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ADDENDUM NO. 2

Date: December 5, 2023

Project Name: Hilliard N. Fletcher WRRF Phase II Improvements

Tuscaloosa Project No.: File No. OCA-23-1043
Engineering Project No. 2024.702.001

Garver Project No.: 19W10160

This addendum shall be a part of the Plans, Contract Documents and Specifications to the same extent as though it were originally included therein, and it shall supersede anything contained in the Plans, Contract Documents, and Specifications with which it might conflict. This Addendum No. 2, including all attachments shall become part of the Contract and all provisions of the Contract shall apply thereto, with exception to the items listed under "Other Project Information" at the end of this Addendum, which are supplements provided for the Contractor's convenience. **The time provided for completion of the Contract has not been changed by this addendum**. Acknowledgement of receipt of this Addendum must be noted in the appropriate section of the Bid Proposal and included with the Contract Documents.

A. SPECIFICATIONS – Volumes 1 and 2
   1. Add the following specification sections in their entirety:
      a. 26 41 13 – LIGHTNING PROTECTION FOR STRUCTURES
   2. Remove the following specification sections in their entirety and replace with the same:
      a. 01 75 00 – STARTUP TESTING AND TRAINING
      b. 44 42 00 – HYDRAULIC MIXING SYSTEM

B. STANDARD DETAILS – Volume 3
   1. Remove the following standard details in their entirety and replace with the same:
      a. D07/9200-001 – Dome Cover Seal
      b. D22/0529-003 – Concrete Pipe Supports at Existing Structure

C. DRAWINGS – Volume 4
   1. Remove the following drawings in their entirety and replace with the same:
      a. 034 11-P103 – Anaerobic Digester No. 1 Improvements Upper Plan
      b. 053 12-P103 – Anaerobic Digester No. 2 Improvements Upper Plan
      c. 070 13-P103 – Anaerobic Digester No. 3 Improvements Upper Plan
      d. 079 20-P101 – Digester Control Building Roof Plan
      e. 114 40-S414 – North Aeration Basins – Blower Building Details 1
      f. 115 40-S415 – North Aeration Basins – Blower Building Details 2

g. 116 40-S416 – North Aeration Basins – Blower Building Details 3

h. 123 40-P303 – North Aeration Basins – Blower Piping Sections and Details 3

i. 126 40-E101 – North Aeration Basins – Electrical Site Plan

2. Revise Drawing 40-X101 as follows:

a. Modify General Note No. 2 to read: “EXISTING BELOW GRADE ALP PIPING TO BE ABANDONED IN PLACE AND FILLED WITH FLOWABLE FILL.”

3. Revise Drawing 40-X102 as follows:

a. Delete General Note No. 3.

4. Revise Drawing 40-P102 as follows:

a. Delete General Note No. 1.

D. OTHER PROJECT INFORMATION (Non-Contract Documents)

1. Other project information (non-contract documents) has been made available for the Contractor’s convenience and includes the following:

a. Questions and Answers No. 2

By: _____

Wes Cardwell, P.E.
Project Manager

Digitally Signed 12/05/2023

Attachments:

1. Specifications:

a. 01 75 00 – STARTUP TESTING AND TRAINING

b. 26 41 13 – LIGHTNING PROTECTION FOR STRUCTURES

c. 44 42 00 – HYDRAULIC MIXING SYSTEM

2. Standard Details:

a. D07/9200-001 – Dome Cover Seal

b. D22/0529-003 – Concrete Pipe Supports at Existing Structure

3. Drawings:

a. 034 11-P103 – Anaerobic Digester No. 1 Improvements Upper Plan

b. 053 12-P103 – Anaerobic Digester No. 2 Improvements Upper Plan

c. 070 13-P103 – Anaerobic Digester No. 3 Improvements Upper Plan

d. 079 20-P101 – Digester Control Building Roof Plan

e. 114 40-S414 – North Aeration Basins – Blower Building Details 1

f. 115 40-S415 – North Aeration Basins – Blower Building Details 2

g. 116 40-S416 – North Aeration Basins – Blower Building Details 3

h. 123 40-P303 – North Aeration Basins – Blower Piping Sections and Details 3

i. 126 40-E101 – North Aeration Basins – Electrical Site Plan

END OF ADDENDUM NO. 2

SECTION 01 75 00 – STARTUP TESTING AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Factory testing.
   2. Manufacturer's services.
   3. Startup plan.
   4. Pre-startup testing.
   5. Functional testing.
   6. Site Acceptance Test.
   7. Demonstration and Training

1.2 FACTORY TESTING

A. Test equipment for proper performance at point of manufacture or assembly when specified.
   1. Demonstrate equipment meets specified performance requirements.
   2. Perform testing as specified in the equipment specification sections.
   3. Provide certified copies of test results. Do not ship equipment until receiving written approval of test results.

B. Factory testing may require witnessing by the Owner or Engineer as specified in the equipment specification sections. When required, provide or reimburse the cost for travel, lodging, and meals for up to two (2) representatives, or quantity as specified in the equipment specification section.

1.3 MANUFACTURER'S SERVICES

A. Execute testing and startup under supervision of manufacturer's representative according to manufacturer's instructions. Schedule services to avoid conflict with other testing and startup activity.

B. Comply with requirements of individual equipment specification sections, including requirements for an on-site manufacturer's representative to inspect, check, and approve equipment or system installation prior to startup and supervise placing equipment or system in operation.

C. Manufacturer's representative shall maintain a log of activities, prepare startup and testing forms, and submit records generated during start-up and testing phase of Project.

D. Manufacturer's Certificate of Proper Installation: Provide a written report prepared and signed by Manufacturer's representative certifying that equipment:
   1. Has been properly installed, adjusted, aligned, and lubricated.
   2. Is free of any stresses imposed by connecting piping or anchor bolts.
   3. Is suitable for satisfactory full-time operation under full load conditions.
   4. Operates within the allowable limits for vibration.
   5. Controls, protective devices, instrumentation, and control panels furnished as part of the equipment package are properly installed, calibrated, and functioning.
   6. Control logic for start-up, shutdown, sequencing, interlocks, and emergency shutdown have been tested and are properly functioning.

1.4 STARTUP PLAN

A. Provide a startup plan for each piece of equipment and each system not less than two weeks prior to planned initial start-up of equipment or system. At a minimum, provide the following information:
   1. Step-by-step instructions for startup of each piece of equipment or system.
   2. Description of the process, including equipment numbers/nomenclature of each item and all included devices.
   3. Detail procedure for startup including valves to be opened/closed, sequence of startup, etc.
   4. Startup requirements including water, power, chemicals, etc.
   5. Provide testing plan with test logs for each item and system when specified. Include testing of alarms, control circuits, capacities, ratings, speeds, flows, pressures, vibrations, sound level, and other specified performance parameters.
   6. Provide a summary of shutdown requirements for existing systems, if any, which are necessary to complete startup of new equipment and systems.

B. Coordinate schedule for startup of various equipment and systems. Allow realistic durations in the Progress Schedule for testing and startup activities, including the following:
   1. Manufacturer's services
   2. Pre-startup testing
   3. Functional testing
   4. Site Acceptance Test

C. Revise and update startup plan based upon review comments or to accommodate changes in startup sequence.

1.5 PRE-STARTUP TESTING

A. Prior to start-up of any piece of equipment, perform all checks and adjustments required to make the equipment ready for safe and proper operation.

B. Furnish labor, power, chemicals, tools, equipment, instruments, and services required for and incidental to completing all pre-startup testing.

C. Perform pre-startup testing and checks as indicated in the individual equipment specification sections and as required by manufacturer's literature.

D. Mechanical Systems
   1. Remove rust preventatives and oils applied to protect equipment during construction.
   2. Flush lubrication systems and dispose of flushing oils. Recharge lubrication system with lubricant recommended by manufacturer.
   3. Flush fuel system and provide fuel for testing and startup.
   4. Install and adjust packing, mechanical seals, O-rings, and other seals. Replace defective seals.
   5. Remove temporary supports, bracing, or other foreign objects installed to prevent damage during shipment, storage, and erection.
   6. Check rotating machinery for correct direction of rotation and for freedom of moving parts before connecting driver.
   7. Perform cold alignment and hot alignment to manufacturer's tolerances.
   8. Adjust V-belt tension and variable pitch sheaves.
   9. Inspect hand and motorized valves for proper adjustment. Tighten packing glands to ensure no leakage but permit valve stems to rotate without galling. Verify valve seats are positioned for proper flow direction.
   10. Tighten leaking flanges or replace flange gasket. Inspect screwed joints for leakage.
   11. Install gratings, safety chains, handrails, shaft guards, and sidewalks prior to functional testing.

E. Electrical Systems
   1. Perform testing as indicated in Division 26 including insulation testing, continuity testing, ground testing, circuit breaker testing, and motor testing.
   2. Verify that tests, meter readings, and electrical characteristics agree with those required by equipment or system manufacturer.

F. Instrumentation and Control Systems
   1. Perform testing as indicated in Division 40 including instrumentation calibration and adjustment, point-to-point wiring checks, signal range testing, and input/output testing.
   2. Verify that tests agree with those required by equipment or system manufacturer.

G. Document results of pre-startup testing on test forms and reports and submit upon completion of testing. Acceptance of pre-startup testing results is required prior to performing functional testing.

1.6 FUNCTIONAL TESTING

A. Functionally test mechanical, electrical, and instrumentation and control equipment for proper operation after pre-startup testing and adjusting is completed.

B. Furnish labor, power, chemicals, tools, equipment, instruments, and services required for and incidental to completing all functional testing.

C. Functional testing of equipment shall be performed for all possible operational scenarios from no load to full load conditions. The various tests performed during functional testing shall be designed to demonstrate that systems fulfill all the requirements of the Contract Documents.

D. Functional testing shall be performed utilizing water, air, electricity, chemicals, or other mediums to simulate permanent operating conditions.
   1. Some processes may require the use of temporary clean water for functional demonstration testing.
   2. Contractor shall coordinate with the Owner for availability of water source. Contractor shall be responsible for all temporary piping, pumping, and power to convey clean water to the facility for testing.
   3. Coordinate with Owner removal of test water from process after satisfactory completion of functional testing. Do not discharge test water in a manner to cause upset or disruption to plant operations.

E. Demonstrate proper rotation, alignment, speed, flow, pressure, vibration, sound level, adjustments, and calibration.

F. Demonstrate that equipment meets performance requirements specified.

G. Demonstrate proper operation of each instrument loop function including alarms, local and remote controls, instrumentation, and other equipment functions. Where required, generate signals with test equipment to simulate operating conditions in each control mode.

H. Document results of functional testing on test forms and reports and submit upon completion of testing. Acceptance of functional testing results is required prior to performing the Site Acceptance Test.

1.7 SITE ACCEPTANCE TEST

A. After all systems have been functionally tested and are operating in accordance with the Contract Documents, the Contractor shall perform a Site Acceptance Test of the comprehensive completed installation.

B. During the testing period, the Owner shall have full use of the system. The Owner will provide operations, personnel, power, fuel, and other consumables for the duration of the site acceptance test.

C. The complete installation must meet all performance requirements for the duration of the Site Acceptance Test.

D. Contractor personnel shall be readily available to address issues onsite during the test. Immediately correct defects in materials, workmanship, or equipment which become evident during the test.

E. The Site Acceptance Test period shall be 30 days, during which time the completed installation must meet specified operation without significant interruption. A significant interruption may include any of the following events:
   1. Failure to meet specified functional or performance requirements for more than 2 consecutive hours.
   2. Failure of any critical component that is not corrected within 8 hours after failure.
   3. Other failures or interruptions as defined by the Engineer.

F. A significant interruption will require restarting of the Site Acceptance Test after the problem is corrected and when directed by the Owner/Engineer. Restarting and satisfactory completion of the Site Acceptance Test shall be conducted at no additional cost to the Owner.

1.8 DEMONSTRATION AND TRAINING

A. Demonstrate operation and maintenance of products to Owner's personnel prior to date of Substantial Completion.

B. Provide a training schedule for all training sessions required for the project. Allow for multiple sessions of each training to accommodate multiple operator shifts. Submit training schedules for approval by Owner.

C. Demonstrate Project equipment and instruct in classroom environment located at the Site and instructed by qualified manufacturer's representative who is knowledgeable about the equipment.

D. Provide a lesson plan for each required course, containing the following minimum information:
   1. Title and objectives.
   2. Recommended attendees.
   3. Course description and outline.
   4. Instructional materials and equipment requirements.
   5. Instructor resumes.

E. Use operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

F. Demonstrate startup, operation, control, adjustment, troubleshooting, servicing, maintenance, and shutdown of each item of equipment at agreed time at designated location.

G. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

H. Allot the required instruction time for each item of equipment and system as specified in individual equipment specification sections.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 26 41 13 - LIGHTNING PROTECTION FOR STRUCTURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes lightning protection for building site components. Specifically, this section applies to lighting protection for the following structure:

1. Existing Blower Building: Install lightning protection components for new roof-mounted air piping and other existing roof-mounted metal equipment. Install new down conductors and bond to a new ground ring and ground rods installed in a loop around the building. Bond the lightning protection system to the existing building grounding electrode system at one location.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: for air terminals and mounting accessories.
1. Layout of the lightning protection system, along with details of the components to be used in the installation.
2. Include indications for use of raceway, data on how concealment requirements will be met, and calculations required by NFPA 780 for bonding of grounded and isolated metal bodies.

C. Qualification Data: For qualified Installer and manufacturer. Include data on listing or certification by UL.

D. Certification, signed by Contractor, that roof adhesive is approved by manufacturer of roofing material.

E. Field quality-control reports.

F. Other Informational Submittals: Plans showing dimensioned as-built locations of grounding features, including the following:
1. Ground rods.
2. Ground loop conductor.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Certified by UL or LPI as a Master Installer/Designer, trained and approved for installation of units required for this Project.

B. Electrical components, Devices and Accessories: Listed and labeled as defined in NFPA 780, “Definitions” Article.

1.4 COORDINATION

A. Coordinate installation of lightning protection with installation of other building systems and components, including electrical wiring, supporting structures and building materials, metal bodies requiring bonding to lightning protection components, and building finishes.

B. Coordinate installation of air terminals attached to roof systems with roofing manufacturer and Installer.

C. Flashings of through-roof assemblies shall comply with roofing manufacturer's specifications.

PART 2 - PRODUCTS

2.1 LIGHTNING PROTECTION SYSTEM COMPONENTS

A. Comply with UL 96 and NFPA 780.

B. Roof-Mounted Air Terminals: NFPA 780, Class I copper unless otherwise indicated.
   1. Manufacturers: subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. East Coast Lightning Equipment Inc.
      b. ERICO International Corporation.
      c. Harger.
      d. Heary Bros. Lightning Protection Co., Inc.
      e. Independent Protection Co.
      f. Preferred Lightning Protection.
      g. Robbins Lightning, Inc.
      h. Thompson Lightning Protection, Inc.
   2. Air Terminals More than 24 Inches Long: With brace attached to the terminal at not less than half the height of the terminal.
   3. Single-membrane, Roof-Mounted, Air Terminals: Designed specifically for single-membrane roof system materials.

C. Main and Bonding Conductors: Copper.

D. Ground Loop Conductor: The same size and type as the main conductor except tinned.

E. Ground Rods: Copper-clad steel; ¾ inch in diameter by 10 feet long.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install lightning protection components and systems according to UL 96A and NFPA 780.

B. Install conductors with direct paths from air terminals to ground connections. Avoid sharp bends.

C. Conceal the following conductors:
   1. System conductors.
   2. Down conductors.
   3. Interior conductors.
   4. Conductors within normal view of exterior locations at grade within 200 feet of building.

D. Cable Connections: Use crimped or bolted connections for all conductor splices and connections between conductors and other components. Use exothermic-welded connections in underground portions of the system.

E. Bond extremities of vertical metal bodies exceeding 60 feet in length of lightning protection components.

F. Ground Loop: Install ground-level, potential equalization conductor and extend around the perimeter of structure.

1. Bury ground ring not less than 30 inches.
2. Bond ground terminals to the ground loop.
3. Bond grounded building systems to the ground loop conductor within 12 feet of grade level.

G. Bond lightning protection components with intermediate-level interconnection loop conductors to grounded metal bodies of building at 60-foot intervals.

3.2 CORROSION PROTECTION

A. Do not combine materials that can form an electrolytic couple that will accelerate corrosion in the presence of moisture unless moisture is permanently excluded from junction of such materials.

B. Use conductors with protective coatings where conditions cause deterioration or corrosion of conductors.

3.3 FIELD QUALITY CONTROL

A. Notify Engineer at least 48 hours in advance of inspection before concealing lightning protection components.

END OF SECTION

SECTION 44 42 00 – HYDRAULIC MIXING SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Work necessary to completely furnish and install the hydraulic mixing system, complete with mixing nozzles, and including all related equipment, materials, and appurtenances.

B. Related Sections:
   1. Section 01 33 00 – Submittal Procedures.
   2. Section 01 60 00 – Product Requirements.
   3. Section 01 75 00 – Startup Testing and Training.
   4. Section 05 50 00 – Metal Fabrications.
   5. Section 09 90 00 – Painting and Protective Coatings.
   6. Division 26 – Electrical.

1.2 GENERAL

A. General Requirements: See Division 01, GENERAL REQUIREMENTS, which contains information and requirements that apply to the work specified herein and are mandatory for this project.

B. Equipment Numbers: See Supplement Data Sheets at end of section.

C. Like items of equipment provided hereinafter shall be the end products of one Manufacturer to achieve standardization of appearance, operation, maintenance, spare parts, and Manufacturer's services.

D. Unit Responsibility: The Work requires that the hydraulic mixing system, local control panel, instruments, and components, complete with all accessories and appurtenances, be the end product of one responsible Manufacturer. The Manufacturer shall furnish all components and accessories of the system to enhance compatibility, ease of operation and maintenance, and as necessary to place the equipment in operation in conformance with the specified performance, features and functions without altering or modifying the Contractor's responsibilities under the Contract Documents.

E. The equipment specified herein is included in form ATTACHMENT B – LIST OF MANUFACTURERS provided in the front-end documents. Contractor shall identify the proposed manufacturer of the equipment specified on this form with the submitted bid.

1.3 SUBMITTALS

A. General: Administrative, shop drawings, samples, quality control, and contract closeout submittals shall conform to the requirements of Section 01 33 00, SUBMITTAL PROCEDURES.

B. In addition to the requirements of Section 01 33 00, SUBMITTAL PROCEDURES, submit the following additional specific information:
   1. Shop Drawings
      a. Make, model, weight, and horsepower of each component.
      b. Manufacturer's catalog information, descriptive literature, specifications, and identification of materials of construction.
      c. Detailed mechanical, and electrical drawings showing the equipment fabrications and interface with other items. Include dimensions, size, and details of anchorage and of connections to other work, and weights of associated equipment.

d. External utility requirements (quantity and connection details) such as air, water, power, drain etc., for each component.
e. Motor nameplate data, motor manufacturer, and any motor modifications.

2. Wiring diagrams for motors, including terminals and numbers.
3. Suggested spare parts list to maintain the equipment in service for a period of 1 year and 5 years. Include a list of special tools required for checking, testing, parts replacement, and maintenance with current price information.
4. List of special tools, materials, and supplies furnished with equipment for use prior to and during startup and for future maintenance.
5. Instrumentation and Control Submittals: In conformance with Division 26.
6. System design calculations, including:
   a. Design basis, with respect to regulatory and industry standard design guidelines. Include design recirculation flow rate.
   b. Nozzle selections, with jet velocity and connection size. Calculations shall show that adequate mixing conditions are provided under the maximum nozzle velocity conditions specified herein.
   c. Pipe size selections, and anticipated range of flow velocities through each selected pipe size.
   d. Hydraulic calculations, leading to pump sizes, motor sizes, and pump selections.
   e. Verification of sufficient available net positive suction head at solids concentrations up to eight percent, assuming normal digester operating level, mixed liquor operating temperature of 100 °F, and accounting for jobsite elevation.
7. CFD Results: Submit a CFD model analysis for the mixing system proposed on this project in a tank of identical size and geometry as the digesters shown in the bid drawings for this project. The CFD analysis shall show how manufacturer's equipment with the number of nozzles provided, in conjunction with nozzle orientation, nozzle flow and heat conditions, will create a mixing pattern suitable to mix the primary digester contents while not exceeding the maximum 25 ft/sec nozzle discharge velocity specified for this project. The CFD model shall indicate what type of mixing pattern is created by the mixing system, when installed.
8. Pumps
   a. Assembly drawing, nomenclature and material list, and parts list.
   b. Type, manufacturer, model numbers, location and spacing of bearings.
   c. Impeller type, diameter, through-let dimensions, sphere size, number of vanes and identification number.
   d. Hydraulic calculations for the head required by the pump.
   e. Complete motor performance data including: rating, voltage/phase/frequency; design type; service factor; insulation class; motor pole number; actual rotation speed when combined with the specified pumps; current, power factor and active input power (KW) as a continuous function of shaft power from no load to at least 115 percent load; start (max. inrush) current; locked rotor current; NEC code letter; and motor torque as a continuous function through the motor start cycle from no rotation to synchronous speed.
   f. Complete performance test curve(s) showing full range (shutoff to run-out) head vs. capacity, NPSHR, hydraulic efficiency, motor active (KW) input power, motor total (KVA) input power (based on measured current and voltage), and shaft power (BHP).
   g. Location and description of Service Centers and spare parts stock.
   h. Factory Test Reports (Balance & Vibration)
   i. For each pump, the manufacturer shall indicate, by arrows to points on the Q/H curves, limits recommended for stable operation, between which the pumps are to be operated to prevent surging, cavitation, and vibration. The stable operating range shall be as large as possible, and shall be based on actual hydraulic and mechanical characteristics of the units and shall meet the hydraulic performance requirements of the proposed system
9. Setting plans, including:

a. Anchor bolt layout
b. Anchor bolt dimensions
c. Outline dimensions and weights of pumps, bases, motors, and control enclosures.

10. Quality Control Submittals:
    a. Manufacturer's Certificate of Compliance: Commercial products, including painting/coating systems.
    b. Certified copies of the results of all Factory Functional and field Performance Test reports.
        1). Submit for the Engineer's approval a copy of the proposed start-up testing log sheet.
    c. Special shipping, storage and protection and handling instructions.
    d. Test procedures.
    e. Test results, reports, and certifications.
    f. Manufacturer's Certificate of Proper Installation.
    g. Operation and maintenance manual.
    h. Manufacturer's printed installation instructions.
11. Contract Closeout Submittals: Service records for maintenance performed during construction.

1.4 QUALITY CONTROL

A. A performance affidavit shall be supplied to the Contractor, Engineer and Owner certifying that the system as provided will meet or exceed the performance requirements for the specific application.

B. Pumps shall be factory tested per the test code of the American Hydraulic Institute, and sound Engineering practice. All pump performance documentation, including flow/head curves, shall adhere to the Hydraulic Institute Standards and shall allow no negative tolerance on flow, head, hydraulic efficiency or any other criteria deemed by the Engineer to be necessary to evaluate pumping system performance. All equipment herein shall be designed and installed in accordance with current OSHA standards.

C. Submit six copies of certified test results to the Engineer for approval.

1.5 OPERATION AND MAINTENANCE DATA

A. O&M Manuals: Content, format, and schedule for providing as specified in Section 01 77 00, CLOSEOUT PROCEDURES.

B. Maintenance Summary Forms: As specified in Section 01 77 00, CLOSEOUT PROCEDURES.

1.6 WARRANTY

A. Provide warranty for a period of 12 months after the final acceptance of the equipment by the Owner and Engineer. The warranty shall stipulate that the equipment furnished is suitable for the purpose intended and free from defects of material and workmanship for the duration of the warranty. In the event the equipment fails to perform as specified, the Manufacturer will promptly repair or replace the defective equipment without additional cost to the Owner.

B. All performance and warranty requirements shall be the sole responsibility of the approved mixing system manufacturer. Deferral or warranties to suppliers and subcontractors is not permitted.

C. Spare parts identified within this specification shall not be used to address warranty repairs.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Where a Manufacturer's standard equipment name and/or model number is listed, the equipment system shall be provided as modified to conform to the performance, functions, features, and materials of construction as specified herein.

B. The naming of a manufacturer in this specification section is not an indication that the manufacturer's standard equipment is acceptable in lieu of the specified component features. Naming is only an indication that the manufacturer may have the capability of Engineering and supplying the mixing system and pumps as specified herein. The manufacturer shall clearly note on his bid proposal to the Contractor and submittal data to the Engineer any and all deviations to this specification. Deviations to this specification shall be cause for rejection of the equipment at the discretion of the Engineer and Owner.

C. An extensive parts inventory shall be maintained by the manufacturer such that all pump parts are available for overnight delivery during the life expectancy of the pump.

D. The hydraulic mixing system including materials, equipment, components, and accessories specified in this section shall be products of:
   1. Vaughan Co., Inc. - Rotamix System.
   2. Hayward Gordon - Hydromix System.

2.2 GENERAL REQUIREMENTS

A. See Section 01 60 00, PRODUCT REQUIREMENTS, for specific requirements related to the equipment specified herein.

B. Noise Level: When in operation, no piece of equipment shall exceed the OSHA noise level requirements for a 1 hour exposure, 105 dBA.

C. Service Factors: Service factors shall be applied in the selection and design of components where so indicated in individual sections. When not indicated there, minimum service factors shall be 1.25, except for gears and gear drives as specified herein.

D. Safety Devices: The completed work shall include all necessary permanent safety devices, such as machinery guards, emergency stops and similar items required by OSHA, and other federal, state, and local health and safety regulations.

E. Flanges and Pipe Threads: Comply with ANSI B 16.1, Class 125; or B 16.5, Class 150, unless otherwise indicated. Threaded flanges and fittings shall have standard taper pipe threads complying with ANSI/ASME B 1.20.1.

F. Bearings:
   1. Conform to the standards of the Anti-Friction Bearing Manufacturers Association, Inc. (AFBMA).
   2. Except where otherwise indicated, bearings of process equipment shall have a minimum L-10 life expectancy of 100,000 hours.

G. Anchor bolts shall be specified in Section 05 50 00, METAL FABRICATIONS. Number and size as recommended by Manufacturer.

H. Stainless Steel: Stainless steel components shall be 304 stainless steel, or higher, as specified.

I. Nameplates: Equipment nameplates of stainless steel shall be engraved or stamped and fastened to the equipment in accessible locations with stainless steel screws or drive pins. Nameplates shall contain the manufacturer's name, model, serial number, size, characteristics, and appropriate data describing the machine performance ratings.

2.3 SERVICE CONDITIONS

A. See supplements to this section for additional equipment system product, component or accessory information.

2.4 PERFORMANCE REQUIREMENTS

A. Maximum Nozzle Discharge Velocity: The digester hydraulic mixing system shall be designed such that the nozzle velocity does not exceed 25 ft/sec under any operating condition.

B. The pumps shall be suitable for pumping digested sludge and shall be designed and fully guaranteed for this use. The fluid temperature range shall be from 40 degrees to 115 degrees F.

C. The pumps shall be specifically designed to pump and mix waste solids at heavy consistencies without plugging or dewatering of the solids. Materials shall be chopped/macerated and conditioned by the pump as an integral part of the pumping action. Each pump must have demonstrated the ability to chop through and pump high concentrations of solids such as plastics, heavy rags, grease and hair balls, wood, paper products and stringy materials without plugging, both in tests and field applications.

D. The mixing nozzles shall be designed to produce a rotational mixing pattern within the tank, while also producing flow across the middle portion of the tank thereby preventing solids from migrating towards the center. The mixing pattern shall effectively prevent mounding in the center of the process. The vendor shall be responsible for determining mixing assembly quantity, location and appropriate nozzle angles.

E. Solids shall be drafted by the nozzle discharge to the outer 30% of the tank where the peripheral rotation will create a homogeneous state throughout the tank, suspending both organic and inorganic solids.

F. Distance and location of Digester Mixing suction piping shall be a minimum of 50% of the digester radius from the center or as recommended by Manufacturer of digester mixing system based upon CFD model results.

G. A minimum of 90% active mixing will occur within thirty minutes or less.

H. The Manufacturer shall size the pipe network connecting the pump and nozzle assemblies, to prevent solids deposition during periods of minimum mixing flow.

2.5 EQUIPMENT AND/OR MATERIALS

A. Mixing Nozzle System
   1. Nozzles
      a. Shall be ASTM A536 glass-lined cast ductile iron with 1.0-inch nominal wall thickness to protect against abrasive conditions, and a long straight taper length of at least 12-inches. Nozzles lined with rubber will not be allowed. Alternatively, mixing nozzles shall be cast of ASTM 532 Class II, Type C chrome iron with a minimum hardness of 450 - 550 Brinell throughout the entire nozzle wall.
      b. Assembly fittings shall be ASTM A536 glass-lined cast ductile iron, with 150-pound flanged piping connection.

c. Nozzles shall have a van Stone style flange connection allowing for adjustment in alignment of 360 degrees.

2. Number of Nozzles per Digester:
   a. Per manufacturer recommendation to meet mixing performance requirements.
   b. Minimum of 6 nozzles.
3. Base shall be fabricated carbon steel, with 3/4-inch mounting holes for 5/8-inch anchor bolts.
4. Anchor bolts shall be 5/8-inch diameter, and of sufficient length to support thrust loads from nozzles. Construction shall be 316 stainless steel.

B. Mixing Pumps
1. Pump Casing
   a. The pump casing shall be of semi-concentric design, ASTM A536 ductile cast iron or ASTM A48 cast iron construction.
   b. Provide a single piece casing with integrally cast discharge flange.
   c. Design to withstand a design working pressure not less than 1.10 times the maximum shutoff total dynamic head with the maximum diameter impeller at the maximum operating speed plus the maximum suction static head.
   d. Design to withstand a 5-minute hydrostatic test pressure not less than 1.5 times the design working pressure.
   e. Provide suction and discharge flanges with ASME B16.1 Class 125 bolt patterns.
   f. Provide a cast cleanout to permit inspection and cleaning of the pump suction area.
      1) The cleanout shall have a bolted cover with inner contour that matches contour of suction piece.
   g. Provide casings with both 1/4-inch NPT high point vent and 2-inch low point drain taps on suction side; install pipe nipples with threaded gate valves.
   h. Provide 1/4-inch NPT taps for pressure gauges on the suction and discharge flanges.
2. Back Plate:
   a. Adapter plate shall be ASTM A536 ductile cast iron or ASTM A48 cast iron construction with all water passages to be smooth, and free of blowholes and imperfections for good flow characteristics.
   b. The back pullout adapter plate shall be a separate component part and shall allow removal of the pump components from above the casing.
   c. The back pullout adapter plate shall allow external adjustment of the impeller to cutter bar clearance.
   d. The pump shall include a rear cutting mechanism designed to cut against the pump out vanes and the impeller hub, reducing and removing stringy materials from the mechanical seal.
3. Impeller:
   a. Impeller and impeller cutter nut shall be ASTM A148 cast alloy steel, hardened to minimum Rockwell C 60 and dynamically balanced.
   b. Shall be single-passage, semi-open chopper-centrifugal impeller with smooth water passages to reduce clogging by rags, stringy or fibrous materials on impellers or shafting.
   c. Provide static, dynamic, and hydraulic balance of impeller and complete rotating element.
   d. Provide for external adjustment of impeller to cutter bar clearances without pump disassembly of suction or discharge piping.
4. Cutter Bar:
   a. Cutter bar shall be T1 alloy steel hardened to minimum Rockwell C 60.
   b. Cutter bar plate shall be designed to prevent blockage of intake and binding of debris at the shaft and impeller vanes.
   c. Cutter bar shall be replaceable without replacement of the suction flange or suction plate. Cutter bars which are integral to the suction flange or suction plate are not acceptable.

5. Pump Shafting:
    a. Material:
        1) Shaft shall be steel, Grade 4140.
        2) Hard faced or with hardened sleeve where shafts pass through bearings. Harden to 550 Brinell hardness number minimum per ASTM E10.
        3) If mechanical seals cannot be installed on hardened shaft, shaft is not to be hardened in the mechanical seal area.
        4) If sleeve provided, sleeve to be renewable and key locked in place.
    b. Strength: Able to withstand minimum 1.5 times maximum operating torque and other loads.
    c. Deflection: Maximum 0.002 inches under operating conditions.
    d. Impeller Attachment: Readily removable without use of special tools.
    e. Shaft Seal Type: Mechanical seal system specifically designed to require no seal flush. The mechanical seal shall be located immediately behind the impeller hub to eliminate the stuffing box and maximize the flushing available from the impeller pumpout vanes. The seal shall be cartridge-type mechanical seal with Viton O-rings and silicon carbide faces. This cartridge seal shall be pre-assembled and pre-tested so that no seal settings or adjustments are required from the installer. Any springs used to push the seal faces together must be shielded from the fluid to be pumped. The cartridge shall also include a 17-4PH, heat-treated seal sleeve and a ductile iron seal gland or CF8M stainless steel gland.
6. Bearings and Bearing Frame:
    a. Bearing Type: Back-to-back mounted single-row angular contact ball bearing and radial bearings, self-aligning spherical roller type radial bearings, angular contact ball type, or tapered roller for thrust bearings.
    b. Bearing Life: Bearings shall be rated with a minimum L10 bearing life of 100,000 hours at rated design point or 24,000 hours in accordance with ABMA 9 or 11 at bearing design load imposed by pump shutoff with maximum sized impeller at rated speed, whichever provides longest bearing life in intended service.
    c. Pump bearing frames shall be one-piece rigid construction with bearing housing.
    d. Bearing Housing:
        1) Shall be A536 ductile cast iron or ASTM A48 cast iron, and machined with piloted bearing fits for concentricity of all components.
        2) Bearing housing shall have oil bath lubrication using ISO Gr. 100 turbine oil and a side mounted site glass to provide a permanently lubricated assembly or fitted with grease nipples for grease lubrication.
        3) Viton® double lip seals riding on stainless steel shaft sleeves are to provide sealing at each end of the bearing housing.
7. Supports, Pedestals, and Baseplates
    a. Pump Base: Minimum 3/8-inch fabricated structural steel base and support system for the drive arrangement indicated herein and shown on the drawings.
    b. Pump, driver, and bearing support strength: Able to withstand minimum 1.5 times maximum imposed operating loads.
    c. Configuration: Allow easy access to stuffing boxes, bearing frames, and couplings.

2.6 ELECTRICAL COMPONENTS AND ACCESSORIES

A. General:
1. Conform with Division 26, ELECTRICAL.
2. Provide all necessary electrical components and wiring for a complete, functional system.
3. Where indicated, motor starters shall be provided in a separate motor control center specified in Division 26, ELECTRICAL. Provide all necessary control functions to properly interface with this motor starter.

B. Wiring: The Drawings and Specifications indicate the anticipated wiring for the equipment provided under this section. If additional wiring is required, or if required wiring does not match

what is indicated, the Contractor shall make the necessary modifications to the electrical wiring and documentation as part of the lump sum price. Wiring shall meet the requirements of Division 26, ELECTRICAL, and NFPA 70. Insulation shall be rated 600 volts, minimum. Low-voltage (24V) signals shall be run in twisted, shielded pair cable.

C. Provide breather drain units in the bottom of all electrical enclosures to allow moisture to exit the enclosure.

D. Motors:
   1. Provide squirrel-cage ac induction motors meeting the requirements of Division 26, ELECTRICAL, and as specified herein.
   2. For additional specific requirements on motors, refer to the Motor Data Sheets at the end of the Section.

2.7 INSTRUMENTATION AND CONTROLS

A. All instrumentation and control components shall be provided in accordance with the requirements of Division 26.

2.8 TOOLS AND SPARE PARTS

A. Tools: The work includes one complete set of special tools recommended by the manufacturer for maintenance and repair of each separate type of equipment; tools shall be stored in tool boxes, and identified with the equipment number by means of stainless steel or solid plastic name tags attached to the box.

B. Spare Parts:
   1. Spare parts shall be tagged by project equipment number and identified as to part number, equipment manufacturer, and subassembly component (if appropriate). Spare parts subject to deterioration such as ferrous metal items and electrical components shall be properly protected by lubricants or desiccants and encapsulated in hermetically sealed plastic wrapping. Spare parts with individual weights less than 50 pounds and dimensions less than 2 feet wide, or 18 inches high, or 3 feet in length shall be stored in a wooden box with hinged wooden cover and locking clasp. Hinges shall be strap type. The box shall be painted and identified with stenciled lettering stating the name of the equipment, equipment numbers, and the words "spare parts." A neatly typed inventory of spare parts shall be taped to the underside of the cover.

C. Provide the following spare parts and special tools:

Qty	Item
1	Complete Shelf-Spare Pump and Motor
1	Seal assembly, complete, for each type supplied.
1 set	Radial and thrust bearings
1 set	Impeller cutter bar
1	Complete set of special tools necessary to perform maintenance

2.9 FINISHES

A. Factory Applied Finishes: Prepare surfaces and apply finishes as specified in Section 01 60 00, Product Requirements.

B. Field Applied Finishes:
   1. The pump unit shall conform to the requirements of Section 09 90 00, PAINTING AND PROTECTIVE COATINGS, System No. 4.
   2. Nozzle Assemblies shall conform to the requirements of Section 09 90 00, PAINTING AND PROTECTIVE COATINGS, System No. 2.

PART 3 - EXECUTION

3.1 GENERAL

A. Coordination shall include space and structural requirements, clearances, utility connections, signals, outputs and features required by the manufacturer including safety interlocks.

3.2 ASSEMBLY AND PREPARATION FOR SHIPMENT

A. Each drive unit, including motor, shall be completely factory assembled, aligned, and securely crated for shipment. Accessory equipment which cannot be shipped assembled to the unit, such as shafts, baseplates, impellers, spare parts, and anchorage materials, shall be separately crated, clearly marked as to the contents, and shipped on the same shipment as the drives.

B. For shipment, exposed surfaces subject to rust, such as mounting flange faces, etc., shall be covered with a rust-preventive compound such as Kendall No. 5, or equal.

3.3 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 60 00, PRODUCT REQUIREMENTS.

B. No shipment shall be made until the Contractor has an approved shop drawing submittal.

C. Delivery of Materials: Products shall be delivered in original, unbroken packages, containers, or bundles bearing the name of the manufacturer.

D. Storage: Products shall be carefully stored in a manner that will prevent damage and in an area that is protected from the elements.

E. Protection of Equipment: Equipment shall be boxed, crated, or otherwise protected from damage and moisture during shipment, handling, and storage. Equipment shall be protected from exposure to corrosive fumes and shall be kept thoroughly dry at all times. Pumps, motors, drives, electrical equipment, and other equipment with anti-friction or sleeve bearings shall be stored in weathertight and heated storage facilities prior to installation. For extended storage periods, plastic equipment wrappers shall not be used to prevent accumulation of condensate in gears and bearings.

3.4 INSTALLATION

A. Install in accordance with manufacturer’s written instructions and approved submittals.

B. At each tank, the mix nozzles shall mount to the tank floor. Locations shall be as shown on the Drawings. The Contractor will supply the interconnecting piping, and the pump suction piping, which shall draw from the center of each tank floor. The Contractor shall provide all pipe supports, including sloped, vertical, and horizontal.

C. Lubricants: Include oil and grease for initial operation.

D. Each unit shall be operated, adjusted, and tested after installation as required to ensure proper adjustment and operation of all controls.

E. Pump bases shall be grouted after initial fitting and alignment, but before final bolting of connecting piping.

F. After final alignment and bolting, pump connections shall be tested for applied piping stresses by loosening the flange bolts. If any movement or opening of the joints is observed, piping shall be adjusted to proper fit.

3.5 FIELD QUALITY CONTROL

A. Field testing shall be performed in accordance with Section 01 75 00, STARTUP TESTING AND TRAINING.

B. Functional Testing
   1. Complete functional testing for the mixing pump units utilizing clean water and in accordance with Section 01 75 00, STARTUP TESTING AND TRAINING.
   2. Mixing Pump Testing:
      a. The Contractor shall complete the following field acceptance tests upon installation of the complete pumping assembly.
         1) Alignment: Test complete assemblies for correct rotation, proper alignment and connection, and quiet operation.
         2) Operating Temperature: Monitor bearing areas on pump and motor for abnormally high temperatures.
         3) Performance: In accordance with Hydraulic Institute Standards. All pumps shall be checked at maximum speed for a minimum of four points on the pump curve for capacity, head, and amperage. The rated motor nameplate current shall not be exceeded at any point.

C. Digester Mixing System Performance Test:
   1. The Contractor shall validate performance of the mixing system following installation and start-up of the digester. Testing shall be performed on each digester of varying size.
   2. When the digester has been filled to at least the minimum water level and has been in operation for at least 14-days, the Manufacturer or their designated representative, shall collect samples from each of the two cover mounted sampling locations at four depths as selected by the Engineer. A minimum of eight samples will be collected and analyzed. Samples shall be collected a minimum of 36-inches from the floor and wall.
   3. The samples shall be analyzed for total solids concentration.
   4. Acceptance Criteria: A uniform concentration of total solids shall be defined as 75% of the samples (6 out of 8) being within plus or minus 10 percent of the arithmetic average of the total solids concentration for all samples taken during the test.
   5. Should the system not yield a mixed tank as specified, Contractor will be required to make system modifications such as additional nozzles, additional horsepower, or piping modifications as necessary to adequately mix tank at no additional cost to Owner.

3.6 MANUFACTURER'S SERVICES

A. A manufacturer's representative for the equipment specified herein shall be present at the job site for the minimum person-days listed for the services hereinunder, travel time excluded.
   1. Installation, Startup, and Testing Services (for each digester mixing system)
      a. 1 person-days for installation assistance, inspection, and Certificate of Proper Installation.
      b. 1 person-day for functional and performance testing.
      c. Provide Qualifications of Manufacturer's Representative.
   2. Training Services (total)

a. 1 person-day of prestart classroom or jobsite training of Owner's personnel.
b. Training of Owner's personnel shall be at such times and at such locations as required and approved by the Owner.

B. See Section 01 75 00, STARTUP TESTING AND TRAINING.

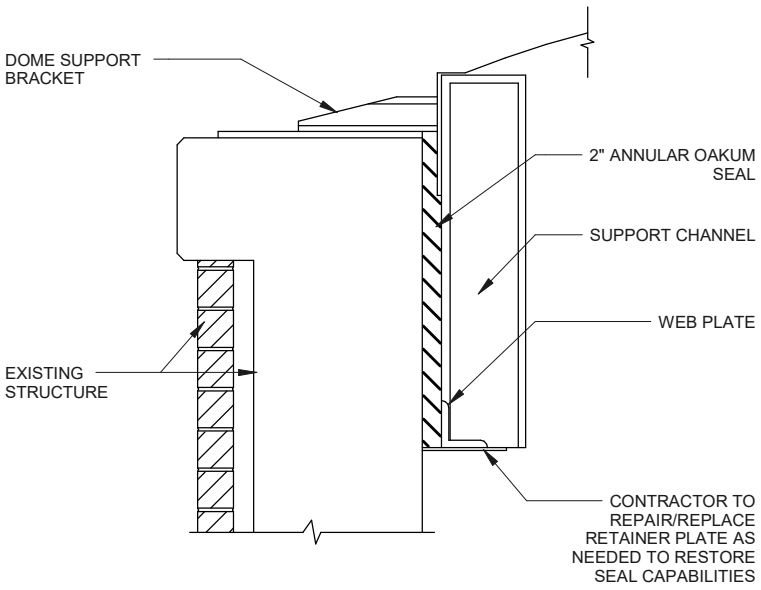
3.7 MANUFACTURER'S CERTIFICATES

A. Provide Manufacturer's certificate(s).

3.8 SUPPLEMENTS

A. The supplements listed below and following end of section are part of this Specification:
1. Digester Mixing System.

END OF SECTION



NOTES:

1. COVER SEAL DETAIL IS SCHEMATIC ONLY, MANUFACTURERS PREFERRED METHOD AND DETAILS SHALL BE USED.

REV	DATE	DESCRIPTION	BY

GARVER

HILLIARD N. FLETCHER WATER RESOURCE RECOVERY FACILITY

TUSCALOOSA, AL

PHASE II IMPROVEMENTS

DOME COVER SEAL

DIVISION

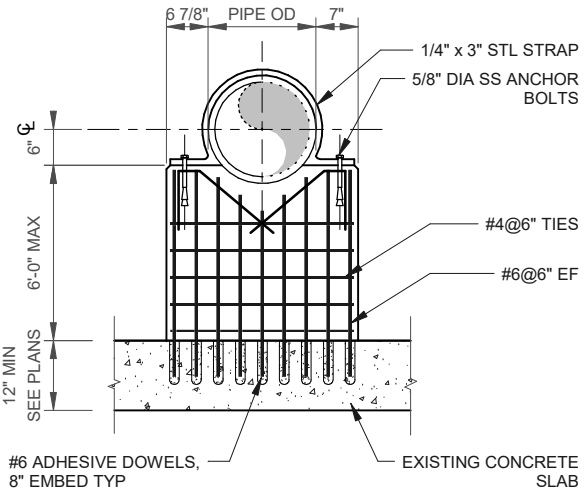
D07

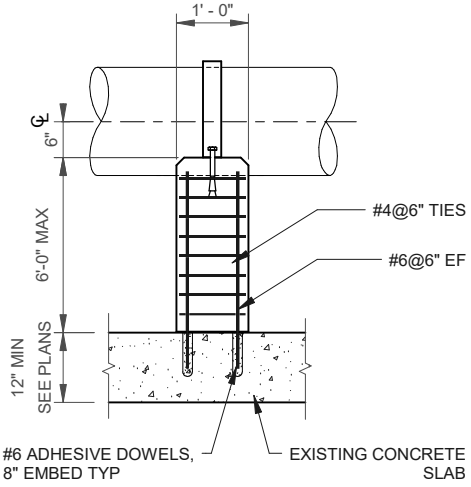
SECTION - DETAIL NO.

9200-001

JOB NO.: 19W10160

DATE: 10/09/2023





REV	DATE	DESCRIPTION	BY

GARVER

HILLIARD N. FLETCHER WATER RESOURCE RECOVERY FACILITY

TUSCALOOSA, AL

PHASE II IMPROVEMENTS

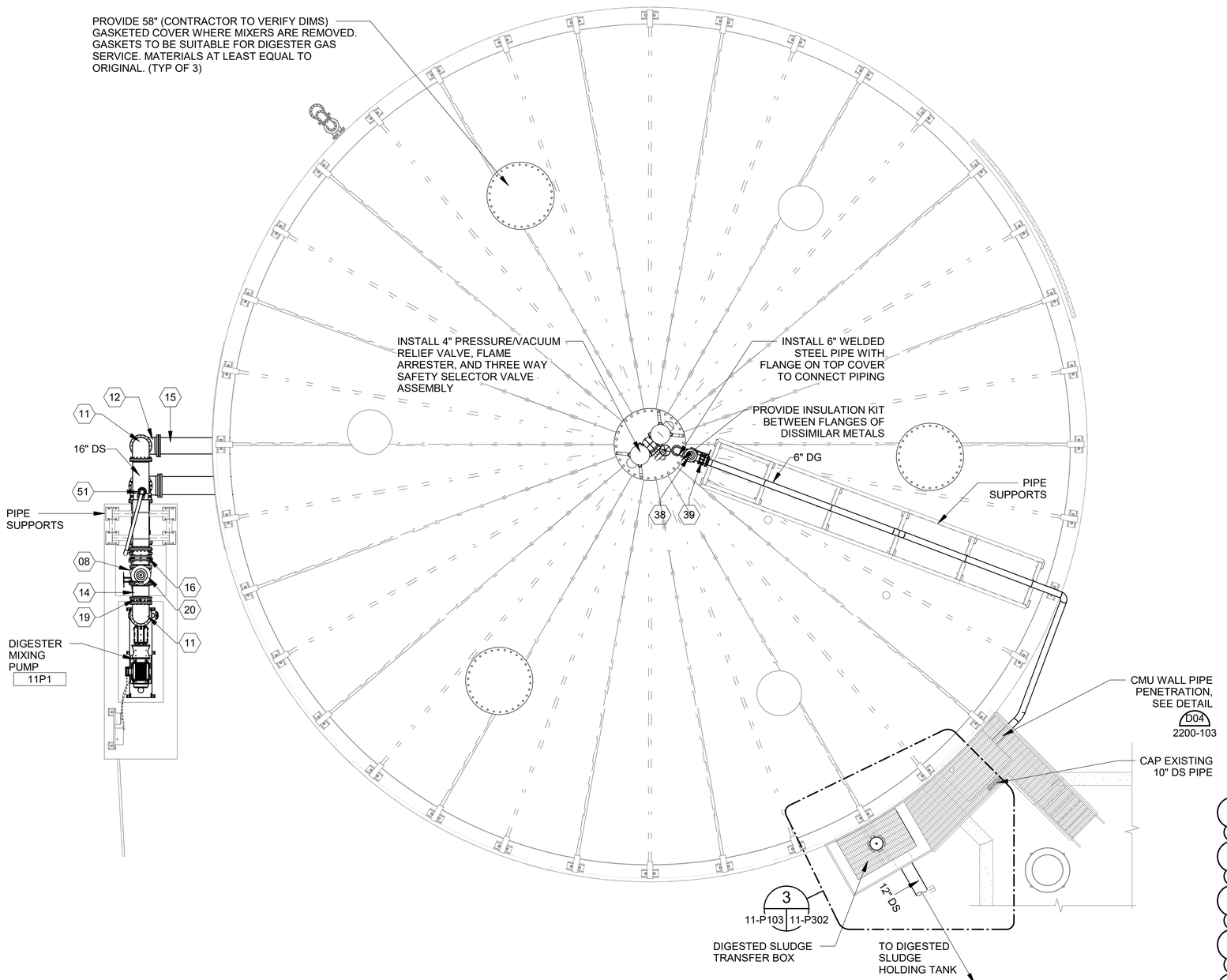
CONCRETE PIPE SUPPORTS AT EXISTING STRUCTURE

DIVISION **D22**

SECTION - DETAIL NO. **0529-003**

JOB NO.: 19W10160

DATE: 10/09/2023



PROJECT NORTH

1 / 11-P103

ANAEROBIC DIGESTER NO. 1 IMPROVEMENTS UPPER PLAN

SCALE: 3/16" = 1'-0"

KEYNOTES: DENOTED BY SYMBOL X

01	18" DISMANTLING JOINT
02	18" 11.25° BEND (FLG x FLG)
03	18" 90° BEND (MJ x MJ)
04	18" 90° BEND (FLG x FLG)
05	18" 90° BEND SQUARE BASE (FLG x FLG)
06	18" x LENGTH AS REQ'D SPOOL (FLG x FLG)
07	18" x LENGTH AS REQ'D SPOOL (FLG x PE)
08	18" PLUG VALVE V406 (FLG x FLG)
09	18" X 12" REDUCER (FLG x FLG)
10	18" PLUG VALVE V406 (FLG x FLG)
11	16" 90° BEND (FLG x FLG)
12	16" 90° BEND (MJ x MJ)
13	16" 90° BEND SQUARE BASE (FLG x FLG)
14	16" x LENGTH AS REQ'D SPOOL (FLG x FLG)
15	16" x LENGTH AS REQ'D SPOOL (FLG x PE)
16	16" DISMANTLING JOINT
17	16" X 10" REDUCER (FLG x FLG)
18	16" X 12" REDUCER (FLG x FLG)
19	16" PRESSURE SWITCH WITH ANNULAR SEAL (FLG x FLG)
20	16" PLUG VALVE V406 (FLG x FLG)
21	12" X 12" X 8" X 8" REDUCING CROSS (FLG x FLG x FLG x FLG)
22	12" 11.25° BEND (FLG x FLG)
23	12" 30° BEND (FLG x FLG)
24	12" 45° BEND (FLG x FLG)
25	12" 90° BEND (FLG x FLG)
26	12" 90° BEND (MJ x MJ)
27	12" X 8" REDUCER (FLG x FLG)
28	12" TEE (FLG x FLG)
29	12" x LENGTH AS REQ'D SPOOL (FLG x FLG)
30	12" V910 TELESCOPING VALVES (FLG x FLG)
31	12" PRESSURE SWITCH WITH ANNULAR SEAL (FLG x FLG)
32	12" FLANGED COUPLING ADAPTER
33	10" BLIND FLANGE
34	8" 90° BEND (FLG x FLG)
35	8" x LENGTH AS REQ'D SPOOL (FLG x FLG)
36	8" X 6" REDUCER (SOC x SOC)
37	8" 11.25° BEND (FLG x FLG)
38	6" PLUG VALVE V405 (FLG x FLG)
39	6" DISMANTLING JOINT
40	6" BLIND FLANGE
41	6" 316SS SWIVEL 90, 150# FLG'S, SWIVEL HORIZONTAL
42	6" BRAIDED HOSE, 150# SS FLOATING FLG'S
43	6" 90° BEND (WLD x WLD)
44	6" 22.5° BEND (WLD x WLD)
45	6" 11.25° BEND (WLD x WLD)
46	6" 316SS DOUBLE SWIVEL 90, 150# FLG'S
47	6" TEE (WLD x WLD x WLD)
48	6" x LENGTH AS REQ'D SPOOL (WLD x FLG)
49	6" X LENGTH AS REQ'D SPOOL (WLD x WLD)
50	4" x LENGTH AS REQ'D SPOOL (FLG x PE)
51	3" AIR RELEASE VALVE V752

1

1

GENERAL NOTES:

1. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH THE COVER MANUFACTURER (OVIVO/EIMCO) BEFORE ANY MODIFICATIONS OR WORK IS PERFORMED (INCLUDING ADDITIONAL PIPE SUPPORTS) BASED ON CONDITION OF THE COVER ONCE TAKEN OUT OF SERVICE. ANY DEVIATIONS SHALL BE SUBMITTED TO ENGINEER FOR REVIEW.
2. AS PART OF FILLING THE DIGESTER WITH WATER TO COMPLETE FUNCTIONAL TESTING, CONTRACTOR SHALL TEST THE DIGESTER FOR GAS TIGHTNESS WITH A COMPRESSED AIR PRESSURE OF 14-INCHES OF WATER COLUMN. ANY REPAIRS TO RESOLVE LEAKS ASSOCIATED WITH WORK NOT INCLUDED IN THIS PROJECT WILL BE PAID FROM THE CONTINGENCY ALLOWANCE. REPAIRS TO ADDRESS LEAKS ASSOCIATED WITH WORK ON THIS PROJECT INCLUDING, BUT NOT LIMITED TO, DIGESTER COVER SEAL, NEW COVER PENETRATION(S), DIGESTER MIXING PIPING, AND SLUDGE TRANSFER PIPING SHALL BE AT NO ADDITIONAL COST TO THE OWNER.
3. THE PRESSURE/VACUUM RELIEF VALVES SHALL BE PRESSURE TESTED USING THE PRESSURE TAP ON THE THREE-WAY SELECTOR VALVE. DO NOT PRESSURIZE THE ENTIRE DIGESTER FOR PURPOSES OF TESTING THE PRESSURE/VACUUM RELIEF VALVES.

GARVER

AL COA# ECA500
EXPIRES 12/31/2023
2111 Parkway Office Circle
Suite 100
Birmingham, AL 35244
(205) 443-3080

ALABAMA LICENSED NO. 34112 PROFESSIONAL ENGINEER R. WESLEY CARDWELL

Digitally Signed 12/05/2023

REV	DATE	DESCRIPTION	BY
1	12/5/23	ADDENDUM NO.2	RWC

CITY OF TUSCALOOSA
TUSCALOOSA, AL

HILLIARD N. FLETCHER WATER RESOURCE RECOVERY FACILITY PHASE II IMPROVEMENTS

ANAEROBIC DIGESTER NO. 1 IMPROVEMENTS UPPER PLAN

JOB NO.: 19W10160
DATE: NOV. 2023
DESIGNED BY: RWC
DRAWN BY: WTL
CHECKED BY: RDT

BAR IS ONE INCH ON ORIGINAL DRAWING
0" 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRAWING NUMBER **11-P103**

SHEET NUMBER **034**

Revit File: BIM 360://19W10160 - Hilliard N Fletcher WRRF Anaerobic/HFWRRF_11 - ANAEROBIC DIGESTER NO.1.rvt
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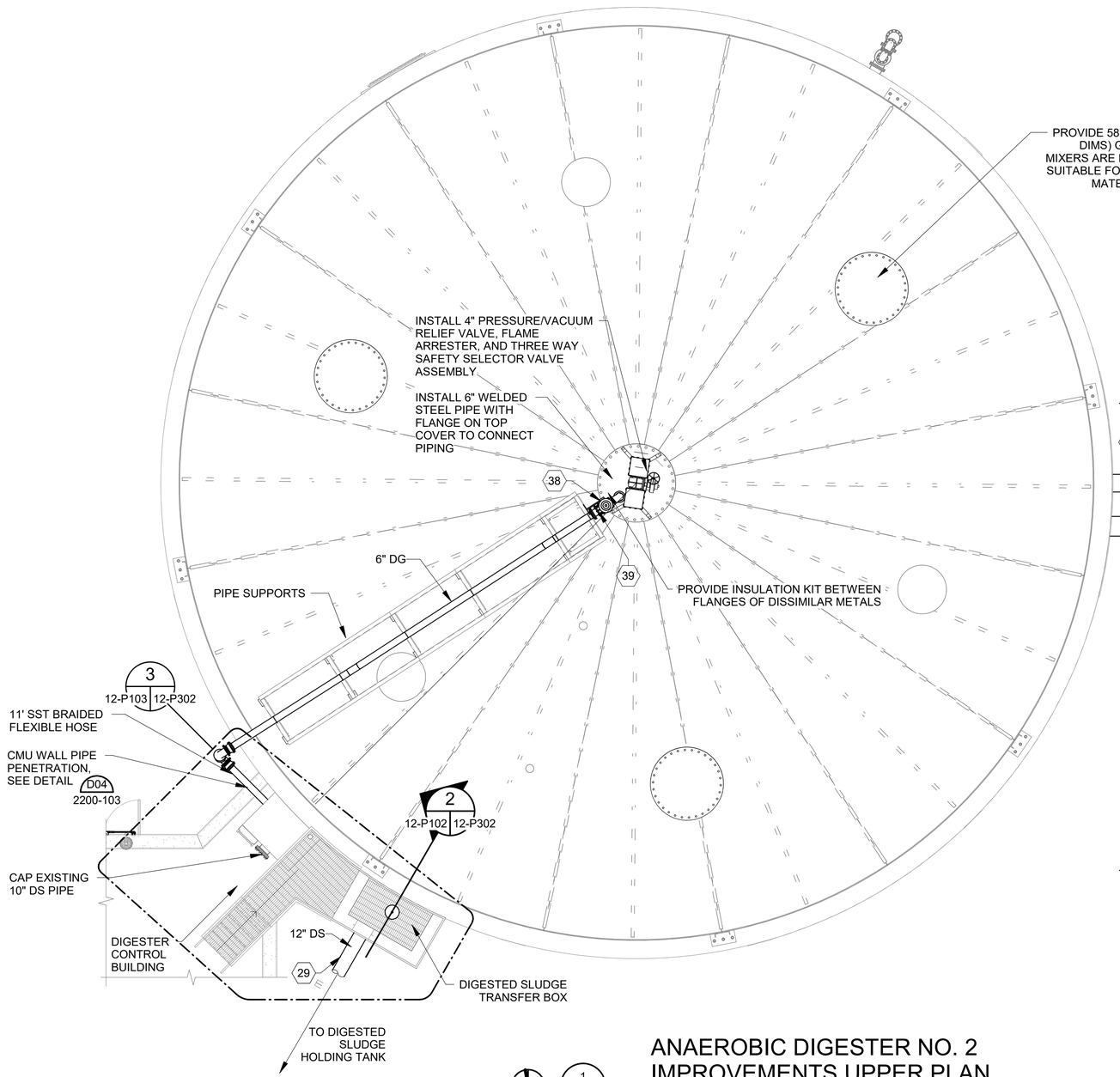

ANAEROBIC DIGESTER NO. 2 IMPROVEMENTS UPPER PLAN

SCALE: 3/16" = 1'-0"

KEYNOTES: DENOTED BY SYMBOL (X)

01	18" DISMANTLING JOINT
02	18" 11.25° BEND (FLG x FLG)
03	18" 90° BEND (MJ x MJ)
04	18" 90° BEND (FLG x FLG)
05	18" 90° BEND SQUARE BASE (FLG x FLG)
06	18" x LENGTH AS REQ'D SPOOL (FLG x FLG)
07	18" x LENGTH AS REQ'D SPOOL (FLG x PE)
08	18" PLUG VALVE V406 (FLG x FLG)
09	18" X 12" REDUCER (FLG x FLG)
10	18" PLUG VALVE V406 (FLG x FLG)
11	16" 90° BEND (FLG x FLG)
12	16" 90° BEND (MJ x MJ)
13	16" 90° BEND SQUARE BASE (FLG x FLG)
14	16" x LENGTH AS REQ'D SPOOL (FLG x FLG)
15	16" x LENGTH AS REQ'D SPOOL (FLG x PE)
16	16" DISMANTLING JOINT
17	16" X 10" REDUCER (FLG x FLG)
18	16" X 12" REDUCER (FLG x FLG)
19	16" PRESSURE SWITCH WITH ANNULAR SEAL (FLG x FLG)
20	16" PLUG VALVE V406 (FLG x FLG)
21	12" X 12" X 8" X 8" REDUCING CROSS (FLG x FLG x FLG x FLG)
22	12" 11.25° BEND (FLG x FLG)
23	12" 30° BEND (FLG x FLG)
24	12" 45° BEND (FLG x FLG)
25	12" 90° BEND (FLG x FLG)
26	12" 90° BEND (MJ x MJ)
27	12" X 8" REDUCER (FLG x FLG)
28	12" TEE (FLG x FLG)
29	12" x LENGTH AS REQ'D SPOOL (FLG x FLG)
30	12" V910 TELESCOPING VALVES (FLG x FLG)
31	12" PRESSURE SWITCH WITH ANNULAR SEAL (FLG x FLG)
32	12" FLANGED COUPLING ADAPTER
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36	8" X 6" REDUCER (SOC x SOC)
37	8" 11.25° BEND (FLG x FLG)
38	6" PLUG VALVE V405 (FLG x FLG)
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46	6" 316SS DOUBLE SWIVEL 90, 150# FLG'S
47	6" TEE (WLD x WLD x WLD)
48	6" x LENGTH AS REQ'D SPOOL (WLD x FLG)
49	6" X LENGTH AS REQ'D SPOOL (WLD x WLD)
50	4" x LENGTH AS REQ'D SPOOL (FLG x PE)
51	3" AIR RELEASE VALVE V752

1

GENERAL NOTES:

1. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH THE COVER MANUFACTURER (OVIVO/EIMCO) BEFORE ANY MODIFICATIONS OR WORK IS PERFORMED (INCLUDING ADDITIONAL PIPE SUPPORTS) BASED ON CONDITION OF THE COVER ONCE TAKEN OUT OF SERVICE. ANY DEVIATIONS SHALL BE SUBMITTED TO ENGINEER FOR REVIEW.
2. AS PART OF FILLING THE DIGESTER WITH WATER TO COMPLETE FUNCTIONAL TESTING, CONTRACTOR SHALL TEST THE DIGESTER FOR GAS TIGHTNESS WITH A COMPRESSED AIR PRESSURE OF 14-INCHES OF WATER COLUMN. ANY REPAIRS TO RESOLVE LEAKS ASSOCIATED WITH WORK NOT INCLUDED IN THIS PROJECT WILL BE PAID FROM THE CONTINGENCY ALLOWANCE. REPAIRS TO ADDRESS LEAKS ASSOCIATED WITH WORK ON THIS PROJECT INCLUDING, BUT NOT LIMITED TO, DIGESTER COVER SEAL, NEW COVER PENETRATION(S), DIGESTER MIXING PIPING, AND SLUDGE TRANSFER PIPING SHALL BE AT NO ADDITIONAL COST TO THE OWNER.
3. THE PRESSURE/VACUUM RELIEF VALVES SHALL BE PRESSURE TESTED USING THE PRESSURE TAP ON THE THREE-WAY SELECTOR VALVE. DO NOT PRESSURIZE THE ENTIRE DIGESTER FOR PURPOSES OF TESTING THE PRESSURE/VACUUM RELIEF VALVES.

GARVER

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ALABAMA LICENSED NO. 34112 PROFESSIONAL ENGINEER R. WESLEY CARROLL

Digitally Signed 12/05/2023

REV	DATE	DESCRIPTION	BY
1	12/5/23	ADDENDUM NO.2	RWC

CITY OF TUSCALOOSA
TUSCALOOSA, AL

HILLIARD N. FLETCHER WATER RESOURCE RECOVERY FACILITY PHASE II IMPROVEMENTS

ANAEROBIC DIGESTER NO. 2 IMPROVEMENTS UPPER PLAN

JOB NO.: 19W10160
DATE: NOV. 2023
DESIGNED BY: RWC
DRAWN BY: WTL
CHECKED BY: RDT

BAR IS ONE INCH ON ORIGINAL DRAWING
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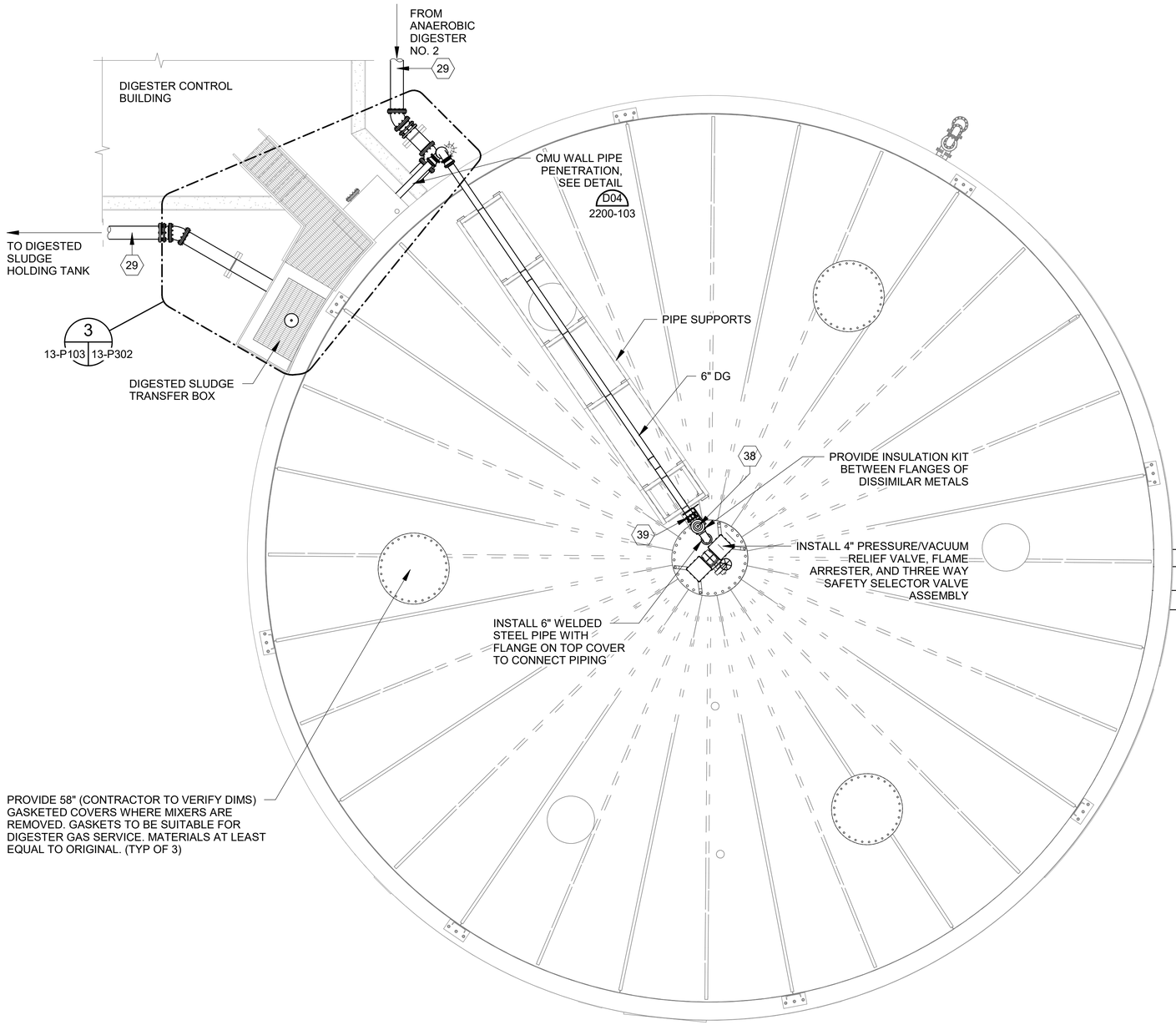
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRAWING NUMBER
12-P103

SHEET NUMBER **053**

Revit File: BIM 360://19W10160 - Hilliard N Fletcher WRRF Anaerobic/HFWRRF_11 - ANAEROBIC DIGESTER NO.1.rvt
Plot Date: 12/4/2023 9:08:43 PM



PROJECT NORTH

1
13-P103

ANAEROBIC DIGESTER NO. 3 IMPROVEMENTS UPPER PLAN

SCALE: 3/16" = 1'-0"

KEYNOTES: DENOTED BY SYMBOL X

01	18" DISMANTLING JOINT
02	18" 11.25° BEND (FLG x FLG)
03	18" 90° BEND (MJ x MJ)
04	18" 90° BEND (FLG x FLG)
05	18" 90° BEND SQUARE BASE (FLG x FLG)
06	18" x LENGTH AS REQ'D SPOOL (FLG x FLG)
07	18" x LENGTH AS REQ'D SPOOL (FLG x PE)
08	18" PLUG VALVE V406 (FLG x FLG)
09	18" X 12" REDUCER (FLG x FLG)
10	18" PLUG VALVE V406 (FLG x FLG)
11	16" 90° BEND (FLG x FLG)
12	16" 90° BEND (MJ x MJ)
13	16" 90° BEND SQUARE BASE (FLG x FLG)
14	16" x LENGTH AS REQ'D SPOOL (FLG x FLG)
15	16" x LENGTH AS REQ'D SPOOL (FLG x PE)
16	16" DISMANTLING JOINT
17	16" X 10" REDUCER (FLG x FLG)
18	16" X 12" REDUCER (FLG x FLG)
19	16" PRESSURE SWITCH WITH ANNULAR SEAL (FLG x FLG)
20	16" PLUG VALVE V406 (FLG x FLG)
21	12" X 12" X 8" X 8" REDUCING CROSS (FLG x FLG x FLG x FLG)
22	12" 11.25° BEND (FLG x FLG)
23	12" 30° BEND (FLG x FLG)
24	12" 45° BEND (FLG x FLG)
25	12" 90° BEND (FLG x FLG)
26	12" 90° BEND (MJ x MJ)
27	12" X 8" REDUCER (FLG x FLG)
28	12" TEE (FLG x FLG)
29	12" x LENGTH AS REQ'D SPOOL (FLG x FLG)
30	12" V910 TELESCOPING VALVES (FLG x FLG)
31	12" PRESSURE SWITCH WITH ANNULAR SEAL (FLG x FLG)
32	12" FLANGED COUPLING ADAPTER
33	10" BLIND FLANGE
34	8" 90° BEND (FLG x FLG)
35	8" x LENGTH AS REQ'D SPOOL (FLG x FLG)
36	8" X 6" REDUCER (SOC x SOC)
37	8" 11.25° BEND (FLG x FLG)
38	6" PLUG VALVE V405 (FLG x FLG)
39	6" DISMANTLING JOINT
40	6" BLIND FLANGE
41	6" 316SS SWIVEL 90, 150# FLG'S, SWIVEL HORIZONTAL
42	6" BRAIDED HOSE, 150# SS FLOATING FLG'S
43	6" 90° BEND (WLD x WLD)
44	6" 22.5° BEND (WLD x WLD)
45	6" 11.25° BEND (WLD x WLD)
46	6" 316SS DOUBLE SWIVEL 90, 150# FLG'S
47	6" TEE (WLD x WLD x WLD)
48	6" x LENGTH AS REQ'D SPOOL (WLD x FLG)
49	6" X LENGTH AS REQ'D SPOOL (WLD x WLD)
50	4" x LENGTH AS REQ'D SPOOL (FLG x PE)
51	3" AIR RELEASE VALVE V752

1

GENERAL NOTES:

1. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH THE COVER MANUFACTURER (OVIVO/EIMCO) BEFORE ANY MODIFICATIONS OR WORK IS PERFORMED (INCLUDING ADDITIONAL PIPE SUPPORTS) BASED ON CONDITION OF THE COVER ONCE TAKEN OUT OF SERVICE. ANY DEVIATIONS SHALL BE SUBMITTED TO ENGINEER FOR REVIEW.
2. AS PART OF FILLING THE DIGESTER WITH WATER TO COMPLETE FUNCTIONAL TESTING, CONTRACTOR SHALL TEST THE DIGESTER FOR GAS TIGHTNESS WITH A COMPRESSED AIR PRESSURE OF 14-INCHES OF WATER COLUMN. ANY REPAIRS TO RESOLVE LEAKS ASSOCIATED WITH WORK NOT INCLUDED IN THIS PROJECT WILL BE PAID FROM THE CONTINGENCY ALLOWANCE. REPAIRS TO ADDRESS LEAKS ASSOCIATED WITH WORK ON THIS PROJECT INCLUDING, BUT NOT LIMITED TO, DIGESTER COVER SEAL, NEW COVER PENETRATION(S), DIGESTER MIXING PIPING, AND SLUDGE TRANSFER PIPING SHALL BE AT NO ADDITIONAL COST TO THE OWNER.
3. THE PRESSURE/VACUUM RELIEF VALVES SHALL BE PRESSURE TESTED USING THE PRESSURE TAP ON THE THREE-WAY SELECTOR VALVE. DO NOT PRESSURIZE THE ENTIRE DIGESTER FOR PURPOSES OF TESTING THE PRESSURE/VACUUM RELIEF VALVES.

GARVER

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(205) 443-3080

ALABAMA LICENSED NO. 34112 PROFESSIONAL ENGINEER R. WESLEY CARWILE

Digitally Signed 12/05/2023

REV	DATE	DESCRIPTION	BY
1	12/5/23	ADDENDUM NO.2	RWC

CITY OF TUSCALOOSA
TUSCALOOSA, AL

HILLIARD N. FLETCHER WATER RESOURCE RECOVERY FACILITY PHASE II IMPROVEMENTS

ANAEROBIC DIGESTER NO. 3 IMPROVEMENTS UPPER PLAN

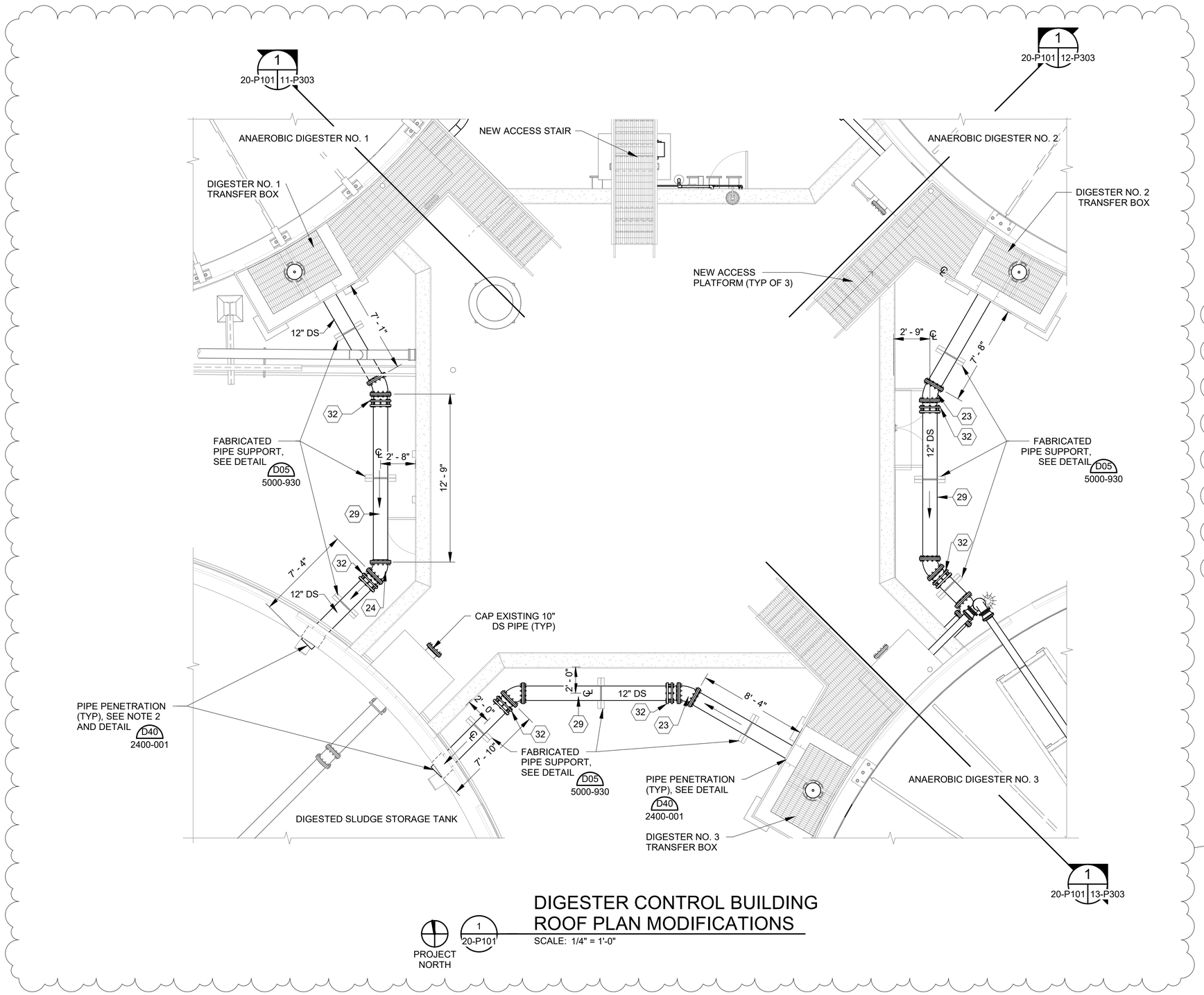
JOB NO.: 19W10160
DATE: NOV. 2023
DESIGNED BY: RWC
DRAWN BY: WTL
CHECKED BY: RDT

BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRAWING NUMBER
13-P103

SHEET NUMBER **070**

Revit File: BIM 360://19W10160 - Hilliard N Fletcher WRRF Anaerobic/HFWRRF_11 - ANAEROBIC DIGESTER NO.1.rvt
Plot Date: 12/4/2023 9:08:45 PM



DIGESTER CONTROL BUILDING ROOF PLAN MODIFICATIONS

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

KEYNOTES: DENOTED BY SYMBOL X

01	18" DISMANTLING JOINT
02	18" 11.25° BEND (FLG x FLG)
03	18" 90° BEND (MJ x MJ)
04	18" 90° BEND (FLG x FLG)
05	18" 90° BEND SQUARE BASE (FLG x FLG)
06	18" x LENGTH AS REQ'D SPOOL (FLG x FLG)
07	18" x LENGTH AS REQ'D SPOOL (FLG x PE)
08	18" PLUG VALVE V406 (FLG x FLG)
09	18" X 12" REDUCER (FLG x FLG)
10	18" PLUG VALVE V406 (FLG x FLG)
11	16" 90° BEND (FLG x FLG)
12	16" 90° BEND (MJ x MJ)
13	16" 90° BEND SQUARE BASE (FLG x FLG)
14	16" x LENGTH AS REQ'D SPOOL (FLG x FLG)
15	16" x LENGTH AS REQ'D SPOOL (FLG x PE)
16	16" DISMANTLING JOINT
17	16" X 10" REDUCER (FLG x FLG)
18	16" X 12" REDUCER (FLG x FLG)
19	16" PRESSURE SWITCH WITH ANNULAR SEAL (FLG x FLG)
20	16" PLUG VALVE V406 (FLG x FLG)
21	12" X 12" X 8" X 8" REDUCING CROSS (FLG x FLG x FLG x FLG)
22	12" 11.25° BEND (FLG x FLG)
23	12" 30° BEND (FLG x FLG)
24	12" 45° BEND (FLG x FLG)
25	12" 90° BEND (FLG x FLG)
26	12" 90° BEND (MJ x MJ)
27	12" X 8" REDUCER (FLG x FLG)
28	12" TEE (FLG x FLG)
29	12" x LENGTH AS REQ'D SPOOL (FLG x FLG)
30	12" V910 TELESCOPING VALVES (FLG x FLG)
31	12" PRESSURE SWITCH WITH ANNULAR SEAL (FLG x FLG)
32	12" FLANGED COUPLING ADAPTER
33	10" BLIND FLANGE
34	8" 90° BEND (FLG x FLG)
35	8" x LENGTH AS REQ'D SPOOL (FLG x FLG)
36	8" X 6" REDUCER (SOC x SOC)
37	8" 11.25° BEND (FLG x FLG)
38	6" PLUG VALVE V405 (FLG x FLG)
39	6" DISMANTLING JOINT
40	6" BLIND FLANGE
41	6" 316SS SWIVEL 90, 150# FLG'S, SWIVEL HORIZONTAL
42	6" BRAIDED HOSE, 150# SS FLOATING FLG'S
43	6" 90° BEND (WLD x WLD)
44	6" 22.5° BEND (WLD x WLD)
45	6" 11.25° BEND (WLD x WLD)
46	6" 316SS DOUBLE SWIVEL 90, 150# FLG'S
47	6" TEE (WLD x WLD x WLD)
48	6" x LENGTH AS REQ'D SPOOL (WLD x FLG)
49	6" X LENGTH AS REQ'D SPOOL (WLD x WLD)
50	4" x LENGTH AS REQ'D SPOOL (FLG x PE)
51	3" AIR RELEASE VALVE V752

NOTES:

1. PIPE LENGTHS FOR DIGESTED SLUDGE TRANSFER PIPING SHOWN ARE BASED ON AVAILABLE RECORD DRAWINGS OF THE DIGESTER CONTROL BUILDING AND MAY VARY BASED ON FIELD CONDITIONS. CONTRACTOR SHALL FIELD VERIFY ALL NECESSARY DIMENSIONS AND ADJUST REQUIRED PIPE LENGTHS ACCORDINGLY.
2. EXTEND PIPING INTO TANK SUCH THAT PIPING SITS AS FLUSH AS POSSIBLE TO SIDE WALL AFTER GROUTING PENETRATION

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Birmingham, AL 35244
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ALABAMA LICENSED NO. 34112 PROFESSIONAL ENGINEER R. WESLEY CARROLL

Digitally Signed 12/05/2023

REV	DATE	DESCRIPTION	BY
1	12/5/23	ADDENDUM NO.2	RWC

CITY OF TUSCALOOSA
TUSCALOOSA, AL

HILLIARD N. FLETCHER WATER RESOURCE RECOVERY FACILITY PHASE II IMPROVEMENTS

DIGESTER CONTROL BUILDING ROOF PLAN

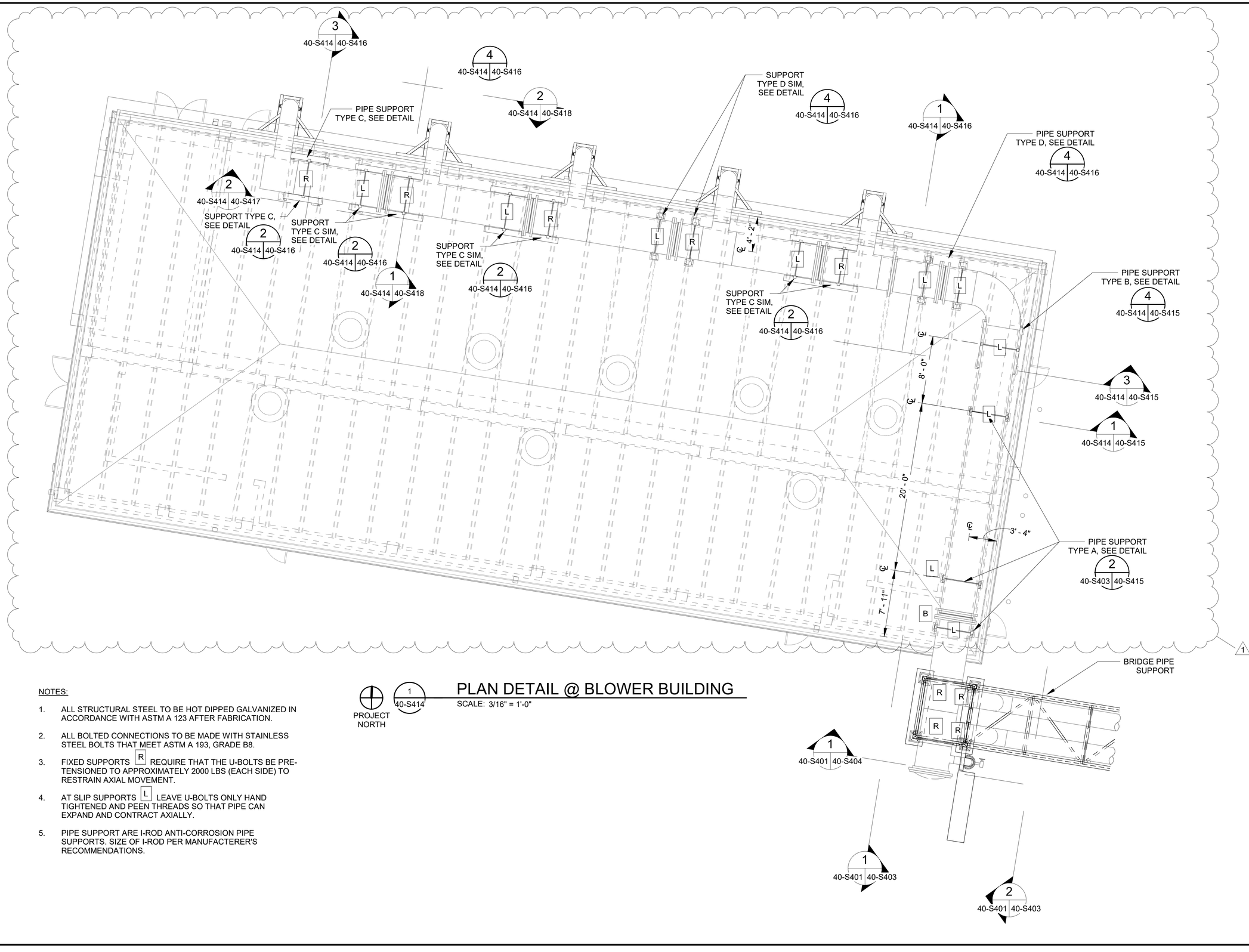
JOB NO.: 19W10160
DATE: NOV. 2023
DESIGNED BY: RWC
DRAWN BY: WTL
CHECKED BY: RDT

BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRAWING NUMBER
20-P101

SHEET NUMBER **079**

Revit File: BIM 360://19W10160 - Hilliard N Fletcher WRRF Anaerobic/HFWRRF_11 - ANAEROBIC DIGESTER NO.1.rvt
Plot Date: 12/4/2023 9:08:47 PM



NOTES:

1. ALL STRUCTURAL STEEL TO BE HOT DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A 123 AFTER FABRICATION.
2. ALL BOLTED CONNECTIONS TO BE MADE WITH STAINLESS STEEL BOLTS THAT MEET ASTM A 193, GRADE B8.
3. FIXED SUPPORTS [R] REQUIRE THAT THE U-BOLTS BE PRE-TENSIONED TO APPROXIMATELY 2000 LBS (EACH SIDE) TO RESTRAIN AXIAL MOVEMENT.
4. AT SLIP SUPPORTS [L] LEAVE U-BOLTS ONLY HAND TIGHTENED AND PEEN THREADS SO THAT PIPE CAN EXPAND AND CONTRACT AXIALLY.
5. PIPE SUPPORT ARE I-ROD ANTI-CORROSION PIPE SUPPORTS. SIZE OF I-ROD PER MANUFACTERER'S RECOMMENDATIONS.

PROJECT NORTH

1 / 40-S414

PLAN DETAIL @ BLOWER BUILDING

SCALE: 3/16" = 1'-0"

GARVER

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ALABAMA LICENSED NO. 34579 PROFESSIONAL ENGINEER KIPPA. MARTIN

Digitally Signed 12/05/2023

REV	DATE	DESCRIPTION	BY
1	12/5/23	ADDENDUM NO.2	RWC

CITY OF TUSCALOOSA
TUSCALOOSA, AL

HILLIARD N. FLETCHER WATER RESOURCE RECOVERY FACILITY PHASE II IMPROVEMENTS

NORTH AERATION BASINS - BLOWER BUILDING DETAILS 1

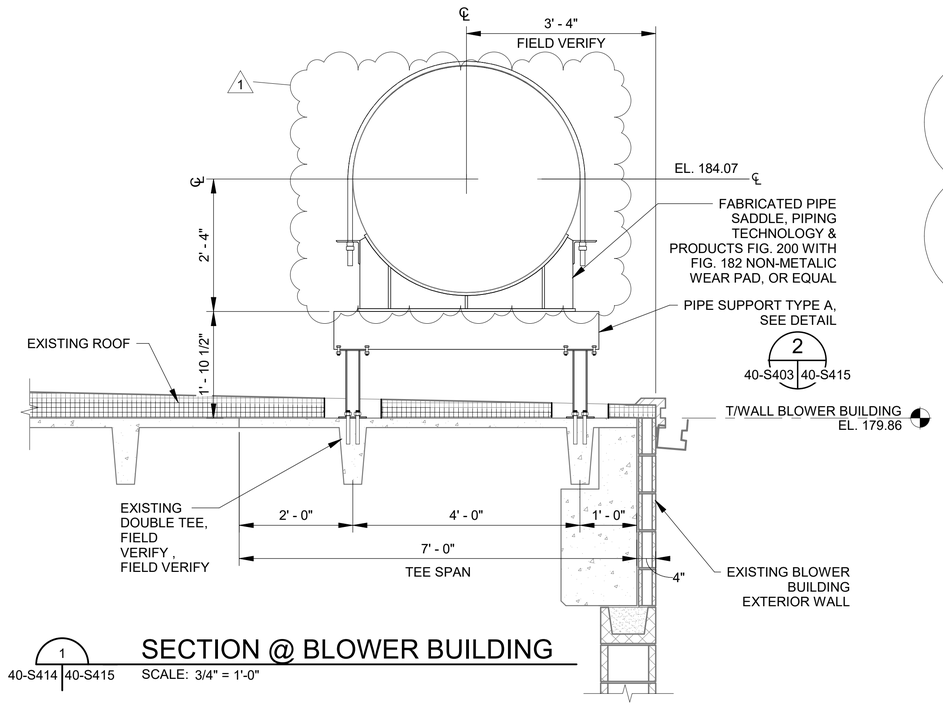
JOB NO.: 19W10160
DATE: NOV. 2023
DESIGNED BY: KAM
DRAWN BY: EGB
CHECKED BY: KAM

BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

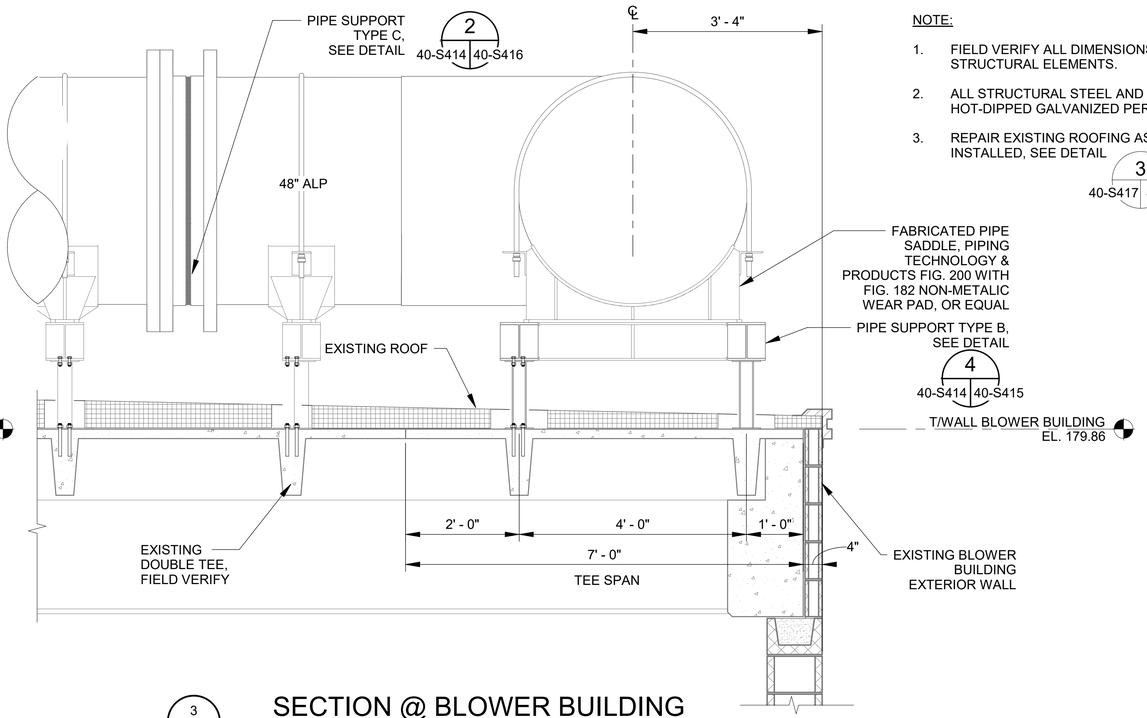
DRAWING NUMBER
40-S414

SHEET NUMBER **114**

Revit File: BIM 360://19W10160 - Hilliard N Fletcher WRRF Anaerobic/HFWRRF_40 - NORTH AERATION BASINS.rvt
Plot Date: 12/5/2023 9:04:33 AM



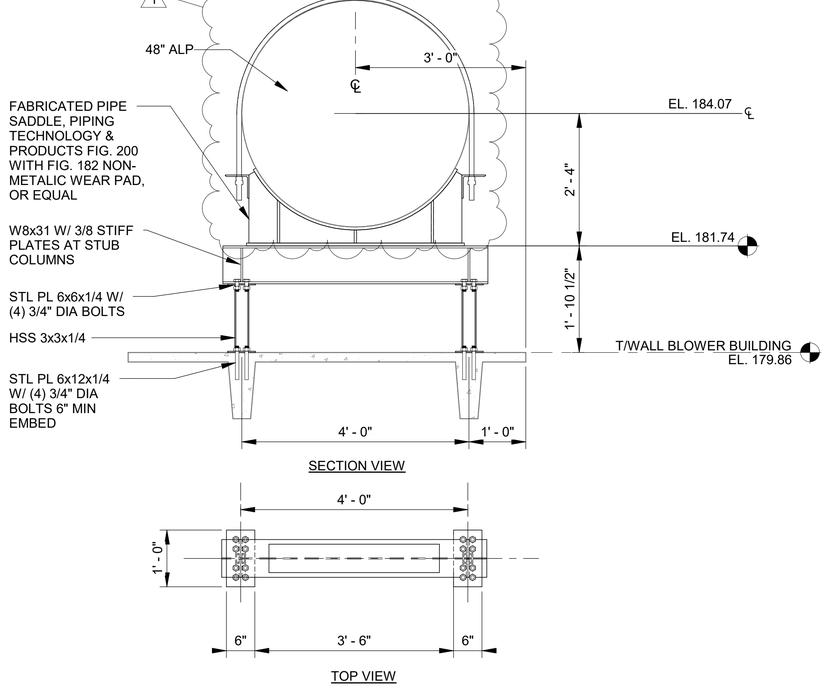
1
40-S414 | 40-S415
SECTION @ BLOWER BUILDING
SCALE: 3/4" = 1'-0"



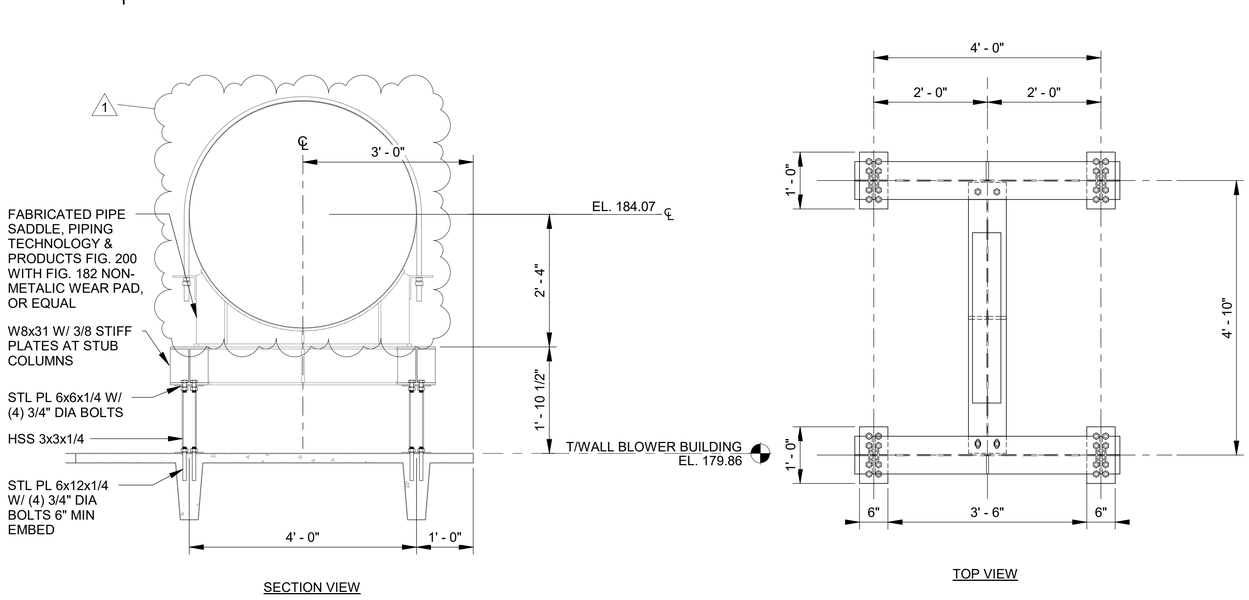
3
40-S414 | 40-S415
SECTION @ BLOWER BUILDING
SCALE: 3/4" = 1'-0"

NOTE:

1. FIELD VERIFY ALL DIMENSIONS TO EXISTING STRUCTURAL ELEMENTS.
2. ALL STRUCTURAL STEEL AND PIPE SADDLES TO BE HOT-DIPPED GALVANIZED PER ASTM A123.
3. REPAIR EXISTING ROOFING AS EACH SUPPORT IS INSTALLED, SEE DETAIL
   3
   40-S417 | 40-S417



2
40-S403 | 40-S415
BLOWER BUILDING PIPE SUPPORT TYPE A
SCALE: 3/4" = 1'-0"



4
40-S414 | 40-S415
BLOWER BUILDING PIPE SUPPORT TYPE B
SCALE: 3/4" = 1'-0"

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ALABAMA
LICENSED
NO. 34579
PROFESSIONAL
ENGINEER
KIPPA. MARTIN

Digitally Signed 12/05/2023

REV	DATE	DESCRIPTION	BY
1	12/5/23	ADDENDUM NO.2	RWC

CITY OF TUSCALOOSA
TUSCALOOSA, AL

HILLIARD N. FLETCHER WATER RESOURCE RECOVERY FACILITY PHASE II IMPROVEMENTS

NORTH AERATION BASINS - BLOWER BUILDING DETAILS 2

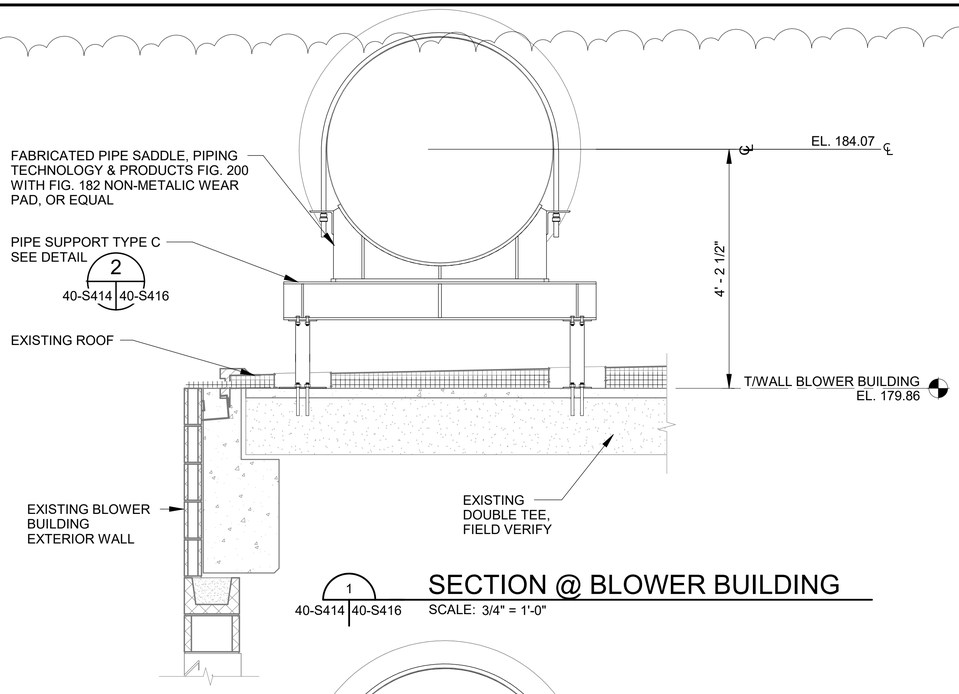
JOB NO.: 19W10160
DATE: NOV. 2023
DESIGNED BY: KAM
DRAWN BY: EGB
CHECKED BY: KAM

BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

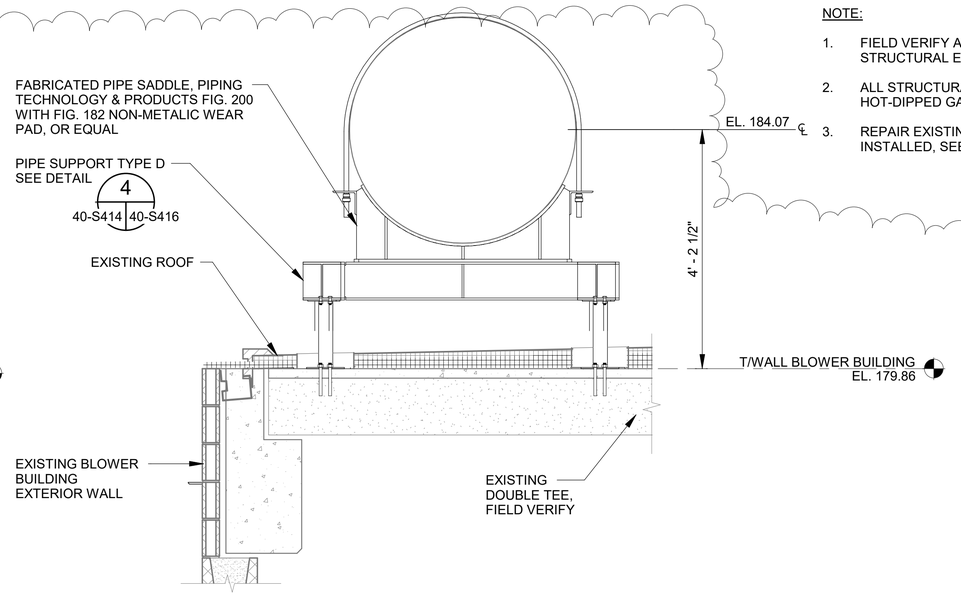
DRAWING NUMBER
40-S415

SHEET NUMBER **115**

Revit File: BIM 360://19W10160 - Hilliard N Fletcher WRRF Anaerobic/HFWRRF_40 - NORTH AERATION BASINS.rvt
Plot Date: 12/5/2023 9:04:34 AM



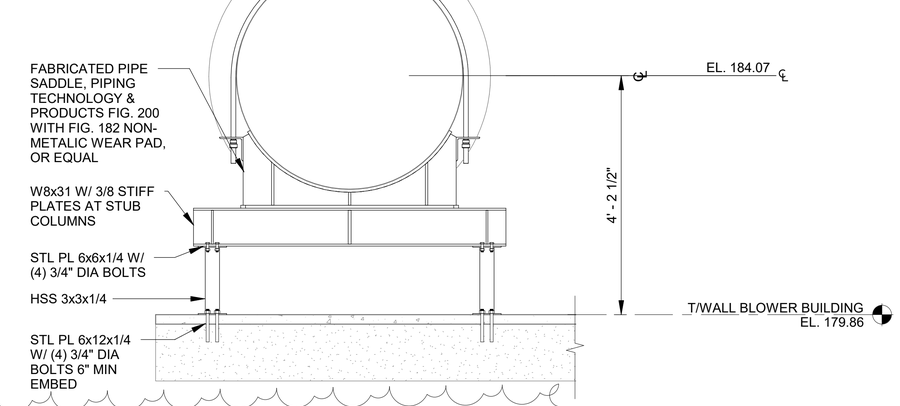
1 40-S414 | 40-S416 SECTION @ BLOWER BUILDING
SCALE: 3/4" = 1'-0"



3 40-S414 | 40-S416 SECTION @ BLOWER BUILDING
SCALE: 3/4" = 1'-0"

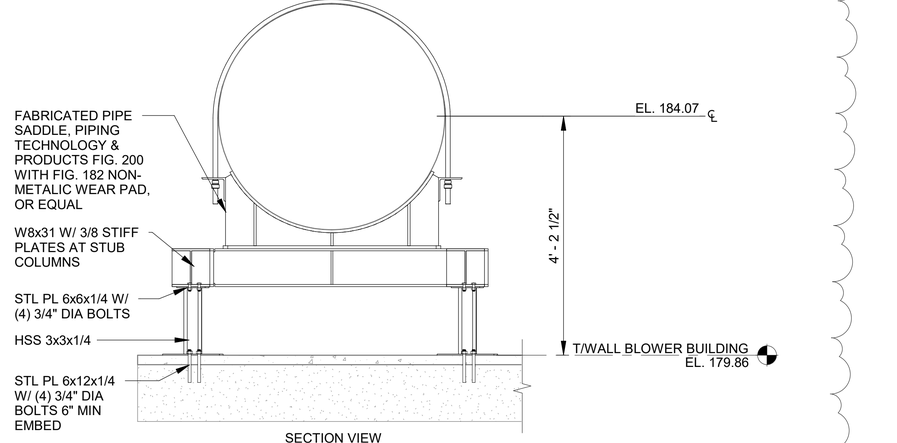
NOTE:

1. FIELD VERIFY ALL DIMENSIONS TO EXISTING STRUCTURAL ELEMENTS.
2. ALL STRUCTURAL STEEL AND PIPE SADDLES TO BE HOT-DIPPED GALVANIZED PER ASTM A123.
3. REPAIR EXISTING ROOFING AS EACH SUPPORT IS INSTALLED, SEE DETAIL 3 40-S417 | 40-S417

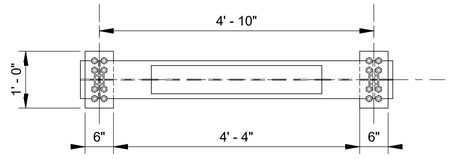


TOP VIEW

2 40-S414 | 40-S416 BLOWER BUILDING PIPE SUPPORT TYPE C
SCALE: 3/4" = 1'-0"



SECTION VIEW



TOP VIEW

4 40-S414 | 40-S416 BLOWER BUILDING PIPE SUPPORT TYPE D
SCALE: 3/4" = 1'-0"

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ALABAMA LICENSED NO. 34579 PROFESSIONAL ENGINEER KIPPA. MARTIN

Digitally Signed 12/05/2023

REV	DATE	DESCRIPTION	BY
1	12/5/23	ADDENDUM NO.2	RWC

CITY OF TUSCALOOSA
TUSCALOOSA, AL

HILLIARD N. FLETCHER WATER RESOURCE RECOVERY FACILITY PHASE II IMPROVEMENTS

NORTH AERATION BASINS - BLOWER BUILDING DETAILS 3

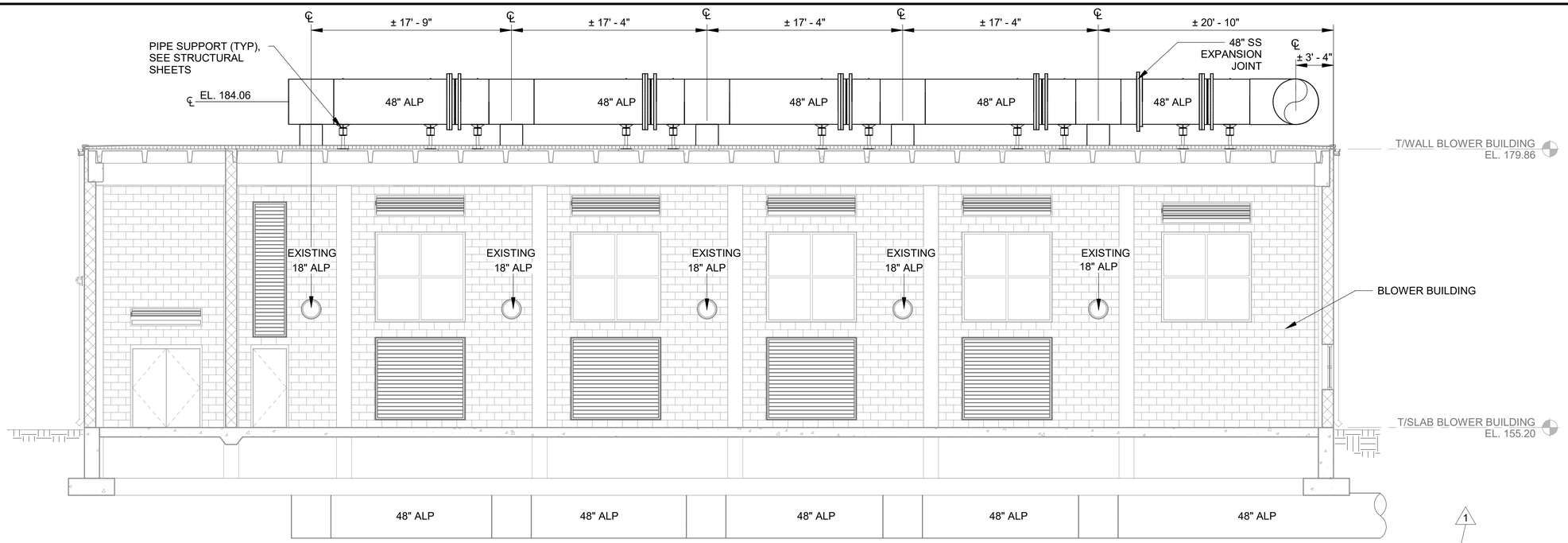
JOB NO.: 19W10160
DATE: NOV. 2023
DESIGNED BY: KAM
DRAWN BY: EGB
CHECKED BY: KAM

BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRAWING NUMBER
40-S416

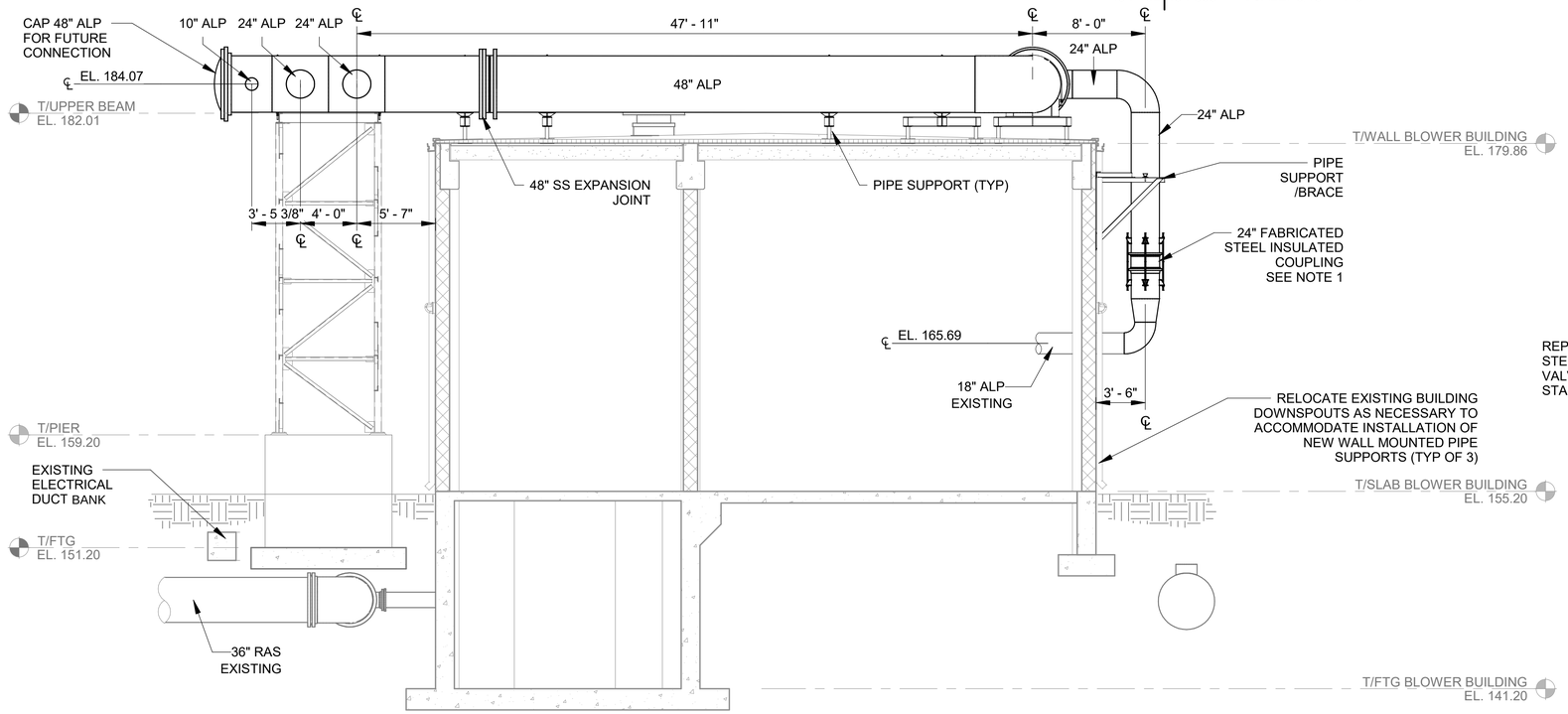
SHEET NUMBER **116**

Revit File: BIM 360://19W10160 - Hilliard N Fletcher WRRF Anaerobic/HFWRRF_40 - NORTH AERATION BASINS.rvt
Plot Date: 12/5/2023 9:04:34 AM



1 SECTION @ BLOWER BUILDING

1 | 40-P102 | 40-P303 SCALE: 3/16" = 1'-0"



2 SECTION @ BLOWER BUILDING

2 | 40-P102 | 40-P303 SCALE: 3/16" = 1'-0"

NOTES:

1. CONTRACTOR SHALL UTILIZE CARBON STEEL PIPING UP TO INSULATED COUPLING AND THEN TRANSITION TO STAINLESS STEEL FOLLOWING THE INSULATED COUPLING. PROVIDE INSULATED JOINT HARNESSES WITH WELDED LUGS ON EACH SIDE OF COUPLING FOR RESTRAINT.

3 NITRATE RECYCLE VALVE PHOTO DETAIL

3 | 40-P303 SCALE: NOT TO SCALE

AL COA# ECA500
EXPIRES 12/31/2023
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(205) 443-3080

ALABAMA LICENSED NO. 34112 PROFESSIONAL ENGINEER R. WESLEY CARROLL

Digitally Signed 12/04/2023

REV	DATE	DESCRIPTION	BY
1	12/5/23	ADDENDUM NO.2	RWC

CITY OF TUSCALOOSA
TUSCALOOSA, AL

HILLIARD N. FLETCHER WATER RESOURCE RECOVERY FACILITY PHASE II IMPROVEMENTS

NORTH AERATION BASINS - BLOWER PIPING SECTIONS AND DETAILS 3

JOB NO.: 19W10160
DATE: NOV. 2023
DESIGNED BY: RWC
DRAWN BY: EGB
CHECKED BY: RDT

BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRAWING NUMBER
40-P303

SHEET NUMBER **123**

Revit File: BIM 360://19W10160 - Hilliard N Fletcher WRRF AnaerobicHFWRRF_40 - NORTH AERATION BASINS.rvt
Plot Date: 12/4/2023 4:22:48 PM

GENERAL NOTES:

1. CONTRACTOR SHALL COORDINATE CONDUIT, WIRE AND INTERCONNECTIONS AS REQUIRED FOR RELOCATING EXISTING FLOW METERS. MAKE ALL REQUIRED CONNECTIONS ACCORDING TO MANUFACTURERS RECOMMENDATIONS. NOT ALL CONNECTIONS SHOWN.
2. VERIFY LOCATION OF ALL EQUIPMENT PRIOR TO INSTALLATION.
3. SOME CONDUIT RUNS OMITTED FOR CLARITY. COORDINATE ALL CONDUIT ROUTING WITH SUPPLIED EQUIPMENT MANUFACTURER AND ENGINEER PRIOR TO INSTALLATION.
4. BELOW GRADE CONDUIT ROUTING AS SHOWN IS DIAGRAMMATIC IN NATURE AND SHOWN FOR REFERENCE ONLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING NUMBER OF REQUIRED CONDUITS AND PLACEMENT OF THESE CONDUITS. THE CONTRACTOR SHALL DEVELOP AND SUBMIT A BELOW GRADE CONDUIT ROUTING PLAN FOR REVIEW PRIOR TO INSTALLATION.
5. SEE SHEET 20-X101 FOR AERATION BASINS DEMOLITION PLANS.
6. PROVIDE LIGHTNING PROTECTON FOR NEW AERATON PIPING SYSTEM. FINAL LIGHTING PROTECTION SYSTEM SHALL BE DEVELOPED AND SUBMITTED BY MASTER INSTALLER/DESIGNER CERTIFIED BY UL OR LPI AS REQUIRED IN SPECIFICATION SECTION 26 41 13.
7. USE CRIMPED OR BOLTED CONNECTIONS FOR ALL CONNECTIONS BETWEEN GROUND CONDUCTORS AND BUILDING SYSTEM COMPONENTS. USE EXOTHERMIC WELDED CONNECTIONS FOR ALL UNDERGROUND PORTIONS OF THE SYSTEM WITH THE EXCEPTION OF GROUND ROD TEST WELLS.

1

6 BLOWER BUILDING

1

SEE GENREAL NOTES #6 AND #7.

INSERTION MASS FLOW METER 7 FIT 6-2-1

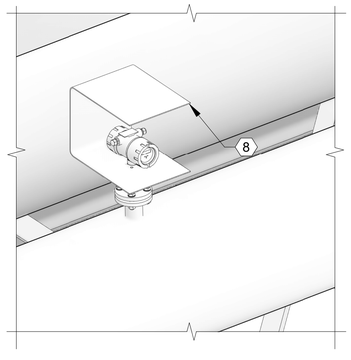
INSERTION MASS FLOW METER 7 FIT 6-2-2

45' - 2"

45' - 2"

KEYED NOTES:

1. INSTALL NEW CONDUIT FROM BLOWER BUILDING TO NEW FLOW METER LOCATION AS SHOWN. CONTRACTOR SHALL FIELD VERIFY CONDUIT ROUTING PRIOR TO CONSTRUCTION AND COORDINATE ROUTE WITH ENGINEER.
2. PULL NEW POWER CONDUCTORS (2-#12, #12 GND) 3/4"C, FOR 120VAC, FROM EXISTING LIGHT PANEL, CIRCUIT #18 (LPB1-18), IN BLOWER BUILDING FOR FLOW METER FIT-6-2-1. MAKE ALL REQUIRED CONNECTIONS.
3. PULL NEW ANALOG CONDUCTORS (1-PAIR STP, 1-PAIR STP SPARE) 3/4"C, FROM EXISTING DATA COLLECTOR PANEL FP-6-32 TO FLOW METER FIT-6-2-1. MAKE ALL REQUIRED CONNECTIONS. SEE SHEET 20-E102 FOR DATA PANEL LOCATION.
4. PULL NEW POWER CONDUCTORS (2-#12, #12 GND) 3/4"C, FOR 120VAC, FROM EXISTING LIGHT PANEL, CIRCUIT #20 (LPB1-20), IN BLOWER BUILDING FOR FLOW METER FIT-6-2-2. MAKE ALL REQUIRED CONNECTIONS.
5. PULL NEW ANALOG CONDUCTORS (1-PAIR STP, 1-PAIR STP SPARE) 3/4"C, FROM EXISTING DATA COLLECTOR PANEL FP-6-32 TO FLOW METER FIT-6-2-2. MAKE ALL REQUIRED CONNECTIONS. SEE SHEET 40-E102 FOR DATA PANEL LOCATION.
6. EXISTING CONDUITS FROM IN BLOWER BUILDING MAY BE REUSED. SEE SHEET 40-E102.
7. RELOCATE EXISTING FLOW METERS FIT-6-2-1 AND FIT-6-2-2 FROM EXISTING METER VAULT TO NEW LOCATIONS AS SHOWN. PROVIDE SUN SHIELDS FOR INSTRUMENTATION.
8. PROVIDE SUNSHADE FOR FLOW TRANSMITTERS.



2 / 40-E101 FLOW TRANSMITTER SUNSHADE
SCALE: NOT TO SCALE

PROJECT NORTH

1 / 40-E101 NORTH AERATION BASINS - ELECTRICAL SITE PLAN
SCALE: 1/8" = 1'-0"

Revit File: BIM 360://19W10160 - Hilliard N Fletcher WRRF Anaerobic/HFWRRF_40 - NORTH AERATION BASINS.rvt
Plot Date: 12/5/2023 8:57:09 AM

GARVER

AL COA# ECA500
EXPIRES 12/31/2023
2111 Parkway Office Circle
Suite 100
Birmingham, AL 35244
(205) 443-3080

ALABAMA LICENSED NO. 38232 PROFESSIONAL ENGINEER JONATHAN C. WHITE

Digitally Signed 12/05/2023

REV	DATE	DESCRIPTION	BY
1	12/5/23	ADDENDUM NO.2	RWC

CITY OF TUSCALOOSA
TUSCALOOSA, AL

HILLIARD N. FLETCHER WATER RESOURCE RECOVERY FACILITY PHASE II IMPROVEMENTS

NORTH AERATION BASINS - ELECTRICAL SITE PLAN

JOB NO.: 19W10160
DATE: NOV. 2023
DESIGNED BY: JCW
DRAWN BY: SAH
CHECKED BY: RWC

BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRAWING NUMBER
40-E101

SHEET NUMBER **126**