and Glazing;; Current Edition.

B. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.

C. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015 (Reaffirmed 2020).

D. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

E. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2015).

F. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.

G. ASTM C1036 - Standard Specification for Flat Glass; 2021.

H. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.

I. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2019.

J. ASTM C1184 - Standard Specification for Structural Silicone Sealants; 2014.

K. ASTM F1233 - Standard Test Method for Security Glazing Materials And Systems; 2008 (Reapproved 2019).

L. GANA (GM) - GANA Glazing Manual; 2008.

M. GANA (SM) - GANA Sealant Manual; 2008.

N. GANA (LGRM) - Laminated Glazing Reference Manual; 2009.

O. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

P. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use; 1990 (2016).

Q. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems; 2017.

R. UL (DIR) - Online Certifications Directory; Current Edition.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by each of the affected installers.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data on Insulating Glass Unit and Glazing Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.

C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.

D. Samples: Submit two samples 4 by 6 inch in size of glass units.

E. Certificate: Certify that products of this section meet or exceed specified requirements.

F. Manufacturer's qualification statement.

G. Installer's qualification statement.

H. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with GANA (GM), GANA (SM), GANA (LGRM), and IGMA TM-3000 for glazing installation methods.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years of documented experience.
   1. Provide certified glass products through ANSI accredited certifications that include plant audits and independent laboratory performance testing.
      a. Insulating Glass Certification Council (IGCC).
      b. Safety Glazing Certification Council (SGCC).

C. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years documented experience and approved by manufacturer.

1.07 FIELD CONDITIONS

A. Do not install glazing when ambient temperature is less than 40 degrees F.

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.08 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

B. Insulating Glass Units: Provide a five (5) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.

C. Laminated Glass: Provide a five (5) year manufacturer warranty to include coverage for delamination, including providing products to replace failed units.

D. Polycarbonate Sheet Glazing: Provide a five (5) year manufacturer warranty to include coverage for breakage, coating failure, abrasion resistance, including providing products to replace failed units.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Laminated Security Glass Manufacturers:

1. Armoured One: www.armouredone.com.
2. Global Security Glazing: www.security-glazing.com.
3. Oldcastle BuildingEnvelope: www.obe.com.
4. School Guard Glass: www.schoolguardglass.com.
5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 GLASS MATERIALS

A. Float Glass: Provide float glass based glazing unless otherwise indicated.
   1. Kind FT - Fully Tempered Type: Complies with ASTM C1048.
   2. Fully Tempered Glass: Complies with ANSI Z97.1 - Class A, or 16 CFR 1201 - Category II criteria.
   3. Tinted Type: ASTM C1036, Class 2 - Tinted, Quality - Q3, with color and performance characteristics as indicated.
   4. Thicknesses: Glass thicknesses listed are minimum. Deflection shall be no greater than the thickness of the glass. Final glazing thickness shall comply with all specification reference standards and glazing manufacturer recommendations for span width and height of each installation.

B. Laminated Glass: Float glass laminated in accordance with ASTM C1172.
   1. Laminated Glass: Complies with ANSI Z97.1 - Class A or 16 CFR 1201 - Category II impact test requirements.
   2. Forced Entry Resistance: See glazing types for specific requirements for each assembly.
   3. Polyvinyl Butyral (PVB) Interlayer: 0.030 inch thick, minimum or manufactures custom security inerlayer as required to meet performance criteria.

2.03 GLASS UNITS

A. Type GLSE - Glass Laminated SEcurity..
   1. Basis of Design: Childgard Security Glazing.
   2. Applications: Locations as indicated on drawings.
   3. Tint: Clear.
   4. Thickness: 3/8 inch (nominal).
   5. Outer Lite: Fully Tempered glass.
   6. Interlayer: Manufactures custom security interlayer , thickness as required to meet performance criteria.
   7. Inside Lite: Fully Tempered glass.
   8. Forced Entry Resistance; Must comply with one of the following multiple impact test:
      a. 5-aa1, Certification Standards for Retrofitting and Reinforcing of Standard Commercial Entry Systems, Windows and Glazing; 6 minutes.
      b. ASTM F1233 Standard Test Method for Security Glazing Materials and Systems, Class 1.3 - 6 minutes.
   9. Wet Glaze Anchoring System: Structural Silicone Sealant/Adhesive.
      a. Dow Chemical Company; Dowsil 995 Silicone Structural Sealant: www.dow.com.

2.04 ACCESSORIES

A. Silicone Structural Sealant: Self-priming, elastomeric adhesive complying with ASTM C1184.
   1. Silicone Structural Sealant: Single component; neutral curing; designed specifically for structural bonding applications of glass; ASTM C920 Type S, Grade NS, Class 50, Uses NT, A, and G; with cured Shore A hardness of 40; color as selected.
   2. Basis of Design: Dow Chemical Company; Dowsil 995 Silicone Structural Sealant: www.dow.com.

B. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch by width of glazing rabbet space minus 1/16 inch by height to suit glazing method and pane weight and area.

C. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch long by one half the height of the glazing stop by thickness to suit application, self adhesive on one face.

D. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.

E. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color as selected.

F. Glazing Clips: Manufacturer's standard type.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.

B. Verify that the minimum required face and edge clearances are being provided.

C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.

D. Verify that sealing between joints of glass framing members has been completed effectively.

E. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.03 INSTALLATION, GENERAL

A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.

B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.

C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.

D. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.

E. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.

F. Structural Sealant and Supplemental Anchors: Install in accordance with manufacturer's instructions and shop drawings.

G. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, etc.

3.04 CLEANING

A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.

B. Remove nonpermanent labels immediately after glazing installation is complete.

C. Clean glass and adjacent surfaces after sealants are fully cured.

D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.05 PROTECTION

A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION

SECTION 08 9100
LOUVERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Louvers, frames, and accessories.

1.02 RELATED REQUIREMENTS

A. Section 07 9200 - Joint Sealants: Sealing joints between frames and adjacent construction.

B. Division 23 - HVAC: Ductwork attachment to louvers.

1.03 REFERENCE STANDARDS

A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.

B. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; 2015.

C. AMCA 511 - Certified Ratings Program for Air Control Devices; 2010.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data describing design characteristics, maximum recommended air velocity, design free area, materials and finishes.

C. Shop Drawings: Indicate louver layout plan and elevations, opening and clearance dimensions, tolerances; head, jamb and sill details; blade configuration, screens, blankout areas required, and frames.

D. Samples: Submit two samples 12 by 12 inches in size illustrating finish and color of exterior and interior surfaces.

E. Test Reports: Independent agency reports showing compliance with specified performance criteria.

F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

G. Maintenance Data: Include lubrication schedules, adjustment requirements.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum five years of documented experience.

1.06 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide one year manufacturer's warranty against distortion, metal degradation, and connection failures of louver components.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Louvers:
   1. Airolite Company, LLC: www.airolite.com.
   2. American Warming and Ventilating: www.awv.com.
   3. Construction Specialties, Inc: www.c-sgroup.com.
   4. Ruskin Manufacturing; www.ruskin.com.
   5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 LOUVERS

A. Louvers: Factory fabricated and assembled, complete with frame, mullions, and accessories; AMCA Certified in accordance with AMCA 511.
   1. Wind Load Resistance: Design to resist positive and negative wind load as required by code without damage or permanent deformation.
   2. Intake Louvers: Design to allow maximum of 0.01 oz/sq ft water penetration at calculated intake design velocity based on design air flow and actual free area, when tested in accordance with AMCA 500-L.
   3. Drainable Blades: Continuous rain stop at front or rear of blade aligned with vertical gutter recessed into both jambs of frame.

B. Wind Driven Rain Resistant LouversLouvers: Horizontal blade, extruded aluminum construction.
   1. Free Area: 44 percent, minimum.
   2. Pressure Drop: ____ inches of water gauge maximum per square foot of free area at velocity of ____ fpm, when tested in accordance with AMCA 500-L, test unit size 48 inch by 48 inch.
   3. Blades: Sightproof with drainable edge design.
   4. Frame: 5 inches deep, channel profile; corner joints mitered and , with continuous recessed caulking channel each side.
   5. Aluminum Thickness: Frame 12 gage, 0.0808 inch minimum; blades 12 gage, 0.0808 inch minimum.
   6. Aluminum Finish: Superior performing organic coatings.
   7. Product: Use the following or any equivalent made by one of the listed manufacturers: Model EME520DD - Ruskin Company.

2.03 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M).

2.04 FINISHES

A. Superior Performing Organic Coatings: AAMA 2605 multiple coat, thermally cured polyvinylidene fluoride system.
   1. Polyvinylidene fluoride (PVDF) multi-coat thermoplastic fluoropolymer coating system, including minimum 70 percent PVDF color topcoat and minimum total dry film thickness of 0.9 mil; color and gloss as scheduled.

B. Color: See Section 01 6210 - Schedule of Materials and Colors.

2.05 ACCESSORIES

A. Blank-Off Panels: Same material as louver, painted black on exterior side; provide where duct connected to louver is smaller than louver frame, sealing off louver area outside duct.

B. Fasteners and Anchors: Stainless steel.

C. Flashings: Of same material as louver frame, formed to required shape, single length in one piece per location.

D. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that prepared openings and flashings are ready to receive this work and opening dimensions are as indicated on shop drawings.

B. Verify that field measurements are as indicated on shop drawings.

3.02 INSTALLATION

A. Install louver assembly in accordance with manufacturer's instructions.

B. Install louvers level and plumb.

C. Set sill members and sill flashing in continuous bead of sealant.

D. Install flashings and align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.

E. Secure louver frames in openings with concealed fasteners.

F. Coordinate with installation of mechanical ductwork.

G. Coordinate with installation of louver actuators.

3.03 ADJUSTING

A. Adjust operable louvers for freedom of movement of control mechanism. Lubricate operating joints.

3.04 CLEANING

A. Strip protective finish coverings.

B. Clean surfaces and components.

END OF SECTION

SECTION 09 2116
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Performance criteria for gypsum board assemblies.

B. Exterior gypsum sheathing.

C. Gypsum wallboard.

D. Joint treatment and accessories.

E. Textured finish system.

1.02 RELATED REQUIREMENTS

A. Section 05 4000 - Cold-Formed Metal Framing: Structural steel stud framing.

B. Section 06 1000 - Rough Carpentry: Wood blocking product and execution requirements.

C. Section 07 2100 - Thermal Insulation: Acoustic insulation.

D. Section 07 2500 - Weather Barriers: Water-resistive barrier over sheathing.

E. Section 07 8400 - Firestopping: Top-of-wall assemblies at fire-resistance-rated walls.

F. Section 07 9200 - Joint Sealants: Sealing acoustical gaps in construction other than gypsum board or plaster work.

1.03 REFERENCE STANDARDS

A. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2017.

B. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2020.

C. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2020.

D. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications; 2022.

E. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2018.

F. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2020.

G. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base; 2019.

H. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2017.

I. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel; 2018.

J. ASTM C1280 - Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing; 2018.

K. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.

L. ASTM C1629/C1629M - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels; 2019.

M. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2016.

N. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).

O. ASTM E413 - Classification for Rating Sound Insulation; 2016.

P. GA-214 - Levels of Finish for Gypsum Panel Products; 2021.

Q. GA-216 - Application and Finishing of Gypsum Panel Products; 2016.

R. GA-226 - Application of Gypsum Board to Form Curved Surfaces; 2025.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Shop Drawings: Indicate special details associated with fireproofing and acoustic seals.

C. Product Data: Provide data on gypsum board, glass mat faced gypsum board, accessories, and joint finishing system.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing gypsum board installation and finishing, with minimum five years of experience.

B. Product Qualifications:
   1. Single Source Responsibility:
      a. Obtain gypsum board products, joint treatment products, and textured coatings from a single manufacturer.

C. Mock-ups
   1. At an area on the site where approved by the Architect, provide a mock-up gypsum wallboard panel.
      a. Make the panel approximately 4'-0" square.
      b. Provide one mock-up panel for each gypsum wallboard finish used on the Work.
      c. For exterior gypsum sheathing, panel shall be complete with all joint sealant, wall ties and/or connectors, flashings and face veneer.
      d. The mock-ups may be used as part of the Work, and may be included in the finished Work, when so approved by the Architect.
      e. Revise as necessary to secure the Architect's approval.
   2. The mock-up panels, when approved by the Architect, will be used as datum points for comparison with the remainder of the work of this Section for the purpose of acceptance or rejection.

D. Reference Standards:
   1. Install gypsum board in accordance with applicable requirements and recommendations of Gypsum Association GA 216, "Recommended Specifications for the Application and Finishing of Gypsum Board", except for more stringent requirements of manufacturer.
   2. Apply acoustical sealant in accordance with applicable requirements of ASTM C919.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Section 01 6000 – Product Requirements.

B. Acceptance at Site
   1. Deliver material to site promptly without undue exposure to weather.
   2. Deliver in manufacturer's unopened containers or bundles, fully identified with name, brand, type and grade.

C. Storage and Protection
   1. Protect materials from contamination, dampness, freezing, or overheating in accordance with manufacturer's instructions.
   2. Store above ground in dry, ventilated space.
   3. Broken, or damaged gypsum board will be rejected, whether built-in or not.

1.07 PROJECT CONDITIONS

A. Project Environmental Requirements
   1. Comply with requirements of referenced standards and recommendations of material manufacturers for environmental conditions before, during, and after installation.
   2. Do not begin installation of gypsum board until building is completely enclosed and protected from water infiltration.
   3. Do not install gypsum board when ambient temperature is below 40ºF.
   4. For adhesive attachment of gypsum board, and for finishing of gypsum board, maintain ambient temperature above 55ºF from one week prior to attachment or joint treatment, and until joint treatment is complete and dry.
   5. Maintain illumination as required for proper installation of material.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.
   1. See PART 3 for finishing requirements.

B. Interior Partitions: Provide completed assemblies with the following characteristics:
   1. Acoustic Attenuation: STC of 45-49 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.

C. Fire-Resistance-Rated Assemblies: Provide completed assemblies complying with applicable code.

2.02 METAL FRAMING MATERIALS

A. Structural and Non-Structural Steel Framing for Application of Gypsum Board: As specified in Section 05 4000.

2.03 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:
   1. CertainTeed Corporation: www.certainteed.com/#sle.
   2. Georgia-Pacific Gypsum: www.gpgypsum.com/#sle.
   3. National Gypsum Company: www.nationalgypsum.com/#sle.
   4. USG Corporation: www.usg.com/#sle.
   5. Substitutions: See Section 01 6000 - Product Requirements.

B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Application:
      a. Non-fire rated partitions and ceilings: Type X.
      b. Fire rated partitions: Type X.
      c. Fire rated ceilings: Type C.
   2. Thickness:
      a. Vertical Surfaces: 5/8 inch.
      b. Ceilings: 5/8 inch.
      c. Multi-Layer Assemblies: Thicknesses as indicated on drawings.
   3. Paper-Faced Products:
      a. CertainTeed Corporation; Type X and C Drywall: www.certainteed.com/#sle.
      b. Georgia-Pacific Gypsum; ToughRock Fireguard X and C: www.gpgypsum.com/#sle.
      c. National Gypsum Company; Gold Bond BRAND Fire-Shield Type X and C Gypsum Board: www.nationalgypsum.com/#sle.
      d. USG Corporation; USG Sheetrock Brand Firecode X and C Panels: www.usg.com/#sle.
      e. Substitutions: See Section 01 6000 - Product Requirements.

C. Impact Resistant Wallboard:
   1. Application: Vandal or destructive resistance areas indicated.
   2. Surface Abrasion: Level 3, minimum, when tested in accordance with ASTM C1629/C1629M.
   3. Indentation: Level 1, minimum, when tested in accordance with ASTM C1629/C1629M.
   4. Soft Body Impact: Level 3, minimum, when tested in accordance with ASTM C1629/C1629M.
   5. Hard Body Impact: Level 3, minimum, when tested in accordance with ASTM C1629/C1629M.
   6. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
   7. Paper-Faced Type: Gypsum wallboard, as defined in ASTM C1396/C1396M.
   8. Type: Fire-resistance-rated Type X, UL or WH listed.
   9. Thickness: 5/8 inch.
   10. Edges: Tapered.
   11. Paper-Faced Products:
      a. CertainTeed Corporation; Extreme Impact Resistant Drywall with M2Tech: www.certainteed.com/#sle.
      b. National Gypsum Company; Gold Bond Hi-Impact XP Gypsum Board: www.nationalgypsum.com/#sle.
      c. USG Corporation; USG Sheetrock Brand Mold Tough VHI Firecode X Panels: www.usg.com/#sle.
      d. Substitutions: See Section 01 6000 - Product Requirements.

D. Backing Board For Wet Areas:
   1. Application: Surfaces behind tile and in wet areas including tub and shower surrounds, shower ceilings, and typical wall drywall base as detailed on the drawings.
   2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
   3. Mold tough gypsum board at wet walls that do not receive tile finish.
   4. At Walls with tile finish, provide a cement backboard or tile backer.
   5. Glass Mat Faced Board: Coated glass mat water-resistant gypsum backing panel as defined in ASTM C1178/C1178M.
      a. Fire-Resistance-Rated Type: Type X core, thickness 5/8 inch.
      b. Products:
         1) CertainTeed Corporation; GlasRoc 5/8" Type X Tile Backer: www.certainteed.com/#sle.
         2) Georgia-Pacific Gypsum; DensShield Tile Backer: www.gpgypsum.com/#sle.
         3) National Gypsum Company; Gold Bond eXP Tile Backer: www.nationalgypsum.com/#sle.
         4) Substitutions: See Section 01 6000 - Product Requirements.

E. Exterior Sheathing Board: Sizes to minimize joints in place; ends square cut.
   1. Application: Exterior sheathing, unless otherwise indicated.
   2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
   3. Glass Mat Faced Sheathing: Glass mat faced gypsum substrate as defined in ASTM C1177/C1177M.
   4. Core Type: Type X, as indicated.
   5. Type X Thickness: 5/8 inch.
   6. Edges: Square.
   7. Glass Mat Faced Products:
      a. CertainTeed Corporation; GlasRoc Type X Exterior Sheathing: www.certainteed.com/#sle.
      b. Georgia-Pacific Gypsum; DensGlass Fireguard Sheathing: www.gpgypsum.com/#sle.

c. National Gypsum Company; Gold Bond eXP Sheathing: www.nationalgypsum.com/#sle.
d. USG Corporation; USG Securock Brand Ultralight Glass-Mat Sheathing Firecode X: www.usg.com/#sle.
e. Substitutions: See Section 01 6000 - Product Requirements.

2.04 GYPSUM WALLBOARD ACCESSORIES

A. Acoustic Insulation: As specified in Section 07 2100.

B. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.

C. Water-Resistive Barrier: As specified in Section 07 2500.

D. Beads, Joint Accessories, and Other Trim: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise.
1. Corner Beads: Low profile, for 90 degree outside corners.
2. Splayed Corner Beads: All other than 90 degree outside corner.
3. Architectural Reveal Beads:
a. Shapes: As indicated on drawings.
4. Expansion Joints:
a. Type: V-shaped metal with factory-installed protective tape.
5. Adjustable Partition Closure between storefront and drywall: Gordon Interior Specialties; Mullion Mate. Provide insulation and gaskets. Size to match application. Finish to match storefront.
6. Other trims and reveals where shown on the drawings.

E. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
1. Fiberglass Tape: 2 inch wide, coated glass fiber tape for joints and corners at glass mat faced board assemblies.
2. Paper Tape: 2 inch wide, creased paper tape for joints and corners, except as otherwise indicated.
3. Joint Compound: Drying type, ready-mixed.

F. Finishing Compound: Surface coat and primer, takes the place of skim coating.

G. Textured Finish Materials: Latex- or Vinyl-based compound; plain.

H. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inches in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion-resistant.

I. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws, corrosion-resistant.

J. For exterior applications provide bugle or wafer head, rust-resistant sharp point, fine thread for light-gauge metal framing or furring.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.02 FRAMING INSTALLATION

A. Metal Framing: Install in accordance with ASTM C754 and as specified in Section 05 4000-Cold-Formed Metal Framing.

B. Blocking: Install supplementary framing, blocking and bracing for support of:
1. Framed openings.
2. Wall-mounted cabinets.

3. Plumbing fixtures.
4. Toilet partitions.
5. Toilet accessories.
6. Wall-mounted door hardware.
7. Heavy trim, furnishings or similar construction.

3.03 ACOUSTIC ACCESSORIES INSTALLATION

A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.

B. Acoustic Sealant: Install in accordance with manufacturer's instructions.
   1. Seal around all penetrations by conduit, pipe, ducts, and rough-in boxes, except where firestopping is provided.

3.04 BOARD INSTALLATION - GENERAL

A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Wall Tile shall be installed on Concrete Unit Masonry or Glass Mat Faced Tile Backer Board in toilet/shower rooms, around water fountains or other areas in which the tile might be exposed to moisture. If CMU is not provided in these areas, Glass Mat Faced Tile Backer Board shall be used. Wall tile to be installed on Glass Mat Faced Tile Backer Board where located in corridors.

C. FRP shall be installed on Glass Mat Faced Tile Backer Board in toilet rooms, janitor closets, around water fountains or other areas in which the tile might be exposed to moisture.

D. Fire-Resistance-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.

E. Exposed Gypsum Board in Interior Wet Areas: Seal joints, cut edges, and holes with water-resistant sealant.

F. Exterior Sheathing: Comply with GA-253 and ASTM C1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.
   1. Seal joints, cut edges, and holes with water-resistant sealant.
   2. Attach exterior sheathing to metal framing with screws spaced 8" o.c. at perimeter where there are framing supports; and 8" o.c. along intermediate framing in field. Do not counter sink.
   3. Locate fasteners minimum 3/8" from edges and ends of sheathing panels, tight against and flush with surface of sheathing.
   4. Immediately after installation, protect from weather by application of water-resistive barrier.

G. Installation on Metal Framing: Use screws for attachment of gypsum board.

H. Curved Surfaces: Apply gypsum board to curved substrates in accordance with GA-226.

3.05 BOARD INSTALLATION

A. Single Layer Gypsum Board on Metal Studs or ICF System.
   1. Loosely butt gypsum board joints together and neatly fit.
   2. Do not place butt ends against tapered edges.
   3. Maximum allowable gap at end joints: 1/8 inch.
   4. Stagger joints on opposite sides of partitions.
   5. Apply ceiling boards first where gypsum board ceilings and wall occur.
   6. Cut openings in gypsum board to fit electrical outlets, plumbing, light fixtures and piping snugly and small enough to be covered by plates and escutcheons. Cut both face and back paper.
   7. Screw board in place securely with screws spaced according to manufacturer's recommendations.

8. At internal and external corners, conceal the cut edges of the boards by the overlapping covered edges of the abutting boards.
9. Stagger the boards so that corners of any four boards will not meet at a common point except in vertical corners.
10. At internal and external corners, conceal the cut edges of the boards by the overlapping covered edges of the abutting boards.
11. In all installations, gypsum wallboard shall be held above the finished floor a minimum of ½". Failure to comply with this requirement will be grounds for rejection and removal of the entire application.

B. Single Layer Gypsum Board on Furring
1. Apply gypsum board with long dimension at right angles to furring channel.
2. Center end joints over channel web; stagger end joints from those in adjacent rows of board.
3. Fasten boards to furring channels with screws spaced according to manufacturer's recommendations.

C. Double Layer Gypsum Board
1. Fasten base layer to studs or furring with screws, and attach face layer using laminating adhesive and screws, applied according to manufacturer's instructions.
2. Offset face-layer joints at least 10 inches from parallel base-layer joints.
3. Screw both layers to metal supports at double layer ceiling applications and where required for fire-rated construction.

D. Single Layer Gypsum Board Suspended for Ceilings:
1. Install the gypsum wallboard to ceilings with the long dimension of the wallboard at right angles to the supporting members.
2. Wallboard may be installed with the long dimension parallel to supporting members that are spaced 16" on centers when attachment members are provided at end joints.

3.06 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints
1. Install control joints at junction of gypsum board partitions with walls or partitions of other finish material.
2. Install control joints within long runs of partitions at approximately 30'-0" on center or as indicated on the drawing.
3. Install control joints at bulkheads as shown on the drawings but in no case shall they exceed 15”-0” on center or as indicated on the drawing. Contractor shall be responsible to insure that bulkheads comply with this requirement and shall coordinate locations with the architect if not shown on the drawings.
4. Where gypsum board is vertically continuous, as at stairwells, provide horizontal control joints at each floor level.
5. Special Trim: Install as indicated on Drawings and in accordance with manufacturer's instructions.
6. Install control joints at each door jamb from head of door ceiling as shown on the drawings.
7. Do not install control joints behind any applied wall coverings.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

D. Install metal casing bead trim whenever edge of gypsum board would otherwise be exposed or semi-exposed.

E. Special Trim and Reveal Joints: Install as indicated on Drawings and in accordance with manufacturer's instructions.

3.07 JOINT TREATMENT

A. Finish gypsum board in accordance with levels defined in GA-214 , ASTM C840, and as follows:
   1. Level 1: Ceiling plenum areas and concealed areas, except provide higher level of finish as required to comply with fire resistance ratings and acoustical ratings.
   2. Level 2: Gypsum board substrate at tile, except remove tool marks and ridges.
   3. Level 3: Gypsum board surfaces, where textured finishes will be used.
   4. Level 4: Gypsum board surfaces scheduled to receive non-textured painted finishes, vinyl wall covering or custom covering is to be applied, except where another finish level is indicated.
   5. Level 5: Gypsum board surfaces scheduled to receive painted graphics or Dry-Erase Coating.

B. General:
   1. Inspect areas to be joint treated, verifying that the gypsum wallboard fits snugly against supporting framework.
   2. In areas where joint treatment and compound finishing will be performed, maintain a temperature of not less than 55 degrees for 24 hours prior to commencing the treatment, and until joint and finishing compounds have dried.
   3. Apply the joint treatment and finishing compound by machine or hand tool.
   4. Provide a minimum drying time of 24 hours between coats, with additional drying time in poorly ventilated areas.
   5. Joint Treatment is required at all gypsum board walls including fire protection assemblies and ICF installations above the ceiling line.

C. Embedding compounds:
   1. Apply to gypsum wallboard joints and fastener heads in a thin uniform layer.
   2. Spread the compound not less than 3" wide at joints, center the reinforcing tape in the joint, and embed the tape in the compound. Then spread a thin layer of compound over the tape.
   3. After this treatment has dried, apply a second coat of embedding compound to joints and fastener heads, spreading in a thin uniform coat to not less than 6" wide at joints, and feather edged.
   4. Sandpaper between coats as required.
   5. When thoroughly dry, sandpaper to eliminate ridges and high points.

3.08 TEXTURE FINISH

A. Apply finish texture coating by means of spraying apparatus in accordance with manufacturer's instructions.

B. Texture Required: Unless shown or otherwise indicated on the drawings, provide medium “Orange Peel or Spatter Finish” texture on walls or ceilings.

3.09 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

SECTION 09 2226
SUSPENSION SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Related Documents: General and Supplementary Conditions of the Contract, Division 1 General Requirements, and Drawings are applicable to this Section.

B. Section Includes, but is not limited to:
   1. Metal suspension systems.
   2. Trim and accessories.

C. Related Sections:
   1. Section 05 4000 – Cold-Formed Metal Framing
   2. Section 09 2982 – Gypsum Board
   3. Section 09 5100 – Acoustical Ceilings
   4. Section 09 9000 – Painting and Coating

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. A635 - Standard Specification for Sheet Steel.
   2. A641 - Standard Specification for Zinc-Coated Carbon Steel Wire
   3. C754 - Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Board.
   4. C1002 - Specification for Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases.
   5. E119 - Standard Test Methods for Fire Tests of Building Construction and Materials

B. Association References:
   1. Gypsum Association GA 216, "Recommended Specifications for the Application and Finishing of Gypsum Board”
   2. Comply with "Specifications for Metal Lathing and Furring" published by the Metal Lath/Steel Framing Association.

1.03 SYSTEM DESCRIPTION

A. Design Requirements: Fabricate and install systems as indicated but not less than that required to comply with ASTM C754 under the following conditions:
   1. Interior suspended ceilings and soffits: Maximum deflection of 1/360 of distance between supports.
   2. Exterior soffits: Withstand minimum positive and negative pressure of 20 psf with maximum deflection of 1/360 of distance between supports.
   3. Fire Resistance Ratings: Where fire resistance classifications are indicated, provide materials and application procedures identical to those listed by UL or tested according to ASTM E119 for type of construction shown.

1.04 SUBMITTALS

A. Product Data: Submit product data sheets on the following materials. Data sheets shall be marked to indicate the product and sizes used.
   1. Metal Framing and Furring Materials

1.05 QUALITY ASSURANCE

A. Qualifications:
   1. Single Source Responsibility:
      a. Obtain metal framing from a single manufacturer.

B. Reference Standards:

1. Applicable requirements of ASTM C754 for installation of steel framing.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Section 01 6000 – Product Requirements.

B. Acceptance at Site
   1. Deliver material to site promptly without undue exposure to weather.
   2. Deliver in manufacturer's unopened containers or bundles, fully identified with name, brand, type and grade.

C. Storage and Protection
   1. Protect materials from contamination, dampness, freezing, or overheating in accordance with manufacturer's instructions.
   2. Store above ground in dry, ventilated space.
   3. Protect materials from soiling, rusting and damage.

1.07 PROJECT CONDITIONS

A. Project Environmental Requirements
   1. Comply with requirements of referenced standards and recommendations of material manufacturers for environmental conditions before, during, and after installation.
   2. Maintain illumination as required for proper installation of material.

1.08 WARRANTY

A. Comply with requirements of Section 01 7800 – Closeout Submittals.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements indicated herein, provide products of one of the listed manufacturers.

B. Suspension Systems:
   1. Armstrong World Industries, Inc: www.armstrong.com.
   2. CertainTeed Corporation: www.certainteed.com.
   3. USG: www.usg.com.
   4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 CEILING AND SOFFIT SUPPORT MATERIALS

A. Hanger Anchorage Devices: Screws, clips, bolts or other devices compatible with indicated structural anchorage for ceiling hangers and whose suitability has been proven through standard construction practices or by certified test data.

B. Hangers
   1. Grade: Steel wire or rods, sizes to comply with requirements of ASTM C754 for ceiling or soffit area and loads to be supported.
      a. Wire: ASTM A 641, soft, Class 1 galvanized.
      b. Rods and flats: Mild steel components.
   2. Finish: Galvanized or painted with rust-inhibitive paint for interior Work; galvanized for exterior Work.

C. Framing System
   1. Grade: Framing system for gypsum board panels consisting of cold-rolled steel members conforming to ASTM C635.
   2. Finish: Exposed surfaces finished in manufacturer’s standard enamel paint finish.
   3. Fire Rating: Rating in accordance with U.L. assembly as indicated on the drawings.
   4. Components: Main tees, furring cross channels, furring cross tees, and cross tees.
      a. Main Tees: Heavy Duty classification 1-1/2” high x 144” long, integral reversible splice with knurled face. (Fire rated where required).

b. Cross Members: Members with knurled face. Cross Tees: 1-1/2” high x 48” long with 1-1/2” wide face; quick release cross tee ends for positive locking and removability without tools. (Fire rated where required).
c. Accessory Cross Tees: Cross tees must have knurled faces and quick release cross tee ends for positive locking and removability without tools.

5. Accessories:
a. U-shaped perimeter channel molding.
b. Galvanized carbon steel (12 ga.) hanger wire.
c. Galvanized carbon steel (9 ga.) hanger wire for soffit assemblies.

D. Hanger Wire Sound Isolators: Provide where indicated for sound-rated suspended ceilings.

E. Aluminum capped with galvanized steel (2") bulbed and mains at wet or humid areas or when exposed to high humidity (Weight Room)

F. Provide trapeze when attachment to structure is not possible. Trapeze material to be unistrut or black iron. Ceiling grid material is not acceptable.

G. Miscellaneous Accessories: Provide as required for complete installations.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

A. Install in accordance with reference standards and manufacturer's instructions.

B. Tolerances:
1. Do not exceed 1/8 inch in 8'-0" variation from plumb or level in exposed lines of surface, except at joints between gypsum board units.
2. Do not exceed 1/16 inch variation between planes of abutting edges or ends.
3. Shim as required to comply with specified tolerances.

C. Install framing to comply with ASTM C754 and with ASTM C840 requirements that apply to framing installation.

3.02 EXAMINATION

A. Site Verification of Conditions:
1. Examine substrates and adjoining construction and conditions under which Work is to be installed. Do not proceed with Work until unsatisfactory conditions are corrected.

3.03 INSTALLATION

A. Comply with provisions of Section 01 7000 – Execution and Closeout Requirements.

3.04 METAL SUPPORT INSTALLATION

A. Ceiling Support Systems
1. Secure hangers or rods to structural support by connecting directly to structure where possible; otherwise connect to inserts, clips or other anchorage devices or fasteners indicated.
2. Space main runners, hangers and furring according to requirements of ASTM C754, except as otherwise indicated.
3. Where spacing of structural members, or width of ducts or other equipment, prevents regular spacing of hangers, provide supplemental hangers and suspension members and reinforce nearest affected hangers to span extra distance.
4. Attach directly to structural elements only, do not attach to metal deck. Loop hangers and wire-tie directly or provide anchors or inserts.
5. Spacing of hangers to NOT exceed 4'-0" o.c.

3.05 ADJUSTING

A. Correct damage and defects which may telegraph through finished work.

B. Leave Work smooth and uniform.

3.06 CLEANING

A. Comply with requirements of Section 01 7000 – Execution and Closeout Requirements.

B. At completion of each segment of installation in a room or space, promptly pick up and remove from the working area all scrap, debris, and surplus material of this Section.

END OF SECTION

SECTION 09 3000
TILING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Tile for floor applications.

B. Tile for wall applications.

C. Trim and accessories.

1.02 RELATED REQUIREMENTS

A. Section 04 2000 - Unit Masonry.

B. Section 05 4000 - Cold-Formed Metal Framing.

C. Section 07 9200 - Joint Sealants: Sealing joints between tile work and adjacent construction and fixtures.

D. Section 07 9513 - Expansion Joint Cover Assemblies: Expansion joint components.

E. Section 09 2116 - Gypsum Board Assemblies: Tile backer board.

1.03 REFERENCE STANDARDS

A. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2017.

B. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2016a.

C. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2019.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.

C. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, and setting details.

D. Samples: Mount tile and apply grout on two plywood panels, minimum 12 by 12 inches in size illustrating pattern, color variations, and grout joint size variations.

E. Grout: Submit manufacturer's full range of standard and designated color samples for each type of grout for Architect's selection.

F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

G. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods.

H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Extra Tile: At completion of project, deliver to Owner extra stock of materials used on project as follows:
      a. Provide 25 square feet of floor tile or two cartons of each color and size, whichever quantity is greater.
      b. Provide 25 square feet of wall tile or two cartons of each color and size, whichever quantity is greater.

c. Thirty (30) lineal feet of each color and type of base.

3. Store in location as directed by Owner.
4. Ensure materials are boxed and identified by manufacturer, type, and color.

1.06 QUALITY ASSURANCE

A. Maintain one copy of and ANSI A108/A118/A136 and TCNA (HB) on site.

B. Manufacturer Qualifications:
   1. Tile: Company specializing in manufacturing the types of products specified in this section, with minimum five years of documented experience.
   2. Setting Materials: Minimum ten years experience in manufacturing the types of setting and grout materials specified.
   3. Membrane: Minimum five years experience in manufacturing the types of membrane materials specified.

C. Installer Qualifications: Company specializing in performing tile installation, with minimum of five years of documented experience.

1.07 MOCK-UP

A. See Section 01 4000 - Quality Requirements, for general requirements for mock-up.

B. Construct tile mock-up where determined by the Architect, incorporating all components specified for the location.
   1. Minimum size of mock-up is full height of wall, 6'-0" long or as determined by the Architect to incorporate all components. More that one mock-up may be required to demonstrate all materials in the project.
   2. Mock-up shall be approved by the Owner, Architect or Architect's representative. Approved mock-up may remain as part of the Work.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.09 FIELD CONDITIONS

A. Do not install solvent-based products in an unventilated environment.

B. Maintain ambient and substrate temperature of no less than 50 degrees F and no more than 100 degrees F during installation of mortar materials.

1.10 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Submit a written warranty, executed by the Contractor, Installer, and Manufacturer, agreeing to repair or replace tile that fails in materials or workmanship within the specified warranty period.
   1. Warranty Period: One (1) year after date of Substantial Completion.

PART 2 PRODUCTS

2.01 TILE

A. Manufacturers: All products by the same manufacturer.
   1. American Olean Corporation: www.americanolean.com/#sle.
   2. Arizona Tile: www.arizonatile.com.
   3. Concept Surfaces: www.conceptsurfaces.com.
   4. Crossville Inc.: www.crossvilleinc.com.
   5. Dal-Tile Corporation: www.daltile.com/#sle.
   6. Emser Tile, LLC: www.emser.com/#sle.
   7. Horizon Italian Tile: www.horizontile.com.
   8. Pantheon: www.pantheontile.com.
   9. Trinity Surfaces: www.trinitysurfaces.com.

10. Substitutions: See Section 01 6000 - Product Requirements.

B. Ceramic Tile: ANSI A137.1, standard grade.
   1. Moisture Absorption: 7.0 to 20.0 percent as tested in accordance with ASTM C373.
   2. Size: As scheduled.
   3. Edges: Square.
   4. Surface Finish: Matte glaze.
   5. Product and Color(s): See drawings for Schedule of Materials and Colors.
   6. Trim Units: Matching bead, bullnose, cove, and base shapes in sizes indicated.

C. Porcelain Tile: ANSI A137.1, standard grade.
   1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
   2. Size: As scheduled.
   3. Thickness: 3/8 inch.
   4. Edges: Square.
   5. Surface Finish: Matte glazed.
   6. Product and Color(s): See drawings for Schedule of Materials and Colors.
   7. Trim Units: Matching bullnose, double bullnose, cove base, cove, and window sill or step nosing shapes in sizes indicated.
   8. Provide Large Format Tile mortar as required according to manufacturer's recommendation.

2.02 TRIM AND ACCESSORIES

A. Trim: Matching bullnose, cove base, and window sill or step nosing shapes in sizes coordinated with field tile.
   1. Applications:
      a. Open Edges: Bullnose.
      b. Inside Corners: Jointed.
      c. Floor to Wall Joints: Cove base.
   2. Manufacturers: Same as for tile.

B. Trim: Satin natural anodized extruded aluminum, style and dimensions to suit application, for setting using tile mortar or adhesive.
   1. Applications:
      a. Wall corners, outside.
         1) Satin anodized aluminum (AE), perforated anchoring leg, square outer corner with 1/4" radius along the surface edge.
         2) Equal to Schluter - QUADEC.
         3) Size: As required for tile.
         4) Accessories:
            (a) Outside Corner Endcap
            (b) Connector (stainless steel)
      b. Wall edges, top.
         1) L-shaped profile with 1/8" wide top section and vertical wall section that together form the visible surface, integrated trapezoid-perforated anchoring leg, and integrated grout joint spacer.
         2) Material and Finish: AE - Satin anodized aluminum
         3) Equal to Schluter - SCHIENE.
         4) Size: As required for tile.
         5) Accessories:
            (a) Outside Corner Endcap
            (b) Connector (satin anodized aluminum)
      c. Floor to wall joints when coved base is not availible.

1) Satin anodized aluminum (AE) profile with integrated trapezoid-perforated anchoring legs, connected at a 90 degree angle by a core-shaped section with 3/8 inch radius that forms the visible surface.
2) Equal to Schluter DILEX-AHKA.
3) Size: As required for tile.
4) Accessories:
   (a) Outside Corner (90 degrees)
   (b) Inside Corner, 2-way (90 degrees)
   (c) Connector
   (d) End Cap

d. Borders and other trim as indicated on drawings.

2. Manufacturers:
   a. Schluter-Systems: www.schluter.com/#sle.
   b. Substitutions: See Section 01 6000 - Product Requirements.

C. Thresholds: Marble, solid surface or other material as indicated on the drawings; color as selected, honed finish; 2 inches wide by full width of wall or frame opening; 1/2 inch thick; beveled on long edge with radiused corners on top side; without holes, cracks, or open seams.

2.03 SETTING MATERIALS

A. Manufacturers:
   1. ARDEX Engineered Cements: www.ardexamericas.com.
   2. Bostik Inc: www.bostik-us.com.
   3. Custom Building Products: www.custombuildingproducts.com.
   4. LATICRETE International, Inc: www.laticrete.com.
   5. Mapei Corporation: www.mapei.com.
   6. Merkrete, by Parex USA, Inc: www.merkrete.com/sle.
   7. TEC, an H.B. Fuller Construction Products Brand: www.tecspecialty.com/#sle.
   8. Substitutions: See Section 01 6000 - Product Requirements.

B. Provide setting materials made by the same manufacturer as grout.

C. Latex-Portland Cement Mortar Bond Coat: ANSI A118.4.
   1. Applications: Use this type of bond coat where indicated and in thick-set applications.

D. Epoxy Adhesive and Mortar Bond Coat: ANSI A118.3.
   1. Applications: Use bonding tile to steel substrates.

E. Organic Adhesive: ANSI A136.1, thinset mastic type.
   1. Applications: Use for shower floors and walls.
   2. Use Type I in areas subject to prolonged moisture exposure.

F. Dry-Set Portland Cement Mortar Bond Coat: ANSI A118.1.
   1. Applications: Use in thin-set applications.

G. Mortar Bed Materials: Pre-packaged mix of Portland cement, sand, latex additive, and water.

2.04 GROUTS

A. Manufacturers:
   1. ARDEX Engineered Cements: www.ardexamericas.com.
   2. Bostik Inc: www.bostik-us.com.
   3. Custom Building Products: www.custombuildingproducts.com.
   4. LATICRETE International, Inc: www.laticrete.com.
   5. Mapei Corporation: www.mapei.com
   6. Merkrete, by Parex USA, Inc: www.merkrete.com/sle.
   7. TEC, an H.B. Fuller Construction Products Brand: www.tecspecialty.com/#sle.
   8. Substitutions: See Section 01 6000 - Product Requirements.

B. High Performance Polymer Modified Grout: ANSI A118.7 polymer modified cement grout.
   1. Applications: Use this type of grout where indicated and where no other type of grout is indicated.
   2. Use sanded grout for joints 1/8 inch wide and larger; use unsanded grout for joints less than 1/8 inch wide.
   3. Color(s): As selected by Architect from manufacturer's full line.

C. Epoxy Grout: ANSI A118.3 chemical resistant and water-cleanable epoxy grout.
   1. Applications: Provide at all walls at food preparation areas and restroom areas.
   2. Color(s): As selected by Architect from manufacturer's full line.

2.05 MAINTENANCE MATERIALS

A. Tile Sealant: Gunnable, silicone, siliconized acrylic, or urethane sealant; moisture and mildew resistant type.
   1. Applications: Between tile and plumbing fixtures.Inside corners at walls and around door frames. Do not grout inside corners
   2. Color(s): As selected by Architect from manufacturer's full line.
   3. Products:
      a. ARDEX Engineered Cements: www.ardexamericas.com.
      b. Custom Building Products: www.custombuildingproducts.com.
      c. LATICRETE International, Inc: www.laticrete.com.
      d. Mapei Corporation: www.mapei.com
      e. Merkrete, by Parex USA, Inc: www.merkrete.com/sle.
      f. Substitutions: See Section 01 6000 - Product Requirements.

B. Grout Sealer: Liquid-applied, moisture and stain protection for existing or new portland cement grout.
   1. Composition: Water-based penetrating sealer.
   2. Products: As recommended by the grout manufacturer.

2.06 ACCESSORY MATERIALS

A. Waterproofing Membrane: Specifically designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.10.
   1. Fluid or Trowel Applied Type:
      a. Apply under all tile floors, and all floor penetrations including but not limited to floor drains and pipe penetrations as well as floor to wall intersections. Provide backer rod at floor to wall intersections and continue membrane 12" minimum up wall surface.
      b. Thickness: 25 mils, minimum, dry film thickness.
      c. Products:
         1) Basis of Design: Custom Building Products; RedGard Crack Prevention and Waterproofing Membrane: www.custombuildingproducts.com; or products of one of the following manufactures:
         2) ARDEX Engineered Cements: www.ardexamericas.com/#sle.
         3) H.B. Fuller Construction Products Inc: www.tecspecialty.com/#sle.
         4) LATICRETE International, Inc: www.laticrete.com/#sle.
         5) Mapei Corporation: www.mapei.com
         6) Merkrete, by Parex USA, Inc: www.merkrete.com/sle.
         7) Substitutions: See Section 01 6000 - Product Requirements.

B. Reinforcing Mesh: 2 by 2 inch size weave of 16/16 wire size; welded fabric, galvanized.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.

C. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of setting materials to sub-floor surfaces.

D. Verify that concrete sub-floor surfaces are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within the following limits:
   1. Moisture Emission Rate: Not greater than 3 lb per 1000 sq ft per 24 hours, test in accordance with ASTM F1869.
   2. Alkalinity (pH): Verify pH range of 5 to 9, test in accordance with ASTM F710.

E. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Protect surrounding work from damage.

B. Vacuum clean surfaces and damp clean.

C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

D. Install backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of setting material to a feather edge.

E. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

3.03 INSTALLATION - GENERAL

A. Install tile and grout in accordance with applicable requirements of ANSI A108.1A thru A108.13, manufacturer's instructions, and TCNA (HB) recommendations.

B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.

C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.

D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.

E. Form internal angles square and external angles bullnosed.

F. Install ceramic accessories rigidly in prepared openings.

G. Install non-ceramic trim in accordance with manufacturer's instructions.

H. Install thresholds where indicated.

I. Sound tile after setting. Replace hollow sounding units.

J. Keep control and expansion joints free of mortar, grout, and adhesive.

K. Where wall or floor tile extends across EJ or CJ provide a 3/8" wide joint to align with the EJ or CJ and fill with sealant to match grout. All joints shall comply with the requirement set in the TCNA Handbook, EJ171 Movement Joint Guidelines for Ceramic, Glass and Stone.

L. Prior to grouting, allow installation to completely cure; minimum of 48 hours.

M. Grout tile joints unless otherwise indicated. Use standard grout unless otherwise indicated.

N. At changes in plane, inside corners, and tile-to-tile control joints, use sanded tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.

O. Apply sealant at all inside tile corners and around door frames and at base areas.

3.04 INSTALLATION - FLOORS - THIN-SET METHODS

A. Over interior concrete substrates, install in accordance with TCNA (HB) Method F113, dry-set or latex-Portland cement bond coat, with standard grout, unless otherwise indicated.
   1. Where waterproofing membrane is indicated, install in accordance with TCNA (HB) Method F122, with latex-Portland cement grout.

B. Install tile-to-tile floor movement joints in accordance with TCNA (HB) Method EJ171F.

3.05 INSTALLATION - FLOORS - MORTAR BED METHODS

A. Over interior concrete substrates, install in accordance with TCNA (HB) Method F111, with cleavage membrane, unless otherwise indicated.
   1. Where waterproofing membrane is indicated, with standard grout or no mention of grout type, install in accordance with TCNA (HB) Method F121.

B. Waterproofing Membrane: Install as recommended by manufacturer .

C. Mortar Bed Thickness: 2 inch, unless otherwise indicated.

3.06 INSTALLATION - SHOWERS AND BATHTUB WALLS

A. At tiled shower receptors install in accordance with TCNA (HB) Method B420, mortar bed floor, and W245, thin-set over coated glass mat backer board walls.

B. Grout with latex-Portland cement grout.

3.07 INSTALLATION - WALL TILE

A. Over coated glass mat backer board on studs, install in accordance with TCNA (HB) Method W245.

B. Over gypsum wallboard on wood or metal studs install in accordance with TCNA (HB) Method W243, thin-set with dry-set or latex-Portland cement bond coat, unless otherwise indicated.
   1. Where mortar bed is indicated, install in accordance with TCNA (HB) Method W222, one coat method.
   2. Where waterproofing membrane is indicated other than at showers and bathtub walls, install in accordance with TCNA (HB) Method W222, one coat method.

C. Over interior concrete and masonry install in accordance with TCNA (HB) Method W202, thin-set with dry-set or latex-Portland cement bond coat.

3.08 CLEANING

A. Clean tile and grout surfaces.

3.09 PROTECTION

A. Do not permit traffic over finished floor surface for 4 days after installation.

3.10 CLOSEOUT ACTIVITIES

A. See Section 01 7800 - Closeout Submittals, for closeout submittals.

B. See Section 01 7900 - Demonstration and Training, for additional requirements.

END OF SECTION

SECTION 09 5100
ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Suspended metal grid ceiling system.

B. Decorative Grid System Trim

C. Acoustical units.

1.02 RELATED REQUIREMENTS

A. Section 05 3100 - Steel Decking: Placement of special anchors or inserts for suspension system.

B. Section 07 2100 - Thermal Insulation: Acoustical insulation.

C. Section 08 3100 - Access Doors and Panels: Access panels.

1.03 REFERENCE STANDARDS

A. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2013.

B. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2017.

C. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2014.

D. CISCA (AC) - Acoustical Ceilings: Use and Practice; 1999.

E. UL (FRD) - Fire Resistance Directory; Current Edition.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

B. Do not install acoustical units until after interior wet work is dry.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate grid layout and related dimensioning, junctions with other ceiling finishes, and mechanical and electrical items installed in the ceiling.

C. Product Data: Provide data on suspension system components and acoustical units.

D. Samples: Submit two full size samples illustrating material and finish of acoustical units.

E. Samples: Submit two samples each, 12 inches long, of suspension system main runner, cross runner, and perimeter molding.

F. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

G. Manufacturer's certificate that products meet or exceed specified requirements.

H. Material Safety Data Sheets under provisions of Section 01 7800 - Closeout Submittals for the following items:
   1. All mastics, glues, and adhesives
   2. Acoustical ceiling tile

I. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.

2. Extra Acoustical Units: Quantity equal to 5 percent of total installed or (2) cartons minimum, whichever quantity is greater.

J. Final acceptance of acoustical units to be made by owner via submittal with full size samples.

1.06 QUALITY ASSURANCE

A. Fire-Resistive Assemblies: Complete assembly listed and classified by UL for the fire resistance indicated.

B. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

C. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

D. Installer Qualifications: An entity experienced in the installation of acoustical ceiling systems similar to requirements for this Project, and acceptable to, or licensed by, acoustical ceiling systems manufacturer.

E. Comply with the following standards:
1. CISCA (AC) "Acoustical Ceilings: Use and Practice."
2. CISCA (AC) "Guidelines for Seismic Restraint Direct Hung Suspended Ceiling Assemblies."

1.07 DELIVERY, STORAGE, AND HANDLING

A. Comply with pertinent provisions of Section 01 6000 – Product Requirements.

B. Deliver acoustical ceiling system components in manufacturer's original unopened packages or containers, with labels intact.

C. Store all components to provide suitable protection against deleterious effects from exposure to moisture, direct sunlight, or other causes.

D. Handle all components to preclude damage. Take special precaution to prevent damage to acoustical ceiling unit edges and corners.

E. Comply with manufacturer's Material Safety Data Sheets (MSDS) for delivery, storage, and handling of components.

1.08 FIELD CONDITIONS

A. Maintain uniform temperature of 60 - 85 degrees F, and maximum relative humidity of 70 percent prior to, during, and after acoustical unit installation.

B. Prior to installation, the following conditions must exist:
1. All windows and exterior doors in place and roof watertight.
2. Work of all wet trades completed and thoroughly dried to installation of any system components.
3. Mechanical and Electrical trades shall have completed their work above ceiling line prior to acoustical ceiling systems installation. Coordinate with Mechanical and Electrical trades prior to start of installation.

1.09 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. The manufacturer shall provide a minimum 15-year acoustical ceiling and suspension system warranty. Warranty shall warrant against ceiling tile sagging, warping and suspension grid rusting.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acoustic Tiles/Panels:

1. Armstrong World Industries, Inc: www.armstrongceilings.com.
2. Certainteed Saint-Gobain: www.certainteed.com.
3. USG: www.usg.com.
4. Substitutions: See Section 01 6000 - Product Requirements.

B. Suspension Systems:
1. Same as for acoustical units.
2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 ACOUSTICAL UNITS

A. Acoustical Tile Type L1 - Standard Panel: Painted mineral fiber, ASTM E 1264 Type III, Form 2, Sag Resistant Panels with the following characteristics:
1. Size: 24 by 24 inches.
2. Thickness: 3/4 inches.
3. Composition: Water felted.
4. Light Reflectance: Not less than 82 percent, determined in accordance with ASTM E1264.
5. NRC Range: Not less than 0.55, determined in accordance with ASTM E1264.
6. Ceiling Attenuation Class (CAC): Not less than 35, determined in accordance with ASTM E1264.
7. Edge: Square.
8. Surface Color: White.
9. Surface Pattern: CE (perforated, small holes and lightly textured)..
10. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical tiles treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold and mildew.
11. Products:
    a. Basis of Design: Fine Fissured 1728 as manufactured by Armstrong World Industries.
    b. Acceptable Equal: HHF-157 by Certainteed.
    c. Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of one of the manufacturers listed in paragraph 2.01.
    d. Substitutions: See Section 01 6000 - Product Requirements.

B. Glass Fiber Acoustical Panels Type L6B– Acoustical “Absorptive” Panel: painted faced glass fiber, ASTM E 1264 Type XII, Form 2, Sag Resistant Panels with the following characteristics:
1. Size: 24 by 24 inches.
2. Thickness: 1 inches.
3. Light Reflectance: Not less than 85 percent, determined in accordance with ASTM E1264.
4. NRC Range: Not less than 0.85, determined as specified in ASTM E 1264.
5. Articulation Class (AC): Not less than 170, determined in accordance with ASTM E1264.
6. Edge: Square.
7. Surface Color: As indicated on drawings.
8. Surface Pattern: E (fine texture).
9. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical tiles treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold and mildew.
10. Products:
    a. Basis of Design: Calla 2820 as manufactured by Armstrong World Industries
    b. Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of one of the manufacturers listed in paragraph 2.01.
    c. Substitutions: See Section 01 6000 - Product Requirements.

2.03 SUSPENSION SYSTEM(S)

A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.

B. Exposed Steel Suspension System: Formed steel, commercial quality cold rolled; heavy-duty.
   1. Profile: Tee; 15/16 inch wide face, main tee 1-1/2 inch, cross tee 1-1/2 inch.
   2. Construction: Double web.
   3. Finish: White painted.
   4. Products:
      a. Basis of Design for Non-Fire Rated Assemblies: "Prelude XL Galvanized Capped" as manufactured by Armstrong World Industries.
      b. Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of one of the manufacturers listed in paragraph 2.01. Ceiling Tile and Grid shall be as approved by the manufacturer.
      c. Substitutions: See Section 01 6000 - Product Requirements.

C. Provide trapeze when attachment to structure is not possible. Trapeze material to be unistrut or black iron. Ceiling grid material is not acceptable.

2.04 ACCESSORIES

A. Support Channels and Hangers: Galvanized steel; size and type to suit application and ceiling system flatness requirement specified.
   1. Angle Hangers: ASTM A 446 steel with G90 coating.
   2. Flat Hangers: Zinc-coated steel.
   3. Hanger Rods: Zinc-coated steel.

B. Perimeter Moldings: Same material and finish as grid.
   1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.

C. Decorative Grid System Trim
   1. Physical properties.
      a. Extruded aluminum alloy 6063 trim channel, 10' straight or curved profiles.
      b. Concealed connections to grid with T-bar connection clip, including all necessary trim for corners inside and outside and all accessories.
      c. Size: 6 inch" wide face with 3/4" horizontal legs, straight or curved sections with special bosses formed for attachment to Axiom T-bar connection clip or hanging clip.
      d. Color: Match color of grid.
      e. Finish: Factory-applied baked polyester paint.
   2. Products:
      a. Basis of Design: Axiom, Classic Trim as manufactured by Armstrong World Industries.
      b. Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of one of the manufacturers listed in paragraph 2.01.
      c. Substitutions: See Section 01 6000 - Product Requirements.

D. Acoustical Sealant For Perimeter Moldings: Non-hardening, non-skinning, for use in conjunction with suspended ceiling system.

E. Touch-up Paint: Type and color to match acoustical and grid units.

F. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that layout of hangers will not interfere with other work.

C. Verify that the building is enclosed, work about proposed ceiling area is completed, tested and approved prior to installation of acoustical ceilings. Humidity must be controllable.

3.02 INSTALLATION - SUSPENSION SYSTEM

A. Install suspension system in accordance with UL design requirements ASTM C 636/C 636M, ASTM E 580/E 580M, and manufacturer's instructions and as supplemented in this section.

B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.

C. Lay out system to a balanced grid design with edge units no less than 50 percent of acoustical unit size.

D. Main runners directly suspended by minimum 12 gage galvanized steel wire; hanger wire wrapped tightly a minimum three full turns.
   1. Runner Spacing: 4’-0”.
   2. Hanger Spacing: 4’-0”.

E. Main runners interconnected by cross-tees to form modules as shown on reflected ceiling plans. Suitable cross-tee lengths adjacent to recessed light fixtures on each side not supported by a main runner.
   1. Cross-Tee Spacing: 4’-0”.

F. Install after all above-ceiling work is complete and all above ceiling inspection lists have been signed off by architect, engineer, owner and any applicable authorities having juridiction as required. Coordinate the location of hangers with other work.

G. Provide hanger clips during steel deck erection. Provide additional hangers and inserts as required.

H. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

I. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

J. Do not eccentrically load system or induce rotation of runners.

K. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
   1. Use longest practical lengths.
   2. Overlap and rivet corners.

L. Add extra ceiling wire at each corner of light fixtures and grilles.

M. Fire rated main runner/cross runner fire expansion relief cutout shall be evaluated for load performance where field application requires the expansion relief to be designed more than 3” from the closest support point.

N. Form expansion joints as detailed. Form to accommodate plus or minus 1 inch movement. Maintain visual closure.

3.03 INSTALLATION - ACOUSTICAL UNITS

A. Install acoustical units in accordance with manufacturer's instructions.

B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.

C. Install acoustical ceiling units from a three-carton mix to obtain uniform distribution of surface variations.

D. Fit border trim neatly against abutting surfaces.

E. Install units after above-ceiling work is complete.

F. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

G. Cutting Acoustical Units:
   1. Cut to fit irregular grid and perimeter edge trim.
   2. Make field cut edges of same profile as factory edges.

H. Sound walls: Set acoustical ceiling boards in four continuous beads of 1/4" diameter sealant, one at top of each edge of the gypsum drywall and two on top of the top metal runner track.

I. Install hold-down clips on each panel to retain panels tight to grid system at rated assemblies; comply with fire rating requirements.

3.04 ADJUSTMENTS

A. Make adjustments in ceiling system as necessary to ensure compliance with this specification.

B. Remove and replace damaged or soiled acoustical ceiling units.

3.05 CLEANING

A. Remove debris which may have been caused during installation of this work.

B. In addition to other stipulated requirements for cleaning, completely remove fingerprints and traces of soil from the surfaces of grid and acoustical materials, using only those cleaning materials recommended for the purpose by the manufacturer of the material being cleaned.

END OF SECTION

SECTION 09 6429
PLATFORM FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. ~~Wood strip flooring, nailed.~~
B. Hardboard stage flooring
C. Secondary subflooring.
D. Sleepers.
E. Sheet vapor retarder.
F. Surface finishing.

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Concrete subfloor surface.
B. Section 06 1000 - Rough Carpentry: Wood subfloor surface.
C. Section 09 9000 - Painting and Coating: Surface finish to flooring.

1.03 REFERENCE STANDARDS

A. NWFA (IG) - Installation Guidelines; Current Edition.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data for flooring.
C. Shop Drawings: Indicate floor joint pattern and termination details.
D. Samples: Submit two samples 12 by 12 inch in size illustrating floor finish, color, and sheen.
E. Installation Instructions: Indicate standard and special installation procedures.
F. Maintenance Data: Include maintenance procedures, recommended maintenance materials, a suggested schedule for cleaning, stripping and re-finishing recommendations, stain removal methods, and polishes and waxes.
G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
    1. See Section 01 6000 - Product Requirements, for additional provisions.
    2. Deliver extra material to Owner. Before installation begins, furnish not less than 1.0 percent of the quantity of each type wood flooring installed on the Project, packaged with protective covering for storage and identified with labels clearly describing contents.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with NWFA (IG).
    1. Maintain one copy of each document on site.
B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years documented experience.
C. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience.
D. The flooring contractor shall be an MFMA Mill Accredited Installation Company and also a accredited installer of Robbins, Connor, or Aacer Flooring with MFMA accredited installer(s) on-site for the duration of the wood floor installation.

1.06 FIELD CONDITIONS

A. Do not install wood flooring until wet construction work is complete and ambient air at installation space has moisture content stabilized at maximum moisture content of 40 percent.

B. Provide heat, light, and ventilation prior to installation.

C. Store materials in area of installation for minimum period of 24 hours prior to installation.

D. Maintain minimum room temperature of 65 degrees F for a period of two days prior to delivery of materials to installation space, during installation, and after installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. ~~Hardwood Strip and Plank Flooring:~~
   1. ~~Aacer Sports Flooring: www.aacerflooring.com.~~
   2. ~~Connor Sports Flooring: www.connorfloor.com.~~
   3. ~~Robbins Sports Surfaces: www.robbinsfloor.com.~~
   4. ~~Substitutions: Section 01 6000 - Product Requirements.~~

2.02 MATERIALS

A. ~~Wood Strip Flooring:~~
   1. ~~Species: Northern hard maple.~~
   2. ~~Grade: Second and better.~~
   3. ~~Cut: Flat grain.~~
   4. ~~Moisture Content: 7 to 9 percent.~~
   5. ~~Actual Thickness: 25/32 inch.~~
   6. ~~Actual Width: 2-1/4 inches.~~
   7. ~~Edge: Tongue and Groove.~~
   8. ~~End: End matched.~~
   9. ~~Length: Random, minimum of 9 inches.~~

B. Hardboard Stage Floor. Tempered hardboard, 1/4 inch thick.
   1. Georgia-Pacific Wood Products LLC: www.buildgp.com.
   2. Masonite International Corp.: www.masonite.com.
   3. Substitutions: Section 01 6000 - Product Requirements.

C. Flooring Nails: Type recommended by flooring manufacturer.

D. Sleepers and Shims: Softwood lumber, pressure treated for moisture protection, 2 by 3 inch size.

E. Secondary Subflooring: 1 layer 3/4 inch thick plywood, with square edges; Exposure 1, unsanded.
   1. Provide 1 layer 3/4 inch and 1 layer 1/2 inch at hardboard floor.

F. Board adhered to substrate and painted black.

2.03 ACCESSORIES

A. Wood Base: Same species as flooring; profile as indicated.

B. Ventilating Base: Molded rubber, 4 inch high with a 3 inch toe, ventilating type, with adhesives and accessories; color as selected.

C. Wood Plugs: Round shape, 3/4 inch diameter by 1/8 inch thick, of same species as flooring.

D. Floor Finish - Wood Floor:
   1. 1st-2nd Coat: Oil modified sealer
   2. 3rd-4th Coat: Oil modified finish
   3. After proper sanding, floor must be completely free from sanding dust and perfectly clean. Apply a seal. Allow to dry 2-4 hours under normal conditions (77 deg. F. and 50% RH) then scuff surface with #3 steel wool. Remove sanding dust and apply a second coat. Let dry 24 hours.

E. Floor Finish - Hardboard Stage:

1. Lightly sand hardboard floor finish and sweep clean.
2. 1st Coat: SW Enamel Undercoater
3. 2nd/3rd Coat: SW Pro-Mar 200 Latex Paint, Flat Black.

2.04 SOURCE QUALITY CONTROL

A. Inspect and stamp species and grade on underside of each piece of wood flooring at factory.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting this work.

B. Verify that concrete subfloor surface is smooth and flat to plus or minus 1/4 inch in 10 feet.

C. Verify wood subfloor is properly secured, smooth and flat to plus or minus 1/4 inch in 10 feet.

D. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Sleepers and Shims:
   1. Place vapor retarder over subfloor surface, lapping edges and ends minimum 6 inches and tape seal; spot glue in place.
   2. Place sleepers over vapor retarder; space sleepers at 8 inches on center.
   3. Shim underside of sleepers to achieve level line of plus or minus 1/4 inch in 10 feet.
   4. Anchor sleepers to concrete substrate with explosive driven concrete nails; place nails at 16 inches on center.
   5. Anchor sleepers to wood substrate with cement-coated nails; place nails at 16 inches on center.

B. Secondary Subflooring: Place plywood subflooring over sleepers.
   1. Lay perpendicular to the sleepers, with end joints over sleepers, and nail at 12 inches on center.

C. Prepare substrate to receive wood flooring in accordance with manufacturer's and NWFA instructions.

D. Broom clean substrate.

3.03 INSTALLATION

A. Sheathing Paper: Place over wood subfloor; lap edges and ends 2 inches, staple in place.

B. Wood Flooring:
   1. Install in accordance with manufacturer's and NWFA instructions; predrill and blind nail to subfloor.
   2. Lay flooring parallel to length of room areas. Verify alignment as work progresses.
   3. Arrange flooring with end matched grain set flush and tight.
   4. Terminate flooring at centerline of door openings where adjacent floor finish is dissimilar; provide divider strips and transition strips in accordance with flooring manufacturer's recommendations and as indicated.
   5. Install edge strips at unprotected or exposed edges, and where flooring terminates.
   6. Secure edge strips before installation of flooring with stainless steel screws.
   7. Install flooring tight to floor access covers.
   8. Provide 1-1/2 inch expansion space at fixed walls and other interruptions.

C. Install base at floor perimeter to cover expansion space in accordance with manufacturer's instructions. Miter inside and outside corners.

D. Finishing:
   1. Mask off adjacent surfaces before beginning sanding.

2. Sand flooring to smooth even finish with no evidence of sander marks. Take precautions to contain dust. Remove dust by vacuum.
3. Apply first coat, allow to dry, then buff lightly with steel wool to remove irregularities. Vacuum clean and wipe with damp cloth before applying succeeding coat.
4. Lightly buff between coats with steel wool and vacuum clean before applying succeeding coat.
5. Apply last coat of finish.

3.04 CLEANING

A. Clean and polish floor surfaces in accordance with floor finish manufacturer's instructions.

3.05 PROTECTION

A. Prohibit traffic on floor finish for 48 hours after installation.

B. Place protective coverings over finished floors; do not remove coverings until Date of Substantial Completion.

END OF SECTION

SECTION 09 6500
RESILIENT FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Resilient tile flooring including layered vinyl tile.

B. Resilient base.

C. Resilient stair accessories.

D. Installation accessories.

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors.

1.03 REFERENCE STANDARDS

A. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2017.

B. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2017.

C. ASTM F1700 - Standard Specification for Solid Vinyl Floor Tile; 2013a.

D. ASTM F2169 - Standard Specification for Resilient Stair Treads; 2015, with Editorial Revision (2016).

E. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2015.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.

C. Verification Samples: Submit two samples, 12 by 12 inch in size illustrating color and pattern for each resilient flooring product specified.

D. Concrete Testing Standard: Submit a copy of ASTM F2170.

E. Certification: Prior to installation of flooring, submit written certification by flooring manufacturer and adhesive manufacturer that condition of sub-floor is acceptable.

F. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Extra Flooring Material: 2% of each type and color.
   3. Extra Wall Base: 2% of each type and color.
   4. Extra Stair Materials: Quantity equivalent to 2% of each type and color.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing specified flooring with minimum three years experience.

B. Installer Qualifications: Company specializing in installing specified flooring with minimum three years experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.

B. Store all materials off of the floor in an acclimatized, weather-tight space.

C. Maintain temperature in storage area between 55 degrees F and 90 degrees F.

D. Do not double stack pallets.

1.07 FIELD CONDITIONS

A. Maintain temperature in storage area between 65 degrees F and 85 degrees F.

B. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 65 degrees F.

1.08 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Submit a written warranty, executed by the Contractor, Installer, and Manufacturer, agreeing to repair or replace flooring that fails in materials or workmanship within the specified warranty period.
   1. Warranty Period: One (1) year after date of Substantial Completion.

PART 2 PRODUCTS

2.01 TILE FLOORING

A. Vinyl Tile (LVT): Printed film type, with transparent or translucent wear layer.
   1. Manufacturers:
      a. Basis of Design: Tarkett : www.commercial.tarkett.com
      b. Mannington Commercial, Inc: www.mannington.com.
      c. Forbo Flooring Systems: www.forbo.com.
      d. Substitutions: See Section 01 6000 - Product Requirements.
   2. Minimum Requirements: Comply with ASTM F1700, of Class corresponding to type specified.
   3. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648 or ASTM E 648.
   4. Tile Size: As scheduled.
   5. Wear Layer Thickness: 0.020 inch.
   6. Total Thickness: 0.125 inch.
   7. Product/Color/Pattern: Refer to Section 01 6210 Schedule of Materials and Colors.

2.02 STAIR COVERING

A. Stair Treads: Rubber; full width and depth of stair tread in one piece; tapered thickness.
   1. Manufacturers:
      a. Johnsonite, a Tarkett Company: www.johnsonite.com.
      b. Mannington Commercial, Inc: www.mannington.com.
      c. Substitutions: See Section 01 6000 - Product Requirements.
   2. Minimum Requirements: Comply with ASTM F2169, Type TS, rubber, vulcanized thermoset.
   3. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648 or ASTM E 648.
   4. Nominal Thickness: 0.250 inch.
   5. Nosing: Square.
   6. Color: To be selected by Architect from manufacturer's full range.

B. Stair Risers: Full height and width of tread in one piece, matching treads in material and color.

1. Manufacturers:
   a. Johnsonite, a Tarkett Company: www.johnsonite.com.
   b. Mannington Commercial, Inc: www.mannington.com.
   c. Substitutions: See Section 01 6000 - Product Requirements.
2. Thickness: 0.125 inch.

2.03 RESILIENT BASE

A. Resilient Base: ASTM F1861, Type TS rubber, vulcanized thermoset; top set Style B, Cove.
   1. Manufacturers:
      a. Johnsonite, a Tarkett Company: www.johnsonite.com.
      b. Mannington Commercial, Inc: www.mannington.com.
      c. Substitutions: See Section 01 6000 - Product Requirements.
   2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648 or ASTM E 648.
   3. Height: 4 inch.
   4. Thickness: 0.125 inch.
   5. Length: Roll.
   6. Color: Refer to Section 01 6210 Schedule of Materials and Colors.
   7. Accessories: Premolded external corners where return is 3" or less.

2.04 ACCESSORIES

A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.

B. Floor Moisture tests are required even if not recommended by Manufacturer ASTM F2170.

C. Adhesives
   1. Provide only high moisture and alkali tolerant type adhesive as recommended by the manufacturer of the material being installed.
   2. Asphalt emulsions and other non-waterproof adhesives will not be acceptable.
   3. All flooring adhesive to meet 99% humidity allowance. Contact manufacturer for recommended adhesive if pH levels exceed 9 or MVER exceeds 5 pounds.

D. Where the moisture-vapor-emission rate exceeds the manufacturers allowable rate provide and install a moisture mitigating primer as reccommended by the manufacturer.

E. Moldings, Transition and Edge Strips: Metal.

F. Sealer and Wax: Types recommended by flooring manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.

C. Cementitious Sub-floor Surfaces: Verify that substrates are dry enough and ready for resilient flooring installation by testing for moisture and pH.
   1. Test in accordance with ASTM F710.

D. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.

B. Clean substrate.

C. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.

3.03 INSTALLATION - GENERAL

A. Install in accordance with manufacturer's written instructions.

3.04 INSTALLATION - TILE FLOORING

A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.

B. Lay flooring with joints and seams parallel to building lines to produce symmetrical pattern.

C. Install tile to pattern as indicated. Allow minimum 1/2 full size tile width at room or area perimeter.

D. Provide floor transition strips as recommended by manufacturer at ALL flooring material changes.

3.05 INSTALLATION - RESILIENT BASE

A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.

B. Miter internal corners. At external corners, use mitered units. Premolded corners are not permitted. Job mitered corners inside/outside. No joints within 18 inches of any outside corners.

C. Install base on solid backing. Bond tightly to wall and floor surfaces.

D. Scribe and fit to door frames and other interruptions.

E. Provide continuous sealant at top of base in all Foodservice areas inluding kitchens, food storage, serving lines, etc. Color as selected by Architect.

3.06 INSTALLATION - STAIR COVERINGS

A. Install stair coverings in one piece for full width and depth of tread.

B. Adhere over entire surface. Fit accurately and securely.

3.07 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean, seal, and wax in accordance with manufacturer's written instructions.
   1. LVT: Initial Maintenance and Preparation for Commercial Traffic
      a. Sweep, dust mop or vacuum the floor thoroughly to remove all loose dust, dirt, grit and debris.
      b. Remove any dried adhesive residue with a clean, white cloth dampened with mineral spirits, carefully following warnings on the container.
      c. Damp mop the floor with a properly diluted neutral (pH 6 to 8) detergent solution such as Armstrong S-485 Commercial Floor Cleaner.
      d. If necessary, scrub the floor using a rotary machine or auto scrubber with a properly diluted neutral detergent solution such as Armstrong S-485 Commercial Floor Cleaner and the appropriate scrubbing brush (aggressiveness equivalent to 3M red pad for light scrub, 3M blue pad or equal for a deep scrub).
      e. Thoroughly rinse the entire floor with fresh, clean water. Remove rinse water and allow the floor to dry completely.

3.08 PROTECTION

A. Prohibit traffic on resilient flooring for 48 hours after installation.

B. Protect installed flooring as recommended by the flooring manufacturer against damage from rolling loads, other trades, or the placement of fixtures and furnishings.

C. If it becomes necessary to move any heavy fixtures or appliances over the flooring on casters or dollies, the flooring should be protected with 1/4" or thicker plywood, hardboard or other underlayment panels. If other on-site work is continuing, use a protective covering such as plain, undyed kraft paper to guard against damage to the new floor.

END OF SECTION

SECTION 09 6723
RESINOUS FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Resinous Flooring System

B. Accessory Materials

1.02 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Pre-installation Conference:
   1. General contractor shall arrange a meeting not less than thirty days prior to starting work.
   2. Attendance:
      a. General Contractor
      b. Architect/Owner's Representative.
      c. Manufacturer/Installer's Representative.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: For each type of product indicated. Include manufacturer's technical data, application instructions, and recommendations for each resinous flooring component required.

C. Samples for Verification: For each resinous flooring system required, 6 inches square, applied to a rigid backing by Installer for this Project.

D. Product Schedule: Use resinous flooring designations indicated in Part 2 and room designations indicated on Drawings in product schedule.

E. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.

F. Maintenance Data: For resinous flooring to include in maintenance manuals.

1.05 QUALITY ASSURANCE

A. No request for substitution shall be considered that would change the generic resin type or minimum thickness of floor system specified. Equivalent materials of other manufacturers may be substituted only on approval of Architect or Engineer. Request for substitution will be considered only if submitted 10 days prior to bid date. Request will be subject to specification requirements described in this section.

B. Installer Qualifications: Engage an experienced installer (applicator) who is experienced in applying resinous flooring systems similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance, and who is acceptable to resinous flooring manufacturer.
   1. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.
   2. Contractor shall have completed at least 10 projects of similar size and complexity.

C. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, through one source from a single manufacturer, with not less than ten years of successful experience in manufacturing and installing principal materials described in this section. Provide secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from source recommended by manufacturer of primary materials.

D. Manufacturer Field Technical Service Representatives: Resinous flooring manufacture shall retain the services of Field Technical Service Representatives who are trained specifically on installing the system to be used on the project.
   1. Field Technical Services Representatives shall be employed by the system manufacturer to assist in the quality assurance and quality control process of the installation and shall be available to perform field problem solving issues with the installer.

1.06 MOCK-UP

A. Apply mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

B. Apply full-thickness mockups on 48-inch- square floor area selected by Architect.
   1. Include 48-inch length of integral cove base.
   2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.

B. Store materials to prevent deterioration from moisture, heat, cold, direct sunlight, or other detrimental effects.

C. All materials used shall be factory pre-weighed and pre-packaged in single, easy to manage batches to eliminate on site mixing errors. No on site weighing or volumetric measurements allowed.

1.08 FIELD CONDITIONS

A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.
   1. Maintain material and substrate temperature between 65 and 85 deg F during resinous flooring application and for not less than 24 hours after application.

B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.

C. Close spaces to traffic during resinous flooring application and for not less than 24 hours after application, unless manufacturer recommends a longer period.

D. Concrete substrate shall be properly cured for a minimum of 30 days. A vapor barrier must be present for concrete subfloors on or below grade. Otherwise, an osmotic pressure resistant grout must be installed prior to the resinous flooring

1.09 WARRANTY

A. See Section 01 7700 - Closeout Procedures, for additional warranty requirements.

B. Contractor shall provide a One Year “Joint and Separate Warranty” to the building owner signed by both the Manufacturer and the Contractor.

C. Manufacturer shall warrant that materials shipped to buyers at the time of shipment are substantially free from material defects and will perform substantially to published literature if used in accordance with the latest prescribed procedures and prior to the expiration date.

D. Contractor shall guarantee the installation and workmanship to be free of defects for a period of one year from the date of Substantial Completion.

E. When a moisture suppression primer is used, manufacturer shall warrant that the moisture mitigating primer will, for a continuous period of two (2) years, reduce water vapor transmission levels to 3#/1000SF/24Hrs or less. This limited warranty shall warrant against failure caused by concrete water vapor pressure only of 20#/1000SF/24Hrs. or less. Warranty shall provide for reasonable labor and materials costs to repair affect areas only.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: Dex-O-Tex: www.dex-o-tex.com.

B. Stonhard: www.stonhard.com.

C. Dur-A-Flex: www.dur-a-flex.com.

D. Neogard: www.neogard.com.

E. Palma, Inc.: www.palmainc.com.

F. The Sherwin-Williams Company: www.industrial.sherwin-williams.com.

G. Sika Corporation: www.sikafloorusa.com.

H. Terrazzo & Marble Supply: www.tmsupply.com.

I. Substitutions: See Section 01 6000 - Product Requirements.

2.02 RESINOUS FLOORING - RESTROOMS

A. Products: Basis of Design - Dex-O-Tex - Decor-Flor Broadcast.
   1. Subject to compliance with requirements:
      a. Nominal 1/8" decorative colored quartz flooring system with iintegral coved base. Flooring consists of color quartz granules embedded in clear epoxy matrix that is grout and top coated with a clear resinous coating.
   2. System Characteristics:
      a. Color and Pattern: Select from manufacturer's standards
      b. Wearing Surface: Texture to be selected from manufacturer's standards
      c. Integral Cove Base: 4:
      d. Overall System Thickness: 1/8”

2.03 ACCESSORY MATERIALS

A. Primer: Type recommended by manufacturer for substrate and body coats indicated.
   1. Where the moisture-vapor-emission rate exceeds the manufacturers allowable rate provide and install a moisture mitigating primer as reccommended by the manufacturer.

B. Patching and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated.
   1. At feathered locations, provide underlayment equal to Armstrong S-194 Patch, “Underlayment, and Embossing Leveler”; or S-183 “Fast Setting Cement Based Patch and Skim Coat”. Contractor shall verify manufacturer's product requirements for each finish material.
   2. Provide at all locations where floor finishes of differing thickness occur. Reference plans for typical detail.

C. Provide metal termination strips at top of cove base and at centerline of doors.

D. Joint Sealant: Type recommended or produced by resinous flooring manufacturer for type of service and joint condition indicated. Allowances should be included for flexible joint fill material.

E. Provide crack isolation compound as recommended by manufacturer to mitigate cracks in existing foundation.

PART 3 EXECUTION

3.01 PREPARATION

A. General: Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry, and neutral Ph substrate for resinous flooring application.

B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.
   1. Mechanically prepare substrates as follows:
      a. Mechanically prepare with the use of Diamond grinding equipment to provide surface sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring. Or,
      b. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
      c. Comply with ASTM C 811 requirements, unless manufacturer's written instructions are more stringent.
   2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written recommendations.
   3. Verify that concrete substrates meet the following moisture requirements:
      a. Perform in situ probe test, ASTM F 2170. Proceed with application only after substrates do not exceed a maximum potential equilibrium relative humidity of 92 percent.
      b. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with application only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. of slab in 24 hours or as reccommended by the manufacturer.
      c. Perform additional moisture tests recommended by manufacturer. Proceed with application only after substrates pass testing or provide a moisture mitigating primer as reccommended by the manufacturer.
   4. Verify that concrete substrates have neutral Ph and that resinous flooring will adhere to them. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.

C. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.

D. Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.

E. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written recommendations. Allowances should be included for flexible joint fill material.

F. Provide floor moisture tests regardless of manufacturer requirement.

3.02 APPLICATION

A. General: Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.
   1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
   2. Cure resinous flooring components according to manufacturer's written instructions.
      a. Prevent contamination during application and curing processes.
   3. At substrate expansion and isolation joints, provide joint in resinous flooring to comply with resinous flooring manufacturer's written recommendations.
      a. Apply joint sealant to comply with manufacturer's written recommendations.

B. Mix and apply primer over properly prepared substrate with strict adherence to manufacturer's installation procedures and coverage rates

C. Body coat: Mix base material according to manufacturer's recommended procedures. Uniformly spread mixed material over previously primed substrate using manufacturer's installation tool.

D. First Sealer: Mix and apply topcoat with strict adherence to manufacturer's installation procedures.

3.03 TERMINATIONS

A. Chase edges to “lock” the coating system into the concrete substrate along lines of termination. Penetration Treatment: Lap and seal coating onto the perimeter of the penetrating item by bridging over compatible elastomer at the interface to compensate for possible movement.

B. Trenches: Continue coating system into trenches to maintain monolithic protection. Treat cold joints to assure bridging of potential cracks.

C. Treat floor drains by chasing the coating to lock in place at point of termination.

3.04 JOINTS AND CRACKS

A. Treat control joints to bridge potential cracks and to maintain monolithic protection.

B. Treat cold joints and construction joints to bridge potential cracks and to maintain monolithic protection on horizontal and vertical surfaces as well as horizontal and vertical interfaces.

C. Discontinue floor coating system at vertical and horizontal contraction and expansion joints by installing backer rod and compatible sealant after coating installation is completed. Provide sealant type recommended by manufacturer for traffic conditions and chemical exposures to be encountered.

3.05 FIELD QUALITY CONTROL

A. Material Sampling: Owner may at any time and any numbers of times during resinous flooring application require material samples for testing for compliance with requirements.
   1. Owner will engage an independent testing agency to take samples of materials being used. Material samples will be taken, identified, sealed, and certified in presence of Contractor. Floor moisture tests will be required (regardless of manufacturers recommendations).
   2. Testing agency will test samples for compliance with requirements, using applicable referenced testing procedures or, if not referenced, using testing procedures listed in manufacturer's product data.
   3. If test results show applied materials do not comply with specified requirements, pay for testing, remove noncomplying materials, prepare surfaces coated with unacceptable materials, and reapply flooring materials to comply with requirements.

3.06 CLEANING, PROTECTING, AND CURING

A. Cure resinous flooring materials in compliance with manufacturer's directions, taking care to prevent contamination during stages of application and prior to completion of curing process. Close area of application for a minimum of 18 hours.

B. Protect resinous flooring materials from damage and wear during construction operation. Where temporary covering is required for this purpose, comply with manufacturer's recommendations for protective materials and method of application. General Contractor is responsible for protection and cleaning of surfaces after final coats.

C. Cleaning: Remove temporary covering and clean resinous flooring just prior to final inspection. Use cleaning materials and procedures recommended by resinous flooring manufacturer

END OF SECTION

SECTION 09 6816
SHEET CARPETING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Carpet, direct-glued.

B. Walk-Off Carpeting.

C. Accessories.

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors to receive adhesive-applied carpet.

1.03 REFERENCE STANDARDS

A. ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials; 2016.

B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2017.

C. CRI 104 - Standard for Installation of Commercial Carpet; 2015.

D. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2015.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.

C. Shop Drawings: Indicate seaming plan, method of joining seams, direction of carpet pile and pattern, location of edge moldings and edge bindings.

D. Samples: Submit three samples 12 by 12 inch in size illustrating color and pattern for each carpet material specified.

E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

F. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional requirements.
   2. Extra Carpet: Quantity equal to 5 percent of total installed of each color and pattern installed.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing specified carpet with minimum five years documented experience.

B. Installer Qualifications: Company specializing in installing carpet with minimum five years documented experience.

1.06 FIELD CONDITIONS

A. Store materials in area of installation for minimum period of 24 hours prior to installation.

B. Maintain minimum 70 degrees F ambient temperature 24 hours prior to, during and 24 hours after installation.

C. Ventilate installation area during installation and for 72 hours after installation.

1.07 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Submit a written warranty, executed by the Contractor, Installer, and Manufacturer, agreeing to repair or replace tile that fails in materials or workmanship within the specified warranty period.
   1. Warranty Period: One (1) year after date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Carpet:
   1. Tarkett: www.commercial.tarkett.com.
   2. Substitutions: See Section 01 6000 - Product Requirements.

B. Walk-Off Carpeting:
   1. Tarkett: www.tarkett.com.
   2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 CARPET

A. Carpet:
   1. Product: As indicated in the drawings
   2. Color: Refer to Schedule of Colors for approved color selection..
   3. Critical Radiant Flux: Minimum of 0.22 watts/sq cm, when tested in accordance with ASTM E648 or NFPA 253.
   4. Surface Flammability Ignition: Pass ASTM D2859 (the "pill test").
   5. Primary Backing: Powerbond Backing.

B. Walk-Off Carpeting:
   1. Basis of Design - Product: Assertive Action manufactured by Tarkett.
   2. Thickness: 1/4 inch.
   3. Pile Yarn Composition: 100 % Solution-Dyed Low Static Polypropylene.
   4. Primary Backing: Powerbond Backing.
   5. Color: Refer to Section 01 6210 Schedule of Materials and Colors.
   6. Product shall be wall to wall over a full-spread adhesive.

2.03 ACCESSORIES

A. Sub-Floor Filler: Type recommended by carpet manufacturer.

B. Adhesives:
   1. Provide only high moisture and alkali tolerant type adhesive as recommended by the manufacturer of the material being installed.
   2. Contact manufacturer for recommended adhesive if pH levels exceed 9 or MVER exceeds 5 pounds.
   3. Asphalt emulsions and other non-waterproof adhesives will not be acceptable.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive carpet.

B. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of adhesives to sub floor surfaces.

C. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.

B. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.

C. Clean substrate.

3.03 INSTALLATION - GENERAL

A. Install carpet and cushion in accordance with manufacturer's instructionsand CRI 104 (Commercial).

B. Verify carpet match before cutting to ensure minimal variation between dye lots.

C. Lay out carpet and locate seams in accordance with shop drawings.
   1. Locate seams in area of least traffic, out of areas of pivoting traffic, and parallel to main traffic.
   2. Do not locate seams perpendicular through door openings.
   3. Align run of pile in same direction as anticipated traffic and in same direction on adjacent pieces.
   4. Locate change of color or pattern between rooms under door centerline.
   5. Provide monolithic color, pattern, and texture match within any one area.

D. Install carpet tight and flat on subfloor, well fastened at edges, with a uniform appearance.

E. Provide floor transition strips as recommended by manufacturer at ALL flooring material changes.

3.04 DIRECT-GLUED CARPET

A. Double cut carpet seams, with accurate pattern match. Make cuts straight, true, and unfrayed. Apply seam adhesive to cut edges of woven carpet immediately.

B. Apply contact adhesive to floor uniformly at rate recommended by manufacturer. After sufficient open time, press carpet into adhesive.

C. Apply seam adhesive to the base of the edge glued down. Lay adjoining piece with seam straight, not overlapped or peaked, and free of gaps.

D. Roll with appropriate roller for complete contact of adhesive to carpet backing.

E. Trim carpet neatly at walls and around interruptions.

3.05 CLEANING

A. Remove excess adhesive from floor and wall surfaces without damage.

B. Clean and vacuum carpet surfaces.

C. Provide a heavy non-staining paper or plastic walkway as required over carpeting in direction of traffic, maintaining intact until carpeted space is accepted by the Owner.

3.06 CLOSEOUT ACTIVITIES

A. See Section 01 7800 - Closeout Submittals, for closeout submittals.

END OF SECTION

SECTION 09 9000
PAINTING AND COATING

PART 1 - GENERAL

1.01 SUMMARY

A. Related Documents: General and Supplementary Conditions of the Contract, Division 01 General Requirements, and Drawings are applicable to this Section.

B. Section Includes, but is not limited to:
   1. Exterior paints and coatings systems including; paints, stains, transparent coatings, and opaque finishes.
   2. Interior paint and coatings systems including; paint, stains, transparent coatings, and opaque finishes.
   3. Specific products and painting scheduled in this Section are based, in general, on products of Sherwin-Williams Company (noted SW). Products of other manufacturers listed in paragraph 2.01 may be substituted with approved color matches.

1.02 RELATED SECTIONS

A. Section 05 2100 - Steel Joist Framing: Shop priming

B. Section 05 5000 - Metal Fabrications: Shop priming

C. Section 06 2000 - Finish Carpentry: Back priming of trim and paneling

D. Section 07 8123 - Intumescent Fire Protection: Field-applied paints coordination with intumescent fireproofing substrate.

E. Division 23 - Mechanical Identification: Markers and color-coding

F. Division 26 - Electrical Identification: Markers and color-coding

1.03 REFERENCES

A. Industry Association Standards
   1. SSPC-SP 1 - Solvent Cleaning.
   2. SSPC-SP 2 - Hand Tool Cleaning.
   3. SSPC-SP 3 - Power Tool Cleaning.
   4. SSPC-SP 13 / NACE No. 6 Surface Preparation for Concrete.

1.04 DEFINITIONS

A. Paint
   1. Means coating systems materials including primers, emulsions, epoxy, enamels, sealers, fillers, and other applied materials whether used as prime, intermediate, or finish coats.

1.05 SUBMITTALS

A. Shop drawings, product data, and samples under provisions of Section 01 3000 - Administrative Requirements.

B. Product Data: Manufacturer's data sheets on each paint and coating product should include:
   1. Product characteristics
   2. Surface preparation instructions and recommendations
   3. Primer requirements and finish specification
   4. Storage and handling requirements and recommendations
   5. Application methods
   6. Cautions

C. Selection Samples: Submit a complete set of color chips that represent the full range of manufacturer's color samples available.

D. Verification Samples: For each finish product specified, submit 8”x10” samples that represent actual product, color, and sheen.

E. Closeout Submittals
   1. Submit under provisions of Section 01 7800 - Closeout Submittals.
   2. Upon conclusion of the project, the Contractor or paint manufacture/supplier shall furnish a coating maintenance manual, such as Sherwin-Williams “Custodian Project Color and Product Information” report or equal. Manual shall include an Area Summary with finish schedule, Area Detail designating where each product/color/finish was used, product data pages, Material Safety Data Sheets, care and cleaning instructions, touchup procedures, and color samples of each color and finish used.

1.06 QUALITY ASSURANCE

A. Qualifications
   1. Single Source Responsibility:
      a. Obtain each type of material required from single source.
   2. No Oil Based Paint will be acceptable.

B. Pre-installation Meetings
   1. Comply with provisions of Section 01 3000 - Administrative Requirements.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Section 01 6000 - Product Requirements.

B. Delivery: Deliver manufacturer's unopened containers to the work site. Packaging shall bear the manufacturer's name, label, and the following list of information:
   1. Product name, type (description)
   2. Application and use instructions
   3. Surface preparation
   4. VOC content
   5. Environmental issues
   6. Batch date
   7. Color number

C. Storage: Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

D. Store materials in an area that is within the acceptable temperature range, per manufacturers instructions. Protect from freezing.

E. Handling: Maintain a clean, dry storage area, to prevent contamination or damage to the coatings.

1.08 PROJECT CONDITIONS

A. Project Environmental Requirements
   1. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not apply coatings under environmental conditions outside manufacturer's absolute limits.

1.09 MAINTENANCE

A. Extra Materials
   1. At completion of project, deliver to Owner extra stock of materials used on project as follows:
      a. High School - Twenty (20) gallons for each field color/type, five (5) gallons for trim and accent of each color/type.
      b. Junior High/Middle School - Fifteen (15) gallons for each field color/type, four (4) gallons for trim and accent of each color/type.

c. Elementary/Intermediate School - Ten (10) gallons for each field color/type, three (3) gallons for trim and accent of each color/type.
d. Additions and Renovations - Five (5) gallons for each field color/type, two (2) gallons for trim and accent of each color/type.

2. Store in location as directed by Owner.
3. Ensure containers are sealed and identified by manufacturer, type, and color.
4. Submit maintenance data under provisions of Section 01 7800 - Closeout Submittals.
5. Include cleaning methods, and recommended cleaning solutions.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: Sherwin-Williams Co.: www.sherwin-williams.com.

B. Acceptable Manufacturers: The following manufacturers are acceptable to provide products of this section provided proposed products meet or exceed all specified requirements.

C. Kelly-Moore Paints: www.kelleymoore.com.

D. PPG Paints: www.ppgpaints.com

E. Benjamin Moore & Co.: www.benjaminmoore.com.

F. TNEMEC Company Inc.: www.tnemec.com.

G. Substitutions: Under provisions of Section 01 6000 - Product Requirements.

2.02 MATERIALS - GENERAL

A. Paints and Coatings - General:
1. Unless otherwise indicated, provide factory-mixed coatings. When required, mix coatings to correct consistency in accordance with manufacturer's instructions before application. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
2. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
3. Structural surfaces which will be concealed in finished construction, or which will not be accessible for finished painting, shall receive an additional shop coat of the specified Paint to which a small amount of tinting has been added for color differentiation.

B. Primers:
1. Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

C. Compatibility with other materials:
1. Topcoats: Suitable for application over applied intumescent coatings; of type recommended in writing by intumescent coatings manufacturer for each fire resistance design. Topcoat to have been tested by manufacturer for compatibility in fire conditions with documentation of such tests to be provided upon request. Color of topcoat shall be as selected by the architect. Colors shall not be limited to manufacturer's standard colors.
2. See Section 07 8123 - Intumescent Fire Protection for additional information.

2.03 COLOR SCHEDULES

A. Color schedule in Section 01 6210 - Schedule of Materials and Colors.

B. The Architect may select, allocate, and vary colors on different surfaces throughout the Work, subject to the following.
1. Exterior work: A maximum of three (3) different colors will be used, with variations for trim, doors, miscellaneous work, and metal work.
2. Interior work: A maximum of ten (10) different pigmented colors will be used, with variations for trim and wall surfaces and wainscots.

3. Dark tones: A maximum of five (5) dark tones will be used as accent colors for interior.

C. All painted graphics shown on the drawings shall be included in the base proposal and shall be included in this section. Contractor shall note that school colors and mascot may be released after initial color selection. Contractor shall make all necessary adjustments.

2.04 MISCELLANEOUS MATERIALS

A. Coating Application Accessories
1. Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required per manufacturer's specifications.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Do not begin application of coatings until substrates have been properly prepared. Notify Architect of unsatisfactory conditions before proceeding

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Proceed with work only after conditions have been corrected, and approved by all parties, otherwise application of coatings will be considered as an acceptance of surface conditions.

3.02 PREPARATION

A. Comply with provisions of Section 01 7000 - Execution and Closeout Requirements.

B. The surface must be dry and in sound condition. Remove oil, dust, dirt, loose rust, peeling paint or other contamination to ensure good adhesion.

C. Remove mildew before painting by washing with a solution of 1 part liquid household bleach and 3 parts of warm water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with clean water and allow the surface to dry 48 hours before painting. Wear protective glasses or goggles, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

D. No exterior painting should be done immediately after a rain, during foggy weather, when rain is predicted, or when the temperature is below 50°F, unless products are designed specifically for these conditions.

E. Methods:
1. Concrete, SSPC-SP13 or NACE 6
a. This standard gives requirements for surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of bonded protective coating or lining systems. The requirements of this standard are applicable to all types of cementitious surfaces including cast-in-place concrete floors and walls, precast slabs, masonry walls, and shotcrete surfaces. An acceptable prepared concrete surface should be free of contaminants, laitance, loosely adhering concrete, and dust, and should provide a sound, uniform substrate suitable for the application of protective coating or lining systems.
2. Drywall-Interior
a. Must be clean and dry. All nail heads must be set and spackled. Joints must be taped and covered with a joint compound. Spackled nail heads and tape joints must be sanded smooth and all dust removed prior to painting.
3. Galvanized Metal
a. Do not paint any exterior galvanized metal metal surfaces unless approved by owner.

b. For all other applications, clean per SSPC-SP1 using detergent and water or a degreasing cleaner to remove greases and oils. Apply a test area, priming as required. Allow the coating to dry at least one week before testing. If adhesion is poor, Brush Blast per SSPC-SP7 is necessary to remove these treatments.

4. Steel: Structural, Plate, Doors and Frames, etc.
   a. Should be cleaned by one or more of the surface preparations described below. All metal shall be thoroughly prepared to ensure adhesion of new paint to the prepared surface. All prepared surfaces shall be observed and approved by the Owner or Owners Representative before new paint is applied.
   b. Solvent Cleaning, SSPC-SP1
      1) Solvent cleaning is a method for removing all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants. Solvent cleaning does not remove rust or mill scale. Change rags and cleaning solution frequently so that deposits of oil and grease are not spread over additional areas in the cleaning process. Be sure to allow adequate ventilation.
   c. Hand Tool Cleaning, SSPC-SP2
      1) Hand Tool Cleaning removes all loose mill scale, loose rust and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Before hand tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1.
   d. Power Tool Cleaning, SSPC-SP3
      1) Power Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Before power tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1.
5. Clean, caulk and fill all expansion or control joints before sealing.

3.03 APPLICATION

A. Comply with provisions of Section 01 7000 - Execution and Closeout Requirements.

B. Testing: Due to the wide variety of substrates, preparation methods, application methods and environments, one should test the product in an inconspicuous spot for adhesion and compatibility prior to full-scale application.

C. Apply all coatings and materials with manufacture specifications in mind. Mix and thin coatings according to manufacture recommendation.

D. Do not apply to wet or damp surfaces.
   1. Wait at least 30 days before applying to new concrete or masonry. Or follow manufactures procedures to apply appropriate coatings prior to 30 days.
   2. Test new concrete for moisture content.
   3. Wait until wood is fully dry after rain or morning fog or dew.

E. Apply coatings using methods recommended by manufacturer.

F. Uniformly apply coatings without runs, drips, or sags, without brush marks, and with consistent sheen.

G. Apply coatings at spreading rate required to achieve the manufacturers recommended dry film thickness.

H. Regardless of number of coats specified, apply as many coats as necessary for complete hide.

I. All drywall installation areas shall be made ready for painting by first preparing the gypsum wallboard surfaces with texturing as specified. Apply in strict compliance with manufacturer's written directions. Omit texturing where wall carpet occurs, reference Finish Schedule on drawings.

J. At gymnasiums, contractor shall paint wood blocking for gym equipment supports to match adjacent color. Contractor shall coordinate the sequencing with all trades.

K. Exterior Woodwork: If final painting must be delayed more than 2 weeks after installation of woodwork, apply primer within 2 weeks and final coating within 2 weeks.

L. Miscellaneous surfaces and procedures
   1. Exposed mechanical items
      a. Finish electric panels, access doors, conduits, pipes, ducts, grilles, registers, vents, and items of similar nature to match the adjacent wall and ceiling surfaces, or as directed.
      b. Paint visible duct surfaces behind vents, registers, and grilles Sherwin Williams Pro Mar Flat Black.
      c. Wash metal with solvent, prime, and apply two coats of alkyd enamel.
   2. Exposed pipe and duct insulation
      a. Apply one coat of latex paint on insulation which has been primed under other Sections; apply two coats on such surfaces when unprepared.
      b. Match color of adjacent surfaces.
      c. Remove band before painting, and replace after painting.
   3. Hardware: Paint prime coated hardware to match adjacent surfaces.
   4. Wet areas
      a. In toilet rooms and contiguous areas, add an approved fungicide to paints.
   5. Exposed vents: Apply two coats of heat-resistant paint approved by the Architect.

M. Inspection: The coated surface must be inspected and approved by the architect just prior to each coat.

3.04 REPAIR/RESTORATION

A. For surfaces that are to receive new finish, prepare surface and apply materials as described below and per manufacture recommendation.

3.05 PROTECTION

A. Protect finished coatings from damage until completion of project.

B. Touch-up damaged coatings after substantial completion, following manufacturer's recommendation for touch up or repair of damaged coatings. Repair any defects that will hinder the performance of the coatings.

PART 4 - SCHEDULES

4.01 GENERAL

A. The Painting Schedule of this Section is based, in general, on products of Sherwin-Williams Company (noted SW on the schedule).

B. Where painting occurs in addition or renovation projects provide low odor finishes equal to Sherwin Williams ProMar 200 Zero VOC Series.

C. The various surfaces and areas receiving finishes maybe indicated on the drawings or as noted below. The desired finishes are shown by code numbers. Not all codes listed below may be used. The required materials for each code number shown on the finish schedule are specified below under the corresponding code numbers.

4.02 PAINTING SCHEDULE

A. Code 100a - Exterior Metal
   1. Including flashing, vents, doors, window trim and grilles (except aluminum, other non-ferrous metals, and galvanized metal)
   2. 1st Coat: Galvite HS B50WZ30.
   3. 2nd/3rd Coat: DTM Acrylic Gloss Coating B66-W1051.

B. Code 100b - Exterior Metal - Paint where required
   1. Including galvanized metals
   2. 1st Coat: Galvite HS.
   3. 2nd/3rd Coat: DTM Acrylic Gloss Coating B66-200 Series.

C. Code 100c - Exterior Metal
   1. For use on exterior painted handrails and exposed structural steel over properly prepared steel (SSPC SP-6 Commercial Metal Blast, 2-3 mil profile).
   2. 1st Coat: Procryl Primer.
   3. 2nd/3rd Coat: DTM Acrylic Gloss Coating B66-200 Series.

D. Code 104b - Interior Metal (Painted Surface, Enamel)
   1. 1st Coat: Problock Latex Primer B51W620.
   2. 2nd/3rd Coat: Promar 200 zeroVOC B31 Series.

E. Code 109 - Floors (Two Component Epoxy Coating)
   1. 1st/2nd Coat: ArmorSeal Trend Plex Water Based Floor Coatinf (floors must be cleaned and etched) B90.
   2. 2nd/3rd Coat: SW ArmorSeal 1000 HS, B67-2000 series
   3. At locker rooms and wet or damp areas provide anti-slip agent equal to one of the following:
      a. H&C Concrete Products, Sharkgrip Slip Resistant Additive
      b. QC Construction products, QC Sure Trac

F. Code 110b - Two Component Epoxy Coating for Gyp Board Walls
   1. 1st Coat: Heavy Duty Block Filler, B42W46
   2. 2nd/3rd Coat: SW Pro Industrial Water Based Catalyzed Epoxy, B73-300 Series.

G. Code 110d - Epoxy for Gyp Board Walls at "Wet/Shower" Areas, Restrooms, Vehicle Wash Bays, Natatoriums, Janitor, & Mechanical Rooms
   1. 1st Coat: SW ProMar 200 Zero VOC Interior Latex Primer, B28W2600.
   2. 2nd/3rd Coat: SW Pro Industrial Water Based Catalyzed Epoxy, B73-300 Series.

H. Code 111 - Exterior Concrete Walls (Painted or Unpainted)
   1. After all work has been completed, apply 2 coats of Sure Klean "Weather Seal SS" as manufactured by Prosoco, Inc., Dallas, Texas or prior approved equal. Apply in full compliance with manufacturer's specifications.

I. Code 113 - Graffiti Resistant Coating
   1. Coating shall be a clear, non-sacrificial graffiti resistant coating which provides protection for exterior vertical surfaces from permanent graffiti staining and damage caused by spray paint and marking pens. Coating shall be suitable for application to painted and unpainted surfaces including masonry, concrete, metals, and EIFS. Product shall be of type such that recoating with the underlying paint is possible without removal of the graffiti resistant coating. Product shall be a coating that dries clear, non-yellowing, with a low luster.
      a. Basis of Design: VandlGuard Single-Part Urethane Non-Sacrificial Graffiti Coating
         1) Micro-Seal Water Repellant (One Coat) by Rainguard International,
            (a) For first coat for unpainted concrete and masonry surfaces
         2) Graffiti Remover: VandlClean Super graffiti remover by Rainguard International,

J. Code 115a - Interior Drywall (Admin Area Walls and Ceilings/Bulkheads)
   1. 1st Coat: SW ProMar 200 Zero VOC Interior Latex Primer, B28W2600.
   2. 2nd/3rd Coat: SW Pro Mar 200 Zero VOC Latex Egg-Shell, B20-2600 series.

K. Code 115b - Interior Plaster (Standard Ceilings/Bulkheads)
   1. 1st Coat: SW ProMar 200 Zero VOC Interior Latex Primer, B28W2600.
   2. 2nd/3rd Coat: SW Pro Mar 200 Zero VOC Latex Egg-Shell, B20-2600 series.

L. Code 116a - Interior Drywall (Walls in Corridors and Student Areas)

1. 1st Coat: SW ProMar 200 Zero VOC Interior Latex Primer, B28W2600.
2. 2nd/3rd Coat: SW Pro Mar 200 Zero VOC Latex Egb-Shell, B20-2600 series.

M. Code 118 - Interior Non-Textured Drywall (where painted or applied graphics occur)
1. 1st Coat: SW ProMar 200 Zero VOC Interior Latex Primer, B28W2600.
2. 2nd/3rd Coat: SW Cashmere Interior Acrylic Latex DP-D17W00151.

N. Code 120 - Exposed Structural Steel, Joist and Deck in Crawl Space
1. Surface Preparation: SSPC SP-6 Commercial Metal Blast, 2-3 mil profile.
2. 1st Coat: SW, Zinc Clad 4100 applied at 3-5 mils dry film thickness.

O. Code 121 - Ceilings (Exposed Structural Steel and Deck)
1. Touch-up factory prime coat on ferrous steel with SW ProCryl Universal Metal Primer, B66-1300 series.
2. 1st /2nd Coat: SW APro Industrial Waterborne Acrylic DryFall Flat, B42W181.

P. Code 122 - Not Used

Q. Code 123 - Concrete Floor Sealer:
1. Properly clean surface as per manufacturer's recommendations.
2. All slab control joints to be sealed prior to sealing concrete.
3. H&C Water Based Natural Look Clear Concrete Sealer (B.O.D.) Matte Finish Only.
   a. 1st Coat: Apply per Manufacturers Recommendations.
   b. 2nd Coat: Same as 1st Coat if necessary to achieve even coverage.

R. Code 124 - Structural & Miscellaneous Steel, Steel Bar Joists
1. 1st Coat: SW Opti-Bond (B50W100).

END OF SECTION

SECTION 10 0100
MISCELLANEOUS SPECIALTIES

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Safety Storage Cabinet.

1.02 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product data: Within 30 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
   1. Materials list of items proposed to be provided under this Section;
   2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements;
   3. Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

1.03 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. The contractor shall furnish a written guarantee warranting all materials, devices, equipment and workmanship to be free of defects for a period of one (1) year from the date of completion and acceptance. Any defects in materials, devices, equipment and workmanship which become apparent within the guarantee period shall be repaired and replaced by the contractor at his own expense and at no additional cost to the Owner.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Basis of design is based on each specific piece of equipment and the manufacturer listed. Substitutions will be considered within the provisions listed in Section 01 6000 - Product Requirements

2.02 SAFETY STORAGE CABINET

A. Manufacturer: Eagle-Justrite Safety Group: www.eagle.justrite.com.

B. Model No: YPI47X

C. Material: Steel, 18 gauge.

D. Door style: Manual close.

E. Color: Yellow.

F. Dimensions (Exterior): 43 inches W x 18 inches D x 65 inches H.

G. Capacity: 60 gallons.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Install in accordance with approved submittals and manufacturer's instructions.

B. This contractor shall do all fitting, fastening, connecting, leveling and placing of all Equipment as required to complete each item in its permanent position.

3.02 CLOSEOUT ACTIVITIES

A. See Section 01 7800 - Closeout Submittals, for closeout submittals.

B. Demonstrate proper operation of equipment to Owner's designated representative.

3.03 ADJUSTING

A. Prepare equipment and systems in accordance with manufacturers' instructions and recommendations.

B. Adjust for proper operation within manufacturer's published tolerances.

END OF SECTION

SECTION 10 1100
VISUAL DISPLAY UNITS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Markerboards

B. Tackboards

1.02 RELATED REQUIREMENTS

A. Section 05 4000 - Cold-Formed Metal Framing.

B. Section 06 1000 - Rough Carpentry: Blocking and supports.

1.03 REFERENCE STANDARDS

A. ANSI A135.4 - Basic Hardboard; 2012 (Reaffirmed 2020).

B. ASTM A424/A424M - Standard Specification for Steel, Sheet, for Porcelain Enameling; 2018.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's data on markerboard, tackboard, tackboard surface covering, trim, and accessories.

C. Shop Drawings: Indicate wall elevations, dimensions, joint locations , special anchor details.

D. Manufacturer's printed installation instructions.

E. Maintenance Data: Include data on regular cleaning, stain removal .

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years documented experience.

1.06 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide five year warranty for markerboard to include warranty against discoloration due to cleaning, crazing or cracking, and staining.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: Claridge Products and Equipment, Inc: www.claridgeproducts.com/#sle.

B. American Visual Display Products: www.americanvisualdisplay.com.

C. ASI Visual Display Products: www.asi-visualdisplayproducts.com.

D. Claridge Products and Equipment, Inc; ____: www.claridgeproducts.com/#sle.

E. Ghent, a GMI Company: www.ghent.com/#sle.

F. MooreCo, Inc: www.moorecoinc.com/#sle.

G. Nelson Adams NACO: www.nelsonadamsnaco.com/#sle.

H. Substitutions: See Section 01 6000 - Product Requirements.

2.02 VISUAL DISPLAY UNITS

A. Markerboards: Porcelain enamel on steel, laminated to core.
   1. Basis of Design: Claridge LCSII or equivalent.
   2. Color: Low Gloss, White.
   3. Steel Face Sheet Thickness: 24 gage, 0.0239 inch .

4. Core: MDF, 7/16 inch thick, laminated to face sheet.
5. Backing: Steel back, laminated to core (moisture barrier backing).
6. Size: As indicated on drawings.
7. Frame: Extruded aluminum , with concealed fasteners. Claridge Series I or equivalent.
8. Frame Finish: Anodized, natural.
9. Markerboard Finish: Markerboard surface shall be consistent in appearance without fading or ghosting.
10. Accessories: Provide marker tray, map rail and flag holder.
11. Omit marker tray in all "Activity Rooms", "Exterior Applications" and "Gymnasiums."

B. Tackboards: Fine-grained, homogeneous natural cork.
1. Acceptable Product: Claridge, Fabricork Series No. 1550EW or equivalent.
2. Cork Thickness: 1/4 inch.
3. Color: As selected from manufacturer's full range.
4. Backing: Hardboard, 1/4 inch thick with wrapped edges, laminated to tack surface.
5. Size: As indicated on drawings.
6. Frame: Extruded aluminum , with concealed fasteners.
7. Frame Finish: Anodized, natural.
8. Vinyl Fabric to meet ASTM E84, Class A Rating.

C. Combination Units and Units Made of More Than One Panel: Factory-assembled markerboards and tackboards in a single frame, of materials specified above.
1. Join panels of different construction with H-shaped extruded aluminum molding finished to match frame.
2. Join panels of similar construction with butt joints, aligned and secured with steel spline concealed in edge of core.
3. Configuration: As indicated on drawings.

2.03 MATERIALS

A. Porcelain Enameled Steel Sheet: ASTM A424/A424M, Type I, Commercial Steel, with fired-on vitreous finish.

B. Hardboard for Cores: ANSI A135.4, Class 1 - Tempered, S2S (smooth two sides).

C. Medium Density Fiberboard (MDF): ANSI A208.2; composed of wood fibers pressure bonded with manufacturer's recommended adhesive to suit application.

D. Steel Sheet Backing: 28 gage, 0.0149 inch, galvanized.

E. Adhesives: Type used by manufacturer.

2.04 ACCESSORIES (CLARIDGE SERIES I OR EQUIVALENT)

A. Map Rail: Extruded aluminum, manufacturer's standard profile, with cork insert and runners for accessories; 1 inch wide overall , full width of frame. Cork insert shall be covered with fabric to match tack board fabric.
1. Basis of Design: Claridge No. 74 Deluxe Map and Display Rail

B. Flag Holders: Claridge No. 766FH or equivalent. (2) per room. Cast aluminum bored to receive 1 inch diameter flag staff, bracketed to fit top rail of board.

C. Marker Marker Tray: Aluminum, manufacturer's standard profile , manufacturer's standard profile, one piece full length of markerboard , one piece full length of markerboard, molded ends , molded ends, concealed fasteners concealed fasteners, same finish as frame same finish as frame. Omit marker tray in all "Activity Rooms", "Corridors" "Exterior Applications" and "Gymnasiums." Provide end caps for chalk troughs.

D. Mounting Brackets: Concealed.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated on shop drawings.

B. Verify that internal wall blocking is ready to receive work and positioning dimensions are as instructed by the manufacturer.

3.02 PREPARATION

A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

A. Install the work of this Section in strict accordance with the original design, the approved Shop Drawings, and the manufacturer's recommended installation procedures as approved by the Architect, anchoring all components firmly into position for long life under hard use, this includes wall anchors at 2’-0” o.c. and wall adhesive at maximum of 16” o.c.e.w.

B. Install with top of the marker tray at 15-48 inches above finished floor. Verify actual height with Owner before installation as required to accommodate writing, projection and viewing surface.

C. Secure units level and plumb.

D. Butt Joints: Install with tight hairline joints.

3.04 CLEANING

A. Clean board surfaces in accordance with manufacturer's instructions.

B. Cover with protective cover, taped to frame.

C. Remove temporary protective cover at Date of Substantial Completion.

END OF SECTION

SECTION 10 1400
SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Room and door signs.

B. Building, Wayfinding and Title Signs.

C. Plaque.

1.02 REFERENCE STANDARDS

A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.

B. 2012 TAS - Texas Accessibility Standards; 2012.

C. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

D. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.

C. Shop Drawings:
   1. Submit shop drawings showing each typical room and door sign type for fabrication, including typical drawings and details for each type to be provided.
   2. Submit shop drawings showing all graphic, wayfinding or other "special" signage for fabrication, including drawings and details for each to be provided.
   3. Shop drawings shall include plan location, directional information, size, font, color, mounting details, and scaled representation of configuration for each sign (included, but not limited to, building signs, directional/ wayfinding signs, and plaques) and graphic elements.

D. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
   1. When room numbers to appear on signs differ from those on drawings, include the drawing room number on schedule.
   2. Request content of signs from Owner through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
   3. Submit for approval by Owner through Architect prior to fabrication.

E. Building signage, including, but not limited to, directional/ wayfinding signs, plaques, graphic elements and marquee signs:
   1. ALL signage shall be submitted for approval by the Owner for content, color, size and other physical qualities.
   2. ALL signage shall not be fabricated or installed without the written approval of the Owner.

F. Samples: Submit two samples of each type of sign, of size similar to that required for project, illustrating sign style, font, and method of attachment.

G. Selection Samples: Where colors are not specified, submit two sets of color selection charts or chips.

H. Verification Samples: Submit samples showing colors specified.

I. Manufacturer's Installation Instructions: Include installation templates and attachment devices.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Section 01 6000 - Product Requirements.

B. Package signs as required to prevent damage before installation.

C. Package room and door signs in sequential order of installation, labeled by floor or building.

D. Store tape adhesive at normal room temperature.

1.06 FIELD CONDITIONS

A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.

B. Maintain this minimum temperature during and after installation of signs.

1.07 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a one year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Room and Door Signs:
1. Apco Architectural Signs: www.apco.com
2. ASI Signage: www.asisignage.com.
3. Benchmark Signs: www.benchmarksigns.biz.
4. Best Sign Systems, Inc.: www.bestsigns.com.
5. Bayuk Graphic Systems, Inc.: www.bayukgraphics.com.
6. Cosco Industries: www.coscoarchitecturalsigns.com.
7. FASTSIGNS: www.fastsigns.com.
8. Inpro: www.inprocorp.com.
9. Kroy Sign Systems: www.kroysignsystems.com.
10. Mohawk Sign Systems, Inc.: www.mohawksign.com.
11. South Texas Graphic Specialties, Inc.: www.stxgraphics.com.
12. Substitutions: See Section 01 6000 - Product Requirements.

B. Building, Wayfinding and Title Signs:
1. Cosco Industries: www.coscoarchitecturalsigns.com.
2. FASTSIGNS: www.fastsigns.com.
3. Inpro: www.inprocorp.com.
4. A.R.K. Ramos Signage Systems: www.arkramos.com.
5. ASI Signage: www.asisignage.com.
6. Best Sign Systems, Inc.: www.bestsigns.com
7. Gemini Inc.: www.geminisignproducts.com
8. The Southwell Company: www.southwellco.com.
9. Substitutions: See Section 01 6000 - Product Requirements.

C. Plaques:
1. Cosco Industries: www.coscoarchitecturalsigns.com.
2. Impact Signs: www.impactsigns.com
3. The Southwell Company: www.southwellco.com.
4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 SIGNAGE APPLICATIONS

A. Accessibility Compliance: Signs are required to comply with ADA Standards, 2012 TAS, ICC A117.1 and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.

B. Room and Door Signs: Provide a sign for every doorway, whether it has a door or not, not including corridors, lobbies, and similar open areas.
   1. Sign Type: Flat signs with extruded acrylic panel media as specified.
   2. Provide "tactile" signage, with letters raised minimum 1/32 inch and Grade II braille.
   3. All letters, numbers and/or symbols shall contrast with their background. Characters and background shall have a non-glare finish.
   4. Background color as selected by architect from manufacturer's actual color samples.
   5. Letterform shall be Helvetica Regular upper case letters and numbers.
   6. Size of letters and numbers shall be as follows:
      a. Owners Room numbers shall be 1".
      b. Lettering for room ID signs shall be 3/4"or as noted.
      c. Provide construction floor plan room number in lower right hand corner on all signs. Number shall be 3/8" high and color shall match background.
      d. Symbol size shall be 6".
      e. Standard Grade 2 braille shall be ½" below copy.
      f. Corners: Square edges.
   7. Provide solid cover plate for back side of sign where mounted to glass.
   8. Entry/Exit Numbering: Provide 4" high door number on each side of all exterior doors for First Responder information. Numbers shall start at main primary entry and continue sequence in clockwise direction around the building.
   9. Exterior Room Identification Signage
      a. Provide cast aluminum sign with raised letters and border.
      b. Raised letters and border shall be satin finish with painted background.
      c. Signs shall have room function followed by Grade 2 Braille directly below.
      d. Provide at all exterior mechanical, electrical, fire riser rooms or other exterior locations.

C. Code Required Signage: Fire Protection and Utility Equipment Identification Access and Emergency Signage. See "Schedules" article below.

D. Building, Wayfinding and Title Signs:
   1. Building Letters.
      a. Use individual cast aluminum alloy, smooth surface letters.
      b. Letters shall be Arial for bidding purposes unless noted otherwise on the drawings.
      c. Finish shall be baked enamel, primed and spray coated with two (2) coats of baked enamel.
      d. Reference drawings for font heights and locations.
      e. Font and finish are for bidding purposes only. Submit samples to Architect for approval before fabrication of any material
      f. Provide (5) 8" high numbers for the building address. Verify location with Building Inspector. Color shall be contrasting to building. Provide one set per building.
   2. All exterior wall, roof, and structure mounted letters/signs to be engineered by the sign manufacturer for mounting requirements and structural connections in accordance with the applicable wind loading and building codes. Sign manufacturer shall coordinate with adjacent building trades for connection requirements prior to other building elements being installed.

E. Plaques:
   1. Provide 1 stainless steel plaque per building.

a. Design shall be as detailed in this section.
b. Tablet to be 18" x 18". ¼" thickness.
c. The plaque shall be etched stainless steel background, free of all pits and gas holes, with raised borders and characters. All characters shall be sharp.
d. Border and faces of raised characters are to be a polished finish and background is to be brushed finish.
e. The plaque shall contain the names of the Superintendent of Schools, School Board members, the Architect, the Contractor, the Year and Title of the Building. Names and all edits to be given by Owner. If the size is not large enough to accommodate all the information given above, the plaque size shall be increased accordingly to 18" x 24".

2. Mount the plaque where directed by the Architect.

2.03 ACCESSORIES

A. Tape Adhesive: Double sided tape and clear silicone adhesive.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.
1. Examine work area with installer present.
2. If existing conditions are not as required to properly complete the work of this section, notify Architect.
3. Do not proceed with installation until deficiencies in existing conditions have been corrected.

B. Verify that dimensions, tolerances, and attachment methods for work in this section are properly coordinated with other work on site.

3.02 INSTALLATION

A. Interior/Exterior Room and Door Signage
1. Install in accordance with manufacturer's instructions.
2. Install neatly, with horizontal edges level.
3. Locate signs where indicated:
a. Room and Door Signs: Contractor shall locate specific mounting heights in coordination with the current TAS and ADA regulations. Mount sign on wall or glass.
b. If no location is indicated obtain Owner's instructions.
c. Wall or Glass Mounted: Double sided vinyl tape and clear silicone adhesive. Provide solid cover plate for back side of sign for glass installations.
4. Protect from damage until Date of Substantial Completion; repair or replace damaged items.

B. Building Identification Signage
1. General: locate sign units and accessories where indicated, using mounting methods of the type described and in compliance with the manufacturer's instructions.
2. Install signs level, plumb, and at the height indicated with sign surfaces free from distortion or other defects in appearance.
3. Cleaning and Protection: After installation, clean soiled sign surfaces according to the manufacturer's instructions. Protect units from damage until acceptance by the owner.

3.03 SCHEDULES

A. Interior/Exterior Room and Door Signage:
1. Type A - ID signs with room number with one window slot. Window insert shall be fixed.
a. Locations – Classrooms, offices.
2. Type B - ID signs with room number and function.
a. Locations – All locations except classrooms, offices.

b. Provide “Roof Access” sign to rooms housing roof access hatch and ladder
c. Provide “Maximum Occupancy” signs at the following locations;
    1) Lecture Hall
    2) Cafeteria
    3) Auditorium
    4) Gymnasium
    5) Activity Room
d. Provide "Exterior Room Identification Signage" at all exterior mechanical, electrical and fire riser rooms.

3. Type C - Restroom signs with accessibility and gender symbol with the verbal description placed directly below and followed by Grade 2 braille.
4. Type D - Pictogram signs with accessibility and function symbol with the verbal description placed directly below and followed by Grade 2 braille.
    a. Messages: Text will be room names as directed by the Architect.
    b. Provide signage outside each assembly entrance stating ”Assistive Listening Devices Available” with the international symbol of access for hearing loss.
    c. Locations – Auditoriums, Distant Learning Rooms, Cafeterias, and Gymnasiums

B. Code Required Signage.
1. Fire Protection Equipment Identification, exterior access.
    a. Location(s): Permanently installed and readily visible. Verify mounting location with AHJ.
        1) Fire Suppression Sprinkler Riser and Valve Rooms.
    b. Copy: "RISER ROOM".
    c. Color: Copy to be White in contrast to its Red background.
2. Fire Protection and Utility Equipment Identification, interior access.
    a. Location(s): Verify mounting location with AHJ.
        1) Air-Conditioning Systems Control Rooms.
        2) Fire Suppression Sprinkler Riser and Valve Rooms.
        3) Fire Detection, Suppression or Control.
    b. Copy: For bidding purposes, use room name as indicated on drawings. Verify final copy with Architect prior to fabrication.
    c. Color: Copy to be in contrast to its background.
3. Elevator Lobby Emergency Signs: Provide one standardized design posted adjacent to each elevator call station on all floors. Copy: "IN CASE OF FIRE, ELEVATORS ARE OUT OF SERVICE. USE EXIT STAIRS".
4. Raised Character and Braille Exit Signs: A sign stating "EXIT" in visual characters, raised characters and braille and complying with ICC A117.1 shall be provided adjacent to each door to an area of refuge, providing direct access to a stairway, an exterior area for assisted rescue, an exit stairway or ramp, an exit passageway and the exit discharge.

C. **Plaque Example:**



END OF SECTION

SECTION 10 2113.19
PLASTIC TOILET COMPARTMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Solid plastic toilet compartments.

B. Urinal screens.

1.02 RELATED REQUIREMENTS

A. Section 01 6000 - Product Requirements: Fundamental product requirements, substitutions and product options, delivery, storage, and handling.

B. Section 05 5000 - Metal Fabrications: Concealed steel support members.

C. Section 06 1000 - Rough Carpentry: Blocking and supports.

1.03 REFERENCE STANDARDS

A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.

B. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2015.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate the work with placement of support framing and anchors in walls and ceilings.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on panel construction, hardware, and accessories.

C. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall, floor, and ceiling supports, door swings.

D. Color charts showing colors available from the proposed manufacturer in the specified products.

E. Samples: Submit two samples of partition panels, 6 by 6 inch in size illustrating panel finish, color, and sheen.

F. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.06 WARRANTY

A. Provide fifteen year manufacturer warranty against plastic breakage, corrosion, and delamination.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Plastic Toilet and Shower Compartments:
   1. Accurate Partitions Corp.: www.accuratepartitions.com.
   2. Ampco Products, Inc: www.ampco.com.
   3. General Partitions Mfg. Corp.: www.generalpartitions.com
   4. Global Partitions Corp.: www.globalpartitions.com
   5. Partition Systems International of South Carolina: www.psisc.com.
   6. Scranton Products (Santana/Comtec/Capital): www.scrantonproducts.com.
   7. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PLASTIC TOILET COMPARTMENTS

A. Solid Plastic Toilet Compartments: Factory fabricated doors, pilasters, and divider panels made of solid molded high density polyethylene (HDPE), tested in accordance with NFPA 286; floor and ceiling anchored.
   1. Color: As scheduled in Section 01 6210 - Schedule of Materials and Colors.

B. Doors:
   1. Thickness: 1 inch.
   2. Width: 28 inch.
   3. Width for Accessible Use: 36 inch, out-swinging. (minimum)
   4. Width for Ambulatory Use: 34 inch, out-swinging.
   5. Height: 55 inch.

C. Panels:
   1. Thickness: 1 inch.
   2. Height: 55 inch, mounted 14" above the finished floor.
   3. Depth: As indicated on drawings.

D. Pilasters:
   1. Thickness: 1 inch.
   2. Width: As required to fit space; minimum 3 inch.

E. Screens: Without doors; to match compartments; mounted to wall with continuous panel brackets with vertical support/bracing same as compartments.

F. Shower Cubicles shall be 1" thick with all edges rounded to a 1/4" radius. Standard vanity size is 24" wide by customer specified length not to exceed 120" for a single piece.

2.03 ACCESSORIES

A. Pilaster Shoes: Stainless steel, satin finish, 3 inches high; concealing floor and ceiling fastenings.
   1. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster.
   2. Provide ceiling attachment using two adjustable hanging studs, attached to above-ceiling framing.

B. Wall, Pilaster, and Shower Brackets: Stainless steel; continuous type.

C. Attachments, Screws, and Bolts: Stainless steel , tamper proof type.
   1. For attaching panels and pilasters to brackets: Through-bolts and nuts ; tamper proof.

D. Hinges: Stainless steel, manufacturer's standard finish.
   1. Continuous-type hinge, self closing.

E. Door Hardware: Stainless steel, manufacturer's standard finish.
   1. Door Latch: Slide type with exterior emergency access feature.
   2. Door Strike and Keeper with Rubber Bumper: Mount on pilaster in alignment with door latch.
   3. Provide door pull for outswinging doors.

F. Coat Hook with Rubber Bumper: One per compartment, mounted on door.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify correct spacing of and between plumbing fixtures.

C. Verify correct location of built-in framing, anchorage, and bracing.

3.02 INSTALLATION

A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.

B. Maintain 1/4 inch to 3/8 inch space between wall and panels and between wall and end pilasters.

C. Attach panel brackets securely to walls using anchor devices.

D. Attach panels and pilasters to brackets.

E. Field touch-up of scratches or damaged finish will not be permitted. Replace damaged or scratched materials with new materials.

3.03 TOLERANCES

A. Maximum Variation From True Position: 1/4 inch.

B. Maximum Variation From Plumb: 1/8 inch.

3.04 ADJUSTING

A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.

B. Adjust hinges to position doors in partial opening position when unlatched. Return out-swinging doors to closed position.

C. Adjust adjacent components for consistency of line or plane.

END OF SECTION

SECTION 10 2213
WIRE MESH PARTITIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wire mesh systems for walls and ceilings.

1.02 RELATED REQUIREMENTS

A. Section 08 7100 - Door Hardware: Cylinders for locksets.

1.03 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

B. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2021.

C. ASTM A510/A510M - Standard Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel, and Alloy Steel; 2020.

D. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2021.

E. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2023).

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data for screen materials, finishes.

C. Shop Drawings: Indicate plan and vertical dimensions, elevations, component details; head, jamb, and sill details; location of hardware. Provide component details, framed openings, bearing, anchorage, loading, welds, type and location of fasteners, and accessories or items required of related work.
   1. Show field measurements on shop drawings.

D. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of experience.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Wire Mesh Partitions:
   1. Acorn Wire and Iron Works, Inc: www.acornwire.com.
   2. The G-S Company: www.g-sco.com/#sle.
   3. Miller Wire Works, Inc: www.millerwireworks.com.
   4. Spaceguard Products: www.spaceguardproducts.com/#sle.
   5. Standard Wire & Steel Works: www.standardwiresteel.com.
   6. Substitutions: See Section 01 6000 - Product Requirements.

2.02 WIRE MESH PARTITIONS

A. Wire Mesh Partitions: Factory-fabricated modular assemblies of panels, doors, anchors, hardware, and accessories as required to provide a complete system.
   1. Design Criteria:
      a. Design partition system to provide for movement of components without damage, undue stress on fasteners or other detrimental effects, when subject to design loads.

b. Design system to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.
c. Comply with applicable code for wire mesh opening size.

2.03 COMPONENTS

A. Woven Wire Mesh: Standard duty.
1. Material: ASTM A510/A510M uncoated crimped steel wire.
2. Wire Size: 10 gauge, 0.135 inch.
3. Mesh Opening Size: 1-1/2 inch diamond shape.
4. Mesh Weave: Plain weave, inter-crimped.

B. Framing and Support Members:
1. Material: ASTM A36/A36M steel shapes and ASTM A500/A500M cold-formed steel.
2. Framing, Corner Posts, and Intermediate Support Members: Manufacturer's standard sizes for system specified and as indicated on drawings.
3. Vertical Stiffeners: As required for partitions greater than 144 inches in height.

C. Doors: Same material as partitions, fully framed; manufacturer's standard construction and hardware for swing operation.
1. Locking: Mortise type cylinder locks, keyed on outside, operated by recessed turn knob inside.

D. Sheet Metal Base Panel: ASTM A1008/A1008M, cold rolled steel sheet.

E. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

2.04 FASTENERS

A. Bolts, Nuts and Washers: Hot dip galvanized.

B. Anchorage Devices: Provide power driven, powder actuated, and drilled expansion bolts.

C. Exposed Mechanical Fastenings: Flush countersunk screws or bolts, unobtrusively located, consistent with design of structure.

2.05 ACCESSORIES

A. Bracing: Formed sheet steel, thickness determined for conditions encountered, manufacturer's standard shapes, same finish as framing members.

B. Plates, Gussets, Clips: Formed sheet steel, thickness determined for conditions encountered, manufacturer's standard shapes, same finish as framing members.

C. Post Caps: Manufacturer's standard.

D. Floor and Ceiling Pilaster Shoe: Manufacturer's standard.

E. Floor Base: Manufacturer's standard.

2.06 FABRICATION

A. Fit and assemble in largest practical sections for delivery to site, ready for installation.

B. Make exposed joints flush or tight.

C. Provide components required for anchorage to adjacent construction.

D. Frame openings made for penetrating mechanical and electrical components.

2.07 FINISHES

A. Painted Finish: Manufacturer's standard powder coat finish.
1. Color: As scheduled in Section 01 6210-Schedule of Materials and Colors.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated on shop drawings.

B. Verify that substrate surfaces and required openings are ready to receive work.

3.02 PREPARATION

A. Clean substrate surfaces.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install items plumb and level, accurately fitted, free from distortion or defects.

C. Perform field welding in accordance with AWS D1.1/D1.1M.

D. After installation, touch-up field welds scratched or damaged surfaces with shop applied finish.

3.04 TOLERANCES

A. Maximum Variation From Plumb or Level: 1/4 inch.

B. Maximum Misalignment From True Position: 1/4 inch.

3.05 ADJUSTING

A. Adjust doors to achieve free movement.

3.06 CLEANING

A. Remove temporary protection to prefinished surfaces.

END OF SECTION

SECTION 10 2239
FOLDING PANEL PARTITIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Top-supported folding panel partitions, horizontal opening.

B. Ceiling track and operating hardware.

1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Wood blocking and track support shimming.

B. Section 08 7100 - Door Hardware: Lock cylinders for panels

1.03 REFERENCE STANDARDS

A. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

B. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

C. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).

D. ASTM E413 - Classification for Rating Sound Insulation; 2016.

E. ASTM E557 - Standard Guide for Architectural Design and Installation Practices for Sound Isolation Between Spaces Separated by Operable Partitions; 2012 (Reapproved 2020).

F. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene at project site seven calendar days prior to scheduled beginning of construction activities of this section to review section requirements.
   1. Require attendance by representatives of installer.
   2. Notify Architect four calendar days in advance of scheduled meeting date.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on partition materials, operation, hardware and accessories, track switching components, and colors and finishes available.

C. Shop Drawings: Indicate opening sizes, track layout, details of track and required supports, and stacking depth.

D. Samples for Selection: Submit two samples of full manufacturer's color range for selection of colors.

E. Samples for Review: Submit two samples of surface finish, 12 by 12 inches size, illustrating quality, colors selected, texture, and weight.

F. Certificates: Certify that partition system meets or exceeds specified acoustic requirements.

G. Manufacturer's Instructions: Indicate special procedures, perimeter conditions requiring special attention, and installation sequence.

H. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods. Describe cleaning materials detrimental to finish surfaces and hardware finish.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified this section with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience and approved by manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until installation.

1.08 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within two year period after Date of Substantial Completion.

C. Provide two year manufacturer warranty against defects in material and workmanship, excluding abuse.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Folding Panel Partitions - Horizontal Opening:
   1. Kwik-Wall Company: www.kwik-wall.com/#sle.
   2. Moderco, Inc: www.moderco.com/#sle.
   3. Modernfold, a DORMA Group Company: www.modernfold.com/#sle.

2.02 FOLDING PANEL PARTITIONS - HORIZONTAL OPENING

A. Folding Panel Partitions: Side opening; individual panels; side stacking; manually operated.

B. Panel Construction:
   1. Frame: 16 gauge, 0.0598 inch thick formed sheet steel frame top, bottom, jambs, and intermediates; welded construction.
   2. Substrate: Gypsum board.
   3. Panel Substrate Facing: Steel sheet, manufacturer's standard thickness.
   4. Hardware: Latching door handles of material, and finish to match remainder of project; lock cylinder keyed to building keying system.
      a. Refer to Section 08 7100 for additional requirements.
      b. Provide pass door with panic hardware where required per code - minimum 1 required.
   5. Panel Properties:
      a. Thickness With Finish: 4 inches max.
      b. Width: Standard width.
      c. Weight: 5-11 lb/sq ft. based on STC rating.

C. Panel Finishes:
   1. Facing: Plastic laminate.
   2. Exposed Metal Trim: As scheduled in Section 01 6210.

D. Panel Seals:
   1. Panel to Panel Seals: Grooved and gasketed astragals, with continuous flexible ribbed vinyl seal fitted to panel edge construction; color to match panel finish.
   2. Acoustic Seals: Flexible acoustic seals at jambs, meeting mullions, ceilings, retractable floor and ceiling seals, and above track to structure acoustic seal.

E. Suspension System:
   1. Track: Formed steel; Minimum 1-1/4 by 1-1/4 inch size; thickness and profile designed to support loads, steel sub-channel and track connectors, and track switches.
   2. Carriers: Nylon wheels on trolley carrier at top of every second panel, sized to carry imposed loads, with threaded pendant bolt for vertical adjustment.

F. Performance:
   1. Acoustic Performance:
      a. Sound Transmission Class (STC): 48 to 52 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90, on panel size of 100 sq ft.
   2. Installed partition system track capable of supporting imposed loads, with maximum deflection of 1/360 of span.

G. Accessories:
   1. Pocket Enclosures where required: Door, frame, and trim to match adjacent panels. Reference plan for conditions.
   2. Pass Door: Single door, 36 inch wide by 84 inch high opening; same design and construction as panel; fit door with perimeter acoustic gaskets, concealed closer, and keyed lock.
   3. Acoustic Sealant: As recommended by partition manufacturer.

2.03 MATERIALS

A. Aluminum Extrusions: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.

B. Plastic Laminate: NEMA LD 3, HGS; color as selected; finish as selected.

C. Acoustic Insulation:
   1. Type: As required for acoustic performance indicated.
   2. Thickness: As required for acoustic performance indicated.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated on shop drawings.

B. Verify track supports are laterally braced and will permit track to be level within 1/4 inch of required position and parallel to the floor surface.

C. Verify floor flatness of 1/8 inch in 10 feet, non-cumulative.

D. Verify wall plumbness of 1/8 inch in 10 feet, non-cumulative.

3.02 INSTALLATION

A. Install partition in accordance with manufacturer's instructions and ASTM E557.

B. Fit and align partition assembly level and plumb.

C. Lubricate moving components.

D. Install acoustic sealant to achieve required acoustic performance.

E. Coordinate electrical connections.

3.03 ADJUSTING

A. Adjust partition assembly to provide smooth operation from stacked to full open position. Do not over-compress acoustic seals.

B. Visually inspect partition in full extended position for light leaks to identify a potential acoustical leak.

C. Adjust partition assembly to achieve lightproof seal.

3.04 CLEANING

A. Clean finish surfaces and partition accessories.

B. Condition markerboard surfaces in accordance with manufacturer's instructions.

3.05 CLOSEOUT ACTIVITIES

A. Demonstrate operation of partition and identify potential operational problems.

END OF SECTION

SECTION 10 2600
WALL AND DOOR PROTECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Corner guards.

1.02 RELATED REQUIREMENTS

A. Section 09 2116 - Gypsum Board Assemblies: Placement of supports in stud wall construction.

1.03 REFERENCE STANDARDS

A. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics; 2010 (Reapproved 2018).

B. ASTM D543 - Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents; 2020.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023.

D. ASTM F476 - Standard Test Methods for Security of Swinging Door Assemblies; 2014.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Indicate physical dimensions, features, wall mounting brackets with mounted measurements, anchorage details, and rough-in measurements.

C. Shop Drawings: Include plans, elevation, sections, and attachment details.

D. Samples: Submit samples illustrating component design, configurations, joinery, color and finish.
   1. Submit two sections of corner guards, 6 inches long.

E. Manufacturer's Instructions: Indicate special procedures, perimeter conditions requiring special attention.

F. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

G. Maintenance Data: Manufacturer's instructions for care and cleaning of each type of product. Include information about both recommended and potentially detrimental cleaning materials and methods.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver wall and door protection items in original, undamaged protective packaging. Label items to designate installation locations.

B. Protect work from moisture damage.

C. Protect work from UV light damage.

D. Do not deliver products to project site until areas for storage and installation are fully enclosed, and interior temperature and humidity are in compliance with manufacturer's recommendations for each type of item.

E. Store products in either horizontal or vertical position, in compliance with manufacturer's instructions.

1.06 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a one year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Corner Guards:
   1. Babcock-Davis: www.babcockdavis.com/#sle.
   2. Construction Specialties, Inc: www.c-sgroup.com/#sle.
   3. Inpro: www.inprocorp.com/#sle.
   4. Koroseal Interior Products: www.koroseal.com/#sle.
   5. Nystrom, Inc: www.nystrom.com/#sle.
   6. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PERFORMANCE CRITERIA

A. Impact Strength: Unless otherwise noted, provide protection products and assemblies that have been successfully tested for compliance with applicable provisions of ASTM D256 and/or ASTM F476.

B. Chemical and Stain Resistance: Unless otherwise noted, provide protection products and assemblies with chemical and stain resistance complying with applicable provisions of ASTM D543.

2.03 PRODUCT TYPES

A. Corner Guards - Flush Mounted:
   1. Material: Polyethylene terephthalate (PET or PETG); PVC-free with full height extruded aluminum retainer.
   2. Performance: Resist lateral impact force of 100 lbs at any point without damage or permanent set.
   3. Surface Burning Characteristics: Provide assemblies with flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
   4. Width of Wings: 2 inches.
   5. Corner: Radiused.
   6. Color: As selected from manufacturer's standard colors.
   7. Length: One piece.
   8. Accessories: Provide manufacturer's standard color-matched trim and moldings, including but not limited to:
      a. End caps.
      b. Splices.
      c. Vertical joint trims.
      d. Inside and outside corner trims.

B. Adhesives and Primers: As recommended by manufacturer.

C. Mounting Brackets and Attachment Hardware: Appropriate to component and substrate.

2.04 FABRICATION

A. Fabricate components with tight joints, corners and seams.

B. Pre-drill holes for attachment.

C. Form end trim closure by capping and finishing smooth.

2.05 SOURCE QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for additional requirements.

B. Provide wall and door protection systems of each type from a single source and manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that rough openings, concealed blocking, and anchors are correctly sized and located.

B. Verify that substrate surfaces for adhered items are clean and smooth.

C. Start of installation constitutes acceptance of project conditions.

3.02 INSTALLATION

A. Install components in accordance with manufacturer's instructions, level and plumb, secured rigidly in position to supporting construction.

B. Position corner guard 4 inches above finished floor to 48 inches high or height as indicated on drawings.

3.03 TOLERANCES

A. Maximum Variation From Required Height: 1/4 inch.

B. Maximum Variation From Level or Plane For Visible Length: 1/4 inch.

3.04 CLEANING

A. Clean wall and door protection items of excess adhesive, dust, dirt, and other contaminants.

END OF SECTION

SECTION 10 2800
TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Commercial toilet accessories.

B. Commercial shower and bath accessories.

C. Under-lavatory pipe supply covers.

D. Diaper changing stations.

E. Utility room accessories.

F. Owner Furnished, Contractor Installed products, (OFCI).

1.02 RELATED REQUIREMENTS

A. Section 06 1000-Rough Carpentry: Concealed supports for accessories, including in wall framing and plates and above ceiling framing.

B. Section 10 2113.19 - Plastic Toilet Compartments.

1.03 REFERENCE STANDARDS

A. 2012 TAS - Texas Accessibility Standards; 2012.

B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

D. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 2015a (Reapproved 2019).

E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.

F. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.

G. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium; 2017.

H. ASTM C1036 - Standard Specification for Flat Glass; 2021.

I. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.

J. ASTM C1822 - Standard Specification for Insulating Covers on Accessible Lavatory Piping; 2015.

K. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023.

L. ASTM F2285 - Standard Consumer Safety Performance Specification for Diaper Changing Tables for Commercial Use; 2004, with Editorial Revision (2016).

M. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015 (Reapproved 2021)e1.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

B. Provide accessories for Integrated Room Mock-ups as required in Section 01 4000-Quality Requirements.

C. Review delivery dates for Owner-Furnished products.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
   2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
   3. Include electrical characteristics.

C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
   1. Identify locations using room designations indicated.
   2. Identify accessories using designations indicated.

D. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

E. Closeout Submittals:
   1. Submit under provisions of Section 01 7800 Closeout Submittals.
   2. Maintenance Data: For accessories to include in maintenance manuals.

1.06 WARRANTY

A. Manufacturer’s Special Warranty: Manufacturer agrees to repair or replace items that fail in materials or workmanship within specified warranty period.
   1. All accessories not specifically listed otherwise, (1) year from date of Substantial Completion.
   2. Mirrors: Failures include, but are not limited to, visible silver spoilage defects; warranty period (5) years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 OWNER FURNISHED - CONTRACTOR INSTALLED PRODUCTS

A. Owner will furnish and contractor will install the products indicated. The work includes receiving, unloading, handling, storing, protecting, and installing Owner-Furnished products.

B. Owner-Furnished Products:
   1. Toilet Tissue (Roll) Dispenser (**T1**).
      a. Surface Mounted with concealed fasteners.
      b. Locations as indicated on plans. One per water closet whether indicated or not.
   2. Paper Towel (Roll) Dispenser (**T6**).
      a. Surface Mounted with concealed fasteners.
      b. Locations as indicated on plans. One per sink or lav whether indicated or not.
   3. Soap Dispenser (**T11**) or (**T12**). See drawings for mounting type required.
      a. Surface Mounted with concealed fasteners.
      b. Locations as indicated on plans. One per sink or lav whether indicated or not.

2.02 MANUFACTURERS

A. Commercial Toilet, Shower, and Bath Accessories:
   1. Basis of Design: Model numbers listed are per Bobrick Corporation unless noted otherwise.

B. Acceptable Manufacturers: The following manufacturers are acceptable to provide products of this section provided proposed products meet or exceed all specifed requirements.
   1. ASI - American Specialties, Inc: www.americanspecialties.com/#sle.

2. Bobrick Washroom Equipment, Inc.: www.bobrick.com.
3. Bradley Corporation: www.bradleycorp.com/#sle.
4. GAMCO – (General Accessory Mfg. Co): www.gamcousa.com.
5. Georgia-Pacific Professional: www.blue-connect.com/#sle.
6. Kimberly Clarke Professional: www.kcprofessional.com.
7. Substitutions: Section 01 6000 - Product Requirements.

C. Under-Lavatory Pipe Supply Covers:
1. Plumberex Specialty Products, Inc: www.plumberex.com/#sle.
2. Substitutions: Section 01 6000 - Product Requirements.

D. Diaper Changing Stations:
1. Koala Kare Products: www.koalabear.com/#sle.
2. Substitutions: 01 6000 - Product Requirements.

E. Utility Room Accessories:
1. Bradley Corporation: www.bradleycorp.com.
2. Zurn Industries, LLC: www.zurn.com.
3. Substitutions: 01 6000 - Product Requirements.

F. Source Limitations: Provide products of each category type by single manufacturer.

2.03 MATERIALS

A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
1. Grind welded joints smooth.
2. Fabricate units made of metal sheet of seamless sheets with flat surfaces.

B. Keys: Provide four keys for each accessory to Owner; master key lockable accessories.

C. Stainless Steel Sheet: ASTM A666, Type 304.

D. Stainless Steel Tubing: ASTM A269/A269M, Grade TP304 or TP316.

E. Galvanized Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.

F. Mirror Glass: Tempered safety glass, ASTM C1048; and ASTM C1036 Type I, Class 1, Quality Q2, with silvering as required.

G. Adhesive: Two component epoxy type, waterproof.

H. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof.

I. Expansion Shields: Fiber or rubber as recommended by accessory manufacturer for component and substrate.

2.04 FINISHES

A. Stainless Steel: Satin finish, unless otherwise noted.

B. Chrome/Nickel Plating: ASTM B456, SC 2, satin finish, unless otherwise noted.

C. Galvanizing for Items Other than Sheet: Comply with ASTM A123/A123M; galvanize ferrous metal and fastening devices.

D. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.

E. Back paint components where contact is made with building finishes to prevent electrolysis.

2.05 COMMERCIAL TOILET ACCESSORIES

A. Mirrors: Stainless steel framed, (**T9**) and (**T10**): 1/4 inch thick tempered safety glass; ASTM C1048.
1. Frame: 0.05 inchangle shapes, with mitered and welded and ground corners; satin finish.

2. Back of unit shall be galvanized steel, secure to frame with concealed screws, equipped with integral horizontal hanging brackets and separate wall hanger for concealed mounting.
3. Products:
   a. Basis of Design: (**T9**), Model 7802-1836, single lavatory mirror, 18” x 36”.
   b. Basis of Design: (**T10**), Model 7802-2460, full-length mirror, 24” x 60”.

B. Grab Bars, (**T3**), (**T4**) and (**T5**): Stainless steel, textured surface.
1. Heavy Duty Grab Bars:
   a. Push/Pull Point Load: 250 pound-force, minimum.
   b. Dimensions: 1-1/2 inch outside diameter, minimum 0.05 inch wall thickness, exposed flange mounting, 1-1/2 inch clearance between wall and inside of grab bar.
   c. Finish: Satin.
   d. Length and Configuration: As indicated on drawings.
   e. Mounting: Flanges with concealed fasteners.
   f. Products:
      1) Basis of Design: (**T3**), Model 8122-00118, 18 inch vertical grab bar.
      2) Basis of Design: (**T4**), Model 8122-00136, 36 inch grab bar.
      3) Basis of Design: (**T5)**, Model 8122-00142, 42 inch grab bar.

C. Sanitary Napkin Disposal Unit, (**T2**): Stainless steel, with self-closing door, locking bottom panel with full-length stainless steel piano-type hinge, removable receptacle.
1. Mounting: Partition mounted, dual access or surface mounted; refer to drawings.
2. Products:
   a. Basis of Design: Bobrick Model B-270, partition mounted, serves two compartments.
   b. Basis of Design: Bobrick Model B-270, surface mounted.

D. Single Robe Hook (**T13**): Heavy-duty stainless steel, single-prong, rectangular-shaped bracket and backplate for concealed attachment, satin finish.
1. Products:
   a. Basis of Design: Model 9114.

2.06 COMMERCIAL SHOWER AND BATH ACCESSORIES

A. Shower Curtain Rod, (**T17**): Stainless steel tube, 1 inch outside diameter, 0.04 inch wall thickness, satin-finished, with 3 inch outside diameter, minimum 0.04 inch thick satin-finished stainless steel flanges, for concealed mounting.
1. Length: Refer to drawings.
2. Products:
   a. Basis of Design: Model 9538, shower curtain rod.

B. Shower Curtain, (**T17**):
1. Material: 9-oz. Nylon reinforced vinyl, 0.014 inch thick with top edge hemmed, matte finish, with antibacterial treatment, flameproof and stain-resistant.
2. Size: Minimum 2-inches wider than the opening by 78 inches high, hemmed edges.
3. Grommets: Corrosion-resistant metal; pierced through top hem on 6 inch centers.
4. Color: White.
5. Shower Curtain Hooks: Stainless steel spring wire designed for snap closure.
6. Products:
   a. Basis of Design: Model 9537, shower curtain.
   b. Basis of Design: Model 9536, shower curtain hooks.

C. Shower Grab Bars, (**T14**), (**T15**), (**T15A**) and (**T16**): Stainless steel, textured surface.
1. Heavy Duty Grab Bars:
   a. Push/Pull Point Load: 250 pound-force, minimum.

b. Dimensions: 1-1/2 inch outside diameter, minimum 0.05 inch wall thickness, exposed flange mounting, 1-1/2 inch clearance between wall and inside of grab bar.
c. Finish: Satin.
d. Length and Configuration: As indicated on drawings.
e. Mounting: Flanges with concealed fasteners.
f. Products:
1) Basis of Design: (**T14**), Model 8122-00124, 24 inch.
2) Basis of Design: (**T15**), Model 8122-0591528, L-shaped 15"x28". Refer to drawings for handing.
3) Basis of Design: (**T15A)**, Model 8122-0592436, L-shaped 24"x36". Refer to drawings for handing.
4) Basis of Design: (**T16**), Model 8122-00148, 48 inch.

D. Folding Shower Seat, (**T18**): Wall-mounted surface; welded tubular seat frame, structural support members, hinges, and mechanical fasteners of Type 304 stainless steel, reversable seat. Refer to drawings for handing.
1. Seat: Phenolic or polymeric composite one-piece seat or seat slats, of white color.
2. Size: TAS/ADA Standards compliant.
3. Products:
a. Basis of Design: Model 9569.

E. Towel Bar, (**T19**): Stainless steel, six hooks and 60-inch backplate with exposed surfaces, satin finish.
1. Mounting: Surface mounted.
2. Products:
a. Basis of Design: Model 9946.

F. Single Robe Hook (**T13**): Heavy-duty stainless steel, single-prong, rectangular-shaped bracket and backplate for concealed attachment, satin finish.
1. Products:
a. Basis of Design: Model 9114.

2.07 UNDER-LAVATORY PIPE AND SUPPLY COVERS

A. Under-Lavatory Pipe and Supply Covers (**T23**):
1. Insulate exposed drainage piping, including hot, cold, and tempered water supplies under lavatories or sinks to comply with TAS/ADA Standards.
2. Exterior Surfaces: Smooth non-absorbent, non-abrasive surfaces.
3. Construction: 1/8 inch flexible PVC.
a. Surface Burning Characteristics: Flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
b. Comply with ASTM C1822, type indicated.
c. Microbial and Fungal Resistance: Comply with ASTM G21.
4. Color: White.
5. Fasteners: Reusable, snap-locking fasteners with no sharp or abrasive external surfaces.
6. Products:
a. Basis of Design: Plumberex Specialty Products, Inc; Plumberex Handy-Shield Maxx: www.plumberex.com/#sle.

2.08 DIAPER CHANGING STATIONS

A. Diaper Changing Station, (**T20**): Wall-mounted folding diaper changing station for use in commercial toilet facilities, meeting or exceeding ASTM F2285.
1. Compliant with the 2012 TAS, Texas Accessibility Standards for work surface height and protruding object limitations, both open and closed positions.
2. Material: Stainless steel.

3. Mounting: Surface mounted, with unit projecting not more than 4 inches from wall when closed.
4. Color: Satin finish.
5. Minimum Rated Load: 250 pounds.
6. Products:
   a. Basis of Design: Koala Kare Products, a Division of Bobrick; Model KB310-SSWM.

2.09 UTILITY ROOM ACCESSORIES

A. Mop and Broom Holder, (**T24)**: 0.05 inch thick stainless steel, Type 304, hat-shaped channel.
   1. Holders: Three spring-loaded rubber cam holders.
   2. Length: Manufacturer's standard length for number of holders.
   3. Mounting: Surface.
   4. Products:
      a. Basis of Design: Model 9953 as manufactured by Bradley Corporation.

B. Mop Basin Hose and Bracket, (**T24A**): Heavy-duty 5/8-inch, cloth-reinforced flexible rubber hose with 3/4-inch brass coupling. Stainless steel, Type 304, bracket with rubber grip.
   1. Length: 30 inches.
   2. Mounting: Surface.
   3. Products:
      a. Basis of Design: Zurn Light Commercial Plumbing Products; Zurn Z1996-HH: www.zurn.com.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify exact location of accessories for installation.

C. Verify that field measurements are as indicated on drawings.

D. See Section 06 1000-Rough Carpentry for installation of blocking, reinforcing plates, and concealed anchors in walls and ceilings.

3.02 PREPARATION

A. Deliver inserts and rough-in frames to site for timely installation.

B. Provide templates and rough-in measurements as required.

3.03 INSTALLATION

A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.

B. Install plumb and level, securely and rigidly anchored to substrate.

C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.

D. Locate accessories in order that they do not interfere with door swings or use of fixtures. Install recessed accessories after wall finishes have been completed.

E. Anchor accessories with bolts, plates, and approved type fasteners. Take down any loose items and repair damaged wall surfaces. Accessories anchored to toilet partitions shall be thru-bolted.

F. Mount surface mounted accessories to backup material with toggle bolts, plumb and align.

G. At metal stud partitions, provide fire-retardant treated wood blocking for anchorage of grab bars, wall-mounted seats and benches, baby changing stations, and other such wall-mounted accessories where additional loads are anticipated.

1. For accessories protruding 3-inches or less from the wall, Contractor may utilitize ClarkDietrich Danback Flexible Wood Backing System with FlamePRO fire-retardant treated wood.

H. At recessed electric hand dryers located in metal stud wall partitions, install rigid sound insulation in wall around unit.

3.04 PROTECTION

A. Protect installed accessories from damage due to subsequent construction operations.

3.05 SCHEDULE

A. Provide the following accessories at type of room scheduled, whether indicated on the drawings or not. Refer to drawings for configuration and mounting heights. Provide (1) of each per accessory listed unless otherwise noted or designated as Owner-furnished.

B. Type C – Toilet Compartments
   1. Type C1 Standard Compartment:
      a. T1 Toilet Tissue (Roll) Dispenser.
      b. T2 Sanitary Napkin Disposal (at designated female restrooms, grades 6 to adult only).
   2. Type C2, C3 and C5 Accessible Compartments:
      a. T1 Toilet Tissue (Roll) Dispenser
      b. T2 Sanitary Napkin Disposal (at designated female restrooms, grades 6 to adult only).
      c. T3 Grab Bars, 18 inch, vertical.
      d. T4 Grab Bars, 36 inch.
      e. T5 Grab Bars, 42 inch.
   3. Type C4 Ambulatory Accessible Compartment:
      a. T1 Toilet Tissue (Roll) Dispenser.
      b. T2 Sanitary Napkin Disposal (at designated female restrooms, grades 6 to adult only).
      c. T3 Grab Bars, 18 inch; (2) each, vertical.
      d. T5 Grab Bars, 42 inch; (2) each.

C. Type L - Lavatories:
   1. T9 Mirror.
   2. T11 Soap Dispenser. At locations with multiple lavatories, provide at a ratio of (1) dispenser per (2) lavatories.
   3. T23 Undersink Piping Covers per lavatory.

D. Type MS - Mop Sink Locations:
   1. T24 Mop and Broom Holder.
   2. T24A Mop Basin Hose and Bracket.

E. Type S – Showers:
   1. Type S1 Transfer Type Shower Compartment:
      a. T13 Coat/Clothes Hook. Locate adjacent to shower seat wall.
      b. T15 Shower Grab Bar.
      c. T17 Shower Curtain & Rod w/Curtain Hooks.
      d. T18 Folding Shower Seat.
      e. T22 Wall-Mounted Soap Dish.
   2. Type S2 Standard Roll-In Type Shower Compartment:
      a. T13 Coat/Clothes Hook. Locate at nearest adjacent wall to shower.
      b. T14 Shower Grab Bar, 24 inch, (2) each.
      c. T16 Shower Grab Bar, 48 inch.
      d. T17 Shower Curtain & Rod w/Curtain Hooks.

e. T22 Wall-Mounted Soap Dish.

3. Type S3 Standard Roll-In Type Shower Compartment w/Seat:
   a. T13 Coat/Clothes Hook. Locate adjacent to shower seat wall.
   b. T15A Shower Grab Bar.
   c. T17 Shower Curtain & Rod w/Curtain Hooks.
   d. T18 Folding Shower Seat.
   e. T22 Wall-Mounted Soap Dish.
4. Type S4 Shower Compartment (Non-Accessible):
   a. T13 Coat/Clothes Hook. Locate at nearest adjacent wall to shower.
   b. T17 Shower Curtain & Rod w/Curtain Hooks.
   c. T22 Wall-Mounted Soap Dish.
5. Multi-User Showers:
   a. T19 Towel Bar. Locate at nearest adjacent wall to shower; (2) each.

F. Type T – Toilet Rooms:
1. Type T1 Single-User Toilet Room:
   a. T1 Toilet Tissue (Roll) Dispenser.
   b. T2 Sanitary Napkin Disposal (at unisex or designated female restrooms, grades 6 to adult only).
   c. T3 Grab Bars, 18 inch, vertical.
   d. T4 Grab Bars, 36 inch.
   e. T5 Grab Bars, 42 inch.
   f. T6 Paper Towel (Roll) Dispenser.
   g. T9 Mirror.
   h. T11 Soap Dispenser.
   i. T13 Coat/Clothes Hook.
   j. T23 Undersink Piping Covers.
2. Type T2 Single-User or Family Toilet Room:
   a. T1 Toilet Tissue (Roll) Dispenser.
   b. T2 Sanitary Napkin Disposal (at unisex or designated female restrooms, grades 6 to adult only).
   c. T3 Grab Bars, 18 inch, vertical.
   d. T4 Grab Bars, 36 inch.
   e. T5 Grab Bars, 42 inch.
   f. T6 Paper Towel (Roll) Dispenser.
   g. T9 Mirror.
   h. T11 Soap Dispenser.
   i. T20 Baby Changing Station.
   j. T13 Coat/Clothes Hook.
   k. T23 Undersink Piping Covers.

G. Type WF - Wash Fountains
1. T9 Mirror, one per station.
2. T11 Soap Dispenser, (2) each.
3. T23 Undersink Piping Covers, if wash fountain is not provided with skirt.

H. Break Rooms, Work Rooms, Clinics, Classrooms:
1. T6 Paper Towel (Roll) Dispenser.
   a. At each sink location
2. T11 Soap Dispenser.
   a. At each sink location

END OF SECTION

SECTION 10 4400
FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fire extinguisher cabinets.

B. Accessories.

C. Fireman's Knox Items: Box, Padlock, and FDC Plug.

1.02 RELATED REQUIREMENTS

A. Section 01 4100 - Regulatory Requirements

B. Section 06 1000 - Rough Carpentry: Wood blocking product and execution requirements.

1.03 DEFINITIONS

A. Where indicated on the Drawings, the abbreviation "F.E.C." defines a fire extinguisher and cabinet and the abbreviation "F.E." is for a fire extinguisher without a cabinet.

1.04 REFERENCE STANDARDS

A. FM (AG) - FM Approval Guide; current edition.

B. NFPA 10 - Standard for Portable Fire Extinguishers; 2022.

C. UL (DIR) - Online Certifications Directory; Current Edition.

D. International Fire Code.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide extinguisher operational features, color and finish, and anchorage details.

C. Shop Drawings: Indicate locations of cabinets, cabinet physical dimensions, rough-in measurements for recessed cabinets, locations of individual fire extinquishers, mounting measurements for wall bracket, installation procedures, and accessories required for complete installation.

D. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.

E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

F. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

G. Material and Safety Data Sheets for all mastics, glues, and adhesives and for insulating material for fire doors.

1.06 QUALITY ASSURANCE

A. Single Source Responsibility: Obtain products in this Section from one manufacturer.

B. Certifications

1. Provide extinguishers which are U.L. listed and bear the U.L. "Listing Work" for type, rating, and classification.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Section 01 6000 - Product Requirements.

B. Store extinguishers in protected location until after final cleaning is completed.

1.08 FIELD CONDITIONS

A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

1.09 WARRANTY

A. Comply with requirements of Section 01 7800 - Closeout Submittals.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Fire Extinguishers and Cabinets and Accessories:
   1. JL Industries, Inc: www.jlindustries.com.
   2. Kidde, a unit of United Technologies Corp: www.kidde.com.
   3. Larsen's Manufacturing Co: www.larsensmfg.com.
   4. Nystrom, Inc: www.nystrom.com/sle.
   5. Potter-Roemer: www.potterroemer.com.
   6. Samson Products, Inc.: www.samsonproducts.com.
   7. Strike First Corporation of America: www.strikefirstusa.com.
   8. Substitutions: See Section 01 6000 - Product Requirements.

B. Fireman’s Knox Box:
   1. Knox Company; www.knoxbox.com.
   2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 FIRE EXTINGUISHERS

A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
   1. Provide extinguishers labeled by UL (DIR) or FM (AG) for purpose specified and as indicated.
   2. UL Rating: 2A-10B:C, minimum for 5 pound.
   3. UL Rating: 4A-60B:C, minimum for 10 pound.

B. Multipurpose Dry Chemical Type Fire Extinguishers: Carbon steel tank, with pressure gauge.
   1. Product: MP10 for all typical installations.
   2. Product: MP5 at Elevator Equipment Rooms and Science Labs.
   3. Class: A:B:C type.
   4. Size: 5 and 10 pound.

C. Halotron I Type Fire Extinguishers: Stainless steel tank, with pressure gage.
   1. Product: HT5 at Computer Lab.
   2. Class: A:B:C type.
   3. Size: 5 pound.

D. Wet Chemical Type Fire Extinguishers: Stainless steel tank, with pressure gage.
   1. Product: WC-6L (6 liter capacity) at Kitchen (20 ft. away from hood).
   2. Class: K.
   3. Size: 1.6 gallons.
   4. Provide initial inspection tag for each extinguisher.

2.03 FIRE EXTINGUISHER CABINETS

A. Product - reference schedule below: Model numbers are based on Larsen's Manufacturing Co.

Wall Construction	Model	Fire Rated	Projection	Box Depth	Wall Depth
3-5/8" Metal Stud or 6" CMU	AL-2409-6R	No	2-1/2"	6"	4"

3-5/8" Metal Stud or 6" CMU	AL-FS-2409-R4	Yes	3-1/2"	6"	4"
8" CMU or wider	AL-2409-6R	No	2-1/2"	6"	4"
8" CMU or wider	AL-FS-2409-6R	Yes	2-1/2"	6"	4-7/8"
8" CMU	AL-2712-RA	No	4"	8"	4-1/2"
8" CMU	AL-FS-2712-RA	Yes	4"	8"	5-3/8"

B. Cabinet Configuration: Semi-recessed type.
   1. Projected Trim: Returned to wall surface, with 2-1/2 inch projection, and 1 inch wide face.

C. Door: 0.036 inch metal thickness, reinforced for flatness and rigidity with roller type catch. Hinge doors for 180 degree opening with continuous piano hinge. Provide solid doors at athletic and shop areas.

D. Door Glazing: Tempered glass, clear, 1/8 inch thick, and set in resilient channel glazing gasket.

E. Cabinet Mounting Hardware: Appropriate to cabinet, with pre-drilled holes for placement of anchors.

F. Weld, fill, and grind components smooth.

G. Finish of Cabinet Exterior Trim and Door: Clear satin anodized aluminum.

H. Finish of Cabinet Interior: White colored enamel.

2.04 ACCESSORIES

A. Extinguisher Brackets: Formed steel, chrome-plated.

B. If extinguisher is not located in a cabinet, provide bracket no. 860.

C. Graphic Identification: Applied decal use vertical decal spelling.

2.05 FIREMAN'S KNOX BOX

A. Provide and install emergency access lock box where shown on the drawings.
   1. Mount: Recessed (7"x7"x3.25"), provide recessed mounting kit with face flange. Mount at 6'-0" above ground level, verify with fire marshal.
   2. Lock: U.L. Listed. Double action rotating tumblers and hardened steel pins accessed by a biased cut key.
   3. Finish: Pre-treatment – Zinc Phosphate; Final Coating – weather resistant polyester powdercoat.
      a. Color: Black.
   4. Alarm: Alarm tamper switch. Connect to buildings security system.
   5. Model: "Knoxbox Series 3200".

2.06 FIREMAN'S KNOX PADLOCK

A. Provide padlock at access gates where indicated on plan.
   1. 3/8" diameter stainless steel shackle.
   2. Heavy-duty brass body with EPDM boot.
   3. Model: Knox 3753.

2.07 FIREMAN'S KNOX FDC PLUG

A. Provide FDC plugs at all locations.
   1. Plug shall be locking style with Knox key wrench.
   2. Bright stainless cover.
   3. Verify plug size and threads with Fire Department.
   4. Model: Knox Model 3011.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify rough openings for cabinet are correctly sized and located.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install cabinets plumb and level in wall openings at locations shown on the Drawings. Install compliant with applicable accessibility requirements.

C. Secure rigidly in place.

D. Place extinguishers and accessories in cabinets.

END OF SECTION

SECTION 10 5100
LOCKERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal lockers.

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Concrete base construction.

B. Section 06 1000 - Rough Carpentry: Wood blocking and nailers.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's published data on locker construction, sizes and accessories.

C. Shop Drawings: Indicate locker plan layout, numbering plan.

D. Samples: Submit two samples 12 by 12 inches in size, of each color scheduled.

E. Manufacturer's Installation Instructions: Indicate component installation assembly.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Section 01 6000 - Product Requirements.

B. Protect locker finish and adjacent surfaces from damage.

1.05 WARRANTY

A. See Section 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide one year manufacturer warranty for repair or replacment of lockers that fail in material or workmanship.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Lockers:
   1. ASI Storage Solutions, Inc.: www.asilockers.com.
   2. Debourgh Manufacturing Co.: www.debourgh.com.
   3. List Industries: www.listindustries.com.
   4. Lyon Workspace Products: www.lyonworkspace.com.
   5. Penco Products, Inc: www.pencoproducts.com.
   6. Republic Storage Systems Co: www.republicstorage.com.
   7. WEC Manufacturing: www.itswec.com
   8. Win-Holt Equipment: www.winholt.com.
   9. Substitutions: See Section 01 6000 - Product Requirements.

2.02 LOCKER APPLICATIONS

A. Size, type and quantity: Reference Drawings.
   1. Basis of Design:
      a. Typical Lockers: Republic Storage Systems, Single Point II Corridor.

2.03 METAL LOCKERS

A. All Lockers: Factory assembled, made of formed sheet steel, Cold-rolled mild steel, uncoated, stretcher leveled; metal edges finished smooth without burrs; baked enamel finished inside and out.
   1. Where ends or sides are exposed, provide flush panel closures.
   2. Provide filler strips where indicated, securely attached to lockers.

3. Colors: Refer to Section 01 6210 - Schedule of Materials and Colors.

B. Assembly:
   1. Typical Lockers: (KD) Rivet with backup washer to provide permanent shake-proof fastening.
   2. Athletic Lockers: All welded construction.

C. Typical Locker Body: Formed and flanged; with steel stiffener ribs.
   1. Body, Shelves, Tops and Trim: 24 gage, 0.0239 inch.
   2. Base: Reference drawings for base height and details

D. Frames: Formed channel shape, welded and ground flush, welded to body, resilient gaskets and latching for quiet operation.
   1. Door Frame: 16 gage, 0.0598 inch, minimum.
   2. Provide ventilation slots in top and bottom of door frame.

E. Doors: Hollow channel edge construction, 1 inch thick; welded construction, channel reinforced top and bottom with intermediate stiffener ribs, grind and finish edges smooth.
   1. Door Outer Face: 14 gage, 0.0747 inch, minimum.
   2. Form recess for operating handle and locking device.
   3. Ventilation Method for Typical Lockers: Provide ventilation slots in top and bottom of door.
   4. Ventilation Method for Athletic Lockers: Doors for tiered lockers shall have diamond shaped perforations 3/4" wide by 1 1/2" high to provide free air flow while leaving sufficient metal for rigidity and strength. Doors for box lockers 3, 4, 5 and 6 openings high are perforated for free airflow using small diamond perforations 7/16" wide by 15/16" high.

F. Hinges: Two for doors under 42 inches high; three for doors over 42 inches high; 2" high, 5-knuckle, full loop, tight pin style, weld securely to locker body and double riveted to the inside of the door.
   1. Hinge Thickness: 14 gage, 0.0747 inch.

G. Coat Hooks: Stainless steel or zinc-plated steel.
   1. Two single prong wall hooks and one double prong back hook for all single, double, and triple tier lockers. For lockers over 42" high, provide one hat shelf. Lockers under 20" high are not equipped with hooks.

H. Number Plates: Provide rectangular shaped aluminum plates. Form numbers 1/2 inch high of block font style, in contrasting color.

I. Latching: Latching shall be achieved by securing a frame hook to the locker side frame located midway up on the door.
   1. Locking device shall be built-in lock. The padlock hasp shall be eliminated and the recessed pocket shall contain only the necessary punching to mount the lock. The frame hook shall have an interlocking finger oriented 90 degrees to the door edge to serve as a catch when padlocks are used and to resist prying when built-in locks are used. Equip each locker with a Master Lock model #1690 built-in lock. Locking device shall be pre-locking so mechanism can be locked in open position, door locking automatically when closed.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that prepared bases are in correct position and configuration.

B. Verify bases and embedded anchors are properly sized.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install lockers plumb and square.

C. Place and secure on prepared base.
D. Secure lockers with anchor devices to suit substrate materials. Minimum Pullout Force: 100 lb.
E. Bolt adjoining locker units together to provide rigid installation.
F. Install end panels, filler panels, and sloped tops.
G. Install accessories.
H. Conceal fasteners on all face frames.
I. Replace components that do not operate smoothly.

3.03 CLEANING

A. Clean locker interiors and exterior surfaces.

END OF SECTION

SECTION 10 5613
METAL STORAGE SHELVING

PART 1 – GENERAL

1.01 DESCRIPTION

A. Work included: Provide metal storage shelving where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these specifications.

1.02 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.03 SUBMITTALS

A. Comply with pertinent provisions of Section 01 3000 - Administrative Requirements.

B. Product Data: Within 15 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
   1. Materials list of items proposed to be provided under this Section;
   2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements;
   3. Shop Drawings in sufficient detail to show fabrication, installation, anchorage, and interface of the work of this Section with the work of adjacent trades.
   4. Samples of the proposed products, showing profiles joining, finish, and manufacturers full range of color.
   5. Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

1.04 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01 6000 - Product Requirements.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements, manufacturer offering products that may be able to be included in the work include, but are not limited to the following:
   1. Penco Products, Inc., 800-562-1000 www.pencoproducts.com.
   2. Uline, 800-295-5510 www.uline.com.
   3. Lyon, 630-892-8941 www.lyonworkspace.com.
   4. Dixie Shelving, 713-957-111 www.dixieshelving.com.
   5. Global Industrial, 888-978-7759 www.globalindustrial.com.

2.02 MATERIALS

A. Cold Rolled Steel Sheet: ASTM A336/A 366M, matte finish, suitable for exposed applications, and stretcher leveled or roller leveled to stretcher level flatness.

B. Galvanized Steel Sheet: ASTM A 653/A 653M, commercial quality, G60 (Z180) coating designation; mill phosphatized; suitable for exposed applications, and stretcher leveled or roller leveled to stretcher level flatness.

2.03 COMPONENTS - BOLTLESS SHELVING

A. Boltless Shelving consists of simple components that lock rigidly together to form exceptionally strong shelving units. Equal to single rivet high density units as manufactured by Penco.

B. Choose from a wide selection of component sizes and capacities to fit the storage requirements.

C. ANGLE POST - 1-7/8" x 1-7/8": When maximum capacity and stability are essential, the heavy duty angle post is the proper choice. Ideally suited for two level shelving, storage deck and high rise shelving applications.

D. TEE POST - 3-3/4" x 1-7/8" (Heavy Duty): Used in the same way as the standard tee, when increased load capacities are required.

E. SINGLE RIVET SHELF BEAM (Heavy Duty): Manufactured to provide maximum capacity with very little loss of usable vertical space between shelves.

F. DOUBLE RIVET ANGLE BEAM (Heavy Duty): Provides stability and increased load capacity in the longer lengths.

G. DOUBLE RIVET CHANNEL BEAM: Designed to provide maximum left to right stability and higher capacity heavy duty beams.

H. CENTER SUPPORT: Used with double rivet beams to provide front-to-rear support for shelf deck and provides added stability to beams.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Install shelving level, plumb, rigid, and flush according to the manufacturer's written instructions.

B. Connect groups of shelves together with standard fasteners

C. Anchor shelves and walls at intervals recommended by the manufacturer, but not more than 36 inches o.c.

D. Provide wood blocking for installation of metal shelving.

E. Touch up marred finish, or replace units that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by the locker manufacturer.

END OF SECTION

SECTION 10 7300
PROTECTIVE COVERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pre-engineered, free-standing, pre-finished extruded aluminum walkway covers.

B. Pre-engineered, pre-finished extruded aluminum wall mounted hanging canopies.

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete

1.03 REFERENCE STANDARDS

A. AA ADM – Aluminum Design Manual; As Referenced in the International Building Code.

B. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2012.

C. AAMA 612 - Voluntary Specification, Performance Requirements and Test Procedures for Combined Coatings of Anodic Oxide and Transparent Organic Coatings on Architectural Aluminum; 2002.

D. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performance Organic Coatings on Aluminum Extrusions and Panels - American Architectural Manufacturers Association; 2011

E. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 6000 Tensile Strength; 2010.

F. ASTM A792/A792M - Steel Sheet, 55% Aluminum-Zinc Alloy Coated by Hot Dip Process; 2010.

G. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2010.

H. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2012.

I. ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws and Studs; 2002 (Reapproved 2008).

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Prior to commencement of fabrication, submit detailed shop drawings, showing all profiles, sections of all components, finishes, fastening details, and manufacturer's technical and descriptive data. Include field dimensions of openings and elevations on shop drawings.

C. Design Data: Submit comprehensive structural analysis of design for the specified loads. Stamp and sign calculations by profession engineer.

D. Shop drawing sheets that include engineering information designed by the Contractor’s Delegated Design Engineer shall be signed and sealed in accordance with the Texas Engineering Practice Act. Sheets that do not provide information designed by the Contractor’s Engineer do not require being signed and sealed. Calculation packages require a signed and sealed cover sheet only. Any submittals requiring to be signed and sealed that are received without the signature and seal will be rejected without review.

E. Samples: 12 inches by 12 inches minimum illustrating design, workmanship and finish color.

F. Designer Qualification Statement.

G. Specimen Warranty: Furnish a copy of manufacturer's standard warranty.

H. Installer Qualification Statement.

1.05 QUALITY ASSURANCE

A. Designer Qualifications: Perform design under direct supervision of a Professional Engineer experienced in design of this type of work licensed in Texas.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with no less than five years of documented experience.

C. Installer Qualifications: Company specializing in performing the work of this section, and;
   1. With minimum five years of documented experience.
   2. Approved by manufacturer.

D. Coordination: Coordinate work of this section with work of other sections which interface with covered walkway or canopy system (sidewalks, curbs, building fascias, etc.).

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to project site ready for erection.

B. Package using methods that prevent damage during shipping and storage on site.

C. Store materials under cover and elevated above grade.

1.07 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Correct defective work within a one-year period after date of Substantial Completion.

C. Finish Warranty: Provide manufacturer's ten year warranty on factory finish against cracking, peeling, and blistering and two years for anodized finishes.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Protective Covers:
   1. AVAdek: www.avadek.com.
   2. Architectural Fabrication, Inc.: www.arch-fab.com.
   3. Aluminum Techniques Inc.: www.aluminumtechniques.com.
   4. Canopy Solutions, LLC: www.canopy-solutions.com.
   5. DITT-Deck, Dittmer: www.dittdeck.com.
   6. Peachtree Protective Covers: www.peachtreecovers.com.
   7. East Texas Canopy, Inc: www.easttexascanopy.com.
   8. Substitutions: See Section 01 6000 - Product Requirements.

2.02 WALKWAY COVERS

A. Extruded Aluminum Walkway Cover shall consist entirely of extruded aluminum sections(roll-formed not acceptable). System shall consist of heli-arc welded, one-piece rigid structural bents (column and beam assemblies), decking, fascia, accessory items and hardware to provide a complete system.
   1. Configuration: As indicated on drawings.
   2. Sizes: As indicated on drawings.
   3. Design Criteria: Design and fabricate to resist loads without failure, damage, or permanent deflection as dictated by the applicable building code. Structure shall be capable of sustaining and supporting a concentrated load such as being walked upon.
      a. For welded material, the tensile ultimate strength, “Ftuw”, and tensile yield strength, “Ftyw”, shall be used to determine available strength within weld-affected zone.
      b. Design, fabrication, and erection of aluminum load-carrying structures, members, and connections shall be in accordance with AA ADM - Aluminum Design Manual; As Referenced in the International Building Code.
   4. Finish: Natural anodized, Class I AAMA 611 AA-M12C22A41 or AAMA 612 with electrolytically deposited organic seal; not less than 0.7 mils thick.

5. Provide a complete system ready for erection at project site.
6. Shop-fabricate to the greatest extent possible; disassemble if necessary for shipping.
7. The Contractor's Walkway Cover Engineer shall not bear on the existing building unless the Walkway Cover Engineer or another Structural Engineer hired by the Contractor evaluates the capacity of the existing structure to withstand loads that would be imposed by the walkway cover and either verifies that there is sufficient capacity or modifies the existing structure in a way that is approved by the Architect. If the covering is connected to the existing building, the Walkway Cover Engineer shall design the connection. For proposal purposes, the Contractor shall assume that it is not acceptable to bear on or attach to the existing building other than with flashing. The Contractor shall be permitted to submit alternative layouts of columns for consideration by the Architect if the alternative layout does not increase the cost of construction or the schedule.
8. All drainage for walkway covers that tie-in into the underground storm sewer shall have threaded connections.

B. Concrete Foundations
1. Where he foundations have been designed and detailed in the Structural Drawings, the Contractor's Walkway Cover Engineer shall design the attachment of the walkway cover to these foundations. The reactions shall not exceed the allowable values provided in the Structural Drawings. If no values are provided in the Drawings, the Contractor shall submit a request for information requesting this information from the Structural Engineer prior to the design and detailng of the Walkway Covers.
2. Where foundation design and detailing is not included in the Architectural or Structural Drawings, the foundation shall be designed by the Contractor's Walkway Cover Engineer in accordance with the following:
   a. All foundations designed by the Walkway Cover Engineer shall be required to comply with the recommendations of the Geotechnical Engineer in the soil reports provided as part of this project manual.
   b. If the Geotechnical Engineering report provided is not applicable to this project, the Contractor's Walkway Cover Engineer shall design the foundation to be consistent with the minimum requirements of the locally adopted version of the International Building Code. If the minimum requirements of the locally adopted version of the International Building Code require that a soil investigation be performed, the Contractor shall hire the Owner's Geotechnical Engineer at no additional cost to the Owner (including the cost for this work in the Contractor's proposal for the main contract to do this project) and it shall not be permitted to increase the construction schedule beyond the agreed upon schedule to perform the project which is to include the time it takes to have the soil report performed if necessary.
3. The Contractor shall have foundations designed and installed to accommodate existing conditions such as nearby existing foundations (which shall not be undermined) and overhead obstructions (which may require low-overhead pier drilling equipment).
4. Refer to Section 03 3000 - Cast-In-Place Concrete.
5. Sleeves (styrofoam blockout) shall be furnished by the walkway cover manufacturer and placed by the general contractor.

2.03 CANOPY SYSTEMS

A. The Contractor's Canopy Engineer shall design the attachment of the canopies to the Structure. Where allowable reactions are provided on the Structural Drawings, the Contractor's Canopy Engineer shall design their attachments to not exceed these allowable reactions. Where no allowable reaction is provided, the Contractor's Canopy Engineer shall evaluate the Structure provided and limit reactions so as to not exceed its structural capacity or modify the existing structure in a way that is approved by the Architect. The Contractor shall be permitted to submit alternative configurations for consideration by the Architect if the alternative configurations do not increase the cost of construction or the schedule.

B. Canopy: Shop fabricated, shop finished, extruded aluminum decking, (roll-formed not acceptable), outriggers, fascia and hanging rod assemblies free of defects impairing strength, durability or appearance.
   1. Configuration: As indicated on drawings.
   2. Sizes: As indicated on drawings.
   3. Design Criteria: Design and fabricate to resist loads without failure, damage, or permanent deflection as dictated by the applicable building code. Structure shall be capable of sustaining and supporting a concentrated load such as being walked upon.
      a. For welded material, the tensile ultimate strength, “Ftuw”, and tensile yield strength, “Ftyw”, shall be used to determine available strength within weld-affected zone.
      b. Design, fabrication, and erection of aluminum load-carrying structures, members, and connections shall be in accordance with AA ADM - Aluminum Design Manual; As Referenced in the International Building Code.
   4. Finish: Natural anodized, Class I AAMA 611 AA-M12C22A41 or AAMA 612 with electrolytically deposited organic seal; not less than 0.7 mils thick.
   5. Provide a complete system ready for erection at project site.
   6. Shop-fabricate to the greatest extent possible; disassemble if necessary for shipping.

2.04 MATERIALS

A. Aluminum Extrusions: ASTM B209 or B 221.

B. Aluminum Coated Steel Sheet: ASTM A792/A792M.

C. Concealed Structural Supports: Aluminum, or steel coated for corrosion resistance and dissimilar metal isolation.

D. Fasteners: ASTM F593 stainless steel or ASTM A 307 carbon steel.
   1. Deck Screws (rivets not permitted): Type 18-8 non-magnetic stainless steel sealed with a neoprene "O" ring beneath 5/8" outside dimension, conical washer.
   2. Fascia Rivets: Size 3/16" by 1/2" grip range aluminum rivets with aluminum mandrel.
   3. Bolts: All bolts, nuts and washers to be 18-8 non-magnetic stainless steel.
   4. Tek Screws: not permitted

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates and site area for conditions that might prevent satisfactory installation.

B. Verify that dimensions of supporting structure are within plus/minus 1/8 inch of dimensions shown on shop drawings.

C. Verify that all adjacent painting, roofing, masonry work, and other work that might damage finish has been completed prior to installation of sun screens.

D. Do not install until after all adjacent painting, roofing and masonry have been completed.

E. Do not proceed with installation until all conditions are satisfactory.

3.02 INSTALLATION

A. Install in accordance with manufacturer's installation instructions.

B. Set units level, plumb, with uniform joints, and aligned with building elements.

C. Separate dissimilar metals using concealed bituminous paint or non-absorbent gasket.

D. Anchor units to structure as indicated on the drawings.

E. Do not cut or trim aluminum members without approval of manufacturer; do not install damaged members.

F. Touch-up damaged finish coating using material provided by manufacturer to match original coating.

3.03 TOLERANCES

A. Maximum Variation from Level/Plumb: Plus/Minus 1/8 inch.

3.04 CLEANING

A. Clean exterior surfaces units of dust and debris; follow manufacturer's cleaning instructions for the finish used.

3.05 PROTECTION

A. Protect units after installation to prevent damage due to other work until the Date of Substantial Completion.

END OF SECTION

SECTION 10 7500
FLAGPOLES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aluminum Flagpoles.

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Concrete base and foundation construction.

B. Section 09 9000 - Painting and Coating: Site painting.

1.03 REFERENCE STANDARDS

A. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

B. ASTM B241/B241M - Standard Specification for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube; 2016.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on pole, accessories, and configurations.

C. Shop Drawings: Indicate detailed dimensions, base details, anchor requirements, and imposed loads.

D. Maintenance Data: Provide lubrication and periodic maintenance requirement schedules.

1.05 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. External Halyard System: Provide manufacturers standard halyard system, including:
   1. Provide flash collar of spun aluminum.
   2. Provide finial ball 6" in diameter of 14 gauge, spun aluminum on each flagpole.
   3. Provide truck assembly on each flagpole consisting of cast aluminum assembly with ball bearing non-fouling, revolving double truck.
   4. Provide cast aluminum cleats, 9" long, two per flagpole, with aluminum fastenings.
   5. Provide two continuous 3/8" diameter braided nylon halyards per flagpole, each with two bronze snaps with neoprene or vinyl covers.
   6. At each cleat, provide a cast aluminum cover with hasp for padlock, staple, and tamper-proof screws.
   7. Finish exposed surfaces to match the flagpoles.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Spiral wrap flagpole with protective covering and pack in protective shipping tubes or containers.

B. Protect flagpole and accessories from damage or moisture.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Flagpoles:
   1. Acme Flagpoles Company, Division of Lingo, Inc.: www.acmelingo.com.
   2. American Flagpole: www.americanflagpole.com.
   3. Babcock-Davis Associates, Inc.: www.babcock-davis.com.

4. Concord Industries, Inc: www.concordindustries.com.
5. Morgan-Frances Flagpoles: www.morgan-frances.com
6. Pole-Tech Co., Inc: www.poletech.com.
7. Substitutions: See Section 01 6000 - Product Requirements.

2.02 FLAGPOLES

A. Flagpoles:
1. Material: Aluminum. Heat treated and age hardened seamless extruded aluminum tubing, alloy 6063-t6.
2. Design: Uniform conical taper of 1 inch in every 5.5 foot of run throughout tapered portion..
3. Mounting: Ground mounted type.
4. Outside Butt Diameter: 6 inches.
5. Outside Tip Diameter: 3.5 inches.
6. Nominal Wall Thickness: 3/16 inches, tensile strength not less than 35,000 psi, and yield point of 30,000 psi. inches.
7. Nominal Height: 30 ft; measured from top of base. Where more than one pole is located in a group, all poles shall be 30 ft. high, (1) section.
8. Halyard: External type.
9. Finish (pole and accessories): Dark Bronze Anodized.

B. Performance Requirements:
1. Structural Performance: Provide flagpoles capable of withstanding the effects of wind loads as determined according to NAAMM FP 1001, Guide Specifications for Design of Metal Flagpoles.
2. Base flagpole design on maximum standard size nylon flag suitable for use with pole or flag size indicated, whichever is more stringent.

2.03 POLE MATERIALS

A. Aluminum: ASTM B221 (ASTM B 221M) , 6063 alloy , T6 temper.

2.04 ACCESSORIES

A. Finial Ball: Aluminum, 6 inch diameter. 14 gaugespun aluminum finish to match pole.

B. Truck Assembly: Cast aluminum; revolving, stainless steel ball bearings, non-fouling.

C. Cleats: 9 inch size, aluminum with stainless steel fastenings, two per halyard.

D. Cleat Box: Aluminum, with built-in hinge and hasp assembly, attached to pole with tamper proof screws inside box.

E. Halyard: 3/8 inch diameter nylon braided with steel or bronze core.

F. Connecting Sleeve For Multiple Section Poles: Same material as pole, precision fit for field assembly of pole, concealed fasteners.

G. Flash Collar: Standard spun aluminum, satin brushed finish.

H. Halyard Flag Snaps: Provide (4) stainless steel swivel snaps per halyard.

2.05 MOUNTING COMPONENTS

A. Foundation Tube Sleeve: AASHTO M 36, corrugated 16 gage, 0.0598 inch steel, galvanized, depth of 36 inches.

B. Lighting Ground Rod: 24 inch long copper rod, 3/4 inch diameter, welded to bottom of support plate.

C. Lightning Ground Cable: Copper No. 6 AWG, soft drawn.

2.06 FINISHING

A. Metal Surfaces in Contact With Concrete: Asphaltic paint.

B. Aluminum: Anodized to AA-C22-A42; Class 1, clear color

C. Finial: Very fine, non-directional, satin brushed, mechanical polished aluminum finish.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that concrete foundation is ready to receive work and dimensions are as indicated on shop drawings.

3.02 PREPARATION

A. Coat metal sleeve surfaces below grade and surfaces in contact with dissimilar materials with asphaltic paint.

3.03 INSTALLATION

A. Install flagpole, base assembly, and fittings in accordance with manufacturer's instructions.

B. Fill foundation tube sleeve with concrete specified in Section 03 3000.

C. Install foundation plate and centering wedges for flagpoles base set in concrete base and fasten.

3.04 TOLERANCES

A. Maximum Variation From Plumb: 1 inch.

3.05 ADJUSTING

A. Adjust operating devices so that halyard function smoothly.

B. Install the flagpoles in strict accordance with the manufacturer's recommendations as approved by the Architect, aligning plumb to a vertical tolerance of one in 1,000 and adjusting operating components for optimum smoothness of operation.

END OF SECTION

SECTION 11 1126
VEHICLE WASHING EQUIPMENT

PART 1 - GENERAL

1.01 DESCRIPTION

A. CONDITIONS OF THE CONTRACT, SECTIONS AA THROUGH CB AND DIVISION 1 APPLY TO THIS SECTION.

B. Refer to the CM@R Proposal Instructions issued under separate cover.

C. Scope of Work:
   1. Provide fully functioning industrial grade vehicle washing equipment as indicated on the Drawings and specified.
   2. Systems shall be complete and integrated, including all equipment, components and accessories required for a complete, operational system.

D. Related Work:
   1. Section 03 30 00 – Cast-In-Place Concrete
   2. Division 22 – Plumbing
   3. Division 26 – Electrical
   4. Division 31 – Site Utilities

1.02 SUBMITTALS

A. Review and comply with all provisions of section 01 33 00 – Submittal Procedures.

B. Product Data: Submit manufacturer's literature, product data, certifications and supporting information for all products proposed to be furnished, as necessary to demonstrate compliance with the specified requirements.

C. Shop Drawings: Submit complete shop drawings consisting of design, fabrication and erection / installation of proposed assemblies.
   1. Show profiles, sizes, spacing and locations of assembled components. 02 Show details of field fabrications, connections and details.
   2. Include water flow diagrams, including description of interface with plumbing work to be provided by others and lines of demark between scopes of work.
   3. Included electrical wiring diagrams, including description of interface with electrical work to be provided by others and lines of demark between scopes of work.

D. Installation Instructions: Submit manufacturer's complete installation instructions, including fastening, for all products and / or assemblies proposed to be furnished.
   1. Installation details submitted for review shall be specific to the work of this contract and accurately depict interface within the assembly(s) indicated on the Drawings.
   2. Generic details that do not depict actual conditions shall not be acceptable.

E. Maintenance Instructions: Submit manufacturer's complete maintenance instructions and recommendations for all products and / or assemblies proposed to be furnished.
   1. Include recommended cleaning products and instructions for use.
   2. Where applicable, provide recommended maintenance schedules and procedures.

F. Operations and Maintenance Manuals
   1. Provide complete operations and maintenance manuals to the Owner.
   2. Refer to section 01 78 23 – Operation and Maintenance Manuals
   3. O & M manuals must be reviewed, accepted and delivered to the Owner prior to Owner demonstration(s).

G. Provide a list of installations of similar systems within the last five (5) years. For each installation, provide the following information for each installation:
   1. Location name and address

2. Contact information of person familiar with the operations and maintenance of the wash system.
3. Record of warranty and / or service repair calls made after installation.

H. For warranties longer than one (1) year, submit a sample of the warranty proposed to be furnished.

1.03 REFERENCES

A. International Organization for Standardization (ISO)
1. ISO 9001 – Quality Management Systems
2. ISO 14001 – Environmental Management Systems

1.04 PROVIDER QUALIFICATIONS

A. The brush unit, pumping stations and all electrical controls shall be designed, assembled and supplied by one manufacturer.

B. The system shall be produced by a manufacturer of established reputation with a minimum of twenty (20) years' experience supplying the specific equipment detailed herein.

C. Vehicle washing equipment provider must have completed a minimum of ten (10) installations of similar rollover vehicle wash systems within the last five (5) years.

D. Vehicle washing equipment provider must have factory authorized local services and technical support teams located within 60 miles of installed location.

1.05 WARRANTY

A. In addition to the one (1) year warranty, the manufacturer shall provide an extended ten (10) year warranty against defects and / or failures on all steel framework, including galvanizing, welds and overall integrity

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Design of vehicle washing equipment specifications and drawings are based on an Istobal Heavy Wash Progress, 3 Brush w/High Pressure System with overlapping side brushes manufactured by Istobal USA Corp.

B. Acceptable Manufacturers: Manufacturers are acceptable to provide vehicle washing equipment of this section, provide all proposed products meet or exceed the specified requirements. It is the responsibility of the manufacturer to determine proposed equipment, including custom modifications to standard equipment, if necessary, meets all requirements.

2.02 PRODUCTS - GENERAL DESCRIPTION

A. Design of vehicle washing equipment is based on Istobal Progress Model 3.9000 heavy duty, three-brush, rollover wash system with combination high pressure.

B. General:
1. System shall be capable of washing a high volume or various sizes and styles of vehicles, ranging from passenger cars to school buses.
2. The machine shall control the wash process to provide a consistent wash result without relying on the judgment of individual drivers.
3. The unit is to be manufactured according to quality assurance standard of ISO 9001 and environmental standards of ISO 14001.
4. This system is capable of washing the front and rear of vehicles several times on a single wash pass and includes 15 programmable modes.
5. The machine fully controls the degree of brush pressure on the vehicle, and it automatically self-adjusts via amp sensing motors.
6. The wash functions of this system shall be operated automatically.

7. The system shall be delivered complete with all control systems, metering devices, drive motors, and brush assemblies

C. Vehicle Wash Operation:
1. Vehicles entering the wash area will stop just before entering the rollover gantry.
2. The driver is signaled to stop by a red traffic light (included).
3. The driver selects the wash program on the main control box and starts the machine.
4. The brushes move into the front of the vehicle. The front area is cleaned by overlapping side brushes or the roof brush, or the high-pressure oscillating bar.
5. Once the front cleaning function is complete, the brushes will withdraw and move automatically around the mirrors.
6. The machine now washes the sides and the roof of the vehicle with brushes or high pressure.
7. The side brushes shall then move into the back of the vehicle, cleaning with overlapping side brushes or the roof brush, or both depending on selection wash program.
8. Alternate program choices are available to accommodate different styles of vehicles within the fleet.
9. Once the rear has been cleaned, the machine rinses the vehicle and then returns to home position. The driver is signaled to exit the wash by a green traffic light (included).

2.03 FEATURES, PERFORMANCE AND CONSTRUCTION

A. Brush Machine Housing:
1. All frame and steel components shall be hot dipped galvanized. The frame structure of the gantry is to be enclosed with galvanized metal and splash guards (optional).
2. Each side of the gantry shall have a cabinet door, gaining access to machine components and controls.
3. All gearboxes and motors are to be encased inside the machine of the highest quality of protection against water.
4. Floor rails shall be hot dipped galvanized and equipped with derailing system.
5. The gantry shall be direct driven via VFD-motors, (Variable Frequency Driven).
6. E Chain drive required.
7. All frame structures shall be hot dip galvanized. Aluminum or Stainless Steel is unacceptable.

B. Brushes:
1. The system shall be equipped with 2 vertical side brushes and 1 horizontal roof brush.
2. The side brushes (1 & 2) shall be suspended and full length, capable of washing the vehicle’s front if desired, as well as the rear of the vehicle multiple times with an overlapping movement.
   a. This set of brushes will also wash the vehicle’s sides and shall be equipped with amp sensing motors.
   b. This function shall be capable of multiple programs to accommodate various styles of vehicles that exist in the fleet presently, and any future styles that may be procured during the lifetime of the wash system.
   c. Pneumatics are not acceptable to control the brushes.
3. Brush pressure is to be electrically driven, with the inclusion of the amperage meter for all brushes (1, 2 & 3), which is to constantly monitor pressure on the vehicle’s surface.
4. The movement of the overlapping side brushes is electrically controlled with motors and worm gearboxes, belt driven.
   a. Pneumatics or hydraulics are not acceptable.
   b. The movement of the roof brush is electrically controlled with motors or worm gearboxes driven by belts.
5. Should pressure become too high due to malfunction or driver error, the system shall automatically shut down to prevent damage.

a. The cause of the shutdown shall be indicated on an LCD Touch Screen within the control panel.
b. Reactivation of the system shall be achieved by resetting the alarm/breaker switch.

6. Brush pressure is to be self-monitoring and self-adjusting to pre-programmed levels prior to the commencement of each wash.
7. The Progress comes standard with LINK feel soft poly brushes with temped ends.
8. Brushes shall have a provision of water and detergent delivery.
9. The mixture of detergent to the brushes shall be controlled by the Evo System allowing for adaptation to wash conditions.
10. Piping shall be galvanized with brass spray tips.
11. Brushes are to be driven by High-Efficiency, energy efficient and durable 3 HP, 3 phase, 60Hz, TEFC electric motors.

C. Supply Cables and Cable Supports:
   a. Energy Chain, VFD driven is required.
   b. All steel details shall be hot dipped galvanized including the brackets for fastening to the wall and / or floor.

D. EVO Chemical System is required.

PART 3 - EXECUTION

3.01 COORDINATION

A. Prior to the installation of any vehicle washing equipment work and interfacing work by other trades, coordinate with other trades as required for proper installation of interfacing work by other trades.
   1. Concrete substrate at wash bay / tunnel. 02 Underground tanks and connections.
   2. Plumbing rough-in and connections.
   3. Electrical rough-in, connections and outlet types / configurations.

B. Coordinate with the Contractor to receive and review submittals of interfacing work of other trades.
   1. 01 Provide review comments to the Contractor prior to the submittal being submitted to the A/E team for review.

3.02 PREPARATION

A. Prior to the installation of any vehicle washing equipment work, thoroughly examine all interfacing work provided by other trades.

B. Notify Contractor of any discrepancies or defects to be corrected to facilitate proper interface with the installation of any vehicle washing equipment work.
   1. Do not proceed until all discrepancies and / or defects have been satisfactorily corrected.

C. Start of the installation of any vehicle washing equipment work shall signify all interfacing work is properly installed.

3.03 INSTALLATION

A. Install vehicle washing equipment system in strict accordance with manufacturer's printed instructions and recommendations.

B. System Startup and Commissioning: Arrange for a local manufacturer's representative to inspect vehicle washing equipment system prior to startup and operation.

C. Adjust for proper and smooth operation.

D. Cycle all equipment through a minimum of five (5) cycles to verify proper operation.

3.04 TRAINING

A. Per spec section 01 78 23 – Operation and Maintenance Manuals, all final, reviewed, accepted O&M manuals must be in possession of the Owner prior to training.

B. Upon completion of installation and testing, coordinate with Owner to provide complete training on the operation and maintenance of the vehicle washing equipment.
   1. Allow up to five (5) hours for demonstration and training session.
   2. Training shall be conducted by a factory / manufacturer representative.

END OF SECTION

SECTION 11 1319.13
LOADING DOCK LEVELERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Prefabricated steel dock leveler with guard rails.

B. Manual operating hardware.

C. Mechanical vehicle restraint safety lock.

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Concrete pit.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide materials and finish, installation details, roughing-in measurements, and operation of unit and safety lock device.

C. Shop Drawings: Indicate required opening dimensions and tolerances, placement dimensions of safety lock device, and perimeter conditions of construction.

D. Manufacturer's Installation Instructions: Indicate special requirements.

E. Operation Data: Provide operating instructions, and identify unit limitations.

F. Maintenance Data: Provide unit maintenance information, lubrication cycles, and provide spare parts manual.

1.04 QUALITY ASSURANCE

1.05 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Manufacturer agrees to correct defective work within two year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Loading Dock Levelers:
   1. Blue Giant Equipment Corporation: www.bluegiant.com.
   2. Bluff Manufacturing, Inc: www.bluffmanufacturing.com.
   3. Kelly Company: www.kelleycompany.com.
   4. Rite-Hite Corp: www.ritehite.com.
   5. Pentalift Equipment Corp.: www.pentalift.com.
   6. Substitutions: See Section 01 6000 - Product Requirements.

2.02 COMPONENTS

A. Loading Dock Leveler:
   1. Basis of Design: EDML72 Mechanical Edge of Dock Leveler as manufactured by Pentalift Equipment Corporation.
   2. Operation: Spring torsion.
   3. Deck Width: 27.5 inch.
   4. Deck Length: 72 inch.
   5. Operating Range: 5 inches above dock level, 5 inches below dock level.
   6. Capacity: 20,000 lbs.

B. Deck: 1/4 inch steel checker plate deck, reinforced on underside, welded to fabricated steel frame; counter balanced with 16 inches long automatically operated plate lip; lip to lock in downward vertical position when leveler is at rest at dock level.

2.03 FINISHES

A. Leveler Platform: Galvanized.

B. Leveler Frame: Galvanized.

C. Provide galvanized finish at minimum of 1.25 oz/sq ft.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that rough-in openings are acceptable.

3.02 INSTALLATION

A. Install dock leveler and mechanical safety vehicle lock unit in accordance with manufacturer's instructions.

B. Set square and level.

C. Anchor unit securely, flush with dock. Weld back of leveling dock to steel frame. Touch-up weld with primer.

D. Anchor safety lock securely and flush with vertical dock face.

3.03 ADJUSTING

A. Adjust installed unit and safety device for smooth and balanced operation.

END OF SECTION

SECTION 11 2336
COMMERCIAL APPLIANCES

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Commercial Washer-Extractors

B. Commercial Drying Tumblers

C. Commercial Ice Machines

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete

B. Division 22 - Plumbing

C. Division 23 - Heating, Ventilating and Air-Conditioning

D. Division 26 - Electrical

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product data: Within 30 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
   1. Materials list of items proposed to be provided under this Section;
   2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements;
   3. Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

1.04 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. The contractor shall furnish a written guarantee warranting all materials, devices, equipment and workmanship to be free of defects for a period of one (1) year from the date of completion and acceptance. Any defects in materials, devices, equipment and workmanship which become apparent within the guarantee period shall be repaired and replaced by the contractor at his own expense and at no additional cost to the Owner.

C. After the above one (1) year period of guarantee, the equipment shall be guaranteed for five (5) years in accordance with standard warranties as offered by the manufacturer.

D. Provide extended seven (7) year warrnaty for ice machine evaporator with water filtration system.

PART 2 – PRODUCTS

2.01 EQUIPMENT MANUFACTURERS

A. Dexter Laundry: www.dexter.com.

B. Alliance Laundry Systems; (Speed Queen, UniMac and Huebsh Commercial Laundry Equipment); www.comlaundry.com.

C. Ice-O-Matic (Commercial Ice Machines): www.iceomatic.com

D. Manitowoc Foodservice (Commercial Ice Machines): www.manitowocice.com

E. Dandux Industrial: www.crdaniels.com.

F. Substitutions: See Section 01 6000 - Product Requirements.

2.02 WASHER-EXTRACTORS/DRYING TUMBLERS AND EQUIPMENT - COMMERCIAL

A. Provide the following products:
   1. Washer-Extractor with the following attributes:
      a. Basis of Design: Speed Queen, SC60
      b. Capacity: 60 lb.
      c. Speed: 6-speed unit
      d. Volume: 9.0 cu. ft.
      e. Mounting: Provide elevated base frame.
      f. Acceptable Model and Manufacturer: Model T-900 by Dexter Laundry.
   2. Drying-Tumblers with the following attributes:
      a. Model: Speed Queen, ST075
      b. Capacity: 75 lb.
      c. Gas:
         1) Energy: 165,000 BTU/HR
         2) Electrical Requirements: 120/60/1
      d. Acceptable Model and Manufacturer: Model T-80 by Dexter Laundry.
   3. Laundry Trucks with the following attributes:
      a. Basis of Design: Model 40-720 Extra Duty Truck and Basket by Dandux Industrial.
      b. Submitals: See Section 01 6000 - Product Requirements.
      c. Product Requirements:
         1) Capacity: Minimum 20 lbs; 48" L x 32" W x 32" basket (37" overall).
         2) Welded construction with reinforced canvas basket.
         3) All Swivel Caster Pattern.
         4) Provide four (4) even if not shown on the drawings.

2.03 COMMERCIAL ICE MACHINES

A. Provide the following products:
   1. Ice Machine with Storage Bin (Cubed Ice):
      a. Model: Hoshizaki KM-230B_J
      b. 24 Hour Yield: 230 lbs.
      c. Condenser: Air
      d. Cube Size/Type: Full/Cube
      e. Storage Capacity: 80 lbs.
      f. Provide water filtration system including extended warranty.
      g. Electrical Requirements: 115V/60/1
   2. Ice Machine with Storage Bin (Cubelet Ice):
      a. Model: Hoshizaki F-450MAJ-C
      b. 24 Hour Yield: 412 lbs.
      c. Condenser: Air
      d. Cube Size/Type: Cubelet Ice
      e. Bin: B-300
      f. Provide water filtration system including extended warranty.
      g. Electrical Requirements: 115V/60/1

PART 3 – EXECUTION

3.01 INSTALLATION

A. This contractor shall do all fitting, fastening, connecting, leveling and placing of all Equipment as required to complete each item in its permanent position.

3.02 CLOSEOUT ACTIVITIES

A. See Section 01 7800 - Closeout Submittals, for closeout submittals.

B. Demonstrate proper operation of equipment to Owner's designated representative.

3.03 SYSTEM STARTUP

A. Provide manufacturer's field representative to perform systems startup.

B. Prepare and start equipment and systems in accordance with manufacturers' instructions and recommendations.

C. Adjust for proper operation within manufacturer's published tolerances.

END OF SECTION

SECTION 11 3013
RESIDENTIAL APPLIANCES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Kitchen appliances.

1.02 REFERENCE STANDARDS

A. UL (DIR) - Online Certifications Directory; Current Edition.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data indicating dimensions, capacity, and operating features of each piece of residential equipment specified.

C. Copies of Warranties: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Electric Appliances: Listed and labeled by UL (DIR) and complying with NEMA Standards (National Electrical Manufacturers Association).

C. Gas Appliances: Bearing design certification seal of American Gas Association (AGA).

1.05 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Submit a written warranty, executed by the Manufacturer, agreeing to repair or replace equipment that fails in materials or workmanship within the specified warranty period.
   1. Warranty Period: One (1) year after date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements indicated herein, provide products of one of the listed manufacturers.
   1. Frigidaire Professional: www.frigidaire.com.
   2. General Electric Appliances: www.geappliances.com.
   3. Hoshizaki America, Inc.: www.hoshizakiamerica.com.
   4. KitchenAid Appliances: www.kitchenaid.com.
   5. Summit Appliance: www.summitappliance.com.
   6. Whirlpool Corporation: www.whirlpool.com.
   7. Substitutions: Under provisions of Section 01 6000 – Product Requirements.

2.02 KITCHEN APPLIANCES

A. Refrigerator: Free-standing, top-mounted freezer, and frost-free.
   1. Basis of Design: GE, Model# GTE16DTNLWW
   2. Capacity: Total minimum storage of 15.6 cubic ft; minimum 15 percent freezer capacity.
   3. Features: Include glass shelves.
   4. Exterior Finish: Porcelain enameled steel.

B. Refrigerator: Free-standing, full height refrigerator, no freezer.
   1. Basis of Design: Frigidaire, Model# FRAE2024AW
   2. Capacity: Total minimum storage of 20 cubic ft.
   3. Features: Include glass shelves.

4. Exterior Finish: Porcelain enameled steel.

C. Range: Electric, free-standing, with glass-ceramic cooktop.
1. Basis of Design (Electric - ADA): GE, Model# JS645SLSS
2. Size: 30 inches wide.
3. Oven: Self-cleaning.
4. Burners: Four (4).
5. Controls: Push-to-turn knobs with electronic clock and timer.
6. Features: Include storage drawer, oven door window, oven light, and safety control lock out function.
7. Exterior Finish: Stainless steel.

D. Cooking Exhaust: Range Hood (w/ Fire Protection)
1. Basis of Design: Accurex, Model # GRRS-W-30-T-E-O-N.
2. Activation: Fusible Link
3. Provide appliance and fuel disconnect
4. Wet chemical extinguishing agent: Low PH Amerex 660
5. Exhaust: Vented, vertical.
6. Controls: Variable speed/on/off controls; remote touchscreen interface.
7. Dimensions: Depth: 19.38 in., Height: 10.5 in., Width: 30 in.
8. Color: Stainless Steel
9. ADA - Handicapped Accessible Control Box

E. Microwave: Countertop.
1. Basis of Design: GE, Model# ZES1227SLSS
2. Capacity: 2.2 cubic ft.
3. Power: 1100 watts.
4. Features: Include turntable.
5. Exterior Finish: Stainless Steel.

F. Dishwasher: Undercounter. (ADA Compliant Height - Must fit under 34" high counter)
1. Basis of Design: GE, Model# GDT225SSLSS
2. Controls: Solid state electronic.
3. Wash Levels: Three (3).
4. Cycles: Three (3), including normal and heavy or light wash.
5. Features: Include rinse aid dispenser, optional no-heat dry, optional water temperature boost, adjustable upper rack, and adjustable lower rack.
6. Finish: Stainless steel.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify utility rough-ins are provided and correctly located.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Anchor built-in equipment in place.

3.03 ADJUSTING

A. Adjust equipment to provide efficient operation.

3.04 CLEANING

A. Remove packing materials from equipment and properly discard.

B. Wash and clean equipment.

END OF SECTION

SECTION 12 3200
MANUFACTURED WOOD CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Manufactured custom plastic-laminate-faced casework, with cabinet hardware.

1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Blocking and nailers for anchoring casework including wood casework base.

B. Section 07 9200 - Joint Sealants: Sealing joints between casework and countertops and adjacent walls, floors, and ceilings.

C. Section 08 8000 - Glazing: Methods for shop-glazing of casework.

D. Section 12 3600 - Countertops: Additional requirements for countertops.

1.03 DEFINITIONS

A. Exposed: Portions of casework visible when drawers and cabinet doors are closed, including end panels, bottoms of cases more than 42 inches above finished floor, tops of cases less than 72 inches above finished floor and all members visible in open cases or behind glass doors. Exposed corners should be raduised.

B. Semi-Exposed: Portions of casework and surfaces behind solid doors, tops of cases more than 72 inches above finished floor and bottoms of cabinets more than 30 inches but less than 42 inches above finished floor.

C. Concealed: Sleepers, web frames, dust panels and other surfaces not generally visible after installation and cabinets less than 30 inches above finished floor.

1.04 REFERENCE STANDARDS

A. ANSI A135.4 - Basic Hardboard; 2012 (Reaffirmed 2020).

B. ANSI A208.2 - Medium Density Fiberboard (MDF) for Interior Applications; 2016.

C. ANSI/AWI 0641 - Architectural Wood Casework Standard; 2019.

D. ASTM C1036 - Standard Specification for Flat Glass; 2021.

E. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.

F. BHMA A156.9 - Cabinet Hardware; 2020.

G. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Conduct a preinstallation meeting at least one week prior to the start of the work of this section; require attendance by all affected installers.

B. Keying Conference: Conduct conference prior to ordering keys. Incorporate conference decisions into keying submittal.

1.06 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Component dimensions, configurations, construction details, joint details, attachments and hardware.

C. Shop Drawings: Indicate casework types, sizes, and locations, using large scale plans, elevations, and cross sections. Include rough-in and anchors, reinforcements, and blocking, placement dimensions and tolerances, clearances required, and keying information.

D. Samples for Finish Selection: Fully finished, for color selection. Minimum sample size: 6 inches by 6 inches or as indicated.
   1. Plastic laminate samples, for color, texture, and finish selection, size 6 inches by 6 inches.

E. Samples for Hardware Selection: Submit actual sample items of proposed pulls, hinges, shelf standards, and locksets, demonstrating hardware design, quality, and finish.

F. Manufacturer's Qualification Statement.

G. Installer's Qualification Statement.

H. Maintenance Data: Manufacturer's recommendations for care and cleaning.

I. Finish touch-up kit for each type and color of materials provided.

1.07 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years of documented experience and one project within the last five years with a value of woodwork within 20 percent of cost of woodwork for this project.

B. Perform cabinet construction in accordance with the latest edition of the ANSI/AWI 0641 - Architectural Woodwork Standards.

C. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than five years of documented experience and approved by manufacturer.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Protect items provided by this section, including finished surfaces and hardware items during handling and installation. For metal surfaces, use polyethylene film or other protective material standard with the manufacturer.

B. Acceptance at Site:
   1. Do not deliver or install casework until the conditions specified under Part 3, Examination Article of this section have been met. Products delivered to sites that are not enclosed and/or improperly conditioned will not be accepted if warping or damage due to unsatisfactory conditions occurs.

C. Storage:
   1. Store casework in the area of installation. If necessary, prior to installation, temporarily store in another area, meeting the environmental requirements specified under Part 3, "Site Verification of Conditions" Article of this section.

1.09 MOCK-UPS

A. Provide full size base cabinet, upper cabinet, and tall cabinet complete with drawers, door, adjustable shelf and countertop of every finish type.

B. See Section 01 4000 - Quality Requirements for additional requirements.

C. Locate where directed by the Architect.

D. Mock-up may remain as part of the work.

1.10 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

B. Correct defective Work within a two year period after Date of Substantial Completion, at no additional cost to Owner. Defects include, but are not limited to:
   1. Ruptured, cracked, or stained finish coating.
   2. Discoloration or lack of finish integrity.
   3. Cracking or peeling of finish.
   4. Delamination of components.
   5. Failure of adhesives.
   6. Failure of hardware.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturer shall be members in good standing of the Architectural Woodwork Institute (AWI).

B. Plastic Laminate Casework:
   1. Basis of Design: Jericho Woodworks: www.jericho-woodworks.com/#sle.
   2. MGC Inc.: www.mgcinc.net/#sle.
   3. TMI Systems: www.tmisystems.com/#sle.
   4. Phoenix Millwork: www.phoenixmillwork.net/#sle.
   5. Substitutions: See Section 01 6000 - Product Requirements.

C. Obtain casework from single source and manufacturer, unless otherwise indicated.

2.02 CASEWORK, GENERAL

A. Quality Standard: The latest edition of the ANSI/AWI 0641 - Architectural Woodwork Standards; 2019.

B. Types: When more than one type is required, see drawings for location of each type of casework.

C. Plastic Laminate Faced Cabinets: Custom Grade.

D. Desks and Display Cases - Premium Grade

E. Refer to 01 6210- Schedule of Materials and Colors and Drawings for additional casework details.

2.03 LUMBER MATERIALS

A. Hardwood Lumber: NHLA; Graded in accordance with the latest editionof the ANSI/AWI 0641, Grade II/Custom; average moisture content of 6-8 percent; species as scheduled.

B. Solid Lumber: Any Species, with no defects affecting strength or utility.

2.04 PANEL MATERIALS

A. Plastic-laminate-faced Plywood for Non-Decorative Purposes: NIST PS 1, Interior rated adhesives, core of wood plies from any species suitable for intended use unless otherwise indicated, thickness as indicated or as required by application.
   1. Provide 1" thick shelves at storage/book rooms.
   2. Provide 1" thick shelves when length is 36" or longer.

B. Medium Density Fiberboard (MDF): ANSI A208.2 ; type as specified in ANSI/AWI 0641; composed of wood fibers pressure bonded with manufacturer's recommended adhesive to suit application; sanded faces; thickness as required.
   1. Use for door and drawer fronts.
   2. For doors 6' high and greater use 1" thick material

C. Hardboard: AHA A135.4; Pressed wood fiber with resin binder, Class 1 - Tempered, 1/4 inch thick, smooth one side for horizontal applications, smooth two sides (S2S) for vertical applications; use for drawer bottoms, dust panels, vertical slot dividers, and other components indicated on drawings.

2.05 FABRICATION

A. Assembly: Shop assemble casework items for delivery to site in units easily handled and to permit passage through building openings.

B. Construction: As required for selected grade.

C. Cabinet sub-base shall be continuous and independent of casework and set prior to casework bodies. Sub-base material for **ALL** casework to be exterior treated dimensional lumber.

D. Fabricate all drawers boxes using 1/2" inch, 9-ply laminated hardwood plywood. The top edges of the drawer box sides and back are radiused. Drawer bottom is let in on four sides, and securely glued underneath with a continuous bead of glue around the perimeter of the drawer bottom. Additional bottom braces are used on drawers over 24" wide. All components have one coat of clear waterproof sealer. Drawer boxes are screw-attached to separate drawer fronts.

E. Glazing for Doors: 1/4 inch Clear tempered glass.

F. Fittings and Fixture Locations: Cut and drill components for fittings and fixtures.

G. Hardware Application: Factory-machine casework members for hardware that is not surface applied.

H. Access Panels: Where indicated, for maintenance of utility service and mechanical and electrical components.

I. Removable back panels on indicated base cabinets. Provide partial height back panels at sink cabinets.

J. Fixed panels at backs of open spaces between base cabinets.
   1. Provide cutouts for power and data receptacles where indicated on drawings.

K. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.

L. Scribes and Fillers: Panels of matching construction and finish, for locations where cabinets do not fit tight to adjacent construction.

M. Apron Frames: Construction similar to other cabinets, with modifications.
   1. Frames fabricated from panels standard with the manufacturer. Include front and back panels, with drawer suspension framing mechanically fastened to support channels spanning between them.
   2. Apron Drawers: Manufacturer's standard drawer construction and size for apron installation. Single drawer for aprons up to 36 inches wide maximum, two drawers for wider aprons.

N. Countertop Panel-Type Supports: Materials similar to adjacent casework, 1-1/2 inch in width, with front-to-back and toe space dimensions matching base cabinet. Designed to be secured in a concealed fashion to countertop material. Include two leveling devices per support panel.

O. Countertop Metal Supports: Hidden metal support brackets of size and configuration as required for support of countertops depth as detailed in the drawings.
   1. Manufactures:
      a. Centerline Brackets: www.countertopbracket.com
      b. Substitutions: See Section 01 6000 - Product Requirements.

P. Casework base to be independent and set prior to casework bodies. Bases to be exterior treated dimensional lumber. Provide an independent 2x4 trated ladder base.

Q. All casework and countertops to receive color matching sealant when sealing to adjacent surfaces/substrates.

2.06 PLASTIC-LAMINATE-CLAD CASEWORK

A. Plastic-Laminate-Clad Casework: Solid wood veneer core plywood and wood panel construction; each unit self-contained and not dependent on adjacent units or building structure for rigidity; in sizes necessary to avoid field cutting except for scribes and filler panels.
   1. Cabinets with water exposure shall be exterior glue grade, veneer core plywood and bottoms for cabinets within 36 inches of wet condition.
   2. Style: Flush overlay. Ease doors and drawer fronts slightly at edges.
   3. Cabinet Nominal Dimensions: Unless otherwise indicated, provide cabinets of widths and heights indicated on drawings, and with following front-to-back dimensions:
      a. Base Cabinets: 24 inches.

b. Tall Cabinets: 24 inches.
c. Wall Cabinets: 14 inches.

4. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline.
   a. See Section 01 6210 - Schedule of Materials and Colors for products Basis of Design and additional information.
   b. Thickness at vertical surfaces: 1/32 inches.
   c. Thickness at horizontal surfaces: 1/16 inches.
   d. Finish: Matte or suede, gloss rating of 5 to 20.
   e. Surface Color and Pattern: As scheduled.
   f. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.
   g. Cap exposed plastic laminate finish edges with plastic trim. Heavy duty T-molded with radiused edge.
      1) 3mm PVC, flat shaped; smooth finish; of width to match component thickness
         (a) Door and drawer fronts (Color match to face laminate).
         (b) Counter top exposed edges (Color match to face laminate).
      2) 1mm PVC, flat shaped; smooth finish; of width to match component thickness.
         (a) Exposed component edges (Color match to face laminate).
         (b) Backsplash and return exposed edges (Color match to face laminate).

2.07 COUNTERTOPS

A. Countertops: See Section 12 3600.

2.08 CABINET HARDWARE

A. Manufacturer's standard types, styles and finishes, and as indicated below.

B. Comply with BHMA A156.9 requirements.

C. Locks: Provide locks on casework drawers and doors where indicated. Comply with BHMA A156.11, Grade 1.. Provide lock on all casework doors and drawers.
   1. Interchangeable Core (Small Format):
      a. For Doors: 721DR/725RD.
      b. For Drawers: 721DW/725RD.
      c. Substitutions: See Section 01 6000 - Product Requirements.
   2. Elbow Catches (Inactive Doors):
      a. EC-2-26D
      b. Substitutions: See Section 01 6000 - Product Requirements.
   3. Coordinate keying with Owner.
   4. Keying: Key locks alike within a space; key each room separately.
   5. Master Key System: All locks operable by master key. Master key system must handle 2,000 key changes minimum.See Section 08 7100 for keying requirements.

D. Shelves in Cabinets:
   1. Shelf Standards and Rests to be metal. No plastic allowed.

E. Swinging Doors: Hinges, pulls, and catches.
   1. Hinges: Concealed, number as required by referenced standards for width, height, and weight of door.
      a. Concealed Hinges: Installed in cabinet edge, and on door back, satin chromium plated over nickel on base material.
         1) European-Style Hinges, soft close, for Overlay Doors: 120 degree opening angle.
   2. Pulls: Satin Chrome wire pulls, 4 inches wide.
      a. Pull design to comply with project's referenced accessibility requirements.
   3. Catches: Magnetic.

F. Drawers: Pulls and slides.
   1. Pulls: Satin Chrome wire pulls, 4 inches wide (typical).
      a. Pull design to comply with project's referenced accessibility requirements.
   2. Slides: Steel, full extension arms, ball bearings; soft close,capacity as recommended by manufacturer for drawer height and width.

G. Clothes Rod each to have:
   1. Rod(K & V)#770 5
   2. Flange(K & V)#764 CHR

H. Adjustable Shelves at Display Cases, each to have:
   1. Standards (K & V)#87
   2. Brackets/Shelf(K & V)#186
   3. Shelf rests to be metal. No plastic allowed.

I. Casters:
   1. Swivel-type: 4-inch diameter wheels of soft or hard rubber and self-lube wheel bearing. Swivel is double-level, hardened ball bearing. All metal surfaces are zinc-plated.
   2. Rigid-type: 4-inch wheels of soft or hard rubber, held in horns of formed steel, zinc plated. Wheel spanner bushings. Load capacity is 225 pounds per caster. Brake available on both swivel and rigid.

2.09 MATERIALS

A. Wood-Based Materials:
   1. Solid Wood: Air-dried to 4.5 percent moisture content, then tempered to 6 percent moisture content before use.

B. Concealed Solid Wood or Plywood: Any species and without defects affecting strength or utility.

C. Hardboard: ANSI A135.4, Class 1, tempered.

D. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications. complying with Grade requirements, and standard with the manufacturer.
   1. Provide specific types as follows:
      a. Horizontal Surfaces: HGS, 0.048 inch nominal thickness, colors as scheduled, .
      b. Vertical Surfaces: VGS, 0.028 inch nominal thickness, colors as scheduled, .
      c. Post-Formed Horizontal Surfaces: HGP, 0.039 inch nominal thickness, colors as scheduled, .
      d. Post-Formed Vertical Surfaces: VGP, 0.028 inch nominal thickness, colors as scheduled, .
      e. Flame Retardant Surfaces: HGF, 0.048 inch nominal thickness, colors as scheduled, .
      f. Cabinet Liner: CLS, 0.020 inch nominal thickness, colors as scheduled, .
      g. Laminate Backer: BKL, 0.020 inch nominal thickness, undecorated; for application to concealed backside of panels faced with high pressure decorative laminate.

E. Glass: Fully tempered float; ASTM C1036, Type 1, Quality Q3; ASTM C1048, tempered using horizontal tempering; 1/4 inch thick minimum; clear.

2.10 ACCESSORIES

A. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel or chrome-plated finish in exposed locations.

B. Concealed Joint Fasteners: Corrosion-resistant, standard with manufacturer.

C. Grommets: Standard plastic or rubber grommets for cut-outs, in color to match adjacent surface.

D. Sealant for Use in Casework Installation:
   1. Manufacturer's recommended type.

E. Concealed Fastening Clips: Provide for accessible panels and other areas indicated on the drawings.

F. Cable Management Tray: Size and configuration required for application.

G. Door/Drawer Silencers: 2 per door/drawer minimum, 3 for door/drawers over 48 inches.

PART 3 EXECUTION

3.01 PREPARATION

A. Large Components: Ensure that large components can be moved into final position without damage to other construction.

3.02 EXAMINATION

A. Site Verification of Environmental Conditions:
   1. Do not deliver casework until the following conditions have been met:
      a. Building has been enclosed (windows and doors sealed and weather-tight).
      b. An operational HVAC system that maintains temperature and humidity at occupancy levels has been put in place.
      c. Ceiling, overhead ductwork, piping, and lighting have been installed.
      d. Installation areas do not require further “wet work” construction.

B. For Base Cabinets Installation: Examine floor levelness and flatness of installation space. Do not proceed with installation if encountered floor conditions required more than 1/2 inch leveling adjustment. When installation conditions are acceptable, for each space, establish the high point of the floor. Set and make level and plumb first cabinet in relation to this high point.

C. For Wall Cabinets Installation: Examine wall surfaces in installation space. Do not proceed with installation if the following conditions are encountered:
   1. Maximum variation from plane of masonry wall exceeds 1/4 inch in 10 ft and 1/2 inch in 20 ft or more, and/or maximum variation from plumb exceeds 1/4 inchper story.
   2. Maximum Variation of finished gypsum board surface from true flatness: 1/8 inch in 10 feet in any direction.

D. Verify adequacy of support framing and anchors.

E. Verify that service connections are correctly located and of proper characteristics.

3.03 INSTALLATION

A. Perform installation in accordance with manufacturer's instructions.

B. Use anchoring devices to suit conditions and substrate materials encountered. Use concealed fasteners to the greatest degree possible. Use exposed fasteners only where allowed by approved shop drawings, or where concealed fasteners are impracticable.

C. Set casework items plumb and square, securely anchored to building structure.

D. Align cabinets to adjoining components, install filler and/or scribe panels where necessary to close gaps.

E. Fasten together cabinets in continuous runs, with joints flush, uniform and tight. Misalignment of adjacent units not to exceed 1/16 inch. In addition, do not exceed the following tolerances:
   1. Variation of Tops of Base Cabinets from Level: 1/16 inch in 10 feet.
   2. Variation of Bottoms of Wall Cabinets from Level: 1/8 inch in 10 feet.
   3. Variation of Faces of Cabinets from a True Plane: 1/8 inch in 10 feet.
   4. Variation of Adjacent Surfaces from a True Plane (Lippage): 1/32 inch.
   5. Variation in Alignment of Adjacent Door and Drawer Edges: 1/16 inch.

F. Secure wall and floor cabinets to concealed reinforcement and blocking at gypsum board assemblies.

G. At wet areas, secure wall and floor cabinets to concealed plywood substrate at gypsum board assemblies.

H. Base Cabinets: Fasten cabinets to service space framing and/or wall substrates, with fasteners spaced not more than 16 inches on center. Bolt adjacent cabinets together with joints flush, tight, and uniform.
   1. Where base cabinets are installed away from walls or service space framing, anchor to floor at toe space at not more than 24 inches on center, and at sides of cabinets with not less than two fasteners per side.

I. Wall Cabinets: Fasten to hanging strips, and/or wall substrates. Fasten each cabinet through back, near top, at not less than 16 inches on center.

J. Install hardware uniformly and precisely.

K. Countertops: Install countertops intended and furnished for field installation in one true plane, with ends abutting at hairline joints, and no raised edges.

L. Replace units that are damaged, including those that have damaged finishes.

3.04 ADJUSTING

A. Adjust operating parts, including doors, drawers, hardware, and fixtures to function smoothly.

3.05 CLEANING

A. Clean casework and other installed surfaces thoroughly.

3.06 PROTECTION

A. Do not permit finished casework to be exposed to continued construction activity.

B. Protect casework and countertops from ongoing construction activities. Prevent workmen from standing on, or storing tools and materials on casework or countertops.

C. Repair damage, including to finishes, that occurs prior to Date of Substantial Completion, using methods prescribed by manufacturer; replace units that cannot be repaired to like-new condition.

END OF SECTION

SECTION 12 3600
COUNTERTOPS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Countertops for manufactured casework.
   1. Solid Surfacing Countertops and Sills.

1.02 RELATED REQUIREMENTS

A. Section 12 3200 - Manufactured Wood Casework.

1.03 REFERENCE STANDARDS

A. ANSI A208.2 - Medium Density Fiberboard (MDF) for Interior Applications; 2016.

B. ANSI/AWI 0641 - Architectural Wood Casework Standard; 2019.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023.

D. ISFA 2-01 - Classification and Standards for Solid Surfacing Material; 2013.

E. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Specimen warranty.

C. Shop Drawings: Complete details of materials and installation and countertop seaming ; combine with shop drawings of cabinets and casework specified in other sections.

D. Verification Samples: For each finish product specified, minimum size 6 inches square, representing actual product, color, and patterns.

E. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.05 MOCK-UPS

A. Provide as part of casework specified in 12 3200-Manufactured Wood Casework.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience and approved by manufacturer.

B. Perform cabinet construction in accordance with ANSI/AWI 0641 - Architectural Woodwork Standards.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.08 FIELD CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.01 COUNTERTOPS

A. Quality Standard: See Section 12 3200.

B. Solid Surfacing Countertops and Sills: Solid surfacing sheet or plastic resin casting self-supporting over structural members.
   1. Flat Sheet Thickness: 1/2 inch, minimum.
   2. Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISFA 2-01 and NEMA LD 3; acrylic or polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
      a. Manufacturers:
         1) Avonite Surfaces: www.avonitesurfaces.com/#sle.
         2) Dupont: www.corian.com/#sle.
         3) Formica Corporation: www.formica.com/#sle.
         4) Meganite, Inc: www.meganite.com/#sle.
         5) Relang International, LLC: www.duraseinusa.com/#sle.
         6) Wilsonart: www.wilsonart.com/#sle.
         7) Substitutions: See Section 01 6000 - Product Requirements.
      b. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
      c. NSF approved for food contact.
      d. Finish on Exposed Surfaces: Matte, gloss rating of 5 to 20or as scheduled in the Schedule of Materials and Colors.
      e. Color and Pattern: As Scheduled.
   3. Exposed Edge Treatment: Built up to minimum 1-1/4 inch thick; square edge.
   4. Back and End Splashes: Same sheet material, 1/2 inch thick maximum, square top; minimum 4 inches high.
   5. Fabricate in accordance with manufacturer's standard requirements.

2.02 MATERIALS

A. Medium Density Fiberboard for Supporting Substrate: ANSI A208.2.
   1. 1-1/8" MDF, for tops without sinks.
   2. 1-1/8" MDF, meets or exceeds ANSI grade MR10 (moisture resistant) for tops with sinks.

B. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.

C. Joint Sealant: Mildew-resistant silicone sealant, color to match counter.

2.03 FABRICATION

A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
   1. Join lengths of tops using best method recommended by manufacturer.
      a. No splices on countertop plastic laminate material less than 144" will be permitted.
   2. Fabricate to overhang fronts and ends of cabinets 1 inch except where top butts against cabinet or wall.
   3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.

B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated on drawings.
   1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
   2. Height: 4 inches, unless otherwise indicated.

C. Solid Surfacing: Fabricate tops up to 144 inches long in one piece; join pieces with adhesive sealant in accordance with manufacturer's recommendations and instructions.

D. Wall-Mounted Counters: Provide skirts, aprons, brackets, and braces as indicated on drawings and finished as scheduled..

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.

B. At wet areas, securely attach countertops to concealed plywood substrate at gypsum board assemblies.

C. Seal joint between back/end splashes and vertical surfaces.

3.04 TOLERANCES

A. Variation From Horizontal: 1/8 inch in 10 feet, maximum.

B. Offset From Wall, Countertops: 1/8 inch maximum; 1/16 inch minimum.

C. Field Joints: 1/8 inch wide, maximum.

3.05 CLEANING

A. Clean countertops surfaces thoroughly.

3.06 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 13 3419
METAL BUILDING SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Manufacturer-engineered, shop-fabricated structural steel building frame.
B. Utility Standing Seam Roof Panels.
C. Panel Rib Wall Panels.
D. Interior Metal Liner Panels.
E. Metal Soffit Panels.
F. Gutters and Downspouts.
G. Building Insulation.
H. Roof Accessories including Roof Curbs and Pipe Flashing.

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete.
B. Section 05 5000 - Metal Fabrications.
C. Section 07 2100 - Thermal Insulation: Insulation not part of metal building system.
D. Section 07 9200 - Joint Sealants: Sealing joints between accessory components and wall system.
E. Section 08 1113 - Hollow Metal Doors and Frames.
F. Section 09 9000 - Painting and Coating.

1.03 REFERENCE STANDARDS

A. AISC 360 - Specification for Structural Steel Buildings; 2016.
B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
D. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014 (Editorial 2017).
E. ASTM A490 - Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength; 2014a.
F. ASTM A490M - Standard Specification for High-Strength Steel Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints (Metric); 2014a.
G. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2021.
H. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2014.
I. ASTM A529/A529M - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality; 2014.
J. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel; 2021, with Editorial Revision.
K. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.

L. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2021a.

M. ASTM A992/A992M - Standard Specification for Structural Steel Shapes; 2011 (Reapproved 2015).

N. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2017.

O. ASTM C991 - Standard Specification for Flexible Fibrous Glass Insulation for Metal Buildings; 2025a.

P. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2020.

Q. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023.

R. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.

S. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2023).

T. IAS AC472 - Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems; 2017.

U. MBMA (MBSM) - Metal Building Systems Manual; 2024.

V. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies; Current Edition, Including All Revisions.

1.04 DESIGN REQUIREMENTS

A. Design members to comply with all governing building code requirements and withstand the design loads indicated on the drawings. Unless a greater load is indicated otherwise, design for a minimum 20 psf roof live load without any live load reduction, 6 psf collateral load, 5 psf nominal snow load, dead load as determined by the Pre-Engineered Metal Buiding Engineer, and calculate positive and negative wind loads in accordance with applicable code.

B. Design members to withstand UL 580 uplift class 90.

C. Exterior wall and roof system shall withstand imposed loads with a maximum allowable live load deflection and maximum allowable wind load deflection of L/180 over areas without a ceiling, L/240 over areas with a nonplaster ceiling, L/360 over areas with a plaster ceiling and L/600 over areas supporting masonry veneer either vertically or horizontally. The lateral force resisting system shall withstand imposed Main Wind Force Resisting system wind pressures with a maximum allowable lateral deflection of H/180 over buildings with no applied veneer (e.g. brick, concrete masonry, stucco, etc...), H/300 over buildings with applied veneer that does not extend higher than 4 feet above the foundation, and H/600 over buildings with applied veneer that extends higher than 4 feet above the foundation, or 1" maximum drift, whichever is the more stringent deflection requirement. The Pre-Engineered Metal Building Engineer shall have the option to design the Main Wind Force Resisting system for 10-year MRI wind speeds (minimum), in lieu of the wind speeds required for strength as determined by the building Risk Category, for deflection purposes only if the Pre-Engineered Metal Building Engineer deems these deflections appropriate. Pre-Engineered Metal Building Engineer to include design parameters for chain hoists attached to building structural frame.

D. Seismic Loads: Calculate and apply seismic loads in accordance with the requirements of applicable building code and as indicated in the structural drawings.

E. Anchor Bolts: Furnish anchor bolt diameters, calculated on the basis of stress in the steel bolt, to resist the column reactions induced by the design loads on the structure. Anchor bolt lengths and embedment details shall be as shown on the structural drawings.

F. Provide drainage to exterior for water entering or condensation occurring within wall or roof system.

G. Permit movement of components without buckling, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to temperature range of 120 degrees Farenheit.

H. Size and fabricate wall and roof systems free of distortion or defects detrimental to appearance or performance.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before starting work of this section.

1.06 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on profiles, component dimensions, fasteners.

C. Shop Drawings: Indicate assembly dimensions, locations of structural members, connections, attachments, openings, cambers, and loads; wall and roof system dimensions, panel layout, general construction details, anchorages and method of anchorage, installation ; framing anchor bolt settings, sizes, and locations from datum, foundation loads; indicate welded connections with AWS A2.4 welding symbols; indicate net weld lengths; provide professional seal and signature. The Metal Building Engineer shall seal all metal building shop drawing submittals.

D. Shop drawing sheets that include engineering information designed by the Contractor's Delegated Design Engineer shall be signed and sealed in accordance with the Texas Engineering Practice Act. Sheets that do not provide information designed by the Contractor's Engineer do not require being signed and sealed. Calculation packages require a signed and sealed cover sheet only. Any submittals requiring to be signed and sealed that are received without the signature and seal will be rejected without review.

E. Samples: Submit two samples of precoated metal panels for each color selected, 2 by 3 inch in size illustrating color and texture of finish.

F. Manufacturer's Instructions: Indicate preparation requirements, anchor bolt placement.

G. Erection Drawings: Indicate members by label, assembly sequence, and temporary erection bracing.

H. Project Record Documents: Record actual locations of concealed components and utilities.

I. Closeout Submittals:
   1. Submit under provisions of Section 01 7800 – Closeout Submittals.
   2. Maintenance Data: Include draft specimen warranty.

J. Submit Material Safety Data Sheets under provisions of Section 01 7800 – Closeout Submittals for the following items:
   1. All mastics, glues, and adhesives
   2. Sealant (interior use only).

1.07 QUALITY ASSURANCE

A. Designer Qualifications: Design structural components, develop shop drawings, and perform shop and site work under direct supervision of a Professional Structural Engineer experienced in design of this type of work.
   1. Design Engineer Qualifications: Licensed in Texas.
   2. Comply with applicable code for submission of design calculations as required for acquiring permits.
   3. Cooperate with regulatory agency or authorities having jurisdiction (AHJ), and provide data as requested.

B. Perform work in accordance with AISC 360 and MBMA (MBSM).
   1. Maintain one copy on site.

C. Perform welding in accordance with AWS D1.1/D1.1M.

D. Manufacturer Qualifications: Company specializing in the manufacture of products similar to those required for this project.
   1. Accredited by IAS in accordance with IAS AC472.

E. Erector Qualifications: Company specializing in performing the work of this section approved by manufacturer.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Section 01 6000 – Product Requirements.

B. Storage and Protection
   1. Protect materials in accordance with manufacturer's instructions.
   2. Damaged materials will be rejected, whether built-in or not.

1.09 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Manufacturer shall warranty installed system for the periods described herein, starting from Date of Substantial Completion against all the conditions indicated below. When notified in writing from Owner, manufacturer/installer shall, promptly and without inconvenience and cost to Owner, correct said deficiencies.
   1. Materials and Workmanship Warranty: 5 years.
   2. Finish Warranty:
      a. Include coverage for exterior pre-finished surfaces to cover pre-finished color coat against chipping, cracking or crazing, blistering, peeling, chalking, or fading.
         1) Panel finish: 20 years.
   3. Standing Seam Roof (SSR) Panel Performance Warranty: Furnish written, single source, no dollar limit warranty, stating sheet metal roofing system and flashing under this Section will be maintained in watertight condition and defects resulting from the following items will be corrected without cost to Owner for a period of 20 years.
      a. Faulty workmanship.
      b. Defective materials including sealants and fasteners.
      c. Water infiltration.
      d. Weathertightness.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Buildings Systems:
   1. Alliance Steel, Inc.: www.allianceokc.com.
   2. Butler Manufacturing Company: www.butlermfg.com/#sle.
   3. Ceco Building Systems: www.cecobuildings.com/#sle.
   4. Horizon Structural Systems, Inc.: www.horizonstructural.com.
   5. Kirby Building Systems: www.kirbybuildingsystems.com.
   6. Mesco Building Solutions; www.mescobuildingsolutions.com
   7. Nucor Building Systems: www.nucorbuildingsystems.com/#sle.
   8. Red Dot Buildings: www.reddotbuildings.com
   9. Star Manufacturing: www.starbuildings.com.
   10. VP Buildings: www.vp.com.
   11. Substitutions: See Section 01 6000 - Product Requirements.

2.02 ASSEMBLIES

A. Primary Framing: Rigid Frame solid web framing consisting of tapered or uniform depth rafters rigidly connected to tapered or uniform depth columns. Provide a clear span that supports the loads at bay spacings indicated.

1. Rigid frames shall consist of welded up plate section columns and roof beams complete with necessary splice members and plates for bolted field assembly.
2. All base plates, cap plates, ridge plates and stiffener plates as required shall be factory welded into place and have the proper bolt connection holes shop fabricated.
3. All splice plates shall be shop fabricated in proper sizes with bolt connection holes shop fabricated.
4. All bolts for field assembly of frame members shall be high strength bolts of proper sizes complete with washers as indicated on erection drawings.
5. There will be no field modification of rigid frame members, unless authorized and specified on the manufacturer's drawings.
6. Bay Spacing: As noted on drawings.

B. Endwall Framing: Corner posts, endposts and rake beams.
1. All base plates, cap plates, ridge plates and stiffeners as required shall be factory welded into place and have the proper bolt connection holes shop fabricated.
2. All splice plates shall be shop fabricated in proper sizes with bolt connection holes shop fabricated.
3. Columns, beams and posts shall be shop fabricated complete with proper holes for the attachment of secondary structural members in proper locations.

C. Secondary Framing: Purlins, Girts, Eave struts, Flange bracing, Sill supports, and Clips, and other items detailed.
1. Purlins: Zee-shaped; 8" and 9 1/2" depth as required; with minimum yield strength of 55,000 psi; simple span or continuous span as required for design.
   a. Outer flange of all girts and purlins shall contain factory punched holes for panel connections.
2. Girts: Zee-shaped (unless otherwise noted on the drawings); 8" and depth as required, with minimum yield strength of 55,000 psi; simple span or continuous span as required for design.
   a. Outer flange of all girts and purlins shall contain factory punched holes for panel connections.
3. Transbay Members: Open web, parallel chord, secondary joists; simple span, utilizing materials, sizes and yield strength as required.
4. Wind Bracing: Portal, torsional, diagonal bracing with or without diaphragm in accordance with manufacturer’s standard design practices; utilizing rods, angles, and other members, with minimum yield strengths as required for design.
   a. Bracing will be located in second bay from each end of the building or as indicated on the drawings.
5. Primary Frame Flange Bracing: Attached from purlins or girts to the primary framing, minimum yield strength as required for design.
6. Base Angles: 2 inch x 3 inch x 0.059 inch steel angles, with minimum yield strength of 55,000 psi, anchored to the floor slab or grade beam with power driven fasteners or equivalent at a maximum spacing of 2 feet on center and not more than 6 inches from the end of any angle member.
7. Door Headers and Jambs: Cee-shaped; depth as required; with minimum yield strength of 55,000 psi.
8. Sag Angles and Bridging: Steel angles, with minimum yield strength of 36,000 psi.

D. Wall System: Preformed metal panels of vertical profile, with sub-girt framing/anchorage assembly, insulation, and liner sheets, and accessory components.

E. Roof System: Preformed metal panels oriented parallel to eave, with sub-girt framing/anchorage assembly and insulation, and accessory components.

F. Roof Slope: As noted on drawings

2.03 MATERIALS - FRAMING

A. Select materials and material yield strengths based on building design requirements; use the following unless required otherwise.
   1. Structural Steel Plate, Bar, Sheet, and Strip for Use in Bolted and Welded Constructions: ASTM A 572 /A 570, A 529, ASTM A 607 with minimum yield strength of 50,000 psi.
   2. Structural Steel Material for Use in Roll Formed or Press Broken Secondary Structural Members: ASTM A 570,or A 607 with minimum yield strength of 55,000 psi.
   3. Galvanized Steel Sheet for Roll Formed or Press Broken Roof and Wall Coverings, Trim and Flashing: ASTM A 653, with minimum yield strength of 50,000 psi.
   4. Galvalume Steel Sheet Used in Roll Formed or Press Broken Roof Covering: Aluminum-zinc alloy-coated steel sheet, ASTM A 792, with minimum yield strength of 50,000 psi; nominal coating weight of 0.5 oz per sq. ft both sides, equivalent to an approximate coating thickness of 0.0018 inch both sides.
   5. Hot Rolled Steel Shapes: W, M and S shapes, angles, rods, channels and other shapes; ASTM A 572/A 529/A 500 or ASTM A 36 as applicable; with minimum yield strengths required for the design.
   6. Structural Bolts and Nuts Used with Primary Framing: High strength, ASTM A 325 or A 490.
   7. Bolts and Nuts Used with Secondary Framing Members: ASTM A 307.
   8. Shop Coat: Manufacturer’s standard rust inhibitive primer paint; manufacturer’s standard color.
   9. Pre-Painted Finish: 1 mil PVDF coating, minimum 70% Kynar 500 or Hylar 5000 on exterior surface.
      a. Color: As selected from manufacturer’s full line.
   10. Interior finish: Off white 0.5 mil washcoat.

B. Grout: ASTM C1107/C1107M; Non-shrink; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
   1. Minimum Compressive Strength at 48 Hours: 2,000 pounds per square inch.
   2. Minimum Compressive Strength at 28 Days: 7,000 pounds per square inch.

2.04 ROOF AND WALL PANEL COMPONENTS

A. Roof Panels: “Utility Standing Seam Roof Panels"; 24 inches wide net coverage, with 2 inch high major ribs formed at the panel side laps, factory formed for field seaming using electrically operated seaming machine.
   1. Side Joints: Factory applied sealant for field seaming.
   2. Material: Galvanized steel, with G90/Z275 coating or Galvalume Steel, with AZ55 coating.
   3. Thickness: 24 gauge design base metal.
   4. Side laps: Two factory-formed interlocking ribs, with one weather sealed joint, mechanically field-seamed into place to form a double-fold 360 degree seam.
   5. Length: Continuous from eave to ridge up to 41 feet in length.
   6. Endlaps: 7 inches wide, located at a support member.
   7. Finish: Factory applied finish, PVDF coating, minimum 70% Kynar 500 or Hylar 5000, color as selected by Architect.
   8. Panel-to-roof purlin structural attachments: SSR clips with movable tabs which interlock with seamed SSR panel ribs and provide for 1-1/4 inch of panel movement in either direction from center of clip to compensate for thermal effects.
   9. The SSR Roof System shall be tested and certified by Factory Mutual to meet the following tests: FM 1-90. The design of the SSR Roof for this project shall meet FM 1-90 Factory Mutual design.
   10. The SSR Roof System shall be tested and certified to meet Underwriters Laboratory UL 90 wind uplift rating. The UL 90 is a requirement for this project.
   11. Panels shall have been tested in accordance to ASTM E-1592.

12. Panel fastening to meet uplift requirements shall be based on tested fastener values with appropriate Safety Factors.
13. Purlin strength with the SSR roof panel shall be determined and tested in accordance with AISI procedures.
14. Acceptable Product: Butler – MR-24 Roof System.

B. Ridge Assembly for SSR Ridge; draw-formed aluminum seam caps factory-attached to SSR ridge panels that are mechanically field-seamed together along the center of the ridge, utilizing only one weather sealed joint and providing a true expansion joint for panel movement.

C. Wall Panels: Panel Rib; 36 inch wide net coverage, with 11/2" high major ribs at 12 inches on center with minor ribs spaced between the major ribs.
1. Material: Galvanized steel, with G90/Z275 coating or Galvalume Steel, with AZ55 coating.
2. Thickness: 22 gauge design base metal.
3. Side laps: Two fully overlapping major ribs secured together with 1/4 inch diameter color-matched carbon steel fasteners.
4. Length: Continuous from sill to eave up to 38 feet in length.
5. Endlaps: 6 inches wide, located at a support member.
6. Cut panels square at each end; provide base trim at sill.
7. Finish: Factory applied finish, PVDF coating, minimum 70% Kynar 500 or Hylar 5000, color as selected by Architect.

D. Liner Panels: Panel Rib Liner Panels; 36 inch wide net coverage, with 11/2" high major ribs with minor ribs spaced between the major ribs.
1. Material: Galvanized steel, with G90/Z275 coating.
2. Thickness: 22 gauge design base metal.
3. Finish: Factory applied finish, PVDF coating, minimum 70% Kynar 500 or Hylar 5000, color as selected by Architect. Provide wall liner panels as shown on the drawings.

E. Soffit Panels: Architectural Soffit Panels; 12 inch wide net coverage, with two 6 inch wide flat surfaces in the same plane separated by a V-groove at 6 inches on center after adjacent panels have been installed.
1. Material: Galvanized steel, with G90/Z275 coating or Galvalume Steel, with AZ55 coating.
2. Thickness: 22 gauge design base metal.
3. Finish: Factory applied finish, PVDF coating, minimum 70% Kynar 500 or Hylar 5000, color as selected by Architect.
4. Side Joints: Factory applied gasket; tongue-in-groove connection with adjacent panels, with the connection reinforced by clips.

F. Panel Fasteners:
1. For Galvalume and factory applied finish roof panels: Stainless steel-capped carbon steel fasteners with integral sealing washer.
2. For wall panels: Coated carbon steel.
3. Color of exposed fastener heads to match the wall panel finish.
4. Concealed Fasteners: Self-drilling type, of size as required.
5. Provide fasteners in quantities and location as required by the manufacturer.

G. Flashing and Trim: Match material and color of adjacent components. Provide trim at rakes, including peak and corner assemblies, high and low eaves, corners, bases, framed openings and as required or specified to provide weathertightness and a finished appearance.

H. Sealants, Mastics and Closures: Manufacturer’s standard type.
1. Provide at roof panel endlaps, sidelaps, rake, eave, transitions and accessories as required to provide a weather resistant roof system; use tape mastic or gunnable sealant at sidelaps and endlaps.
2. Provide at wall panel rakes, eaves, transitions and accessories.

3. Closures: Formed to match panel profiles; closed cell elastic material, manufacturer's standard color.
4. Tape Mastic: Pre-formed butyl rubber-based, non-hardening, non-corrosive to metal; white or light gray.
5. Sealant: Non-skinning synthetic elastomer based material; gray or bronze.

I. Building Insulation System:
1. Basis of Design:
   a. Thermal Design, Inc., Simple Saver System: www.thermaldesign.com.
   b. Substitutions: See Section 01 6000 - Product Requirements.
2. System Components: Batt Insulation, Roof Insulation, Wall Insulation, Vapor Barrier Liner Fabric, Thermal Breaks, Straps, and other devices and components to for an insulation system as follows:
   a. Thermal Resistance as required by 2015 IECC:
      1) Roofs: R-19 + R-11 LS.
      2) Walls: R-13 + R-6.5ci. or R-25 with 1/8" foam thermal break strips.
   b. Batt Insulation: ASTM C 991 Type 1; preformed formaldehyde-free glass fiber.
      1) Batt Size: Equal to purlin/girt spacing by manufacturer's standard lengths.
      2) Unfaced.
   c. Roof Insulation: Formaldehyde-free fiberglass batt or fiberglass blanket complying with ASTM C 991 Type 1 and ASTM E 84 with a thermal resistance and thickness as required to comply with 2015 IECC.
   d. Wall Insulation: Formaldehyde-free fiberglass blanket or batt complying with ASTM C 991 Type 1, ASTM E 136 and ASTM E 84 with a thermal resistance and thickness as required to comply with 2015 IECC.
   e. Vapor Barrier Liner Fabric: Syseal® type woven, reinforced, high-density polyethylene yarns coated on both sides with a continuous white or colored polyethylene coatings, as follows:
      1) Product complies with ASTM C 1136, Types I through Type VI.
      2) Perm rating: 0.02 for fabric and for seams in accordance with ASTM E 96.
      3) Flame/Smoke Properties:
         (a) 25/50 in accordance with ASTM E 84.
         (b) Self-extinguishes with field test using matches or butane lighter.
      4) Ultra violet radiation inhibitor to minimum UVMAX® rating of 8.
      5) Size and seaming: Manufactured in large custom pieces by extrusion welding from roll goods, and fabricated to substantially fit defined building area with minimum practicable job site sealing.
      6) Provide with factory double, extrusion welded seams. Stapled seams or heat-melted seams are not acceptable due to degradation of fabric.
      7) Factory-folded to allow for rapid installation.
      8) Color: White
   f. Vapor Barrier Lap Sealant: Solvent-based, Simple Saver polyethylene fabric adhesive.
   g. Vapor Barrier Tape: Double-sided sealant tape 3/4 inch (19 mm) wide by 1/32 inch (.79 mm) thick.
   h. Vapor Barrier Patch Tape: Single-sided, adhesive backed sealant tape 3 inches (76 mm) wide made from same material as Syseal® type liner fabric.
   i. Thermal Breaks:
      1) Thermal Blocks: 1 x 3-1/2 inch extruded polystyrene thermal spacer strips at 2'-0" on center at SSR clip locations, and pre-punched fastener holes.
   j. Straps:
      1) 100 KSI minimum yield tempered, high-tensile-strength steel.

2) Size: Not less than 0.020 inch (0.50 mm) thick by 1 inch (25 mm) by continuous length.
3) Galvanized, primed, and painted to match specified finish color on the exposed side.
4) Color: White

k. Fasteners:
1) For light gage steel: #12 by 3/4 (19 mm) inch plated Tek 2 type screws with sealing washer, painted to match specified color.
2) For heavy gage steel: #12 by 1-1/2 inch (38 mm) plated Tek 4 type screws with sealing washer, painted to match specified color.
3) For wood, concrete, other materials: As recommended by manufacturer.

l. Wall Insulation Hangers: Fast-R preformed rigid hangers, 32 inch (813 mm) long galvanized steel strips with barbed arrows every 8 inches (203 mm) along its length.

2.05 FABRICATION - FRAMING

A. Fabricate members in accordance with AISC 360 for plate, bar, tube, or rolled structural shapes.

B. Anchor Bolts: Formed with straight shank, assembled with template for casting into concrete.

C. Provide framing for all roof openings.

D. Component Identification: Mark all fabricated parts, either individually or by lot or group, using an identification marking corresponding to the marking shown on the shop drawings, using a method that remains visible after shop painting.

E. Shop Priming: Finish all structural steel members using one coat of manufacturer's standard shop coat, after cleaning of oil, dirt, loose scale and foreign matter.
1. Finish primary frames with a minimum coating of 1.0 mil.
2. Finish secondary structural with a minimum coating of 0.5 mil.

2.06 FABRICATION - GUTTERS AND DOWNSPOUTS

A. Eave Gutters: Roll-formed 26 gage Galvanized or Galvalume steel sheet, with gutter straps, fasteners and joint sealant.
1. Downspouts: 4 x 5 inches in 10 foot lengths, with downspout elbows and downspout straps. Provide expansion joints in gutters per SMACNA guidlines, 50'-0" o.c. max.

B. Downspouts
1. Downspouts shall be fabricated from 26 ga. Galvanized or Galvalume steel factory colored with PVDF coating, minimum 70% Kynar 500 or Hylar 5000, color as selected by Architect and shall have a minimum cross section area of 16 square inches.
2. Downspout sleeve shall be furnished for attachment to the gutter. This attachment shall be made with 1/8" diameter stainless steel pop rivets and sealed with aluminized sealant.
3. Downspout splices shall be lapped 2" and secured with 1/8" diameter stainless steel pop rivets.
4. A 45 degree elbow shall be provided at the base of all downspouts to direct the water flow away from the foundation for on-grade drainage. Refer to architectural drawings for details for below-grade drainage.
5. Downspouts shall return from the edge of eave canopies to the building wall.
6. Refer to 05 5000-Metal F for downspout steel boot requirements and connections.

2.07 ROOF ACCESSORIES

A. Metal Building Manufacturer shall furnish or approve all roof accessories.

B. Roof Curbs: Welded units fabricated for shingled installation with roof panels; minimum 18 gage Galvanized steel, with welds cleaned and treated with protective coating compatible with the Galvanized substrate.
1. Top of curbs horizontal with 1-1/2 inch perimeter flange.

2. Curb walls insulated with 1-1/2 inch, 3 pcf density rigid glass fiber insulation.
3. Water Diversion: Integral 4 inch high by full length cricket on upslope side.
4. Exposed curb flanges pre-drilled for correct fastener locations.
5. Upslope and downslope curb flanges with integral welded inside and outside cell closures compatible with the roof panel profile.
6. Curb Framing: Mounted on secondary structural members and installed from the top; compatible with the thermal expansion and contraction properties of the roof on which it is used.
7. Opening Size: As indicated on drawings.
8. Curbs for SSR Roof Panels: One-piece type.
9. Finish: Factory applied finish, PVDF coating, minimum 70% Kynar 500 or Hylar 5000, color as selected by Architect.

C. Pipe flashing shall consist of a molded rubber cone with an aluminum ring bonded to the base. Pipe flashing shall accommodate pipe diameter as specified and be capable of flashing penetration at any location of the roof panel. Flashing shall be sealed and fastened in accordance with manufacturer's drawings.
   1. Stack or pipe penetration shall be at the centerline of a major corrugation of the roof panel.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that foundation, floor slab, mechanical and electrical utilities, and placed anchors are in correct position

3.02 ERECTION - FRAMING

A. Erect framing in accordance with AISC 360.

B. Provide for erection and wind loads. Provide temporary bracing to maintain structure plumb and in alignment until completion of erection and installation of permanent bracing.

C. Set column base plates with non-shrink grout to achieve full plate bearing.

D. Do not field cut or alter structural members without approval.

E. After erection, prime welds, abrasions, and surfaces not shop primed.

3.03 ERECTION - WALL AND ROOF PANELS

A. Install in accordance with manufacturer's instructions.

B. Exercise care when cutting prefinished material to ensure cuttings do not remain on finish surface.

C. Fasten cladding system to structural supports, aligned level and plumb.

D. Provide expansion joints where indicated.

E. Install sealant and gaskets, providing weather tight installation.

3.04 ERECTION - GUTTERS AND DOWNSPOUTS

A. Rigidly support and secure components. Join lengths with formed seams sealed watertight. Flash and seal gutters to downspouts.

B. Apply bituminous paint on surfaces in contact with cementitious materials.

3.05 INSTALLATION - ACCESSORY COMPONENTS IN WALL SYSTEM

A. Install door frames, doors, overhead doors, and windows and glass in accordance with manufacturer's instructions.

3.06 TOLERANCES

A. Framing Members: 1/4 inch from level; 1/8 inch from plumb.

B. Siding and Roofing: 1/8 inch from true position.

END OF SECTION

SECTION 14 2400
HYDRAULIC ELEVATORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Complete hydraulic elevator systems.
   1. Passenger type without machine room

B. Elevator Maintenance Contract.

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Includes elevator pit.

B. Section 04 2000 - Unit Masonry: Masonry hoistway enclosure; building-in and grouting hoistway door frames.

C. Section 05 1200 - Structural Steel Framing: Includes hoistway framing and overhead hoist beams.

D. Section 07 1300 - Sheet Waterproofing: Waterproofing of elevator pit walls and floor.

E. Section 07 8400 - Firestopping: Fire rated sealant in hoistway.

F. Section 08 7100 - Door Hardware: Product requirements for key cylinders and card readers for placement by this section.

G. Section 09 2116.23 - Gypsum Board Shaft Wall Assemblies.

H. Division 21 - Fire Suppression: Fire Sprinkler System in Hoistway

I. Division 22 - Plumbing: Motor for sump pump in pit.

J. Division 26 - Electrical: Conduit and wiring connections.

K. Division 28 - Electronic Safety and Security: Fire detection and alarm systems.

1.03 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.

B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

C. AISC 360 - Specification for Structural Steel Buildings; 2016.

D. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015 (Reaffirmed 2020).

E. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

F. ASME A17.1 - Safety Code for Elevators and Escalators; 2016.

G. ASME A17.2 - Guide for Inspection of Elevators, Escalators, and Moving Walks; 2014.

H. ASME QEI-1 - Standard for the Qualification of Elevator Inspectors; 2024.

I. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

J. ASTM A139/A139M - Standard Specification for Electric-Fusion (Arc)-Welded Steel Pipe (NPS 4 and Over); 2016.

K. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes; 2017.

L. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.

M. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.

N. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2021.

O. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.

P. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.

Q. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

R. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

S. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.

T. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2019.

U. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2023).

V. ITS (DIR) - Directory of Listed Products; Current Edition.

W. NEMA MG 00001 - Motors and Generators; 2024.

X. NFPA 13 - Standard for the Installation of Sprinkler Systems; 2015, with Errata (2017).

Y. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

Z. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2019.

AA. UL (DIR) - Online Certifications Directory; Current Edition.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Contractor to coordinate clearances, layout, structural requirements and infrastructural requirements with selected elevator(s). Dimensions and other information will vary and differ from each elevator product / model / manufacturer and may even change when using basis-of-design product. Do not commence with this work, related foundation work, steel fabrication or other impacted activities until submittals and shop drawings have been produced, coordinated with the other work, and reviewed.
   2. Coordinate work with other installers to provide conduits necessary for installation of wiring including but not limited to:
      a. Elevator equipment devices remote from elevator machine room or hoistway.
      b. Remote group automatic panel from controller cabinet.
      c. Elevator pit for lighting and sump pump.
      d. Automatic transfer switch from controller cabinet.
      e. Fire alarm panel from controller cabinet.
   3. Coordinate work with other installers for equipment provisions necessary for proper elevator operation, including but not limited to, the following:
      a. Automatic transfer switches with auxiliary contacts for emergency power transfer status indication.
      b. Shunt trip devices for automatic disconnection of elevator power prior to fire suppression system activation.
      c. Overcurrent protection devices selected to achieve required selective coordination.

B. Preinstallation Meeting: Convene meeting at least one week prior to start of this work.
   1. Review schedule of installation, proper procedures and conditions, and coordination with related work.

2. Review use of elevator for construction purposes, hours of use, scheduling of use, cleanliness of car, employment of operator, and maintenance of system.

C. Construction Use of Elevator: Provide designated elevator for transport of construction personnel and materials in compliance with ASME A17.1.
1. Owner to negotiate with manufacturer/installer for construction use of elevator in accordance with terms and conditions of manufacturer's temporary acceptance form.
2. Make elevator available for construction use as early as possible.
3. Enclose car with protective plywood on floor, walls, and ceiling.
4. Provide temporary lighting.
5. Provide control panel with manual and emergency operation.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit data on following items:
1. Signal and operating fixtures, operating panels, and indicators.
2. Car design, dimensions, layout, and components.
3. Car and hoistway door and frame details.
4. Electrical characteristics and connection requirements.

C. Shop Drawings: Include appropriate plans, elevations, sections, diagrams, and details on following items:
1. Elevator Equipment and Machines: Size and location of driving machines, power units, controllers, governors, and other components.
2. Hoistway Components: Size and location of car guide rails, buffers, jack unit and other components.
3. Rail bracket spacing; maximum loads imposed on guide rails requiring load transfer to building structural framing.
4. Clearances and over-travel of car.
5. Locations in hoistway and machine room of traveling cables and connections for car lighting and telephone.
6. Location and sizes of hoistway and car doors and frames.
7. Interface with building security system.
8. Electrical characteristics and connection requirements.
9. Indicate arrangement of elevator equipment and allow for clear passage of equipment through access openings.

D. Samples: Submit samples illustrating car interior finishes, car and hoistway door and frame finishes, and handrail material and finish in the form of cut sheets or finish color selection brochures.

E. Testing Agency's Qualification Statement.

F. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

G. Operation and Maintenance Data:
1. Parts catalog with complete list of equipment replacement parts; identify each entry with equipment description and identifying code.
2. Operation and maintenance manual.
3. Schematic drawings of equipment and hydraulic piping, and wiring diagrams of installed electrical equipment with list of corresponding symbols to identify markings on machine room and hoistway apparatus.

1.06 QUALITY ASSURANCE

A. Maintain one copy of each quality standard document on site.

B. Designer Qualifications: Design guide rails, brackets, anchors, and machine anchors under direct supervision of a licensed Professional Structural Engineer experienced in design of this type of work and licensed in Texas.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years documented experience.

D. Installer Qualifications: Trained personnel and supervisor on staff of elevator equipment manufacturer.

E. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of type specified in this section.

F. Products Requiring Fire Resistance Rating: Listed and classified by ITS (DIR), UL (DIR), or testing agency acceptable to authorities having jurisdiction.

G. Products Requiring Electrical Connection: Listed and classified by UL (DIR) or testing agency acceptable to authorities having jurisdiction as suitable for the purpose indicated in construction documents.

1.07 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide manufacturer's warranty for elevator operating equipment and devices for one year from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design - Hydraulic Elevators: Endura MRL 4500; by TK Elevator.

B. Other Acceptable Manufacturers - Hydraulic Elevators:
   1. Otis Elevator Company: www.otis.com.
   2. TK Elevator: www.tkelevator.com.

C. Substitutions: See Section 01 6000 - Product Requirements.

D. Source Limitations: Provide elevator and associated equipment and components produced by a single manufacturer and obtained from a single supplier .

E. Provide UL listed equipment as required by code.

2.02 HYDRAULIC ELEVATORS

A. Hydraulic Passenger Elevator:
   1. Hydraulic Elevator Equipment:
      a. Holeless hydraulic with cylinder mounted within hoistway.
   2. Operation Control Type:
      a. Selective Collective Automatic Operation Control.
   3. Service Control Types:
      a. Standard service control.
      b. Independent service control.
      c. Restricted Access service control.
   4. Interior Car Height: 96 inch.
   5. Electrical Power: 480 volts; alternating current (AC); three phase; 60 Hz.
   6. Freight Car Loading Classification: Class A - General Freight Loading in compliance with ASME A17.1.
   7. Rated Net Capacity: 4500 pounds.
   8. Rated Speed: 80 feet per minute.
   9. Hoistway Size: As indicated on drawings.
   10. Interior Car Platform Size: As indicated on drawings.
   11. Travel Distance: As indicated on drawings.

12. Number of Stops: As indicated on drawings.
13. Hydraulic Equipment Locations:
    a. In Hoistway

2.03 COMPONENTS

A. Elevator Equipment:
1. Motors, Hydraulic Equipment, Controllers, Controls, Buttons, Wiring, Devices, and Indicators: Comply with NFPA 70. Refer to Division 26 for additional information.
2. Guide Rails, Cables, Buffers, Attachment Brackets and Anchors: Design criteria for components includes safety factors in accordance with applicable requirements of Elevator Code, ASME A17.1.
3. Buffers:
    a. Spring type for elevators with speed less than or equal to 200 feet per minute.
4. Lubrication Equipment:
    a. Provide grease fittings for periodic lubrication of bearings.
    b. Grease Cups: Automatic feed type.
    c. Lubrication Points: Visible and easily accessible.
5. Power Unit (Oil Pumping and Control Mechanism): A self-contained unit located in the elevator hoistway consisting of the following items:
    a. An oil hydraulic pump.
    b. An electric motor.
    c. Electronic oil control valve with the following components built into single housing; high pressure relief valve, check valve, automatic unloading up start valve, lowering and leveling valve, and electro-magnetic controlling solenoids.
    d. Pump: Positive displacement type pump specifically manufactured for oil-hydraulic elevator service. Pump shall be designed for steady discharge with minimum pulsation to give smooth and quiet operation. Output of pump shall not vary more than 10 percent between no load and full load on the elevator car.
    e. Motor: Standard manufacture motor specifically designed for oil-hydraulic elevator service. Duty rating - motors shall be capable of 80 starts per hour with a 30% motor run time during each start.
    f. Oil Control Unit: The following components shall be built into a single housing. Welded manifolds with separate valves to accomplish each function are not acceptable. Adjustments shall be accessible and be made without removing the assembly from the oil line.
        1) Relief valve shall be adjustable and be capable of bypassing the total oil flow without increasing back pressure more than 10 percent above that required to barely open the valve.
        2) Up start and stop valve shall be adjustable and designed to bypass oil flow during start and stop of motor pump assembly. Valve shall close slowly, gradually diverting oil to or from the jack unit, ensuring smooth up starts and up stops.
        3) Check valve shall be designed to close quietly without permitting any perceptible reverse flow.
        4) Lowering valve and leveling valve shall be adjustable for down start speed, lowering speed, leveling speed and stopping speed to ensure smooth "down" starts and stops. The leveling valve shall be designed to level the car to the floor in the direction the car is traveling after slowdown is initiated.
        5) Provided with constant speed regulation in both up and down direction. Feature to compensate for load changes, oil temperature, and viscosity changes.
    g. Solid State Starting: Provide an electronic starter featuring adjustable starting currents.

h. Oil Type: Readily biodegradable that is USDA certified biobased product, ultra low toxicity, readily biodegradable, energy efficient, high performing fluid made from canola oil with antioxidant, anticorrosive, antifoaming, and metal-passivating additives. Especially formulated for operating in environmentally sensitive areas. USDA certified biobased product, 95% bio-based content, per ASTM D6866.

6. A secondary hydraulic power source (powered by 110VAC single phase) must be provided. This is required to be able to raise (reposition) the elevator in the event of a system component failure (i.e. pump motor, starter, etc.)

B. Electrical Equipment:
   1. Motors: NEMA MG 1.
   2. Boxes, Conduit, Wiring, and Devices: As required by NFPA 70. Refer to Division 26 for additional information.
   3. Sump Pump in Pit: Refer to Division 22 for additional information.
   4. Spare Conductors: Provide ten percent in extra conductors and two pairs of shielded audio cables in traveling cables.

2.04 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with ASME A17.1, applicable local codes, and authorities having jurisdiction (AHJ).

B. Accessibility Requirements: Comply with ADA Standards.

C. Perform structural steel design, fabrication, and installation in accordance with AISC 360.

D. Comply with seismic design requirements in accordance with ASME A17.1, applicable local codes, and authorities having jurisdiction (AHJ).
   1. Complying with Elevator Safety Requirements for Seismic Risk Zone in accordance with ASME A17.1, ASCE 7 and other related requirements.
      a. Project Seismic Risk: As indicated on drawings.
   2. Provide earthquake emergency operations in accordance with ASME A17.1 requirements.

E. Perform welding of steel in accordance with AWS D1.1/D1.1M.

F. Fabricate and install door and frame assemblies in accordance with NFPA 80 and in compliance with requirements of authorities having jurisdiction.

G. Perform electrical work in accordance with NFPA 70.

H. Comply with fire protection sprinkler system of hoistway design in accordance with NFPA 13 requirements and authorities having jurisdiction (AHJ). Refer to Division 21 - Fire Suppression.

2.05 OPERATION CONTROLS

A. Elevator Controls: Provide vandal resistant landing operating panels and landing indicator panels.
   1. Landing Operating Panels: Metallic type, one for originating "Up" and one for originating "Down" calls, one button only at terminating landings; with illuminating indicators.
   2. Landing Indicator Panels: Illuminating.
   3. Comply with ADA Standards for elevator controls.

B. Car Lantern and Chime: A directional lantern visible from the corridor shall be provided in the car entrance. When the car stops and the doors are opening, the lantern shall indicate the direction in which the car is to travel and a chime will sound.

C. Hoistway Access key-switch at top floor in entrance jamb.

D. Hoistway Access key-switch at lowest floor in entrance jamb.

E. Interconnect elevator control system with building security, fire alarm, card access, and smoke alarm systems.

F. Door Operation Controls:

1. Program door control to open doors automatically when car arrives at floor landing.
2. Render "Door Close" button inoperative when car is standing at dispatch landing with doors open.
3. Door Operation: Provide a direct current motor driven heavy duty operator designed to operate the car and hoistway doors simultaneously. Door movements shall be electrically cushioned at both limits of travel and the door operating mechanism shall be arranged for manual operation in event of power failure. Doors shall automatically open when the car arrives at the landing and automatically close after an adjustable time interval or when the car is dispatched to another landing. Closed-loop, microprocessor controlled motor-driven linear door operator, with adjustable torque limits, also acceptable. AC controlled units with oil checks or other deviations are not acceptable.
    a. No Un-Necessary Door Operation: The car door shall open only if the car is stopping for a car or hall call, answering a car or hall call at the present position or selected as a dispatch car.
    b. Door Open Time Saver: If a car is stopping in response to a car call assignment only (no coincident hall call), the current door hold open time is changed to a shorter field programmable time when the electronic door protection device is activated.
    c. Double Door Operation: When a car stops at a landing with concurrent up and down hall calls, no car calls, and no other hall call assignments, the car door opens to answer the hall call in the direction of the car's current travel. If an onward car call is not Nudging Operation: The doors shall remain open as long as the electronic detector senses the presence of a passenger or object in the door opening. If door closing is prevented for a field programmable time, a buzzer will sound. When the obstruction is removed, the door will begin to close at reduced speed. If the infra-red door protection system detects a person or object while closing on nudging, the doors will stop and resume closing only after the obstruction has been removed.
    d. Limited Door Reversal: If the doors are closing and the infra-red beam(s) is interrupted, the doors will reverse and reopen partially. After the obstruction is cleared, the doors will begin to close.
    e. Door Open Watchdog: If the doors are opening, but do not fully open after a field adjustable time, the doors will recycle closed then attempt to open six times to try and correct the fault.
    f. Door Close Watchdog: If the doors are closing, but do not fully close after a field adjustable time, the doors will recycle open then attempt to close six times to try and correct the fault.
    g. Door Close Assist: When the doors have failed to fully close and are in the recycle mode, the door drive motor shall have increased torque applied to possibly overcome mechanical resistance or differential air pressure and allow the door to close.
4. Door Safety:
    a. Primary door protection shall consist of a two-dimensional, multi-beam array projecting across the car door opening. Under normal operation and for any door position, the system shall detect as a blockage an opaque object that is equal to or greater than 1.3 inches in diameter when inserted between the car doors at vertical positions from within 1 inch above the sill to 71 inches above the sill. Under degraded conditions (one or more blocked or failed beams), the primary protection shall detect opaque objects that are equal to or greater than 4” in diameter for the same vertical coverage. If the system performance is degraded to the point that the 4” object cannot be detected, the system shall maintain the doors open or permit closing only under nudging force conditions.

b. The door reopening device shall also include a secondary, three dimensional, triangular infrared multi-beam array projecting across the door opening and extending into the hoistway door zone. The door opening device will cause the doors to reopen when it detects a person(s) or object(s) entering or exiting the car in the area between the hoistway doors or the entryway area adjacent to the hoistway doors.
c. The secondary protection shall have an anti-nuisance feature which will ignore detection in the secondary zone after continual detection occurs for a significant time period in the secondary zone without corresponding detection in the primary protection zone; i.e. a person/object is in the entryway but does not enter. Normal secondary protection shall be re-enabled whenever a detection occurs in the primary zone.
d. The reaction time of the door detector sub-system shall not exceed 60 milliseconds when both primary and secondary protection capabilities are active; nor 40 milliseconds when the secondary protection is disabled.
e. Door nudging operation to occur if doors are prevented from closing for an adjustable period of time.

G. Provide microprocessor-based control system with utilizes on-board diagnostics for servicing, trouble-shooting, and adjusting without requiring the use of an outside service tool. If an on-board diagnostic system is not provided, a handheld service tool (or laptop), owner's license, operation manual, and tool instructions must be provided in addition to the control system. System shall be a non-proprietary control system/open protocol. Provide remote elevator monitoring capabilities
1. Locate controller in hoistway or machine room as indicated.

H. Hall Stations
1. Floor Identification Pads: Provide door jamb pads at each floor. Jamb pads shall comply with applicable accessibility standards.
2. All fixtures shall be designed to be VANDAL RESISTANT.
3. Provide keyed hall stations for access at hall stations.

I. Signal Devices and Fixtures
1. Car-Operating Panel: A panel shall be provided which contains all push buttons, key switches, and message indicators for elevator operation. Raised markings Braille markings shall be provided for each push-button.
2. Car Fixture Finish:
a. Satin stainless steel
b. Applied car operating panel shall be furnished. It shall contain a bank of round metal mechanical illuminated buttons. Flush mounted to the panel and marked to correspond to the landings served, an emergency call button, door open and door close buttons, and switches for lights, inspection and the exhaust fan. The emergency call button shall be connected to a bell that serves as an emergency signal. All buttons to have raised numerals and Braille markings. Red LED halo illumination with Flat Flush Target finishes: satin stainless steel.
3. Car Position Indicator.
4. A compliant communication device shall be provided which has been designed in response to applicable accessibility requirements integral with the car operating panel.
5. Car Lantern and Chime: A directional lantern visible from the corridor shall be provided in the car entrance. When the car stops and the doors are opening, the lantern shall indicate the direction in which the car is to travel and a chime will sound.
6. Hall Fixtures: Hall fixtures shall be provided with necessary push buttons and key switches for elevator operation. Raised markings shall be provided for each push-button.
7. Fixture Finish: satin stainless steel.
8. Landing Passing Signal: A chime bell shall sound in the car to tell a passenger that the car is either stopping at or passing a floor served by the elevator.

J. Provide "Firefighter's Emergency Operation" in accordance with ASME A17.1, applicable building codes, and authorities having jurisdiction (AHJ).
   1. Designated Landing: Main Lobby.

2.06 OPERATION CONTROL TYPE

A. Selective Collective Automatic Operation Control: Applies to car in single elevator shaft.
   1. Refer to description provided in ASME A17.1.
   2. Automatic operation by means of one button in the car for each landing served and by "UP" and "DOWN" buttons at the landings.
   3. Stops are registered by momentary actuation of landing car buttons without consideration of the number of buttons actuated or the sequence buttons are actuated, but the stops are made in the order that landings are reached in each direction of travel.
   4. All "UP" landing calls are made when car is traveling in the up direction.
   5. All "DOWN" landing calls are made when car is traveling in the down direction.
   6. Uppermost and lowermost calls are answered as soon as they are reached without consideration of the car travel direction.

2.07 SERVICE CONTROL TYPE

A. Independent Service Control:
   1. Provide key operated "Independent Service" on car operating panel. Key activation will remove that car from normal operation and cancel pre-registered car calls.
   2. Car will respond to selected floor. Car will not respond to any calls from landing call buttons. Car will only respond to calls placed on the car operating panel. Doors will remain open at last landing requested. Doors will close with a constant pressure on "Door Close" button.
   3. Key activation to normal operation will return car to normal operation.

B. Restricted Access Service Control:
   1. Landing Call Lock-out: Provide a key operated switch with spring return with key removable only in "Lock-Out" position in landing control station that performs the following when activated:
      a. Restricts or permits landing call registration for that landing.
      b. Causes the elevator to not respond to that landing.
   2. Allow "Firefighter's Emergency Operation" to take control priority over "Restricted Access Service Control".

2.08 EMERGENCY POWER

A. Elevator to be connected to emergency generator power. Verify all switches and connections are provided.

B. Set-up elevator operation to run with elevator emergency power supply when the normal building power supply fails, and in compliance with ASME A17.1 requirements.

C. Elevator Emergency Power Supply: Supplied by battery backup; provide elevator system components as required for emergency power characteristics.

D. Emergency Lighting: As selected from manufacturers standard line.

E. Provide operational control circuitry for adapting the change from normal to emergency power.

F. Upon transfer to emergency power, advance one elevator at a time to a pre-selected landing, stop car, open doors, disable operating circuits, and hold in standby condition.

2.09 MATERIALS

A. Steel Cylinder Casing: ASTM A139/A139M, Grade A steel.

B. Rolled Steel Sections, Shapes, Rods: ASTM A36/A36M.

C. Steel Sheet: ASTM A1008/A1008M, Designation CS (commercial steel), with matte finish.

D. Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.

E. Stainless Steel Sheet: ASTM A666, Type 441; No. 4 Brushed finish unless otherwise indicated.

F. Stainless Steel Bars, Shapes and Moldings: ASTM A276/A276M, Type 441.

G. Extruded Aluminum: ASTM B221 (ASTM B221M), natural anodized finish unless otherwise indicated.

H. Aluminum Sheet: ASTM B209 (ASTM B209M), 3105 alloy, O temper.

I. Tempered Glass: 1/4 inch minimum thickness, fully tempered in compliance with ASME A17.1, 16 CFR 1201, ANSI Z97.1, and ASTM C1048 tempered glass requirements.

J. Laminated Glass: 3/8 inch minimum thickness, and in compliance with ASME A17.1, 16 CFR 1201, ANSI Z97.1, and ASTM C1172 laminated glass requirements.

2.10 CAR AND HOISTWAY ENTRANCES

A. Elevator, as indicated on drawings:
   1. Car and Hoistway Entrances, Each Elevator Floor Lobby:
      a. Hoistway Fire Rating: As indicated on drawings.
      b. Elevator Door Fire Rating: As indicated on drawings.
      c. Framed Opening Finish and Material: Brushed stainless steel.
      d. Car Door Material: Stainless steel, with rigid sandwich panel construction.
      e. Hoistway Door Material: Stainless steel, with rigid sandwich panel construction.
      f. Door Operation: As indicated on the drawings.
      g. Door Width: As indicated on drawings.
      h. Door Height: As indicated on drawings.
      i. Sills: Extruded aluminum.

B. Sills/Thresholds: Configure to align with frame return and coordinate with floor finish.

C. Gasketing: Provide acoustic type gasketing at hoistway doors and frames to minimize audible noise due to car activities in the hoistway, and air pressure differential between hoistway and landing floors.

2.11 CAR EQUIPMENT AND MATERIALS

A. Elevator Car:
   1. Car Operating Panel: Provide main; flush-mounted applied face plate, with vandal resistant illuminated call buttons corresponding to floors served with hoistway access, "Door Open/Door Close" buttons, "Door Open" button, "Door Close" button, alarm button, and top of car inspection.
      a. Panel Material: Integral with front return; one per car.
      b. Car Floor Position Indicator: Above door with illuminating position indicators.
      c. Locate alarm button where it is unlikely to be accidentally actuated; not more than 54 inch above car finished floor.
      d. Provide IP based communications system with voice simulator to dial alarm monitoring company.
   2. Ventilation: Two speed fan with ventilation per manufacturer standard operation.
   3. Subfloor: Underlayment grade, exterior plywood, 5/8" nominal thickness.
   4. Flooring: See Section 01 6210 - Schedule of Materials and Colors for required flooring. Adjust recess for flooring material as well as load capacity of car.
   5. Wall Base: Recessed stainless steel, 4 inch high.
   6. Front Return Panel: Stainless steel.
   7. Side Walls: Plastic laminate on plywood.
   8. Rear Wall: Plastic laminate on plywood.

9. Hand Rail: Stainless steel, at rear wall. Provide open clearance space 1-1/2 inch (38 mm) wide to face of wall.
    a. Round, Metal Tube: 1-1/2 inch diameter.
    b. Stainless Steel Finish: No. 4 Brushed.
10. Ceiling: Downlight type, metal pans with suspended LED downlights.
    a. Canopy Ceiling: Stainless steel.
11. Provide emergency access panel for egress from car at ceiling.
12. On/Off Light Switch located in car operating panel.

B. Car Accessories:
1. Certificate Frame: Stainless steel frame glazed with tempered glass, and attached with tamper-proof screws.
2. Protective Pads: Canvas cover, padded with impact-resistant fill material, sewn with piping edges; fire resistant in compliance with ASME A17.1, covering side and rear walls and front return; provide one set for each elevator.
    a. Color: As selected by Architect.
    b. Provide at least 4 inch clearance from bottom of pad to finished floor.
    c. Pad Supports: Stainless steel studs, and mounted from ceiling frame.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting this work.

B. Verify that hoistway, pit, and machine room are ready for work of this section.

C. Verify hoistway shaft and openings are of correct size and within tolerance.

D. Verify location and size of machine foundation and position of machine foundation bolts.

E. Verify that electrical power is available and of correct characteristics.

F. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.02 PREPARATION

A. Arrange for temporary electrical power for installation work and testing of elevator components, and comply with requirements of Section 01 5000 - Temporary Facilities and Controls.

B. Maintain elevator pit excavation free of water.

3.03 INSTALLATION

A. Coordinate this work with installation of hoistway wall construction.

B. Install system components, and connect equipment to building utilities.

C. Provide conduit, electrical boxes, wiring, and accessories. Refer to Division 26 for additional information.

D. Install hydraulic piping between cylinder and pump unit.

E. Mount machines, motors, and pumps on vibration and acoustic isolators.
1. Place on structural supports and bearing plates.
2. Securely fasten to building supports.
3. Prevent lateral displacement.

F. Install hoistway, elevator equipment, and components in accordance with approved shop drawings.

G. Install guide rails to allow for thermal expansion and contraction movement of guide rails.

H. Accurately machine and align guide rails, forming smooth joints with machined splice plates.

I. Bolt brackets to self drilling expansion shell anchors.

J. Field Welds: Chip and clean away oxidation and residue with wire brush; spot prime surface with two coats.

K. Install hoistway door sills, frames, and headers in hoistway walls; grout sills in place, set hoistway floor entrances in alignment with car openings, and align plumb with hoistway.

L. Fill hoistway door frames solid with grout in accordance with Section 04 2000.

M. Structural Metal Surfaces: Clean surfaces of rust, oil or grease; wipe clean with solvent; prime two coats.

N. Machine Room Components: Clean and degrease; prime one coat, finish with one coat of enamel.

O. Wood Surfaces not Exposed to Public View: Finish with one coat primer; one coat enamel.

P. Adjust equipment for smooth and quiet operation.

3.04 TOLERANCES

A. Guide Rail Alignment: Plumb and parallel to each other in accordance with ASME A17.1 and ASME A17.2.

B. Car Movement on Aligned Guide Rails: Smooth movement, without any objectionable lateral or oscillating movement or vibration.

3.05 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for additional requirements.

B. Testing and inspection by regulatory agencies will be performed at their discretion.
   1. Schedule tests with agencies and notify Owner and Architect.
   2. Obtain permits as required to perform tests.
   3. Document regulatory agency tests and inspections in accordance with requirements.
   4. Perform tests required by regulatory agencies.
   5. Furnish test and approval certificates issued by authorities having jurisdiction.

C. Perform testing and inspection in accordance with requirements.
   1. Inspectors shall be certified in accordance with ASME QEI-1.
   2. Perform tests as required by ASME A17.2.
   3. Provide at least two weeks written notice of date and time of tests and inspections.
   4. Supply instruments and execute specific tests.

D. Perform tests in the presence of Owner and Architect.

E. Operational Tests:
   1. Perform operational tests in the presence of Owner and Architect.
   2. At an agreed time, and the building occupied with normal building traffic, conduct tests to verify performance.
      a. Furnish event recording of each landing call registrations, time initiated, and response time throughout entire working day.

3.06 ADJUSTING

A. Adjust for smooth acceleration and deceleration of car to minimize passenger discomfort.

B. Adjust with automatic floor leveling feature at each floor landing to reach 1/4 inch maximum from flush with sill.

3.07 CLEANING

A. Remove protective coverings from finished surfaces.

B. Clean surfaces and components in accordance with manufacturers written instructions.

3.08 CLOSEOUT ACTIVITIES

A. See Section 01 7800 - Closeout Submittals, for closeout submittals.

B. See Section 01 7900 - Demonstration and Training, for additional requirements.

C. Demonstrate proper operation of equipment to Owner's designated representative.

D. Demonstration: Demonstrate operation of system to Owner's personnel.
   1. Use operation and maintenance data as reference during demonstration.
   2. Conduct walking tour of project.
   3. Briefly describe function, operation, cleaning and maintenance of each component.

E. Training: Train Owner's personnel on cleaning and operation and maintenance of system.
   1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
   2. Provide minimum of two hours of training.
   3. Instructor: Manufacturer's training personnel.
   4. Location: At project site, unless noted otherwise.

3.09 PROTECTION

A. Do not permit construction traffic within car after cleaning.

B. Protect installed products until Date of Substantial Completion.

C. Touch-up, repair, or replace damaged products and materials prior to Date of Substantial Completion.

3.10 MAINTENANCE

A. Refer to Section 01 7000 - Execution and Closeout Requirements, for additional requirements relating to initial maintenance service.

B. Provide Initial Maintenance Contract of elevator system and components in accordance with ASME A17.1 and requirements as indicated for 12 months from Date of Substantial Completion.

C. Perform maintenance contract services using competent and qualified personnel under the supervision and direct employ of the elevator manufacturer or original installer.

D. Maintenance contract services shall not be assigned or transferred to any agent or other entity without prior written consent of Owner.

E. Examine system components periodically.

F. Include systematic examination, adjustment, and lubrication of elevator equipment.

G. Maintain and repair or replace parts, whenever required, using parts produced by original equipment manufacturer.

H. Perform work without removing cars from use during peak traffic periods.

I. Provide emergency call back service during regular working hours throughout period of this maintenance contract.

J. Maintain an adequate stock of parts for replacement or emergency purposes, and have personnel available to ensure the fulfillment of this maintenance contract without unreasonable loss of time.

END OF SECTION

SECTION 21 1313
FIRE SPRINKLER SYSTEM

PART 1 – GENERAL

1.01 REFERENCE STANDARDS

A. NFPA 13 - Standard for the Installation of Sprinkler Systems; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.02 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.03 GENERAL REQUIREMENTS

A. Provide all piping and equipment shown on the drawings, and all accessories necessary for a complete operating system.

B. Systems and installation shall comply with the requirements of City Fire Marshall, applicable NFPA codes, FM/UL approving agencies and the State Board of Insurance requirements.

C. Sprinkler piping shall not be installed over electrical panels, electrical/technology equipment or transformers. Sprinkler piping shall not be installed beneath HVAC equipment under any circumstance or adjacent to HVAC equipment where it restricts full service access to equipment. Sprinkler piping shall be coordinated with chases when available.

D. All piping through walls (interior and exterior) shall be sleeved with Schedule 40 galvanized piping and sealed per Detail on Plumbing Drawings. All piping through fire walls shall be fire-caulked.

E. Where areas beneath stairs or above ceilings are enclosed, fire sprinkler protection shall be provided as required by Code.

F. All sprinkler piping shall be manufactured in the United States of America by Bull Moose Tube, Wheatland Tube or Allied Tube. All piping shall be labeled by manufacturer along entire length of pipes. Labeling shall indicate SIZE, CLASS, MATERIAL SPECIFICATION, NAME OF MANUFACTURER and COUNTRY OF ORIGIN. Piping not properly labeled by manufacturer with the information listed above will be removed from site and replaced at no cost to Owner. Piping and fittings shall be protected at all times. Piping and fittings resting directly on the ground is NOT acceptable. Provide temporary end caps and end closures on all piping and fittings. Piping found unprotected will be replaced by the Contractor at no additional cost to Owner.

G. Provide pipe markers and valve tags per Section 22 05 53 of the Specifications.

H. Fire Sprinkler System shall be included in the Coordination Drawings. See Section 22 01 00 of the Specifications.

PART 2 – MATERIALS AND METHODS

2.01 GENERAL

A. Engage the services of a sprinkler subcontractor who will perform detailed hydraulic calculations and system design to meet the design requirements as noted on the drawings. The subcontractor shall also furnish and install all equipment and piping according to his approved design. He shall provide all labor, scaffolding and equipment necessary for the performance of this work. Sprinkler Contractor shall have a Licensed Professional Engineer (State of Texas) on staff to perform their fire sprinkler system design and hydraulic calculations. This Engineer shall be the Engineer of Record for the fire sprinkler systems. All fire sprinkler drawings and hydraulic calculations provided by the fire sprinkler contractor shall be sealed and signed (State of Texas Engineer's Seal – RME stamp is not sufficient) by the aforementioned Licensed Professional Engineer – submittal will be REJECTED by LTY otherwise without further review.

B. Each new building includes a separate fire riser to the space, with separate FDC. Provide all required components for each separate system. All signage to be revised for site to dictate changes with fire sprinkler system, and designate the separate systems.

2.02 SCOPE OF WORK

A. The connection to the water main, fire vault and associated backflow preventer, isolating valves, supervisory switch, fire department connection and post indicating valve, and piping to the building are specified on the civil engineering drawings.

B. In location shown on drawings, install system riser including O S & Y valve, check valve, alarm valve, water motor alarm, retarding chamber and, water flow sensor. Where code authority requires, provide wall mounted PIV's for each fire sprinkler zone/system. Provide fire department test valves at appropriate places with approval of the Engineer. Piping for test valves shall not be exposed in any location unless in a mechanical room.

C. Install fire sprinkler system with sprinkler branch piping and sprinkler heads in all areas of the building.

D. All fire sprinkler piping and equipment shall be labeled for identification according to the following requirements:

1. Data/Name plates shall be installed in accordance to Fire Prevention Bureau Standards.

2. Piping shall be identified in mechanical rooms, unfinished spaces without ceilings, above suspended lay-in acoustical ceilings, and crawl spaces for the type of service and direction of flow.

3. All fire prevention equipment shall be identified with data/name plates.

E. Painting: Coordinate all fire sprinkler piping and associated items exposed to view with architect.

2.03 EQUIPMENT AND MATERIALS

A. SPRINKLERS: Provide concealed sprinkler in all areas with ceilings, cover color to coordinate with ceiling color (verify with architect). Install chrome plated, upright type in mechanical rooms or other rooms with no ceiling. Similar style, extended coverage or quick response heads are also acceptable. All sprinkler heads installed in ceiling tile shall be centered in the tile. Provide heavy-duty American-Time model G2036 (no substitutions) red metal guard to protect sprinkler heads from abuse or tampering in high-risk areas on all exposed heads including in mechanical and electrical rooms. Upright heads shall be chrome plated, brass construction and installed a minimum of 6” below overhead structure, ducts, etc. Fusible links shall have a temperature rating of a minimum of 50□ F normal ambient temperature, 145□ F minimum.

1. SPRINKLERS UNDER STAIRS: Provide Victaulic V3802 adjustable low profile concealed sprinkler head.

B. ALARM VALVES: UL approved alarm check valve complete with necessary trimmings, including electric alarm bell as shown on the drawings. Provide supervising switch on interior O S & Y valves for fire alarm interconnection.

C. VALVES AND DEVICES: All sprinkler control valves, alarm check valves, check valve and accessories shall be UL listed and FM approved. 2” and smaller shall be bronze, rising stem, inside screw with solid wedge. Larger valves shall be iron body, bronze trim, rising stem, OS&Y with solid wedge. Check valves shall be cast iron flanged body, bronze fitted, non-slam type. Acceptable manufacturers include Nibco, Tyco, Grinnell, Stockham and Victaulic.

D. PIPING BELOW GRADE: UL/FM listed PVC Class 200 water pipe installed in accordance with the manufacturers recommendations. Provide tracer wire for all underground piping with leads located in accessible area.

E. PIPING ABOVE GRADE: Schedule 40 or heavier, black steel with screwed or Victaulic joint complying with NFPA 13. Thinwall pipe is not acceptable. For every sprinkler head (including end of line sprinkler head), tap main/branch pipe serving each individual sprinkler head on top of pipe to prevent trash from collecting at head. Main or branch pipe shall extend 24” beyond the last sprinkler head tap. For all sprinkler heads except upright type, install swing joint (hard pipe return bend) over to sprinkler head location to prevent corrosion and materials from settling into sprinkler heads. All sprinkler heads installed in ceilings shall be centered in tile. Saddle taps are not acceptable. Where piping is exposed it shall be installed tight to structure and a minimum of eight feet above the floor. No piping shall be exposed beneath stairwells – coordinate fire

sprinkler design accordingly so that areas beneath stairwells are protected without installing exposed piping (i.e. sidewall sprinklers or within chase). All piping shall be manufactured in the United States by Bull Moose Tube, Wheatland Tube or Allied Tube. No foreign manufacturers are acceptable. Braided stainless steel high performance U.L. listed and FM Approved flexible sprinkler head connections manufactured by Victaulic, Viking or Flex-head shall be acceptable to use provided flex connection tap is located on top of main/branch pipe serving flex connection. Where flexible sprinkler head connections are used, provide ceiling bracket assembly from same manufacturer as flexible sprinkler head connection at each sprinkler head that utilizes a flexible connection.

F. FITTINGS: Threaded for 2" and smaller and schedule 40 steel with grooved fittings for sizes larger than 2". Threaded fittings shall be Class 150, malleable iron, manufactured in USA (Anvil is an acceptable manufacturer). Grooved fittings shall be Schedule 40 steel joined with Victaulic style 005, 009, 07, 75 or 77 couplings and Grade "E" gaskets. For outlet fittings, Victaulic reducing couplings/fittings and outlet couplings shall NOT be used - use welded outlet fittings (Anvil is an acceptable manufacturer). Welded joints on pipe runs shall be made with continuous welds and with pipe ends beveled BEFORE fabrication. A hole cutting tool shall be used (Do NOT burn holes in pipe). All fittings shall be UL listed and FM approved for fire sprinkler systems.

G. MISCELLANEOUS PIPING: Piping exposed to view outside such as drain and test piping shall be chrome plated and installed so as not to be a pedestrian hazard or stain building.

H. SIGNS, LABLES AND IDENTIFICATION: Furnish metal signs in accordance with NFPA 13. Provide placards on all control valves, alarm lines, alarm test lines, floor control valves, area control valves, inspector test valves and auxiliary drain locations. Valves, etc. above ceiling or in walls to be provided direct access and the location conspicuously noted by a permanent placard indicating the type of device and the zone it covers. Provide a zone map, mounted in an extruded metal frame with protective plexi-glass cover mounted at the sprinkler zone valve header. Map shall indicate which zone valve controls which portion of the building as well as the location of all system drain and test valves. Label each valve with lamacoid, printed signs (“Inspector’s test”, “Main Drain”, etc.). Map shall reflect the actual room numbers indicated in the final approved graphics package.

I. ACCEPTABLE PIPING MANUFACTURERS: Bull Moose Tube, Allied Tube, Wheatland Tube, American Tube. All piping and fittings shall be manufactured in the United States.

J. ACCEPTABLE ACCESSORY MANUFACTURERS: Grinnell, Reliable, Tyco, Victaulic and Viking (All equipment such as retarding chamber, valves, sprinkler heads, alarms and similar items shall be from the same manufacturer.)

K. SLEEVES: Provide sleeves through all wall penetrations (no exceptions). For penetrations through interior non-rated sheetrock walls provide 16g Snap-Locking sleeves. Provide Schedule 40 Galvanized sleeves for all other wall penetrations including but not limited to: Exterior walls, interior masonry walls and all two hour and above fire barriers. Provide UL listed fire barrier method for caulking for all fire rated walls.

L. BENTONITE PLUG: Provide bentonite plug at fire sprinkler building water entry. See structural details for additional requirements on bentonite plug installation.

2.04 PIPE SUPPORTS

A. GENERAL: Provide pipe supports and guides of size and type to support pipe as well as limit movement. Minimum size hanger rod shall be 3/8”. Piping connected to a piece of equipment shall have a support located near enough to the equipment that there will be no pipe weight supported by the equipment. In no case shall the nearest support be more than two feet horizontally from the connection point. Pipe support material shall be selected to be compatible with the pipe material to prevent galvanic corrosion. Un-insulated copper piping shall be wrapped with gas wrap tape at each hanger (minimum 2” beyond hanger) and supports shall be hot dipped copper clad or plastic covered. Vertical pipe shall support per the manufacturer’s recommendations.

B. HORIZONTAL PIPING:

1. SUPPORT SPACING: As recommended by support manufacturer, but spaced not more than below:

2. Pipe Size Steel Pipe Other Pipe

3. 1" & Smaller 6 Feet 4 Feet

4. 1¼" & 1½" 8 Feet 5 Feet

5. 2" 8 Feet 5 Feet

6. 2½" to 4" 8 Feet 6 Feet

7. 6" and Larger 8 Feet 6 Feet

8. SUPPORT FROM ABOVE: Support piping near roof or upper floor from structure if sufficient strength exists. Use a method suitable for type of construction and of sufficient strength. Use threaded steel hanger rods of diameter required to safely support loads. Minimum size hanger rod shall be 3/8”. Install rods through holes drilled in beam flanges, 1½" x 1½" x 8" angles welded to structural members or top cord slot at joist panel points and secure with large washers and nuts. Refer to structural drawing details for additional information. Do not use perforated strap. CONCRETE ANCHORS SHALL NOT BE USED.

9. HANGERS: Manufactured by Anvil, Grinnell or Tolco.

a. SINGLE RUNS OF PIPE, NO EXPANSION PROBLEM: Adjustable clevis type Grinnell Figure 260.

b. MULTIPLE RUNS: Trapeze hangers.

c. BEAM CLAMPS: Grinnell Figure 92 for smaller pipe

d. BEAM CLAMPS: Grinnell Figure 228 (storm or sanitary 8” and larger)

10. SUPPORT FROM BELOW: All piping near the floor, or where ceiling structure does not have sufficient strength, or where there is no ceiling shall be supported from below. Support members shall be steel pipe with base plates, or welded steel structure suitably braced. Unless described by detail on the drawings, provide Tolco Pipe Pier Supports four foot on center to support piping on the roof. Select for proper weight loading.

11. SUPPORT MATERIAL FINISH: Galvanized or cadmium plated steel.

12. PIPE SADDLES: Install 18 gauge, formed galvanized sheets at each support point for insulated pipe, shaped to fit pipe, and covering bottom half of pipe. Length at saddle shall be not less than twice the insulation outside diameter, 16” minimum length. Provide compressible gasketing between non-insulated plastic pipe and hangers. Provide insulating material between dissimilar metal.

13. SWAY BRACING: Piping shall be braced as necessary to prevent excessive movement of pipe due to water flow.

2.05 SYSTEM TESTING

A. All underground piping shall be thoroughly flushed in accordance with NFPA 13 and 24. The flush test shall be witnessed by the proper governing authority.

B. All underground piping shall be hydrostatically tested at 200 psi (1378.95 kPa) for a period of two hours. Comply with NFPA 13 and 24.

C. All above ground piping shall be hydrostatically tested at 200 psi (1378.95 kPa) for a period of two hours. All piping, valves and sprinkler heads shall be water tight.

D. Provide inspector's test connection at the required test points. Provide and install AGF model 1000 test and drain/test valves shall be located out in the system piping, not at the building service entrance. Drain/test stations shall NOT be located in high traffic areas, in areas where susceptible to vandalism or above ceilings under any circumstances. Locate all drain/test stations with discharge piped to exterior of building in grassy areas where possible (avoid discharge allowed onto sidewalks or concrete). All drain/test stations shall be clearly shown by subcontractor on design drawings submitted to Owner and LT&Y for approval. Failure to show drain/test station locations will result in immediate rejection of submittal without further review.

E. All testing shall be subject to the guidelines outlined in 22 00 00 – General Plumbing, Paragraph 1.24 – MEP INSPECTIONS section of the Specifications.

2.06 SPARES

A. Provide sprinkler box with a minimum of 12 spare sprinkler heads. Provide an assortment of head types in proportion to those types installed with a minimum of two of each type. Include sprinkler head wrench to fit each type head installed.

2.07 GUARANTEE

A. All materials and installation shall be guaranteed for one year from Owner's acceptance.

2.08 SUBMITTALS

A. Submit equipment, hydraulic design calculations and layout drawings for approval. Hydraulic Calculations and Layout Drawings shall be sealed and signed by the Licensed Engineers (State of Texas) on staff with the fire sprinkler contractor that performed the design and calculations. LTY WILL NOT REVIEW SUBMITTAL UNLESS ALL SHEETS ARE SEALED AND SIGNED BY THE FIRE SPRINKLER CONTRACTORS LICENSED PROFESSIONAL ENGINEER. These drawings shall be approved by the applicable state and insuring agencies. Alternately, contractor may submit design drawings for preliminary approval prior to submitting to governing agencies. After agency approval, resubmit to architect for final approval.

B. Submittal drawing shall show the location of ductwork, mechanical equipment above the ceiling, ceiling devices, and other items that may cause conflict with sprinkler piping and sprinkler heads. Drawings shall indicate height of pipes not in mechanical rooms, and any pipe that cannot be installed above 8 feet (243.84 cm) shall be highlighted. Piping shall be coordinated with ductwork contactor and may require relocation due to mechanical/plumbing ductwork and piping constraints.

C. Submittal drawing shall show the location of all drain and test valves and piping discharge.

D. Provide a printed sheet giving brief instructions relative to all necessary aspects of sprinkler controls and emergency procedures next to sprinkler riser mains. Instruction shall be protected by glass or a transparent plastic cover. Provide zoning map of building framed and mounted at fire sprinkler riser.

E. Approval of these submittals shall not be construed as releasing the contractor from compliance with the contract Documents. They are a means of coordinating the work and aiding in the proper selection and installation of equipment. Do not release items such as fire dampers and starters until associated equipment or ductwork drawings are approved. All materials and equipment shall be subject to final acceptance by the Engineer at the completion of construction and adjustments of the system.

F. If a submittal is returned to the Contractor marked “Rejected” or “Revise and Resubmit”, only one (1) additional submittal will be permitted without the Contractor incurring charges for the additional re-submittals. LTY shall be reimbursed by the Contractor for any expense in

connection with any necessary submission in addition to the two (2) submissions allowed. Contractor will be billed by LTY a flat rate of $1,000 plus any additional expenses for each re-submittal that is in addition to the two (2) submissions allowed.

2.09 RECORD DRAWINGS AND CALCULATIONS

A. During the course of construction, the Contractor shall revise their design drawings and calculations to reflect any changes which are made. At completion of job, updated Design Drawings and Hydraulic Calculations that have been signed and sealed by the Contractor's design engineer shall be included in the Operations and Maintenance Manual that the Contractor provides for the Owner when the project has been completed. Record drawings shall include exact installed locations of all piping, sprinkler heads, zone valves and drain/test valves. See Section 22 00 00 of the Specifications for additional requirements.

B. Provide zoning map of buildings framed and mounted at each fire sprinkler riser.

2.10 CONSTRUCTION PHASING

A. Phasing of construction shall be the sole responsibility of the General Contractor. Construction phasing shall accommodate all needs and schedules required by the Owner. All costs for construction shall be included in the price submitted by the Contractor on the bid date. No additional money will be approved for the Contractor or their sub-contractors to accommodate costs (including labor) associated with construction phasing.

END OF SECTION

SECTION 22 0000
GENERAL PLUMBING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 INTENT OF DRAWINGS AND SPECIFICATIONS

A. Drawings and Specifications are intended to be complimentary. Any work exhibited in either of them whether in the other or not, is to be executed according to true intent and meaning thereof, the same as if set forth in all. Should any work required by the drawings and specifications be in violation of any Federal, State, County or City laws, ordinance or regulation, those laws and regulations shall prevail, and shall be complied with by the Contractor as a part of this work with no extra compensation.

B. The drawings are schematic in nature but show the various components of the system approximately to scale and indicate how they are to be integrated with other parts of the building. Determine exact locations by close coordination with the Owner's Representative, job measurements, determining the requirements of other trades and reviewing all contract documents. The Drawings indicated general routing of the various parts of the systems, but do not indicate all fittings, offsets and runouts which are required. The Contract includes these items as required to fit the system into spaces allotted for them.

C. Equipment that is scheduled is the basis of the design, and have been coordinated for space, installation and electrical requirements. Space, installation and electrical requirements for other equipment and models from acceptable manufacturers have not been verified or coordinated. Contractor shall verify these requirements prior to using other equipment in his bid and include any additional costs for installation of the equipment. This includes general construction and MEP costs.

1.03 PERMITS AND FEES

A. The contractor shall obtain and pay for all permits and licenses, file all notices, pay all legal fees and comply with all laws, ordinances, rules and regulations bearing on the conduct of the work specified or shown on the drawings. This applies to Federal, State and Local Codes and Requirements. Approval to the various insuring and inspection authorities shall also be obtained. Refer to Architectural sections for additional information.

1.04 GUARANTEE

A. All materials, apparatus and equipment furnished and installed under this Section of these Specifications shall be new and free from any defects when accepted by the Owner and shall be guaranteed in writing for a period of one year from the date of acceptance by the Owner unless noted to have extended warranties.

1.05 COOPERATION

A. The Contractor shall cooperate with other trades on the job and make installations in the proper sequence during the construction of the buildings, and he shall notify the Architect well in advance of construction of all interference of his work with that of other trades and of building construction. This notification shall not relieve the contractor of his responsibilities.

1.06 VISITING THE SITE

A. The Contractor shall be familiar with the Drawings and Specifications and shall have examined the premises and understand the conditions under which he will be obligated to operate in performing the contract. No allowance shall be made consequently for any error through negligence in this regard.

1.07 WORKMANSHIP

A. All work shall be performed in a neat workmanlike manner and in the best practice of the trade. Only workmen skilled in the trades shall be employed to perform the work included in these specifications.

1.08 MATERIALS

A. Materials, when not otherwise definitely specified, shall conform to applicable National Specifications and Standards. All materials shall be certified to not contain any asbestos or other material banned by the Environmental Protection Agency. Lead shall not be used in any material, pipe or solder in contact with the domestic water system.

B. The names of manufacturers and model numbers have been used in the Contract Documents to establish type of equipment and standard of quality. Where only one name is mentioned for a particular item of material, then that manufacturer is the only one acceptable. Where several names are mentioned, any one of those listed may be furnished provided submittal contains sufficient information to show complete compliance with contract Documents. No attempt has been made to determine if each manufacturer listed will produce material that will comply with all requirements of this project or will fit the allotted space; if they do, then it will be acceptable.

C. Requests for substitution during the bidding period, in accordance with the requirements of the Special Conditions, must be accompanied by a complete product submittal with all features,

accessories and capacities noted. Large equipment must include a 1/4" scale drawing showing how the equipment and required access space are compatible with the available space. Acceptance for bidding does not waive the post bidding requirement for formal submittal and approval.

1.09 REMOVAL OF RUBBISH AND CLEAN-UP

A. Keep area of operations free from accumulation of waste material or rubbish at all times. At the completion of the work, remove all rubbish, tools, scaffolding and surplus materials from the area of operations. The exposed parts of the Mechanical installation which are to be painted shall be thoroughly cleaned of cement, plaster, grease, oil spots and other materials in preparation for painting. All piping shall be cleaned of cement, plaster and other construction debris prior to being concealed above accessible ceilings or being insulated. Clean exposed piping prior to final inspection. All construction areas shall be left "broom" clean on a daily basis. Prior to final acceptance, vacuum clean all mechanical rooms including equipment.

1.10 LUBRICATION

A. After the installation is completed, lubricate all moving parts of all equipment furnished under this Division of the Specifications requiring same. Leave with the Owner a brief but complete set of lubrication instructions, showing the recommended frequency of lubrication and the type of lubricant recommended for each piece of equipment.

1.11 NOISE AND VIBRATIONS

A. The Contractor shall guarantee that the entire system and its component items of equipment, as installed by him, shall operate without objectionable vibration or noises, as determined by the Architect. If, in the opinion of the Architect, objectionable vibration or transmission thereof to the building occurs, the Contractor shall execute such remedial measures as are necessary to eliminate such unsatisfactory operating conditions and the material and labor thereby required shall be performed at the Contractor's expense.

1.12 RELATED WORK SPECIFIED IN OTHER SECTIONS

A. ELECTRICAL: Power wiring is specified in the Electrical Section. Interlock and control wiring (any voltage) is specified under this Section. Controllers and starters, unless part of a motor control center, are specified under this Section.

B. PAINTING OF EQUIPMENT, PIPING AND ACCESSORIES: Painting Section. However, all items furnished under this Section shall be kept clean and free from corrosion.

C. OPENINGS: Various Sections. However, the locations of all inserts and openings shall be determined under this Section and coordinated with other Sections in ample time to avoid cutting new construction.

D. CUTTING, PATCHING AND FURRING: Various Sections. However, the locations of all inserts and openings shall be determined and coordinated with other sections.

E. EQUIPMENT AND PIPING SUPPORTS: Refer to structural drawings, details and notes for specific support and pipe hanging requirements. Specific loading and attachment methods shall be followed to assure that individual structural members are not overloaded.

1.13 GENERAL EQUIPMENT REQUIREMENTS

A. Manufacturer's printed directions shall be followed for preparing, assembling, installing, erecting and cleaning manufactured materials or equipment, unless otherwise directed.

1.14 SHOP DRAWINGS

A. Submit seven complete sets of shop drawings checked and certified by the contractor as being checked, and lists of materials furnished under this Division. Shop drawings shall be approved before installation of the material under consideration.

B. Shop Drawings shall consist of published ratings of capacity data, detailed construction drawings, wiring and control diagrams, performance curves, installation instructions, manufacturer's installation drawings and other pertinent data. Where the literature is submitted covering a group or series of similar items, the item under consideration shall be clearly indicated. Shop drawing shall list VOC of materials. Materials with VOC levels higher than LEED and code requirements will be rejected. Drawings shall be submitted showing revisions to equipment layouts due to use of alternate or substitute equipment. The front sheet of each copy of the submittal shall have the following typed information. Any submittal without all of the below information will be rejected without review:

1. Job name and location.
2. General Contractor's name, address, Project Manager's name and telephone number.
3. Submitting Sub-contractor's name, address, Project Manager's name and telephone number.
4. Suppliers company name, address, salesman's name and telephone number.
5. Signature of an officer or attorney-in-fact of the Sub-contractor with date and title and a statement that the submittal materials and equipment complies with the Contract Documents.

C. Equipment that has regional representation shall only be supplied by the regional representative that serves the area where the project is located. The regional representative’s name and signature shall be included with the shop drawing.

D. Shop Drawings are required for but are not limited to the following items:

Plumbing Carriers, Drains & Cleanouts	Water Heaters
Plumbing Piping Insulation	Plumbing Fixtures & Equipment
Pipe Markers and Valve Tags	Plumbing Piping, Valves & Fittings
Coordination Drawings	Fire Sprinkler Drawings & Hydraulic Calcs
Sample Test Wells	Fire Sprinkler Equipment, Piping and Valves
Acid Neutralization Tanks	Domestic Water Booster Pumps
Fire Pumps and Controllers	Surge Tank

E. Approval of these submittals shall not be construed as releasing the contractor from compliance with the contract Documents. They are a means of coordinating the work and aiding in the proper selection and installation of equipment. Do not release items such as fire dampers and starters until associated equipment or ductwork drawings are approved. All materials and equipment shall be subject to final acceptance by the Engineer at the completion of construction and adjustments of the system.

F. If a submittal is returned to the Contractor marked “Rejected” or “Revise and Resubmit”, only one (1) additional submittal will be permitted without the Contractor incurring charges for the additional re-submittals. LTY Engineers (LTY) shall be reimbursed by the Contractor for any expense in connection with any necessary submission in addition to the two (2) submissions allowed. Contractor shall pay LTY $500 for review of EACH additional submission beyond the two (2) submissions allowed. For shop drawing submittals beyond the two (2) submissions allowed, a $500 cashier’s check shall be included with such submittals or LTY will not review the submittal.

1.15 PROTECTION OF EQUIPMENT

A. Do not deliver equipment to jobsite until progress of construction has reached the stage where equipment is actually needed, or until building is closed in enough to protect equipment from the weather. Equipment allowed to stand in weather will be rejected, and Contractor is obligated to furnish new equipment at no cost to Owner.

B. Adequately protect equipment (including all Owner-furnished items) from damage after delivery to job. Cover with heavy cloth as required to protect from damage.

C. Equipment which has been damaged by construction activities will be rejected. Contractor shall furnish new equipment at no cost to Owner.

1.16 CUTTING AND PATCHING

A. Coordinate the work with other trades to arrange for all holes, chases, and other spaces necessary for the installation of all components of the mechanical systems. Inform the other trades in ample time for these to be provided. Failure to comply with this requirement may necessitate cutting and patching work. If such work becomes necessary, it will be done under this Section of the specifications, and shall conform to all applicable requirements of other Sections of the Specifications.

1.17 STRUCTURAL STEEL

A. All structural steel used for the purpose of fabricating pipe supports, pipe guides, pipe anchors, equipment supports, and framing for large ducts and plenums, shall conform to ASTM Designation A-36. All steel used for these purposes shall be new, clean, straight and galvanized.

1.18 CONCRETE PADS

A. All equipment mounted on the floor shall have a concrete house keeping pad. Concrete pads shall be sized for the equipment to be supplied. Pad shall exceed base dimensions by approximately 4" all around. Reinforce pads rebar including #4 bar around perimeter. Tool pad to form chamfered edge. Nominal thickness shall be 4”. Refer to details for outdoor equipment.

1.19 SPARE PARTS LISTS, OPERATING INSTRUCTIONS

A. At completion of job, furnish three copies of spare parts lists and operating instructions for all equipment furnished under this Division. These lists and instructions shall be published by the manufacturer of the equipment and shall be in good condition. Bind in 3-ring binder with project name.

1.20 TOOLS AND SPARE PARTS

A. Upon completion of the installation, deliver to the Owner all tools and spare parts that are furnished by the Equipment Manufacturer for use with the equipment furnished under this Contract.

1.21 RECORD DRAWINGS

A. Maintain at the job site a separate set of white prints (blue line or black line) of the contract drawings for the sole purpose of recording the "as-built" changes and diagrams of those portions of work in which actual construction is at variance with the contract drawings. Mark the drawings with a colored pencil. Prepare, as the work progresses and upon completion of work, reproducible drawings clearly indicating locations of various lines, valves, ductwork, traps, equipment, and other pertinent items, as installed. Include flowline elevation of sewer lines. Record existing and new underground and under slab piping with dimensioned locations and elevations of such piping.

B. At the conclusion of project, obtain copy of the original drawings and transfer as-built changes to these in PDF format. As-built documents shall be submitted to A/E teams for review and approval. Deliver the accepted as-built documents in both printed format and digital saved in thumb drive to the Owner. Delivery of these as-built prints is a condition of final acceptance.

C. As-Built drawings should indicate the following information as a minimum:

1. Indicate all addendum changes to documents.
2. Remove Engineer’s seal, name, address and logo from drawings.
3. Mark documents RECORD DRAWINGS.
4. Clearly indicate: DOCUMENT PRODUCED BY
5. Indicate all changes to construction during construction. Indicate actual routing of all piping, ductwork, etc. that were deviated from construction drawings.
6. Indicate exact location of all underground plumbing and flow line elevation.
7. Indicate exact location of all underground plumbing piping and elevation.
8. Indicate exact location of all underground electrical raceways and elevations.
9. Revise schedules to reflect (actual) equipment furnished and manufacturer.
10. During the execution of work, maintain a complete set of drawings and specifications upon which all locations of equipment, ductwork, piping, devices, and all deviations and changes from the construction documents in the work shall be recorded.
11. Location and size of all ductwork and mechanical piping above ceiling including exact location of plumbing isolation valves.
12. Exact location of all electrical equipment in and outside of the building.
13. Fire Protection System documents revised to indicate exact location of all sprinkler heads and zone valves.
14. Exact location of all roof mounted equipment, wall, roof and floor penetrations.
15. Cloud all changes.

1.22 OWNER'S INSTRUCTIONS

A. Provide four hours of instruction to the Owner's designated personnel upon completion of the system's installation.

1.23 ALTERNATES

A. Determine the scope of each specified alternate proposal by carefully reading all Divisions of the Documents. The Bid Form contains information explaining the extent of the construction to be performed under a specific alternate. Alternate proposals, which are not predominantly mechanical in scope, are described in other Divisions of these Documents. Pay particular note to re-roofing items that may necessitate adjustments to existing piping.

B. Alternative Equipment: Certain types of equipment as listed below require the specified brand and model to be included in the base bid. At the contractor's option, he may propose equivalent equipment from one of the listed alternate manufacturers for one or more of these types of equipment. The contractor shall list in this alternate bid the name of the item, manufacturer's name, model number and the amount to be deducted from his base bid.

1.24 MEP INSPECTIONS

A. Contractor shall formally request inspections from LTY and owner to review any and all MEP installations. Inspections shall include but not be limited to: pipe tests, underground installations prior to backfill, rough-in installations, wall cover inspections, above ceiling inspections, final inspection. Owner and City shall also be included in inspection requests; however, approval of installation by Owner or City does NOT absolve the Contractor of the required inspection and approval of all Plumbing installations by LTY nor take the place of the required inspection and approval of all Plumbing installations by LTY.

B. Information required from Contractor on each and every request for inspection is as follows:

1. Specific type of test (i.e. hydrostatic test, etc.).

2. Exact location of test (i.e. area of building with room numbers, riser number for sanitary waste / vent plumbing tests, etc.).

3. Description of test (i.e. partial inspection, walls only, chase walls, wall cover, ceiling cover, etc.)

4. Exact time test started (required test time per Project Manual will need to have elapsed prior to LTY inspection). Estimated time test will start will not be acceptable.

5. Pressure reading on gauge at time of request for all pipe tests (provide picture of gauge with request).

6. Verification from General Contractor with name of person that verified, that specific test has been verified by the Contractor and all sub-contractors to meet all requirements of the Specifications and Codes (prior to inspection request).

C. Contractor shall provide a MINIMUM of 48-hour notice prior to requested inspection time, no exceptions.

D. INSPECTION REPORTS: After each inspection, LTY will generate an inspection report and distribute promptly. The Contractor will then be given 7 working days from date of report to address all deficiencies listed on the report. The GENERAL CONTRACTOR shall verify that all items on each inspection report have been addressed by their subcontractors in this time period. Once verified the GENERAL CONTRACTOR shall sign-off on each deficiency listed on the report and return the signed-off copy of the inspection report to LTY via e-mail. After the signed-off report is returned to LTY, the GENERAL CONTRACTOR shall request a re-inspection by LTY to

close the report. If after 7 working days no re-inspection is requested by the GENERAL CONTRACTOR to close a report, LTY reserves the right to re-inspect whenever our schedule allows, with these re-inspections still being subject to Paragraph E below.

E. TEST REJECTIONS AND RE-INSPECTIONS: If a test is rejected or a re-inspection of an issued LTY Inspection Report is found to NOT be completely addressed, only ONE (1) additional inspection will be permitted without the Contractor incurring charges for each additional inspection required. LTY shall be reimbursed $500 by the GENERAL CONTRACTOR for expenses in connection with EACH inspection in addition to the two (2) inspections allowed. For inspections beyond the two (2) allowed inspections, a $500 cashier's check shall be provided at the time of each additional inspection or LTY will not perform the inspection.

1.25 CONSTRUCTION PHASING

A. Phasing of construction shall be the sole responsibility of the General Contractor. Construction phasing shall accommodate all needs and schedules required by the Owner. All costs for construction shall be included in the price submitted by the Contractor on the bid date. No additional money will be approved for the Contractor or their sub-contractors to accommodate costs (including labor) associated with construction phasing.

END OF SECTION

SECTION 22 0100
COORDINATION DRAWINGS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 SUBMITTALS

A. Provide submittals as outlined in Section 22 00 00 General Plumbing

PART 2 – REQUIREMENTS

2.01 COORDINATION DRAWINGS

A. The Mechanical Contractor shall take the lead in coordinating the Mechanical (HVAC), Electrical, Plumbing and Fire Protection Systems within the building.

B. The Mechanical Contractor shall coordinate a three dimensional (3-D) model of the building which includes the Mechanical (HVAC), Electrical, Plumbing and Fire Protection Systems. The Electrical, Plumbing and Fire Protection Contractors shall prepare their work and generate 3-D models which will be given to the Mechanical Contractor for coordination. The Contractor will be provided with the REVIT model and AutoCAD files that were used to generate the contract documents. These files may be used as the background file. The Contractor shall replace the systems drawn with the actual shop drawing models. The Contractor is not limited to using REVIT but may use any 3-D software in generating and combining the coordination model. If an alternate software is used, all contractors must agree to provide compatible software models.

C. Submitting the contract drawings as coordination drawings will not be acceptable.

D. The model shall include detailed and accurate representations of all equipment to be installed based upon the reviewed equipment submittals.

E. The Mechanical Contractor shall hold a 3-D coordination meeting with all sub-contractors present to review the model and discuss coordination of the installation of the building systems.

F. Upon completion of the coordination meeting, the Contractor shall submit the 3-D model and 1/4” scale drawings for review.

G. The model shall detail major elements, components, and systems in relationship with other systems, installations and building components. Indicate locations where space is limited for

installation and access, and where sequencing and coordination of installations are of importance to the efficient flow of the Work, including (but not necessarily limited to) the following:

H. Indicate the proposed locations of pipe, duct, equipment and other materials. Include the following:

1. Wall and type locations
2. Clearances for installing and maintaining insulation.
3. Locations of light fixtures and sprinkler heads.
4. Clearances for servicing and maintaining equipment, including tube removal, filter removal, and space for equipment disassembly required for periodic maintenance.
5. Equipment connections and support details.
6. Exterior wall and foundation penetrations.
7. Routing of storm and sanitary sewer piping.
8. Fire-rated wall and floor penetrations
9. Sizes and locations of required concrete pads and bases.
10. Valve stem movement.
11. Structural floor, wall and roof opening sizes and details.

I. Indicate scheduling, sequencing, movement, and positioning of large equipment in the building during construction.

J. Prepare floor plans, elevations, and details to indicated penetrations in floors, walls and ceilings and their relationship to other penetrations and installations.

K. Prepare reflected ceiling plans to coordinate and integrate installations, air distribution devices, light fixtures, communication systems components and other ceiling mounted items.

L. Sequence of Coordination

M. Below is hierarchy of model elements and the sequencing by which the models will be coordinated:

N. Structural and Architectural Model

O. Miscellaneous steel

P. Perform preliminary space allocation

Q. Identify hard constraints (locations of access panels, lights, A/V space requirements, etc.

R. Main and medium pressure ducts from the shaft out

S. Main graded plumbing lines and vents.

T. Sprinkler mains and branches

U. Cold and hot water mains and branches

V. Lighting fixtures and plumbing branches

W. Smaller sized ducts and flex ducts

X. Smaller size cold water and hot water piping, flex ducts, etc.

Y. The Contractor and Sub-Contractors shall not install any item until the coordination has been completed and reviewed by the Construction Manager, Owner and A/E Team.

Z. This Contractor shall be responsible for coordination of all items that will affect the installation of the work of this Division. This coordination shall include but not be limited to: ampacity, capacity, electrical and piping connections, space requirements, system construction, building requirements and special conditions.

AA. By submitting shop drawings on the project, this Contractor is indicating that all necessary coordination has been completed and that the systems, products and equipment submitted can be installed in the building and will operate as specified and intended, in full coordination with all other Contractors and Subcontractors.

END OF SECTION

SECTION 22 0553
IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

1.02 THE GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL, SUPPLEMENTARY AND SPECIAL CONDITIONS, APPLY TO THE WORK SPECIFIED IN THIS SECTION.

PART 2 – MATERIALS AND METHODS

2.01 PIPE MARKING

A. Identify all new system piping. Use Opti-Code Brady pressure sensitive adhesive pipe markers consisting of pipe marker and direction of flow arrow tape. Background colors of markers, arrows and tape of each type of pipe system shall be of appropriate legend and background color to meet all ANSI/OSHA/ASME standards, complete with direction arrow. Select appropriate size for O.D. of piping including insulation. Clean pipe PRIOR to installation of pipe markers. Markers or arrows not wrapping the full circumference of the pipe shall be tie wrapped in place, otherwise taped at each end around full circumference of pipe. Provide minimum 2-1/4” letters through 4” pipe and 4” letters for piping larger than 4”. For exterior piping or piping inside mechanical rooms, provide Snap-Around pipe markers up to 4” pipe and Strap-Around pipe markers for piping larger than 4”. Manufacturer shall be Brady or approved equal.

B. Apply markers as follows:

1. At input and output of each piece of equipment inside building.
2. At each valve not in a mechanical room.
3. At every point a pipe enters or exits a wall or floor (both sides of wall or floor).
4. At intervals not exceeding 20 feet (609.6 cm).
5. Any location where view is obstructed.

C. These markers shall conform to OSHA and ANSI A 13.1 Codes. Arrow markers must have same ANSI background colors as their companion pipe markers and wrap completely around pipe with 3” overlap.

D. Pipe markers and arrow markers shall be provided as follows:

1. Domestic Cold Water
2. Domestic Hot Water (with flow direction)
3. Domestic Hot Water Return (with flow direction)
4. Sanitary Waste
5. Sanitary Vent
6. Roof Drain Leader
7. Overflow Roof Drain Leader
8. Fire Sprinkler Piping
9. Compressed Air

E. MANUFACTURER PIPE LABELING: All piping shall be labeled by manufacturer along entire length of pipes. Labeling shall indicate SIZE, CLASS, MATERIAL SPECIFICATION, NAME OF MANUFACTURER and COUNTRY OF ORIGIN. Piping not properly labeled by manufacturer with the information listed above will be removed from site and replaced at no cost to Owner.

2.02 EQUIPMENT MARKING

A. GENERAL: Each piece of plumbing equipment shall be suitably marked with the name as listed on the plans. Name shall be prominently displayed so it may be easily located and read after equipment installation. Pumps may be marked on adjacent piping.

B. The following equipment shall be marked with lamacoid nameplate, 2" high letters:

1. Water Heaters
2. Air Dryers
3. Air Compressors

C. The following equipment shall be marked with laminated engraved plastic nameplate with 1.25" high letters, fastened with epoxy or screws:

1. Circulator Pumps

2.03 VALVE MARKING

A. Each valve, except those located adjacent to the equipment they serve, shall have a tag of heavy-gauge 1½" diameter brass, stamped and engraved in black with the valve number and service symbol. Attach tag to the valve handle with a chain of similar gauge and material.

B. On the "As Built" Drawings, mark the symbol and number of all valves, exactly as the valves are tagged.

C. Furnish a valve schedule properly identifying the valve number and service with the exact location, the material within the pipe and the room numbers or area that the valve serves. This schedule shall be furnished on reproducible film suitable for reproduction on an ozlid machine.

D. Provide one valve schedule, as above, installed in aluminum frame with lexan shield, and mount on wall of main equipment room.

E. At valves above accessible ceilings, at ceiling tee intersection nearest the valve location, glue red dot for hot water valves and blue dot for cold water valves.

2.04 PAINTING

A. GENERAL: All piping or insulation on piping exposed to view shall be painted color directed by Architect. Insulated pipe with required metal jacket shall not be painted unless directed by Architect. Reference Architectural Contract Documents. All above grade gas piping shall be painted.

B. PAINT TYPE: Industrial grade, high gloss enamel over suitable primer. Provide two finish coats.

C. COLOR CODING: (Verify with Architect prior to painting)

END OF SECTION

SECTION 22 0719
PLUMBING PIPING INSULATION

PART 1 – GENERAL

1.01 REFERENCE STANDARDS

A. ASTM D5590 - Standard Test Method for Determining the Resistance of Paint Films and Related Coatings to Fungal Defacement by Accelerated Four-Week Agar Plate Assay; 2017 (Reapproved 2021).

1.02 RELATED DOCUMENTS

1.03 THE GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL, SUPPLEMENTARY AND SPECIAL CONDITIONS, APPLY TO THE WORK SPECIFIED IN THIS SECTION.

1.04 GENERAL REQUIREMENTS

A. Install all insulation in conformance with manufacturer's recommendations and these specifications.

B. All interior adhesives and sealants must meet VOC limit requirements of South Coast Air Quality Management District (SCAQMD) Rule #1168. Must comply with the TIPS requirements.

C. All interior paints and coatings must meet VOC limit requirements of South Coast Air Quality Management District (SCAQMD) Rule #1113 and Green Seal GS-11 and GS-03. Must comply with the TIPS requirements.

D. Insulation materials manufactured by the following list of companies will be acceptable provided their materials conform to these specifications (see Paragraph on Substitution): Armstrong, CertainTeed, Childers, Foster, Knauf, Koolphen, Manville, Owens-Corning and Pittsburg-Corning.

E. Flame Spread and Smoke Requirements:

1. All jackets, adhesives, coatings, insulating materials and vapor barrier mastics for piping and equipment shall have a flame spread not higher than 25 and smoke developed rating not higher than 50.

2. All materials containers shall have a U. L. Label.

F. At each pipe support point, provide formed 16 gauge galvanized sheet metal saddle, with length three times pipe size, 8” minimum. Sheet metal saddle shall be secured to pipe insulation using aluminum band at both ends of saddle. For piping 1½” and larger, install a hard section of

Koolphen K phenolic foam pipe insulation, with length three times pipe size, minimum 8" length, on lower 180° of piping, 360° if clamps are used on top of pipe, same thickness as adjacent insulation, to prevent compression at support bearing area. Seal and finish to match adjoining insulation. Pipe supports should be outside of insulation.

G. Any wall penetrations shall be large enough for pipe and insulation without any compromise to insulation.

H. Install .020" thick aluminum jacket with minimum 2” overlap joint on all insulated piping exposed outside building. Install factory made aluminum covers on all elbows. Cut aluminum neatly to fit all tees, such that all insulation is covered by aluminum. Use waterproofing aluminum colored Foster 95-44 or Childers CP-76-1 sealer to seal all joints. Provide .020x3/4” aluminum bands not more than 12" on center for all jacketing. Install aluminum covers on insulated pipe inside that is exposed to view in finished areas including inside gymnasiums, shop areas and any areas with partial or no ceilings. Cover is not required in mechanical or AHU rooms. Jacketing in contact with soil shall be .010" stainless steel.

PART 2 – MATERIALS AND METHODS

2.01 DOMESTIC COLD WATER PIPING

A. Insulate all water piping outside and above grade, in exterior walls, within eight (8) feet of exterior walls, inside concrete block walls (not including 6” or deeper chase walls unless concrete touches piping), inside walls where concrete touches piping, central mechanical and boiler room piping, piping inside the building but outside the building insulation (i.e. above insulation on ceiling), in basements and all unconditioned spaces and all piping subject to condensation with 1.5" thick factory molded fiberglass pipe covering, density not less than 3 pounds per cubic foot, conductivity (k) not higher than .25 at 100° mean temperature difference with factory attached fire retardant, vapor barrier jacket. Piping exposed to view in finished areas, including inside gymnasiums, shall have aluminum jacketing per specification.

B. For piping outside or in unconditioned buildings or spaces, including pipe entry to building at grade and backflow preventers, provide 1.5” thick, 3.7 PCF, Molded Koolphen K phenolic foam pipe insulation. Install .010” stainless steel protective jacket from building wall to 6” below grade. Insulation and jacketing for backflow preventers shall be installed with easily removable sections to allow periodic servicing, testing and inspection of backflow preventer without damaging insulation installation or integrity.

C. Install insulation over pipe and carefully connect self sealing laps. Provide 3" butt strips at each joint between sections, sealed with Foster 85-75 or Childers CP-82 adhesive. Coat all vapor retarder film (ASJ) longitudinal and butt joints with anti-fungal Foster 30-80AF vapor barrier coating to prevent moisture ingress. Coating permeance shall be 0.013 perms or less at 43 mil (1.0922 mm) dry thickness as tested by ASTM E96 and meet ASTM D5590 with 0 growth rating. Reinforcing mesh shall be 10x10 Childers Chil Glas #10 or Foster Mast a Fab. This application shall provide a minimum dry film thickness of 37 mils.Apply Foster 95-50 or Childers CP-76

insulation joint sealant in phenolic insulation longitudinal and butt joints to prevent moisture ingress.

D. Insulate fittings with pre-molded cover of same materials and thickness as pipe covering. Field fabricated, mitred fittings will not be accepted. Coat all fittings and elbows with anti-fungal Foster 30-80AF vapor barrier coating and reinforcing mesh. Coating permeance shall be 0.013 perms or less at 43 mil (1.0922 mm) dry thickness as tested by ASTM E96 and meet ASTM D5590 with 0 growth rating. Finish all joints and seams smooth and even. Reinforcing mesh shall be 10x10 Childers Chil Glas #10 or Foster Mast a Fab. This application shall provide a minimum dry film thickness of 37 mils.

2.02 DOMESTIC HOT WATER AND TEMPERED WATER PIPING

A. Insulate all hot water supply and return piping, including tempered water and booster heater piping, with factory molded pipe covering made from glass fibers; 2" thick with density not less than 3 pounds per cubic foot; conductivity (k) not higher than .25 at 100° mean temperature difference; with factory attached fire retardant jacket. Piping exposed to view in finished areas, including inside gymnasium, shall have aluminum jacketing per specification.

B. Install insulation over pipe and carefully connect self sealing laps. Provide 3" butt strips at each joint between sections, sealed with Foster 85-75 or Childers CP-82 adhesive. Coat all vapor retarder film (ASJ) longitudinal and butt joints with anti-fungal Foster 30-80AF vapor barrier coating to prevent moisture ingress. Coating permeance shall be 0.013 perms or less at 43 mil (1.0922 mm) dry thickness as tested by ASTM E96 and meet ASTM D5590 with 0 growth rating. Reinforcing mesh shall be 10x10 Childers Chil Glas #10 or Foster Mast a Fab. This application shall provide a minimum dry film thickness of 37 mils.Apply Foster 95-50 or Childers CP-76 insulation joint sealant in phenolic insulation longitudinal and butt joints to prevent moisture ingress.

C. Insulate fittings with pre-molded cover of same materials and thickness as pipe covering. Field fabricated, mitred fittings will not be accepted. Coat all fittings and elbows with anti-fungal Foster 30-80AF vapor barrier coating and reinforcing mesh. Coating permeance shall be 0.013 perms or less at 43 mil (1.0922 mm) dry thickness as tested by ASTM E96 and meet ASTM D5590 with 0 growth rating. Finish all joints and seams smooth and even. Reinforcing mesh shall be 10x10 Childers Chil Glas #10 or Foster Mast a Fab. This application shall provide a minimum dry film thickness of 37 mils.

2.03 SANITARY DRAIN PIPING ABOVE GRADE

A. GENERAL: Insulate horizontal piping, floor drain bodies, elbow at drain, first elbow that turns down and all piping in ceiling plenums of sanitary system serving floor and hub drains receiving condensate from air conditioning and refrigeration equipment. Also insulate all plastic piping inside walls (if any) where concrete touches piping.

B. MATERIALS: 1½" thick flexible fiberglass blanket with vapor barrier or 1" thick fiberglass pipe insulation with vapor barrier.

C. EXECUTION: Seal vapor retarder laps with white Foster 85-75 or Childers CP-82 and staple at 4" on center. Vapor seal staples with Foster 30-80AF. Provide 3" butt strips at each joint between sections and seal as above. Install vapor stop every 15'-0" using Foster 30-80AF. Coating permeance shall be 0.013 perms or less at 43 mil (1.0922 mm) dry thickness as tested by ASTM E96 and meet ASTM D5590 with 0 growth rating. Finish all joints and seams smooth and even. Reinforcing mesh shall be 10x10 Childers Chil Glas #10 or Foster Mast a Fab. This application shall provide a minimum dry film thickness of 37 mils. Piping exposed to view in finished areas, including inside gymnasiums, shall have aluminum jacketing per specification.

2.04 STORM DRAINAGE PIPING ABOVE SLAB

A. GENERAL: Insulate HORIZONTAL AND VERTICAL piping including roof drain bodies. Overflow drains and piping are included in this specification. All piping above grade shall be insulated.

B. MATERIALS: 1½" thick flexible fiberglass blanket with vapor barrier or 1" thick fiberglass pipe insulation with vapor barrier.

C. EXECUTION: Seal vapor retarder laps with white Foster 85-75 or Childers CP-82 and staple at 4" on center. Vapor seal staples with Foster 30-80AF. Provide 3" butt strips at each joint between sections and seal as above. Install vapor stop every 15'-0" using Foster 30-80AF. Coating permeance shall be 0.013 perms or less at 43 mil (1.0922 mm) dry thickness as tested by ASTM E96 and meet ASTM D5590 with 0 growth rating. Finish all joints and seams smooth and even. Reinforcing mesh shall be 10x10 Childers Chil Glas #10 or Foster Mast a Fab. This application shall provide a minimum dry film thickness of 37 mils. Piping exposed to view in finished areas, including inside gymnasiums, shall have aluminum jacketing per specification.

2.05 DRINKING FOUNTAIN DRAIN LINES

A. Insulate from connections to fountains to connection to next larger size drain, or, if drain runs into floor, from fountain to floor, with 1/2" thick pipe covering the same as for Domestic Cold Water Piping.

END OF SECTION

SECTION 22 0800
PLUMBING SYSTEMS TECHNICAL COMMISSIONING REQUIREMENTS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions Specification Sections, apply to this Section.

B. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them.

1.02 SUMMARY

A. The purpose of this Section is to define responsibilities in the Commissioning Process. Additional system testing is required within individual Specification Sections.

B. Commissioning agent shall be selected and employed by owner.

C. Commissioning requires the participation of the Contractor to ensure that all systems are operating in a manner consistent with the Contract Documents. Division 20-25 Contractors shall be familiar with all parts of the Commissioning Plan issued by the Owner's CxA, shall execute all Commissioning responsibilities assigned to them in the Contract Documents and include the cost of Commissioning in the Contract price.

D. Plumbing systems to be commissioned include the following:

1. Domestic Water Heaters

2. Domestic Water Circulation Pumps

1.03 DEFINITIONS

A. Refer to the General Commissioning Requirements for definitions.

1.04 SUBMITTALS

A. Contractor shall provide Owner and/or CxA with documentation required for Commissioning Work. At minimum, documentation shall include: Detailed Start-up procedures, full sequences of operation, Operating and Maintenance data, performance data, control drawings, and details of Owner-contracted tests.

1. Shop drawings and product submittal data related to systems or equipment to be commissioned.

B. Contractor shall submit to Owner and/or CxA installation and checkout materials actually shipped inside equipment and actual field checkout sheet forms used by factory or field technicians.

C. Where installation testing may be performed in a progressive manner (i.e., piping hydrostatic testing), the Contractor shall prepare and submit to the Owner, A/E team and CxA a testing plan that details how the progressive testing will be performed, documented, and presented for approval prior to the start of any testing activities.

D. Contractor shall provide any additional documentation needed to complete the requirements of the Commissioning Process

1. Factory Performance Test Reports: Review and compile all factory performance data to assure that the data is complete prior to executing the FPTs.

2. Installation testing reports such as piping hydrostatic testing, piping chemical treatment and flushing, bolt flange torqueing, and any documentation associated with local code authority inspections or authorizations.

3. Completed equipment Start-up certification forms along with the manufacturer's field or factory performance and Start-up test documentation.

4. Operating and Maintenance (O&M) information per requirements of the Technical Specifications and Division 01 requirements.

PART 2 – PRODUCTS

2.01 GENERAL

A. All materials and installation shall meet or exceed all applicable referenced standards, federal, state, and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

B. Refer to the General Commissioning Requirements for other work products related to the Commissioning Process

C. Contractor is required to follow all applicable industry and site specific safety practices, lockout / tagout requirements, specialized PPE requirements, and provide qualified, trained personnel to execute Commissioning Process requirements.

2.02 TEST EQUIPMENT

A. Contractor shall provide all specialized tools, test equipment and instruments required to execute Start-up, checkout, and testing of equipment.

B. All specialized tools, test equipment, and instruments required to execute Start-up, checkout, and testing of equipment shall be of sufficient quality and accuracy to test and/or measure system performance within specified tolerances. A testing laboratory must have calibrated test equipment within the previous twelve (12) months. Calibration shall be NIST traceable. Contractor must calibrate test equipment and instruments according to manufacturer's recommended intervals and whenever the test equipment is dropped or damaged. Calibration tags must be affixed to the test equipment or certificates readily available.

PART 3 – EXECUTION

3.01 CONSTRUCTION PHASE

A. In each purchase order or subcontract that is written for changes in scope, include the appropriate requirements for submittal data, Commissioning documentation, testing assistance, Operating and Maintenance (O&M) data, and training, as a minimum.

B. Attend Pre-Commissioning Meeting(s) with commissioning agent, owner and design team to discuss intent and standards, Pre-Installation Meeting(s) with commissioning agent, owner, general contractor and subconsultants, and other Project meetings scheduled by the Owner, CxA or Contractor to facilitate the Commissioning process.

C. Provide manufacturer's data sheets and shop drawing submittals of equipment.

D. Provide additional requested documentation to the Owner and/or CxA, prior to O&M manual submittals, for development of System Verification Checklists and Functional Performance Testing procedures.

1. Typically, this will include detailed manufacturer's installation and Start-up, operating,

2. troubleshooting and maintenance procedures, full details of any Owner-contracted tests, full factory testing reports, if any, and full warranty information.

3. In addition, the installation, Start-up, and checkout materials that are actually shipped inside the equipment and the actual field checkout sheet forms to be used by the factory or field technicians shall be submitted to the Contractor and/or CxA.

4. This information and data request may be made prior to normal submittals.

E. During the installation, Start-up and initial checkout process, execute and document related portions of the System Verification Checklists for all commissioned equipment according to the procedures indicated in the Commissioning Plan.

F. Factory Start-ups: Factory Start-ups are specified for certain equipment. Factory Start-ups generally are Start-up related activities that will be reviewed and checked prior to Functional Performance Tests. All costs associated with factory Start-ups shall be included with the contract price unless otherwise noted. Notify the Commissioning Team of the factory Start-up schedule and coordinate these factory Start-ups with witnessing parties. The Commissioning Team members may witness these Start-ups at their discretion.

G. Independent Testing Agencies: For systems that specify testing by an independent testing agency, the cost of the test shall be included in the Contract price unless otherwise noted. Testing performed by independent agencies may cover aspects required in the System Verification Checklists, Start-ups, and Functional Performance Tests. Coordinate with the independent testing agency so that CxA, Owner and/or A/E can witness the test to ensure that applicable aspects of the test meet requirements.

H. Incorporate manufacturer's Start-up procedures with System Verification Checklists (SVC).

I. Provide skilled technicians to execute starting of equipment and to assist in execution of Functional Performance Tests. Ensure that they are available and present during the agreed-upon schedules and for a sufficient duration to complete the necessary tests, adjustments, and problem solving.

J. Correct deficiencies (differences between specified and observed performance) as interpreted by the Owner's Project Manager and A/E and retest the system and equipment.

K. During construction, maintain as-built marked-up Drawings and Specifications of all Contract Documents and Contractor-generated coordination Drawings. Update after completion of Commissioning activities (include deferred tests).

L. Provide training of the Owner's operating personnel as specified.

M. Coordinate with equipment manufacturers to determine specific requirements to maintain the validity of the warranty.

3.02 WARRANTY PHASE

A. Execute seasonal or deferred tests, witnessed by the CxA and Owner, according to the Specifications.

1. Complete deferred tests as part of this Contract during the Warranty Period. Schedule this activity with the Owner.

B. Correct deficiencies and make necessary adjustments to O&M manuals, Commissioning documentation, and as-built drawings for applicable issues identified in any deferred or seasonal testing.

3.03 INSTALLATION

A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.

B. All installation shall be in accordance with the Project Documents.

3.04 TRAINING

A. Refer to the individual section of this Specification for specific training requirements on each system.

B. Refer to the General Commissioning Requirements and Division 01 for overall training requirements related to the Commissioning process and this project.

END OF SECTION

SECTION 22 1111
NATURAL GAS PIPING

PART 1 – GENERAL

1.01 REFERENCE STANDARDS

A. ASTM D2513 - Standard Specification for Polyethylene (PE) Gas Pressure Pipe, Tubing, and Fittings; 2024, with Editorial Revision (2025).

B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.02 RELATED DOCUMENTS

1.03 THE GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL, SUPPLEMENTARY AND SPECIAL CONDITIONS, APPLY TO THE WORK SPECIFIED IN THIS SECTION.

1.04 GENERAL REQUIREMENTS

A. Piping shall be installed in a neat and orderly manner parallel to building coordinates with vertical drops. Piping shown underground shall be buried a minimum of 12 inches (304.8 mm) to top of pipe. Piping in the vicinity of equipment shall be arranged to not interfere with access panels and maintenance space. Provide unions, flanges, and shutoff valves to allow removal of the equipment and its subassemblies.

B. Piping shall be concealed in wall, chases, and above ceilings except in the vicinity of equipment. All materials shall conform with the requirements of the local code authority.

C. All below grade non-metallic, non-conducting pipe not under building slab shall have a tracer wire installed parallel to pipe. Tracer wire shall be a 14 gage, solid copper wire with PVC jacket with all joints and splices sealed water-tight. Carry end of wire up through slab and terminate in an accessible location. Provide identification label attached to wire.

D. All piping, fittings and valves shall be manufactured in the United States of America. Acceptable pipe manufacturers are Bull moose Tube and Wheatland. Other domestic manufacturers will be considered for approval.

E. Provide pipe markers, pipe painting and valve tags per the Specifications, Section 22 05 53.

PART 2 – METHODS

2.01 EXCAVATION AND BACKFILLING

A. GENERAL: Provide all excavation and backfilling required for the proper installation of all underground piping and other components installed below grade.

B. EXCAVATION: Trench with ladder type trenching machine. Make trenches 6" wider than outside diameter of pipe. Excavate, backfill and grade trench bottom.

C. BACKFILLING:

1. Backfill for pipe in City Property must comply with City requirements.

2. For non-drainage lines backfill with approved backfill material to 95% standard proctor, by hand compaction.

2.02 PIPE SUPPORTS

A. GENERAL: Provide pipe supports and guides of size and type to support pipe as well as limit movement. Minimum size hanger rod shall be 3/8”. Piping connected to a piece of equipment shall have a support located near enough to the equipment that there will be no pipe weight supported by the equipment. In no case shall the nearest support be more than two feet horizontally from the connection point. Pipe support material shall be selected to be compatible with the pipe material to prevent galvanic corrosion.

B. HORIZONTAL PIPING:

1. SUPPORT SPACING: As recommended by support manufacturer, but spaced not more than below:

a. Pipe Size Steel Pipe

b. 1" & Smaller 6 Feet

c. 1¼" & 1½" 8 Feet

d. 2" 8 Feet

e. 2½" to 4" 8 Feet

f. 6" and Larger 8 Feet

2. SUPPORT FROM ABOVE: Support piping near roof or upper floor from structure if sufficient strength exists. Use a method suitable for type of construction and of sufficient strength. Use threaded steel hanger rods of diameter required to safely support loads. Minimum size hanger rod shall be 3/8”. Install rods through holes drilled in beam

flanges, 1½" x 1½" x 8" angles welded to structural members or top cord slot at joist panel points and secure with large washers and nuts. Refer to structural drawing details for additional information. Do not use perforated strap. DO NOT USE CONCRETE ANCHORS.

3. HANGERS: Manufactured by Anvil, Grinnell or Tolco.

   a. SINGLE RUNS OF PIPE, NO EXPANSION PROBLEM: Adjustable clevis type Grinnell Figure 260.

   b. BEAM CLAMPS: Grinnell Figure 92 for smaller pipe

4. SUPPORT FROM BELOW: All piping near the floor, or where ceiling structure does not have sufficient strength, or where there is no ceiling shall be supported from below. Support members shall be steel pipe with base plates, or welded steel structure suitably braced.

5. SUPPORT MATERIAL FINISH: Cadmium plated steel (including all thread rods).

2.03 VALVE INSTALLATION

A. Ball valves shall be installed such that handle for valve is positioned on the side of the pipe and is pulled down to close the valve.

2.04 TESTING GAS PIPING SYSTEMS

A. GENERAL: All new and existing gas piping shall be tested and repaired as required for safe operation and the passing of the Texas Railroad Commission requirements.

B. GAS PIPING TESTING

1. Preliminary gas test as required by Code, but a minimum test pressure of 50 PSIG held for not less than eight hours without noticeable drop.

2. Test joints with a soap solution while lines are under pressure. Repair any leaks that are detected.

3. Final gas test shall be with a diaphragm gauge with a minimum dial size of 3.5 inches (88.9 mm) with a set hand and a pressure range not to exceed 20 PSIG with 2/10 pound increments. The minimum test pressure shall be not less than 10 PSIG and the maximum pressure shall not exceed 12 PSIG. The test shall be observed by the Owner's Representative AND LTY for a minimum of 30 minutes with no drop in pressure.

4. Perform gas piping test as required by the Texas Railroad Commission and submit competed Texas Pipeline Safety Form PS-86B.

5. Provide a copy of the gas pressure test reports in the Operations & Maintenance Manual provided at closeout.

C. FINAL TEST: Subject each piping system to its normal operating pressure and temperature for not less than twenty-four hours. The piping systems must remain absolutely tight during this period. The satisfactory completion of any test or series of tests will not relieve the contractor of responsibility for ultimate proper and satisfactory operation of piping systems and their accessories.

2.05 SLEEVES

PROVIDE SLEEVES FOR ALL PIPING PASSING THROUGH WALLS, FLOORS NOT ON GRADE AND ROOF SLABS. MAKE SLEEVES OF GALVANIZED PIPE AND SIZED TO PROVIDE CLEARANCE OF 1/4" AROUND PIPING OR PIPE INSULATION IF PIPE IS INSULATED. SET END OF SLEEVE FLUSH WITH THE SURROUNDING SURFACE OF WALL OR CEILING IN WHICH SLEEVE IS INSTALLED. FLOOR SLAB SLEEVES SHALL EXTEND 3" ABOVE FLOOR LEVEL. PROVIDE VENTED SLEEVES FOR ALL GAS PIPING BELOW FLOOR SLABS OR PAVED AREAS. PIPES THROUGH GRADE BEAMS SHALL BE SLEEVED PER STRUCTURAL ENGINEER'S DRAWINGS. AS A MINIMUM PIPE SHALL BE WRAPPED WITH 1" THICK CLOSED CELL PIPE INSULATION.

2.06 PLATES

PROVIDE CHROMIUM PLATED WALL AND CEILING PLATES FOR ALL EXPOSED PIPING, AT POINT PIPING PASSES THROUGH WALLS OR CEILINGS. PLATES SHALL BE LARGE ENOUGH TO COMPLETELY COVER PIPE SLEEVES. ON INSULATED PIPING, INSIDE DIAMETER OF PLATES SHALL JUST EXCEED OUTSIDE DIAMETER OF PIPE COVERING. PLATES MAY BE OMITTED FOR PIPE SIZES LARGER THAN 6".

2.07 VALVE AND FITTING SIZES

A. All hand valves, fittings and other piping accessories shall be size of the line in which installed unless specifically indicated otherwise on the Drawings.

2.08 DIELECTRIC UNIONS

A. Provide dielectric insulating unions at all connections between dissimilar metals, except at final fixture connections, such as galvanized pipe connection to brass water faucet.

2.09 FITTINGS

1. SCREWED: Conform to ANSI Specification B16.3.

2.10 VALVES AND DEVICES

A. GENERAL: All pressures shown below are minimum working pressures.

B. GAS VALVES (Ball valves only):

1. GAS VALVES: Ball type ANSI B16.33-1981, ANSI B16.38-1978 or UL 842-1980 approved and rated at the gas pressure of application. Nibco T-580-70-UL. Provide stainless steel trim.

2. SMALL GAS COCKS: Nibco T-585-70-UL. Provide stainless steel trim.

3. UNIONS: Brass insert, ground joint

C. ACCEPTABLE MANUFACTURERS: Milwaukee, Hammond and Nibco

PART 3 – MATERIALS

3.01 NATURAL GAS, OUTSIDE BUILDING

A. GENERAL: Gas utility company will provide and install metering equipment for 5 psi (34.47 kPa) service pressure. Extend piping from meter to building and install pressure reducing valve at building. Provide grounding per NFPA 70.

B. MATERIALS:

1. ABOVE GROUND: Schedule 40 black steel, ASTM ERW A-53, Grade B or ASTM A106, with welded joints. Joints shall be welded except that piping smaller than 2” may have Class 150 malleable iron screw type fittings. Fittings for welded pipe will be socket-weld type. Threaded nipples less than 1/2” shall be Schedule 80. All thread nipples are not allowed. All bolts, nuts and all thread used in the piping system and components shall be cadmium plated to resist rust. For gas piping at emergency generator and rooftop ac units, flex connection shall NOT be concealed inside equipment housing – install hard pipe from equipment connection to outside housing and install flexible connection outside housing.

2. BELOW GRADE: Polyethylene gas piping conforming to ASTM D2513, installed per manufacturer's requirements. Install minimum #14 copper wire in trench with pipe for locating purposes. Install X-Truecoat type schedule 40 steel pipe riser or anodeless riser for the last five feet before exiting ground. Specify with sleeve when installed through or concrete. Install dielectric union after piping exits the ground. No polyethylene or flexible piping shall be exposed above ground. Piping shall have socket heat fusion joints and fittings. For pipe sizes 1.5-2”, piping shall be SDR-11. For pipe sizes 3-4”, piping shall be SDR-11.5. Piping shall be manufactured by JM Eagle or other approved domestic manufacturer.

C. TESTING: As required by Code but minimum test pressure of 50 PSI held for not less than 24 hours without noticeable drop. Test all joints with a soap solution while lines are under pressure. Provide test tee in pipe at meter and downstream of building pressure reducing station. Reference Paragraph 2.4 – Testing Gas Piping Systems. Testing requirements shall meet requirements listed in Paragraph 2.4.

D. SLEEVES: Install pipe in vented sleeves when passing under roads, driveways, parking lots and similar areas. Sleeves shall be Schedule 40 PVC below grade and Schedule 40 galvanized steel otherwise. Install vent in a manner to prevent entry of rainwater, insects or foreign objects.

E. PAINTING: All gas piping outside shall be painted with two coats of industrial grade, yellow epoxy paint.

3.02 NATURAL GAS, INSIDE BUILDING

A. GENERAL: Extend gas to all fixtures, appliances and equipment as required.

B. MATERIALS ABOVE GRADE: Schedule 40 black steel, ASTM ERW A-53, Grade B or ASTM A106. Joints shall be welded except that piping smaller than 2” may have Class 150 malleable iron screw type fittings. Fittings for welded pipe will be socket-weld type. Threaded nipples less than 1/2” shall be Schedule 80. All thread nipples are not allowed. All bolts, nuts and all thread used in the piping system and components shall be cadmium plated to resist rust. Final connections at low pressure appliances shall be corrugated flexible brass connections with epoxy coating, complying with ANSI ANS-Z21-24-1981, minimum pressure rating of 1/2 PSI. Science lab gas cocks shall be “hard piped” with schedule 40 black steel as specified above. Flex connections will not be accepted at gas cocks.

C. MATERIALS BELOW GRADE: Do not install piping below grade.

D. INSTALLATION:

1. Do not install any gas piping in unventilated spaces unless totally encased with airtight sleeving. NO GAS PIPING SHALL BE INSTALLED INSIDE WALLS. Sleeving shall be all metallic construction, welded or screwed black steel, Schedule 10 or heavier. Sleeves shall be vented as shown on the Drawings.

2. Provide an all brass lever handle gas cock in an accessible location branch line at each individual piece of gas consuming equipment.

3. Branch connections to gas consuming equipment shall be size indicated on the Drawings up to points immediately adjacent to equipment. Do not reduce to size of equipment until immediately adjacent to equipment.

4. All welded connections shall be made with bevel-ended pipe by certified welders.

5. All branch connections shall be made off the top of the main line.

E. TESTING: As required by Code but minimum test pressure of 50 PSI held for not less than 24 hours without noticeable drop. Test all joints with a soap solution while lines are under pressure. Reference Paragraph 2.4 – Testing Gas Piping Systems. Testing requirements shall meet requirements listed in Paragraph 2.4.

F. PAINTING: All gas piping shall be painted with two coats of industrial grade, yellow epoxy paint.

3.03 GAS PRESSURE REGULATORS:

A. Size for full connected load, with stop valves on both inlet and outlet connections.

B. Equip with internal relief valve to vent full capacity if regulator fails wide open. Extend full size vent without reduction to the outside.

C. Provide weather and bug proof screening on vent.

D. Select orifices for inlet pressures established by gas company serving the building, and for outlet pressures as required to serve the proper pressure at the items of equipment being supplied.

E. Outlet pressure shall be field adjustable.

F. Capacities as indicated in Schedule plus 10%.

G. Unit shall conform to latest published ANSI Code.

H. ACCEPTABLE MANUFACTURERS: Invensys, Rockwell or Sensus.

END OF SECTION

SECTION 22 1116
DOMESTIC WATER PIPING

PART 1 – GENERAL

1.01 REFERENCE STANDARDS

A. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2021.

B. ASTM B42 - Standard Specification for Seamless Copper Pipe, Standard Sizes; 2020.

C. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2022.

D. ASTM B828 - Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings; 2023.

1.02 RELATED DOCUMENTS

1.03 THE GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL, SUPPLEMENTARY AND SPECIAL CONDITIONS, APPLY TO THE WORK SPECIFIED IN THIS SECTION.

1.04 GENERAL REQUIREMENTS

A. Piping shall be installed in a neat and orderly manner parallel to building coordinates with vertical drops. Piping shown underground shall be buried a minimum of 12 inches (304.8 mm) to top of pipe. Piping in the vicinity of equipment shall be arranged to not interfere with access panels and maintenance space. Provide unions, flanges, and shutoff valves to allow removal of the equipment and its subassemblies without having to remove excessive amounts of building piping or drain water systems.

B. Piping shall be concealed in wall, chases, and above ceilings except in the vicinity of equipment such as water heaters. Hot water shall be piped to left hand side of plumbing fixtures as user faces fixture. All materials shall conform with the City Building Code.

C. All piping, fittings and valves shall be manufactured in the United States of America.

D. Provide pipe markers and valve tags per Section 22 05 53 Identification of Plumbing Piping and Equipment.

PART 2 – METHODS

2.01 EXCAVATION AND BACKFILLING

A. GENERAL: Provide all excavation and backfilling required for the proper installation of all underground piping and other components installed below grade.

B. EXCAVATION: Trench with ladder type trenching machine. Make trenches 12" to 18" wider than outside diameter of pipe. Excavate, backfill and grade trench bottom.

C. BACKFILLING:

1. Backfill for pipe in City Property must comply with City requirements.

2. For non-drainage lines backfill with approved backfill material to 95% standard proctor, by hand compaction.

D. SAFETY SYSTEMS: Refer to Architectural Sections for additional requirements.

E. BENTONITE PLUG: Provide bentonite plug building water entry. See structural details for additional requirements on bentonite plug installation.

2.02 PIPE SUPPORTS

A. GENERAL: Provide pipe supports and guides of size and type to support pipe as well as limit movement. Minimum size hanger rod shall be 3/8”. Piping connected to a piece of equipment shall have a support located near enough to the equipment that there will be no pipe weight supported by the equipment. In no case shall the nearest support be more than two feet horizontally from the connection point. Pipe support material shall be selected to be compatible with the pipe material to prevent galvanic corrosion. Un-insulated copper piping shall be wrapped with gas wrap tape at each hanger (minimum 2” beyond hanger). Vertical copper piping shall have a minimum on one intermediate support if over five feet.

B. HORIZONTAL PIPING:

1. SUPPORT SPACING: As recommended by support manufacturer, but spaced not more than below:

a. Pipe Size Steel Pipe Other Pipe

b. 1" & Smaller 6 Feet 4 Feet

c. 1¼" & 1½" 8 Feet 5 Feet

d. 2" 8 Feet 5 Feet

e. 2½" to 4" 8 Feet 6 Feet

f. 6" and Larger 8 Feet 6 Feet

2. SUPPORT FROM ABOVE: Support piping near roof or upper floor from structure if sufficient strength exists. Use a method suitable for type of construction and of sufficient strength. Use threaded steel hanger rods of diameter required to safely support loads. Minimum size hanger rod shall be 3/8". Install rods through holes drilled in beam flanges, 1½" x 1½" x 8" angles welded to structural members or top cord slot at joist panel points and secure with large washers and nuts. Refer to structural drawing details for additional information. Do not use perforated strap. DO NOT USE CONCRETE ANCHORS.

3. HANGERS: Manufactured by Anvil, Grinnell or Tolco.

   a. SINGLE RUNS OF PIPE, NO EXPANSION PROBLEM: Adjustable clevis type Grinnell Figure 260.

   b. MULTIPLE RUNS: Trapeze hangers.

   c. BEAM CLAMPS: Grinnell Figure 92 for smaller pipe

   d. BEAM CLAMPS: Grinnell Figure 228 (storm or sanitary 8" and larger)

4. SUPPORT FROM BELOW: All piping near the floor, or where ceiling structure does not have sufficient strength, or where there is no ceiling shall be supported from below. Support members shall be steel pipe with base plates, or welded steel structure suitably braced.

5. SUPPORT MATERIAL FINISH: Galvanized or cadmium plated steel.

6. PIPE SADDLES: Install 18 gauge, formed galvanized sheets at each support point for insulated pipe, shaped to fit pipe, and covering bottom half of pipe. Length at saddle shall be not less than twice the insulation outside diameter, 16" minimum length. Provide compressible gasketing between non-insulated plastic pipe and hangers. Provide insulating material between dissimilar metal.

C. PLUMBING CHASE PIPING: Plumbing piping located in chases and at individual fixtures not located at chases shall be rigidly supported and aligned using the Sumner Pipe Support and Alignment System, Hubbard Holdrite System or Unistrut with U-bolts and pipe clips.

2.03 VALVE INSTALLATION

A. Ball and butterfly valves shall be installed such that handle for valve is positioned on the side of the pipe and is pulled down to close the valve. Provide access panels of adequate size for concealed valves. All valves above a ceiling shall be installed within 24" of the ceiling. All valves shall be located such that there is NO OBSTRUCTION for accessing or operating valve. Do not install valves directly above casework or partitions.

2.04 CLEANING DOMESTIC WATER PIPING

A. Flush thoroughly, sterilize with chlorine solution for minimum 24 hours, then flush clean. Strength of chlorine solution, minimum dosage 50 ppm, and methods must comply with local Code and Health Authorities. At completion, there must be no discernible odor. System shall be flushed afterwards until remaining chlorine content is less than 0.2 ppm. Post warnings until sterilization is complete.

2.05 TESTING PIPING SYSTEMS

A. GENERAL: Test all piping systems to assure that they are absolutely leak free. Pipe to be insulated shall be proved leak free before pipe is concealed. LTY to witness and approve all testing. If piping is concealed prior to LTY witnessing and approving testing, contractor shall expose entire piping system and re-test piping for LTY to witness and approve.

B. PRESSURE TEST METHOD: Hydraulically test (no air testing allowed) domestic water piping with a minimum test pressure of 150 psig (1034.21 kPa). Maintain pressure for 8 hours. During this test period, inspect all pipe fittings and accessories in the piping and eliminate all leaks.

C. FINAL TEST: Subject each piping system to its normal operating pressure and temperature for not less than twenty-four hours. The piping systems must remain absolutely tight during this period. The satisfactory completion of any test or series of tests will not relieve the contractor of responsibility for ultimate proper and satisfactory operation of piping systems and their accessories.

2.06 SLEEVES

A. Provide sleeves for all piping passing through walls, floors not on grade and roof slabs. Make sleeves of galvanized pipe and sized to provide clearance of 1/4" around piping or pipe insulation if pipe is insulated. Set end of sleeve flush with the surrounding surface of wall or ceiling in which sleeve is installed. Floor slab sleeves shall extend 3" above floor level. Pipes through grade beams shall be sleeved per structural engineer’s drawings. As a minimum pipe shall be wrapped with 1” thick closed cell pipe insulation.

2.07 PLATES

A. Provide chromium plated wall and ceiling plates for all exposed piping, at point piping passes through walls or ceilings. Plates shall be large enough to completely cover pipe sleeves. On insulated piping, inside diameter of plates shall just exceed outside diameter of pipe covering. Plates may be omitted for pipe sizes larger than 6".

2.08 VALVE AND FITTING SIZES

A. All hand valves, fittings and other piping accessories shall be size of the line in which installed unless specifically indicated otherwise on the Drawings.

2.09 DIELECTRIC UNIONS

A. Provide dielectric insulating unions at all connections between dissimilar metals, except at final fixture connections, such as galvanized pipe connection to brass water faucet.

2.10 FITTINGS

A. COPPER: Conform to ANSI Specification B16.22.

2.11 VALVES, STRAINERS, AND DEVICES

A. GENERAL: All pressures shown below are minimum working pressures. Provide memory stops for valves used for throttling service.

B. GATE VALVE FOR PLUMBING SYSTEMS: No gate valves shall be used.

C. BUTTERFLY: Provide for pipe larger than 3” only, 200# full lug ductile iron type body, EPDM stem seals and seat liner, aluminum bronze disc, 416 stainless steel stem, extended neck for insulated lines, notched top plate with handle for throttling. All valves certified suitable for dead end service with no downstream flange. Nibco LD-2000.

D. BALL VALVE FOR PLUMBING SYSTEMS: Provide for 3" and smaller pipe: Bronze body, threaded connection, full port, Teflon seat, stainless steel trim, extension stem for insulation. Nibco T-585-66-LF-EL.

E. CHECK: 2" and under, 125# bronze body, bronze swing check with Teflon seat; 2½" and over 125# iron body, flanged, bronze trim. Nibco T-413-Y-LF or W-920-W-LF.

F. INSULATION PROVISIONS: Valves on insulated lines shall have stems extending through insulation.

G. INSTALLATION: Ball and butterfly valves shall be installed such that handle for valve is positioned on the side of the pipe and is pulled down to close the valve. All valves above a ceiling shall be installed within 24” of the ceiling.

H. BACKFLOW PREVENTER: Provide Watts Series U-909-SQT preventer at makeup water connection to building chilled and heating water systems. Provide 909AG air gap drain funnel with drain line extension. No other brand or model is acceptable. For sizes 2-1/2” and larger, provide stainless steel body RPZ backflow preventer, Watts model 957 with 957AG air gap drain funnel with drain line extension. Only Watts shall be acceptable for backflow preventers. Provide backflow preventer at all stand-alone ice makers.

I. ACCEPTABLE MANUFACTURERS: Hammond, Milwaukee and Nibco

2.12 MISCELLANEOUS PIPING

A. GENERAL: Provide all required piping not specifically shown on the drawings but necessary for the proper operation of the systems. Piping materials, methods of installation, fittings, valves, etc., shall conform, in general, to that specified for similar piping systems.

B. PLUMBING CONNECTIONS: Make all required connections between HVAC Systems and Plumbing Systems. Pipe extensions to equipment shall be same materials as supply pipe (i.e. copper water lines will be copper to point of connection to equipment). Provide valves at each and every connection between Plumbing and HVAC Systems.

C. TRAP PRIMER AND BELOW SLAB DOMESTIC WATER PIPING: Use Type K copper piping. Piping in contact with concrete shall be installed in continuous protective sleeve.

D. MISCELLANEOUS DRAINS: Provide drain line to floor drain from backflow preventers, relief valves and other plumbing equipment with automatic drains.

2.13 ROUGH-INS AND CONNECTIONS

A. SPECIAL FIXTURES AND TRIM: Provide rough-ins and connections to cabinet sinks and all trim where shown on the Drawings. Fixtures and trim requiring rough-ins and connections will be furnished loose under the special equipment section of those specifications, installation shall be under this Section. Refer to Architectural Specifications for information on prefab cabinets. Provide stops, risers and P-traps under this Section for prefab cabinets and kitchen equipment provided under the Architectural Specifications.

B. COORDINATION: The piping and connections for these areas have been indicated approximately. The exact arrangements and locations of various piping and connections shall be determined by shop drawings provided under other sections of these Specifications.

PART 3 – MATERIALS

3.01 EXTERIOR DOMESTIC WATER

A. GENERAL: This paragraph relates to all water piping below grade, all piping above grade outside of building and piping in contact with concrete.

B. MATERIALS:

1. PIPING: Type "K" copper rigid water tubing per ASTM B42 and ASTM B88, with solder type ASME B16.18 cast bronze, or ASTM B 16.22 wrought copper alloy fittings, made up with lead-free solder. Solder shall be 95.5% tin, 4% copper, 0.5% silver (lead free, antimony free, zinc-free). Silvabrite 100 by Engelhard Corporation or approved equal.

Piping in contact with concrete shall be protected with Benjamin Foster 60-25 mastic or be PVC coated.

2. MISCELLANEOUS REQUIREMENTS: Connections at water meter shall be as specified by the water district or water department. The 30 feet (914.4 cm) of piping ahead of the building service shutoff valve shall be Type"K" copper rigid water tubing with sweat fittings and lead-free solder. Install 2" diameter by 6" long capped tee above grade ahead of shutoff valve for electrical grounding use. Install concrete anchors below grade as recommended by the piping manufacturer.

C. EXECUTION:

1. The installing contractor shall examine the copper tubing and fittings for defects, sand holes or cracks. There shall be no defects of the tubing or fittings. Any damaged tubing or fittings shall be rejected.

2. The installing contractor shall insure that sealing elements are properly in place and free from damage. For Sizes 2-1/2” to 4”, installer should ensure that the stainless steel grip ring is in place.

3. Copper tubing shall be cut with a wheeled tubing cutter or approved copper tubing cutting tool. The tubing shall be cut square to permit proper joining with the fittings.

4. Remove scale, slag, dirt and debris from inside and outside of tubing and fittings before assembly. The tubing end shall be wiped clean and dry. The burrs on the tubing shall be reamed with a deburring or reaming tool.

5. Solder Joints: Solder joints shall be made in accordance with ASTM B828. The temperature of the joint during soldering shall not be raised above the maximum temperature limitation of the flux.

D. TESTING: Test in accordance with recommendations of AWWA.

3.02 INTERIOR DOMESTIC WATER

A. GENERAL: This paragraph relates to all piping inside of building.

B. MATERIALS:

1. All piping shall be hard drawn, copper water tube, Type "L" per ASTM B88 and ANSI/NSF Standard 61, with solder type ASME B16.18 cast bronze, or ASTM B 16.22 wrought copper alloy fittings, made up with lead-free solder.

2. All individual branches serving fixtures, from surface of walls to connections to fixtures or equipment, shall be chrome plated.

3. Solder shall be 95.5% tin, 4% copper, 0.5% silver (lead free, antimony free, zinc-free). Silvabrite 100 by Engelhard Corporation or approved equal.

4. Propress fittings for copper piping and Uponor (PEX-A) is acceptable when all the following conditions are provided:

   a. piping is completely exposed to view (no plenum spaces)

   b. Piping is readily accessible to maintenance

   c. Limited instances

   d. Owner is notified prior to scheduling, and cost savings provided back to owner.

C. EXECUTION:

1. The installing contractor shall examine the copper tubing and fittings for defects, sand holes or cracks. There shall be no defects of the tubing or fittings. Any damaged tubing or fittings shall be rejected.

2. The installing contractor shall insure that sealing elements are properly in place and free from damage. For Sizes 2-1/2” to 4”, installer should ensure that the stainless steel grip ring is in place.

3. Copper tubing shall be cut with a wheeled tubing cutter or approved copper tubing cutting tool. The tubing shall be cut square to permit proper joining with the fittings.

4. Remove scale, slag, dirt and debris from inside and outside of tubing and fittings before assembly. The tubing end shall be wiped clean and dry. The burrs on the tubing shall be reamed with a deburring or reaming tool.

5. Solder Joints: Solder joints shall be made in accordance with ASTM B828. The temperature of the joint during soldering shall not be raised above the maximum temperature limitation of the flux.

D. WATER HAMMER ARRESTERS: Provide on both hot and cold water branches in addition to air chambers. Arresters to be Precision Plumbing Products, Inc. or Sioux Chief, size and location to be based on pipe size, fixture unit count and manufacturer’s recommendation. Install upright and according to the Plumbing Riser Diagrams. Sizes shown on Riser Diagrams are PDI sizes. Units shall have 3-year warranty. Provide access panel for all hammer arrestors installed in inaccessible locations. Preferred placement above accessible ceiling when installed within manufacturer's recommended spacing.

E. VALVING:

1. Provide valve in branch line to each piece of water consuming equipment or fixture.

2. Generally, stop valves serving fixtures are specified in Plumbing Fixtures Section 22 42 00.

3. Valves not specified under Plumbing Fixtures, but to be located exposed to view, shall be chrome plated.

END OF SECTION

SECTION 22 1119
DOMESTIC WATER PIPING SPECIALTIES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 GENERAL REQUIREMENTS

A. Provide all accessories and specialties indicated on the Contract Drawings, as specified, and as required under Section General Plumbing.

PART 2 – MATERIALS AND METHODS

2.01 SPECIALTIES

A. HYDRANTS: See Schedule on Drawings.

B. VACUUM BREAKERS: Provide where required by Plumbing Code or shown on Plans, female inlet and outlet, polished chrome plated vacuum breakers, full size of line.

C. WATER HAMMER ARRESTERS: Provide on both hot and cold water branches in addition to air chambers. Arresters to be Precision Plumbing Products, Inc. or Sioux Chief, size and location to be based on pipe size, fixture unit count and manufacturer's recommendation. Install according to the Plumbing Riser Diagrams. Sizes shown on Riser Diagrams are PDI sizes. Units shall have 3-year warranty and shall NOT require an access panel. INSTALL IN ADDITION TO AIR CHAMBERS.

D. VACUUM RELIEF VALVES:

1. GENERAL: Provide on each water heater in cold water inlet connection.

2. RATING: AGA certified, 3/4", 21.5 CFM opens at less than 1/2" vacuum, 200 pounds and 250° F.

3. MODEL: Watts No. 36A.

4. ACCEPTABLE MANUFACTURERS: Cash, McDonnell-Miller and Watts

E. HOT WATER CIRCULATING PUMP:

1. TYPE: In-the-line, all bronze or stainless steel construction, designed for domestic water pumping, certified by manufacturer to be suitable for frequent on/off cycling. Manufactured by Grundfos

2. MOTOR: Single phase, 120 volt, 1750 RPM, ½ HP with built-in overload protection, non-overloading throughout pumping range.

3. CAPACITY: Refer to Plumbing Drawings for minimum requirements.

4. ACCEPTABLE MANUFACTURERS: Bell and Gossett PL-B Series, Grundfos (stainless steel) or Taco. Refer to Motors and Starters under Miscellaneous Equipment and Requirements Section.

5. CONTROL: Honeywell L6008C, 40° - 180° range, immersion-type aquastat (clip-on style will not be accepted). Mount in return line to cycle pump.

END OF SECTION

SECTION 22 1316
SANITARY WASTE AND VENT PIPING

PART 1 – GENERAL

1.01 REFERENCE STANDARDS

A. ASTM A74 - Standard Specification for Cast Iron Soil Pipe and Fittings; 2021.

B. ASTM C564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings; 2020a.

C. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120; 2021a.

D. ASTM D3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2024, with Editorial Revision (2025).

1.02 RELATED DOCUMENTS

1.03 THE GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL, SUPPLEMENTARY AND SPECIAL CONDITIONS, APPLY TO THE WORK SPECIFIED IN THIS SECTION.

1.04 GENERAL REQUIREMENTS

A. Piping shall be installed in a neat and orderly manner parallel to building coordinates with vertical drops. Piping shown underground shall be buried a minimum of 12 inches (304.8 mm) to top of pipe. Piping in the vicinity of equipment shall be arranged to not interfere with access panels and maintenance space.

B. Piping shall be concealed in wall, chases, and above ceilings except in mechanical rooms. All materials shall conform with the City Building Code.

C. All below grade non-metallic, non-conducting pipe not under building slab shall have a tracer wire installed parallel to pipe. Tracer wire shall be a 14 gage, solid copper wire with PVC jacket with all joints and splices sealed water-tight. Carry end of wire up through slab and terminate in an accessible location. Provide identification label attached to wire.

D. All piping, fittings and valves shall be manufactured in the United States of America by Tyler or Charlotte Pipe. Do not mix and max manufacturers on project. All piping and fittings shall be from same manufacturer (Tyler or Charlotte Pipe).

E. Provide pipe markers and valve tags per Section 22 05 53 Identification of Plumbing Piping and Equipment.

F. After installation and before final inspection, all sanitary piping shall be rodded out to ensure there are no obstructions in the pipe and the systems are free flowing.

PART 2 – METHODS

2.01 EXCAVATION AND BACKFILLING

A. GENERAL: Provide all excavation and backfilling required for the proper installation of all underground piping and other components installed below grade.

B. EXCAVATION: Trench with ladder type trenching machine. Make trenches 12" to 18" wider than outside diameter of pipe. Excavate, backfill and grade trench bottom to required slope. Verify slope with laser level or approved device. Cut out bedding for pipe joints to provide solid bearing surface for entire length of pipe. Backhoe may be used to excavate trench if bottom is properly sloped and compacted to proper grade prior to installation of the piping.

C. BACKFILLING:

1. Backfill for pipe in City or County Property must comply with AHJ requirements. Also, if Architect’s or Structural Engineer’s backfill requirements are more stringent, Contractor shall comply with whatever requirements are the most stringent.

2. For drainage lines, provide cement-stabilized sand bed to 6” below bottom of pipe with top surface shaped to accommodate pipe including joints, at the proper flowline. Grading shall be determined by laser level. After installation of the pipe, backfill to 4” above top of pipe with cement stabilized sand. Entire pipe shall be surrounded on all sides by minimum 4” of cement stabilized sand. The remainder of the excavation shall be backfilled with approved backfill material to 95% standard proctor, by hand compaction. Do not place backfill material or second layer of cement stabilized sand until the piping and joints have been inspected and approved.

3. Cement stabilized sand shall be 1.5 sacks cement per ton of sand with MINIMUM 160 psi (1103.16 kPa) compressive strength at 48 hours.

D. SAFETY SYSTEMS: Refer to Architectural Sections for additional requirements.

E. BENTONITE PLUG: Provide bentonite plug for all sanitary piping routed under exterior grade beam. See structural details for additional requirements on bentonite plug installation.

2.02 PIPE SUPPORTS

A. GENERAL: Provide pipe supports and guides of size and type to support pipe as well as limit movement. Minimum size hanger rod shall be 3/8”. Pipe support material shall be selected to be compatible with the pipe material to prevent galvanic corrosion. Vertical cast iron pipe shall supported per the cast iron manufacturers recommendations.

B. HORIZONTAL PIPING:

1. SUPPORT SPACING: As recommended by support manufacturer, but spaced not more than below:

	Pipe Size Iron Pipe	Other Pipe
a.	1" & Smaller	6 Feet 4 Feet
b.	1¼" & 1½"	8 Feet 5 Feet
c.	2"	8 Feet 5 Feet
d.	2½" to 4"	8 Feet 6 Feet
e.	6" and Larger	8 Feet 6 Feet

2. SUPPORT FROM ABOVE: Support piping near roof or upper floor from structure if sufficient strength exists. Use a method suitable for type of construction and of sufficient strength. Use threaded steel hanger rods of diameter required to safely support loads. Minimum size hanger rod shall be 3/8”. Install rods through holes drilled in beam flanges, 1½" x 1½" x 8" angles welded to structural members or top cord slot at joist panel points and secure with large washers and nuts. Refer to structural drawing details for additional information. Do not use perforated strap. DO NOT USE CONCRETE ANCHORS.

3. HANGERS: Manufactured by Anvil, Grinnell or Tolco.

a. SINGLE RUNS OF PIPE, NO EXPANSION PROBLEM: Adjustable clevis type Grinnell Figure 260.

b. MULTIPLE RUNS: Trapeze hangers.

c. BEAM CLAMPS: Grinnell Figure 92 for smaller pipe

d. BEAM CLAMPS: Grinnell Figure 228 (storm or sanitary 8” and larger)

4. SUPPORT FROM BELOW: All piping near the floor, or where ceiling structure does not have sufficient strength, or where there is no ceiling shall be supported from below. Support members shall be steel pipe with base plates, or welded steel structure suitably braced.

5. SUPPORT MATERIAL FINISH: Galvanized or cadmium plated steel. Provide hot dipped copper clad supports for copper piping.

6. PIPE SADDLES: Install 18 gauge, formed galvanized sheets at each support point for insulated pipe, shaped to fit pipe, and covering bottom half of pipe. Length at saddle shall be not less than twice the insulation outside diameter, 16” minimum length. Provide compressible gasketing between non-insulated plastic pipe and hangers. Provide insulating material between dissimilar metal.

7. SWAY BRACING: All horizontal no-hub cast iron piping larger than 4” shall have sway bracing per the manufacturer’s recommendations.

C. PLUMBING CHASE PIPING: Plumbing piping located in chases and at individual fixtures not located at chases shall be rigidly supported and aligned using the Sumner Pipe Support and Alignment System, Hubbard Holdrite System or Unistrut with U-bolts and pipe clips.

2.03 TESTING PIPING SYSTEMS

A. GENERAL: Test all piping systems to assure that they are absolutely leak free. Test for sanitary piping shall include the first fitting above slab (i.e. transition fitting between underground PVC and cast iron). Pipes that will contain water or sewage shall be leak tested with water. Pipe to be insulated shall be proved leak free before pipe is concealed. LTY Engineers (LTY) to witness and approve all testing. If piping is concealed prior to LTY witnessing and approving testing, contractor shall expose entire piping system and re-test piping for LTY to witness and approve.

B. PRESSURE TEST METHOD: For drainage systems, plug outlet and fill piping with water to top of vent. System shall remain plugged and filled with water until after system below grade is backfilled and compacted per specification. Multistory systems shall be tested one floor at a time at ten feet of hydrostatic head with out leaks. Maintain pressure for 8 hours. During this test period, inspect all pipe fittings and accessories in the piping and eliminate all leaks.

C. UNDERGROUND PIPE TESTING AND INSPECTION

1. Initial open trench underground piping tested to 10-foot head for 8 hours, as always. LTY to inspect pipe installation, approve/reject test, approve for backfill.

2. Pipe to remain full of water through backfill and compaction.

3. After backfill and compaction, pipes to be topped off for 10-foot head to account for evaporation. New water level to be marked and dated on pipe.

4. Prior to concrete pour, Architect’s CA (already on site for concrete pour) and Contractor to check water levels and Architect’s CA to approve/reject test for concrete pour.

5. After concrete is poured and dry, Architect’s CA or LTY to check water levels and approve/reject pipe tests accordingly. Test shall not be removed until approval is granted by A/E team.

6. If water drops or is released prior to A/E review after concrete is placed then an investigation will begin immediately by the sub and GC to locate the problem. If issue is determined to be a leak then it must be located, concrete removed, corrections made, pipe re-tested and water from test left on until after re-compaction and concrete placement.

D. FINAL TEST: Test underground PVC sanitary drainage piping for physical deformation by passing a mandrel of 95% pipe inside diameter through piping 8" and larger. Just prior to substantial complete, contractor shall smoke test all sanitary and vent piping to confirm that the piping system is complete, access cleanouts are properly installed and all joints are tight. Contractor shall use a commercial smoke generating machine with fan to pressurize the system with smoke. Test shall be witnessed by Owner's Representative and the A/E inspectors. Both Owner and LTY must approve smoke testing of sanitary and vent systems before substantial completion can be granted.

E. UNDERGROUND PIPE CLEANING AND CERTIFICATION: All underground sanitary sewer piping shall be hydro-flushed or rodded all the way to the sanitary manhole that the system is connected to prior to substantial completion. After cleaning, contractor shall provide 3rd-party subcontractor to camera and video tape inside of all underground sanitary sewer piping all the way to the sanitary manhole that the system is connected to, and provide video tape as well as detailed report outlining quality of installation and noting exact areas of poor installation. Contractor shall repair all areas noted as problems and re-camera/video tape those areas to confirm proper installation at no cost to the Owner.

2.04 SLEEVES

A. Provide sleeves for all piping passing through walls, floors not on grade and roof slabs. Make sleeves of galvanized pipe and sized to provide clearance of 1/4" around piping or pipe insulation if pipe is insulated. Set end of sleeve flush with the surrounding surface of wall or ceiling in which sleeve is installed. Floor slab sleeves shall extend 3" above floor level. Pipes through grade beams shall be sleeved per structural engineer's drawings. As a minimum pipe shall be wrapped with 1" thick closed cell pipe insulation.

2.05 PLATES

A. Provide chromium plated wall and ceiling plates for all exposed piping, at point piping passes through walls or ceilings. Plates shall be large enough to completely cover pipe sleeves. On insulated piping, inside diameter of plates shall just exceed outside diameter of pipe covering. Plates may be omitted for pipe sizes larger than 6".

2.06 DIELECTRIC UNIONS

A. Provide dielectric insulating unions at all connections between dissimilar metals.

2.07 FLASHINGS

A. Provide flashings for all vent pipes.

B. Flashings shall be constructed of 4 lbs./s.f. sheet lead, with bases extending not less than 10" on each side of pipe. The vertical portion of flashings shall extend upward entire length of the pipe and be turned down inside of pipe at least 2", unless vent caps are used. Minimum size flashing sheet is 36" x 36". Flashings shall be compatible with the roof system specified by the Architect.

2.08 ROUGH-INS AND CONNECTIONS

A. SPECIAL FIXTURES AND TRIM: Provide rough-ins and connections to cabinet sinks and all trim where shown on the Drawings. Fixtures and trim requiring rough-ins and connections will be furnished loose under the special equipment section of those specifications, installation shall be under this Section. Refer to Architectural Specifications for information on prefab cabinets. Provide stops, risers and P-traps under this Section for prefab cabinets and kitchen equipment provided under the Architectural Specifications.

B. COORDINATION: The piping and connections for these areas have been indicated approximately. The exact arrangements and locations of various piping and connections shall be determined by shop drawings provided under other sections of these Specifications.

PART 3 – MATERIALS

3.01 SANITARY SOIL, WASTE AND VENT PIPING

A. GENERAL: Provide for all fixtures, equipment and floor drains as indicated and as required by Code. Provide appropriate wye fittings and bends. Sanitary crosses and double-combination fittings are prohibited. Do NOT install these types of fittings. Do not use any fittings prohibited by the codes. All piping shall be manufactured by Charlotte or Tyler Pipe. Do not mix pipe manufacturers on project. All piping shall comply with ASTM D1785/D2665.

B. MATERIALS:

1. ABOVE SLAB: Standard weight cast iron, no hub piping per ASTM A74 with no hub clamps may be used if proper pipe supports are installed to maintain uniform slope and rigidity – supports shall be installed on both sides and within 18” of each hub. Heavy weight, medium duty no-hub clamps shall be installed on all sanitary piping, excluding vents.

2. BELOW SLAB: Schedule 40, DWV PVC. Refer to 2.1 for backfilling requirements.

3. BELOW GRADE, BEYOND FIVE FEET FROM BUILDING: Schedule 40, DWV PVC. Sizes over 6" may be heavy wall SDR-26 PVC sewer pipe meeting ASTM D3034 requirements. Refer to 2.1 for backfilling requirements.

4. All PVC glue shall be grey heavy bodied glue. Clear PVC glue not acceptable.

C. GASKETS: No-hub joints shall be made with gasket and one piece stainless steel, heavy weight, medium duty no-hub clamps. No-hub clamps for pipes 6” and larger shall have 6 bands. Clamps shall be Husky 2000 or equal by Mission, unless otherwise noted.

D. CLEANOUTS: Install at each change of direction and at locations indicated on drawings. Exact location to be reviewed by Architect prior to setting. Shall be size of the line served, except maximum size of 4". Provide double cleanout for two-way rodding after each pipe exits the building. Wall cleanouts behind access panels shall be within 2” of the panel for ease of use and shall be installed above flood level rim of adjacent plumbing fixtures.

E. DRAINS: Floor drains installed in floors, with waterproofing membranes, to have clamping collars.

F. GRADING: Continuously grade all drainage piping. Inside building, grade 1/4" per foot for lines 3" and smaller. Grade 1/8" per foot for line 4" and larger. Piping below grade beyond five feet from building shall have maximum continuous slope consistent with site conditions of existing mains to which they will be connected or 1/8" per foot whichever is less (1/4" per foot for lines smaller than 4").

G. PROVE FREE FLOWING: Hydroflush or rod out all sections of sanitary waste lines prior to substantial completion.

END OF SECTION

SECTION 22 1319
SANITARY WASTE PIPING SPECIALTIES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 GENERAL REQUIREMENTS

A. Provide all fixtures, drains, equipment, accessories, and specialties indicated on the Contract Drawings, as specified, and as required under Section General Plumbing.

B. In addition to the manufacturers listed, equipment of identical design, quality and appearance will be considered when of the following manufactures:

1. FLOOR DRAINS, CLEANOUTS AND CARRIERS: J.R. Smith, Wade or Zurn. Do not mix manufacturers on project. All drains, cleanouts and fixture carriers shall be from the same approved manufacturer.

PART 2 – MATERIALS AND METHODS

2.01 FLOOR DRAINS

A. GENERAL: See Plumbing Drawings for model numbers. Some drains for this project are trap primed using Proset Trap Guards or trap primers – see Plumbing Drawings to determine which drains. When specified, only Proset Trap Guard will be acceptable.

B. TOILET ROOMS, SHOWER AREAS AND SIMILAR LOCATIONS: Cast iron two-piece floor drain with seepage flange, reversible clamping collar, 6" diameter, heavy-duty stainless-steel strainer, 1/2" trap primer tap or Proset trap guard. Plumbing Fixture schedule dictates which trap seal device to be used for each fixture.

C. EQUIPMENT CONDENSATE DRAINS: Cast iron, medium depth floor drain with flange, clamping device, seepage openings with 12” stainless steel rim, less top grate but with internal ductile iron sediment bucket and Proset Trap Guard in lieu of trap primer tap– drain designed to not allow installation of grate without installation of sediment bucket.

D. GRATED EQUIPMENT DRAINS: Cast iron floor drain with flange, seepage openings, 9” heavy duty ductile iron grate with stainless steel veneer, clamping device and Proset Trap Guard in lieu of trap primer tap see plumbing fixture schedule for sewer gas emission device.

E. SANITARY FLOOR SINK: Cast iron floor sink with 8” sump, 12"x12" acid resisting enamel coated interior, heavy-duty stainless-steel frame and 3/4 tractor grate, ductile iron secondary dome strainer, integral flange with seepage openings for support, clamping device and Proset Trap Guard in lieu of trap primer tap.

2.02 CLEANOUTS

A. GENERAL: Install cleanouts at bends, angles, and at ends of all waste and sewer piping and as noted on Drawings. Bring all cleanouts up to grade and make accessible. All cleanouts shall have extra heavy PVC plugs. For cleanouts in unpaved areas, install in 18" x 18" x 6" thick concrete pad. The top of cleanout shall be 2” above grade with the pad sloping to edges at grade level. For cleanouts in paving, sidewalks, etc., install flush with finished surface. Refer to detail on Architectural Drawings. See Plumbing Drawings for model numbers.

B. MATERIALS:

1. UNFINISHED AREAS AND CHASES: Cast iron caulking ferrule with countersunk head with PVC plug.

2. FINISHED WALLS: Cast iron caulking ferrule with countersunk slotted head with PVC plug (full size up to 4”). Provide square smooth finish, 8”x8”, 16 gauge stainless steel, vandal-proof access cover, flanged frame with anchoring lugs. Also provide flanged frame for pre-finished or CMU walls. Cleanout plug shall be installed within 2” of and centered on access panel. Install wall cleanouts at higher level than the flood level rim of adjacent plumbing fixtures. For urinals, wall cleanouts shall be installed to side of urinal above flood level rim of fixture – coordinate cleanout location with urinal privacy partitions.

3. FINISHED FLOORS: Floor cleanout with adjustable extension housing, cast iron ferrule with PVC plug (full size up to 4”), round scoriated stainless steel, secured, vandal-proof access cover and round frame. Provide top style compatible with floor type. Carpet: - carpet flange (carpet markers will not be acceptable); Terrazzo: - top with terrazzo recess.

4. OUTSIDE AREAS: Extra heavy duty, vandal-proof ductile iron cover, cast iron ferrule for caulk, PVC plug (full size up to 4”) and positioning set screws. In non-surfaced areas these shall be installed in 18" x 18" x 6" thick concrete pad. The top of cleanout shall be 2” above grade with the pad sloping to edges at grade level. Locate as directed by the Architect.

2.03 PLASTER TRAPS

A. Provide Wade 5740 Series canister type cast iron solids interceptor with A.R.E. coating and internal stainless steel sediment basket. Install inside casework adjacent to sink, properly supported. Install union on downstream pipe connection to allow easy and complete removal of interreceptor from casework for ease of servicing. Install cleanout on top of all cross fittings and figure 5 fittings above floor in chase walls. Do not provide vandal-proof screws – they will not be allowed.

END OF SECTION

SECTION 22 1413
STORM DRAINAGE PIPING

PART 1 – GENERAL

1.01 REFERENCE STANDARDS

A. ASTM A74 - Standard Specification for Cast Iron Soil Pipe and Fittings; 2021.

B. ASTM C564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings; 2020a.

C. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120; 2021a.

1.02 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.03 GENERAL REQUIREMENTS

A. Piping shall be installed in a neat and orderly manner parallel to building coordinates with vertical drops. Piping shown underground shall be buried a minimum of 12 inches (304.8 mm) to top of pipe. Piping in the vicinity of equipment shall be arranged to not interfere with access panels and maintenance space.

B. Piping shall be concealed in wall, chases and above ceilings except in mechanical rooms. All materials shall conform to the City Building Code and any requirements from the Owner or local authority having jurisdiction.

C. All below grade non-metallic, non-conducting pipe not under building slab shall have a tracer wire installed parallel to pipe. Tracer wire shall be a 14 gage, solid copper wire with PVC jacket with all joints and splices sealed water-tight. Carry end of wire up through slab and terminate in an accessible location. Provide identification label attached to wire.

D. All piping, fittings and valves shall be manufactured in the United States of America by Tyler or Charlotte Pipe. Do not mix and max manufacturers on project. All piping and fittings shall be from same manufacturer (Tyler or Charlotte Pipe).

E. Provide pipe markers and valve tags per Section 22 05 53 Identification of Plumbing Piping and Equipment.

F. After installation and before final inspection, all storm piping shall be rodded out to ensure there are no obstructions in the pipe and the systems are free flowing.

PART 2 – METHODS

2.01 EXCAVATION AND BACKFILLING

A. GENERAL: Provide all excavation and backfilling required for the proper installation of all underground piping and other components installed below grade.

B. EXCAVATION: Trench with ladder type trenching machine. Make trenches 24" wider than outside diameter of pipe. Excavate, backfill and grade trench bottom to required slope. Verify slope with laser level or approved device. Cut out bedding for pipe joints to provide solid bearing surface for entire length of pipe. Backhoe may be used to excavate trench if bottom is properly sloped and compacted to proper grade prior to installation of the piping.

C. BACKFILLING:

1. Backfill for pipe in City Property must comply with City requirements. Also, if Architect's or Structural Engineer's backfill requirements are more stringent, Contractor shall comply with whatever requirements are the most stringent.

2. For storm drainage lines, provide cement-stabilized sand bed to 6" below bottom of pipe with top surface shaped to accommodate pipe including joints, at the proper flowline. Grading shall be determined by laser level. After installation of the pipe, backfill to 12" above top of pipe with cement stabilized sand. The remainder of the excavation shall be backfilled with approved backfill material to 95% standard proctor, by hand compaction. Do not place backfill material or second layer of cement stabilized sand until the piping and joints have been inspected and approved.

3. Cement stabilized sand shall be 1.5 sacks cement per ton of sand with MINIMUM 160 psi compressive strength at 48 hours.

D. SAFETY SYSTEMS: Refer to Architectural Sections for additional requirements.

E. BENTONITE PLUG: Provide bentonite plug for all storm piping routed under exterior grade beam. See structural details for additional requirements on bentonite plug installation.

2.02 PIPE SUPPORTS

A. GENERAL: Provide pipe supports and guides of size and type to support pipe as well as limit movement. Minimum size hanger rod shall be 3/8". Pipe support material shall be selected to be compatible with the pipe material to prevent galvanic corrosion. Vertical cast iron pipe shall supported per the cast iron manufacturers recommendations.

B. HORIZONTAL PIPING:

1. SUPPORT SPACING: As recommended by support manufacturer, but spaced not more than8 feet apart for iron pipe and 6 feet apart for PVC.

2. SUPPORT FROM ABOVE: Support piping near roof or upper floor from structure if sufficient strength exists. Use a method suitable for type of construction and of sufficient strength. Use threaded steel hanger rods of diameter required to safely support loads. Minimum size hanger rod shall be 3/8". Install rods through holes drilled in beam flanges, 1½" x 1½" x 8" angles welded to structural members or top cord slot at joist panel points and secure with large washers and nuts. Refer to structural drawing details for additional information. Do not use perforated strap. DO NOT USE CONCRETE ANCHORS.

3. HANGERS: Manufactured by Anvil, Grinnell or Tolco.

   a. SINGLE RUNS OF PIPE, NO EXPANSION PROBLEM: Adjustable clevis type Grinnell Figure 260.

   b. MULTIPLE RUNS: Trapeze hangers.

   c. BEAM CLAMPS: Grinnell Figure 92 for smaller pipe

   d. BEAM CLAMPS: Grinnell Figure 228 (storm or sanitary 8" and larger)

4. SUPPORT FROM BELOW: All piping near the floor, or where ceiling structure does not have sufficient strength, or where there is no ceiling shall be supported from below. Support members shall be steel pipe with base plates, or welded steel structure suitably braced.

5. SUPPORT MATERIAL FINISH: Galvanized or cadmium plated steel. Provide hot dipped copper clad supports for copper piping.

6. PIPE SADDLES: Install 18 gauge, formed galvanized sheets at each support point for insulated pipe, shaped to fit pipe, and covering bottom half of pipe. Length at saddle shall be not less than twice the insulation outside diameter, 16" minimum length. Sheet metal saddle shall be secured to pipe insulation using aluminum band at both ends of saddle. Provide compressible gasketing between non-insulated plastic pipe and hangers. Provide insulating material between dissimilar metal.

7. SWAY BRACING: All horizontal no-hub cast iron piping larger than 4" shall have sway bracing per the manufacturer's recommendations. Install bracing at each roof drain pipe connection.

2.03 TESTING PIPING SYSTEMS

A. GENERAL: Test all piping systems to assure that they are absolutely leak free. Test for storm piping shall include the first fitting above slab (i.e., transition fitting between underground PVC and cast iron). Pipes that will contain water or sewage shall be leak tested with water. Pipe to be insulated shall be proved leak free before pipe is concealed. Lee Truong & Yu Engineers (LT&Y) to witness and approve all testing. If piping is concealed prior to LT&Y witnessing and approving

testing, contractor shall expose entire piping system and re-test piping for LT&Y to witness and approve.

B. PRESSURE TEST METHOD: For drainage systems, plug outlet and fill piping with water to top of roof drain. System shall remain plugged and filled with water until after system below grade is backfilled and compacted per specification. Multistory systems shall be tested one floor at a time at ten feet of hydrostatic head with out leaks. Maintain pressure for 8 hours. During this test period, inspect all pipe fittings and accessories in the piping and eliminate all leaks. Testing shall be witnessed by Owner and LTY Engineers (LTY).

C. UNDERGROUND PIPE TESTING AND INSPECTION

1. Initial open trench underground piping tested to 10-foot head for 8 hours, as always. Architect's CA or LTY to inspect pipe installation, approve/reject test, approve for backfill.

2. Pipe to remain full of water through backfill and compaction.

3. After backfill and compaction, pipes to be topped off for 10-foot head to account for evaporation. New water level to be marked and dated on pipe.

4. Prior to concrete pour, Architect's CA (already on site for concrete pour) and Contractor to check water levels and Architect's CA to approve/reject test for concrete pour.

5. After concrete is poured and dry, Architect's CA or LTY to check water levels and approve/reject pipe tests accordingly. Test shall not be removed until approval is granted by A/E team.

6. If water drops or is released prior to A/E review after concrete is placed then an investigation will begin immediately by the sub and GC to locate the problem. If issue is determined to be a leak then it must be located, concrete removed, corrections made, pipe re-tested and water from test left on until after re-compaction and concrete placement.

D. FINAL TEST: Test underground PVC storm drainage piping for physical deformation by passing a mandrel of 95% pipe inside diameter through piping 8" and larger. Just prior to substantial complete, contractor shall smoke test all roof drain and storm piping to confirm that the piping system is complete, access cleanouts are properly installed and all joints are tight. Contractor shall use a commercial smoke generating machine with fan to pressurize the system with smoke. Test shall be witnessed by Owner's Representative and the A/E inspectors. Both Owner and LTY must approve smoke testing of sanitary and vent systems before substantial completion can be granted.

E. UNDERGROUND PIPE CLEANING AND CERTIFICATION: All underground storm sewer piping shall be hydro-flushed or rodded all the way to the storm manhole, inlet or junction box that the system is connected to prior to substantial completion. After cleaning, contractor shall provide 3rd-party subcontractor to camera and video tape inside of all underground storm sewer piping all the way to the storm manhole, inlet or junction box that the system is connected to and provide

video tape as well as detailed report outlining quality of installation and noting exact areas of poor installation. Contractor shall repair all areas noted as problems and re-camera/video tape those areas to confirm proper installation at no cost to the Owner.

2.04 SLEEVES

A. Provide sleeves for all piping passing through walls, floors not on grade. Make sleeves of galvanized pipe and sized to provide clearance of 1/4" around piping or pipe insulation if pipe is insulated. Set end of sleeve flush with the surrounding surface of wall or ceiling in which sleeve is installed. Floor slab sleeves shall extend 3" above floor level. Pipes through grade beams shall be sleeved per structural engineer's drawings. As a minimum pipe shall be wrapped with 1" thick closed cell pipe insulation.

2.05 PLATES

A. Provide chromium plated wall and ceiling plates for all exposed piping, at point piping passes through walls or ceilings. Plates shall be large enough to completely cover pipe sleeves. On insulated piping, inside diameter of plates shall just exceed outside diameter of pipe covering. Plates may be omitted for pipe sizes larger than 6".

2.06 DIELECTRIC UNIONS

A. Provide dielectric insulating unions at all connections between dissimilar metals.

PART 3 – MATERIALS

3.01 STORM DRAINAGE, INSIDE BUILDING

A. GENERAL: Provide roof drains, drains, flashings and piping extending from drains to five feet outside of building. All piping shall be manufactured by Charlotte or Tyler Pipe. Do not mix pipe manufacturers on project. Do not use double combination fittings, sanitary crosses or any fittings prohibited by Code. All piping shall comply with ASTM D1785/D2665.

B. MATERIALS:

1. ABOVE SLAB: Standard weight cast iron, no hub piping per ASTM A74 with no hub clamps may be used if proper pipe supports are installed to maintain uniform slope and rigidity – supports shall be installed on both sides and within 18" of each hub. Heavy weight, medium duty no-hub clamps shall be installed on all sanitary piping, excluding vents.

2. BELOW SLAB: Schedule 40 PVC. Refer to 2.1 for backfilling requirements.

    a. All PVC glue shall be grey heavy bodied glue. Clear PVC glue not acceptable.

3. BELOW GRADE, BEYOND FIVE FEET FROM BUILDING: See civil requirements.

C. GASKETS: No-hub joints shall be made with gasket and one piece stainless steel, heavy weight, medium duty no-hub clamps. No-hub clamps for pipes 6” and larger shall have 6 bands. Clamps shall be Husky 2000 or equal by Mission, unless otherwise noted.

D. INSTALLATION: Continuously grade down in direction of flow 1/8" per foot. Piping below grade shall have maximum continuous slope consistent with the site conditions of existing mains to which they will be connected.

E. PROVE FREE FLOWING: Hydroflush or rod out all sections of storm drain lines prior to substantial completion.

3.02 STORM DRAINAGE, OUTSIDE BUILDING

A. GENERAL: Refer to Civil Engineering Drawings for location of storm tie-ins. Plumbing subcontractor shall extend building storm piping to the storm tie-ins that are provided by site subcontractor.

B. MATERIALS: Schedule 40 PVC. All piping shall be manufactured by Charlotte or Tyler Pipe. Do not mix pipe manufacturers on project. Do not use double combination fittings, sanitary crosses or any fittings prohibited by Code. All piping shall comply with ASTM D1785/D2665.

C. INSTALLATION: Continuously grade down in direction of flow 1/8" per foot. Piping below grade shall have maximum continuous slope consistent with the site conditions of mains to which they will be connected.

D. PROVE FREE FLOWING: Hydroflush or rod out all sections of storm drain lines prior to substantial completion.

END OF SECTION

SECTION 22 1426
ROOF DRAINS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 GENERAL REQUIREMENTS

A. Provide all fixtures, drains, equipment, accessories, and specialties indicated on the Contract Drawings, as specified, and as required under Section General Plumbing.

B. In addition to the manufacturers listed, equipment of identical design, quality and appearance will be considered when of the following manufacture:

C. ROOF DRAINS: J.R. Smith, Wade or Zurn – same manufacturer as floor drains, cleanouts and fixture carriers (do not mix manufacturers of products on project).

PART 2 – MATERIALS AND METHODS

2.01 2.01 ROOF DRAINS

A. GENERAL: Wade 3000 Series, adjustable cast iron roof drain with no hub connection. Provide heavy duty, vandal proof, galvanized, cast iron mushroom dome strainer and flashing rim with integral gravel stop, all secured with non-corrosive clamping units and vandal-proof locking mechanism that includes stainless steel, vandal proof hardware. ROOF DRAINS SHALL NOT HAVE ANY GASKET OR OTHER TYPES OF WATER SEALING COMPONENTS BELOW THE ROOF FLASHING LINE – models that do not comply with this requirement will not be allowed. Where no-hub coupling at drain connection is not accessible due to roof thickness, provide deep sump roof drain to allow accessibility of coupling for maintenance purposes. If deep sump still does not allow coupling to be accessible, provide threaded-to-no-hub pipe extension of required length so that coupling is accessible.

B. ACCESSORIES:

1. Adjustable extension collar for insulated roof (where required)

2. Bearing pan with Securing Package and underdeck clamp (where required)

3. 2” water dam for overflow drains

4. Vandal-proof, galvanized cast iron dome

5. Galvanized Top-Plate/Deck Assembly (where required)

END OF SECTION

SECTION 22 1500
COMPRESSED AIR PIPING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 GENERAL REQUIREMENTS

A. Piping shall be installed in a neat and orderly manner parallel to building coordinates with vertical drops. Piping in the vicinity of equipment shall be arranged to not interfere with access panels and maintenance space. Provide unions, flanges and shutoff valves to allow removal of the equipment and its subassemblies.

B. Piping shall be concealed in wall, chases and above ceilings except in the vicinity of equipment. All materials shall conform with the City Building Code.

C. All piping, fittings and valves shall be manufactured in the United States of America.

D. Provide pipe markers and valve tags per Section 22 05 53 Identification of Plumbing Piping and Equipment.

PART 2 – METHODS

2.01 PIPE SUPPORTS

A. GENERAL: Provide pipe supports and guides of size and type to support pipe as well as limit movement. Minimum size hanger rod shall be 3/8”. Piping connected to a piece of equipment shall have a support located near enough to the equipment that there will be no pipe weight supported by the equipment. In no case shall the nearest support be more than two feet horizontally from the connection point. Pipe support material shall be selected to be compatible with the pipe material to prevent galvanic corrosion. Un-insulated copper piping shall be wrapped with gas wrap tape at each hanger (minimum 2” beyond hanger). Vertical copper piping shall have a minimum on one intermediate support if over five feet.

B. HORIZONTAL PIPING:

1. SUPPORT SPACING: As recommended by support manufacturer, but spaced not more than below:

PIPE SIZE	STEEL PIPE	OTHER PIPE

1" AND SMALLER	**6 FEET**	**4 FEET**
1-1/4" AND 1-1/2"	**8 FEET**	**5 FEET**
2"	**8 FEET**	**5 FEET**
2-1/2" TO 4"	**8 FEET**	**6 FEET**
6" AND LARGER	**8 FEET**	**6 FEET**

1. SUPPORT FROM ABOVE: Support piping near roof or upper floor from structure if sufficient strength exists. Use a method suitable for type of construction and of sufficient strength. Use threaded steel hanger rods of diameter required to safely support loads. Minimum size hanger rod shall be 3/8". Install rods through holes drilled in beam flanges, 1½" x 1½" x 8" angles welded to structural members or top cord slot at joist panel points and secure with large washers and nuts. Refer to structural drawing details for additional information. Do not use perforated strap. Do not use concrete anchors.

2. HANGERS: Manufactured by Anvil, Grinnell or Tolco.

   a. SINGLE RUNS OF PIPE, NO EXPANSION PROBLEM: Adjustable clevis type Grinnell Figure 260.

   b. MULTIPLE RUNS: Trapeze hangers.

   c. BEAM CLAMPS: Grinnell Figure 92 for smaller pipe

   d. BEAM CLAMPS: Grinnell Figure 228 (storm or sanitary 8" and larger)

3. SUPPORT FROM BELOW: All piping near the floor, or where ceiling structure does not have sufficient strength, or where there is no ceiling shall be supported from below. Support members shall be steel pipe with base plates, or welded steel structure suitably braced.

4. SUPPORT MATERIAL FINISH: Cadmium plated steel (including all thread rods).

5. PIPE SADDLES: Install 18 gauge, formed galvanized sheets at each support point for insulated pipe, shaped to fit pipe, and covering bottom half of pipe. Length at saddle shall be not less than twice the insulation outside diameter, 16" minimum length. Provide compressible gasketing between non-insulated plastic pipe and hangers. Provide insulating material between dissimilar metal.

C. PLUMBING CHASE PIPING: Plumbing piping located in chases and at individual fixtures not located at chases shall be rigidly supported and aligned using the Sumner Pipe Support and Alignment System, Hubbard Holdrite System or Unistrut with U-bolts and pipe clips.

2.02 VALVE INSTALLATION

A. Ball valves shall be installed such that handle for valve is positioned on the side of the pipe and is pulled down to close the valve.

2.03 TESTING PIPING SYSTEMS

A. GENERAL: Test all piping systems to assure that they are absolutely leak free. LTY to witness and approve all testing. If piping is concealed prior to LTY witnessing and approving testing, contractor shall expose entire piping system and re-test piping for LTY to witness and approve.

B. PRESSURE TEST METHOD: Test compressed air piping with a minimum test pressure of 200 psig (1378.95 kPa). Maintain pressure for 8 hours. During this test period, inspect all pipe fittings and accessories in the piping and eliminate all leaks.

C. FINAL TEST: Subject each piping system to its normal operating pressure and temperature for not less than twenty-four hours. The piping systems must remain absolutely tight during this period. The satisfactory completion of any test or series of tests will not relieve the contractor of responsibility for ultimate proper and satisfactory operation of piping systems and their accessories.

2.04 SLEEVES

A. Provide sleeves for all piping passing through walls, floors not on grade and roof slabs. Make sleeves of galvanized pipe and sized to provide clearance of 1/4" around piping or pipe insulation if pipe is insulated. Set end of sleeve flush with the surrounding surface of wall or ceiling in which sleeve is installed. Floor slab sleeves shall extend 3" above floor level. Provide vented sleeves for all gas piping below floor slabs or paved areas. Pipes through grade beams shall be sleeved per structural engineer’s drawings. As a minimum pipe shall be wrapped with 1” thick closed cell pipe insulation.

2.05 PLATES

A. Provide chromium plated wall and ceiling plates for all exposed piping, at point piping passes through walls or ceilings. Plates shall be large enough to completely cover pipe sleeves. On insulated piping, inside diameter of plates shall just exceed outside diameter of pipe covering. Plates may be omitted for pipe sizes larger than 6".

2.06 VALVE AND FITTING SIZES

A. All hand valves, fittings and other piping accessories shall be size of the line in which installed unless specifically indicated otherwise on the Drawings.

2.07 DIELECTRIC UNIONS

A. Provide dielectric insulating unions at all connections between dissimilar metals, except at final fixture connections, such as galvanized pipe connection to brass water faucet.

2.08 FITTINGS

A. SCREWED: Conform to ANSI Specification B16.3. All fittings shall be Class 150 malleable iron and galvanized.

2.09 VALVES

A. GENERAL: All pressures shown below are minimum working pressures.

B. GATE VALVE: DO NOT USE GATE VALVES. Gate valves will not be allowed.

C. BALL VALVE: Bronze body, threaded connection, full port, Teflon seat, stainless steel trim, lead-free, extension stem for insulation. Nibco T-585-66-LF.

D. INSTALLATION: Ball valves shall be installed such that handle for valve is positioned on the side of the pipe and is pulled down to close the valve. All valves above a ceiling shall be installed within 24” of the ceiling.

E. ACCEPTABLE MANUFACTURERS: Hammond, Milwaukee and Nibco

PART 3 – MATERIALS

3.01 COMPRESSED AIR PIPING

A. Galvanized steel, Schedule 40 with galvanized, Class 150, malleable iron fittings.

END OF SECTION

SECTION 22 3413
INSTANTANEOUS TANKLESS GAS DOMESTIC WATER HEATERS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Indoor Tankless Gas Water Heaters.

1.02 DEFINITIONS

A. Tankless Gas Domestic Water Heater: Internally or externally mounted, or freestanding, commercial condensing, multiple point-of-use, gas fired water heater.

1.03 SUBMITTALS

A. Submit in accordance with requirements of Section 01 30 00 - Administrative Requirements.

B. Product Data: Manufacturer's technical data sheets, specifications, performance data and installation instructions for all products referenced in the scope of work defined in this section.

C. Shop Drawings: Submit shop drawings required to depict the requirements for fabrication and installation. Include the following drawings as applicable:

1. Include dimension drawings of water heaters indicating components and connections to other equipment and piping.

2. Include heat-exchanger dimensions, size of tappings, and performance data.

1.04 CLOSEOUT SUBMITTALS

A. Provide original manufacturer’s installation and operation manuals.

B. Provide written manufacturer’s warranty.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Primary products in this section to be provided by a manufacturer with no less than five years of experience producing the products specified in this section at a facility in the United States.

B. Installer's Qualifications: All work specified in this section is to be completed by a firm with demonstrated experience installing systems similar in scope and complexity to those specified.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle materials and products in accordance with the manufacturer's instructions and recommendations and industry standards.

B. Store all materials in the manufacturer’s original packaging until ready for installation. Protect all products from damage or exposure to adverse environmental conditions, including weather, humidity, and dust.

C. Provide temporary inlet and outlet caps, maintain caps in place until installation.

1.07 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.08 WARRANTY

A. Manufacturer’s Warranty: Manufacturer agrees to replace products that fail within the specified warranty period.

1. Failure Methods: Condensate corrosion, thermal stress, mechanical defects, or workmanship.

2. Heat Exchanger: 15 years from date of Substantial Completion under standard or controlled regulation.

3. All Other Parts and Components: 5 years from date of Substantial completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Acceptable manufacturer: Navien Inc. only.

2.02 PERFORMANCE REQUIREMENTS

A. Certifications: Provide products with heat exchanger that has the following certification labels.

1. ANSI and CSA marks for the United States and Canada.
2. AHRI certification for the United States and Canada.
3. UL certification controller for recovery and external recirculation marks for the United States and Canada.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and use.

C. ASHRAE/IES Compliance: Fabricate and label fuel-fired, domestic-water heaters to comply with ASHRAE/IES 90.1.

1. Comply with efficiency requirements in ASHRAE 189.1, which supersede requirements in ASHRAE/IESNA 90.1.

D. NSF Compliance: Fabricate and label equipment components that will be in contact with potable water to comply with NSF 61 and NSF 372.

E. Energy Star Compliance: Fabricate and label equipment in compliance with Energy Star requirements.

1. Special Requirements: NSF 5 construction.

F. High Altitude: approved up to 10,200 ft or (3,109 m).

G. SCAQMD Rule 1146.2 Type 1 Compliance: Provide units with low nitrous oxide emissions that meet or exceed 14 ng/j or 20 ppm NOx requirements at 3%.

2.03 SYSTEM REQUIREMENTS

A. General: Provide tankless condensing water heater with microprocessor control and a direct electronic ignition system (with no standing pilot), fully modulating gas control valve, turbine flow meter, automatic electro-mechanical water flow control valve, and water temperature thermistors to maintain outlet water temperature between ± 2°F of set point temperature. Microprocessor shall have built in recirculation logic to control a pump’s heating cycles.

B. Controls: Provide an integrated temperature thermostat with an adjustable set point range of 96°F to 185°F.

C. Error Memory: Provide water heater with no less than nine diagnostic maintenance codes that can be read via the display on the temperature thermostat controller.

D. Emissions: Provide water heater that produces no more than 20 ppm NOx emissions when tested in accordance with the rules and regulations of the South Coast Air Quality Management District.

E. Burners: Provide tankless water heater with downward fired fiber mesh burners, solid brass water flow control valve, and solid brass inlet and outlet water connections.

F. Junction Box: Provide pre-installed electrical junction box.

G. Heat Exchanger Construction: 400 series stainless steel.

2.04 INDOOR TANKLESS GAS WATER HEATERS

A. General: ANSI Z21.10.3/CSA 4.3 for gas-fired, hybrid, domestic-water heaters for indoor application.

1. Basis of Design Product: Navien NPE, Model 240A2.

2. Uniform Energy Factor: 0.95.

3. Temperature Setting Range: 97 to 185 degrees F (36 to 85 degrees C).

4. Fuel: Natural Gas

a. Gas Consumption: 13,300 to 199,900 Btu/hr.

b. Gas Supply Pressure:

1) Natural Gas: 3.5 to 10.5 inches of water column.

5. Electrical: Provide 120V/60 Hz AC power source, with consumption as follows:

a. Normal Usage: 52 Watts.

b. Max Current: 4 Amps.

6. Hot Water Flow Rate Capacity: 11.2 GPM at 35°F temperature rise.

7. Pressure Rating: 150 psi

8. Heat Exchanger: Dual, stainless steel heat exchangers.

9. Freeze Protection: For ambient temperatures as low as –5°F.

10. Recirculation Pump: Internal recirculation pump to provide a zero GPM activation rate.

11. Buffer Tank: Provide Internal insulated 0.5-gallon buffer tank to eliminate the introduction of cold water into the hot water supply line on occasions of frequent on/off operations.

2.05 TANKLESS RACK SYSTEMS

A. Tankless Free-Standing Rack System – Base Kit.

1. Capacity: Single unit, front mounted or Two unit, mounted Back to back.

2. Rack Frame: 1.5 inch square tube 14 gauge hot rolled steel.

B. Tankless Free-Standing Rack System – Add-on Kit.

1. Capacity: Additional single unit mounted in-line or Two units, mounted Back to back, per Add-on Kit.

2. Rack Frame: 1.5 inch square tube 14 gauge hot rolled steel.

2.06 ACCESSORIES

A. Venting System: Exhaust manifold shall be a minimum of 3”, of either polypropylene or schedule 40 PVC/CPVC with horizontal or vertical termination.

1. Provide common vent system allowing up to twelve (12) units to vent through 6” vent diameter in the same system.

2. Provide system capable of configuring vent intake and exhaust in different pressure planes.

B. Exhaust damper: provide common vent system with dampers that allows venting without check valves.

C. Provide locked storage case mounted to rack system keyed per PISD's requirements. Storage case to include all necessary items for regular flushing maintenance procedure, and size for all components.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin work until adjacent substrates have been properly prepared to receive work specified in this section.

B. Verify that locations of concealed reinforcements have been clearly marked for the installer.

C. Locate reinforcement points and clearly mark their locations if not already done.

3.02 PREPARATION

A. Clean surfaces prior to installation.

B. Protect all adjacent surfaces from possible damage during installation of units.

C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

A. Coordinate with plumbing piping, fuel piping, and related electrical work to achieve operating system.

B. Install in accordance with manufacturer’s current installation instructions, industry recognized best practices, and all code bodies having jurisdiction; do not install damaged products.

C. Test for proper operation and adjust until satisfactory results are obtained, including start-up and check out procedures as recommended by the manufacturer.

D. Protect adjacent finishes from damage during installation using manufacturer’s recommendations.

3.04 CLEANING AND PROTECTION

A. Clean and remove all grime or other soils using manufacturer’s recommended methods.

B. Damaged products must be repaired or replaced prior to substantial completion.

C. Protect installed products until completion of work specified in this section.

END OF SECTION

SECTION 22 4200
PLUMBING FIXTURES

PART 1 – GENERAL

1.01 REFERENCE STANDARDS

A. ASSE 1070 - Performance Requirements for Water Temperature Limiting Devices; 2020.

1.02 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.03 GENERAL REQUIREMENTS

A. Provide all fixtures, drains, equipment, accessories, and specialties indicated on the Contract Drawings, as specified, and as required under Section General Plumbing.

B. All fixtures and equipment shall be constructed of materials that are non-hazardous to the user. No lead or lead solder may be used where in contact with potable water, or asbestos for any purpose.

C. Faucets, shower heads, shower valves and similar items shall have chrome plated brass handles, spouts, plates and trim.

D. Include all necessary accessories and trim pieces such as escutcheons, traps, supply tubing, stop and basin cocks, etc. All brass piping shall be seamless brass tubing. Fittings shall be heavy cast brass. Nipples shall be extra heavy. All exposed pipe shall be chrome plated.

E. All flush valves shall have screwdriver angle stops with cap covers, vacuum breakers and be chrome plated. P-traps shall be cast brass body, adjustable type with bottom cleanout plug and 17 gauge tubing outlet with wall flange, chrome plated where exposed to view. Provide Marvel mechanical coupling for connection to copper piping. Provide 1/2" x 3/8" angle valve, loose key, supply stops with flexible supply risers for fixtures, chrome plated when exposed to view. Provide four stop keys.

F. Handicap fixtures shall have handicap compatible trim including stops and supplies, drains and valves. Provide Truebro Handi Lav-Guard vandal proof insulation kit over p-trap supplies and all sharp edges. Controls for flush valves shall be mounted on the wide side of toilet areas as required by the handicap codes.

G. All flush valves and self-closing faucets shall be adjusted for proper operation. Faucets shall have an “on” time of 4 to 5 seconds.

H. Hot water shall be piped to left hand side of plumbing fixture as user faces fixture.

I. Fixtures and equipment shall be delivered to the building properly crated and in perfect condition.

J. Install Bradley ASSE 1070 certified point of use mixing valve on HW supply side of all lavatories and sinks where fixture not already protected by a ASSE 1070 certified mixing valve, including fixtures not provided by Plumbing Contractor (i.e. lab sinks, kitchen faucets, etc.). Refer to Plumbing Drawings. Mixing valve by Symmons, Leonard and Powers also acceptable.

1.04 ACCEPTABLE MANUFACTURERS

A. WATER CLOSETS, LAVATORIES AND URINALS: American Standard, Eljer, Crane or Toto – certified by manufacturer for 500 lbs static load (no mixing of manufacturers – all vitreous china fixtures shall be from same manufacturer).

B. SINKS AND SERVICE SINKS: Elkay or Just.

C. MULTI-LAVS AND WASHFOUNTAINS: Acorn or Bradley.

D. MOP BASINS: Stern Williams or Fiat

E. DRINKING FOUNTAINS: Elkay or Halsey-Taylor.

1. (NO ELECTRONIC SOLENOID VALVE).

F. TOILET SEATS: Bemis 1655-C/SS with stainless steel, self-sustaining check hinge or equal by Beneke. White.

G. MANUAL FAUCETS: Chicago, Symmons, T&S Brass.

H. MANUAL FLUSH VALVES: Sloan Royal (BOD), Zurn or Toto.

I. FIXTURE STOPS, P-TRAPS AND RISERS: McGuire or T&S Brass.

J. FIXTURE CARRIERS: J.R. Smith, Josam, MiFab, Wade, Watts/Ancon or Zurn (same manufacturer as drains and cleanouts). Certified by manufacturer for 500 lbs static load.

K. INDIVIDUAL SHOWER VALVES: Bradley HD, Symmons, Leonard, or Powers.

L. EYEWASH (unit with wall bracket): Bradley - Model 519-220 or freestanding piped unit without cabinet.

PART 2 – MATERIALS AND METHODS

2.01 FIXTURE SUPPORTS

A. GENERAL:

1. Provide fixture supports for all water closets, lavatories, urinals, drinking fountains and other wall hung fixtures.

2. All foot supports on all types of fixture supports shall be the type that does not extend out from under the wall on which the fixture is mounted.

3. Construction and installation of the supports shall be as required to suit the job conditions, the space available, and the riser diagrams and details on the Drawings.

B. CARRIERS:

1. WATER CLOSET CARRIER: Adjustable, horizontal or vertical closet carrier as required by waste piping. Provide hanger-rod support feet for carriers that span wide chases. Provide flush valve supply support with all water closet carriers. Carriers shall be designed for 500-pound load.

2. LAVATORY CARRIER: Floor mounted steel uprights with concealed arms.

3. URINAL CARRIER: Floor mounted steel uprights with hanger and bearing plate. Provide flush valve supply support with all urinal carriers.

4. ELECTRIC DRINKING FOUNTAIN AND BUBBLER CARRIERS: Floor mounted steel uprights with hanger and bearing plate.

5. SERVICE SINK: Floor mounted steel uprights with hanger and bearing plate.

6. SCULLERY SINKS: Floor mounted steel uprights with hanger and bearing plate. Provide at each end of fixture where sink width requires it.

2.02 FIXTURES

A. See Drawings.

END OF SECTION

SECTION 22 5000
VEHICLE FUELING AND FLUID SYSTEMS

PART 1 – GENERAL

1.01 REFERENCE STANDARDS

A. NFPA 30 - Flammable and Combustible Liquids Code; 2024, with Errata (2025).

B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

C. UL 142 - Steel Aboveground Tanks for Flammable and Combustible Liquids; Current Edition, Including All Revisions.

D. UL 508A - Industrial Control Panels; Current Edition, Including All Revisions.

E. UL 2085 - Protected Aboveground Tanks for Flammable and Combustible Liquids; Current Edition, Including All Revisions.

1.02 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.03 SECTION INCLUDES

A. Fuel storage tanks.

B. Fuel Pumps

C. Fuel Dispensers

D. Fuel pipe and pipe fittings

E. Fuel Monitoring and Fuel Management Systems

F. Miscellaneous Accessories

1.04 CODES AND REFERENCES

A. Montgomery County Building Code

B. National Electrical Code 2023 Edition

C. 2018 Edition of the International Fire Code

D. TCEQ guidelines and rules.

E. ANSI B31.1 – Power Piping

F. ANSI B31.4 – Liquid Petroleum Transportation Piping System

G. ANSI B31.9 – Building Service Piping

H. API 2000 – Venting Atmospheric and Low-Pressure Storage Tanks

I. NFPA 30A 2018

J. NFPA 30 – Flammable and Combustible Liquids Code

K. UL 142 – Steel Above Ground Tanks for Flammable and Combustible Liquids

L. UL 2085 – Protected Above Ground Tanks for Flammable and Combustible Liquids

1.05 REGULATORY REQUIREMENTS

A. Conform to applicable EPA, State of Texas, and Local Regulations for the installation of fuel systems.

B. Contractor shall obtain certificate of compliance from the governing agencies indicating approval of the installed fuel system.

1.06 SUBMITTALS

A. EQUIPMENT AND MATERIALS: Provide product sheets of all equipment, systems, and material to be provided.

B. LAYOUT DRAWINGS: Provide scaled drawings indicating layout of equipment, pipe routing and elevation, and pipe sizes. Indicate accessories and locations in the system.

C. WIRING DIAGRAM: Provide wiring diagram for the entire system including power, control and monitoring systems. This shall include all field wiring.

1.07 INSTALLER QUALIFICATIONS

A. Installer shall be a company specializing in performing the work of this Section with a minimum of three years documented experience and licensed by the State of Texas, possessing contractor licensing as well as on site supervisor license.

B. Contractor shall be responsible for the coordination of the entire fuel system including system component interface and communications with the FM Live.

C. This contractor shall include in his scope of work the equipment, installation, interconnecting piping, associated electrical power, system monitoring and control and associated wiring.

D. Installer shall be FuelMaster FMLive certified.

1.08 WARRANTY

A. All new components of fuel system included in project scope, including but not limited to dispensing systems and piping systems shall have a one year warranty for parts and labor for a complete operational system. Starting from date of owner's acceptance of building.

PART 2 – PRODUCTS

2.01 FUEL STORAGE TANK

A. Existing underground storage tanks to remain and be reused for new fueling system.

2.02 ABOVE GROUND DEF STORAGE TANK

A. Existing DEF storage tank to remain. Tie existing DEF tank into new Fuel Management System for access.

2.03 FUEL DISPENSERS

A. Single product dispenser (Gasoline or Diesel)

1. Gasboy Atlas 9853 Series (dual hose, one product)
2. 15 GPM flow rate for both nozzles for gasoline
3. 22 GPM flow rate for both nozzles for diesel
4. 115 VAC/60 Hz
5. Four piston, positive displacement CFT meter
6. 1" solenoid valve
7. Check valve and filters
8. Automatic nozzles, swivels and breakaways
9. NFPA 30, NFPA 30A and NFPA 70 compliant
10. Electronic display and totalizer

11. Card system interface

12. Pulser compatible with fuel management system

13. Required decals and signage

14. Miscellaneous hoses, retractors, and fittings for a complete installation

B. ACCEPTABLE MANUFACTURERS: Gasboy, or equal by Bennett.

2.04 FUEL TRANSFER PUMPS

A. Diesel and Unleaded Fuel: Turbine type variable speed pump with submersible centrifugal impeller, automatic thermal overload protection, integral check valve, integral pressure relief valve, air eliminator, UL Listed for fuel type, mounted in container sump integral with fuel storage tank. Provide turbine pump interface controller. Red Jacket Series P200U1-RJ or Franklin Fueling.

1. See Fuel Equipment Schedule on drawings for additional information.

B. Each turbine pump will include one control starter and dispenser hook-isolation box. Manufactured by Franklin Fueling or equal.

C. Each tank component will include a tank probe connected to the main control panel. Control panel manufacturer Franklin EVO500 only.

D. Acceptable manufacturer: Red Jacket or Franklin only.

2.05 FUEL PIPE AND FITTINGS

A. Above grade fuel pipe and fittings (including in open trenches) shall be Schedule 40 ASTM A106B, seamless carbon steel pipe with socket welded fittings. All piping to be welded where accessible, threaded only where pipe cannot be welded. Piping in trenches shall be supported, including spacing requirements, per the manufacturer’s recommendations.

B. Vent and drain pipe and fittings shall be Schedule 40 ASTM A106B seamless carbon steel pipe. Provide ASTM A234 WPB seamless carbon steel fittings with long radius butt weld joints for sizes over 2”. Provide threaded Class 150 malleable iron fittings for pipe sizes 2” and smaller; vents shall terminate 12’ AFF.

C. Flanges shall be Class 150 steel weldneck flanges conforming to ASTM A105, bored to match pipe.

D. Unions shall be Class 3000 wog carbon steel ASTM A105, Grade 2 with steel to steel seats with threaded or socket weld ends.

E. All pipe, fittings and all associated steel components and hardware shall be field primed and epoxy painted with two coats. Color shall be selected by Architect.

2.06 COUPLINGS

A. Dielectric Connections: Union with galvanized or plated steel threaded end, copper end, water impervious isolation barrier.

2.07 BALL VALVES

A. No valves on tanks—all openings should be from the top, per UL 2008.

B. Valves for fuel transfer: Three-piece fire safe design per API 607, socket welded ends, carbon steel, stainless steel ball and stem, rated for 250 PSI working pressure, Teflon seats. Milwaukee 35-C-1-R-LL

2.08 FUEL MANAGEMENT SYSTEM

A. GENERAL: Provide a fuel management system to authorize and track fueling and DEF dispensing.

B. CENTRAL CONTROLLER: Windows based to generate comprehensive transaction reports, and vehicle fuel consumption and efficiency reports.

C. PROKEE: Provide prokees for white fleet access to dispensers. Provide programmer and 100 PROKEE.

D. FUEL MONITOR INTERFACE KIT: Provide interface to access information from the fuel tank controllers. Provide for two tanks, upgradeable for an additional tank. Provide proximity card access suitable to interface with New Caney ISD personnel proximity cards.

E. TRAINING: Provide training for New Caney ISD personnel on installation of AIMS modules into vehicles as well as using the Fuel Master interface. Training to include 10 vehicles.

F. AUTOMOTIVE INTERFACE MODULE: Provide and install Titanium AIMS module for 100 vehicles. All items required for installation to be provided.

G. FUEL ISLAND PEDESTAL: Provide fuel island pedestal with FM Live. Fuel island pedestal to have capability to authorize all dispensers shown on plans. Provide transition sump when connections are from below.

H. ACCEPTABLE SYSTEM: Fuel Master, manufactured by SynTech only.

2.09 TANK MONITORING CONTROL PANEL

A. UL 508A control panel shall be an integral type panel to control pumps, solenoid valves and monitor system functions. Panel shall have the following features:

1. NEMA 4X Type enclosure
2. Circuit breaker for each pump
3. Overload protection for each fuel transfer pump
4. Fuel transfer pumps motor magnetic contactors and relays
5. HOA switches for pumps and control relays
6. Run lights for fuel transfer pumps
7. Automatic pump start on call for service
8. 208/120 volt single phase power requirements
9. Power step-down transformer where required for control devices
10. Fuel storage tanks high level alarm (90% full) with horn and light installed at tank fill.
11. Fuel storage tanks % full indication and gallons display
12. Fuel storage tanks low level alarm (20% full)
13. Fuel storage tanks leak detection alarm
14. Fuel tank equipment sump leak detection, with fuel pump shutdown upon leak detection, for each tank
15. Each tank component will include a tank probe connected to the main control panel.
16. PLC logic
17. RS485 MODBUS communications capability
18. Set of dry contacts shall be provided to indicate pump status for each pump, pump failure alarm for each pump, fuel storage tank leak detection for each fuel tank, fuel storage tank equipment sump leak detection, fuel storage tank high level alarm for each tank, fuel storage tank low level alarm for each tank. Connect these points to the building DDC EMS System.

B. ACCEPTABLE SYSTEM: Franklin EVO500 only.

2.10 GRAPHICS

A. Provide all signage and graphics as required by Fire Marshal and all applicable governing codes.

PART 3 – EXECUTION

3.01 INSTALLATION

A. The existing fueling system to remain accessible and operational until the new fueling center and storage tanks are completed, tested, accepted by any required regulatory agency, and fully operational. Sequencing is to be coordinated by the general contractor with the Owner, Architect, and consultants.

B. Install system in accordance with the manufacturer's instructions.

C. Route piping in an orderly manner and maintain gradient.

D. Install piping to allow for expansion and contraction without stressing pipe, joints or connected equipment.

E. Protect piping systems from entry of foreign materials.

F. Refer to Division 26 Specifications for electrical wiring requirements.

G. Refer to Division 26 Specifications for requirements of miscellaneous electrical devices that may be required for a complete installation.

H. All wiring, including low voltage, shall be inside conduit and shall comply with division 26.

3.02 FUEL SYSTEM INSTALLATION

A. Ground tank per NFPA 70.

B. This contractor is responsible for a complete installation including equipment, piping, wiring, and conduit associated with the fuel system.

C. Hydrostatically test primary (carrier) piping system at 100 psi (689.48 kPa) and carefully check for leaks. Repair leaks and retest until proven leak tight. Flush system thoroughly with fuel until all moisture and debris is removed, and fuel is clear. Fill system with clean fuel, close end valves and allow system to remain full. Legally dispose of fuel.

D. The piping system shall be thoroughly flushed with fuel upon completion of work. The contractor is responsible for all items and equipment required to completely flush the system. The fuel tanks shall be tested as outlined in the 2021 Edition of the International Fire Code and local requirements. As a minimum, contractor shall test tanks at 5 psig (34.47 kPa) for a minimum of 10 minutes without leakage and documented prior to applying for city/county permits.

E. All pipe, fittings and all associated steel components and hardware shall be field primed, and epoxy painted with two coats. Color shall be selected by Architect.

3.03 START-UP AND TRAINING

A. Provide start up in presence of the Owner and four hours of training on fuel system operation and monitoring.

B. Coordinate inspections required by Owner and Authorities Having Jurisdiction.

C. Operate system as a complete system with dispensers, demonstrating proper operation to maintenance personnel.

3.04 CLOSE OUT

A. Final as-built drawings shall be provided in pdf format prior to final acceptable.

B. Drawings shall include location of piping, conduit, and equipment; and schedules of equipment, systems and devices installed.

C. Provide detailed control drawings showing all devices, terminal numbers, schedules, legends, labels, etc as required to properly display the system installed to allow easy trouble shooting in the future. The diagrams shall include set points and all other switch settings and adjustments.

D. Provide complete operating and maintenance binder fully indexed and including a complete parts listing.

E. Provide a detailed written sequence of operation.

END OF SECTION

SECTION 23 0000
GENERAL HVAC

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 INTENT OF DRAWINGS AND SPECIFICATIONS

A. Drawings and Specifications are intended to be complimentary. Any work exhibited in either of them whether in the other or not, is to be executed according to true intent and meaning thereof, the same as if set forth in all. Should any work required by the drawings and specifications be in violation of any Federal, State, County or City laws, ordinance or regulation, those laws and regulations shall prevail, and shall be complied with by the Contractor as a part of this work with no extra compensation.

B. The drawings are schematic in nature but show the various components of the system approximately to scale and indicate how they are to be integrated with other parts of the building. Determine exact locations by close coordination with the Owner's Representative, job measurements, determining the requirements of other trades and reviewing all contract documents. The Drawings indicated general routing of the various parts of the systems, but do not indicated all fittings, offsets and runouts which are required. The Contract includes these items as required to fit the system into spaces allotted for them.

C. Equipment that is scheduled is the basis of the design, and have been coordinated for space, installation and electrical requirements. Space, installation and electrical requirements for other equipment and models from acceptable manufacturers have not been verified or coordinated. Contractor shall verify these requirements prior to using other equipment in his bid and include any additional costs for installation of the equipment. This includes general construction and MEP costs.

1.03 PERMITS AND FEES

A. The contractor shall obtain and pay for all permits and licenses, file all notices, pay all legal fees and comply with all laws, ordinances, rules and regulations bearing on the conduct of the work specified or shown on the drawings. This applies to Federal, State and Local Codes and Requirements. Approval to the various insuring and inspection authorities shall also be obtained. Refer to Architectural sections for additional information.

1.04 GUARANTEE

A. All materials, apparatus and equipment furnished and installed under this Section of these Specifications shall be new and free from any defects when accepted by the Owner and shall be guaranteed in writing for a period of one year from the date of acceptance by the Owner unless noted to have extended warranties.

1.05 COOPERATION

A. The Contractor shall cooperate with other trades on the job and make installations in the proper sequence during the construction of the buildings, and he shall notify the Architect well in advance of construction of all interference of his work with that of other trades and of building construction. This notification shall not relieve the contractor of his responsibilities.

1.06 VISITING THE SITE

A. The Contractor shall be familiar with the Drawings and Specifications and shall have examined the premises and understand the conditions under which he will be obligated to operate in performing the contract. No allowance shall be made consequently for any error through negligence in this regard.

1.07 WORKMANSHIP

A. All work shall be performed in a neat workmanlike manner and in the best practice of the trade. Only workmen skilled in the trades shall be employed to perform the work included in these specifications.

1.08 MATERIALS

A. Materials, when not otherwise definitely specified, shall conform to applicable National Specifications and Standards. All materials shall be certified to not contain any asbestos or other material banned by the Environmental Protection Agency. Lead shall not be used in any material, pipe or solder in contact with the domestic water system.

B. The names of manufacturers and model numbers have been used in the Contract Documents to establish type of equipment and standard of quality. Where only one name is mentioned for a particular item of material, then that manufacturer is the only one acceptable. Where several names are mentioned, any one of those listed may be furnished provided submittal contains sufficient information to show complete compliance with contract Documents. No attempt has been made to determine if each manufacturer listed will produce material that will comply with all requirements of this project or will fit the allotted space; if they do, then it will be acceptable.

C. Requests for substitution during the bidding period, in accordance with the requirements of the Special Conditions, must be accompanied by a complete product submittal with all features,

accessories and capacities noted. Large equipment must include a 1/4" scale drawing showing how the equipment and required access space are compatible with the available space. Acceptance for bidding does not waive the post bidding requirement for formal submittal and approval.

1.09 REMOVAL OF RUBBISH AND CLEAN-UP

A. Keep area of operations free from accumulation of waste material or rubbish at all times. At the completion of the work, remove all rubbish, tools, scaffolding and surplus materials from the area of operations. The exposed parts of the Mechanical installation which are to be painted shall be thoroughly cleaned of cement, plaster, grease, oil spots and other materials in preparation for painting. All piping shall be cleaned of cement, plaster and other construction debris prior to being concealed above accessible ceilings or being insulated. Clean exposed piping prior to final inspection. All construction areas shall be left "broom" clean on a daily basis. Prior to final acceptance, vacuum clean all mechanical rooms including equipment.

1.10 OPERATION TESTS AND ADJUSTMENTS

A. After completion of the work and before final acceptance thereof, the Contractor shall notify the Architect when he is ready for the balancing of air and hydronic systems which will be performed by a professional test and balance firm selected by the Owner as described in Section 23 05 93.

1.11 LUBRICATION

A. After the installation is completed, lubricate all moving parts of all equipment furnished under this Division of the Specifications requiring same. Leave with the Owner a brief but complete set of lubrication instructions, showing the recommended frequency of lubrication and the type of lubricant recommended for each piece of equipment.

1.12 NOISE AND VIBRATIONS

A. The Contractor shall guarantee that the entire system and its component items of equipment, as installed by him, shall operate without objectionable vibration or noises, as determined by the Architect. If, in the opinion of the Architect, objectionable vibration or transmission thereof to the building occurs, the Contractor shall execute such remedial measures as are necessary to eliminate such unsatisfactory operating conditions and the material and labor thereby required shall be performed at the Contractor's expense.

1.13 RELATED WORK SPECIFIED IN OTHER SECTIONS

A. ELECTRICAL: Power wiring is specified in the Electrical Section. Interlock and control wiring (any voltage) is specified under this Section. Controllers, starters and VFD’s for mechanical equipment are to be provided under Mechanical Section, Division 23.

B. PAINTING OF EQUIPMENT, PIPING AND ACCESSORIES: Painting Section. However, all items furnished under this Section shall be kept clean and free from corrosion.

C. OPENINGS: Various Sections. However, the locations of all inserts and openings shall be determined under this Section and coordinated with other Sections in ample time to avoid cutting new construction.

D. CUTTING, PATCHING AND FURRING: Various Sections. However, the locations of all inserts and openings shall be determined and coordinated with other sections.

E. EQUIPMENT AND PIPING SUPPORTS: Refer to structural drawings, details and notes for specific support and pipe hanging requirements. Specific loading and attachment methods shall be followed to assure that individual structural members are not overloaded.

1.14 GENERAL EQUIPMENT REQUIREMENTS

A. Manufacturer's printed directions shall be followed for preparing, assembling, installing, erecting and cleaning manufactured materials or equipment, unless otherwise directed.

1.15 SHOP DRAWINGS

A. Submit seven complete sets of shop drawings checked and certified by the contractor as being checked and lists of materials furnished under this Division. Shop drawings shall be approved before installation of the material under consideration.

B. Shop Drawings shall consist of published ratings of capacity data, detailed construction drawings, wiring and control diagrams, performance curves, installation instructions, manufacturer's installation drawings and other pertinent data. Where the literature is submitted covering a group or series of similar items, the item under consideration shall be clearly indicated. Ductwork shop drawings shall include one blueline set and one reproducible set. Drawings shall be submitted showing revisions to equipment layouts due to use of alternate or substitute equipment. The front sheet of each copy of the submittal shall have the following typed information:

1. Job name and location.

2. General Contractor's name, address, Project Manager's name and telephone number.

3. Submitting Sub-contractor's name, address, Project Manager's name and telephone number.

4. Suppliers company name, address, salesman's name and telephone number.

5. Signature of an officer or attorney-in-fact of the Sub-contractor with date and title and a statement that the submittal materials and equipment complies with the Contract Documents.

6. Any submittal without all of the above information will be rejected without review.

C. Equipment that has regional representation shall only be supplied by the regional representative that serves the area where the project is located. The regional representative's name and signature shall be included with the shop drawing.

D. Shop Drawings are required for but are not limited to the following items:

Chillers	Boilers	DX Split Systems
AHU's	Dust Collector	Pumps
CVT & VAV Boxes	Controls	VFD & Motor Starters
Fans & Roof Curbs	Ductwork Shop Drawings	Ductwork Material & Accessories
Ductless Split System	Water Specialties	Piping Materials
Insulation	Air Devices	Pipe Markers
Water Treatment	Fire & Smoke Dampers	Vibration Isolation

E. Approval of these submittals shall not be construed as releasing the contractor from compliance with the contract Documents. They are a means of coordinating the work and aiding in the proper selection and installation of equipment. Do not release items such as fire dampers and starters until associated equipment or ductwork drawings are approved. All materials and equipment shall be subject to final acceptance by the Engineer at the completion of construction and adjustments of the system.

F. If a submittal is returned to the Contractor marked "Rejected" or "Revise and Resubmit", only one (1) additional submittal will be permitted without the Contractor incurring charges for the additional re-submittals. Lee Truong & Yu Engineers (LTY) shall be reimbursed by the Contractor for any expense in connection with any necessary submission in addition to the two (2) submissions allowed. Contractor will be billed by LTY at a rate of $125/hr for these occurrences.

1.16 PROTECTION OF EQUIPMENT

A. Do not deliver equipment to jobsite until progress of construction has reached the stage where equipment is actually needed, or until building is closed in enough to protect equipment from the weather. Equipment allowed to stand in weather will be rejected, and Contractor is obligated to furnish new equipment at no cost to Owner.

B. Adequately protect equipment (including all Owner-furnished items) from damage after delivery to job. Cover with heavy cloth as required to protect from damage.

C. Equipment which has been damaged by construction activities will be rejected. Contractor shall furnish new equipment at no cost to Owner.

1.17 CUTTING AND PATCHING

A. Coordinate the work with other trades to arrange for all holes, chases, and other spaces necessary for the installation of all components of the mechanical systems. Inform the other

trades in ample time for these to be provided. Failure to comply with this requirement may necessitate cutting and patching work. If such work becomes necessary, it will be done under this Section of the specifications, and shall conform to all applicable requirements of other Sections of the Specifications.

1.18 STRUCTURAL STEEL

A. All structural steel used for the purpose of fabricating pipe supports, pipe guides, pipe anchors, equipment supports, and framing for large ducts and plenums, shall conform to ASTM Designation A-36. All steel used for these purposes shall be new, clean, straight and galvanized.

1.19 CONCRETE PADS

A. All equipment mounted on the floor, including expansion tanks and pot feeder, shall have a concrete house keeping pad. Concrete pads shall be sized for the equipment to be supplied. Pad shall exceed base dimensions by approximately 4" all around. Reinforce pads rebar including #4 bar around perimeter. Tool pad to form chamfered edge. Nominal thickness shall be 4” except air handling units and indoor chillers shall be 6”. Refer to details for outdoor equipment.

1.20 SPARE PARTS LISTS, OPERATING INSTRUCTIONS

A. At completion of job, furnish three copies of spare parts lists and operating instructions for all equipment furnished under this Division. These lists and instructions shall be published by the manufacturer of the equipment and shall be in good condition. Bind in 3-ring binder with project name.

1.21 TOOLS AND SPARE PARTS

A. Upon completion of the installation, deliver to the Owner all tools and spare parts that are furnished by the Equipment Manufacturer for use with the equipment furnished under this Contract.

1.22 REFRIGERANT AND OIL

A. Furnish and install full refrigerant and oil charge in the air conditioning refrigeration systems and maintain it for full term of the guarantee.

1.23 RECORD DRAWINGS

A. Maintain at the job site a separate set of white prints (blue line or black line) of the contract drawings for the sole purpose of recording the "as-built" changes and diagrams of those portions of work in which actual construction is at variance with the contract drawings. Mark the drawings with a colored pencil. Prepare, as the work progresses and upon completion of work,

reproducible drawings clearly indicating locations of various lines, valves, ductwork, traps, equipment, and other pertinent items, as installed. Include flowline elevation of sewer lines. Record existing and new underground and under slab piping with dimensioned locations and elevations of such piping.

B. At the conclusion of project, obtain copy of the original drawings and transfer as-built changes to these in PDF format. As-built documents shall be submitted to A/E teams for review and approval. Deliver the accepted as-built documents in both printed format and digital saved in thumb drive to the Owner. Delivery of these as-built prints is a condition of final acceptance.

C. As-Built drawings should indicate the following information as a minimum:

1. Indicate all addendum changes to documents.
2. Remove Engineer's seal, name, address and logo from drawings.
3. Mark documents RECORD DRAWINGS.
4. Clearly indicate: DOCUMENT PRODUCED BY
5. Indicate all changes to construction during construction. Indicate actual routing of all piping, ductwork, etc. that were deviated from construction drawings.
6. Indicate exact location of all underground plumbing and flow line elevation.
7. Indicate exact location of all underground plumbing piping and elevation.
8. Indicate exact location of all underground electrical raceways and elevations.
9. Revise schedules to reflect (actual) equipment furnished and manufacturer.
10. During the execution of work, maintain a complete set of drawings and specifications upon which all locations of equipment, ductwork, piping, devices, and all deviations and changes from the construction documents in the work shall be recorded.
11. Location and size of all ductwork and mechanical piping above ceiling including exact location of plumbing isolation valves.
12. Exact location of all electrical equipment in and outside of the building.
13. Fire Protection System documents revised to indicate exact location of all sprinkler heads and zone valves.
14. Exact location of all roof mounted equipment, wall, roof and floor penetrations.
15. Cloud all changes.

1.24 OWNER'S INSTRUCTIONS

A. Provide the following periods of instruction to the Owner's designated personnel upon completion of the system's installation. Provide additional training as noted in individual equipment specifications.

HVAC Sytems	8 Hours
Temperature Controls System	8 Hours

1.25 ALTERNATES

A. Determine the scope of each specified alternate proposal by carefully reading all Divisions of the Documents. The Bid Form contains information explaining the extent of the construction to be performed under a specific alternate. Alternate proposals, which are not predominantly mechanical in scope, are described in other Divisions of these Documents. Pay particular note to re-roofing items that may necessitate adjustments to existing piping.

B. Alternative Equipment: Certain types of equipment as listed below require the specified brand and model to be included in the base bid. At the contractor’s option, he may propose equivalent equipment from one of the listed alternate manufacturers for one or more of these types of equipment. The contractor shall list in this alternate bid the name of the item, manufacturer’s name, model number and the amount to be deducted from his base bid.

1.26 MEP INSPECTIONS

A. Contractor shall formally request inspections from LTY to review any and all MEP installations. Inspections shall include but not be limited to: pipe tests, underground installations prior to backfill, rough-in installations, wall cover inspections, above ceiling inspections, final inspection.

B. Information required from Contractor on each and every request for inspection is as follows:

1. Specific type of test (i.e. hydrostatic test, head pressure test, medium pressure duct test, etc.).

2. Exact location of test (i.e. area of building with wing or room numbers).

3. Description of test (i.e. partial inspection, walls only, chase walls, wall cover, ceiling cover, etc.)

4. Exact time test started (required test time per Project Manual will need to have elapsed prior to LTY inspection). Estimated time test will start will not be acceptable.

5. Pressure reading on gauge at time of request for all pipe tests (provide picture of gauge with request).

6. Verification from General Contractor with name of person that verified, that specific test has been verified by the Contractor and all sub-contractors to meet all requirements of the Specifications and Codes (prior to inspection request).

C. Contractor shall provide a MINIMUM of 48-hour notice prior to requested inspection time, no exceptions.

D. INSPECTION REPORTS: After each inspection, LTY will generate an inspection report and distribute promptly. The Contractor will then be given 7 working days from date of report to address all deficiencies listed on the report. The GENERAL CONTRACTOR shall verify that all items on each inspection report have been addressed by their subcontractors in this time period. Once verified the GENERAL CONTRACTOR shall sign-off on each deficiency listed on the report and return the signed-off copy of the inspection report to LTY via e-mail. After the signed-off report is returned to LTY, the GENERAL CONTRACTOR shall request a re-inspection by LTY to close the report. If after 7 working days no re-inspection is requested by the GENERAL CONTRACTOR to close a report, LTY reserves the right to re-inspect whenever our schedule allows, with these re-inspections still being subject to Paragraph E below.

E. TEST REJECTIONS AND RE-INSPECTIONS: If a test is rejected or a re-inspection of an issued LTY Inspection Report is found to NOT be completely addressed, only ONE (1) additional inspection will be permitted without the Contractor incurring charges for each additional inspection required. LTY shall be reimbursed $500 by the GENERAL CONTRACTOR for expenses in connection with EACH inspection in addition to the two (2) inspections allowed.

1.27 SUBSTANTIAL COMPLETION

A. No portion of the total contract will be declared substantially complete until the automatic temperature controls for that portion has been demonstrated to be complete and functioning as intended. The temperature control system will be complete and functioning as intended when all of the space temperatures are maintained at plus or minus two degrees of set point.

1.28 DEMOLITION AND REMODELING

A. In areas of demolition, contractor shall remove all HVAC equipment, ductwork, piping and devices not to be reused. Any material that has salvage value shall be offered to the Owner, and if accepted, delivered to his warehouse. If not accepted it shall be properly disposed of with the other construction debris.

B. Where existing systems serve other areas as well, they shall remain active in those areas. Cap, patch and relocate ducts, piping, etc to keep systems operable.

C. Remove and replace ceilings, walls, floors and other finishes as necessary to install or modify mechanical systems.

D. Where ceilings are to be removed or replaced, remove and reinstall diffusers, grilles or other existing mechanical devices.

E. Relocate ductwork and piping as necessary to allow new or modified construction. Repair existing mechanical systems damaged by construction activities.

F. Where existing starters are to be reused, install heaters with proper size for revised loads.

G. Where existing equipment is modified or replaced and interfaces with the Energy Management System, disconnect and reconnect EMS wiring, and replace end devices and sensors as necessary.

H. Where existing building opening does not accommodate removal of the whole unit to demolished, equipment shall be disassembled or cut into sizes capable of being removed without modification to existing building component.

I. Any existing to remain equipment in the project shall be adequately protected. After completion of work, all existing equipment shall be maintained at the same level of working condition and cleanliness as they were prior to the work. Any units or supplemental work that are damaged during demo or construction shall be replaced or repaired by the contractor.

1.29 CONSTRUCTION PHASING FOR RENOVATION AND ADDITION PROJECT

A. Phasing of construction shall be the sole responsibility of the General Contractor. Construction phasing shall accommodate all needs and schedules required by the Owner, including any temporary cooling, heating, dehumidification for critical spaces. All costs for construction shall be included in the price submitted by the Contractor on the bid date. No additional money will be approved for the Contractor or their sub-contractors to accommodate costs (including labor) associated with construction phasing.

END OF SECTION 23 00 00

SECTION 23 0100
COORDINATION DRAWINGS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 SUBMITTALS

A. Provide submittals as outlined in Section 23 00 00 General Mechanical

PART 2 – REQUIREMENTS

2.01 COORDINATION DRAWINGS

A. The Mechanical Contractor shall take the lead in coordinating the Mechanical (HVAC), Electrical, Plumbing and Fire Protection Systems within the building.

B. The Mechanical Contractor shall coordinate a three dimensional (3-D) model of the building which includes the Mechanical (HVAC), Electrical, Plumbing and Fire Protection Systems. The Electrical, Plumbing and Fire Protection Contractors shall prepare their work and generate 3-D models which will be given to the Mechanical Contractor for coordination. The Contractor will be provided with the REVIT model and AutoCAD files that were used to generate the contract documents. These files may be used as the background file. The Contractor shall replace the systems drawn with the actual shop drawing models. The Contractor is not limited to using REVIT, but may use any 3-D software in generating and combining the coordination model. If an alternate software is used, all contractors must agree to provide compatible software models.

C. Submitting the contract drawings as coordination drawings will not be acceptable.

D. The model shall include detailed and accurate representations of all equipment to be installed based upon the reviewed equipment submittals.

E. The Mechanical Contractor shall hold a 3-D coordination meeting with all sub-contractors present to review the model and discuss coordination of the installation of the building systems.

F. Upon completion of the coordination meeting, the Contractor shall submit the 3-D model and 1/4” scale drawings for review.

G. The model shall detail major elements, components and systems in relationship with other systems, installations and building components. Indicate locations where space is limited for

installation and access, and where sequencing and coordination of installations are of importance to the efficient flow of the Work, including (but not necessarily limited to) the following:

1. Indicate the proposed locations of pipe, duct, equipment and other materials. Include the following:
    a. Wall and type locations
    b. Clearances for installing and maintaining insulation.
    c. Locations of light fixtures and sprinkler heads.
    d. Clearances for servicing and maintaining equipment, including tube removal, filter removal, and space for equipment disassembly required for periodic maintenance.
    e. Equipment connections and support details.
    f. Exterior wall and foundation penetrations.
    g. Routing of storm and sanitary sewer piping.
    h. Fire-rated wall and floor penetrations
    i. Sizes and locations of required concrete pads and bases.
    j. Valve stem movement.
    k. Structural floor, wall and roof opening sizes and details.
2. Indicate scheduling, sequencing, movement and positioning of large equipment in the building during construction.
3. Prepare floor plans, elevations and details to indicated penetrations in floors, walls and ceilings and their relationship to other penetrations and installations.
4. Prepare reflected ceiling plans to coordinate and integrate installations, air distribution devices, light fixtures, communication systems components and other ceiling mounted items.

H. Sequence of Coordination

1. Below is hierarchy of model elements and the sequencing by which the models will be coordinated:
2. Structural and Architectural Model
3. Miscellaneous steel

4. Perform preliminary space allocation

5. 4.Identify hard constraints (locations of access panels, lights, A/V space requirements, etc.

6. Main and medium pressure ducts from the shaft out

7. Main graded plumbing lines and vents.

8. Sprinkler mains and branches

9. Cold and hot water mains and branches

10. Lighting fixtures and plumbing branches

11. Smaller sized ducts and flex ducts

12. Smaller size cold water and hot water piping, flex ducts, etc.

I. The Contractor and Sub-Contractors shall not install any item until the coordination has been completed and reviewed by the Construction Manager, Owner and A/E Team.

J. This Contractor shall be responsible for coordination of all items that will affect the installation of the work of this Division. This coordination shall include but not be limited to: ampacity, capacity, electrical and piping connections, space requirements, system construction, building requirements and special conditions.

K. By submitting shop drawings on the project, this Contractor is indicating that all necessary coordination has been completed and that the systems, products and equipment submitted can be installed in the building and will operate as specified and intended, in full coordination with all other Contractors and Subcontractors.

END OF SECTION

SECTION 23 0513
HVAC MOTORS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

1.02 THE GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL, SUPPLEMENTARY AND SPECIAL CONDITIONS, APPLY TO THE WORK SPECIFIED IN THIS SECTION.

PART 2 – MATERIALS AND METHODS

2.01 MOTORS

A. GENERAL: This section applies to motors larger than 1/2 horsepower and not part of an assembly such as a chiller or condenser. Select for starting torque and current, suitable to start and continuously run equipment served. Horsepower rating shown on Drawings are preferred, but motor must not be loaded more than 1.0 X nameplate horsepower. Provide larger motor if required to stay within this limitation, and include all costs for any required increases in the electrical system. All motors shall have metallic nameplates marked with information required by NEC 430-7. Motors that are controlled by inverters shall be designed for this application.

B. ENCLOSURE: Drip proof for locations protected from the weather; totally enclosed fan cooled for exposure to weather. Frame construction shall be steel or cast iron with all surfaces including air passages coated with a rust inhibiting primer and finished with an alkyd or epoxy enamel paint.

C. INSULATION: Class B for maximum 40° C ambient, Class F or H or higher.

D. EFFICIENCY: Motors shall be premium efficiency type and have all copper windings.

E. SERVICE FACTOR: 1.15.

F. ELECTRICAL CHARACTERISTICS: Provide nameplate ratings the same as circuit voltage indicated on the electrical drawings. Coordinate to give proper operation with starting equipment scheduled.

G. SINGLE PHASE MOTORS: Permanent split capacitor start unless special load requires another type, resilient mounting, inherent overload protection and sealed bearings requiring no lubrication but with provisions for future lubrication.

H. THREE PHASE MOTORS: Ball bearings with grease lubrication fitting on top and drain on side or bottom. Provide sleeve bearings with oil cups for units requiring minimum noise level. Average bearing life shall be 150,000 hours.

I. ACCEPTABLE MANUFACTURERS: Baldor, Allis Chalmers, Century, General Electric, Marathon, Reliance, Siemens, US Motors and Westinghouse.

END OF SECTION

SECTION 23 0548
VIBRATION CONTROLS FOR HVAC PIPING AND EQUIPMENT

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

1.02 THE GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL, SUPPLEMENTARY AND SPECIAL CONDITIONS, APPLY TO THE WORK SPECIFIED IN THIS SECTION.

1.03 GENERAL REQUIREMENTS

A. Provide the miscellaneous HVAC and Plumbing Equipment materials and services as shown on the Drawings and specified herein.

PART 2 – MATERIALS

2.01 VIBRATION ISOLATION

A. GENERAL: All vibration isolation devices shall be designed and furnished by a single manufacturer, or supplier, who will be responsible for adequate coordination of all phases of this work. Submittal data shall show type, size and deflection of each isolator proposed.

B. CORROSION PROTECTION:

1. All vibration isolators shall be designed or treated for resistance to corrosion.

2. Steel components shall be PVC coated, or phosphated and painted with industrial grade enamel. All nuts, bolts and washers shall be zinc electroplated. Structural steel bases shall be thoroughly cleaned of welding slag and primed with zinc chromate or metal etching primer. A finish coat of industrial enamel shall be applied over the primer.

C. SELECTION: Spring deflections listed are static deflection and are minimum requirements. Isolation efficiencies listed are minimum. The springs shall be capable of 30% over-travel before becoming solid (minimum 1/2" clearance at final inspection). All isolators supporting a given piece of equipment shall be selected for approximately equal deflection.

D. FIRST TWO PIPE HANGERS FROM EACH PIECE OF EQUIPMENT ISOLATED ON SPRINGS: Provide a spring hanger consisting of a rectangular steel box, coil spring, spring cups, neoprene impregnated fabric washer and steel washer. The hanger box shall be capable of supporting a

load of 200% of rated load without noticeable deformation or failure. Static deflection shall be equal to isolation units supporting equipment to which piping is connected.

E. FIRST TWO PIPE HANGERS FROM EACH PIECE OF EQUIPMENT ON ISOLATORS OTHER THAN SPRINGS: Provide an elastomeric hanger, consisting of a rectangular steel box and an elastomeric isolation element, which shall be of Neoprene or high quality synthetic rubber with anti-ozone additive. The elements shall be designed for approximately 1/4" deflection and loaded so that deflection does not exceed 15% of the free height of the element. The design shall be such as to prevent metal-to-metal contact between the hanger rod and the steel box.

F. AIR HANDLING UNITS: Units are internally isolated from the factory.

G. PUMPS: Install a "waffle" style isolation pad underneath vertical inline pumps. The pumps should not be rigidly attached to base/concrete pad structure.

H. FLEXIBLE HOSE: Flexible connections at pumps shall be stainless steel flexible hose with flanges and stainless steel wire braid. Amber Booth Type SS-FP.

I. CHILLERS: See Chiller Specification

J. FANS:

1. GENERAL: This Section refers to in-line fans and other structure hung fans including CVT (VAV) BOXES.

2. FANS LARGER THAN .5 HORSEPOWER: Provide a spring hanger consisting of a rectangular steel box, coil spring, spring cups, neoprene impregnated fabric washer and steel washer. The hanger box shall be capable of supporting a load of 200% of rated load without noticeable deformation or failure. Size for 1½" deflection, 95% efficient.

3. SMALL HORSEPOWER, STRUCTURE MOUNTED FANS INCLUDING CVT BOXES: Provide an elastomeric hanger, consisting of a rectangular steel box and an elastomeric isolation element, which shall be of Neoprene or high quality synthetic rubber with anti-ozone additive. The elements shall be designed for approximately 1/4" deflection and loaded so that deflection does not exceed 15% of the free height of the element. The design shall be such as to prevent metal-to-metal contact between the hanger rod and the steel box.

K. ACCEPTABLE MANUFACTURERS: Amber/Booth, Kinetics, Korfund, Mason, Peabody, Vibra-Sonics, Vibration Mountings and Southeastern Hose.

PART 3 – EXECUTION

3.01 INSTALLATION SHALL COMPLY WITH MANUFACTURER'S REQUIREMENTS AND INSTALLATION DETAILS ON THE DRAWINGS.

END OF SECTION

SECTION 23 0553
IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

1.02 THE GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL, SUPPLEMENTARY AND SPECIAL CONDITIONS, APPLY TO THE WORK SPECIFIED IN THIS SECTION.

PART 2 – MATERIALS AND METHODS

2.01 EQUIPMENT MARKING

A. GENERAL: Each piece of mechanical equipment shall be suitably marked with the name as listed on the plans. Name shall be prominently displayed so it may be easily located and read after equipment installation. Pumps may be marked on adjacent piping.

B. The following equipment shall be marked with decal or stencil painted, 3" high letters:

1. Chillers
2. AHU's
3. Pumps
4. Boilers

C. The following equipment shall be marked with decal or stencil painted, 2" high letters:

1. Fans
2. FPB's & VAV’s

D. Install factory made arrow marker on piping in Mechanical Rooms.

E. Suspended air moving equipment shall be marked on ceiling grid with specific identification name using a label maker with black letters on white background, applied directly to c

2.02 PIPE MARKING

A. Identify all system piping. Use EMED Co. Kwik-Koil Pipe Markers of appropriate legend and background color, complete with direction arrow. Select appropriate size for O.D. of piping including insulation. Markers or arrows not wrapping the full circumference of the pipe shall be tie wrapped in place, otherwise taped at each end.

B. Apply markers as follows:

1. At input and output of each piece of equipment inside building.
2. At each valve not in a mechanical room.
3. At every point a pipe enters or exits a wall or floor.
4. At intervals not exceeding 20 feet (609.6 cm).

C. These markers shall conform to OSHA and ANSI A 13.1 Codes. Arrow markers must have same ANSI background colors as their companion pipe markers and wrap completely around pipe with 3” overlap.

D. Pipe markers and arrow markers shall be provided as follows:

PLUMBING	**HVAC**
1. Domestic Hot Water	1. Chilled Water Supply
2. Domestic Cold Water	2. Chilled Water Return
3. Domestic Hot Water Return	3. Heating Water Supply
4. Natural Gas	4. Heating Water Return
5. Fire Standpipe	

E. All gas piping in mechanical or air handling unit rooms shall be painted in accordance with the Owner's color code prior to installing pipe markers.

2.03 VALVE MARKING

A. Each valve, except those located adjacent to the equipment they serve, shall have a tag of .050 inch (1.27 mm) thick by 1½" diameter brass, stamped or engraved with the valve number and service symbol. Attach tag to the valve handle with double loop of 18 gauge, type 302 stainless steel wire, with a minimum of four wraps to secure. Chain of similar gauge and material may be used.

B. On the "As Built" Drawings, mark the symbol and number of all valves, exactly as the valves are tagged.

C. Furnish a valve schedule properly identifying the valve number and service with the exact location, the material within the pipe and the room numbers or area that the valve serves. This schedule shall be furnished on reproducible film suitable for reproduction on an ozlid machine.

D. Provide one valve schedule, as above, installed in aluminum frame with lexan shield, and mount on wall of main equipment room.

E. At valves above accessible ceilings, glue green dot on ceiling tee intersection nearest the valve location.

2.04 PAINTING

A. GENERAL: All piping or insulation on piping exposed to view shall be painted. Insulated pipe with required metal jacket shall not be painted. All above grade gas piping shall be painted.

B. PAINT TYPE: Industrial grade, high gloss enamel over suitable primer. Provide two finish coats.

C. COLOR CODING: (Verify with Architect prior to painting)

1. Gas Piping Yellow

END OF SECTION

SECTION 23 0593
TESTING AND BALANCING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 GENERAL REQUIREMENTS

A. Do all work required for complete testing and adjusting of the Plumbing Systems, and preparation for HVAC Systems Testing and Balancing to be accomplished by others.

B. Provide all instruments and equipment required to accomplish necessary testing and adjusting, and as required by the Architect to verify performance. All instruments shall be in accurate calibration, and shall be calibrated in ranges that will be expected.

1.03 DESIGN CONDITIONS

1.04 THE AIR CONDITIONING SYSTEMS HAVE BEEN DESIGNED AND THE EQUIPMENT SELECTED TO PERFORM AS FOLLOWS:

A. Summer Conditions

B. Indoor Temperatures 72° F DB 60% RH

C. Outdoor Temperatures 98° F DB 81° F WB

D. Winter Conditions

E. Indoor Temperatures 70° F DB

F. Outdoor Temperatures 20° F DB

PART 2 – METHODS

2.01 GENERAL

A. The Plumbing Contractor shall clean and balance all plumbing systems as described in paragraph 2.02.

B. The HVAC contractor shall clean and adjust all systems as described in paragraph 2.03.

C. The testing, adjusting and balancing (TAB) of the air conditioning systems and related ancillary equipment for the Owner will be performed by an impartial, technical TAB firm selected and employed by the Owner as described in paragraph 2.04. This cost is not to be included in the bid directly or by allowance.

2.02 PLUMBING

A. GENERAL: Balance all water systems to provide proper amounts of water to all equipment and fixtures which require water.

B. WATER HEATER INSTALLATION

1. Verify capacity and correct operation of relief valves.

2. Before initial firing, verify that installation is safe for firing.

C. MOTOR OPERATED EQUIPMENT

1. Verify rotation and proper operation of controls.

2. Tabulate motor nameplate F.L.A., actual amps at full load and voltage.

D. AT TIME OF JOB COMPLETION

1. Provide such tools, equipment and personnel as required to conduct tests and demonstrate the acceptability of the various plumbing systems.

2. Have the authorized representatives of the various manufacturers available if requested.

3. Power rotor clean all the sanitary and storm sewer piping to ensure full flow capacity and drainage free of debris, sand and dirt. Contractor shall use an electric sewer cleaning machine (similar to that made by the Spartan Manufacturing Company) to ream out all sanitary and storm sewer lines installed under this contract. Contractor shall use a cleaning head the same size as the pipe up through 6”. For larger pipes use 6” size. Contractor shall demonstrate to Engineer and New Caney ISD maintenance representatives that all lines are free and clear of obstructions to proper sewer operation. If any deficiencies or obstructions are found, they shall be corrected before asking for Final Inspection.

2.03 HVAC

A. BOILER INSTALLATION:

1. GENERAL: Before initial firing, obtain inspection approval from the inspection authority and the manufacturer's representative, that the installation is safe for firing.

2. OPERATIONAL TEST: Check operation and proper sequencing of all operating and safety controls and devices. Check pressure relief valve for opening at proper pressure. Make Orsat flue gas analysis and adjust firing for proper air-gas mixture. Operation tests shall be witnessed by designated New Caney ISD representative.

B. HVAC CONTRACTOR'S SCOPE OF WORK

1. As a part of this contract, the HVAC Contractor shall make any changes in the sheaves, belts, dampers, valves, etc. required for correct balance as required by the TAB firm, at no additional cost to the Owner.

2. The HVAC Contractor shall provide and coordinate services of qualified, responsible subcontractors, suppliers and personnel as required to correct, repair or replace any and all deficient items or conditions found during the testing, adjusting and balancing period.

3. In order that all systems may be properly tested, balanced and adjusted as required by these Specifications, the contractor shall operate the systems at his expense for the length of time necessary to properly verify their completion including final adjustments, balancing and readiness for Owner's TAB firm. This length of time shall be acceptable to the Inspector. Contractor shall provide all devices to verify correctness of operation.

4. Contract completion schedules shall provide sufficient time to permit the completion of TAB firm's services prior to Substantial Completion Date.

5. The Drawings and Specifications have indicated valves, dampers and miscellaneous adjusting devices for the purpose of adjustment to obtain optimum operating conditions, and it shall be the responsibility of the contractor to install these devices in a manner that will leave them adjusted, accessible and readily adjustable. Should any such device not be readily accessible, the contractor shall provide access as requested by the TAB firm. Any malfunction encountered by TAB personnel and reported to the contractor or to the inspector shall be corrected by the contractor immediately so the balancing work can proceed.

6. The scope of the TAB work as defined herein is indicated in order that the contractor will be appraised of the coordination, adjustment and system modification which will be required under the project work in order to complete the Owner's requirements for final TAB. The TAB firm will not have a contractual relationship with this contractor but will be responsible to the Inspector and Owner for the satisfactory execution of the TAB work. The contractor shall allow sufficient funds in the project cost estimate and bid proposal to provide all work which may be required in the TAB phases as defined herein and as may be necessary for the completion of the TAB work as defined by the TAB firm.

7. Contractor shall provide necessary scaffolding or lifts for the TAB to complete their work.

C. RELATED WORK

1. The contractor shall have the building and air conditioning systems in complete operational readiness and shall perform all other items as described herein to assist the TAB company in performing the balancing, testing and adjusting of the HVAC systems.

2. For the air distribution systems the contractor shall complete and verify the following:

    a. Verify installation for conformity to design. All supply, return and exhaust ducts terminated.

    b. All volume, splitter, extractor and fire dampers properly located and functional. Dampers shall provide tight closure and full opening, smooth and free operation. All dampers are left 100% open and locked down prior to TAB starting.

    c. All supply, return, exhaust, transfer grilles, registers, diffusers and terminal units installed, leak tested and operational.

    d. Air handling systems, units and associated apparatus, such as heating and cooling coils, filter sections, access doors, etc., shall be blanked and/or sealed to eliminated excessive by-bass or leakage of air.

    e. All fans (supply, return, relief and exhaust) operating and verified for freedom from vibration, proper fan rotation and belt tension; overload heater elements to be of proper size and rating; and clean filters installed.

3. For the water circulation systems the contractor shall complete the following:

    a. Check and verify pump alignment and rotation.

    b. Water systems shall be cleaned by circulation and strainers cleaned for normal operation.

    c. Check each motor amperage and voltage to insure readings do not exceed nameplate rating.

    d. Verify electrical overload heater elements to be of proper size and ratings.

    e. All water circulating systems shall be full and free of air; all vents installed at high points of systems.

    f. Check and set operating temperatures of heat exchangers to design requirements.

4. For the automatic controls system the contractor shall complete the following:

    a. Verify that all control components are installed in accordance with project requirements, a point-to-point check of all DDC and computer controls has been completed and that all controls are functional, including all electrical interlocks, damper sequence, air and water resets, fire and freezestats.

b. All controlling instruments calibrated and set for design conditions.

c. Provide the services of a controls technician, knowledgeable in the system operation, full time when Test and Balance work is being performed.

5. The contractor and the suppliers of the equipment installed shall all cooperate with the TAB firm to provide all necessary data on the design and proper application of the system components and shall furnish all labor and material required to eliminate any deficiencies or mal-performance. Furnish a list of all motors with nameplate data and size of overload heater installed with motor amperage during operation.

6. During the balancing the temperature regulation shall be adjusted for proper relationship between controlling instruments and calibrated by the Control Manufacturer. The correctness of the final setting shall be proved by taking hourly readings for a period of three successive eight hour days, in a typical room on each separately controlled zone by the TAB firm. The total variation shall not exceed 2□ F from the preset medium temperature during the entire temperature survey period.

7. In all fan systems, the air quantities shown on the plans may be varied as required to secure a maximum temperature variation of 2□ F within each separately controlled space, but the total air quantity indicated for each zone must be obtained. It shall be the obligation of the contractor to furnish or revise fan drives and/or motors if necessary, without additional cost to the Owner, to attain the specified air volumes. Using inverters to slow fan units is not acceptable.

8. The contractor shall assist the TAB firm in performing three inspections approximately 30 days apart within 90 days after occupancy of the building to insure that satisfactory conditions are being maintained throughout and to correct any unusual condition.

9. The contractor shall assist the TAB firm in performing inspections in the building during the opposite season from that in which the initial adjustments required to produce optimum operation of the system components, to produce the proper conditions in each conditioned space.

10. Provide scaffolding, lifts, etc. necessary for completion of the Test and Balance work.

11. Provide and install new air filters for Test and Balance work.

12. Verify and clean inside of all air handling units, especially filter and coil sections.

D. STORAGE: The contractor shall provide the TAB firm a secure area of ample size, conveniently located for storage of tools, equipment and other items as required.

E. NOTIFICATION:

1. Systems shall be complete and in operational readiness prior to notifying the Owner that the project is ready for the services of the TAB firm and the contractor shall so certify in writing to the Owner that such a condition exists.

2. Should the Owner be so notified and the TAB work commence and the systems are found to not be in readiness or a dispute occurs as to the readiness of the systems, the contractor shall request an inspection be made by the Owner. This inspection shall establish to the satisfaction of the represented parties whether or not the systems meet the basic requirements for TAB services. Should the inspection reveal the notification to have been premature, all costs of the inspection and work previously accomplished by the TAB firm shall be paid for by the contractor. Furthermore, such items as are not ready for TAB services shall again be re-tested. Complete, operational readiness, prior to commencement of TAB services, shall include the work described in RELATED WORK above.

F. AFTER OWNER OCCUPANCY:

1. At the season opposite that of start up, inspect and verify correct operation of all systems.

2.04 HVAC TESTING, ADJUSTING AND BALANCING

A. The testing, adjusting and balancing of the air conditioning systems will be performed by an impartial technical firm whose operations are limited only to the field of professional TAB. The TAB work shall be done under the direct supervision of a qualified engineer employed by the TAB company. Work shall be in accordance with procedures and techniques as outlined in the ASHRAE 1987 Systems Handbook in Chapter 57 on TAB and procedural standards for TAB, National Environmental Balancing Bureau.

B. The TAB firm shall be responsible for inspecting, adjusting, balancing and tabulating the data on the performance of fans, all dampers in the duct systems, all air distribution devices and the flow on water through all coils. The Mechanical Subcontractor, the various subcontractors involved and the suppliers of the equipment installed shall all cooperate with the TAB firm to provide all necessary data on the design and proper application of the system components and shall furnish all labor and material required to eliminate any deficiencies or mal-performance.

C. DOCUMENTS

1. The Owner will provide plans, specifications and change orders to the TAB firm.

2. The Owner will provide approved submittal data on equipment installed.

3. The Owner will transmit one copy of the following “Records for Owner” to the TAB firm for review and comment:

a. “As-Installed” Drawings

b. Approved Fixture Brochures, Wiring Diagrams and Control Diagrams

c. Shop Drawings

d. Instructions

e. Valve Charts

D. RESPONSIBILITY OF THE TAB FIRM

1. The TAB personnel shall check, adjust and balance the components of the air conditioning system which will result in optimum noise, temperature and air flow conditions in the conditioned spaces of the building while the equipment for the system is operating economically. This is intended to be accomplished after the system components are installed and operating as provided for in the contract documents, which is the responsibility of the project contractor.

2. The tests shall demonstrate the specified capacities and operation of all equipment and materials comprising the systems. Such tests shall be made as are deemed necessary by the Architect to indicate the fulfillment of the contract. The TAB firm shall then make available to the Engineer such instruments and technicians as are required for spot checks of the systems.

3. The TAB firm will not instruct or direct the contractor in any of the work. Any proposed changes or revisions in the work shall be submitted to the Architect and Owner in writing. The Architect will process the proposal as appropriate.

E. BALANCING SERVICES:

1. The TAB firm, Architect and Owner will inspect the installation of heating and cooling pipe systems, sheet metal work, temperature controls and other component parts of the heating, air conditioning and ventilating systems. The inspection of the work will cover that part relating to proper arrangement and adequate provisions for the testing and balancing. The inspections shall be performed periodically as the work progresses.

2. Upon formal notification of completion of the installation and start-up of the mechanical equipment by the contractor, TAB firm will balance, test and adjust the system components to obtain optimum condition in each conditioned space in the building.

3. The TAB firm shall be responsible for inspecting, balancing, adjusting, testing and compiling the data on the performance of fans, all dampers in the duct systems, all air distribution devices or heat exchangers, and the water flow through all coils.

4. The TAB firm will, fourteen days prior to Final Inspection, as requested by the Owner prepare seven copies of the completed Test and Balance Report. The report shall be complete with logs, data and records as required herein and all logs, data and records shall be typed, produced on white bond paper and spiral bound. The report shall be certified accurate and complete by a Texas Registered Engineer of the TAB firm. Transmit one copy directly to the Owner’s Representative and the remaining six copies

to the Architect. The Architect will review and approve the report. Upon approval, two copies will be submitted to the Owner's Representative and two copies transmitted to the Contractor.

5. Verify all deficiencies have been corrected.

F. REPORT: After balancing is complete and before calling for final observation, record and submit for record, the following data:

1. For each supply and exhaust fan:

a. Suction and discharge static pressure, total static pressure and total CFM.

b. Fan RPM measured by tachometer. Verify rotation.

c. Motor nameplate F.L.A., actual amps and voltage.

d. CFM of each outlet served by fan.

2. For each pump:

a. Suction and discharge pressure readings at shut off.

b. Suction and discharge pressure readings at final balance flow.

c. Motor nameplate F.L.A., actual amps at rated flow, voltage and verify rotation.

d. Copy of pump curve, with final balance point marked.

3. For each chilling unit:

a. Water temperature entering and leaving cooler.

b. Water pressure entering and leaving cooler.

c. Water temperature entering and leaving condenser (air temperatures for air cooled unit).

d. Water pressure entering and leaving condenser with flow points marked.

e. Pressure drop - flow curves for cooler and condenser with flow points marked.

f. Motor nameplate F.L.A., actual amps and voltage.

g. Compressor suction and discharge pressures.

4. Each air unit:

a. Total supply, return and outside air CFM.

b. Suction and discharge static pressure, total static pressure.

c. Fan RPM measured by tachometer. Verify rotation.

d. Motor nameplate F.L.A., actual amps and voltage.

e. Entering and leaving air temperature for each coil at full water flow.

f. Entering and leaving water temperature for each water coil at full flow.

g. Coil water pressure drop with point marked on flow curve at full flow.

h. CFM of each outlet served by unit.

5. Each double duct mixing box:

a. Total supply CFM in full cooling.

b. Total supply CFM in full heating.

c. CFM of each outlet served by unit.

6. Each boiler: (performed by boiler manufacturers representative, witness by TAB personnel)

a. Safety inspection authority approval certificate.

b. Orsat flue gas analysis report.

c. Operating pressure and temperature.

d. Safety control setting points.

7. Each data value that cannot be balanced to meet scheduled design value:

a. List the cause of the discrepancy between the actual data and the design value.

b. List corrective action that must be taken to meet design value.

c. Note that “Not Operating” is not an acceptable entry into the Testing and Balancing report. If a piece of equipment is not operating during the testing and balancing process, TAB firm will contact Mechanical Contractor. Mechanical Contractor will repair system as required. TAB firm will then test and balance the system as specified.

END OF SECTION

SECTION 23 0713
DUCT INSULATION

PART 1 – GENERAL

1.01 REFERENCE STANDARDS

A. ASTM D5590 - Standard Test Method for Determining the Resistance of Paint Films and Related Coatings to Fungal Defacement by Accelerated Four-Week Agar Plate Assay; 2017 (Reapproved 2021).

1.02 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.03 GENERAL REQUIREMENTS

A. Install all insulation in conformance with manufacturer's recommendations and these specifications.

B. Insulation materials manufactured by the following list of companies will be acceptable provided their materials conform to these specifications (see Paragraph on Substitution): Armstrong, CertainTeed, Childers, Foster, Insulphen, Knauf, Koolphen, Manville, Owens-Corning, Pabco, Pittsburg-Corning and SPI.

C. Flame Spread and Smoke Requirements:

1. All jackets, adhesives, coatings, insulating materials and vapor barrier mastics for air distribution systems shall meet the requirements of NFPA Bulletin 90-A with a flame spread of 25 or less and smoke developed rating not higher than 50.

2. All jackets, adhesives, coatings, insulating materials and vapor barrier mastics for piping and equipment shall have a flame spread not higher than 25 and smoke developed rating not higher than 50.

3. All materials containers shall have a U. L. Label.

D. Greenguard Certification: Insulating materials shall have Greenguard certification and be formaldehyde free.

E. VOC Requirement: Shop drawing shall list VOC of materials. Materials with VOC levels higher than LEED and code requirements are not be acceptable.

F. Submittals: Include all material and mastic data in the submittal including certifications and VOC information.

PART 2 – MATERIALS AND METHODS

2.01 DUCT INSULATION

A. GENERAL: Insulate all supply air ducts and outside air ductwork, kitchen hood supply air ducts and dryer vent. Insulate exhaust ducts down stream of inline fan backdraft damper.

B. DUCTS INSIDE: 2” thick, fiberglass flexible duct insulation, 1 pound density (Type 100), conductivity (k) value not more then 0.27 at 75° mean temperature difference with an installed R value of 6 or higher, with factory adhered reinforced foil faced flame resistant Kraft paper vapor barrier. Wrap around duct with minimum lap of 2 inches each way, staple with 1/2" outward clinch staples 2” on center, secure on bottom of duct with water based, fire retardant adhesive (Foster 85-60 or Childers CP-127). For ducts 24” to 30” wide, provide one row of pins on bottom of duct, 16” on center. For wider ducts provide one row on bottom of duct for each 16” of width. Trim pins flush with retainer disk. Seal all with tape with Foster 30-80AF vapor barrier coating. For ducts in mechanical rooms, reduce spacing to 12” on center for each 12” of dimension (all sides of duct). Seal joints and seams with 3" wide FSK foil tape, including termination of flex ducts, and coat tape with Foster 30-80AF vapor barrier coating. Where insulation terminates at equipment (AHU, fan coil, VAV box, etc) and where insulation is custom fitted to transitions and elbows, add glass cloth strip adhered with anti fungal Foster 30-80AF vapor barrier coating between equipment and insulation cover. Coating permeance shall be 0.013 perms or less at 43 mil (1.0922 mm) dry thickness as tested by ASTM E96 and meet ASTM D5590 with 0 growth rating.

C. DRYER VENT: Shall be insulated in the same manner as Low Pressure Duct.

2.02 KITCHEN HOOD EXHAUST DUCT

A. Insulate with two 2" layers of 2300°F rated wrap similar to 3M Fire Barrier Duct Wrap, installed per manufacturer’s recommendations. Secure each layer to duct with 16 gage stainless steel wires at 9" on center. Separately insulate cleanout access doors to allow removal for inspection and cleaning duct without damaging insulation. is acceptable.

END OF SECTION

SECTION 23 0719
HVAC PIPE INSULATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 GENERAL REQUIREMENTS

A. Install all insulation in conformance with manufacturer's recommendations and these specifications.

B. Insulation materials manufactured by the following list of companies will be acceptable provided their materials conform to these specifications (see Paragraph on Substitution): Armstrong, CertainTeed, Childers, Foster, Insulphen, Knauf, Insulphen, Polyphen, Manville, Owens-Corning, Pabco, Pittsburg-Corning and SPI.

C. Flame Spread and Smoke Requirements:

1. All jackets, adhesives, coatings, insulating materials and vapor barrier mastics for air distribution systems shall meet the requirements of NFPA Bulletin 90-A with a flame spread of 25 or less and smoke developed rating not higher than 50.

2. All jackets, adhesives, coatings, insulating materials and vapor barrier mastics for piping and equipment shall have a flame spread not higher than 25 and smoke developed rating not higher than 50.

3. All materials containers shall have a U. L. Label.

D. At each pipe support point, install a hard section of phenolic foam pipe insulation, minimum 18" length, on lower 180° of piping, 360° if clamps are used on top of pipe, same thickness as adjacent insulation, to prevent compression at support bearing area. Seal and finish to match adjoining insulation. Provide formed 16 gage galvanized sheetmetal saddles, same length as hard section, to completely cover hard section.

E. Install .020" thick aluminum jacket with minimum 2” overlap joint on all insulated piping exposed outside building. Install factory made aluminum covers on all elbows. Cut aluminum neatly to fit all tees, such that all insulation is covered by aluminum. Use waterproofing aluminum colored Foster 95-44 sealer to seal all joints. Provide .020x3/4” aluminum bands not more than 12" on center for all jacketing. Install aluminum covers on insulated pipe inside that is exposed to view in finished areas. Cover is not required in mechanical or AHU rooms. Jacketing in contact with soil shall be .010" stainless steel.

PART 2 – MATERIALS AND METHODS

2.01 CHILLED WATER PIPING

A. GENERAL: Insulate all chilled water piping, valves, fittings, rolairtrol, tanks, filter feeders and other items subject to condensation.

B. PIPE:

1. MATERIALS INSIDE BUILDING: Molded phenolic foam pipe insulation, 3.7 pounds per cubic foot density, conductivity (k) not higher than .14 at 100° mean temperature difference with factory attached fire retardant, vapor barrier jacket. Insulation above ceilings may be 2.2 pound per cubic foot density.

2. MATERIALS OUTSIDE BUILDING: Molded phenolic foam pipe insulation, 3.7 pounds per cubic foot density, conductivity (k) not higher than .14 at 100° mean temperature difference with factory attached fire retardant, vapor barrier jacket.

3. EXECUTION: Install insulation over pipe and carefully connect seal sealing laps. Provide 3" butt strips at each joint between sections, sealed with Foster 85-20.

C. VALVES, FITTINGS AND OTHER COMPONENTS:

1. MATERIALS: Pre-molded cover of same materials and thickness as pipe covering.

2. EXECUTION: Provide vapor barrier consisting of a tack coat of white Foster 30-35 with glass fabric, finished with a 1/16" thick coating of Foster 30-35. Finish all joints and seams smooth and even.

D. INSULATION THICKNESS:

1. Piping outside or in non-air conditioned spaces inside building shall be 2” thick.

2. Piping inside in conditioned spaces including air handling unit rooms and return air spaces shall be 1” thick.

2.02 BUILDING HEATING WATER PIPING

A. Insulate all hot water piping with factory molded pipe covering made from glass fibers; 2" thick (1½” thick for pipes 1½” and smaller) with density not less than 3 pounds per cubic foot; conductivity (k) not higher than .25 at 100° mean temperature difference; with factory attached fire retardant jacket. Piping insulation outside shall be 1/2“ thicker.

B. Secure all laps and joints with staples at 4" on center. Provide 3" butt strips at each joint between sections.

C. Insulate fittings with pre-molded cover of same materials and thickness as pipe covering.

2.03 CHILLED WATER PUMP

A. GENERAL: Insulate all cold surfaces as required to prevent condensation. Do not insulate pump until the chilled water system has been balanced.

B. MATERIALS: 2" thick foamglass or Armaflex insulation.

C. INSTALLATION: Cut and form to fit or foam in place. Fill any voids with closed cell insulation. Seal all joints with Foster 30-80. Apply tack coat white Foster 30-80 and then a 1/16" thick finish coat of same material.

2.04 CONDENSATE DRAINS

A. Insulate all condensate drain lines in same manner as specified for Chilled Water Piping, except 1/2" thick. Exposed piping located close to the floor inside an equipment room, from an air handling unit to floor drain, need not be insulated.

2.05 CHILLED WATER SYSTEM EXPANSION AND STORAGE TANKS, AIR SEPARATOR AND FILTER FEEDER

A. Insulate with 2" thick closed cell foam insulation covering conforming to Specifications for Refrigerant Piping Insulation.

2.06 LAP AND JOINT ATTACHMENT

A. Self-sealing type jackets will be acceptable provided the laps are sealed per the manufacturers recommendations and the installation is 100% visually inspected by the insulation contractor's foreman.

2.07 REFRIGERANT PIPING

A. GENERAL: Insulate all refrigerant piping.

B. MATERIAL: 1" thick, closed cell foam insulation with a thermal conductivity (C value) of .27 at 75° F. Insulation shall have a maximum flame spread rating of 25 and a maximum smoke density rating of 50. Chemical composition of material shall not cause or accelerate corrosion or other deterioration of piping. Provide 1.5” thick insulation if pipe is 2½” or larger.

C. INSTALLATION: Install insulation in accordance with the manufacturer's recommendations using pre-glued slits and butt joints. Visually inspect joints and touchup as necessary with the manufacturer's recommended adhesive. Insulation without pre-glued factory slits shall be installed over piping during fabrication then glued together. Provide UV protective coating for insulation installed outside and cover with aluminum jacketing.

D. MANUFACTURER: Rubatex or ImcoLock by IMCOA

END OF SECTION

SECTION 23 0800
HVAC SYSTEMS TECHNICAL COMMISSIONING REQUIREMENTS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions Specification Sections, apply to this Section.

B. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them.

1.02 SUMMARY

A. This specification covers the start-up, operating performance test and commissioning of the HVAC systems. The purpose of this effort is to bring the project mechanical systems to a state of dynamic operation in accordance with the contract documents by verifying the operation of individual components, subsystems and systems. Additional system testing is required within individual Specification Sections.

B. The Owner will retain the services of an independent commissioning agent (CxA) separate from the work of this Contract. As herein specified the Owner and CxA shall develop detailed commissioning procedures, equipment checkout procedures and data forms for recording compliance with contract documents, performance and punchlist deficiencies, and will assist in developing schedules for checkout and Owner acceptance, at a future date during the construction phase.

C. Commissioning requires the participation of the Contractor to ensure that all systems are operating in a manner consistent with the Contract Documents. Division 22-28 Contractors shall be familiar with all parts of the Commissioning Plan issued by the Owner's CxA, shall execute all Commissioning responsibilities assigned to them in the Contract Documents and include the cost of Commissioning in the Contract price.

D. HVAC systems to be commissioned include the following (some may not apply – refer to the Plans and other sections of the specifications for the scope of work):

1. Chillers
2. Boilers
3. Pumps
4. Air Handling Unit Systems

5. DX Split Systems

6. Air Terminal Units (10% Sampling)

7. Fan Coil Units

8. Exhaust and Supply Fan Systems

9. Fire, Fire/Smoke and Volume Dampers (Review of testing documentation provided by the contractor)

10. HVAC / Building Automation System and Integrations

11. HVAC / Emergency Power Source Integrations

12. HVAC / Life Safety Systems Integrations

E. The TAB Contractor will perform control sequence verification on each terminal unit shall independently verify each sensor and point and document the results to be included in the Final TAB Report. The CxA will commission 10% of the terminal units once TAB is complete with the CSV and point verification of the terminal units.

1. SUBMITTALS

F. Contractor shall provide Owner and/or CxA with documentation required for Commissioning Work. At minimum, documentation shall include: Detailed Start-up procedures, full sequences of operation, Operating and Maintenance data, performance data, control drawings, and details of Owner-contracted tests.

1. Shop drawings and product submittal data related to systems or equipment to be commissioned.

1.03 CONTRACTOR SHALL SUBMIT TO OWNER AND/OR CXA INSTALLATION AND CHECKOUT MATERIALS ACTUALLY SHIPPED INSIDE EQUIPMENT AND ACTUAL FIELD CHECKOUT SHEET FORMS USED BY FACTORY OR FIELD TECHNICIANS.

1.04 WHERE INSTALLATION TESTING MAY BE PERFORMED IN A PROGRESSIVE MANNER (I.E., PIPING HYDROSTATIC TESTING, DUCTWORK PRESSURE TESTING, ETC.), THE CONTRACTOR SHALL PREPARE AND SUBMIT TO THE OWNER, A/E TEAM AND CXA A TESTING PLAN THAT DETAILS HOW THE PROGRESSIVE TESTING WILL BE PERFORMED, DOCUMENTED AND PRESENTED FOR APPROVAL PRIOR TO THE START OF ANY TESTING ACTIVITIES.

1.05 CONTRACTOR SHALL PROVIDE ANY ADDITIONAL DOCUMENTATION NEEDED TO COMPLETE THE REQUIREMENTS OF THE COMMISSIONING PROCESS

A. Factory Performance Test Reports: Review and compile all factory performance data to assure that the data is complete prior to executing the FPTs.

B. Installation testing reports such as ductwork pressure testing, piping hydrostatic testing, piping chemical treatment and flushing, bolt flange torqueing, and any documentation associated with local code authority inspections or authorizations.

C. Completed equipment Start-up certification forms along with the manufacturer’s field or factory performance and Start-up test documentation.

D. Operating and Maintenance (O&M) information per requirements of the Technical Specifications.

PART 2 – PRODUCTS

2.01 GENERAL

A. All materials and installation shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

B. Contractor is required to follow all applicable industry and site specific safety practices, lockout / tagout requirements, specialized PPE requirements, and provide qualified, trained personnel to execute Commissioning Process requirements.

C. The Contractor shall be responsible for maintaining the commissioning documentation until final acceptance of the project. Final checklists will be produced by the CxA and provided prior to beginning commissioning. The commissioning documentation shall be kept current by the Contractor and shall be available for inspection at all times. At the time of acceptance of the

project, the Contractor shall surrender 3 completed copies of the commissioning documentation to the Owner's representative.

2.02 TEST EQUIPMENT

A. Contractor shall provide all specialized tools, test equipment and instruments required to execute Start-up, checkout, and testing of equipment.

B. All specialized tools, test equipment, and instruments required to execute Start-up, checkout, and testing of equipment shall be of sufficient quality and accuracy to test and/or measure system performance within specified tolerances. A testing laboratory must have calibrated test equipment within the previous twelve (12) months. Calibration shall be NIST traceable. Contractor must calibrate test equipment and instruments according to manufacturer's recommended intervals and whenever the test equipment is dropped or damaged. Calibration tags must be affixed to the test equipment or certificates readily available.

PART 3 – EXECUTION

3.01 CONSTRUCTION PHASE

A. In each purchase order or subcontract that is written for changes in scope, include the appropriate requirements for submittal data, Commissioning documentation, testing assistance, Operating and Maintenance (O&M) data, and training, as a minimum.

B. Attend Pre-Commissioning Meeting(s), Pre-Installation Meeting(s), and other Project meetings scheduled by the Owner, CxA or Contractor to facilitate the Commissioning process.

C. Provide manufacturer's data sheets and shop drawing submittals of equipment.

D. Provide additional requested documentation to the Owner and/or CxA, prior to O&M manual submittals, for development of System Verification Checklists and Functional Performance Testing procedures.

1. Typically, this will include detailed manufacturer's installation and Start-up, operating, troubleshooting and maintenance procedures, full details of any Owner-contracted tests, full factory testing reports, if any, and full warranty information.

2. In addition, the installation, Start-up, and checkout materials that are actually shipped inside the equipment and the actual field checkout sheet forms to be used by the factory or field technicians shall be submitted to the Contractor and/or CxA.

3. This information and data request may be made prior to normal submittals.

E. With input from the BAS vendor and A/E, clarify the operation and control of commissioned equipment in areas where the Specifications, BAS control drawings, or equipment documentation are not sufficient for writing detailed test procedures.

F. During the installation, Start-up and initial checkout process, execute and document related portions of the System Verification Checklists for all commissioned equipment according to the procedures indicated in the Commissioning Plan.

G. Factory Start-ups: Factory Start-ups are specified for certain equipment. Factory Start-ups generally are Start-up related activities that will be reviewed and checked prior to Functional Performance Tests. All costs associated with factory Start-ups shall be included with the contract price unless otherwise noted. Notify the Commissioning Team of the factory Start-up schedule and coordinate these factory Start-ups with witnessing parties. The Commissioning Team members may witness these Start-ups at their discretion.

H. Independent Testing Agencies: For systems that specify testing by an independent testing agency, the cost of the test shall be included in the Contract price unless otherwise noted. Testing performed by independent agencies may cover aspects required in the System Verification Checklists, Start-ups, and Functional Performance Tests. Coordinate with the independent testing agency so that CxA, Owner and/or A/E can witness the test to ensure that applicable aspects of the test meet requirements.

I. Incorporate manufacturer's Start-up procedures with System Verification Checklists (SVC).

J. Air and water test, adjust and balance shall be completed with discrepancies and problems remedied before Functional Performance Tests of the respective air or water related systems are executed.

K. Provide skilled technicians to execute starting of equipment and to assist in execution of Functional Performance Tests. Ensure that they are available and present during the agreed-upon schedules and for a sufficient duration to complete the necessary tests, adjustments, and problem solving.

L. Correct deficiencies (differences between specified and observed performance) as interpreted by the Owner's Project Manager and A/E and retest the system and equipment.

M. During construction, maintain as-built marked-up Drawings and Specifications of all Contract Documents and Contractor-generated coordination Drawings. Update after completion of Commissioning activities (include deferred tests).

N. Provide training of the Owner's operating personnel as specified.

O. Coordinate with equipment manufacturers to determine specific requirements to maintain the validity of the warranty.

3.02 WARRANTY PHASE

A. Execute seasonal or deferred tests, witnessed by the CxA and Owner, according to the Specifications.

B. Complete deferred tests as part of this Contract during the Warranty Period. Schedule this activity with the Owner.

C. Correct deficiencies and make necessary adjustments to O&M manuals, Commissioning documentation, and as-built drawings for applicable issues identified in any deferred or seasonal testing.

3.03 INSTALLATION

A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.

B. All installation shall be in accordance with the Project Documents.

3.04 TRAINING

A. Refer to the individual section of this Specification for specific training requirements on each system.

END OF SECTION

SECTION 23 0801
COMMISSIONING AGENT REQUIREMENTS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Refer to section 23 08 00 for commissioning requirements for additional information.

1.02 DESCRIPTION OF THE WORK

A. This Section covers the Scope of Work for the Commissioning Agent (CxA) who will be hired by the Owner.

B. The Commissioning Agent shall oversee the commissioning of the HVAC systems as described in Section 23 08 00. The CxA shall prepare precommissioning and functional performance test checklists to be used by the Contractor. Prepare and publish a commissioning plan. Witness startup and operational tests of equipment and systems. Perform observations of the mechanical systems throughout construction and prepare the final commissioning document.

C. The CxA shall have authority to direct and schedule test. The CxA shall have no authority to direct changes to the systems.

1.03 COMMISSIONING PLAN

A. The CxA shall prepare a plan listing the parties involved with their responsibility, scope, definitions, safety concerns, design criteria, attendance schedules, commissioning schedules, and commissioning manual requirements.

1.04 COMMISSIONING FORMS

A. Review 100% CD’s. Provide written summary of how each commissioned item of equipment, should operate include calculations verifying scheduled capacity.

B. The CxA shall develop forms similar to that in Section 23 08 00 for the Contractors use during the commissioning process. The forms shall become part of the final commissioning manual. Forms shall be provided for each piece of commissioned equipment and system. Any deviations from the design shall be noted and proved by the Owner prior to acceptance. Each form shall be signed by the Contractor, CxA and Owner prior to acceptance of a system or piece of equipment.

1.05 COMMISSIONED EQUIPMENT

A. All equipment as scheduled.

1.06 COMMISSIONED SYSTEMS

A. All new HVAC systems in the Building as shown on the Plans.

1.07 PROJECT OBSERVATIONS

A. The CxA shall perform observations of the commissioned equipment and systems twice a month at a minimum and more as required to keep pace with construction. The CxA shall note progress and any deviations of the construction documents shall be brought to attention of the Contractor and Owner for resolution. The CxA will have no authority to direct changes or corrections to the system. Observation reports shall be published to the Owner, Architect and Contractor and shall be part of the final commissioning manual.

1.08 OPERATIONAL AND START-UP TESTS

A. The CxA shall witness start-up tests and collect documentation of the tests. The CxA shall notify the Architect and Contractor of any deviations from the contract documents. Any deviations shall be corrected or accepted by the Owner prior to acceptance.

B. After the Contractor has submitted in writing that the systems are completed, the CxA shall schedule and direct operational tests of the systems. These tests shall be as described in Section 23 09 00 and 23 08 00. The results shall be documented and made part of the commissioning manual. Any deviations from the design shall be brought to the attention of the Architect and Contractor. Any deviations shall be corrected or accepted by the Owner prior to acceptance.

1.09 COMMISSIONING MANUAL

A. The CxA shall prepare the final commissioning manual. The manual shall provide a complete history of the commissioning process and shall include:

1. Design and Energy Codes.
2. Commissioning Plan.
3. Completed Commissioning Forms.
4. Completed Observation Reports.
5. Completed Start-up Reports.
6. System Operational Tests.
7. Final sequence of operation to be achieved.
8. Summary of building operation as commissioned, noting deviations from design.

9. Design Criteria (extended from Design Documents by CxA).

10. Written summary of normal startup and operating procedures for each commissioned item of equipment.

B. The manual shall be a three-ring binder with tabs for each section. Provide 5 copies.

END OF SECTION

SECTION 23 0923
AUTOMATED TEMPERATURE CONTROLS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 GENERAL REQUIREMENTS

A. The engineered BMCS to be installed as an expansion of our existing, district wide, Delta Controls System, completed HVAC System components and Exterior Lighting System controls shall be incorporated into our established, district wide, EnteliWEB Portal and shall provide seamless, integrated diagnostics and real time control. These controls shall be available to the District and configurable via smart phone, or computer to provide the District allowed control features in the field- live time.

B. The graphics, software, updating of information and permissions will be supplied by the control systems subcontractor as a complete package including a web based system.

C. Design a complete Building Management and Control System (BMCS), including instrumentation necessary to obtain functions and results specified. A complete system includes items such as sensors, valves, dampers, valve and damper operators, DDC panel, relays terminal equipment controllers, mounting brackets and thermo wells, etc. Integrate all components to provide a complete and functioning system.

D. When requested by NCISD, a laptop computer shall be provided with BMCS software installed with graphics along with a port to connect the BMCS at any panel on site. Otherwise, software shall be provided and updated to NCISD front end user computer. Provide color graphics software. The BMCS software shall be Android and ISO compatible in addition to being a web based system.

E. Temperature Control System components:

1. Electronic instruments as specified.
2. Electric instruments as specified.
3. Microcomputer instruments as specified
4. Wiring for a complete system.

F. All control devices of the same type product shall be of a single manufacturer.

G. Control, power and interlock wiring necessary to accomplish sequences specified in this Section shall be provided and installed by the Control Subcontractor. Materials and methods of executions will be as specified in Division 16, Electrical.

1. Coordinate current characteristic of all electrical instruments and equipment with Division 26

2. All power wiring installed by this division shall be by a licensed electrician.

3. Data connection cabling to be provided in Structured Cabling by Others: Section 27 10 00.

H. The entire building, management and control system (BMCS), automatic temperature control system shall be configured by the automation system manufacturer.

1. All components and elements shall be field checked.

2. The testing and acceptance procedure shall be managed by personnel from the manufacturer.

3. Each control unit shall be capable of full operation either as a completely independent unit or as a part of the building wide control system. All units shall contain the necessary equipment for direct interface to the sensors and actuators connected to it. Each control module shall be capable of stand- alone direct digital operation utilizing its own processor. Memory, input/output, analog to detail conversion, clock field modules for extra I/O will be permitted.

4. The temperature control subcontractor shall provide complete control wiring diagrams and interlock wiring diagrams which have been approved by the Architect and shall provide on the job supervision for the wiring installation.

I. BMCS system and service supplier shall be local region.

J. The Electrical Contractor shall provide dedicated 120 volt power in each mechanical room to a single point for BAS panels. Control and interlock wiring, both low-voltage and 120 volts, shall be by the temperature controls Sub-contractor. Interlock wiring between VFD’s and temperature controls devices shall be provided by the Temperature Controls Contractor, fire alarm system shut down relays and mechanical system starters shall be by the electrical contractor. All wiring shall be run in conduit except plenum rated, low voltage wiring above accessible ceilings may be installed without conduit if installed near structure. All temperature controls wiring shall follow the applicable sections of Division 26 including enclosing low voltage connections install panels or splice boxes. All MSTP Communications cable will be in a Yellow Jacket, all other Low Voltage cable will be in a Green Jacket.

K. The temperature control Sub-contractor shall provide complete control wiring diagrams and interlock wiring diagrams which have been approved by the Architect and shall provide on-the-job supervision for the wiring installation. The temperature control system and its proper operation

shall be guaranteed for a period of one and one half (1-1/2) years after installation, all labor and equipment will be replaced without cost to the Owner.

L. All setpoints, including time, temperature, humidity, pressure and flow, shall be adjustable. System shall be capable of transmitting data over fiberoptic cable, being accessed through the internet and through the schools internal network system via the maintenance department's two computers, using the appropriate software. All Ethernet cabling shall be by the districts' contractor.

PART 2 – MATERIALS AND METHODS

2.01 INSTALLATION

A. GENERAL

1. All automatic control valves shall be furnished by the controls manufacture.

2. The mechanical contractor shall receive, handle, mount and install all automatic temperature control valve bodies and linkages.

3. All control dampers furnished by the control manufacturer shall be installed by the sheetmetal contractor under the control manufacturer's supervision.

B. NAMETAGS: Install a plastic tape identification tag or approved wire label on each item of control equipment, to correlate with the name shown on schematic drawing. Tag may be omitted for device which is obvious, such as a damper operator. Provide a Engraved Plastic Name Tag for each Control Enclosure, Name plate shall have two holes for attaching to enclosure.

C. SENSOR LOCATIONS: Locations in finished spaces shall be reviewed with the Architect before beginning any installation work. Mount all wall sensors as noted on the floor plans at 46" above finished floor.

D. PNEUMATIC TUBING: Hard drawn copper organized and secured to adjacent equipment, piping and walls to provide protection from damage and present a professionally installed appearance.

2.02 EQUIPMENT

A. TEMPERATURE SENSORS

1. GENERAL: All sensors shall be 10K Thermistor or solid state type with a 4-20 mA output over the scheduled temperature range. (Sensors shall be capable of being field calibrated.)

2. ROOM SENSORS: Delta Style Plastic enclosure and flush mounted within a wall box. (with aluminum cover.) Sensing range shall be 45° to 96° F with an accuracy of ±.25° F. Mount at +46".

3. OUTDOOR AIR SENSORS: Waterproof with sunshield over sensing element. Sensing range shall be -30° to 130° F with an accuracy of ±1° F.

4. DUCT AIR SENSORS: Duct mounted junction box containing electronics and with 12" long sensing probe for AHUs and 4” long for VAV Boxes. Sensing range shall be 32° to 134° F with an accuracy of ±1/2° F.

5. WATER SENSORS: Immersion type, screwed into threaded, pipe weld-o-let. Chilled water sensing range shall be 30° to 81° F with an accuracy of ±1/4° F. Heating water sensing range shall be 80° to 233° F with an accuracy of ±3/4° F.

B. VALVE AND DAMPER OPERATORS: Belimo, Seimens or one of the listed valve manufacturers.

C. DAMPERS: Shall be of the opposed blade type, Ruskin CD64 or equal for all Outair Dampers and Ruskin CD35 for all others.

D. TEMPERATURE CONTROL VALVES: Three-way or straight through control valves shall be Characterized Ball Valves 2" and smaller shall have screwed bronze bodies. Valves 2½" and larger shall be Globe valves and shall have flanged iron bodies. Size all valves for full flow and with a maximum pressure drop of 5 PSI unless specified otherwise. All straight through water valves shall have equal percentage characterized plugs and be capable of shutting off against a minimum of 60 psi (413.69 kPa).

E. VAV BOX CONTROLLER: Digital control package with integral damper operator for mounting in box controller housing. Controls contractor is to ship controllers to VAV Box Manufacturer to be installed at the manufacturing facility.

F. DIFFERENTIAL PRESSURE AND PRESSURE SENSORS: Sensors shall have a 0-10Vdc or 4-20 MA output proportional signal. Accuracy shall be within +2% of full scale. Sensors shall be manufactured by Veris, Setra or Dwyer Instruments.

G. HIGH STATIC LIMIT SWITCH: Switches shall include a 1.4 - 5.5" w.c. range pressure switch with manual reset snap switch. Manufactured by Cleveland or Dwyer.

H. STATIC PRESSURE SENSORS (DRY Media): Provide a differential pressure transmitter with a 0-10Vdc or 4-20ma output to the BMCS. It shall operate on the capacitance principle and be capable of sensing very low positive, negative or differential pressures.

1. Accuracy: +/- 1% of range

2. Ranges: 5.0"/12.5mbar

3. Operating temp range: 32o to 125of

4. Operating humidity range: 20% to 90% rh non-condensing

I. DIFFERENTIAL PRESSURE SWITCHES (WET Media): Pressure switches shall have a repetitive accuracy of + 2% of range and withstand up to 150% of rated pressure. Switches shall be manufactured by Veris or Dwyer Instruments.

J. CURRENT SENSING RELAYS. Relays shall monitor status of motor loads. Switch shall have self-wiping, snap-acting Form C contacts rated for the application.

K. SOLID STATE CONTROL RELAYS (SSR): Control relay contacts shall be solid state with a coil voltage of 10-30 Vac or Vdc and 120 Vac.

L. MISCELLANEOUS: Provide and install all relays, switches, and all other necessary devices required for a complete and satisfactory operating system.

M. CARBON MONOXIDE (CO) SENSORS/MONITORS to be provided and installed by the MECHANICAL CONTRACTOR for all hydronic boilers, as well as all domestic gas water heaters over 200MBH. BMS contractor to provide uninteruptable power supply (UPS) for all CO sensors to prevent outage during power surges. Detection of CO to disable all boilers and water heaters within a shared space. Controller shall be mounted on wall at 48" AFF maximum.

N. Ethernet cabling shall be grey in color.

2.03 BUILDING AUTOMATION SYSTEM (BAS)

A. GENERAL CONDITIONS:

1. CONTRACTOR RESPONSIBILITY: The BAS Contractor shall be fully responsibility for the complete installation and proper operation of the Building Automation System equipment, sensors, controls, and controller. After the installation, the contractor shall be responsible for "debugging" and calibration of the BAS, including software for the duration of the warranty. All equipment shall be the latest standard design that complies with the specification requirements and is manufactured by the listed manufacturers. During the warranty period, Contractor shall monitor system from his office and provide assistance to Owner. Should software control schemes provide unsatisfactory operation, as determined by the Engineer, during the warranty period, Contractor shall modify control schemes, setpoints, timing sequences or other software features to provide satisfactory operation as a part of his warranty package.

2. SYSTEM ARCHITECTURE: The system shall possess fully modular architecture that permits the expansion of the system through the addition of field modules, sensors and actuators. Module communications to be through a local area network (LAN). The central site system shall be used only as an interface to the LAN.

B. CENTRAL SITE:

1. HARDWARE: The control system installed under this Section shall interface with the existing New Caney ISD Delta Control System central site located at the maintenance

facility. From this existing central site global commands shall be input one time and affect the setpoints, operating parameters and schedules of this facility. The system shall also be accessed by any Web capable computer having the proper access codes.

2. SOFTWARE: The central site shall allow receipt of alarms and messages. To ensure both security and flexibility for a range of operators, the password system shall have a minimum of ten levels of authorization and capacity for assignment of up to sixteen different operators.

C. GRAPHIC CONSTRUCTION:

1. COLOR VALUE: Thermal Floor Plans showing the space temperature with a color chart on each section of the building. These colors shall represent a defined temperature value and be implemented by the same standard throughout the entire system, including all graphic displays and parameter pages. The central site shall be able to display graphically, in up to 64 different colors, the following system information:

   a. General area map that shall show the locations of controlled.

   b. Floor plan maps shall show heating and cooling zones throughout the buildings in a range of colors which provide a visual display of temperature relative to their respective setpoints. The colors shall be updated automatically without operator action. Set point adjustment and color band displays shall be operator definable through the two button mouse. Floor plan maps shall also show the relative position of sensors and mechanical equipment. Each zone shall display the setpoint temperature and measured temperature.

   c. Mechanical system graphics shall show the type of mechanical system components servicing any zone through the use of pictorial representation of components. It shall also provide a current status of all I/O points being controlled and applicable to each piece of equipment including analog readouts in appropriate locations on the graphic representation of the setpoint and measured value.

   d. All system graphics shall come programmed and require no owner modification. Individual graphics shall be as minimum the following:

      1) Each air handling unit

      2) Each zone of multi-zone

      3) Each single or double duct mixing box

      4) Each chiller

2. INFORMATION ACCESS: The following information shall be selectable from a "pop-up" menu available on various graphics:

a. Alarms Schedule graphs

b. Message Schedule groups

c. Module status Setpoints

d. Programming parameters Trends

e. Quit Utilities

f. Schedules

g. Setpoint and Schedule changes shall be accessible for modification of each menu for the associated equipment

D. SPECIFIC GRAPHIC REQUIREMENTS:

1. DATA FORMAT

a. Temperature Tenths xx.x ºF

b. Percentage Units xx %

c. Amps Units xx A

d. Humidity Units xx %

e. Air Quantity Units xxxx CFM

f. GPM Units xxx GPM

2. MAIN BUILDING SCREEN GRAPHIC:

a. Provide an overview of the each building (entire building) with color coding of zones based on temperature relative to setpoint, with light gray indicating zone is off. Green shall be area within setpoint tolerance, and varying shades of light to darker blue for lower than setpoint, and varying shades of light to dark red for higher than setpoint.

b. Clicking on an area of the building will change to a more detailed graphic of that area.

c. Provide table of status for Fire Alarm, Security Alarm, Emergency Generator and Air Conditioning Emergency Shutdown.

d. Provide button to click to go to equipment and mechanical systems graphics.

3. DETAILED AREA GRAPHICS:

a. Individual zones shall be color coded base on temperature relative to setpoint, with light gray indicating zone is off. Green shall be area within setpoint tolerance, and varying shades of light to darker blue for lower than setpoint, and varying shades of light to dark red for higher than setpoint.

b. Label zone by AHU, AHU and Zone or AHU and DD/VAV Box as applicable with zone temperature listed.

c. Clicking on zone shall transfer to applicable AHU or DD/VAV box.

d. Provide button for each AHU serving this area that transfers to the AHU graphic.

4. MAIN EQUIPMENT GRAPHIC:

a. Provide composite graphic for the chilled water/condenser water system at the central plant. The off/on condition of each chiller, pump and cooling tower shall be a color coded element of the equipment: Red - Off, Blue - On.

b. Provide composite graphic for the heating water system at the central plant. The off/on condition of each boiler and pump shall be a color coded element of the equipment: Red - Off, Blue - On.

c. Provide buttons for each AHU and RTU that will transfer to the associated graphic.

5. CHILLED WATER SYSTEM GRAPHIC:

a. Provide graphic that shows the chilled water system including pumps and chillers. Chilled water shall be light blue for water returning to the chiller and dark blue for water supplied by the chillers.

b. Each piece of equipment shall be labeled and have a text indication whether it is ON, OFF. Additionally, equipment that is on shall have some graphical indication of its status, either by color or animation. Animations shall be observable but not distracting.

c. Each data point shall be displayed adjacent to a appropriate graphical symbol located in the proper position in the system.

6. HEATING WATER SYSTEM GRAPHIC:

a. Provide graphic that shows the heating water system including all pumps and boilers. Heating water shall be light red for return hot water and dark red for supply hot water.

b. Each piece of equipment shall be labeled and have a text indication whether it is ON, OFF for FAILED. Additionally, equipment that is on shall have some

graphical indication of its status, either by color or animation. Animations shall be observable but not distracting.

c. Each data point shall be displayed adjacent to an appropriate graphical symbol located in the proper position in the system.

7. AIR HANDLING UNIT, ROOFTOP UNIT AND FAN COIL UNIT GRAPHICS:

a. Provide graphic that shows all coils, valves and dampers. Outside air and return air shall be shown. For multizones, include graphic for each zone.

b. Each data point shall be displayed adjacent to a appropriate graphical symbol located in the proper position on the graphic.

8. VAV/FPB GRAPHIC:

a. Provide individual graphic for each box and equipment.

b. Provide graphic that shows all coils, valves and dampers.

c. Each data point shall be displayed adjacent to a appropriate graphical symbol located in the proper position on the graphic.

9. MAIN MECHANICAL ROOM GRAPHIC:

a. Provide graphic showing mechanical room fans, unit heaters and purge systems.

b. Each piece of equipment shall be labeled and have a text indication whether it is ON, OFF for FAILED. Additionally, equipment that is on shall have some graphical indication of its status, either by color or animation. Animations shall be observable but not distracting.

c. Each data point shall be displayed adjacent to an appropriate graphical symbol located in the proper position in the system.

10. SITE LIGHTING GRAPHIC:

a. Provide graphic for each zone (8 total) per Sheet E3.1.

E. STAND-ALONE CONTROL UNIT (SCU):

1. DISTRIBUTED CONTROL: Each control unit shall be capable of full operation either as a completely independent unit or as a part of the building wide control system. All units shall contain the necessary equipment for direct interface to the sensors and actuators connected to it. Each control module shall be capable of stand-alone direct digital operation utilizing its own processor, memory, input/output, analog-to-digital conversion, clock. Field Modules for extra I/O will be permitted.

2. MEMORY: The memory used in each module shall SRAM type, which has read/write capability from the central site or local operator interface and does not lose its programs or operating data upon power failure. Power for each module shall be 24 Vac. Each module shall have an automatic restart feature with sequencing after power failure. Module memory shall not require reloading at power up.

3. COMMUNICATION: To share global building data, such as outside air temperature, humidity and electric demand, modules shall be able to communicate with each over the building's LAN Ethernet or MSTP RS485.

4. EMS FUNCTIONS: Each SCU shall be capable of performing the following energy management routines as a minimum:

   a. Heating Water Reset

   b. Chiller Sequencing and Optimization, Lead/Lag

   c. Graphic Trend Analysis

   d. Start/Stop Time Optimization

   e. Supply Air Reset

   f. Time of Day Scheduling

5. Each VAV AHU controller shall be Ethernet capable.

END OF SECTION

SECTION 23 0993
SEQUENCE OF OPERATIONS FOR HVAC CONTROLS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

1.02 THE GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL, SUPPLEMENTARY AND SPECIAL CONDITIONS, APPLY TO THE WORK SPECIFIED IN THIS SECTION.

PART 2 – SEQUENCE OF OPERATION

2.01 SYSTEM START/STOP

A. Each air handling unit or unitary equipment shall have an individual schedule of operation. If any equipment requires chilled water for cooling, chiller plant shall operate. If any equipment requires heating water for heating, heating water plant shall operate

2.02 CHILLED WATER SYSTEM

A. If any air handling unit is on and requesting cooling, building pump is energized. If the pump fails to start, energize backup pump. The lead/lag status of the building pumps shall be alternated daily, weekly or monthly. If the pressure in the system 2/3 down the piping system is higher than set point, modulate variable frequency drive to limit maximum pressure.

B. If the building pumps are started, the lead chiller is signaled to start. Chiller will start its own pump, check safeties and then start and maintain setpoint supply water temperature. Whenever the temperature in the chilled water decoupling pipe is not 2□F cooler than building return water temperature or the chiller supply temperature is not at set point for 15 minutes, the second chiller shall be started in the same sequence as the first. The chillers shall be constantly monitored for percent of capacity loading and chilled water supply/return temperatures at each chiller. If the both chillers is operating at 40% or less and the chilled water supply temperature has been maintained for 30 minutes or more, the lag chiller shall be stopped. When a chiller is de-activated, its associated pump shall continue to run 2 minutes (adjustable) before stopping.

C. The EMS shall constantly monitor the operation of the chillers and pumps. If a chiller or pump should fail, an alarm shall be sent operator's work station. The operator shall be able to over ride any sequence, set point, alarm or chiller/pump selection from the remote location.

D. The EMS shall compare de-coupler pipe water temperature and building supply water temperature to determine if deficit flow conditions exist.

2.03 HEATING WATER SYSTEM

A. If the outdoor/indoor air temperature is such that heating will be required, hot water pump and lead boiler shall be pre-started to warm loop temperature prior to starting the air handling units. The building hot water pump shall be activated and operated by VFD to maintain system pressure.

B. If hot water loop temperature is below setpoint and the system pump is operating, the lead boiler shall be enabled and shall operate on its internal controls, but monitored by the EMS. System pumps shall alternate operation weekly. If one fail, the other to start. Pump shall not operate when boilers are off for more than 45 minutes.

C. If the lead boiler is unable to attain loop temperature after a preset time, the lag boiler system shall be started and operate on their internal controls, but monitored by the EMS.

D. System temperature shall operate to provide 160˚F of leaving water temperature. Should the boiler be unable to achieve set point by more than 17˚F, the lag boiler started shall be started.

E. If outside air temperature is less than 30˚F and no air handling units are ON, start hot water pump, open heating water coil valves and circulate 120˚F water without starting air handling unit fans.

F. The EMS shall constantly monitor alarm contact provided with the boiler and CO level. If boiler should fail to fire, the lag boiler system shall be started and an alarm sent to the operator's work station. Boiler lead/lag order shall alternate weekly. Any failure or CO high level detection alarm shall be sent to programmed Staff's cellphone number.

2.04 VAV AIR HANDLING UNIT

A. Unit shall be controlled by DDC controller that shall receive start/stop signal from the central EMS. If the unit is scheduled to be on and cooling is required, fan shall start. Outside air damper or fan shall start/open to preset position. Chilled water valve shall modulate to maintain 53°F supply air temperature. Associated VAV boxes shall be enabled. If building temperature is less than 65°F, associated VAV boxes shall be enabled and heat the building to above 65°F before starting AHU fan, energizing outside air fan or opening outside air damper, and enabling chilled water valve. For unit with hot water heating coil in outside air duct, hot water control valve shall modulate to maintain air temperature of 55°F. During warmup period, the minimum CFM setpoint of the VAV units shall be 50%.

B. The control system shall monitor all the VAV box cold air damper positions and adjust the unit fan speed as required to maintain duct static pressure of 1.5" wc at 2/3 length of longest duct run. Duct pressure sensor located in duct shall limit fan speed through variable frequency drive to limit static pressure to 3.5" wc., and send alarm to the operator's workstation.

C. Any time the outside air/return air mixed temperature falls below 35°F, supply fan shall be de-energized, chilled water valve opened, system chilled water pump energized, building heating water pump energized and outside air damper closed.

D. Outside air fan or damper shall close on loss of signal, loss of electric power or when AHU fan is off.

E. Fan status shall be based on differential pressure sensors.

F. Fire alarm system shall disable fan through starter interlock when in alarm, and send alarm to the operator's workstation.

G. Safety devices and circuits such as low limit sensors, high limit sensors, fire alarm contacts and high-pressure cutout shall operate whether the starter is in Auto or Hand position.

H. Associated VAV boxes shall maintain zone setpoint temperatures by modulating cold air damper and sequencing on heating coil valve. Minimum setting of cold valve shall be adjustable with initial set point of 50%. Fan shall run constantly when box is enabled.

I. Economizer function: When outdoor temperature and humidity readings are below 72°F and 50%RH, unit shall call for 100% outside air delivery regardless of CO2 level reading. This function shall be active until heating of the space is called for.

2.05 SINGLE ZONE FOUR PIPE UNITS

A. Unit shall be controlled by DDC controller that shall receive start/stop signal from the central EMS. Controller shall monitor cooling coil leaving air temperature and modulate chilled water valve to maintain leaving air temperature setpoint 55˚F. Controller shall monitor space temperature and modulate fan speed between 50% and 100% to maintain space temperature. If fan speed is at 50% and space temperature is still dropping, heating coil valve shall modulate to maintain space temperature setpoint. If more heating is required in the space, fan speed shall then be modulated from 50% and 100% as required. On high humidity sensing of 55%RH or greater, chilled water valve shall be fully opened, fan speed at full speed, and hot water valve modulate to maintain space temperature setpoint. Cooling coil valve shall drive to full open position on loss of control signal. Heating coil valve shall drive to the full closed position on loss of control signal.

B. EMS shall monitor CO2 level in space and modulate pretreated outside air damper as required to maintain setpoint of 700 PPM (adjustable).

C. Fan and filter status shall be based on differential pressure sensors.

D. Fire alarm system shall disable fan through starter interlock when in alarm.

E. Safety devices and circuits such as low limit thermostats, high limit thermostats, fire alarm contacts and high pressure cutout shall operate whether the starter is in Auto or Hand position.

F. Economizer function: When outdoor temperature and humidity readings are below 72°F and 50%RH, unit shall call for 100% outside air delivery regardless of CO2 level reading. This function shall be active until heating of the space is called for.

2.06 UNIT HEATERS

A. Heaters will operate off local thermostat not controlled by EMS. DDC controller monitors space temperature and cycles unit to maintain space temperature.

2.07 EXHAUST FANS

A. Fans are started based on occupancy schedule and override condition. Fans with local switch shall operate only if switch is on and scheduled to be on

2.08 MDF/IDF DEDICATED HVAC UNIT

A. Units will operate off local programmable thermostat not controlled by EMS. Provide monitoring thermostat only.

2.09 EMERGENCY SHUTDOWN

A. Provide an emergency shutdown push button switch in the administration area that stops all exhaust fans and outside air fans immediately. Once stopped, the system may be restarted with a twist to release the button.

2.10 CARBON MONOXIDE LEVEL MONITOR AND GAS SHUTOFF

A. EMS shall monitor CO level in each room with gas burning equipment and shutoff gas valve when setpoint is exceeded. Location to be monitored shall be boiler room, kitchen, and mechanical room with a gas water heater/s. Alarm shall be sent to main control computer at Maintenance Center.

2.11 GENERAL REQUIREMENTS

A. Energy management system monitors building conditions 24 hours per day.

B. Chiller safety status point shall be wired so that the BAS recognizes all chiller panel alarms, chilled water proof of flow and condenser water proof of flow regardless of chiller staging.

C. Provide and install plenum rated Cat 6 cable from system modem location to building network panel.

D. Refer to Drawings for additional requirements

2.12 TEMPERATURE SETPOINTS

Cooling Room Temperature	73° F
Heating Room Temperature	70° F
Chilled Water Temperature	44° F
Heating Water Temperature	160° F
Single Zone Cooling Coil Leaving Air Temperature	54° F
Single Zone Heating Coil Leaving Air Temperature	95° F
VAV Cooling Coil Leaving Air Temperature	55° F
Humidity Sensors	55%

2.13 POINT CONFIGURATION

EQUIPMENT	CONTROL FORM
CHILLER MANAGER PROGRAM:	
EACH SYSTEM PUMP	MODULATING CONTROL
BUILDING CHW SUPPLY	TEMP READING
BILDING CHW RETURN	TEMP READING
DE-COUPLER PIPE	TEMP READING
BUILDING FLOW	FLOW READING
TEMPERATURE HIGH LIMIT	ALARM POINT
TEMPERATURE LOW LIMIT	ALARM POINT
SYSTEM PRESSURE	PRESSURE READING
EACH CHILLER:	
CHILLER RUN	ENERGIZE
CHILLED WATER PUMP RUN	ENERGIZE
CHILLED WATER RESET	MODULATING CONTROL
CHILLED WATER SUPPLY	TEMP READING
EQUIPMENT FAILURE STATUS	ALARM POINT
CHILLED WATER TEMPERATURE HIGH LIMIT	ALARM POINT
CHILLED WATER TEMPERATURE LOW LIMIT	ALARM POINT
CHILLED WATER PUMP STATUS	DATA POINT
CHILLER SAFETY STATUS	DATA POINT
CHILLER OPERATING LOAD	DATA POINT
RUN TIME	REPORT POINT
BOILER MANAGEMENT PROGRAM:	
BUILDING HEATING WATER PUMP RUN	MODULATING CONTROL
EACH BOILER	ENABLE

BUILDING HEATING WATER SUPPLY	TEMP READING
BUILDING HEATING WATER RETURN	TEMP READING
TEMPERATURE HIGH LIMIT	ALARM POINT
TEMPERATURE LOW LIMIT	ALARM POINT
HEATING WATER PUMP STATUS	DATA POINT

EACH SINGLE ZONE AIR HANDLING UNIT (VAV UNIT):

FAN RUN	ENERGIZE
OUTDOOR AIR DAMPER/FAN	ENERGIZE
CHILLED WATER VALVE	MODULATING CONTROL
HEATING WATER VALVE	MODULATING CONTROL
VARIABLE FREQUENCY DRIVE	MODULATING CONTROL
DUCT STATIC PRESSURE	PRESSURE READING
ZONE SUPPLY AIR TEMPERATURE	TEMP READING
ENTERING AIR TEMPERATURE	TEMP READING
SMOKE DETECTOR/FIRESTAT	ALARM POINT
EQUIPMENT FAILURE STATUS	ALARM POINT
TEMPERATURE HIGH LIMIT	ALARM POINT
TEMPERATURE LOW LIMIT	ALARM POINT
FAN STATUS	DATA POINT
RUN TIME	REPORT POINT

EACH SINGLE ZONE AIR HANDLING UNIT:

FAN RUN	ENERGIZE
CHILLED WATER VALVE	MODULATING CONTROL
HEATING WATER VALVE	MODULATING CONTROL
ZONE TEMPERATURE	TEMP READING
ZONE SUPPLY AIR TEMPERATURE	TEMP READING
ZONE HUMIDITY LEVEL	RH READING
ZONE CO2 LEVEL	CO2 READING
OUTDOOR AIR DAMPER	MODULATING CONTROL
SMOKE DETECTOR	ALARM POINT
EQUIPMENT FAILURE STATUS	ALARM POINT
TEMPERATURE HIGH LIMIT	ALARM POINT
TEMPERATURE LOW LIMIT	ALARM POINT
FAN STATUS	DATA POINT
RUN TIME	REPORT POINT

EACH SUPPLY FAN:

FAN RUN	ENERGIZE
RUN TIME	DATA POINT
CONTROL DAMPER	MODULATING CONTROL
DAMPER STATUS	DATA POINT

EACH EXHAUST FAN:	
FAN RUN	ENERGIZE
RUN TIME	DATA POINT
MDF/IDF:	
ZONE TEMPERATURE	TEMP READING
MISCELLANEOUS:	
EMERGENCY SHUTDOWN	ENERGIZE
BOILER ROOM CO MONITOR	ALARM POINT
OUTDOOR AIR TEMPERATURE	TEMP READING
OUTDOOR HUMIDITY	HUMIDITY READING
EMERGENCY GENERATOR WARNING	ALARM POINT
CHILLER PLANT REFRIGERANT SENSOR WARNING	ALARM POINT
EACH VAV AHU MECHANICAL ROOM RETURN AIR	CO2 READING
ELECTRICAL POWER METER	KWH INPUT
ELECTRICAL SERVICE PHASE FAILURE	ALARM MONITORING
LIGHTING CONTROL (COORDINATE WITH ELECTRICAL)	ON/OFF

END OF SECTION

SECTION 23 2113
HYDRONIC PIPING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 GENERAL REQUIREMENTS

A. Construct all piping systems in accordance with applicable ASME Codes. Provide a vent valve at the topmost part and a drain valve at the lowest part of all water piping systems.

B. Piping shall be installed in a neat and orderly manner parallel to building coordinates with vertical drops. Piping in the vicinity of equipment shall be arranged to not interfere with access panels and maintenance space. Provide unions, flanges and shutoff valves to allow removal of the equipment and its subassemblies without having to remove excessive amounts of building piping or drain water systems. Bull head Tee arrangement is not acceptable.

C. Provide pipe markers per Section 23 05 53.

PART 2 – METHODS

2.01 PIPE SUPPORTS

A. GENERAL: Provide supports of adequate strength for all piping. Piping connected to a piece of equipment shall have a support located near enough to the equipment that there will be no pipe weight supported by the equipment. In no case shall the nearest support be more than two feet horizontally from the connection point. Pipe support material shall be selected to be compatible with the pipe material to prevent galvanic corrosion. The minimum size hanger rod shall be 3/8”.

B. HORIZONTAL PIPING:

1. SUPPORT SPACING: As recommended by support manufacturer, but spaced not more than below:

	Pipe Size	Steel Pipe	Other Pipe
a.			
b.	1" & Smaller	6 Feet	4 Feet
c.	1¼" & 1½"	8 Feet	5 Feet
d.	2"	8 Feet	5 Feet

e. 2½" to 4" 8 Feet 6 Feet

f. 6" and Larger 8 Feet 6 Feet

g. Multiple parallel runs of piping shall be supported from every joist and beam the piping crosses. Where piping runs parallel to structure support from three adjacent joists or beams.

2. SUPPORT FROM ABOVE: Support piping near roof or upper floor from structure if sufficient strength exists. Use a method suitable for type of construction and of sufficient strength. Use threaded steel hanger rods of diameter required to safely support loads. Install rods through holes drilled in beam flanges, 1½" x 1½" x 8" angles welded to structural members or top cord slot at joist panel points and secure with large washers and nuts. Refer to structural drawing details for additional information. Do not use perforated strap.

3. HANGERS: Manufactured by Grinnell or Tolco.

a. SINGLE RUNS OF PIPE, NO EXPANSION PROBLEM: Adjustable clevis type Grinnell Figure 260.

b. MULTIPLE RUNS: Trapeze hangers.

c. BEAM CLAMPS: Grinnell Figure 92 except use Figure 228 for pipes 6” and larger.

4. SUPPORT FROM BELOW: All piping near the floor, or where ceiling structure does not have sufficient strength, or where there is no ceiling shall be supported from below. Support members shall be steel pipe with base plates, or welded steel structure suitably braced.

5. SUPPORT MATERIAL FINISH: Galvanized or cadmium plated steel. Provide solid copper supports for copper piping, or install gas wrap insulating tape on pipe at support point.

6. PIPE SADDLES: Install 18 gauge, formed galvanized sheets at each support point for insulated pipe, shaped to fit pipe, and covering bottom half of pipe. Length at saddle shall be not less than twice the insulation outside diameter, 16” minimum length. Provide compressible gasketing between non-insulated plastic pipe and hangers. Provide insulating material between dissimilar metal.

7. TRAPEZE SUPPORTS: Shall consist of unistrut or channel with 3/8” thick or heavier all thread rods attached to structure. Provide double nuts and cut all tread so no more than 1” extends beyond nut.

2.02 VALVE INSTALLATION

A. Install in accessible locations, to make possible removal of bonnet and complete servicing of each valve. Do not install valve with stem down. Provide access panels of adequate size.

2.03 TESTING PIPING SYSTEMS

A. GENERAL: Test all piping systems to assure that they are absolutely leak free. Pipe to be insulated shall be proved leak free before pipe is concealed. Architect shall be notified when testing is performed so that the Engineer and/or Owner may observe and certify the results.

B. PRESSURE TEST METHOD: Use method suitable for type of piping system being tested. For pressure pipe, use a test pressure approximately 150% of maximum system working pressure but at a minimum pressure of 60 psig (413.69 kPa). The minimum test pressure for chilled water and heating water shall be 125 psig (861.84 kPa). Maintain pressure for 8 hours. During this test period, inspect all pipe fittings and accessories in the piping and eliminate all leaks.

C. FINAL TEST: Subject each piping system to its normal operating pressure and temperature for not less than twenty-four hours. The piping systems must remain absolutely tight during this period. The satisfactory completion of any test or series of tests will not relieve the contractor of responsibility for ultimate proper and satisfactory operation of piping systems and their accessories. Pipes that will contain water shall be leak tested with water.

2.04 SLEEVES

A. Provide sleeves for all piping passing through walls, floors not on grade and roof slabs. Make sleeves of galvanized pipe and sized to provide clearance of 1/4" around piping or pipe insulation if pipe is insulated. Set end of sleeve flush with the surrounding surface of wall or ceiling in which sleeve is installed. Floor slab sleeves shall extend 3" above floor level. Provide vented sleeves for all gas piping below floor slabs or paved areas.

2.05 PLATES

2.06 PROVIDE CHROMIUM PLATED WALL AND CEILING PLATES FOR ALL EXPOSED PIPING, AT POINT PIPING PASSES THROUGH WALLS OR CEILINGS. PLATES SHALL BE LARGE ENOUGH TO COMPLETELY COVER PIPE SLEEVES. ON INSULATED PIPING, INSIDE DIAMETER OF PLATES SHALL JUST EXCEED OUTSIDE DIAMETER OF PIPE COVERING. PLATES MAY BE OMITTED FOR PIPE SIZES LARGER THAN 6".

2.07 VALVE AND FITTING SIZES

A. All hand valves, fittings and other piping accessories shall be size of the line in which installed unless specifically indicated otherwise on the Drawings.

2.08 DIELECTRIC UNIONS

A. Provide dielectric insulating unions at all connections between dissimilar metals.

2.09 FITTINGS

A. SCREWED: Conform to ANSI Specification B16.3.

B. COPPER: Conform to ANSI Specification B16.22.

C. WELDED: Install elbow, transition, branch and weld-o-let lateral fittings in welded systems. Mitered or field fabricated fittings are not acceptable. Flanges shall be weld neck type for sizes 6” and larger pipe.

D. SPECIAL: Use long radius ells on all pumped lines.

2.10 VALVES

A. GENERAL: Provide shutoff/balancing valve for each water connection to equipment that is piped to the chilled or heating water systems. All pressures shown below are minimum working pressures. Provide memory stops for valves used for throttling service. Provide chain operators with guide for all valves 6" and larger, located higher than 8 feet (243.84 cm). Loop chain with bottom 7 feet (213.36 cm) high. Provide close-off plugs or plates for all valves in dead end service or otherwise opening to the atmosphere (drains, manual vents, future extensions, etc.).

B. BALL VALVE FOR MECHANICAL SYSTEMS: Provide for 2" and smaller pipe: 600 PSI WOG, bronze threaded, full port, Teflon seat, stainless steel trim, extension stem for insulation. Nibco T-585-70-66(-NS). Ball valves for strainer blow down and drains shall have hose end connection and attached cap. Nibco T-585-70-66-HC. Valves used for air venting may be non-full port type with chrome plated ball. Nibco T-580-70.

C. GATE VALVE FOR MECHANICAL SYSTEMS: Provide for steel pipe 2½" and larger only: 125# iron body, bronze fitted, flanged, bolted bonnet, solid wedge, OS&Y. Nibco F-617-0.

D. PLUG VALVE FOR MECHANICAL SYSTEMS: Bronze or iron body, screwed for 2" and smaller, flanged for 2½" and larger, eccentric plug with compressible resilient seal suitable for 250° F water service, permanently molded to plug face, permanently lubricated corrosion resistant bearing bushings, lever actuator. DeZurik Series 100 and 400

E. CHECK: 2" and under, 125# bronze body, bronze swing check with Teflon seat; 2½" and over 125# iron body, flanged, bronze trim. Use Duo-Check for pumped lines. Nibco T-413-Y, Nibco W-920-W or Mission "Duo-Check"

F. BUTTERFLY: 2½" and larger, 200# full lug ductile iron type body, stem seals, molded in or renewable seat, aluminum bronze disc, 416 stainless steel stem, extended neck for insulated lines, notched top plate with handle for throttling. Valves 6" and larger and valves with chain

operators, to have enclosed weatherproof gear operator. All valves certified suitable for dead end service with no downstream flange. Nibco LD-2000 or Victaulic Vic-300 Masterseal (for grooved systems)

G. MISCELLANEOUS VALVES: As indicated on the Drawings.

H. INSULATION PROVISIONS: Valves on insulated lines shall have stems extending through insulation. Plug valves shall have DeZurik 400 dry cap. All ball valves shall have Nibco Nibseal system installed. Heating water valves inside do not require Nibseal system.

I. INSTALLATION: Ball valves shall be installed such that handle for valve is positioned on the side of the pipe and is pulled down to close the valve.

J. ACCEPTABLE MANUFACTURERS: Crane, De Zurik, Hammond, Kitz, Grinnell, Milwaukee, Nibco, Victaulic and Stockham

2.11 STRAINERS

A. STRAINERS: Iron body, Y pattern basket type, line size, not more than 2 PSIG pressure drop, 20 mesh Monel screen unless indicated otherwise. Provide ball valve with end plug for blow-off on strainers. Chilled and hot water strainer baskets to have 1/16" perforations.

B. SUCTION DIFFUSERS: Flanged type with strainer area five times suction area, straightening vanes with length 2½ times suction diameter, magnetic insert, reducing flange as required and adjustable floor support. All internal parts shall be replaceable.

C. ACCEPTABLE MANUFACTURERS: Keckley, Victaulic and Taco

2.12 WATER SPECIALTIES

A. GENERAL: Provide all specialties necessary for proper operation of the water systems. Install manual air vents at all high points on chilled and hot water lines and automatic vents where shown. Install T&P relief valves in all closed water piping systems.

B. TEMPERATURE AND PRESSURE RELIEF VALVES: ASME labeled, with try handle, discharge pressure rating approximately 10 PSI above normal maximum system operating pressure; except valves on hot water boilers to be rated at 30 PSI, with capacity not less than rated output of boiler.

C. AUTOMATIC PRESSURE REDUCING FILL VALVES: Equip with built-in strainer and set for 12 PSI unless system requires higher pressure.

D. CAPTIVE AIR EXPANSION TANKS: 125 PSI rated, captive air type with charging valve and replaceable bladder designed for 100% acceptance.

E. AUTOMATIC AIR VENTS: Bell & Gossett No. 107A high capacity vent, 150 psi (1034.21 kPa) rating, with shut-off cock, and 1/2" copper tube overflow line extended to a suitable drain point.

F. MANUAL AIR VENTS: 1/2” ball valve with plug.

G. AIR AND DIRT ELIMINATORS: Shall have tangential inlet and outlet connections, top tank fitting, PALL ring technology, drain/blow down valve and be constructed to ASME applicable codes for 125 PSIG working pressure. Taco Model 4900-AD or equivalence by Spirotherm

H. ACCEPTABLE MANUFACTURERS: Aurora, Bell & Gossett, Keckley, McDonnell-Miller, Taco, Thrush and Wood Industrial Products.

I. TEST PLUGS: Provide Pete's Plugs or Texas Fairfax test plugs at inlet and outlet of each pump, AHU water coil, strainer, control valve and chiller cooler bundle. Provide extension where piping is insulated. Provide two sets of temperature and pressure gages for use with the Pete's Plugs. Gages to be of appropriate scale for system measurements.

J. GAGES: 4½" dial diameter, bottom connected, flangeless, fiberglass reinforced polypropylene, brass or aluminum moisture and dust proof case with blowout plug or blowout back, screw rings, glass crystal and silicone dampened, bronze brushed rotary movement. Pressure range 0 to 150% of system working pressure. Provide brass TEE handle shut off for each gage with minimum rating same as gage. Manufacturers: Ashcroft, Marsh, Marshalltown, Scientific, Trerice, Weiss or Weksler.

K. THERMOMETERS: Outdoor thermometers shall be cast brass or cast aluminum case with brass separable sockets (with extension neck for insulated piping); blue reading non-Mercury type with 9" scale for maximum and minimum to be encountered. Chilled and condenser water range to be 30° F to 130° F, 2° divisions. Hot water range shall be 30° F to 240° F, 2° F divisions. For thermometers at or below 6 feet (182.88 cm) high, install scale vertical. For thermometers above 6 feet high provide adjustable angle type. Install scale at 45° facing down for easy reading. Weiss Model 9VU35. Indoor thermometers shall be solar powered digital type. Weiss Model DVU35. Equal thermometers by American, Marshalltown, Scientific, Taylor, Trerice and Weksler are acceptable.

L. THERMOMETER WELLS: Weksler Test Wells, brass with 3½" stem, 2½" extension neck, and brass screw plug, or comparable models made by American, Marshalltown, Scientific, Taylor, Trerice or Weiss.

M. BACKFLOW PREVENTER: Watts Series U-909SQT preventer at makeup water connection to building chilled and heating water systems is specified in the plumbing section.

N. FLOW VENTURI: Venturi stations, velocity profile type, each with quick disconnect valves, safety shut-off valves, and metal tag on chain showing pipe size and meter reading at specified flow rate. Units shall be manufactured by Armstrong, Barco, Gerand, Preso or Velocity Profile.

2.13 MISCELLANEOUS PIPING

A. GENERAL: Provide all required piping not specifically shown on the drawings but necessary for the proper operation of the systems. Piping materials, methods of installation, fittings, valves, etc., shall conform, in general, to that specified for similar piping systems.

B. CONDENSATE DRAINS: From each air conditioning unit drain pan to drain indicated, or to a suitable drain point if not indicated. All lines graded down in direction of flow. Provide trap of height required for air seal. Provide screw plug cleanout at change of direction to allow rodding.

C. GAS RELIEF PIPING: Provide galvanized steel piping from refrigerant gas relief ports on refrigeration equipment installed inside building to safe location outside of building. Provide similar piping from natural gas pressure regulators to outside location.

D. CHILLED AND HEATING WATER MAKEUP LINES: Type L copper with lead free solder joints.

E. MISCELLANEOUS DRAINS: Provide copper drain line to floor drain from air compressors, air dryers, automatic air vents, backflow preventers, relief valves and other equipment with automatic drains.

2.14 PIPE WELDING

A. GENERAL: All welds shall be made using shielded arc process. Welding shall be performed by experienced and highly skilled workmen, holding current certification by the National Certified Pipe Welding Bureau or currently certified under the requirements of the ASME Boiler and Pressure Vessel Code, Section IX. Piping and fittings shall be welded and fabricated in accordance with ASME/ANSI the latest edition of Standard B31.9 for all systems. Machine beveling in shop is preferred. Field beveling may be done by flame cutting to recognized standards. Welding process shall ensure complete penetration of deposited metal with base metal. Provide fill metal suitable for use with base metal. Keep inside of fittings free from globules of weld metal. All piping shall have the ends beveled 37-1/2° and joints shall be aligned true before welding. All changes in direction, intersections of lines, reduction in pipe size and the like shall be made with factory fabricated welding fittings. Mitering of pipe to form elbow, mating of straight runs to form tees or similar construction will not be permitted. Do not split, bend, flatten or otherwise damage piping before, during or after installation. Remove dirt, scale or other foreign matter from inside piping before tying in section, fitting, valve or equipment.

B. PASSES: After tack welding sections for alignment purposes, make one welding pass completely around joint. Make additional passes until the joint is completed. After each pass, wire brush and/or grind weld to remove slag deposits and prepare the surface for additional passes. Schedule 40 pipe shall be welded with no less than three passes, including one stringer/root, one fillet and one lacer. Schedule 80 pipe shall be welded with no less than four passes including one stringer/root, two fillets and one lacer. In all cases, the weld must be filled before the cap weld is added.

C. APPEARANCE: The finished weld shall have no surface voids and present a raised bead at the joint. Wire brush joint for a finished appearance.

D. TESTING: All welds are subject to inspection, visual and/or X-ray, for compliance with the specifications. The A/E will, at A/E's option, provide employees or employ a testing laboratory for the purposes of performing inspections and/or testing. If X-ray testing finds unacceptable welds, the Contractor shall be responsible for all labor, material and travel expenses involved for the first testing, as well as all re-inspection and testing that may be required to ensure compliance. The Contractor shall be responsible for costs of all additional testing required as recommended by ASME/ANSI Standards B31.9 due to discovery of unacceptable welds. Welds lacking penetration, containing excessive porosity of cracks or are found to be unacceptable for any reason, must be removed and replaced with an original quality weld as specified herein.

2.15 GROOVED PIPING SYSTEM

A. GENERAL: The grooved coupling system may be used at contractor's option, except in all cases provide a sufficient quantity of Victaulic flexible type mechanical couplings in straight pipe runs to compensate for expansion.

B. PIPE: Use only those pipe materials allowed in the Specifications and approved by the coupling manufacturer for the application. Pipe grooves shall be machine roll or cut for schedule 40 pipe.

C. COUPLINGS: Housings shall be ductile or malleable iron constructed to ASTM A-47 or A-536, or forged steel constructed to ASTM A-106. Coupling gaskets shall be EPDM Grade EHP for -30° F to 250° F service. Couplings shall be Victaulic Style 177 flexible couplings at first three joints from equipment, in lieu of a flexible connector Elsewhere use Style 107 for rigid joints or Style 177 for flexible joints.

D. DNOTES: To assure uniformity and compatibility of piping components in grooved end piping systems, all grooved products utilized shall be supplied by Victaulic. A factory trained representative (direct employee) shall provide on-site training for contractor’s field personnel in the use of grooving tools, application of groove, and product installation.

E. ACCEPTABLE MANUFACTURERS: Gustin Bacon, Grinnell Gruvlok and Victaulic

PART 3 – MATERIALS

3.01 CHILLED WATER, CONDENSER WATER AND BUILDING HEATING WATER PIPING

A. Schedule 40 black steel pipe and fittings, long radius ells, screwed, welded or Victaulic type mechanical couplings. Piping shall be of domestic manufacture and meet ASTM ERW A-53 Grade B. Use Victaulic type couplings for the first two elbows off each chiller, pump, boiler and AHU. Provide a sufficient quantity of Victaulic flexible type mechanical couplings in straight pipe runs to compensate for expansion. Piping underground shall be pre-insulated. All bolts, nuts and all thread used in the piping system and components shall be cadmium plated to resist rust.

3.02 REFRIGERANT PIPING

A. Type "L" copper.

3.03 CONDENSATE DRAIN PIPING

A. Type "L" copper or Schedule 40 galvanized steel.

END OF SECTION

SECTION 23 2123
HVAC HYDRONIC PUMPS

PART 1 – GENERAL

1.01 1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 SUBMITTALS

A. Provide submittals as outlined in Section 23 00 00 General Mechanical

PART 2 – PRODUCTS

2.01 CLOSE-COUPLED VERTICAL INLINE PUMPS

A. GENERAL: Provide close coupled, NEMA standard JM re-greaseable motor and factory installed vent line from the seal chamber to the pump suction to remove trapped air. Pump shall be designed to allow seal replacement without removing motor.

B. CONSTRUCTION: Pumps shall be bronze fitted with iron or steel casing, casing wearing ring, shaft sleeve, drip proof motor, cast iron or steel base, coupling guard, grease fittings and mechanical shaft seals. Impeller shall be statically and dynamically balanced and shall not be larger than 85% of cutwater size. Motor to pump connection shall use Wood's Dura-Flex or Omega coupling with 1.5 service factor suitable for variable speed drive applications.

C. CAPACITY: Capacity as scheduled on Drawings. Include cost of re-trimming impeller if required to properly balance the system.

D. MOTOR: Construction and selection shall be non-overloading at selection point and at any point on the curve. Service factor may be used for meeting this requirement except at selection point. See Motors in Section 23 05 13. MOTORS SHALL BE TEFC TYPE.

E. ACCEPTABLE MANUFACTURERS: Armstrong, Aurora, Bell and Gossett and Taco.

PART 3 – EXECUTION

3.01 INSTALLATION SHALL COMPLY WITH MANUFACTURER'S REQUIREMENTS AND INSTALLATION DETAILS ON THE DRAWINGS.

END OF SECTION

SECTION 23 2300
REFRIGERANT PIPING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 SUBMITTALS

A. Provide submittals as outlined in Section 23 00 00 General Mechanical

PART 2 – PRODUCTS

2.01 REFRIGERANT PIPING

A. GENERAL: Provide for the systems as shown. Submit shop drawing of piping system showing all traps, pipe sizes, and accessories; drawing to be marked "Approved", and signed by an employee of the Application Engineering Department of the unit manufacturer. Do not install piping until this drawing is submitted and approved.

B. MATERIALS:

1. PIPE: Type "L" copper ACR tubing.

2. FITTINGS: Wrought copper streamlined, long radius sweat fitting.

3. SOLDER: Sil-Fos, except on valves use solder recommended by valve Manufacturer. Make joints while pipe is under nitrogen purge to prevent formation of oxides inside piping.

C. ACCESSORIES: Replaceable core type liquid line dryer-strainer sized for system capacity at 2 PSI pressure drop per ARI Standard 710-64, sight glass-moisture indicator, expansion valves, solenoid valves and charging fittings.

PART 3 – EXECUTION

3.01 EVACUATION

A. Completely evacuated of all moisture by applying vacuum pump for a minimum of 24 hours. Moisture indicator must indicate a completely moisture-free condition at a time of final inspection.

Vacuum must be maintained at 50 microns to completely dry system and remove non-condensables.

3.02 DIELECTRIC

A. Insulate copper pipe from all dissimilar metals, hangers, pipe, etc., with 4 pound/square foot lead shields 6" long wrapped completely around the pipe and placed between hangers and pipe, or elastomeric snubbers of similar design. B-line B1999 vibra cushion and B2000 two piece clamp.

END OF SECTION

SECTION 23 2513
HYDRONIC SYSTEMS WATER TREATMENT

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, and the requirements of Section apply to the Work specified in this section.

1.02 GENERAL REQUIREMENTS

A. The service to be provided requires the Sub-contractor to provide complete water analysis, chemicals, testing equipment, training, consulting and technical service in support of the chemical cleaning and treatment of the following systems:

1. HVAC Hot Water Systems

2. Chilled Water Systems

B. Provide the initial chemical treatment for all systems based on a complete water analysis prior to the equipment installation.

1. The initial chemical treatment shall be applied after the systems have been cleaned and flushed.

2. The initial treatment supply of chemicals shall be adequate for the start-up and testing period, for the time the system is being operated by the Contractor for temporary cooling and heating, and for a period of (1) year after Substantial Completion.

3. The Sub-contractor shall recommend a periodic testing procedure and chemical treatment schedule for facility personnel. This procedure is outlined in the Program Administration Manual (Section 2.02 C).

C. The Sub-contractor shall have a qualified Service Representative on site at the facilities to assist with the initial application of the chemicals and training of the Facility personnel. This Service Representative shall then make two service visits per month for the first two months and service visits at least once a month as specified herein or more often if required to analyze water samples, to inspect the equipment and to make recommendations for continued application of the products. Provide 48 hours advance notice to the Owner of site visits.

D. A service report shall be prepared on site and submitted at the time of each service visit and shall include all required test results and recommendations. Also, proof of training, including training topics and names of trainees, must be provided.

E. The Sub-contractor must provide equipment with electrical characteristics compatible with those shown on the Electrical Drawings.

1.03 ACCEPTABLE MANUFACTURERS

A. All materials and systems shall be new and compatible for use in the Owner's Facility (including compatibility with system pressures, temperatures, etc.). Chemicals complying with this specification and manufactured by the following companies will be accepted.

1. All work shall be performed by a qualified full-time water program manager.

   a. Specialist in the field of industrial water treatment.

   b. Facilities include water analysis laboratory, development

2. Provider shall be Worth HydroChem of Houston.

3. Worth HydroChem Representative shall act on behalf of Owner to provide witness to all flush, fill and chemical treatment of Hydronic Systems:

   a. Brad Kym – Representative

      1) bradkym@worthhydrochemofhouston.com

      2) Office Number: 713-896-0087

1.04 SUBMITTAL

A. Follow the submittal requirements of Section 23 00 00. Submit all data to prove compliance with these specifications including but not limited to:

1. Product specification sheets and MSDS's for each chemical used.

2. Cut sheets with technical data on the automated monitoring and control systems and all equipment as specified herein.

3. Shop drawings as necessary to assist the mechanical contractor with proper system installations.

4. List of six references of customers using above noted systems.

PART 2 – TECHNICAL SPECIFICATIONS

2.01 GENERAL

A. Work covered by this specification consists of providing all cleaning and treatment chemicals, consulting services, training, testing, technical services, equipment and materials necessary for the work herein called for.

B. GUARANTEE AND SERVICE: All materials furnished by the Sub-contractor shall be new, and both workmanship and materials shall be of good quality.

2.02 BASIC SERVICES

A. ROUTINE SERVICES: Sub-contractor's Service Representative shall provide minimum of bi-monthly service for the first two months and monthly service from there on to include consulting and cooling water analyses for conductivity (TDS), "M" alkalinity, hardness, sodium chloride and scale and corrosion inhibitor levels. Any additional visits required shall be at no additional cost to the Owner.

1. Chilled and hot water systems shall be analyzed at least quarterly for nitrite and conductivity.

2. A legible, hand-written or computer generated report shall be prepared at the conclusion of each monthly site visit, showing all test results and providing recommendations for continued systems operations.

B. TRAINING: The Sub-contractor shall provide training for operating personnel on the chemical testing, application and control of the treatment program. Training shall utilize a combination of multi-media lectures and "hands-on" activities. Sub-contractor shall provide verification examples of training materials. Provide 48 hours advance notice and coordinate times with the Owner.

1. Training shall include such tests which are required to satisfactorily monitor the treatment program, including conductivity (TDS), "M" alkalinity, calcium hardness, sodium chloride and scale and corrosion inhibitor levels. Test kits including all necessary reagents for these tests shall be included in the Sub-contractor's proposal.

2. Operating personnel shall be trained on basic chemistry, system operation, testing procedures and safety.

C. PROGRAM ADMINISTRATION MANUAL: The Sub-contractor shall provide the Facility with two Program Administration Manuals including sections covering program control, testing requirements, in-plant logs, safety data and system information. Each section shall include the following:

1. Program Control: This section shall include a complete program outline with chemical descriptions, control ranges, and required action for “out of range” situations. It shall also

contain complete ordering instructions with applicable account numbers and phone numbers.

2. Testing Requirements: This section shall include basic testing practices as well as detailed test instructions for each test being performed by Facility personnel.

3. In-Plant Logs: This section shall include detailed testing log sheets for each system to be tested including room to record one month's data on one sheet and a section to log chemical inventory.

4. Safety Data: This section shall include the Sub-contractor's 24-Hour toll free safety hotline number as well as MSDS sheets for each chemical used.

5. System Information: This section shall be provided for any equipment manuals and related information to be stored.

2.03 TREATMENT PROGRAM - CLEANING AND PASSIVATION

A. CHILLED & HOT WATER SYSTEM:

1. The chilled and hot water systems shall be flushed and all debris, rags and foreign objects from construction shall be removed from equipment, traps, etc. When system is being cleaned and flushed, do not circulate water through coils, control valves or flow control valves. Install temporary by-pass hoses between isolating and balancing valves at coils to allow re-circulation. Install temporary spool pieces at control valve locations in mains during the flushing and cleaning process. Strainers at coils only shall be removed until flushing is complete. Strainers at pumps shall remain in place to protect pumps and equipment. Clean strainers frequently during the circulation process. When flushing and cleaning are finished, complete piping connections. Remove temporary hoses and spool pieces, install strainers or strainer elements. When systems are refilled with clean water, circulate that water for 24 hours, then clean and re-install strainers or strainer elements.

2. System drains shall be located at low points and preferably as far from the fill point as practical. Drain valves shall be minimum 3/4" ball valves. Do not use hose-bibbs as drain valves.

3. A solution of Allegheny BC88 liquid piping cleaner shall be circulated in the system for a minimum of 24 hours according to a procedure recommended by the chemical company. Dosage: 5 gallons per 1000 gallon system water.

4. After circulating cleaner solution for 24 hours, drain system as fast as possible to remove suspended solids. At this time refill system, and circulate clean water for 24 hours with a constant bleed off drain/refill rate of approximately 6 GPM to flush remaining solids.

5. After ensuring the system water is clean, add Allegheny CST375 corrosion inhibitor through pot feeders to leave closed systems in proper pH condition. Leave system at 1

gallon per 1000 gallons of water concentration. Circulate water with all control valves open for 24 hours to ensure proper mixing.

6. The system water at final inspection will be certified in writing as to cleanliness and final treatment by the water treatment supplier to the Mechanical Contractor.

2.04 TREATMENT PROGRAMS – QUALITY RESULTS ASSURANCE

A. The hot water and chilled water programs proposed by the Sub-contractor shall be designed to maintain corrosion rates below 0.5 mils (0.0127 mm) per year for mild steel and 0.1 mils (0.00254 mm) per year for copper. These rates should be verified with corrosion coupon racks provided by the Sub-contractor and installed by the mechanical contractor on each hot and chilled water system. Hot and chilled water coupons must be analyzed once a year with a minimum 90-day system exposure. A report of the coupon analytical results shall be provided to the Owner or Owner's representative.

B. Hot and chilled water microbiological growth levels shall be maintained below 10,000 cfu's aerobic bacteria and 10 cfu's anaerobic bacteria. The Sub-contractor shall perform detailed microbiological culturing off-site at the Sub-contractor's company's own analytical laboratory annually to determine these levels. A report of the off-site analytical results shall be provided to the Owner or Owner's representative.

2.05 EQUIPMENT

A. GENERAL: All equipment needed to completely install and facilitate designed operation of the Sub-contractor's program given the Facility's operating requirements must be provided in the Bid. The Sub-contractor will be required to provide all necessary shop drawings and consulting to facilitate installation by the mechanical contractor. The following equipment must be provided to meet the specification as listed:

B. CLOSED LOOP POT FEEDERS: Provide Vector Industries Model FA 900 filter feeder with legs and stainless steel sock enclosure, drain valve, gate type shut-off valves, 50 micron filter and flow indicator and necessary accessories for the chilled and heating water systems. Unit for heating water system shall be suitable for 240° F water temperature. Feed shall be piped across the system pump. Flow rate through filter feeder shall be adjusted to equal 1% of system flow.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Installation shall be performed by the mechanical contractor with consultation by the water treatment Sub-contractor. Install where shown on the Drawings. Follow the manufacturer's installation and start-up instructions.

B. Prior to installation of hot taps and water treatment equipment, the water treatment Sub-contractor shall give final approval of locations and design and receive approval by the Owner.

3.02 FLUSHING PROCEDURE

A. FLUSHING & CLEANING OF STEEL PIPING SYSTEMS

1. Submit a detailed plan for the Engineer's and Owner's review and approval describing in full detail the individual steps associated with this process before any piping is installed.

2. After the mechanical contractor has tested the piping, it is to be flushed and cleaned for service. Pro- vide a complete water flushing and cleaning of the closed loop chilled and hot water systems as specified herein. Systems must be commissioned as clean and meet water treatment specifications. All chilled, and hot water piping and related equipment shall be thoroughly flushed out with pre- cleaning chemicals designed to remove deposits such as pipe dope, oils, loose rust, mill scale and other extraneous materials. Recommended dosages of pre-cleaner chemical products shall be fur- nished by water treatment supplier, added and circulated throughout the water systems. The water system shall then be diluted and final flushed thoroughly until no foreign matter is observed and total alkalinity of the water is equal to or better that that of the make-up water.

3. All temporary connections required for flushing, cleaning, purging, and circulating shall be included. Provide suitable pipe bypasses at each coil and heat exchanger during the flushing and cleaning operation.

4. Self-contained flush unit requirements will contain a pump or pumps connected that will meet or ex- ceed the volume required to flush and purge the system at the required velocity rate through the largest pipe. Pump curve will be submitted along with other important documentation for the related equipment on the unit. This will include, at minimum, filtration, flow meter(s), pressure gauges, and unit description or picture. All operators will comply with all safety regulations of the project site. The flushing operation will be manned continuously during the flushing process.

5. Acceptable Manufacturer:

   a. PurgeRite, a third-party flushing company, will be used for flushing and cleaning of the HVAC related piping. Contact: PurgeRite, - www.purgerite.com - sales@purgerite.com - 936-344- 6210

   b. Owner and Engineer approved equivalent. See alternate manufacturer substitution request requirements.

B. FLUSHING PROCEDURE GUIDELINES

1. Pre-Flush – Bypass loops should be installed in front of any strainers and control valves at all equipment components. Coordinate with PurgeRite for proper sizing and placement of bypasses and flush ports.

2. Install temporary strainer elements in front of pumps, tanks, solenoid valves, control valves, and oth- er equipment where permanent strainers are not indicated that are not bypassed. Keep these strainers in service until the equipment has been tested, then remove either entire strainer or strain- ing element only. Fit strainers with a line size blow-off valve. Strainers should be removed when a self-contained flush unit is used in conjunction with on board filtration.

3. Flush ports should be identified along with the type of high pressure hose or piping that will be used to connect to the system. The water source should be identified and must be adequate to fill and make up water in a timely manner to the system during the flush process. A water dump location should be identified which is usually the sanitary.

4. Clear Water Flush – Fill the piping system with clean potable water. The first flush is a clear- water flush intended to circulate water through the system and force loose debris to low point drains and flush cart filtration system. This flush should be at minimum velocity throughout the system of 5 - 7 feet/sec throughout. Filtration should be at minimum, 50 microns. This flush shall continue until the system water is comparable to the make-up water. Iron content should be under 2.0 ppm.

5. Cleaning & Passivation – The second flush cycle is a combined flushing cycle where cleaning and passivation chemicals are introduced into the system to clean the oils and treat the inside wall of the piping system. This process will be monitored by the chemical treatment company to meet the chem- ical specifications of the water. The cleaning velocity should be between 3 to [5] feet/sec throughout, and the circulation time will be based on the chemical testing, but will be at minimum, 24 hours.

6. Final Clear Water Flush – The system will be continuously flushed while discharging chemicals into the sanitary system as approved locally. As the existing treated water is being discharged, a fresh water make-up source will be utilized to ensure air is not introduced into the system. Continue to drain the system while adding domestic water to dilute the treated water. The chemical treatment company will monitor the outgoing water composition and compare the composition with the incom- ing water. Flush with fresh water until the conductivity is reduced to that of the make-up water and iron meets specifications. The final system water should be approved by the chemical treatment company. Filtration should be 5 microns.

7. Final Chemical Fill – Once the chemical treatment company has determined the system has been brought back to the correct composition, the chemical treatment company will inject the final chemi- cals into the system. Once the system is filled with the final chemicals it is important the water not be left stagnant.

8. Verify satisfactory completion of clean piping and a final flushing and chemical treatment report should be submitted by field personnel. The report should include at minimum, project name, date, location, parties involved, type of pipes treated, scope summary, flows, durations, and other relevant information.

9. Cleaning chemicals, procedure, water testing, reporting, and consultation must be provided by a qualified water treatment company specializing in this type of work.

END OF SECTION

SECTION 23 2913
MOTOR STARTERS AND CONTROLLERS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 SUBMITTALS

A. Provide submittals as outlined in Section 23 00 00 General Mechanical

PART 2 – PRODUCTS

2.01 MOTOR STARTERS

A. GENERAL: Provide an individual controller for each motor which does not have an integral control assembly such as a chiller and is not served from a motor control center. VAV air handling units shall have variable frequency drive controller specified in Section 23 29 23.

B. ENCLOSURES: Provide NEMA 1 for standard installations and NEMA 4X for installations outdoors and wet areas. Comply with Code requirements for other environments.

C. AUTOMATIC STARTERS: Each starter component shall be sized in accordance with NEMA Standards, unless specifically indicated otherwise on drawings. The minimum size starter shall be #1. Each unit shall be provided with a manual reset, adjustable electronic current sensing relay that protects for over-current, unbalanced current and phase loss. Provide for auxiliary contacts, including at least one spare NO set, required for interlock wiring. Provide individual 120 volt control transformers in each enclosure sized to operate coil and equipment related control and safety devices. Provide HOA switch and red LED running light. For small motors, provide the appropriate trip unit in the Size 1 starter.

D. NAMEPLATES: Identify each device with an engraved lamacoid nameplate (5/16" high letters) showing circuit number and load served. Attach with mastic and two screws.

E. FINISH: Standard.

F. ACCEPTABLE MANUFACTURERS: General Electric, Siemens and Square D

PART 3 – EXECUTION

3.01 INSTALLATION IS BY ELECTRICAL CONTRACTORS.

END OF SECTION

SECTION 23 2923
VARIABLE SPEED MOTOR CONTROLLERS

PART 1 – GENERAL

1.01 1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 SUBMITTALS

A. Provide submittals as outlined in Section 23 00 00 General HVAC

PART 2 – PRODUCTS

2.01 VARIABLE SPEED MOTOR CONTROLLER

A. GENERAL: Controller shall be a microprocessor controlled, adjustable frequency motor controller consisting of a sine-coded, pulse width modulated output inverter suitable for specified size and voltage motors listed on the Drawings. Unit shall be U. L. Listed as a complete package and comply with the applicable ANSI, IEEE and NEMA Standards as well as the National Electrical Code. Inverter shall be grounded and line, load, control and fire/safety wiring shall be installed in separate conduits.

B. FEATURES:

1. NEMA 12, wall mounted enclosures.

2. Panel mounted start-stop control as well as 0-10 VDC and 4-20 ma interface to standard energy management systems.

3. Field adjustable acceleration and deceleration times.

4. 0-67 Hz controlled speed range with adjustable maximum and minimum stops.

5. Safe shutdown and immediate restart after a power outage.

6. Two contactor style, three leg manual bypass contactors with H-O-A switch and lockable disconnect. Bypass section shall be in a separate enclosure from the inverter and circuited to allow operation with all power disconnected from the inverter section. Protective controls shall operate in both normal and by-pass modes.

7. Digital keypad entry of set points

8. Input (line) reactors and DC Bus filtered chokes matched to motor size to reduce harmonics emitted to electrical system and limit voltage spikes to motor and drive.

9. MOV's for transient voltage protection

10. Provide 115 volt control transformer to interface with vibration switches and other control devices.

11. Inherent power factor correction to .95.

12. 24 month warranty from date of substantial completion. Provide 24 hour/365 day telephone support via toll free telephone number.

C. PROTECTIVE CONTROLS (both automatic and bypass):

1. Overvoltage and undervoltage.

2. Ground fault.

3. Phase loss or failure.

D. STARTUP: A factory trained service technician shall startup and test each drive. Technician shall contact Engineer prior to startup to obtain special settings that may be required for primary pumps, cooling tower and other equipment. Provide a minimum of 4 hours of technical training provided by factory personnel for the owner's operating and technical staff.

E. SUBMITTALS: Provide complete information to confirm compliance. Also provide certified noise data showing that the drive does not exceed preferred "RC" as listed in 1995 ASHRAE HVAC Applications, Chapter 43 Sound and Vibration Control, Table 2 Criteria for Acceptable HVAC Noise in Unoccupied Rooms.

F. ACCEPTABLE MANUFACTURES: ABB

PART 3 – EXECUTION

3.01 INSTALLATION SHALL COMPLY WITH MANUFACTURER'S REQUIREMENTS AND INSTALLATION DETAILS ON THE DRAWINGS.

END OF SECTION

SECTION 23 3113
METAL HVAC DUCTS

PART 1 – GENERAL

1.01 1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

PART 2 – MATERIAL AND METHODS

2.01 DUCTWORK

A. Furnish and install all supply, return, exhaust, outside air and other ductwork shown, together with splitters, extractors, dampers, etc. All ductwork, supports, bracing, etc. shall be constructed of new grade, lock forming quality, G-60 or better galvanized steel sheets.

B. Dimensions of duct work shown on Drawings are inside air stream dimensions. Allowances have not been made for duct insulation.

C. Provide adjustable extractors with quadrant lock mechanism equal to Titus AG-45 at all supply outlet taps into trunk duct. Provide conical tap with damper and raised quadrant lock for flexible duct taps, reference detail on the Drawings. Provide adjustable round elbows (0-90°) at ceiling devices connected with flex ducts (not required if Flexmaster self supporting flex is installed).

D. Ductwork shall conform with current edition of SMACNA "Duct Manual and Sheet Metal Construction for Ventilating and Air Conditioning System" and the National Board of Fire Underwriters Pamphlet 90A, plus more stringent requirements of these Specifications. Adjust location of standing seams to clear structural members.

E. Duct connections to air handling units and fans shall match the outlet/inlet size, or as recommended by the equipment manufacture, including straight lengths of duct before transitions, to minimize system effect losses. Where duct adapters or damper trays are provided with roof fans, duct connections shall match size for a minimum of 36” before elbow or transistion.

F. All duct transitions shall be gradual with a 15° maximum angle as measured from centerline of duct. This includes angled offset, mitered offset, eccentric transition and concentric transition (2 x 15°).

G. Ductwork shall be constructed to operate at the pressure as specified under "external static pressure" of the associated air handling unit and fan schedule. Ductwork downstream of VAV boxes and fan coil unit shall be 1” static class ductwork. Ductwork operating at .75 to 2.0” shall

be 2.0” pressure rated. Primary ductwork from a variable air volume air handling unit shall be constructed in accordance with Section 2.2 Medium Pressure Ductwork.

H. Square turns shall be equipped with airfoil turning vanes built to SMACNA Standards. Provide radius turns for elbows less than 90°.

I. Support ductwork with 1" wide x 20 gage galvanized steel straps; 6'-0" maximum centers but not more than allowed by SMACNA. Connect strap to duct with two sheet metal screws on each side of duct and one on bottom. Exposed ducts shall be supported in a manner to provide a finished appearance.

J. Install duct braces in duct openings to hold shape of duct until grilles, registers and/or diffusers are installed. Then remove duct brace.

K. Seal all duct joints, adjustable elbows and spin-in taps with Elgen Duct Seal-it, Design Polymerics DP1010 or Hardcast IG601 Iron Grip installed full strength (no dilution). Ductwork subject to moisture and not required to be welded, shall be sealed with Benjamin Foster 3214. DP1020 may be used.

L. In areas noted to have round double wall ductwork, provide United McGill Acousti-K27. Outer duct shall be constructed of paintable, 18 gauge galvanized steel. Inner duct shall be perforated galvanized steel. Between the inner and outer ducts install 2” thick fiberglass insulation coated to inhibit growth of micro-biological organisms and to eliminate erosion of fibers.

M. The minimum distance between the air terminal box and the first tap shall be 54”. The minimum distance between taps on the same side of the duct shall be 54”.

N. Provide equivalent sized duct of different aspect ratio to accommodate ceiling cavity conditions.

O. Sheet metal contractor shall install control system and fire alarm system devices that are attached to ductwork. This includes control dampers, sensors and duct smoke detectors.

P. All ductwork shall be externally insulated per the Specifications. All turning vanes shall be heavy gage, double thickness type.

2.02 MEDIUM PRESSURE DUCTWORK

A. Furnish and install medium pressure round and oval ducts as indicated on the Drawings, connecting air handling units to fan powered boxes. All ducts shall be sized as indicated on the Drawings, and properly supported and hung from the building structure by trapeze hangers. The minimum size hanger rod shall be 3/8”.

B. Medium pressure round or oval duct shall be spiral lock seam duct as manufactured by Gowco, Graco or United Sheet Metal with matching factory made fittings and couplings. All transitions shall be gradual with 15° maximum angle with centerline of the duct. All joints and fittings shall be spot-welded and sealed. Gauges of round medium pressure ducts shall be as follows:

1. 3” thru 8” 26 gauge
2. 9” thru 22” 24 gauge
3. 24” thru 36” 22 gauge
4. 38” thru 50” 20 gauge
5. 52” thru 60” 18 gauge
6. Fittings and couplings thru 36” shall be 22 gauge, 38” thru 60” shall be 20 gauge.
7. Gauges of flat oval spiral ducts shall be 22 gauge up to 48” major axis and 20 gauge from 49” thru 74” major axis. Fittings shall be 20 gauge up to 36” major axis, 18 gauge for 37” thru 50” and 16 gauge for 51” and larger major axis. Centerline radius of elbows shall be 1½ duct diameters. Provide conical take-off’s where possible.

C. All square to round/oval transitions at air handling unit discharges shall be 18 gauge galvanized steel with all welded connections, and shall have flanged rectangular connection.

D. All joints in ducts and fittings shall be sealed with United Sheet Metal High Pressure Unigrip duct sealer or Benjamin Foster No. 3214. DP1020 may be used.

E. Connections to fan powered boxes from main duct to box extension shall be made with a two foot length of straight flexible connecting duct. This flexible duct shall be Flexible Tubing Corporation Thermaflex, insulated Type M-KC, U. L. approved, or equivalence product of Atco and Peppertree Air Solutions. Provide a hard, straight section of round duct at VAV box connections with length 1½ times duct diameter. Connect inner liner to spin-in, VAV box, round rigid duct or air device with stainless steel, adjustable bands (hose clamps), or plenum rated panduit strap. Secure outer cover with nylon wire tie strap.

F. Duct work supports shall consist of unistrut with 3/8” thick or heavier all thread rods attached to structure. Provide double nuts and cut all tread so no more than 1” extends beyond nut.

2.03 KITCHEN HOOD EXHAUST DUCTWORK

A. GENERAL: Make connections to all hoods and extend ductwork to exhaust blowers. Securely fasten and support ducts at every change of direction. Supports or fasteners shall not penetrate any duct or plenum. Systems shall be installed to maintain not less than 1500 feet (45720 cm) per minute velocity. Discharge air outlets shall be at least 40" above roof and at least 24" above any intake opening with 10 feet (304.8 cm).

B. DUCT CONSTRUCTION: Install ductwork without forming dips or traps and slope not less than 1" per foot downward toward hood. Provide cleanout openings at each change in direction. Cleanout openings shall be equipped with tight fitting doors, same thickness as duct, equipped with latching to make grease tight. Doors shall be operable and removable without the use of a tool.

C. COOKING HOOD EXHAUST DUCT: Black steel, minimum 16 gage, with grease tight, continuous external welded joints.

D. DISHWASHER HOOD EXHAUST DUCT: 18 gauge, Type 316L stainless steel, watertight construction with continuous external welded joints.

2.04 DUCTWORK FOR OUTSIDE AIR HOODS AND FANS

A. Where hoods or fans are shown open to mechanical room, shop, etc., provide short length of duct to allow installation of OBD and/or motorized control damper. Duct dimension shall be roof curb opening size or larger if required by damper size.

2.05 PLENUMS AND BLANK-OFF PLATES

A. Provide plenums at louvers, air handling units, fan coil units and other equipment where return air or outside air ducts are shown to connect. Provide plenums for the mounting fans to louvers. Provide full or partial blank-off plates on return air openings as necessary for properly balancing of system supply air, outside air and return air flows or to cover openings where air transfer is not desired.

B. Construct plenums with galvanized steel framing members and galvanized sheet steel, cross broken or rigidly braced with galvanized angles. Gages and bracing shall conform to SMACNA recommendations for ductwork of like size. Openings for fans, access doors, etc., shall be framed with galvanized steel angles.

C. Where access doors are shown, provide hinged doors with #202 Ventlok latch.

2.06 DRYER EXHAUST DUCTWORK

A. Snap lock, round galvanized sheetmetal with taped, slip-fit joints. Eliminate edges and sheetmetal screws that could catch lint.

B. Install flexible connections of fire resistant material with spiral inner liner wire, stainless steel clamps between unit and exhaust duct.

C. Roof discharge cap shall have baffled outlet, without bird screen similar to Penn Pul-Air.

2.07 SHEET METAL SHOP DRAWINGS

A. Prior to fabrication of any sheet metal, submit Shop Drawings for all ductwork, showing coordination of mechanical, electrical, plumbing and structural components. All crafts shall sign off on final drawings. The shop drawing shall include a construction details booklet (multiple copies), one blueline set of drawings and one reproducible set of drawings. The booklets and reproducible set with comments noted will be returned. Contractor shall provide blueline sets of drawings from the reproducible set for distribution to Owner, Architect and others.

2.08 SCREENS

A. Furnish and install screen on all duct, fan, etc., openings which lead to or are outdoors. Screens shall be No. 16 gage, galvanized steel 1/2" mesh bolted into removable galvanized steel frame. Install screens over return air openings between floors.

2.09 CONNECTIONS TO LOUVERS

A. All connections to louvers shall be in a manner that will be watertight. Ductwork behind louver for a minimum of three feet shall have watertight soldered joints and shall be sloped to weep holes in bottom of louver. Duct shall be lapped over bottom louver blade where possible. Make connections to aluminum louvers with dielectric connections.

2.10 METAL CLOSURES

A. Provide metal closures around all openings in floors or walls through which ducts or piping are passing.

B. Build 3" high by 3" wide concrete "dam" around duct or return air penetrations of mechanical room floors above grade. Floor return air openings without sound attenuator attached shall be covered with 1" x 1/8" welded steel bar grating supported by 2" x 2" x 1/4" angles attached to slab with 3/4" round drilled anchors, 24" on center.

C. MATERIALS:

1. Where no fire rating required, and where no fire dampers installed: 18 gage galvanized sheet metal.

2. Where fire rating required or where fire damper is installed: Gage of sleeves shall be as required by the conditions of U. L. listing, but not less than the gage of duct. Minimum 18 gage. Install 1½" x 1½" x 1/8" angles around duct on both sides of wall or floor penetration.

3. Sleeves for floor pipe penetrations above grade shall be a section of Schedule 40 steel pipe extending 3" above finished floor and sealed watertight.

2.11 SADDLES

A. Provide sheet metal protective saddles at all pipe supports for insulated piping. Refer to Insulation Section.

2.12 DRAIN PANS

A. GENERAL: Provide drain pan under fan coil units, air handling units, water heaters and other equipment subject to water leakage not mounted on concrete floor in mechanical room.

B. CONSTRUCTION: 16 gauge galvanized steel suitably stiffened, with minimum 2" perimeter lip and all joints soldered watertight. Pans to have ball valve and threaded end to fit garden hose for ease of emptying. Provide connection and overflow drain to suitable location.

2.13 INSTALLATION OF DUCTWORK AND AIR DEVICES

A. Prior to all work of this section, Carefully inspect the installed work of all other trades and verify that all such work is complete to the point where fabrication and installation of the work of this section may properly commence.

B. Verify the location of all ducts, structure, piping and equipment. Coordinate the routing of all work with that of other trades prior to installation. Verify that all ductwork will fit spaces indicated prior to fabrication or installation of any ductwork.

C. Exact location of all registers, grilles or ceiling outlets shall be verified by the Architect before roughing-in. Reference shall be made to reflected ceiling plan in locating ceiling outlets.

D. Ducts shall be installed in a neat and workmanlike manner.

2.14 TESTING AND INSPECTIONS

A. MEDIUM PRESSURE DUCTWORK

1. Completed duct system (taps and access panels installed) shall be tested at 5” water column at which pressure leakage shall not exceed 3/4 of 1% of the total designed CFM for the individual duct system being tested.

B. LOW PRESSURE DUCTWORK

1. For all low pressure constant volume air systems, not including outside air ductwork, that are not down stream of a VAV or fan powered box. Pressure test the ductwork prior to installation of taps. Ductwork leakage to 1% leakage max of the total designed CFM for the individual duct system being tested.

2. All outside air ductwork to be tested. Ductwork leakage not to exceed 1% of the total designed CFM for the individual duct system being tested.

3. All other low pressure ductwork to be visually inspected for

C. All duct leakage tests shall be performed by mechanical contractor and witnessed by TAB, Cx, Owner and Arch/MEP Engineer. The duct leakage machine will require calibration certification. Pretesting by mechanical contractor will be required prior to scheduling the final test. Failed tests due to mechanical contractor negligence will be charged a return trip by the TAB (daily rate).Commissioning agent to be in attendance for all testing.

2.15 ADJUSTMENTS AND CORRECTIONS

A. Balance all systems of ductwork including exhaust systems to obtain the air quantities indicated for each inlet and outlet. Air quantities shall be further adjusted as required to obtain uniform temperatures in the spaces.

END OF SECTION

SECTION 23 3300
AIR DUCT ACCESSORIES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 SUBMITTALS

A. Provide submittals as outlined in Section 23 00 00 General HVAC

PART 2 – PRODUCTS

2.01 DAMPERS

A. GENERAL: Provide dampers where shown on Drawings and wherever necessary for complete control of air flow, including all supply and outside air ducts. Provide multi-blade volume dampers in all zone ducts at multi-zone air handling units. Where access to dampers through a suspended ceiling is necessary, coordinate the proper location of the access doors. Install, mount and connect into ductwork all control dampers furnished under the control contractors supervision.

B. SPLITTER DAMPERS: Shall be constructed of single thickness, 16 gauge galvanized steel, hinged at leaving edge and founded at entering edge, securely riveted or welded to a square operating rod. The length of the splitter damper blade shall be 1½ times the width of the split in the main duct, but not less than 12".

C. VOLUME DAMPERS: Factory constructed of 16 gage galvanized steel for frame and blades. Blades shall not exceed 48" in length or 6" in width, and shall be of the opposed interlocking type. The blades shall be supported on 1/2" diameter rust-proofed axles. Axle bearings shall be self-lubricating ferrule type.

D. FLEX TAP CONNECTIONS: Taps on rectangular low pressure ducts for flexible connections to diffusers, etc shall be 22 gauge, round conical taps with adjustable single blade damper. Damper rod shall be continuous though tap with blade mechanically attached. Provide bearings at each end, and quadrant lock operator with wingnut and 2” standoff bracket for insulation. Refer to detail on the drawings for additional construction details.

E. DAMPER ADJUSTING DEVICES: Each splitter or volume damper shall be fitted with an adjusting device extending beyond external duct insulation.

1. ACCESSIBLE CEILINGS: DuroDyne UESO with 2" standoff and locking wingnut/bolt assembly with teflon end bearing attached directly to duct and location marked in ceiling as approved.

2. NON-ACCESSIBLE CEILING: Dampers to be placed in accessible location in accessible drop ceiling.

2.02 FIRE DAMPERS

A. Install fire dampers in all duct penetrations and return air openings in fire rated walls, ceilings, floors and chases. Provide fire damper at each sidewall register or grille. Provide additional fire dampers where specified by local building codes and also where shown on drawings.

B. Construction shall conform to requirements of NFPA Pamphlet No. 90A with recommended steel sleeves, fusible links, spring catches, non-corrosive bearings, etc., and shall be U. L. labeled.

C. Fire dampers shall be shutter type providing minimum restriction to air flow. Provide Type B for ducts passing through walls. Provide thinline Type A dampers at sidewall registers. Provide Type B (or Type A of equal free area) dampers at wall openings. Select damper thickness to fit within the thickness of the wall with OBD's or other specified devices. Dampers located in medium pressure ducts shall be compatible with this construction including the specified maximum leakage rate. Install dampers in accordance with conditions of their U. L. listing.

D. Air devices in U. L. fire rated ceilings shall have compatible U. L. classified ceiling dampers with volume adjustment mechanism and extension collar equal to Ruskin CFD-A. Install complete system including thermal blanket on back of air device in accordance with the U. L. listing.

E. Acceptable Manufacturers: Greenheck, Nailor, Pottoroff, Ruskin and Safe-Air

2.03 SMOKE DAMPERS

A. Dampers shall be 1½ hour fire rated under U. L. Standard 555S. Dampers shall be normally closed with a leakage rate of no more than 10 CFM per square foot at 1" static pressure (Class II). Provide duct sleeve. Damper blades shall be airfoil type for low pressure drop and low noise when in the open position.

B. Damper operator shall respond to remote signals to open and close, and shall fail in the closed position. Damper operator shall be 120 volts unless noted otherwise. Provide micro-switches to signal full open and full closed positions.

C. Dampers noted to be combination smoke and fire shall have fusible link assembly to close damper on elevated temperature.

D. Smoke dampers shall be Nailor Model 1211. Combination dampers shall be Nailor Model 1221.

E. Acceptable Manufacturers: Greenheck, Nailor, Pottoroff, Ruskin and Safe-Air

2.04 ACCESS DOORS TO FIRE AND SMOKE DAMPERS

A. Provide double wall galvanized steel, insulated access door in duct for inspection and service to fire damper and fusible link. Minimum size shall be 16"x16" with four cam latches unless limited by duct size. Access doors in stainless steel ducts shall be constructed of stainless steel.

B. Construct access door airtight and conform to recommendations of NFPA and SMACNA.

C. Opening of access panel shall be within 12” of the damper to allow resetting of the actuator.

2.05 FLEXIBLE DUCT

A. Flexible duct shall be U. L. Listed 181 Class I air duct with CPE inner liner, fiberglass insulation with a C=.23, bi-directional reinforced metalized vapor barrier outer jacket and 6" w.c. pressure rating. The insulating value shall be meet the International Energy Code, minimum R=6. The maximum length between duct and air device shall be six feet. The maximum length between duct and single or double duct mixing box shall be three feet. Atco, Flexmaster, Peppertree, and Thermaflex. Connect inner liner to duct tap, air terminal box, round rigid duct or air device with stainless steel or plenum rated Panduit adjustable bands (hose clamps). Secure outer cover with nylon wire tie strap. Tape edges of outer cover to adjacent insulation or duct with FSK foil tape to present a finished appearance.

2.06 FLEXIBLE CONNECTIONS BETWEEN AHU, CVT BOX OR FAN AND DUCTWORK

A. Flexible connections shall be made from neoprene coated, woven glass fiber material, 30 ounce per square yard, installed air tight with at least 1" slack to insure that no vibration is transmitted from fan to ductwork. Air handling units with fans that are internally isolated from the housing do not require flexible connections.

2.07 ACOUSTICAL LINER

A. GENERAL: Provide 1" thick acoustical lining in return air ducts and return air plenums. Do not install in any supply air duct or kitchen return air duct.

B. MATERIAL: Owens-Corning "Aeroflex Duct Liner" or equivalent by CertainTeed; 1½ pound per cubic foot density, neoprene faced, "K" value not more than .27 at 75° F mean temperature difference.

C. INSTALLATION: Adhere liner, with coated side toward air stream, to all interior sides of duct with 100% coverage of Foster 85-11. Further secure the liner with mechanical fasteners on maximum 12" centers. All edges and fasteners shall be coated with one brush coat of Foster 30-35.

D. PLENUMS: Plenum interiors exposed to view through louvers and grilles shall be lined and have pins painted flat black.

PART 3 – EXECUTION

3.01 INSTALLATION SHALL COMPLY WITH MANUFACTURER'S REQUIREMENTS AND INSTALLATION DETAILS ON THE DRAWINGS.

3.02 INSTALL BACKDRAFT AND CONTROL DAMPERS AT INLET OF EXHAUST FANS OR EXHAUST DUCTS AS CLOSE AS POSSIBLE TO EXHAUST FAN UNLESS OTHERWISE INDICATED.

3.03 INSTALL DUCT ACCESS DOORS ON SIDES OF DUCTS TO ALLOW FOR INSPECTING, ADJUSTING, AND MAINTAINING ACCESSORIES AND EQUIPMENT AT THE FOLLOWING LOCATIONS:

A. At all fire/smoke dampers.

END OF SECTION

SECTION 23 3319
AIR DUCT SILENCERS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 SUBMITTALS

A. Provide submittals as outlined in Section 23 00 00 General HVAC

PART 2 – PRODUCTS

2.01 SOUND ATTENUATORS

A. GENERAL: Basis of specification is the United McGill Type UTLER. Unit shall consist of 22 gage, galvanized steel outer shell with 24 gage galvanized steel, die stamped internal passages. Acoustical filler shall be fiberglass compressed to 4.5 pcf density enclosed in an erosion resistant polymer bag.

B. ATTENUATION: Sound attenuation shall be within 5% of that listed below at 1000 FPM face velocity:

1. Octave Band 2 3 4 5 6 7 8
2. 36" long insertion loss, dB 4 5 7 12 14 14 11
3. 60" long insertion loss, dB 8 8 12 20 22 21 16
4. 84" long insertion loss, dB 11 15 21 30 32 27 19

C. PRESSURE DROP: Silencer design must limit pressure drop to.1" w.g. based on 1000 feet (30480 cm) per minute face velocity.

D. INSTALLATION: Attenuators shall be installed in galvanized sheet metal wall sleeve and sealed with duct sealant to prevent air leakage.

E. ACCEPTABLE MANUFACTURERS: AeroSonics, Anemostat, Buensod, Commercial Acoustics, IAC, Koppers, Price, Rink, Ruskin, Dynasonics , United McGill and Vibro-Acoustics.

PART 3 – EXECUTION

3.01 INSTALLATION SHALL COMPLY WITH MANUFACTURER'S REQUIREMENTS AND INSTALLATION DETAILS ON THE DRAWINGS.

3.02 PROVIDE DETAILED CAD DRAWINGS OF EQUIPMENT TO THE MECHANICAL CONTRACTOR SO HE CAN PROVIDE THE SHEETMETAL CONTRACTOR WITH THIS INFORMATION TO BE INCLUDED IN THE SHEETMETAL DRAWINGS.

END OF SECTION

SECTION 23 3410
HIGH VOLUME LOW SPEED FANS (HVLS)

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes

1. The ceiling-mounted circulation fan is the model scheduled with the capacities indicated. The fan shall be furnished with standard mounting hardware and variable speed control to provide cooling and destratification.

B. Summary of Work

1. Installation of the fan, miscellaneous or structural metal work (if required), field electrical wiring, cable, conduit, fuses and disconnect switches, other than those addressed in the installation scope of work, shall be provided by others. F actory installation services are available through Big Ass Fans. Consult the appropriate installation scope of work for information on the available factory installation options, overview of customer and installer responsibilities, and details on installation site requirements.

1.02 REFERENCE STANDARDS

A. ISO 9001 - Quality Management Systems — Requirements; 2015, with Amendment (2024).

B. NFPA 13 - Standard for the Installation of Sprinkler Systems; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

D. NFPA 72 - National Fire Alarm and Signaling Code; Most Recent Edition Cited by Referring Code or Reference Standard.

1.03 RELATED SECTIONS

A. 21 00 00 Fire Suppression

B. 23 00 00 Heating, Ventilating, and Air Conditioning (HVAC)

C. 26 00 00 Electrical

1.04 REFERENCES

A. National Fire Protection Association (NFPA)

B. Underwriters Laboratories (UL)

C. Canadian Standards Association (CSA)

D. National Electrical Code (NEC)

E. International Organization for Standardization (ISO)

F. Air Movement and Control Association Inc. (AMCA)

1. AMCA Publication 211-13 - Certified Ratings Program - Product Rating Manual for Fan Air Performance

2. AMCA 230-15 - Standard Laboratory Methods of Testing Air Circulating Fans for Rating and Certification

G. American National Standards Institute (ANSI)

H. Nationally Recognized Testing Laboratory (NRTL)

I. European Community (CE)

J. UK Conformity Assessed (UKCA)

1.05 SUBMITTALS

A. Shop Drawings: Drawings detailing product dimensions, weight, and attachment methods

B. Product Data: Specification sheets on the ceiling-mounted fan, specifying electrical and installation requirements, features and benefits, and controller information

C. Revit Files: Files provided for architectural design

D. IES Files (fans with optional light kit)

E. Installation Guide: The manufacturer shall furnish a copy of all operating and maintenance instructions for the fan. All information is subject to change without notice.

F. Schedule

G. Provide manufacturer's certification that high volume, low speed fans are licensed to bear the Air Movement and Control Association (AMCA) Certified Rating Seal for Circulating Fan Performance.

1.06 QUALITY ASSURANCE

A. Certifications

1. The fan assembly, as a system (without light kit), shall be Nationally Recognized Testing Laboratory (NRTL)-certified and built pursuant to the guidelines set forth by UL standard 507 and CSA standards 22.2 No. 60335-1 and 22.2 No. 113.

2. The fan assembly, as a system (without light kit), shall be CE- and UKCA-compliant.

3. The fan (without light kit) shall be compliant with NFPA 13—Standard for the Installation of Sprinkler Systems, NFPA 72—National Fire Alarm and Signaling Code, and NFPA 70—NEC.

4. Controllers shall comply with NEC and UL standards and shall be labeled where required by code.

5. The optional LED light kit shall be compliant with UL standard 1598 and CSA standard 22.2 No. 250.

6. Performance ratings (airflow and power) shall conform to AMCA standard 211. Fans must be tested in accordance with ANSI/AMCA Standard 230-15 in an AMCA accredited laboratory. Fans shall be certified to bear the AMCA Seal for Circulating Fan Performance.

B. Manufacturer Qualifications

1. The fan and any accessories shall be supplied by Big Ass Fans that has a minimum of twenty (20) years of product experience.

2. ISO 9001 compliant

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver product in original, undamaged packaging with identification labels intact. The fan shall be new, free from defects, and factory tested.

B. The fan and its components shall be stored in a safe, dry location until installation.

1.08 WARRANTY

A. The manufacturer shall replace any products or components defective in material or workmanship for the customer free of charge (including transportation charges within the USA, FOB Lexington, KY), pursuant to the complete terms and conditions of the Big Ass Fans Warranty in accordance to the following schedule:

Mechanical†	10 years

Electrical††	5 years (no factory install†††); 10 years (factory install††††)
Labor	1 year

† "Mechanical" is defined as mechanical components of the fan, including, the gearbox, fan hub, motor frame, mounting, airfoils, and winglets.

†† "Electrical" is defined as electrical and electronic components of the fan, including the motor, motor drive, variable frequency drive, and any standard controller or accessories.

††† The No Factory Install Warranty Period defined above for "Electrical" applies to proper installations by any other state-qualified or licensed electrical contractor.

†††† The Factory Install Warranty Period defined above for "Electrical" requires installation to be purchased from Big Ass Fans and performed by a factory-approved, Big Ass Fans Certified Installer.

††††† All reasonable costs of repair or replacement will be paid or reimbursed provided customer obtains pre-approval.

†††††† The Warranty Period for light kits is limited to 1 year (parts).

††††††† The Warranty period for any manufacturer defects or flaws to surface finishes is limited to 1 year.

†††††††† All products are considered for indoor use only unless specifically specified on the product label.

††††††††† See the complete warranty for more details.

PART 2 PRODUCT

2.01 MANUFACTURER

A. Delta T LLC, dba Big Ass Fans, PO Box 11307, Lexington, Kentucky 40575. Phone (877) 244-3267. Fax (859) 233-0139. Website: www.bigassfans.com.

1. Essence model only

2.02 HIGH VOLUME, LOW SPEED FANS – BIG ASS FANS ESSENCE

A. Complete Unit

1. Regulatory Requirements: The entire fan assembly (without light kit) shall be NRTL-certified and built pursuant to the construction guidelines set forth by UL standard 507 and CSA standards 22.2 No. 60335-1 and 22.2 No. 113.

2. Sustainability Characteristics: The fan shall be designed to move an effective amount of air for cooling and destratification of conditioned commercial applications over an extended life. The fan components shall be designed specifically for high volume, low speed fans to ensure lower operational noise. Sound levels from the fan operating at maximum speed measured in a laboratory setting shall not exceed 40 dBA. Actual results of sound measurements in the field may vary due to sound reflective surfaces and environmental conditions.

3. Good workmanship shall be evident in all aspects of construction. Field balancing of the airfoils shall not be necessary.

4. High volume, low speed (HVLS) fans shall be licensed to bear the AMCA Certified Rating Seal for Circulating Fan Performance to ensure performance as cataloged in the field. Unlicensed HVLS fans shall not be accepted.

B. Controls

1. The fan controller shall be incorporated into the fan assembly and housed in an enclosure independent of the motor to prevent overheating or electrical interference. The fan controller shall be factory programmed to minimize starting and braking torques and shall be equipped with a simple diagnostic program and an LED light to identify and relay faults in the system.

C. Airfoil System

1. The fan shall be equipped with eight (8) high volume, low speed airfoils of precision extruded, anodized aluminum alloy. Each airfoil shall be of the high-performance Mini-Elipto design. The airfoils shall be connected to the hub and interlocked with eight (8) stainless steel retainers and two (2) sets of stainless steel bolts and lock washers per airfoil.

2. The fan shall be equipped with eight (8) upswept winglets designed to redirect outward airflow downward, thereby enhancing efficiency. The winglets shall be molded of high strength polymer and shall be attached at the tip of each airfoil with a stainless steel screw. The standard color of the winglets shall be silver or black.

3. As an option, the fan shall be equipped with eight (8) plug-style airfoil tips, molded of high strength polymer, in place of the eight (8) upswept winglets. The airfoil tips shall be attached at the tip of each airfoil with a stainless steel screw. The standard color of the airfoil tips shall be black.

D. Motor

1. The motor shall be a permanent magnet brushless motor rated for continuous operation at maximum speed with the capability of modulating the fan speed from 0–100% without the use of a gearbox or other mechanical means of control.

2. The motor shall operate from any voltage ranging from 100–120 VAC or 200–240 VAC, single phase, and 50/60Hz, without requiring adapters or customer selection. The motor shall be a non-ventilated, heat sink design with the capability of continuous operation in -4°F to 131°F (-20°C to 55°C) ambient condition.

3. The motor shall be rated IP43.

4. The standard color of the motor unit shall be white with silver trim or silver with black trim.

E. Mounting System

1. The fan mounting system shall be designed for quick and secure installation from a variety of structural supports. All components in the mounting system shall be of formed metal design using low-carbon steel no less than 3/16” (0.5 cm) thick and containing no critical welds. The mounting system shall be powder coated for appearance and resistance to corrosion. All mounting bolts shall be metric stainless steel or equivalent. No mounting hardware substitutions, including cast aluminum, are acceptable.

2. The fan extension tube shall be a round, extruded aluminum tube. The extension tube shall include a chrome plate with forward and reverse controls and a fan status indicator light that is visible from the floor.

F. Hub

1. The fan hub shall be constructed of zinc plated steel for high strength and durability. The hub shall be precision machined to achieve a well-balanced and solid rotating assembly.

G. Safety Cable

a. The fan shall be equipped with a safety cable that provides an additional means of securing the fan assembly to the building structure. The safety cable shall be Ø3/16” (0.5 cm) diameter and fabricated out of 7 x 19 stranded galvanized steel, pre-loaded and tested to 3,200 lbf (13,345 N).

b. Field construction of safety cables is not permitted.

H. Wall Control

1. Wired (standard). The fan shall be equipped with a low-voltage wired remote wall control providing control of all fan functions. The wall control shall be capable of mounting to a standard electrical box. The wall control shall include a rotary-style dial for controlling the fan’s power and speed and an LED light to identify and relay faults in the system. Communication with the fan drive and controller shall be by a standard, commercially available CAT5 (or higher) Ethernet cable that is field installed and provided by the installer.

2. Wireless (optional). As an option, the fan shall be equipped with a battery-operated radio frequency (RF) remote wall control in place of the wired wall control. The wall control

shall include buttons for wirelessly controlling the fan's power and speed and for programming a preferred preset speed. The wall control shall be capable of functioning as a handheld remote control or can be mounted to a wall or other surface. Communication with the fan drive and controller shall be wireless.

I. Fire Control Panel Integration

1. Includes a 10–30 VDC pilot relay for seamless fire control panel integration. The pilot relay can be wired Normally Open or Normally Closed in the field.

J. Guy Wires

1. Guy wires shall be included for installations with extension tubes 4 ft (1.2 m) or longer to limit the potential for lateral movement.

PART 3 EXECUTION

3.01 PREPARATION

A. Fan location shall have a typical bar joist or existing I-beam structure from which to mount the fan. Additional mounting options may be available.

B. Mounting structure shall be able to support weight and operational torque of fan. Consult structural engineer if necessary.

C. Fan location shall be free from obstacles such as lights, cables, or other building components.

D. Check fan location for proper electrical requirements. Consult Installation Guide for appropriate circuit requirements.

E. Each fan requires dedicated branch circuit protection.

3.02 INSTALLATION

A. The fan shall be installed by a factory-certified installer according to the manufacturer's Installation Guide, which includes acceptable structural dimensions and proper sizing and placement of angle irons for bar joist applications. Big Ass Fans recommends consulting a structural engineer for installation methods outside the manufacturer's recommendation and a certification, in the form of a stamped print or letter, submitted prior to installation.

B. Minimum Distances

1. Airfoils shall be at least 10 ft (3.05 m) above the floor.

2. Installation area shall be free of obstructions such as lights, cables, sprinklers, or other building structures with the airfoils at least 2 ft (0.61 m) clear of all obstructions.

3. The structure the fan is attached to shall be capable of supporting a torque load of up to 40 ft·lb (54 N·m) of torque.

C. The fan shall not be located where it shall be continuously subjected to wind gusts or in close proximity to the outputs of HVAC systems or radiant heaters. Additional details are in the Big Ass Fans Installation Manual.

D. The fan is suitable for use in wet locations when installed on a GFCI protected branch circuit.

E. The optional LED light kit shall be installed on a separate circuit from the fan and shall be connected to the lighting grid control, not the fan control.

F. In buildings equipped with sprinklers, including ESFR sprinklers, fan installation shall comply with all of the following:

1. The maximum fan diameter shall be 24 ft (7.3 m).

2. The HVLS fan shall be centered approximately between four adjacent sprinklers.

3. The vertical clearance from the HVLS fan to the sprinkler deflector shall be a minimum of 3 ft (0.9 m).

4. All HVLS fans shall be interlocked to shut down immediately upon receiving a waterflow signal from the alarm system in accordance with the requirements of NFPA 72—National Fire Alarm and Signaling Code.

END OF SECTION

SECTION 23 3416
HVAC FANS

PART 1 – GENERAL

1.01 REFERENCE STANDARDS

A. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; 2024.

1.02 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.03 SUBMITTALS

A. Provide submittals as outlined in Section 23 00 00 General HVAC

PART 2 – PRODUCTS

2.01 ROOF FANS AND VENTS

A. GENERAL: Furnish and install as indicated and scheduled on the plans. Capacities and sizes shown are the minimum required. Fans shall bear the AMCA seal of certified ratings for air and sound performance. Fans and their accessories shall be a prewired assembly from the factory for single point connection by the electrical subcontractor. Fans for fume hoods and prep rooms shall have acid resistant coating and explosion-proof construction, see Plan Schedule.

B. DESIGN: Fans shall be low silhouette type with removable top for easy access. Housings shall be constructed of heavy gauge aluminum. Kitchen fans shall have grease trough, discharge air vertically from a minimum of 40 inches (1016 mm) above roof and be mounted on 18" high curb per NFPA 96, and shall be U. L. 762 Listed up to 400□ F. Power assemblies shall be completely removable as a unit for ease of service.

C. DRIVE: Direct drive only unless dictated otherwise in fan schedule. Belt drive (when noted on schedule) shall include heavy cast iron sheaves, adjustable drive sheave and adjustable motor plate. Centrifugal fans shall have motor out of the air stream, cooled by outside air.

D. FAN: Centrifugal fans shall have aluminum, backward curved, non-overloading wheel. Propeller fans shall be of heavy aluminum construction with a minimum of five blades set in a smooth venturi orifice.

E. ROOF CURBS: Mount on insulated, welded prefabricated aluminum roof curb (galvanized steel if on steel decking) with integral cant strip. Curbs shall be designed to mount fan level on sloped roof and be compatible with roof construction specified under the Architectural Sections of the Specifications. Provide duct adapter matched to supply air fans selected. Securely attach fans and hoods to curb with two bolts on each side. Bolt curb to structure.

F. KITCHEN HOOD FANS: Fans shown to have both a supply and exhaust fan mounted on a common curb shall have separate electrical connections and associated disconnect switches for each fan. Starters will be remote mounted and are not a part of the fan assembly. Outside air intake duct shall be sufficiently long to provide 10 feet (304.8 cm) separation between exhaust and intake even if installed perpendicular to rather than inline with the fan curb.

G. ACCESSORIES: All fans shall have built-in thermal overloads, disconnect switch and bird screen. Backdraft dampers shall be aluminum construction with nylon bushings. Provide additional accessories as noted on the Drawings.

H. HOODS: Provide roof intakes and relief hoods of similar construction, features and installation as fans.

I. ACCEPTABLE MANUFACTURERS: Acme, Cook, Greenheck, Penn Barry and Twin City

PART 3 – EXECUTION

3.01 INSTALLATION SHALL COMPLY WITH MANUFACTURER'S REQUIREMENTS AND INSTALLATION DETAILS ON THE DRAWINGS.

END OF SECTION

SECTION 23 3513
SHOP DUST COLLECTION AND EXHAUST SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

B. Refer to Section 23 05 13 for motor requirements.

1.02 SUBMITTALS

A. Provide submittals as outlined in Section 23 00 00 General HVAC

PART 2 - PRODUCTS

2.01 DUST COLLECTION SYSTEM

A. GENERAL

1. Provide a collection duct system conforming to the layout and notes appearing on the Drawings. All ducts are located at the roof joists or ceiling with vertical drops to equipment unless shown to be in floor trench. the drawings show tentative locations and arrangement of shop equipment and branch ducts. Exact locations shall be determined by the Owner and on the job, and may vary somewhat from those shown on the Drawings without additional cost to the Owner. Provide final connection to equipment with flexible duct.

B. DUST COLLECTOR

1. The unit shall also include a funnel bottom for dust disposal. Overall construction shall be of Hot Rolled Steel with polyester powder coat paint on the interior and exterior for maximum corrosion resistance. Air inlets shall be on the back of the funnel section opposite the doors and the air outlet shall be on top of the unit with horizontal flow through the fan outlet. Integral lifting lugs shall be included for placement of the equipment. Dust collector provided with explosion vents on opposite side of full height doors.

2. A fan outlet silencer and transition piece shall be provided for sound attenuation. Silence and transition are shipped separate from field installation. They are designed to be

structurally supported by others. The transition is painted to match the unit. The silencer will be galvanized material and will not be painted.

3. The unit shall be started by a factory installed and wired starter, NEMA 4X.

C. FAN & MOTOR

1. Shall be direct drive, backwardly inclined for non-overloading operation with scroll for maximum efficiency. The fan-motor assembly shall be dynamically balanced for smooth vibration free operation. Motor shall be 3600-rpm TEFC construction. Refer to 23 05 13 for motor specification. A fan outlet silencer and transition piece shall be provided for sound attenuation.

D. FUNNEL BOTTOM

1. Units shall be designed with a steep 60-degree funnel terminating in a 14” diameter drum connection device without gates or doors to permit immediate downflow of dislodged dust into the dust disposal container. The unit shall be designed to accommodate two standard 55-gallon drums with two spare drums with quick opening, positive locking barrel top adaptors to prevent air or dust leakage.

E. CONTROL

1. A remote NEMA 1 start/stop pushbutton station shall ship separate for field installation.

2. Provide a push button station with start, E-stop and 2-position selector switch (automatic/ manual). Unit will pause for approximately 70 seconds then clean for 35 seconds.

F. CAPACITY

1. Refer to drawings.

G. SHIPPING & HANDLING

1. The collector shall be shipped as a cartridge section, fan, and knocked down hopper assembly for ease of handling. Each major subassembly shall be plastic wrapped and banded to a skid for protection and shipping. The fan and silencer/transition will ship loose for field installation.

H. APPROVED MANUFACTURER

1. UAS CYCLONE or DONALDSON TORIT CYCLONE

PART 3 - EXECUTION

3.01 INSTALLATION SHALL COMPLY WITH MANUFACTURER'S REQUIREMENTS AND INSTALLATION DETAILS ON THE DRAWINGS. WHEN INSTALLED THE UNIT SHALL OCCUPY FLOOR AREA NO GREATER THAN 15 SQ. FT.

END OF SECTION

SECTION 23 3600
AIR TERMINAL UNITS

PART 1 – GENERAL

1.01 REFERENCE STANDARDS

A. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2024.

B. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; Current Edition, Including All Revisions.

1.02 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.03 SUBMITTALS

A. Provide submittals as outlined in Section 23 00 00 General Mechanical

PART 2 – PRODUCTS

2.01 VARIABLE AIR VOLUME BOX

A. Box shall be a pressure independent, single input box and built-in sound attenuator. Maximum casing leakage shall be 2 percent at 3” inlet pressure.

B. Input connection shall be round or oval stub connections for flexible ducts. Outlet connections shall have S and Drive connection for sheet metal duct connection.

C. Input shall be electronic operated. Damper shall position damper to normally open. Damper operator, control cards and transformers shall be provided by controls supplier, installed by box manufacturer. Controller shall maintain scheduled air flow within 5 percent, with static pressure variation between .5” to 2.0” w.g.

D. Boxes shall have the schedule air flow at a maximum of .5" static pressure differential and an NC rating of 25 or less.

E. Air flow sensor shall be an aluminum, multi-point cross flow center averaging sensor with external taps for air flow readings with corresponding chart/label mounted on the box.

F. The assembly casing shall be constructed of 20 gage galvanized steel, internally lined with a minimum of 3/4", 1½ pound density fiberglass insulation meeting NFPA 90A requirements and

UL 181 erosion requirements. Attenuator section shall have 2” thick insulation. Airstream Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1

G. Damper blades shall be extruded aluminum or 20 gauge galvanized steel keyed to shaft and have a maximum leakage of 2% at 3" static pressure.

H. Hot water heating coil shall be minimum two row, copper tube, aluminum fin construction.

I. ACCEPTABLE MANUFACTURERS: Krueger, Metalaire, Nailor, Price and Titus

2.02 DOUBLE DUCT MIXING BOX

A. Mixing box shall be a pressure independent, dual input box with mixing chamber with multiple deflection baffles and built-in sound attenuator. Maximum casing leakage shall be 2 percent at 3” inlet pressure.

B. Input connections shall be round or oval stub connections for flexible ducts. Outlet connections shall have S and Drive connection for sheet metal duct connection.

C. Each input shall be electronic operated and programmable for sequencing and mixing of air flows. Damper shall position damper to normally open. Damper operators, control cards and transformers shall be provided by controls supplier, installed by box manufacturer. Controller shall maintain scheduled air flow within 5 percent, with static pressure variation between .5” to 2.0” w.g.

D. Boxes shall have the schedule air flow at a maximum of .5" static pressure differential and an NC rating of 25 or less.

E. Air flow sensor shall be an aluminum, multi-point cross flow center averaging sensor with external taps for air flow readings with corresponding chart/label mounted on the box. Install at inlets to the box.

F. The assembly casing shall be constructed of 20 gage galvanized steel, internally lined with a minimum of 3/4", 1½ pound density fiberglass insulation meeting NFPA 90A requirements and UL 181 erosion requirements. Attenuator section shall have a minimum of 3/4” thick insulation.

G. Damper blades shall be extruded aluminum or 20 gauge galvanized steel keyed to shaft and have a maximum leakage of 2% at 3" static pressure.

H. ACCEPTABLE MANUFACTURERS: Krueger, Metalaire, Nailor, Price and Titus

PART 3 – EXECUTION

3.01 INSTALLATION SHALL COMPLY WITH MANUFACTURER'S REQUIREMENTS AND INSTALLATION DETAILS ON THE DRAWINGS.

END OF SECTION

SECTION 23 3713
DIFFUSERS REGISTERS AND GRILLES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 SUBMITTALS

A. Provide submittals as outlined in Section 23 00 00 General Mechanical

PART 2 – PRODUCTS

2.01 AIR DEVICES

A. Furnish and install louvers, supply, return and exhaust registers, grilles and outlets shown on the Drawings.

B. All devices shall be all aluminum construction and shall have white finish. Aluminized type corrosion resistant steel with finish having a five year warranty against the formation of visible rust will also be acceptable. Devices in U. L. fire rated ceilings shall be of aluminized steel construction with white finish, suitable for U. L. classification.

C. All supply outlets to be provided with dampers for balancing:

1. All ceiling mounted supply outlets shall be equipped with manual volume dampers at tap off main ductwork.

2. All sidewall diffusers require manual volume damper installed in ductwork to diffuser. Factory provided damper is not acceptable and to be removed prior to installation.

D. The air distribution equipment supplier shall guarantee that each supply, return and exhaust device shall be of the proper design and size to pass the indicated quantity of air into or out of the space involved, with maximum diffusion and without objectionable noise, excessive friction or objectionable air movement at the occupied level.

E. Registers, grilles and outlets shall be of manufacture, type and capacity as shown on the schedule of the Drawings. Similar devices of other manufacture may be submitted for approval for those items for which a reasonable close substitute is available. Devices must be similar in appearance and their style must be acceptable to the Architect.

F. If devices other than those shown are proposed, the values for their face velocities, neck velocities and noise levels, DBA or NC, shall not exceed these values for the devices scheduled on the Drawings.

G. Ceiling outlets shall be of a type compatible with the ceiling in which they are installed and shall have removable core with overlapping cone design to prevent vertical downward projection of air.

H. Contractor shall check the Architectural Drawings and verify the type of ceiling shown in the various areas to determine the proper type of outlet for the ceiling used.

I. Air devices in U. L. fire rated ceilings shall have compatible U. L. classified ceiling dampers with volume adjustment mechanism and have U. L. approved fireproofing on device. Dampers connected to flexible ducts shall also have extension collar feature equal to Ruskin CFD-A. Sidewall registers shall have thinline fire damper. Fire proofing devices shall contain no friable or fibrous material in the air stream.

J. Provide insulation blanket for all diffusers.

K. ACCEPTABLE MANUFACTURERS: Krueger, Metalaire, Nailor, Price and Titus.

PART 3 – EXECUTION

3.01 INSTALLATION SHALL COMPLY WITH MANUFACTURER'S REQUIREMENTS AND INSTALLATION DETAILS ON THE DRAWINGS.

END OF SECTION

SECTION 23 4100
AIR HANDLING UNIT FILTERS

PART 1 – GENERAL

1.01 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; Current Edition.

1.02 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.03 SUBMITTALS

A. Provide submittals as outlined in Section 23 00 00 General HVAC

PART 2 – PRODUCTS

2.01 AIR FILTERS

A. GENERAL: Provide complete sets of air filters for all supply air handling equipment for use during construction. Protect filters during construction with an overlay of polyester filter media. Replace overlay filter media and filters during construction as necessary to protect coils. Install a set of new filters prior to Testing and Balancing of the system. Install a final set of new filters at Substantial Completion.

B. FILTER MEDIA: Farr Type 30-30 MERV 13 efficiency when tested according to ASHRAE 52.2., pleated, disposable type filter, 2" thick, suitable for face velocity up to 300 FPM with initial resistance not more than .12" w.g. at that velocity. Use .5" w.g. resistance in fan motor selection. Adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24). Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

PART 3 – EXECUTION

3.01 INSTALLATION SHALL COMPLY WITH MANUFACTURER'S REQUIREMENTS AND INSTALLATION DETAILS ON THE DRAWINGS.

A. Provide filters during construction period to maintain clean coils. Provide extra media filter over return air as necessary.

B. The district uses disposable filters provided by NCISD after job completion, NOT to be included in bid.

C. Clean filters shall be maintained through substantial completion by GC/Sub.

D. Contractor to ensure clean filters are in use at ALL times.

E. Contractor to provide and install a NEW set of filters for TAB to test equipment.

F. Resistance to air flow not to exceed 0.12" WG at 300 fpm.

G. If contractor fails to keep clean filters/media on units, contractor will be responsible for cleaning coils and inside of units.

H. Provide common size, angled, filter racks.

END OF SECTION

SECTION 23 5200
CONDENSING HIGH EFFICIENCY BOILER SYSTEM

PART 1 – GENERAL

1.01 REFERENCE STANDARDS

A. NFPA 54 - National Fuel Gas Code; 2024.

B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

1.03 SUMMARY

A. This section includes gas-fired, condensing cast-iron boilers and copper finned tube boilers for hydronic heating.

B. Related Sections include the following:

1. Section 23 09 23 for control wiring for automatic temperature control.

1.04 SUBMITTALS

A. Product Data: Include rated capacities; shipping, installed, and operating weights; furnished specialties; and accessories for each model indicated.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, required clearances, and method of field assembly, components, and location and size of each field connection.

1. Wiring Diagrams: Detail wiring for power, signal, and control systems and differentiate between manufacturer-installed and field-Installed wiring.

C. Source Quality Control Tests and Inspection Reports: Indicate and interpret test results for compliance with performance requirements before shipping.

D. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

E. Maintenance Data: Include in the maintenance manuals specified in Division 1. Include parts list, maintenance guide, and wiring diagrams for each boiler.

F. Refer to Section 23 00 00 for additional shop drawing requirements.

1.05 QUALITY ASSURANCE

A. Listing and Labeling: Provide electrically operated components specified in this Section that are listed and labeled.

1. The Terms "Listed" and "Labeled": As defined in NFPA 70, Article 100.

2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" as defined in OSHA Regulation 1910.7.

B. ASME Compliance: Boilers shall bear ASME "H" stamp and be National-Board listed.

C. FM Compliance: Control devices and control sequences according to requirements of FM.

D. IRI Compliance: Control devices and control sequences according to requirements of IRI.

E. Comply with NFPA 70 for electrical components and installation.

F. CSD-1

G. SCAQMD Rule 1146.2 for low NOx equipment.

1.06 COORDINATION

A. Coordinate size and location of concrete bases. Concrete, reinforcement, and formwork requirements are specified in Division 03 "Cast-in-Place Concrete".

1.07 WARRANTY

A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents. Manufacturer shall provide five year parts and labor warranty from the date of substantial completion.

B. Special Warranty: Submit a written warranty, executed by the contractor for the heat exchanger.

1. Warranty Period: Manufacturer's standard, but not less than 10 years from date of Substantial Completion on the heat exchanger. No less than 5 years on all other

components. Warranty shall cover all parts and labor and be non-prorated and not limited to thermal shock. Additional 21-year thermal shock warranty on heat exchanger.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Manufacturer shall be a company specializing in manufacturing the products specified in this section with minimum five (5) years experience. Subject to compliance with requirements, manufacturers offering boilers that may be incorporated into the Work include, but not limited to, the following:

B. Design: Boilers shall be CSA design certified as a condensing boiler. Boilers shall be stainless steel firetube designed for a minimum of 5:1 continuous turn down with constant CO2 over the turndown range. The boiler shall operate with natural gas or propane and have a CSA certified input rating as noted on the drawings, and a thermal efficiency rating of 98%. The boiler shall be symmetrically air-fuel coupled such that changes in combustion air flow or flue flows affect the BTUH input without affecting combustion quality. The boiler will automatically adjust input for altitude and temperature induced changes in air density. The boiler will use a proven pilot interrupted spark ignition system. Hot surface ignition will not be accepted. The boiler shall use a UL approved flame safeguard ignition control system using UV detection flame sensing. The UV detector shall be air cooled to prevent condensate formation and so designed as to prevent misalignment. The design shall provide for silent burner ignition and operation. The boiler shall be down fired counter flow such that formed condensate always moves toward a cooler zone to prevent re-evaporation. An aluminum corrosion resistant condensate drain designed to prevent pooling and accessible condensate trap shall be provided. Boiler shall be able to vent a horizontal distance of 80 equivalent feet.

C. Service Access: The boilers shall be provided with access covers for easily accessing all serviceable components. The boilers shall not be manufactured with large enclosures, which are difficult to remove and reinstall. All accesses must seal completely as not to disrupt the sealed combustion process. All components must be accessible and able to adjust with the removal of a single cover or cabinet component.

D. Indicating Lights: Each boiler shall include a diagnostic control panel with a full text display indicating the condition of all interlocks and the BTUH input percentage. Access to the controls shall be through a completely removable cover leaving diagnostic panel intact and not disrupted.

E. Acceptable Manufacturers:

1. RBI Flexcore (Basis of Design)

2. Lochinvar Crest

3. Patterson-Kelly Solis

2.02 COMPONENTS

A. Combustion Chamber: The combustion chamber shall be constructed of stainless steel only.

B. Heat Exchanger: Boilers shall be a stainless steel sectional unit designed for pressure firing and shall be constructed and tested for 100 PSI water working pressure, in accordance with the ASME Section IV Rules for the Construction of Heating Boilers. Individual sections will have been subjected to a hydrostatic pressure test of 250 PSIG at the factory before shipment and they shall be marked, stamped or cast with the ASME Code symbol. Boilers with less than 250 PSI pressure test will not be accepted for this project. The sections shall be of a down fired counter flow single-pass design. Water ports will be sealed with graphite port connectors. The sections will be fully machined for metal to metal sealing of the gas side surfaces. The design will provide for equal temperature rise through all sections. The heat exchanger shall be designed to prevent fluid boiling. The iron shall have a minimum thickness of 3/8". The heat exchanger design should have no limitations on temperature rise or restrictions to inlet water temperature and a Cv of 100.

C. Jackets: Stainless Steel.

D. Gas Burner: The burner shall be constructed of a reticulated Corderite Ceramic. The burner flame shall burn horizontally and be of the pre-mix type with a forced draft fan. Burner shall fire to provide equal distribution of heat throughout the entire heat exchanger. The burner shall be easily removed for maintenance without the disruption of any major component of the boiler. A window view port shall be provided for visual inspection of the boiler during firing. The gas distribution components and burner shall be enclosed with a cast-aluminum housing.

E. Ignition Components: The ignition hardware shall consist of Alumina ceramic insulated ignition electrodes and UV sensing tube permanently arranged to ensure proper ignition electrode and UV alignment.

F. Rated Capacity: The boiler shall be capable of operating at rated capacity with pressures as low as 2” W.C. at the inlet to the burner pressure regulator.

G. The burner shall be capable of 98% efficiency without exceeding a NOx reading above 10 ppm.

H. The burner and gas train shall be provided with the following trim and features:

1. Burner Firing: Full modulation with 5:1 turndown @ Continuous CO2

2. Burner Ignition: Intermittent spark

3. Safety Controls: Energize ignition, limit time for establishing flame, prevent opening of gas valve until pilot flame is proven, stop gas flow on ignition failure, and allow gas valve to open.

4. Flue-Gas Collector: Enclosed combustion chamber with integral combustion-air blower and single venting connection.

5. Gas Train: Lubricated manual gas valves (2), main gas valve (motorized), 'B' valve, pilot gas pressure regulator, and automatic pilot gas valve. All components to be factory mounted.

6. Safety Devices: High/Low gas pressure switches, air-flow switch, and blocked flue detection switch. All safeties to be factory mounted and wired.

2.03 BOILER TRIM

A. Safety-Relief Valve: ASME rated, factory set to protect boiler sand piping as per schedule/drawings.

B. Gauge: Combination water pressure and temperature shipped factory installed. LCD inlet/outlet temperature gauges to be an integral part of the front boiler control panel to allow for consistent easy monitoring of temperatures factory mounted and wired.

C. Low Water Cut Off: Prevent burner operation when water falls below a safe level. Low water cut off shall be factory mounted and wired. Provision for installation of a low water cut off shall be provided.

D. Operating Controls: Boiler shall be provided with a Honeywell RM7896C series digital flame safe guard with digital display. The flame safe guard shall be capable of both pre and post purge cycles.

E. Operating Temperature Control: Shall be a digital controller adjustable from 60 to 240 degrees Fahrenheit (115.56 degrees Celsius). Control shall be factory mounted and sense the inlet and outlet temperature of the boiler through resistance sensors.

F. High Limit: Temperature control with automatic-reset limits boiler water temperature in series with the operating control. High Limit shall be factory mounted and sense the outlet temperature of the boiler through a dry well.

G. PROVIDE THE FOLLOWING STANDARD TRIM:

1. Aluminum Condensate Receiver Pan

2. Low Air Pressure Switch

3. Blocked Flue Detection Switch

4. Manual Reset Low Water Cut Off (CSD-1 Factory Mounted and wired)

5. Modulation Control, 0-20 ma operating signal

6. Temperature/Pressure Gauge
7. Manual Reset High Limit
8. Air inlet filter
9. Inlet/Outlet Temperature Display
10. Full Digital Text Display for all Boiler Series of Operation and Failures.
11. Variable Frequency Drive and Combustion Air Fan
12. Condensate Drain

H. PROVIDE THE FOLLOWING JOB SPECIFIC TRIM AND FEATURES

1. FM or IRI controls and Gas Train
2. Diagnostic Keyboard Display for RM7800 series control
3. Provide TACO 1935C boiler pump to provide boiler with a 50 degree temperature rise.

2.04 MOTORS

A. Refer to Section 23 05 13 “HVAC Motors” for factory-installed motors.

B. Boiler Blower Motor: Open drip-proof motors where satisfactorily housed or remotely located during operation. Blower motor shall be externally mounted for ease of service. There shall be no requirement to remove covers or gas train components to remove the blower motor. Blower Motor shall not exceed ½ HP and not require more than 8 amps.

2.05 SOURCE QUALITY CONTROL

A. Test and inspect boilers according to the ASME Boiler and Pressure Vessel Code, Section IV. Boilers shall be test fired in the factory with a report attached permanently to the exterior cabinet of the boiler for field reference.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Examine area to receive boiler for compliance with requirements for installation tolerances and other conditions affecting boiler performance. Do not proceed with installation until unsatisfactory conditions have been corrected.

B. After installation, contractor shall schedule inspection with the State Boiler Inspector and obtain inspection report to be included in the O&M Manual.

3.02 INSTALLATION

A. Install boilers level and plumb, according to manufacturer's written instructions and referenced standards.

B. Install gas-fired boilers according to NFPA 54.

C. Support boilers on 4-inch- (100-mm-) thick concrete base, 4 inches (101.6 mm) larger on each side than base of unit.

D. Install electrical devices furnished with boiler, but not specified to be factory mounted.

E. CONDENSING BOILER ONLY – Install a condensate line to drain.

F. Condensing boilers to be installed as lead boiler in Hybrid System series.

G. Do not rotate condensing boiler unless multiple condensing boilers are to be used.

H. Condensing and non-condensing boilers are to be piped in independent primary/secondary loops with condensing boiler to be operating first in the series. Bypass must be installed in non-condensing boiler loop to include a circuit setter.

I. Boiler manufacturer rep shall provide room CO sensor / monitor for interlocking with gas shutoff valve upon detection of high CO level.

3.03 CONNECTIONS

A. Connect gas piping full size to boiler gas-train inlet with union.

B. Connect hot-water piping to supply- and return-boiler tappings with shutoff valve and union or flange at each connection.

C. Install piping from safety-relief valves to nearest floor drain.

D. Connect breeching to boiler outlet, full size of outlet. The boiler shall operate under positive (Category IV) or negative (Category II) stack pressure. Vent material must be listed AL29-4C Stainless Double Wall Stack.

E. Electrical: Comply with applicable requirements in Division 26 Sections.

F. Ground equipment.

1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.04 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to supervise the field assembly of components and installation of boilers, include piping and electrical connections. Report results in writing.

1. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

B. Manufacturer's representative shall supply a factory authorized service technician to start up the boilers.

3.05 CLEANING

A. Flush and clean boilers on completion of installation, according to manufacturer's written instructions.

B. After completing boiler installation, including outlet fittings and devices, inspect exposed finish. Remove burs, dirt, and construction debris.

3.06 COMMISSIONING

A. Engage a factory-authorized service representative to provide startup service. Start up to be performed only after complete boiler room operation is field verified t offer a substantial load, and complete system circulation. One-year warranty shall be handled by factory authorized tech.

B. Verify that installation is as indicated and specified.

1. Verify that electrical wiring installation complies with manufacturer's submittal and installation requirements in Division 26 Sections. Do not proceed with boiler startup until wiring installation is acceptable to equipment installer.

C. Complete manufacturer's installation and startup checklist and verify the following:

1. Boiler is level on concrete base.

2. Flue and chimney are installed without visible damage.

3. No damage is visible to boiler jacket or combustion chamber.

4. Pressure-reducing valves are checked for correct operation and specified relief pressure. Adjust as required.

5. Clearances have been provided and piping is flanged for easy removal and servicing.

6. Heating circuit pipes have been connected to correct ports.

7. Labels are clearly visible.

8. Boiler, burner, and flue are clean and free of construction debris.

9. Pressure and temperature gauges are installed.

10. Control installations are completed.

D. Ensure pumps operate properly.

E. Check operation of pressure-reducing valve on gas train, including venting.

F. Check that fluid-level, flow-switch, and high-temperature interlocks are in place.

G. Start pumps and boilers, and adjust burners to maximum operating efficiency.

1. Fill out startup checklist and attach copy with Contractor Startup Report.

2. Check and record performance of factory-provided boiler protection devices and firing sequences.

3. Check and record performance of boiler fluid-level, flow-switch, and high-temperature interlocks.

4. Run-in boilers as recommended or required by manufacturer.

H. Perform the following tests for each firing rate for high/low burners and for 100, 66, and 33 percent load for modulating burners. Adjust boiler combustion efficiency at each firing rate. Measure and record the following:

1. Gas pressure on manifold

2. Combustion-air temperature at inlet to burner.

3. Flue-gas temperature at boiler discharge.

4. Flue-gas carbon-dioxide and oxygen concentration.

5. Natural flue draft.

I. Measure and record temperature rise through each boiler.

3.07 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel as specified below:

1. Operate boiler, include accessories and controls, to demonstrate compliance with requirements.

2. Train Owner's maintenance personnel on procedures and schedules related to startup and shutdown, troubleshooting, servicing, and preventive maintenance.

3. Review data in the maintenance manuals. Refer to Division 1 Section "Contract Closeout."

4. Review data in the maintenance manual. Refer to Division 1 Section "Operation and Maintenance Data."

5. Schedule training with Owner with at least 7 days' advance notice.

END OF SECTION

SECTION 23 6313
AIR-COOLED CONDENSING UNITS & DX-SPLIT SYSTEM

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 GENERAL REQUIREMENTS

A. Equipment and accessories shall be prewired at the factory for single point connection.

1.03 EQUIPMENT NAMEPLATES

A. Each piece of equipment shall have a nameplate identifying manufacturer, model number, serial number, voltage, phase, amperage, refrigerant type, etc. as applicable. For units outside, nameplate shall be stainless steel or have a protective cover to prevent sun fading.

PART 2 – MATERIALS AND METHODS

2.01 AIR COOLED CONDENSING UNIT

A. GENERAL: Units shall be designed for installation outdoors with all parts weatherproofed and protected with outdoor paint. Fans shall have guards and motors shall have rain shields. Discharge air shall be vertical. Unit shall be U. L. Listed for outdoor installation and bear the ARI Rating Seal.

B. COIL: Condenser coil shall be copper tube with aluminum plate fins, tested at factory at 425 psi (2930.27 kPa) minimum, subcooler circuit and refrigerant receiver and coil fin guards. Refrigerant flooding low ambient control not acceptable. Coil shall be coated for corrosion protection.

C. COMPRESSORS: Shall be spring mounted, hermetic construction, with suction and discharge service valves, hot gas muffler and charging valves. Unit shall operate with R410a refrigerant. Provide five year compressor warranty.

D. ACCESSORIES AS FOLLOWS:

1. Line voltage magnetic starter with 3 leg overload protection and winding stat protection.

2. Crankcase heater

3. Low pressure cutout control

4. High pressure cutout control

5. Time delay to prevent compressor short cycling

6. Time delay relay for cold weather start-up

7. Head pressure controls to allow system operation at 20°F ambient

8. Single phase protection.

E. REFRIGERANT PIPING DIAGRAM: Unit submittal data shall include a complete piping diagram showing all components, pipe sizes and balance curve for unit and AHU coil, control and wiring diagram for units. Copies shall be marked "Approved" and signed by an authorized employee of the unit manufacturer.

F. INSPECTION AND TEST: Upon completion of the installation, before start-up, an authorized employee of the unit manufacturer shall inspect the installation. If he approves it, he shall be present to observe start-up and shall spend not less than four hours observing system operation. At completion, he shall write a letter to the Owner confirming this procedure and stating the manufacturer's approval of the installation.

G. ACCEPTABLE MANUFACTURERS: To match AHU manufacturer.

2.02 DUCT FREE SPLIT SYSTEM

A. GENERAL: System shall consist of outdoor condensing unit connected to one or more duct free, wall or ceiling mounted fan coil units. System shall be designed to operate as a unit complete with microprocessor control system.

B. AIR COOLED CONDENSING UNIT

1. HOUSING: Cabinet shall be constructed of galvanized steel, bonderized and coated with baked-enamel finish. Provide access panels for ease of service.

2. COMPRESSOR: Fully hermetic reciprocating or scroll type operating with R410a refrigerant. Unit shall have internal protection for over temperature and over current. Provide crankcase heater. Refrigeration system shall have gage ports, service valves, accumulator, filter dryer and pressure relief. Heat pump units shall have reversing valve and heating mode metering device.

3. CONDENSER FAN: Direct drive propeller type with internally protected, totally enclosed motor

4. COIL: Condenser coil shall be copper tube with aluminum plate fins, tested at factory at 425 psi (2930.27 kPa) minimum, subcooler circuit and refrigerant receiver and coil fin guards. Coil shall be coated for corrosion protection.

5. CONTROLS AND SAFETIES: Unit shall have time delay restart, automatic restart on power failure, safety lockout, high and low pressure safeties.

C. EVAPORATOR UNIT

1. GENERAL: Indoor, ceiling or wall mounted, direct expansion fan coil unit complete with electric controls, microprocessor control system and integral temperature sensing.

2. FAN: Direct drive tangential blower with automatic motor-driven vertical air sweep. Fan motor shall be three speed type.

3. COIL: Copper tube aluminum fin with refrigerant metering device. Provide condensate drain pan and drip pan under headers.

4. CONTROLS: Shall be microprocessor-based and control space temperature, determine optimum fan speed and run self-diagnostics. Provide remote wireless controller for programming and temperature adjustment.

5. Provide low ambient kit.

6. Provide hard start kit.

7. FILTERS: Factory supplied, permanent cleanable type with rack.

D. ACCEPTABLE MANUFACTURERS:

1. Daikin (BOD)

2. JCI/York

END OF SECTION

SECTION 23 6426
AIR-COOLED WATER CHILLERS

PART 1 – GENERAL

1.01 REFERENCE STANDARDS

A. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus; 2019.

1.02 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.03 SUBMITTALS

A. Provide submittals as outlined in Section 23 00 00 General HVAC

PART 2 – PRODUCTS

2.01 AIR COOLED ROTARY CHILLER

A. GENERAL: Helical rotary type screw compressor, minimum capacity as scheduled on drawings, including electric motor driven compressor, purge system, electronic expansion valve, control voltage transformer, control system and starter. Unit shall have two completely independent refrigeration circuits. Unit panels, control boxes and structural elements shall be constructed of 12 gauge galvanized steel and mounted on a welded steel structural base. All parts shall be weatherproofed. Control boxes, unit panels and structural elements shall be finished with a baked on powder paint, and the structural base with an air dry paint. Coatings or paint shall withstand 500 hours in salt-spray test per ASTM B117. Insulate chiller vessel, suction elbows, motor and all cold components to prevent condensation. Provide complete refrigerant and oil charge. Unit shall use R-134a refrigerant. Performance shall be ARI certified and meet ASHRAE 90.1 minimum efficiency requirements. Efficiency ratings shall meet the International Energy Conservation Code.

B. COMPRESSOR: Helical rotary screw, driven by refrigerant cooled motor. Motor shall have electronic overheating protection and a power factor of 0.9 or greater. Statically and dynamically balance all rotating parts. Provide a forced feed lubrication system with oil sump, oil charging valve, hermetically sealed motor driven pump, oil filter, thermostatically controlled heater and crankcase heater. Automatic capacity control system to provide continuously variable capacity from 15% to 100% including automatic stop when load falls below 15% and automatic restarting. Provide factory installed, weatherproof, sound reduction compressor enclosure and discharge piping sound reduction wraps.

C. CONDENSER AND FANS: Condenser coils shall have.0055” thick aluminum fins, mechanically bonded to internally finned seamless copper tubing. Coils shall be factory coated to prevent corrosion or copper fins may be provided. The condenser coil shall have an integral sub-cooling circuit and provide oil cooling for the compressor bearing and injection oil. The condenser shall be factor leak tested at 500 psig (3447.38 kPa). The condenser fans shall be vertical discharge direct drive type, with three phase motors, permanently lubricated ball bearings and internal thermal overload protection. Fan assembly shall be statically and dynamically balanced, constructed of zinc coated steel and have sound reduction kits and fan guards. Provide louvered hail guards on coils and security wire guards around compressor access. Fans shall be ultra quiet VFD design with TEAO motors. Microchannel condenser coils are acceptable.

D. EVAPORATOR: Shell and finned tube type, designed, constructed, tested and stamped in accordance with ASME Code for Unfired Pressure Vessels, as applicable. Each tube shall be individually replaceable with tube ends rolled into tube sheets. Unit shall be built for a working pressure on the refrigerant side suitable for the refrigerant used, and for 200 psi (1378.95 kPa) on the water side. Provide safety relief valve with discharge piped to a safe point for water and refrigerant systems. Insulate with 3/4” thick flexible elastomeric closed cell insulation R=5 minimum, sealed on outside surface with vinyl lacquer finish. Provide factory mounted heat tape with thermostat to protect the evaporator from freezing at ambient temperatures down to -20°F. Provide water drain connection, vent and fittings for factory installed sensors.

E. CONTROL SYSTEM: All controls shall be housed in weather-tight enclosure with full opening access door and external lockable operator handle. All controls, including sensors, shall be factory mounted and tested prior to shipment. Control system shall include the following:

1. Unit start-stop switch and operating signal light with provision for automatic start-stop.

2. Internal controls to maintain leaving water temperature.

3. Motor current controller with maximum load selector switch for 40% to 100% full load current to permit manual control of power demand.

4. Digital readout panel indicating condenser, evaporator, lubricating oil and purge pressures, voltage, amps.

5. Protective controls with low evaporator temperature, high condenser pressure, high motor temperature, loss of refrigerant charge and low oil pressure, factory wired to independently stop compressor motor. Each fault type to have associated indicator and manual reset.

6. Anti-recycle timer to limit starting to once every 15 minute or as recommended by manufacturers. Mount in either control panel or starter.

7. System shall be microprocessor based and designed to accept start-stop, demand limiting and temperature reset signals from a remote controller or energy management system using dry contact closures and 4-20 ma signals.

8. Microprocessor control shall de-energize unit if there is a momentary interruption of power, or loss of power that would damage the machine. Unit shall automatically restart when power is available and anti-cycle timer has counted down.

9. Provide a powered 120 volt, ground fault, duplex convenience outlet

10. Provide a BACnet interface unit to allow the energy management system to monitor and control the chiller operation.

F. STARTER: Unit mounted, X-L type, to include the following:

1. Overload protection in all three legs.

2. Phase loss and low voltage protection.

3. Chiller mounted, NEMA 3R cabinet.

G. ISOLATORS: Provide factory supplied, minimum 3” load point specific, color coded, encased neoprene isolators matched to the specific chiller supplied. Provide a minimum of four isolators per side evenly distributed around the perimeter of the unit.

H. SOUND RATINGS:

1. Emitted sound pressure shall note exceed 67 dBA as measured from the ends of the unit and 70 dBA at 30 feet (914.4 cm) from the sides of the unit.

2. Sound power levels shall not exceed specified levels in the listed octave band.

a. 63 Hz 88 dBA

b. 125 Hz 97 dBA

c. 250 Hz 97 dBA

d. 500 Hz 96 dBA

e. 1000 Hz 92 dBA

f. 2000 Hz 90 dBA

g. 4000 Hz 82 dBA

h. 8000 Hz 77 dBA

I. INSPECTION AND TEST: Upon completion of installation, an authorized representative of the manufacturer of the chilling unit shall supervise starting the chilling unit, the piping and the controls, and shall forward to the engineer a letter confirming this inspection and stating approval of the installation. This same representative shall be present at the time of the operational test and shall observe equipment performance.

J. WARRANTY: Provide a five year warranty for total unit, including all parts and labor, including refrigerant. Warranty to be non-prorated. All replacement parts shall be newly manufactured. For each chiller provide factory certificates listing chiller model, serial number and warranty information in the close out documents.

K. SUBMITTALS: All submittals shall be prepared by the Salesman that calls on the Engineer from the successful supplier.

L. ACCEPTABLE MANUFACTURERS:

1. Alternate No. 1a: Daikin (BOD)

2. Alternate No. 1b: JCI/York

PART 3 – EXECUTION

3.01 INSTALLATION SHALL COMPLY WITH MANUFACTURER'S REQUIREMENTS AND INSTALLATION DETAILS ON THE DRAWINGS.

END OF SECTION

SECTION 23 7313
INDOOR AIR HANDLING UNITS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 SUBMITTALS

A. Provide submittals as outlined in Section 23 00 00 General HVAC

PART 2 – PRODUCTS

2.01 AIR HANDLING UNITS

A. CABINETS: Unit casing shall meet ASHRAE 111 Class 6 leakage and a maximum of 1% airflow at +/- 8” total static pressure. Unit shall be of double wall construction with encapsulated 2” thick, R-13 foam injected insulation in both fan and coil sections to prevent unit sweating. Sections and panels shall be bolted together with insulating gasket to prevent sweating at the joints. The interior liner shall be 22-gauge. The unit base floor shall be heavy duty walk-on floor construction. Exterior wall panels shall be removable and constructed of 20-gauge G90 mill galvanized steel. Interior surface shall be galvanized and exterior primed with rust inhibiting primer and painted with two heavy coats of enamel paint. Exterior panels of unit may be galvanized finish if unit is located in mechanical room or above ceiling. A rigid, welded framework shall support the panels, coils and fan. Coil casings shall be stainless steel. Drain pans shall be insulated, double wall type of 16 gage Type 304 stainless steel, sloped for positive drainage and extend a minimum of 12” beyond the coil. Provide drain pan for all coils, including heating coils. Provide minimum 12-gauge rails or channels on bottom of unit to ensure bottom plates do not contact floor or concrete pad. Coordinate drain location with mechanical room layout. Units with down discharge or return from below shall have a 3” high “water dam” around duct openings to prevent water from leaking through openings. All units shall be pre-assembled and balanced at the factory, and then shipped to the site in that condition.

B. ARRANGEMENT AND COMPONENTS: Units shall be horizontal or vertical as shown on the Drawings. Provide face and bypass dampers, coil sequence or other item that is shown or described in the temperature controls sequence. Unless noted otherwise, heating coils shall be in the reheat position. Where face and bypass dampers are specified, the bypass shall be internal to the unit, and not bypass the heating coil. Where outside air is shown connecting directly to the unit, provide manual return air damper to set return air/outside air ratio.

C. FANS: Single wheel, airfoil DWDI Class II fan operating below first critical speed, and selected for high operating efficiency and low noise generation. Fans for VAV air handling units shall be selected so that their peak efficiency is as close as possible to the 100% output point of the system without generating aerodynamic stall at 50% output. Fan shall be mounted on grease lubricated ball bearings having 200,000 hours average life. The fan/drive/motor assembly shall be internally mounted and factory isolated from the enclosing cabinet with 1” minimum deflection spring isolators and flexible connection to unit housing. Select spring isolators under conditions present when operating at 50% of full output. Provide extended grease lines to exterior of unit or grouped inside at access panel. FC fan is acceptable for single zone unit.

D. DRIVE: Provide adjustable motor mount, V-belt drive with Browning or Gates adjustable motor sheave rated at 150% BHP. Drive shall have a minimum of two individual belts. Add static pressure for filter resistance and unit coil, damper, casing and conversion losses to scheduled external static pressure to select motor size. Motor shall not overload if system static pressure drops 1/4" at selected RPM. See Motors in Section Miscellaneous Equipment and Requirements.

E. ACCESS DOORS: Provide hinged, double wall, insulated and gasketed access doors with Ventlock 260 or equal handles on both inside and outside of casing, on each side of unit between fan and coil sections. Provide 18” wide access door in side of unit at drain pan connection to observe and clean drain pan.

F. WATER COILS: Shall be 5/8”, .020” thick wall copper tube, .008” thick aluminum fin with belled collars, tested at 300 PSI with ARI certified ratings. Coil connections shall be counterflow with supply at the very bottom and outlet at the very top of the coil. Coil casings shall be stainless steel. Mount coils on tracts for easy removal without requiring disassembly of the air handling unit. Coils shall be drainable, non-trapping circuits. Headers shall have drain and vent connections extended to the outside of the unit casing. Install rubber grommets at all pipe penetrations of the cabinet. Coils in outside air pre-treatment section shall have a flexible polymer e-coating (ElectroFin).

G. AIR FILTER GAGES: Provide filter gages for each filter bank to monitor filter performance. System shall be a Dwyer 2000-ASF 4" diameter gage with red filter flag, 0-2" w.g. scale, mounting hardware, pressure sensors and tubing.

H. FILTERS: Provide filter rack for 2" thick filters, maximum velocity 350 FPM. See specification section for Air Filters.

I. SUBMITTAL: Provide a 1/4" scale drawing of each AHU room showing proposed unit placement, dashed-in access space required, drive location, coil piping connections and condensate drain connection. Provide side elevation drawing indicating fan placement/rotation, and discharge air opening, showing proper coordination of arrangement with the specified ductwork. Submittal shall include fan curve with efficiency and horsepower curves, and noise generated by octave. For VAV units, submit fan curves for operation at 50% and 100% of full output, while maintaining constant static pressure. Also include this data for the next larger and smaller fan for the unit. All

submittals shall be prepared by the Salesman that calls on the Engineer from the successful supplier.

J. ACCEPTABLE MANUFACTURERS: Daikin and JCI/York

PART 3 – EXECUTION

3.01 INSTALLATION SHALL COMPLY WITH MANUFACTURER'S REQUIREMENTS AND INSTALLATION DETAILS ON THE DRAWINGS.

END OF SECTION

SECTION 23 8239
UNIT HEATERS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 SUBMITTALS

A. Provide submittals as outlined in Section 23 00 00 General Mechanical

PART 2 – PRODUCTS

2.01 ELECTRIC UNIT HEATER

A. GENERAL: Provide a U. L. Listed heater with formed steel casing with baked enamel paint finish, fan guard, ceiling mounting bracket, adjustable horizontal and vertical discharge louvers and direct drive propeller fan.

B. CONTROLS: 24-volt controls transformer, staging contactors, fusing per NEC, thermal overloads, single point electrical connection, terminal panel, hinged door to control panel and unit-mounted thermostat. Provide two stages of control for units 25 kw and larger.

C. HEATING ELEMENTS: High mass finned tubular heating elements.

D. ACCEPTABLE MANUFACTURERS: Carrier, Markel, Modine, Reznor and Trane.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Installation shall comply with manufacturer’s requirements and installation details on the Drawings.

END OF SECTION 23 82 39

SECTION 26 0000
GENERAL ELECTRICAL

PART 1 – GENERAL

1.01 1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 1.02 GENERAL REQUIREMENTS

A. Provide all supervision, labor, equipment and materials required for the installation of complete and operating electrical systems in the building. Pay all fees and obtain all permits related to construction activities and utility service installation.

1.03 GUARANTEE

A. All materials, apparatus and equipment furnished and installed under this Section of these Specifications shall be new and free from any defects when accepted by the Owner and shall be guaranteed in writing for a period of one year from the date of acceptance by the Owner.

1.04 COORDINATION

A. Coordinate work of this Division with that of other Divisions so that various components of the building will be installed at the proper time, will fit the available space and will allow proper service access to those items requiring maintenance. This means adequate access to all equipment, not just that installed in this Section.

B. Where various items of equipment and materials are specified and scheduled, the purpose is to define the general type and quality level, not to set forth the exact trim required to fit the various types of ceiling, wall or floor finishes. Provide materials which will fit properly the types of finishes actually installed.

1.05 DRAWINGS

A. The drawings indicate approximate locations of the various items of electrical systems. These items are shown approximately to scale and attempt to show how these items should be integrated with building construction. Locate all the various items by on-the-job measurements, conformance with Contract Documents and cooperation with other trades.

B. Prior to locating light fixtures, confer with Architect as to desired method of locating fixtures in the various areas. In no case should fixture locations be determined by scaling drawings.

C. All light fixtures, speakers and other ceiling devices shall be located to conform to the ceiling grid system. Examine all drawings to become familiar with this requirement. Lighting fixtures in mechanical spaces are shown in their approximate location only. Do not install light fixtures until mechanical piping and ductwork is installed, then install lights in a location to provide best lighting.

D. In certain instances, the Architect may require relocation of outlets, switches, etc. Where relocation is within five feet of location shown on drawings, and when Contractor is informed of necessary relocation before work is begun on this portion of the job, no extra compensation will be allowed.

E. The drawings are schematic in nature and are not intended to show exact locations of conduit, but rather to indicate distribution, circuitry and control.

1.06 INTENT OF DRAWINGS AND SPECIFICATIONS

A. The drawings and specifications are intended to be complimentary. Any work exhibited in either of them, whether in the other or not, is to be executed according to the true intent and meaning thereof, the same as if set forth in all.

1.07 1.07 ALTERNATES

A. Determine the scope of each specified alternate proposal by carefully reading all Divisions of the Documents. The Bid Form contains information explaining the extent of the construction to be performed under a specific alternate. Alternate proposals, which are not predominantly electrical in scope, are described in other Divisions of these Documents.

1.08 CODES

A. All materials and their installation shall be in accordance with the National Electrical Code, local building codes and the National Safety Code. Nothing in the plans and specifications shall be construed to permit work not conforming to the most stringent of the codes. Particular attention shall be paid to the U. L. codes for fireproofing of conduit, electrical devices and light fixtures that are part of or pass through fire rated ceilings, walls and floors.

1.09 VISITING THE SITE

A. The Contractor shall be familiar with the Drawings and Specifications and shall have examined the premises and understand the conditions under which he will be obligated to operate in performing the contract. No allowance shall be made consequently for any error through negligence in this regard.

1.10 ELECTRICAL SERVICE

A. GENERAL: Obtain (during the bidding period) from the Power Company all required information to provide a complete electrical service installation as shown on the Drawings.

B. FEES: Pay all fees and installation costs charged by the Power Company for temporary service. Power Company fees and charges for the permanent service will be paid by Owner. Kilowatt hour charges shall be paid by contractor until building is accepted by Owner.

C. SERVICE: The service characteristics are 480Y/277V, 3 phase, 4 wire. The Power Company is Entergy Services, Inc.

D. SERVICE ENTRANCE: Provide bus-type weatherhead, bus-type CT/meter, service rack, pad for pad mounted transformer, cable tap box, service junction boxes, protective bollards or other special construction as required by the Power Company. Refer to Power Company standards.

1.11 TEMPORARY SERVICE

A. Provide a temporary electrical service for construction power. Size and voltage as required for construction activities as specified by the General Contractor. Construction site distribution shall be overhead and comply with NEC and OSHA Standards.

1.12 GENERAL REQUIREMENTS FOR ALL MATERIALS

A. Provide all parts and accessories necessary for equipment and complete installation.

B. Provide factory applied finish on all exterior surfaces of electrical equipment. Any item which has the finish marred must be refinished to a new condition before final acceptance.

C. Provide three copies of spare parts lists and operating and maintenance instructions for all distribution apparatus, major equipment and auxiliary systems. These shall be bound in folders with suitable identification on front cover. Deliver to Architect prior to final acceptance.

D. All materials must be new and of good quality and shall bear the stamp of approval of the Underwriters' Laboratories, Inc. (U. L.). Equipment and materials shall be used and installed consistent with the U. L. testing and U. L. requirements. All materials shall be certified to not contain any asbestos, PCB's or other material banned by the Environmental Protection Agency.

1.13 SUBMITTALS

A. The purpose of these submittals is to attempt to aid the contractor in such a manner that improper or unacceptable materials are not delivered to or installed on the job. Approval of these submittals shall not be construed as releasing The Contractor from compliance with the Contract Documents. All materials and equipment shall be subject to final acceptance by the Engineer at completion of construction.

B. Equipment and material submittals must show sufficient data to indicate complete compliance with contract documents as follows:

1. Proper sizes and capacities.

2. That the item will fit in the available space in a manner that will allow proper service.

3. Construction methods, materials and finishes.

C. Catalog data must be clearly marked to indicate the item or model number being submitted and must include all specified accessories. All information on a catalog sheet not pertaining to the item being submitted must be marked out.

D. All submittals must be bound in book form with a table of contents listing all items in that specific submittal. Loose catalog sheets or drawings will not be acceptable. All submittals on the project need not be submitted in one book. The front sheet of each copy of the submittal shall have the following typed information:

1. Job name and location.

2. General Contractor's name, address, Project Manager's name and telephone number.

3. Submitting Sub-contractor's name, address, Project Manager's name and telephone number.

4. Supplier's company name, address, salesman's name and telephone number.

5. Signature of an officer or attorney-in-fact of the Sub-contractor with date and title and a statement that the submittal materials and equipment complies with the contract Documents.

6. Any submittal without all of the above information will be rejected without review.

E. For any item to be installed in or on a finished surface (such as tee bar acoustical ceiling, plaster wall), Contractor certifies by making the submittal that he has checked all applicable contract Documents and that the item submitted is compatible with the surface finish on which it is to be installed.

F. Submit shop drawings and/or brochures for:

1. Switchboards Panelboards Transformers

2. Circuit Breakers Disconnect Switches PMT Service Entrance

3. Light Fixtures Lighting Control Devices Lighting Control Panelboards

4. Wiring Devices Phase Loss Monitors Sound Systems

5. Fire Alarm System TVSS Structured Cabling

6. Motor Starter/Controller Generator Automatic Transfer Switch

7. Security Alarm/Access Control Systems CCTV System

G. Provide one (1) complete instructional/operational maintenance manuals (O&M Manuals) as outlined in paragraph 1.13-H below and grouped/labelled as follows:

1. Electrical Switchgear: Switchboards, Panelboards, Transformers, Circuit Breakers, Disconnect Switches, PMT Service Entrance, Wiring Devices, Phase Loss Monitors, Motor Starter/Controller & TVSS.

2. Lighting Controls: Lighting Control Devices & Lighting Control Panelboards

3. EM Generator System: Emergency Generator, Automatic Transfer Switch & Emergency Lighting Transfer Relays

4. Light Fixtures

5. Sound System

6. Fire Alarm System

7. Structured Cabling

8. Security Alarm & Access Control Systems

9. CCTV System

H. Each O&M Manual shall include instructions for operating the system, performing routine trouble shooting procedures, a set of all inspection & test reports, as-built drawings, wiring diagrams, block diagrams as specified above, warranty information and complete instructions & data sheets for all devices within the system. These documents shall reflect any changes made during the course of construction and shall be provided to the owner, for their use, in PDF format and hard copy in a three-ring binder labeled with project name and description. Include a tumb drive with an electronic copy of the complete O&M with each binder.

I. If a submittal/O&M manual is returned to the Contractor marked “Rejected” or “Revise and Resubmit”, only one (1) additional submittal will be permitted without the Contractor incurring charges for the additional re-submittals. LTY shall be reimbursed by the Contractor for any expense in connection with any necessary submission in addition to the two (2) submissions allowed. Contractor will be billed by LTY at a rate of $125/hr for these occurrences.

1.14 SUBSTITUTIONS

A. The names of manufacturer and model numbers have been used in the Contract Documents to establish types of equipment and standards of quality and are intended to be the Basis of Bid. If only one manufacturer is named for a specific item of equipment alternate manufacturers shall be

acceptable as a substitution/approved equal as specified in this Article. Alternate light fixtures may be submitted but a substitute fixture must be equal from the standpoint of materials, construction and performance. Request for substitution must be accompanied by complete data and descriptive sheets during the bidding period as described in the Architectural Sections.

B. All other brands, including any additional names which may be listed as “Alternates” or “Approved Equal” must conform with the specifications, size, accessories, etc. of the first named brand and be subject to Paragraph D and E of this Article. Alternate equipment must be equal from the standpoint of materials, construction and performance. Request for substitution must be accompanied by complete data and descriptive sheets during the bidding period as described in Paragraph D and E of this Article.

   1. Submitted on Bidder’s letterhead attached to Proposal Form with individual deductive amounts stipulated and the documentation required in Paragraph E-03.

   2. All savings for Owners selection of deductive amounts by acceptance of alternate or substituted items are to be paid to the Owner.

C. All equipment within common group or category (e.g., switchgear, lighting fixtures, fire alarm, etc.) shall be same manufacturer.

D. Proposed Substitutions/Approved Equals:

   1. Submitted no less than 7 calendar days prior to bid date.

   2. Submit proposed substitutions with catalog data and/or manufacturer’s shop details indicating all modifications required to conform with specified brand. Include all relevant items necessary to make a determination of equal status or submittal shall be deemed incomplete and rejected.

   3. If submittal contains sufficient information to prove compliance with the Contract Documents, then that alternate submittal will be acceptable. Approved submittals for bidding purposes only will be published by addenda.

E. Substitutions with prior approval:

   1. Submitted on Bidder’s letterhead attached to Proposal Form with individual additive/deductive amounts stipulated and the documentation required in Paragraph B-2.

   2. Owner reserves the right to accept or reject any or all substitution proposals before execution of Contract.

   3. Provide all design/engineering services required to make adjustments in space, systems, utilities, etc. and pay all additional costs of utilities, construction or professional services that may be incurred due to the acceptance of any substitution.

1.15 PROTECTION OF EQUIPMENT

A. Do not deliver equipment to jobsite until progress of construction has reached the stage where equipment is actually needed, or until building is closed in enough to protect equipment from the weather. Equipment allowed to stand in weather will be rejected, and Contractor is obligated to furnish new equipment at no cost to Owner.

B. Adequately protect equipment (including all Owner-furnished items) from damage after delivery to job. Cover with heavy cloth as required to protect from damage.

C. Equipment which has been damaged by construction activities will be rejected. Contractor shall furnish new equipment at no cost to Owner.

1.16 FOUNDATIONS AND EQUIPMENT SUPPORTS

A. GENERAL: Provide all foundations and supports.

B. CONCRETE HOUSEKEEPING PADS: 4" high concrete pad to be provided under Division 3, for all floor mounted equipment. Concrete pads shall be sized for the equipment to be supplied. Pad shall exceed base dimensions by approximately 4" all around. Reinforce pads with 6" x 6" woven wire mesh and #4 bar around perimeter. Tool pad to form chamfered edge.

C. OUTDOOR ELECTRICAL EQUIPMENT: Provide structural pad to support pad mounted transformers and outdoor switchgear. Provide galvanized pipe or angle iron structure to support weatherheads, meters, and outdoor protective devices and disconnect switches.

D. INSIDE ELECTRICAL EQUIPMENT: Securely attach panels to block walls with concrete bolts. When attaching to sheetrock or other less substantial walls, provide blocking and unistrut cross supports to securely attach panel to structural members. Where panels are required to be freestanding provide angle iron support structure bolted to floor and building structure.

E. VIBRATION ISOLATION: Install dry type transformers on four waffle pad type isolators.

1.17 NOISE

A. Eliminate any abnormal noises which are not considered by the Architect to be an inherent part of the systems as designed. Abnormal buzzing in equipment components will not be acceptable.

1.18 TESTING BY CONTRACTOR

A. GENERAL: All wiring, instruments, apparatus and equipment shall be tested for continuity, ground and short circuits before the circuits are energized. For 120 Volts circuits, the neutral/s may require disconnecting. A complete record of all testing shall be submitted to Owner at completion.

B. GROUND TESTING: The resistance of the grounding system to ground shall not exceed 3 ohms for water pipe ground or 6 ohms for driven ground rods. If tests indicate a higher value, additional ground rods shall be installed to reduce the resistance to a value of 6 ohms or less. Whenever connection is required to an existing ground conductor, tests shall be made before connection to ensure that the existing ground conductor is unbroken and continuous. Ground tests shall be performed after at least 7 days of dry weather with test meter supplying a minimum of 50 amps to the ground rod. Auxiliary current electrode shall be approximately85 feet from ground rod and auxiliary potential electrode shall be 62% of this distance from the ground rod in between the two rods.

C. INSULATION TESTING: Test all electrical equipment bussing, underground feeders and feeders 1/0 and larger at 85% of rated insulation value. Insulation tests shall be made with a 500 volt "Megger" as manufactured by James G. Biddle Company or equal. Test one conductor at a time with other two grounded. Attempt to raise voltage to maximum in one minute. Do not exceed 2 MA. Polarization Index (amps ratio - 1 minute/10 minutes) to be at least 3 unless approved otherwise.

D. ADDITIONAL TESTING: The Contractor shall make such other tests as may be or become necessary to assure satisfactory operation of each unit device or equipment.

1.19 RECORD DRAWINGS

A. Maintain at the job site a separate set of white prints (blue line or black line) of the contract drawings for the sole purpose of recording the "as-built" changes and diagrams of those portions of work in which actual construction is at variance with the contract drawings. Mark the drawings with a colored pencil. Prepare, as the work progresses and upon completion of work, reproducible drawings clearly indicating locations of various lines, valves, ductwork, traps, equipment, and other pertinent items, as installed. Include flowline elevation of sewer lines. Record existing and new underground and under slab piping with dimensioned locations and elevations of such piping.

B. At the conclusion of project, obtain copy of the original drawings and transfer as-built changes to these in PDF format. As-built documents shall be submitted to A/E teams for review and approval. Deliver the accepted as-built documents in both printed format and digital saved in thumb drive to the Owner. Delivery of these as-built prints is a condition of final acceptance.

C. As-Built drawings should indicate the following information as a minimum:

1. Indicate all addendum changes to documents.

2. Remove Engineer’s seal, name, address and logo from drawings.

3. Mark documents RECORD DRAWINGS.

4. Clearly indicate: DOCUMENT PRODUCED BY

5. Indicate all changes to construction during construction. Indicate actual routing of all piping, ductwork, etc. that were deviated from construction drawings.

6. Indicate exact location of all underground plumbing and flow line elevation.

7. Indicate exact location of all underground plumbing piping and elevation.

8. Indicate exact location of all underground electrical raceways and elevations.

9. Revise schedules to reflect (actual) equipment furnished and manufacturer.

10. During the execution of work, maintain a complete set of drawings and specifications upon which all locations of equipment, ductwork, piping, devices, and all deviations and changes from the construction documents in the work shall be recorded.

11. Location and size of all ductwork and mechanical piping above ceiling including exact location of plumbing isolation valves.

12. Exact location of all electrical equipment in and outside of the building.

13. Fire Protection System documents revised to indicate exact location of all sprinkler heads and zone valves.

14. Exact location of all roof mounted equipment, wall, roof and floor penetrations.

15. Cloud all changes.

1.20 OWNER'S INSTRUCTIONS

A. Provide the following periods of on-site instructions to Owner's designated personnel upon completion of the systems' installation:

1. Electrical Systems: 4 Hours

2. Fire Alarm System: 4 Hours

3. Sound Systems: 4 Hours

4. Security System: 4 Hours

5. CCTV System: 4 Hours

1.21 MOUNTING HEIGHTS

A. GENERAL: Heights are measured to centerline from the finished floor. Where devices are located in block walls Architect may require height to be adjusted so junction box is in a desired

relationship with the mortar joint. Device must still be mounted within the acceptable height range for ADA.

B. DEVICE:

1. Light switch 46"
2. Receptacle 18"
3. Receptacle at counter 7" above countertop
4. Data outlet 18”
5. Telephone outlet 18"
6. Telephone outlet at counter 7" above countertop
7. Wall telephone 46"
8. Desk telephone 18"
9. Clock outlet 12" below ceiling or 96" maximum
10. Wall exit light Bottom 4" above door frame or 96"
11. Fire alarm pull station 46"
12. Fire alarm horn or flasher 82" or on ceiling
13. Wall TV outlet 18”
14. Outdoor bells or speakers 10’-0” (or as shown on the Architectural Drawings)
15. Wall Pack Lights 14’-0” (or as shown on the Architectural Drawings)

1.22 TESTING

A. All testing shall be witnessed by the Owner’s Representative and the Commissioning Agent’s Representative. Notify/coordinate with these personnel for all testing scheduled.

1.23 EQUIPMENT LABELING

A. All panels, transformers, disconnects and other electrical equipment shall be labeled as described in the equipment section.

B. All receptacles shall be labeled on the faceplate with the circuit number serving the receptacle. Label shall be machine label similar to that provided for the data outlet labeling.

C. Panel schedules provided for electrical panels shall note the room numbers served by light circuits and receptacles (REC RMS A120, A122, A124). For specific equipment note equipment and room number (EDF – Hall A123). Note that the room numbers are the actual room numbers, not plan room numbers. Actual numbers will be provided by the Architect toward the end of construction.

END OF SECTION

SECTION 26 0100
COORDINATION DRAWINGS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 SUBMITTALS

A. Provide submittals as outlined in Section 26 00 00 General Electrical.

PART 2 – REQUIREMENTS

2.01 COORDINATION DRAWINGS

A. The Mechanical Contractor shall take the lead in coordinating the Mechanical (HVAC), Electrical, Plumbing and Fire Protection Systems within the building.

B. The Mechanical Contractor shall coordinate a three-dimensional (3-D) model of the building which includes the Mechanical (HVAC), Electrical, Plumbing and Fire Protection Systems. The Electrical, Plumbing and Fire Protection Contractors shall prepare their work and generate 3-D models which will be given to the Mechanical Contractor for coordination. The Contractor will be provided with the REVIT model that was used to generate the contract documents. This file may be used as the background file. The Contractor shall replace the systems drawn with the actual shop drawing models. The Contractor is not limited to using REVIT but may use any 3-D software in generating and combining the coordination model. If an alternate software is used, all contractors must agree to provide compatible software models.

C. Submitting the contract drawings as coordination drawings will not be acceptable.

D. The model shall include detailed and accurate representations of all equipment to be installed based upon the reviewed equipment submittals.

E. The Mechanical Contractor shall hold a 3-D coordination meeting with all sub-contractors present to review the model and discuss coordination of the installation of the building systems.

F. Upon completion of the coordination meeting, the Contractor shall submit the 3-D model and 1/4” scale drawings for review.

G. The model shall detail major elements, components, and systems in relationship with other systems, installations and building components. Indicate locations where space is limited for

installation and access, and where sequencing and coordination of installations are of importance to the efficient flow of the Work, including (but not necessarily limited to) the following:

1. Indicate the proposed locations of pipe, duct, equipment, and other materials. Include the following:
    a. Wall and type locations
    b. Clearances for installing and maintaining insulation.
    c. Locations of light fixtures and sprinkler heads.
    d. Clearances for servicing and maintaining equipment, including tube removal, filter removal, and space for equipment disassembly required for periodic maintenance.
    e. Equipment connections and support details.
    f. Exterior wall and foundation penetrations.
    g. Routing of storm and sanitary sewer piping.
    h. Fire-rated wall and floor penetrations
    i. Sizes and locations of required concrete pads and bases.
    j. Valve stem movement.
    k. Structural floor, wall and roof opening sizes and details.
2. Indicate scheduling, sequencing, movement and positioning of large equipment in the building during construction.
3. Prepare floor plans, elevations, and details to indicated penetrations in floors, walls and ceilings and their relationship to other penetrations and installations.
4. Prepare reflected ceiling plans to coordinate and integrate installations, air distribution devices, light fixtures, communication systems components and other ceiling mounted items.

H. Sequence of Coordination

1. Below is hierarchy of model elements and the sequencing by which the models will be coordinated:
    a. Structural and Architectural Model
    b. Miscellaneous steel

c. Perform preliminary space allocation.

d. Identify hard constraints (locations of access panels, lights, A/V space requirements, etc.

e. Main and medium pressure ducts from the shaft out

f. Main graded plumbing lines and vents.

g. Sprinkler mains and branches

h. Cold and hot water mains and branches

i. Lighting fixtures and plumbing branches

j. Smaller sized ducts and flex ducts

k. Smaller size cold water and hot water piping, flex ducts, etc.

I. The Contractor and Sub-Contractors shall not install any item until the coordination has been completed and reviewed by the Construction Manager, Owner and A/E Team.

J. This Contractor shall be responsible for coordination of all items that will affect the installation of the work of this Division. This coordination shall include but not be limited to: ampacity, capacity, electrical and piping connections, space requirements, system construction, building requirements and special conditions.

K. By submitting shop drawings on the project, this Contractor is indicating that all necessary coordination has been completed and that the systems, products and equipment submitted can be installed in the building and will operate as specified and intended, in full coordination with all other Contractors and Subcontractors.

END OF SECTION 26 01 00

SECTION 26 0500
ELECTRICAL WIRING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

PART 2 – MATERIALS AND METHODS

2.01 RACEWAY SYSTEMS

A. REQUIRED: Complete raceway systems for all wiring. This includes, but is not limited to feeders, branch circuit wiring, temperature controls wiring, data cabling, video cabling, sound system wiring and fire alarm system wiring. Generally auxiliary system and controls wiring is plenum rated so conduit system would consist of junction boxes and conduit in walls or above inaccessible ceilings only. Control and interlock wiring shall be provided under the Mechanical Section.

B. RACEWAY CAPACITY: It shall be the Contractor's responsibility to determine the correct sizes of all types of raceway, to be installed, as instructed in the NEC and all applicable Codes. Runs of underground conduit longer than 80 feet (2438.4 cm) shall be one size larger than NEC requirement, 4" maximum.

C. INSTALLATION:

1. LOCATION: Conceal all raceway systems in ceilings, walls and floors, except feeders serving equipment in mechanical and electrical equipment rooms, and in such other areas as indicated where conduit may be exposed. Keep at least 8" away from any heat producing items. Do not install conduit below grade or in floor slabs unless there is no other way to conceal conduit. Equipment feeders in mechanical rooms or mechanical yards shall be run above grade. Major feeders from switchboard to distribution panels containing 4/0 or larger wire may be run underground. Do not install conduit on roof unless specifically shown to be on the roof or authorized in writing by the Engineer. All junction and pull boxes above accessible ceilings shall be mounted so that the access panel is no higher than 18” above the ceiling.

2. ROUTING: Conduit shall be installed parallel to building coordinates, except for underground feeders from panel to panel may be installed in the most direct manner. Install all horizontal conduit at structure unless mounted to a wall.

3. EXPOSED RACEWAY: Run parallel to walls, ceiling or structural members, in a manner to present a neat appearance. Before installation, explain to the Inspector the proposed method of routing and obtain his approval. Hold all horizontal conduit at ceiling or structure, unless mounted on wall.

4. SUPPORT: Provide adequate and sturdy support for all parts of raceway system. Conduit concealed in walls or slabs may be supported with wire hangers, provided they are of heavy gage and spaced to give adequate strength. Exposed conduit must be supported with materials specifically made for this purpose; do not use wire hangers. Do not attach any parts of raceway system to air conditioning ducts or ceiling systems. Wiring above ceiling without conduit shall be supported from structure with J hooks. Unless described by detail on the drawings, provide Tolco Pipe Pier Supports four foot on center to support conduit on the roof. Select for proper weight loading.

5. CONTINUITY: Make all joints and connections in a manner which will insure mechanical strength and electrical continuity. Use double locknuts and insulated bushings for rigid conduit, and insulated type connectors for EMT conduit 1” and larger for connections to boxes. Provide grounding jumper at each end of a continuous run of conduit, e.g. where a splice is contained in a jbox, at a panel, etc. Use insulated grounding bushings wherever connection is subject to vibration or moisture, such as near mechanical equipment, when internal ground wire is installed, and when concentric or eccentric knockouts are encountered, as well as where reducing washers are used. No insulated grounding bushing is required at a device location with integral grounding screw.

6. PULL BOX LOCATIONS: As required by the National Electrical Code.

7. EXPANSION FITTINGS: Install O. Z. or equal expansion fitting in each run of conduit which crosses building expansion joint, and in all runs longer than 200 feet (6096 cm).

8. CORROSION PROTECTION: For all non-coated metal raceway in contact with concrete or mortar, tape with 3M corrosion protective tape, or equal. Tape shall extend for approximately 6" before entering and after exiting concrete.

9. PULL WIRE: Install nylon pull cord in all empty electrical power raceway systems.

10. OPENINGS: Keep all raceway openings closed in a manner to prevent entry of moisture and foreign materials until conductors are installed.

11. FIRE PROOFING: All power and telephone raceway components passing through or installed within U. L. fire rated walls, ceiling or floor structures shall be fireproofed in the manner prescribed by the U. L. Fire Resistive Index and local building codes. All penetrations shall be fireproofed with 3M Fire Barrier CP25WB caulk, moldable putty or FS-195 wrap/strip installed per the manufacturer's recommendations.

12. MARKING: All junction and pull boxes shall be marked noting electrical circuits contained. Additionally, boxes containing emergency or exit circuits shall have covers painted red. Boxes containing normal high voltage circuits shall have covers painted

yellow. Boxes containing normal low voltage circuits shall have covers painted blue. Paint colors shall be light enough to ensure that the circuit numbers can be easily distinguished.

13. SEALING: All conduit, junction box, outlet box and other penetrations of the building envelop shall be sealed with non-hardening caulking or other non-hardening material as required by the International Energy Conservation Code.

D. MANUFACTURERS: All components of raceway systems must be made in U.S.A. and bear U.L. label.

2.02 CONDUIT

A. CONDUIT TYPES

1. RIGID GALVANIZED STEEL – Threaded fittings

2. PVC COATED RIGID GALVANIZED STEEL - Plasti-Bond REDH2OT with ETL Verified PVC-001 label or equal with ETL label. Provide Plasti-Bond coated couplings, fittings and pulling elbows.

3. PVC CONDUIT – Schedule 40

4. EMT – Steel conduit with steel watertight fittings

5. FLEXIBLE METAL CONDUIT – Greenfield, galvanized steel conduit for field installation of conductors

6. LIQUID TIGHT FLEXIBLE METAL CONDUIT – SealTite Type UA galvanized steel conduit with PVC waterproof coating for field installation of conductors

7. MC CABLE – Flexible steel conduit with factory installed, full size aluminum bonding/grounding conductor and additional stranded green insulated copper conductors. Steel interlocked armor with colorTrak ID system.

8. SURFACE RACEWAY – Wiremold steel raceway, ivory finished and mechanically connected to walls or casework. Type based on application.

9. CABLE TRAYS – Cooper B-Line 36 Series aluminum, ladder type cable tray with 9” rung spacing. Width based on application. Support per manufacturer’s recommendations.

B. TYPE OF CONDUIT FOR VARIOUS LOCATIONS:

1. UNDERGROUND: Rigid galvanized steel or Schedule 40 PVC. Conduit in contact with concrete shall be PVC coated, rigid galvanized steel. Install PVC coated, rigid galvanized steel, long radius elbows where conduit turns up to grade. Elbow shall extend a minimum of 2” above the grade or concrete slab. Encase underground conduit not under building

slab in a 3" red concrete envelope plus two red caution tapes located a minimum of 36" below finished grade to top of envelope (48" if above 600 volts). Notify Inspector for inspection of duct bank at least 24 hours prior to concrete placement. Conduit below building slab or conduit for telephone, data, etc. do not require concrete encasement. Conduit 1” and smaller under the building slab may be run just under the concrete. Larger conduit shall be 24” below finished floor.

a. BENTONITE PLUG: Provide bentonite plug for all conduit routed under exterior grade beam. See structural details for additional requirements on bentonite plug installation.

2. IN POURED CONCRETE WALLS: PVC coated, rigid galvanized steel or Schedule 80 PVC. Install PVC coated rigid steel fittings on PVC conduit prior to conduit exiting concrete.

3. IN MASONRY WALLS: Galvanized steel EMT with steel, watertight fittings.

4. EXPOSED OUTSIDE OF BUILDING: Rigid galvanized steel. For conduit in mechanical courtyard within 50 feet (1524 cm) of a cooling tower provide PVC coated, rigid galvanized steel conduit and fittings.

5. INSIDE OF BUILDING IN CEILING CAVITIES, IN EXPOSED FLOOR OR ROOF STRUCTURE AREAS, OR IN DRY WALL TYPE CONSTRUCTION: Galvanized steel EMT or rigid galvanized steel.

6. EXPOSED ON MASONRY OR PLASTER WALLS IN FINISHED AREAS: Provide only where specifically noted on the drawings. Wiremold V500 metallic raceway, ivory finish, complete with various boxes, devices, offsets and transitions. For data systems provide Wiremold 2000 Series or larger consistent with cabling requirements, ivory finish, metal raceway with various devices, offsets and transitions. Provide Wiremold 4000 two compartment if both data and power wiring are installed together. All raceway shall be mechanically fastened to walls or cabinets. No tapes or glues allowed.

7. IN CONCRETE SLABS: Do not install conduit in concrete slabs.

8. LIGHT FIXTURE WHIPS: No BX cable or flex conduit allowed. Provide MC cable with Steel interlocked armor with colorTrak ID system, full size aluminum bonding/grounding conductor and additional green insulated ground wire. Maximum length shall be less than 72”. Do not loop MC between light fixtures.

9. CONNECTIONS TO MOTOR AND VIBRATING EQUIPMENT: Provide liquid tight construction flexible metal conduit and fittings at wet, damp or outside areas. Connections to mechanical equipment in main mechanical or boiler room, to air handling units, water heaters, transformers and kitchen equipment shall be in flexible metal liquid tight. Minimum length shall be 18”. Maximum length shall be may be up to six feet. Connections for equipment located at spaces for return air plenum space do not require liquid type.

C. MINIMUM CONDUIT SIZE: 3/4" with throat plastic bushing or plastic bushing. Except home run shall be minimum ¾”

D. FITTINGS:

1. RIGID CONDUIT: All rigid galvanized steel conduit shall have threaded fittings with insulated bushings.

2. EMT CONDUIT: Provide insulated bushings for all EMT conduit 1" or larger or housing #6 or larger wires.

3. GROUNDING: Provide fitting with grounding lug where conduit attaches to a painted box (disconnect switch, starter, transformer case, etc), conduit attaches to a box through a knockout which has an associated larger knockout or a reducing washer is used, or conduit contains a feeder from switchgear to switchgear or between switchgear and transformer.

4. TELEPHONE AND DATA CONDUIT: Provide protective bushing on the end of telephone, data, sound system or other conduit stubbed into the ceiling cavity.

E. SPARE CONDUIT: Provide five empty 1” conduit from all recessed electrical panels (such like recessed panels in kitchen area) to above the nearest accessible ceiling.

F. LOW VOLTAGE CONDUCTORS: Low voltage conductors may be run in accessible ceilings without conduit. Provide conduit sleeve with protective end fittings through all walls and floors where raceway system is not installed. All exposed conductors shall be in conduit. All splices shall be in supported junction boxes. Low voltage conductors installed without conduit shall be independently supported on ring hangers, and plenum rated. Low voltage conductors for audio and data wiring shall be stranded unless otherwise recommended by the manufacturer.

2.03 PULL BOXES

A. REQUIRED: Pull boxes, junction boxes, wiring troughs and cabinets wherever required for proper installation of various electrical systems.

B. CONSTRUCTION: Made of code gage steel with sides formed and welded, screw covers unless shown to have hinged doors. Hinged doors to be same as furnished on panel boards, with same locking device. Knockouts shall be factory made or formed in field with a cutting tool which will provide a clean, symmetrically cut hole. Do not gang boxes or use extension rings to increase capacity.

2.04 OUTLET BOXES

A. REQUIRED: For all switches, light fixtures, receptacles and the various other outlets shown.

B. CONSTRUCTION: Galvanized steel, one piece construction, in all cases suitable for intended use. Provide "gang" boxes where devices are shown grouped. Use hot dipped galvanized cast iron for floors or exterior locations.

C. TYPES FOR VARIOUS LOCATION:

1. CEILINGS: 4" square, 2-1/8" deep.

2. DRY WALLS: 4" square, 2-1/8" deep standard galvanized switch box. Provide shallow boxes where necessary. Provide tab to align box with studs.

3. MASONRY WALLS: Galvanized switch boxes designed especially for masonry installations. Depths of boxes must be properly coordinated for each specific installation. Box shall be installed within 1/8” of surface of block.

4. FLOOR: Watertight, adjustable, cast iron.

5. SURFACE MOUNTED: Boxes surface mounted on walls or floor shall be Bell, cast aluminum box with appropriate plate and threaded hubs.

6. BACK-TO-BACK OUTLETS: Outlets shown back-to-back on the drawings are to be installed with a minimum of 6" of lateral separation between outlets for minimum sound transmission. "Through-the-wall" type boxes are not permitted.

7. SPECIAL: Boxes for VGA outlets shall have 1.25” knockouts/lugs.

D. MOUNTING PLATES: Boxes mounted in drywall construction shall have extension plates matched to wall thickness so the box can be mounted flush with the metal stud and the wiring device mounts flush with the wall.

2.05 CONDUCTORS

A. REQUIRED: A complete system of conductors in all raceway systems except where shown otherwise. No conductors are to be installed in telephone conduit. Emergency or exit circuitry shall be installed in a separate raceway system.

B. BUILDING WIRE: 600 Volt, soft drawn annealed copper, 98% conductivity, continuous from outlet to outlet. Minimum wire size #12 except remote control wire may be #14. All wire shall be stranded Type THHN, THW-2 or THWN-2 (wet rated for 90□ C). All wires shall be color coded with same color connected to same ungrounded phase throughout the installation.

C. BURIED GROUND WIRE: Conductors used to interconnect ground rods of a grounding triad or supplemental ground loop shall be minimum #2, bare, tinned, solid copper wire. Connect this wire to rod with short length of same wire, thermo-welded to loop and rod.

D. MANUFACTURERS: Collier, General Cable, General Electric, Simplex, Triangle and Southwire Co.

E. CONNECTORS: Make all connections on #10 and smaller wire with Code approved solderless pressure type insulated connectors; Ideal Wingnut. Solderless lugs must be used for all terminations.

F. TEST: After installation of all conductors, and before final acceptance, make such tests as are required to determine proper functioning of all circuits. Furnish all necessary instruments required to make such tests and correct any deficiencies found.

2.06 CONNECTIONS TO MOTORS, EQUIPMENT AND DEVICES

A. POWER WIRING: Make wiring connections to all mechanical, plumbing and other equipment being installed as a part of this Contract. In addition, make connections to Owner furnished equipment as shown.

B. CONTROL WIRING: Control and interlock wiring for HVAC Systems will be provided by the Mechanical Contractor. Motorized dampers of the same voltage as the associated fan shall be wired by the electrical contractor when the damper is in close proximity to the fan. Under this section provide a 20 amp, 120 volt circuit to the control panel in each mechanical room from the local low voltage panel.

C. CONNECTIONS TO EQUIPMENT: Make connection to each motor and to each piece of equipment subject to vibration with not less than 18" nor more than 24” of flexible conduit. All horizontal runs of conduit (not strapped to walls) must be kept above 7 feet (213.36 cm) high, with a vertical drop to equipment. Conduit blocking walk and service space is not acceptable and will require relocation. Conduit on and adjacent to equipment must be located to allow free access to all removable panels for equipment service. Wire adjacent to heat producing equipment, such as boilers and electric heaters, must be of a type approved for this use.

D. CONNECTIONS TO TRANSFORMERS: Install not less than 18" nor more than 24” of flexible conduit at each connection to floor mounted transformers.

E. CONNECTIONS TO RECEPTACLES: All multiple devices on a circuit such as receptacles shall be back wired with pigtail so device does not provide continuity path.

2.07 GROUNDING

A. GENERAL: Permanently and securely ground the mechanical and plumbing equipment and piping systems, conduit system, panel boards and all other components of the electrical system installed or connected by the Sub-contractor. Follow NEC and building code requirements.

B. CIRCUIT GROUNDS: Provide a green ground wire sized per the NEC for every circuit.

C. EQUIPMENT ENCLOSURES: Make firm ground to raceway system. For equipment connected with flexible conduit or sealtite shall have the specified ground wire installed inside conduit. Do not install on the outside of the conduit.

D. TRANSFORMERS: Each transformer shall have its enclosure and secondary neutral terminal (except when a neutral terminal does not exist) bonded to the building steel and local, driven ground rod.

E. SYSTEM GROUND: Ground system neutral in service entrance equipment to the building steel and three 3/4" x 10 foot (304.8 cm), copperclad, driven ground rods. Install ground rods outside in an equilateral triangle pattern, 10 feet (304.8 cm) on a side, with rod tops 12” below grade. Connect ground wire from rod to rod in a complete loop then extend to service equipment. Use cadweld connections below grade. Refer to drawings.

F. GROUND WIRE CONDUIT: Conduit containing a ground wire shall be grounded at each end to the ground wire.

G. MDF/IDF/TELEPHONE GROUND: Install a #6 ground wire from the telephone board to ground bar and ground rod at the telephone board and connect to building service.

H. SOUND SYSTEM GROUND: Install a #6 ground wire from the amplifier equipment to the ground bar in the Service Entrance Equipment.

2.08 CIRCUITRY

A. The intent of the drawings is to indicate schematically the circuitry required.

B. Install a dedicated neutral for each single pole circuit requiring a neutral per NEC for multiwire branch circuits without 3-pole breaker tie. The ungrounded and neutral conductors of a multiwire branch circuit must be grouped together by cable ties and circuit number tags at the point of origination in side electrical panel. Do not install more than four current carrying conductors in a conduit except nine #12 or #10 conductors may be installed in 3/4" or larger conduit. Install a dedicated neutral for each circuit serving electronic data processing equipment, lighting dimmers and motors. Segregate data processing circuits from other types of circuits. Do not install 480/277 volt conductors in the same conduit with 208/120 volt conductors. Install a green ground wire for each circuit or group of circuits in one conduit.

C. The work performed in grouping conductors in a single raceway shall comply with all applicable articles in the latest edition of the NEC and Local Codes which shall include, but shall not be limited to, ampacity de-rating of conductors and maximum capacities of raceways.

2.09 POWER CONDUCTOR COLOR CODING

A. 480/277 VOLT SYSTEM: Conductors shall have insulation of the proper color as listed below:

1. Phase A - Brown

2. Phase B - Purple

3. Phase C - Yellow

4. Neutral - Natural Gray

5. Ground - Green

6. Isolated Ground - Green w/yellow stripe

B. 208Y/120 VOLT SYSTEMS: Conductors shall have insulation of the proper color as listed below:

1. Phase A - Black

2. Phase B - Red

3. Phase C - Blue

4. Neutral - White

5. Ground - Green

6. Isolated Ground - Green w/yellow stripe

C. 240/120 VOLT DELTA SYSTEMS

1. Phase A - Black

2. Phase B - Orange (high leg of delta)

3. Phase C - Blue

4. Neutral - White w/colored stripe

5. Ground - Green

6. Isolated Ground - Green w/yellow stripe

D. conductors, and size 4 and larger ground conductors.

E. Switch legs are to be color coded the same as the un-switched phase, i.e., all wiring from lighting control panels and contactors shall retain the phase color.

F. If existing construction has a consistent but different color coding, match existing.

2.10 SPECIAL SYSTEMS CABLE COLOR CODING

A. DATA/IP Phone - Blue

B. Wireless (6A) - Blue

C. Access Control / Intrusion - Yellow

D. Video Surveillance (6A) - Purple/Violet

E. Intercom - White

F. Fire Alarm - Red

G. Controls - HVAC - Grey

H. Projector / TV / Sound System - Green

I. Misc Low Voltage/Sound Gray

J. Fiber Optics Black installed in Orange inner duct

K. Note: Contractor shall coordinate with School District for additional cable color coding requirement prior to ordering cables. Provide cable color coding to match existing school district cable color coding as required. Refer to DIV 27 specs for exact location requirments for cable colors and types.

END OF SECTION

SECTION 26 0526
GROUNDING AND BONDING OF ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.01 1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

PART 2 – MATERIALS AND METHODS

2.01 CONDUCTORS

A. REQUIRED: A complete system of ground wires in all raceway systems except where shown otherwise.

B. BUILDING WIRE: 600 Volt, soft drawn annealed copper, 98% conductivity, continuous from outlet to outlet. Minimum wire size #12 except remote control wire may be #14. All wire shall be stranded Type THHN, THW-2 or THWN-2 (wet rated for 90□ C). All ground wires shall have green color insulation. Large conductors may have green tape marking at each end.

C. BURIED GROUND WIRE: Conductors used to interconnect ground rods of a grounding triad or supplemental ground loop shall be minimum #2, bare, tinned, solid copper wire. Connect this wire to rod with short length of same wire, thermo-welded to loop and rod.

D. MANUFACTURERS: Collier, General Cable, General Electric, Simplex, Triangle and Southwire Co.

2.02 GROUNDING

A. GENERAL: Permanently and securely ground the mechanical and plumbing equipment and piping systems, conduit system, panel boards and all other components of the electrical system installed or connected by the Sub-contractor. Follow NEC and building code requirements.

B. CIRCUIT GROUNDS: Provide a green ground wire sized per the NEC for every circuit.

C. EQUIPMENT ENCLOSURES: Make firm ground to raceway system. For equipment connected with flexible conduit or sealtite shall have the specified ground wire installed inside conduit. Do not install on the outside of the conduit.

D. TRANSFORMERS: Each transformer shall have its enclosure and secondary neutral terminal (except when a neutral terminal does not exist) bonded to the building steel and local, driven ground rod.

E. SYSTEM GROUND: Ground system neutral in service entrance equipment to the building steel and three 3/4" x 10 foot (304.8 cm), copperclad, driven ground rods. Install ground rods outside in an equilateral triangle pattern, 10 feet (304.8 cm) on a side, with rod tops 12” below grade. Connect ground wire from rod to rod in a complete loop then extend to service equipment. Use cadweld connections below grade. Refer to drawings.

F. DATA SYSTEM GROUNDING: At each MDF and IDF provide a 24”x3”x1/4” copper ground bar mounted to the wall with isolating standoffs. Provide eight lugs for connecting ground wires up to #6 AWG. Ground the IDF Room bars to the MDF ground bar with #6 AWG daisy chained from bar to bar. Ground the MDF ground bar to the service ground bar in the main switchboard with #6 AWG.

G. ELECTROMAGNETIC SHIELDING: In rooms painted with EMI shielding paint provide grounding system between the painted walls and the local ground bar. These areas include MDF and IDF rooms. Provide Ground-Connection-Set ESK manufactured by Less-EMF Inc. Kit consists of a plate mounted to the wall, with a continuous Conductive Tape extending from the ground bar and attached each wall completely around the room. The mounting plate shall be electrically connected to the room ground bar with the included cable. Refer to manufacturer’s instructions for complete details of the installation.

H. GROUND WIRE CONDUIT: Conduit containing a ground wire shall be grounded at each end to the ground wire.

I. TELEPHONE GROUND: Install a #6 ground wire from the telephone board to the MDF ground bar.

J. SOUND SYSTEM GROUND: Install a #6 ground wire from the amplifier equipment to the ground bar in the Service Entrance Equipment.

PART 3 – INSTALLATION

3.01 ELECTRICAL SYSTEM GROUND TESTING:

A. The resistance of the grounding system to ground shall not exceed 3 ohms for water pipe ground or 6 ohms for driven ground rods. If tests indicate a higher value, additional ground rods shall be installed to reduce the resistance to a value of 6 ohms or less. Whenever connection is required to an existing ground conductor, tests shall be made before connection to ensure that the existing ground conductor is unbroken and continuous. Ground tests shall be performed after at least 7 days of dry weather with test meter supplying a minimum of 50 amps to the ground rod. Auxiliary current electrode shall be approximately 85 feet (2590.8 cm) from ground rod and auxiliary potential electrode shall be 62% of this distance from the ground rod in between the two rods.

END OF SECTION

SECTION 26 0800
ELECTRICAL AND LIFE SAFETY SYSTEMS TECHNICAL COMMISSIONING REQUIREMENTS

PART 1 – GENERAL

1.01 REFERENCE STANDARDS

A. NECA 90 - Standard for Commissioning Building Electrical Systems; 2015.

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions Specification Sections, apply to this Section.

B. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them.

1.03 SUMMARY

A. The purpose of this Section is to define responsibilities in the Commissioning Process. Other electrical system testing is required under other Division 26 Specification Sections. National Electrical Installation Standards (NEIS) NECA 90-2004, “Recommended Practice for Commissioning Building Electrical Systems”, 27th Volume of the NEIS Series, provides additional guidance for the commissioning of electrical systems.

B. Commissioning requires the participation of the Contractor to ensure that all systems are operating in a manner consistent with the Contract Documents. Division 26 and 28 Contractors shall be familiar with all parts of the General Commissioning Requirements and the Commissioning Plan issued by the Owner’s CxA, shall execute all Commissioning responsibilities assigned to them in the Contract Documents and include the cost of Commissioning in the Contract price. Commissioning agent shall be selected and employed by the owner.

C. Electrical Testing Agency (ETA)

1. The Contractor shall retain an independent Electrical Testing Agency (ETA). Their specific testing responsibilities are delineated in individual technical sections within Division 26. This generally requires checking and testing of the electrical power distribution equipment per National Electrical Testing Association (NETA) Acceptance Testing Standards (ATS).

2. Attend, as needed, Pre-Commissioning Meeting(s), Pre-Installation Meeting(s), and other Project meetings scheduled by the Contractor, Owner or CxA to facilitate the Commissioning process.

3. Obtain all required manufacturer's data to facilitate tests.

4. Provide assistance to the CxA in preparation of the specific System Verification Checklists (SVC) and Functional Performance Test procedures.

5. Generally, the ETA shall provide their standard forms to document the NETA tests to be incorporated into the System Verification Checklists and Functional Performance Test records.

6. The ETA shall assist the Contractor in completing required SVC information such as relay settings, protective overload settings, and equipment ratings utilizing the protocols in the Commissioning Plan.

7. Perform and clearly document all completed Start-up and system operational checkout procedures, providing a copy to the Contractor.

8. Clearly indicate any deficiencies identified during testing and add to an action list for resolution and tracking. The field technicians shall keep a running log of events and issues.

9. Provide skilled technicians to execute testing. Ensure that they are available and present during the agreed-upon schedules and for sufficient duration to complete the necessary tests, adjustments and problem solving.

D. Electrical systems to be commissioned include the following:

1. Lighting Controls - Occupancy Sensors (All assembly/large space, 25% for rest)

2. Lighting - Daylight Controls (100%)

3. Lighting - Time Switch Controls (100%)

4. Emergency genset & ATS emergency startup timing

1.04 DEFINITIONS

1.05 REFER TO DIVISION 01: GENERAL COMMISSIONING REQUIREMENTS FOR DEFINITIONS.

1.06 SUBMITTALS

A. Contractor shall provide Owner and / or CxA with documentation required for Commissioning Work. At minimum, documentation shall include: Detailed Start-up procedures, full sequences of operation, Operating and Maintenance data, performance data, control drawings, and details of Owner-contracted tests.

1. Shop drawings and product submittal data related to systems or equipment to be commissioned.

B. Contractor shall submit to Owner and / or CxA installation and checkout materials actually shipped inside equipment and actual field checkout sheet forms used by factory or field technicians.

C. Where installation testing may be performed in a progressive manner (ie. grounding systems, insulation resistance, etc.), the Contractor shall prepare and submit to the Owner, A/E team and CxA a testing plan that details how the progressive testing will be performed, documented and presented for approval prior to the start of any testing activities.

D. Contractor shall provide Owner with documentation required for Commissioning work. At minimum, documentation shall include: Detailed Start-up procedures, Full sequences of operation, Operating and Maintenance data, Performance data, Functional Performance Test Procedures, Control Drawings, and details of Owner-Contracted tests.

E. Contractor shall provide any additional documentation needed to complete the requirements of the Commissioning Process

1. Factory Performance Test Reports: Review and compile all factory performance data to assure that the data is complete prior to executing the FPTs.

2. Incorporate manufacturer's initial energizing / startup procedures with System Verification Checklists.

3. Final Electrical Testing Agency (ETA) Reports documenting all NETA requirements indicated in the Project Documents

4. Completed equipment Start-up certification forms along with the manufacturer's field or factory performance and Start-up test documentation.

5. Operating and Maintenance (O&M) information per the requirements of the Technical Specifications and Division 01 requirements.

PART 2 – PRODUCTS

2.01 GENERAL

A. All materials and installation shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

B. Refer to the General Commissioning Requirements for other work products related to the Commissioning Process

C. Contractor is required to follow all applicable industry and site specific safety practices, lockout / tagout requirements, specialized PPE requirements, and provide qualified, trained personnel to execute Commissioning Process requirements.

2.02 TEST EQUIPMENT

A. The Contractor shall provide all specialized tools, test equipment and instruments required to execute Start-up, checkout, and testing of equipment.

B. All specialized tools, test equipment, and instruments required to execute Start-up, checkout, and testing of equipment shall be of sufficient quality and accuracy to test and/or measure system performance within specified tolerances. A testing laboratory must have calibrated test equipment within the previous twelve (12) months. Calibration shall be NIST traceable. Contractor must calibrate test equipment and instruments according to manufacturer's recommended intervals and whenever the test equipment is dropped or damaged. Calibration tags must be affixed to the test equipment or certificates readily available.

PART 3 – EXECUTION

3.01 CONSTRUCTION PHASE

A. In each purchase order or subcontract that is written for changes in scope, include the appropriate requirements for submittal data, commissioning documentation, testing assistance, Operating and Maintenance (O&M) data, and training, as a minimum.

B. Attend Pre-Commissioning Meeting(s), Pre-Installation Meeting(s), and other Project meetings scheduled by the Owner, CxA or Contractor to facilitate the Commissioning process.

C. Provide manufacturer's data sheets and shop drawing submittals of equipment.

D. Provide additional requested documentation to the Owner and / or CxA, prior to O&M manual submittals, for development of System Verification Checklists and Functional Performance Testing procedures.

1. Typically, this will include detailed manufacturer's installation and Start-up, operating, troubleshooting and maintenance procedures, full details of any Owner-contracted tests, full factory testing reports, if any, and full warranty information.

2. In addition, the installation, Start-up, and checkout materials that are actually shipped inside the equipment and the actual field checkout sheet forms to be used by the factory or field technicians shall be submitted to the Contractor and / or CxA.

3. This information and data request may be made prior to normal submittals.

E. With input from the Lighting Controls, PCMS vendors and A/E, clarify the operation and control of commissioned equipment in areas where the Specifications, control drawings, or equipment documentation are not sufficient for writing detailed test procedures.

F. During the installation, Start-up and initial checkout process, execute and document related portions of the System Verification Checklists for all commissioned equipment according to the procedures indicated in the Commissioning Plan.

G. Factory Start-ups: Factory Start-ups are specified for certain equipment. Factory Start-ups generally are Start-up related activities that will be reviewed and checked prior to Functional Performance Tests. All costs associated with factory Start-ups shall be included with the contract price unless otherwise noted. Notify the Commissioning Team of the factory Start-up schedule and coordinate these factory Start-ups with witnessing parties. The Commissioning Team members may witness these Start-ups at their discretion.

H. Independent Testing Agencies: For systems that specify testing by an independent testing agency, the cost of the test shall be included in the Contract price unless otherwise noted. Testing performed by independent agencies may cover aspects required in the System Verification Checklists, Start-ups, and Functional Performance Tests. Coordinate with the independent testing agency so that CxA, Owner and/or A/E can witness the test to ensure that applicable aspects of the test meet requirements.

I. Provide skilled technicians to execute starting of equipment and to assist in execution of Functional Performance Tests. Ensure that they are available and present during the agreed-upon schedules and for a sufficient duration to complete the necessary tests, adjustments, and problem solving.

J. Correct deficiencies (differences between specified and observed performance) as interpreted by the Owner’s Project Manager and A/E and retest the system and equipment.

K. During construction, maintain as-built marked-up Drawings and Specifications of all Contract Documents and Contractor-generated coordination Drawings. Update after completion of Commissioning activities (include deferred tests).

L. Provide training of the Owner’s operating personnel as specified.

M. Coordinate with equipment manufacturers to determine specific requirements to maintain the validity of the warranty.

3.02 WARRANTY PHASE

A. Execute seasonal or deferred tests, witnessed by the CxA and Owner, according to the Specifications.

1. Complete deferred tests as part of this Contract during the Warranty Period. Schedule this activity with the Owner.

B. Correct deficiencies and make necessary adjustments to O&M manuals, Commissioning documentation, and as-built drawings for applicable issues identified in any deferred or seasonal testing.

3.03 INSTALLATION

A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.

B. All installation shall be in accordance with the Project Documents.

3.04 TRAINING

A. Refer to the individual section of this Specification for specific training requirements on each system.

B. Refer to the General Commissioning Requirements and Division 01 of the Project Specifications for overall training requirements related to the Commissioning process and this project.

END OF SECTION

SECTION 26 0923
STAND-ALONE LIGHTING CONTROL DEVICES AND EQUIPMENT

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 SUBMITTALS

A. Provide submittals as outlined in Section 26 00 00 General Electrical

1.03 QUALITY ASSURANCE

A. Product manufacturer shall have a minimum of (5) years' experience in the manufacturing of occupancy sensors.

B. All components shall be UL listed, meet all state and local applicable code requirements.

C. All components shall offer a five (5) year manufacturer's warranty.

1.04 ACCEPTABLE MANUFACTURERS

A. Cooper ILC

1.05 GENERAL

A. Provide the quantity of "Stand-Alone" digital lighting controller, digital lighting switches, occupancy sensors and power packs required for complete and proper volumetric coverage to completely cover the controlled areas. Contractor shall verify room coverage and ceiling heights with manufacturer and provide the quantity of occupancy sensors as required. Rooms shall have one hundred (100) percent volumetric coverage of small motion detection to completely cover the controlled areas to accommodate all occupancy habits of single or multiple occupants at any location within the room(s). The locations and quantities of sensors shown on the drawings are diagrammatic and indicate only rooms that are to be provided with sensors. Proper judgment must be exercised in executing the work so as to ensure the best possible installation in the available space and to overcome local difficulties due to space limitations or interference of structural or architectural components. Provide sensors to provide complete and proper volumetric coverage. Sensor wall switches are not allowed.

B. Stand Alone Digital Lighting Controllers, occupancy sensors/vacancy sensors and multiple button lighting control stations shall be located in accessible ceiling spaces.

C. In rooms such as Library / Cafeteria / PE, etc. with light switches / circuits operating separate areas of room, provide Relay Control Panels with additional 2-hour override switches for control of each switched area.

D. Low voltage cabling is to be green with black stripe in color, Plenum Rated.

E. Where ceilings are above 12 feet (365.76 cm) provide wall mounted sensors at 10 feet (304.8 cm) AFF where practical or shown on prints, and high bay sensors where the wall mounted would not be practical.

PART 2 – MATERIALS AND METHODS

2.01 OCCUPANCY SENSORS AND LIGHTING CONTROL EQUIPMENT

A. GENERAL: Provide occupancy sensors with associated accessories including Stand Alone Digital Lighting Controllers and Digital Light Switches for rooms noted on the drawings. Units shall be suitable for both 120V and 277V. Refer to the Drawings for proposed layout. Supplier shall have factory review layout, provide additional devices as necessary at no additional cost, and certify the proper operation of the sensor system. Devices shall be factory set at 100% sensitivity and 30 minutes or more minimum ON time.

B. Stand Alone Digital Lighting Controller: Provide non-Dimming Room Controller for room with non-dimmable light fixtures. Digital Lighting Controller shall have quantity of relays match the number of lighting load in each room. For Example, provide minimum of 3 relays to control 3 lighting loads. Cooper Lighting Solutions RC3DE-PL. For room with more than 3 lighting loads, provide additional Digital Lighting Controllers.

C. Stand Alone Digital Lighting Controller-Dimmable: Provide Dimming Room Controller for room with dimmable light fixtures. Digital Lighting Controller shall have quantity of relays match the number of lighting load in each room. For Example, provide minimum of 3 relays to control 3 lighting loads. Cooper Lighting Solutions RC3DE-PL. For room with more than 3 lighting loads, provide additional Digital Lighting Controllers. Provide matching Digital Dimmer Light Switches.

D. WALL MOUNTED DUAL CIRCUITS SWITCH OCCUPANCY SENSOR: Dual Circuits to control two lighting loads. Passive infrared type with 180º field of view, tamper resistant lens. Unit shall have no minimum load requirement and fit standard single gang outlet box. Provide LED walk test indicator and one or two electronic OFF-AUTO switches depending on switching arrangement. Unit shall have field adjustable time delay and sensitivity adjustment. Cooper Lighting Solutions RC-2TLB-221.

E. WALL MOUNTED SINGLE CIRCUIT SWITCH OCCUPANCY SENSOR: Single Circuits to control only one lighting load. Passive infrared type with 180º field of view, tamper resistant lens. Unit shall have no minimum load requirement and fit standard single gang outlet box. Provide LED walk test indicator and one or two electronic OFF-AUTO switches depending on switching arrangement. Unit shall have field adjustable time delay and sensitivity adjustment. Cooper Lighting Solutions RC-1TLB-101.

F. DUAL TECHNOLOGY CEILING MOUNTED: Dual technology infrared and ultrasonic detection system. Unit shall have field adjustable time delay and sensitivity adjustment. LMDC-100 or equal depending on room size and configuration. White Finish. Cooper Lighting Solutions OAC-DT-1000-R.

G. ULTRASONIC CEILING MOUNTED: Ultrasonic detection system for locker rooms and restrooms. Unit shall have field adjustable time delay and sensitivity adjustment. Cooper Lighting Solutions OAC-U-1000R.

H. CEILING MOUNTED (SMALL ROOMS): Infrared technology with field adjustable timer. Cooper Lighting Solutions OAC-P-1500-R

I. CEILING MOUNTED HIGH BAY SENSOR: Cooper Lighting Solutions OXC-P-1500-R

J. WALL MOUNTED HIGH CEILING AREAS: Wall mounted Infrared detection system rated for ceiling higher than 10 FT. Cooper Lighting Solutions OAWC-P

K. POWER PACK: Cooper Lighting Solutions SP20-RD4

L. EMERGENCY LIGHTING CONTROLLER / GENERATOR TRANFER DEVICE - GTD: Generator transfer device to transfer power source for light fixture from normal circuit to emergency circuit. Cooper Lighting Solutions ELCU-200.

M. EMERGENCY LIGHTING CONTROLLER / GENERATOR TRANFER DEVICE - GTD FOR DIMMABLE LIGHT FIXTURE: Generator transfer device to transfer power source for light fixture from normal circuit to emergency circuit. Device shall disconnect 2-10V dimming control wire when transfer power source from normal power to emergency power. Cooper Lighting Solutions Evenlite ELCD 924. Program device delay to be zero.

N. PHOTOSENSOR: Cooper Lighting Solutions DSRC-FOMIR

O. DIGITAL WALL LIGHT SWITCH:

1. Single Button: Cooper Lighting Solutions RC-1TLB-101

2. Dual Buttons: Cooper Lighting Solutions RC-2TLB-221

3. Three Buttons: Cooper Lighting Solutions RC-3TLB-331

4. Four Buttons: Cooper Lighting Solutions RC-4TSB-XX

5. Eight Buttons: Cooper Lighting Solutions RC-6TSB-XX

P. DIMMER LIGHT SWITCH. Greengate WBSD-010M-C1

Q. LOW VOLTAGE MOMENTARY CONTACT KEY SWITCH: Hubbel Controls LV series Heavy Duty Key Switch.

1. Model: LVSKEY-3M-SS

2. Key:#126

3. Provide in following spaces:

a. All security pad locations.

b. Ancillary spaces as required

4. Keyed switch to sweep all associated lights on for a period of time(final amount of time to be confirmed by owner). Control will return to standard control schedule after time out.

R. DIGITAL INPUT/OUTPUT INTERFACE: Cooper Lighting Solutions OCC-RJ45.

S. LOW VOLTAGE LIGHTING CONTROL RELAY PANEL: In rooms such as Library / Cafeteria / PE, etc. with light switches / circuits operating separate areas of room, provide Relay Control Panels with additional 2-hour override switches for control of each switched area.

T. ACCESSORIES: Provide power packs for ceiling mounted units including multiple switching capabilities, wire guards where noted and hard ceiling adapters as necessary. Provide auxiliary dry contact (NO in lights off state), -RP option.

U. Spares: Include additional spare devices including installation, raceway and wiring where directed during construction. Items not installed shall become spares and be delivered to the Owner.

1. Room Controllers (3)

2. Occupancy Sensors (3 of each type)

3. Emergency Bypass Controllers (3)

4. Low Voltage Switches (3 of each type)

5. Daylight Harvesting Photocells

V. SUBMITTAL: Include equipment, wiring diagrams and installation floor plan.

2.02 OUTDOOR LIGHTING CONTROL

A. GENERAL: Outdoor lighting circuits shall be controlled by lighting relay panel and BAS control points. Lighting relay panel shall be provided by Electrical Contractor. BAS lighting control points shall be provided by Mechanical Contractor.

B. Emergency lighting controller / Generator transfer lighting control device for outdoor lighting shall be wall mounted in the mechanical/electrical room must be 20A rated manufactured by Bodine GDT20A or other approved GTD manufacturer listed on this section.

2.03 SUBMITTALS

A. Submit manufacturer's data on lighting control system and components including shop drawings, detailed point to point wiring diagrams, and floor plans showing occupancy and daylighting sensor locations. Provide typical mounting details for occupancy and daylighting sensors for this application. Include equipment, wiring diagrams, programming and installation floor plan.

PART 3 – EXECUTION

3.01 INSTALLATION

A. The installing electrical contractor shall complete, prior to request of Manufacturer factory start up and site commissioning, complete installation of all relay panels, their respective loads landed and confirmed operations, switches installed, and confirmed operational, and the entire data network shall be pulled from all panels to the designated IT room as indicated on plans.

B. The installing contractor shall, prior to request of Manufacturer factory start up and site commissioning, request a site visit by the local authorized Manufacturer rep to assist in identification of any open ended issues, thereby eliminating potential for delays and system commission interruptions. The pre commissioning meeting shall include the local rep, the New Caney ISD project manager, the New Caney ISD energy manager, the electrical contractor and the general contractor.

C. Upon confirmation of progress by local factory authorities, the installing electrical contractor will complete the start up request form found in the Manufacturer submittals, including any relay/circuit, and switching changes from the contract documents. This is essential to facilitate substantial completion.

D. The installing electrical contractor shall clearly label all low voltage wiring inside the relay controllers. Labels shall be typed and indicate what they are connected to (switch, occupancy sensor, etc..) and what room they are connected to. Labels shall be Panduit Permanent Labels or Brother Cable Labels. The room # shall include both the architectural plan room numbers as well as the room numbers to be shown on the signage.

E. All low voltage wiring inside the relay controllers must be clean and organized. Wire nuts are not acceptable, only compression fittings.

F. Low voltage wire shall be terminated so the wire jackets match the color coding on the termination blocks.

G. Attic stock. Electrical contractor shall provide the following spare parts package to turn over to the owner within thirty (30) days of substantial completion of the project. This material is to be ordered separately when commissioning is scheduled in order to ensure the longest warranty period possible.

1. Room Controllers (3 of each type)

2. Occupancy Sensors (3 of each type)

3. Emergency Bypass Controllers / Generator Transfer Devices - GTD (3)

4. Low Voltage Switches (3 of each type)

5. Daylight Harvesting Photocells (3)

6. Provide installation for the above items where directed during construction at no additional cost to Owner. Items not installed shall become spares and be delivered to maintenance department.

H. Install Stand Alone Digital Lighting Controller in ceiling cavity above digital light switch.

I. Low voltage RJ45 cabling installed from Digital Lighting Controller to sensor(s) and from sensor to sensor shall be supported every 4 feet (121.92 cm) at a minimum height of 3 feet (91.44 cm) above grid/ceiling. Support system shall be ceiling wire attached to structure and clipped to ceiling support grid using Caddy drop wire securing clip #EC311. Cabling is to hang plumb to devices.

J. Low voltage cables at exposed area or above sheet rock ceiling shall be installed in conduit.

K. Provide ceiling sensors rated for specified ceiling height as shown on Architectural Ceiling Plan. See Architectural Ceiling Plan for specified ceiling height.

L. Provide wire guard for occupancy sensor in areas subject to physical damage.

M. Occupancy sensor feature, setting and control sequence must comply with latest IECC code and City requirement.

N. Occupancy Sensors shall have dual technology infrared and ultrasonic detection system. Unit shall have field adjustable time delay and sensitivity adjustment.

O. Location of all sensors is approximate. Review installation instructions before installing sensors.

P. To prevent false activation, Ultrasonic ceiling mount sensors should be mounted away from the path of strong air turbulence. In normal airflow conditions sensors should be mounted four to six feet away from source. For typical placement, ref to location diagrams. In locations with strong air turbulence a PIR ceiling sensor should be considered.

Q. Contractor should follow manufacturer's recommended placement and verify circuits with respect to digital lighting controller and power pack needed in the field.

R. Adjust sensor to de-energize lighting after 30 minutes of inactivity.

1. SUPPORT SERVICES

S. System Start Up and Commissioning:

1. Manufacturer shall provide a factory authorized technician to confirm proper installation and operation of all lighting control system components. The startup requirement is intended to verify:

a. That all occupancy and daylighting sensors are located, installed, and adjusted as intended by the factory and the contract documents.

b. The occupancy sensors and daylighting sensors are operating within the manufacturers specifications.

c. The sensors and room controllers interact as a complete and operational system to meet the design intent.

2. Manufacturer to provide a written statement verifying that the system meets the above requirements.

T. System Training:

1. Manufacturer shall provide factory authorized technician to train owner personnel in the operation, programming and maintenance of the lighting control system including all occupancy sensors and daylighting controls.

U. System Programming:

1. Manufacturer shall provide system programming including:

a. Wiring documentation.

b. Switch operation.

c. Occupancy sensors.

d. Photocells

2. Provide computer generated documentation on the commissioning of the system including a room by room description of:

    a. Sensor Parameters, time delays, sensitivities and daylighting setpoints.

    b. Sequence of operation (e.g. manual on, auto off, etc.)

    c. Load Parameters (e.g. blink warning, etc.)

V. Re-Commissioning:

1. After 90 days from occupancy the factory authorized representative and electrical contractor shall re-calibrate all sensor time delays and sensitivities to meet the Owner's Project Requirements. Provide a detailed report to the Architect/Owner of all re-commissioning activity and changes.

W. Warranty

1. Provide a five (5) year complete manufacturer's warranty on all products to be free of manufacturers' defects.

2. System warranty shall be for one (1) year of complete maintenance coverage after final acceptance of the system and include all material and labor to provide consistent peak performance of the system. Post-warranty maintenance shall be available on contract or call basis.

END OF SECTION

SECTION 26 0926
LIGHTING CONTROL PANELBOARDS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 SUBMITTALS

A. Provide submittals as outlined in Section 26 00 00 General Electrical

PART 2 – PRODUCTS

2.01 LIGHTING CONTROL PANELS

A. GENERAL: Provide lighting control panel for those areas noted on the Drawings. These are generally installed for the Gymnasium and Cafeteria.

B. CONTROLLER: Unit shall have eight inputs and control eight 20 amp outputs, suitable for 120 and 277 volts. Unit shall be programmable through keypad with two line LCD backlit display with prompts. Provide 7 day memory backup. Provide BacNet interface to optionally allow building energy management system to schedule lighting.

C. TIME CLOCK: Internal time clock shall have astronomical control feature, auto daylight savings time option, 64 time-of-day schedules and 32 holiday groups.

D. OPERATION: Unit shall allow individual or group control of the eight circuits. Individual circuits shall be controlled ON or OFF by local momentary switch operation, and automatic shutoff at night. Each circuit may be programmed to “warn-off” by momentary flashing of lights to allow occupants to exit the area or opportunity to override automatic off. Warn-off and override times shall be programmable.

E. MANUFACTURER: Hubbell Automation Systems Model LX8-IP-120-277 with LXJNSYS2 BACNET IP interface or equal product approved by NCISD.

PART 3 – EXECUTION

3.01 INSTALLATION SHALL COMPLY WITH MANUFACTURER'S REQUIREMENTS AND INSTALLATION DETAILS ON THE DRAWINGS.

END OF SECTION

SECTION 26 2213
LOW VOLTAGE DISTRIBUTION TRANSFORMERS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 SUBMITTALS

A. Provide submittals as outlined in Section 26 00 00 General Electrical

PART 2 – PRODUCTS

2.01 STANDARD DRY TYPE TRANSFORMERS

A. GENERAL: Provide U. L. labeled, copper or aluminum wire wound, two winding type units, NEMA 3R construction suitable for location installed. Refer to Drawings for KVA ratings. Provide K=1 for normal power. Provide K=13 for computer power.

B. TEMPERATURE RISE: Design shall use 220° C insulation and operate with a maximum temperature rise of 115° C above a 40° C ambient.

C. TAPS: High voltage windings shall be provided with two 2½% taps FCAN and four 2½% taps FCBN.

D. NOISE: The manufacturer shall properly isolate the core and coil from the enclosure with vibration isolation pads in order to minimize the transmission of vibration and noise. Noise levels shall not be more than NEMA and ANSI Standards.

E. IDENTIFICATION: Install lamacoid nameplate with 5/16" letters on front face showing transformer name and voltage. Attach with mastic and two screws. Coordinate to give same name as shown on drawings. Example:

1. Transformer XL 45 KVA

2. 480V-208Y/120 Volts, 3 Phase, 4 Wire

F. MANUFACTURERS: General Electric, HeviDuty, Siemens and Square D.

PART 3 – EXECUTION

3.01 INSTALLATION SHALL COMPLY WITH MANUFACTURER'S REQUIREMENTS AND INSTALLATION DETAILS ON THE DRAWINGS.

END OF SECTION

SECTION 26 2413
SWITCHBOARDS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 SUBMITTALS

A. Provide submittals as outlined in Section 26 00 00 General Electrical

PART 2 – PRODUCTS

2.01 SWITCHBOARDS

A. GENERAL: Universal building type switchboard fabricated in accordance with NEMA standards. Switchboards and circuit breakers shall be listed for use with 75° C wiring.

B. CABINETS: All switchboards 1600 amp and larger shall be totally enclosed free standing circuit breaker type switchboards as shown on the electrical drawings. The switchboard framework shall be formed code gauge steel, rigidly welded and bolted together to support all cover plates, bussing and component devices during shipment and installation. Each switchboard section shall have an open bottom and removable top, front and side plate. All circuit breaker connections shall be front accessible. The paint finish shall be gray enamel over a rust-inhibiting phosphate primer.

C. BUSSING: The switchboard bussing shall be silver plated copper and of sufficient cross-sectional area to continuously conduct rated full load current with a maximum average temperature rise of 65° C, above an ambient temperature of 40°C. The main horizontal bus bars between sections shall be located on the back of the switchboard to permit a maximum of available conduit area. The horizontal main bus bar supports, connections, and joints are to be bolted with grade 5 carriage bolts and Belleville washers to be free of required periodic maintenance. Drill bus bars for future extension both directions. Provide a full length ground bus in each cubicle.

D. SHORT CIRCUIT RATING: Each switchboard, as a complete unit, shall be given a single integrated equipment rating by the manufacturer. The integrated equipment short-circuit rating shall certify that all equipment is capable of withstanding the stresses of a fault equal to that of the least overcurrent protective device contained therein. Such rating shall be established by actual tests by the manufacturer on similar equipment construction as the subject switchboard. Busses shall be braced for a minimum of 50,000 amps symmetrical at 480V.

E. CIRCUIT BREAKERS: Circuit breakers shall be equipped with individually insulated, braced and protected connectors. Tripped indication shall be clearly shown by the circuit breaker handle taking a position between ON and OFF. All circuit breakers shall have an interrupting rating as shown on the drawings. Circuit breakers through 600A shall be Square D I-Limiter type. Circuit breakers 1000A and larger shall be Square D Type SE with LSG trip. When adjustable trip circuit breakers are provided, manufacturer shall provide system coordination study with recommended settings.

F. INSTRUMENTATION: Provide Square D Powerlogic Model CM4250 monitoring system sensing the entire switchboard. The display shall be mounted no lower than 45” nor higher than 72” above the concrete pad. The monitoring system shall provide readouts for current-per-phase, phase-to-neutral voltage, phase-to-phase voltage and have waveform capture. System shall store historical information of these values for the past seven days. System shall have optical port for downloading information to a computer as well as having a method of connecting a remote computer for real time monitoring system. Factory representative shall set up meter per the Engineer’s direction and include two site visits during the warranty period (as needed) to assist in analyzing power quality problems. Meter to have BACNET capability to send data to BAS.

G. SUPPRESSORS: Provide Square D Model SP3650 lighting surge suppresser with capacitor. Provide Square D Model IMA240 TVSS (rated for 240kA) with dry contacts and surge counter. Equipment shall be mounted in the switchboard.

H. COORDINATION STUDIES: Provide coordination studies and recommend setting of circuit breakers sealed by a manufacturer’s professional engineer. If Switchgear does not have adjustable setting for circuit breakers, then manufacturer does not need to submit coordination studies.

I. TESTING: Provide testing and test report for main circuit breaker.

J. NAME TAGS:

1. Identify each device, space and meter with an engraved lamacoid nameplate (5/16" high letters) showing equipment served and trip setting or space size. Attach nameplates with mastic and two sheetmetal screws.

2. Provide a master nameplate on switchboard stating:

    a. Switchboard Name

    b. 480Y/277V, 3 phase, 4 wire

3. Main Buss: 2000 amps braced for 50,000 amps symmetrical

    a. Date Installed:

K. ACCEPTABLE MANUFACTURERS: General Electric, Siemens, and Square D.

PART 3 – EXECUTION

3.01 INSTALLATION SHALL COMPLY WITH MANUFACTURER'S REQUIREMENTS AND INSTALLATION DETAILS ON THE DRAWINGS.

3.02 HOUSEKEEPING PAD

A. Provide 4" thick concrete pad for each unit. Concrete pads shall be sized for the equipment to be supplied. Pad shall exceed base dimensions by approximately 4" all around. Reinforce pads rebar including #4 bar around perimeter minimum, see structural/architectural drawings for additional requirements. Tool pad to form chamfered edge.

END OF SECTION

SECTION 26 2416
PANELBOARDS

PART 1 – GENERAL

1.01 REFERENCE STANDARDS

A. UL 67 - Panelboards; Current Edition, Including All Revisions.

1.02 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.03 SUBMITTALS

A. Provide submittals as outlined in Section 26 00 00 General Electrical

PART 2 – PRODUCTS

2.01 LIGHTING PANELS

A. GENERAL: Circuit breaker type; Square D Type NQOD for 120/208-240 Volts, NF for 277/480 Volts. Construction shall comply with NEMA and U. L. Standards. Panels and circuit breakers shall be listed for use with 75° C wiring. Mount panel with top of can at 72" above finished floor.

B. CABINETS: Safety dead front type with front hinged to box; box made of code gage galvanized steel; provide wire bending space per NEC Table 373-6; door with flush type combination lock and latch, all keyed alike.

C. CIRCUIT BREAKERS: Plug in for 120/208-240 Volts, bolt in for 277/480 Volts; quick make, quick break, trip free, thermal magnetic trip; automatic tripping indicated by handle at midpoint position; multi-pole breakers to have common trip (handle ties are not acceptable). Minimum interrupting ratings shall be 14,000 Amps symmetrical at 277/480 Volts and 10,000 Amps symmetrical at 120/208-240 Volts. All main circuit breakers shall be rated 22,000 Amps minimum. Ratings as scheduled on drawings. Square D I-line construction with plug on breakers is acceptable for 277/480 Volts. Install circuit breakers in same order as shown on the drawings. Where spaces are noted, provide bus connectors and all other provisions necessary to add future breakers of any size and number of poles up to 100 amp and three poles.

D. BUSSING: Tin plated copper sized in accordance with NEMA temperature rise standards and installed completely throughout panel for installation of future breakers where schedule shows space only. Lugs U. L. rated for Cu/Al terminations. Unless indicated otherwise on drawings,

bus bracing shall be 22,000 Amps symmetrical. Panels with 24 or more circuits shall have a minimum of 225 Amp bussing. Provide a ground bar in the Service Entrance Equipment and in each electrical panel having a branch circuit ground wire.

E. SURGE SUPPRESSION: Panels noted to have TVSS surge suppression shall include TVSS externally mounted and wired to 30A/3P circuit breaker in panel.

F. DIRECTORY: Complete at end of job, typewritten, stating equipment or rooms served by circuit. Type even circuits on right side of card, odd on left side.

G. FINISH: Gray enamel over rust inhibiting treatment after fabrication and before assembly. After installation, and before acceptance by the Owner, assembly shall be painted with a rust inhibiting paint (color selected by Architect). Recessed cans may have galvanized finish.

H. NAMEPLATE: Provide lamacoid nameplate with 5/16" letters on front face showing panel name and voltage. Attach with mastic and two screws. Coordinate to give same name as shown on panelboard schedule. Example:

1. Panel LA 225 MCB

2. 120/208 Volts, 3 Phase, 4 Wire

I. ACCEPTABLE MANUFACTURERS: General Electric, Siemens, and Square D.

2.02 DISTRIBUTION PANELS

A. GENERAL: Construction in accordance with NEMA standards. Panels and circuit breakers shall be listed for use with 75° C wiring.

B. CABINETS: Panelboard assembly shall be safety dead front type with front hinged to box, enclosed in a code gauge steel cabinet with removable endwalls. Fronts shall be of code gauge, full-finished steel with rust-inhibiting primer and baked enamel finish. Provide locking door unless panel is located in a mechanical room. Provide the largest cabinet available for the ampacity panel schedules.

1. Bottom of cabinet to be no less than 3' above finished floor for all areas prone to water spray. These areas include but are not limited to all kitchen and CTE space panels.

2. When two panels are shown side by side with same panel name, separate panels are to be supplied.

C. BUSSING: Bus structure and main lugs shall have current ratings as shown on the panelboard schedule. Such ratings shall be established by heat rise tests with maximum hot spot temperature on any connector or bus bar not to exceed 122 degrees Fahrenheit (50 degrees Celsius) rise above ambient. Heat rise tests shall be conducted in accordance with Underwriters' Laboratories Standard UL 67. Busses shall be tin plated copper braced for the scheduled fault current (50,000 amperes minimum). Bussing shall accept the largest circuit breaker available for

the ampacity scheduled even though only smaller size CB's are listed. Where space only is shown, bussing shall allow any combination of 1, 2 and 3 pole circuit breakers of various frame sizes.

D. CIRCUIT BREAKERS: Circuit breakers shall bolt in or have Square D I-Line plug on construction. Circuit breakers shall be equipped with individually insulated, braced and protected connectors. Tripped indication shall be clearly shown by the breaker handle taking a position between ON and OFF. Trip ratings of the circuit breaker shall be as shown on the panelboard schedule. All spaces shown shall include all buss connectors and any other provisions necessary for future breaker additions. Minimum 18,000 amperes interrupting capacity for circuit breakers 100A and larger.

E. NAMEPLATES: Provide lamacoid nameplate for panel stating name, voltage, amps & bracing. Provide lamacoid nameplate for each device and space stating equipment served and trip setting. Attach with mastic and two screws.

F. ACCEPTABLE MANUFACTURERS: General Electric, Siemens and Square D.

PART 3 – EXECUTION

3.01 INSTALLATION SHALL COMPLY WITH MANUFACTURER'S REQUIREMENTS AND INSTALLATION DETAILS ON THE DRAWINGS.

END OF SECTION

SECTION 26 2726
WIRING DEVICES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 SUBMITTALS

A. Provide submittals as outlined in Section 26 00 00 General Electrical

PART 2 – PRODUCTS

2.01 WIRING DEVICES

A. GENERAL: All devices must be suitable for use intended, and have voltage and current ratings adequate for loads served. All devices shall have terminals designed for use with stranded wire. All receptacles shall have a grounded pole and green painted grounding screw. Grounded receptacles shall ground lug internally connected to mounting tabs. Wall outlets shall be installed with the ground pin down. Devices installed in or served through fire rated structures shall be fireproofed in a manner compatible with the U. L. fire rating.

B. ACCEPTABLE MANUFACTURERS: Catalog numbers listed below are Hubbell, unless indicated otherwise. Equivalent items made by P&S will be also acceptable provided they meet specification requirements.

1. Note: All receptacles (convenience, GFI, Surge Suppresser, Computer, etc.) listed on paragraph 2.01 D, E, F, G shall have latest Hubbel commercial grade redesigned “Cam Action Shutters” tamper resistance feature complies with NEC Article 406.12. Contact Hubbel wiring device supplier for latest part numbers. Provide with Goove Finder.

C. WALL SWITCHES: (20 Amp/277 Volt) HBL1221-I HBL1221GY

D. CONVENIENCE OUTLET: (20 amp/125v/3 wire, Groove finder, Tamper-Resistant, Extra Heavy Duty) HBL8300SGIA-Ivory HBL5362WTR. (Red if on generator)

E. GFI OUTLET: (20 amp, Tamper-Resistant, Weather Resistant) GFR8300HITR-Ivory GFSG5362W (Red if on generator)

F. SURGE SUPPRESSER OUTLET: IG5362ISA IG5362WSA.

G. COMPUTER OUTLET: (20 amp/125v/3 wire, Tamper-Resistant, Extra Heavy Duty) HBL8300SGGYA-Gray HBL5362GYTR. (Red if on generator)

H. SPECIAL DEVICES: Refer to Drawings, all specification grade. Provide matching cord and cap.

I. PLATES: Provide Type 302/304 smooth stainless steel plates for all devices; provide combination and/or gangable plates where adjacently located multi-outlet assemblies are indicated on drawings which shall include multi-switch installations. Plates for surface mounted switch or outlet boxes shall be Sierra galvanized steel handy box plates (H series).

J. OUTDOOR COVERS: Electrical devices noted “WP” installed under canopies or other areas not subject to direct rainfall shall have aluminum self closing covers that are rated for wet location with cover closed. Devices subject to direct rainfall shall have Hubbell WP26M aluminum cover rated for wet location with cord connected to device.

K. FLOOR OUTLETS: For standard receptacles mounted in floors provide Legrand Wiremold Evolution EFB6S, EFB8S or EFB10S floor boxes. Provide on-grade style for ground level floors, and fire rated steel type for above grade floors. Provide polished brass cover (final finish to be confirmed by architect and owner) with hinged access openings, final finish to be confirmed by Architect. For furniture feed floor outlets provide Wiremold EFBFF-OG floor box with nickel colored aluminum cover assembly. Where power/AV/data boxes are shown, provide Wiremold Evolution Series EFB6S, EFB8S or EFB10S as required. Box shall be –OG for on grade locations or –FC for above grade applications. Provide surface style cover with nickel colored aluminum assembly. Provide carpet insert style for carpeted areas.

L. DIMMERS: Greengate WBSD-010M-C1. Select dimmer for 150% of load served, 1000 watt minimum, 2000 watt maximum. Provide ivory face plate. Provide matching three way remote preset where shown.

M. GANGABLE AV WALL BOX: AV wall box with 1 ½ in knockout, HUBBELL HBL989

PART 3 – EXECUTION

3.01 INSTALLATION SHALL COMPLY WITH MANUFACTURER’S REQUIREMENTS AND INSTALLATION DETAILS ON THE DRAWINGS.

END OF SECTION

SECTION 26 2816
ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 – GENERAL

1.01 1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 SUBMITTALS

A. Provide submittals as outlined in Section 26 00 00 General Electrical

PART 2 – PRODUCTS

2.01 FUSED AND SAFETY SWITCHES

A. GENERAL: Provide disconnect switch for each motor, motor starter, electric duct heater and other equipment required by the NEC, fusible or non-fusible as required. Where motor circuit protective device is in the same room, within 50 feet (1524 cm) of and in sight of the equipment, no additional switch is required; if those conditions do not prevail provide switch at the equipment and as indicated on Drawings. Equipment shall be listed for use with 75□ C wiring. Disconnect switches for motors controlled by variable frequency drives shall have auxiliary “early break” contact to turn off VFD when motor is disconnected. All products shall be manufactured in the United States.

B. TYPE: Heavy duty switch sized for load served; non-fusible where used purely as disconnect device. Fused switches shall accommodate Class RK1 fuses. NEMA 3R for switches for indoor mechanical rooms and outside unless noted to be NEMA 4X on the Drawings. Switches located in the kitchen area shall be NEMA 4X stainless steel.

C. FUSES: Fuses to 600 amps shall be low peak, dual element, time delay fuses – LPS Class RK1. Larger fuses shall Limitron KTU Class L fuses. Provide 10% spare fuses of each size, minimum of three per size. Install in cabinet in main mechanical room.

D. NAMEPLATE: Provide each device with an engraved lamacoid nameplate (5/16" high letters) showing load served. Attach with mastic and two screws.

E. MANUFACTURERS: General Electric Type TH, Siemens and Square D.

2.02 ENCLOSED CIRCUIT BREAKERS

A. GENERAL: Provide where shown on the Drawings.

B. TYPE: Circuit breaker shall be selected to meet the short circuit requirements as listed on the Drawings. Mount in NEMA 1 or NEMA 3R enclosure to match application.

C. NAMEPLATE: Provide each device with an engraved lamacoid nameplate (5/16" high letters) showing load served. Attach with mastic and two screws.

D. MANUFACTURERS: General Electric, Siemens and Square D.

PART 3 – EXECUTION

3.01 INSTALLATION SHALL COMPLY WITH MANUFACTURER'S REQUIREMENTS AND INSTALLATION DETAILS ON THE DRAWINGS.

END OF SECTION

SECTION 26 2913
MOTOR STARTERS AND CONTROLLERS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 SUBMITTALS

A. Provide submittals as outlined in Section 26 00 00 General Electrical

PART 2 – PRODUCTS

2.01 MOTOR CONTROLLERS

A. Motor starters and contactors shall be provided under the Mechanical Section, installed under the Electrical Section. Starters installed in motor control centers shall be provided under this section. Locate starters next to electrical panel serving equipment unless shown otherwise. Note that all motors require starters (or contactor if motor is small and single phase).

2.02 CONTACTORS

A. Contactors shall have poles and rating consistent with the load being served but shall have a minimum of three poles, 30 amps (20 amps tungsten) per pole at 600 volts. The load may consist of all types of ballast and tungsten lighting, resistance and motor loads.

B. The unit shall have 100% rated double-break, silver-cadmium-oxide power contacts, field convertible from N.O. to N.C. and vice-versa and with clearly visible N.O. and N.C. contact-status indicators.

C. CONTROL: The unit shall be electrically held installed in a NEMA 1 enclosure. Provide 120 volt coil. Provide controls transformer with input and output fusing if circuit controlled is not 120 volt. Provide HOA switch to allow manual control of lights. List circuits controlled inside enclosure.

D. NAMEPLATES: Identify each device with an engraved lamacoid nameplate (5/16" high letters) showing circuit numbers and loads served. Attach with mastic and two screws.

E. ACCEPTABLE MANUFACTURERS: Square D.

2.03 PHASE LOSS MONITOR

A. Provide a Time Mark Model 2644 monitor for each motor one horsepower and larger. Wire into starter control circuit to de-energize motor on phase loss, phase reversal or low voltage. Do not provide for chiller or DX compressor motors. Adjust trip level to 20% below motor voltage and trip delay to mid-scale. Re-adjust set points at the Engineer's direction should frequent, nuisance tripping occurs.

B. Monitor phase loss for main electrical service through Automatic Transfer Switch. Provide monitoring relay, BAS interface modules and security alarm interface module. Provide wiring and programming to send notification to New Caney ISD Dispatch.

PART 3 – EXECUTION

3.01 INSTALLATION SHALL COMPLY WITH MANUFACTURER'S REQUIREMENTS AND INSTALLATION DETAILS ON THE DRAWINGS.

END OF SECTION

SECTION 26 3213
EMERGENCY GENERATORS

PART 1 – GENERAL

1.01 1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

PART 2 – MATERIALS AND METHODS

2.01 STANDBY GENERATOR

A. GENERAL: Provide a standby natural gas fired generator suitable for outdoor installation with remote mounted panel and transfer switch for all locations shown on floor plans. Each system must have true 3-phase monitoring with multiple ATS, emergency ATS to be provided general purpose by same manufacturer. No outsourced mismatching equipment is acceptable.

B. ENGINE: Six cylinder, four cycle gas engine, complete with electronic governor for tight frequency control and starter.

C. ALTERNATOR: Revolving field, four pole brushless type with epoxy impregnated windings rated for 480Y/277 volts, 3 phase, 4 wire.

D. ACCESSORIES:

1. Weatherproof housing with residential muffler and rain cap for outside installation.

2. Provide a remote digital display to monitor load power conditions, adjusting transfer switch parameters, monitoring network status and reviewing transfer switch events. Monitor shall be password protected to limit access to adjustments and key lock protected to prevent unauthorized activation of transfer or test functions.

3. 125 watt, 120 volt heater in alternator to compensate for condensation.

4. Starter batteries.

5. Engine coolant heater, 1500 watt at 120 volts. Provide dedicated circuit.

6. Voltage sensing dry contact to verify AC power generation.

7. 3-pole AC output line circuit breaker. Size and Quantity are specified on the Drawings.

8. 10 amp, 24 volt battery charger (Model 305-0813-01). Provide dedicated circuit.

9. Complete oil and coolant charge (with anti-freeze to 0° F).

10. Gas pressure reducing valve and flexible hose with stainless steel wire braid covering for natural gas connection.

11. Cables between unit, batteries, charger, controller, remote annunciator and transfer switch.

12. Provide a remote annunciator panel to indicate system status, voltage and load conditions. Install adjacent to transfer switch. Note: Install remote annunciator next to Automatic Transfer Switch.

13. Interlock automatic transfer switch with school security alarm system to monitor power outage to notify the District Police Department when the building is on emergency power.

14. Provide all required cabling and devices for fully functional systems.

E. TESTING: Provide 8 hour load test and run-in with full load at the local distributor's facility prior to shipment. After installation provide complete startup and checkout of generator and transfer switch.

F. CAPACITY: Refer to the Drawings capacity requirements.

G. DRAWINGS: Provide five sets of service/operation manuals and one set of mylar reproducible drawings for the standby generator and transfer switch system and equipment.

H. ACCEPTABLE MANUFACTURERS: Cummins, Caterpillar, Kohler, and Taylor

PART 3 – EXECUTION

3.01 INSTALLATION

A. Provide 4” thick concrete pad for each unit. Concrete pads shall be sized for the equipment to be supplied. Pad shall exceed base dimensions by approximately 4" all around. Reinforce pads rebar including #4 bar around perimeter. Tool pad to form chamfered edge. Refer to structural/architectural details for additional requirements.

B. Installation shall comply with manufacturer’s requirements and installation details on the Drawings.

C. Locate remote annunciator as noted on floor plans.

3.02 FINAL APPROVAL

A. The final approval test of the generator system shall consist of opening the building main circuit breaker. Generator shall start and automatically power the electrically load connected to the

associated electrical panels. All emergency lights shall illuminate. After operation of emergency loads are verified, main circuit breaker will be closed. Generator system shall wait the prescribed time then automatically transfer these loads back to the utility service. All lights that were ON prior to opening main circuit breaker shall come back ON automatically. Generator shall wait the prescribed time then shut off. Test shall be performed by the factory authorized representative and witness by project A/E team and school personnel.

3.03 WARRANTY

A. Provide 5 year or 1500-hour operation, non-prorated, parts and labor warranty for the generator.

3.04 TRAINING

A. Provide four hours training on operation and maintenance of the generator and transfer switch for four persons at the site.

END OF SECTION

SECTION 26 3623
AUTOMATIC TRANSFER SWITCHES

PART 1 – GENERAL

1.01 1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

PART 2 – MATERIALS AND METHODS

2.01 AUTOMATIC TRANSFER SWITCH

A. GENERAL: Provide transfer switch matched to generator output capacity installed in NEMA 1 cabinet.

B. RATINGS: Match with generator. Refer to Drawings for required capacity. Provide three pole switch with neutral bar. Provide switching sequence compatible with Houston Lighting and Power Company requirements. Unit shall have a long-time/closing rating of 65,000 AIC with upstream power co. pad mounted transformer or 100,000 AIC with upstream power co. pole mounted transformer connected at the normal power connections. Except if the switch has been tested with the specific circuit breaker installed upstream at the main electrical service switchboard.

C. ACCESSORIES:

1. Extended start time delay (0 to 90 seconds).
2. Seven-day exerciser clock.
3. Programmed transition (0 to 60 seconds).
4. 24-volt coil auxiliary relay with 2-NO and 2-NC dry contacts.
5. Voltage, Amp and Frequency meters with phase selector switch.
6. Interlock Automatic Transfer Switches control system with school security alarm system to monitor power outage to notify the District Police Department when the building is on emergency power.
7. Provide all required cabling and devices for fully functional systems.

D. DRAWINGS: Provide five sets of service/operation manuals and one set of mylar reproducible drawings for the standby generator and transfer switch system and equipment.

E. WARRANTY: Provide 5 year, non-prorated, parts and labor warranty for the generator/transfer switch system with up to 1500 hours of operation allowed.

F. ACCEPTABLE MANUFACTURERS: Cummins, Caterpillar, Kohler, and Taylor

1. Note: ATS to be included with generator to ensure compatibility

PART 3 – SETUP AND TESTING

3.01 SYSTEM SETUP

A. The main emergency transfer switch (ATS-E) serving the required lighting and other emergency loads shall be set to start the generator and then transfer the load to the generator with a 1-2 second time delay. The secondary transfer switch (ATS-O) serving kitchen and other optional loads shall be set to transfer to the generator approximately five seconds after ATS-E. Once utility power is restored, the ATS-O shall switch loads back to the utility after five minutes. ATS-E shall switch loads back to the utility after an additional five minutes.

B. Should generator over current conditions be sensed, ATS-O shall be transferred back to normal power to ensure ATS-E loads are met.

C. Settings shall be modified as required during testing to ensure that required emergency loads are properly served and lighting transfers are coordinated with the lighting control panels, without interference by the non-emergency load transfer switch ATS-O.

3.02 FINAL APPROVAL

A. The final approval test of the generator system shall consist of opening the building main circuit breaker. Generator shall start and automatically power the electrically load connected to the associated electrical panels. All emergency lights shall illuminate. After operation of emergency loads are verified, main circuit breaker will be closed. Generator system shall wait the prescribed time then automatically transfer these loads back to the utility service. All lights that were ON prior to opening main circuit breaker shall come back ON automatically. Generator shall wait the prescribed time then shut off. Test shall be performed by the factory authorized representative and witness by LTY and school personnel.

B. PROGRAMMING:

1. Program weekly test with no load Tuesday morning at 8am.

2. Program test button START and transfer switch with load.

END OF SECTION

SECTION 26 4313
TRANSIENT VOLTAGE SUPPRESSION

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 SUBMITTALS

A. Provide submittals as outlined in Section 26 00 00 General Electrical

PART 2 – PRODUCTS

2.01 TRANSIENT VOLTAGE SURGE SUPPRESSOR (TVSS)

A. GENERAL: Provide TVSS equipment for electrical panels and equipment as noted on the Drawings. TVSS shall be installed in NEMA 1 housing and mounted adjacent to the equipment to be protected. Connect TVSS to three pole circuit breaker in the panel with wiring as short and straight as possible. Where noted on the riser provide TVSS integral to panel or switchboard.

B. DISPLAY: Provide digital transient counter with battery backup.

C. SUPPRESSION MODES: System shall provide suppression of L-L, L-N, L-G and N-G transients.

D. RESPONSE TIME: 1 nanosecond or less.

E. EMI/RFI ATTENUATION: 38 dB or better.

F. WARRANTY: 10-year, non-prorated replacement.

G. TVSS RATING:

1. Panels 800 amps and smaller: 160 kAmps per phase
2. Panels larger than 800 amps: 240 kAmps per phase
3. Main Switchboard: 320 kAmps per phase

H. ACCEPTABLE MANUFACTURERS: Current Technology by ABB or equal.

2.02 SPECIAL EQUIPMENT TRANSIENT VOLTAGE SURGE SUPPRESSOR (TVSS)

A. GENERAL: For certain 120-volt circuits provide TVSS protection at the protected device.

B. INSTALLATION: Install device in junction box surface mounted in mechanical rooms or above accessible ceiling if equipment is not in mechanical room. The branch circuit shall terminate on the TVSS then subfeed the equipment. The wire between the device and the equipment shall be three to five feet long.

C. TVSS: Ditek Model DTK-120SR surge suppressor

D. EQUIPMENT PROTECTED: Install for fire alarm panel, security panel and CCTV panel.

2.03 TELEPHONE LINE TRANSIENT VOLTAGE SURGE SUPPRESSOR (TVSS)

A. GENERAL: Install for telephone connections to fire alarm and security alarm dialers.

B. TVSS: Ditek Model DTK-MRJ31XSCP-WP

PART 3 – EXECUTION

3.01 INSTALLATION SHALL COMPLY WITH MANUFACTURER'S REQUIREMENTS AND INSTALLATION DETAILS ON THE DRAWINGS.

END OF SECTION

SECTION 26 5113
INTERIOR LIGHTING FIXTURES, LAMPS AND BALLASTS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 SUBMITTALS

A. Provide submittals as outlined in Section 26 00 00 General Electrical

PART 2 – PRODUCTS

2.01 LIGHT FIXTURES

A. GENERAL: Provide all fixtures as shown, completely wired and securely attached to supports. Include all necessary accessories including heavy duty, chrome plated wire guards on high bay fixtures, indirect fixtures, and over exit lights located in the gymnasium. Fixture models scheduled are to show general type of fixtures required. Furnish mounting design and trim to fit type of ceiling and finish on which fixture is to be installed. Fixture shall be designed to operate satisfactorily where installed including the required fire proofing. All fixtures are static unless noted to be otherwise on the fixture schedule. Provide wire guard for mechanical room strip light fixtures.

B. PAINT: All fluorescent fixture housings shall have a complete coverage of white alkyd reflecting enamel, 85% minimum reflectivity, applied after fabrication then baked in a temperature controlled oven until paint is thoroughly cured. Prior to applying the enamel, each metallic surface shall be prepared for painting by using a five stage hot zinc phosphatizing process. Baked polyester powder finish is acceptable.

C. PLASTIC REFRACTORS/DIFFUSERS: Material shall be light-stable 100% virgin acrylic, translucent (98% minimum transmission), conforming to minimum standards of IES-NEMA-SPI. Material shall perform as applied in a normal interior environment for a period of 20 years, without noticeable deformation and with a transmission loss not exceeding 5%. Nominal thickness of material shall be .125" for either extrusions or injections.

D. LAMPS: Provide all LED lamps as scheduled, 4100K, CEE-Qualifying High Performance or Energy Start Rating. All LED light fixtures and lamps shall have 5-year warranty.

E. BALLASTS or DRIVERS: Ballasts or Drivers shall be electronic type with a maximum of 10% THD, a minimum ballast factor of 0.90, a minimum power factor of .99 and crest factor less than 1.6. Ballasts shall be 2 or 3 lamp type with lamps wired in parallel so failure of one lamp does not extinguish all lamps or degrade ballast performance. Provide single lamp ballast where one lamp of the fixture is shown to be connected to a remote emergency power source. Ballasts or Drivers installed in suspended light fixtures shall be specifically selected and installed in a manner so as to emit no discernible buzzing or hum. Ballasts installed in fixtures mounted in U. L. fire rated ceilings or ceilings with insulation on top shall be of low heat type to allow operation under these conditions. Ballasts or Drivers shall be suitable for use with occupancy sensors that will cause a higher rate of switching. Ballasts or Drivers for outdoor fixtures or unheated areas shall be rated for 0° operation. Ballasts or Drivers shall be warranted for five years from date of substantial completion of the project. Ballasts shall be manufactured by Advance, Motorola or Magnetek.

F. EMERGENCY POWER PACKS: High output, self-contained, unit mounted internal to fixture to power two lamps. Battery shall be long life nickel cadmium sized for 90 minute operation. Unit shall have 120/277 volt solid state charger and automatic transfer switch. Unit shall provide a nominal 1100 lumen output from the specified fluorescent lamps. Emergi-lite Model FPSI/U. Note: Provide inverters instead of battery packs for LED lights with 90 minute operation.

G. FIRE PROTECTION: Provide fixture fire protection as required by U. L. Fire Resistive Index for the type ceiling to be installed. Provide additional fireproofing as required by the local building code. Protection is specified under the Ceiling Section of these Specifications.

H. SUPPORT: Adequate, sturdy support as necessary to prevent possibility of fixture falling. Lay-in fixtures shall be supported with wire hangers at all four corners of the fixture, 4 wires total per fixture. Fixture support wires are in addition to those required to support the ceiling grid. Surface and pendant fluorescent fixtures must be supported with two supports per four foot section. All pendants must have swivel aligners located at the top ends; pendants shall be 1/2" rigid steel conduit, unless specifically indicated otherwise on drawings, painted as directed by Architect on jobsite. Support surface mounted fluorescent fixtures from structural members other than ceiling tees by providing Unistrut members laid across main ceiling tees or by attachment directly to structure. Provide caddy clips for recessed fixtures. Pendants for indirect light fixtures shall be securely attached to structure or Unistruts across joists using threaded connections. High bay fixtures shall have manufacturer supplied quick disconnect mounting hardware and safety cable.

PART 3 – EXECUTION

3.01 INSTALLATION SHALL COMPLY WITH MANUFACTURER'S REQUIREMENTS AND INSTALLATION DETAILS ON THE DRAWINGS.

END OF SECTION

SECTION 26 5600
EXTERIOR LIGHTING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.02 SUBMITTALS

A. Provide submittals as outlined in Section 26 00 00 General Electrical

PART 2 – PRODUCTS

2.01 LIGHT FIXTURES

A. GENERAL: Provide all fixtures as shown, completely wired and include all necessary accessories.

B. PAINT: All fluorescent fixture housings shall have a complete coverage of white alkyd reflecting enamel, 85% minimum reflectivity, applied after fabrication then baked in a temperature controlled oven until paint is thoroughly cured. Prior to applying the enamel, each metallic surface shall be prepared for painting by using a five stage hot zinc phosphatizing process. Baked polyester powder finish is acceptable.

C. LAMPS: Provide all lamps as scheduled.

D. BALLASTS or DRIVERS: Ballasts or Drivers shall be high power factor, constant wattage auto-transformer with a 20□ F temperature rating. Ballasts or Drivers shall be warranted for five years from date of substantial completion of the project. Ballasts or Drivers shall be manufactured by Advance, Motorola or Magnetek.

E. LIGHT POLES: All poles shall be selected to support the scheduled fixtures and equipment for 130 MPH wind loading plus 1.3 gust factor. Provide a reinforced concrete support base, refer to Structural Drawings and electrical details for pole base dimensions. For poles taller than 75 feet (2286 cm), provide aircraft warning lights with photocell and unswitched power.

2.02 EXTERIOR LIGHTING CONTROL

A. GENERAL: Outdoor lighting circuits shall be controlled by lighting relay panel and BAS control points. Lighting relay panel shall be provided by Electrical Contractor. BAS lighting control points shall be provided by Mechanical Contractor.

B. Exterior Emergency lighting controller / Generator transfer lighting control device for outdoor lighting shall be provided by Electrical Contractor. Provide wall mounted units in the mechanical/electrical room and must be 20A rated manufactured by Bodine GDT20A or other approved GTD manufacturer listed on this section.

PART 3 – EXECUTION

3.01 INSTALLATION SHALL COMPLY WITH MANUFACTURER'S REQUIREMENTS AND INSTALLATION DETAILS ON THE DRAWINGS.

END OF SECTION

SECTION 27 1000
STRUCTURED CABLING SYSTEM

PART 1 – GENERAL

1.01 REFERENCE STANDARDS

A. ASTM B1 - Standard Specification for Hard-Drawn Copper Wire; 2013 (Reapproved 2018).

B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft; 2023.

C. ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2017.

D. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)); 2012 (Reapproved 2021).

E. ICEA S-87-640 - Standard for Optical Fiber Outside Plant Communications Cable; 2023.

F. IEEE C2 - National Electrical Safety Code(R) (NESC(R)); 2023.

G. NECA/BICSI 607 - Standard for Telecommunications Bonding and Grounding Planning and Installation Methods for Commercial Buildings; 2011.

H. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

I. NFPA 75 - Standard for the Fire Protection of Information Technology Equipment; 2024.

J. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

K. NFPA 780 - Standard for the Installation of Lightning Protection Systems; 2026.

L. TIA-526-14 - Optical Power Loss Measurement of Installed Multimode Fiber Cable Plant; IEC 61280-4.1 Edition 3.1, Fiber Optic Communications Subsystem Test Procedures- Part 4-1: Installed Cable Plant- Multimode Attenuation Measurement; 2023d.

M. TIA-569 - Telecommunications Pathways and Spaces; 2019e, with Addendum (2022).

N. TIA-606 - Administration Standard for Telecommunications Infrastructure; 2021d.

O. TIA-607 - Telecommunications Bonding and Grounding (Earthing) for Customer Premises; 2024e.

1.02 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General and Supplementary Conditions, apply to the work specified in this Section.

1.03 WORK INCLUDED

A. Contractor shall verify and test a complete cable distribution system for data interconnections (Local Area Network). The data distribution system shall include fully terminated single mode fiber optic cable, unshielded twisted pair cables, raceways, conduit, UTP termination devices, data communications outlets, patch panels, patch cables, racks and other incidental and miscellaneous premises wiring system hardware as required for a complete and usable system. Contractor shall install MDF and IDF's, where shown on the Drawings. Should additional IDF's be required to meet project constraints, contractor shall include these in his bid and locate them with the approval of the Architect. Data drops from Classroom B110 and Technology Lab E036 shall run to the nearest IDF. Each IDF room shall be connected to MDF with twelve (12) strand armored single mode (SM) fiber optic cable only.

B. The data structured cabling sub-contractor shall also install HDbase-T cable, HDMI and 3.5mm Audio outlets and cables projects and TV(s) as described in Electrical Floor Plans Drawings and Detail.

C. The data structured cabling sub-contractor shall also install audio wiring for auxiliary local sound speakers serving classroom projectors. Refer to drawings and details for wiring and Fire Alarm and PA. Auxiliary speakers to be provided by sound system contractor under section 27 51 23.

D. Network electronics equipment will be furnished by Owner.

E. The finished installation shall be a complete Uniprise Category 6A Solution by Commscope and receive a minimum 20 year factory warranty.

F. Conduit and outlet boxes will be provided by the electrical subcontractor under Section 16. Data cabling subcontractor shall coordinate with the electrical contractor to ensure that wall and floor sleeves are installed for proper installation.

1.04 QUALITY ASSURANCE

A. INSTALLER QUALIFICATIONS: The Data Cable System Installer shall be licensed and shall meet all applicable regulations of the State of Texas and Department of Labor insofar as they apply to this type of system. The installer shall be a firm normally employed in the low voltage and data cabling industry and shall provide a reference list of ten projects of similar size and contact names confirming successful Commscope/Uniprise Category 6/6A premises wiring system installations. He shall also be factory certified to design and install this system by Commscope/Uniprise. Contractor shall carefully verify with Commscope/Uniprise for all the part

numbers during bidding period, update part number with equal or better grade product as necessary.

B. STANDARDS: All work shall be performed in accordance with the following standards and codes:

1. City Building Code

2. National Electric Code, latest Edition

1.05 REFERENCES

A. American National Standards Institute (ANSI)

B. American Society for Testing and Materials (ASTM)

1. ASTM B1 Standard Specification for Hard-Drawn Copper Wire

2. ASTM B8 Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, MediumHard, or Soft

3. ASTM D1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3) (2700 kN-m/m3)

4. ASTM D709 Laminated Thermosetting Materials

C. Alliance for Telecommunications Industry Solutions (ATIS)

D. Building Industry Consulting Service International (BICSI)

1. Telecommunications Distribution Methods Manual 14th Edition

2. Outside Plant Design Reference Manual 6th Edition

3. ANSI/BICSI Data Center Design and Implementation Best Practices

4. NECA/BICSI 568-D Standard for Installing Commercial Building Telecommunications Cabling

5. NECA/BICSI 607-D, Standard for Telecommunications Bonding and Grounding Planning and Installation Methods for Commercial Buildings

E. Federal Communications Commission (FCC)

1. FCC Part 15, Radiated Emissions Limits

2. FCC Part 68, Connection of Terminal Equipment to the Telephone Network

3. FCC Part 76, Cable Television Service

F. Insulated Cable Design Consultants Association (ICEA)

1. ICEA S-87-640 Fiber Optic Outside Plant Communications Cable

2. ICEA S-98-688 Broadband Twisted Pair, Telecommunications Cable Aircore, Polyolefin Insulated Copper Conductors

3. ICEA S-99-689 Broadband Twisted Pair Telecommunications Cable Filled, Polyolefin Insulated Copper Conductors

G. International Electrotechnical Commission (IEC)

H. Institute of Electrical and Electronics Design Consultants, Inc. (IEEE)

1. IEEE Standard IEEE Guide for Measuring Earth Resistance, Ground Impedance, and Earth Surface Potential of a Ground System

2. IEEE Standard 1100 Recommended for practice for Powering and Grounding Sensitive

3. Electronic Equipment in Industrial and Commercial Power Systems (IEEE Emerald Book)

4. IEEE C2 Errata INT National Electrical Safety Code

5. IEEE Std 100 The Authoritative Dictionary of IEEE Standards Terms

I. International Organization for Standardization (ISO)

1. International Organization of Standardization/International Electrotechnical Commission (ISO/IEC)

2. ISO/IEC 11801, Information Technology-Generic Cabling for Customer Premises,

3. ISO/IEC 14763-1, Information Technology-Implementation and Operation of Customer Premises Cabling-Administration

4. ISO/IEC 11801, Information Technology-Generic Cabling for Customer Premises

5. ISO/IEC 14763-1, Information Technology-Implementation and Operation of Customer Premises Cabling-Administration

J. National Cable Television Association (NCTA)

K. National Electrical Manufacturers Association (NEMA)

1. 1. NEMA C62.61 Gas Tube Surge Arresters on Wire Line Telephone Circuits

L. National Fire Protection Association (NFPA)

1. NFPA 70, National Electrical Code

2. NFPA 75, Protection of Electronic Computer Data Processing Equipment.
3. NFPA 101, Life Safety Code
4. NFPA-297, Guide on Principles and Practices for Telecommunications Systems
5. NFPA 780, Standard for the Installation of Lightning Protection Systems.

M. National Institute Standards and Technology (NIST)

N. Occupational Safety and Health Administration (OSHA)

O. Telecommunications Industry Association (TIA)

1. ANSI/TIA-568-D, Generic Telecommunications Cabling for Customer Premises.
2. ANSI/TIA-568-D, Commercial Building Telecommunications Cabling Standard.
3. ANSI/TIA -568-D, Balanced Twisted-Pair Telecommunications Cabling and Components Standard.
4. ANSI/TIA-568-D, Optical Fiber Cabling Components Standard.
5. ANSI/TIA-569-E Commercial Building Standard for Telecommunications Pathways and Spaces.
6. ANSI/TIA-606-D, Administration Standard for the Telecommunications Infrastructure.
7. ANSI/TIA-607-D, Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises.
8. ANSI/TIA-758-B, Customer-Owned Outside Plant Telecommunications Infrastructure Standard.

P. U.S. Department of Agriculture (USDA)

1. RUS 1755 Telecommunications Standards and Specifications for Materials, Equipment and Construction
2. RUS Bull 1751F-643 Underground Plant Design
3. RUS Bull 1751F-815 Electrical Protection of Outside Plant
4. RUS Bull 1753F-201 Acceptance Tests of Telecommunications Plant (PC-4)
5. RUS Bull 1753F-401 Splicing Copper and Fiber Optic Cables (PC-2)
6. RUS Bull 345-65 Shield Bonding Connectors (PE-65)
7. RUS Bull 345-72 Filled Splice Closures (PE-74)

1.06 ABBREVIATIONS

A. MDF: Main Distribution Frame

B. IDF: Intermediate Distribution Frame

C. UTP: Unshielded Twisted Pair

1.07 WARRANTY

A. The selected system installer shall be factory certified by the manufacturer and shall provide an end-to-end performance warranty of not less than twenty (20) years. The cabling contractor shall provide certification documentation. The performance warranty shall be issued by the manufacturer and shall warrant that all Category 6/6A cable links have been tested by-directionally (end-to-end) using a Level 2 tester, per TSB-67, and that all test results conform to the most current TIA/EIA-568-A and/or TSB-67 Link values.

B. The warranty will also cover multimode fiber optic cabling. Performance testing shall be conducted in accordance with ANSI/EIA/TIA-526-14 Standard, Method B.

C. The warranty will stipulate that all products used in this installation meet the prescribed mechanical and transmission specifications for such products as described in ISO/IEC 11801, ANSI/TIA/EIA-568-A, or EN 50173. Quality and workmanship evaluation shall be solely by the Owner and designated representatives.

1.08 SUBMITTALS

A. GENERAL: Comply with Sections 01300 and 26 00 00.

B. PRODUCT DATA: Complete product data for all cable, patch panels, cross-connect blocks, modular outlets, cable supports, cable labels, outlet devices and other products to be used in the installation.

C. SHOP DRAWINGS: Proposed circuit routing and circuit grouping plan prepared by a BICSI certified registered communications distribution designer. The RCDD certification must have been granted on or before January 1, 2001. Any data runs exceeding 300 feet (9144 cm) shall be brought to the Owner/Architect’s attention before cabling commences.

D. TESTING FORMS: Submit proposed Category 6/6A UTP cable test result forms, fiber optic test result forms, and a list of instrumentation to be used for systems testing.

E. PROJECT CLOSEOUT: At completion of the project, include the following in the Close-out Documents:

1. Complete manufacturer’s product literature and samples for all approved substitutions to the products made during the course of the Project.

2. INSPECTION AND TEST REPORTS - During the course of the Project, the Contractor shall maintain an adequate inspection system to insure that the materials supplied and the work performed conform to Contract requirements. The Contractor shall provide written documentation that indicated that materials acceptance testing was conducted as specified. The Contractor shall also provide documentation, which indicates that all cable termination testing was completed and that all irregularities were corrected prior to job completion.

3. OPERATING AND MAINTENANCE INSTRUCTIONS - Submit four copies of Operating and Maintenance Instructions for all devices within the system. These instructions shall reflect any changes made during the course of construction, and shall be in a three-ring binder labeled with the project name and description.

4. AS-BUILT DRAWINGS - As-built drawings will include cable pathways, data outlet locations with correct labeling and MDF/IDF locations. The as-built drawings will be prepared using AutoCAD or Revit. Provide the Owner with three prints of each drawing, and electronic versions of the as-builts on CDs.

5. In each MDF and IDF, provide a plan view of the building area covered by each equipment closet with the following requirements:

    a. Full-size plan laminated and secured to the wall.

    b. "YOU ARE HERE" indicator with arrow.

    c. Room names and numbers. Verify with Owner.

    d. Each data device with symbol and cable run labeling scheme identification as designated by the Owner.

    e. Symbol legend.

    f. Scale indicator.

PART 2 – PRODUCTS

2.01 GENERAL

A. All products shall be new and brought to the site in the original packaging. Electrical components shall bear all Underwriters Laboratories (U. L.) labels. All cable shall bear flammability testing ratings as follows:

1. CM Communications Cable

2. CMP Plenum Rated Communications Cable

3. CMR Riser-Rated Communications Cable

B. Contractor shall contact manufacturer to verify product or part number during bidding period. For any product or part number discontinued, Contractor shall provide a replacement product or part number with same or better quality.

C. UPS installed from FF&E

2.02 TWISTED PAIR DATA CABLE

A. Indoor data cables shall be plenum rated, 4 pair (high performance), 24 gauge Category 6e UTP certified cable, terminated on an 8 pin modular jack T568B configuration. Commscope Uniprise Category 6e UTP Plenum 8773614/10 (Blue) and 8774514/10 (Purple), etc. See 2.02 D for other colors.

B. Point of Service (POS) cables shall be plenum rated, 4 pair (high performance), 24 gauge, Category 6/6A UTP certified cable, terminated on an 8 position, non-keyed, modular RJ45 jack wired straight through. Uniprise Category 6e UTP Plenum 8773614/10 (Blue), blue color. Cable shall be installed in underground conduit from cash registers to IDF/MDF.

C. All data cable shall be home run to the patch panel distribution frames designated by the room number.

Cable Part Numbers			
Cable Color	Plenum Cable Part #		Devices
Blue 6	UN874049914/10	CS34P BLU C6 4/23 U/UTP CPK 1KFT	Data / IP Phone
Blue 6A	UN874035114/10	CS44P BLU C6A 4/23 U/UTP CPK 1KFT	Wireless
Yellow 6	UN874034114/10	CS34P YEL C6 4/23 U/UTP CPK 1KFT	Access Control / Intrusion
Purple/Violet 6A	UN874041614/10	CS44P VLT C6A 4/23 U/UTP CPK 1KFT	Video Surveillance
White 6	UN874019914/10	CS34P WHT C6 4/23 U/UTP CPK 1KFT	Intercom
Red 6	UN874017414/10	CS34P RED C6 4/23 U/UTP CPK 1KFT	Fire Alarm
Grey 6	UN874042114/10	CS34P GRY C6 4/23 U/UTP CPK 1KFT	Controls-HVAC
Green 6	UN874037414/10	CS34P GRN C6 4/23 U/UTP CPK 1KFT	Projectors/TVs/Sound Systems
indoor outdoor plenum 6	874049304/10	CS34P-IO BLK C6 4/23 U/UTP RL 1KFT	All cables that go under slab

Patch Cord Part Numbers		
1' Patch cord - racks	Part #	Devices
Black	UC1BBB2-01F001	Data / IP Phone

Patch Cord Part Numbers		
Blue 6A	UC1AAA2-0ZF001	Wireless
Yellow	UC1BBB2-09F001	Access Control / Intrusion
Purple/Violet 6A	UC1AAA2-0LF001	Video Surveillance
White	UC1BBB2-08F001	Intercom
Red	UC1BBB2-07F001	Fire Alarm
Grey	UC1BBB2-0CF001	Controls-HVAC
Green	UC1BBB2-0MF001	Projectors/TVs
30' Patch cord - end connection used for exterior cameras from high ceilings (example: gym, welding shop, dance, etc)	Part #	Devices
Purple/Violet 6A SD	CO199K2-0LF030	Video Surveillance

1. All cable termination shall be clear.

2. Colors are shown for bidding purpose, coordinate with Owner for final colors prior to ordering any Structured Cabling Products.

3. Data/IP Phone 1’ patch cable at rack to be black, Projector 15’ patch cord end connection to be black, all other cable types to match cable color.

2.03 TERMINATIONS FOR DATA OUTLETS

A. Category 6e Jack UKJ600-BL (Blue), UKJ600-VL (Purple), UKJ600-OR (Orange), UKJ600-GR (Green), etc. See 2.02 D for other colors, giga speed, 8 pin non-keyed, modular RJ45 jack per T568-B pin/pair configuration, Category 6/6A rated.

Biscuit Boxes		
1 Port surface mount box-White	760248521	SMB-1P-262
2 Port surface mount box-White	760248525	SMB-2P-262

B. Faceplates shall be stainless steel for six RJ45 outlets at all locations. Provide blue blank insert covers for unused station ports.

Stainless Steel Faceplates w/label window - Leviton		
1 Port	43080-1L1	QP SS wallplate w/id single gang 1 port
2 Port	43080-1L2	QP SS wallplate w/id single gang 2 port
4 Port	43080-1L4	QP SS wallplate w/id single gang 4 port

Stainless Steel Faceplates w/label window - Leviton			
6 Port	43080-1L6	QP SS wallplate w/id single gang 6 port	
KeyStone			
Insert Color	MID	Part Number	Devices
Orange	760257280	UKJ600-OR	Data / IP Phone
Blue 6A	760257290	UKJ10G-BL	Wireless
Yellow	760257283	UKJ600-YL	Access Control / Intrusion
Purple/Violet 6A	760257294	UKJ10G-VI	Video Surveillance
White	760237652	UKJ600-P.WH	Intercom
Red	760257282	UKJ600-RD	Fire Alarm
Grey	760237658	UKJ600-GY	Controls-HVAC
Green	760257284	UKJ600-GN	Projectors/TVs
Leviton Grey blanks for faceplates	41084-143-0BG	Leviton Blank QuickPort Insert - 10 pack	unused ports in faceplates
NOTE: All terminations shall be done with Jack Termination Tool with Lacing Fixture (SLX / SL / KJ / UNJ) Commscope part # 1725150-6. All terminations should be using TIA/EIA 568B standard.			

2.04 FIBER OPTIC CABLE

A. Indoor Fiber Optic Cable shall be plenum rated, U. L. listed type OFNP;

1. Twelve Single-Mode Fiber Optic Data Backbone Cable: Provide twelve (12) strand single-mode fibers from MDF to each new IDF. Provide 12-Strand single mode Armored SM Fiber Optic Cable, Commscope 760127803 plenum rated distribution cable, yellow color jacket.

B. Outdoor fiber optic cable: Single mode (2) entries to campus.

C. Optical Fiber Connectors shall be LC type connectors. SM Fiber Optic Connector shall be Commscope 760007096.

D. Run 6 stand fiber optic cable from MDF to IDF room(s) if an IDF room is required for Contractor’s design layout.

E. Provide twist lock plug for UPS power in MDF rooms.

F. Optical fiber patch cable shall be yellow color for single mode, compatible Systimax cable, one meter in length, with LC type connectors. Provide one patch cable for each fiber pair at each MDF/IDF. Delete multimode fiber patch cables and connectors. Provide matching single mode fiber LC to LC patch cables and connectors manufactured by Commscope only.

G. Provide 1’ and 15’ patch cables. Follow color scheme in NCISD color chart.

Fiber Cable		
Plenum, 12f SM Armored	760127803	P-012-DZ-8W-FSUYL
Plenum, 24f Armored SM	760127886	P-024-DZ-8W-FSUYL
Indoor/Outdoor armored Plenum 12	760134924	P-012-OZ-8W-FSUBK
Indoor/Outdoor armored Plenum 24	760134932	P-024-OZ-8W-FSUBK
OSP armored Fiber Cable, 12f SM	760053280	D-012-LA-8W-F12NS
OSP armored Fiber Cable, 24f SM	760053298	D-024-LA-8W-F12NS
Fiber Connectors only pre populated TeraSPEED		
part number for reference only (no longer used) SM LC	760117895	part number for reference only (no longer used) SFC-LCF-09-8X
Fiber Patch Cords		
SM LC-LC 7ft	FEWLCLC42-JXF007	n/a
Fiber Shelves and Coupler Panels		
1U	760249997	EPX-1U-PNL-ENC
2U	760251045	EPX-2U-PNL-ENC
4U	760251049	EPX-4U-PNL-ENC
Wall Mount Building Enclosure configured for one LGX/1000 Style module, splice cassette or adapter pack	760248904	WB2-EMT-BK-1P-PNL
Wall Mount Building Enclosure configured for two LGX/1000 Style module, splice cassette or adapter pack	760248905	WB2-EMT-BK-2P-PNL
TeraSPEED® Splicing cassette, 12LC , 900µm	760221747	PNL-CS-12LCW-PT
TeraSPEED® Splicing cassette, 24LC , 900µm	760221705	PNL-CS-24LCW-PT
NOTE: All splices shall be fusion splice.		

2.05 DATA CLOSET (MDF/IDF) CATEGORY 6/6A TERMINATION HARDWARE

A. EQUIPMENT RACKS: Provide and install equipment racks in locations indicated on the project drawings. These racks are intended for use where more than 16 drops are terminated. Racks shall be equipped as specified. Racks shall be 19” x 84” floor-mount, aluminum construction, with double sided universal mounted spaces with #12-24 panel mounting holes. Chatsworth 48353-703 (7’ floor mounted equipment racks in IDF/MDF rooms). Provide minimum three (3) racks for MDF room and minimum two racks for each IDF rooms.

B. WALL CABINETS: Provide and install equipment racks in locations indicated on the project drawings. These racks are intended for use where 16 or fewer drops are terminated and with the approval of the Engineer and Owner. Racks shall be 24 inch (609.6 mm) wide by 48 inch (1219.2

mm) tall by 18 inch (457.2 mm) deep, aluminum construction with brushed flat black finish. Provide double sided universal mounted spaces with #12-24 panel mounting holes. Chatsworth CUBE-it Wall Mounted: 24”H x 30”D, Chatsworth 12419- 724 inch (18389.6 mm) each of Classroom B110 and Technology Lab E036. For each cabinet provide fan and filter, Hubbell MCCPSS19 power strip. Coordinate cabinet depth with Owner’s network switches prior to ordering cabinets.

C. DISTRIBUTION RACK GROUNDING: Rack shall be grounded using stranded #6 AWG insulated copper conductor. Provide all required bonding materials and hardware and bond to building grounding electrode system at building electrical service entrance. Chatsworth Products, Inc. (CPI) #08009-01. Add wall mount bus bars, Chatsworth 10622-010.

D. FIBER OPTIC PATCH PANELS: The enclosures used shall provide termination panels for LC type connectors and be of sufficient size and capacity to terminate 110% of the fiber count of the inside and outside fiber optic cables. Patch panels must be 19” rack mountable. Provide all termination accessories, enclosures and test for a complete fiber optic distribution system. SM Fiber Optic Patch Panels / Multiport Shuttered Adapters and Connectors manufactured by Commscope at all IDF and MDF Data closets.

E. CATEGORY 6/6A PATCH PANELS: The Category 6 data station cable shall be terminated on Category 6/6A RJ45 patch panels with circuit board construction. Patch panels shall consist of faceplates pre-assembled with communication port housings and shall be 19 inch (482.6 mm) rack mountable. Workstation patch panels shall terminate all workstation communications outlets. Furnish units that adhere to the performance requirements TIA/EIA-568A Standards with RJ-45 connectors. Provide flat modular and spaces for labels Tombstone.

Copper Patch Panel		
24 port	760237052	CPP-UDDM-KJ-1U-24
48 port	760241547	CPP-UDDM-KJ-2U-48

F. POWER STRIP: A power strip shall be installed vertically at the back of each data rack and horizontally at the base of the rack. Tripp Lite series 3.8kW Single-Phase Local Metered PDU, Dual Circuit, 120V Outlets (32 5-15/20R), L5-20P/5-20P, 10 ft. (3.05 m) Cord, 0U Vertical, PDUMV40. Horizontal power strop, vertiv power 20 amp, 1U, #38045 SP124-1026

G. CABLE MANAGEMENT PANELS: Provide cable management panels as required for vertical cable management. Vertical: 8 inch (203.2 mm) x 84 inch (2133.6 mm) management panels, Commscope 760072793. Transition Tray: Chatsworth #12183 and 1285-719, top and bottom for each rack. Rack Radius Dropouts: Chatsworth 12394-x01

H. PATCH CABLES: Category 6/6A/tangle free patch cables shall be 1’ & 15’ in length, modular/modular conforming to Category 6/6A protocol. (Two (2) patch cables are required for each workstation served). Provide Cat 6/6A Patch Cord manufactured by Uniprise, Uniprise BC1BBB2-0Z (Blue), BC1BBB2-0L (Purple), BC1BBB2-0M (Green), etc. See 2.02 D for other colors”. Also, coordinate patch cord length in MDF/IDF prior to ordering patch cords.

2.06 CABLE ROUTING/PATHWAY

A. CABLE TRAY - LADDER RACKS: Metal cable tray shall be provided to affix to the top of all floor mount racks. Cable tray shall be used to brace racks to walls and to route cable from walls to racks in communication closets. Chatsworth Products, Inc. (CPI)

1. 12” Ladder Tray Wall Angle Support, Chatsworth 11421-712
2. Rack to Runway Mounting Plate, Chatsworth 10595-712
3. Rack Elevation Kit, Chatsworth 10506-702
4. Butt Splice Kit, Chatsworth 11301-701
5. 12” Ladder Tray, Chatsworth 10250-712
6. Provide additional hardware and supports as necessary.

B. CABLE SUPPORT SYSTEM: Cable saddles, bridal rings or J-Hooks shall be used to route all exposed cables (cable not in conduit or cable tray) in open access environments as well as in communications closets. Caddy.

C. INNERDUCT: Innerduct shall be bright orange and shall be installed for fiber optic cables from fiber patch panels to conduit or plenum entrances. Innerduct shall be plenum rated. Carlon, Dura-line and Panduit.

2.07 CABLE LUBRICANTS

A. Lubricants specifically designed for installing communications cable may be used to reduce pulling tension as necessary when pulling cable into conduit. Dyna-Blue or American Polywater for Twisted pair cables. Optic Lube or Ideal for Fiber Optical Cable.

2.08 FIRE WALL SEALANT

A. Any penetration through firewalls (including those in sleeves) shall be sealed with an Underwriter Laboratories approved sealant, Flameseal.

PART 3 – EXECUTION

3.01 EXISTING CONDITIONS

A. The Contractor shall familiarize himself/herself with the site before submitting proposal. Congested building areas shall be inspected by the Contractor to ensure coordination with the other trades during construction. NO EXTRAS SHALL BE PERMITTED BECAUSE OF THE

CONTRACTOR'S FAILURE TO PROPERLY INVESTIGATE EXISTING CONDITIONS OR BUILDING DESIGN AT THE TIME OF THE PROPOSAL.

3.02 INSTALLATION

A. GENERAL:

1. The Cabling Contractor shall furnish and install a complete data cabling system with all necessary wiring and devices. The General Contractor will provide a conduit and outlet box at each outlet location. The Cable Contractor shall furnish tie wraps, tape or hooks for slack-wire management where appropriate.

2. FIRE WALL PENETRATIONS: The Contractor shall avoid penetration of fire-rated walls and floors wherever possible. Where penetrations are necessary, they shall be sleeved with metallic conduit and resealed with an Underwriter Laboratories approved sealant. Contractor shall also seal all floor, ceiling and wall penetrations in fire or smoke barriers and in the wiring closet.

3. ALLOWABLE CABLE BEND RADIUS AND PULL TENSION: In general, communications cable cannot tolerate sharp bends or excessive pull tension during installation. Refer to the cable manufacturers allowable bend radius and pull tension data for the maximum allowable limits.

4. CABLE LUBRICANTS: After installation, exposed cable and other surfaces must be cleaned free of lubricant residue.

5. PULL STRINGS: Coordinate with Div 26 contractor for pull strings in all new conduits, including all conduits with cable installed as part of this contract. Pull test is not to exceed 200 pounds. Where other cables (video, telephone, etc) are data are in the same conduit serving the same wall outlet, they shall be pulled together with pull strings.

6. CONDUIT FILL: Conduit fill shall not exceed 40%.

7. DAMAGE:

   a. The Contractor shall replace or rework cables showing evidence of improper handling including stretches, kinds, short radius bends, over-tightened bindings, loosely twisted and over-twisted pairs at terminals and cable sheath removed too far (over 1½").

   b. The Contractor shall replace any damaged ceiling tiles that are broken during cable installation.

8. Clean-UP: All clean up activity related to work performed will be the responsibility of the Contractor and must be completed daily before leaving the facility.

B. DOCUMENTATION:

1. LABELS: The Contractor will label all outlets using permanent/legible machine generated, self laminating labels approved by the Owner. Label patch panels in the wiring closet to match those on the corresponding data outlets. The font shall be 10 point, at least one-eighth inch (1/8”) in height, black block lettering on white field. All labels shall correspond to as-builts and to final test reports.

2. FLOOR PLAN: A floor plan clearly labeled with all outlet jack numbers shall be included in the as-built plans.

3. LABELING SYSTEM: Contractor shall label wiring and equipment based on the Owner’s prescribed system to be provided to the Contractor prior to installation. Typically this is “D” for data, then closet designation and number. Example – A001D indicates data drop # 1 inch (25.4 mm) MDF closet “A”.

4. Separate cable label needed at head end for each E-Rate cable with FRN # & date of Job.

C. EQUIPMENT RACK CONFIGURATION:

1. EQUIPMENT RACKS: Equipment racks shall be assembled and mounted in locations shown on the drawings. Each rack shall be securely mounted to the floor and braced to the wall with cable tray in accordance with the manufacturer’s instructions and recommendations. Racks shall be mounted such that the side rails are plumb. Racks shall be grounded in accordance with NEC requirements. Install racks such that future expansion can occur. Equipment and wiring panels shall be installed so that the top 40% of the rack is available for future wiring and equipment.

2. WIRE MANAGEMENT COMPONENTS: Vertical cable management panels shall be installed on each side of the rack. In instances where more than one rack is installed in a single location, vertical cable management shall be installed between the racks.

3. CABLE PLACEMENT: Cable installation in the Wiring Closet must conform to the Project Drawings. All cabling shall be routed so as to avoid interference with any other service or system, operation or maintenance location. Avoid crossing areas horizontally just above or below any riser conduit. Lay and dress cables to allow other cables to enter the conduit/riser without difficulty at a later time by maintaining a working distance from these openings.

4. CABLE ROUTING: Cable shall be routes as close as possible to the ceiling, floor or corners to ensure that adequate wall or backboard space is available for current and future equipment. All cable runs within the Wiring closet shall be horizontal or vertical within the constraints of minimum cable bending radii. Minimum bend radius shall be observed. Cables shall not be tie-wrapped to electrical conduit or other equipment.

5. INSTALLATION: All incoming cables shall be routed on the cable tray and neatly dressed down to the patch panels.

6. HARDWARE: Provide rack and jack panel hardware as required for all data station wiring.

D. STATION WIRING INSTALLATION:

1. GENERAL:

a. Cabling between wiring closet and workstation locations shall be made as individual home runs. No intermediate punch down blocks or splices may be installed or utilized between the wiring closet and the communications outlet at the workstation location.

b. All cable must be handles with care during installation so as not to change performance specifications. Factory twists of each individual pair must be maintained up to the connection points at both ends of the cable. There shall never be more than one and one-half inches of unsheathed Category 6 UTP cable at either the wiring closet or the workstation termination locations.

2. EXPOSED CABLE:

a. All cabling shall be installed inside walls or ceiling spaces whenever possible.

b. Exposed cable runs will require Owner approval, and will only be allowed when no other options exist.

3. PLACEMENT: All cabling and associated hardware shall be placed so as to make efficient use of available space. All cabling and associated hardware shall be placed so as not to impair the Owner’s efficient use of their full capacity.

4. CABLE ROUTES: All cabling placed in ceiling areas must be in conduit, cable tray or J-HOOKS. Cable supports shall be permanently anchored to building structure or substrates. Provide attachment hardware and anchors designed for the structure to which attached and that are suitable sized to carry the weight of the cables to be supported. Attaching cable to pipes or other mechanical items is not permitted. Use J-hooks for up to 15 cables (Caddy CAT 21 or CAT 32 hooks with appropriate brackets). All runs of sixteen (16) or more cables, provide cable rings on 36-inch maximum centers to hang cable. Communications cable shall be rerouted so as to provide a minimum of 18 inches (457.2 mm) spacing from light fixtures, sources of heat, power feeder conduits and EMI sources. Cabling shall not be attached to ceiling grid support wires. Cable runs shall be parallel or perpendicular to building structure. Multiple cables to be bonded together every six feet.

E. STATION HARDWARE:

1. FLUSH MOUNT JACKS: Flush mount jacks shall be mounted in a faceplate with backbox. Backbox will be provided by General Contractor.

2. RJ-45 JACK PIN ASSIGNMENTS:

a. Pin connections for data station cable outlets and patch panels shall match EIA/TIA 568 modular jack wiring recommendation T568B.

b. Pin connections at data jack panels shall match pin connections at outlets (straight through wiring).

F. FIBER OPTIC CABLE INSTALLATION:

1. PLACEMENT: Fiber Optic Cable shall be installed in innerduct from fiber patch panels to plenum entrances. Innerduct shall not be installed in plenum ceilings unless it is U. L. approved plenum rated. Plenum rated Fiber Optic Cable shall be installed in conduit or U. L. approved plenum rated innerduct in all plenum ceilings.

2. TERMINATIONS: Terminations shall be performed by manufacturer-trained and certified technicians. Terminations shall be made in a controlled environment. The contractor may choose to have the cables assembled off-site, although testing must be completed with the cable in its final installed condition.

3. WARNING TAGS: At each location where fiber cable is exposed to human intrusion, it shall be marked with warning tags. These tags shall be yellow or orange in color, and shall contain THE warning: “CAUTION FIBER OPTIC CABLE”. The text shall be permanent, black, block characters, and at least 3/16” high. A warning tag shall be permanently affixed to each exposed cable or bundle of cables, at intervals of not less than five (5) feet. Any section of exposed cable that is less than five (5) feet in length shall have at least one warning tag affixed to it.

G. CABLE TESTING:

1. NOTIFICATION: The Owner/Designer shall be notified one week prior to any testing so that the testing may be witnessed.

2. INSPECTION: Before requesting a final inspection, the Contractor shall perform a series of end-to-end installation performance tests. The Contractor shall submit for approval describing the test procedures, test result forms and timetable for all copper and fiber optic cabling.

3. TESTS: Trained personnel shall perform all testing. Acceptance of the test procedures discussed below is predicated on the Contractor’s use of the recommended products and adherence to the inspection requirements and practices set forth. Acceptance of the COMPLETED installation will be evaluated in the context of each of these factors.

4. ERRORS: When errors are found, the source of each error shall be determined, corrected and the cable retested. All defective components shall be replaced and retested. Retest results must be provided on Owner approved forms and witnessed by Owner.

5. TWISTED PAIR CABLE TESTING:

a. At a minimum, the Contractor shall test all station drop cable pairs from Data Closet termination patch panels to outlet device RJ45 jacks. Category 6 products shall be tested for compliance to ANSI/TIA/EIA 568A and ISO/IEC 11801 for a Category 6 rated installation. Test equipment used shall meet TIA/EIA TSB-67, Level II accuracy. Further, the Contractor shall have a copy of TSB- 67 inch (1701.8 mm) its possession and be familiar with its contents.

b. Each wire/pair shall be tested at both ends for the following:

1) Wire map (pin to pin connectivity)

2) Length (in feet)

3) Attenuation

4) Near End Cross Talk (NEXT)

5) Power sum

c. Test equipment shall provide an electronic and printed record of these tests. Test results for each Category 6e four-pair UTP cable must be submitted with identification to match labels on all patch panel ports and RJ45 jacks and must match as-builts associated with that cable.

6. FIBER OPTIC CABLE TESTING:

a. Testing device for fiber optic cables shall be a high quality OTDR (Optical Time-Domain Reflectometer) equipped with a printer. The printed data shall show, in addition to any summary information, the complete test trace and all relevant scale settings. The OTDR must have the capability to take measurements from bare fiber strands as well as ST or SC connector terminations.

b. All fiber optic cable shall be tested on the reel before installation to ensure that it meets the specifications outlined herein.

c. After installation, the Contractor shall test each fiber strand in accordance with the EIA 455-171 Method D procedures (bi-directional testing) at both 850 and 1300 nm. A form shall be completed for each cable showing data recorded for each strand including length, total segment (end-to-end) loss (dB) and connector losses (dB) at each end. In addition, the printed data strip for each strand shall be attached to the form. Patch cables shall also be tested.

d. Acceptable fiber optic cable and connector loss shall not exceed 1.5 dB. The Contractor is responsible for obtaining minimum loss in fiber connections and polishing per manufacturer specifications.

H. INSPECTION: Conformance to the installation practices covered above are to be verified when completed. In some cases, the Owner may inspect before acceptance.

END OF SECTION

SECTION 27 4116
INTEGRATED AUDIO VIDEO SYSTEMS AND EQUIPMENT

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1. Furnish and install A/V systems including high-low cabling, interactive monitors, projectors,

2. monitors, mounts, mounting accessories, labor, testing and all supporting equipment to provide

3. a complete and fully functional solution as described in this specification.

1.02 INSTALLER QUALIFICATIONS

A. A. The firm bidder shall be normally employed in the audio-visual and industry and shall provide a reference list of ten (10) large-scale projects and contact names confirming successful classroom video projection system installations.

B. B. The manufacturer shall have an authorized service center in the state of Texas for the brand of projector that is submitted for bid. The school district reserves the right to perform an on site inspection.

C. The bidder shall have full time local service personnel capable of servicing the provided audio visual systems, and able to respond to service issues within 24 hours.

1.03 SUBMITTALS

A. Product Literature: Complete manufacturer's product literature for all projectors, mounting plates, projector bracket, speakers, amplifiers, cable, cross-connect blocks, cable supports, cable labels, outlet devices, and other products to be used in the installation. In addition, whenever substitutions for recommended products are made, samples (when requested by the Owner/Designer) and the manufacturer's supporting documentation demonstrating compatibility with other related products shall be included

B. Testing: Proposed Contractor test result forms, and a list of instrumentation to be used for systems testing.

C. The contractor shall provide a letter from the manufacturer stating that the dealer is an authorized service center.

D. The resume and contact information of the full time service personnel responsible for the installed projection system.

E. Shop Drawings: Proposed wiring and connectivity diagram of the proposed projection system including all faceplates and sound reinforcing equipment

F. Refer to Electrical Division 26 Sections for additional submittal requirements.

PART 2 – SYSTEMS

2.01 GENERAL

A. Materials shall be as listed or shall be approved equivalent products of other manufacturers meeting the intent and quality level of those specified.

2.02 ACCEPTABLE MANUFACTURERS

A. Projectors:

1. NEC

B. Interactive Monitors:

1. Clear Touch

C. Monitors:

1. Clear Touch NIO (55" & 65" per drawings) Mount to be provide by manufacture

D. Mounting Equipment:

1. Crimson AV
2. Peerless
3. Premier
4. Chief

E. Patch Cabling:

1. Liberty

2. Kramer

3. Comprehensive AV

F. Accessories:

1. Logitech

2. APC

3. Kanex Pro

4. Tripp Lite

2.03 PERFORMANCE REQUIREMENTS

A. Projectors:

1. Cafeteria Projector

a. 7000 Lumens

b. Laser source

c. Minimum WUXGA

d. PA703UL with NP41ZL lens, or Epson equal

B. Interactive Monitors

1. Interactive Monitors

a. Screen sizes of 75”and 86”

b. Minimum resolution of 2160P

c. Minimum of 20-points of touch

d. Clear Touch A+series

2. Collaboration Interactive Monitors

a. 75” Screen Size

b. Capable of being used with A+ PORTABLE Stand

c. Clear Touch A+ Series

3. PC Module
    a. Minimum of i5 Processor
    b. Minimum of 8GB DDR4 Memory
    c. Minimum of 256GB SSD Storage
    d. Shall come preloaded with Windows 10 Pro
    e. Clear Touch CTI-WFMOD-DBAX
4. WiFi Module
    a. Minimum of 802.11 AC
    b. Clear Touch CTI-WFMOD-DBAX

C. Monitors/Displays
1. Digital Signage Monitors/Displays
    a. Screen size of 55” or 65” according to drawings
    b. Minimum resolution of 2160P
    c. Must be commercial grade
    d. Cleartouch NIO

D. Projector Mounting Equipment:
1. Library/Cafeteria Projector Mounting
    a. Speed Tile above ACT
    b. 2’-4’ Pole Extension in the Library/Cafeteria
    c. Universal Projector Mount with security
    d. Color to be coordinated with owner prior to purchase
2. Monitor Mounts
    a. Tilting Wall Mount
    b. Post mount adjustments
    c. Security Option

d. Black

3. Interactive Monitor Flat Mounts

a. Fixed Wall Mount

b. Security Option

c. Black

d. Clear Touch CTI-MOUNT-FIXW

4. Interactive Monitor Cart

a. Height Adjustable

b. Electrically Powered

c. Weight Capacity up to 330lbs

d. Clear Touch CTI-STAND-ADJM-E1

E. Patch Cabling

1. 12’ black HDMI cable

2. 12’ black USB 2.0 A to B cable

3. 6’ black 3.5mm cable

F. Accessories

1. Wireless Keyboard

a. Logitech K400 Plus

2. Surge Protector

a. Tripp Lite #SUPER725B

2.04 LOCAL SOUND REINFORCING CEILING MOUNTED SPEAKERS

A. Specified in Section 27 51 23.

1. LOCAL SOUND SPEAKER AMPLIFIER

2. Specified in Section 27 51 23.

2.05 SYSTEM CABLING

A. SYSTEM REQUIREMENTS:

1. Provide complete cabling video/audio solution from projector station faceplate to ceiling mounted projector location. Contractor shall refer to floor plan for input plate and projector location to determine proper cable length requirements. Contractor shall provide at least 10'-0" service loop at all projector and input locations. Contractor shall properly support and label all cabling at each projector and faceplate location.

B. B. AUDIO/VIDEO COMPONENTS AND CABLES:

1. Cables shall include:

a. At least 50' including Cat 6e cable, plenum rated, x 1 (From presentation station to ceiling projector)

b. 6' Extension Cable, HDMI plenum rated, x 1 (At ceiling Projector/Receiver location)

c. Ensure 3.5mm output from projector to sound rack where applicable.

C. AUDIO/VIDEO BASE T TRANSMITTER/FACEPLATES AT TEACHER PRESENTATION STATION

D. AUDIO/VIDEO BASE T RECEIVER AT PROJECTOR LOCATION:

1. Ceiling Project Location: Contractor shall provide and install HD BASE T HDMI Receiver with integral HDMI connector. Contractor just needs to connect the other end of Cat 6e Cable to the Receiver.

E. ADDITIONAL REQUIREMENTS:

1. Refer to the Details on the Drawings for additional information and requirements. Provide equipment, devices and wiring that is shown.

PART 3 – EXECUTION

3.01 GENERAL CABLING REQUIREMENTS

A. Allowable Cable Bend Radius and Pull Tension: In general, communications cable cannot tolerate sharp bends or excessive pull tension during installation. Refer to the cable manufacturers allowable bend radius and pull tension data for the maximum allowable limits.

B. Cable Lubricants: After installation, exposed cable and other surfaces must be cleaned free of lubricant residue.

C. Pull Strings: Coordinate with Div. 26 for pull strings in all new conduits, including all conduits with cable installed as part of this contract. Pull test is not to exceed 200 pounds. Data and video cables can be pulled together with pull strings.

D. Fire Wall Penetrations: The contractor shall avoid penetration of fire rated walls and floors wherever possible. Where penetrations are necessary, they shall be sleeved with metallic conduit and resealed with an Underwriter Laboratories (UL) approved sealant. Contractor shall also seal all floor, ceiling and wall penetrations in fire or smoke barriers and in the wiring closet.

E. Inspection and Test Reports: During the course of the project, the Contractor shall maintain an adequate inspection system to ensure that the materials supplied, and the work performed conform to Contract requirements. The Contractor shall provide written documentation that indicates that materials acceptance testing was conducted as specified. The contractor shall also provide documentation which indicates that all termination testing was completed and that all irregularities were corrected prior to job completion.

F. Operating and Maintenance Instruction for all devices within the system: These instructions shall reflect any changes made during the course of construction.

G. As-Built Drawings will include cable pathways, outlet locations with correct labeling and the installing wiring and connectivity diagram of the proposed projection system including the sound reinforcing equipment. The as-built drawings will be prepared using AutoCAD 2018 or later or Revit. Provide the owner with one Mylar plot of each drawing and one-half prints of each drawing. Provide the owner with electronic versions of the as-builts on CD ROM. Provide digital one-line drawing showing signal flow, devices and model numbers.

H. Conduit Fill shall not exceed 40%.

I. Damage:

1. The Contractor shall replace or rework cables showing evidence of improper handling including stretches, kinks, short radius bends, over-tightened bindings, loosely twisted and over-twisted pairs at terminals and cable sheath removed too far (over 1-1/2 inches (38 mm).

2. The Contractor shall replace any damaged ceiling tiles that are broken during cable installation.

J. Clean-up: All clean-up activity related to work performed will be the responsibility of the contractor and must be completed daily before leaving the facility.

K. Labels: The Contractor will label all outlets using permanent/legible typed or machine engraved labels approved by the Owner (no handwritten labels permitted). The font shall be at least on-eighth inch (1/8”) in height, block. All labels shall correspond to as-builts and to final test reports.

3.02 INSTALLATION

A. Collaboration Space Infrastructure:

1. Furnish and install quantity of one (1) collaboration AV system:

2. Provide and install 65” collaboration interactive monitor as specified above. Each shall be mounted to the adjustable mount. Each display shall come. with the PC module, WiFi module, and a wireless keyboard.

3. Each display shall have a surge protector, and extension cord.

4. Provide quantity of patch cords: one (1) HDMI and one (1) USB A to B

3.03 STATION WIRING INSTALLATION

A. All cable must be handled with care during installation so as not to change performance specifications. Factory twists of each individual pair must be maintained up to the connection points at both ends of the cable. There shall never be more than one and one-half inches of unsheathed Category 6e UTP cable at either the wiring closet or the workstation termination locations.

B. Exposed Cable:

1. All cabling shall be installed inside walls or ceiling spaces whenever possible. Exposed station cable will only be run where indicated on the Drawings.

2. Additional exposed cable runs will require Owner approval, and will only be allowed when no other options exist.

C. Placement: All cabling and associated hardware shall be placed so as to make efficient use of available space. All cabling and associated hardware shall be placed so as not to impair the Owner’s efficient use of their full capacity.

D. Cable Routes:

1. All cabling placed in ceiling areas must be in conduit, cable tray or J-Hooks. Cable supports shall be permanently anchored to building structure or substrates. Provide attachment hardware and anchors designed for the structure to which attached and that are suitably sized to carry the weight of the cables to be supported. Do not route cable through webbing of structural steel. Cabling must be supported in dedicated supports intended to support cabling as described in this section.

2. Attaching cable to pipes or other mechanical items is not permitted. Use J-Hooks for up to 15 cables (Chatsworth hooks with appropriate brackets). All runs of sixteen (16) or more cables, provide cable rings on 36-inch maximum centers to hang cable.

Communications cable shall be rerouted so as to provide a minimum of 18 inches (457.2 mm) spacing from light fixtures, sources of heat, power feeder conduits and EMI sources. Cabling shall not be attached to ceiling. Grid support wires. Cable runs shall be parallel or perpendicular to building structure. Multiple cables to be bundled together every 6 feet (182.88 cm).

3.04 STATION HARDWARE INSTALLATION

A. Flush Mount Jacks: Flush mount jacks shall be mounted in a faceplate with backbox.

B. Placement: Where possible, the Teacher Workstation (TWS) outlet shall be located so that its centerline is 18 inches (457.2 mm) above floor level or 12 inches (304.8 mm) above permanent bench surfaces. Outlets shall not be mounted on temporary, movable, or removable surfaces, doors, or access hatches. The Ceiling Mounted Projector (CMP) outlet shall be installed in the ceiling mounted projector plate.

3.05 CABLE TESTING REQUIREMENTS

A. Notification: The Owner and Engineer shall be notified one week prior to any testing so that the testing may be witnessed.

B. Inspection: Before requesting a final inspection, the Contractor shall perform a series of end-to-end installation performance tests. The Contractor shall submit for approval a proposal describing the test procedures, test result forms and timetable for all copper and fiber optic cabling.

C. Procedures: Trained personnel shall perform all testing. Acceptance of the test procedures discussed below is predicated on the Contractor’s use of the recommended products and adherence to the inspection requirements and practices set forth. Acceptance of the completed installation will be evaluated in the context of each of these factors.

D. Errors: When errors are found, the source of each shall be determined, corrected and the cable retested. All defective components shall be replaced and retested. Re-test results must be provided on Owner approved forms and witnessed by Owner.

E. Continuity: As tested in the above testing requirements.

F. Power Readings: A power reading will be required at each drop of each of the cabling systems. A +3 dB to a +7 dB is required at each drop with a common feed signal of + 15 dB into the head end amplifier. These measurements to be taken with an approved field strength meter of know calibration. Test measurements to be performed at low channel, mid-band channel, and high channel to determine cable slope.

G. Signal Quality: A standard receiver, typical of those used in the system, shall randomly be connected to 10% of the outlets across the system and tuned to a reference channel of known

quality. No visible indication of co-channel interference, noise, ghosting, or beat interference may be observed.

H. Carrier to Noise: Carrier to Noise shall be measured at random outlets representing an average cross section of the drops with an approved field strength meter by the following process. With normal operating levels the field set shall be tuned to each channels visual carrier and the level recorded. The input signal to the head end amplifier shall be removed and the input of the amplifier terminated with a short. Each channel shall be re-measured and the noise levels recorded. The Carrier to Noise measurement is the difference of the two figures.

I. Documentation of Results: All recorded measurements are to be tabulated and included in the systems documentation manual for reference during maintenance of the system.

3.06 INSPECTION

A. Conformance to the installation practices covered above are to be verified when completed. In some cases, the Owner/Designer may inspect before acceptance.

3.07 TRAINING

A. Contractor is required to provide at least 4 hours of training to owner on proper usage of system as well as maintenance requirements of system. Provide all training materials and documentation required for owner to operate, configure and maintain all components of system.

3.08 PROJECT COMPLETION

A. Inspection and Test Reports: During the course of the project, the Contractor shall maintain an adequate inspection system to ensure that the materials supplied and the work performed conform to Contract requirements. The contractor shall provide written documentation that:

1. Indicates that materials acceptance testing was conducted as specified.

2. The Contractor shall also provide documentation, which indicates that all cable termination testing was completed and that all irregularities were corrected prior to job completion.

B. Operating and Maintenance Instructions: Operating and maintenance instructions for all devices within the system. These instructions shall reflect any changes made during the course of construction.

C. As-Built Drawings: As-built drawings will include cable pathways, outlet locations with correct labeling and the installed wiring and connectivity diagram of the proposed projection system including the sound reinforcing equipment. Provide digital one-line drawing showing signal flow, devices and model numbers.

D. The as-built drawings will be prepared using AutoCAD or Revit. Provide the Owner with one paper plot of each drawing and one half prints of each drawing. Provide the Owner with electronic versions of the as-builts on USB drive.

3.09 WARRANTY

1. The selected system installer shall be factory authorized service center and shall provide an end-to-end performance warranty of not less than five (5) years on installation and all components. The proposer shall provide current certification documentation. The performance warranty shall be issued by the manufacturer and shall warrant that ALL video projection system components have been tested to the districts approval.

END OF SECTION

SECTION 28 0000
ACCESS CONTROL SYSTEM

PART 1 - GENERAL

1.01 REFERENCE STANDARDS

A. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

B. NFPA 72 - National Fire Alarm and Signaling Code; Most Recent Edition Cited by Referring Code or Reference Standard.

C. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS AND INSTALLERS

A. RS2 Technologies. Installer must be RS2 certified and provide integration.

B. Contractor shall contact manufacturer to verify product or part number during bidding period. For any product or part number discontinued, Contractor shall provide a replacement product or part number with same or better quality.

2.02 ACCESS CONTROL EQUIPMENT (ACS)

A. General: The access control system is a modular and networked based system providing physical access control security to a Wide Area campus enterprise. The system shall be capable of controlling and integrating multiple security functions including the configuration, management and monitoring of cardholder access, locking hardware units, events, alarms, visitors and real time tracking and reporting. The access control system is to be alterable at any time depending on the facility requirements and will allow for easy upgradeability or modification of network processors, controller, interface modules, card data, inputs, outputs, and remote work stations. The access control system shall include, but not limited to the followings:

2.03 CLIENT/SERVER MODEL OPERATING CENTRAL SERVER HOST SOFTWARE MODULES AND CLIENT WORKSTATION SOFTWARE APPLICATIONS IN A MULTI-USER AND A MULTI-TASKING ENVIRONMENT.

2.04 PARTITIONING:

A. The system to support security partitioning enabling system administrator to segment the configuration database and group multiple entities within the security partition.

2.05 ENCRYPTION:

A. The system to support encrypted communication between the central server software and client software application (server-to-server and client-to-server) using 128-bit access control encryption algorithm (at a minimum).

2.06 DISTRIBUTED PROCESSING:

A. The system is fully distributed processing application allowing information, including time, date, zones, valid codes, tasks, access levels and similar data, to be downloaded from the central host station to controller interface devices allowing access-control decisions with or without central host station communication. If communications to a central host station are lost, the controllers will automatically buffer event transactions until communications are restored and events are automatically uploaded to the central host station.

2.07 SINGLE DATA BASE

2.08 SYSTEM ACCESS MANAGEMENT

2.09 CARDHOLDER MANAGEMENT

2.10 ACCESS GROUPS AND ACCESS LEVELS

2.11 ALARM MONITORING

2.12 EVENT MONITORING

2.13 TRANSACTION LOGS

2.14 SYSTEM MONITORING

2.15 LOCK/UNLOCK COMMANDS

2.16 HARDWARE INTERFACE

2.17 REPORT GENERATOR

2.18 MULTI-USER/WEB BASED NETWORK CAPABILITIES

2.19 SYSTEM INTEGRATION

A. Open Architecture

B. Open Protocol

C. Network Support

2.20 LAN/ETHERNET ENTERPRISE RING TOPOLOGY AND LOCALIZED STAR TOPOLOGY BASED ON TCP/IP.

2.21 DIRECT-CONNECTED RS-232 AND RS-485 COMMUNICATION CABLING.

2.22 DIAL-UP MODEM CONNECTION USING A STANDARD DIAL-UP TELEPHONE LINE.

2.23 PROVIDE LOCAL COMMUNICATION PORT AT EACH PANEL FOR LOCAL CONFIGURATION OF SYSTEM WITH LAPTOP.

2.24 LOCATE ALL MAIN CONTROL PANELS IN MER AND BCR ROOMS OF EACH BUILDING.

2.25 PROVIDE 120V AT ALL CONTROLLER AND POWER SUPPLY LOCATIONS.

2.26 FINAL SOFTWARE CONFIGURATION / PROGRAMMING OF SYSTEM INTEGRATION WILL REQUIRE OWNER / CONTRACTOR CONSULTATION.

A. Approved Products

2.27 STANDARD SOFTWARE INCLUDING ONE (1) SINGLE CLIENT LICENSE, ONE (1) S-TERM STANDARD TERMINAL SERVICES LICENSE, AND SUPPORT UP TO EIGHT (8) SCPS.

2.28 STANDARD CLIENT OPTION

2.29 STANDARD SYSTEM WIDE OPTIONS:

A. Data Exchange Package

B. ID Badging License

C. Web Client License

D. Custom Report Designer License

2.30 STANDARD THIRD PARTY INTERFACE SUPPORT AGREEMENT:

A. Video surveillance integration support (provide 3 yrs of support with initial system installation).

2.31 STANDARD DIRECT SUPPORT AGREEMENT (DSA)

A. Direct support agreement (provide a 3 yr DSA with initial system installation)

1. ACCESS CONTROL PANEL HARDWARE (Contractor shall verify with manufacturer for the latest part number update during the bidding period. Provide panels and modules as required based on the number of controlled doors on project, No Exception).

B. Enclosures: Each enclosure shall have 8-door access control PDF with the following components:

1. One (1) Base Electronics LV-8RS Power Distribution Module
2. One (1) Base Electronics LV-8A Power Distribution Module
3. One (1) Altronix SMP5 / SMP10 Power Supply
4. Eight (8) RH1B-U-DC24V Relay
5. One (1) RH2B-U-DC24V Relay
6. Seventeen (17) 1A Fuses
7. Provide required buck boost step-down transformers
8. Manufacturer/ Model: Base Electronics, Model LVPC-2011568 or approval equal

C. System Control Processor: Intelligent two portal two reader combination system controller with 10/100Base-T Ethernet connectivity and dual reader interface module, 6MB RAM (non-expandable), 1 RS-232/485 host port, with a secondary RS-232/485 host port for redundancy, 1 two wire RS-485 channel for communication to a maximum of 31 I/O modules, support for up to two magstripe or Wiegand readers includes: Eight door contacts, eight request to exit inputs, eight door strike relays, 16 programmable inputs and 8 output relays.

1. Model: EP-1502 (s) or approved equal

D. Door Controllers: Two Portal Two Deader interface module – support for up to two magstripe or Wiegand readers. Includes: Eight door contacts, eight request to exit inputs, eight door strike relays, 16 programmable inputs and 16 output relays.

1. Model: MR-52 (s) or approved equal

E. Input Monitor Modules: 16 normally open or closed, supervised or non-supervised inputs for monitoring vital alarm points or for providing elevator floor selection control. Includes: Minimum 8 programmable output relays and (32) 1K ohm resisters for supervisory wiring.

1. Model: MR-16IN (s) or approved equal

F. Output Control Modules: 16 programmable output relays with the option of being configured as fail-secure only. These relays support “On”, “Off” or “Pulse” modes for a variety of applications such as elevator control or any device requiring dry contacts.

1. Model: MR-16OUT (s) or approved equal

2. 2.04 FIELD DEVICES (Contractor shall verify with manufacturer for the latest part number update during the bidding period. Provide field devices as required based on the number of controlled doors on project, No Exception).

G. Card Readers:

1. Card Readers shall be HID ThinLine II Type Reader, provide on door only. No wall mounted card readercard. readers to be supplied via DIV 28 access control sub. Coordinate with General Contractor and door hardware suppler during bidding period.

2. Card Reader integrated with door is also acceptable. Coordinate with General Contractor and door hardware suppler during bidding period.

H. Provide Ethernet Network Interface to connect buildingsto district-wide access control system. Connect to local area network at each facility.

I. Contractor shall provide Security Access Software for required number of licenses/points added to the system. Contractor shall install on owner provided computer located at district.

J. Contractor shall provide all cabling and accessories required to provide complete access control access control solution and proper integration with building Bosch/Radionics burglar alarm system for door contact shunting.

K. Provide two hundred (200) iCLASS smart card HID Product 200xiCLAS proximity cards. Card shall be able to print directly on face of card.

2.32 WIRING

A. All wiring shall be by the manufactures (RS2 Technologies) specifications. All cable shall be shielded as required.

B. All 120v Power shall be furnished by the Division 26 contractor.

C. All Access Control Conduit as show on the drawings shall be furnished by the division 26 contractor as part of there scope of work.

D. Coordination with the Division 26 contractor is the responsibility of the Access Control Contractor to ensure all conduit is in place for a complete installation.

E. All systems shall be connected to an emergency power source as available.

1. Color code of all Access Control intrusion detection system and access control wiring shall be Yellow in color. Anixter/Belden product numbers:

   a. YM47016007 22/6 Yellow

   b. YM46496007 18/4 Yellow

   c. YM47081007 18/2 Yellow

   d. YM48839007 16/2 Yellow

PART 3 – EXECUTION

3.01 INSTALLATION

A. All wiring shall be in accordance with the National Electrical Code, Local Codes, and article 760 of NFPA Standard 70. All wiring sizes shall conform to recommendations of the equipment manufacturer, and as indicated on the engineered shop drawings.

B. All wire shall be UL Listed CL2 for limited energy (300V) applications and shall be installed in conduit. Limited energy MPP wire may be run open in return air ceiling plenums provided such wire is UL Listed for such applications and is of the low smoke producing fluorocarbon type and complies with NEC Article 760 if so approved by the local authority having jurisdiction.

C. No AC wiring or any other wiring shall be run in the same conduit as Access Control alarm wiring.

D. All wire shall be installed in an approved conduit/raceway system (except 70V or lower where permitted by NEC and the local authority having jurisdiction). Maximum conduit "fill" shall not exceed 40% per NEC.

E. Minimum conduit size shall be 3/4" EMT. Install conduit per engineered shop drawings.

F. Systems utilizing open wiring techniques with low smoke plenum cable shall provide conduit in all inaccessible locations, inside concealed walls, all mechanical/electrical rooms, in exposed locations, or other areas where wiring might be exposed or subject to damage. For conduit in walls stub up into nearest accessible ceiling cavity and provide protective bushing at the end of the conduit.

G. All vertical wiring and all main trunk/riser wiring shall be installed in a complete raceway/conduit system. All riser boxes shall be adequately sized for the number of conductors transversing the respective box as well as the number of terminations required.

H. Telephone Cable: Provide a 4 pair Category 6 telephone cable from the Master Control Panel to the MDF Room.

I. Magnetic door contacts protecting separate hallways or entry areas to be connected into separate modules for separate identification.

J. All plenum wiring is to be installed parallel and perpendicular to the building structure. Install wiring tight up against structure for protection. Cable shall be bundled on a maximum of 2'-6" and secured to the structure at a maximum of 5' on center. Bundling and support shall be with plenum rated cable ties.

K. Integrate the Access Control system to the remote monitoring station. Provide all hardware and cabling as required. Coordinate with Owner for approved remote monitoring service.

L. All modules on project shall be mounted above ceiling in easily accessible area. All modules are required to be located on as-built drawings delivered to owner at completion of project.

M. Contractor is required to provide all mapping and software configuration required to operate system as per manufacturer's recommendations. 8

N. Should 120 volt power be required including the main panel, include the cost of additional circuits.

3.02 SYSTEM OPERATION

A. When an alarm condition is detected by any of the alarm initiating devices, the following functions shall occur:

3.03 THE SYSTEM KEYPAD'S INTERIOR AUDIBLE DEVICE SHALL SOUND UNTIL SILENCED BY USING PROPER ACCESS CONTROL CODE OR AFTER SYSTEM TIME OUT.

3.04 A CUSTOM SYSTEM ALARM MESSAGE SHALL BE DISPLAYED ON THE LCD DISPLAY. THIS DISPLAY WILL SHOW THE ALARM DEVICE LOCATION IN PLAIN ENGLISH. LOCATION AND PARTITION CUSTOM MESSAGES SHALL BE FIELD PROGRAMMABLE.

3.05 THE REMOTE SIGNALING TIE CONNECTION SHALL BE ACTIVATED AT THE OWNER'S APPROVED CENTRAL ACCESS CONTROL MONITORING LOCATION AND/OR OTHER OWNER DESIGNATED LOCATION.

3.06 PRINTER SHALL PROVIDE PRINTED COPY OF EVENTS RECORDED IN LOGGER. INSTALL ADJACENT TO ACCESS CONTROL PANEL.

3.07 SYSTEM ZONING AND PARTITIONING

A. The system shall employ intelligent initiating devices and interface devices capable of being recognized and enunciated at the main system keypad and devices partition keypad.

B. All zoning/device locations shall be field programmable.

3.08 TESTING

A. Submit a written test report from an authorized representative of the equipment manufacturer that the system has been 100% tested and approved. Final test shall be witnessed by Owner, Engineer, Electrical Contractor and performed by the equipment supplier. Final test report must be received and acknowledged by the Owner prior to substantial completion.

B. Provide instruction as to proper use and operation of system, for the Owner's designated personnel.

C. OPERATIONAL AND MAINTENACE MANUALS: Provide O&M Manuals as outlined in specification section 260000, paragraph 1.13.

3.09 WARRANTY

A. Entire system shall be warranted against defects in materials and workmanship for a period of one (1) year from the date of substantial completion.

3.10 SOFTWARE

A. Provide two electronic copies of the final programming and program software to the Owner’s Access Control Supervisor after final approval.

END OF SECTION

SECTION 28 1000
INTRUSION DETECTION SYSTEM

PART 1 - GENERAL

1.01 REFERENCE STANDARDS

A. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

B. NFPA 72 - National Fire Alarm and Signaling Code; Most Recent Edition Cited by Referring Code or Reference Standard.

C. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS AND INSTALLERS

A. BOSCH.

B. Contractor shall contact manufacturer to verify product or part number during bidding period. For any product or part number discontinued, Contractor shall provide a replacement product or part number with same or better quality.

2.02 CONTROL COMMUNICATOR (PANEL)

A. The control communicator shall be BOSCH model number D9512G with latest ROM revision. The unit shall be UL listed for commercial burglar alarm application and shall be FM approved.

2.03 INTEGRAL MODEM FOR REMOTE ACCESSIBILITY FOR THE PURPOSES OF PROGRAMMING, DIAGNOSTICS, AND REMOTE CONTROL OF FUNCTIONS.

2.04 EQUIPPED WITH A MINIMUM OF EIGHT (8) PROTECTIVE ZONES AND SHALL HAVE A 1.4-AMP POWER OUTPUT CAPABILITY FOR ALARM SIGNALS.

2.05 MINIMUM OF 1-AMP POWER FOR AUXILIARY DEVICES, REAL-TIME CLOCK AND TEST TIMER, BATTERY CHARGING CIRCUIT, ON-BOARD DIAGNOSTIC LED'S, AUTOMATIC RESETTING CIRCUIT BREAKERS, A MODEL D8004 TRANSFORMER COVER, AND RFI PROTECTION.

2.06 MAIN CONTROL PANEL SHALL BE CAPABLE OF ANNUNCIATION ALARM, TROUBLE, AND SUPERVISORY SIGNALS AT THE LOCAL KEY PAD(S) AND TO A REMOTE SECURITY MONITORING CENTER.

2.07 MAIN CONTROL PANEL SHALL INCORPORATE A MINIMUM OF FOUR (4) HOURS STANDBY POWER.

2.08 MAIN CONTROL PANEL SHALL BE INTERFACED WITH THE INTERCOMMUNICATIONS SYSTEM TO EMIT A DISTINCT ALARM.

2.09 MAIN CONTROL PANEL SHALL BE LOCATED AS INDICATED ON FLOOR PLANS OR AS DIRECTED.

2.10 CARD READER (WIEGAND D9210B) WITH INTERFACE IF APPLICABLE.

2.11 NETWORK INTERFACE MODULE AS NEEDED TO CONNECT TO THE CLIENTS NETWORK FOR RPS PROGRAMMING AND SIGNAL REPORTING.

A. Programmable features shall include:

2.12 INDEPENDENTLY CONTROL ZONES THROUGH AN INDEPENDENT ZONE CONTROL KEYPAD.

A. Bosch B915 Keypad only.

2.13 TWO TELEPHONE NUMBER DIAL UP FOR PRIMARY AND SECONDARY REMOTE RECEIVERS.

2.14 AUTOMATIC TEST REPORTS.

2.15 SELECTIVE ZONE SHUNTING.

2.16 CUSTOM TEXT ON THE ASSOCIATED COMMAND CENTERS.

2.17 ONE ZONE FOR BURGLARY

A. Zone Expansion - Expanded to 238 individually annunciated points of protection through the addition of a two-wire multiplex zone expansion system (ZONEX). Points of protection are annunciated with custom text at the D1255 Alpha Command Center and they can be reported to a Radionics D6600 Receiver.

B. User Pass Codes – Two Hundred Forty Nine (249) user pass codes shall be available to identify the user when arming/disarming the system.

C. Protective Circuits shall consist of zones designed for fire and/or panic (holdup, duress, or emergency) and/or burglary and/or supervisory. Each zone represents a protective circuit and shall accommodate normally opened and closed devices with end-of-line resistor supervision. Each of the 246 points are programmable as to whether they are controlled versus 24 hours; interior versus perimeter; instant versus delayed; silent versus audible (and if audible, pulsed or steady); and local or reporting.

2.18 ADDITIONAL PROGRAMMABLE PARAMETERS FOR EACH POINT INCLUDE THE ABILITY TO SUPPRESS TROUBLE OR RESTORAL REPORTS, DESIGNATE IT AS A PRIORITY ZONE (SYSTEM CANNOT BE ARMED IF THIS POINT IS OFF-NORMAL), REPORT TWO SEPARATE TELEPHONE NUMBERS AND PROVIDE FOR AUTOMATIC SHUNTING OF POINTS FROM THE SYSTEM IN THE EVENT THAT THE DETECTION DEVICE MALFUNCTIONS AND CREATES NUMEROUS FALSE ALARMS.

2.19 EACH POPIT SHALL ACCOMMODATE NORMALLY OPENED AND NORMALLY CLOSED DEVICES WITH END-OF-LINE RESISTOR SUPERVISOR.

2.20 MINIMUM TOTAL POINTS, 248.

A. Entry/exit delays shall be independently programmable from 10 to 150 seconds. A pre-warn audible shall be coincident with the entry delay.

B. Programming of all system functions shall be achievable at system site or remotely via the use of the dial-up telephone network. Minimum programmable functions shall include:

2.21 USER PASS CODES, ENTRY/EXIT DELAY TIMES, MASTER ZONE PERSONALITY, DAY/DATE/TIME, TELEPHONE NUMBERS, POINT OF PROTECTION TEXT LABELS, AND BELL TIME.

2.22 A PROGRAMMABLE SYSTEM PASS CODE SHALL BE USED TO PREVENT UNAUTHORIZED REMOTE PROGRAMMING ATTEMPTS.

2.23 REMOTE PROGRAMMING CAPABILITY SHALL BE AUTOMATIC OR REQUIRE USER ENABLING AT THE DISCRETION OF THE USER.

A. Remote control via the use of the IP communicator phone and owners local area network shall include:

2.24 SYSTEM ARMING.

2.25 RESET OF AUDIBLE SIGNALS.

2.26 ACTIVATION/DEACTIVATION OF RELAY CONTACTS.

2.27 INTERROGATION OF BATTERY.

2.28 ZONE AND ARMED STATUS.

2.29 ENABLE/DISABLE OF REPORTING FUNCTIONS AND REMOVING REPORTING DEVICES FOR SERVICING WHILE THE REMAINDER OF THE SYSTEM IS OPERATIVE.

A. Recognitions shall include: UL for central station fire and/or burglary, local burglary and/or fire; FM for fire, California Fire Marshal for fire; and NYBSA for fire.

B. Miscellaneous built-in features shall include:

2.30 REAL-TIME CLOCK.

2.31 INTERROGATOR.

2.32 AUTO-ANSWER MODEM.

2.33 PHONE LINE MONITOR.

2.34 LOOP START/GROUND START TELEPHONE INTERFACE.

2.35 AUTO BELL TEST.

2.36 LUG-IN TERMINAL STRIPS, AND USER CONTROLLED ZONE BYPASS.

A. Command centers shall be microprocessor-based, UL listed, with built in: Model D1255 White Alpha IV Command Center.

2.37 16 CHARACTER ILLUMINATED ALPHA-NUMERIC DISPLAY.

2.38 BURGLARY AND FIRE SOUNDERS.

2.39 TOUCHPAD KEYPAD.

A. Bosh B915 Basic keypad

2.40 PRE-WARN TONE.

2.41 THE ARMING STATION SHALL HAVE THE ABILITY TO ANNUNCIATE THE ENGLISH LANGUAGE FORMAT VIA THE 16 CHARACTER ALPHANUMERIC DISPLAY BY THE FOLLOWING:

A. Master zone (alarm, service, faulted, and function), POPIT (alarm, service, faulted, missing, extra, function, and location), arm/disarm status (system diagnostics, time/day/date, and user prompts).

2.42 ADDITIONAL FEATURES SHALL INCLUDE LOCAL SYSTEM TEST, SENSOR RESET, PANIC AND/OR MEDICAL AND/OR DURESS ALARM INITIATION, INDEPENDENT MASTER ZONE BY-PASS WITH AUTOMATIC RESTORATION TO NORMAL STATUS TO NEXT SYSTEM ARMING, PERIMETER WATCH MODE, USER CHANGEABLE PASS CODES, REMOTE PROGRAMMING INITIATION, AND SYSTEM/MONITORING SERVICE TEST.

2.43 RADIONICS MODEL D1255 W ALPHA IV, AND SHALL BE FUNCTIONAL AT EACH OF THE LOCATIONS SHOWN ON THE FLOOR PLANS.

A. Modules and Accessories

2.44 ZONEX (ZONE EXPANSION D8125, D8126)

2.45 D8132 BATTERY CHARGER MODULE

2.46 D8103 UNIVERSAL ENCLOSURE

2.47 D8129 OCTO-RELAY MODULE - PROVIDES EIGHT FORM "C" DRY CONTACT RELAY OUTPUTS FOR A VARIETY OF PROGRAMMABLE RESPONSES TO ALARM, TROUBLE AND OTHER SYSTEM CONDITIONS. THEY SHALL BE AUTOMATICALLY OPERATED THROUGH SCHEDULES.

2.48 AUXILIARY POWER SUPPLIES AS REQUIRED FOR POWERING OF MOTION DETECTORS.

2.49 DX4020 NETWORK INTERFACE MODULE.

2.50 D928 DUAL PHONE LINE SWITCHER.

2.51 FIELD DEVICES

A. Ceiling mounted, 360-degree dual technology, infrared sensors/microwave motion sensors. Model DS 9360.

2.52 BRACKET FOR DIRECT MOUNTING TO STANDARD 3-1/2" AND 4" ELECTRICAL BACKBOXES.

2.53 ALL UNITS TO HAVE AREAS OF COVERAGE, WHICH WOULD CAUSE FALSE ALARM SIGNALS TO BE GENERATED, MASKED OUT AND ADJUSTED TO REDUCE FALSE SIGNALS.

A. Wall mounted, high performance, TriTech PIR/Microwave sensor, Model DS970.

2.54 LOW PROFILE BRACKET FOR DIRECTIONAL MOUNTING TO STANDARD 3-1/2” AND 4” ELECTRICAL BACKBOXES.

2.55 ALL UNITS TO HAVE AREAS OF COVERAGE, WHICH WOULD CAUSE FALSE ALARM SIGNALS TO BE GENERATED, MASKED OUT AND ADJUSTED TO REDUCE FALSE SIGNALS.

2.56 PROVIDE IN GYMNASIUMS/CAFETERIA WALL MOUNTED AREAS. PROVIDE PROTECTIVE WIRE COVER IN GYMNASIUM AREAS.

2.57 MAGNETIC DOOR/HATCH CONTACTS MODEL SENTROL 2500 SERIES 2505L

2.58 WHERE EXPOSED CONTACTS ARE USED, THEY SHALL BE HEAVY DUTY SWITCHES PROTECTED BY DIE CAST ALUMINUM HOUSING. THE CONTACT LEADS SHALL BE ENCASED IN STEEL ARMOR JACKET.

2.59 MAGNETIC DOOR/HATCH CONTACTS MODEL SENTROL 2505A DOOR CONTACT

2.60 MAGNETIC CONTACTS ON ALL ROOF HATCHES MODEL SENTROL

2.61 GLASS BREAK DETECTOR

A. None.

2.62 WIRING

A. All wiring shall be by the manufactures (Bosch/Radionics) specifications. All cable shall be shielded as required.

B. All 120v Power shall be furnished by the Division 16000 contractor.

C. All Security Conduit as show on the drawings shall be furnished by the division 16000 contractor as part of there scope of work.

D. Coordination with the Division 16000 contractor is the responsibility of the Security Contractor to ensure all conduit is in place for a complete installation.

E. All systems shall be connected to an emergency power source as available.

F. Color code of all security intrusion detection system and access control wiring shall be Yellow in color. Anixter/Belden product numbers:

1. YM4701600722/6 YELLOW
2. YM4649600718/4 YELLOW
3. YM4708100718/2 YELLOW
4. YM4883900716/2 YELLOW

PART 3 – EXECUTION

3.01 INSTALLATION

A. All wiring shall be in accordance with the National Electrical Code, Local Codes, and article 760 of NFPA Standard 70. All wiring sizes shall conform to recommendations of the equipment manufacturer, and as indicated on the engineered shop drawings.

B. All wire shall be UL Listed CL2 for limited energy (300V) applications and shall be installed in conduit. Limited energy MPP wire may be run open in return air ceiling plenums provided such wire is UL Listed for such applications and is of the low smoke producing fluorocarbon type and complies with NEC Article 760 if so approved by the local authority having jurisdiction.

C. No AC wiring or any other wiring shall be run in the same conduit as security alarm wiring.

D. All wire shall be installed in an approved conduit/raceway system (except 70V or lower where permitted by NEC and the local authority having jurisdiction). Maximum conduit "fill" shall not exceed 40% per NEC.

E. Minimum conduit size shall be 3/4" EMT. Install conduit per engineered shop drawings.

F. Systems utilizing open wiring techniques with low smoke plenum cable shall provide conduit in all inaccessible locations, inside concealed walls, all mechanical/electrical rooms, in exposed locations, or other areas where wiring might be exposed or subject to damage. For conduit in walls stub up into nearest accessible ceiling cavity and provide protective bushing at the end of the conduit.

G. All vertical wiring and all main trunk/riser wiring shall be installed in a complete raceway/conduit system. All riser boxes shall be adequately sized for the number of conductors transversing the respective box as well as the number of terminations required.

H. Telephone Cable: Provide a 4 pair Category 5E telephone cable from the Master Control Panel to the Telephone Equipment Room.

I. Each motion sensor is to be connected into a dedicated POPIT module for point identification.

J. Each set of magnetic door contacts that protect one room are to be connected through one POPIT module for point identification of that room.

K. Magnetic door contacts protecting separate hallways or entry areas to be connected into separate POPIT modules for separate identification.

L. Motion detectors and door contacts shall not share one POPIT module.

M. All plenum wiring is to be installed parallel and perpendicular to the building structure. Install wiring tight up against structure for protection. Cable shall be bundled on a maximum of 2'-6" and secured to the structure at a maximum of 5' on center. Bundling and support shall be with plenum rated cable ties.

N. Integrate the security system to the remote monitoring station. Provide all hardware and cabling as required. Provide a Bosch. B.456 dual path communicator for communication pathway for remote alarm purpose.

O. All popits on project shall be mounted above ceiling in easily accessible area. All popit modules are required to be located on as-built drawings delivered to owner at completion of project.

P. All keypads and sirens shall have dedicated wiring homeruns from each keypad or siren back to panel. Do not daisy chain keypads or sirens.

3.02 SYSTEM OPERATION

A. When an alarm condition is detected by any of the alarm initiating devices, the following functions shall occur:

3.03 THE SYSTEM KEYPAD'S INTERIOR AUDIBLE DEVICE SHALL SOUND UNTIL SILENCED BY USING PROPER SECURITY CODE OR AFTER SYSTEM TIME OUT.

3.04 A CUSTOM SYSTEM ALARM MESSAGE SHALL BE DISPLAYED ON THE LCD DISPLAY. THIS DISPLAY WILL SHOW THE ALARM DEVICE LOCATION IN PLAIN ENGLISH. LOCATION AND PARTITION CUSTOM MESSAGES SHALL BE FIELD PROGRAMMABLE.

3.05 THE REMOTE SIGNALING TIE CONNECTION SHALL BE ACTIVATED AT THE OWNER'S APPROVED CENTRAL SECURITY MONITORING LOCATION AND/OR OTHER OWNER DESIGNATED LOCATION.

3.06 PRINTER SHALL PROVIDE PRINTED COPY OF EVENTS RECORDED IN LOGGER. INSTALL ADJACENT TO SECURITY PANEL.

3.07 SYSTEM ZONING AND PARTITIONING

A. The system shall employ intelligent initiating devices and interface devices capable of being recognized and enunciated at the main system keypad and devices partition keypad.

B. All zoning/device locations shall be field programmable.

C. Input control zones include but are not limited to the following:

1. Each individual building

3.08 TESTING

A. Submit a written test report from an authorized representative of the equipment manufacturer that the system has been 100% tested and approved. Final test shall be witnessed by Owner, Engineer, Electrical Contractor and performed by the equipment supplier. Final test report must be received and acknowledged by the Owner prior to substantial completion.

B. Provide instruction as to proper use and operation of system, for the Owner's designated personnel.

C. OPERATIONAL AND MAINTENACE MANUALS: Provide O&M Manuals as outlined in specification section 260000, paragraph 1.13.

3.09 WARRANTY

A. Entire system shall be warranted against defects in materials and workmanship for a period of one (1) year from the date of substantial completion.

3.10 SOFTWARE

A. Provide two electronic copies of the final programming and program software to the Owner's Security Supervisor after final approval.

END OF SECTION

SECTION 28 2000
CCTV SURVEILLANCE SYSTEM – NETWORK CCTV SYSTEM

PART 1 – GENERAL

1.01 RELATED WORK

A. Section 260500 – Raceways

B. Section 260500 – Outlets, Junction & Pull Boxes

C. Section 260500 – Grounding

D. Section 271000 – Structured Cabling System

1.02 DESCRIPTION OF WORK

A. Provide a complete and tested Network video surveillance system including digital IP cameras and network cabling. Provide fully terminated unshielded twisted pair (UTP) cable, UTP terminations, patch panels, patch cords, raceways, conduit, and other incidental and miscellaneous premises wiring system hardware as required for a complete and useable system. The installation shall comply with applicable codes and standards in effect at the job site and as indicated in the Specifications and Drawings.

B. All IP cameras are normal network devices connected to over normal TCP/IP traffic and owner's servers. NO network video recorder, mouse, keyboard, monitor, digital image storage, and UPS required at all.

C. General Contractor shall coordinate with his Electrical Subcontractor to provide conduit system to serve CCTV Surveillance System. General Contractor shall coordinate with his Structured Cabling System Subcontractor to provide data cables for CCTV Surveillance System.

D. The contractor shall coordinate with other system vendors, where appropriate, to facilitate equipment installation, scheduling, protection of equipment and access to the project site in order to provide the Owner a substantially complete project in a timely manner.

E. Contractor will be required to meet with district representative before any cabling is to be installed to walk the site and coordinate proposed camera locations and cable routing.

F. NCISD will provided licenses for all cameras after final count of cameras. Contractor to provide final camera count.

1.03 QUALITY ASSURANCE

A. Installer Qualifications:

1. The Contractor shall be a firm normally employed in the low voltage and video cabling industry.

2. The contractor shall be certified by the manufacturing company in all aspects of design, installation and testing of the products described herein. Each contractor shall furnish with their submittal a letter from the manufacture indicating they are a dealer in good standing.

3. The contractor must be certified by the manufacturer of the products, adhere to the engineering, installation and testing procedures and utilize the authorized manufacturer components and distribution channels.

4. The contractor shall be experienced in all aspects of this work and shall be required to demonstrate direct experience on recent systems of similar type and size. The contractor shall own and maintain tools and equipment necessary for successful installation and testing of video surveillance distribution systems and have personnel who are adequately trained in the use of such tools and equipment.

5. A resume of qualifications shall be submitted with the Contractor's proposal indicating the following:

   a. A list of five recently completed projects using the product proposed of similar type and size with contact names and telephone numbers for each.

   b. A list of test equipment proposed for use in verifying the installed integrity of metallic cable systems on this project.

   c. A technical resume of experience for the contractor's Project Manager and on-site installation supervisor who shall be assigned to this project.

   d. A list of technical product training attended by the contractor's personnel that shall install the video surveillance system shall be submitted.

   e. Any subcontractor who shall assist the video surveillance contractor in performance of this work shall have the same training and certification as the video surveillance contractor.

B. The Owner's representative reserves the right to reject all or a portion of the work performed, either on technical or aesthetic grounds.

1.04 REGULATORY REQUIREMENTS

A. Standards: All work shall be performed in accordance with the latest revisions of the following standards and codes:

1. Local Building Code
2. Local Electrical Code
3. NEC National Electrical Code

B. Other references:

1. TIA/EIA-568-A - Commercial Building Telecommunications Wiring Standard
2. EIA/TIA-569 - Commercial Building Standard for Telecommunications Pathways and Spaces.
3. TIA/EIA-606 - The Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
4. TIA/EIA-607 - Commercial Building Grounding and Bonding Requirements for Telecommunications
5. TIA/EIA TSB 67 - Transmission Performance Specification for Field Testing of Unshielded Twisted-Pair Cabling Systems.
6. ISO/IEC 11801 - Generic Cabling Standard
7. EN 50173 - Generic Cabling Standards for Customer Premises

C. Governing Codes and Conflicts: If the requirements of these specifications or the Project Drawings exceed those of the governing codes, regulations, and manufacturer installation requirements, then the requirements of these specifications and the drawings shall govern. However, nothing in the drawings or specifications shall be construed to permit work not conforming to all governing codes, regulations, and manufacturer installation requirements.

1.05 SUBMITTALS

A. The video surveillance system installer shall furnish all CCTV system submittals in a single consolidated submittal. Coordination Meeting for CCTV System: Contractor shall set up a coordination meeting with Owner during Submittal Period in order to coordinate location of cameras, type of cameras and mounting method at different locations. Include all information in the CCTV submittal.

B. Shop Drawings: Submit the following items, for Owner review and approval:

1. Samples: Complete manufacturer's product literature and samples (if requested) for all pre-approved substitutions to the recommended products made during the course of the Project.

2. Permits: The Contractor shall obtain all required permits and provide copies to the Owner/Architect/Engineer

3. Product Literature: Complete manufacturer's product literature for all electronics, cable, cable supports, cable labels, outlet devices, and other products to be used in the installation. In addition, whenever substitutions for recommended products are made, samples (when requested by the Owner/Architect/Engineer) and the manufacturer's supporting documentation demonstrating compatibility with other related products shall be included.

4. Testing: Proposed Contractor test result forms, a list of instrumentation to be used for systems testing.

5. A complete point-to-point floor plan diagram indicating camera locations and all required cabling to connect systems.

C. Project Completion: As a condition for project acceptance, the Contractor shall submit the following for review and approval:

1. Inspection and Test Reports: During the course of the Project, the Contractor shall maintain an adequate inspection system to ensure that the materials supplied and the work performed, conform to contract requirements. The Contractor shall provide written documentation that indicates that materials acceptance testing was conducted as specified. The Contractor shall also provide documentation, which indicates that all cable termination testing was completed and that all irregularities were corrected prior to job completion.

2. Operating and Maintenance Instructions for all devices within the system. These instructions shall reflect any changes made during the course of construction, and shall be provided to the Owner, for their use, in a three-ring binder labeled with the project name and description. (4 copies)

3. All training sessions with district staff and training media shall be complete.

4. As-built Drawings shall include cable pathways, camera locations with correct labeling and MDF/IDF locations. The as-built drawings shall be prepared using AutoCad 2000 or later. Provide the Owner with electronic versions of the as-builts on CDs.

D. PROPOSALS

1. All proposal shall be in the format as shown in the General Conditions Section of the Specification.

PART 2 – PRODUCTS

2.01 GENERAL

2.02 REFERENCE STANDARDS

A. TIA-569 - Telecommunications Pathways and Spaces; 2019e, with Addendum (2022).

B. All IP cameras are normal network devices connected to over normal TCP/IP traffic and owner's servers. NO network video recorder, mouse, keyboard, monitor, digital image storage, and UPS required at all.

C. Contractor is responsible to provide category 6 network cabling connection to owner provided network equipment.

D. Materials shall be as listed or shall be approved equivalent products of other manufacturers meeting the intent and quality level of the specifications. All approved equivalent products shall be published by addendum ten days prior to proposal for Architect/Engineer review.

E. Testing: all installed cabling shall be tested 100% at specified performance after installation by the Contractor.

F. All equipment and materials used shall be standard components, regularly manufactured, and regularly utilized in the manufacturer's system.

G. All systems and components shall have been thoroughly tested and proven in actual use.

H. All systems and components shall be provided with the availability of a toll free 24-hour technical support phone number from the manufacturer. The phone number shall allow for immediate technical assistance for either the dealer/installer or the end user at no charge.

I. All systems and components shall be provided with an explicit manufacturer warranty.

J. In response to proposal, contractor shall provide owner with amounts for annual service maintenance agreement that can be purchased after warranty period has expired.

K. Contractor shall contact manufacturer to verify product or part number during bidding period. For any product or part number discontinued, Contractor shall provide a replacement product or part number with same or better quality.

L. CAMERAS:

1. General:

a. Provide new IP cameras as shown on the drawings.

b. Tamper resistant with all movable parts enclosed behind a protective cover.

c. Integrated Dome In-Ceiling flush mount and or surface mount

d. Water resistant.

e. All new standard IP cameras shall be PoE (Power over Ethernet) type. Power for new IP cameras come from data network, typical of all.

f. All indoor and outdoor cameras shall have color and day/night capabilities.

g. RJ-45 Connector for 100Base-TC, PoE power input, 24VAC nominal.

h. 2 year warranty on all cameras.

i. Prior to installation of back-box or conduit coordinate exact location with NCISD school safety security department.

2. Cameras types:

a. Interior Hallways and Reception:

1) Digital Watchdog DWC-VSDG04Bi (C-1)

(a) 4MP vandle dome ip camera with fixed lens and ir with built-in microphone.

2) Indoor cameras shall be ceiling mounted in ceiling tile via toggle bolts. Except for all high ceiling area, Gym, Cafetorium, front entry, main corridor, library and Cafetorium, mount camera on wall at approx. +12 FT AFF.

3) 1.4MP vandal dome IP camera with fixed lens and IR with built-in microphone

b. Exterior and larger interior area (Gym, cafeteria, multipurpose rooms, etc.) dual lens camera 180 degree(C-2)

1) I-Pro WV-S85702-F3L, 180 Degree vandal dome ip camera

c. Exterior and larger interior area (Gym, cafeteria, multipurpose rooms, etc.) single lens camera (C-3)

1) Hanwha QNV-C9011R, 4K IR vandal dome IP camera

d. Exterior 270° camera (C-4)

1) i-Pro WV-S8573LG 3x4K Outdoor Multi-Directional Network Camera

M. Field Of View Determination by the contractor as necessary for fixed camera locations shall be performed at no additional cost to provide the view desired by the owner. Contractor shall coordinate all final camera views and locations with owner for final approval.

N. Provide I-Pro Multi-Sensor camera where directed by owner.

O. Provide 20'-0" service loops at all camera locations. Support service loops from proper cable support system.

2.03 CAMERA MOUNTS

1. Provide camera mounts for corner, pendant, wall, miscellaneous adapters shall be manufactured by camera manufacturer. Note that no back box, mount to ceiling tile.

2.04 CABLE AND INSTALLATION

A. For each IP camera, Contractor shall provide a plenum rated purple color Cat 6A data cable back to the nearest MDF or IDF, including patch panels and patch cables at two ends. Data cable, jacks, patch panels, patch cords shall be the same products and manufacturers listed under the Network Cabling Section of this project – No exception. Provide required testing and certification and warranty for 20 Years. Field coordinate location requirements with the owner's representative.

B. Follow Section 27 10 10 – Structured Cabling System for data cabling product and installation for data cabling system serving IP security cameras. Except color of data cable shall be purple for security cameras.

C. Ensure Exterior cameras patch cords do not have strain relief on jack to allow for weatherproof fitting at camera.

D. Provide all penetrations and all conduits as necessary for installation of CCTV installation.

1. All exterior penetrations require necessary weatherproofing to avoid moisture penetration.

2. All outdoor cable runs underground shall be rated for underground use.

3. All cabling for entire project shall be installed at 4'-0" intervals in dedicated support system using supports such as metal j-hooks, d-rings, or u support systems. Cable supports will be securely attached directly to building structure. Do not attach cabling or supports to ductwork, piping, grid hangers, conduit, or equipment.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Final camera locations to be approved by owner prior to rough-in and installation.

B. Final camera aiming shall be approved by owner prior to building turn-over.

C. Cable Pathway:

1. In suspended ceiling and raised floor areas where duct, cable trays or conduit are not available, the Contractor shall bundle, in bundles of 25 cables or less, with cable ties snug, but not deforming the cable geometry. Cable bundles shall be supported via “J” hooks attached to the existing building structure and framework at a maximum of four (4) foot intervals. Plenum rated cable ties shall be used in all appropriate areas. The Contractor shall adhere to the manufacturer’s requirements for bending radius and pulling tension of all cables.

2. Cables shall not be attached to lift out ceiling grid supports or laid directly on the ceiling grid.

3. Cables shall not be attached to or supported by fire sprinkler heads or delivery systems or any environmental sensor located in the ceiling air space.

D. Fire Wall Penetrations: The Contractor shall avoid penetration of fire rated walls and floors wherever possible. Contractor shall also seal all floor, ceiling and wall penetrations in fire or smoke barriers and in the wiring closet.

E. Wall Penetrations: Where penetrations are necessary, they shall be sleeved with metallic conduit and resealed with an Underwriter Laboratories (UL) approved sealant.

F. Provide three sided pre-finished metal hood and seal to wall where conduit penetrates exterior wall.

G. Install new conduit on portable pipe supports – (low profile type), as manufactured by Portable Pipe Hangers or Advanced Support Products. Provide roof protection pads under each support. Coordinate location and routing with design engineer prior to rough-in or installation of system.

H. Do not install wall mounted camera’s into metal fascia. Ensure they are mounted into brick, and sealed top and sides (not bottom)

I. Follow Section 27 10 10 – Structured Cabling System for data cabling installation.

J. Provide weather proof fittings for all exterior cameras, no exceptions. Patch cable to have removable strain relief so that weather proof fitting can be used.

3.02 DOCUMENTATION

A. Labels: The Contractor shall label all outlets using clear machine produces labels with black prints, labels shall be approved by the Owner. Label patch panels in the wiring closet to match those on corresponding camera locations. The font shall be at least one-eighth inch (1/8”) in height, block. All labels shall correspond to as-builts and to final test reports.

B. Contractor shall ensure complete typed labeling of all cameras with numbers that correspond to the Owner’s labeling system. Verify with Owner. Provide tags (black letters on white labels, plastic coated) on all cables and outlets.

C. All cables shall be labeled at both ends with a machine label and all terminations shall be stenciled with a typed label for quick circuit identification. Labeling shall conform to TIA/EIA standard 606 and include interconnect cable identification numbers.

D. A floor plan, clearly labeled with all numbered camera locations, shall be included in the as-built plans.

3.03 IP CCTV CAMERAS AND CABLE TESTING REQUIREMENTS

A. Notification: The Owner/Architect/Engineer shall be notified one week prior to any testing so that the testing may be witnessed.

B. Final Acceptance: Before requesting a final acceptance, the Contractor shall perform a series of end-to-end installation performance tests. The Contractor shall submit for approval a proposal describing the test procedures, test result forms and time table for all copper and fiber optic cabling.

1. Final aiming shall be approved by the owner prior to any acceptance, without any additional cost to owner for changes.

C. Procedures: Trained personnel shall perform all testing. Acceptance of the test procedures discussed below is predicated on the Contractor’s use of the recommended products and adherence to the inspection requirements and practices set forth. Acceptance of the completed installation shall be evaluated in the context of each of these factors.

D. Errors: When errors are found, the source of each error shall be determined, corrected and the cable retested. All defective components shall be replaced and retested. Retest results must be entered on the test results form. All corrections shall be made prior to final acceptance test.

3.04 INSPECTION

1. Conformance to the installation practices covered above are to be verified when completed. In some cases, the Owner/Architect/Engineer may observe before acceptance.

3.05 TRAINING

1. Provide 4 Hours of on-site instructions to Owner's designated personnel upon completion of the systems' installation.

3.06 WARRANTY

A. Guarantee and warrant all IP CCTV Cameras provided for a period of 1 year following date of substantial completion, or a period equal to the stated guaranty/warranty offered by the product manufacturer, whichever is the longest in duration.

B. Provide required Cat 6 Network Cable testing and certification and warranty for 20 Years.

END OF SECTION

SECTION 28 3100
FIRE ALARM SYSTEM

PART 1 – GENERAL

1.01 REFERENCE STANDARDS

A. NFPA 3 - Standard for Commissioning of Fire Protection and Life Safety Systems; 2024.

B. NFPA 72 - National Fire Alarm and Signaling Code; Most Recent Edition Cited by Referring Code or Reference Standard.

C. PS 1 - Structural Plywood; 2023.

D. PS 2 - Performance Standard for Wood Structural Panels; 2019.

1.02 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

PART 2 – SYSTEM REQUIREMENTS, EQUIPMENT AND INSTALLATION

2.01 GENERAL

A. Provide new systems for each new building. Provide new system for existing mechanic building.

B. Design, furnish and install a complete fire alarm system based on a fire alarm panel utilizing addressable architecture with analog intelligent devices as specified herein and shown on the drawings. Fire Alarm system shall initiate the occupant notification signal utilizing an emergency voice/alarm communication system. Equipment shall be manufactured by EST/Edwards. Installation shall be in accordance with the manufacturer's recommendations. The system shall conform to the most recent issue of the applicable NFPA Sections, the National Electric Code and applicable local codes for fire detection/alarm requirements. This also includes the State of Texas requirements for school facilities.

C. Note that the complete fire alarm system shall be designed by the fire alarm contractor’s licensed designer per all applicable codes. In the event that certain devices are shown on the drawings that may be in excess of the minimum code standards, incorporate these additional requirements into the contractor’s design since the Owner’s requirements are in addition to the minimum code requirements. Devices are shown to indicate the areas of coverage and to provide a means for the electrical contractor to estimate raceway requirements, and to assist in coordinating with architectural constraints.

D. The following are acceptable suppliers of the specified equipment:

1. Note: All fire alarm system suppliers must provide Fire Alarm System with Emergency Voice Evacuation System.

a. EST/Edwards - EST4 only

E. The system shall consist of all fire alarm panels, manual pull stations, automatic detectors, visual and audible speaker devices and accessory equipment as described in the specifications and/or indicated on the drawings. All components of the system shall be standard products of the manufacturer, approved by Factory Mutual and Underwriters' Laboratories, Inc.

F. Where detection and alarm devices are shown on the drawings they indicate areas for detection and alarm coverage and not the exact number and placement of devices. Provide devices in sufficient number and locate to protect and alarm the specified areas in accordance with the NFPA, these specifications and the limitations of the devices provided.

G. The FACP shall send trouble, supervisory and fire signals through the FACP to the School District’s chosen monitorial company. Equipment shall be provided to meet this requirement and provide monitoring and reporting of system deficiencies with bi-directional antennae system.

1. Ensure complete compatibility of fire detection and alarm system with Intrusion detection and alarm.

H. Under this Division, engage the services of a fire alarm company who is an authorized distributor for an approved fire alarm system (as indicated below) who shall:

1. Maintain a staff of specialists for engineering assistance, installation and maintenance of the fire alarm system and associated equipment.

2. Stock the required spare parts to keep the fire alarm system in operation.

3. Have proof of experience in the installation and maintenance of the type of fire alarm system specified herein.

I. After installation and prior to the final inspection, the Contractor must certify in a letter to the Owner that the system is working in accordance with the Contract Documents.

J. Provide an adequate period of instruction on the operation of the system to the Owner's designated personnel upon completion of the system installation.

K. Provide the Owner with the following:

1. Two composite wiring diagrams of the system indicating point to point connections, one to be placed in the control panel.

2. Two block diagrams of the system indicating conduit and number and size of wires between all devices, one to be placed in the control panel.

3. OPERATIONAL AND MAINTENACE MANUALS: Provide O&M Manuals as outlined in specification section 260000, paragraph 1.13. One (1) O&M Manual shall be placed in the control panel.

4. Provide framed FML at main panel. Floor plan of building noting zoning, pull station and detector locations, acceptable to the Fire Marshall or Owner. Provide frame and install where directed by the Fire Marshall.

L. Contractor shall have a representative at the job site during the final inspection by the Engineer to demonstrate system operation and specification compliance. Representative will be required to "smoke test" a number of randomly selected active devices.

M. System warranty shall be for one year of complete maintenance coverage after final acceptance of the system and include all material and labor to provide consistent peak performance of the system. Post-warranty maintenance shall be available on contract or call basis.

2.02 SYSTEM LAYOUT

A. Device layout shown on the Drawings shows areas of coverage and to assist the electrical contractor in estimating junction box requirements during bidding. Fire alarm supplier shall properly design a system based on his equipment and devices that meets ADA, NFPA and Texas Accessibility requirements and these specifications.

B. Provide fire alarm voice evacuation speakers with visual alarm devices coverage of the building.

C. Provide a manual pull station with strobe flasher above at each exit from the building.

D. Provide smoke detector coverage of all halls and corridors, Central Mechanical Room and each AHU Room.

E. Provide smoke duct detector in the supply air of each air handling unit. Test switches for duct smoke detectors to be installed at typical swtich height.

F. Interlock alarm with Kitchen hood fire suppression system. Provide contacts as necessary at Ansul system.

G. Interlock alarm with fire sprinkler system and monitor position of O S & Y valves and Post Indicator Valve. Provide individual address for each valve sensor and flow switch.

H. Provide equipment and wiring for portable buildings. Wiring shall be installed to outside wall at building where noted on the Drawings. Wiring shall support 40 initiating devices and include one dedicated NAC circuit.

I. Refer to Drawings for additional information.

2.03 SYSTEM OPERATION

A. Actuation of any alarm initiating device shall cause the following:

1. An LCD readout on the main control panel shall indicate the device in alarm.

2. All horn/flasher alarms shall sound continuously until reset at main panel.

3. De-energize air handling units serving the area in alarm. Also de-energize supply fans, VAV boxes and other air circulating devices if 2000 CFM or over, serving the area in alarm. Exhaust fans to the exterior and devices less than 2000 CFM are excepted.

4. Release fire doors and smoke dampers.

5. Transmit alarm warning to remote location via telephone line.

B. The actuation of automatic detection devices shall be visually identified by light on device. The light shall remain illuminated until the initiating device has been restored to normal and the Fire Alarm Panel reset. A remote alarm lamp shall light where indicated on drawings.

2.04 EQUIPMENT

A. GENERAL: All equipment shall be manufactured by the same company as the control panel or be a factory authorized compatible device. Devices that may operate but are not factory authorized compatible shall not be used. This includes remote power supplies, horns and strobes.

B. CONTROL PANEL: The control panel shall be a microprocessor based, addressable intelligent system enclosed in a semi-flush style cabinet. The door and frame assembly shall be equipped with a lock and transparent door panel for viewing of indicators of operation and annunciation. The control panel shall contain, but not limited to the following:

1. Control modules as required to provide system monitoring, alarm control, trouble sensing and remote equipment control.

2. City/remote station module to service as interface unit between the fire alarm control panel and an authorized remote monitoring point.

3. Power supply modules as required to supply continuous filtered power of the proper voltage. Module shall indicate a normal power, battery trouble and power supply trouble, all readable on front of the enclosure. Power supply shall be sized 50% larger than necessary for the installed system.

4. Sealed and rechargeable battery supply, sized for 24 hour sensing and 5 minute alarm capability, based on system installed plus 50% additional alarm devices.

5. Remote alarm signal distributing panels with power supplies as needed by final design of the fire alarm contractor.

6. Provide emergency voice/alarm communication panel with microphone in administration area.

C. MANUAL PULL STATIONS: Addressable type, red lexan, non-coded, dual action type. Provide Stopper II cover with battery powered sounder over all pull stations.

D. AREA SMOKE DETECTORS: White, analog addressable, photoelectric type, non-polarized with 360° smoke entry, LED normal/alarm status light and separable base.

E. DUCT DETECTORS: White, analog addressable, photoelectric type with DPST auxiliary relay. Provide LED remote alarm light with engraved stainless steel plate on ceiling near detector where detectors are not located in mechanical rooms.

1. Provide test switches for duct detectors at typical switch height.

F. HEAT DETECTORS: White, analog addressable, rate of rise type.

G. SPEAKER HORNS: White, semi-flush, ADA compatible, electronic horn with high visibility, synchronized strobe and field selectable sound level. Fire alarm speaker horns shall provide clear emergency voice/alarm communication per NFPA 72. Provide required testing and testing result according to NFPA 72 testing method. Set level based on individual application (hall, classroom, restroom, office, etc.) Audible portion shall sound a three beat temporal tone for alarm signaling as required by NFPA 1993. Strobe intensity shall conform to NFPA 1993 Chapter 6 requirements and also 75 candela to meet ADA and TAS requirements.

H. STROBE LIGHTS: White, semi-flush, ADA compatible, synchronized strobe with intensity suitable for the individual application (hall, classroom, restroom, office, etc.). Strobe intensity shall conform to NFPA 1993 Chapter 6 requirements and also 75 candela to meet ADA and TAS requirements. Provide Stopper II covers over devices in gymnasium.

I. DIGITAL COMMUNICATOR: Two channel dialer/modem to automatically call two different designated numbers in the event of a fire or system trouble.

J. RELAYS: Provide and install control relays to perform the specified functions. This includes relays to shutdown the various HVAC equipment. Relays shall be mounted near items to be controlled. Coordinate with HVAC controls contractor for relay contact voltage capability (120 volts minimum) and preferred mounting location.

K. SPARES: Provide three additional relays, intelligent relays, area smoke detectors, manual pull stations, horn/strobes and strobes, including installation where directed during construction. Items not installed shall become spares and be delivered to maintenance department.

L. WEATHERPROOF: Devices located outside, even if sheltered from rain shall be weatherproof and suitable for outdoor installation.

2.05 INSTALLATION

A. WIRING:

1. Fire alarm contractor shall provide and install all wiring for his system. He shall include wiring of control relays and the landing of power and control wiring to these relays to “break” control circuits or power wiring to controls transformers, door release magnets and other devices requiring shutdown. HVAC controls interlock wiring between fire alarm relay and starters, VFD’s or other temperature controls devices shall be provided by the temperature controls contractor.

2. All wiring shall be installed in conduit (except 70V or lower where permitted by NEC and local authority having jurisdiction). In existing areas not in mechanical rooms, use Wiremold surface raceway where exposed. Low smoke wiring may be installed without conduit above accessible ceilings if wiring is supported at structure with cable rings 48” on center. Do not support from data system cable rings. All splices shall be in supported junction boxes. All auxiliary control circuits shall be connected to NAC type circuits and be supervised per NFPA.

3. Systems utilizing open wiring techniques with low smoke plenum cable shall provide conduit in all inaccessible locations, inside concealed walls, all mechanical/electrical rooms, exposed locations or other areas where wiring might be exposed or subject to damage. For conduit in walls stub up into nearest accessible ceiling cavity and provide protective bushing at the end of the conduit.

4. Wiring outside or between buildings shall be suitable for and installed properly for this application, and comply with NEC Article 800. Provide isolation and surge suppression for all aerial and inter-building cables.

5. Wire shall be color coded in accordance with IPCEA Standards. Provide numbered labels on all wires entering annunciators, terminal boxes and the main control panel.

6. The minimum wire sizes to be used when not otherwise directed by Codes are as follows:

   a. Detector Circuits AWG #18

   b. Remote Annunciators AWG #18

   c. Remote Alarm Lamps AWG #18

   d. Audible Signal Circuits AWG #14 (up to 1.1 A) or larger as necessary

   e. 120 volt or higher AWG #12

   f. All other wiring AWG #18

7. Limited energy cable for 24 volt low voltage systems shall be Plastic Wire and Cable Company Low Energy Safety Control Wire, 105° C, 18/2 solid copper cable.

8. Should 120 volt power be required other than at the main panel, include the cost of additional circuits.

9. Provide interconnection wiring between fire alarm system and the telephone system and emergency lighting controls.

B. RACEWAY SYSTEMS

1. RACEWAY CAPACITY: It shall be the contractor's responsibility to determine the correct sizes of all type of raceway, to be installed, as instructed in the NEC and all applicable Codes.

2. See Section Electrical Wiring for conduit types and installation requirements.

C. CEILING SUPPORTS: All devices installed in laying ceilings shall have bracket to support device from ceiling tees.

D. MOUNTING HEIGHTS

1. PULL STATIONS: 46" above finished floor to top

2. ALARM HORNS/FLASHERS: 80" or 6" below ceiling (or on ceiling if less than 14 feet (426.72 cm)

3. REMOTE ANNUCIATORS: 60” above finished floor

E. LABELING: All devices shall be labeled with their system address.

2.06 TESTING

A. REQUIREMENTS: All components and circuits of the fire alarm system shall be tested under operating conditions for proper functions. The testing shall demonstrate that all requirements as herein specified have been successfully accomplished, and that the system is fully operational. Testing shall include, but shall not be limited to, the following:

1. INITIATING DEVICES: Each initiating device shall be activated and proper operation of all visual and audible alarm and auxiliary devices shall be demonstrated.

2. DUCT AND PHOTOELECTRIC DETECTORS: Each detector shall be adjusted with electronic measuring equipment for calibration sensitivity. Each detector shall subsequently be checked for operation.

3. AUDIBLE ALARM DEVICES: Each audible alarm device shall be tested for proper operation and connection to the correct circuit.

B. TEST REPORT: Upon completion of testing, three copies of a report shall be submitted to the Owner containing the following information:

1. Complete as-built wiring diagrams
2. Detailed catalog data on all components of system
3. Ionization detector sensitivity settings
4. Certification of system performance and operation as specified

C. Initial training shall be a 4-hour session with the users and a 4-hour session with maintenance, which occurs after the Owner receives the O&M manuals but before substantial completion. After Substantial completion, the contractor shall provide the follow up training of a total of four 2-hour sessions for users and four 2-hour sessions for Maintenance.

2.07 WARRANTY

A. System (materials and installation) shall be warranted for one year following substantial completion. Problem trouble shooting and repair shall begin within 24 hours of notification.

2.08 ADDITIONAL REQUIREMENTS

A. LABEL SMOKE DETECTORS

1. Label with device address.
2. Mechanical rooms can be black permanent marker.
3. Exposed white label with black letters from label maker or equivalent.

B. DUCT DETECTORS

1. Need to be marked in permanent marker on outside of box.
2. Super Ducts are not to be installed.

C. MAIN FIRE ALARM PANEL

1. Need to be labeled with circuit number.

D. BOOSTER PANELS

1. Need to be labeled with circuit number.
2. Need to be labeled with Booster Panel number and the location of circuit.

E. FIRE ALARM CIRCUITS

1. Shall be Red on panel schedules.

F. SIGHT MAP

1. Shall be installed and firmly secured to the wall so as not to be easily removed.
2. All relay locations shall be legible.
3. Door holder locations.
4. Booster panel locations.
5. Annunciator location.
6. Duct Detector locations.
7. Smoke, Pull Station and Audio and Visual Devices.

G. T-TAPS AND STAR TAPS

1. Are not permitted.
2. Circuits shall be looped.
3. Junction boxes shall have bushings.

H. DUCT DETECTORS

1. Above drop ceiling shall have an alarm and LED mounted in ceiling grid.
2. Labeled with device address.

I. SMOKE DETECTORS

1. Provide EST / EDWARDS PS 1 or SIGN-PD Smoke Detectors only. Do NOT provide PS 2 Smoke Detectors.

J. ANNUNCIATORS

1. Need to be labeled with main panel location.

K. ALL DOOR HOLDERS

1. All are to be controlled by 24V fire alarm relay.

L. ALL AIR HANDLERS

1. Shut down are to be controlled by fire alarm relay.

M. PROGRAMMING OF PANELS

1. All shall have a walk test.

2. Air handlers shall be in supervisory unless otherwise stated by FIRE MARSHAL.

3. All locations shall have school room number not Architectural.

4. A drill button shall be capable of allowing building to perform a drill with everything working except HVAC shutdown function. HVAC to continue to operate during drill.

N. FIRE ALARM

1. All wiring shall be red.

2. Cables shall not be supported or secured by Tie Wraps.

3. Tie Wraps are allowed to group wire bundles.

END OF SECTION

SECTION 28 5129
EMERGENCY RADIO COMMUNICATION SYSTEM

PART 1 – GENERAL

1.01 REFERENCE STANDARDS

A. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

B. NFPA 72 - National Fire Alarm and Signaling Code; Most Recent Edition Cited by Referring Code or Reference Standard.

C. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

D. NFPA 1221 - Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems; 2019, with Amendment (2021).

E. UL 2524 - Emergency Responder Communication Enhancement Systems; Current Edition, Including All Revisions.

1.02 RELATED DOCUMENTS

A. The requirements of the General Conditions, Supplementary Conditions, Division 1, Division 20 and Division 28 apply to all Work herein.

B. No Drawing will be provided. Contractor shall design and provide complete emergency radio communication systems per this performance specifications and manufacturer’s recommendations.

1.03 SCOPE

A. Provide an in-building radio signal amplification system to provide complete coverage in the building for the public safety agencies as required by the local fire department and other agencies and authorities having jurisdiction. System users shall receive and transmit radio broadcasts from their portable radio units within the building. This shall be accomplished utilizing the following components:

1. Bi Directional Amplifiers (Signal Boosters)

2. Plenum rated Coaxial Cable

3. Antennas

4. Cable taps
5. Connectors
6. Power dividers
7. Other components and interconnecting circuitry as required

B. The system shall comply with the requirements of UL 2524 1st Edition In-building 2-Way Emergency Radio Communication Enhancement Systems, NFPA 72 2013 Edition, NFPA 1221 2016 Edition and IFC 2018, as referenced.

C. The entire system shall meet with approval of the Fire Department, the Building Department and all other agencies and authorities having jurisdiction (AHJ).

D. The work in this section shall include the responsibility for all filings with the AHJ. Where filings require engineer's signature, documents shall be submitted for his review and signature. This responsibility shall include furnishing of required quantities of floor plans, descriptive notes and/or specifications, wiring diagrams, shop drawings and amendment forms.

E. Early completion of the in-building emergency radio communication enhancement system will be required as to permit a Certificate of Occupancy to be obtained in a timely manner

F. Any permits necessary for the installation of the work shall be obtained prior to the commencement of the work. All permit costs and inspection fees shall be included as the part of the required work.

G. The in-building emergency radio communication enhancement system shall use a UL 2524 1st Edition, NFPA 72 2013 Edition, NFPA 1221 2016 Edition and IFC 2018 compliant NOTIFIER® signal booster or approved equal.

H. All conductors shall be installed in conduit. Conduit installation shall be as specified in the Conduit Section.

I. Related Sections: Other Division 20-28 Sections contain requirements related to the work of this Section. These may include, but not be limited to, the following sections:

1. Conductors – Division 26
2. Motor and Control Wiring - Division 26
3. Conduit - Division 26
4. Outlet Boxes - Division 26

1.04 QUALITY ASSURANCE

A. Basis: To establish the type, quality and features of the system required, the equipment specified is that of the Notifier Fire Systems. All references to manufacturer or supplier model numbers and other pertinent information herein is intended to establish a minimum standard of quality, performance and features required. All equipment proposed as an EQUAL to that specified shall COMPLETELY conform to the Specifications herein.

B. Manufacturers: If they comply with these specifications and requirements, products of the following manufacturers will be acceptable:

1. ADRF or other equal as approved by Montgomery County Fire Marshal.

C. Contractor Qualifications:

1. The equipment supplier shall be an authorized and designated representative of the In-building Radio System Manufacturer to sell, install, and service the proposed manufacturer's equipment. The equipment supplier shall have technical factory training specifically for the system proposed.

D. Codes and Standards: The system shall comply with the applicable Codes and Standards as follows:

1. National Fire Protection Association Standards:

a. NFPA 70 National Electrical Code

b. NFPA 72 National Fire Alarm Code

c. NFPA 101 Life Safety Code

d. d. NFPA 1221 Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems

2. The Americans with Disabilities Act (ADA).

3. The Texas Accessibility Standards.

4. Local and State Building Codes.

5. Requirements of Local Authorities having Jurisdiction.

PART 2 – PRODUCTS

2.01 DESIGN REQUIREMENTS

A. In-building emergency radio communication enhancement systems for emergency responders are an integral component of the life safety equipment of a building or structure. The primary function is to provide reliable emergency responder communications at the required signal strength within the specified areas.

B. Critical Areas such as Fire Command Center, fire pump room, exit stairs, exit passageways, elevator lobbies, standpipe cabinets, sprinkler sectional valve locations and similar critical areas shall be provided with 100% floor area radio coverage.

C. General building areas shall be provided with 95% radio coverage, or as specified by AHJ.

D. The In-building emergency radio communication enhancement systems must provide the following signal strengths:

1. Downlink - Minimum signal strength of -95 dBm throughout the coverage area

2. Uplink - Minimum signal strength of -95 dBm received at the AHJ Radio System.

E. The system shall be complete with all components and wiring required for compliance with all applicable codes and regulations, and for its operations described hereinafter.

F. EC shall sub-contract an approved manufacturer or a qualified and approved vendor to supply, test and determine locations of components which are required for proper operation as well as to supply, deploy, test and certify the performance of the complete system. Vendor qualifications must be acceptable to the AHJ.

G. All tests shall be conducted, documented, and signed by a person in possession of an FCC General Radio Telephone Operators License. All testing personnel shall be certified and authorized by the signal booster manufacturer in the installation and operation of their equipment. Personnel qualifications must be acceptable to the AHJ.

H. The system design shall be based on the NOTIFIER® line of Public Safety Signal Boosters UL 2524 1st Edition, NFPA 72 2013 Edition, NFPA 1221 2016 Edition, IFC 2018 Edition and FCC compliant to establish standards of quality for materials and performance. The naming of a specific manufacturer or a catalog number does not waiver any requirement or performance of individual components described in the specifications.

I. Assembly and installation of all components of the Emergency Responder Radio Communication Enhancement System shall comply with all applicable sections of the National Electrical Code.

J. Survivability from attack by fire shall meet NFPA 72, National Fire Alarm and Signaling Code, 2013 edition and NFPA 1221 2016 edition.

K. The system must comply with all applicable sections of the FCC rules. Signal booster shall have FCC certification prior to installation.

L. Antenna isolation shall be maintained between the donor antenna and all inside antennas (D.A.S.) to a minimum of 20dB under all operating conditions

2.02 PERFORMANCE REQUIREMENTS

A. The basis of design system is specified based upon NOTIFIER® line of Public Safety UL 2524 1st Edition, NFPA 72 2013 Edition, NFPA 1221 2016 Edition, IFC 2018 Edition compliant signal boosters.

B. The signal booster shall be a Class B Public Safety type as designated by the FCC and as required by the AHJ.

C. The secondary power supplies, battery chargers and system monitoring shall be fully compliant with NFPA 72, 2013 edition and NFPA 1221,2016 edition. The signal booster shall have both the primary and the secondary power supplies built in a fully sealed NEMA-4 type approved enclosure.

D. All signal boosters and other active system components must have FCC certification prior to installation. The equipment FCC ID must be shown on the product datasheets and technical submittals. The ID must also be displayed on the product as required by the FCC.

E. The signal booster shall be set and tuned by the equipment manufacturer to pass frequencies as specified by the local fire department.

F. To reduce the possibility of unwanted interference affecting the operation of the system, signal boosters shall be band or channel selective type with a maximum 3dB channel bandwidth of 200KHz (Fc +/- 100KHz). Wide-band signal boosters shall not be accepted, unless required to cover multiple channels within the same band.

G. Signal Boosters shall have oscillation prevention circuitry to protect the public safety radio system in case of signal booster malfunction.

H. Signal Booster gain shall be rated at minimum of 80dB and the gain shall be adjustable in a minimum of 25dB range. System gain shall be set and documented at the time of the final system test.

I. Maximum Propagation delay of the signal booster system shall be 14µs (microseconds) or as specified by AHJ.

J. The signal booster system shall include built-in automatic alarming of malfunctions of the signal booster and battery system as per NFPA 1221 2016 Edition Section 9.6, NFPA 72, 2013 Edition, Sections 24.5.2.6.1, and 24.5.2.6.2. Aftermarket equipment add-ons and modifications to comply with this specification will not be accepted.

K. A dedicated supervised monitoring panel shall be provided within the emergency command center or other location as designated by AHJ to annunciate the status of all signal booster locations. The monitoring panel shall provide visual and labeled indication of the following for each signal booster:

1. Normal AC power
2. Signal booster trouble
3. Antenna Failure
4. Loss of normal AC power
5. Failure of battery charger
6. Low battery capacity

L. The signal booster system shall include a built-in addressable monitor module tied to the Building Fire Alarm Panel for monitoring the signal booster.

M. The vendor shall verify the system monitoring requirements with the AHJ prior to system installation. System monitoring shall be fully compliant with the AHJ requirements.

N. External filters, attachments or other aftermarket modifications of the original equipment shall not be accepted.

O. All signal booster components shall be contained in a NEMA4-type approved waterproof cabinet. All enclosures shall be painted red with signage in bright yellow or as required by AHJ.

P. SURGE PROTECTION DEVICES: Provide surge protection devices for central equipment, remote power supplies and indoor and outdoor circuits.

PART 3 – EXECUTION

3.01 SUBMITTALS

A. The installing contractor and/or equipment manufacturer shall provide complete and detailed shop drawings and include:

1. Riser wiring diagram with associated conduit sizes.
2. Complete floor plan drawings locating all devices and interfaces associated with the fire alarm system. Floor plan drawings shall include conduit and wiring routing complete with conduit sizing and number of conductors by type.

3. Factory data sheets on each piece of equipment to be used and so marked as to model, dimensions, size, voltage and configuration.

4. Detailed written system description in this Specification format describing system functions and operation. All specification variations and deviations shall be clearly noted and marked.

5. Complete Bill of Material for reference.

B. All submittal data shall be in bound form with contractor's name, supplier's name, project name, and state fire alarm license number adequately identified.

C. Only basic equipment devices have been shown on the contract drawings. Specific wiring between equipment/devices has not been shown. It is the contractor's responsibility to submit for approval the Complete Engineered System Configuration and Layout showing all devices, wiring, conduit, and locations along with other required information as specified herein.

3.02 INSTALLATION

A. General: It shall be the responsibility of the installing contractor to coordinate all requirements surrounding installation of the in-building radio system with all trades including, but not exclusive of: electrical contractor, sprinkler contractor, and HVAC/ controls contractor. Adequate coordination shall be provided to ensure proper installation and interface to all peripheral items required to interact with the fire alarm and communication system to provide a complete and functional life safety system.

B. The in-building radio system contractor shall be responsible for coordinating all devices, panels and other equipment requiring 120V input power with the Electrical Contractor prior to bid.

C. Assembly and installation of all components of the Emergency Responder Communication Enhancement System shall comply with all applicable sections of the National Electrical Code, NFPA 70 and the National Fire Alarm and Signaling Code, NFPA 72, NFPA 1221 current enforceable editions.

D. At least two independent and reliable power supplies shall be provided as specified below.

E. The primary power source shall be supplied from a dedicated twenty (20) ampere branch circuit and comply with NFPA 70 National Electrical Code, NFPA 72, National Fire Alarm and Signaling Code, 2010 edition and NFPA 1221 2016 edition.

F. The emergency responder radio coverage enhancement system shall be equipped with a secondary source of power. The secondary source of power shall be a battery system with a dedicated battery charger powered by a separate, dedicated twenty (20) ampere branch circuit. The secondary power supply shall supply power automatically when the primary power source is lost. The secondary source of power shall be capable of operating the emergency responder

radio coverage enhancement system for a period of at least 24 hours. The battery system shall automatically charge in the presence of external power input. Battery charger and all other electronic components must be fully enclosed in a non-vented NEMA4 Type approved enclosure. Batteries shall be enclosed in a separate, vented NEMA 3R Type approved enclosure.

G. The signal booster shall be designed to allow degraded performance in adverse conditions, such as high temperatures in the event of heat from a nearby fire, voltage fluctuations or other abnormal conditions that may occur during an emergency. Circuits that intentionally disable the signal booster in such situations (i.e. under/over voltage, over/under current, over/under temperature, etc.) are not acceptable. External UPS (Uninterruptable Power Supplies) are not acceptable. It is the purpose of this specification to assure the maximum possible level of communications to public safety personnel depending upon the signal booster, even to the extent of damaging the signal booster, as long as some communications benefit can be provided during the emergency.

H. System design shall be such that neither the failure of the normal power source, the transfer to an emergency source, nor the re-transfer to the normal source shall cause a change in system status.

I. The amplifier shall be housed in a 2-hour fire rated room or other suitable space as approved by the Engineer, or where specifically shown on the drawing.

J. Radiating cable, if used, shall be run without conduit. All other cable can be run in conduit.

K. RF Coaxial Cable shall be a fire-resistant, low-smoke type, UL classified as plenum. The classification shall be clearly marked on the outer surface of the cable regular intervals.

L. Provide 2 hour rated jacketing for vertical wiring for the BDA system.

M. All wiring shall be in accordance with NFPA 72, the National Electrical Code, Local Codes, and Article 760 of NFPA Standard 70. All wiring sizes shall conform to recommendations of the equipment manufacturer, and as indicated on the engineered shop drawings.

N. All conductors shall be U.L. Listed FPL for LIMITED ENERGY (300 volt) and fire alarm applications and shall be installed in conduit.

O. All conductors for intelligent/addressable circuits shall be of the TWISTED/SHIELDED type to guard against outside RF interference and induced noise. Alarm and telephone communications circuits shall also be of the twisted/shielded type. Conductor size shall be determined by calculated voltage drop and circuit loading but shall not be less than #18 AWG.

P. All wiring shall be run in a supervised fashion (i.e., no branch wiring or dog-legged wiring) per NFPA requirements such that any wiring disarrangement will initiate the appropriate trouble signals via the main control panel per NFPA and U.L. requirements.

Q. Conduit and raceway system shall be installed as specified under the CONDUIT Section of the specifications, and per NEC.

R. Minimum conduit size shall be 3/4" EMT. Install conduit per engineered shop drawings.

S. All 120V emergency power circuits, electrical conduits, J-boxes, sleeves shall be furnished by the Division 26 00 00 electrical contractor. Provide at minimum three 20 amp circuits from generator panel. Should 120 volt emergency power be required other than at the main panel, General Contractor shall have Emergency Radio Communication System Contractor to coordinate with Electrical Contractor to include the cost of additional 120V dedicated emergency circuits, J-boxes, conduits and sleeves in the base proposal.

T. Antenna shall be mounted at edge of buidling closset to signal. Antenna shall be directed so as it is not pointed accross building. Cordinate roof penetrations and antenna locations with roofing contractor prior to final completion of roof.

3.03 TEST AND REPORTS

A. Acceptance testing for an in-building radio system is required upon completion of installation.

B. The coverage testing shall be done in accordance with NFPA 72, National Fire Alarm and Signaling Code, 2013 edition, NFPA 1221 2016 edition and as required by the local AHJ

C. All tests shall be conducted, documented, and signed by a person in possession of a current FCC General Radio Operator License.

D. All test records along with system diagrams, equipment specifications, user manuals, RF link budget calculations, battery backup calculation and other design data shall be submitted upon completion of the project.

E. Must pass … Montgomery County Hospital District radio test.

3.04 WARRANTY

A. The in-building radio system shall be free from defects in workmanship and materials, under normal use and service, for a period of one year from the date of acceptance or beneficial occupancy, whichever shall occur first. Any equipment shown to be defective shall be repaired, replaced or adjusted during normal working hours at no cost to the owner.

B. The equipment manufacturer shall be represented by a local organization and the name of such shall be furnished to the Owner, Architect, and Engineer.

C. Additions required to the in-building radio system shall not affect or void any warranty to the existing system provided that said additions are installed by an authorized manufacturer’s dealer.

All additions to such shall be of compatible components to match existing manufacturer's components.

D. The system shall be designed to provide 100% coverage of the building with the minimum signal levels required by the prevailing code for the area where the project is located. this exceeds the requirments of NFPA and IFC.

3.05 CLOSE-OUT DOCUMENTS

A. Provide the Owner with the following Close-Out Documents:

1. Two composite wiring diagrams of the system indicating point to point connections.

2. Two block diagrams of the system indicating conduit and number and size of wires between all devices, one to be placed in the control panel.

3. Three complete instructional/operational maintenance manuals.

4. Floor plan of building with correct room signage noting zoning, equipment and device locations, acceptable to the Fire Marshall. Provide frame and install where directed by the Fire Marshall.

5. In addition to hard copies, provide AutoCad and PDF files in a CD.

6. Installer shall provide a backup copy of the installed program database on CD upon completion of the project. Installer shall also provide the current version of CD Software for the panel provided.

7. A list of spare parts.

3.06 TRAINING

A. Provide four hours of instruction in proper operation and routine maintenance for the system. Instruction shall cover all materials indicated in the Owner's and operator's manuals. Contractor shall record training class in video. Save video to USB drive for Owner to use.

B. Operational guidelines shall be given in written form in sufficient numbers so that all key personnel have a copy.

END OF SECTION

SECTION 31 1100
CLEARING AND GRUBBING

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. This section pertains to the specifications for clearing and grubbing, topsoil removal and stockpiling, disconnecting, capping or sealing, and abandoning site utilities in place, and disposal of all vegetation, rubbish and excess material, as required for site grading and related staging areas as noted on the drawings and in accordance with these specifications.

1.02 DEFINITIONS

A. Topsoil: Soil with organic content suitable for sustaining the growth of a soil stabilizing groundcover such as turf. Topsoil is spread over prepared subgrade.
   1. Stockpiled Native Topsoil: Topsoil stripped from the site prior to rough grading work to be spread and amended as required. No onsite soil may be used as topsoil unless approved by Landscape Architect. Soil cut from non-organic layers will not be considered for use as topsoil.
   2. Imported Landscape Topsoil: Off-site topsoil imported and stockpiled to be spread and amended as specified.

B. Tree Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and defined by the drip line of individual trees or the perimeter drip line of groups of trees, unless otherwise indicated.

C. Subgrade: The uppermost surface of an excavation, including excavation for trenches, or the top surface of a fill or backfill immediately below base course, pavement, or topsoil materials.

D. Unauthorized excavation consists of removing materials beyond indicated subgrade elevations or dimensions without direction by the Owner’s representative. Unauthorized excavation, as well as remedial work directed by the Owner’s Rep shall be at the Contractor's expense.

1.03 REGULATORY REQUIREMENTS

A. Conform to applicable codes for disposal of debris.

B. Coordinate clearing work with utility companies.

C. Prior to commencement of work, the Contractor shall be responsible for obtaining, at the contractors own expense, all construction permits necessary to complete the project according to the plans and specifications.

1.04 MATERIAL OWNERSHIP

A. Except for stripped topsoil or other materials indicated to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.05 PROJECT CONDITIONS

A. Subsurface data is available from the Owner. Contractor is urged to carefully analyze the site conditions.

B. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-preparation operations.
   1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
   2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

C. Salvable Improvements: Carefully remove items indicated on drawings to be salvaged and store on Owner's premises where indicated. Contractor to contact Owner's representative for coordination.

D. Do not commence site clearing operations until temporary erosion and sedimentation control measures are in place

E. Protection of Existing Utilities:
   1. Existence and location of underground items are not guaranteed. Investigate and field verify before starting work. Excavation and backfill in the vicinity of existing items of work shall be carried out with extreme caution.
   2. Utility Locator Service: Notify Texas 811 before site clearing.
   3. Contractor shall be held responsible for any damage and for maintenance and protection of existing utilities.
   4. Indicate on record drawings where there is conflict between field conditions and drawings.

F. Staging Areas - Approval must be obtained from the Owner to use any area for staging that is not specifically identified as such on the plans. The Contractor shall restore all areas used for staging, the extent of said restoration to be defined by the Owner upon granting approval for the use of said area for staging.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Protect existing site improvements to remain from damage during construction. Restore damaged improvements to their original condition, as acceptable to Owner.

C. Locate and clearly flag trees and vegetation to remain or to be relocated

D. Control dust and noise, perform work in accordance with the requirements of authorities having jurisdiction. No explosives are permitted. No on-site burning is permitted.

3.02 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion and sedimentation control measures per Section 01 5713 – Erosion and Sedimentation Controls.

B. Provide measures according to a sediment and erosion control plan, specific to the site, which complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.

C. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

D. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.03 TREE PROTECTION

A. Erect and maintain temporary fencing around Tree Protection Zones (TPZ) before starting site clearing. TPZ is 1.50 feet away in radial distance from the trunk for every inch in stem diameter. Remove fence when construction is complete.

B. Do not excavate within Tree Protection Zones, unless otherwise indicated.

C. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by Architect.

3.04 UTILITIES

A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.
   1. Arrange with utility companies to shut off indicated utilities. Contractor is responsible for any service charge required for shut-off action. If other outstanding fees or billings are encountered, the Contractor shall notify the Owner's representative for direction.

B. Known utilities are shown on drawings. If utilities are discovered that are not shown on the drawings, contact Owner's representative for direction. Do not interrupt unknown utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
   1. Notify Owner's representative not less than two weeks in advance of proposed utility interruptions.
   2. Do not proceed with utility interruptions without the authorization of the authority having jurisdiction.

3.05 CLEARING

A. That portion of the site required for constructing the work under these specifications shall be cleared of all vegetation, such as trees, brush, grass and weeds and all other objectionable matter to the limits as depicted in the plans.
   1. Stumps and roots shall be removed to a depth of 24 inches below finished subgrade elevation in area bounded by lines two feet behind back of curbs or to a depth of 24 inches below finished surface of required cross section for other areas.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
   1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches and compact each layer to a density equal to adjacent original ground.

3.06 STRIPPING

A. Topsoil stripping:
   1. Remove sod and grass before stripping topsoil.
   2. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials. A minimum of 6 inches of soil shall be stripped. This must be verified with the geotechnical report provided by the owner for this project. If discrepancy, review with Owner prior to start of work.

a. Remove subsoil and nonsoil materials from topsoil, including trash, debris, weeds, roots, and other waste materials.

3. Strip man-made fills under structures and pavements to minimum 12” below the ground surface and dispose of all waste materials.

B. At all times during clearing and stripping operations the area shall be kept in a manner to prevent ponding. Refer to Section 01 5713 – Erosion and Sedimentation Control.

3.07 SITE IMPROVEMENTS

A. Remove existing above and below-grade improvements as indicated and as necessary to facilitate new construction.

B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.
2. Paint cut ends of steel reinforcement in concrete to remain to prevent corrosion

3.08 STOCKPILING

A. All topsoil from the stripping operations shall be stockpiled in the areas designated by the Owner’s representative or shown on the drawings. Materials shall be deposited and spread in such a manner to ensure proper drainage and prevent severe erosion of the stockpile.

B. Stockpile borrow materials and satisfactory excavated soil materials. Stockpile soil materials without intermixing.

C. Stockpile materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.
1. Limit the height of topsoil stockpiles to 72 inches.
2. Do not stockpile material within tree protection zones.
3. Stockpile surplus topsoil to allow for re-spreading deeper topsoil.

3.09 DISPOSAL

A. Subject to approval of the Owner, material from clearing operations shall be disposed of by removal from the Project site.
1. Disposal of Material by Removal
a. Material disposed of by removal from the construction area shall be removed from the areas prior to the completion of the work under these specifications. All materials removed shall become the property of the Contractor.
b. Materials to be disposed of by dumping shall be hauled to an approved dump. It shall be the responsibility of the Contractor to make any necessary arrangements with private parties and with local officials pertinent to locations and regulations of such dumping. Any fees or charges required to be paid for dumping of materials shall be paid by the Contractor.
c. In hauling any material from the site, it shall be the responsibility of the Contractor to prevent debris from dropping from vehicles and littering the site or area streets and roads. The Contractor shall promptly remove any debris which falls from vehicles.
d. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities.

END OF SECTION 31 1100

SECTION 31 2213
SITE GRADING

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. This Section pertains to the earthwork generally consisting of excavation, filling, backfilling and subgrade preparation as required for construction of site retaining walls/structures, slab on grade walks, pavement surfaces, landscaped areas and the general shaping of the site as shown, described or reasonably inferred on the drawings.

B. This section excludes work necessary for building pad preparations.

1.02 DEFINITIONS

A. Excavation consists of the removal of material encountered to subgrade elevations and the reuse or disposal of materials removed.

B. Subgrade: The uppermost surface of an excavation, including excavation for trenches, or the top surface of a fill or backfill immediately below base course, pavement, or topsoil materials.

C. Borrow: Soil material obtained off-site when sufficient approved soil material is not available from excavations.

D. Base Course: The layer placed between the subgrade and surface pavement in a paving system.

E. Unauthorized excavation consists of removing materials beyond indicated subgrade elevations or dimensions without direction by the Owner’s rep. Unauthorized excavation, as well as remedial work directed by the Owner’s Rep shall be at the Contractor's expense.

F. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below ground surface.

G. Unforeseen Excavation: Excavation of material, regardless of its character or nature, below the subgrade elevation required to construct the work as indicated on the drawings or specified herein.

H. Geotechnical Engineer: Person or company contracted by the Owner and/or through the architect to provide testing and onsite Geotechnical services during the construction schedule.

1.03 REGULATORY REQUIREMENTS

A. Contractor shall comply with all current, applicable codes and regulations.

B. Contractor shall comply with all Standard Specifications and Details of Authorities having Jurisdiction for work in the right-of-way or easements.

C. Shoring that is required to complete the Work, is considered a method or technique and is the sole responsibility of the Contractor. If a regulatory agency requires a licensed engineer to design, approve or provide drawings for shoring, then it is the sole responsibility of the Contractor to engage the services of a qualified Engineer for shoring design services at no additional cost to the Owner.

D. Prior to commencement of work, the Contractor shall be responsible for obtaining, at the contractors own expense, all construction permits necessary to complete the project according to the plans and specifications.

1.04 PROJECT CONDITIONS

A. Subsurface data is available from the Owner. Contractor is urged to carefully analyze the site conditions.

B. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-preparation operations.
   1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
   2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

C. Prior to earthwork operations, existing utilities, facilities and permanent objects to remain shall be located and adequately protected.

D. Protection of Existing Utilities:
   1. Existence and location of underground items are not guaranteed. Investigate and field verify before starting work. Excavation and backfill in the vicinity of existing items of work shall be carried out with extreme caution.
   2. Notify Texas 811 or the utility company involved to locate all public and private utility company lines before beginning work.
   3. Contractor shall be held responsible for any damage and for maintenance and protection of existing utilities.
   4. If unknown and uncharted utilities are encountered during excavation, promptly notify Owner’s Representative and the governing utility company when determinable and wait for instructions.
   5. For private utilities found, if it is ascertained by Owner’s Representative that such utility line has been abandoned, properly cap line at a depth approved by Owner’s Representative or remove line as directed. All work to cap and remove abandoned public utilities found, must be coordinated through the governing utility company.
   6. If such unknown utilities are encountered and work is continued without contacting the Owner for instructions, and damage is caused to said utilities, Contractor shall repair, at his own expense, such damage to the satisfaction of the Owner and the Utility Company.
   7. Indicate on record drawings where there is conflict between field conditions and drawings.

1.05 SUBMITTALS

A. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

B. Samples: Submit samples of all materials used for Architect's approval wherever specified or as directed by the Architect.

C. Shoring and Slope Protection Design:
   1. Prior to beginning any excavation, submit certification to the Architect that the proposed shoring and slope protection system has been accepted and approved by all governing jurisdictions. Certification shall be signed and sealed by the engineer of record for the shoring design.
   2. Provide signed letter from the Geotechnical Engineer stating that the proposed design complies with the recommendations of geotechnical reports.

1.06 QUALITY ASSURANCE

A. Pre-Excavation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

B. Codes and Standards: Perform earthwork complying with requirements of authorities having jurisdiction.

C. Testing and Inspection Service: Owner will employ a qualified independent geotechnical engineering testing agency to classify proposed on-site and borrow soil materials to verify that soils comply with specified requirements and to perform required field and laboratory testing. Contractor responsible to coordinate with the testing agency prior to start of work requiring testing so as to minimize unnecessary cost or delays to the project.

D. Testing:
   1. Owner will retain and pay a qualified Geotechnical engineer to take all field samples and do all laboratory testing necessary to verify compliance of the work to these Specifications or as required by City or other regulatory agencies. The Geotechnical Engineer shall submit results of all testing done during the course of the work to the Owner, Architect, and Contractor.
   2. Notify testing lab a minimum of 48 hours in advance of the time testing is required to satisfy requirements of this section.
   3. Should testing specified above show work which does not satisfy these Specifications, the Contractor shall pay, through the Owner, for all additional tests required to determine the extent of work that is not satisfactory and for all additional tests necessary to demonstrate compliance with these specifications.
   4. All tests shall be performed by the Soil Engineer in accordance with ASTM D 1557, D1556, D2922, D3017, or other test method selected by Geotechnical Engineer.

PART 2 – PRODUCTS

2.01 SOIL MATERIALS

A. Fill materials and sources must be approved by the Owner’s Representative. The Contractor is responsible for providing adequate samples and testing results to the Owner for testing and approval.

B. Select fill per 2.2 shall be used beneath all site retaining walls and site structures where fill material is required to achieve the grades and elevations on the plans.

C. General fill per 2.3 shall be used for fill in landscaping areas not supporting structures. Topsoil per 2.4 shall be spread over landscape areas as needed.

D. Fill material beneath paving shall be per 2.2 or 2.3. Regardless of the fill material used, subgrade shall be chemically stabilized for the thickness specified and detailed in the drawings.

E. Material excavated onsite may be used as fills, with prior Geotechnical Engineer approval.
   1. Onsite fill materials shall be free of organic or deleterious products.
   2. Moisture content of existing soils may require adjustment for compaction approval.

2.02 SELECT FILL

A. The select fill shall consist of sandy clay, lime stabilized clays or clean sand, uniformly graded and free of objectionable material.

1. Sandy Clay Fill: Sandy clay fill shall have a plasticity index between 10 and 20. The fill materials shall be placed in loose lifts not exceeding 8 inches in height and compacted to 95 percent of Standard Maximum Density at the proper moisture content for that soil type as defined by ASTM D 698.
2. Lime Stabilized Clay Fill: Clays may be stabilized in place or mixed with lime at another location on the site and placed and compacted. Lime stabilization shall be performed in accordance with Section 31 32 13.29 – Lime Stabilization or 31 32 13.26 – Lime-Fly Ash or Fly Ash Stabilization. The percent of lime to be used shall be determined by the testing laboratory at the source prior to acceptance of the material for fill. The material shall be placed in loose lifts not exceeding 8 inches in thickness and compacted to 95 percent of Standard Maximum Density at the proper moisture content for that soil type as determined by ASTM D 698.

2.03 GENERAL FILL

A. General fill material shall be used for fill in landscaping areas not supporting structures, and may be used beneath pavement. General fill material may be any native soil free of debris, trash, rocks over one (1) inch in diameter and other objectionable material with a PI less than 35. General fill shall be placed and compacted in lifts not exceeding 8 inches in thickness to 95 percent standard density as defined by ASTM D 698. The fill shall be kept sufficiently low to accommodate the proper depth of topsoil and related sod or other vegetation.

2.04 TOPSOIL

A. Topsoil material shall be native earthen material suitable for growth of vegetation such as silty and sandy loams. The site stripings may be used as topsoil unless otherwise shown on the drawings. Topsoil shall be free of roots and rocks larger than ½ inch (12 mm), subsoil, debris, large weeds and foreign matter. Topsoil shall be spread over landscape areas to a depth of 4 to 6 inches and compacted to 92 percent of standard density as defined by ASTM D 698.

2.05 SPECIAL DRAINAGE MEDIA

A. All retaining wall and French drain backfill material shall be clean open-graded gravel, maximum 3/4" particle size in accordance with the details contained in the plans

B. Drainage Fabric: Nonwoven geotextile, specifically manufactured as a drainage geotextile; made from polyolefins, polyesters, or polyamides; and with the following minimum properties determined according to ASTM D 4759 and referenced standard test methods:
   1. Grab Tensile Strength: 90 lbf; ASTM D 4632.
   2. Tear Strength: 40 lbf; ASTM D 4533.
   3. Puncture Resistance: 50 lbf; ASTM D 4833.
   4. Water Flow Rate: 150 gpm per sq. ft.; ASTM D 4491.
   5. Apparent Opening Size: No. 50; ASTM D 4751.

C. Approved Materials
   1. Mirafi 140 filter fabric.
   2. Contech C-35NW
   3. Approved alternate.

PART 3 – EXECUTION

3.01 PREPARATION

A. Inspection
   1. Prior to performing the work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where work may properly commence.
   2. Verify that survey bench mark and intended elevations for the Work are as indicated.
   3. Verify existing grades and dimensions before starting any grading operations.
   4. Verify that work may proceed in complete accordance with the design.
   5. In the event of discrepancy, immediately notify the Owner's Representative.

B. General

   1. Use all means necessary to control dust on or near the site resulting from the performance of the Work. Thoroughly moisten all surfaces to prevent dust being a nuisance to the public, adjacent uses, and concurrent work on site. Moisture level during compaction operations shall not exceed that amount as specified by Geotechnical Engineer.
   2. Conduct work so as to avoid injury to persons and damage to adjacent property. Provide appropriate shoring, bracing and barriers, including light when necessary.
   3. Coordinate operations with, and provide access to, the Geotechnical Engineer or designated representative during demolition and construction for purposes of testing, investigation and inspection.

C. Protect and maintain benchmarks and survey control points from disturbance during construction.

D. Protect existing site improvements to remain from damage during construction. Restore damaged improvements to their original condition, as acceptable to Owner.

E. Locate and clearly flag trees and vegetation to remain or to be relocated

F. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

G. Protect subgrade from excessive drying or excessive moisture.

3.02 EXCAVATION

A. General - Contractor shall complete all excavation required regardless of the variations in hardness, type, or density of materials encountered, to the dimensions and elevations shown on the drawings. When unsatisfactory material is uncovered, that material shall be removed and replaced with select fill or treated as directed by the Owner's Representative at no additional cost to the Owner.

B. Excavation is unclassified and includes excavation to subgrade elevations regardless of the character of surface and subsurface conditions encountered, including rock, soil materials, and obstructions.
   1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
   2. Remedial work due to over-excavation including provision of suitable and stable backfill meeting the degree of compaction required shall be at the Contractor's expense.

C. If excavated materials of a suitable nature are not of sufficient quantity to complete the work, contractor may provide borrow material in sufficient quantity to complete the work with the approval of the Owner's Representative at no additional cost to the Owner.

D. Dispose of excess satisfactory soil material and all unsatisfactory soil material and rock obtained from excavations in at no additional cost to the Owner in accordance with all local Ordinances and State and Federal Laws.

E. Excavation for Pavement
   1. The material exposed after excavation shall be scarified to a depth of 6 inches and compacted to at least 95 percent of Standard (ASTM D 698) Maximum Density within plus or minus 3 percent of optimum moisture content of the soil. Where necessary to achieve the required compaction, stabilization methods as outlined in paragraph 2.2. A. 2 of this specification shall be used at no additional cost to the Owner.
   2. Excavation required beneath pavement sections shall comply with elevations and dimensions shown on the plans and detailed sections within a tolerance of plus or minus 0.10 foot. Contractor shall take care not to disturb areas that are designated to be protected or are outside the construction limits. Excavated areas shall be kept free of ground and surface water.

F. Cut Slopes and Ditches: Slopes and grades of ditches shall conform to the plans within a tolerance of plus or minus 0.10 foot. No exposed slopes shall be steeper than three feet horizontal to one foot vertical. Where slope protection is specified or called out on the plans, said protection shall be placed as soon as practical, after exposing the slope. Erosion and sedimentation controls shall be implemented in all cut areas as specified in Section 01 5713 – Erosion and Sedimentation Control.

3.03 FILL AND BACKFILL

A. Placement
   1. Fill material shall be placed in loose lifts not exceeding 8 inches for areas beneath site structures and pavement, and 12 inches for landscape areas not supporting structures. Fill areas shall be compacted to 95 percent of Standard Maximum Density at the proper moisture of that soil as defined by ASTM D 698.
   2. Each lift shall be thoroughly compacted and shall have obtained satisfactory density prior to proceeding with the next lift.
   3. The top 6 to 8 inches of material beneath vehicular pavement shall be stabilized after placement.
   4. Material shall be free of trash and rocks over 1 inch in diameter.
   5. Fill shall be brought up to the proper elevations as determined from the lines, grades, sections and elevations shown on the plans.

B. Site Retaining Wall/Structure Backfill:
   1. Place granular material as engineered backfill at all building and site retaining walls.
   2. For precast site retaining walls, install specified gravel and filter fabric prior to backfill installation. Position according to manufacturer’s recommendations.
   3. Place in accordance with applicable portions of the Specifications.
   4. Compact per approved methods, using hand operated compaction equipment. Compact to at least 90% per ASTM D1557.

C. Compaction and Finishing
   1. Suitable compaction equipment commonly used to meet the requirements for this type of compaction work shall be used.
   2. The finished surface shall be reasonably smooth, compacted, and free from irregular surface changes. The surface grade shall be consistent with the drainage intent shown on the plans such that no unwanted ponding shall occur.
   3. Surface shall not be more than 0.10 feet above or below the established grade, and all ground surfaces shall vary uniformly between indicated grades.

4. Cut material from the site may be used for fill material. Where cut material is used as fill, each lift of such material shall be properly mixed to obtain a uniform material with clay being the predominant material and maintaining a plasticity index less than 35.
   a. Lime stabilization shall be used for clay material and shall conform to Section 31 3213.19 – Lime Stabilization or 31 3213.26 – Lime-Fly Ash or Fly Ash Stabilization.
   b. Cement stabilization shall be used for sandy or silty materials and shall conform to Section 31 3213.16 - Cement Stabilization.

3.04 EROSION CONTROL

A. There shall be at all times adequate protection to newly graded areas to prevent soil erosion as provided in Section 01 5713 – Erosion and Sedimentation Control.

B. Soil erosion that occurs prior to acceptance of the work shall be repaired at no expense to the Owner.

C. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

D. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
   1. Scarify or remove and replace soil material to depth as directed by Owner's Testing and Inspection Service; reshape and re-compact.

E. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
   1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

3.05 GRADING

A. Rough Grading
   1. Cut and fill shall be left sufficiently high to require cutting by fine grading.
   2. Grade to subgrade depths required for construction of finished surface materials and for controlled internal drainage of site.

B. Fine Grading
   1. Fine grading shall conform to elevations required to ensure finished elevations as indicated on the drawings.
   2. At no additional cost to the Owner the Contractor shall be responsible for minor adjustments to finished grade if deemed required by the Owner's Representative.
   3. Provide a smooth transition between adjacent existing grades and new grades.
   4. Till, disc, hand rake or otherwise scarify soil removing all clods, stones, and undesirable material ½ inch or larger. Place and spread any additional material that may be required.
   5. Prepare to immediately begin planting operations of the completed and accepted finish grade to prevent excessive weed growth in lawn areas.

C. Slope grades to direct water away from buildings and to prevent ponding at a minimum of 5% grade for the initial 10 feet, as shown on the drawings or as directed by the Owner's Representative. Maximum cross slope for all walkways shall be 2% for disabled access. Finish subgrades to required elevations within the following tolerances:
   1. Lawn or Unpaved Areas: Plus or minus 0.1 foot (1.2 inches)
   2. Walks: Plus or minus ½ inch
   3. Pavements: Plus or minus ½ inch

3.06 TESTING AND INSPECTION

A. Materials and installed work require testing to show that the specifications for the materials and work have been met. The Owner may, at the Owner's expense, take random tests on materials and installed work. The Contractor shall allow free access to material stockpiles and facilities at all times. In fill areas each lift must be tested and approved before proceeding on the next lift. Retesting of rejected materials and installed work, shall be done at the Contractor's expense.

B. Contractor shall notify Owner's testing laboratory 24 hours in advance of beginning any earth work operations and coordinate testing schedules to meet these specifications.

C. Maximum density tests per ASTM D 698 shall be taken on all fill materials at a rate of one test for each type of soil to be used and at least one test for every 1,000 cubic yards of fill.

D. Field density tests per ASTM D 1556 or ASTM D 2922 shall be taken on all fill material at a rate of one test for every ten thousand 10,000 square feet and at least one test per lift.

E. All imported fill material shall be approved prior to importing.

3.07 DUST ABATEMENT

A. The Contractor shall comply with applicable Federal, State, and local laws and regulations concerning the prevention and control of dust pollution.

B. During the performance of the work required by these specifications or any operations appurtenant thereto, whether on right-of-way provided by the Owner or elsewhere, the Contractor shall furnish all the labor, equipment, materials, and means required, and shall carry out proper and efficient measures wherever and as often as necessary to reduce the dust nuisance, and to prevent dust which has originated from the contractor's operations from damaging crops, orchards, cultivated fields, and dwellings, or causing a nuisance to persons. The Contractor will be held liable for any damage resulting from dust originating from the contractor's operations under these specifications.

C. Dust Control shall be accomplished by one of the following methods:
   1. Sprinkling the ground surface with water until it is moist.
   2. Whenever ordered by the Owner's Representative, the Contractor shall furnish and distribute over the traveled road surfaces, which have not yet been fully restored, an application of Calcium Chloride. The material used shall be Regular Flake Calcium Chloride having a minimum chemical content of Calcium Chloride of 77%. Unless otherwise specified or ordered by the Owner, rate of application shall be 3 pounds per square yard of surface covered.
   3. All methods of reducing formation of dust shall be at no additional cost to the Owner.

3.08 STORAGE OF SOIL MATERIALS

A. Stockpile borrow materials and satisfactory excavated soil materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

B. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

C. Stockpile Topsoil may not exceed 6 feet in height.

3.09 FIELD QUALITY CONTROL

A. Testing shall be the responsibility of the Owner and costs of initial testing shall be paid by Owner. Cost of all subsequent testing necessary due to non-compliance with specifications shall be paid by Contractor.

B. Density Test:
   1. Density tests shall be performed by an approved commercial testing laboratory approved per ASTM D 1557.
   2. Tests shall be performed in accordance with the referenced Standards.
   3. Field and laboratory tests for moisture density relations shall be determined in accordance with ASTM D 1557. The frequency and location of field density tests will be determined by the Geotechnical Engineer.
   4. Trenches improperly compacted shall be reopened to the depth directed, then refilled and compacted to the density specified at no additional cost to the Owner.

3.10 DRAINAGE CONTROLS

A. Provide all necessary temporary apparatus, pumps, curbs or ditches as required to divert or convey water from any source away from the Work. Do not allow water from any source to accumulate within or damage earthwork.

3.11 CLEANING AND DISPOSAL

A. Remove unused stockpiled topsoil and subsoil. Grade stockpile area to prevent standing water.

B. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property at no additional cost to the Owner.

C. Leave site clean and raked, ready to receive landscaping.

END OF SECTION 31 2213

SECTION 31 2310
BUILDING EXCAVATION AND FILL

PART 1 – GENERAL

1.01 DESCRIPTION

A. Work included: Excavate, backfill, compact, and grade for the building to the elevations shown on the Drawings, as specified herein, and as needed to meet the requirements of the construction shown in the Contract Documents.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
   2. Section 00 3132 – Geotechnical Data.
   3. Section 01 4000 – Quality Requirements.

1.02 QUALITY ASSURANCE

A. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. Use equipment adequate in size, capacity, and numbers to accomplish the work of this Section in a timely manner.

C. In addition to complying with requirements of governmental agencies have jurisdiction, comply with the directions of the Geotechnical Engineer.

1.03 PRODUCT HANDLING

A. Comply with pertinent provisions of Supplementary Conditions.

PART 2 – PRODUCTS

2.01 SOIL MATERIALS

A. Provide fill as indicated on the Drawing Sheets prepared by the various design professionals on the project.

PART 3 – EXECUTION

3.01 SURFACE CONDITIONS

A. Examine the area and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 FINISH ELEVATIONS AND LINES

A. Finish grades shall be as shown on the site plan and shall form straight lines of slope between elevation markings.

3.03 PROCEDURES

A. Utilities:
   1. Unless shown to be removed, protect active utility lines shown on the Drawings or other wise made known to the Contractor prior to excavating. If damaged, repair or replace at no additional cost to the Owner.
   2. If active utility lines are encountered, and are not shown on the Drawings or otherwise made known to the Contractor, promptly take necessary steps to assure that service is not interrupted.
   3. If service is interrupted as a result of work under this Section, immediately restore service by repairing the damaged utility at no additional cost to the Owner.

4. If existing utilities are found to interfere with the permanent facilities being constructed under this Section, immediately notify the Architect and secure his instructions.
5. Do not proceed with permanent relocation of utilities until written instructions are received from the Architect.

B. Protection of persons and property:
1. Barricade open holes and depressions occurring as part of the Work, and post warning lights on property adjacent to or with public access.
2. Operate warning lights during hours from dusk to dawn each day and as otherwise required.
3. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, washout, and other hazards created by operations under this Section.

C. De-watering:
1. Remove all water, including rain water, encountered during trench and sub-structure work to an approved location by pumps, drains, and other approved methods.
2. Keep excavations and site construction area free from water.
3. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.

D. Maintain access to adjacent areas at all times.

3.04 EXCAVATING

A. Perform excavating of every type of material encountered within the limits of the Work to the lines, grades, and elevations indicated and specified herein.

B. Surplus material:
1. Dispose of unsatisfactory excavated material, and surplus satisfactory excavated material, away from the Project site.

C. Unauthorized excavation:
1. Unauthorized excavation consists of removal of materials beyond indicated sub-grade elevations or dimensions without specific instruction from the Architect or the Geotechnical Engineer.
2. Under footings, foundations, or retaining walls:
a. Fill unauthorized excavations by extending the indicated bottom elevation of the footing or base to the excavation bottom, without altering the required top elevation.
b. When acceptable to the Geotechnical Engineer, lean concrete fill may be used to bring the bottom elevation to proper position.
3. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations, unless otherwise directed by the Geotechnical Engineer.

D. Stability of excavations:
1. Slope sides in accordance with OSHA requirements. For proposal purposes, proposers shall assume 1.5H:1V maximum slope. Steeper slopes are permitted only when allowed by OSHA or the Geotechnical Engineer. Calculations and drawings sealed by an Engineer licensed in the State of Texas, shall be submitted to the Architect and Engineer for design of any alternative excavation protection systems.
2. Shore and brace where sloping is not possible because of space restrictions or stability of the materials being excavated.
3. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.

E. Shoring and bracing:
1. Provide materials for shoring and bracing as may be necessary for safety of personnel, protection of work, and compliance with requirements of governmental agencies having jurisdiction.

2. Maintain shoring and bracing in excavations regardless of the time period excavations will be open.
3. Carry shoring and bracing down as excavation progresses.

F. Excavating for structures:
1. Conform to elevations and dimensions shown within a tolerance of 0.10 ft., and extending a sufficient distance from footings and foundations to permit placing and removing concrete formwork, installation of services, other construction required, and for inspection.
2. In excavating for footings and foundations, take care not to disturb bottom of excavation:
a. Excavate by hand tools to final grade just before concrete is placed.
b. Trim bottoms to required lines and grades to leave solid base to receive concrete.
c. Where continuous or spot footings are shown to be bearing on the soil, compact the bottom of the footing as noted in Paragraph 3.06 of this Section. Trenches and foundation holes shall be dry and free of water when concrete is placed.
3. Excavate for footings and foundations only after general site excavating, filling, and grading are complete.

3.05 FILLING AND BACKFILLING

A. General:
1. For each classification listed below, place acceptable soil material in layers to required sub-grade elevations. Provide fill and backfill as indicated on the Drawing Sheets prepared by the various design professionals on the project.

B. Backfill excavations as promptly as progress of the Work permits, but not until completion of the following.
1. Acceptance of construction below finish grade including, where applicable, dampproofing and waterproofing.
2. Inspecting, testing, approving, and recording locations of underground utilities.
3. Removing concrete formwork.
4. Removing shoring and bracing, and backfilling of voids with satisfactory materials.
5. Removing trash and debris.
6. Placement of horizontal bracing on horizontally supported walls.

C. Placing and compacting:
1. Place backfill and fill materials in layers not more than 8" in loose depth.
2. Before compacting, moisten or aerate each layer as necessary to provide the optimum moisture content.
3. Compact each layer to required percentage of maximum density for area.
4. Do not place backfill or fill material on surfaces that are muddy, frozen, or containing frost or ice.
5. Place backfill and fill materials evenly adjacent to structures, to required elevations.
6. Take care to prevent wedging action of backfill against structures by carrying the material uniformly around the structure to approximately the same elevation in each lift.
7. Where the construction includes basement or other underground walls having structural floors over them, do not backfill such walls until the structural floors are in place and have attained sufficient strength to support the walls.

3.06 COMPACTING

A. Compact the soil within the building lines as indicated in the Structural drawings and the geotechnical report. If there are any discrepancies, the Contractor shall compact to the most stringent case of these.

B. Control soil compaction during construction outside building lines to provide the minimum percentage of density specified for each area as determined according to ASTM D698 Standard Proctor Density.

3.07 FIELD QUALITY CONTROL

A. An Special Inspection and Testing Agency (SITA) will perform field quality control tests and inspections, as specified in Section 01 4533.

3.08 MAINTENANCE

A. Protect newly graded areas.

B. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify the surface, reshape, and compact to the required density prior to further construction.

PART 4 – TRENCHING REQUIREMENTS

4.01 GENERAL

A. These requirements shall be used for all trench excavations deeper than five (5) feet. The excavating and trenching operation manual of OSHA, Subpart B (latest edition) shall be the minimum governing requirement of this item and is hereby made a part of this specification.

1. Banks more than 5 feet high shall be shored, laid back to a stable slope, or some other equivalent means of protection shall be provided where employees may be exposed to moving ground or cave-ins. Refer to Table P-1 as a guide sloping of banks. Trenches less than 5 feet in depth shall also be effectively protected when examination of the ground indicates hazardous ground movement may be expected.
2. Sides of trenches in unstable or soft material, 5 feet or more in depth, shall be shored, sheeted, braced, sloped, or otherwise supported by means of sufficient strength to protect the employees working within them. See Table P-1, P-2 (following paragraph (l) of this section.)
3. Sides of trenches in hard or compact soil, including embankments, shall be shored or otherwise supported when the trench is more than 5 feet in depth and 8 feet or more in length. In lieu of shoring, the sides of the trench above the 5-foot level may be sloped to preclude collapse, but shall not be steeper than a 1-foot rise to each 1/2-foot horizontal. When the outside diameter of a pipe is greater than 6 feet, a bench of 4-foot minimum shall be provided at the toe of the sloped portion.
4. Materials used for sheeting and sheet piling, bracing, shoring, and underpinning, shall be in good serviceable condition, and timbers used shall be sound and free from large or loose knots, and shall be designed and installed so as to be effective to the bottom of the excavation.
5. Additional precautions by way of shoring and bracing shall be taken to prevent slides or cave-ins when excavations or trenches are made in locations adjacent to backfilled excavations, or where excavations are subjected to vibrations from railroad or highway traffic, the operation of machinery, or any other source.
6. Employees entering bell-bottom pier holes shall be protected by the installation of a removable-type casing of sufficient strength to resist shifting of the surrounding earth. Such temporary protection shall be provided for the full depth of that part of each pier hole which is above the bell. A lifeline, suitable for instant rescue and securely fastened to a shoulder harness, shall be worn by each employee entering the shafts. This lifeline shall be individually manned and separate from any line used to remove materials excavated from the bell footing.
7. Minimum requirements for trench timbering shall be in accordance with Table P-2.
8. Braces and diagonal shores in a wood shoring system shall not be subjected to compressive stress in excess of values given by the following formula:
    a. S=3-20L/D
    b. Maximum ratio L/D=50
    c. Where: L= Length, unsupported, in inches.
    d. D= Least side of the timber in inches.
    e. S= Allowable stress in pounds per square inch of cross-section.

9. When employees are required to be in trenches 4 feet deep or more, an adequate means of exit, such as a ladder or steps shall be provided and located so as to require no more than 25 feet of lateral travel.
10. Bracing or shoring of trenches shall be carried along with the excavation.
11. Cross braces or trench jacks shall be placed in true horizontal position, be spaced vertically, and be secured to prevent sliding, falling, or kickouts.
12. Portable trench boxes or sliding trench shields may be used for the protection of personnel in lieu of a shoring system or sloping. Where such trench boxes or shields are used, they shall be designed, constructed, and maintained in a manner which will provide protection equal to or greater than the sheeting or shoring required for the trench.
13. Backfilling and removal of trench supports shall progress together from the bottom of the trench.
14. Jacks or braces shall be released slowly and, in unstable soil, ropes shall be used to pull out the jacks or braces from above after employees have cleared the trench.

B. Definitions applicable to this subpart:
1. "Accepted engineering requirements (or practices)" - Those requirements or practices which are compatible with standards required by a registered architect, a registered professional engineer, or other duly licensed or recognized authority.
2. "Angle of repose" - The greatest angle above the horizontal plane at which a material will lie without sliding.
3. "Bank" - A mass of soil rising above a digging level.
4. "Belled excavation" - A part of a shaft or footing excavation, usually near the bottom and bell-shaped; i.e., an enlargement of the cross section above.
5. "Braces (trench)" - The horizontal members of the shoring system whose ends bear against the uprights or stringers.
6. "Excavation" - Any manmade cavity or depression in the earth's surface, including its sides, walls, or faces, formed by earth removal and producing unsupported earth conditions by reasons of the excavation. If installed forms or similar structures reduce the depth-to-width relationship, an excavation may become a trench.
7. "Faces" - See paragraph (k) of this section.
8. "Hard compact soil" - All earth materials not classified as running or unstable.
9. "Kickouts" - Accidental release or failure of a shore or brace.
10. "Sheet pile" - A pile, or sheeting, that may form one of a continuous interlocking line, or a row of timber, concrete, or steel piles, driven in close contact to provide a tight wall to resist the lateral pressure of water, adjacent earth, or other materials.
11. "Sides", "Walls", or "Faces" - The vertical or inclined earth surfaces formed as a result of excavation work.
12. "Slope" - The angle with the horizontal at which a particular earth material will stand indefinitely without movement.
13. "Stringers" (wales) - The horizontal members of a shoring system whose sides bear against the uprights or earth.
14. "Trench" - A narrow excavation made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench is not greater than 15 feet.
15. "Trench jack" - Screw or hydraulic type jacks used as cross bracing in a trench shoring system.
16. "Trench shield" - A shoring system composed of steel plates and bracing, welded or bolted together, which support the walls of a trench from the ground level to the trench bottom and which can be moved along as work progresses.
17. "Unstable soil" - Earth material, other than running, that because of its nature or the influence of related conditions, cannot be depended upon to remain in place without extra support, such as would be furnished by a system of shoring.
18. "Uprights" - The vertical members of a shoring system.

19. "Wales" - See paragraph (m) of this section.
20. "Walls" - See paragraph (k) of this section.

END OF SECTION

SECTION 31 2333
TRENCHING BACKFILLING AND COMPACTION

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. This Section specifies the requirements for excavating and backfilling for storm sewer, sanitary sewer, water distribution lines, and all related appurtenances. Excavation and backfill shall be in conformance with the locations, lines, elevations and grades shown on the plans. This section also specifies the requirements for clay plugs that must be installed near building face on all utility trenches including water, storm sewer, sanitary sewer, mechanical, electrical, telecom, data, plumbing and other utility trenches for slab on grade and structural first floor building projects.

1.02 DEFINITIONS

A. Excavation consists of the removal of material encountered to subgrade elevations and the reuse or disposal of materials removed.

B. Subgrade: The uppermost surface of an excavation, including excavation for trenches, or the top surface of a fill or backfill immediately below base course, pavement, or topsoil materials.

C. Borrow: Soil material obtained off-site when sufficient approved soil material is not available from excavations.

D. Base Course: The layer placed between the subgrade and surface pavement in a paving system.

E. Unauthorized excavation consists of removing materials beyond indicated subgrade elevations or dimensions without direction by the Owner’s rep. Unauthorized excavation, as well as remedial work directed by the Owner’s Rep shall be at the Contractor's expense.

F. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below ground surface.

G. Utilities include underground pipes, conduits, ducts, and cables, as well as underground services within building lines.

H. Unforeseen Excavation: Excavation of material, regardless of its character or nature, below the subgrade elevation required to construct the work as indicated on the drawings or specified herein.

I. Bedding Material: Granular material utilized to bed piped utilities placed in trench excavations.

1.03 REGULATORY REQUIREMENTS

A. Contractor shall comply with all current, applicable codes and regulations.

B. Contractor shall comply with all Standard Specifications and Details of Authorities having Jurisdiction for work in the right-of-way or easements.

C. Shoring that is required to complete the Work, is considered a method or technique and is the sole responsibility of the Contractor. If a regulatory agency requires a licensed engineer to design, approve or provide drawings for shoring, then it is the sole responsibility of the Contractor to

engage the services of a qualified Engineer for shoring design services at no additional cost to the Owner.

D. Prior to commencement of work, the Contractor shall be responsible for obtaining, at the contractor's own expense, all construction permits necessary to complete the project according to the plans and specifications.

1.04 PROJECT CONDITIONS

A. Subsurface data is available from the Owner. Contractor is urged to carefully analyze the site conditions.

B. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-preparation operations.
   1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
   2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

C. Prior to earthwork operations, existing utilities, facilities and permanent objects to remain shall be located and adequately protected.

D. Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by the Authority having Jurisdiction (AHJ) and then only after arranging to provide temporary utility services as required by the AHJ.

E. Protection of Existing Utilities:
   1. Utilities have been located from surveys and available existing records; not all utilities may be shown on the Drawings. Locate all utilities prior to beginning any construction activities.
   2. Notify Texas 811 or the utility company involved to locate all public and private utility company lines before beginning work.
   3. Excavation and backfill in the vicinity of existing items of work shall be carried out with extreme caution. Contractor shall be held responsible for any damage and for maintenance and protection of existing utilities.
   4. If unknown and uncharted utilities are encountered during excavation, promptly notify Owner's Representative and the governing utility company when determinable and wait for instructions.
   5. For private utilities found, if it is ascertained by Owner's Representative that such utility line has been abandoned, properly cap line at a depth approved by Owner's Representative or remove line as directed. All work to cap and remove abandoned public utilities found, must be coordinated through the governing utility company.
   6. If such unknown utilities are encountered and work is continued without contacting the Owner for instructions, and damage is caused to said utilities, Contractor shall repair, at his own expense, such damage to the satisfaction of the Owner and the Utility Company.
   7. Indicate on record drawings where there is conflict between field conditions and drawings.

F. Where utilities require adjustment or relocation to construct the Work, and those utilities are shown on the Drawings, relocation or adjustment is a part of the Work and shall be completed at no additional cost to the Owner.

G. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

1.05 SUBMITTALS

A. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

B. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with classification according to ASTM D 2487 of each soil material proposed for backfill.

C. Samples: Submit samples of all materials used for Owner's Representative’s approval wherever specified or as directed.

D. Submit proposed target cement content and production data for sand-cement mixture in accordance with requirements of Paragraph 2.3, Materials Qualifications.

1.06 QUALITY ASSURANCE

A. Pre-Excavation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

B. Codes and Standards: Perform earthwork complying with requirements of authorities having jurisdiction.

C. Testing and Inspection Service: Owner will employ a qualified independent geotechnical engineering testing agency to classify proposed on-site and borrow soil materials to verify that soils comply with specified requirements and to perform required field and laboratory testing. Contractor responsible to coordinate with the testing agency prior to start of work requiring testing so as to minimize unnecessary cost or delays to the project.

D. Testing:
   1. Owner will retain and pay a qualified Geotechnical engineer to take all field samples and do all laboratory testing necessary to verify compliance of the work to these Specifications or as required by City or other regulatory agencies. The Geotechnical Engineer shall submit results of all testing done during the course of the work to the Owner, Architect, and Contractor.
   2. Notify testing lab a minimum of 48 hours in advance of the time testing is required to satisfy requirements of this section.
   3. Should testing specified above show work which does not satisfy these Specifications, the Contractor shall pay, through the Owner, for all additional tests required to determine the extent of work that is not satisfactory and for all additional tests necessary to demonstrate compliance with these specifications.
   4. All tests shall be performed by the Soil Engineer in accordance with ASTM D 1557, D1556, D2922, D3017, or other test method selected by Geotechnical Engineer.

PART 2 – PRODUCTS

2.01 EARTH BACKFILL

A. Earth backfill shall be native soils free of debris, trash, rocks over 1-inch in diameter and other objectionable material.

2.02 CEMENT STABILIZED SAND BACKFILL

A. Use sand-cement mixture producing minimum unconfined compressive strength of 100 pounds per square inch (psi) in 48 hours.
   1. Design will be based on strength specimens molded in accordance with ASTM D 558 at moisture content within 3 percent of optimum and within 4 hours of batching.
   2. Determine minimum cement content from production data and statistical history. Provide no less than 1.1 sacks of cement per ton of dry sand.

B. Cement: Type I Portland cement conforming to ASTM C 150.

C. Sand: Clean, durable sand meeting grading requirements for fine aggregates of ASTM C 33, or requirements for bank sand below, and the following requirements:
   1. Classified as SW, SP, SW-SM, SP-SM, or SM by Unified Soil Classification System of ASTM D 2487.
   2. Deleterious materials:
      a. Clay lumps, ASTM C 142 - less than 0.5 percent.
      b. Lightweight pieces, ASTM C 123; less than 5.0 percent.
      c. Organic impurities, ASTM C 40, color no darker than standard color.
   3. Plasticity index of 4 or less when tested in accordance with ASTM D 4318.

D. Add required amount of water and mix thoroughly in pugmill-type mixer. This material cannot be used after it loses its moisture content.

2.03 BANK SAND BACKFILL

A. Durable bank run sand classified as SP, SW, or SM by Unified Soil Classification System (ASTM D 2487) meeting following requirements:
   1. Less than 15 percent passing number 200 sieve when tested in accordance with ASTM D 1140. Amount of clay lumps or balls may not exceed 2 percent.
   2. Material passing number 40 sieve shall meet the following requirements when tested in accordance with ASTM D 4318: PI not exceeding 7.

2.04 WATER

A. Water used for mixing or curing shall be reasonably clean and free of oil, salt, acid, alkali, sugar, vegetable matter or other substances injurious to the finished product.

B. Water sources other than the local municipal domestic water supply must be approved by the Owner’s Representative.

C. If onsite reclaimed water sources are used, tanks and appurtenances must be clearly marked with the words “non-potable” water.

PART 3 – EXECUTION

3.01 PREPERATION

A. Inspection
   1. Prior to performing the work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where work may properly commence.
   2. Verify that survey bench mark and intended elevations for the Work are as indicated.
   3. Verify existing grades and dimensions before starting any grading operations.

4. Verify that work may proceed in complete accordance with the design.
5. In the event of discrepancy, immediately notify the Owner's Representative.

B. General
1. Use all means necessary to control dust on or near the site resulting from the performance of the Work. Thoroughly moisten all surfaces to prevent dust being a nuisance to the public, adjacent uses, and concurrent work on site. Moisture level during compaction operations shall not exceed that amount as specified by Geotechnical Engineer.
2. Conduct work so as to avoid injury to persons and damage to adjacent property. Provide appropriate shoring, bracing and barriers, including light when necessary.
3. Coordinate operations with, and provide access to, the Geotechnical Engineer or designated representative during demolition and construction for purposes of testing, investigation and inspection.

C. Protect and maintain benchmarks and survey control points from disturbance during construction.

D. Protect existing site improvements to remain from damage during construction. Restore damaged improvements to their original condition, as acceptable to Owner.

E. Locate and clearly flag trees and vegetation to remain or to be relocated

F. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.02 EXCAVATION

A. General
1. All utility trenches shall be constructed in conformance with OSHA trench safety standards.
2. Sheeting and shoring shall be accomplished to the extent necessary to maintain the sides of the trench in a vertical position throughout the construction period for trenches five (5) feet in depth or deeper. Where approved, trench sides may be laid back in lieu of shoring to meet OSHA safety standards.
3. Utilities shall not be constructed or laid in a trench in the presence of water. All water shall be removed from the trench sufficiently prior to the line placing operation to insure a dry, firm bed on which to place the utility line.
4. Excavation is unclassified and includes excavation to subgrade elevations regardless of the character of surface and subsurface conditions encountered, including rock, soil materials, and obstructions.
    a. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
    b. Remedial work due to over-excavation including provision of suitable and stable backfill meeting the degree of compaction required shall be at the Contractor's expense.
5. If excavated materials of a suitable nature are not of sufficient quantity to complete the work, provide borrow material in sufficient quantity to complete the work at no additional cost to the Owner.
6. Dispose of excess satisfactory soil material and all unsatisfactory soil material and rock obtained from excavations in accordance with the provisions of this Section.
7. Where utilities are in fill, compact fill material to 95% standard proctor maximum dry density at least 12 inches above the top of the proposed utility prior to excavation of trench.
8. Where indicated widths of utility trenches are exceeded, provide stronger pipe, or special installation procedures, as required by the Owner's Representative. Unauthorized excavation, as well as remedial work, shall be at the Contractor's expense.

B. Sewer Trenches
   1. For pipe sizes less than 30-inches in diameter, the minimum trench width shall be outside diameter of pipe plus 24-inches.
   2. For pipe sizes 30-inches in diameter and larger the minimum trench width shall be outside diameter of pipe plus-36 inches.
   3. Trenches shall be excavated to a depth at least 12-inches below the barrel of pipe, and then the pipe bedding and backfill shall be placed as shown on the appropriate details contained within the plans and as described in paragraph 3.3 A. of this section.

C. Excavation for manholes, inlets, tie-in to existing facilities and similar structures shall be sufficient to leave at least 12-inches clear between the outer surfaces and the embankment or sheeting that may be used to hold and protect the banks. Any over depth excavation below such appurtenances shall be refilled with cement stabilized sand, as directed, at no additional cost to the Owner.

D. Water line Trenches:
   1. Water lines must be a minimum of 4-feet in depth from the top of proposed grade to the top of pipe, unless otherwise shown on the plans.
   2. Trench width for water lines shall be a minimum of the outside pipe diameter plus 24-inches.
   3. Trenches shall be excavated to a depth of at least 12-inches below the barrel of pipe, and then the pipe bedding and backfill shall be placed as shown on the appropriate details contained within the plans and as described in paragraph 3.3 B. of this section.

3.03 PIPE BEDDING AND BACKFILL

A. Storm and sanitary sewer trenches:
   1. Pipe shall be bedded and backfilled in trench in accordance with the details shown on the plans.
   2. Cement stabilized sand bedding shall extend from a point 12 inches below the bottom of the pipe to the level of the spring line. The cement stabilized sand shall be thoroughly rodded after being placed in trench.
   3. Bedding, sewer pipe and initial backfill over the top of pipe must be placed in a single day's operation for any given portion of pipe. Initial backfill shall be placed to 12-inches over the top of pipe for cement stabilized sand backfill.
   4. Backfill shall be placed in uniform layers not to exceed 8-inch loose depth, and compacted to a minimum of 95 percent of Standard Maximum Density (ASTM D 698) at the proper moisture content specified in the Geotechnical report for this project.
   5. Backfill, under pavement and to 2-foot from outer edge, shall be cement stabilized sand up to 1-foot below subgrade elevation.

B. Water line Trenches
   1. Pipe shall be bedded and backfilled in trench in accordance with the details shown on the plans.
   2. Bank sand bedding shall extend from a point 12-inches below the bottom of the pipe to the level of the spring line. The bank sand shall be thoroughly rodded after being placed in trench.
   3. Bedding, sewer pipe and initial backfill over the top of pipe must be placed in a single day's operation for any given portion of pipe. Initial backfill shall be placed to 12-inches over the top of pipe for bank sand backfill.
   4. Backfill shall be placed in uniform layers not to exceed 8-inch loose depth, and compacted to a minimum of 95 percent of Standard Maximum Density (ASTM D 698) at the proper moisture content specified in the Geotechnical report for this project.
   5. Backfill, under pavement and to 2-foot from outer edge, shall be cement stabilized sand up to 1-foot below subgrade elevation.

C. Bentonite Clay Plug for All Utility Trenches (water, storm, sanitary, mechanical, electrical, telecom, plumping, etc.)
   1. All trenches must have a bentonite granular clay plug installed to reduce the transmission of ground water under slab on grade buildings and structural first floor buildings.
      a. The plug must be installed at a distance of 1-foot beyond the face of the building foundation and be a minimum of 1-foot wide.
      b. The plug must extend 6-inches beneath utility trench into undisturbed soil. This portion of the clay plug must be installed prior to the installation of the utility pipe.
      c. The plug must extend across the entire trench width and extend 6-inches into undisturbed soil beyond the trench width. Install bentonite clay plug and the utility pipe at the same time.
      d. The plug must extend to within 12-inches of finished grade. A clay plug cap consisting of material with a PI greater than 15 and a LL in excess of 30 shall be placed on top of the bentonite granular clay plug. This clay plug cap shall fill the remaining 12-inches up to finished grade and be placed up to the edge of the building.

3.04 STORAGE OF SOIL MATERIALS

A. Stockpile borrow materials and satisfactory excavated soil materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

B. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

C. Stockpile Topsoil may not exceed 6 feet in height.

3.05 FIELD QUALITY CONTROL

A. Testing shall be the responsibility of the Owner and costs of initial testing shall be paid by Owner. Cost of all subsequent testing necessary due to non-compliance with specifications shall be paid by Contractor.

B. Density Test:
   1. Frequency and scope of testing shall be established by Geotechnical Engineer, and as required by local jurisdictional authority. If Geotechnical Engineer has not established a frequency of testing in the Geotechnical Report, testing shall be at every 100 linear foot of trench at a minimum of one per lift and a minimum of one per day.
   2. Tests shall be performed in accordance with the referenced Standards.
   3. Laboratory tests for moisture density relations shall be determined in accordance with ASTM D 1557. A minimum of one test shall be performed for each major soils type. In addition, sufficient number of retests or check points shall be performed to evaluate accuracy of maximum density values being used.
   4. Field in-place density shall be determined in accordance with ASTM Test Methods D 1556 or D 2922, and the moisture-density relations shall be determined in accordance with ASTM Test Method D 1557.
   5. Reopen improperly compacted trenches to depth directed, then refill and compact to the specified density at no additional cost to Owner

3.06 DRAINAGE CONTROLS

A. Provide all necessary temporary apparatus, pumps, curbs or ditches as required to divert or convey water from any source away from the Work. Do not allow water from any source to accumulate within or damage trenches.

END OF SECTION 31 2213

SECTION 31 3116
TERMITE CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Chemical soil treatment.

1.02 REFERENCE STANDARDS

A. Title 7, United States Code, 136 through 136y - Federal Insecticide, Fungicide and Rodenticide Act; 2022.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Indicate toxicants to be used, composition by percentage, dilution schedule, intended application rate.

C. Test Reports: Indicate regulatory agency approval reports when required.

D. Manufacturer's Certificate: Certify that toxicants meet or exceed specified requirements.

E. Certificate of compliance from authority having jurisdiction indicating approval of toxicants.

F. Manufacturer's Application Instructions: Indicate caution requirements and materials list of proposed items to be provided under this section.

G. Record and document moisture content of soil before application, date and rate of application, areas of application, and diary of toxicity meter readings and corresponding soil coverage.

H. Installer Qualifications: Company specializing in performing work of the type specified and with minimum 5 years years of documented experience.

I. Maintenance Data: Indicate re-treatment schedule .

J. Warranty: Submit warranty and ensure that forms have been completed in Owner's name.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing this type of work and:
   1. Having minimum of 5 years documented experience.
   2. Approved by manufacturer of treatment materials.
   3. Licensed in Texas.

1.05 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide five year installer's warranty against damage to building caused by termites.
   1. Include coverage for repairs to building and to contents damaged due to building damage. Repair damage and, if required, re-treat.
   2. Inspect annually and report in writing to Owner. Provide inspection service for 5 years from Date of Substantial Completion.
   3. Make inspections, retreatment, and repairs at no additional cost to the Owner.

PART 2 PRODUCTS

2.01 CHEMICAL SOIL TREATMENT

A. Installer shall notify the Texas Department of Agriculture no more than 24 hours before application and provide all data and pre-treatment paperwork to the Owner for review.

B. Toxicant Chemical: EPA Title 7, United States Code, 136 through 136y approved; synthetically color dyed to permit visual identification of treated soil.

C. Diluent: Recommended by toxicant manufacturer.

D. Manufacturers:
   1. Bayer Environmental Science Corp: www.backedbybayer.com/pest-management.
   2. Control Solutions, Inc.; Taurus SC: www.controlsolutionsinc.com.
   3. FMC Professional Solutions: www.fmcprosolutions.com.
   4. Syngenta Professional Products: www.syngentaprofessionalproducts.com.
   5. Termiticide/Termidor HE or SE by Termidor Termite Defense: www.termidorhome.com
   6. Substitutions: See Section 01 6000 - Product Requirements.

E. Mixes: Mix toxicant to manufacturer's instructions.

F. If combinations of toxicants are approved by governmental agencies having jurisdiction, provide toxicants having such approval and in the maximum strength so approved, at no additional cost to the Owner.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that soil surfaces are unfrozen, sufficiently dry to absorb toxicant, and ready to receive treatment.

B. Verify final grading is complete.

3.02 APPLICATION - CHEMICAL TREATMENT

A. Comply with requirements of U.S. EPA and applicable state and local codes.

B. Spray apply toxicant in accordance with manufacturer's instructions.

C. Apply toxicant at following locations:
   1. Under Slabs-on-Grade.
   2. In Crawl Spaces.
   3. At Interior Side of Foundation Surface.
   4. Utility Entrances
   5. Immediately below expansion joints, control joints, and all areas where slab will be penetrated by construction features.
   6. Where exterior facings or veneers extend below grade level along the exterior side of all foundation walls.
   7. Where unit masonry foundation construction is used.

D. Under slabs, apply toxicant immediately prior to installation of vapor barrier or void forms.

E. At foundation walls, apply toxicant immediately prior to finish grading work outside foundations.

F. Apply extra treatment to structure penetration surfaces such as pipe or ducts, and soil penetrations such as grounding rods or posts.

G. Re-treat disturbed treated soil with same toxicant as original treatment.

H. If inspection or testing identifies the presence of termites, re-treat soil and re-test.

3.03 PROTECTION

A. Do not permit soil grading over treated work.

END OF SECTION

SECTION 31 3213.19
LIME STABILIZATION

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. This Section specifies the requirements for treating and stabilizing existing subgrade material or select fill material under pavements or site structures as shown on the drawings, by pulverizing, adding lime, and finishing to the lines and grades shown on the drawings and constructed as specified herein.

1.02 DEFINITIONS

A. Subgrade: The uppermost surface of an excavation, including excavation for trenches, or the top surface of a fill or backfill immediately below base course, pavement, or topsoil materials.

B. Backfill: Soil material or controlled low-strength material used to fill an excavation.

C. Base Course: The layer placed between the subgrade and surface pavement in a paving system.

D. Geotechnical Engineer: Person or company contracted by the owner and/or through the architect to provide testing and onsite Geotechnical services during the construction schedule.

E. Moist Cure: Curing soil and lime to obtain optimum hydration.

1.03 REGULATORY REQUIREMENTS

A. Contractor shall comply with all current, applicable codes and regulations.

B. Contractor shall comply with all Standard Specifications and Details of Authorities having Jurisdiction for work in the right-of-way or easements.

C. Prior to commencement of work, the Contractor shall be responsible for obtaining, at the Contractor’s own expense, all construction permits necessary to complete the project according to the plans and specifications.

1.04 SUBMITTALS

A. Submit certification that hydrated lime, quicklime, or commercial lime slurry complies with specifications.

B. Submit weight tickets, certified by supplier, with each bulk delivery of lime to work site.

1.05 QUALITY ASSURANCE

A. Owner will employ a qualified independent geotechnical engineering testing agency to classify proposed on-site and borrow soil materials to verify that soils comply with specified requirements and to perform required field and laboratory testing. Contractor responsible to coordinate with the testing agency prior to start of work requiring testing so as to minimize unnecessary cost or delays to the project.

B. Testing:
   1. Owner will retain and pay a qualified Geotechnical engineer to take all field samples and do all laboratory testing necessary to verify compliance of the work to these Specifications or as required by City or other regulatory agencies. The Geotechnical Engineer shall submit results of all testing done during the course of the work to the Owner, Architect, and Contractor.
   2. Notify testing lab a minimum of 48 hours in advance of the time testing is required to satisfy requirements of this section.
   3. Should testing specified above show work which does not satisfy these Specifications, the Contractor shall pay, through the Owner, for all additional tests required to determine the extent of work that is not satisfactory and for all additional tests necessary to demonstrate compliance with these specifications.
   4. All tests shall be performed by the Geotechnical Engineer in accordance with ASTM D 698, D1556, or other test method selected by Geotechnical Engineer.

PART 2 – PRODUCTS

2.01 LIME SLURRY

A. Lime slurry for use in treating the subgrade shall conform to the chemical and physical requirements listed in Tables 1 and 2 of TxDOT Departmental Material Specification (DMS) 6350 for Commercial Lime Slurry. Lime Slurry may be prepared at the job site or other Owner approved location by using Hydrated Lime or Quicklime as specified by chemical and physical requirements in Tables 1 and 2 of TxDOT Departmental Material Specifications (DMS) 6350.

2.02 WATER

A. Water used for mixing or curing shall be reasonably clean and free of oil, salt, acid, alkali, sugar, vegetable matter or other substances injurious to the finished product.

B. Water sources other than the local municipal domestic water supply must be approved by the Owner's Representative.

C. If onsite reclaimed water sources are used, tanks and apprentices must be clearly marked with the words "non-potable" water.

2.03 SOIL

A. Soil should be a clayey type soil, free of organic material, large rocks and other unsuitable materials with a plasticity index greater than 15 and a liquid limit in excess of 30. The soil should not contain more than twenty percent sands or silts.

B. Where existing pavement or base material is encountered, pulverized or scarify material so that 100 percent of sampled material passes 2-inch sieve.

PART 3 – EXECUTION

3.01 PREPERATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage and displacement.

B. Verify compacted subgrade will support imposed loads.

C. Verify subgrade lines and grades.

D. Complete backfill of utilities prior to stabilization.

E. Cut material to bottom of subgrade using an approved cutting and pulverizing machine meeting following requirements:
   1. Cutters accurately provide smooth surface over entire width of cut to plane of secondary grade.
   2. Provide cut to depth as specified or shown in the Drawings.

F. Alternatively, scarify or excavate to bottom of stabilized subgrade. Remove material or windrow to expose secondary grade. Obtain uniform stability.

G. Correct wet or unstable material below secondary grade by scarifying, adding lime, and compacting as directed by the Owner's Representative, at no additional cost to the Owner.

H. Pulverize existing material so that 100 percent passes a 1-3/4-inch sieve.

3.02 APPLICATION

A. The percent of lime to the dry weight of the soil shall be as shown on the drawings.

B. The lime shall be mixed with water in trucks with approved distributors and applied as a thin water suspension or slurry.

C. Apply slurry with distributor truck equipped with an agitator to keep lime and water in consistent mixture. The distribution of lime shall be uniformly placed in such quantity that all soil to be treated receives the minimum percentage of lime and successive passes made until the proper moisture and lime content is obtained. Limit spreading to an area where preliminary mixing operations can be completed on same working day.

3.03 MIXING

A. Do not expose hydrated lime to open air for 6 hours or more during interval between application and mixing. Avoid excessive hydrated lime loss due to washing or blowing.

B. The material and lime shall be thoroughly mixed by approved road mixers until a homogeneous, friable mixture of material and lime is obtained, free from all clods or lumps.

C. Immediately after the "first mixing" operation, the mixture shall be brought to the proper moisture content and sealed with a light pneumatic rubber tire roller and left to cure for 1 to 4 days, as directed by the Owner's Representative. If rework is required to obtain compaction after 72 hours of the last mixing, add 25% of the specified rate of lime.

D. After curing time add water to bring moisture content of soil mixture to optimum or above. Mix and pulverize until all material passes 13/4-inch sieve; minimum of 85 percent, excluding non-slacking fractions, passes 3/4-inch sieve; and minimum of 60 percent excluding non-slacking fractions passes No. 4 sieve. Test according to TxDOT Tex-101-E, Part III using dry method. All clods shall be reduced in size by raking, blading, disking, harrowing, scarifying or other approved method.

E. Shape mixed subgrade to final lines and grades.

3.04 COMPACTION

A. Compaction of the mixture shall begin immediately after final mixing and in no case later than 3 calendar days after final mixing.

B. Aerate or sprinkle to attain optimum moisture content to 3 percent above optimum, as determined by ASTM D 698 on material sample after final mix with lime.

C. Spread and compact in two or more equal layers where total compacted thickness is greater than equipment manufacturer's recommended range of mixing and compaction.

D. Compact with approved heavy pneumatic or vibrating rollers, or combination of tamping rollers and light pneumatic rollers. Begin compaction at bottom and continue until entire depth is uniformly compacted.

E. Do not allow stabilized subgrade to mix with underlying material. Correct irregularities or weak spots immediately by replacing material and recompacting.

F. Compact subgrade to minimum density of 95 percent of maximum dry density, according to ASTM D 698, at moisture content of optimum to 3 percent above optimum, unless otherwise indicated on Drawings.

G. Seal with approved light pneumatic tired rollers. Prevent surface hair line cracking. Rework and recompact at areas where hairline cracking develops.

3.05 CURING

A. Moist cure for minimum of 3 days before placing base or surface course, or opening to traffic. Subgrade may be opened to traffic after 2 days when adequate strength has been attained to prevent damage. Restrict traffic to light pneumatic rollers or vehicles weighing less than 10 tons.

B. Keep subgrade surface damp by sprinkling. Roll with light pneumatic roller to keep surface knit together.

C. Place base or surface within 14 days after final mixing and compaction. Restart compaction and moisture content of base material when time is exceeded.

3.06 TOLERANCES

A. Surface of the subgrade shall not show any deviation in excess of 1/4 inch above or one inch below established subgrade elevation. Thickness of the finished subgrade shall be at least the thickness shown on the plans within ¼ inch tolerance and can exceed the thickness shown on the plans as needed to meet the needs of the project.

B. The surface shall be uniform and smooth without large clumps or voids.

3.07 FIELD QUALITY CONTROL

A. Testing shall be the responsibility of Owner and costs of initial testing will be paid by Owner. Cost of subsequent testing necessary due to non-compliance with Specifications shall be paid by Contractor.

B. Test soils, lime, and mixtures as follows:
   1. Tests and analysis of soil materials will be performed in accordance with ASTM D 4318, using the wet preparation method.

2. Sampling and testing of lime slurry shall be in accordance with TxDOT Tex-600-J, except using a lime slurry cup.
3. Sample mixtures of hydrated lime or quicklime in slurry form will be tested to establish compliance with specifications.
4. Moisture-density relationship will be established on material sampled from roadway, after stabilization with lime and final mixing, in accordance with ASTM 698, Moist Preparation Method.

C. In-place depth will be evaluated for each 5,000-square feet of subgrade and determined in accordance with TxDOT Tex-140-E in hand excavated holes. For each 5,000-square feet of subgrade, 3 phenolphthalein tests will be performed. Average stabilization depth for 5,000-square feet of subgrade will be based on average depth for three tests.

D. Perform compaction testing in accordance with ASTM D 2922. Three tests will be performed for each 5,000-square feet of subgrade.

E. Pulverization analysis will be performed as required by Paragraph 3.03D on material sampled during mixing of each production area. Three tests will be performed per 5,000-square feet of subgrade or a minimum of once daily.

3.08 REWORK OF FAILED SECTIONS

A. Rework sections that do not meet specified thickness.

B. Perform the following steps when more than 72 hours have lapsed since completion of compaction.
1. Moist cure for minimum of 3 days after compaction to required density.
2. Add lime at rate of 25 percent of specified rate at no additional cost to City.
3. Moisture density test of reworked material must be completed by laboratory before field compaction testing can be completed.

3.09 PROTECTION

A. Maintain stabilized subgrade to lines and grades and in good condition until placement of base or surface course. Protect asphalt membrane from being picked up by traffic.

B. Repair defects immediately by replacing material to full depth.

END OF SECTION 31 3213.19

SECTION 31 3213.26
LIME-FLY ASH OR FLY ASH STABILIZATION

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. This Section specifies the requirements for treating and stabilizing existing subgrade material or select fill material under pavements or site structures as shown on the drawings, by pulverizing, adding lime and/or fly ash, and finishing to the lines and grades shown on the drawings and constructed as specified herein.

1.02 DEFINITIONS

A. Subgrade: The uppermost surface of an excavation, including excavation for trenches, or the top surface of a fill or backfill immediately below base course, pavement, or topsoil materials.

B. Backfill: Soil material or controlled low-strength material used to fill an excavation.

C. Base Course: The layer placed between the subgrade and surface pavement in a paving system.

D. Geotechnical Engineer: Person or company contracted by the owner and/or through the architect to provide testing and onsite Geotechnical services during the construction schedule.

E. Moist Cure: Curing soil and lime to obtain optimum hydration.

1.03 REGULATORY REQUIREMENTS

A. Contractor shall comply with all current, applicable codes and regulations.

B. Contractor shall comply with all Standard Specifications and Details of Authorities having Jurisdiction for work in the right-of-way or easements.

C. Prior to commencement of work, the Contractor shall be responsible for obtaining, at the Contractor’s own expense, all construction permits necessary to complete the project according to the plans and specifications.

1.04 SUBMITTALS

A. Submit certification that fly ash, hydrated lime, quicklime, or commercial lime slurry complies with these specifications.

B. Submit weight tickets, certified by supplier, with each bulk delivery of lime to work site.

1.05 QUALITY ASSURANCE

A. Owner will employ a qualified independent geotechnical engineering testing agency to classify proposed on-site and borrow soil materials to verify that soils comply with specified requirements and to perform required field and laboratory testing. Contractor responsible to coordinate with the testing agency prior to start of work requiring testing so as to minimize unnecessary cost or delays to the project.

B. Testing:
   1. Owner will retain and pay a qualified Geotechnical engineer to take all field samples and do all laboratory testing necessary to verify compliance of the work to these Specifications or as required by City or other regulatory agencies. The Geotechnical Engineer shall submit results of all testing done during the course of the work to the Owner, Architect, and Contractor.
   2. Notify testing lab a minimum of 48 hours in advance of the time testing is required to satisfy requirements of this section.
   3. Should testing specified above show work which does not satisfy these Specifications, the Contractor shall pay, through the Owner, for all additional tests required to determine the extent of work that is not satisfactory and for all additional tests necessary to demonstrate compliance with these specifications.
   4. All tests shall be performed by the Geotechnical Engineer in accordance with Test Method Tex-114-E or other approved methods selected by Geotechnical Engineer.

PART 2 – PRODUCTS

2.01 LIME

A. Lime for use in treating the subgrade shall conform to the chemical and physical requirements listed in Tables 1 and 2 of TxDOT Departmental Material Specification (DMS) 6350 for hydrated lime or quicklime. When Quicklime is selected, the Contractor is to select, prior to construction, the grade to be used and notify the Owner's Representative in writing before changing from one grade to another.

2.02 FLY ASH

A. Fly ash to meet ASTM Specification C618-05, Class C. Fly ash, have a minimum CaO content of 20 percent and contain no lignite ash.

2.03 WATER

A. Water used for mixing or curing shall be reasonably clean and free of oil, salt, acid, alkali, sugar, vegetable matter or other substances injurious to the finished product.

B. Water sources other than the local municipal domestic water supply must be approved by the Owner's Representative.

C. If onsite reclaimed water sources are used, tanks and apprentices must be clearly marked with the words "non-potable" water.

2.04 SOIL

A. Soil should be a clayey type soil, free of organic material, large rocks and other unsuitable materials with a plasticity index greater than 10 and a liquid limit in excess of 30. The soil should not contain more than twenty percent sands or silts.

B. Where existing pavement or base material is encountered, pulverized or scarify material so that 100 percent of sampled material passes 2-inch sieve.

PART 3 – EXECUTION

3.01 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage and displacement.

B. Verify compacted subgrade will support imposed loads.

C. Verify subgrade lines and grades.

D. Complete backfill of utilities prior to stabilization.

E. Cut material to bottom of subgrade using an approved cutting and pulverizing machine meeting following requirements:
   1. Cutters accurately provide smooth surface over entire width of cut to plane of secondary grade.
   2. Provide cut to depth as specified or shown in the Drawings.

F. Alternatively, scarify or excavate to bottom of stabilized subgrade. Remove material or windrow to expose secondary grade. Obtain uniform stability.

G. Correct wet or unstable material below secondary grade by scarifying, adding lime, and compacting as directed by the Owner's Representative, at no additional cost to the Owner.

H. Pulverize existing material so that 100 percent passes a 1-3/4-inch sieve.

3.02 APPLICATION

A. The percent of lime and/or fly ash to the dry weight of the soil shall be as shown on the drawings.

B. The lime and/or fly ash shall be mixed with water in trucks with approved distributors and applied as a thin water suspension or slurry.

C. Apply slurry with distributor truck equipped with an agitator to keep lime and water in consistent mixture. The distribution of lime and/or fly ash shall be uniformly placed in such quantity that all soil to be treated receives the minimum percentage of lime and successive passes made until the proper moisture and lime content is obtained. Limit spreading to an area where preliminary mixing operations can be completed on same working day.

D. Apply lime/fly ash as single mix, single pass.

3.03 MIXING

A. Do not expose hydrated lime and/or fly ash to open air for 6 hours or more during interval between application and mixing. Avoid excessive hydrated lime loss due to washing or blowing.

B. The soil material, lime and/or fly ash shall be thoroughly mixed by approved road mixers until a homogeneous, friable mixture of material, lime and/or sly ash is obtained, free from all clods or lumps.

C. Shape mixed subgrade to final lines and grades.

3.04 COMPACTION

A. Compaction of the mixture shall begin immediately after final mixing and in no case later than 6 hours after final mixing.

B. Aerate or sprinkle to attain optimum moisture content to 3 percent above optimum, as determined by ASTM D 698 on material sample after final mix with lime.

C. Spread and compact in two or more equal layers where total compacted thickness is greater than equipment manufacturer's recommended range of mixing and compaction.

D. Compact with approved heavy pneumatic or vibrating rollers, or combination of tamping rollers and light pneumatic rollers. Begin compaction at bottom and continue until entire depth is uniformly compacted.

E. Do not allow stabilized subgrade to mix with underlying material. Correct irregularities or weak spots immediately by replacing material and recompacting.

F. Compact subgrade to minimum density of 95 percent of maximum dry density, according to ASTM D 698, at moisture content of optimum to 3 percent above optimum, unless otherwise indicated on Drawings.

G. Seal with approved light pneumatic tired rollers. Prevent surface hair line cracking. Rework and recompact at areas where hairline cracking develops.

3.05 CURING

A. Moist cure for minimum of 3 days before placing base or surface course, or opening to traffic. Subgrade may be opened to traffic after 2 days when adequate strength has been attained to prevent damage. Restrict traffic to light pneumatic rollers or vehicles weighing less than 10 tons.

B. Keep subgrade surface damp by sprinkling. Roll with light pneumatic roller to keep surface knit together.

C. Place base or surface within 14 days after final mixing and compaction. Restart compaction and moisture content of base material when time is exceeded.

3.06 TOLERANCES

A. Surface of the subgrade shall not show any deviation in excess of 1/4 inch above or one inch below established subgrade elevation. Thickness of the finished subgrade shall be at least the thickness shown on the plans within1/4 inch tolerance and can exceed the thickness shown on the plans as needed to meet the needs of the project.

B. The surface shall be uniform and smooth without large clumps or voids.

3.07 FIELD QUALITY CONTROL

A. Testing shall be the responsibility of Owner and costs of initial testing will be paid by Owner. Cost of subsequent testing necessary due to non-compliance with Specifications shall be paid by Contractor.

B. Test soils, lime, fly ash and mixtures as follows:
   1. Tests and analysis of soil materials will be performed in accordance with ASTM D 4318, using the wet preparation method.

2. Sampling and testing of lime slurry shall be in accordance with TxDOT Tex-600-J, except using a lime slurry cup.
3. Sample mixtures of hydrated lime or quicklime in slurry form will be tested to establish compliance with specifications.
4. Moisture-density relationship will be established on material sampled from roadway, after stabilization with lime and final mixing, in accordance with ASTM 698, Moist Preparation Method.

C. In-place depth will be evaluated for each 25,000-square feet of subgrade and determined in accordance with TxDOT Tex-140-E in hand excavated holes. For each 25,000-square feet of subgrade, 3 phenolphthalein tests will be performed. Average stabilization depth for 25,000-square feet of subgrade will be based on average depth for three tests.

D. Perform compaction testing in accordance with ASTM D 2922. Three tests will be performed for each 25,000-square feet of subgrade.

E. Pulverization analysis will be performed as required by Paragraph 3.03D on material sampled during mixing of each production area. Three tests will be performed per 25,000-square feet of subgrade or a minimum of once daily.

3.08 REWORK OF FAILED SECTIONS

A. Rework sections that do not meet specified thickness.

B. Perform the following steps when more than 72 hours have lapsed since completion of compaction.
1. Moist cure for minimum of 3 days after compaction to required density.
2. Add lime at rate of 25 percent of specified rate at no additional cost to City.
3. Moisture density test of reworked material must be completed by laboratory before field compaction testing can be completed.

3.09 PROTECTION

A. Maintain stabilized subgrade to lines and grades and in good condition until placement of base or surface course. Protect asphalt membrane from being picked up by traffic.

B. Repair defects immediately by replacing material to full depth.

END OF SECTION 31 3213.26

SECTION 31 4133
TRENCH SAFETY

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. This Section is intended to provide specifications for the minimum requirements for trench safety. The Contractor shall endeavor to insure the safety of their employees working in and around trenches and other excavations in accordance with current Occupation and Safety Health Administration (OSHA) standards and in particular, Excavations, Trenching and Shoring, Federal OSHA Standards, 29 C.F.R. part 1926, Subpart P, as amended including Final Rule, published in Federal Register Vol. 54, No. 209 Tuesday October 31, 1989 and latest amendment thereto. These specifications outline minimum standards of construction safety to be followed, but should not be construed as the means, methods and operations of construction. Where the Contractor deviates from these outlined minimum standards, the Contractor is required to submit for approval by the Owner sealed engineering plans designed by a Registered Professional Engineer in the State of Texas showing the proposed method of trench protection. A copy of the approved design shall be kept at the site.

1.02 DEFINITIONS

A. Trench: A narrow excavation (in relation to its depth) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet. The trench safety system requirements will apply to larger open excavations if the erection of structures or other installations limits the space between the excavation slope and these installations to dimensions equivalent of a trench as defined.

B. Trench Safety Systems: Include but are not limited to sloping, sheeting, trench boxes or trench shields, sheet piling, cribbing, bracing, shoring, dewatering or diversion of water to provide adequate drainage.

C. Trench Safety Program: The safety procedures governing the presence and activities of individuals working in and around trench excavations.

D. Stable Rock - Natural solid mineral matter that can be excavated with vertical sides and remain in tract while exposed.

E. Type A Soil – Cohesive soils with an unconfined compressive strength of 1.5 tons per square foot or greater. Examples of cohesive soils are: clay, silty clay, sandy clay, clay loam and in some cases, silty clay loam and sandy clay loam cemented soils such as caliche and hard pan are also considered Type A. However, no soil is Type A if:
   1. The soil is fissured.
   2. The soil is subject to vibration from heavy traffic, piling driving, or similar effects
   3. The soil has been previously disturbed.
   4. The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical or greater.
   5. The soil is subject to other factors that would require it to be classified as a less stable material.

F. Type B Soil – Soil that meets one of the following:
   1. Cohesive soil with an unconfined compressive strength greater than 0.5 tons per square foot, but less than 1.5 tons per square foot.

2. Granular cohesionless soils including: angular gravel, silt, silt loam, sandy loam and in some cases, silty clay loam and sandy clay loam.
3. Previously disturbed soils except those which would otherwise be classified as Type C soil.
4. Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subject to vibration.
5. Dry rock that is not stable.
6. Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical, but only if the soil would otherwise be classified as Type B.

G. Type C Soil – Soil that meets one of the following:
1. Cohesive soil with an unconfined compressive strength of 0.5 tons per square foot or less.
2. Granular soils including: gravel, sand and loamy sand.
3. Saturated or submerged soil.
4. Submerged rock that is not stable.
5. Soil in a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical or greater.

H. Unconfined compressible strength shall mean the load per unit area at which a soil will fail in compression. It can be determined by laboratory testing, estimated in the field using a pocket penetrometer, or other previously approved methods.

I. Wet soil shall mean soil that contains significantly more moisture than moist soil, but in such a range of values that cohesive material will slump or begin to flow when vibrated. Granular material that would exhibit cohesive properties when moist will lose those cohesive properties when wet.

1.03 REGULATORY REQUIREMENTS

A. Install and maintain trench safety systems in accordance with current Occupation and Safety Health Administration (OSHA) standards and in particular, Excavations, Trenching and Shoring, Federal OSHA Standards, 29 C.F.R. part 1926, Subpart P, as amended including Final Rule, published in Federal Register Vol. 54, No. 209 Tuesday October 31, 1989 and latest amendment thereto.

B. The Contractor is responsible for obtaining a copy of OSHA standards included in "Subpart P - Excavations" from the Federal Register Vol. 54, No. 209 section of the Federal Register.

C. Legislation that has been enacted by the Texas Legislature with regard to Trench Safety Systems, is hereby incorporated, by reference, into these specifications. Refer to Texas Health and Safety Code Ann., §756.021 (Vernon 1991).

D. Reference materials, if developed for a specific project, will be issued with the Bid/Proposal Documents.

1.04 SUBMITTALS

A. Submit a safety program specifically for the construction of trench excavation. Design the trench safety program to be in accordance with OSHA 29CFR standards governing the presence and activities of individuals working in and around trench excavations.

B. Construction and shop drawings containing deviations from OSHA standards or special designs shall be sealed by a licensed Engineer retained and paid by Contractor.

C. Review of the safety program by the Owner's Representative will only be in regard to compliance with this specification and will not constitute approval by the Owner's Representative nor relieve Contractor of obligations under State and Federal trench safety laws.

D. Submit certification that trench safety system will not be subjected to loads exceeding those which the system was designed to withstand according to the available construction and geotechnical information.

1.05 INDEMNIFICATION

A. Contractor shall indemnify and hold harmless the Owner, its employees and agents, from any and all damages, costs (including, without limitation, legal fees, court costs, and the cost of investigation), judgments or claims by anyone for injury or death of persons resulting from the collapse or failure of trenches constructed under this Contract.

B. Contractor acknowledges and agrees that this indemnity provision provides indemnity for the Owner in case the Owner is negligent either by act or omission in providing for trench safety, including, but not limited to safety program and design reviews, inspections, failures to issue stop work orders, and the hiring of the Contractor.

PART 2 – PRODUCTS

2.01 GENERAL

A. Materials used for sheeting, sheet piling, cribbing, bracing, shoring, underpinning, and other structural retaining systems shall be in good serviceable condition, of good quality, of a suitable condition and grade to perform the intended use. Wood shall be sound, free from large or loose knots, and of the proper dimensions. The Contractor shall be responsible for maintaining the systems in a manner consistent with the intended design and in a manner that will prevent exposure of workers to hazards.

PART 3 – EXECUTION

3.01 GENERAL SAFETY REQUIREMENTS

A. The work area shall be kept free of hazards to the employees. All surface encumbrances which may create a hazard shall be removed, supported or otherwise isolated as necessary to safeguard employees.

B. The Contractor shall take special precautions to locate existing utilities and to protect those systems as required. The Contractor shall call the Utility Coordinating Committee as required 24 hours prior to excavating around existing utilities.

C. The Contractor shall provide safe access and egress to excavations. Ramps or stairways shall be structurally sound and capable of providing a safe means of escape from the excavation. Trenches in excess of four (4) feet in depth shall have a safe means of egress from the trench spaced such that no more than 25 feet of lateral travel would be required to reach the egress system.

D. The employees shall be protected from work place hazards such as vehicular traffic, falling loads, and hazardous atmosphere. Excavations shall be marked so that employees and equipment are clearly warned of the location of the excavations. Trenches shall be kept free of water accumulations that would present a hazard to employees. Adjacent structures shall be stabilized as necessary so as not to present a possible hazard to the employees. Equipment shall be kept

sufficiently clear of excavations so as not to create a potential overburden stress to trench walls causing cave-ins. Safe access shall be provided with handrails where access over trenches is required.

E. Emergency rescue equipment as required by OSHA shall be readily available at the site and shall be maintained to good working condition.

F. Daily inspections of excavations, the adjacent areas, and the protective systems shall be made by a person or persons competent to make such inspections to keep the Contractor notified of unsafe conditions so that necessary precautionary actions can be taken.

3.02 INSTALLATION

A. Install and maintain trench safety systems in accordance with provisions of OSHA 29CFR.

B. Install specially designed trench safety systems in accordance with the Contractor’s trench excavation safety program for the locations and conditions identified in the program.

C. A competent person, as identified in the Contractor’s Trench Safety Program, shall verify that trench boxes and other premanufactured systems are certified for the actual installation conditions.

3.03 INSPECTION

A. Contractor, or Contractor's independently retained consultant, shall make daily inspections of the trench safety systems to ensure that the installed systems and operations meet OSHA 29CFR and other personnel protection regulations requirements.

B. If evidence of possible cave-ins or slides is apparent, Contractor shall immediately stop work in the trench and move personnel to safe locations until the necessary precautions have been taken by Contractor to safeguard personnel entering the trench.

C. Maintain a permanent record of daily inspections.

3.04 FIELD QUALITY CONTROL

A. Contractor shall verify specific applicability of the selected or specially designed trench safety systems to each field condition encountered on the project.

END OF SECTION 31 4133

SECTION 31 6329
DRILLED CONCRETE PIERS AND SHAFTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Machine drilled shaft and belled base.

B. Concrete and reinforcement.

C. Shaft liner, if required.

1.02 RELATED REQUIREMENTS

A. Section 01 1400 - Work Restrictions

B. Section 01 4000 - Contractor's Quality Assurance

C. Section 01 4533 - Code-Required Quality Control

D. Section 03 2000 - Concrete Reinforcing: Requirements for concrete reinforcement.

E. Section 03 3000 - Cast-in-Place Concrete: Requirements for concrete.

1.03 PRICE AND PAYMENT PROCEDURES

A. Proposers shall assume all drilled piers shall be installed as shown on the construction documents as part of the construction, with adjustments made by unit price. The same unit price shall be used for adding linear feet as is used for deducting linear feet. If more than one unit price is submitted for each type, (e.g. if a different price is submitted for adding than for deducting), the average of the absolute values shall be used for adding and deducting. Proposers shall provide a unit price for each type of pier, $/LF, with the Proposal. If a unit price is not provided with the Proposal and made part of the Agreement with the Owner, the Contractor shall not begin installation of drilled piers until a unit price is proposed and the Owner agrees to the unit price. If a unit price is not agreed to by the Owner before drilled piers begin, the Architect will establish a unit price that the Architect believes to be fair and reasonable, based solely on the Architect's opinion, to make any cost adjustments if the actual piers vary from the designed piers. The Proposal and Unit Prices shall include costs of mobilizing equipment. For example, if equipment needs to be remobilized to drill piers at the end of the project, the Owner shall not be responsible for the costs of remobilization.

B. Designed Piers:
   1. Design Pier Quantity: Determined by the quantity of piers indicated in the Contract Documents. Refer to Typical Details and Plans. The Plans may not show all piers required by the typical details at, for example, site structures such as fences.
   2. Design Pier Length: By the linear foot measured from bottom of pier to top of pier elevation as indicated.
   3. Pier Casings: By the linear foot. Per Structural Drawings.

C. Actual Piers:
   1. Actual Pier Quantity: Determined by quantity of piers identified in the Project Record Documents.
   2. Actual Pier Length: Determined by length of piers identified in Project Record Documents.
   3. Pier Casings: By the linear foot. The actual cased length shall be defined from the top of the pier to the bottom of the casing. Any pier penetration below the bottom of the casing shall be considered uncased pier length.

D. Adjustments to the Contract Sum/Price will be made if the Actual Pier Quantity or Length differs from Design Pier Quantity or Length, based on unit prices established in the Agreement and as follows:
   1. Unit price per unit length. To calculate cost adjustment, multiply unit price by difference between the sum of the total Design Pier Lengths for all piers of each type on the project and Actual Pier Lengths for all piers of each type on the project.

2. The Contractor shall not be compensated for penetrations deeper than indicated to be required by the Owner's Testing Laboratory

E. Determination of Unit Measurements: Identified by site measurements and verified by Owner's testing laboratory. The Contractor shall notify the Laboratory when the last pier has been drilled and request a report from the Laboratory to assist with the calculation of cost adjustment. The Laboratory shall determine the difference between the sum of the total Design Pier Lengths for all piers of each type on the project and Actual Pier Lengths for all piers of each type on the project

1.04 REFERENCE STANDARDS

A. ACI 336.1 - Specification for the Construction of Drilled Piers; 2001.

B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Conduct a preinstallation meeting at least one week prior to the start of the work of this section; require attendance by all affected installers.

1.06 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings:
1. Pier Diameter
2. Anticipated length
3. Pier reinforcement
4. Top of pier elevations

C. Project Record Documents: Record actual locations of piers, pier diameter, and pier length. Accurately record the following:
1. Sizes, lengths, and locations of piers.
2. Sequence of placement.
3. Final base and top elevations.
4. Deviation from indicated locations.
5. Placement and configuration of reinforcement deviations.

1.07 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing the work of this section with minimum 3 years of documented experience.

PART 2 PRODUCTS

2.01 MATERIALS

A. Casing: Temporary casings of steel conforming to ASTM A 36 of sufficient strength to withstand handling and drilling stresses, concrete pressures, and surrounding earth and water pressures.

B. Concrete Materials and Mix: Specified in Section 03 3000.

C. Reinforcement: Specified in Section 03 2000; spiral wound. Spiral bars shall be smooth rod spiral, not deformed rebar. Vertical pier reinforcement shall not be spliced. Vertical bars shall be shipped to the project in stock lengths and field cut after measuring each pier.

D. Equipment: Appropriate for dewatering excavated shaft.

E. Reinforcement Supports:
1. Manufacturers
a. Subject to compliance with requirements indicated herein, provide products of one of the listed manufacturers.
b. Pier Sleds and Bolsters:
1) Simpson Strong-Tie, McKinney, TX, https://www.strongtie.com.
2) Foundation Technologies, Inc., Tucker, GA, www.foundationtechnologies.com.

3) Blackthorn, Inc., 6113 Brookville Sale Road, Clayton, OH, www.blackthorn-inc.com.
4) EZ-Lok Products by Dayton Superior, 1002 Avenue T, Grand Prairie, TX, 800-745-3703, www.daytonsuperior.com.
5) Substitutions under provisions of Section 01 6000 - Product Requirements.

2. Pier Sled or Wheel Spacers
   a. Pier sleds shall be fabricated concrete support with minimum compressive strength of 8,500 psi and integral wire ties.
   b. Wire ties: plain finish.
      1) Manufactured sizes:
         (a) Nominal 8 x 3 x 1-1/4 inch
         (b) Nominal 8 x 4 x 1-1/4 inch
         (c) Use 3-inch sled for uncased and 4-inch sled for cased piers.
   c. Wheel spacers shall be EZ-LOK - PLW-300/4-HD, 3/4-inch thick.
   d. Provide minimum three sleds or wheels around the cage at 10'-0" maximum on center spaced uniformly to properly align cage in shaft.
3. Pier Bolster
   a. Fabricated concrete support with minimum compressive strength of 8,500 psi and integral wire ties.
      1) Wire ties: plain finish.
      2) Manufactured size: nominal 4-inch diameter by 3-inch high with two 9-gage wires for attachment to bottom of reinforcing cage.
   b. Minimum number of bolsters, spaced to support steel free of earth, per structural drawings (every other vertical bar reinforcement bar minimum).

PART 3 EXECUTION

3.01 PREPARATION

A. Use placement method which will not cause damage to nearby structures.

B. Notify adjacent and affected land owners and building occupants before proceeding with the work.

C. Protect structures near the work from damage.

D. Prepare to place piers from excavated working elevation.

E. Grade perimeter of pier and shaft area to prevent surface water from draining into soil borings. Provide temporary means and methods, as required, to maintain surface diversion until no longer needed, or as directed by the Architect.

F. Test Pier Holes: (The paragraphs below shall not apply to light pole bases.)
   1. The Contractor shall drill all Test Pier Holes (belling and/or dewatering if required) as indicated on the Structural Drawings in the presence of the Special Inspection and Testing Agency (SITA). If none are shown on the Structural Drawings, the Contractor shall drill one Test Pier Hole (to the diameter and depth required for a most common pier size provided in the Structural Drawings, (belling if required) for every 50,000 square feet of floor plan within the building area with the location(s) to be determined by the SITA.
   2. Within one (1) business day after receiving the Test Pier Hole Report from the SITA, the Contractor shall forward the report to the Geotechnical Engineer for their review of general conformance with the borings provided in the Geotechnical Report and to the Structural Engineer with a Request for Information (RFI), requesting verification that the conditions encountered are generally consistent with those required for proposal purposes (total lineal feet of cased and uncased piers). If conditions are significantly different from what was anticipated, the Structural Engineer may recommend modification of the pier design(s).
   3. Information included in test pier hole submission shall include the following:

a. Elevation of top of grade
b. Depth to bearing strata (as noted in Structural Drawings)
c. Depth water encountered (if applicable)
d. Any strata within the boring that may cause concern for sloughing during construction of piers.

3.02 INSTALLATION

A. Refer to Section 01 1400 for work restrictions regarding the schedule of drilled pier installation.

B. Construct piers in accordance with ACI 336.1.

C. Drill vertical pier shafts to diameters and depths indicated.

D. Place steel casings during drilling operations. Set firmly in place. If casing is to be temporary, install shaft liner with sufficient strength to withstand concrete pressures.
1. Withdrawal of temporary casings is at option of Contractor.

E. Clean shaft and bottom of loose material. Provide temporary means and methods, as required, to remove all water from soil borings as needed, or until directed by the Geotechnical Engineer.

F. Allow inspection of shaft prior to placement of reinforcement and concrete.

G. Place reinforcing steel in accordance with Section 03 2000.

H. Fabrication and Placing of Reinforcing
1. All steel reinforcing cages shall be completely fabricated in a rigid fashion in order to permit expeditious placement into the shaft excavation by service equipment with a minimum time delay.
2. The reinforcing steel cage for the shafts, consisting of longitudinal bars and hoops or ties, shall be completely assembled and placed into the shaft as a unit. Each longitudinal bar shall be tied to each hoop or tie.
3. Place pier bottom bolsters in accordance with manufacturer's recommendations.
4. Place pier side sleds in accordance with manufacturer's recommendations.

I. Place concrete in single pour, in accordance with Section 03 3000 with equipment designed for vertical placement of concrete.

J. Placing of Concrete
1. Concrete may be placed through a tremie if desired by the Contractor if concrete will not strike the side of the shaft.
2. Concrete shall be placed as soon as practical after the pier excavation has been completed and in no case shall the time lapse between completion of the excavations and concrete placement therein exceed four (4) hours (no pier excavation shall be left open overnight).
3. Placement of concrete in any individual shaft shall be continuous from the beginning of concrete placement to the completion of any individual shaft installation. Concrete shall be vibrated.

K. Coordinate casing withdrawal with concrete placement so that concrete pressure head exceeds anticipated outside soil and water pressure above bottom of casing at all times during withdrawal. Vibration and rotation will not be permitted during extraction of the casing and special care shall be exercised to insure that separation or squeezing of the freshly placed concrete does not occur. At all times during extraction of the casing, the concrete head within the casing shall be sufficient to prevent encroachment of ground water or caving material into the freshly placed concrete.

L. Extend reinforcement or provide dowels for connection of caps and grade beams.

M. Set tops of piers to elevations indicated.

3.03 TOLERANCES

A. Maximum Variation From Vertical: 1 in 48.

B. Maximum Variation From Design Top Elevation: Plus 3 inches, minus 1 inch.

C. Maximum Out-of-Position: 2 inches.

3.04 FIELD QUALITY CONTROL

A. A Special Inspection and Testing Agency (SITA) will perform field quality control tests and inspections, as specified in Sections 01 4516 and 01 4533.

3.05 UNACCEPTABLE PIERS

A. Unacceptable Piers: Piers that fail, are placed out of position, are below elevations, or are damaged.

B. Provide additional piers or replace piers failing to conform to specified requirements.

END OF SECTION

SECTION 32 1313
CONCRETE SITE PAVING

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. This Section specifies the requirements for forming and placing reinforced vehicular pavement, curbs, sidewalks, courtyards and pedestrian areas to the lines and grades shown on the drawings and constructed as specified herein.

1.02 REGULATORY REQUIREMENTS

A. Contractor shall comply with all current, applicable codes and regulations.

B. Contractor shall comply with all Standard Specifications and Details of Authorities having Jurisdiction (herein after referred to as "Standard Specifications") for work in the right-of-way or easements.

C. Prior to commencement of work, the Contractor shall be responsible for obtaining, at the Contractor's own expense, all construction permits necessary to complete the project according to the plans and specifications.

1.03 SUBMITTALS

A. Product Data: For each type of manufactured material and product indicated.

B. Design Mixtures: For each concrete pavement mixture. Include alternate mixture designs when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

C. Material Test Reports: From a qualified testing laboratory indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials:

D. Material Certificates: Signed by manufacturers certifying that each of the following materials which are part of this project, complies with requirements:
1. Cementitious materials.
2. Steel reinforcement and reinforcement accessories.
3. Admixtures.
4. Curing compounds.
5. Applied finish materials.
6. Bonding agent or epoxy adhesive.
7. Joint fillers.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products who complies with ASTM C 94/C 94M requirements for production facilities and equipment.

B. Owner will employ a qualified independent geotechnical engineering testing agency to take all field samples and do all laboratory testing necessary to verify compliance of the work to the Specifications or as required by City or other regulatory agencies. Contractor shall be responsible

to coordinate with the testing agency prior to start of work requiring testing so as to minimize unnecessary cost or delays to the project.

C. Testing:
1. The Geotechnical Engineer shall submit results of all testing done during the course of the work to the Owner, Owner's Representative, and Contractor.
2. Notify testing lab a minimum of 48 hours in advance of the time testing is required to satisfy requirements of this section.
3. Should testing specified above show work which does not satisfy these Specifications, the Contractor shall pay, through the Owner, for all additional tests required to determine the extent of work that is not satisfactory and for all additional tests necessary to demonstrate compliance with these specifications.

PART 2 – PRODUCTS

2.01 CONCRETE MATERIALS

A. Portland Cement:
1. Sample and test cement to verify compliance with Standards of ASTM C 150, Type I or Type III.
2. Bulk cement which meets referenced standards may be used when method of handling is approved by the Owner's Representative. When using bulk cement, provide satisfactory weighing devices.
3. Fly ash which meets standards of ASTM C 618 may be used as mineral fill when method of handling is approved by the Owner's Representative.

B. Water: Conform to requirements for water in ASTM C 94.

C. Coarse Aggregate: Crushed stone, gravel, or combination thereof, which is clean, hard, and durable, conforms to requirements of ASTM C 33, and has abrasion loss not more than 45 percent by weight when subjected to Los Angeles Abrasion Test (ASTM C 131).
1. Maximum percentage by weight of deleterious substances shall not exceed the following:

Item	Percent by Weight of Total Sample Maximum
Clay lumps and friable particles	3.0
Material finer than 75-µm (No. 200) sieve:	
Concrete subject to abrasion	3.0*
All Other concrete	5.0*
Coal and lignite:	
Where surface appearance of concrete is of importance	0.5
All other concrete	1.0

* In case of manufactured sand, when material finer than 75-µm (No. 200) sieve consists of dust of fracture, essentially free from clay or shale, these limits may be increased to 5 and 7 percent, respectively.

2. Conform coarse aggregate (size 1 1/2 inch to No. 4 sieve) to requirements of ASTM C 33. Use gradation within following limits when graded in accordance with ASTM C 136:

Sieve Designation (Square Openings)	Percentage by Weight
Retained on 1 3/4” sieve	0
Retained on 1 1/2” sieve	0 – 5
Retained on 3/4” sieve	30 – 65
Retained on 3/8” sieve	70 – 90
Retained on No. 4 sieve	95 – 100
Loss by Decantation Test (Tex-406-A)	1.0 Maximum

* In case of aggregates made primarily from crushing of stone, when material finer than 200 sieve is dust of fracture essentially free from clay or shale as established by Part III of TxDOT Tex-406-A, percent may be increased to 1.5.

D. Fine Aggregate: Sand, manufactured sand, or combination thereof, composed of clean, hard, durable, uncoated grains, free from loams or other injurious foreign matter. Conform fine aggregate for concrete to requirements of ASTM C 33. Use gradation within the following limits when graded in accordance with ASTM C 136:

Sieve Designation (Square Openings)	Percentage by Weight
Retained on 3/8" sieve	0
Retained on No. 4 sieve	0 – 5
Retained on No. 8 sieve	0 – 20
Retained on No. 16 sieve	15 – 50
Retained on No. 30 sieve	35 – 75
Retained on No. 50 sieve	65 -90
Retained on No. 100 sieve	90 – 100
Retained on No. 200 sieve	97 – 100

1. When subjected to color test for organic impurities (ASTM C 40), fine aggregate shall not show color darker than standard color. Fine aggregate shall be subjected to Sand Equivalent Test (Tex-203-F). Sand equivalent value shall not be less than 80, unless higher value is shown on Drawings.

E. Mineral Filler: Type “C” or Type “F” fly ash of acceptable quality and meeting requirements of ASTM C 618 may be used as mineral admixture in concrete mixture. When fly ash mineral filler is used, store and inspect in accordance with ASTM C 618. Do not use fly ash in amounts to exceed 20 percent by weight of cementatious material in mix design. Cement content may be reduced when strength requirements can be met. Note: When fly ash is used, term "cement" is defined as cement plus fly ash.

F. Air Entraining Agent: Furnish air entraining agent conforming to requirements of ASTM C 260.

G. Water Reducer: Water reducing admixture conforming to requirements of ASTM C 494 may be used when required to improve workability of concrete. Amount and type of admixture is subject to approval by the Owner’s Representative.

2.02 MIXING

A. Flexural strength shall be as specified using test specimens prepared in accordance with ASTM C 31 and tested in accordance with ASTM C78 (using simple beam with third-point loading). Compressive strength shall be as specified using test specimens prepared in accordance with ASTM C 31 and tested in accordance with ASTM C 39. Determine and measure batch quantity of each ingredient, including water for batch designs and all concrete produced for Work. Mix shall conform to these specifications and other requirements indicated on Drawings.

B. Vehicular Pavement and Curbs
   1. Mix design shall have a minimum compressive strength of 3,000 pounds per square inch at 7 days and 3,500 pounds per square inch at 28 days when tested in accordance with ASTM C39. Slump of concrete shall be at least 3 inches but no more than 6 inches, when tested in accordance with ASTM C143.
      a. Determine cement content in accordance with ASTM C 138 (water-cement ratio maximum 0.57). Addition of mineral filler may be used to improve workability or plasticity of concrete to limits specified.
      b. Coarse dry aggregate shall not exceed 85 percent of loose volume of concrete.
      c. Add air-entraining admixture to ensure uniform distribution of agent throughout batch. Base air content of freshly mixed air-entrained concrete upon trial mixes with materials to be used in Work, adjusted to produce concrete of required plasticity and workability. Percentage of air entrainment in mix shall be 4 1/2 percent plus or minus 1 1/2 percent. Determine air content by testing in accordance with ASTM C 231.
      d. Use retardant when temperature exceeds 90 degrees F. Proportion as recommended by manufacturer. Use same brand as used for air-entraining agent. Add and batch material using same methods as used for air-entraining agent.

C. Sidewalk, Courtyard and Pedestrian Area Pavement
   1. Mix design shall have a minimum compressive strength of 3,000 pounds per square inch at 28 days when tested in accordance with ASTM C39. Slump of concrete shall be at least 3 inches but no more than 6 inches, when tested in accordance with ASTM C143.
      a. Determine cement content in accordance with ASTM C 138 (water-cement ratio maximum 0.57). Addition of mineral filler may be used to improve workability or plasticity of concrete to limits specified.
      b. Coarse dry aggregate shall not exceed 85 percent of loose volume of concrete.
      c. Add air-entraining admixture to ensure uniform distribution of agent throughout batch. Base air content of freshly mixed air-entrained concrete upon trial mixes with materials to be used in Work, adjusted to produce concrete of required plasticity and workability. Percentage of air entrainment in mix shall be 4 1/2 percent plus or minus 1 1/2 percent. Determine air content by testing in accordance with ASTM C 231.
      d. Use retardant when temperature exceeds 90 degrees F. Proportion as recommended by manufacturer. Use same brand as used for air-entraining agent. Add and batch material using same methods as used for air-entraining agent.

D. High Early Strength Concrete
   1. Use high early strength concrete pavement to limits shown on Drawings or as required to meet the project schedule. Design to meet the following:
      a. Concrete Mix: Flexural strength greater than or equal to 500 psi at 72 hours.
      b. Cement: Minimum of 7 sacks of cement per cubic yard of concrete.
      c. Water-Cement Ratio maximum of 0.45. Slump of concrete shall a maximum of 5 inches, when tested in accordance with ASTM C 143.

E. No additional water shall be added to the concrete at the job site.

2.03 REINFORCING STEEL

A. Provide new deformed billet steel conforming to ASTM A 615, Grade 60. Store steel to protect it from mechanical injury and rust. At time of placement, steel shall be free from dirt, scale, rust, paint, oil, or other injurious materials.

B. Cold bend reinforcing steel to shapes shown. Once steel has been bent, it may not be rebent.

C. Welded wire fabric may only be utilized if indicated on the drawings. If wire fabric is utilized provide wire fabric conforming to ASTM A 82. Use fabric in which longitudinal and transverse wires have

been electrically welded at points of intersection. Welds shall have sufficient strength not to be broken during handling or placing. Conform welding and fabrication of fabric sheets to ASTM A 185.

D. Employ supports of approved shape and size that will secure reinforcing steel and joint assembly in correct position during placing and finishing of concrete. Space supports as directed by the Owner's Representative. Charis shall be Dayton Superior - Aztec "Castle" or OCM Cradle Chair (PCC).

2.04 ISOLATION JOINT MATERIAL

A. Filler board of selected stock. Clear, all-heart redwood weighing no more than 30 pounds per cubic foot, after being oven dried to constant weight.

B. Board filler shall be free of defects which will impair their usefulness as expansion joint fillers.

2.05 LOAD TRANSMISSION DEVICES

A. Load Transmission devices shall be as detailed on plans and conform to the properties specified in ASTM A615, Grade 60 steel.

2.06 STEEL DOWEL BARS

A. Steel dowel bars and steel reinforcement shall be deformed or smooth bars conform in properties to ASTM A 615 Grade 40. Unless otherwise shown on the plans all reinforcing steel shall be deformed bars, all dowel bars at joints shall be smooth bars, and all curb dowels shall be deformed bars.

B. Greenstreak two component speed dowel system can be used at construction joints pending engineer approval. Product submittal required for approval.

C. Greenstreak two component speed load system can be used at isolation joints pending engineer approval. Product submittal required for approval.

2.07 NONSHRINK GROUT

A. Nonmetallic, nonshrink grout containing no chloride producing agents conforming to following requirements.
   1. Compressive strength
      a. at 7 days: 3,500 psi
      b. at 28 days: 8,000 psi
   2. Initial set time: 45 minutes
   3. Final set time: 1.5 hours

2.08 LIQUID MEMBRANE-FORMING COMPOUNDS

A. Liquid membrane-forming compounds shall conform to ASTM C 309, Type 1 or Type 2, white pigmented. Membrane shall restrict loss of water to not more than 0.55 kg/m2 in 72 hours using test method ASTM C 156.

2.09 COVER MATERIALS FOR CURING

A. Polyethylene Film: Opaque pigmented white film conforming to requirements of ASTM C 171.

2.10 JOINT SEALING COMPOUND

A. Self-Leveling, Low Modulus Silicone or Polyurethane Sealant for Asphaltic Concrete and Portland Cement Concrete joints conforming to the requirements of TXDoT DMS-6310 for Class 5 Joint Sealants.

PART 3 – EXECUTION

3.01 PREPERATION

A. Verify subgrade lines and grades.

B. The subgrade shall be a previously prepared subgrade, stabilized if required, compacted to a minimum of 95% standard density ASTM D-698, and graded to the required section and grades shown on the drawings and as specified.

C. Proof-roll prepared sub-base surface below concrete pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding.

D. Rolling and sprinkling shall be performed to maintain the specified moisture content of the subgrade as necessary prior to placing the concrete.

3.02 FORMS

A. Forms shall be of wood or metal, properly treated to ensure concrete does not adhere to the forms, straight, clean, free from warp or defect, and of sufficient depth.

B. The forms shall be so placed that when placed each form section will be firmly in contact for its whole length and base width and exactly at the established grade.

C. Any subgrade under the forms below established grade shall be corrected using suitable material, placed, sprinkled, and rolled.

D. Forms shall be securely staked and tightly jointed and keyed to prevent displacement.

E. Sufficient stability of forms to support equipment operated thereon and to withstand its vibration without springing shall be required.

F. Forms shall remain in place not less than 24 hours after concrete is placed.

3.03 JOINTS

A. Shall be constructed in the pavement slab at locations and according to details as shown on the drawings. Stakes, braces, brackets or other devices shall be used as necessary to keep the entire joint assembly in true vertical and horizontal position.

B. When new Work is adjacent to existing concrete, place joints at same location as existing joints in adjacent pavement.

C. Form construction, isolation, and contraction joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.

D. Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour unless pavement terminates at isolation joints.

E. Form isolation joints of board filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.

F. Expansion Joints shall be constructed with board filler and sealed at top. Board filler must be perpendicular to plane of concrete slab. Alignment of joint shall not vary more than 1/4 inch in 10 feet.

G. Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness. If applicable, match jointing of existing adjacent concrete pavement.

H. Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to a 3/16-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces..

3.04 REINFORCING STEEL

A. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

B. Reinforcing Steel shall be accurately placed as shown on drawings and secured in place. Wire reinforcing bars securely together at intersections and splices. All bars shall be supported on and secured to steel or plastic bar chairs. Laps shall be a minimum of ten (10) inches and tied. Bars and coatings shall be free of rust, dirt or other foreign matter when concrete is placed.

C. Use sufficient number of chairs for steel reinforcement bars to maintain position of bars within allowable tolerances. Place reinforcement as shown on Drawings. In plane of steel parallel to nearest surface of concrete, bars shall not vary from plan placement by more than 1/12 of spacing between bars. In plane of steel perpendicular to nearest surface of concrete, bars shall not vary from plan placement by more than 1/4 inch.

D. Drill dowels into existing pavement, secure with epoxy, and provide paving headers as required to provide rigid pavement sections.

3.05 CONCRETE PLACEMENT

A. Concrete not placed as herein prescribed within 90 minutes after mixing shall be rejected.

B. Concrete shall not be placed when temperature is below 40 degrees F and falling, but may be placed when the temperature is above 35 degrees F and rising, the temperature being taken in the shade and away from artificial heat.

C. Concrete shall not be placed before the time of sunrise, and shall not be placed later than will permit the finishing of the pavement during sufficient natural light.

D. Moisten sub-base to provide a uniform dampened condition at time concrete is placed.

E. Deposit concrete continuously in successive batches. Distribute concrete in manner that will require as little rehandling as possible. Where hand spreading is necessary, distribute concrete with shovels or by other approved methods. Use only concrete rakes in handling concrete. At placement interruption of more than 30 minutes, place transverse construction joint at stopping point. Remove and replace sections less than 10 feet long.

F. Take special care in placing and spading concrete against forms and at longitudinal and transverse joints to prevent honeycombing. Voids in edge of finished pavement will be cause for rejection.

G. Concrete shall be consolidated by a mechanical vibrator to remove all voids. Special care shall be exercised in placing and spading concrete against forms and at all joints to prevent the forming of honeycombs and voids and to prevent displacement of steel reinforcement and load transmission devices.

H. The concrete shall be struck off with an approved strike-off screed to such elevation that when consolidated and finished, the surface of pavement shall conform to the required section and grade. In no case shall the maximum ordinate from a 10 foot straight edge to the pavement be greater than 1/8 inch.

I. The strike template shall be moved forward with a combined transverse and longitudinal motion in the direction the work is progressing, maintaining the template in contact with the forms, and maintaining a slight excess of material in front of the cutting edge.

3.06 FINISHING

A. Do not add water to concrete surfaces during finishing operations.

B. After completion of a strike-off, consolidation and transverse screeding, a hand-operated longitudinal float shall be operated to test and level the surface to the required grade. The longitudinal float shall be held in contact with the surface and parallel to the center line, and operated with short longitudinal strokes while being passed from one side of the pavement to the other. If contact with the pavement is not made at all points, additional concrete shall be placed if required, and screeded, and the float shall be used to produce a satisfactory surface.

C. Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform texture.
   1. Burlap Finish: Drag a seamless strip of damp burlap across float-finished concrete, perpendicular to line of traffic, to provide a uniform, gritty texture.
   2. Medium-to-Coarse-Textured Broom Finish: Provide a coarse finish by striating float-finished concrete surface 1/16 to 1/8 inch deep with a stiff-bristled broom, perpendicular to line of traffic.
   3. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.

3.07 TOLERANCES

A. Test entire surface before initial set and correct irregularities or undulations. Bring surface within requirements of following test and then finish.

B. Comply with tolerances of ACI 117 and as follows:
   1. Elevation: 1/4 inch.
   2. Thickness: Plus 3/8 inch, minus 1/4 inch.
   3. Surface: Gap below 10-foot long, unleveled straightedge not to exceed 1/16 inch.
   4. Joint Spacing: 3 inches.
   5. Contraction Joint Depth: Plus 1/4 inch, no minus.
   6. Joint Width: Plus 1/8 inch, no minus.

3.08 CONCRETE PROTECTION AND CURING

A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures for a period of not less than 72 hours from the beginning of the curing operation.

B. Comply with ACI 306.1 for cold-weather protection.

C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

D. Apply liquid membrane-forming compound in accordance with manufacturer's instructions.

E. Moisten concrete by water fogging prior to application of membrane when surface has become dry.

F. Seal concrete surface with single coat at rate of coverage recommended by manufacturer and directed by the Owner’s Representative, but not less than one gallon per 200 square feet of surface area.

3.09 CURBS

A. Dowelled on Curb
1. After curing the concrete pavement, doweled on curbs, using secure forms shall be constructed to the size shown on the plans.
2. Dowels may be placed in the pavement slab before the concrete has set, or placed in drilled holes using epoxy adhesive to secure the bars in place.
3. Pavement joints shall extend through the curbs. Expansion joint material shall be the same thickness, type and quality as specified for the pavement.
4. When sawed joints are provided, the placement of curb shall be delayed until all transverse joints are sawed.
5. All joints should be tool finished after sufficient curing of the concrete.
6. The concrete, reinforcement and curing of the curbs shall conform to the requirements specified for the concrete pavement.
7. In finishing the curbs, a thin coating of mortar shall be worked into the exposed face of the curb in order to obtain a brush finish free of all blemishes and form or tool marks.
8. Curbs shall have a straightness tolerance of 1/8 inch in 10 feet, measured longitudinally along the back and face of the curb.
9. The top of the curb shall not vary vertically in height more than 1/8" when measured up from the concrete pavement.

B. Monolithic Curbs and Curb and Gutter
1. Monolithic curb and curb and gutter shall conform to the specifications for doweled on curb and the details shown on the plans.
2. Monolithic curb and curb and gutter shall be constructed after final grading of the subgrade and before placement of the base material.
3. These curbs shall be cured for at least 72 hours and shall be properly backfilled behind the curb by hand tamping to 95% standard proctor density ASTM D 698 before placing the base material.

3.10 APPLICATION OF JOINT SEALING COMPOUND

A. Joints shall be thoroughly cleaned of loose scale, dirt, dust, and curing compound. When necessary, existing joint material shall be removed to the depth as shown on the plans.

B. Joints shall be filled to the full depth of the joint opening. Pouring shall be done in a neat and workman like manner to give satisfactory results. Sufficient joint sealer shall be poured into the joints so that upon the completion of the work the surface of sealer within the joint shall be 1/4" above top of the pavement surface.

3.11 FIELD QUALITY CONTROL

A. Compressive Strength Test Specimens: Make four test specimens for compressive strength test in accordance with ASTM C 31 for each 150 cubic yards or less of pavement that is placed in one day. Test two specimens at 7 days or at number of hours as directed by the Owner's Representative for high early strength concrete. Test remaining two specimens at 28 days. Test specimens in accordance with ASTM C 39. Laboratory technician will prepare concrete test cylinders.

B. When compressive test indicates failure, make yield test in accordance with ASTM C 138 for cement content per cubic yard of concrete. When cement content is found to be less than that specified per cubic yard, increase batch weights until amount of cement per cubic yard of concrete conforms to requirements.

C. Minimum of one 4 inch core will be taken at random locations per 5,000-square feet of pavement to measure in-place depth. Measure depth in accordance with ASTM C 174. Each core may be tested for 28 day compressive strength according to methods of ASTM C 42. 28 day compressive strength of each core tested shall be a minimum of 3,000 pounds per square inch.

D. Request, at option, three additional cores in vicinity of cores indicating nonconforming inplace depths at no cost to the Owner. In-place depth at these locations shall be average depth of four cores.

E. Fill cores and density test sections with new concrete paving or non-shrink grout.

3.12 REPAIRS AND PROTECTION

A. Remove and replace concrete pavement that is broken, damaged, or defective or that does not comply with requirements in this Section.

B. Protect concrete from damage.

C. The pavement shall be closed to all traffic, including vehicles of the Contractor, until the concrete is at least 7 days old or has attained a minimum average of 3,000 psi compressive strength.

D. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

E. Any damage to the pavement prior to acceptance by the Owner shall be repaired by the Contractor at no extra cost to the Owner.

END OF SECTION 32 1313

SECTION 32 1723.13
PAINTED PAVEMENT MARKINGS

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. This Section pertains to the application of pavement marking as indicated on the drawings and as specified herein.

1.02 REGULATORY REQUIREMENTS

A. Contractor shall comply with all current, applicable codes and regulations.

B. Contractor shall comply with all Standard Specifications and Details of Authorities having Jurisdiction (herein after referred to as "Standard Specifications") for work in the right-of-way or easements.

C. Prior to commencement of work, the Contractor shall be responsible for obtaining, at the Contractor's own expense, all construction permits necessary to complete the project according to the plans and specifications.

1.03 SUBMITTALS

A. Product Data: For each type of product; include technical data and tested physical and performance properties.

B. As requested by the Owner's Representative submit Shop Drawings for pavement markings.
   1. Indicate pavement markings, colors, lane separations, defined parking spaces, and dimensions to adjacent work.
   2. Indicate, with international symbol of accessibility, spaces allocated for people with disabilities.

C. As requested by the Owner's Representative submit samples for each product and for each color and texture specified; on rigid backing, 8 inches (200 mm) square.

1.04 QUALITY ASSURANCE

A. Comply with materials, workmanship, and other applicable requirements of the Harris County Engineering Specifications latest edition for pavement-marking work.

PART 2 – PRODUCTS

2.01 CONFORMANCE OF FINISHED PRODUCTS

A. Conformance of Finished Products. Coatings shall conform on a weight basis, to the composition requirements of the standard formula. No variation from the standard formula will be permitted except for replacement of materials lost in processing, or those approved by the Engineer. The finished coatings shall conform with all requirements stipulated for each standard formula and in addition shall equal a Wet Standard in characteristics such as color, drying, flow, settling, brush ability, can stability, hiding, etc.

B. Film characteristics such as gloss, hardness, light permanency, adhesion, etc., shall also conform. When testing for such conformity, the coating shall be applied and tested under parallel conditions with the Wet Standard.

C. The finished product shall be free of skins and foreign materials.

2.02 PAINTS

A. Paint for stripping shall be 100% acrylic premium grade traffic paint conforming to the requirements of FS TT-P-1952 Type 1; latest edition.

B. Colors shall be as shown on the Drawings or designated by the Owner's Representative from the following:
1. White
2. Yellow
3. Blue
4. Red
5. Black
6. Green

2.03 GLASS REFLECTIVE BEADS

A. Glass reflective beads shall conform to the requirements of FS TT-B1325 - Type 1; latest edition.

PART 3 – EXECUTION

3.01 PREPERATION

A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Owner's Representative.

B. Allow paving to age for a minimum of 30 days before starting pavement marking.

C. The pavement surface to receive the striping shall be thoroughly cleaned of all dirt, organic growth, oil, grease, or other materials that will prevent adhesion of the paint to the roadway surface.

3.02 LAYOUT

A. The pavement markings shall be placed in proper alignment with guidelines established on the roadway. Deviation from the alignment established shall not exceed 2 inches and, in addition, the deviation in alignment of the marking being placed shall not exceed 1 inch per 200 feet of roadway nor shall any deviation be abrupt.
1. No striping material shall be applied over a guide cord; only longitudinal joints, existing stripes, primer, or other approved type guides will be permitted. In the absence of a longitudinal joint or existing stripe, the Contractor shall mark the points necessary for the placing of the proposed stripe. Edge striping shall be adjusted as necessary so that the edge stripe will be parallel to the centerline and shall not be placed off the edge of the pavement.
2. Longitudinal markings shall be offset at least 2-inches from construction joints of portland cement concrete surfaces and joints and shoulder breaks of asphalt surfaces.

3.03 APLICATION

A. Paints shall be applied by brush, spray, or flow methods to clean and dry surfaces with surface temperature 50 F or above.

B. Traffic paint shall be applied with a minimum thickness of 10 mils, measured in dry condition, prior to adding any glass reflective spheres.

C. Paint striping shall be applied and measured to ± 1/4" of the specified widths.

D. Paint shall be applied as shown on drawings.

E. Where required glass spheres or reflectorized granules shall be applied, before the paint sets or dries, evenly at a rate of 6 pounds of glass spheres or 1.7 pounds of reflectorized granules per gallon of paint.

END OF SECTION 32 1723.13

SECTION 32 3113
CHAIN LINK FENCES AND GATES

PART 1 – GENERAL

1.01 DESCRIPTION

A. Work included: Provide chain link fence system where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 01 of these Specifications.

1.02 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.03 SUBMITTALS

A. Comply with pertinent provisions of Section 01 3000 – Administrative Requirements.

B. Product data: Within 15 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
   1. Materials list of items proposed to be provided under this Section;
   2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements;
   3. Shop Drawings in sufficient detail to show fabrication, installation, anchorage, and interface of the work of this Section with the work of adjacent trades;
   4. Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.
   5. Samples: Accompanying the submittal described above, submit Samples of each sealant, each backing material, each primer, and each bond breaker proposed to be used.

1.04 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01 6000 – Product Requirements.

PART 2 – PRODUCTS

2.01 DIMENSIONAL DATA

A. General:
   1. Pipe sizes indicated are commercial pipe sizes.
   2. Tube sizes indicated are nominal outside dimensions.
   3. H-section sizes indicated are normal flange dimensions.
   4. Roll-formed section sizes indicated are the nominal outside dimensions.

2.02 GALVANIZING

A. On steel framework and appurtenances, provide galvanized finish with not less than the following weight of zinc per sq. ft.
   1. Pipe: 1.8 oz, complying with ASTM A120.
   2. H-sections and square tubing: 2.0 oz, complying with ASTM A123.
   3. Hardware and accessories: Comply with Table 1 of ASTM A153.
   4. Fabric: 2.0 oz, complying with class II of ASTM A121.

2.03 FABRIC

A. Provide number 9 gage or 0.148" wires in 2" or 2-1/4" mesh (match existing), with top knuckled and bottom selvages twisted and barbed.

B. Provide fabric in one piece widths.

2.04 POSTS, RAILS, AND ASSOCIATED ITEMS

A. Where vinyl coated fabric is specified, all post, rails and associated items shall be vinyl coated to match.

B. End, corner, slope, and pull posts: Provide at least the following minimum sizes and weights:
   1. Material and dimensions:
      a. Pipe, 2.875" outside dimension, Lbs. per lin ft: 5.79
      b. Tubing, 2-1/2" square, Lbs per lin ft: 5.70
      c. Roll-formed section, 3-1/2" x 3-1/2", Lbs per lin ft: 5.14

C. Line posts: Provide minimum sizes and weights as follows:
   1. Material and dimensions:
      a. Pipe, 2.375" outside dimension, Lbs. per lin ft: 3.65
      b. H-section, 2.25" x 1.95" x 0.143", Lbs per lin ft: 10.10

D. Gate posts: Provide gate posts for supporting single gate leaf, or one leaf of a double gate installation, for nominal gate widths as follows:
   1. Material and dimension:
      a. Pipe, 4" outside dimension: Lbs. per lin ft: 9.10
      b. Tubing, 3" square:, Lbs. per lin ft: 9.10
      c. H-section, 4", Lbs. per lin ft: 14.00
         1) Over 13 feet wide, and up to 18 feet wide: Use 6.625" outside diameter pipe weighing 14.0 lbs. per lin ft.
         2) Over 18 feet wide: Use 8.625" outside diameter pipe weighing 24.70 lbs. per lin ft.

E. Top rails:
   1. Use 1.660" outside diameter pipe weighing 1.80 lbs. per lin ft; or
   2. Use 1.625" x 1.25" roll-formed sections weighing 1.35 lbs. per lin ft.
   3. Provide in manufacturer's longest lengths, with expansion type couplings approximately 6" long for each joint.
   4. Provide means for attaching top rail securely to each gate, corner, pull, slope, and end post.

F. Mid-Rails:
   1. Provide mid-rail for fences 8'-0" tall and higher, same as top rail.

G. Post brace assemblies:
   1. Provide at end and gate posts, and at both sides of corner, slope, and pull posts, with the horizontal brace located at mid-height of the fabric.
   2. Use 1.660" outside diameter pipe weighing 1.80 lbs. per lin ft for horizontal brace.
   3. Use 3/8" diameter rod with turnbuckle for diagonal truss.

H. Tension wire: Provide number 7 gage galvanized coiled spring wire at bottom of fabric.

I. Post tops:
   1. Provide steel, wrought iron, or malleable iron, designed as weathertight closure cap.
   2. Provide one cap for each post.
   3. Provide caps with openings to permit through passage of top rail.

J. Stretcher bars:
   1. Provide one-piece lengths equal to full height of fabric, with a minimum cross-section of 3/16"x 3/4".

2. Provide one stretcher bar for each gate and end post, and two for each corner, slope, and pull post, except where fabric is woven integrally into the post.

K. Stretcher bar bands:
1. Provide steel, wrought iron, or malleable iron, spaced not over 15" on centers, to secure stretcher bars to end, corner, pull, slope, and gate posts.
2. Bands may be used also with special fittings for securing rails to end, corner, pull, slope, and gate posts.

2.05 GATES

A. General:
1. Fabricate gate perimeter frames of tubular members.
2. Provide additional horizontal and vertical members to assure proper operation of the gate, and for attachment of fabric, hardware, and accessories.
3. Space so frame members are not more than 8 feet apart.
4. Fabricate gate frames from:
a. Materials and dimension:
1) Pipe 1.90" outside diameter, Lbs. per lin ft: 2.72
2) Tubing, 2" square, Lbs. per lin ft: 2.60

B. Fabrication:
1. Assemble gate frames by welding with special malleable or pressed steel fittings and rivets for rigid connections.
2. Use same fabric as used in the fence.
3. Install fabric with stretcher bars at vertical edges as a minimum.
4. Attach stretchers to gate frame at not more than 15" on centers.
5. Attach hardware with rivets or by other means which will provide security against removal and breakage.
6. Provide diagonal cross-bracing consisting of 3/8" diameter adjustable length truss rods on gates where required to provide frame rigidity without sag or twist.

C. Gate hardware: Provide following for each gate:
1. Hinges:
a. Pressed or forged steel, or malleable iron, to suit the gate size; non-lift-off type, offset to permit 180 degree opening.
b. Provide 1-1/2 pr of hinges for each leaf over 6 feet in nominal height.
2. Latches:
a. Provide forked type or plunger-bar type to permit operation from either side of the gate.
b. Provide padlock eye as integral part of latch.
3. Keeper: Provide keeper for vehicle gates, which automatically engages the gate leaf and holds it in the open position until manually released.
4. Double gates:
a. Provide gate stops for double gates consisting of mushroom or flush plate, with anchors.
b. Set in concrete to engage the center drop rod or plunger bar.
c. Provide locking device and padlock eyes as an integral part of the latch, requiring one padlock for locking both gate leaves.

D. Rolling Gates:
1. Frame shall be 1 5/8” o.d. SS20.
2. Gate Posts shall be 2 7/8” o.d.
3. Fabric shall be 9 gauge C.A.W.

4. Rolling gate assembly shall be manual operated, front wheel operated, 12” solid wheel assembly with 7” pressed steel, safety rear wheel. All wheels shall be of solid rubber. Provide gate latch and heavy duty brackets.
5. Assembly equal to Manual Rolling Gate manufactured by Merchants Metals.

2.06 MISCELLANEOUS MATERIALS AND ACCESSORIES

A. Wire ties:
1. For tying fabric to line posts, use number 9 gage wire ties spaced 12" on centers.
2. For tying fabric to rails and braces, use number 9 gage wire ties spaced 24" on centers.
3. For tying fabric to tension wire, use number ll gage hog rings spaced 24" on centers.
4. Manufacturer's standard wire ties will be acceptable if of equal strength and durability.

B. Concrete: Comply with provisions of Section 03 3000 – Cast-in-Place Concrete for 2500 psi concrete.

PART 3 – EXECUTION

3.01 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 GUARANTEE

A. The contractor shall furnish a written guarantee warranting all materials, devices, and workmanship to be free of defects for a period of one year from the date of completion and acceptance. Any defects in materials, devices, and workmanship which become apparent within the guarantee period shall be repaired or replaced by the contractor at his own expense, and at no additional cost to the Owner.

3.03 INSTALLATION

A. General:
1. Install posts at a maximum spacing of 10 feet on centers.
2. Install corner or slope posts where changes in line or grade exceed a 30 degree deflection.

B. Excavating:
1. Drill holes for post footings in firm, undisturbed or compacted soil, strictly adhering to the dimensions and spacing shown.
2. Post hole dimensions:
   a. Provide 30" deep by 8" diameter foundations for line posts for 5 foot fabric height and less.
   b. Provide 36" deep by 8" diameter foundations for line posts for fabric heights exceeding 5 feet.
   c. Provide 36" deep by 12" diameter foundations for all other posts.
3. Spread soil from excavations uniformly adjacent to the fence line, or on adjacent areas of the site if so directed.
4. When solid rock is encountered near the surface, drill into rock at least 12" for line posts and at least 18" for end, pull, gate, and corner posts. Drill hole at least 1" greater diameter than the largest dimension of the post to be placed.
5. If solid rock is below soil overburden, drill to full depth required, except penetration into rock need not exceed minimum depths specified above.

C. Setting posts:
1. Remove loose and foreign materials from sides and bottoms of holes, and moisten soil prior to placing concrete.
2. Center and align posts in holes.

3. Place concrete around posts in a continuous pour, and vibrate or tamp for consolidation.
4. Check each post for vertical and top alignment, and hold in position during placement and finishing operations.
5. Trowel tops of footings, and slope or dome to direct water away from posts.
6. Extend footings for gate posts to the underside of bottom hinge.
7. Set keeps, stops, sleeves, and other accessories into concrete as required.
8. Keep exposed concrete surfaces moist for at least seven days after placement, or cure with membrane curing material or other curing method approved by the Architect.
9. Grout-in those posts which are set into sleeved holes, concrete constructions, or rock excavations, using non-shrink Portland cement grout or other grouting material approved by the Architect.

D. Concrete strength:
1. Allow concrete to attain at least 75% of its minimum 28-day strength before rails, tension wires, and/or fabric is installed.
2. Do not, in any case, install such items in less than seven days after placement of concrete.
3. Do not stretch and tension fabric and wire, and do not hang gates, until concrete has attained its full design strength.

E. Rails and bracing:
1. Install fence with a top rail and bottom tension wire.
2. Install top rails continuously through post caps or extension arms, bending to radius for curved runs.
3. Provide expansion couplings as recommended by the fencing manufacturer.
4. Provide bracing to the midpoint of the nearest line post or posts at all end, corner, slope, pull, and gate posts.
5. Install tension wires parallel to the line of fabric by weaving through the fabric, and tying to each post with not less than number 6 gage galvanized wire, or by securing the wire to the fabric.

F. Installing fabric:
1. Leave approximately 2" between finish grade and bottom selvage.
2. Excavate high points in the ground to clear the bottom of the fence.
3. Place and compact fill to within 1" of the bottom of the fabric in depressions.
4. Pull fabric taut and tie to posts, rails, and tension wires.
5. Install fabric on outward side facing side of fence, and anchor to framework so that the fabric remains in tension after pulling force is removed.
6. Install stretcher bars by threading through or clamping to fabric on 4" centers, and secure to posts with metal bands spaced 15" on centers.

G. Installing gates:
1. Install gates plumb, level, and secure for full opening without interference.
2. Install ground-set items in concrete for anchorage in accordance with the fence manufacturer's recommendations as approved by the Architect.
3. Lubricate and adjust the hardware for smooth operation.

H. Miscellaneous:
1. Use U-shaped tie wires, conforming to diameter of pipe to which attached, clasping pipe and fabric firmly with ends twisted at least two full turns.
2. Bend ends of wire to minimize hazards to persons and clothing.
3. Fasteners:
   a. Install nuts for tension band and hardware bolts on side of fence opposite fabric side.
   b. Peen the ends of bolts to prevent removal of nuts.

4. Repair coatings damaged in the shop or field erection, using a hot-applied repair compound applied in accordance with its manufacturer's recommendations as approved by the Architect.

END OF SECTION

SECTION 32 3132
VEHICULAR GATE OPERATORS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Electric swing gate operators.

B. Electric slide gate operators

C. Sensors and controls.

1.02 RELATED SECTIONS

A. 32 3113 - Chainlink Fences and Gates

B. 32 3119 - Decorative Metal Fences and Gates

C. Division 26 – Requirements for electrical connections.

1.03 RELATED WORK

A. Parking control / gate operator systems contractor shall coordinate all work with other contractors and trades where necessary.

B. All necessary conduit, raceways and pull boxes shall be installed by the electrical contractor.

C. Installation of the vehicular swing gate operator system shall be coordinated with the installation of other parking control related systems.

1.04 REFERENCE STANDARDS

A. Underwriters Laboratories (UL): UL 325 - Standard for Safety for Door, Drapery, Gate, Louver, and Window Operators and Systems.

B. Underwriters Laboratories (UL): UL 991 - Standard for Tests for Safety Related Controls Employing Solid-State Devices.

C. American Society Testing Materials (ASTM): ASTM F2200 - Standard Specification for Automated Vehicular Gate Construction.

D. National Electrical Manufacturers Association (NEMA): NEMA ICS 6 - Industrial Control Systems: Enclosures.

1.05 SUBMITTALS

A. Submit under provisions of Section 01 3000 - Administrative Requirements.

B. Product Data: Manufacturers data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements.
   3. Installation methods.

C. Shop Drawings: Submit shop drawings showing layout, profiles, and product components, including anchorage, edge connections, and accessories.
   1. Operation, installation, and maintenance manuals including wire diagrams.
   2. Risers, layouts, and special wiring diagrams showing any changes to standard drawings.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle materials and products in strict compliance with manufacturer’s instructions and industry standards.

B. Store products indoors in manufacturer’s original containers and packaging with labels clearly identifying product name and manufacturer. Protect from damage.

1.07 QUALITY ASSURANCE

A. Installation shall comply with all applicable codes.

B. All equipment shall be new, in current production, and the standard products of a manufacturer of vehicular gate operator equipment.

C. Manufacturer shall guarantee availability of parts, for a minimum of seven (7) years from date of shipment.

D. If required, manufacturer shall be able to demonstrate features, functions and operating characteristics to the Owner.

E. System shall be installed by a factory authorized contractor, with technicians specifically trained in this system.

F. On-site maintenance and repair service shall be available locally and within four (4) hours of notification for emergency condition.

1.08 WARRANTY

A. Products shall include a factory warranty that equipment is free from defects in design, material, manufacturing and operation. Factory warranty period shall be for five (5) years parts and workmanship; 60-months from date of shipment.

B. Manufacturer shall not be responsible for improper use, handling, or installation of the product.

C. Installing contractor shall guarantee the equipment, wire and installation for 12-months from date of acceptance.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. LiftMaster: www.LiftMaster.com.

B. DoorKing, Inc.: www.doorking.com

C. Substitutions: See Section 01 6000 - Product Requirements.

2.02 SYSTEM DESCRIPTION

A. Furnish and install a complete microprocessor based vehicular gate operator system, with a solid-state board to control all functions of the swing gate operator, as described herein and shown on the plans. Include all necessary control boards, power supplies, loop detectors, connectors, and accessories for a complete operational system.

B. Swing Gate Operator:
   1. Compliant to UL 325, UL 991 and CSA C22.2 No. 247 and listed by Intertek Testing Laboratories NA, Inc. (ETL), a Nationally Recognized Testing Laboratory.
   2. Maximum Gate length:
      a. 18-feet with 1/2 HP motor.
      b. 22-feet with 1 HP motor.
   3. Maximum Gate Weight:
      a. 700 Lbs. with 1/2 HP motor.
      b. 800 Lbs. with 1 HP motor.
   4. Operator speed: 90-degrees in approximately 12-14 seconds.
   5. Frame: 1/4 inch steel plated for corrosion resistance.
   6. Enclosure: LLDPE Polyethylene .125-inch texture gray.
   7. Configuration: Left or right hand mount.
   8. Mounting:
      a. Post Mount.
      b. Pad Mount.
   9. Motor: Continuous Duty Motor.
      a. 1/2 HP
      b. 1 HP
   10. Primary Reduction: 60:1 gear reduction, single cog belt drive train.

11. Magnetic Limit Switches: No mechanical switches to set, wear out or break.

C. Slide Gate Operator:
   1. The slide gate operator shall use a microprocessor based solid-state control board that controls all functions of the slide gate operator. Operator shall be rated for continuous duty for use in residential, commercial and industrial applications.
   2. Primary reduction system shall employ an adjustable clutch and power transfer shall be provided by single cog belt drive train.
   3. Operator shall employ magnetic sensing to set open and close limit adjustment. Mechanical type limit switches shall not be allowed.
   4. Operator shall automatically set both open and close limit adjustments upon power-up and activation in the open direction. Operator shall automatically sense for any gate coasting to insure true limit settings.
   5. Pulling medium shall provide a positive mechanical connection to the gate system. Friction driven rail type pulling mediums shall not be allowed. Roller chain pulling medium shall be minimum size #40.
   6. A positive dead bolt shall activate only when the gate is forced open, to reduce solenoid lock wear and failure.
   7. Operator shall be capable of being mounted at the front, center or rear of the gate system, shall be designed for either left or right hand mount and shall be designed for pad or post mounting.
   8. Operator frame shall use 12-gauge G90 galvanized steel to avoid rusting and shall be painted charcoal gray.
   9. Operator shall have two 115 VAC convenience outlets available for accessory transformer power and shall have a built-in lockable power disconnect and reset switch.

D. Fail-Safe Operation
   1. To prioritize safety over security, operator shall assume a fail-safe mode in the event of a power loss or if an entrapment is sensed (entrapment alarm activated).
      a. Operator shall revert to a fail-safe mode allowing the gate to be pushed open without any special knowledge or use of any special cranks, keys or other devices.

E. Primary Electronic Reverse
   1. The vehicular gate operator shall be equipped with an inherent electronic obstruction sensing system. The electronic sensing system shall automatically cause the gate operator to stop and reverse if an obstruction is sensed during the open or close cycle.
   2. For enhanced safety, the control circuit shall check the obstruction sensing system circuit prior to the start of each cycle of operation. Should the control circuit detect a fault in the obstruction sensing system, the motor shall not be allowed to start.

F. Secondary Entrapment Prevention
   1. Non-contact sensors, or contact sensors, or combination thereof, shall be utilized to prevent persons from becoming entrapped in the gate system.
   2. Warning signs shall be installed in accordance with manufacturer’s installation instructions and UL 325 guidelines.

G. A complete operational system shall be provided.

2.03 EQUIPMENT

A. Model 6500 Vehicular Swing Gate Operator
   1. Magnetic lock power.
   2. Adjustable, no maintenance magnetic limits.
   3. Solid-state control circuit and motor control.
   4. Built-in reset switch.
   5. Built-in power On/Off switch.
   6. UL Class of Operation: I, II, III and IV.

7. Compliant with UL 325 and 991.
8. Dimensions: 31.63 inches high, 18.38 inches wide, 23.25 inches deep.
9. Horsepower
    a. 1/2 HP: 1000 Lb maximum gate weight, 800 Lb if convenience open option is installed. 30-ft maximum gate length, approximately 1-ft/sec gate speed.
10. Power
    a. 115 VAC

B. Model 9150 Vehicular Slide Gate Operator
1. Single cog belt drive train with adjustable clutch.
2. Automatic limit / coast magnetic adjustment system.
3. Solid-state control circuit and motor control.
4. Partial open limit feature.
5. Anti-Tailgate feature.
6. UL Class of Operation: I, II, III and IV.
7. #40 roller chain.
8. Dimensions: 24 inches high, 15 inches wide, 16.5 inches deep.
9. Horsepower
    a. 1/2 HP: 1000 Lb maximum gate weight, 800 Lb if convenience open option is installed. 30-ft maximum gate length, approximately 1-ft/sec gate speed.
10. Power
    a. 115 VAC

C. Entrapment Prevention : The type of device(s) and placement are dependant on the application and construction of the vehicular swing gate and shall be determined on-site by the vehicular gate operator system installer.
1. Non-contact sensors (photo-cells).
2. Contact sensors

D. Accessories
1. Plug-in loop detectors.
2. Thermostatically controlled heater kit.
3. Red/Green traffic signal.
4. Gate Tracker: provides time and date stamped electronic record of cycles, input errors, loop detector input errors, obstruction hits and power cycles.
5. Backup power inverter – allows system to remain operation upon loss of primary (AC) power.

E. A complete operational system shall be provided.

PART 3 - EXECUTION

3.01 EXAMINATION AND PREPARATION

A. Inspect and prepare substrates using the methods recommended by the manufacturer for achieving the best results for the substrates under project conditions.

B. Do not begin installation until substrates have been properly cleaned and prepared. Commencement of installation constitutes acceptance of conditions.

C. If preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.

3.02 INSTALLATION

A. Install in accordance with manufacturer’s installation instructions. Test for proper operation and adjust until satisfactory results are obtained.

3.03 SYSTEM INITIALIZING AND PROGRAMMING

A. System shall be turned on and adjustment made to meet requirements of specifications and on-site conditions.

B. System shall function as specified.

3.04 SYSTEM TEST PROCEDURES

A. System shall be completely tested to assure that all components and accessories are hooked-up and in working order.

B. System shall be pre-tested by contractor and certified to function in accordance with plans and specifications.

C. System shall be tested in presence of owner's representative.

3.05 OWNER INSTRUCTIONS

A. Installation contractor shall conduct up to (1) hour of instruction in use and operation of the system to designated owner representatives, within (30) days of acceptance.

B. Installation contractor shall conduct up to (1) hour of technical training, in troubleshooting and service of the system, to designated owner representatives within (90) days of system acceptance.

3.06 MANUALS AND DRAWINGS

A. Contractor shall provide owner with (2) copies of standard factory prepared operation, installation and maintenance manuals. Manuals shall include typical wiring diagrams.

B. Contractor shall provide owner with (2) copies of any risers, layouts, and special wiring diagrams showing any changes to standard drawings, if required on project.

3.07 MAINTENANCE

A. The manufacturer recommends periodic maintenance at three month intervals as described in the installation and maintenance manual.

B. External reversing devices should be checked at least once a month.

END OF SECTION

SECTION 32 9200
TURF AND GRASSES

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. This Section pertains to the establishment of vegetative cover by hydromulching or sodding as indicated on the drawings and as specified herein.

1.02 DEFINITIONS

A. Finish Grade: Elevation of finished surface of planting soil.

B. Manufactured Soil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

C. Planting Soil: Native or imported topsoil, manufactured topsoil, or surface soil modified to become topsoil; mixed with soil amendments.

D. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill immediately beneath planting soil.

E. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

1.03 REGULATORY REQUIREMENTS

A. Contractor shall comply with all current, applicable codes and regulations.

B. Contractor shall comply with all Standard Specifications and Details of Authorities having Jurisdiction (herein after referred to as "Standard Specifications") for work in the right-of-way or easements.

C. Prior to commencement of work, the Contractor shall be responsible for obtaining, at the Contractor’s own expense, all construction permits necessary to complete the project according to the plans and specifications.

1.04 SUBMITTALS

A. Submit certification from supplier that each type of seed conforms to these specifications and requirements of Texas Seed Law. Certification shall accompany seed delivery.

B. Submit certificate stating that fertilizer complies with these specifications and requirements of Texas Fertilizer Law.

C. Pesticides and Herbicides: Product label and manufacturer's application instructions specific to Project.

D. Planting Schedule: Indicating anticipated planting dates for each type of planting.

1.05 QUALITY ASSURANCE

A. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when planting is in progress.

B. Topsoil Analysis: Furnish soil analysis by a qualified soil-testing laboratory.
   1. Report suitability of topsoil for lawn growth. State-recommended quantities of nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory topsoil.

PART 2 – PRODUCTS

2.01 HYDROMULCH

A. Seed: Conform to U.S. Department of Agriculture rules and regulations of Federal Seed Act and Texas Seed Law. Seed shall be certified 90 percent pure and furnish 80 percent germination and meet following requirements:
   1. Rye: Fresh, clean, Italian rye grass seed (lollium multi-florum), mixed in labeled proportions. As tested, minimum percentages of impurities and germination must be labeled. Deliver in original unopened containers.
   2. Bermuda: Extra-fancy, treated, lawn type common bermuda (Cynodon dactylon). Deliver in original, unopened container showing weight, analysis, name of vendor, and germination test results.
   3. Wet, moldy, or otherwise damaged seed will not be accepted.
   4. Seed requirements, application rates, and planting dates are:

TYPE	APPLICATION RATE (Lb/Ac)	PLANTING DATE
Hulled Common Bermuda Grass 98/88 Unhulled Common Bermuda Grass 98/88	40 40	Jan 1 to Mar 31
Hulled Common Bermuda Grass 98/88	40	Apr 1 to Sep 30
Hulled Common Bermuda Grass 98/88 Unhulled Common Bermuda Grass 98/88 Annual Rye Grass (Gulf)	40 40 30	Oct 1 to Dec 31

B. Shall be 13-13-13 grade, pelleted, uniform on composition, free-flowing, and suitable for application with approved equipment. The fertilizer shall be delivered to the site in bags or other convenient containers, each fully labeled, conforming to the applicable state fertilizer laws, and bearing the name or trademark and warrant of the producer.

C. Wood Cellulose fiber mulch, for use with the hydraulic application of grass seed and fertilizer, shall consist of specially prepared wood cellulose fiber. It shall be processed in such a manner that it will not contain germination of growth inhibiting factors. It shall be dyed a green color to allow visual metering of its application. The wood cellulose fibers shall have the property of becoming evenly dispersed and suspended when agitated in water. When sprayed uniformly on the surface of the soil, the fibers shall form a blotter-like groundcover which readily absorbs water and allows infiltration to the underlying soil. Weight specifications from suppliers for all applications shall refer only to air dry weight of the fiber, a standard equivalent to eighteen (18%) percent moisture. The mulch material shall be supplied in packages having a gross weight not in excess of 100 pounds and be marked by the manufacturer to show the dry weight content. Suppliers shall be prepared to certify that laboratory and field testing of their product has been accomplished and that meets all of the foregoing requirements.

D. Soil Stabilizer: "Terra Tack 1" or approved equal.

E. Weed control agent: Pre-emergent herbicide for grass areas, such as "Benefin," or approved equal.

2.02 SOD

A. Species: Bermuda (Cynodon Dactylon), Buffalo (Buchloe Dactyloides), or St. Augustine (Stenotaphrum Secundatum) Gulf Coast variety to match existing sod or as indicated on the Drawings.

B. Contents: 95 percent permanent grass suitable to climate in which it is to be placed; not more than 5 percent weeds and undesirable grasses; good texture, free from obnoxious grasses, roots, stones and foreign materials.
   1. Sod shall be rejected if found to contain any amount of the following weeds:
      a. Quackgrass.
      b. Johnson grass.
      c. Poison ivy.
      d. Nimbleweed.
      e. Thistle.
      f. Bindweed.
      g. Bentgrass.
      h. Perennial sorrel.
      i. Bromegrass.

C. Size: 12 inch wide strips, uniformly 2 inches thick with clean-cut edges. Rhizome development should be apparent.

D. Sod is to be supplied and maintained in healthy condition as evidenced by grass being normal green color.

2.03 TOP DRESS FERTILIZER

A. (Delayed Application) Complete fertilizer, fifty (50%) percent of the nitrogen to the derived from natural organic sources or urea-form. Available phosphoric acid shall be from superphosphate, bond, or tankage. Potash shall be derived from muriate of potash containing sixty (60%) percent potash:
   1. 16% Nitrogen
   2. 6% Phosphoric Acid
   3. 8% Potash

PART 3 – EXECUTION

3.01 PREPERATION

A. Verify that grades are within 1-inch plus or minus the required finished grades. Verify that all soil preparation has been completed and approved. Report all variations in writing.

B. Stones, Weeds, Debris: Verify that all areas to receive lawns and grasses are clear of stones larger than 1/2 inch in diameter, weeds, debris, and other extraneous materials.

C. Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

D. Before planting, restore areas if eroded or otherwise disturbed after finish grading.

E. Contractor shall obtain approval of hydromulch area preparation from the Owner's Representative prior to beginning turf establishment.

3.02 SODDING

A. Sod Bed Preparation:
   1. Rolling: Roll amended soil with 200 pound water-ballast roller.
   2. Moistening Soil Surface: After all unevenness in the soil surface has been corrected, lightly moisten the soil immediately prior to laying the sod.
   3. Timing: Sod immediately thereafter, provided the sod bed has remained in friable condition.

B. Sodding Operations :
   1. Big roll sod shall be installed by tractors with proper flotation tires of by an approved big roll sod installation machine. Care should be taken to roll out sod at a proper speed so that no humping or tearing of sod occurs. Sod will be manually pulled together by stiff rakes to insure no gaps remain in the seams. Joints should be staggered. Damaged or problem areas shall be cut out and replaced in a professional matter.
   2. Starter Strip:
      a. Lay first row of sod in a straight line, with subsequent rows parallel to and tightly against each other.
      b. Stagger lateral joints.
      c. Do not stretch or overlap sod.
      d. Butt all joints tightly to eliminate all voids.
   3. Cutting: Use a sharp knife to cut sod to fit curves, surface components of the irrigation system or other items.
   4. Tamping and Rolling: Thoroughly tamp and roll sod to make contact with sod bed. Roll each entire section of completed sod.
   5. Watering: Thoroughly water sod immediately after installation to wet the underside of the new sod pad and the soil immediately below to a depth of 6 inches. Maintain constant moisture for 2 weeks or until sod is fully rooted.
   6. Top-Dress Fertilizer: Apply at the rate of (6) to (8) pounds per 1,000 square feet at 25 days and at 50 days after sodding.

3.03 HYDROMULCH SEEDING

A. Operators of hydromulching equipment shall be thoroughly experienced in this type of application. Apply specified slurry mix in a motion to form a uniform mat at specified rate.

B. Mixing: Care shall be taken that the slurry preparation should be accomplished per the material supplier's recommendations and the equipment manufacturer's written operations manual. Spraying shall commence immediately when the slurry is mixed and the tank is full. The operator shall spray the area with a uniform, visible coat by using the green color of the wood pulp as a guide.

C. Keep hydromulch within areas designated and keep from contact with other plant material.

D. Slurry mixture which has not been applied within four (4) hours of mixing shall not be used and shall be removed from the site.

E. After application, the Contractor shall not operate any equipment over the covered area.

F. Immediately after application, thoroughly wash off any plant material, planting areas, or paved areas not intended to receive slurry mix. Keep all paved and planting areas clean during maintenance operations.

G. Refer also to the maintenance portion of this section.

H. All areas designed on drawings shall be covered uniformly with specified materials using hydromulching processes. If surfaces remain uncovered within the designated area, the Contractor shall seed with required grasses or ground cover materials those areas missed by the hydromulch application. Method used to seed these missed surfaces shall be an alternate seeding operation approved by the Architect/Engineer/Owner's Representative and shall be accomplished at no additional cost to the Owner.

3.04 MAINTENANCE

A. The Contractor shall provide full maintenance by skilled employees of the landscape installer to maintain and establish lawn by watering, fertilizing, weeding, mowing, trimming, replanting, and other operations. Roll, re-grade, and replant bare or eroded areas and re-mulch to produce a uniformly smooth lawn. Provide materials and installation the same as those used in the original installation.

B. Begin maintenance immediately after each area is planted and continue until acceptable lawn is established, but for not less than the following periods:
   1. Seeded Lawns: 90 days from date of planting completion.
   2. For areas seeded in fall or if lawn is not fully established, continue maintenance following spring until acceptable lawn is established.
   3. Sodded Lawns: 30 days from date of planting completion.

C. Repair areas damaged by erosion by regrading, rolling and replanting.

D. Reseed small, sparse grass areas. When sparse areas exceed 20 percent of planted area, reseed by hydromulch.

E. Mow lawn as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 1/3 of grass height. Remove no more than 1/3 of grass-leaf growth in initial or subsequent mowing.

3.05 WARRANTY

A. Time Period: Warrant that lawns are in healthy and flourishing condition of vigorous active growth one year from date of Final Acceptance.

B. Appearance During Warranty: Lawns shall be free of dead or dying patches, and all areas shall show foliage of a normal density, size and color.

C. Delays: Delays caused by the Contractor in completing planting operations which extend the planting into more than one planting season shall extend the Warranty Period correspondingly.

D. Exceptions: Contractor shall not be held responsible for failures due to neglect by Owner, vandalism, or Acts of God during Warranty Period. Report such conditions in writing.

3.06 FINAL ACCEPTANCE

A. Work under this Section will be accepted by the Owner's Representative upon satisfactory completion of all work, but exclusive of re-application under the Guarantee Period. Final Acceptance of lawn establishment shall be as follows:
   1. For Seed: Ninety Five (95%) percent uniform coverage of grass in excess of one (1") inch height. No bare spots of greater than two (2) square feet will be accepted.
   2. For Sod: At end of maintenance period, a healthy, well-rooted, even-colored, viable lawn has been established, free of weeds, open joints, bare areas, and surface irregularities.

B. The Owner's Representative shall interpret the above. Upon Final Acceptance, the Owner will assume the responsibility for maintenance of the work.

END OF SECTION 32 9200

SECTION 33 1000
WATER DISTRIBUTION

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. This Section specifies the requirements for furnishing and installing water lines, laterals, stubs, and appurtenances for both potable and non-potable water distribution systems. The pipe shall be of the size, type and location, and to the lines, grades and elevations shown on the plans and constructed in accordance with these specifications.

1.02 DEFINITIONS

A. PVC: Polyvinyl chloride plastic.

1.03 REGULATORY REQUIREMENTS

A. Contractor shall comply with all Standard Specifications and Details of Authorities having Jurisdiction (herein after referred to as "Standard Specifications") for work in the right-of-way or easements.

B. Prior to commencement of work, the Contractor shall be responsible for obtaining, at the Contractor's own expense, all construction permits necessary to complete the project according to the plans and specifications.

C. Regulatory Requirements for potable water systems:
   1. Contractor shall comply with requirements of utility company supplying water; including tapping of water mains and backflow prevention.
   2. Contractor shall comply with standards of authorities having jurisdiction for potable water service piping, including materials, installation, testing, and disinfection.

D. Regulatory Requirements for Non-potable water systems:
   1. The system shall be comprised of purple components. Use purple colored pipe, Pantone 522 embossed or integrally stamped/marked in English and in Spanish "CAUTION RECLAIMED WATER DO NOT DRINK" and "AGUA DE RECUPERACIÓN - NO BEBER".
   2. A minimum of an eight inch by eight-inch sign, in English and Spanish, is prominently posted on/in the area that reads "Reclaimed Water – Do not drink" and "AGUA DE RECUPERACIÓN - NO BEBER" on the storage tank of such non-potable system if within the construction site.
   3. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.

1.04 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Coordination Drawings: For piping and specialties including relation to other services in same area, drawn to scale. Show piping and specialty sizes and valves, meter and specialty locations, and elevations.

C. Field quality-control test reports.

1.05 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Comply with ASTM F 645 for selection, design, and installation of thermoplastic water piping.

C. Comply with FMG's "Approval Guide" or UL's "Fire Protection Equipment Directory" for fire-service-main products.

D. NFPA Compliance: Comply with NFPA 24 for materials, installations, tests, flushing, and valve and hydrant supervision for fire-service-main piping for fire suppression.

E. NSF Compliance:
1. Comply with NSF 14 for plastic potable-water-service piping.[Include marking "NSF-pw" on piping.]
2. Comply with NSF 61 Annex G for materials for water-service piping and specialties for domestic water.

PART 2 – PRODUCTS

2.01 PVC PIPE

A. Provide self-extinguishing PVC pipe that bears Underwriters' Laboratories mark of approval and is acceptable without penalty to Texas State Fire Insurance Committee for use in fire protection lines.

B. Bear National Sanitation Foundation Seal of Approval (NSF-PW).

C. Pipe 3-inch diameter and less: PVC I.P.S. ASTM D2241, SDR 26; SDR 21 as alternate to offset pipe sections or for construction within 9 feet of any existing or proposed sanitary sewer; nominal 20-foot lengths; cast-iron equivalent outside diameters.

D. Pipe 4-inch through 12-inch: AWWA C 900, DR 18; DR 14 as alternate to offset pipe sections or for construction within 9 feet of any existing or proposed sanitary sewer; nominal 20-foot lengths; cast-iron equivalent outside diameters.

E. Pipe 14-inch through 20-inch: AWWA C 905; 235 psi; DR 18; nominal 20-foot lengths; cast iron equivalent outside diameter.

F. Gaskets:
1. Gaskets shall meet requirements of ASTM F 477. Use elastomeric factory-installed gaskets to make joints flexible and watertight.
2. Flat Face Mating Flange: Full faces 1/8-inch-thick ethylene propylene (EPR) rubber.
3. Raised Face Mating Flange: Flat ring 1/8-inch ethylene propylene (EDR) rubber, with filler gasket between OD of raised face and flange OD to protect flange from bolting moment.

G. Do not use PVC in potentially or known contaminated areas.

H. Do not use PVC in areas exposed to direct sunlight.

I. Make curves and bends by bending the pipe, do not exceed maximum limits of curvature recommended by pipe manufacturer. Submit details of other methods of providing curves and bends for review by the Owner’s Representative

2.02 DUCTILE IRON PIPE

A. Ductile iron pipe shall conform to AWWA C115, C150 and C151 and bear mark of Underwriters' Laboratories approval. Unless otherwise shown on Drawings, use minimum Pressure Class 250 for water lines or thickness Class 52 for water lines in casing or augured hole. Provide minimum Pressure Class 350 for flanged pipe.

B. Provide standard outside coating with cement mortar lining to AWWA C 104 standards.

C. Provide pipe sections in standard lengths, not less than 18 feet long, except for special fittings and closure sections as indicated on shop drawings.

D. Provide flange adapter with insulating kit as required when connecting new piping to existing piping and piping of different materials, unless otherwise approved by the Owner's Representative.

E. No welding will be permitted on Ductile Iron Pipe except at restrained joint spigots. No field welding is allowed.

F. Gaskets
   1. Furnish, when no contaminant is identified, plain rubber (SBR) gasket material in accordance with ANSI A21.11 or ASTM F 477 (One Bolt only); for flanged joints 1/8-inch-thick gasket in accordance with ANSI A 21.15.
   2. For Pipes to be installed in contaminated areas, use gaskets as recommended by the Pipe Manufacturer, and approved by the Owner's Representative prior to installation.

G. All ductile iron pipe and fittings shall be wrapped with polyethylene per AWWA C 105.

2.03 JOINTS

A. Joint Types: ANSI A 21.11 push-on; ANSI A 21.11 mechanical joint; or ANSI A 21.16 flanged end. Provide push-on restrained joints unless otherwise indicated on the Drawings or required by these specifications. For bolted joints, conform to requirements of AWWA C111; provide minimum 304 stainless steel for restraint joints.

B. Where required by Drawings, provide approved restrained joints for buried service.

C. Threaded or grooved-type joints which reduce pipe wall thickness below minimum required are not acceptable.

D. Provide for restrained joints designed to meet test pressures required under 3.8 of this Section. Provide restrained joints for test pressure or maximum surge pressure as specified, whichever is greater for water lines. Do not use passive resistance of soil in determining minimum restraint lengths.

2.04 FITTINGS

A. Use fittings of same size as pipe. Reducers are not permitted to facilitate an off-size fitting. Reducing bushings are also prohibited. Make reductions in piping size by reducing fittings. Line and coat fittings as specified for pipe they connect to.

B. Fittings shall conform to AWWA C 153, latest edition, pressure rated at 250 psi and shall be fusion bonded epoxy lined or cement mortar lined. Unless otherwise noted on the drawings or required by the authority having jurisdiction provide mechanical joint fittings.

C. Mechanical Joint Fittings: ANSI A 21.11; pressure rated at 250 psi.

D. Push-on Fittings: ANSI A 21.10; ductile iron ANSI A 21.11 joints, gaskets, and lubricants; pressure rated at 250 psi.

2.05 GATE VALVES

A. Gate Valves 2 inches in diameter: Iron body resilient-seated, non-rising stem, 150-pound test, 2-inch square nut operating clockwise to open.

B. Gate Valves 3 inches to 12 inches in diameter: Non-directional, standard-wall resilient seated (AWWA C 509), 200 psi pressure rating, bronze mounting, mechanical joint ends with rubber joint rings, and nut-operated unless otherwise specified.

C. Gate valves 14 inch and larger in Diameter: AWWA C 500; parallel seat double disc gate valves; mechanical joint ends with rubber rings and nut-operated unless otherwise specified. Provide approved double disc valves with 150 psi pressure rating.

D. Gate Valves Extension Stem: Provide non-rising, extension stem having coupling sufficient to attach securely to operating nut of valve. Upper end of extension stem shall terminate in square wrench nut no deeper than 4 feet from finished grade or as shown on Drawings. Support extension stem with an arm attached to wall of manhole or structure that loosely holds extension stem and allows rotation in the axial direction only.

E. Gate Valves in Factory Mutual (Fire Service) Type Meter Installations: Conform to provisions of this specification; outside screw and yoke valves; carry label of Underwriters' Laboratories, Inc.; flanged, Class 125; clockwise to close.

F. The operating nut shall be 2-inch square and shall have an arrow, cast in the metal, indicating the counter-clockwise direction of opening.

G. Gate Valves for Tapping Steel Pipe: Provide double disc gate valve. Resilient wedge gate valve shall only be installed in a vertical position.

H. Provide flanged joints when valve is connected to steel or PCCP.

I. Key valve stem into the operator nut.

J. Unless otherwise specified, all gate valves shall be installed complete with valve box.

K. Do not exceed 600 ft-lbs of torque on operator nut on gate valve.

2.06 TAPPING SLEEVES AND VALVES

A. Tapping Sleeves:
   1. Tapping Sleeve Bodies: AWWA C 110 cast or ductile iron or AWWA C 200 carbon steel in two sections to be bolted together with high-strength, corrosion-resistant, low-alloy steel bolts with mechanical joint ends.
   2. Branch Outlet of Tapping Sleeve:
   3. Flanged, machined recess, AWWA C 207, Class D, ANSI 150 pound drilling.
   4. Gasket: Affixed around recess of tap opening to prevent rolling or binding during installation.
   5. Use cast iron split sleeve where fire service from 6-inch water line is approved.

B. Tapping Valves: Meet requirements of 2.05 above with the following exceptions:
   1. Inlet Flanges:

2. AWWA C 110; Class 125.
3. AWWA C 110; Class 150 and higher: Minimum 8-hole flange.
4. Outlet: Standard mechanical or push-on joint to fit any standard tapping machine.
5. Valve Seat Opening: Accommodate full-size shell cutter for nominal size tap without contact with valve body; double disc.

2.07 VALVE BOXES

A. Provide approved Type A, cast-iron/ductile-iron, slide-type, valve boxes. Design of valve box shall minimize stresses on valve imposed by loads on box lid.

B. Cast letter “W” into lid, 1/2 inch in height and raised 3/32 inch, for valves serving potable water lines.

C. Unless otherwise specified, uncoated cast iron.

D. Riser Pipe.
1. Provide 6-inch PVC, DR 18, riser pipes in accordance with 2.01 above.
2. 6-inch ductile-iron, thickness Class 51 riser pipes in accordance with 2.02 above.
3. Provide single section of pipe.

E. Concrete for valve box placement:
1. For locations in new concrete pavement, provide strength and mix design of new pavement.
2. For other locations, provide concrete for sidewalks conforming to requirements of Section 32 1313 Concrete Paving.

2.08 FIRE HYDRANTS

A. Fire hydrants shall be Mueller Super Centurion or an approved equivalent.

B. Each hydrant shall be factory tested to a hydrostatic pressure of 300 psi with valve in both the open and closed positions. The direction of opening nut shall be counterclockwise and shall be cast on the head of the hydrant. Hose nozzles shall be bronze or non-corrosive metal and threads shall be national standard. The main valve opening shall be either five and one fourth (5 1/4) inches in diameter or six and one fourth caps shall be provided with gaskets. Bury length shall be three and one half (3 1/2) feet unless otherwise noted on the plans. Hydrants shall be provided with "dry top" which prevents stem threads from contacting water, and "break off" type barrel and stem.

C. Hydrants shall be painted with shop coating in accordance with AWWA C502 specification. Final coats of paint will be applied by Contractor in accordance with the requirements of the authority having jurisdiction.

D. Contractor shall verify and provide nozzle threads consistent with the requirements of the authority having jurisdiction.

2.09 MANUFACTURERS

A. Use approved American manufacturers.

PART 3 – EXECUTION

3.01 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage and displacement.

B. Verify all existing utilities prior to beginning construction. Inform the Owner's Representative if existing utilities are not as shown in the plans.

C. Water service to the site or adjacent landowners shall not be shut down without prior approval of the Owner's Representative and the authority having jurisdiction. At no additional cost to the Owner the Contractor shall install necessary valves so as not to disrupt service outside limits of water lines to be lowered/relocated whether or not indicated on the plans.

D. Confirm that nine feet minimum separation from gravity sanitary sewers and manholes or separation of four feet minimum from force mains in all directions. Where above clearances cannot be attained, provide protection per the requirements of the drawings and obtain additional instructions as required from the Owner's Representative before proceeding with construction.

3.02 GENERAL

A. Unless otherwise specified, the provisions of this section shall conform to AWWA C600 and C605, latest editions.

B.

3.03 CLEANING AND INSPECTION

A. Cleaning: Thoroughly clean and dry interior of pipe and fittings of foreign matter before installation, and keep interior clean until Work has been accepted. Keep joint contact surfaces clean until jointing is completed. Do not place debris, tools, clothing or other materials in pipe. After pipe laying and joining operations are completed, clean inside of pipe and remove debris. The interior of the pipe shall be kept clean throughout the duration of the work.

B. Inspection: Before installation, inspect each pipe and fitting for defects. Reject defective, damaged or unsound pipe and fittings and remove them from site.

3.04 EARTHWORK

A. Conform to applicable provisions of Section 31 2333 Trenching, Backfilling and Compaction.

B. Backfill excavated areas in same day excavated. When not possible, cover excavated areas using steel plates on paved areas and other protective measures elsewhere.

C. Place material in uniform layers of prescribed maximum loose thickness and wet or dry material to approximately optimum moisture content. Compact to prescribed density Water tamping is not allowed.

D. When trenches exceed five feet in depth Contractor shall utilize trench safety measures per Section 31 4133 Trench Safety.

3.05 PIPE CUTTING

A. Cut pipe 12 inches and smaller with standard wheel pipe cutters. Cut pipe larger than 12 inches in manner approved by the Owner's Representative. Make cuts smooth and at right angles to axis of pipe. Bevel plain end with heavy file or grinder to remove sharp edges.

3.06 LOWERING/RELOCATING EXISTING WATER LINES

A. Water lines to be lowered/relocated shall not be shut down without prior approval of the local governing agency.

B. Whether or not indicated on the plans, any existing water lines that are in conflict with proposed utilities shall be the lowered/relocated as necessary to facilitate construction, at no additional cost to the Owner.

C. Contractor shall install necessary valves so as not to disrupt service outside limits of water lines to be lowered/relocated whether or not indicated on the plans.

D. Whether or not indicated on the plans, the lowered/relocated water line shall have minimum of four (4) feet of cover. Location shall be a minimum distance from existing location as necessary to facilitate construction.

E. If the lowered/relocated water lines are of potable water systems, they shall be required to meet same hydrostatic and sterilization test results as new water lines.

F. Installation of lowered/relocated water lines shall meet the same requirements of new water lines as in paragraph 3.07 below.

3.07 PIPING INSTALLATION

A. General Requirements:
   1. Lay pipe in subgrade free of water.
   2. Make adjustments of pipe to line and grade by scraping away subgrade or filling in with granular material.
   3. For potable water line installation, when a water line is being installed parallel to a sanitary sewer, a horizontal distance of separation of nine (9) feet (outside to outside) must be maintained.
   4. A minimum clearance of 12" must be maintained between water lines and all other utility lines.
   5. For potable water line installation, when a water line is to be installed such that it will cross over an existing or proposed sanitary sewer, a section of pipe at least 18' long of either ductile iron or PVC pipe C-900 DR-18 shall be installed such that it will be centered over the sanitary sewer. Water lines shall in no case be installed below a sanitary sewer.
   6. Properly form bedding to fully support bell without wedging or blocking up bell.
   7. Open Cut Construction: Keep pipe trenches free of water which might impair pipe laying operations. Grade trench to provide uniform support along bottom of pipe. Excavate for bell holes after bottom has been graded and in advance of placing pipe. Lay not more than 500 feet of pipe in trench ahead of backfilling operations. Cover or backfill laid pipe if pipe laying operations are interrupted and during non-working hours. Place backfill carefully and simultaneously on each side of pipe to avoid lateral displacement of pipe and damage to joints. If adjustment of pipe is required after it has been laid, remove and re-lay as new pipe.

B. Protection of Pipeline: Securely place stoppers or bulkheads in openings and in end of line when construction is stopped temporarily and at end of each day's work.

C. For tie-ins to existing water lines, provide necessary material on hand to facilitate connection prior to connecting to or shutting down existing water line. Provide the authority having jurisdiction and the Owner’s Representative a minimum of two weeks notice prior to connecting to or shutting down existing water line.

D. Make curves and bends as recommended by manufacturer and approved by the Owner's Representative.

E. Deflection of pipe joints shall not exceed maximum deflection recommended by pipe manufacturer.

F. When rubber gasketed pipe is laid on curve, join pipe in straight alignment and then deflect to curved alignment.

G. Every valve, including bypass valves, shall be provided with a valve box. The valve box shall not transmit shock or stress to the valve and shall be centered and plumb over the operating nut, with the cover flush with the pavement surface or such other level as directed.

H. Hydrants shall be located as shown on the Plans and in a manner that will provide complete accessibility and will prevent damage from vehicles. All hydrants shall stand plumb and shall have their pumper connections at right angles to the street.

I. Minimum cover on water lines shall be 48 inches unless otherwise specified, but in no case shall the top of any water line be less than 24 inches below the finished ground surface.

3.08 JOINTS AND JOINTING

A. Rubber Gasketed Bell-and-Spigot Joints:
   1. After rubber gasket is placed in spigot groove of pipe, equalize rubber gasket cross section by inserting tool or bar recommended by manufacturer under rubber gasket and moving it around periphery of pipe spigot.
   2. Lubricate gaskets with nontoxic water-soluble lubricant before pipe units are joined.
   3. Fit pipe units together in manner to avoid twisting or otherwise displacing or damaging rubber gasket.
   4. After pipe sections are joined, check gaskets to ensure that no displacement of gasket has occurred. If displacement has occurred, remove pipe section and remake joint as for new pipe. Remove old gasket, inspect for damage and replace if necessary before remaking joint.
   5. Use restrained joints as shown on Drawings.
      a. Include buoyancy conditions for soil unit weight when computing thrust restraint calculations.
      b. Do not include passive resistance of soil in thrust restraint calculations.
   6. Except for PVC pipe, provide means to prevent full engagement of spigot into bell as shown on Drawings. Means may consist of wedges or other types of stops as approved by the Owner's Representative.

B. Restrained Joints
   1. Installation.
      a. Install restrained joints mechanism in accordance with manufacturer's recommendations.
      b. Examine and clean mechanism; remove dirt, debris and other foreign material.
      c. Apply gasket and joint NSF 61 FDA food grade approved lubricant.
      d. Verify gasket is evenly seated.
      e. Do not over stab pipe into mechanism.
   2. Prevent any lateral movement of thrust restraints throughout pressure testing and operation.

C. All bends, tees, valves, and plugs shall have thrust blocks installed in accordance with the details on the plans. Thrust blocking will be installed such that joints will be accessible for inspection and repair. Concrete used in thrust blocking shall have a compressive strength of at least 3,000 psi and conform to the requirements of Section 32 1313 Concrete Paving.

3.09 HYDROSTATIC TESTING OF WATER LINES

A. After the pipe has been laid and initial backfill completed, the water line shall be subjected to a hydrostatic test per AWWA C600 or AWWA C605 at a minimum pressure of 150 psi. Joints shall remain exposed during testing whenever possible.

B. The Contractor shall furnish, install, and operate, at his expense, the necessary connections, pumps, meters, and gauges necessary to conduct the test. The meters used in the testing shall be tested, sealed and approved at the Contractor's expense prior to running any test.

C. Procedure
1. Where practicable, pipelines shall be tested in lengths between valves or plugs of no more than 1,500 feet. Contractor must have written approval for test sections greater than 1,500 feet.
2. Minimum duration of testing for each section shall be 2 hours when joints are exposed and 8 hours when joints are covered.
3. Allowable leakage shall be as calculated by the following formula:
   $L=(S)(D)(P^{.05})/133,200$
   L= Allowable leakage in gallons per hour
   S=Length of Pipe in Feet
   D=Inside diameter of pipe in inches
   P=Pressure in pounds per square inch
4. Correct defects, cracks, or leakage by replacement of defective items. All visible leaks at exposed joints and all leaks evident on the surface where joints are covered shall be replaced, regardless of total leakage shown.
5. Repeat test until satisfactory results are obtained.
6. Upon satisfactory completion of testing, remove risers remaining from disinfection and hydrostatic testing, and backfill excavation promptly.

3.10 DISINFECTION OF WATER LINES

A. Promptly disinfect water lines after approved completion of the hydrostatic tests.

B. Contractor shall pay for and provide water for disinfection and flushing.

C. Contractor will conduct disinfection operations.

D. Coordinate chlorination operations with the authority having jurisdiction and the Owner’s Representative.

E. Provide temporary blind flanges, cast-iron sleeves, plugs, necessary service taps, copper service leads, risers and jumpers of sizes, location and materials, and other items needed to facilitate disinfection of new water lines prior to connection to the existing water distribution system. Normally, each valved section of water line requires two each 3/4-inch taps. A 2-inch minimum blow-off is required for water lines up to and including 6-inch diameter.

F. Use fire hydrants as blow-offs to flush newly constructed water lines 6 inch diameters and above. Where fire hydrants are not available on water lines, install temporary blow-off valves as approved by the Owner’s Representative and remove promptly upon successful completion of disinfection and testing.

G. Slowly fill each section of pipe with water in manner approved by Owner’s Representative. Average water velocity when filling pipeline should be less than one foot per second and shall not,

under any circumstance, exceed 2 feet per second. Before beginning disinfection operations, expel air from pipeline.

H. Backfill excavations immediately after installation of risers or blow-offs.

I. Install blow-off valves at end of water line to facilitate flushing of dead-end water lines. Install permanent blow-off valves according to drawings.

J. Procedure
   1. Use not less than 100 parts of chlorine per million parts of water.
   2. Introduce chlorinating material to water lines in accordance with AWWA C 651.
   3. After contact period of not less than 24 hours, flush system with clean water until residual chlorine is no greater than 1.0 parts per million parts of water.
   4. Open and close valves in lines being sterilized several times during contact period.
   5. After disinfection and flushing of water lines, the Contractor shall have bacteriological tests performed by an approved testing laboratory. When test results indicate need for additional disinfection of water lines based upon Texas Commission on Environmental Quality and/or Texas Department of Health requirements, provide additional disinfection operations.
   6. Upon satisfactory completion of testing, remove temporary risers remaining disinfection and hydrostatic testing, and backfill excavation promptly.

END OF SECTION 33 1000

SECTION 33 3000
SANITARY SEWER

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. This Section specifies the requirements for furnishing and placing sanitary sewer pipe, laterals, stubs, and appurtenances. The pipe shall be of the size, type and location, and to the lines, grades and elevations shown on the plans and constructed in accordance with these specifications.

1.02 DEFINITIONS

A. PVC: Polyvinyl chloride plastic.

1.03 REGULATORY REQUIREMENTS

A. Contractor shall comply with all current, applicable codes and regulations.
   1. Contractor shall comply with requirements of utility company receiving waste water. Include tapping of existing structures or service lines.
   2. Contractor shall comply with standards of authorities having jurisdiction for sanitary sewer piping, including materials, installation and testing.

B. Contractor shall comply with all Standard Specifications and Details of Authorities having Jurisdiction (herein after referred to as "Standard Specifications") for work in the right-of-way or easements.

C. Install sewer lines to meet minimum separation distance from potable water line, as shown in the drawings. Separation distance is defined as distance between outside of water pipe and outside of sewer pipe. When possible, install new sanitary sewers no closer to water lines than 9 feet in all directions. Where this separation distance cannot be achieved, new sanitary sewers shall be installed as shown in the drawings.

D. Prior to commencement of work, the Contractor shall be responsible for obtaining, at the Contractor’s own expense, all construction permits necessary to complete the project according to the plans and specifications.

1.04 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Coordination Drawings: For piping and specialties including relation to other services in same area, drawn to scale. Show piping and specialty sizes and valves, meter and specialty locations, and elevations.

C. Field quality-control test reports.

1.05 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Contractor is responsible for protecting materials per manufactures recommendations
   1. Do not store plastic manholes, pipe, and fittings in direct sunlight.
   2. Protect pipe, pipe fittings, and seals from dirt and damage.

3. Handle precast structures according to manufacturer's written rigging instructions.

C. Install sanitary sewer that is watertight both in pipe-to-pipe joints and in pipe to-manhole connections.

PART 2 – PRODUCTS

2.01 PVC PIPE

A. PVC pipe for gravity sanitary sewers shall conform to ASTM D3034, SDR 26. All diameters shall use bell and spigot ends for gasketed joints. For sewers up to 12” diameter crossing over or under waterlines, provide minimum 150 psi pressure-rated pipe conforming to ASTM D2241 with suitable PVC couplings.

B. PVC pipe for sanitary sewer force mains shall conform to ASTM D2241, SDR 21 or AWWA C 900, DR 18 and provide a minimum pressure rating of 150 psi. Pipe shall be green in color.

C. Gaskets shall meet requirements of ASTM F 477. Use elastomeric factory-installed gaskets to make joints flexible and watertight.

D. Do not use PVC in potentially or known contaminated areas.

E. Do not use PVC in areas exposed to direct sunlight.

F. Make curves and bends by bending the pipe, do not exceed maximum limits of curvature recommended by pipe manufacturer. Submit details of other methods of providing curves and bends for review by the Owner’s Representative.

2.02 DUCTILE IRON PIPE

A. Ductile iron pipe for gravity sanitary sewers shall conform to ASTM A746, thickness Class 50, pressure rated for 150 PSI unless otherwise indicated on the plans. Pipe shall be lined with 20 mils of epoxy extending from plain or beveled end to rear of gasket socket. The exterior of the pipe shall have a bituminous coating approximately one mil in thickness.

B. Ductile iron pipe for sanitary sewer force mains shall conform to ASTM C151, thickness Class 50, pressure rated for 150 PSI. Pipe shall be lined with 20 mils of epoxy extending from plain or beveled end to rear of gasket socket. The exterior of the pipe shall have a bituminous coating approximately one mil in thickness.

C. Gaskets shall conform to AWWA C111, rubber.

D. All ductile iron pipe and fittings shall be wrapped with polyethylene per AWWA C 105.

2.03 JOINTS

A. PVC pipe joints shall conform to ASTM D3212 with a SDR matching the pipe.

B. Ductile iron pipe joints shall be push-on type unless otherwise indicated on the plans.

2.04 MANHOLES

A. Precast concrete manholes in accordance with the details shown on the Drawings shall conform to ASTM C-478.

B. Cast-in-Place-Concrete Manholes: Construct of reinforced-concrete bottom, walls, and top; designed according to ASTM C 890 for A-16 (ASSHTO HS20-44), heavy-traffic, structural loading; of depth, shape, dimensions, and appurtenances indicated. The minimum compressive strength of concrete manhole shall be 4,000 psi.

C. Ballast: Increase thickness of concrete as required to prevent flotation.

D. Resilient Pipe Connectors: ASTM C 923 cast or fitted into manhole walls, for each pipe connection.

E. Adjusting Rings: Interlocking rings with level or sloped edge in thickness and diameter matching manhole frame and cover. Include sealant recommended by ring manufacturer.

F. Grade Rings: Reinforced-concrete rings, 6- to 9-inch total thickness, to match diameter of manhole frame and cover.

G. All manholes shall have stainless steel manhole inserts (inflow preventers).

2.05 MORTAR

A. Mortar for construction of the bench and invert in all manholes shall conform to ASTM C 476.

2.06 CLEANOUTS

A. Cleanouts in accordance with the details shown on the Drawings shall consist of PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.

2.07 RIMS, GRATES AND FRAMES

A. Castings for manhole rims, covers and frames shall conform to ASTM A 48, Class 35B gray iron or better quality.

2.08 FITTINGS

A. Fittings shall be mechanical joint conforming to AWWA C153 lined with 20 mils of epoxy extending from plain or beveled end to rear of gasket socket. The exterior of the fitting shall have a bituminous coating approximately one mil in thickness.

B. Gaskets shall conform to AWWA C111, rubber.

C. All ductile iron fittings shall be wrapped with polyethylene per AWWA C 105.

2.09 MANUFACTURERS

A. Use approved American manufacturers.

PART 3 – EXECUTION

3.01 PREPERATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage and displacement.

B. Verify all existing utilities prior to beginning construction. Inform the Owner's Representative if existing utilities are not as shown in the plans.

C. Perform work in accordance with OSHA standards.

D. Sewer service to the site or adjacent landowners shall not be shut down without prior approval of the Owner's Representative and the authority having jurisdiction. At no additional cost to the Owner the Contractor shall install necessary piping and accessories so as not to disrupt service outside to other facilities or landowners whether or not indicated on the plans.

E. Confirm that nine feet minimum separation from water lines and accessories. Where above clearances cannot be attained, provide protection per the requirements of this Section and obtain additional instructions as required from the Owner's Representative before proceeding with construction.

F. Before installation, inspect each pipe, fitting and structure for defects. Reject defective, damaged or unsound pipe, fittings or structures and remove them from site.

3.02 GENERAL

A. No pipe shall be installed in the trench until excavation has been properly constructed per the plans and details to at least two (2) pipe lengths beyond the section of pipe being installed and the bottom of the trench has been properly shaped.

B. Pipe shall be so laid that after the sewer is completed the interior surface shall conform accurately to the grades and alignments fixed and given in the Plans.

C. All sewers must be laid accurately to line and grade, with tongue or spigot end downstream. Establish required uniform line and grade in trench from benchmarks identified by the Owner's Representative. Use laser beam equipment to establish and maintain proper line and grade of work.

D. Pipes shall be fitted together and matched so that when laid, they form a sewer with a smooth and uniform invert.

E. A minimum clearance of twelve (12) inches must be maintained between the sewer and all other lines. Sanitary sewers shall not be routed over water lines.

F. Where conditions are such that running or standing water occurs in the trench bottom or the soil in the trench bottom displays a "quick" tendency, the water shall be removed by pumps and suitable means such as well points or pervious underdrain bedding until the pipe has been installed and the backfill has been placed to a sufficient height to prevent pipe flotation. Care should be taken that any underdrain is of proper gradation and thickness to prevent migration of material between the underdrain, pipe embedment and native soils in the trench below and at the sides of the pipe.

G. Do not allow sand, debris, runoff or other foreign materials to enter sewer system.

3.03 DIVERSION PUMPING

A. Install and operate required bulkheads, plugs, piping, and diversion pumping equipment to maintain sewage flow and to prevent backup or overflow. Obtain approval for diversion pumping equipment and procedures from the Owner's Representative.

B. Design piping, joints and accessories to withstand twice maximum system pressure or 50 psi, whichever is greater.

C. In event of accidental spill or overflow, immediately stop overflow and take action to clean up and disinfect spillage and promptly notify the Owner's Representative.

3.04 EARTHWORK

A. Conform to applicable provisions of Section 31 2333 Trenching, Backfilling and Compaction.

B. Backfill excavated areas in same day excavated. When not possible, cover excavated areas using steel plates on paved areas and other protective measures elsewhere.

C. Place material in uniform layers of prescribed maximum loose thickness and wet or dry material to approximately optimum moisture content. Compact to prescribed density Water tamping is not allowed.

D. When trenches exceed five feet in depth Contractor shall utilize trench safety measures per Section 31 4133 Trench Safety.

3.05 PIPE CUTTING

A. Cut pipe 12 inches and smaller with standard wheel pipe cutters. Cut pipe larger than 12 inches in manner approved by the Owner's Representative. Make cuts smooth and at right angles to axis of pipe. Bevel plain end with heavy file or grinder to remove sharp edges.

3.06 PIPE INSTALLATION BY OPEN CUT

A. Install pipe in accordance with pipe manufacturer's recommendations and as specified in following paragraphs.

B. Install pipe only after excavation is completed, bottom of trench fine graded, bedding material is installed.

C. Install pipe to line and grade indicated. Place pipe so that it has continuous bearing of barrel on bedding material and is laid in trench so interior surfaces of pipe follow grades and alignment indicated. Provide bell holes where necessary.

D. Form concentric joint with each section of adjoining pipe so as to prevent offsets.

E. Keep interior of pipe clean as installation progresses. Remove foreign material and debris from pipe.

F. Provide lubricant, place and drive home newly laid sections so as to eliminate damage to sections. Install pipe to "home" mark where provided.

G. Keep excavations free of water during construction and until final inspection.

H. When work is not in progress, cover exposed ends of pipes with approved plug to prevent foreign material from entering pipe.

I. Where gravity sanitary sewer is to be installed under existing water line with separation distance of at least 2 feet and less than 9 feet, install new sewer pipe so that one full 20 foot long pipe is centered on water line crossing. Embed sewer pipe in cement stabilized sand for minimum distance of 10 feet on each side of crossing.

J. Where gravity sanitary sewer is to be installed under existing water line with separation distance of less than 2 feet, install new sewer using pressure-rated pipe as shown on Drawings. Maintain minimum 1 foot separation distance.

3.07 PIPE INSTALLATION OTHER THAN OPEN CUT

A. Contractor shall utilize methods of pipe installation other than open cut as shown on the Drawings or as otherwise required to install the sewer.

B. Pipe shall be of the size, type, and class specified on the Plans, or other types as may be specified by the Engineer or designated on the Plans.

C. Jacking
1. If the grade of the pipe at the jacking end is below the ground surface, suitable pits or trenches shall be excavated for the purpose of conducting the jacking operations and for placing end joints of the pipe. Wherever end trenches are cut in the sides of the embankment or beyond it, such work shall be sheeted securely and braced in a manner satisfactory to the Owner's Representative to prevent earth caving.
2. Where pipe is required to be installed under railroad embankments or under highways, streets, or other facilities by jacking or boring methods, construction shall be made in such a manner that will not interfere with the operation of the railroad, street, highway, or other facility, and shall not weaken or damage any embankment or structure. During construction operations, barricades and lights to safeguard traffic and pedestrians shall be furnished and maintained, as directed by the Owner's Representative, until such time as the backfill has been completed and then shall be removed from the site.
3. Heavy duty jacks suitable for forcing the pipe through the embankment shall be provided. In operating jacks, even pressure shall be applied to all jacks used. A suitable jacking head, usually of timber, and suitable bracing between jacks and jacking head shall be provided so that pressure will be applied to the pipe uniformly around the ring of the pipe. A suitable jacking frame or back stop shall be provided. The pipe to be jacked shall be set on guides, properly braced together, to support the section of the pipe and to direct it in the proper line and grade. The whole jacking assembly shall be placed so as to line up with the direction and grade of the pipe. In general, embankment material shall be excavated just ahead of the pipe and material removed through the pipe, and the pipe forced through the embankment with jacks, into the space thus provided.
4. The Contractor shall furnish for the Owner's Representative's review, a plan showing his proposed method of handling, including the design for the jacking head, jacking support of back stop, arrangement and position of jacks, pipe guides, etc., complete in assembled position. The review of this plan by the Owner's Representative's will not relieve the Contractor from his responsibility to obtain the specified results.
5. The excavation for the underside of the pipe, for at least one third of the circumference of the pipe, shall conform to the contour and grade of the pipe. A clearance of not more than two inches (2") may be provided for the upper half of the pipe. This clearance is to be tapered off to zero at the point where the excavation conforms to the contour of the pipe. The distance that the excavation shall extend beyond the end of the pipe depends on the character of the material, but it shall not exceed two feet (2') in any case. This distance shall be decreased on instructions from the Engineer, if the character of the material being excavated makes it desirable to keep the advance excavation closer to the end of the pipe.
6. The pipe, preferably, shall be jacked from the low or downstream end. Lateral or vertical variation in the final position of the pipe from the line and grade established will be permitted at the discretion of the Owner's Representative provided that such variation shall be regular, only in one direction and that the final grade of flow line shall be in the direction indicated on the plans.

7. If the Contractor desires, he may use a cutting edge of steel plate around the head end of the pipe extending a short distance beyond the end of the pipe with inside angles or lugs to keep the cutting edge from slipping back onto pipe.
8. When jacking of pipe is once begun, the operation shall be carried on without interruption, insofar as practicable, to prevent the pipe from becoming firmly set in the embankment.
9. Any pipe damaged in jacking operations shall be removed and replaced by the Contractor at no additional cost to the Owner.
10. The pits or trenches excavated to facilitate jacking operations shall be backfilled in accordance with the details for backfilling sewer lines shown in the Drawings immediately after the jacking of the pipe has been completed.

D. Boring
1. The boring shall proceed from a pit provided for the boring equipment and workmen. Excavation for pits and installation of shoring shall be as outlined above under 3.5.C. The location of the pit shall meet the approval of the Owner's Representative. The holes are to be bored mechanically. The boring shall be done using a pilot hole. By this method approximately a two inch (2") pilot hole shall be bored the entire length of the crossing and shall be checked for line and grade on the opposite end of the bore from the work pit.
2. This pilot hole shall serve as the centerline of the larger diameter hole to be bored. Excavated material will be placed near the top of the working pit and disposed of as required. The use of water or other fluids in connection with the boring operation will be permitted only to the extent to lubricate cuttings. Jetting will not be permitted.
3. In unconsolidated soil formations a gel forming colloidal drilling fluid consisting of at least 10% of high grade carefully processed bentonite may be used to consolidate cuttings of the bit, seal the walls of the hole, and furnish lubrication for subsequent removal of cuttings and installation of the pipe immediately thereafter.
4. Allowable variation from line and grade shall be as specified under 3.5.C. above. Over cutting in excess of one inch (1") shall be remedied by pressure grouting the entire length of the installation.

3.08 MANHOLES

A. Manholes shall be constructed at locations shown on the plans and to the depth indicated thereon.

B. Manholes shall be constructed to the dimensions shown on the plans. Where concrete or precast concrete sections are used, the interior wall shall be coated with 80 mils thickness Raven 405.

C. Joints between precast concrete sections shall be made by uniformly placing "Ram-Nek" flexible plastic gaskets or approved equal on all faces of the lower part of the joint and lowering the upper ring evenly into place to produce uniform bearing and compression on the sealer.

D. The construction of manholes shall be done as soon as practical after sewer lines into or through the manhole are completed.

E. All sewers shall be cut neatly at the inside face of the walls of the manhole and pointed up with mortar.

F. After the masonry work has been completed to the proper elevation, the cast iron manhole cover frame shall be set in a full mortar bed and adjusted to the elevation established on the drawings.

G. The inverts of the sewer line or several sewer lines entering the manhole at or near the flow line elevation of the manhole shall be shaped and routed across the floor of the manhole using mortar to obtain the proper contour.

H. When sanitary sewer pipes enter a manhole two (2) feet or greater above the bottom of the manhole, a drop pipe of equal diameter shall be constructed outside the manhole to the bottom of the manhole per the details on the plans.

I. All Manholes are to be backfilled per the details shown in the Drawings and the requirements of Section 31 2333 – Trenching, Backfill and Compaction.

3.09 FRAMES, GRATES, RINGS AND COVERS

A. Casting shall conform to the type shown on the Drawings and shall be clean castings, free from sand or blow holes or other defects. Materials shall be not less than Class 30B gray iron conforming to ASTM A-48.

B. Surfaces of the castings shall be free from burnt-on sand and shall be reasonably smooth.

C. Bearing surfaces between manhole rings and covers and frames shall be cast or machined with such precision that uniform bearing shall be provided throughout the perimeter area of contact.

3.10 INSPECTION AND TESTING OF GRAVITY SANITARY SEWERS

A. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.

B. Do not put into service before inspection and approval.

C. Test completed piping systems according to requirements of this section and authorities having jurisdiction.

D. Schedule tests and inspections by the Owner's Representative and authorities having jurisdiction with at least 48 hours' advance notice.

E. Submit separate report for each test.

F. Sanitary Sewer Cleaning and Television Inspection
   1. Cleaning:
      a. Take precautions to protect sanitary sewer mains and manholes from damage that might be inflicted by the improper selection of cleaning processes or improper use of equipment. When using hydraulically-propelled devices take precautions to ensure that the water pressure created does not cause damage to or flooding of public or private property. Do not surcharge any sanitary sewer to an elevation that could cause overflow of sewage into area waterways, homes or buildings, or onto the surface.
      b. Exercise care to prevent contamination of the potable water system. Use an appropriately sized backflow preventer as required by the authority having jurisdiction when drawing water from a public hydrant.
      c. Debris Disposal: Remove sludge, soil, sand, rocks, grease, roots and other solid or semi-solid material resulting from the cleaning operation at the downstream manhole of the section being cleaned. Passing debris from any sewer section to any other sewer section is not allowed. Load debris from the manholes into an enclosed container permitted for liquid waste hauling. Remove solids and semi-solids resulting from cleaning operations from the site and dispose of lawfully at the end of each work day. Do not accumulate debris, liquid waste, or sludge on the site.
   2. Television Inspection
      a. Immediately after cleaning, video inspect the sanitary sewer line to document the condition of the line. Notify the Owner's Representative 48 hours in advance of any television inspection so that they may observe inspection operations.

b. Perform television inspection on one manhole section at a time. Adequately control the flow in the section being inspected. No flow is allowed in the line while performing post-installation video inspection.
c. Perform television inspection of sanitary sewers as follows:
d. Videos shall pan all manholes showing benches, walls, annular spaces, and debris removal. Camera operator shall slowly pan each service connection, clamped joint and pipe material transition from one material to another. Complete and submit a Television Inspection Report for every sewer segment video submitted to the Owner's Representative.
e. Provide a video showing the completed work including the condition of any service connections. Prepare and submit Television Inspection Report forms providing the location of service connections along with the location of any discrepancies.
f. Document results of video inspections using a Television Inspection Report form approved by the Owner's Representative.

G. Sanitary Sewer Deflection Testing
1. Perform deflection testing on flexible and semi-rigid pipe to confirm pipe has no more than 5 percent deflection. Mandrel testing shall conform to ASTM D 3034. Perform testing no sooner than 30 days after backfilling of line segment, but prior to final acceptance testing of line segment.
2. Rigid mandrel shall have outside diameter (O.D.) equal to 95 percent of inside diameter (I.D.) of pipe. Mandrel shall be constructed of metal or rigid plastic material that can withstand 200 psi without being deformed. Mandrel shall have nine or more "runners" or "legs" as long as total number of legs is odd number. Barrel section of mandrel shall have length of at least 75 percent of inside diameter of pipe. Rigid mandrel shall not have adjustable or collapsible legs which would allow reduction in mandrel diameter during testing.
3. Pull approved mandrel by hand through sewer sections. Mandrel testing is not required for stubs.
4. Document results of deflection testing using a Sanitary Sewer Deflection Test Report form approved by the Owner's Representative.

H. Sanitary Sewer Leakage Testing
1. Low Air Pressure Test: When using this test conform to ASTM C 828, ASTM C 924, or ASTM F 1417, as applicable, with holding time not less than that listed below.
a. Low Pressure Air testing for sections of pipe shall be limited to lines less than 36-inch average inside diameter.
b. Lines 36-inch average inside diameter and larger shall be tested at each joint. Minimum time allowable for pressure to drop from 3.5 pounds per square inch gauge to 2.5 pounds per square inch during joint test shall be 10 seconds, regardless of pipe size.
c. Time Allowed for Pressure Loss from 3.5 psig to 2.5 psig, at end of this Section, are based on equation from Texas Commission on Environmental Quality (TCEQ) Design Criteria.

	$T = 0.0850(D)(K)/(Q)$
T =	time for pressure to drop 1.0 pounds per square inch gauge in seconds
K =	0.000419 DL, but not less than 1.0
D =	average inside diameter in inches
L =	length of line of same pipe size in feet
Q =	rate of loss, 0.0015 ft^3/min./sq. ft. internal surface

d. Since K value of less than 1.0 shall not be used, there are minimum testing times for each pipe diameter as given below.

e. For joint test, pipe is to be pressurized to 3.5 psi greater than pressure exerted by groundwater above pipe. Once pressure has stabilized, minimum times allowable for pressure to drop from 3.5 pounds per square inch gauge to 2.5 pounds per square inch gauge shall be 10 seconds.

f. Document results of low pressure air test using a Sanitary Sewer Low Pressure Air Test Report form approved by the Owner's Representative.

Notes:

- When two sizes of pipe are involved, compute time by ratio of lengths involved.
- Lines with 27-inch average inside diameter and larger may be air tested at each joint.
- Lines with average inside diameter greater than 36 inches must be air tested for leakage at each joint.
- If joint test is used, perform visual inspection of joint immediately after testing.

I. Sanitary Manhole Vacuum Testing

1. After completion of manhole construction, wall sealing, or rehabilitation, but prior to backfilling, test manholes for water tightness using hydrostatic or vacuum testing procedures.
2. Plug influent and effluent lines, including service lines, with suitably-sized pneumatic or mechanical plugs. Ensure plugs are properly rated for pressures required for test; follow manufacturer's safety and installation recommendations. Place plugs minimum of 6 inches outside of manhole walls. Brace inverts to prevent lines from being dislodged when lines entering manhole have not been backfilled.
3. Install vacuum tester head assembly at top access point of manhole and adjust for proper seal on straight top section of manhole structure. Following manufacturer's instructions and safety precautions, inflate sealing element to recommended maximum inflation pressure; do not over-inflate.
4. Evacuate manhole with vacuum pump to 10 inches mercury (Hg), disconnect pump, and monitor vacuum for time period specified below.
5. A manhole passes the test if after 2.0 minutes and with all valves closed, the vacuum is at least 9.0 inches of mercury (Hg).
6. Document results of vacuum testing using a Sanitary Sewer Manhole Vacuum Test Report form approved by the Owner's Representative.

3.11 INSPECTION AND TESTING OF SANITARY SEWER FORCE MAINS

A. Hydrostatic Testing

1. After the pipe has been laid and initial backfill completed, the water line shall be subjected to a hydrostatic test per AWWA C600 or AWWA C605 at a minimum pressure of 150 psi. Joints shall remain exposed during testing whenever possible.
2. The Contractor shall furnish, install, and operate, at his expense, the necessary connections, pumps, meters, and gauges necessary to conduct the test. The meters used in the testing shall be tested, sealed and approved at the Contractor's expense prior to running any test.
3. Where practicable, pipelines shall be tested in lengths between valves or plugs of no more than 1,500 feet. Contractor must have written approval for test sections greater than 1,500 feet.
4. Minimum duration of testing for each section shall be 2 hours when joints are exposed and 8 hours when joints are covered.
5. Allowable leakage shall be as calculated by the following formula:

   L=(S)(D) (P.05)/133,200
   L= Allowable leakage in gallons per hour
   S=Length of Pipe in Feet
   D=Inside diameter of pipe in inches

P=Pressure in pounds per square inch

6. Correct defects, cracks, or leakage by replacement of defective items. All visible leaks at exposed joints and all leaks evident on the surface where joints are covered shall be replaced, regardless of total leakage shown.
7. Repeat test until satisfactory results are obtained.
8. Upon satisfactory completion of testing, plug openings in force main. Use cast iron plugs or blind flanges to prevent debris from entering tested pipeline.

B. Pigging Test
1. After completion of hydrostatic testing and prior to final acceptance, test force mains longer than 200 feet by pigging to ensure piping is free of obstructions.
2. Pigs: Provide proving pigs manufactured of open-cell polyurethane foam body, without coating or abrasives which would scratch or otherwise damage interior pipe wall surface or lining. Pigs shall be able to pass through reductions of up to 65 percent of nominal cross-sectional area of pipe. Pigs shall be able to pass through standard fittings such as 45-degree and 90-degree elbows, crosses, tees, wyes, gate valves, or plug valves, as applicable to force main being tested.

END OF SECTION 33 3000

SECTION 33 40 00
STORM DRAINAGE

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. This Section specifies the requirements for furnishing and placing drainage pipe, laterals, stubs, and appurtenances. The pipe shall be of the size, type and location, and to the lines, grades and elevations shown on the plans and constructed in accordance with these specifications.

1.02 DEFINITIONS

A. CMP: Corrugated metal pipe.

B. HDPE: High-density polyethylene plastic.

C. PVC: Polyvinyl chloride plastic.

D. RCB: Reinforced concrete box.

E. RCP: Reinforced concrete pipe.

1.03 REGULATORY REQUIREMENTS

A. Contractor shall comply with standards of authorities having jurisdiction for drainage piping, including materials, installation and testing.

B. Contractor shall comply with all Standard Specifications and Details of Authorities having Jurisdiction (herein after referred to as "Standard Specifications") for work in the right-of-way or easements.

C. Prior to commencement of work, the Contractor shall be responsible for obtaining, at the Contractor’s own expense, all construction permits necessary to complete the project according to the plans and specifications.

1.04 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Coordination Drawings: For piping and specialties including relation to other services in same area, drawn to scale. Show piping and specialty sizes and valves, meter and specialty locations, and elevations.

C. Field quality-control test reports.

1.05 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Contractor is responsible for protecting materials per manufactures recommendations
   1. Do not store plastic manholes, pipe, and fittings in direct sunlight.
   2. Protect pipe, pipe fittings, and seals from dirt and damage.
   3. Handle precast structures according to manufacturer's written rigging instructions.

C. Install drainage system that is watertight both in pipe-to-pipe joints and in pipe to-manhole connections.

PART 2 – PRODUCTS

2.01 CMP PIPE

A. Corrugated metal pipe shall be galvanized steel conforming to the requirements of AASHTO M 218
   1. Reference to gauge of metal is to U.S. Standard Gauge for uncoated sheets. Tables in AASHTO M 218 list thicknesses for coated sheets in inches.

B. Coupling bands and other hardware for galvanized steel pipe shall conform to requirements of AASHTO M 36.
   1. Coupling bands shall be not more than 3 nominal sheet thicknesses lighter than thickness of pipe to be connected and in no case lighter than 0.052 inch.
   2. Coupling bands shall be made of same base metal and coating (metallic or otherwise) as pipe.
   3. Minimum width of corrugated locking bands shall be as shown below for corrugations which correspond to end circumferential corrugations on pipes being joined:
      a. 10-1/2 inches wide for 2-2/3 inch by 1/2 inch corrugations.
      b. 12 inches wide for 3 inch by 1 inch corrugations.
   4. Helical pipe without circumferential end corrugations will be permitted only when it is necessary to join new pipe to existing pipe which was installed with no circumferential end corrugations. In this event pipe furnished with helical corrugations at ends shall be field jointed with either helically corrugated bands or with bands with projections (dimples). Minimum width of helical corrugated bands shall conform to following:
      a. 12 inches wide for 1/2 inch deep helical end corrugations.
      b. 14 inches wide for 1 inch deep helical end corrugations.
   5. Bands with projections shall have circumferential rows of projections with one projection for each corrugation. Width of bands with projections shall be not less than following:
      a. 12 inches wide for pipe diameters up to and including 72 inches. Bands shall have two circumferential rows of projections.
      b. 16-1/4 inches wide for pipe diameters of 78 inches and greater. Bands shall have four circumferential rows of projections.
   6. Bolts for coupling bands shall be 1/2 inch diameter. Bands 12 inches wide or less will have minimum of 2 bolts per end at each connection, and bands greater than 12 inches wide shall have minimum of 3 bolts at each connection.
   7. Galvanized bolts may be hot dip galvanized in accordance with requirements of AASHTO M 232, mechanically galvanized to provide same requirements as AASHTO M 232, or electro galvanized per ASTM B 633, Type RS.

C. Furnish fittings and specials required for bends, end sections, branches, access manholes, and connections to other fittings. Design fittings and specials in accordance with Drawings and ASTM A 760. Fittings and specials are subject to same internal and external loads as straight pipe.

D. Fabrication
   1. Steel Pipe:
      a. Galvanized steel pipe shall be full circle or arch pipe conforming to AASHTO M 36, Type I, Type IA, or Type II, as indicated on Drawings.
      b. Fabrication with circumferential corrugations, lap joint construction with riveted or spotwelded seams, helical corrugations with continuous helical lock seam, or ultra-high frequency resistance butt-welded seams is acceptable.

2.02 HDPE PIPE

A. Furnish annular corrugated profile wall polyethylene pipe conforming to ASTM F2648 for gravity storm sewer and storm sewer culvert pipe. Joints shall be installed such that connection of pipe sections will form continuous line free from irregularities in flow line.

B. Joints
   1. Integral Bell and Spigot. Bell shall overlap minimum of two corrugations of spigot end when fully engaged.
   2. Shall be watertight according to the requirements of ASTM D3212.

C. Gaskets shall meet requirements of ASTM F 477. Use gasket molded into circular form or extruded to proper section and then spliced into circular form. When no contaminant is identified, use gaskets of properly cured, high-grade elastomeric compound. Basic polymer shall be natural rubber, synthetic elastomer, or blend of both.

D. Fittings shall conform to ASTM F2306.

E. Perforated pipe shall conform to the requirements of ASTM M252 for pipe diameters 3-inch through 10-inch and ASTM M294 for pipe diameters 12-inch through 60-inch.

2.03 PVC PIPE

A. PVC pipe shall conform to ASTM D3034, SDR 26. All diameters shall use bell and spigot ends for gasketed joints.

B. Joints shall conform to ASTM D3212 with a SDR matching the pipe.

C. Gaskets shall meet requirements of ASTM F 477. Use elastomeric factory-installed gaskets to make joints flexible and watertight.

D. Fittings shall conform to ASTM D3034.

E. Do not use PVC in potentially or known contaminated areas.

F. Do not use PVC in areas exposed to direct sunlight.

G. Make curves and bends by bending the pipe, do not exceed maximum limits of curvature recommended by pipe manufacturer. Submit details of other methods of providing curves and bends for review by the Owner’s Representative.

2.04 RCP PIPE

A. Reinforced concrete pipe shall conform to requirements of ASTM C-76, wall “B” thickness for, Class III and Class IV as shown on the plans or as necessary to meet ASTM cover design requirements.

B. Reinforced concrete arch pipe shall conform to requirements of ASTM C 506 for Class A-III. Joints shall conform to ASTM C 877.

C. Reinforced concrete elliptical pipe, either vertical or horizontal, shall conform to requirements of ASTM C 507 for Class VE-III for vertical or Class HE-III for horizontal. Use rubber gasket joints conforming to ASTM C 877.

D. Gaskets shall conform to AWWA C111, rubber.

E. Gaskets
   1. When no contaminant is identified, furnish rubber gasket conforming to ASTM C 443 for circular reinforced concrete pipe and rubber gasket conforming to ASTM C 877 for reinforced concrete elliptical pipe.
   2. Use gaskets as recommended by pipe manufacturer and approved by the Owner's Representative prior to installation in potentially contaminated soil.

2.05 RCB PIPE

A. Reinforced concrete boxes shall conform to requirements of ASTM C1577.

2.06 MANHOLES

A. Precast concrete manholes in accordance with the details shown on the Drawings shall conform to ASTM C-478.

B. Cast-in-Place-Concrete Manholes: Construct of reinforced-concrete bottom, walls, and top; designed according to ASTM C 890 for A-16 (ASSHTO HS20-44), heavy-traffic, structural loading; of depth, shape, dimensions, and appurtenances indicated. The minimum compressive strength of concrete manhole shall be 4,000 psi.

C. Ballast: Increase thickness of concrete as required to prevent flotation.

D. Adjusting Rings: Interlocking rings with level or sloped edge in thickness and diameter matching manhole frame and cover. Include sealant recommended by ring manufacturer.

E. Grade Rings: Reinforced-concrete rings, 6- to 9-inch total thickness, to match diameter of manhole frame and cover.

2.07 PRECAST CONCRETE INLETS, HEADWALLS AND WINGWALLS

A. Provide precast concrete machine-made units meeting requirements of ASTM C 76 regarding reinforced concrete, cement, aggregate, mixture, and concrete test. Minimum 28-day compressive strength of concrete shall be 4,000 psi.

B. Reinforcing Steel shall conform to requirements of ASTM A615, Grade 60.

C. Mark date of manufacture and name or trademark of manufacturer clearly on inside of inlet, headwall, or wingwall.

2.08 PVC INLETS

A. PVC surface drainage inlets shall include the drain basin type as indicated on the drawings. The ductile iron grates for each of these fittings are to be considered an integral part of the surface drainage inlet and shall be furnished by the same manufacturer.

B. PVC inlets shall be manufactured from PVC pipe stock, utilizing a thermoforming process to reform the pipe stock to the specified configuration. The drainage pipe connection stubs shall be manufactured from PVC pipe stock and formed to provide a watertight connection with the specified pipe system. This joint tightness shall conform to ASTM D3212 for joints for drain and sewer plastic pipe using flexible elastomeric seals. The flexible elastomeric seals shall conform to ASTM F477. The pipe bell spigot shall be joined to the main body of the drain basin or catch basin.

The raw material used to manufacture the pipe stock that is used to manufacture the main body and pipe stubs of the surface drainage inlets shall conform to ASTM D1784 cell class 12454.

C. The grates and frames furnished for all PVC inlets shall be ductile iron and shall be made specifically for each basin so as to provide a round bottom flange that closely matches the diameter of the inlet. Grates for drain basins shall be capable of supporting H-20 wheel loads. Ductile iron used in the manufacture of the castings shall conform to ASTM A536 grade 70-50-05. Grates and covers shall be provided painted black.

2.09 MORTAR

A. Mortar shall conform to ASTM C 476.

2.10 CLEANOUTS

A. Cleanouts in accordance with the details shown on the Drawings shall consist of PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.

2.11 RIMS, GRATES AND FRAMES

A. Castings for manhole and inlet rims, covers, grates and frames shall conform to ASTM A 48, Class 35B gray iron or better quality.

2.12 MANUFACTURERS

A. Use approved American manufacturers.

PART 3 – EXECUTION

3.01 PREPERATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage and displacement.

B. Verify all existing utilities prior to beginning construction. Inform the Owner’s Representative if existing utilities are not as shown in the plans.

C. Perform work in accordance with OSHA standards.

D. Drainage to the site and adjacent landowners shall not be obstructed without prior approval of the Owner’s Representative and the authority having jurisdiction. At no additional cost to the Owner the Contractor shall install necessary piping and accessories so as not to disrupt drainage from other facilities or landowners whether or not indicated on the plans.

E. Before installation, inspect each pipe, fitting and structure for defects. Reject defective, damaged or unsound pipe, fittings or structures and remove them from site.

3.02 GENERAL

A. No pipe shall be installed in the trench until excavation has been properly constructed per the plans and details to at least two (2) pipe lengths beyond the section of pipe being installed and the bottom of the trench has been properly shaped.

B. Pipe shall be so laid that after the sewer is completed the interior surface shall conform accurately to the grades and alignments fixed and given in the Plans.

C. All sewers must be laid accurately to line and grade, with tongue or spigot end downstream. Establish required uniform line and grade in trench from benchmarks identified by the Owner's Representative. Use laser beam equipment to establish and maintain proper line and grade of work.

D. Pipes shall be fitted together and matched so that when laid, they form a sewer with a smooth and uniform invert.

E. A minimum clearance of twelve (12) inches must be maintained between the drainage system and all other lines.

F. Outfall pipes shall be as detailed on the drawings and conform to the requirements of the authority having jurisdiction.

G. Where conditions are such that running or standing water occurs in the trench bottom or the soil in the trench bottom displays a "quick" tendency, the water shall be removed by pumps and suitable means such as well points or pervious underdrain bedding until the pipe has been installed and the backfill has been placed to a sufficient height to prevent pipe flotation. Care should be taken that any underdrain is of proper gradation and thickness to prevent migration of material between the underdrain, pipe embedment and native soils in the trench below and at the sides of the pipe.

H. Do not allow sand, debris, runoff or other foreign materials to enter sewer system.

3.03 EARTHWORK

A. Conform to applicable provisions of Section 31 2333 Trenching, Backfilling and Compaction.

B. Backfill excavated areas in same day excavated. When not possible, cover excavated areas using steel plates on paved areas and other protective measures elsewhere.

C. Place material in uniform layers of prescribed maximum loose thickness and wet or dry material to approximately optimum moisture content. Compact to prescribed density Water tamping is not allowed.

D. When trenches exceed five feet in depth Contractor shall utilize trench safety measures per Section 31 4133 Trench Safety.

3.04 PIPE CUTTING

A. Cut pipe 12 inches and smaller with standard wheel pipe cutters. Cut pipe larger than 12 inches in manner approved by the Owner's Representative. Make cuts smooth and at right angles to axis of pipe. Bevel plain end with heavy file or grinder to remove sharp edges.

3.05 PIPE INSTALLATION BY OPEN CUT

A. Install pipe in accordance with pipe manufacturer's recommendations and as specified in following paragraphs.

B. Install pipe only after excavation is completed, bottom of trench fine graded, bedding material is installed.

C. Install pipe to line and grade indicated. Place pipe so that it has continuous bearing of barrel on bedding material and is laid in trench so interior surfaces of pipe follow grades and alignment indicated. Provide bell holes where necessary.

D. Form concentric joint with each section of adjoining pipe so as to prevent offsets.

E. Keep interior of pipe clean as installation progresses. Remove foreign material and debris from pipe.

F. Provide lubricant, place and drive home newly laid sections so as to eliminate damage to sections. Install pipe to "home" mark where provided.

G. Keep excavations free of water during construction and until final inspection.

H. When work is not in progress, cover exposed ends of pipes with approved plug to prevent foreign material from entering pipe.

3.06 PIPE INSTALLATION OTHER THAN OPEN CUT

A. Contractor shall utilize methods of pipe installation other than open cut as shown on the Drawings or as otherwise required to install the sewer.

B. Pipe shall be of the size, type, and class specified on the Plans, or other types as may be specified by the Engineer or designated on the Plans.

C. Jacking
1. If the grade of the pipe at the jacking end is below the ground surface, suitable pits or trenches shall be excavated for the purpose of conducting the jacking operations and for placing end joints of the pipe. Wherever end trenches are cut in the sides of the embankment or beyond it, such work shall be sheeted securely and braced in a manner satisfactory to the Owner’s Representative to prevent earth caving.
2. Where pipe is required to be installed under railroad embankments or under highways, streets, or other facilities by jacking or boring methods, construction shall be made in such a manner that will not interfere with the operation of the railroad, street, highway, or other facility, and shall not weaken or damage any embankment or structure. During construction operations, barricades and lights to safeguard traffic and pedestrians shall be furnished and maintained, as directed by the Owner’s Representative, until such time as the backfill has been completed and then shall be removed from the site.
3. Heavy duty jacks suitable for forcing the pipe through the embankment shall be provided. In operating jacks, even pressure shall be applied to all jacks used. A suitable jacking head, usually of timber, and suitable bracing between jacks and jacking head shall be provided so that pressure will be applied to the pipe uniformly around the ring of the pipe. A suitable jacking frame or back stop shall be provided. The pipe to be jacked shall be set on guides, properly braced together, to support the section of the pipe and to direct it in the proper line and grade. The whole jacking assembly shall be placed so as to line up with the direction and grade of the pipe. In general, embankment material shall be excavated just ahead of the pipe and material removed through the pipe, and the pipe forced through the embankment with jacks, into the space thus provided.
4. The Contractor shall furnish for the Owner’s Representative’s review, a plan showing his proposed method of handling, including the design for the jacking head, jacking support of back stop, arrangement and position of jacks, pipe guides, etc., complete in assembled position. The review of this plan by the Owner’s Representative’s will not relieve the Contractor from his responsibility to obtain the specified results.
5. The excavation for the underside of the pipe, for at least one third of the circumference of the pipe, shall conform to the contour and grade of the pipe. A clearance of not more than

two inches (2") may be provided for the upper half of the pipe. This clearance is to be tapered off to zero at the point where the excavation conforms to the contour of the pipe. The distance that the excavation shall extend beyond the end of the pipe depends on the character of the material, but it shall not exceed two feet (2') in any case. This distance shall be decreased on instructions from the Engineer, if the character of the material being excavated makes it desirable to keep the advance excavation closer to the end of the pipe.

6. The pipe, preferably, shall be jacked from the low or downstream end. Lateral or vertical variation in the final position of the pipe from the line and grade established will be permitted at the discretion of the Owner's Representative provided that such variation shall be regular, only in one direction and that the final grade of flow line shall be in the direction indicated on the plans.
7. If the Contractor desires, he may use a cutting edge of steel plate around the head end of the pipe extending a short distance beyond the end of the pipe with inside angles or lugs to keep the cutting edge from slipping back onto pipe.
8. When jacking of pipe is once begun, the operation shall be carried on without interruption, insofar as practicable, to prevent the pipe from becoming firmly set in the embankment.
9. Any pipe damaged in jacking operations shall be removed and replaced by the Contractor at no additional cost to the Owner.
10. The pits or trenches excavated to facilitate jacking operations shall be backfilled in accordance with the details for backfilling sewer lines shown in the Drawings immediately after the jacking of the pipe has been completed.

D. Boring

1. The boring shall proceed from a pit provided for the boring equipment and workmen. Excavation for pits and installation of shoring shall be as outlined above under 3.5.C. The location of the pit shall meet the approval of the Owner's Representative. The holes are to be bored mechanically. The boring shall be done using a pilot hole. By this method approximately a two inch (2") pilot hole shall be bored the entire length of the crossing and shall be checked for line and grade on the opposite end of the bore from the work pit.
2. This pilot hole shall serve as the centerline of the larger diameter hole to be bored. Excavated material will be placed near the top of the working pit and disposed of as required. The use of water or other fluids in connection with the boring operation will be permitted only to the extent to lubricate cuttings. Jetting will not be permitted.
3. In unconsolidated soil formations a gel forming colloidal drilling fluid consisting of at least 10% of high grade carefully processed bentonite may be used to consolidate cuttings of the bit, seal the walls of the hole, and furnish lubrication for subsequent removal of cuttings and installation of the pipe immediately thereafter.
4. Allowable variation from line and grade shall be as specified under 3.5.C. above. Over cutting in excess of one inch (1") shall be remedied by pressure grouting the entire length of the installation.

3.07 MANHOLES, INLETS, JUNCTION BOXES AND OTHER STRUCTURES

A. Structures shall be constructed in accordance with the details shown on plans at locations shown on the plans and to the depth indicated thereon.

B. Joints between precast concrete sections shall be made by uniformly placing "Ram-Nek" flexible plastic gaskets or approved equal on all faces of the lower part of the joint and lowering the upper ring evenly into place to produce uniform bearing and compression on the sealer.

C. The construction of structures shall be done as soon as practical after sewer lines into or through the manhole are completed.

D. All sewers shall be cut neatly at the inside face of the walls of the manhole and pointed up with mortar.

E. After the masonry work has been completed to the proper elevation, the cast iron manhole cover frame shall be set in a full mortar bed and adjusted to the elevation established on the drawings.

F. All Manholes are to be backfilled per the details shown in the Drawings and the requirements of Section 31 2333 – Trenching, Backfill and Compaction.

3.08 FRAMES, GRATES, RINGS AND COVERS

A. Casting shall conform to the type shown on the Drawings and shall be clean castings, free from sand or blow holes or other defects. Materials shall be not less than Class 30B gray iron conforming to ASTM A-48.

B. Surfaces of the castings shall be free from burnt-on sand and shall be reasonably smooth.

C. Bearing surfaces between manhole rings and covers and frames shall be cast or machined with such precision that uniform bearing shall be provided throughout the perimeter area of contact.

3.09 UNDERDRAIN SYSTEM

A. Pipe shall be laid per paragraph 3.1 and per the details on the plans.

B. Prior to placing granular backfill and bedding, line trench with drainage fabric according to the details.

C. Granular bedding shall be prepared to a depth of 2 to 4 inches below the pipe invert. The pipe shall be laid with the perforations facing down. The granular backfill shall then be placed to the depth shown on the details. The filter fabric shall then be wrapped around the granular material with a minimum overlap at the top of 6 inches.

D. Where vertical pipe risers penetrate the granular backfill to the surface, the drainage fabric shall be cut in an 'X' to accommodate the pipe penetration and then the fabric shall be sealed with a heavy duty tape to the pipe in the manner to insure the integrity of the filter fabric.

3.10 CLEANING AND INSPECTION

A. Clean and inspect new piping systems, and parts of existing systems that have been altered, extended, repaired, or otherwise impacted by the construction.

B. Schedule cleaning and inspections by the Owner’s Representative and authorities having jurisdiction with at least 48 hours' advance notice.

C. Cleaning:
   1. Take precautions to protect storm sewer mains and structures from damage that might be inflicted by the improper selection of cleaning processes or improper use of equipment. When using hydraulically-propelled devices take precautions to ensure that the water pressure created does not cause damage to or flooding of public or private property.
   2. Exercise care to prevent contamination of the potable water system. Use an appropriately sized backflow preventer as required by the authority having jurisdiction when drawing water from a public hydrant.
   3. Debris Disposal: Remove soil, sand, rocks, construction debris and other solid or semi-solid material resulting from the cleaning operation at the downstream structure of the section being cleaned. Passing debris from any section to any other section is not allowed. Load debris from the structures into an enclosed container permitted for waste hauling. Remove

solids and semi-solids resulting from cleaning operations from the site and dispose of lawfully at the end of each work day. Do not accumulate debris or liquid waste on the site.

D. Inspect all structures and interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.

E. Repair or replace defective piping or structures as required by the Owner's Representative and repeat inspections until results are satisfactory.

END OF SECTION 33 4000

Huckabee MORE THAN ARCHITECTS