CITY OF FAIRHOPE

INVITATION TO BID

SEALED BIDS will be received by the City of Fairhope of Baldwin County, Alabama, in the City of Fairhope's City Services and Public Utilities Building located at, 555 South Section St. Fairhope, Alabama, until 10:00 A.M. Tuesday, March 26, 2024, and then publicly opened thereafter, for furnishing all labor and materials, and performing all work required by the City of Fairhope and described as follows:

Bid Number 24-030
SCADA System for Water Treatment Plant No. 1

The City of Fairhope is requesting responses from qualified contractors to provide a complete SCADA system with instrumentation and controls with appurtenant equipment and accessories as indicated, specified, and as necessary for a complete and proper operating system.

Bid documents will be posted on the City of Fairhope Website: www.FairhopeAL.gov or a copy may be obtained by e-mailing: Purchasing@FairhopeAL.gov. Specifications are on file and may be seen in the Purchasing Department of the City of Fairhope, Alabama, 555 S. Section Street. Prior to opening, Bid packages may be picked up at that location during normal operation, between 7:00 am and 4:00 pm local time.

Questions or comments pertaining to this bid must be presented in writing, sent as e-mail to the attention of the Purchasing Manager, Erin Wolfe, 555 South Section St., Fairhope, AL 36532, e-mail: Purchasing@FairhopeAL.gov, by Wednesday, March 20, 2024, at 11:00 A.M. or will be forever waived.

There will be a non-mandatory pre-bid meeting on Tuesday, March 19, 2024, at 9:00 A.M. at the City Services and Public Utilities Building located at 555 South Section Street, Fairhope, AL.

The City of Fairhope is an Equal Opportunity Employer and requires that all **BIDDERS** comply with the Equal Employment Opportunity laws and the provisions of the CONTRACT Documents in this regard. The **CITY** also encourages and supports the utilization of Minority Business Enterprises on this and all public bids.

All bids must be on blank bid forms provided in the Bid Documents. All bids, with their guarantee (when required), must be enclosed in a sealed, opaque envelope, clearly identified on the outside as a "**Sealed Bid" with Item Name, Bid Number, City of Fairhope's Name and Address and CONTRACTOR's Name and Address**. Each bid must be in a separate envelope. Bids made out in pencil will not be accepted. Failure to observe the instructions contained herein will constitute grounds for rejection of your bid. The **City** reserves the right to accept or reject all bids or any portion thereof, and to waive informalities and to furnish any item of material or work to change the amount of the CONTRACT, whichever is in the best interest of the City of Fairhope.

No bids will be considered unless the **CONTRACTOR,** whether resident or non-resident of Alabama, is properly qualified to submit a proposal for this type of work in accordance with all applicable laws of the State of Alabama. Where applicable, this shall include evidence of holding a current license from the State Licensing board for General BIDDERS, Montgomery, Alabama, as required by Chapter 8 of Title 34, of the Code of Alabama, 1975. In addition, the Awarded Vendor, if non-resident of the State, and if a corporation, shall show evidence of having qualified with the Secretary of State to do business in the State of Alabama. **CONTRACTOR** must have a current business license or purchase a business license with the City of Fairhope prior to work performed. No bids shall be withdrawn for the period of thirty (30) days subsequent to the opening of proposals without the consent of the City of Fairhope, Baldwin County, Alabama. Once completed, a tabulation of the responsive and responsible bids will be available for public viewing by visiting the following web address: www.FairhopeAL.gov.

INVITATION TO BID
NO. 24-030
SCADA SYSTEM FOR
WATER TREATMENT PLANT NO. 1

CITY OF FAIRHOPE
SHERRY SULLIVAN, MAYOR

TABLE OF CONTENTS

ITEM I
INVITATION AND INSTRUCTIONS TO BIDDERS

1.00 **BID INVITATION**

Notice is hereby given that the **City of Fairhope ("CITY")** will receive bids on the project described herein. Qualified **BIDDERS** are invited to bid on this CONTRACT.

1.01 **BID NO.:** **24-030**
NAME: **SCADA System for Water Treatment Plant No. 1**

1.02 **SUMMARY**

The City of Fairhope is requesting responses from qualified contractors to provide a complete SCADA system with instrumentation and controls with appurtenant equipment and accessories as indicated, specified, and as necessary for a complete and proper operating system

1.03 **BID DEADLINE**

Bids will be received until **10:00 A.M. local time, Tuesday, March 26, 2024,** at the City Services and Public Utilities Building, 555 South Section St., Fairhope, Alabama, and publicly opened shortly thereafter.

1.04 **AVAILABILITY OF DOCUMENTS**

Bid Documents may be obtained on the City's website at www.FairhopeAL.gov/departments/purchasing/bids or at the City Services and Public Utilities Building, 555 South Section Street., Fairhope, Alabama. One set of Bid Documents can be obtained free of charge.

1.05 **INQUIRIES**

Questions or comments pertaining to this bid must be presented in writing, sent as e-mail to the attention of the Purchasing Manager, Erin Wolfe, 555 South Section St., Fairhope, AL 36532,
e-mail: Purchasing@FairhopeAL.gov, by Wednesday, March 20, 2024, at 11:00 A.M. or will be forever waived.

1.06 **SITE EXAMINATION**

There will be a **non-mandatory pre-bid meeting on Tuesday, March 19, 2024, at 9:00 A.M.** at the City Services and Public Utilities Building located at 555 South Section Street, Fairhope, AL. This non-mandatory pre-bid meeting will serve as an opportunity for potential bidders to engage project stakeholders, review plans and ask questions.

The City of Fairhope will not furnish any labor, material, or supplies unless specifically stated in the CONTRACT Documents. **BIDDERS** must be properly licensed to perform the work as outlined in the Scope of Work. Awarded Vendor must have a current business license or purchase a business license with the City of Fairhope prior to bid being awarded.

Except for CONTRACTS funded in whole or in part by funds received from a federal agency, preference shall be given to resident **BIDDERS** on the same basis as the nonresident **BIDDERS** state awards CONTRACT to Alabama **BIDDERS b**idding under similar circumstances. Therefore, non-resident **BIDDERS** shall submit with their bid a written opinion of an attorney at law licensed to practice law in the non-resident **BIDDERS** state of domicile as to preferences granted by that state to entities doing business in that state when letting public contracts.

1.07 **BID SECURITY**

Bids shall be accompanied by a Bid Security equal to 5% (percent) of the bid price, but in no event more than $10,000.00. Bid Security shall be in the form of a Bid Bond or a cashier's check payable to The City of Fairhope. No Bid Security is required on bids less than $10,000.00.

1.08 **PERFORMANCE ASSURANCE AND INSURANCE**

Performance Bond and Labor and Material Bond are waived for this contract.

The accepted **BIDDER** shall also provide insurance as required in ITEM V.

1.09 **DURATION OF OFFER**

Bids maybe withdrawn in written or telegraphic request received from **BIDDER** prior to the time fixed for opening. No bid shall be withdrawn for a period of thirty (30) days subsequent to the opening of bids without the consent of the City Council of the City of Fairhope.

1.10 **EQUAL OPPORTUNITY**

The City of Fairhope is an Equal Opportunity Employer and requires that all **BIDDERS** comply with the Equal Employment Opportunity laws and the provisions of the CONTRACT Documents in this regard. The City of Fairhope also encourages and supports the utilization of Minority Business Enterprises on this and all public bids.

1.11 **BID SUBMISSION AND PREPARATION**

Sealed Bids, signed, executed, and dated, will be received by the City of Fairhope as noted in section 1.03 above. Submit one copy of the executed offer on the Bid Form provided, signed, and with the required Bid Security. **The bid shall be enclosed in a sealed opaque envelope approximately 9x12 inches or larger, clearly identified on the outside** as a **SEALED BID** with **the BID NAME, BID NUMBER, CITY'S NAME AND ADDRESS, CONTRACTOR'S NAME AND ADDRESS.**

Forms furnished, or copies thereof, shall be used, and strict compliance with the requirements of the invitation, these instructions, and the instructions printed on the forms is necessary. Special care should be exercised in the preparation of bids. **BIDDERS** must make their own estimates of the facilities and difficulties attending the performance of the proposed CONTRACT, including local conditions, uncertainty of weather, and all other contingencies. All designations and prices shall be fully and clearly set forth. The proper space in the bid and guaranty forms shall be suitably filled in.

Fill in all blanks on the bid form with non-erasable ink or type. Erasers or other changes must be explained or noted over the signature of the **BIDDER.**

The Bid Form may have a Contingency Allowance listed. Add this amount to the Base Bid to derive the Total Bid. The Contingency Allowance covers unforeseen conditions and shall not be used by the **BIDDER** without the written authorization of the **CITY**. At the conclusion of the project, the unused portion of the Contingency Allowance shall revert to the **CITY**.

Each bid must give the full business address of the **BIDDER** and must be signed by him with his usual signature. Bids by partnerships must furnish the full names of all partners and must be signed with the partnership name by one of the members of the partnership, or by an authorized representative, followed by the signature and designation of the person signing. Bids by corporations must be signed with the legal name of the corporation followed by the name of the State of Incorporation and by the signature and designation of the president, secretary, or other person authorized to bind it in the matter. The name of each person shall also be typed or printed below the signature. A bid by a person who affixes to this signature the word "president," "secretary," "agent," or other designation without disclosing his principal, may be held to be the bid of the individual signing. When requested by the **CITY** satisfactory evidence of the authority of the officer signing in behalf of the corporation shall be furnished.

Each project will be bid separately unless otherwise expressly requested in the CONTRACT document. Combination bids, that is bids on separate projects lumped together as a single bid or on all or none basis, will not be accepted unless the CONTRACT document expressly requests or permits same.

1.12 **BID INELIGIBILITY**

Bids that contain irregularities of any kind may be declared unacceptable at the discretion of the **CITY**. The **CITY** may waive any irregularities and may reject any or all bids. Bids received after the deadline will be returned to the **BIDDER** unopened.

1.13 **CONTRACT TIME**

The **BIDDER** agrees to provide a complete SCADA system with instrumentation and controls with appurtenant equipment and accessories as indicated, specified, and as necessary for a complete and proper operating system. System must be delivered by September 30, 2024.

1.14 **INQUIRIES/ADDENDA**

All Addenda are part of the CONTRACT Documents. Include resultant costs in the Bid. Addenda will be issued by E-MAIL and posted on the City's website: www.FairhopeAL.gov. It is the responsibility of the **BIDDER** to verify that all Addenda have been received.

Questions or comments pertaining to this bid must be presented in writing, sent via email to Purchasing@FairhopeAL.gov by Wednesday, March 20, 2024, at 11:00 A.M. or will be forever waived.

1.15 **BID ACCEPTANCE**

Bid with lowest Total Bid amount from a responsive and responsible **BIDDER** may be accepted if within the CONTRACT Budget. In the event that alternates are listed on the Bid Form, the lowest combination of Total Bid and Alternate Bids accepted by the **CITY** shall be the accepted bid. Alternates shall be awarded in the order in which they are listed on the Bid Form.

1.16 **BIDDERS INTERESTED IN MORE THAN ONE BID**

If more than one bid is offered by any one party, by or in a name of his clerk, partner, corporation in which he has a substantial interest, or in which he is an officer, or other person, all such bids may be rejected. A party who has quoted prices on materials to a **BIDDER** is not thereby disqualified from quoting prices to other **BIDDERS** or from submitting a bid directly for the materials or work. The **CITY** reserves the right to determine in its discretion whether the provisions of this clause have been violated by any **BIDDER.**

1.17 **ERRORS IN BIDS**

BIDDERS or their authorized agents are expected to examine the maps, drawings, specifications and all other instructions pertaining to the work, which will be open to their inspection. Failure to do so will be at the **BIDDER'S** own risk. In case of error, in the extension of prices, the unit price will govern.

1.18 **CONTRACT AND BOND**

The **BIDDER** to whom award is made must, when requested, enter into written CONTRACT on the standard form as set out herein, with satisfactory security in the amount required, within the period specified, or, if no period be specified, within 15 days after the required forms are presented to him for signature.

1.19 **COLLUSION**

If there is any reason for believing that collusion exists among the **BIDDERS** any or all bids may be rejected, and those participating in such collusion may be barred from submitting bids on the same or other work with the **CITY**.

1.20 SUBLETTING OR ASSIGNING OF CONTRACT

Limitations: The CONTRACTOR shall not sublet, assign, transfer, convey, sell, or otherwise dispose of any portion of the CONTRACT, his right, title or interest therein, or his power to execute such CONTRACT, to any person, firm or corporation without written consent of the **CITY**, and such written consent shall not be construed to relieve the **BIDDER** of any responsibility for the fulfillment of the CONTRACT. Unless otherwise stipulated in the proposal or special provisions, the **BIDDER** shall perform with his own organization, and with the assistance of workmen under his immediate superintendence and reported on his payroll, all CONTRACT work of a value not less than 50 percent of the total CONTRACT amount, except that any items designated in the CONTRACT as "Specialty Items" so performed by SUB-CONTRACT may be deducted from the total CONTRACT amount before computing the amount of work required to be performed by the B**IDDER** with his own organization.

SUB-CONTRACTOR'S Status:

A **SUB-CONTRACTOR** shall be recognized only in the capacity of an employee or agent of the **CONTRACTOR** and the **CONTRACTOR** will be responsible to the **CITY** for all of the **SUB-CONTRACTOR's** work, including failures or omissions; and his removal may be required by the Project Manager, as in the case of an employee.

1.21 PROSECUTION OF WORK

The **BIDDER** shall prosecute the work continuously and diligently in the order and manner set out in his schedule as approved by the **CITY**. He shall provide sufficient satisfactory materials, labor, and equipment to ensure that the work will be completed in a satisfactory manner within the time specified in the CONTRACT.

Should the **BIDDERS** fail to maintain a satisfactory rate of progress, the **CITY** may require that additional forces and/or equipment be placed on the work to bring the project up to schedule and maintain it at that level.

Should the **BIDDER** fail to furnish sufficient satisfactory equipment and/or labor for maintaining the quality and progress of the work at satisfactory level, the **CITY** may withhold all estimates that may become due until satisfactory quality and progress are maintained; or the CONTRACT may be annulled.

ITEM II
SCOPE OF WORK

Bid No. 24-030
SCADA System for Water Treatment Plant No. 1

SCOPE OF WORK

The City of Fairhope is requesting responses from qualified contractors to provide a complete SCADA system with instrumentation and controls with appurtenant equipment and accessories as indicated, specified, and as necessary for a complete and proper operating system. System must be delivered by September 30, 2024.

SECTION 27 60 00 - SCADA SYSTEM

PART 1 - GENERAL

1.1. DESCRIPTION

A. Work included: Provide a complete SCADA System with instrumentation and controls with appurtenant equipment and accessories as indicated, specified, and as necessary for a complete and proper operating system.
   1. Work includes, but not necessarily limited to, the following:
      a. All programmable logic controllers (PLCs), instruments, and other appurtenances as indicated and specified herein and as required by the process flow and instrumentation diagrams and descriptions.
      b. All engineering, hardware and software development, installation, startup, calibration services and supervision necessary.
      c. Testing and operational demonstrations as specified.
      d. Training programs as specified.
      e. Preparation of manuals.
      f. Programming of screens, alarms, historian, trending, etc. for the SCADA Computer system.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Specifications, Special Provisions, and all other related Sections.
   2. Refer to Specification Section 26 29 00 for additional control panel requirements.
   3. If applicable, refer to Specification Section 27 60 01 for SCADA Functional Descriptions (to be provided within construction phase of project unless indicated otherwise).
   4. Refer to Specification Section 27 60 05 for instrumentation requirements.
   5. Refer to plans for point lists and additional device requirements.

1.2. QUALITY ASSURANCE

A. The qualifications and experience of key project personnel shall be acceptable to the Engineer. The System Integrator shall employ competent service personnel to service and troubleshoot the control and instrumentation systems and shall have at least 15 years of experience with similar work. References shall be provided upon request by the Engineer. The System Integrator shall maintain their own UL508 panel shop. The System Integrators approved for this project are:
   1. Automation Control Services, LLC (“ACS”) – Pensacola, Florida (contact: Josef Anderson; josef.anderson@autoconserv.com; 850-477-8440)
   2. Electric Machine Controls (“EMC”) – Birmingham, Alabama (contact: Brian Thomason, bthomason@emcinc.com)
   3. Revere Controls – Birmingham, Georgia (contact: Derick Lamar, dlamar@reverecontrol.com)
   4. Other Pre-Approved Equivalent.

B. The system integration duties shall be provided by a company qualified, experienced, and regularly engaged in designing, setting up, programming, and integrating complex process loop controls and instrumentation for process control and monitoring applications. Only qualified system integrators will be allowed to submit proposals for

this project. In order to be considered qualified, integrator shall have completed a minimum of five (5) projects of similar type/scope and equal or greater magnitude and complexity within the last ten (10) years. Sub-contractors without qualifications will be rejected. Previous projects used to meet this experience requirement must have included similar (or greater) scopes of work for each of the following areas:

1. Process loop controls for the proposed processes
2. HMI graphics
3. Instrumentation
4. Control Panel/PLC panel construction

C. The System Integrator shall have and shall maintain a qualified technical and support staff. The System Integrator shall employ a Control Systems Engineer or Electrical Engineer to supervise or perform the work required by this Specification

D. The System Integrator or it's personnel engaged in this project shall have and shall maintain, at a minimum, the first three (3) certificates of ISA 62443 (for cybersecurity of industrial automation and control systems).

E. Contractor:

1. Shall be fully and solely responsible for the work of the systems supplier and solely responsible to the Owner for having supplied to the Owner the complete integrated SCADA system.
2. To provide personal superintendence and direction of the work, maintaining and supplying complete supervision over and coordination between all subcontractors employed by him and the Instrumentation and Control System Integrator.
3. To be responsible for defining the limits of his subcontractor's work.
4. To be responsible for setting of instruments (including alarms, etc. as provided under other sections).

F. Operation and Maintenance Manuals

1. Operating instructions shall incorporate a functional description of the entire system, including the system schematics which reflect "as-built" modifications.
2. Special maintenance requirements particular to the system shall be clearly defined along with special calibration and test procedures.
3. As part of the operation and maintenance manuals, provide one hard copy of the program used to program the programmable logic controller.

1.3. WARRANTY

A. Systems supplier shall furnish a hardware and software warranty for the system starting at substantial completion and ending one year from this date.

1.4. REFERENCES

A. Instrument Society of America (ISA) PR7. 1, Pneumatic Control Circuit Pressure Test, Tentative Recommendation Practice.

B. Instrument Society of America (ISA) S5.4, Instrument Loop Diagrams, standard.

C. National Electrical Manufacturers Association (NEMA) Publication, General Standards for Industrial and Control Systems, ICS 1 and Industrial Controls and Systems ICS2.

1.5. RADIO/WIRELESS SYSTEM PROPAGATION STUDIES

A. The successful bidder of this project will be responsible for implementing a highly reliable wireless communication network to remote panels/devices as indicated on plans. The successful bidder shall provide these studies prior to preparing project submittals and shall implement radio/wireless networks with components/antennae/radios/mounting poles/etc. accordingly as required for a fully functional system.

B. The System Integrator shall obtain all necessary permits required for radio/wireless systems prior to ordering/procuring any associated system equipment/devices.

C. The propagation study will include running a computer model from topographical information. The propagation study will also include a site survey to test signal strength (with the actual equipment proposed) to confirm the computer analysis.

D. The goal of the study is to produce a report that will specify the equipment that a supplier/integrator will need to install at each radio/wireless-connected device/panel to achieve better than -90dB communication for each radio/wireless link.

E. The propagation study report shall include the following information:
   1. Location of each new station geographical coordinates – longitude, latitude and elevation.
   2. Type of wireless equipment/devices and wireless communication types proposed. Where applicable, frequencies used in system testing and proposed in final installation of radio systems shall specifically be noted..
   3. Tower/pole/mast mounting heights, types and installation requirements for all antennae.
   4. All antenna styles/types.
   5. Locations, types, mounting details, etc. for any required access points or repeaters required to achieve the required signal strengths. Note that, if possible, no intermediate access points or repeaters other than those specifically noted on contract documents should be provided. Any access points/repeaters required must be specifically approved by the engineer in writing prior to implementation. Any and all costs associated with furnishing or installing any required access points/repeaters (including material, power, mounting towers/poles, permitting, etc.) shall be fully included within the bid.
   6. Complete documentation from the computer analysis.

1.6. SUBMITTALS

A. General/System submittal requirements:
   1. Provide submittal (quantity as required by contract) of:
      a. Component manufacturing data sheets indicating pertinent data and identifying each component (including all components within PLC/control panel enclosures, instruments, computer systems, surge protection devices, antennae, radios, sun/rain shields, etc.) by tag number and nomenclature as indicated on drawings and in specifications.
      b. Component drawing showing dimensions, mounting, and external connection details,

c. SCADA Network Diagram showing all major network equipment (including all PLCs, RTUs, Ethernet Switches, Computer System components, network cabling networked I/O, etc.).
d. List of all spare parts. All manufacturers recommended spare parts shall be provided in addition to required spare parts.
e. Shop test plan and results.
f. Propagation study results.

2. Identify any specification section where exceptions are being taken or an "or equal" piece of hardware is being proposed.
3. A Bill of Materials shall be included with catalog information on all components.
4. Information shall be included on any proprietary logic component sufficient to demonstrate its ability to perform the required functions.

B. Panel submittal requirements:
1. A job-specific, custom wiring diagram
a. The wiring diagram shall clearly show all components (whether the components are mounted internal or external to the control panel enclosure).
b. All wires and terminal blocks shall be clearly labeled.
c. Diagram shall be in accordance with NEMA/ICS standards.
2. Size, type and rating of all system components.
3. Unit frontal elevation and dimension drawings.
4. Internal component layout diagrams.
5. Manufacturer’s product data sheets for all components.

C. Instrumentation/Field Device submittal requirements:
1. Manufacturer’s product data sheets
2. Job-specific model numbers for each instrument/field device
3. Job-specific ranges/setpoints/etc. proposed for each instrument/field device

D. Computer System submittal requirements:
1. Manufacturer’s product data sheets
2. Job-specific model numbers and bill of materials for all computer system devices and software.
3. Screen shots showing proposed layout of each specific or typical SCADA HMI screen.

E. Calculation submittal requirements:
1. Thermal calculations showing amount of air conditioning and heating required for each control panel, per ambient requirements listed below and operating temperature limitations of all equipment/devices within each control panel.
a. Thermal calculations used for sizing cooling systems for each control panel located in exterior or non-conditioned spaces shall assume:
1) Ambient exterior air temperature ranges of -5 degrees F to 105 degrees F.
2) Full solar contact where applicable.
3) No wind.
4) Heat loss from interior equipment (electronics, etc.) per equipment supplier’s information.
b. Thermal calculations used for sizing heating systems for each control panel shall assume:

1) Ambient exterior air temperature ranges of -5 degrees F to 105 degrees F.
2) No heat loss by interior components of control panel.
3) No solar gain on exterior of control panel.
4) Doubling of heating wattage required to account for wind where control panels are located outdoors.
5) Minimum temperature difference (due to heating) of 10 degrees F to prevent condensation, regardless of equipment temperature limitations.

2. Load calculations showing the sizing of all power supplies provided (with spare capacity as specified).
3. Load calculations showing the sizing and anticipated runtime of all Uninterruptible Power Supply systems provided (with spare capacity as specified).

1.7. DELIVERY, STORAGE AND HANDLING:

A. Packing and Labeling:
1. Prior to shipment, each component shall be tagged to identify its' location, tag number, and system function. Identification shall be prominently displayed on the outside of the package.
2. Firmly attach permanent, final labeling (as specified elsewhere) to all equipment, panels, instruments/field devices, etc. prior to installation.

B. Delivery:
1. Following completion of shop assembly, factory test, and approval of all equipment by the Engineer, the panels, cabinets, and consoles and equipment shall be shipped. Provide protection for equipment from handling and the environment.

C. Receiving:
1. The contractor is responsible for receiving and proper storage of equipment delivered to the job site.
2. All received items shall be protected from the elements and where required stored in a low humidity environment.
3. Protect materials and equipment against damage in storage and during construction.

PART 2 - PRODUCTS

2.1. GENERAL:

A. Refer to Specification Section 26 29 00 (Manufactured Control Panels) for all control panel enclosure, control component, controller, surge protection device, etc. requirements.

B. Specifications below identify general intent and major system components only. System Integrator shall be responsible providing all system accessories, interconnections, installation, etc. and verifying compatibility of all system components as required to provide a fully-functional/coordinated system.

2.2. SCADA COMPUTER SYSTEMS

A. Existing remote SCADA computer systems shall be modified as required to monitor/control/alarm the new I/O. Update existing remote VTSCADA HMI software/programming/etc. as required to includes screens, alarming, etc. for the new facilities on the existing SCADA computers. SCADA Integrator is responsible for performing site visits at owner's existing remote facilities prior to bid to confirm existing quantities/types of SCADA computers, existing HMI software/license types, the potential need to upgrade licenses for the new tags required by this project, etc.; and to include all costs in bid as required to provide an upgraded/fully-functional SCADA system (for new local SCADA touchscreen computer AND remote existing SCADA computers).

2.3. EACH NEW SCADA PLC PANEL SHALL INCLUDE:

A. General construction/materials/devices per Specification Section 26 29 00 (Manufactured Control Panels).

B. All printed circuit boards within electronic devices (PLCs, RTUs, controllers, I/O modules, power supplies, touchscreens, Ethernet switches, radios, etc.) installed in panels located in non-conditioned or exterior/process areas shall be conformal-coated for harsh environments.

C. Ethernet Switch:
   1. Provide Managed Industrial Ethernet Switch, with copper ports for all required copper Ethernet connections plus 50% spares and SC-type fiber optic ports for all required fiber optic connections: Rockwell Stratix 5700 series (to match existing).

D. VPN Router:
   1. Provide Fortinet FG-60F Security Appliance (to match existing) for remote access / VPN connections. See EXECUTION section below for additional cybersecurity requirements.

E. Controller Devices
   1. Rockwell CompactLogix 5380 series 5069-L340ER processor, 4MB of user memory, 8GB secure digital memory card, (2) integral 10Mbps/100Mbps/1Gbps Ethernet ports, (1) USB client, and chassis and other accessories as required.

F. Input/Output modules:
   1. Provide I/O modules on associated controller backplane as required by point lists provided on plans. I/O modules shall be Rockwell/Allen-Bradley Compact 5000 series (5069-IA16, 5069-OA16, 5069-IF8, 5069-OF8, etc.). Spare I/O: A quantity of spare I/O equal to 25% of the quantity specified for the PLC, of each I/O point type, or two of each I/O point type (whichever is greater) shall be provided for each PLC. For example, a PLC with 20 Discrete Inputs, 9 Discrete Outputs and 4 Analog Inputs shall additionally be provided with the following spare I/O: 5 Discrete Inputs, 3 Discrete Outputs, 2 Analog Inputs and 2 Analog Outputs (including spares). This applies to the following I/O point types:
      a. Discrete Input
      b. Discrete Output

c. Analog Input
d. Analog Output

2. Provide network/communication I/O modules (for Ethernet, Profibus, DeviceNet, etc. connections) as required by point lists provided on plans. All networked points listed are representative only. Prior to preparation of submittals, System Integrator shall collect register lists identifying all available networked points for the associated systems from the system supplier(s) and shall review the lists with the owner and engineer for determination of final points to be monitored/controlled. System Integrator shall provide programming/HMI for all networked points chosen by the owner/engineer for these systems.

G. Ambient Air Temperature Transmitter:
   a. Each SCADA PLC shall be provided with an ambient air temperature transmitter (per Specification Section 27 60 05 requirements) factory-mounted to the outside of the PLC enclosure, with engraved nameplate to identify instrument name/tag/function and factory-wired as an analog input to the associated PLC by the SCADA Integrator.

H. Panel-mounted Thin Client PC and Touchscreen:
   1. Industrial panel-mounted thin client PC and touchscreen.
   2. Mounted on the deadfront door (outer-most door of panels mounted in dry locations, inner door of panels mounted in exterior locations).
   3. Programming/Screens:
      a. See “Part 3 – Execution” section below for additional requirements. Intent is for this PC/Touchscreen to be programmed with VTSCADA HMI screens as required to clearly display and provide control of parameters for this facility, plus basic information for other remote facilities already connected to Fairhope’s VTSCADA network (well statuses, remote tank statuses, etc.). Detailed requirements shall be coordinated with owner during programming stage.
   4. Touchscreen:
      a. 19.5” color touchscreen with LED backlight,
      b. NEMA 4X rating,
      c. Rated for operational temperatures of 0 degrees C to 50 degrees C.
      d. HD1080P with 3000:1 contrast ratio
      e. Connectors ars required to coordinate with associated PC/etc.
      f. NEMA 4X stainless steel front mounting bezel
      g. Where located in exterior environments, shall be covered by outer door of panel or fully-collapsible sun shield to fully protect LCD display from UV light when not in use, shall provide side and top shielding when in use. Sun shields shall be constructed of stainless steel and shall be installed such as to maintain NEMA 4X ratings of enclosures.
      h. Hope Industrial HIS-ML19.5-CTTA touchscreen with VB-20A mounting bracket (to match existing).
   5. Industrial PC:
      a. Fanless design.
      b. Rated for operational temperatures of 0 degrees C to 50 degrees C.
      c. 2.1 GHz Dual Core processor with 4GB system memory
      d. Two (2) Mini-DisplayPorts, one (1) GB LAN Ethernet port and four (4) USB 3.0 ports
      e. Logic Supply ML100G-52 PC (to match existing).

6. Furnished with SCADA HMI and Windows operating system software as required for this computer to operate as the local SCADA server for this site, and to communicate with other existing remote SCADA computers to provide remote monitoring/control and a remote redundant historian for this site.
7. Furnished with wireless/Bluetooth keyboard and optical mouse (stored within pocket within door of PLC), and folding 18”x18” shelf on front of outer door of enclosure (shelf material to match that of enclosure, for example: provide foldable stainless steel shelf for stainless steel panels).

I. Flash-Drive Programming Backup:
1. Provide portable flash-drive (exact type as required to be easily loadable into panel equipment) mounted to retractable cord hung from inside surface of inner door downloaded with final copies of all programming, etc. for equipment within panel (controller, touchscreen, etc.). Provide engraved nameplate to read: “PROGRAMMING BACKUP”.

J. Communication Equipment:
1. Internet-connected PLC Panels:
a. Provide copper Ethernet ports within Ethernet Switch within PLC panel as required for internet connections. Ethernet Switch shall be connected to owner’s internet connection as directed.
2. Cellular-connected PLC Panels:
a. Provide cellular LTE gateway (Sierra Wireless RV50X-NA to match existing) with dual-band cellular/PCS antenna and amplification equipment as required (exact types as required to achieve required signal strength). Include all necessary mounting hardware, interconnections and weatherproofing kit (where required).
b. See Radio/Wireless System Propagation Studies submittal section above for additional requirements.

K. UPS: Provide UPS with battery-supplied power to operate the system for 10 minutes. Refer to Specification Section 26 29 00 for UPS specification requirements.

L. Provide 20A-120V-1Pole grounding-type GFI receptacle within inner door of panel for convenience (laptop charging, etc.). Receptacle shall be connected upstream of UPS power and shall be protected by a dedicated circuit breaker rated for 10A.

M. Panel surge protection, lighting, HVAC, auxiliary components, etc. shall be provided per Specification Section 26 29 00.

2.4. RAW WATER FLOW AND TANK LEVEL TRANSMITTER/CONTROL PANEL SHALL INCLUDE:

A. General construction/materials/devices per Specification Section 26 29 00 (Manufactured Control Panels).

B. Enclosure and hardware as described in the “Separately-Enclosed Control Panels Schedule” on electrical plans.

C. Redundant 24VDC power supplies as required to provide loop-power to remote 2-wire instruments as required.

D. Provisions to monitor the following 4-20mA analog inputs:
   1. To SCADA:
      a. Aerator No. 1 Flow
      b. Aerator No. 2 Flow
      c. Total Raw Water Flow (instantaneous summation of Aerator No. 1 Flow and Aerator No. 2 Flow)
      d. Elevated Tank Level
   2. To existing daisy-chained chemical feed equipment (for flow pacing):
      a. Total Raw Water Flow (instantaneous summation of Aerator No. 1 Flow and Aerator No. 2 Flow)

E. Provisions to transmit the following 4-20mA analog outputs:
   1. Aerator No. 1 Flow
   2. Aerator No. 2 Flow
   3. Elevated Tank Level

F. Digital panel-mounted displays (with engraved nameplate labeling) for:
   1. Aerator No. 1 Flow
   2. Aerator No. 2 Flow
   3. Total Raw Water Flow (instantaneous summation of Aerator No. 1 Flow and Aerator No. 2 Flow)
   4. Elevated Tank Level

2.5. CLEARWELL LOW LEVEL CUTOFF CONTROL PANEL SHALL INCLUDE:

A. General construction/materials/devices per Specification Section 26 29 00 (Manufactured Control Panels).

B. Enclosure and hardware as described in the “Separately-Enclosed Control Panels Schedule” on electrical plans.

C. Wiring/interconnections as indicated on elementary diagram on electrical plans.

D. General construction/etc. to match similar unit recently installed at Fairhope WTP No. 3.

2.6. WIRING

A. Refer to Specification Sections 27 05 00, 26 05 19 and 26 29 00 for requirements.

PART 3 - EXECUTION

3.1. GENERAL

A. SCADA System shall:
   1. Measure and monitor discrete and continuous process and process equipment variables (see SCADA Point List on contract plans).
   2. Effectively present the process and process equipment variables to the operators allowing them to accurately monitor the status of the processes. Screens/screen shots shall be detailed 2 dimensional.
   3. Provide a means for the operators to effectively control the treatment processes, both automatically and manually.

4. Provide historical data acquisition, storage, retrieval, processing, and report generation.

B. All SCADA HMI screens shall be designed to utilize the pre-established graphic standards for the existing SCADA screens (for Fairhope WTP No. 3, etc.) for this owner. Level of detail, general organization of screens, color conventions, etc. shall match those existing standards.

C. The SCADA software shall be developed to include graphics for the proposed project scope. Human-Machine Interface (HMI) software as specified shall be supplied and fully configured by the System Integrator. Reports, graphics displays, real-time trends, function blocks, PID loop control, historical trends, security, alarming, etc. shall be developed by the System Integrator through a collaborative effort between the Engineer, Owner, Contractor and Equipment Suppliers.

D. Where multiple SCADA computers (workstations or servers) are provided, each computer shall be configured as redundant historians (of each other) to provide native, redundant, synchronized historians for the facility.

E. This system shall allow owner to securely monitor and control the facility via internet (from the referenced owner-furnished workstations/laptops) using industry-standard Internet security and automatic server failover. Displays on remote workstations/laptops shall appear exactly as they do on standard, hardwired thick-client workstations without further configuration.

F. The system shall include all provisions as necessary to allow SCADA Integrator to remotely monitor the system and to remotely make software/configuration repairs/improvements/updates to the system. Include modifications or additions to facility networks (in collaboration with owner's IT personnel) as required to provide VPNs or SSNs with industrial firewalls as required for secure network access to the SCADA systems. Entire installation shall be fully compliant with applicable sections of the latest version of ISA/IEC standard 62443 and all recommendations/standards of the PLC, Ethernet switch, and computer system manufacturers for proper cybersecurity. Minimum security provisions shall include, but not be limited to, 2-Factor Authentication, data encryption, strict firewall rules, automated security patch updates, etc. as recommended by ISA 62443 or as required by owner's IT personnel. The SCADA Integrator shall plan a meeting with the owner's IT personnel to review the proposed cybersecurity requirements and provisions prior to submitting system shop drawings.

G. The system shall include all provisions as necessary to provide alarm notification to off-site personnel. The system shall be configured to provide customizable alarm information via text-to-voice phone calls, SMS text messages, emails or pagers as directed/approved by the facility owner. The alarming system shall cascade alarms through a user-editable list of contacts, allowing each user to acknowledge the alarm (and to stop further notifications to other contacts).

H. In general, the operator interface to the system shall be via a hierarchy of graphics screens with "poke points" which will allow operators to navigate the plant facility by facility by simply "clicking" on the poke points with a mouse pointing device.
   1. A "Main Menu" shall be developed and will contain "poke points" to allow navigation to the following major subsystems:

a. Overall detailed 2-D graphical screen of site(s), showing major structures/processes. Screen(s) shall be fully-colorized representations of the various facilities. Screen(s) shall indicate major system parameters such as significant flow/level measurements, system on/off statuses, etc., but shall not be used for detailed parameter displays.
b. One (1) overall system process-flow diagrammatical representation of major process system or structure, on one screen if possible (with detailed 2-D graphics for each major structure or process). Screen(s) shall indicate major system parameters such as significant flow/level measurements, system on/off statuses, etc., but shall not be used for detailed parameter displays.
c. Separate process-flow diagrammatical representations (with detailed 2-D graphics for each component) for each major process or structure. Screens shall indicate all relevant I/O statuses, and shall allow for control for the given process or structure.
d. Pop-up style detailed component or process screens (for individual VFDs, analog instruments, PID or setpoint control systems, etc.). These types of component screens shall rely on graphical/diagrammatical displays rather than just text where possible.
e. Real-time trend displays.
f. Historical trend displays.
g. Excel reporting subsystem.
h. I/O diagnostics test displays.
i. Current alarms.
j. Equipment maintenance subsystem.

2. Where possible, real-time trends shall be embedded into the process-flow diagrammatical representations noted above. For example, graphical displays showing tank levels shall include an embedded trend line (within the tank image) to indicate the historical trend for the tank level. Similar embedded trending graphics shall be provided for other analog values where helpful to the plant operator.
3. The “Main Menu” shall contain dynamic symbols to depict the operational/communications status of each SCADA System panel/network device on the network (i.e. Normal or In Communications Failure).
4. Each new graphic display shall be designed so that an operator may “click” on “poke points” to gain access to any area of the facility (or to remote systems, where applicable) or to the Main Menu. The operator shall also be able to access the Current Alarms Display from any graphic display. Real-time and Historical Trend displays shall be made available from each plant process area via poke points.
5. All new graphics displays of plant areas shall be based upon detailed 2-D graphics as a basis for the display unless noted otherwise. For example, piping shall generally be drawn as grey-scale 2D pipes with fading (from center of pipe to outside edge of pipe). Motors, pumps, equipment images, etc. shall include similar detail.
6. Special graphics displays shall be developed by the System Integrator for each process control strategy. These graphics displays shall allow authorized operators to modify control parameters such as set points, operational sequences, etc. Passwords shall be utilized to determine the authorization level of operators.
7. All process alarms shall be categorized by “group” with each group representing a specific area of the plant or distribution system.

8. Security of the system shall be accomplished via allowing access to various parts and features of the system via entry of User names and passwords.
9. Graphics screens shall be developed for each major item of process equipment for which equipment runtime or equipment maintenance data is being collected. These graphics screens shall contain all data relative to the piece of equipment including runtime today, runtime since last serviced, total runtime between maintenance intervals. All runtime data shall be maintained by the various programmable logic controllers; not by the HMI software package.
10. All historical process data, such as average flows, hourly minimums and maximums, etc., shall be maintained by the various programmable logic controllers; not by the HMI software package.

3.2. TESTING

A. General
1. All elements of the hardware and software shall be tested to demonstrate that the total system satisfies all of the requirements of this specification.
2. As a minimum the testing shall include the following:
   a. Unwitnessed Factory Test (UFT)
   b. Operational Readiness Test (ORT)
   c. Functional Acceptance Test (FAT)
3. Each test shall be in the cause and effect format. The person conducting the test shall initiate an input (cause) and upon the system's or subsection's producing the correct result (effect), the specific test requirement will have been satisfied.

B. Unwitnessed Factory Test (UFT)
1. Prior to start of the witnessed Factory Demonstration Tests, the entire system shall be inspected and tested at the system supplier's factory to ensure that it is fully operational and ready for demonstration testing.
2. All panels, consoles and assemblies of the System shall be inspected and tested to verify that they are in conformance with related submittals and these specifications.

C. Operational Readiness Test (ORT)
1. General: Prior to start-up, the entire installed System shall be certified (inspected, tested and documented) that it is ready for operation. These inspections and tests shall include Loop/Component Inspections and Tests and a repeat of the Factory Demonstration Tests.

D. Functional Acceptance Test (FAT)
1. The entire SCADA System shall be tested on-site to demonstrate that it is operational and in conformance with these specifications.
2. Tests shall demonstrate specified functions, both hardware and software, to the satisfaction of the owner.

3.3. TRAINING

A. General
1. Provide an integrated training program for the owner's personnel at the jobsite. Tailor the training program to meet the specific needs of the Owner's personnel. Include training sessions, classroom and field, for managers, engineers, operators and maintenance personnel.

2. The training shall be carried out by technically competent and experienced instructors
3. The Owner shall have the right to make and reuse video tapes of all of the onsite training sessions.
4. One eight (8) hour day shall be provided on site for owner and or engineer selected attendees.

END OF SECTION 27 60 00

SECTION 26 05 19 - POWER CONDUCTORS AND CABLES 51V-600V

PART 1 - GENERAL

1.1. DESCRIPTION

A. Power Wires and Cables

B. Low Voltage Wires and Cables

PART 2 - PRODUCTS

2.1. POWER WIRES AND CABLES - 600 VOLT

A. General: Conductors shall have current carrying capacities as per N.E.C. and with 600 volt insulation, #12 minimum except for controls and fixture wire. Conductors shall be copper.

B. General Application (see below for exceptions):
   1. At or Below Grade (including within slab-on-grade):
      a. #8 or larger conductors:
         1) XHHW or RHH/RHW/USE stranded (in conduit).
      b. #10 or smaller conductors for circuits terminating at motors:
         1) THHN/THWN or XHHW stranded (in conduit).
      c. #10 or smaller conductors (excluding circuits terminating at motors):
         1) THHN/THWN or XHHW solid (in conduit).
   2. Above Grade:
      a. #8 or larger conductors:
         1) THHN/THWN, XHHW or RHH/RHW/USE stranded (in conduit).
      b. #10 or smaller conductors for circuits terminating at motors:
         1) THHN/THWN, XHHW or RHH/RHW/USE stranded (in conduit).
      c. #10 or smaller conductors (excluding circuits terminating at motors):
         1) THHN/THWN, XHHW or RHH/RHW/USE solid (in conduit).
   3. Power Wire and cable shall be as manufactured by Southwire, Rome, Encore Wire, American Insulated Wire, Okonite, Phelps-Dodge, Amercable, Aetna or approved equal.

C. VFD Cabling
   1. Wiring/Cabling installed between each VFD (Variable Frequency Drive) and the associated motor shall be multi-conductor shielded VFD power cable with the following characteristics:
      a. Multi-conductor cable with three (3) power conductors and three (3) ground conductors
      b. Soft annealed flexible stranded copper conductors.
      c. 1kV cross-linked polyolefin insulation (to resist the potential reflected voltages experienced in 600VAC VFD applications).
      d. Metallic shielded providing 100% shield coverage
      e. Oil, abrasion, chemical & sunlight resistant thermosetting compound outer jacket.
      f. Flexible TC-ER rated, UL listed for use in cable trays.
      g. Equal to AmerCable #37-108VFD cable.

D. Emergency Feeder Wiring
   1. Where specifically required by NEC articles 700, 701, or other similar sections, feeder-circuit wiring for emergency systems and legally-required standby systems shall be a listed electrical circuit protective system consisting of 2-hour fire-rated, mineral insulated, copper-sheathed wiring cable (Pyrotenax System 1850 or equal).

E. Class 1 Control Cabling (120VAC Control Circuits, Etc.)
   1. Unless specified otherwise, Class 1 control cabling shall:
      a. Be rated for exposed cable tray installation.
      b. Be plenum rated (Class 1 Control cabling and Instrumentation cabling installed in conduit or exposed in cable tray in non-plenum areas is not required to be plenum-rated).
      c. Be UL-rated for the proposed application.
      d. Be multi-conductor with overall outer sheath as required by the application. The insulation of each conductor within the overall multi-conductor cable shall be uniquely color-coded. Ground conductors (when provided) within the multi-conductor cable shall have green insulation. Conductors with green insulation shall not be used for conductors other than ground.
      e. Utilize copper conductors.
      f. Have wire gauge as required to limit voltage drop to acceptable limits determined by the system supplier and to meet all applicable code requirements.
      g. Where installed underground, within slab-on-grade or in exterior locations, be rated for wet locations.
      h. Where required for specific systems, meet the specific requirements (conductor quantity, wire gauge, insulation type, shielding, etc.) of the system supplier.
      i. Be rated for 600V.
      j. Be industrial grade.
      k. Have stranded conductors.
      l. Have sunlight/oil-resistant PVC/Nylon insulation and jacket with ripcord.
   2. Control cabling shall be as manufactured by Belden, AlphaWire or General Cable.

F. Fixture Wiring
   1. Conductor Types:
      a. Type TFFN or XFF.
   2. Minimum Sizes:
      a. For fixtures up to 300 watts: #16.
      b. For fixtures over 300 watts up to 1500 watts: #14.
      c. For fixtures over 1500 watts: as required.
      d. Conductors to concrete pour fixtures: #12.
   3. Fixture wire shall extend only from fixture to first junction, and not over 6 feet, except for concrete pour units.

2.2. WIRE CONNECTIONS:

A. All connector types:
   1. Shall be properly rated for the proposed application by UL and per the manufacturer.

B. At Motor Connections (within motor terminal boxes):
   1. On Unshielded Wire:
      a. Single conductor per phase: shall be made with insulated set screw connectors or 3M 5300 Series 1kV Motor Lead Connections kits with mechanical lugs as required.
      b. Multiple conductors per phase: shall be made with insulated mechanical lugs, rated for the associated motor cable types, by Polaris or Ilsco.
   2. On Shielded Power Wire:
      a. The braided shields and internal grounding conductors of shielded power (not instrumentation) cables shall be grounded at BOTH ends (at VFD/starter and at motor) with a termination kit provided by the cable supplier. This termination kit shall include a connection ring that makes contact around the full circumference of the braided shield, and connects all internal grounds to a common external ground point.

C. Other Dry locations:
   1. On Wire larger than #10: shall be made with solderless, non-insulated compression-type connectors meeting requirements of Federal Specification WS-610e for Type II, Class 2 and shall be covered with Scotch #33 electrical tape so that insulation is equal to 150% of conductor insulation.
   2. On Wire #10 and smaller: shall be made with one of the following:
      a. Ideal Wing Nuts or equal by 3M .
      b. Ideal Push-In Wire Connectors (for #12 and smaller only).

D. Other Wet/Damp locations:
   1. On Wire larger than #10: shall be made with underground/direct-burial, waterproof rated EPDM or TPE-insulated connectors by Ilsco, Burndy or T&B.
   2. On Wire #10 and smaller: shall be made with one of the following:
      a. Ideal Weatherproof or Underground Wire Connectors pre-filled with 100% silicone sealant as required by the application.

PART 3 - EXECUTION

3.1. GENERAL INSTALLATION

A. All wires and cables shall be installed in conduit unless specifically noted otherwise.

B. All joints and splices on wire shall be made with solderless connectors, and covered so that insulation is equal to conductor insulation.

C. No splices shall be pulled into conduit.

D. No conductor shall be pulled until conduit is cleaned of all foreign matter.

E. Wire and cable shall be neatly formed, bundled and tied in all panelboards, wireways, disconnect switches, pullboxes, junction boxes, cabinets and other similar electrical enclosures.

F. All wires and cables installed in underground or other wet locations shall be rated by the manufacturer for wet locations.

G. Network cabling shall be continuous from endpoint to endpoint and shall not be spliced

unless specifically noted otherwise.

H. All conductors/cabling (including spare conductors) shall be properly terminated unless specifically directed otherwise. See above for general termination hardware requirements.

3.2. POWER WIRE AND CABLE INSTALLATION:

A. No power conductor shall be smaller than #12 except where so designated on the drawings or hereinafter specified.

B. Multi-wire lighting branches shall be used as indicated.

C. Where more than three current-carrying conductors are installed in a single raceway or cable, conductors shall be derated as indicated in NEC Table 310.15(B)(3)(a).

D. Raceways/cables shall generally not be installed exposed to sunlight on roofs unless specifically required. Where raceways or cables are installed exposed to sunlight on roofs, conductors shall be derated with ampacities adjusted per NEC Table 310.15(B)(3)(c).

E. In installing parallel power conductors, it is mandatory that all conductors making up the feeder be exactly the same length, the same size, the same type of conductor with the same insulation. Each group of conductors making up a phase or neutral must be bonded at both ends in an approved manner.

F. In installing overhead main power services, a minimum of 5’-0” of cable per run shall be extended beyond the weatherhead(s) for connection to service drop. Confirm exact requirements with local utility company.

3.3. WIRE CONNECTIONS

A. See Part 2 above for material types.

B. Aluminum Wire Connections:
   1. Where aluminum wiring is allowed, connections shall utilize compression fittings, no exceptions (Anderson Versa Crimp or equal).

C. Any stranded wire connection to wiring devices shall be made with crimp type terminals.

D. All electrical connections and terminals shall be tightened according to manufacturer’s published torque-tightening values with calibrated torque wrenches as required to clearly indicate final torque value to the contractor. Where manufacturer’s torque values are not provided, those specified in UL 486A & 486B shall be used.

E. All connections and connector types shall be installed in strict compliance with all requirements of the connector manufacturer.

F. Under no condition shall the specified conductors be connected to terminals rated less than 75°C. Where conductors sized #1 or smaller are shown to be terminated at equipment and the terminals of that equipment are rated for less than 75°C, contractor

shall install junction box near equipment to capture the specified conductors, splice with compression connections (rated for a least 75°C) and extend conductors with ampacity rating as required by NEC (based on terminal temperature rating) to equipment terminals. The length of the conductors to be terminated shall be as directed by the AHJ but not less than 48 inches.

3.4. SHIELDED CABLE INSTALLATION

A. Shielded VFD (power) cables:
   1. The braided shields and internal grounding conductors of shielded VFD (power) cables shall be grounded at BOTH ends (at VFD and at motor) with a termination kit provided by the cable supplier. This termination kit shall include a connection ring that makes contact around the full circumference of the braided shield, and connects all internal grounds to a common external ground point.
   2. Contractor shall coordinate the necessary size of conduit with the outer diameter of the proposed cable type to verify that the raceway loading does not exceed NEC requirements prior to rough-in of the conduit system.

B. Shielded instrumentation (low voltage) cables:
   1. The outer foil of shielded instrumentation cables shall be grounded at the PLC/control panel end only (not at the field device end) with a termination kit as directed by the PLC/control panel supplier.

3.5. LOW VOLTAGE (LESS THAN 50V) CONTROL AND NETWORK CABLE INSTALLATION:

A. All wires and cables shall be installed in conduit unless specifically noted otherwise. Low voltage control and/or network cabling located within concealed, accessible ceiling spaces (such as above lay-in ceilings) may be run without conduit if the following requirements are met:
   1. Cabling shall be plenum-rated, multi-conductor.
   2. Cabling shall be supported by cable tray or with J-hook supports on intervals not to exceed 5’-0” on center. Cabling shall be supported solely from the cable tray or j-hooks supported from the building structure, without using piping, ductwork, conduit or other items as supports.
   3. Cabling shall be properly bundled with plenum-rated Velcro straps on intervals not to exceed 30” on center.
   4. Properly-sized conduit(s) shall be provided wherever cabling enters an inaccessible or exposed area (such as above gyp board ceilings or through walls). End bushings shall be provided on both ends of all raceway terminations. All fire/smoke barrier penetrations shall be made in accordance with a U.L. listed assembly.

3.6. CIRCUITS AND BRANCH CIRCUITS

A. Outlets shall be connected to branch circuits as indicated on drawings by circuit number adjacent to outlet symbols, and no more outlets than are indicated shall be connected to a circuit.

3.7. LABELING AND COLOR CODING OF WIRE AND CABLE

A. Refer to Specification Section 26 05 53 for all labeling requirements.

B. A color coding system as listed below shall be followed throughout the network of branch power circuits as follows:

PHASE	120/208/240/ COLOR	120/240 HIGH LEG DELTA COLOR	277/480 VOLT COLOR
A	BLACK	BLACK	BROWN
B	RED	ORANGE (FOR HI-LEG)	ORANGE
C	BLUE	BLUE	YELLOW
NEUTRAL	WHITE	WHITE	GRAY
GROUND	GREEN	GREEN	GREEN

C. Where dedicated neutrals are installed for multi-wire branch circuits, the neutral conductors shall be color coded as follows:

PHASE	120/208/240/ COLOR	120/240 HIGH LEG DELTA COLOR	277/480 VOLT COLOR
NEUTRAL A	WHITE W/ BLACK TRACER	WHITE W/ BLACK TRACER	GRAY W/ BROWN TRACER
NEUTRAL B	WHITE W/ RED TRACER	WHITE W/ ORANGE TRACER (FOR HI-LEG NEUTRAL)	GRAY W/ ORANGE TRACER
NEUTRAL C	WHITE W/ BLUE TRACER	WHITE W/ BLUE TRACER	GRAY W/ YELLOW TRACER

D. Control Conductors: Shall be color coded by use of colored “tracers”. No control circuit shall contain two identical conductors. For example, a set of five (5) control conductors for a pushbutton station represents one (1) control circuit which would require five (5) uniquely-colored control conductors.

3.8. TESTING

A. The insulation resistance of all feeder conductors (feeding electrical distribution equipment such as switchboards, panelboards, transfer switches, transformers, etc.) shall be tested at the load side of the feeder breaker with a 1000-volt DC Megger Tester prior to energization or final termination. Any feeder conductor with an insulation resistance less than the recommended minimums in the latest version of NETA Acceptance Testing Specification (“ATS”) standard shall be replaced by the contractor at the contractor’s expense. All final test results shall be clearly documented (with date, time, feeder, results, test equipment, etc.), and the final test results shall be submitted to the design team for review.

END OF SECTION 26 05 19

SECTION 26 29 00 - MANUFACTURED CONTROL PANELS

PART 1 - GENERAL

1.1. SCOPE

A. This section describes control stations, PLC panels, motor control panels, manufactured control panels, and other similar panels specified herein. Specifications herein are intended as an extension of requirements in other Divisions of these specifications where reference is made to Electrical Specifications.

1.2. DEFINITIONS

A. “Control Stations”: Enclosures (with all required accessories) containing only door-mounted pushbuttons, indicator lights and/or selector switches (no electronic components or starter/controller equipment).

B. “Control Panels”: Enclosures (with all required accessories) containing equipment/devices other than door-mounted pushbuttons, indicator lights and/or selector switches (such as electronic components, starter/controller equipment, etc.).

1.3. SUBMITTALS

A. Provide the following for each control panel:
   1. A job-specific, custom wiring diagram
      a. The wiring diagram shall clearly show all components (whether the components are mounted internal or external to the control panel enclosure).
      b. All wires and terminal blocks shall be clearly labeled.
      c. Diagram shall be in accordance with NEMA/ICS standards.
   2. Size, type and rating of all system components.
   3. Unit frontal elevation and dimension drawings.
   4. Internal component layout diagrams.
   5. Manufacturer’s product data sheets for all components.

B. A Bill of Materials shall be included with catalog information on all components.

C. Information shall be included on any proprietary logic component sufficient to demonstrate its ability to perform the required functions.

D. The following calculations shall be submitted:
   1. Thermal calculations showing amount of air conditioning or ventilation and heating required for each control panel, per ambient requirements listed below and operating temperature limitations of all equipment/devices within each control panel. Where possible, forced air ventilation shall be utilized rather than air conditioning. Panel shall be oversized, interior equipment/devices shall be derated, and solar shielding shall be provided as required to allow the use of forced air ventilation as the cooling method. Air conditioning, ventilation, and/or heating equipment shall each have ratings/capacities at least 20% larger than required by calculations below unless noted otherwise:

a. Thermal calculations used for sizing cooling/ventilation systems for each control panel located in exterior or non-conditioned spaces shall assume:
   1) Ambient exterior air temperature ranges of -5 degrees F to 105 degrees F.
   2) Full solar contact where applicable (not applicable where enclosures are fully protected from solar contact using solar shields separated from panel enclosure with standoffs or similar).
   3) No wind.
   4) Heat loss from interior equipment (electronics, etc.) per equipment supplier's information.

b. Thermal calculations used for sizing heating systems for each control panel shall assume:
   1) Ambient exterior air temperature ranges of -5 degrees F to 105 degrees F.
   2) No heat loss by interior components of control panel.
   3) No solar gain on exterior of control panel.
   4) Doubling of heating wattage required to account for wind where control panels are located outdoors.
   5) Minimum temperature difference (due to heating) of 10 degrees F to prevent condensation, regardless of equipment temperature limitations.

2. Load calculations showing the sizing of all power supplies provided (with spare capacity as specified). Power supplies shall each have ratings/capacities at least 20% larger than required by load calculations unless noted otherwise.
3. Load calculations showing the sizing and anticipated runtime of all Uninterruptible Power Supply systems provided (with spare capacity as specified).

PART 2 - PRODUCTS

2.1. GENERAL

A. Control panels shall be Underwriters' Laboratories labeled by the panel manufacturer. Control panel manufacturers not capable of applying the U.L. label to their products are unacceptable.

B. All human interface equipment/devices (indicator lights, selector switches, pushbuttons, time switches, displays, keypads, and other similar items used for control, adjustments or monitoring) shall be mounted on the non-energized side of enclosure door(s) in such a way as to be accessible without exposing the user to energized parts.

2.2. RATINGS

A. All Control Panels shall have short circuit current ratings at least equal to the lesser of the following, unless noted otherwise on plans:
   1. The short circuit current rating of the electrical distribution equipment that feeds the Control Panel.
   2. 150% of the available fault current at the Control Panel as determined by a Short Circuit Current study prepared by a licensed professional electrical engineer.

B. All equipment/devices installed within control panels shall be rated to operate in

ambient temperatures of 50 degrees C (122 degrees F) or higher.

2.3. ENCLOSURES

A. All enclosures (with any required accessories or auxiliary items) shall fit within the space shown on the Plans. Any costs associated with furnishing equipment which exceeds the available space shall be borne by the Contractor.

B. Enclosures (with any required accessories or auxiliary items) shall be suitable for the environment where installed.

C. Enclosure materials shall be as follows unless noted otherwise:
   1. Control Stations:
      a. Where located in extremely corrosive areas (chlorine rooms, fluoride rooms, etc.): NEMA 4X of non-metallic construction (with non-metallic hardware) compatible with the associated chemical(s).
      b. Where located in other wet, process or outdoor areas: NEMA 4X of type 304 stainless steel construction (with stainless steel hardware).
      c. Where located in dry, non-process, indoor areas (such as electrical rooms): NEMA 1 of die cast zinc/aluminum construction.
   2. Control Panels:
      a. Where located in extremely corrosive areas (chlorine rooms, fluoride rooms, etc.): NEMA 4X of non-metallic construction (with non-metallic hardware) compatible with the associated chemical(s).
      b. Where located in other wet, process or outdoor areas: NEMA 4X of type 304 stainless steel construction (with stainless steel hardware).
      c. Where located in dry, non-process, indoor areas (such as electrical rooms): NEMA 1 or 12.

D. Control Panel Enclosure Construction:
   1. Non-metallic control panel enclosure material, where specified, shall be reinforced polyester resin or equivalent, with a minimum thickness of 3/16 inch for all surfaces except those requiring reinforcement. Panels shall be precision molded to form a one piece unit with all corners rounded. Exterior surfaces shall be gel-coated to provide a corrosion-resistant maintenance-free satin finish which shall never need painting. Color pigments shall be molded into the resin. Color shall be grey.
   2. Metallic control panel enclosures, where specified, shall be fabricated using a minimum of 14 gauge steel for wall or frame mounted enclosures and a minimum of 12 gauge for freestanding enclosures. Continuously weld all exterior seams and grind smooth. Reinforce sheet steel with steel angles where necessary support equipment and ensure rigidity and preclude resonant vibrations.
   3. Use pan-type construction for doors.
   4. Door widths shall not exceed 36-inches.
   5. Mount doors with full length, heavy duty piano hinge with hinge pins.
   6. Provide gasket completely around each door opening.
   7. Mount and secure all internal components to removable back plate assembly.
   8. For NEMA 1 or 12 enclosures, provide handle-operated key-lockable three point stainless steel latching system for each door.
   9. For NEMA 4X enclosures, provide provisions for padlocking all doors and provide clamps on three (3) sides of each door.

E. Control panel enclosures (and associated backpanels and other similar accessories) shall be manufactured by Hoffman Engineering Co., or Saginaw Control & Engineering.

2.4. CONTROL PANEL ACCESSORIES:

A. Cooling systems shall be provided if so required by the application to maintain temperatures within the acceptable ranges of the interior equipment. In no case (regardless of temperature ratings of internal equipment) shall maximum temperatures within control panels be allowed to exceed 50 degrees C (122 degrees F). Thermostats shall be provided to control cooling without need of manual operation. Thermostat setpoints shall be as per recommendations of the equipment suppliers. See above for thermal calculation requirements. Cooling units shall be as manufactured by Hoffman Engineering Co., Rittal or approved equal and shall be thermostatically controlled.

B. Space heaters shall be provided for condensation and temperature control. Thermostats AND hygrostats (or combination hygrotherm controllers) shall be provided to control heating requirements (based on temperature and relative humidity within enclosure) without need of manual operation. Setpoints shall be as per recommendations of the equipment suppliers. See above for thermal calculation requirements. Space heaters and associated control devices shall be as manufactured by Hoffman Engineering Co., Rittal, Stego or approved equal.

C. NEMA 4X control panels shall be provided with vapor-phase corrosion inhibitor(s) (chemical combinations that vaporize and condense on all surfaces in the enclosed area, to protect metal surfaces/devices within the enclosed area from corrosion). Corrosion inhibitor shall be Hoffman #AHCI series (sized as required by the enclosure volume to be protected) or equal.

D. For outdoor panels, stainless steel solar shields for front, top and each side of panel, supported to associated panel face with standoffs as required (to allow free air flow between solar shield and panel enclosure), shall be provided where required to limit solar loading on panel to allow use of a ventilated panel design rather than an air-conditioned panel design.

E. Provide a sun shield over all LCD displays in exterior-mounted panels. Sun shield shall be collapsible to fully protect LCD display from UV light when not in use, shall provide side and top shielding when in use, shall be constructed of stainless steel and shall be installed such as to maintain NEMA 4X ratings of enclosures.

F. Provide a clear polycarbonate gasketted hinged door or window to encompass all indicators, controllers, recorders, etc. mounted on NEMA 4 and 4X enclosures.

G. Provide interior mounting panels and shelves constructed of minimum 12 gauge steel with white enamel finish. Provide metal print pocket with white enamel finish on inside of door.

H. Provide interior LED light kit, mounted at top of interior of panel, and switched to turn “ON” when door is opened for the following control panels:
   1. Control panels with outer dimensions greater than 20” wide or 30” high.
   2. Control panels containing PLCs or other similar programmable devices.

I. Control panels containing VFDs or Reduced Voltage Soft Starters shall include a door mounted digital keypad for adjusting the starter parameters and viewing process values and viewing the motor and starter statuses without opening the enclosure deadfront door.

2.5. CONTROL COMPONENTS

A. General:
1. All pushbuttons, pilot lights, selector switches and other control devices shall be separate, standard size (full 30mm) and shape, heavy duty oil-tight units.
   a. Devices in extremely corrosive areas (chlorine rooms, fluoride rooms, etc.) shall be of non-metallic construction.
   b. Devices in other areas shall be of chrome-plated construction.
2. All components and devices so that connection can be easily made and so there is ample room for servicing each item.
3. Door-mounted indicators, recorders, totalizers and controllers shall be located between 48” and 72” above finished floor level.
4. Door-mounted indicator lights, selector switches and pushbuttons shall be located between 36” and 80” above finished floor level.
5. All devices and components shall be adequately supported to prevent movement. Mounting strips shall be used to mount relays, timers and other devices suitable for this type of mounting.

B. Pilot Lights:
1. All pilot lights to be cluster LED type & push to test.

C. Pushbuttons:
1. All STOP operators within control stations located at equipment shall be provided with lockout provisions and a minimum of two (2) sets of contact blocks.
2. Emergency shutoff pushbutton devices shall be as follows unless noted otherwise:
   a. 2 ¼” diameter, mushroom-style, maintained contact push buttons
   b. With a minimum of one (1) normally open dry contact and three normally closed dry contacts.
   c. Connections made such that pushing “in” the button will shutoff the associated equipment.
   d. Provided with a red engraved nameplate with ½” lettering to read “Emergency Shutoff”.

D. Relays:
1. Control relays shall have the following characteristics, unless noted otherwise:
   a. General purpose, plug-in type.
   b. Minimum mechanical life of 10 million operations.
   c. Coil voltage as indicated or required by application.
   d. Single-break contacts rated 12 amperes, resistive at 240 volts.
   e. Contacts as shown on wiring diagrams plus a minimum of one (1) spare N.O. contact and one (1) spare N.C. contact. At a minimum, each individual relay shall have 3PDT contacts. Where required, multiple control relays shall be provided (to provide the required quantities of contacts) for each “relay” function shown on plans/diagrams.
   f. Furnished with RC transient suppressor to suppress coil-generated transients to 200% of peak voltage.

g. LED on/off indicator light and manual operator.
h. Industry standard wiring and pin terminal arrangements.
i. Equal to Square D 8501KP series with matching plug-in socket.

2. Interposing/isolation relays used to isolate discrete output field wiring (and where required for voltage translation for other discrete signals) to/from PLC inputs/outputs shall be terminal-block style. Terminal-block style relays shall have the following characteristics, unless noted otherwise:
   a. Minimum mechanical life of 10 million operations.
   b. Single-break contacts rated 6 amperes, resistive at 120 volts.
   c. One (1) N.O. contact per relay.
   d. Furnished with integral transient protection.
   e. LED on/off indicator light.
   f. DIN-rail mounted.
   g. Equal to Square D type Zelio RSL.
3. Timer relays shall be electronic, adjustable plug-in devices meeting the following characteristics, unless noted otherwise:
   a. General purpose, plug-in type.
   b. Minimum mechanical life of 10 million operations.
   c. Single-break contacts rated 10 amperes, resistive at 240 volts.
   d. Contacts as shown on wiring diagrams plus a minimum of one (1) spare N.O. contact and one (1) spare N.C. contact. At a minimum, each relay shall have DPDT contacts (2 N.O. & 2N.C.). Where required, multiple timer or control relays shall be provided (to provide the required quantities of contacts) for each “relay” function shown on plans/diagrams.
   e. Rotary-thumbwheel adjustments for time value, timing range and function.
   f. Time value adjustments from .05 seconds to 999 hours
   g. Selectable Timing Functions, including the following:
      1) On Delay
      2) Interval
      3) Off Delay
      4) One Shot
      5) Repeat Cycle-Off
      6) Repeat Cycle-On
      7) On/Off Delay
      8) One Shot Falling Edge
      9) Watchdog
      10) Trigger On Delay
   h. Accuracy shall be $\pm$ 2% and repeatability shall be $\pm$ 0.1%.
   i. Furnished with integral transient protection.
   j. LED indicator light(s) for “timing” and “on/off status”
   k. Held in place with hold-down spring
   l. Equal to Square D type JCK with matching plug-in socket.

2.6. DC POWER SUPPLIES

A. DC Power supplies shall be provided where specified elsewhere, or as required by design of system. Power supplies shall be industrial type, AC-to-DC switching, output voltage as required, 120vac input, size as required for the initial application plus 50% spare capacity.

B. Redundant power supplies with diode isolation shall be provided so that the loss of one power supply does not affect system operation. The back-up supply systems shall be designed so that either the primary or the back-up supply can be removed, repaired, and returned to service without disrupting the system operation.

C. Power supply output shall be protected by secondary overcurrent protection device(s).

D. The power distribution from multiloop supplies shall be selectively fused so that a fault in one instrument loop will be isolated from the other loops being fed from the same supply.

E. Each power supply shall meet the following requirements.
   1. Regulation, line: 0.4% for input from 105 to 132vac.
   2. Regulation, load: 0.8%
   3. Ripple/Noise: 15mV RMS / 200 mV peak to peak
   4. Operating temperature range: 0 deg C - 60 deg C
   5. Overvoltage protection
   6. Overload Protection
   7. Output shall remain within regulation limits for a least 16ms after loss of AC power at full load.
   8. Output status indicator.
   9. UL listing

F. Power supplies shall be manufactured by Puls, Sola, Phoenix Contact or equal.

2.7. UNINTERRUPTIBLE POWER SUPPLIES

A. Uninterruptible power supplies (UPSs) shall be provided where specified elsewhere, or as required by design of system. Power supplies shall be industrial type, size as required for the initial application plus 50% spare capacity unless noted otherwise.

B. Battery runtime shall be as specified elsewhere. If no other specification for battery runtime is specified, battery runtime shall be 12.5 minutes at full load.

C. UPSs shall be double-conversion, on-line type.

D. UPSs shall be rated for operation in -20 degrees C to 55 degrees C ambient temperatures.

E. UPS batteries shall be hot-swappable and 12-year rated when installed in 25 degrees C environment and 4-year rated when installed in 50 degrees C environment.

F. UPSs shall include dry contacts for the following alarm points:
   1. Loss of Input Power Alarm
   2. Low Battery Alarm

G. UPSs shall be manufactured by Falcon UPS or approved equal.

2.8. DISCONNECTS

A. A main disconnect switch or circuit breaker shall be supplied integral to all control panels. The main disconnect or circuit breaker shall be accessible/operable without

exposing the operator to energized sections of the control panel(s), and shall be lockable in the open/off position.

B. Individual circuit breakers shall be provided integral to the manufactured control panel for each separate power circuit originating within the control panel.

C. Where the highest continuous current trip setting for which the actual overcurrent device installed in a circuit breaker is rated (or can be adjusted to is 1200A or higher, breakers shall be electronic trip and shall be provided with arc energy-reducing maintenance switching (with local status indicator) to reduce arc flash energy per NEC 240.87 requirements.

D. Manufacturers:
   1. Square 'D' or Cutler Hammer.

2.9. COMBINATION STARTERS

A. All combination starters shall utilize a unit disconnect. Magnetic starters shall be furnished in all combination starter units unless specifically shown otherwise. All starters shall utilize full NEMA/EEMAC rated contactors (size 1 minimum).

B. Starters shall be provided with a three-pole, external (door mounted) manual reset, solid state overload relay. Solid state overload relay shall have switch-selectable trip class and shall provide protection from:
   1. Overload.
   2. Phase Unbalance.
   3. Phase Loss.
   4. Ground Fault (Class II detection).

C. Unless specifically shown otherwise, each combination starter or each group of starters shall be furnished with a control circuit transformer including two primary protection fuses and one secondary fuse (in the non-ground secondary conductor). The transformer shall be sized to accommodate the contactor(s) and all connected control circuit loads (including motor space heaters and other similar loads where specified). The transformer rating shall be fully visible from the front when the unit door is opened. Unless otherwise indicated, control voltage shall be 120V AC. Control power shall be provided by individual unit control power transformers.

D. When a unit control circuit transformer is not provided, the disconnect shall include an electrical interlock for disconnection of externally powered control circuits.

E. Auxiliary control circuit interlocks shall be provided where indicated. Auxiliary interlocks shall be field convertible to normally open or normally closed operation.

F. NEMA/EEMAC Size 1-4 starters shall be mounted directly adjacent to the wireway so that power wiring (motor leads) shall connect directly to the starter terminals without the use of interposing terminals. Larger starters shall be arranged so that power wiring may exit through the bottom of the starter cubical without entering the vertical wireway.

G. Each starter shall be equipped with a minimum of the following control devices:
   1. Door-mounted reset button.
   2. Two (2) field-reversible (N.O./N.C.) auxiliary contacts

3. For reversing and two-speed starters: Four (4) field-reversible (N.O./N.C.) auxiliary contacts
4. Additional control devices as indicated on plans.

H. Control Wiring Terminal Blocks
1. Terminal blocks shall generally be:
a. Feed-thru, screw-in type
b. DIN rail mounted
c. Furnished with the stationary portion of the block secured to the unit bottom plate
d. Furnished with unit-mounted control terminal blocks for each field wire.
e. Rated for the voltage and current of the proposed application per UL/NEC standards.
f. Sized (by supplier) for the associated wire gauges/types/quantities.
g. Phoenix Contact UT-4 series, Weidmuller WDU-4 series (or equivalent) unless required otherwise by application.

I. Nameplates
1. Each unit shall be properly labeled with an engraved phenolic nameplate with a white background and black letters.
2. Each pilot device shall be properly labeled with a legend plate or an engraved phenolic nameplate.

J. Manufacturers:
1. Square 'D' or Cutler Hammer.

2.10. WIRING

A. Refer to Section 26 05 19 for all wiring types/applications.

B. All wiring shall be identified on each end with hot stamped, shrink tube type, or self-laminating vinyl permanent wire markers to correspond with numbering shown on wiring diagrams.

C. All connections shall be made on terminals with no splices.

D. All wiring runs shall be along horizontal or vertical routes to present a neat appearance. Angled runs will not be acceptable. Group or bundle parallel runs of wire in plastic wire duct where practical.

E. All wiring runs shall be securely fastened to the panel or wire duct by means of plastic wire ties. Adequately support and restrain all wire runs to prevent sagging or movement.

F. AC power wiring and instrumentation/analog wiring shall be run separate.

G. Color code all internal wiring (not field wiring) as follows:
1. Line and load circuits: Black (B)
2. AC control wiring: Red (R)
3. Externally-Powered control wiring: Yellow (Y)
4. Neutral wiring: White (W)
5. Low voltage DC(+)pos: Blue (BL)

6. Low voltage DC(-)neg: Blue/White Tracer (BL/W)
7. Grounding: Green (G)

H. Terminal strips shall be provided for all input and output wiring. No more than two (2) wires shall be connected to one (1) terminal block.

2.11. ELECTRICAL SURGE AND TRANSIENT PROTECTION

A. General
1. Function: Protect the system against damage due to electrical surges.

B. Application: As a minimum, provide surge and transient protection (with proper grounding) at the following locations as described below:
1. Power Input High Frequency Noise Filtering:
a. 120VAC Control panels with integral UPSs, PLCs, or other electronic/microprocessor equipment that is susceptible to failure or improper operation due to high frequency/harmonic input transients shall be provided with series-connected high-frequency noise filters on the line input (downstream of any panel main disconnects/breakers). Filters shall be as manufactured by Edco/Emerson/Islatrol or equal (exact type(s) as required by application).
2. Power Input Surge Protection:
a. Provide surge protection device at any connection of 120VAC power to panels containing programmable logic controllers, remote I/O equipment, UPS's, transmitters, radios, VFDs, Reduced Voltage Soft Starters or other electronic equipment. Device shall:
1) Be mounted internal to the associated panel, with dedicated overcurrent protection.
2) Be of two-part (base and SPD), DIN-rail mountable construction.
3) Have 15kA total nominal discharge current per line (based on 8/20µs waveform).
4) Have maximum continuous operating voltage (MCOV) rating as required by the associated circuit voltage.
5) Visually indicate operational status.
6) Be Dehn DEHNguard series or equal by MTL Technologies, or may be combined with the High Freqency Noise Filtering device required above.
b. Provide surge protection device at any connection of multi-pole AC power to panels containing programmable logic controllers, remote I/O equipment, UPS's, transmitters, radios, VFDs, Reduced Voltage Soft Starters or other electronic equipment. Device shall:
1) Be mounted internal to the associated panel, with dedicated overcurrent protection.
2) Provide protection for all phases.
3) Have 40kA (per phase) peak surge current rating.
4) Have maximum continuous operating voltage (MCOV) rating as required by the associated circuit voltage.
5) Visually indicate operational status.
6) Be Square D SDSA or HWA series or equal.
3. Analog I/O Panel Terminations Surge Protection:
a. Provide surge protection device at the PLC (or similar) panel connection of each analog I/O signal. Device shall:

1) Be mounted internal to the associated panel.
2) Be of two-part (base and SPD), DIN-rail mountable construction.
3) Have 10kA total nominal discharge current per line (based on 8/20µs waveform).
4) Have maximum continuous operating voltage (MCOV) rating as required by the associated signal.
5) Be Dehn Blitzductor XT series or equal by MTL Technologies.

4. Discrete I/O Panel Terminations Surge Protection:
   a. Provide isolation relay at the PLC (or similar) panel connection of each discrete output signal (within the associated panel). See above for isolation relay requirements.
5. Low Voltage Power Supply Load Side Surge Protection:
   a. Provide surge protection device at the PLC (or similar) panel on the load side of each low voltage power supply that has low voltage connections extending external to the panel. Device shall:
      1) Be mounted internal to the associated panel.
      2) Be of two-part (base and SPD), DIN-rail mountable construction.
      3) Have 10kA total nominal discharge current per line (based on 8/20µs waveform).
      4) Have maximum continuous operating voltage (MCOV) rating as required by the associated utilization voltage.
      5) Be as manufactured by Dehn, MTL Technologies, or Phoenix Contact.
6. Antenna Cable Terminations Surge Protection:
   a. Provide surge protection device at the connection of antenna cable to the radio panel. Device shall:
      1) Be mounted internal to the associated panel.
      2) Provide coarse protection via replaceable gas-filled surge voltage arrestor
      3) Be Phoenix Contact CN-LAMBDA series or equal.

C. Installation and grounding of suppressor: As directed by manufacturer. Provide coordination and inspection of grounding.

PART 3 - EXECUTION

3.1. INSTALLATION

A. Provide enclosure mounting supports as required for floor, frame or wall mounting. All supports in exterior, wet or process areas shall be stainless steel unless noted otherwise. All floor-mounted panels or other similar distribution equipment shall be mounted on 6” concrete housekeeping pads unless specifically shown otherwise.

B. All enclosures used outside shall be solid bottom unless otherwise specified. All cable and piping openings shall be sealed watertight. Cable and piping shall enter the enclosure as shown on drawings or specified herein.

C. All equipment and components shall be solidly grounded to the control panel. One grounded terminal unit shall be provided in each control panel for connection to plant ground system. Grounding digital and analog components shall be performed in accordance with the instrument supplier’s installation recommendations. Signal ground shall be solidly connected to the ground system so as to prevent ground loops

3.2. PAINTING

A. For enclosures other than NEMA 4X stainless steel or fiberglass:
   1. Completely clean all surfaces so that they are free of corrosive residue. Then, phosphatize all surfaces for corrosion protection.
   2. Prime with two (2) coats and finish with one coat of factory finish textured polyurethane. Paint shall be Sherwin-Williams Polane “T’ or approved equal.
   3. Color to be selected during shop drawing review phase.

3.3. IDENTIFICATION & DOCUMENTATION

A. Refer to specification section 26 05 53 for additional requirements.

B. Control panel power supply source, type, voltage, number or circuit ratings shall be identified inside control panels and on drawings.

C. All interior devices and components shall be identified with thermal transfer labels with black letters on white background. Labels shall be placed on the subpanel and not the component. Marking system shall be a Brother “PTouch II” or equal. Lettering shall be 1/4" high.

D. All front panel mounted devices such as push buttons shall be identified by the use of engraved bakelite nameplates or legend plates. Nameplates shall be 1/8” thick, white with black core.

E. Where a panel includes a PLC or other network-connected device that is intended to be connected to another system (such as a plant SCADA system) via a network connection, the panel supplier shall provide an Interface Control Document (ICD) to the other system supplier (such as the SCADA Integrator). This document shall itemize the following for each networked parameter that is capable of being monitored or controlled by the other system:
   1. Parameter Name/Function (ex: Pump No. 1 On/Off Status)
   2. Parameter Type (discrete or analog, input or output)
   3. Parameter register ID/location

F. Where a panel includes a touchscreen or other programmable HMI display and is to be monitored by another system (such as a plant SCADA system), the panel supplier shall provide copies of the HMI display code and screenshots of all proposed HMI screens to the other system supplier (such as the SCADA Integrator) for their use in duplicating the associated HMI.

G. A job-specific, custom wiring diagram for each control panel (not including control stations without relays) shall be provided to the contractor prior to installation for making the appropriate electrical connections. The wiring diagram shall clearly show all control components connected to the panel (whether the components are mounted internal or external to the enclosure). All wires and terminal blocks shall be clearly labeled. A laminated copy of the final wiring diagram for each unit shall be installed inside the door of the associated panel, and submitted to the owner with the as-built documentation.

3.4. OWNER TRAINING

A. Fully train the owner in the proper operation of all control panels/equipment, describing and demonstrating full operation, including function of each door-mounted device.

3.5. SPARE EQUIPMENT

A. Provide the following spare equipment:
   1. Fuses: 10% (minimum of 3) of each size and type utilized, mounted within a pocket within the associated control panel.
   2. Where control panel contains programmable controller (or similar equipment): Flash drive containing copies of all final programs utilized within the control panel, with provisions/cable assemblies as required to connect the flash drive provided to the controller to download the programs. Flash drive shall be attached to retractable cord (long enough to reach the associated port) attached to the inside of the panel door.

END OF SECTION 26 29 00

SECTION 27 05 00 - AUXILIARY SYSTEM CABLES, 0-50V

PART 1 - GENERAL

1.1. DESCRIPTION

A. Cables rated for 0V-50V application

PART 2 - PRODUCTS

2.1. GENERAL

A. Unless specified otherwise, all cables within the scope of this specification section shall:
   1. Be rated for exposed cable tray installation.
   2. Be plenum rated (Class 1 Control cabling and Instrumentation cabling installed in conduit or exposed in cable tray in non-plenum areas is not required to be plenum-rated).
   3. Be UL-rated for the proposed application.
   4. Be multi-conductor with overall outer sheath as required by the application. The insulation of each conductor within the overall multi-conductor cable shall be uniquely color-coded. Ground conductors (when provided) within the multi-conductor cable shall have green insulation. Conductors with green insulation shall not be used for conductors other than ground.
   5. Utilize copper conductors.
   6. Have wire gauge as required to limit voltage drop to acceptable limits determined by the system supplier and to meet all applicable code requirements.
   7. Where installed underground, within slab-on-grade or in exterior locations, be rated for wet locations.
   8. Where required for specific systems, meet the specific requirements (conductor quantity, wire gauge, insulation type, shielding, etc.) of the system supplier.

2.2. INSTRUMENTATION CABLING

A. In addition to above requirements, and unless specified otherwise, Instrumentation cabling shall:
   1. Be #16awg minimum.
   2. Be rated for 300V.
   3. Have aluminum foil shielding.
   4. Have stranded, twisted conductors.
   5. Have PVC insulation/jacket with ripcord.
   6. Be manufactured by Belden, AlphaWire or General Cable.

2.3. CLASS 1 CONTROL CABLING (120VAC CONTROL CIRCUITS, ETC.)

A. In addition to above requirements, and unless specified otherwise, Class 1 control cabling shall:
   1. Be rated for 600V.
   2. Be industrial grade.
   3. Have stranded conductors.
   4. Have sunlight/oil-resistant PVC/Nylon insulation and jacket with ripcord.

5. Be manufactured by Belden, AlphaWire or General Cable.

2.4. CLASS 2 & 3 CONTROL CABLING (FED FROM CLASS 2 OR 3 POWER SUPPLIES)

A. In addition to above requirements, and unless specified otherwise, Class 2 & 3 control cabling shall:
   1. Be rated for 300V.
   2. Be shielded if so recommended by the system supplier/integrator.
   3. Have twisted conductors.
   4. Have plenum-rated insulation/jacket with ripcord.
   5. Be manufactured by AlphaWire, Belden, General Cable, Superior Essex or West Penn.

2.5. NETWORK CABLING

A. Furnish and install all Ethernet, Fiber Optic and Backbone Copper Telephone cabling in accordance with all BICSI requirements and in accordance with other applicable specification sections.

PART 3 - EXECUTION

3.1. GENERAL INSTALLATION

A. Routing:
   1. All wires and cables shall be installed in conduit unless specifically noted otherwise. Where conduit is not otherwise required by contract documents, 0-50V Cabling located within concealed, accessible ceiling spaces (such as above lay-in ceilings) may be run without conduit if the following requirements are met:
      a. Cabling is plenum-rated, multi-conductor.
      b. Cabling is supported by cable tray or with J-hook supports on intervals not to exceed 5’-0” on center. Cabling shall be supported solely from the cable tray or j-hooks supported from the building structure, without using piping, ductwork, conduit or other items as supports.
      c. Cabling is neatly formed, bundled and tied with plenum-rated Velcro straps on intervals not to exceed 30” on center.
      d. Properly-sized conduit(s) are provided wherever cabling enters an inaccessible or exposed area (such as above gyp board ceilings, within walls or through walls).
      e. Cabling is not a part of a Fire Alarm System, Smoke Control System, Emergency Generator Control System or other life-safety related system.
   2. End bushings shall be provided on both ends of all raceway terminations.
   3. No splices shall be pulled into conduit.
   4. No cabling shall be pulled until conduit is cleaned of all foreign matter.

B. Penetrations:
   1. All fire/smoke barrier penetrations shall be made in accordance with a U.L. listed assembly.
   2. For cabling not installed in conduit:
      a. Fire/smoke barrier penetrations shall be sealed utilizing an enclosed fire-rated pathway device (STI EZ Path or equal) containing a built-in fire sealing system sufficient to maintain the hourly fire rating of the barrier being penetrated. The self-contained sealing system shall automatically

adjust to the installed cable loading and shall permit cables to be installed, removed or retrofitted without the need to remove or reinstall firestop materials. The pathway shall be UL Classified and tested to the requirements of applicable ASTM/UL1479 standards.

3. For cabling installed within conduit from endpoint to endpoint:
   a. Fire/smoke barrier penetrations shall sealed utilizing fire caulk or other equivalent firestop systems around perimeters of conduits per UL requirements.
4. For cabling installed within cable trays:
   a. Fire/smoke barrier penetrations shall be sealed with one of the following methods:
      1) Continuous cable tray through the penetration, with a combination of large firestop pillows and small firestop pillows contained, supported and secured (to prevent unauthorized removal) on both sides by aluminum wire mesh and firestop putty. Firestop pillows shall be STI Series SSB or equal and Firestop putty shall be STI Spec Seal or equal.
      2) Cable tray broken at the penetration, with fire/smoke barrier penetrations sealed utilizing an enclosed fire-rated pathway device (STI EZ Path or equal) containing a built-in fire sealing system sufficient to maintain the hourly fire rating of the barrier being penetrated. The self-contained sealing system shall automatically adjust to the installed cable loading and shall permit cables to be installed, removed or retrofitted without the need to remove or reinstall firestop materials. The pathway shall be UL Classified and tested to the requirements of applicable ASTM/UL1479 standards.

C. Excess Cabling:
   1. Excess cabling shall be neatly coiled within all junction boxes, pullboxes, wireways, etc. and at all terminations as required to allow future re-termination of cabling.

D. Terminations:
   1. All conductors/cabling (including spare conductors) shall be properly terminated unless specifically directed otherwise. See below for general termination hardware requirements.
   2. Cabling shall be neatly formed, bundled and tied at all terminations.

3.2. SPLICES/CONNECTIONS/TERMINATIONS:

A. Network Cabling:
   1. Network and fiber optic cabling shall be continuous from endpoint to endpoint and shall not be spliced unless specifically noted otherwise.

B. Control Cabling:
   1. Connections shall be made with T & B Sta-Kon wire joints EPT66M, complete with insulating caps. To be installed with WT161 Tool or C nest of WT11M Tool, Ideal Super - Nuts (not wire nuts), Ideal Wing Nuts, or Buchanan Elec. Products B Cap or Series 2000 Pressure connectors complete with nylon snap on insulators to be installed with C24 pressure tool.

C. Shielded cabling:

1. Unless directed otherwise by the system supplier, 0-50V cable shielding shall be grounded at the PLC/control panel end only (not at the field device end) with a termination kit as directed by the PLC/control panel supplier.
2. Shielded cabling shall be continuous from endpoint to endpoint and shall not be spliced without prior written approval from the Engineer.

3.3. LABELING

A. Refer to Specification Section 26 05 53 for all labeling requirements.

END OF SECTION 27 05 00

SECTION 27 60 00 - SCADA SYSTEM

PART 1 - GENERAL

1.1. DESCRIPTION

A. Work included: Provide a complete SCADA System with instrumentation and controls with appurtenant equipment and accessories as indicated, specified, and as necessary for a complete and proper operating system.
   1. Work includes, but not necessarily limited to, the following:
      a. All programmable logic controllers (PLCs), instruments, and other appurtenances as indicated and specified herein and as required by the process flow and instrumentation diagrams and descriptions.
      b. All engineering, hardware and software development, installation, startup, calibration services and supervision necessary.
      c. Testing and operational demonstrations as specified.
      d. Training programs as specified.
      e. Preparation of manuals.
      f. Programming of screens, alarms, historian, trending, etc. for the SCADA Computer system.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Specifications, Special Provisions, and all other related Sections.
   2. Refer to Specification Section 26 29 00 for additional control panel requirements.
   3. If applicable, refer to Specification Section 27 60 01 for SCADA Functional Descriptions (to be provided within construction phase of project unless indicated otherwise).
   4. Refer to Specification Section 27 60 05 for instrumentation requirements.
   5. Refer to plans for point lists and additional device requirements.

1.2. QUALITY ASSURANCE

A. The qualifications and experience of key project personnel shall be acceptable to the Engineer. The System Integrator shall employ competent service personnel to service and troubleshoot the control and instrumentation systems and shall have at least 15 years of experience with similar work. References shall be provided upon request by the Engineer. The System Integrator shall maintain their own UL508 panel shop. The System Integrators approved for this project are:
   1. Automation Control Services, LLC (“ACS”) – Pensacola, Florida (contact: Josef Anderson; josef.anderson@autoconserv.com; 850-477-8440)
   2. Electric Machine Controls (“EMC”) – Birmingham, Alabama (contact: Brian Thomason, bthomason@emcinc.com)
   3. Revere Controls – Birmingham, Georgia (contact: Derick Lamar, dlamar@reverecontrol.com)
   4. Other Pre-Approved Equivalent.

B. The system integration duties shall be provided by a company qualified, experienced, and regularly engaged in designing, setting up, programming, and integrating complex process loop controls and instrumentation for process control and monitoring applications. Only qualified system integrators will be allowed to submit proposals for

this project. In order to be considered qualified, integrator shall have completed a minimum of five (5) projects of similar type/scope and equal or greater magnitude and complexity within the last ten (10) years. Sub-contractors without qualifications will be rejected. Previous projects used to meet this experience requirement must have included similar (or greater) scopes of work for each of the following areas:

1. Process loop controls for the proposed processes
2. HMI graphics
3. Instrumentation
4. Control Panel/PLC panel construction

C. The System Integrator shall have and shall maintain a qualified technical and support staff. The System Integrator shall employ a Control Systems Engineer or Electrical Engineer to supervise or perform the work required by this Specification

D. The System Integrator or it's personnel engaged in this project shall have and shall maintain, at a minimum, the first three (3) certificates of ISA 62443 (for cybersecurity of industrial automation and control systems).

E. Contractor:

1. Shall be fully and solely responsible for the work of the systems supplier and solely responsible to the Owner for having supplied to the Owner the complete integrated SCADA system.
2. To provide personal superintendence and direction of the work, maintaining and supplying complete supervision over and coordination between all subcontractors employed by him and the Instrumentation and Control System Integrator.
3. To be responsible for defining the limits of his subcontractor's work.
4. To be responsible for setting of instruments (including alarms, etc. as provided under other sections).

F. Operation and Maintenance Manuals

1. Operating instructions shall incorporate a functional description of the entire system, including the system schematics which reflect "as-built" modifications.
2. Special maintenance requirements particular to the system shall be clearly defined along with special calibration and test procedures.
3. As part of the operation and maintenance manuals, provide one hard copy of the program used to program the programmable logic controller.

1.3. WARRANTY

A. Systems supplier shall furnish a hardware and software warranty for the system starting at substantial completion and ending one year from this date.

1.4. REFERENCES

A. Instrument Society of America (ISA) PR7. 1, Pneumatic Control Circuit Pressure Test, Tentative Recommendation Practice.

B. Instrument Society of America (ISA) S5.4, Instrument Loop Diagrams, standard.

C. National Electrical Manufacturers Association (NEMA) Publication, General Standards for Industrial and Control Systems, ICS 1 and Industrial Controls and Systems ICS2.

1.5. RADIO/WIRELESS SYSTEM PROPAGATION STUDIES

A. The successful bidder of this project will be responsible for implementing a highly reliable wireless communication network to remote panels/devices as indicated on plans. The successful bidder shall provide these studies prior to preparing project submittals and shall implement radio/wireless networks with components/antennae/radios/mounting poles/etc. accordingly as required for a fully functional system.

B. The System Integrator shall obtain all necessary permits required for radio/wireless systems prior to ordering/procuring any associated system equipment/devices.

C. The propagation study will include running a computer model from topographical information. The propagation study will also include a site survey to test signal strength (with the actual equipment proposed) to confirm the computer analysis.

D. The goal of the study is to produce a report that will specify the equipment that a supplier/integrator will need to install at each radio/wireless-connected device/panel to achieve better than -90dB communication for each radio/wireless link.

E. The propagation study report shall include the following information:
   1. Location of each new station geographical coordinates – longitude, latitude and elevation.
   2. Type of wireless equipment/devices and wireless communication types proposed. Where applicable, frequencies used in system testing and proposed in final installation of radio systems shall specifically be noted..
   3. Tower/pole/mast mounting heights, types and installation requirements for all antennae.
   4. All antenna styles/types.
   5. Locations, types, mounting details, etc. for any required access points or repeaters required to achieve the required signal strengths. Note that, if possible, no intermediate access points or repeaters other than those specifically noted on contract documents should be provided. Any access points/repeaters required must be specifically approved by the engineer in writing prior to implementation. Any and all costs associated with furnishing or installing any required access points/repeaters (including material, power, mounting towers/poles, permitting, etc.) shall be fully included within the bid.
   6. Complete documentation from the computer analysis.

1.6. SUBMITTALS

A. General/System submittal requirements:
   1. Provide submittal (quantity as required by contract) of:
      a. Component manufacturing data sheets indicating pertinent data and identifying each component (including all components within PLC/control panel enclosures, instruments, computer systems, surge protection devices, antennae, radios, sun/rain shields, etc.) by tag number and nomenclature as indicated on drawings and in specifications.
      b. Component drawing showing dimensions, mounting, and external connection details,

c. SCADA Network Diagram showing all major network equipment (including all PLCs, RTUs, Ethernet Switches, Computer System components, network cabling networked I/O, etc.).
d. List of all spare parts. All manufacturers recommended spare parts shall be provided in addition to required spare parts.
e. Shop test plan and results.
f. Propagation study results.

2. Identify any specification section where exceptions are being taken or an "or equal" piece of hardware is being proposed.
3. A Bill of Materials shall be included with catalog information on all components.
4. Information shall be included on any proprietary logic component sufficient to demonstrate its ability to perform the required functions.

B. Panel submittal requirements:
1. A job-specific, custom wiring diagram
a. The wiring diagram shall clearly show all components (whether the components are mounted internal or external to the control panel enclosure).
b. All wires and terminal blocks shall be clearly labeled.
c. Diagram shall be in accordance with NEMA/ICS standards.
2. Size, type and rating of all system components.
3. Unit frontal elevation and dimension drawings.
4. Internal component layout diagrams.
5. Manufacturer’s product data sheets for all components.

C. Instrumentation/Field Device submittal requirements:
1. Manufacturer’s product data sheets
2. Job-specific model numbers for each instrument/field device
3. Job-specific ranges/setpoints/etc. proposed for each instrument/field device

D. Computer System submittal requirements:
1. Manufacturer’s product data sheets
2. Job-specific model numbers and bill of materials for all computer system devices and software.
3. Screen shots showing proposed layout of each specific or typical SCADA HMI screen.

E. Calculation submittal requirements:
1. Thermal calculations showing amount of air conditioning and heating required for each control panel, per ambient requirements listed below and operating temperature limitations of all equipment/devices within each control panel.
a. Thermal calculations used for sizing cooling systems for each control panel located in exterior or non-conditioned spaces shall assume:
1) Ambient exterior air temperature ranges of -5 degrees F to 105 degrees F.
2) Full solar contact where applicable.
3) No wind.
4) Heat loss from interior equipment (electronics, etc.) per equipment supplier’s information.
b. Thermal calculations used for sizing heating systems for each control panel shall assume:

1) Ambient exterior air temperature ranges of -5 degrees F to 105 degrees F.
2) No heat loss by interior components of control panel.
3) No solar gain on exterior of control panel.
4) Doubling of heating wattage required to account for wind where control panels are located outdoors.
5) Minimum temperature difference (due to heating) of 10 degrees F to prevent condensation, regardless of equipment temperature limitations.

2. Load calculations showing the sizing of all power supplies provided (with spare capacity as specified).
3. Load calculations showing the sizing and anticipated runtime of all Uninterruptible Power Supply systems provided (with spare capacity as specified).

1.7. DELIVERY, STORAGE AND HANDLING:

A. Packing and Labeling:
1. Prior to shipment, each component shall be tagged to identify its' location, tag number, and system function. Identification shall be prominently displayed on the outside of the package.
2. Firmly attach permanent, final labeling (as specified elsewhere) to all equipment, panels, instruments/field devices, etc. prior to installation.

B. Delivery:
1. Following completion of shop assembly, factory test, and approval of all equipment by the Engineer, the panels, cabinets, and consoles and equipment shall be shipped. Provide protection for equipment from handling and the environment.

C. Receiving:
1. The contractor is responsible for receiving and proper storage of equipment delivered to the job site.
2. All received items shall be protected from the elements and where required stored in a low humidity environment.
3. Protect materials and equipment against damage in storage and during construction.

PART 2 - PRODUCTS

2.1. GENERAL:

A. Refer to Specification Section 26 29 00 (Manufactured Control Panels) for all control panel enclosure, control component, controller, surge protection device, etc. requirements.

B. Specifications below identify general intent and major system components only. System Integrator shall be responsible providing all system accessories, interconnections, installation, etc. and verifying compatibility of all system components as required to provide a fully-functional/coordinated system.

2.2. SCADA COMPUTER SYSTEMS

A. Existing remote SCADA computer systems shall be modified as required to monitor/control/alarm the new I/O. Update existing remote VTSCADA HMI software/programming/etc. as required to includes screens, alarming, etc. for the new facilities on the existing SCADA computers. SCADA Integrator is responsible for performing site visits at owner's existing remote facilities prior to bid to confirm existing quantities/types of SCADA computers, existing HMI software/license types, the potential need to upgrade licenses for the new tags required by this project, etc.; and to include all costs in bid as required to provide an upgraded/fully-functional SCADA system (for new local SCADA touchscreen computer AND remote existing SCADA computers).

2.3. EACH NEW SCADA PLC PANEL SHALL INCLUDE:

A. General construction/materials/devices per Specification Section 26 29 00 (Manufactured Control Panels).

B. All printed circuit boards within electronic devices (PLCs, RTUs, controllers, I/O modules, power supplies, touchscreens, Ethernet switches, radios, etc.) installed in panels located in non-conditioned or exterior/process areas shall be conformal-coated for harsh environments.

C. Ethernet Switch:
   1. Provide Managed Industrial Ethernet Switch, with copper ports for all required copper Ethernet connections plus 50% spares and SC-type fiber optic ports for all required fiber optic connections: Rockwell Stratix 5700 series (to match existing).

D. VPN Router:
   1. Provide Fortinet FG-60F Security Appliance (to match existing) for remote access / VPN connections. See EXECUTION section below for additional cybersecurity requirements.

E. Controller Devices
   1. Rockwell CompactLogix 5380 series 5069-L340ER processor, 4MB of user memory, 8GB secure digital memory card, (2) integral 10Mbps/100Mbps/1Gbps Ethernet ports, (1) USB client, and chassis and other accessories as required.

F. Input/Output modules:
   1. Provide I/O modules on associated controller backplane as required by point lists provided on plans. I/O modules shall be Rockwell/Allen-Bradley Compact 5000 series (5069-IA16, 5069-OA16, 5069-IF8, 5069-OF8, etc.). Spare I/O: A quantity of spare I/O equal to 25% of the quantity specified for the PLC, of each I/O point type, or two of each I/O point type (whichever is greater) shall be provided for each PLC. For example, a PLC with 20 Discrete Inputs, 9 Discrete Outputs and 4 Analog Inputs shall additionally be provided with the following spare I/O: 5 Discrete Inputs, 3 Discrete Outputs, 2 Analog Inputs and 2 Analog Outputs (including spares). This applies to the following I/O point types:
      a. Discrete Input
      b. Discrete Output

c. Analog Input
d. Analog Output

2. Provide network/communication I/O modules (for Ethernet, Profibus, DeviceNet, etc. connections) as required by point lists provided on plans. All networked points listed are representative only. Prior to preparation of submittals, System Integrator shall collect register lists identifying all available networked points for the associated systems from the system supplier(s) and shall review the lists with the owner and engineer for determination of final points to be monitored/controlled. System Integrator shall provide programming/HMI for all networked points chosen by the owner/engineer for these systems.

G. Ambient Air Temperature Transmitter:
   a. Each SCADA PLC shall be provided with an ambient air temperature transmitter (per Specification Section 27 60 05 requirements) factory-mounted to the outside of the PLC enclosure, with engraved nameplate to identify instrument name/tag/function and factory-wired as an analog input to the associated PLC by the SCADA Integrator.

H. Panel-mounted Thin Client PC and Touchscreen:
   1. Industrial panel-mounted thin client PC and touchscreen.
   2. Mounted on the deadfront door (outer-most door of panels mounted in dry locations, inner door of panels mounted in exterior locations).
   3. Programming/Screens:
      a. See “Part 3 – Execution” section below for additional requirements. Intent is for this PC/Touchscreen to be programmed with VTSCADA HMI screens as required to clearly display and provide control of parameters for this facility, plus basic information for other remote facilities already connected to Fairhope’s VTSCADA network (well statuses, remote tank statuses, etc.). Detailed requirements shall be coordinated with owner during programming stage.
   4. Touchscreen:
      a. 19.5” color touchscreen with LED backlight,
      b. NEMA 4X rating,
      c. Rated for operational temperatures of 0 degrees C to 50 degrees C.
      d. HD1080P with 3000:1 contrast ratio
      e. Connectors ars required to coordinate with associated PC/etc.
      f. NEMA 4X stainless steel front mounting bezel
      g. Where located in exterior environments, shall be covered by outer door of panel or fully-collapsible sun shield to fully protect LCD display from UV light when not in use, shall provide side and top shielding when in use. Sun shields shall be constructed of stainless steel and shall be installed such as to maintain NEMA 4X ratings of enclosures.
      h. Hope Industrial HIS-ML19.5-CTTA touchscreen with VB-20A mounting bracket (to match existing).
   5. Industrial PC:
      a. Fanless design.
      b. Rated for operational temperatures of 0 degrees C to 50 degrees C.
      c. 2.1 GHz Dual Core processor with 4GB system memory
      d. Two (2) Mini-DisplayPorts, one (1) GB LAN Ethernet port and four (4) USB 3.0 ports
      e. Logic Supply ML100G-52 PC (to match existing).

6. Furnished with SCADA HMI and Windows operating system software as required for this computer to operate as the local SCADA server for this site, and to communicate with other existing remote SCADA computers to provide remote monitoring/control and a remote redundant historian for this site.
7. Furnished with wireless/Bluetooth keyboard and optical mouse (stored within pocket within door of PLC), and folding 18”x18” shelf on front of outer door of enclosure (shelf material to match that of enclosure, for example: provide foldable stainless steel shelf for stainless steel panels).

I. Flash-Drive Programming Backup:
1. Provide portable flash-drive (exact type as required to be easily loadable into panel equipment) mounted to retractable cord hung from inside surface of inner door downloaded with final copies of all programming, etc. for equipment within panel (controller, touchscreen, etc.). Provide engraved nameplate to read: “PROGRAMMING BACKUP”.

J. Communication Equipment:
1. Internet-connected PLC Panels:
a. Provide copper Ethernet ports within Ethernet Switch within PLC panel as required for internet connections. Ethernet Switch shall be connected to owner’s internet connection as directed.
2. Cellular-connected PLC Panels:
a. Provide cellular LTE gateway (Sierra Wireless RV50X-NA to match existing) with dual-band cellular/PCS antenna and amplification equipment as required (exact types as required to achieve required signal strength). Include all necessary mounting hardware, interconnections and weatherproofing kit (where required).
b. See Radio/Wireless System Propagation Studies submittal section above for additional requirements.

K. UPS: Provide UPS with battery-supplied power to operate the system for 10 minutes. Refer to Specification Section 26 29 00 for UPS specification requirements.

L. Provide 20A-120V-1Pole grounding-type GFI receptacle within inner door of panel for convenience (laptop charging, etc.). Receptacle shall be connected upstream of UPS power and shall be protected by a dedicated circuit breaker rated for 10A.

M. Panel surge protection, lighting, HVAC, auxiliary components, etc. shall be provided per Specification Section 26 29 00.

2.4. RAW WATER FLOW AND TANK LEVEL TRANSMITTER/CONTROL PANEL SHALL INCLUDE:

A. General construction/materials/devices per Specification Section 26 29 00 (Manufactured Control Panels).

B. Enclosure and hardware as described in the “Separately-Enclosed Control Panels Schedule” on electrical plans.

C. Redundant 24VDC power supplies as required to provide loop-power to remote 2-wire instruments as required.

D. Provisions to monitor the following 4-20mA analog inputs:
   1. To SCADA:
      a. Aerator No. 1 Flow
      b. Aerator No. 2 Flow
      c. Total Raw Water Flow (instantaneous summation of Aerator No. 1 Flow and Aerator No. 2 Flow)
      d. Elevated Tank Level
   2. To existing daisy-chained chemical feed equipment (for flow pacing):
      a. Total Raw Water Flow (instantaneous summation of Aerator No. 1 Flow and Aerator No. 2 Flow)

E. Provisions to transmit the following 4-20mA analog outputs:
   1. Aerator No. 1 Flow
   2. Aerator No. 2 Flow
   3. Elevated Tank Level

F. Digital panel-mounted displays (with engraved nameplate labeling) for:
   1. Aerator No. 1 Flow
   2. Aerator No. 2 Flow
   3. Total Raw Water Flow (instantaneous summation of Aerator No. 1 Flow and Aerator No. 2 Flow)
   4. Elevated Tank Level

2.5. CLEARWELL LOW LEVEL CUTOFF CONTROL PANEL SHALL INCLUDE:

A. General construction/materials/devices per Specification Section 26 29 00 (Manufactured Control Panels).

B. Enclosure and hardware as described in the “Separately-Enclosed Control Panels Schedule” on electrical plans.

C. Wiring/interconnections as indicated on elementary diagram on electrical plans.

D. General construction/etc. to match similar unit recently installed at Fairhope WTP No. 3.

2.6. WIRING

A. Refer to Specification Sections 27 05 00, 26 05 19 and 26 29 00 for requirements.

PART 3 - EXECUTION

3.1. GENERAL

A. SCADA System shall:
   1. Measure and monitor discrete and continuous process and process equipment variables (see SCADA Point List on contract plans).
   2. Effectively present the process and process equipment variables to the operators allowing them to accurately monitor the status of the processes. Screens/screen shots shall be detailed 2 dimensional.
   3. Provide a means for the operators to effectively control the treatment processes, both automatically and manually.

4. Provide historical data acquisition, storage, retrieval, processing, and report generation.

B. All SCADA HMI screens shall be designed to utilize the pre-established graphic standards for the existing SCADA screens (for Fairhope WTP No. 3, etc.) for this owner. Level of detail, general organization of screens, color conventions, etc. shall match those existing standards.

C. The SCADA software shall be developed to include graphics for the proposed project scope. Human-Machine Interface (HMI) software as specified shall be supplied and fully configured by the System Integrator. Reports, graphics displays, real-time trends, function blocks, PID loop control, historical trends, security, alarming, etc. shall be developed by the System Integrator through a collaborative effort between the Engineer, Owner, Contractor and Equipment Suppliers.

D. Where multiple SCADA computers (workstations or servers) are provided, each computer shall be configured as redundant historians (of each other) to provide native, redundant, synchronized historians for the facility.

E. This system shall allow owner to securely monitor and control the facility via internet (from the referenced owner-furnished workstations/laptops) using industry-standard Internet security and automatic server failover. Displays on remote workstations/laptops shall appear exactly as they do on standard, hardwired thick-client workstations without further configuration.

F. The system shall include all provisions as necessary to allow SCADA Integrator to remotely monitor the system and to remotely make software/configuration repairs/improvements/updates to the system. Include modifications or additions to facility networks (in collaboration with owner's IT personnel) as required to provide VPNs or SSNs with industrial firewalls as required for secure network access to the SCADA systems. Entire installation shall be fully compliant with applicable sections of the latest version of ISA/IEC standard 62443 and all recommendations/standards of the PLC, Ethernet switch, and computer system manufacturers for proper cybersecurity. Minimum security provisions shall include, but not be limited to, 2-Factor Authentication, data encryption, strict firewall rules, automated security patch updates, etc. as recommended by ISA 62443 or as required by owner's IT personnel. The SCADA Integrator shall plan a meeting with the owner's IT personnel to review the proposed cybersecurity requirements and provisions prior to submitting system shop drawings.

G. The system shall include all provisions as necessary to provide alarm notification to off-site personnel. The system shall be configured to provide customizable alarm information via text-to-voice phone calls, SMS text messages, emails or pagers as directed/approved by the facility owner. The alarming system shall cascade alarms through a user-editable list of contacts, allowing each user to acknowledge the alarm (and to stop further notifications to other contacts).

H. In general, the operator interface to the system shall be via a hierarchy of graphics screens with "poke points" which will allow operators to navigate the plant facility by facility by simply "clicking" on the poke points with a mouse pointing device.
   1. A "Main Menu" shall be developed and will contain "poke points" to allow navigation to the following major subsystems:

a. Overall detailed 2-D graphical screen of site(s), showing major structures/processes. Screen(s) shall be fully-colorized representations of the various facilities. Screen(s) shall indicate major system parameters such as significant flow/level measurements, system on/off statuses, etc., but shall not be used for detailed parameter displays.
b. One (1) overall system process-flow diagrammatical representation of major process system or structure, on one screen if possible (with detailed 2-D graphics for each major structure or process). Screen(s) shall indicate major system parameters such as significant flow/level measurements, system on/off statuses, etc., but shall not be used for detailed parameter displays.
c. Separate process-flow diagrammatical representations (with detailed 2-D graphics for each component) for each major process or structure. Screens shall indicate all relevant I/O statuses, and shall allow for control for the given process or structure.
d. Pop-up style detailed component or process screens (for individual VFDs, analog instruments, PID or setpoint control systems, etc.). These types of component screens shall rely on graphical/diagrammatical displays rather than just text where possible.
e. Real-time trend displays.
f. Historical trend displays.
g. Excel reporting subsystem.
h. I/O diagnostics test displays.
i. Current alarms.
j. Equipment maintenance subsystem.

2. Where possible, real-time trends shall be embedded into the process-flow diagrammatical representations noted above. For example, graphical displays showing tank levels shall include an embedded trend line (within the tank image) to indicate the historical trend for the tank level. Similar embedded trending graphics shall be provided for other analog values where helpful to the plant operator.
3. The “Main Menu” shall contain dynamic symbols to depict the operational/communications status of each SCADA System panel/network device on the network (i.e. Normal or In Communications Failure).
4. Each new graphic display shall be designed so that an operator may “click” on “poke points” to gain access to any area of the facility (or to remote systems, where applicable) or to the Main Menu. The operator shall also be able to access the Current Alarms Display from any graphic display. Real-time and Historical Trend displays shall be made available from each plant process area via poke points.
5. All new graphics displays of plant areas shall be based upon detailed 2-D graphics as a basis for the display unless noted otherwise. For example, piping shall generally be drawn as grey-scale 2D pipes with fading (from center of pipe to outside edge of pipe). Motors, pumps, equipment images, etc. shall include similar detail.
6. Special graphics displays shall be developed by the System Integrator for each process control strategy. These graphics displays shall allow authorized operators to modify control parameters such as set points, operational sequences, etc. Passwords shall be utilized to determine the authorization level of operators.
7. All process alarms shall be categorized by “group” with each group representing a specific area of the plant or distribution system.

8. Security of the system shall be accomplished via allowing access to various parts and features of the system via entry of User names and passwords.
9. Graphics screens shall be developed for each major item of process equipment for which equipment runtime or equipment maintenance data is being collected. These graphics screens shall contain all data relative to the piece of equipment including runtime today, runtime since last serviced, total runtime between maintenance intervals. All runtime data shall be maintained by the various programmable logic controllers; not by the HMI software package.
10. All historical process data, such as average flows, hourly minimums and maximums, etc., shall be maintained by the various programmable logic controllers; not by the HMI software package.

3.2. TESTING

A. General
1. All elements of the hardware and software shall be tested to demonstrate that the total system satisfies all of the requirements of this specification.
2. As a minimum the testing shall include the following:
   a. Unwitnessed Factory Test (UFT)
   b. Operational Readiness Test (ORT)
   c. Functional Acceptance Test (FAT)
3. Each test shall be in the cause and effect format. The person conducting the test shall initiate an input (cause) and upon the system's or subsection's producing the correct result (effect), the specific test requirement will have been satisfied.

B. Unwitnessed Factory Test (UFT)
1. Prior to start of the witnessed Factory Demonstration Tests, the entire system shall be inspected and tested at the system supplier's factory to ensure that it is fully operational and ready for demonstration testing.
2. All panels, consoles and assemblies of the System shall be inspected and tested to verify that they are in conformance with related submittals and these specifications.

C. Operational Readiness Test (ORT)
1. General: Prior to start-up, the entire installed System shall be certified (inspected, tested and documented) that it is ready for operation. These inspections and tests shall include Loop/Component Inspections and Tests and a repeat of the Factory Demonstration Tests.

D. Functional Acceptance Test (FAT)
1. The entire SCADA System shall be tested on-site to demonstrate that it is operational and in conformance with these specifications.
2. Tests shall demonstrate specified functions, both hardware and software, to the satisfaction of the owner.

3.3. TRAINING

A. General
1. Provide an integrated training program for the owner's personnel at the jobsite. Tailor the training program to meet the specific needs of the Owner's personnel. Include training sessions, classroom and field, for managers, engineers, operators and maintenance personnel.

2. The training shall be carried out by technically competent and experienced instructors
3. The Owner shall have the right to make and reuse video tapes of all of the onsite training sessions.
4. One eight (8) hour day shall be provided on site for owner and or engineer selected attendees.

END OF SECTION 27 60 00

SECTION 27 60 05 - SCADA INSTRUMENTATION

PART 1 - GENERAL

1.1. DESCRIPTION

A. Work included: Provide a complete system of instrumentation and controls with appurtenant equipment and accessories as indicated, specified, and as necessary for a complete and proper operating system.
   1. Work includes, but not necessarily limited to, the following:
      a. All engineering, hardware and software development, installation, startup, ranging, calibration services and supervision necessary.
      b. Testing and operational demonstrations as specified.
      c. Training programs as specified.
      d. Preparation of manuals.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Specifications, Special Provisions, and all other related Sections.
   2. Refer to Specification Section 27 60 00 for additional SCADA System requirements.
   3. Refer to plans for point lists and additional device requirements.

1.2. QUALITY ASSURANCE

A. Where not specifically allowed or required otherwise by contract documents, all instrumentation and related equipment specified within this section shall be furnished by the SCADA Integrator for the project for proper system coordination.

B. Contractor:
   1. Shall be fully and solely responsible for the work of the systems supplier and solely responsible to the Owner for having supplied to the Owner the complete integrated SCADA system.
   2. To provide personal superintendence and direction of the work, maintaining and supplying complete supervision over and coordination between all subcontractors employed by him and the Instrumentation and Control System Integrator.
   3. To be responsible for defining the limits of his subcontractor's work.
   4. To be responsible for setting of instruments (including alarms, etc. as provided under other sections).

C. Provide Operation and Maintenance manuals
   1. Operating instructions shall incorporate a functional description of the entire system, including the system schematics which reflect “as-built” modifications.
   2. Special maintenance requirements particular to the system shall be clearly defined along with special calibration and test procedures.
   3. As part of the operation and maintenance manuals, provide one hard copy of the program used to program the programmable logic controller.

1.3. WARRANTY

A. Systems supplier shall furnish a hardware and software warranty for the system

starting at substantial completion and ending one year from this date.

1.4. REFERENCES

A. Instrument Society of America (ISA) PR7. 1, Pneumatic Control Circuit Pressure Test, Tentative Recommendation Practice.

B. Instrument Society of America (ISA) S5.4, Instrument Loop Diagrams, standard.

C. National Electrical Manufacturers Association (NEMA) Publication, General Standards for Industrial and Control Systems, ICS 1 and Industrial Controls and Systems ICS2.

1.5. SUBMITTALS

A. General/System submittal requirements:
   1. Provide submittal (quantity as required by contract) of:
      a. Component manufacturing data sheets indicating pertinent data and identifying each component (including all instruments, surge protection devices, antennae, sun/rain shields, etc.) by tag number and nomenclature as indicated on drawings and in specifications.
      b. Component drawing showing dimensions, mounting, and external connection details,
      c. List of all spare parts. All manufacturers recommended spare parts shall be provided in addition to required spare parts.
   2. Identify any specification section where exceptions are being taken or an "or equal" piece of hardware is being proposed.
   3. A Bill of Materials shall be included with catalog information on all components.
   4. Information shall be included on any proprietary logic component sufficient to demonstrate its ability to perform the required functions.

B. Instrumentation/Field Device submittal requirements:
   a. Manufacturer’s product data sheets
   b. Job-specific model numbers for each instrument/field device
   c. Job-specific ranges/setpoints/etc. proposed for each instrument/field device

1.6. DELIVERY, STORAGE AND HANDLING:

A. Packing and Labeling:
   1. Prior to shipment, each component shall be tagged to identify its' location, tag number, and system function. Identification shall be prominently displayed on the outside of the package.
   2. Firmly attach permanent stainless-steel, or other durable non corrosive tag to the equipment. Mark tags with the instrument tag number shown in the Instrumentation Data Sheets and/or Instrument drawings.

B. Delivery:
   1. Following completion of shop assembly, factory test, and successful submittal of all equipment information (without requirement for resubmittal), equipment shall be shipped. Provide protection for equipment from handling and the environment.

C. Receiving:

1. The contractor is responsible for receiving and proper storage of equipment delivered to the job site.
2. All received items shall be protected from the elements and where required stored in a low humidity environment.
3. Protect materials and equipment against damage in storage and during construction.

PART 2 - INSTRUMENTATION

2.1. GENERAL

A. All equipment and materials shall be new, unused and proved by previous use of similar products to be completely suitable for the service intended.

B. All of the equipment shall be the manufacturer's latest and proven design. Specifications and drawings call attention to certain features but do not purport to cover all details entering into the design of the system. All accessories, hardware, etc. shall be provided as required for a fully functional system. The completed system shall be compatible with the functions required and other equipment furnished by the Contractor.

C. All electrical components of the system shall be powered by 120V, single phase, 60 cycle current or 24VDC loop-powered from control panel, except as otherwise indicated or specified.

D. Cable lengths between sensors/elements and associated transmitters shall be as required by application. Contractor shall coordinate lengths and types of all sensor cables with the associated sensor supplier prior to bid and shall provide cable lengths/types as required.

2.2. LEVEL (OR OPEN CHANNEL FLOW) TRANSMITTERS & ULTRASONIC TRANSDUCERS

A. General:
   1. Scope -This section describes the requirements for a 4-wire, multi-functional ultrasonic level/open channel flow transmitter system.
   2. Basic System Description
      a. The multi-functional level control system (level system) shall employ acoustic echo-ranging technology to determine the distance between the transducer(s) and monitored surface(s), as a basis for display, output, and digital communication.
      b. The level/flow monitoring system shall consist of a microprocessor based level transmitter and one or two ultrasonic transducers.
      c. The level/flow transmitter shall be operator configurable to meet specific application requirements by implementation of available signal processing and process control functions, in any allowable combination.

B. Technical Specifications:
   1. Signal Processing - The level transmitter shall:
      a. Employ ultrasonic transceiver(s) suitable for providing excitation to, and processing resultant signals from the attached ultrasonic transducer(s).

b. Create a digitized echo profile, and apply patented Sonic Intelligence echo processing techniques to select and verify the echo representing the reflective surface monitored.
c. Calculate the distance between the transducer face and reflective surface based on the echo selected. The calculated distance may be converted to represent: material level, differential level, average level, space, material volume, vessel ullage, pumped volume, or head, open channel flow rate, and/or total flow volume.
d. Compensate temperature-induced variation in the acoustic wave propagation velocity in air. This compensation shall be based on signals received from the ultrasonic transducer(s) and/or a TS-3 temperature sensor.
e. Include a calibration method and/or enable manual operator value entry, to set a fixed acoustic wave propagation velocity for transmission mediums other than air.
f. Include configuration and calibration ability via integral keypad with non-volatile EEPROM memory to store user-programmed configuration.
g. Display measured variable (level/flow) on the main backlit LCD display along with associated units.

2. Process Control Functions - The level transmitter shall provide an assortment of process control functions that may be user implemented in any allowable combination.
   a. Standard Process Control Functions
      1) 0/4–20 mA output directly / inversely proportional to level, space, flow or distance
      2) Level alarm(s) based on on/off setpoints
      3) Loss of Echo or Cable Fault alarm
      4) Duty assist pump operation based on fixed or alternating level setpoints
      5) Remote relay state control via communications
      6) Basic failsafe operation on measurement loss
      7) Discrete inputs configurable to override level transmitter I/O operations
3. User Interface - The level transmitter shall enable user access to read only and read/write enabled data, using any of the following methods:
   a. Direct or scroll access to data stored in numerical parameters, using the hand programmer and graphic LCD display.
   b. IBM PC compatible computer access to data and digital echo profiles, using the Dolphin Plus instrument configuration package.
   c. HMI, SCADA, PLC, or DCS system access to data stored in Modbus registers via digital communications.
4. Detailed Specifications:
   a. Power
      1) 100-230 VAC ± 15%, 50 / 60 Hz, 50VA or less
   b. Enclosure
      1) Polycarbonate/Polyester, Indoor/Outdoor
      2) NEMA 4X / IP 65
   c. Ambient Temp.
      1) -20 to 50°C (-5 to 122°F)
   d. Display
      1) Back lit LCD, multi-line display
   e. Process Control I/O - The level transmitter shall provide:

1) One (1) 4-20mA HART analog signal output, directly or inversely proportional and scalable to the configured process variables, (dependent upon the transmitter model), capable of driving a 750 ohm load.
2) A minimum of three (3) form C relays with contact outputs based on the level conversion or other process variable as set by the Relay Function and other user configurable relay parameters.
3) Two discrete inputs that may be configured to override normal Process Control Functions.
4) One (1) 4-20mA input (model dependant) that may be scaled to a monitored process variable, to be used as a basis for level transmitter Process Control Functions.

f. Ranges: As directed by Civil Engineer.

5. Accessories:
   a. Stainless steel mounting bracket/hardware as recommended by manufacturer.
6. Spare Parts:
   a. Provide one (1) spare transducer of each type furnished with manufacturer's cable length to match longest cable length furnished within project.
7. Execution:
   a. Maintain minimum separation between transducer and maximum process material level as recommended by manufacturer.
   b. Mount transducer to ensure a clear path from the transducer to the process material surface.
   c. Where required by the application, provide submergence shield for the transducer(s).

C. Manufacturer/ Model:
   1. Pulsar Ultra 5 series transmitter with dB Ultrasonic Level Transducer(s) as required by application.
   2. Equal by Siemens Milltronics
   3. Equal by Endress + Hauser

2.3. NON-MERCURY FLOAT SWITCHES

A. Standard Specifications:
   1. Non-mercury construction.
   2. Rugged Chemical Resistant casing (no Teflon coatings will be allowed).
   3. Suspended type unit with built-in weight.
   4. Enclosed/encapsulated mercury SPST switch rated for 100VA at up to 250V. N.O. and N.C. contacts shall be provided, and shall be connected as indicated on wiring diagrams or required by application, coordinated by contractor and equipment supplier.
   5. Complete with factory-installed PVC-jacketed STO cable designed for industrial duty, length as required to be extended to contractor-furnished termination point.

B. Execution:
   1. Install float switches at heights as directed by civil engineer at locations that do not risk damage to the float switches.
   2. Contractor shall provide corrosion resistant junction box or other termination point above high water level for splicing cables furnished with float switch(es) to

cables furnished by contractor. Provide cord connectors at base of junction box (or similar) and stainless steel Kellems cord grips for proper strain relief of all float switch cables.

C. Manufacturer/ Model: Anchor Scientific Eco-Float with hardware/accessories as described above, or equal. Normally-open/normally-closed contact types shall be coordinated by supplier and shall be as required by application.

2.4. PROPELLER FLOW METER ELEMENT

A. General:
1. Basic System Description
a. The system shall employ an insertion-type, 2-wire, propeller flow meter element as directed by owner (to match existing). The flow meter be designed such as to allow hot-tap installation. Under this item, the contractor shall furnish and install the system, and all associated equipment and accessories as required for a complete installation.

B. Technical Specifications:
1. Process Control I/O - The flow transmitter shall provide:
a. One loop-powered 4-20mA analog signal output, directly or inversely proportional and scalable to the configured process variable, (dependent upon the controller model).

C. Execution:
1. Sensor shall be of sufficient length to allow a full profile of the pipe flow.
2. Install a valve or corporation stop with a female pipe thread output for the sensor as recommended by the sensor supplier.
3. Install sensor as required to maintain minimum upstream/downstream straight piping sections recommended by the manufacturer. Sensor shall be inserted into pipe at orientation as recommended by the manufacturer.
4. The system shall be factory calibrated to traceable NIST standards.

D. Manufacturer/ Model: As directed by owner (to match owner's standards).

2.5. DIFFERENTIAL PRESSURE TRANSMITTERS

A. Standard specifications:
1. NEMA 4X, corrosion resistant polyurethane-covered aluminum enclosure.
2. Provided with integral 5-valve coplanar manifold for isolation, venting, draining, calibration and equalization.
3. Provided with diaphragm or flanged annular seals (by Red Valve or equal) where in contact with process fluids other than clean water or air. Diaphragms and/or seals shall be factory-installed and factory-calibrated by the supplier of the seal or pressure transmitter prior to delivery to project site.
4. 24vdc loop powered
5. Integral digital LCD display
6. Transmitter output 4-20 mA
7. Accuracy +/- 0.2% Span
8. Stability +/- 0.25% Upper Range Limit.
9. Local adjustments – zero and span
10. Overrange and overload protection

11. 316 SS diaphragm
12. Glass-filled PTFE O-Ring
13. Silicone fill fluid

B. Execution:
   1. Where in contact with clear water or air:
      a. Shall be connected to process piping with flexible stainless steel impulse piping such as to limit transmission of vibration to device as directed by civil engineer unless specifically shown otherwise.
      b. Impulse piping shall be as short as possible and shall slope at least 1 in./foot upward from the transmitter toward the process connection.
   2. Where in contact with other fluids:
      a. Diaphragm seals shall be installed onto process piping or vessel as per manufacturer's recommendations.
      b. Flanged annular seal shall be installed in-line within process piping as per manufacturer's recommendations.
      c. Contractor shall coordinate installation (and insertion into or connection to process piping or vessel) with associated piping or vessel prior to ordering materials.

C. Acceptable manufacturers: Rosemount 3051CG series

2.6. GAUGE PRESSURE TRANSMITTERS

A. Standard specifications:
   1. NEMA 4X, corrosion resistant polyurethane-covered aluminum enclosure.
   2. Provided with integral 2-valve manifold for isolation, venting, draining or calibration.
   3. Provided with diaphragm or flanged annular seals (by Red Valve or equal) where in contact with process fluids other than clean water or air. Diaphragms and/or seals shall be factory-installed and factory-calibrated by the supplier of the seal or pressure transmitter prior to delivery to project site.
   4. 24vdc loop powered
   5. Integral digital LCD display
   6. Transmitter output 4-20 mA
   7. Accuracy +/- 0.2% Span
   8. Stability +/- 0.25% Upper Range Limit.
   9. Local adjustments – zero and span
   10. Overrange and overload protection
   11. 316 SS diaphragm
   12. Glass-filled PTFE O-Ring
   13. Silicone fill fluid

B. Execution:
   1. Where in contact with clear water or air:
      a. Shall be connected to process piping with flexible stainless steel impulse piping such as to limit transmission of vibration to device as directed by civil engineer unless specifically shown otherwise.
      b. Impulse piping shall be as short as possible and shall slope at least 1 in./foot upward from the transmitter toward the process connection.
   2. Where in contact with other fluids:

a. Diaphragm seals shall be installed onto process piping or vessel as per manufacturer's recommendations.
b. Flanged annular seal shall be installed in-line within process piping as per manufacturer's recommendations.
c. Contractor shall coordinate installation (and insertion into or connection to process piping or vessel) with associated piping or vessel prior to ordering materials.

C. Acceptable manufacturers: Rosemount 3051CG series

2.7. AMBIENT AIR TEMPERATURE TRANSMITTERS

A. Interior/Dry Locations:
1. Standard Specifications:
a. Panel-mounted to panel exterior (where on control panel/PLC panel), or outlet-box mounted.
b. 1000 Ohm platinum RTD
c. With integral transmitter for 4-20mA loop-powered output (2-wire instrument)
d. Display: 4 Digit LED
e. Labeling: Supplier/integrator shall provide engraved nameplate to read "AMBIENT TEMPERATURE TRANSMITTER"
f. Housing: Splash resistant faceplate with rear gasket seal
g. Temperature Range: -40 to 180 degrees F (scaled to 4mA = -13 degrees F and 20mA = 167 degrees F)
h. Accuracy: ±0.5 ºF (±0.3 ºC) at 77 ºF (25 ºC)
2. Acceptable Manufacturers: Devar d-RTTI

B. Wet/Process/Exterior Locations:
1. Standard Specifications:
a. NEMA 4X enclosure
b. 1000 Ohm platinum RTD
c. With integral transmitter for 4-20mA loop-powered output (2-wire instrument)
d. Display: 4 Digit LED
e. Labeling: Supplier/integrator shall provide engraved nameplate to read "AMBIENT TEMPERATURE TRANSMITTER"
f. Housing: Splash resistant faceplate with rear gasket seal
g. Temperature Range: -40 to 180 degrees F (scaled to 4mA = -13 degrees F and 20mA = 167 degrees F)
h. Accuracy: ±0.5 ºF (±0.3 ºC) at 77 ºF (25 ºC)
2. Acceptable Manufacturers: Devar d-RTTI-N4

2.8. SUN/RAIN SHIELDS

A. General:
1. Sun/Rain Shields shall be:
a. Furnished for all instruments that will be exposed to sun or rain (or where otherwise specifically noted).
b. Furnished by instrumentation supplier.

B. Standard Specifications:

1. Unless specified otherwise, sun/rain shields shall:
    a. Have minimum dimensions of 24” wide X 24”high X 6” projection past front of associated instrument. Sun/Rain shields shall be sufficiently sized to accommodate instrument(s) plus associated surge protection device(s), power supplies, and other similar devices.
    b. Have top and sides formed of single sheet 10 gauge aluminum.
    c. Have back formed of single sheet 10 gauge aluminum tack-welded to top and sides to form a waterproof connection.
    d. Have all exposed corners and edges grounded to be smooth and round.

C. Execution:
1. Sun/rain shields shall:
    a. Be mounted corrosion resistant stainless steel mounting hardware
    b. Include hardware as required to provide a minimum of ¾” separation between instrument (and other similar devices) and back of sun/rain shield.
    c. Be mounted to wall, handrail, pipe or other similar supporting structure.

2.9. ELECTRICAL SURGE AND TRANSIENT PROTECTION

A. General
1. Function: Protect the system against damage due to electrical surges.

B. Application: As a minimum, provide surge and transient protection (with proper grounding) at all field instrumentation connected to process piping or where part of circuitry extends outside building(s), as described below:
1. Analog Instruments::
    a. Provide surge protection device(s) at power and analog circuit connections to the instrument equipment.
    b. At 2-wire, loop-powered instruments, surge protection device shall:
        1) Be of stainless steel, pipe-mounted, IP67 construction, nipple-mounted at the instrument as directed by the device supplier.
        2) Have 10kA total nominal discharge current per line (based on 8/20µs waveform).
        3) Have maximum continuous operating voltage (MCOV) rating as required by the associated signal.
        4) Be Dehn DEHNpipe series or equal by MTL Technologies.
    c. At 4-wire, separately-powered instruments, surge protection device(s) shall:
        1) Be mounted within one (1) appropriately-sized NEMA 4X enclosure with viewing window at the field device.
        2) Be of DIN-rail mountable construction.
        3) Have 10kA total nominal discharge current per line (based on 8/20µs waveform) for the analog signal.
        4) Have 15kA total nominal discharge current per line (based on 8/20µs waveform) for the power input.
        5) Have maximum continuous operating voltage (MCOV) rating as required by the associated signal/power circuit(s).
        6) Be one of the following:
            (a) Edco SLAC series

(b) Dehn Blitzductor XT series (for the analog signal) plus Dehn DEHNguard series (for the power input), combined into (1) overall NEMA 4X enclosure.

C. Installation and grounding of suppressor: As directed by manufacturer. Provide coordination and inspection of grounding.

PART 3 - EXECUTION

3.1. INTERFACE REQUIREMENTS

A. The instrumentation supplier shall forward submittals clearly identifying all instrumentation interface requirements (inputs/outputs, network connections, register locations for network connections, loop power source requirements, etc.) to the supplier of the associated control and monitoring system, or SCADA system, prior to construction of the associated control and monitoring panels, PLC's, RIO's, RTU's, etc.

3.2. IDENTIFICATION AND LABELING:

A. Refer to Specification Section 26 05 53 for identification and labeling requirements.

3.3. INSTALLATION

A. All equipment shall be installed in accordance with the manufacturer's recommendations.

B. All mounting hardware shall be of corrosion resistant material unless noted otherwise. In exterior or typical process areas, mounting hardware shall be type 316 stainless steel. In extremely corrosive areas (Chlorine rooms, Fluoride rooms, etc.), mounting hardware shall be of non-metallic construction as recommended by the equipment supplier.

3.4. CALIBRATION

A. All instruments provided, relocated or modified within the project shall be calibrated and ranged by a factory-trained representative to the range specified by the process engineer.

B. All calibration procedures shall be implemented using equipment meeting NIST standards.

C. Calibration sheets shall be used to record all applicable calibration settings and calibration equipment data, and to indicate certification of traceability to National Institute of Standards and Technology (NIST) standards.

3.5. TESTING

A. General
1. All elements of the instrumentation system shall be tested to demonstrate that the total system satisfies all of the requirements of this specification.
2. As a minimum the testing shall include the following:
a. Operational Readiness Test (ORT)

b. Functional Acceptance Test (FAT)

3. Each test shall be in the cause and effect format. The person conducting the test shall initiate an input (cause) and upon the system's or subsection's producing the correct result (effect), the specific test requirement will have been satisfied.

B. Operational Readiness Test (ORT)

1. General: Prior to start-up, the entire installed instrumentation system shall be certified (inspected, tested and documented) that it is ready for operation.

C. Functional Acceptance Test (FAT)

1. The entire instrumentation system shall be tested on-site to demonstrate that it is operational and in conformance with these specifications.
2. Tests shall demonstrate specified functions, calibration and ranging to the satisfaction of the owner.

3.6. TRAINING

A. General

1. Provide an integrated training program for the owner's personnel at the jobsite. Tailor the training program to meet the specific needs of the Owner's personnel. Include training sessions, classroom and field, for managers, engineers, operators and maintenance personnel.
2. The training shall be carried out by technically competent and experienced instructors
3. The Owner shall have the right to make and reuse video tapes of all of the onsite training sessions.
4. A minimum of one eight (8) hour day shall be provided on site for training owner and or engineer selected attendees.

3.7. SPARES:

A. A quantity of spare surge protection devices for field instruments equal to 25% of the quantity specified of each type, or one of each type (whichever is greater) shall be provided. For example, a system with surge protection devices for two (2) loop-powered 2-wire field instruments and nine (9) 120V-powered 4-wire field instruments shall be provided with one (1) spare surge protection device for loop-powered 2-wire field instruments and three (3) spare surge protection devices for 120V-powered 4-wire field instruments.

3.8. SYSTEM DOCUMENTATION:

A. Upon completion of the installation, the instrumentation supplier shall provide full documentation sets (quantity as required by other specification sections) to the owner for approval. Documentation shall include:

1. A record set of all information submitted prior to installation.
2. Records of all calibration sheets described above.

3.9. FINAL ACCEPTANCE & SYSTEM CERTIFICATION:

A. Completion of the installation, in-progress and final inspections, receipt of the system documentation, and successful performance of the instrumentation system for a two week period will constitute acceptance of the system.

3.10. WARRANTY:

A. The contractor shall fully warrant the completed instrumentation system to be free from inherent mechanical and electrical defects for a period of one (1) year from the date of final acceptance.

END OF SECTION 27 60 05

ITEM III
BID RESPONSE FORM

Date: ____ / _____ / _____

Bid No: 24-030 SCADA System for Water Treatment Plant No. 1

Bids Due: Tuesday, March 26, 2024 at 10:00 a.m.

Lumps Sum Cost for complete SCADA System as listed in Scope of Work **$_____**

Bid will include all labor, materials, equipment, shipping and postage, overhead, profit, bonds, insurance and all other costs necessary to provide the complete services outlined within this CONTRACT and scope of work.

Receipt of the following Addenda to these documents is hereby acknowledged by the undersigned (CONTRACTOR to complete below):

ADDENDUM NO.	DATE ISSUED	ADDENDUM NO.	DATE ISSUED
_____	_____	_____	_____
_____	_____	_____	_____

Each bid must give the full business address of the CONTRACTOR and must be signed by him with his usual signature. Bids by partnerships must furnish the full names of all partners and must be signed with the partnership name by one of the members of the partnership, or by an authorized representative, followed by the signature and designation of the person signing. Bids by corporations must be signed with the legal name of the corporation followed by the name of the State of Incorporation and by the signature and designation of the president, secretary, or other person authorized to bind it in the matter. The name of each person shall also be typed or printed below the signature. A bid by a person who affixes to this signature the word "president," "secretary," "agent," or other designation without disclosing his principal, may be held to be the bid of the individual signing. When requested by the City of Fairhope, Baldwin County, Alabama, satisfactory evidence of the authority of the officer signing in behalf of the corporation shall be furnished.

The undersigned agrees to furnish the goods/services as requested by you for the City of Fairhope, Baldwin County, Alabama in your invitation to bid, and certifies that they will meet or exceed the specifications called for. The undersigned has read all information pertaining to this bid and has resolved all questions. It is also understood and agreed that all prices quoted are F.O.B. described in the bid documents and specifications. The undersigned also affirms he/she has not been in any CONTRACT or collusion among BIDDERS or prospective BIDDERS in restraint of freedom of competition, by CONTRACT to bid at a fixed price or to refrain from bidding or otherwise.

Witness our hands and seals this _____ day of _____, 2024.

If Individual or Partnership

_____ _____
(Name of Individual or Partnership) (Name of Partner Print)

_____ _____
(Name of Representative Authorized to sign Bids and CONTRACTs for the firm Print) (Name of Partner Print)

Address_____

_____

_____

Phone Number ( )_____Fax Number ( )_____

E-mail address _____Alabama Contractor's License No. _____

Foreign Entity ID (if outside of Alabama)_____

If Corporation or LLC

Company_____

State of Incorporation _____

Company Representative_____
(Representative Authorized to sign Bids and CONTRACTs for the firm Print)

Company Representative_____
(Representative Authorized to sign Bids and CONTRACTs for the firm Signature)

Address_____

_____

_____

Phone Number ( )_____ Fax Number(___)_____

E-mail address _____AL Contractor's License No. _____

Foreign Vendor Id_____

BID PROPOSAL NOTARIZATION:

STATE OF _____}

COUNTY OF _____}

I, the undersigned authority in and for said State and County, hereby certify that_____, as_____ respectively, of _____, whose name is signed to the foregoing document and who is known to me, acknowledged before me on this day, that, being informed of the contents of the document they executed the same voluntarily on the day the same bears date.

Given under my hand and Notary Seal on this _____ day of _____, 2024.

NOTARY PUBLIC _____

MY COMMISSION EXPIRES____/___/_____

ITEM IV
CONTRACTOR INFORMATION

This Section must be printed, completed, and turned in with your bid response to

Bid No. 24-030
SCADA System for Water Treatment Plant No. 1

Business Organization

Name of CONTRACTOR (exactly as it appears on W-9):

_____
Doing-Business-As Name of CONTRACTOR:

_____
Principal Office Address:

_____

_____

_____

LOCAL Telephone Number: _____ Toll- Free_____
LOCAL Fax Number: _____
Email address: _____
Website: _____

Form of Business Entity [check one ("X"]
Corporation ____
Partnership ____
Individual ____
Joint Venture ____
Other (describe): _____

Corporation Statement
If a corporation, answer the following:
Date of incorporation: _____
Location of incorporation: _____
The corporation is held: Publicly ___
Privately ___

Partnership Statement
If a partnership, answer the following:
Date of organization: _____
Location of organization: _____
The partnership is: General ___
Limited ___

Joint Venture Statement
If a Joint Venture, answer the following:
Date of organization: _____
Location of organization: _____
JV CONTRACT recorded? Yes ___ No ___

Contact: _____Email_____

Phone_____Fax_____

END OF CONTRACTOR INFORMATION SECTION

ITEM V
INSURANCE

3.0 **INSURANCE REQUIREMENTS**

Awarded **CONTRACTOR**, at its sole expense, shall obtain and maintain in full force the following insurance to protect the **CONTRACTOR** and the City of Fairhope at limits and coverages specified herein. The City of Fairhope will be listed as an additional insured under the **CONTRACTOR'S** general liability insurance and automobile liability insurance policies, and all other applicable policies and certificates of insurance. These limits and coverages specified are the minimum to be maintained and are not intended to represent the correct insurance needed to fully and adequately protect the awarded **CONTRACTOR.**

3.01 All insurance will be provided by insurers by admitted carriers in the State of Alabama, shall have a minimum A.M. Best rating of A-VII and must be acceptable to the City. Self-insured plans and/or group funds not having an A.M. Best rating must be submitted to the City for prior approval.

3.02 **NO WORK IS TO BE PERFORMED UNTIL PROOF OF COMPLIANCE WITH THE INSURANCE REQUIREMENTS HAS BEEN RECEIVED BY THE CITY.**

3.03 **Worker's Compensation and Employers Liability**

Part One: Statutory Benefits as required by the State of Alabama	
Part Two: Employers Liability	$100,000 Each Accident
	$100,000 Each Employee
	$500,000 Policy Limit

3.04 **U.S. Longshoreman & Harbor workers Act (USL&H)-**

Required if CONTRACT involves work near a navigable Waterway that may be subject to the USL&H law.

3.05 **Maritime Endorsement (Jones Act)-**

Endorsement required if CONTRACT involves the use of a Vessel. Or include coverage for "Master or Members or Crew" under "Protection and Indemnity" coverage (P&I), unless crew is covered under Workers Compensation.

Bodily injury by accident	$1,000,000 Each Accident
Bodily injury by disease	$1,000,000 Aggregate

3.06 **Commercial General Liability**

Coverage on an Occurrence form with a combined single limit of (Bodily Injury and Property Damage combined as follows:

Each Occurrence	$1,000,000
Personal and Advertising Injury	$1,000,000
Products/Completed Operation Aggregate	$2,000,000
General Aggregate	$2,000,000

Coverage to include:

Premises and operations
Personal Injury and Advertising Injury
Products/Completed Operations
Independent BIDDERS
Blanket Contractual Liability
Explosion, Collapse and Underground hazards
Broad Form Property Damage
Railroad Protective Liability Insurance if work involves construction, demolition or maintenance operations on or within 50 feet of a railroad.

3.07 **Automobile Liability**

Covering all Owned, Non-Owned, and Hired vehicles with a limit of no less than $1,000,000 combined single limit of Bodily Injury and property damage per occurrence.

3.08 **Certificate of Insurance**

A Certificate of Insurance evidencing the above minimum requirements must be provided to and accepted by the City PRIOR to commencement of any work on the CONTRACT. Each policy shall be endorsed to provide ten (10) days written notice of cancellation to the CITY

Such insurance as is afforded by the above policies covers the operations undertaken by the insured with respect to the construction of the project above designated. The insurance afforded by the above designated policies, specimen copies of which have been filed with the **CITY**, and to each of which is attached for following endorsement.

The insurer agrees with the insured as follows:

1. That it will furnish to said City of Fairhope a certificate of insurance in triplicate on a form approved for such purpose by said **CITY,** setting forth the pertinent information regarding the policy to which this endorsement is attached, for each project of said **CITY** to which the policy applies.

2. That it will attach to each said certificate of insurance executed copies of any endorsement other than this endorsement which are attached to said policy at the time said policy is issued, provided only that said endorsements affect the coverage of said policy in respect of operations involved in the construction of the projects of said **CITY** to which the policy applies.

3. That it will mail to the City Council of the City of Fairhope three executed copies of each endorsement subsequently issued to become a part of said policy provided only that endorsement affects the coverages of said policy in respect of operations involved in the construction of the project of said **CITY** which the policy applies, and provided further that such endorsement shall not be effective unless such notice is given to the **CITY** at the same time that notice thereof is given to the insured.

4. That it will mail to the City Council of the **CITY** of Fairhope at least ten days before the effective date thereof notice of cancellation of said policy, provided no cancellation shall be effective unless such notice is given to the **CITY.**

END OF INSURANCE REQUIREMENTS

ITEM VI

City of Fairhope
CONTRACT

This **CONTRACT** is made this _____ day of _____, 202__, by and between the City of Fairhope (hereinafter referred to as the "**OWNER**") and _____ (hereinafter referred to as the "**CONTRACTOR**"), for

Bid Number/Name

The **OWNER** and the **CONTRACTOR** agree as set forth below:

1. The CONTRACT consists of all the items contained within this CONTRACT, The Proposal Package, Proposal, Scope of Work and Specifications, drawings (if applicable), Addenda, Amendments, and City of Fairhope Standard Terms and Conditions, which are attached hereto and made a part hereof, as if fully contained herein; for the performance of all work and the furnishing of all labor and materials required for completion of the WORK.

2. The CONTRACTOR shall perform all the WORK described herein.

3. The **WORK** to be performed under this **CONTRACT** shall be commenced upon execution of this **CONTRACT** within number (DAYS) days of the date specified in the *Notice to Proceed* (NTP) to be issued to the **CONTRACTOR** by the **OWNER,** or its authorized representative. The work shall be completed, subject to authorized adjustments, within (DAYS) consecutive calendar days from and after the commencement date stipulated in said *Notice to Proceed.* Liquidated damages for non-completion of the work within this time limit will be assessed at the rate of (DOLLARS) per working day.

4. The **OWNER** shall pay the **CONTRACTOR** in current funds for the performance of the **WORK**, the **CONTRACT SUM** of _____DOLLARS ($). This represents a LUMP SUM payment for performance of the **WORK**, which payment shall be issued after the Contract is fully performed and the **OWNER** has inspected the **WORK**.

5. **General Conditions**
   a. **Indemnity:** The CONTRACTOR hereby agrees to indemnify and save harmless the OWNER, its officers, agent, and employees, from and against any and all liabilities, claims, demands, damages, fines, fees, expenses, penalties, suits, proceedings, actions and cost of actions, including reasonable attorneys' fees for trial and on appeal, of any kind and nature, arising or growing out of, or in any way connected with the performance of this CONTRACT, to the extent caused by a negligent act or omission of the CONTRACTOR, their agents, servants, employees, SUB-CONTRACTORS, or others associated with the CONTRACTOR. The CONTRACTOR shall be responsible for damage to any elevator equipment excluded from this agreement, or damage or injury caused by any equipment excluded from this agreement, to the extent that the damage or injury is caused by a negligent act or omission of the CONTRACTOR.

   b. **Notification and Accident Reports:** In the event of accidents of any kind, the **CONTRACTOR** shall notify the **OWNER** immediately and furnish, without delay, copies of all such accident reports to the **OWNER.** If in the performance of their Work, the **CONTRACTOR** fails to immediately report an accident to the **OWNER**, of which the **CONTRACTOR** has knowledge of and which results in a fine

levied against the **OWNER** then the **CONTRACTOR** shall be responsible for all fines levied against the **OWNER**.

6. **Termination of Agreement**
    a. Termination for Default: Performance of Work under this Agreement may be terminated by the OWNER, in whole or in part, in writing, whenever the OWNER determines that the CONTRACTOR has failed to meet the requirements of this Agreement.
        i. The Owner has a right to terminate for default if the contractor fails to make delivery of material or does not perform the work, or if the Contractor fails to perform the Work within the time specified in the Agreement, or if the Contractor fails to perform any other provision of the Agreement.

        ii. Failure on the part of the Contractor to deliver or perform the Work within the time specified, or within a reasonable time as determined by the Owner, or failure on the part of the Contractor to make replacements of rejected articles, or Work when so requested, immediately or as directed by the Owner, shall constitute authority for the Owner to purchase in the open market, articles or Work of comparable grade to replace the articles or Work rejected, not delivered or completed. On all such purchases, the Contractor shall reimburse the Owner within a reasonable time specified by the Owner for any expense incurred in excess of Agreement prices.

        iii. Such purchases shall be deducted from the Agreement sum. If public necessity demands it, the Owner reserves the right to utilize services or use and/or consume articles delivered, which are standard in quality, subject to an adjustment of price to be determined by the Owner.

    b. Termination for Convenience: The OWNER has the absolute right to terminate the Agreement upon "Award of Contract" another CONTRACTOR, to perform work referenced herein. In such event, payment of the monthly contract fee shall cease on the date of cancellation of the CONTRACT by the OWNER.

7. **Warranty**
    a. The CONTRACTOR warrants that the Work including equipment and materials provided shall conform to the professional standards of care and practice in effect at the time the Work is performed, be of the highest quality, and be free from all faults, defects, or errors. If the CONTRACTOR is notified in writing of a fault, deficiency or error in the Work, the CONTRACTOR shall at the OWNER's option, either re-perform such portions of the Work to correct such fault, defect, or error, at no additional cost to the OWNER, or refund to the OWNER the charge paid by the OWNER, which is attributable to such portions of the faulty, defective or erroneous Work, including costs for re-performance or Work provided by other CONTRACTORS. All equipment and materials provided by the CONTRACTOR shall be merchantable and for the purpose intended and meet all industry quality standards.

8. **Time of Completion**
The OWNER and CONTRACTOR understand and agree that time is of the essence in the performance of this Agreement. The CONTRACTOR or OWNER, respectively, shall not be liable for any loss or damage, resulting from any delay or failure to perform its contractual obligations within the time specified, due to acts of God, actions or regulations by any governmental entity or representative, strikes, fire, water damage, loss of power, loss of funding or any other causes, contingencies, or circumstances not subject to the OWNER or CONTRACTOR'S control, respectively, whether of a similar or dissimilar nature, which prevent or hinder the performance of the OWNER'S or CONTRACTOR'S contractual obligations, respectively. Any such causes of delay, even though existing on the date of the CONTRACT, or on the day

of the start of Work, shall extend the time of the OWNER'S or CONTRACTOR'S performance respectively, by the length of the delays occasioned thereby, including delays reasonably incident to the resumption of normal Work schedules.

However, under such circumstances as described herein, the OWNER may, at their discretion, cancel this CONTRACT for their own convenience.

9. **Insurance Requirements**
   See **ATTACHMENT B**

10. **Acceptance of Work**
    The OWNER will be deemed to have accepted the Work after the OWNER agrees the Work is completed. In the event Work furnished under the CONTRACT is found to be defective or does not conform to the intent of the CONTRACT, the CONTRACTOR shall, within ten (10) days from receipt of notice from the OWNER, correct the deficiencies. Failure on the part of the CONTRACTOR to properly correct the deficiencies within the time period allowed will constitute the OWNER'S right to cancel the CONTRACT immediately, upon written notice to the CONTRACTOR.

11. **Correction of Work**
    The CONTRACTOR shall promptly correct all Work rejected by the OWNER as faulty, defective or failing to conform to the CONTRACT, whether observed before or after completion of the Work. The CONTRACTOR shall bear all costs of correcting such rejected Work.

12. **Right to Audit**
    The CONTRACTOR shall maintain documentation of all work performed. The CONTRACTOR shall make any and all documentation available to the OWNER at all reasonable times, for inspections and audit by the OWNER, during the entire term of the CONTRACT, and for a period of three (3) years after the expiration of this CONTRACT.

13. **CONTRACT Rights and Remedies**
    The CONTRACTOR shall maintain documentation of all work performed. The CONTRACTOR shall make any and all documentation available to the OWNER at all reasonable times, for inspections and audit by the OWNER, during the entire term of the CONTRACT, and for a period of three (3) years after the expiration of this CONTRACT.

14. **Time is of the Essence**
    The Owner and CONTRACTOR agree that time is of the essence in the performance of Work called for under this CONTRACT. The CONTRACTOR agrees that all work will be accomplished regularly, diligently and uninterrupted at such a rate of progress as will ensure full completion thereof within reasonable time periods.

15. **Safety Measures**
    The CONTRACTOR shall take all necessary precautions for the safety of the OWNER'S and CONTRACTOR'S employees at the Work site, and shall erect and properly maintain at all times, all necessary safeguards for the protection of the workmen and the public. The CONTRACTOR shall post signs warning against hazards in and around the Work site.

16. **Extra Work and Associated Costs**
    a. Changes in the Work: The OWNER, without invalidating the CONTRACT, may order changes in the Work within the general scope of this CONTRACT, consisting of additions, deletions, or other revision, the CONTRACT price and time for execution of the Work being adjusted accordingly.

    b. All such changes in the Work shall be authorized by a written Amendment to the CONTRACT or a separate Change Order and shall be executed under the applicable conditions of the CONTRACT.

17. **Familiarity with the Work**
    The CONTRACTOR, by executing this CONTRACT, acknowledges full understanding of the extent and character of the Work required and the conditions surrounding the performance thereof. The OWNER will not be responsible for any alleged misunderstanding of conditions surrounding the performance thereof. It is understood that execution of the CONTRACT by the CONTRACTOR serves as his stated commitment to fulfill all requirements and conditions referred to in this CONTRACT.

18. **Scope of Work**
    See **ATTACHMENT B**

19. **Contractor Liability**
    Nothing in this CONTRACT shall be construed to mean that the CONTRACTOR assumes any liability for damages or otherwise, on account of accidents to persons or property, except those resulting from negligence on the part of the CONTRACTOR or its agents, servants, employees, and subcontractors.

20. **Miscellaneous Provisions**
    a. The CONTRACTOR shall not employ SUB-CONTRACTORS without the express written permission of the OWNER.

    b. The CONTRACTOR shall not assign the CONTRACT or sublet it as a whole without the express written permission of the OWNER. The OWNER may assign the CONTRACT, or sublet it as a whole, without the consent of the CONTRACTOR.

    c. No waiver, alteration, consent, or modification of any of the provisions of the CONTRACT shall be binding unless in writing and signed by the OWNER and CONTRACTOR.

    d. The CONTRACTOR is to procure all permits, licenses, and certificates, or any approvals of plans or specifications as may be required by Federal, State, Local Laws, ordinances, rules, and regulations, for the proper execution and completion of Work covered under this CONTRACT.

    e. The CONTRACTOR shall at all times keep the Work area free from accumulation of waste materials or rubbish caused by his operations, and promptly remove any such materials to an area designated by the OWNER or remove to a waste site as directed by the OWNER. If the CONTRACTOR fails to clean up the Work site, the OWNER will complete the task and charge the CONTRACTOR for such services.

    f. This CONTRACT is considered a non-exclusive Agreement between the parties.

    g. This CONTRACT is deemed to be under and shall be governed by and construed according to the laws of the State of Alabama.

    h. Any litigation arising out of the CONTRACT shall be heard in the Courts of Baldwin County, Alabama.

i. This CONTRACT contains all terms and conditions agreed upon by the OWNER and CONTRACTOR. No other agreement, oral or otherwise, regarding the subject matter of this CONTRACT shall be deemed to exist or to bind either party hereto.

j. This CONTRACT shall not be construed against the party or parties preparing it. It shall be construed as if all the parties and each of them jointly prepared this CONTRACT, and any uncertainty or ambiguity shall not be interpreted against one or more parties.

Section 41-16-5, Code of Alabama 1975, requires that public contracts over $15,000 include the following language:

By signing this Contract, _____ represents and agrees
COMPANY NAME
that it is not currently engaged in, nor will it engage in, any boycott of a person or entity based in or doing business with a jurisdiction with which the State of Alabama can enjoy open trade

IN WITNESS WHEREFORE, the parties hereto have executed this **CONTRACT** as of the day and year first above written.

THE CITY OF FAIRHOPE, ALABAMA

_____ ATTEST: _____
Sherry Sullivan, Mayor **Lisa A. Hanks, MMC, City Clerk**

NOTARY FOR OWNER (CITY OF FAIRHOPE)

STATE OF ALABAMA _____ }
COUNTY OF BALDWIN _____}

I, the undersigned authority in and for said State and County, hereby certify that SHERRY SULLIVAN, Mayor of the City of Fairhope whose name is signed to the foregoing document and who is known to me, acknowledged before me on this day, that, being informed of the contents of the document she executed the same voluntarily on the date the same bears date.

Given under my hand and Notary Seal on this _____ day of _____, 202__.

NOTARY PUBLIC _____

MY COMMISSION EXPIRES _____

IF INDIVIDUAL OR PARTNERSHIP

Individual or Partnership

Print Name of Partner

Print Name of Representative Authorized to Sign Contracts for the firm

Print Name of Partner

Signature of Representative Authorized to Sign Contracts for the firm

Print Name of Partner

Address

Address

City, State, Zip Code

Phone Number

Fax Number

Primary E-mail Address

AL General Contractor License No. (Attach Copy)

AL General Contractor License Major Categories

AL General Contractor Specialties

AL Foreign Corporation Entity ID (Required of Out of State Vendors)

IF CORPORATION OR LLC

Company

State of Incorporation

Company Representative

Print Name of Representative Authorized to Sign Contracts for the firm

Signature of Representative Authorized to Sign Contracts for the firm

Address

Address

City, State, Zip Code

Phone Number

Fax Number

Primary E-mail Address

AL General Contractor License No. (Attach Copy)

AL General Contractor License Major Categories

AL General Contractor Specialties

AL Foreign Corporation Entity ID (Required of Out of State Vendors)

NOTARY FOR INDIVIDUAL, PARTNERSHIP, CORPORATION, OR LLC

STATE OF _____ }
COUNTY OF _____}

I, the undersigned authority in and for said State and County, hereby certify that _____As
Name

_____ respectively of _____
Title Company Name

Whose name is signed in the foregoing document and who is known to me, acknowledged before me on this day, being informed of the contents of the document they executed the same voluntarily on the day the same bears date.

Given under my hand and Notary Seal on this _____ day of _____, 202__.

NOTARY PUBLIC_____

MY COMMISSION EXPIRES _____

ITEM VII
CITY OF FAIRHOPE
STANDARD TERMS AND CONDITIONS

1. ACCEPTANCE OF AGREEMENT

This Agreement contains all terms and conditions agreed upon by the Owner and Winning bidder. No other agreement, oral or otherwise, regarding the subject matter of this Agreement shall be deemed to exist or to bind either party hereto. The Winning Bidder shall not employ Subcontractors without the express written permission of the Owner. No waiver, alteration, consent or modification of any of the provisions of the Agreement shall be binding unless in writing and signed by the Owner and Contractor. This Agreement shall not be construed against the party or parties preparing it. It shall be construed as if all the parties and each of them jointly prepared this Agreement, and any uncertainty or ambiguity shall not be interpreted against one or more parties.

2. ACCEPTANCE OF WORK

The City of Fairhope will be deemed to have accepted the Work after the City of Fairhope agrees the Work is completed by signature on delivery or service tickets. In the event Work furnished under the Contract / Agreement / Purchase Order is found to be defective or does not conform to the intent of the Contract / Agreement / Purchase Order, the awarded vendor shall, after receipt of notice from the City of Fairhope, correct the deficiencies. Failure on the part of the awarded vendor to properly correct the deficiencies within the time period allowed will constitute the City of Fairhope's right to cancel the Contract / Agreement / Purchase Order immediately, upon written notice to the awarded vendor.

3. ADDENDA

All Addenda are part of the Contract Documents. Include resultant costs in the Bid. Addenda will be issued by email to all Bidders on record and posted to the City of Fairhope website www.FairhopeAL.gov. It is the responsibility of the bidder to verify that all addenda have been received, and to include all signed addenda in the bid submission

4. ADDITIONAL ORDERS

Unless it is specifically stated to the contrary in the bid response, the City of Fairhope reserves the option to place additional orders against a contract awarded as a result of this solicitation at the same terms and conditions; to extend the renewal date until a new bid is in place, if it is mutually agreeable.

5. APPLICABLE LAW

This Agreement is deemed to be under and shall be governed by and construed according to the laws of the State of Alabama. Any litigation arising out of the Agreement shall be heard in the Courts of Baldwin County, Alabama.

6. ASSIGNMENT

The awarded vendor shall not assign the Contract / Agreement /Purchase Order or sublet it as a whole without the express written permission of the City of Fairhope. The awarded vendor shall not assign any payment due them hereunder, without
the express written permission of City of Fairhope. The City of Fairhope may assign the Contract / Agreement / Purchase Order, or sublet it as a whole, without the consent of the awarded vendor.

7. ASSURANCE OF NON-CONVICTION OF BRIBERY

The bidder hereby declares and affirms that, to its best knowledge, none of its officers, directors, or partners and none of its employees directly involved in obtaining contracts has been convicted of bribery, attempted bribery, or conspiracy to bribe under the laws of any state or Federal government.

8. AWARD CONSIDERATION

The following factors will be considered in determining the lowest **responsible** bidder: Overall quality, Conformity with specifications both general and specific, Purposes for which materials or services are required, Delivery dates and time required for delivery, Unit acquisition cost, financial ability to meet the contract, previous performance, facilities and equipment, availability of repair parts, experience, delivery promise, terms of payments, compatibility as required, other costs, and other objective and accountable factors which are reasonable.

9. AWARD OR REJECTION OF BIDS

The Bid will be awarded to the lowest responsible bidder complying with conditions of the invitation for bids, provided his bid is reasonable and it is in the interest of the City of Fairhope to accept it. The bidder to whom the award is made will be notified at the earliest possible date. The City of Fairhope, however, reserves the right to reject any and all bids and to waiver any informality in bids received whenever such rejection or waiver is in the interest to the City of Fairhope.

10. BACK ORDERS

If it is necessary to back order any items, the vendor must notify the Purchasing Department and advice as to the expected shipping or delivery date. If this date is not acceptable, the City of Fairhope may seek remedies for default.

11. BID AND PERFORMANCE SECURITY

If bid security is required, a bid bond or cashier's check in the amount indicated on the bid cover must accompany the bid and be made payable to The City of Fairhope of Baldwin County, AL. Corporate or certified checks are not acceptable. Bonds must be in a form satisfactory to the City and underwritten by a company licensed to issue bonds in the State of Alabama. If bid security fails to accompany the bid, it shall be deemed unresponsive, unless the Purchasing Manager deems the failure to be non-substantial. All checks will be returned to the bidders after the contract has been approved. If a performance bond is required, the successful bidder will be notified after the awarding of the contract.

12. BRAND NAMES

Reference to brand names and numbers is descriptive, but not restrictive, unless otherwise specified. Bids on equivalent items meeting the standards of quality thereby indicated will be considered, providing the bid clearly describes the article offered and indicates how it differs from the referenced brands. Descriptive literature or manufacturers specifications plus any supplemental information necessary for comparison purposes should be submitted with the bid or the bid on that item may be rejected. Reference to literature submitted with a previous bid or on file with the Division of Purchasing will not satisfy this requirement. The burden is on the bidder to demonstrate that the item bid is equivalent to the item specified in the ITB. Bids without sufficient documentation to fully support equality, may be considered non-responsive. Reference by the City of Fairhope in the ITB to available existing specifications shall be sufficient to make the terms of such specifications binding on the bidder. Unless the bidder specifies otherwise in its bid, it is understood the bidder is offering a referenced brand item as specified in the ITB or is bidding as specified when no brand is referenced. Failure to examine drawings, specifications and instructions will be at the bidder's risk.

13. BUSINESS LICENSE

The vendor selected to enter into a Contract / Agreement with the City of Fairhope must be licensed to do business in the City of Fairhope prior to commencement of any work under the contract. Delivery of goods or services to the City of Fairhope by Purchase Order have detailed and varied Business License requirements. In all instances that require a business license. Awarded vendor will provide proof of possessing a current City of Fairhope Business License. Prospective bidders will not be required to possess a City of Fairhope Business License prior to award.

14. CANCELLATION OF / CONTRACT / AGREEMENT / PURCHASE ORDER / LEASE

A purchase order can be canceled in whole or in part when awarded vendor fails to deliver or perform as specified. Cancellation of a purchase order can only be made by a written purchase order change (POC) from the City of Fairhope. A term contract, lease or agreement can be canceled by the City of Fairhope, for justifiable cause, or convenience, by written notice.

15. CERTIFICATION PURSUANT TO ACT NO. 2006-557

Alabama law (section 41-4-116, code of Alabama 1975) provides that every bid submitted and contract executed shall contain a certification that the vendor, contractor, and all of its affiliates that make sales for delivery into Alabama or leases for use in Alabama are registered, collecting, and remitting Alabama state and local sales, use, and/or lease tax on all taxable sales and leases into Alabama. By submitting this bid, the bidder is hereby certifying that they are in full compliance with act no. 2006-557, they are not barred from bidding or entering into a contract pursuant to 41-4-116, and acknowledges that the awarding authority may declare the contract void if the certification is false. All corporations must register to do business in Alabama with the Office of the Secretary of State. Their address is:

Office of the Secretary of State
P.O. Box 5616
Montgomery, AL 36103
(334) 242-5324
Fax: (334) 240-3138
http://www.sos.state.al.us/index.aspx

The Foreign Corporation form is online at http://www.sos.state.al.us/downloads/dl1.cfm.

16. COST OF REMEDYING DEFECTS

All defects, indirect and consequential costs of correcting, removing, or replacing any or all of the defective materials or equipment will be charged against the awarded vendor.

17. DELIVERY OF BID

Bids must be received in the Purchasing Office by the date and time specified on the bid cover. All bids will be accepted until the time and date stated on the bid cover. No bids will be accepted that extend past the time and date on the bid cover. The time of receipt shall be determined by the time clock stamp in the Purchasing Department. Bids submitted by U.S. Mail must be received by the City of Fairhope of Baldwin County, Alabama, in the City of Fairhope offices, 555 South Section St., Fairhope, Al., unless otherwise specified.

18. DELIVERY

The number of calendar days required for delivery after receipt of a purchase order shall be stated in the RFQ / ITB / RFP and /or Purchase Orders. When no time is stated in the document, the time shall be fourteen (14) calendar days after receipt of order. If a shipment is not made within the time period specified, the Purchase Order may be canceled.

19. ENVIRONMENTAL REQUIREMENTS

All products will be clearly labeled for their intended use. Each delivery of product or materials will include a Material Safety Data Sheet (MSDS) for all materials that require an MSDS. All manufacturers/distributors of hazardous substances, including any of the items listed on this bid/quote/ contract and subsequent award must include completed material safety data sheet (MSDS) for each hazardous material. Additionally, each container of hazardous materials must be appropriately labeled with:

a) The identity of the hazardous material,

b) Appropriate hazard warnings, and manufacturer, importer, or other responsible party.

20. EQUIPMENT DEMONSTRATION

The City of Fairhope may require equipment/ product materials or service techniques to be demonstrated at a time, date, and location to be specified by the City of Fairhope.

21. EQUIPMENT ELECTRICAL CERTIFICATION

All electrical equipment purchased shall conform to, and be identified in, the applicable standard(s), or otherwise be certified as applicable, as of the bid opening date and time, by Underwriters Laboratories, Inc., or other recognized laboratory facility. Bidder must provide satisfactory documentation with returned bid that all such equipment meets the applicable product standard or has otherwise been certified as outlined above. Unless indicated in the bid document, the above certification shall apply to the equipment itself, not the individual components of that equipment.

22. ERRORS IN BID

Bidders are assumed to be informed regarding conditions, requirements, and specifications prior to submitting bids. Failure to do so will be at the bidder's risk. Bids already submitted may be withdrawn without penalty prior to bid opening. Errors discovered after the bid opening may not be corrected.

23. FORCE MAJEURE

Neither the City nor the awarded vendor shall be deemed in breach of any contract / Purchase Order or Agreement which may result from this proposal submission if it is prevented from performing any of the obligations hereunder by reason of Acts of God, acts of the public enemy, acts of superior governmental authority, strikes or labor disputes, floods, riots, rebellion, sabotage, or any similar other unforeseeable causes beyond its control and not due to its fault or negligence. Each party shall notify the other immediately in writing of the cause of such after the beginning period thereof. The awarded vendor may request cancellation and the City of Fairhope may grant the request if performance is prevented by any of the above referenced causes, or other unavoidable circumstances not attributable to the fault or negligence of the vendor. The burden of proof for such relief rests with the vendor. All correspondence pertaining to cancellation of a purchase order or term contract must be addressed to the City of Fairhope Purchasing Manager.

24. HAZARDOUS AND TOXIC SUBSTANCES

Bidder must comply with all applicable Federal, State, County and City laws, ordinances and regulations relating to hazardous and toxic substances, including such laws, ordinances and regulations pertaining to information hazardous and toxic substances, and as amended from time to time. Bidder shall provide the City of Fairhope with a "Material Safety Data Sheet" for all goods that carry one.

25. INDEMNITY

Indemnity: The awarded vendor hereby agrees to indemnify and save harmless the City of Fairhope, its officers, agent, and employees, from and against any and all liabilities, claims, demands, damages, fines, fees, expenses, penalties, suits, proceedings, actions and cost of actions, including reasonable attorney fees for trial and on appeal, of any kind and nature, arising or growing out of, or in any way connected with the performance of this Contract / Agreement / Purchase Order, to the extent caused by a negligent act or omission of the awarded vendor, their agents, servants, employees, Subcontractors, or others associated with the awarded vendor. The awarded vendor shall be responsible for damage to any equipment excluded from this agreement, or damage or injury caused by any equipment excluded from this agreement, only to the extent that the damage or injury is caused by a negligent act or omission of the awarded vendor or caused by failure of the awarded vendor's supplied product to perform as specified.

26. INSPECTION

All materials, workmanship, equipment, and supplies are subject to inspection and test at any source or time. Final inspection, acceptance or rejection will be made at delivery destination. Goods that do not meet specifications will be rejected unless substitutions have been approved by the City of Fairhope. Failure to inspect or to reject upon receipt, however, does not relieve the awarded vendor of liability. When subsequent tests, after receipt, are conducted and when such tests reveal a failure to meet specifications, the City of Fairhope will reject the goods and the awarded vendor shall immediately supply goods meeting specifications or the City of Fairhope may seek damages including but not limited to the testing expense, regardless of whether a part of or all of the goods have been consumed through the testing process. Rejected goods shall be removed by the awarded vendor promptly after rejection, at his expense. If not removed in fourteen (14) calendar days, they may be disposed of at the discretion of the City of Fairhope. Disposal costs will be the awarded vendor's responsibility.

27. INSPECTION OF PREMISES

At reasonable times, the City may inspect those areas of the awarded vendor's place of business that are related to the performance of a Contract / Agreement / Purchase Order. If the City makes such an inspection, the awarded vendor must provide reasonable assistance. The City of Fairhope reserves the right on demand and without notice all the vendor's files associated with a subsequent Contract / Agreement / Purchase Order where payments are based on the awarded vendor's record of time, salaries, materials, or actual expenses. This same clause will apply to any subcontractors assigned to the Contract / Agreement / Purchase Order.

28. INSURANCE

If a Contract / Agreement / Purchase Order results from this RFQ /ITB /RFP, or other form of solicitation, the awarded vendor shall maintain such insurance as will indemnify and hold harmless the City of Fairhope from Workmen's Compensation and Public Liability claims from property damage and personal injury, including death, which may arise from the awarded vendor's operations under this Contract / Agreement / Purchase Order, or by anyone directly or indirectly employed by him/her.

29. INVITATION TO BID

Any provisions made in the RFQ / ITB / RFP, or other form of solicitation, supersedes any provisions outlined here in the General Terms and Conditions.

30. INVOICING, DELIVERY, PACKAGING

Invoices shall be prepared only after ordered materials have been delivered. All invoices must show the purchase order number. Unless otherwise specified in writing, vendors shall not ship any material without an authorized Purchase Order from the City of Fairhope Purchasing Department. All packages delivered must show the purchase order number. The awarded vendor will be required to furnish all materials, equipment and/or service called for at the bid price quoted. In the event the awarded vendor fails to deliver within a reasonable period of time, as determined by the City of Fairhope, the right is reserved to cancel the award and subsequent purchase order and purchase from the next lowest responsible bidder the items needed. The original awarded vendor will be back charged the difference between the original contract price and the price the City of Fairhope has to pay as a result of the failure to perform by the original awarded vendor. All bids will remain firm for acceptance for 60 days from the date of bid opening. Prices shall be net F.O.B., Prepaid and Allow, City of Fairhope chosen site, Baldwin County, Al. The title and risk of loss of the goods will not pass to the City of Fairhope until receipt and acceptance takes place at the F.O.B. point.

31. LABELING

Individual shipping cartons shall be labeled with the name "City of Fairhope", Purchase Order Number, and where applicable, Contract Number, date of manufacture, batch number, storage requirements, conditions, and recommended shelf life. Bidders are encouraged to offer product packaging with recycled content.

32. LOSS OR DAMAGE IN TRANSIT

Delivery by a vendor to a common carrier does not constitute delivery to the City of Fairhope. Any claim for loss or damage incurred during delivery shall be between the vendor and the carrier. The City of Fairhope accepts title only after satisfactory receipt at the delivery point. The City of Fairhope shall note all visible damages on the freight bill and may refuse the damaged goods. The vendor shall make immediate replacement of the damaged merchandise or be subject to damages for breach of contract. If damage is to a small portion of a total shipment and the City of Fairhope will not be inconvenienced because of the shortage, the vendor may be permitted by the Purchasing Manager to deduct the amount of damage or loss from its invoice, in lieu of replacement. Risk of loss during delivery is borne by the vendor until the goods have been accepted by the City of Fairhope, unless otherwise specified in the RFQ / ITB / RFP or other form of solicitation.

33. MANDATORY SITE VISIT

If the RFQ / ITB /RFP or other form of solicitation requires a mandatory site visit, bidders must inspect the site where installation or service is to take place to obtain a full understanding of scope of work outlined therein. Date of site visit will be determined by the City of Fairhope.

34 MONITORING OF SERVICES

Performance of services will be monitored by the requisitioning department and/or the Purchasing Department, and evaluation reports may be filed with the Purchasing Department. Performance not meeting specifications will result in cancellation of Contract / Agreement / Purchase Order and may result in vendor being removed from the vendor list.

35. NONCONFORMING MERCHANDISE

When merchandise received from the lowest responsible bidder is not in accordance with the purchase order, it will be returned to the bidder, at bidder's expense.

36. NON-DESCRIMINATION

The City of Fairhope is an Equal Opportunity Employer and requires that all contractors comply with the Equal Employment Opportunity laws and the provisions of the Contract / Agreement / Purchase Order documents in this regard. The City also encourages and supports the utilization of Minority Business Enterprises on this and all public bids.

37. NON-EXCLUSIVE

Unless otherwise specified, this Contract / Agreement / Purchase Order is considered a non-exclusive Contract /Agreement / Purchase Order between the parties.

38. NOTIFICATION AND ACCIDENT REPORTS

In the event of accidents of any kind, in the performance of a Contract / Agreement / Purchase Order, the awarded vendor shall notify the City of Fairhope immediately and furnish, without delay, copies of all such accident reports to the City of Fairhope. If in the performance of their Work, the awarded vendor fails to immediately report an accident to the City of Fairhope, of which the awarded vendor has knowledge of and which results in a fine levied against the City of Fairhope then the awarded vendor shall be responsible for all fines levied against the City of Fairhope.

39. PACKAGING

All goods must be packaged in new packing containers. Packing that meets the requirements of common carriers is acceptable, unless otherwise required. A packing slip or invoice must accompany all shipments and must reference the purchase order number. Unless otherwise specified, goods are to be packaged in cartons meeting federal specifications and shipped on non-returnable pallets.

40. PATENTS

Awarded Vendor guarantees that the sale and / or use of goods will not infringe upon any U.S. or foreign patent. Awarded vendor will at his / her own expense, indemnify, protect and save harmless the City of Fairhope, on any patent claims arising from the purchase of goods or services.

41. PAYMENT

Invoices -- Upon completion of service and delivery of materials specified in the applicable Contract / Agreement / Purchase Order, awarded vendor will submit an invoice and signed delivery ticket to:

City of Fairhope
Accounts Payable Department
P.O. Box 429
Fairhope, Al. 36533

All invoices must reference appropriate Purchase Order Numbers Payment of Invoice: All invoices received by the City of Fairhope are payable within thirty (30) days from the date of receipt by the City of Fairhope, provided they are approved by the City of Fairhope.

42. PAYMENT WITHHELD

Payment may be withheld until all items have been delivered and all requirements of the Contract / Agreement / Purchase Order have been fulfilled

43. PRODUCT TESTING

Vendor shall incur all cost involved in obtaining an Independent Laboratory Test if the City deems necessary during the term of the Contract / Agreement / Purchase Order. The City of Fairhope reserves the right to request a demonstration of any and all items bid before making the award.

44. PERMITS LICENSES AND CERTIFICATES

The awarded vendor is to procure all permits, licenses, and certificates, or any approvals of plans or specifications as may be required by Federal, State, Local Laws, ordinances, rules, and regulations, for the proper execution and completion of Work covered under the Contract / Agreement / Purchase Order.

45. PREPARATION OF BID

All bids / proposals shall be typewritten or in ink on the form(s) prepared by the City of Fairhope. Bids / proposals prepared in pencil will not be accepted. All bids / proposals must be signed by officials of the corporation or company duly authorized to sign bids / proposals. Any bid / proposal submitted without being signed will automatically be rejected. All corrections or erasures shall be initialed and dated by the person authorized to sign quotations /bids / proposals. If there are discrepancies between unit prices quoted and extensions, the unit price will prevail.

46. QUESTIONS / CONTACT

Commencing with the issuance of the RFQ / ITB / RFP, or other form of solicitation, no vendor or anyone acting on a vendor's behalf, shall make direct or indirect contact with City personnel or undertake any activities or take any action to otherwise promote its quotation / bid / proposal to the City or its personnel. All communications shall be made to the contact identified in the quotation / bid / proposal documents. Violation of this requirement may, at the City's sole and absolute discretion, be grounds for disqualifying a vendor from further consideration.

47. RECEIPT BY CITY OF FAIRHOPE

If not otherwise stated in the order, the City of Fairhope will be said to have received goods when they have been delivered, unloaded, and placed on the agency's dock or if there is no dock, inside an accessible building, and signed for by an authorized City employee. Shipments will be checked against the receiving copy of the Purchase Order. If the purchase order requires grading certificates, USDA Stamps, or any proof of quality, such proof must accompany the shipment.

48. REJECTION OF BIDS

The City of Fairhope reserves the right to accept or reject any or all bids in whole or in part for any reason, to waive technicalities or informalities, or to advertise for new proposals, if, in the judgment of the awarding authority, the best interest of the City of Fairhope will be promoted thereby. Bidders may be disqualified and rejection of proposals may be recommended for any of (but not limited to) the following causes: Failure to use the bid forms furnished by the City of Fairhope, Lack of signature by an authorized representative on the bid form, Failure to properly complete the bid form and vendor compliance, Evidence of collusion among bidders, Unauthorized alteration of the bid form.

49. RIGHT TO AUDIT

The awarded vendor shall maintain documentation of all work performed. The awarded vendor shall make any and all documentation available to the City of Fairhope at all reasonable times, for inspections and audit by the City of Fairhope for a period of Three (3) years after expiration of the Contract / Agreement / Purchase Order.

50. SAMPLES

Bidders will not be required to furnish samples at the time of bid opening, unless specifically called for. The City of Fairhope reserves the right to request samples after bid opening to assist in the evaluation of proposals submitted.

51. SAFETY MEASURES

The awarded vendor shall take all necessary precautions for the safety of the City of Fairhope's and awarded vendor's employees at the Work site, and shall erect and properly maintain at all times, all necessary safeguards for the protection of the workmen and the public. The awarded vendor shall post signs warning against hazards in and around the Work site.

52. SET-UP AND INSTALLATION

Unless otherwise specified, bid / quotation to include cost of all uncrating, disposal of shipping materials, set-up, testing and initial instruction to agency personnel.

53. SPILL CLEAN UP

The awarded vendor shall be responsible for spillage caused by their negligence, which occurs during transit or unloading operations. The awarded vendor shall immediately report and clean up any spillage. Upon failure to do so, the awarded vendor shall remain responsible for all actual related costs.

54. SUBSTITUTIONS

Substitutions on a purchase order shall require the approval of the Originating Buyer. The City of Fairhope reserves the right to reject at destination and hold at the vendor's risk and expense any goods supplied by the vendor which do not conform to the specification or description embodied in the order or are inferior in any respect to the good specified. Any good bought by sample which is inferior in quality to the sample submitted by vendor will be rejected. Any goods delivered that do not meet specifications may be returned to the vendor at its expense. When a good is returned, the vendor must make immediate replacement with acceptable merchandise, or the City of Fairhope may seek remedies for default.

55. TABULATION

Bid results are posted on The City of Fairhope's web site: www.FairhopeAL.gov. The awarded vendor will be sent a written notification.

56. TAXES

Prices quoted shall be delivered prices, exclusive of all federal or state excise, sales, and manufacturer's taxes. The City will assume no transportation or handling charges other than specified in the RFQ, ITB, RFP or other form of solicitation. The City is tax exempt by law – Code of Alabama 1975.

57. TERMINATION FOR CONVENIENCE

Any Contract / Agreement / Purchase Order may be terminated for convenience by the City of Fairhope, in whole or in part, by written notification to the awarded vendor.

58. TERMINATION FOR DEFAULT

Performance of Work under the Contract / Agreement / Purchase Order Agreement may be terminated by the City of Fairhope, in whole or in part, in writing, whenever the City of Fairhope determines that the awarded vendor has failed to meet the requirements of the Contract / Agreement / Purchase Order.

59. TERMINATION FOR NON-APPROPRIATION

Termination for Non-appropriation – The continuation of any financial obligation beyond the current fiscal year is subject to and contingent upon sufficient funds being appropriated, budgeted, and otherwise made available by the local source, State Legislature and/or federal sources. The City of Fairhope may terminate any financial obligation, and awarded vendor waives any and all claim(s) for damages, effective immediately upon receipt of written notice (or any date specified therein) if for any reason the City of Fairhope's funding from local, State and/or federal sources is not appropriated, withdrawn or limited.

60. TIME IS OF THE ESSENCE

The City of Fairhope and awarded vendor agree that time is of the essence in the performance of work called for under this Contract / Agreement / Purchase Order. The awarded vendor agrees that all work will be accomplished regularly, diligently, and uninterrupted at such a rate of progress as will ensure full completion thereof within reasonable time periods.

61. TITLE

All titles, fees, as well as other charges, are to be paid by awarded vendor. Awarded vendor is to furnish prepaid certificate of title in the name of the City of Fairhope, Title shall change upon acceptance of delivery at the City of Fairhope approved delivery location.

62. VENDOR LIST

A vendor may be removed from the City of Fairhope's Bidders List if a vendor fails to respond to three (3) consecutive ITB's. A properly submitted "No Bid" is considered as a response and the vendor will receive credit for the response.

63. WARRANTY

The awarded vendor expressly warrants that all articles, materials, and work offered shall conform to each and every specification, drawing, sample, or other description which is furnished to or adopted by the City of Fairhope, and that it will be fit and sufficient for the purpose intended, merchantable, of good material and workmanship, and free from defects. The awarded vendor further warrants all items for a period of one year, unless otherwise stated, from the date of acceptance of the items delivered and installed or work completed. All repairs, replacements, or adjustments during the warranty period will be at the awarded vendor's sole expense. Awarded vendor will provide written warranty for all parts and labor for a period of (1) one year commencing from date of written acceptance of delivery by City of Fairhope. Awarded vendor will provide written copies of all other applicable warranties, such as, Manufacturer's warranty. Those warranties, if any, will be in addition to the awarded vendor's warranty, and the terms of which will not be altered by the awarded vendor's warranty.

64. IMMIGRATION LAW

The Contractor agrees that it shall comply with all of the requirements of the **Beason-Hammon Alabama Taxpayer and Citizen Protection Act, Act No 2011-535**, Alabama Code (1975) Section 31-13-1, et. Seq., (also known as the Alabama Immigration Act) see Section 31-13-9, and the provisions of said Act, including all penalties for violation thereof, are incorporated herein.

ITEM VIII

ALABAMA IMMIGRATION ACT CONTRACT REQUIREMENTS

1.0 Background

The **Beason-Hammon Alabama Taxpayer and Citizen Protection Act, Act No 2011-535**, **as amended by Act No 2012-491, *Code of Alabama* (1975) Section 31-13-1** through **Section 31-13-30** (also known as and hereinafter referred to as "the Alabama Immigration Act") is applicable to CONTRACTs with the City of Fairhope, Alabama. All business entities entering into CONTRACTs with the City of Fairhope, Alabama will comply with the Alabama Immigration Act.

2.0 Definitions

ALIEN. Any person who is not a citizen or national of the United States, as described in 8 U.S.C. § 1101, et seq., and any amendments thereto.

BUSINESS ENTITY. Any person or group of persons employing one or more persons performing or engaging in any activity, enterprise, profession, or occupation for gain, benefit, advantage, or livelihood, whether for profit or not for profit. Business entity shall include but not be limited to the following:

a. Self-employed individuals, business entities filling articles of incorporation, partnerships, limited partnerships, limited liability companies, foreign corporations, foreign limited partnerships, foreign liability companies authorized to transact business in this state, business trusts, and any business entity that registers with the Secretary of State.
b. Any business entity that possesses a business license, permit, certificate, approval, registration, charter, or similar form of authorization issued by the state, any business entity that is exempt by law from obtaining such a business license, an any business entity that is operating unlawfully without a business license.

CONTRACTOR. A person, employer, or business entity that enters into a CONTRACT to perform any service or work or to provide a certain product in exchange for valuable consideration. This definition shall include, but not be limited to, a general CONTRACTOR, SUB-CONTRACTOR, independent CONTRACTOR, CONTRACT employee, project manager, or a recruiting or staffing entity.

EMPLOYEE. Any person directed, allowed, or permitted to perform labor or service of any kind by an employer. The employees of an independent CONTRACTOR working for a business entity shall not be regarded as the employees of the business entity, for the purposes of this chapter. This term does not include any inmate in the legal custody of the state, a county, or a municipality.

EMPLOYER. Any person, firm, corporation, partnership, joint stock association, agent, manager, representative, foreman, or other person having control or custody of any employment, place of employment, or of any employee, including any person or entity employing any person for hire within the State of Alabama, including a public employer. This term shall not include the occupant of a household contracting with another person to perform casual domestic labor within the household.

E-VERIFY. The electronic verification of federal employment authorization program of the Illegal Immigration Reform and Immigrant Responsibility Act of 1996, P.L. 104-208, Division c, Section 403 (a); 8 U.S.C. §1324(a) and operated by the United States Department of Homeland Security, or its successor program.

STATE-FUNDED ENTITY. Any governmental entity of the state or a political subdivision thereof or any other entity that receives any monies from the state or a political subdivision thereof; provided, however, an entity that merely provides a service or a product to any governmental entity of the state or a political subdivision thereof, and receives compensation for the same, shall not be considered a state-funded entity.

SUB-CONTRACTOR. A person, business entity, or employer who is awarded a portion of an existing CONTRACT by a CONTRACTOR, regardless of its tier.

UNAUTHORIZED ALIEN. An alien who is not authorized to work in the United States as defined in 8 U.S.C. § 1324a (h) (3) .

3.0 Mandatory Clause

All CONTRACTS or CONTRACTS to which the state, a political subdivision, or state-funded entity are a party shall include the following clause:

> ***"By signing this CONTRACT, the CONTRACTING parties affirm, for the duration of the CONTRACT, that they will not violate federal immigration law or knowingly employ, hire for employment, or continue to employ an unauthorized alien within the state of Alabama. Furthermore, a CONTRACTING party found to be in violation of this provision shall be deemed in breach of the CONTRACT and shall be responsible for all damages resulting therefrom."***

For purposes of this section, "CONTRACT" shall mean a CONTRACT awarded by the state, any political subdivision thereof, or any state-funded entity that was competitively bid or would, if entered into by the state or an agency thereof, be required to be submitted to the CONTRACT Review Permanent Legislative Oversight Committee.

4.0 CONTRACTs Involving Business Entity, or Employer

As a condition for the award of any CONTRACT, grant, or incentive by the state, any political subdivision thereof, or any state-funded entity to a business entity or employer that employs one or more employees, the business entity or employer shall not knowingly employ, hire for employment, or continue to employ an unauthorized alien within the State of Alabama.

As a condition for the award of any CONTRACT, grant, or incentive by the state, any political subdivision thereof, or any state-funded entity to a business entity or employer that employs one or more employees within the state of Alabama, **the business entity or employer shall provide documentation establishing that the business entity or employer is enrolled in the E-Verify program.** During the performance of the CONTRACT, the business entity or employer shall participate in the E-Verify program and shall verify every employee that is required to be verified according to the applicable federal rules and regulations.

5.0 CONTRACTS Involving Subcontracting

Any SUB-CONTRACTOR on a project paid for by CONTRACT, grant, or incentive by the state, any political subdivision thereof, or any state-funded entity shall not knowingly employ, hire for employment, or continue to employ an unauthorized alien within the State of Alabama and shall also enroll in the E-Verify program prior to performing any work on the project. Furthermore, during the performance of the CONTRACT, the SUB-CONTRACTOR shall participate in the E-Verify program and shall verify every employee that is required to be verified according to the applicable federal rules and regulations. This subsection shall only apply to SUB-BIDDERS performing work on a project subject to the provisions of this section and not to collateral persons or business entities hired by the SUB -CONTRACTOR.

6.0 Proof of E-Verify documentation will be in the form of a copy of the signed Memorandum Of Understanding (MOU) generated upon completion of the E-Verify program.

END OF ALABAMA IMMIGRATION ACT CONTRACT REQUIREMENTS

ITEM IX

INVITATION SUMMARY

Bid No. 24-030
SCADA System for Water Treatment Plant No. 1

Bid Number 24-030
SCADA System for Water Treatment Plant No. 1

The City of Fairhope is requesting responses from qualified contractors to provide a complete SCADA system with instrumentation and controls with appurtenant equipment and accessories as indicated, specified, and as necessary for a complete and proper operating system.

Bid Name:	**BID 24-030** **SCADA System for Water Treatment Plant No. 1**
Issue Date:	March 1, 2024
Certificate of Insurance Requirements:	See Item V
Non-Mandatory Pre-Bid Meeting:	Tuesday, March 19, 2024, 9:00 A.M.
Deadline for Questions Date:	Wednesday, March 20, 2024, 11:00 A.M.
Bid Due Date:	Tuesday, March 26, 2024, 10:00 A.M.
City Internet Site:	www.FairhopeAL.gov
SEALED Bid Response Copies to submit:	One (1) Original Paper Copy
Purchasing Department Contact for questions:	Purchasing@FairhopeAL.gov (251) 928-8003

END OF INVITATION SUMMARY

ITEM X
BID BOND INFORMATION

Bids shall be accompanied by a Bid Security equal to 5% (percent) of the bid price, but in no event more than $10,000.00. Bid Security shall be in the form of a Bid Bond or a cashier's check payable to The City of Fairhope. All bonds and/or cashier's check will be made payable to the City of Fairhope for an amount not less than five (5) percent of the City's or its engineers or architects estimated cost of the Project or of the total bid in the proposal, but in no event more than $10,000.00.

Return of Bid Bonds: All bid bonds, except those of the three lowest bona fide bidders, will be returned immediately after bids have been checked, tabulated and the relation of the bids established. The bid bonds of the three lowest bidders may be retained and if so, will be returned as soon as the contract bonds and the contract documents of the successful bidder have been approved and properly executed.

In the event it is necessary to defer a contract award for longer than fifteen (15) days, after opening of bids, then all bid bonds, except that of the potential successful bidders will be returned.

Award of the contract will be made within the time specified after the opening of bids. In the event no award is made within such time, all bids may be rejected, and all bonds returned.

Provided; however, the potentially successful bidder may enter into a written agreement with the City for an extension of time for consideration of its bid, in which case, the bidder's bond shall remain in full force and effect, or the City may permit said bidder to substitute a satisfactory surety for the cashier's check if submitted as a guaranty to the bid bond.

Forfeiture of Bid Bonds: Should the successful bidder or bidders to whom a contract is awarded fail to execute a contract(s) and furnish acceptable contract securities and evidence of insurance, as required, within thirty (30) days after the prescribed forms have been presented to him/her, the City may retain from the proposal guaranty, if it is a cashier's check or recovered from the principal or the sureties, if the guaranty is a bid bond, the difference between the amount of the contract as awarded, and the amount of the proposals of the new lowest bidder. If no other bids are received, the full amount of the proposal guaranty may be so retained and recovered as liquidated damages for such default. Any sum so retained or recovered shall be the property of the awarding authority.

END OF BID BOND INFORMATION

ITEM X

BID BOND

The PRINCIPAL (Bidder's name and address)

The OWNER
City of Fairhope
P.O. Drawer 429
Fairhope, Al 36533

The PROJECT for which the Principal's Bid is submitted: (Project name as it appears in the Bid Documents)

PROJECT NO.
PROJECT NAME:

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned Principal and Surety, jointly and severally, hereby bind ourselves, our heirs, executors, administrators, successors, and assigns to the OWNER in the PENAL SUM of five percent (5%) of the amount of the Principal's bid, but in no event more than TEN THOUSAND DOLLARS ($10,000.00).

THE CONDITION OF THIS OBIGATION is that the Principal has submitted to the OWNER the attached bid, which is incorporated herein by reference, for the Project identified above.

NOW, THEREFORE, if, within the terms of the Bid Document, the OWNER accepts the Principal's bid and the Principal thereafter either:

(a) executes and delivers a Construction Contract with the required Performance and Payment Bonds (each in the for contained in the Bid Documents and properly completed in accordance with the bid) and delivers evidence of insurance as prescribed in the Bid Documents, or fails to execute and deliver such Construction Contract with such Bonds and evidence of insurance, but pays the OWNER the difference, not to exceed the Penal Sum of this Bond, between the amount of the Principal's Bid and the larger amount for which the OWNER may award a Construction Contract for the same Work to another Bidder, then, this obligation shall be null and void, otherwise it shall remain in full force and effect.

The Surety, for value received, hereby stipulates and agrees that the obligation of the Surety under this Bond shall not in any manner be impaired or affected by any extension of the time within which the OWNER may accept the Principal's bid, and the Surety does hereby waive notice of any such extension.

SIGNED AND SEALED this _____ day of _____, 202____.

_____
(Principal (Company)

ATTEST
_____ By_____

_____
Print Name and Title

SURETY
ATTEST

_____
Surety Company

_____ By_____

_____
Print Name and Title

CORPORATION

_____
Name of Corporation, Partnership, or Joint Venture

Business Mailing Address: _____
_____

email_____ phone_____

BY: _____ _____

(Signature of Officer Authorized to sign Bids and Contracts for the Firm) (Position or Title)

_____ _____

(General Contractor's License Number) Foreign Corporation Entity Id (Required of out-of-state-vendors)

Attest:

_____ _____

(Secretary) (Name of State under the laws of which incorporated)

_____ BY: _____

(Name of Surety) (Attorney in Fact)

ITEM XIII

CITY OF FAIRHOPE

CLOSEOUT DOCUMENTS

CONSENT OF SURETY COMPANY TO FINAL PAYMENT

CONTRACTOR'S AFFIDAVIT OF PAYMENT

FINAL RELEASE OF LIENS

NOTICE OF COMPLETION ADVERTISEMENT

CITY OF FAIRHOPE
CONSENT OF SURETY COMPANY TO FINAL PAYMENT

COF PROJECT NO: _____

COF PROJECT NAME: _____

OWNER: **City of Fairhope**
P.O. Drawer 429
Fairhope, AL 36533

CONTRACTOR: _____

_____

_____

In accordance with the provision of the Contract between the OWNER and the CONTRACTOR as indicated above, the _____, Surety Company on bond of _____ CONTRACTOR, hereby approved the final payment to the CONTRACTOR and agrees that final payment to the CONTRACTOR shall not relieve the Surety Company of any of its obligations to the City of Fairhope as set forth in said Surety Company's bond dated the _____ day of _____, 202___.

IN WITNESS WHEREOF

The Surety Company has hereunto set its hand this ____ day of _____, 202___.

ATTEST
(Seal)

Surety Company

_____
Signature of Authorized Representative

_____
Title

CITY OF FAIRHOPE
CONTRACTOR'S AFFIDAVIT OF PAYMENT OF CLAIMS & DEBTS

COF PROJECT NO: _____

COF PROJECT NAME: _____

OWNER: **City of Fairhope**
P.O. Drawer 429
Fairhope, AL 36533

CONTRACTOR: _____

_____

_____

STATE OF: _____

COUNTY OF: _____

The undersigned hereby certified that, except as listed below, he has paid in full or otherwise satisfied all obligations for all materials and equipment furnished, for all work, Labor and services performed, and for all known indebtedness and claims against the CONTRACTOR for damages arising in any manner in connection with the performance of the Contract referenced above for which the OWNER or his property might in any way be held responsible.

EXCEPTION: (If none, write NONE) _____

_____
CONTRACTOR

_____ _____
By: Title:

Subscribed and sworn to and before me this ___ day of _____, 202___.

_____
NOTARY PUBLIC

My Commission expires_____/_____/_____

CITY OF FAIRHOPE
FINAL RELEASE OF LIENS

KNOW ALL MEN BY THESE PRESENTS: In consideration of, and contingent upon the receipt of total payments in the amount of _____

Under and pursuant to the following contract:

COF PROJECT NO: _____

COF PROJECT NAME: _____

The undersigned hereby releases _____, its officers, agents, and employees, of and from all liabilities, obligations, and claims whatsoever in law and in equity under or arising out of said contract. We do hereby certify that all labor, materials, equipment, supplies, etc. for this project have been paid in full and there is no outstanding indebtedness.

IN WITNESS WHEREOF, this release has been executed this _____ day of _____, 202___.

_____
CONTRACTOR

_____ _____
By: SIGNATURE PRINTED NAME

_____
Title

STATE OF ALABAMA
COUNTY OF BALDWIN

I. the undersigned authority, a Notary Public in and for said County and State, hereby certify that _____, whose name is signed to the foregoing instrument and who is known to me, acknowledged before me on this day that, being informed of the contents of the within instrument, he executed the same voluntarily on the day the same bears date.

Given under my hand and seal on this the _____ day of _____, 202___.

_____
NOTARY PUBLIC

My Commission Expires: ____/____/____

CITY OF FAIRHOPE
NOTICE OF COMPLETION LEGAL NOTICE

Bid Number: _____

Bid Name: _____

In accordance with Chapter 1, Title 39, Code of Alabama, 1975, for contracts over $50,000 and less than $500,000, Notice is hereby given that _____, CONTRACTOR, has completed the Contract for the above referenced bid for the City of Fairhope, Alabama, OWNER, and has made request for final settlement of said Contract. Any claims for labor, materials or otherwise in connection with this project should be itemized, notarized, and presented to:

OWNER:

CITY OF FAIRHOPE
555 South Section Street
P.O. Drawer 429
Fairhope, AL 36533

On or before (30 days) or same will be barred.

Contractor:

Dates ad was run (one time): _____

Newspapers in which ad run (dates): _____

Contractor to provide Proof of Publication of the Notice of Completion to the City by affidavit of the publisher and a printed copy of the notice published.

CITY OF FAIRHOPE

WTP No. 1 IMPROVEMENTS
PHASE 1

FAIRHOPE, ALABAMA

PROJECT NO. 23040.3

KREBS ENGINEERING

BY:M-ENGL-ON
12/8/2023
4:29:50 PM
P:\Job Mstr\Fairhope\23040_Water\System Expansion\WTP No. 1 Expansion\Drawings\23040G0-01.dgn

KREBS ENGINEERING

ALABAMA LICENSED PROFESSIONAL ENGINEER No. 34xxx 12/8/23 REGISTERED MARYLAND

BID SET

CITY OF FAIRHOPE
WTP No. 1 IMPROVEMENTS
PHASE 1
FAIRHOPE, ALABAMA

CITY OF FAIRHOPE ALABAMA

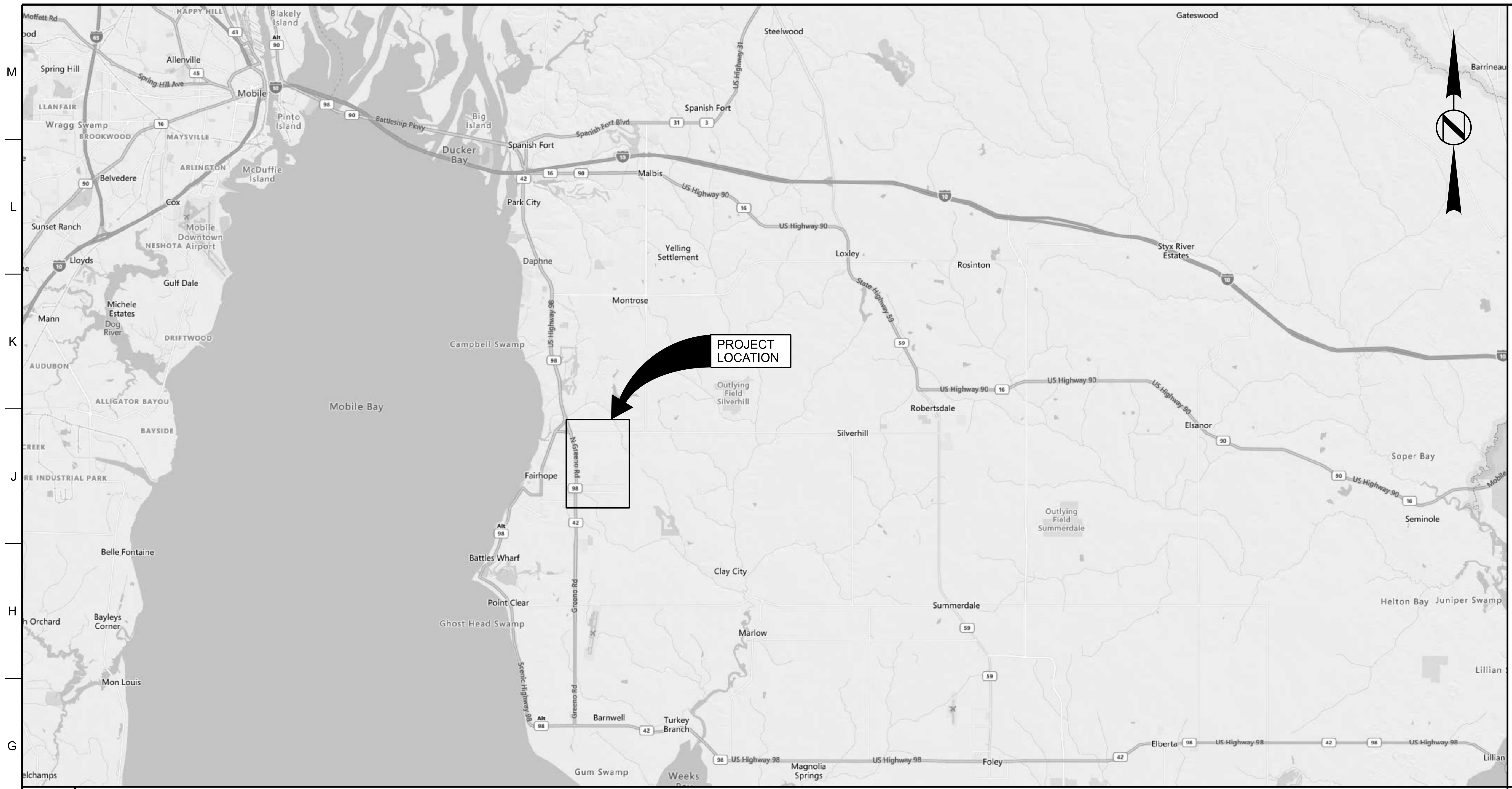
Designed: ADM	Project No.: 23040.3
Drawn: CLM	
Checked: CLL	

Revisions

No.	Date	Description

Sheet Title: COVER SHEET

Issue Date	Sheet No.
DEC., 2023	G0-01
Sequence: 1 of 37	

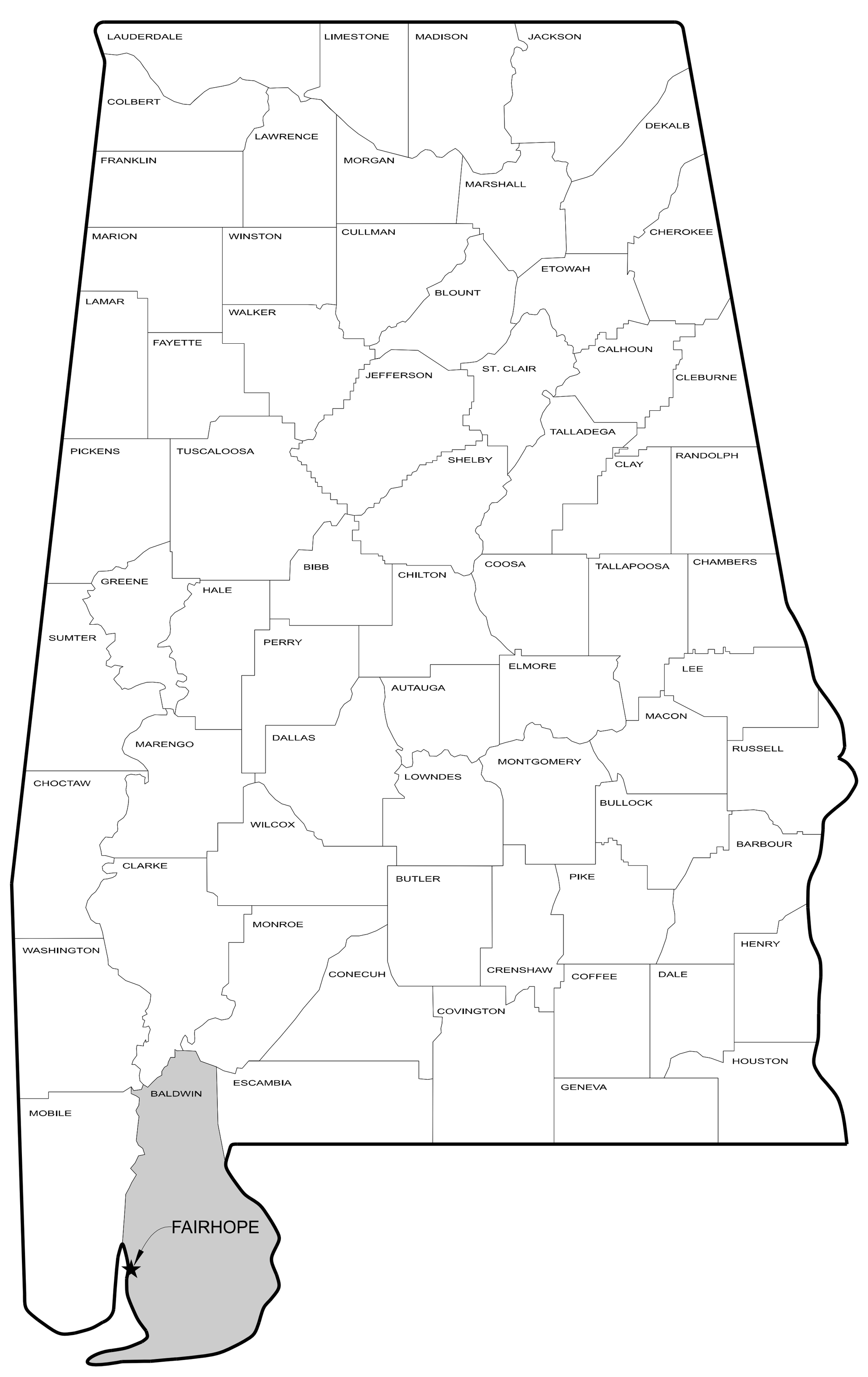


G1 VICINITY MAP NO SCALE

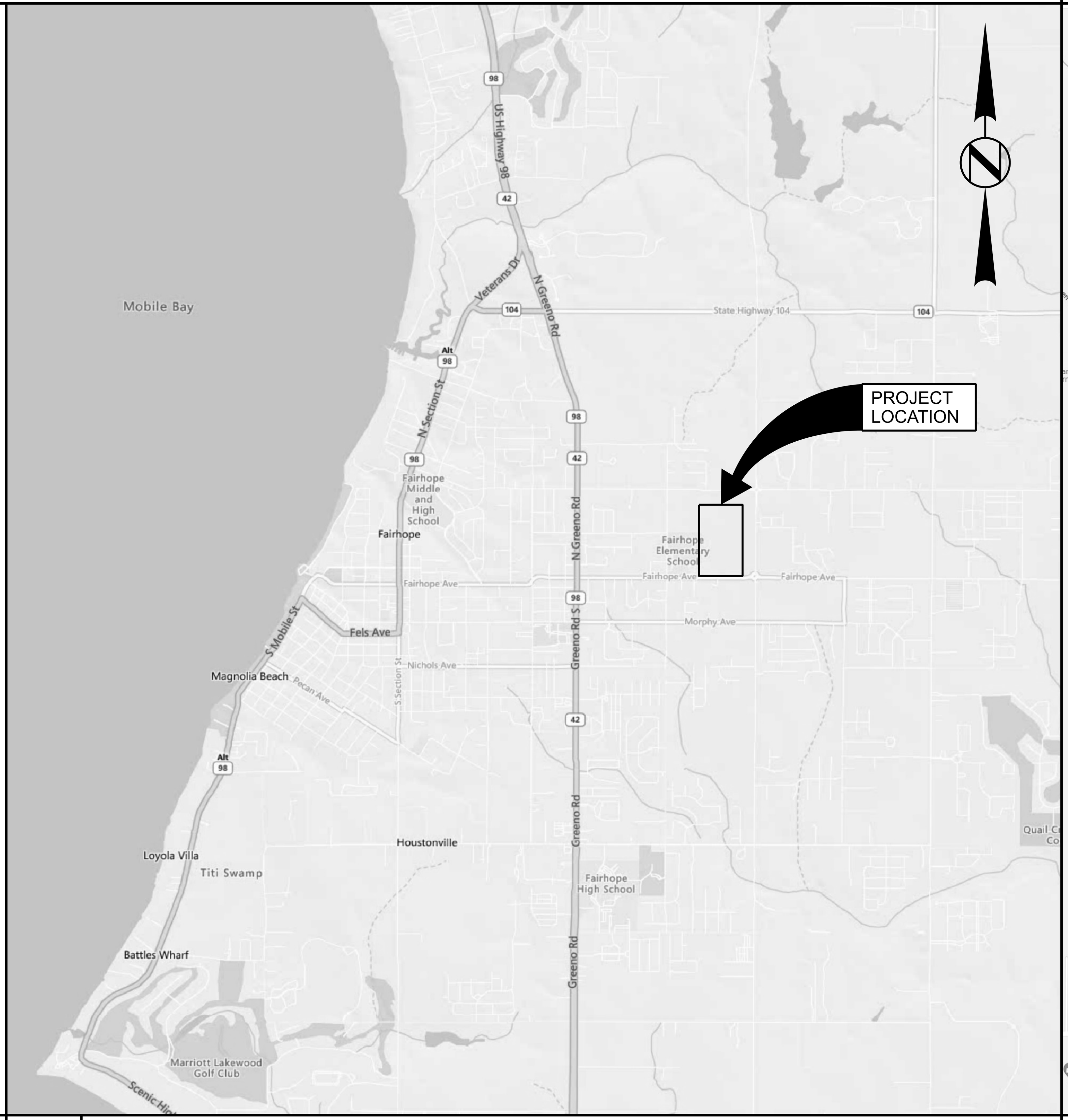
SHEET INDEX

SEQ. NO.	SHEET NO.	SHEET TITLE
1	G0-01	COVER SHEET
2	G0-02	LOCATION MAP & SHEET INDEX
3	G0-03	STANDARD SYMBOLS & ABBREVIATIONS
4	S0-01	GENERAL STRUCTURAL NOTES & DETAILS
5	C1-01	EXISTING SITE / YARD PIPING DEMOLITION PLAN
6	C3-01	SITE / YARD PIPING PLAN
7	C3-02	YARD PIPING PROFILES
8	C3-03	FINISHED WATER FLOW METER VAULT PLANS & SECTIONS
9	C5-01	EX. TREATMENT BUILDING DEMOLITION PLAN
10	C5-02	EX. TREATMENT BUILDING DEMOLITION SECTIONS
11	C5-03	EX. TREATMENT BUILDING MODIFICATIONS PLAN
12	C5-04	EX. TREATMENT BUILDING MODIFICATIONS SECTIONS
13	S5-01	EX. TREATMENT BUILING LOWER STRUCTURAL PLAN
14	S5-02	EX. TREATMENT BUILING STRUCTURAL SECTIONS
15	S5-03	EX. TREATMENT BUILING STRUCTURAL SECTIONS
16	M5-01	EX. TREATMENT BUILDING MECHANICAL PLAN
17	DT-01	MISCELLANEOUS DETAILS
18	DT-02	MISCELLANEOUS DETAILS
19	E0-01	ELECTRICAL LEGEND AND NOTES
20	E0-02	SINGLE LINE DIAGRAM
21	E0-11	ELECTRICAL SCHEDULES
22	E0-12	ELECTRICAL SCHEDULES
23	E0-13	CONTROL AND INSTRUMENTATION SCHEDULES
24	E0-21	ELEMENTARY DIAGRAMS
25	E0-22	ELEMENTARY DIAGRAMS
26	E1-01	SITE ELECTRICAL DEMOLITION PLAN
27	E3-01	SITE ELECTRICAL PLAN
28	E3-02	SITE SUPPLEMENTAL GROUNDING PLAN
29	E3-03	FINISHED WATER FLOW METER VAULT ELECTRICAL PLAN
30	E5-01	TREATMENT BUILDING ELECTRCIAL DEMOLITION PLAN
31	E5-02	TREATMENT BUILDING MODIFICATIONS ELECTRICAL PLAN
32	E5-03	TREATMENT BUILDING HVAC ELECTRICAL PLAN
33	DTE-01	ELECTRICAL DETAILS
34	DTE-02	ELECTRICAL DETAILS
35	DTE-03	ELECTRICAL DETAILS
36	DTE-04	ELECTRICAL DETAILS
37	DTE-05	ELECTRICAL DETAILS

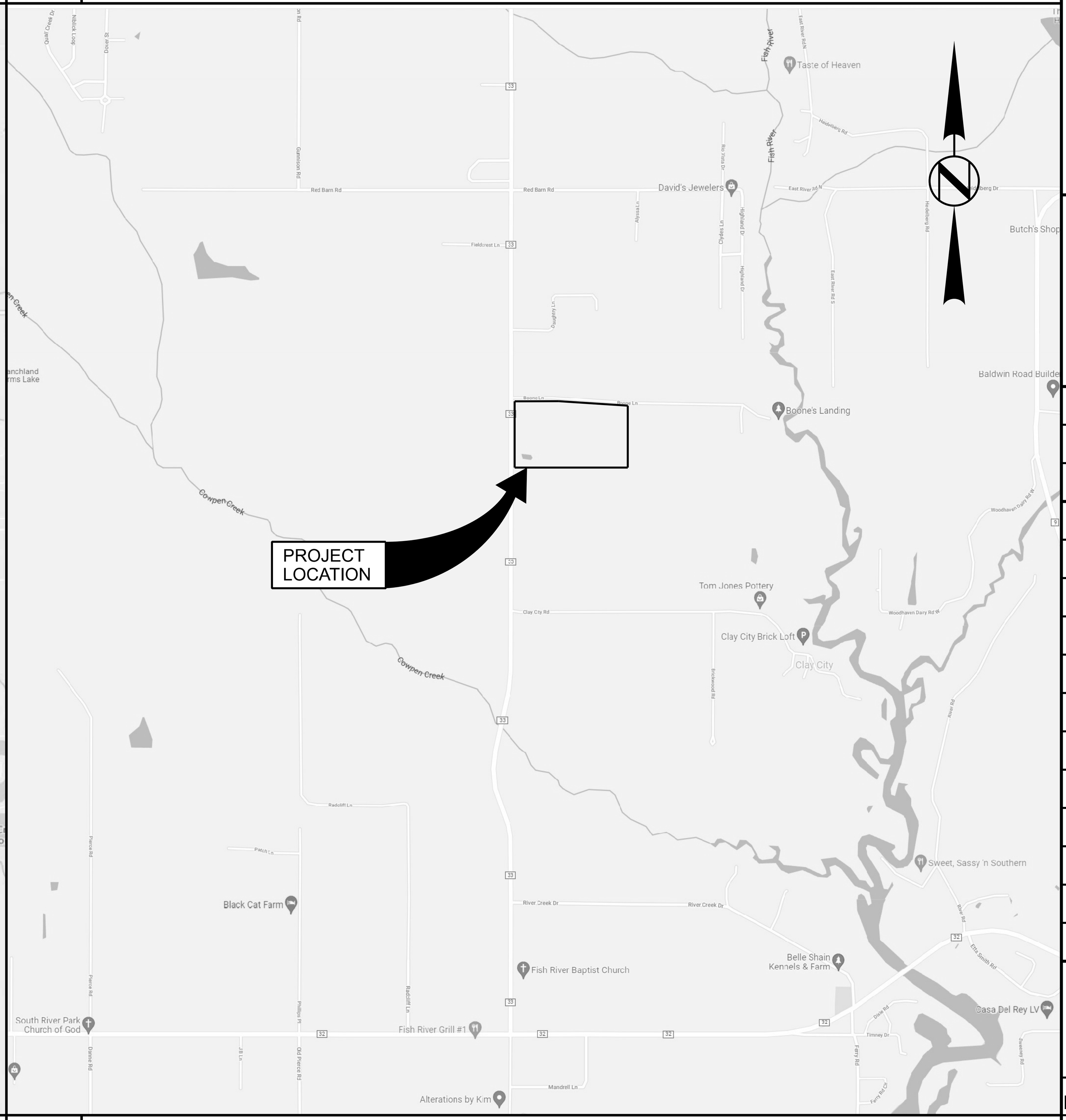
G11 SHEET INDEX



A1 STATE LOCATOR NO SCALE



A6 PROJECT LOCATION MAP NO SCALE



A11 EXISTING AERATOR LOCATION MAP (WTP No. 3) NO SCALE

KREBS ENGINEERING

BID SET

CITY OF FAIRHOPE
WTP No. 1 IMPROVEMENTS
PHASE 1
FAIRHOPE, ALABAMA

CITY OF FAIRHOPE ALABAMA

Designed ADM	Project No. 23040.3
Drawn CLM	
Checked CLL	

Revisions

No.	Date	Description

Sheet Title
LOCATION MAP & SHEET INDEX

Issue Date DEC., 2023
Sequence 2 of 37
Sheet No. G0-02

D1 ABBREVIATIONS

Abbreviation	Meaning
@	AT
&	AND
#	NUMBER
AC.	ACRE
ACQ'D	ACQUIRED
ADJ	ADJUSTABLE
ALDOT	ALABAMA DEPARTMENT OF TRANSPORTATION
ALT	ALTERNATE
ALUM.	ALUMINUM
APPROX.	APPROXIMATE
ARV	AIR RELEASE VALVE
ASPH.	ASPHALT
ASSY	ASSEMBLY
AVE	AVENUE
AVG	AVERAGE
AWWA	AMERICAN WATER WORKS ASSOCIATION
BFV	BUTTERFLY VALVE
BLDG.	BUILDING
BLK	BLOCK
BM	BENCH MARK
BOC	BACK OF CURB
BOT.	BOTTOM
BRKT.	BRACKET
BR. RES.	BRICK RESIDENCE
B.S.	BOTH SIDES
CB	CATCH BASIN
C.C.	CARRYING CAPACITY
C & G	CURB AND GUTTER
C.I.	CAST IRON
C.I.P.	CAST IRON PIPE
CIR	CIRCLE
℄	CENTER LINE
CONC.	CONCRETE
CONN.	CONNECTION
CONT.	CONTINUOUS
COR.	CORNER
CU. FT.	CUBIC FEET
CU. YD.	CUBIC YARD
CV	CHECK VALVE
CLR	CLEAR/CLEARANCE
C.M.P.	CORRUGATED METAL PIPE
CMU	CONCRETE MASONRY UNIT
CO	CLEAN OUT
COL	COLUMN
CTSK.	COUNTERSINK
CTV	CABLE TELEVISION
D.A.	DRAINAGE AREA
DBL	DOUBLE
D.F.	DESIGN FLOW
D.I.	DUCTILE IRON
D.I.P.	DUCTILE IRON PIPE
DIA.	DIAMETER
DIAG.	DIAGRAM
DIST.	DISTANCE
DET.	DETAIL
DN	DOWN
E	EAST
EA.	EACH
E.F.	EACH FACE
EFF. WTR.	EFFLUENT WATER
EL.	ELEVATION
EOP	EDGE OF PAVEMENT
EQ	EQUAL
ESMT.	EASEMENT
E.W.	EACH WAY
EX.	EXISTING
EXP.	EXPANSION
EXT.	EXTRUDED
FCA	FLANGED COUPLING ADAPTER
FD	FLOOR DRAIN
F.F.	FINISH FLOOR
FH	FIRE HYDRANT
FIG	FIGURE
FIN.	FINISH/FINISHED
FIN. GR.	FINISH GRADE
F.L.	FLOW LINE
FLG	FLANGED
FM	FORCE MAIN
FR. RES.	FRAME RESIDENCE
FT.	FOOT/FEET
G	GAS
GA.	GAUGE
GALV	GALVANIZED
GDOT	GEORGIA DEPARTMENT OF TRANSPORTATION
GM	GAS METER
GPM	GALLONS PER MINUTE
GR.	GRADE
GRND	GROUND
GRTG	GRATING
GRVL	GRAVEL
GTV	GATE VALVE
GV	GAS VALVE
HB	HOSE BIBB
HDCP	HANDICAPPED
HDPE	HIGH DENSITY POLYETHYLENE
HDWL	HEADWALL
HORIZ.	HORIZONTAL
HP	HORSE POWER/HIGH PRESSURE
HT.	HEIGHT
HVAC	HEATING, VENTILATION AND AIR CONDITIONING
H.W.	HIGH WATER
H.W.L.	HIGH WATER LEVEL
HWSEL.	HIGH WATER SURFACE ELEVATION
HWY	HIGHWAY
HYD	HYDRAULIC
I.D.	INSIDE DIAMETER
I.F.	INSIDE FACE
IN.	INCH
INF.	INFLUENT
INV.	INVERT
IPF	IRON PEN FOUND
JB	JUNCTION BOX
JCT	JUNCTION
JST	JOIST
JT	JOINT
LAT.	LATITUDE
LB.	POUND
LBL	LABEL
L.F.	LINEAR FEET
LIN	LINEAL, LINEAR
LONG.	LONGITUDE
LP	LOW POINT/LONG PATTERN
LT	LEFT
LVR	LOUVER
MAX.	MAXIMUM
MB	MAIL BOX
MCC	MOTOR CONTROL CENTER
MFG	MANUFACTURER/MANUFACTURING
MGD	MILLION GALLONS PER DAY
M.H.	MANHOLE
MI.	MILE/MILES
MIN.	MINIMUM
MISC.	MISCELLANEOUS
MJ	MECHANICAL JOINT
MT.	MOUNT
MTL	METAL
MTR	MOTOR
N	NORTH
NIC	NOT IN CONTRACT
NO.	NUMBER
NOM	NOMINAL
NORM	NORMAL
NTS	NOT TO SCALE
NWSEL.	NORMAL WATER SURFACE ELEVATION
O.C.	ON CENTER
O.D.	OUTSIDE DIAMETER
O.F.	OUTSIDE FACE
OVFL	OVERFLOW
P	POWER
P.C.	POINT OF CURVE
PE	PLAIN END
PEJ	PIPE EXPANSION JOINT
PH.	PHASE
P.I.	POINT OF INTERSECTION
PKWY	PARKWAY
ℙ	PROPERTY LINE
PLBG	PLUMBING
P-O	PUSH ON
PP	POWER POLE
PRESS	PRESSURE
PRKG	PARKING
PROJ	PROJECT
PRV	PRESSURE REDUCING VALVE
PSI	POUNDS PER SQUARE INCH
P.T.	POINT OF TANGENT
PV	PLUG VALVE
PVC	POLYVINYL CHLORIDE
PNL	PANEL
PSF	POUNDS PER SQUARE FOOT
PVMT	PAVEMENT
QTR	QUARTER
QTY	QUANTITY
R.	RANGE
RAD	RADIUS
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
RED.	REDUCER
REF	REFERENCE
REG	REGULAR
REINF	REINFORCING
REM	REMOVE
REQ'D	REQUIRED
RES.	RESIDENCE
RET	RETAINER/RETAINING
REV	REVISE/REVISION
RJ	RESTRAINED JOINT
ROW	RIGHT-OF-WAY
RPM	REVOLUTIONS PER MINUTE
RR	RAILROAD
RT	RIGHT
S	SOUTH
SAN.	SANITARY
SCH	SCHEDULE
SD	STORM DRAIN
SEC.	SECTION
SHLDR.	SHOULDER
SHT	SHEET
SIM	SIMILAR
SL	SURVEY LINE
SLV	SLEEVE
SPECS	SPECIFICATIONS
SQ.	SQUARE
SQ. FT.	SQUARE FEET
SQ. YD.	SQUARE YARD
SS	SANITARY SEWER
ST	STREET
STA.	STATION
STD.	STANDARD
ST. STL.	STAINLESS STEEL
STM.	STORM
STM. SEW.	STORM SEWER
STR	STRAIGHT
STRUC	STRUCTURAL
SW	SIDE WALK
SWD	SIDE WATER DEPTH
SYS	SYSTEM
T	TELEPHONE
T.	TOWNSHIP
T&B	TOP AND BOTTOM
TAN.	TANGENT
TAN. TO C.	TANGENT TO CURVE
TBM	TEMPORARY BENCHMARK
TEMP	TEMPORARY
THK.	THICK/THICKNESS
THRU	THROUGH
TOC	TOP OF CURB
TOW	TOP OF WALL
TYP.	TYPICAL
UNO	UNLESS NOTED OTHERWISE
UP	UNDERGROUND POWER
UT	UNDERGROUND TELEPHONE
UTIL	UTILITY
UV	ULTRAVIOLET
V	VALVE
V.C.P.	VITRIFIED CLAY PIPE
VERT.	VERTICAL
V.F.	VERTICAL FEET
VFD	VARIABLE FREQUENCY DRIVE
V.G.	VALLEY GUTTER
V.P.C.	VERTICAL POINT OF CURVE
V.P.I.	VERTICAL POINT OF INTERSECTION
V.P.T.	VERTICAL POINT OF TANGENT
W	WATER
W	WEST
W/	WITH
W/O	WITHOUT
WM	WATER METER
WS	WATERSTOP
WSEL.	WATER SURFACE ELEVATION
WT.	WEIGHT
WTM	WATER TRANSMISSION MAIN
WV	WATER VALVE
W.W.	WING WALL
WWF	WELDED WIRE FABRIC
YD.	YARD
YR.	YEAR

D7 EXISTING UTILITIES

- STORM DRAIN MANHOLE
- SANITARY SEWER MANHOLE
- SANITARY SEWER CLEANOUT (CO)
- SANITARY SEWER (GRAVITY) (SS)
- SANITARY SEWER (FORCEMAIN) (FM)
- WATER LINE (SIZE NOTED) (W)
- NON-CONNECTING PIPING
- WATER METER (SIZE NOTED IF LARGER THAN 3/4")
- WATER VALVE
- FIRE HYDRANT
- AIR RELEASE VALVE
- GAS LINE (SIZE NOTED) (G)
- GAS METER
- GAS LAMP
- GAS VALVE
- GAS REGULATOR
- UTILITY LINE MARKER
- OVERHEAD POWER LINE (P)
- UNDERGROUND POWER LINE (UP)
- POWER/TELEPHONE LINE (P/T)
- HIGH VOLTAGE TRANSMISSION TOWER/POLE
- UTILITY POLE
- LIGHT POLE
- GUY WIRE
- POWER MANHOLE
- OVERHEAD TELEPHONE LINE (T)
- UNDERGROUND TELEPHONE LINE (UT)
- FIBER OPTIC CABLE (UNDERGROUND) (FO)
- CABLE TV (UNDERGROUND) (CTV)
- TELEPHONE MANHOLE
- TELEPHONE PEDESTAL
- JUNCTION BOX (LETTER DENOTES UTILITY) — P - POWER, T - TELEPHONE, C - CABLE TV, F - FIBER OPTIC

G10 PROPOSED UTILITIES

- MANHOLE
- CLEANOUT (CO)
- UTILITY LINE (SIZE AND TYPE NOTED)
- ENCASED PIPE (I.D. OF CASING & CARRIER NOTED)
- NON-CONNECTING PIPING
- WATER METER (SIZE NOTED IF LARGER THAN 3/4")
- VALVE (TYPE NOTED)
- FIRE HYDRANT
- AIR RELEASE VALVE
- TAPPING SLEEVE AND VALVE
- TAPPING SADDLE AND VALVE
- SLEEVE
- CONCRETE BRACE
- PLUG W/CONCRETE CROSS ANCHOR
- GAS METER
- GAS LAMP
- GAS REGULATOR

A1 GENERAL SYMBOLS

- SECTION MARKER: A1 / C0-0 — SECTION NUMBER, SHEET NUMBER
- DETAIL MARKER: A1 / C0-0 — DETAIL NUMBER, SHEET NUMBER
- BUILDING SECTION: A1 / C0-0
- WALL SECTION: A1 — SECTION/DETAIL APPEARS ON SAME SHEET
- B-1 SOIL TEST BORING
- DEMOLITION AND DISPOSAL

A4 SURVEYING SYMBOLS

- SECTION LINE
- 1/4 SECTION LINE
- 1/4-1/4 SECTION LINE
- SECTION CORNER OR 1/4 SECTION CORNER (TYPE AND DESCRIPTION NOTED)
- CITY OR TOWN LIMITS
- PROPERTY LINE (℗)
- IRON PIN FOUND (SIZE AND TYPE NOTED) (IPF)
- IRON PIN SET (SIZE AND TYPE NOTED) (IPS)
- SURVEY LINE AND POINT OF INTERSECTION
- BENCHMARK
- MONUMENT (SIZE AND TYPE NOTED)
- RIGHT-OF-WAY LINE (ROW)
- PERMANENT EASEMENT BOUNDARY (ESMT)
- LAND HOOK

A10 TOPOGRAPHY & INFRASTRUCTURE SYMBOLS

- TREE
- SHRUB
- HEDGEROW
- TREE LINE/WOODED AREA
- ROCK OUTCROPPING (R)
- SLOPE
- FLOWER BED, GARDEN, ROCK GARDEN (NOTED)
- RIVER/STREAM (ARROW INDICATES FLOW)
- INTERMITTENT DITCH OR STREAM
- LAKE OR POND (LAKE)
- SWAMP OR MARSH
- EXISTING GROUND CONTOUR (500, 499)
- FINISH GROUND CONTOUR (500, 499)
- RAILROAD
- FENCE (TYPE NOTED)
- MAILBOX
- TRAFFIC/STREET SIGN
- OUTDOOR ADVERTISING SIGN (BILLBOARD)
- EXISTING BUILDING/STRUCTURE
- EXISTING STORM DRAIN W/HEADWALL (SIZE AND TYPE NOTED)
- NEW STORM DRAIN W/HEADWALL (SIZE AND TYPE NOTED)
- EXISTING BRIDGE OR CULVERT
- EXISTING ASPHALT ROAD OR DRIVE
- NEW ASPHALT ROAD OR DRIVE
- EXISTING ASPHALT ROAD WITH CURB AND GUTTER (DRAINAGE INLET SHOWN)
- NEW ASPHALT ROAD WITH CURB AND GUTTER (DRAINAGE INLET SHOWN)
- EXISTING CONCRETE ROAD OR DRIVE
- NEW CONCRETE ROAD OR DRIVE
- EXISTING UNPAVED ROAD OR DRIVE
- NEW UNPAVED ROAD OR DRIVE

KREBS ENGINEERING

ALABAMA LICENSED PROFESSIONAL ENGINEER No. [signature] AUSTIN D. MAYNARD 12/8/23

BID SET

CITY OF FAIRHOPE
WTP No. 1 IMPROVEMENTS PHASE 1
FAIRHOPE, ALABAMA

CITY OF FAIRHOPE ALABAMA

Designed	ADM	Project No.
Drawn	CLM	23040.3
Checked	CLL	

Revisions

No.	Date	Description

Sheet Title: STANDARD SYMBOLS & ABBREVIATIONS

Issue Date: DEC., 2023 — Sheet No.: G0-03

Sequence: 3 of 37

BHM-ENGL-26 12/8/2023 4:28:58 PM P:\BHAM\Fairhope\23040_WaterSystemExpansion\WTP No. 1 Expansion\Drawings\23040G0-03.dgn

ABBREVIATIONS:

AND	&	KIP	K
NUMBER	NO. / #		
PLUS OR MINUS	+/-	LONG	LG
ABOVE FINISHED FLOOR	AFF	MAXIMUM	MAX
ABOVE FINISHED GRADE	AFG	MOMENT CONNECTION	MC
APPROXIMATE	APPROX	MECHANICAL	MECH
ARCHITECTURAL	ARCH	MANUFACTURE(R)	MFR
		MINIMUM	MIN
BELOW FINISHED FLOOR	BFF	MISCELLANEOUS	MISC
BELOW FINISHED GRADE	BFG	METAL	MTL
BUILDING	BLDG		
BEAM	BM	NEAR SIDE	NS
BOTTOM OF STEEL	BOS	NOT TO SCALE	NTS
BASE PLATE	BP		
BEARING	BRG	ON CENTER	OC
BOTH SIDES	BS	OUTSIDE DIAMETER	OD
		OPENING	OPNG
CAST IN PLACE	CIP	OPPOSITE HAND	OPP HD
CANTILEVER	CANT		
CONTROL JOINT	CJ	PRE-ENGINEERED METAL BUILDING	PEMB
COMPLETE JOINT PENETRATION	CJP	PARTIAL JOINT PENETRATION	PJP
CENTERLINE	CL	PERPENDICULAR	PERP
CLEAR	CLR	PLATE	PL
COLUMN	COL	PLUMBING	PLMB
CONCRETE	CONC	PROJECTION	PROJ
CONTINUOUS	CONT	POUNDS PER SQUARE FOOT	PSF
		POUNDS PER SQUARE INCH	PSI
DOUBLE	DBL		
DIAMETER	Ø / DIA	RADIUS	R
DIMENSION	DIM	REFERENCE	REF
DRAWING	DWG	REINFORCING	REINF
DOWEL	DWL	REQUIRED	REQ'D
		ROUGH OPENING	R.O.
EACH	EA		
EACH FACE	EF	SCHEDULE	SCHED
EXPANSION JOINT	EJ	SECTION	SECT
EMBEDMENT	EMBD	SIMILAR	SIM
ELEVATION	ELEV	SLAB ON GRADE	SOG
EDGE OF SLAB	EOS	SEISMIC LOAD RESISTING SYSTEM	SLRS
EQUAL	EQ	SPECIFICATIONS	SPECS
EACH SIDE	ES	SQUARE	SQ
EACH WAY	EW	STAGGER	STAG
EXTERIOR	EXT	STANDARD	STD
		STIFFENER	STIFF
FOUNDATION	FNDT	STIRRUP	STIR
FACE OF CONCRETE	F.O.C	STEEL	STL
FACE OF MASONRY	F.O.M.	STRUCTURAL	STR
FACE OF STUD	F.O.S.	SYMMETRICAL	SYM
FAR SIDE	FS		
FINISH	FIN	TOP	T
FINISH FLOOR	FF	TOP AND BOTTOM	T&B
FINISH GRADE	FG	THICK	THK
FLANGE	FLG	TOP OF CONCRETE	TOC
FLOOR	FLR	TOP OF DECK	TOD
FOOTING	FTG	TOP OF FOOTING	TOF
FIELD VERIFY	FV	TOP OF PARAPET	TOP
		TOP OF STEEL	TOS
GAGE, GAUGE	GA	TOP OF WALL	TOW
GALVANIZED	GALV	TYPICAL	TYP
GENERAL NOTES	GN		
GRADE	GR	UNLESS NOTED OTHERWISE	UNO
HOOK	HK	VERTICAL	VERT
INSIDE DIAMETER	ID	WITH	w/
INTERIOR	INT	WELDED WIRE REINFORCEMENT	WWR
		WEIGHT	WGT
JOINT	JT		

GENERAL NOTES:

1. GENERAL:

1.1. GENERAL BUILDING CODE: INTERNATIONAL BUILDING CODE, 2021 EDITION.

1.2. THE STRUCTURAL DRAWINGS AND SPECIFICATIONS ARE PART OF THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL OBTAIN ALL CONTRACT DOCUMENTS AND NOTIFY THE STRUCTURAL ENGINEER OF ANY DISCREPANCIES OR OMISSIONS.

1.3. THE CONTRACTOR SHALL REVIEW ALL SHOP DRAWINGS AND STAMP ALL SHOP DRAWINGS WITH HIS SUBMITTAL REVIEW STAMP PRIOR TO SUBMITTING THEM FOR FINAL REVIEW. SHOP DRAWINGS NOT BEARING THE CONTRACTOR'S SUBMITTAL REVIEW STAMP WILL BE RETURNED WITHOUT ACTION.

1.4. ALL SHOP DRAWINGS RELATED TO THE ITEMS SPECIFIED IN THE STRUCTURAL CONTRACT DOCUMENTS SHALL BEAR THE ENGINEER'S SUBMITTAL REVIEW STAMP PRIOR TO PROCEEDING. SHOP DRAWINGS WILL BE RETURNED TO THE ENGINEER AFTER THE SUBMITTAL REVIEW IS COMPLETE.

1.5. THE STRUCTURAL DESIGN IS BASED ON THE FOLLOWING EXISTING DRAWINGS THAT WERE PROVIDED TO OUR OFFICE FOR REFERENCE. THE GENERAL CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND CONTACT THE STRUCTURAL ENGINEER'S OFFICE IF ANY DISCREPANCIES ARE NOTED BETWEEN THE EXISTING DRAWINGS AND THE AS-BUILT CONDITIONS.

DRAWING NUMBER 0986-037 (SHEETS 4 & 5) BY MOORE ENGINEERING COMPANY

1.6. DO NOT SCALE THESE DRAWINGS. WHERE DIMENSIONAL INFORMATION IS REQUIRED, OR DISCREPANCIES ARE NOTED, CONTACT THE ENGINEER.

1.7. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND SITE CONDITIONS PRIOR TO CONSTRUCTION AND SHALL NOTIFY ENGINEER IF ANY DISCREPANCIES ARE NOTED.

1.8. THE CONTRACTOR IS RESPONSIBLE FOR ALL MEANS, METHODS, AND SEQUENCE OF CONSTRUCTION.

1.9. THE STRUCTURE IS DESIGNED BASED ON THE COMPLETED CONDITION ONLY. THE CONTRACTOR IS RESPONSIBLE FOR ALL TEMPORARY BRACING TO MAINTAIN STABILITY DURING CONSTRUCTION PRIOR TO THE COMPLETION OF THE STRUCTURE.

1.10. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT ALL CONSTRUCTION MATERIALS ARE SPREAD OUT ON FRAMED FLOORS SUCH THAT THE DESIGN LOADS LISTED BELOW ARE NOT EXCEEDED

1.11. DESIGN LOADS:

A. DEAD LOADS:

SEE DRAWINGS FOR THE CONSTRUCTION MATERIALS USED IN THE PROJECT. ANY CHANGES IN CONSTRUCTION MATERIALS FROM THOSE SHOWN ON THE DRAWINGS SHALL BE REPORTED TO THE STRUCTURAL ENGINEER FOR VERIFICATION OF THE CAPACITY OF THE STRUCTURE.

B. LIVE LOADS (PSF):

FLOOR ---------- 125

2. STRUCTURAL STEEL:

2.1. STRUCTURAL STEEL DESIGN CODE: AISC SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS, AISC STEEL CONSTRUCTION MANUAL (EDITION REFERENCED IN THE APPLICABLE BUILDING CODE EDITION LISTED ABOVE).

2.2. ALL STRUCTURAL STEEL MATERIALS SHALL CONFORM TO THE FOLLOWING REQUIREMENTS:

WIDE FLANGE SHAPES ----------	ASTM A992, GR 50
HSS AND TS ----------	ASTM A500, GR C
PLATES, ANGLES, AND CHANNELS ----------	ASTM A36
ANCHOR RODS ----------	ASTM F1554 GR 36

2.3. ALL DETAILING, FABRICATION, AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO THE REQUIREMENTS OF THE LATEST EDITION OF THE AISC SPECIFICATIONS FOR STRUCTURAL STEEL BUILDINGS, UNLESS NOTED OTHERWISE.

2.4. UNLESS NOTED OTHERWISE, ALL CONNECTIONS SHALL BE MADE BY WELDING OR HIGH STRENGTH BOLTING WITH ¾" DIAMETER A325 BOLTS, MINIMUM. ALL BOLTS SHALL BE INSTALLED AS "SNUG-TIGHTENED JOINTS" AS SPECIFIED IN THE AISC STEEL CONTRUCTION MANUAL.

2.5. WELDS SHALL BE MADE WITH E-70XX ELECTRODES. THE MINIMUM SIZE FILLET WELD SHALL BE 3/16".

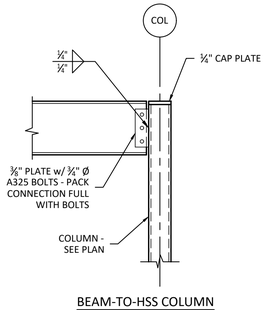
2.6. UNLESS OTHERWISE SHOWN, ALL BEAM CONNECTIONS SHALL BE SIMPLE SHEAR CONNECTIONS AS DEFINED IN PART 10 OF THE AISC STEEL CONSTRUCTION MANUAL, AND SHALL BE DESIGNED AS BEARING TYPE WITH THREADS IN THE SHEAR PLANE.

2.7. STEEL BEAM SHEAR CONNECTIONS SHALL BE PROVIDED AS NOTED IN THE TYPICAL DETAILS. THE STEEL FABRICATOR MAY PROVIDE ALTERNATIVE SHEAR CONNECTIONS; HOWEVER, IT IS THE RESPONSIBILITY OF THE STEEL FABRICATOR TO PROVIDE DESIGN CALCULATIONS SIGNED AND SEALED BY A LICENSED ENGINEER IN THE STATE WHERE THE PROJECT IS LOCATED FOR ALL ALTERNATIVE CONNECTIONS. CONNECTION CALCULATIONS (IF REQUIRED) SHALL BE SUBMITTED AS PART OF THE STRUCTURAL STEEL SUBMITTAL. STRUCTURAL STEEL SHOP DRAWINGS SUBMITTED WITHOUT SEALED CONNECTION CALCULATIONS WILL BE CONSIDERED INCOMPLETE AND RETURNED.

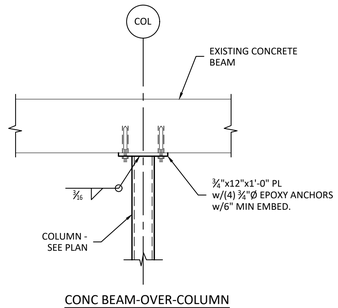
2.8. ALL STRUCTURAL STEEL SHALL BE HOT DIPPED GALVANIZED UNLESS NOTED OTHERWISE.

2.9. ALL COLUMN ANCHOR ROD HOLES TO BE OVERSIZED AS REQUIRED. THE MAXIMUM HOLE SIZE FOR ANCHOR RODS IN BASE PLATES SHALL CONFORM TO THE REQUIREMENTS LISTED IN TABLE 14-2 OF THE AISC STEEL CONSTRUCTION MANUAL. PLATE WASHERS ARE REQUIRED WITH ALL OVERSIZED HOLES.

2.10. ALL EPOXY SHALL CONFORM TO THE REQUIREMENTS OF HILTI HY 200 OR APPROVED EQUIVALENT.



BEAM-TO-HSS COLUMN



CONC BEAM-OVER-COLUMN

STEEL CONNECTION DETAILS

TYPICAL

12/7/2023
4:36:44 PM
C:\Users\Intern\Desktop\Fairhope WTP\Fairhope WTP No 1 Pump_DETS.dwg

KREBS ENGINEERING

ALABAMA LICENSED PROFESSIONAL ENGINEER SCOTT J. DOLLAR No. 27512
12/08/23

MK STRUCTURAL ENGINEERING
1490 NORTHBANK PARKWAY - SUITE 272 - TUSCALOOSA - AL - 35406
WWW.MAKEGR.COM - (205) 469-7912
MAK Project - 23.024

CITY OF FAIRHOPE
WTP No. 1 IMPROVEMENTS
PHASE 1
FAIRHOPE, ALABAMA

CITY OF FAIRHOPE ALABAMA

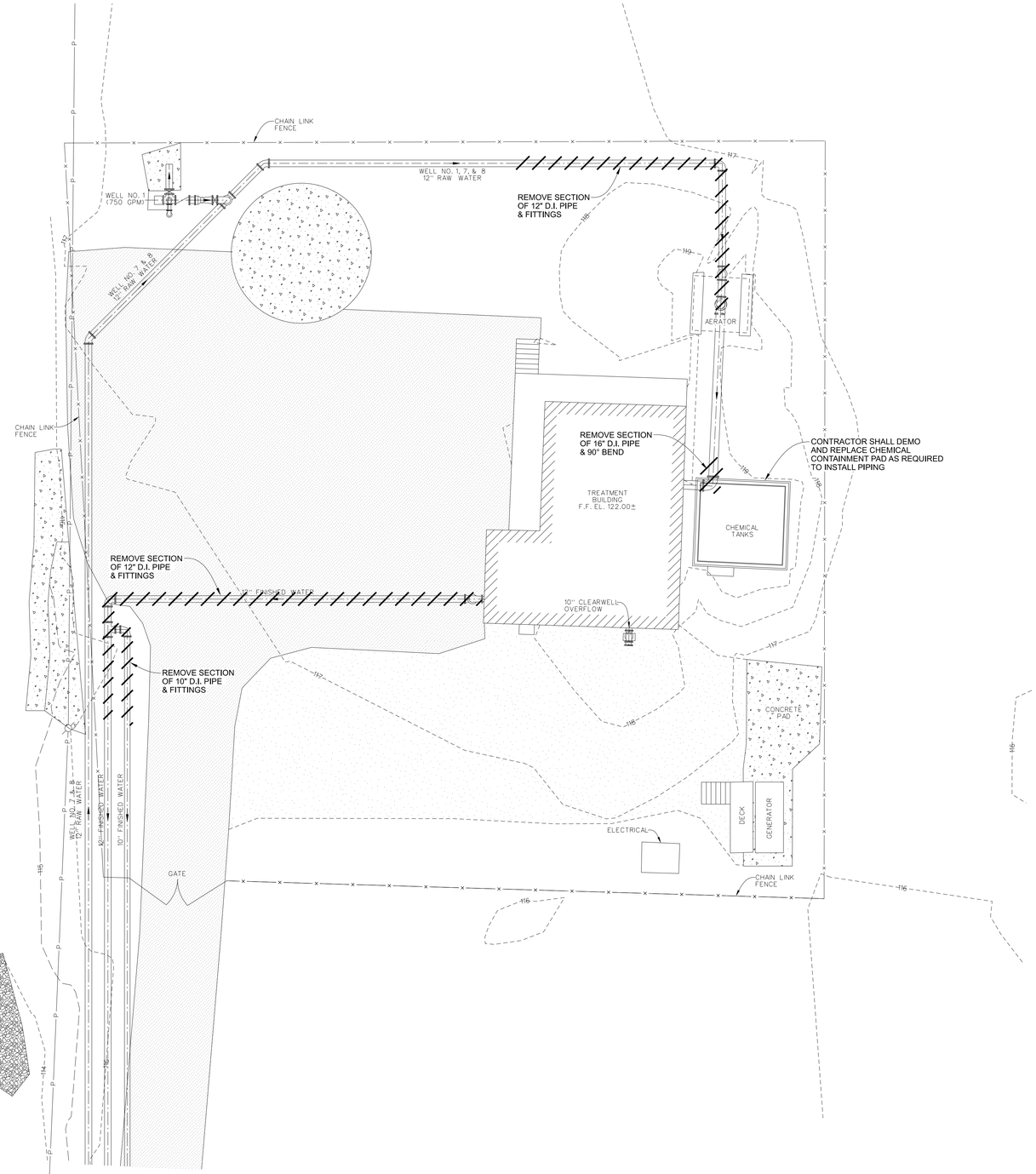
Designed: SJD	Project No.: 23040.3
Drawn: MAK	
Checked: SJD	

Revisions

No.	Date	Description

Sheet Title: GENERAL STRUCTURAL NOTES & DETAILS

Issue Date: DEC., 2023	Sheet No.: S0-01
Sequence: 4 of 37	



10 0 5 10

1 INCH = 10 FT.

GENERAL NOTES:

1. THE LOCATION OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE MANNER ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. THE CONTRACTOR AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VISITING THE SITE, BECOMING FAMILIAR WITH THE EXISTING PROPERTY CONDITIONS AND ADJACENT SITE CONDITIONS AND SATISFYING HIMSELF/HERSELF AS TO THE NATURE AND LOCATION OF ALL ASPECTS OF THE WORK PRIOR TO BIDDING.
3. DEMOLITION WORK SHALL BE DONE IN ACCORDANCE WITH ALL CODES AND ORDINANCES SET FORTH BY ALL GOVERNING AGENCIES.
4. UTILITIES THAT ARE INDICATED TO BE DEMOLISHED OR SERVE DEMOLISHED STRUCTURES ARE TO BE REMOVED, CAPPED, OR PLUGGED AT PROPERTY LINE IN ACCORDANCE WITH UTILITY OWNER INSTRUCTIONS.
5. THE CONTRACTOR SHALL DEMOLISH AND REMOVE THE EXISTING BUILDINGS, FOUNDATIONS, FOOTINGS, EQUIPMENT AND APPURTENANCES AS NOTED IN THE DRAWINGS AND AS REQUIRED FOR CONSTRUCTION OF THE IMPROVEMENTS.
6. THE CONTRACTOR SHALL TRANSFER/ESTABLISH BENCHMARKS OUTSIDE OF THE CONSTRUCTION LIMITS FOR CONSTRUCTION LAYOUT AND ENGINEERING.
7. THE CONTRACTOR SHALL OBTAIN ALL REQUIRED PERMITS PRIOR TO COMMENCING WORK.
8. ALL EQUIPMENT, CONTROLS, PIPING, HARDWARE, APPURTENANCES, AND MISCELLANEOUS ITEMS REMOVED UNDER THIS CONTRACT SHALL BE MADE AVAILABLE TO OWNER IN GOOD CONDITION. ALL MECHANICAL, CONTROL, AND ELECTRICAL EQUIPMENT ASSOCIATED WITH AN ITEM OR EQUIPMENT SHALL BE KEPT WITH EQUIPMENT ITEM AS A COMPLETE UNIT. SHOULD THE OWNER ELECT NOT TO RETAIN THE DEMOLISHED ITEMS, THE CONTRACTOR SHALL LEGALLY DISPOSE OF THEM OFF-SITE AT NO ADDITIONAL COST TO THE OWNER.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR SEQUENCING DEMOLITION CONSTRUCTION TO MINIMIZE DISRUPTIONS TO WATER TREATMENT PLANT OPERATIONS.
10. CONTRACTOR SHALL FURNISH AND INSTALL ALL TEMPORARY FACILITIES AS NEEDED TO COMPLETE THE WORK.
11. DEMOLITION PLANS ARE INTENDED TO SHOW ONLY MAJOR DEMOLITION ITEMS. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DEMOLITION AND/OR RE-ROUTING OF FACILITIES REQUIRED TO COMPLETE THE WORK.
12. SEE INDIVIDUAL STRUCTURE SHEETS FOR ADDITIONAL DETAILS.

A1 PLAN 1" = 10'

KREBS ENGINEERING

ALABAMA LICENSED PROFESSIONAL ENGINEER No. 34[illegible] 12/8/23 CERTIFICATE OF AUTHORIZATION NO. 0[illegible]

BID SET

CITY OF FAIRHOPE

WTP No. 1 IMPROVEMENTS PHASE 1

FAIRHOPE, ALABAMA

CITY OF FAIRHOPE ALABAMA

Designed ADM	Project No. 23040.3
Drawn CLM	
Checked CLL	

Revisions

No.	Date	Description

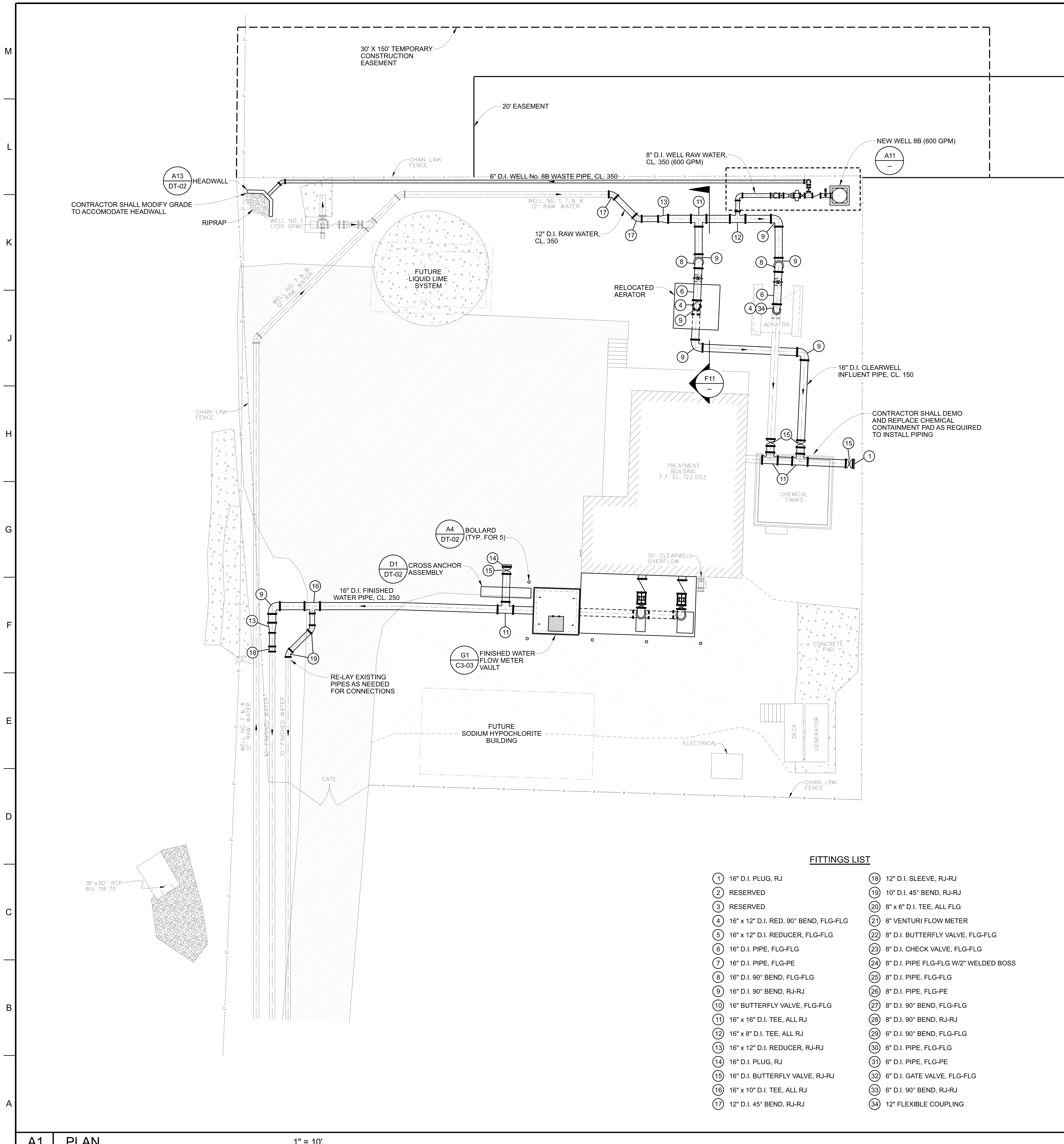
Sheet Title: EXISTING SITE / YARD PIPING DEMOLITION PLAN

Issue Date: DEC., 2023

Sequence: 5 of 37

Sheet No.: C1-01

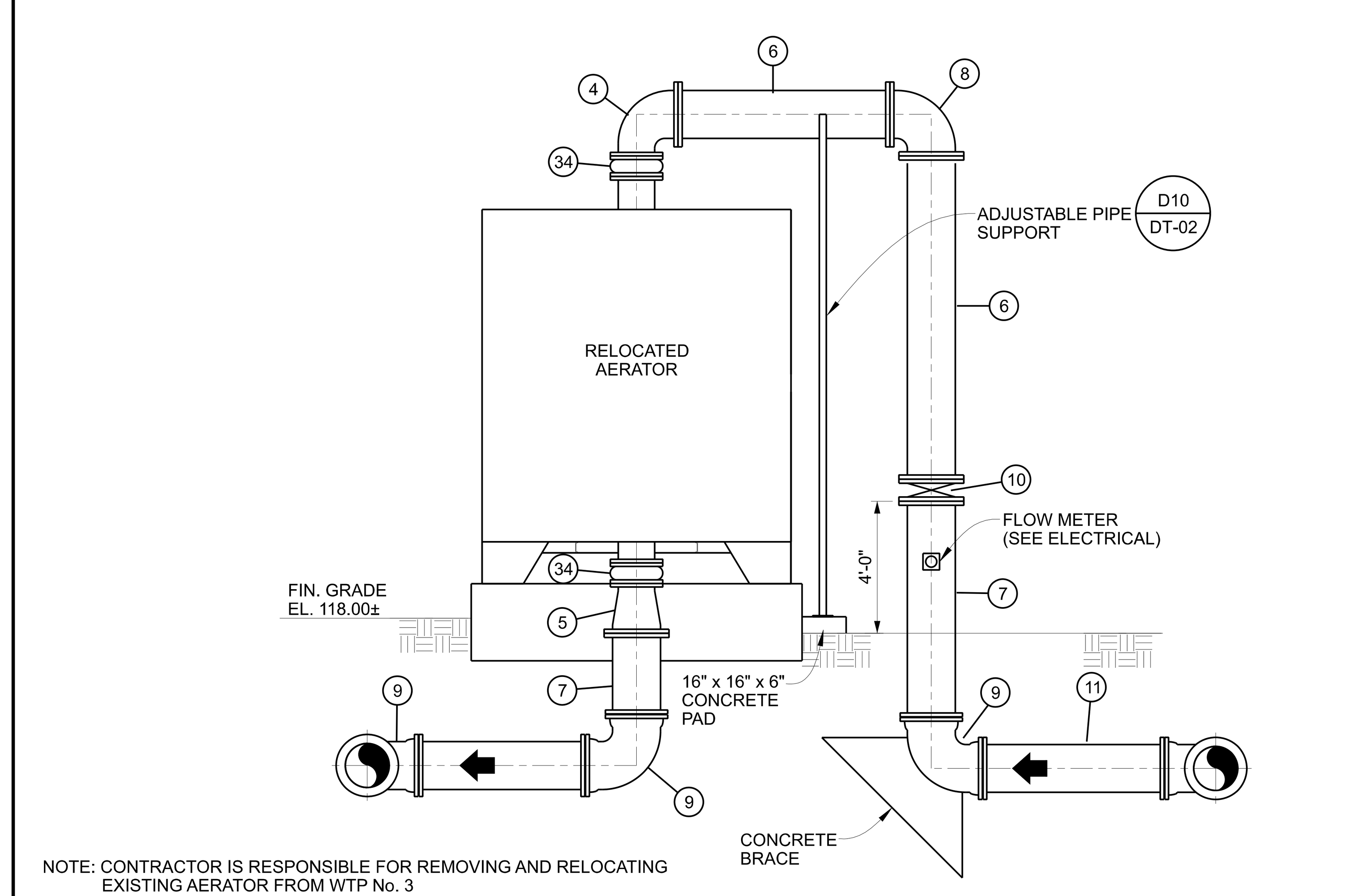
BHM-ENG-26
12/8/2023
4:29:59 PM
F:\Projects\Fairhope\23040_WaterSystemExpansion\WTP No. 1 Expansion\Drawings\23040C1-01.dgn



A1 PLAN 1" = 10'

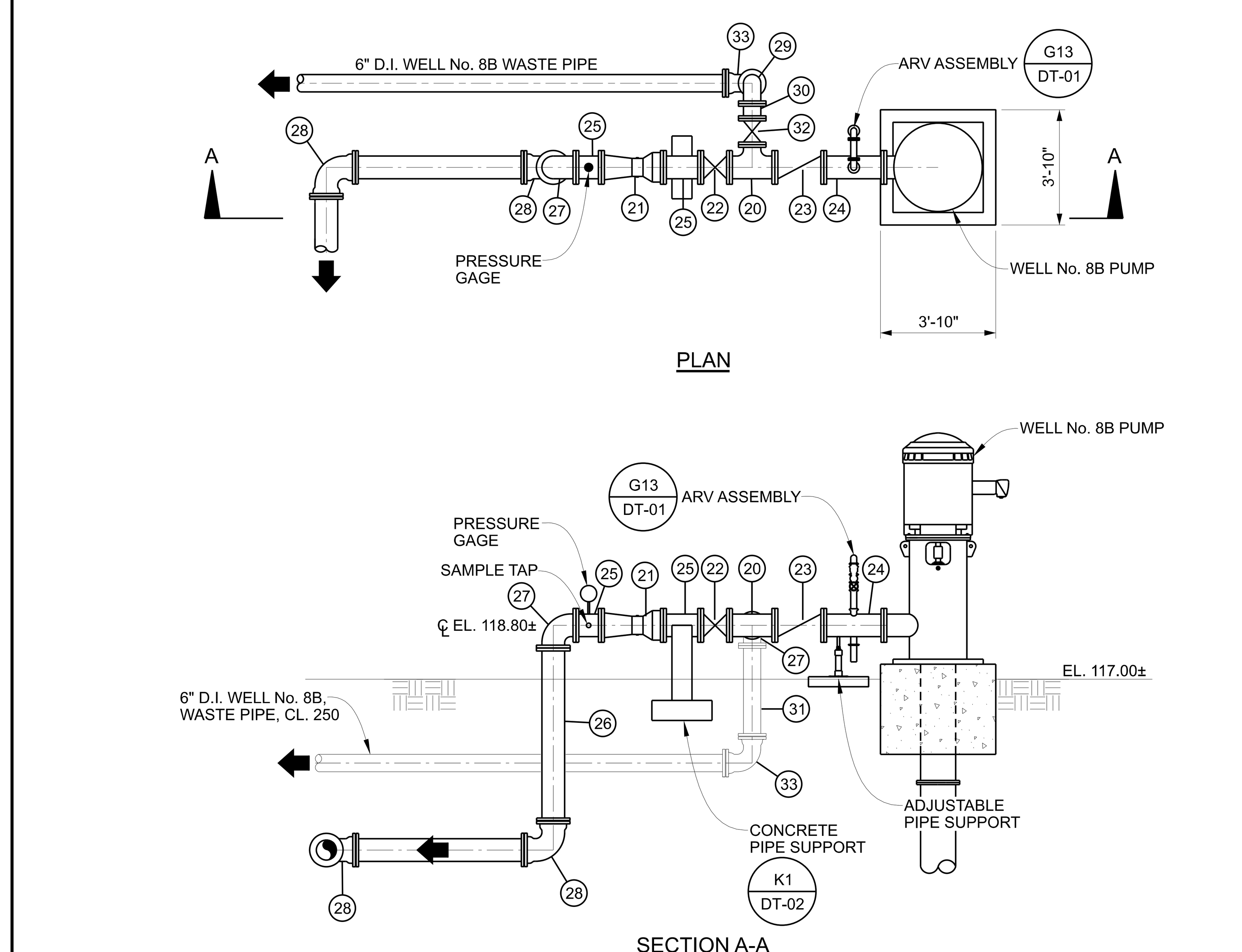
__FITTINGS LIST__

(1) 16" D.I. PLUG, RJ	(18) 12" D.I. SLEEVE, RJ-RJ
(2) RESERVED	(19) 10" D.I. 45° BEND, RJ-RJ
(3) RESERVED	(20) 8" x 6" D.I. TEE, ALL FLG
(4) 16" x 12" D.I. RED. 90° BEND, FLG-FLG	(21) 8" VENTURI FLOW METER
(5) 16" x 12" D.I. REDUCER, FLG-FLG	(22) 8" D.I. BUTTERFLY VALVE, FLG-FLG
(6) 16" D.I. PIPE, FLG-FLG	(23) 8" D.I. CHECK VALVE, FLG-FLG
(7) 16" D.I. PIPE, FLG-PE	(24) 8" D.I. PIPE FLG-FLG W/2" WELDED BOSS
(8) 16" D.I. 90° BEND, FLG-FLG	(25) 8" D.I. PIPE, FLG-FLG
(9) 16" D.I. 90° BEND, RJ-RJ	(26) 8" D.I. PIPE, FLG-PE
(10) 16" BUTTERFLY VALVE, FLG-FLG	(27) 8" D.I. 90° BEND, FLG-FLG
(11) 16" x 16" D.I. TEE, ALL RJ	(28) 8" D.I. 90° BEND, RJ-RJ
(12) 16" x 8" D.I. TEE, ALL RJ	(29) 6" D.I. 90° BEND, FLG-FLG
(13) 16" x 12" D.I. REDUCER, RJ-RJ	(30) 6" D.I. PIPE, FLG-FLG
(14) 16" D.I. PLUG, RJ	(31) 6" D.I. PIPE, FLG-PE
(15) 16" D.I. BUTTERFLY VALVE, RJ-RJ	(32) 6" D.I. GATE VALVE, FLG-FLG
(16) 16" x 10" D.I. TEE, ALL RJ	(33) 6" D.I. 90° BEND, RJ-RJ
(17) 12" D.I. 45° BEND, RJ-RJ	(34) 12" FLEXIBLE COUPLING



NOTE: CONTRACTOR IS RESPONSIBLE FOR REMOVING AND RELOCATING EXISTING AERATOR FROM WTP No. 3

F11 SECTION 1/4" = 1'-0"



A11 WELL 8B (600 GPM) 1/4" = 1'-0"

KREBS ENGINEERING

ALABAMA LICENSED PROFESSIONAL ENGINEER No. 31... ALLEN D. MAYNARD 12/8/23

BID SET

CITY OF FAIRHOPE
WTP No. 1 IMPROVEMENTS PHASE 1
FAIRHOPE, ALABAMA

CITY OF FAIRHOPE ALABAMA

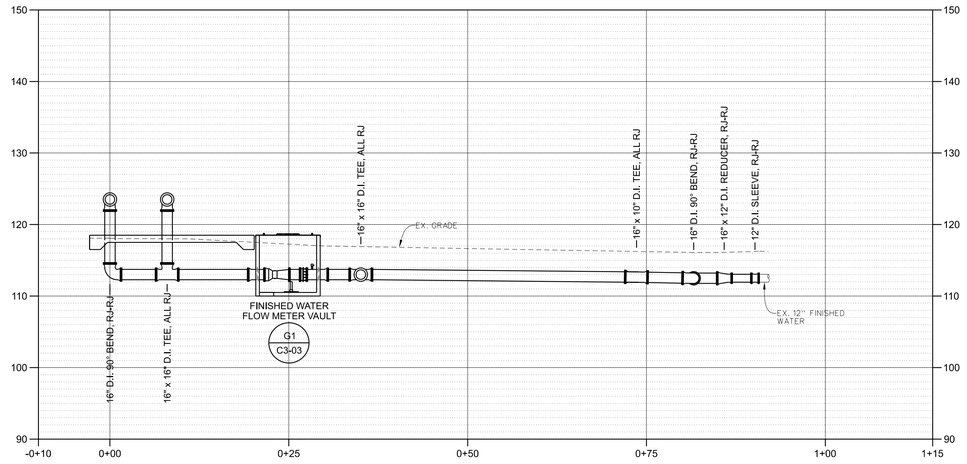
Designed	ADM	Project No.
Drawn	CLM	23040.3
Checked	CLL	

Revisions

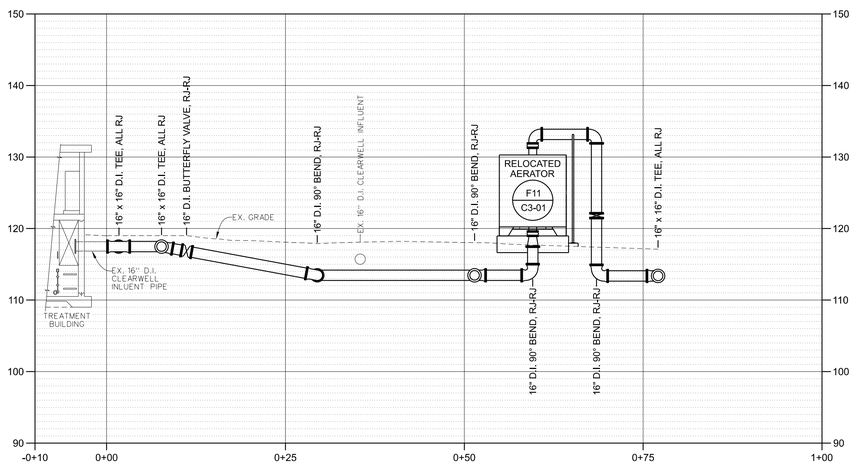
No.	Date	Description

Sheet Title: SITE / YARD PIPING PLAN

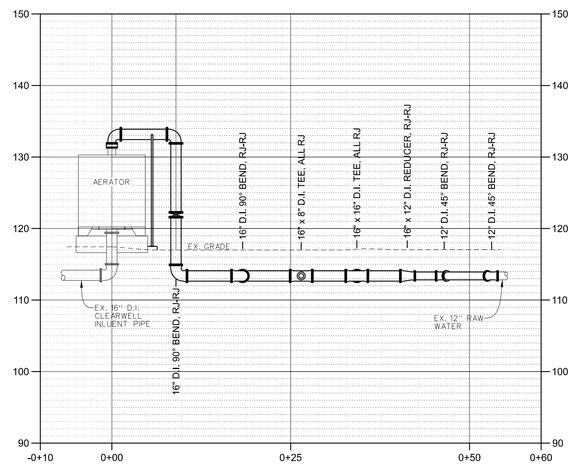
Issue Date: DEC., 2023
Sequence: 6 of 37
Sheet No.: C3-01



G1 | FINISHED WATER LINE PROFILE 1" = 10'



A1 | CLEARWELL INFLUENT LINE PROFILE 1" = 10'



A10 | RAW WATER LINE PROFILE 1" = 10'

KREBS ENGINEERING

ALABAMA LICENSED PROFESSIONAL ENGINEER — No. 34[illegible] — 12/8/23

BID SET

CITY OF FAIRHOPE

WTP No. 1 IMPROVEMENTS
PHASE 1

FAIRHOPE, ALABAMA

CITY OF FAIRHOPE ALABAMA

Designed	Project No.
ADM	23040.3
Drawn: CLM	
Checked: CLL	

Revisions

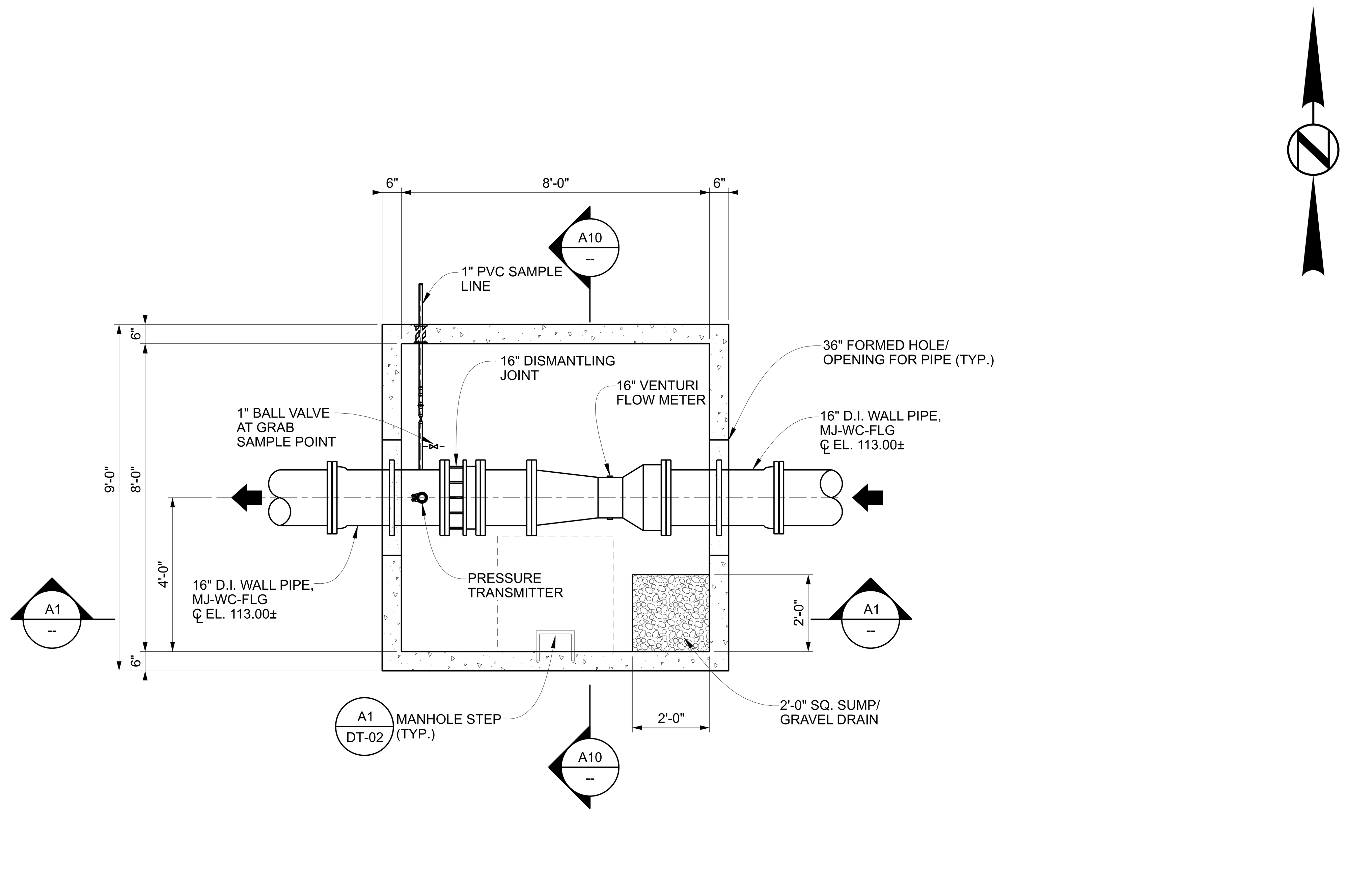
No.	Date	Description

Sheet Title

YARD PIPING PROFILES

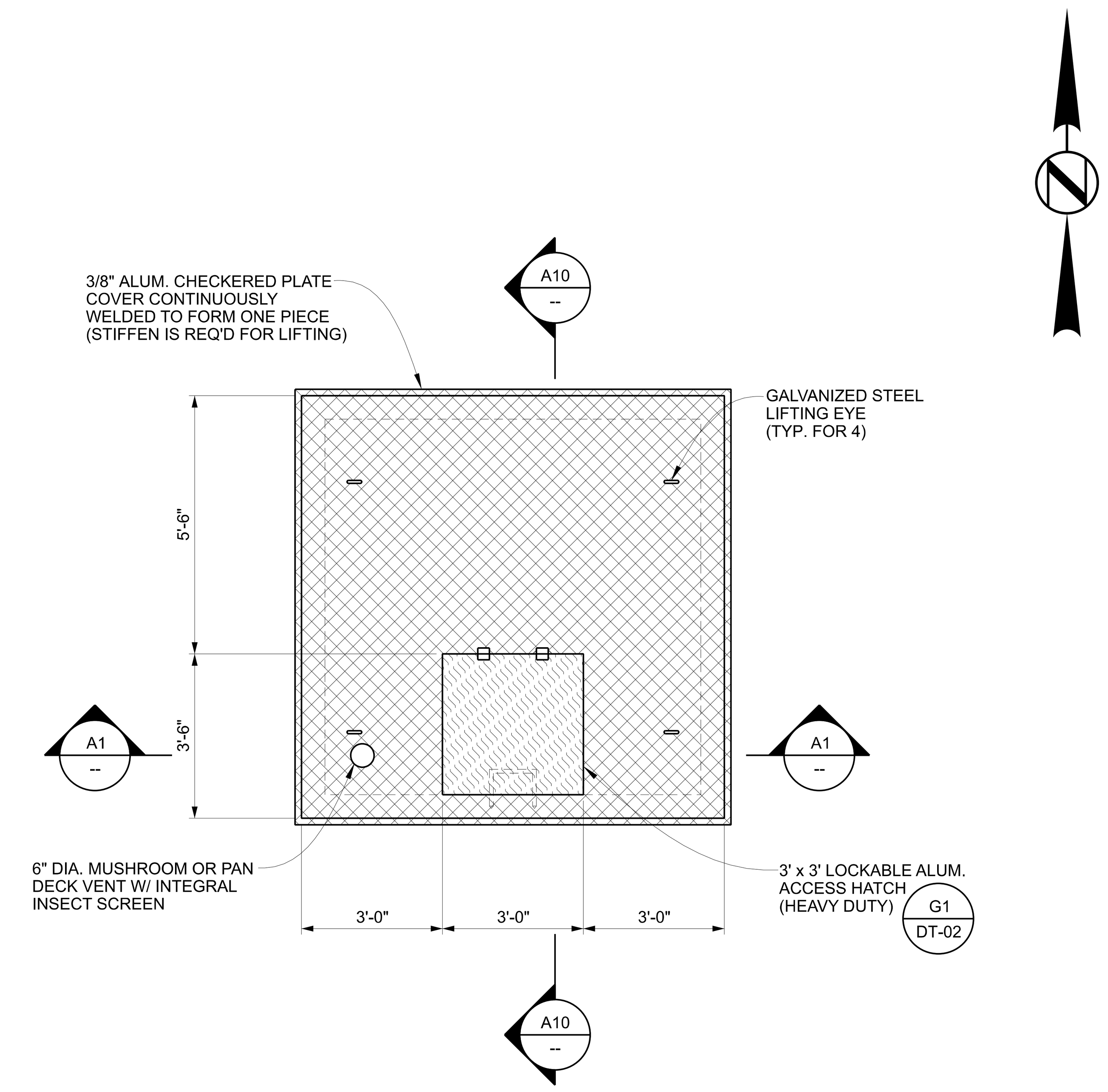
Issue Date	Sheet No.
DEC., 2023	C3-02
Sequence 7 of 37	

BHM-ENGL-06
12/8/2023
4:29:03 PM
P:\Projects\Fairhope\23040_WaterSystemExpansion\WTP No. 1 Expansion\Drawings\23040C3-02.dgn

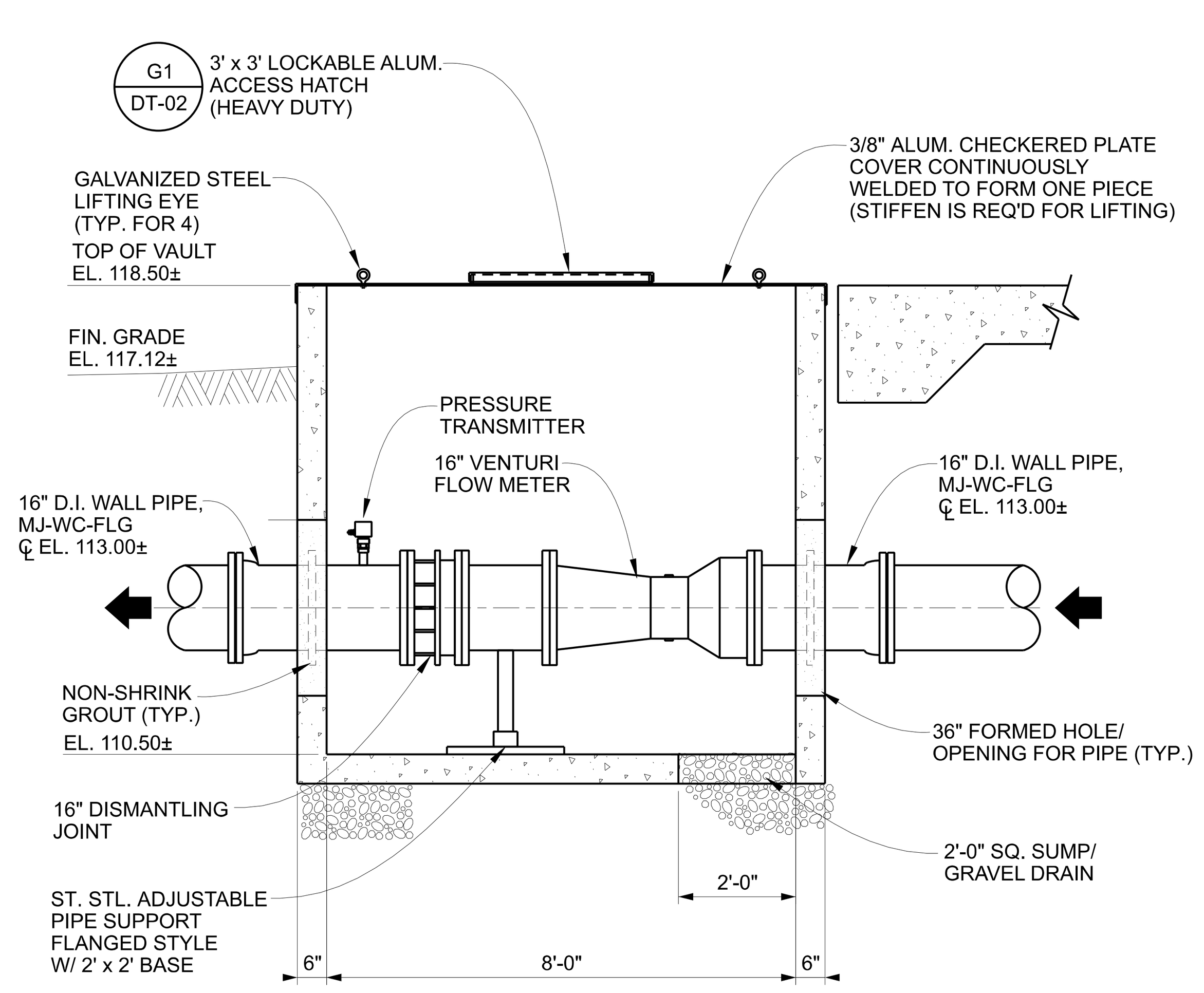


NOTES: CONNECTIONS TO VENTURI FLOW METER PRESSURE PORTS SHALL BE MADE WITH DIELECTRIC COUPLINGS. PROVIDE VALVES AND MEANS FOR BLEEDING AIR AT DP TRANSMITTER. CONTRACTOR CAN FORM WALL PIPES IN PLACE IF DESIRED.

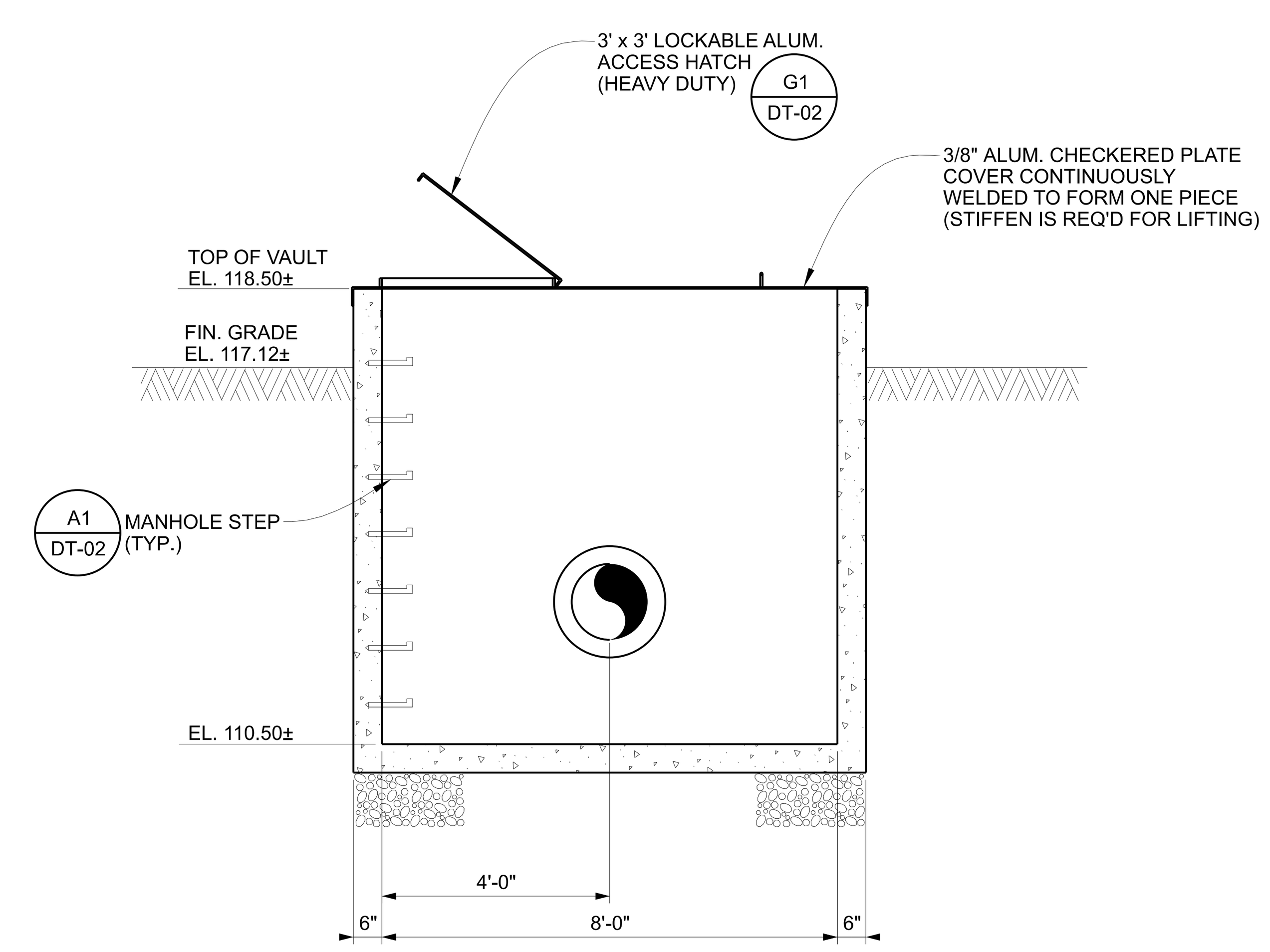
G1 SECTIONAL PLAN 3/8" =1'-0"



G10 TOP PLAN 3/8" =1'-0"



A1 SECTION 3/8" =1'-0"



A10 SECTION 3/8" =1'-0"

KREBS ENGINEERING

BID SET

CITY OF FAIRHOPE
WTP No. 1 IMPROVEMENTS
PHASE 1
FAIRHOPE, ALABAMA

Designed	ADM	Project No.
Drawn	CLM	23040.3
Checked	CLL	

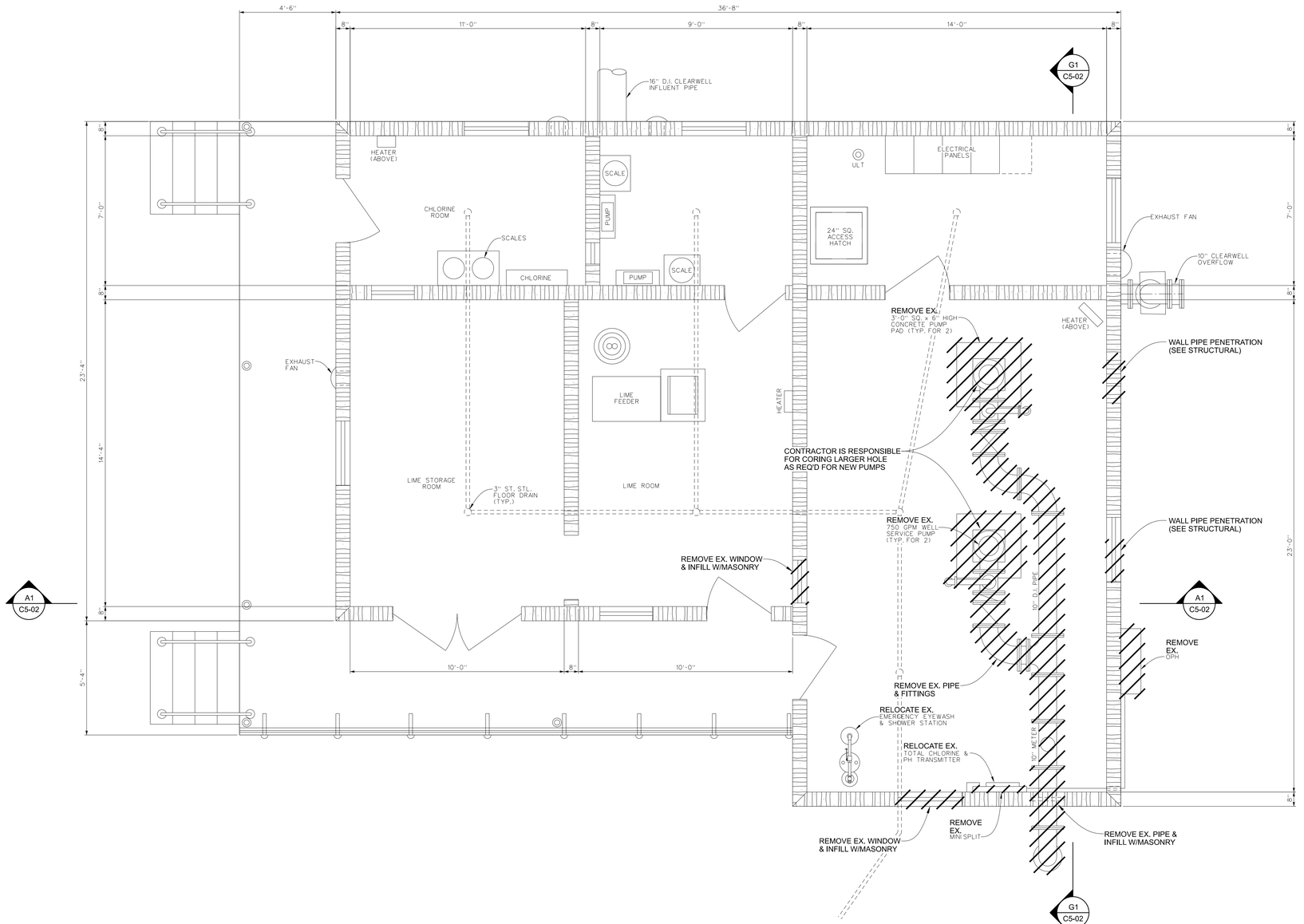
Revisions

No.	Date	Description

Sheet Title
FINISHED WATER FLOW METER VAULT PLANS & SECTIONS

Issue Date DEC., 2023
Sequence 8 of 37
Sheet No. C3-03

BHM-ENGL-26 12/8/2023 4:30:03 PM P:\BHAM\Fairhope\23040_WaterSystemExpansion\WTP No. 1 Expansion\Drawings\23040C3-03.dgn



GENERAL NOTES:

1. THE LOCATION OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE MANNER ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. THE CONTRACTOR AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VISITING THE SITE, BECOMING FAMILIAR WITH THE EXISTING PROPERTY CONDITIONS AND ADJACENT SITE CONDITIONS AND SATISFYING HIMSELF/HERSELF AS TO THE NATURE AND LOCATION OF ALL ASPECTS OF THE WORK PRIOR TO BIDDING.
3. DEMOLITION WORK SHALL BE DONE IN ACCORDANCE WITH ALL CODES AND ORDINANCES SET FORTH BY ALL GOVERNING AGENCIES.
4. UTILITIES THAT ARE INDICATED TO BE DEMOLISHED OR SERVE DEMOLISHED STRUCTURES ARE TO BE REMOVED, CAPPED, OR PLUGGED AT PROPERTY LINE IN ACCORDANCE WITH UTILITY OWNER INSTRUCTIONS.
5. THE CONTRACTOR SHALL DEMOLISH AND REMOVE THE EXISTING BUILDINGS, FOUNDATIONS, FOOTINGS, EQUIPMENT AND APPURTENANCES AS NOTED IN THE DRAWINGS AND AS REQUIRED FOR CONSTRUCTION OF THE IMPROVEMENTS.
6. THE CONTRACTOR SHALL TRANSFER/ESTABLISH BENCHMARKS OUTSIDE OF THE CONSTRUCTION LIMITS FOR CONSTRUCTION LAYOUT AND ENGINEERING.
7. THE CONTRACTOR SHALL OBTAIN ALL REQUIRED PERMITS PRIOR TO COMMENCING WORK.
8. ALL EQUIPMENT, CONTROLS, PIPING, HARDWARE, APPURTENANCES, AND MISCELLANEOUS ITEMS REMOVED UNDER THIS CONTRACT SHALL BE MADE AVAILABLE TO OWNER IN GOOD CONDITION. ALL MECHANICAL, CONTROL, AND ELECTRICAL EQUIPMENT ASSOCIATED WITH AN ITEM OR EQUIPMENT SHALL BE KEPT WITH EQUIPMENT ITEM AS A COMPLETE UNIT. SHOULD THE OWNER ELECT NOT TO RETAIN THE DEMOLISHED ITEMS, THE CONTRACTOR SHALL LEGALLY DISPOSE OF THEM OFF-SITE AT NO ADDITIONAL COST TO THE OWNER.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR SEQUENCING DEMOLITION CONSTRUCTION TO MINIMIZE DISRUPTIONS TO WATER TREATMENT PLANT OPERATIONS. EXISTING PUMPS SHALL REMIAN IN SERVICE AS LONG AS POSSIBLE TO REDUCE WTP SHUTDOWN TIME.
10. CONTRACTOR SHALL FURNISH AND INSTALL ALL TEMPORARY FACILITIES AS NEEDED TO COMPLETE THE WORK.
11. DEMOLITION PLANS ARE INTENDED TO SHOW ONLY MAJOR DEMOLITION ITEMS. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DEMOLITION AND/OR RE-ROUTING OF FACILITIES REQUIRED TO COMPLETE THE WORK.
12. SEE INDIVIDUAL STRUCTURE SHEETS FOR ADDITIONAL DETAILS.

A1 PLAN 3/8" = 1'-0"

KREBS ENGINEERING

ALABAMA LICENSED PROFESSIONAL ENGINEER No. 19800 12/8/23 REGISTERED MARYLAND

BID SET

CITY OF FAIRHOPE
WTP No. 1 IMPROVEMENTS
PHASE 1
FAIRHOPE, ALABAMA

CITY OF FAIRHOPE ALABAMA

Designed	Project No.
ADM	23040.3
Drawn: CLM	
Checked: CLL	

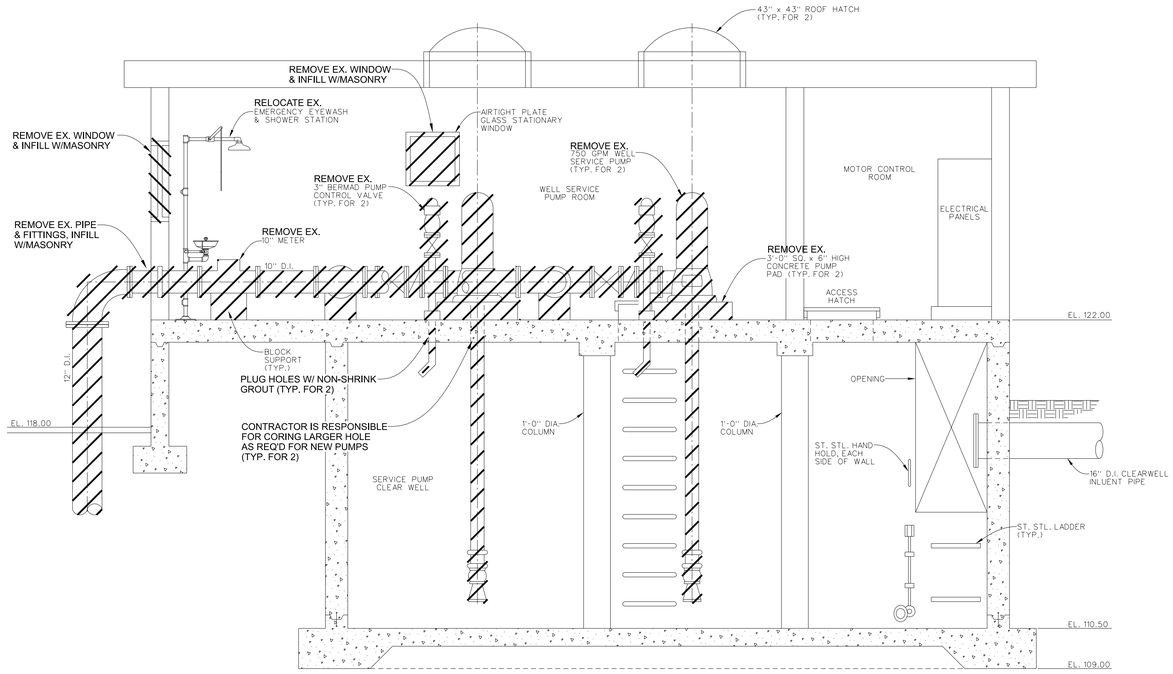
Revisions

No.	Date	Description

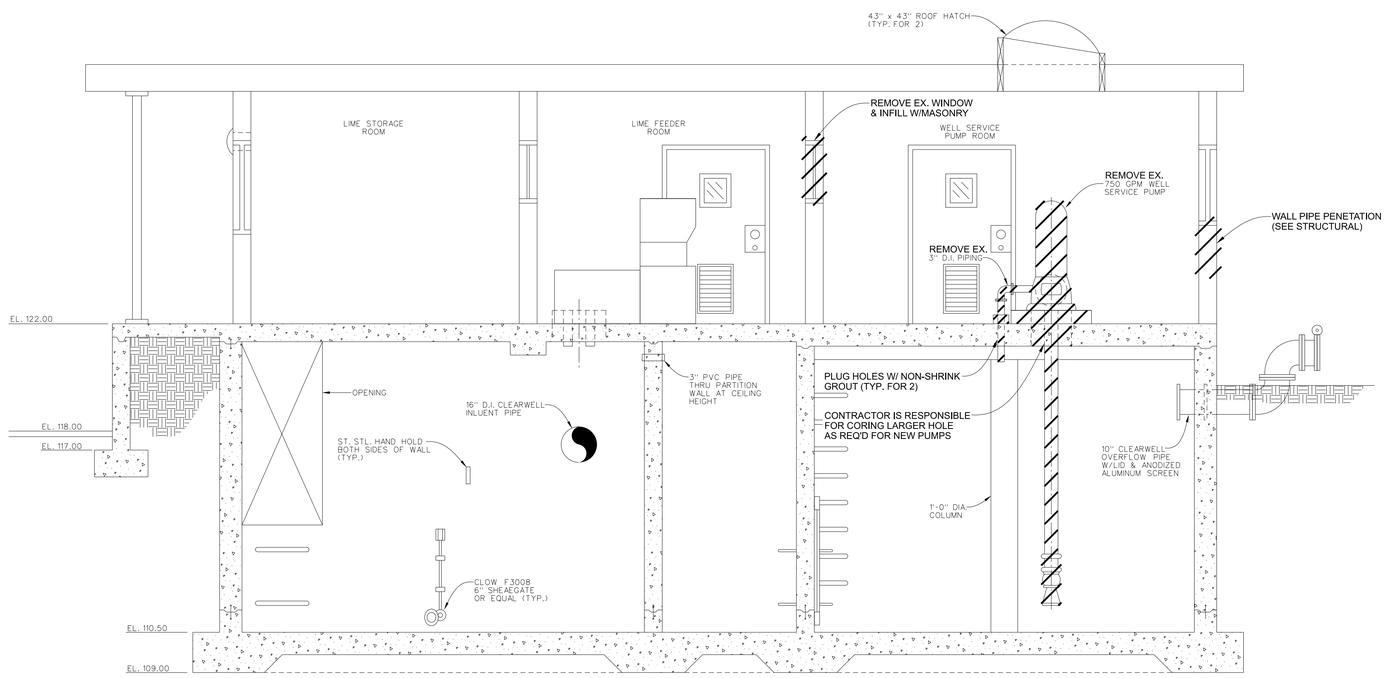
Sheet Title: EX. TREATMENT BUILDING DEMOLITION PLAN

Issue Date: DEC., 2023
Sequence: 9 of 37
Sheet No.: C5-01

BHM-MNGL-26
12/8/2023
4:36:05 PM
H:\Civil\MWF.fairhope\23040_WaterSystemExpansion\WTP No. 1 Expansion\Drawings\23040C5-01.dgn



G1 SECTION 3/8" = 1'-0"



A1 SECTION 3/8" = 1'-0"

GENERAL NOTES:

1. THE LOCATION OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE MANNER ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. THE CONTRACTOR AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VISITING THE SITE, BECOMING FAMILIAR WITH THE EXISTING PROPERTY CONDITIONS AND ADJACENT SITE CONDITIONS AND SATISFYING HIMSELF/HERSELF AS TO THE NATURE AND LOCATION OF ALL ASPECTS OF THE WORK PRIOR TO BIDDING.
3. DEMOLITION WORK SHALL BE DONE IN ACCORDANCE WITH ALL CODES AND ORDINANCES SET FORTH BY ALL GOVERNING AGENCIES.
4. UTILITIES THAT ARE INDICATED TO BE DEMOLISHED OR SERVE DEMOLISHED STRUCTURES ARE TO BE REMOVED, CAPPED, OR PLUGGED AT PROPERTY LINE IN ACCORDANCE WITH UTILITY OWNER INSTRUCTIONS.
5. THE CONTRACTOR SHALL DEMOLISH AND REMOVE THE EXISTING BUILDINGS, FOUNDATIONS, FOOTINGS, EQUIPMENT AND APPURTENANCES AS NOTED IN THE DRAWINGS AND AS REQUIRED FOR CONSTRUCTION OF THE IMPROVEMENTS.
6. THE CONTRACTOR SHALL TRANSFER/ESTABLISH BENCHMARKS OUTSIDE OF THE CONSTRUCTION LIMITS FOR CONSTRUCTION LAYOUT AND ENGINEERING.
7. THE CONTRACTOR SHALL OBTAIN ALL REQUIRED PERMITS PRIOR TO COMMENCING WORK.
8. ALL EQUIPMENT, CONTROLS, PIPING, HARDWARE, APPURTENANCES, AND MISCELLANEOUS ITEMS REMOVED UNDER THIS CONTRACT SHALL BE MADE AVAILABLE TO OWNER IN GOOD CONDITION. ALL MECHANICAL, CONTROL, AND ELECTRICAL EQUIPMENT ASSOCIATED WITH AN ITEM OR EQUIPMENT SHALL BE KEPT WITH EQUIPMENT ITEM AS A COMPLETE UNIT. SHOULD THE OWNER ELECT NOT TO RETAIN THE DEMOLISHED ITEMS, THE CONTRACTOR SHALL LEGALLY DISPOSE OF THEM OFF-SITE AT NO ADDITIONAL COST TO THE OWNER.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR SEQUENCING DEMOLITION CONSTRUCTION TO MINIMIZE DISRUPTIONS TO WATER TREATMENT PLANT OPERATIONS. EXISTING PUMPS SHALL REMIAN IN SERVICE AS LONG AS POSSIBLE TO REDUCE WTP SHUTDOWN TIME.
10. CONTRACTOR SHALL FURNISH AND INSTALL ALL TEMPORARY FACILITIES AS NEEDED TO COMPLETE THE WORK.
11. DEMOLITION PLANS ARE INTENDED TO SHOW ONLY MAJOR DEMOLITION ITEMS. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DEMOLITION AND/OR RE-ROUTING OF FACILITIES REQUIRED TO COMPLETE THE WORK.
12. SEE INDIVIDUAL STRUCTURE SHEETS FOR ADDITIONAL DETAILS.

KREBS ENGINEERING

ALABAMA LICENSED PROFESSIONAL ENGINEER No. 34800 12/8/23 REGISTERED

BID SET

CITY OF FAIRHOPE

WTP No. 1 IMPROVEMENTS PHASE 1

FAIRHOPE, ALABAMA

CITY OF FAIRHOPE ALABAMA

Designed ADM	Project No. 23040.3
Drawn CLM	
Checked CLL	

Revisions

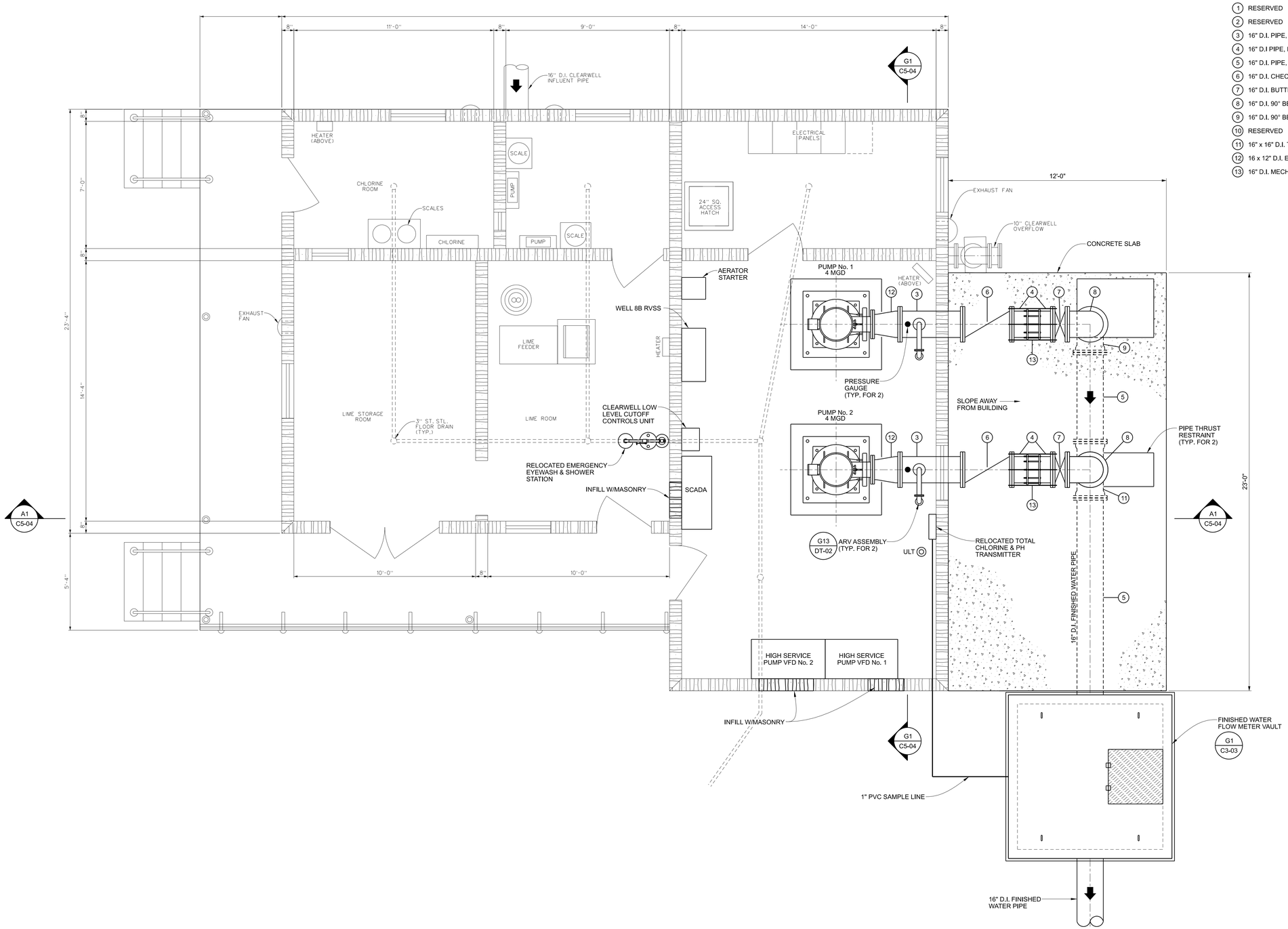
No.	Date	Description

Sheet Title

EX. TREATMENT BUILDING DEMOLITION SECTIONS

Issue Date	Sheet No.
DEC., 2023	C5-02
Sequence 10 of 37	

BHM-ENGL-26
12/8/2023
4:29:06 PM
P:\Projects\Fairhope\23040_WaterSystemExpansion\WTP No. 1 Expansion\Drawings\23040C5-02.dgn



FITTINGS LIST

1. RESERVED
2. RESERVED
3. 16" D.I. PIPE, FLG-FLG W/3" WELDED BOSS
4. 16" D.I PIPE, FLG-PE
5. 16" D.I. PIPE, PE-PE
6. 16" D.I. CHECK VALVE, FLG-FLG
7. 16" D.I. BUTTERFLY VALVE, FLG-FLG
8. 16" D.I. 90° BEND, FLG-FLG
9. 16" D.I. 90° BEND, RJ-RJ
10. RESERVED
11. 16" x 16" D.I. TEE, ALL RJ
12. 16 x 12" D.I. ECCENTRIC REDUCER, FLG-FLG
13. 16" D.I. MECHANICAL COUPLING

KREBS ENGINEERING

STATE OF ALABAMA LICENSED PROFESSIONAL ENGINEER No. 34804 12/8/23 REGISTERED MARYLAND

BID SET

CITY OF FAIRHOPE

WTP No. 1 IMPROVEMENTS
PHASE 1

FAIRHOPE, ALABAMA

CITY OF FAIRHOPE ALABAMA

Designed	Project No.
ADM	23040.3
Drawn: CLM	
Checked: CLL	

Revisions

No.	Date	Description

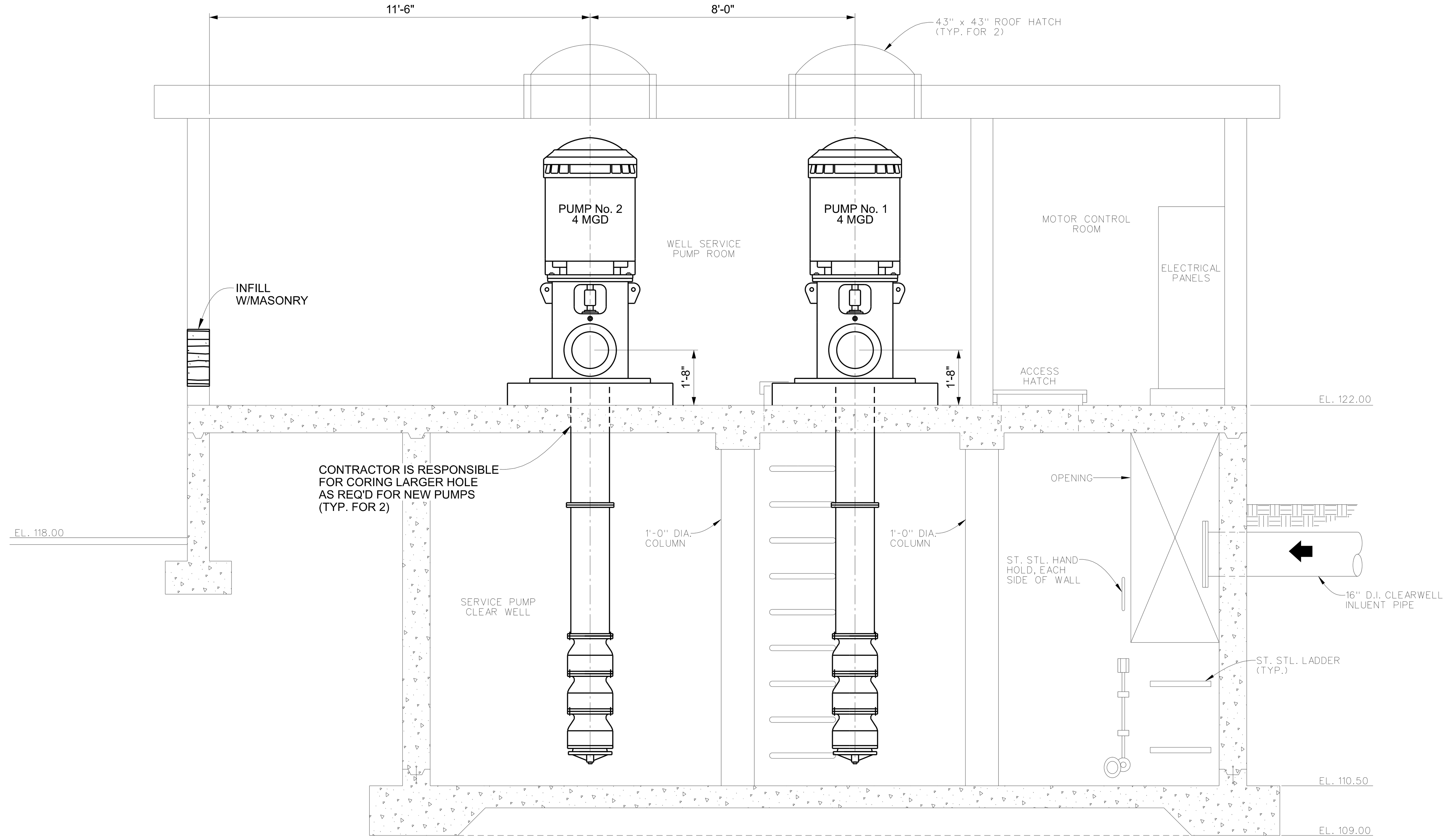
Sheet Title

EX. TREATMENT BUILDING MODIFICATIONS PLAN

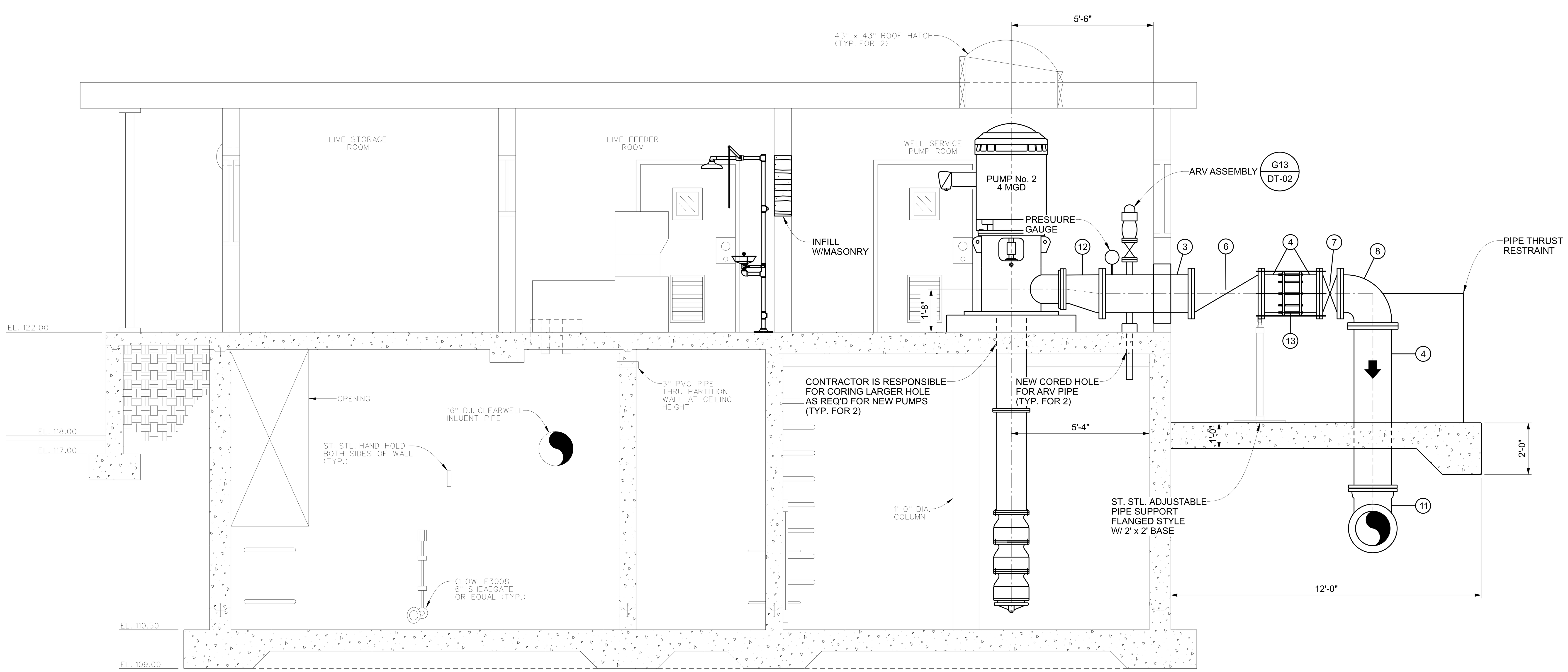
Issue Date	Sheet No.
DEC., 2023	C5-03
Sequence: 11 of 37	

A1 PLAN 3/8" = 1'-0"

BIMA-ENGL-26
12/8/2023
4:51:26 PM
H:\2019\MM\Fairhope\23040_WaterSystemExpansion\WTP No. 1 Expansion\Drawings\23040C5-03.dgn



G1 SECTION 3/8" = 1'-0"



A1 SECTION 3/8" = 1'-0"

FITTINGS LIST

1. RESERVED
2. RESERVED
3. 16" D.I. PIPE, FLG-FLG W/3" WELDED BOSS
4. 16" D.I PIPE, FLG-PE
5. 16" D.I. PIPE, PE-PE
6. 16" D.I. CHECK VALVE, FLG-FLG
7. 16" D.I. BUTTERFLY VALVE, FLG-FLG
8. 16" D.I. 90° BEND, FLG-FLG
9. 16" D.I. 90° BEND, RJ-RJ
10. RESERVED
11. 16" x 16" D.I. TEE, ALL RJ
12. 16 x 12" D.I. ECCENTRIC REDUCER, FLG-FLG
13. 16" D.I. MECHANICAL COUPLING

KREBS ENGINEERING

BID SET

CITY OF FAIRHOPE

WTP No. 1 IMPROVEMENTS
PHASE 1

FAIRHOPE, ALABAMA

Designed: ADM Drawn: CLM Checked: CLL	Project No.: 23040.3

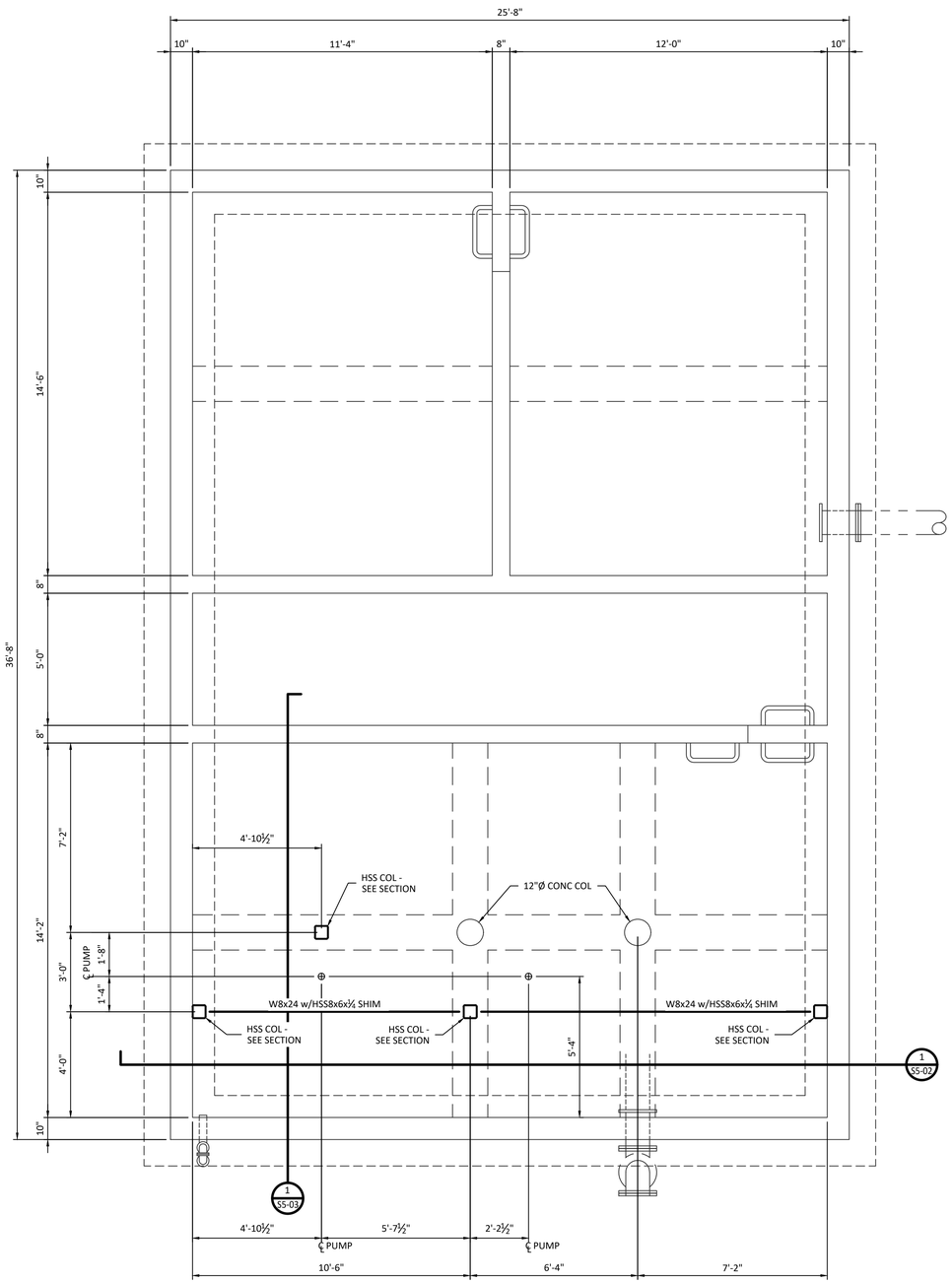
Revisions

No.	Date	Description

Sheet Title: EX. TREATMENT BUILDING MODIFICATIONS SECTIONS

Issue Date: DEC., 2023
Sequence: 12 of 37
Sheet No.: C5-04

BHM-ENGL-26
12/8/2023
4:38:18 PM
P:\BHAM\Fairhope\23040_WaterSystemExpansion\WTP No. 1 Expansion\Drawings\23040C5-04.dgn



EX. TREATMENT BUILDING LOWER STRUCTURAL PLAN

3/8" = 1'-0"

NOTES:

1. FOR LOCATION AND ORIENTATION OF PLAN SEE CIVIL DWGS.
2. CONTRACTOR SHALL FIELD VERIFY EXISTING DIMENSIONS, ELEVATIONS, AND FRAMING CONDITIONS PRIOR TO FABRICATION AND CONSTRUCTION. NOTIFY THE ENGINEER IF ANY DISCREPANCIES ARE NOTED.

KREBS ENGINEERING

ALABAMA LICENSED PROFESSIONAL ENGINEER SCOTT J. DOLLAR No. 27512
12/08/23

MK STRUCTURAL ENGINEERING
1490 NORTHBANK PARKWAY - SUITE 272 - TUSCALOOSA - AL - 35406
WWW.MAKEGR.COM - (205) 469-7912
MAK Project - 23.024

CITY OF FAIRHOPE
WTP No. 1 IMPROVEMENTS
PHASE 1
FAIRHOPE, ALABAMA

CITY OF FAIRHOPE ALABAMA

Designed SJD	Project No. 23040.3
Drawn MAK	
Checked SJD	

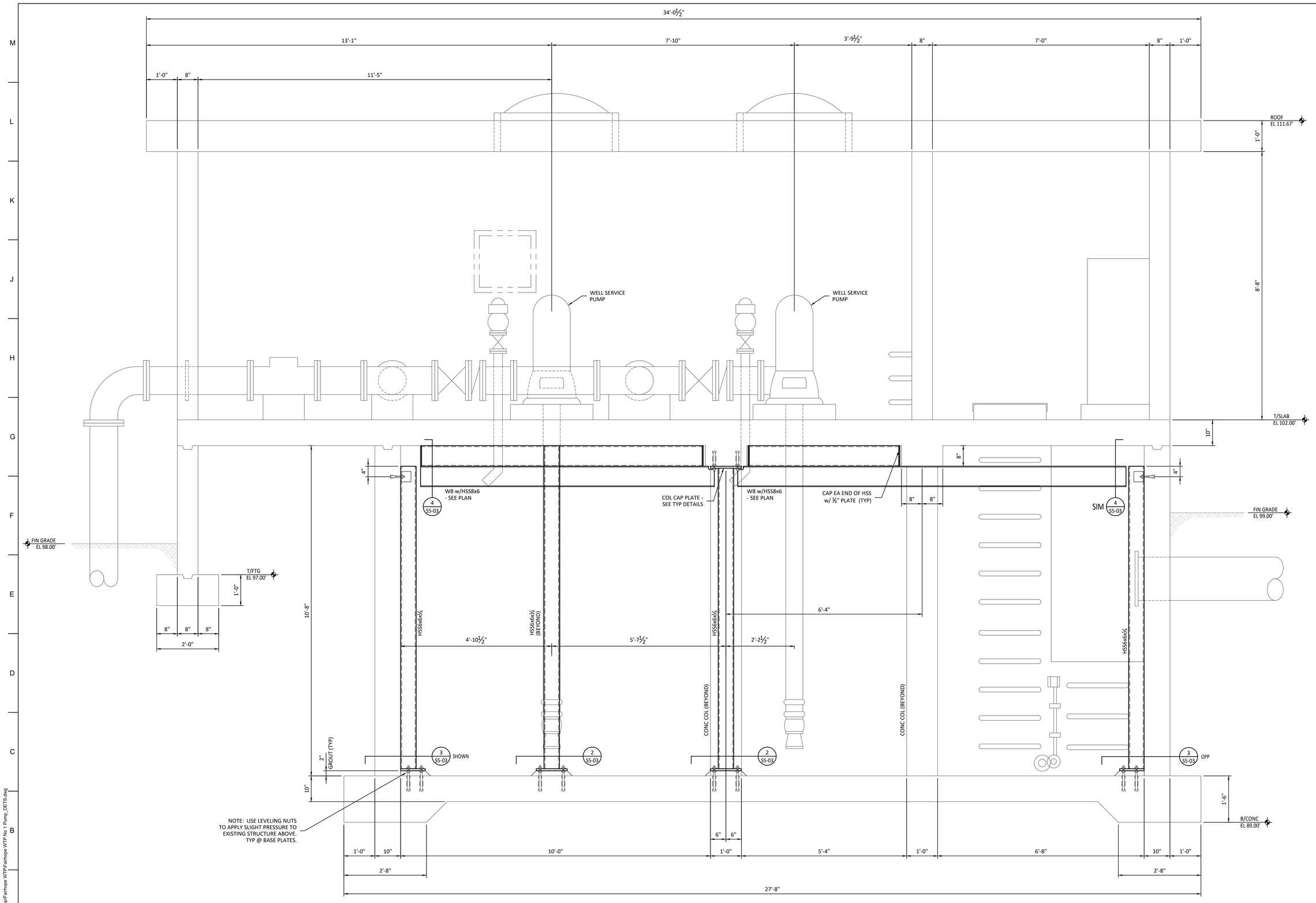
Revisions

No.	Date	Description

Sheet Title: EX. TREATMENT BUILDING LOWER STRUCTURAL PLAN

Issue Date	Sheet No.
DEC., 2023	S5-01
Sequence 13 of 37	

12/7/2023
4:39:23 PM
C:\Users\Intern\Desktop\Fairhope WTP\Fairhope WTP No 1 Pump_PLANS.dwg



1 SECTION
S5-02 3/4"=1'-0"

KREBS ENGINEERING

ALABAMA LICENSED PROFESSIONAL ENGINEER
No. 27512
SCOTT J. DOLLAR
12/08/23

MK STRUCTURAL ENGINEERING
1490 NORTHBANK PARKWAY - SUITE 272 - TUSCALOOSA - AL - 35406
WWW.MAKEGR.COM - (205) 469-7912
MAK Project - 23.024

CITY OF FAIRHOPE
WTP No. 1 IMPROVEMENTS
PHASE 1
FAIRHOPE, ALABAMA

CITY OF FAIRHOPE ALABAMA

Designed: SJD	Project No.: 23040.3
Drawn: MAK	
Checked: SJD	

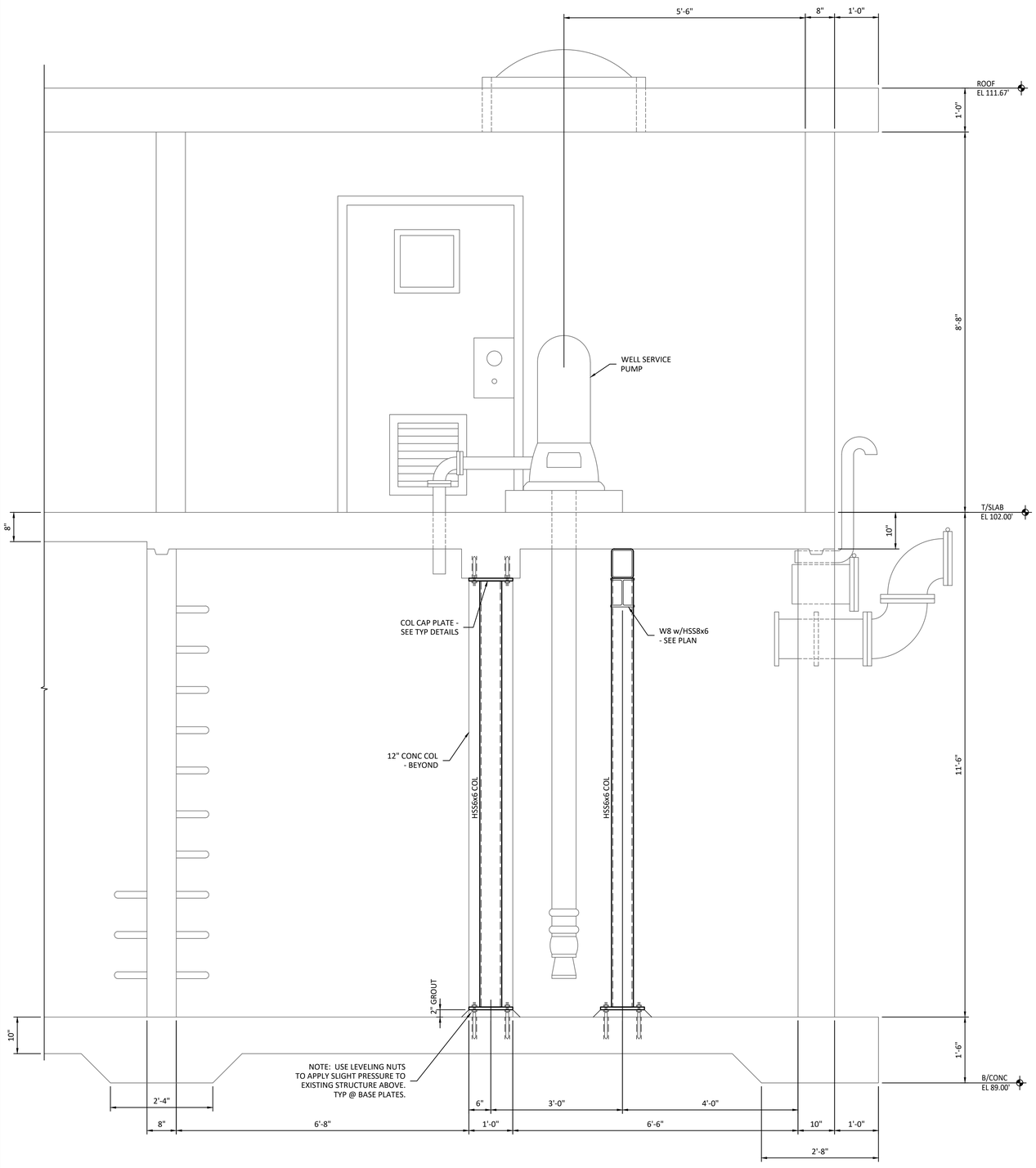
Revisions

No.	Date	Description

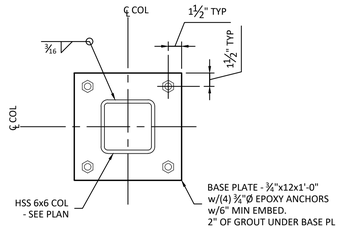
Sheet Title
EX. TREATMENT BUILDING STRUCTURAL SECTIONS

Issue Date: DEC., 2023
Sheet No.: S5-02
Sequence: 14 of 37

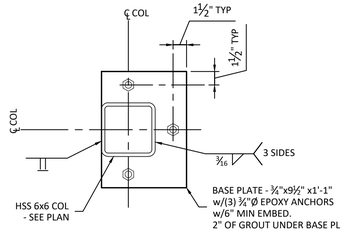
12/7/2023
4:37:15 PM
C:\Users\ilmen\Desktop\Fairhope WTP\Fairhope WTP No 1 Pump_DETS.dwg



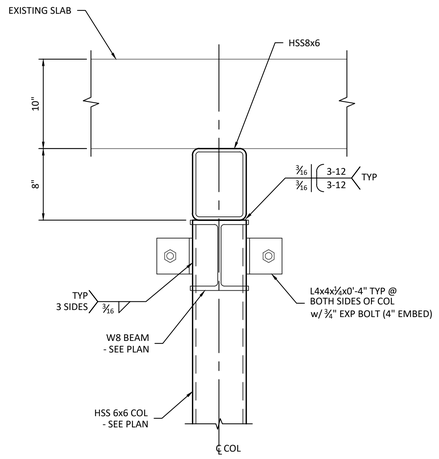
1 SECTION
S5-03 3/4"=1'-0"



2 SECTION
S5-03 1 1/2"=1'-0"



3 SECTION
S5-03 1 1/2"=1'-0"



4 SECTION
S5-03 1 1/2"=1'-0"

KREBS ENGINEERING

ALABAMA LICENSED No. 27512 PROFESSIONAL ENGINEER SCOTT J. DOLLAR
12/08/23

MK STRUCTURAL ENGINEERING
1490 NORTHBANK PARKWAY - SUITE 272 - TUSCALOOSA - AL - 35406
WWW.MAKEGR.COM - (205) 469-7912
MAK Project - 23.024

CITY OF FAIRHOPE

WTP No. 1 IMPROVEMENTS
PHASE 1

FAIRHOPE, ALABAMA

CITY OF FAIRHOPE ALABAMA

Designed	Project No.
SJD	23040.3
Drawn: MAK	
Checked: SJD	

Revisions

No.	Date	Description

Sheet Title

EX. TREATMENT BUILDING STRUCTURAL SECTIONS

Issue Date	Sheet No.
DEC., 2023	S5-03
Sequence 15 of 37	

12/7/2023
4:37:37 PM
C:\Users\Intern\Desktop\Fairhope WTP\Fairhope WTP No 1 Pump_DETS.dwg

DUCTLESS INDOOR UNIT SCHEDULE

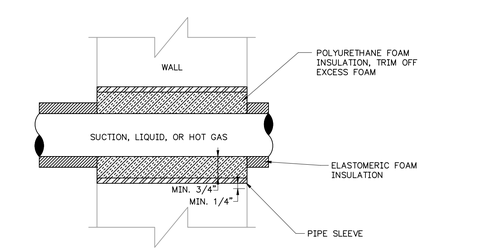
EQUIPMENT NO.	MANUFACTURER/ MODEL NO.	SERVICE	CFM	OA CFM	COOLING CAPACITY (MBH)	HEATING CAPACITY AT 47°F (MBH)	MOUNTING	ELECTRICAL					WEIGHT (LBS)	REMARKS
								DISCONNECT	MOTOR STARTER	MCA	MOCP	VOLTS/PH./HZ.		
IHP-1	TRANE TPKA0A0361KA70A	PUMP ROOM	920	--	36	38	WALL	BY DIV. 26	INTEGRAL	1	--	208/1/60	50	1), 2), 3)
IHP-2	TRANE TPKA0A0361KA70A	PUMP ROOM	920	--	36	38	WALL	BY DIV. 26	INTEGRAL	1	--	208/1/60	50	1), 2), 3)

REMARKS:
1) POWER FOR THIS UNIT IS PROVIDED FROM OUTDOOR UNIT
2) PROVIDE WITH WIRED THERMOSTAT
3) PROVDIE WITH INTEGRAL CONDENSATE PUMP

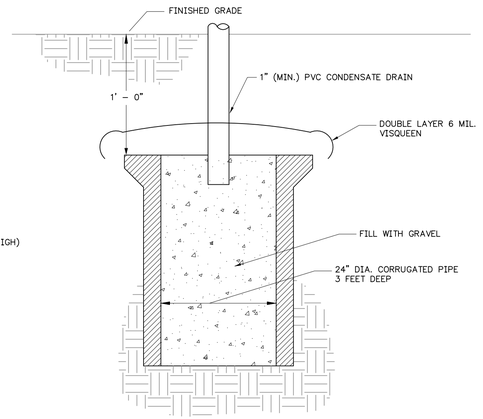
DUCTLESS OUTDOOR UNIT SCHEDULE

EQUIPMENT NO.	MANUFACTURER/ MODEL NO.	SERVICE	NOMINAL COOLING CAPACITY (TONS)	NOMINAL HEATING CAPACITY (BTUH)	ELECTRICAL				VIBRATION ISOLATION			SEER	HSPF	WEIGHT (LBS)	REMARKS
					DISCONNECT	MCA	MOCP	VOLTS/PH./HZ.	TYPE	DEFL. (IN.)	BASE				
OHP-1	TRANE TRUZA0361KA70	IHP-1	3	38	BY DIV. 26	25	31	208/1/60	--	--	--	19.4	8.4	215	1), 2), 3), 4)
OHP-2	TRANE TRUZA0361KA70	IHP-2	3	38	BY DIV. 26	25	31	208/1/60	--	--	--	19.4	8.4	215	1), 2), 3), 4)

REMARKS:
1) POWER FOR INDOOR UNIT IS PROVIDED FROM THIS UNIT
2) COORDINATE EXACT LOCATION WITH ALL OTHER TRADES
3) PROVIDE WIND BAFFLES FOR LOW AMBIENT OPERATION
4) PROVIDE WITH WALL MOUNTING BRACKET

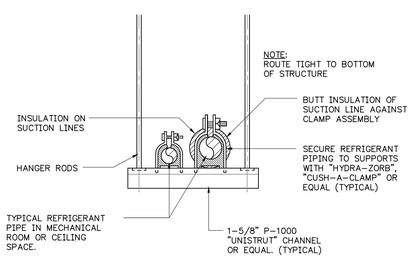


1 M101 EQUIPMENT NAMEPLATE DETAIL
NO SCALE

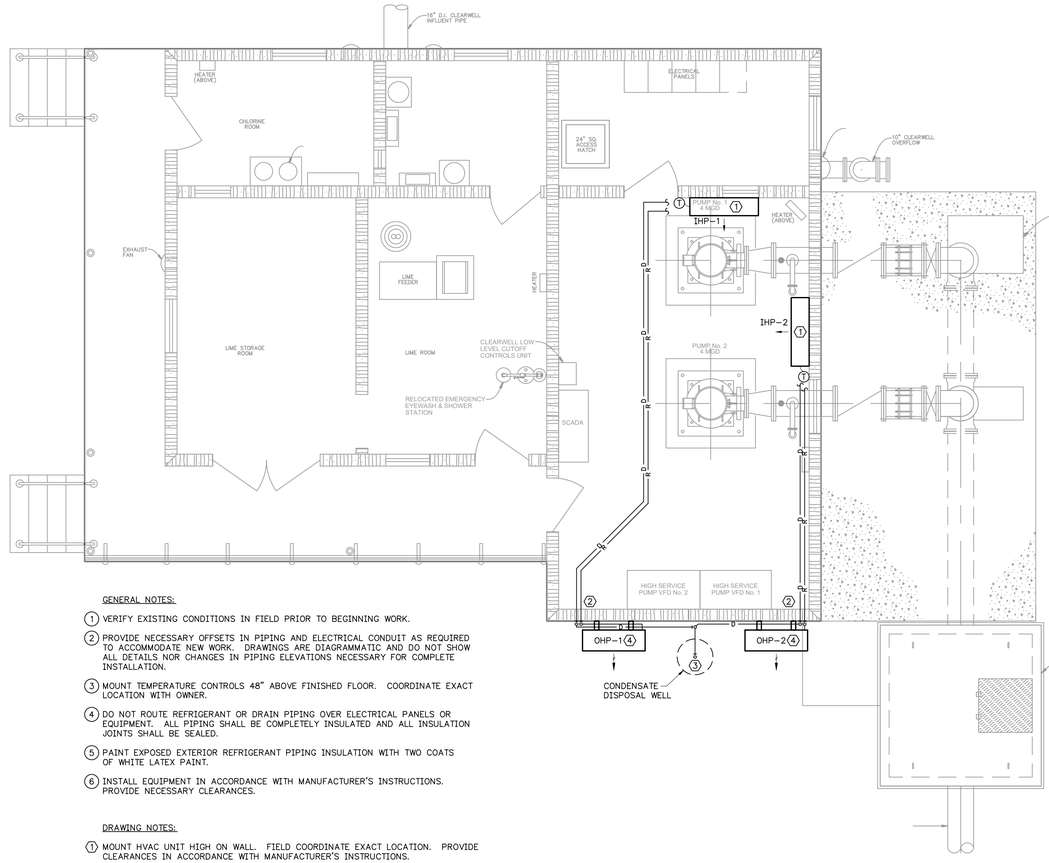


2 M101 CONDENSATE DISPOSAL WELL DETAIL
NO SCALE

3 M101 WALL PENETRATION DETAIL
NO SCALE



4 M101 REFRIGERANT PIPING SUPPORT DETAIL
NO SCALE



GENERAL NOTES:

1. VERIFY EXISTING CONDITIONS IN FIELD PRIOR TO BEGINNING WORK.
2. PROVIDE NECESSARY OFFSETS IN PIPING AND ELECTRICAL CONDUIT AS REQUIRED TO ACCOMMODATE NEW WORK. DRAWINGS ARE DIAGRAMMATIC AND DO NOT SHOW ALL DETAILS NOR CHANGES IN PIPING ELEVATIONS NECESSARY FOR COMPLETE INSTALLATION.
3. MOUNT TEMPERATURE CONTROLS 48" ABOVE FINISHED FLOOR. COORDINATE EXACT LOCATION WITH OWNER.
4. DO NOT ROUTE REFRIGERANT OR DRAIN PIPING OVER ELECTRICAL PANELS OR EQUIPMENT. ALL PIPING SHALL BE COMPLETELY INSULATED AND ALL INSULATION JOINTS SHALL BE SEALED.
5. PAINT EXPOSED EXTERIOR REFRIGERANT PIPING INSULATION WITH TWO COATS OF WHITE LATEX PAINT.
6. INSTALL EQUIPMENT IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. PROVIDE NECESSARY CLEARANCES.

DRAWING NOTES:

1. MOUNT HVAC UNIT HIGH ON WALL. FIELD COORDINATE EXACT LOCATION. PROVIDE CLEARANCES IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
2. ROUTE CONDENSATE AND REFRIGERANT PIPING THROUGH EXTERIOR WALL. TERMINATE REFRIGERANT PIPING TO OUTDOOR UNITS. SEAL PIPING PENETRATIONS THROUGH WALL WEATHERTIGHT.
3. TERMINATE CONDENSATE DRAIN PIPING TO DISPOSAL WELL. REFER TO DETAIL.
4. MOUNT OUTDOOR UNIT ON WALL USING MANUFACTURER'S SUPPORT BRACKET. INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

A8 MECHANICAL PLAN 1/4" = 1'-0"

KREBS ENGINEERING

ALABAMA REGISTERED PROFESSIONAL ENGINEER No. 24075 JAMES M. HOGLAND
12/8/23

Pinnacle ENGINEERING, INC
Engineering & Design Consultants
2111 Parkway Office Circle, Suite 125
Birmingham, AL 35244
(205) 733-6912 FAX: (205) 733-6913
Job No.: 23289 File: 23289M01

CITY OF FAIRHOPE
WTP No. 1 IMPROVEMENTS
PHASE 1
FAIRHOPE, ALABAMA

CITY OF FAIRHOPE ALABAMA

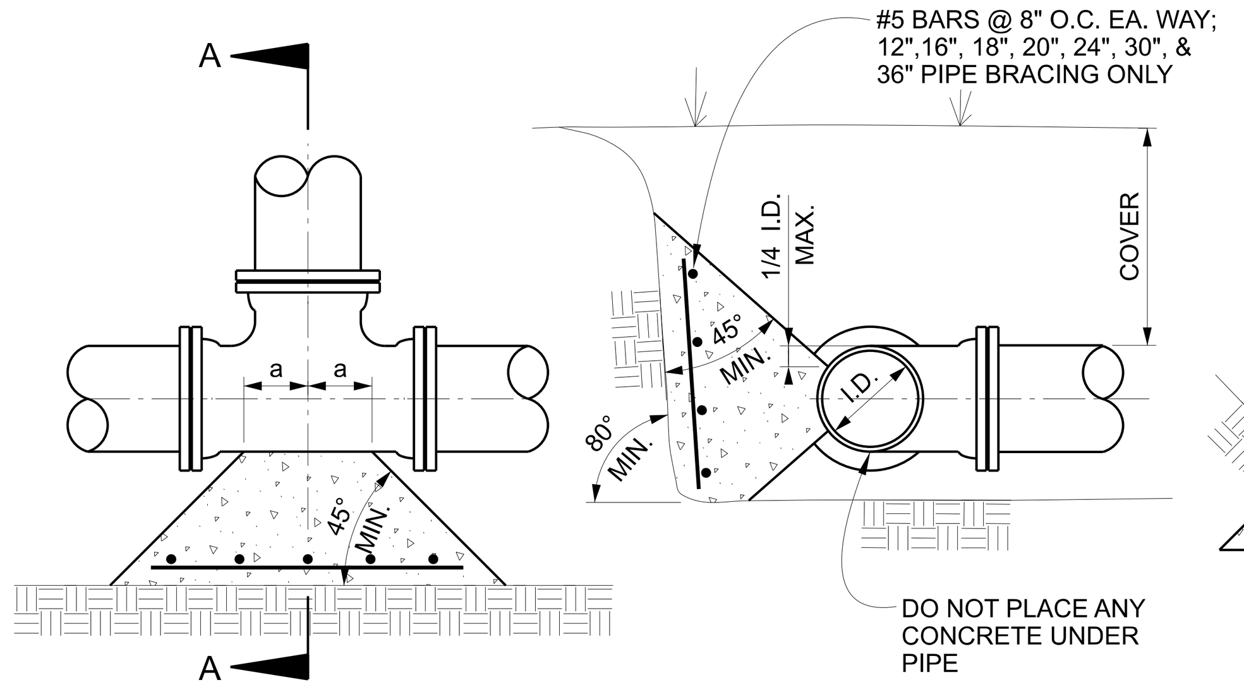
Designed	Project No.
JMH	23040.3
Drawn: JMH	
Checked: JMH	

Revisions

No.	Date	Description

Sheet Title: EX. TREATMENT BUILDING MECHANICAL PLAN

Issue Date	Sheet No.
DEC., 2023	M5-01
Sequence 16 of 37	



PLAN

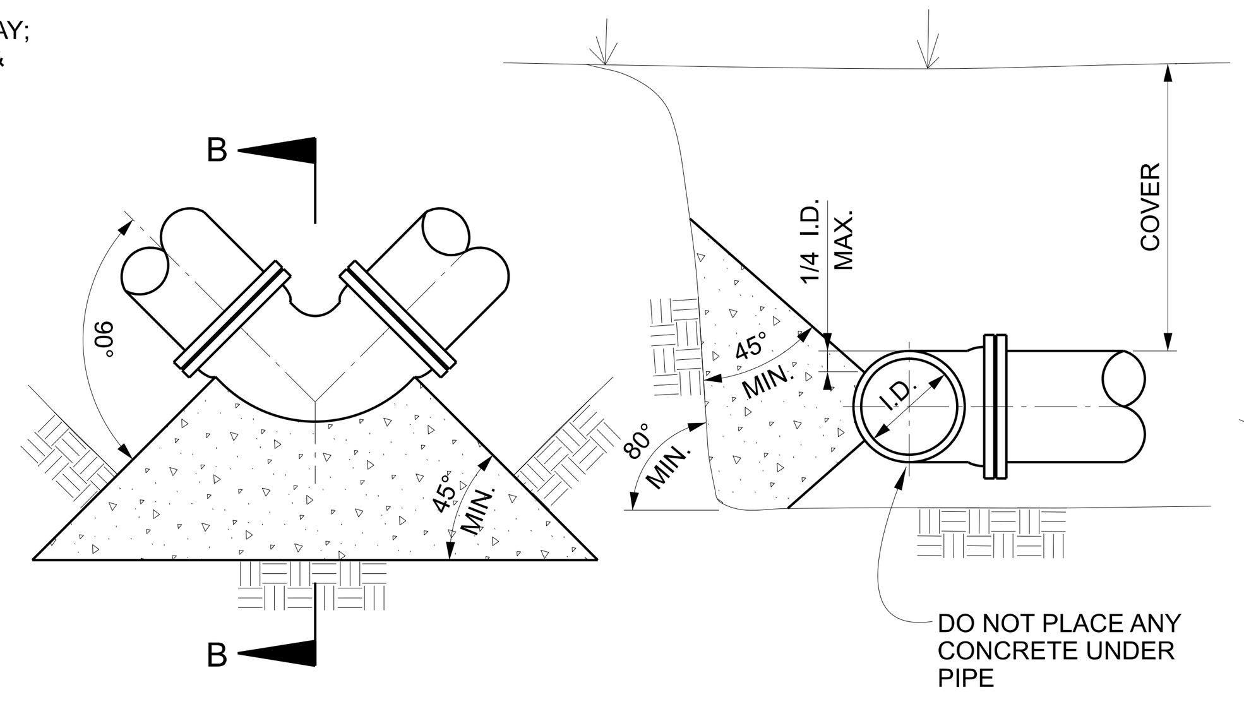
SECTION A-A

NOTES:

1. CONCRETE MUST BE POURED AGAINST UNDISTURBED SOIL.
2. DUCTILE IRON JOINTS SHALL NOT BE IN DIRECT CONTACT WITH CONCRETE. PIPE SHALL BE WRAPPED IN PLASTIC ENCASEMENT.
3. ASSUMED ALLOWABLE SOIL BEARING STRESS IS 2,500 lbs./ SQ. FT. CONTACT ENGINEER SHOULD SOIL WITH LOWER BEARING STRESS BE ENCOUNTERED.

TYPICAL CONCRETE BRACING FOR TEES

PIPE DIA.	a	MIN. COVER	150 PSI BEARING AREA (SQ. FT.)	250 PSI BEARING AREA (SQ. FT.)
4"	5"	3'-0"	1	2
6"	6"	3'-0"	2	3
8"	7"	3'-0"	4	6
10"	9"	3'-0"	5	8
12"	10"	5'-0"	7	12
14"	1'-0"	5'-0"	10	16
16"	1'-1"	5'-0"	13	21
18"	1'-2"	5'-0"	16	26
20"	1'-4"	5'-0"	19	32
24"	1'-8"	5'-0"	28	46
30"	1'-11"	5'-0"	43	71
36"	2'-2"	5'-0"	62	102
42"	2'-4"	5'-0"	84	139
48"	2'-7"	5'-0"	109	181



PLAN

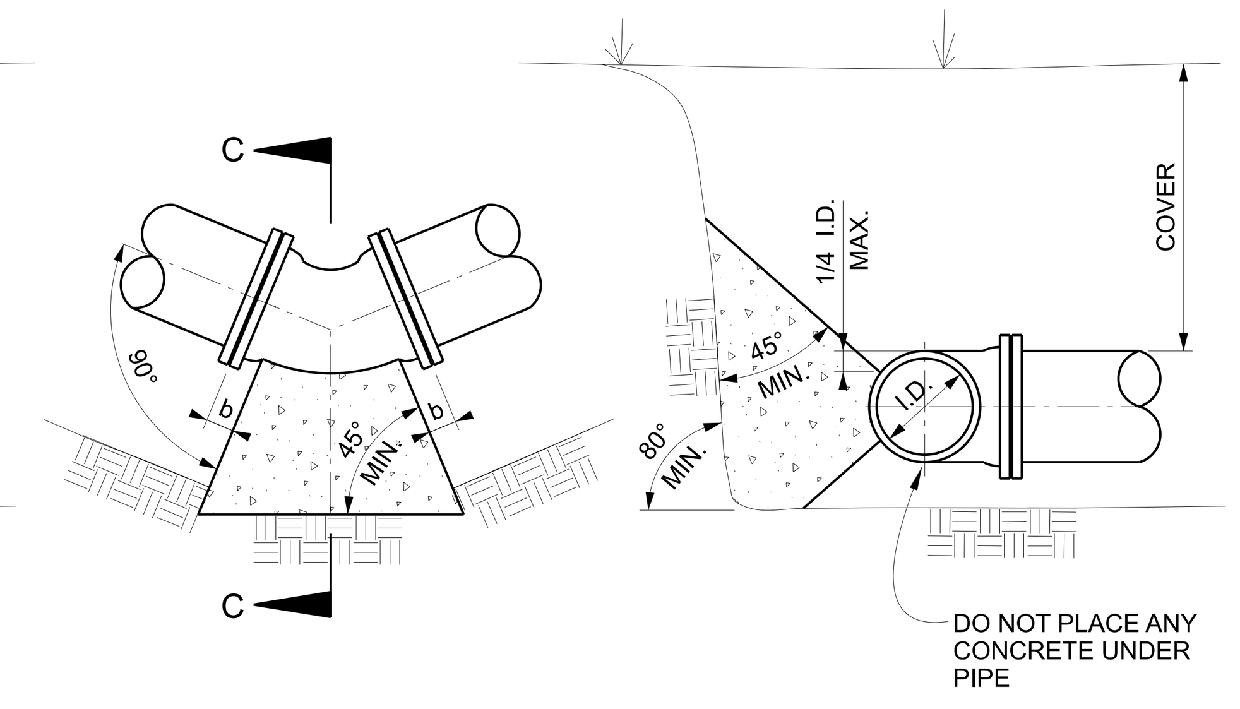
SECTION B-B

NOTES:

1. CONCRETE MUST BE POURED AGAINST UNDISTURBED SOIL.
2. DUCTILE IRON JOINTS SHALL NOT BE IN DIRECT CONTACT WITH CONCRETE. PIPE SHALL BE WRAPPED IN PLASTIC ENCASEMENT.
3. ASSUMED ALLOWABLE SOIL BEARING STRESS IS 2,500 lbs./ SQ. FT. CONTACT ENGINEER SHOULD SOIL WITH LOWER BEARING STRESS BE ENCOUNTERED.

TYPICAL CONCRETE BRACING FOR 90° BENDS

PIPE DIA.	b	MIN. COVER	150 PSI BEARING AREA (SQ. FT.)	250 PSI BEARING AREA (SQ. FT.)
4"	5"	3'-0"	2	2
6"	5"	3'-0"	3	4
8"	5"	3'-0"	5	8
10"	5"	3'-0"	7	12
12"	6"	5'-0"	10	16
14"	6"	5'-0"	14	22
16"	6"	5'-0"	18	29
18"	6"	5'-0"	22	36
20"	6"	5'-0"	27	45
24"	7"	5'-0"	39	64
30"	8"	5'-0"	60	100
36"	8"	5'-0"	87	144
42"	9"	5'-0"	118	196
48"	9"	5'-0"	154	256



PLAN

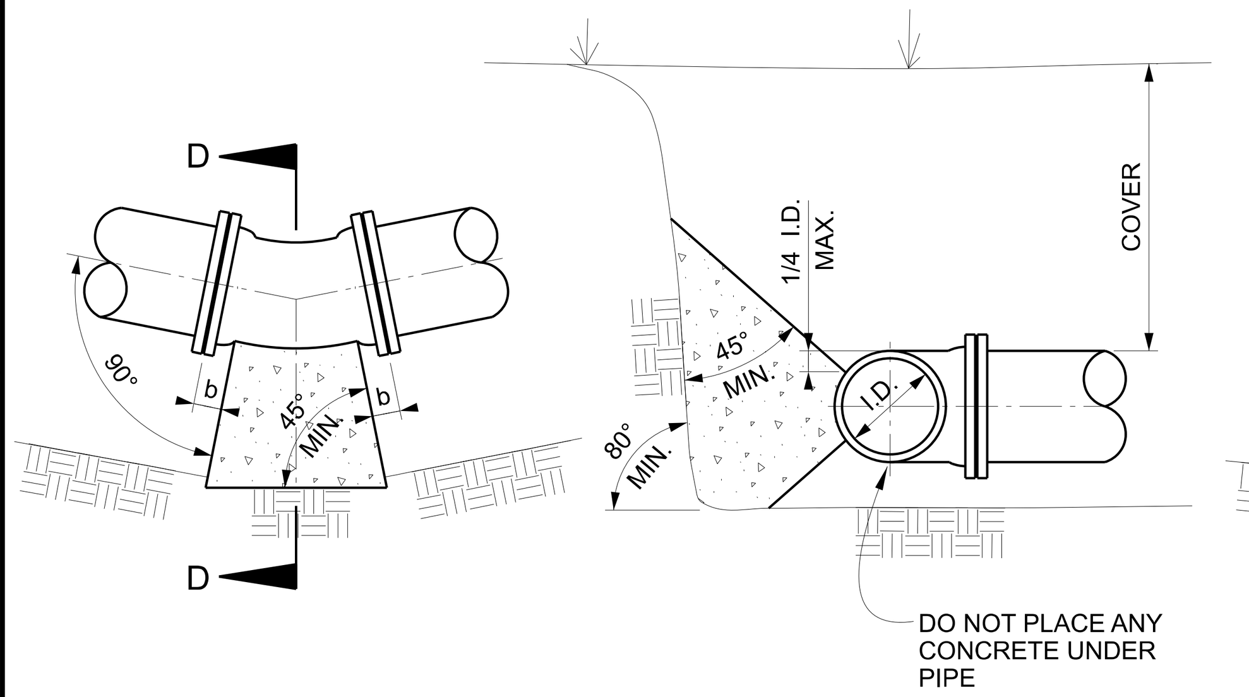
SECTION C-C

NOTES:

1. CONCRETE MUST BE POURED AGAINST UNDISTURBED SOIL.
2. DUCTILE IRON JOINTS SHALL NOT BE IN DIRECT CONTACT WITH CONCRETE. PIPE SHALL BE WRAPPED IN PLASTIC ENCASEMENT.
3. ASSUMED ALLOWABLE SOIL BEARING STRESS IS 2,500 lbs./ SQ. FT. CONTACT ENGINEER SHOULD SOIL WITH LOWER BEARING STRESS BE ENCOUNTERED.

TYPICAL CONCRETE BRACING FOR 45° BENDS

PIPE DIA.	b	MIN. COVER	150 PSI BEARING AREA (SQ. FT.)	250 PSI BEARING AREA (SQ. FT.)
4"	5"	3'-0"	1	1
6"	5"	3'-0"	2	3
8"	5"	3'-0"	3	4
10"	5"	3'-0"	4	7
12"	6"	5'-0"	6	9
14"	6"	5'-0"	8	12
16"	6"	5'-0"	10	16
18"	6"	5'-0"	12	20
20"	6"	5'-0"	15	25
24"	7"	5'-0"	21	35
30"	8"	5'-0"	33	55
36"	8"	5'-0"	47	78
42"	9"	5'-0"	64	107
48"	9"	5'-0"	84	139



PLAN

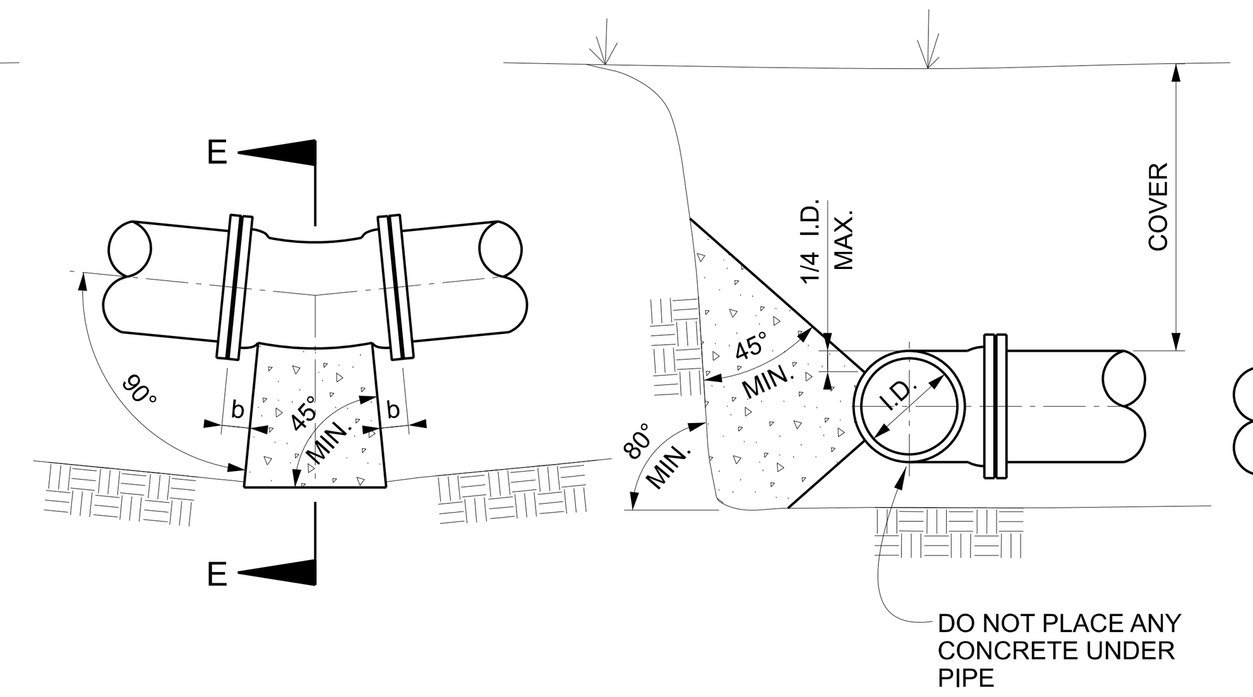
SECTION D-D

NOTES:

1. CONCRETE MUST BE POURED AGAINST UNDISTURBED SOIL.
2. DUCTILE IRON JOINTS SHALL NOT BE IN DIRECT CONTACT WITH CONCRETE. PIPE SHALL BE WRAPPED IN PLASTIC ENCASEMENT.
3. ASSUMED ALLOWABLE SOIL BEARING STRESS IS 2,500 lbs./ SQ. FT. CONTACT ENGINEER SHOULD SOIL WITH LOWER BEARING STRESS BE ENCOUNTERED.

TYPICAL CONCRETE BRACING FOR 22½° BENDS

PIPE DIA.	b	MIN. COVER	150 PSI BEARING AREA (SQ. FT.)	250 PSI BEARING AREA (SQ. FT.)
4"	5"	3'-0"	1	1
6"	5"	3'-0"	1	2
8"	5"	3'-0"	2	2
10"	5"	3'-0"	2	4
12"	6"	5'-0"	3	5
14"	6"	5'-0"	4	7
16"	6"	5'-0"	5	8
18"	6"	5'-0"	6	10
20"	6"	5'-0"	8	13
24"	7"	5'-0"	11	18
30"	8"	5'-0"	17	28
36"	8"	5'-0"	24	40
42"	9"	5'-0"	33	55
48"	9"	5'-0"	43	71



PLAN

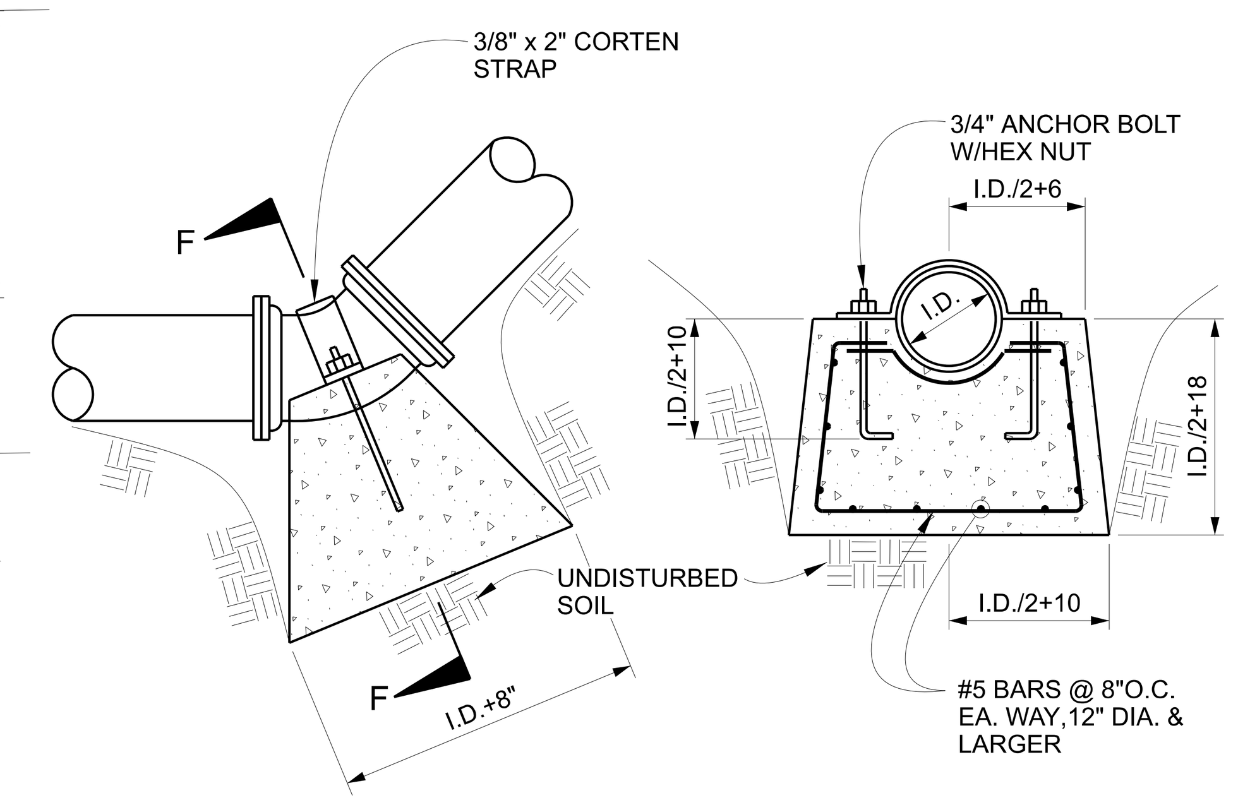
SECTION E-E

NOTES:

1. CONCRETE MUST BE POURED AGAINST UNDISTURBED SOIL.
2. DUCTILE IRON JOINTS SHALL NOT BE IN DIRECT CONTACT WITH CONCRETE. PIPE SHALL BE WRAPPED IN PLASTIC ENCASEMENT.
3. ASSUMED ALLOWABLE SOIL BEARING STRESS IS 2,500 lbs./ SQ. FT. CONTACT ENGINEER SHOULD SOIL WITH LOWER BEARING STRESS BE ENCOUNTERED.

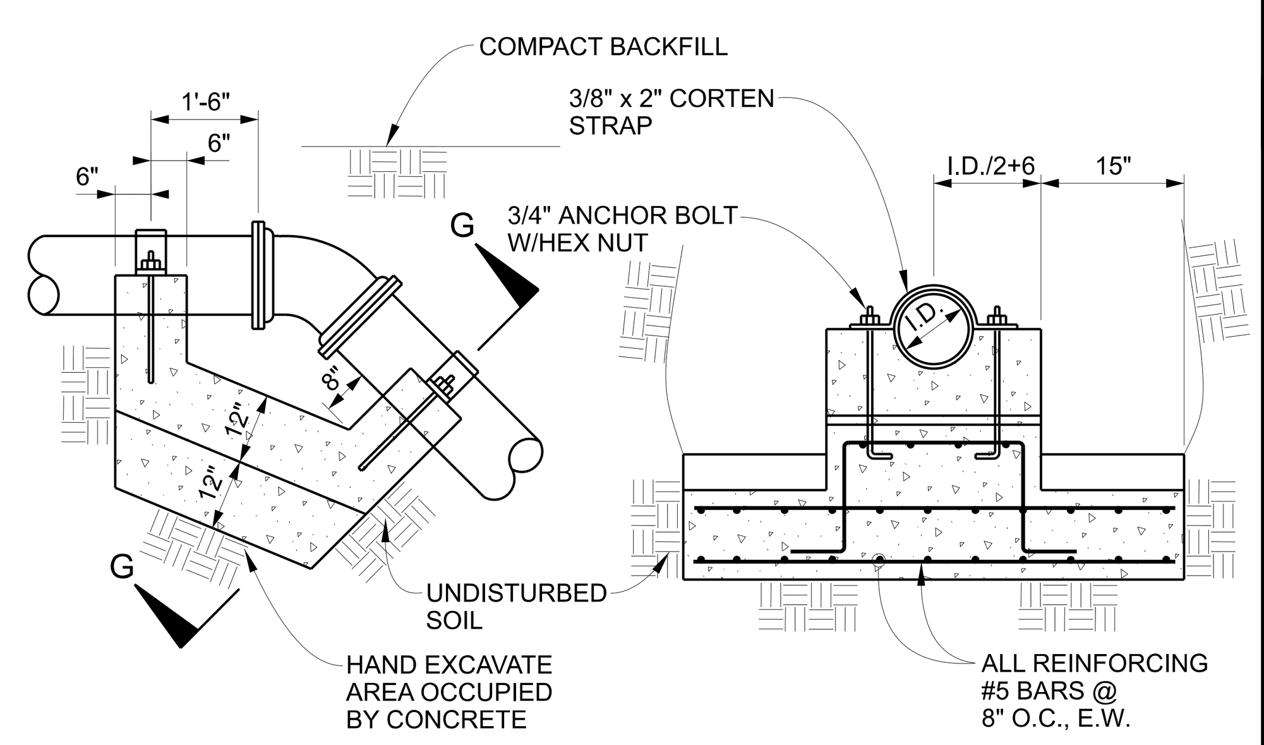
TYPICAL CONCRETE BRACING FOR 11¼° BENDS

PIPE DIA.	b	MIN. COVER	150 PSI BEARING AREA (SQ. FT.)	250 PSI BEARING AREA (SQ. FT.)
4"	5"	3'-0"	1	1
6"	5"	3'-0"	1	1
8"	5"	3'-0"	1	1
10"	5"	3'-0"	1	2
12"	6"	5'-0"	2	3
14"	6"	5'-0"	2	4
16"	6"	5'-0"	3	4
18"	6"	5'-0"	3	5
20"	6"	5'-0"	4	7
24"	7"	5'-0"	6	9
30"	8"	5'-0"	9	14
36"	8"	5'-0"	12	20
42"	9"	5'-0"	17	28
48"	9"	5'-0"	22	36



ELEVATION

SECTION F-F

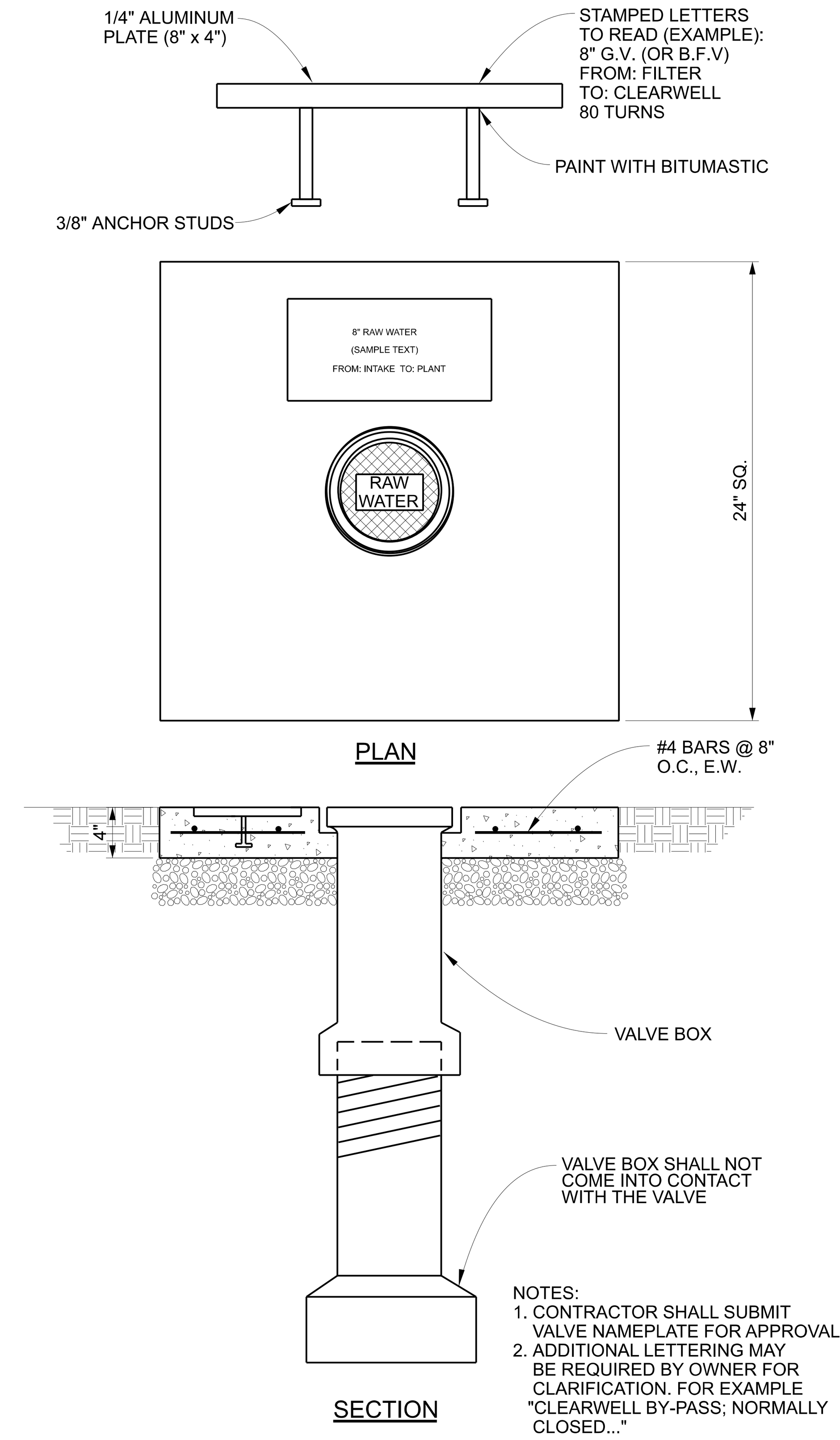


ELEVATION

SECTION G-G

CONCRETE BRACING FOR VERTICAL BENDS

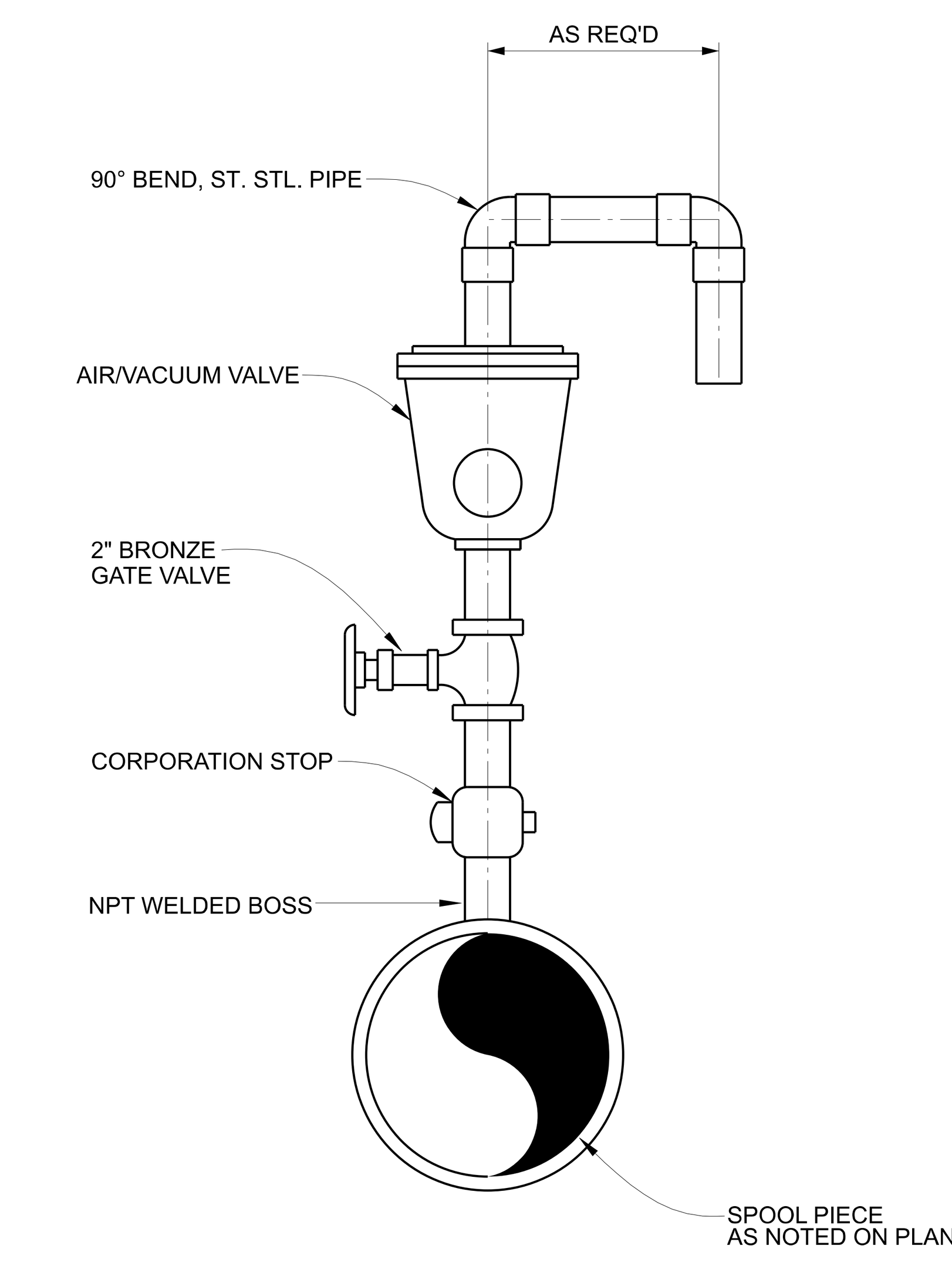
A1 STANDARD PIPE BRACING DETAILS NO SCALE



NOTES:
1. CONTRACTOR SHALL SUBMIT VALVE NAMEPLATE FOR APPROVAL
2. ADDITIONAL LETTERING MAY BE REQUIRED BY OWNER FOR CLARIFICATION. FOR EXAMPLE "CLEARWELL BY-PASS; NORMALLY CLOSED..."

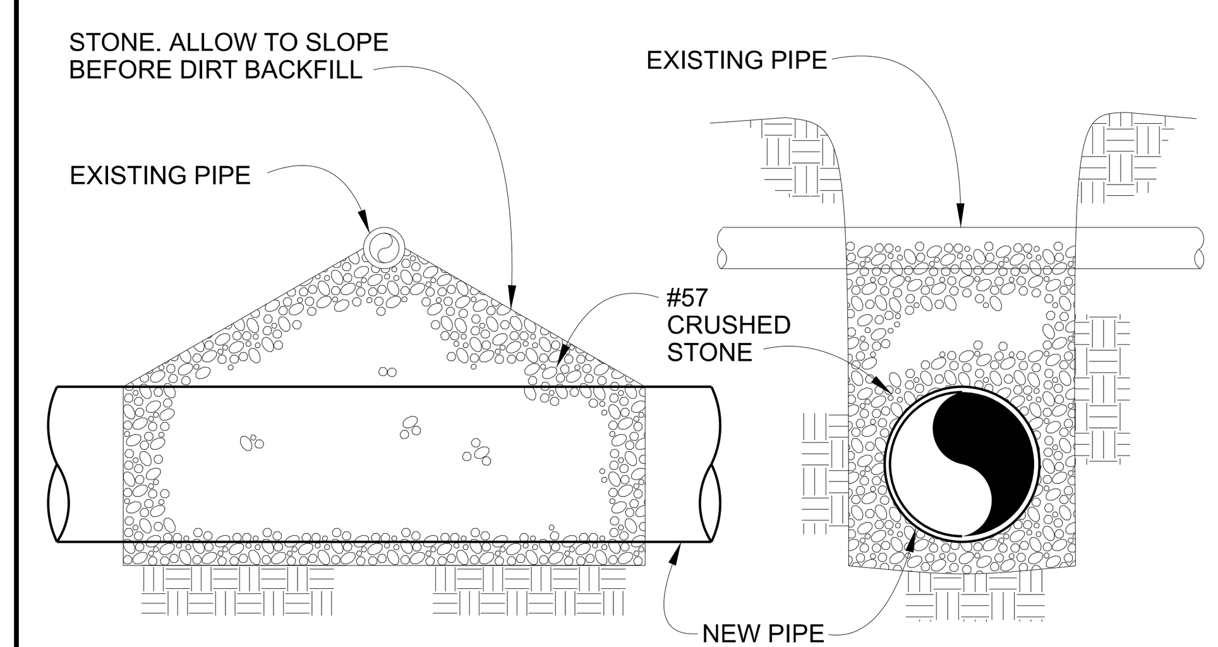
G10 VALVE BOX DETAIL NO SCALE

NOTE: PIPE AND FITTINGS SHALL BE ST. STL. NPT. REFERENCE PLANS FOR PIPE AND FITTING SIZES.



NO SCALE

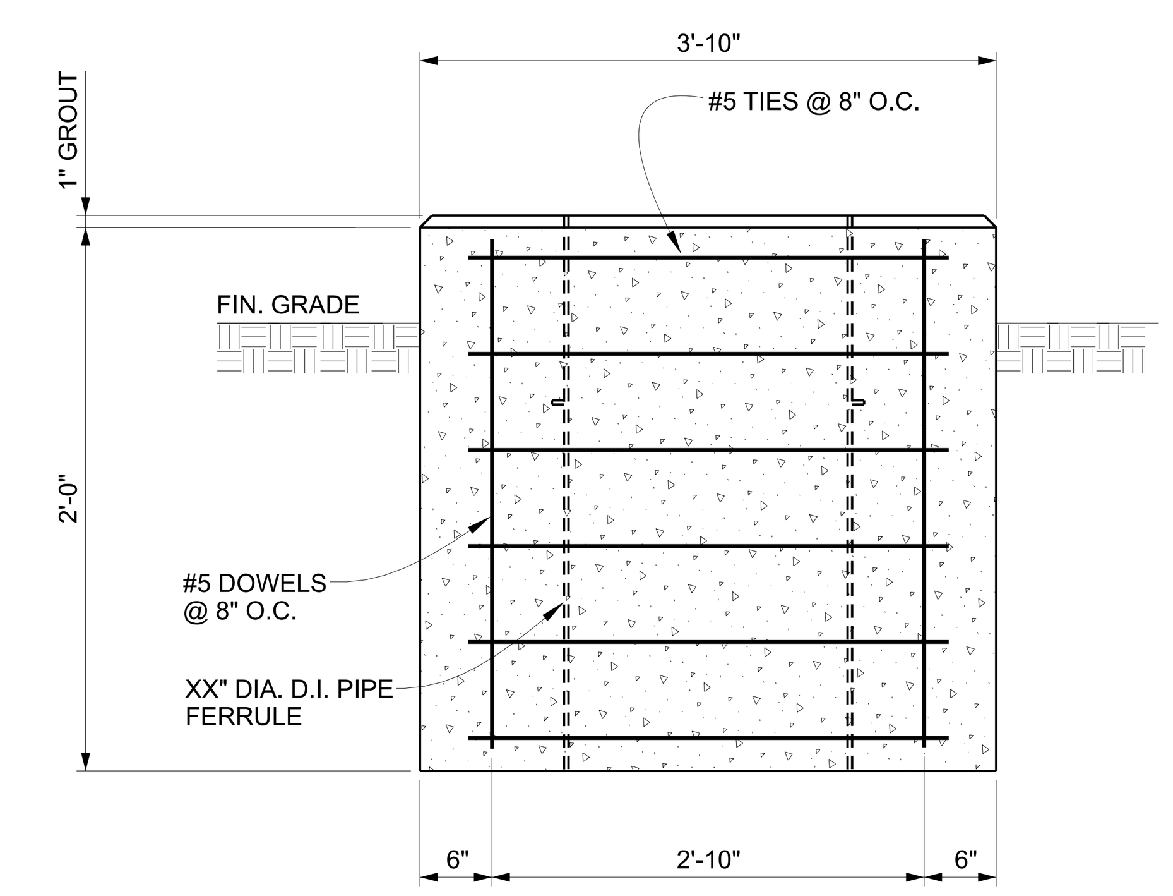
G13 WELL ARV & PIPING DETAIL



NOTE: WHERE NOT LOCATED UNDER PAVING.

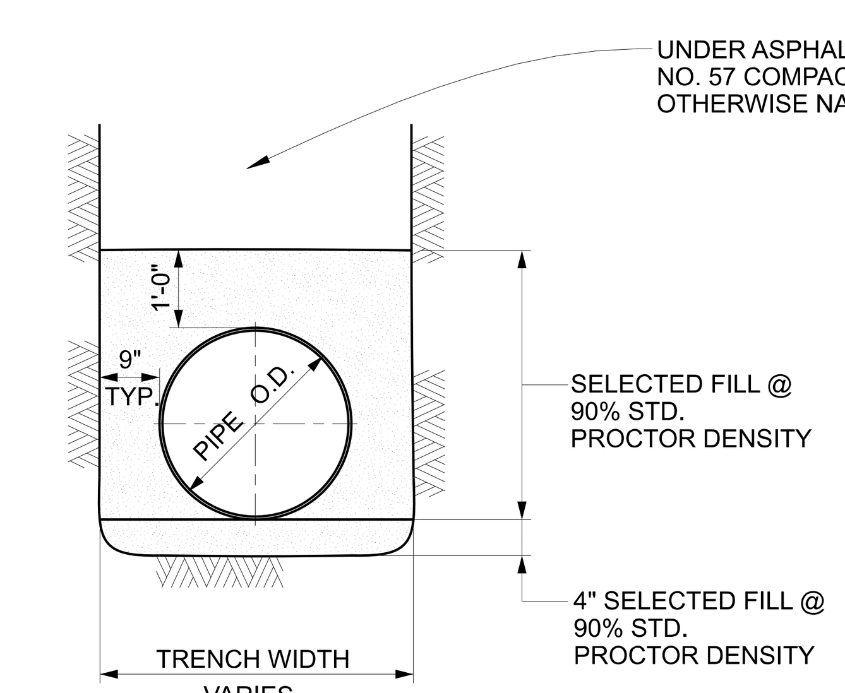
NO SCALE

D10 UTILITY CROSSING PROTECTION DETAIL

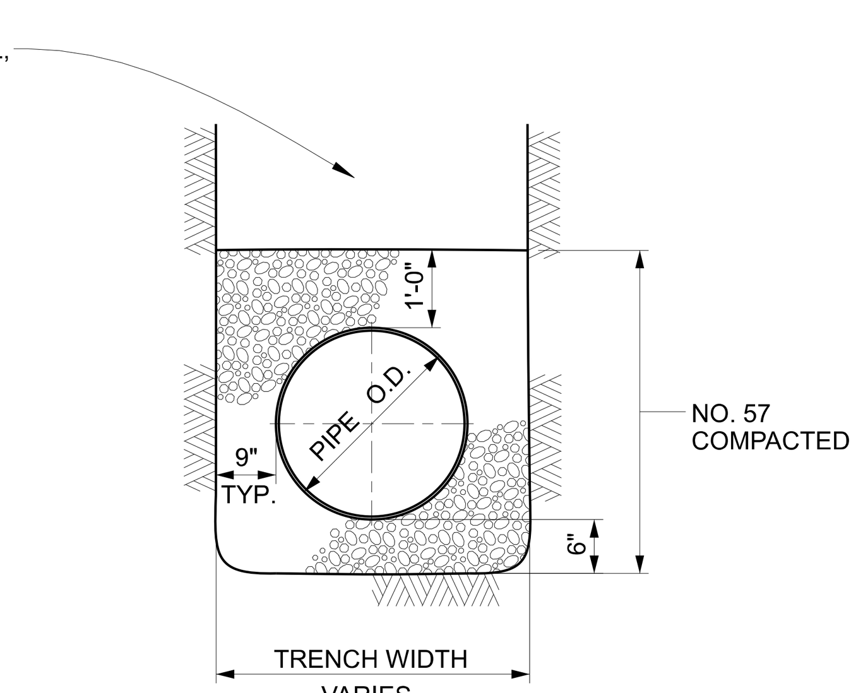


D13 WELL PUMP SUPPORT DETAIL NO SCALE

UNDER ASPHALT OR GRAVEL, NO. 57 COMPACTED, OTHERWISE NATIVE SOIL



TRENCH EXCAVATED IN SOIL



TRENCH EXCAVATED IN ROCK

A10 DUCTILE IRON PIPE BEDDING & BACKFILL DETAIL NO SCALE

KREBS ENGINEERING

ALABAMA LICENSED PROFESSIONAL ENGINEER No. [illegible] AUSTIN D. MAYNARD 12/8/23

BID SET

CITY OF FAIRHOPE
WTP No. 1 IMPROVEMENTS
PHASE 1
FAIRHOPE, ALABAMA

CITY OF FAIRHOPE ALABAMA

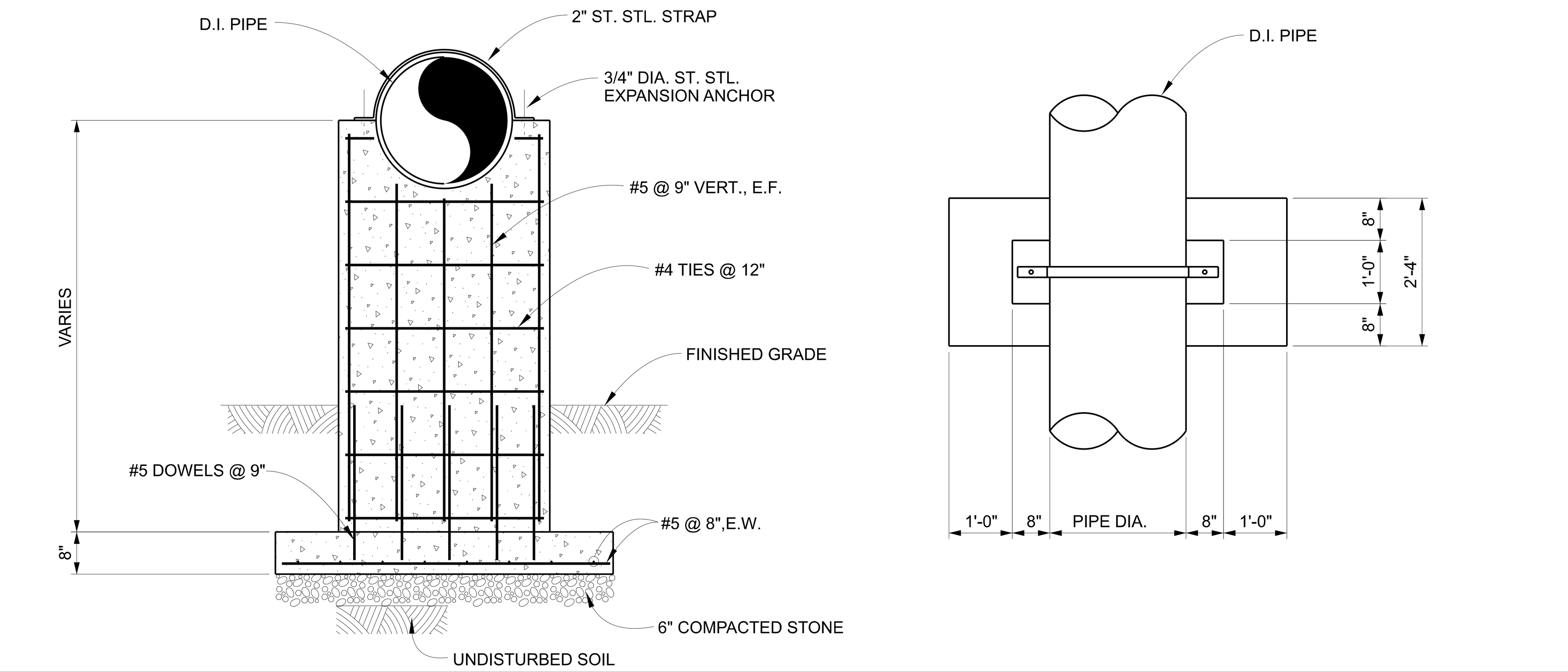
Designed	ADM	Project No.
Drawn	CLM	23040.3
Checked	CLL	

Revisions

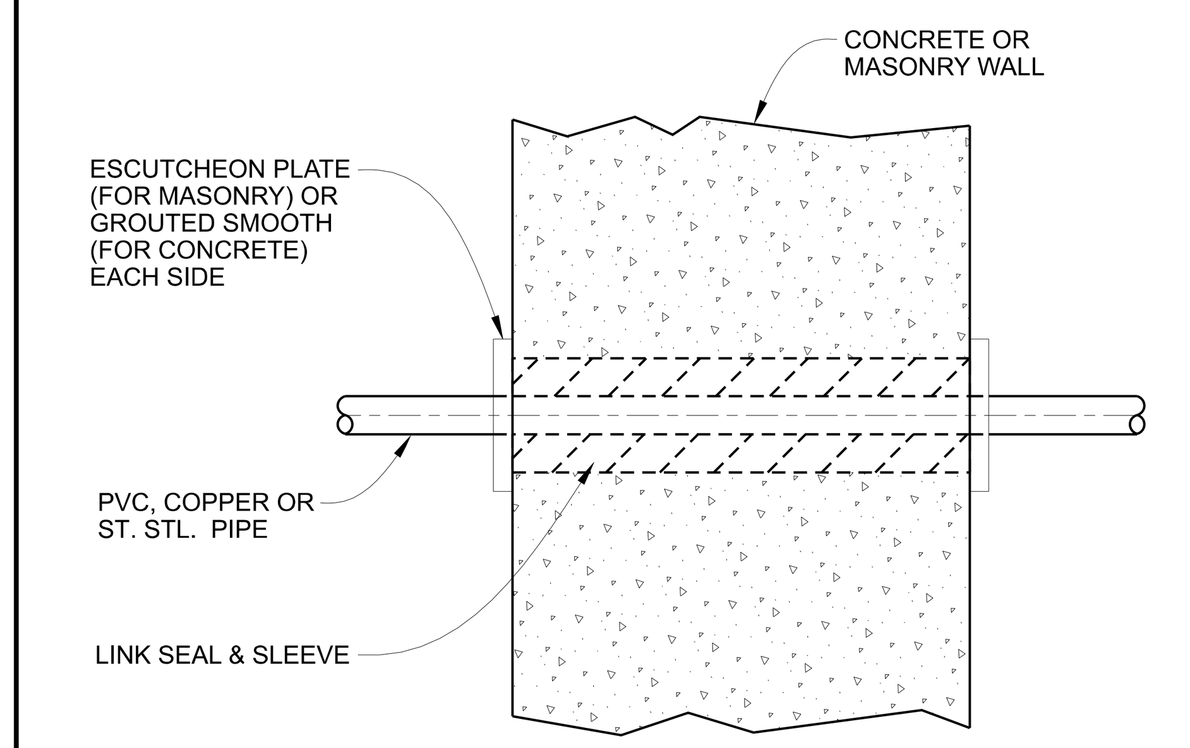
No.	Date	Description

Sheet Title
MISCELLANEOUS DETAILS

Issue Date	Sheet No.
DEC., 2023	DT-01
Sequence 17 of 37	

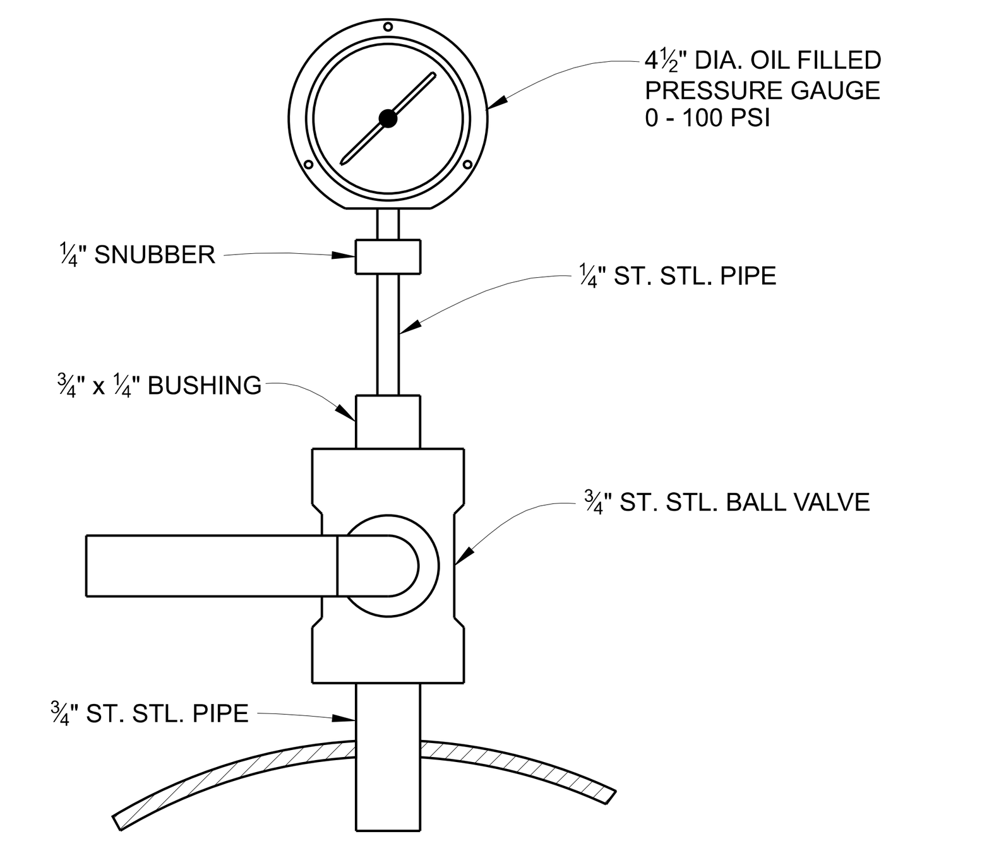


K1 CONCRETE PIPE SUPPORT DETAIL 1/2"=1'-0"



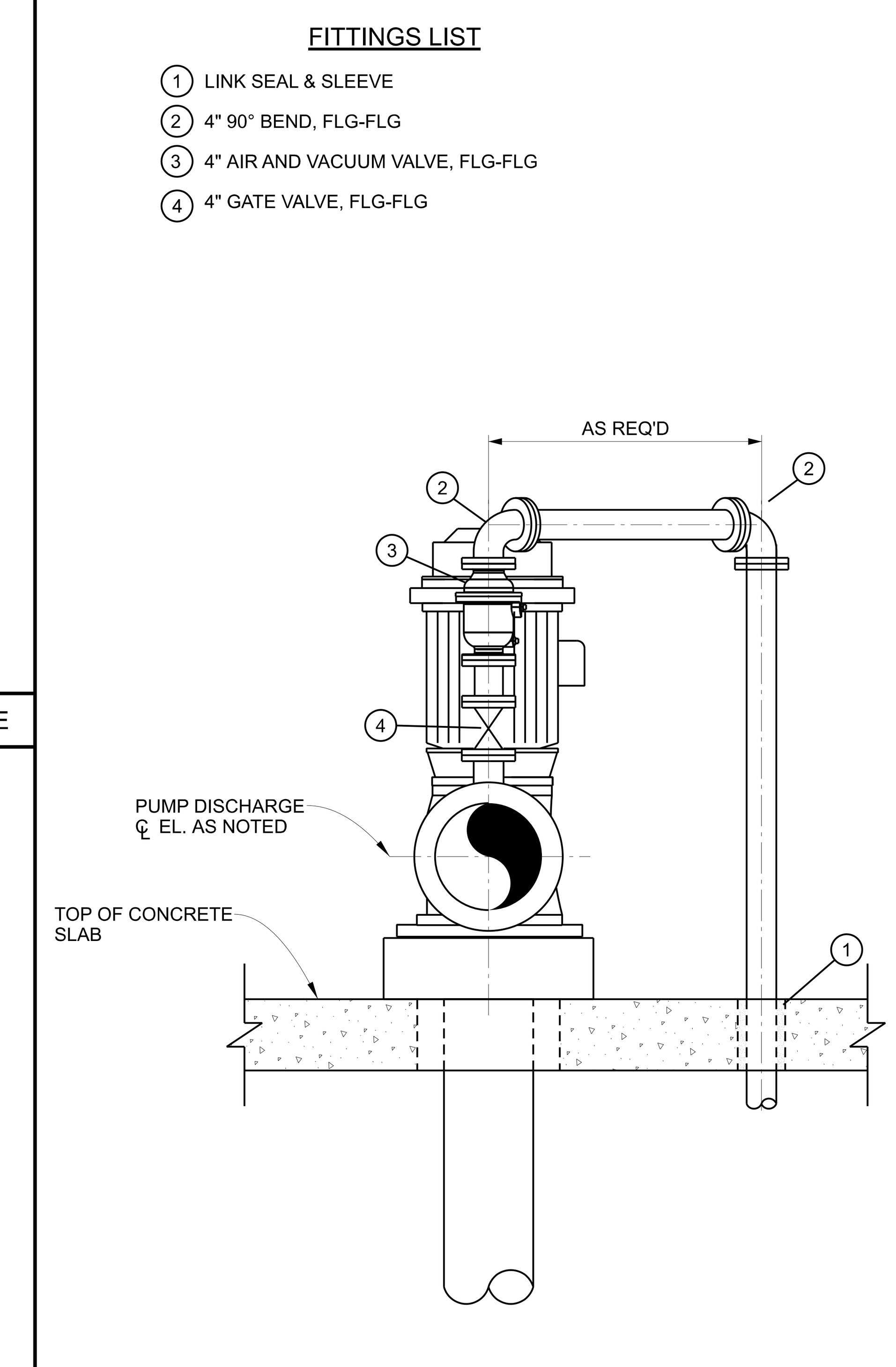
NO SCALE

K7 TYP. WALL PENETRATION (SM. DIA. PIPE)



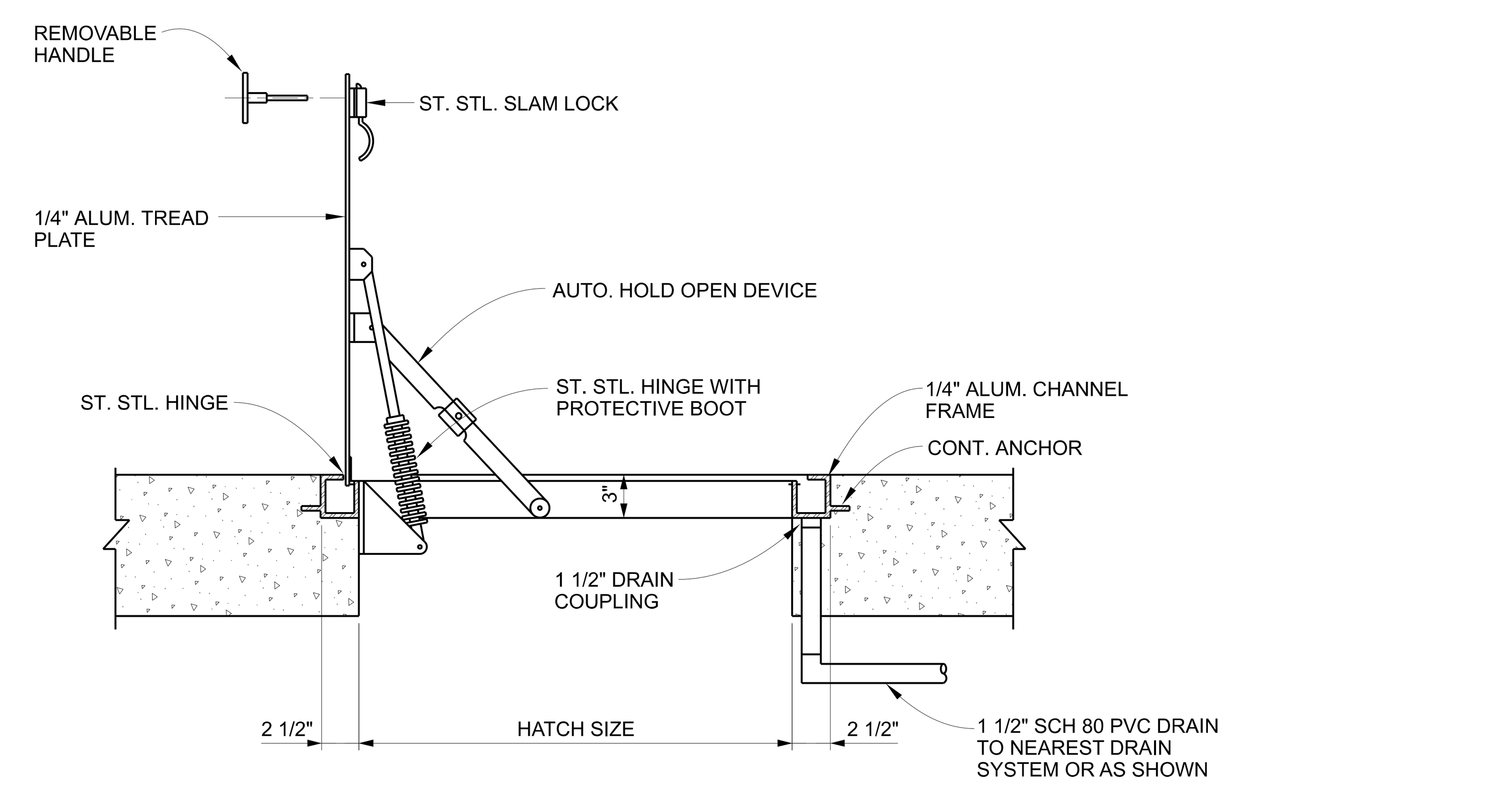
NOTE: ALL PIPE & FITTINGS THIS DETAIL TO BE STAINLESS STEEL, SIZE AS INDICATED.

K10 PRESSURE GAUGE ASSEMBLY NO SCALE



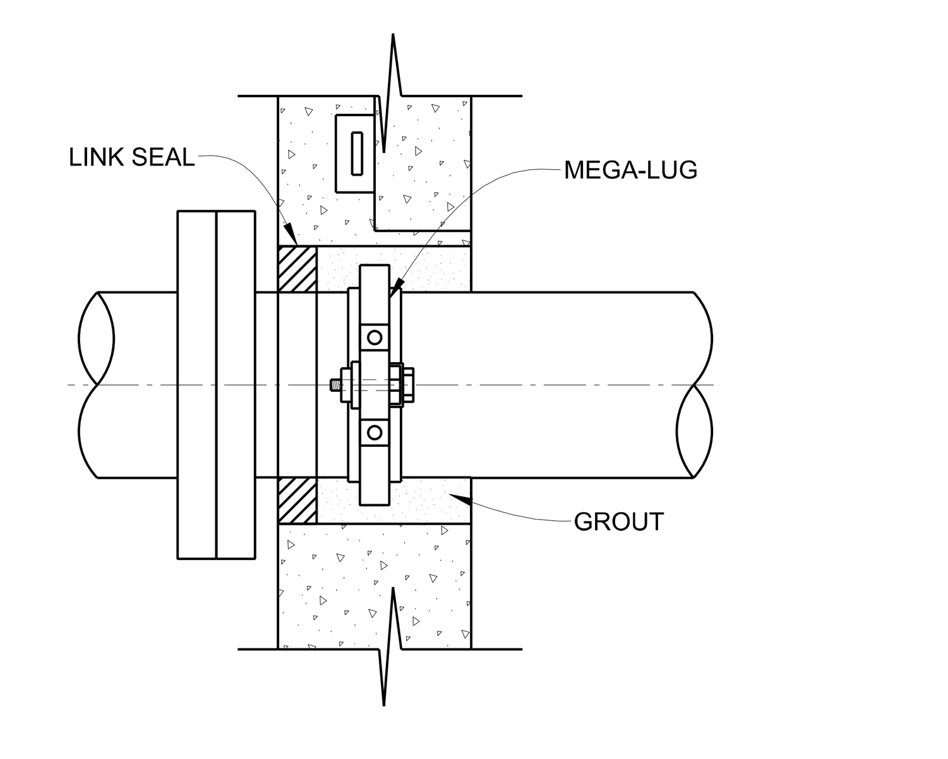
NO SCALE

G13 FINISHED WATER ARV & PIPING DETAIL



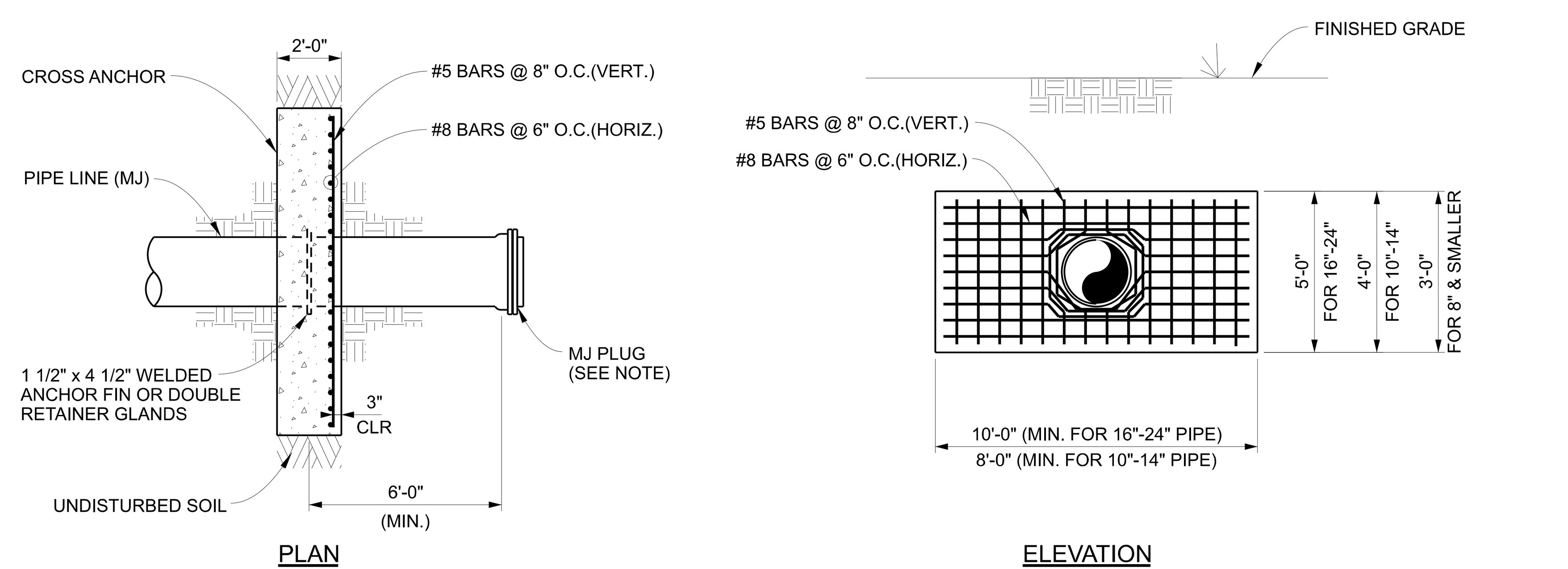
G1 ALUMINUM SINGLE LEAF HATCH DETAIL NO SCALE

G7 NO SCALE

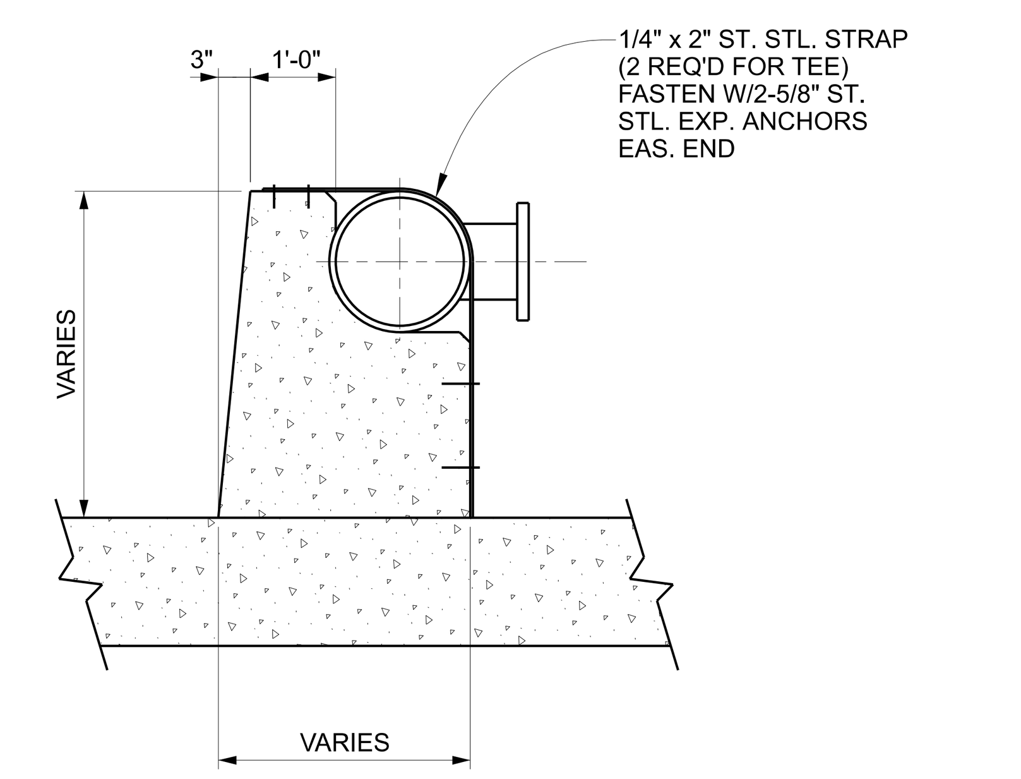


G10 LINKSEAL DETAIL NO SCALE

NOTE: OTHER METHOD OF RESTRAINING PLUG MAY BE CONSIDERED, IF DESIRED. SUBMIT OTHER OPTIONS TO ENGINEER FOR REVIEW.



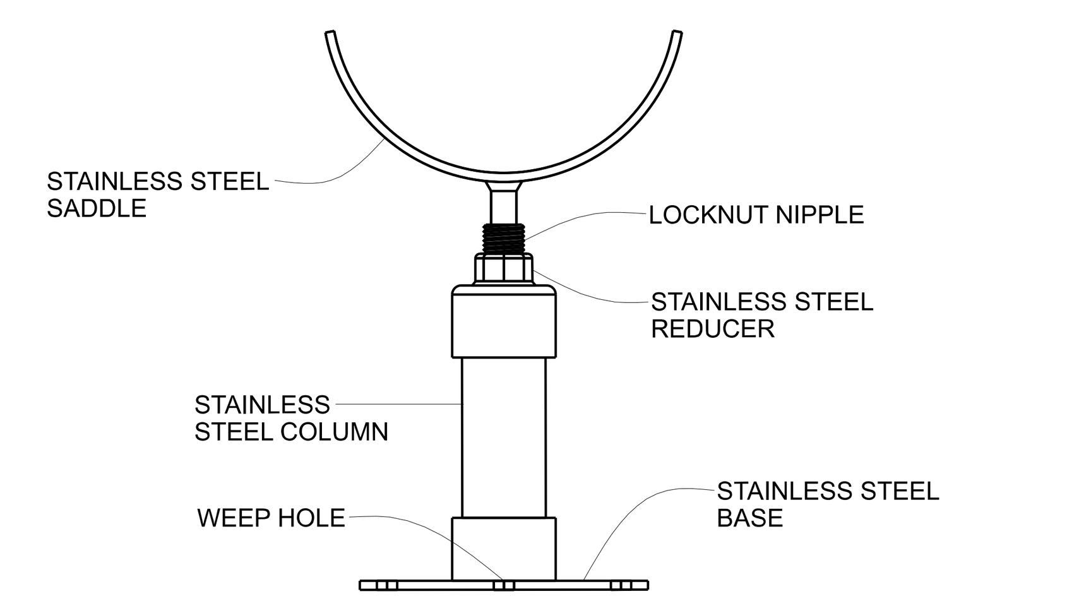
D1 CONCRETE CROSS ANCHOR DETAIL NO SCALE



NOTE:

SEE STRUCTURAL DETAILS FOR REINFORCING

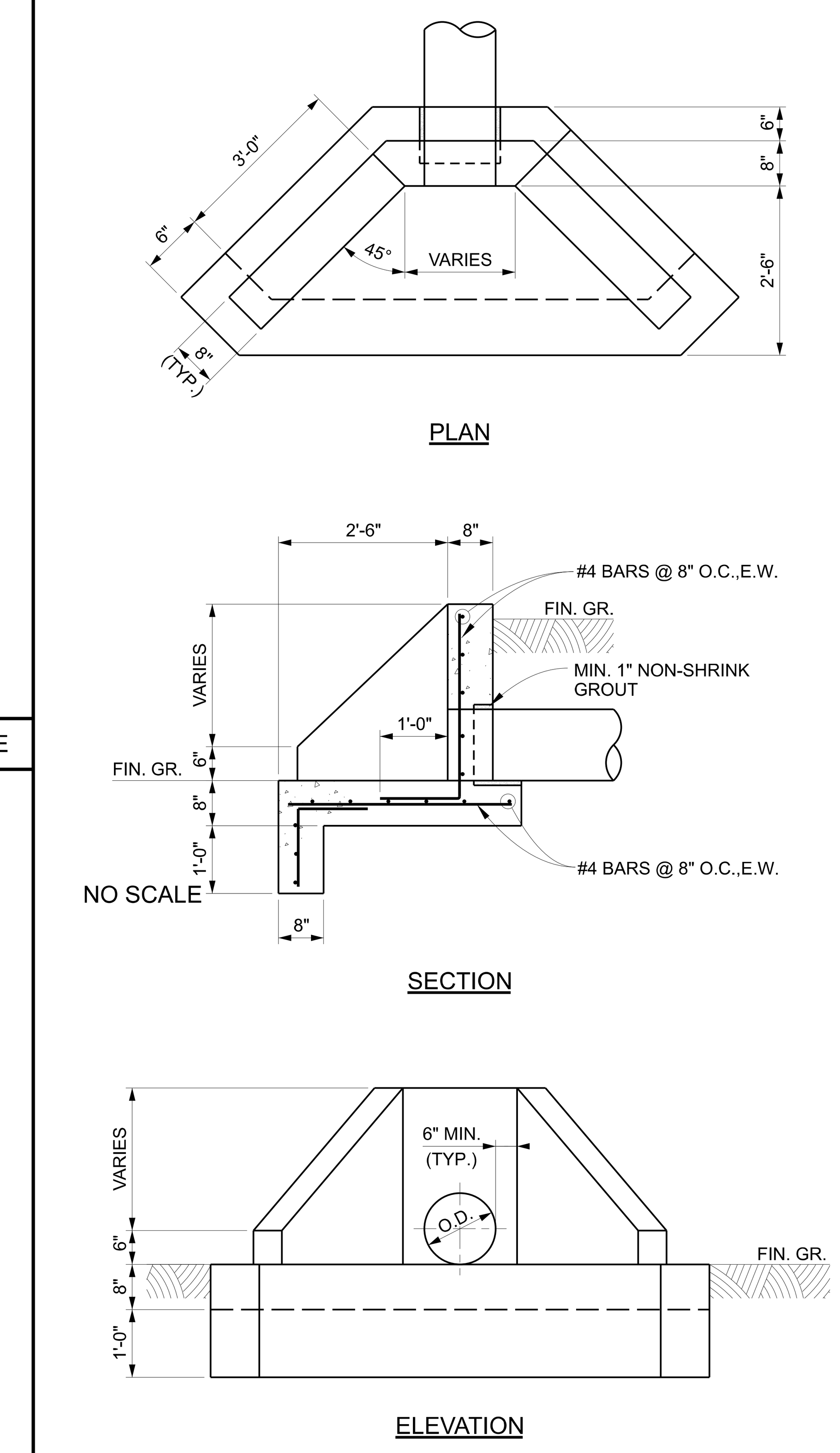
D7 CONCRETE PIPE SUPPORT NO SCALE



NOTES:

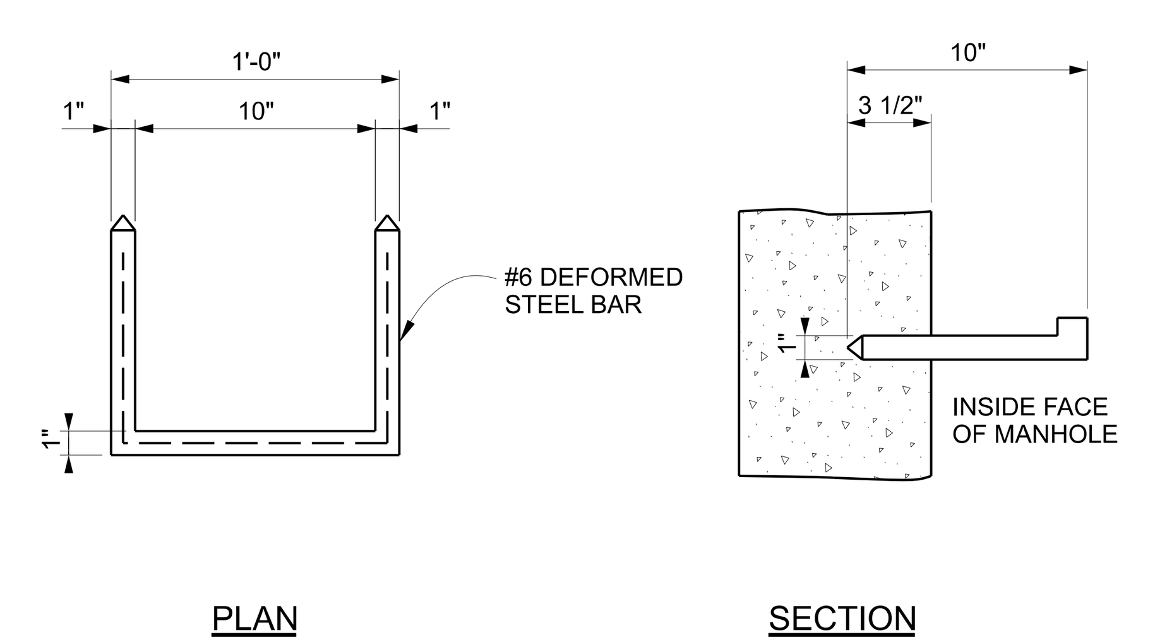
1. PROVIDE PIPE SUPPORTS AS REQUIRED TO SUPPORT PIPING WITHOUT PUTTING STRESSES ON CONNECTIONS TO EQUIPMENT.
2. SUPPORT BASE SHALL BE ANCHORED ON 4-SIDES WITH 5/8" STAINLESS STEEL ANCHOR BOLTS.
3. ADJUSTABLE PIPE SUPPORTS SHOULD BE PLACED AT 6'-0" O.C. FOR HORIZONTAL RUNS OF PIPE GREATER THAN 6'-0".

D10 ADJUSTABLE PIPE SUPPORT NO SCALE

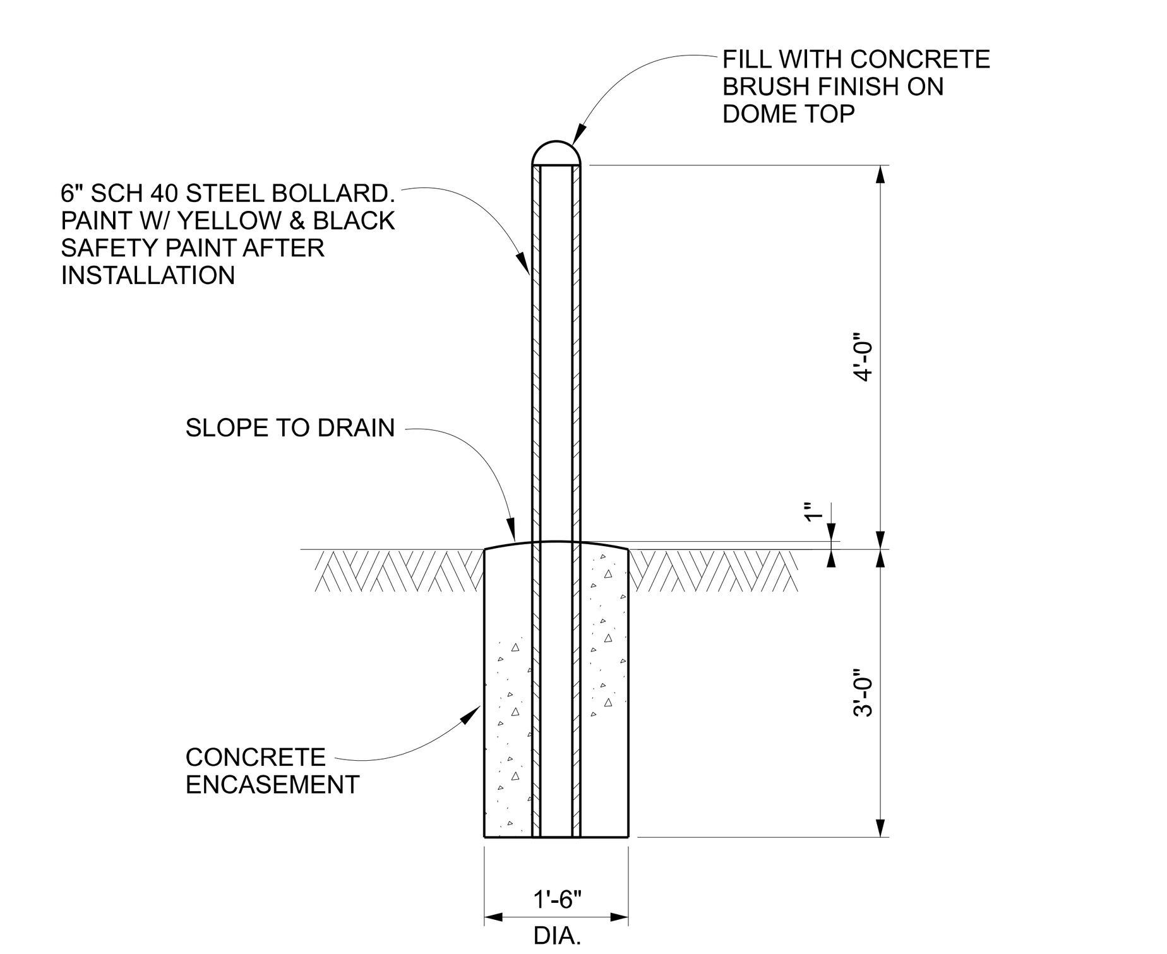


NO SCALE

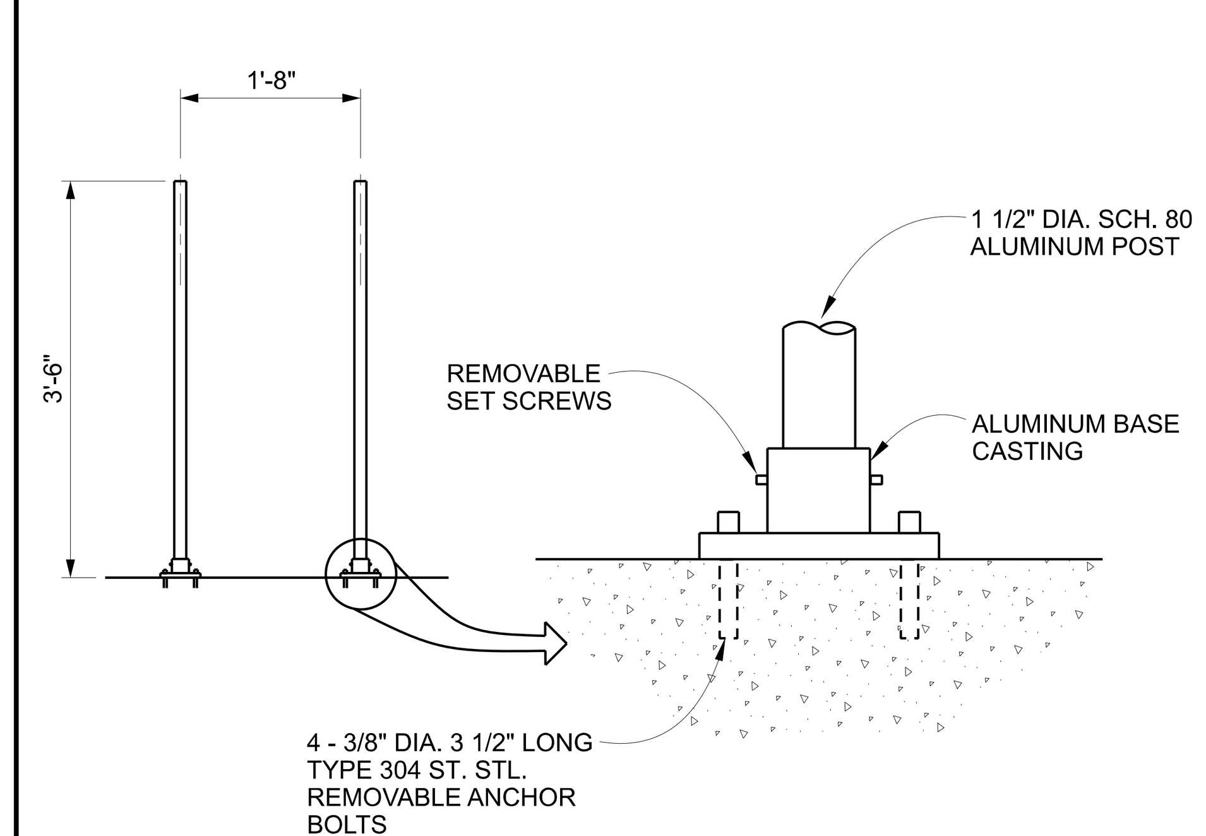
A13 HEADWALL DETAIL NO SCALE



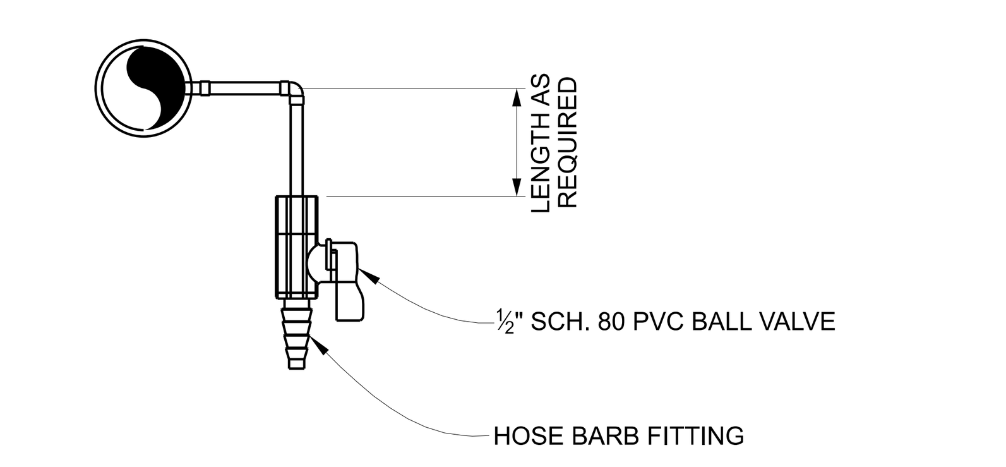
A1 STANDARD MANHOLE STEP 1 1/2" = 1'-0"



A4 BOLLARD DETAIL 1/2"=1'-0"



A7 REMOVABLE GRAB BAR DETAIL NO SCALE



NOTES:

1. PROVIDE PIPE SUPPORTS AS REQUIRED FOR A UNIFORM, RIGID INSTALLATION.
2. BALL VALVE FOR HYPOCHLORITE SHALL BE VENTED PORT.

A10 SAMPLE TAP NO SCALE

KREBS ENGINEERING

BID SET

CITY OF FAIRHOPE
WTP No. 1 IMPROVEMENTS
PHASE 1
FAIRHOPE, ALABAMA

Designed ADM	Project No. 23040.3
Drawn CLM	
Checked CLL	

Revisions

No.	Date	Description

Sheet Title: MISCELLANEOUS DETAILS

Issue Date: DEC., 2023
Sequence: 18 of 37
Sheet No.: DT-02

GENERAL ELECTRICAL LEGEND

$SX — SWITCH OUTLET – MANUAL MOTOR STARTER – TOGGLE TYPE – 3 POLE – SQUARE "D" TYPE K02 WITH ENCLOSURE AS REQUIRED BY APPLICATION – PROVIDE LOCK–OFF HARDWARE.

DUPLEX — DOUBLE DUPLEX — WALL OUTLET – RECEPTACLE – 20A – 125V – 2P – 3W – GROUNDING – "GFI" TYPE – WEATHER RESISTANT – NEMA 5–20R – SINGLE PLATE.

J — FLOOR OR SURFACE–MOUNTED OUTLET – JUNCTION BOX.

OUTLET DESIGNATIONS (APPLY TO ALL OUTLETS, DEVICES & EQUIPMENT):

- ES EQUIPMENT MOUNTED TO ALUMINUM SUPPORT FRAME – SEE DETAIL "E–ES".
- SRS PROVIDE SUN/RAIN SHIELD FOR DEVICE/EQUIPMENT PER DETAIL "E–SRS".
- VL VERIFY EXACT OUTLET LOCATION WITH OWNER PRIOR TO ROUGH–IN.
- W WEATHER PROOF – OUTLET SHALL BE INSTALLED WITH WEATHERPROOF, IN–USE, CAST COVER.

FLEXIBLE CONNECTION TO EQUIPMENT.

BRANCH CIRCUIT – RISER UP.

BRANCH/FEEDER CIRCUIT – CONCEALED IN WALLS OR CEILING.

BRANCH/FEEDER CIRCUIT – EXPOSED ON WALLS OR CEILING.

BRANCH/FEEDER CIRCUIT – CONCEALED IN FLOOR SLAB OR DIRT FILL.

BRANCH/FEEDER CIRCUIT – TO BE DEMOLISHED – MAY BE USED WITH OTHER LINE TYPES.

BRANCH/FEEDER CIRCUIT – HOMERUN – CAN BE USED WITH OTHER BRANCH/FEEDER TYPES.

BRANCH/FEEDER CIRCUIT MODIFIERS:

- ——— : 2#12 & 1#12G UNLESS NOTED OTHERWISE.
- ———// : 3#12 & 1#12G, ETC. UNLESS NOTED OTHERWISE (TICK MARKS INDICATE CONDUCTOR QUANTITY NOT INCLUDING GROUND WIRE).
- ——10—— : 2#10 & 1#10G UNLESS NOTED OTHERWISE (NUMBER INDICATES WIRE AWG).

SIZE CONDUIT PER N.E.C. UNLESS INDICATED OTHERWISE.

–·–OHP–·– OVERHEAD PRIMARY POWER SERVICE CABLING (WITH TELECOMMUNICATIONS CABLING WHERE APPLICABLE).

■■■UGP■■■ UNDERGROUND PRIMARY POWER SERVICE – PROVIDE CONDUITS (QUANTITIES, SIZES, TYPES & INSTALLATION) AS DIRECTED BY UTILITY COMPANY) TO POINT AS DIRECTED BY UTILITY CO. – WHERE SO REQUIRED BY UTILITY CO., PROVIDE PULLBOXES (QUANTITIES, LOCATION, TYPES & INSTALLATION) AS PER UTILITY CO. REQUIREMENTS – COORDINATE LOCATION(S) & EXACT REQUIREMENTS WITH UTILITY CO. PRIOR TO BID AND INCLUDE ALL COSTS IN BID.

■■■UGS■■■ UNDERGROUND SECONDARY POWER SERVICE – SEE ASSOCIATED SINGLE LINE DIAGRAM – VERIFY EXACT SERVICE TRANSFORMER LOCATION(S) WITH UTILITY CO. PRIOR TO BID AND INCLUDE ALL COSTS IN BID.

POWER/TELECOMMUNICATIONS POLE WITH GUYING AS REQUIRED.

■■■■■■ POWER AND INSTRUMENTATION DUCT BANK – SEE DETAIL "E–DR".

POWER DISTRIBUTION EQUIPMENT.

LIGHTING PANEL – SURFACE MOUNTED.

TRANSFORMER – POWER.

SC*–**–*** TYPICAL CONTROL & INSTRUMENTATION WIRING MARK (WHERE "**" REPRESENTS A UNIQUE IDENTIFIER CONSISTING OF LETTERS AND NUMBERS) – SEE CONTROL & INSTRUMENTATION WIRING SCHEDULES.

DISCONNECT SWITCH – NONFUSED.

DISCONNECT SWITCH – FUSED.

M — MOTOR OUTLET – SIZE AS SHOWN.

UH — UNIT HEATER – ELECTRICAL – ARROW INDICATES DIRECTION.

CP — CONDENSATE PUMP – 120V–1ø – PROVIDE WITH LOCAL TOGGLE–TYPE MANUAL MOTOR STARTER DISCONNECT SWITCH..

T AC — THERMOSTAT – AIR CONDITIONING – LOW VOLTAGE – WALL MOUNTED AT 48" A.F.F. – LABEL FUNCTION WITH ENGRAVED NAMEPLATE.

PUSHBUTTON STATION – NUMBER OF BUTTONS AS SHOWN – SEE DETAIL "E–CS".

--G-- BARE SUPPLEMENTAL GROUND WIRE – #4/0G IF NOT INDICATED OTHERWISE – INSTALLED A MINIMUM OF 24" BELOW GRADE AND 24" MINIMUM FROM STRUCTURES WHERE POSSIBLE.

SUPPLEMENTAL GROUNDING SYSTEM – GROUND ROD – 3/4" x10'–0" COPPER–CLAD – TOP DRIVEN A MINIMUM OF 24" BELOW GRADE.

SUPPLEMENTAL GROUNDING SYSTEM – GROUND CONNECTION – CADWELD WHERE BELOW GRADE OR CONCEALED.

SUPPLEMENTAL GROUNDING SYSTEM – CAST GROUND PLATE ASSEMBLY (ERICO OR EQUAL) – CAST FLUSH WITHIN CONCRETE WITH FLEXIBLE BARE COPPER GROUND WIRE CONNECTIONS VIA COMPRESSION LUGS TO EQUIPMENT.

SUPPLEMENTAL GROUNDING SYSTEM – GROUND CONNECTION – TO EQUIPMENT OR STRUCTURE AS FOLLOWS (UNLESS NOTED OTHERWISE):

- GEQ #4/0 BARE COPPER GROUND WIRE (UNLESS INDICATED OTHERWISE) – BOND TO EQUIPMENT/MOTOR/PANEL/TRANSFORMER, ETC.
- GES #2 BARE COPPER GROUND WIRE – BOND TO EQUIPMENT STAND.
- GF #2 BARE COPPER GROUND WIRE – BOND TO FENCE POST.
- GHR #2/0G BARE COPPER GROUND WIRE – BOND TO HANDRAIL & WALKWAY STRUCTURE USING CAST GROUND PLATE & FLEXIBLE JUMPER – SEE DETAIL "E–MMG".
- GP #2 BARE COPPER GROUND WIRE – BOND TO PIPE FLANGE.
- GS #4/0 BARE COPPER GROUND WIRE – BOND TO STRUCTURE/REBAR/WIRE MESH REINFORCEMENT.

CR — CHLORINE RESIDUAL SENSOR.

PH — PH SENSOR.

FS — FLOAT SWITCH.

UT — ULTRASONIC LEVEL TRANSDUCER.

AIT — ANALOG INDICATING TRANSMITTER.

FIT — FLOW INDICATING TRANSMITTER.

LIT — LEVEL INDICATING TRANSMITTER.

PIT — PRESSURE INDICATING TRANSMITTER.

A / E-1 — DETAIL DESIGNATOR – "A" INDICATED DETAIL MARK – "E–1" INDICATED SHEET NUMBER WHERE DETAIL IS LOCATED (TYPICAL).

GENERAL ABBREVIATIONS:

- (EX) EXISTING TO REMAIN.
- (EX–R) EXISTING TO BE REMOVED – REMOVE ALL ASSOCIATED ELECTRICAL EQUIPMENT, DEVICES, CONDUIT AND WIRING CONNECTIONS TO OTHER ELECTRICAL ITEMS.
- (EX–RL) EXISTING TO BE RELOCATED – REMOVE ALL ASSOCIATED ELECTRICAL EQUIPMENT, DEVICES, CONDUIT AND WIRING AT EXISTING LOCATION. RELOCATE ITEM TO NEW LOCATION SHOWN ON ELECTRICAL PLANS.
- (EX–RP) EXISTING TO BE REPLACED – EXTEND AND RECONNECT EXISTING CONDUIT AND WIRING TO REPLACED ITEM.

ELECTRICAL ABBREVIATIONS:

A	AMPERES.	NSV	NEW, SPARE OR VACATED.
AIC	AMPERES INTERRUPTING CAPACITY.	OC	ON CENTER.
AFF	ABOVE FINISHED FLOOR.	P	POLES.
AL	ALUMINUM.	PF	POWER FACTOR.
ATS	AUTOMATIC TRANSFER SWITCH.	ø	PHASE.
AWG	AMERICAN WIRE GAUGE.	PVC	POLYVINYL CHLORIDE.
C	CONDUIT.		
CU	COPPER.	SLD	SINGLE LINE DIAGRAM.
EC	EMPTY CONDUIT. OR ELECTRICAL CONTRACTOR	SS	STAINLESS STEEL.
		UL	UNDERWRITERS LABORATORY.
FPN	FUSE PER NAMEPLATE.	UNO	UNLESS NOTED OTHERWISE.
G	GROUND CONDUCTOR.	V	VOLTS.
KVA	KILOVOLT–AMPERES.	W	WIRES.
KW	KILOWATT.		
LV	LOW VOLTAGE.	CFCI	CONTRACTOR FURNISHED, CONTRACTOR INSTALLED.
MCM	THOUSAND CIRCULAR MILS.		
MV	MEDIUM VOLTAGE.	CFOI	CONTRACTOR FURNISHED, OWNER INSTALLED.
N	NEUTRAL.		
NEC	NATIONAL ELECTRICAL CODE.	OFOI	OWNER FURNISHED, OWNER INSTALLED.
NEMA	NATIONAL ELECTRICAL MANUFACTURER ASSOCIATION.	OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED.
NIC	NOT IN CONTRACT.		

TYPICAL CIRCUITRY DESIGNATIONS:

2 SETS OF 4#3/0 & 1#3G – 2 1/2"C

- 2 — QUANTITY OF PARALLEL SETS OF THE PHASE/NEUTRAL CONDUCTORS, GROUND CONDUCTOR AND CONDUIT SPECIFIED.
- 4 — QUANTITY OF PHASE/NEUTRAL CONDUCTORS (PER SET).
- 3 — PHASE/NEUTRAL CONDUCTOR WIRE GAUGE.
- 3 — QUANTITY OF GROUND CONDUCTORS (PER SET)
- G — GROUND CONDUCTOR WIRE GAUGE.
- 2 1/2"C — CONDUIT SIZE.

MULTI–CONDUCTOR CONTROL 600V TRAY CABLE DESIGNATIONS:

(2) 4C#14 W/G – 1 1/4"C

- (2) — QUANTITY OF MULTI–CONDUCTOR CABLES OF THE TYPE SPECIFIED WITHIN THE SPECIFIED CONDUIT.
- 4C — QUANTITY OF CONDUCTORS IN EACH CABLE SHEATH (NOT INCLUDING GROUND).
- #14 — WIRE GAUGE.
- W/G — "W/G" = WITH ADDITIONAL INTEGRAL GROUND CONDUCTOR WITH GREEN INSULATION IN EACH CABLE SHEATH.
- 1 1/4"C — CONDUIT SIZE.

TWISTED, SHIELDED INSTRUMENTATION CABLE DESIGNATIONS:

(2) #16TSP – 1"C

- (2) — QUANTITY OF INSTRUMENTATION CABLES IN THE SPECIFIED CONDUIT.
- #16 — WIRE GAUGE.
- TSP — "TSP" = TWISTED SHIELDED PAIR.
- 1"C — CONDUIT SIZE.

GENERAL ELECTRICAL NOTES

1. SPECIAL ATTENTION IS CALLED TO THE FACT THAT THE REQUIRED WORK IS AT OPERATING FACILITIES, AND AS SUCH, NO UNNECESSARY SHUTDOWNS WILL BE ALLOWED. ANY NECESSARY SHUTDOWNS SHALL BE APPROVED IN WRITING BY THE PLANT MANAGER A MINIMUM OF TWO (2) WEEKS IN ADVANCE. TEMPORARY/PORTABLE PUMPING PROVISIONS (AND OTHER TEMPORARY PROVISIONS AS REQUIRED FOR OPERATION OF THE EXISTING SYSTEMS) SHALL BE PROVIDED BY THE CONTRACTOR IF OWNER–MANDATED MAXIMUM SHUTDOWN PERIODS ARE ANTICIPATED OR ARE POSSIBLE.
2. ELECTRICAL PLANS & DETAILS INDICATE TYPICAL WIRING REQUIREMENTS FOR PROCESS EQUIPMENT. VERIFY EXACT WIRING REQUIREMENTS & ALL DEVICE LOCATIONS WITH APPROVED MANUFACTURER'S SHOP DRAWINGS PRIOR TO ROUGH–IN. NO ADDITIONAL COMPENSATION WILL BE PAID FOR MINOR CIRCUITRY ADJUSTMENTS REQUIRED TO COMPLY WITH MANUFACTURERS INSTALLATION DETAILS.
3. THIS CONTRACTOR SHALL VERIFY EXACT REQUIREMENTS FOR ALL MECHANICAL EQUIPMENT FROM MANUFACTURER'S RECOMMENDATIONS PRIOR TO ROUGHING IN CONDUIT AND SHALL ADJUST CONDUIT SIZE, WIRE SIZE AND CIRCUIT PROTECTION SIZE ACCORDINGLY. IF REQUIREMENTS ARE LARGER THAN CALLED FOR ON ELECTRICAL PLANS NOTIFY ENGINEER IMMEDIATELY.
4. CONTRACTOR SHALL VISIT THE SITE(S) OF THE WORK PRIOR TO SUBMITTING BID TO EXAMINE CAREFULLY LOCAL CONDITIONS AND DIFFICULTIES TO BE ENCOUNTERED. ANY DISCREPANCY BETWEEN PLANS AND EXISTING CONDITIONS SHALL IMMEDIATELY BE CALLED TO THE ATTENTION OF THE ENGINEER.
5. ALL EQUIPMENT SHALL BE GROUNDED AND BONDED IN ACCORDANCE WITH NEC.
6. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLATION AND MOUNTING OF ALL INSTRUMENTATION DEVICES (EXCLUDING THOSE PRE–INSTALLED ON SKIDS BY THE MANUFACTURER). SEE INSTALLATION DETAILS ON CIVIL & ELECTRICAL DRAWINGS AND PROVIDED BY SUPPLIERS. COORDINATE ALL REQUIREMENTS WITH SUPPLIERS PRIOR TO ROUGH–IN.
7. ALL HVAC CIRCUITRY (INCLUDING CONTROL CIRCUITRY NOT SHOWN ON THESE PLANS) SHALL BE INSTALLED TO MEET DIVISION 26 SPECIFICATIONS. COORDINATE ALL HVAC CONTROLS CIRCUITRY REQUIRED WITH HVAC CONTRACTOR PRIOR TO BID.
8. REMOVE ALL EXISTING ELECTRICAL EQUIPMENT AND WIRING MADE OBSOLETE BY THIS RENOVATION AND DISPOSE OF AS DIRECTED BY THE ENGINEER.
9. THIS CONTRACTOR SHALL FURNISH ALL MATERIALS AND LABOR NECESSARY TO EXTEND CIRCUITS AND MAKE RECONNECTIONS TO ANY ACTIVE ELECTRICAL DEVICES ON WHICH THE BRANCH CIRCUIT IS INTERRUPTED BY THIS ALTERATION. CARE SHALL BE TAKEN TO INSURE THAT EXISTING PANEL AND FEEDER RATINGS ARE NOT EXCEEDED.
10. WET OR PROCESS AREAS (FOR USE IN DETERMINING TYPES OF MATERIALS REQUIRED PER ELECTRICAL SPECIFICATIONS) SHALL BE DEFINED AS ALL AREAS WITHIN THE PROJECT SCOPE EXCEPT THE FOLLOWING:
    A. DRY, NON–PROCESS, INTERIOR AREAS: EXISTING ELECTRICAL ROOM.
    B. EXTREMELY CORROSIVE AREAS: EXISTING CHEMICAL ROOM, CHLORINE ROOM, LIME ROOM, AND LIME STORAGE ROOM.
11. ALL INDICATING TRANSMITTER DEVICES (FLOW TRANSMITTERS, LEVEL TRANSMITTERS, ETC.) LOCATED IN EXTERIOR ENVIRONMENTS & NOT UNDER CANOPIES SHALL BE INSTALLED WITHIN SUN/RAIN SHIELDS PER DETAIL "E–SRS". CONTRACTOR SHALL PROVIDE SUN/RAIN SHIELDS (INCLUDING INSTRUMENTS FURNISHED BY OTHERS). CONTRACTOR SHALL COORDINATE WITH INSTRUMENT SUPPLIER(S) PRIOR TO SUBMITTAL OF SHOP DRAWINGS.
12. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING 120V AND ANALOG SURGE PROTECTION DEVICES AT ALL INSTRUMENTS LOCATED IN EXTERIOR ENVIRONMENTS (OR IN SEPARATE BUILDINGS FROM THE SCADA/CONTROL PANEL TO WHICH THEY CONNECT) (INCLUDING INSTRUMENTS FURNISHED BY OTHERS). CONTRACTOR SHALL COORDINATE WITH INSTRUMENT SUPPLIER(S) PRIOR TO SUBMITTAL OF SHOP DRAWINGS.
    A. SURGE PROTECTION DEVICES AT 2–WIRE INSTRUMENTS SHALL BE DEHN DEHNPIPE SERIES (IP67 STAINLESS STEEL DEVICE WITH 10kA TOTAL NOMINAL DISCHARGE CURRENT PER LINE) OR EQUAL BY MTL TECHNOLOGIES.
    B. SURGE PROTECTION DEVICES AT 4–WIRE INSTRUMENTS SHALL BE EDCO SLAC SERIES (NEMA 4X DEVICE WITH VIEWING WINDOW, 10kA DISCHARGE CURRENT PER LINE FOR ANALOG, 15kA DISCHARGE CURRENT PER LINE FOR 120V POWER) OR EQUAL BY DEHN.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING IDENTIFICATION/LABELING FOR ALL NEW, RENAMED, OR REFED INSTRUMENTS, UTILIZATION EQUIPMENT (PUMPS, BLOWERS, ETC.), CONTROL DEVICES, CONTROL PANELS, STARTERS, POWER PANELS, ETC. (REGARDLESS OF WHICH ENTITY PROVIDES THE EQUIPMENT) PER DETAILED REQUIREMENTS OF SPECIFICATION SECTION 16075.
14. CONTRACTOR SHALL VERIFY ALL REQUIREMENTS FOR POWER AND TELECOMM SERVICES WITH UTILITY COMPANIES PRIOR TO SUBMITTING BID. IF THEIR REQUIREMENTS ARE AT A VARIANCE WITH THOSE SHOWN ON PLANS THE CONTRACTOR SHALL INFORM ENGINEER IMMEDIATELY. ALL COSTS INCURRED WITH UTILITY COMPANIES FOR SERVICES SHALL BE INCLUDED IN BID PRICE. IF SUCH COSTS ARE NOT AVAILABLE AT BID TIME CONTRACTOR SHALL INCLUDE WITH BID A LETTER FROM A RESPONSIBLE PARTY WITH THE UTILITY COMPANY STATING SUCH, AND COSTS WILL THEN BE EXCLUDED FROM THE BID PRICE.

KREBS ENGINEERING

ALABAMA LICENSED No. 27420 PROFESSIONAL ENGINEER PHILIP D. BLACK

12/8/2023

JACKSON, RENFRO & ASSOCIATES, INC.
ELECTRICAL ENGINEERING & DESIGN
PHILIP D. BLACK, PE
phil@jrare.com
(D) 205.536.7120 (P) 205.995.1078
JRA JOB NO. 223217
31 INVERNESS CENTER PKWY • SUITE I
BIRMINGHAM, ALABAMA • 35242

CITY OF FAIRHOPE
WTP No. 1 IMPROVEMENTS
PHASE 1
FAIRHOPE, ALABAMA

CITY OF FAIRHOPE ALABAMA

Designed	Project No.
PDB	23040.3
Drawn: ZJG	
Checked: PDB	

Revisions

No.	Date	Description

Sheet Title: ELECTRICAL LEGEND AND NOTES

Issue Date	Sheet No.
DEC, 2023	E0-01
Sequence 19 of 37	

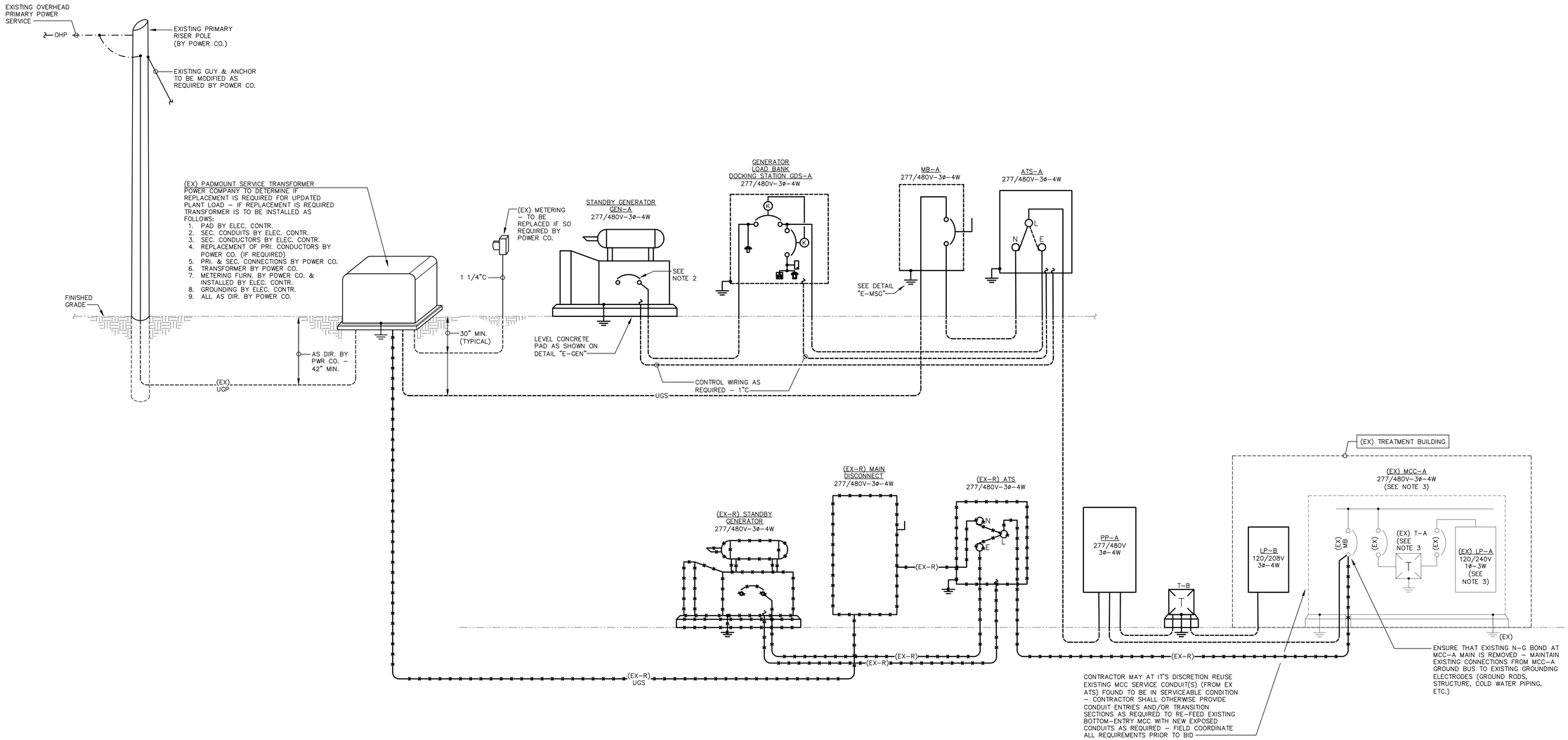


DIAGRAM NOTES

1. REFER TO EQUIPMENT, PANELBOARD, MCC AND TRANSFORMER SCHEDULES FOR ALL APPLICABLE FEEDER SIZES, BREAKER RATINGS, BUS RATINGS, TRANSFORMER RATINGS, ETC. NOT SHOWN ON THIS DIAGRAM.
2. NEUTRAL–GROUND BONDS SHALL ONLY BE MADE AT THE FOLLOWING LOCATIONS:
   A. MAIN BREAKER MB–A.
   B. SECONDARY SIDE OF ALL TRANSFORMERS.
3. PROVIDE NEW ENGRAVED MASTER NAMEPLATES FOR ALL EXISTING DISTRIBUTION EQUIPMENT (MCC'S, PANELS, TRANSFORMERS) PER DETAIL "E–EDL".

KREBS ENGINEERING
ALABAMA LICENSED No. 27420 PROFESSIONAL ENGINEER PHILIP D. BLACK
12/8/2023
JACKSON, RENFRO & ASSOCIATES, INC.
ELECTRICAL ENGINEERING & DESIGN
PHILIP D. BLACK, PE
phil@jrare.com
(O) 205.536.7120 (F) 205.595.1078
JRA JOB NO. 223217
31 INVERNESS CENTER PKWY • SUITE 1
BIRMINGHAM, ALABAMA • 35242

CITY OF FAIRHOPE

WTP No. 1 IMPROVEMENTS PHASE 1

FAIRHOPE, ALABAMA

CITY OF FAIRHOPE ALABAMA

Designed	Project No.
PDB	23040.3
Drawn	
ZJG	
Checked	
PDB	

Revisions

No.	Date	Description

Sheet Title: SINGLE LINE DIAGRAM

Issue Date: DEC, 2023

Sheet No.: E0-02

Sequence: 20 of 37

A1 | SINGLE LINE DIAGRAM | SCALE: NONE

MAIN BREAKER SCHEDULE - MB-A

PANEL TYPE:	ENCLOSED ELECTRONIC TRIP LSI TYPE	AIC RATING:	50KAIC (MINIMUM)
VOLTAGE:	277/480V-3P-4W	MOUNTING:	SURFACE
AMPS & TYPE:	800/3 MAIN BKR (SEE NOTE 3)	LOCATION:	ELECTRICAL EQUIPMENT STAND
FED FROM:	UTILITY	FEEDER:	3 SETS OF 4-300MCM - 3"C

CIR. NO.	DESCRIPTION	VOLTS	P	HP	KW OR KVA	AMPS	BKR SIZE	LOCAL SAFETY SW. RATING	WIRE AND COND. SIZE	REMARKS
1	ATS-A (N)	277/480	3		414.2		800/3	-	3 SETS OF 4-300MCM & 1#1/0G - 3"C	

TOTAL CONNECTED LOAD:	552.8	KVA
	691.0	AMPS
TOTAL DEMAND LOAD:	408.8	KVA
	511.0	AMPS
TOTAL COMPUTED LOAD:	414.2	KVA
	517.7	AMPS

NOTES:
1. ENCLOSURE SHALL BE NEMA 4X STAINLESS STEEL.
2. EQUIPMENT SHALL BE SERVICE-ENTRANCE RATED.
3. MAIN BREAKER SHALL BE ELEC. TRIP LSI TYPE.

GENERATOR SCHEDULE - GEN-A

KW RATING:	500KW (MINIMUM)	SKVA RATING (AT 35%V. DIP):	
VOLTAGE:	277/480V-3P-4W	SOUND ATTENUATION:	CRITICAL SILENCER
FUEL TYPE:	DIESEL	LOCATION:	EXTERIOR

CIR. NO.	DESCRIPTION	VOLTS	P	HP	KW OR KVA	AMPS	BKR SIZE	SWITCH SIZE: SWITCH AMPS	SWITCH SIZE: F-TRON AMPS	WIRE AND COND. SIZE
1	GDS-A	277/480	3		414.2		800/3			3 SETS OF 4-300MCM & 1#1/0G - 3"C

TOTAL CONNECTED LOAD:	552.8	KVA
	691.0	AMPS
TOTAL DEMAND LOAD:	408.8	KVA
	511.0	AMPS
TOTAL COMPUTED LOAD:	414.2	KVA
	517.7	AMPS

NOTES:
1. THE GENERATOR SUPPLIER SHALL SUBMIT A SIZING REPORT SHOWING THAT THE MAXIMUM GENERATOR VOLTAGE DIP WILL BE LESS THAN 20% & FREQUENCY DIP LESS THAN 10% WITH THE LOAD(S) SEPERATED INTO THREE (3) STEPS AS FOLLOWS:
   STEP 1 - 32KVA MISCELLANEOUS THREE-PHASE LINEAR LOAD, TWO (2) 50HP - 3PHASE PUMP MOTORS WITH PART-WINDING STARTERS.
   STEP 2 - ONE (1) 60HP - 3PHASE PUMP MOTOR WITH RVSS, (400% CURRENT LIMIT) AND ONE (1) 50HP 3PHASE PUMP MOTOR WITH PART-WINDING STARTER.
   STEP 3 - ONE (1) 150HP PUMP MOTOR WITH ACTIVE FRONT VFD.
2. CONTRACTOR SHALL CONFIRM THE EXACT STARTER TYPES AND MOTOR CHARACTERISTICS PRIOR TO SUBMITTING SHOP DRAWINGS.
3. THE GENRATOR SUPPLIER SHALL DESIGN GENERATOR SUCH THAT NO CIRCUIT BREAKER, CONTROL PANEL, ETC. IS ABOVE 6'7" ABOVE FINISHED GRADE.

GENERATOR DOCKING STATION SCHEDULE - GDS-A

PANEL TYPE:	SEE NOTE 1	AIC RATING:	42KAIC (MINIMUM)
VOLTAGE:	277/480V-3P-4W	MOUNTING:	SURFACE
AMPS & TYPE:	TWO (2) 800/3	LOCATION:	ELECTRICAL EQUIPMENT STAND
FED FROM:	GEN-A	FEEDER:	SEE GENERATOR SCHEDULE - GEN-A

CIR. NO.	DESCRIPTION	VOLTS	P	HP	KW OR KVA	AMPS	BKR SIZE	LOCAL SAFETY SW. RATING	WIRE AND COND. SIZE	REMARKS
1	ATS-A (E)	277/480	3		414.2		800/3	-	3 SETS OF 4-300MCM & 1#1/0G - 3"C	

TOTAL CONNECTED LOAD:	552.8	KVA
	691.0	AMPS
TOTAL DEMAND LOAD:	408.8	KVA
	511.0	AMPS
TOTAL COMPUTED LOAD:	414.2	KVA
	517.7	AMPS

NOTES:
1. EQUIPMENT SHALL BE TRYSTAR DUAL PURPOSE DOCKING STATION WITH NEMA 3R STAINLESS STEEL ENCLOSURE WITH MALE CAM-LOK CONNECTIONS (FOR PORTABLE GENERATOR CONNECTION), FEMALE CAM-LOK CONNECTIONS (FOR LOAD BANK CONNECTIONS), HARDWIRED LUGS FOR CONNECTION TO DOWNSTREAM EQUIPMENT, PHASE REVERSAL PROTECTION RELAY, BREAKER FOR PERMANENT GENERATOR FEED, BREAKER FOR TEMPORARY GENERATOR FEED, AND KIRK KEY INTERLOCK SYSTEM AND SCHEME FOR BREAKERS THAT SHALL ALLOW ONLY ONE BREAKER TO BE CLOSED AT ANY GIVEN TIME. SEE SPECIFICATION SECTION 26 36 33 FOR ADDITIONAL REQUIREMENTS.

AUTOMATIC TRANSFER SWITCH SCHEDULE - ATS-A

KAIC / WCR RATING:	50KAIC (MINIMUM)	NORMAL FED FROM:	MB-A
VOLTAGE:	277/480V-3P-4W	NORMAL FEEDER:	SEE MAIN BREAKER SCHEDULE - MB-A
AMP RATING:	800 AMP	EMERGENCY FED FROM:	GDS-A
LOCATION:	ELECTRICAL EQUIPMENT STAND	EMEGENCY FEEDER:	SEE GENERATOR DOCKING STATION SCHEDULE - GDS-A

LOAD SIDE FEEDER DESCRIPTION	VOLTS	P	HP	KW OR KVA	AMPS	WIRE AND COND. SIZE
MP-A	277/480	3		414.2		3 SETS OF 4-300MCM & 1#1/0G - 3"C

EMERGENCY			NORMAL	NOTES:
552.8	KVA	TOTAL CONNECTED LOAD:	552.8	KVA
691.0	AMPS		691.0	AMPS
408.8	KVA	TOTAL DEMAND LOAD:	408.8	KVA
511.0	AMPS		511.0	AMPS
414.2	KVA	TOTAL COMPUTED LOAD:	414.2	KVA
517.7	AMPS		517.7	AMPS

PANELBOARD SCHEDULE - MP-A

PANEL TYPE:	SQUARE 'D' I-LINE SERIES	AIC RATING:	42KAIC (MINIMUM)
VOLTAGE:	277/480V-3P-4W	MOUNTING:	SURFACE
AMPS & TYPE:	800/3 MAIN BKR (ELEC. TRIP LSI TYPE)	LOCATION:	ELECTRICAL ROOM
FED FROM:	ATS-A	FEEDER:	SEE AUTOMATIC TRANSFER SWITCH SCHEDULE - ATS-A

CIR. NO.	DESCRIPTION	VOLTS	P	HP	KW OR KVA	AMPS	BKR SIZE	LOCAL SAFETY SW. RATING	WIRE AND COND. SIZE	REMARKS
1	MCC-A	277/480	3		184.9		400/3	-	4#500MCM & 1#3G - 4"C	ELEC. TRIP LSI TYPE
2	FINISHED WATER PUMP NO. 1	480	3	150			400/3	-	3-350MCM & 1#4G - 3"C	ELEC. TRIP LSI TYPE
3	FINISHED WATER PUMP NO. 2	480	3	150			400/3	-	3-350MCM & 1#4G - 3"C	ELEC. TRIP LSI TYPE
4	WELL PUMP NO. 8B RVSS	480	3	60			175/3	-	3#1 & 1#4G - 2 1/2"C	ELEC. TRIP LSI TYPE
5	LP-B (45 KVA X-FORMER)	480	3		22.0		80/3	-	3#4 & 1#8G - 1 1/4"C	
6	AERATOR NO. 2 STARTER	480	3	1			15/3	-	3#12 & 1#12G - 3/4"C	
7	SPARE	277/480	3				20/3	-		
8-12	SPACES	277/480	3				-/3	-		

TOTAL CONNECTED LOAD:	552.8	KVA
	691.0	AMPS
TOTAL DEMAND LOAD:	408.8	KVA
	511.0	AMPS
TOTAL COMPUTED LOAD:	414.2	KVA
	517.7	AMPS

NOTES:
1. PROVIDE INTEGRAL 240KA (PER PHASE) SURGE PROTECTION DEVICE.
2. ENCLOSURE SHALL BE NEMA 4X STAINLESS STEEL.
3. PROVIDE INTEGRAL POWER METER (SQ. D #PM5563) WITH DOOR-MOUNTED DISPLAY & ETHERNET COMMUNICATION CARD.

PANELBOARD SCHEDULE - LP-B

PANEL TYPE:	SQUARE 'D' TYPE NQ	AIC RATING:	10KAIC (MINIMUM)
VOLTAGE	120/208V-3P-4W	MOUNTING:	SURFACE
AMPS & TYPE:	150/3 MAIN BKR	LOCATION:	ELECTRICAL ROOM
FED FROM:	MP-A	FEEDER:	4#1/0 & 1#6G - 2"C

CKT. NO.	NOTES	BKR	DESCRIPTION	WATTS	PHASE	WATTS	DESCRIPTION	BKR	NOTES	CKT NO.
1	-	20/1	WELL NO. 8B E.Q. STAND RECEP.	200	A	2,600	OHP-1	40/2	-	22
2	-	20/1	WELL NO. 8B FLOW TRANSMITTER	500	B	2,600	|	|	-	23
3	-	20/1	SPARE		C	2,600	OHP-2	40/2	-	24
4	-	20/1	SPARE		A	2,600	|	|	-	25
5	-	20/1	FWFV SUMP PUMP RECEPTACLE	400	B	3,000	GEN-A LOAD CENTER	60/2	-	26
6	-	20/1	ELECTRICAL EQ. STAND RECEP.	200	C	3,000	|	|	-	27
7	-	20/1	GDS-A INTEGRAL HEATER	800	A		SPARE	20/1	-	28
8	-	20/1	CLEARWELL LEVEL TRANSMITTER	200	B		SPARE	20/1	-	29
9	LON	20/1	CLEARWELL LLCO	200	C		SPARE	20/1	-	30
10	LON	20/1	SCADA PLC-A	800	A		SPARE	20/1	-	31
11	LON	20/1	R.W. FLOW AND TANK LEVEL C.P.	200	B		SPARE	20/1	-	32
12	-	20/1	HVAC CONDENSATE PUMPS	200	C		SPARE	20/1	-	33
13	-	20/1	HVAC EXTERIOR RECTPTACLE	200	A		SPARE	20/1	-	34
14	-	20/1	SPARE		B		SPARE	20/1	-	35
15	-	20/1	SPARE		C			20/1	-	36
16	-	20/1	SPARE		A			20/1	-	37
17	-	20/1			B			20/1	-	38
18	-	20/1			C			20/1	-	39
19	-	20/1			A			20/1	-	40
20	-	20/1			B			20/1	-	41
21	-	20/1			C			20/1	-	42

NOTES:
1. PROVIDE INTEGRAL 160KA (PER PHASE) SURGE PROTECTION DEVICE.

PH. A:	PH. B:	PH. C:
7,200	6,900	6,200

TOTAL CONNECTED LOAD:	20.3	KVA
	56.4	AMPS
TOTAL DEMAND LOAD:	20.3	KVA
	56.4	AMPS
TOTAL COMPUTED LOAD:	22.0	KVA
	61.1	AMPS

TRANSFORMER SCHEDULE

MARK	SIZE (KVA)	DESCRIPTION	PRIMARY VOLTAGE & PHASE	SECONDARY VOLTAGE & PHASE	PANEL FED	MOUNTING	GROUND SIZE	REMARKS
T-B	45	DRY-TYPE	480V-3P-3W	120/208V-3P-4W	LP-B	6" CONCRETE PAD	#6	PROVIDE NEMA 3R ENCLOSURE / WEATHERSHIELD

TRANSFORMER SCHEDULE NOTES:
1. EXACT TRANSFORMER LOCATIONS SHALL BE FIELD COORDINATED TO PROVIDE CODE-REQUIRED CLEARANCES AND WORKING SPACES AROUND TRANSFORMERS AND ADJACENT EQUIPMENT (SUCH AS PANELBOARDS).
2. ALL TRANSFORMERS SHALL BE MOUNTED ON VIBRATION ISOLATORS PER SPECIFICATION REQUIREMENTS.

KREBS ENGINEERING

ALABAMA LICENSED No. 27420 PROFESSIONAL ENGINEER PHILIP D. BLACK

12/8/2023

JACKSON, RENFRO & ASSOCIATES, INC.
ELECTRICAL ENGINEERING & DESIGN
PHILIP D. BLACK, PE
phil@jrae.com
(D) 205.536.7120 (P) 205.995.1078
JRA JOB NO. 223217
31 INVERNESS CENTER PKWY. • SUITE I
BIRMINGHAM, ALABAMA • 35242

CITY OF FAIRHOPE
WTP No. 1 IMPROVEMENTS
PHASE 1
FAIRHOPE, ALABAMA

CITY OF FAIRHOPE ALABAMA

Designed: PDB	Project No.: 23040.3
Drawn: ZJG	
Checked: PDB	

Revisions

No.	Date	Description

Sheet Title: ELECTRICAL SCHEDULES

Issue Date	Sheet No.
DEC, 2023	E0-11
Sequence: 21 of 37	

A1 | ELECTRICAL SCHEDULES | SCALE: NONE

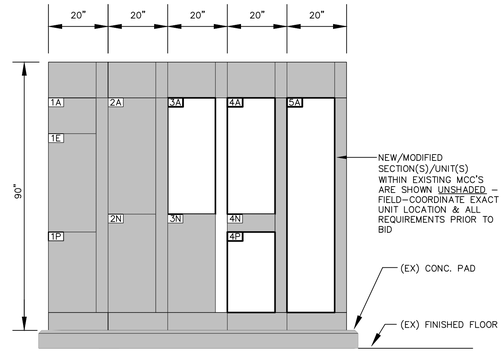
MOTOR CONTROL CENTER SCHEDULE - (EX) MCC-A

MCC TYPE:	CUTLER-HAMMER FREEDEOM SERIES 2100	AIC RATING:	65KAIC (MINIMUM) (EXISTING)
VOLTAGE:	277/480V-3P-4W	LOCATION:	ELECTRICAL ROOM
MAIN AMPS:	400/3 MAIN BKR (EXISTING)	REMARKS:	
FED FROM:	MP-A	FEEDER:	SEE PANELBOARD SCHEDULE - MP-A

UNIT NO.	NAMEPLATE DESCRIPTION	MCC UNIT TYPE	ELECT. EQUIP. CHARACTERISTICS					STARTER NEMA OR AMPERAGE RATING	CIR. BKR. OR MCP	ELEM. DIAG. NO.	LOCAL SAFETY SWITCH RATING	WIRE AND COND. SIZE	REMARKS
			V	P	HP	KW OR KVA	AMPS						
1 A	(EX) AERATOR NO. 1		480	3	1/2						-		**SEE NOTE 3**
1 E	(EX) LP-A (25 KVA X-FORMER)	EXISTING PANEL - WITHIN MCC	120/240	1		28.0					-		**SEE NOTE 4**
1 P	TRANSFORMER T-A	EXISTING 25KVA TRANSFORMER - WITHIN MCC	480	1							-		**SEE NOTE 4**
2 A	(EX) WELL NO. 8	EXISTING STARTER	480	3	50						-		**SEE NOTE 3**
2 N	(EX) WELL NO. 1	EXISTING STARTER	480	3	50						-		**SEE NOTE 3**
3 A	**(EX) HIGH SERVICE PUMP NO .1**	**EXISTING STARTER**	**480**	**3**							**-**		**RELABEL AS "SPARE" (SEE NOTE 1)**
3 N	(EX) WELL NO. 7	EXISTING STARTER	480	3	50						-		**SEE NOTE 3**
4 A	**(EX) HIGH SERVICE PUMP NO. 1**	**EXISTING STARTER**	**480**	**3**							**-**		**RELABEL AS "SPARE" (SEE NOTE 1)**
4 N	SPACE	PROVISIONS FOR FUTURE PLUG-IN UNITS							-/		-		
4 P	**(EX) MAIN BREAKER**	**EXISTING MAIN BREAKER**	**277/480**	**3**							**-**		**SEE NOTE 4**
5 A	**(EX) CONTROLS UNIT**	**EXISTING CONTROLS SECTION**	**120**	**1**							**-**		**(SEE NOTE 2)**

NEW/MODIFIED SECTION(S)/UNIT(S) WITHIN EXISTING MCC'S ARE SHOWN UNSHADED. – FIELD–COORDINATE EXACT UNIT LOCATION & ALL REQUIREMENTS PRIOR TO BID

NOTES:
1. FOR INDICATED UNITS, REMOVE ALL (EX) FIELD WIRING AND RELABEL AS INDICATED.
2. FOR INDICATED UNITS REMOVE ALL OBSOLETE INTERIOR AND DOOR MOUNTED COMPONENTS. REPLACE EXISTING UNIT DOOR.
3. FOR INDICATED UNITS, MAINTAIN ALL EXISTING CONTROL RELAY, CONTACTS, TERMINAL BLOCKS, ETC. FOR EXISTING NON-OBSOLETE CHEMICAL CONTROL SYSTEMS. ADD NEW RELAYING, CONTACTS TERMINAL BLOCKS, ETC. FOR NEW ON/OFF CONTROL/MONITORING, ALARMS, ETC. SEE PLANS AND SCADA POINTS LISTS/SCHEDULES FOR ALL REQUIREMENTS.
4. FOR INDICATED UNITS, RELABEL PER DETAIL "E-EDL".



(EX) MCC–A ELEVATION

SCALE : 1/2" = 1'–0"

SEPARATELY ENCLOSED STARTERS SCHEDULE

"FED FROM" EQUIPMENT	NAMEPLATE DESCRIPTION	UNIT DESCRIPTION	MOUNTING/ENCLOSURE	LOCATION	CHARACTERISTICS					STARTER SIZE/ CONTINUOUS RATING (MIN.)	ASSOCIATED ELEM. DIAG.	WIRE & COND. SIZE (TO MOTOR)	KAIC RATING	REMARKS
					V	P	HP	KW	AMPS					
MP-A	WELL PUMP NO. 8B RVSS	COMBINATION RVSS WITH MCP WITH LINE ISOLATION CONTACTOR, SPD, AND SHORTING CONTACTOR	SEPARATE NEMA 12 ENCLOSURE	FINISHED WATER PUMP ROOM	480	3	60			96 AMPS	1	3#1 & 1#4G - 2"C	42KAIC	
MP-A	AERATOR NO. 2 STARTER	COMBINATION FVNR STARTER WITH MCP	SEPARATE NEMA 12 ENCLOSURE	FINISHED WATER PUMP ROOM	480	3	1			NEMA 1	2	3#12 & 1#12G - 3/4"C	42KAIC	
MP-A	FINISHED WATER PUMP NO. 1 VFD	COMBINATION LOW-HARMONIC ACTIVE FRON END (AFE) VARIABLE TORQUE VFD WITH MCP, LINE ISOLATION CONTACTOR, SPD, BYPASS STARTER, AND ACCESSORIES PER SPECS	SEPARATE NEMA 12 ENCLOSURE	FINISHED WATER PUMP ROOM	480	3	150			240 AMPS	4	(1) 3C#313MCM W/G (SHIELDED VFD CABLING) - 3"C	42KAIC	OWNER-FURNISHED CONTRACTOR-INSTALLED VFD
MP-A	FINISHED WATER PUMP NO. 2 VFD	COMBINATION LOW-HARMONIC ACTIVE FRON END (AFE) VARIABLE TORQUE VFD WITH MCP, LINE ISOLATION CONTACTOR, SPD, BYPASS STARTER, AND ACCESSORIES PER SPECS	SEPARATE NEMA 12 ENCLOSURE	FINISHED WATER PUMP ROOM	480	3	150			240 AMPS	4	(1) 3C#313MCM W/G (SHIELDED VFD CABLING) - 3"C	42KAIC	OWNER-FURNISHED CONTRACTOR-INSTALLED VFD

NOTES:
1. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

KREBS ENGINEERING
ALABAMA LICENSED No. 27420 PROFESSIONAL ENGINEER PHILIP D. BLACK
12/8/2023

JACKSON, RENFRO & ASSOCIATES, INC.
ELECTRICAL ENGINEERING & DESIGN
PHILIP D. BLACK, PE
phil@jrae.com
(D) 205.536.7120 (P) 205.995.1078
JRA JOB NO. 223217
31 INVERNESS CENTER PKWY • SUITE 1
BIRMINGHAM, ALABAMA • 35242

CITY OF FAIRHOPE
WTP No. 1 IMPROVEMENTS
PHASE 1
FAIRHOPE, ALABAMA

CITY OF FAIRHOPE ALABAMA

Designed: PDB	Project No.: 23040.3
Drawn: ZJG	
Checked: PDB	

Revisions

No.	Date	Description

Sheet Title: ELECTRICAL SCHEDULES

Issue Date: DEC, 2023
Sheet No.: E0-12
Sequence: 22 of 37

A1 | ELECTRICAL SCHEDULES | SCALE: NONE

SEPARATELY ENCLOSED CONTROL PANELS SCHEDULE

NAMEPLATE DESCRIPTION	EQUIPMENT ID	UNIT DESCRIPTION	"FED FROM" EQUIPMENT	MOUNTING/ENCLOSURE	FURNISHED BY	INSTALLED BY	ASSOCIATED SPECIFICATION SECTIONS	ASSOCIATED ELEM. DIAG.	MINIMUM KAIC RATING
RAW WATER FLOW AND TANK LEVEL TRANSMITTER CONTROL PANEL	20-CP-101	120V CONTROL PANEL	LP-B	SEPARATE NEMA 12 ENCLOSURE	SCADA INTEGRATOR	CONTRACTOR	26 29 00 & 27 60 00	N/A	10KAIC
CLEARWELL LOW LEVEL CUTOFF CONTROL PANEL	30-CP-101	120V CONTROL PANEL	LP-A	SEPARATE NEMA 12 ENCLOSURE	SCADA INTEGRATOR	CONTRACTOR	26 29 00 & 27 60 00	3	10KAIC
SCADA PLC-A	90-PLC-101	120V CONTROL PANEL	LP-A	SEPARATE NEMA 12 ENCLOSURE	SCADA INTEGRATOR	CONTRACTOR	26 29 00 & 27 60 00	N/A	10KAIC

NOTES:
1. SEE SPECIFICATIONS SECTION 26 29 00 ("MANUFACTURED CONTROL PANELS") FOR ADDITIONAL REQUIREMENTS.
2. THIS SCHEDULE IS NOT INTENDED TO IDENTIFY ALL CONTROL PANELS REQUIRED FOR PROJECT (SUCH AS HVAC PANELS, ETC.), BUT IDENTIFIES MAJOR PANELS ONLY. REFER TO PLANS & SPECIFICATIONS FOR ADDITIONAL CONTROL PANEL REQUIREMENTS.

CONTROL & INSTRUMENTATION WIRING SCHEDULES LEGEND & NOTES

LEGEND:
"DI" - DISCRETE INPUT POINT
"DO" - DISCRETE OUTPUT POINT
"AI" - ANALOG INPUT POINT
"AO" - ANALOG OUTPUT POINT

NOTES:
1. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS & INFORMATION.
2. ALL CONTROL CABLING (IDENTIFIED WITH "*C#14" OR SIMILAR DESIGNATIONS) SHALL BE 600V MULTI-CONDUCTOR TRAY CABLE PER SPECIFICATION REQUIREMENTS.
3. ALL INSTRUMENTATION CABLING (IDENTIFIED WITH "*SP" OR "*SHD" DESIGNATIONS) SHALL BE 300V TWISTED, OVERALL-SHIELDED TRAY CABLE.
4. ALL NETWORKED POINTS LISTED ARE REPRESENTATIVE ONLY. EQUIPMENT SUPPLIERS OF PANELS/EQUIPMENT CONNECTED TO SCADA SYSTEM VIA NETWORK CONNECTIONS SHALL PROVIDE REGISTER LISTS OF ALL AVAILABLE POINTS TO THE SCADA INTEGRATOR AND CIVIL ENGINEER PRIOR TO PREPARATION OF SHOP DRAWINGS. SCADA INTEGRATOR SHALL PROVIDE PROGRAMMING/HMI FOR ALL NETWORKED POINTS CHOSEN BY THE CIVIL ENGINEER.

PLC-A SCADA POINT LIST AND CONTROL & INSTRUMENTATION WIRING SCHEDULE

HOMERUN MARK	TO	EQUIP. ID NO.	EQUIPMENT DESCRIPTION	PARAMETER	POINT TYPE	TAG	WIRING	SHEET	REMARKS
10-P-110	PLC-A	10-P-110	WELL PUMP NO. 1	ON/OFF CONTROL	DO	10-P-110-YC	(4) 8C#14 - 2"C	E5-02	
				ON/OFF STATUS	DI	10-P-110-YI			
				H/O/A SWITCH POSITION INDICATION	DI	10-P-110-HS			
				ALARM	DI	10-P-110-YA			
		10-P-710	WELL PUMP NO. 7	ON/OFF CONTROL	DO	10-P-710-YC			
				ON/OFF STATUS	DI	10-P-710-YI			
				H/O/A SWITCH POSITION INDICATION	DI	10-P-710-HS			
				ALARM	DI	10-P-710-YA			
		10-P-810	WELL PUMP NO. 8	ON/OFF CONTROL	DO	10-P-810-YC			
				ON/OFF STATUS	DI	10-P-810-YI			
				H/O/A SWITCH POSITION INDICATION	DI	10-P-810-HS			
				ALARM	DI	10-P-810-YA			
		20-M-110	AERATOR NO. 1	ON/OFF CONTROL	DO	20-M-110-YC			
				ON/OFF STATUS	DI	20-M-110-YI			
				H/O/A SWITCH POSITION INDICATION	DI	20-M-110-HS			
				ALARM	DI	20-M-110-YA			
10-P-820	PLC-A	10-P-820	WELL PUMP NO. 8B	ON/OFF CONTROL	DO	10-P-820-YC	(1) 10C#14 - 1"C & (1) #16TSP - 3/4"C	E5-02	
				ON/OFF STATUS	DI	10-P-820-YI			
				H/O/A SWITCH POSITION INDICATION	DI	10-P-820-HS			
				OVERLOAD ALARM	DI	10-P-820-YA:OL			
				TEMPERATURE ALARM - HIGH	DI	10-P-820-TAH			
				CURRENT (AMPERAGE) INDICATION - 3 PHASE AVG.	AI	10-P-820-II			
10-FIT-821	PLC-A	10-FIT-821	WELL PUMP NO. 8B FLOW TRANSMITTER	FLOW INDICATION	AI	10-FIT-821-FI	(1) #16TSP - 3/4"C	E3-01	
20-CP-101	PLC-A	20-CP-101	RAW WATER FLOW AND TANK LEVEL TRANSMITTER CONTROL PANEL	TOTAL RAW WATER FLOW INDICATION	AI	20-CP-101-FI.TF	(4) #16TSP - 1 1/4"C	E5-02	
				AERATOR NO. 1 FLOW INDICATION	AI	20-FE-111-FI			
				AERATOR NO. 2 FLOW INDICATION	AI	20-FE-121-FI			
				ELEVATED TANK LEVEL INDICATION	AI	70-LIT-110-LI			
20-M-120	PLC-A	20-M-120	AERATOR NO. 2	ON/OFF CONTROL	DO	20-M-120-YC	(1) 8C#14 - 1"C	E5-02	
				ON/OFF STATUS	DI	20-M-120-YI			
				H/O/A SWITCH POSITION INDICATION	DI	20-M-120-HS			
				ALARM	DI	20-M-120-YA			
30-CP-101	PLC-A	30-CP-101	CLEARWELL LOW LEVEL CUTOFF CONTROL PANEL	LEVEL ALARM - LOW	DI	30-CP-101-LAL	(1) 4C#14 - 3/4"C	E5-02	
				SYSTEM DISABLED ALARM	DI	30-CP-101-YA:DS			
30-LIT-201	PLC-A	30-LIT-201	CLEARWELL LEVEL TRANSMITTER	LEVEL INDICATION	AI	30-LIT-201-LI	(1) #16TSP - 3/4"C	E5-02	
40-P-110	PLC-A	40-P-110	FINISHED WATER PUMP NO. 1	ON/OFF CONTROL	DO	40-P-110-YC	(1) 14C#14 - 1"C & (3) #16TSP - 1 1/4"C	E5-02	
				ON/OFF STATUS	DI	40-P-110-YI			
				H/O/A SWITCH POSITION INDICATION	DI	40-P-110-HS			
				VFD ALARM	DI	40-P-110-YA:VFD			
				TEMPERATURE ALARM - HIGH	DI	40-P-110-TAH			
				LEVEL ALARM - LOW	DI	40-P-110-LAL			
				VFD BYPASSED STATUS	DI	40-P-110-HS:BP			
				SPEED CONTROL	AO	40-P-110-SC			
				SPEED INDICATION	AI	40-P-110-SI			
				CURRENT (AMPERAGE) INDICATION - 3 PHASE AVG.	AI	40-P-110-II			
40-P-120	PLC-A	40-P-120	FINISHED WATER PUMP NO. 2	ON/OFF CONTROL	DO	40-P-120-YC	(1) 14C#14 - 1"C & (3) #16TSP - 1 1/4"C	E5-02	
				ON/OFF STATUS	DI	40-P-120-YI			
				H/O/A SWITCH POSITION INDICATION	DI	40-P-120-HS			
				VFD ALARM	DI	40-P-120-YA:VFD			
				TEMPERATURE ALARM - HIGH	DI	40-P-120-TAH			
				LEVEL ALARM - LOW	DI	40-P-120-LAL			
				VFD BYPASSED STATUS	DI	40-P-120-HS:BP			
				SPEED CONTROL	AO	40-P-120-SC			
				SPEED INDICATION	AI	40-P-120-SI			
				CURRENT (AMPERAGE) INDICATION - 3 PHASE AVG.	AI	40-P-120-II			
50-FIT-101	PLC-A	50-FIT-101	FINISHED WATER FLOW TRANSMITTER	FLOW INDICATION	AI	50-FIT-101-FI	(2) #16TSP & 1#14G - 1"C	E3-03	
		50-PIT-102	FINISHED WATER PRESSURE TRANSMITTER	PRESSURE INDICATION	AI	50-PIT-102-PI			
50-AIT-201	PLC-A	50-AIT-201	FINISHED WATER TOTAL CHLORINE AND PH TRANSMITTER	CHLORINE RESIDUAL LEVEL INDICATION	AI	50-AIT-201-AI.CR	(2) #16TSP - 1"C	E5-02	
				PH LEVEL INDICATION	AI	50-AIT-201-AI.PH			
60-AIT-101	PLC-A	60-AIT-101	CHLORINE LEAK ALARM SYSTEM	CHLORINE LEAK ALARM	DI	60-AIT-101-CL2L	(1) 2C#14 - 3/4"C	E5-02	
90-GEN-201	PLC-A	90-GEN-201	GENERATOR GEN-A	ON/OFF STATUS	DI	90-GEN-201-YI	(1) 8C#14 - 3/4"C	E3-01	
				MINOR ALARM	DI	90-GEN-201-YAH			
				MAJOR ALARM	DI	90-GEN-201-YAHH			
				LOW FUEL LEVEL ALARM	DI	90-GEN-201-LAF			
90-ATS-202	PLC-A	90-ATS-202	AUTOMATIC TRANSFER SWITCH ATS-A	NORMAL POWER AVAILABLE INDICATION	DI	90-ATS-202-JNI	(1) 8C#14 - 3/4"C	E5-02	
				EMERGENCY POWER AVAILABLE STATUS	DI	90-ATS-202-JEI			
				NORMAL/EMERGENCY SWITCH POSITION STATUS	DI	90-ATS-202-ZINE			
				H/O/A SWITCH POSITION INDICATION	DI	90-ATS-202-HS			
90-PM-211	PLC-A	90-PM-211	MPA POWER METER	LOSS OF PHASE ALARM	EN- DI	90-PM-211-JPA	(1) GEL-FILLED CAT6 ETHERNET CABLE 3/4"C	E5-02	
				POWER (KW)	EN- AI	90-PM-211-JI			
				POWER (KVA)	EN- AI	90-PM-211-JAI			
				VOLTAGE INDICATION - PHASE A	EN- AI	90-PM-211-EI.A			
				VOLTAGE INDICATION - PHASE B	EN- AI	90-PM-211-EI.B			
				VOLTAGE INDICATION - PHASE C	EN- AI	90-PM-211-EI.C			
				VOLTAGE INDICATION - 3 PHASE AVG.	EN- AI	90-PM-211-EI			
				CURRENT (AMPERAGE) INDICATION - 3 PHASE AVG.	EN- AI	90-PM-211-II			
N/A	PLC-A	90-PLC-101	SCADA PLC-A	120V POWER INPUT FAILURE	DI	90-PLC-101-PNA	N/A = INTEGRAL	E5-02	INTEGRAL TO PLC
				UPS POWER FAILURE	DI	90-PLC-101-PUA			INTEGRAL TO PLC
				DC POWER FAILURE	DI	90-PLC-101-PDA			INTEGRAL TO PLC
				PROCESSOR FAILURE	DI	90-PLC-101-PRA			INTEGRAL TO PLC
		90-TT-101	PLC-A TEMPERATURE TRANSMITTER	TEMPERATURE INDICATION		90-TT-101-TI			

INSTRUMENT SCHEDULE

INSTRUMENT NAME	INSTRUMENT TYPE	INSTRUMENT ID	SHEET	ASSOCIATED SPECIFICATION SECTION	FURNISHED BY	PROVIDE 2-WIRE SURGE PROTECTION DEVICE	PROVIDE 4-WIRE SURGE PROTECTION DEVICE	PROVIDE SUN/RAIN SHIELD	NOTES
WELL PUMP NO. 8B FLOW TRANSMITTER	DIFFERENTIAL PRESSURE TRANSMITTER	10-FIT-821	E3-01	27 60 05	SCADA INTEGRATOR		X	X	PROVIDE HEATED ENCLOSURE & HEAT TRACING AS NOTED ON PLANS
AERATOR NO. 2 FLOW TRANSMITTER	2-WIRE PROPELLER TYPE FLOW METER WITH 4-20mA OUTPUT	20-FE-121	E-301	27 60 05	SCADA INTEGRATOR	X			
CLEARWELL LOW LEVEL FLOAT SWITCH	NON-MERCURY SUSPENDED FLOAT SWITCH	30-FS-101	E5-02	27 60 05	SCADA INTEGRATOR				
CLEARWELL LEVEL TRANSMITTER	ULTRASONIC TRANSDUCER WITH REMOTE TRANSMITTER	30-LIT-201	E5-02	27 60 05	SCADA INTEGRATOR				
FINISHED WATER FLOW TRANSMITTER	DIFFERENTIAL PRESSURE TRANSMITTER	50-FIT-101	E3-03	27 60 05	SCADA INTEGRATOR	X			
FINISHED WATER PRESSURE TRANSMITTER	GAUGE PRESSURE TRANSMITTER	50-PIT-102	E3-03	27 60 05	SCADA INTEGRATOR	X			
PLC-A TEMPERATURE TRANSMITTER	2-WIRE AMBIENT TEMPERATURE TRANSMITTER	90-TT-101	E5-02	27 60 05	SCADA INTEGRATOR				PANEL-MOUNTED TO SCADA PLC ENCLOSURE BY SCADA INTEGRATOR

NOTES:
1. SEE INSTRUMENTATION & EQUIPMENT SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
2. ELECTRICAL CONTRACTOR SHALL COORDINATE ALL EQUIPMENT MOUNTING HARDWARE REQUIREMENTS WITH INSTRUMENT MANUFACTURERS.
3. SEE PLANS FOR ADDITIONAL REQUIREMENTS.
4. RANGES AND/OR MOUNTING HEIGHTS OF ALL INSTRUMENTS/DEVICES LISTED ABOVE SHALL BE AS DIRECTED BY CIVIL ENGINEER.

KREBS ENGINEERING

ALABAMA LICENSED No. 27420 PROFESSIONAL ENGINEER PHILLIP D. BLACK

12/8/2023

JACKSON, RENFRO & ASSOCIATES, INC.
ELECTRICAL ENGINEERING & DESIGN
PHILLIP D. BLACK, PE
phil@jrae.com
(D) 205.536.7120 (P) 205.995.1078
JRA JOB NO. 223217
31 INVERNESS CENTER PKWY. • SUITE 1
BIRMINGHAM, ALABAMA • 35242

CITY OF FAIRHOPE
WTP No. 1 IMPROVEMENTS
PHASE 1
FAIRHOPE, ALABAMA

CITY OF FAIRHOPE ALABAMA

Designed	Project No.
PDB	23040.3
Drawn: ZJG	
Checked: PDB	

Revisions

No.	Date	Description

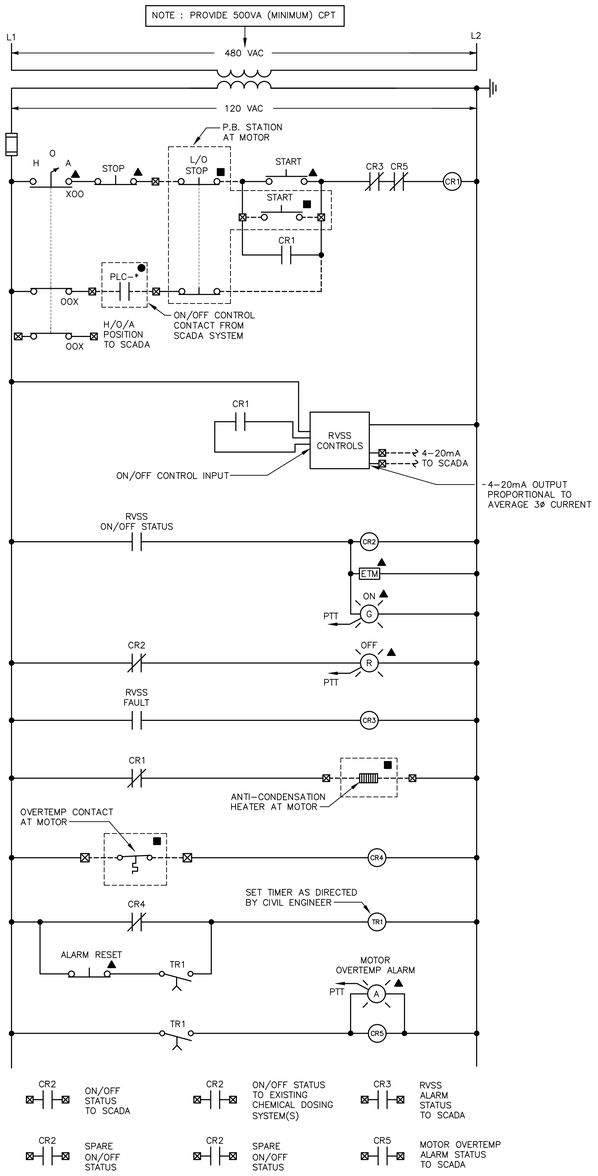
Sheet Title: CONTROL AND INSTRUMENTATION SCHEDULES

Issue Date	Sheet No.
DEC, 2023	E0-13
Sequence 23 of 37	

A1 | CONTROL AND INSTRUMENTATION SCHEDULES | SCALE: NONE

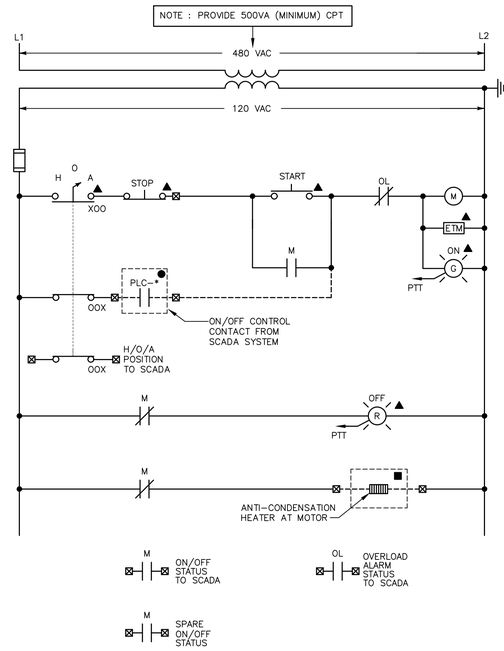
ELEMENTARY DIAGRAM LEGEND

START	PUSHBUTTON – START – NORMALLY OPEN – MOMENTARY CONTACT.
STOP	PUSHBUTTON – STOP – NORMALLY CLOSED – MOMENTARY CONTACT.
E–STOP	PUSHBUTTON – EMERGENCY STOP – NORMALLY CLOSED – MAINTAINED CONTACT – MUSHROOM HEAD.
H O A / XOO	SELECTOR SWITCH – HAND–OFF–AUTOMATIC – MAINTAINED CONTACT – "XOO" INDICATES THAT CONTACT IS ONLY CLOSED IN THE FIRST (HAND) POSITION (MAY BE USED WITH OTHER COMBINATIONS OF "X" & "O").
OFF ON / OX	SELECTOR SWITCH – ON–OFF – MAINTAINED CONTACT – "XO" INDICATES – THAT CONTACT IS ONLY CLOSED IN THE FIRST (ON) POSITION (MAY BE USED WITH OTHER COMBINATIONS OF "X" & "O").
N BP / OX	SELECTOR SWITCH – NORMAL–BYPASS – MAINTAINED CONTACT – "XO" INDICATES – THAT CONTACT IS ONLY CLOSED IN THE FIRST (NORMAL) POSITION (MAY BE USED WITH OTHER COMBINATIONS OF "X" & "O").
L O R / XOO	SELECTOR SWITCH – LOCAL–OFF–REMOTE – MAINTAINED CONTACT – "XOO" INDICATES THAT CONTACT IS ONLY CLOSED IN THE FIRST (HAND) POSITION (MUST BE USED WITH OTHER COMBINATIONS OF "X" & "O").
(M)	MOTOR STARTER COIL.
(BP)	BYPASS MOTOR STARTER COIL.
OL	OVERLOAD RELAY CONTACT.
(CR)	CONTROL RELAY COIL.
	CONTROL CONTACT – NORMALLY OPEN.
	CONTROL CONTACT – NORMALLY CLOSED.
	INDICATOR LIGHT – COLOR AS SHOWN.
	CONTROL TRANSFORMER.
ETM	ELAPSED TIME METER.
▲	DEVICE LOCATED ON STARTER DOOR.
■	DEVICE LOCATED ADJACENT TO MOTOR.
●	DEVICE LOCATED REMOTE – SEE PLAN.
⊠	TERMINAL BLOCK WITHIN STARTER UNIT.
	FLOAT SWITCH – CLOSES ON RISING LEVEL.
	FLOAT SWITCH – CLOSES ON FALLING LEVEL.
	PRESSURE SWITCH – CLOSES ON INCREASE PRESSURE.
	PRESSURE SWITCH – CLOSES ON DECREASE PRESSURE.
	LIMIT SWITCH – NORMALLY OPEN – HELD CLOSED.
	LIMIT SWITCH – NORMALLY CLOSED – HELD OPEN.
(TR)	TIME DELAY RELAY COIL.
	TIME DELAY RELAY CONTACT – NORMALLY CLOSED, TIME OPEN.
	TIME DELAY RELAY CONTACT – NORMALLY OPEN, TIME CLOSED.
	TIME DELAY RELAY CONTACT – NORMALLY OPEN, TIME OPEN.
	TIME DELAY RELAY CONTACT – NORMALLY CLOSED, TIME CLOSED.
	SOLENOID VALVE.
	THERMOSTAT – NORMALLY CLOSED, OPENS ON HIGH TEMP.
	THERMOSTAT – NORMALLY OPEN, CLOSES ON HIGH TEMP.
AD	AUTOMATIC DAMPER.
	ALARM HORN.



ELEMENTARY DIAGRAM NO. 1

WELL NO. 8B: SEPARATELY ENCLOSED RVSS



ELEMENTARY DIAGRAM NO. 2

AERATOR NO. 2
(SEPARATELY–ENCLOSED STARTER)

KREBS ENGINEERING
ALABAMA LICENSED No. 27420 PROFESSIONAL ENGINEER PHILIP D. BLACK
12/8/2023
JACKSON, RENFRO & ASSOCIATES, INC.
ELECTRICAL ENGINEERING & DESIGN
PHILIP D. BLACK, PE
phil@jrare.com
(D) 205.536.7120 (P) 205.995.1078
JRA JOB NO. 223217
31 INVERNESS CENTER PKWY • SUITE I
BIRMINGHAM, ALABAMA • 35242

CITY OF FAIRHOPE
WTP No. 1 IMPROVEMENTS
PHASE 1
FAIRHOPE, ALABAMA

CITY OF FAIRHOPE ALABAMA

Designed	PDB
Drawn	ZJG
Checked	PDB
Project No.	23040.3

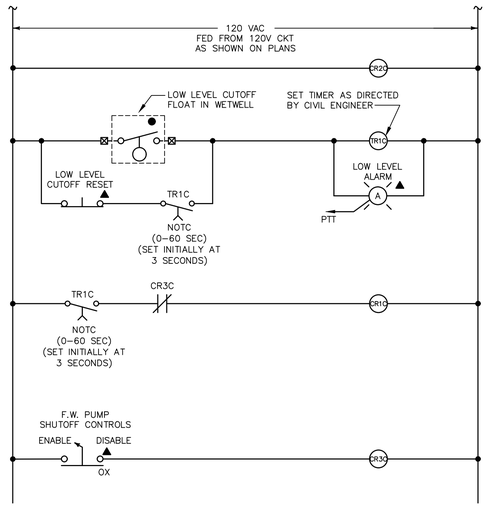
Revisions

No.	Date	Description

Sheet Title: ELEMENTARY DIAGRAMS

Issue Date: DEC, 2023
Sheet No.: E0-21
Sequence: 24 of 37

A1 | ELEMENTARY DIAGRAMS | SCALE: NONE



CR1C — LOW LEVEL ALARM (TO FINISHED WATER PUMP NO.1 STARTER)

CR1C — LOW LEVEL ALARM (TO FINISHED WATER PUMP NO.2 STARTER)

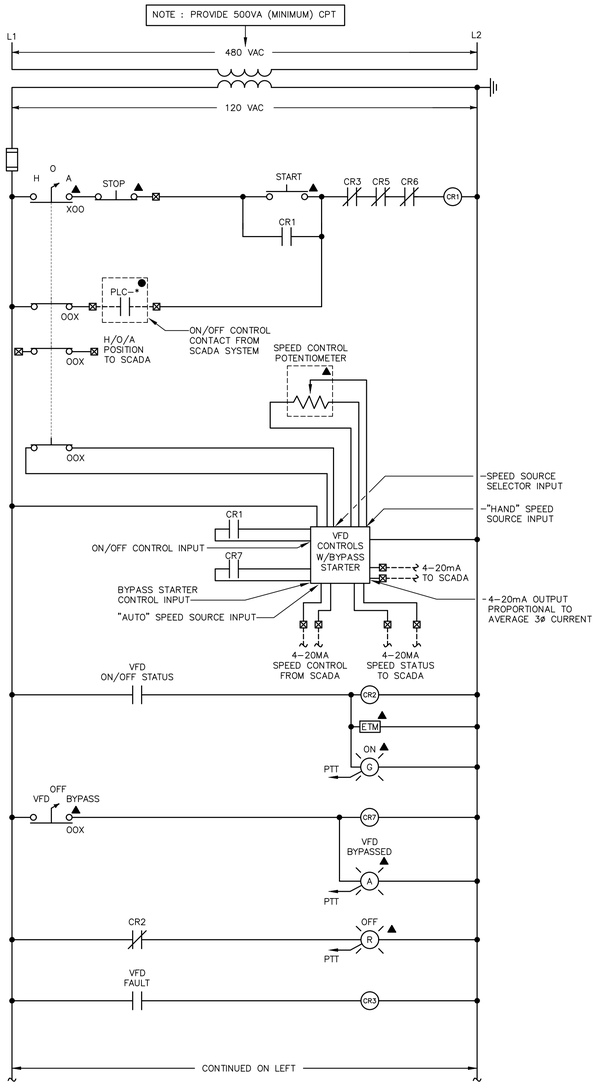
CR1C — LOW LEVEL ALARM TO SCADA

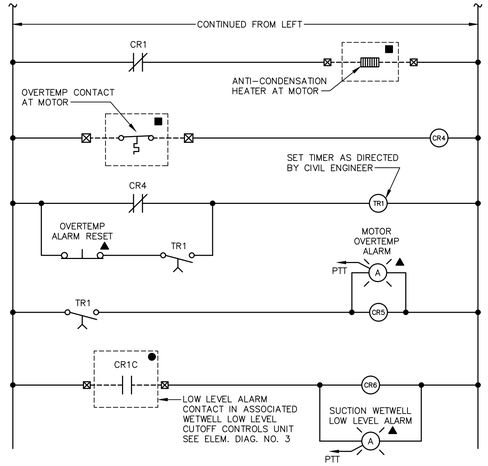
CR1C — SPARE LOW LEVEL ALARM

CR3C — CR2C — SYSTEM DISABLED ALARM TO SCADA

ELEMENTARY DIAGRAM NO. 3

CLEARWELL LOW LEVEL CUTOFF CONTROL PANEL
(SEPARATELY–ENCLOSED CONTROL PANEL)





CR2 — ON/OFF STATUS TO SCADA

CR3 — VFD ALARM STATUS TO SCADA

CR5 — MOTOR OVERTEMP ALARM STATUS TO SCADA

CR6 — SUCTION WETWELL LOW LEVEL ALARM STATUS TO SCADA

CR7 — VFD BYPASSED STATUS TO SCADA

ELEMENTARY DIAGRAM NO. 4

FINISHED WATER PUMPS NO. 1 AND NO. 2: SEPARATELY ENCLOSED VFD's

KREBS ENGINEERING
ALABAMA LICENSED No. 27420 PROFESSIONAL ENGINEER PHILIP D. BLACK
12/8/2023
JACKSON, RENFRO & ASSOCIATES, INC.
ELECTRICAL ENGINEERING & DESIGN
PHILIP D. BLACK, PE
phil@jrare.com
(D) 205.536.7120 (P) 205.995.1078
JRA JOB NO. 223217
31 INVERNESS CENTER PKWY. • SUITE 1
BIRMINGHAM, ALABAMA • 35242

CITY OF FAIRHOPE
WTP No. 1 IMPROVEMENTS
PHASE 1
FAIRHOPE, ALABAMA

CITY OF FAIRHOPE ALABAMA

Designed PDB	Project No. 23040.3
Drawn ZJG	
Checked PDB	

Revisions

No.	Date	Description

Sheet Title: ELEMENTARY DIAGRAMS

Issue Date: DEC, 2023
Sheet No.: E0-22
Sequence: 25 of 37

A1 | ELEMENTARY DIAGRAMS | SCALE: NONE

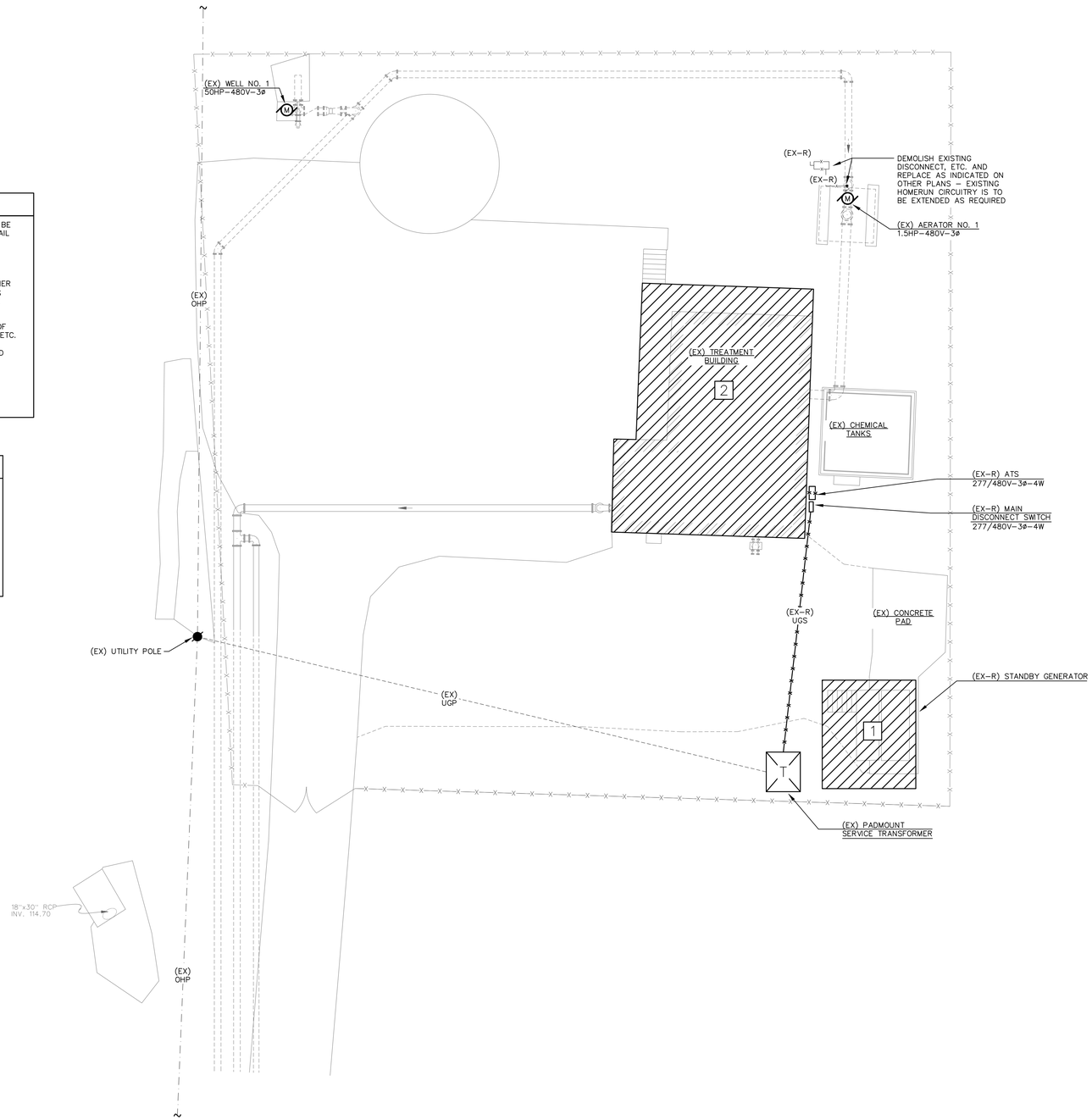
ELECTRICAL DEMOLITION NOTES

1. THE ELECTRICAL DEMOLITION PLANS INDICATE GENERAL SCOPE OF DEMOLITION WORK TO BE ACCOMPLISHED UNDER THIS CONTRACT. IT IS NOT THE INTENT OF THESE PLANS TO DETAIL ALL ELECTRICAL ITEMS THAT MUST BE REMOVED. THE ELECTRICAL CONTRACTOR SHALL REFER TO ALL OTHER PLANS IN THIS SET OF DRAWINGS FOR ADDITIONAL INFORMATION RELATED TO EXTENT AND SCOPE OF DEMOLITION WORK. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS. VERIFY ALL REQUIREMENTS AT JOB SITE PRIOR TO BID.
2. EXISTING SALVAGEABLE MATERIALS REMOVED SHALL REMAIN THE PROPERTY OF THE OWNER AND SHALL BE DELIVERED TO OWNER'S DESIGNATED STORAGE FACILITY. ANY MATERIALS REMOVED THAT THE OWNER DOES NOT WISH TO RETAIN SHALL BE DISPOSED OF BY THE CONTRACTOR.
3. NO EXISTING ELECTRICAL ITEMS SHALL BE REMOVED WITHOUT PRIOR WRITTEN CONSENT OF THE OWNER. THE EXISTING PLANT RWPS, GAC FILTER SYSTEM, MAINTENANCE BUILDING, ETC. SHALL BE KEPT OPERATIONAL THROUGHOUT THE CONSTRUCTION PROCESS UNTIL THE ASSOCIATED REPLACEMENT/NEW PLANT SYSTEMS ARE IN SERVICE AND PROPERLY TESTED AND DEEMED RELIABLE/ACCEPTABLE FOR PERMANENT SERVICE.
4. ALL EXISTING FEEDER WIRING MADE OBSOLETE BY THIS PROJECT SHALL BE DEMOLISHED COMPLETELY. SEE ELECTRICAL DEMOLITION NOTE 3.

ELECTRICAL DEMOLITION KEYED NOTES

1 EXISTING BUILDING/STRUCTURES TO BE DEMOLISHED WITHIN THIS PROJECT. DEMOLISH ALL OBSOLETE ELECTRICAL EQUIPMENT, DEVICES, DISCONNECTS, EXPOSED CONDUIT AND WIRING, ETC. TO INCLUDE FEEDERS AND CONTROL/INSTRUMENTATION WIRING CONNECTIONS TO OTHER BUILDINGS AND STRUCTURES.

2 EXISTING BUILDING/STRUCTURES TO BE MODIFIED WITHIN THIS PROJECT. REMOVE OBSOLETE POWER DISTRIBUTION EQUIPMENT INCLUDING MAIN DISCONNECT, AUTOMATIC TRANSFER SWITCH, ETC. ALL EXISTING MCC'S PANELBOARDS, RECEPTACLES, LIGHTS, AND ASSOCIATED CIRCUITRY, SWITCHES, CONDUIT AND WIRING, ETC. SHALL REMAIN IN SERVICE. SEE OTHER PLANS FOR NEW REQUIREMENTS.



A1 SITE ELECTRICAL DEMOLITION PLAN SCALE: 1" = 10'-0"

KREBS ENGINEERING
ALABAMA LICENSED No. 27420 PROFESSIONAL ENGINEER PHILIP D. BLACK
12/8/2023

JACKSON, RENFRO & ASSOCIATES, INC.
ELECTRICAL ENGINEERING & DESIGN
PHILIP D. BLACK, PE
phil@jrare.com
(D) 205.536.7120 (P) 205.995.1078
JRA JOB NO. 223217
31 INVERNESS CENTER PKWY. • SUITE 1
BIRMINGHAM, ALABAMA • 35242

CITY OF FAIRHOPE
WTP No. 1 IMPROVEMENTS PHASE 1
FAIRHOPE, ALABAMA

CITY OF FAIRHOPE ALABAMA

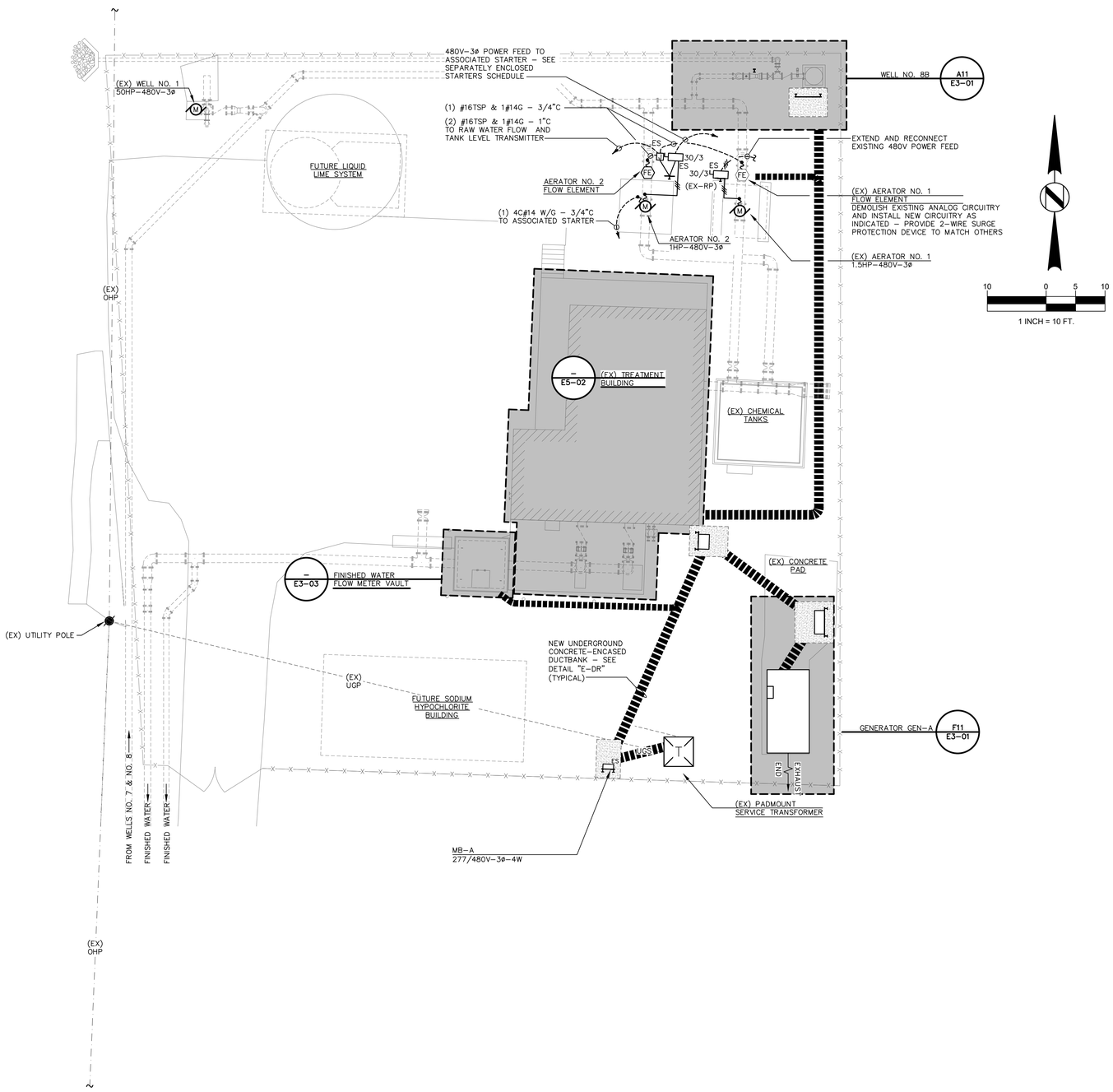
Designed	Project No.
PDB	23040.3
Drawn: ZJG	
Checked: PDB	

Revisions

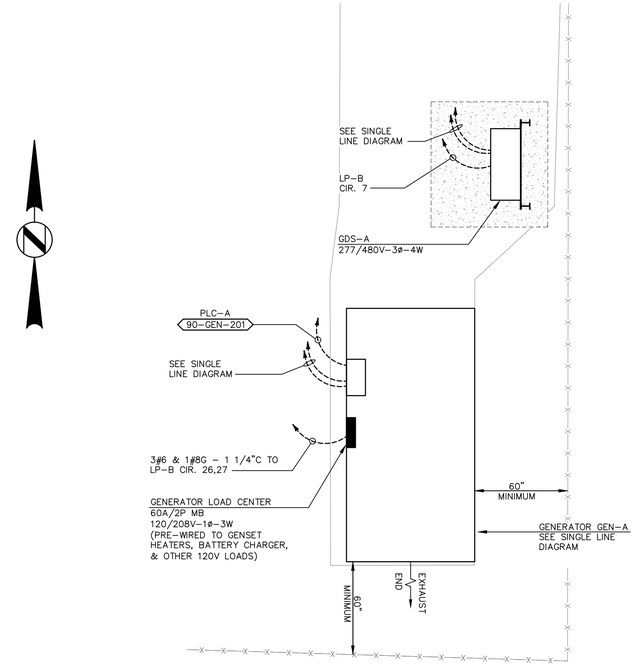
No.	Date	Description

Sheet Title: SITE ELECTRICAL DEMOLITION PLAN

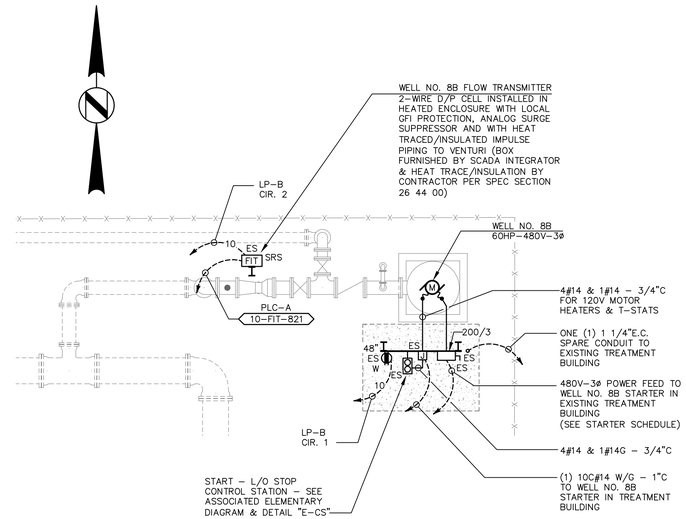
Issue Date	Sheet No.
DEC, 2023	E1-01
Sequence: 26 of 37	



A1 SITE ELECTRICAL PLAN SCALE: 1" = 10'-0"



F11 GENERATOR PLAN SCALE: 1/4" = 1'-0"



A11 WELL 8B ELECTRICAL PLAN SCALE: 1/4" = 1'-0"

KREBS ENGINEERING

ALABAMA LICENSED No. 27420 PROFESSIONAL ENGINEER PHILIP D. BLACK

12/8/2023

JACKSON, RENFRO & ASSOCIATES, INC.
ELECTRICAL ENGINEERING & DESIGN
PHILIP D. BLACK, PE
phil@jrae.com
(D) 205.536.7120 (P) 205.995.1078
JRA JOB NO. 223217
31 INVERNESS CENTER PKWY. • SUITE I
BIRMINGHAM, ALABAMA • 35242

CITY OF FAIRHOPE

WTP No. 1 IMPROVEMENTS PHASE 1

FAIRHOPE, ALABAMA

CITY OF FAIRHOPE ALABAMA

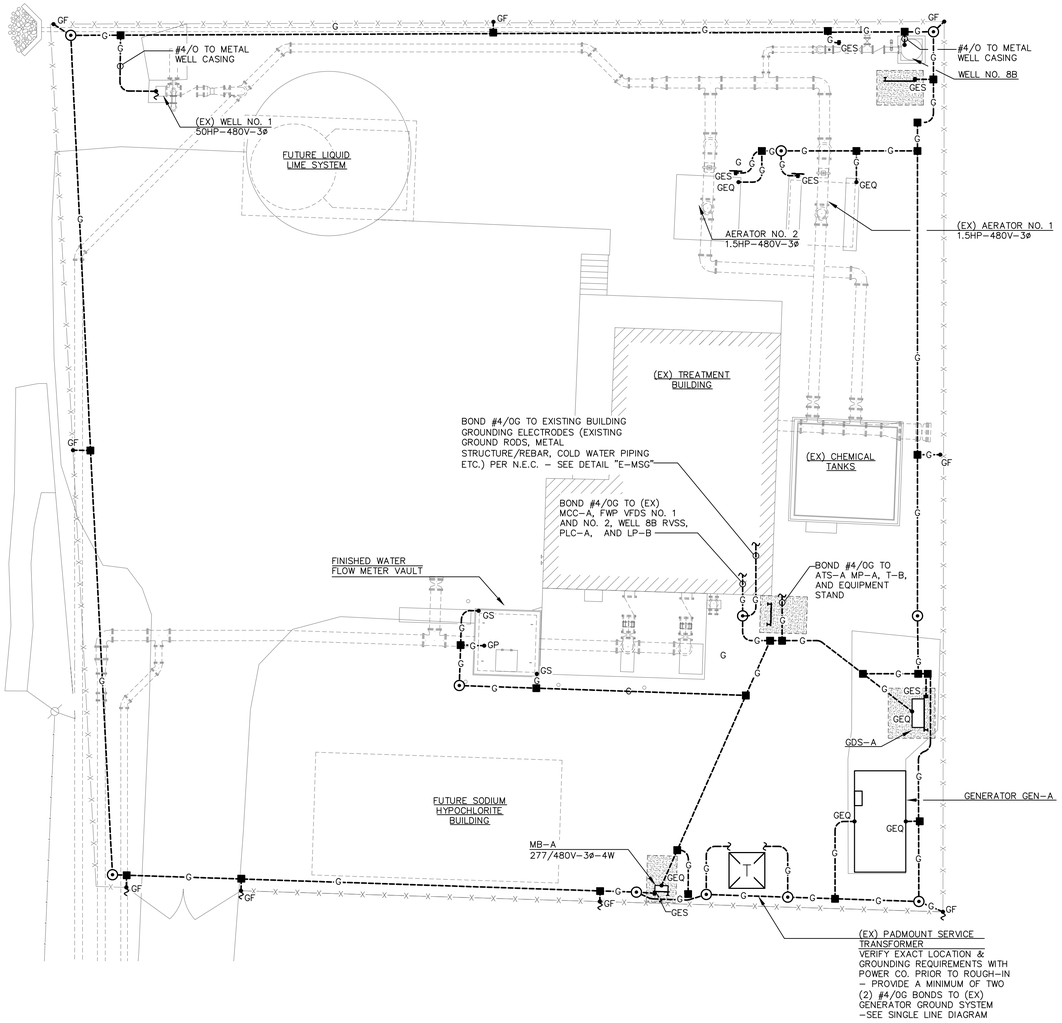
Designed	Project No.
PDB	23040.3
Drawn: ZJG	
Checked: PDB	

Revisions

No.	Date	Description

Sheet Title: SITE ELECTRICAL PLAN

Issue Date	Sheet No.
DEC, 2023	E3-01
Sequence: 27 of 37	



A1 SITE SUPPLEMENTAL GROUNDING PLAN SCALE: 1" = 10'-0"

KREBS ENGINEERING
ALABAMA LICENSED No. 27420 PROFESSIONAL ENGINEER PHILIP D. BLACK
12/8/2023
JACKSON, RENFRO & ASSOCIATES, INC.
ELECTRICAL ENGINEERING & DESIGN
PHILIP D. BLACK, PE
phil@jrae.com
(D) 205.536.7120 (P) 205.995.1078
JRA JOB NO. 223217
31 INVERNESS CENTER PKWY. • SUITE I
BIRMINGHAM, ALABAMA • 35242

CITY OF FAIRHOPE

WTP No. 1 IMPROVEMENTS PHASE 1

FAIRHOPE, ALABAMA

CITY OF FAIRHOPE ALABAMA

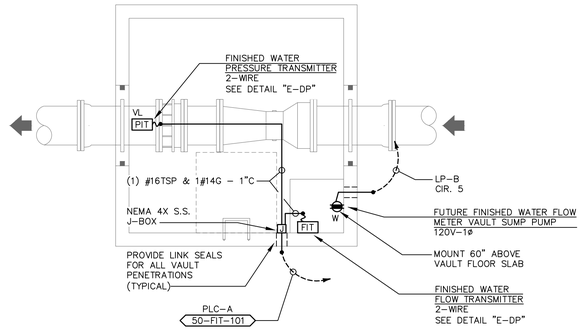
Designed PDB	Project No. 23040.3
Drawn ZJG	
Checked PDB	

Revisions

No.	Date	Description

Sheet Title: SITE SUPPLEMENTAL GROUNDING PLAN

Issue Date	Sheet No.
DEC, 2023	E3-02
Sequence 28 of 37	



KREBS ENGINEERING

ALABAMA LICENSED No. 27420 PROFESSIONAL ENGINEER PHILIP D. BLACK

12/8/2023

JACKSON, RENFRO & ASSOCIATES, INC.
ELECTRICAL ENGINEERING & DESIGN
PHILIP D. BLACK, PE
phil@jrare.com
(D) 205.536.7120 (P) 205.995.1078
JRA JOB NO. 223217
31 INVERNESS CENTER PKWY • SUITE 1
BIRMINGHAM, ALABAMA • 35242

CITY OF FAIRHOPE

WTP No. 1 IMPROVEMENTS PHASE 1

FAIRHOPE, ALABAMA

CITY OF FAIRHOPE ALABAMA

Designed PDB	Project No. 23040.3
Drawn ZJG	
Checked PDB	

Revisions

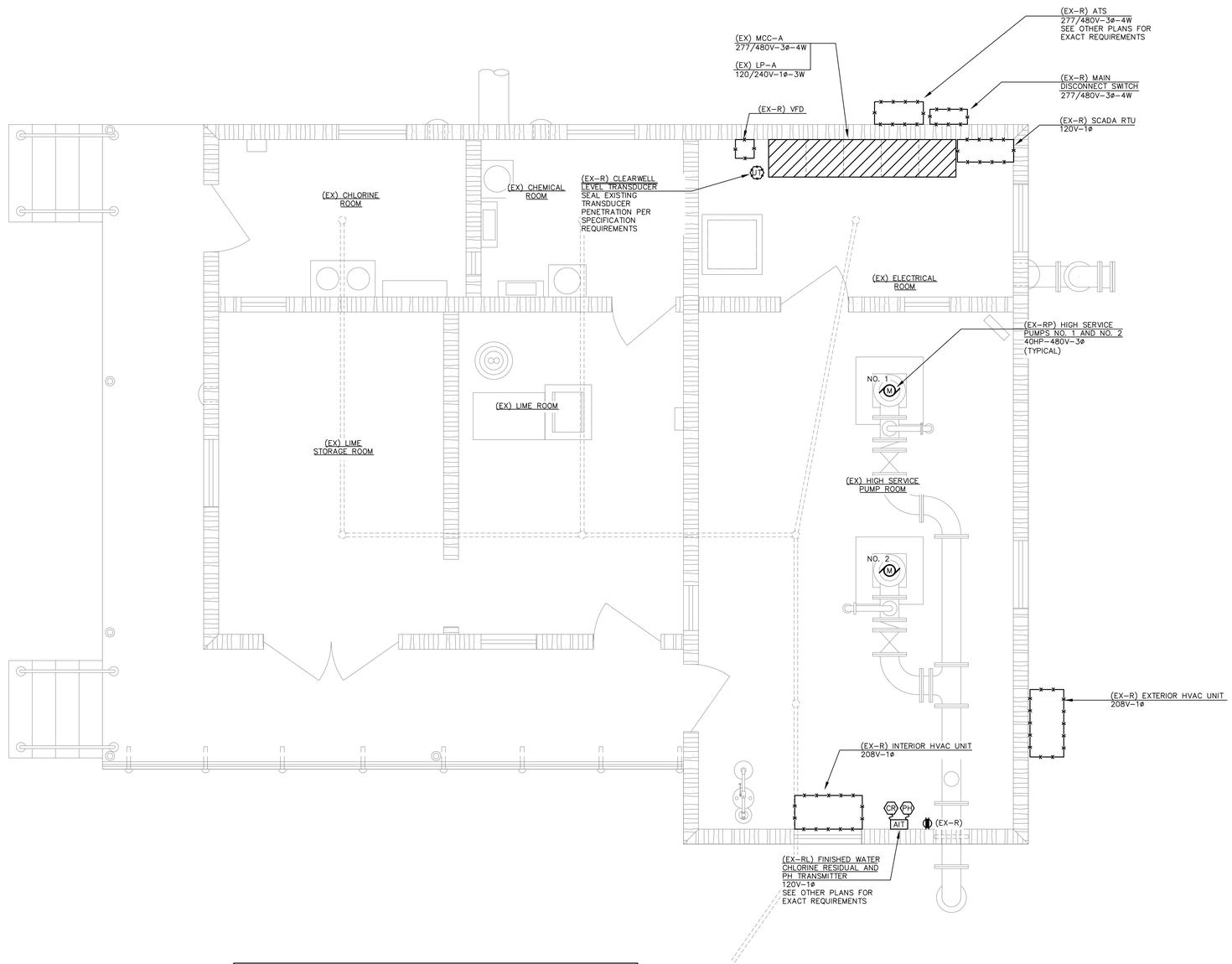
No.	Date	Description

Sheet Title

FINISHED WATER FLOW METER VAULT ELECTRICAL PLAN

Issue Date	Sheet No.
DEC, 2023	E3-03
Sequence 29 of 37	

A1 | FINISHED WATER FLOW METER VAULT ELECTRICAL PLAN SCALE: 3/8" = 1'-0"



ELECTRICAL DEMOLITION NOTES

1. THE ELECTRICAL DEMOLITION PLANS INDICATE GENERAL SCOPE OF DEMOLITION WORK TO BE ACCOMPLISHED UNDER THIS CONTRACT. IT IS NOT THE INTENT OF THESE PLANS TO DETAIL ALL ELECTRICAL ITEMS THAT MUST BE REMOVED. THE ELECTRICAL CONTRACTOR SHALL REFER TO ALL OTHER PLANS IN THIS SET OF DRAWINGS FOR ADDITIONAL INFORMATION RELATED TO EXTENT AND SCOPE OF DEMOLITION WORK. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS. VERIFY ALL REQUIREMENTS AT JOB SITE PRIOR TO BID.
2. EXISTING SALVAGEABLE MATERIALS REMOVED SHALL REMAIN THE PROPERTY OF THE OWNER AND SHALL BE DELIVERED TO OWNER'S DESIGNATED STORAGE FACILITY. ANY MATERIALS REMOVED THAT THE OWNER DOES NOT WISH TO RETAIN SHALL BE DISPOSED OF BY THE CONTRACTOR.
3. NO EXISTING ELECTRICAL ITEMS SHALL BE REMOVED WITHOUT PRIOR WRITTEN CONSENT OF THE OWNER. THE EXISTING PLANT RWPS, GAC FILTER SYSTEM, MAINTENANCE BUILDING, ETC. SHALL BE KEPT OPERATIONAL THROUGHOUT THE CONSTRUCTION PROCESS UNTIL THE ASSOCIATED REPLACEMENT/NEW PLANT SYSTEMS ARE IN SERVICE AND PROPERLY TESTED AND DEEMED RELIABLE/ACCEPTABLE FOR PERMANENT SERVICE.
4. ALL EXISTING FEEDER WIRING MADE OBSOLETE BY THIS PROJECT SHALL BE DEMOLISHED COMPLETELY. SEE ELECTRICAL DEMOLITION NOTE 3.

A1 TREATMENT BUILDING ELECTRICAL DEMOLITION PLAN SCALE: 3/8" = 1'-0"

KREBS ENGINEERING
ALABAMA LICENSED No. 27420 PROFESSIONAL ENGINEER PHILIP D. BLACK
12/8/2023
JACKSON, RENFRO & ASSOCIATES, INC.
ELECTRICAL ENGINEERING & DESIGN
PHILIP D. BLACK, PE
phil@jrare.com
(D) 205.536.7120 (P) 205.995.1078
JRA JOB NO. 223217
31 INVERNESS CENTER PKWY. • SUITE E
BIRMINGHAM, ALABAMA • 35242

CITY OF FAIRHOPE

WTP No. 1 IMPROVEMENTS
PHASE 1

FAIRHOPE, ALABAMA

CITY OF FAIRHOPE ALABAMA

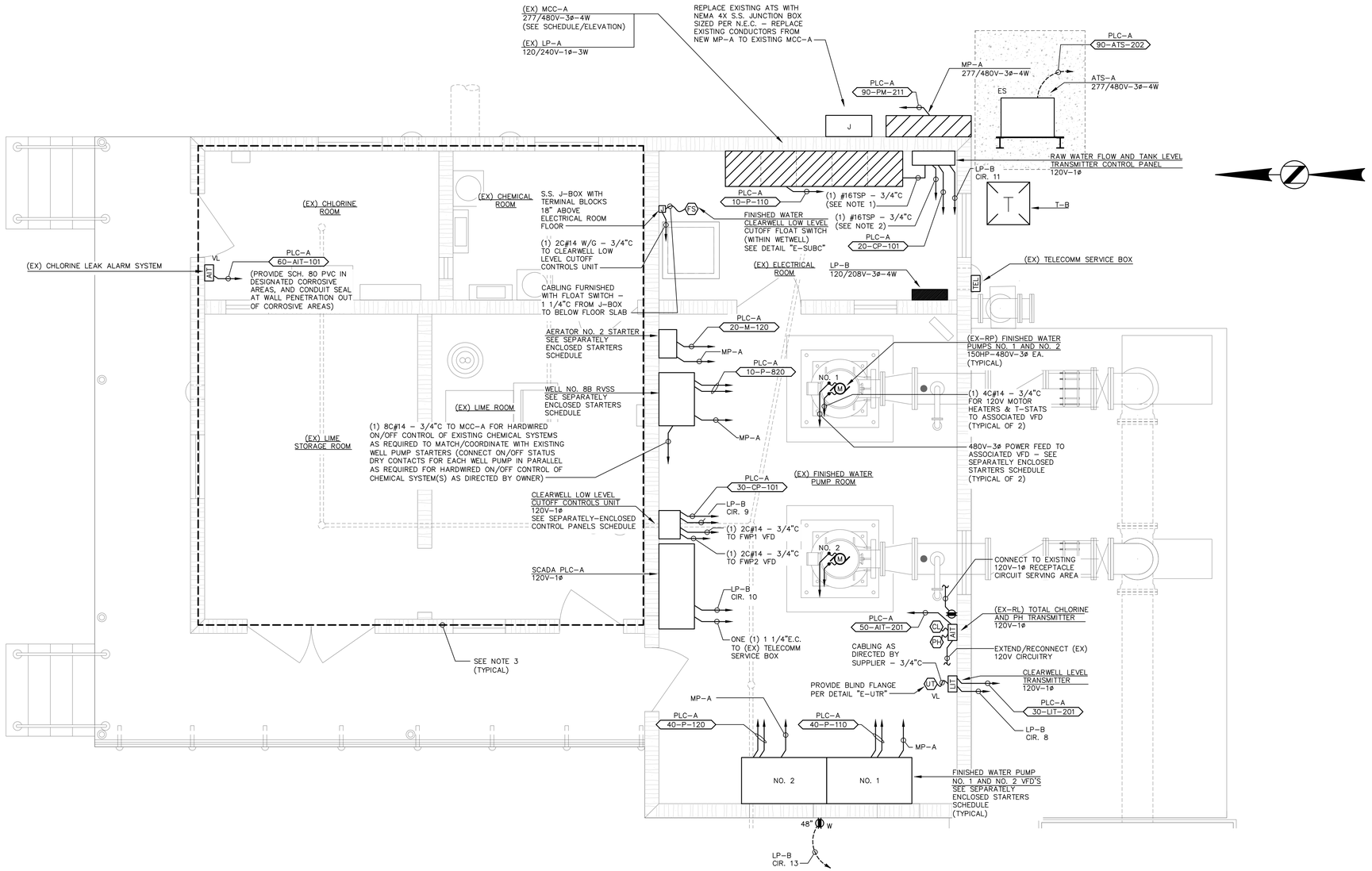
Designed	Project No.
PDB	23040.3
Drawn: ZJG	
Checked: PDB	

Revisions

No.	Date	Description

Sheet Title: TREATMENT BUILDING ELECTRICAL DEMOLITION PLAN

Issue Date: DEC, 2023
Sequence: 30 of 37
Sheet No.: E5-01



NOTES THIS SHEET ONLY

1. EXTEND AND RE-CONNECT EXISTING ELEVATED TANK LEVEL INDICATION CIRCUITRY TO RAW WATER FLOW AND TANK LEVEL TRANSMITTER CONTROL PANEL.
2. EXTEND AND RECONNECT TOTAL RAW WATER FLOW SIGNAL TO EXISTING CHEMICAL DOSING CONTROL SYSTEMS - DAISY-CHAIN THRU (EX) EQUIPMENT/DEVICES AS REQUIRED FOR FLOW PACING - VERIFY EXACT ROUTING WITH OWNER PRIOR TO ROUGH-IN
3. NO NEW ELECTRICAL CIRCUITRY, BOXES, EQUIPMENT, DEVICES, ETC. SHALL BE INSTALLED WITHIN THE EXISTING (EXTREMELY CORROSIVE) CHEMICAL ROOM, CHLORINE ROOM, LIME ROOM, OR LIME STORAGE ROOM UNLESS SPECIFICALLY SO SHOWN.

KREBS ENGINEERING
ALABAMA LICENSED No. 27420 PROFESSIONAL ENGINEER PHILLIP D. BLACK
12/8/2023
JACKSON, RENFRO & ASSOCIATES, INC.
ELECTRICAL ENGINEERING & DESIGN
PHILLIP D. BLACK, PE
phil@jrae.com
(D) 205.536.7120 (P) 205.995.1078
JRA JOB NO. 223217
31 INVERNESS CENTER PKWY. • SUITE I
BIRMINGHAM, ALABAMA • 35242

CITY OF FAIRHOPE

WTP No. 1 IMPROVEMENTS
PHASE 1

FAIRHOPE, ALABAMA

CITY OF FAIRHOPE ALABAMA

Designed	Project No.
PDB	23040.3
Drawn: ZJG	
Checked: PDB	

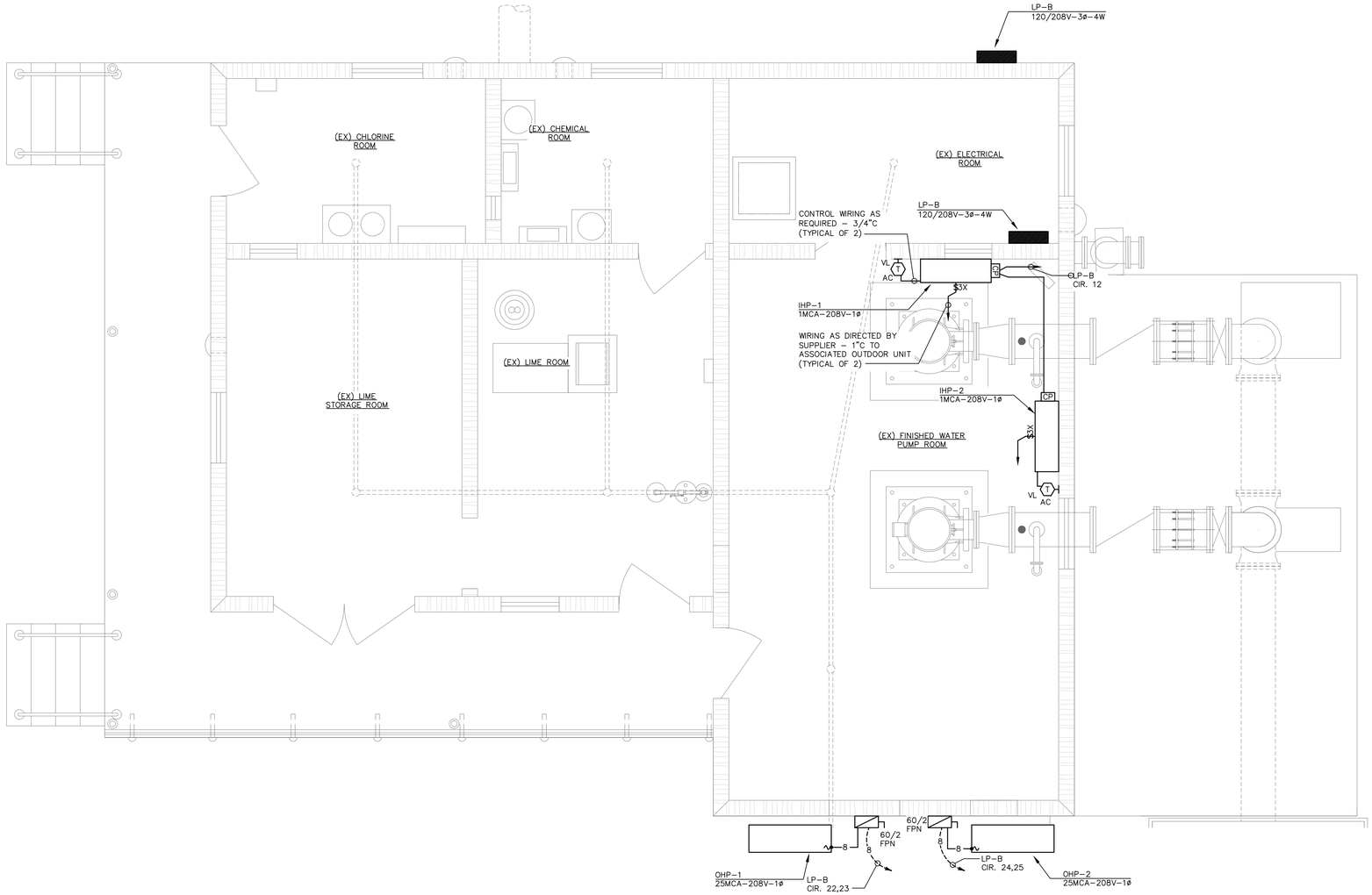
Revisions

No.	Date	Description

Sheet Title: TREATMENT BUILDING MODIFICATIONS ELECTRICAL PLAN

Issue Date	Sheet No.
DEC, 2023	E5-02
Sequence: 31 of 37	

A1 TREATMENT BUILDING MODIFICATIONS ELECTRICAL PLAN SCALE: 3/8" = 1'-0"



A1 TREATMENT BUILDING MODIFICATIONS HVAC ELECTRICAL PLAN SCALE: 3/8" = 1'-0"

KREBS ENGINEERING

ALABAMA LICENSED No. 27420 PROFESSIONAL ENGINEER PHILIP D. BLACK

12/8/2023

JACKSON, RENFRO & ASSOCIATES, INC.
ELECTRICAL ENGINEERING & DESIGN
PHILIP D. BLACK, PE
phil@jrae.com
(D) 205.536.7120 (P) 205.995.1078
JRA JOB NO. 223217
31 INVERNESS CENTER PKWY. • SUITE I
BIRMINGHAM, ALABAMA • 35242

CITY OF FAIRHOPE

WTP No. 1 IMPROVEMENTS PHASE 1

FAIRHOPE, ALABAMA

CITY OF FAIRHOPE ALABAMA

Designed PDB	Project No. 23040.3
Drawn ZJG	
Checked PDB	

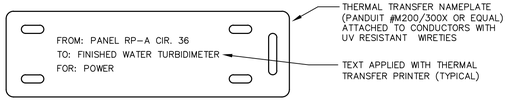
Revisions

No.	Date	Description

Sheet Title

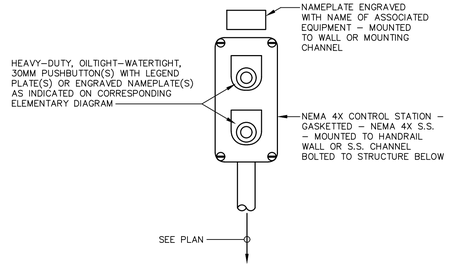
TREATMENT BUILDING MODIFICATIONS HVAC ELECTRICAL PLAN

Issue Date	Sheet No.
DEC, 2023	E5-03
Sequence 32 of 37	

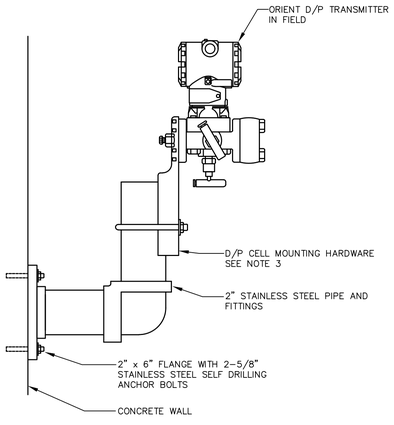


DETAIL "E–CL"
TYPICAL CIRCUIT LABEL
SCALE : NONE

NOTES THIS DETAIL ONLY
1. CIRCUIT LABEL TYPES SHOWN ABOVE SHALL BE USED TO IDENTIFY ALL CIRCUITS WITHIN PULLBOXES, HANDHOLES, VAULTS JUNCTION BOXES LARGER THAN 4–11/16", APPROXIMATELY EVERY 50 FEET WITHIN CABLE TRAYS (INCLUDING AT MAJOR CABLE TRAY JUNCTIONS AND BREAKOUT LOCATIONS) AND AT OTHER SIMILAR LOCATIONS. SEE SPECIFICATIONS FOR LABELING REQUIREMENTS IN OTHER AREAS.
2. CIRCUIT NUMBERS SHALL BE IDENTIFIED FOR ALL CIRCUITS FED FROM LIGHTING OR POWER PANELBOARDS.
3. "FROM", "TO" & "FOR" TEXT SHOWN ABOVE ARE FOR EXAMPLE PURPOSES ONLY. NAMES/NUMBERS SHALL BE ADJUSTED TO MATCH ASSOCIATED CIRCUITS/CABLES.
4. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

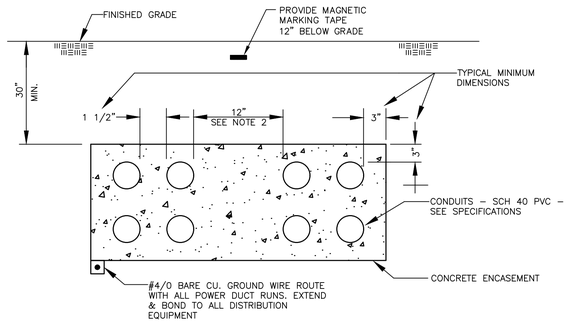


DETAIL "E–CS"
TYPICAL CONTROL STATION
SCALE : NONE



DETAIL "E–DP"
TYPICAL WALL MOUNTED D/P CELL INSTALLATION DETAIL
SCALE : NONE

DETAIL NOTES
1. INSTALLATION SHOWN IS TYPICAL. EXACT REQUIREMENTS SHALL BE DETERMINED BY APPROVED MANUFACTURER'S SHOP DRAWINGS.
2. REFER TO CIVIL DRAWINGS FOR ALL MECHANICAL PIPING REQUIREMENTS.
3. CONTRACTOR SHALL COORDINATE ALL EQUIPMENT MOUNTING HARDWARE REQUIREMENTS WITH INTRUMENTATION PROVIDER.
4. D/P CELLS SHALL BE MOUNTED AT HEIGHTS AS DIRECTED BY CIVIL ENGINEER.
5. SIMILAR PIPE–MOUNTING PROVISIONS SHALL BE PROVIDED FOR FLOOR–MOUNTED OR HANDRAIL–MOUNTED D/P TRANSMITTERS.



DETAIL "E–DR"
TYPICAL DUCT RUN SECTION
SCALE : NONE

DETAIL NOTES
1. PVC SPACERS SHALL BE INSTALLED AT RECOMMENDED INTERVALS TO SUPPORT AND MAINTAIN SPACING FOR CONDUITS.
2. INSTRUMENTATION CONDUITS SHALL BE SEPARATED FROM POWER/CONTROL CONDUITS BY A MINIMUM OF 12" THROUGHOUT ANY DUCT RUNS.

KREBS ENGINEERING

ALABAMA LICENSED No. 27420 PROFESSIONAL ENGINEER PHILIP D. BLACK

12/8/2023

JACKSON, RENFRO & ASSOCIATES, INC.
ELECTRICAL ENGINEERING & DESIGN
PHILIP D. BLACK, PE
phil@jrare.com
(D) 205.536.7120 (P) 205.995.1078
JRA JOB NO. 223217
31 INVERNESS CENTER PKWY. • SUITE I
BIRMINGHAM, ALABAMA • 35242

CITY OF FAIRHOPE

WTP No. 1 IMPROVEMENTS
PHASE 1

FAIRHOPE, ALABAMA

CITY OF FAIRHOPE ALABAMA

Designed	Project No.
PDB	23040.3
Drawn: ZJG	
Checked: PDB	

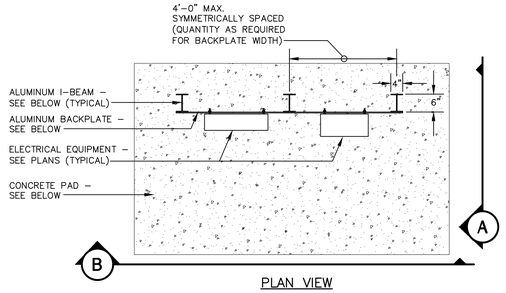
Revisions

No.	Date	Description

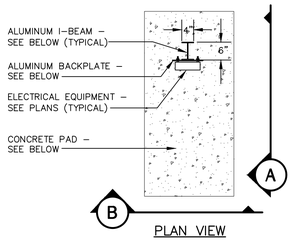
Sheet Title: ELECTRICAL DETAILS

Issue Date: DEC, 2023
Sequence: 33 of 37
Sheet No.: DTE-01

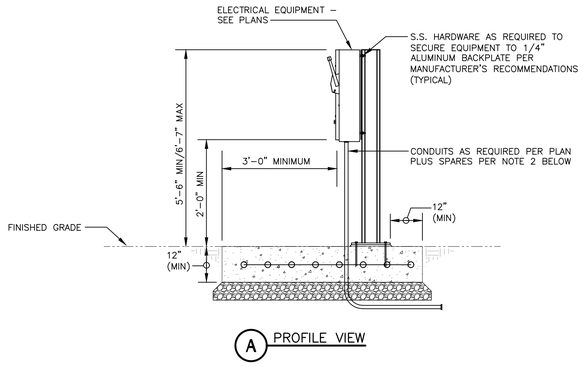
A1 | ELECTRICAL DETAILS | SCALE: NONE



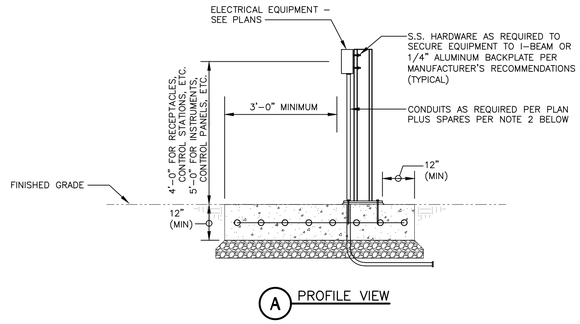
PLAN VIEW



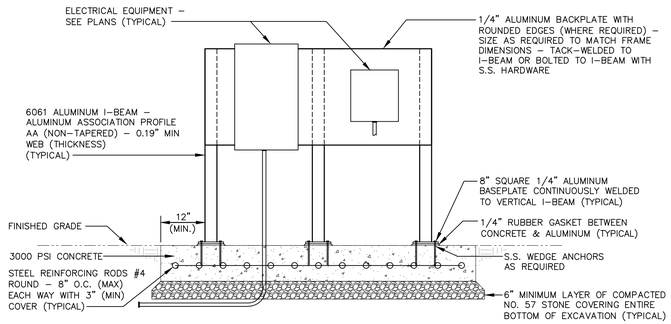
PLAN VIEW



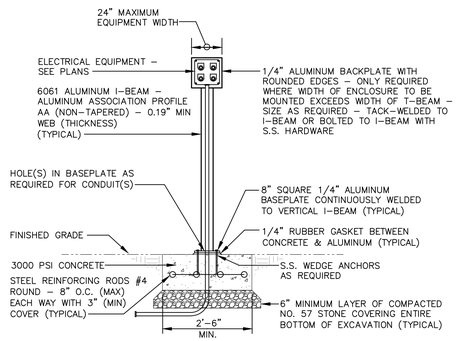
A PROFILE VIEW



A PROFILE VIEW



B FRONT VIEW



B FRONT VIEW

NAME:	RP-A
RATING:	120/208V-3ø-4W
FED FROM:	PP-A CIR. 4 (IN MAIN ELEC. ROOM)

DETAIL "E-EDL" ELECTRICAL DISTRIBUTION EQUIPMENT LABEL

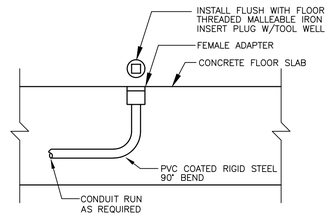
SCALE : NONE

DETAIL NOTES
1. PANEL NAMES & RATINGS LISTED ABOVE ARE FOR EXAMPLE PURPOSES ONLY. NAMES & RATINGS SHALL BE ADJUSTED TO MATCH ASSOCIATED EQUIPMENT.
2. THE INTENT OF THIS DETAIL IS TO DEMONSTRATE GENERAL ELECTRICAL IDENTIFICATION REQUIREMENTS FOR ELECTRICAL DISTRIBUTION AND UTILIZATION EQUIPMENT. REFER TO SPECIFICATIONS FOR SPECIFIC REQUIREMENTS REGARDING LOCATIONS, CONTENT, MATERIALS, ETC..

DETAIL "E-ES" EQUIPMENT SUPPORT

SCALE : NONE

DETAIL NOTES
1. ALL DIMENSIONS SHOWN ARE TYPICAL.
2. PROVIDE TWO (2) 1"E.C. FROM ALL DISTRIBUTION PANELS, LIGHTING PANELS, PLC'S AND CONTROL PANELS ROUTED BELOW CONCRETE PAD TO NEAREST PULLBOX OR ACCESSIBLE STUB OUT LOCATION (NOT UNDERNEATH CONCRETE/ROCK/STRUCTURE/ETC).



DETAIL "E-FC" FUTURE CONDUIT STUB-UP

SCALE : NONE

KREBS ENGINEERING
ALABAMA LICENSED No. 27420 PROFESSIONAL ENGINEER PHILIP D. BLACK
12/8/2023
JRA JACKSON, RENFRO & ASSOCIATES, INC.
ELECTRICAL ENGINEERING & DESIGN
PHILIP D. BLACK, PE
phil@jrare.com
(D) 205.536.7120 (P) 205.995.1078
JRA JOB NO. 223217
31 INVERNESS CENTER PKWY. • SUITE I
BIRMINGHAM, ALABAMA • 35242

CITY OF FAIRHOPE
WTP No. 1 IMPROVEMENTS
PHASE 1
FAIRHOPE, ALABAMA

CITY OF FAIRHOPE ALABAMA

Designed	Project No.
PDB	23040.3
Drawn: ZJG	
Checked: PDB	

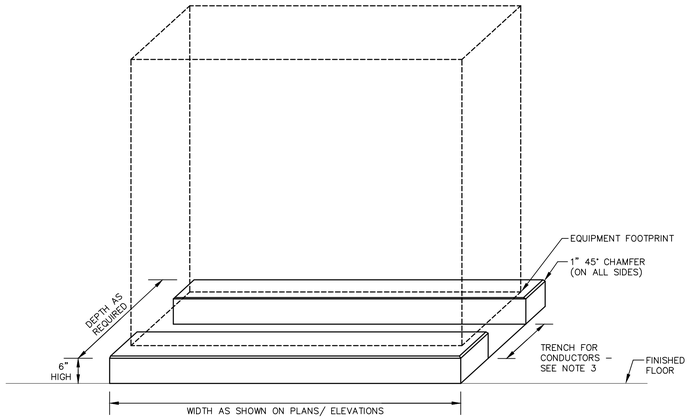
Revisions

No.	Date	Description

Sheet Title: ELECTRICAL DETAILS

Issue Date: DEC, 2023
Sequence: 34 of 37
Sheet No.: DTE-02

A1 | ELECTRICAL DETAILS | SCALE: NONE



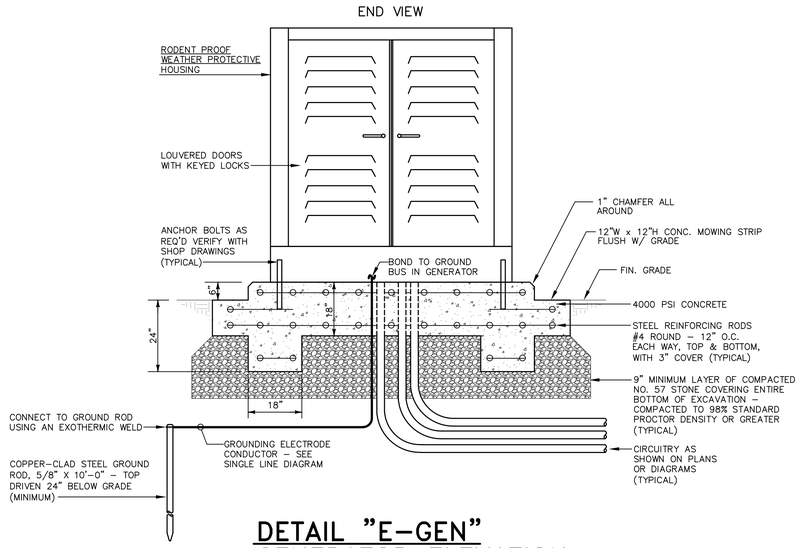
NOTES:

1. CONCRETE PAD SHALL BE EITHER POURED WITH SLAB BELOW OR SECURELY ANCHORED WITH EPOXIED DOWELS TO SLAB BELOW.
2. ALL PAD REQUIREMENTS SHALL BE COORDINATED WITH EQUIPMENT SUPPLIER TO ASSURE PROPER SUPPORT OF EQUIPMENT AND ACCESS FOR CABLES.
3. TRENCH SHALL BE COVERED WITH EITHER EQUIPMENT SECTIONS OR CUSTOM–FIT CHECKERPLATE COVERPLATE (BOLTED TO PAD). TRENCH SHALL BE OPEN–ENDED (WITH CHECKERPLATE COVER) FOR EXPANDABLE EQUIPMENT (MCC'S, SWITCHBOARDS, ETC.) AND SHALL BE CLOSED WITH CONCRETE SIDES) FOR NON–EXPANDABLE EQUIPMENT (SEPARATE CONTROL PANELS, ETC.).

DETAIL "E–HKP" FREESTANDING ELECTRICAL EQUIPMENT HOUSEKEEPING PAD

SCALE : NONE

END VIEW

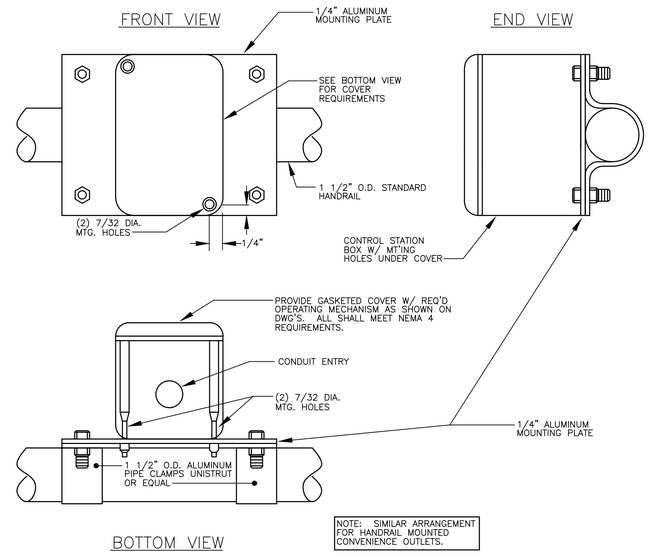


DETAIL "E–GEN" GENERATOR ELEVATION

SCALE : NONE

DETAIL NOTES

1. ALL DIMENSIONS SHOWN ARE TYPICAL AND MINIMUM. ADDITIONALLY, CONTRACTOR SHALL SIZE CONCRETE PAD SUCH THAT THE TOTAL PAD WEIGHT (AT AN ASSUMED CONCRETE DENSITY OF 150 LBS/CUBIC FOOT) IS A MINIMUM OF 1.5 TIMES THE TOTAL GENERATOR SET WEIGHT (INCLUDING ENCLOSURE(S), ACCESSORIES, FUEL, OIL, ETC.).
2. PROVIDE VIBRATION ISOLATORS, SPRING & PAD TYPE, QUANTITY AS RECOMMENDED BY THE GENERATOR SET MANUFACTURER TO MOUNT GENERATOR SET. ISOLATORS SHALL INCLUDE SEISMIC RESTRAINTS IF REQUIRED BY SITE LOCATION.



NOTE: SIMILAR ARRANGEMENT FOR HANDRAIL MOUNTED CONVENIENCE OUTLETS.

DETAIL "E–HR" NEMA 4 HANDRAIL MOUNTING

SCALE : NONE

KREBS ENGINEERING
ALABAMA LICENSED No. 27420 PROFESSIONAL ENGINEER PHILIP D. BLACK
12/8/2023

JACKSON, RENFRO & ASSOCIATES, INC.
ELECTRICAL ENGINEERING & DESIGN
PHILIP D. BLACK, PE
phil@jrae.com
(D) 205.536.7120 (P) 205.995.1078
JRA JOB NO. 223217
31 INVERNESS CENTER PKWY. • SUITE I
BIRMINGHAM, ALABAMA • 35242

CITY OF FAIRHOPE
WTP No. 1 IMPROVEMENTS
PHASE 1
FAIRHOPE, ALABAMA

CITY OF FAIRHOPE ALABAMA

Designed PDB	Project No. 23040.3
Drawn ZJG	
Checked PDB	

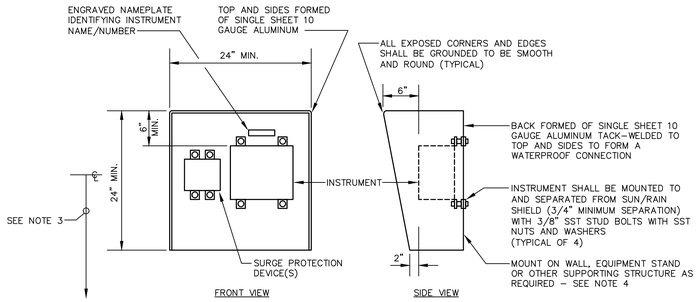
Revisions

No.	Date	Description

Sheet Title: ELECTRICAL DETAILS

Issue Date: DEC, 2023
Sheet No.: DTE-03
Sequence: 35 of 37

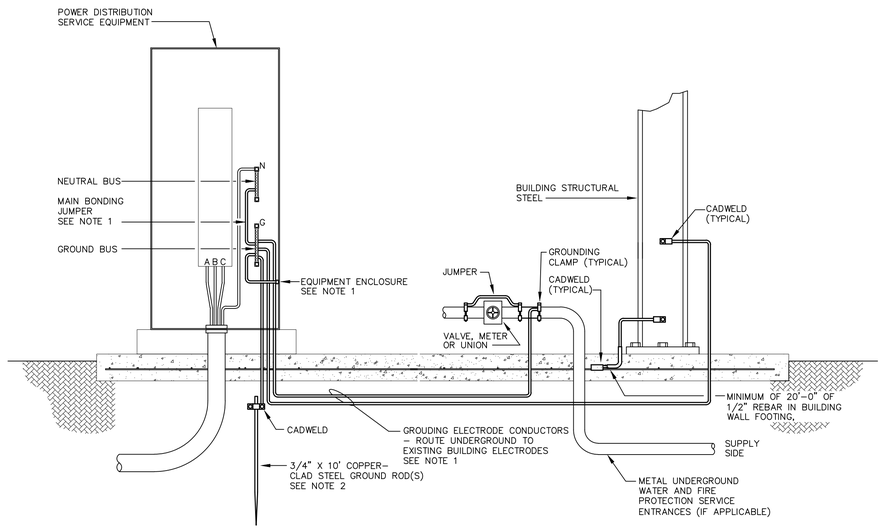
A1 | ELECTRICAL DETAILS | SCALE: NONE



DETAIL "E-SRS" INSTRUMENT SUN/RAIN SHIELD INSTALLATION DETAIL

SCALE : NONE

DETAIL NOTES
1. SUN/RAIN SHIELDS SHALL BE FURNISHED FOR ALL ELECTRONIC INSTRUMENTS THAT WILL BE EXPOSED TO SUN OR RAIN (OR WHERE OTHERWISE SPECIFICALLY NOTED).
2. DIMENSIONS SHOWN ABOVE ARE MINIMUM. SUN/RAIN SHIELDS SHALL BE SUFFICIENTLY SIZED TO ACCOMODATE INSTRUMENT PLUS ASSOCIATED SURGE PROTECTION DEVICE(S), POWER SUPPLIES, AND OTHER SIMILAR DEVICES.
3. CENTERLINE OF INSTRUMENT SHALL BE LOCATED AT APPROXIMATELY 60" ABOVE GRADE/FLOOR LEVEL.



DETAIL "E-MSG" MAIN SERVICE GROUNDING

SCALE : NONE

DETAIL NOTES
1. UNLESS OTHERWISE NOTED, MAIN BONDING JUMPER SHALL BE SIZED IN ACCORDANCE WITH NEC TABLE 250.102(C)(1) AND ALL GROUNDING ELECTRODE CONDUCTORS SHALL BE SIZED IN ACCORDANCE WITH NEC TABLE 250.66. ALL CONDUCTORS SHALL BE INSULATED COPPER.
2. ADDITIONAL GROUND RODS SHALL BE INSTALLED A MINIMUM OF SIX (6) FEET APART AND CONNECTED BY GROUNDING ELECTRODE CONDUCTORS UNTIL THE GROUND RESISTANCE DOES NOT EXCEED FIVE (5) OHMS.
3. ALL GROUNDING CONDUCTORS SHALL BE INSTALLED IN CONDUIT (TYPE PER SPECIFICATION REQUIREMENTS) UNLESS SPECIFICALLY NOTED OTHERWISE. METAL CONDUITS SHALL BE GROUNDED PER NEC REQUIREMENTS.
4. REFER TO "GROUNDING" SPECIFICATIONS SECTION FOR ADDITIONAL GROUNDING REQUIREMENTS.

KREBS ENGINEERING

ALABAMA LICENSED No. 27420 PROFESSIONAL ENGINEER PHILIP D. BLACK

12/8/2023

JACKSON, RENFRO & ASSOCIATES, INC.
ELECTRICAL ENGINEERING & DESIGN
PHILIP D. BLACK, PE
phil@jrare.com
(O) 205.536.7120 (F) 205.995.1078
JRA JOB NO. 223217
31 INVERNESS CENTER PKWY. • SUITE I
BIRMINGHAM, ALABAMA • 35242

CITY OF FAIRHOPE

WTP No. 1 IMPROVEMENTS PHASE 1

FAIRHOPE, ALABAMA

CITY OF FAIRHOPE ALABAMA

Designed	Project No.
PDB	23040.3
Drawn: ZJG	
Checked: PDB	

Revisions

No.	Date	Description

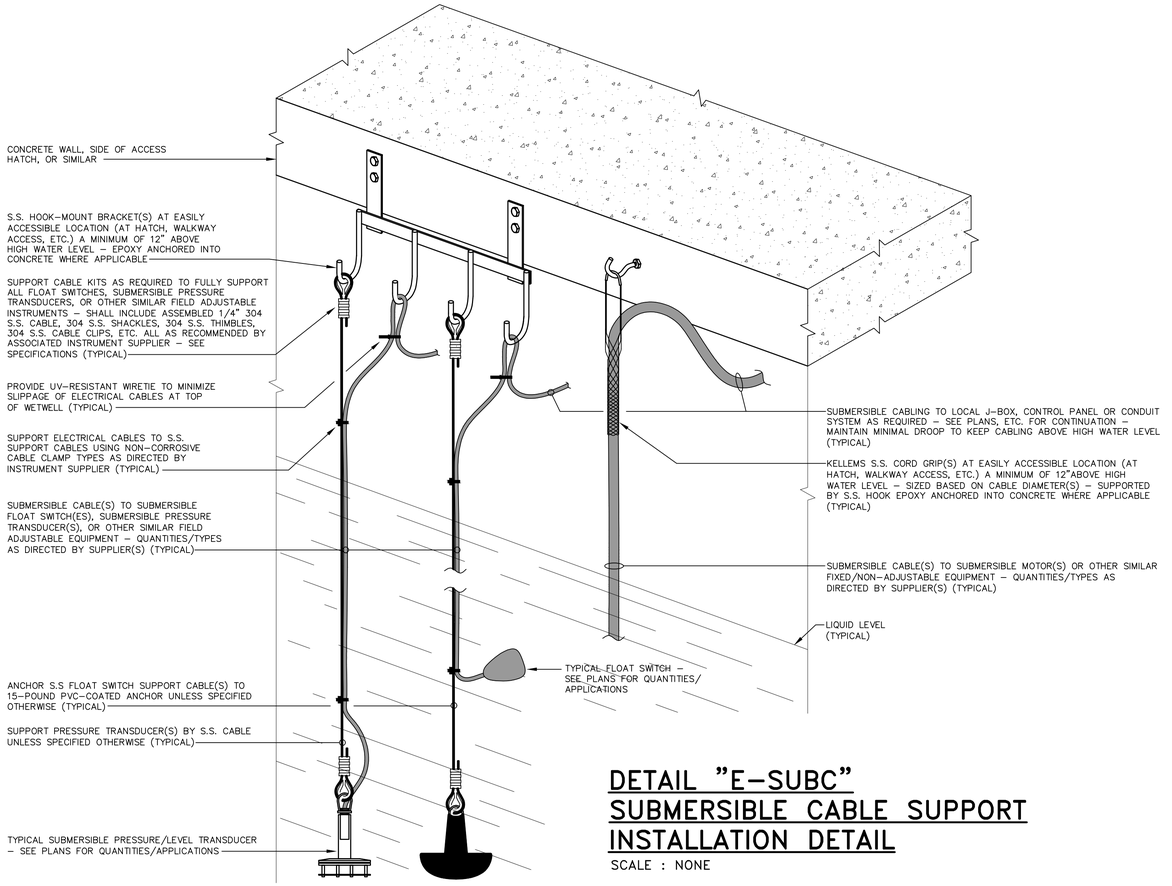
Sheet Title: ELECTRICAL DETAILS

Issue Date: DEC, 2023

Sheet No.: DTE-04

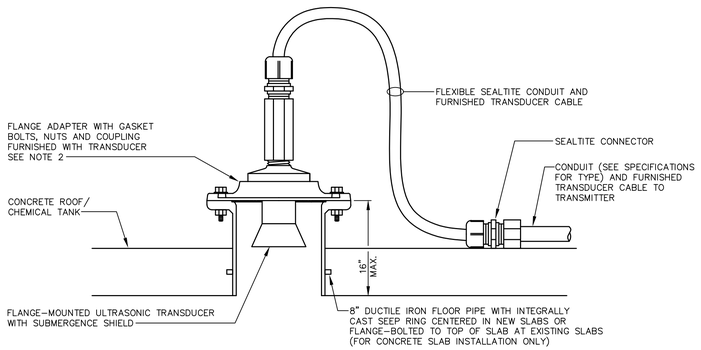
Sequence: 36 of 37

A1 | ELECTRICAL DETAILS | SCALE: NONE



DETAIL "E–SUBC"
SUBMERSIBLE CABLE SUPPORT INSTALLATION DETAIL

SCALE : NONE



DETAIL "E–UTR"
TYPICAL ULTRASONIC LEVEL TRANSDUCER CONCRETE ROOF INSTALLATION DETAIL

SCALE : NONE

DETAIL NOTES
1. INSTALLATION SHOWN IS TYPICAL. EXACT REQUIREMENTS SHALL BE DETERMINED BY APPROVED MANUFACTURER'S SHOP DRAWINGS.
2. CONTRACTOR SHALL COORDINATE ALL EQUIPMENT MOUNTING HARDWARE REQUIREMENTS WITH INTRUMENTATION PROVIDER.
3. TRANSDUCER SHALL BE LOCATED AS REQUIRED TO AVOID OBSTRUCTIONS INTERFERING WITH THE ULTRASONIC BEAMSPREAD AND TO PROVIDE PROPER MEASUREMENT OF THE ASSOCIATED LEVEL PER THE RECOMMENDATIONS OF THE TRANSDUCER SUPPLIER.

KREBS ENGINEERING

ALABAMA LICENSED No. 27420 PROFESSIONAL ENGINEER PHILIP D. BLACK

12/8/2023

JACKSON, RENFRO & ASSOCIATES, INC.
ELECTRICAL ENGINEERING & DESIGN
PHILIP D. BLACK, PE
phil@jrare.com
(D) 205.536.7120 (P) 205.995.1078
JRA JOB NO. 223217
31 INVERNESS CENTER PKWY • SUITE E
BIRMINGHAM, ALABAMA • 35242

CITY OF FAIRHOPE

WTP No. 1 IMPROVEMENTS PHASE 1

FAIRHOPE, ALABAMA

CITY OF FAIRHOPE ALABAMA

Designed	Project No.
PDB	23040.3
Drawn: ZJG	
Checked: PDB	

Revisions

No.	Date	Description

Sheet Title: ELECTRICAL DETAILS

Issue Date: DEC, 2023

Sequence: 37 of 37

Sheet No.: DTE-05

A1 | ELECTRICAL DETAILS | SCALE: NONE