

ADDENDUM NO. 2

September 28, 2022

**TIPPECANOE VALLEY HIGH SCHOOL ADDITIONS & RENOVATIONS
Akron, IN 46910**

TO: ALL BIDDERS OF RECORD

This Addendum forms a part of and modifies the Bidding Requirements, Contract Forms, Contract Conditions, the Specifications, and the Drawings dated September 9, 2022 by Fanning Howey Associates, Inc. Acknowledge receipt of the Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to disqualification.

This Addendum consists of pages ADD 2-1 through ADD 2-2 and attached Addendum No. 2 from Fanning Howey Associates, Inc. dated September 27, 2022 and consisting of 2 pages, revised Specification Section 21 32 17 - Vertical Turbine Fire Pumps, Specification Section 33 13 13 - Facility Sanitary Sewers, and 9 drawings.

A. SPECIFICATION SECTION 00 00 20 - TABLE OF CONTENTS

1. Revise:

Change name of Specification Section 23 09 00 - Instrumentation and Control for HVAC to HVAC Direct Digital Controls.

B. SPECIFICATION SECTION 00 20 00 - INFORMATION AVAILABLE TO BIDDERS

- 1. Existing drawings and photos are available to bidders upon request. Send requests to Scott Rogers with The Skillman Corporation at srogers@skillman.com.**

C. SPECIFICATION SECTION 00 31 00 - BID FORM

1. Replace:

Specification Section 00 31 00 - Bid Form with the attached revised section.

D. SPECIFICATION SECTION 01 23 00 - ALTERNATES

1. Replace:

Specification Section 01 23 00 - Alternates with the attached revised section.

CONTRACTOR'S BID FOR PUBLIC WORKS FORM NO. 96

Format (Revised 2013)
(Amended for TVSC)

Tippecanoe Valley High School
Additions & Renovations
Tippecanoe Valley School Corporation
Akron, IN

PART I

(To be completed for all bids. Please type or print)

Date (month, day, year): _____

BIDDER (Firm) _____

Address _____ P.O. Box _____

City/State/Zip _____

Telephone Number: _____ Email Address: _____

Person to contact regarding this Bid _____

Pursuant to notices given, the undersigned offers to furnish labor and/or materials necessary to complete the public works project of:

Insert Category No. (s) and Name(s)

Of public works project, ***Tippecanoe Valley High School Additions & Renovations***, in accordance with Plans and Specifications prepared by ***Fanning Howey Associates, Inc., 350 E. New York St., #300, Indianapolis, IN 46204***, as follows:

BASE BID

For the sum of _____
(Sum in words)

_____ DOLLARS (\$_____)
(Sum in figures)

The undersigned acknowledges receipt of the following Addenda:

Receipt of Addenda No. (s) _____

PROPOSAL TIME

Bidder agrees that this Bid shall remain in force for a period of sixty (60) consecutive calendar days from the due date, and Bids may be accepted or rejected during this period. Bids not accepted within said sixty (60) consecutive calendar days shall be deemed rejected.

Attended pre-bid conference YES _____ NO _____

Has visited the jobsite YES _____ NO _____

The Bidder has reviewed the Guideline Schedule in Section 01 32 00 and the intent
Of the schedule can be met.

YES _____ NO _____

Bidder has included their Written Drug Testing Plan that covers all employees of the bidder who will perform work on the public work project and meets or exceeds the requirements set in IC 4-13-18-5 or IC 4-13-18-6.

YES _____ NO _____

The Skillman Corporation's diversity initiative is to create a program to encourage, assist and measure the active participation of Minority- Owned, Women-Owned, Veteran – Owned and Disabled Individual-Owned Businesses. The Program is to ensure that MWVDBEs are provided full and equal opportunity to participate in all Skillman Corporation's Projects.

Bidder has included:	DBE: YES _____ %	NO _____
	MBE: YES _____ %	NO _____
	WBE: YES _____ %	NO _____
	VBE: YES _____ %	NO _____

The undersigned further agrees to furnish a bond or certified check with this Bid for an amount specified in the Notice to Bidders. If Alternate Bids apply, submit a proposal for each in accordance with the Plans and Specifications.

If additional units of material included in the contract are needed, the cost of units must be the same as that shown in the original contract if accepted by the governmental unit. If the bid is to be awarded on a unit bases, the itemization of the units shall be shown on a separate attachment.

The contractor and his subcontractors, if any, shall not discriminate against or intimidate any employee, or applicant for employment, to be employed in the performance of this contract, with respect to any matter directly or indirectly related to employment because of race, religion, color, sex, national origin, or ancestry. Breach of this covenant may be regarded as a material breach of the contract.

CERTIFICATION OF USE OF UNITED STATES STEEL PRODUCTS
(if applicable)

I, the undersigned bidder, or agent as a contractor on a public works project, understand my statutory obligation to use steel products made in the United States (I.C. 5-16-8-2). I hereby certify that I and all subcontractors employed by me for this project will use U.S. steel on this project if awarded. I understand that violations hereunder may result in forfeiture of contractual payments.

ALTERNATE BIDS

A blank entry or an entry of "No Bid", "N/A", or similar entry on any Alternate will cause the bid to be rejected as non-responsive only if that Alternate is selected. If no change in the bid amount is required, indicate "No Change".

****MARK "ADD" OR "DEDUCT" FOR EACH ALTERNATE****

Alternate Bid No. 1 - New Field House & Renovation of Existing Field House

Change the Base Bid the sum of _____
(sum in words)

_____ DOLLARS (\$_____) ADD
(sum in figures) DEDUCT

Alternate Bid No. 2 - Ag Renovation

Change the Base Bid the sum of _____
(sum in words)

_____ DOLLARS (\$_____) ADD
(sum in figures) DEDUCT

Alternate Bid No. 3 - Multi-Purpose Renovation

Change the Base Bid the sum of _____
(sum in words)

_____ DOLLARS (\$_____) ADD
(sum in figures) DEDUCT

Alternate Bid No. 4 - Skylight

Change the Base Bid the sum of _____
(sum in words)

_____ DOLLARS (\$_____) ADD
(sum in figures) DEDUCT

Alternate Bid No. 5 - Decorative Resinous Flooring in New Locker Room Areas

Change the Base Bid the sum of _____
(sum in words)

_____ DOLLARS (\$_____) ADD
(sum in figures) DEDUCT

Alternate Bid No. 6 - Wall Cabinets in New Locker Rooms

Change the Base Bid the sum of _____
(sum in words)

_____ DOLLARS (\$_____) ADD
(sum in figures) DEDUCT

Alternate Bid No. 7 - Metal Wall Panels at Existing Exterior Ribbed Pre-Cast

Change the Base Bid the sum of _____
(sum in words)

_____ DOLLARS (\$_____) ADD
(sum in figures) DEDUCT

Alternate Bid No. 8 - Fire Protection Storage System

Change the Base Bid the sum of _____
(sum in words)

_____ DOLLARS (\$_____) ADD
(sum in figures) DEDUCT

PART II

(For projects of \$150,000 or more – IC 36-1-12-4)

These statements to be submitted under oath by each bidder with and as a part of his bid. (Attach additional pages for each section as needed.)

SECTION I EXPERIENCE QUESTIONNAIRE

1. What public works projects has your organization completed for the period of one (1) year prior to the date of the current bid?

Contract Amount	Class of Work	Completion Date	Name and Address of Owner

2. What public works projects are now in process of construction by your organization?

Contract Amount	Class of Work	Completion Date	Name and Address of Owner

3. Have you ever failed to complete any work awarded to you?_____If so, where and why?

4. List references from private firms for which you have performed work.

SECTION II PLAN AND EQUIPMENT QUESTIONNAIRE

1. Explain your plan or layout for performing proposed Work. (Examples could include a narrative of when you could begin, complete the project, number of workers, etc. and any other information which you believe would enable the governmental unit to consider your bid.)

2. Please list the names and addresses of all subcontractors (i.e. persons or firms outside your own firm who have performed part of the work) that you have used on public works projects during the past five (5) years along with a brief description of the work done by each subcontractor.

3. If you intend to sublet any portion of the work, state the name and addresses of each subcontractor, equipment to be used by the subcontractor, and whether you will require a bond. However, if you are unable to currently provide a listing, please understand a listing must be provided prior to contract approval. Until the completion of the proposed project, you are under a continuing obligation to immediately notify the governmental unit in the event that you subsequently determine that you will use a subcontractor on the proposed project.

4. What equipment do you have available to use for the proposed Project? Any equipment used by subcontractors may also be required to be listed by the governmental unit.

5. Have you into contracts or received offers for all materials which substantiate the prices used in preparing your proposal? If not, please explain the rationale used which corroborate the process listed.

SECTION III CONTRACTOR'S FINANCIAL STATEMENT

Attachment of Bidder's financial statement is mandatory. Any Bid submitted without said financial statement as required by statute shall thereby be rendered invalid. The financial statement provided hereunder to the governing body awarding the Contract must be specific enough in detail so that said governing body can make a proper determination of the Bidder's capability for completing the Project if awarded.

SECTION IV CONTRACTOR NON-COLLUSION AFFIDAVIT

The undersigned Bidder or agent, being duly sworn on oath, says that he has not, nor has any other member, representative, or agent of the firm, company, corporation or partnership represented by him, entered into any combination, collusion or agreement with any person relative to the price to be bid by anyone at such letting nor to prevent any person from bidding nor to induce anyone to refrain from bidding, and that this Bid is made without reference to any other bid and without any agreement, understanding or combination with any other person in reference to such bidding.

He further says that no person or persons, firms, or corporations has, have, or will receive directly or indirectly, any rebate, fee, gift, commission, or thing of value on account of such contract.

SECTION V OATH AND AFFIRMATION

I HEREBY AFFIRM UNDER THE PENALTIES OF PERJURY THAT THE FACTS AND INFORMATION CONTAINED IN THE FOREGOING BID FOR PUBLIC WORKS ARE TRUE AND CORRECT

Dated at _____ this _____ day of _____, 20

(Name of Organization)

By

(Title of Person Signing)

ACKNOWLEDGEMENT

STATE OF _____)
) SS:
COUNTY OF _____)

Before me, a Notary Public, personally appeared the above-named

Swore that the statements contained in the foregoing document are true and correct.

Subscribed and sworn to before me this _____ day of _____,

(Title)

Notary Public

My Commission Expires: _____

County of Residence: _____

END OF SECTION 00 31 00

SECTION 01 23 00 - ALTERNATES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including amended General Conditions and other Division 1 Specification Sections, apply to work of this Section.

1.02 PURPOSE

- A. The Bids for the Alternates described herein are required in order for the Owner to obtain information necessary for the proper consideration of the Project in its entirety.

1.03 ALTERNATES

- A. Definitions: Alternates are defined as alternate products, materials, equipment, installations or systems for the Work, which may, at Owner's option and under terms established by Instructions to Bidders, be selected and recorded in the Owner-Contractor Agreement to either supplement or displace corresponding basic requirements of Contract Documents. Alternates may or may not substantially change scope and general character of the Work; and must not be confused with "allowances", "unit prices", "change orders", "substitutions", and other similar provisions.

1.04 SCHEDULE OF ALTERNATES

- A. ALTERNATE NO. 1 (Field House): State the cost to provide all new work associated with the new Field House (Room A101) and renovation of the existing Field House (Rooms B111 and B112). **Base Bid:** No addition to the existing Field House or renovation of existing Field House.
- B. ALTERNATE NO. 2 (Agriculture Renovation): State the cost to provide all new work and renovation associated with Agriculture Renovation as indicated in Unit B drawings. This is all work shown in Room Numbers B101 through B111. **Base Bid:** No renovations of existing area, to remain as is.
- C. ALTERNATE NO. 3 (Multi-Purpose Renovation): State the cost to provide all new work and renovation associated with Multi-Purpose Renovation as indicated in Unit F drawings. This is all work shown in Room Numbers F119 through F135, F137 and F138. **Base Bid:** No renovations of existing area, to remain as is.

- D. ALTERNATE NO. 4 (Skylight): State the cost to provide the skylight and associated bulkhead and structure in the Student Commons (Room E106) as indicated as alternate per keynote No. 11 on the Reflected Ceiling Plans and as detailed on drawing sheet A9.08. **Base Bid:** Lay-in Acoustical Ceiling and no perimeter Gypsum Wallboard perimeter bulkhead.
- E. ALTERNATE NO. 5 (DRF): State the cost to provide Decorative Resinous Flooring (DRF) floor and base in the new Locker Room Areas (Rooms C102, C103, C110, and C111) as indicated as alternate per keynote No. 8 on the Floor Finish Plans. **Base Bid:** Floor Sealer (FS-1) and resilient base shall be Base Bid.
- F. ALTERNATE NO. 6 (Wall Cabinets): State the cost to provide the wall cabinets above the lockers in the new Locker Room Areas (Rooms C102, C110, and F124) as indicated as alternate per keynote Nos. 49, 50, and 51 on the Equipment Plans. **Base Bid:** No wall cabinets.
- G. ALTERNATE NO. 7 (Metal Wall Panels): State the cost to provide the metal wall panels to enclose the existing precast ribs at the existing exterior ribbed precast, as indicated as alternate and detailed on drawing sheet A0.02. **Base Bid:** Existing precast ribs to remain as is.
- H. ALTERNATE NO. 8 (Fire Protection): State the cost to provide alternative to storage system as indicated as Alternate within Specification Section 21 32 17 and detailed on the Fire Suppression and Electrical Drawings. **Base Bid:** Provide specified system.

PART 2 - PRODUCTS, PART 3 - EXECUTION (Not Used)

END OF SECTION 01 23 00

ADDENDUM NO. 2

Tippecanoe Valley High School Additions and Renovations

Project No. 220158.00

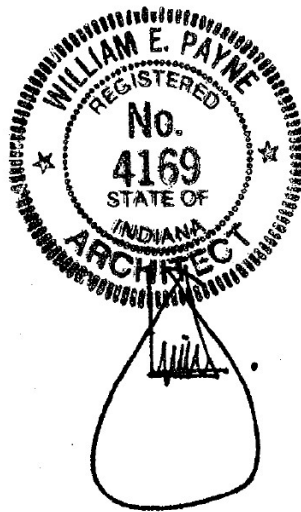
Tippecanoe Valley School Corporation
Akron, Indiana

Index of Contents

Addendum No. 2, 8 items, 2 pages
Revised Project Manual Sections: 21 32 17 – Vertical Turbine Fire Pumps, and
33 13 13 – Facility Sanitary Sewers
New Drawing Sheet: A1.07
Revised Drawing Sheets – Addendum No. 1: FP.02, FP.03 and FP2.01
Revised Drawing Sheets: E5.2, E5.4, E6.1, E7.1 and E8.1

Date: September 27, 2022

FANNING/HOWEY ASSOCIATES, INC.
ARCHITECTS/ENGINEERS/CONSULTANTS



William E. Payne, AIA
Indiana Registration No. 4169

TO: ALL BIDDERS OF RECORD

ADDENDUM NO. 2 to Drawings and Project Manual, dated September 6, 2022 for Tippecanoe Valley High School Additions and Renovations for Tippecanoe Valley School Corporation, 8343 South State Road 19, Akron, Indiana 46910; as prepared by Fanning/Howey Associates, Inc., Indianapolis, Indiana.
This Addendum shall hereby be and become a part of the Contract Documents the same as if originally bound thereto.

The following clarifications, amendments, additions, revisions, changes, and modifications change the original Contract Documents only in the amount and to the extent hereinafter specified in this Addendum.

Each bidder shall acknowledge receipt of this Addendum in his proposal or bid.

NOTE: Bidders are responsible for becoming familiar with every item of this Addendum. (This includes miscellaneous items at the very end of this Addendum.)

RE: ALL BIDDERS

ITEM NO. 1. PROJECT MANUAL, TABLE OF CONTENTS

- A. Book 3, Page 00 01 10-1, DIVISION 23: Change name of Section 23 09 00 to "HVAC Direct Digital Controls".

ITEM NO. 2. REVISED PROJECT MANUAL SECTIONS

- A. Sections 21 32 17 – Vertical Turbine Fire Pumps and 33 13 13 – Facility Sanitary Sewers have been revised, dated 9/27/22, and are included with and hereby made a part of this Addendum.

ITEM NO. 3. ACCEPTABLE MANUFACTURERS

The following manufacturers are to be considered acceptable manufacturers (suppliers and fabricators) for the Sections of the Specifications listed. Listed manufacturers are required to bid on products equal in type and design, size, function, and quality to that originally specified. Final decision as to equality of products specified versus those proposed shall be made by the Architect.

Section 13 15 00 – Competition Swimming Pool and Equipment

- Aqua Revival, Elkhorn, Wisconsin
- Filtrex, Wayne, New Jersey
- Paddock, Rock Hill, South Carolina
- Neptune Benson, Coventry, Rhode Island

Section 13 15 60 – Aquatic Timing Systems and Display Systems

- Daktronics, Brookings, South Dakota

ITEM NO. 4. NEW DRAWING SHEETS

- A. Drawing Sheet No's: A1.07 – Unit F Base Bid, dated 9/27/2022 is included with and hereby made a part of this Addendum.

ITEM NO. 5. REVISED DRAWING SHEETS – ADDENDUM NO. 1

- A. Drawing Sheets: FP.02, FP.03 and FP2.01 have been revised, dated 9/27/22 and are included with and hereby made a part of this Addendum. These Drawings supersede the original documents.

ITEM NO. 6. REVISED DRAWING SHEETS

- A. Drawing Sheets: E5.2, E5.4, E6.1, E7.1 and E8.1 have been revised, dated 9/27/22 and are included with and hereby made a part of this Addendum. These Drawings supersede the original documents.

ITEM NO. 7. DRAWING SHEETS INDEX A and INDEX B

- A. Sheet Index: Add Drawing Sheet A1.07 – Unit F Base Bid
- B. Sheet Index: GD1.1, G1.1, G2.1, G3.1, SU1.0 and SU1.1: Change the wording “BASE BID”, to “ALTERNATE #1”.
- C. Sheet Index: GD1.2, G1.2, G2.2, G3.01, SU1.01 and SU1.2: Change the wording “BID ALTERNATE #1”, to “BASE BID”.

ITEM NO. 8. DRAWING SHEET NO. S2.05 – UNITS D & E ROOF FRAMING

- A. E106, Change the wording “ALTERNATE NO. 6” to “ALTERNATE NO. 4” at the Skylight Framing.

END OF ADDENDUM

SECTION 21 32 17 – VERTICAL TURBINE FIRE PUMPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes vertical turbine fire pumps and the following:
 - 1. Fire-pump controllers.
 - 2. Fire-pump accessories and specialties.
 - 3. Pressure-maintenance pumps, controllers, accessories, and specialties.
 - 4. Alarm panels.

1.3 PERFORMANCE REQUIREMENTS

- A. Pump, Equipment, Accessory, Specialty, and Piping Pressure Rating: 300 PSIG (2068-kPa) minimum working-pressure rating, unless otherwise indicated.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, certified pump performance curves with each selection point indicated, operating characteristics, and furnished accessories and specialties for each fire pump and pressure-maintenance pump.
- B. Shop Drawings: For fire pumps, drivers, and right-angle gear drives; fire-pump controllers; fire-pump accessories and specialties; pressure-maintenance pumps; pressure-maintenance-pump controllers; and pressure-maintenance-pump accessories and specialties. Include plans, elevations, sections, details, and attachments to other work.
 - 1. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - 2. Wiring Diagrams: Power, signal, and control wiring.

1.5 INFORMATIONAL/QUALITY ASSURANCE/CONTROL SUBMITTALS

- A. Manufacturer Seismic Qualification Certification: Submit certification that fire pumps and drivers and fire-pump controllers, pressure-maintenance pumps, accessories, and specialties will withstand seismic forces defined in Division 21 Section "Vibration and Seismic Controls for Fire-Suppression Piping and Equipment." Include the following:
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
 - b. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- B. Product Certificates: For each type of fire pump and fire-pump controller, signed by product manufacturer.

C. Source quality-control test reports.

D. Field quality-control test reports.

1.6 CLOSEOUT DOCUMENTS

A. General: Closeout Submittals are to be submitted with O and M Manuals only. Do not submit with other ACTION and INFORMATIONAL Submittals:

1. Operation and Maintenance Data: For fire pumps and drivers, pressure-maintenance pumps, controllers, accessories and specialties, alarms, and flowmeter systems to include in emergency, operation, and maintenance manuals.

1.7 QUALITY ASSURANCE

A. Source Limitations: Obtain fire pumps, drives, pressure-maintenance pumps, and controllers through one source from a single manufacturer for each type of equipment.

B. Product Options: Drawings indicate size, profiles, and dimensional requirements of fire pumps, pressure-maintenance pumps, and controllers and are based on specific systems indicated. Refer to Division 01 Section "Product Requirements."

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. Comply with standards of authorities having jurisdiction pertaining to materials, hose threads, and installation.

E. Comply with NFPA 20, "Stationary Pumps for Fire Protection," for fire pumps, drivers, controllers, accessories, and their installation.

F. Comply with NFPA 72, "National Fire Alarm and Signaling Code Handbook" for fire pump alarms and supervisory requirements.

1.8 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

B. Coordinate size, location and installation of wet wells or water storage tanks.

C. Coordinate primary and emergency power requirements and locations with Division 26 Contractor.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.
 - a. Armstrong (Design Basis)
 - b. Peerless Pump
 - c. Patterson

2.2 VERTICAL TURBINE FIRE PUMP

- A. Contractor shall supply the pumps furnished for fire protection service with the specified drivers, controls and pump accessory items. The pump, driver and control will be Underwriters Laboratories (UL) Listed(x) Factory Mutual Research Corporation (FM) Approved for fire protection service. The pumping equipment will be installed as recommended in the National Fire Protection Association (NFPA) Pamphlet 20, Standard for the Installation of Centrifugal Fire Pumps.
- B. The fire pump shall be designed to deliver 750 US gpm at a total differential pressure of 150 psi (381' TDH). The fire pump shall also be capable of delivering not less than 150% of rated flow at not less than 65% of rated head. A Armstrong model 8X12M VTF (Base Bid, model to be TEFC NEMA rated for exterior service under fire pump alternate) will be furnished with driver, controllers and accessories as detailed in this specification and per drawings. The pump manufacturer will have unit responsibility for the proper operation of the complete unit assembly as indicated by field acceptance tests. Fire Pump Motor shall be selected to not operate in the motor safety factor through
- C. The fire pump column assembly shall be of component quantity and depth adequate to set suction bowl/strainer inlet elevation per drawings. Minimum 12" above the bottom of wet well or tank.
- D. Manufacturer's Factory Tests: Each individual pump shall be hydrostatically tested and run tested prior to shipment. The pump will be hydrostatically tested at a pressure of not less than one and one-half times the no flow (shut off) head of the pump's maximum diameter impeller plus the maximum allowable suction head but in no case less than 250 psig.
- E. Field Acceptance Test: A field acceptance performance test shall be conducted upon completion of pump installation. The test will be made by flowing water through "Hose Monster" calibrated nozzles with a remote reading "Monster Tester" assembly. The test will be conducted as recommended in NFPA Pamphlet 20 by the pump manufacturer's representative and the installing contractor in the presence of the authority having jurisdiction and with that authority's final approval and acceptance. Failure to submit documentation of factory and field tests will be just cause for equipment rejection.
- F. Fittings: The pump manufacturer shall furnish piping accessory items for the pump installation which will adapt the pump connections to the fire protection system and test connection as follows. Fittings subjected to pump discharge pressure shall be ANSI (300) pound rating.
1. Discharge Flange, Check Valve, Indicating Type Shut Off Valve.
 2. Polished chrome inline hose valve test head
 3. Hose valves with caps and chains
 4. Automatic air release valve
 5. Hose valve head drain valve
 6. Discharge pressure gauges
 7. Casing Relief Valve.
 8. Pressure switch and drain piping.
 9. Fire Pump Test Discharge Flow Meter and Associated Valves and Piping.
- G. **Base Bid** Electric Motor: The pump driver shall be vertical shaft, non reversing, NEMA Type 1 enclosure with Class B or F insulation, 1.15 service factor, UL Listed for Fire Pump Service, rated 100 HP, 460 volts, 3 phase, 60 hertz. **Alternate fire pump TEFC NEMA rated with equal electrical characteristics.**
- H. **Base Bid** Electric Fire Pump Controllers equal to Firetrol Model FTA1900 Solid State Soft Start/Stop Type With Integrally Mounted And Wired Automatic Transfer Switch For Emergency Generator Power Source Application. **Alternate Electric Fire Pump Controller equal to base bid with NEMA 4X stainless steel enclosure and cabinet heater.**

- I. The main fire pump controller shall be factory assembled and wired with a power transfer switch listed by Underwriters' Laboratories, Inc. for transfer switch and fire pump service. The power transfer switch and fire pump controller shall be factory assembled, wired and tested as a single unit and shall conform to all requirements of the latest edition of NFPA20, Centrifugal Fire Pumps and NFPA 70, National Electrical Code. The controller shall be listed by Underwriters Laboratories, Inc., in accordance with UL218, Standard for Fire Pump Controllers, CSA, and Canadian Standards Association CSA-C22.2, Standard for Industrial Control Equipment (cULus), approved by Factory Mutual and approved by the City of New York for fire pump service.
- J. Starting Method
 - 1. The controller shall be of the combined manual and automatic type designed for Solid State Soft (REDUCED VOLTAGE) Starting of the fire pump motor having the horsepower, volt-age, phase and frequency rating shown on the plans and drawings. The controller components shall be housed in a NEMA Type 12 (IEC IP11) drip-proof, wall mounted enclosure.
- K. Withstand Ratings (Short Circuit Current Ratings)
 - 1. All controller components shall be front mounted, wired and front accessible for maintenance. The minimum withstand rating of the controllers shall not be less than 100,000 Amps RMS Symmetrical at 600 Volts.
 - 2. Isolation Switch and Circuit Breaker
 - a. The controller shall include a motor rated combination isolating disconnect switch/circuit breaker, mechanically interlocked and operated with a single, externally mounted handle. When moving the handle from OFF to ON, the interlocking mechanism shall sequence the isolating disconnect switch ON first, and then the circuit breaker. When the handle is moved from ON to OFF, the interlocking mechanism shall sequence the circuit breaker OFF first, and then the isolating disconnect switch.
- L. The isolating disconnect switch/circuit breaker shall be mechanically interlocked so that the enclosure door cannot be opened with the handle in the ON position except by a hidden tool operated defeater mechanism. The isolating disconnect switch/circuit breaker shall be capable of being padlocked in the OFF position for installation and maintenance safety, and shall also be capable of being locked in the ON position without affecting the tripping characteristics of the circuit breaker. The controller door shall have a locking type handle and three-point cam and roller vault type hardware. The circuit breaker trip curve adjustment shall be factory set, tested and sealed for the full load amps of the connected motor. The circuit breaker shall be capable of being field tested to verify actual pick up, locked rotor, and instantaneous trip points after field installation without disturbing incoming line and load conductors.
- M. Operator Interface
 - 1. The fire pump controller shall feature an operator interface with user keypad. The interface shall monitor and display motor operating conditions, including all alarms, events, and pressure conditions. All alarms, events, and pressure conditions shall be displayed with a time and date stamp. The display shall be a 2-line, 20-character, vacuum fluorescent, dot matrix type designed to allow easy viewing from all angles and in all light conditions. The display and interface shall be NEMA rated for Type 2, 3R, 4, 4X, and 12 protection and shall be fully accessible without opening the controller door. The display and user interface shall utilize multiple levels of password protection for system security. A minimum of 3 password levels shall be provided. The display shall be capable of being programmed for any language.
 - a. Ammeter/Voltmeter
 - 1) The fire pump controller operator interface shall be capable of displaying true RMS digital motor voltage and current measurements for all three phases simultaneously. Displays requiring push-button and selector switches to toggle between phases or current and voltage shall not be accepted.

- 2) Voltage and current shall be measured by True RMS technology to provide the most accurate measurement for all sine waves, including non-sinusoidal waveforms. Average responding meters will not be accepted.

2.3 DIGITAL STATUS/ALARM MESSAGES

- A. The digital display shall indicate text messages for the status and alarm conditions of:
 1. Motor On
 2. Sequential Start Time
 3. Minimum Run Time/Off Delay Time
 4. Local Start
 5. Remote Start
 6. Fail to Start
 7. System Battery Low
 8. Under Voltage
 9. Over Voltage
 10. Locked Rotor Trip
 11. Low Suction Pressure
 12. Over Frequency
 13. Emergency Start
 14. Motor Over 320
 15. Drive Not Installed
 16. Motor Overload
 17. Disk Error
 18. Printer Error
 19. Disk Near Full
 20. Pressure Error
- B. The Sequential Start Timer and Minimum Run Timer/ Off Delay Timer shall be displayed as numeric values reflecting the value of the remaining time.
 1. LED Visual Indicators
 2. LED indicators, visible with the door closed, shall indicate:
 - a. Power On
 - b. Emerg. Isolating Switch Open
 - c. Pump Running
 - d. Low System Pressure
 - e. Alarm
 - f. Transfer Switch Normal
 - g. Deluge Open
 - h. Transfer Switch Emergency
 - i. Phase Failure
 - j. Phase Reversal
 - k. Interlock On
 - l. (CTS suction pressure control)
 3. In addition to the standard alarm contacts required by NFPA20, the digital display module shall have N.O. and N.C. contacts for remote indications of any digitally displayed alarm and N.O. and N.C. contacts for remote indication up to EIGHT, specified, programmable alarm.

2.4 DATA LOGGING

- A. The digital display shall monitor the system and log the following data:
 1. Motor Calls/Starts
 2. Elapsed Motor Run Time
 3. Last Trip Currents
 4. Elapsed Power On Time
 5. Last Breaker Trip
 6. Maximum Run Currents
 7. Minimum Voltages
 8. Minimum Run Currents

9. Maximum Voltages
10. Last Motor Run Time
11. Last Phase Failure
12. Last Start Currents
13. Last Phase Reversal
14. Min/Max Frequency
15. Min/Max Pressure

2.5 EVENT RECORDING

- A. Memory - The controller shall record all operational and alarm events to system memory. All events shall be time and date stamped and include an index number- The system memory shall have the capability of storing 3000 events and allow the user access to the event log via the user interface. The user shall have the ability to scroll through the stored messages in groups of 1, 10, or 100.
- B. Flash Drive - The controller shall include a USB port to save all operational and alarm events. The floppy disk drive shall have the ability to store up to 1 year's worth of data (under normal operating conditions) in individual monthly files. Each event shall be time and date stamped. The controller shall also have the capability to save settings and values to USB port through the user interface.
 1. Communications - The controller shall feature two independent communications ports to allow connectivity to computers, modems, or building management systems.
 2. An Ethernet Adapter Communications Module Shall Be Included in the fire pump controller for remote monitoring of alarm conditions.

2.6 SOLID STATE PRESSURE TRANSDUCER

- A. The controller shall be supplied with a solid state pressure transducer with a range of 0-300 psi (0-20.7 bar) ± 1 psi. The solid state pressure switch shall be used for both display of the system pressure and control of the fire pump controller. Systems using analog pressure devices or mercury switches for operational control will not be accepted.
 1. The START, STOP and SYSTEM PRESSURE shall be digitally displayed and adjustable through the user interface. The pressure transducer shall be mounted inside the controller to prevent accidental damage. The pressure transducer shall be directly pipe mounted to a bulkhead pipe coupling without any other supporting members. Field connections shall be made externally at the controller coupling to pre-vent distortion of the pressure switch element and mechanism.
 2. Operation
 - a. A digitally set On Delay (Sequential Start) timer shall be provided as standard. Upon a call to start, the user interface shall display a message indicating the remaining time value of the On Delay timer.
- B. The controller shall be field programmable for manual stop automatic stop. If set for automatic stop-ping, the controller shall allow the user to select either a Minimum Run Timer or an Off Delay Timer. Both timers shall be programmable through the user interface.
- C. The controller shall be fully programmable to allow up to 8 custom alarm messages to be displayed on the user interface.
- D. A nonadjustable restart delay timer shall be provided to allow the residual voltage of the motor to decay prior to restarting the motor. At least 2 seconds, but no more than 3 seconds, shall elapse between stopping and restarting the pump motor.
- E. A weekly test timer shall be provided as standard. The controller shall have the ability to program the time, date, and frequency of the weekly test. In addition, the controller shall have the capability to display a preventative maintenance message for a service inspection. The message text and frequency of occurrence shall be programmable through the user interface.

- F. A Lamp Test feature shall be included. The user interface shall also have the ability to display the status of the system inputs and outputs.
- G. The controller shall not start the fire pump motor under a single-phase condition. If the motor is already running when a phase loss occurs, the controller shall continue to run the motor, but still display a Phase Failure alarm.

2.7 POWER TRANSFER SWITCH FOR GENERATOR EMERGENCY POWER SOURCE

- A. The **Base Bid** power transfer switch shall be housed within the fire pump controller enclosure or in a NEMA Type 12 (IEC IP11) drip-proof enclosure attached directly to the fire pump controller. **The Alternate ATS shall be housed in NEMA 4X enclosure matching fire pump controller.** Where the power transfer switch is provided in an attached enclosure, the enclosures shall be fitted so that the assembly constitutes a single unit. The fire pump controller/power transfer switch shall be factory assembled, wired and tested as a unit prior to shipment.
 - 1. The power transfer switch shall include a motor rated combination isolating disconnect switch/circuit breaker, mechanically interlocked and operated with a single, externally mounted handle. When moving the handle from OFF to ON, the interlocking mechanism shall sequence the isolating disconnect switch closed first, and then the circuit breaker. When the handle is moved from ON to OFF, the interlocking mechanism shall sequence the circuit breaker open first, and then the isolating disconnect switch.
 - 2. The isolating disconnect switch/circuit breaker shall be mechanically interlocked so that the enclosure door cannot be opened with the handle in the ON position except by a hidden tool operated defeater mechanism. The isolating disconnect switch/circuit breaker shall be capable of being padlocked in the OFF position for installation and maintenance safety, and shall also be capable of being locked in the ON position without affecting the tripping characteristics of the circuit breaker. The enclosure door shall have a locking type handle and three-point cam and roller type vault hardware.
 - 3. The circuit breaker trip curve adjustment shall be factory set, tested and sealed for the connected full load amps of the motor.
 - 4. The fire pump controller/power transfer switch shall have data logging capability for historical operation recording and to aid in annual test, service and trouble shooting. The data logging shall be accessible by front mounted interface panel and also by saving the information to supplied USB port. The USB port file shall be in text (.txt) format and easily readable by most common text editing or word processing software. The circuit breaker shall be capable of being field tested to verify actual pick up, locked rotor, and instantaneous trip points after field installation without disturbing incoming line and load conductors.
 - 5. The transfer switch circuitry shall be capable of sensing both the normal power source and the emergency power source. The normal power source pickup shall be set at 95 nominal voltage. The emergency power source shall be set to pick up at 90 nominal voltage and 95 nominal frequency. All voltage sensing, frequency sensing, and time delays shall be field adjustable to accommodate individual installation requirements. The transfer signal shall be delayed for one second, delaying the transfer signal so as to compensate for momentary, normal power outages. An automatic delay of three seconds shall be provided upon transfer to or from the emergency power source to allow the motor to slow sufficiently, preventing line disturbances that could trip either the transfer switch or fire pump circuit breakers.
 - 6. The controller shall have TRANSFER SWITCH NORMAL, TRANSFER SWITCH EMERGENCY and EMERGENCY ISOLATING SWITCH OFF LED's, TEST and TRANSFER BYPASS switches, an audible alarm device and SILENCEALARM pushbutton mounted on the flange of the enclosure. To aid servicing, no indicating lights or switch devices shall be mounted on the enclosure door. Auxiliary contacts shall be provided and wired to terminals to indicate the transfer switch position. The transfer switch shall be electrically operated and mechanically held, and shall be capable of being operated by a manual transfer mechanism located on the switch.
 - 7. The transfer switch shall be a Firetrol FTA900 for normal utility power and alternate Generator emergency power.
 - 8. The **Base Bid** controller shall be like Firetrol Model FTA1900AM75B-TS. **The alternate controller shall be like the Tornatech GPx series.**

- B. Jockey Pump and Controller: Contractor shall furnish and install pump and controller as indicated on the drawings. Pump shall be submersible type pump Rated 15 GPM at 15 PSI above main fire pump driven by a 2 HP 460 Volt 3 phase 60 Hertz ODP motor. Jockey pump controller shall be a Firetrol FTA505 jockey pump controller rated for jockey pump electrical characteristics.

2.8 ELECTRICAL SECTION

- A. The assembly shall be factory and field wired in accordance with NFPA 20 and the NEC. All wiring for (AC) alternating current within the skid limits shall be in rigid and / or with liquid - tight flexible conduit.
- B. Isolation Valves for Fire Pumps: Shall be provided with supervisory tamper switches. Wiring to a remote monitor by others.

2.9 WIRING ARRANGEMENTS (200 THROUGH 600 VOLT):

- A. Basic Motor Driven Fire Pump: The electric motor fire pump controller shall be wired to the fire pump motor. Incoming AC power and wiring must be provided by others
- B. Basic Jockey Pump: The jockey pump motor controller shall be wired to the jockey pump motor. Incoming AC power and wiring must be provided by others.

2.10 SYSTEM PIPING

- A. All piping shall be Schedule 40 carbon steel. All piping shall receive a hydrostatic test at twice the design pressure before shipment at factory. Note, all references to flanges in this section shall conform to ANSI B-16.1. When increases and / or reducers are required to accommodate changes in pipe diameters they must conform to the Hydraulic Institute and the pump manufactures requirements
- B. The discharge pipe shall be sized in accordance with NFPA # 20. It shall consist of a (300) pound flange sized to couple to the pump, a labeled (300) pound wafer check valve, a labeled (300) pound butterfly isolation valve and a 300 pound flange for the installation connection.
- C. **Base Bid Meter By Pass: Install a fire pump test flow meter by pass piping assembly. It shall connect the discharge line. It shall include a supervised isolation valve located on either side of the meter.**
- D. Hose Header: Install a Tee, sized in accordance with NFPA # 20, butterfly valve, test header and piping as required to mount test header.
- E. Controller Sensing Lines: A separate 1/2 inch brass or stainless steel pressure sensing line shall be piped from the discharge line of each pump to its corresponding controller. It will include two 3/32 inch orifices. At the connection to the controller a branch line consisting of two globe valves separated by a Tee with a 1/4 inch branch.

2.11 PAINT SECTION

- A. All materials not requiring paint are excluded from this section. IE., Galvanized tubing, synthetic rubber, stainless steel, glass etc.. Some equipment such as engines and controllers that have been finished painted by their respective manufactures are excluded from this specification. All other equipment shall be cleaned and painted accordance with Sterling Fire Pump Paint Standards. This includes items such as the pump, skid, piping, valves etc.. Prior to painting all surfaces shall be cleaned and free of dirt, scale and rust. Cleaning may be either by use of solvents, sand blasting or other mechanical means. The finish coat shall be 2.0 mills of Elpaco 5372E red, high solid enamel or equal.

2.12 WET WELLS

- A. Provide concrete sectional manhole type of the dimensions indicated on the drawings. Concrete shall be precast, 4,500 PSI strength, with extended base and risers to accommodate pipe inverts. Risers shall include O-ring type gaskets compliant with ASTM C-443. Include access steps on 12" centers. Include hydrostatically rated mechanical pipe sleeves at each penetration, equal to "Link Seal". Provide coated steel lid with access hatch, wet well vent as well as mounting base to support full weight and inertia of fire pump. Wet Well(s) shall be bed and backfilled to prevent unit from heaving under hydrostatic pressure or undermining adjacent building structure.
- B. Wet Well(s) shall be minimum 60" ID/72" ID and 6'8"/10' Deep.
- C. Centerline of pump intake shall be maximum feasible distance away from storage tank inlet piping.
- D. Provide 4" size wet well vent pipe, extended 12" above lid, elbowed down.

2.13 SOURCE QUALITY CONTROL

- A. Test and inspect fire pumps with their controllers according to NFPA 20 for certified shop tests.
- B. Verification of Performance: Rate fire pumps according to requirements indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, concrete bases, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of fire pumps.
- B. Examine roughing-in for fire-suppression piping to verify actual locations of piping connections before fire-pump installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 CONCRETE BASES

- A. Install concrete bases of dimensions indicated for fire pumps, pressure-maintenance pumps, and controllers. Refer to Division 21 Section "Common Work Results for Fire Suppression."
 - 1. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around full perimeter of base.
 - 2. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
 - 3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 4. Install anchor bolts to elevations required for proper attachment to supported equipment.
- B. Cast-in-place concrete materials and placement requirements are specified in Division 03.

3.3 INSTALLATION

- A. Install and align fire pump, pressure-maintenance pump, and controller according to NFPA 20.
- B. Install pumps and controllers to provide access for periodic maintenance including removal of motors, impellers, couplings, and accessories.

- C. Set pumps on concrete bases. Disconnect coupling halves before setting. Do not reconnect couplings until alignment operations have been completed.
 - 1. Support pump baseplate on rectangular metal blocks and shims or on metal wedges having small taper, at points near anchor bolts, to provide 3/4- to 1-1/2-inch gap between pump base and concrete base for grouting.
 - 2. Adjust metal supports or wedges until pump and driver shafts are aligned. Verify that coupling faces and pump suction and discharge flanges are level and plumb.
- D. Install discharge piping equal to or greater than diameter of fire-pump nozzles.
- E. Install valves that are same size as piping connecting fire pumps, bypasses, test headers, and other piping systems.
- F. Install pressure gage on fire-pump discharges at pressure-gage tapping.
- G. Support pumps and piping separately so weight of piping does not rest on pumps.
- H. Install piping accessories, hangers and supports, anchors, valves, meters and gages, and equipment supports.
- I. Refer to Division 21 Section "Common Work Results for Fire Suppression" for basic piping installation and joint construction.
- J. Install flowmeters and sensors where indicated. Install flowmeter-system components and make connections according to manufacturer's written instructions.
- K. Electrical Wiring: Install electrical devices furnished by equipment manufacturers but not specified to be factory mounted. Furnish copies of manufacturers' wiring diagram submittals to electrical Installer.

3.4 ALIGNMENT

- A. Align fire-pump and driver shafts after complete unit has been leveled on concrete base, grout has set, and anchor bolts have been tightened.
- B. After alignment is correct, tighten anchor bolts evenly. Fill baseplate completely with grout, with metal blocks and shims or wedges in place. Tighten anchor bolts after grout has hardened. Check alignment and make required corrections.
- C. Align piping connections.
- D. Align pump and driver shafts for angular and parallel alignment according to HI 2.4 and to tolerances specified by manufacturer.

3.5 CONNECTIONS

- A. Piping installation requirements are specified in Division 21 Section "Water-Based Fire-Suppression Systems." Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to pumps and equipment to allow service and maintenance.
- C. Connect water supply and discharge piping to fire pumps[with flexible connectors]. Connect water supply and discharge piping to pressure-maintenance pumps[with flexible connectors]. [Refer to Division 21 Section "Water-Based Fire-Suppression Systems" for flexible connectors.]
- D. Connect relief-valve discharge to point of disposal.

- E. Connect flowmeter-system sensors and meters.
- F. Connect controllers to pumps.
- G. Connect fire-pump controllers to building fire-alarm system. Refer to Division 28 Section "Fire Detection and Alarm."
- H. **Emergency generator shall be coordinated to start on signal initiation from the fire pump controller. Coordinate with Division 26.**
- I. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- J. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.6 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect[, test, and adjust] field-assembled components and equipment installation, including connections[, and to assist in field testing]. Report results in writing.
- B. Perform field tests for each fire pump when installation is complete. Comply with operating instructions and procedures in NFPA 20 to demonstrate compliance with requirements. Where possible, field correct malfunctioning equipment, then retest to demonstrate compliance. Replace equipment that cannot be satisfactorily corrected or that does not perform as indicated, then retest to demonstrate compliance. Verify that each fire pump performs as indicated.
- C. Perform the following field tests and inspections and prepare test reports:
 - 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 - 2. Final Checks before Startup: Perform the following preventive-maintenance operations and checks:
 - a. Lubricate oil-lubrication-type bearings.
 - b. Remove grease-lubrication-type bearing covers, flush bearings with kerosene, and clean thoroughly. Fill with new lubricant according to manufacturer's written instructions.
 - c. Disconnect coupling and check electric motor for proper rotation. Rotation shall match direction of rotation marked on pump casing.
 - d. Verify that pump is free to rotate by hand. If pump is bound or if it drags even slightly, do not operate until cause of trouble is determined and corrected.
 - 3. Starting procedure for pumps is as follows:
 - a. Starting procedure for vertical turbine pump shall be per manufacturer's requirements..
 - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 - 5. Furnish fire hoses in number, size, and length required to reach storm drain or other acceptable location to dispose of fire-pump test water. Fire hoses are for field-acceptance tests only and are not property of Owner.

3.7 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain fire pumps, right-angle gear drives, drivers, controllers, and pressure-maintenance pumps. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 21 32 16

SECTION 33 13 13 – FACILITY SANITARY SEWERS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. Sanitary sewerage includes but is not necessarily limited to furnishing all labor, materials and equipment necessary for the complete installation of exterior sanitary sewers and appurtenances in accordance with this Section and applicable drawings.
- B. Section includes;
 - 1. Pipe and Fittings.
 - 2. Transition Couplings.
 - 3. Cleanouts.
 - 4. Manholes.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this Section.
- B. Section 31 20 00 – Earth Moving.

1.3 QUALITY ASSURANCE

- A. Comply with the Indiana Department of Health and the Indiana Department of Environmental Management regulations regarding sanitary sewer construction and construction inspection requirements.
- B. Comply with the Geotechnical Engineer and testing agency construction inspection requirements.

1.4 SUBMITTALS

- A. Submittal procedures and requirements shall comply with Division 01 Specification Sections.
- B. Product Data for the following;
 - 1. Pipes and fittings.
 - 2. Manholes.
 - 3. Manhole and cleanout frames and covers.
- C. Shop drawings: For manholes include plans, elevations, sections, details, frames and covers.
- D. Manufacturer's Certificate: Certify that the material inspections and tests have been made and meet or exceed the applicable ANSI/ASTM Specifications.

E. Project Record Documents:

1. Record location of pipe runs, connections, manholes, cleanouts, top of casting, and invert elevations.
2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.5 PROTECTION

- A. The Contractor shall support and protect all existing structures, pipes, sewers, drains, conduits and other facilities during excavation. The Contractor shall locate all existing structures and utilities before construction.
- B. The Contractor shall protect all structures, utilities and materials against damage or displacement. The Contractor shall repair or replace at no additional cost to the Owner any damaged or displaced structures, utilities, or materials.

PART 2 - PRODUCTS

2.1 PIPES AND FITTINGS

A. Poly Vinyl Chloride Pipe (PVC) Type PSM Sewer Pipe and Fittings:

1. Pipe: ANSI/ASTM D3034, PVC Type PSM, SDR 26 with bell and spigot ends for gasketed joints.
2. Fittings: ANSI/ASTM D3034, PVC SDR 26 with bell ends.
3. Gaskets: ASTM F 477, Elastomeric seals.
4. Furnish ells, tees, wyes, couplings, increasers, crosses, transitions and end caps of same type and class of material as pipe, or of material having equal or superior physical and chemical properties as acceptable to the material as noted herein or on the plans.

B. TRANSITION COUPLINGS

- A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground non-pressure piping. Include ends of same sizes as piping to be joined and corrosion-resistant-metal tension band and tightening mechanism on each end.

1. Sleeve Materials:

- a. For Cast-Iron Soil Pipes: ASTM C 564, rubber.
- b. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
- c. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

2. Unshielded, Flexible Couplings:

- a. Description: Elastomeric sleeve with stainless-steel shear ring corrosion-resistant-metal tension band and tightening mechanism on each end.

3. Shielded, Flexible Couplings:
 - a. Description: ASTM C 1460, elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.
4. Non-pressure Type, Rigid Couplings:
 - a. Description: ASTM C 1461, sleeve-type, reducing- or transition-type mechanical coupling, molded from ASTM C 1440, TPE material; with corrosion-resistant-metal tension band and tightening mechanism on each end

2.2 CLEANOUTS

- A. General: Provide as indicated, pipe extension to grade with ferrule and countersunk cleanout plug.
- B. Cast-Iron Cleanouts:
 1. Description: ASME A112.36.2M, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover. Include gray-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug.
 2. Top-Loading Classification(s): Heavy Duty, unless otherwise noted..
 3. Sewer Pipe Fitting and Riser to Cleanout: ASTM A 74, Service class, cast-iron soil pipe and fittings.
- C. PVC Cleanouts:
 1. Description: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.

2.5 PRECAST CONCRETE MANHOLES

- A. General: Provide precast concrete manhole sections and adjusting rings complying with ANSI/ASTM C478, sized as indicated on the drawings.
- B. Precast Manholes:
 1. Description: Manhole structures shall be constructed of precast, Class 'A' reinforced concrete with a minimum compressive strength of 4000 psi conforming to ASTM C 478, of depth indicated with provision for sealant joints. Manholes must be designed to support heavy traffic, HS20-44 Loading.
 2. Diameter: 48 inches minimum unless otherwise indicated.
 3. The precast manhole structure shall be constructed with the base and the first riser section as one complete precast unit.
 4. Manhole bases, inverts and flow channels, bench walls shall conform to local standards.
 5. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.
 6. Base Section: 6" minimum thickness for floor slab (8" minimum thickness for manholes larger than 48" diameter) and 5" minimum thickness for walls and base riser section.
 7. Riser Sections: 4" minimum thickness, of length to provide depth indicated.
 8. Top Section: Eccentric cone type unless flat-slab-top type is indicated on the drawings or dictated by elevations; with top of cone of size that matches grade rings.
 9. All joints between precast manhole elements shall be made with an approved rubber gasket in accordance with ASTM C443, or ½ inch diameter non-asphaltic mastic (Kent Seal or approved equal) conforming to AASHTO M198 and Federal Specifications SS-521-A.
 10. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
 11. Resilient Pipe Connectors: ASTM C 923, cast or fitted into manhole walls, for each pipe connection.

12. Manhole bases, inverts and flow channels, bench walls shall conform to local standards.
13. Steps: The steps shall be factory installed $\frac{1}{2}$ " diameter (Grade 60, deformed) steel reinforcing rods encased in polypropylene plastic conforming to ASTM C 478.
 - a. Spacing shall be 12" to 16" evenly spaced intervals.
 - b. The maximum distance from the manhole rim to the first step shall be 30".
 - c. Minimum 12" width, non-slip surface..
 - d. Projection from the interior face of wall shall be uniform, between 6" and 10"
14. Drop pipe connection is required if lateral entering manhole exceeds 24" above outflow pipe invert elevation.
 - a. External or internal drop connections may be used.
 - b. The pipe size of the drop shall be the same as the incoming pipe size.
 - c. An internal drop, will require an increase in manhole structure from 48" to 60" for one connection, and 72" for two or three connections.
 - d. External drops must be encased in 8" (min.) concrete.
15. Provide Manhole Chimney Seal as noted per plan.
 - a. Internal Manhole Chimney Seals shall consist of a flexible internal rubber sleeve, interlocking extensions, and stainless steel compression bands conforming to ASTM C 923.
 - b. The seal shall remain flexible throughout a 25-year design life, allowing repeated vertical movement of the frame of not less than two (2) inches and repeated horizontal movement of the frame of not less than one-half ($\frac{1}{2}$) inch.
 1. The sleeve portion of the seal shall be a minimum double pleated with a minimum unexpanded vertical height of 8, 10, or 13 inches, respectively.
 2. The sleeve and extension shall have a minimum thickness of three-sixteenths ($\frac{3}{16}$) inches and shall be made from a high quality rubber compound conforming to the applicable requirements of ASTM C 923, with a minimum 1500 psi tensile strength, a maximum 18% compression set, and a hardness (durometer) of 48 ± 5 .
 - c. The area of the seal that compresses against the manhole frame/casting and the chimney/cone shall provide a watertight seal.
 - d. The bands shall be fabricated from 16 gauge stainless steel with no welded attachments and shall have a minimum adjustment range of two (2) diameter inches. Any screws, bolts, or nuts used to lock the band in place shall be stainless steel.
 - e. The internal seals shall be as manufactured by Cretex Specialty Products, NPC Specialty Products, or an approved equal.
- C. Concrete: Cast-in-place Concrete for manhole channels, bench walls shall conform to ACI 318, and the following:
 1. Portland Cement Design Mix: 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio.
 - a. Cement: ASTM C 150, Type II.
 - b. Fine Aggregate: ASTM C 33, sand.
 - c. Coarse Aggregate: ASTM C 33, crushed gravel.
 - d. Water: Potable.

2. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to 80% of pipe diameter. Form curved channels with smooth, uniform radius and slope at a minimum of 1.0% through manhole.

3. Benches: Concrete, sloped at 4% to drain into channel.

C. Manhole Frames and Covers:

1. The frame and cover shall be Neenah Foundry Company R-1772 or East Jordan Iron Works 1022-1HD with machined bearing surface, self-sealing gasket lid, and concealed pickhole, or as required by local sewer utility.

2. Covers shall have the words "Sanitary Sewer" cast in letters two (2) inches in height.

D. Adjusting Rings:

2. No brick or block shall be used in the construction of a manhole or to adjust the elevation of the frame and cover. Final adjustments in elevation of the frame and cover shall be accomplished by the use of precast concrete adjusting rings conforming to ASTM C478.

2. A watertight seal shall be provided between the cone and riser ring, each adjoining riser ring, and riser ring and casting by the use of two rows of ½ inch extrudable preformed gasket material.

3. Total height of adjusting rings shall not exceed 12 inches.

2.6 ENCASEMENT FOR PIPING

A. Encasement for piping shall be used in areas as indicated on plans.

B. Standard: ASTM A 674 or AWWA C105.

C. Material: Linear low-density polyethylene film of 0.008-inch (0.20-mm) or, high-density, cross-laminated polyethylene film of 0.004-inch (0.10-mm) minimum thickness.

D. Form: Sheet or tube.

E. Color: Natural, or clear.

2.7 BEDDING AND COVER MATERIALS

A. Pipe Bedding Material: Indiana Department of Transportation Coarse Aggregate Size No. 8 Crushed Limestone or Gravel installed a minimum of four inches below the pipe, a minimum of nine inches on each side of the pipe, and a minimum of 12 inches above the pipe.

B. Pipe Cover Material: As specified in Section 31 20 00.

PART 3 - EXECUTION

3.1 GENERAL

A. The Contractor shall be responsible for all aspects of construction site safety.

- B. Work rejected by the Owner will be removed and replaced, as required by the Contractor, at his expense.

3.2 EARTHWORK

- A. Excavating, trenching, and backfilling are specified in Section 31 20 00 "Earth Moving."
- B. Backfill sanitary sewer trenches upon completion of inspection and in accordance with the trench detail drawings.
- C. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.3 PIPING INSTALLATION

- A. General Locations and Arrangements: Drawing plans and details to indicate general location and arrangement of underground sanitary sewer piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.
 - 1. Install piping in accordance with the specifications and requirements of the governing authorities except where more stringent requirements are indicated.
 - 2. Inspect piping before installation to detect apparent defects. Remove defective materials and promptly remove from site.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for using lubricants, cements, and other installation requirements.
- C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.
- D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling.
- F. Where vertical clearance between two pipes is less than one foot, a concrete saddle shall be placed as a buffer between them. After backfill for the lower pipe has been placed and compacted to a point halfway up the pipe, place concrete in the trench and between the pipes to a point at least 4 inches above the top of the lower pipe. The saddle shall extend the full width of the trench and a minimum of 8 inches on each side of the crossing pipe.
- G. Where a minimum horizontal separation distance of ten feet, from outside of pipe to outside of pipe, or a vertical crossing separation distance of 18 inches, outside of pipe to outside of pipe, cannot be maintained between sewers and water lines, the sanitary sewer pipe shall be waterworks grade ductile iron with mechanical joints. At vertical crossing locations, both the sanitary sewer and the water line pipes shall be installed with the pipe joints equidistant and as far as possible from the crossing location. Where ductile iron pipe is required, because the minimum separation distances cannot be achieved, the sewer shall be pressure tested to ensure water tightness prior to backfilling.

- H. Install gravity-flow, non-pressure, drainage piping according to the following:
1. Install piping pitched down in direction of flow, at minimum slope of 1.04% percent unless otherwise indicated.
 2. Install piping NPS 6 and larger with restrained joints at tee fittings and at changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place-concrete supports or anchors.
 3. Install piping with 48-inch minimum cover.
 4. Install hub-and-spigot, cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook".
 5. Install ductile-iron, gravity sewer piping according to ASTM A 746.
 6. Install ABS sewer piping according to ASTM D 2321 and ASTM F 1668.
 7. Install PVC gravity sewer piping according to ASTM D 2321 and ASTM F 1668.
- I. Clear interior of piping and manholes of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed. Place plug in end of incomplete piping at end of day and when work stops.
- J. Interior Inspection: Inspect piping to determine whether line displacement or other damage has occurred and repair any such misalignment or damage.

3.4 PIPE JOINT CONSTRUCTION

- A. Join gravity-flow, non-pressure, drainage piping according to the following:
1. Join hub-and-spigot, cast-iron soil piping with gasket joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.
 2. Join hub-and-spigot, cast-iron soil piping with calked joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for lead and oakum calked joints.
 3. Join ductile-iron, gravity sewer piping according to AWWA C600 for push-on joints.
 4. Join ABS sewer piping according to ASTM D 2321 for elastomeric-seal joints.
 5. Join PVC cellular-core sewer piping according to ASTM D 2321 and ASTM F 891 for solvent-cemented joints.
 6. Join PVC profile sewer piping according to ASTM D 2321 for elastomeric-seal joints or ASTM F 794 for gasketed joints.
 7. Join PVC Type PSM sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric-gasket joints.
 8. Join dissimilar pipe materials with non-pressure type, flexible or rigid couplings.
- B. Join force-main, pressure piping according to the following:
1. Join ductile-iron pressure piping according to AWWA C600 or AWWA M41 for push-on joints.
 2. Join PVC pressure piping according to AWWA M23 for gasketed joints.
 3. Join dissimilar pipe materials with pressure-type couplings.
- C. Pipe couplings, expansion joints, and deflection fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.
1. Use non-pressure flexible couplings where required to join gravity-flow, non-pressure sewer piping unless otherwise indicated.

- a. Shielded flexible or rigid couplings for pipes of same or slightly different OD.
 - b. Unshielded, increaser/reducer-pattern, flexible or rigid couplings for pipes with different OD.
 - c. Ring-type flexible couplings for piping of different sizes where annular space between smaller piping's OD and larger piping's ID permits installation.
2. Use pressure pipe couplings for force-main joints.

3.5 MANHOLE INSTALLATION

- A. General: Install manholes complete with appurtenances and accessories indicated.
- B. Install precast concrete manhole sections with sealants according to ASTM C 891, at locations shown in the drawings and in accordance with the construction details. Set tops of frames and covers flush with finish surface, unless otherwise indicated.
- C. Free drop in manhole shall not exceed 24 inches, from invert of inlet to top of floor of flow channels. Construct drop manhole if free drop is greater than 24 inches.
- D. Coat entire exterior surface of manhole with waterproof mastic applied in accordance with manufacturer's recommendations.
- E. Form continuous concrete channels and benches between inlets and outlet.
- F. Set tops of frames and covers flush with finished surface of manholes that occur in pavements. Set tops 1 inch above finished surface elsewhere unless otherwise indicated.
- G. Install manhole-cover inserts in frame and immediately below cover.

3.6 CONCRETE PLACEMENT

- A. Place cast-in-place concrete according to ACI 318.

3.7 CLEANOUT INSTALLATION

- A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts, and use cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.
 1. Use Medium-Duty, top-loading classification cleanouts in lawn, landscape and sidewalk areas.
 2. Use Heavy-Duty, top-loading classification cleanouts in vehicle-traffic service and parking lot areas.
 3. Use Extra-Heavy-Duty, top-loading classification cleanouts in roads and industrial pavements.
- B. Set cleanout frames and covers in lawn and landscape areas in cast-in-place-concrete block, 18 by 18 by 12 inches deep. Set cleanout frames and covers with tops 1" above finished grade surface, unless otherwise noted.
- C. Set cleanout frames and covers in asphalt pavement or brick paver areas in cast-in-place-concrete block, 18 by 18 by 12 inches deep. Set cleanout frames and covers flush with finished grade surface, unless otherwise noted.

- D. Set cleanout frames and covers in concrete pavement areas with tops flush with pavement surface.

3.8 CONNECTIONS

- A. Make connections to existing piping and underground manholes.
 - 1. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye fitting plus 6-inch overlap with not less than 6 inches of concrete.
 - 2. Make branch connections from side into existing piping, NPS 4 to NPS 20. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye with not less than 6 inches of concrete.
 - 3. Make branch connections from side into existing piping, NPS 21 or larger, or to underground manholes by cutting opening into existing unit large enough to allow 3 inches of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of, and be flush with, inside wall unless otherwise indicated. On outside of pipe or manhole wall, encase entering connection in 6 inches of concrete for minimum length of 12 inches to provide additional support of collar from connection to undisturbed ground.
 - a. Use concrete that will attain a minimum 28-day compressive strength of 3000 psi unless otherwise indicated.
 - b. Use epoxy-bonding compound as interface between new and existing concrete and piping materials.
 - 4. Protect existing piping and manholes to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.
- B. Connect non-pressure, gravity-flow drainage piping to building's sanitary building drains specified in Section 22 13 16 "Sanitary Waste and Vent Piping."
- C. Connect to grease traps, oil and sand interceptors specified in Section 22 13 23 "Sanitary Waste Interceptors."

3.9 CLOSING ABANDONED SANITARY SEWER SYSTEMS

- A. Abandoned Piping: Close open ends of abandoned underground piping indicated to remain in place. Include closures strong enough to withstand hydrostatic and earth pressures that may result after ends of abandoned piping have been closed. Use either procedure below:
 - 1. Close open ends of piping with a plumbers plug and at least 12-inch thick, cast-in-place lean concrete or flowable fill bulkhead.
 - 2. Close open ends of piping with threaded metal caps, plastic plugs, or other acceptable methods suitable for size and type of material being closed. Do not use wood plugs.

- B. Abandoned Manholes: Excavate around manhole as required and use either procedure below:
 - 1. Remove manhole and close open ends of remaining piping.
 - 2. Remove top of manhole down to at least 36 inches below final grade.
 - 3. Provide (3) four inch holes in the bottom of the structure.
 - 4. Fill to within 12 inches of top with stone, rubble, gravel, or compacted dirt. Fill to top with concrete.
- C. Backfill to grade according to Section 31 20 00 "Earth Moving."

3.10 IDENTIFICATION

- A. Comply with requirements in Section 31 20 00 "Earth Moving" for underground utility identification devices. Arrange for installation of green warning tapes directly over piping and at outside edges of underground manholes.
 - 1. Use detectable warning tape over ferrous piping.
 - 2. Use detectable warning tape over nonferrous piping and over edges of underground manholes.

3.11 FIELD QUALITY CONTROL

- A. Protect pipe and bedding cover from damage or displacement until backfilling operation is in progress.
- B. Perform field inspection and testing in accordance with Division 1.
- C. If tests indicate work does not meet specified requirements, remove work, replace and retest at no cost to Owner.
- D. Infiltration Test: Provide low pressure air tests per sewer utility requirements (and per ASTM F1417. Provide leakage test for manholes per ASTM C1244-93).
- E. Deflection Test: Provide mandrel test for PVC pipe per sewer utility requirements. A deflection test shall be performed on each flexible pipe following the elapse of thirty (30) days after the placement of the final backfill per 327 IAC 3-6-19 (a).
- F. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.
 - 1. Submit separate report for each system inspection.
 - 2. Defects requiring correction include the following:
 - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
 - b. Deflection: 327 IAC 3-6-19 (b) requires that no pipe shall exceed a deflection of five percent (5%) or greater. 327 IAC 3-6-19 (c) requires that the diameter of the rigid ball or mandrel used for a deflection test shall be no less than ninety-five percent (95%) of the base inside diameter of the pipe to be tested dependent on what is specified in the corresponding ASTM standard. Also, the test shall not be performed with the aid of a mechanical pulling device.
 - c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
 - d. Infiltration: Water leakage into piping.
 - e. Exfiltration: Water leakage from or around piping.

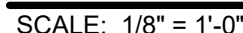
3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
 4. Re-inspect and repeat procedure until results are satisfactory.
- G. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
1. Do not enclose, cover, or put into service before inspection and approval.
 2. Test completed piping systems according to requirements of authorities having jurisdiction.
 3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
 4. Submit separate report for each test.
 5. Hydrostatic Tests: Test sanitary sewerage according to requirements of authorities having jurisdiction and the following:
 - a. Fill sewer piping with water. Test with pressure of at least 10-foot head of water, and maintain such pressure without leakage for at least 15 minutes.
 - b. Close openings in system and fill with water.
 - c. Purge air and refill with water.
 - d. Disconnect water supply.
 - e. Test and inspect joints for leaks.
 6. Air Tests: Test sanitary sewerage according to requirements of authorities having jurisdiction, UNI-B-6, and the following:
 - a. Test plastic gravity sewer piping according to ASTM F 1417.
 7. Manholes: Perform hydraulic test according to ASTM C 969. Perform air test in accordance with ASTM C1244 Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test, per 327 IAC 3-6-16 (j).
- H. Leaks and loss in test pressure constitute defects that must be repaired.
- I. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

3.12 CLEANING

- A. Clean dirt and superfluous material from interior of piping. Flush with potable water.

END OF SECTION 33 13 13

SHOULD DIFFERENT CONDITIONS BE ENCOUNTERED,
CONTACT THE ARCHITECT BEFORE PROCEEDING WITH
WORK.



SCALE: 3/4" = 1'-0"

SCALE: 1/8" = 1'-0"

TIPPECANOE VALLEY HIGH SCHOOL A & R

8345 STATE ROUTE 19, AKRON, IN 46910

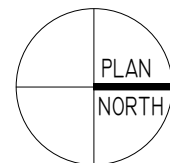
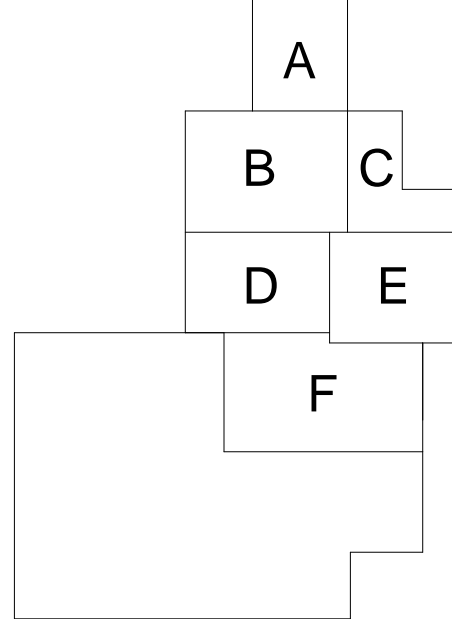
TIPPECANOE VALLEY SCHOOL CORPORATION



ARCHITECT

FANNING HOWEY

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350 E NEW YORK ST #500, INDIANAPOLIS, IN 46204



KEY PLAN

CONSTRUCTION DOCUMENTS



PROJECT MANAGER: MKS
DRAWN BY: CSS
PROJECT NUMBER: 220158.00
PROJECT ISSUE DATE: 9/6/2022

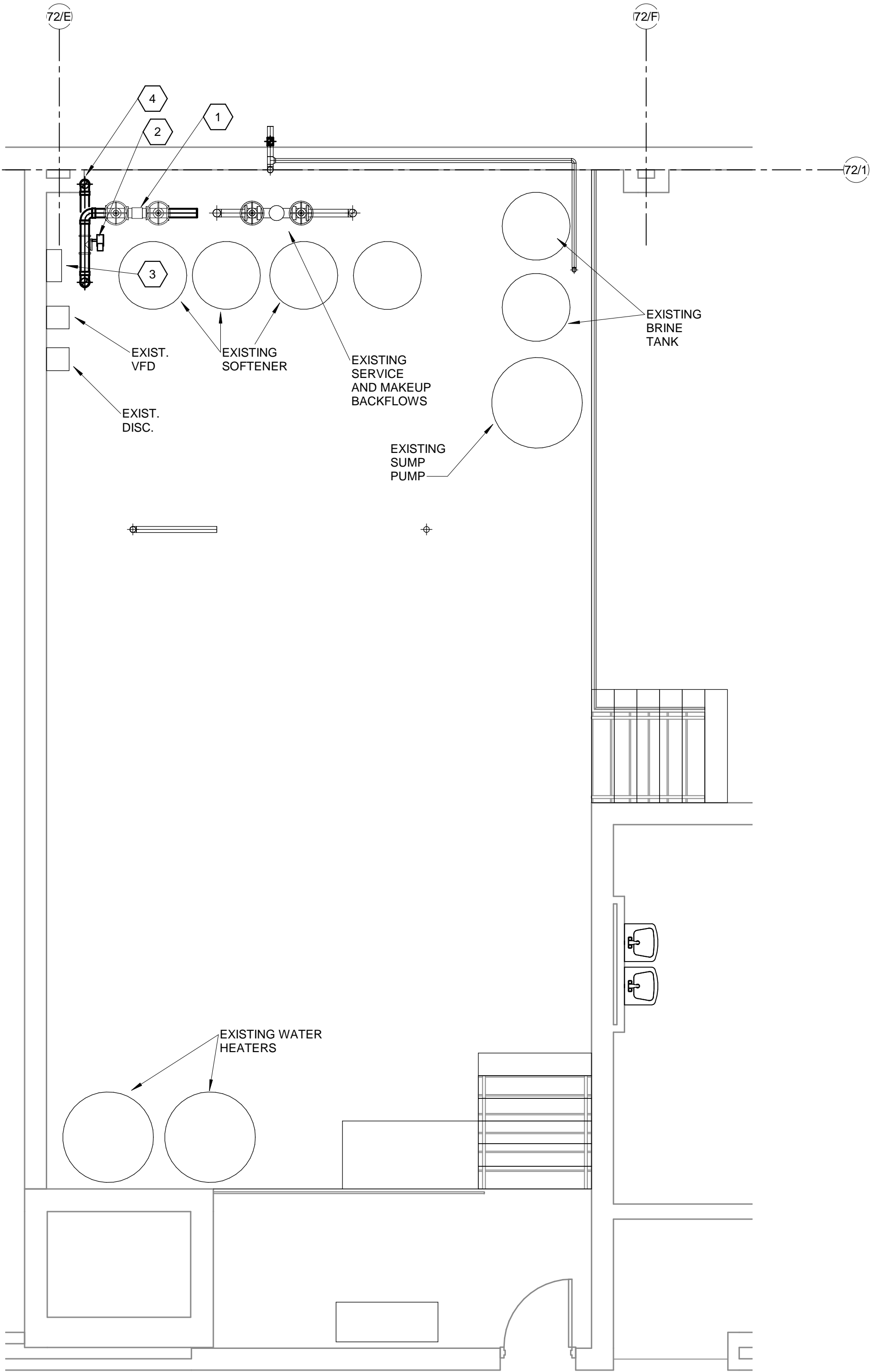
REV. NO.	DESCRIPTION	DATE
1	ADDENDUM #2	9/27/2022

FIRE SUPPRESSION DETAILS AND NOTES

FP.02

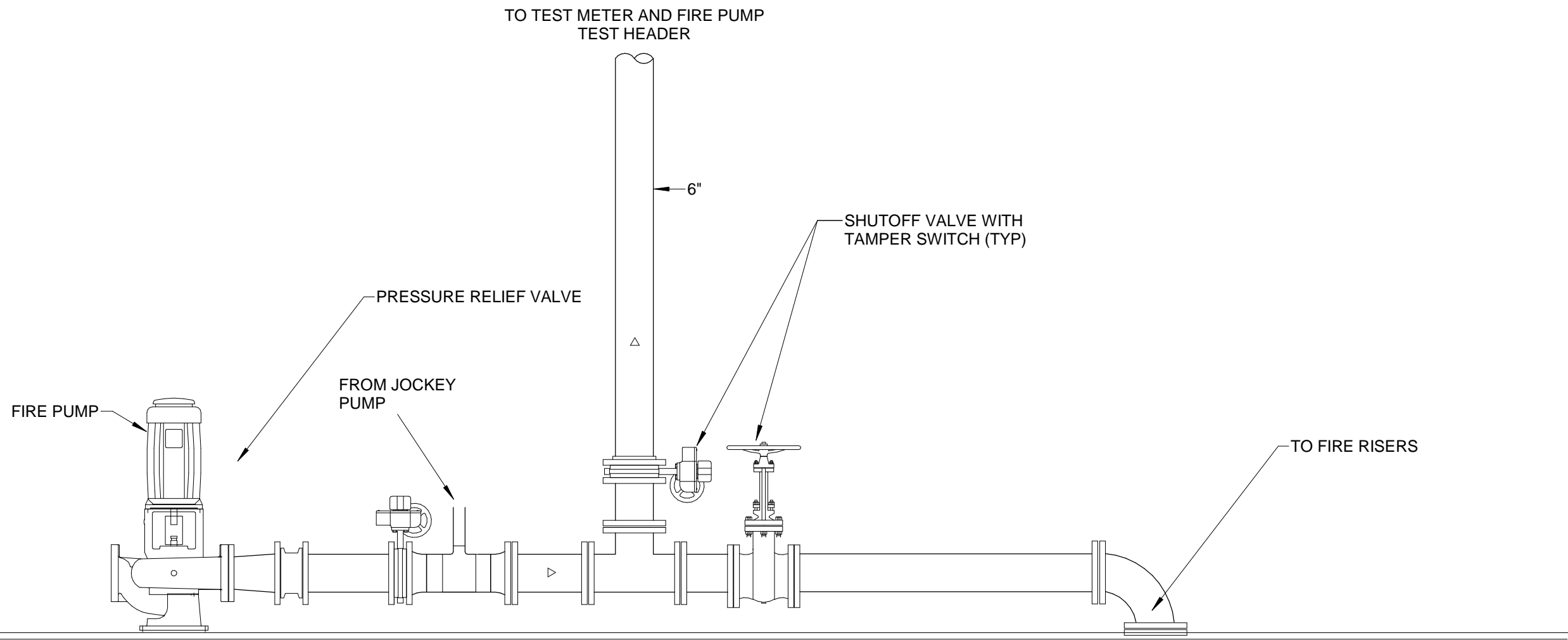
PLAN NOTES

- CONNECT TO EXISTING 4" WATER SERVICE PIPING DOWN STREAM OF SERVICE BACKFLOW, EXTEND THROUGH REDUCED PRESSURE ZONE DETECTOR ASSEMBLY, THROUGH AUTOMATIC FILL CONTROL VALVE, BELOW FLOOR SLAB AND THROUGH EXTERIOR BUILDING WALL TO FILL CONNECTION AT FIRE SUPPRESSION STORAGE TANK. SLEEVE PIPE PENETRATION ACROSS FOOTER AND ALL REQUIRED BEDDING, BACKFILL AND SURFACE RESTORATION.
- 4" UL/FM AUTOMATIC CONTROL AND FILL VALVE. WIRE ACTUATOR TO TANK MONITORING AND CONTROL PANEL ON WALL. PROVIDE 4" MANUAL SUPERVISED FILL BYPASS VALVE. AUTOMATIC CONTROL VALVE EQUAL TO WATTS LF930GC. AUTOMATIC CONTROL VALVE SOLENOID SHALL BE 120 VAC OR 24 V, COMPATIBLE WITH TANK LEVEL MONITOR AND CONTROL PANEL OUTPUT CAPABILITIES. SOLENOID SHALL BE POWERED-OPEN, NORMALLY CLOSED. VALVE ASSEMBLY SHALL INCLUDE VISIBLE POSITION INDICATOR AND DRY CONTACT LIMIT SWITCH TO NOTIFY VALVE POSITION TO THE FIRE ALARM SYSTEM.
- TANK LEVEL MONITORING AND CONTROL PANEL. EXTEND CONTROL WIRING TO FILL CONTROL VALVE. EXTEND LEVEL MONITORING WIRING AND CONDUIT TO EXTERIOR BELOW GRADE FIRE SUPPRESSION TANK LEVEL MONITORS. REFER TO DETAILS, SHEET FP.03 AND SPECS FOR ADDITIONAL REQUIREMENTS. BASIS OF DESIGN TANK LEVEL MONITORING PANEL IS PRECISION DIGITAL "CONSOLIDATOR" PD9000 SERIES OR FLOWLINE "COMMANDER MULTITANK CONTROLLER".
- FILL PIPING DROPS BELOW GRADE.



01-FIRE SUPPRESSION - FIRST FLOOR MECHANICAL ROOM

SCALE: 1/4" = 1'-0"



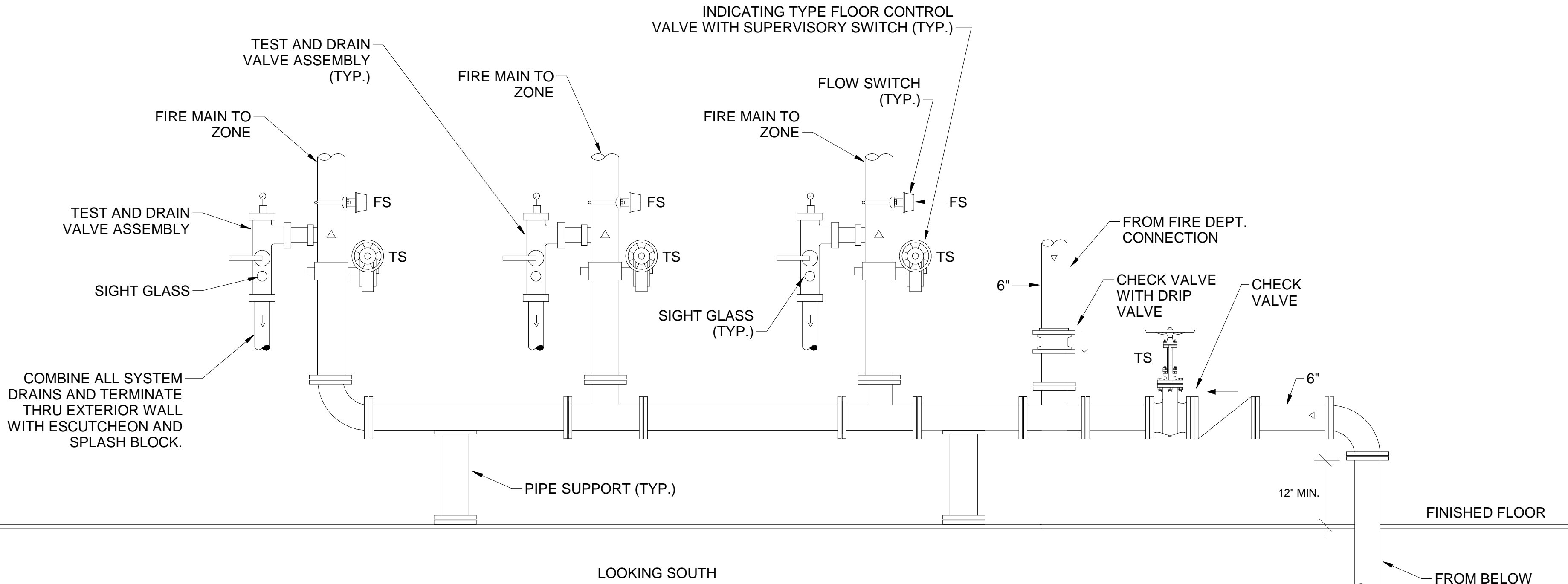
FIRE PROTECTION EQUIPMENT SCHEDULE

ITEM	MAKE & MODEL NUMBER (OR APPROVED EQUAL)	DESCRIPTION	CAPACITY	ELECTRICAL CHARACTERISTICS	NOTES
FIRE PUMP (FP-1)	ARMSTRONG 8 X 12 M VTF - 100 HP	CONSTANT SPEED DRIVE W/SOFT START CONTROLLER (SKID MOUNTED) VERTICAL TURBINE	750 GPM AT 100 PSI RISE	100 HP 460V/3PH	-
JOCKEY PUMP (JP-1)	ARMSTRONG VMS-01:16B	MULTISTAGE VERTICAL TURBINE	7.5 GPM AT 110 PSI RISE	2 HP 480V 3 PH	-

FIRE PUMP ASSEMBLY DETAIL - BASE BID

2

N.T.S.



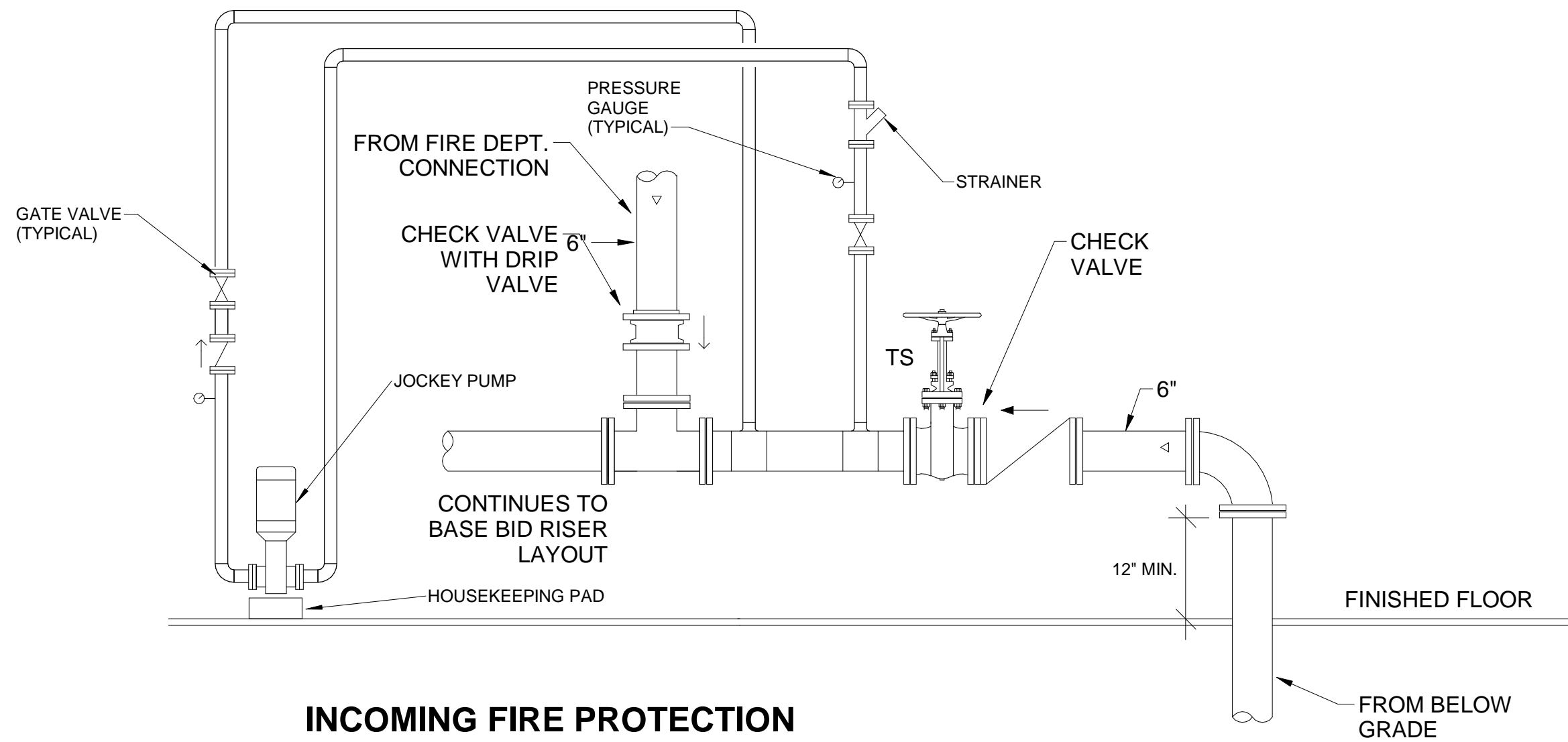
INCOMING FIRE PROTECTION SERVICE DETAIL - BASE BID

3

N.T.S.

FIRE PROTECTION ALTERNATE EQUIPMENT SCHEDULE

ITEM	MAKE & MODEL NUMBER (OR APPROVED EQUAL)	DESCRIPTION	CAPACITY	ELECTRICAL CHARACTERISTICS	NOTES
FIRE PUMP (FP-1)	ARMSTRONG 8 X 12 M VTF - 100 HP TEFC WEATHERPROOF	CONSTANT SPEED DRIVE W/SOFT START CONTROLLER (SKID MOUNTED) VERTICAL TURBINE	750 GPM AT 100 PSI RISE	100 HP 460V/3PH	REFER TO SPECIFICATIONS, FIRE PUMP CONTROL PANEL FOR ALTERNATE NEMA 4X WITH STAINLESS STEEL BRUSHED FINISH
JOCKEY PUMP (JP-1)	ARMSTRONG VMS-01:16B	MULTISTAGE VERTICAL TURBINE	7.5 GPM AT 110 PSI RISE	2 HP 208V 3 PH	-



INCOMING FIRE PROTECTION SERVICE DETAIL - ALTERNATE

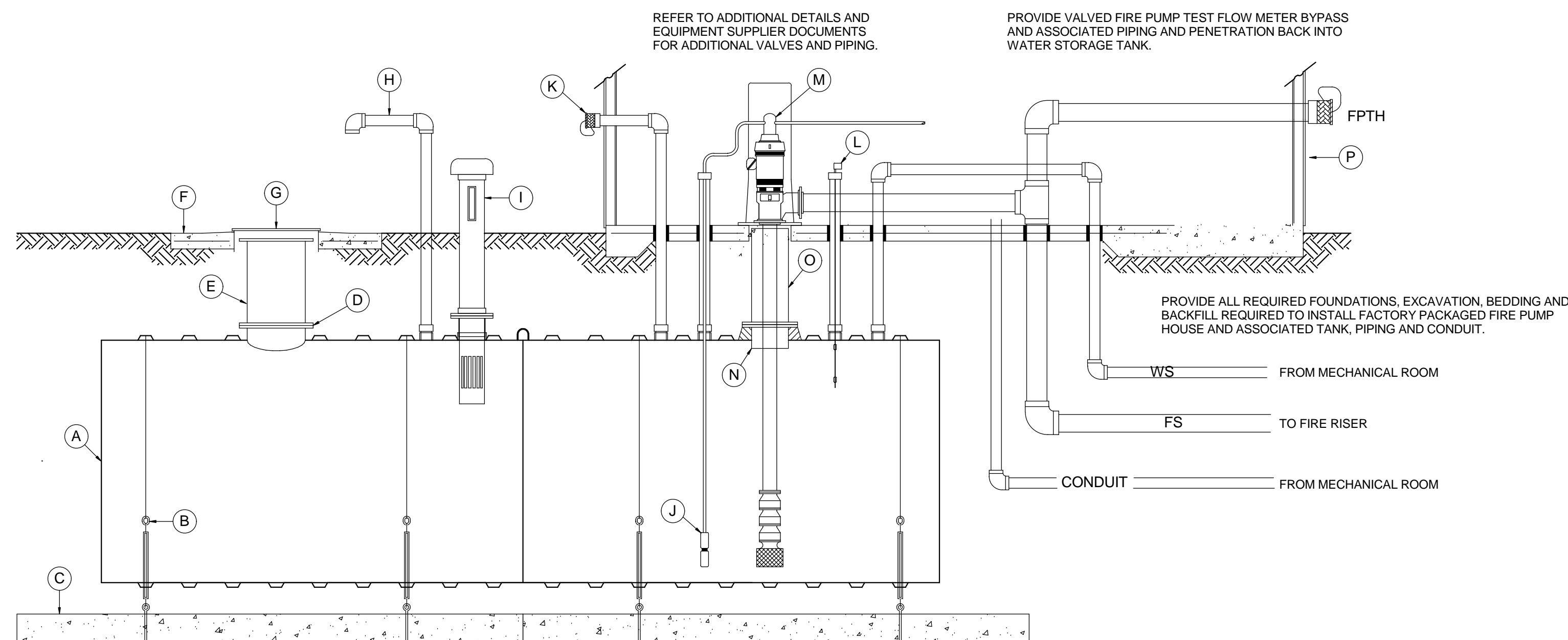
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N.T.S.

VERIFICATION NOTE

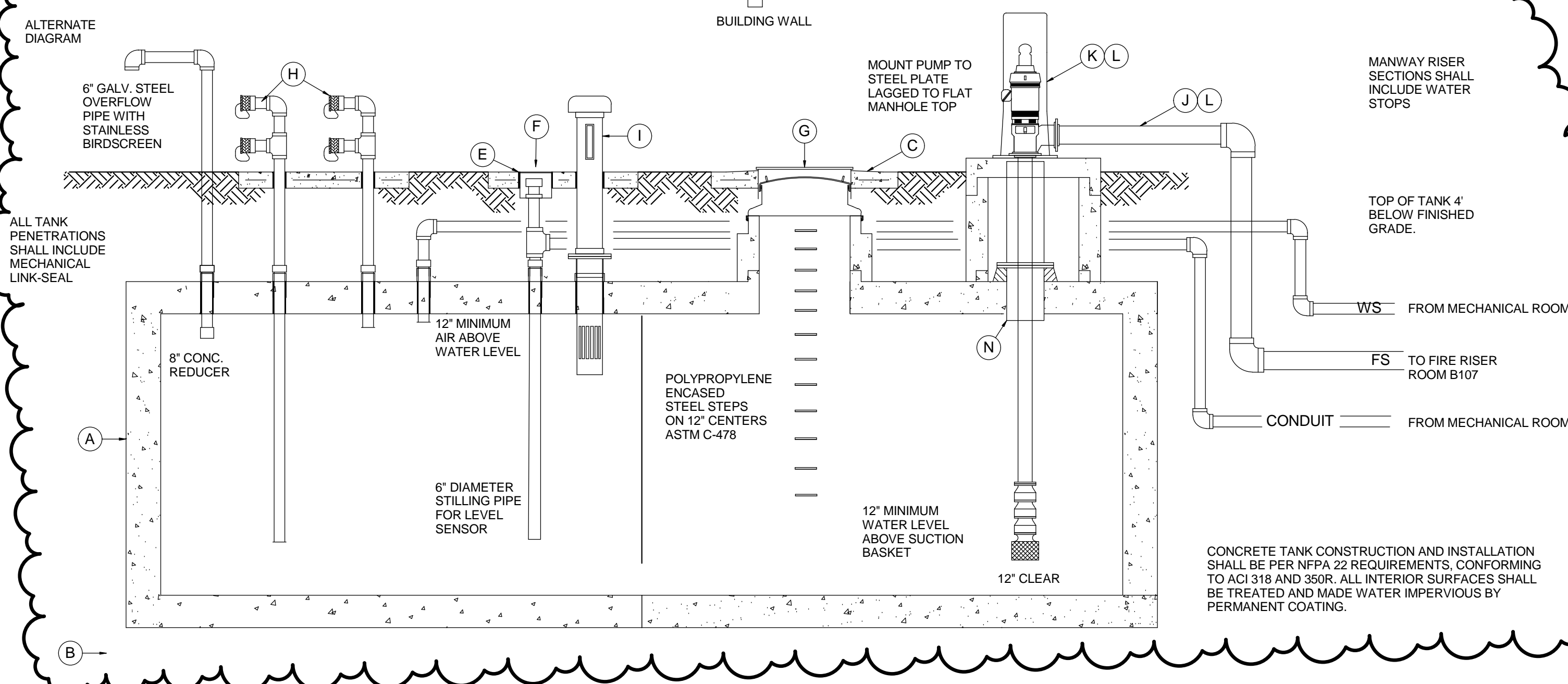
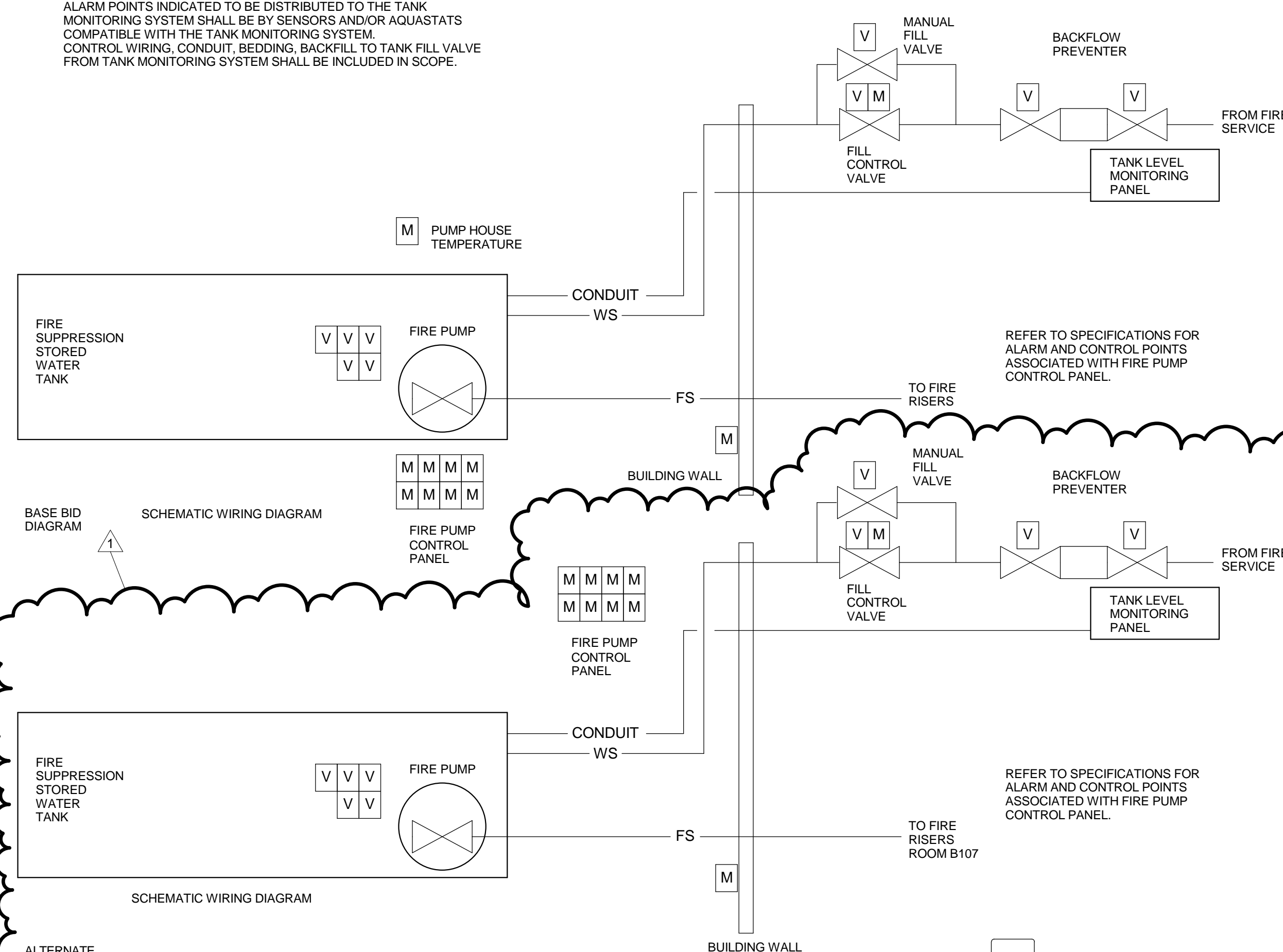
CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CLEARANCES AND ALL EXISTING FIELD CONDITIONS BEFORE STARTING CONSTRUCTION. COMMENCEMENT OF WORK CONSTITUTES ACCEPTANCE OF CONDITIONS. SHOULD DIFFERENT CONDITIONS BE ENCOUNTERED, CONTACT THE ARCHITECT BEFORE PROCEEDING WITH WORK.

MARK		MARK	
A	50,000 GALLON FIRE SUPPRESSION WATER STORAGE TANK	I	10" NPT FITTING WITH VENT/LEVEL INDICATOR ASSEMBLY
B	HOLD DOWN STRAP & TURNBUCKLE ASSEMBLY	J	4" NPT FTG w/ JOCKEY PUMP & GALVANIZED THREADED LINE
C	PRECAST DEADMAN ANCHOR WITH EYEBOLTS	K	4" NPT FTG w/ NST REMOTE FILL OR RECIRCULATING POINT
D	FLANGED MANWAY	L	4" NPT FTG w/ FLOAT SWITCH FOR HIGH WATER ALARM
E	MANWAY EXTENSION	M	VERTICAL PUMP w/ DISCHARGE HEAD AND MULTI STAGE BOWL
F	H=20 AXLE LOAD CONCRETE APRON	N	14" FLANGED NOZZLE
G	36" DIAMETER MANHOLE AND COVER	O	14" FLANGED NOZZLE EXTENSION
H	6" TANK VENT	P	FACTORY ASSEMBLED PUMP BUILDING



QTY.	TANK MONITORING AND CONTROL POINTS	FA	FA & TANK	TANK MONITORING	NOTES
2	TANK WATER LEVEL RESTORED (ELEV. SETPOINT) - CLOSE FILL VALVE		X		
1	TANK WATER LEVEL 6" BELOW SETPOINT - ACTUATE FILL VALVE			X	
2	TANK WATER LEVEL 12" BELOW SETPOINT		X		
1	PUMP HOUSE TEMPERATURE BELOW 40 DEGREE F.		X		
2	TANK OUTLET SHUT OFF VALVE SUPERVISION		X		
2	MANUAL TANK FILL BYPASS SHUT OFF VALVE SUPERVISION		X		

GENERAL NOTES
ALARM POINTS INDICATED TO BE DISTRIBUTED TO THE FIRE ALARM SYSTEM SHALL BE BY MODULE/RELAY ATTACHMENT THAT IS LISTED AND COMPATIBLE WITH BUILDING FIRE ALARM SYSTEM.
ALARM POINTS INDICATED TO BE DISTRIBUTED TO THE TANK MONITORING SYSTEM SHALL BE BY SENSORS AND/OR AQUASTATS COMPATIBLE WITH THE TANK MONITORING SYSTEM.
CONTROL WIRING, CONDUIT, BEDDING, BACKFILL TO TANK FILL VALVE FROM TANK MONITORING SYSTEM SHALL BE INCLUDED IN SCOPE.

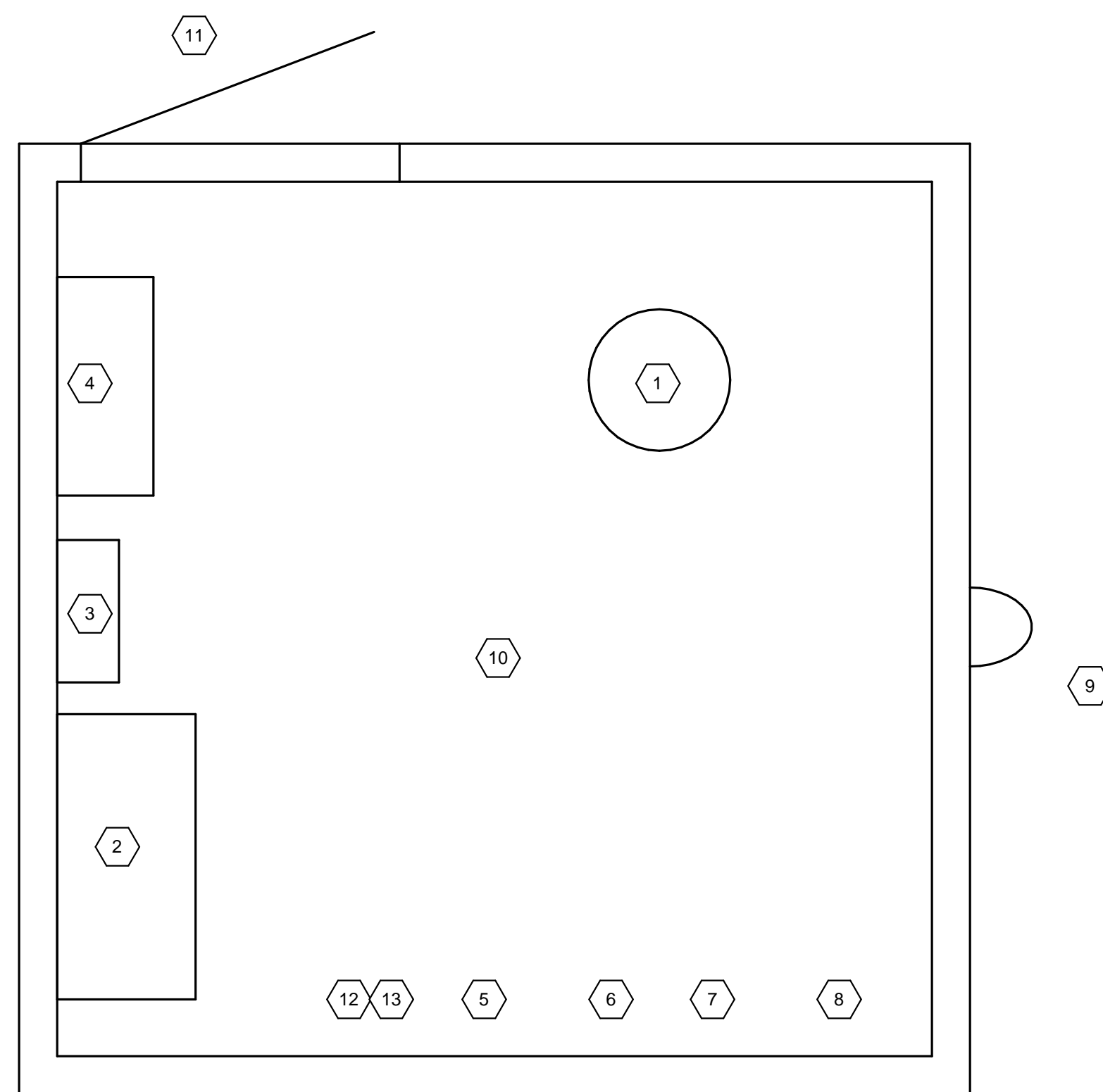


MARK	EQUIPMENT LISTING AND SUPPLIER
A	10' D X 15' H X 72" L INTERIOR DIMENSION CONCRETE TANK
B	6" MINIMUM SAND BED, 6" MINIMUM NO 57.
C	CONCRETE PAD
D	22" FLANGED MANWAY
E	SEALED ACCESS BOX WITH H20 RATED LID
F	SUBMERGENCE RATED TANK WATER LEVEL SENSOR

MARK	EQUIPMENT LISTING AND SUPPLIER
G	36" DIAMETER SEALED MANHOLE AND COVER
H	4" NPT FFG W/ DUAL, NET FILL AND DE-AERATING POINTS
I	10" NPT FITTING WITH VENT-LEVEL INDICATOR ASSEMBLY
J	AIR RELEASE VALVE AND CHECK VALVE
K	VERTICAL TURBINE FINE PUMP
L	HEAT TREAT AND ALUMINUM PROTECTIVE JACKET PIPING

CONCRETE TANK CONSTRUCTION AND INSTALLATION SHALL BE PER NFPA 22 REQUIREMENTS, CONFORMING TO ACI 318 AND 350R. ALL INTERIOR SURFACES SHALL BE TREATED AND MADE WATER IMPERVIOUS BY PERMANENT COATING.

FIRE PUMP HOUSE ASSEMBLY PLAN

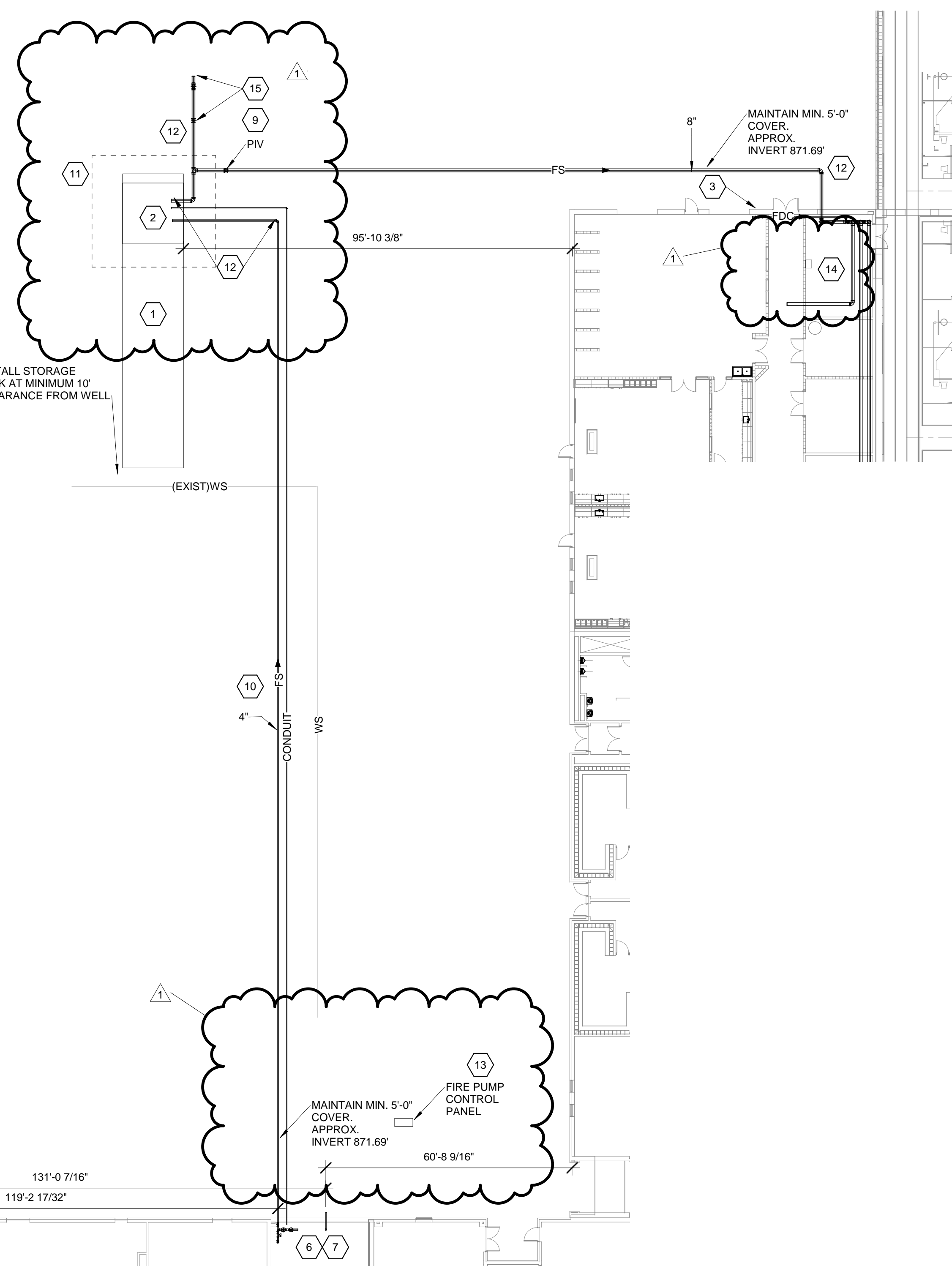


PUMP HOUSE GENERAL NOTES

LOCATION OF COMPONENTS INDICATED ON PLAN FOR GENERAL REFERENCE AND BIDDING PURPOSES ONLY. COORDINATE ALL SERVICE AND UTILITY CONNECTIONS WITH FINAL EQUIPMENT SUPPLIER DOCUMENTS. CONTRACTOR SCOPE INCLUDES COMPLETE AND FUNCTIONAL ASSEMBLY AS INDICATED IN THE DRAWINGS. COMPONENTS, ELEMENTS, AND SERVICES EXCLUDED FROM FACTORY ASSEMBLY SHALL BE INCLUDED IN THE FIELD FURNISHED AND INSTALLED PROJECT SCOPE.

PLAN NOTES

- FIRE SUPPRESSION STORED WATER SUPPLY TANK,
UNDER BASE BID, COATED STEEL TANK AS DETAILED
PER BASE BID SPECIFICATIONS AND DETAILS. UNDER
FIRE SUPPRESSION ALTERNATE, CONCRETE BELOW
GRADE FIRE SUPPRESSION WATER STORAGE TANK.
- 2 UNDER BASE BID, EXTERIOR FACTORY ASSEMBLED FIRE PUMP HOUSE,
UNDER FIRE SUPPRESSION ALTERNATE, GENERAL LOCATION OF
RISER MOUNTED FIRE PUMP.
- 3 WALL MOUNTED FIRE DEPARTMENT CONNECTION,
PROVIDE CHECK VALVE AND BALL DRIP, EXTEND
BALL DRIP DISCHARGE THROUGH WALL.
- 4 REFER TO ENLARGED PLAN.
- 5 SCOPE CONTINUED ON FIRST FLOOR PLAN.
- 6 SCOPE CONTINUED ON MECHANICAL ROOM PLAN.
- 7 TANK FILL CONTROL VALVE.
- 8 FIRE RISERS.
- 9 POST INDICATOR VALVE WITH SUPERVISORY
ATTACHMENT.
- 10 PROVIDE CONDUIT AND SIGNAL WIRING FROM
TANK LEVEL MONITOR IN FIRE PUMP HOUSE AND
EXTEND TO CONNECTION AT TANK LEVEL
MONITORING PANEL AND FILL VALVE IN EXISTING
MECHANICAL ROOM.
- 11 REFER TO ENLARGED SCALE PLAN.
- 12 PROVIDE THRUST BLOCK AT PUMPING CHANGE IN
DIRECTION.
- 13 UNDER FIRE SUPPRESSION ALTERNATE, FIRE PUMP
CONTROL PANEL. COORDINATE LOCATION WITH MECH. YARD EQUIPMENT.
- 14 UNDER FIRE SUPPRESSION ALTERNATE, JOCKEY PUMP
CONTROL PANEL.
- 15 UNDER FIRE SUPPRESSION ALTERNATE, PROVIDE FIRE PUMP
TEST HEADER, FREESTANDING, SET IN CONCRETE WITH (4) - 2.5"
OUTLETS WITH CHAINED CAPS AND SIGNAGE. PROVIDE BELOW
GRADE GATE TYPE SHUT OFF VALVE WITH EXTENSION AND GRADE
LEVEL DISCHARGE TO FISHED COVER PLATE.



VERIFICATION NOTE

CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CLEARANCES AND ALL EXISTING FIELD CONDITIONS BEFORE STARTING CONSTRUCTION. COMMENCEMENT OF WORK CONSTITUTES ACCEPTANCE OF CONDITIONS

SHOULD DIFFERENT CONDITIONS BE ENCOUNTERED,
CONTACT THE ARCHITECT BEFORE PROCEEDING
WITH WORK

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**TIPPECANOE
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SCHOOL A & R**

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46910

**TIPPECANOE VALLEY
SCHOOL CORPORATION**



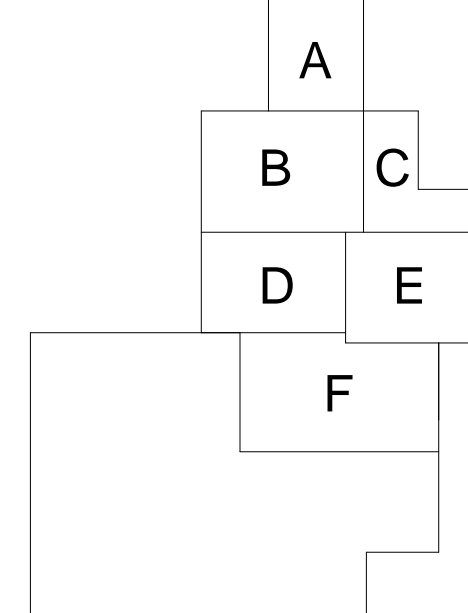
ARCHITECT

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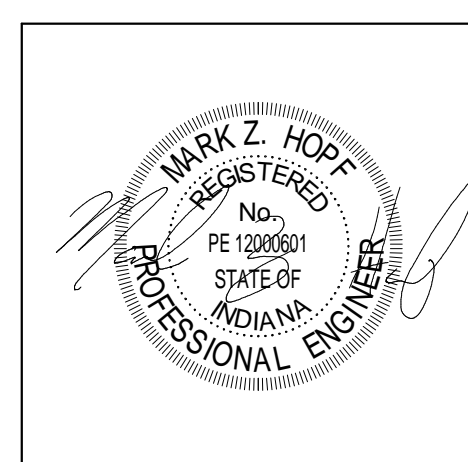
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KEY PLAN

CONSTRUCTION DOCUMENTS



PROJECT MANAGER: MKS

DRAWN BY: CSS

PROJECT NUMBER: 220158.00

PROJECT ISSUE DATE: 9/6/2022

[illegible]

FIRE SUPPRESSION SITE PLAN AND DETAILS

FP.03

TIPPECANOE VALLEY HIGH SCHOOL A&R

8345 STATE ROUTE 19, AKRON, IN 46910

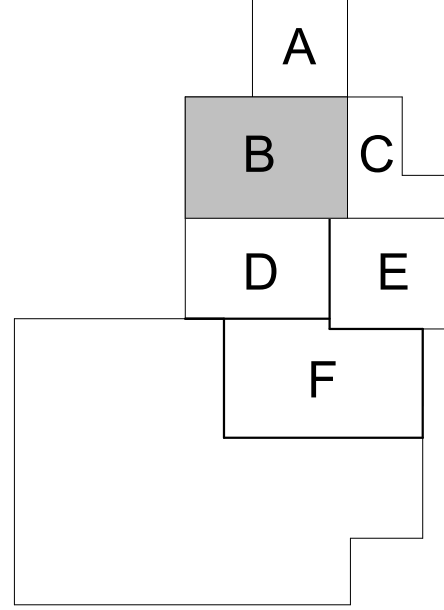
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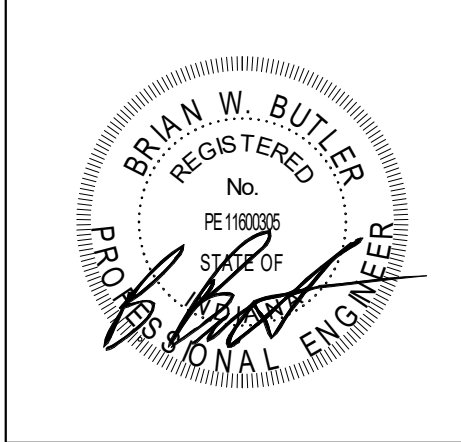
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KEY PLAN

CONSTRUCTION DOCUMENTS



PROJECT MANAGER: MKS
DRAWN BY: AMN
PROJECT NUMBER: 220158.00
PROJECT ISSUE DATE: 09/06/2022

REV. NO.	DESCRIPTION	DATE
2	ADDENDUM 2	9/27/2022

UNIT B - FIRST FLOOR POWER PLAN

E5.2

ROOM LEGEND - FIRST FLOOR UNIT B		
ROOM NO.	ROOM NAME	AREA (SF)
B101	CORRIDOR	1123 SF
B102	AG LAB	1827 SF
B103	AG CLASSROOM 2	1083 SF
B104	AG LAB CLEAN WORK ROOM	212 SF
B105	AG CLASSROOM 1	1051 SF
B106	AG PLANNING	234 SF
B107	FIELDHOUSE STORAGE	419 SF
B108	AG LAB STORAGE	231 SF
B109	AG LAB CONSTRUCTION	302 SF
B110	CUSTODIAL OFFICE	209 SF
B111	STORAGE	697 SF
B112	FIELD HOUSE	13884 SF

GENERAL NOTES - POWER

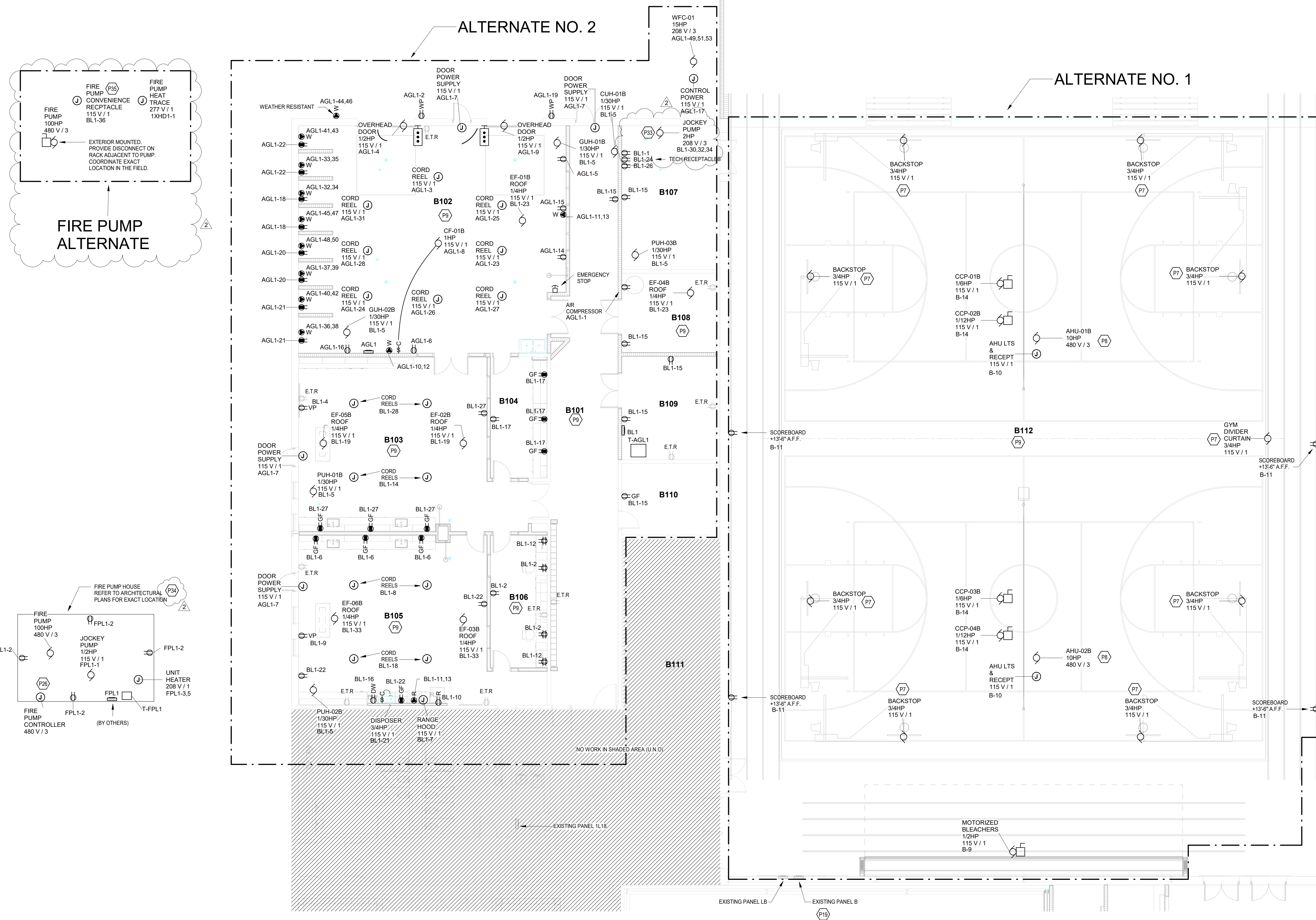
- PROVIDE REVISED TYPED PANELBOARD DIRECTORIES FOR EACH PANELBOARD ADDED OR MODIFIED DURING CONSTRUCTION. FIELD VERIFY EXISTING CIRCUIT INFORMATION WITH OWNER'S ASSISTANCE TO ENSURE FINAL DIRECTORY IS ACCURATE. UNUSED SPARE BREAKERS SHALL BE IN THE OFF POSITION.
- VIDEO PROJECTOR RECEPTACLE TO BE MOUNTED ABOVE WALL MOUNTED PROJECTOR BRACKET, 96" A.F.F. UNO.
- CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CLEARANCES AND ALL EXISTING FIELD CONDITIONS BEFORE STARTING CONSTRUCTION. COMMENCEMENT OF WORK CONSTITUTES ACCEPTANCE OF CONDITIONS. SHOULD DIFFERENT CONDITIONS BE ENCOUNTERED, CONTACT THE ARCHITECT BEFORE PROCEEDING WITH WORK.
- LABEL EACH RECEPTACLE WITH THE PANEL NAME AND CIRCUIT NUMBER ON THE FACE OF EACH COVER PLATE WITH A TYPED LAMINATED LABEL.
- PROVIDE "GFCI PROTECTED" LABEL ON COVER PLATE FOR ANY GFCI PROTECTED DEVICE.
- CONTRACTOR SHALL INCREASE CIRCUIT CONDUCTOR SIZE TO COMPENSATE FOR VOLTAGE DROP DUE TO EXCESSIVE CIRCUIT LENGTHS. IN NO CASE SHALL VOLTAGE DROP EXCEED NFPA 70 (N.E.C.) REQUIREMENTS.
- REFER TO MECHANICAL PLANS FOR LOCATION OF MECHANICAL EQUIPMENT. LOCATE DISCONNECT SWITCHES PER NEC.
- REFER TO "CONTROL SCHEMATICS" MECHANICAL DRAWINGS FOR ADDITIONAL CONTROL WIRING AND CONTROL CONNECTIONS.
- ALL DEVICES, EQUIPMENT, FIXTURES, AND THE LIKE, SHALL BE BONDED WITH A PROPERLY SIZED EQUIPMENT GROUNDING CONDUCTOR. MAINTAIN MECHANICAL/ELECTRICAL BONDS OF METALLIC RACEWAY SYSTEM.
- REPLACE EXISTING TO REMAIN RECEPTACLES WITH NEW DEVICES AND FACEPLATES.

KEYNOTES

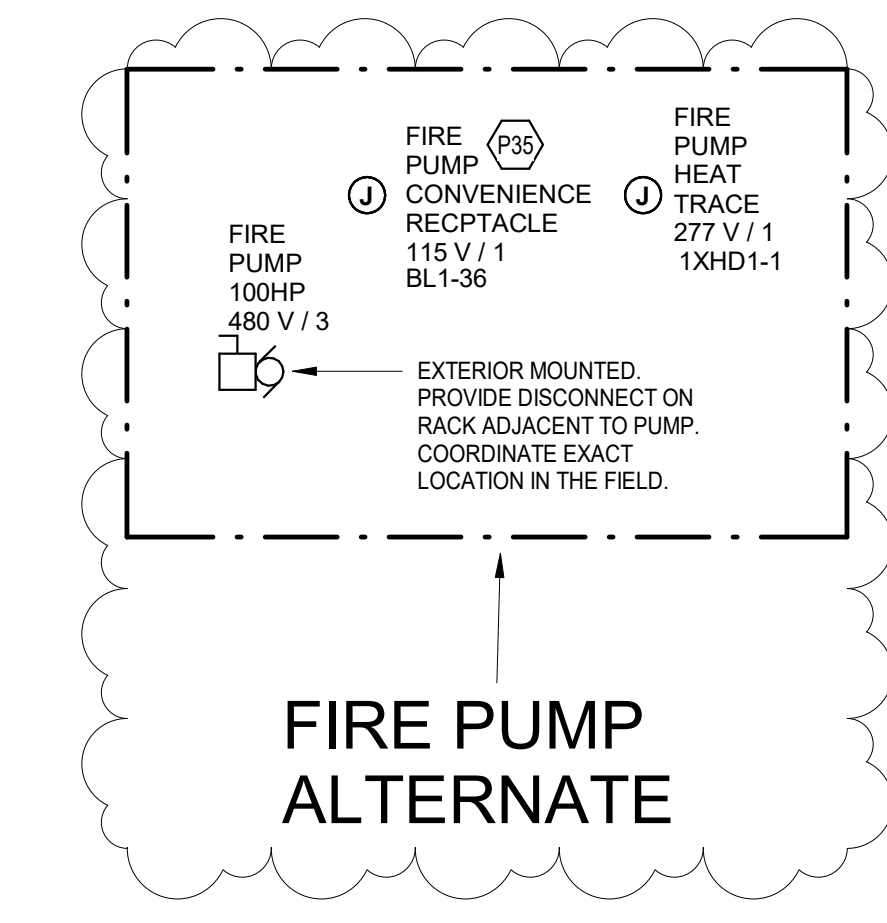
P7	CONNECT EQUIPMENT TO AVAILABLE SPACE IN DRAPER RELAY PANEL. PROVIDE ALL WIRING TO THIS RELAY PANEL AS REQUIRED.
P8	CONNECT ROOFTOP AIR HANDLING UNIT TO AVAILABLE SPACE IN PANEL LB. PROVIDE A 25A 3-POLE CIRCUIT BREAKER IN PANEL AND CONNECT WITH 3/10, #100 IN S.W.C.
P9	PROVIDE NEW DEVICES AND FACEPLATES AT EXISTING RECEPTACLE LOCATIONS.
P19	NEW CIRCUITS SHOWN CONNECTED TO THIS EXISTING PANEL SHALL BE NUMBERED BASED ON AVAILABLE SPACES AND SPACES FOR THESE CIRCUITS.
P26	PROVIDE A CONTROL CONNECTION FROM THE FIRE PUMP CONTROLLER TO THE BAS SYSTEM TO SHUTDOWN HEATING WATER PUMP HW-1 UPON CALL FOR FIRE PUMP START. BAS IS TO CEASE HW-1 OVERBRIDGE UPON FIRE PUMP SHUTDOWN.
P33	JOCKEY PUMP AT THIS LOCATION IS INCLUDED IN THE FIRE PUMP ALTERNATE.
P34	ELIMINATE THE FIRE PUMP HOUSE AND ALL COMPONENTS CONTAINED WITHIN UNDER THE FIRE PUMP ALTERNATE.
P35	PROVIDE A CONVENIENCE RECEPTACLE AT THE FIRE PUMP. PROVIDE MOUNTING HARDWARE AS REQUIRED.

UNIT B - FIRST FLOOR POWER PLAN

SCALE: 1/8" = 1'-0"



FIRE PUMP ALTERNATE



ALTERNATE NO. 2

ALTERNATE NO. 1



**TIPPECANOE VALLEY
SCHOOL CORPORATION**

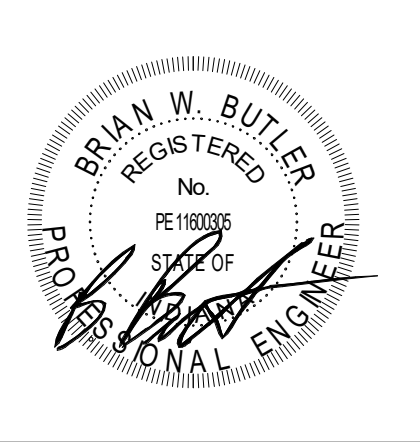


**FANNING
HOWEY**

The diagram illustrates a sequence of six rectangular blocks labeled A through F, arranged in a staircase pattern. Block A is at the top, followed by B and C, then D and E, and finally F at the bottom. Block D is shaded gray.



CONSTRUCTION DOCUMENTS

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E5.4

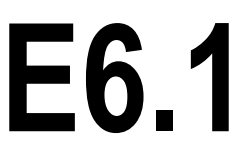


ALTERNATE NO. 3

ROOM LEGEND - FIRST FLOOR UNIT F		
ROOM NO.	ROOM NAME	AREA (SF)
F101	STORAGE	175 SF
F102	CORRIDOR	611 SF
F103	STORAGE	83 SF
F103A	PASSAGE	75 SF
F104	CORRIDOR	1980 SF
F105	LOCKERS	464 SF
F106	OFFICE	177 SF
F107	JANITOR	28 SF
F108	RESTROOM	137 SF
F109	ATHLETIC STORAGE	118 SF
F110	SHOWERS	78 SF
F111	ELECTRICAL	82 SF
F112	LOCKERS	564 SF
F113	OFFICE	172 SF
F114	JANITOR	28 SF
F115	RESTROOM	137 SF
F116	ATHLETIC STORAGE	118 SF
F117	SHOWER	78 SF
F118	STORAGE	169 SF
F119	TEAM ROOM	554 SF
F120	CORRIDOR	765 SF
F121	SGI	193 SF
F122	JANITOR	24 SF
F123	VESTIBULE	50 SF
F124	LOCKER ROOM	244 SF
F125	TRAINING ROOM	175 SF
F126	TRAINING ROOM	472 SF
F127	STORAGE	170 SF
F128	ELECTRICAL CLOSET	91 SF
F129	MULTI-PURPOSE	3100 SF
F130	STORAGE	161 SF
F131	INDIVIDUAL RESTROOM	65 SF
F134	DRESSING	173 SF
F135	DRESSING	181 SF
F136	INDIVIDUAL RESTROOM	65 SF
F137	RESTROOM	39 SF
F138	TRAINING ROOM	345 SF
F139	TRAINING ROOM	214 SF

1. QUANTITY AND LOCATION OF TAMPER AND FLOW SWITCHES IS FOR BIDDING PURPOSES ONLY. VERIFY EXACT QUANTITY AND LOCATIONS WITH SPRINKLER CONTRACTOR PRIOR TO FIRE ALARM SHOP DRAWING SUBMITTAL.

KEYNOTES	
F1	PROVIDE ADDRESSABLE INTERFACE DEVICE TO CONNECT CEILING FAN CONTROLS TO FIRE ALARM SYSTEM. PROGRAM AS REQUIRED FOR FAN SHUTDOWN DURING FIRE ALARM ACTIVATION.
F2	EXISTING FIRE ALARM DEVICES IN THIS SPACE ARE EXISTING TO REMAIN.
F3	PROVIDE WEATHER RESISTANT FIRE ALARM CONNECTIONS AT THE FIRE PUMPS AS REQUIRED. VERIFY QUANTITIES IN THE FIELD. CORRECTLY EXACT LOCATION OF THE FIRE PUMP IN THE FIELD.
F4	FIRE ALARM DEVICES AT THIS LOCATION ARE BASE BID.
F5	PROVIDE FIRE ALARM SYSTEM CONNECTIONS FOR THE FIRE SUPPRESSION TANK LEVEL CONTROLLER. PROGRAM FIRE ALARM SYSTEM AS REQUIRED.



SOURCE 2014 NEC 310.15(B)(6), ALUMINUM 75C, (THW, THWN, THWN XHHW)						
X		CONDUCTOR SIZE			CONDUIT	
FEEDER	NO.	PHASE	NEUTRAL	GROUND	SIZE	
LEGEND	SETS	QTY	(1)	(1)	Inches	
100A	1	3 # 1/2	#4		1 1/2	
100MA	1	3 # 1/2	#10	#4	1 1/2	
125A	1	3 # 2/3		#4	2	
125MA	1	3 # 2/3	#20	#4	2	
150A	1	3 # 3/3		#4	2	
150MA	1	3 # 3/3	#30	#4	2	
175A	1	3 # 4/3		#4	2	
175MA	1	3 # 4/3	#40	#4	2	
200A	1	3 # 25/3		#4	2 1/2	
200MA	1	3 # 25/3	#250	#4	2 1/2	
225A	1	3 # 30/3		#2	3	
225MA	1	3 # 30/3	#300	#2	3	
250A	1	3 # 35/3		#2	3	
250MA	1	3 # 30/3	#300	#2	3	
300A	1	3 # 50/3		#2	3	
300MA	1	3 # 50/3	#500	#2	3	
350A	2	3 # 50/3		#1	2	
350MA	2	3 # 50/3	#500	#1	2	
400A	2	3 # 25/3		#1	2 1/2	
400MA	2	3 # 25/3	#250	#1	2 1/2	
450A	2	3 # 30/3		#1 1/3	3	
450MA	2	3 # 30/3	#300	#1 1/3	3	
500A	2	3 # 35/3		#1 1/3	3	
500MA	2	3 # 25/3	#350	#1 1/3	3	
600A	2	3 # 40/3		#2	3	
600MA	2	3 # 50/3	#500	#2	3	
700A	3	3 # 25/3		#3 1/3	4	
700MA	3	3 # 50/3	#250	#3 1/3	4	
800A	3	3 # 40/3		#3 1/3	4	
800MA	3	3 # 50/3	#500	#3 1/3	4	
1000A	3	3 # 60/3		#4 1/3	4	
1000MA	3	3 # 60/3	#600	#4 1/3	4	
1200A	4	3 # 50/3		#2 5/8	4	
1200MA	4	3 # 50/3	#500	#2 5/8	4	
1600A	5	3 # 60/3		#3 5/8	4	
1600MA	5	3 # 60/3	#600	#3 5/8	4	
2000A	6	3 # 60/3		#4 1/2	4	
2000MA	6	3 # 60/3	#600	#4 1/2	4	
2500A	8	3 # 60/3		#5 1/2	4	
2500MA	8	3 # 60/3	#600	#5 1/2	4	
3000A	9	3 # 60/3		#6 1/2	4	
3000MA	9	3 # 60/3	#600	#6 1/2	4	
4000A	12	3 # 60/3		#8 1/2	4	
4000MA	12	3 # 60/3	#600	#8 1/2	4	



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Branch Panel: 2H3													
Location: MECHANICAL MEZZANINE...						Volts: 480/277 Wye				A.I.C. Rating:			
Supply From: SB2						Phases: 3				Mains Type: M.C.B			
Mounting: Surface						Wires: 4				Mains Rating: 400 A			
Enclosure: Type 1						MCB Rating: 400 A							
Notes: INTEGRAL SURGE PROTECTION													
CKT	Circuit Description	Trip	Poles	A (VA)	B (VA)	C (VA)	Poles	Trip	Circuit Description	CKT			
1	Lighting - Unit E second floor	20 A	1	351 1732				1	20 A	Lighting - Rm. D105	2		
3	Lighting Room 363, 412, 431, 168, 539, 538, 371...	20 A	1		1578 3977			1	20 A	Lighting - Unit C	4		
5	Spare	20 A	1			0 2165		1	20 A	Lighting - Rm. D105	6		
7	Lighting - Unit E	20 A	1	2263 2598				1	20 A	Lighting - Rm. D105	8		
9	Air Handling Unit AHU-01C - Mezzanine (NOTE 3)	40 A	3		5817 2598			1	20 A	Lighting - Rm. D105	10		
11	--	--	--			5817 2165		1	20 A	Lighting - Rm. D105	12		
13	--	--	--	5817 2105				3	20 A	Air Handling Unit AHU-02C - Mezzanine (NOTE 1)	14		
15	DOAS-01E - POOL OUTSIDE AIR UNIT (NOTE 4)	60 A	3		10415 2105			--	--	--	16		
17	--	--	--			10415 2105		--	--	--	18		
19	--	--	--	10415 23046				3	125 A	AHU-01E - POOL DEHUMID UNIT (NOTE 5)	20		
21	Air Handling Unit AHU-03C - Mezzanine (NOTE 2)	25 A	3		3878 23046			--	--	--	22		
23	--	--	--			3878 23046		--	--	--	24		
25	--	--	--	3878 2105				3	20 A	Air Handling Unit AHU-04C - Mezzanine (NOTE 1)	26		
27	Lighting - Rm. D105	20 A	1		1732 2105			--	--	--	28		
29	Pool Pump (NOTE 3)	40 A	3			5817 2105		--	--	--	30		
31	--	--	--	5817 0				1	20 A	Spare	32		
33	--	--	--		5817 0			1	20 A	Spare	34		
35	Spare	20 A	1			0 0		1	20 A	Spare	36		
37	Spare	20 A	1	0 0				1	20 A	Spare	38		
39	Spare	20 A	1		0 0			1	20 A	Spare	40		
41	Spare	20 A	1			0 0		1	20 A	Spare	42		
Total Load:				60128 VA	63069 VA	57514 VA							
Total Amps:				219 A	229 A	208 A							
Legend:													
Load Classification		Connected Load		Demand Factor		Estimated Demand		Panel Totals					
Lighting		21159 VA		100.00%		21159 VA							
Motor		159552 VA		110.83%		176837 VA							
								Total Conn. Load: 180711 VA					
								Total Est. Demand: 197996 VA					
								Total Conn.: 217 A					
								Total Est. Demand: 236 A					
Notes:													
NOTE 1: CONNECT WITH 3#12, #12G IN 3/4"C.													
NOTE 2: CONNECT WITH 3#10, #10G IN 3/4"C.													
NOTE 3: CONNECT WITH 3#6, #10G IN 3/4"C.													
NOTE 4: CONNECT WITH 3#6, #10G IN 1"C.													
NOTE 5: CONNECT WITH 3#1, #6G IN 2"C.													

Branch Panel: 2L1													
Location: MECHANICAL MEZZANINE...						Volts: 208/120 Wye				A.I.C. Rating:			
Supply From: T-2L1						Phases: 3				Mains Type: M.C.B			
Mounting: Surface						Wires: 4				Mains Rating: 200 A			
Enclosure: Type 1										MCB Rating: 200 A			
Notes: INTEGRAL SURGE PROTECTION													
CKT	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	CKT			
1	Receptacle #4 - RM E107	20 A	1	180	360			1	20 A Quad Receptacle #1 - Rm. E107	2			
3	Door Access Rm. B101, E102, E110	20 A	1		200	1127		1	20 A Bleachers RM D105	4			
5	Proscenium Receptacles	20 A	1			360	600	1	20 A Water Cooler Rm. C101 (NOTE 1)	6			
7	Receptacle Rm. E102, E103, EXT.	20 A	1	640	1200			1	20 A Dishwasher - Rm. C104	8			
9	Monitors - East Wall RM C114	20 A	1		1350	1690		1	20 A Video Projectors - RM C102 & C110	10			
11	Monitors - West Wall RM C114	20 A	1			900	1080	1	20 A Receptacle - Rm. E116	12			
13	Spare	20 A	1	0	180			1	20 A Receptacle Treadmill - Rm. C112	14			
15	Receptacle Treadmill - Rm. C112	20 A	1		180	180		1	20 A Receptacle #2 - RM E107	16			
17	Auditorium Control Booth	20 A	1			1440	180	1	20 A Receptacle Treadmill - Rm. C112	18			
19	Receptacle #1 - RM E107	20 A	1	180	360			1	20 A Quad Receptacle #2 - Rm. E107	20			
21	Quad Receptacle #5 - Rm. E107	20 A	1		360	540		1	20 A Receptacle Rm. C112	22			
23	Receptacle #3 - RM E107	20 A	1			180	360	1	20 A Receptacles - Stage E106	24			
25	Auditorium 2nd Floor Receptacles	20 A	1	540	600			1	20 A Water Cooler Rm. C102 (NOTE 1)	26			
27	Water Cooler Rm. C110 (NOTE 1)	20 A	1		600	720		1	20 A Receptacle Rm. E104, E105, E114, E115	28			
29	Receptacle Rm. E108, E109	20 A	1			540	600	1	20 A Water Cooler Rm. E102 (NOTE 1)	30			
31	Receptacle Rm. C115	20 A	1	720	720			1	20 A Receptacle Rm. C105	32			
33	Receptacle Rm. C112	20 A	1		720	720		1	20 A Receptacle Rm. C104	34			
35	Receptacles Rm. C101, C113, CUH-01C,...	20 A	1			720	720	1	20 A Receptacle Rm. C114	36			
37	Receptacle Rm. D105, D108, D110	20 A	1	720	720			1	20 A Mechanical Mezzanine Receptacles	38			
39	Receptacle - Rm. E106	20 A	1		720	900		1	20 A Receptacle Rm. C107	40			
41	Receptacle Rm. C105	20 A	1			720	720	1	20 A Receptacle - Rm. E113	42			
43	Receptacle - Rm. E108, E110, EXT.	20 A	1	900	1080			1	20 A Receptacle - Rm. E117	44			
45	Receptacle Rm. C107-C111, CUH-04C	20 A	1		1080	1260		1	20 A Receptacle Rm. C102, C03, C106	46			
47	Receptacle Space 430	20 A	1			900	1080	1	20 A Receptacle Rm. D102 - D104, OHD - Rm. D102	48			
49	Receptacle - Rm. E116	20 A	1	1260	0			1	20 A Spare	50			
51	Spare	20 A	1		0	0		1	20 A Spare	52			
53	Receptacle Rm. C114	20 A	1			1260	0	1	20 A Spare	54			
55	Spare	20 A	1	0	0			1	20 A Spare	56			
57	Spare	20 A	1		0	0		1	20 A Spare	58			
59	Spare	20 A	1			0	0	1	20 A Spare	60			
				Total Load:	10360 VA	12347 VA	12360 VA						
				Total Amps:	86 A	105 A	106 A						
Legend:													
Load Classification		Connected Load		Demand Factor		Estimated Demand		Panel Totals					
Motor		1817 VA		115.51%		2099 VA							
Other		300 VA		100.00%		300 VA		Total Conn. Load: 35067 VA					
Receptacle		32950 VA		65.17%		21475 VA		Total Est. Demand: 23874 VA					
								Total Conn.: 97 A					
								Total Est. Demand: 66 A					
Notes:													
NOTE 1: PROVIDE WITH 5mA GFCI BREAKER.													
NOTE 2: CONNECT WITH 2#10, #10G IN 3/4".													