NELSON

ADDENDUM 2

Minneapolis, MN

Date: 01/13/2026

Project Name: Coushatta Education Building

Project Number: 24.0002607.000

This Addendum 2 becomes as fully a part of the first issued documents as if originally issued therewith or originally contained herein.

This Addendum embraces additions to, deductions from, all changes and substitutions in, or clarifications and emphasis on part of requirements of the drawings and specifications, pertaining to ALL TRADES herewith mentioned for the completion of the PROJECT.

PROJECT MANUAL

Section 01 91 13 – General Commissioning Requirements

1. Add section in its entirety.

Section 21 05 00 – Common Work Results for Fire Suppression

1. Add section in its entirety.

Section 21 13 13 – Automatic Sprinkler System

1. Add section in its entirety.

DRAWINGS

Sheet FA000 –Symbols, Legends, and Abbreviations – Fire Alarm

1. Update sheet into set.

Sheet FA201 –First Floor Construction Plan – Fire Alarm

1. Update sheet into set. See revision 2 clouds on plan at RM 18 and RM 13.

Sheet FA400 –Details – Fire Alarm

1. Update sheet into set.

Sheet FP000 –Symbols, Legends, and Abbreviations – Fire Protection

1. Add sheet in its entirety to the set.

Sheet FP201 – First Floor Construction Plan – Fire Protection

1. Add sheet in its entirety to the set.

Sheet FP400 – Details – Fire Protection

1. Add sheet in its entirety to the set.

OTHER

Pre-Bid Meeting Minutes

1. Attached for reference at end of this addendum.
2. Special Note: Harvested Wood Supplier:
    a. GibKo Nursery & Signs
    Greg Kogees
    318-253-3121
    Gibko110@yahoo.com
    109 Chevy Lane Suite A
    Bunkie, LA. 71322

Request for Information Questions and Responses

Question	Response
Door Hardware Supplier - I am going through the specs on the hardware and it is calling for Schlage locks no substitution and also match existing registered key system. Is there a way to find out what the existing system is?	Client needs to stay within the Schlage system to coordinate with other facilities and long term planning.
Window shades clarification - We are needing to get clarification on some Window Treatments for this project. If you reference: 12-2400-2 1.05 Closeout Submittal D.1 "Furnish extra materials that match products installed..... Full size units equal to 5% of quantity installed for each size, color and material, but no fewer than two units. On this project, there are a TOTAL of 61 Shades: 17 Motorized and 44 Manual Shades With the different Sizes, there would be a Total of 52 Maintenance shades needed. Are you Really wanting 52 ADDITIONAL Shades plus the 61 Shades that are on Bid??? As you would know this would ADD a tremendous amount to the total cost of our Bid.	Extra materials associated with manual and motorized roller shades will not be required.
The plans are marked "not released for construction" will there be an "issued for construction" plan after the bidding process?	Plans will be updated to include all addendum and BID RFI responses where necessary as an "Issued for Construction" set after the bidding process.
There is a proposal form in the documents. There is also a Public Bid Form. There are no alternates listed on the Bid form. Please advise which form is to be submitted. Are	The USDA does not allow alternates. The EV chargers and seal coat are to be provided as Unit Prices. Fill out both forms.

the EV chargers and Seal Coat to be considered unit prices? or Alternates?	
States to provide EV chargers brand and model to match what is on other Tribal Property. Please specify Brand and Model Number. Also this is a unit price item. Typically we would just have the conduit, wire, labor, etc as a unit price per foot. Do we do the EV Chargers as a separate Unit price for each of them.	EV Chargers are to be included in the Unit Price so that the Unit Price reflects a completely installed system. Brand and Model forthcoming in Addendum #3.
I cannot find any information telling me the size of the fire water line that feeds the building.	See Sheet FP201 First Floor Construction Plan - Fire Protection provided by Addendum 2.
Do I need to include water meter & tap fees in my price	Contractors to provide water and meter fees in pricing.
Specifications call out in 084313 - Page 7 - 2.03 - A. "Basis of design Kawneer Trifab II 601T". The plans call out for Kawneer Trifab 451T on page A17.21 (except for frames marked SF19). Please clarify system(s) to be used.	Per A17.21 BOD is correct at 451T for all 2x4 1/2" framing instances. SF19 is the only glazing elevation to be Trifab Versaglaze 601T as this is 2x6 system. We will update drawing and spec to indicate both in the next Addendum #3.
Can the AISC requirement be waived. "E. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program is designated an AISC-certified plant, category STD.	The AISC requirement will not be waived.

END OF ADDENDUM

NELSON

Pre-Bid MEETING MINUTES

Minneapolis, MN

Date: 1-12-2026
Date of Meeting: 1-12-2026
Meeting Location: Virtual (TEAMS)

Project Name: Coushatta Education Building
Project Location: Elton, LA
Project Number: 24.0002607.000

Present:
Rebecca Muchow, AIA, NELSON
Keith Banes, Wenaha Group
Steve Manual, CLTA
Kristian Poncho, CLTA
Trevor Paitz, Marais Consulting
Tripp Moynan, Moynan Consulting
Mia Kaplan, MKS Consulting
Sam Olbeskon, Full Circle Planning & Design
Kyle Clawson – Artel Construction
John Quarles – K&J Development
Charlie Spence – Alfred Palma
Lamar Poole – Pivotal Construction
Jeff Perryman – Pivotal Construction
Jason & Scott - Miller & Associates
Brandon Berthelot – Pivotal Construction
Anthony Reale – Mahoney Group
Jared - Pat Williams Construction
Trey - Chaumont Construction

Prepared by: Rebecca Muchow, AIA, NELSON (AOR)

TOPICS/SCHEDULES

Task / Topic Name

1. Project name and Location: Coushatta Education Building, Elton, LA
2. Introductions – see list above.
3. Bid Opening: Tuesday, January 20th at 3:00 pm CST. (Mail, Hand Delivery, Email) to Keith Banes KeithB@wenahagroup.com
4. BID Documents Location: available electronically via a link. Specifications in the folder contain Division 0 sections with Bid Forms and Instructions.
5. Bid Security: 5% to be issued with the Bid Form.
6. Funding: USDA. See Specifications for RD forms.
7. Applicability of all documents in bid preparation: Bidders are solely responsible for misinterpretations resulting from using an incomplete set of the documents.
8. Unless confirmed in writing by Addendum no changes are binding, and no interpretations or clarifications are reliable.

9. Addenda issuance – Addendum 1 issued Friday, January 9th. Addendum 2 planned Tuesday, January 13. May issue a third addendum.
10. Requests for interpretation or clarification must be (1) in writing, (2) to a designated email address, and (3) prior to a set deadline (10 days prior to bidding).
11. Q&A from this meeting will be issued with Addendum 2 Tuesday, January 13.
12. Site Visit – bid requirement, to be coordinated with Keith Banes of Wenaha group. Individuals to reach out to Keith directly for site visit coordination this week. Identify three times that could work and will coordinate from there. Copy Steve and Rebecca on correspondence.
13. Rebecca described the overall size of building, uses within the building and site amenities. Sam noted that it is an important building for the Tribe and Community and is a meaningful project and anticipates great care in construction.
14. Rebecca noted duration anticipated is 12 months with substantial completion of April 2027.
15. Keith touched on Harvested Wood that came from the site. This will be in the next addendum. It has been rough sawn, kiln dried and stored for GC use in the project. Owner provided material with bidders to be responsible for transporting from current location by Bunky to the site or to the GC lumber finish contractor. There should be more material present than needed and remainder will be for Tribe's use.
16. Keith touched on roadway and provisions for site lighting around parking lot. Wil require the conduit lines to be bored in lieu of cut and patch. Surface to be preserved as much as possible. Asking for seal coat and restripe to refresh parking lot at end of construction. Seal coat is addressed as Unit Price in the bid documents.
17. Rebecca noted that Fire Protection is coming in addendum. The building does not require it, but client would like to future-proof the building. There is already space designed for a fire sprinkler room and alarm is already part of the drawing set. Distribution piping and water connection will be in the new fire protection drawings, but sprinkler heads are not.
18. Rebecca noted that there is an EV charging station and conduit Unit Price. Conduit to be bored under parking lot like the site lighting.
19. Rebecca reviewed Addendum 1 issued on 1/9/25.
20. Rebecca noted that USDA must review the bids and determine the approval date, which we anticipate will be within 30 days. There are RD forms in the spec for GC to review that will be implemented into the contracts.
21. No further questions.

End of Minutes

SECTION 01 91 13

GENERAL COMMISSIONING REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Commissioning is a quality-oriented process for achieving, verifying, and documenting that the performance of facilities, systems, and assemblies meet defined objectives and criteria. The Commissioning process begins at project inception and continues through the life of the facility. The commissioning process includes specific tasks to be conducted during each phase in order to verify that design, construction, and training meets the owner's project requirements. Commissioning shall:

1. Verify that the work is installed in accordance with Contract Documents and the manufacturer’s recommendations and instructions, and that it receives adequate operational checkout prior to startup: Startup reports and Pre-functional Checklists executed by Contractor are utilized to achieve this.
2. Verify and document that functional performance is in accordance with Contract Documents: Functional Tests executed by Contractor and witnessed by the Commissioning Authority are utilized to achieve this.
3. Verify that operation and maintenance manuals submitted to Owner are complete: Detailed operation and maintenance (O&M) data submittals by Contractor are utilized to achieve this.
4. Verify that the Owner’s operating personnel are adequately trained: Formal training conducted by Contractor is utilized to achieve this.

B. The commissioning team is made up of the contracted commissioning agent (CxA) as well as representatives from the Owner, architect, design engineers, general contractor, sub-contractors of certain construction trades and major equipment suppliers. The lead person for each trade who will actually perform and/or supervise the work shall be the designated representative to the commissioning team. All team members work together to fulfill their contracted responsibilities and meet the objectives of the contract documents.

C. The CxA shall have the responsibility for coordinating each step of the commissioning process. The trade representatives shall perform the tasks required in each step as described in this section.

1.02 RELATED REQUIREMENTS

A. Section 01 78 00 - Closeout Submittals: Scope and procedures for operation and maintenance manuals and project record documents.

B. Section 22 08 00 - Plumbing Systems Commissioning

C. Section 23 08 00 - Commissioning of HVAC: HVAC control system testing; other requirements.

1.03 ABBREVIATIONS & DEFINITIONS

A. Approval - acceptance that a piece of equipment or system has been properly installed and is functioning in the tested modes according to the Contract Documents.

B. Basis of Design (BOD) – documentation of the primary thought processes and assumptions behind the design decisions that were made to meet the Owner's Project Requirements. The Basis of Design describes the systems, components, conditions, and methods chosen to meet these requirements.

C. Commissioning (Cx) - a quality-oriented process for achieving, verifying, and documenting that the performance of facilities, systems, and assemblies meet defined objectives and criteria.

D. Commissioning Agent (CxA) - an independent agent not otherwise associated with the A/E team members or the Contractor. The CxA directs and coordinates the day-to-day commissioning activities.

E. Commissioning Plan - an overall plan that provides the structure, schedule, and coordination planning for the commissioning process.

F. Deficiency - a condition in the installation or function of a component, piece of equipment, or system that is not in compliance with the Contract Documents (that is, does not perform properly or is not complying with the design intent).

G. Design Intent - the ideas, concepts and criteria that are considered to be very important to the Owner. It is initially the outcome of the programming and conceptual design phases.

H. Functional Performance Test (FPT) - test of the dynamic function and operation of equipment and systems using manual (direct observation) or monitoring methods. Systems are tested under various modes, such as during low load conditions, component failures, unoccupied mode, power failure, etc. The commissioning agent develops the functional performance test procedures in a sequential written form, coordinates, oversees and documents the actual testing, which is usually performed by the installing contractor or vendor. FPTs are performed after pre-functional checklists and startup is complete.

I. Heating, Ventilating, and Air Conditioning (HVAC)

J. Mechanical, Electrical, and Plumbing (MEP)

K. Monitoring - the recording of parameters (flow, current, status, pressure, etc.) of equipment operation using data loggers or the trending capabilities of the building's energy management system.

L. Non-Compliance (also Non-Conformance) - a condition in the installation or function of a component, piece of equipment, or system that does not perform properly or is not complying with the design intent.

M. Owner's Project Requirements (OPR) – document outlining the owner's expectations and goals for the performance of the building upon project completion.

N. Operation and Maintenance (O&M)

O. Phased Commissioning - Commissioning that is completed in phases due to construction scheduling issues.

P. Pre-Start / Start-Up Checklist - a list of items to inspect and elementary component tests to conduct to verify proper installation of equipment, provided by the CxA to the MEP Contractors. This checklist consists primarily of static inspections and procedures to prepare the equipment or system for initial operation (e.g., belt tension, oil levels OK, labels affixed, gages in place, sensors calibrated, etc.). However, some checklist items entail simple testing of

the function of a component, a piece of equipment, or system (such as measuring the voltage imbalance on a three-phase pump motor of a chiller system).

Q. Seasonal Performance Test - FPT that is deferred until the system will experience conditions closer to their design conditions.

R. Simulated Condition - a condition that is created for the purpose of testing the response of a system (e.g., applying a hair blower to a space sensor to see the response in a VAV box).

S. Start-up - the initial starting or activating of dynamic equipment including executing the Pre-Start / Start-Up checklist.

T. Test, Adjust, Balance (TAB)

U. Test procedure - the step-by-step process which must be executed to fulfill the test requirements specifying what modes and functions, etc. shall be tested.

1.04 SYSTEMS TO BE COMMISSIONED

A. The following systems are to be commissioned for this project:
   1. HVAC System and Associated Controls
   2. Lighting and Lighting Controls
   3. Domestic Hot Water System

1.05 ROLES AND RESPONSIBILITIES

A. The following describes the roles of the trade contractors in the commissioning process.
   1. General Contractor
      a. Include the cost for commissioning requirements in the contract price.
      b. Include commissioning requirements in the mechanical, electrical, controls and other appropriate sub-contracts.
      c. Ensure acceptable representation, with the means and authority to prepare and coordinate execution of the commissioning plan.
      d. Remedy deficiencies identified during the verification test and FPT process.
   2. Mechanical Contractor
      a. Include cost for commissioning requirements in the contract price.
      b. Include requirements for copies of documents and training in each sub-contract.
      c. Ensure representation and cooperation of applicable trade contractors.
      d. Ensure participation of HVAC equipment manufacturers and/or suppliers representatives in appropriate testing and training activities.
      e. Attend commissioning coordination meeting with CxA.
      f. Prepare and provide construction schedule to CxA, including estimated equipment delivery dates, pipe and duct system testing, equipment start-up, and TAB. Update schedule as appropriate and notify CxA of these updates throughout construction process.
      g. Gather submittals from equipment manufacturers and provide to CxA prior to installation.
      h. Conduct mechanical system orientation and inspection at the completion of mechanical equipment placement. For phased scheduling, conduct multiple orientation and inspections as appropriate.

i. Update drawings to record current condition (continual as-builts).
j. Notify CxA at least two weeks prior to system start-up and testing. Perform start-up and testing with CxA present.
k. Notify CxA at least two weeks prior to commencement of TAB services.
l. Coordinate timing of FPTs with CxA. Perform FPTs with CxA present.
m. Gather O&M data for all equipment and provide a copy to CxA prior to completion of construction.
n. Participate in training sessions.
o. Provide CxA with certificate of readiness stating all HVAC systems are complete and have been tested in accordance with functional performance testing procedures.
p. Provide a complete set of as-built records to the CxA at completion of Work.

3. TAB Contractor
   a. Include cost for commissioning requirements in the contract price.
   b. Attend commissioning coordination meeting with CxA.
   c. Attend TAB review meeting and discuss TAB procedures to be used on this project.
   d. At completion of TAB work, submit a copy of the TAB report to CxA.
   e. Participate in verification of the TAB report, which may consist of repeating any selected measurement contained in the report, if required by the CxA for verification purposes.
4. Controls Contractor
   a. Include cost for commissioning requirements in the contract price.
   b. Review design for controllability with respect to selected manufacturers equipment.
   c. Attend commissioning coordination meeting with CxA.
   d. Provide copy of submittals to the CxA.
   e. Provide anticipated schedule for installation and programming.
   f. Conduct tests of system performance through all modes of operation with CxA present.
   g. Provide control system personnel to assist CxA during verification and FPT testing.
   h. Provide remedies to controls-related deficiencies identified during tests.
5. Electrical Contractor
   a. Include cost for commissioning requirements in the contract price.
   b. Attend commissioning coordination meeting with CxA.
   c. Provide copy of submittals for automatic lighting equipment and materials to CxA.
   d. Provide anticipated schedule for installation and programming.
   e. Conduct tests of system performance through all modes of operation with CxA present.

B. The following paragraphs present a brief description of the responsibilities of parties outside of trade divisions. These descriptions are provided to assist the trade contractors in their understanding of the overall commissioning process.
1. Owner
   a. Provide Owner's Project Requirements (OPR) on which design is based.
   b. Identify and assign a representative who has the authority to make decisions in a timely manner regarding the commissioning process.

c. Assign maintenance personnel to participate in the commissioning process.

2. Commissioning Agent
   a. Develops and executes the Commissioning Plan through the organization of meetings, observation of the construction, presence at tests described in the Plan and coordination of commissioning document development.
3. Architect
   a. Provide Design Intent and Basis of Design information that developed from the Owner's Requirements.
   b. Incorporate text into appropriate sections of the specifications which alert the contractor(s) of their commissioning responsibilities.
4. Mechanical Designer
   a. Provide Design Intent and Basis of Design information that developed from the Owner's Requirements.
   b. Incorporate text into appropriate sections of the specifications which alert the contractor(s) of their commissioning responsibilities.

1.06 QUALITY ASSURANCE

A. Appropriate personnel (i.e., Project Manager and/or Field Foreman) in the employ of the Mechanical Contractor and certain Trades Contractors shall assist the CxA in coordinating and executing the required commissioning activities. These personnel shall become familiar with the Commissioning Plan and shall coordinate the tasks, documentation and submissions required by this Plan. These personnel shall review these documents for compliance with the commissioning requirements and shall arrange for remedies to deficiencies noted in these documents.

B. The Owner will engage an independent Commissioning Agent (CxA). The Contractor shall properly coordinate with the CxA throughout the construction of the project.

C. The CxA will be an objective advocate of the Owner observing the commissioning activities of the Contractor and will make final recommendations to the Owner regarding functional performance of the commissioned building systems. The CxA will prepare a Commissioning Plan for coordination with the design/build team to assure an efficient design and construction process that provides verification to the Owner through a seamless commissioning process which blends their activities into the overall project schedule.

D. All submittal data for systems and components to be commissioned shall be submitted to the CxA for use in the Cx process. The Contractor shall submit additional copies of submittals for the use in the Commissioning process.

E. The Contractor shall schedule the work taking into account the activities to be performed by the Commissioning Agent. No claim for delay or request for an extension of Contract Time will be allowed as the result of the scheduled activities of the Commissioning Agent.

1.07 DOCUMENTATION

A. Owner's Project Requirements (OPR): A written document, prepared by the owner, outlining the owner's expectations and goals for the performance of the building upon project completion.

B. Basis of Design (BOD): A written document, prepared by the Architect and design team, outlining the primary thought processes and assumptions behind the design decisions that were made to meet the Owner's Project Requirements. The Basis of Design describes the systems, components, conditions, and methods chosen to meet these requirements.

C. Commissioning Plan: An overall plan, prepared by the CxA, that provides the structure, schedule and coordination planning for the commissioning process.

D. Pre-Start / Start-Up Checklists and Functional Performance Test Procedures: The CxA shall develop Pre-Start / Start-Up checklists and FPT Procedures for each system, subsystem, or equipment including interfaces and interlocks, and include a separate entry, with space for comments, for each item to be tested.

E. Test Reports: The CxA shall record test data, observations, and measurements on test procedures and test logs. Photographs, forms, and other means appropriate for the application shall be included with data. CxA shall compile test reports and include them in systems manual and commissioning report.

F. Corrective Action Documents: CxA shall document corrective action taken for systems and equipment that fail tests. Include required modifications to systems and equipment and revisions to test procedures, if any. Retest systems and equipment requiring corrective action and document retest results.

G. Issues Log: CxA shall prepare and maintain an issues log that describes design, installation, and performance issues that are in variance with the OPR, BOD, and Contract Documents.

H. Commissioning Report: CxA shall document results of the commissioning process including unresolved issues and performance of systems, subsystems, and equipment. The commissioning report shall indicate whether systems, subsystems, and equipment have been completed and are performing in accordance with the OPR, BOD, and Contract Documents.

I. The Mechanical, Electrical and Plumbing Contractors shall provide copies of documents gathered or developed during the construction process to the Commissioning Agent in a timely and accurate manner. Where documents are developed by a Trades Contractor, Mechanical Contractor shall make sure that those documents are provided to the Commissioning Agent. The documents required are:
   1. Construction schedule, including estimated dates for equipment delivery, system testing, and equipment start-up. Provide updated schedules as appropriate.
   2. Procedures and status reports, including deficiencies noted.
   3. Minutes from all meetings concerning MEP contractors and/or the commissioning process.
   4. All manufacturer's equipment submittals showing the manufacturer and model number, installation and start-up instructions, sequence of operation, performance data, performance test procedures and controls drawings.
   5. Field checkout sheets to be used by the factory or field technicians.
   6. TAB reports.
   7. As-built records.
   8. Posted systems diagrams.

9. Any of the above documents created by Trades Contractors that and are not contracted through the Mechanical Contractor. For example, the Owner is considering contracting directly with a TAB Contractor. If this occurs, the TAB Contractor will be responsible for providing the TAB report to the CxA.

PART 2 PRODUCTS

2.01 TEST EQUIPMENT

A. Provide all standard testing equipment required to perform startup and initial checkout and required Functional Testing; unless otherwise noted such testing equipment will NOT become the property of Owner.

B. Calibration Tolerances: Provide testing equipment of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified. If not otherwise noted, the following minimum requirements apply:
   1. Temperature Sensors and Digital Thermometers: Certified calibration within past year to accuracy of 0.5-degree F (0.3 degree C) and resolution of plus/minus 0.1-degree F (0.05 degree C).
   2. Pressure Sensors: Accuracy of plus/minus 2.0 percent of the value range being measured (not full range of meter), calibrated within the last year.
   3. Calibration: According to the manufacturer's recommended intervals and when dropped or damaged; affix calibration tags or keep certificates readily available for inspection.

C. Equipment-Specific Tools: Where special testing equipment, tools and instruments are specific to a piece of equipment, are only available from the vendor, and are required in order to accomplish startup or Functional Testing, provide such equipment, tools, and instruments as part of the work at no extra cost to Owner; such equipment, tools, and instruments are to become the property of Owner.

D. Dataloggers: Independent equipment and software for monitoring flows, currents, status, pressures, etc. of equipment.
   1. Dataloggers required to for Functional Tests will be provided by the Commissioning Authority and will not become the property of Owner.

PART 3 EXECUTION

3.01 GENERAL

A. A commissioning kickoff meeting with all commissioning team members shall be held at a time and place designated by the Owner. The purpose of this meeting shall be to familiarize all parties with the commissioning process, and to ensure that the responsibilities of each party are clearly understood.

B. MEP Contractors shall complete all phases of work so the systems can be started, tested, balanced, and acceptance procedures undertaken. This includes the complete installation of all equipment, materials, pipe, duct, wire, insulation, controls, etc., per the contract documents and related directives, clarifications, and change orders.

C. MEP Contractors shall assist the CxA in preparing the Commissioning Plan by providing pertinent information pertaining to the actual equipment and installation. If changes have

been made to the contract schedule that alters the commissioning process, Mechanical Contractor shall notify CxA immediately.

D. Acceptance procedures are normally intended to begin prior to completion of a system and/or sub-systems. Start of acceptance procedures before system completion does not relieve the contractor from completing those systems as per the schedule.

3.02 COMMISSIONING PLAN

A. Commissioning Authority will prepare the Commissioning Plan.
   1. Attend meetings called by the Commissioning Authority for purposes of completing the commissioning plan.
   2. Require attendance and participation of relevant subcontractors, installers, suppliers, and manufacturer representatives.

B. Contractor is responsible for compliance with the Commissioning Plan.

C. Commissioning Plan: The commissioning schedule, procedures, and coordination requirements for all parties in the commissioning process.

D. Commissioning Schedule:
   1. Submit anticipated dates of startup of each item of equipment and system to Commissioning Authority within 60 days after award of Contract.
   2. Re-submit anticipated startup dates monthly, but not less than 4 weeks prior to startup.
   3. Pre-functional Checklists and Functional Tests are to be performed in sequence from components, to subsystems, to systems.
   4. Provide sufficient notice to Commissioning Authority for delivery of relevant Checklists and Functional Test procedures, to avoid delay.

3.03 STARTUP PLANS AND REPORTS

A. Startup Plans: For each item of equipment and system for which the manufacturer provides a startup plan, submit the plan not less than 8 weeks prior to startup.

B. Startup Reports: For each item of equipment and system for which the manufacturer provides a startup checklist (or startup plan or field checkout sheet), document compliance by submitting the completed startup checklist prior to startup, signed and dated by responsible entity.

C. Submit directly to the Commissioning Authority.

3.04 PREFUNCTIONAL CHECKLISTS

A. A Pre-functional Checklist is required to be filled out for each item of equipment or other assembly specified to be commissioned.
   1. No sampling of identical or near-identical items is allowed.
   2. These checklists do not replace manufacturers' recommended startup checklists, regardless of apparent redundancy.
   3. Pre-functional Checklist forms will not be complete until after award of the contract; the following types of information will be gathered via the completed Checklist forms:
      a. Certification by installing contractor that the unit is properly installed, started up, and operating and ready for Functional Testing.

b. Confirmation of receipt of each shop drawing and commissioning submittal specified, itemized by unit.
c. Manufacturer, model number, and relevant capacity information; list information "as specified," "as submitted," and "as installed."
d. Serial number of installed unit.
e. List of inspections to be conducted to document proper installation prior to startup and Functional Testing; these will be primarily static inspections and procedures; for equipment and systems may include normal manufacturer's start-up checklist items and minor testing.
f. Sensor and actuator calibration information.

B. Contractor is responsible for filling out Pre-functional Checklists, after completion of installation and before startup; witnessing by the Commissioning Authority is not required unless otherwise specified.
1. Each line item without deficiency is to be witnessed, initialed, and dated by the actual witness; checklists are not complete until all line items are initialed and dated complete without deficiencies.
2. Checklists with incomplete items may be submitted for approval provided the Contractor attests that incomplete items do not preclude the performance of safe and reliable Functional Testing; re-submission of the Checklist is required upon completion of remaining items.
3. Individual Checklists may contain line items that are the responsibility of more than one installer; Contractor shall assign responsibility to appropriate installers or subcontractors, with identification recorded on the form.
4. If any Checklist line item is not relevant, record reasons on the form.
5. Contractor may independently perform startup inspections and/or tests, at Contractor's option.
6. Regardless of these reporting requirements, Contractor is responsible for correct startup and operation.
7. Submit completed Checklists to Commissioning Authority within two days of completion.

C. Commissioning Authority is responsible for furnishing the Pre-functional Checklists to Contractor.
1. Initial Drafts: Contractor is responsible for initial draft of Pre-functional Checklist where so indicated in Contract Documents.
2. Provide all additional information requested by Commissioning Authority to aid in preparation of checklists, such as shop drawing submittals, manufacturers' startup checklists, and O&M data.
3. Commissioning Authority may add any relevant items deemed necessary regardless of whether they are explicitly mentioned in Contract Documents or not.
4. When asked to review the proposed Checklists, do so in a timely manner.

D. Commissioning Authority Witnessing: Required for:
1. Each piece of primary equipment unless sampling of multiple similar units is allowed by the commissioning plan.
2. A sampling of non-primary equipment, as allowed by the commissioning plan.

E. Deficiencies: Correct deficiencies and re-inspect or re-test, as applicable, at no extra cost to Owner.
   1. If difficulty in correction would delay progress, report deficiency to the Commissioning Authority immediately.

3.05 FUNCTIONAL TESTS

A. A Functional Test is required for each item of equipment, system, or other assembly specified to be commissioned, unless sampling of multiple identical or near-identical units is allowed by the final test procedures.

B. Contractor is responsible for execution of required Functional Tests, after completion of Pre-functional Checklist and before closeout.

C. Commissioning Authority is responsible for witnessing and reporting results of Functional Tests, including preparation and completion of forms for that purpose.

D. Contractor is responsible for correction of deficiencies and re-testing at no extra cost to Owner; if a deficiency is not corrected and re-tested immediately, the Commissioning Authority will document the deficiency and the Contractor's stated intentions regarding correction.
   1. Deficiencies are any condition in the installation or function of a component, piece of equipment or system that is not in compliance with Contract Documents or does not perform properly.
   2. When the deficiency has been corrected, the Contractor completes the form certifying that the item is ready to be re-tested and returns the form to the Commissioning Authority; the Commissioning Authority will reschedule the test, and the Contractor shall re-test.
   3. Identical or Near-Identical Items: If 10 percent, or three, whichever is greater, of identical or near-identical items fail to perform due to material or manufacturing defect, all items will be considered defective; provide a proposal for correction within 2 weeks after notification of defect, including provision for testing sample installations prior to replacement of all items.
   4. Contractor shall bear the cost of Owner and Commissioning Authority personnel time witnessing re-testing.
   5. Contractor shall bear the cost of Owner and Commissioning Authority personnel time witnessing re-testing if the test failed due to failure to execute the relevant Pre-functional Checklist correctly; if the test failed for reasons that would not have been identified in the Pre-functional Checklist process, Contractor shall bear the cost of the second and subsequent re-tests.

E. Functional Test Procedures:
   1. Some test procedures are included in Contract Documents; where Functional Test procedures are not included in Contract Documents, test procedures will be determined by the Commissioning Authority with input by and coordination with Contractor.
   2. Examples of Functional Testing:
      a. Test the dynamic function and operation of equipment and systems (rather than just components) using manual (direct observation) or monitoring methods under full

operation (e.g., the chiller pump is tested interactively with the chiller functions to see if the pump ramps up and down to maintain the differential pressure setpoint).

b. Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc.

c. Systems are run through all the HVAC control system's sequences of operation and components are verified to be responding as the sequence's state.

d. Traditional air or water test and balancing (TAB) is not Functional Testing; spot checking of TAB by demonstration to the Commissioning Authority is Functional Testing.

F. Deferred Functional Tests: Some tests may need to be performed later, after substantial completion, due to partial occupancy, equipment, seasonal requirements, design, or other site conditions; performance of these tests remains the Contractor's responsibility regardless of timing.

3.06 SENSOR AND ACTUATOR CALIBRATION

A. Calibrate all field-installed temperature, relative humidity, carbon monoxide, carbon dioxide, and pressure sensors and gauges, and all actuators (dampers and valves) on this piece of equipment shall be calibrated. Sensors installed in the unit at the factory with calibration certification provided need not be field calibrated.

B. Calibrate using the methods described below; alternate methods may be used, if approved by Commissioning Authority and Owner beforehand. See PART 2 for test instrument requirements. Record methods used on the relevant Pre-functional Checklist or other suitable forms, documenting initial, intermediate, and final results.

C. All Sensors:

1. Verify that sensor location is appropriate and away from potential causes of erratic operation.
2. Verify that sensors with shielded cable are grounded only at one end.
3. For sensor pairs that are used to determine a temperature or pressure difference, for temperature make sure they are reading within 0.2 degree F (0.1 degree C) of each other, and for pressure, within tolerance equal to 2 percent of the reading, of each other.
4. Tolerances for critical applications may be tighter.

D. Sensors Without Transmitters - Standard Application:

1. Make a reading with a calibrated test instrument within 6 inches (150 mm) of the site sensor.
2. Verify that the sensor reading, via the permanent thermostat, gauge or building automation system, is within the tolerances in the table below of the instrument-measured value.
3. If not, install offset, calibrate or replace sensor.

E. Sensors With Transmitters - Standard Application.

1. Disconnect sensor.
2. Connect a signal generator in place of sensor.

3. Connect ammeter in series between transmitter and building automation system control panel.
4. Using manufacturer's resistance-temperature data, simulate minimum desired temperature.
5. Adjust transmitter potentiometer zero until 4 mA is read by the ammeter.
6. Repeat for the maximum temperature matching 20 mA to the potentiometer span or maximum and verify at the building automation system.
7. Record all values and recalibrate controller as necessary to comply with specified control ramps, reset schedules, proportional relationship, reset relationship and P/I reaction.
8. Reconnect sensor.
9. Make a reading with a calibrated test instrument within 6 inches (150 mm) of the site sensor.
10. Verify that the sensor reading, via the permanent thermostat, gauge or building automation system, is within the tolerances in the table below of the instrument-measured value.
11. If not, replace sensor and repeat.
12. For pressure sensors, perform a similar process with a suitable signal generator.

F. Sensor Tolerances for Standard Applications: Plus/minus the following maximums:
1. Watthour, Voltage, Amperage: 1 percent of design.
2. Pressure, Air, Water, Gas: 3 percent of design.
3. Air Temperatures (Outside Air, Space Air, Duct Air): 0.4 degrees F (0.2 degree C).
4. Relative Humidity: 4 percent of design.
5. Barometric Pressure: 0.1 inch of Hg (340 Pa).
6. Flow Rate, Air: 10 percent of design.
7. Flow Rate, Water: 4 percent of design.
8. AHU Wet Bulb and Dew Point: 2.0 degrees F (1.1 degrees C).

G. Critical Applications: For some applications more rigorous calibration techniques may be required for selected sensors. Describe any such methods used on an attached sheet.

H. Valve/Damper Stroke Setup and Check:
1. For all valve/damper actuator positions checked, verify the actual position against the control system readout.
2. Set pump/fan to normal operating mode.
3. Command valve/damper closed; visually verify that valve/damper is closed and adjust output zero signal as required.
4. Command valve/damper to open; verify position is full open and adjust output signal as required.
5. Command valve/damper to a few intermediate positions.
6. If actual valve/damper position does not reasonably correspond, replace actuator or add pilot positioner (for pneumatics).

I. Isolation Valve or System Valve Leak Check: For valves not associated with coils.
1. With full pressure in the system, command valve closed.
2. Use an ultra-sonic flow meter to detect flow or leakage.

3.07 TEST PROCEDURES - GENERAL

A. Provide skilled technicians to execute starting of equipment and to execute the Functional Tests. Ensure that they are available and present during the agreed upon schedules and for sufficient duration to complete the necessary tests, adjustments and problem-solving.

B. Provide all necessary materials and system modifications required to produce the flows, pressures, temperatures, and conditions necessary to execute the test according to the specified conditions. At completion of the test, return all affected equipment and systems to their pre-test condition.

C. Sampling: Where Functional Testing of fewer than the total number of multiple identical or near-identical items is explicitly permitted, perform sampling as follows:
   1. Identical Units: Defined as units with same application and sequence of operation; only minor size or capacity difference.
   2. Sampling is not allowed for:
      a. Major equipment.
      b. Life-safety-critical equipment.
      c. Pre-functional Checklist execution.
   3. XX = the percent of the group of identical equipment to be included in each sample; defined for specific type of equipment.
   4. YY = the percent of the sample that if failed will require another sample to be tested; defined for specific type of equipment.
   5. Randomly test at least XX percent of each group of identical equipment, but not less than three units. This constitutes the "first sample."
   6. If YY percent of the units in the first sample fail, test another XX percent of the remaining identical units.
   7. If YY percent of the units in the second sample fail, test all remaining identical units.
   8. If frequent failures occur, resulting in more troubleshooting than testing, the Commissioning Authority may stop the testing and require Contractor to perform and document a checkout of the remaining units prior to continuing testing.

D. Manual Testing: Use hand-held instruments, immediate control system readouts, or direct observation to verify performance (contrasted to analyzing monitored data taken over time to make the “observation”).

E. Simulating Conditions: Artificially create the necessary condition for the purpose of testing the response of a system; for example, apply hot air to a space sensor using a hair dryer to see the response in a VAV box.

F. Simulating Signals: Disconnect the sensor and use a signal generator to send an amperage, resistance or pressure to the transducer and control system to simulate the sensor value.

G. Over-Writing Values: Change the sensor value known to the control system in the control system to see the response of the system; for example, change the outside air temperature value from 50 degrees F to 75 degrees F to verify economizer operation.

H. Indirect Indicators: Remote indicators of a response or condition, such as reading from a control system screen reporting a damper to be 100 percent closed, are considered indirect indicators.

I. Monitoring: Record parameters (flow, current, status, pressure, etc.) of equipment operation using dataloggers or the trending capabilities of the relevant control systems, where monitoring of specific points is called for in Functional Test Procedures:
   1. All points that are monitored by the relevant control system shall be trended by Contractor; at the Commissioning Authority's request, Contractor shall trend up to 20 percent more points than specified at no extra charge.
   2. Other points will be monitored by the Commissioning Authority using dataloggers.
   3. At the option of the Commissioning Authority, some control system monitoring may be replaced with datalogger monitoring.
   4. Provide hard copies of monitored data in columnar format with time down left column and at least 5 columns of point values on same page.
   5. Graphical output is desirable and is required for all output if the system can produce it.
   6. Monitoring may be used to augment manual testing.

3.08 DEFERRED TESTING

A. Schedule and coordinate any required seasonal testing, tests that were delayed due to construction phasing or operating condition requirements and any re-tests that could not be accomplished immediately after initial tests. Deferred testing shall be executed and documented as specified for Functional Performance Tests

B. Deficiencies found during these deferred tests shall be remedied as specified for the Functional Performance Tests

C. Changes to systems as a result of the deferred testing shall be incorporated into the as-built documents and/or O&M manuals to provide Owner with up-to-date and accurate record of the systems and their operation.

3.09 OPERATION AND MAINTENANCE MANUALS (O&M MANUALS)

A. See Section 01 78 00 - Closeout Submittals for additional requirements.

B. Prior to substantial completion, the Contractor shall submit O&M manuals, documentation and redline as-builts for systems that were commissioned to the CxA for review and verification of compliance with the Specifications. The Commissioning Agent will communicate deficiencies in the manuals to the Owner and Contractor. Upon a successful review of the corrections, the Commissioning Agent recommends approval and acceptance of these sections of the O&M manuals to the Owner. The Commissioning Agent also reviews each equipment warranty and verifies that all requirements to keep the warranty valid are clearly stated. This work does not supersede the A/E's review of the O&M manuals according to the A/E's contract.

C. The O&M Manual submitted by the contractor shall include the following:
   1. Name, address and telephone number of the manufacturer and installing contractor and the 24-hour number for emergency service for each piece of equipment.
   2. Submittal and Product Data. This section shall include all approved submittal data, cut sheets, database sheets, and appropriate shop drawings. If submittal was not required for approval, descriptive product data shall be included.
   3. Manufacturers' brochures (including controls): Manufacturers' descriptive literature covering devices and equipment used in the system, together with illustrations, exploded

views and renewal parts lists. Manufacturers' literature shall be corrected so that information applying to the actual installed equipment is clearly defined.

4. Operation and Maintenance Instructions. These shall be the written manufacturer's data with the model and features of this installation clearly marked and edited to omit reference to products or data not applicable to this installation. This shall include data on the following:
    a. Model number, serial number and nameplate data for each piece of equipment and any subcomponent.
    b. Installation, startup, and break-in instructions.
    c. All starting, normal shutdown, emergency shutdown, manual operation and normal and emergency operating procedures and data, including any special limitations.
        1) Step-by-step procedure for system startup, including a pre-start checklist. Refer to controls and indicators by nomenclature consistent with that used on panels and in control diagrams.
        2) Sequence of operations, with detailed instruction in proper sequence, for each mode of operation (i.e., day-night; staging of equipment).
        3) Emergency operation: If some functions of the equipment can be operated while other functions are disabled, give instructions for operations under these conditions. Include here only those alternate methods of operations (from normal) which the operator can follow when there is a partial failure or malfunctioning of components, or other unusual conditions.
        4) Shutdown procedure: Include instructions for stopping and securing the equipment after operation. If a particular sequence is required, give step-by-step instructions in that order.
5. O&M and installation instructions that were shipped with the unit.
6. Preventative and corrective maintenance, with service procedures and schedules:
    a. Provide a schedule for preventive maintenance in a printed format and an electronic format compatible with owner's system. State, preferably in tabular form, the recommended frequency of performance for each preventive maintenance task, cleaning, inspection, and scheduled overhauls.
    b. Cleaning: Provide instructions and schedules for all routine cleaning and inspection with recommended lubricants.
    c. Inspection: If periodic inspection of equipment is required for operation, cleaning or other reasons, indicate the items to be inspected and give the inspection criteria for: motors; controls; filters and any other maintenance items.
    d. Provide instructions for minor repairs or adjustments required for preventive maintenance routines. Identify test points and give values for each. Include sensor calibration requirements and methods by sensor type.
    e. Corrective maintenance instructions shall be predicated upon a logical effect-to-cause troubleshooting philosophy and a rapid replacement procedure to minimize equipment downtime.
    f. Troubleshooting tables, charts, or diagrams shall be used to present specified procedures. A guide to this type shall be a three-column chart. The columns shall be titled: malfunction, probable cause, and recommended action.

g. Repair and Replacement: Indicate repair and replacement procedures most likely to be required in the maintenance of the equipment.

7. Safety Precautions: This subsection shall comprise a list of safety precautions and instructions to be followed before, during and after making repairs, adjustments, or routine maintenance.
8. Supply any special tools required to service or maintain the equipment.
9. Performance data, ratings, and curves.
10. Warranty and guarantee, which clearly lists conditions to be maintained to keep warranty in effect and conditions that would affect the validity of the warranty.
11. Any service contracts issued.
12. Supplemental Data. Prepare written text and/or special drawings to provide necessary information, where manufacturer's standard printed data is not available and information is necessary for a proper understanding and operation and maintenance of equipment or systems, or where it is necessary to provide additional information to supplement data included in the manual or project documents.

3.10 SYSTEMS MANUAL

A. A Systems Manual shall be provided to the owner, in addition to the O&M manuals, under LEED requirements for EAc3 Enhanced Commissioning. The focus should be on operating, rather than maintaining the equipment, including the interactions between equipment.

B. The Contractor shall be responsible for providing:
   1. As-built sequences of operations, control drawings, and a full print out of original set points and schedules for each piece of commissioned equipment. Copies of all checkout tests and calibrations performed by the contractor (not commissioning tests) shall also be included.
   2. Operating instructions for integrated building systems
   3. Recommended schedule of maintenance requirements and frequency.
   4. Recommended schedule for retesting of the commissioned systems.
   5. Recommended schedule for calibrating sensors and actuators.

C. The Architect shall be responsible for providing:
   1. Final version of the Basis of Design document, updated to as-built status.
   2. System Single Line Drawings on 8 ½ x 11 or 11x 17 sheets. These shall include supply air, make-up air, exhaust air, heat pumps, FCUs, chilled water systems, hydronic systems, and all associated controls. These diagrams shall show major pieces of equipment such as pumps, chillers, boilers, control valves, expansion tanks, coils, service valves, air handling units, PIUs and VAVs, exhaust fans, etc.

D. The CxA shall be responsible for:
   1. Compiling the A/E and Contractors contributions.
   2. Reviewing all documentation submitted for accuracy and completeness.
   3. Providing a copy to the Owner, Facilities Manager, or other applicable parties.

3.11 TRAINING OF OWNER PERSONNEL

A. The Contractor shall be responsible for training coordination and scheduling, and ultimately for ensuring that training is complete.

B. The CxA shall be responsible for overseeing and approving content and adequacy of the training of Owner Personnel for commissioned equipment.

C. A training plan shall be submitted to the CxA for review before such training is set to occur. It should include the following:
   1. Equipment or systems
   2. Intended audience.
   3. Location of training
   4. Objectives
   5. Subjects covered (description, duration of training)
   6. Instructor and qualifications for each subject
   7. Methods (classroom lecture, manufacturer's quality video, site walk- through, actual operational demonstrations, written handouts, etc.)

D. Training shall normally start with classroom sessions followed by hands-on demonstration/training on each piece of equipment. Training shall include:
   1. Use of the printed materials included in the O&M manuals or System manuals.
   2. A review of the written O&M instructions emphasizing safe and proper operating requirements, preventative maintenance, special tools needed and spare parts inventory suggestions. The training shall include startup, operation in all modes possible, shutdown, seasonal changeover, and any emergency procedures.
   3. Discussion of relevant health and safety issues and concerns.
   4. Discussion of warranties and guarantees.
   5. Common troubleshooting problems and solutions.
   6. Discussion of any peculiarities of equipment installation or operation.

E. During any demonstration, should the system fail to perform in accordance with the requirements of the O&M manual or sequence of operations, the system shall be repaired or adjusted as necessary and the demonstration repeated at another scheduled time, if necessary.

F. The contractor shall ensure that each subcontractor and vendor (mechanical, plumbing, fire, electrical, specialty, etc.) shall have the following responsibilities:
   1. Provide designated owner personnel with comprehensive orientation and training in the understanding of the systems and the operation and maintenance of each piece of equipment that makes up the system.
   2. The appropriate trade or manufacturer's representative shall provide the instructions on each major piece of equipment. More than one party may be required to execute the training.
   3. The controls contractor shall attend sessions other than the controls training, as specified, to discuss the interaction of the controls system as it relates to the equipment being discussed.
   4. The contractor shall fully explain and demonstrate the operation, function and overrides of any local packaged controls not controlled by the central control system.

G. At the discretion of the CxA, training may occur before performance testing is complete if required by the facility operators to assist the CxA in the performance testing.

END OF SECTION 01 91 13

SECTION 21 0500

COMMON WORK RESULTS FOR FIRE SUPPRESSION

PART 1 - GENERAL

1.1 STIPULATIONS

A. General provisions of the Contract Documents including General and Supplementary Conditions and Division 1 Specifications Sections apply to all work in this section.

1.2 WORK INCLUDED

A. This specification applies to the installation of the automatic sprinkler system at the Coushatta Education Building. This specification provides general items related to the fire protection work.

B. Within the scope of work for this project, the Contractor shall:

1. Provide a complete automatic sprinkler system piping layout in the building. Sprinkler heads will be added in a future phase. Refer to Section 21 13 13 and the drawings.

1.3 DEFINITIONS

A. The Authority Having Jurisdiction (AHJ) and other project supervisors are defined as:

1. AHJ: Coushatta Tribe
2. Fire Marshal: Coushatta Tribe
3. Owner: Coushatta Tribe
4. Professional: Windward Engineers & Consultants, LLC
5. Construction Manager (CM): Agent for the Owner who provides daily construction oversight and coordination of the project
6. Insurance Carrier: Agent for the Owner that provides insurance coverage for the project

B. The following words are defined as:

1. Contractor: In this section shall refer to the Fire Protection Contractor.
2. Provide: Includes the furnishing and installation of a device or system.

1.4 APPROVALS

A. The Contractor must comply with all laws, ordinances, and regulations of all Authorities Having Jurisdiction (AHJ), including Borough, County, State, Federal, Public Utility, and the Owner's insurance carrier.

B. Hydraulic calculations, product data sheets, shop drawings and all other associated submittals must bear the stamp of approval of the AHJ. Provide NFPA 13 working plans to the AHJ. Any and all comments received from the AHJ and resolution thereof shall be submitted to the Professional for record.

C. The Contractor is responsible for all fees associated with the required approvals.

1.5 SUBMITTALS

A. Refer to any front end specifications for additional detailed requirements regarding shop drawings, product data, and samples.

B. The Contractor shall be responsible for all fees associated with the AHJ, Insurance Carrier and/or Professional's reviews.

C. The submittal shall be made as a complete package consisting of fire protection equipment ONLY. The submittal shall NOT include other plumbing equipment or components not directly related to the fire protection system installation for approval. Where other equipment or components are an integral part of the fire protection system, they shall be indicated as such, but not included with the submittal and only show required interface details. Failure to submit all required materials as a complete, separate single package shall be cause for rejection of entire package. Copies of the Contract Documents with contractor's notes thereon will be rejected. Simply redlining the Contract Documents is not acceptable.

D. Refer to the individual sections for additional submittal requirements, including identified equipment and materials for which submittals are required.

E. Submit Contractor Qualifications (from the Quality Assurance portion of this Specification)

1. Installation Experience

2. Designer Certification

F. The Contractor shall submit, for review by the Professional, identification and data of specific materials and equipment to be incorporated in the project. Shop drawings, hydraulic calculations, catalog cuts, and associated materials shall be submitted as a complete, single package. This package shall include:

1. Hydrant Flow Test results. This Contractor shall coordinate water flow tests required by this Contract. The Professional shall be notified at least 5 working days prior to said water flow test. The results of the water flow test shall be submitted within 10 working days following the water flow test and prior to or in conjunction with the submission of shop drawings.

2. Product data. Identification of specific product data and equipment shall be submitted prior to or in conjunction with the submission of shop drawings. Should more than one item or a specific item with multiple options appear on a single cut sheet, the item or items shall be specifically indicated.

3. Complete shop drawings. Failure of the Contractor to submit complete shop drawing packages may result in delay in processing time or rejection of the submittal. All such delays to the job resulting from the Contractor's failure to submit complete shop drawings at one time will be the responsibility of the Contractor. The Shop drawing submittal shall be subdivided by drawing and clearly identify the Contract Specification Section or drawing referenced, identifying and highlighting each item to be reviewed.

4. Submit materials and information described in NFPA 13, NFPA 24, NFPA 25, NFPA 70 and NFPA 72.

5. Hydraulic calculations and piping drawings. All calculations and CAD drawings shall:

   a. Be prepared under the direct supervision of an individual having NICET Level III or IV certification or an individual having registration as a Professional Engineer. Preparation of hydraulic calculations and/or piping drawings by individuals who do not have said certification or who are not directly supervised by an individual with said certification is prohibited.

   b. Be prepared using a commercially available computer models such as HASS, HydraCALC, Sprinkler-CALC, Sigma or "THE".

   c. Be prepared using the same computer model. Hydraulic calculations and the model used shall be consistent throughout the project. Hydraulic calculations shall be neat and orderly (e.g. columns and rows line up accordingly on printouts).

   d. Have hydraulic reference points, provided in a systematic and consistent manner, clearly indicated on both the shop drawings and the hydraulic calculations.

6. Where sprinkler systems are submitted separately, a schematic drawing indicating locations of all nodes used in the hydraulic calculations shall be included with the submission. Common piping and nodes shall utilize that same nomenclature.

7. Where phasing of construction requires submission of portions of the system, all piping and equipment associated with any calculations must be provided with the submittal. Additionally, the phasing plan as it relates to the fire protection system installation shall be provided either diagrammatically or by narrative.

G. Where the Contractor must revise and resubmit, the revised submittal shall be accompanied by the written response to all previous submittal comments. Failure to provide written response to previous comments shall be cause for rejection of the submittal.

H. CAD layout drawings shall be submitted for the automatic sprinkler system. The layout drawings shall be prepared at a scale of not less than 1/8 inch = 1 foot, and drawings sheet size shall be either 24x36 or 30x42 inches. The layout drawings shall include all information identified in NFPA 13 to be indicated and:

1. All Room numbers shall be provided on the drawings.

2. Plan and Elevation views of the mechanical room showing the sprinkler riser, proposed piping, equipment pads, dimensions of openings in floors, roofs, and walls, and equipment to establish that all proposed equipment will fit within the allotted spaces with clearances for installation and maintenance.

3. Plan views, with elevation views where necessary for clarity, of all piping and distribution systems indicating locations of proposed piping, hangers, sprinklers, water flow switches, hose outlets, and penetrations to fire-rated or smoke enclosure walls.

4. Where trapeze hangers are to be used, provide all pertinent information for determining size of trapeze member.

5. The drawings shall show proposed details for attachment, anchoring, and hanging to structural framing of the building; vibration isolation units; foundation and support; location and size of

sleeves and prepared openings for passage of pipes. If the Contractor deems departures from the Contract Drawings necessary, details of such departures, including changes in related portions of the project and the reasons therefore, shall be submitted with the drawings for review by the Professional. Allowed departures shall be made at no additional cost to the Owner.

6. The available water supply data for the sprinkler system design shall be provided on the drawing that indicates the location of the fire protection water service entrance. The data shall include: date and time of test, location (relative to building) of static pressure reading and location of residual pressure reading, along with the pressures and flows during the test. Further, the data for adjustments to the water supply data, including elevation changes and friction loss components, between the street and the building shall be noted. Provide a "schematic" for clarity if necessary.

7. Items on or projecting through the ceiling shall be coordinated with other items and shall be shown on the reflected ceiling plan shop drawings submitted for the Professional's review. Such items shall follow the intent as shown on the contract documents reflected ceiling plan drawings and shall not be installed until reviewed by the Professional.

I. The Contractor shall forward to all AHJ's, for their review and comment, a minimum of 3 sets of the shop drawings indicating the final sprinkler head layout with associated hydraulic calculations.

J. Fire Protection Equipment Electrical Data shall be submitted for review:

1. Prior to submitting data for equipment requiring electrical service, the Contractor shall verify that electrical characteristics of equipment submittals comply with electrical service provided for the specified items of equipment.

2. Upon receipt of reviewed submittals for equipment provided under this Division of this specification, the Contractor shall coordinate the electrical service requirements such as, motor horsepower and full load amps; electrical service characteristics such as voltage and phase; and number of services for each item of equipment requiring electrical connections with the electrical drawings and specifications. The Contractor shall furnish to the Professional and the Electrical Contractor a complete typewritten list of electrical requirements for each item of equipment to be installed.

K. Operation and Maintenance Manuals shall be provided and include system components, water flow test information, CAD as-built drawings, as-built hydraulic calculations, and test certifications as a minimum. See Operations and Maintenance section of this Specification.

L. The Contractor shall submit a letter of coordination verifying those aspects of painting preparation being done under this Contract. The Painting Contractor shall concur upon this coordination letter prior to submission. The Contractor shall submit color samples and manufacturers instructions for those aspects of painting being provided by the Contractor.

M. All firestopping material and installation methods must be approved by the Professional.

N. Provide a Valve Chart.

O. Provide documentation of grooved coupling training.

P. The Fire Protection Contractor shall submit for review and approval to the Local AHJ, three (3) sets of shop drawings and hydraulic calculations indicating the sprinkler system layout including head locations. Submit drawings with the required application and fee.

1.6 QUALITY ASSURANCE

A. The fire protection equipment and installation shall conform to the full meaning and intent of the following codes and regulations:

1. International Code Council (ICC) – International Codes, 2021 Edition.
2. Local Water Authority Rules and Regulations

B. The fire protection and installation shall conform to the full meaning and intent of the following National Fire Protection Association (NFPA) codes and standards (IBC/IFC Referenced Edition if so designated, otherwise the latest edition):

1. NFPA 13, Standard for the Installation of Sprinkler Systems
2. NFPA 24, Standard for the Installation of Private Fire Service Mains and Their Appurtenances
3. NFPA 25, Inspection, Testing, and Maintenance of Water-Based Fire Protection System
4. NFPA 70, National Electrical Code (NEC)
5. NFPA 72, National Fire Alarm Code
6. NFPA 101, Life Safety Code
7. NFPA 291, Recommended Practice for Fire Flow Testing and Marking of Hydrants

C. The fire protection equipment and installation shall conform to the full meaning and intent of the latest edition of the following agency standards:

1. UL Fire Protection Equipment Directory
2. Factory Mutual Approval Guide
3. Requirements of the Owner’s Insurance Company

D. Obtain all permits and inspections for the installation of this work and pay all charges incident thereto. Deliver to the Owner all certificates of said inspection issued by the AHJ.

E. Workmanship and Materials

1. The workmanship and materials covered by these specifications shall conform to all ordinances and regulations of the city, township, county, and/or other AHJ.
2. All products and materials utilized in the fire protection systems shall be listed for fire protection service by Underwriter’s Laboratories (UL) and/or approved for fire protection service by Factory Mutual (FM).

F. Qualifications of Contractor

1. The Contractor for the fire protection system shall be qualified for the work specified herein and be regularly engaged in the installation of automatic sprinkler systems and equipment.

2. The Contractor shall have a minimum of three years experience in the installation of sprinkler systems. Documentation shall be submitted to show that the Contractor has provided similar systems to those specified herein. Documentation on at least 3 similar systems shall be provided including the system size and the name of a contact person at the facility.

3. Documentation shall be provided to show that all fire protection systems are designed by a regular full-time employee with a Level III or Level IV NICET (National Institute for Certification in Engineering Technologies) certification in automatic sprinkler system layout or a Registered Professional Engineer. If such a certified individual is not employed, adequate documentation shall be provided to show comparable training and experience of the designer. Additionally, provide documentation for the registered PE or NICET level person that will review and certify the design.

4. Welding:

   a. All welders employed for the work shall be qualified under the requirements of ANSI B31.1.0 Section 127.5.

   b. Evidence of welders' qualifications shall be submitted to the Professional before any welds are made.

   c. All welding shall be performed at the shop.

5. The proposed Contractor shall submit evidence of the above qualifications items to the Professional prior to proceeding with any work on this project. Contractors not meeting these requirements will not be permitted to perform work specified under this section, unless specifically authorized in writing by the Owner.

G. Qualifications of Manufacturer and Products

1. Pipe, valves, fittings, and appurtenances shall be manufactured in the United States.

2. Firms whose equipment and product name appear within the Underwriter Laboratory's "Fire Protection Equipment Directory" list of specialties and/or accessories and Factory Mutual's "Fire Protection Approval Guide".

3. All products/parts installed or furnished under this Contract shall be listed and approved for use by the Authorities and Agencies listed herein.

1.7 AS-BUILTS, OPERATION AND MAINTENANCE INSTRUCTIONS, TRAINING

A. Refer to any front end specifications for additional information and detail requirements.

B. Operation and Maintenance Manuals, with a Table of Contents, shall include:

1. Printed material relating to all the fire protection equipment.

2. All flow test information including date, time, location and pressure readings.

3. Contractor's Materials and Test Certificates as required by NFPA 13, completed and signed.

4. Completed and signed Contractor's Material and Test Certificate for Private Fire Service Mains, as required by NFPA 24, where outside underground water supply is installed under this project, either by the Contractor or by others.

5. Completed and approved as-built hydraulic calculations.

6. Provide a copy of the valve schedule.

7. As-built drawings. Provide drawings updated in CAD.

8. 6. A synopsis of the requirements of NFPA 25, standard for the inspection, testing, and maintenance of water-based fire protection systems. This document shall be a summary listing of all required tests and inspections and their frequencies per NFPA 25. A full printed copy of NFPA 25 shall not be provided in lieu of this document unless specifically purchased by the owner.

C. Provide a minimum of 4 copies of Operations and Maintenance Manuals.

D. A minimum of 2 hours of instruction/training shall be provided to Owner designated personnel.

1. Before final inspection at a time designated by the Professional, CM or Owner, provide a competent representative to instruct Owner's designated personnel in operation, adjustment, and maintenance of products, equipment, and systems under this Division of the specifications. For equipment requiring seasonal operation, perform instruction for other seasons within six months unless requested otherwise.

2. The information provided for the Operation and Maintenance Manuals shall be used as basis of instruction. Review contents of said manual with personnel in detail to explain all aspects of operation and maintenance.

3. Prepare and insert additional data in the Operation and Maintenance Manual when the need for such data becomes apparent during instruction.

1.8 RECORD DOCUMENTS

A. Refer to the front end specifications for additional information related to record documents and related submittals.

B. As-Built Documents - Upon completion of approvals, installation, testing, and acceptance thereof of each phase of construction, the Contractor shall provide to the Owner one complete set of reproducible drawings, one set of CAD/Electronic Drawings, and one set of corresponding hydraulic as-built calculations.

1.9 CONTRACT DRAWINGS

A. The drawings are diagrammatic and are indicative of the work to be performed and show general locations of main piping and equipment. However, it is not intended that they show every pipe, fitting, or apparatus required for a complete installation.

B. When sprinkler head locations are shown on the fire protection contract drawings or the Architectural reflected ceiling plans, they are also diagrammatic and are indicative of the work to be performed. Contractor is responsible for determining final locations in accordance with NFPA 13 and the reflected ceiling plans.

C. Where a specific pipe routing, equipment arrangement or pipe size is indicated, the Fire Protection contract drawings shall be followed as closely as circumstances will permit unless prior approval is

granted by the Professional. The Contractor may improve upon equipment locations and pipe routings as required to facilitate the proper installation of the system.

D. The Contractor is responsible for the proper installation of all materials and equipment required for a complete installation within the intent and meaning of the Fire Protection Contract documents and NFPA 13.

E. The Contractor shall follow drawings and specifications in laying out work and check drawings of other disciplines relating to work to verify space conditions. The Contractor is responsible for field verification of all fire protection equipment and water service connections. Scaling drawings without field verification is not sufficient.

F. Equipment layout is based on one typical manufacturer's product. Where equipment selected by the Contractor for use on the job differs from the layout indicated on the Contract Drawings, the Contractor shall be responsible for coordinating space requirements and connection arrangements.

1.10 GUARANTY

A. The components of the fire protection systems shall be guaranteed for a period of one year from the date of acceptance thereof, either for beneficial use or final acceptance, whichever is earlier, against defective materials, design, and workmanship. Upon receipt of notice from the Professional, CM or Owner of failure of any part of the equipment during the guaranty period, the affected part or parts shall be replaced promptly. This includes all parts and labor for removing the defective part or parts and subsequently replacing and installing the new part or parts at the expense of the Contractor.

1.11 FIELD MEASUREMENTS

A. It is the Contractor's responsibility to verify the location of any and all underground utilities in the vicinity of the work contained herein including the location of the fire water service. When it has been indicated that these utilities are to remain in place, the Contractor shall provide adequate means of support and protection during excavation operations.

B. Before ordering any equipment and material, or performing any work, the Contractor shall verify all measurements and dimensions at the job site and shall be held responsible for the correctness of same.

C. No extra compensation will be allowed on account of difference between actual dimensions and measurements and those indicated on the drawings.

D. Any difference which may be found shall be submitted to the Professional for consideration before proceeding with the work.

1.12 LINES AND GRADES

A. The Contractor shall lay out his work, establishing heights and grades for all exterior and interior piping included in these specifications in strict accordance with the intent of the drawings, the physical conditions of the building and the finished site grades. The Contractor shall be responsible for the accuracy of such heights and grades and make sure that they meet all physical conditions of the building and the requirements of these specifications.

1.13 PROTECTION OF SERVICES AND EQUIPMENT

A. The Contractor, at his own expenses, shall repair, replace and maintain in service any utilities, facilities or services (underground, aboveground, interior or exterior) damaged, broken, or otherwise rendered inoperative during the course of construction due to activities on the part of the Contractor. The method used by the Contractor in repairing, replacing, or maintaining the services shall be approved by the Professional and Construction Manager.

B. The Contractor shall protect, at his own expense, all materials or equipment related to his work that is liable to damage during the construction period. All openings into any piping, ducts, equipment, or building components, must be securely covered, or otherwise protected, to prevent injury, due to accidental encroachment of, or carelessly or maliciously dropped tools, materials, dirt, or any foreign matter. The Contractor shall be held responsible for all damage so done until his work is fully and finally accepted.

C. It shall be the responsibility of the Contractor to protect motors, pumps, electrical equipment, and all similar items of equipment from dirt, grime, plaster, water, etc. during all phases of construction. This protection shall be provided by covering equipment with transparent plastic sheeting to the satisfaction of the Professional or Construction Manager.

1.14 INTERRUPTION OF SERVICES

A. The Contractor shall schedule his work to avoid any major interruption of any utility services.

B. The Contractor shall not interrupt existing utilities serving facilities occupied and used by Owner or others during occupied hours except when such interruptions have been authorized in writing by Owner, Construction Manager or Professional and then interruptions shall occur only after acceptable temporary utility services have been provided. The Contractor shall provide a minimum of 10 working days notice to Professional, Owner and Construction Manager and receive written notice to proceed before interrupting any utility.

1.15 EQUIPMENT STORAGE AND EQUIPMENT HANDLING

A. Deliver and store equipment in the original manufacturer’s shipping containers.

B. Piping and other supplies that are not provided in original manufacturer’s shipping containers shall be stored in a neat and orderly manner that minimizes the potential for damage.

C. Protect pipe, fittings, and other fire protection equipment from the weather so as to avoid undo rust. Any component exhibiting rust shall be replaced at the discretion of the Professional, CM or Owner at no additional cost.

1.16 COORDINATION

A. The Contractor shall participate in the development of inter-trade coordination drawings.

B. The Contractor must coordinate his work with that of the other Contractors so that the work of all trades will be performed in an orderly manner and with the least possible interference. In the case where interference with the work of other Contractors should occur, the decision of the Professional or Construction Manager as to changes to be made in the work shall be final.

C. The Contractor must thoroughly familiarize himself with all specifications and drawings for the project so that he clearly understands his responsibility in relationship to the work to be performed under this Contract. The Contractor must plan and perform his work so as to permit the use of the building at the earliest possible date.

D. The Contractor shall be responsible for coordinating all fire protection equipment locations with the locations of all lighting fixtures, HVAC diffusers, ceiling architectural features, and structural members. The Contractor is responsible for coordinating the locations of all fire protection piping and equipment with the General Contractor and all other trades to prevent obstructions to the required sprinkler discharge pattern.

E. The Contractor is responsible for coordinating locations of all fire protection piping with respect to electrical equipment and the NEC. Routing of piping directly above electrical equipment shall be avoided.

F. The Contractor shall coordinate locations of fire protection system piping with respect to fresh air intake louvers. Routing of piping directly in front of such louvers shall be avoided due to potential freezing conditions. Refer to mechanical drawings for exact locations for all louvers. All louvers shall be shown on the shop drawing submittals.

1.17 CUTTING, PATCHING, AND FINISHING

A. Unless otherwise noted, the Contractor shall cut, patch and finish all penetrations and openings in walls, and floor/ceiling assemblies required for the installation of work to be performed under this Contract in accordance with this section of the specification and any additional front end specification requirements. All patching and finishing shall match existing adjacent undisturbed surfaces.

B. Penetrations made in existing or new fire rated chases, partitions, floors, etc. shall be sealed with an approved material and method as required to maintain the integrity of the fire separation in accordance with a UL method as well as any additional requirements herein.

C. Cutting of the construction excessively or carelessly done shall be repaired to match the original work by the Contractor and to the satisfaction of the Professional, Owner, and Construction Manager who will make the final decision with respect to excessive or careless cutting work. The Contractor shall seal all openings made in plenum spaces, fire rated floors, ceilings or partitions after all work has been installed. The material used for sealing the openings shall have a fire rating equal to or greater than the rating of the floor, ceiling or partition material.

D. Where present equipment is removed and unused opening remain in walls, floors, partitions, etc., the Contractor shall properly patch all such openings except as hereinafter specified under “Work by Others”. All patching and repairing shall be done by workmen skilled in this type of work and shall match present or new finishes.

E. No cutting shall be done which may affect the building structurally or architecturally without first securing the approval of the Professional. Cutting shall be accomplished in such a manner as not to cause damage to the building or leave unsightly surfaces that cannot be concealed by plates, escutcheons or other construction. Cutting shall not cause damage to the building or leave unsightly surfaces. Where such unsightly conditions are caused, the Contractor shall be required, at his own expense, to repair the damaged areas.

F. No structural member shall be cut.

G. The Contractor shall contact the holder of the guarantee and obtain written approval before cutting the roofing membrane so as not to void said guarantee.

H. The Contractor shall set all sleeves, hangers, and anchors required for the work under this Contract and shall be responsible for their proper and permanent location.

1.18 PAINTING AND INDICATON

A. Painting

1. Steel equipment hangars, supports, and pipe shall be prepared as indicated below.

2. The Painting Contractor shall paint exposed sprinkler piping in all finished areas of the building. The Contractor is responsible for preparing pipe surface to accept primer and paint to the satisfaction of the painting contractor. All surfaces shall be thoroughly cleaned of rust, scale, dirt, grease, dust, and like items, and sanded so as to provide a bond for new paint.

3. The contractor shall paint all piping within the Sprinkler Riser Room. The color shall be red.

4. Shop paint all pipe with a powder coating application. If conventional painting is provided in lieu of powder coating apply at least 1 coat of approved primer and 2 coats of machinery enamel on all piping.

5. All painting shall conform to the manufacturer's requirements as well as any additional front end painting specification.

6. All painting shall be done in a careful, neat and workmanlike manner, with particular care being exercised to protect building equipment and finishes.

7. Provisions shall be made to protect sprinklers from being painted. All sprinklers having "non-factory-applied paint" on them shall be replaced.

8. The manufacturer shall paint all items of equipment. All equipment manufacturers shall supply sufficient paint to completely paint each unit one coat in the field to cover all scratches, etc., due to installation. The Professional will carefully inspect all equipment for acceptance. If paintwork does not meet the Professional's approval, the Contractor shall repaint all equipment found to be defective as directed by the Professional.

9. All exposed hangers and supports shall be primed and finished with rust inhibitor paint.

10. All nameplates and data plates that indicate or identify data on equipment shall not be painted, but shall be carefully marked and left unpainted.

11. Where pipe support members are welded to the structural building framing, scrape and/or brush clean and apply one coat of zinc primer to welding.

12. All colors to be used shall be submitted to the Professional for approval.

B. Identification

1. The Contractor shall provide permanently affixed identification of fire protection piping. This may include stenciled painting or labels.

2. Identify all sprinkler piping (except branch lines), concealed or exposed, with permanently affixed identification. Install in clear view and align with axis of piping. Locate identification not to exceed 15-feet on straight runs including risers and drops, adjacent to each valves and "T", at each side of penetration of structure or enclosure, and at each obstruction.

3. Identify service as "FIRE PROTECTION" and mark the direction of flow. Letters shall be of height equal to the diameter of the pipe on piping up to and including 1½ inches, and 2 inches high on pipes 2 inches in diameter and over. Flow arrows shall be approximately 4 inches long having a 1 inch wide head and base with a ½ inch wide shaft.

4. The band color shall be red and letter color shall be white.

5. Background color coding and stenciling for piping, equipment, and related appurtenances provided under this Contract shall meet the minimum standards for identification as set forth by the latest edition of the ANSI A13.1.

C. Contractor Indications

1. Clearly marked permanent labels which are securely fastened to the ceiling shall be provided to identify access points for concealed control valves in accordance with NFPA 13.

2. Place tags on all valves indicating function.

3. The following schedules shall be used for manufacture and application of indication:

a. Plastic Nameplates: Laminated 3 layer plastic with engraved white letters on red background color.

b. Metal Tags: Brass with stamped letters; tag size minimum 1 1/2 inch diameter with smooth edges.

1.19 EXCAVATION, BACKFILLING, AND COMPACTION

A. General

1. This section is applicable to all underground fire protection lines.

2. The Contractor shall notify the CM prior to commencing any excavation.

3. The Contractor shall perform all excavation, backfilling, compaction, and necessary finishing for all lines, equipment, and accessories installed under this Contract. Piping installation and testing shall be in accordance with NFPA 24 and applicable State and Local codes.

4. The Contractor shall provide all bracing, sheathing, and shoring necessary to perform and protect the excavations. Safety rails, lights, signs, etc. shall be provided as necessary or required for safety, as directed by the CM or as required to conform to governing laws.

5. The Contractor shall furnish, maintain, and operate pumping equipment of sufficient capacity to insure that all excavations and trenches required herein are kept free of water at all times.

6. All surfaces of streets, walkways, seeded areas, or finished grade areas disturbed by the excavation shall be restored to their original condition and/or as shown on the Civil site plans and specifications.

7. Existing structures, utilities, sidewalks, pavements, and other facilities not indicated for removal shall be protected from damage caused by settlement, lateral movement, undermining, washout, and/or hazards resulting from the excavation operations specified herein.

8. If it becomes necessary to install any lines or equipment in locations other than those shown, the CM's acceptance shall be obtained before starting said excavation.

9. The presence of explosives on the project site or the use of explosives in the execution of the work under this Contract is not permitted.

B. Excavation

1. All fire protection excavation is unclassified.

2. Trenches shall be dug to uniform width not less than 12 inches or more than 16 inches wider than the bell diameter. Trench sides shall be vertical. Excavate trenches to depth indicated or required. Carry depth of trenches for piping as required to establish desired flow line and invert elevations. Beyond building perimeter, keep bottom of trenches sufficiently below finished grade to protect against frost and allow for the minimum required depth of cover. The bottom of trenches shall be accurately graded to provide uniform and smooth flow throughout. Any over-excavation shall be backfilled with modified aggregate and thoroughly tamped.

3. If trench excavation operations are performed when the atmospheric temperature is less than 35 degrees Fahrenheit, the Contractor shall provide, at his own expense, cold weather protection to protect excavated trench bottoms from freezing. Under no circumstances will any pipe be permitted to be laid in a trench containing water or on a subgrade containing frost.

4. All material excavated shall be deposited on the side of the trenches and beyond the reach of sides. Excavated material shall not be piled where it will interfere with traffic.

5. Surplus excavated material not required for backfill shall be removed from the building site or distributed on the premises as directed by the CM.

6. Take up and re-lay pipe that is not laid true to required alignment or grade. Pipe that has had the joints disturbed after being laid shall be taken up and laid again. Deviation from the required lines and grades will not be permitted unless approved by the CM.

7. Pipe Embedding Material – All pipe shall be laid on a First Class granular bedding. The bedding shall be a minimum depth of 6 inches or 1/4 the pipe diameter, whichever is greater. The bedding shall provide uniform longitudinal support to the pipe and shall be laid to provide the grade and line as shown on the drawing or as directed by the Professional. Compaction of bedding materials under the hunches and around the springline of the pipe shall be by hand tamping. Final bedding material for ferrous pipe materials shall extend from the springline of the pipe to a depth of 6 inches (minimum) above the top of the pipe.

C. Backfilling

1. Backfilling shall not be undertaken until all test and inspections have been completed.

2. Backfilling operations shall avoid damaging or displacing installed piping systems.

3. Contractor shall restore the surface of all excavations to their original conditions, including paved or unpaved streets, gutters, shrubbery, fences, walls, sidewalks, and sod. Contractor shall furnish all labor and material required.

4. All backfill material shall be free from cinders, ashes, refuse, vegetable or organic material, boulders, rocks or stones, frozen soil, or other material that is unsuitable. When the type of backfill material is not indicated on the plans or is not specified, the excavated material may be used, provided that such material consists of loam, clay, sand, gravel, or other material that is suitable for backfilling. Above the top of the pipe to the subgrade of the pavement, material containing stones greater than 6 inches in their greatest dimension may not be used.

5. All trench backfill shall be brought to subgrade ready for base material or topsoil. After the initial aggregate backfill layer has been placed, refill remainder of the trench using backfill materials specified below.

6. Walks and Parking Areas – Clean earth backfill compacted in 6 inch layers to a point 8 inches below the adjacent existing surfaces. Refill the remaining 8 inches with compacted 2A modified stone and replace walk or paving as required.

7. Paved Areas - When working within the right-of-way limits of all highways, a Township or Borough street, avenue or alleys constructed of concrete or macadam surfaces, school driveways, backfilling must be in conformance with the requirements of the Department of Transportation, , which is made a part of these specifications by this reference thereto. Trenches located with the areas described above shall be backfilled with 2RC aggregate material from the top of the “pipe bedding” to the bottom elevation of the pavement structure and must be spread and compacted in layers not to exceed 4 inches when using a mechanical damper, except 8 inch layers will be permitted when Department of Transportation approved vibratory compaction equipment is used. The Contractor is to understand that payment for special backfilling material shall not be made unless specifically provided in the form of Proposal. The Contractor shall comply with applicable regulations of Township, Borough, and City.

D. Compaction

1. Thoroughly compact subgrade prior to the installation of 6 inches of First Class pipe bedding. Following satisfactory pipe laying and in-line structure installation, backfill trenches to a height of at least 12 inches above the top of the outside barrel of the pipe with No. 1B Crushed Stone.

2. All fill shall be compacted to 95 percent. Each layer shall be compacted to the specified percent of maximum density obtained at optimum moisture content, in accordance with ASTM D1557, method D and ASTM D1556 sand cone method.

3. Compaction shall be accomplished by approved equipment suited to the soil being compacted. Material shall be moistened or aerated as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction with the equipment used.

4. Thoroughly compact successive layers of backfill material with a vibrating compactor of a type and size satisfactory to the CM. Compacting of this backfill by pudding or jetting will not be permitted. Use mechanical tampers to compact backfill materials in trench refill operations to produce a density of backfill at the bottom of each layer of not less than 95 percent of the maximum density obtained at optimum moisture content as determined by AASHTO T99 when

requested by the CM. Perform field determinations of backfill density in accordance with AASHTO T 191.

5. The use of special equipment such as the "HYDRA-HAMMER" for compaction of backfill is prohibited.

PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS

A. Pipe and fitting shall be as specified herein and used on the services indicated. Pipe shall be clear and free of dirt, debris, or any other obstruction.

B. "Plain-end" pipe/fittings and threadable light-wall pipe are NOT permitted. All pipe must have a Corrosion Resistance Ratio ≥ 1.00 for the joint specified.

C. All sprinkler piping shall be steel. Additionally, all pipe and fittings shall be in accordance with the requirements of NFPA 13. All piping and fittings for the wet pipe system shall be black. All piping which utilizes threaded fittings shall be Schedule 40.

D. Sprinkler piping 1-1/4 inches in diameter or larger, connected by welded flanged fittings or roll grooved fittings, shall be Schedule 40, Schedule 30, or Schedule 10 as permitted by NFPA 13. Cut grooves are not permitted. All sprinkler piping 2 inches in diameter and smaller (that is not roll grooved or welded) shall be Schedule 40 utilizing screwed fittings (plain end fittings shall not be accepted).

E. Flexible sprinkler hose and fittings are permitted as detailed in Specification 21 13 13.

F. All miscellaneous drain and test piping and fittings shall be Schedule 40 internally and externally galvanized.

G. All above ground piping on the supply side of the backflow prevention device shall be listed for potable service and in accordance with the local water department requirements and internally and externally galvanized steel pipe.

H. Outside underground piping shall be Class 52, cement-lined ductile-iron pipe listed for potable service and shall be in accordance with NFPA 24.

2.2 VALVES – GENERAL

A. All valves in each system, except for special types, shall be the product of a single manufacturer. Valves shall have the name or trademark of the manufacturer and the working pressure stamped or cast on the valve body.

B. All valves requiring packing shall be designed and constructed such that they can be repacked under pressure.

C. Handwheels for valves 2 inches and smaller shall be malleable iron or aluminum except where specified otherwise. Handwheels for valves 2 ½ inches and larger shall be malleable or cast iron except where specified otherwise.

D. Valves shall have listing or approval agency identification mark stamped or cast on valve body. All valves shall be listed for fire protection service use.

E. All Fire Protection service valves shall be UL listed and FM approved, with minimum 175 psig (1200-kPa) non-shock working-pressure rating. Valves for grooved-end piping may be furnished with grooved ends instead of type ends specified.

2.3 GATE VALVES

A. All gate valves shall be in accordance with UL 262.

B. Gate valves (2 ½ inches in size and larger) shall be OS&Y type with iron body, bronze trim, solid wedge, and flanged ends.

C. Gate valves (2 inches in size and smaller) shall be OS&Y type with bronze body, solid wedge, and threaded end.

D. Indicator Posts shall be UL 789, cast-iron body, with windows for target plates that indicate valve position, extension rod and coupling, locking devices, handwheel operation and red enamel finish.

2.4 BUTTERFLY VALVES

A. Butterfly valves shall be lug type with ductile iron body, stainless steel stem, Buna N or EPDM seat, nickel or aluminum plated brass disc, and gear operator. Valve shall be listed for fire service and rated for the anticipated operating pressure.

B. Indicating Valves: NPS 2-1/2 and Smaller shall be in accordance with UL 1091 and be butterfly or ball-type utilizing a bronze body with threaded ends and integral indicating devices.

2.5 CHECK VALVES

A. All check valves shall be in accordance with UL 312.

B. Check valves (2 1/2 inches in size and larger) shall be Class 150, horizontal swing type with iron body, bronze trim, and flanged or grooved ends.

C. Check valves (2 inches in size and smaller) shall be Class 150, horizontal swing type with bronze body, composition disc, and threaded ends.

2.6 GLOBE AND ANGLE VALVES

A. Globe valves shall have bronze body, rising stem, composition disc, and be threaded.

B. Globe valves having cast iron handwheels shall be permitted.

C. Angle valves shall have bronze body, rising stem, composition disc, and threaded ends.

2.7 FLOW SWITCHES

A. Vane type waterflow switch/detectors shall be installed on the sprinkler system piping as designated on the drawings. Waterflow switches shall be furnished and installed by the Sprinkler System Contractor. Fire Alarm Contractor shall connect the flow switches to the Fire Alarm Control Panel. The two Contractors shall work in a coordinated basis to test the units.

1. Said switch/detectors shall be designed for mounting on either vertical or horizontal piping, but shall not be mounted in a fitting or within 12 inches of any fitting that changes the direction of water flow.
2. Said switch/detector shall have a sensitivity setting to signal any flow of water that equals or exceed the discharge from one sprinkler head for the specified retard period.
3. The waterflow switches shall have a minimum rated capacity of 15 amps at 125V AC and 2 amp at 0-30V DC resistive, two (2) normally open contacts, and shall be actuated by a polyethylene vane extending into the waterway of the piping.
4. The waterflow switch/detectors shall be of weatherproof, dust tight construction, shall provide a ½ inch conduit entrance, and shall be finished in red baked enamel.
5. The waterflow switch mechanisms shall incorporate an instantly recycling pneumatic retard element in the adjustable range of 0 to 70 seconds.

2.8 VALVE SUPERVISORY SWITCHES/EQUIPMENT

A. Supervisory switches shall be installed on the system control valves. Supervisory switches shall be furnished and installed by the Sprinkler System Contractor. Fire Alarm Contractor shall connect the supervisory switches to the Fire Alarm Control Panel. The two Contractors shall work in a coordinated basis to test the units.

B. The mechanism shall be contained in a weatherproof, die cast aluminum housing, which shall provide a ¾ inch tapped conduit entrance and incorporate the necessary facilities for attachment to the valve.

C. Post Indicator Valve and Outside Screw and Yoke type switches shall contain one single pole, double throw contact (Form C nominally rated for 2.5 Amp at 0-30V DC resistive.) Switches shall be mounted so as not to interfere with the normal operation of the valve. The switch shall activate when the valve is closed during the first two revolutions of the hand wheel or during one-fifth of the travel distance of the valve control apparatus from its normal position. The switch shall provide for a restoration signal when the valve is returned to the normal position. The switch cover shall be tamper resistant and cause the switch to activate if the cover is removed or if the unit is removed from its mounting.

D. Valve supervisory switches shall be designated for valve mounting either vertically or horizontally.

E. The Fire Protection Contractor shall provide a supervisory switch on the Post Indicator Valve. Wiring extended to the Mechanical Room and connection to the Fire Alarm Panel will be provided by others.

2.9 IDENTIFICATION SIGNS

A. Identification signs shall be provided on all valves in accordance with NFPA 13.

B. Provide riser placards for each remote area of each system.

C. In addition to the required identification signs above, a means for identifying the locations of concealed control valves shall be provided with signage in the vicinity of each valve in a conspicuous location. The information provided on the identifying plate shall be as required by NFPA 13, including the location of the control valve, the area isolated by the valve, and the “normal” position of the valve, and shall be approved by the Fire Marshal’s Office and the Professional prior to installation.

D. Signs shall be manufactured of metal or plastic, and shall be securely fastened.

E. A valve chart shall be provided to indicate the location of all valves with the function and areas served by said valves. The valve chart shall be accompanied by legible scaled plan views of the building indicating the relative location of all remotely located isolation valves and the bulk feed supply piping to said valves.

2.10 FLANGES

A. Flanges in threaded pipelines shall be cast iron screwed flanges.

B. Flanges in welded pipelines shall be steel weld neck or slip-on type welding flanges.

C. Flanges shall have either raised or flat faces. All flanges mating with adjacent flanges, valve fittings, and equipment shall be of the same type.

D. Flange gasket shall be 1/16 inch non-metallic, non-asbestos, ring type.

E. Flange bolts shall be carbon steel, all threaded type. Nuts shall be carbon steel hexagon type. Steel for bolt and nuts shall conform to NFPA 24 requirements.

2.11 GROOVED COUPLINGS

A. Grooved couplings shall be two-piece malleable iron or ductile iron, ASTM A536, with gasket and two bolts. Gasket shall be Buna N. Coupling shall be rated for 300 psig working pressure.

B. All mechanical fittings shall be manufactured by the same company.

C. Only full flow fittings shall be permitted.

D. Mechanical tees may be used to connect to 1.25 inch or larger pipe only. Mechanical tees, which incorporate a “U” bolt of hinged strap arrangement, shall not be used.

E. Fittings shall be roll grooved. Cut grooves are not permitted.

F. Flanged connection transitions shall be made via approved adapters.

G. The grooved coupling Manufacturer’s Representative shall provide an on-site training session with the Contractor’s sprinkler fitters to ensure that the products are being properly installed and utilized. The Contractor shall provide documentation of such training to the Professional.

2.12 HANGERS

A. All hanging methods shall be in accordance with the requirements contained in NFPA 13. The portion of the hanger that directly attaches to the piping or the building structure shall be listed for that purpose.

B. Fire Protection System piping shall not be supported from the bottom chord of bar joists.

C. Hangers used on sloped or angled structures shall be of the articulating beam clamp style. Do not bend or angle threaded rod.

D. The use of powder driven anchors for hanging of fire protection equipment is generally prohibited. The use of powder driven anchors may be permitted for certain applications where no other reasonable alternative exists. Specific approval by the Professional or CM is required prior to use.

E. Methods of hanging fire protection piping shall include the requirements of seismic restraints of piping indicated in NFPA 13, in accordance with the International Building Code, for Architectural, mechanical and electrical components and systems.

PART 3 - EXECUTION – NOT USED

END OF SECTION

SECTION 21 1313

AUTOMATIC SPRINKLER SYSTEMS

PART 1 - GENERAL

1.1 STIPULATIONS

A. General provisions of the Contract Documents including General and Supplementary Conditions and Division 1 Specifications Sections apply to all work in this section.

1.2 WORK INCLUDED

A. This Specification applies to the installation of the automatic sprinkler system at Coushatta Education Building.

B. Provide a new 6 inch Class 52, cement lined, ductile iron fire protection underground service line from 5-feet outside the building as shown on the drawings. The Contractor shall obtain the Flushing and Testing Certificate, as required by NFPA 24, from the contractor installing the outside underground prior to connection of sprinkler pipe. If this certificate cannot be obtained, the Contractor is responsible for flushing the outside underground.

C. Provide a double detector check type backflow preventer in the room with the sprinkler riser for the fire protection service.

D. Provide and coordinate a confirming water flow test for the site in accordance with NFPA 291, prior to submitting all hydraulic calculations/shop drawings. Include test results with the submittal.

E. Design and install a hydraulically designed wet-pipe automatic sprinkler system piping layout throughout the entire building in accordance with NFPA 13, all referenced codes, and the requirements specified under “Sprinkler System Design” below. Sprinkler coverage will be added in a future phase. See Specification 21 05 00 Common Work Results for Fire Suppression for all applicable codes.

F. Provide sprinkler protection as per NFPA 13 for any concealed combustible construction identified during the course of construction.

G. Provide dry pendent automatic sprinklers for use in cooler and freezer areas.

H. Provide dry sprinklers for use in areas subject to cold and freezing as required.

I. Provide all alarm and supervisory sprinkler system equipment (e.g., flow and tamper switches) for interface with the building fire alarm system. The Contractor shall coordinate these equipment locations with the Fire Alarm Contractor.

J. Provide a wall-mounted Siamese fire department connection as indicated on the drawings.

K. Coordinate all equipment installations with the building architectural and structural features and with the other trades to ensure a complete, supervised, and operational system. Review architectural plans to understand any varying, sloped, and open ceilings, soffits, or bulkheads throughout the building.

L. The Contractor shall become knowledgeable of any phasing plan in place and bid the job accordingly.

1.3 SUBMITTALS

A. All submittals shall comply with any front end specification requirements as well as Section 21 05 00.

B. Product Data shall be submitted on the following items. Where more than one item, or a specific item with multiple options appear on a single cut sheet, the items shall be specifically indicated:

1. Waterflow Switches
2. Supervisory Switches
3. Fire Department Connection
4. Piping, Fittings, and Mechanical Couplings
5. Hangers and Supports
6. Test/Drain Assemblies
7. Control Valves
8. Alarm Check Valves
9. Backflow Prevention Device
10. Means of Identification of Piping and Valves
11. Means of Identification of Concealed Control Valve Locations
12. Seismic Separation Assembly

C. Operation and Maintenance Data shall be submitted on the following items:

1. Waterflow Switches
2. Supervisory Switches
3. Fire Department Connection
4. Test/Drain Assemblies
5. Control Valves
6. Alarm Check Valves
7. Backflow Prevention Device
8. Completed Final Certificates for All System Tests

D. Hydraulic Calculations

1. Data and all relevant drawings shall be submitted indicating hydraulic design calculations, flows, pressures, pipe sizes, and layout of all piping; including the outside underground to the effective point of available water supply data. Calculations and pipe layout shall also be submitted and approved by the AHJ. Provide any and all comments received from the AHJ and resolution thereof to the Professional for record.

2. Include the allowance for inside hose stream connections at the point of connection. Include the allowance for outside hose streams.

3. Hydraulic calculations shall be provided for the remote area of each specific hazard class (e.g., Light, Ordinary Group 1, and Ordinary Group 2).

4. Common piping throughout different sets of calculations shall utilize the same nomenclature.

E. Shop Drawings

1. CAD drawings shall be provided in accordance with the requirements of Section 21 05 00 and NFPA 13. Provide CAD working plan drawings and data as required by NFPA 13. The shop drawings, scaled at a minimum of 1/8 inch = 1 foot shall:

a. Provide Room Names and/or Numbers along with the reflected ceiling layout, including light fixture locations, HVAC diffuser locations, and other ceiling mounted fixtures and devices to verify that the sprinkler system layout has been coordinated with the other trades.

b. Provide the noded and dimensioned portion of the sprinkler system drawing independently of the reflected ceiling plan drawings (for clarity in submittal reviews).

c. Provide ceiling elevations and pipe elevations.

d. Indicate make, type, and orifice size of sprinkler heads.

e. Identify all locations where piping and/or fittings will be exposed to sight along with identification of all trapped segments of pipe and auxiliary/low-point drains.

f. Identify all walls and/or floors which are fire-rated, smoke barriers, or smoke partitions that are penetrated by the fire protection piping or equipment. Identification of the wall/floor and penetration thereto shall include the required rating, type of construction, and reference to type of penetration seal that is to be used (including UL System Number). Refer to Architectural Drawings for locations.

g. Include a diagram of all control valves, checks, drain pipes, and test pipes.

h. Include a diagram of the underground water supply to the building. Include all piping between the building and the location of the confirming water flow test data. Identify source of water supply, pressure, and elevation.

i. Provide a copy of the hydraulic design information sign that will be installed on the riser.

F. As-Builts

1. Prior to final acceptance, complete CAD as-built drawings and hydraulic calculations shall be submitted to the Professional for review. As-builts shall reflect all piping and head location deviations from the approved shop drawings including additional fittings.

2. Provide one half-sized, laminated set of approved as-built drawings. Install a complete set of these drawings at the sprinkler riser location.

3. Provide a copy of the revised hydraulic design information sign. Upon approval, install on the sprinkler riser.

4. Coordinate as-built submission with Section 21 05 00.

1.4 SPRINKLER SYSTEM DESIGN

A. The Fire Protection Contractor is responsible for a confirming water flow test in accordance with NFPA 291. The results shall be submitted in accordance with Specification 21 05 00. The pressure hydrant location utilized in the calculations shall be the effective point of the flow test. The hydraulic calculations shall utilize either this water supply data or the "confirming" water flow test data, whichever is less at the sprinkler system demand flow rate.

B. De-rate the water supply by 10% of the static pressure reading at both the static and residual pressure valves.

C. Hydraulic calculations shall be done utilizing the Area/Density method outlined in NFPA 13 and shall entail all pertinent piping including all outside underground extending to the point of the aforementioned confirming water flow test data.

D. Hydraulic calculations shall not be done utilizing the Room Design Method provided in NFPA 13.

E. The hydraulic calculations shall use the "C" values contained in NFPA 13.

F. The sprinkler system demand pressure shall be at least 5 psi less than the available pressure from the system adjusted from the effective point of the water flow test.

G. The design area for all hydraulic calculations shall be a minimum of 1500 square feet for wet pipe systems, unless otherwise noted, and represent the hydraulically most remote area. Sprinkler spacing and design density for all hydraulic calculations shall be as follows:

1. Where sprinkler head locations are not specifically shown, they shall be provided in accordance with NFPA 13 and these specifications to form a complete system.

2. Offices, Conference Rooms, Classrooms, Corridors, Concealed Spaces, and other areas of low combustible loading as defined by NFPA 13 shall have minimum design density of 0.10 gpm per square foot over the most hydraulically remote 1,500 ft^2.

3. Mechanical Spaces, Janitor's Closets, Cafeterias, and other areas of moderate combustible loading as defined by NFPA 13 shall have minimum design density of 0.15 gpm per square foot over the most hydraulically remote 1,500 ft^2. Maximum sprinkler protection area will be limited to 130 ft^2.

4. Storage Rooms and other areas of moderate to high combustible loading as defined by NFPA 13 shall have a minimum design density of 0.20 gpm per square foot over the most hydraulically remote 1,500 ft^2. Maximum sprinkler protection area is limited to 130 ft^2.

H. The inside/outside hose stream demand shall be 100 or 250 gpm for light or ordinary hazard calculations respectively. The inside/outside hose stream demand shall be added to the hydraulic calculations in accordance with NFPA 13.

I. Hydraulic calculations shall be revised and resubmitted to include all system design modifications, at no additional cost to the owner, until a satisfactory design in accordance with these specifications is provided.

J. All piping shall be concealed in areas with finished ceilings or chases unless otherwise indicated. Sidewall sprinkler heads in-lieu-of running exposed piping shall be utilized where possible. Where

piping cannot be run concealed (e.g., areas without ceilings), the exposed piping shall be routed as inconspicuously as possible in a neat and orderly fashion.

K. The Contractor is responsible for the routing of sprinkler piping such that only piping serving the Electrical Rooms, Elevator Equipment Rooms/Shaft, Wiring Closets, and Telecommunication or data rooms shall be permitted to enter these rooms. Route piping so that it enters the room over the door. Routing of any piping above electrical equipment or panels shall be avoided throughout the building.

L. All sprinkler heads in areas throughout the building that are below 7 foot clearance or subject to mechanical damage shall be equipped with head guards.

M. Provide a supervised control valve on all sprinkler branch lines that protect the elevator shaft and equipment room as well as the areas for the main electrical service entrance and generator. The control valves shall be located outside of the equipment room or shaft enclosure.

N. Sprinklers shall be installed under all ducts or obstructions, greater than 48 inches in width, including overhead retractable doors, in accordance with NFPA 13.

O. Sprinklers near heat sources shall be provided in accordance with NFPA 13, with respect to temperature rating and location.

P. Provide an inspectors test connection for each sprinkler system zone, as required. Test connections may be located off the system riser permitting that the initial system test can be conducted off the hydraulically most remote head. The most remote head should be an outlet with hose bib and cap.

Q. All control, drain, and test connection valves shall be provided with permanently marked weatherproof metal or rigid plastic identification signs. The sign shall be secured with corrosion-resistant wire, chain, or other approved means.

R. Where zone control valves are concealed above ceilings, identification signs shall be provided in the vicinity of the control valve to indicate location of said valve, the area isolated by said valve, and normal position of said valve.

S. All drains and inspectors test connections shall be piped to the exterior or suitably sized drain risers as indicated on the drawings.

T. Auxiliary and low-point drains shall be kept to a minimum. Auxiliary drains shall be provided in accordance with NFPA 13 except that all trapped sections shall be provided with an auxiliary drain consisting of a valve 3/4” or larger and a plug or nipple and cap. Auxiliary and low-point drains that are required to be piped to an accessible location are permitted to discharge to the building exterior, drain risers, mop receptors/sinks, or floor drains. All pipe segments that trap more than one head shall contain a low-point drain.

U. All piping and fittings on the discharge side of all drain valves shall be internally and externally galvanized.

PART 2 - PRODUCTS

2.1 ALARM VALVES

A. A 6 inch alarm check valve shall be provided for the system.

B. Provide a full trim package including retard chamber.

2.2 ELECTRIC ALARM BELL

A. Electric alarm bells shall be a nominal 8-inch diameter with a red powder coating finish. Bell shall have a typical decibel rating of 92 dB. The bell shall be rated for use at 24VDC and approved for outdoor use (-40°F to 150°F). The bell shall be UL Listed and FM Approved. Typical vendor and model is Potter Electric Signal Company model PBD248.

B. Provide a weatherproof backbox approved for outdoor use. Typical vendor and model is Potter Electric Signal Company model BBK-1.

2.3 SPECIALTY SPRINKLER FITTINGS

A. Specialty Fittings shall be UL listed and FM approved. They shall be made of steel, ductile iron, or other materials compatible with piping.

B. Mechanical T Fittings shall comply with UL 213 and have a ductile iron housing with pressure responsive gaskets, bolts, and threaded or locking-lug outlet.

C. Mechanical-Cross Fittings shall comply with UL 213 and have a ductile iron housing with pressure responsive gaskets, bolts, and threaded or locking-lug outlets.

D. Drop-Nipple Fittings shall comply with UL 1474 and have a threaded inlet, threaded outlet, and seals that are adjustable.

E. Sprinkler Drain and Alarm Test Fittings shall be UL listed and utilize a cast or ductile iron body. They shall have a threaded inlet and outlet, a test valve, and orifice and sight glass.

F. Sprinkler Branch-Line Test Fittings shall be UL listed and have a brass body with threaded inlet and capped drain outlet and threaded outlet for sprinkler.

G. Sprinkler Inspector’s Test Fittings shall be UL listed utilizing a cast or ductile iron housing. They shall have a threaded inlet, drain outlet, and sight glass.

2.4 ESCUTCHEON PLATES

A. Provide escutcheons for all exposed pipes passing through walls, partitions, or ceiling. Escutcheons shall be steel, primed and finish painted to match adjacent wall finish.

2.5 BACKFLOW PREVENTION ASSEMBLIES

A. The backflow prevention device shall be a minimum 6 inch Double Check Detector type backflow prevention assembly. Backflow prevention assemblies shall be UL listed for fire protection service, listed for use in the vertical orientation (if so installed), and in accordance with the AHJ requirements.

2.6 FIRE DEPARTMENT CONNECTION (FDC)

A. The FDC shall be flush wall mounted siamese type, 2 1/2 inches by 2 1/2 inches by 4 inches, single clapper with female thread connections matching local Fire Department specifications, 2 1/2 inch caps/plugs, finish to match FDC and chains. Verify finish with architect prior to ordering.

B. The FDC shall be equipped with an exterior wall plate labeled “AUTO SPKR” and check valve with ball drip arranged to maintain the FDC in a dry state. All exposed surfaces shall be finished to match the FDC.

PART 3 - EXECUTION

3.1 INSTALLATION

A. The installation shall comply with all applicable codes and standards.

B. The drawings show the riser locations and general routings for the mains. The riser locations shall be adhered to as closely as possible. The indicated locations for the mains are based on proposed routings of equipment by other trades and structural elements. The contactor is responsible for providing coordination drawings to the Professional reflecting the other trades works prior to installation.

C. The drawings may show proposed head locations (dots). The contractor shall determine final head locations in accordance with NFPA and in coordination with the reflected ceiling plan. Any heads shown are not intended to show all actual locations or be representative of the total device count. Any heads shown on the fire protections drawings or reflected ceiling plans are to show the intent only.

1. Sprinkler heads shall be located as required and coordinated with the Reflected Ceiling Plans. Deviations from submitted locations shall be approved by the Professional prior to installation.
2. Sprinkler heads shall be installed in a symmetrical and orderly fashion.
3. Sprinkler heads in suspended acoustical tile ceiling shall be located in center of ceiling tile. Where the ceiling tile is scored, creating multiple surfaces, the location of the sprinkler head shall be with respect to the surface.
4. All recessed sprinkler heads shall be fully recessed. A maximum tolerance of +/- 1/4-inch between any recessed sprinkler heads within a room or common visual area shall be accepted.
5. Positioning of sprinkler heads with respect to obstructions located below or adjacent to the sprinkler heads shall be evaluated in accordance with the requirements of NFPA 13.
6. Sprinkler heads in storage areas, janitor’s closets, and like areas shall not be located within 3 feet of the walls. If this minimum dimension cannot be met due to the room dimension or ceiling coordination features, the head shall be placed in the best alternate location.
7. Sprinkler heads shall be kept free of dirt and debris at the time of installation by covering with plastic bags or covers. Removal of the bags shall be the responsibility of the contractor.
8. Remove and replace heads having paint other than factory finish.

D. The contractor may utilize tree, loop, grid type, or combination thereof piping systems as necessary for the wet pipe system.

E. Concealed combustible construction should not be anticipated by the contractor during the development of their bid and subsequent design. If identified by the contractor during the course of the project, it shall be brought to the Professional’s attention.

F. Coordinate the work of this section with the related work specified under other sections and all Electrical Equipment locations.

G. Piping shall be pitched to permit draining of the sprinkler systems. Drain valves shall be installed at low points in accordance with NFPA 13, except that all drains shall have a 3/4 inch valve and cap or plug and nipple as a minimum.

H. The installation shall not add heads or institute pipe changes in direction or size without submitting revised calculations.

I. All piping in areas with finished ceilings shall be concealed.

J. Provide a pressure gauge at the top of all system risers.

K. Locate pipe runs to minimize obstructions of other work and to avoid obvious conflicts.

L. Piping shall be routed in an orderly manner, plumb and parallel to the building structure. Pendent sprinkler “drops” shall be vertical to the ceiling. Piping shall be installed to conserve building space, and in such a manner that it does not interfere with the use of space, other work, or the required headroom.

M. Where trapeze hangers are used, documentation shall be provided to the Professional for each such hanger indicating location, size, length, type, and all pertinent information for reviewing against the requirements of NFPA 13.

N. Changes in direction of piping shall be made with fittings.

O. “Tee” fittings with plugs shall not be used as a substitute for “Elbow” fittings unless approved by the professional prior to installation.

P. Pipe size transitions shall be made with reducing fittings. Bushings shall not be used.

Q. Any sprinkler pipe, which passes through an exterior wall, shall be internally and externally galvanized.

1. Do not use welded joints with galvanized steel pipe.

2. Flanges, unions, and transition and special fittings with pressure ratings the same as or higher than system’s pressure rating may be used in aboveground applications, unless otherwise noted on the drawings.

R. The contractor is ultimately responsible for:

1. Maintaining all components of the fire protection system free and clear of all dirt, debris, or other potential obstructions.

2. Not storing materials directly on the ground.

3. Making sure that the open ends of piping are plugged or capped during the construction to prevent dirt or debris from entering the pipe where pipes, fittings, and equipment are located in areas subject to dirt or debris.

4. Using methods that prevent damage, deterioration, and other loss during shipping and on-site storage. These include: using padded or strap slings, etc. as appropriate for materials being handled, lifting equipment by lift points provided or recommended by the manufacturer, and storing equipment away from the effects of rain, wind-driven dust, and other similar phenomena.

S. Extended coverage sprinklers may be used, except for mechanical rooms or other potentially obstructed areas.

T. Test connections shall not discharge to the interior of the building.

U. All piping on the discharge side of drain valves shall be internally and externally galvanized.

V. Electric Alarm Bell An electric alarm bell shall be provided for the sprinkler systems. A common bell can be utilized for all valves within the same room.

W. Provide a concrete splash block on grade for all exterior sprinkler/standpipe drains.

3.2 PENETRATIONS

A. All penetrations shall be completed in a neat and orderly fashion.

B. Penetrations of fire-rated wall and/or floor assemblies shall be with a UL listed fire stopping assembly appropriate for the rating and configuration of the penetrated assembly. The number of penetrations shall be kept to a minimum. See the Architectural Drawings to verify floor or wall ratings.

C. Except where concrete walls/floors/partitions are core-drilled, provide pipe sleeves where piping passes entirely through walls, floors, and/or partitions. Secure sleeves to the wall, floor, and/or partition in position during construction in a permanent manner.

D. Provide sleeves of sufficient length to pass through entire thickness of walls, floors, and roofs.

E. Provide 1-inch minimum clearance between exterior of piping and interior of sleeve (i.e., 1-inch annular space). Firmly pack annular space with mineral wool insulation.

F. Seal space at both ends of the sleeve with plastic waterproof cement that will dry to a firm but pliable mass, or provide a mechanically adjustable segmented elastomeric material.

3.3 JOINTS

A. Threaded joints shall be made up using pipe dope and Teflon tape or other standard industry practice.

B. After cutting, but prior to threading, sprinkler piping shall be reamed and deburred. Additionally, the piping shall be “wiped” out with an absorbent cloth or rag following threading operations (and prior to installation of fittings to the pipe) for the purpose of cleaning and sopping up excess oil.

C. Welded joints for steel pipe shall be fusion welded in accordance with the American Standards Code for pressure pipe, ANSI B31.1, Section 6. All welding shall be performed at the shop.

D. Flanged joints shall be made with ring type non-metallic gaskets, bolts and nuts.

E. Outside Underground Piping:

1. All piping shall be installed per NFPA 24.

2. Tie Rod Anchors:

a. Rod and clamp type anchors shall be installed on all hub and spigot joints in underground pipe including mechanical joint and push-on joints where change in direction of pipe run occurs unless UL listed or FM approved restrained joints are used. Straight runs of pipe do not require rod and clamps.

b. After installation, rods and clamps shall be covered with coal tar coating.

3. Thrust Blocks:

a. Concrete thrust blocks shall be installed at each change in pipe direction on underground piping and at each tee and dead end in accordance with NFPA 24.

b. Restrained joints that are listed in the Factory Mutual Approval Guide may be used with ductile iron pipe instead of thrust blocks or tie rod anchors.

3.4 WATERFLOW SWITCHES

A. This Contractor shall provide all vane type waterflow switches under this Contract.

B. The Fire Alarm Contractor shall furnish and install all necessary wire, conduit, and boxes to properly connect flow switches to the fire alarm system.

C. This Contractor shall coordinate with the Fire Alarm Contractor to insure that the flow switches provided are compatible with the fire alarm system and meet the requirements of the NEC.

D. The waterflow switches shall be installed with the retard setting set to between 20 and 30 seconds.

3.5 VALVE SUPERVISORY SWITCHES/EQUIPMENT

A. Valve position supervisory switches shall be installed on all control valves.

B. This Contractor shall provide all sprinkler valve supervisory switches under this Contract including the tamper switch on the post indicator valve. The Contractor shall also verify the make and model of all valves to ensure that the switches provided are compatible.

C. The Fire Alarm Contractor shall provide all necessary wire, conduit, and boxes to properly connect supervisory switches to the fire alarm system.

D. This Contractor shall coordinate with the Fire Alarm Contractor to insure that the supervisory switches provided are compatible with the fire alarm system and meet the requirements of the NEC.

3.6 FIRE DEPARTMENT CONNECTION (FDC)

A. Locate the FDC such that sufficient clearance from all walls, obstructions, or other equipment is provided to allow full swing of the fire department wrench handle.

B. The FDC shall be mounted at least 18 inches above pavement, sidewalks or grade adjacent to the exterior of the building.

3.7 SPECIALTY SPRINKLER FITTING INSTALLATION

A. Install specialty sprinkler fittings according to manufacturer’s written instructions.

3.8 VALVE INSTALLATION

A. Refer to Division 15 for installing general-duty valves. Install fire-protection specialty valves, trim, fittings, controls, and specialties according to NFPA 13, manufacturer’s written instructions, and the AHJ.

B. Gate Valves: Install fire-protection-service valves supervised-open, located to control sources of water supply except from fire department connections. Provide permanent identification signs indicating portion of system controlled by each valve.

C. Alarm Check Valves: Install valves in vertical position for proper direction of flow, including bypass check valve and retard chamber drain-line connection.

D. All valves installed in horizontal lines shall be installed with the stems horizontal or above. Valve handwheels shall be oriented, when installed, to provide maximum accessibility for operation.

3.9 LABELING AND IDENTIFICATION

A. Install labeling and pipe markers on equipment and piping according to requirements of NFPA 13 and Specification 21 05 00.

3.10 COMMISSIONING

A. Verify that specialty valves, trim, fittings, controls, and accessories are installed and operate correctly.

B. Verify that specified tests of piping are complete.

C. Verify that damaged sprinklers and sprinklers with paint or coating not specified are replaced with new, correct type.

D. Verify that sprinklers are correct types, have correct finishes and temperature ratings, and have guards as required for each application.

E. Verify that interconnected potable-water supplies, where permitted, have correct types of backflow prevention installed.

F. Fill wet-pipe sprinkler piping with water.

G. Energize circuits to electrical equipment and devices.

H. Adjust operating controls and pressure settings.

I. Coordinate with fire alarm tests. Operate as required.

3.11 DEMONSTRATION

A. Demonstrate equipment, specialties, and accessories. Review operating and maintenance information.

B. Schedule demonstration with Owner. Allow at least 7 days advance notice.

3.12 TESTING

A. The contractor shall notify the Professional and the AHJ 3 weeks or more in advance of all tests to be conducted.

B. All underground piping shall be flushed prior to connection to system risers in accordance with NFPA 24 and documented as such.

C. The entire system, including the outside underground, shall be tested in accordance with the requirements of NFPA 13, NFPA 24, and all local requirements. Contractor’s Material and Test

Certificates shall be completed, signed, and dated and included in the Operations and Maintenance Manuals. The Contractor is responsible for obtaining copies of the Contractor's Material and Test Certificates for the Underground installed by the Civil contractor. If such a certificate cannot be obtained, the contractor shall be responsible for performing the test and preparing the certificate.

D. Any retesting that is required due to failure of any test for any reason shall be conducted at no additional cost to the owner. Any corrections or repairs to the system or building necessary due to such a failure, and retesting of the system shall be performed at no cost to the owner.

E. Report test results promptly and in writing to the Professional and AHJ.

END OF SECTION

THE LINE SHOWN ABOVE IS EXACTLY ONE INCH LONG AT PLOTTED ORIGINAL PAGE SIZE

THE SQUARES ABOVE ARE SOLID WITH BLACK AND WHITE LEVELS, AT PLOTTED DENSITY

TYPICAL ANNOTATION LEGEND

- AREA OF REVISION
- REVISION SEQUENCE NUMBER
- KEYNOTE
- POINT OF CONNECTION OF EXISTING SYSTEM
- POINT OF DISCONNECTION OF EXISTING SYSTEM
- DETAIL NUMBER / DRAWING NUMBER
- DETAIL NUMBER / DRAWING NUMBER
- VIEW REFERENCE

FIRE ALARM LEGEND

- F — MANUAL PULL STATION
- F — HORN, WALL
- F — HORN, CEILING
- STROBE, WALL, CANDELA AS INDICATED
- STROBE, CEILING, CANDELA AS INDICATED
- HORN/STROBE, WALL, CANDELA AS INDICATED
- HORN/STROBE, CEILING, CANDELA AS INDICATED
- RMTS — REMOTE INDICATOR W/ TEST SWITCH
- S — SMOKE DETECTOR
- S_SB — SMOKE DETECTOR W/ AUDIBLE BASE
- H — HEAT DETECTOR
- CO — CARBON MONOXIDE DETECTOR
- S_BT — BEAM DETECTOR T: TRANSMITTER R: RECEIVER
- H S CO — COMBINATION DETECTOR (UP TO THREE)
- DUCT SMOKE DETECTOR
- SMOKE DAMPER
- COMBINATION FIRE/SMOKE DAMPER
- DH — DOOR HOLDER
- DCL — DOOR CLOSER
- FIRE SERVICE PHONE
- FIRE SERVICE PHONE JACK
- XXX — ADDRESSIBLE MODULE
  - AIM: ADDRESSIBLE INPUT MODULE
  - AOM:ADDRESSIBLE OUTPUT CONTROL MODULE
  - AIO: ADDRESSIBLE INPUT/OUTPUT MODULE
- XXXX — FIRE ALARM CONTROL UNIT
  - EVAC: VOICE EVACUATION CONTROL PANEL
  - FAA: FIRE ALARM ANNUNCIATOR
  - FACP: FIRE ALARM CONTROL PANEL
  - FATC: FIRE ALARM TERMINAL CABINET
  - NACP: NOTIFICATION APPLIANCE CIRCUIT PANEL
  - FAMN: FIRE ALARM MASS NOTIFICATION CONTROL PANEL
  - AMP: AMPLIFIER PANEL
  - COMM: FIRE ALARM COMMUNICATOR PANEL
- XX — SUPERVISORY OR INTERFACE DEVICE
  - PIV: POST INDICATOR VALVE SUPERVISORY
  - PS: PRESSURE SWITCH
  - R: NON-ADDRESSIBLE RELAY
  - VS: VALVE SUPERVISORY SWITCH
  - WF: WATER FLOW SWITCH
- J — JUNCTION BOX
- PRT — PRINTER
- DOC — DOCUMENT STORAGE BOX
- ACS — EMERGENCY TWO-WAY COMMUNICATION CALL STATION
- ARA — EMERGENCY TWO-WAY COMMUNICATION BASE STATION

GENERAL NOTES FIRE ALARM

1. SOME LEGEND SYMBOLS MAY NOT BE USED. SEE FLOOR PLANS FOR APPLICABLE DEVICES.
2. THESE NOTES ARE GENERAL IN NATURE AND PERTAIN TO THE ENTIRE PROJECT UNLESS OTHERWISE NOTED AS SUCH ON AN INDIVIDUAL DRAWING.
3. PRIOR TO BIDDING, THE CONTRACTOR SHALL EXAMINE ALL PROJECT DRAWINGS AND SPECIFICATIONS TO DEVELOP A COMPLETE UNDERSTANDING OF THE PROJECT SCOPE. THE CONTRACTOR SHALL VISIT THE SITE AND VERIFY EXISTING CONDITIONS BEFORE BIDDING. FAILURE TO DO THIS WILL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITIES TO PERFORM ALL REQUIRED WORK. THE CONTRACTOR SHALL ADVISE THE PROFESSIONAL OF ANY DISCREPANCIES WHICH WILL AFFECT THE WORK REQUIRED.
4. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH ALL PERTINENT CODES AND REGULATIONS. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT IN ACCORDANCE WITH APPLICABLE CODES, MANUFACTURER'S WRITTEN INSTRUCTIONS, AND RECOGNIZED INDUSTRY PRACTICES. ALL EQUIPMENT, DEVICES, AND MATERIALS SHALL BE UL LISTED AND FM APPROVED.
5. THE CONTRACTOR IS RESPONSIBLE FOR SUBMITTING ALL REQUIRED INFORMATION TO THE AUTHORITY HAVING JURISDICTION TO OBTAIN THE NECESSARY PERMITS AND APPROVALS. ALL FEES ASSOCIATED WITH THIS SUBMISSION ARE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR SHALL COORDINATE ALL REQUIRED INSPECTIONS AND BE RESPONSIBLE FOR ALL FEES CHARGED BY THE AUTHORITY HAVING JURISDICTION FOR SUCH INSPECTIONS.
6. REFER TO THE ARCHITECTURAL PLANS FOR DIMENSIONS, ROOM FINISHES, FIRE WALLS, DOOR HARDWARE SCHEDULES AND LIKE ITEMS. REFER TO THE STRUCTURAL DRAWINGS FOR STRUCTURAL MEMBERS. REFER TO OTHER TRADES PLANS TO UNDERSTAND THE EXTENT OF THEIR WORK AS REQUIRED.
7. DO NOT SCALE DRAWINGS. HOLD INDICATED DIMENSIONS WHERE SHOWN. RESOLVE ANY DISCREPANCIES WITH THE PROFESSIONAL PRIOR TO BEGINNING WORK.
8. PROVIDE A NEW MULTIPLEX/ADDRESSABLE, NON-CODED, SUPERVISED FIRE ALARM SYSTEM AS DESCRIBED IN THE SPECIFICATIONS AND AS SHOWN ON THE FIRE ALARM DRAWINGS. THE WORK COVERED UNDER THIS CONTRACT INCLUDES THE FURNISHING OF ALL EQUIPMENT, LABOR, AND MATERIALS TO PROVIDE A COMPLETE SYSTEM IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND REFERENCED CODES. THE DRAWINGS DO NOT SHOW ALL REQUIRED CONNECTIONS, INTERCONNECTING DETAILS, TERMINAL BLOCKS, JUNCTION BOXES, ETC. THE CONTRACTOR SHALL PROVIDE ALL APPURTENANCES FOR A COMPLETE AND OPERATIONAL SYSTEM THAT MEETS THE DESIGN INTENT AND CODE REQUIREMENTS.
9. THE LAYOUT ON THE DRAWINGS IS DIAGRAMMATIC. WHERE ADDITIONAL REMOTE FIRE ALARM CONTROL UNITS, NAC EXTENDER PANELS, OR SIMILAR FIRE ALARM RELATED EQUIPMENT ARE NEEDED, THEY SHALL BE PROVIDED.
10. THE CONTRACTOR SHALL COORDINATE WITH OTHER TRADES TO ELIMINATE CONFLICTS BETWEEN STRUCTURAL ELEMENTS AS WELL AS PIPING, DUCTWORK, SPRINKLER, ARCHITECTURAL, AND OTHER ELECTRICAL WORK. ALL EQUIPMENT SHALL BE COORDINATED WITH OTHER TRADES AND ARCHITECTURAL AND STRUCTURAL FEATURES.
11. PROVIDE A NEW FIRE ALARM CONTROL PANEL (FAP) AND REMOTE ANNUNCIATOR PANEL (FAA).
12. PROVIDE AUDIBLE/VISIBLE NOTIFICATION THROUGHOUT THE AREA OF WORK.
13. PROVIDE DETECTION THROUGHOUT THE AREA OF WORK AS SHOWN IN THE PLANS.
14. FURNISH DUCT SMOKE DETECTORS FOR INSTALLATION BY THE MECHANICAL CONTRACTOR. REFER TO THE MECHANICAL DRAWINGS FOR EXACT QUANTITIES AND LOCATIONS. INTERFACE THE DUCT SMOKE DETECTORS WITH THE FIRE ALARM SYSTEM TO SHUTDOWN ASSOCIATED AIR HANDLERS UPON ACTIVATION OF THE SMOKE DETECTOR.
15. PROVIDE CONTROL MODULES, RELAYS, AND MONITOR MODULES TO INTERFACE DOOR HOLDERS, FIRE PROTECTION ALARM AND SUPERVISORY SWITCHES, AND KITCHEN HOOD SUPPRESSION SYSTEMS WITH THE FIRE ALARM SYSTEM.
16. ALL FIRE ALARM WIRING SHALL BE IN CONDUIT THROUGHOUT, UNLESS NOTED OTHERWISE. ALL CONDUIT AND WIRING SHALL BE CONCEALED IN AREAS WITH CEILINGS. CONDUIT SHALL BE UTILIZED IN AREAS WITHOUT CEILINGS. CONTRACTOR SHALL COORDINATE ROUTINGS WITHIN THESE EXPOSED AREAS TO PRODUCE A SYMMETRIC AND AESTHETIC LAYOUT.
17. FIRE ALARM CIRCUITS SHALL BE 24-VOLT DC AND POWER WIRING SHALL BE 120-VOLT AC CIRCUITS. SIGNALING LINE CIRCUITS SHALL BE CLASS B AND NOTIFICATION APPLIANCE CIRCUITS SHALL BE CLASS B.
18. CIRCUITS SHALL CONTAIN AT LEAST 20 PERCENT SPARE CAPACITY FOR NOTIFICATION APPLIANCES ON THE NAC CIRCUITS AND 20 PERCENT SPARE CAPACITY FOR INITIATING DEVICES ON THE SLC (E.G., NOT MORE THAN 80 PERCENT LOADED).
19. CONTRACTOR SHALL REPLACE IN KIND ALL CEILING TILES DAMAGED DURING INSTALLATION AT NO ADDITIONAL COST.
20. CONTRACTOR SHALL REPAINT OR REFINISH ANY AREA IN KIND IF INSTALLATION DEFACES EXISTING WALLS, FLOORS, OR CEILINGS.
21. AFTER ALL EQUIPMENT IS INSTALLED, IT SHALL BE TESTED TO DEMONSTRATE PROPER OPERATION OF PERFORMANCE AND COMPLIANCE WITH THE SPECIFICATIONS. EQUIPMENT NOT OPERATING CORRECTLY SHALL BE FIELD CORRECTED OR REPLACED. SYSTEMS WILL BE TESTED IN ACCORDANCE WITH NFPA REQUIREMENTS. THE OWNER'S REPRESENTATIVE, PROFESSIONAL, AND AUTHORITY HAVING JURISDICTION SHALL BE PRESENT FOR THE TEST.

FIRE ALARM SHEET INDEX

DEFERRED SUBMISSION

THE FIRE ALARM DRAWINGS AND SPECIFICATIONS ARE PERFORMANCE BASED. THE CONTRACTOR SHALL SUBMIT FOR REVIEW AND APPROVAL AS A DEFERRED SUBMITTAL TO THE AHJ SHOP DRAWINGS AND CALCULATIONS INDICATING THE SYSTEM LAYOUT. THE PROFESSIONAL SHALL REVIEW THE SHOP DRAWINGS AND CALCULATIONS PRIOR TO THE DEFERRED SUBMISSION TO THE AHJ AND PROVIDE NOTATION ON THE DRAWINGS INDICATING THEY WERE REVIEWED BY THE PROFESSIONAL. SUBMIT REVIEWED DRAWINGS PRIOR TO INSTALLATION.

DEFERRED SUBMISSION

SYSTEM OUTPUTS

SYSTEM INPUTS	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	
	ACTIVATE FAP TROUBLE LAMP	ACTIVATE FAP TROUBLE SUPERVISORY SIGNAL	ACTIVATE FAP TROUBLE SUPERVISORY LAMP	ACTIVATE FAP SUPERVISORY SIGNAL	ACTIVATE FAP SUPERVISORY LAMP	ACTIVATE FAP ALARM LAMP	ACTIVATE REMOTE ANNUNCIATOR ALARM SIGNAL	ACTIVATE FAP ALARM SIGNAL	FUNCTION LOCKOUT OF SYSTEM POWER	FUNCTION LOCKOUT OF SYSTEM TROUBLE SIGNAL	TRANSMIT TROUBLE SIGNAL TO REMOTE ANNUNCIATOR PANELS	TRANSMIT SUPERVISORY SIGNAL TO REMOTE ANNUNCIATOR PANELS	TRANSMIT FIRE ALARM SIGNAL TO REMOTE ANNUNCIATOR PANELS	SHUT DOWN ASSOCIATED AIR HANDLER	DELAY DOWNSTREAM SIGNALS TO SUPERVISING STATIONS	ACTIVATE ELECTRONIC ALARM BELL	
1	ANY GENERAL BUILDING DETECTOR IN TROUBLE	X	X					X		X	X							1
2	ANY GENERAL BUILDING DETECTOR IN ALARM						X	X	X	X			X					2
3	ANY GENERAL BUILDING MANUAL PULL STATION IN ALARM						X	X	X	X			X					3
4	ANY DUCT DETECTOR IN ALARM				X	X			X		X			X		X		4
5	FIRE ALARM AC POWER FAILURE				X	X			X		X		X					5
6	FIRE ALARM SYSTEM LOW BATTERY	X	X						X		X	X						6
7	OPEN CIRCUIT	X	X						X		X	X						7
8	GROUND FAULT	X	X						X		X	X						8
9	NOTIFICATION APPLIANCE CIRCUIT SHORT	X	X						X		X	X						9
10	ANY TROUBLE ALARM	X	X						X		X	X						10
11	SMOKE DETECTOR ADJACENT TO DOOR HOLD-OPEN DEVICE						X	X	X	X			X		X			11
12	KITCHEN HOOD EXTINGUISHING SYSTEM ACTIVATION						X	X	X	X			X					12
13	BUILDING KNOX BOX OPEN				X	X			X		X							13
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	

1 FA000 FIRE ALARM SYSTEM MATRIX OF OPERATION
NOT TO SCALE

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SYMBOLS, LEGENDS, AND ABBREVIATIONS - FIRE ALARM

ARCHITECT
LIC#:

Proj #: 24.0002607.000 Reviewed By:

FA000

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1/13/2026 10:05:52 AM Autodesk Docs://Coushatta Education Building/24.0002607.080 Coushatta Education Building MEP_R24.rvt

KEYED NOTES:

1. MOUNT THE DEVICE TO THE WINDOW MULLION. ALL WIRING SHALL BE CONCEALED INSIDE THE MULLION.
2. PROVIDE AN ADDRESSABLE INPUT MODULE TO MONITOR THE KITCHEN HOOD SUPPRESSION SYSTEM FOR ALARM SIGNAL. PROVIDE AN ADDRESSABLE OUTPUT MODULE AND RELAY TO SHUT DOWN THE KITCHEN MAKE-UP AIR FAN UPON HOOD SUPPRESSION SYSTEM ACTIVATION.
3. PROVIDE AN ADDRESSABLE INPUT MODULE TO MONITOR THE TAMPER SWITCH ON THE BUILDING'S KNOX BOX WITH THE FIRE ALARM SYSTEM. FIELD LOCATE THE MODULE BASED ON THE FIRE MARSHAL APPROVED LOCATION OF THE KNOX BOX.

1 FA201 FIRST FLOOR CONSTRUCTION PLAN - FIRE ALARM
1/8" = 1'-0"

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FIRST FLOOR CONSTRUCTION PLAN - FIRE ALARM

ARCHITECT
LIC#:

Proj #: 24.0002607.000 Reviewed By:

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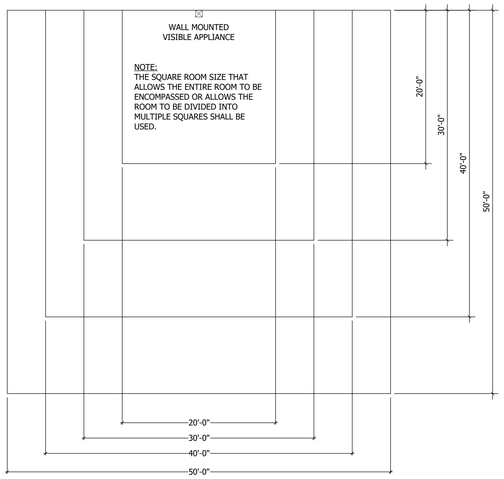
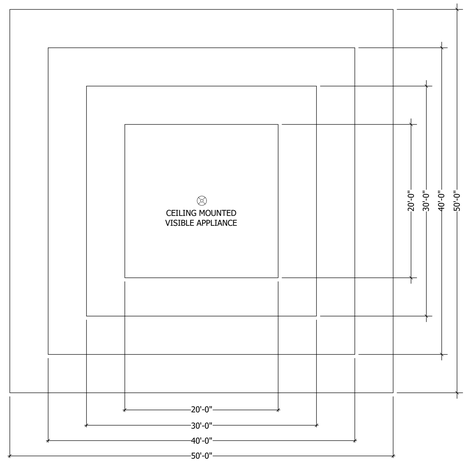
TRUE & PROJECT NORTH



MAXIMUM ROOM SIZE (FT)	MINIMUM REQUIRED LIGHTING OUTPUT (CD) ONE LIGHT PER ROOM
20 X 20	15
28 X 28	30
30 X 30	34
40 X 40	60
45 X 45	75
50 X 50	94
54 X 54	110
55 X 55	115
60 X 60	135
63 X 63	150
68 X 68	177

8 FA400 FIRE ALARM WALL MOUNTED VISIBLE APPLIANCE SPACING TEMPLATE
NOT TO SCALE



MAXIMUM ROOM SIZE (FT)	MAXIMUM LENS HEIGHT (FT)	MINIMUM REQUIRED LIGHTING OUTPUT (CD)
20 X 20	10	15
30 X 30	10	30
40 X 40	10	60
44 X 44	10	75
50 X 50	10	95
53 X 53	10	110
55 X 55	10	115
59 X 59	10	135
63 X 63	10	150
68 X 68	10	177
70 X 70	10	185

MAXIMUM ROOM SIZE (FT)	MAXIMUM LENS HEIGHT (FT)	MINIMUM REQUIRED LIGHTING OUTPUT (CD)
20 X 20	20	30
30 X 30	20	45
40 X 40	20	75
44 X 44	20	80
50 X 50	20	95
53 X 53	20	110
55 X 55	20	115
59 X 59	20	135
63 X 63	20	150
68 X 68	20	177
70 X 70	20	185

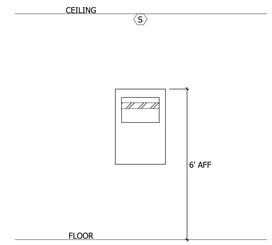
MAXIMUM ROOM SIZE (FT)	MAXIMUM LENS HEIGHT (FT)	MINIMUM REQUIRED LIGHTING OUTPUT (CD)
20 X 20	30	55
30 X 30	30	75
50 X 50	30	95
53 X 53	30	110
55 X 55	30	115
59 X 59	30	135
63 X 63	30	150
68 X 68	30	177
70 X 70	30	185

5 FA400 FIRE ALARM CEILING MOUNTED VISABLE APPLIANCE SPACING TEMPLATE
NOT TO SCALE

NOTES:

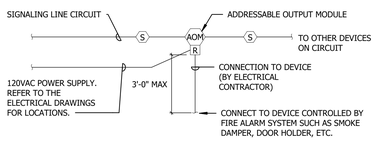
1. WHERE FLOOR PLAN INDICATES THAT NOTIFICATION APPLIANCE AND MANUAL PULL STATION ARE LOCATED IN THE SAME AREA, THEY SHALL BE MOUNTED IN THE SAME VERTICAL LINE.

1 FA400 FIRE ALARM MANUAL PULL STATION AND STROBE DETAIL
NOT TO SCALE



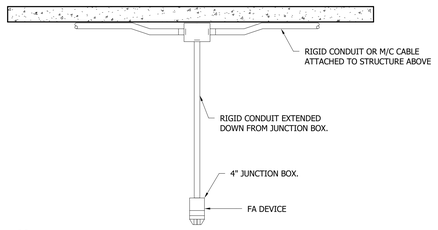
NOTES:
FOR BLOCK WALLS - COORDINATE MOUNTING HEIGHT WITH TOP OF COURSE OF BLOCK NEAREST 6 FEET AFF.

2 FA400 FIRE ALARM PANEL ANNUNCIATOR MOUNTING DETAIL
NOT TO SCALE

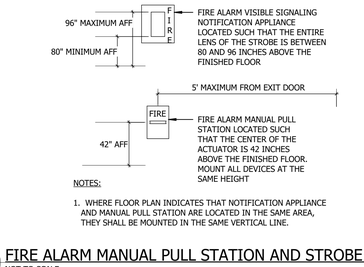


NOTES:
PROVIDE RELAY AS REQUIRED.
VERIFY POWER DRAW AND VOLTAGE OF DEVICE WITH THE RESPECTIVE CONTRACTOR.

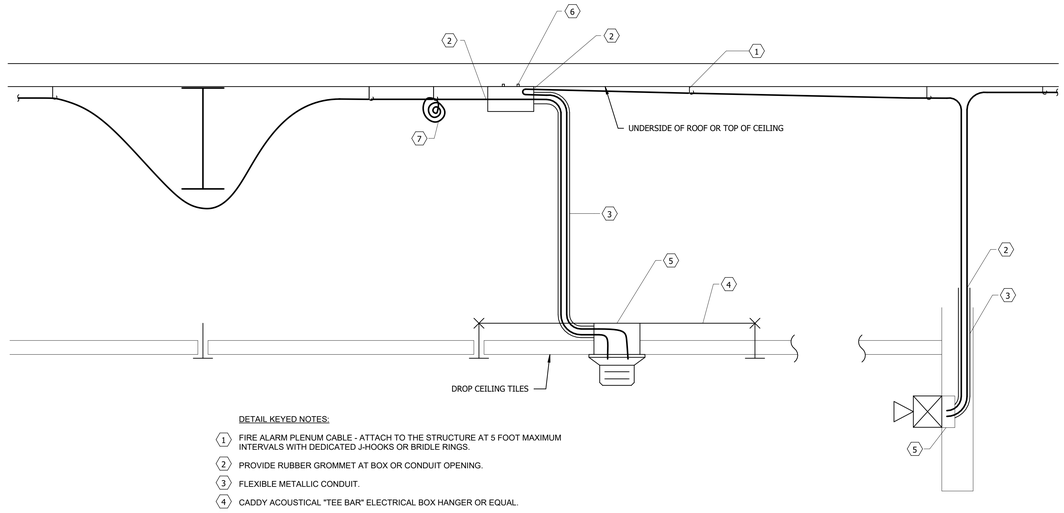
9 FA400 FIRE ALARM 120V POWER CONTROL INTERFACE DETAIL
NOT TO SCALE



6 FA400 FIRE ALARM PENDENT MOUNT DEVICE DETAIL
NOT TO SCALE



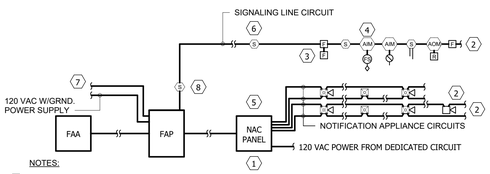
3 FA400 FIRE ALARM PROPER PLACEMENT FOR DETECTORS DETAIL
NOT TO SCALE



DETAIL KEYED NOTES:

1. FIRE ALARM PLENUM CABLE - ATTACH TO THE STRUCTURE AT 5 FOOT MAXIMUM INTERVALS WITH DEDICATED J-HOOKS OR BRIDLE RINGS.
2. PROVIDE RUBBER GROMMET AT BOX OR CONDUIT OPENING.
3. FLEXIBLE METALLIC CONDUIT.
4. CADDY ACOUSTICAL "TEE BAR" ELECTRICAL BOX HANGER OR EQUAL.
5. JUNCTION BOX.
6. SECURELY FASTEN FLEXIBLE METALLIC CONDUIT TO STRUCTURE VIA A JUNCTION BOX OR CONDUIT FITTING AND CLAMP.
7. COIL EXCESS WIRE ON A J-HOOK OR BRIDLE RING ADJACENT TO CONDUIT.

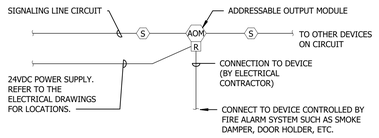
10 FA400 FIRE ALARM PLENUM WIRING AND DEVICE MOUNTING
NOT TO SCALE



NOTES:

1. THE TYPE OF DEVICE AT THIS LOCATION WILL DEPEND ON THE MANUFACTURER'S EQUIPMENT. NOTHING IN THE DESIGN DOCUMENTS IS INTENDED, NOR SHOULD IT BE CONSTRUED, TO LIMIT THE TYPES OF DEVICES THAT MAY BE USED, PROVIDED THE INTENDED SYSTEM PERFORMANCE IS ACHIEVED AND WITHIN THE UL LISTING.
2. THE DEVICES SHOWN ON THE RISER DIAGRAM ARE REPRESENTATIVE OF THOSE TO BE PROVIDED THROUGHOUT THE BUILDING. THEY ARE NOT INTENDED TO SHOW TOTAL QUANTITIES OF DEVICES. THE CONTRACTOR SHALL REFER TO THE FLOOR PLANS FOR THIS INFORMATION.
3. THE SIGNALING LINE CIRCUIT MAY BE T-TAPPED, PROVIDED THE LOCATION OF THE T-TAP IS CLEARLY SHOWN ON THE SHOP DRAWINGS, IS PERFORMED IN A JUNCTION BOX, AND IS MADE WITH A TERMINAL STRIP. PIGTAILING IS NOT PERMITTED.
4. ADDRESSABLE INTERFACE MODULES ARE REQUIRED FOR NON-ADDRESSABLE INITIATING AND INDICATING DEVIES FOR CONNECTION TO THE FIRE ALARM SYSTEM. SEE THE WIRING SCHEMATICS ON THIS DRAWING FOR ADDITIONAL INFORMATION.
5. PROVIDE REMOTE NOTIFICATION APPLIANCE CIRCUIT POWER BOOSTER PANELS AS REQUIRED.
6. AUDIBLE AND VISIBLE NOTIFICATION APPLIANCES SHALL BE WIRED SEPARATELY OR SEPARATELY CONTROLLED.
7. THE LOCATION AND TYPE OF INTERFACE DEVICE FOR CONNECTION TO THE MONITORING SERVICE MUST BE COORDINATED WITH CONTRACTING SERVICE COMPANY.
8. PROVIDE A SMOKE DETECTOR ABOVE ALL CONTROL PANELS (TYPICAL).

7 FA400 FIRE ALARM SYSTEM RISER DIAGRAM - SINGLE FLOOR
NOT TO SCALE



NOTES:
PROVIDE 24VDC POWER SUPPLY FROM FACP AS RQUIRED.
PROVIDE RELAY AS REQUIRED.
VERIFY POWER DRAW AND VOLTAGE OF DEVICE WITH THE RESPECTIVE CONTRACTOR.

4 FA400 FIRE ALARM CONTROL INTERFACE DETAIL
NOT TO SCALE

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DETAILS - FIRE ALARM

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LIC#:

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THE LINE SHOWN ABOVE IS EXACTLY ONE INCH LONG AT PLOTS ORIGINAL PAGE SIZE

THE SQUARES ABOVE ARE COLOR WITH BLACK AND WHITE LEVELS, AT PLOTS CORRECTLY

TYPICAL ANNOTATION LEGENDS

- AREA OF REVISION
- REVISION SEQUENCE NUMBER
- KEYNOTE
- POINT OF CONNECTION OF EXISTING SYSTEM
- POINT OF DISCONNECTION OF EXISTING SYSTEM
- DETAIL NUMBER / DRAWING NUMBER
- DETAIL NUMBER / DRAWING NUMBER
- ? / ? VIEW REFERENCE

FIRE PROTECTION LEGEND

**ALL EXISTING ITEMS TO BE SHOWN HALFTONE*

- PENDENT SPRINKLER HEAD
- UPRIGHT SPRINKLER HEAD
- SIDEWALL SPRINKLER HEAD
- PIPE RISE
- PIPE DROP
- TEE CONNECTION STRAIGHT
- TEE CONNECTION DOWN
- TEE CONNECTION UP
- PIPE CONTINUATION
- PIPE CAP
- HIGH/LOW AIR PRESSURE SWITCH
- ALARM PRESSURE SWITCH
- WATER FLOW SWITCH
- PRESSURE GAUGE
- GATE VALVE
- GATE VALVE WITH TAMPER SWITCH
- CHECK VALVE
- MULTI-PURPOSE/ANGLE HOSE VALVE
- VALVE CONTROL STATION
- BFP — BACKFLOW PREVENTER ASSEMBLY
- DOUBLE CHECK VALVE BACKFLOW PREVENTER ASSEMBLY
- FIRE DEPARTMENT CONNECTION
- FREESTANDING FIRE DEPARTMENT CONNECTION
- ROOF HYDRANT
- FREESTANDING ROOF HYDRANT
- FIRE PUMP TEST CONNECTION
- FREESTANDING FIRE PUMP TEST CONNECTION
- WATER MOTOR ALARM
- EXTERIOR ELECTRIC ALARM BELL
- ACV — ALARM CHECK VALVE ASSEMBLY
- DRY — DRY PIPE VALVE ASSEMBLY
- SIP — SINGLE INTERLOCK PREACTION VALVE ASSEMBLY
- DIP — DOUBLE INTERLOCK PREACTION VALVE ASSEMBLY
- FHC — FIRE HOSE CABINET
- FHV — FIRE HOSE VALVE CABINET
- FS F — FIRE SUPPRESSION RELEASING STATION/ MANUAL PULL STATION
- OH-1 — ORDINARY HAZARD GROUP 1
- OH-2 — ORDINARY HAZARD GROUP 2

FIRE PROTECTION LEGEND

**ALL EXISTING ITEMS TO BE SHOWN HALFTONE*

- FPD — FIRE PROTECTION - DRY
- FPO — FIRE PROTECTION - OTHER
- FPW — FIRE PROTECTION - WET
- FPDL — FIRE PROTECTION DRAIN
- CLDI — CEMENT LINED DI
- PIPING TO BE REMOVED (DEMOLISHED)
- UNDERGROUND PIPING
- HAZARD OUTLINE
- ZONE OUTLINE
- AREA OF WORK

GENERAL NOTES FIRE PROTECTION

1. SOME LEGEND SYMBOLS MAY NOT BE USED. SEE FLOOR PLAN DRAWINGS FOR APPLICABLE DEVICES.
2. THESE NOTES ARE GENERAL IN NATURE AND PERTAIN TO THE ENTIRE PROJECT UNLESS OTHERWISE NOTED AS SUCH ON AN INDIVIDUAL DRAWING.
3. PRIOR TO BIDDING, THE CONTRACTOR SHALL EXAMINE ALL PROJECT DRAWINGS AND SPECIFICATIONS TO DEVELOP A COMPLETE UNDERSTANDING OF THE PROJECT SCOPE. THE CONTRACTOR SHALL VISIT THE SITE AND VERIFY EXISTING CONDITIONS BEFORE BIDDING. FAILURE TO DO THIS WILL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITIES TO PERFORM ALL REQUIRED WORK. THE CONTRACTOR SHALL ADVISE THE PROFESSIONAL OF ANY DISCREPANCIES WHICH WILL AFFECT THE WORK REQUIRED.
4. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH ALL PERTINENT CODES AND REGULATIONS. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT IN ACCORDANCE WITH APPLICABLE CODES, MANUFACTURER'S WRITTEN INSTRUCTIONS, AND RECOGNIZED INDUSTRY PRACTICES. ALL EQUIPMENT, DEVICES, AND MATERIALS SHALL BE UL LISTED AND FM APPROVED.
5. THE CONTRACTOR IS RESPONSIBLE FOR SUBMITTING ALL REQUIRED INFORMATION TO THE AUTHORITY HAVING JURISDICTION TO OBTAIN THE NECESSARY PERMITS AND APPROVALS. ALL FEES ASSOCIATED WITH THIS SUBMISSION ARE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR SHALL COORDINATE ALL REQUIRED INSPECTIONS AND BE RESPONSIBLE FOR ALL FEES CHARGED BY THE AUTHORITY HAVING JURISDICTION FOR SUCH INSPECTIONS.
6. REFER TO THE ARCHITECTURAL PLANS FOR DIMENSIONS, ROOM FINISHES, FIRE WALLS, AND LIKE ITEMS. REFER TO THE STRUCTURAL DRAWINGS FOR STRUCTURAL MEMBERS. REFER TO OTHER TRADES PLANS TO UNDERSTAND THE EXTENT OF THEIR WORK AS REQUIRED.
7. DO NOT SCALE DRAWINGS. HOLD INDICATED DIMENSIONS WHERE SHOWN. RESOLVE ANY DISCREPANCIES WITH THE PROFESSIONAL PRIOR TO BEGINNING WORK.
8. PROVIDE A NEW COMPLETE SPRINKLER PIPING SYSTEM AS DESCRIBED IN THE SPECIFICATIONS AND AS SHOWN ON THE DRAWINGS. THE WORK COVERED UNDER THIS CONTRACT INCLUDES THE FURNISHING OF ALL EQUIPMENT, LABOR, AND MATERIALS TO PROVIDE A COMPLETE SYSTEM IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND REFERENCED CODES.
9. THE CONTRACTOR IS RESPONSIBLE FOR CONDUCTING A WATER FLOW TEST AND SUBMITTING THE INFORMATION TO THE PROFESSIONAL.
10. THE LAYOUT ON THE DRAWINGS IS DIAGRAMMATIC. THE CONTRACTOR SHALL COORDINATE WITH OTHER TRADES TO ELIMINATE CONFLICTS BETWEEN STRUCTURAL ELEMENTS AS WELL AS PIPING, DUCTWORK, ELECTRICAL, AND ARCHITECTURAL WORK. PROVIDE OFFSETS, TRANSITIONS IN PIPING, AND AUXILIARY LOW POINT DRAINS AS REQUIRED TO AVOID INTERFERENCES AT NO ADDITIONAL COST TO THE PROJECT.
11. THE DRAWINGS DO NOT SHOW ALL OF THE HEADS REQUIRED. ANY HEADS SHOWN ON THE DRAWINGS ARE INTENDED TO SHOW THE INTENT OF THE LAYOUT WITH RESPECT TO ARCHITECTURAL AND OTHER TRADES WORK. THE CONTRACTOR IS ULTIMATELY RESPONSIBLE FOR THE FINAL PLACEMENT OF ALL SPRINKLER HEADS IN ACCORDANCE WITH NFPA 13.
12. ALL PIPING SHALL BE CONCEALED IN AREAS WITH CEILINGS. PIPING SHALL BE EXPOSED IN AREAS WITHOUT CEILINGS. CONTRACTOR SHALL COORDINATE ROUTINGS WITHIN THESE EXPOSED AREAS TO PRODUCE A SYMMETRIC AND AESTHETIC PIPE AND HEAD LAYOUT.
13. THE AUTOMATIC SPRINKLER SYSTEMS SHALL BE HYDRAULICALLY DESIGNED IN ACCORDANCE WITH THE AREA/DENSITY METHOD REQUIREMENTS OF NFPA 13. THE ROOM DESIGN METHOD SHALL NOT BE USED. ALL C-FACTORS UTILIZED SHALL BE IN ACCORDANCE WITH NFPA 13.
14. ALL AREAS NOT OTHERWISE SHOWN AS A HIGHER HAZARD CLASS SHALL BE DESIGNATED AS LIGHT HAZARD.
15. ALL THREADED PIPE SHALL BE SCHEDULE 40. MINIMUM PIPE SIZE IS 1".
16. PIPE HANGERS SHALL COMPLY WITH IBC AND NFPA REQUIREMENTS FOR SEISMIC BRACING.
17. ALL EQUIPMENT SHALL BE COORDINATED WITH OTHER TRADES AND ARCHITECTURAL AND STRUCTURAL FEATURES.
18. FIRE STOPPING FOR ALL PIPES PENETRATING FIRE RATED WALLS AND SEALING OF SMOKE BARRIERS SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS, THE UL LISTING, AND THE SPECIFICATIONS TO MAINTAIN THE RATING.
19. CONTRACTOR SHALL REPLACE IN KIND ALL CEILING TILES DAMAGED DURING INSTALLATION AT NO ADDITIONAL COST.
20. CONTRACTOR SHALL REPAINT OR REFINISH ANY AREA IN KIND IF INSTALLATION DEFACES EXISTING WALLS, FLOORS, OR CEILINGS.
21. AFTER ALL EQUIPMENT IS INSTALLED, IT SHALL BE TESTED IN ACCORDANCE WITH NFPA 13 AND THE SPECIFICATIONS. EQUIPMENT NOT OPERATING CORRECTLY SHALL BE FIELD CORRECTED OR REPLACED. THE OWNER'S REPRESENTATIVE, PROFESSIONAL, AND AUTHORITY HAVING JURISDICTION SHALL BE PRESENT FOR THE TEST.

DEFERRED SUBMISSION

THE FIRE PROTECTION DRAWINGS AND SPECIFICATIONS ARE PERFORMANCE BASED. THE FIRE PROTECTION CONTRACTOR SHALL SUBMIT FOR REVIEW AND APPROVAL AS A DEFERRED SUBMITTAL TO THE LOCAL AHJ THREE (3) SETS OF SHOP DRAWINGS AND HYDRAULIC CALCULATIONS INDICATING THE SPRINKLER SYSTEM LAYOUT INCLUDING FINAL HEAD LOCATIONS. THE PROFESSIONAL SHALL REVIEW THE SHOP DRAWINGS AND HYDRAULIC CALCULATIONS PRIOR TO THE DEFERRED SUBMISSION TO THE AHJ AND PROVIDE NOTATION ON THE DRAWINGS INDICATING THEY WERE REVIEWED BY THE PROFESSIONAL. SUBMIT REVIEWED DRAWINGS AND CALCULATIONS WITH THE REQUIRED APPLICATION FEE PRIOR TO INSTALLATION.

FIRE PROTECTION SHEET INDEX

SCOPE OF WORK

THE SITE WATER SUPPLY DOES NOT CURRENTLY HAVE ADEQUATE FLOW OR PRESSURE TO SUPPORT AN NFPA 13 COMPLIANT SPRINKLER SYSTEM. THE OWNER IS WORKING ON WATER SYSTEM UPGRADES AND HAS DECIDED TO INSTALL THE SPRINKLER SYSTEM INFRASTRUCTURE DURING THE INITIAL CONSTRUCTION OF THE BUILDING. ONCE THE WATER SUPPLY SYSTEM HAS BEEN UPGRADED, SPRINKLER HEADS WILL BE INSTALLED AND THE SYSTEM AND THE SYSTEM WILL BE ACTIVATED.

THE INITIAL SCOPE OF WORK WILL INCLUDE THE INSTALLATION OF THE FIRE WATER SERVICE, BACK FLOW PREVENTER, RISER CHECK VALVE, MAIN PIPING, BRANCH LINES, AND FDC. SPRINKLER HEADS SHALL NOT BE INSTALLED AT THIS TIME. PLEASE NOTE SPRINKLER HEAD RQUIREMENTS ARE PROVIDED IN THE SPECIFICATION FOR REFERENCE TO SUPPORT THE INITIAL DESIGN AND INSTALLATION.

INITIAL PIPE SIZING SHALL INCLUDE A 6" INCOMING FIRE WATER SERVICE, 6" RISER, AND 4" MAINS. SIZE BRANCH LINES TO MINIMIZE FRICTION LOSS.

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SYMBOLS, LEGENDS, AND ABBREVIATIONS - FIRE PROTECTION

ARCHITECT
LIC#:

2 FP000

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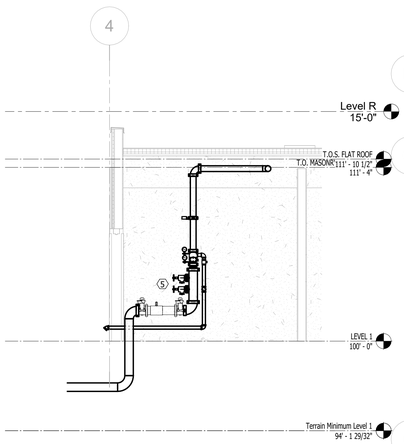
THE LINE SHOWN ABOVE IS EXACTLY ONE INCH LONG AT PLOTTED ORIGINAL PAGE SIZE

THE SQUARES ABOVE ARE SOLID WITH BLACK AND WHITE LAYERS, AS PRINTED DIRECTLY



2 FP201 FIRE SPRINKLER RISER SECTION
1/4" = 1'-0"

1 FP201 FIRST FLOOR CONSTRUCTION PLAN - FIRE PROTECTION
1/8" = 1'-0"

GENERAL NOTES:

1. PROVIDE A COMPLETE SPRINKLER SYSTEM PIPING LAYOUT THROUGHOUT THE BUILDING IN ACCORDANCE WITH THE REQUIREMENTS OF NFPA 13. SPRINKLER COVERAGE WILL BE ADDED IN A FUTURE PHASE. PROVIDE A PRELIMINARY SPRINKLER LAYOUT AND HYDRAULIC CALCULATION AT THE MOST HYDRAULICALLY DEMANDING AREA TO JUSTIFY THE PIPE SIZING.

KEYED NOTES:

1. ROUTE THE SPRINKLER LINE INTO THE ROOM ABOVE THE DOOR. DO NOT INSTALL PIPE OR HEADS ABOVE THE ELECTRICAL EQUIPMENT.
2. ROUTE THE SPRINKLER LINE INTO THE ROOM ABOVE THE DOOR. DO NOT INSTALL PIPE OR HEADS ABOVE THE IT EQUIPMENT.
3. LOCATE THE ELECTRIC ALARM BELL ABOVE THE FIRE DEPARTMENT CONNECTION.
4. PROVIDE DRY PENDENT SPRINKLER HEADS IN THE FREEZER AND TRASH AREA.
5. PROVIDE A 2 1/2" OUTLET TO FORWARD FLOW TEST THE BACKFLOW PREVENTER.
6. PROVIDE COMPLETE SPRINKLER COVERAGE WITH THE PARTITION OPEN AND CLOSED.
7. THE EXTERIOR CANOPY IS CONSTRUCTED OF NONCOMBUSTIBLE MATERIALS. SPRINKLERS ARE PERMITTED TO BE OMITTED FROM THE EXTERIOR CANOPY PER NFPA 13 - 8.15.7.2.

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FIRST FLOOR CONSTRUCTION PLAN - FIRE PROTECTION

TRUE & PROJECT NORTH

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2 Addendum #2 01/13/2026 Reviewed By:

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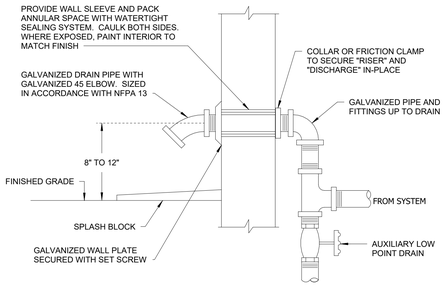
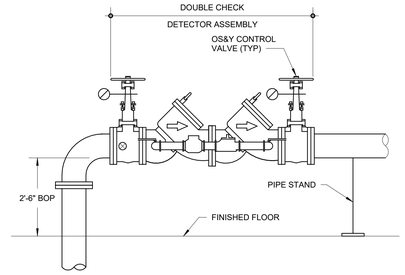


4 FP400 DRAIN DISCHARGE DETAIL WITH AUXILIARY LOW POINT DRAIN
NOT TO SCALE



1 FP400 BACKFLOW PREVENTOR ASSEMBLY DETAIL
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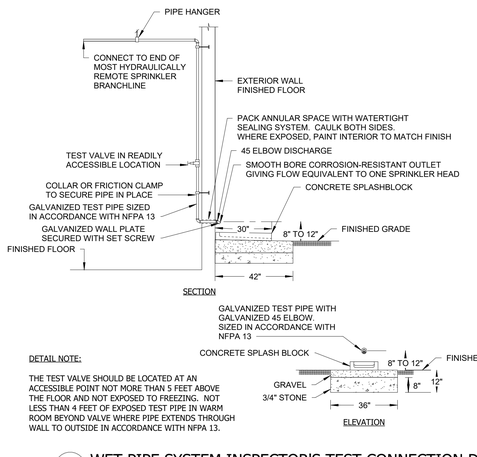
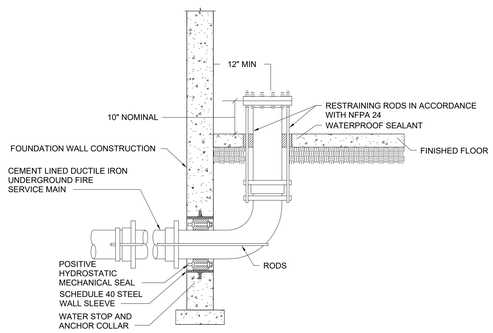


DETAIL NOTE:

THE TEST VALVE SHOULD BE LOCATED AT AN ACCESSIBLE POINT NOT MORE THAN 5 FEET ABOVE THE FLOOR AND NOT EXPOSED TO FREEZING. NOT LESS THAN 4 FEET OF EXPOSED TEST PIPE IN WARM ROOM BEYOND VALVE WHERE PIPE EXTENDS THROUGH WALL TO OUTSIDE IN ACCORDANCE WITH NFPA 13.

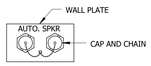
5 FP400 WET PIPE SYSTEM INSPECTOR'S TEST CONNECTION DETAIL
NOT TO SCALE



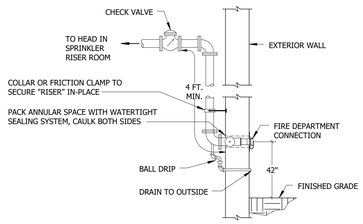
DETAIL NOTES:

1. THE FIRE PROTECTION CONTRACT SHALL BEGIN APPROXIMATELY 5 FEET FROM THE BUILDING.
2. WATER LINE SHALL PENETRATE THROUGH THE WALL ABOVE THE FOOTER.

2 FP400 FIRE WATER SERVICE - FOOTING WALL PENETRATION DETAIL
NOT TO SCALE



FLUSH MOUNTED INLETS



3 FP400 FIRE DEPARTMENT CONNECTION FLUSH MOUNT DETAIL
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DETAILS - FIRE PROTECTION

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