

ADDENDUM NO. 1
to the
PLANS AND SPECIFICATIONS
for the
WASTEWATER IMPROVEMENTS PROJECT
DIV. I – WASTEWATER TREATMENT PLANT IMPROVEMENTS
for the
TOWN OF WATERLOO
DEKALB COUNTY, INDIANA
MEI PROJECT #2020073-00
Issue Date: APRIL 24, 2024

This addendum becomes part of the Contract Documents and modifies the original Contract Documents as noted below. Acknowledge receipt of this Addendum by inserting the number and issue date of this addendum in the blank space provided on the Bid Form.

The following items shall amend, clarify, and/or correct plans and/or specifications for the above project and shall take precedence over items in conflict herein:

Item No. 01 Reference Specifications, Agreement, Section 4.03, Contract Time: Days

Change: On page 61, Section 4.03 of the Agreement addressing Contract Times of 450 days to substantial completion and 540 days to final completion, shall be changed.

To Read: The Work will be substantially complete within 730 days of the commencement of the Contract, which begins with the issuance of the Notice to Proceed and shall be inclusive of the submissions noted below. Upon issuance of the notice to proceed, Contractor shall immediately begin submission of shop drawings for all equipment and materials and shall submit an operational plan approved by the Owner and Engineer with a proposed construction schedule. All the preceding noted submissions shall be completed prior to commencing construction work on-site. At the latest, the Contractor shall commence work on-site no later than March 1, 2025. Final completion shall be 60 days following the issuance of the substantial completion.

Item No. 02 Reference Specifications, Supplementary Conditions of the Construction Contract, Section SC-1.01.A.53, Build America Buy America Act (BABBA)

Clarification: On page 4, Section 53.a, compliance with the Build America, Buy America Act (BABBA) is not required for this project. Compliance with American Iron and Steel (AIS) is required as directed in Section SC-1.01.A.52.

Item No. 03: Reference Specifications, General Construction, Section 033000 – Cast-In-Place Concrete, Part 2, 2.15, A. Walls & Footings: Normal-Weight Concrete, 7.

Delete: On page 11, Section 2.15-A-7, delete this section. Waterproofing Treatments are not required for this project.

- Item No. 04: Reference Specifications, Process Equipment, Section 06650 – Chemical Storage Tank**
Re-Issue: Re-Issue Section 06650 in its entirety with attached Specification.
- Item No. 05: Reference Specifications, Process Equipment, Section 11234 – Ultraviolet Disinfection Equipment, Part 2, 2.2, I. Low Water Level Sensor, 3.**
Change: The low water level sensor shall be powered by the Power Distribution Center.
To Read: The low water level sensor is powered by the Level Control Panel which is powered by the Power Distribution Center.
- Item No. 06: Reference Specifications, Process Equipment, Section 11234 – Ultraviolet Disinfection Equipment, Part 2, 2.2, J. Electrical, 8.**
Change: Electrical supply for the water level sensor shall be provided by the PDC and be 12 Volt DC.
To Read: Electrical supply for the low level water sensor is from the Level Control Panel (LCP) which is powered by the PDC through 24 VDC connection. Low level sensor also uses a 24 VDC connection from the LCP.
- Item No. 07: Reference Specifications, Process Equipment, Section 11234 – Ultraviolet Disinfection Equipment, Part 2, 2.2, L. Control and Instrumentation, 1c.**
Change: The SCC panel shall be constructed of painted steel.
To Read: The SCC enclosure shall be constructed of NEMA 4X S.S.
- Item No. 08: Reference Specifications, Process Equipment, Section 11310 – Submersible Pumps, 2.4 Pumps – Design Conditions and Pump Design, A.**
Add: 6. Sludge Transfer Pumps – These shall consist of two (2) pumps rated at a flow range of 160 GPM to 250 GPM. Total dynamic head (TDH) range shall be 30' to 28'. Pumps shall be 5 HP, 4" discharge, 6.5" cast iron impeller of non-clog design capable of passing a 3" solid. Furnish base elbow, sealing flange, and stainless steel lifting chain. Pumps to be mounted to existing removal rails.
7. Digester Decant Pump – This shall consist of one (1) pump rated at a flow range of 160 GPM to 250 GPM. Total dynamic head (TDH) range shall be 30' to 28'. Pump shall be 5 HP, 4" discharge, 6.5" cast iron impeller of non-clog design capable of passing a 3" solid. Furnish base elbow, sealing flange, stainless steel lifting chain, and removal rail system.
- Item No. 09: Reference Specifications, Process Equipment, Section 11332 – AquaStorm Cloth Media Filter, 6.3 Junction Box, A.**
Change: UL Listed, type 4X NEMA rated fiberglass wall mounted junction box shall be provided pre-mounted and wired to the tank when the main control enclosure is remotely mounted from the disk filter.
To Read: UL Listed, type 4X NEMA rated stainless steel wall mounted junction box shall be provided pre-mounted and wired to the tank when the main control enclosure is remotely mounted from the disk filter.
- Item No. 10: Reference Specifications, Process Equipment, Section 11353 – Alum Feed System**
Re-Issue: Re-Issue Section 11353 in its entirety with attached Specification.

Item No. 11: Reference Civil Plans, Sheet C2.01, Site Demolition Plan, Note #1

Change: Existing manholes to be abandoned shall have all pipe openings filled with a concrete plug, filled with sand to frame height and existing lid to be permanently closed with spot welds (typical each location).

To Read: Existing manholes to be abandoned shall be cleaned; casting, rim, top manhole section and all internal piping are to be removed; all incoming pipe inverts to be plugged with non-shrink grout; bottom of structure to be punctured and then backfilled with clean sand; and surface shall be restored per plans.

Item No. 12: Reference Civil Plans, Sheet C2.03, Site Piping and Utility Plan, Flow Control Valve

Clarification: The final location of the Flow Control Valve between manhole SA-1 and manhole No. 1 shall be field verified and coordinated with existing water and gas utilities, the existing water meter pit, and the location of the proposed asphalt drive.

Item No. 13: Reference Process Plans, Sheet P5.01, P5.02, P5.03, New Flow Filtering Building Plans and Sections, Backwash Flow Meter

Clarification: The backwash flow meter shall be 6" in lieu of 4" shown on the Drawings. Delete 6"x4" inlet and outlet reducer fittings, and install meter in 6" pump discharge piping without reductions.

Item No. 14: Reference Process Plans, Sheet P7.01, New Effluent Flow Meter Plan and Section, Prefabricated Parshall Flume

Clarification: The prefabricated parshall flume shall be equal to Plasti-Fab 9" flume with 1/4" composite FRP thickness, white gel coated interior and exterior finish, bottom and side box stiffeners, spreaders and anchor clips, integral staff gauge marked in feet and MGD, inlet wingwalls and outlet bulkheads for 2'-6" wide channel, and adjustable stainless steel radar mounting bracket.

Item No. 15: Reference Process Plans, Sheet P12.02, New Chemical Feed Building Plan and Details

Re-Issue: Re-issue Sheet P12.02 in its entirety with attached Drawing.

Item No. 16: Reference Process Plans, Sheet P12.03, New Chemical Feed Building Section and Details

Re-Issue: Re-issue Sheet P12.03 in its entirety with attached Drawing.

Item No. 17: Reference Structural Plans, Elevations

Clarification: On Drawings S4.02, S4.03, S6.01, S6.02, S9.02, S11.01, S11.02, S11.03, S13.02, reference the corresponding Process Drawings for structure elevations.

Item No. 18: Reference Structural Plans, Sheet S3.03, New Headworks Building Floor Plans, Upper Floor Framing

Re-Issue: Re-issue Sheet S3.03 in its entirety with attached Drawing.

Item No. 19: Reference Structural Plans, Sheet S3.08, New Headworks Building Sections, Transverse Section

Re-Issue: Re-issue Sheet S3.08 in its entirety with attached Drawing.

Item No. 20: Reference Structural Plans, Sheet S4.03, New Pump Station No. 1 Structural Details, Trolley Crane

Add: Trolley crane shall be an electric hoist with plain trolley rated for 1-ton capacity, 35-foot lift, 1-hp, 120v. Assembly shall be complete with standard push button control drop cord, molded chain container, weather cover, 35-foot power cord, and be equal to Coffing Model JLCET-2016-1-35.

Item No. 21: Reference Structural Plans, Sheet S5.01, New Flow Filtering Building Foundation Plan, Wall Dimensions

Clarification: The wall dimensions shown on the foundation plan (i.e. 10", 12") are intended to show the thickness of the stem walls beneath the block wall construction. CMU sizes are accurately shown in the corresponding wall sections.

Item No. 22: Reference Electrical Plans, Sheet E6.01, New UV Structure Power and Controls Plan, Low Level Sensor Wiring

Clarification: The low level sensor power is provided by the Level Control Panel (LCP), which receives its power from the PDC via 24 VDC. LCP to be added and wiring updated accordingly.

Item No. 23: Reference Electrical Plans, Sheet E8.01, RAS/WAS, Clarifiers and Effluent Pump Station SCADA System Notes

Add: The Contractor shall install an automatic/heated rain gauge provided by Owner. All conduit, miscellaneous material and wire shall be provided and installed by Contractor as required for fully functional system. Local 120V power and analog control terminations shall be included in the proposed control panel.

Item No. 24: Reference Electrical Plans, Sheet E10.01, Existing Blower Building Electrical Plan, 480V-3PH. Submersible Pump Receptacles in Aeration Tanks

Clarification: The Contractor shall field locate the proposed receptacles near the existing rails for when the submersible transfer pump is moved from one tank to the next.

Item No. 25: Reference Electrical Plans, Sheet E10.01, Existing Blower Building Electrical Plan, DO Probe/Controller Locations

Change: The DO Probe and Controller on uni-strut stand shown for Digester #3 shall be moved and installed on Existing Aeration Tank #2.

Clarification: The two DO probes need to be installed on the aeration tanks, not digester as previously indicated.

Item No. 26: Reference Electrical Plans, Sheet E12.01, RAS/WAS, Chemical Feed Building Electrical Plan and SCADA System Notes

Add: Analog input for chemical feed pump #1, #2 and #3 speed feedback.

Clarification: The Contractor shall provide and install conduit and wire for the above signals from each pump to the local operator station then to blower building control panel. This signal will be totalized in the SCADA system to calculate total alum usage.



April 24, 2024

Respectfully submitted,

MIDWESTERN ENGINEERS, INC.

A handwritten signature in cursive script that reads "Mark M. Sullivan".

Mark M. Sullivan, P.E.

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SECTION 06650 – CHEMICAL STORAGE TANK

PART 1 – GENERAL

1.1 DESCRIPTION

- A. Furnish and install one high density polyethylene storage tank in accordance with the definitions given in ASTM D 1998-96 (polyethylene upright storage tank). The tank shall be manufactured by rotational molding process. Tank capacity shall be listed within this specification.

1.2 REFERENCE STANDARDS

- A. Codes, specifications, and standards referred to by number or title shall form a part of this specification to the extent required by the references thereto. This includes ANSI B16.5 and ASTM D883. Latest revisions shall apply, unless otherwise shown or specified.

1.3 QUALITY ASSURANCE

- A. Perform field tests specified in this Section.
- B. The manufacturer shall warranty the products against defect in the manufacturing and workmanship covering all products manufactured and furnished by it. Warranty shall be for a period of five years from the date of shipment, with the last three years on a prorated basis. Warranty shall be delivered to the Owner for the tank at the time of shipment.
- C. The tank shall have a manufacturer's warranty for the storage of aluminum sulfate, as specified in this Section.

1.4 SUBMITTALS

- A. Submit the following:
 - 1. Certified copies of reports of factory tests specified in this Section and required by the referenced standards.
 - 2. Shop drawings with tank dimensions, weights, physical characteristics, materials of construction, and fitting sizes, types and locations.
 - 3. Wall thickness calculations per ASTM D1998 using 600 psi design hoop stress at 100°F.
 - 4. Resin used and a complete manufacturer's specification of the resin used.
 - 5. Manufacturer's installation instructions.
 - 6. Manufacturers shall certify in writing that the tank and all nozzles shall withstand continuous duty with its intended chemical without defects.
 - 7. Certificate of compliance stating that fabrication is in accordance with these specifications and resin is compatible with chemical to be stored.
 - 8. Information indicating UL tank manufacturing capabilities.
 - 9. Information indicating ISO 9001 certification.

- B. Samples: Representative samples of the high density crosslinked polyethylene tank shall be furnished at the time of shop drawing review. These samples shall be from plant production and shall be representative of quality and impact resistance of tank to be furnished. The Engineer may reject any tank, which does not meet the standard of the representative samples.

1.5 TANK IDENTIFICATION

- A. The tank shall be tagged at the factory with a permanent label indicating the intended service.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. The Contractor shall be responsible for the delivery, storage and handling of products.
- B. Promptly remove damaged products from the job site. Replace damaged projects with undamaged products.
- C. Thoroughly clean all equipment, components, and subassemblies of all water, sand, grit, weld splatter, grease, oil, and other foreign materials before preparation for shipment. Protect all machined surfaces against physical damage and exposure to the elements during shipment, handling, storage, and installation.
- D. Pack and ship equipment to provide ample protection from damage during shipment, handling and storage. Cap and seal all piping and fitting openings.

1.7 FACTORY TESTING

- A. The tank manufacturer shall perform the tests described below prior to shipping. Test samples shall be taken from the cut out areas where fittings are inserted in the tank. The Engineer or Owner's representative shall have the option of witnessing these factory tests.
 - 1. Impact Test: ASTM D1998-Section 11.3 shall be used for this test.
 - 2. Degree of Crosslinking Test: ASTM D1998-Section 11.4 shall be used in this test.
 - 3. Wall Thickness: The tank shall have an actual wall thickness measurement taken at every 90 degrees, at the one-foot elevation, up to three feet from the bottom of the tank.
 - 4. Hydrostatic Test: The tank shall be filled with water and checked for leaks no less than one hour after filling.

1.8 FACTORY QUALITY CONTROL

- A. The tank manufacturer must be ISO 9001 certified company with a minimum 10 years experience in the municipal market.

PART 2 – PRODUCTS

2.1 HIGH DENSITY CROSS-LINKED POLYETHYLENE TANK

- A. The tank shall be molded from crosslinked polyethylene. The resin used for molding shall be Schulink XL350, as manufactured by A. Schulman, or approved equal. The plastic shall contain no fillers. All plastic shall contain a minimum of 0.3% U.V. stabilizers compound by the resin manufacturer. Pigments may be added as desired by the customer or as designated by the tank manufacturer, not to exceed 0.5%-dry blended and 0.2%-compounded in, of the total weight. The mechanical properties of the polyethylene shall include ESCR, condition A F50 results for 100% Igepal as defined in ASTM D1593 as well as the results using a 10% Igepal solution. Both test results must exceed 1000 hours of exposure without failure. The tank manufacturer must supply a copy of the mechanical property table as provided by the resin manufacturer for the resin used to manufacture the specified polyethylene tank.
- B. The tank shall be designed with a hoop stress value no greater than 600 PSI at 100 degrees F, with a safety factor of no less than 2. The Barlow Formula shall be used to calculating the wall thickness at the bottom sidewall or at the area of the tank that experiences the greatest head pressure. The manufacture shall produce the crosslinked polyethylene tank with verifiable uniform wall thickness throughout the entire surface area of vessel. The crosslinked tank shall have a minimum 70% crosslinking throughout and Gel Test results shall be provided by the manufacturer using the test method as defined in ASTM D 1998-15. The sample used for the test shall come from the lowest point possible on the sidewall of the tank. The vessel shall be air-cooled to ensure a consistent cure throughout the thickness of the part and reduce the stress caused by shrinkage.
- C. The finished surface shall be as free as commercially practical from visual defects such as foreign inclusions; air bubbles, pinholes, and craters. All edges where openings are cut into the tank shall be trimmed smooth.
- D. The tank diameter shall be measured externally. The tolerance on the outside diameter shall be plus or minus 3%. The measurement shall be taken with the tank in the vertical position. All tank shall have a minimum 2-inch knuckle radius.

2.2 DESCRIPTION OF VESSEL

- A. The design of the vessel shall be vertical, flat bottom, closed top, and one piece seamless in construction. The top dome shall have a minimum of 3 flats to locate top dome mounted nozzles.

2.3 ACCESSORIES

- A. Side Wall Fittings - Fitting shall pass through the sidewall of the primary tank. The fitting shall be a metallic double male bolted style fitting. The metallic fitting shall be constructed out of material compatible with the tank contents. Fitting shall be constructed to an ANSI 150 LB. flange bolt hole pattern. A single gasket shall be placed between the metallic fitting and the inside of the primary tank wall. All mounting hardware shall be compatible with the tank contents.

- B. The sidewall fitting shall be designed so that all crosscuts are completely sealed off from chemical exposure by a full faced gasket compatible with the chemical being stored. The discharge nozzles on bulk tanks greater than 1,500 gallons shall be elevated with internal siphon tubes. Smaller bulk and day tank nozzles shall be located on the lower sidewall of the storage tank on the recessed fitting placement flat. Tank shall be shipped with discharge nozzle installed. No additional fitting installation will be required onsite.
- C. Dome Fittings - Tank shall be equipped with three (3) molded in fitting placement flats. Molded in flats shall be at 90-degree increments from tank manway. Flats shall be 14" x 14" square. All dome connections shall be PVC bulkhead fittings with Viton elastomers, manufactured by Hayward Industries or equal. The use of Hayward self-aligning dome fittings is permitted if the tank nozzle must be located off of a molded in flat. All dome fittings shall be fume tight.
- D. Manway Covers shall be 16" lever lock covers with 1/4" EPDM gasket. The manway covers shall be mounted on a raised flat molded integrally with the primary dome for structural support. Fume tight manway covers shall be bolted with PVC or stainless steel bolts with 1/2" crosslinked gasket.
- E. Vents - The vent size shall be directly related to the size of piping specified for discharge and filling. The size of vent shall also take into consideration product flow and air pressure experienced in normal fill and discharge operations. The standard vent shall be a schedule 40 PVC u-vent assembly, or a flanged bulkhead.
- F. Name Plates shall be self-adhesive, phenolic plastic engraved name plates shall include:
 - 1. Type of vessel, total volume and working capacity, product being stored including percentage of concentration, date vessel manufactured, and name of facility owner.
- G. Tank nozzle requirements - All connection penetrating the tank wall shall be made by the tank manufacturer. Nozzle designs must have a full faced gasket compatible to the chemical service that completely seals off the crosscuts required to install each nozzle.
- H. Reverse Float Level Indicator - A 2 inch PVC reverse float level indicator shall be provided on the tank to indicate the liquid level in the storage tank. The reverse float level indicator shall utilize a molded polyethylene float that rides on the liquid within the tank. A bright orange counter balance/indicator will show the liquid level in reverse action, as the liquid in the tank drops or rises.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. The tank shall be delivered, unloaded, and installed strictly according to manufacturer's written instructions.
- B. Foundation pads shall be smooth, and free of dirt, rocks, or any foreign matter.

- C. Concrete pads requiring coatings shall be coated and cured prior to installation of the tank.
- D. Install the tank as shown on the Drawings.
- E. Use Type 316 stainless steel expansion bolts to secure tank to floor. Bolts are to be drilled into tank pads.

3.2 ONSITE INSPECTION

- A. After the tank has been installed, a manufacturer's representative shall visit the site and inspect the tank and their installation. A minimum of one trip shall be provided.
- B. The representative shall note any deficiencies in the installation and recommend solutions to the Contractor.
- C. The representative shall deliver a written report to the Contractor and Engineer certifying acceptance of the installation to the manufacturer.
- D. The Contractor shall submit three copies of the report to the Owner.

3.3 FIELD TESTING

- A. After installation, the tank, connecting pipes, and valving shall be field-tested by filling with water. The tank and fittings shall hold water without loss, evidence of weeping or capillary action for a period of 24 hours prior to acceptance. The tank shall also be inspected for defects, damage, and conformance with the specifications.
- B. After testing, the tank shall be thoroughly cleaned and dried.
- C. Should any defects become evident during inspection, testing, or within the guarantee period, the Contractor shall repair or replace the defective tank or fitting as recommended by the manufacturer and approved by the Engineer.

CHEMICAL STORAGE TANK DATA SHEET

ALUMINUM SULFATE BULK TANK

Condition: Aluminum Sulfate, ambient temperature, atmospheric pressure, 1.35 specific gravity
Quantity: 1 - Model ICT1500, dome top, flat bottom Single Wall vertical bulk storage tank. Rated for 1.9 specific gravity liquids. Exceeds ASTM D 1998-06 standards minimum guidelines.
Size: 64" diameter X 123" overall height
Capacity: 1,500 US-gallons
Material: "NSF" Approved Schulink Crosslinked Polyethylene.
Color: Natural
U.V.: UV stabilizer provided with the resin.
Support: Tank rests on fully supported flat foundation. Tank to be installed per Assmann Corporation Tank Installation and Use Guidelines for Bulk Storage Tanks. Flexible expansion joints are required on all sidewall nozzles.

Nozzles:

Qty	Description	
1	4" PVC bulkhead, EPDM gasket	(Vent)
1	4" PVC flange adapter	
1	2" PVC bulkhead fitting, EPDM gasket	(Fill)
1	2" PVC flange adapter	
1	2" PVC 45 degree anti-foam elbow	
1	2" 316L stainless steel bolted double male nozzle, EPDM gasket	(Discharge)
1	2" PVC flange adapter	
1	2" PVC siphon	
1	2" Teflon expansion joint, S/S hardware	
1	3" PVC bulkhead fitting, EPDM gasket	(Overflow)
1	3" PVC flange adapter	
1	2" PVC self-aligning bulkhead fitting, EPDM gasket	(Level-Radar)
1	16" Lever-locking cover with EPDM gasket	(Manhole)
1	ASTM testing and documentation (ASTM Documentation)	
1	White phenolic engraved tank data plate	

Accessories: 2" PVC reverse float level, with internal polyethylene float & orange counter balance/indicator

Tank shall be manufactured by Assmann Corporation of America as distributed by The Henry P. Thompson Company or approved equal.

END OF SECTION

SECTION 11353 - ALUM FEED SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

- A. The Chemical Feed System shall be the standard equipment of the supplier involved in the manufacture of similar type equipment and shall be as manufactured by ProMinent Fluid Controls, Inc. as distributed by The Henry P. Thompson Company or engineered approved equal
- B. Chemical Metering Pumps shall be positive displacement pumps of either the electronic solenoid actuated diaphragm type. This specification addresses wall mounted chemical metering pump systems complete with the skid assembly containing chemical metering pumps, all necessary piping, valves, fittings, supports, electrical controls, and accessories as specified herein. The metering pump skid shall contain the following items:
 - 1. Floor Mount skid assembly
 - 2. Metering pumps with adjustable stroke length adjustment
 - 3. Calibration column
 - 4. Pulsation dampeners
 - 5. Pressure gauges with diaphragm seals
 - 6. Ball valves
 - 7. Pressure relief valves
 - 8. Backpressure valves
 - 9. All piping, valves, gaskets, supports, hardware, wiring, and accessories necessary for a fully functioning skid.
- C. Equipment of a different type, size, weight or design of that specified herein can be offered. However, such equipment shall be acceptable only on the basis of the following.
 - 1. Any revisions in the design and/or construction of the structure, piping, appurtenant equipment, electrical work, etc., required to accommodate such a substitution shall be made at no additional cost to the Owner.
 - 2. Changes in scope of equipment and performance thereof shall be the responsibility of the Contractor.
 - 3. All modifications to the scope shall be approved by the Engineer and must be determined to be the equal of that specified.

1.2 REFERENCE STANDARDS

- A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date. All materials, installation and workmanship shall comply with the applicable requirements and standards addressed within the following references:
 - 1. American National Standard Institute (ANSI)
 - 2. Occupational Safety and Health Administration (OSHA)
 - 3. National Electrical Manufacturers Association (NEMA)
 - 4. National Electrical Code (NEC)
 - 5. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.3 SUBMITTALS

- A. Product Data:
 - 1. One electronic copy of submittal data will be supplied for the system.
 - 2. Component data and shop drawings of the system will be supplied, including dimensions, weight, and parts list.
 - 3. When applicable control panel elevation, control schematics and component data will be supplied.
- B. Record Documents: Manufacturer's warranty form in which manufacturer agrees to repair or replace components that fail in materials or workmanship within specified warranty period.
- C. Operation and Maintenance Manuals. Provide complete operation and maintenance manuals for all equipment, in accordance with the requirements of Section 01 78 00, Closeout Submittals.

1.4 QUALITY ASSURANCE

- A. Manufacturer shall have minimum ten years of experience in manufacturing Chemical Feed Systems.
- B. All equipment provided under this section shall be obtained from a single supplier or manufacturer who shall assume full responsibility for the completeness and proper installation of the Chemical Feed System.
- C. To insure quality and unit responsibility, the Chemical Feed System must be assembled and tested by the manufacturer at its facility and be a standard regularly marketed product of that manufacturer. The manufacturer must have a physical plant, technical and design staff and fabricating personnel to complete the work specified. Skids assembled by a second party fabricator, integrator or contractor shall not be acceptable.
- D. Prior to shipment the Chemical Feed System shall be inspected for quality of construction verifying all fasteners and fittings are tight, all wires are secure and connection whisker-free. The Chemical Feed System shall be tested under pressure for a minimum of one hour at 100 psi. If leaks are found they shall be fixed and a new test shall be conducted for an additional hour at 100 psi until the Chemical Feed System is verified to be leak free.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.
- B. The feed system shall be specially designed, constructed and installed for the service intended and shall comply with the conditions listed in the schedule in Section 2.02 below. The VENDOR shall submit compatibility data from the manufacturer being supplied to confirm the materials of construction
- C. The skid mounting of the metering pumps shall conform the following requirements:

1. Each chemical feed system shall be completely assembled, mounted, calibrated, tested, and delivered to the site on a single skid. Components to be mounted on the skid are as indicated on the drawings and shall include the metering pumps, calibration column, piping, valves, piping accessories (pulsation dampeners, strainers, etc.), and wiring integral to the skid. The chemical feed system supplier shall be responsible for providing all equipment, valves and piping within the skid boundary.
 2. The skids shall be constructed of a minimum 3/8" thick fusion welded polypropylene sheets with adequate supports for all equipment and piping. The polypropylene material shall be UV protected and shall be suitable wall mounting as specified below or in project drawings.
 3. All components of the skid-mounted system (pumps, piping and controls) shall be tested prior to shipment as described in Part 1.06.D.
- D. Calibration Chamber: Provide one, clear plastic calibration chamber with vent for use in calibrating the metering pumps.
1. The chamber shall be sized to give adequate capacity for a minimum 60-second draw down test.
 2. The scale shall give direct readings in GPH without the need for calculations.
 3. The calibration chamber shall be piped and valved so that each pump shall be able to utilize the calibration chamber without interfering with the operation of the other pumps.
 4. The top of the chamber shall have a fitting to allow for piping to a common vent.
- E. Pulsation Dampeners:
1. Pulsation dampeners shall be of the single diaphragm design, capable of arresting water hammer in the pump discharge lines created by the metering pumps. The pulsation dampener shall dampen flow pulsations a minimum of 95 percent.
 2. Pulsation dampeners shall be provided with valves, gauges and fittings necessary for maintaining required air pressure in the air chamber.
 3. Materials of construction of diaphragm and body shall be corrosion resistant to the chemical fluid pumped.
 4. Provide one dampener on the discharge side of each metering pump.
 5. Each pulsation dampener shall include an integral pressure gauge.
- F. Back Pressure and Pressure Relief Valves;
1. Provide one type of each valve for each metering pump.
 2. Valves shall be spring-loaded, diaphragm-type, with materials of construction compatible with chemical service.
- G. Piping, Valves and Appurtenances: All pipe, molded fittings, valve end connectors and fabricated piping components shall be made of Schedule 80 PVC. Cement shall be as recommended by the pipe manufacturer for the services outlined in this Section.
- H. Tru-union Isolation valves shall be Asahi Type 21 ball valves and provided for isolation of major equipment. Seals shall be compatible with the chemical being pumped.

2.2 CHEMICAL FEED SYSTEMS REQUIRED

System Tag No.		Phosphorus Removal System
Qty		3 - primary pump arrangement
Service (Chemical)		Aluminum Sulfate
Chemical Conc	%	50
Specific Gravity		1.34
Temperature	F	
Feed Rate	GPH	21.1
Pressure at Injection Point	PSIG	29
Drive Type	Solenoid	
Speed Control	4-20mA	
Stroke Adjustment	Manual	
Electrical Requirement	V / ph / Hz	120V/1/60Hz
Control Panel	Terminal Box on Skid	
No. of Suction Points/Size	Skid	One (1) / ³ / ₄ inch
No. of Discharge Points/Size	Skid	Three (3) / ³ / ₄ inch
Shelf Spare	One (1)	
Type of Skid	Wall Mounted Fusion Welded Polyethylene Skid Base	

2.3 METERING PUMPS

- A. General
- Pump construction and features vary as a function of the pump flow output range. See paragraph 2.02.B above for pump flow range requirements, and see paragraphs below for pump specific design features.
 - The pump shall be designed for leak-proof operation and trouble-free performance.
- B. Metering Pump Capacity up to 21.1 gph:
- The chemical metering pump(s) shall be microprocessor-controlled, simplex, solenoid-driven, reciprocating, mechanically actuated diaphragm type. Motor driven metering pumps shall not be acceptable for the specified services. The housing shall be rated with a minimum IP65 protection rating.
 - The power supply shall have a universal power supply that allows it to operate at a supply voltage in the range of 100-230 VAC +/- 10%, 50-60 Hz, single-phase. The microprocessor is to automatically compensate for supply voltage variations within

3. All pumping functions shall be set by membrane-switch keypad and clickwheel. Status shall be displayed on an illuminated LCD. The keypad shall allow for simple scrolling and display of programmed parameters.
4. The liquid end shall be physically separated from the drive unit by a backplate with weep hole creating an air gap. An elastomer shaft wiper seal shall prevent contamination of the solenoid if the primary diaphragm fails.
5. The diaphragm shall be constructed of a steel core, vulcanized into nylon reinforced EPDM, with PTFE-faced fluid contact surface. The diaphragm shall be of a convex design fitting into a concave liquid end to minimize dead head volume and promote flow of solids in suspension. The pump shall also have a diaphragm failure detector option.
6. Liquid End Materials of Construction: shall be PVDF as required by the application. The PVDF liquid end shall be NSF 61 Certified for use with standard water treatment chemicals.
7. Stroke length control shall be electronically adjustable by means of the clickwheel, in increments of 1%, from 0% to 100% of stroke length. Stroke length shall be controlled within the pump solenoid and provide accurate feedback to the electronics of the pump for calibration for LCD display of stroke length.
8. The pump shall include the provision and drive technology to enable the timed flow of suction and discharge stroke profiles to optimize an application based on discharge or suction conditions. There shall be options for the following operations: Optimum, Fast Discharge, Sine Mode Discharge, Continuous Discharge or interface with a DFMA flow metering depending on application requirements.
9. Stroke rate shall be adjustable via the clickwheel and membrane-switch keypad from 1 to 12,000 strokes per hour and 10% of the rated voltage such that the frequency of the pump remains constant.
10. It shall be possible to select suction stroke profiles based upon the use of higher viscosity fluids. High Viscosity (HV) stroke profiles shall allow for lowering the speed of the pump suction to ensure complete filling of the liquid end on the suction stroke. These settings shall include, Normal, HV1, HV2 and HV3 with progressively lower stroking speeds for increasingly high fluid viscosity applications.
11. For simplified operator monitoring the pump shall be equipped with three LED displays (Red, Yellow and Green) to locally indicate normal operation, fault conditions and warning conditions.
12. Operating Modes – The pump shall have the following modes available:
 - a. Manual – Mode permits the pump to operate the pump stroke and speed controls manually.
 - b. Contact – Mode provides the option of controlling the pump externally by means of potential free contacts. The Pulse control option in the contact mode enables you to preselect the number of strokes.
 - c. Batch – Mode provides the option of working with large transfer factors (up to 99,999). Metering can be triggered either by pressing the Clickwheel or by a pulse received via the “External control” terminal or through a contact or a semiconductor switching element. It is possible to pre-select a metering volume (batch) or a number of strokes using the Clickwheel.
 - d. Analog – Mode allows the capacity and/or stroke rate to be controlled via an analogue current signal via the “External Contact” socket. The processing of the current signal can be preselected via the control unit.

13. The chemical metering pumps shall be a Gamma XL series model as manufactured by ProMinent Fluid Controls, Pittsburgh, PA as distributed by The Henry P. Thompson Company or approved equal.

2.4 SYSTEM DESCRIPTION

A. General

1. All wetted surfaces of feed pumps and all sealing gaskets shall be suitable for continuous exposure to chemical service shown on the pump schedule.
2. All wetted surfaces shall be of materials suitable for contact with potable water and shall not leach out any organic or inorganic constituent that is not permitted by local or federal regulations

B. Controls - Metering Pump Terminal Box

1. Include a skid mounted, three (3) pump (Aluminum Sulfate) NEMA 4X polycarbonate terminal box to include terminals for power and control / alarm cable connections for all pumps respectively..
 - a. 2. Terminal box shall be connected to SCADA for Local or Remote operation of the pumps.
 3. All functions of the pumps shall be available via the terminal box including a dry contact start and 4-20mA speed reference as well as the alarm contact status and analog feedback for each pump..

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.
- B. The equipment shall be installed per the contract documents and manufacturer's recommendations.
 1. Provide a manufacturer's certificate showing the equipment has been satisfactorily calibrated and tested.
 2. An authorized manufacturer's representative shall inspect the installation of all work furnished under this section and shall provide a certificate of proper installation.

3.2 MANUFACTURERS SERVICES

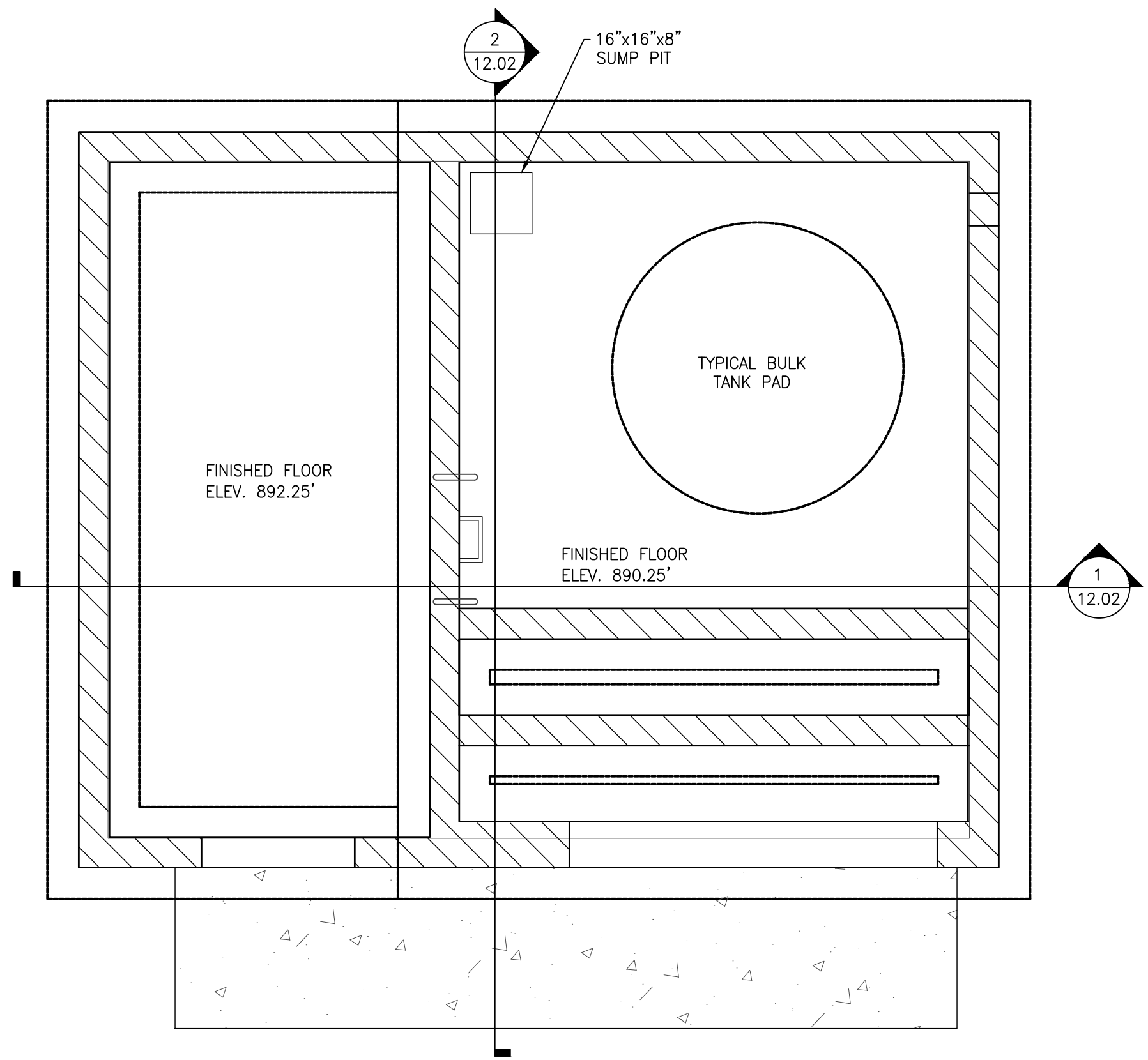
- A. The manufacturer or manufacturers representative shall provide the services of an experienced, authorized representative the equipment specified herein who shall be present at the jobsite and/or classroom designated by the City/District for the minimum man-days listed for the services shown below time travel excluded
 1. One man-day per site for inspection, start-up, functional testing and certificate of proper installation.
 2. One man-day per site for training commissioning.

3.3 WARRANTY

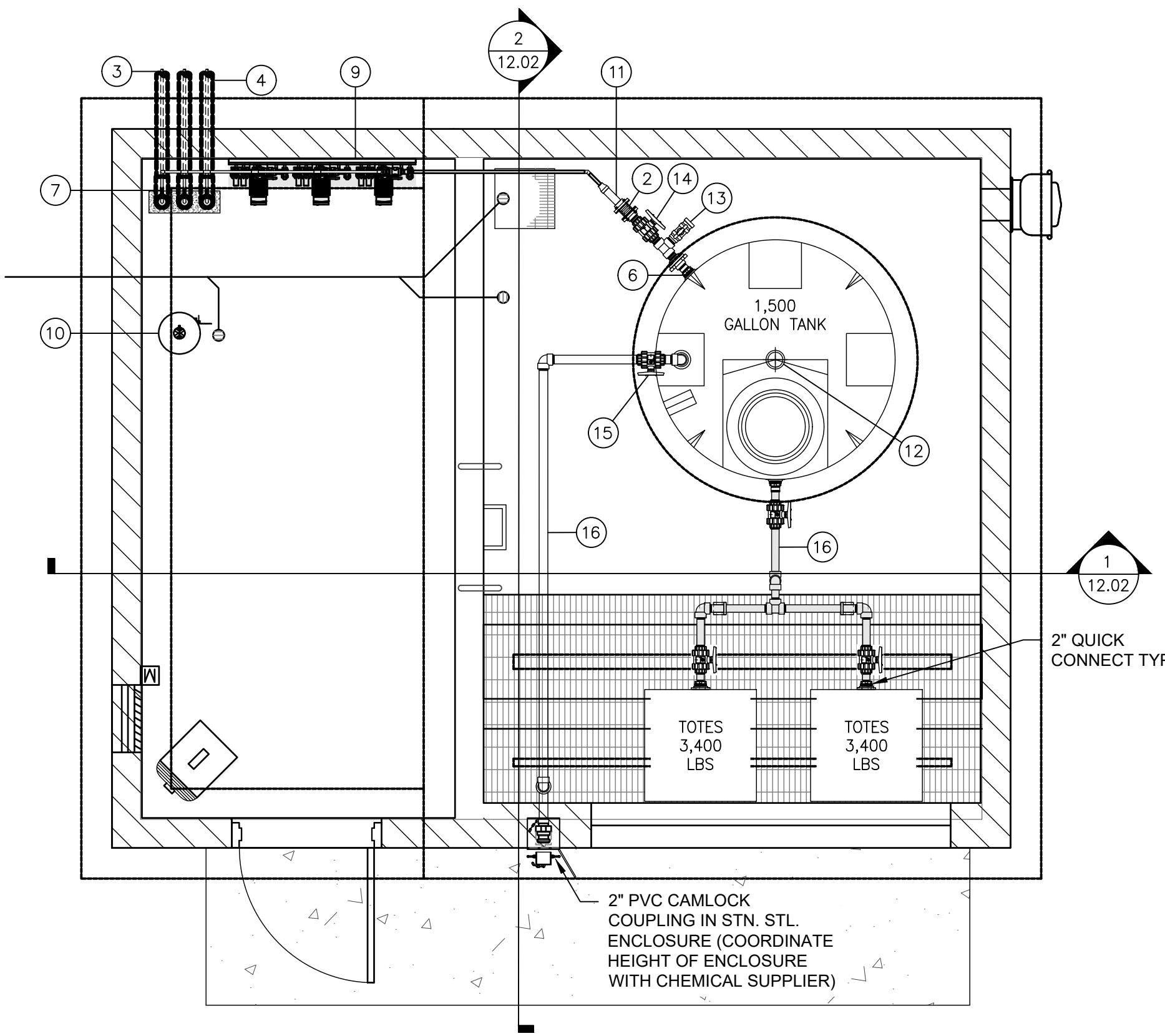
- A. Chemical feed system shall be warranted for a period of 12 months from the date of start-up by authorized technician.

- B. Damage due to makeup water particulates will not be considered as a warranty defect and will be the responsibility of the owner.

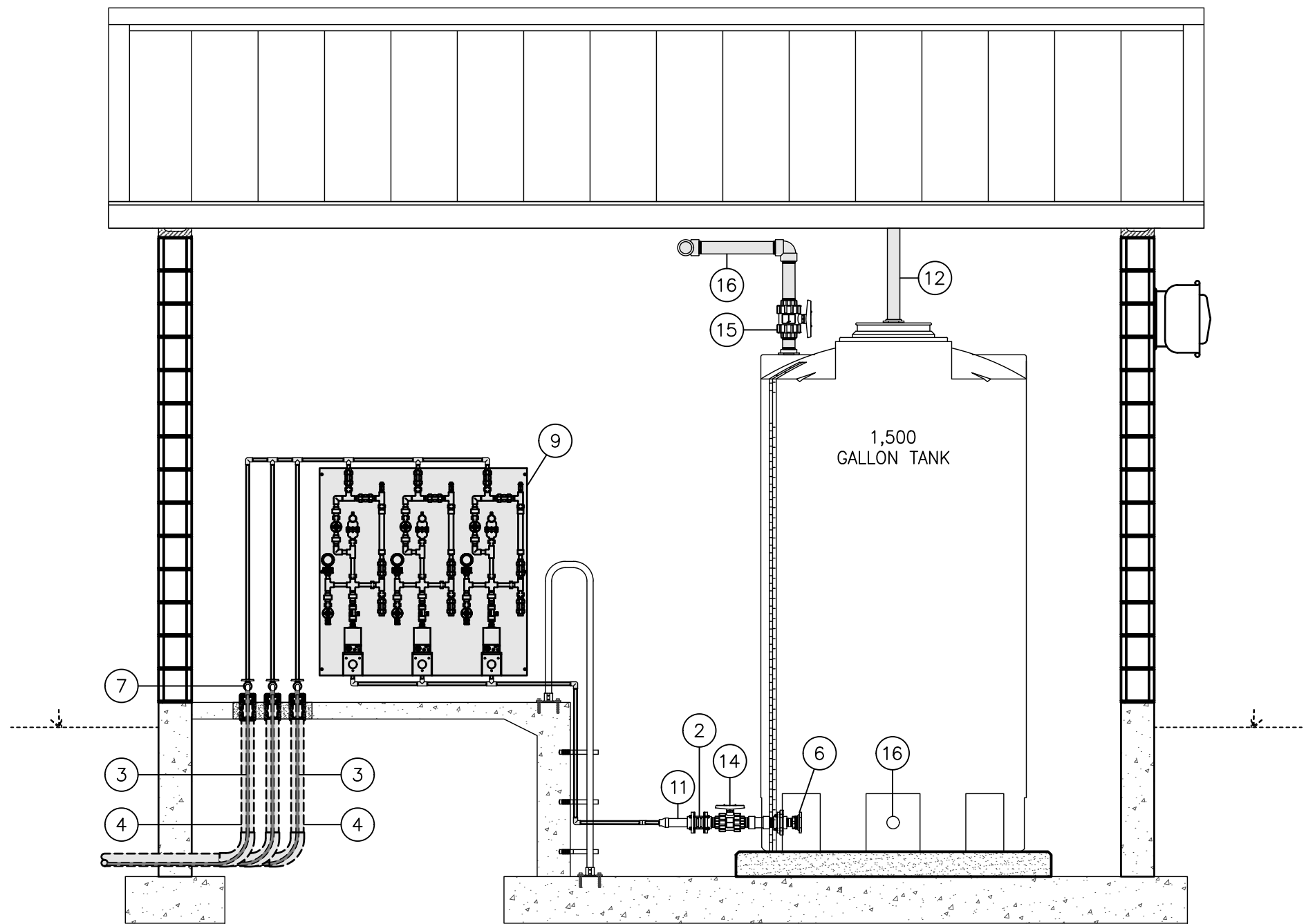
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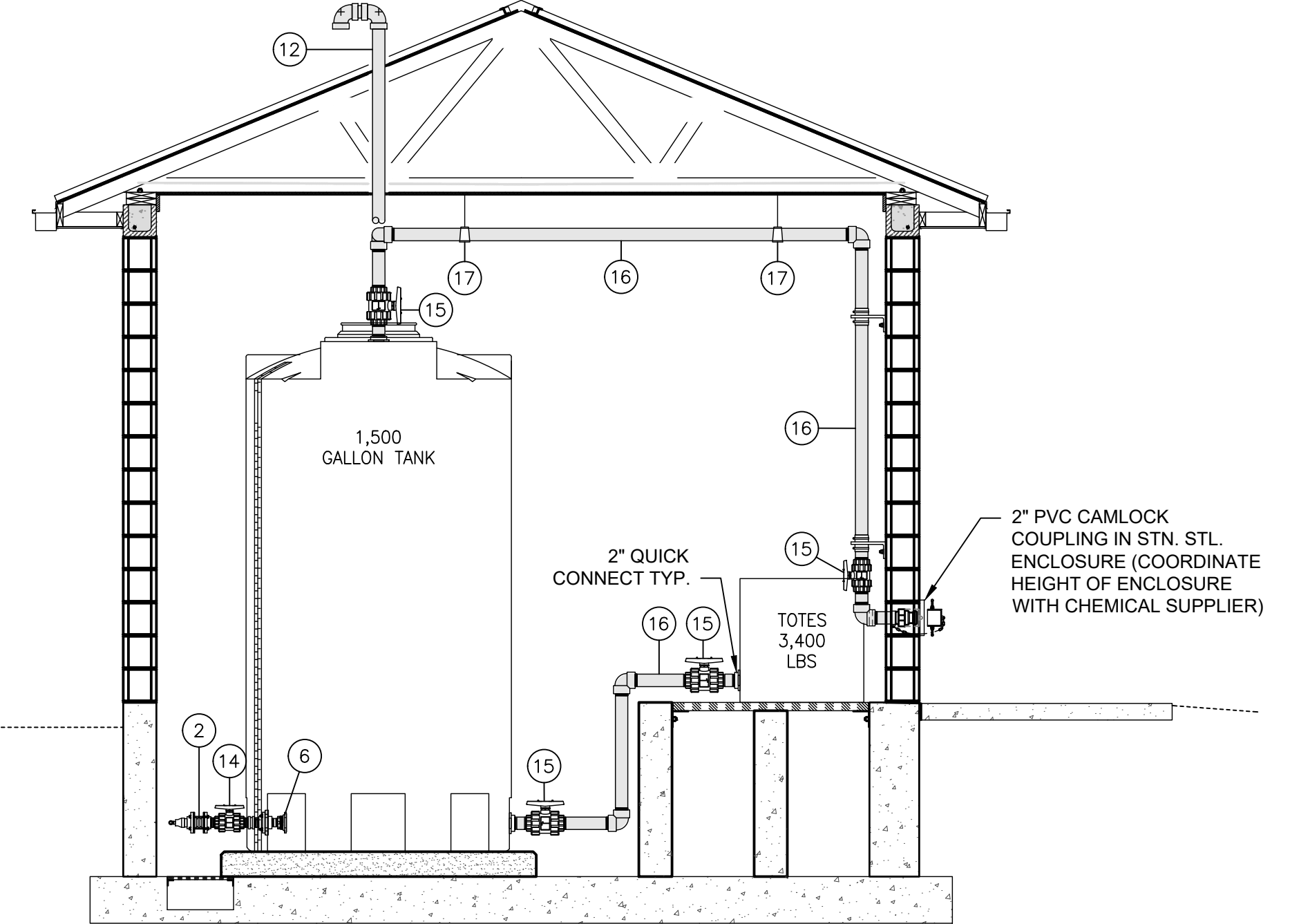
CHEMICAL FEED BUILDING FOUNDATION PLAN
SCALE: 1/4" = 1'-0"



CHEMICAL FEED BUILDING FLOOR PLAN
SCALE: 3/8" = 1'-0"



1 SECTION
SCALE: 3/8" = 1'-0"



2 SECTION
SCALE: 3/8" = 1'-0"

EQUIPMENT KEY	
1	2" 316L S.S. BOLTED MALE NOZZLE, EPDM GASKET, FLANGE ADAPTER & SIPHON DRAIN
2	2" TEFLON EXPANSION JOINT W/S.S. HARDWARE FULL FACE EPDM GASKET
3	3/4" BRAIDED CHEMICAL LINE TO INJECTION POINT
4	3" PVC CONDUIT FOR CHEMICAL LINE. PROVIDE 3" L.R. BENDS AT ALL TURNING POINTS
5	76" DIA. CONCRETE EQUIPMENT PAD. 6" A.F.F. (REFER TO STRUCTURAL DRAWINGS)
6	DOUBLE WALL, 2" METALLIC NOZZLE FOR DISCHARGE TO CHEMICAL PUMP SKID
7	PVC BALL VALVE, PER LINE SIZE USED
8	3/4" PVC CHEMICAL LINE TO 3" PVC CONDUIT
9	50"x50" CHLORIDE WALL MOUNTED SKID, SIZED FOR 3 PUMPS
10	EMERGENCY EYEWASH AND SHOWER EQUIPMENT
11	2" PVC CHEMICAL LINE TO PUMP SKID
12	4" PVC VENT
13	2" TANK DRAIN LINE WITH 2" QUICK CONNECT HOSE COUPLING AND CHAINED CAP REQUIRED
14	2" PVC INLINE BALL VALVE
15	3" PVC INLINE BALL VALVE
16	3" PVC BULK STORAGE FILL LINE
17	PIPE HANGER, SIZE AND SPACING AS NECESSARY

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WASTEWATER IMPROVEMENTS PROJECT
DIVISION 1 - WASTEWATER TREATMENT PLANT IMPROVEMENTS
FOR THE TOWN OF WATERLOO
DEKALB COUNTY, INDIANA

REVISIONS
1. Addem. No. 1

REGISTERED PROFESSIONAL ENGINEER

MARK M. SULLIVAN

No. PE60920059

STATE OF INDIANA

Mark M. Sullivan
3/15/24

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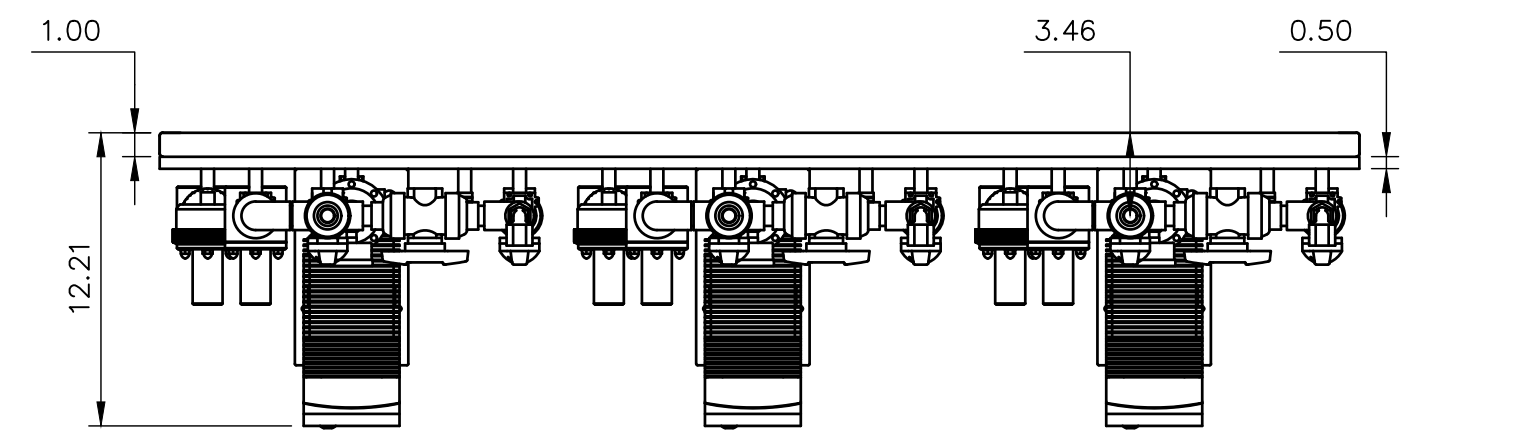
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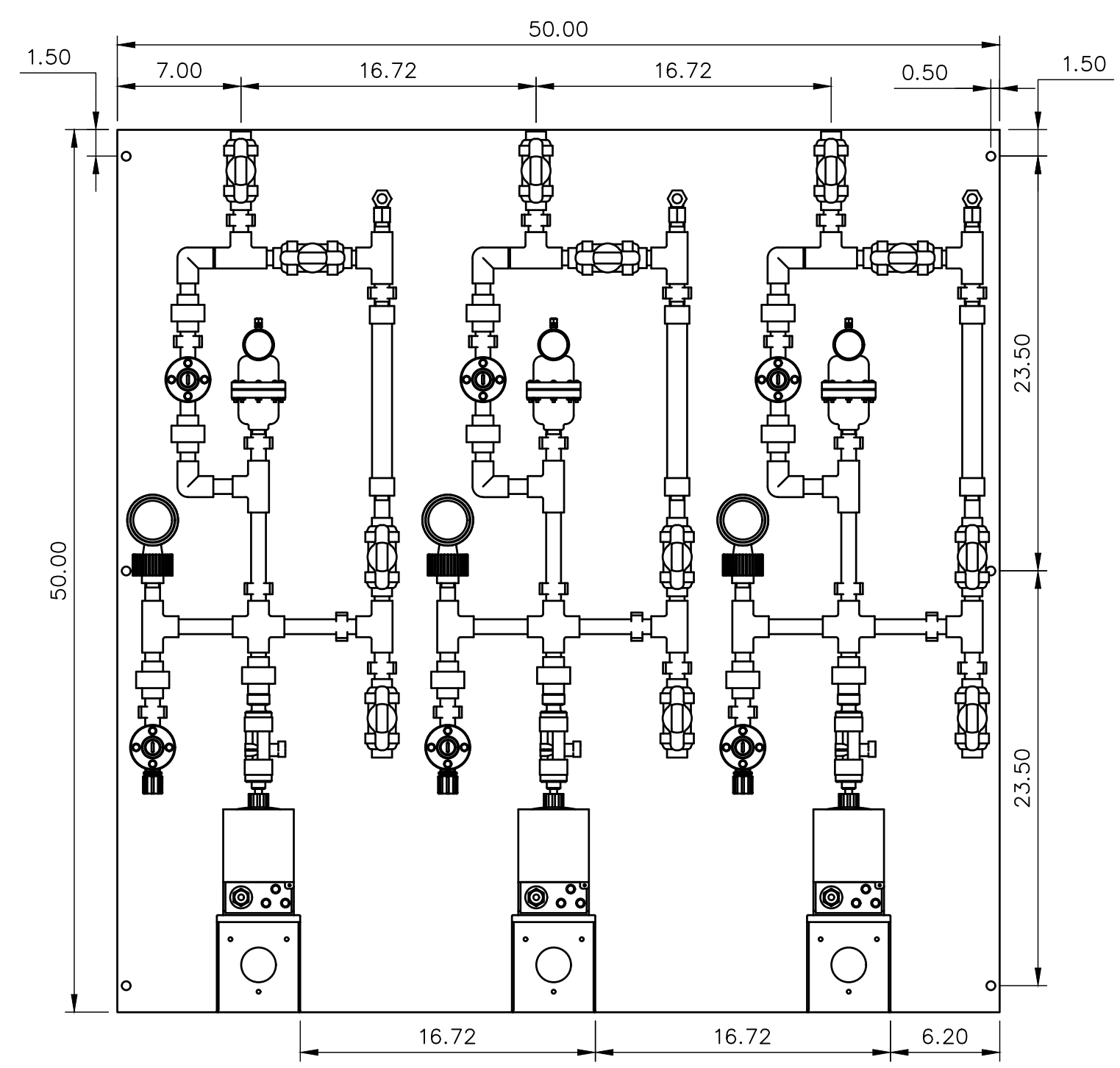
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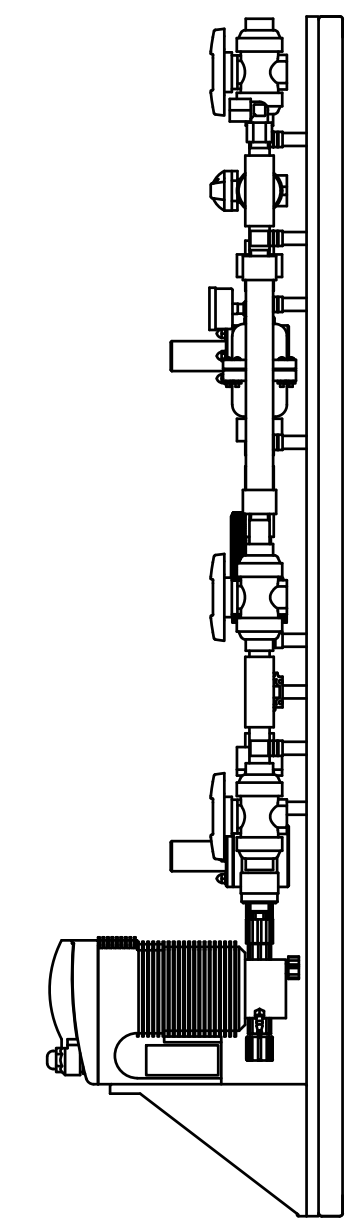
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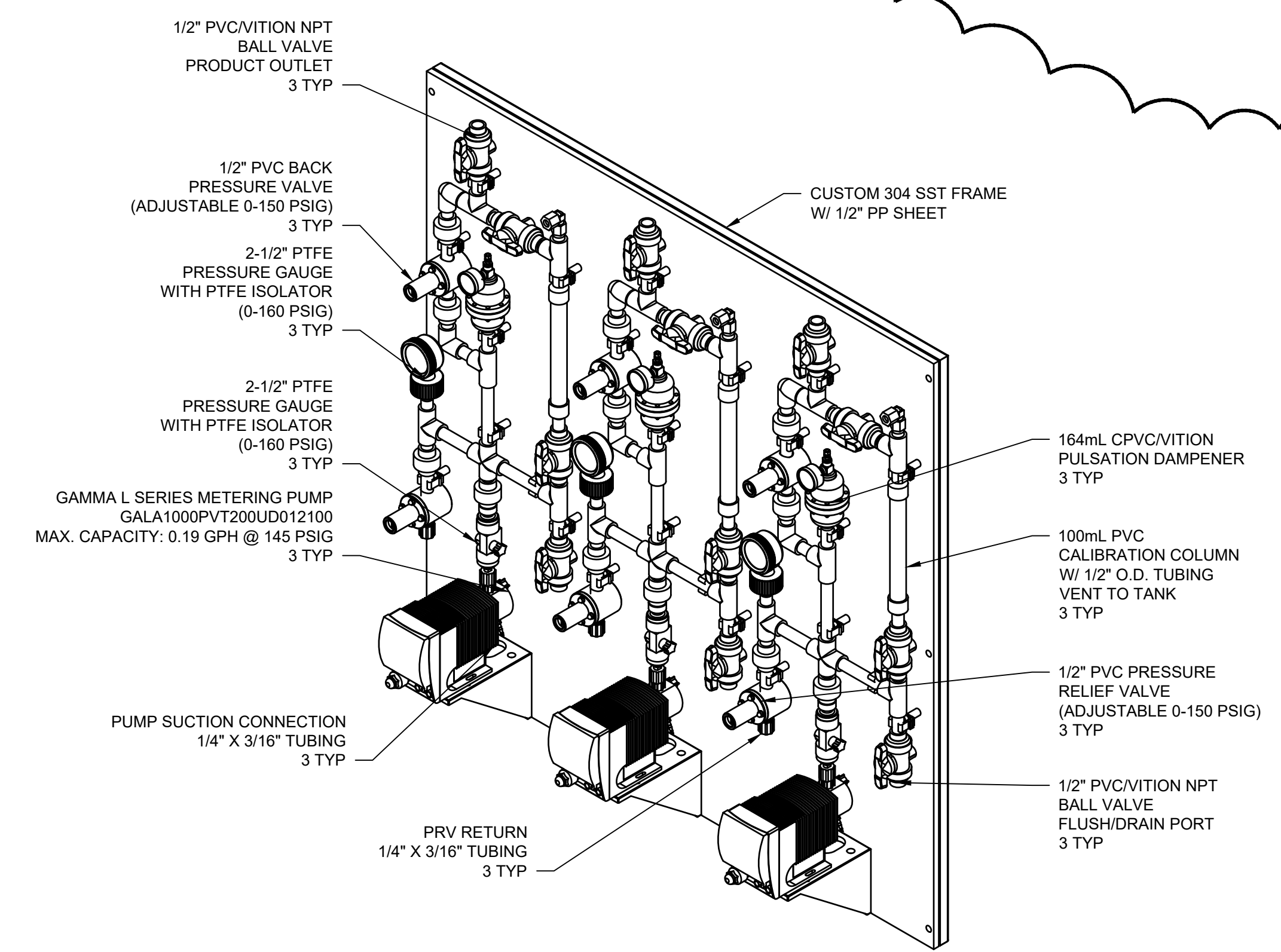
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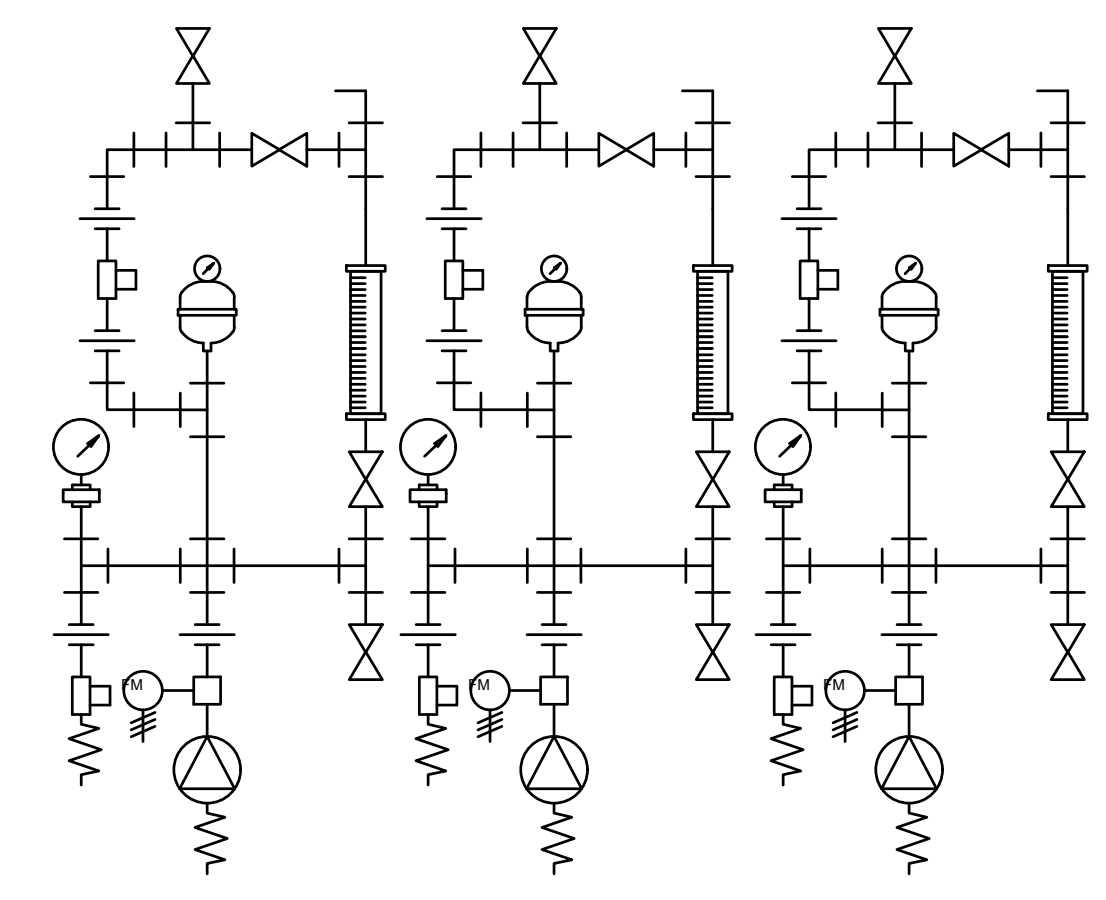
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SCALE: N/A



SIDE VIEW
SCALE: N/A



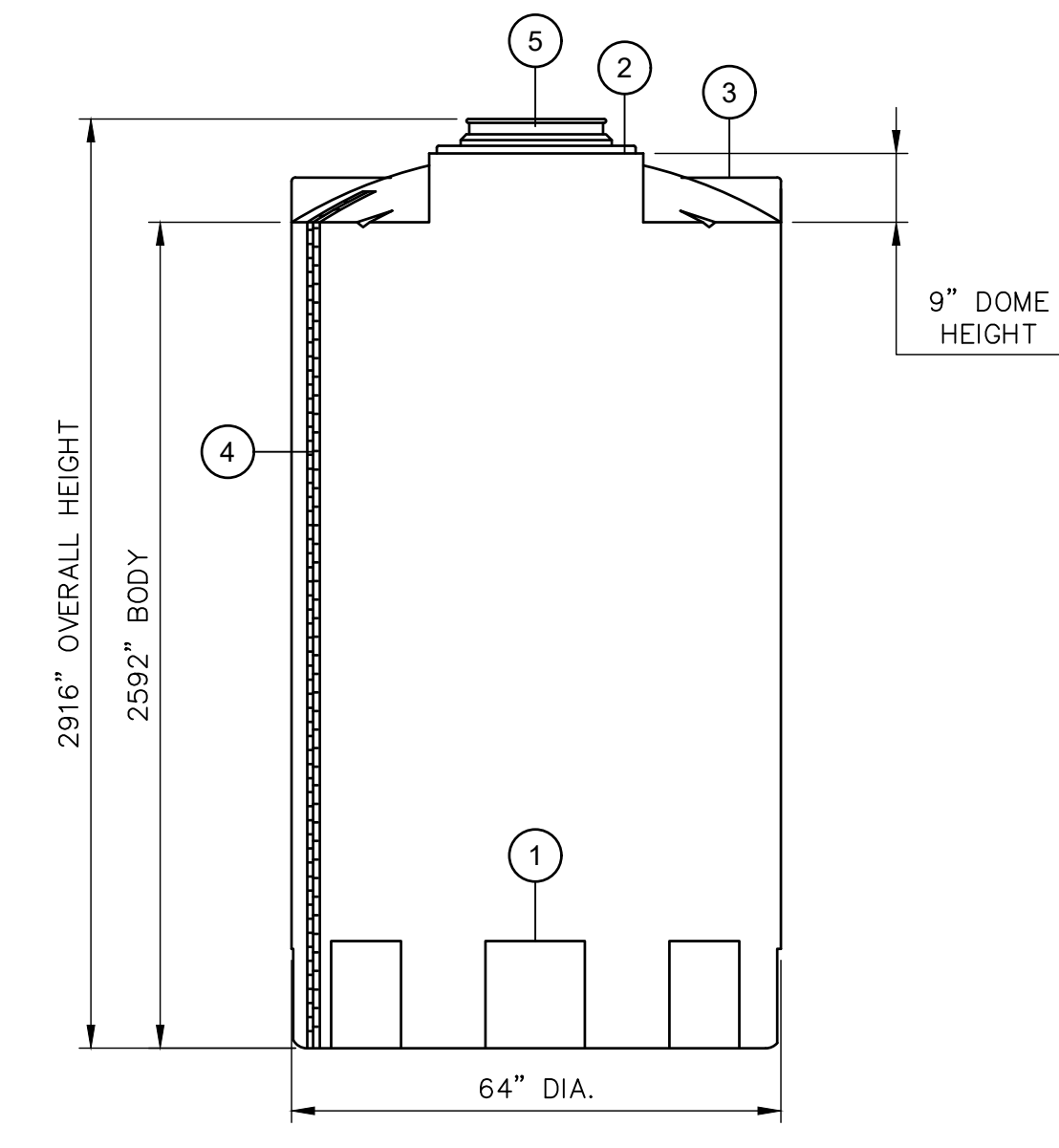
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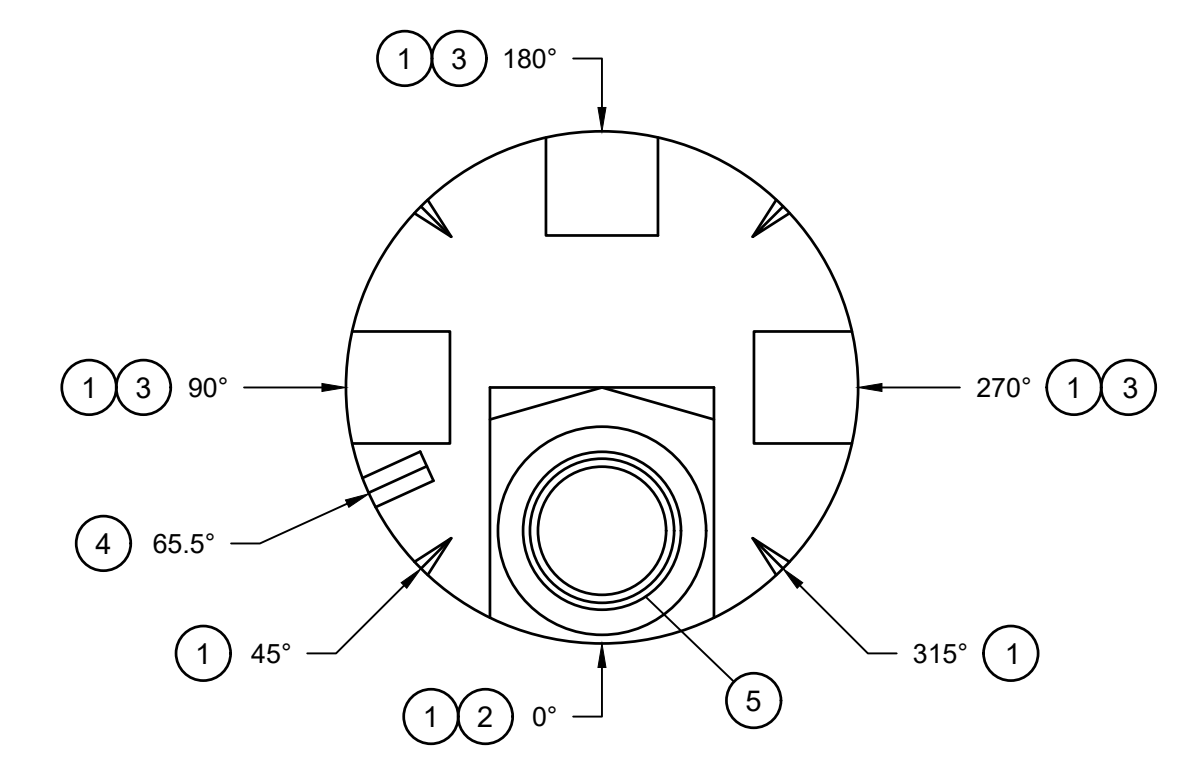
PIPING SCHEMATIC
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NOTES

1. ALL PIPING AND FITTINGS SHALL BE 1/2" SCH. 80 PVC SOCKET WELD WITH VITON SEALS UNLESS OTHERWISE REQUIRED BY COMPONENTS.
2. QUANTITY OF (3) CONTROL CABLES, P/N 1001301, TO BE SHIPPED LOOSE WITH SKID.
3. ALL DIMENSIONS ARE IN INCHES AND ARE SHOWN FOR REFERENCE ONLY.
4. PANELS MUST BE INSTALLED ABOVE TANK HEIGHT.



FRONT VIEW
SCALE: N/A



TOP VIEW
SCALE: N/A

NOTATION TABLE	
NUMBER	NOTE
1	13" x 14" LOWER FLATS (TYP. 6 PLACES)
2	28" x 32" MANWAY FLAT
3	14" x 13" DOME FLATS (TYP. 3 PLACES)
4	MOLDED IN VOLUME MARKER (25 GAL. INCREMENTS)
5	16" MANWAY W/ LEVER LOCK COVER

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 No. PE60920059
 STATE OF INDIANA
 Mark R. Sullivan
 3/15/24

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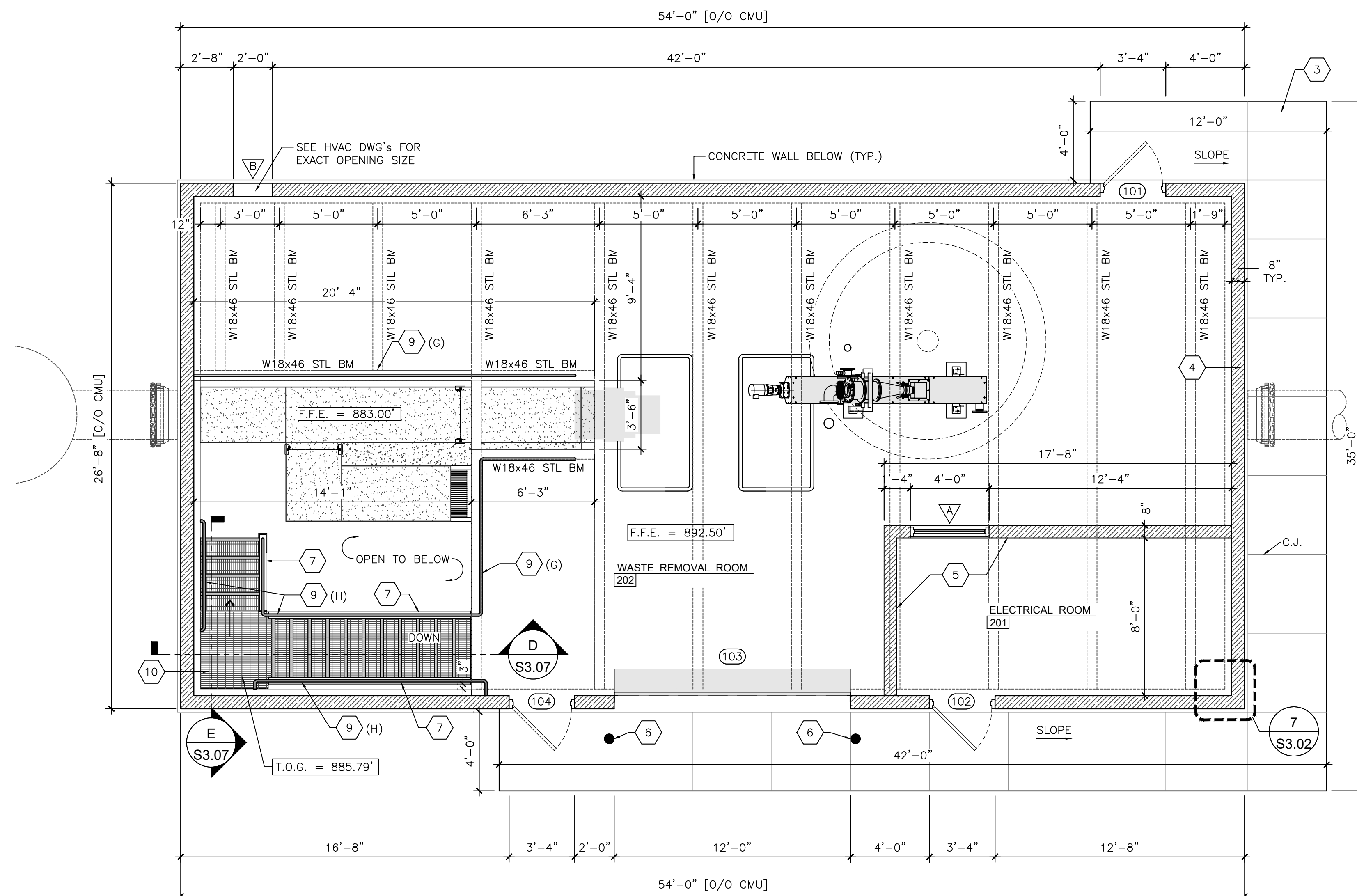
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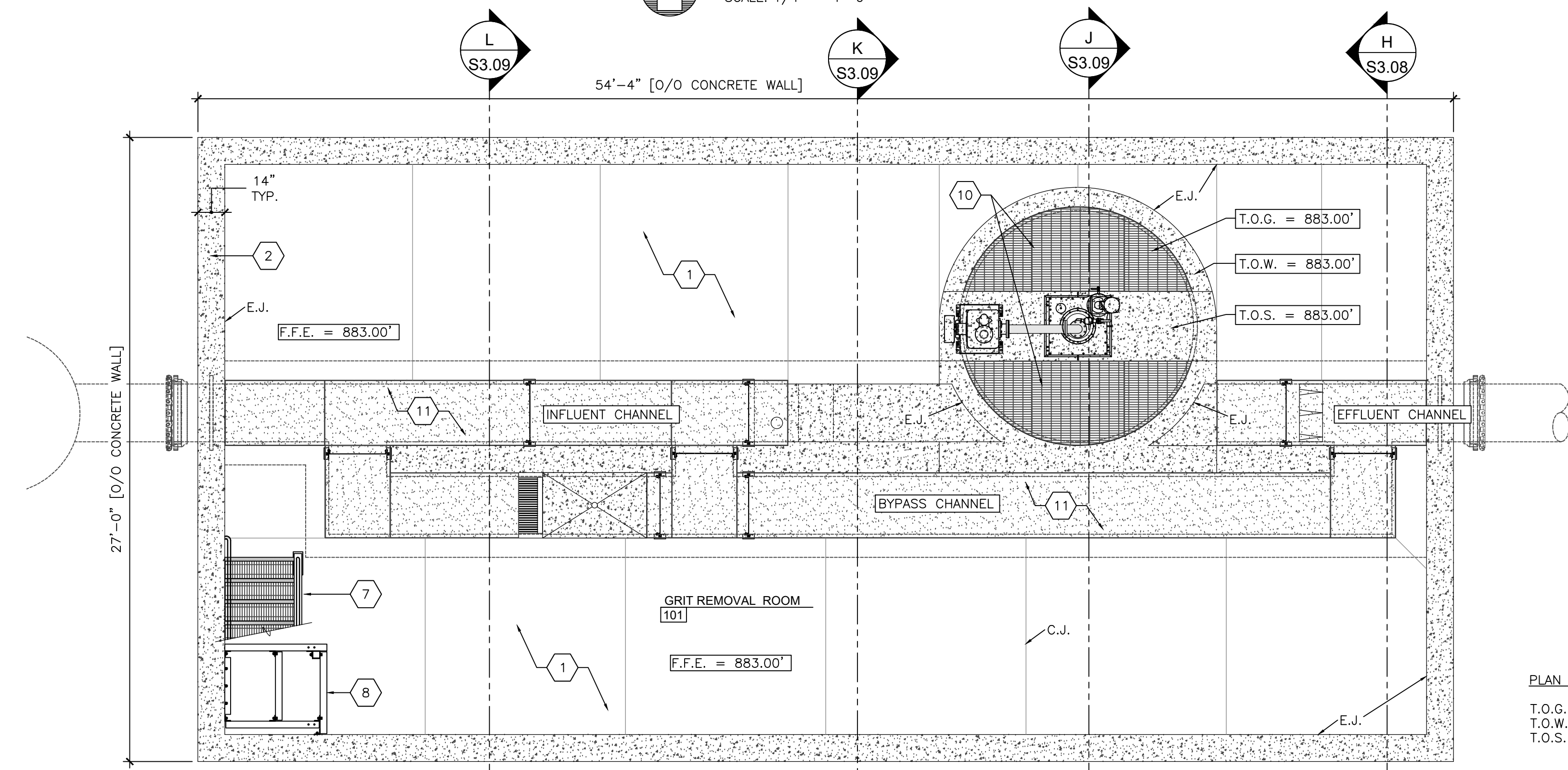
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UPPER FLOOR PLAN
 SCALE: 1/4" = 1'-0"



LOWER FLOOR PLAN
 SCALE: 1/4" = 1'-0"

PLAN ABBREVIATIONS:
 T.O.G. = TOP OF GRATING
 T.O.W. = TOP OF WALL
 T.O.S. = TOP OF SLAB

ROOM NAME	ROOM No.	ROOM FINISH SCHEDULE																
		FLOOR				BASE		WALLS				CEILING						
		MATERIAL	FINISH	MATERIAL	FINISH	MATERIAL	FINISH	MATERIAL	FINISH	MATERIAL	FINISH	MATERIAL	FINISH					
GRIT-REMOVAL RM	101	CRUSHED STONE																
ELECTRICAL RM	201	CARPET TILE																
WASTE REMOVAL RM	202	CURED & SEALED CONCRETE																

- GENERAL CONSTRUCTION NOTES**
- IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO INSURE THAT ALL GUARDRAILS & HANDRAILS ARE INSTALLED PER THE CURRENT EDITION OF THE ADA STANDARDS FOR ACCESSIBLE DESIGN & OSHA REQUIREMENTS.
 - GUARDRAILING ON UPPER FLOOR SHALL BE INSTALLED 6" FROM SLAB EDGE TO CENTERLINE OF RAILING.
 - EXTERIOR CMU ON UPPER FLOOR SHALL BE OFFSET 2" FROM THE OUTSIDE EDGE OF THE CONCRETE WALL BELOW. OUTSIDE EDGE OF CONCRETE WALL BELOW SHALL BE CHAMFERED 1/2" EXCEPT AT DOORS BUT SHALL BE SLOPED TO PREVENT WATER INFILTRATION.
 - ALL CONCRETE MIXTURES USED FOR CONTAINMENT OF LIQUIDS SHALL BE AS NOTED FOR (MIXTURES FOR TREATMENT PLANT STRUCTURES) UNDER SPEC. SECTION "033000-C.I.P. CONCRETE". WATERPROOFING ADMIXTURE IS NOT REQUIRED IF A LINER SYSTEM IS USED.
 - DOOR, WINDOW, & HARDWARE SCHEDULE LOCATED ON SHEET "S3.10".

FLOOR PLAN KEYNOTES

1	033000-CAST-IN-PLACE CONCRETE PROPOSED INTERIOR SLAB-ON-GRADE (MIXTURE FOR BUILDING ELEMENTS)
2	033000-CAST-IN-PLACE CONCRETE 14" CONCRETE WALLS (MIXTURE FOR BUILDING ELEMENTS)
3	033000-CAST-IN-PLACE CONCRETE PROPOSED 4" EXTERIOR SLAB-ON-GRADE LANDING (MIXTURE FOR BUILDING ELEMENTS)
4	042200-UNIT MASONRY PROPOSED 8" CMU EXTERIOR WALL
5	042200-UNIT MASONRY PROPOSED 8" CMU INTERIOR WALL
6	055000-METAL FABRICATIONS 6" STEEL PIPE BOLLARD
7	055000-METAL FABRICATIONS C12x8.27 ALUM. STAIR STRINGER
8	055000-METAL FABRICATIONS ALUM. STAIR LANDING FRAMING MEMBERS (ALUM. CHANNELS, ANGLES, & TUBE COLUMN)
9	055213-PIPE & TUBE RAILINGS GUARDRAIL (G) OR HANDRAIL (H)
10	055313-BAR GRATINGS ALUMINUM GRATING
11	067413-FRP GRATINGS SOLID GRATING

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WASTEWATER IMPROVEMENTS PROJECT
DIVISION 1 - WASTEWATER TREATMENT PLANT IMPROVEMENTS
TOWN OF WATERLOO
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 No. PE12100483
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Ray H. Richard
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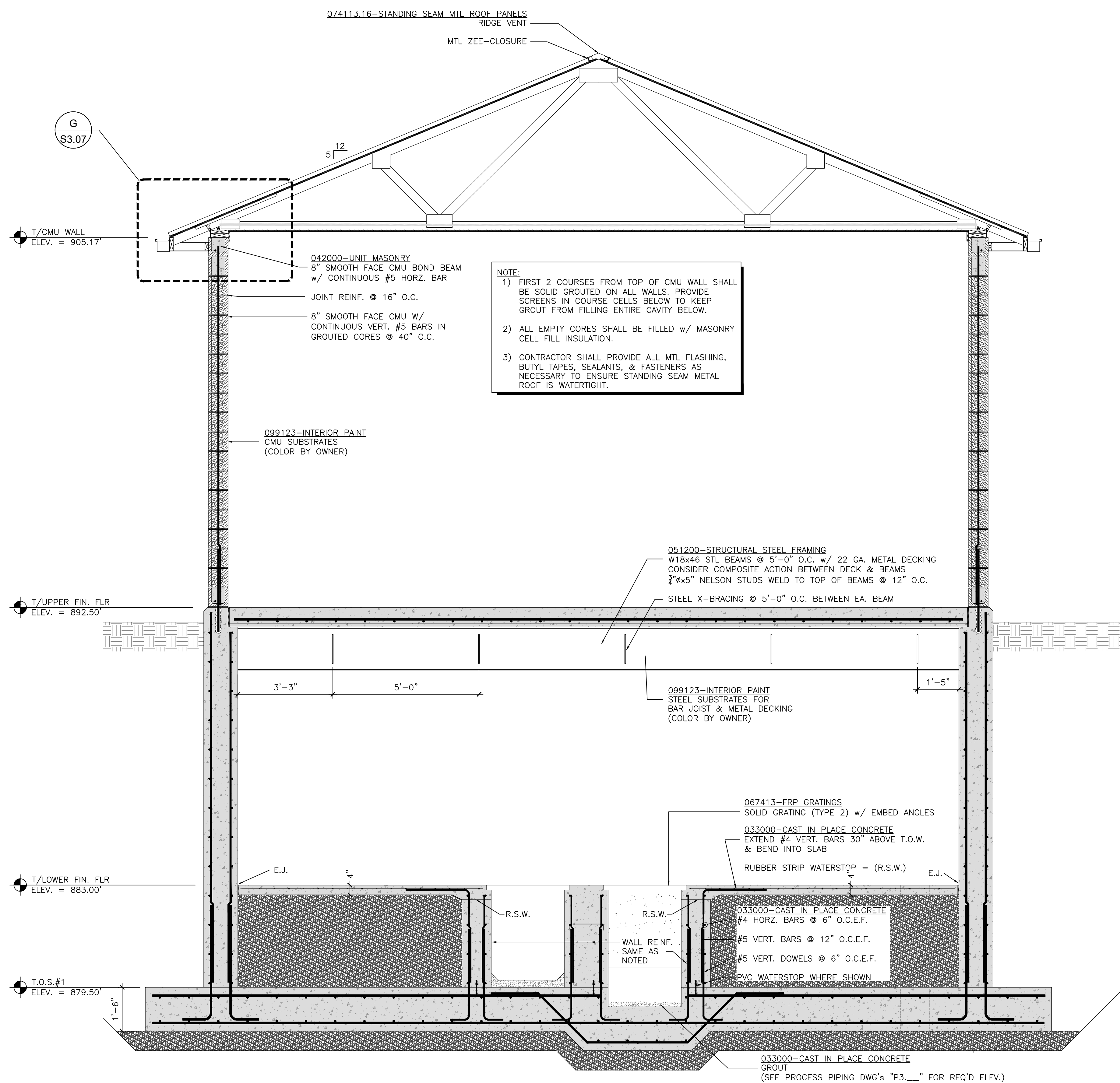
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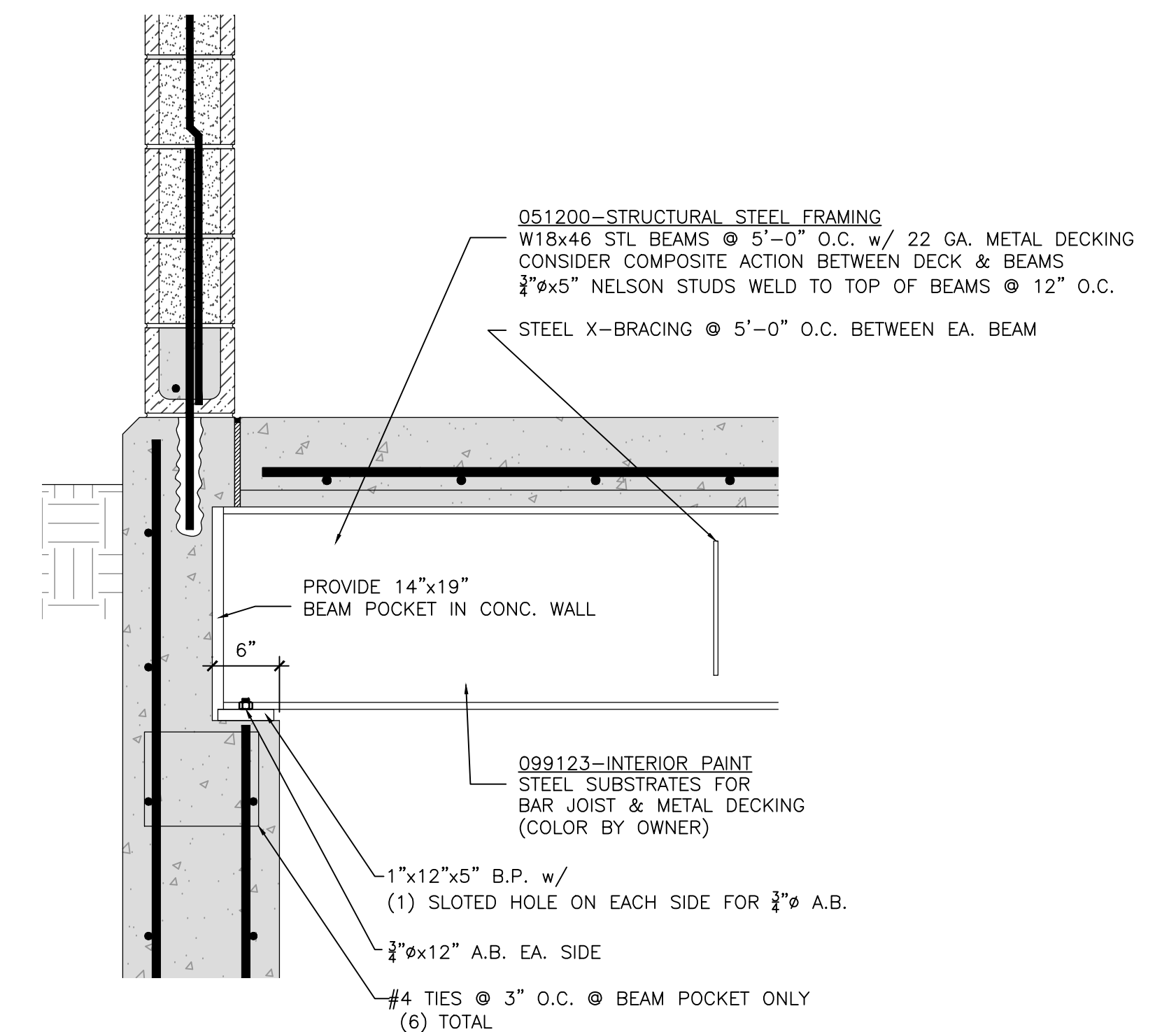
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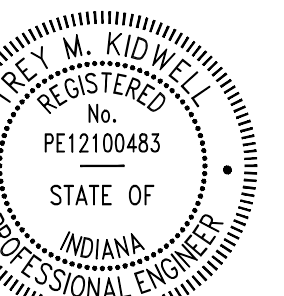


H TRANSVERSE SECTION
 SCALE: 1/2" = 1'-0"



TYPICAL BEAM POCKET DETAIL
 SCALE: 1" = 1'-0"

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T.M.K. Kidwell
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FILE NUMBER
 43995