MORE THAN ARCHITECTS

ADDENDUM

NO. 2

TO THE DRAWINGS AND THE PROJECT MANUAL

PROJECT NAME: AR Turner Elementary School Classroom Expansion

CLIENT NAME: Willis Independent School District

LOCATION: Willis, Texas

PROJECT NUMBER: 01989-06-01

PROPOSAL DATE: Thursday, July 30, 2026, at 3:00 p.m.

ADDENDUM DATE: Thursday, July 23, 2026

For additional information regarding this project, contact Matthew Gvist at matt.gvist@huckabee-inc.com or 281.380.0863

07.23.2026

THIS ADDENDUM INCLUDES:

Civil Items	1 Pages
Landscape Items	1 Pages
Architectural Items	2 Pages
Electrical Items	1 Pages
Technology Items	1 Pages

AND ALL ATTACHED REVISED DRAWINGS AND SPECIFICATION REFERENCES IN THE ADDENDUM

SUPPLEMENTAL INFORMATION:

1. Pre-Proposal Sign-in Sheet
2. Pre-Bid Meeting Agenda
3. Bidders Question (RFI) Responses

CLARIFICATION:

1. **Proposals will be publicly opened electronically through the Ion Wave online bidding system at the date and time specified in the solicitation. The virtual public bid opening will be conducted via Ion Wave, where the names of the proposers will be publicly announced along with their base and alternate monetary proposals.**

Huckabee

Huckabee

a MORE group brand

Project Name: AR Turner ES Classroom Addition
Client: Willis Independent School District
Willis, Texas
Project Number: 01989-06-01

07.23.2026

ARCHITECTURAL ITEMS FOR ADDENDUM NO. 2

NOTICE TO PROPOSERS:

A. This Addendum shall be considered part of the contract documents for the above-mentioned project as though it had been issued at the same time and incorporated integrally therewith. Where provisions of the following supplementary data differ from those of the original contract documents, this Addendum shall govern and take precedence.

B. Proposers are hereby notified that they shall make any necessary adjustments in their estimate on account of this Addendum. It will be construed that each Proposer's proposal is submitted with full knowledge of all modifications and supplemental data specified therein. Acknowledge receipt of this addendum in the space provided on the proposal form. Failure to do so may subject Proposer to disqualification.

REFERENCE IS MADE TO THE DRAWINGS AND THE PROJECT MANUAL AS NOTED:

PROJECT MANUAL:

AD No 2, Arch. Item 1: To the Project Manual, Sections as listed below, Part 2 – Products;
Products listed herein are considered acceptable for conformance with the design concept of the project and general compliance with the information given in the contract documents. The manufacturer, supplier and installer are responsible for meeting all requirements given in the contract documents unless specifically noted in the written approval.

1) To Section 07 5400, "THERMOPLASTIC MEMBRANE ROOFING"
ADD Duro-Last: www.Duro-Last.com as an approved manufacturer.

AD No 2, Arch. Item 2: To the Project Manual, Section 00 1119, "REQUEST FOR COMPETITIVE SEALED PROPOSALS"
To paragraph C, **ADD** the following "along with their base and alternate monetary proposals." At the end of the paragraph.

AD No 2, Arch. Item 3: To the Project Manual, Section 00 4335, "PROPOSAL FORM PART "B" QUALIFICATIONS"
REVISE the following paragraph as follows: "THE CONTRACTOR SHALL PROVIDE THE FOLLOWING INFORMATION IN THE SEQUENCE AND FORMAT PRESCRIBED HEREIN AND AS OUTLINED IN THE REQUEST FOR COMPETITIVE SEALED PROPOSALS SECTION 001119."

AD No 2, Arch. Item 4: To the Project Manual, Section 00 4339, "PROPOSAL SUBMITTAL CHECKLIST"
To paragraph 1.03, A. **DELETE** the following: "five (5) copies of the information as outlined in the Proposal, Tabbed, and Bound."

AD No 2, Arch. Item 5: To the Project Manual, Section 01 5000, "TEMPORARY FACILITIES AND CONTROLS"
To paragraph 1.02 Temporary Utilities, **ADD** the following "C. General contractor is responsible for storm water mitigation plan during construction at existing building/new addition tie-in where existing roof gutters and downspouts will be removed."

Project Name: AR Turner ES Classroom Addition
Client: Willis Independent School District
Willis, Texas
Project Number: 01989-06-01

AD No 2, Arch. Item 6: To the Project Manual, Section 01 5000, "TEMPORARY FACILITIES AND CONTROLS"
To paragraph 1.05 Fencing, B, ADD the following "Fence posts to be secured below grade. Provide wind screens at all fencing, typical."

AD No 2, Arch. Item 7: To the Project Manual, Section 07 2200, "ROOF AND DECK INSULATION"
REPLACE specification section in its entirety.

END OF ARCHITECTURAL ADDENDUM

Project Name: AR Turner ES Classroom Addition
Client: Willis Independent School District
Willis, Texas
Project Number: 01989-06-01

CIVIL ITEMS FOR ADDENDUM NO. 2

NOTICE TO PROPOSERS:

A. This Addendum shall be considered part of the contract documents for the above-mentioned project as though it had been issued at the same time and incorporated integrally therewith. Where provisions of the following supplementary data differ from those of the original contract documents, this Addendum shall govern and take precedence.
B. Proposers are hereby notified that they shall make any necessary adjustments in their estimate on account of this Addendum. It will be construed that each Proposer's proposal is submitted with full knowledge of all modifications and supplemental data specified therein. Acknowledge receipt of this addendum in the space provided on the proposal form. Failure to do so may subject Proposer to disqualification.

REFERENCE IS MADE TO THE DRAWINGS AND THE PROJECT MANUAL AS NOTED:

PROJECT MANUAL:

None

DRAWINGS:

AD No 2, Civil Item 1: **To the Drawings, Sheet C1.06, "SITE & DIMENSION CONTROL PLAN,"**

1) Future fire hydrant by others added to drawing.

END OF CIVIL ADDENDUM

Project Name: AR Turner ES Classroom Addition
Client: Willis Independent School District
Willis, Texas
Project Number: 01989-06-01

07/23/2026

CIVIL ITEMS FOR ADDENDUM NO. 2

NOTICE TO PROPOSERS:

A. This Addendum shall be considered part of the contract documents for the above-mentioned project as though it had been issued at the same time and incorporated integrally therewith. Where provisions of the following supplementary data differ from those of the original contract documents, this Addendum shall govern and take precedence.
B. Proposers are hereby notified that they shall make any necessary adjustments in their estimate on account of this Addendum. It will be construed that each Proposer's proposal is submitted with full knowledge of all modifications and supplemental data specified therein. Acknowledge receipt of this addendum in the space provided on the proposal form. Failure to do so may subject Proposer to disqualification.

REFERENCE IS MADE TO THE DRAWINGS AND THE PROJECT MANUAL AS NOTED:

PROJECT MANUAL:

None

DRAWINGS:

AD No 2, Land Item 1: **To the Drawings, Sheet L1.01, "LANDSCAPE PLAN,"**

1) Added backflow device detail for temporary irrigation.

END OF LANDSCAPE ADDENDUM

Project Name: AR Turner ES Classroom Addition
Client: Willis Independent School District
Willis, Texas
Project Number: 01989-06-01

THE SEAL APPEARING ON THIS DOCUMENT
WAS AUTHORIZED BY
B. KYLE HASKOVEC, PE #143448 ON 07/21/2026

ELECTRICAL ITEMS FOR ADDENDUM NO. 2

NOTICE TO PROPOSERS:

A. This Addendum shall be considered part of the contract documents for the above-mentioned project as though it had been issued at the same time and incorporated integrally therewith. Where provisions of the following supplementary data differ from those of the original contract documents, this Addendum shall govern and take precedence.
B. Proposers are hereby notified that they shall make any necessary adjustments in their estimate on account of this Addendum. It will be construed that each Proposer's proposal is submitted with full knowledge of all modifications and supplemental data specified therein. Acknowledge receipt of this addendum in the space provided on the proposal form. Failure to do so may subject Proposer to disqualification.

REFERENCE IS MADE TO THE DRAWINGS AND THE PROJECT MANUAL AS NOTED:

PROJECT MANUAL:

AD No 2, Elec. Item 1: To the Project Manual, Section 26 2416, "PANELBOARDS"
ADD specification in its entirety.

AD No 2, Elec. Item 2: To the Project Manual, Section 28 4600, "FIRE DETECTION AND ALARM"
Revised spec section to indicate the existing system shall be expanded in lieu of providing a new fire alarm system.

END OF ELECTRICAL ADDENDUM

TECHNOLOGY ITEMS FOR ADDENDUM NO. 2

NOTICE TO PROPOSERS:

A. This Addendum shall be considered part of the contract documents for the above-mentioned project as though it had been issued at the same time and incorporated integrally therewith. Where provisions of the following supplementary data differ from those of the original contract documents, this Addendum shall govern and take precedence.

B. Proposers are hereby notified that they shall make any necessary adjustments in their estimate on account of this Addendum. It will be construed that each Proposer's proposal is submitted with full knowledge of all modifications and supplemental data specified therein. Acknowledge receipt of this addendum in the space provided on the proposal form. Failure to do so may subject Proposer to disqualification.

REFERENCE IS MADE TO THE DRAWINGS AND THE PROJECT MANUAL AS NOTED:

PROJECT MANUAL:

AD No 2, Tech. Item 1: To the Project Manual, Sections as listed below, Part 2 – Products;

Products listed herein are considered acceptable for conformance with the design concept of the project and general compliance with the information given in the contract documents. The manufacturer, supplier and installer are responsible for meeting all requirements given in the contract documents unless specifically noted in the written approval.

1) To Section 27 1000, "Structured Cabling System"
   Replace this section in its entirety with the specification attached. Telecommunications room metals have been updated to conform with owner standards and changes recently make on other ongoing project within the district

DRAWINGS:

AD No 2, Tech. Item 2: To the Drawings, Sheet TPA1.02, "PUBLIC ADDRESS FLOOR PLAN – AREA D"

1) Delete two secondary clocks, refer to attached drawing TPA1.02

END OF TECHNOLOGY ADDENDUM

MORE THAN ARCHITECTS

MEETING AGENDA

Project Name:	Turner ES Classroom Expansion		
Client:	Willis ISD		
Location:	21026 TX-494 Loop, New Caney, TX 77357	**Date of Meeting:**	07/15/2026
Project No:	01989-06-01	**Time of Meeting:**	2:30 pm
Meeting Subject:	Pre-Proposal Meeting	**Place of Meeting:**	612 N. Campbell Street, Willis, TX 77378

INTRODUCTIONS:

- Bob Eaton – Willis ISD, Chief of Operations and Construction
- Ginger Deck – Willis ISD, Purchasing Director
- Karla Castillo – Huckabee Architects, Principal
- Matthew Gvist – Huckabee Architects, Associate Principal
- Miguel Rodriguez – Huckabee Architects, Project Leader
- Amanda Mullen – TNP, Civil
- Craig Mckee – IEG, Structural
- Merl Prichard – IEG, MEP
- Mark Calvo – Combs, Technology

SCOPE: 10 Classroom, Breakout Rooms and ancillary space addition to existing AR Turner Elementary School with site improvements including adding additional concrete parking spaces on site.

PROPOSAL INFORMATION:

Who: Proposal submitted to Ion Wave (Willis ISD procurement website) https://willisisd.ionwave.net/Login.aspx
When: Bid date: **July 30, 2026**: Base Bid, Alternate and qualifications due by 3:00pm
Where: Proposals will be publicly opened electronically through the Ion Wave online bidding system at the date and time specified in the solicitation. **The virtual public bid opening will be conducted via Ion Wave, where the names of the proposers will be publicly announced along with their base and alternate monetary proposals.**

Instructions to Proposers – Refer to 00 1119 Request for Competitive Sealed Proposals

- All documents can be obtained from Ion Wave https://willisisd.ionwave.net/Login.aspx or https://moregroup-inc.com/construction/
- ALL QUESTIONS MUST BE SUBMITTED TO Ion Wave https://willisisd.ionwave.net/Login.aspx and Matthew Gvist, email to matt.gvist@huckabee-inc.com. Verbal responses are not considered binding.
- Questions and substitution requests will be accepted by 3:00pm on **7/20/2026**. The required substitution request form can be found on Huckabee's website.

- All Addenda will be posted to Ion Wave https://willisisd.ionwave.net/Login.aspx and Huckabee's website https://moregroup-inc.com/construction/

SCHEDULE: *(Refer to Section 01 1400)*

Addendum 2, sign in + agenda + pre-proposal meeting minutes + RFI responses (if any): to be released **7/23/2026**
Bid date: Base Bid, Alternate and qualifications at 3pm on **7/30/2026**
Board award: **August 12, 2026**
Notice to proceed: Following signed contract
Substantial completion: **July 1, 2027**

ALLOWANCES: *(Section 01 2100)*

- Owners' contingency of $275,000.00
- Project Identification Sign allowance of $1,500.00
- Emergency Radio Communication System allowance of $60,000.00

ALTERNATES: *(Section 01 2300)*

- Alternate 1A:
  - Provide packaged rooftop air conditioning units manufactured by Carrier ILO Trane as specified in 23 7416 and in the drawings.
- Alternate 1B:
  - Provide packaged rooftop air conditioning units manufactured by York ILO Trane as specified in 23 7416 and in the drawings.
- Alternate 1C:
  - Provide packaged rooftop air conditioning units manufactured by Daiken ILO Trane as specified in 23 7416 and in the drawings.
- Alternate 2
  - Install tile finish as scheduled on west wall (CMU wall) at D123 Boys and D124 Girls. Refer to plans for additional information.
- Alternate 3
  - Install bench along west wall at D119 Corridor. Refer to plans for additional information.

WORK RESTRICTIONS: *(Refer to Section 01 1400)*

SITE TOURS:

- Optional site visit immediately following the pre-proposal meeting.

BUDGET: $5,500,000.00

MORE THAN ARCHITECTS

SIGN IN SHEET

Project Name: Willis ISD – Turner ES Classroom Expansion
Project Number: 01989-06-01
Owner: Willis ISD
Meeting Description: Pre-Proposal Meeting

Meeting Date and Time: 07/15/2026 – 2:30 PM
Meeting Location: 612 N. Campbell St. Willis, TX 77378
Owner's Designated Representative: Bob Eaton

INITIAL	NAME	EMAIL	PHONE
	Eaton, Bob	reaton@willisisd.org	936.333.2189
	Deck, Ginger	gdeck@willisisd.org	936.890.7295
	Castillo, Karla	karla.castillo@huckabee-inc.com	713.292.6925
	Gvist, Matthew	matt.gvist@huckabee-inc.com	281.380.0863
	Miguel Rodriguez	miguel.rodriguez@huckabee-inc.com	
MP	Merl Prichard	merl.prichard@moregroup-inc.com	
	Amanda Mullen	amullen@tnpinc.com	
MC	Mark Calvo	Mark.calvo@combs-group.com	
	Craig Mckee	craig.mckee@moregroup-inc.com	
	Jack Ellisor	bids@ellisorinc.com	281-359-5426
	Matthew Fails	matthew@ellisorinc.com	936-661-1105
	Elena Gonzalez	estimating@mps-team.com	832 512 0980
	Chance Davis	estimating@GTTconstruction.com	936-441-8282
	Jeremy Jackson	jeremy@roglermetals.com	832-334-2569
	BRAD HOOPER	ESTIMATING@JAMALSMITH.COM	281 393 1403
	PHILLIP CANO	estimating@primecontractorsinc.com	281 999 0875
	Tad Gray	tgray@thinkdsc.com	936 203 3289
	Keith Miller	keith@rmillc-texas.com	936 520-4827
	Jennifer Steen	JSteen@tnpinc.com	936 718-8023
INITIAL	NAME	EMAIL	PHONE

CSP 26-033 PRE-PROPOSAL CONFERENCE & SITE VISIT - 7/15/26 - 2:30 PM	
FIRM NAME	ATTENDEE NAME
Omni Construction Ser	Jeff Hearne
Omni Construction	Joe Greer
Westfall Constructors	Francois Harvey
ICI Construction Inc.	Andy Knobloch
Division One Constr. LLC	Brandon Watson / Stephanie Thomas
Construction Managers of South East Texas	Jesus Cardenas
TAG Communications	Jose Hernandez
C. A Walker	Nestor Gonzalez
Spring Glass	Hudson Badwell
Spring Glass	Matt Gray

Proposal Phase Questions

Project Name: AR Turner ES Classroom Expansion
Client: Willis Independent School District
Location: Willis, Texas
Project Number: 01989-06-01

Proposal Date: 7/30/2026
Proposal Location: Wiliis ISD - Ion Wave (Virtual)

Date Received	Method (phone/ email)	Contact	Contractor Company	Email	Question	Response	Date Responded	Method (phone/ email/ addenda #)	Item Completed
7/9/2026	Email	Michelle Vela	Milennium	mvela@mps-team.com	Is the AIA A305 due on the 15th or the 30th with the bid? The specs have this information below and the in Ionwave, in the Response Attachments tab it doesn't state a date.	Date to be revised to July 30 at 3:00 pm - Revision issued in Addedum 1	7/13/2026	Addendum 1	Complete
7/9/2026	Via Ion Wave		Virtual Builders Exchange		What is the Zoom invitation for? It is dated for 5/20. Please advise.	This was included erroneously and has been removed.	7/9/2026	Ion Wave Clarification	Complete
7/9/2026	Via Ion Wave		Division One Construction		The Fire Alarm specifications reference installing a new fire alarm system? Pyrotex Systems has already put a new Gamewell FCI system in within the past couple years. Please clarify that the District does not want to replace something that is fairly new?	Intent is to expand existing system in lieu of providing a new FA system. Revised spec to be issued with Addendum 2 for clarification.	7/21/2026	Ion Wave Clarification	Complete
7/9/2026	Via Ion Wave		Division One Construction		Drawing TPA 1.02 shows the symbol for 2 clocks. The School does not have any clocks and the District does not want clocks in corridors of this expansion. Please clarify.	Secondary clocks are not needed. These will be removed in addendum 2	7/22/2026	Ion Wave Clarification	Complete
7/9/2026	Via Ion Wave		ICI Construction		Would you please confirm that both part A and B are due on July 30th at 3:00PM via IonWave only? Page 004393-1 contradicts this information.	Date to be revised to July 30 at 3:00 pm - Revision issued in Addedum 1	7/9/2026	Addendum 1	Complete
7/10/2026	Via Ion Wave		Division One Construction		Is the intent to include permanent ELD components (e.g., conductive layer, embedded grid/wiring, or termination points) as part of the roof assembly, built in during installation for future/ongoing leak-detection capability? If so, please identify which specific system and confirm the associated roof assembly components, connection details, and any coordination required with the roofing membrane and insulation layers (Sections 07 22 00 / 07 54 00).	Electronic Leak Detection will not be required. 3.02 Field Quality Control,Item C. will be removed from 07 5400 Thermoplastic Membrane Roofing specification in addendum 1.	7/13/2026	Addendum 1	Complete
7/10/2026	Via Ion Wave		Division One Construction		Or, is the intent limited to a one-time, third-party ELD survey performed by a certified testing agency upon substantial completion of the roof installation, using portable/non-invasive equipment with no components remaining embedded in the finished roof assembly?	Electronic Leak Detection will not be required. 3.02 Field Quality Control,Item C. will be removed from 07 5400 Thermoplastic Membrane Roofing specification in addendum 1.	7/13/2026	Addendum 1	Complete
7/10/2026	Via Ion Wave		Division One Construction		If a permanent/embedded system is intended, please confirm whether this scope and cost is to be carried by the roofing subcontractor or engaged as a separate testing agency contract by the Owner, and whether it affects the roofing manufacturer's NDL warranty terms under Section 07 54 00.	Electronic Leak Detection will not be required. 3.02 Field Quality Control,Item C. will be removed from 07 5400 Thermoplastic Membrane Roofing specification in addendum 1.	7/13/2026	Addendum 1	Complete
7/10/2026	Via Ion Wave		Division One Construction		This distinction materially affects the roofing bid: an embedded ELD system requires additional materials, installation labor, and coordination with the membrane/insulation trades, while a third-party post-installation survey is a testing/inspection cost only and does not affect roof assembly construction. Clarification is needed prior to bid submission to accurately price this requirement.	Electronic Leak Detection will not be required. 3.02 Field Quality Control,Item C. will be removed from 07 5400 Thermoplastic Membrane Roofing specification in addendum 1.	7/13/2026	Addendum 1	Complete
7/14/2026	Via Ion Wave		Division One Construction		Who is responsible for furniture moving?	Willis ISD	7/14/2026	Ion Wave Clarification	Complete
7/14/2026	Via Ion Wave		Division One Construction		Is asbestos abatement required? If so, who is responsible?	No	7/14/2026	Ion Wave Clarification	Complete
7/14/2026	Via Ion Wave		Division One Construction		Is badging required?	Yes	7/14/2026	Ion Wave Clarification	Complete
7/14/2026	Via Ion Wave		Division One Construction		Please confirm security Div 28 is by owner	Only equipment by Willis ISD - cabling and infastructure by General Contractor	7/14/2026	Ion Wave Clarification	Complete
7/14/2026	Via Ion Wave		Division One Construction		What Jurisdiction is permitting?	City of Conroe	7/14/2026	Ion Wave Clarification	Complete
7/14/2026	Via Ion Wave		Division One Construction		What is the status of the permit?	Currently in Review	7/14/2026	Ion Wave Clarification	Complete
7/14/2026	Via Ion Wave		Division One Construction		Who is responsible for the cost of the permit?	Willis ISD will pay for the building permit	7/14/2026	Ion Wave Clarification	Complete
7/14/2026	Via Ion Wave		Division One Construction		Does the GC need to pay for any power or utility bills during construction?	General Contractor	7/14/2026	Ion Wave Clarification	Complete

7/14/2026	Via Ion Wave		Division One Construction		Who is responsible for utility tap fees if required?	General Contractor	7/14/2026	Ion Wave Clarification	Complete
7/14/2026	Via Ion Wave		Division One Construction		Will emergency radio system testing be required in our bid, or is it included in the allowance?	Included in Allowance	7/14/2026	Ion Wave Clarification	Complete
7/17/2026	Via Ion Wave		Virtual Builders Exchange		Will the Pre-Proposal Conference sign in sheet be posted?	Yes	7/20/2026	Ion Wave Clarification	Complete
7/17/2026	Via Ion Wave		Construction Managers of Southeast Texas, LLC		Will the video surveillance and access control scopes be by Owner? Will the contractor be responsible for anything associated with these scopes of work outside of providing pathways? If so, please advise who currently handles the existing video surveillance and access controls.	Access Control and Video Surveillance End Points, licensing, and programming are by Owner. Please reference drawing T0.01 Scope and Responsibility Matrix. Contractor is only responsible for pathways and cabling for the systems. Video surveillance cabling is specified under section 27 10 00 Structured Cabling systems. Access Control Cabling is specified under section 280513 Conductors and Cabling for Electronic Safety and Security	7/22/2026	Ion Wave Clarification	Complete
7/17/2026	Via Ion Wave		Construction Managers of Southeast Texas, LLC		Please advise who handles the school's existing fire sprinkler system?				
7/17/2026	Via Ion Wave		Construction Managers of Southeast Texas, LLC		Please advise who handles the school's existing fire alarm system?	Based on email correspondence, it appears Pryotex Systems manages/installed the Gamewell system currently in the school	7/21/2026	Ion Wave Clarification	Complete
7/17/2026	Via Ion Wave		Construction Managers of Southeast Texas, LLC		Please advise who handles the existing building HVAC controls?				
7/17/2026	Via Ion Wave		Construction Managers of Southeast Texas, LLC		Please advise who handles the existing public address system?				
7/17/2026	Via Ion Wave		Construction Managers of Southeast Texas, LLC		During the pre-bid meeting it was mentioned that the contractors will need to implement a temporary drainage system to reroute water from the existing roof away from the new building footprint. Can this requirement be included in the documents?	Requirement added to spec section 01 5000 in addendum 2	7/22/2026	Ion Wave Clarification	Complete
7/17/2026	Via Ion Wave		Construction Managers of Southeast Texas, LLC		Can the windscreen requirement that was brought up at the pre-bid meeting for temporary fencing be added to spec section 015000?	Requirement added to spec section 01 5000 in addendum 2	7/20/2026	Addendum 2	Complete
7/17/2026	Via Ion Wave		Construction Managers of Southeast Texas, LLC		During the pre-bid meeting it was mentioned that the contractor will need to board up windows at the existing building. Is this correct, if so, can these windows be identified on a floor plan?	Windows are shown on Demolition Floor Plan - Area D - AD1.01, keynote 'D1'	7/20/2026	Ion Wave Clarification	Complete
7/17/2026	Via Ion Wave		Construction Managers of Southeast Texas, LLC		There are mentions of a commissioning agent and pre-functional checklists in the specifications. Can we confirm who the selected commissioning agent for the project is and provide the pre-functional checklists?				
7/17/2026	Via Ion Wave		Construction Managers of Southeast Texas, LLC		Will an irrigation system be required? Intent of irrigation specification 328400. From what we can tell there will not be an irrigation system?	No new irrigation system is required, the spec is included for temporary irrigation that is required per Landscape Plan - L1.01	7/20/2026	Ion Wave Clarification	Complete
7/17/2026	Via Ion Wave		Construction Managers of Southeast Texas, LLC		Is material testing such as soil compaction, concrete strength, etc. to be paid for by the contractor or will the Owner be responsible for this testing?	Paid by Willis ISD	7/22/2026	Ion Wave Clarification	Complete
7/20/2026	Via Ion Wave		Virtual Builders Exchange		Page 262416 is missing from the Specs. Please advise.	26 2416 Panelboard spec will be added in addendum 2	7/20/2026	Ion Wave Clarification	Complete
7/20/2026	Via Ion Wave		Division One Construction		Are we required to fill out the proposal forms in the spec section 004200, or can we just fill out the "Line Items" tab in Ionwave to submit our bid?				
7/20/2026	Via Ion Wave		Division One Construction		Spec section 07 22 00 / 2.01 lists a vapor barrier, however detail G3.01 / Roof Types does not show one. Please confirm the design intent.	Disregard vapor barrier. it will be removed from spec in addednum 2	7/22/2026	Ion Wave Clarification	Complete
7/20/2026	Via Ion Wave		Division One Construction		Spec section 07 22 00 / 2.02 / A / 2 states for the insulation thickness to be 5” minimum, however detail G3.01 / Roof Types lists an R-25 (4.4”). Please confirm the design intent.	GC to provide insulation as specified even if it exceeds R-25. R-25 is the minimum	7/22/2026	Ion Wave Clarification	Complete
7/20/2026	Via Ion Wave		Division One Construction		Spec section 07 22 00 / 3.03 / F / 1 states for the insulation adhesive to be installed in a “picture frame” pattern in addition to the required ribbon spacing. This is not required for warranty or testing purposes and increases the cost due to additional adhesive being used. Please confirm if “picture framing” is required.	Disregard "picture frame" adhesive pattern. It will be removed from spec in addendum 2	7/22/2026	Ion Wave Clarification	Complete
7/20/2026	Via Ion Wave		Division One Construction		Spec section 07 62 00 / 2.03 / J lists gutter screen, however detail A6.04 / 5 does not show this. Please confirm the design intent.	GC to install as specified	7/22/2026	Ion Wave Clarification	Complete

7/20/2026	Via Ion Wave		Milennium Project Solutions		Can you all confirm that there is not any synthetic turf or running tracks in this project?	No synthetic turf or running tracks in the project	7/20/2026	Ion Wave Clarification	Complete
7/20/2026	Via Ion Wave		Milennium Project Solutions		Who is the current BAS controls holder?				
7/20/2026	Via Ion Wave		Milennium Project Solutions		What Fire Alarm system is in the building?	Based on email correspondence, we believe a Gamewell FCI system was installed and currently serving the building	7/20/2026	Ion Wave Clarification	Complete
7/20/2026	Via Ion Wave		Milennium Project Solutions		What Project Management software is required for the project?	Project Mates	7/22/2026	Ion Wave Clarification	Complete
7/20/2026	Via Ion Wave		Jamail & Smith Construction		Section 004335-Proposal form Part "B" Qualifications mentions an Instructions to Proposers section 00 2116, but it is not included in the specification documents. Will this be issued?	GC to disregard this note referencing spec section 002116. It will be removed from spec in addendum 2	7/22/2026	Ion Wave Clarification	Complete
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	RFI-001 – Existing Utility Verification The civil drawings indicate connections to existing utilities. Will the Owner provide record utility drawings and recent utility locates, or will the Contractor be responsible for locating all underground utilities prior to construction?	We can provide the record drawings, no SUE survey was performed on the design side. Contractor is responsible for locating and verifying utilities as indicated on the plans.	7/21/2026	Ion Wave Clarification	Complete
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	RFI-002 – Existing Building Tie-In Please clarify the exact sequence and extent of demolition required where the new classroom addition connects to the existing building. Will temporary weather protection and occupied building separation be required during tie-in operations?	Means and methods by the GC. Extent of demolition is shown on demo plans in the drawing set. Temporary weather protection and occupied building separation will be required during construction.	7/21/2026	Ion Wave Clarification	Complete
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	RFI-003 – School Occupancy During Construction Will the existing elementary school remain occupied throughout construction? If so, please provide restrictions regarding: •Working hours •Student access routes •Noise limitations •Utility shutdowns •Weekend work •Summer work	School will be operating during construction, refer to 01 1400 Work Restrictions specifications for more information	7/22/2026	Ion Wave Clarification	Complete
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	RFI-004 – Construction Phasing Please confirm whether construction is to occur in a single phase or multiple phases. If phased, provide milestone dates and turnover requirements.	Single Phase	7/21/2026	Ion Wave Clarification	Complete
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	RFI-005 – Temporary Facilities Please clarify Owner expectations regarding: •Temporary fencing •Temporary sidewalks •Temporary ADA access •Construction entrances •Laydown areas •Contractor parking	Refer to 01 5000 Temporary Facilities and Control specification	7/22/2026	Ion Wave Clarification	Complete
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	RFI-006 – Existing Fire Alarm Integration Please clarify whether the existing fire alarm panel has sufficient capacity for the new addition or if replacement/expansion of the existing panel will be required.	Unaware of existing system capacity. Intent is to utilize existing system/expand existing system to cover new addition area	7/21/2026	Ion Wave Clarification	Complete
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	RFI-007 – Existing Security System Please confirm the manufacturer of the existing security/access control system and identify whether programming and licensing are by Owner or Contractor.	Access Control End Points, licensing, and programming are by Owner. Existing Intrusion system manufacture, main panel location, etc. will be clarified in Addendum	7/22/2026	Ion Wave Clarification	Complete
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	RFI-008 – Existing Technology Infrastructure Please identify: •Existing MDF location •Existing fiber backbone size •Required fiber counts •Owner standards for network switches •Owner-furnished network equipment, if any.	Please refer to specification section 27 10 00 Strucured Cabling System, Part 2 Products, Article 2.02 Fiber Optic Backbone Cable AND drawing T3.01 Technology Enlarged Views and Elevations. Network Switches are owner furnished / owner installed Reference drawing T0.01 Scope and Responsibility Matrix	7/22/2026	Ion Wave Clarification	Complete
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	RFI-009 – Domestic Water Capacity Has the existing domestic water service been evaluated to confirm adequate capacity for the additional restroom fixtures?	Yes, the 4-inch water entry and 3-inch cold water loop is large enough to sustain current building fixtures and fixtures to be added.	7/21/2026	Ion Wave Clarification	Complete
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	RFI-010 – Sanitary Sewer Capacity Please confirm the existing sanitary sewer has sufficient capacity for the proposed addition.	We don't anticipate any issues with sewer capacity	7/22/2026	Ion Wave Clarification	Complete
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	RFI-011 – Existing Electrical Service Please confirm the existing electrical service and switchgear have sufficient spare capacity to serve the addition without major upgrades.	Existing electrical gear within the building has sufficient capacity based on as-built documents to serve new addition area. Utility transformer will need to be reviewed by utility company to determine possible upgrade	7/21/2026	Ion Wave Clarification	Complete
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	RFI-012 – Roof Warranty Will tying into the existing building roof require maintaining an existing roof warranty? If so, please provide warranty requirements and approved installers.				

7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	RFI-013 – Brick Matching The drawings identify existing brick matching in some locations. Please clarify acceptable color and texture tolerances and whether salvaged brick is required anywhere.	Match existing brick veneer, manfacturer and colors are shown on sheet G1.02 - Salvage brick as detail on sheet A1.31 and A6.04	7/22/2026	Ion Wave Clarification	Complete
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	RFI-014 – Mock-Up Requirements Please clarify the acceptance criteria for the required exterior wall mock-up and water testing. Is third-party testing required, and who is responsible for associated costs?	Refer to 01 4339 Mock-Up Wall Construction specification , GC is responsible for cost	7/22/2026	Ion Wave Clarification	Complete
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	RFI-015 – Technology Equipment Please identify all Owner-Furnished/Contractor-Installed (OFCI) equipment for: •Data •Wireless •Security •Public Address •AV	Reference drawing T0.01 Scope and Responsibility Matrix	7/22/2026	Ion Wave Clarification	Complete
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	RFI-016 – Commissioning Please clarify whether independent commissioning will be provided by the Owner or included in the Contractor's scope.				
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	RFI-017 – Testing & Inspections Please identify which testing agencies will be Owner-retained versus Contractor-retained for: •Geotechnical •Concrete •Structural steel •Fireproofing •Masonry •Roofing •TAB				
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	RFI-018 – Alternate HVAC Manufacturers Alternate No. 1 identifies multiple acceptable rooftop unit manufacturers. Please confirm whether substitutions beyond those listed will be considered prior to bid.	No substitutions beyond manufacturers listed	7/22/2026	Ion Wave Clarification	Complete
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	RFI-019 – Finish Alternates Please clarify whether Alternates No. 2 and No. 3 are additive or deductive and whether they will be considered independently or collectively during award.	Additive, considered independently	7/21/2026	Ion Wave Clarification	Complete
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	RFI-020 – Building Automation System Please identify the existing Building Automation System manufacturer and confirm whether integration, graphics, programming, and licenses are included in this project.				
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	RFI-021 – Existing Access Control and Intrusion Detection Systems Please identify the existing campus access control and intrusion detection systems, including the manufacturer, software platform, controller and panel models, and current firmware/software versions. While the drawings indicate the project will utilize the existing server, software, UPS, and credentials, the Contract Documents do not clearly identify the existing systems or the required integration platform.	Access Control End Points, licensing, and programming are by Owner. Please reference drawing T0.01 Scope and Responsibility Matrix. Existing Intrusion system manufacture, main panel location, etc. will be clarified in Addendum	7/22/2026	Ion Wave Clarification	Complete
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	RFI-021-2/2 Please also clarify: •The manufacturer and model of the existing Access Control System. •The manufacturer and model of the existing Intrusion Detection System. •Whether all programming, licensing, software upgrades, and integration with the existing head-end are included in the Contractor's scope. •Whether work must be performed by the Owner's existing security integrator or if any qualified manufacturer-certified installer is acceptable. •Whether any proprietary software, licensing fees, or Owner-furnished equipment should be excluded from the Contractor's bid.	Access Control End Points, licensing, and programming are by Owner. Please reference drawing T0.01 Scope and Responsibility Matrix. Existing Intrusion system manufacture, main panel location, etc. will be clarified in Addendum	7/22/2026	Ion Wave Clarification	Complete
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	Is imported fill anticipated?	The bidders need to calculate their own cut/fill analysis. I will say though that per the Geotech recommendation fill under the building should be select fill. Civil doesn't specify earthwork within the building footprint (would be covered by structural) but I'd anticipate they need to bring in the select fill per the Geotech recommendation. Outside of the building it's primarily cut.	7/21/2026	Ion Wave Clarification	Complete
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	Will export of excess soils be paid separately?	Any required export of material should be included in the bid.	7/21/2026	Ion Wave Clarification	Complete
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	Are geotechnical recommendations complete?	Yes, refer to geotechnical report in specifications	7/21/2026	Ion Wave Clarification	Complete
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	Are drilled piers anticipated if unsuitable soils are encountered?	No, per Note 8 & 9 of the "Foundation and Soil Prep Notes" on Sheet S0.0: Footings shall bear on either native undisturbed soil approved by the SITA or select fill as specified in Note 11D of the same section. Soft or unsuitable soils at the foundation bearing level shall be removed to expose suitable firm soil	7/22/2026	Ion Wave Clarification	Complete

7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	Is structural steel required to be shop primed or galvanized?	Per 05 1200 2.03 B of the project manual: Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or high strength bolted. Reference 09 9000 of the project manual for additional information on priming. All loose lintels shall be hot dipped galvanized after fabrication	7/22/2026	Ion Wave Clarification	Complete
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	Is TAB by the mechanical contractor or an independent TAB agency?				
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	Who provides rooftop unit startup?				
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	Is backflow prevention by the plumbing contractor or utility authority?	Backflow prevention is existing, no new water lines are being run into the building. If they need to know existing preventer information, this should be a question for the owner	7/21/2026	Ion Wave Clarification	Complete
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	Is a reduced pressure backflow assembly required?	No	7/21/2026	Ion Wave Clarification	Complete
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	Is the utility transformer existing or new?	Intent is for transformer to remain as main panel serving school is existing to remain	7/21/2026	Ion Wave Clarification	Complete
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	Who pays utility company fees?	Contractor shall pay any associated utility fees. Currently not anticipating any electrical utility fees unless the utility company determines a transformer upgrade is necessary, hence why a service entrance spec was not issued to cover this	7/21/2026	Ion Wave Clarification	Complete
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	Who furnishes network switches?	Network Switches are by Owner. Please reference drawing T0.01 Scope and Responsibility Matrix	7/22/2026	Ion Wave Clarification	Complete
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	Is fiber testing by the installing contractor?	Yes, please reference specifications section 27 10 00 Structured Cabling Systems for additional information	7/22/2026	Ion Wave Clarification	Complete
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	Is OTDR testing required?	Yes, please reference specifications section 27 10 00 Structured Cabling Systems for additional information	7/22/2026	Ion Wave Clarification	Complete
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	Is the existing fire pump adequate?	This is officially confirmed by the Fire Protection designer, but the water flow test values did not imply that a pump would be needed	7/21/2026	Ion Wave Clarification	Complete
7/20/2026	Email	Beatriz Garcia	E Contractors USA	Beatriz.Garcia@econtractors.com	Will sprinkler acceptance testing occur after school hours?				

SECTION 072200
ROOF AND DECK INSULATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Roof and Deck Insulation.

1.02 RELATED WORK

A. Section 06 1000 - Rough Carpentry

B. ~~Section 07 5100 - Built-Up Bituminous Roofing~~

C. ~~Section 07 5216 - SBS Modified Bituminous Roofing~~

D. Section 075400 - Thermoplastic Membrane Roofing

E. Section 07 6200 - Sheet Metal Flashing and Trim

1.03 SYSTEM DESCRIPTION

A. Install rigid board insulation and coverboard as required to achieve a complete and proper substrate for the roof membrane system and associated crickets, saddles, and taper to provide complete drainage of stormwater. Refer to Part 2 and Drawings for insulation thicknesses required. Roofing insulation is intended to be included within a single source warranty by the primary roofing manufacturer.

1.04 SUBMITTALS

A. Submit manufacturer's installation instructions, samples and product data, in accordance with the provisions of Division 1.

B. Submit fastening and adhesive patterns for field, perimeter, and corner areas to sufficiently comply with wind loads calculated in accordance with ASCE 7, as referenced by applicable Codes.

C. Submit roof plan indicating proposed dimensions of perimeter and corner zones, complying with minimum requirements specified in the Drawings.

D. Submit tapered insulation layout plans.

E. Submit manufacturer's certificate, in accordance with the provisions of Section 013300, that products meet or exceed specified requirements.

F. Submit certification from roof membrane manufacturer that board insulation materials are acceptable for use with roof membrane materials.

1.05 REGULATORY REQUIREMENTS

A. Conform to applicable local building codes for roof assembly requirements.

1.06 QUALITY ASSURANCE

A. Comply with PIMA and NRCA standards and requirements.

B. Materials shall comply with the requirements to meet UL Class A Ratings (UL 790 and UL 1256 Standard) and FM Global Class 1 (FM 4450 and FM 4470) requirements.

C. Contractor shall provide in-place mock-ups to illustrate insulation offsets and staggers in accordance with the requirements in this Section.

D. Work shall not commence prior to the Pre-Roofing Conference.

1.07 DELIVERY, STORAGE AND HANDLING

A. Deliver and store products in accordance with the provisions of Division 1.

B. Any material becoming wet or damaged, including water stained facers will be rejected and shall be removed from the jobsite immediately and replaced at Contractor's expense. Any insulation found to be improperly stored at the jobsite shall be considered wet at the discretion of the Architect and removed from the jobsite.

C. Materials Stored on Roof Levels for Immediate Use Only:
   1. Comply with maximum roof live loads specified by the Structural Engineer.
   2. Distribute to prevent concentrated loads that would impose excessive strain on deck or structural members.
   3. Positively secure to prevent displacement by wind.
   4. Tarp for protection from exposure as noted above.
   5. Material storage on roof levels overnight is not allowed.

1.08 SEQUENCING AND SCHEDULING

A. Coordinate work under provisions of Division 1.

B. Coordinate the work of installing roof membrane and flashing as the work of this Section proceeds.

C. Plan roof layout with respect to roof deck slope to prevent rainwater drainage into completed roofing. All roof drains and/or scuppers shall be installed prior to beginning with installation. Contractor shall coordinate location and heights of drains/scuppers to ensure ponding does not occur after roof installation. Improper coordination for drainage components resulting in ponding or shaved rigid insulation will require correction at the Contractor's expense.

D. Do not install more insulation than can be covered with the complete roof system in the same day.

E. Do not install roofing until all wood blocking, roof curbs, and penetrations have been installed.

F. Do not install materials in fog and/or inclement weather or when rain is predicted (30% or more possibility) or when ambient temperature is below 40 F. The Contractor shall suspend work if in their opinion, wind speed will impede the proper installation of the roofing work or cause a danger to personnel or the property.

PART 2 - PRODUCTS

2.01 ~~VAPOR BARRIER~~

A. ~~Roofing vapor barrier is intended to be included within a single source warranty by the primary roofing manufacturer.~~

B. ~~Acceptable Vapor Barriers:~~
   1. ~~Smooth SBS modified bitumen sheet vapor barrier set in cold adhesive,~~
   2. ~~Torch applied SBS modified bitumen sheet vapor barrier, ASTM D 4601, Type II, and ASTM D 1970.~~
   3. ~~Built up felts set in hot asphalt, minimum four (4) plies ASTM D 2178 Type VI asphalt impregnated, glass fiber felt, with a glaze coat of asphalt at the top surface.~~

2.02 INSULATION MATERIALS

A. Flat Stock Polyisocyanurate Insulation, ASTM C1289, Type II, Class 2, Grade 2 (20 psi) closed cell foam core bonded to coated fiberglass facers, 4'x4' maximum board dimension,
   1. Maximum board thickness: 2.6".
   2. System Thickness (metal and membrane roofs over conditioned space): Two (2) layers 2.5" or 2.6" thickness insulation, total thickness 5" minimum.

B. Tapered Polyisocyanurate Insulation, ASTM C1289, Type II, Class 2, Grade 2 (20 psi) closed cell foam core bonded to coated fiberglass facers, slope as indicated in the Drawings,
   1. Maximum board thickness: 2.6", except in locations where at least 3 layers of insulation are present.

2. System thickness (membrane roofs over conditioned space): Total average thickness 5” minimum, with average calculated based on a maximum variation of 1 inch.

C. Tapered Edge Strips expanded perlite, ASTM C 728, Type 1.

D. Cover Board: 4’x4’ board dimension, 5/8” thickness, approved for use in Factory Mutual Very Severe Hail (VSH) approved assemblies.
1. Dexcell FA VSH Glass Mat Roof Board
2. Densdeck StormX Prime
3. USG Gypsum Fiber Roof Board
4. Pre-proposal approved equivalent.

2.03 ACCESSORIES

A. General: Provide fasteners approved by insulation manufacturer, meeting wind uplift requirements as specified.

B. Metal Decks: No. 12 hex-head fastener with coating which exceeds F.M. Specification No. 4470
1. Induction welding type metal plates, approved by roof membrane manufacturer.

C. Insulation Adhesive: manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:
1. Modified asphaltic, asbestos-free, cold-applied adhesive.
2. Bead-applied, low-rise, one-component or multicomponent urethane adhesive.
3. Full-spread spray-applied, low-rise, two-component urethane adhesive.

D. Pre-fabricated tapered roof drain sump insulation.

PART 3 - EXECUTION

3.01 PREPARATION

A. Clean deck and ensure deck is dry prior to the application of new roof assembly.

B. Wet, water stained, warped, discolored, or physically damaged insulation and/or insulation facers will be rejected and must be removed from the project site.

C. Verify that:
1. Roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set and comply with specified minimum flashing height requirements.
2. Wood nailing strips at perimeter edges and parapet walls are in place and are fastened in accordance with applicable codes.
3. Deck conditions are free and clear of dirt, rust, moisture, debris, and surface conditions are in accordance with manufacturer required guidelines for adhesion.
4. Under deck conditions are clear for fastener installation. Contractor is responsible for field verifying the roof deck underside to ensure no equipment or MEP lines will be damaged from new fasteners. While excessive length roofing fasteners should not be used, the MEP subcontractors also should not be attaching anchors, straps, or fasteners to the roof deck or equipment, piping or other service lines in close proximity (within 3") of the roof deck. All damaged components will be the responsibility of the Contractor.
5. Insulation strips are installed according to acoustical roof deck manufacturer’s written instructions.

D. Installation of materials means acceptance of conditions of substrate.

3.02 ~~VAPOR BARRIER INSTALLATION~~

A. ~~Prime cleaned, dry deck in accordance with manufacturer instructions, allow primer to fully flash off, install vapor barrier to primed substrate immediately after primer is suitable for receiving membrane. Do not allow primer to sit overnight.~~

B. ~~Adhere vapor barrier to ensure full adhesion to substrate and adequate bleedout/bond. Do not overheat or apply excessive adhesive.~~

C. ~~Limit foot traffic over vapor barrier in accordance with manufacturer recommendations. Inspect vapor barrier immediately prior to insulation adhesion and repair damage in accordance with manufacturer requirements. Clean surface of vapor barrier to remove debris just prior to installation of insulation boards.~~

3.03 INSULATION INSTALLATION

A. Insulation layers are to be installed with an offset of 6" minimum to minimize the effect of thermal bridging.

B. Only install materials that can be temporarily sealed at the end of the workday. All open roof areas are to be temporarily sealed at the end of each workday or when inclement weather is expected. Any installed roof materials that become wet must be removed and replaced prior to continuing roofing

C. Verify and document in Daily Report that the existing deck/substrate is functional; insulation board is free from moisture and suitable as substrate for roof membrane.

D. Attachment Schedule: Comply with approved fastening patterns and zone widths.
   1. Metal Decks with Membrane Roofing:
      a. Mechanically fasten first layer of insulation to achieve uplift pressures indicated in Drawings in field, perimeter, and corners, and per approved fastening patterns based on pull out testing performed in accordance with Section 07 01 50. Ensure proper fastener engagement in substrate to provide full pullout resistance.
      b. Install subsequent layers of insulation and coverboard in adhesive in accordance with approved ribbon spacing patterns for field, perimeter, and corner areas and as specified below.
   2. Metal Decks with Metal Roofing:
      a. Mechanically fasten all layers of insulation to substrate, with boards laid in staggered pattern.
      b. Provide a minimum 8 fasteners per 4’x8’ board, with additional fasteners as required to ensure a smooth substrate for installation of underlayment materials and panel clips.

E. Mechanical Fastener Installation, General:
   1. Mechanically fasten first layer boards with approved fasteners and plates.
   2. Ensure that fasteners penetrate top flange of deck ¾-inch, do not penetrate bottom flange of deck. Reinstall fasteners that do not engage top flute of deck.
   3. Provide fasteners in location per the approved fastening pattern and layout provided by the manufacturer. Provide required edge distance between fasteners and edge of boards.

F. Adhesive Application, General:
   1. Install insulation and coverboard layers in low-rise foam adhesive in accordance with approved ribbon spacing patterns and shop drawings for field, perimeter, and corner areas. ~~Install adhesive in “picture frame” pattern in addition to ribbons required to achieve Code required resistance to wind uplift in field, perimeter, and corner zones. “Picture frame” pattern shall consist of a single bead of adhesive applied within 2” of board perimeter.~~
   2. Do not allow the adhesive application to precede the board placement by more than three board lengths.
   3. Allow low-rise foam adhesive to rise between ¾” to 1” prior to placement of boards, or as required by the manufacturer.
   4. Firmly press each insulation board into adhesive by “walking-in” each board immediately after placement. Provide a minimum of five (5) weighted five (5) gallon buckets per board at corners and center of each board. Boards not properly adhered will require to be removed and replaced.

5. Stagger end joints in adjacent boards. Stagger successive layers in both vertical and horizontal directions. Minimum horizontal stagger is 2-feet; minimum vertical stagger is 12-inches.
6. Butt edges for snug contact. Repair voids greater than ¼" wide by filling with like material.
7. Tapered Insulation Sumps and Crickets:
   a. Curbs: Install upslope crickets at all curbs wider than 12 inches.
   b. Drains: Install a minimum 4'-0" by 4'-0" tapered insulation sump at all primary roof drains. Install a minimum 4'-0" by 2'-0" tapered insulation sump at all primary scuppers.
   c. Gutters: Install a minimum 1'-0" wide tapered edge to increase slope at membrane roof gutter edges.

G. Failure to install the roof insulation fasteners and/or low-rise foam adhesive as described in these specifications and the approved manufacturer's assembly letter will be considered defective workmanship and application of the roof system by the Contractor. Contractor shall remove and replace all roof system materials with non-compliant attachment at no cost to the Owner.

END OF SECTION

SECTION 26 2416
PANELBOARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Power distribution panelboards.

B. Lighting and appliance panelboards.

C. Overcurrent protective devices for panelboards.

1.02 RELATED REQUIREMENTS

A. Section 26 0526 - Grounding and Bonding for Electrical Systems.

B. Section 26 0529 - Hangers and Supports for Electrical Systems.

C. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

D. Section 26 0573 - Power System Studies: Additional criteria for the selection and adjustment of equipment and associated protective devices specified in this section.

E. Section 26 4300 - Surge Protective Devices.

1.03 REFERENCE STANDARDS

A. FS W-C-375 - Circuit Breakers, Molded Case; Branch Circuit and Service; 2013e, with Amendments (2022).

B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

C. NECA 407 - Standard for Installing and Maintaining Panelboards; 2025.

D. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.

E. NEMA PB 1 - Panelboards; 2011.

F. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 1000V or Less; 2023.

G. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems; 2021.

H. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

I. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.

J. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.

K. UL 67 - Panelboards; Current Edition, Including All Revisions.

L. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures; Current Edition, Including All Revisions.

M. UL 869A - Reference Standard for Service Equipment; Current Edition, Including All Revisions.

N. UL 943 - Ground-Fault Circuit-Interrupters; Current Edition, Including All Revisions.

O. UL 1699 - Arc-Fault Circuit-Interrupters; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, overcurrent protective device arrangement and sizes, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. ABB: www.electrification.us.abb.com/#sle.

B. Eaton Corporation: www.eaton.com/#sle.

C. Schneider Electric: www.se.com/#sle.

D. Siemens Industry, Inc: www.new.siemens.com/#sle.

E. Source Limitations: Provide panelboards and associated components produced by same manufacturer as other electrical distribution equipment used for project and obtained from a single supplier.

2.02 PANELBOARDS - GENERAL REQUIREMENTS

A. Provide products listed, classified, and labeled as suitable for the purpose intended.

B. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
   1. Altitude: Less than 6,600 feet.
   2. Ambient Temperature:
      a. Panelboards Containing Circuit Breakers: Between 23 degrees F and 104 degrees F.

C. Short Circuit Current Rating:
   1. Provide panelboards with listed short circuit current rating not less than the available fault current at the installed location as determined by short circuit study performed in accordance with Section 26 0573.
   2. Label equipment utilizing series ratings as required by NFPA 70.

D. Panelboards Used for Service Entrance: Listed and labeled as suitable for use as service equipment according to UL 869A.

E. Mains: Configure for top or bottom incoming feed as indicated or as required for the installation.

F. Branch Overcurrent Protective Devices: Replaceable without disturbing adjacent devices.

G. Bussing: Sized in accordance with UL 67 temperature rise requirements.
   1. Provide fully rated neutral bus unless otherwise indicated, with a suitable lug for each feeder or branch circuit requiring a neutral connection.
   2. Provide 200 percent rated neutral bus and lugs where indicated, where oversized neutral conductors are provided, or where panelboards are fed from K-rated transformers.
   3. Provide solidly bonded equipment ground bus in each panelboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.
   4. Provide separate isolated/insulated ground bus where indicated or where isolated grounding conductors are provided.

H. Conductor Terminations: Suitable for use with the conductors to be installed.

I. Enclosures: Comply with NEMA EN 10250, and list and label as complying with UL 50 and UL 50E.
   1. Environment Type per NEMA EN 10250: Unless otherwise indicated, as specified for the following installation locations:
      a. Indoor Clean, Dry Locations: Type 1.
      b. Outdoor Locations: Type 3R.
   2. Boxes: Galvanized steel unless otherwise indicated.
      a. Provide wiring gutters sized to accommodate the conductors to be installed.
   3. Fronts:
      a. Fronts for Surface-Mounted Enclosures: Same dimensions as boxes.

b. Fronts for Flush-Mounted Enclosures: Overlap boxes on all sides to conceal rough opening.
c. Finish for Painted Steel Fronts: Manufacturer's standard grey unless otherwise indicated.

4. Lockable Doors: All locks keyed alike unless otherwise indicated.

J. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.

K. Surge Protective Devices: Where factory-installed, internally mounted surge protective devices are provided in accordance with Section 26 4300, list and label panelboards as a complete assembly including surge protective device.

L. Load centers are not acceptable.

2.03 POWER DISTRIBUTION PANELBOARDS

A. Description: Panelboards complying with NEMA PB 1, power and feeder distribution type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.

B. Conductor Terminations:
1. Main and Neutral Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
2. Main and Neutral Lug Type: Mechanical.

C. Bussing:
1. Phase and Neutral Bus Material: Aluminum or copper.
2. Ground Bus Material: Aluminum or copper.

D. Circuit Breakers:
1. Provide bolt-on type or plug-in type secured with locking mechanical restraints.
2. Provide thermal magnetic circuit breakers unless otherwise indicated.

E. Enclosures:
1. Provide surface-mounted enclosures unless otherwise indicated.
2. Fronts: Provide door-in-door trim with hinged cover for access to load terminals and wiring gutters, and separate lockable hinged door with concealed hinges for access to overcurrent protective device handles without exposing live parts.
3. Provide clear plastic circuit directory holder mounted on inside of door.

2.04 LIGHTING AND APPLIANCE PANELBOARDS

A. Description: Panelboards complying with NEMA PB 1, lighting and appliance branch circuit type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.

B. Conductor Terminations:
1. Main and Neutral Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
2. Main and Neutral Lug Type: Mechanical.

C. Bussing:
1. Phase Bus Connections: Arranged for sequential phasing of overcurrent protective devices.
2. Phase and Neutral Bus Material: Aluminum or copper.
3. Ground Bus Material: Aluminum or copper.

D. Circuit Breakers: Thermal magnetic bolt-on type unless otherwise indicated.

E. Enclosures:
1. Provide surface-mounted or flush-mounted enclosures as indicated.
2. Provide clear plastic circuit directory holder mounted on inside of door.

2.05 OVERCURRENT PROTECTIVE DEVICES

A. Molded Case Circuit Breakers:
   1. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.
   2. Interrupting Capacity:
      a. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than:
         1) 10,000 rms symmetrical amperes at 240 VAC or 208 VAC.
         2) 14,000 rms symmetrical amperes at 480 VAC.
      b. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.
   3. Conductor Terminations:
      a. Provide mechanical lugs unless otherwise indicated.
      b. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
   4. Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.
      a. Provide field-adjustable magnetic instantaneous trip setting for circuit breaker frame sizes 225 amperes and larger.
      b. Provide interchangeable trip units where indicated.
   5. Multi-Pole Circuit Breakers: Furnish with common trip for all poles.
   6. Provide the following circuit breaker types where indicated:
      a. Ground Fault Circuit Interrupter (GFCI) Circuit Breakers: Listed as complying with UL 943, class A for protection of personnel.
      b. Ground Fault Equipment Protection Circuit Breakers: Designed to trip at 30 mA for protection of equipment.
      c. Arc-Fault Circuit Interrupter (AFCI) Circuit Breakers: Combination type listed as complying with UL 1699.
      d. 100 Percent Rated Circuit Breakers: Listed for application within the panelboard where installed at 100 percent of the continuous current rating.
   7. Do not use tandem circuit breakers.
   8. Do not use handle ties in lieu of multi-pole circuit breakers.
   9. Provide multi-pole circuit breakers for multi-wire branch circuits as required by NFPA 70.
   10. Provide the following features and accessories where indicated or where required to complete installation:
      a. Shunt Trip: Provide coil voltage as required for connection to indicated trip actuator.

2.06 SOURCE QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for additional requirements.

B. Factory test panelboards according to NEMA PB 1.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that the ratings and configurations of the panelboards and associated components are consistent with the indicated requirements.

C. Verify that mounting surfaces are ready to receive panelboards.

D. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

A. Perform work in accordance with NECA 1 (general workmanship).

B. Install products in accordance with manufacturer's instructions.

C. Install panelboards in accordance with NECA 407 and NEMA PB 1.1.

D. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

E. Provide required support and attachment in accordance with Section 26 0529.

F. Install panelboards plumb.

G. Install flush-mounted panelboards so that trims fit completely flush to wall with no gaps and rough opening completely covered.

H. Mount panelboards such that the highest position of any operating handle for circuit breakers or switches does not exceed 79 inches above the floor or working platform.

I. Provide minimum of six spare 1 inch trade size conduits out of each flush-mounted panelboard stubbed into accessible space above ceiling and below floor.

J. Provide grounding and bonding in accordance with Section 26 0526.
   1. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on isolated/insulated ground bus.
   2. Terminate branch circuit isolated grounding conductors on isolated/insulated ground bus only. Do not terminate on solidly bonded equipment ground bus.

K. Install all field-installed branch devices, components, and accessories.

L. Where accessories are not self-powered, provide control power source as indicated or as required to complete installation.

M. Multi-Wire Branch Circuits: Group grounded and ungrounded conductors together in the panelboard as required by NFPA 70.

N. Set field-adjustable circuit breaker tripping function settings as determined by overcurrent protective device coordination study performed according to Section 26 0573.

O. Provide filler plates to cover unused spaces in panelboards.

P. Provide circuit breaker lock-on devices to prevent unauthorized personnel from de-energizing essential loads where indicated. Also provide for the following:
   1. Emergency and night lighting circuits.
   2. Fire detection and alarm circuits.
   3. Communications equipment circuits.
   4. Intrusion detection and access control system circuits.
   5. Video surveillance system circuits.

Q. Identify panelboards in accordance with Section 26 0553.

3.03 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for additional requirements.

B. Inspect and test in accordance with NETA ATS, except Section 4.

C. Molded Case Circuit Breakers: Perform inspections and tests listed in NETA ATS, Section 7.6.1.1 for all main circuit breakers and circuit breakers larger than _____ amperes. Tests listed as optional are not required.

D. Ground Fault Protection Systems: Test in accordance with manufacturer's instructions as required by NFPA 70.

E. Test GFCI circuit breakers to verify proper operation.

F. Test AFCI circuit breakers to verify proper operation.

G. Test shunt trips to verify proper operation.

H. Procure services of a qualified manufacturer's representative to observe installation and assist in inspection, testing, and adjusting. Include manufacturer's reports with field quality control submittals.

I. Correct deficiencies and replace damaged or defective panelboards or associated components.

3.04 ADJUSTING

A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

B. Adjust alignment of panelboard fronts.

C. Load Balancing: For each panelboard, rearrange circuits such that the difference between each measured steady state phase load does not exceed 20 percent and adjust circuit directories accordingly. Maintain proper phasing for multi-wire branch circuits.

3.05 CLEANING

A. Clean dirt and debris from panelboard enclosures and components according to manufacturer's instructions.

B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

SECTION 271000
STRUCTURED CABLING SYSTEM

PART 1 - GENERAL

1.01 SUMMARY

A. This section identifies the requirements, technical design, and specifications for the structured cabling system at the Willis ISD, Turner Elementary School Renovation in Willis, Texas (“Owner”). The structured cabling system as specified is an Industry-Standard Category 6A structured cabling system and includes backbone cabling, horizontal cabling and equipment room hardware as specified.

B. The Contractor shall provide a minimum Manufacturer’s 20-Year Performance Certification for the installed structured cabling system, certified by CommScope Uniprise for fiber and copper.

C. Contractor shall include materials, equipment, and labor necessary to provide a complete and functional structured cabling system regardless of any items not listed or described in this specification or associated drawings.

1.02 REQUIREMENTS TABLE OF CONTENT

A. Contractor Experience Requirements

B. Submittal Requirements

C. Acceptable Manufacturers

D. Codes, Standards and Regulations

E. General Requirements

F. System Requirements

G. Testing Requirements

H. Project Closeout Documentation

I. Attachments

1.03 RELATED REQUIREMENTS

A. The Drawings, Specifications, General Conditions, Supplementary General Conditions, and other requirements of Division 1 apply to the work specified in Division 27, and shall be complied with in every respect. The Contractor shall examine all of the items which make up the Contract Documents, and shall coordinate them with the work on the project.

B. Contractor Experience Requirements

1. The Contractor shall be a CommScope Uniprise Partner prior to submitting a bid for the work.
2. The Contractor shall possess all relevant Manufacturer Certifications (i.e. structured cable systems, testing equipment, etc,) for both the company and individual technicians prior to submitting a bid for the work.
3. The Contractor’s Project Manager shall be a Registered Communications Distribution Designer (RCDD) and available for all on-site coordination meetings.

4. The Contractor shall have been in business for a minimum of five (5) years.
5. The Contractor shall have a local office with local technicians and an adequate workforce to complete this project within a 100-mile radius of the project site.
6. The Contractor shall have completed a minimum of three (3) projects similar in size and scope to the Owner's installation, where the systems have been in continuous satisfactory operation for at least one (1) year.

C. Subcontractors shall be identified at the time of bid and comply with the requirements and intentions of these specifications, associated drawings, and related contract documents.

1.04 SUBMITTAL REQUIREMENTS

A. Pre-Installation Submittal

1. Contractor shall not order, purchase, or install any equipment until pre-installation submittals have been accepted in writing by the Architect/Design Consultant.
2. Contractor shall ensure submittals are submitted in a timely manner to ensure all products can be ordered and received on site in order to not cause any delays. If there are any concerns with any products having long lead times, those products shall be clearly identified in writing so the review and approval can be expedited.
3. All submittals shall be submitted in the same sequence as they are listed in the specifications (i.e. product data in the sequence items are listed in the product data section, manufacturer product certifications for company, manufacturer product certifications for installers, etc.). Submittals not in the proper sequence will not be approved.
4. Manufacturer product data sheets for each proposed system component.

    a. For product data sheets containing more than one (1) part number or product, the Contractor shall clearly identify the specific part number or product being submitted. Product data sheets without the part number clearly identified will not be approved.

5. Manufacturer Product Certifications for Company.
6. Manufacturer Product Certifications for Installers.
7. Manufacturer Certifications for testing equipment technicians.
8. Manufacturer Certifications for testing equipment calibration.
9. RCDD Certificate for Contractor's Project Manager.
10. Manufacturer Warranty letter.
11. Documentation indicating that Contractor has been in business for (3) years.
12. Address of Contractor's local office within a 100-mile radius of the project site.
13. Quantity of full time local technicians within a 100-mile radius of the project site.
14. List of three (3) contractor-installed projects of a similar size and scope that have been in operation for at least (1) year. The Contractor shall provide the following information for each project: Project Name, Project Location, Project Start Date, Project Completion Date, Project Start Cost, Project Completion Cost, Brief Description of Project, Client Point of Contact Name and Phone Number.
15. List of completed and ongoing projects with the Owner. The Contractor shall provide the following information for each project: Project Name, Project Location, Project Start Date, Project Completion Date, Project Start Cost, Project Completion Cost, and Brief Description of Project.
16. List of subcontractors performing any work on the project. The list shall clearly identify the subcontractor's legal name and address, the scope of work to be performed by the subcontractors and the overall percentage of the project being provided by the subcontractor. If there are no subcontractors performing any work on the project, submit a statement on company letterhead clearly indicating no subcontractors will be performing any work on this project.

17. Contractor shall maintain a set of shop drawings on site at all times and shall update the shop drawings on a weekly basis. Shop drawings shall be made available for inspection at the request of the Architect/Design Consultant.
18. Contractor shall submit a line, by line specification review acknowledging conformance to the contract documents If any variances are taken due to a product being discontinued or factory recommended replacement for product reaching end of life the contractor shall note it on the review as a variance. The specified products will be itemized and listed as an attachment.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS

A. The following sections specifically list the acceptable equipment types and items for this project.

B. Architect/Design Consultant will have final determination of acceptability of all proposed equipment and must approve submitted equipment prior to purchase or installation.

C. Proposed equivalent items must be approved in writing by the Architect/Design Consultant prior to purchase or installation. Proposed equivalent items must meet or exceed these specifications and the specifications of the specified item.

D. In the event a manufacturer's specified product or part number has changed or is no longer available, Contractor shall substitute the appropriate equivalent manufacturer's part number and add the required information to the submittal package.

E. In the event of a discrepancy between the specifications and the drawings, the greater quantity and/or better quality will be furnished.

F. For listed products with no part number specified, Contractor shall provide a product that meets the performance requirements of these specifications, industry standard practices, and intended application.

G. All wiring, equipment, and installation materials shall be new and of the highest quality.

H. Labels on all cabling, materials, and equipment must indicate a nationally recognized testing laboratory.

I. Original Equipment Manufacturer (OEM) documentation must be provided to the Architect/Design Consultant which certifies performance characteristics and compliance with ANSI/TIA 568-D standards.

J. Contractor shall review all products specified and required for this project to determine if there are any lead times for any products that may cause any delay. Contractor shall clearly identify any concerns with lead times in writing to the Architect/Design Consultant prior to submitting a proposal for this work. If the Contractor does not identify any concerns with products having long lead times, it will be understood there are no long lead time issues and the Contractor will have all products on-site when needed to complete the job as required.

2.02 FIBER OPTIC BACKBONE CABLE

A. Plenum

1. Interlocking Armored Cable, Plenum, 12 F, Singlemode (OS2) –

    a. CommScope Part Number P-012-DZ-8W-FSUYL

2.03 COPPER BACKBONE CABLE

A. Indoor/Outdoor

1. 50-pair Category 5e 24 AWG Unshielded Twisted Pair (UTP)

a. Superior Essex Part # 09-100-02

2.04 HORIZONTAL CABLE

A. Category 6A UTP Plenum

1. Network Access (Blue Sheath) (Use Plenum where Applicable)

a. CommScope Part # UN874035114/10

2. Wireless Access (Yellow Sheath)

a. CommScope Part # UN874050014/10

3. Cameras (Orange Sheath)

a. CommScope Part # UN874015814/10

4. HVAC & BMS (Green Sheath)

a. CommScope Part # UN874035914/10

5. Indoor/Outdoor (Black Sheath)

a. CommScope Part # CS44P-IO

2.05 FIBER OPTIC CABLE TERMINATION

A. Fiber Enclosure

1. Fiber Optic Enclosure –

a. CommScope Part # 760249997

B. Optical Fiber Connector

1. Qwik-Connect LC Fiber Optic Connector (Blue), OS2 (Singlemode)

a. CommScope Part # 760117895

C. Optical Fiber Coupler Panels

1. Fiber bulkhead panels/Blank panels

a. Manufacturer: CommScope
1) CommScope Part # 760148254
2) Blank = CommScope Part # 760147736

2.06 CATEGORY 6/6A HORIZONTAL RACK MOUNTED PATCH PANELS

A. Network Access - 19-inch rack mounted Cat 6A Universal Patch Panel. Cable management bar included. Complies with ANSI/TIA-568-2.D Category 6A performance. Terminate using T568-B pin out. Complete with wire management bars and designation strips.

1. CommScope 48 Port Patch Panel

a. (110-style 2RU 48-port standard flat panel) Part # CPP-UDDM-M-2U-48

B. Wireless Access - 19-inch rack mounted Cat 6A Universal Patch Panel. Cable management bar included. Complies with ANSI/TIA-568-2.D Category 6A performance. Terminate using T568-B pin out. Complete with wire management bars and designation strips.

1. CommScope 48 Port CAT6A Patch Panel

a. (110-style 2RU 48-port standard flat panel) Part # CPP-UDDM-M-2U-48

C. Cameras - 19-inch rack mounted Cat 6A Universal Patch Panel. Cable management bar included. Complies with ANSI/TIA-568-2.D Category 6A performance. Terminate using T568-B pin out. Complete with wire management bars and designation strips.

1. CommScope 48 Port CAT6A Patch Panel

a. (110-style 2RU 48-port standard flat panel) Part # CPP-UDDM-M-2U-48

2.07 CATEGORY 6 / 6A MODULAR JACKS

A. Category 6A, 8-position modular jack, IDC terminals, T568A/B wiring scheme. The modular connector shall exceed all component performance requirements in the ANSI/TIA-568-D.2 standard for Augmented Category 6 from 1 MHz to 500 MHz. Outlet wired with standards compliant T568-B pin out. Suitable to be mounted in corresponding faceplate, mounting plate or surface mount box.

1. Manufacturer: CommScope
2. Type:

a. Cat 6A Uniprise Connector, Yellow for Wireless Access Points
a) Part # UNJ10G-YL

b. Cat 6A Uniprise Connector, Blue for General Use
a) Part # UNJ10G-BU

c. Cat 6A Uniprise Connector, Orange for Cameras
a) Part # UNJ10G-OR

d. Cat 6A Uniprise Connector, Green for HVAC
a) Part # UNJ10G-GN

2.08 CATEGORY 6 BUILDING ENTRANCE PROTECTORS

A. Category 6 Building Entrance Protector – Wall-Mounted

1. Solid state building entrance protector for Category 6 cables serving outlets on the exterior face and outside of the building
2. Approved per UL497 and UL497B
3. Shall support a minimum of 1G-BASE-T and Power-over-Ethernet applications
4. Manufacturer:

    a. Ditek – DTK-VM6WM
    b. Or equal from ITWLinx
    c. Or Approved Equivalent

B. Category 6 Building Entrance Protector – Rack-Mounted

1. Solid state building entrance protector for Category 6 cables serving outlets on the exterior face and outside of the building
2. Approved per UL497 and UL497B
3. Shall support at least 1G-BASE-T and Power-over-Ethernet applications
4. Rack-mounted
5. RJ45 in and out
6. Manufacturer:

    a. Ditek DTK-RM12ETHS
    b. Or equal from ITWLinx
    c. Or Approved Equivalent

C. Category 6 In-Line Surge Suppression – at Device end

1. Shielded surge protector
2. Approved per UL497B
3. Shall support at least 1G-BASE-T and Power-over-Ethernet applications
4. RJ45 in and out
5. Manufacturer:

    a. Ditek – DTK-MRJEXTS
    b. ITWLinx – CT6-POE-RJ45
    c. Or Approved Equivalent

2.09 TELECOMMUNICATIONS FACEPLATES

A. Coordinate color with Architect prior to ordering.

1. Outlet faceplate suitable to be installed over a standard NEMA electrical junction box, capable of mounting approved flat 8-pin modular connectors and coaxial connectors.

    a. Manufacturer: CommScope
    b. Type:
        1) Single-Gang Wall Plate with ID Windows, White = Part # M14L-262

2. Outlet box suitable to be surface mounted, capable of mounting approved 8-pin modular connectors and coaxial connectors.

    a. Manufacturer: CommScope
    b. Type:
        1) Surface-Mount Box, 1-Port, White = Part # SMB-1P-262
        2) Surface-Mount Box, 4-Port, White = Part # 107952459

3. 2-Port, QuickPort in-ceiling bracket with clip for drop wire/rod mounting. Compatible with QuickPort Surface-Mount Boxes (fasteners included with bracket, boxes sold separately). Brackets must be installed on a dedicated drop wire/rod per NEC® 300.11.

    a. Manufacturer: Leviton
    b. Type:
        1) In-ceiling Bracket, 2-Port = Part # 49223-CBC

2.010 PATCH CABLES

A. LC to LC 50 micron Multi-mode Fiber Patch Cords

1. Physical Specifications: Duplex multi-mode optical fiber cable patch cords, terminated with LC connectors on both ends.
2. Performance Characteristics: Superior to the individual characteristics established in ANSI/TIA-568-3.D – Optical Fiber Cabling Components Standard optical fiber cable performance. Equal to or greater than the performance characteristics of cables specified under this work.

    a. Manufacturer: CommScope
    b. Type:
        1) (OS2) LC to LC, 1 meter = Part # 1966319-1
        2) (OS2) LC to LC, 2 meter = Part # 1966319-2
        3) (OS2) LC to LC, 3 meter = Part # 1966319-3

B. Copper Patch Cables

1. Equipment Room / Telecommunications Rooms

    a. CommScope Part # UC1AAA2-09FXXX where xxx equals length in feet (Wireless Access Points)
    b. CommScope Part # UC1AAA2-0ZFXXX where xxx equals length in feet (Data)
    c. CommScope Part # UC1AAA2-06FXXX where xxx equals length in feet (Video Surveillance)
    d. CommScope Part # UC1AAA2-0MXXX where xxx equals length in feet (HVAC & BMS)

2. Workstations

    a. CommScope Uniprise CAT 6A U/UTP Patch Cords – Part Number UC1AAA2-0ZFXXX (blue)
    b. CommScope Uniprise CAT 6A U/UTP Patch Cords – Part Number UC1AAA2-06FXXX (Orange)
    c. CommScope Uniprise CAT 6A Patch Cords – Part Number UC1AAA2-0MFXXX (Green)
    d. CommScope Uniprise CAT 6A Patch Cords – Part Number UC1AAA2-09FXXX (Yellow)
    e. * For Lengths 1 to 20 feet (increments of one foot)
    f. Contractor shall verify Patch Cord quantity and lengths shall be verified with the owner prior to purchase.

2.011 EQUIPMENT RACKS, CABINETS, CABLE MANAGEMENT, AND ACCESSORIES

A. Equipment Racks

1. CommScope or approved equivalent, 2 post rack, black

    a. CommScope Part # RK3-45S

B. Vertical Cable Managers

1. Provide 6-inch wide, dual-sided Vertical Cable Manager at both ends of a row of equipment racks in the MDF and each IDF.
2. Provide 8-inch wide, dual-sided Vertical Cable Managers between each equipment rack.
3. Shall have integral cover/door on both sides.
4. Manufacturer:

    a. CommScope
        1) 6-inch wide: Part # VCM2-DS-846BK
        2) 8-inch wide: Part # VCM2-DS-84-8BK

C. Horizontal Cable Managers (Black)

1. CommScope Rack Cabling Manager - Part Number HTK2-19-SS-2U-BK

D. Vertical Power Strip for 7’ Equipment Rack

1. Provide one vertical power strip per 2-post and 4-post rack.
2. Chatsworth 24 Outlet (5-20R) Power Strip with Meter and NEMA 5-20P – Part Number 12848-755

2.012 CABLE RUNWAY (LADDER TYPE)

A. Universal Cable Runway

1. 12-inch CommScope - Part Number CR-SLR-10L12W
2. Or approved equal from 2-post rack manufacturer

B. Cable Runway Radius Drop, Cross Member

1. 12-inch CommScope - Part Number CRDK-12W
2. Or approved equal from 2-post rack manufacturer

C. Cable Runway Radius Drop, Stringer

1. CommScope - Part Number CRSMCRDK
2. Or approved equal from 2-post rack manufacturer

D. Cable Runway Butt-Splice Kit

1. CommScope - Part Number CRBSK
2. Or approved equal from 2-post rack manufacturer

E. Cable Runway Junction-Splice Kit

1. CommScope - Part Number CRBSK
2. Or approved equal from 2-post rack manufacturer

F. Cable Runway Butt-Swivel Splice Kit

1. CommScope - Part Number CRVALS
2. Or approved equal from 2-post rack manufacturer

G. Rack-to-Runway Mounting Kit

1. 15 to 18-inch runway CommScope - Part Number CRR2RRMK
2. Or approved equal from 2-post rack manufacturer

H. Cable Runway Elevation Kit for Racks

1. Chatsworth - Part Number 10506-706
2. Or approved equal from 2-post rack manufacturer

I. Triangular Support Bracket, Aluminum

1. 12-inch runway CommScope - Part Number CRTWSBK-12W
2. Or approved equal from 2-post rack manufacturer

J. Wall Angle Support Kit, Cable Runway

1. 12-inch runway CommScope - Part Number CR12-C24WRSK
2. Or approved equal from 2-post rack manufacturer

K. Foot Kit, Cable Runway

1. CommScope - Part Number CRFK
2. Or approved equal from 2-post rack manufacturer

L. Vertical Wall Brackets (pair)

1. CommScope - Part Number CRVWBK
2. Or approved equal from 2-post rack manufacturer

M. Threaded Ceiling Kit, Cable Runway

1. CommScope - Part Number CRCMK3-8TR
2. Or approved equal from 2-post rack manufacturer

N. Protective End Caps for Cable Runway

1. CommScope - Part Number CRPECK
2. Or approved equal from 2-post rack manufacturer

2.013 J-HOOKS / HOOK & LOOP STRAPS

A. J-Hooks

1. Shall be listed as meeting UL 2239 requirements
2. Shall be listed/approved for installation in return-air plenum spaces
3. Shall be designed and equipped with accessories (if needed) to be supported by the following methods:

    a. Threaded rod from structure
    b. Wall-mounted to concrete/CMU walls or wood or metal studs

c. Beam clamps
d. Optional “multi-tiered” mounting to bottom of J-hook
e. Optional Fastener to raised floor pedestal

4. Equipped with retainer or strap over top of J-hook once cables are installed
5. Sized to support quantity of installed cables, plus 25% spare capacity
6. Manufacturer:

a. Erico – Caddy CAT Links
b. Panduit – J-Mod Cable Supports
c. Or Approved Equivalent

B. Hook & Loop Straps

1. Plenum-rated
2. Velcro construction with hook/loop strap
3. Color: black
4. Manufacturer:

a. Panduit Tak-Ty Plenum Ties
b. VELCRO ONE-WRAP
c. Or Approved Equal

C. Grid Wire Clips

1. Caddy 6Z4S WR RD FLANGE CLIP
2. Or Approved Equal

2.014 TELECOM GROUNDING AND BONDING

A. TMGB (Telecommunications Main Grounding Busbar) / PBB (Primary Bonding Busbar)

1. Copper construction
2. Size: per Drawings
3. UL 467 Listed
4. TIA-607 hole pattern (pairs of lugs at 5/8” hole centers and 1” hole centers)
5. Part of kit that includes: busbar, two insulators, two steel stand-off brackets, and mounting accessories
6. Manufacturer:

a. 4” x 12” x 1/4"
   1) Chatsworth 40153-012
   2) Harger GBI14412TMGBKT
   3) Or equal from Hubbell
   4) Or equal from Panduit
   5) Or Approved Equal

b. 4” x 20” x 1/4"
   1) Chatsworth 40153-020
   2) Harger GBI14420TMGBKT
   3) Or equal from Hubbell
   4) Or equal from Panduit
   5) Or Approved Equal

B. TGB (Telecommunications Grounding Busbar) / SBB (Secondary Bonding Busbar)

1. Copper construction
2. Size: per Drawings
3. UL 467 Listed
4. TIA-607 hole pattern (pairs of lugs at 5/8” hole centers and 1” hole centers)
5. Part of kit that includes: busbar, two insulators, two steel stand-off brackets, and mounting accessories
6. Manufacturer:

    a. 2” x 12” x 1/4"
        1) Chatsworth 13622-012
        2) Harger GBI14212TGBKT
        3) Or equal from Hubbell
        4) Or equal from Panduit
        5) Or Approved Equal

    b. 4” x 12” x 1/4"
        1) Chatsworth 40153-012
        2) Harger GBI14412TMGBKT
        3) Or equal from Hubbell
        4) Or equal from Panduit
        5) Or Approved Equal

C. Two-Hole Lugs

1. UL listed
2. Two-hole, long barrel, electro tin-plated compression lug with inspection port
3. Manufacturer:

    a. Chatsworth 40162-XXX
    b. Harger – GECLB series
    c. Burndy
    d. Or equal from Hubbell
    e. Or Approved Equal

D. Conductors

1. Minimum conductor size shall be #6 AWG; sized based on length per Table on Drawings
2. Green sheath
3. Insulation shall be rated for the environment where it is installed
4. Manufacturer:

    a. Chatsworth
    b. Harger
    c. Hubbell
    d. Or Approved Equal
    e. Or approved conductors listed in Division 26.

E. Conduit Clamps

1. Tinned copper with 1-1/2-inches of contact area.
2. Can be connected to conductors via exothermic connection or standard compression lugs.
3. Manufacturer:

    a. Harger – UPC series

b. Or equal from Hubbell
c. Or Approved Equal

F. Cable Tray Clamps

1. Electro-tin plated cast bronze connector
2. UL 467 approved
3. Manufacturer:

a. Harger - TBCTC
b. Or equal from Hubbell
c. Or Approved Equal

G. Cable to Cable Connections

1. T-tap or Exothermic Weld
2. Manufacturer:

a. Harger RT series (T-tap) or UltraShot Weld Metal (Exothermic Weld)
b. Or equal from Hubbell
c. Or Approved Equal

H. Cable to Structural Steel Connections

1. Exothermic Weld – types VA, VD, or VU
2. Manufacturer:

a. Harger – Ultraweld series
b. Or equal from Hubbell
c. Or Approved Equal

2.015 LABELING

A. Cable Labeling

1. For Horizontal Cables and Inside-Plant Backbone Cables

a. Laser/Ink Jet Self Laminating Labels
b. Manufacturer:
1) Panduit – S100X Series
2) Or equal from Brady
3) Or equal from Dymo
4) Or equal from Hellermann Tyton
5) Or Approved Equivalent

2. For Outside-Plant Backbone Cables and Innerduct

a. Self-laminating cable marker tag, tie on (with zip ties)
b. Manufacturer:
1) Fiber Optic – Panduit PST-FO, Mooseline F1-0095
2) Copper – Mooseline F1-0095

B. Rack and Patch Panel Labeling

1. Vinyl cloth label

2. Lettering/numbering text height 3/8” to 1/2"
3. Manufacturer:

    a. Brady PTL series
    b. Panduit PCL037 series
    c. Or Approved Equivalent

2.016 PLYWOOD BACKBOARD

A. Fire-treated, AC grade plywood

B. 8’ tall by 4’ wide by ¾” thick

C. Locations as noted on Drawings

D. Painted with two-coats of fire-retardant white paint (mask out a minimum of one stamp on each piece of plywood used)

2.017 FIRESTOPPING SYSTEMS

A. Fire-Rated Pathway Device (Sleeve)

1. Steel pathway (sleeve) with integral intumescent firestopping material to facilitate the initial installation - and frequent moves, adds, and changes - of low-voltage voice/data, fiber, video, security, paging, etc cabling.
2. UL System meeting the hourly fire-rating of the wall or floor type
3. Multiple pathways in the same location shall be ganged together.
4. Plenum-rated
5. Manufacturer:

    a. Specified Technologies Inc – EZ Path Fire-Rated Pathway
        1) 2” – Series 22
        2) 3” – Series 33
        3) 4” – Series 44

B. Firestopping for conduit penetrations

1. For metallic conduit or tube to be installed through 1 or 2 hr fire-rated wall or floor.
2. Manufacturer:

    a. Gypsum board stud walls
        1) Specified Technologies - UL System No. W-L-1222 with SpecSeal LCI Sealant

    b. Concrete floors or walls
        1) Specified Technologies – UL System No. C-AJ-1353 with SpecSeal LCI Sealant

C. Firestopping for backboxes in fire- or smoke-rated wall

1. For Communications backboxes to be installed in 1 or 2 hr fire-rated or smoke-rated walls.
2. STC sound rating – 64 or higher (related to specific construction)
3. Shall meet criteria of UL263 and classified for up to hrs as a Wall Opening Protective Material (Category CLIV)
4. Manufacturer:

a. Specified Technologies – SpecSeal Power Shield

D. Smoke-Rated or Acoustical Sleeves

1. Metallic or non-metallic pathway (sleeve) with integral self-adjusting smoke and sound sealing system to facilitate the initial installation – and frequent moves, ads, and changes – of low-voltage voice/data, fiber, video, security, paging, etch cabling.
2. L Rating – Air Leakage Test Procedure tested per UL1479 without a Fire Test
3. Less than 1.25 cubic feet per minute for 0% fill (cable) capacity
4. Less than 2.5 cubic feet per minute for 1 to 100% fill (cable) capacity
5. Sound Transmission Classification (STC) – 59 or higher (related to specific construction)
6. Plenum-rated
7. Manufacturer:

a. Specified Technologies Inc – NEZ Pathway

E. Fire-rated Conduit (Circuit Integrity) Wrap

1. Endothermic wrap for EMT and RMC for protection of cable pathways for critical life safety circuits.
2. Tested to ASTM E1725 for circuit integrity
3. Manufacturer:

a. Specified Technologies – E-Wrap Endothermic Wrap
b.

PART 3 - EXECUTION

3.01 CODES, STANDARDS, REGULATIONS

A. American National Standards Institute (ANSI)

B. American Society for Testing and Materials (ASTM)
1) ASTM B 1 Standard Specification for Hard-Drawn Copper Wire

2. ASTM B 8 Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
3. ASTM D 1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3) (2700 kN-m/m3)
4. ASTM D 709 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. ANSI/TIA-568.1-E - Commercial Building Telecommunications Infrastructure Standard
5. ANSI/TIA-568.2-D - Balanced Twisted-Pair Telecommunications Cabling and Components Standard
6. ANSI/TIA-568.3-E - Optical Fiber Cabling and Components Standard
7. ANSI/TIA-569-E - Telecommunications Pathways and Spaces
8. ANSI/TIA-606-D - Administration Standard for Telecommunications Infrastructure

9. ANSI/TIA-607-E - Telecommunications Bonding and Grounding (Earthing) for Customer Premises

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. 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-568.1-E - Commercial Building Telecommunications Infrastructure Standard
2. ANSI/TIA-568.2-D - Balanced Twisted-Pair Telecommunications Cabling and Components Standard
3. ANSI/TIA-568.3-E - Optical Fiber Cabling and Components Standard
4. ANSI/TIA-569-E - Telecommunications Pathways and Spaces
5. ANSI/TIA-606-D - Administration Standard for Telecommunications Infrastructure
6. ANSI/TIA-607-E - Telecommunications Bonding and Grounding (Earthing) for Customer Premises
7. 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)
8. RUS Bull 345-83 Gas Tube Surge Arrestors (PE-80)

Q. Underwriters Laboratories, Inc. (UL)

1. UL 510 Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape
2. UL 910 (NFPA 262) Applicable Flame Test

3.02 GENERAL REQUIREMENTS

A. In the event of any conflicts between documents referenced herein and the contents of this specification, the Contractor shall notify the Architect/Design Consultant in writing of any such occurrences before purchasing or installing any equipment or materials. The Architect/Design Consultant will notify the Contractor of any actions required to resolve these conflicts. Such actions may include but are not limited to: design changes, equipment, materials and/or installation changes. In any event Contractor shall not supersede specifications and standards from the latest NFPA and NEC publications. In the event of any conflicts between Standards and Codes the more stringent shall take precedence.

B. Contractor shall comply with the requirements of local Authority Having Jurisdiction (AHJ), State of Texas, the National Fire Protection Association (NFPA), and the National Electrical Code (NEC). If the Contractor identifies any item in the plans or specifications that will not strictly comply with the aforementioned laws, ordinances, and rules, the matter shall be referred to the Architect/Design Consultant for direction before proceeding with that part of the work.

C. The Contractor shall be responsible for coordination with other trades to ensure any conflicts or potential conflicts are resolved prior to any work beginning on the project.

D. The Contractor shall install the materials in accordance with these specifications and the manufacturer’s installation guidelines.

E. No deviations from the plans or specifications shall be made without full consent in writing of the Architect/Design Consultant. The Contractor shall have written approval from the Architect/Design Consultant for any additional work beyond the Contract Documents prior to beginning such work. If the Contractor does not obtain written approval from the Architect/Design Consultant prior to proceeding with the work, the contractor shall not be reimbursed for the work.

F. The Contractor shall obtain written permission from the Architect/Design Consultant before proceeding with any work that would necessitate cutting into or through any part of the building structure such as, but not limited to girders, beams, floors, walls, roofs, or ceilings.

G. Contractor shall perform onsite coordination with the General Contractor, Structural, MEP, and Civil as required to discuss outside plant and inside plant clash detection with other trades.

H. Contractor shall notify the Architect/Design Consultant a minimum of (2) weeks prior to beginning work and will participate in a pre-construction meeting with the Architect/Design Consultant to perform a walkthrough, review the scope of work, schedule, and escalation procedures.

I. The Contractor shall maintain a work area free of debris, trash, empty cable reels, scrap cable, etc., and dispose of such items on a daily basis and return the site to the original state of cleanliness. The Contractor shall not use Owner's facilities for the disposal of excess or scrap materials.

J. Equipment and materials installed by the Contractor shall be free of defects and damage.

K. Contractor shall be responsible for the repair of any damage caused by the contractor during the installation.

L. Contractor shall test all cables prior to installation. By failing to perform this testing operation, the Contractor shall accept the cable as compliant and assume all liability for the replacement of the cable at no cost to the Owner should it be found defective at a later date.

M. Contractor shall maintain a set of working specifications, design drawings, and record drawings to be kept on site at all times and shall update the record drawings with any changes on a weekly basis. Record drawings shall be made available for inspection at the request of the Architect/Design Consultant.

N. Equipment and materials shall be consistent throughout the installation. Where multiple units of the same type of equipment and materials are required, these units shall be a standard product with the same manufacturer and model number.

O. Equipment and materials shall be delivered and stored in accordance with the manufacturer's guidelines at the Contractor's expense.

P. Contractor shall make all stored equipment and materials available for inspection at the request of the Architect/Design Consultant.

Q. All equipment and material used in the installation shall be approved by the manufacturer for the environment in which it is being installed.

R. Cables shall be properly supported in accordance with industry standards at all times. Improperly supported cables shall be corrected by the Contractor at no cost to the Owner.

S. Contractor shall be responsible to properly protect information outlets from damage by other trades during construction.

T. Cables shall be routed at 90-degree angles to the building structure. At no time shall a diagonal pull be installed.

U. The Contractor shall not install cables in conduits or sleeves without nylon bushings. Cables installed through conduits or sleeves without nylon bushings shall be removed and replaced at no cost to the Owner.

3.03 SYSTEM REQUIREMENTS

A. The contractor is responsible for furnishing materials as required to provide a complete and functioning system. Quantities are not noted, so the information may be obtained from the technology drawings.

B. Inter-Building Cable Plant

1. Fiber Optic Cable

a. Singlemode
   1) Contractor shall furnish and install fiber optic cables as indicated on the Drawings
   2) Contractor shall install a 10-foot service loop at the ends of each cable to be coiled, mounted, and stored on the wall above the ladder rack.
   3) Cables shall be routed utilizing the pathways as indicated in the technology drawings.

2. Fiber Optic Termination

a. Contractor shall terminate all installed fiber optic strands with fusion splice connectors and place into fiber optic enclosures with splice trays as indicated in the technology drawings.
b. Contractor shall furnish fiber optic enclosures and coupler panels for all fiber optic strands and blank panels for all unused slots.

3. Copper Cable

a. High Pair Count Cable
   1) The Contractor shall furnish and install copper cables as indicated on the Drawings.
   2) The Contractor shall install a 10-foot service loop at the ends of each cable to be coiled, mounted, and stored on the wall above the ladder rack.
   3) Cables shall be routed utilizing the pathways as indicated in the technology drawings.

4. High Pair Count Termination

a. Building Entrance Terminals
   1) The contractor shall terminate copper cable pairs between the existing communications rooms on contractor furnished and installed building entrance terminals as indicated in the technology drawings.
   2) Contractor shall furnish and install all terminals fully populated with surge protection modules.
   3) Contractor shall ground and bond all cables and terminals.

b. Wall-mounted Wiring Blocks

1) The Contractor shall furnish and install wall mounted 110 wiring blocks and terminate cable whip from Building Entrance Terminal to this 110-block.
2) The Contractor shall furnish and install tie cables from the protector block/110 block to contractor furnished and install category 5e patch panels.
3) Contractor shall furnish and install tie cables/cross connects from the service provider high pair count copper cable to the owners equipment rack as required.

C. Intra-Building Cable Plant

1. Fiber Optic Cable

a. Singlemode
1) Contractor shall furnish and install plenum rated fiber optic cables as indicated on the technology drawings.
a) Each fiber optic cable shall be installed inside a single cell of the fabric innerduct.
2) Contractor shall install a 10-foot service loop at the ends of each cable to be coiled, mounted, and stored on the wall above the ladder rack.
3) Cables shall be routed utilizing the pathways as indicated in the technology drawings.

2. Fiber Optic Termination

a. Contractor shall terminate all installed fiber optic strands with fusion splice connectors and place into fiber optic enclosures with splice trays as indicated in the technology drawings.
b. Contractor shall furnish fiber optic enclosures and coupler panels for all fiber optic strands and blank panels for all unused slots.

3. Copper Cable

a. High Pair Count
1) The Contractor shall furnish and install copper cables as indicated on the Drawings.
2) The Contractor shall install a 10-foot service loop at the ends of each cable to be coiled, mounted, and stored on the wall above the ladder rack.
3) Cables shall be routed utilizing the pathways as indicated in the technology drawings.

4. High Pair Count Termination

a. Wall-mounted Wiring Blocks
1) The Contractor shall furnish and install wall-mounted 110-blocks to support all copper backbone pairs. Indicate proposed location on Shop Drawings.

D. Horizontal Cable

1. No horizontal cable shall be longer than two hundred ninety-five (295) feet. If any station cable will be longer than two hundred ninety-five (295) feet, Contractor shall stop installation of the cable and immediately notify Architect/Design Consultant in writing. If Contractor fails to notify the Architect/Design Consultant in writing, Contractor shall replace cable at no cost to the Owner.

2. The Contractor shall furnish and install horizontal cables within each Technology Region from the respective ER or TR to each outlet location as indicated in the technology drawings.
3. The Contractor shall install a 10-foot service loop to be coiled, mounted, and stored above the ladder rack in each respective Equipment Room or Telecommunications Room.
4. The Contractor shall provide a 2-foot service loop coiled and supported directly above the workstation outlet.

E. Horizontal Cable Termination

1. Contractor shall terminate cables as defined by the ANSI/TIA 568-D Commercial Building Wiring Standard with the EIA-568B sequence.
2. Workstations

    a. Contractor shall furnish and install modular jacks to terminate UTP horizontal cables.
    b. Contractor shall furnish and install faceplates, systems furniture faceplates, or surface-mount boxes to house modular jacks as indicated in the technology drawings.
        1) Any unused faceplate positions shall have the appropriate number and color of blanks installed.

3. Equipment Rooms / Telecommunications Rooms

    a. Horizontal Cable for Data
        1) Contractor shall furnish and install patch panels and horizontal cable managers to terminate horizontal data cables as indicated in the technology drawings.
        2) The Contractor shall provide and install separate modular patch panels for the cabling supporting the following devices:
            a) Network Access (Blue cabling and jacks)
            b) Security Camera Access (Orange cabling and jacks)
            c) Wireless Access (Yellow cabling and jacks)

    b. Horizontal Cable requiring lightning protection
        1) Contractor shall furnish and install lightning protection on both ends of any cables on the exterior of the building as indicated in the technology drawings.
        2) All lightning protection shall be installed per manufacturer’s instructions including but not limited to placement and bonding requirements.

F. Patch Cables

1. Fiber

    a. Equipment Rooms / Telecommunications Room
        1) The Contractor shall furnish and store (1) patch cable in original manufacturer packaging for 75% of the strands terminated per Equipment Room / Telecommunications Room:
            a) 100% of the patch cables shall be (2) meters in length and stored in the applicable Equipment Room / Telecommunications Room

2. Copper

    a. Workstations

1) The Contractor shall furnish and store (1) patch cable in original manufacturer packaging for each cable terminated.
2) 100% of the patch cables shall be (15) feet in length and stored in the applicable Equipment Room / Telecommunications Room.

b. Equipment Rooms / Telecommunications Rooms
1) The Contractor shall furnish and store (1) patch cable in original manufacturer packaging for each cable terminated per Equipment Room / Telecommunications Room:
2) 100% of the patch cables shall be (length TBD) foot in length and stored in the applicable Equipment Room / Telecommunications Room

G. Cable Support

1. All cables shall be installed and supported in conduit systems, cable trays, cores, sleeves, etc. as indicated in the technology drawings.
2. When cables leave the main pathway systems as indicated on the technology drawings, they shall be installed and supported in Contractor furnished and installed j-hooks or adjustable cable supports.
3. No cable pathway shall exceed 40% fill ratio.
4. The contractor shall furnish a separate j-hook or adjustable cable support pathway for each cable type (data, paging/clock, and security).
5. J-hooks and adjustable cable supports shall be installed no more than five-feet (5') apart on center, using only manufacturer-approved installation methods and hardware.
6. J-hooks and adjustable cable supports shall be installed no higher than 3-feet above the accessible ceiling to allow for ease of access for future moves, adds and changes
7. Do not utilize ceiling grid support wire; support j-hooks via wall, structure, or threaded rod support to structure.
8. J-hooks shall be furnished with closure clips.
9. Maximum sag between supports shall not exceed twelve-inches (12").
10. Contractor shall establish j-hook and adjustable cable supports pathways and shall coordinate pathways with all other disciplines. Under no-circumstances shall these pathways be used to support other low-voltage applications not included in this specification.
11. Contractor shall provide and install horizontal cabling in unison with the construction process and prior to the gypsum ceiling being installed.
12. UNDER NO CIRCUMSTANCES SHALL ZIP TIES BE USED ON ANY HORIZONTAL CABLING.
13. Cable Dressing

a. No nylon cable ties shall be used at any time during the installation of the cable.
b. Above Ceiling
1) Contractor shall furnish and install plenum-rated hook & loop straps in plenum-rated airspaces.
a) The Contractor shall install no more than (1) hook & loop strap between each j-hook or saddle strap or at service loop locations.

c. Equipment Rooms / Telecommunications Rooms
1) The Contractor shall bundle all visible cables by type (blue Cat 6 for data, blue Cat 6A for WAPs, yellow for security, white for paging, etc) with Contractor furnished and installed hook & loop straps.
a) Hook & loop straps shall be installed twenty-four (24) inches apart on center.

H. Equipment Rooms / Telecommunications Room Build-Out

1. Plywood

a. The Contractor shall furnish and install 8’ H x 4’ W x ¾” D sheets of AC grade fire-rated plywood as indicated in the technology drawings.
b. The Contractor shall mount all plywood vertically starting at 24” AFF.
c. The Contractor shall cover the plywood with two (2) coats of Contractor furnished white fire-retardant paint leaving exposed (1) fire rating stamp per sheet.

2. Cable Runway (Ladder Type)

a. Contractor shall furnish and install cable runway using manufacturer-approved hardware and installation methods as indicated in the technology drawings.
b. Contractor shall furnish and install vertical sections of cable runway using manufacturer-approved hardware and installation methods to provide transition and support where cables enter or exit the room using a vertical pathway.
c. Contractor shall furnish and install radius drops cross member and stringers above each rack using manufacturer-approved hardware and installation methods where cables exit the horizontal section of the ladder rack.
d. Contractor shall ground and bond each cable runway section to the next utilizing ground straps and ensure metal-to-metal contact.

3. Equipment Racks and Cabinets

a. Contractor shall furnish and install equipment racks with vertical management using manufacturer approved hardware and installation methods as indicated in the technology drawings.
b. Contractor shall secure relay racks to the concrete floor utilizing expandable concrete anchors.
c. Contractor shall secure the equipment racks to the cable runway using cable runway elevation kits and manufacturer approved hardware and installation methods.
d. Contractor shall bolt all equipment racks and vertical cable managers together.
e. Contractor shall individually ground and bond each equipment rack and ensure metal-to-metal contact.

4. Patch Panels

a. Horizontal Cabling patch Panels shall be installed as indicated in the Technology Drawings.

I. Grounding and Bonding

1. General Requirements:

a. Ensure metal-to-metal contact for all terminations.
b. All materials shall be UL Listed.
c. Cable-to-cable connections and cable-to-building steel connections shall be exothermic welds. All other connections shall be made with UL Listed compression 2-hole lugs with anti-oxidation compound, utilizing both lug openings.
d. Only one lug shall occupy a hole on the busbar. No stacking lugs or “double lugging” shall be permitted.
e. Bonding conductors shall be sized based on length per the table on the Drawings; minimum size #6 AWG and maximum size 750kcmil.

f. For Communications Rooms / Data Centers with a raised floor, provide a supplementary bonding grid (SGB) below the raised floor comprised of the following:
   1) Bare copper conductor around the perimeter of the room
   2) 12”x4” TGB/SBB, bonded to two points of the perimeter conductor and to the TGB/SBB above the access floor
   3) Bond all piping and conduit entering raised floor at the perimeter.
   4) Bond floor pedestal to Computer Room Air Conditioning Unit (if located in Communications Room)
   5) Bare copper conductor between every four stringers, running the length/width of the room in both directions; bond to every fourth pedestal in both directions and to perimeter bonding conductor.
   6) Bond floor pedestal to Power Distribution Unit feeder conduit below raised floor.

2. Telecom Bonding System shared with Electrical Ground System – Compliant with BICSI TDMM

   a. For a building without structural steel, Telecommunications Bonding Backbone is not required. The TMGB/PBB shall be bonded to the Electrical Ground System via a Bonding Conductor for Telecommunications. TGB/SBB shall be bonded to the grounding busbar of the serving electrical panelboard. Bonding conductor routing shall be indicated on Record Drawings.
   b. Provide label above TGB/SBB shall indicated name of electrical panelboard and the room it is located. Indicate routing on pre-construction Shop Drawings, and update with final installed routing as part of As-Built Drawings.

3. Main Communication Room (MDF / Server Room) requirements

   a. Install TMGB/PBB at 84-inches above finished floor.
   b. Bonding Conductor for Telecommunications (BCT)
      1) Division 26 Contractor shall provide Bonding Conductor for Telecommunications from the Electrical Ground System to the TMGB/PBB in the MDF Room.
      2) BCT conductor size shall be sized based on length per the table on the Drawings and shall be no smaller than the largest TBB conductor. If installed underground, install in dedicated 2-inch diameter conduit.

   c. Provide bonding conductors to the following equipment within the Communication Room (where available/installed):
      1) Structural steel or support beams located within the room.
      2) If electrical distribution panelboard serving the Communications Room is located within the Communications Room, bond TGB/SBB to ground bus of the panelboard.
      3) Overhead ladder rack
      4) Equipment racks, cabinets, and enclosures
      5) Surge protectors / building entrance terminals
      6) Exposed cable shields
      7) Continuous metallic conduits for low-voltage cabling that stub into the Communication Room
      8) Any additional equipment or pathways where bonding/grounding is recommended by the equipment manufacturer or the referenced standards (TIA 607 and NECA/BICSI 607).

4. Secondary Communication Rooms (IDFs / Data Rooms)

a. Install TGB/SBB at 84-inches above finished floor.
b. Provide bonding conductors to the following equipment within the Communication Room (where available/installed):
    1) Structural steel or support beams located within the room.
    2) If electrical distribution panelboard serving the Communications Room is located within the Communications Room, bond TGB/SBB to ground bus of the panelboard.
    3) Overhead ladder rack
    4) Cable trays in corridor
    5) Equipment racks, cabinets, and enclosures
    6) Surge protectors / building entrance terminals
    7) Exposed cable shields
    8) Continuous metallic conduits for low-voltage cabling that stub into the Communication Room
    9) Any additional equipment or pathways where bonding/grounding is recommended by the equipment manufacturer or the referenced standards (TIA 607 and NECA/BICSI 607).

J. Wire-mesh cable tray

1. Coordinate with all other disciplines to ensure cable tray routing and installation is coordinated with other systems.
2. Coordination with all other disciplines to ensure the 12-inch clearance above the tray is maintained.
3. Any elevation changes shall have radius drops installed to support the cables properly.
4. Install cable trays parallel with or at right angles to ceilings, walls, and structural members. Utilize 45-degree off-sets/routing to change elevation and horizontal routing.
5. Provide supports to resist forces of 0.5 times the equipment weight in any direction and 1.5 times the equipment weight in the downward direction.
6. Where cable trays encounter a non-fire-, smoke-, or acoustically-rated wall, cut opening through wall to facilitate continuous cable tray installation through wall.
7. Where cable trays encounter fire, smoke, or acoustically-rated wall, stop cable tray and provide Fire-or Smoke-Rated Pathway Devices. Provide number of devices to match square-inch capacity of cable tray. Devices shall be ganged together with manufacturer-specific accessory.
8. Ground and bond cable tray in accordance with NFPA 70, TIA-607, and NECA/BICSI-607.

    a. Bond cable tray to the Telecom Ground Bar in each Communications Rooms. Utilize #6 AWG conductor for lengths up 13 feet, a #4 AWG conductor for lengths of 14 to 20 feet, and a #3 AWG conductor for lengths of 21 to 26 feet. Refer to TIA 607 standard for conductor size requirements for lengths longer than 26 feet.
    b. Provide ground lugs between each section of cable tray to ensure electrical continuity of cable tray installation. Where cable tray sections are separated by conduit or firestopping sleeves, provide #6 AWG bonding jumper between cable tray sections.

9. Cable Tray Supports

    a. Cable tray shall be supported by a trapeze or wall support brackets. No center support brackets shall be allowed.
    b. A minimum of 3/8-inch all-thread shall be used for trapeze supports.
    c. Support in accordance with manufacturer recommendations but at not more than 10 foot intervals.
    d. Cable tray shall be no less than 3-inches above a lay-in ceiling.

e. Cable tray shall be rigidly supported and level.
f. All-thread shall be covered from the attachment to the trapeze system to 3-inches above the tray to protect the cables from being chaffed.
g. All supports shall attach to structure or a rigid surface such as a plywood backer in a sheet rock wall.
h. Supports shall not be shared with any other discipline.

K. Firestopping

1. Fire-Rated Pathway Devices

a. Provide Fire-Rated Pathway Device(s) wherever Communications cabling routed above accessible ceiling needs to be routed through a fire-rated wall. Quantity and size of devices shall be sized per manufacturer's published cable fill counts, leaving 25% spare capacity.
b. Coordinate quantity, size and locations with other Division 27 Subcontractors and indicate quantity, size, location, product make and model number, and UL System number on Pre-Construction Shop Drawings.
c. Coordinate quantity, size and locations with other Division 27 Subcontractors and indicate quantity, size, location, product make and model number, and UL System number on Pre-Construction Shop Drawings.
d. Affix adhesive wall label immediately adjacent to devices to communicate to future cable technicians, authorities having jurisdiction and others the manufacturer of the device and the corresponding UL System number installed.

2. Firestopping for Conduits

a. Provide firestopping components as part of a UL System for all conduit penetrations through fire-rated and smoke-rated walls and floors.
b. Coordinate locations and UL System with other Division 27 Subcontractors and indicate locations and UL System number on Pre-Construction Shop Drawings.
c. Affix adhesive wall label immediately adjacent to devices to communicate to future cable technicians, authorities having jurisdiction and others the manufacturer of the device and the corresponding UL System number installed.

3. Firestopping for Backboxes

a. Provide firestopping component(s) as part of a UL tested/approved solution for backboxes located in fire-rated and smoke-rated walls.
b. Coordinate locations with other Division 27 Subcontractors and indicate locations on Pre-Construction Shop Drawings.

4. Smoke-Rated / Acoustical Pathway Device

a. Provide Smoke-Rated Pathway Device(s) wherever Communications cabling routed above accessible ceiling needs to be routed through a smoke-rated wall or through a wall of a Noise Critical Room.
b. Quantity and size of devices shall be sized per manufacturer's published cable fill counts, leaving 40% spare capacity.
c. Coordinate quantity, size and locations with other Division 27 Subcontractors and indicate quantity, size, location, product make and model number, and UL System number on Pre-Construction Shop Drawings.

d. For smoke-rated partitions: Affix adhesive wall label immediately adjacent to devices to communicate to future cable technicians, authorities having jurisdiction and others the manufacturer of the device and the corresponding UL System number installed.

5. Fire-rated Conduit (Circuit Integrity) Wrap

a. Provide Fire-rated Conduit (Circuit Integrity) Wrap for certain Communications conduits for the following systems:
   1) Section 275129 Two-Way Communications System
   2) Section 275319 Emergency Responder Radio Coverage (ERRC) DAS

b. Coordinate conduit size and lengths requiring wrap with Subcontractors of those sections prior to Bid and include cost to provide that wrap in the Bid.

L. System Labeling

1. Contractor shall verify room numbers and confirm the final room numbering scheme prior to generating any labels.
2. Horizontal Cables shall be labeled within (12) inches from the termination point inside the Equipment Room/Telecommunications Rooms.
3. Horizontal Cables shall be labeled within (6) inches from the termination point at the workstation end.
4. Backbone Fiber and Copper Cables shall be labeled within (12) inches of the visible end of the jacket and at each pull point location. If passing through an IDF it will be labeled when entering and leaving that IDF.
5. Fiber Innerduct shall be labeled within (12) inches of the point of entry of the fiber optic enclosure and at each pull point location. If passing through an IDF it will be labeled when entering and leaving that IDF.
6. Bonding conductors shall be labeled within (12) inches from their termination point.
7. Cables shall be labeled identically at both ends.
8. Equipment Racks

a. Equipment racks in each Equipment/Telecommunication Room shall be labeled in sequential numeric order.
   1) Labels shall be centered on the top front of the equipment rack.

9. Cabinets

a. Cabinets in each Equipment/Telecommunication Room shall be labeled in sequential numeric order.
   1) Labels shall be centered on the top front of the Cabinet.

10. Fiber Optic Enclosures

a. Fiber optic enclosures shall be labeled alpha-numeric starting with the 1st fiber optic enclosure in the top of the 1st equipment rack.
b. A label for each terminated strand shall be securely placed inside each fiber optic enclosure.

11. Backbone Cable

a. Fiber Optic Cable

1) Fiber optic backbone cable labels shall contain the cable origin room number, the cable destination room number, fiber strand numbers, and type (i.e. B126-A118/001-012MM).
2) Fiber optic couplers panels in fiber enclosures shall be labeled at each end by strand denoting building code, Equipment Room and/or Telecommunications Room, enclosure number, and strand number to and from respectively (i.e. B126/01/01-12 – A118/01/01-12).

b. High Pair Count Copper Cable
1) For high pair count copper backbone cables, the label scheme shall contain, cable origin room number, the cable destination room number, and cable pairs (i.e. B126-A118/001-025).

12. Horizontal Cable

a. Inside Equipment Rooms
1) Horizontal cables shall be labeled at each end with the destination end and origin room number, patch panel number, and port number. (i.e. B126-B127-A01).
2) Patch panels in each closet shall be labeled sequentially starting with the first Patch Panel in the top of the first relay rack (A, B, C, D, E, etc.).
3) All patch panels will indicate the room number along with the patch panel port designation. The labels shall be mechanical labels that are neatly printed with uniform font and evenly spaced across the patch panel. Room numbers will be in sequential order throughout the panels as indicated on the drawings.
4) 110-type blocks shall contain the destination room number, pair numbers, and binder pair number under each pair termination. (example)
a) 110-type block labels shall be printed on product-specific label strips and placed into label holders.

13. Workstation Faceplates

a. Cables and wall plates shall be labeled denoting origin, Equipment Room/Telecommunications Room Number, Patch Panel, 110-type termination block, and Port Number. (i.e. B127-A01).

14. TMGB/PBB and TGB/SBB

a. TMGB/PBB and TGB/SBB shall be labeled with a unique identifier (i.e. TMGB/PBB-B126, TGB/SBB-A118).

15. Bonding Conductors

a. The following conductors shall be labeled at each end with the destination end and origin room number (i.e. B126 – IDFA118).
1) Bonding Conductor for Telecommunications
2) Telecommunications Bonding Backbone
3) Grounding Equalizer

3.04 TESTING REQUIREMENTS

A. Fiber Optic Cable

1. Installed strands shall be tested and certified in accordance with industry standards.
2. Only Manufacturer Certified Technicians shall perform testing.

3. The Contractor shall test and certify all fiber optic cable strands with approved field tester(s) that are within their calibration period. The Contractor shall be liable for all re-testing required in the event tests are performed with non-approved test equipment or tester(s) that are not within their calibration period.
4. The Contractor shall provide calibration results from the manufacturer showing the current calibration of the testers.
5. The Contractor shall notify the Architect/Design Consultant a minimum of five (5) days in advance to observe cable testing.
6. The Architect/Design Consultant may randomly select 5% of the installed strands for test verification purposes. The Contractor shall re-test these strands in the presence of the Architect/Design Consultant and the results shall be compared to the previously Contractor submitted test results. In the event that any of the verification tests differ in results from the previously submitted test results, all testing shall be declared a failure and the Contractor shall re-test 100% of the installed strands at no cost to the Owner.

B. Copper Backbone Cable

1. Installed pairs shall be tested and certified in accordance with industry standards.
2. Only Manufacturer Certified Technicians shall perform testing.
3. The Contractor shall test and certify all copper pairs with approved field tester(s) that are within their calibration period. The Contractor shall be liable for all re-testing required in the event tests are performed with non-approved test equipment or tester(s) that are not within their calibration period.
4. The Contractor shall provide calibration results from the manufacturer showing the current calibration of the testers.
5. The Contractor shall notify the Architect/Design Consultant a minimum of five (5) days in advance to observe cable testing.
6. The Architect/Design Consultant may randomly select 5% of the installed pairs for test verification purposes. The Contractor shall re-test these pairs in the presence of the Architect/Design Consultant and the results shall be compared to the previously Contractor submitted test results. In the event that any of the verification tests differ in results from the previously submitted test results, all testing shall be declared a failure and the Contractor shall re-test 100% of the installed pairs at no cost to the Owner.

C. Category 6 and 6A UTP Cable

1. Cable links shall be tested in accordance with industry standards.
2. Only Manufacturer Certified Technicians shall perform testing.
3. The Contractor shall test and certify the structured cable system with approved field tester(s) that are within their calibration period. The Contractor shall be liable for all re-testing required in the event tests are performed with non-approved test equipment or tester(s) that are not within their calibration period.
4. No Fail or *Pass results will be accepted.
5. The Contractor shall notify the Architect/Design Consultant a minimum of five (5) days in advance to observe field testing.
6. The Architect/Design Consultant may randomly select 5% of the installed links for test verification purposes. The Contractor shall re-test these links in the presence of the Architect/Design Consultant and the results shall be compared to the previously Contractor submitted test results. In the event that any of the verification tests differ in results from the previously-submitted test results, all testing shall be declared a failure and the Contractor shall re-test 100% of the installed links at no cost to the Owner.

D. Grounding and Bonding

1. Main Building Ground

    a. Coordinate with electrical contractor and provide a copy of their test results for the main building ground. The results shall be below 25 Ohms.

2. Two-Point Ground/Continuity Testing

    a. Prior to the two-point ground testing, a visual inspection shall be performed to verify that the bonding and grounding system is installed according to the drawings and specifications and in compliance with the TIA-607-D Standard.
    b. All testing shall be conducted prior to any active equipment is installed.
    c. The Contractor shall use an earth ground resistance tester that is configured for a continuity test. This is also known as a two-point tester or a “dead earth” test.
    d. Prior to the two-point continuity test conduct a voltage test to ensure there is no stray voltage in the system.
    e. The testing shall include but is not limited to the following points:
        1) Building electrical grounding electrode and the TMGB/PBB.
        2) TGMB/PBB TGB/SBB to electrical ground in ER/TR.
        3) TGMB/PBB TGB/SBB to the building steel (if present).
        4) TMGB/PBB to each TGB/SBB.
        5) Building steel (if present) to the electrical ground.

    f. Per the TIA-607-D, the maximum value for resistance between any point in the telecommunications bonding and grounding system and the building’s electrical grounding electrode system is 100 milliohms. In the case of long TBB and Grounding Equalizer conductor runs, the resistance of the conductor must be factored into the total resistance. For example: 1 km of a No. 3/0 conductor has a resistance of 0.2028 ohms. (0.06180 ohms per 1000 ft.)
    g. The Contractor shall notify the Architect/Design Consultant a minimum of five (5) days in advance to observe field testing.

3.05 PROJECT CLOSEOUT DOCUMENTATION

A. As-Built Drawings

1. Drawings shall be provided to the Architect/Design Consultant at the time of substantial completion. Final payment will not be recommended until drawings are received and approved by the Architect/Design Consultant.
2. Provide Drawings depicting the condition of the structured cabling system as installed.
3. As-Built drawings shall be produced in AutoCAD 2017 or higher and provided in hardcopy and electronically in .dwg and PDF format.
4. Drawings shall retain the formatting and title block of the original drawings as issued by the Architect/Design Consultant.
5. Drawings shall be provided utilizing the original scale and shall include the exact dimensions and locations of all equipment room/telecommunication room layouts, wall elevations, equipment rack elevations, ladder racks, cable tray, sleeves, backbone and horizontal cable pathways, workstation locations, and labeling scheme.
6. A laminated copy of the telecommunications room service region with the labeled work areas outlet shall be provided and hung in each telecommunications room. Drawing size will be 30”x42”.

B. Test Documentation

1. Test documentation shall be provided to the Architect/Design Consultant at the time of substantial completion. Final payment will not be recommended until these test results are received and approved by the Architect/Design Consultant.
2. Provide test documentation for the structured cabling system as installed.
3. Test results shall be provided in original electronic format (i.e., manufacturer's proprietary testing software along with applicable reader software) and PDF electronic format.
4. Test documentation shall be bound, sectioned, and tabbed in the following sequence as applicable:
    a) Tester(s) Calibration Certificate(s)
    b) Inter-Building Backbone Fiber Optic Cable
    c) Inter-Building Backbone Copper Cable
    d) Intra-Building Backbone Fiber Optic Cable
    e) Intra-Building Backbone Count Copper
    f) Horizontal Category 3 Cable
    g) Horizontal Category 5e Cable
    h) Horizontal Category 6 Cable
    i) Horizontal Category 6A Cable
    j) Main Building Ground
    k) Two-Point Ground/Continuity Test

C. Manufacturer's Performance Certification

1. Certificate shall be provided to the Architect/Design Consultant at the time of final system acceptance. Final payment will not be recommended until the certificate of certification is received and approved by the Architect/Design Consultant.

    a. The manufacturer of the solution shall furnish a performance certification as per the specifications starting at final system acceptance.
    b. One original and two copies of the Manufacturer's Certificate shall be provided.

D. Manufacturer's Product Warranty

1. Certificate of product warranty shall be provided to the Architect/Design Consultant at the time of final system acceptance. Final payment will not be recommended until this certificate of product warranty is received and approved by the Architect/Design Consultant.

    a. The manufacturer of the solution shall furnish a product warranty as per the specifications starting at final system acceptance.
    b. One original and two copies of the Manufacturer's product warranty shall be provided.

E. Contactor's Statement of Warranty

1. Statement of warranty shall be provided to the Architect/Design Consultant at the time of substantial completion. Final payment will not be recommended until statement of warranty is received and approved by the Architect/Design Consultant.

    a. Contractor shall furnish a minimum of a one (1) year warranty on all materials, labor and workmanship starting at final system acceptance.
    b. One original and two copies of Contractor's warranty terms and conditions to include contact information (i.e. Contractor name, Point of Contact, address, phone number and email address) and start and end date for warranty call outs.

F.

G.

END OF SECTION

SECTION 28 4600
FIRE DETECTION AND ALARM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fire alarm system design and installation, including all components, wiring, and conduit.

B. Transmitters for communication with supervising station.

C. Replacement and removal of existing fire alarm system components, wiring, and conduit indicated.

D. Maintenance of fire alarm system under contract for specified warranty period.

1.02 RELATED REQUIREMENTS

A. Section 08 3323 - Overhead Coiling Doors: Coiling fire doors to be released by fire alarm system.

B. Section 08 7100 - Door Hardware: Electrically operated locks and door holder devices to be monitored and released by fire alarm system.

C. Section 21 1300 - Fire-Suppression Sprinkler Systems: Supervisory, alarm, and actuating devices installed in sprinkler system.

D. Section 21 2200 - Clean-Agent Fire-Extinguishing System: Supervisory, alarm, and releasing devices installed in extinguishing system.

E. Section 23 3300 - Air Duct Accessories: Smoke dampers monitored and controlled by fire alarm system.

1.03 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. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

C. IEEE C62.41.2 - IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits; 2002 (Corrigendum 2012).

D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

E. NFPA 72 - National Fire Alarm and Signaling Code; Most Recent Edition Cited by Referring Code or Reference Standard.

F. NFPA 101 - Life Safety 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. Proposal Documents: Submit the following with cost/time proposal:
   1. NFPA 72 "Record of Completion", filled out to the extent known at the time.
   2. Manufacturer's detailed data sheet for each control unit, initiating device, and notification appliance.
   3. Certification by Contractor that the system design will comply with Contract Documents.
   4. Proposed maintenance contract.

C. Evidence of designer qualifications.

D. Design Documents: Submit all information required for plan review and permitting by authorities having jurisdiction, including but not limited to floor plans, riser diagrams, and description of operation:
   1. Copy (if any) of list of data required by authority having jurisdiction.
   2. NFPA 72 "Record of Completion", filled out to the extent known at the time.

3. Clear and concise description of operation, with input/output matrix similar to that shown in NFPA 72 Appendix A-7-5-2.2(9), and complete listing of software required.
4. System zone boundaries and interfaces to fire safety systems.
5. Location of all components, circuits, and raceways; mark components with identifiers used in control unit programming.
6. Circuit layouts; number, size, and type of raceways and conductors; conduit fill calculations; spare capacity calculations; notification appliance circuit voltage drop calculations.
7. List of all devices on each signaling line circuit, with spare capacity indicated.
8. Manufacturer's detailed data sheet for each component, including wiring diagrams, installation instructions, and circuit length limitations.
9. Description of power supplies; if secondary power is by battery include calculations demonstrating adequate battery power.
10. Detailed drawing of graphic annunciator(s).
11. Certification by either the manufacturer of the control unit or by the manufacturer of each other component that the components are compatible with the control unit.
12. Certification by the manufacturer of the control unit that the system design complies with Contract Documents.
13. Certification by Contractor that the system design complies with Contract Documents.
14. Do not show existing components to be removed.

E. Evidence of installer qualifications.

F. Evidence of instructor qualifications; training lesson plan outline.

G. Evidence of maintenance contractor qualifications, if different from installer.

H. Inspection and Test Reports:
1. Submit inspection and test plan prior to closeout demonstration.
2. Submit documentation of satisfactory inspections and tests.
3. Submit NFPA 72 "Inspection and Test Form," filled out.

I. Operating and Maintenance Data: See Section 01 7800 for additional requirements; revise and resubmit until acceptable; have one set available during closeout demonstration:
1. Complete set of specified design documents, as approved by authority having jurisdiction.
2. Additional printed set of project record documents and closeout documents, bound or filed in same manuals.
3. Contact information for firm that will be providing contract maintenance and trouble call-back service.
4. List of recommended spare parts, tools, and instruments for testing.
5. Replacement parts list with current prices, and source of supply.
6. Detailed troubleshooting guide and large scale input/output matrix.
7. Preventive maintenance, inspection, and testing schedule complying with NFPA 72; provide printed copy and computer format acceptable to Owner.
8. Detailed but easy to read explanation of procedures to be taken by non-technical administrative personnel in the event of system trouble, when routine testing is being conducted, for fire drills, and when entering into contracts for remodeling.

J. Project Record Documents: See Section 01 7800 for additional requirements; have one set available during closeout demonstration:
1. Complete set of floor plans showing actual installed locations of components, conduit, and zones.
2. "As installed" wiring and schematic diagrams, with final terminal identifications.
3. "As programmed" operating sequences, including control events by device, updated input/output chart, and voice messages by event.

K. Closeout Documents:

1. Certification by manufacturer that the system has been installed in compliance with manufacturer's installation requirements, is complete, and is in satisfactory operating condition.
2. NFPA 72 "Record of Completion", filled out completely and signed by installer and authorized representative of authority having jurisdiction.
3. Certificate of Occupancy.
4. Maintenance contract.
5. Report on training results.

L. Maintenance Materials, Tools, and Software: Furnish the following for Owner's use in maintenance of project.
1. Furnish spare parts of same manufacturer and model as those installed; deliver in original packaging, labeled in same manner as in operating and maintenance data and place in spare parts cabinet.

1.05 QUALITY ASSURANCE

A. Designer Qualifications: NICET Level III or IV (3 or 4) certified fire alarm technician or registered fire protection engineer, employed by fire alarm control panel manufacturer, Contractor, or installer , with experience designing fire alarm systems in the jurisdictional area of the authorities having jurisdiction.

B. Installer Qualifications: Firm with minimum 3 years documented experience installing fire alarm systems of the specified type and providing contract maintenance service as a regular part of their business.
1. Authorized representative of control unit manufacturer; submit manufacturer's certification that installer is authorized; include name and title of manufacturer's representative making certification.
2. Installer Personnel: At least 2 years of experience installing fire alarm systems.
3. Supervisor: NICET level III or IV (3 or 4) certified fire alarm technician; furnish name and address.
4. Certified in the State in which the Project is located as fire alarm installer.

C. Maintenance Contractor Qualifications: Same entity as installer or different entity with specified qualifications.

D. Instructor Qualifications: Experienced in technical instruction, understanding fire alarm theory, and able to provide the required training; trained by fire alarm control unit manufacturer.

1.06 WARRANTY

A. Provide control panel manufacturer's warranty that system components other than wire and conduit are free from defects and will remain so for 1 year after date of Substantial Completion.

B. Provide installer's warranty that the installation is free from defects and will remain so for 1 year after date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Fire Alarm Control Units and Accessories:
1. Match existing system..
2. Provide control units made by the same manufacturer.

B. Initiating Devices and Notification Appliances:
1. Same manufacturer as control units.
2. Provide initiating devices and notification appliances made by the same manufacturer, where possible.

2.02 FIRE ALARM SYSTEM

A. Fire Alarm System: Provide modifications and extensions to the existing automatic fire detection and alarm system:

1. Provide all components necessary, regardless of whether shown in Contract Documents or not.
2. Protected Premises: Entire building shown on drawings.
3. Comply with the following; where requirements conflict, order of precedence of requirements is as listed:
   a. ADA Standards.
   b. The requirements of the State Fire Marshal.
   c. The requirements of the local authority having jurisdiction .
   d. Applicable local codes.
   e. Contract Documents (drawings and specifications).
   f. NFPA 101.
   g. NFPA 72; where the word "should" is used consider that provision mandatory; where conflicts between requirements require deviation from NFPA 72, identify deviations clearly on design documents.
4. Evacuation Alarm: Multiple smoke zones; allow for evacuation notification of any individual zone or combination of zones, in addition to general evacuation of entire premises.
5. Voice Notification: Provide emergency voice/alarm communications with multichannel capability; digital.
6. General Evacuation Zones: Each smoke zone is considered a general evacuation zone unless otherwise indicated, with alarm notification in all zones on the same floor, on the floor above, and the floor below.
7. Program notification zones and voice messages as directed by Owner.
8. Fire Alarm Control Unit: New, located at supervising station.
9. Two-Way Telephone: Provide two-way telephone service for the use of the fire service and others; provide jacks and two portable handsets.
10. Combined Systems: Do not combine fire alarm system with other non-fire systems.

B. Supervising Stations and Fire Department Connections:
   1. Public Fire Department Notification: By on-premises supervising station.
   2. On-Premises Supervising Station: New proprietary station operated by Owner, located at _____.
   3. Means of Transmission to On-Premises Supervising Station: Directly connected noncoded system.
   4. Means of Transmission to Remote Supervising Station: Digital alarm communicator transmitter (DACT), 2 telephone lines.

C. Circuits:
   1. Initiating Device Circuits (IDC): Class B, Style A.
   2. Signaling Line Circuits (SLC) Within Single Building: Class B, Style 0.5.
   3. Notification Appliance Circuits (NAC): Class B, Style W.

D. Spare Capacity:
   1. Initiating Device Circuits: Minimum 25 percent spare capacity.
   2. Notification Appliance Circuits: Minimum 25 percent spare capacity.
   3. Speaker Amplifiers: Minimum 25 percent spare capacity.
   4. Fire Alarm Control Units: Capable of handling all circuits utilized to capacity without requiring additional components other than plug-in control modules.

E. Power Sources:
   1. Primary: Dedicated branch circuits of the facility power distribution system.
   2. Secondary: Storage batteries.
   3. Capacity: Sufficient to operate entire system for period specified by NFPA 72.
   4. Each Computer System: Provide uninterruptible power supply (UPS).

2.03 EXISTING COMPONENTS

A. Existing Fire Alarm System: Remove existing components indicated and incorporate remaining components into new system, under warranty as if they were new; do not take existing portions of system out of service until new portions are fully operational, tested, and connected to existing system.

B. Clearly label components that are "Not In Service."

C. Remove unused existing components and materials from site and dispose of properly.

2.04 FIRE SAFETY SYSTEMS INTERFACES

A. Supervision: Provide supervisory signals in accordance with NFPA 72 for the following:
   1. Sprinkler water control valves.
   2. Dry-pipe sprinkler system pressure.
   3. Dry-pipe sprinkler valve room low temperature.
   4. Fire pump(s).
   5. Elevator shut-down control circuits.

B. Alarm: Provide alarm initiation in accordance with NFPA 72 for the following:
   1. Sprinkler water flow.
   2. Total flooding suppression system activation.
   3. Kitchen hood suppression activation; also disconnect fuel source from cooking equipment.
   4. Elevator lobby, elevator hoistway, and elevator machine room smoke detectors.
   5. Duct smoke detectors.

C. Elevators:
   1. Elevator lobby, hoistway, and machine room smoke detectors: Elevator recall for fire fighters' service.
   2. Elevator Machine Room Heat Detector: Shut down elevator power prior to hoistway sprinkler activation.
   3. Sprinkler pressure or waterflow: Shut down elevator power prior to hoistway sprinkler activation.

D. HVAC:
   1. Duct Smoke Detectors: Close dampers indicated; shut down air handlers indicated.

E. Doors:
   1. Smoke Barrier Door Magnetic Holders: Release upon activation of smoke detectors in smoke zone on either side of door, upon alarm from manual pull station on same floor, and upon sprinkler activation on same floor. Refer to Section 08 7100.
   2. Electromagnetic Door Locks on Egress Doors: Unlock upon activation of any alarm initiating device or suppression system in smoke zone that doors serve as egress from. Refer to Section 08 7100.
   3. Overhead Coiling Fire Doors: Release upon activation of smoke detectors in smoke zone on either side of door, upon alarm from manual pull station on same floor, and upon sprinkler activation on same floor. Refer to Section 08 3323.

2.05 COMPONENTS

A. General:
   1. Provide flush mounted units where installed in finish areas; in unfinished areas, surface mounted unit are acceptable.
   2. Provide legible, permanent labels for each control device, using identification used in operation and maintenance data.

B. Fire Alarm Control Units: Analog, addressable type; listed, classified, and labeled as suitable for the purpose intended.

C. In addition to code required components, provide carbon monoxide detectors in all classrooms.

D. Provide wire guards for devices installed in gyms.

E. Master Control Unit: FACP.

F. Remote Annunciators: FAP.

G. Addressable Modules:
   1. Provide addressable modules suitable for connection to fire alarm control unit signaling line circuits.
   2. Unless otherwise indicated, use addressable modules only in clean, dry, indoor, nonhazardous locations.
   3. Monitor Modules: Unless devices are explicitly permitted to be connected together as zone, provide separate addressable monitor module for each conventional dry-contact input device in order to be individually identifiable by addressable fire alarm control unit.
   4. Control Modules: Provide as indicated or as required for selective control of notification appliances.
   5. Relay Modules: Provide as indicated or as required to perform necessary functions via dry-contact interface. Where load exceeds module contact rating, provide accessory power isolation relays suitable for load as required.

H. Initiating Devices:
   1. Addressable Systems:
      a. Addressable Devices: Individually identifiable by addressable fire alarm control unit.
      b. Provide suitable addressable interface modules as indicated or as required for connection to conventional (non-addressable) devices and other components that provide a dry closure output.

I. Notification Appliances:
   1. Bells: _____.
      a. Provide 1 extra.
   2. Speakers: _____.
      a. Provide 1 extra.
   3. Strobes: _____.
      a. Provide 1 extra.

J. Circuit Conductors: Copper or optical fiber; provide 200 feet extra; color code and label.

K. Surge Protection: In accordance with IEEE C62.41.2 category B combination waveform and NFPA 70; except for optical fiber conductors.
   1. Equipment Connected to Alternating Current Circuits: Maximum let through voltage of 350 V(ac), line-to-neutral, and 350 V(ac), line-to-line; do not use fuses.
   2. Initiating Device Circuits, Notification Appliance Circuits, and Communications Circuits: Provide surge protection at each point where circuit exits or enters a building; rated to protect applicable equipment; for 24 V(dc) maximum dc clamping voltage of 36 V(dc), line-to-ground, and 72 V(dc), line-to-line.

L. Locks and Keys: Deliver keys to Owner.
   1. Provide the same standard lock and key for each key operated switch and lockable panel and cabinet; provide 5 keys of each type

M. Instruction Charts: Printed instruction chart for operators, showing steps to be taken when a signal is received (normal, alarm, supervisory, and trouble); easily readable from normal operator's station.
   1. Frame: Stainless steel or aluminum with polycarbonate or glass cover.
   2. Provide one for each control unit where operations are to be performed.
   3. Obtain approval of Owner prior to mounting; mount in location acceptable to Owner.
   4. Provide extra copy with operation and maintenance data submittal.

N. Storage Cabinet for Spare Parts and Tools: Steel with baked enamel finish, size appropriate to quantity of parts and tools.
   1. Padlock eye and hasp for lock furnished by Owner.
   2. Locate as directed by Owner.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with applicable codes, NFPA 72, NFPA 70, and Contract Documents.

B. Conceal all wiring, conduit, boxes, and supports where installed in finished areas.
   1. All wiring for fire alarm system shall be in conduit. Refer to 26 05 33.13 for conduit applications and 26 05 53 for identification of emergency conduit for electrical systems.

C. Obtain Owner's approval of locations of devices, before installation.

D. Install instruction cards and labels.

3.02 INSPECTION AND TESTING FOR COMPLETION

A. Notify Owner 7 days prior to beginning completion inspections and tests.

B. Notify authorities having jurisdiction and comply with their requirements for scheduling inspections and tests and for observation by their personnel.

C. Provide the services of the installer's supervisor or person with equivalent qualifications to supervise inspection and testing, correction, and adjustments.

D. Prepare for testing by ensuring that all work is complete and correct; perform preliminary tests as required.

E. Provide all tools, software, and supplies required to accomplish inspection and testing.

F. Perform inspection and testing in accordance with NFPA 72 and requirements of local authorities; document each inspection and test.

G. Correct defective work, adjust for proper operation, and retest until entire system complies with Contract Documents.

H. Diagnostic Period: After successful completion of inspections and tests, Operate system in normal mode for at least 14 days without any system or equipment malfunctions.
   1. Record all system operations and malfunctions.
   2. If a malfunction occurs, start diagnostic period over after correction of malfunction.
   3. Owner will provide attendant operator personnel during diagnostic period; schedule training to allow Owner personnel to perform normal duties.
   4. At end of successful diagnostic period, fill out and submit NFPA 72 "Inspection and Testing Form."

3.03 OWNER PERSONNEL INSTRUCTION

A. Provide the following instruction to designated Owner personnel:
   1. Hands-On Instruction: On-site, using operational system.
   2. Classroom Instruction: Owner furnished classroom, on-site or at other local facility.
   3. Factory Instruction: At control unit manufacturer's training facility.

B. Administrative: One-hour session(s) covering issues necessary for non-technical administrative staff; classroom:
   1. Initial Training: 1 session pre-closeout.

C. Basic Operation: One-hour sessions for attendant personnel, security officers, and engineering staff; combination of classroom and hands-on:
   1. Initial Training: 1 session pre-closeout.

D. Detailed Operation: Two-hour sessions for engineering staff; assume NICET level I qualifications or equivalent; combination of classroom and hands-on:
   1. Initial Training: 1 session pre-closeout.

E. Maintenance Technicians: Detailed training for electrical technicians, on programming, maintaining, repairing, and modifying; factory training:
   1. Initial Training: One 3-day session, pre-closeout.

F. Furnish the services of instructors and teaching aids; have copies of operation and maintenance data available during instruction.

G. Provide means of evaluation of trainees suitable to type of training given; report results to Owner.

3.04 CLOSEOUT

A. Closeout Demonstration: Demonstrate proper operation of all functions to Owner.
   1. Be prepared to conduct any of the required tests.
   2. Have at least one copy of operation and maintenance data, preliminary copy of project record drawings, input/output matrix, and operator instruction chart(s) available during demonstration.
   3. Have authorized technical representative of control unit manufacturer present during demonstration.
   4. Demonstration may be combined with inspection and testing required by authority having jurisdiction; notify authority having jurisdiction in time to schedule demonstration.
   5. Repeat demonstration until successful.

B. Occupancy of the project will not occur prior to Substantial Completion.

C. Substantial Completion of the project cannot be achieved until inspection and testing is successful and:
   1. Specified diagnostic period without malfunction has been completed.
   2. Approved operating and maintenance data has been delivered.
   3. Spare parts, extra materials, and tools have been delivered.
   4. All aspects of operation have been demonstrated to Owner.
   5. Final acceptance of the fire alarm system has been given by authorities having jurisdiction.
   6. Occupancy permit has been granted.
   7. Specified pre-closeout instruction is complete.

D. Perform post-occupancy instruction within 3 months after Substantial Completion.

3.05 MAINTENANCE

A. See Section 01 7000 - Execution and Closeout Requirements, for additional requirements relating to maintenance service.

B. Provide to Owner, at no extra cost, a written maintenance contract for entire manufacturer's warranty period, to include the work described below.

C. Perform routine inspection, testing, and preventive maintenance required by NFPA 72, including:
   1. Maintenance of fire safety interface and supervisory devices connected to fire alarm system.
   2. Repairs required, unless due to improper use, accidents, or negligence beyond the control of the maintenance contractor.
   3. Record keeping required by NFPA 72 and authorities having jurisdiction.

D. Provide trouble call-back service upon notification by Owner:
   1. Provide on-site response within 2 hours of notification.
   2. Include allowance for call-back service during normal working hours at no extra cost to Owner.
   3. Owner will pay for call-back service outside of normal working hours on an hourly basis, based on actual time spent at site and not including travel time; include hourly rate and definition of normal working hours in maintenance contract.

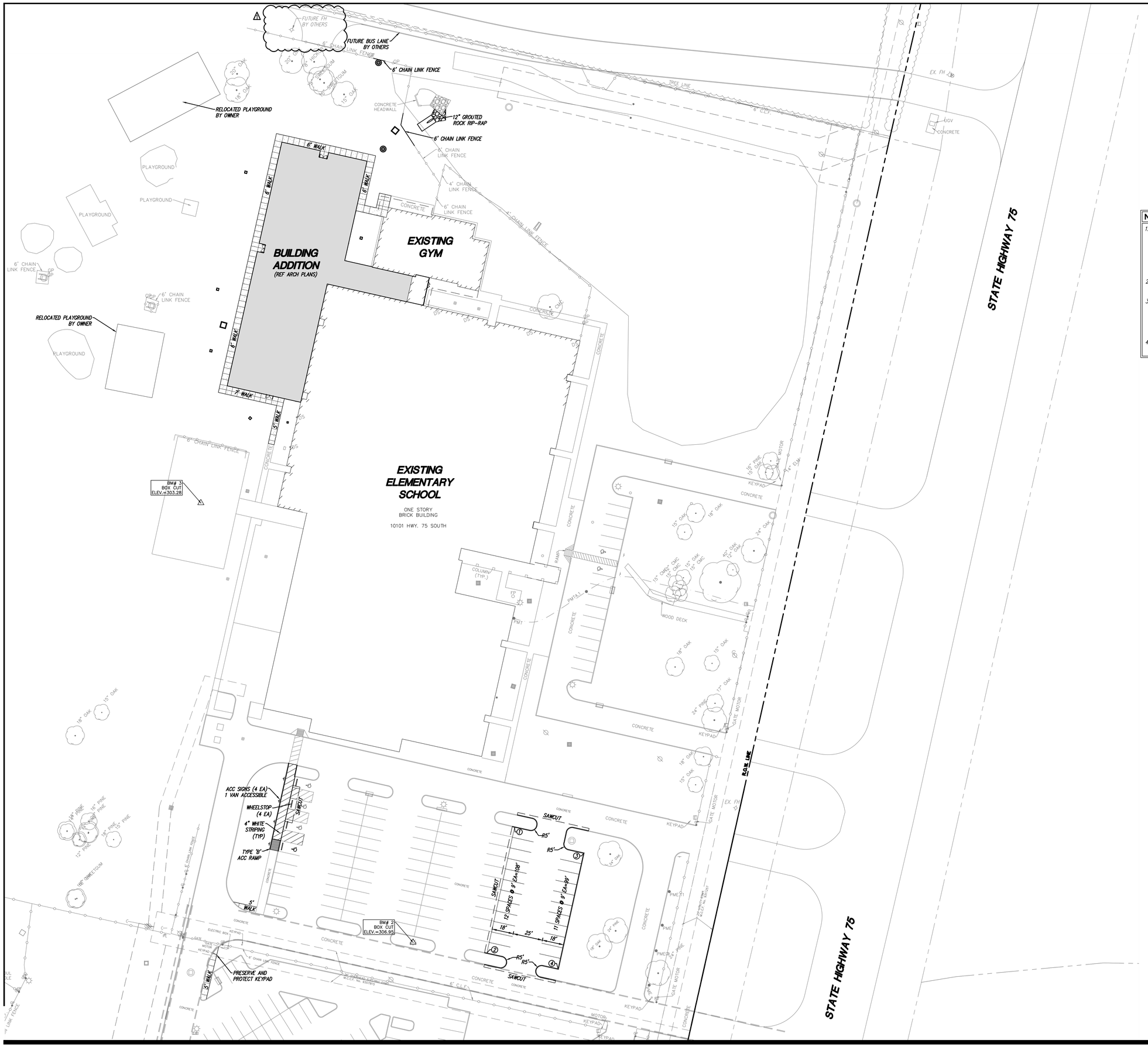
E. Provide a complete description of preventive maintenance, systematic examination, adjustment, cleaning, inspection, and testing, with a detailed schedule.

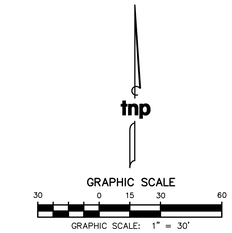
F. Maintain a log at each fire alarm control unit, listing the date and time of each inspection and call-back visit, the condition of the system, nature of the trouble, correction performed, and

parts replaced. Submit duplicate of each log entry to Owner's representative upon completion of site visit.

G. Comply with Owner's requirements for access to facility and security.

END OF SECTION





LEGEND

4" CONCRETE FLATWORK

NOTES

1. THIS PLAN SHALL BE USED TO CONTROL THE GEOMETRICS OF THE SITE LAYOUT. DIMENSIONAL TIES AND COORDINATES ARE PROVIDED TO ASSIST IN THE LAYOUT OF THE SITE IMPROVEMENTS. THE CONTRACTOR SHALL VERIFY THE COORDINATE TIES WITH THE DIMENSIONS PROVIDED ON THE PLANS.
2. ALL DIMENSIONS AND COORDINATES ARE TO THE FACE OF CURB AND BUILDING.
3. ALL BUILDING TIES AND DIMENSIONS SHALL BE COORDINATED AND VERIFIED WITH THE ARCHITECT'S PLANS. ALL DIMENSIONS TO BUILDINGS SHALL BE FIELD VERIFIED PRIOR TO CONSTRUCTION.
4. ALL CURB RADII ARE 5' UNLESS OTHERWISE NOTED.

BENCHMARKS

BM #1:

[NGS PID BL1266] – BRASS DISK STAMPED "P 1203 1973" LOCATED 1.35 MILES SOUTHERLY ALONG MISSOURI PACIFIC RAILROAD FROM ITS JUNCTION WITH STEWART STREET IN WALLIS, 297' SOUTHWEST OF AND ACROSS FROM US HIGHWAY 75 FROM MILE POST 105, 58.7' WEST OF THE CENTERLINE OF HIGHWAY, 2' EAST OF A FENCE, 1.6' NORTH OF POWER POLE,180, 1.2' SOUTH OF METAL WITNESS POST AND 1' ABOVE THE LEVEL OF THE ROAD.

ELEV.=332.00 (NAVD 88)

BM #2:

[TBM "BB"] – BOX CUT ON TOP OF CONCRETE BASE FOR LIGHT STANDARD LOCATED AT THE SOUTHEASTERLY CORNER OF PARKING LOT ON THE SOUTH SIDE OF THE SCHOOL.

ELEV.=306.95

BM #3:

[TBM "C"] – BOX CUT ON TOP OF CONCRETE SLAB AT THE CENTER POINT UNDER COVERED PLAY AREA ON THE WEST SIDE OF SCHOOL.

ELEV.=303.28

COORDINATE CONTROL TABLE

Point #	Northing	Easting	Desc
1	10141404.22	3827866.02	PARK
2	10141299.12	3827842.86	PARK
3	10141382.49	3827923.70	PARK
4	10141285.81	3827902.39	PARK

CITY OF CONROE
Engineering Division
These plans have been reviewed for general conformity with the City of Conroe design requirements and construction specifications. Constructability and sound engineering practices remain the responsibility of the engineer sealing the plans. Construction of the project is required to meet all City of Conroe guidelines prior to the issuance of initial certification. Errors and omissions in the plans may cause significant increases in construction costs and time delays.
Initial:_____ Date:_____
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TNP PROJECT NO. HUC26208
TNP TBPELS REGISTRATION NO. F-230

Revision / 1 – ADDENDUM #2
Date 07/23/2026

Project:
WILLIS ISD - A.R. TURNER ELEMENTARY SCHOOL CLASSROOM EXPANSION
WILLIS, TX
10575 HIGHWAY 75 N. WILLIS, TEXAS

Key plan NTS

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SURV 10011600, 10011601, 10194381
GBPE: PEF007431; TBAE: BR 2673
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STATE OF TEXAS
AMANDA M. MULLEN
123232
LICENSED PROFESSIONAL ENGINEER
01/23/2026

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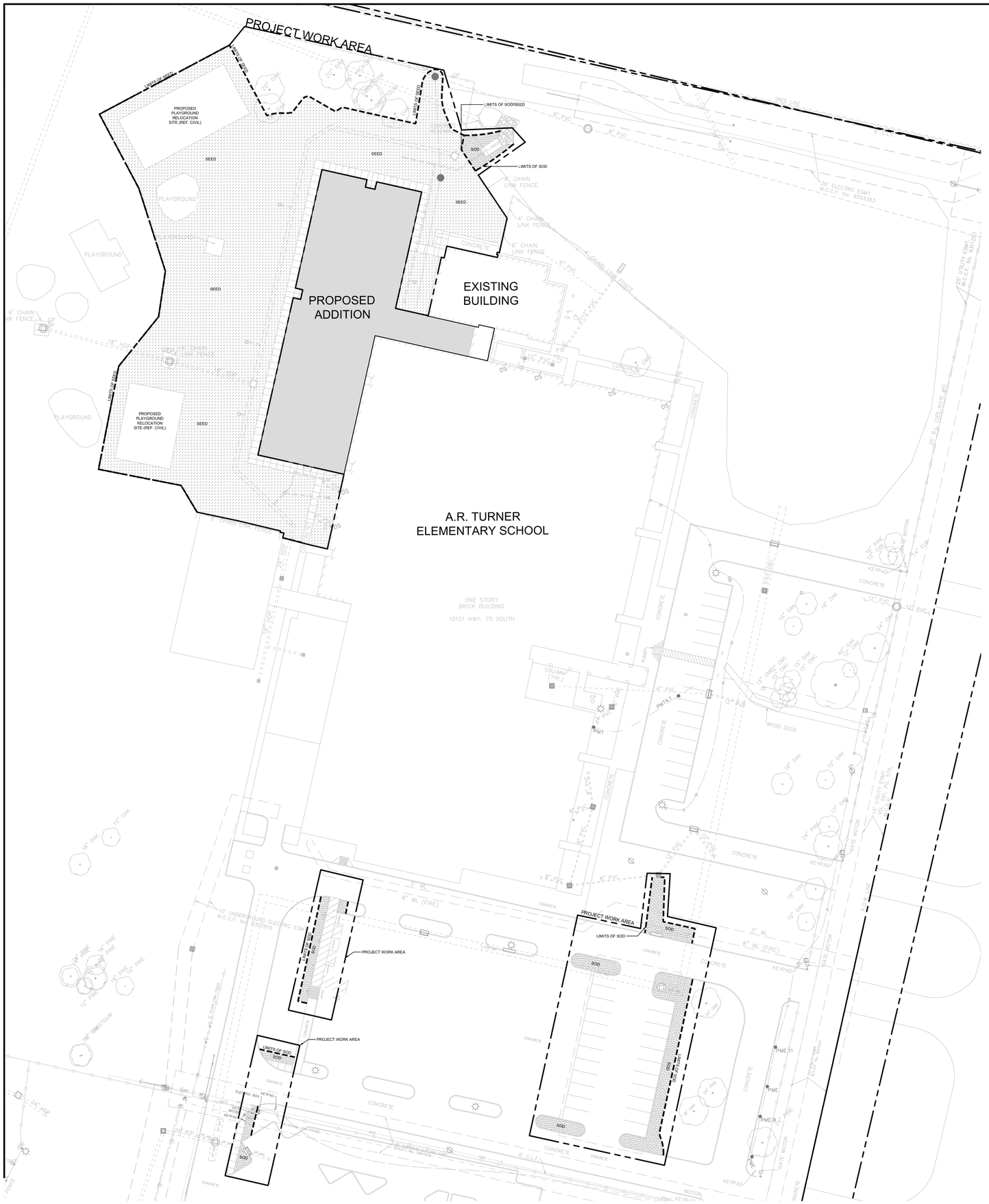
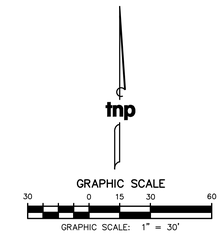
www.huckabee-inc.com
800.687.1229

SITE & DIMENSION CONTROL PLAN

Job No.	Sheet No.
01989-06-01	C1.06
Drawn By: TNP	
Date: 07.07.2026	

S&S



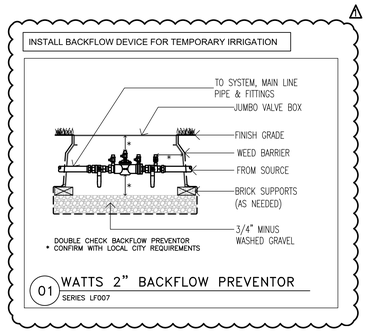


MINIMUM SOD/ SEED AREA SHOWN; CONTRACTOR TO RE-SOD/ RE-SEED ALL OTHER AREAS DISTURBED BY CONSTRUCTION

ALL PROPOSED LANDSCAPE SHALL RECEIVE TEMPORARY IRRIGATION UNTIL ESTABLISHMENT OF ACCEPTABLE STAND OF GRASS

PLANT SCHEDULE

SYMBOL	COMMON NAME	BOTANICAL NAME	QTY	SIZE	HEIGHT	SPREAD	SPACING	REMARKS
SOD/SEED								
	BERMUDA HYDROMULCH	Cynodon dactylon	36,760 sf	Hydromulch seed	n/a	n/a	n/a	REF. PLANTING NOTES AND SPECIFICATIONS.
	TIF 419 BERMUDA SOD	Cynodon dactylon `TIF 419`	4,226 sf	Rolled sod	n/a	n/a	n/a	REF PLANTING NOTES AND SPECIFICATIONS



Revision / Date
1 07/23/2026 ADDENDUM #2

Project:
WILLIS ISD - A.R. TURNER ELEMENTARY SCHOOL CLASSROOM EXPANSION
WILLIS, TX
10575 HIGHWAY 75 N. WILLIS, TEXAS

Key plan
NTS

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GBPE: PEF007431; TBAE: BR 2673
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07/23/2026
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LANDSCAPE PLAN

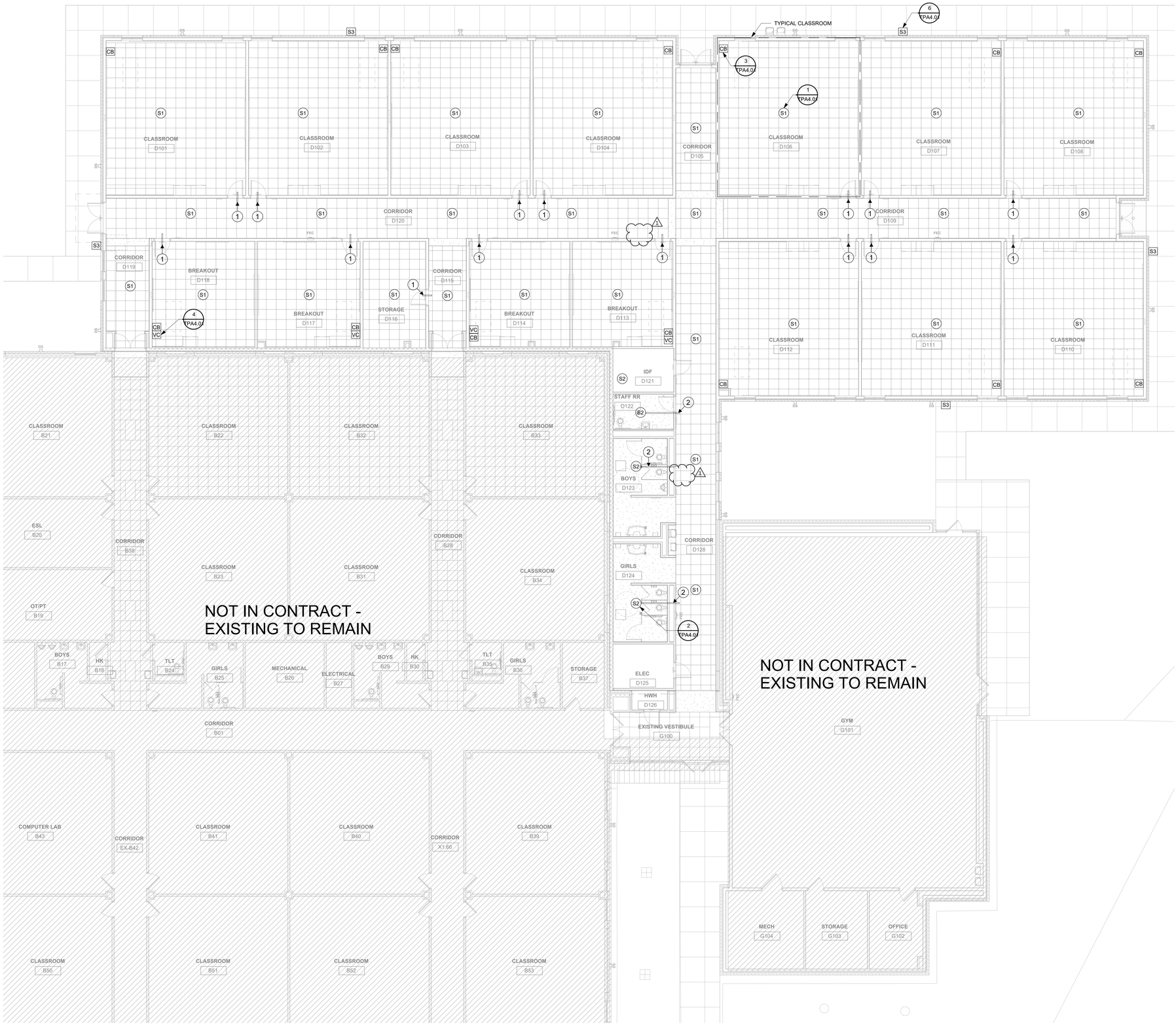
Job No.	Sheet No.
019894-6-01	L1.01
Drawn By: TNP	
Date: 07.07.2026	

S&S

TNP PROJECT NO. HUC26208
TNP TBPELS REGISTRATION NO. F-230

TPA FLOOR PLAN KEYED NOTES:

1. (1) 2-INCH EMT CONDUIT SLEEVE ABOVE ACCESSIBLE CEILING WITH NYLON BUSHING ON EACH END AND SECURED TO WALL. CONDUIT SLEEVE SHALL BE USED FOR LOW VOLTAGE TECHNOLOGY CABLE ONLY. (BY DIV. 26).
2. 1-INCH EMT CONDUIT FROM CUT SPEAKER TO ACCESSIBLE CEILING WITH NYLON BUSHING ON END



1 / TPA1.02 PUBLIC ADDRESS FLOOR PLAN - AREA D
1/8" = 1'-0"

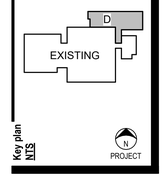
7/7/2026 8:16:44 AM

Autodesk Docs://WILLIS ISD - AR TURNER ES CLASSROOM EXP/01989-06-01 TURNER ES CL EXP_COMBS_V25.rvt

Revision /	Date	
2	7/23/2026	Addendum #2

Project:
WILLIS ISD - A.R. TURNER
ELEMENTARY SCHOOL
CLASSROOM EXPANSION
WILLIS, TX
10575 HIGHWAY 75 N. WILLIS, TEXAS

Key plan NTS



REGISTERED COMMUNICATIONS DISTRIBUTION DESIGNER
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Jason Gonzalez Jr
BICSI ID # 364970
EXPIRES 12-31-28
Jason Gonzalez
RCDD
07/23/2026

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PUBLIC ADDRESS FLOOR PLAN - AREA D

Job No.	Sheet No.
01989-06-01	TPA1.02
Drawn By: BP	
Date: 07/07/2026	

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