

ADDENDUM # 01
DATE: 01-17-2024

TO CONTRACT DOCUMENTS ENTITLED:

PROJECT MANUAL FOR:
Middlebush Farms – Nextgen Center of Excellence for
Influenza Research, Phase II

PROJECT NUMBER: CP230831

ADVERTISEMENT DATE: January 4, 2024

PREPARED FOR: The Curators of the University of Missouri

CONSULTANT: Clark & Enersen
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Drawings and Specifications for the above noted project and the work covered thereby are herein modified as follows, and except as set forth herein, otherwise remain unchanged and in full force and effect:

GENERAL:

Item 1-1 Questions:

Question: (Email)The details on the structural plans (1, 3, 4, 5, 8/S2.10) do not give a grade beam thickness. I assume they are all 18” thick can you please confirm?

Answer: Confirmed, refer to revised resubmitted sheet S2-10.

Question: *(Prebid meeting) Is there an indication within bid documents for allowance to be provided for collateral loading on pre-engineered metal building structure that would include hanging mechanical/electrical/plumbing/fire protection from structure?*

Answer: Refer to sheet S0.00, note 2.C.5.

Clarification: (Prebid meeting) Transformer primary conductors provided by local electrical provider.

Answer: Provide trenching and conduit per C4.01, contractor to coordinate and confirm with Boone Electric.

Question: (Prebid meeting) Are animal waste holding tanks to be provided with internal coating per tank manufacture?

Answer: Tank coating defined in specification section 22 13 43, section 2.A.5.L.

Question: (Email) Are resinous flooring visual finishes defined to match existing visually including resinous and flake color and variety of texture finish?

- Answer:* Floor finish noted on finish legend intended for match to existing finishes; resinous flooring specifications require site mockup samples for approval.
- Question:* (Email) Please provide eave height for pre-engineered metal building.
- Answer:* Refer to revised resubmitted sheet A-410.
- Question:* (Email) What are extents of rated ceiling?
- Answer:* Room 211 Cylinders, refer to ceiling plan, sheet A1.21.

PROJECT MANUAL:

Item 1-1 TABLE OF CONTENTS

- a. REVISED specification section 09 67 33 to read “Resinous Flooring and Walls

Item 1-2 09 67 33 – RESINOUS FLOORIN AND WALL COATING

- a. REVISED specification section clarifying flooring type to double-broadcast resinous.

Item 1-3 11 53 19 – DRY HEAT STERILIZER

- a. REVISED issue date for section in header.
- b. REVISED section 3.2 to define single door for load-in, load out.

DRAWINGS:

Item 1-4 C5.01 – SITE DETAILS - 1

- a. REVISE annotations in detail 2/C501 for 6” sidewalk.

Item 1-5 C5.02 – SITE DETAILS – 2

- a. REVISE section A-A in detail 1/C502

Item 1-6 A4-10 – WALL SECTIONS

- a. ADD dimension to note eave height.

Item 1-7 F1.11 – FIRST FLOOR FINISH PLAN AND SCHEDULES

- a. REVISE Vestibule 218 finishes; delete transition detail; add floor and wall finish note.

Item 1-8 S2.10 – FOUNDATION SECTIONS

- a. REVISE details to add foundation dimension.

Item 1-9 M7.02 – MECHANICAL SCHEDULES

- a. REVISE to provide fan schedule.

ATTACHMENTS:

Project Manual: Sections 096733; 115319

Drawings: Sheets C5.01; C5.02; A4.10; F1.11; S2.10; M7.02

END OF ADDENDUM 01

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SECTION 09 67 33 – RESINOUS FLOORING AND WALL COATING

1. PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

1.2 SUMMARY

- A. This Section includes the following:
1. Resinous flooring systems with high-build double-broadcast applied flooring system consisting of 100% solids epoxy binder, that consists of epoxy resin ad colored quartz aggregate with a high-solids, two-component 100% aliphatic urethane topcoat providing a slip-resistant surface on interior concrete floors.
 2. Installer pre-approval required.
- B. Related Requirements:
1. Section 03 30 00 “Cast-In-Place Concrete”.

1.3 PRE-INSTALLATION MEETINGS

- A. Pre-Installation Conference: Conduct conferenced at Project Site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include manufacturer’s technical data, material test reports, application instructions, chemical resistance, surface preparation, and application instructions.
- B. Samples for Initial Selection: For each type of exposed finish and texture required.
- C. Samples for Verification: For each resinous flooring system required, 12 inches (300-mm) square, applied to rigid backing by Installer for this Project.
1. Samples for review of color and texture.

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- D. **Test Data:** Provide a letter confirming that the concrete substrate meets all specified requirements including, not limited to product manufacturer specific requirements prior to commencing with floor finish installation. Include in letter, documentation of test results showing passing results.

1.5 INFORMATIONAL SUBMITTALS

A. **Installer Qualifications:**

1. Provide documentation of the requirements listed under Quality Assurance.
2. Applicator personnel shall be trained for application of specified materials.
 - a. Provide a list of employees trained for application of specified materials with product manufacturer's statement of qualification training for installation.
3. Provide a list of completed projects including project name and location, name of Architect, name of material manufacturer, and approximate quantity of materials applied.

1.6 MOCKUP

- A. Provide 6"x18" mockups of three levels of texture for selection by Owner regarding finish and slip resistance. Levels of additive for mockup to be discussed with Owner and Architect and agreed to prior to mockup installation. Mockup location to occur in agreed location in pre-application meeting within space to receive sealed concrete per finish schedule (mechanical or electrical room).

1.7 CLOSEOUT SUBMITTALS

- A. **Maintenance data:** For resinous flooring to include in maintenance manuals.

1.8 QUALITY ASSURANCE

- A. **Installer Qualifications:** An authorized representative who employs only persons trained and approved by resinous flooring manufacturer for applying resinous flooring systems indicated.
1. Qualifications of installers for resinous flooring system shall not be less than seven (7) years of experience installing resinous flooring systems indicated. Resinous flooring installer shall be manufacturer approved and have performed at least ten similar installations. Resinous flooring installer shall have a minimum of 1,000,000 square feet of successful applications.
 2. **Special Coatings System Installers must be pre-approved by the Architect.** Subject to the requirements of the specifications and approval of the manufacturer.

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- B. **Pre-Application Meeting:** Convene a pre-application meeting two (2) weeks before the start of application of floor coating system. Require attendance of parties directly affecting work of this section, including the Contractor, Architect, Applicator, Manufacturer's Representative, and Owner's Representative. Review the surface preparation, application, cleaning, protection, and coordination with other work.
- C. **Source Limitations:** Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, through one source from a single manufacturer. Provide secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from source recommended by manufacturer of primary materials.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.

1.10 PROJECT CONDITIONS

- A. **Environmental Limitations:** Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.
- B. **Lighting:** Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.
- C. Close spaces to traffic during resinous flooring application and for not less than 24 hours after application, unless manufacturer recommends a longer period.

1.11 WARRANTY

- A. Manufacturer's written warranty against defects and wear for a period of five (5) years, including:
 - 1. Delamination from substrate.
 - 2. Loss of aggregate.
 - 3. Degradation of finish.
 - 4. Cracking and spalling
 - 5. Water penetration.

2. PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

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- A. Flammability: Self-extinguishing according to ASTM D 635.

2.2 MANUFACTURERS

- A. Source Limitations:
 - 1. Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, from single source from single manufacturer.
 - 2. Obtain secondary materials, including patching and fill material, joint sealant, and repair materials of type and from manufacturer recommended in writing by manufacturer of primary materials.
- B. Requests for manufacturer substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements.

2.3 RESINOUS FLOORING

- A. Resinous Flooring System: Abrasion-resistant, impact-resistant, and chemical-resistant, aggregate-filled, and resin-based monolithic floor surfacing designed to produce a seamless floor.
 - 1. Acceptable Manufacturers—Double Broadcast Resinous Flooring subject to compliance w/ Basis of Design product requirements include:
 - a. Tnemec Company – Series 224 DecoFlake with Aliphatic Urethan Finish.
 - b. Stonhard®, Inc—Stontec with Aliphatic Urethan Finish.
 - c. Res-Tek—EPO-CF Aliphatic Urethan Finish..
- B. Pattern and color per finish legend.
- C. System Characteristics:
 - 1. Colored Flake with 100 percent solids according to ASTM D2369. Completely light stable over the normal life of the coating.
 - 2. Wearing Surface: Medium Textured for slip resistance, match Architect's sample. Integral.
 - 3. Cove Base: 6 inches high or as noted on drawings.
 - 4. Overall System Thickness: 1/4-inch (6.4-mm) finish over sloped patching and fill material.
- D. System Components: Manufacturer's standard components that are compatible with each other and as follows:

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1. Primer: Type recommended by resinous flooring manufacturer for substrate and resinous flooring system indicated.
 - a. Formulation Description: 100 percent solids.
 2. Floor Slope Build:
 - a. Per manufacturer recommendation. Application rate 200 sf/gal.
 3. Body Coat—1st coat:
 - a. Modified Polyamine Epoxy.
 - b. Formulation Description: 100 percent solids.
 4. Broadcast—2 coats to refusal:
 - a. Broadcast Colored Flake per manufacturer's written instructions.
 5. Body Coat—2nd coat:
 - a. Basis of Design Product: Modified Polyamine Epoxy.
 - b. Formulation Description: 100 percent solids.
 6. Grout Coat:
 - a. A Two-Component Modified Polyamine Epoxy.
 - b. Application rate: 100 sf/gal.
 - c. Additional grout coats may be required to achieve desired texture.
 7. Topcoats: Sealing or finish coats.
 - a. High Traffic Urethane Finish Coat.
 - b. Formulation Description: High Solids.
 - c. Type: Clear.
 - d. Finish: Satin/Low Sheen
 - e. Finish Texture: Manufacturer's standard
 - f. Dry Film Thickness: 2.0 – 3.0 DFT.
- E. System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested according to test methods indicated
1. Compressive Strength: 15,567 psi per ASTM C 579.
 2. Tensile Strength: 2,200 psi per ASTM C 307.
 3. Flexural Modulus of Elasticity: 4,550 psi per ASTM C 580.
 4. Indentation: 2,000 psi according to MIL-D-3134.

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5. Impact Resistance: No chipping, cracking, or delamination and not more than 1/16-inch (1.6-mm) permanent indentation per MIL-D-3134J.
6. Resistance to Elevated Temperature: No slip or flow of more than 1/16 inch (1.6 mm) per MIL-D-3134J.
7. Abrasion Resistance: 0.18gm maximum weight loss per ASTM D 4060.
8. Coefficient of Friction: 0.5 minimum according to STM D-2047.
9. Hardness: 85 - 90, Shore D per ASTM D 2240.

F. System Chemical Resistance: Test specimens of cured resinous flooring system are unaffected by the following:

1. 20% Hydrochloric Acid.
2. Mercurochrome.
3. Betadyne.
4. Urine.
5. Coffee.
6. Ethyl Alcohol.
7. Iodine.
8. 10% Lactic Acid.
9. Tea.
10. Mustard.

2.4 RESINOUS WALL COATING

A. Resinous Wall System:

1. Acceptable pre-approved Manufacturers—Resinous wall coating include:
 - a. .
 - b. Stonhard®, Inc—Stoneglaze VSD.
 - c. Res-Tek-EPO 205 system
 - d. Tnemic – Stranlock ML

2.5 ACCESSORIES

- A. Patching and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated.
- B. Metal Edge Strips: Metal strips are to be provided by Resinous Flooring Installer and used at transitions between epoxy and adjacent floor finishes and two differing resinous flooring finishes as noted within and located on the finish plan.

3. PART 3 - EXECUTION

3.1 PREPARATION

TROWEL-APPLIED RESINOUS FLOORING AND WALL COATING

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- A. **General:** Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry, and neutral Ph substrate for resinous flooring application.
- B. **Concrete Substrates:** Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.
 1. **Roughen concrete substrates as follows:**
 - a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
 - b. Comply with ASTM C 811 requirements, unless manufacturer's written instructions are more stringent.
 - c. Create a surface profile similar to ICRI-CSP3 or greater.
 2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written instructions.
 3. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.
 - a. **Anhydrous Calcium Chloride Test:** ASTM F 1869. Proceed with application of resinous flooring only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1,000 sq. ft. (1.36 kg of water/92.9 sq m) of slab area in 24 hours.
 - b. **Plastic Sheet Test:** ASTM D 4263. Proceed with application only after testing indicates absence of moisture in substrates.
 - c. **Relative Humidity Test:** Use in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 80 percent relative humidity level measurement.
 4. **Alkalinity and Adhesion Testing:** Verify that concrete substrates have neutral pH within acceptable range. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.
- C. **Patching and Filling:** Use patching and fill and build material to fill holes and depressions in substrates and to provide floor slopes where indicated according to manufacturer's written instructions to build floor surface to the specified slopes. Fill, sand or grind cured floor build to eliminate surface imperfections and trowel marks.
 1. **Control Joint Treatment:** Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written recommendations.

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- D. Resinous Materials: Mix components and prepare according to resinous flooring manufacturer's written instructions.

3.2 APPLICATION OF BROADCAST FLAKE FLOOR

- A. General: Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.
 - 1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
 - 2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
 - 3. Expansion and Isolation Joint Treatment: At substrate expansion and isolation joints, provide joint in resinous flooring to comply with resinous flooring manufacturer's written recommendations.
 - a. Apply joint sealant to comply with manufacturer's written recommendations.
- B. Primer: Apply primer over prepared substrate at manufacturer's recommended spreading rate.
- C. Floor Slope Build: Apply floor slope build product, where indicated, over primed substrate per manufacturer's recommendations.
- D. Integral Cove Base: Apply cove base mix to wall surfaces before applying flooring. Apply according to manufacturer's written instructions and details including those for taping, mixing, priming, troweling, sanding, and top coating of cove base. Round internal and external corners.
- E. Double Broadcast Body Coats: Apply double broadcast body coats to refusal in thickness indicated for flooring system.
- F. Grout Coats: Apply grout coat(s) at manufacture recommended spread rate. Additional coats may be needed to achieve required texture.
- G. Topcoats: Apply topcoat(s) in number of coats indicated for flooring system and at spreading rates recommended in writing by manufacturer and to produce wearing surface indicated.
- H. Add glass beads and/or top coats to achieve desired surface texture and uniformity.

3.3 APPLICATION OF WALL SYSTEM

- A. Allow new mortar to cure 28 days minimum prior to initial application. Provide moisture testing per product manufacturer direction.
- B. Apply product within temperature and wall moisture range within manufacturer recommendation.

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3.4 PROTECTION

- A. Protect resinous flooring, cove, and walls from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.

END OF SECTION 09 67 33

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SECTION 11 53 19 – DRY HEAT STERILIZER

1.0 GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Divisions 01 specifications Sections, apply to this section.

1.2 ACTION SUBMITTALS

Product data with manufacturer's qualified data for the unit including required utility services. Shop drawings with specifics including but not limited to plans, elevations, sections, details that will assist with verification of chamber size, chamber access size, overall unit size with required rough openings and clearances, utility input locations.

2.0 EQUIPMENT DESCRIPTION / SUMMARY

Unit shall be a truck-in style, dry heat sterilizer to be used in the sterilization of poultry cages, various items designed to be sterilized at 285°F/140°C or better.

Proposed sterilizer shall be rated as a NFPA 86 Class "B" dry heat sterilizer.

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Proposed sterilizer shall be rated as a NFPA 86 Class "B" dry heat sterilizer.

The dry heat sterilizer shall be designed to accommodate cages/racks which are 38"W x 64"L x 74"H and 47"W* x 84.5"L x 86"H.

At a minimum, the interior chamber of the sterilizer shall be a minimum of 52"W x 86"L x 88"H.

The exterior dimensions of the dry heat sterilizer shall not exceed 115"W x 95"L x 106"H.

3.0 DRY HEAT STERILIZER CONSTRUCTION

3.1 CHAMBER CONSTRUCTION

The dry heat sterilizer shall be constructed in modules, sized for ease of rigging and assembly without modification of the existing facility, from a welded heavy-duty steel frame that supports the interior stainless steel chamber. The exterior shall be constructed from stainless steel sheet metal. All interconnecting struts shall be non-continuous from inner to outer walls, thus keeping the exterior as cool as possible. A full 4" of insulation shall surround the work chamber on all sides, with the exception of the floor, which shall be 3/16" stainless plate. Locating pins integral to the frame must be used to align the modules during assembly and have interior flanges to bolt them together for perfectly aligned seams.

3.1.1 CHAMBER SIDE RAILS

Internal side rails shall be supplied and located down the length of the work chamber. These side rails shall be located at a height of 36" up from the chamber floor. The internal side rails shall

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prevent the trucks from coming in contact with the side air duct walls in each work chamber. Chamber rail construction shall be designed for ease of cleaning and toolless removal.

3.1.2 FULLY WELDED LINER (BACK SIDE, SQUARE CORNERS)

The interior of the sterilizer shall be fabricated with 304L stainless steel with a 2B finish. All welds shall be ground and polished to match this finish. The dry heat sterilizer's stainless steel liner shall be continuously welded thus creating an impervious barrier between the process chamber and the insulation material and preventing any contamination from entering the chamber from that source.

3.1.3 FLOOR

The dry heat sterilizer shall contain a 3/16" thick plate floor. The front edges of the plate shall be beveled to give a loading truck a smooth transition into and out of the dry heat sterilizer. The facility floor will be rated withstand to the operating temperature.

3.1.4 EXTERIOR FINISH

The exterior of the sterilizer shall be fabricated with 304 stainless steel with a #4 finish. All welds shall be ground and polished to match this finish. The following components shall be a 2B finish with welds chemically passivated: filter boxes, junction boxes, motor/blower mounts and pneumatic boxes.

The following components shall be a mill finish with welds mechanically passivated:

Exterior tubular stands and interior tubular guide rails.

3.2 DOOR

One individual door, one, right hand hinged for loading and unloading, shall be fitted to the unit. The door close against the sterilizer cabinet over a silicone "P" gasket. Door shall be held closed by a dual cam-action bar latch and hung with a pair of stainless steel machined hinges. Each bar latch shall be supplied with an inside release handle. The bottom bar latch shall be side latching so no truck obstructions are located on the plate floor.

3.2.1 DOOR SWITCHES

Door switches shall be installed on the dry heat sterilizer to de-energize the heating and circulation systems when the dry heat sterilizer door is opened. This is to minimize hot air from being expelled from the dry heat sterilizer should the doors be opened during the heating cycle.

3.2.2 DOOR LOCK OPERATION

Each end door will be equipped with an automatic lock that will function in accordance with operational modes. Pneumatic interlocks will control the door lock sequence in this manner:

When the unload door is open, the load side door is locked;

When the load side door is open, the unload side door is locked

When the cycle is engaged, all doors are locked;

3.2.3 INTERIOR DOOR LOCK OVERRIDE

Inside the sterilizer, located along a duct wall in the work chamber, shall be door lock over-ride cables. When pulled, the cable shall activate the interior door override. This shall shut down the sterilizer and unlock the doors. The Safety Reset Button must be pushed to reset the PLC logic. Junction boxes to be mounted on the top of the unit.

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3.2.4 WINDOW, DOOR

A viewing window shall be mounted in the face of the door. The viewing area shall be approximately 10" wide x 15.50" high with a 6-pane glass window. Each window shall be supplied with a window guard located above and below to protect the windows from accidental contact.

3.3 STAINLESS STEEL TRIM PANELS SEAL

Trim panels of 18 ga stainless steel matched to the exterior of the sterilizer shall be fitted to cover the area between the wall opening and the unit so that a flush appearance is achieved. The trim panels are held in place by magnets on the back of the panel to simplify the installation.

3.4 MODULAR/SPLIT CONSTRUCTION

The unit shall be built in sections to accommodate move in restrictions such as elevators, hallways, doorways and the like. The joining flanges shall be interior flange design. No joining hardware is to be mounted on the outside of the unit. Sections shall contain tapered alignment pins for ease of reassembly where possible.

4.0 PROCESS AIR CIRCULATION (HORIZONTAL)

To ensure uniform heat distribution throughout the oven chamber and optimize efficiency, a high volume, horizontal airflow system is installed in the unit. A large fan located in a plenum chamber on the r side of the sterilizer, directs air to a circulation duct up across a top mounted duct running to the opposite side of the unit. The air enters the work space through a semi-pierced wall, flows horizontally across the product, from the one side to the other side, and exits the work space through a semi-pierced wall on the other side, and is directed back to the fan for reheating and recirculation.

Note: Output of each circulation motor will be controlled by Variable Frequency Drives to allow for correct tuning of the oven system. Circulation systems are mounted on the right side of the unit.

5.0 AIR HEATING SYSTEM

Seamless-tubular incoloy type heaters shall be used as the heat source. The heaters are suspended in the plenum, adjacent to, but separate from the process chamber, so that work in progress and operators are protected. Terminal ends are inserted through the walls of the dry heat sterilizer and use sufficient dead zones so that heat is not generated beyond the plenum. All heaters are wired with double nut connections. The heaters shall be positioned between the circ. return duct and the circ. fan to ensure the maximum utilization of the electric heaters and the recirculation of conditioned air.

5.1 FILTRATION

1. Intake Air Pre-filter

Air shall be pre-filtered through 25-40% roughing filter, 24" x 24" x 2" thick

2. Exhaust Air Pre-filter

Air shall be pre-filtered through a 25-40% roughing filter, 24" x 24" x 2" thick

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3. Air Intake HEPA Filter

A 24" x 24" x 5-7/8" HEPA filter, rated at 99.97% efficient at particles 0.3 microns or larger, shall be installed in a stainless steel housing on the incoming airflow side of the conditioning path. Challenge ports are provided for the verification of filter integrity. Access panels in the filter housing are secured with acorn nuts on 3" centers.

4. Air Exhaust HEPA Filter

A 24" x 24" x 5-7/8" HEPA filter, rated at 99.97% efficient at particles 0.3 microns or larger, shall be fitted to the exhaust path to protect the chamber from particulate backflow. Challenge ports are provided for the verification of filter integrity. Access panels in the filter housing are secured with acorn nuts on 3" centers.

5. Forced Exhaust

A 1100 SCFM exhaust blower that shall operate at minimum SCFM during the cycle or 1100 SCFM during cooling shall be installed to the dry heat sterilizer's air exhaust system and be initiated by an output from the programmable temperature controller to provide for moisture removal during the sterilization period, and a cooling capacity at the end of the temperature soak cycle. The blower shall be 2-speed, with a lower rpm during the ramp and soak period and a higher speed during the cooling period. A 10" O.D. exhaust collar shall be supplied for attaching customer's exhaust connection.

6.0 CONTROLS AND INSTRUMENTATION

6.1 CONTROL CONSOLE

The main operating electrical components for the sterilizer are housed in a single free-standing remote control console and shall house the Micro850 PLC and other electrical components. Circuit wiring is complete, including a step-down transformer to provide the control circuits with 110-volt power. Wiring in the control console terminates in a suitable block for connection to the customer's power supply. The control console and control boxes shall be labelled as NEMA 1 but designed and built to NEMA 12 standards in order to comply with UL508A regulations.

1. U.L. Label

The control console and the control box shall be designed and built to comply with all current and pertinent UL508A directives and labelled. All control boxes shall be rated at NEMA 1, built to NEMA 12 design.

2. E-Stop

The control console shall include an E-Stop. When pressed, the sterilizer heat, circulation and exhaust fans shall stop and the load end doors shall unlock.

3. Controls Protection Rail

Stand-off rails shall be included on the face of the control console and HMI box to protect the face of the electrical controls from accidental damage from being hit by carts and operators. The bumper rails shall be a round design without sharp edges for easy cleaning and located above and below the controls on the face of the console.

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6.2 DISCONNECT SWITCH

A fused power disconnect switch shall be installed on the main control console for safe maintenance of the sterilizer. The disconnect switch assures that the panel power is de-energized before the access door can be opened.

6.3 OPERATOR INTERFACE TERMINALS, 10" Display

One Operator interface terminal shall be supplied with this unit and located in the load end main control console. At a minimum, it shall feature:

- 10 inch diagonal (800 x 480) color TFT LCD and an analog-resistive touchscreen
- Serial, Ethernet communications, and USB
- Expandable memory for recipe and data log storage
- Support monitoring from a personal computer (PC) with free VNC Client software
- Data logging in Excel®-compatible comma separated value (.csv) files
- Recipe management
- 128MB Memory
- Provides audible alarms and key chirp
- Flexible 4 level password security
- UL®, NEMA 4, CE, RoHS rated

6.4 PLC

An Allen Bradley Micro850 PLC with on board Ethernet communications must be supplied to provide all control and functional logic of the sterilizer.

6.5 HIGH LIMIT THERMOSTAT

A separate, independent high limit thermostat shall be provided to de-energize the heating system should the process temperature reach the customer's preset limit. The high limit control must be manually reset to reactivate heating.

6.6 AIRFLOW SWITCHES

Pressure differential switches shall be installed and located in the air stream of the circulation and forced exhaust systems. Upon failure of either system, the airflow switch shall de-energize the heater circuit.

6.7 SEPARATE MAIN POWER RELAY

This relay is in addition to the normal relays serving the heater circuits. It shall be wired into the control circuit so that the high limit thermostat activates it. Should the main relays become mechanically frozen, as a result of extended use, this "back up" relay is deactivated, and the heat system shall be de-energized.

6.8 SCR

The sterilizer shall use SCR power controls installed to proportion power to the heaters only as necessary to maintain set-point temperature. This minimizes swings in set-point temperature, provides good temperature uniformity within the chamber, conserves energy and provides longer heater life.

Contract Documents

UM Project No.: CP230831

Clark & Enersen Project No.: 624-221-23

6.9 PANEL MOUNT THERMAL PRINTER, EVENT LOGGER

A thermal panel mount 2" printer shall be included. It shall feature easy paper loading, incorporated paper cutter, end of roll signal, USB and RS232 connections. A NEMA 4 rated enclosure shall be supplied, mounted to the face of the control console.

6.10 COMMUNICATIONS INTERFACE MODULE

A Communications Interface module may be provided on the control panel. It shall include an Ethernet Port and a 120 VAC outlet for the connection of an external PC to perform software maintenance. A USB port shall also be provided.

6.11 AUDIBLE ALARM

An audible alarm with manual silencer shall be provided. Alarms, at a minimum, shall indicate over-temperature alarm, circ. and exhaust low airflow alarm, temperature deviation alarm, and filter alarm.

6.12 DRY CONTACTS FOR BMS INTEGRATION

The sterilizer shall be provided with two dry contacts. One shall signal the building management system (BMS) when the sterilizer is in cycle at low exhaust flow. The second dry contact shall signal the BMS when the sterilizer is in cooling at high exhaust flow.

6.13 HMI CONTROL BOXES (Locations at load/unload end, remote in wall panel)

Control boxes shall house an Operator Interface touchscreen terminal.

7.0 LOADING TRUCKS/TROLLEYS

Not used.

8.0 TESTING AND ACCEPTANCE

The factory testing shall include at least two tests: one empty chamber uniformity mapping, and one full chamber uniformity mapping and sterilization test. (Customer may supply a full complement of trucks and cages or the seller shall include these items for testing).

Factory standard testing and standard operating procedure documents shall be provided for review along with the approval drawings. SOP's to be included are, at a minimum, sterilizer functional testing SOP, chamber uniformity testing and calibration SOP, HEPA filter testing SOP, temperature controller and high limit calibration SOP and full load testing SOP.

Testing shall be performed using calibrated NIST traceable data recording equipment. The documentation of calibration shall be submitted to the client along with the test data.

8.1 TEMPERATURE UNIFORMITY

The sterilizer shall be equipped to maintain a temperature uniformity of $\pm 5^{\circ}\text{F}$, at a test temperature of 300°F . Test temperature readings are taken within a volume of space not exceeding 80% of each empty work chamber or closer than 3" from any of the six interior surfaces of each work chamber. At a minimum, a 12-point uniformity test shall be performed with a soak length of 60 minutes.

9.0 PRE-SHIPMENT EVALUATION WITNESS TEST

DRY HEAT STERILIZER

11 55 19 - 6

Contract Documents

UM Project No.: CP230831
Clark & Enersen Project No.: 624-221-23

All equipment shall be built to the referenced specification and subject to the standard seller's test protocols pertinent to the specific equipment design. Additional test protocols maybe completed if agreed to prior to the equipment purchase. Clients shall be welcome to visit the factory *by arrangement* prior to shipment of their equipment in order to carry out a Pre-Shipment Evaluation Witness Test. As a minimum, this evaluation shall consist of the following.

- Dimensional review and quality check of system.
- Review of completed test data.
- Controls overview and interface.
- Functional review: Cycle operated either through the equipment design extremes or through the clients agreed to cycle parameters. Cycle operation is performed with a loaded chamber, including temperature mapping of the customer's load.

10.0 INSTALLATION

Seller shall send a factory trained technician(s) to manage and supervise the rigging and installation of the dry heat sterilizer. The installation shall be performed using a local rigger, at the direction and supervision of the seller's technician. The cost of the rigger shall be included in seller's proposal.

10.1 START-UP and TRAINING

Seller shall send a factory trained test technician to perform the start-up of the sterilizer. Training on the control system, maintenance, and overall features of the unit shall be provided. The startup shall follow manufacturer's standard SOP for startup and standard agenda for the user training.

10.2 POST INSTALLATION VALIDATION

Seller shall send a trained test technician to perform a Post Installation Validation on this unit. The scope of work shall consist of commissioning the sterilizer and the execution of the system's validation protocols as they were when the unit was tested at our facility before being shipped. A minimum of 3 different cycle types shall be developed and validated as part of the proposal. The installation shall follow manufacturer's SOP for cycle validation and be available for review prior to bid award. A written validation report showing the efficacy as challenged with a minimum of (20) 10-6 biological indicators for each cycle shall be provided to users at the end of testing.

10.3 INSTALLATION, START UP, TRAINING AND VALIDATION DOCUMENTATION

As part of the approval drawing process, seller shall provide copies of their standard operating procedures for the installation, start up, user training and post installation validation for review.

11.0 WARRANTY

At a minimum, a comprehensive two-year parts and labor warranty shall be included. The date of the warranty shall start at the date of substantial completion of the project.

12.0 MAINTENANCE AND OPERATING DOCUMENTS

Contract Documents

UM Project No.: CP230831
Clark & Enersen Project No.: 624-221-23

Seller shall supply 1 set of operational and maintenance manuals on thumb-drive. It shall be complete with lubrication specifications, routine maintenance, parts lists, wiring, and mechanical drawings.

13.0 UTILITIES

1. V: 480V/240 or 208V / 3Ø / 60Hz / 176 FLA
2. CA: 2-5 CFM, 80-120psig
3. EXH: 10" OD, minimal SCFM during the cycle, 1100 SCFM during cooling. Up to 285°F

14.0 QUALIFICATIONS

14.1 MANUFACTURER'S QUALIFICATIONS

Vendor shall have been in the business of providing NFPA 86 rated dry heat sterilizers, dry heat sterilizers and related equipment for at least 10 years. In addition, vendor shall have direct laboratory animal industry experience with more than 7 years' experience and more than one dozen successful dry heat sterilizer installations specifically in cage sterilization applications in vivariums. All bidders must provide a list of at least 5 successful installations completed in the last five years. Manufacturers shall have established organizations and production facilities including all tools, equipment and special machinery necessary for specializing in the fabrication and installation of dry heat sterilizers, with skilled personnel, factory trained workmen and an experienced engineering department.

14.2: INSTALLER QUALIFICATIONS

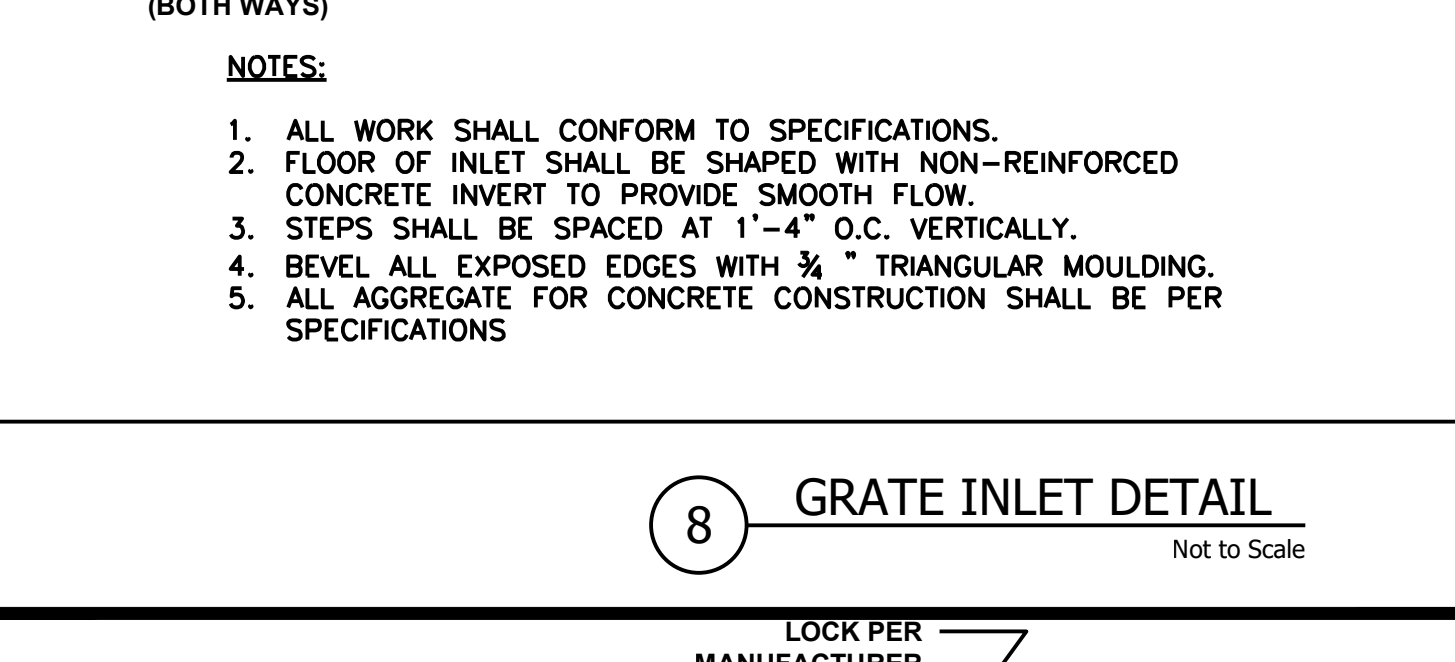
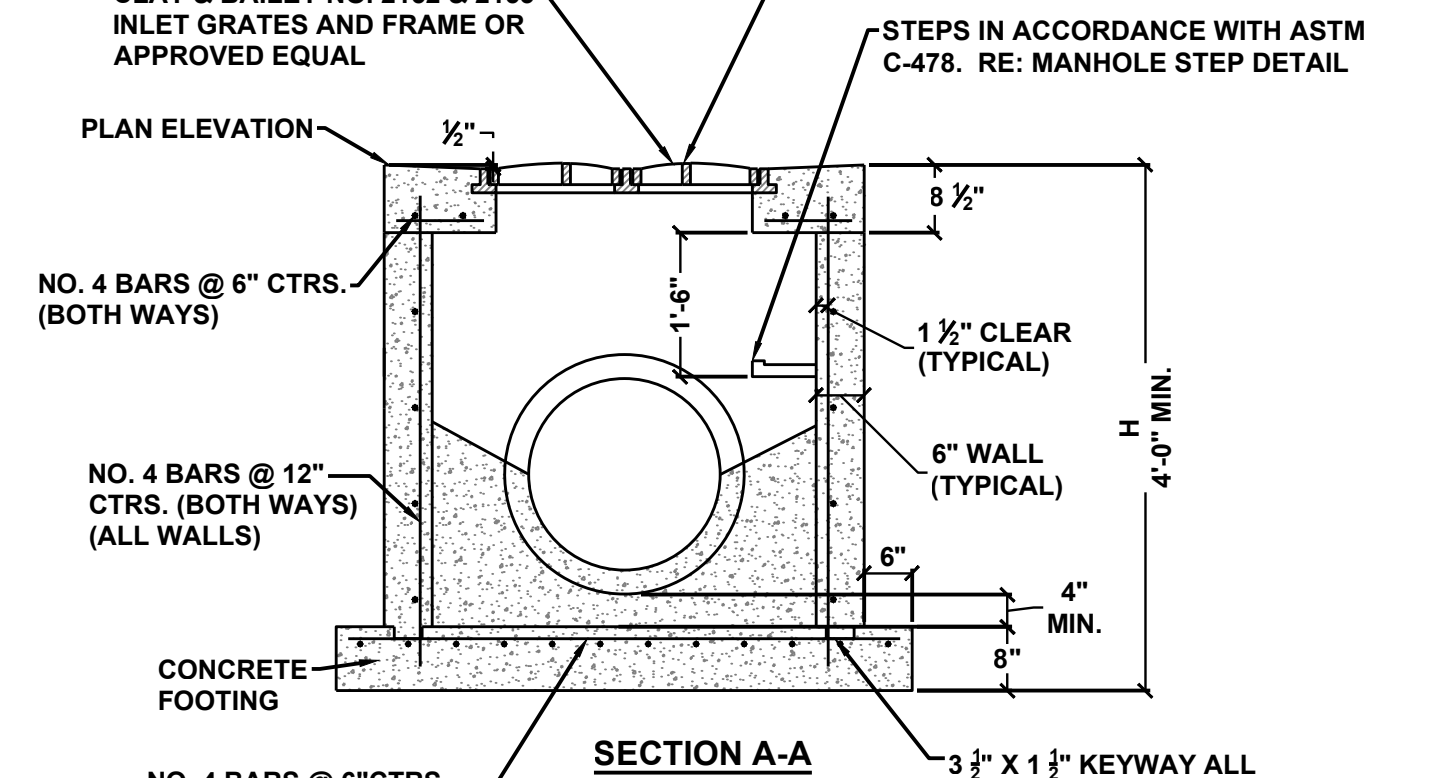
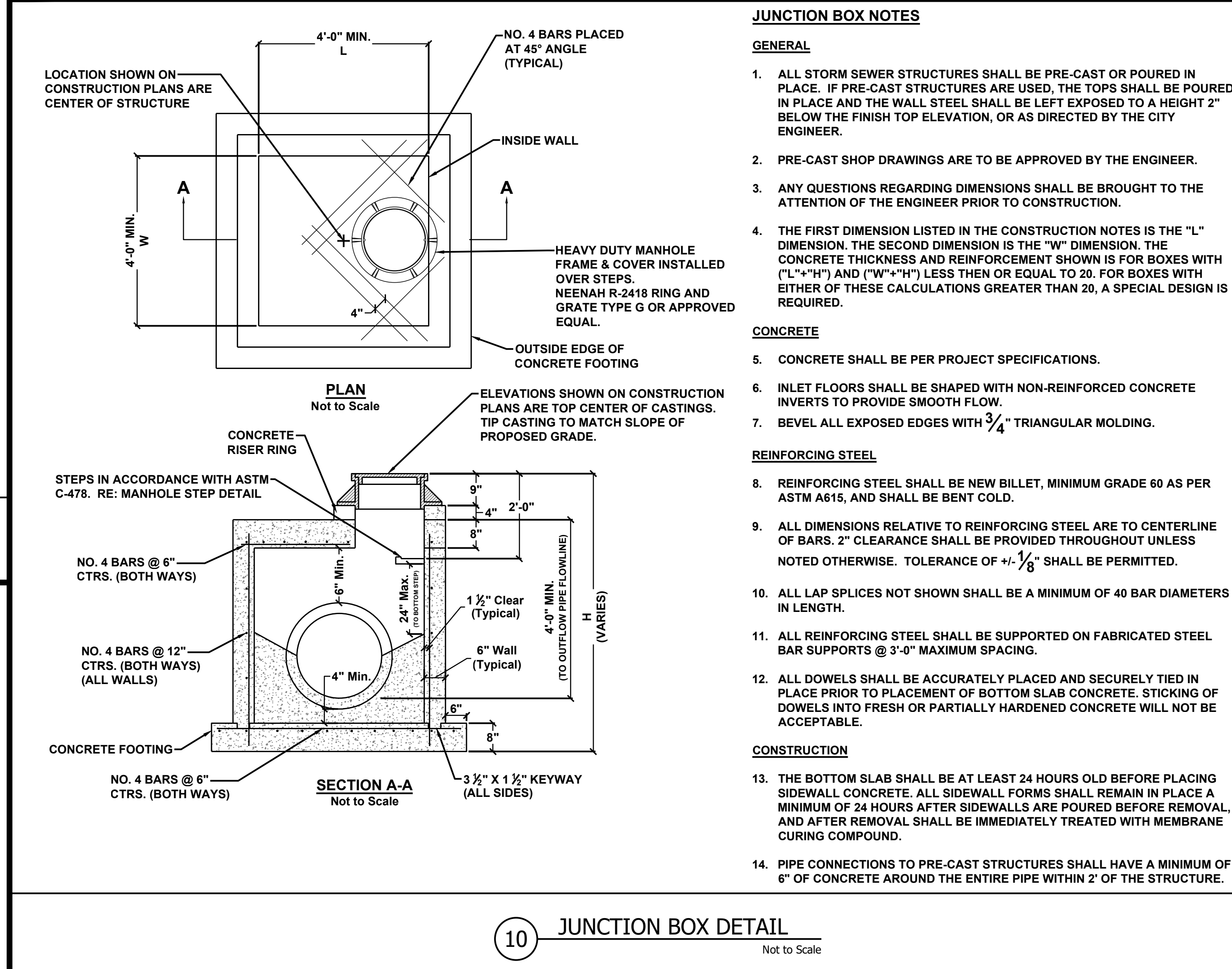
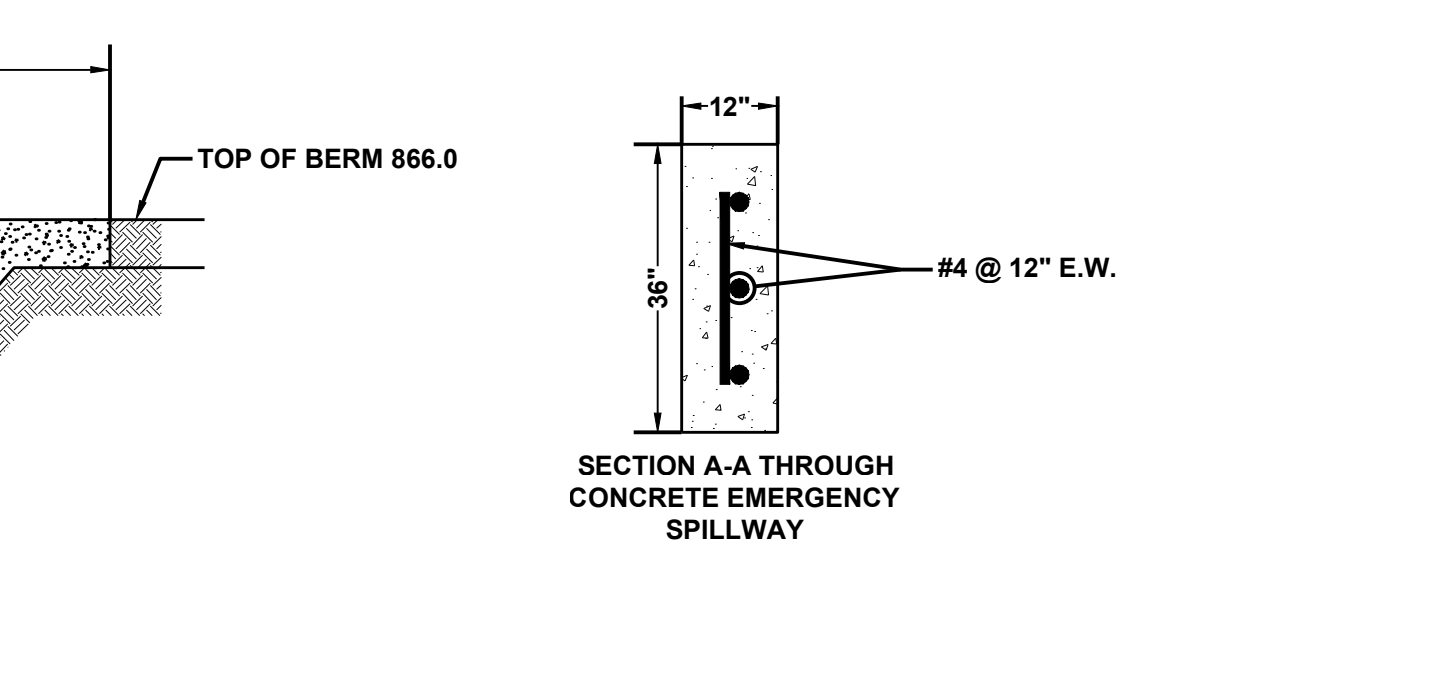
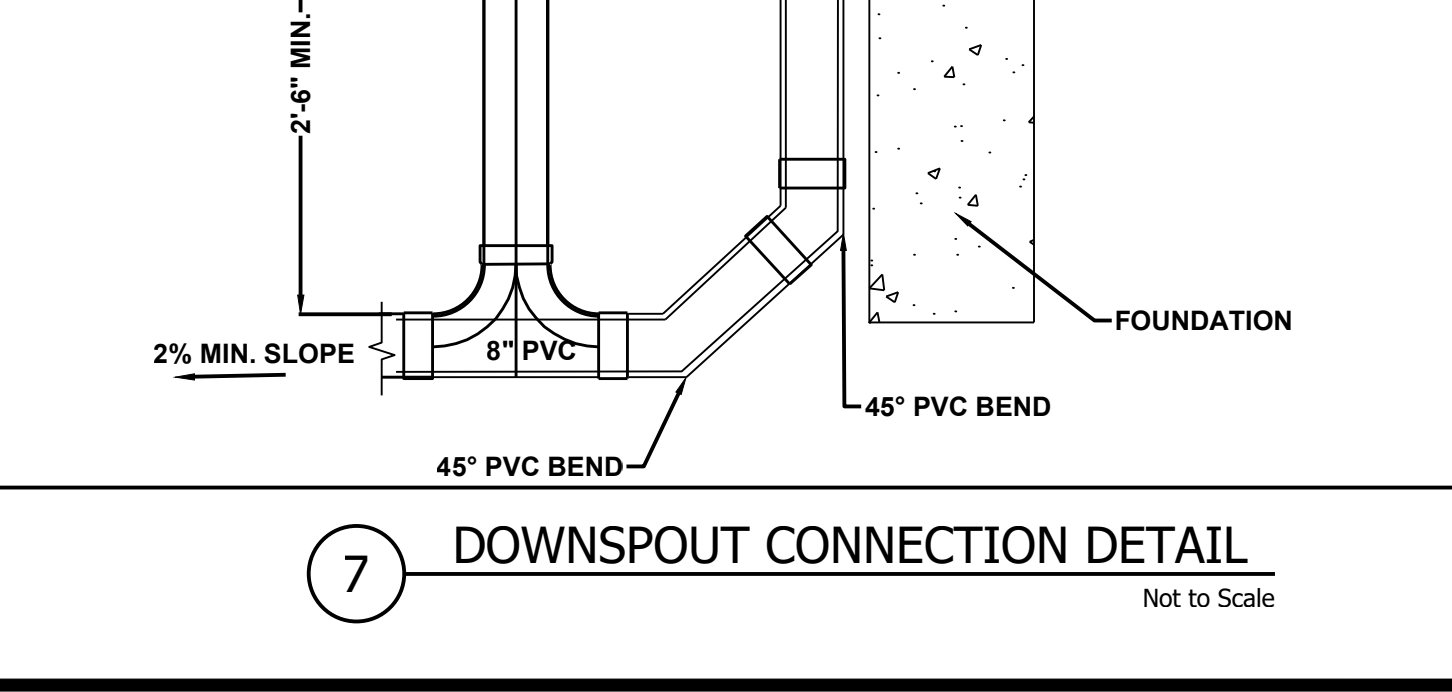
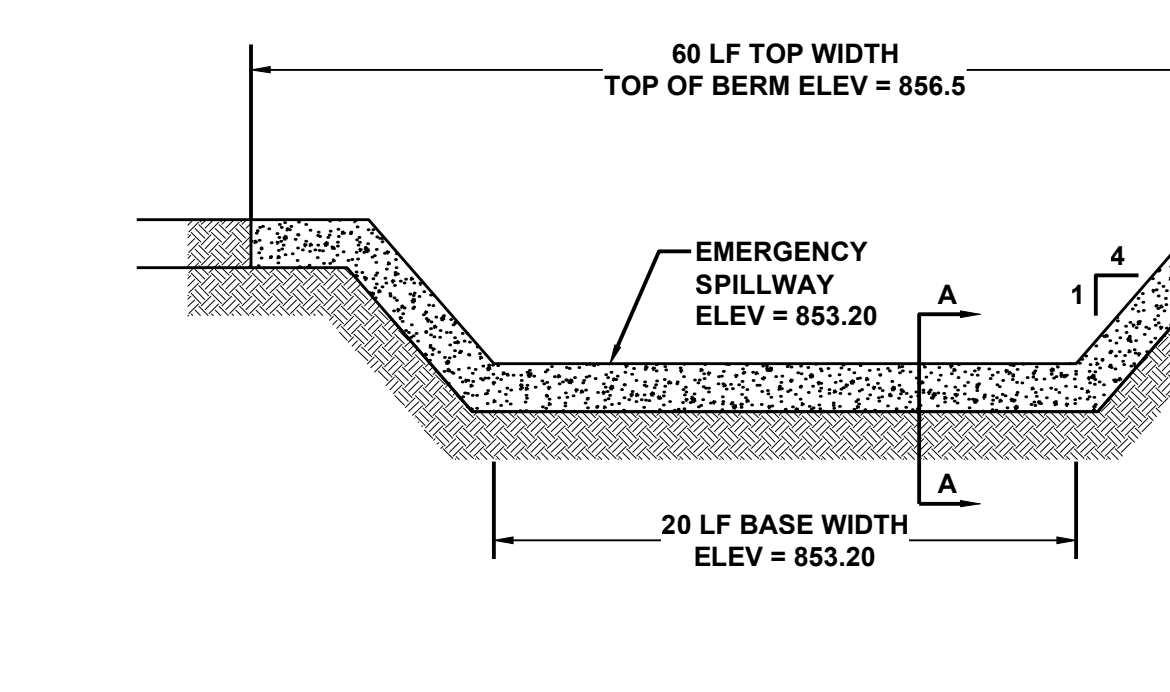
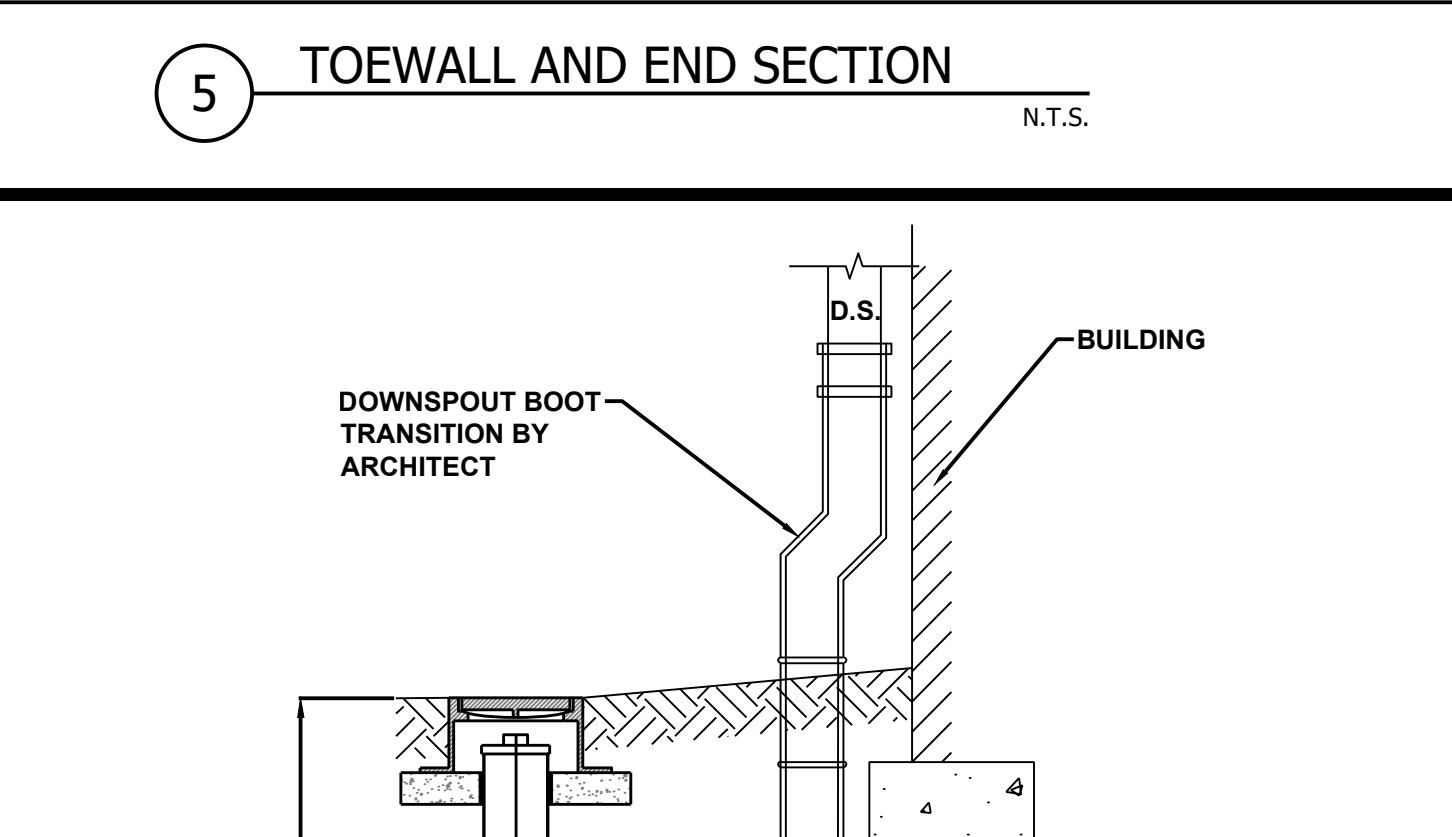
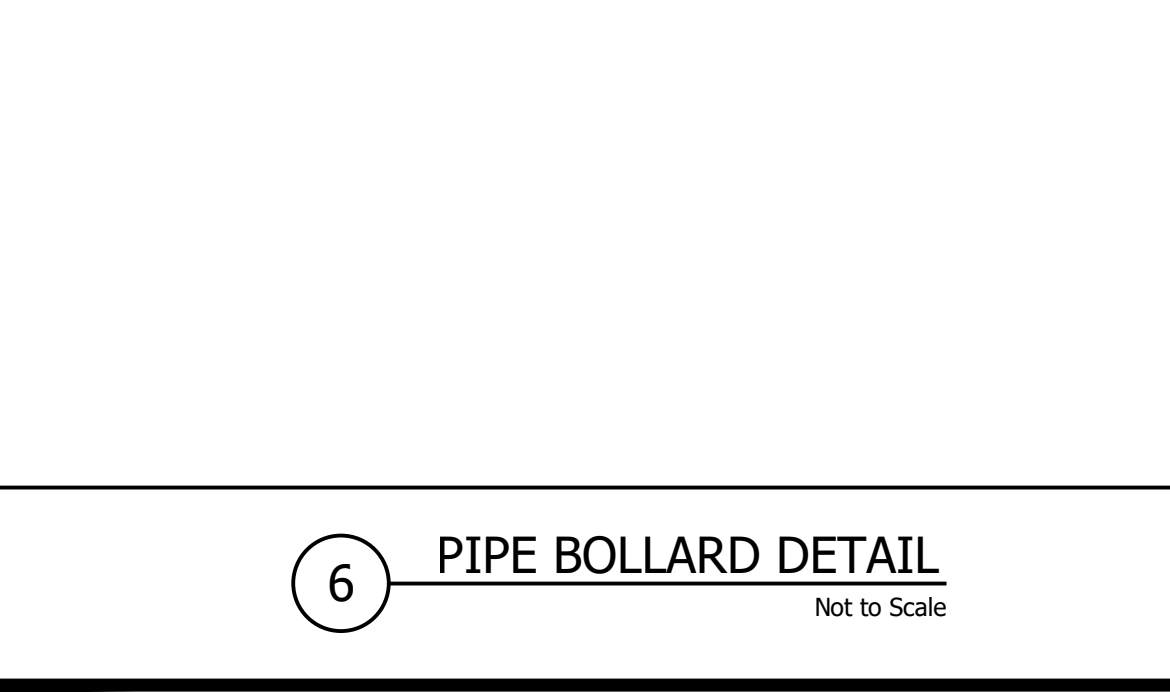
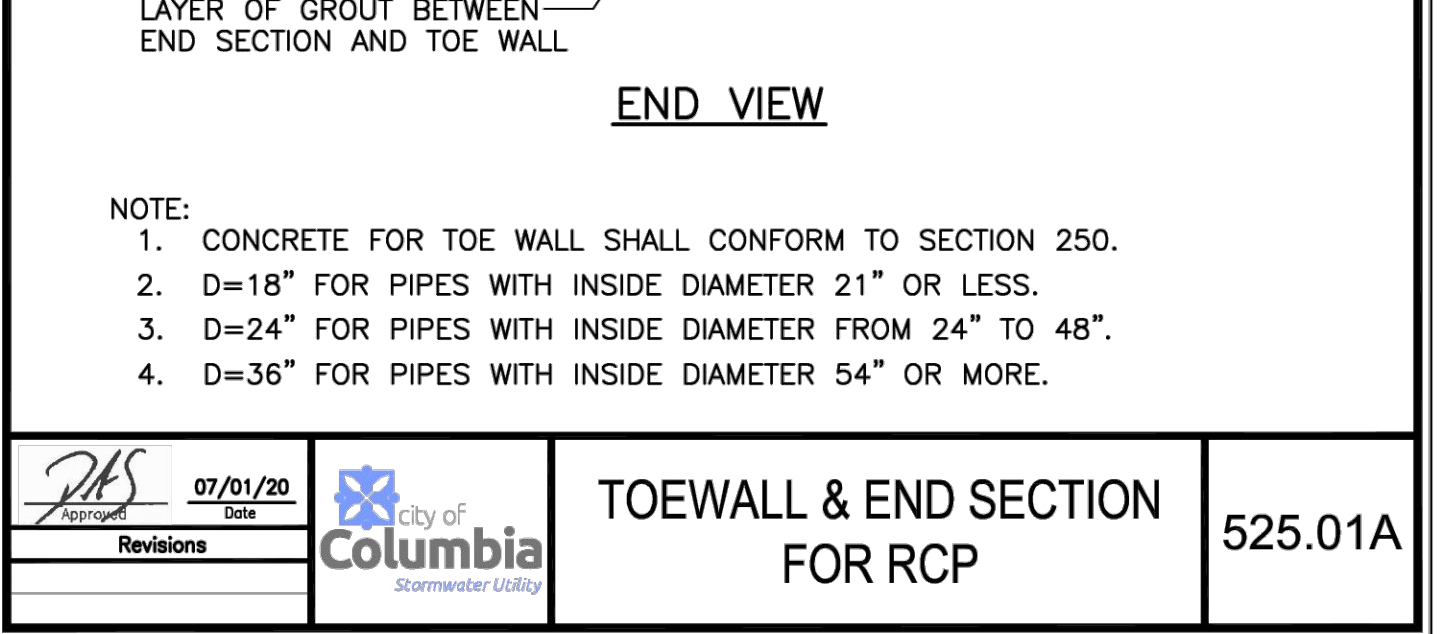
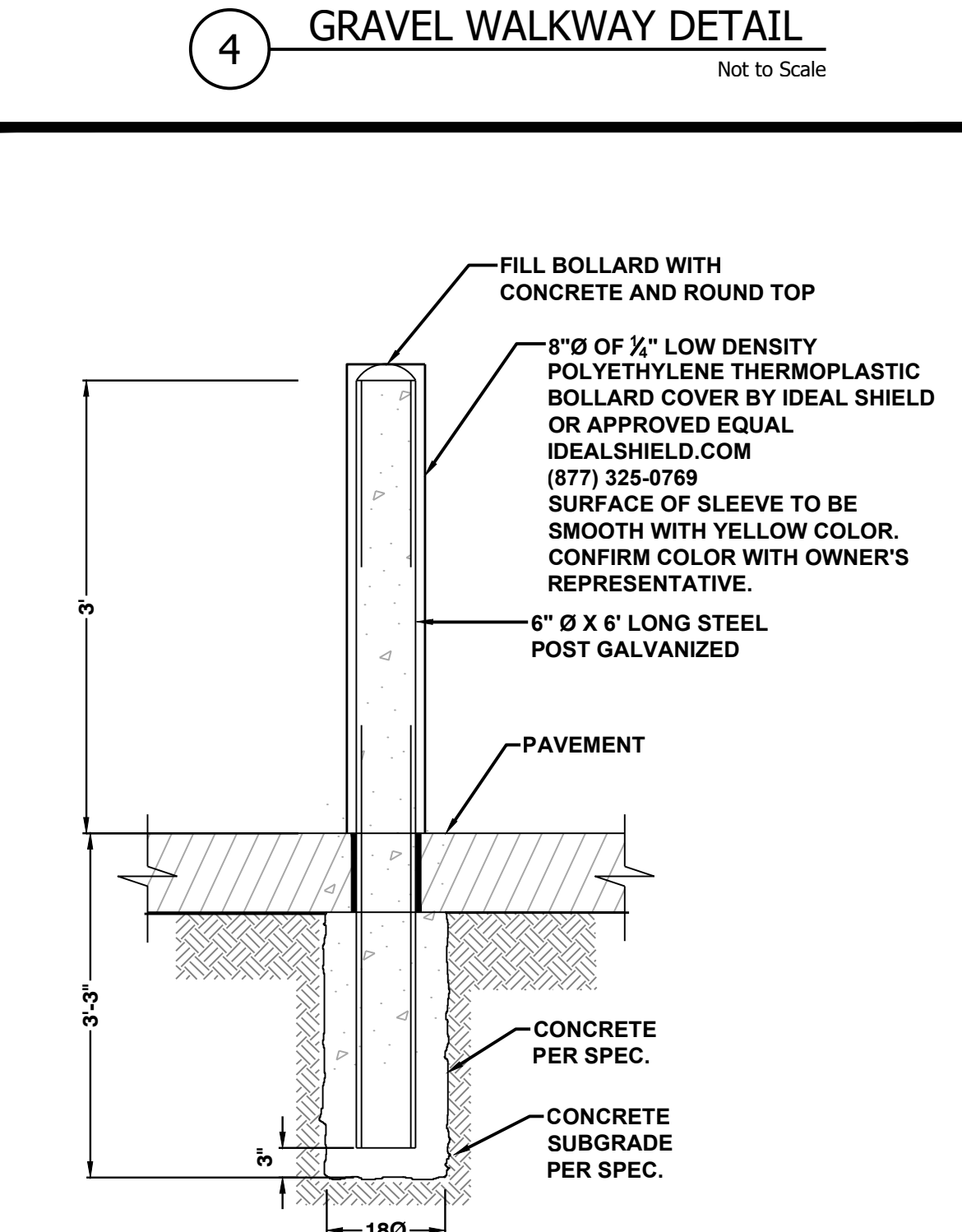
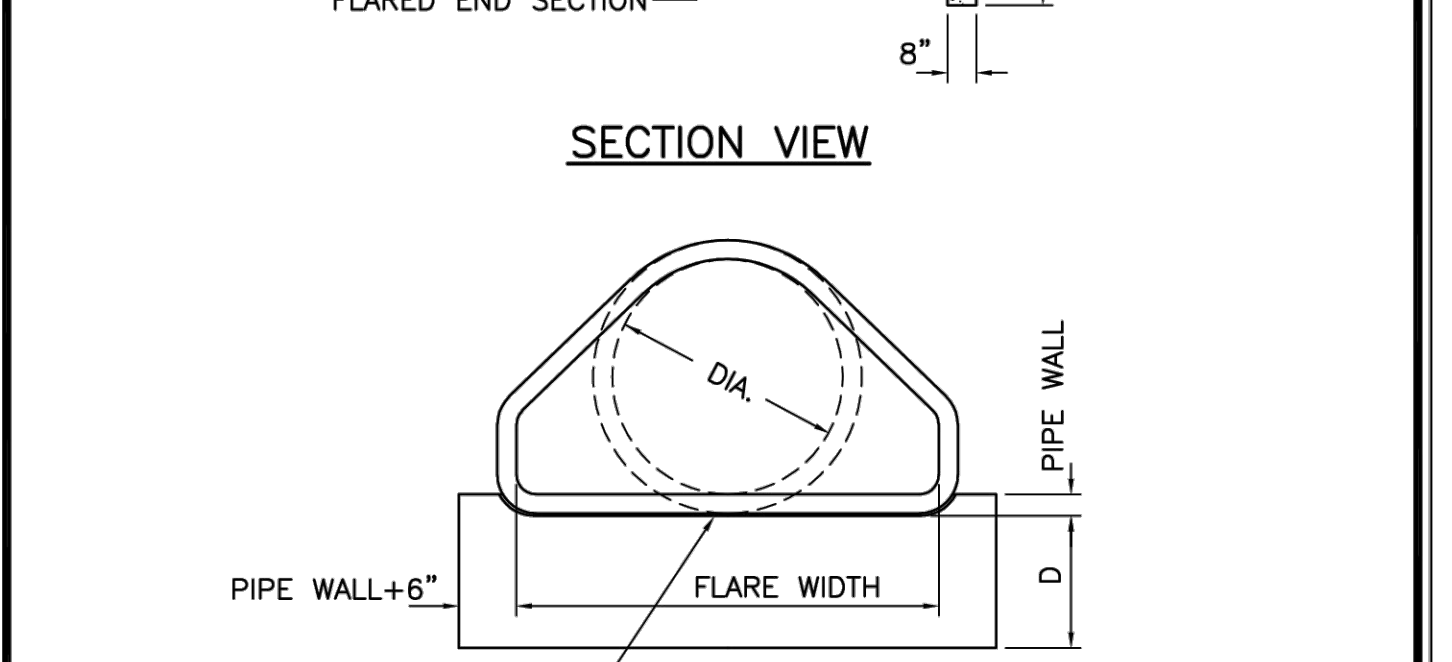
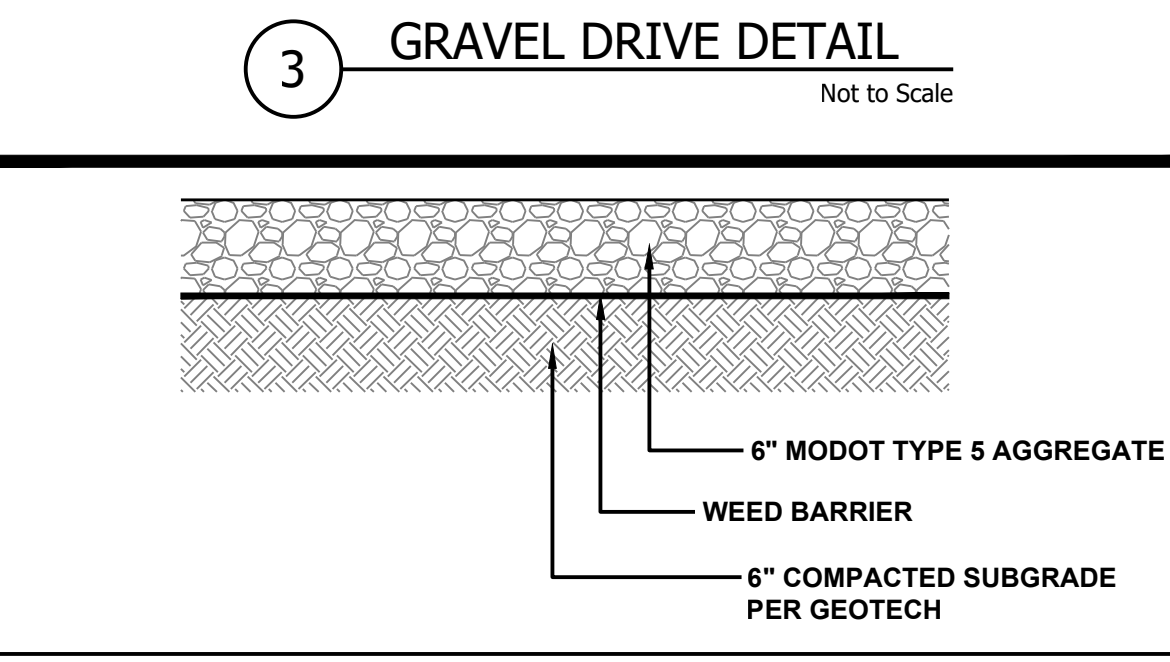
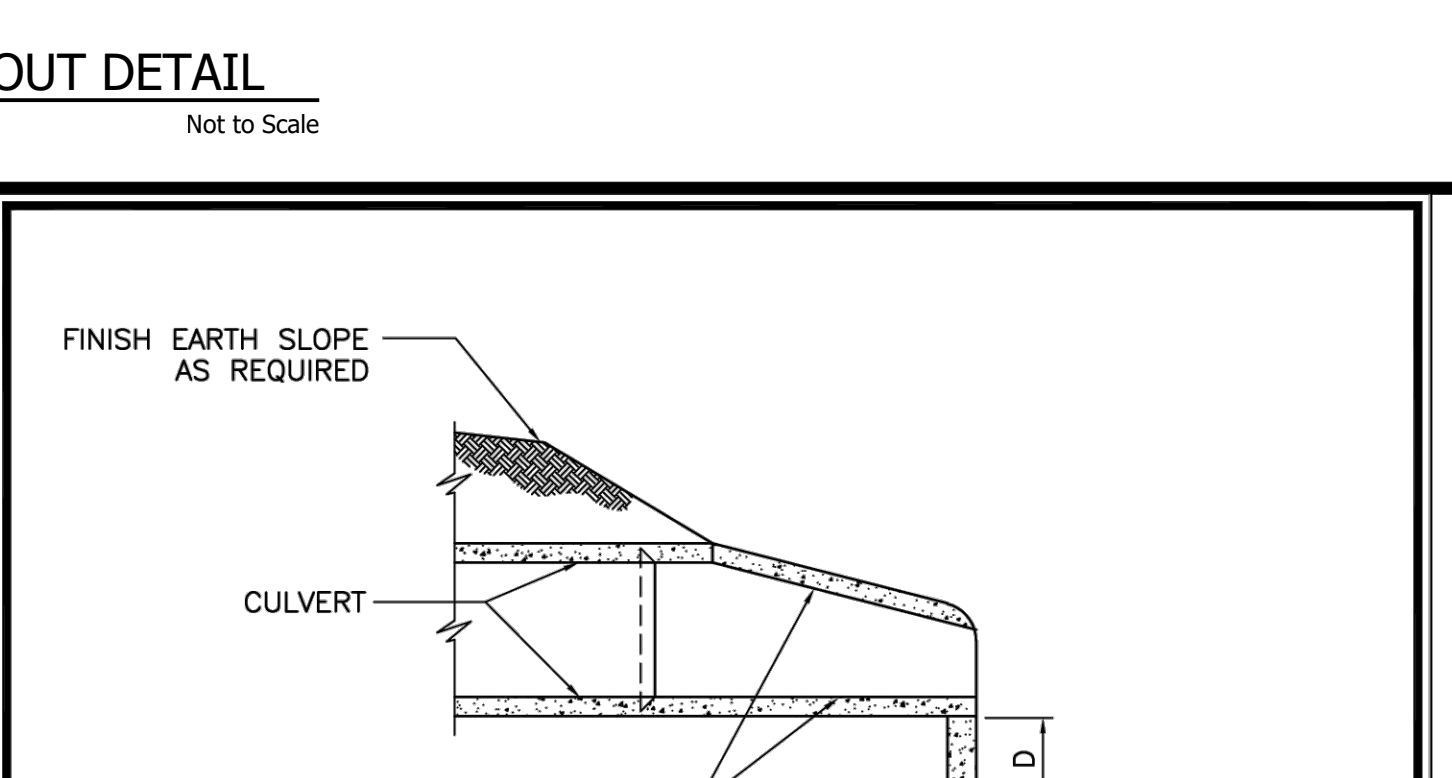
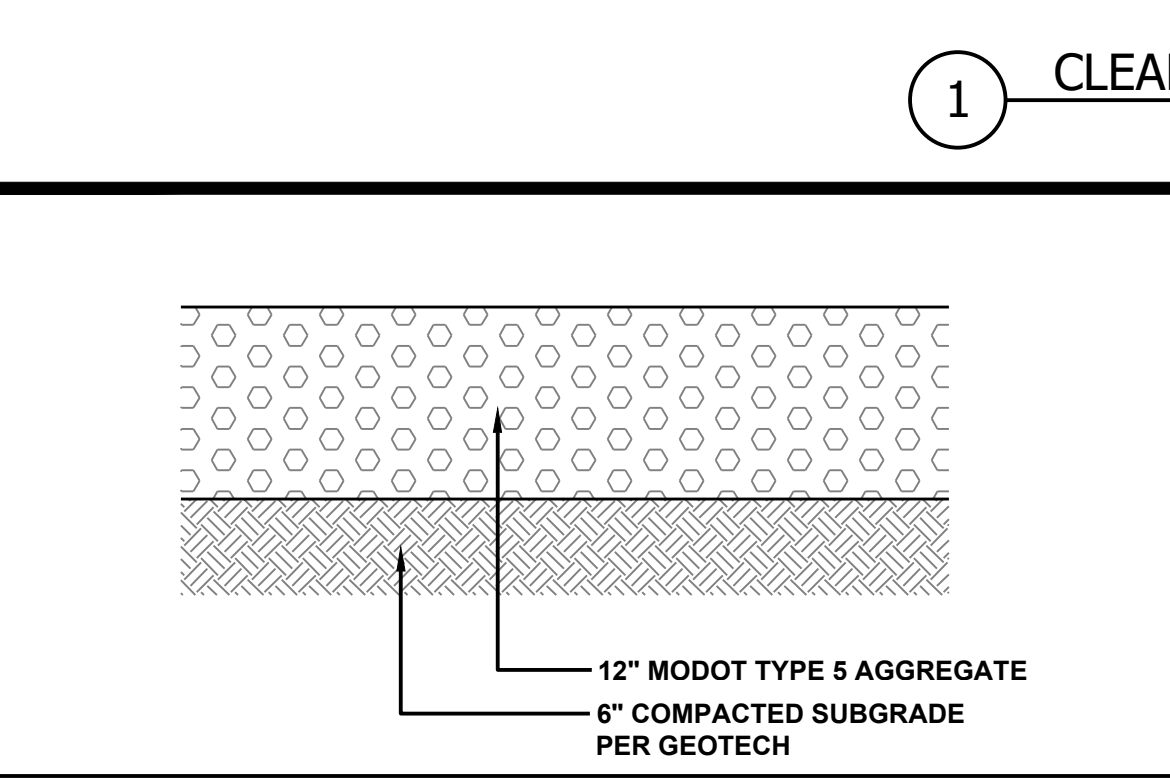
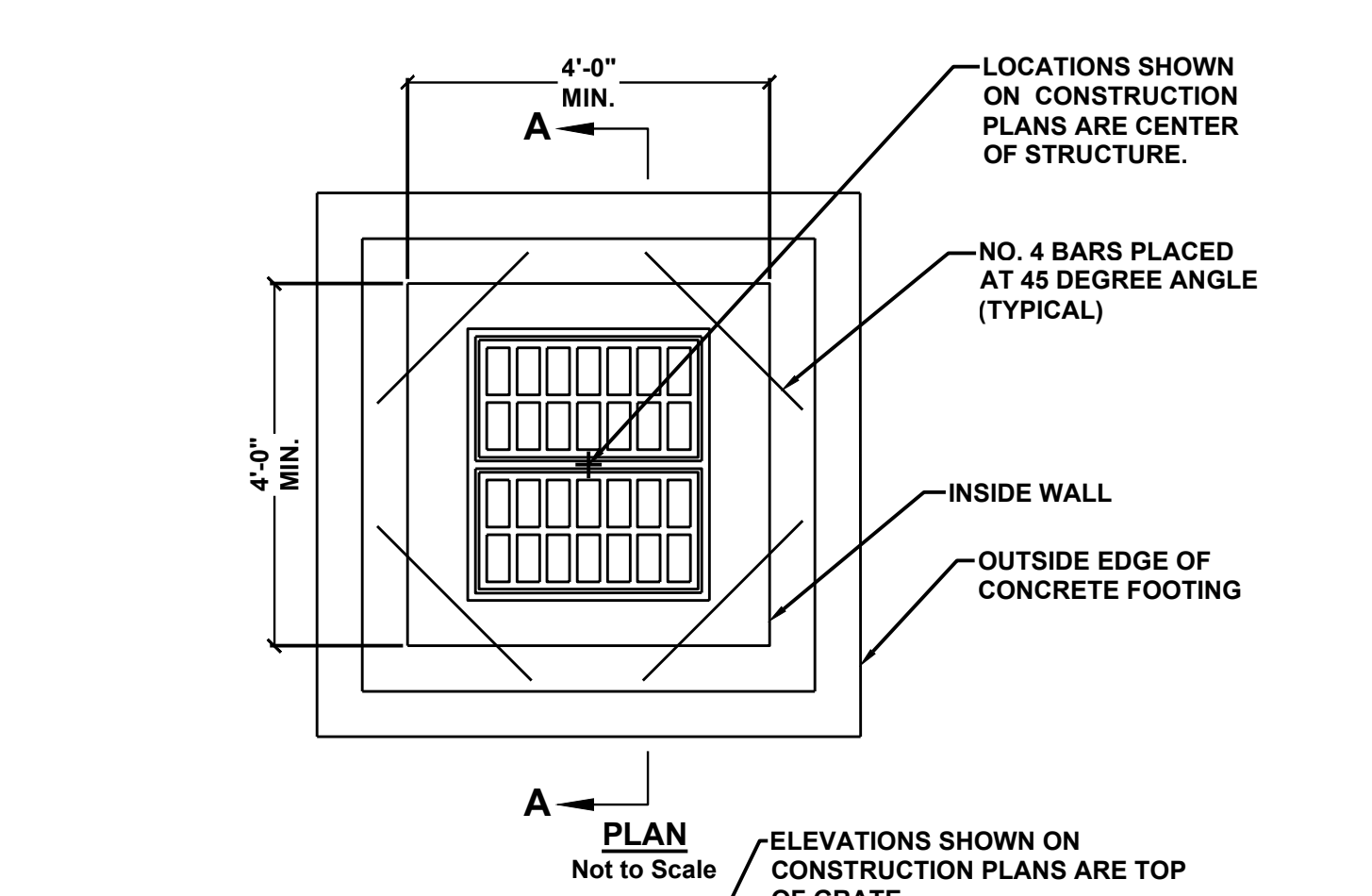
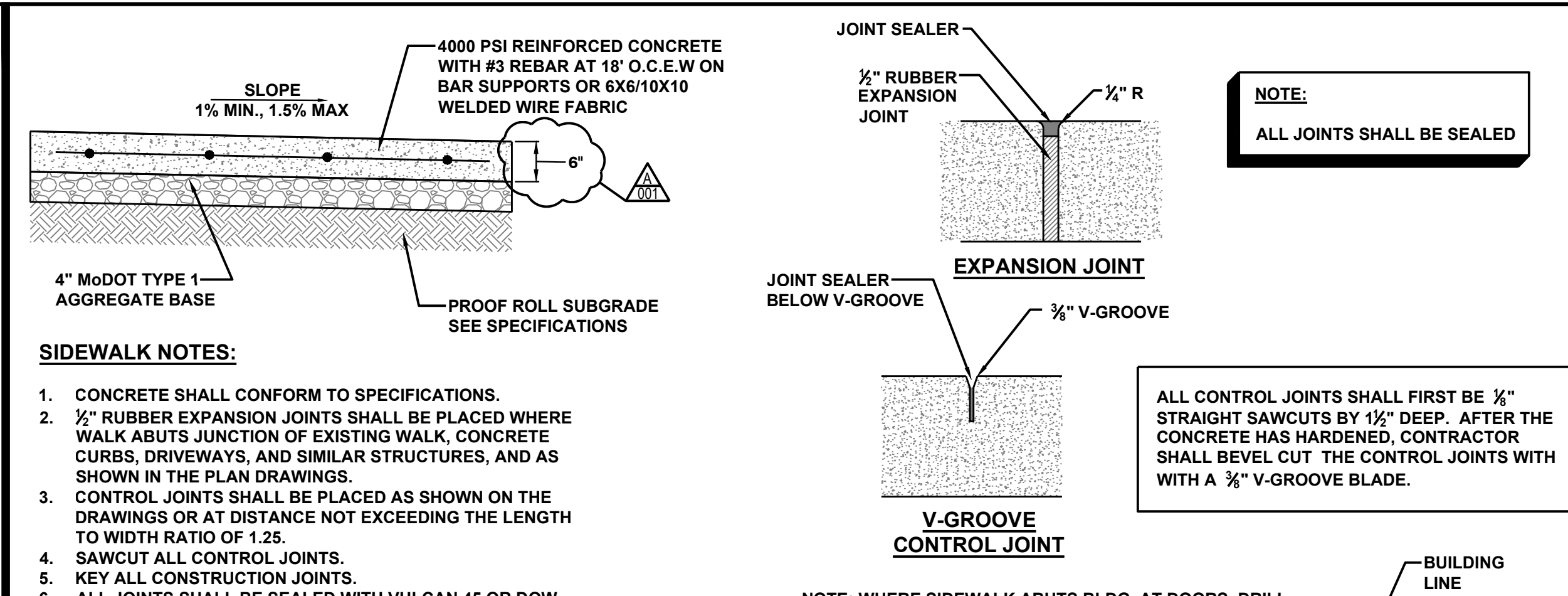
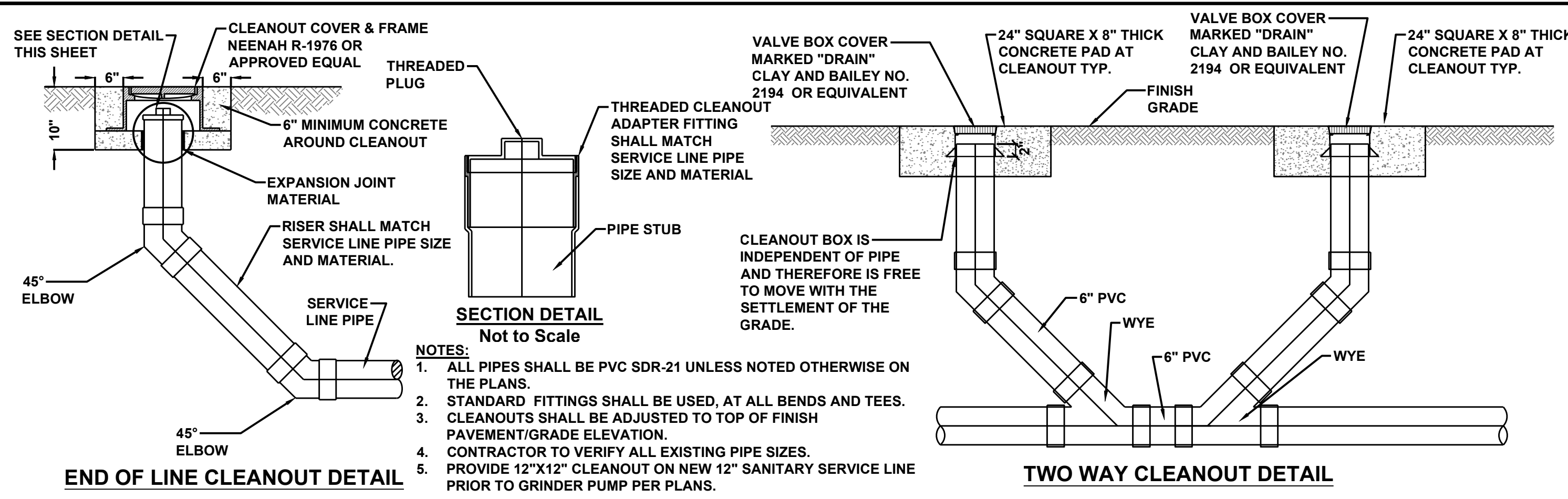
Installer of dry heat sterilizers shall have an established organization including all tools, equipment and special machinery necessary for specializing in the installation, start up and validation of this equipment. Personnel shall have the demonstrated knowledge, ability and the capability to install the specified equipment of the required quality and capacity to complete an installation of this size and type within the required time limits. The firm specializing in installation of products specified shall have a minimum five years' experience and authorized by manufacturer to install product.

Manufacturer to provide installation standard operating procedure (SOP) documents for review along with the approval drawings. SOP's for the installation and validation to be included are, at a minimum, sterilizer field commissioning testing SOP, chamber uniformity testing SOP and cycle validation SOP.

Upon request, installer shall provide five references of similar installations.

15.0 MANUFACTURER

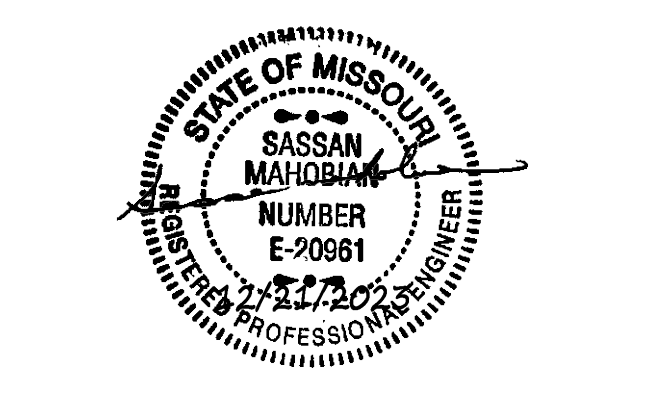
Products, which comply with this specification section as judged and approved by the Owner or Owner's Architect, may be provided by the following manufacturers. All dry heat sterilizers specified in this section shall be provided by a single manufacturer.



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Contract documents
Middlebush Farm -
NextGen Center of
Excellence for Influenza
Research, Phase II
 9251 Tom Bass Rd,
 Columbia, MO 65201

CE No.: 624-221-23
 UM No.: CP230831
 12/21/2023

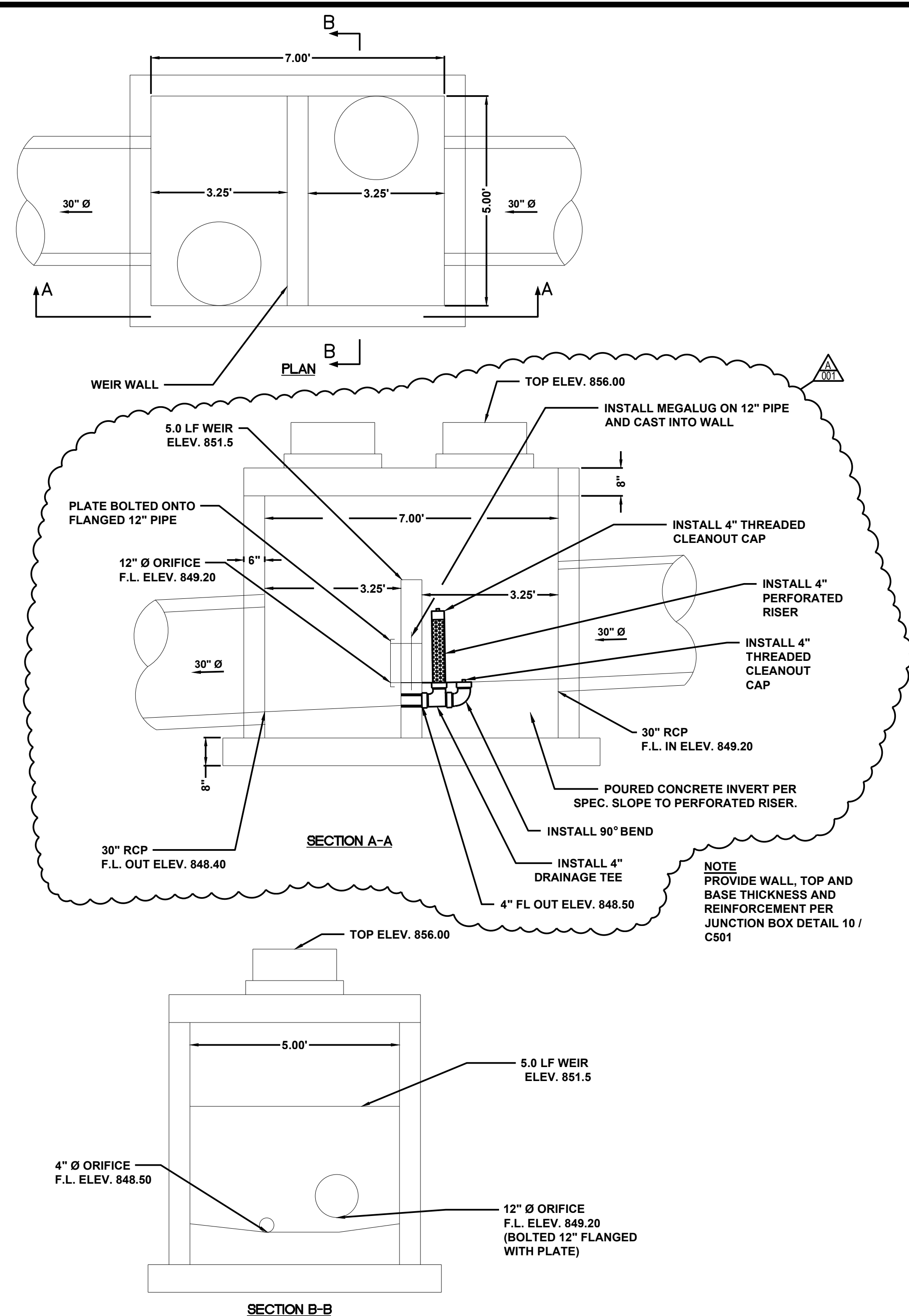
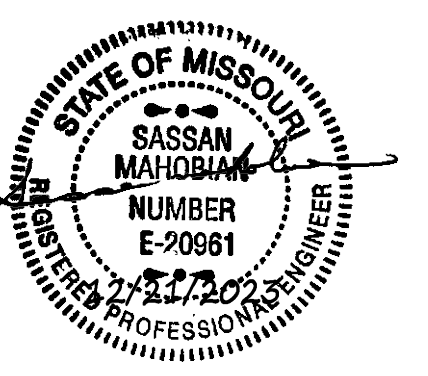


Contract documents

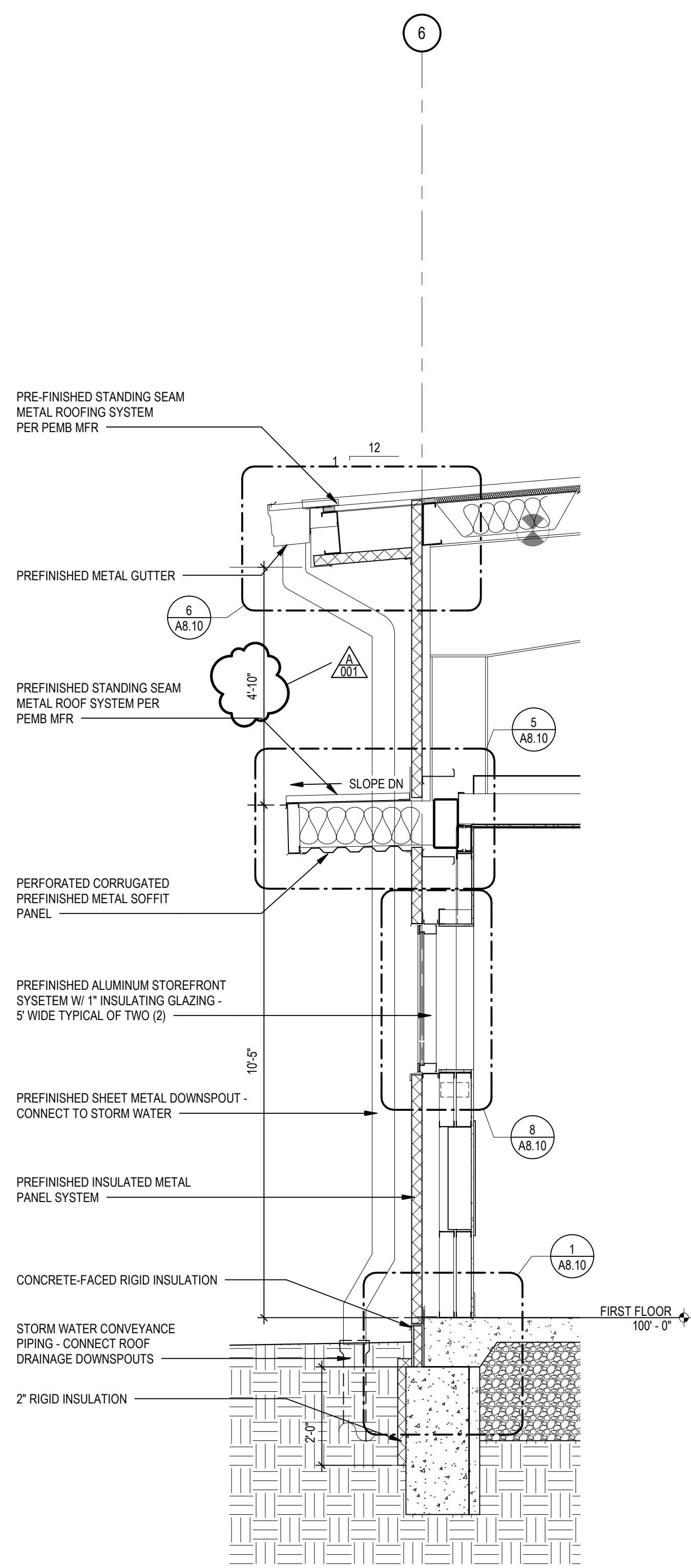
**Middlebush Farm -
 NextGen Center of
 Excellence for Influenza
 Research, Phase II**

9251 Tom Bass Rd,
 Columbia, MO 65201

CE No.: 624-221-23
 UM No.: CP230831
 12/21/2023

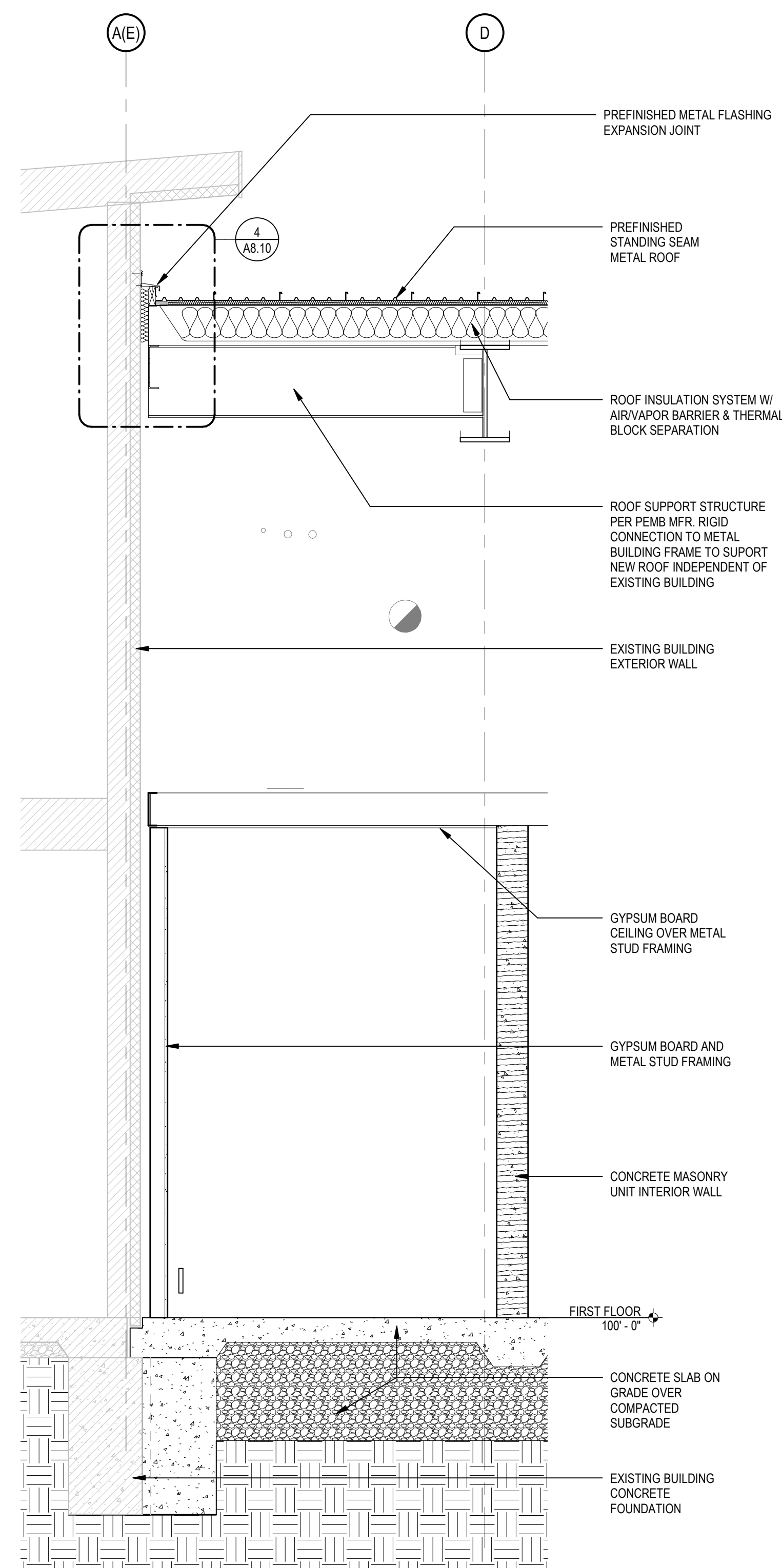


1 DETENTION CONTROL STRUCTURE C2
 N.T.S.



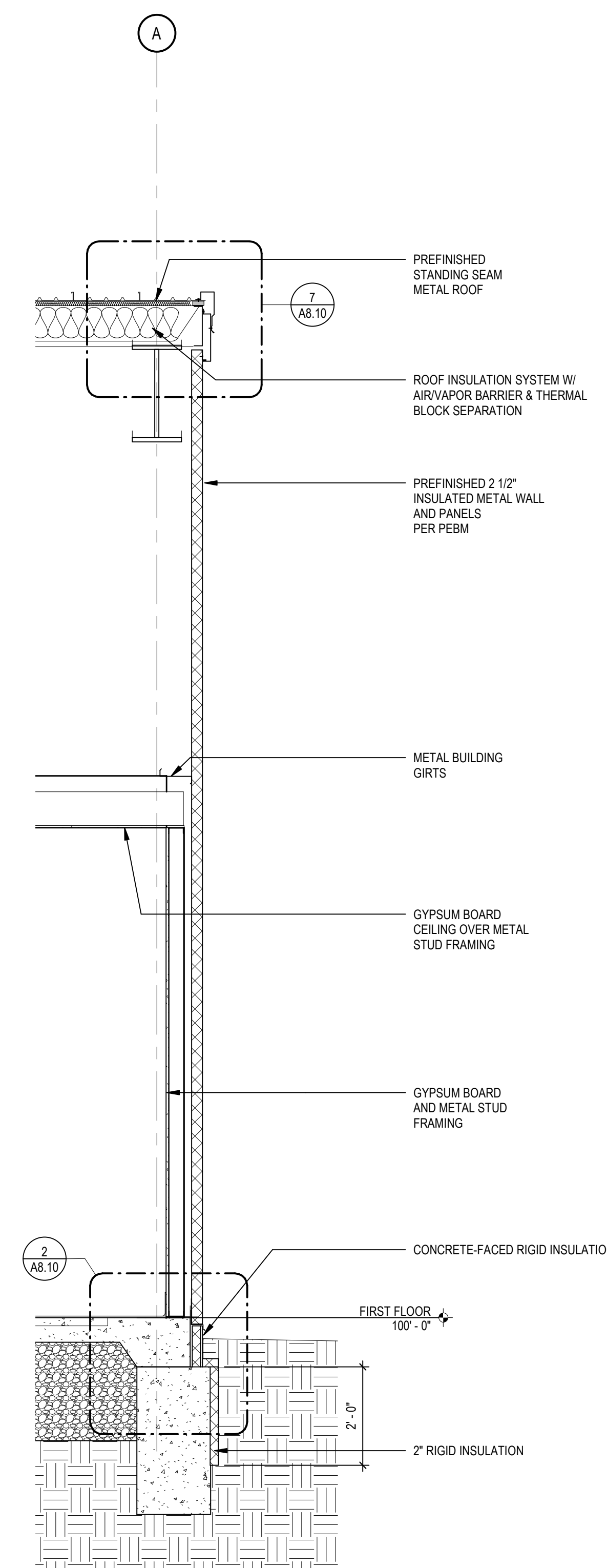
1 NORTH/SOUTH WALL SECTION

SCALE: 1/2" = 1'-0"



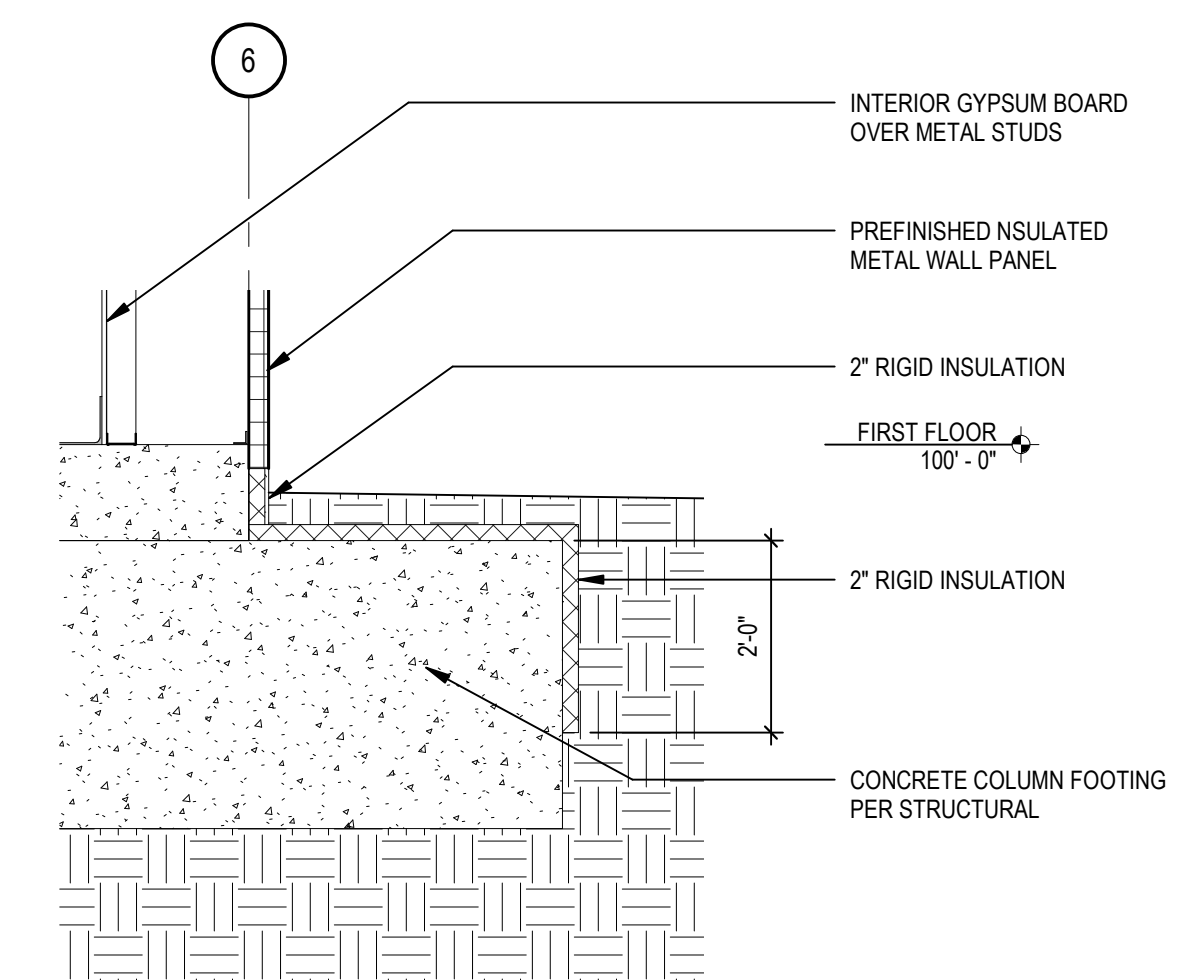
2 EAST/WEST WALL SECTION

SCALE: 1/2" = 1'-0"



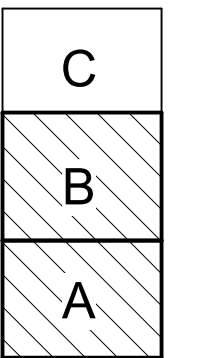
3 EAST/WEST WALL SECTION

SCALE: 1/2" = 1'-0"



4 PARTIAL WALL SECTION @ TYP. COL. FOOTING

SCALE: 1/2" = 1'-0"



Key Plan

Contract Documents
Middlebush Farm -
NextGen Center of
Excellence for Influenza
Research, Phase II

9251 Tom Bass Rd,
 Columbia, MO 65201

CE No.: 624-221-23
 UM No.: CP230831
 12/21/2023



FINISH PROTECTION

GUARDS		
CG-1	MANUFACTURER:	C/S ACROVYN
	PRODUCT:	STAINLESS STEEL CORNER GUARD 2X2 - CO SERIES (48)
	COLORWAY:	BRUSHED STAINLESS STEEL 304
	PROFILE:	
BG-1	MANUFACTURER:	NPRO - S2SS
	PRODUCT:	BUMPER GUARDS - INSTALL BOTTOM OF GUARD @ TOP OF WALL BASE
	COLORWAY:	BRUSHED STAINLESS STEEL 304

ROOM FINISH GENERAL NOTES

- RUBBER BASE SHALL NOT BE APPLIED TO CMU WALLS, TYP.
- RE INTERIOR ELEVATIONS AND FINISH FLOOR PLAN FOR EXTENT OF PAINT AND WALL COVERING FINISHES DESIGNATED ON FINISH SCHEDULE.
- RE INTERIOR WALL ELEVATIONS AND FINISH FLOOR PLAN FOR EXTENT OF TILE FINISHES.
- RE DOOR SCHEDULE FOR DOOR & FRAME FINISH

FINISHES

TILE			PAINT			RESILIENT BASE		
TL-1	MANUFACTURER:	DALTILE	EPT-1	MANUFACTURER:	SHERWIN WILLIAMS	RB-1	MANUFACTURER:	JOHNSONITE
	PRODUCT:	PORTFOLIO		HUE:	SW7005 PURE WHITE (MATCH EXIST.)		PRODUCT:	--
	SIZE:	12X24; 6X12 COVE BASE		FINISH:	SEMI-GLOSS EPOXY		COLORWAY:	CHARCOL 20
	COLORWAY:	PF05 ASH GRAY		APPLICATION:	--		APPLICATION:	--
	APPLICATION:	RESTROOM FLOOR & BASE	EPT-2	MANUFACTURER:	SHERWIN WILLIAMS	SC-1	MANUFACTURER:	--
TL-2	MANUFACTURER:	DALTILE		HUE:	SW6304 SEQUIN (MATCH EXIST.)		PRODUCT:	--
	PRODUCT:	PORTFOLIO		FINISH:	SEMI-GLOSS EPOXY		APPLICATION:	--
	SIZE:	12X24	EPT-3	MANUFACTURER:	SHERWIN WILLIAMS	RES-1	MANUFACTURER:	FINISH BOD - DUR-A-FLEX - COBBLESTONE
	COLORWAY:	PF02 WHITE		HUE:	SW9147 FAVORITE JEANS (MATCH EXIST.)		PRODUCT:	--
	APPLICATION:	RESTROOM WALLS		FINISH:	SEMI-GLOSS EPOXY		COLORWAY:	FLAKE COLOR 1
				APPLICATION:	DIRTY CORRIDORS		APPLICATION:	ROOMS/SPACES CLEAN/PROCEDURE
			EPT-4	MANUFACTURER:	SHERWIN WILLIAMS	RES-2	MANUFACTURER:	FINISH BOD - DUR-A-FLEX - COBALT
				HUE:	SW7068 GRIZZLE GREY (MATCH EXIST.)		PRODUCT:	--
				FINISH:	SEMI-GLOSS EPOXY		COLORWAY:	FLAKE COLOR 2
				APPLICATION:	HOLLOW METAL DOORS/FRAMES		APPLICATION:	ROOMS/SPACES DIRTY
VM	MANUFACTURER:	SHAW	PT-1	MANUFACTURER:	--			
	PRODUCT:	WELCOME II TILE ST031		HUE:	SW7005 PURE WHITE (MATCH EXIST.)			
	SIZE:	24X24		FINISH:	EGGSHELL LATEX			
	COLORWAY:	CHARCOL 31549		APPLICATION:	--			
	APPLICATION:	ENTRY VESTIBULE WALK-OFF						

NOTE: MATCH WALL PAINT COLOR AND RESINOUS FLOORING COVE FINISH WITH EXISTING. PROVIDE MOCKUPS FOR OWNER APPROVAL PRIOR TO FULL WORK COMPLETION.

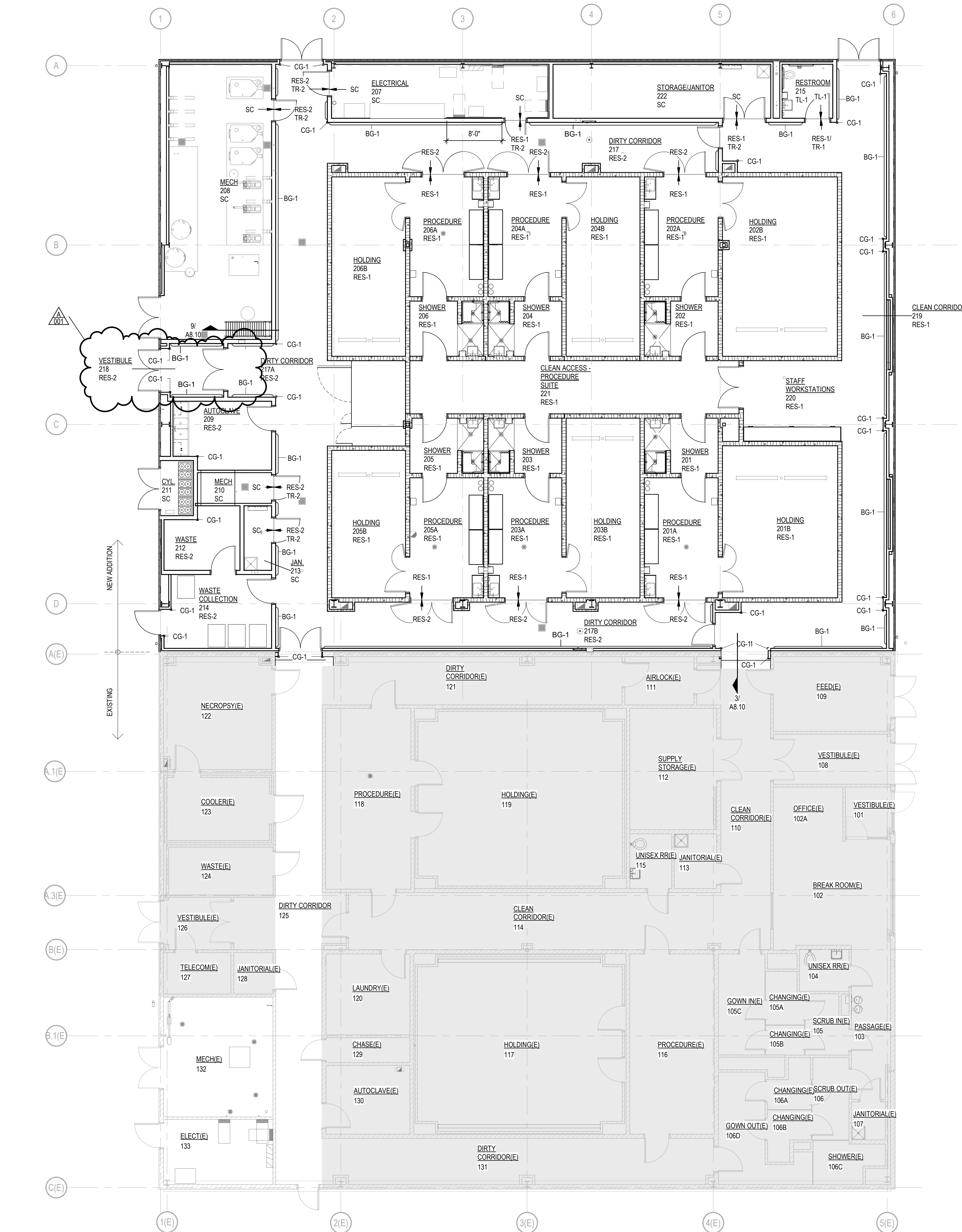
ROOM FINISH SCHEDULE

ROOM NO.	ROOM NAME	FLOOR		NORTH WALL		EAST WALL		SOUTH WALL		WEST WALL		CEILING		REMARK NO.
		MTL	FIN	MTL	FIN	MTL	FIN	MTL	FIN	MTL	FIN	MTL	FIN	
125	DIRTY CORRIDOR	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	4
201	SHOWER	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	1
201A	PROCEDURE	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	1
201B	HOLDING	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	1
202	SHOWER	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	1
202A	PROCEDURE	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	1
202B	HOLDING	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	1
203	SHOWER	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	1
203A	PROCEDURE	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	1
203B	HOLDING	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	1
204	SHOWER	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	1
204A	PROCEDURE	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	1
204B	HOLDING	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	1
205	SHOWER	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	1
205A	PROCEDURE	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	1
205B	HOLDING	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	1
206	SHOWER	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	1
206A	PROCEDURE	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	1
206B	HOLDING	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	1
207	ELECTRICAL	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	5
208	MECH	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	5
209	AUTOCLAVE	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	5
210	MECH	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	5
211	CYL	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	5
212	WASTE	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	5
213	JAN.	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	5
213A	JAN.	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	5
214	WASTE COLLECTION	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	5
215	RESTROOM	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	5
216	STORAGE/JANITOR	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	5
217	DIRTY CORRIDOR	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	5
217A	DIRTY CORRIDOR	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	5
217B	DIRTY CORRIDOR	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	5
218	VESTIBULE	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	5
219	CLEAN CORRIDOR	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	5
220	STAFF WORKSTATIONS	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	5
221	CLEAN ACCESS - PROCEDURE SUITE	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	CON	RES-1	5
222	STORAGE/JANITOR	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	CON	RES-2	5

ROOM FINISH SCHEDULE REMARKS

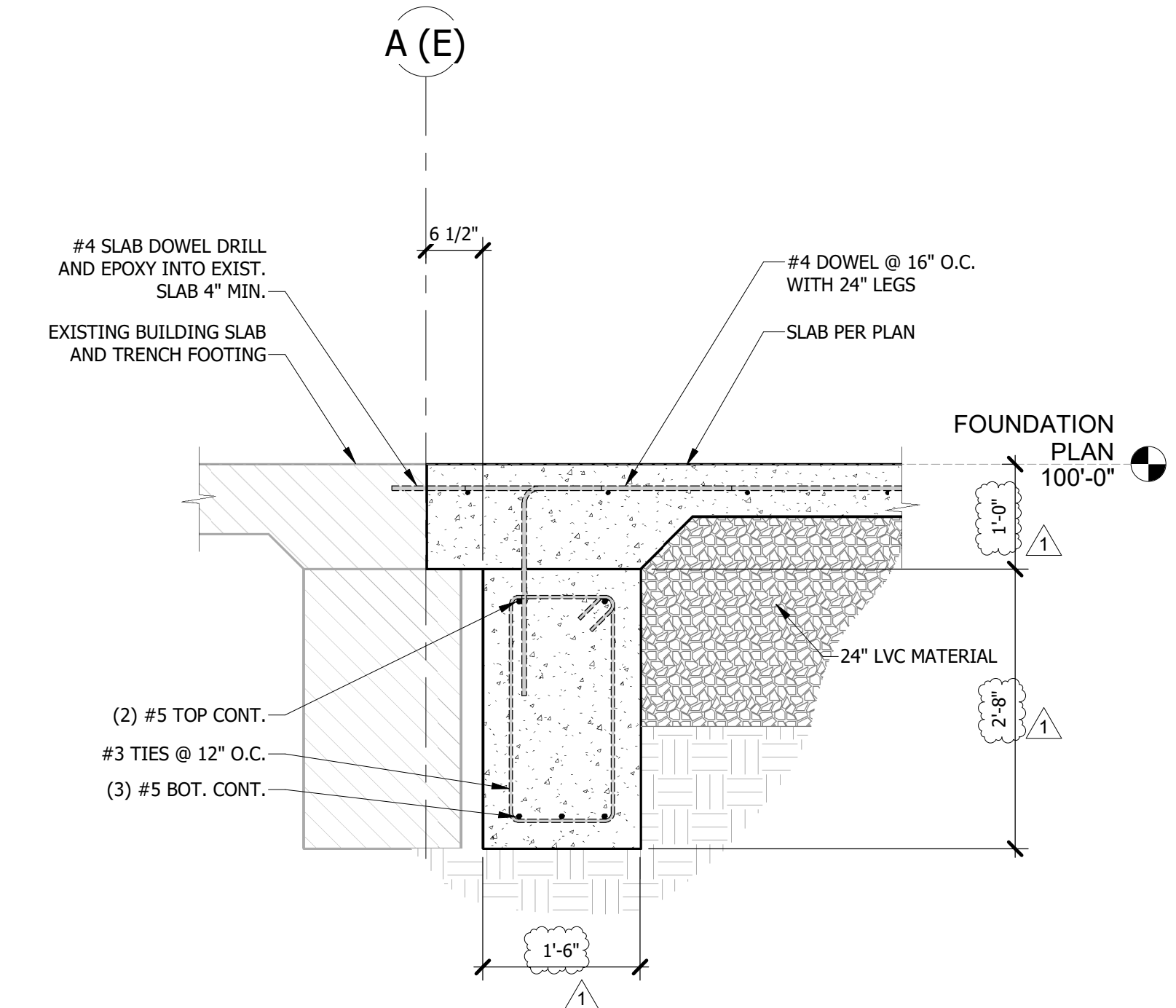
- RESINOUS EPOXY COATING AT SHOWER WALLS TO 8'-0" A.F.F. FINISH TO MATCH FLOOR/BASIN FLOOR AND COVE MATERIAL TO MATCH FLOORING
- FIBERGLASS-REINFORCED PLASTIC (FRP) FINISH PANELS @ SOUTH & WEST WALLS TO 4' A.F.F. - RE. A1.11
- FIBERGLASS-REINFORCED PLASTIC (FRP) FINISH PANELS @ NORTH & EAST WALLS TO 4' A.F.F. - RE. A1.12
- PATCH REPAIR RESTORE GYPSUM DRYWALL AT NEW CEILING WORK AND ADJACENT WALLS. REPAINT ADJACENT WALLS TO RETURN CORNERS AND ENTIRE EXISTING DIRTY CORRIDOR CEILINGS
- 3/4" FIRE RESISTIVE PLYWOOD @ NORTH, EAST & SOUTH WALLS TO 8' A.F.F. REFER TO FINISH PLAN
- STERILIZER FLOOR/BASE FINISHES - BASE BID - SEALED CONCRETE, NO WALL BASE; ALT NO. 2 - RES-2 FLOOR AND COVE BASE

NOTE: PAINT ALL EXTERIOR DUCT SUPPORT STEEL AND EXTERIOR HOLLOW METAL DOORS AND FRAMES - REFER TO 099600 HIGH-PERFORMANCE COATINGS FOR SPECIFICS.

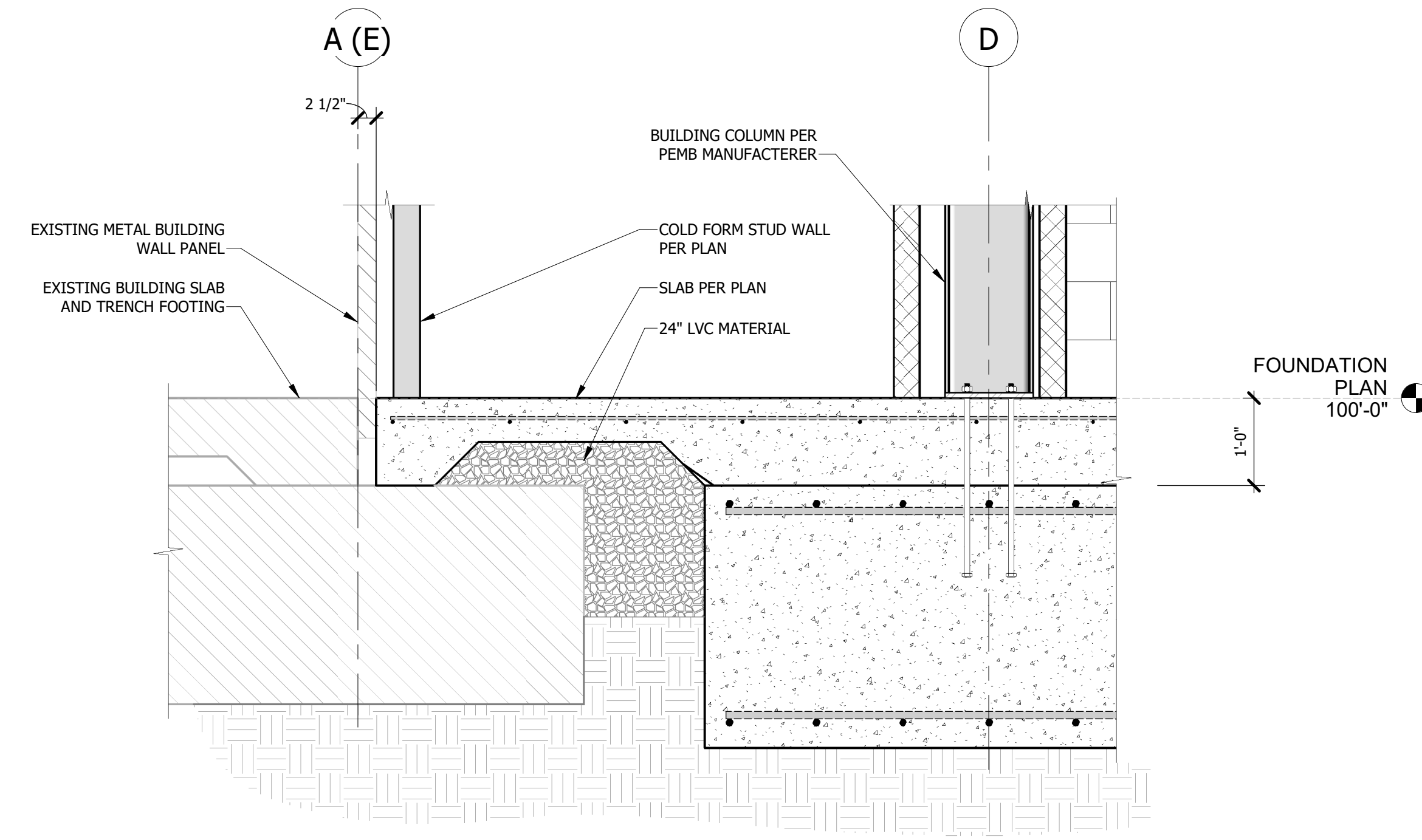


1 FIRST FLOOR FINISH PLAN

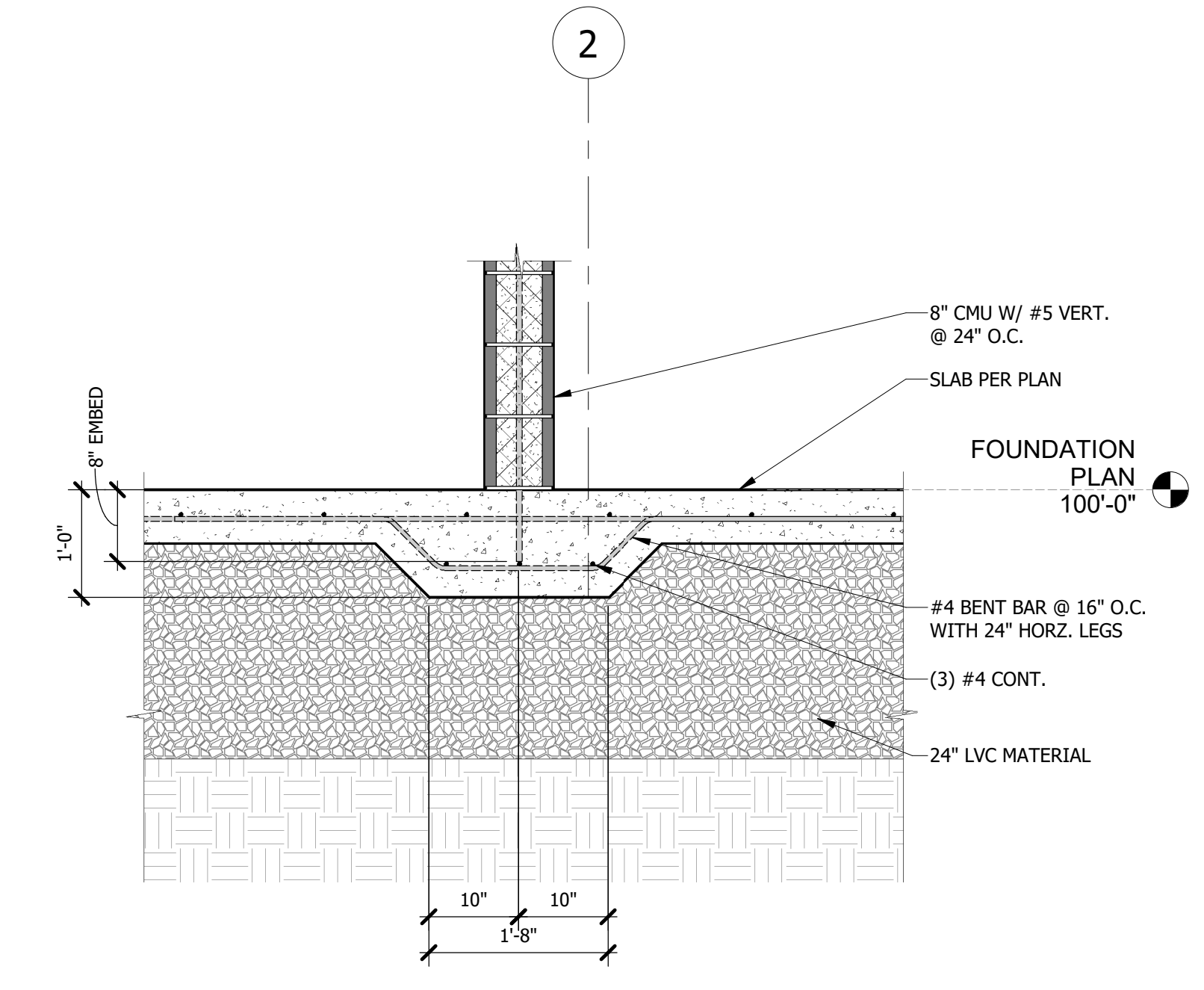
SCALE: 1/8" = 1'-0"



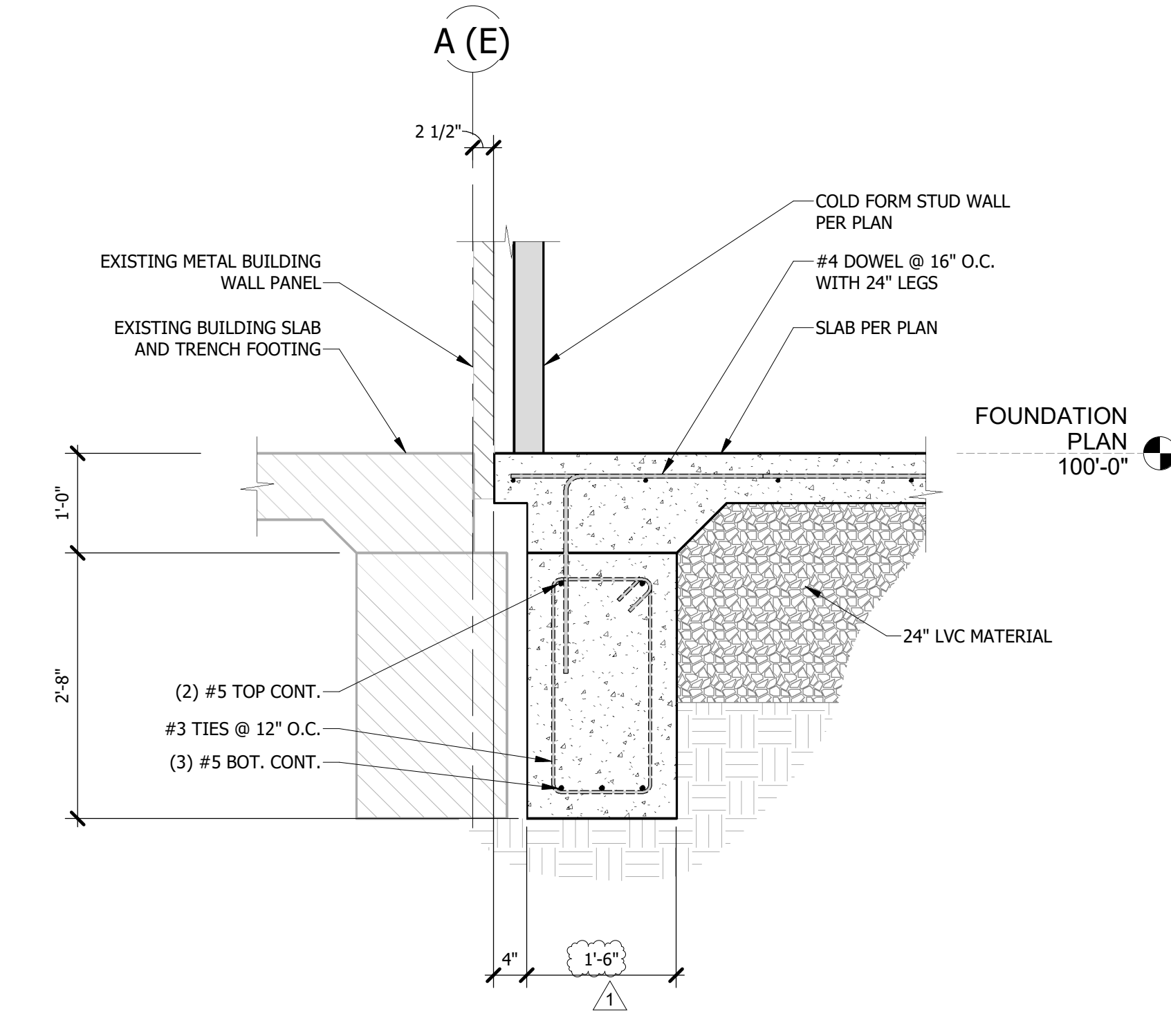
8 FOUNDATION @ NEW OPENING IN EXISTING
 3/4" = 1'-0"



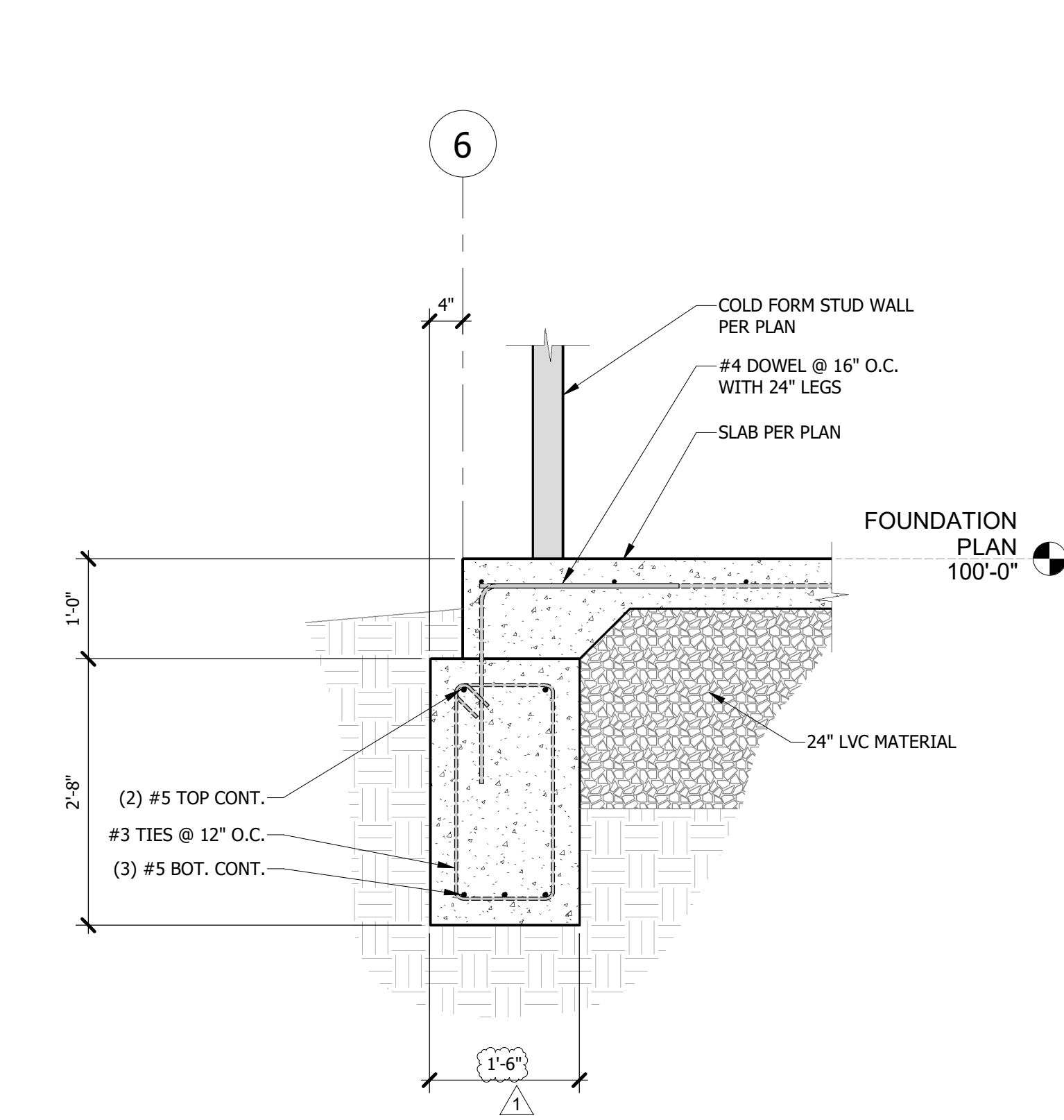
7 FOUNDATION @ EXISTING FOOTING
 3/4" = 1'-0"



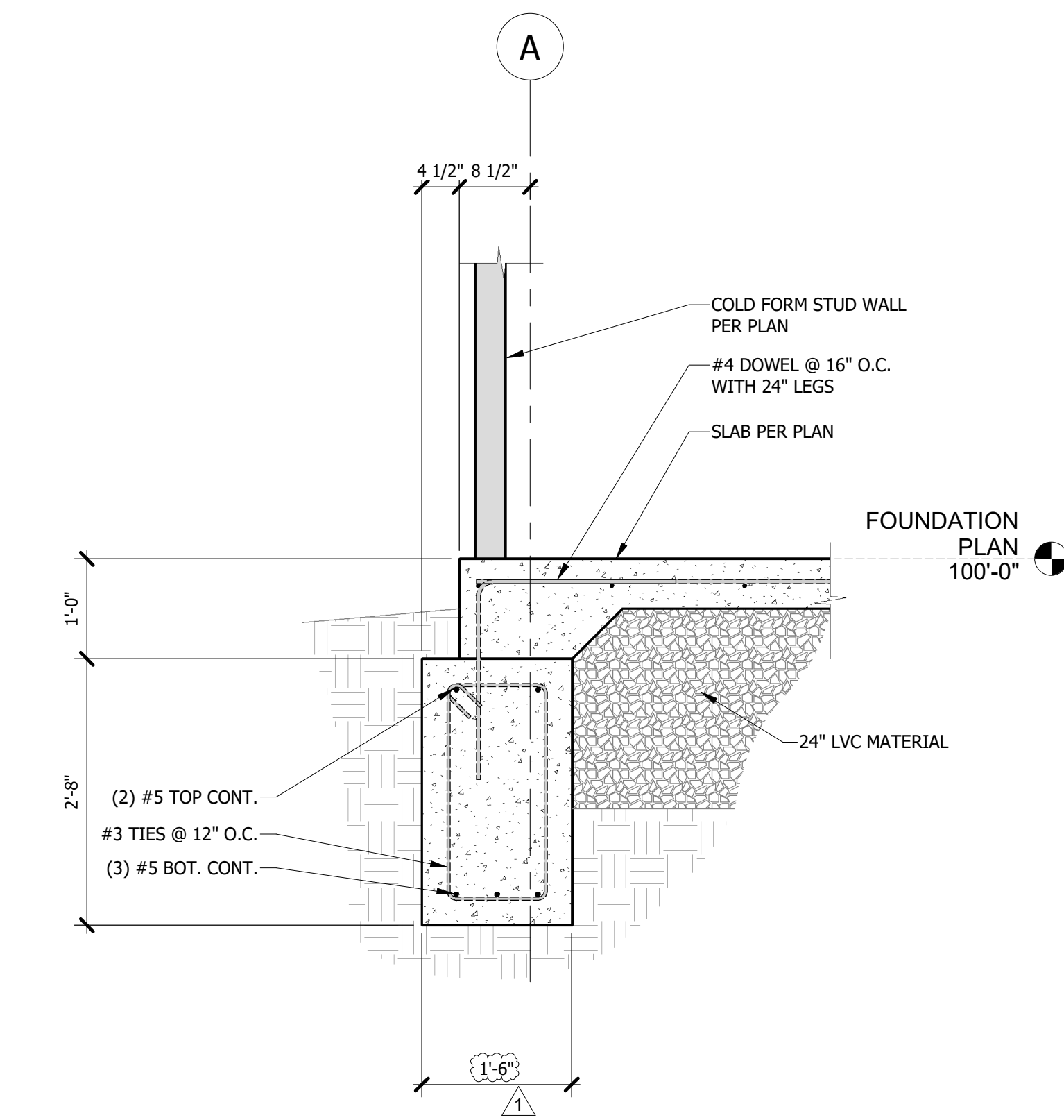
6 INTERIOR FOUNDATION @ CMU WALL
 3/4" = 1'-0"



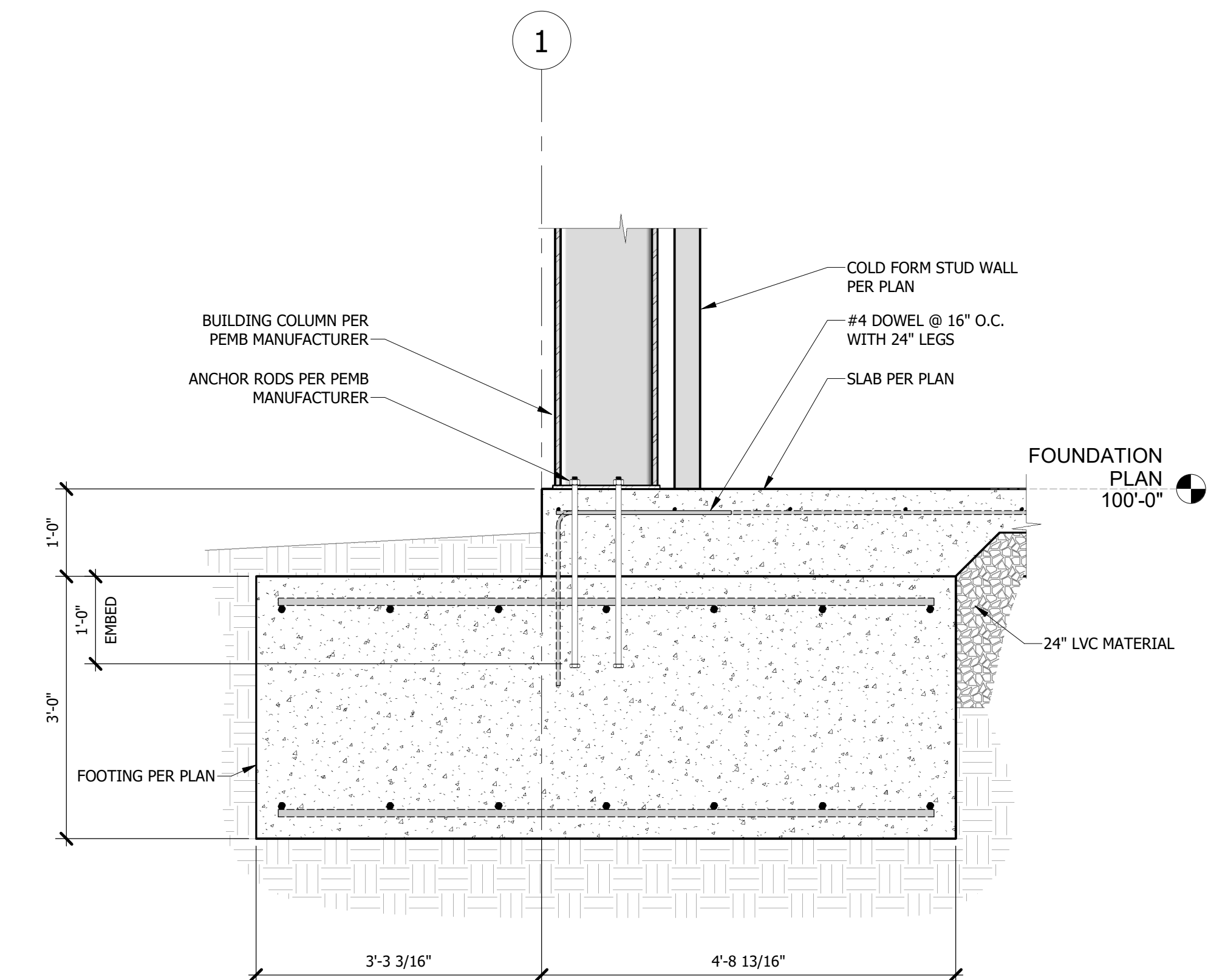
5 EXTERIOR FOUNDATION @ GL A(E)
 3/4" = 1'-0"



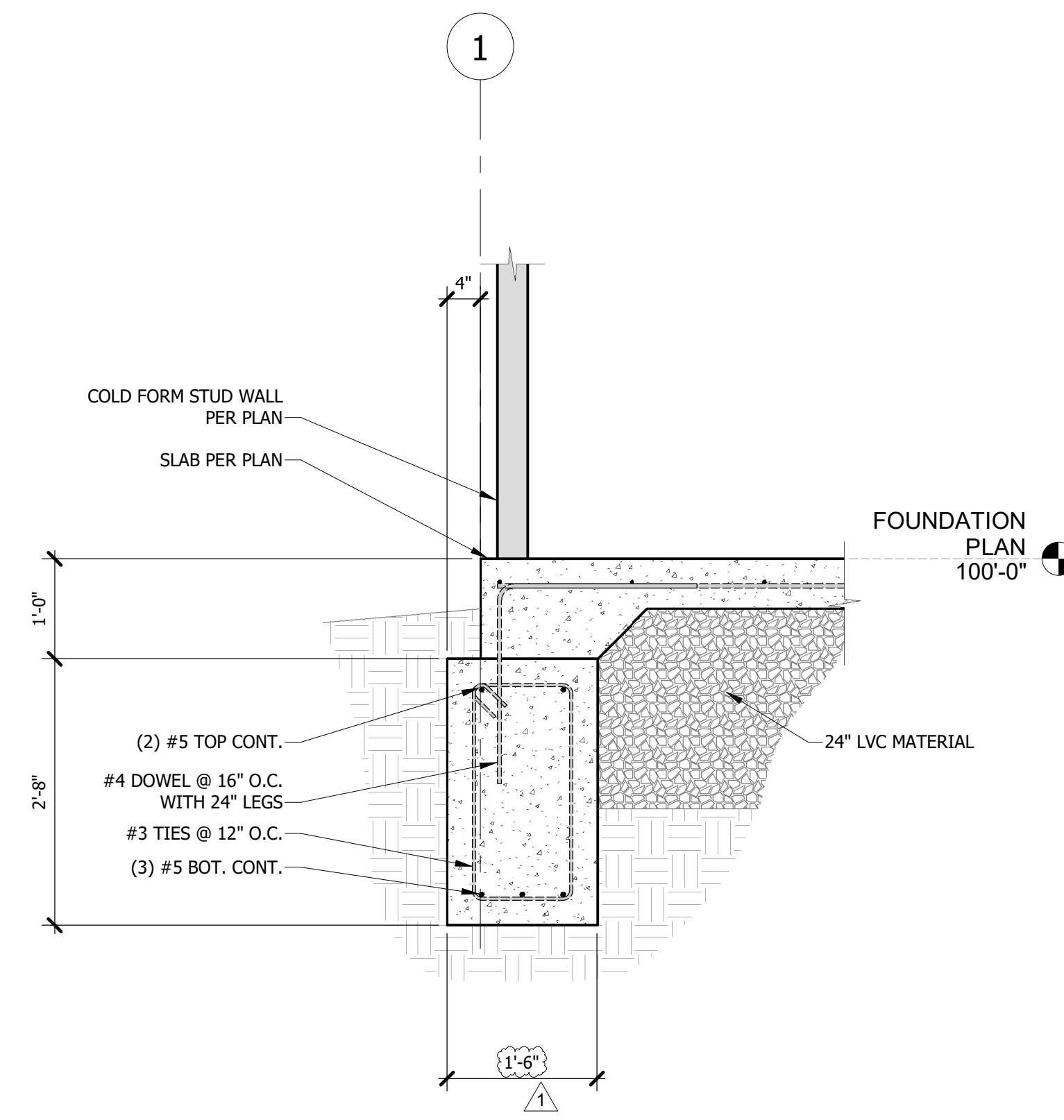
4 EXTERIOR FOUNDATION @ GL 6
 3/4" = 1'-0"



3 EXTERIOR FOUNDATION @ GL A
 3/4" = 1'-0"



2 TYP. FOUNDATION @ EXTERIOR COLUMN
 3/4" = 1'-0"



1 EXTERIOR FOUNDATION @ GL 1
 3/4" = 1'-0"

Plot Time Stamp: 1/24/2024 2:45:08 PM
 File Location/Name: Autodesk Docs://624-221-23 MU Middlebush Cntr for Flu Bcrch Add/624-221-Middlebush-S22.rvt

Contract Documents
Middlebush Farm -
NextGen Center of
Excellence for Influenza
Research, Phase II

9251 Tom Bass Rd,
 Columbia, MO 65201

CE No.: 624-221-23
 UM NO.: CP230831
 12/21/2023



NATURAL GAS CONDENSING BOILER SCHEDULE

MARK	BOILER			MIN. INPUT (MBH)	MAX. INPUT (MBH)	TURN DOWN	GROSS OUTPUT (MBH)	NET AHRI RATING (MBH)	MIN. EFF. (%)	MIN / MAX FLOW (GPM)	DESIGN FLOW (GPM)	EWT (F)	LWT (F)	GAS PRESS. MIN - MAX (IN.W.G.)			CONNECT. (IN INCHES)		
	MANUFACTURER	MODEL	WATER											GAS	VENT	AIR			
B-1	LOCHINVAR	FTX725N		103.5	725	7:1	705	613	97.2	20 / 150	73	120	140	4.14	2-1/2"	1"	6"	4"	
B-2	LOCHINVAR	FTX725N		103.5	725	7:1	705	613	97.2	20 / 150	73	120	140	4.14	2-1/2"	1"	6"	4"	
B-3 (FUTURE)	LOCHINVAR	FTX725N		103.5	725	7:1	705	613	97.2	20 / 150	73	120	140	4.14	2-1/2"	1"	6"	4"	

GENERAL NOTES:
 1. REFER TO SPECIFICATION SECTION 23 52 00 FOR MORE INFORMATION AND ADDITIONAL REQUIREMENTS.
 2. BOILERS PROVIDED MUST MEET ALL RELEVANT ASME, CSO-1 AND UL REQUIREMENTS AS WELL AS ALL APPLICABLE STATE AND LOCAL CODES.
 3. BOILER FORCED DRAFT BURNER IS TO BE FACTORY WIRED. ELECTRICAL CONNECTION, ELECTRICAL THERMAL OVERLOAD, AND CONTROL RELAYS ARE TO BE FACTORY FURNISHED AND WIRED.
 4. PROVIDE NATURAL GAS TRAIN WITH ANY ADDITIONAL GAS PRESSURE REDUCING VALVES AS REQUIRED TO OPERATE WITH 2 PSI SOURCE GAS PRESSURE.
 5. THE SCHEDULED MINIMUM OUTPUT VALUE (MBH) IS AT THE ACTUAL ELEVATION OF 761 FT.
 6. BOILER HEAT EXCHANGER TO BE STAINLESS STEEL.
 7. 120V CIRCUIT IS FOR BOILER SAFETIES AND CONTROLS.
 8. BOILERS SHALL BE PROVIDED WITH MANUFACTURER CONTROL.
 9. PROVIDE BOILERS WITH CONDENSATE PH NEUTRALIZATION KIT, MIN CN4-850 SUITABLE FOR BTU/H RANGE BETWEEN 400,000-850,000.
 10. PUMP, B-3, SHOWN FOR INFORMATION PURPOSES ONLY. DO NOT INCLUDE IN BID.
 11. MEMBER BOILERS SHALL BE PROVIDED WITH ALL CONTROLS REQUIRED TO ALLOW FOR CONTINUED OPERATION UPON LOSS OF COMMUNICATION/POWER OF MASTER BOILER.

PUMP SCHEDULE

MARK	FUNCTION	OPERATING WATER TEMP RANGE (DEG F)	FLUID TYPE	PUMP TYPE	WATER FLOW (GPM)	TOTAL HEAD (FT)	% EFF.	MOTOR DATA					MANUFACTURER & MODEL NO OR EQUIVALENT	SIZE S x D x IMP	SUCTION DIFFUSER	REMARKS
								RPM	HP	VOLTS	PH	HZ				
HWP-1	HEATING WATER PUMP	120 - 140	A	1	72.5	80	56.6	1,800	5	480	3	60	B&G e-1510 125BC	1.5" X 1.25" X 9.5"	BA-3	1,2,3,4
HWP-2	HEATING WATER PUMP	120 - 140	A	1	72.5	80	56.6	1,800	5	480	3	60	B&G e-1510 125BC	1.5" X 1.25" X 9.5"	BA-3	1,2,3,4
HWP-3 (FUTURE)	FUTURE HEATING WATER PUMP	120 - 140	A	1	72.5	80	56.6	1,800	5	480	3	60	B&G e-1510 125BC	1.5" X 1.25" X 9.5"	BA-3	5

FLUID TYPE:
 A. HEATING HOT WATER (NO GLYCOL)

PUMP TYPE:
 1. BASE MOUNTED, END SUCTION PUMP.

- REMARKS
- PREMIUM EFFICIENCY, INVERTER DUTY, ODP MOTOR
 - STAINLESS STEEL SHAFT WITH ALUMINUM COUPLING, PROVIDE SUPPORT STAND FOR PUMPS OVER 5 HORSEPOWER
 - PROVIDE WITH VARIABLE FREQUENCY DRIVE BY DIV 26, SEE VFD SCHEDULE.
 - PROVIDE SHAFT GROUNDING.
 - PHASE 3 FUTURE PUMP SHOWN FOR INFORMATION ONLY, DO NOT INCLUDE IN BID.

HYDRONIC SPECIALTIES SCHEDULE

MARK	FUNCTION	SERVES	OPERATING CONDITIONS	CAPACITY	MANUFACTURER	MODEL	REMARKS
AS-1	AIR/DIRT SEPARATOR WITH MAGNET & INTEGRAL AIR VENT	HEATING WATER SYSTEM	100 - 180 DEG. F	150 GPM AT 1 FT WPD, 3" FLANGED CONNECTION	SPIROTHERM OR APPROVED EQUIVALENT	VDT400FAM	1
CF-1	CHEMICAL POT FEEDER	HEATING WATER SYSTEM	100 - 180 DEG. F	5 GALLONS	NEPTUNE	DBF-5HP	2
ET-1	VERTICAL EXPANSION TANK	GLYCOL HEATING SYSTEM WATER	140 - 180 DEG. F	23 GALLON TANK CAPACITY, 23 GALLON ACCEPTANCE VOLUME, FACTORY CHARGED TO 13 PSIG	TACO	CA-90	3
SRV-1	SAFETY RELIEF VALVE	HEATING WATER SYSTEM	100 - 180 DEG. F	95 PSIG SET PRESSURE, 1" INLET AND 1" OUTLET	WATTS OR EQUIVALENT	SERIES 174A	4

- REMARKS:
- STEEL CONSTRUCTION, RATED FOR 150 PSIG DESIGN PRESSURE, INTERNAL COPPER COALESCING MEDIUM, HIGH CAPACITY FLOAT-ACTUATED AIR VENT, NEODYMIUM MAGNETS, SUPPORT LUGS (AS APPLICABLE).
 - 11-GAUGE STEEL CONSTRUCTION, RATED TO 300 PSIG AND 200 DEG. F, 3-1/2" DIAMETER WIDE MOUTH OPENING, CONTINUOUS THREADED CLOSURE, CAST IRON CAP WITH EPOXY-COATED UNDERSIDE, SQUARE RING GASKET SEAL, WITH FILTER BAG KIT.
 - 150 PSIG DESIGN PRESSURE, HEAVY DUTY BUTYL DIAPHRAGM, CARBON STEEL SHELL, CONSTRUCTED TO ASME SECTION VIII, DIVISION 1.
 - BRONZE BODY CONSTRUCTION, ASME SECTION IV CERTIFIED, RAISED SEAT AND NON-MECHANICAL DISC ALIGNMENT, NON-METALLIC DISC-TO-METAL SEATING.

INDOOR AIR HANDLING UNIT SCHEDULE

EQUIPMENT MARK	LOCATION	ACCESS SECTION	REMARKS
AHU-4 (AHU-SIMILAR)	EXTERIOR GRADE MOUNTED		20" access door
UNIT TYPE: Draw Thru / Blow Thru Sgl Zone/Dual Duct/VAV Cooling Medium/Heating Medium	DRAW THRU VARIABLE AIR VOLUME DX / NATURAL GAS	GAS HEATER SECTION: Heater Model: Air Pressure Drop (in w.g.)	HDB-HHX-300-900 0.02 Natural gas
UNIT ARRANGEMENT: Horizontal/Vertical Fan Discharge Arrangement	HORIZONTAL TOP	Fuel Type: Input Capacity (MBH): Output Capacity (MBH): Airflow (CFM): Turndown Ratio:	900 729.0 12,000 15:1
MANUFACTURER AND MODEL:	DAIKIN SKYLINE	Electrical: EAT (Deg F): LAT (Deg F): Remarks:	120V/12A 49.5 99.5 Combustion air to be hooded and 409 SS
UNIT COMPONENTS IN DIRECTION OF AIR FLOW:	PLENUM SECTION FILTER SECTION ACCESS SECTION FIXED PLATE HEAT EXCHANGER ACCESS SECTION DX COIL ACCESS SECTION SUPPLY FAN	PLENUM SECTION: Air Pressure Drop (in w.g.) Remarks:	0.07 Top opening 22"x104", 22" access door
	ACCESS SECTION GAS HEATER PLENUM SECTION ACCESS SECTION FILTER SECTION ACCESS SECTION FIXED PLATE HEAT EXCHANGER ACCESS SECTION EXHAUST FAN PLENUM SECTION	ACCESS SECTION Remarks:	20" x 104" access door
	ACCESS SECTION GAS HEATER PLENUM SECTION ACCESS SECTION FILTER SECTION ACCESS SECTION FIXED PLATE HEAT EXCHANGER ACCESS SECTION EXHAUST FAN PLENUM SECTION	FINAL FILTER SECTION Design Airflow (CFM): Filter Face Area (Sqft): Filter Face Velocity (FFM): Pre-filter Type / Efficiency: Pre-filter Pressure Drop (in w.g.): Final Filter Type / Efficiency: Final Filter Pressure Drop (in w.g.): Remarks:	12,000 24.0 500 (4) Pleated Merv 8 1.0 (4) HEPA MERV 17 (99.97%) 2.8 20" access door
PLENUM SECTION: Remarks:	1 98"x46" UltraSeal Low Leak Damper, Galv. Steel, Parallel Blades, Provide factory installed rainhood w/ screen. 20" access door		
PRE-FILTER SECTION: Design Airflow (CFM): Filter Face Area (Sqft): Filter Face Velocity (FFM): Pre-filter Type / Efficiency: Pre-filter Pressure Drop (in w.g.): Final Filter Type / Efficiency: Final Filter Pressure Drop (in w.g.): Remarks:	12,000 27.8 432 (4) Pleated Merv 8 1.0 (4) Varical SH cartridge Merv 13 1.5 20" access door		
ACCESS SECTION Remarks:	20" access door		
FIXED PLATE HEAT EXCHANGER (Supply): Summer Performance: Total Coil Capacity (MBH): Sensible Coil Capacity (MBH): Entering Air Temperature DB / WB (Deg. F): Leaving Air Temperature DB / WB (Deg. F): Air Pressure Drop (in w.g.): Winter Performance: Total Coil Capacity (MBH): Sensible Coil Capacity (MBH): Entering Air Temperature DB (Deg. F): Leaving Air Temperature DB (Deg. F): Air Pressure Drop (in w.g.):	152.9 152.9 95 / 80 83.1 / 77 0.91 538.1 538.1 3.2 / 3.0 30.1 / 21.3 0.76		
ACCESS SECTION Remarks:	20" access door		
EXHAUST FAN SECTION: Fan Qty: Wheel Dia/Fan Model: Airflow (CFM): Total / External Static Pressure (in w.g.): Total Fan BHP: Operating Speed (RPM): Motor HP / RPM: Motor VOLTAGE / PHASE / HERTZ: MCA / MOCOP Fan Array Sound Data (63/125/250/500/1000/2000/4000/8000): Radiated: Unit Discharge: Unit Return:	3 19.7" / FA1700523 4,000 5.63 / 1.5 16.8 1993 6 / 2225 480 / 3 / 60 32.15 / 40 78/88/73/66/65/52/46/51 88/98/91/87/87/80/75/72 78/84/84/81/76/74/72/68		
ACCESS SECTION Remarks:	20" access door		
DX COOLING COIL SECTION: Coil Qty: Rows / Fins: Coil Airflow (CFM): Maximum Coil Face Velocity (FFM): Total Coil Capacity (MBH): Sensible Capacity (MBH): Refrigerant: Condensate Rate (lb/hr): Air Pressure Drop (in w.g.): EAT (Deg F): LAT (Deg F):	1 8 / 96 12,000 469.4 1,124 460 R410a 595.7 0.73 83.1 / 77 49.5 / 49		
ACCESS SECTION Remarks:	20" access door		
SUPPLY FAN SECTION: Fan Qty: Wheel Dia/Fan Model: Airflow (CFM): Total / External Static Pressure (in w.g.): Total Fan BHP: Operating Speed (RPM): Motor HP / RPM: Motor VOLTAGE / PHASE / HERTZ: MCA / MOCOP Fan Array Sound Data (63/125/250/500/1000/2000/4000/8000): Radiated: Unit Discharge: Unit Return:	3 19.7" / FA1700523 4,000 5.56 / 1.75 16.5 1982 6 / 2225 480 / 3 / 60 32.15 / 40 78/88/73/66/65/52/46/51 88/98/91/87/87/80/75/72 78/84/84/81/76/74/72/68		
ACCESS SECTION Remarks:	20" access door		
PLENUM SECTION: Remarks:	1 98"x46" UltraSeal Low Leak Damper, Galv. Steel, Parallel Blades 20" access door		
ADDITIONAL REMARKS:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13		
SCHEDULE NOTES:	1. ALL FANS TO BE DIRECT DRIVE TYPE WITH EXTENDED LUBE LINES TO OUTSIDE OF CASING. 2. PROVIDE MIN 2"x12" VIEWING WINDOWS ON ACCESS DOORS AT ALL FAN AND DAMPER SECTIONS. 3. PROVIDE 8" HIGH BASE RAILS FOR MOUNTING TO MINIMUM 4" EQUIPMENT PAD. UPSIDE PAD IF NECESSARY FOR PROPER CONDENSATE TRAP DESIGN. SEE DETAIL 10M5.01. 4. ALL COIL AND FAN PERFORMANCE DATA SUBMITTALS MUST BE COMPUTER GENERATED - NO EXCEPTIONS. 5. PROVIDE HIGH PRESSURE LOW LEAKAGE CONSTRUCTION, OUTER PANEL 24 GAUGE G60 GALV STEEL, LINER 24 GAUGE GALV STEEL, R-13 INJECTED FOAM 6. ALL FAN MOTORS SHALL INVERTER DUTY TYPE AND MEET NEMA MG 1 MINIMUM FULL LOAD EFFICIENCIES. 7. SEE MECHANICAL SHEETS FOR AHU CONFIGURATION. UNIT DIMENSIONS: 352" L X 108" W X 100" H. INSTALLED WEIGHT OF 13903 LB. UNITS THAT EXCEED WEIGHT AND DIMENSIONS TO BE COORDINATED PRIOR TO BID. 8. ALL FILTER PRESSURE DROPS CALCULATED AT DIRTY CONDITIONS. 9. PROVIDE INDIVIDUAL LIGHT CIRCUIT AND RECEPTACLE CIRCUIT, EACH PRE-WIRED. 10. ALL DAMPERS SHALL BE LOW-LEAK CONSTRUCTION, EQUIVALENT TO RUSKIN CD-80. 11. ALL ACCESS DOORS SHALL BE MINIMUM 20" WIDE, NO EXCEPTIONS. SECTION LENGTH SHALL BE EXTENDED AS REQUIRED TO ENSURE MIN. DOOR WIDTH. 12. COORDINATE TOTAL COIL CONNECTIONS WITH MANUFACTURER. 13. FANS TO BE PROVIDED WITH INTEGRAL DISCONNECTS AND AUXILIARY CONTACTS FOR VFD CONTROL WIRING.		
GENERAL NOTES:	1. ELECTRICAL CONTRACTOR WILL PROVIDE (2) 120V/1P CIRCUITS, (1) FOR AHU LIGHTS AND (1) FOR AHU RECEPTACLES. 2. PROVIDE DIGITAL TIME SWITCHES, WATTSTOPPER MODEL TS-400-120V OR EQUIVALENT FOR AHU LIGHTS. 3. LIGHT LEVELS IN SECTIONS WITH LIGHTS SHALL BE MINIMUM 26 FC. PROVIDE ADDE. FIXTURES AS REQUIRED.		

FAN SCHEDULE

MARK	SERVES	LOCATION	TYPE	CFM	WEIGHT (LB.)	S.P. IN. WG.	DRIVE	RPM	HP	ELECTRICAL DATA			MANUFACTURER AND MODEL NUMBER	REMARKS
										V.	PH.	HZ.		
EF-1	BSC EXHAUST FAN	STAND MOUNTED EXTERIOR	COATED STEEL DIRECT DRIVE	675	193	3	DIRECT	2,405	1/2	115	1	60	GREENHOCK USF-12-VG OR APPROVED EQUIVALENT	COATED STEEL CONSTRUCTION, FACTORY PROVIDED DISCONNECT AND STARTER DRY POWDER EPOXY-COATED BASE AND WEATHER COVER. PROVIDE BACKDRAFT DAMPER ON FAN DISCHARGE. PAD-MOUNTED, UPBLAST DISCHARGE, DRAIN IN BASE OF FAN. PROVIDE VARI-GREEN MOTOR WITH SPEED ADJUSTMENT DIAL.



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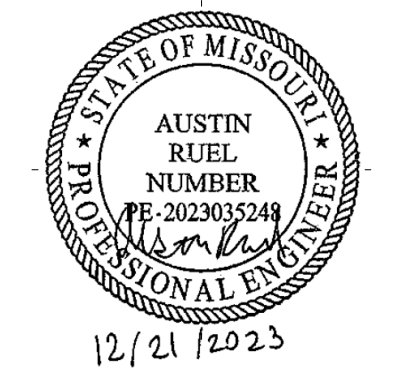
SHEET HISTORY:
 ISSUED 12/21/23 CONTRACT DOCUMENTS
 A - 001 01/25/24 ADDENDUM 001

Contract Documents

Middlebush Farm - NextGen Center of Excellence for Influenza Research, Phase II

9251 Tom Bass Rd,
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CE No.: 624-221-23
 UM No.: CP230831
 12/21/2023



12/21/2023

Mechanical Schedules

M7.02