

ADDENDUM NUMBER 2ISSUED September 9, 2010

to the CONTRACT DOCUMENTS for:

**WASHINGTON COUNTY SERVICE AUTHORITY
MIDDLE FORK WTP UPGRADE TO 12 MGD**

Prepared by: Olver - A CHA Company
1116 South Main Street
Blacksburg, VA 24060
Olver Project No.: 12367.13

The following revisions, additions, and clarifications are hereby made part of the Contract Documents and Technical Specifications for the above-referenced project and shall be taken into account in the preparation of all bids and the execution of all Work. Bidders shall acknowledge receipt of the addendum in the appropriate space on the Bid Form.

GENERAL REVISIONS AND CLARIFICATIONS:

- AD2-1 The Bid Opening Date has been revised to Thursday, September 16, 2010. All other items regarding the bid opening remains unchanged.
- AD2-2 Please note that Infilco Degremont, Inc. has been replaced by Severn Trent for the Filter Units. The Bid Form Schedule and Section 01062 have been revised.
- AD2-3 Major Equipment and Suppliers that have been approved are listed in the Bid Form Schedule. Individual letters were not sent out to the individual companies. If a Manufacturer was listed in the Bid Form then the firm is approved to bid the project.
- AD2-4 Throughout the contract documents (Plans and Specifications), the symbols HSA and FSA for Hydrofluorosilicic acid shall be interchangeable.
- AD2-5 Comments and the attendance sheet at the pre-bid meeting are attached.
- AD2-6 The value of the Owner-provided equipment is listed below as well as the manufacturer's supplier information. Please contact the supplier listed for a detailed scope of supply. The owner is purchasing this work directly from the manufacturer for installation by the contractor.
1. Adsorption Clarifier Equipment - \$994,341; Contact Mark Morgan with Heyward, Inc. at (804) 965-0086.
 2. ClaVal Pressure relief and sustaining valves - \$34,995 for base bid; \$6,942 for Bid Alternate B; Contact Dan Esser at (800) 451-3030.
 3. Benshaw Variable Frequency Drives - \$78,000; Contact Martin Goodpasture at (336)694-1131.

REVISIONS/CLARIFICATIONS TO TECHNICAL SPECIFICATIONS:

- AD2-7 Section 00200, Article 23 - In addition to the description listed, the additional clarification for each Additive Alternate is offered.

Alternate A1 - Monitoring of the chlorine scrubber blower by the SCADA system shall also be provided under this additive Bid Alternate.

Alternate A2 - On sheet E102 the South Fork Intake Remote SCADA work is still required under the base bid. Also the SCADA work including new CP-9 and monitoring/control of the existing raw water pumps is included in the base bid. Only the electrical, control and monitoring of new equipment is included in this add alternate.

Alternate A4 - Monitoring and control of all mixers by the SCADA system shall be included in the Base Bid.

Alternate B - Under this alternate the raw water control vault will not be required and the control valve shall be located in the Energy Recovery Building on Sheet M107.

AD2-8 Section 00200 - ADD Article 26 as follows:

"Article 26 - Contracts to be assigned:

Owner as "buyer" will execute a contract with Siemens as "seller" for the procurement of goods and special services for the Adsorption Clarifiers. Owner as "buyer" will execute a contract with Benshaw as "seller" for the procurement of goods and special services for the Variable Frequency Drives. Owner as "buyer" will execute a contract with Cla-Val as "seller" for the procurement of goods and special services for two 10-inch pressure relief valves and one 18-inch pressure sustaining valve. The materials and equipment provided for in the procurement contract are to be furnished and delivered to the Site for installation by Contractor. The said procurement contracts will be assigned by Owner to Contractor as set forth in the Agreement Contractor will accept the assignment and assume responsibility for the "seller," who will become a Subcontractor to Contractor. The specifications for these documents are included in the specifications for reference by the Contractor.

AD2-9 Section 00410 - **REPLACE** the bid form with the *attached* revised bid form. Please note that the equipment allowance items have been removed and additional suppliers have been approved and added to the list of Major Equipment Providers. Also an allowance for permit and E&S fees has been added. Also a deduct for award of both the South Fork Intake and the Middle Fork WTP Upgrade to 12 MGD to one contractor has been added. Please utilize this Bid Form in submitting your bid.

AD2-10 Agreement EJCDC C-521 - **REVISE** the contract times listed in Article 4 to 660 days for Substantial Completion and 720 days for Final Payment.

AD2-11 Agreement EJCDC C-521 - **ADD** the following paragraph 10.05.A.

Owner as "buyer" will execute a contract with Siemens as "seller" for the procurement of goods and special services for the Adsorption Clarifiers. Owner as "buyer" will execute a contract with Benshaw as "seller" for the procurement of goods and special services for the Variable Frequency Drives. Owner as "buyer" will execute a contract with Cla-Val as "seller" for the procurement of goods and special services for two 10-inch pressure relief valves and one 18-inch pressure sustaining valve. The materials and equipment provided for in the procurement contract are to be furnished and delivered to the Site for installation by Contractor. The said procurement contracts will be assigned by Owner to Contractor as set forth in the Agreement Contractor will accept the assignment and assume responsibility for the "seller," who will become a Subcontractor to Contractor. The specifications for these documents are included in the specifications for reference by the Contractor.

- AD2-12 Section 01020 - **DELETE** Paragraph 3.1.C. and **REPLACE** with a \$2,500 allowance for permit fees and E&S bonds.
- AD2-13 Section 01026 - **DELETE** Paragraph 3.2.C in its entirety; **RENAME** Bid Item No. 4 to Bid Item No. 3.
- AD2-14 Section 01060 - **DELETE** the following sentence in Paragraph 1.5.A: "Any plant shutdowns will only be allowed in the months October through December and March through April."
- AD2-15 Section 01060 - **ADD** Paragraph 1.5.A.2: "2. Connection of temporary pumped flow piping to existing Filters 1-4."
- AD2-16 Section 01060 - **DELETE** Paragraph 1.5.D.2; renumber remaining sections.
- AD2-17 Section 01060 - **DELETE** last sentence of Paragraph 1.5.D.6 and Paragraph 1.5.D.7 in its entirety.
- AD2-18 Section 01060 - **REVISE** Paragraph 3.1.B items as follows; all items not listed below shall remain the same:
- "1. Construct the Intermediate Booster Pump Station. Demolish a portion of the Abandoned Sedimentation Basins while keeping the existing Coagulant Tank in service. Build Bulk Chemical Storage and Chemical Feed Building with the focus of placing the coagulant feed facilities in operation. Place Coagulant feed facilities either in temporary or final service as noted in item 4 below in order to demolish the remaining portion of the Abandoned Sedimentation Basins. At contractor's option, he may provide a temporary bulk storage coagulant tank and connect to the existing day tank/metering system in order to demolish the entire abandoned sedimentation tanks at one time. The contractor at his option can provide temporary pumping facilities to connect to the existing filters to enable him to work on the main plant building, booster pump station and chemical feed facilities simultaneously. The temporary pumping facilities shall be certified for use in potable water, disinfected properly prior to use, have a firm pumping capacity of 6.6 MGD with one pump out of service, and can be connected to the owner's electrical system at contractor's expense. The Owner will be responsible for the power bills associated with pumping system."
 - "7. Demolish all above ground piping, remaining portions of the Abandoned Sedimentation Basins including coagulant tank, plant building front porch."
 - "13. The following general systems may be constructed at any time:
 - a. Energy Recovery Building (Bid Alternate B).
 - b. Middle Fork Raw Water Improvements (Bid Alternate A2); this intake may only be taken offline for an extended period of time (2-3 months) after the remote South Fork Intake has been placed into service. This is anticipated to be 12 months after Notice to Proceed for the project. The Notice to Proceed for the South Fork Intake and this project will be identical.
 - c. For the interconnection work between the existing flocculation basins 1-3 and the new flocculation basins 4-6 as well as work within the rapid mix basins, the contractor shall note that the existing pretreatment facilities (rapid mix basins, flocculation basins 1-3 and sedimentation basins 1-3) may be taken out of service for an extended period of time as long as raw

water turbidity does not exceed 50 NTU, the adsorption clarifier process, and the bypass piping around the pretreatment facilities is operational.”

- AD2-19 Section 01062 - **MODIFY** the list of Major Equipment and Acceptable System Manufacturers listed in Paragraph 1.4.A to reflect the Schedule as submitted in the revised Bid Form.
- AD2-20 Section 01640 - **REVISE** Paragraph 1.6.A. as follows: “A. The Bidder may propose a substitute for any items of equipment, products, systems or suppliers listed in the “Schedule of Proposed Equipment Suppliers Form” in the Bid Form. The Bidder may write in next to column E the proposed equipment and resulting cost deduct (savings). Any cost savings from the proposed product substitution will not be considered in determining the low bidder.”
- AD2-21 Section 01650 - **REVISE** Paragraph 1.4. A-D as follows; existing item E shall be revised to L:
- A. System No. 1 - Middle Fork Raw Water Pump Station
 - B. System No. 2 - Flocculators 4-6
 - C. System No. 3 - Energy Recovery Building
 - D. System No. 4 - Intermediate Booster Pump Station
 - E. System No. 5 - Adsorption Clarifiers
 - F. System No. 6 - Filters 5-8
 - G. System No. 7 - Filters 1-4
 - H. System No. 8 - Chlorine Contact Tank
 - I. System No. 9 - Building improvements
 - J. System No. 10 - Chemical Feed Building
 - K. System No. 11 - Bulk Chemical Storage
- AD2-22 Section 03002 - Paragraph 3.1.E.2; **CHANGE** “10 FT maximum centers” to “14 FT maximum centers”.
- AD2-23 Section 07412 - **REVISE** the first sentence of Paragraph 2.5.E as follows: “E. Gutters: Formed from 0.0179-inch (0.45 mm) thick, metallic-coated seamless steel sheet.”
- AD2-24 Section 09905 - **REPLACE** with *attached* Section 09905.
- AD2-25 **ADD** Section 11006 as *attached*.
- AD2-26 Section 11025 - Paragraph 2.2.F.1.b and 17125 Paragraph 2.1.A.7 - Operator interface panels shall be NEMA 12.
- AD2-27 Section 11060, Paragraph 3.2.A.5.b - **ADD** “4 hours” to the end of the sentence.
- AD2-28 Section 11064 - The following revisions shall apply to the specification:
- 2.3.A.1.h. Discharge: ½”.
 - 2.5.G.3. Motors shall be submersible 120 volt, single phase.
- DELETE** Paragraph 2.5.G.4
- AD2-29 Section 11072, Paragraph 2.4.B.3 - **REVISE** as follows: “3. Provide intermediate column sections not exceeding 5 FT in length.”
- AD2-30 Section 11152 - **DELETE** Paragraph 1.2.A.2.a.
- AD2-31 Section 11227 - **REPLACE** this section with the attached. This specification is provided for reference since it is owner-provided but is to be installed by the contractor.

- AD2-32 Section 11927, Paragraph 1.1A.1.c - DELETE "P309".
- AD2-33 Section 11930, Paragraph 2.4.F and K. - REVISE as follows: "F. An FRP duct system shall be furnished as shown on Sheet 409." "K. the inputs from power source and outputs to blower shall be 460 V, 3 phase."
- AD2-34 Section 14301 - Paragraph 3.3.A, hoist H2, under the column "Hoist", the designation should be CHANGED to read "C, HG" indicating that the hoist is a hand-gearred chain hoist and the lifting speed should be listed as "N/A". Hoists H3 and H4 should be listed with lifting speeds of 15/30 indicating 15 fpm for slow speed travel and 30 fpm for fast speed travel.
- AD2-35 Section 15060 and 15062 - CLARIFICATION: Compact fittings for both mechanical joint and flanged pipe may be used for ductile iron pipe in all sizes. Standard manufacturer's nuts and bolts may be utilized as well for all ductile iron pipe.
- AD2-36 Section 15115, Paragraph 2.3.B.1.a and 2.a, REVISE material to "Aluminum: ASTM B209, alloy 6061."
- AD2-37 Section 16858, Paragraph 2.3.K - REVISE as follows: "K. Provide nominal 1" insulation type Thermos-Plastic Elastomer (TPE)."
- AD2-38 REPLACE the existing specification with the *attached* Section 17610 - *Venturi Flow Tubes*.
- AD2-39 REPLACE the existing specification with the *attached* Section 17740 - *Ultrasonic Liquid Level Measurement System*.
- AD2-40 REPLACE the existing specification with the *attached* Section 17760 - *Pressure Indicating Transmitters*.
- AD2-41 Section 07412- add the following to paragraph 2.6.b. Sno-Barricade as manufacturer by Sno Gem is an approved manufacturer.
- AD2-42 Section 08331 Delete 1.2 2. In its entirety, Delete 1.6 3. In its entirety Delete 1.12 Electric Door Operators in its entirety and delete 1.14 1. and 3 in their entirety.
- AD2-43 Add the attached section 08841 glazed aluminum curtain walls to the specifications.
- AD2-44 Add the attached section 02831 Chain Link Fences and Gates to the specifications.
- AD2-45 Section 07412 add the following to paragraph 2.4: Series 2000 metal roof system as manufacturer by Construction Metal Products Inc. is an approved equal.
- AD2-46 Section 17950 - REVISE Paragraph 3.10.B.1 to read as follows:
 "1. All filters will be automated and integrated into two PLC systems, one for filters 1-4 and one for filters 5-8."

REVISIONS/CLARIFICATIONS TO DRAWINGS:

- AD2-47 Piping and Instrumentation Drawings will be issued with the Construction Issue set of Drawings to the successful contractor. These Drawings will be provided for Owner's use and can be utilized for general guidance. The Contractor shall not be responsible for any conflicts identified on these drawings when compared to the bidding documents and addenda.
- AD2-48 Sheet C005, Details C005.4 and C005.5 - ADD the note "see Detail M029" next to the sample pump note. ADD a metal pipe support (Detail M040) under the 18" valve.
- AD2-49 Sheets C101 -C106 - **CLARIFICATION:** The estimated completion date of the current Interim Improvements project is 6/21/2011.
- AD2-50 Sheet C102 and C106 - ADD a 1.5-inch sump line from the sump pumps in the Energy Recovery Building to the nearest Storm Drain that goes to the lagoons. This addition is part of Alternate B.
- AD2-51 Sheet C103, C105, and C106 - The drain line on the south side of the Rapid Mix Basin shall be 8" dia. Also the 36"x8" tee is existing. See M104 for further details.
- AD2-52 Sheets C104 and C106, Route a common 1" SU line from the two sump pumps in the Raw Water Control Vault and the Metering Vault for the South Fork Source to the drain manhole on the southeast corner of the sedimentation basins.
- AD2-53 Sheets C104, C105, and C106 - REVISE "1-inch FSA" to "2-inch FSA" from bulk storage to main plant facility.
- AD2-54 E001 - ADD Specific notes as follows:
1. The contractor and his filter manufacturer shall furnish, install, and program filter control panels CP-2 and CP-3, and Operator Interface Panels for the eight filters. The contractor and his systems integrator shall program the two SCADA computers to have identical screen displays and functionality as the filter operator interface panels.
 2. The contractor and his systems integrator shall furnish, install, and program control panel CP-1.
 3. Mount Yagi antenna on mast attached to exterior building wall.
- AD2-55 E002 - ADD Specific notes as follows:
1. The contractor and his adsorption clarifier manufacturer shall furnish, install, and program adsorption clarifier control panels CP-4 and CP-5, and the Operator Interface Panels for the three adsorption clarifiers. The contractor and his systems integrator shall program the two SCADA computers to have identical screen displays and functionality as the adsorption clarifier operator interface panels.
 2. The contractor and his systems integrator shall furnish, install, and program control panel CP-10.
- AD2-56 Sheet E003 - At CP-9, ADD the submersible mixer control panel with 8#14 & 1#14 gnd in ¾" conduit to CP-9 (conduit and wire tag #32).
- AD2-57 Sheet E003 - ADD Specific note 1 as follows:
1. The contractor and his systems integrator shall furnish, install and program control panels CP-6, CP-7, CP-8, and CP-9.

- AD2-58 Sheet E003 - At CP-7, ADD the raw water pressure control valve shown on E105 and extend 2-TSP in 1" conduit (conduit and wire tag #37) to CP-7.
- AD2-59 Sheet E003 - CHANGE "motor control center MCC1" to read "VFD Lineup".
- AD2-60 Sheet E004 - CHANGE the rating of the transformer for panel P3 from 75 kVA to 150 kVA.
- AD2-61 Sheet E004 - At panel H3 one-line diagram, CHANGE UH-8 and UH-9 to UH-12 and UH-13.
- AD2-62 Sheet E005 - RELOCATE the nine VFD's shown inside MCC1 to a separate enclosure marked "VFD Lineup". ADD a 100/3 C/B in MCC1 and 3#2 and 1#8 gnd in 1-1/4" conduit from this C/B to the VFD Lineup.
- AD2-63 Sheet E005, ADD TVSS schedule, *attached*.
- AD2-64 Sheet E005 - ADD a 100/3 C/B in MCC1 and extend 3#2 & 1#8 gnd in 1-1/4" conduit to the scrubber motor starter and then to the scrubber fan motor (conduit and wire tag #3).
- AD2-65 Sheet E005 - CHANGE C/B feeding P2 transformer from 60/2 to 150/3. CHANGE P2 transformer rating from 25 kVA to 50 kVA. CHANGE primary side wiring to 2#1/0 & 1#6 gnd in 1-1/2" conduit. CHANGE secondary side wiring to 3#4/0 & 1#2 gnd in 2-1/2" conduit.
- AD2-66 Sheet E008 - In panel H3 schedule, CHANGE UH-8 and UH-9 to UH-12 and UH-13.
- AD2-67 Sheet E009 - In panel P3D schedule CHANGE the 3 amp circuit breaker to 30 amps.
- AD2-68 Sheet E010 - REPLACE panel P2 Schedule with revised Schedule, *attached*.
- AD2-69 Sheet E011 - ADD Fiber Optic Pullbox detail, *attached*.
- AD2-70 Sheet E011 - ADD Electrical handhole detail, *attached*.
- AD2-71 ADD new Drawing E012, *attached*.
- AD2-72 Sheet E013 - ADD new Drawing E013, *attached*.
- AD2-73 Sheet E101, REVISE Sheet E101 as *attached*.
- AD2-74 Sheet E101 - ADD General Electrical Note L as follows:
 "L. All outdoor areas including under the bulk chemical storage shed are Wet and Corrosive. See specifications."
- AD2-75 Sheet E101 - In the Electrical legend, ADD a receptacle symbol with a "C" subscript described as "Duplex receptacle located flush in wall above countertop".
- AD2-76 Sheet E101 - In the Electrical legend, ADD a receptacle symbol with a "P" subscript described as "Duplex receptacle located in a pedestal device box on the countertop".
- AD2-77 Sheet E101 - ADD Specific note: "4. At the sign floodlight, extend 120 vac branch circuit to the fountain pump. Provide waterproof manual starter for the fountain pump."
- AD2-78 E101 - In the electrical legend, ADD a symbol with T in a circle with a subscript C with the description "Line voltage cooling type thermostat".
- AD2-79 E101 - In the electrical legend, ADD a symbol with D in a circle with the description "Motor operated damper".
- AD2-80 E101 - ADD General Electrical Note: "M. Provide conduit, wire, and connections for safety devices in motors including high temperature switches, RTD's, thermocouples,

- seal fail detectors, and other safety devices to stop motor on an alarm condition in the motor. Refer to the motor shop drawings indicating required safety devices.”
- AD2-81 Sheet E102 - **ADD** 15 HP submersible pump near the wetwell level sensor. Provide a NEMA 4X stainless steel enclosed combination motor starter on the outside wall and extend 3#10 & 1#10 gnd in ¾” conduit to panel MDP. Provide a new 30/3 C/B in existing panel MDP for this pump.
- AD2-82 Sheet E102 - **CHANGE** note at antenna to read “10 dB Yagi Antenna” (two places).
- AD2-83 Sheet E102, **CLARIFICATION** - This drawing also includes the SCADA work required at the remote South Fork Intake project. This work cannot be completed until after the South Fork Intake is operation approximately 12 months after Notice to Proceed.
- AD2-84 Sheet E103 - **ADD** sump pump control panel with branch circuits from P5-14,16.
- AD2-85 Sheet E104 - **EXTEND** 120 vac from panel P1 to the rolling door operator.
- AD2-86 Sheet E104 - **ADD** a 3-way switch at the south exterior door of the electrical room.
- AD2-87 Sheet E104 - **ADD** trace heating outlet near piping shown to be heat traced on the mechanical drawings. Extend 120 vac to trace heating from panel P2-10.
- AD2-88 Sheet E106, **ADD** new Drawing E106, *attached*.
- AD2-89 Sheet E203 - **REPLACE** the Lighting fixture schedule with the attached Luminaire Schedule.
- AD2-90 Sheet E203 - **CHANGE** H3 branch circuit to sump pump control panel to “P3A-38, 40”.
- AD2-91 E205 - **CHANGE** the 3-way light switch at the main entrance to a 4-way light switch.
- AD2-92 E207 - **ADD** condensing units CU1, CU2, and CU3 on the pad at the west end of the building as shown on the architectural drawings. **ADD** feeders back to the indicated panelboards. **ADD** service receptacle.
- AD2-93 Sheet E208 - **CHANGE** the 225 kVA transformer to 25 kVA.
- AD2-94 Sheet E208, **ADD** the following note: “Final electrical connections to the laboratory casework shall be in accordance with the final approved casework shop drawings and performed at no additional cost to the owner.”
- AD2-95 E208 - **ADD** feeder to the wheel chair lift from a panelboard matching the wheelchair lift voltage requirement.
- AD2-96 Sheet E209 - **CHANGE** the 225 kVA transformer to 25 kVA.
- AD2-97 E209 - **ADD** Specific note: “1. Provide combination starter for EF-11 with on/off selector switch in cover, and with control transformer and relays to operate the twelve inlet air dampers in the clerestory. Dampers to automatically open when fan starts and close when fan stops.
- AD2-98 E209 - **ADD** condensing unit CU-4 on a concrete pad at grade below AHU-4 **ADD** feeder back to panel P3. **ADD** service receptacle.
- AD2-99 Sheet E210 - **CHANGE** “exit lights” to read “existing lights”.
- AD2-100 Sheet E213 - **ADD** unit heater UH-10 near panel P3A.
- AD2-101 Sheet E214 - **ADD** unit heater UH-11 near the turbidimeters.
- AD2-102 Sheet E215 - **ADD** unit heater UH-12 in filter 4 pipe gallery.

- AD2-103 Sheet E215 - ADD unit heater UH-13 in filter 8 pipe gallery.
- AD2-104 E228 - ADD condensing unit CU-4 on a concrete pad at grade below AHU-4.
- AD2-105 Sheet E402 - CHANGE disconnect switch shown for the Chlorine Scrubber to a combination motor starter furnished with the Scrubber. CHANGE scrubber fan HP to 40 HP. Extend 120 vac from panel P2-21 to the scrubber control panel.
- AD2-106 Sheet E402 - LOCATE EF-1 where shown on M409.
- AD2-107 Sheet E402 - ADD 120 vac branch circuits to two roll up door operators.
- AD2-108 E402 - ADD feeder from a 20/3 C/B in MCC1 to the hoist junction box.
- AD2-109 Sheet E403 - ADD trace heating outlet to bulk storage tank area. Extend 120 vac to trace heating from panel P2-35. ADD connections to tank, piping, and pump trace heating equipment.
- AD2-110 Sheet M003, Detail M042 - ADD a ½" automatic air release valve at the high point of the 1.5" piping. Also ADD a note to the detail that states sump pump for P-109 and P-110 are similar.
- AD2-111 Sheet M005, on the Gate Schedule G201, G202 and G203 shall be the embedded type.
- AD2-112 Sheet M005 - DELETE G-205 from the project and schedule.
- AD2-113 M006 - ADD symbol TP-Trap Primer to the plumbing legend.
- AD2-114 M006 - ADD General Note G. as follows:
- "G. Piping sizes:
1. Main Building Drain - 4"
 2. Water Closet Drain - 4"
 3. Floor Drain - 3"
 4. Lavatory, shower, sink, drinking fountain Drain - 2"
 5. Cold water service and to Emergency shower - 1-1/4"
 6. Cold and hot water piping - ¾"
 7. Trap primer piping - ½"
 8. Main vent pipe - 3"
 9. Other vent pipes - 2"
- AD2-115 Sheet M006, ADD Plumbing schedule, *attached*.
- AD2-116 Sheet M006, ADD Emergency Shower detail, *attached*.
- AD2-117 Sheet M008, REVISE Sheet M008 as *attached*.
- AD2-118 M008 - In the unit heater schedule, CHANGE ratings of Unit heater UH-10, UH-11, UH-12, and UH-13 from 2.5 kW to 7.5 kW.
- AD2-119 Sheets M101 and M102 - New hatch for P-104 shall be 36"x36" SDDF. Relocate hoist location to opposite side of opening.
- AD2-120 Sheet M102 - Note 2; Detail callout should be M035 and not M033 and REVISE note call out at doors to read "Door 50, See S101 for door schedule". The reference to "see note 1" should be deleted.
- AD2-121 Sheet M102, Plan M102.2 - In the Screen room the only work that is required is the installation of a new basket strainer, waterproofing the wall, and the installation of the floor drains and below slab drain piping.

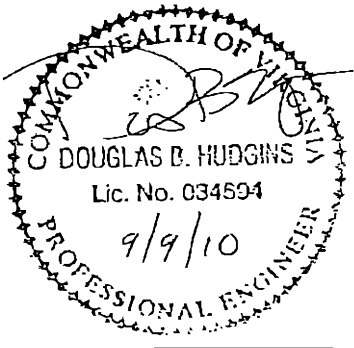
- AD2-122 Sheet M104, **DELETE** the following note: "All grouting in influent channel part of Bid Alt A." This is part of the base bid work. **REPLACE** the "Bid Alt B" call out near mixer M-104 through M-106 with "Bid Alt A4".
- AD2-123 Sheet M107, **CLARIFICATION** The piping downstream of the pressure sustaining valve turns 90 degrees down and then 90 degrees underneath the slab to tie into the piping with a 24"x24"x28" tee just downstream of valve V-015. Also on Section M107.2, the 10" pipe below V-055 should enter the 20" pipe with a 20"x20"x10" tee.
- AD2-124 Sheet M203 - At the location where G205 was originally shown, saw cut a 48" square opening located at the clearwell slab elevation. Do not provide G205.
- AD2-125 Sheet M205 - **CLARIFICATION:** For Note 1 the existing concrete wall is 12" thick and the rebar is spaced at 12" on each face.
- AD2-126 Sheet M208 - Under the tag Streaming Current Monitor AE-3 - **REVISE** the call out to be "See Note 2".
- AD2-127 Sheet M208 and M209, **ADD** a contained 2-inch FSA line along the southern wall at the location shown on the civil piping to the fluoride day tank.
- AD2-128 Sheet M221, **ADD** the following note: "Final plumbing connections to the laboratory casework sink, faucets, and fixtures shall be in accordance with the final approved casework shop drawings and performed at no additional cost to the owner."
- AD2-129 M226 - **ADD** a return air grille type G3 in the ceiling of room #110 for return air flow to the ceiling plenum.
- AD2-130 M226 - **ADD** radiant heaters RH-1, RH-2, and RH-3 in the filter operating area. See sheet E207 for locations.
- AD2-131 M226 - **ADD** condensing units CU1, CU2, and CU3 on the pad at the west end of the building as shown on the architectural drawings.
- AD2-132 M227 - **ADD** radiant heaters RH-5, RH-6, and RH-7 in the filter operating area. See sheet E208 for locations.
- AD2-133 M227 - **ADD** return air grilles type G3 in the ceilings of rooms #109, #101, #102, #103, #104, and #188 (corridor) for return air flow to the ceiling plenum.
- AD2-134 M228 - **ADD** return air grille type G1 in the ceiling of room #121 ducted to the main air return duct.
- AD2-135 M228 - **ADD** radiant heaters RH-4, RH-8, RH-9, RH-10, RH-11 and RH-12 in the filter and clarifier operating areas. See sheet E209 for locations.
- AD2-136 M228 - **CHANGE** "AHU-1" to "AHU-4".
- AD2-137 M228 - **CHANGE** tag EF-7 for the filter operating area exhaust to tag EF-11. **CHANGE** airflow from 8400 CFM to 4200 CFM.
- AD2-138 M228 - **CHANGE** EF-7 airflow from 300 CFM to 500 CFM.
- AD2-139 M229 - **CHANGE** tag EF-11 for the fluoride room exhaust fan to EF-12.
- AD2-140 M229 - **ADD** unit heaters UH-10, UH-11, UH-12, and UH-13 on the lower level of the filter building. See electrical drawings for locations.
- AD2-141 Sheet M401 - **CLARIFICATION:** The NaClO₂ scale (SC-10) shall be provide; however no NaClO₂ feed system is proposed. It is for future. The Owner may choose to utilize this

scale for a redundant sodium permanganate system piped by owner. The contractor shall be responsible for the installation of the sodium permanganate feed system as detailed on M404.

- AD2-142 Sheet M406 - REVISE Plan callout to M406.1/M406.
- AD2-143 Sheet M407 - REVISE Plan and section callouts to M407 (typ.).
- AD2-144 Sheet M408 - REVISE detail callouts to M408 (typ.).
- AD2-145 M409 - CHANGE the 30" X 30" duct to 36" X 36 ".
- AD2-146 M409 - CHANGE the airflow for PTAC-1 from 600 CFM to 1200 CFM.
- AD2-147 M409 - CHANGE grilles G2 to G4, G1 to G5, G3 to G6. ADD grille G7 to the 24" X 24" duct.
- AD2-148 M409 - CHANGE unit heater UH5 rating from 25 kW to 7.5 kW.
- AD2-149 S102, ADD detail S102.8, attached.
- AD2-150 S204, at left side of sheet CHANGE the dimension from column line C.1 to column D from 12'-11 5/8" to 12'-0".
- AD2-151 S205, at left side of sheet CHANGE the dimension "12'-11 5/8" TO COL LINE C" to read "12'-0" TO COL LINE C.1".
- AD2-152 S205, floor section S205.2, CHANGE all three reinforcing callouts to read "SEE ELEVATED CONCRETE SLAB SCHEDULE."
- AD2-153 S206, below the Drilled Pier Nomenclature ADD a note that reads "THE TERM DRILLED PIER IS SYNONYMOUS WITH AUGER CAST PILING. CONSTRUCT DRILLED PIERS IN ACCORDANCE WITH SPECIFICATION SECTION 02302."
- AD2-154 S206, floor section S206.2, CHANGE all three reinforcing callouts to read "SEE ELEVATED CONCRETE SLAB SCHEDULE."
- AD2-155 S207, CHANGE detail number S207.1/S208 to S207.2/S208.
- AD2-156 S207, between column lines 2 and 3 ADD the word "EXISTING" before the text "2T MONORAIL BELOW".
- AD2-157 S207, DELETE the text delineating "CAST IN PLACE WALWAY" and "CONC TOPPED PRECAST WALKWAY". There is no precast concrete intended for use.
- AD2-158 S207, at left side of sheet CHANGE the dimension from column line C.1 to column D from 12'-11 5/8" to 12'-0".
- AD2-159 S208, along column line D, CHANGE section cut number from S207.3/S208 to S207.2/S208.
- AD2-160 S208, floor section S208.2, CHANGE all three reinforcing callouts to read "SEE ELEVATED CONCRETE SLAB SCHEDULE."
- AD2-161 S208, at left side of sheet CHANGE the dimension "12'-11 5/8" TO COL LINE C" to read "12'-0" TO COL LINE C.1".
- AD2-162 S208, REPLACE details S208.3 and S208.4 with the *attached*.
- AD2-163 S209, ADD a leader and text indicating that all 6" cmu walls are reinforced vertically with #4 bars @ 48" o.c.

- AD2-164 S209, floor section S209.2, **CHANGE** all three reinforcing callouts to read "SEE ELEVATED CONCRETE SLAB SCHEDULE."
- AD2-165 S209, **CHANGE** the top of wall elevation on column line 8 between column lines B and C from + (15'-6") to + (14'-10").
- AD2-166 S209, **ADD** a leader and callout to the top of the filter walkways. Callout should read "TOP OF WALKWAY + (15'-6")".
- AD2-167 S210 & S211 - **ADD** the *attached* partial roof framing detail.
- AD2-168 S211, **CHANGE** the T/Steel elevation for the upper roof framing from +(??'-??") to (25'-6").
- AD2-169 Sheet S403 - **ADD** the following note: "Each containment bay shall be coated in accordance with Specification Section 09850."
- AD2-170 S506, **ADD** the *attached* sections S506.10/S210, S506.11/S210 & S506.12/S506.
- AD2-171 On plan sheet C101 Delete the note requiring remove and dispose abandoned tanks from the project. These tanks will be removed from the project site by others prior to start of construction.
- AD2-172 Excess soil materials may be disposed on site when material complies with fill requirements of specification section 02200 Earthwork and with approval by the engineer. The Contractor shall be responsible to spread out the material in uniform layers, provide minimum 6" topsoil cover, and establish vegetation cover in a manner that does not trap or impede or pond surface water flow. Adequate erosion and sediment control measures must also be provided at the disposal site and the contractor is responsible for amendments to the erosion and sediment control permit for these disposal areas if they are used during construction.
- AD2-173 Delete plan sheet C102 and replace with the attached revised sheet C102R
- AD2-174 Add the attached plan sheet C002R to the plans.
- AD2-175 Add the attached specification section 02831 Chain Link fences and Gates to the Specifications
- AD2-176 Plan sheet A144 delete details A and B from the plans.
- AD2-177 Add the attached detail of the Intermediate Booster Pump Station Building South entrance to the plans.
- AD2-178 Delete the following sheets from the plans and replaced with the attached revised sheets: A040, A101, A120, A121, A130, A150, A161, A202, and A220.
- AD2-179 Modify the following plan sheets per the attached details: A100, A134, A135, A142, A160, A170, A200, A260, A300, A315 and A360.

END OF ADDENDUM



Douglas B. Hudgins, P.E.
Project Manager



Bid Form

Project Identification: Washington County Service Authority Middle Fork WTP Upgrade to 12 MGD.

Contract Identification and Number: Middle Fork WTP Upgrade to 12 MGD, 12367.13.

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ARTICLE 1 - BID RECIPIENT

- 1.01 This Bid Is Submitted To: Washington County Service Authority, 25122 Regal Drive, Abingdon, VA 24211.
- 1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in the Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 - BIDDER'S ACKNOWLEDGMENTS

- 2.01 Bidder accepts all of the terms and conditions of the Advertisement and Instructions to Bidders, including without limitations those dealing with the dispositions of Bid security. The Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

ARTICLE 3 - BIDDER'S REPRESENTATIONS

- 3.01 In submitting this Bid, Bidder represents that:
- A. Bidder has examined and carefully studied the Bidding Documents, the other related data identified in the Bidding Documents, and the following Addenda, receipt of which is hereby acknowledged.

Addendum No.	Addendum Date
_____	_____
_____	_____
_____	_____
_____	_____

- B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
- C. Bidder is familiar with and is satisfied as to all Federal, State, and local Laws and Regulations that may affect cost, progress, and performance of the Work.
- D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in SC-4.02, and (2) reports and drawings of a Hazard Environmental Condition, if any, which has been identified in SC-4.06.
- E. Bidder has obtained and carefully studied (or accepts the consequences for not doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by the Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents to be employed by Bidder, and safety precautions and programs incident thereto.
- F. Bidder does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents.
- G. Bidder is aware of the general nature of the Work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
- H. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.
- I. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by Engineer is acceptable to Bidder.
- J. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.
- K. Bidder will submit written evidence of its authority to do business in the State where the Project is located not later than the date of its execution of the Agreement.

ARTICLE 4 - FURTHER REPRESENTATIONS

4.01 Bidder further represents that:

- A. This Bid is genuine and not made in the interest of or on the behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization, or corporation;
- B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;

- C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and
- D. Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over Owner.

4.02 In connection with major items of equipment to be furnished and installed in this Project, BIDDER expressly agrees to the following provisions:

- A. That the Total Base Bid Price stated above includes the furnishing and installing of major equipment, products and systems furnished by the Supplier which BIDDER has selected from those suppliers listed in Section 01062 – *Major Equipment and Systems Suppliers*; and BIDDER has circled the name of the selected Supplier in Column E of the Schedule of Proposed Equipment Suppliers form at the end of this Section.
- B. That the installed price of the equipment, products and systems includes the cost (if any) of changes in the piping, wiring, accessories, etc., necessary to accommodate the particular equipment, products or systems proposed.
- C. The Schedule of Proposed Equipment Suppliers found at the end of this Section 00300 shall be binding in terms of the selected equipment, products, systems and suppliers to be provided by the BIDDER under the Total Base Bid Price.

ARTICLE 5 - BASIS OF BID

5.01 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

Base Bid Schedule					
<u>Item No.</u>	<u>Description</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Price</u>	<u>Extended Total Price</u>
1	Bonds, Mobilization, and Insurance	LS	1	\$	\$
2	Middle Fork WTP Construction	LS	1	\$	\$
3	Over Excavation and Backfill	CY	2,000	\$	\$
4	Allowance for Permit Fees and E&S Bonds	LS	1	\$2,500.00	\$2,500.00
Total Base Bid Price				(\$	_____)

(In Figures)

(In Words)

Additive Bid Alternate Schedule

<u>Item No.</u>	<u>Description</u>	<u>Unit Price</u>
A1	Add Chlorine Scrubber	\$
		<i>(In Figures)</i>
<i>(In Words)</i>		
A2	Add Middle Fork Intake Improvements	\$
		<i>(In Figures)</i>
<i>(In Words)</i>		
A3	Add Caustic Bulk Storage Facilities	\$
		<i>(In Figures)</i>
<i>(In Words)</i>		
A4	Add Existing Rapid and Flocculation Mixer Improvements	\$
		<i>(In Figures)</i>
<i>(In Words)</i>		
B	Add Energy Recovery Improvements	\$
		<i>(In Figures)</i>
<i>(In Words)</i>		

A. All specified allowances are included in the price(s) set forth above, and have been computed in accordance with Paragraph 11.02 of the General Conditions.

5.02 Deduction for Award of Multiple Contracts:

A. The following deduction shall be provided should the OWNER award the South Fork Intake and this Project to one BIDDER. The deduction will be taken in even increments over the first three (3) payments or the balance upon final payment, whichever occurs first.

TOTAL DEDUCTION
<i>(in words)</i>
(\$ _____)
<i>(in figures)</i>

ARTICLE 6 - TIME OF COMPLETION

- 6.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with paragraph 14.07.B of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.
- 6.02 Bidder accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the work within the Contract Times.

ARTICLE 7 - ATTACHEMENTS TO THIS BID

- 7.01 The following documents are attached to and made a condition of the Bid:
 - A. Required Bid security in the form of a Bid Bond (EJCDC No. C-430) or Certified Check (circle type of security provided);
 - B. If Bid amount exceeds \$10,000, signed Compliance Statement (RD 400-6). Refer to specific equal opportunity requirements set forth in paragraph 18.10 of the General Conditions;
 - C. If Bid amount exceeds \$25,000, signed Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions (AD-1048);
 - D. If Bid amount exceeds \$100,000, signed RD Instruction 1940-Q, Exhibit A-1, Certification for Contracts, Grants, and Loans. Refer to paragraph 18.11 of the General Conditions; and
 - E. Required bidder qualifications statement with supporting data.

ARTICLE 8 - DEFINED TERMS

- 8.01 The terms used in this Bid with the initial capital letters have the meanings indicated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

SCHEDULE OF PROPOSED MAJOR EQUIPMENT SUPPLIERS				
A	B	C	D	E
Item	Spec. Section	Description	Prequalified Major Equipment Manufacturers	Identify "Supplier or Manufacturer" Included in Bidder's Base Bid Price by circling one of the following ⁽¹⁾
a.	11025	Filter Units	a. Severn Trent b. The F.B. Leopold Company, Inc. c. Roberts Water Technologies, Inc.	a. Severn Trent b. The F.B. Leopold Company, Inc. c. Roberts Water Technologies, Inc.
b.	11070	Pumping Equipment: Submersible Chopped Type (Add Alternate A2)	a. Vaughn Co., Inc. b. Haywood Gordon, Inc.	a. Vaughn Co., Inc. b. Haywood Gordon, Inc.
c.	11072	Pumping Equipment: Vertical Turbine	a. Fairbanks-Morse b. Peerless c. Goulds	a. Fairbanks-Morse b. Peerless c. Goulds.
d.	11152	Mixing Equipment – Submersible (Add Alternate A2)	a. Wilco EMU b. Landia c. ITT Flygt	a. Wilco EMU b. Landia c. ITT Flygt
e.	11240	Chemical Metering Pumps (Peristaltic) (Base Bid & Alternate A5)	a. Watson-Marlow/Bredel b. Verdeflex Pumps c. Blue-White Pumps d. Periflo	a. Watson-Marlow/Bredel b. Verdeflex Pumps c. Blue-White Pumps d. Periflo
f.	11927	Chemical Feed: Bulk Transfer System	a. Pulsafecder b. Goulds	a. Pulsafecder b. Goulds
g.	11880	Powdered Activated Carbon (PAC) Dry Chemical Feeder	a. Siemens b. Acrison b. Merrick	a. Siemens b. Acrison b. Merrick

SCHEDULE OF PROPOSED MAJOR EQUIPMENT SUPPLIERS				
A	B	C	D	E
Item	Spec Section	Description	Prequalified "Major Equipment Manufacturers"	Identify "Supplier or Manufacturer" Included in Bidder's Base Bid Price by circling one of the following (1)
h.	11930	Chlorine Vapor Scrubber System (Add Alternate A1)	a. Purafil, Inc. b. Severn Trent c. Pure Air Filtration	a. Purafil, Inc. b. Severn Trent c. Pure Air Filtration
i.	11948	Flocculation Basin Mixers (Base Bid and Alternate A4)	a. Sharpe Mixers b. Lighting Mixing Equipment Co. c. Philadelphia Mixer Corp. d. Chemineer, Incorporated e. Enviropax	a. Sharpe Mixers b. Lighting Mixing Equipment Co. c. Philadelphia Mixer Corp. d. Chemineer, Incorporated e. Enviropax
j.	11999	In-Line Static Mixers	a. Komax System, Inc. b. Chemineer, Incorporated c. Koflow Corporation	a. Komax System, Inc. b. Chemineer, Incorporated c. Koflow Corporation
k.	13200	Fiberglass Reinforced Plastic Tank (Base Bid and Alternate A3)	a. Augusta Fiberglass b. Plas-Tanks Industries c. Advance Fiberglass, Inc. d. Diamond Fiberglass e. Southeastern Fiberglass	a. Augusta Fiberglass b. Plas-Tanks Industries c. Advance Fiberglass, Inc. d. Diamond Fiberglass e. Southeastern Fiberglass
l.	17000	Control & Information System Scope & General Requirements (System Integrators)	a. L&F Automation b. Systems East c. American Mine Research d. Piedmont Automation e. Innovative Controls f. Southern Flow, Inc. g. Lord & Company h. Industrial Control Systems, Inc.	a. L&F Automation b. Systems East c. American Mine Research d. Piedmont Automation e. Innovative Controls f. Southern Flow, Inc. g. Lord & Company h. Industrial Control Systems, Inc.

- Notes: (1) Instructions for listing supplier or manufacturer included in BIDDER's Base Bid Price under Column E:
- Circle name of one supplier or manufacturer for each item listed under Column A to be included in the BIDDER's Base Bid Price.
 - Proposal shall be considered irregular and subject to rejection if BIDDER:
 - Fails to list (by circling) an approved Supplier or Manufacturer listed under Column E.
 - Lists (circles) more than one approved Supplier or Manufacturer listed under Column E.
 - If BIDDER fails to list (circle) an approved Supplier or Manufacturer, Owner has the sole right to select one of the Suppliers or Manufacturers from the list of acceptable Suppliers and Manufacturers under Column D for the Base Bid Price.
 - If the BIDDER lists (circles) more than one approved Supplier or Manufacturer, the Owner has the sole right to select one of the Suppliers or Manufacturers so listed for the Base Bid Price.
 - Refer to Section 01062 – *Major Equipment and Systems Suppliers* and Section 01640 – *Product Substitutions* for additional details.

ARTICLE 9 - BID SUBMITTAL

9.01 This Bid submitted by:

If Bidder is:

An Individual

Name (typed or printed): _____

By: _____
(Individual's signature)

SEAL,
if
required
by State

Doing business as: _____

A Partnership

Partnership Name: _____

By: _____
(Signature of general partner -- attach evidence of authority to sign)

SEAL,
if
required
by State

Name (typed or printed): _____

A Corporation

Corporation Name: _____

State of Incorporation: _____

Type (General Business, Profession, Service, Limited Liability): _____

By: _____
(Signature -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Attest: _____
(Signature of Corporate Secretary)

CORPORATE
SEAL,
If required
by State

Date of Qualification to do business in _____ [State where Project is located] is ___/___/___

A Joint Venture

Name of Joint Venture: _____

First Joint Venture Name: _____

By: _____
(Signature of joint venture partner -- attach evidence of authority to sign)

SEAL,
if
required
by State

Name (typed or printed): _____

Title: _____

Second Joint Venture Name: _____

By: _____
(Signature of joint venture partner -- attach evidence of authority to sign)

SEAL,
if
required
by State

Name (typed or printed): _____

Title: _____

(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is party to the venture should be in the manner indicated above.)

Bidder's Business address:

Business Phone No. (____) _____

Business FAX No. (____) _____

Business E-Mail Address _____

State Contractor License No. _____ (If applicable)

Employer's Tax ID No. _____

Phone and FAX Numbers, and Address for receipt of official communications, if different from Business contact information:

9.02 Bid submitted on _____, 20__.

SECTION 02831 - CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Labor, material, equipment, and services necessary to provide galvanized-steel chain link fencing.

1.3 SUBMITTALS

- A. Submit product data in the form of manufacturer's technical data, specifications, and installation instructions for fence and gate posts, fabric, gates, gate operators, and accessories.
- B. Submit shop drawings showing location of fence, gates, each post, and details of post installation, extension arms, gate swing, hardware, and accessories.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has at least three years' experience and has completed at least five chain link fence projects with same material and of similar scope to that indicated for this Project with a successful construction record of in-service performance.
- B. Single-Source Responsibility: Obtain chain link fences and gates, including accessories, fittings, and fastenings, from a single source.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Verify layout information for fences and gates shown on the Drawings in relation to the property survey and existing structures. Verify dimensions by field measurements.

PART 2 - PRODUCTS

2.1 FABRIC

- A. Selvage: Knuckled on both selvages.
- B. Steel Chain-Link Fence Fabric: Fabricated in one-piece widths for fencing 12 feet and less in height to comply with Chain Link Fence Manufacturers Institute (CLFMI) "Product Manual" and with requirements indicated below:
 - 1. All locations unless noted otherwise: Mesh and Wire Size shall be 2-inch mesh, 0.148-inch diameter (9 gage).

2.2 FRAMING

- A. Round member sizes are given in actual outside diameter (OD) to the nearest thousandth of inches. Round fence posts and rails are often referred to in ASTM standard specifications by nominal pipe sizes (NPS) or the equivalent trade sizes in inches.
- B. Top Rail: Manufacturer's longest lengths (17 to 21 feet) with swaged-end or expansion-type coupling, approximately 6 inches long for joining. Provide rail ends or other means for attaching top rail securely to each gate corner, pull, and end post. Rail shall be Round 1.660-inch OD Type I or II steel pipe.
- C. Steel posts for fabric heights over 6 feet:
 - 1. Round Line or Intermediate Posts: 2.375-inch OD Type I or II steel pipe.
 - 2. Round End, Corner, and Pull Posts: 2.875-inch OD Type I or II steel pipe.
- D. Swing Gate Posts: Furnish posts to support single gate leaf, or one leaf of a double-gate installation, according to ASTM F 900, sized as follows for steel and aluminum pipe posts:
 - 1. Steel posts for fabric height over 6 feet and gate leaf width:
 - a) Up to and Including 6 Feet: 2.875-inch OD pipe weighing at least 4.64 lb/ft.
 - b) Over 6 to 12 Feet: 4.000-inch OD pipe weighing at least 8.65 lb/ft.
 - c) Over 12 to 18 Feet: 6.625-inch OD pipe weighing at least 10.02 lb/ft.
 - d) Over 18 to 24 Feet: 8.625 OD pipe weighing at least 27.12 lb/ft.

2.3 FITTINGS AND ACCESSORIES

- A. Material: Comply with ASTM F 626. Mill-finished aluminum or galvanized iron or steel to suit manufacturer's standards. Unless specified otherwise, hot-dip galvanize pressed steel or cast-iron fence fittings and accessories with at least 1.2 oz. zinc per sq. ft. as determined by ASTM A 90.
- B. Post and Line Caps: Provide weathertight closure cap for each post. Provide line post caps with loop to receive tension wire or top rail.
- C. Post Brace Assembly: Manufacturer's standard adjustable brace. Use material specified below for brace, and truss to line posts with 3/8-inch-diameter rod and adjustable tightener. Provide manufacturer's standard galvanized-steel, cast-iron or cast-aluminum cap for each end.
 - 1. Round Steel: 1.660-inch OD Type I or II steel pipe.
 - 2. Roll-Formed Steel: 1-1/4-by-1-5/8-inch C section weighing a minimum of 1.40 lb per linear ft.
- D. Bottom and Center Rail: Same material as top rail. Provide manufacturer's standard galvanized-steel, cast-iron or cast-aluminum cap for each end.
- E. Tension or Stretcher Bars: Hot-dip galvanized steel with a minimum length 2 inches less than the full height of fabric, a minimum cross section of 3/16 inch by 3/4 inch, and a minimum of 1.2 oz. of zinc coating per sq. ft. Provide one bar for each gate and end post, and two for each corner and pull post, except where fabric is integrally woven into the post.
- F. Tension and Brace Bands: 3/4-inch-wide minimum hot-dip galvanized steel with a minimum of 1.2 oz. of zinc coating per sq. ft.
 - 1. Tension Bands: 0.074 inch thick (14 gage) minimum.
 - 2. Brace Bands: 0.105 inch thick (12 gage) minimum.
- G. Tension Wire: 0.177-inch-diameter metallic-coated steel marcelled tension wire conforming to ASTM A 824 with finish to match fabric.
 - 1. Coating Type I aluminum with a minimum coating weight of 0.40 oz. per sq. ft. as determined by ASTM A 428.
 - 2. Coating Type II zinc in the following class as determined by ASTM A 90.
 - a) Class 1, with a minimum coating weight of 0.80 oz. per sq. ft. of uncoated wire surface.
 - b) Class 2, with a minimum coating weight of 1.20 oz. per sq. ft. of uncoated wire surface.

- c) Class 3, with a minimum coating weight of 2.00 oz. per sq. ft. of uncoated wire surface.
- H. Tension Wire: 0.192-inch-diameter (6-gage) mill-finished aluminum wires, ASTM B 211, alloy 6061-T94 with 50,000-psi minimum tensile strength.
- I. Tie Wires: 0.106-inch-diameter (12-gage) galvanized steel with a minimum of 0.80 oz. per sq. ft. of zinc coating according to ASTM A 641, Class 3 or 0.148-inch-diameter (9-gage) aluminum wire alloy 1350-H19 or equal, to match fabric wire.
- J. Barbed Wire: Provide post extension members on each post to extend 16" (or as detailed on the Drawings) above top horizontal member and prepare to receive three strands of wire. Provide necessary clips for securing wire to extensions.

2.4 GATES

- A. Fabricate perimeter frames of gates from same material and finish as fence framework. Assemble gate frames by welding. Provide horizontal and vertical members to ensure proper gate operation and attachment of fabric, hardware, and accessories. Space frame members maximum of 8 feet apart unless otherwise indicated.
 - 1. Fabric: Same as for fence unless otherwise indicated. Secure fabric at vertical edges with tension bars and bands and to top and bottom of frame with tie wires.
 - 2. Bracing: Install diagonal cross-bracing consisting of 5/16-inch-diameter adjustable-length truss rods on gates to ensure frame rigidity without sag or twist.
 - 3. Barbed Wire: Extend end members of gate frames 16 inches above top member (or as detailed on the Drawings) and prepare to receive three strands of wire. Provide necessary clips for securing wire to extensions.
- B. Swing Gates: Comply with ASTM F 900.
 - 1. Steel: Gates up to 8 feet wide shall be fabricated perimeter frames of 1.90-inch minimum OD Type I or II steel pipe or 2-inch-square galvanized-steel tubing weighing 2.52 lb per sq. ft.
 - 2. Gate Hardware: Provide galvanized hardware and accessories for each gate according to the following:
 - a) Hinges: Size and material to suit gate size, non-lift-off type, offset to permit 180-degree gate opening. Provide 1-1/2 pair of hinges for each leaf over 6-foot nominal height.
 - b) Latch: Forked type or plunger-bar type to permit operation from either side of gate, with padlock eye as an integral part of latch.
 - c) Keeper: Provide a keeper for vehicle gates that automatically engages gate leaf and holds it in the open position until manually released.

- d) Gate Stops: Provide gate stops for double gates consisting of mushroom-type flush plate with anchors, set in concrete, and designed to engage a center drop rod or plunger bar. Include a locking device and padlock eyes as an integral part of the latch, permitting both gate leaves to be locked with a single padlock.
- C. Horizontal Slide Gates: Comply with ASTM F 1184 for **single** gates, made from pipe and tubing complying with ASTM F 1043, complete with hardware.
- 1. Type: **II Cantilever Slide, Class 1 with external roller assemblies.**
 - 2. Frames and Bracing: Fabricate members from round **aluminum** pipe for the gate type, fabric height, opening width, and overhead clearance to match fence
 - a. Corners: **Welded.**

SLIDE GATE OPERATORS

- A. Slide Gate Operators:
- 1. UL 325 and 991 listed.
 - 2. UL 325, Class I, II, III, and IV vehicular gate operator.
 - 3. Operation: 24 V DC with 1/2 HP motor.
 - 4. Maximum Gate Weight: 1,200 lbs.
 - 5. Maximum Gate Length: 40 feet.
 - 6. Maximum Operating Speed: 12 inches per second.
 - 7. Operating Temperature: Minus 4 degrees F to 158 degrees F.
 - 8. Maximum Duty Cycle: 100 percent; continuous cycle.
 - 9. Power:
 - a. Main Power Source: 120 or 220 V AC, single phase.
 - 1) Built-in power selector switch.
 - b. Consumption Current: 3 A at 120 V AC and 1.5 A at 220 V AC.
 - c. EMI Filter and Lightning Protection: For AC line up to 6 kV, 3 kA.
 - 10. Chassis: 6-gauge steel, zinc plated and powder coated.
 - 11. Control Board Enclosure: Aluminum, powder coated.
 - 12. Logic Board.
 - a. Multiple-stage built-in lightning-strike protection up to 20 kV and 10 kA.
 - b. Redundancy design in hardware and firmware.
 - c. Regulated power supply for external accessories up to 1 A.
 - d. Multiple-stage short circuit protected.
 - e. Fail-safe/fail-secure connector.
 - f. Auto open in case of power failure.

- B. Remote Controls: Nema 3r enclosure for exterior mounting, and with space for additional optional equipment. Provide the following remote-control device(s):
 - 1. Control Station: Momentary-contact, three-button-operated control station with open, close, and stop positions.
 - a. Key Switch: To lock out open and close buttons. Provide two keys per station.
 - 2. Card Reader: Functions only when authorized card is presented. Magnetically coded, single-code system activated by coded card. Provide insertion-reader-type, face-lighted unit fully visible at night.
 - 3. Digital Keypad Entry Unit: Functions only when authorized code is entered. Multiple-code capability of not less than 45 possible individual codes.
- C. Obstruction Detection Devices: Provide each motorized gate with automatic safety sensor(s). Activation of **photoelectric/infrared** sensor(s) causes operator to immediately reverse gate in both opening and closing cycles and hold until clear of obstruction.
- D. Limit Switches: Adjustable switches, interlocked with motor controls and set to automatically stop gate at fully retracted and fully extended positions.
- E. Emergency Release Mechanism: Quick disconnect release of operator drive system.
- F. Automatic Closing Timer: With adjustable time delay before closing.
- G. Audio Warning Module: ADA-compliant audible alarm sounding three to five seconds in advance of gate operation and continuing until gate stops moving.
- H. Visual Warning Module: ADA-compliant visible **constant** light alarm activated three to five seconds in advance of gate operation and continuing until gate stops moving.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install fence to comply with ASTM F 567. Do not begin installation and erection before final grading is completed, unless otherwise permitted. Apply fabric to outside of framework. Install fencing on boundary lines as indicated on drawings.
- B. Excavation: Drill or hand-excavate (using post-hole digger) holes for posts to diameters and spacings indicated, in firm, undisturbed or compacted soil.

1. If not indicated on Drawings, excavate holes for each post to minimum diameter recommended by fence manufacturer, but not less than four times the largest cross section of post.
 2. Unless otherwise indicated, excavate hole depths approximately 3 inches lower than post bottom, with bottom of posts set not less than 36 inches below finish grade surface.
- C. Setting Posts: Center and align posts in holes 3 inches above bottom of excavation. Space a maximum of 10 feet o.c., unless otherwise indicated.
1. Protect portion of posts above ground from concrete splatter. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment, and hold in position during placement and finishing operations.
 - a) Unless otherwise indicated, extend concrete footings 2 inches above grade and trowel to a crown to shed water.
- D. Top Rails: Run rail continuously through line post caps, bending to radius for curved runs and at other posts terminating into rail end attached to posts or post caps fabricated to receive rail. Provide expansion couplings as recommended by fencing manufacturer.
- E. Center Rails: Install center rails in one piece between posts and flush with post on fabric side, using rail ends and special offset fittings where necessary.
- F. Brace Assemblies: Install braces at end and gate posts and at both sides of corner and pull posts. Locate horizontal braces at midheight of fabric on fences with top rail and at two thirds fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.
- G. Bottom Tension Wire: Install tension wire within 6 inches of bottom of fabric before stretching fabric and tie to each post with not less than same gage and type of wire. Pull wire taut, without sags. Fasten fabric to tension wire with 0.120-inch-diameter (11-gage) hog rings of same material and finish as fabric wire, spaced a maximum of 24 inches o.c.
- H. Fabric: Leave approximately 2 inches between finish grade and bottom selvage unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Install fabric on security side of fence, and anchor to framework so that fabric remains under tension after pulling force is released.
- I. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gate posts with tension bands spaced not over 15 inches o.c.

- J. Tie Wires: Use wire of proper length to secure fabric firmly to posts and rails. Bend ends of wire to minimize hazard to persons or clothing. Maximum Spacing: Tie fabric to line posts 12 inches o.c. and to rails and braces 24 inches o.c.
- K. Fasteners: Install nuts for tension bands and carriage bolts on the side of the fence opposite the fabric side. Peen ends of bolts or score threads to prevent removal of nuts for added security.

3.2 GATE INSTALLATION

Install gates plumb, level, and secure for full opening without interference. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary. Install gates according to manufacturer's instructions, plumb, level, and secure.

3.3 ADJUSTING

Gates and Gate Operators: After repeated operation of completed installation equivalent to 3 days' use by normal traffic, readjust gates and gate operators and controls for optimum operating condition and safety. Lubricate operating equipment and clean exposed surfaces.

END OF SECTION 02831

SECTION 08441 - GLAZED ALUMINUM CURTAIN WALLS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes conventionally glazed aluminum curtain walls installed as stick assemblies.

1.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Comply with performance requirements specified, as determined by testing of manufacturer's standard glazed aluminum curtain walls representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.

1. Glazed aluminum curtain walls shall withstand movements of supporting structure indicated on Drawings including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
2. Failure also includes the following:
 - a. Thermal stresses transferring to building structure.
 - b. Glass breakage.
 - c. Noise or vibration created by wind and thermal and structural movements.
 - d. Loosening or weakening of fasteners, attachments, and other components.
 - e. Failure of operating units.

- B. Wind Loads: As indicated on structural drawings.

- C. Structural-Test Performance: Test according to ASTM E 330 as follows:

1. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
2. Test Durations: 10 seconds.

- D. Deflection of Framing Members: At design wind pressure, as follows:

1. Deflection Normal to Wall Plane: Limited to edge of glass in a direction perpendicular to glass plane not exceeding $L/175$ of the glass edge length for each individual glazing lite.
2. Deflection Parallel to Glazing Plane: Limited to $L/360$ of clear span or 1/8 inch, whichever is smaller.

- E. Water Penetration under Static Pressure: No evidence of water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 10 lbf/sq. ft.

- F. Energy Performance: Glazed aluminum curtain wall shall have certified and labeled energy performance ratings in accordance with NFRC.
1. Thermal Transmittance (U-factor): Fixed glazing and framing areas shall have U-factor of not more than 0.45 Btu/sq. ft. x h x deg F as determined according to NFRC 100.
 2. Solar Heat Gain Coefficient: Fixed glazing and framing areas shall have a solar heat gain coefficient of no greater than 0.45 as determined according to NFRC 200.
 3. Air Infiltration: Maximum air leakage through fixed glazing and framing areas of 0.30 cfm/sq. ft. (1.50 L/s per sq. m) of fixed wall area as determined according to ASTM E 283 at a minimum static-air-pressure differential of 1.57 lbf/sq. ft. (75 Pa).

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For glazed aluminum curtain walls. Include plans, elevations, sections, full-size details, and attachments to other work.
1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
 2. Include full-size isometric details of each vertical-to-horizontal intersection of glazed aluminum curtain walls, showing the following:
 - a. Joinery, including concealed welds.
 - b. Anchorage.
 - c. Expansion provisions.
 - d. Glazing.
 - e. Flashing and drainage.
- C. Samples: For each type of exposed finish required.
- D. Qualification Data: For qualified Installer.
- E. Product test reports.
- F. Maintenance data.
- G. Warranties: Sample of special warranties.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.
- C. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

- D. Energy Performance Standards: Comply with NFRC for minimum standards of energy performance, materials, components, accessories, and fabrication. Comply with more stringent requirements if indicated.

- 1. Provide NFRC-certified glazed aluminum curtain walls with an attached label.

1.5 WARRANTY

- A. Special Assembly Warranty: Standard form in which manufacturer agrees to repair or replace components of glazed aluminum curtain walls that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

- 1. Warranty Period: Five years from date of Substantial Completion.

- B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.

- 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- B. Basis-of-Design Product: Subject to compliance with requirements, provide Kawneer Aluminum Curtain Wall 1600 Wall System 4 - 2-1/4" x 6", inside glazed format or comparable product by one of the following:

- 1. Arch Aluminum & Glass Co., Inc.
 - 2. EFCO Corporation.
 - 3. Kawneer North America; an Alcoa company.
 - 4. Tubelite.
 - 5. United States Aluminum.
 - 6. Vistawall Architectural Products; The Vistawall Group; a Bluescope Steel company.
 - 7. Wausau Window and Wall Systems.

2.2 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

- 1. Sheet and Plate: ASTM B 209.
 - 2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
 - 3. Extruded Structural Pipe and Tubes: ASTM B 429.
 - 4. Structural Profiles: ASTM B 308/B 308M.

5. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.
- B. Steel Reinforcement: With manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.
 1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
 2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
 3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.3 FRAMING

- A. Framing Members: Manufacturer's standard extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
 1. Construction: Thermally broken.
 2. Glazing System: Retained mechanically with gaskets on four sides.
 3. Glazing Plane: Front (inside) glazed format
- B. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
 1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
 2. Reinforce members as required to receive fastener threads.
 3. Use exposed fasteners with countersunk Phillips screw heads, fabricated from 300 series stainless steel.
- D. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
 1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.
- E. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
- F. Framing Sealants: Manufacturer's standard sealants.

2.4 GLAZING

- A. Glazing: Comply with Division 08 Section "Glazing."
- B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.

- C. Glazing Sealants: As recommended by manufacturer.

2.5 ACCESSORY MATERIALS

- A. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

2.6 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Fabricate components that, when assembled, have the following characteristics:
 - 1. Profiles that are sharp, straight, and free of defects or deformations.
 - 2. Accurately fitted joints with ends coped or mitered.
 - 3. Physical and thermal isolation of glazing from framing members.
 - 4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 - 5. Provisions for field replacement of glazing from interior.
 - 6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Fabricate components that, when assembled, have the following characteristics:
 - 1. Internal guttering system or other means to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum curtain wall to exterior.
 - 2. Pressure-equalized system or double barrier design with primary air and vapor barrier at interior side of glazed aluminum curtain wall and secondary seal weeped and vented to exterior.
- E. Factory-Assembled Frame Units:
 - 1. Rigidly secure nonmovement joints.
 - 2. Seal joints watertight unless otherwise indicated.
 - 3. Install glazing to comply with requirements in Division 08 Section "Glazing."
- F. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.7 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
6. Weld components in concealed locations to minimize distortion or discoloration of finish. Protect glazing surfaces from welding.
7. Seal joints watertight unless otherwise indicated.

B. Metal Protection:

1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape or installing nonconductive spacers as recommended by manufacturer for this purpose.
2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum curtain wall to exterior.

D. Install components plumb and true in alignment with established lines and grades.

E. Install glazing as specified in Division 08 Section "Glazing."

3.2 ERECTION TOLERANCES

A. Erection Tolerances: Install glazed aluminum curtain walls to comply with the following maximum tolerances:

1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
3. Alignment:
 - a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch unless noted otherwise.
 - b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch unless noted otherwise.
 - c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch unless noted otherwise.
4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Testing Services: Testing and inspecting of representative areas of glazed aluminum curtain walls shall take place as installation proceeds to determine compliance of installed assemblies with specified requirements.
 - 1. Water Penetration: Areas shall be tested according to ASTM E 1105 at a minimum uniform and cyclic static-air-pressure differential of 0.67 times the static-air-pressure differential specified for laboratory testing in "Performance Requirements" Article, but not less than 6.24 lbf/sq. ft., and shall not evidence water penetration.
 - a. Test Area: One installed assembly, but not less than 30 feet, of glazed aluminum curtain wall.
Perform a minimum of two tests, prior to 70 percent completion.
 - 2. Water Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.
 - a. Test Area: One installed assembly, but not less than 30 feet, of glazed aluminum curtain wall.
- C. Glazed aluminum curtain walls will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

END OF SECTION 08441

TRANSIENT VOLTAGE SURGE SUPPRESSOR (TVSS) SCHEDULE	
PROTECTED EQUIPMENT	TVSS CAT NO.
MDP	PTX120-NN400
H3	PTX080-NN400
MCC1	PTX080-NN400
VFD-1	PTX080-NN400
VFD-2	PTX080-NN400
VFD-3	PTX080-NN400
VFD LINE-UP	PTX080-NN400
P1	EQX80N-1S101
P2	EQX80N-1S101
P3	EQX80N-3Y101
P4	EQX80N-1S101
P5	EQX80N-1S101
CP-1	HS-120-10A
CP-2	HS-120-10A
CP-3	HS-120-10A
CP-4	HS-120-10A
CP-5	HS-120-10A
CP-6	HS-120-10A
CP-7	HS-120-10A
CP-8	HS-120-10A
CP-9	HS-120-10A
CP-10	HS-120-10A

NOTES: (TVSS SCHEDULE ONLY)

1. PROVIDE INNOVATIVE TECHNOLOGY TRANSIENT VOLTAGE SURGE ARRESTORS. CATALOG NUMBERS SHOWN ABOVE ARE INNOVATIVE TECHNOLOGY PRODUCTS.
2. INSTALL AND WIRE TVSS LOCATED WITHIN 24 INCHES OF THE PROTECTED EQUIPMENT.

**WASHINGTON COUNTY SERVICE AUTHORITY
MIDDLE FORK WTP UPGRADE TO 12 MGD
E005 - TVSS SCHEDULE**

ADDENDUM 2

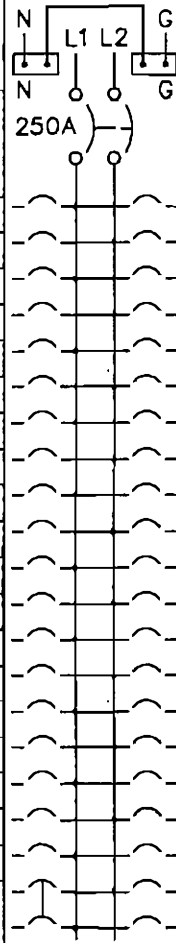
SCALE: NTS
JOB NO.: 12367.13

SEP 2010



PANEL DESIGNATION: P2
 VOLTAGE: 120/240V, 1 ϕ , 3W
 AMPERES: 250A

LOCATION: CHEMICAL BUILDING
 MAIN: MCB
 PANEL MOUNTING: NEMA 1, SURFACE



LOAD SERVED	CONNECTED LOAD (KVA)		CIRCUIT BREAKER		CKT NO.		CKT NO.	CIRCUIT BREAKER		CONNECTED LOAD (KVA)		LOAD SERVED
	L1	L2	AMPS	POLES				AMPS	POLES	L1	L2	
LIGHTS	0.8		20	1	1		2	20	1	0.5		RECEPTACLES
LIGHTS		0.8	20	1	3		4	20	1		0.5	RECEPTACLES
LIGHTS	1.2		20	1	5		6	20	1	0.5		RECEPTACLES
LIGHTS		0.4	20	1	7		8	20	1		0.5	RECEPTACLES
LIGHTS, EXTERIOR	1.0		20	1	9		10	20	1	0.5		STREAMING CURRENT METER
LIGHTS		1.2	20	1	11		12	20	1		1.5	VALVE VAULT
LIGHTS	0.6		20	1	13		14	20	1	1.5		VALVE VAULT
LIGHTS		0.8	20	1	15		16	20	1		1.2	CARBON FEEDER
LIGHTS - BULK TANKS	0.6		20	1	17		18	20	1	0.9		EF-3
LIGHTS - BULK TANKS		0.8	20	1	19		20	20	1		0.9	EF-4
LC3	0.9		20	1	21		22	20	1			TRACE HEATING
LC3		0.9	20	1	23		24	20	1		0.7	CAUSTIC METERING PUMP 1
EF-2	1.2		20	1	25		26	20	1	0.7		CAUSTIC METERING PUMP 2
CI STORAGE LEAK DET.		0.1	20	1	27		28	20	1		1.0	METER VAULT
CI ROOM LEAK DET.	0.1		20	1	29		30	20	1	1.0		METER VAULT
CHLORINE SCALES		0.2	20	1	31		32	20	1		0.7	PACI METERING PUMP 1
POT. PERM. SCALE	0.1		20	1	33		34	20	1	0.7		PACI METERING PUMP 2
TRACE HEATING		0.3	20	1	35		36	20	1		0.7	PACI METERING PUMP 3
TRACE HEATING	0.3		20	1	37		38	20	1	0.7		POT. PERM METERING PUMP 1
WATER HEATER	2.3	2.3	30	2	39		40	20	1		0.7	POT. PERM METERING PUMP 2
							42	20	1	0.6		CP-2
SUB-TOTAL	9.1	7.8								7.6	8.4	SUB-TOTAL

L1: 16.7 KVA
 L2: 16.2 KVA

TOTAL CONNECTED LOAD = 32.9 KVA

INTERRUPTING RATING AT 240 VOLTS: 10,000 AMPS

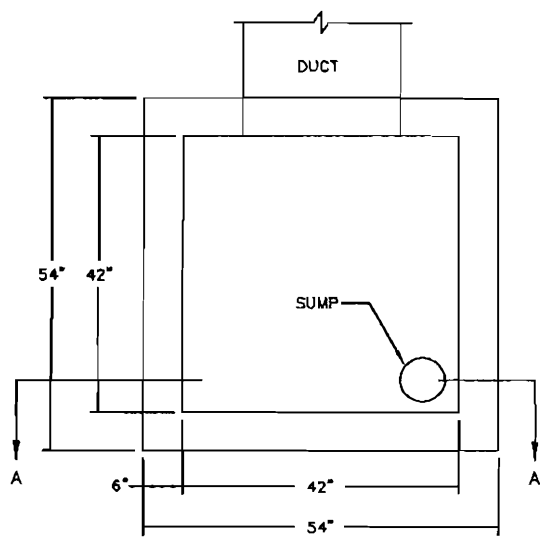
WASHINGTON COUNTY SERVICE AUTHORITY
 MIDDLE FORK WTP UPGRADE TO 12 MGD
 E010 - PANEL P2

ADDENDUM 2

SCALE: NTS
 JOB NO.: 12367.13

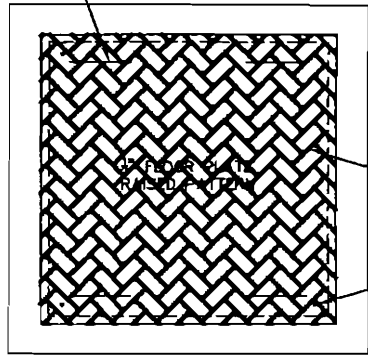
SEP 2010



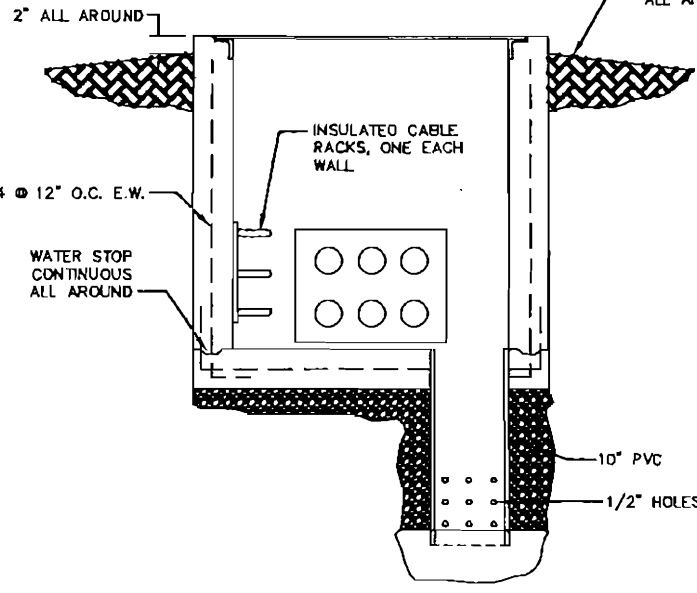


PLAN

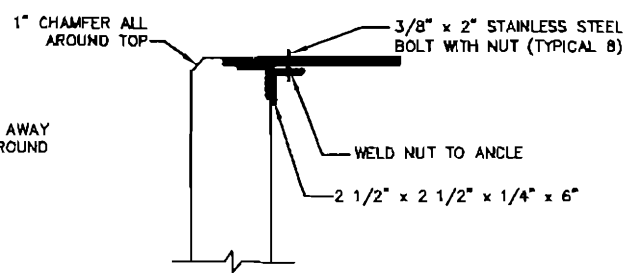
COVER LIFT HANDLE
(TYPICAL 4)



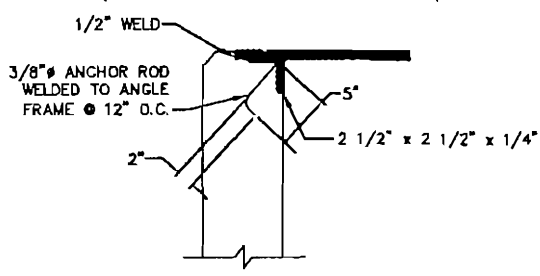
PLAN (COVER)



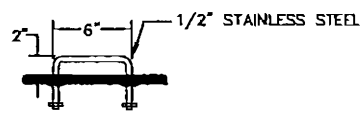
SECTION A-A



DETAIL COVER ATTACHMENT



DETAIL COVER AND FRAME



DETAIL COVER LIFT HANDLE

ELECTRICAL HANDHOLE DETAIL

SCALE: NOT TO SCALE

ED11.2
ED11

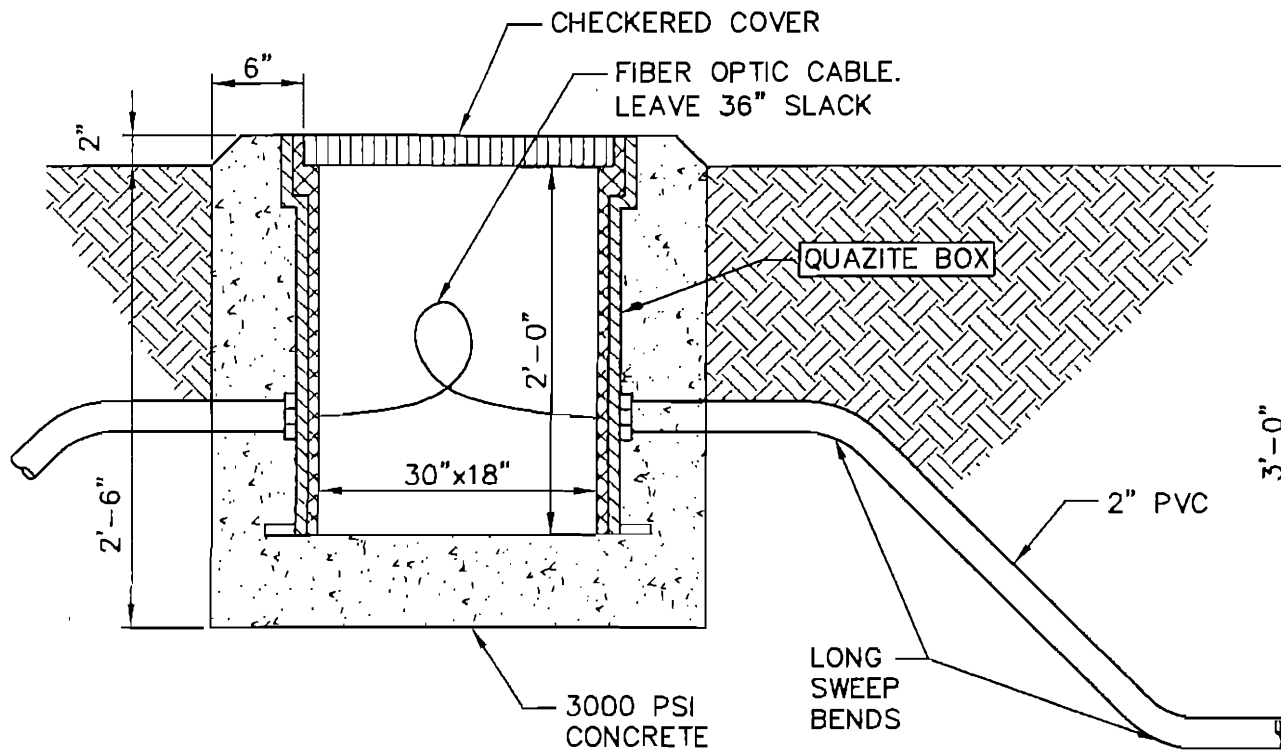
WASHINGTON COUNTY SERVICE AUTHORITY
MIDDLE FORK WTP UPGRADE TO 12 MGD
ELECTRICAL HANDHOLE DETAIL

ADDENDUM 2

SCALE: NTS
JOB NO.:12367.13

SEP 2010





FIBER OPTIC CABLE PULLBOX

SCALE: NOT TO SCALE

E011.3
E011

WASHINGTON COUNTY SERVICE AUTHORITY
MIDDLE FORK WTP UPGRADE TO 12 MGD
FIBER OPTIC CABLE PULLBOX DETAIL

ADDENDUM 2

SCALE: NTS
JOB NO.: 12367.13

SEP 2010

LUMINAIRE SCHEDULE

FIXTURE TAG	LAMPS			TYPE OF MOUNTING	TYPE OF CEILING OR WALL	DESCRIPTION	MANUFACTURER AND CATALOG NO.
	FLUOR.	INCAND.	HID				
A	2-96HO			PENDANT	OPEN STRUCTURE	INDUSTRIAL FLUORESCENT, 8 FT	LITHONIA AF296T8HO
B			175W MH	CEILING	CONCRETE	VAPORTIGHT HID	CROUSE-HINDS VMVM2C175R5-SB28
C			175W MH	CEILING	CONCRETE	CLASS II, DIV. 1 HID	CROUSE-HINDS DMVM175GR305
D			175W MH	WALL	CONCRETE	WET LOCATION WALL BRACKET, PHOTOCCELL	LITHONIA TWP175M120PE
E				WALL	SEE PLANS	LIGHTED EXIT SIGN, LED LAMPS	LITHONIA LES1R120ELN
F		2-25W PAR		WALL	SEE PLANS	BATTERY BACKED EMERGENCY LIGHT SET	LITHONIA ELT50120N2512N
G			175W MH	PENDANT	OPEN STRUCTURE	ENCLOSED HID WET LOCATION LABEL	CROUSE-HINDS VMVM2A175R5
H	2-F32			LAY-IN	ACOUS. TILE	LAY-IN FLUORESCENT ACRYLIC DIFFUSER	LITHONIA 2SP8G232A12
K	3-F32			LAY-IN	ACOUS. TILE	LAY-IN FLUORESCENT ACRYLIC DIFFUSER	LITHONIA 2SP8G332A12
L	4-F32			LAY-IN	ACOUS. TILE	LAY-IN FLUORESCENT PARABOLIC REFRACTOR	LITHONIA 2PM3NGB43232LD
M	2-F32			CEILING SURFACE	GYP. BO	SURFACE MTD. ENCLOSED FLUORESCENT	LITHONIA LB232
N	18W TRT			RECESSED	GYP. BD	SHOWER LIGHT	LITHONIA 6HF-F6L4
P	32W TRT			RECESSED	ACOUS. TILE	DOWN LIGHT	LITHONIA LP6FN
S		150W		CEILING SURFACE	CONCRETE	VAPORTIGHT INCANDESCENT	HUBBELL NV21G15XHG
T		150W		WALL	CONCRETE	VAPORTIGHT INCANDESCENT WALL BRACKET	HUBBELL NV21G15BHG
W		150W QUARTZ		SEE DETAIL	CONCRETE	WET LOCATION FLOODLIGHT	HUBBELL Q-150-B

NOTES: (LUMINAIRE SCHEDULE ONLY)

1. FLUORESCENT LUMINARIES TO HAVE ELECTRONIC BALLASTS.
2. DIFFUSERS SHALL BE 1/8" THICK VIRGIN ACRYLIC.
3. LUMINAIRE VOLTAGE SHALL BE 120 VAC UNLESS INDICATED OTHERWISE.

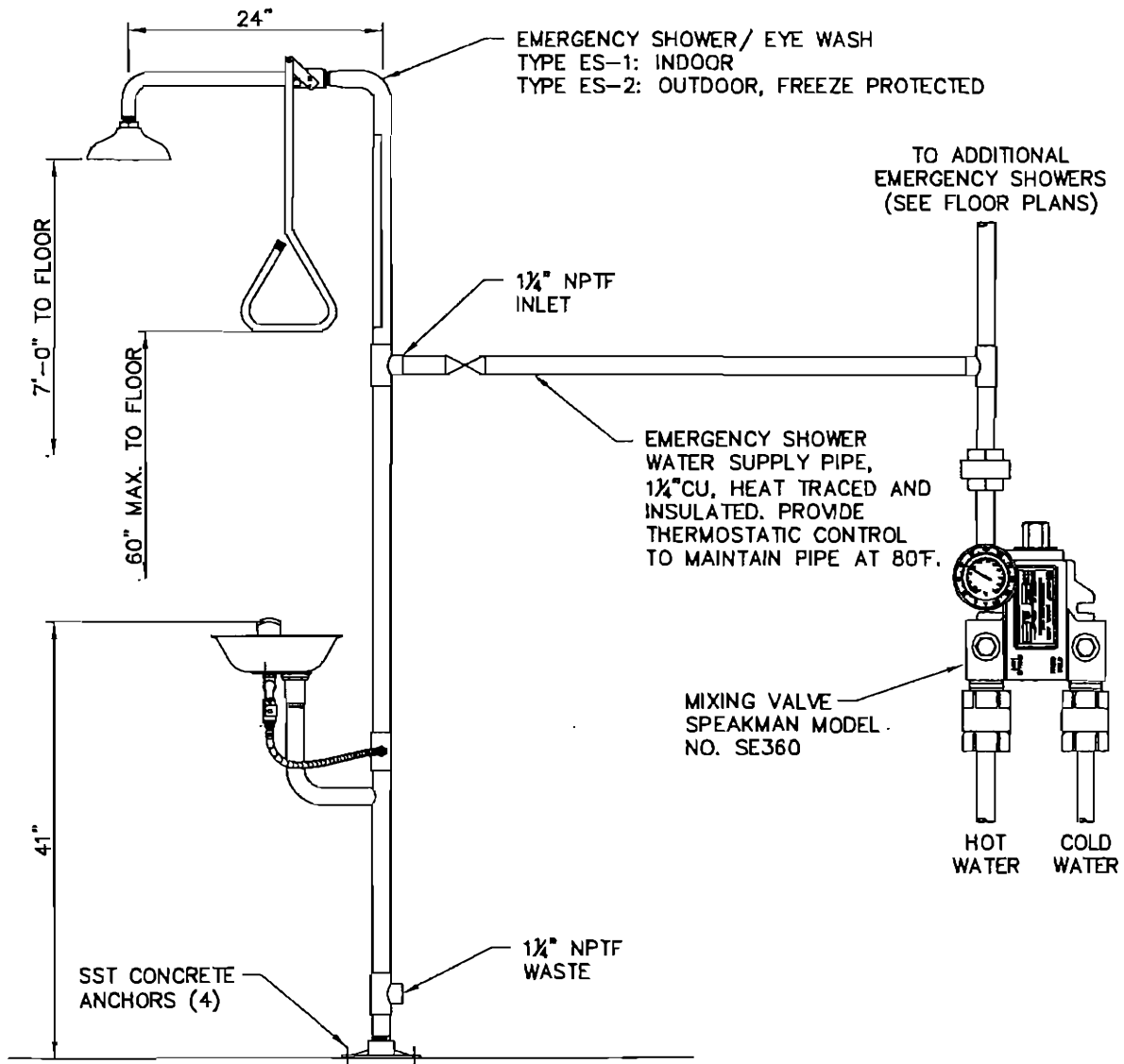
WASHINGTON COUNTY SERVICE AUTHORITY
MIDDLE FORK WTP UPGRADE TO 12 MGD
E203 - LUMINAIRE SCHEDULE AND NOTES

ADDENDUM 2

SCALE: NTS
JOB NO.: 12367.13

SEP 2010





DETAIL - EMERGENCY EYEWASH/ SHOWER (M006.6)

SCALE: NO SCALE

TYP

WASHINGTON COUNTY SERVICE AUTHORITY
 MIDDLE FORK WTP UPGRADE TO 12 MGD
 M006 - EMERGENCY WYEWASH/ SHOWER DETAIL

ADDENDUM 2

SCALE: NTS
 JOB NO.:12367.13

SEP 2010

PLUMBING FIXTURE SCHEDULE

TAG	TYPE	MOUNTING	CONNECTIONS			MANUFACTURER AND MODEL NO.	NOTES
			DRAIN	COLD WATER	HOT WATER		
WC-1	WATER CLOSET TANK TYPE	FLOOR	4"	½"		AMERICAN STANDARD 2034.014	3,4
WC-2	WATER CLOSET TANK TYPE	FLOOR	4"	½"		AMERICAN STANDARD 2034.014	1,3,4
L1	LAVATORY	COUNTERTOP	2"	½"	½"	AMERICAN STANDARD 0491.019.020	1,2,4,8
S1	KITCHEN SINK	COUNTERTOP	2"	½"	½"	AMERICAN STANDARD 7144.803	2,4,8
U1	URINAL	WALL HUNG	2"	½"		AMERICAN STANDARD GLENBROOK 6205.010	9
DF1,2	DRINKING FOUNTAIN	WALL HUNG	2"	½"		OASIS BI-LEVEL PG8ACSL	1,4
WH1,2	HOT WATER HEATER	FLOOR		½"	½"	RHEEM 82V40, 40 GAL, 4.5W, 208V, 1Ø	6
FD	FLOOR DRAIN	FLUSH IN FLOOR	3"			ZURN Z415D76-P	
SD	SHOWER DRAIN	FLUSH IN SHOWER	2"			PROVIDE WITH SHOWER BASE, 4" STRAINER	
SH	SHOWER	SEE ARCH DETAIL	2"	½"	½"	ACCESSIBILITY PROFESSIONALS APTH4836BF2	1,5
ES	EMERGENCY EYEWASH/ SHOWER	SEE DWGS		½"		SPEAKMAN SE-690-ADA-FLW	1,7,10

NOTES: (PLUMBING FIXTURE SCHEDULE ONLY)

- 1.EQUIPMENT AND INSTALLATION SHALL MEET HANDICAP CODE (ADA) REQUIREMENTS.
- 2.PROVIDE CHROME PLATED FAUCET SET AND DRAIN.
- 3.PROVIDE SEATS FOR WATER CLOSETS.
- 4.PROVIDE STOPS WITH CHROME PLATED VALVE HANDLES.
- 5.PROVIDE HOT AND COLD WATER CONTROLS AND PERSONAL SHOWER HEAD MEETING ADA REQUIREMENTS.
- 6.WATER HEATER SHALL BE EQUIPPED WITH AN EXPANSION TANK AND PRESSURE RELIEF VALVE.
- 7.EMERGENCY EYE WASH/SHOWERS LOCATED OUTDOORS TO BE HEAT TRACED AND INSULATED FOR FREEZE PROTECTION TO BELOW 0 DEGREES F.
- 8.ENAMELED STEEL.
- 9.PROVIDE FLUSH VALVE.
- 10.PROVIDE FLOW SWITCH WITH SPDT CONTACT.
11. PROVIDE TRAPS FOR DRAINS FOR ALL FIXTURES REQUIRING DRAINS.

**WASHINGTON COUNTY SERVICE AUTHORITY
MIDDLE FORK WTP UPGRADE TO 12 MGD
M006 - PLUMBING FIXTURE SCHEDULE AND NOTES**

ADDENDUM 2

SCALE: NTS
JOB NO.:12367.13

SEP 2010



SECTION 11006
OWNER FURNISHED EQUIPMENT: INSTALLATION
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1 SECTION 11006

2 OWNER FURNISHED EQUIPMENT: INSTALLATION

3 PART 1 – GENERAL

4 1.1 SUMMARY

5 A. Section Includes:

- 6 1. Installation of Owner Furnished Equipment and supply and installation of equipment
7 appurtenances.

8 B. Related Sections include but are not necessarily limited to:

- 9 1. Division 0 - Bidding Requirements, Contract Forms, and Conditions of the Contract.
10 2. Division 1 - General Requirements.
11 3. Division 16 - Electrical.
12 4. Section 03002 - *Concrete*.
13 5. Section 07900 - *Joint Sealants*.
14 6. Section 11227 - *Adsorption Clarifiers*.
15 7. Section 15114 - *Miscellaneous Valves*.
16 8. Section 16472 - *Variable Frequency Drives*.

17 1.2 QUALITY ASSURANCE

18 A. Referenced Standards:

- 19 1. National Fire Protection Association:
20 a. NFPA 70, National Electrical Code.
21 2. National Electrical Manufacturers Association.
22 a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
23 b. ICS-6, Industrial Control and Systems: Enclosures.

24 B. Miscellaneous:

- 25 1. A single manufacturer of a particular "product" is to be selected and utilized uniformly
26 throughout the Project even though:
27 a. More than one manufacturer is listed for a particular "product" in the Specifications.
28 b. No manufacturer is listed.
29 2. Equipment, electrical assemblies, related electrical wiring, instrumentation, controls,
30 and system components shall fully comply with specific NEC area and NEMA 250 and
31 ICS-6 designations.

32 1.3 DEFINITIONS

33 A. Product: Manufactured materials and equipment.

34 B. Major Equipment Supports: Located on slabs-on-grade with supported equipment weighing
35 3000 LBS or greater.

36 C. Equipment: One or more assemblies capable of performing a complete function;
37 mechanical, electrical, instrumentation or other devices requiring an electrical, pneumatic,
38 electronic or hydraulic connection. Not limited to items listed under "Equipment" article
39 within specifications and Appendix.

40 D. Installer or Applicator: Installer or applicator is the person actually installing or applying the
41 product in the field at the Project site.

- 42 1. Installer and applicator are synonymous.
43

1 1.4 SUBMITTALS

2 A. Shop Drawings:

- 3 1. See Section 01340 - *Shop Drawings, Product Data & Samples, Operations & Maintenance*
4 *Manuals, and Miscellaneous Submittals.*
5 2. Acknowledgment that products submitted comply with the requirements of the
6 standards referenced.
7 3. Manufacturer's delivery, storage, handling, and installation instructions.
8 4. Shall include utility requirements including air, natural gas, electricity, and water.

9 PART 2 – PRODUCTS

10 2.1 OWNER SUPPLIED EQUIPMENT

11 A. The Owner is procuring the equipment described in Sections 11227, 16472, and 15114 (Part
12 2.5 and 2.11 only). Refer to the sections for descriptions of equipment and appurtenances
13 provided. Contractor is responsible for installing Owner supplied equipment and
14 appurtenances. Contractor is responsible for providing and installing other required
15 appurtenances as indicated on the drawings, discussed in the specifications, or as required
16 for a complete and functioning installation. Once the equipment arrives at the Project Site,
17 the contractor's insurance shall cover any damages to the equipment from that point
18 forward.

19 B. Contractor supplied appurtenances include, but are not limited to; grout, power and control
20 wiring, piping, piping and pipe supports, piping fittings and valves, and all other items not
21 specified in the shop drawings as being provided by the Owner or shown as "Furnished by
22 Owner (FBO)" on the Drawings.

23 2.2 ANCHORAGE

24 A. Installer shall provide all anchoring materials except as noted in the owner supplied
25 equipment specifications and labor to mount, support, or restrain all equipment.

- 26 1. Provide type 316L stainless steel rods meeting requirements of ASTM F593.
27 2. Configuration and number of anchors shall be per equipment manufacturer's
28 recommendations.
29 3. Provide two nuts for each anchor rod.

30 B. Cast-in-place anchors (anchor rods): Threaded rods with heavy hex heads imbedded in the
31 concrete.

32 C. Post-installed Concrete Anchors:

- 33 1. Adhesive Type: Hilti HVA, Molly Parabond, or equal.

34 2.3 SHOP OR FACTORY PAINT FINISHES

35 A. Electrical Equipment:

- 36 1. The standard factory-applied paint coating system(s) of the approved manufacturers of
37 the following equipment are acceptable:
38 a. Panel boards.
39 b. Electrical panels.
40 c. Switchboards.
41 d. Switchgear.
42 e. Safety switches.
43 f. Motor starter equipment.
44 g. Motor control centers.
45 h. Busways.
46 i. Raceways and cable trays.
47 j. Transformers.

- 1 k. Engine generator sets.
- 2 l. Power circuit breakers.
- 3 m. Exterior substation galvanized structural steel.

4 **PART 3 – EXECUTION**

5 **3.1 SCHEDULING**

- 6 A. Contractor is responsible for scheduling delivery of Owner Supplied Equipment, installation
- 7 and start-up services being provided by Suppliers of Owner Supplied Equipment; and any
- 8 testing requiring observation by Owner or Owner's representatives.

9 **3.2 INSTALLATION**

- 10 A. Install equipment as shown on Drawings and in accordance with manufacturer's directions.
- 11 B. Utilize templates for anchorage placement for slab-mounted equipment.
- 12 C. For equipment having drainage requirements provide PVC drain piping or tubing from
- 13 equipment to nearest floor or equipment drain. Route clear of major traffic areas and as
- 14 approved by Engineer.
- 15 D. DO NOT construct foundations until major equipment supports are approved.
- 16 E. Construct sub-bases level in both directions.

17 **3.3 INSTALLATION CHECKS**

- 18 A. The Owner has contracted equipment manufacturer services for site visits to inspect, check,
- 19 adjust and approve equipment installation. See the shop drawings for specific
- 20 arrangements.
- 21 B. No separate payment shall be made for initial installation checks. Initial installation check is
- 22 defined to be any checks, including corrections and modifications to installation and
- 23 equipment that can be made in one workday. Contractor is responsible for providing
- 24 personnel competent in Division 15, 16, and 17 trades to assist the manufacturer's
- 25 representative.
- 26 C. No additional payment will be made for additional installation checks caused by improper or
- 27 incomplete installation.
- 28 D. Contractor will be responsible for any additional expenses or compensation due to the
- 29 equipment supplier due to improper or incomplete installation.

30 **3.4 FIELD PAINTING AND PROTECTIVE COATINGS**

- 31 A. For required field painting and protective coatings, see Drawings.

32 **3.5 WIRING CONNECTIONS AND TERMINATION**

- 33 A. Clean wires before installing lugs and connectors.
- 34 B. Coat connection with oxidation eliminating compound for aluminum wire.
- 35 C. Terminate motor circuit conductors with copper lugs bolted to motor leads.
- 36 D. Tape uninsulated conductors and connectors with electrical tape, 150 percent of insulation
- 37 value of conductor.
- 38 E. Connections to carry full capacity of conductors without temperature rise.

1 F. Terminate spare conductors with electrical tape.

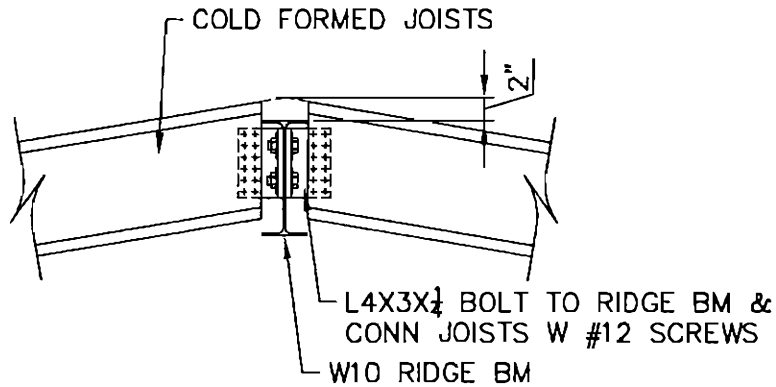
2 **3.6 FIELD QUALITY CONTROL**

3 A. Inspect wire and connections for physical damage and proper connection.

4 B. Check rotation of motor before connection to driven equipment, before couplings are bolted
5 or belts installed. Before motor is started to check rotation, determine that motor is
6 lubricated.

7

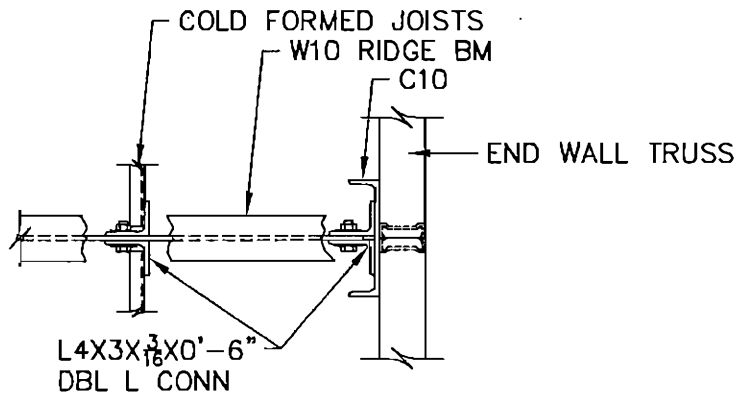
END OF SECTION



SECTION

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

S506.11
S210
S211



DETAIL

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

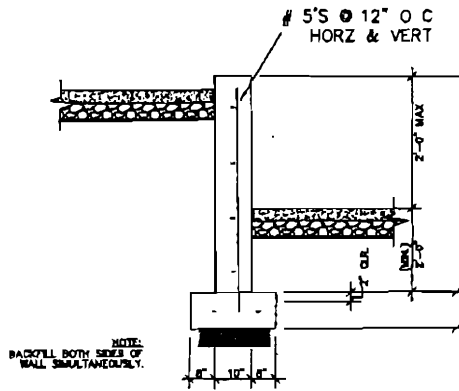
S506.12
S506

WASHINGTON COUNTY SERVICE AUTHORITY
MIDDLE FORK WTP UPGRADE TO 12 MGD
ADDENDUM NO. 2

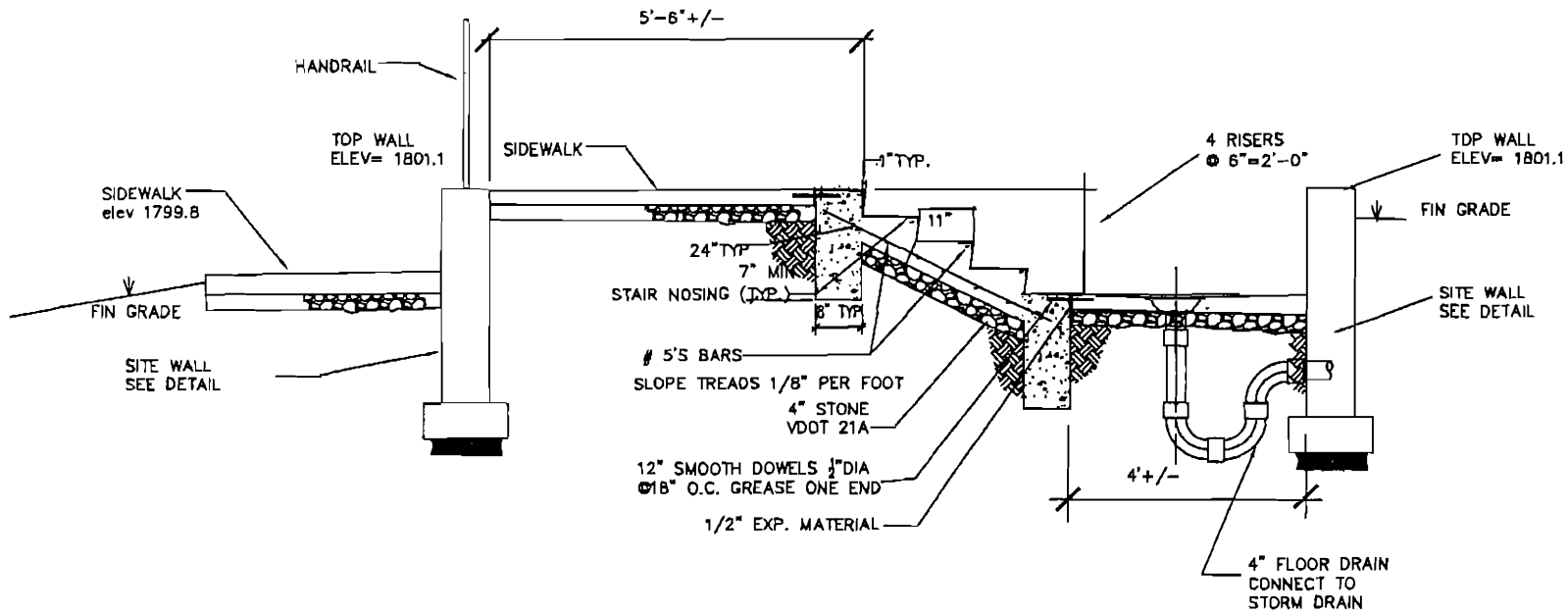
SECTIONS S506.11 & S506.12

SCALE: 3/4"=1'-0"
JOB NO.:12367.13

SEPT. 1, 2010



SITE WALL DETAIL
NOT TO SCALE



**ELEVATION DETAIL BOOSTER
PUMP STA SOUTH ENTRANCE**

SCALE: NOT TO SCALE

SECTION 17760
PRESSURE INDICATING TRANSMITTERS
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1 SECTION 17760

2 PRESSURE INDICATING TRANSMITTERS

3 PART 1 – GENERAL

4 1.1 THE REQUIREMENT

- 5 A. The Contractor shall furnish, test, install and place in satisfactory operation the pressure
6 indicating transmitters, with all spare parts, accessories, and appurtenances as herein
7 specified and as shown on the Drawings.

8 1.2 RELATED WORK SPECIFIED ELSEWHERE

- 9 A. Section 17000 - *Control and Information System Scope and General Requirements.*
10 B. Section 17700 - *Powered Instruments - General.*

11 PART 2 – PRODUCTS

12 2.1 GAUGE PRESSURE INDICATING TRANSMITTERS

- 13 A. Gauge pressure transmitters shall be of the capacitance type with a process-isolated
14 diaphragm with silicone oil fill, microprocessor-based "smart" electronics, and a field
15 adjustable rangeability of 100:1 input range. Span and zero shall be continuously adjustable
16 externally over the entire range. Span and zero adjustments shall be capable of being
17 disabled internally. Transmitters shall be NEMA 4X weatherproof and corrosion resistant
18 construction with low-copper aluminum body and 316 stainless steel process wetted parts.
19 Accuracy, including nonlinearity, hysteresis and repeatability errors shall be plus or minus
20 0.065 percent of calibrated span, zero based. The maximum zero elevation and maximum
21 zero suppression shall be adjustable to anywhere within sensor limits. Output shall be linear
22 isolated 4-20 milliamperes 24 VDC. Power supply shall be 24 VDC, two-wire design. Each
23 transmitter shall be furnished with a 4-digit LCD indicator capable of displaying engineering
24 units and/or milliamps and mounting hardware as required. Overload capacity shall be rated
25 at a minimum of 25 MPa. Environmental limits shall be -40 to 85 degrees Celsius at 0-100%
26 relative humidity. Each transmitter shall have a stainless steel tag with calibration data
27 attached to body.
- 28 B. The piezo-resistive silicon pressure sensor shall be mechanically, electrically, and thermally
29 isolated from the process and the environment, shall include an integral temperature
30 compensation sensor, and shall provide a digital signal to the transmitter's electronics for
31 further processing. Factory set correction coefficients shall be stored in the sensor's
32 non-volatile memory for correction and linearization of the sensor output in the electronics
33 section. The electronics section shall correct the digital signal from the sensor and convert
34 it into a 4-20 mA analog signal for transmission to receiving devices. The electronics section
35 shall contain configuration parameters and diagnostic data in non-volatile EEPROM memory
36 and shall be capable of communicating, via a digital signal superimposed on the 4-20 mA
37 output signal, with a remote interface device. Output signal damping shall be provided,
38 with an adjustable time constant of 0-36 seconds. Total long-term stability (frequency of
39 calibration) shall be not less than 0.125% for five years.
- 40 C. Where scheduled, gauge pressure indicating transmitters shall be calibrated in feet of liquid
41 for liquid level service.
- 42 D. Gauge pressure indicating transmitters shall be Model 3051T as manufactured by Rosemount,
43 or equal.
- 44

E. Provide the following gauge pressure indicating transmitters:

Tag	Service	Range
PIT-102	South Fork Force Main Pressure	0-200 psig

2.2 DIFFERENTIAL PRESSURE INDICATING TRANSMITTERS

A. Differential pressure indicating transmitters shall be the same as the gauge pressure transmitters except for body specifications. Differential pressure units shall be furnished with close coupled stainless steel three valve manifold assembly. Manifold assembly shall be HEX Products Model HM, or equal.

B. The electronics sections of differential pressure transmitters shall contain user-selectable square root extractors to provide a linear 4-20 mA DC output proportional to flow, when activated. Square root extractor circuitry shall be activated on the flow transmitters listed in the Instrument Schedules. In addition, each flow transmitter shall be furnished with laminated flow versus differential pressure curves wall mounted adjacent to the transmitter.

C. Differential pressure indicating transmitters shall be Model 3051C as manufactured by Rosemount, or equal.

D. Provide the following Differential Pressure Indicating Transmitters:

Tag	Service	Integral Sq. Root Extractor	Range
DPIT-201	Adsorption Clarifier 1 Loss-of-Head	No	0-10 FT
DPIT-202	Adsorption Clarifier 2 Loss-of-Head	No	0-10 FT
DPIT-203	Adsorption Clarifier 3 Loss-of-Head	No	0-10 FT
DPIT-213	Filter 1 Loss-of-Head	No	0-10 FT
DPIT-214	Filter 2 Loss-of-Head	No	0-10 FT
DPIT-215	Filter 3 Loss-of-Head	No	0-10 FT
DPIT-216	Filter 4 Loss-of-Head	No	0-10 FT
DPIT-217	Filter 5 Loss-of-Head	No	0-10 FT
DPIT-218	Filter 6 Loss-of-Head	No	0-10 FT
DPIT-219	Filter 7 Loss-of-Head	No	0-10 FT
DPIT-220	Filter 8 Loss-of-Head	No	0-10 FT
DPIT-101	Middle Fork Raw Water Flow	Yes	0-7 MGD
DPIT-102	South Fork Raw Water Flow	Yes	0-18 MGD
DPIT-205	Filter 1 Effluent Flow	Yes	0-2 MGD
DPIT-206	Filter 2 Effluent Flow	Yes	0-2 MGD
DPIT-207	Filter 3 Effluent Flow	Yes	0-2 MGD
DPIT-208	Filter 4 Effluent Flow	Yes	0-2 MGD
DPIT-209	Filter 5 Effluent Flow	Yes	0-2 MGD
DPIT-210	Filter 6 Effluent Flow	Yes	0-2 MGD
DPIT-211	Filter 7 Effluent Flow	Yes	0-2 MGD
DPIT-212	Filter 8 Effluent Flow	Yes	0-2 MGD

E. Transmitters DPIT-213 through DPIT-216 are existing and shall be reconnected to the indicated new Filter Control Panel. Recalibrate transmitters for new system.

F. Transmitter DPIT-205 through DPIT-208 are existing and shall be reconnected to the indicated new Filter Control Panel. Recalibrate transmitters for new system.

PART 3 – EXECUTION

3.1 REQUIREMENTS

A. Refer to Section 17700, Part 3 of the Specifications.

END OF SECTION

SECTION 17610
VENTURI FLOW TUBES
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3.1	INSTALLATION	2

1 SECTION 17610

2 VENTURI FLOW TUBES

3 PART 1 – GENERAL

4 1.1 THE REQUIREMENT

5 A. The Contractor shall furnish, test, install and place in satisfactory operation all venturi flow
6 tubes, with all spare parts, accessories, and appurtenances as herein specified and as shown
7 on the Drawings.

8 1.2 RELATED WORK SPECIFIED ELSEWHERE

9 A. Section 17000 - Control and Information System Scope and General Requirements.

10 B. Section 17600 - Unpowered Instruments - General.

11 C. Section 17760 - Pressure Indicating Transmitters.

12 1.3 SUBMITTALS

13 A. The manufacturer shall provide data that substantiates head loss and accuracy for the flow
14 tubes submitted, which shall include the following information:

- 15 1. Differential vs. flow curves.
- 16 2. Differential vs. flow data in tabular format.
- 17 3. Non-recoverable head loss data.
- 18 4. A certified dimensional drawing for each flow tube.
- 19 5. Specific equations for calculating airflow in scfm or liquid flow in gpm, as appropriate,
20 in the following format:

$$\text{Actual scfm} = \text{constant} \times \frac{(\text{Differential P})^{1/2} \times (\text{Operating Press.})^{1/2}}{(\text{Operating Temp.})^{1/2}} \quad (\text{Gas})$$

$$\text{gpm (or mgd)} = \text{constant} \times (\text{Differential P})^{1/2} \quad (\text{Liquid})$$

21
22 B. Two copies of each of the following curves with plastic see-through type envelopes shall be
23 furnished for each venturi tube by the manufacturer:

- 24 1. Certified differential pressure vs. flow at nominal static pressures.

25 PART 2 – PRODUCTS

26 2.1 VENTURI FLOW TUBES

27 A. The Contractor shall furnish the exact internal diameter of process piping to the
28 instrumentation subcontractor for fabricating and calibrating flow tubes. The flow tube
29 shall have pressure and temperature capabilities at least equal to the surrounding piping.
30 The Contractor shall coordinate end conditions for installation allowing for future removal of
31 the tube by use of expansion fittings and flanges in the pipeline, as shown on the Drawings.

32 B. Venturi tubes shall produce a differential pressure proportional to the square of flow. The
33 venturi meter shall have a cylindrical, precision-machined, bronze throat section with a
34 minimum length equal to 0.5 times its diameter. Center flange material shall be epoxy-
35 coated carbon steel, and shall match the pressure classification of the surrounding pipe.
36 Flange gaskets shall be provided for sealing and shall be consistent with the rest of the
37 gaskets used in the pipeline.

38 C. Pressure taps shall be 1/2-inch or 1/4-inch NPT as recommended by the manufacturer,
39 constructed of 316L stainless steel. If the 1/4-inch taps are furnished, appropriate fittings

1 shall be provided to connect to the ½-inch process tubing. The low-pressure sensing tap
 2 shall be installed in the cylindrical throat section of the flow tube. The static or high-
 3 pressure sensing tap shall be located in the upstream spool piece of the flow tube. Location
 4 of the upstream tap shall be directed by the flow tube supplier. Corner-type high-pressure
 5 taps shall not be acceptable. Flushing/drain assemblies with stainless steel ball valves for
 6 isolation, together with fittings and appurtenances, shall be furnished on all high and low
 7 pressure taps.

8 D. Accuracy shall be + or - 0.50% of actual flow rate over the specified flow range. Permanent
 9 head loss shall not exceed 8% of the maximum differential pressure.

10 E. Venturi Tube Schedule:

- 11 1. Acceptable manufacturers:
 - 12 a. BIF.
 - 13 b. Primary Flow Signal.
- 14 2. Materials:
 - 15 a. Body: ASTM A126 Class B cast iron.
 - 16 b. Throat: Bronze.
 - 17 c. Lining: Bronze.
 - 18 d. All materials in contact with potable water shall be NSF-61 listed.
- 19 3. Provide the following venture tubes:

Tag	Service	Range	Size
FE-102	South Fork Raw Water Flow	0-18 MGD	See Drawings
FE-209	Filter 5 Effluent	0-2 MGD	See Drawings
FE-210	Filter 6 Effluent	0-2 MGD	See Drawings
FE-211	Filter 7 Effluent	0-2 MGD	See Drawings
FE-212	Filter 8 Effluent	0-2 MGD	See Drawings

20 F. Refer to Section 17760 and coordinate the associated differential pressure transmitter input
 21 range with the differential produced by the venturi for a calibrated flow measuring system
 22 having the specified accuracy.

23 **PART 3 – EXECUTION**

24 **3.1 INSTALLATION**

25 A. All insert venturi meters and appurtenant work, including pressure taps, shall be installed in
 26 strict accordance with the manufacturer's printed instructions.

27 B. Refer to Section 17600, Part 3 for additional requirements.

28 **END OF SECTION**

SECTION 17740
ULTRASONIC LIQUID LEVEL MEASUREMENT SYSTEMS

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3.1	REQUIREMENTS	2

1 SECTION 17740

2 ULTRASONIC LIQUID LEVEL MEASUREMENT SYSTEMS

3 PART 1 – GENERAL

4 1.1 THE REQUIREMENT

- 5 A. The Contractor shall furnish, test, install and place in satisfactory operation the ultrasonic
6 liquid level measurement systems, with all spare parts, accessories, and appurtenances as
7 herein specified and as shown on the Drawings.

8 1.2 RELATED WORK SPECIFIED ELSEWHERE

- 9 A. Section 17000 - *Control and Information System Scope and General Requirements.*
10 B. Section 17700 - *Powered Instruments - General.*

11 PART 2 – PRODUCTS

12 2.1 ULTRASONIC LEVEL CONTROLLERS

- 13 A. Each ultrasonic level monitoring system shall include one ultrasonic level sensor and an
14 "intelligent" transmitter (controller). The ultrasonic level monitoring system shall be
15 required to monitor the level of liquids as shown on the Drawings and/or as specified herein.
16 Location of the sensor and transmitters shall be as shown on the Drawings and/or as
17 specified.
- 18 B. For outdoor installation, the use of approved watertight conduit hub/glands shall be
19 required. Tank mounting applications shall include mounting flange adapter supplied by the
20 manufacturer, which is compatible with the process liquid and the tank flange connection.
21 Sensor mounting thread shall be 1" NPT. Channel or wall mounting applications shall include
22 mounting bracket supplied by the manufacturer and constructed of 316 stainless steel
23 material.
- 24 C. The level sensor shall be unaffected by moisture droplets on the transducer face and operate
25 on the ultrasonic echo ranging principle. Sensor accuracy shall be a minimum of 0.25
26 percent of level measurement range, and include integral temperature compensation with
27 an accuracy of 0.01% per °C. Resolution shall be at least 0.1 percent of full range or 0.08
28 inches, whichever is greater.
- 29 D. The transmitter shall be programmable with a LCD display, which shall have the capability to
30 display a minimum of 4 characters at one time, and shall be shielded from direct sunlight.
31 The transmitter shall compensate for temperature and air density. The controller shall be
32 capable of performing the following functions: level monitor, both linear and nonlinear level
33 to flow relationships, volumetric, level signals, control of up to 5 pumps, alarms, monitor
34 pump runtime and pump sequencing. Output level signal shall be linear, isolated 4-20 mA
35 DC. Power requirement for the transmitter shall be 120 VAC, 60 Hz. The units shall have a
36 NEMA 4X stainless steel or nonmetallic enclosure. The units shall have as a minimum, the
37 required number of programmable set points to perform the functions specified. Each set
38 point shall operate a set of contacts rated at 10 amps, 120 VAC.
- 39 E. Ultrasonic level measurement system shall be the HydroRanger 200/Echomax Series
40 Transducers by Siemens/Milltronics, or equal.
41

1 F. Furnish and install the following level transmitters with separate level sensors:

Tag	Service
LIT-101	Middle Fork RWPS wetwell level
LIT-102	Sedimentation Basin effluent channel level
LIT-201	Filter influent channel 1 level
LIT-202	Filter influent channel 2 level
LIT-203	Filter 1 level
LIT-204	Filter 1 level
LIT-205	Filter 1 level
LIT-206	Filter 1 level
LIT-207	Filter 1 level
LIT-208	Filter 1 level
LIT-209	Filter 1 level
LIT-210	Filter 1 level
LIT-211	CCT #1 level
LIT-212	CCT #2 level
LIT-301	Finished Water Pump Station wetwell No. 1 level
LIT-302	Finished Water Pump Station wetwell No. 2 level
LIT-401	Caustic Bulk tank level
LIT-402	PACl Bulk Tank 1 level
LIT-403	PACl Bulk Tank 2 level
LIT-404	Fluoride Bulk tank level
LIT-405	PACl day tank 1 level
LIT-406	PACl day tank 2 level
LIT-408	Sodium Hydroxide day tank level
LIT-409	Fluoride day tank level

2

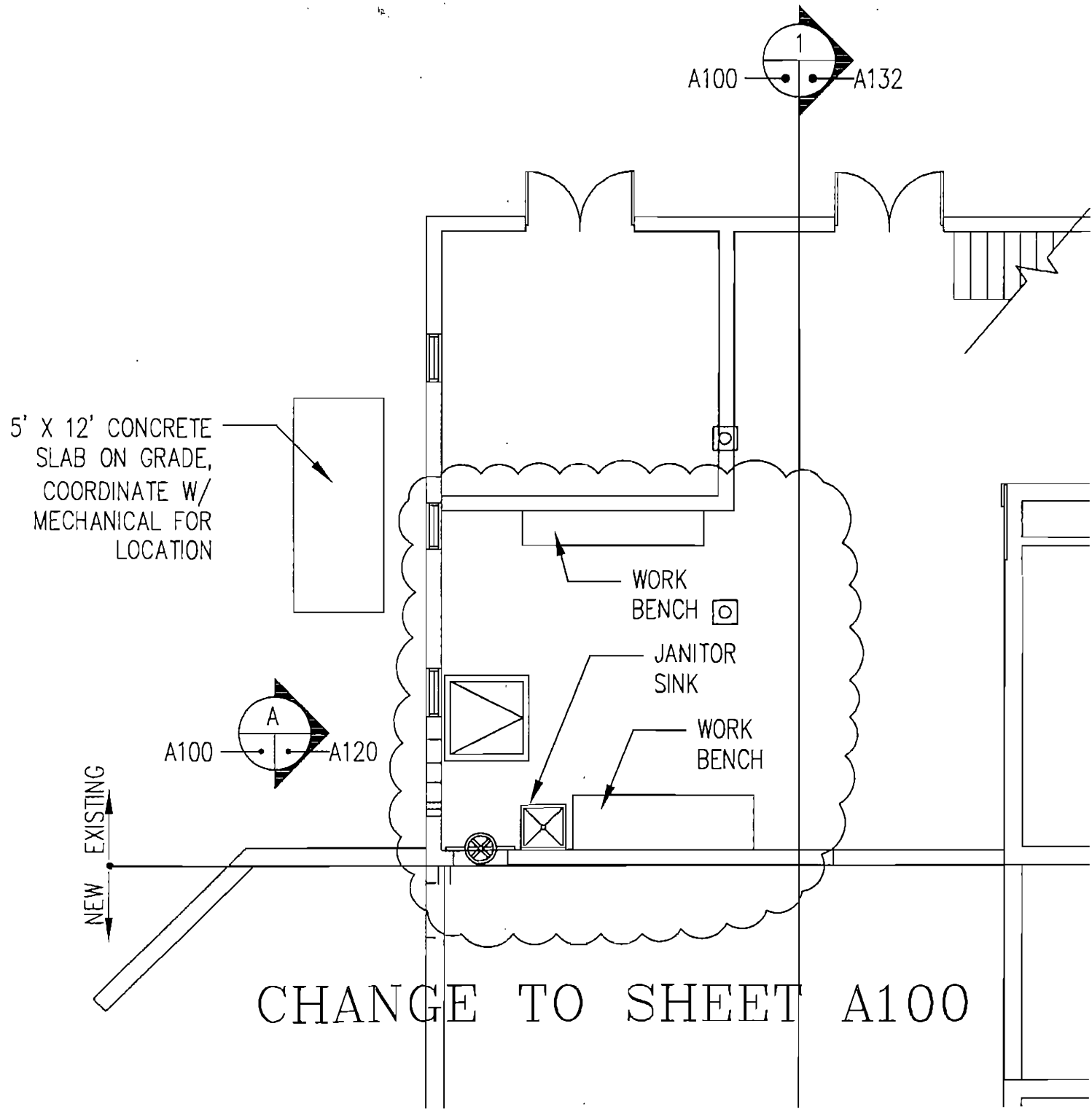
3 **PART 3 – EXECUTION**

4 **3.1 REQUIREMENTS**

- 5 A. Where level transducers may become submerged, provide a manufacturer-supplied
6 submergence hood.
- 7 B. For open channel flow applications where the transducer is subject to direct sunlight, use an
8 externally mounted temperature compensator mounted out of direct sunlight.
- 9 C. Refer to Section 17700, Part 3 of the specifications for additional requirements.

10

END OF SECTION



5' X 12' CONCRETE
SLAB ON GRADE,
COORDINATE W/
MECHANICAL FOR
LOCATION

WORK
BENCH

JANITOR
SINK

WORK
BENCH

NEW
EXISTING

CHANGE TO SHEET A100

1/4" M.R. GWB TO EXTEND TO TOP OF ROOF DECK - BACKER ROD AND CAULK ALL JOINTS

METAL ROOF SYSTEM OVER SLIP SHEET AND CONTINUOUS ICE DAM BARRIER

3" POLYISO INSULATION

1-1/2" METAL ROOF DECK

1-1/2" GALV. HAT CHANNELS OVER 4" METAL STUD

TRUSSES PERPENDICULAR TO STOREFRONT, SEE STRUCTURAL

R-30 INSULATION

1822.0 T.B.

BOTTOM CHORD OF TRUSS

SEAL ALL LOCATIONS WHERE TRUSS PENETRATES GWB

R-13 INSULATION

METAL STUD KICKERS @ 16" O.C.

1/2" M.R. GWB CONT. TO ROOF DECK

1/2" GWB W/ LEVEL 2 FINISH

ALUMINUM CURTAINWALL WINDOW SYSTEM

CEILING AS SCHEDULED

FILTRATION AREA

LABORATORY

113

GLAZING AS SCHEDULED

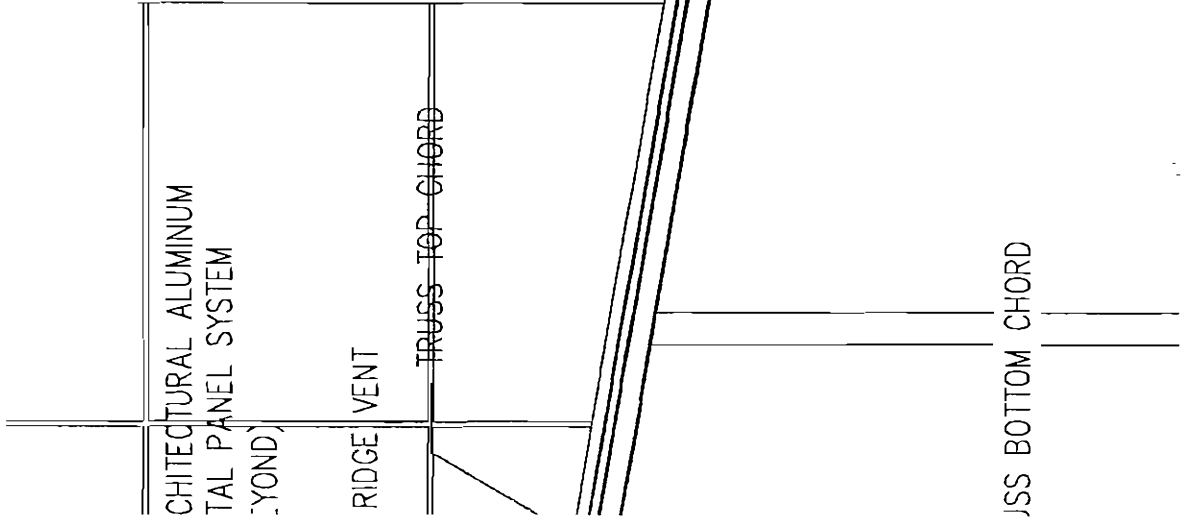
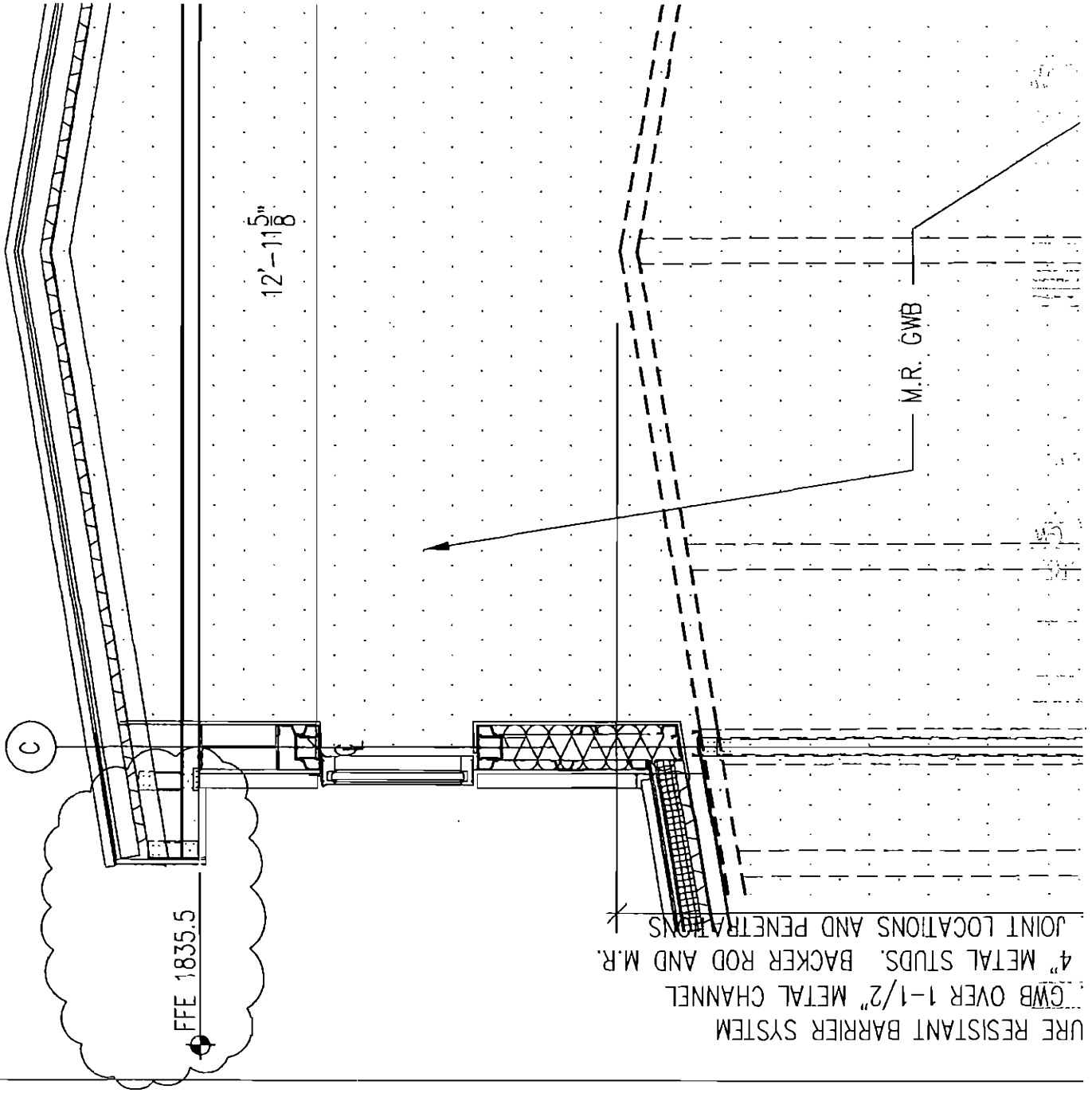
CASEWORK NOT SHOWN FOR CLARITY

ALIGN

CHANGE TO SHEET A134

6" RIFY VARY

CHANGE TO SHEET A135



CHITECTURAL ALUMINUM
TAL PANEL SYSTEM
(YOND)

RIDGE VENT

TRUSS TOP CHORD

TRUSS BOTTOM CHORD

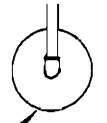
FFE 1835.5

12'-11 5/8"

M.R. G.W.B.

URE RESISTANT BARRIER SYSTEM
GWB OVER 1-1/2" METAL CHANNEL,
4" METAL STUDS, BACKER ROD AND M.R.
JOINT LOCATIONS AND PENETRATIONS

HACH AUTO
CAT 9000
N.I.C.



JAR TEST
AREA

PH CHECK
AREA

HACH D
N.I.C.

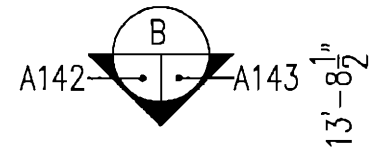
SPEAKMAN SE601
EMERGENCY EYE
WASH

23'-9 $\frac{1}{2}$ "

SOUTH FORK
RAW WATER

8"

SAMPLE SINK



MIDDLE FORK
RAW WATER

LABORATORY

113

COMBINED
RAW WATER

APPLIED
SEDIMENTATION

APPLIED
FILTER

COMBINED
FILTER
EFFLUENT

HACH 2100N
TURBIDIMETER
N.I.C.

Mn + Cl₂ CHECK
AREA

FINISHED
WATER

FISHER
MODEL #

5'-9"

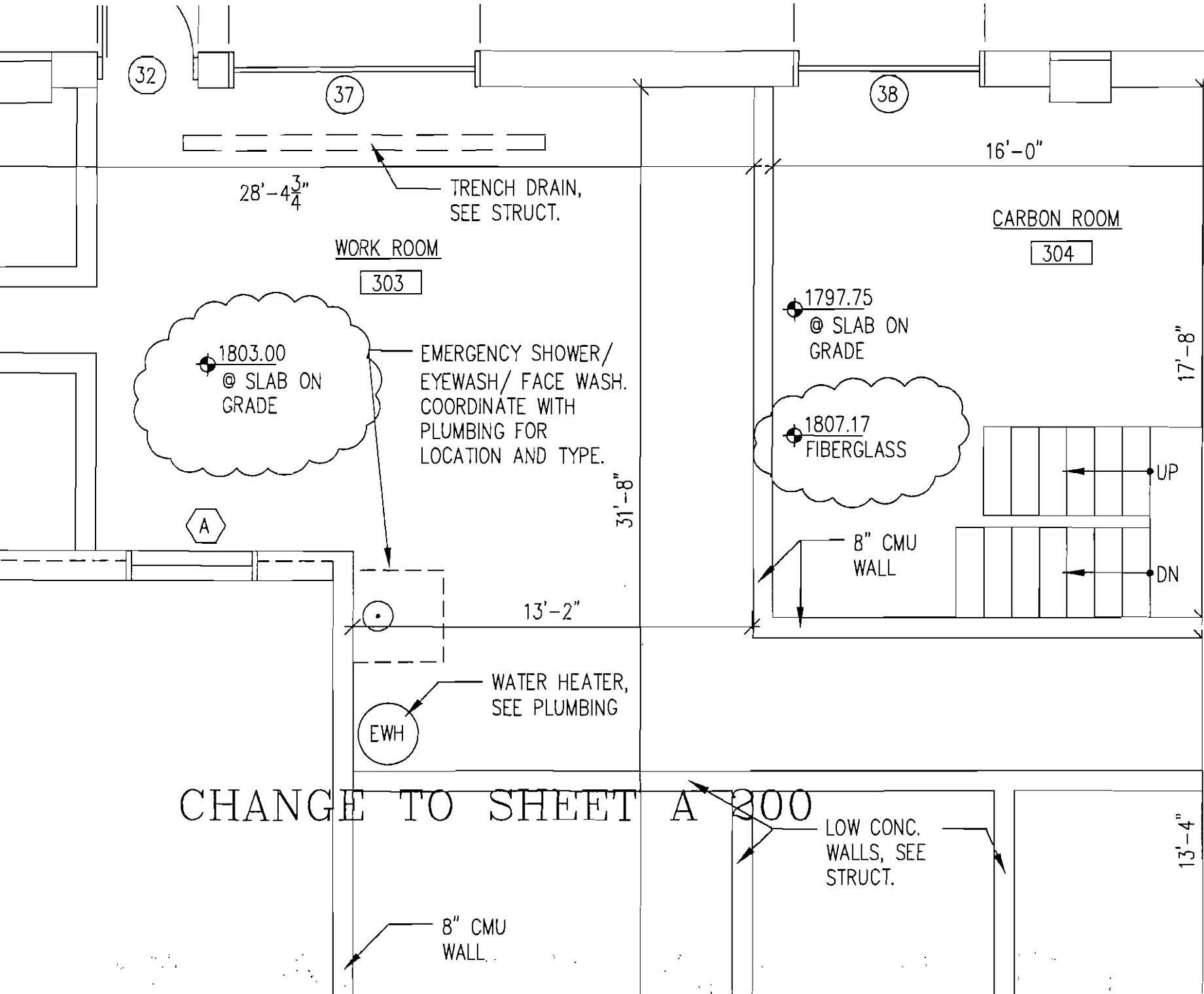
4" METAL
STUD WALL

CHANGE TO SHEET A142

DOOR SCHEDULE

MARK	DOOR SIZE			MATERIAL	TYPE	HDW.	LOUVER		DR .FINISH	HEAD	JAMB	FRAME MATERIAL	REMARKS
	WIDTH	HEIGHT	THICKNESS				WIDTH	HEIGHT					
01	PR-3'-0"	7'-0"	1-3/4"	ALUMINUM	A	1	--	--	ANODIZED	X	X	ALUMINUM	W/ 1" CLEAR INSULATED GLAZING
02	PR-3'-0"	7'-0"	1-3/4"	ALUMINUM	A	2			ANODIZED			ALUMINUM	W/ 1/4" CLEAR TEMPERED GLAZING
03	3'-0"	7'-0"	1-3/4"	ALUMINUM	D	3			ANODIZED			ALUMINUM	W/ 1/4" CLEAR TEMPERED GLAZING
04	3'-0"	7'-0"	1-3/4"	H.M.	B	3			PAINT	B	B	H.M.	W/ 1/4" CLEAR TEMPERED GLAZING
05	3'-0"	7'-0"	1-3/4"	ALUMINUM	D	3			ANODIZED			ALUMINUM	W/ 1/4" CLEAR TEMPERED GLAZING
06	3'-0"	7'-0"	1-3/4"	H.M.	B	4			PAINT	B	B	H.M.	W/ 1/4" CLEAR TEMPERED GLAZING
07	3'-0"	7'-0"	1-3/4"	H.M.	B	4			PAINT	B	B	H.M.	W/ 1/4" CLEAR TEMPERED GLAZING
08	3'-0"	7'-0"	1-3/4"	H.M.	B	4			PAINT	B	B	H.M.	W/ 1/4" CLEAR TEMPERED GLAZING
09	3'-0"	7'-0"	1-3/4"	H.M.	C	5	--	--	PAINT	B	B	H.M.	
10	3'-0"	7'-0"	1-3/4"	H.M.	C	5	--	---	PAINT	B	B	H.M.	
11	3'-0"	7'-0"	1-3/4"	H.M.	C	5	---	--	PAINT	B	B	H.M.	
12	3'-0"	7'-0"	1-3/4"	H.M.	C	5	---	--	PAINT	B	B	H.M.	
13	3'-0"	7'-0"	1-3/4"	H.M.	C	5			PAINT	B	B	H.M.	
14	3'-0"	7'-0"	1-3/4"	H.M.	C	6			PAINT	B	B	H.M.	
15	3'-0"	7'-0"	1-3/4"	H.M.	C	6			PAINT	B	B	H.M.	
16	3'-0"	5'-10"	1-3/4"	H.M.	C*	7			PAINT	B	B	H.M.	
17	3'-0"	5'-10"	1-3/4"	H.M.	C*	7			PAINT	B	B	H.M.	
18	3'-0"	5'-10"	1-3/4"	H.M.	C*	7			PAINT	B	B	H.M.	
19	3'-0"	5'-10"	1-3/4"	H.M.	C*	7			PAINT	B	B	H.M.	
20	3'-0"	7'-0"	1-3/4"	ALUMINUM	A	2			ANODIZED			ALUMINUM	W/ 1" CLEAR INSULATED GLAZING
21	3'-0"	7'-0"	1-3/4"	H.M.	C	4			PAINT	B	B	H.M.	
22	3'-0"	7'-0"	1-3/4"	H.M.	C	4			PAINT	B	B	H.M.	
23	3'-0"	7'-0"	1-3/4"	H.M.	B	4			PAINT	B	B	H.M.	
24	3'-0"	7'-0"	1-3/4"	H.M.	B	4			PAINT	B	B	H.M.	W/ 1" CLEAR INSULATED GLAZING
25	3'-0"	7'-0"	1-3/4"	H.M.	B	4			PAINT	B	B	H.M.	W/ 1" CLEAR INSULATED GLAZING
26	3'-0"	7'-0"	1-3/4"	ALUMINUM	A	11			ALUMINUM			ALUMINUM	W/ 1" CLEAR INSULATED GLAZING
27	PR-3'-0"	7'-0"	1-3/4"	H.M.	C	8			PAINT	A	A	H.M.	
28	PR-3'-0"	7'-0"	1-3/4"	H.M.	B	8			PAINT	B	B	H.M.	W/ 1/4" GLAZING
29	PR-3'-0"	7'-0"	1-3/4"	H.M.	B	9			PAINT	B	B	H.M.	W/ 1/4" GLAZING
30	3'-0"	7'-0"	1-3/4"	H.M.	C	5			PAINT	B	B	H.M.	
31	PR-3'-0"	7'-0"	1-3/4"	H.M.	C	10			PAINT	B	B	H.M.	

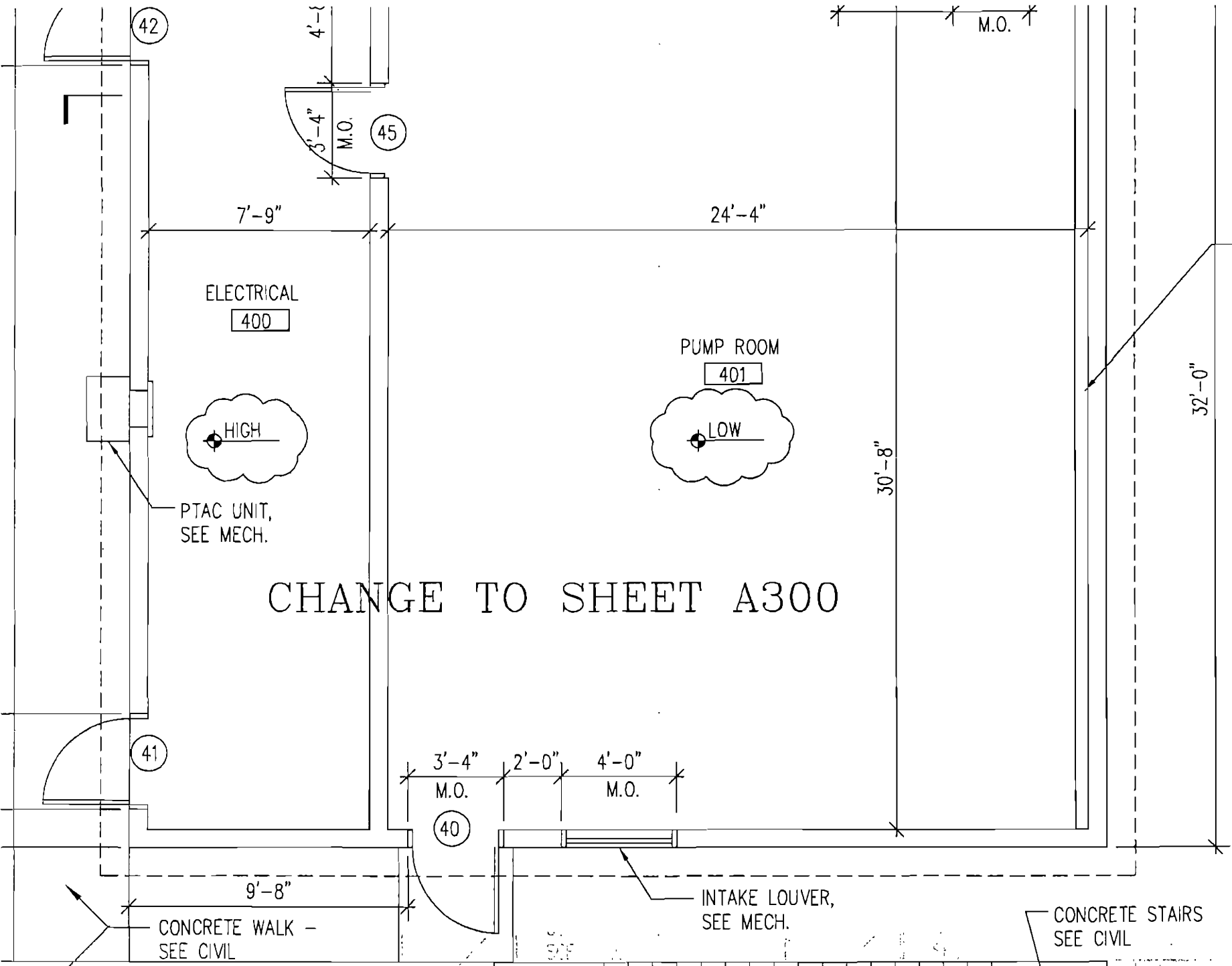
CHANGE TO SHEET A160

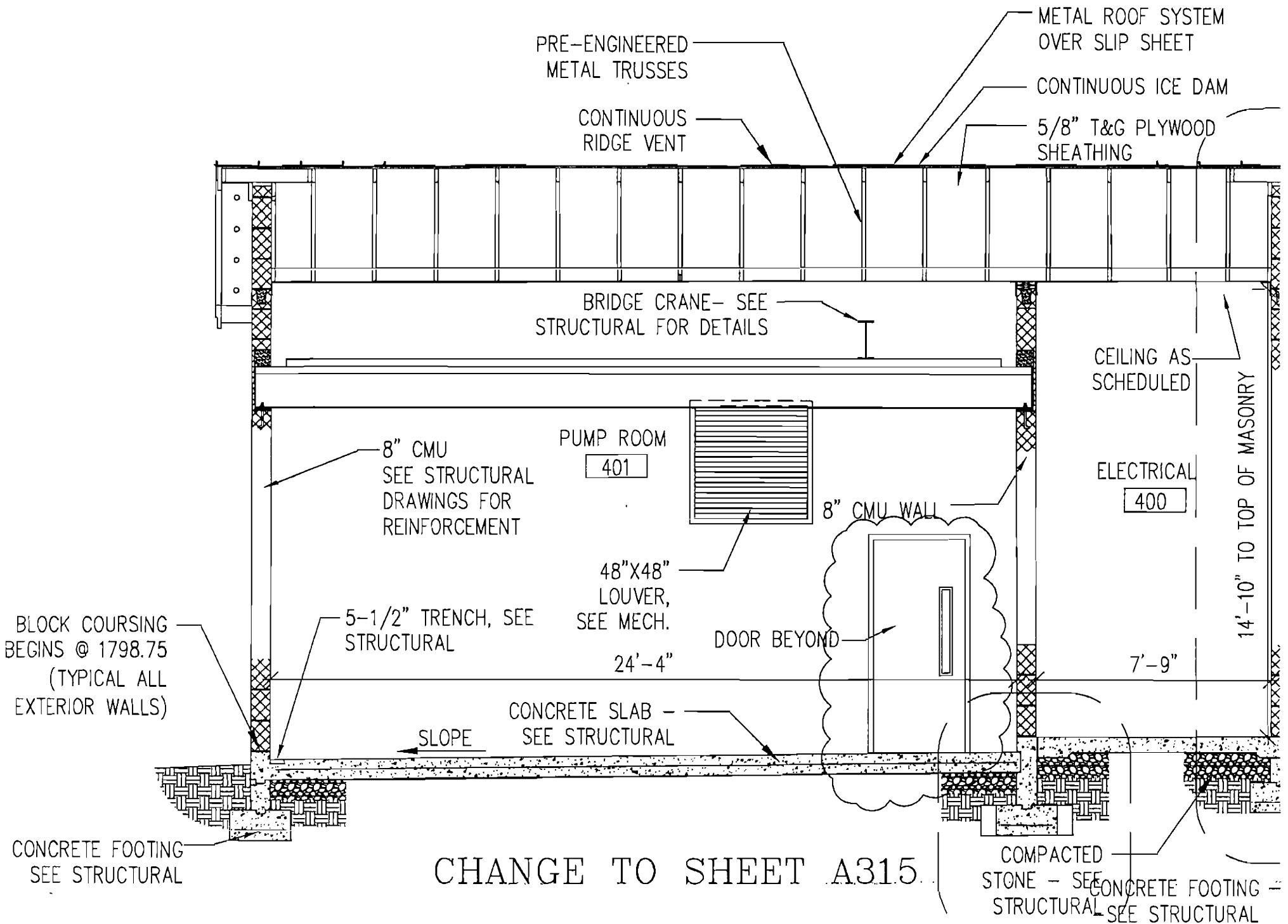


DOOR SCHEDULE

MARK	DOOR SIZE			MATERIAL	TYPE	HDW	LOUVER		DR .FINISH	HEAD	JAMB	FRAME MATERIAL	REMARKS
	WIDTH	HEIGHT	THICKNESS				WIDTH	HEIGHT					
30	3'-0"	7'-0"	1-3/4"	H.M.	A	12	--	--	PAINT	A	A	H.M.	W/ 1/4" CLEAR TEMPERED GLAZING
31	3'-0"	7'-0"	1-3/4"	H.M.	A	12			PAINT	A	A	H.M.	W/ 1/4" CLEAR TEMPERED GLAZING
32	3'-0"	7'-0"	1-3/4"	H.M.	A	11			PAINT	A	A	H.M.	W/ 1/4" CLEAR TEMPERED GLAZING
33	3'-0"	7'-0"	1-3/4"	H.M.	A	12			PAINT	A	A	H.M.	W/ 1/4" CLEAR TEMPERED GLAZING
34	3'-0"	7'-0"	1-3/4"	H.M.	A	11			PAINT	A	A	H.M.	W/ 1/4" CLEAR TEMPERED GLAZING
35	3'-0"	7'-0"	1-3/4"	H.M.	A	12			PAINT	A	A	H.M.	W/ 1/4" CLEAR TEMPERED GLAZING
36	3'-0"	7'-0"	1-3/4"	H.M.	A	12			PAINT	A	A	H.M.	W/ 1/4" CLEAR TEMPERED GLAZING
37	8'-0"	10'-0"	1-3/4"	H.M.	B	13			PAINT	B	B	H.M.	SEE NOTE 1.
38	6'-0"	7'-0"	1-3/4"	H.M.	B	13	--	--	PAINT	B	B	H.M.	SEE NOTE 1.
39	PR 5'-0"	12'-0"	1-3/4"	H.M.	C	14	--	--	PAINT	B	B	H.M.	COORDINATE DOOR HEIGHT WITH HOIST BEAM - SEE STRUCTURAL

CHANGE TO SHEET A260



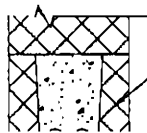


CHANGE TO SHEET A315

DOOR SCHEDULE

MARK	DOOR							LOUVER		HARDWARE SET #	HEAD	JAMB	FRAME		FIRE RATING	REMARKS
	WIDTH	HEIGHT	THICKNESS	MATERIAL	CORE	FINISH	TYPE	WIDTH	HEIGHT				TYPE	MATERIAL		
40	3'-0"	7'-0"	1-3/4"	HM	INSUL	PAINT	A	---	---	12	A	A		HM		
41	3'-0"	7'-0"	1-3/4"	HM	INSUL	PAINT	A	---	---	12	A	A		HM		
42	3'-0"	7'-0"	1-3/4"	HM	INSUL	PAINT	A	---	---	12	A	A		HM		
43	3'-0"	7'-0"	1-3/4"	HM	INSUL	PAINT	A	---	---	12	A	A		HM		
44	10'-0"	10'-0"	1-3/4"	STEEL	INSUL	PAINT	B	---	---	13	B	*	*	*		* BY MANUFACTURER
45	3'-0"	7'-0"	1-3/4"	HM	INSUL	PAINT	A	---	---	5	A	A		HM		

CHANGE TO SHEET A360



8" CMU LINTEL
WITH (2) #5'S
GROUT SOLID
PROVIDE 8"