

**JEFFERSON COUNTY ENVIRONMENTAL SERVICES DEPARTMENT  
2026 TURKEY CREEK WRF AND AL SEIER PS IMPROVEMENTS  
JEFFERSON COUNTY PROJECT NO. E2613**

**BID OPENING DATE: Wednesday, October 29, 2025, at 2:00 p.m. Central Time**

**ADDENDUM NO. 5  
October 16, 2025**

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The following additions, deletions, modifications, and clarifications shall be incorporated into the above referenced bid. These items shall have the full force and effect as the Contract Documents and cost involved shall be included in the bid price.

Bidders must acknowledge receipt of this Addendum by inserting the number and date in the space provided in Section 00300, Bid Proposal.

**I. WITHIN THE BIDDING DOCUMENTS & CONTRACT DOCUMENTS (DIVISION 00)**

**A. SECTION 000001 – TABLE OF CONTENTS**

1. Page 000001-3: Insert the following new headings and Sections.

After Division 09:

***“Facility Services Subgroup***

**DIVISION 26 – ELECTRICAL**

**260510 LIMITED ELECTRICAL FOR SMALL PROJECTS”**

Under the Process Equipment Subgroup heading:

**“DIVISION 40 – PROCESS INTERCONNECTIONS**

**400507 HANGERS AND SUPPORTS FOR PROCESS PIPING**

**400551 COMMON REQUIREMENTS FOR PROCESS VALVES**

**400557 ACTUATORS FOR PROCESS VALVES**

**400561 GATE VALVES**

**400562 PLUG VALVES”**

**B. SECTION 000107 – SEALS PAGE**

1. Page 000107-1: Delete the last line (END OF DOCUMENT 000107).
2. Page 000107-2: Delete this page in its entirety, and insert Page 000107-2 in its place. See Attachment B.

**C. SECTION 00100 – NOTICE TO BIDDERS**

1. Page 00100-1:
  - i. First paragraph: Delete “October 22, 2025” and insert “**October 29, 2025**” in its place.

- ii. Second paragraph: Before the words “site restoration,” insert the following:  
**“modifications to the pump discharge header in the Influent Pump Station at the Trussville WRF, including bypass pumping;”**
- 2. Page 00100-2, fifth paragraph: Delete “October 13, 2025” and insert **“October 20, 2025”** in its place.

D. SECTION 00101 – INSTRUCTIONS TO BIDDERS

- 1. Page 00101-4, Article 1.03.C.1: Delete “October 13, 2025” and insert **“October 20, 2025”** in its place.
- 2. Page 00101-5, Article 1.06.B: Insert the following new Article 1.06.B.3:  
**“For visits to Trussville WRF:  
Jonathan Gardner, Plant Superintendent, 205-529-2819”**

E. SECTION 00300 – BID PROPOSAL

- 1. This Section has been reissued. See Attachment C.

F. SECTION 00820 – SPECIAL CONDITIONS

- 1. Page 00820-5, Article 1.08.A: Delete the table in its entirety, and insert the following table in its place.

<b>“SHEET NO.</b>	<b>DESCRIPTION</b>	<b>NO. OF SHEETS</b>
<b>G-0 through G-3</b>	<b>General Drawings</b>	<b>4</b>
<b>M-1 through M-3</b>	<b>Process Mechanical Drawings</b>	<b>3</b>
<b>S-1 through S-3, SD-1 through SD-3</b>	<b>Structural Drawings</b>	<b>6”</b>

G. SECTION 00822 – INSURANCE REQUIREMENTS

- 1. Page 00822-5, Article 1.8.A: Delete the words “(excluding floods and earthquakes)” without replacement.

**II. WITHIN THE TECHNICAL SPECIFICATIONS (DIVISIONS 01 THROUGH 46)**

A. SECTION 01010 – SUMMARY OF WORK

- 1. Page 01010-1, Article 1.01.B: Insert the following new Article 1.01.B.3, and renumber subsequent Articles accordingly.  
**“3. Modifications to the pump discharge header in the Influent Pump Station at the Trussville WRF, including bypass pumping.”**

B. SECTION 01025 – MEASUREMENT AND PAYMENT

- 1. Page 01025-3:
  - iii. Article 1.02.G: Renumber Bid Item F to **Bid Item G**.
  - iv. Article 1.02.H: Renumber Bid Item G to **Bid Item H**.

- v. Insert the following new Article 1.02.G, and renumber subsequent Articles accordingly.

**“G. Part 1, Bid Item F**

**Lump Sum - Modifications to the Influent Pump Station Discharge Header at the Trussville WRF as Shown on Process Mechanical Drawings**

**Work under this bid item includes all materials, labor, equipment, and appurtenances necessary to perform the modifications as described on the Drawings and in the Specifications.**

- a. Measurement: In accordance with the accepted Schedule of Values.**
- b. Payment: Progress payments will be based on the actual percentage of Work satisfactorily completed during the progress payment period in accordance with the approved Schedule of Values. Final Payment will be the balance of the stated Lump Sum.”**

**C. SECTION 013100 – PROJECT MANAGEMENT AND COORDINATION**

- 1. Page 013100-6, Article 1.7.B.12: Inside the second set of parentheses, append the words **“or Trussville WRF”**.
- 2. Page 013100-9: In the line labeled “Project Location(s),” insert the following after Al Seier Pump Station:  
**“[ ] Trussville WRF”**

**D. SECTION 013233 – PHOTOGRAPHIC DOCUMENTATION**

- 1. Page 013233-5: Insert the following new rows into Table 013233-A.

<b>“Item</b>	<b>Milestone No.</b>	<b>Milestone Descriptions</b>
<b>Trussville WRF Modifications</b>	<b>1</b>	<b>Pre-demolition (each valve)</b>
	<b>2</b>	<b>Completion of demolition (each valve)</b>
	<b>3</b>	<b>During installation (each valve)</b>
	<b>4</b>	<b>At completion (each valve)”</b>

**E. SECTION 013513.24 – SPECIAL PROCEDURES FOR MAINTENANCE OF PLANT OPERATIONS AND SEQUENCE OF CONSTRUCTION**

- 1. Page 013513.24-9, Part 1: Insert the following new Article 1.7, and renumber subsequent Articles accordingly.  
**“1.7 SPECIFIC CONSTRUCTION CONSTRAINTS FOR TRUSSVILLE WRF**  
**A. At the Influent Pump Station, the Contractor will install a new 24” plug valve on the existing 24” discharge header pipe between Pump No. 1 and Pump No. 5. The plug valve will give the Owner the ability to isolate Pump Nos. 1, 2, 3, and 4 while allowing for continuous operation of Pump No. 5.**  
  
**B. Not less than 30 days before any interruption of normal operation of the pump station, submit a plan for installation of the 24” plug valve, including plans for bypass pumping. Any bypass pumping operations will be planned for dry-weather flows.**

Contractor will install the bypass pumping system and demonstrate its successful operation to the Owner and Engineer before any demolition of existing piping will begin.

C. Upon installation of the 24" plug valve, the pump station will be returned to normal operation and the 24" valve checked for leaks. If no leaks are found after two hours of operation, then no other full disruption of the operation of the pump station will occur.

D. Pump No. 5 will operate during the Contractor's replacement of the existing 12" gate valves on the discharge piping of Pump Nos. 1, 2, and 3. Only one of the 12" header pipes will be disassembled at any time. Upon replacement of each 12" gate valve, its respective pump will be placed into normal operation and the gate valve checked for leaks. If no leaks are found after two hours of operation, the Contractor will coordinate with the Owner before replacing the next 12" gate valve.

E. The Trussville WRF Influent Pump Station dry well is unclassified as defined by NFPA 820 'Fire Protection in Wastewater Treatment and Collection Facilities.'"

F. SECTION 015728 – TEMPORARY FLOW CONTROL

1. Page 015728-2, Article 1.05: Insert the following new Article 1.05.B.

**"B. During the installation of improvements to the Trussville WRF Influent Pump Station, provide temporary pumping to allow for the disruption of service of the existing pump station to install the new 24" plug valve.**

1. **The Contractor will install bypass pumping to direct flows from upstream of the existing pumps to the junction box upstream of grit removal facility.**

2. **The maximum duration of interruption to the operation of the existing pump station to complete the 24" plug valve installation will be a total of two days, not including any time spent during installation and testing of the bypass system as coordinated with the Owner.**

3. **The bypass system will have a firm capacity of 1,500 gallons per minute with a static head of approximately 50 feet. The firm capacity of each bypass set-up is defined as the capacity of the system with the largest bypass pump out of service. The bypass requirements are based upon dry weather flow. The existing pump station will not be removed from service during wet weather.**

4. **Pump Controls: The pumps shall be controlled by water level with alarms set to prevent sanitary sewer overflows due to surcharging of the upstream screen channels and influent junction box. These levels will be coordinated with the Owner based upon observations of the levels in the upstream structures.**

**5. Owner notification, approval, and coordination to take the Trussville WRF Influent PS off-line shall be a minimum of 72 hours in advance.”**

G. SECTION 01740 – WARRANTIES AND BONDS

1. Page 01740-2, Article 1.05.A.5: Inside the parentheses, append the words **“and Trussville WRF”**.

H. SECTION 017823 – OPERATION AND MAINTENANCE DATA

1. Page 017823-2, Article 1.4.A: Insert the following new Article 1.4.A.4.  
**“4. Provide separate manuals for each type of equipment, or each Section number. When equipment is installed at more than one Project site (Turkey Creek WRF, Al Seier Pump Station, Trussville WRF), provide separate, complete manuals specific to the equipment installed at each facility. A single manual containing operation and maintenance data for multiple facilities is not acceptable.”**

I. SECTION 024119 – SELECTIVE DEMOLITION

1. Page 024119-8, Article 3.8.A: Insert the following new Article 3.8.A.3.  
**“3. Trussville WRF Influent Pump Station: Existing 12” gate valves on the discharge piping of Pump Nos. 1, 2, and 3 (typical of three).”**
2. Page 024119-9, Article 3.8.C: Insert the following new Article 3.8.C.3.  
**“3. Trussville WRF Influent Pump Station: Existing 24” spool piece, 24” harnessed flanged adapter coupling, restraint lugs, and tie rods.”**

J. SECTION 099010 – SHOP PRIMING

1. Page 099010-2, Article 2.1: Insert the following new Article 2.1.B.  
**“B. Non-Submerged Surfaces: Shop primer for ferrous metals which will not be in contact with water being treated, not submerged and not subject to splash action:**
  1. **Shop Prime Coat: (Zinc Micaceous Iron Oxide Polyurethane Aromatic Shop Primer):**
    - a. **TNEMEC: Series 1 Omnithane.**
    - b. **Carboline: Carboguard 61.**
    - c. **Sherwin-Williams Company (The): Corothane I Zinc Primer 1K Mio-Zinc.**
    - d. **PPG Industries - Protective and Marine Coatings: Durathane MCZ 97-679 Series or Amercoat 68HS.**
    - e. **Or equal.”**

K. SECTION 099100 – PAINTING

1. Page 099100-7, Article 3.6.D: Renumber this Article to **3.6.A.**
2. Page 099100-8, Article 3.6: Insert the following new Article 3.6.B.  
**“B. Steel Substrates, Non-Submerged**
  - a. **Polysiloxane System:**
    - 1) **Prime Coat:**

- a) CAR: Carboguard 60.
  - b) PPG: Amerlock 2/2 VOC/400/600.
  - c) SWC: Macropoxy 646 FC Epoxy.
  - d) TNE: Series 66.
- 2) Topcoat: (MPI Gloss Level 6).
- a) CAR: Carboxane 2000.
  - b) PPG: PSX 700/805/ONE 750.
  - c) SWC: Sher-Loxane 800.
  - d) TNE: Series 740.”

L. SECTION 260510 – LIMITED ELECTRICAL FOR SMALL PROJECTS

- 1. Insert this new Section. See Attachment D.

M. SECTION 400507 – HANGERS AND SUPPORTS FOR PROCESS PIPING

- 1. Insert this new Section. See Attachment E.

N. SECTION 400551 – COMMON REQUIREMENTS FOR PROCESS VALVES

- 1. Insert this new Section. See Attachment F.

O. SECTION 400557 – ACTUATORS FOR PROCESS VALVES

- 1. Insert this new Section. See Attachment G.

P. SECTION 400561 – GATE VALVES

- 1. Insert this new Section. See Attachment H.

Q. SECTION 400562 – PLUG VALVES

- 1. Insert this new Section. See Attachment I.

R. SECTION 464331 – CIRCULAR SECONDARY CLARIFIER EQUIPMENT

- 1. Page 464331-1:
  - i. Article 1.2: Insert the following new Article 1.2.B, and renumber subsequent Articles accordingly.  
**“B. For each clarifier, Contractor will remove existing conduit and wire back to the stub next to the clarifier, as well as the existing Hand-Off-Remote (H-O-R) station; and install new conduit, wire, and H-O-R station in accordance with Section 260510.”**
  - ii. Article 1.2.C (formerly Article 1.2.B): Insert the following new Article 1.2.C.5.  
**“5. Section 260510 “Limited Electrical for Small Projects.”**
- 2. Page 464331-4, Article 2.1.C.7: Delete the sentence “1/4 inch per foot.” and insert the following sentence in its place.  
**“To be field verified by Contractor.”**

3. Page 464331-5, Article 2.1.D.1.c: At the end of the Article, delete the words “in either the forward or reverse direction.”
4. Page 464331-6:
  - vi. Article 2.1.E.1.e: Before the words “truss arm,” insert the words **“tie bars or a”**.
  - vii. Article 2.1.F.5.d: After the words “Cast bronze,” insert the words **“or ductile iron per ASTM A536.”**
5. Page 464331-7:
  - iii. Article 2.1.F.7.c.3: Delete the words “500,000 hours,” and insert the words **“175,200 hours”** in their place.
  - iv. Article 2.1.G.1: After the word “One,” insert the words **“perpendicular or”**.
6. Page 464331-8:
  - i. Article 2.1.G.1.j: After the word “Chloroprene,” insert the words **“or neoprene.”**
  - ii. Article 2.1.G.1.j.1: Delete the sentence “Bronze or aluminum.” and insert the following sentence in its place.  
**“Bronze, aluminum, or stainless steel.”**
  - iii. Article 2.1.G.1.L: Delete this Article in its entirety, and replace it with the following Article.  
**“I. Coiled Spring: If enclosed, provide a cast iron or welded steel housing with bronze bushing and oil or grease lubrication. If not enclosed, provide Type 316 stainless steel spring.”**
  - iv. Article 2.1.H: Insert the following new Article 2.1.H.1, and renumber subsequent Articles accordingly.  
**“1. Platform: Minimum 8 feet by 10 feet. Provide a minimum clear distance of 2 feet around the turntable base.”**
  - v. Article 2.1.H.3: Append the following sentence to this Article.  
**“Manufacturer to provide mounting points on the new bridges for the spray piping and nozzles.”**

### III. ON THE DRAWINGS

#### A. DRAWING G-1 – INDEX OF SHEETS AND GENERAL NOTES

1. In the Index of Sheets:
  - i. Sheet No. G-2 (LOCATION MAPS AND SITE PLANS): Insert the Roman numeral **I** at the end of the sheet title.
  - ii. Insert the following sheets.  
**G-3 LOCATION MAPS AND SITE PLANS II**  
**M-1 MECHANICAL LEGEND SHEET**  
**M-2 TRUSSVILLE WRF INFLUENT PUMP STATION DEMOLITION PLAN AND SECTION**

**M-3 TRUSSVILLE WRF INFLUENT PUMP STATION MODIFICATION PLAN AND SECTION**

- 2. Note 6 under General Requirements: Delete the first sentence in its entirety, and insert the following sentence in its place.

**“BECAUSE THE TURKEY CREEK AND TRUSSVILLE WRFs ARE OPERATING WASTEWATER TREATMENT PLANTS WITH SURFACE WATER DISCHARGE PERMITS, MAINTAINING COMPLIANCE WITH PERMIT REQUIREMENTS DURING CONSTRUCTION IS OF THE HIGHEST IMPORTANCE TO THE OWNER.”**

- 3. Note 16 under Regulatory Compliance, Health and Safety, Site Security, and Damage Control: After the FIRM panel information for the AI Seier Pump Station, insert the following:

**“-- TRUSSVILLE WRF (SEE ADDRESS ON SHEET G-3): PANEL 01073C0426J REVISED 09/24/2021”**

**B. DRAWING G-3 – LOCATION MAPS AND SITE PLANS II**

- 1. Insert this new sheet. See Attachment J.

**C. DRAWING M-1 – MECHANICAL LEGEND SHEET**

- 1. Insert this new sheet. See Attachment K.

**D. DRAWING M-2 - TRUSSVILLE WRF INFLUENT PUMP STATION DEMOLITION PLAN AND SECTION**

- 1. Insert this new sheet. See Attachment L.

**E. DRAWING M-3 – TRUSSVILLE WRF INFLUENT PUMP STATION MODIFICATION PLAN AND SECTION**

- 1. Insert this new sheet. See Attachment M.

**IV. REQUESTS FOR INFORMATION AND RESPONSES (Not to be included within the Contract Documents)**

No.	Question	Response
8	464331 - 2.1.C.7 - The slope shown in the existing drawings is 5/16:12. The specification states 1/4:12. Please confirm.	Article 2.1.C.7 has been revised in this Addendum.
9	464331 - 2.1 .D. 1 .c - Please delete “in either forward or reverse direction” as our drives are not intended to operate in the reverse and cannot meet this requirement.	Article 2.1.D.1.c has been revised in this Addendum.
10	464331 - 2.1 .E. 1 .e - The spec implies a truss supported header. Would tie bar supports for the header be acceptable? This is the support design used in the existing tanks.	Tie bar supports are acceptable. Article 2.1.E.1.e has been revised in this Addendum.

No.	Question	Response
11	464331 - 2.1 .F.5.d - The spec calls for a cast bronze worm gear. This would require a high torqued drive from what is specified. Is a like for like drive to the existing units acceptable? This would have a worm gear of ductile iron ASTM A536.	A ductile iron worm gear is acceptable. Article 2.1.F.5.d has been revised in this Addendum.
12	464331 - 2.1 .F.7.C.3 - The existing drives have a 20-year life rating. Is a like for like drive acceptable?	Article 2.1.F.7.c.3 has been revised in this Addendum.
13	464331 - 2.1 .G. 1 - The existing units have skimmer arms that are perpendicular to the well. Would this be acceptable?	Perpendicular skimmer arms are acceptable. Article 2.1.G.1 has been revised in this Addendum.
14	464331 - 2.1 .G. 1 .j - Are neoprene wipers for the skimmer wiper blades acceptable?	Neoprene wipers are acceptable. Article 2.1.G.1.j has been revised in this Addendum.
15	464331 - 2.1 .G. 1 .j. 1 - Would either [hot dipped galvanized] carbon steel or stainless-steel backing plates be acceptable?	Stainless steel backing plates are acceptable. Article 2.1.G.1.j.1 has been revised in this Addendum.
16	464331 - 2.1 .G. 1.1 - Please provide additional information to point to which part of the mechanism this is referring to. We believe this to be referring to the attachment point between the skimmer blade and the support arm that extends from the influent well. If so, these coils are not enclosed. Would this be acceptable?	Article 2.1.G.1.L has been revised in this Addendum.
17	464331 - 2.1.G.3 - What type of cleaning assemblies are being removed and reinstalled? Our team would like to know so we can properly account for any additional weight on the mechanism.	The originally specified cleaning assemblies are the Algae Sweep Automation™ (ASA) system by the Ford Hall Company, Inc.
18	464331 - 2.1.H.1 - The existing units have 8'x10' platforms with a 2' clearance around the drive. Would this be acceptable?	The existing platform dimensions and clearance are acceptable. Article 2.1.H has been modified in this Addendum.
19	464331 - 2.1.H.3 - Does the clarifier manufacturer need to provide new mounting materials for the spray nozzles?	Yes. This requirement has been added to Article 2.1.H.3 in this Addendum.
20	464331 - 2.1.1 - Would Evoqua's FEDWA baffle arrangement style EDI design be acceptable?	Yes, the proposed EDI design is acceptable.
21	464331 - 3.3.E.5 - Please confirm which, if any, of the required trips and days are per clarifier or total for all four (4) clarifiers. We typically see (2) trips (3) days per clarifier for our jobs for reference, so we want to make sure we are accounting correctly.	This Article is intended to define requirements for all four clarifiers. Where noted, time onsite is defined as per trip or per mechanism.

No.	Question	Response
22	Regarding the electrical scope for the work at Turkey Creek there are no specifications about this. Would it be possible to have a electrical scope of work defined so that parameters are set to price the work from. We are assuming that for each clarifier that the existing conduit and wire needs to be removed from the drive assemblies and reinstalled once the new mechanisms are in place. What type of conduit will be required on the reinstallation? Aluminum, coated, stainless, etc. Please let me know if it would be possible to have an electrical scope defined or if the above assumptions would be acceptable.	Section 464331 has been clarified in this Addendum. See also new Section 260510 attached to this Addendum.
23	Is there any potential for the bid date to be postponed for this project?	See revisions to the bidding schedule in this Addendum.

**V. FOR INFORMATION ONLY (Not to be included within the Contract Documents)**

- A. Attachment A: List of Plan Holders. Access the most up-to-date list from the bid information page by clicking the “View Plan Holders” link in the left sidebar of the window.
- B. The virtual bidding page on QuestCDN will be republished shortly after the release of this Addendum and will be reopened to Prime Bidders to fill out the bid proposal form online, download required forms, upload the completed forms, and submit their bids. Be aware that any changes to the bidding forms made in a future Addendum may cause the bidding site to discard Bidders’ previously entered information as well as submitted bids. Bidders are encouraged to check carefully to make sure their bid is complete before submitting it.
- C. Notice to Bidders: The bid opening date has been changed in this Addendum. Also note the new deadline for submittal of questions.**
- D. Those who have previously received an invitation to the October 22, 2025 virtual bid opening will receive notification that the meeting has been moved to October 29, 2025. If you have not yet requested an invitation to the bid opening, send your request to Caroline Carden ([cardencd@cdmsmith.com](mailto:cardencd@cdmsmith.com)). The invitation will contain a Microsoft Teams link and a toll-free telephone number for those unable to join via Teams.
- E. Site visits may be conducted prior to the new bid opening date. Refer to Section 00101 (Instructions to Bidders) for instructions.
- F. The final Addendum will be issued no later than Friday, October 24, 2025.


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Plan Holder Report as of 10/16/2025 03:54 PM CDT  
 2026 Turkey Creek WRF and Al Seier PS Improvements

**Quest eBidDoc™ Number: 9826412**

**Closing Date:** Wed, 10/22/2025 02:00 PM CDT **Posting Type:** Construction Project **Owner Name:** Jefferson County, AL - Environmental Serv (Hazen) **Solicitor Name:** CDM Smith - Atlanta **Contact:** Caroline Carden **Phone:** 404-720-1353 **Email:** cardencd@cdmsmith.com

<a href="#">Company Name &amp; Address</a>	<a href="#">Contact Name/Email Address</a>	<a href="#">Phone/Fax</a>	<a href="#">Bus. Cert</a>	<a href="#">Bus. Desig</a>	<a href="#">Entry Date</a>	<a href="#">Doc Type</a>	<a href="#">Comments</a>
Video Industrial Services, Inc. 7721 2ND AVE N, BIRMINGHAM, AL-35206	Drew Mahan dmahan@videoindustrial.com	205-798-0300 205-798-6211		Subcontractor	09/17/2025	eBidDoc	
P F Moon and Company Inc 2207 GA Hwy 103, West Point, GA-31833	Jeannie Cole jcole@pfmoon.com	706-643-1524 706-645-1511		Prime Bidder	09/19/2025	eBidDoc	
The TDH Company 3225 Shallowford Road, Suite 410, Marietta, GA-30062	Allison Kulp akulp@tdhco.com	770-509-1808 770-509-1808	WBE	Supplier	09/22/2025	eBidDoc	
ConstructConnect 3825 Edwards Rd, Cincinnati, OH-45209	Eric Mills content@constructconnect.com	800-364-2059 866-570-8187		Plan Room	09/24/2025	eBidDoc	
Vortex Services, LLC. 300 East Coffee Street, Greenville, SC-29601	Jennifer Joiner bids@vortexcompanies.com	7137509081		Unknown	09/24/2025	eBidDoc	
Templeton & Associates 4324 Brogdon Exchange, Suwanee, GA-30024	Timothy Boyne tim@templeton-associates.com	770-614-8550	SBE	Supplier	09/24/2025	eBidDoc	
Heyward 3590 Habersham at Northlake, Building O, Tucker, GA-30084	Michael Holt Michael.holt@heywardatlanta.com	4042138734		Supplier	09/24/2025	eBidDoc	
Mark Johnson Construction, LLC 4200 Joe Mallisham Pkwy, Tuscaloosa, AL-35401	Mark Johnson julia@mjohnsonconstruction.com	205-752-1978		Prime Bidder	09/25/2025	eBidDoc	
Gulf Coast Underground, LLC 5655 Middle Rd, Theodore, AL-36582	Denise Wilson dwilson@gulfcoastunderground.com	251-725-0200 866-471-2753		Unknown	10/06/2025	eBidDoc	
Haren Construction Company, Inc. 1715 Highway 411 North, Etowah, TN-37331	Cindy Osborne cosborne@harenconstruction.com	423-263-5561 423-263-5573		Prime Bidder	10/08/2025	eBidDoc	

<p>D. Electrical Engineer:</p> <ol style="list-style-type: none"><li>1. Spencer J. Perry, Jr.</li><li>2. License 32229.</li><li>3. Responsible for Division 26.</li></ol>	 <p>The seal is circular with a double-line border. The outer ring contains the text 'ALABAMA REGISTERED' at the top and 'ENGINEER J.R.' at the bottom. The inner ring contains 'PROFESSIONAL' at the top and 'SPENCER J. PERRY, JR.' at the bottom. In the center, it reads 'No. 32229'. At the bottom of the seal, there is a digital signature and timestamp: 'Spencer J. Perry', 'ALABAMA 32229', and '2025.10.18 14:43:04-04'00''.</p>
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This item has been digitally signed and sealed by the above listed Design Professional on the date adjacent to the seal. Printed copies of this document are not considered signed and sealed, and the signature must be verified on any electronic copies.

END OF DOCUMENT 000107

**IMPORTANT NOTE:**

This form will be provided to Bidders through the QuestCDN online bidding system. Bidders will download the form from QuestCDN and upload the completed form to QuestCDN.

73998-270907  
October 2025

**SECTION 00300  
BID PROPOSAL**

DATE: \_\_\_\_/\_\_\_\_/\_\_\_\_

TO: The Commission of  
Jefferson County  
Birmingham, Alabama

Commissioners:

In response to your request the undersigned Bidder submits this Bid Proposal for the **2026 TURKEY CREEK WRF AND AL SEIER PS IMPROVEMENTS – PROJECT NO. E2613** as described and specified in the Drawings and Specifications:

1. Bidder proposes and agrees, in the event this Bid Proposal be accepted, to enter into a Contract with the above named Commission (herein designated and referred to as the Owner), in the form herein specified, to furnish all materials, equipment, machinery, tools, means of transportation, power and fuel, and to perform all labor necessary for or incidental to the construction of the aforementioned improvements, all in complete accordance with the requirements of the Contract Documents, to the entire satisfaction of the Owner, at the unit and lump sum prices we have inserted opposite each item of work listed in the accompanying Bid Proposal Form, which is an integral part of this Bid Proposal.
2. In submitting this Bid Proposal, the Bidder understands and agrees that a Contract may be awarded for the Work as may appear to the interest of the Owner; that the quantities as stated are approximate only; that no claim shall be made against the Owner on account of any excess or deficiency, either absolute or relative, therein; that the estimated quantities will be used as a basis for canvassing and evaluating Bid Proposals and for determining the estimated amount of the Contract; and that, within the limits of available funds, the Owner reserves the right to increase or decrease the estimated quantities by such amounts as may be necessary to complete the Work, provided, however, that the stated unit prices shall remain firm and unchanged.
3. Bidder hereby declares that the only person or persons interested in this Bid Proposal as principal or principals is, or are, named herein and that no other person than herein mentioned has any interest in this Bid Proposal or in the Contract to be entered into, that this Bid Proposal is made without connection with any other person, company, or parties making Bid Proposal, and that this Bid Proposal is in all respects fair and made in good faith without collusion or fraud.

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4. Bidder further declares that he has examined the site of the Work and the building and labor conditions and has informed himself fully in regard to all conditions pertaining to the place where the Work is to be done; that he has examined the Drawings and these Specifications for the Work and other Contract Documents relating thereto and has read all Special Conditions furnished prior to the opening of bids; and that he has satisfied himself relative to the Work to be performed.
5. Bidder further proposes and agrees that, if awarded a Contract for this project, he will commence Work immediately on or before the date stated in a written notice from the Owner to commence Work; that he will furnish all materials, and perform all labor for the completion of the Contract and will complete same, including all accepted alternates thereto, within the time stated in the Special Conditions; and that on his failure to complete the Work within such time he will pay to the Owner for each calendar day that the Work, or any part thereof remains uncompleted beyond such specified time, the amount specified in the Special Conditions; this payment shall be made as liquidated damages.
6. The Bidder further declares that accompanying this Bid Proposal is a satisfactory Bid Bond in the sum of five percent (5%) of this Bid Proposal, not to exceed \$10,000.00 and it is hereby agreed that in case of the withdrawal of this Bid Proposal without the consent of the Owner within sixty (60) days after the Bid opening, or that in case of failure on the part of the undersigned to execute the Contract as aforesaid and to deliver same and the required security for the faithful performance of the Contract (executed in the form annexed hereto), to said Owner within ten days from the date a notice of acceptance of this Bid Proposal is given to the undersigned personally, or by mail to the address as herein stated, then the undersigned Bidder will be deemed to have abandoned the Contract, and thereupon the amount of such bond shall be absolutely due and payable thereunder to the Owner.
7. The Bidder further declares his understanding that the Bid Proposal contains an Owner's Contingency. Any unused balance of the Owner's Contingency shall revert back to the Owner upon completion of the Project.
8. The Bidder certifies that prices bid shall be firm for a period of 60 days from the date of the Bid Proposal.
9. The Bidder further declares his understanding that the Bid Proposal may contain quantities for Bid Items that exceed the quantities identified in the Contract Documents. If applicable, the quantities that are not shown in the Contract Documents may be identified by the Owner and/or Engineer and, if so identified, will be completed in this Contract.

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**IMPORTANT NOTE:**

This form will be provided to Bidders through the QuestCDN online bidding system. Bidders will download the form from QuestCDN and upload the completed form to QuestCDN.

73998-270907  
October 2025

\_\_\_\_\_  
Individual or Firm Name of Bidder

Bidder's Address \_\_\_\_\_

Bidder's Telephone Number (include area code): \_\_\_\_\_

Bidder's Email Address: \_\_\_\_\_

Bidder's State of Alabama License Number: \_\_\_\_\_

Licensed to be awarded Contracts not exceeding: \_\_\_\_\_

Note: If the Bidder is a corporation, give the following information:

State in which incorporated: \_\_\_\_\_

Address of Principal Office: \_\_\_\_\_

The Contractor is advised that TIME IS OF THE ESSENCE on this project. The Contract Time for this project is **five hundred seventy (570)** consecutive calendar days. The first two hundred seventy (270) days will be an Administrative Period followed by a three hundred (300)-day Construction Period from the effective date of the written Notice to Proceed to achieve Final Acceptance. If mutually agreed upon between the Owner and Contractor, the Construction Period may commence prior to the end of the Administrative Period. Upon such agreement, the contract end date will be modified based on the date of termination of the Administrative Period. LIQUIDATED DAMAGES WILL BE ASSESSED IF THE CONTRACT TIME IS EXCEEDED. The Contractor may apply for an extension of time in accordance with provisions of the Contract and these Specifications; however, such an extension of time must be approved PRIOR to the Contract completion date to avoid the imposition of liquidated damages. The Contractor is referred to Section 01015 – Prosecution and Progress and to the Special Conditions.

Bidder has examined the following addenda, and receipt of them is acknowledged:

No. _____	Dated _____	No. _____	Dated _____
No. _____	Dated _____	No. _____	Dated _____
No. _____	Dated _____	No. _____	Dated _____
No. _____	Dated _____	No. _____	Dated _____

Signature of Bidder: \_\_\_\_\_

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## BID PROPOSAL FORM

### 2026 TURKEY CREEK WRF AND AL SEIER PS IMPROVEMENTS – PROJECT NO. E2613

All Bid Items shall include costs for furnishing to Owner all materials, equipment, and supplies and for all costs incurred in completing the Work, including installation of all materials, equipment, and supplies furnished, complete in-place and ready for continuous service, and all other labor, permit fees, taxes, insurance, miscellaneous costs, overhead, and profit.

#### PART 1 – BASE BID

Item No.	Item Description	Est. Qty.	Units	Unit Price in Figures	Total Price in Figures
A	Mobilization and Demobilization (Not to Exceed 5% of the Grand Total of Bid; See Specification Section 01505)	LS	LS	\$ _____	\$ _____
B	Enlargement of Existing Hatch in Top Slab of Al Seier Pump Station Wet Well and Installation of Platform Above Wet Well Slab as Shown On Structural Drawings	LS	LS	\$ _____	\$ _____
C	Continuous Ventilation for the Al Seier Pump Station Wet Well (See Specification Section 013513.24)	LS	LS	\$ _____	\$ _____
D	Replacement of the Clarifier Mechanisms in the Process Clarifiers at the Turkey Creek WRF	LS	LS	\$ _____	\$ _____
E	Repair of Grout Floor at the Turkey Creek WRF Process Clarifiers (See Specification Sections 030130.71 and 036000)	60	CY	\$ _____ per CY	\$ _____
F	Modifications to the Influent Pump Station Discharge Header at the Trussville WRF as Shown on Process Mechanical Drawings	LS	LS	\$ _____	\$ _____

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Item No.	Item Description	Est. Qty.	Units	Unit Price in Figures	Total Price in Figures
G	Bonds and Insurance	LS	LS	\$ _____	\$ _____
H	Owner's Contingency	N/A	N/A	N/A	\$225,000.00

TOTAL, PART 1 – BASE BID (Items A through H) PRICE \$ \_\_\_\_\_

Amount of PART 1 – BASE BID shall be shown in figures. In the event of a discrepancy between the unit price bid and the extension, the unit price will be deemed intended by the bidder and the extension shall be adjusted. In the event of a discrepancy between the sum of the extended amounts and the bid total, the sum of the extended amounts shall govern.

The Owner's contingency is an allowance for unforeseen conditions and Owner initiated additional work. These contingency dollars are only available through change orders approved by the Owner. Unused Owner's contingency dollars revert back to the Owner at the end of the project.

In the event of a discrepancy between the unit price bid and the extended total amount, the unit price will be deemed intended by the bidder and the extended total amount shall be adjusted. In the event of a discrepancy between the sum of the extended amounts and the Grand Total of Bid, the sum of the extended amounts shall govern.

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**PART 2 – ALLOWANCE ITEMS**

The Bidder shall include in the Total Bid the lump sum allowances specified below. Payment for items of allowance shall be made in accordance with Section 01028, Change Order Procedures and Section 01025, Measurement and Payment. Any unused balance of the allowances shall revert to Owner upon completion of the project.

<b>Item No.</b>	<b>Item Description</b>	<b>Estimated Quantity</b>	<b>Unit Price in Figures</b>	<b>Total Price in Figures</b>
1	Allowance for structural repairs to the Process Clarifiers at the Turkey Creek WRF (See Specification Section 013513.24)	As determined by the Engineer	\$310,000.00	\$310,000.00
2	Allowance for chemical application or bypass pumping alternatives to mitigate gases in the Al Seier Pump Station wet well (See Specification Section 015728)	As determined by the Engineer	\$325,000.00	\$325,000.00
3	Allowance for tariffs on imported goods	As determined by the Engineer	\$100,000.00	\$100,000.00

**TOTAL, PART 2 – ALLOWANCE ITEMS (Items 1 through 3) \$735,000.00**

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PART 3 – BID SUMMARY

ALL WORK SHOWN AND SPECIFIED IN THE CONTRACT DOCUMENTS	
TOTAL PART 1 (BASE BID)	\$ _____
TOTAL PART 2 (ALLOWANCE ITEMS)	\$ <u>735,000.00</u>
TOTAL BID (in numbers)	\$ _____

Amount of PART 3 – BID SUMMARY shall be shown in figures. In the event of a discrepancy between the sum of the extended amounts and the bid total, the sum of the extended amounts shall govern.

- END OF SECTION -

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## SECTION 260510 – LIMITED ELECTRICAL FOR SMALL PROJECTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section Includes:

1. Copper power and control wire rated 600V or less.
2. Industrial Ethernet cable.
3. Connectors, splices, and terminations.
4. Grounding and bonding components.
5. Support systems for raceways, boxes, and electrical equipment.
6. Metal conduits and fittings.
7. Nonmetallic conduit and fittings.
8. Boxes, enclosures, and cabinets.
9. Handholes and boxes for exterior underground cabling.
10. Identification requirements.

#### 1.3 DEFINITIONS

- A. ARC: Aluminum rigid conduit. See also RAC.
- B. Direct Buried: Duct or a duct bank that is buried in the ground, without any additional casing materials such as concrete.
- C. Duct: A single duct or multiple ducts. Duct may be installed singly or as a component of a duct bank.
- D. Duct Bank:
  1. Two or more ducts installed in parallel, with or without additional casing materials.
  2. Multiple duct banks.
- E. EMI: Electromagnetic interference.
- F. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50V or for remote-control and signaling power-limited circuits.
- G. RAC: Rigid aluminum conduit. See also ARC.
- H. RoHS: Restriction of Hazardous Substances.

- I. Trafficways: Locations where vehicular or pedestrian traffic is a normal course of events.
- J. National Electrical Code (NEC) / NFPA conduit types:
  - 1. RMC – rigid metal conduit
  - 2. FMC – flexible metal conduit
  - 3. LFMC – liquidtight flexible metal conduit
  - 4. PVC – rigid polyvinyl chloride conduit
  - 5. LFNC – liquidtight flexible nonmetallic conduit
  - 6. RNC – rigid nonmetallic conduit
  - 7. EMT – Electrical metallic tubing

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product used on this project.
- B. Shop Drawings:
  - 1. Precast Handholes: Include plans, elevations, sections, and details.
- C. Installation Working Drawings: For underground conduit routing.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

### PART 2 - PRODUCTS

#### 2.1 ELECTRICAL MATERIALS

- A. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with associated UL Standards as applicable and listed in this specification.

#### 2.2 WIRE

- 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:
  - 1. Alpha Wire Company.
  - 2. Encore Wire Corporations.
  - 3. General Cable Technologies Corporation.
  - 4. Okonite Company (The).
  - 5. Service Wire Co.
  - 6. Southwire Company.

- B. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V.
- C. Standards:
  - 1. RoHS compliant.
  - 2. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."
- D. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.
- E. Size: Minimum No. 12 AWG for power circuits, minimum No. 14 AWG for control circuits.
- F. Stranding: Refer to Part 3 "Conductor Applications" Article.
- G. Conductor Insulation: Refer to Part 3 "Conductor Applications" Article.
  - 1. Type RHW-2: Comply with UL 44.
  - 2. Type TC-ER: Comply with NEMA WC 70/ICEA S-95-658 and UL 1277.
  - 3. Type XHHW-2: Comply with UL 44.

### 2.3 INDUSTRIAL ETHERNET CABLE

- 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:
  - 1. Rockwell Automation 1585-C8HB-S.
- B. Description: Four-pair, balanced-twisted pair cable, certified to meet transmission characteristics of Category 5e cable at frequencies up to 100 MHz *Ethernet/IP* compliant.
- C. Standard: UL, UL PLTC, UL AWM 2570 80C 600V, TIA 568B.
- D. Conductors: 100-ohm, No. 22 AWG solid copper.
- E. Shielding/Screening: Overall foil shield.
- F. Cable Rating: 600V.
- G. Jacket: PVC.

### 2.4 CONNECTORS, SPLICES, AND TERMINATIONS

- 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:
  - 1. 3M Electrical Products.
  - 2. Ideal Industries, Inc.
  - 3. TE Connectivity Ltd.

4. Thomas & Betts Corporation; A Member of the ABB Group.
- B. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- C. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.
  1. Material: Tin-plated copper.
  2. Type:
    - a. Locking spade with insulated sleeve for No. 10 AWG and smaller.
    - b. One hole with long barrels for No. 8 AWG to No. 4/0 AWG.
    - c. Two holes with long barrels for 250 kcmil and larger.
  3. Termination: Compression for No. 8 AWG and larger.
- D. Connectors:
  1. Solderless pressure type (wirenuts) for No. 10 AWG and smaller.
  2. Pre-filled with silicone-based sealant for exterior, wet, or corrosive locations.
  3. Split bolt type for No. 8 AWG and larger splices.
- E. Motor Terminations: Mechanical compression ring type, secured with bolt, nut, and spring washer. Insulated with Raychem type RVC, roll-on stub insulator or equal.
- F. Industrial Ethernet Cable Terminations: Match conductor count, RJ45 type, intended for shielded cable. Rockwell Automation Bulletin 1585J or equal.

## 2.5 GROUNDING AND BONDING MATERIALS

- 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:
  1. ERICO; a brand of nVent.
  2. Hubbell Incorporated (Construction and Energy Group).
  3. O-Z/Gedney; a brand of Emerson Industrial Automation.
  4. Thomas & Betts Corporation; A Member of the ABB Group.
- B. Standard: Comply with UL 467 for grounding and bonding materials and equipment.
- C. Grounding Conductors:
  1. Insulated conductors to match corresponding 600V phase conductor insulation requirements.
  2. Bare copper conductors: tin-plated.
- D. Ground rods: Copper-clad steel, sectional type; 3/4-inch diameter by 10-foot; minimum copper thickness 0.25 mm (10 mil).

- E. Grounding conduit hubs: Malleable iron type, mechanical type, terminal with threaded hub, sized for the associated conduit.
- F. Waterpipe ground clamps: cast bronze saddle type, sized for the associated water pipe.
- G. Exothermic weld: CADWELD process, or equal. Molds and powder furnished by same manufacturer and selected for specific combination of conductors and connected items. Use low emission type, CADWELD EXOLON or equal for welds used indoors in occupied buildings or confined spaces.

## 2.6 SUPPORT SYSTEMS

### A. Aluminum Channel:

- 1. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
- 2. Channel Material: 6063-T5 aluminum alloy.
- 3. Fittings and Accessories Material: 5052-H32 aluminum alloy.

### B. Stainless Steel Channel:

- 1. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
- 2. Material for Channel, Fittings, and Accessories: Stainless steel, Type 316.

### C. Accessories: conduit clamps, straps, hangers, rods, backplates, anchors, nuts, washers, etc. shall match channel material as listed in the SUPPORT MATERIALS APPLICATION Article.

### D. Threaded rod: 3/8-inch minimum diameter.

### E. Expansion anchors: 3/8-inch minimum diameter.

## 2.7 METAL CONDUITS AND FITTINGS

### A. Rigid Aluminum Conduit: Comply with ANSI C80.5 and UL 6A.

### B. LFMC: Sealtite®, Type UA, continuously interlocked flexible steel conduit with sunlight and chemical resistant PVC jacket and complying with UL 360.

### C. Metallic Fittings: Comply with NEMA FB 1 and UL 514B.

- 1. Use cast aluminum fittings with RAC.
- 2. Use 316 stainless steel, three-piece screw in type with LMFC.
- 3. Use Myers Electric Products, Inc. or equal, grounding type for conduit hubs.

## 2.8 NONMETALLIC CONDUIT AND FITTINGS

### A. RNC: Schedule 40 or Schedule 80 PVC based on application; comply with NEMA TC 2 and UL 651.

- B. LFNC-B: Comply with UL 1660, Type B.
- C. Nonmetallic Fittings:
  - 1. RNC: Comply with NEMA TC 3; match conduit type and material.
  - 2. LFNC: Comply with UL 514B; dust-tight, liquid-tight, chemical resistant thermoplastic/nylon construction with tapered thread hub and neoprene O-ring gasket. Push-on fittings are prohibited.
- D. Solvents and Adhesives: As recommended by conduit manufacturer.

## 2.9 BOXES, ENCLOSURES, AND CABINETS

- A. Sheet Metal Outlet and Device Boxes: Pressed steel. Comply with NEMA OS 1 and UL 514A.
- B. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, aluminum, Type FD, with gasketed cover.
- C. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.
- D. NEMA 1 and NEMA 12 Pull and Junction Boxes:
  - 1. Material: aluminum, minimum 14 gauge, without knockouts.
  - 2. Construction: flanged box, galvanized with continuous weld seams that are ground smooth.
  - 3. Cover: Gasketed, hanged, fastened with quick connect door clamp.
- E. NEMA 4X Pull and Junction Boxes:
  - 1. Material: Type 316 stainless steel, minimum 14 gauge, without knockouts.
  - 2. Construction: flanged box, continuous weld seams that are ground smooth.
  - 3. Cover: Gasketed, hanged, fastened with quick connect door clamp.
- F. NEMA 4X Chemical Area Pull and Junction Boxes: When Drawings classify the area as CORROSIVE, ultraviolet resistant fiberglass reinforced plastic (FRP) with 316 stainless steel hardware and gasketed covers.
- G. NEMA 7/4 Pull and Junction Boxes: When Drawings classify the area for Class 1, Division 1, Group D hazardous area, cast aluminum with stainless steel bolts; Type EJB-N4 as manufactured by Crouse Hinds or equal.
- H. Handholes and Boxes for Exterior Underground Cabling: Comply with details as indicated on the Drawings.

## 2.10 IDENTIFICATION

- A. Factory applied insulation color for No. 8 AWG conductors and smaller. Factory applied insulation color or field applied colored electrical tape for No. 6 AWG conductors and larger:
  - 1. Color for 208/120V Circuits:

- a. Phase A: Black.
  - b. Phase B: Red.
  - c. Phase C: Blue.
  - d. Neutral: White.
2. Color for 240/120V Circuits (Single Phase):
    - a. Phase A: Black.
    - b. Phase B: Red.
    - c. Neutral: White.
  3. Color for 240 $\Delta$ /120V Circuits (Three Phase, Four Wire, high leg, center tap):
    - a. Phase A: Black.
    - b. Phase B: Orange (high leg).
    - c. Phase C: Blue.  
Neutral: White.
  4. Color for 480/277V Circuits:
    - a. Phase A: Brown.
    - b. Phase B: Orange.
    - c. Phase C: Yellow.
    - d. Neutral: Gray.
  5. Color for Equipment Grounds: Green.
  6. Color of Individual Control Conductors:
    - a. AC: Red.
    - b. DC: Blue.
- B. Nameplates and Labels:
1. Equipment Identification and Source Nameplates:
    - a. Black letters on a white field.
    - b. Engraved, laminated plastic, 3/16-inch-high lettering.
    - c. Provide for all electrical equipment. Match Drawing designation.
    - d. Include power source information, i.e., "FED FROM MCC-2" or provide separate nameplate.
  2. Device Identification Labels:
    - a. Black letters on a white field.
    - b. Machine generated, self-adhesive, 1/4-inch-high lettering.
    - c. Provide for all receptacles, wall switching, lighting fixtures, photocells, exit lights, instruments, etc.
    - d. Include power source and branch circuit information, i.e., "LP-2/15" indicates panelboard LP-2, branch circuit 15.
  3. Wire and Cable Labels:

- a. Black letters on a white field.
  - b. Wraparound or sleeve type.
- C. Detectable Underground-Line Warning Tape:
- 1. Foil-backed, detectable buried utility tape with black lettering on a bright background.
  - 2. Width: 6 inches.
  - 3. Overall Thickness: 5 mils.
  - 4. Background Color / Description:
    - a. Red / Electric: electrical power, control, or instrumentation.
    - b. Orange / Fiber: fiber optic cables.

## PART 3 - EXECUTION

### 3.1 GENERAL

- A. Comply with the applicable National Electrical Contractors Association (NECA) documents for installation requirements except where requirement on Drawings or in this specification are stricter.
- 1. NECA 1: Standard for Good Workmanship in Electrical Construction.
  - 2. NECA 102: Standard for Installing Aluminum Rigid Metal Conduit.
  - 3. NECA 111: Standard for Installing Nonmetallic Raceways.
  - 4. NECA 331: Standard for Installing Building and Service Entrance Grounding and Bonding.
  - 5. NECA / NEMA 605: Recommended Practice for Installing Underground Nonmetallic Utility Duct.

### 3.2 CONDUCTOR APPLICATIONS

- A. Wires and Cables: Copper, stranded, except for lighting and receptacle wiring which may be solid.
- B. Wire for lighting, receptacles, and other circuits not exceeding 150 volts to ground shall be NEC type XHHW-2.
- C. Wire for power circuits over 150 volts to ground shall be NEC type XHHW-2 for sizes No. 4/0 AWG and smaller and shall be NEC type RHW-2 for sizes 250 kcmil and larger.
- D. Equipment grounding conductors shall be the same NEC type as the phase conductors described previously, green and sized per NEC Table 250.122.
- E. Bare copper ground wire shall be stranded, tinned soft drawn annealed copper wire.
- F. Ground grid conductors shall be uninsulated unless shown otherwise on the Drawings.
- G. Wire for control, status, and alarm shall be NEC type XHHW-2.

- H. Multi-conductor power cable shall be stranded, 600V, cross-linked polyethylene insulated with PVC jacket, Type TC (XLP) with ground.
- I. Multi-conductor control cable shall be NEC type TC (tray cable), stranded, No. 14 AWG, XHHW-2 600V insulated color coded conductors, bare stranded ground wire, with overall PVC cable jacket.

### 3.3 CONDUCTOR INSTALLATION

- A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
- B. Complete raceway installation between conductor and cable termination points prior to pulling conductors and cables.
- C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway. Use of steel fish tapes and/or steel pulling cables in PVC conduit or raceways that terminate into energized enclosures is prohibited.
- E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members and follow surface contours where possible.
- F. Adequately support cables.
- G. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- H. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors. Do not splice service or feeder cables without prior written approval of Engineer. Ethernet cables may not be spliced and shall be continuous from terminal to terminal.
- I. Wiring at Outlets:
  - 1. Install conductor at each outlet, with at least 6 inches of slack.
  - 2. Form solid wire into loop to fit around device terminal screw. Do not overlap wire.
- J. Identify and color-code conductors and cables.
- K. Identify each spare conductor at each end with identity number and location of other end of conductor and identify as spare conductor.
- L. Identify circuit number associated with lights, receptacles, and other miscellaneous loads to panelboards. Identify phase and neutral conductors with circuit number.
- M. Install Ethernet cabling in separate raceway from control or power wiring.

N. Separation from EMI Sources:

1. Separation between open cables in non-metallic or non-ferrous raceways and unshielded power conductors and electrical equipment shall be as follows:
  - a. Equipment or circuits rated less than 2 kVA: Minimum 5 inches.
  - b. Equipment or circuits rated between 2 and 5 kVA: Minimum 12 inches.
  - c. Equipment or circuits rated more than 5 kVA: Minimum 24 inches.

3.4 GROUNDING

- A. Comply with NEC Article 250.
- B. Install insulated green equipment grounding conductor in all power and control raceways.
- C. Install grounding conductors in conduit or sleeves when passing through floor slabs.
- D. Use exothermic welding process for all underground connections, connections to structural steel, connections to ground rods, or other connections which will become inaccessible at project completion.

3.5 SUPPORT MATERIALS APPLICATION

- A. Dry, indoor, conditioned, non-process space: aluminum.
- B. Outdoor, process areas, or areas shown on the drawings as “DUST”, “DAMP”, or “WET”: Aluminum and/or stainless-steel channel, depending upon load requirements.
- C. Areas shown on the drawings as “CORROSIVE”: aluminum.

3.6 RACEWAY APPLICATIONS

- A. Refer to Appendix Table 260510-1 for specific raceway application requirements.
- B. Minimum Raceway Size: 3/4-inch trade size.

3.7 BOX APPLICATIONS

- A. All boxes shall be metallic unless specified herein or indicated on the Drawings.
- B. Use stainless steel or aluminum for boxes and conduit fittings for exposed switch, receptacle, and lighting outlets.
- C. Use pressed aluminum boxes for concealed switch, receptacles, and lighting outlets.
- D. Pull boxes, junction boxes, cabinets, etc. shall be suitable for the location and conform to the NEMA enclosure rating and material descriptions as indicated on the Drawings.

- E. Where no size is indicated for junction boxes, pull boxes, or terminal cabinets, size in accordance with NEC Article 314.

### 3.8 RACEWAY INSTALLATIONS

- A. Complete raceway installation before starting conductor installation.
- B. Tightly plug ends of conduits during construction to exclude dust and moisture.
- C. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- D. Arrange conduit system to allow liquids such as water, condensation, etc. will drain away from equipment served. If conduit drainage is not possible, plug conduits using conduit seals.
- E. Install no more than the equivalent of three 90-degree bends in any conduit run. Support within 12 inches of changes in direction.
- F. Make bends in raceway using large-radius preformed ells. Field bending shall be according to NFPA 70 minimum radii requirements. Use only equipment specifically designed for material and size involved.
- G. Support conduit within 12 inches of enclosures to which attached.
- H. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- I. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
- J. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits. Install Meyers grounding type hubs when conduits terminate at gasketed enclosures.
- K. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- L. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- M. Cut conduit perpendicular to the length. For conduits 2-inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
- N. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- O. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a

blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70.

- P. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways using “Duxseal” or seal fitting at the following points:
1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
  2. Where an underground service raceway enters a building or structure.
  3. Conduit extending from interior to exterior of building.
  4. Conduit extending into pressurized duct and equipment.
  5. Conduit extending into pressurized zones that are automatically controlled to maintain different pressure set points.
  6. Where otherwise required by NFPA 70.
- Q. Comply with manufacturer's written instructions for solvent welding RNC and fittings.
- R. Install expansion joint fittings where necessary to compensate for thermal expansion and contraction.
- S. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches of flexible conduit for equipment subject to vibration, noise transmission or movement; and for transformers and motors.
- T. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.
- U. A maximum continuous run of conduit shall not exceed 300 feet and shall be reduced by 75 feet for each 90-degree elbow.
- V. Provide a 4-inch concrete housekeeping pad at all slab and grade penetrations. Provide a 45 degree, 3/4-inch chamfer at all exposed edges.
- W. Protect metallic finish conduit installed in contact with concrete or below grade with two coats of bitumastic paint, heat shrink tubing, or approved equivalent. Extend protection on riser conduits from 12 inches below slab to 6 inches above slab.
- X. In hazardous locations, seal conduits terminating at boxes enclosing circuit opening equipment at the entrance to the enclosure with approved compound filled sealing fittings to prevent passage of explosive or combustible gases through the conduits. Similarly seal all conduits leading from or entering hazardous locations at points of exit or entrance. Seal exposed conduits passing through hazardous locations at both the entrance to and the exit from the hazardous locations.
- Y. Install conduit sealing and drain fittings in all hazardous (classified) areas designated Class 1, Division 1, and Class 1, Division 2.

### 3.9 UNDERGROUND SYSTEM INSTALLATION

- A. Coordinate final arrangement with other underground utilities, site grading, and surface features.
- B. Comply with Division 31 specifications for earthwork, excavation, trenching, backfill, and compaction.
- C. Raceway Drainage:
  - 1. Drain away from buildings.
  - 2. Drain towards manholes or handholes.
  - 3. Slope raceway not less than 3-inches per 100-feet.
- D. Restoration: Restore surface features and re-establish grade, paving, and vegetation to original unless otherwise indicated.
- E. Underground signal conduits (telecom, and fiber optic) shall be installed in separate raceways from power conduits, with a minimum of 12 inches separation unless noted otherwise. Where power and signal must share a raceway, use a listed composite or divided conduit system to maintain isolation. Crossings shall be minimized and, where required, occur at 90 degrees.
- F. Transition to Metal Conduit:
  - 1. Use fittings manufactured for RNC to metal conduit transition.
  - 2. Make transition from underground duct to metal conduit at least 10 feet outside the building wall, without reducing duct line slope away from building and without forming a trap in the line.
- G. Minimum Cover and Additional Detail: As indicated per details on Drawings.
- H. Where Drawings call for concrete encased duct bank, color concrete red.

### 3.10 ELECTRICAL PENETRATIONS

- A. Provide and place all sleeves for conduits penetrating floors, walls, partitions, etc.
- B. Locate all slots and concealed conduits and stub-ups for electrical work and place and form as required before concrete is poured.
- C. Make weathertight and restore finishes on exterior penetrations.
- D. Use conduit wall seals where underground conduits penetrate walls or at other locations indicated on the Drawings.
- E. Seal openings where conduits pass through walls or floors to prevent passage of flame and smoke. Maintain fire rating of walls.
- F. Patch and paint interior wall penetrations to match original.

### 3.11 IDENTIFICATION INSTALLATION

- A. Self-Adhesive Identification Products: Before applying identification product, prepare and clean attachment surface with manufacturer recommended product to allow for effective bond.
- B. Verify and coordinate identification names and other features.
- C. Nameplate Attachment:
  - 1. Screw mounted for NEMA 1 enclosures.
  - 2. Epoxy or similar waterproof adhesive for all other enclosure types.
- D. Install identification and power source nameplates for electrical equipment. Refer to Part 2 “Identification” Article for requirements.
- E. Install circuit identification labels for cables and conductors at each termination location and within pull boxes and handholes. Refer to PART 2 “Identification” Article for color code and additional requirements.
- F. Install device identification labels for receptacles, light switches, etc. Refer to Part 2 “Identification” Article for requirements.
- G. Install underground warning tape during backfilling of trenches for underground conduits and duct banks in accordance with details on the Drawings.
- H. Panelboard Identification
  - 1. Provide equipment and power source nameplates as previously described.
  - 2. Label branch circuit phase and neutral wires with associated pole number.
  - 3. Install typed as built circuit directory giving location and nature of load served.

### 3.12 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections for conductors and cables.
  - 1. Visually inspect for correct installation.
  - 2. Perform continuity test.
  - 3. Perform insulation-resistance test for power and control conductors in accordance with NETA standards.
  - 4. Verify uniform resistance of parallel conductors.
- B. Cable will be considered defective if it does not pass tests and inspections.
- C. Conduct fall-of-potential grounding electrode system test in accordance with IEEE 81.
- D. Prepare test and inspection reports.

3.13 CLEANING / PROTECTION

- A. Protect coatings, finishes, and cabinets from damage and deterioration. Repair damage as recommended by manufacturer.
- B. Remove all rubbish and construction debris from inside electrical equipment and enclosures.

3.14 APPENDICES

- A. Table 260510-1: Raceway Application Guidelines

Table 260510-1 Raceway Application Guidelines	
Raceway Type	Location / Application
Aluminum Rigid Conduit (ARC)	All indoor and outdoor applications, except where other types are listed. All exposed, non-corrosive areas. All concealed, non-corrosive areas. Under slabs in slab on grade construction. Stub-ups through slabs.  Use LFMC for flexible connections.  When installed underground or in contact with concrete, paint with two coats of bitumastic paint.
PVC Schedule 40	Concrete encased duct banks. Embedded in concrete slabs or structures.  Use ARC elbows.
PVC Schedule 80	Direct buried. Corrosive areas. Protection of grounding electrode conductors. Protection of lightning conductors.  Where exposed, use LFNC for flexible connections.  Use ARC elbows for underground applications.

END OF SECTION 260510

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## SECTION 400507 - HANGERS AND SUPPORTS FOR PROCESS PIPING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

##### A. Section Includes:

##### 1. Delegated Design:

- a. This specification requires Contractor to delegate pipe support design to a pipe support design engineer hired by the Contractor.

##### B. Related Requirements:

- 1. Section 033010 "Miscellaneous Cast-In-Place Concrete."
- 2. Section 099100 "Painting" for product and execution requirements for painting specified by this Section.
- 3. Section 400562 "Plug Valves".

#### 1.3 COORDINATION

- A. Coordinate Work of this Section with piping and equipment connections specified in other Sections and indicated on Drawings.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: Submit manufacturer's catalog data including load capacity.
- B. Shop Drawings: Submit scaled piping layouts for each system. Indicate flow stream, pipe size(s) material(s), schedule(s), lining(s), critical dimensions between pipes, equipment and building features. Indicate by schedule pipe hanger/support type and locations. Provide detail of each type of hangers, supports, anchors, and guides.

#### 1.5 DELEGATED DESIGN SUBMITTALS

##### A. Support System Design:

- 1. All pipe support designs are to be delegated to the pipe support design engineer hired by the Contractor.

2. Engage the services of an independent registered professional engineer licensed in the State of Alabama ordinarily engaged in the business of pipe support systems analysis and design, to analyze system piping and service conditions, and to develop a detailed support system design, specific to the piping material, pipe joints, valves, and piping appurtenances proposed for use.
    - a. The proposed support system engineer shall have at least 5 years of experience in the analysis and design of similar systems, including the use of commercial and custom pipe supports and in the use of commercial pipe stress software programs.
    - b. Engineer pre-approved support system engineering groups include the following:
      - 1) SAC Incorporated; <https://www.sacincorporated.com/contact-us/>
      - 2) Fenny Engineering; <http://www.fennyengineering.com/contact/>
      - 3) Piping Solutions and Energy Associates; <https://www.pseassoc.com/request-for-service/>
  3. The support system design shall include:
    - a. Criteria by piping system.
    - b. Summary of Contractor-selected related components including joints, class, valves, appurtenances, etc., and commercial supports and especially including pipe materials.
    - c. Dead weight and dynamic analysis, including system thermal effects and pressure thrusts. Computer-based software system equivalent to Bentley Systems AutoPIPE or SST Systems CAEPIPE.
      - 1) Present each system in an isometric graphic and show the resolved and resultant force and moment systems, as well as all recommended hangers, supports, anchors, restraints, and expansion/flexible joints.
    - d. Submit a support system design to the Engineer for review. The submittal needs to be stamped by a professional engineer registered in Alabama.
    - e. All aspects of the analysis and design to comply with the provisions of ANSI B31.3 and the referenced standards.
    - f. Coordinate support arrangements to eliminate interference with similar systems to be installed under HVAC, Plumbing, and Electrical; to account for structural expansion joints and to maintain access for both personnel and for the removal of equipment.
    - g. Complete pipe support drawings indicating support framing, connections, types of supports, location, magnitude and direction of all loads transmitted to the structure or foundation and anchor bolt type, size, number and embedment and other duct supporting appurtenances including structural fasteners. Drawings shall be sealed by a Professional Engineer registered in the State of Alabama.
    - h. Calculations for the pipe supports, including analysis data, signed and sealed by a Professional Engineer registered in the State of Alabama. Calculations will not be reviewed by the Engineer and will be for project records.
- B. Manufacturers' Instructions: Submit special procedures and assembly of components.

## 1.6 INFORMATIONAL SUBMITTALS

- A. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- B. Welders' Certificate: Submit welders' certification of compliance with AWS D1.1, verifying qualification within previous 12 months.
- C. Qualifications Statements:
  - 1. Submit qualifications for manufacturer, fabricator, installer, and licensed professional.
  - 2. Submit manufacturer's approval of installer.

## 1.7 DEFINITIONS

- A. Ferrous Metal: Iron, steel, stainless steel, and alloys with iron as principal component.
- B. Wetted or submerged: Submerged, less than 1-foot above liquid surface, below top of channel or tank wall, under cover or slab of channel or tank, or in other damp locations.
- C. "Pipe" or "piping" shall mean all piping, piping system(s), hose, tube, duct, fittings, joints, valves, and similar appurtenances.
- D. Supports: wherever the word "supports" or "pipe supports" are used, they shall mean pipe supports, hangers, concrete foundations, structural connections, concrete inserts (if allowed), anchors, guides, bolts, expansion units, restraints and all restraint, hanging, supporting, allowing controlled expansion, or other means of attaching piping along with the necessary appurtenances.

## 1.8 QUALITY ASSURANCE

- A. Perform Work according to AWS D1.1 for welding hanger and support attachments to building structure.
- B. Maintain one copy of each standard affecting the Work of this Section on-Site.

## 1.9 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this Section with minimum three years' documented experience.
- B. Fabricator: Company specializing in fabricating products specified in this Section with minimum three years' documented experience.
- C. Installer: Company specializing in performing Work of this Section with minimum three years' documented experience.
- D. Licensed Professional: Professional engineer experienced in design of specified Work and licensed in Alabama.

#### 1.10 DELIVERY, STORAGE, AND HANDLING

- A. Inspection: Accept materials on-Site in original factory packaging, labeled with manufacturer's identification.
- B. All supports and hangers shall be crated, delivered and uncrated so as to protect against any damage.
- C. Store materials according to manufacturer instructions.
- D. Protection:
  - 1. Protect products from weather and construction traffic, dirt, water, chemical, and damage by storing in original packaging.
  - 2. All parts shall be properly protected so that no damage or deterioration shall occur during a prolonged delay from the time of shipment until installation is completed.
  - 3. Finished metal surfaces not galvanized, that are not of stainless steel construction, or that are not coated, shall be grease coated, to prevent rust and corrosion.
  - 4. Provide additional protection according to manufacturer instructions.

#### 1.11 EXISTING CONDITIONS

- A. Field Measurements:
  - 1. Verify field measurements prior to fabrication.
  - 2. Indicate field measurements on Shop Drawings.

#### 1.12 WARRANTY

- A. Furnish five-year manufacturer's warranty for pipe hangers and supports.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE AND DESIGN CRITERIA

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 013300 "Submittal Procedures" and Section 014000 "Quality Requirements" to design pipe support and restraint systems.
- B. All supports and appurtenances shall be standard products from approved manufacturers wherever possible and shall be adequate to maintain the supported load in proper position under all operating conditions. Any reference to a specific figure number of a specific manufacturer is for the purpose of establishing a type and quality of product and shall not be considered as proprietary. Note that different materials required, as specified in Part 2 MATERIALS, may require different figures or model numbers than those shown.

1. The minimum working factor of safety for all items, with the exception of springs, shall be five times the ultimate tensile strength of the material, assuming 10 feet of water-filled pipe being supported and normal test pressures.
  2. Design for all loads using a safety factor of 5.
- C. Piping schedule is included in the contract drawings.
- D. All items shall be designed with strength and stiffness to support, restrain, and allow expansion of the respective pipes under the maximum combination of peak loading conditions to include pipe weight, liquid weight, liquid movement and pressure forces, thermal expansion and contraction, vibrations, and all probable externally applied forces.
- E. Support spacing shall be per ASME B31.3.
- F. Complete design details of the pipe system components shall be submitted for review and approval as specified in PART 1. No support shall be installed without approved support system Drawings.
- G. The pipe support system shall not impose loads on the supporting structures in excess of the loads for which the supporting structure is designed.
- H. Seismic Design and restraint requirements, in accordance with the Structural Design criteria.

## 2.2 GENERAL

- A. Process pipe supports and details are generally not shown on the Drawings. The absence of pipe supports and details on the Drawings will not relieve the Contractor of the responsibility for providing them. Process pipe supports indicated on the Drawings are shown only to convey the intent of the design for a particular location and are not intended to represent a complete system. Where the Drawings show support types and/or locations, they shall be analyzed for adequacy to support loads and stresses calculated by the pipe support designer, modified if required, installed generally where shown, and integrated with the pipe support system design provided by the Contractor.
- B. Provide piping stress and flexibility analysis for all piping systems shown on the Drawings. The piping stress analysis to be performed for dead weight of the piping and its contents, pressure, thermal, seismic, and wind loading conditions in any combination in accordance with the ASME B31.3 code utilizing an industry standard piping stress analysis program. Perform weight balance calculations to determine the approximate design load at each pipe support for all other piping systems shown on the Drawings not requiring stress analysis.
- C. Support pipe and appurtenances connected to equipment to prevent any strain being imposed on the equipment. Comply with manufacturer's requirements regarding piping loads being or not being transmitted to their equipment. Submit certification stating that such requirements have been met.
- D. Support and secure all pipe and tubing in the intended position and alignment to prevent significant stresses in the pipe or tubing material, valves, fittings, and other pipe appurtenances. Design all supports to adequately secure the pipe against excessive dislocation due to thermal

expansion and contraction, internal flow forces, and all probable external forces such as equipment, pipe, and personnel contact.

- E. Contractor may propose minor adjustments to the piping arrangements in order to simplify the supports, or in order to resolve minor conflicts in the work. Such an adjustment might involve minor change to a pipe centerline elevation so that a single trapeze support may be used.
  - F. Where flexible sleeve, split ring, vibration, or other couplings are required at equipment, tanks, etc., the end opposite to the piece of equipment, tank, etc., shall be rigidly supported to prevent transfer of force systems to the equipment. Do not install fixed or restraining supports between a flexible coupling and the piece of equipment.
  - G. Pipe supports:
    - 1. Shall not induce point loadings but shall distribute pipe loads evenly along the pipe circumference.
    - 2. Provide supports at changes in direction and elsewhere as shown in the Drawings or as specified herein.
    - 3. No piping shall be supported from other piping or from metal stairs, ladders, and walkways, unless specifically directed or authorized by the Engineer.
    - 4. Provide pipe supports to minimize lateral forces through valves, both sides of flexible split ring type couplings and sleeve type couplings, and to minimize all pipe forces on pump housings. Pump housings shall not be utilized to support connecting pipes.
    - 5. Effects of thermal expansion and contraction of the pipe to be accounted for in the pipe support selection and installation.
  - H. Insofar as is possible, floor supports shall be given preference. Where specifically indicated, concrete supports, as shown on the Drawings, may be used. Base elbow and base tees shall be supported on concrete pedestals.
  - I. Include in pipe support analysis all restraints, flexible connections, expansion items, and related items as included in other specifications and shown on the Drawings.
- 

## 2.3 MATERIALS

- A. For support of metallic pipe: Type 316 stainless steel (SS).

## 2.4 SUPPORT AND RESTRAINT SYSTEMS

- A. Ductile Iron Piping:
  - 1. Cast iron and ductile iron, steel, and stainless steel piping larger than 2-inches shall be supported at a maximum support spacing of 10 feet with a minimum of one support per pipe section at the joints.
  - 2. Support spacing for ductile iron, steel, and stainless steel piping 2-inches and smaller diameter shall not exceed 5 feet.
- B. Framing Support System:
  - 1. See Part 2 MATERIALS for materials of construction.

2. Beams: Size such that beam stress does not exceed 25000 psi and maximum deflection does not exceed 1/240 of span.
  3. Column Members: Size in accordance with manufacturer's recommended method.
  4. Support Loads: Calculate using weight of pipes filled with water.
  5. Maximum Spans:
    - a. Steel and ductile iron pipe, 3 inch diameter and larger: 10 feet centers, unless otherwise shown.
    - b. Other pipelines and special situations: Same as noted in previous paragraphs. Supplementary hangers and supports may be required.
- C. All vertical pipes shall be supported at each floor or at intervals of not more than 12 feet by approved pipe collars, clamps, brackets, or wall rests and at all points necessary to ensure rigid construction. All vertical pipes passing through pipe sleeves shall be secured using a pipe collar.

## 2.5 ANCHOR BOLTS/SYSTEMS

- A. Anchoring Devices: Design, size, and space support anchoring devices, including anchor bolts, inserts, and other devices used to anchor support, to withstand shear, and pullout loads imposed by loading and spacing on each particular support. **DO NOTE USE ADHESIVE ANCHOR BOLTS ON ANY PIPE SUPPORT HUNG FROM A ROOF OR CEILING**, unless specifically noted otherwise.
- B. All post-installed anchors in concrete shall have current published ICC-ES Evaluation Report indicating the anchor is approved for installation in cracked concrete.
- C. The latest edition of the following specification and recommended practices shall become part of this specification as if written herein. Wherever requirements conflict, the more stringent shall govern.
1. ACI 318, Appendix D.
  2. ACI 355.2, Mechanical Anchors "Qualification of Post-Installed Mechanical Anchors in Concrete".
  3. Anchor manufacturer's published installation requirements.
- D. Expansion anchors:
1. The length of expansion bolts shall be sufficient to place the wedge portion of the bolt a minimum of 1 inch behind the steel reinforcement.
  2. Manufacturers:
    - a. Power-Stud+ SD4 and Power-Stud+ SD6 by Powers Fasteners, Brewster, NY,
    - b. Kwik Bolt as manufactured by Hilti USA, Tulsa, Oklahoma; or
    - c. Wej-it by Wej-it Expansion Products, Inc., Broomfield, Colorado.
- E. Material: Type 316 stainless steel for anchor bolts.
- F. Size of anchor bolts as designed by manufacturer, 1/2 inch minimum diameter, or as shown on the Drawings.

## 2.6 SINGLE PIPE SUPPORTS FROM BELOW

- A. Single pipes located in a horizontal plane close to the floor shall be Pedestal type: Schedule 40 pipe stanchion, saddle, and anchoring flange.
  - 1. Adjustable Saddle: MSS SP 58, Type 38 without clamp:
    - a. Anvil, Figure 264.
    - b. Cooper B-Line, Figure B3093.
- B. Pipes 3 inch in diameter and larger:
  - 1. Support by adjustable stanchions.
  - 2. Provide at least 4 inch adjustment.
  - 3. Flange mount to floor.
- C. Use yoked saddles for piping whose centerline elevation is 18 inches or greater above the floor and for all exterior installations.
- D. Pipe roller type supports shall be used where required to accommodate thermal movement in conjunction with axial supports.

## 2.7 SHOP FACTORY FINISHING

- A. Prepare and prime metallic (except stainless steel) supports in accordance with Division 09.

## 2.8 ACCESSORIES

- A. Insulation Shield: Install on insulated non-steel piping. Oversize the rollers and supports, as required. Manufacturers:
  - 1. Anvil, Figure 167.
  - 2. Cooper B-Line, Series B3151.
- B. Welding Insulation Saddle: Install on insulated metal pipe. Oversize the rollers and supports, as required. Manufacturers:
  - 1. Anvil, Figure 160.
  - 2. Cooper B-Line, Series B3160.
- C. Vibration Isolation Pad: Install under base flange of pedestal type pipe supports adjacent to equipment, and where required to isolate vibration.
  - 1. Isolation pads to be neoprene, waffle type.
  - 2. Manufacturers:
    - a. Mason Industries, Type W.
    - b. Korfund.
- D. Dielectric Barrier:

1. Install between carbon steel members and copper or stainless steel pipe.
  2. Install between stainless steel supports and non-stainless steel ferrous metal piping.
  3. All stainless steel piping shall be isolated from all ferrous materials, including galvanized steel by use of neoprene sheet material and protection shields.
- E. Electrical Isolation: Install 1/4 by 3 inch neoprene rubber wrap between submerged metal pipe and oversized clamps.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Section 017300 "Execution" for examination requirements.
- B. Verify field dimensions as indicated on Drawings.

### 3.2 INSTALLATION

- A. Section 017300 "Execution" for installation requirements.
- B. Obtain permission from Engineer before using powder-actuated anchors.
- C. Obtain permission from Engineer before drilling or cutting structural members.
- D. Inserts:
  1. Install inserts for placement in concrete forms. Before setting inserts, all drawings and figures shall be checked that have a direct bearing on the pipe location. Responsibility for the proper location of pipe supports is included under this Section.
  2. Install inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
  3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe 4 inches and larger.
  4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
  5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above slab.
- E. Pipe Hangers and Supports:
  1. Install according to: ASME B31.3.
  2. Support horizontal piping as indicated on Drawings, depending upon pipe size.
  3. Install hangers with minimum 1/2 inch space between finished covering and adjacent Work.
  4. Place hangers within 12 inch of each horizontal elbow.
  5. Use hangers with 1-1/2 inch minimum vertical adjustment.
  6. Support horizontal cast iron pipe adjacent to each hub, with 5 feet maximum spacing between hangers.
  7. Support vertical piping at every other floor. Support vertical cast iron pipe at each floor at hub.

8. Where piping is installed in parallel and at same elevation, provide multiple pipe or trapeze hangers.
9. Support riser piping independently of connected horizontal piping.
10. Design hangers for pipe movement without disengagement of supported pipe.
11. Support piping independently so that equipment is not stressed by piping weight or expansion in piping system.
12. Support large or heavy valves, fittings, and appurtenances independently of connected piping.
13. Provide welded steel brackets where piping is to be run adjacent to building walls or columns.
14. Use beam clamps where piping is to be suspended from building steel.
15. Insulated Piping: Provide two bolted clamps designed to accommodate insulated piping.
16. Use offset clamps where pipes are indicated as offset from wall surfaces.
17. Proceed with installation of piping and supports only after any building structural work has been completed and new concrete has reached its 28-day compressive strength.
18. The installation of pipe support systems shall not interfere with the operation of any overhead bridge cranes, monorails, access hatches, etc. No piping shall be supported from stairs, other pipes, ladders, and walkways unless authorized by the Engineer.
19. Repair mounting surfaces to original condition after attachments are made.
20. Brace horizontal pipe movements by both longitudinal and lateral sway bracing.
21. Where supports are required in areas to receive chemical resistant seamless flooring, install supports prior to application of flooring system.

F. Equipment Bases and Supports:

1. Provide housekeeping pads of concrete, minimum 3-1/2 inches thick and extending 6 inches beyond supported equipment. Section 033010 "Miscellaneous Cast-In-Place Concrete."

G. Prime Coat:

1. Prime coat exposed steel hangers and supports.
2. Conform to Section 099100 "Painting".
3. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

### 3.3 FIELD QUALITY CONTROL

- A. Section 014000 "Quality Requirements" for testing.
- B. All pipe support systems shall be tested after installation in conjunction with the respective piping pressure tests. If any part of the pipe support system proves to be defective or inadequate, it shall be repaired, augmented or replaced to the satisfaction of the Engineer.
- C. After the work is installed, but before it is filled for start-up and testing, the Support System Design Engineer shall inspect the work and shall certify its complete adequacy. Each system shall be inspected and certified in the same way.
- D. Submit a report, including all field modifications and including all certificates.

1. Insert state where project is located.
2. The report shall bear the stamp of a professional engineer registered in the State of Alabama and shall be subject to the review of the Engineer.

END OF SECTION 400507

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## SECTION 400551 - COMMON REQUIREMENTS FOR PROCESS VALVES

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Common requirements for valves.
2. Valve tags.

##### B. Related Requirements:

1. Section 099100 "Painting" for product and execution requirements for painting specified by this Section.
2. Section 400507 "Hangers and Supports for Process Piping" for product and execution requirements for valve supports specified by this Section.
3. Section 400557 "Actuators for Process Valves."
4. Section 400561 "Galve Valves."
5. Section 400562 "Plug Valves."

#### 1.2 COORDINATION

- ##### A. Coordinate Work of this Section with individual process valve specifications.

#### 1.3 ACTION SUBMITTALS

##### A. Valve Schedule:

1. Submit valve schedule populated with all Division 40 process valves specified for this project. Include all information shown on the Sample Valve Schedule included in this project.
2. Approval of valve schedule submittal to precede all individual valve submittals. All subsequent individual valve submittals to include the approved valve tag number or group on the submittal cover sheet.

##### B. Valve Tags:

1. Materials, dimensions and thickness of tags, materials and gauge of cable and splicing hardware.
2. Color palette for Owner selection.
3. Full scale drawing of sample with lettering dimensions and scribe depth.
4. Valve tag lettering provided with Valve Schedule above.

##### C. Shop Drawings:

1. Valve and actuator model number and size.
2. Valve parts list.

3. Materials of each part including material standard designation (ASTM or other).
  4. Descriptive literature, bulletins, and/or catalogs of the equipment.
  5. The total weight of each item.
  6. Any position indicators, limit switches, or other accessories.
- D. Provide certified hydrostatic test data, per manufacturer's standard procedure or MSS-SP-61 for all valves.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Manufacturer Instructions: Submit installation and operation instructions for each component including valve, actuator, gearbox, and any included instrumentation.
- B. Source Quality-Control Submittals: Indicate results of integrators facility tests and manufacturers factory tests and inspections.
- C. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
- D. Manufacturer Certification of Installation: Certify that equipment has been installed according to manufacturer instructions.
- E. Qualifications Statement:
1. Submit qualifications for manufacturer and licensed professional.
- F. Manufacturer's Certification that the design and selection of actuators for process valves has been fully coordinated with the valve manufacturer.

#### 1.5 QUALITY ASSURANCE

- A. Maintain clearances as indicated on Drawings.
- B. Ensure that materials of construction of wetted parts are compatible with process liquid.
- C. Mate valves to actuators at manufacturer's or integrator's facility. Fully test assembled product and certify ready for installation prior to shipment to the job site.
1. Only in special cases for extremely large assemblies where installation requires disassembly, may actuators be mounted to the valves in the field.
- D. Furnish affidavit of compliance with testing and manufacturing standards referred in this specification and the individual valve specifications.
- 
- E. Obtain Manufacturer's Certification of Proper Installation and Certificate of Compliance for Specified valves and valve assemblies.

## 1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing valves and actuators with minimum ten years' documented experience.
- B. Licensed Professional: Professional engineer experienced in design of specified Work and licensed in State of Alabama.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- B. Deliver factory mated power actuated valves on rigid wooden skids, fully braced and strapped to prevent damage to valve, actuator or coupling system.
- C. Store materials according to manufacturer instructions.
- D. Protection:
  - 1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
  - 2. Protect valve ends from entry of foreign materials by providing temporary covers and plugs.
  - 3. Provide additional protection according to manufacturer instructions.

## 1.8 EXISTING CONDITIONS

- A. Field Measurements:
  - 1. Verify field measurements prior to materials ordering or any fabrication.
  - 2. Indicate field measurements on Shop Drawings.

## 1.9 WARRANTY

- A. Furnish one-year manufacturer's warranty for valves and actuators.

## PART 2 - PRODUCTS

### 2.1 VALVES

- A. Description: Valves, operator, actuator, handwheel, chainwheel, extension stem, floor stand, worm and gear operator, operating nut, chain, wrench, and other accessories as required.
- B. All valves of the same type shall be the product of one manufacturer.

- C. Valve Ends: Compatible with adjacent piping system and as indicated on valve schedule and in the Drawings.
- D. Operation:
  - 1. Close by turning clockwise.
  - 2. Cast directional arrow on valve or actuator with OPEN and CLOSE cast on valve in appropriate location.
- E. Valve Marking and Labeling:
  - 1. Marking: Comply with MSS SP-25.
  - 2. As indicated on the Drawings and the P&IDs and in the valve schedule.
  - 3. Labeling (valve tags):
    - a. Fiberglass reinforced plastic, ASTM D709, 70 mil thick, 2 1/2-inch diameter or 2 1/2-inch by 1 1/4-inch.
    - b. Lettering 1/16-inch thick of silk screening or other permanent embedment of subsurface printed graphics, permanently sealed.
    - c. Colors of lettering and backing as selected by Owner.
    - d. Two, 1/4-inch clear opening Type 316 stainless steel grommets at each end, center of hole 3/8-inch from tag edge.
    - e. 3/32-inch Type 316 stainless steel cable and splice hardware.
- F. Valve Construction: As Specified in Valve Sections.
- G. Van Stone flanges shall not be used with pinch valves, industrial butterfly valves; elastomer bellows style expansion joints or other piping system components having an elastomer liner (rubber seat) that is used as a gasket.

## 2.2 FINISHES

- A. Valve Coating: Comply with AWWA C550.
- B. Factory finishes are included in individual valve sections.
- C. Exposed Valves: As specified in Section 099100 "Painting".
- D. Stainless Body Valves: Do not coat.
- E. Do not coat flange faces of valves unless otherwise specified.

## 2.3 SOURCE QUALITY CONTROL

- A. Section 014000 "Quality Requirements" for requirements for testing, inspection, and analysis.
- B. Testing: Test valves according to manufacturer's standard testing protocol, including hydrostatic, seal, and performance testing.
- C. Certificate of Compliance:

1. If manufacturer is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at manufacturer's facility conforms to Contract Documents.
2. Specified shop tests are not required for Work performed by approved manufacturer.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Section 017300 "Execution" for examination requirements.
- B. Verify that piping system is ready for valve installation.
- C. Fully examine valves for debris, damage and interior finish blemishes prior to installation. Do not install valves with soiled interior or any visible damage to seats, discs or interior finish.
- D. Identify any piping, plant or equipment clearance issues prior to installation, bring to Engineer's attention via job meetings, submittal process or request for information process.

#### 3.2 INSTALLATION

- A. Section 017300 "Execution" for installation requirements.
- B. Install valves, actuators, extensions, valve boxes, and accessories according to manufacturer instructions.
- C. Inspect valve interiors before line closure for the presence of debris. At the option of the Engineer, internal inspection of valve and appurtenances may be required any time that the likelihood of debris is a possibility. Clean connecting pipes prior to installation, testing, disinfection and final acceptance.
- D. Disinfect valves installed in potable water lines with approved pipeline disinfection process.
- E. Rigidly support valves to avoid stresses on piping.
- F. Coat studs, bolts and nuts with anti-seizing lubricant.
- G. Dielectric Fittings: Provide between dissimilar metals.
- H. Clean field welds of slag and splatter to provide a smooth surface.
- I. Mate, adjust and fully test gearboxes, electric, hydraulic and pneumatic actuators to valves at manufacturer's or integrator's facility.
  1. Only in special cases for extremely large assemblies where installation requires disassembly may actuators be mounted to the valves in the field. These circumstances require preinstallation meetings.
- J. In no case shall stems be installed vertically downward.

- K. Unless otherwise indicated on the Drawings:
1. Install Gate, Globe, Ball valves with stem vertical in the 12 o'clock position.
  2. Install Plug valves with stem horizontal and plug opening to the top of the body unless position will not allow proper actuator access, in which case stem may be vertical in the 12 o'clock position.
- L. Install all brackets, extension rods, guides, the various types of operators and appurtenances as indicated. Before properly setting these items, check all drawings and figures which have a direct bearing on their location.
- M. Inspect all materials for defects in construction and materials. Clean debris and foreign material out of openings, etc. Valve flange covers shall remain in place until connected piping is in place. Verify operability of all operating mechanisms for proper functioning. Check all nuts and bolts for tightness. Repair or replace valves and other equipment which do not operate easily or are otherwise defective.
- N. Where installation is covered by a referenced standard, installation shall be in accordance with that standard, except as herein modified, and the Contractor shall certify such. Also note additional requirements in other parts of this Section.
- O. Unless otherwise noted, joints for valves and appurtenances shall be made up utilizing the same procedures as specified under the applicable type connecting pipe joint. Install valves and other items as recommended by the manufacturer. Verify manufacturers' torqueing requirements for all valves.
- P. Coordinate direction of flow through offset type and shaped butterfly valve discs with the mated actuator torque capacity.
- Q. Rotate valve operators and indicators to display toward normal operation locations. Consult with Engineer prior to installing valves with handwheels to confirm final position of handwheel.
- R. Vertically center floor boxes, valve boxes, extension stems, and low floor stands over the operating nut, with couplings as required.
1. Adjust elevation of the box top to conform to the elevation of the finished floor surface or grade at the completion of the Contract.
  2. Support boxes and stem guides during concrete placement to maintain vertical alignment.
- S. Install brass male adapters on each side of valves in copper-piped system and solder adapters to pipe.
- T. Install 1-inch gate and ball valves with cap for drains at main shutoff valves, low points of piping, bases of vertical risers, and equipment.
- U. Install valves with clearance for installation of insulation and to allow access.
- V. Provide access where valves and fittings are not accessible.
- W. Pipe Hangers and Supports: As specified in Section 400507 "Hangers and Supports for Process Piping".

- X. Comply with Division 40 “Process Interconnections” for piping materials applying to various system types.

### 3.3 FIELD QUALITY CONTROL

#### A. Valve Field Testing:

1. Test for proper alignment.
2. If specified by valve Section, field test equipment to demonstrate operation without undue noise, vibration, or overheating.
3. Engineer will witness field testing.
4. Functional Test:
  - a. Prior to system startup, inspect valves and actuators for proper alignment, quiet operation, proper connection and satisfactory performance.
  - b. After installation, open and close all manual valves in the presence of the Engineer to show the valve operates smoothly from full open to full close and without leakage.
  - c. Cycle valves equipped with electric, pneumatic or hydraulic actuators 5 times from full open to full closed in the presence of the Engineer to exhibit operation without vibration, jamming, leakage, or overheating.
  - d. Operate pressure control and pressure relief valves in the presence of the Engineer to show they perform their specified function at some time prior to placing the piping system in operation and as agreed during construction coordination meetings.
5. Field test pipelines in which the valves and appurtenances are to be installed. During these tests, adjust, remove or replace defective valve or appurtenance, or otherwise make acceptable to the Engineer. Test regulating valves, strainers, or other appurtenances to demonstrate conformance with the specified operational capabilities. Correct deficiencies, replace device or otherwise made acceptable to the Engineer.

END OF SECTION 400551

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## SECTION 400557 - ACTUATORS FOR PROCESS VALVES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section Includes: Following types of actuators for linear, multi-turn, and quarter turn valves:
  - 1. Manual actuators.
- B. Related Requirements:
  - 1. Section 099100 "Painting" for product and execution requirements.
  - 2. Section 400507 "Hangers and Supports for Process Piping" for hangers, anchors, sleeves, and sealing of piping to adjacent structures.
  - 3. Section 400551 "Common Requirements for Process Valves" for common product requirements for valves for placement by this Section.

#### 1.3 COORDINATION

- A. Section 400551 "Common Requirements for Process Valves" for valve schedule requirements.
- B. Coordinate Work of this Section with installation of valves and accessories.

#### 1.4 SUBMITTALS

- A. Product Data: Manufacturer information for actuator with model number and size indicated.
- B. Shop Drawings:
  - 1. Parts list, materials, sizes, position indicators, limit switches, actuator mounting, wiring diagrams, control system schematics with external interfaces on assembly drawings.
  - 2. Actuator Shop Drawings with respective valve and gate submittal.
- C. Manufacturer's Certificate: Products meet or exceed specified requirements.
- D. Manufacturer Instructions: Special procedures and placement requirements.
- E. Source Quality-Control Submittals: Results of factory tests and inspections and provide required certifications.

- F. Field Quality-Control Submittals: Results of Contractor-furnished tests and inspections.
- G. Qualifications Statements:
  - 1. Qualifications for manufacturer and installer.
- H. Manufacturer's certification that the design and selection of actuators for process valves has been fully coordinated with the valve manufacturer.

## 1.5 QUALITY ASSURANCE

- A. Mate actuators to equipment at equipment manufacturers or integrators facility.
  - 1. Test assembled product. Certify ready for installation prior to shipment to job site.
  - 2. For extremely large assemblies requiring disassembly for installation, the actuator may be disassembled for shipment and remounted in the field.

## 1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five years documented experience.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- B. Store materials according to manufacturer instructions.
- C. Protection:
  - 1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
  - 2. Furnish temporary end caps and closures on piping and fittings and maintain in place until installation.
  - 3. Provide additional protection according to manufacturer instructions.

## 1.8 EXISTING CONDITIONS

- A. Field Measurements:
  - 1. Verify field measurements prior to fabrication.
  - 2. Indicate field measurements on Shop Drawings.
- B. Where new actuators are to be installed on existing valves, verify the torque and travel time requirements of the existing valves prior to sizing and selecting the new actuators.

## 1.9 WARRANTY

- A. Manufacturer's Special Warranty: Submit standard written warranty against manufacturing defects for actuators provided under this Section.
  - 1. Warranty Period: One year from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 GENERAL

- A. Refer to drawings for actuator type, accessories, and sizing information.
- B. Provide clockwise closed actuation unless otherwise noted on the valve and gate schedule.
- C. Supply chain actuators for manual valves located 7 feet or higher above finished floor.

### 2.2 ACCESSORIES

- A. Floor Stands:
  - 1. Materials:
    - a. Stand: Cast iron.
    - b. Stem Bushing: Sintered bronze.
    - c. Position Indicator: Bronze.
  - 2. Height to input shaft or handwheel: 36 inch.
  - 3. Base Mounting Requirements:
    - a. Concrete Floor Mounting: Type 316 stainless steel anchor bolts.
    - b. Face of Basin or Offset Mounting: Heavily reinforced, adjustable wall bracket with required anchor hardware using Type 316 stainless steel.
  - 4. Actuator Mounting Requirements:
    - a. Manual Actuator: Cast iron handwheel on top of floor stand with dual ball type thrust bearings, grease fitting on bearing bowl, hardened machined alloy bronze lift nut (for rising stem). Where manual effort is greater than 40 lb rim pull with 2 feet diameter wheel, provide geared actuator with a handwheel or crank.
      - 1) Handwheel casting to include the word "OPEN" and an arrow indicating the direction of operation.
    - b. Gearbox or Direct Powered Actuator: Through bolt holes matched to actuator or gearbox bolting pattern.

5. Non-rising stem position indicator: Mechanical indicator connected to and driven by stem extension and cast position marks on floor stand with the word “OPEN” cast at the top of the travel, and a field mounted aluminum “CLOSED” tag supplied with drive rivets, installed based on number of valve turns.
  6. Rising Stem Position Indicator: Permanent markings on transparent stem covers.
- B. Stem Covers: Fracture-resistant clear butyrate plastic stem covers for rising stems. Closed top with position indicator markings.
- C. Extension Stems and Stem Guides:
1. Extension stems and couplings to actuate recessed, buried, below slab valves via operating nut or floor stand mounted actuator.
  2. Stem Extensions and Stem Couplings: Alloy steel, hardware of Type 316 stainless steel unless specified otherwise in the respective slide gate specification.
  3. Stem and Stem Couplings: Rated for five times the maximum input torque capacity of the actuator.
  4. Adjustable, Cast Iron Wall Bracket Type Stem Guides: Include bronze bushing.
  5. Spacing: 10 feet spacing or at spacing calculated by manufacturer to prevent buckling with a safety factor of 2 based on design thrust, shaft material and shaft size.
- D. Torque Tubes:
1. Supply where shown on the Drawings.
  2. Supported by/mated to valve bonnet/yoke.
  3. Sized by supplier for the required actuator torque.
  4. Drilled specifically for valve and actuator bolt pattern.
  5. Internal extension keyed or shaped specifically to mate to valve shaft and fabricated of Type 316 stainless steel.
  6. Internal extension designed for axial adjustment for mating purposes.
- E. Chain Wheels:
1. Supply for manual valves 3 inch diameter or larger mounted 7 feet and greater above operating floor level.
  2. Type: Sprocket rim with chain and floating chain guide.
  3. Chain Wheel and Guides Materials: Cast iron with hot-dip galvanized chain.
  4. Chain Length: Extend to 5-1/2 feet above operating floor level.
  5. Chain Storage: Include where chains may interfere with personnel egress; made with high-strength thermoplastic polymer in safety orange color.
    - a. Basis-of-Design: Trumbull, Model ‘Chain Up’ as manufactured by Trumbull Manufacturing, Inc., or equal.
  6. Chain Wall Hooks: Include where feasible to prevent chain from impeding personnel egress.

## 2.3 MANUAL ACTUATORS

- A. Gear-Assisted Manual Valve Actuators:

1. Provide:
  - a. For manually actuated valves larger than 8 inch nominal diameter and for ball and plug valves 6 inch and larger.
  - b. With power actuators where torque requirements dictate.
  
2. Comply with AWWA C504.
3. Handwheel Diameter: 8 inch
4. Maximum Handwheel Pull: 40 lbs maximum.
5. Housings: Cast or ductile iron.
6. Worm or helical gear type.
7. Gears: Hardened steel, machine cut and mated.
8. Bearings: Permanently lubricated bronze.
9. Input and Output Shafts: Sealed with greased, waterproof machine shaft seals.
10. Filled with waterproof grease and designed for submerged service where scheduled.
11. Handwheel: Removable.
  - a. Diameter: 8 inch up to 12 inch valve size.
  - b. Diameter: 12 inch diameter up to 16 inch valve size.
  - c. Diameter: 18 inch diameter for larger than 16 inch valve size.
  - d. Maximum Diameter: 24 inch diameter.
  
12. Include mechanical top mounted valve position indication, opening direction, and adjustable stops.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Section 017300 "Execution," for installation examination requirements.
- B. Verify field dimensions are as indicated on Shop Drawings.

#### 3.2 INSTALLATION

- A. Section 017300 "Execution" for installation requirements.
- B. Install products plumb, square, and true according to manufacturer's published installation instructions.
- C. Securely mount actuators using brackets or hardware specifically designed for attachment to valves.
- D. Extend chain actuators to 5-1/2 feet above operating floor level.

#### 3.3 FIELD QUALITY CONTROL

- A. Section 014000 "Quality Requirements" for inspecting and testing requirements.

- B. After installation, inspect for proper supports and interferences according to manufacturer's requirements and Section 400551.
- C. Repair damaged coatings with material equal to original coating as specified in Section 099100 "Painting".

### 3.4 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Perform adjustments during normal occupancy hours.

END OF SECTION 400557

## SECTION 400561 - GATE VALVES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section Includes:

- 1. Solid wedge, resilient-seated gate valves.

- B. Related Requirements:

- 1. Section 400551 “Common Requirements for Process Valves” for basic materials and methods related to valves commonly used for process systems.
  - 2. Section 400557 “Actuators for Process Valves and Gates”.

#### 1.3 SUBMITTALS

- A. As specified in Section 400551 “Common Requirements for Process Valves” for submittal requirements for compliance with this section.

#### 1.4 QUALITY ASSURANCE

- A. Test valves in accordance with AWWA C515.
- B. Provide Installation Inspection and Operator Training per Section 400551.
- C. Provide testing and inspection certificates.
- D. As specified in Section 400551 “Common Requirements for Process Valves” for submittal requirements for compliance with this Section.

### PART 2 - PRODUCTS

#### 2.1 SOLID WEDGE, RESILIENT-SEATED GATE VALVES – TAG TYPE GV

- A. Manufacturers:

1. American Flow Control Valve.
2. M&H Valve.
3. J&S Valve.
4. American R/D Valve.
5. Stockham Valve.
6. Walworth.

B. Description:

1. Wastewater service.
2. As specified in Section 400551 “Common Requirements for Process Valves”.
3. Comply with AWWA C515.
4. Minimum Working Pressure: 150 psig.
5. Maximum Process Fluid Temperature: 80 degrees F.
6. End Connections: ASME B16.1, ASME B16.5, and ASME B16.42, Class 125/150 flanged or mechanical joint.
7. Gear Actuators for Manual Valves: Comply with AWWA C509.

C. Operation:

1. As specified in Section 400551 “Common Requirements for Process Valves”.
2. Stem: Nonrising.
3. Actuator: As indicated on valve schedule and/or Drawings.
4. Furnish gear operators for valves 8 inches and larger, and chainwheel operators for valves mounted over 7 feet above operating floor.

D. Materials:

1. Wedge: Resilient ASTM A536, ductile iron, fully encapsulated with EPDM.
2. Body and Disc: ASTM A536, ductile iron, AWWA C509, vulcanized rubber coated.
3. Stem, Stem Nuts, Glands, and Bushings: Manganese bronze or Type 316 stainless steel.
4. Connecting Hardware: Type 304 or 316 stainless steel.

E. Finishes:

1. As specified in Section 400551 “Common Requirements for Process Valves”.
2. Body, internal and external, including bonnet: AWWA C550, Epoxy, 4-mil minimum thickness.
3. Gate: ASTM D2000 EPDM encapsulated, ASTM B429 Method B Bonded and vulcanized.

## 2.2 SOURCE QUALITY CONTROL

- A. Section 014000 “Quality Requirements” for requirements for testing, inspection, and analysis.
- B. As specified in Section 400551 “Common Requirements for Process Valves”.
- C. Testing: Test gate valves according to AWWA C515.
- D. UL and FM approved.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. As specified in Section 400551 “Common Requirements for Process Valves” for submittal requirements for compliance with this Section.

### 3.2 INSTALLATION

- A. According to AWWA C515.

END OF SECTION 400561

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## SECTION 400562 - PLUG VALVES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section Includes: Eccentric plug valves.
- B. Related Requirements:
  - 1. Section 400551 “Common Requirements for Process Valves” for basic materials and methods related to valves commonly used for process systems.

#### 1.3 SUBMITTALS

- A. As specified in Section 400551 “Common Requirements for Process Valves” for submittal requirements for compliance with this Section.
- B. As specified in Section 400557 “Actuators for Process Valves and Gates” for submittal requirements for compliance with this Section.

#### 1.4 QUALITY ASSURANCE

- A. Test valves in accordance with AWWA C517.
- B. Provide Installation Inspection and Operator Training per Section 400551.
- C. Provide testing and inspection certificates.

### PART 2 - PRODUCTS

#### 2.1 ECCENTRIC PLUG VALVES – Tag Type PV.

- A. Manufacturers:
  - 1. DeZurik;
  - 2. M&H Valve;
  - 3. Milliken Valve Company;
  - 4. Valmatic.

B. Description:

1. As specified in Section 400551 “Common Requirements for Process Valves”.
2. Type:
  - a. Non-lubricated.
  - b. Serviceable (able to be repacked) under full line pressure.
  - c. Eccentric.
  - d. Capable of sealing in both directions at the rated pressure.
  - e. Unobstructed flow path when open.
  - f. Drop tight shut-off to the full valve rating with pressure on either side of the plug.
3. Body:
  - a. 30,000-psi tensile strength.
  - b. Top entry, bolted bonnet.
  - c. Body shall be cast with integral piping connections.
4. Plug:
  - a. To be removable without removing the valve from the line.
  - b. To have an integral upper and lower shaft:
    - 1) Seals on the upper and lower journals to prevent entrance of solids into the journals.
  - c. One piece for all valves.
5. Bearings:
  - a. Permanently lubricated.
6. Minimum Working Pressure: Minimum 175 psi WOG (Water, Oil and Gas) working pressure for sizes 4-inches to 12-inches inclusive and minimum 150 psi WOG working pressure for sizes 14-inches and larger.
  - a. At the above rated minimum working pressures, certified by the manufacturer as permitting zero leakage for a 5-minute duration with full pressure applied in either direction.
7. Maximum Process Fluid Temperature: 80 degrees F.
8. Ports:
  - a. Configuration: Rectangular.
  - b. Minimum Port Area:
    - 1) 100 percent of nominal pipe area (full port) for valves used in pumped systems.
    - 2) 80 percent of nominal pipe area for valves used in gravity systems.
9. Seats:

- a. Full 360 degree seating by contact of a resilient seating material on the plug mating with welded-in seating surface in the body.
  - b. Screw in body seats not acceptable.
  - c. Resilient and of the continuous interface type having consistent opening and closing torques.
  - d. Non-jamming in the closed position.
10. Stem Bearings: Self-lubricating.
  11. Stem Seals:
    - a. Type: V-ring.
    - b. Externally adjustable and repackable without removing the bonnet from the valve.
  12. Packing and Gland: Accessible and externally adjustable.
  13. End Connections:
    - a. Flanged: Comply with ASME B16.1 and B16.42.
- C. Operation:
1. As specified in Section 400551 “Common Requirements for Process Valves”, and as indicated on the Drawings.
  2. A suitably sized steel actuator mounting bracket shall be provided to provide an air gap between the actuator and the valve stem seal. Under no circumstance shall the gear box be mounted directly to the top body flange such that leakage could directly enter the gear box.
  3. Provide adjustable limit stops for both opening and closing and a clearly marked position indicator.
  4. Greater Than 4 Inches: Worm gear manual operators with handwheel.
  5. Furnish chain wheel operators for valves mounted over 7 feet above operating floor.
- D. Materials:
1. Body:
    - a. Cast iron, AWWA C517 or Ductile iron, ASTM A536.
    - b. Lining: Epoxy.
  2. Plug:
    - a. Ductile iron, ASTM A536, Grade 65-45-12 or Cast iron ASTM A126, Grade B.
    - b. Lining: Resilient coating, as recommended by valve manufacturer for service conditions.
  3. Seats: Welded-in Nickel.
  4. Stem: Same material as plug.
  5. Stem Bearings: Bronze or Stainless steel.
  6. Seals: PTFE.
  7. Connecting Hardware: Type 316 stainless steel.
- E. Finishes:

1. As specified in Section 400551 “Common Requirements for Process Valves”.
2. Interior ferrous surfaces: AWWA C550, Epoxy, 8-mil minimum thickness.
3. Ferrous surfaces not painted: Coating of manufacturer recommended grease.

## 2.2 SOURCE QUALITY CONTROL

- A. Section 014000 “Quality Requirements” for requirements for testing, inspection, and analysis.
- B. As specified in Section 400551 “Common Requirements for Process Valves”.
- C. Testing: Hydrostatic Test Per ANSI B16.1 and B16.5.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

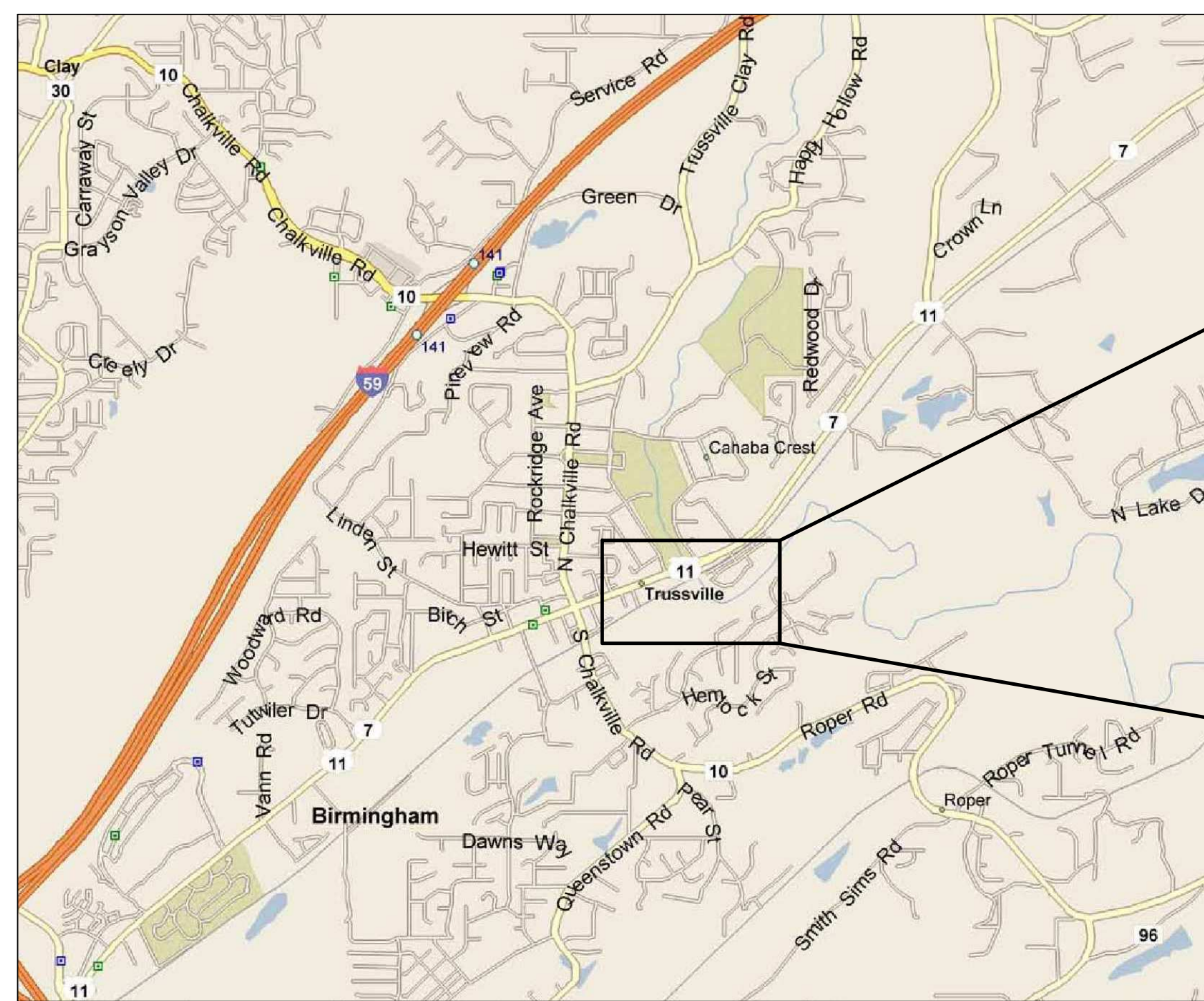
- A. As specified in Section 400551 “Common Requirements for Process Valves” for submittal requirements for compliance with this Section.

### 3.2 INSTALLATION

- A. According to AWWA C517.
- B. Install as follows:
  1. Horizontal Piping: Stem horizontal, plug opening to crown of body.
  2. Vertical Piping: Plug at top when closed.
  3. Plugs: On top when open and on pressure side when closed.

END OF SECTION 400562

XREFS: [CDMS 2436\_CEP000ST\_Corden AL PE Seal] Images: [A0115 MAP Leeds WRF vicinity map 270907, Trussville WRF-Site location map]  
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VICINITY PLAN  
 TRUSSVILLE WRF SITE ADDRESS:  
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 TRUSSVILLE, AL 35173

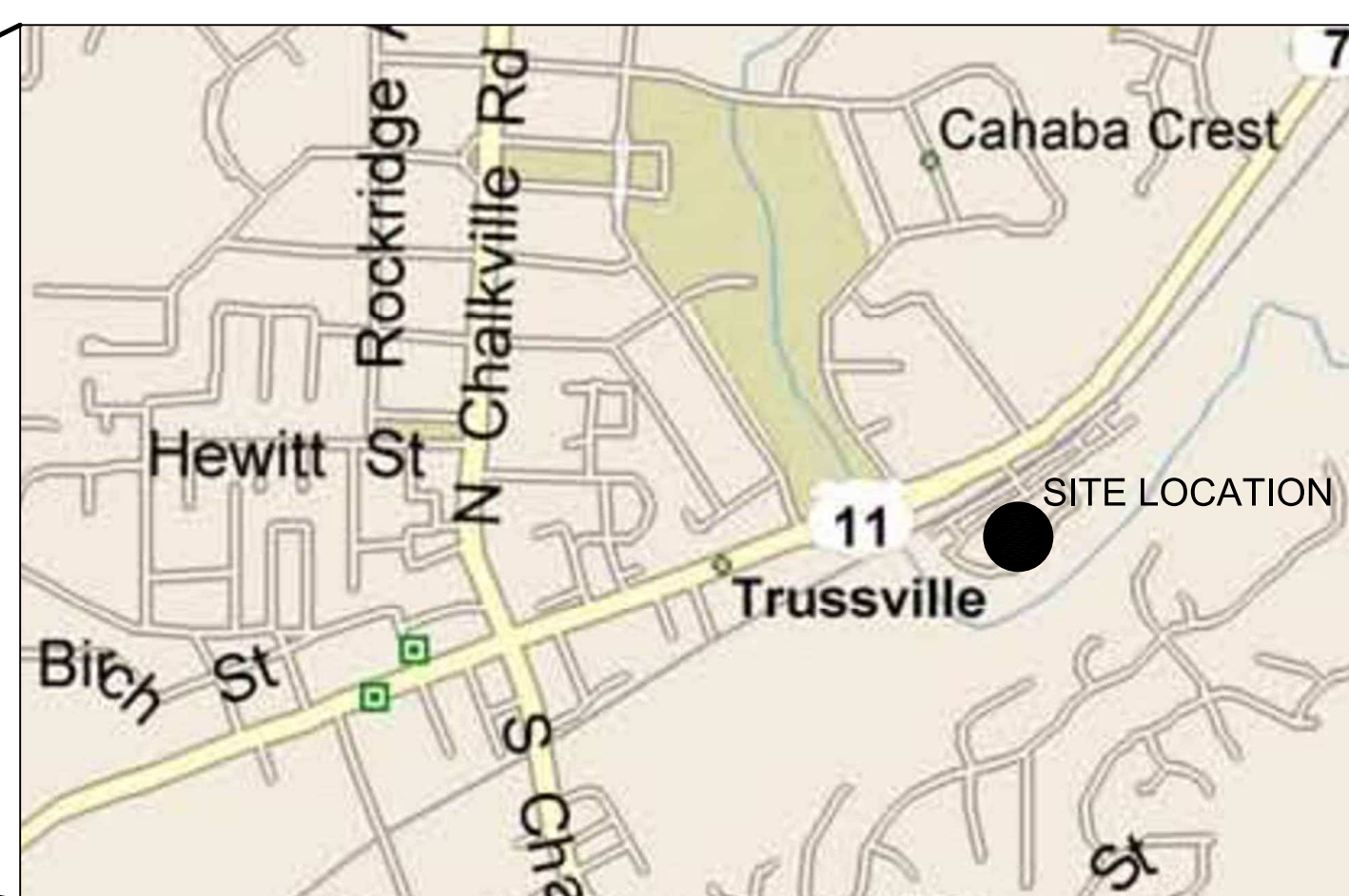
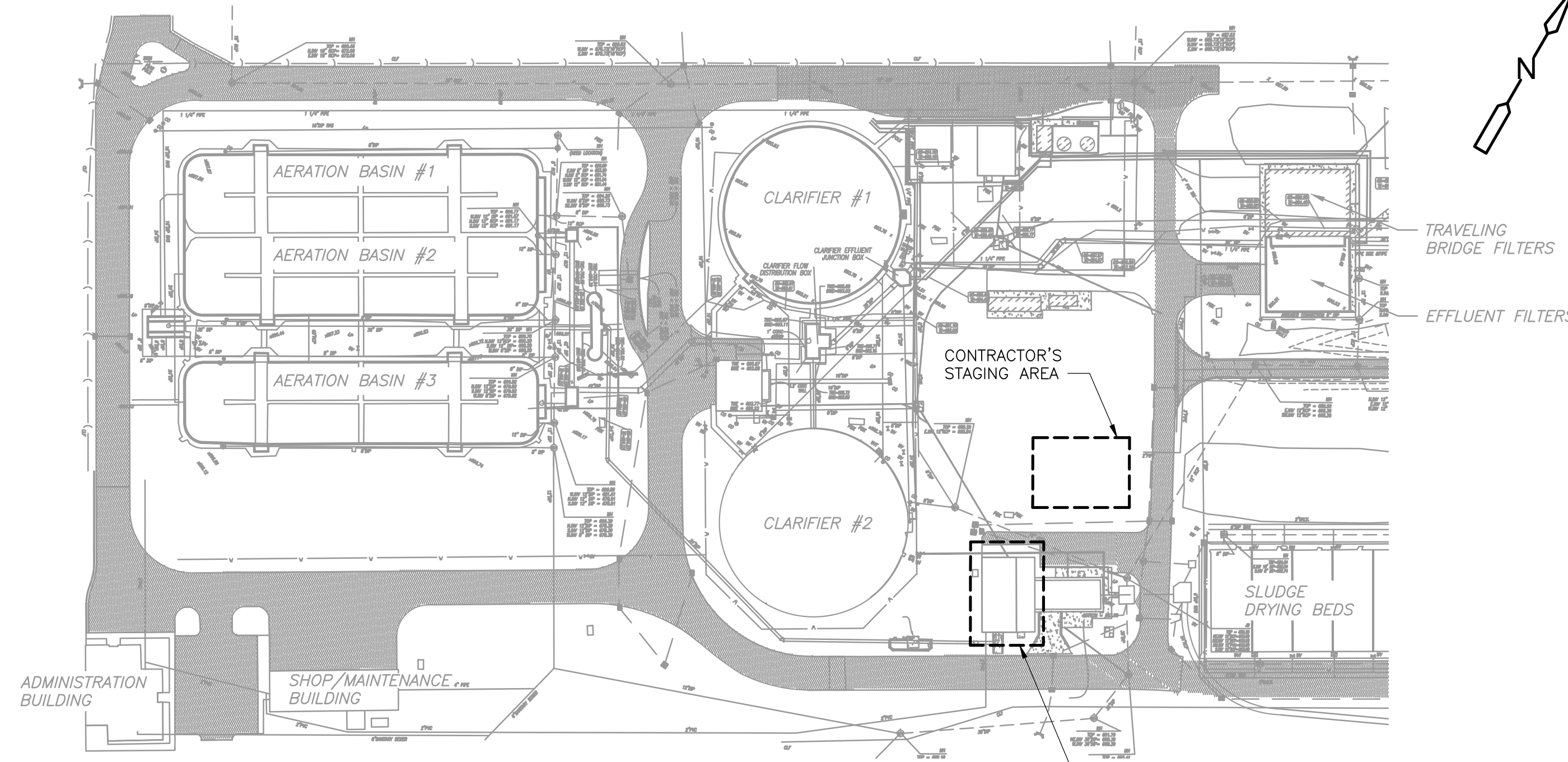


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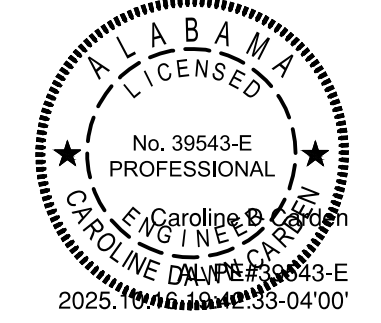
TRUSSVILLE WRF SITE  
 LOCATION PLAN



TRUSSVILLE WRF PARTIAL  
 PLAN  
 1" = 1000'

MODIFICATIONS TO  
 INFLUENT PUMP STATION  
 SEE SHEETS M-2 AND M-3  
 AND SECTION 013513.24

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	10/25	MN	CDC	ISSUED PER ADDENDUM NO. 5

DESIGNED BY: C. CARDEN  
 DRAWN BY: M. NAGESHA  
 SHEET CHK'D BY: C. MILEY  
 CROSS CHK'D BY: A. KIRBY  
 APPROVED BY: C. CARDEN  
 DATE: SEPTEMBER 2025



JEFFERSON COUNTY, ALABAMA  
 2026 TURKEY CREEK WRF AND  
 AL SEIER PUMP STATION  
 IMPROVEMENTS  
 JEFFERSON COUNTY PROJECT NO. E2613

LOCATION MAPS AND SITE PLANS II  
 SHEET NO.  
 G-3

PROJECT NO. 73998-270907  
 FILE NAME: G003STPL.DWG  
 SHEET NO.  
 G-3  
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**SYMBOLS (ABBREVIATIONS)**

	UNCLASSIFIED. TYPE AS SHOWN ON THE DRAWINGS ADJACENT TO SYMBOL
	GATE VALVE (GV)
	KNIFE GATE VALVE (KG)
	GLOBE VALVE (GLV)
	BALL VALVE (BV)
	3-WAY BALL VALVE (BV3)
	4-WAY BALL VALVE (BV4)
	RECYCLE CONTROL VALVE (RCV)
	CONE VALVE (CNV)
	NEEDLE VALVE (NV)
	PINCH VALVE (PV)
	DIAPHRAGM VALVE (DV)
	BUTTERFLY VALVE (BFV)
	PLUG VALVE (PV)
	3-WAY PLUG VALVE (PV3)
	4-WAY PLUG VALVE (PV4)
	CHECK VALVE, GENERAL SYMBOL (CKV)
	BALL CHECK VALVE (BCV)
	DOUBLE DOOR CHECK VALVE (DDCV)
	SOLENOID VALVE (SV)
	MOTOR OPERATED VALVE (MOV)
	3-WAY SOLENOID VALVE (SV3)
	4-WAY SOLENOID VALVE (SV4)
	ANGLE VALVE (AV)
	QUICK CONNECT COUPLING (QCC)
	SLUICE GATE (SLG)
	BULKHEAD GATE (BHG)
	SLIDE GATE (SG)
	WEIR SLIDE GATE (WG)
	STOP PLATE GUIDES (SPG)
	FLAP VALVE (FLV)
	SHEAR GATE (SHG)
	MUD VALVE (MV)
	PRESSURE REDUCING REGULATOR (PCV)
	PRESSURE REDUCING REGULATOR WITH EXTERNAL PRESSURE TAP (PCV)
	DIFFERENTIAL PRESSURE REDUCING REGULATOR WITH INTERNAL AND EXTERNAL PRESSURE TAPS (PDCV)

**SYMBOLS**

	CONTROL VALVE (CV)
	FLOW CONTROL VALVE (FCV)
	BACK PRESSURE REGULATOR SELF CONTAINED (PCV)
	BACK PRESSURE REGULATOR WITH EXTERNAL PRESSURE TAP (PCV)
	PRESSURE REDUCING REGULATOR WITH INTEGRAL OUTLET PRESSURE RELIEF VALVE (PCV)
	PRESSURE RELIEF OR SAFETY VALVE, (PSV) STRAIGHT-THROUGH PATTERN, SPRING OR WEIGHT-LOADED, OR WITH INTEGRAL PILOT
	PRESSURE RELIEF OR SAFETY VALVE, (PSV) GENERAL SYMBOL
	VACUUM RELIEF VALVE, GENERAL SYMBOL (VRV)
	PRESSURE AND VACUUM RELIEF VALVE, (PSV) SPRING OR WEIGHT-LOADED, OR WITH INTEGRAL PILOT
	RUPTURE DISK OR SAFETY HEAD FOR PRESSURE RELIEF (PSE)
	RUPTURE DISK OR SAFETY HEAD FOR VACUUM RELIEF (PSE)
	PRESSURE AND VACUUM RELIEF MANHOLE COVER (PSE)
	SLIDE PLATE (SP)
	MANUAL VOLUME DAMPER (VD)
	BACKDRAFT DAMPER (BDD)
	FOOT VALVE

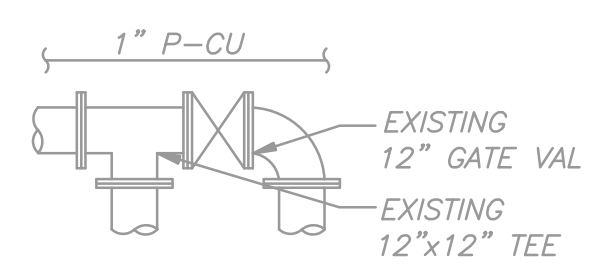
**VALVE ACTUATORS**

	DIAPHRAGM, SPRING OPPOSED
	DIAPHRAGM, SPRING OPPOSED WITH POSITIONER
	DIAPHRAGM, PRESSURE-BALANCED
	ROTARY MOTOR. (SHOWN TYPICALLY WITH ELECTRIC SIGNAL. MAY BE HYDRAULIC OR PNEUMATIC)
	SOLENOID
	CYLINDER, SINGLE-ACTING, SPRING OPPOSED WITHOUT POSITIONER OR PILOT.
	CYLINDER, DOUBLE ACTING, WITHOUT POSITIONER OR PILOT
	EXAMPLE OF CYLINDER WITH POSITIONER
	ANY CYLINDER THAT IS ASSEMBLED WITH A PILOT SO THAT ASSEMBLY IS ACTUATED BY ONE CONTROLLED INPUT. PILOT MAY BE POSITIONER, SOLENOID VALVE, SIGNAL CONVERTER, etc.
	FLOAT ACTUATOR
	FLOAT ACTUATOR WITH PILOT VALVE

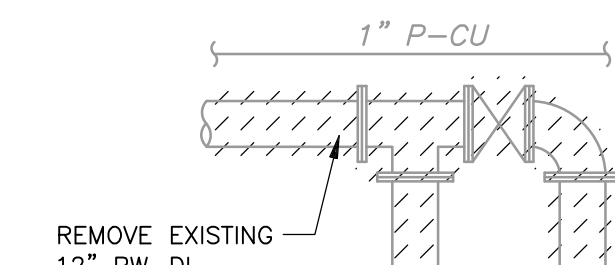
**PIPE AND FITTING SYMBOLS**

DOUBLE LINE PIPING	SINGLE LINE PIPING	PROCESS PIPING:
		PROCESS PIPING:
		EXISTING PROCESS PIPING
		FUTURE PROCESS PIPING
		WELDED JOINT
		FLANGED JOINT SIMPLIFIED REPRESENTATION. (SEE NOTE 1)
		FLANGED JOINT (SEE NOTE 1)
		COUPLING FOR GROOVED END JOINTS: (F) FLEXIBLE (R) RIGID
		MECHANICAL JOINT (SEE NOTE 1)
		PUSH ON JOINT OR CAULKED BELL & SPIGOT JOINT (SEE NOTE 1)
		FLANGE x PLAIN END PIPE COUPLING (FLANGE ADAPTOR)
		PIPE COUPLING (SLEEVE-TYPE)
		FLEXIBLE COUPLING OR EXPANSION JOINT (SLEEVE TYPE)
		FLEXIBLE COUPLING OR EXPANSION JOINT (BELLWASHER TYPE)
		FLANGE GUARD

**EXISTING FACILITIES SYMBOLOLOGY AND ANNOTATION**



**EXISTING FACILITIES DEMOLITION SYMBOLOLOGY AND ANNOTATION**



**PIPE AND FITTING SYMBOLS NOTES:**

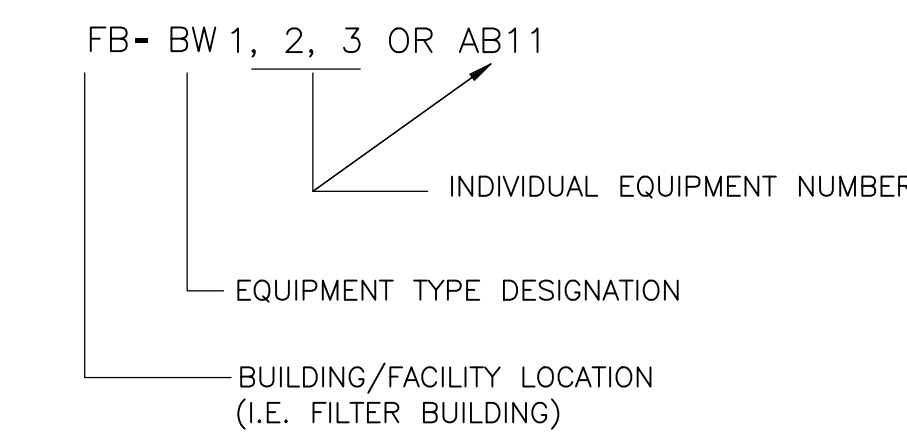
- GENERIC JOINT SYMBOL IS USED FOR ALL SINGLE LINE PIPING SHOWN ON THE INTERIOR AND EXTERIOR PIPING DRAWINGS.
- BOTH, DETAILED AND SIMPLIFIED FLANGE REPRESENTATION SYMBOLS MAY BE SHOWN ON THE DRAWINGS.
- UNLESS MODIFIED BY THE GENERAL PROJECT NOTES OR DETAILED ON THE LAYOUT AND SCHEMATIC DRAWINGS PIPE AND FITTING JOINT REQUIREMENTS FOR THE VARIOUS PIPE MATERIALS ARE DEFINED IN THE SPECIFICATIONS

**PROCESS PIPE IDENTIFICATION**

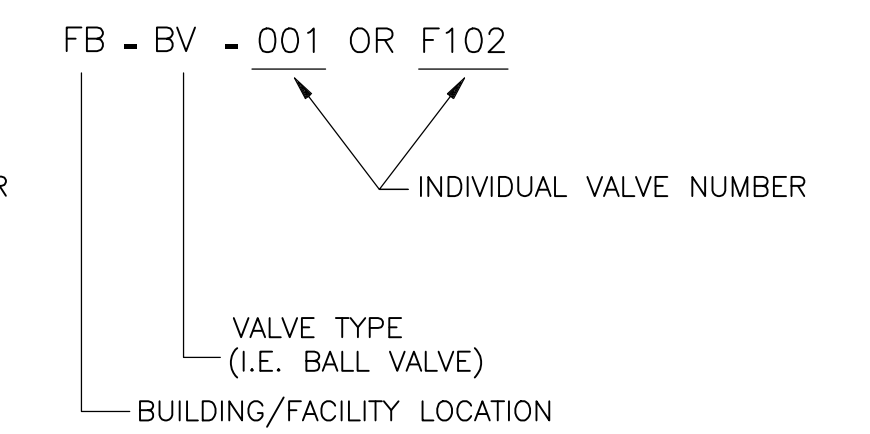
PROCESS FLOW STREAMS	PIPE MATERIALS
ABE AERATION BASIN EFFLUENT	BS BLACK STEEL PIPE
ALUM ALUMINUM SULFATE	CI CAST IRON
BYP BYPASS	CPVC CHLORINATED POLYVINYL CHLORIDE
D DRAIN	CU COPPER
DFS DIGESTER FEED SLUDGE	DI DUCTILE IRON
DRS DIGESTER RECIRCULATION SLUDGE	DIGL DUCTILE IRON GLASS LINED
DS DIGESTED SLUDGE	FSH FLEXIBLE SLURRY HOSE
FBW FILTER BACKWASH WATER	FRP FIBERGLASS REINFORCED PLASTIC
FeCl3 FERRIC CHLORIDE, 40%	GS GALVANIZED STEEL
FEF FILTER EFFLUENT	HDPE HIGH DENSITY POLYETHYLENE
NPW NON-POTABLE WATER	PCCP PRESTRESSED CONCRETE CYLINDER PIPE
OVF OVERFLOW	POLYP POLYPROPYLENE
PLW PLANT REUSE WATER	PPSTL POLYPROPYLENE LINED STEEL PIPE
POLN-DW POLYMER, NEAT, DEWATERING	PVC POLYVINYL CHLORIDE PRESSURE PIPE
POLN-SA POLYMER, NEAT, SETTLING AID	RCP REINFORCED CONCRETE SEWER PIPE
POLS-DW POLYMER SOLUTION, DEWATERING	RUB RUBBER
POLS-SA POTABLE WATER	SST STAINLESS STEEL
PW RETURN ACTIVATED SLUDGE	STL STEEL
RAS RAW WASTEWATER	
RWW SECONDARY CLARIFIER EFFLUENT	
SCR SCREENINGS	
SPLABE SAMPLE - AERATION BASIN EFFLUENT	
SPLFEF SAMPLE - FILTER EFFLUENT	
SPLSCE SAMPLE - SECONDARY CLARIFIER EFFLUENT	
TDS THICKENED DIGESTED SLUDGE	
UVEFF UV DISINFECTION EFFLUENT	
V VENT	
WAS WASTE ACTIVATED SLUDGE	
WBW WASTE BACKWASH WATER	

NOTE: NOT ALL ABBREVIATIONS APPLY TO THIS PROJECT.

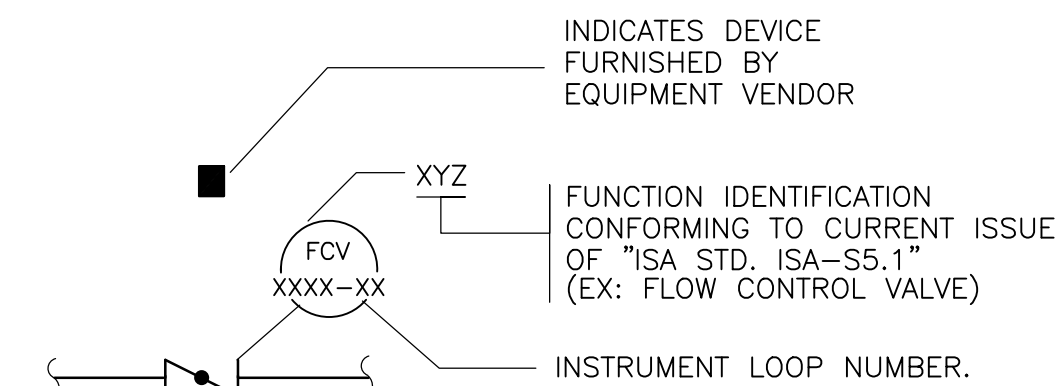
**EQUIPMENT TAG**



**VALVE TAG**



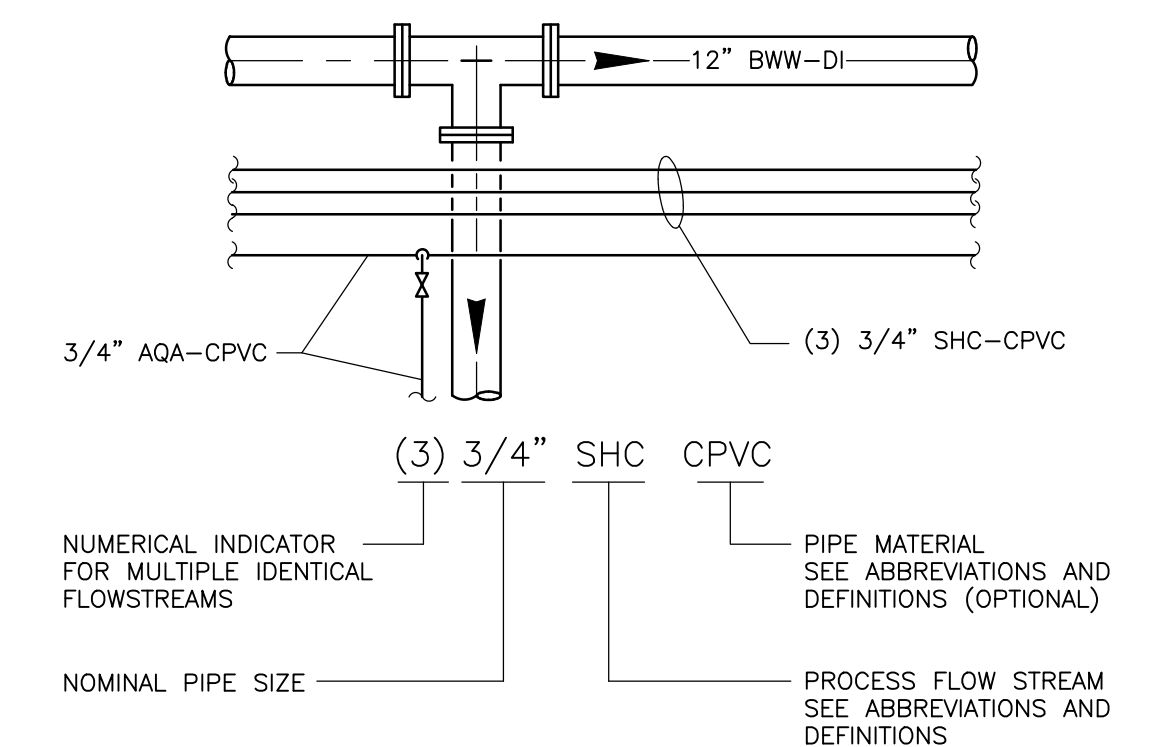
**PROCESS VALVE LOOP IDENTIFICATION**



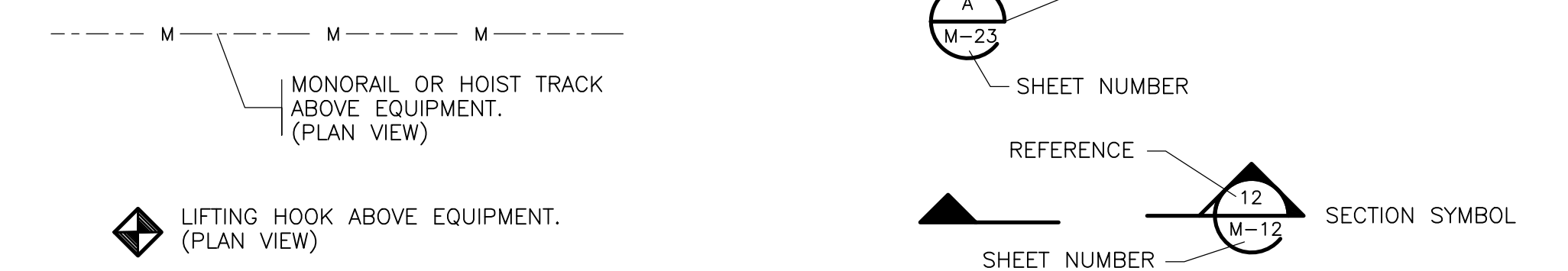
MECHANICAL DRAWINGS SHOW ONLY PRIMARY INSTRUMENT ELEMENTS. FOR ADDITIONAL DETAILS REFER TO INSTRUMENTATION SPECIFICATIONS.

**TYPICAL INSTRUMENTATION AND LOOP TAG**

**PIPE TAG**



**MISCELLANEOUS SYMBOLS**



LEGENDS SYMBOLS AND ABBREVIATIONS SHOWN ON THIS SHEET INDICATE STANDARD SYMBOLS AND ABBREVIATIONS AND ARE PERTINENT TO THE CONDITIONS ON THIS SET OF DRAWINGS TO THE EXTENT APPLICABLE.

ADDITIONAL LEGENDS AND/OR ABBREVIATIONS MAY APPEAR IN THIS SET OF DRAWINGS TO INDICATE SPECIFIC CONDITIONS.

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DRAWN BY:	S. PUNNYA
SHEET CHK'D BY:	R. KEEFE
CROSS CHK'D BY:	A. KIRBY
APPROVED BY:	C. CARDEN
DATE:	SEPTEMBER 2025

**CDM Smith**  
 2100 Riveridge Parkway, Suite 1250  
 Atlanta, GA 30328  
 Tel: (404) 724-1400

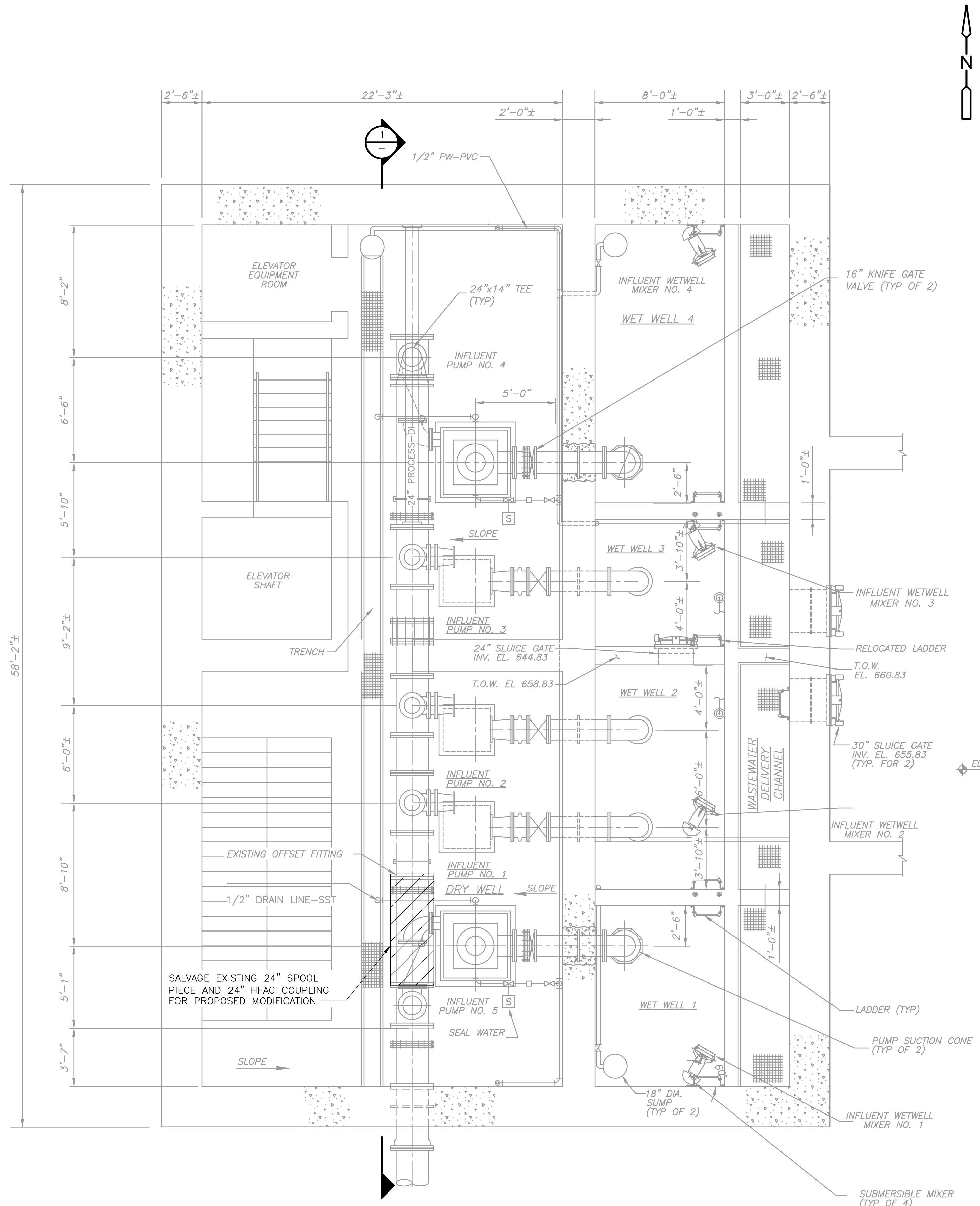
JEFFERSON COUNTY, ALABAMA  
 2026 TURKEY CREEK WRF AND  
 AL SEIER PUMP STATION  
 IMPROVEMENTS  
 JEFFERSON COUNTY PROJECT NO. E2613

**MECHANICAL LEGEND SHEET**

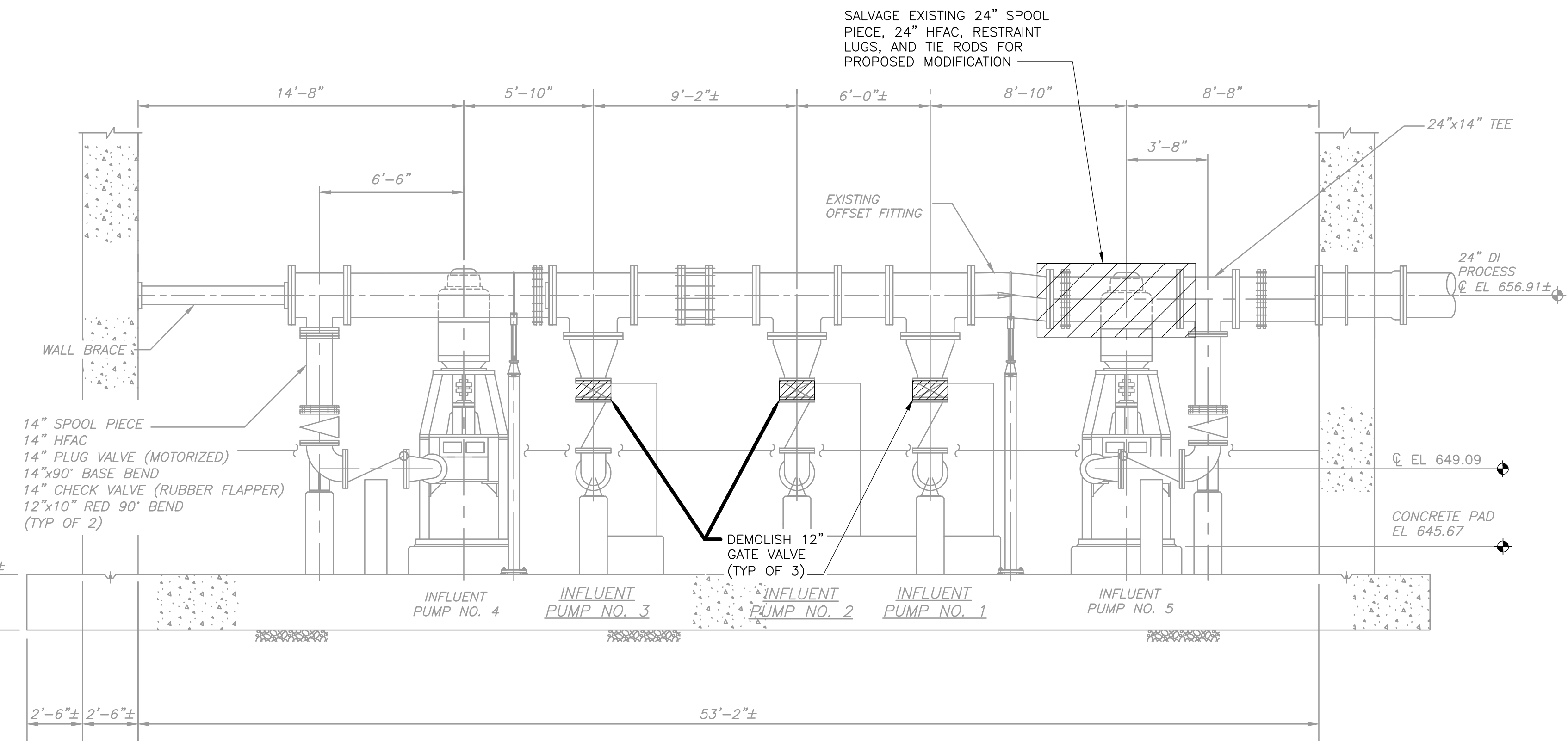
PROJECT NO.	73998-270907
FILE NAME:	MO01PLG.DWG
SHEET NO.	M-1

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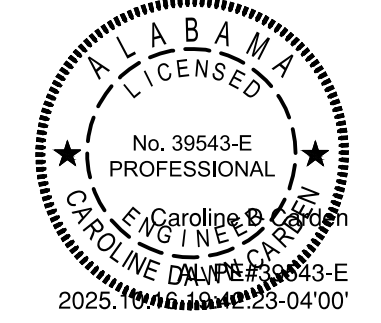
**INFLUENT PUMP STATION @ EL 664.83**  
**PLAN**  
 1/4" = 1'-0"



**SECTION 1**  
 1/4" = 1'-0"

- NOTES:**
- COMPLY WITH THE REQUIREMENTS OF SPECIFICATION SECTION 013513.24, SPECIAL PROCEDURES FOR MAINTENANCE OF PLANT OPERATIONS AND SEQUENCE OF CONSTRUCTION.
  - SLANTED AND SCREENED TEXT INDICATES INFORMATION OR DIMENSIONS TAKEN FROM DRAWINGS TITLED "CAHABA RIVER AND TRUSSVILLE WWTPs AND AL SEIER PUMP STATION PHASE II" PRODUCED BY CDM SMITH. CONTRACTOR TO FIELD VERIFY ALL EXISTING INFORMATION PRIOR TO INSTALLATION.

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REV. NO.	DATE	DRWN	CHKD	REMARKS
	10/25	PS	RJK	ISSUED PER ADDENDUM NO. 5

DESIGNED BY: R. KEEFE  
 DRAWN BY: S. PUNNYA  
 SHEET CHK'D BY: R. KEEFE  
 CROSS CHK'D BY: A. KIRBY  
 APPROVED BY: C. CARDEN  
 DATE: SEPTEMBER 2025

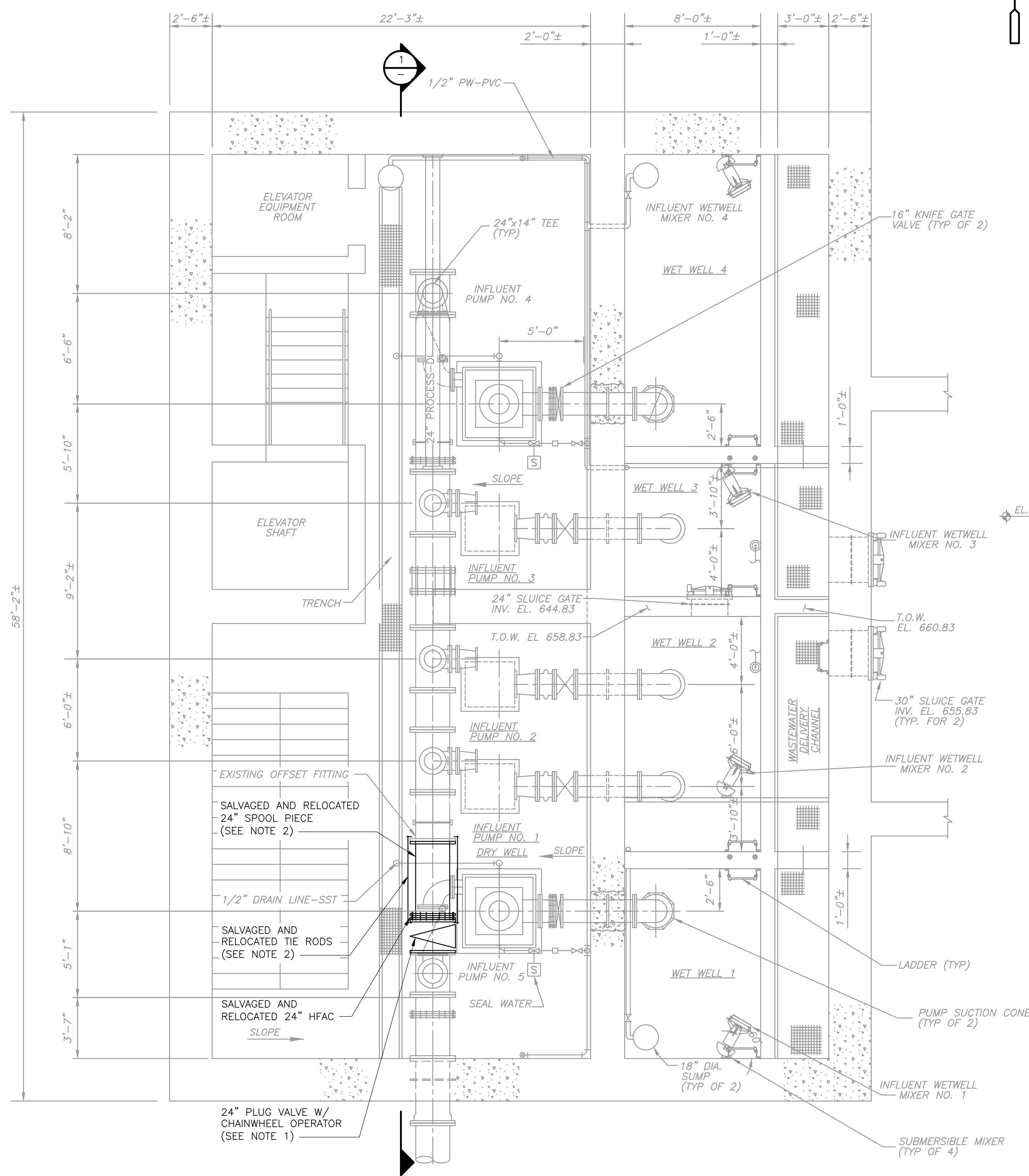


JEFFERSON COUNTY, ALABAMA  
**2026 TURKEY CREEK WRF AND AL SEIER PUMP STATION IMPROVEMENTS**  
 JEFFERSON COUNTY PROJECT NO. E2613

**TRUSSVILLE WRF**  
**INFLUENT PUMP STATION**  
**DEMOLITION PLAN AND SECTION**

PROJECT NO. 73998-270907  
 FILE NAME: M002PSDM.DWG  
 SHEET NO. **M-2**  
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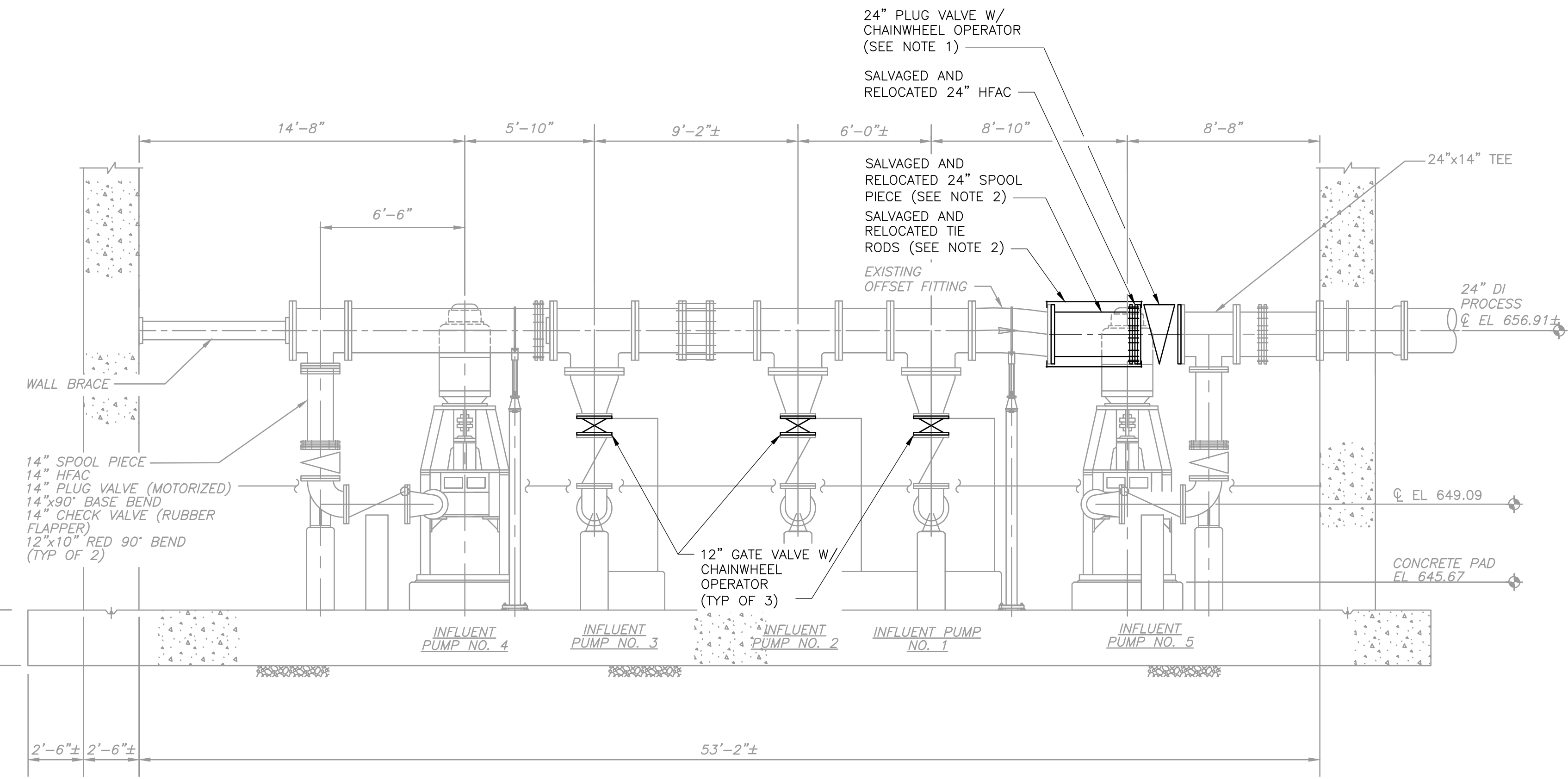
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INFLUENT PUMP STATION @ EL 664.83

PLAN

1/4" = 1'-0"

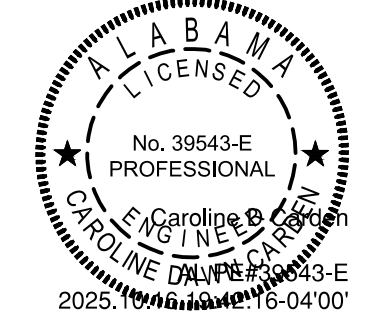


SECTION 1  
1/4" = 1'-0"

NOTES:

- ANY ADDITIONAL PIPE SUPPORTS REQUIRED FOR THE ADDITION OF THE 24" PLUG VALVE ARE TO BE DELEGATED DESIGN BY A 3RD PARTY PIPE SUPPORT ENGINEER. THIS ANALYSIS AND SUPPORT RECOMMENDATION IS TO BE SUBMITTED FOR REVIEW AND APPROVAL.
- UTILIZE EXISTING 24" SPOOL PIECE BY CUTTING IT TO THE APPROPRIATE LENGTH IN THE FIELD AND CONNECTING THE NEW PLAIN END TO THE SALVAGED AND RELOCATED 24" HFAC. THE SALVAGED AND RELOCATED 24" HFAC IS A SMITH-BLAIR MODEL 913 STEEL FLANGED COUPLING ADAPTER. ADDITIONALLY, THE EXISTING SALVAGED AND RELOCATED TIE RODS ARE SMITH-BLAIR MODEL 907 RESTRAINT LUGS AND TIE RODS THAT EXTEND AS SHOWN ON THE DRAWINGS. TRIM THE EXISTING TIE RODS TO FIT IN THE SHORTER DISTANCE BETWEEN THE EXISTING FLANGE AND NEW 24" PLUG VALVE, AS SHOWN ON THE DRAWINGS. UTILIZE THE SAME TIE ROD ORIENTATION AROUND THE BOLT FLANGES OF THE PIPE AS EXISTING. PROTECT ALL FIELD CUTS AND SCRATCHED SURFACES WITH PAINT TO PROTECT FROM CORROSION. CUT SHEET INFORMATION FOR THE HFAC AND TIE RODS CAN BE PROVIDED UPON REQUEST.
- COMPLY WITH THE REQUIREMENTS OF SPECIFICATION SECTION 013513.24, SPECIAL PROCEDURES FOR MAINTENANCE OF PLANT OPERATIONS AND SEQUENCE OF CONSTRUCTION.
- SLANTED AND SCREENED TEXT INDICATES INFORMATION OR DIMENSIONS TAKEN FROM DRAWINGS TITLED "CAHABA RIVER AND TRUSSVILLE WWTPS AND AL SEIER PUMP STATION PHASE II" PRODUCED BY CDM SMITH. CONTRACTOR TO FIELD VERIFY ALL EXISTING INFORMATION PRIOR TO INSTALLATION.

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JEFFERSON COUNTY, ALABAMA  
 2026 TURKEY CREEK WRF AND  
 AL SEIER PUMP STATION  
 IMPROVEMENTS  
 JEFFERSON COUNTY PROJECT NO. E2613

TRUSSVILLE WRF  
 INFLUENT PUMP STATION  
 MODIFICATION PLAN AND SECTION

PROJECT NO. 73998-270907  
 FILE NAME: M003PSPL.DWG  
 SHEET NO. M-3  
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