

**CITY OF RIPLEY
JACKSON COUNTY, WEST VIRGINIA**

**PHASE II – PROPOSED SANITARY SEWER SYSTEM IMPROVEMENTS PROJECT
CONTRACT #3 – PROPOSED 1.2 MGD WASTEWATER TREATMENT PLANT**

ADDENDUM #2

MARCH 23, 2022

THRASHER PROJECT #020-01535

TO WHOM IT MAY CONCERN:

A Pre-Bid Conference was held on Tuesday, March 1, 2022, for the above-referenced project. The following are clarifications and responses to questions posed by contractors for the above reference project.

A. GENERAL

1. CHANGES TO DAVIS BACON WAGE RATES

Davis Bacon Wage Rates have changed. Please use the attached Davis Bacon Wage Rates.

B. SPECIFICATIONS

1. 2.1 Index

2. Specification 323113 – Chain Link Fence and Gates

Specification has been added to clarify fence and gate requirements.

3. Specification 461215 – Pre-Screening Equipment

Specification has been revised to include SAVECO as a named manufacturer.

4. Specification 461802 – Sludge Dewatering Equipment

Specification has been revised.

C. DRAWINGS

1. Sheet X – Construction Setbacks
 - a. This sheet included as part of this addendum depicts an extended LOD to the east of the WWTP site which will allow for a 2.5H:1V excavation beginning 5’ out from the base of the SBR structures.
2. Sheet 35
 - a. HWL and LWL locations within the Post-EQ basin have been revised to match the scale.
3. Sheet 45
 - a. Notes added to clarify the supernatant pump and sludge feed pump will be supplied by the Contractor, as detailed in Specification 333220.
4. Sheet 49
 - a. Centerline of decant pipe adjusted to 11.1’ to reflect Specification 461405.
5. Sheet 51
 - a. Post-EQ water levels have been corrected.
 - b. SBR sludge discharge pipe has been revised to 4” DIP instead of 3” DIP.
6. Sheet 52
 - a. Note added to clarify the sludge feed line pump will be supplied by the Contractor, as detailed in Specification 333220.
 - b. Revised mis-labeled basin.
 - c. Water levels for the digester basin have been revised.
7. Sheet 53
 - a. Note added to clarify the digester decant pump and pump hoist will be supplied by the Contractor, as detailed in Specification 333220.
8. Sheet 56
 - a. DO sensor details have been revised. The old plan sheet depicted Thermo Fisher DO sensors; however, the basis of design was Hach DO sensors. Hach is named in Specification 461405. The page now depicts Hach DO sensors.
9. Sheet 74
 - a. Blower discharge has been revised to 2”, as described in Specification 461405.
10. Sheet 153
 - a. Revised to show thermostats in place of space heaters for motors.
11. Sheet 171
 - a. Revised to include Pre-EQ float switch.
 - b. Sludge pumps have been changed to 5 HP.
 - c. Based on the required flow rate and TDH, the Post-EQ pumps have been changed to 12 HP.

D. QUESTIONS AND RESPONSES

QUESTION

1. Is there a specific material requirement for any of the foundation backfills? Note #6 on sheet 106 under the General Foundation / Geotechnical Notes states “non-organic soil / rock material with maximum particle size of 4in” is to be used. The geotechnical report mentions the use of #57 backfill or a drainage board.

RESPONSE

Page 10 of the Geotech Report allows for “non-organic soil / rock material with maximum particle size of 4in” to be used. #57 backfill is required when specifically called out for drainage material.

QUESTION

2. A few of the buildings have foundation drains. Will these buildings need a porous backfill as suggested in the geotechnical report?

RESPONSE

No, subsurface drainage is required only as indicated on Page 21 of the Geotech Report. Porous backfill is not required when setting foundations on caissons when foundation drains are utilized.

QUESTION

3. There is not a specification for the perimeter fence. Is the fence 6'-tall with 3-strands of barbed wire in all locations? Please provide pipe sizing, pipe specifications, and fabric specifications.

RESPONSE

The fence is 6'-tall with 3-strands of barbed wire in all locations. Specification 323113 – Chain Link Fence and Gate has been added to the contract as part of this addendum to clarify fencing requirements. The fence details on Plan Sheet 104 have been updated to reflect the fence specified.

E. CLARIFICATIONS

1. Section B.9 in Addendum #1 made note of “ICEAS SBR Reactor tanks and building structure” for eligibility of pre-cast, post-tensioned concrete tank construction. This note was intended to say “Aqua-Aerobic Systems, Inc. (or Equal) Pre-EQ basin, Digester, Post-EQ basin, and SBR basins.”
2. Section B.9 in Addendum #1 made note of a minimum of 30 years of experience. A minimum of 25 years of experience will be accepted to allow for competition and “or equal” manufacturers may be considered. “Or equal” manufacturers must abide by all other items outlined in Section B.9 of Addendum #1.

If you have any questions or comments, please feel free to contact me at your earliest convenience. As a reminder, bids will be received until 2:00 p.m. on Wednesday, March 30, 2022, at 203 S. Church Street, Ripley, WV 25271.

Sincerely,

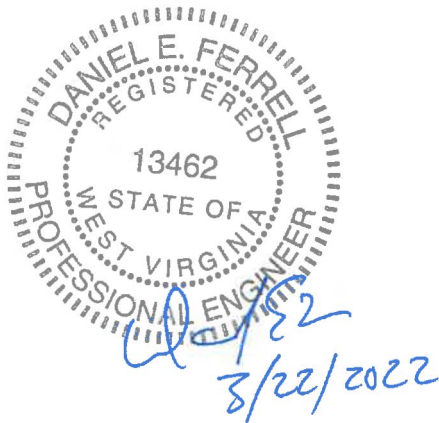
THE THRASHER GROUP, INC.



DANIEL E. FERRELL, P.E.
Project Manager

Enclosures:

- Index Volume 2
- Specification 333213 – Chain Link Fence and Gates
- Specification 461215 – Pre-Screening Equipment
- Specification 461802 – Sludge Dewatering Equipment
- Specification 463643 – Lime Feed Equipment
- Plan Sheets
- Davis Bacon Wage Rates



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VOLUME 2

- I N D E X -

TECHNICAL SPECIFICATIONS

Hangers and Supports	220529
Pipe Insulation	220719
Valves	221113
Domestic Water Piping	221116
Plumbing Specialties	221119
Sanitary Waste and Vent Piping	221316
Electric, Domestic Water Heaters	223300
Plumbing Fixtures	224000
Emergency Plumbing Fixtures	224500
Common Motor Requirements for HVAC Equipment	230513
Sleeves and Sleeve Seals for HVAC Piping	230517
Escutcheons for HVAC Piping	230518
Vibration Controls for HVAC	230548.13
Identification for HVAC Piping and Equipment	230553
Testing, Adjusting, and Balancing for HVAC	230593
Duct Insulation	230713
Facility Natural-Gas Piping	231123

Metal Ducts	233113
Air Duct Accessories	233300
Flexible Ducts	233346
HVAC Power Ventilators	233423
Air Outlets and Inlets	233713
HVAC Gravity Ventilators	233723
Deep Bed Scrubber	233724
Gas-Fired Unit Heaters	235533.16
Split-System Air Conditioners	238126
Wall and Ceiling Unit Heaters	238239.19
Basic Electrical Materials and Methods	260500
Conductors and Cables	260523
Grounding and Bonding	260526
Raceways and Boxes	260533
Dry-Type Transformers (1000V and Less)	262200
Switchboards	262300
Panelboards	262416
Motor Control Centers	262419
Mini-Power Zones (1000V and Less)	262600
Wiring Devices	262726
Fuses	262813
Enclosed Switches and Circuit Breakers	262816
Enclosed Controllers	262913

Variable-Frequency Drives for Submersible Pumps	262934
Transfer Switches	263200
Packaged Engine Generators	263213
LED Interior Lighting	265101
Site Clearing	311000
Earth Moving/Excavation	312000
Dewatering	312319
Erosion and Sedimentation Control	312500
Asphalt Paving	321216
Stone Surfacing Material	321217
Chain Link Fences and Gates	323113
Landscaping	329119
Sewer and Manhole Testing	330130.13
Manholes and Structures	330513
Site Water Utility Distribution Piping	331116
Disinfecting of Water Utility Distribution	331300
Pre-EQ Basin Pumps	333218
Submersible Non-Clog Pump Station	333219
Submersible Pump for Digester Decant	333220
Couplings, Adapters and Specials for Process Piping	400506
Hangers and Supports for Process Piping	400507
Ductile Iron Process Pipe	400519
Stainless Steel Process Pipe and Tubing	400523

Thermoplastic Process Pipe	400531
Common Requirements for Process Valves	400551
Identification for Process Piping	400553
Aluminum Slide and Weir Gates	400559.21
Plug Valves	400562
Butterfly Valves	400564
Swing Check Valves	400565.23
Supervisory Control and Data Acquisition (SCADA) System	401250
Process Piping Insulation	404213
Magnetic Flow Meters	407113
Ultrasonic Level Meters (Continuous and Point Type)	407213
Identification for Water and Wastewater Equipment	460553
Pre-Screening Equipment	461215
Grit Removal Equipment	461216
Non-Potable Water Packaged Pumping System	461320
Sequencing Batch Reactor (SBR) Equipment	461405
Sludge Dewatering Equipment	461802
Chlorination/Dechlorination Gas Feed Equipment	463111
Lime Feed Equipment	463643
Miscellaneous Equipment	469000
Safety Equipment	470000

FEDERAL WAGE RATES

ACCOMMODATION OF HIGHWAYS

SECTION 323113 - CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Chain-link fences.
2. Swing gates.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For each type of fence and gate assembly.

1. Include plans, elevations, sections, details, and attachments to other work.

C. Delegated-Design Submittal: For structural performance of chain-link fence and gate frameworks, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.3 INFORMATIONAL SUBMITTALS

A. Product certificates.

B. Product test reports.

C. Sample warranty.

1.4 WARRANTY

A. Special Warranty: Installer agrees to repair or replace components of chain-link fences and gates that fail in materials or workmanship within specified warranty period.

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

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design chain-link fence and gate frameworks.

2.2 CHAIN-LINK FENCE FABRIC

- A. General: As provided in the plan set. Provide fabric in one-piece heights measured between top and bottom of outer edge of selvage knuckle or twist according to "CLFMI Product Manual" and requirements indicated below:
1. Fabric Height: As indicated on Drawings.
 2. Steel Wire for Fabric: Wire diameter of 9 gauge.
 - a. Mesh Size: 2 inches.
 - b. Aluminum-Coated Fabric: ASTM A 491, Type I.
 - c. Zinc-Coated Fabric: ASTM A 392, Type II, Class 1, 1.2 oz./sq. ft
 - d. Zn-5-Al-MM Aluminum-Mischmetal-Coated Fabric: ASTM F 1345, Type III.
 - e. Polymer-Coated Fabric: ASTM F 668, over-coated steel wire.
 - 1) Color: As shown on the Drawings, according to ASTM F 934.
 - f. Coat selvage ends of metallic-coated fabric before the weaving process with manufacturer's standard clear protective coating.
 3. Aluminum Wire Fabric: ASTM F 1183, with mill caustic-cleaned or etched finish, and wire diameter of 0.148 inch.
 - a. Mesh Size: 2 inches.
 4. Selvage: Twisted top and knuckled bottom.

2.3 FENCE FRAMEWORK

- A. Posts and Rails: ASTM F 1043 for framework, including rails, braces, and line; terminal; and corner posts. Provide members with minimum dimensions and wall thickness according to ASTM F 1043 or ASTM F 1083 based on the following:
1. Fence Height: 72 inches.
 2. Light-Industrial-Strength Material: Group IC-L, round steel pipe, electric-resistance-welded pipe, Group II-L, roll-formed-steel C-section shapes, Group III-L, hot-rolled H-beam shapes or Group IV, Alternative Design.
 - a. Line Post: 1.9 inches in diameter.
 - b. End, Corner, and Pull Posts: 4.0 inches.
 3. Heavy-Industrial-Strength Material: Group IA, round steel pipe, Schedule 40, Group IC, round steel pipe, electric-resistance-welded pipe, Group II, roll-formed-steel C-section shapes, Group III, hot-rolled H-beam shapes or Group IV, Alternative Design.
 - a. Line Post: As recommended by the manufacturer.
 - b. End, Corner, and Pull Posts: As recommended by the manufacturer.
 4. Horizontal Framework Members: top rails according to ASTM F 1043.
 5. Brace Rails: ASTM F 1043.
 6. Metallic Coating for Steel Framework:

- a. External, Type B zinc with organic overcoat and internal, Type D zinc-pigmented coating.

7. Polymer coating over metallic coating.

- a. Color: according to ASTM F 934.

2.4 TENSION WIRE

- A. Metallic-Coated Steel Wire: 0.177-inch-diameter, marcelled tension wire according to ASTM A 817 or ASTM A 824, with the following metallic coating:

1. Type II: Zinc coated (galvanized) with minimum coating weight matching chain-link fabric coating weight.

- B. Polymer-Coated Steel Wire: diameter, tension wire according to ASTM F 1664.

1. Color: according to ASTM F 934.

2.5 SWING GATES

- A. General: ASTM F 900 for gate posts and double swing gate types.

1. Gate Leaf Width: As indicated on drawings.
2. Framework Member Sizes and Strength: Based on gate fabric height of 72 inches or less.

- B. Pipe and Tubing:

1. Zinc-Coated Steel: ASTM F 1043 and ASTM F 1083; protective coating and finish to match fence framework.
2. Aluminum: ASTM B 429/B 429M; finish.
3. Gate Posts: Round tubular steel.
4. Gate Frames and Bracing: Round tubular steel.

- C. Frame Corner Construction: Welded.

- D. Extended Gate Posts and Frame Members: Fabricate gate posts and frame end members to extend as indicated above top of chain-link fabric at both ends of gate frame to attach barbed wire assemblies.

- E. Hardware:

1. Hinges: 360-degree inward and outward swing.
2. Latch: Permitting operation from both sides of gate with provision for padlocking accessible from both sides of gate.
3. Lock: Manufacturer's standard internal device.
4. Padlock and Chain: Per Owner Requirements.
5. Closer: Manufacturer's standard.
6. As indicated on the plan set.

2.6 FITTINGS

- A. Provide fittings according to ASTM F 626.
- B. Barbed Wire Arms: Pressed steel, with clips, slots, or other means for attaching strands of barbed wire, and means for attaching to posts, integral with post cap, for each post unless otherwise indicated, and as follows:
 - 1. Provide line posts with arms that accommodate top rail or tension wire.
 - 2. Provide corner arms at fence corner posts unless extended posts are indicated.
 - 3. Single-Arm Type: Type I, slanted arm.
- C. Finish:
 - 1. Metallic Coating for Pressed Steel or Cast Iron: Not less than 1.2 oz./sq. ft. of zinc.
 - a. Polymer coating over metallic coating.
 - 2. Aluminum: Mill finish.

2.7 BARBED WIRE

- A. Steel Barbed Wire: ASTM A 121, two-strand barbed wire, 0.099-inch-diameter line wire with 0.080-inch-diameter, four-point round barbs spaced not more than 5 inches o.c.
 - 1. Aluminum Coating: Type A.
 - 2. Zinc Coating: Type Z, Class 3.
- B. Polymer-Coated, Galvanized-Steel Barbed Wire: ASTM F 1665, two-strand barbed wire, 0.080-inch-diameter line wire with 0.080-inch-diameter, four-point, round galvanized-steel barbs spaced not more than 5 inches o.c.:

2.8 GROUT AND ANCHORING CEMENT

- A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout, recommended in writing by manufacturer, for exterior applications.
- B. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating, and that is recommended in writing by manufacturer for exterior applications.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Do not begin installation before final grading is completed unless otherwise permitted by Architect.

3.2 PREPARATION

- A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.3 CHAIN-LINK FENCE INSTALLATION

- A. Install chain-link fencing according to ASTM F 567 and more stringent requirements specified.
- B. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed soil.
- C. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.
 - 1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
 - 2. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.
 - a. Concealed Concrete: Place top of concrete 2 inches below grade to allow covering with surface material.
 - b. Posts Set into Sleeves in Concrete: Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts are inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout or anchoring cement, mixed and placed according to anchoring material manufacturer's written instructions. Finish anchorage joint to slope away from post to drain water.
- D. Terminal Posts: Install terminal end, corner, and gate posts according to ASTM F 567 and terminal pull posts at changes in horizontal or vertical alignment of 15 degrees or more as indicated on Drawings. For runs exceeding 500 feet, space pull posts an equal distance between corner or end posts.
- E. Line Posts: Space line posts uniformly at 10 feet o.c.
- F. Tension Wire: Install according to ASTM F 567, maintaining plumb position and alignment of fence posts. Pull wire taut, without sags. Fasten fabric to tension wire with 0.120-inch-diameter hog rings of same material and finish as fabric wire, spaced a maximum of 24 inches o.c. Install tension wire in locations indicated before stretching fabric. Provide horizontal tension wire as shown on the Drawings.
- G. Chain-Link Fabric: Apply fabric to outside of enclosing framework. Leave 2-inch bottom clearance between finish grade or surface and bottom selvage unless otherwise indicated. Pull fabric taut and tie

to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.

- H. Barbed Wire: Install barbed wire uniformly spaced as indicated on Drawings. Pull wire taut, install securely to extension arms, and secure to end post or terminal arms.

3.4 ADJUSTING

- A. Gates: Adjust gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.
- B. Lubricate hardware and other moving parts.

END OF SECTION 323113

SECTION 461215 – PRE-SCREENING EQUIPMENT

PART 1- GENERAL

1.1 SCOPE

- A. Supply all labor, materials, equipment and incidentals required to install and place into operation the fine screening system as shown on the Drawings and as specified herein.

1.2 REFERENCE STANDARDS

- A. The properties of all materials, design, fabrication and performance of the equipment to be furnished under this section shall be in accordance with the latest issue of applicable standard specifications. The governing authorities of these standards are listed below.
 1. AICS, American Institute of Steel Construction
 2. AISI American Iron and Steel Institute
 3. ANSI, American National Standards Institute
 4. ASCE, American Society of Civil Engineers
 5. ASME, American Society of Mechanical Engineers
 6. ASTM, American Society of Testing and Materials
 7. AWS, American Welding Society
 8. IBC, International Building Code
 9. IEC, International Electric Code
 10. IEEE, Institute of Electrical and Electronics Engineers
 11. NEC, National Electrical Code
 12. NEMA, National Electrical Manufacturers Association
 13. Underwriters Laboratory (UL and cUL)

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Submittals shall be provided to the engineer that includes all the following information:
 1. Certified shop drawings showing all important details of construction, dimensions and anchor bolt locations.
 2. Descriptive product literature.
 3. Schematic electrical wiring diagram and electrical controls information.
 4. Complete motor and drive data.
 5. The total weight of the equipment.
 6. A complete bill of materials of all equipment.
- C. A copy of this specification section and all referenced and applicable sections, with addendum updates included and with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements is required under this section. Check marks (✓) shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated, and therefore requested by the Contractor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph, referenced to

a detailed written explanation of the reasons for requesting the deviation. The Engineer shall be the final authority for determining acceptability of requested deviations. The remaining portions of the

paragraph not underlined will signify compliance on the part of the Contractor with the specifications. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.

1.4 QUALITY ASSURANCE

- A. Single Source Responsibility: To ensure that all equipment required for the installation of the screening equipment and controls is properly coordinated and will function as a unit in accordance with the intent of these specifications, the Contractor shall obtain all the equipment specified under this Section, from a single supplier in whom the responsibility for the proper function of all the equipment, regardless of manufacturer, as an integrated and coordinated system shall be vested. The intent of this paragraph is to establish unit responsibility for all the equipment with the screening equipment supplier. The use of the work "responsibility" relating to the equipment supplier is in no way intended to relieve the Contractor's ultimate responsibility for equipment coordination, installation, operation, and guarantee.
- B. All the equipment specified under this Section shall be supplied by a single manufacturer involved in the manufacture of the screening equipment. Qualified manufacturers shall have a minimum of ten (10) years' experience with wastewater screening systems, specifically including through flow continuous belt screens and Washing Compactors, for consideration.
- C. If equipment is not manufactured by supplier, including welding and machining, the name and contact information of manufacturing facility must be supplied. If more than one manufacturer is used all companies and facilities must be provided.
- D. If patents protecting equipment are not owned by supplier then an affidavit must be supplied stating owner of design and expiration of licensing agreement.
- E. The equipment shall be the Continuous Belt Through Flow Screen and Washing Compactor as provided by Hydro-Dyne Engineering, Inc., Clearwater, FL. Other than the named supplier, all manufacturers proposing equipment described herein, will provide a detailed submittal package, which will consist, at a minimum, of all information and details prescribed in section 1.3, 1.4 and Part 2 of this specification. All pre-qualification submittals will be submitted to the Engineer at least 15 days prior to the bid date.
- F. If submitted equipment requires arrangement differing from that specified, prepare and submit for review complete structural, mechanical, and electrical drawings and equipment lists showing all necessary changes and embodying all special features of equipment proposed. Any changes are at no additional compensation and the Manufacturer will be responsible for all engineering costs of redesign by the Engineer, if necessary.

1.5 DESIGN REQUIREMENTS

- A. System Description

1. The fine screen will have a continuous stainless steel belt that automatically rotates within the internal guide system of the static frame.
2. The fine screen herein specified will be of the center flow type. The flow enters the inside of the continuous belt and exits through both sides and the bottom of the belt.
3. The solids will collect as a mat on the inside of the continuous belt. The belt will intermittently rotate and elevate the solids to the discharge point. Larger objects will be picked up by a series of hooks and/or trays placed at regular intervals.
4. The solids will collect as a mat on the front face of the continuous belt. The belt will intermittently rotate and elevate the solids to the discharge point. Larger objects will be picked up by a series of hooks.
5. The solids will be removed at the top of the screen by two spray bar headers positioned on the outside of the belt. The screenings will drop into an internal hopper and be fed to the screening handling system.
6. The continuous belt will be directly driven by drive sprockets that shall support and rotate the grid assembly.
7. The screen will be totally enclosed and have access covers that will be lightweight and easily removable for maintenance.
8. The Washing Compactor will sit under the discharge point of the fine screens.
9. The Washing Compactor will be adequately sized to handle all the screenings and wash water that will be generated by the screen at peak flow. The system will be required to wash the screenings to reduce the organic content and compact the remaining solids into a dry plug.
10. The Washing Compactor will generally comprise of a screw auger rotating within the washing and drainage trough, a wash water system, a compaction zone and an outlet chute arrangement.
11. All stainless steel (including frame, grid, and drive components) mentioned below as stainless steel shall be T304 stainless steel. All hardware shall be T316 stainless steel.

B. System Performance - The fine screening system will be designed to meet the following design parameters:

- | | | |
|-----|--|---|
| 1. | Number of screens | 1 |
| 2. | Peak flow to plant | 6.0 MGD |
| 3. | Velocity through the grid | 3.8 ft/s |
| 4. | Screen grid opening | 3 mm |
| 5. | Head loss at peak flow | 10" @ 65% blinding and 45.71"
Upstream water level |
| 6. | Structural design differential of frame/grid | 48 inches minimum @
100% blinding |
| 7. | Drive design differential (operating) | 48 inches minimum |
| 8. | Screen grid supporting drive sprocket | 2 minimum – all stainless steel |
| 9. | Channel width | 18 inches |
| 10. | Channel depth | 54 inches |

11.	Number of Washing Compactors	1
12.	Diameter of screw	6 inches
13.	Diameter of shaft	2.375 inches
14.	Compactor discharge height above grade	48 inches
15.	System wash water requirements	41 GPM @ 60 PSI

1.6 WARRANTY

- A. The Manufacturer of the equipment supplied under this specification shall provide a warranty for a period of twelve (12) months commencing on the date of Substantial Completion. The Manufacturer shall guarantee that the equipment furnished is suitable for the purpose intended and free from defects in design, materials and workmanship. In the event that the equipment fails to perform as specified the Manufacturer shall, at his option, promptly repair, modify or replace the defective equipment.

Part 2 - PRODUCTS

2.1 MANUFACTURER

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to the following:
1. Hydro-Dyne Engineering, Inc.
 2. Ovivo, J+A
 3. SAVECO

2.2 THE CENTER FLOW SCREEN

A. Perforated Plate - The Continuous Screening Belt

1. The screenings belt will consist of panels manufactured from 3/8" thick UHMWPE with perforations of the specified opening.
2. The perforated panels will be supported by 12 gauge stainless steel vertical mounted lifting hooks horizontally spaced a maximum of 3 inches apart preventing deflection. The lifting hooks shall support the screening grid and bear tension loads across the entire length and width of the screen belt.
3. The hooks on elements shall form horizontal lifting trays or shelves for removing large solids and rags every 8 inches around the entire screen grid.
4. The perforated panels will be connected by heavy duty stainless steel axles every 8 inches to form a continuous belt that will rotate within the frame's guide system. The axle design will allow the plates to pivot and create a seal between the perforated panels to prevent the passage of solids.

5. The axles will include Delrin spacers that will maintain the 3 inch space between the vertical support elements. Delrin spacers will also form a seal between each perforated panel with clearance not to exceed 0.5mm.
6. The axles will be extended to fix a UHMWPE guide link to the side of each perforated plate. These guides will interlock to create a continuous guide link system that will slide within the frame.
7. Guide links shall be precision machined from solid virgin UHMWPE. Injection molded links are not acceptable.
8. The heavy duty guide links will be minimum 2 inches thick to protect against undue wear from grit and will be specially machined to form a closure seal between the rotating belt and the static frame.
9. The seal shall be continuous from grade level through the water flow forming an uninterrupted closure between the traveling screen grid and the stationary frame. The seal shall be heavy gauge stainless steel, fixed to the screen frame and be adjustable so it will remain in contact with the rotating screen belt at all times. There shall be no gap in the grid to frame seal larger than 0.5mm.
10. Guide systems that use rollers, stainless or hardened steel chains will not be acceptable.
11. Grid panel sealing systems that use neoprene seals or stainless steel hinges will not be acceptable.
12. Grid to frame sealing systems that use adjustable UHMWPE strips attached to the frame will not be acceptable.

B. The Frame

1. The continuous belt will rotate within a heavy duty stainless steel static support frame that shall be a rectangular box construction.
2. The guide link system will travel around a stainless steel guide wear track that is integral to the support frame. Top and bottom wear tracks shall be bolt in and field replaceable.
3. There shall be a removable inspection panel located directly beneath the drive allowing easy access to the grid drive sprockets, drive shaft and screenings collection hopper.
4. The design will ensure that the support frame meshes with the closure seal on each guide link to prevent passage of screening material and grit particles.
5. All components of the lower wear tracks shall be bolt in, field replaceable and manufactured from stainless steel.
6. The frame shall accommodate stainless steel protective covers designed to prevent leakage and contain spray wash. All access covers for maintenance will be lightweight and easily removable. Screens with covers requiring neoprene, rubber or plastic seals are not acceptable.

7. The screen manufacturer will supply the stainless steel angled filler plates to connect from the upstream corners of the support frame to the channel walls.
8. The back-plate of the screen shall be furnished with a bypass gate that will allow manual removal for complete flow bypass.

C. The Offloading of Screenings

1. Two stainless steel spray wash headers will be located in the head space of the screen to offload the screenings from the continuous belt.
2. The spray bar will incorporate brass nozzles at 2 inch spaces that can easily be replaced or removed for cleaning.
3. The spray bars will be positioned behind the rotating belt and will backwash the solids into an internal hopper manufactured from stainless steel. The wash water will be used to continuously flush the screenings from the internal hopper into the extended sluice or directly into the Washing Compactor.
4. The addition of a rotating or static brush system to aid offloading will not be acceptable.

D. Screen Drive Mechanism

1. Each screen will have a maximum 0.5 hp, inverter duty electric motor suitable for a 460/3/60 supply and rated for a Class 1 Div. 2 environment. As a minimum, the motor will be TEFC with an IP55 enclosure rating and will conform to NEMA MG-1 requirements. The motor will be located outside of the screen covers and above the top of the channel.
2. The gear reducer shall be directly coupled to a heavy duty shaft machined from solid stainless steel round bar.
3. The drive shaft shall be supported on both ends by grease filled roller bearings. Separate grease-filled self-contained cartridge seals shall be mounted on drive shaft between bearings and frame to eliminate spray wash from entering bearings or gear reducer.
4. The continuous belt will be supported and rotated around heavy duty stainless steel sprockets located on the drive shaft in the head space of the screen.
5. These sprockets will have lugs that transmit torque directly from the gear reducer to notches on the underside of the UHMWPE guide links. Driving forces shall be transmitted to areas located behind the screen's grid to prevent solids from contacting drive surfaces.
6. Chain driven systems or screens with wheels submerged in the wastewater are not acceptable.
7. Drive systems that use an external track and pinion to drive or push the band against grid weight supporting wear tracks will not be acceptable. Drive shall lift, and be capable of bearing, the full weight of the grid.

2.3 THE WASHING COMPACTOR

- A. The main body will be the washing trough that will receive screenings and wash water directly from the discharge point of the screen.
- B. The washing trough will house the screw auger and provide a dedicated section to reduce organic content. It will comprise of angled side walls manufactured from 10 gauge stainless steel that will direct the screenings on to the screw auger, and a drainage section in which the screw auger will ride.
- C. The stainless steel drainage section will be perforations with 3mm openings. This drainage section shall be removable and easily replaceable in the field with no special tools. The flights of the screw will be fitted with a stiff nylon brush that will maintain contact with the drainage section, preventing blockages. The replaceable brushes will be supplied in pre-coiled lengths with stainless steel removable clamps.
- D. The stainless steel screw auger will sit in the washing trough. Washing compactors with shaftless screws are not acceptable as a shaft is required to support the flight and provide necessary torque and compaction. Carbon steel screws are unacceptable due to corrosion probability.
- E. The auger will be a varied pitch screw supported at the compaction end by AMS 5848 hardened stainless steel wear and anti-rotation bars designed to prevent the compacted screening from spinning within the compaction zone.
- F. The end of the screw shall be reinforced with a stainless steel gusset welded behind the final screw flight to provide protection in this high wear/high torque area and to assist in compression of the screenings.
- G. The screw will rotate allowing wash water and free organic/fecal material finer than trough openings to escape and return to the plant flow. The wash water system will flush the separated organic material through the drainage section in solution or as small particles.
- H. Washing of screenings shall be achieved through a washing module consisting of the following minimum requirements manufactured out of stainless steel:
 - 1. Variable pitch flight for separate screening transport through the wash, rinse and compaction zones.
 - 2. Wash Zone
 - a. Flanged connections and a stainless steel orifice plate or nozzle
 - b. AMS 5848 hardened steel wear and anti-rotation bars
 - c. High pressure washing to shear and break-up organic and fecal material for return to the channel
 - 3. Rinse Zone
 - a. Stainless steel header feeding an external rinse shower
 - b. AMS 5848 hardened steel wear and anti-rotation bars
 - c. Full circumference perforations for dewatering and extrusion of organics and fecal material.
 - d. Attached drainage catch pan with a separate wash water supply to periodically purge the area of accumulated solids

- e. Cleansing cycles controlled through the main control panel and operator adjustable up to 9 cycles
 - f. Removable covers for inspection access
4. Compaction Zone
- a. Flange connected
 - b. AMS 5848 hardened steel wear and anti-rotation bars
- I. The compacted screenings will be pushed through the compaction zone and pass through an elbow into an outlet chute. The outlet chute will be tapered at 1 degree to allow for screening expansion and will elevate the dewatered screenings to discharge by gravity into a waste receptacle (by others).
- J. Each Washing Compactor will have a minimum 1.5 hp, continuous duty electric motor suitable for a 460/3/60 supply and rated for a Class 1 Div. 2 environment. As a minimum, the motor will be TEFC with an IP55 enclosure rating and will conform to NEMA MG-1 requirements.

2.4 FREEZE PROTECTION

- A. Each equipment item will be outfitted with a freeze protection package that is designed to automatically start based on ambient temperatures.
- B. The freeze protection package is specifically designed for highly corrosive and wet treatment plant environments.
- C. The heat will be provided via Class 1 Div. 2 energy efficient, self-regulating, low temperature copper cable with a wearable jacket suitable for a single phase 120V power supply.
- D. Power is supplied via NEMA 4X junction boxes specifically designed for heat trace systems.
- E. Insulation will be a minimum 1" thick ultra-low water absorption melamine fully enclosed with minimum 18 gauge thick stainless steel covers. The covers must allow unhindered access for inspection and maintenance without requiring removal or electrical disconnection of the freeze protection package.
- F. The equipment manufacturer will supply a ground fault interrupt breaker to be installed in the control panel and a NEMA 4X thermostat to be mounted by the contractor in the vicinity of the equipment.
- G. The equipment manufacturer will provide a step down transformer that delivers single phase 120V power supply installed inside or adjacent to the control panel.

2.5 THE CONTROL PANEL

- A. General Information - General Information - The manufacturer will supply one UL listed main control panel and one local control station that shall automatically control the equipment offered in this section.

B. The Main Control Panel

1. NEMA 4X stainless steel enclosure for outdoor installation. Each control panel shall consist of the following components for each screening system:
 - a. Main lockout/disconnect switch
 - b. Variable Frequency Drive
 - c. Compactor motor starter
 - d. Control transformer, 500 VA minimum
 - e. Programmable control relay with minimum 5 cycle timers
 - f. Fused disconnect
 - g. Hour run meter
 - h. Fuses and breakers
 - i. Motor overload sensor
 - j. Panel power light
 - k. Screen run/fault lights
 - l. Washing Compactor run/fault lights
 - m. Reset pushbutton
 - n. Emergency stop pushbutton

C. Ancillary Control Components -

1. Float switch.
2. Ultrasonic differential level control system consisting of the following per screen:
 - a. NEMA 4X enclosure with viewing window.
 - b. Milltronics Hydro-Ranger 200 controller with real-time 4-20 mA output.
 - c. Two (2) NEMA 4X/7 transducers.
 - d. Programming remote.
3. Local Control Panel – NEMA 7 - Each local control panel shall consist of the following components:
 - a. NEMA 7 enclosure
 - b. Hand/Off/Auto switch for each motor
 - c. Emergency stop

D. SCADA System Interface

1. The control system shall provide dedicated terminations for connection to the SCADA monitoring system inputs. Digital contacts shall be relay isolated dry contacts. Analog outputs shall be isolated 4-20 mA.
 - a. DI-1 Screen Run
 - b. DI-2 Screen Run Time
 - c. DI-3 Coarse Screen Fault
 - d. DI-4 High Level Alarm

e. AI-1 Influent Channel Level/High Level Alarm

2.6 SURFACE PREPARATION AND PAINTING

- A. All stainless steel materials, including hardware, shall be acid passivated for quality control, removal of heat affected discoloration, surface treatment for corrosive environments and to provide a uniform finish to stainless surfaces.
- B. All ferrous surfaces (except stainless steel) shall be coated with a pre-primer, primer, and an exterior top coating, or fusion bonded polyester coating suitable for humid/wet environments for superior corrosion protection.
- C. Motor and gearbox shall be manufacturer's standard coating for humid/wet environments for superior corrosion protection.

2.7 SPARE PARTS

- A. The manufacturer will supply the following spare parts, per screen supplied, with the equipment:
 - 1. Ten (10) hook links and elements spacers.
 - 2. Two (2) grid axles.
 - 3. Two (2) guide links.
 - 4. Two (2) screen panels.
 - 5. One (1) brush for the screw.

2.8 ACCESSORIES

- A. The manufacturer will supply the following accessories, with the equipment:
 - 1. One (1) 1" NEMA 7 brass body solenoid valve.
 - 2. One (1) 1.5" wash water strainer.
 - 3. Two (2) wash water pressure gauges.

PART 3 – EXECUTION

3.1 FACTORY TESTING

- A. The screening system and all components shall be factory assembled and tested for a minimum of 24 hours prior to shipment. The equipment shall be shipped fully assembled and shall be capable of being set in place and field erected by the Contractor with minimal field assembly.
- B. During the factory test period the screening system shall be adjusted as required assuring proper operation on completion of the field installation. The Manufacturer shall supply a certification of the completion of the factory testing of the assembled screening system and appurtenances and shall certify as to the equipment being in satisfactory operating condition at time of shipment. The Engineer and/or Owner may, at their own option and expense, witness the factory test.

3.2 DELIVERY AND STORAGE

- A. The screening system shall be appropriately crated and delivered to protect against damage during shipment.
- B. An authorized representative of the Contractor shall inspect the screens on delivery to the jobsite and shall report any damage or missing components to the Manufacturer and the Engineer within 72 hours of receipt of the shipment.

3.3 INSTALLATION

- A. The installation of the equipment shall be as indicated on the drawings and in strict accordance with the Manufacturer's instructions and recommendations.

3.4 FIELD TESTS, ADJUSTMENTS AND COMMISSIONING

- A. The equipment shall be shipped completely factory assembled. Contractor shall verify all access dimensions, channel dimensions, and any interior building dimensions to ensure equipment may be installed as a factory assembled units.
- B. After completion of the installation, the equipment shall be inspected and certified by an authorized representative of the Manufacturer as being in compliance with the Manufacturer's recommendations and requirements. At such time as the Manufacturer has deemed the installation to be acceptable, the Manufacturer's authorized service representative shall make any required adjustments and shall start the equipment to assure proper operation.
- C. The Manufacturer's authorized representative shall provide instruction to the plant personnel as to the operation and maintenance of the equipment including commissioning, shut down, on-line operations, lubrication and preventative maintenance.
- D. Manufacturer shall state field service rates for a Service Engineer to Owner and Contractor. In the event that the field service time required by this section should not be sufficient to properly place the equipment into operation, and the requirement for additional time is beyond the manufacturer's responsibility, additional time shall be purchased by Contractor to correct deficiencies in installation, equipment, or material without additional cost to Owner.
- E. The Contractor shall include in his bid, the cost of the above referenced authorized service representative for a minimum of one (1) eight hour day onsite to complete the certifications and training described in this specification section.

3.5 PERFORMANCE GUARANTEE

- A. The screening equipment shall be tested at the normal plant operating conditions and shall provide results equal to or greater than specified herein.

END OF SECTION 461215

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SECTION 461802 – SLUDGE DEWATERING EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. The work included under this section consists of all labor, tools, equipment and services necessary to install a complete sludge dewatering system including one (1) 1.0 meter belt filter press, polymer feed system, lime feed system, sludge conveyor and control panel; as specified and indicated on the Drawings and as required to meet specified performance requirements.
- B. Related Sections
 - 1. Section 463643 – Lime Feed Equipment: The Sludge Dewatering Equipment shall control the lime feed equipment.
- C. Equipment furnished and installed under this section shall be fabricated, assembled, erected and placed in proper operating condition in full conformity with the drawings, specifications, engineering data, instructions, and recommendations of the equipment manufacturer, unless exceptions are noted by the engineer.

1.2 COORDINATION

- A. Section 013000: “Administrative Requirements: Requirements for Coordination.”
- B. Coordinate Work of this Section with piping and equipment connections as specified in other Sections and as indicated on Drawings.

1.3 SUBMITTALS

- A. Submittals shall be submitted based on the requirements in Section 013300 - Submittal Procedures. Submittals shall include the following:
 - 1. Product information and drawings for all sludge dewatering equipment components to be furnished and installed as specified herein.
- B. A copy of this specification section and all referenced and applicable sections, with addendum updates included and with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements is required under this section. Check marks (✓) shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated, and therefore requested by the Contractor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph, referenced to a detailed written explanation of the reasons for requesting the deviation. The Engineer shall be the final authority for determining acceptability of requested deviations. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specifications. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to

the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.

1.4 CLOSEOUT SUBMITTALS

- A. Section 017000: "Execution and Closeout Requirements: Requirements for Submittals."
- B. Complete system Operation and Maintenance manuals shall be available in hardcopy and electronic form. The electronic form shall be provided in .pdf format and be fully bookmarked. Manuals shall address:
 - 1. General project information
 - 2. Installation and start-up
 - 3. Process design and operational control description
 - 4. Mechanical, electrical and field instrumentation component descriptions
 - 5. Maintenance and troubleshooting
 - 6. Mechanical and electrical drawings

1.5 WARRANTY

- A. Section 017000 - Execution and Closeout Requirements: Requirements for warranties.
- B. All equipment provided under this Section shall be furnished with one (1) year warranty on materials and workmanship from the **date of Substantial Completion**. The Owner will return any equipment found defective to the manufacturer for inspection and validation of the defect. Defective equipment will be repaired or replaced at manufacturer's discretion and shipped back to Owner at no charge.

1.6 WORKMANSHIP AND DESIGN

- A. All components of the sludge dewatering equipment shall be engineered for long, continuous, and uninterrupted service. Provisions shall be made for easy lubrication, adjustment, or replacement of all parts. Corresponding parts of multiple units shall be interchangeable.

1.7 SYSTEM DESCRIPTION

- A. The sludge dewatering system shall consist of one (1) belt filter press, polymer feed system, lime feed system, sludge conveyor and all appurtenances. Each belt filter press shall be a complete prefabricated unit consisting of at least a sludge conditioning system, a gravity drainage section, a pressure section, a belt tensioning system and a belt washing system. Only units having a measured belt width of 1.2 meters, 1.0 meters effective shall be considered acceptable under this specification. The unit shall be the Klampress® 1.0 meters with Extended Gravity and Wedge zones Belt Filter Press as manufactured by Alfa Laval Ashbrook Simon-Hartley, Houston, Texas, or equal.
- B. The overall height, width, and length of each belt filter press shall be as follows: 95.75" inches high (centerline of feed inlet), 244.75 inches long and 94.75 inches wide.

- C. The minimum clearance requirements specified herein shall not relieve the contractor from allowing additional clearances for the proper installation, operation, and maintenance of the units. Should equipment other than that specified be proposed, the contractor shall be responsible for any redesign based on the requirements contained herein.

1.8 QUALITY ASSURANCE

- A. Perform Work according to specified standards.
- B. Maintain one (1) copy of each standard affecting Work of this Section on Site.
- C. Basis of Design: The Drawings and Specifications have been developed based on the Klampress 1.0 meter Extended Gravity as manufactured by Alfa Laval, Inc. Ashbrook Simon-Hartley of Houston, Texas. Any costs resulting from changes made necessary by the approval of other SBR equipment shall be borne by the Contractor. This shall include all design work and drawing and specification revisions by the Engineer. Also, the Contractor shall submit drawings to the Engineer for approval showing all changes made necessary by the other equipment.
- D. Single Source Responsibility: To ensure that all equipment required for the installation of the screening equipment and controls is properly coordinated and will function as a unit in accordance with the intent of these specifications, the Contractor shall obtain all the equipment specified under this Section, from a single supplier in whom the responsibility for the proper function of all the equipment, regardless of manufacturer, as an integrated and coordinated system shall be vested. The intent of this paragraph is to establish unit responsibility for all the equipment with the screening equipment supplier. The use of the work "responsibility" relating to the equipment supplier is in no way intended to relieve the Contractor's ultimate responsibility for equipment coordination, installation, operation, and guarantee.
- E. Consideration will be given only to products of manufacturers who can demonstrate that their equipment fully complies with all requirements of the specifications and contract documents. The equipment shall be supplied by a firm which has been regularly engaged in the design, fabrication, assembly, testing, start-up and service of full scale belt filter presses, of the same model and size as proposed, operating in the U.S., with similar sludges, for a period of not less than ten (10) years prior to the bid date of this contract. To insure that the highest standards are met each bidder shall be certified to ISO 9001 quality standards as a belt press manufacturer in the United States. The bidder shall submit data to substantiate the manufacturers experience in accordance with the contract documents. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- F. If a bidding belt press manufacturer does not have a formal quality system in place, or documentation to prove so, a performance/maintenance bond in the amount of 100% of the installed price (including equipment; labor, piping, and wiring associated with the system covered under this specification) shall be included in the bid proposal. The bond should be made out to the owner for 100% of the amount bid, and shall be in force for a minimum of five (5) years from the date of first beneficial use of the equipment. The five (5) year minimum is to cover all warranties listed under this specification.
- G. Store materials according to manufacturer instructions.

H. Protection:

1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
2. Protect piping and appurtenances by storing off ground.
3. Provide additional protection according to manufacturer instructions.

1.9 PATENTS

- A. The manufacturer warrants that the use of this system and its equipment, in the process for which the system has been expressly designed, will not infringe any U.S. or foreign patents or patents pending. In the event of any claim of infringement the manufacturer shall defend and indemnify the owner free from any liabilities associated with the use of the patented equipment or process.
- B. The manufacturer hereby grants to the owner, in perpetuity, a paid up license to use any inventions covered by patent or patents pending, owned, or controlled by the manufacturer in the operation of the facility being constructed in conjunction with the equipment supplied under this contract, but without the right to grant sublicenses.

1.10 CONDITIONS OF SERVICE AND PERFORMANCE REQUIREMENTS

- A. The sludge dewatering equipment shall be designed to adequately condition and dewater the sludge so that a dewatered sludge cake is produced that easily discharges from the dewatering unit without blinding and that may be handled by the pump or conveying equipment.
- B. Each unit shall be designed to operate in the environment for which it is intended, continuously or intermittently on demand, and shall perform the required dewatering operations without spillage of water or sludge beyond the nominal machine envelope.
- C. The description of the sludge to be fed to the belt filter press is as follows:
 1. Type of sludge:
 - WAS from a Sequencing Batch Reactor (SBR) plant which is raw, aerobically digested.
 - Feed Solids, percent d.w.s. 1% to 2%
- D. Each belt filter press shall be capable of meeting the following minimum performance criteria provided the above Conditions of Service are furnished:
 - Sludge throughput (lbs. d.w.s./hour) 650 – 750
 - Hydraulic capacity (GPM) 65-75
 - Cake solids, percent d.w.s 16 – 18%
 - Solids capture, percent 93-95%
 - Lbs/ton of active polymer in feed, d.ws. 12 - 15

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include:
1. Alfa Laval, Inc.
 2. Komline-Sanderson

2.2 MATERIALS AND COATINGS

- A. All materials used in the construction of the sludge dewatering equipment shall be of the best quality and entirely suitable in every respect for the service required. All structural steel shall conform to the ASTM Standard Specification for Structural Steel, Designation A36/A36M. All iron castings shall conform to the ASTM Standard Specifications for Gray Iron Castings, Designation A48, and shall be of a class suitable for the purpose intended. Other materials shall conform to the ASTM Specifications where such specifications exist and the use of such materials shall be based on continuous and successful use under similar conditions of service.
- B. All electrical components shall be U.L. listed where such listing exists and all electrical control panels shall be assembled in U.L. approved facilities.
- C. All structural carbon steel plates and shapes shall have a minimum thickness of 1/4 inch and shall be hot dip galvanized in accordance with ASTM A-123.
- D. The following materials and coatings shall be provided for the belt filter press and related components unless specified otherwise herein:

Bearing housings	Nylon coated, cast iron
Horizontal gravity, wedge, and pressure zone grids:	Carbon steel hot dipped galvanized, fitted with U.H.M.W. Polyethylene wiper bars
Wash box	C.S. Galvanized, fitted with U.H.M.W. Polyethylene wiper bars.
Belt wash spray tube and nozzles	Stainless steel.
Belt wash piping	Schedule 80 PVC, 1 1/2 inch.
Chicanes	Galvanized steel support rods, galvanized cast iron holders and U.H.M.W. polyethylene blades.
Discharge Chute	Stainless steel.
Doctor blades	U.H.M.W. polyethylene.
Drain trays	Stainless steel, 14 gauge.

Drain tray piping	Schedule 40 PVC.
Frame	A36 steel, hot dip galvanized, ASTM A123, coating grade 100
Hardware, fasteners, springs, clips, etc.	316 stainless steel.
Hydraulic cylinders	Painted carbon steel
Miscellaneous	Carbon steel surfaces to be hot dip galvanized, ASTM A123 4 mils. min.
Polymer mixer housing	Stainless Steel
Counterweight	Cast iron, galvanized
Injection ring	UHMW polyethylene
Splitter Manifold	UHMW polyethylene
Roller shaft & body	Carbon steel. Drive roller coated with Buna N rubber, 1/4 inch, other rollers coated with thermoplastic nylon, 25 mils.
Sludge containment barriers	Stainless steel, 14 gauge.

E. All hot dip galvanizing shall be applied in accordance with ASTM-A123. Zinc flame spray shall not be considered an acceptable substitute to this specification.

F. The heat setting thermoplastic nylon coating, specified herein, shall have the following properties:

<u>Coating Properties</u>	<u>Test Method</u>	<u>Value</u>
Hardness, Shore D	ASTM D-2240	77 durometer
Specific Gravity	ASTM D-792	1.06-1.20
Impact, RT & 45 F	ASTM D-2794	160 in-lbs
Direct Pass		
Tensile Strength	ASTM D-638	6000 PSI
Elongation	ASTM D-638	15%
Melting Point	ASTM D-789	3700F
Abrasion Resistance	ASTM D-4060	8-18 mg. Wt. loss

G. Buna N rubber coating shall have the following properties:

Tensile strength, ASTM D-412	2500 psi
Tear strength, die C, ASTM D-624	250 psi
Elongation at break, ASTM D-412	160%
Hardness, Shore A, ASTM D -676	90

H. Other types of protective coatings shall not be acceptable.

2.3 SLUDGE CONDITIONING SYSTEM

- A. Each belt filter press shall be provided with a sludge conditioning system, designed to efficiently mix polymer with the sludge and to adequately flocculate the sludge, for optimum dewatering.
- B. The sludge conditioning system shall be mounted upstream of the press and shall consist of a flow splitting manifold, a four port vortex polymer injection ring and an in line, non-clog, variable orifice mixer. Polymer addition systems which utilize tanks with mixers or inject polymer directly into the sludge line are not an acceptable equal to the system specified due to the excess amounts of polymer required by these inefficient systems.
- C. The belt filter press manufacturer shall be required to provide, to the engineer, a recommended layout for the sludge conditioning system that includes the recommended locations for the system.
- D. The sludge conditioning system shall be capable of providing the following performance:
 - 1. The polymer and sludge must be instantly mixed (less than 1.0 second at 60 GPM).
 - 2. Mixing energy must be independently adjustable during operation.
 - 3. Flocculation time must be independently adjustable, by the displacement of flanged pipe sections, with the mixer, at a minimum of three locations in the sludge feed piping. The three locations shall be 15, 30, and 45 seconds upstream from the belt filter press as calculated using the sludge feed design flow rate and velocity.
- E. The manufacturer shall be required to demonstrate, during the start up and calibration phase, that one man can adjust flocculation time within sixty minutes. The sludge conditioning system shall meet the following mechanical specifications:
 - 1. The in line mixer shall have a flanged, cast housing, an adjustable orifice plate, with shaft and o ring seal, connected to an externally mounted lever and counterweight and a removable side plate for inspection and cleaning.
 - 2. The inlet to the flow splitting manifold shall be fitted with a 3/4-inch male hose fitting connection. The four manifold outlets and polymer injection ring inlets shall be fitted with 1/2-inch male hose fittings that provide for the interconnection of clear flexible tubing. The Manufacturer shall provide four feet of 3/4 inch clear flexible tubing, sixteen feet of 1/2 inch clear flexible tubing and all necessary hose clamps with the sludge conditioning system.
 - 3. The open throat area of the mixer shall be fully adjustable downward and shall open automatically to prevent clogging.
 - 4. The position of the counterweight on the externally mounted orifice plate lever shall be fully adjustable, within a 360 degree circle, to allow for adjustment of the mixing energy, regardless of the mounting angle, while the unit is in operation.
- F. The polymer mixer shall be designed specifically for it's intended use. The use of modified check valves, static mixers, or mixers requiring a tank and motor driven propeller shall not be acceptable to this specification.

2.4 STRUCTURAL MAIN FRAME

- A. The structural main frame shall be fabricated of steel plate conforming to ASTM Standard Specifications for Structural Steel, into a rigid structure, adequately braced to withstand intended loads without excessive vibration or deflection.
- B. Maximum load on the frame, rollers and bearings shall be based on the summation of forces applied to the frame from roller mass forces, weight of the rollers including the sludge and belts and static belt tension of 30 pli per belt plus the tension produced by the driving torque of the motor. The frame shall have a minimum design safety factor greater than 5, and frame deflection shall not exceed 0.030 inches under the above specified loading forces.
- C. The framework shall be of welded and/or bolted construction. All welding shall conform to the American Welding Society Structural Welding Code.
- D. The structure shall be designed for installation on a prepared concrete foundation and secured with anchor bolts. The entire system shall be surrounded by an emergency trip cord mounted around the machine's perimeter which can be used to stop the machine in emergency situations.
- E. The manufacturer shall warrant the frame and the coating for a period of three years from the date of start up, not to exceed three and a half years from the date of delivery. The frame shall not require preventive maintenance during the warranty period. Any defects or corrosion occurring within the warranty period shall be repaired or replaced at no additional cost to the owner.

2.5 GRAVITY DRAINAGE SECTION

- A. Each belt filter press shall be furnished with a gravity drainage section to accept sludge from the sludge conditioning system. The gravity drainage section shall be furnished with a sludge feed baffle to evenly distribute conditioned sludge over the effective width of the moving filter belt.
- B. The conditioned sludge shall be contained on the belt with adjustable containment barriers equipped with replaceable rubber seals to prevent leakage. The rubber seals shall be designed for attachment to the containment barriers by friction fit, to allow for easy replacement without the use of tools.
- C. The gravity drainage section shall have an effective dewatering area of 46 square feet, which is defined as the effective width of the belt press times the length of the gravity deck.
- D. A carbon steel hot dipped galvanized grid fitted with high-density polyethylene wiper bars shall support the filter belt while in the gravity drainage section. The wiper bars shall be spaced at a maximum of two and one half inches and shall have a nominal wear thickness of one half inch, to minimize the frequency of replacement. The belt support grid shall be a minimum of 2 inches wider than the belt on each side and so designed to reduce belt wear. Wiper bars constructed of fiberglass, other high friction materials, or table rollers that require extra maintenance due to coatings and additional bearings shall not be considered an acceptable substitute to this specification.
- E. The gravity drainage section shall be furnished with chicanes (plows) to adequately furrow the conditioned sludge to facilitate drainage. Each row of chicanes shall be provided with a single

lifting handle, designed to remove the entire row of chicanes at least 6 inches from the belt, out of the sludge flow, to facilitate cleaning. Chicanes shall be designed to be individually adjustable laterally and shall pivot to allow them to pass over obstructions on the belt. A minimum of 5 rows, for a total of 13 chicanes shall be supplied in the gravity section.

- F. The manufacturer shall be required to demonstrate that each individual chicane shall be capable of allowing a one-inch vertical obstruction on the belt to pass under them without damage to the equipment.
- G. Vacuum assisted, inclined gravity drainage sections that are subject to flooding, or independent gravity drainage sections that require a separate belt drive motor and tensioning device will not be considered an acceptable substitute to this specification.

2.6 PRESSURE SECTION

- A. Each belt filter press shall be furnished with a pressure section following the gravity drainage section. The pressure section shall consist of two stages.
- B. The first stage of the pressure section shall be the increasing pressure (wedge) zone, where the upper and lower belts gradually converge with the sludge between the belts. In the wedge zone the sludge cake is prepared for the shear pressure zone by generating continuously increasing pressure on the sludge as it travels through the zone.
- C. For process flexibility, the amount of pressure exerted on the sludge and the rate at which the increasing pressure is applied shall be independently adjustable while the machine is in operation utilizing an adjustable steel wedge plate located between the belts, pressing down on the sludge. These adjustments shall be capable of being performed without causing undue wear on the belts or other components and without causing the belts to be moved from their normal path between rollers. The sludge inlet height at the entrance to the wedge plate shall be adjustable between one and three inches.
- D. The minimum effective dewatering area in the increasing pressure shall be 29 square feet. The belt in the increasing pressure zone shall be supported in the same manner as supported in the gravity drainage section.
- E. The second stage of the pressure section shall be the shear pressure zone consisting of a 12" radius curved grid and a minimum of 8 pressure rollers arranged to provide a serpentine pattern of belt travel.
- F. The curved grid shall further enhance dewatering by causing the pressure on the sludge between the belts to increase and press out free water. The horizontal wiper bars shall give a wiping action to the bottom of the belt in the wedge zone that will quickly remove water from the belt allowing faster drainage. The belt-supporting grid in the wedge zone shall be horizontal and blend into a gradual downward curve that shall be tangent to a radius pressure grid.
- G. The first roller in the increasing pressure zone shall be a 16" perforated roller. Rollers shall be constructed as specified under "Rollers". The rollers shall be supported by bearings mounted on the end shafts as specified under "Bearings".

- H. The minimum effective dewatering area in the shear pressure zone shall be 66 square feet. The effective dewatering area in the shear pressure zone shall be defined as the area of curved grid and rollers in contact with the belts, meaning full width of the belt.

2.7 ROLLERS

- A. All Solid Rollers shall be constructed using one-piece forge shafts and end plates. The forged stub shaft unit shall eliminate all welding of the roller shafts in the region of highest stress where the shafts join with the end plates. Welded up constructions of round bar and flat plates that create built in stresses and stress concentrations will not be considered equal to this specification. The forged stub shaft unit shall be welded to the roller shell with a machine-applied weld using the submerged arc process. The weld depth shall be equal to the wall thickness of the roller shell. The roller shall be machined so that the total indicated run out of the shell relative to the journals is 0.010 inch maximum. Total surface machining is required to provide a smooth surface for the coating of thermoplastic nylon or to prepare the roller for cladding.
- B. The perforated roller, which is the first roller in the pressure section, is designed to allow water to escape out both ends. It shall be constructed with a solid through shaft and at least five (5) radial vanes to support the perforated shell.
- C. The forged stub shaft unit shall be made of ASTM A572 Grade 50 Type 2 or equal. The roller shells may be ASTM A53 or equal. The perforated roller shall have a solid shaft of cold drawn carbon steel, AISC 8620 and the shell and radial vanes shall be ASTM A36 or equal, or stainless steels may be substituted on special order.
- D. Drive rollers shall be coated up to the point of insertion into the bearings by a 1/4-inch minimum thickness of Buna-N rubber. Solid and perforated rollers shall be coated with a 30-mil minimum thickness of thermoplastic nylon. See detail spec for these coatings in Section 2.2.
- E. Solid rollers may also be clad with 304 or 316 stainless steel. The cladding will be welded to the fully machined roller entirely covering the roller up to the point of insertion into the bearings. Welded stainless steel shafts in lieu of the forging are not acceptable for this application due to the lower strength and higher stress.
- F. All solid roller shells shall have a mill spec minimum wall thickness of 1/2 inch. Heavier walls shall be used where required to meet the maximum stress and deflection limits. The roller bearing journals shall be turned to 75 mm to accept direct mounted 75 mm bore bearings. The minimum thickness of the forged flange that forms the end plates shall be one (1) inch.
- G. The perforated roller shall have punched holes of 1 1/4 inch diameter minimum to prevent bridging of solid material. The punched shell shall be rolled with the smooth side out. The shell shall be a minimum 1/4-inch thick.
- H. The rollers shall be analyzed using finite element stress analyses. Certified calculations, showing the maximum stress to be less than 1/5 the yield strength of the material and the maximum deflection at mid span to be less than 0.050 inch shall be submitted as set forth in the contract documents. The standard load case for the pressure rollers shall be a distributed load in the belt contact area equivalent to 50-pli belt tension, weight loading and drive torque. The

standard load case for the other rollers shall be a distributed load in the belt contact area equivalent to 50-pli belt tension and weight loading.

2.8 BEARINGS

- A. All rollers shall be supported by greaseable type, high capacity design roller bearings, in sealed, splash proof, horizontal split case pillow block housings. The bearings shall be direct mounted on the shaft with a shrink fit backed by a retaining snap ring.
- B. Bearings supporting the steering rollers shall be non self aligning cylindrical roller bearings in pivot mounted pillow block housings.
- C. All other rollers shall be supported by self-aligning Type "E" spherical roller bearings with metallic cages, (plastic cages in spherical roller bearings are not acceptable) mounted in fixed pillow block housings.
- D. Bearings supporting all the rollers except the steering rollers shall be 75mm bore double row spherical bearings (type E construction) AFBMA size number 22215 with a dynamic radial capacity of 41,500 lb.. Bearings supporting the steering rollers shall be 75mm bore single row cylindrical roller bearings AFBMA size number 2215 with a dynamic radial capacity of 36,500 lb.
- E. Bearing housings shall be cast iron with two mounting bolts and four cap bolts. The outer side of the housing shall be solid, without end caps or filler plugs. The housings shall be designed with an integrally cast water trough which, when shrouded by a shaft mounted water flinger, shall divert water from the bearing seal area. The housings shall be cleaned, iron phosphate, and coated with nylon to a thickness of 8-12 mil.
- F. The bearing seal in the pillow block housing shall be of nonmetallic construction with a carrier/flinger, which rotates with the roller shaft. A static sealing arrangement between the carrier/flinger and the shaft shall be a triple rubber seal, constructed in a manner that prevents relative rotation between the seal and the shaft. A dynamic sealing arrangement between the carrier/flinger and the bearing housing shall consist of a primary dynamic contact seal of ozone resistant rubber which shall seal by rotational contact with a machined housing surface. A secondary dynamic seal shall be a labyrinth seal between the carrier/flinger and the bearing housing which utilizes a nonmetallic retaining ring to hold the seal assembly in position within the housing.
- G. Bearing lubrication shall be performed through stainless steel grease fitting mounted on the bearing housing. All bearings shall be outboard (externally mounted) and shall be greaseable while the unit is in operation. Lubrication shall not be required more often than once every six months.
- H. The manufacturer of the belt filter press shall warrant the complete bearing assembly, as specified herein, for a period of five years from the date of start-up, or acceptance of the equipment, whichever occurs first. The warranty shall include all parts and labor for repairing or replacing any bearing that fails during the warranty period.

2.9 BELT WASH SYSTEM

- A. Each belt filter press shall be equipped with individual belt wash stations for both the upper and lower belts. Each station shall consist of a spray pipe, fitted with spray nozzles, contained within a fabricated housing which encapsulates a section of each belt. The spray tube assembly shall be readily removable.
- B. Nozzle spacing and spray pattern shall be such that the sprays from adjacent nozzles overlap one another at the belt surface. Individual spray nozzles shall be replaceable.
- C. The housing shall be sealed against the belt with rubber seals. The spacing between the upper and lower housing shall be adjustable to insure continuous contact between the seals and belt. The seals shall be replaceable without disassembly of the wash station.
- D. Each belt wash station shall be furnished with a drain valve having an external handwheel to which is mounted a stainless steel cleaning brush located inside the spray pipe. One full turn of the handwheel shall cause the brush bristles to enter each spray nozzle, and dislodge any solid particles which have accumulated, open the valve and allow the solids particles to be flushed into the drainage system.
- E. Belt wash stations shall be the type manufactured by Appleton Manufacturing, Menasha Corporation, Menasha, Wisconsin or equal.
- F. Each belt wash station shall be positioned such that the washing is performed after the cake has been discharged from the belt. The belt wash station shall extend over the full width of the filter belt by a minimum of two (2) inches. The belt shall be cleaned by the belt wash with no blinding. The belt wash system shall be suitable for use with plant effluent water supplied at a minimum pressure of 85 psig and shall be designed to operate at a flow of 40 gpm.
- G. Washwater pressure shall be supplied to each washwater pump (one required per belt press) at 40 psig, and the belt press manufacturer shall furnish a separately mounted in line booster pump rated at sufficient capacity and discharge head to meet the process requirements. All controls and equipment necessary to provide a complete and operating system shall be provided for the pumps by the belt press manufacturer, including the controls from the machine control panel as specified hereinafter.
- H. Each belt filter press shall be provided with a 1 1/2 inch female pvc connection for belt wash water.

2.10 BELT ALIGNMENT SYSTEM

- A. Each belt shall be provided with an alignment system. Belt alignment shall be accomplished using a self-contained system that does not require an external power source, except for electrical power.
- B. The belt alignment system shall be provided with sensing devices designed with a counter-weighted arm fitted with a ceramic plate, which rides on the edge of the belts to detect their position. The arm shall operate a pilot valve, which in turn affects the position of a hydraulic actuator connected to a pivoted belt alignment roller. The pivoting action of the belt alignment

roller shall cause this roller to skew from its transverse position to guide the belts centrally along their path.

- C. The alignment systems shall function as a continuous automatic belt guidance system and shall be an integral part of the press. The alignment system shall operate with smooth and slow motions resulting in a minimum of belt travel from side to side. The use of electrical servos or systems which utilize devices that maintain alignment by a large snap action type alternating movement of the alignment roller shall not be considered acceptable to this specification.
- D. Rollers for the belt aligning system shall be constructed as specified under "Rollers". Support bearings for these rollers shall be as specified under "Bearings".
- E. Backup limit switches for the belt alignment system shall be provided on the machine with sufficient contacts to de energize all drives and sound an alarm in case of belt over travel.
- F. A hydraulic unit shall be provided, as specified under "Hydraulic Power Unit".

2.11 BELT TENSIONING SYSTEM

- A. Each belt shall be provided with a belt tensioning system. The belt tensioning system shall be hydraulically actuated. The design of the tensioning system shall be such that adjustments in tension shall result in immediate changes in dewatering pressure.
- B. The belt tensioning system shall be furnished with a control station located on the press so that shutoff of belt tension is possible. Actual belt tension, shall be maintained automatically despite process changes or belt stretching and not require additional adjustment by the operator to maintain the setpoint.
- C. The belt tensioning system shall be designed to accommodate maximum belt stretching during the useful life of the belt.
- D. The tensioning system shall have two hydraulic cylinders for each belt, directly connected to a rigid tensioning yoke, to provide absolute parallel tension across the entire width of the belt. The tension force shall be constant over the full range of the cylinder.
- E. Manual tensioning systems or pneumatic bellows systems, which do not automatically maintain a pre-set pressure on the sludge despite process changes, are not acceptable. Furthermore, air bladders change diameter and, as a result, force as they extend.
- F. Sensing devices shall be furnished for each belt with sufficient electrical contacts to de energize all drives and sound an alarm in the event of failure of the belt or the tensioning system.
- G. Rollers for the belt tensioning system shall be constructed as specified under "Rollers". The roller shaft bearings shall be as specified under "Bearings".

2.12 HYDRAULIC POWER UNIT

- A. Each belt filter press system shall be provided with a dedicated hydraulic power system to provide pressurized oil for the tensioning. The unit shall consist of a one-gallon reservoir,

variable-displacement pressure compensated hydraulic oil pump and drive motor, hydraulic oil filter, pressure gauge, piping, and cylinders to make a complete operational system.

- B. The pump, motor, reservoir, and oil filter shall be mounted directly to the belt press frame to eliminate excess piping runs, extra fittings and hoses. All hydraulic lines shall be properly sized for the pressure and flow of the unit. Pressurized hydraulic lines shall be 316ss tubing or high-pressure hose, and shall be supported on the structural frame of the press. Flexible lines to cylinders, low-pressure connections to the reservoir, etc. shall be hose of the material and construction appropriate to the application. The hydraulic reservoir shall be made of high-density polyethylene (HDPE) and shall be translucent to allow visual inspection of the oil level.
- C. The pump motor shall be a 1 hp and shall not exceed a noise level of 70 DbA. The motor shall be a cast iron TEFC 1,200 rpm, NEMA B design with a "C" face mounting for the hydraulic pump adapter.
- D. Maximum system pressure shall be set equal to the highest pressure required to obtain the desired operating belt tension. The maximum system operating pressure is 1,000 psi.
- E. Hydraulic system controls shall be grouped for easy access and ease of operation. There shall be means provided to retract the belt tension cylinders for service. The valves, fittings, manifold and associated parts shall be of non-corroding materials such as FRP, glass filled Nylon and stainless steel.
- F. The oil pressure gauge(s), one for each pair of belt tension cylinders (upper & lower belt) shall indicate oil pressure in PSI. Low-pressure switch (es) shall be provided to sense the absence of belt tension pressure.
- G. Hydraulic cylinders shall have a non-corrosive body and 316 stainless hardware and cylinder rod. The cylinder rod shall be solid stainless with a hardened polished seal contact surface. Chrome or nickel-plated rods are not acceptable.

2.13 BELT DRIVE

- A. Input power to the drive roller shaft shall be supplied through a variable speed drive unit. The drive roller speed reduction is obtained through a helical-bevel mounted gear reducer.

Drive Motor Data:

Quantity per Machine	1
Maximum Horsepower	1.5 hp
Power Requirements	460 v.a.c., 3 phase, 60 cycle.
Rated Speed	1740 r.p.m.
Nema Design	B
Insulation Class	F
Enclosure	TEFC
Service Factor	1.15
Lubrication	grease filled
Special Features	severe duty rating

- B. The variable input power shall be transmitted through a gear reducer mounted on the drive roller shaft. The drive roller shall be constructed as specified under “Rollers” and shall be surfaced with a Buna-N rubber coating to permit slip free transmission of driving torque to the belt.

2.14 DEWATERING BELTS

- A. Each belt filter press shall incorporate the use of two dewatering belts. Belts shall be fabricated of monofilament polyester and shall have 316 Stainless Steel seams. The mesh design shall be selected for optimum dewatering of the sludge to be processed and provide for maximum belt life when operated in accordance with the manufacturer’s instructions.
- B. Belt selection shall be based on the manufacturer’s experience obtained from testing the sludge during start up of the belt filter press (es) and at other installations dewatering similar sludges with similar polyelectrolyte conditioning chemicals.
- C. Each belt and connecting seam shall be designed for a minimum tensile strength equal to five times the normal maximum dynamic tension to which the belt shall be subjected. The seam shall be designed to fail before the belt.
- D. Belts shall be designed for ease of replacement with a minimum of belt filter down time. Belt replacement shall be such that disassembly of the equipment is not required.

2.15 DISCHARGE BLADES

- A. Discharge blades shall be provided to scrape dewatered sludge from the belt at the final discharge rollers. The blades shall be of ultra-high molecular weight polyethylene (UHMW) construction and shall be readily removable.

2.16 DRAINAGE PANS

- A. Drainage pans shall be provided as necessary to contain filtrate from all dewatering areas within the belt filter press without splashing and to prevent rewetting of downstream cake. All drainage piping shall be furnished, adequately sized for the intended service, and rigidly attached to the press frame. Drainage piping shall terminate inside the structural frame at the bottom of the press. Drain connection shall be self-venting to prevent overflow. Drainage pans shall be located so that the moving belts do not come into contact with the pans, nor does the filtrate come back into contact with the belt, under any condition.

2.17 SHAFTLESS SCREW CONVEYOR EQUIPMENT

- A. Furnish three (3) shaftless screw conveyors for the conveyance of dewatered wastewater sludge from a belt filter press or other.
- B. Screw conveyors shall be fabricated and assembled in full conformity with this specification and as shown in the contract drawings. Each conveyor shall be furnished complete with all supports; all mechanical equipment required for proper operation, including complete drive

Supports	AISI 304, ASTM A167, 18-8
Hoppers	AISI 304, ASTM A167, 18-8
Spiral Flighting	old formed, High Strength Micro Alloy Carbon Steel with a minimum hardness of 220 Brinell
Wear Liner	Ultrahigh molecular polyethelene (4.02.04A)
Bolts, Nuts, and Washers For Conveyor Supports	AISI 316, ASTM A167, 18-8
For Conveyor Trough,	AISI 304, ASTM A167, 18-8

E. General

1. Power supply: Power supply to the equipment will be 480volts, 60 Hz, 3 phase. Power supply for control shall be 120 volts, 60 Hz, single phase.
2. Electrical Equipment
 - a. All electrical equipment shall conform to applicable standard of the National Electrical Manufactures Association (NEMA) and the National Electrical Code (NEC). Both power and control equipment shall be insulated for not less than 600 volts even though operating voltages may be lower. Controls for conveyors supplied by others.
 - b. All motors shall be totally enclosed, fan cooled (TEFC). Control panels shall be NEMA 4X, stainless steel.
3. Fabrication: All welds shall be continuous unless otherwise specified. Facing surfaces of bolted joints shall be shop primed. Facing surfaces of field welded components shall be beveled and match marked.
4. Edge Grinding: Sharp corners of all cut and sheared edges shall be made smooth by a power grinder.
5. Fasteners: All bolts, nuts, washers, and other fasteners shall be AISI 316 stainless steel.
6. Surface Preparation: All iron and mild steel surfaces to be painted shall be dry abrasive grit blasted to "near white metal" in accordance with SSPC-SP6 or SSPC-SP10, and in accordance with the painting section of these specifications. Grit blasted surfaces shall be painted within 24 hours to prevent rusting and surface discoloration.
7. Painting: After surface preparation, metal surfaces except for the spiral flighting shall receive a minimum of one coat of Tnemec "66-1211 Epoxoline primer" or equal, and one coat of "46H-413 Hi-Build Tnemec-tar" coal tar epoxy or equal, to provide a total minimum dry film thickness of 15 mils prior to shipment to jobsite. Stainless steel components shall be furnished unpainted.

F. Shaftless Screw Conveyor Construction

1. Spiral Flighting

- a. Spiral flighting for the shaftless screw conveyors shall be designed to convey material without a center shaft. The minimum overall spiral weight and surface pressure shall be as specified herein. The conveyor will include an inner flight to increase axial strength and capacity of the conveyor. The minimum spiral weight shall be specified herein.
- b. Spiral flights shall be cold-formed high strength micro alloy steel with a minimum hardness of 220 Brinell. The spiral flights shall be designed with the stability to prevent distortion and jumping in the trough. The torsional rating of the auger flighting shall be reached at 30% of the Fy value in the extreme fiber of the flight material. Supplier shall demonstrate that, at 250% of the motor nameplate horsepower, the drive unit cannot produce more torque than the torsional rating of the flighting, and that the "spring effect" of the spiral shall not exceed + 0.8 mm per meter of length at maximum load conditions.
- c. Spiral flight material, fabrication technique, strength, hardness, and overall quality are critical to the proper operation of the conveying system as herein designed. Spiral flights that do not meet the characteristics or herein specified are specifically not acceptable. Supplier shall provide certified written documentation that the spiral flights conform to the following:

Material: Micro Alloy Steel
Hardness: 220 Brinell Minimum
Concentricity: 2.0 mm +/-

- d. Supplier shall maintain a certified factory quality control program which shall include certification of spiral flighting as described herein
- e. The spiral flighting shall be formed in sections from one continuous flat bar and shall be concentric to within 2mm +/- . Sectional flighting formed from plate shall not be permitted.
- f. Spiral flighting shall have full penetration welds at all splice connections. The flights shall be aligned to assure true alignment when assembled in the field and shall be made in accordance with the supplier's requirements. The spiral flights shall be coupled to the end shaft by a flanged, bolted connection.
- g. The connection of the spiral to the drive system shall be through a flanged connection plate that is welded to the spiral forming a smooth and continuous transformation from the flange plate to the spiral. The drive shaft shall have a mating flange and shall be bolted to the spiral connection plate.

2. Horizontal and Inclined Troughs

- a. Troughs shall be similar to the dimensional standards of CEMA 300 and enclosure classification IIE. Each conveyor trough shall be U-shaped, fabricated from a minimum 1/8 inch stainless steel plate.

- b. Stiffeners shall be placed across the top of the trough and fastened to both sides of the trough to maintain trough shape and act as a face seal for the covers; apply a continuous gasket, one half inch width, to the entire top face of the trough top flange and stiffeners.
 - c. Each trough shall be equipped with filling and/or discharge openings as required by the contract drawings. If required, each filling and discharge opening shall be flanged suitable for interconnection to other devices. Any interconnecting devices such as chutes and hoppers shall be fabricated from the same material as the troughs.
 - d. A flanged covered drain outlet shall be provided with each conveyor to facilitate cleaning.
 - e. The portion of each trough that is not covered by the filling chute shall be covered by a bolted cover of a material identical to the trough. The covers shall be manufactured in maximum four foot length section to allow for access to the conveyors. To prevent unsafe access to the conveyors, quick opening covers will not be allowed.
3. Wear Liner (Anti-Wear UHMW)
- a. The wear liner for each conveyor shall be fabricated of ultra high molecular weight polyethylene sintered with an anti-wear filler to reduce wear and synthetic lubricant to reduce friction. The wear liner shall be furnished in maximum four foot sections, 3/8" minimum thickness, to provide ease of replacement. The liner shall be held in place with clips; no fasteners will be allowed.
4. Inlet and Discharge Chutes
- a. Inlet and discharge chutes shall be provided by the conveyor supplier as shown on the drawings. All chutes shall be fabricated from the same material as the conveyor trough.
5. Conveyor Supports
- a. Each conveyor shall be furnished complete with supports suitable for mounting as shown on the contract drawings and as required by the supplier's design. The supports shall be shop fabricated from structural steel shapes and plates, and shall be assembled and fitted to the conveyor prior to its delivery to the jobsite. Supports and conveyor segments shall be match marked and shipped to the jobsite for assembly by the contractor. At a minimum, each conveyor shall be provided with supports at the inlet and discharge end, with intermediate supports as required. Supports shall be fabricated of AISI 304 stainless steel or equal.
 - b. All shop welding shall conform to the latest standards of the American Welding Society (AWS). The supports shall be designed to avoid interference with other equipment or equipment supports.
6. Structural Design

- a. All structural supporting members shall be designed such that the ratio of the unbraced length to least radius of gyration (slenderness ratio) shall not exceed 120 for any compression member and shall not exceed 240 for any tension member (of angles about Z-Z axis). In addition, all structural members and connections shall be designed so that the unit stresses will not exceed the American Institute of Steel Construction allowable stresses by more than 1/3 when subject to loading of twice the maximum design operating torque of the spiral conveyor drive motors.

7. Drive Units

- a. Each spiral conveyor shall be driven by a constant-speed integral gear reducer/motor drive unit mounted to an adapter flange mounted to the end plate of the conveyor. The adapter flange shall allow the leakage of any material from the conveyor trough to atmosphere rather than into the gear reducer/ motor drive unit. Direct coupling of the gear reducer/motor drive unit to the end flange of the conveyor will not be acceptable.
- b. The drive unit shall be rigidly supported so there is no visible "wobble" movement under any operating condition. In the event of a prolonged power failure or emergency system shutdown the drive system shall be designed, at a minimum, to start the conveyor from a dead stop with the trough filled throughout its entire cross sectional area and length with partially dried and hardened dewatered material.
- c. Each motor shall be 460 volt, 60 Hz, 3 phase conforming to the General Equipment specifications, except as modified herein. Each motor shall be high efficiency, 40C ambient rated, 1.15 service factor and shall have Class F insulation. Motor shall have a TEFC enclosure with Design B speed/torque characteristics.

8. Gear Reducers

- a. All gears shall be AGMA Class II, single or double reduction, helical gear units with high capacity roller bearings. Bearings shall be designed for the thrust loads from the fully loaded startup condition and shall have a AFBMA B10 life of 30,000 hours. The reducer will be the standard air cooled unit with no auxiliary cooling. The gear reducer shall be sized with a torque service factor of 1.5 times the absorbed power or 1.1 times the motor nameplate, at the driven shaft speed, whichever is greater.
- b. An adjustable greased gland packing ring consisting of two Teflon coated packing rings shall seal the drive shaft at its penetration through the end plate.

9. Zero Speed Switch

- a. Each conveyor drive unit shall be equipped with a motion failure alarm unit. The location and mounting details shall be as recommended by the conveyor manufacturer. Motion sensors shall be the non contacting type using a probe with a pre-amplifier and main electronic assembly. The main electronic unit shall operate on 120 volt, single phase, 60 Hz power supply, and shall be housed in a NEMA 4X enclosure. A 0 to 60 second time delay shall be provided for startup of the conveyor.

10. Emergency Shutdown

- a. Each conveyor shall be furnished with an emergency trip cord and safety switch. The cord shall run the full length of each conveyor. The trip switch shall immediately stop all conveyors when the switch is actuated.

11. Quality Assurance

- a. Conveyors shall be inspected and operated in the shop with the actual drive unit for this project in its entire length. Conveyor longer than the required shipping lengths will have the screws tack welded together and tested in their entire length. Conveyors should be operated for a minimum of 15 minutes and observed for alignment and abnormal operation. Conveyors shall be corrected as necessary. Prior to shipment the tack welds will be broken apart and conveyors suitably prepared for shipment. A video of the test should be supplied on disk to the contractor to be forwarded on to the engineer for record purposes. Video must be received to get paid.

2.18 POLYMER DOSING SYSTEM FOR LIQUID POLYMER

- A. System shall be designed for the preparation, dosing of up to 3 GPH of polymer solution having an active polymer concentration between 0.05 and 0.25 %. The actual size of the polymer system depends on the specified type of sludge, maximum capacity and polymer consumption. The polymer system shall be a Veloblend VM-P.
- B. The polymer station shall be self-contained with pumps, piping, fittings, and accessories, and shall be factory assembled and tested to eliminate field assembly work and therefore to minimize installation and start up time. The frame shall be 304 stainless steel and the piping SCH.80 PVC.
- C. A polymer mixing chamber shall be provided. A high energy, multi zoned, hydro-mechanical mixing device shall be provided. The mixing chamber shall have a translucent front cover.
- D. The hydro mechanical impeller shall be designed to produce variable intensity, back flow mixing action to optimize polymer performance without damaging polymer molecular structure.
- E. The motors shall be 0.5hp, 1750rpm, 90 V, 60Hz, wash down duty with keyless shaft and left hand impeller mounting screw.
- F. Materials: Impeller - stainless steel; body of mixing device – stainless steel; cover – clear lexan; fastener – 316 SS; seals – viton; pressure rating – maximum 100 PSI.
- G. Contractor shall provide a drinking water connection for the dilution of the polymer in the polymer tank. The water piping to the polymer blend system shall include a minimum 1 in inlet (NPT female), an UL listed solenoid valve (rated IP65), and a flow meter with a rate adjusting valve and low pressure alarm switch. The dilution water flow range is 1 to 10 GPM.
- H. A neat polymer metering pump with hose connector shall be provided and connected through a 1/2 in barbed hose to the polymer mixing device. The neat polymer pump shall be a Seepex progressive cavity type pump.
- I. Control Panel: NEMA 4X FRP enclosure, 120 VAC, 60 Hz, 1 PH service.

1. Operator interface – discrete selector switch (system ON/OFF/REMOTE); mechanical mixer speed adjust potentiometer; ten-turn potentiometer – progressive cavity metering pump control
 2. Status / Alarm indicators: system running indication; LCD display of metering pump rate; low pressure switch alarm; low polymer flow alarm
 3. Inputs: remote start / stop (discrete dry contact); pacing signal from main control panel (4-20mA)
 4. Outputs: system running (discrete dry contact); remote mode (discrete dry contact); low pressure alarm (discrete dry contact)
- J. The pressure side of the polymer system shall be connected through a minimum 1 in diameter PVC pipeline and a magnetic inductive flow meter to the polymer injection ring described above.

2.19 LIME FEED SYSTEM

- A. Refer to Section 463643.

2.20 CONTROL SYSTEM

- A. Each belt filter press shall be provided with a manual control panel that will contain the necessary control devices and equipment for controlling the dewatering process as described herein.
- B. General Considerations
1. The control panel shall accept a 460 VAC, 60 hertz, 3-phase power input. A main disconnect circuit breaker and operator mechanism shall be included. When the disconnect is in the open position, all power shall be removed from the control system. An IEC rated motor starter shall be provided for the hydraulic unit, the sludge pump, the wash water booster pump, two (2) 2 HP sludge conveyor drives, one (1) 1..0 HP sludge conveyor drive and a remotely mounted VFD included for the belt drive. Short circuit protection for the hydraulic pump motor shall be accomplished utilizing thermal magnetic circuit breakers, while the VFD will use an in line fuse to protect the belt drive motor. Individual thermal overload protection shall be provided. A control power transformer shall be included that will provide 120 VAC control power to the system.
 2. Located on the front of the control panel shall be a CONTROL POWER ON/OFF switch. When in the ON position, the CONTROL POWER ON pilot light will be illuminated and control power shall be distributed to the control system. When in the OFF position, the control system shall be held de energized. Also located on the control panel shall be an EMERGENCY STOP pushbutton. It shall be a mushroom head style push/pull operator that when depressed shall immediately de energize all moving equipment in the system.
- C. System Operation
1. As a minimum, the following control pilot devices shall be located on the front of the control panel:

CONTROL POWER on/off
PRESS READY indicator
WASHWATER PUMP START pushbutton
WASHWATER PUMP STOP pushbutton
WASHWATER PUMP RUNNING indicator
HYDRAULIC PUMP START pushbutton
HYDRAULIC PUMP STOP pushbutton
HYDRAULIC PUMP RUNNING indicator
BELT DRIVE REMOTE VFD keypad with controls
SLUDGE PUMP START pushbutton
SLUDGE PUMP STOP pushbutton
SLUDGE PUMP RUNNING indicator
POLYMER SYSTEM START pushbutton
POLYMER SYSTEM STOP pushbutton
POLYMER SYSTEM RUNNING indicator
CONVEYOR START pushbuttons
CONVEYOR STOP pushbuttons
CONVEYOR RUNNING indicators
LIME FEED SYSTEM START pushbutton
LIME FEED SYSTEM STOP pushbutton
LIME FEED SYSTEM RUNNING indicator
EMERGENCY STOP push/pull operator

D. Sequence of Operation (Manual Mode)

1. To operate the press, the operator will start the washwater pump by pressing the WASHWATER PUMP START pushbutton, then start the hydraulic pump by pressing the HYDRAULIC PUMP START pushbutton.
2. The operator must not proceed until the belts are fully tensioned. No interlock is provided to prevent the operator from starting the belt drive before the belts are tight. Pressing the BELT DRIVE START button on the remote keypad will energize the belt drive.
3. The conveyor should be started by pressing the CONVEYOR START pushbutton and then the sludge pump, polymer system and lime feed system started by pushing their respective pushbuttons.
4. Pressing the respective STOP pushbuttons in the reverse order stated above will stop the system.

E. Enclosure

1. Control panel enclosures shall be fabricated of fiberglass, and shall be suitable for NEMA 4X service.

F. Wiring

1. All power and control wiring shall be 600 volt, type THHN/THWN insulation stranded copper and shall be sized for the required load, 12 AWG for power, 14 AWG for control, and 18AWG for instrumentation.

G. Circuit Breakers

1. Circuit breakers for the main disconnect shall be thermal magnetic molded case units. Circuit breakers shall be Square D, Class 650, Type FAL, or equal.

H. Motor Starters

1. Motor starters shall be full voltage, non-reversing, IEC GV2 style across the line units. Coils shall be 120 VAC.

I. Variable Frequency Drives

1. The VFD shall be UL listed and shall be a Yaskawa V1000 wash down duty NEMA 4X.

J. Selector Switches

1. All selector switches shall be heavy duty, oil tight/watertight, and corrosion resistant units rated for NEMA 4X service. Contact blocks shall be rated for 10-ampere continuous service. Selector switches shall be Square D, Type SK or equal.

K. Pushbuttons

1. All pushbuttons shall be heavy duty, oil tight/watertight, corrosion resistant units rated for NEMA 4X service. Contact blocks shall be rated for 10-ampere continuous service. Pushbuttons shall be Square D, Type SK or equal.

L. Pilot Lights

1. Pilot lights shall be heavy duty, oil tight/watertight, corrosion resistant units rated for NEMA 4X service. Units shall be 120 VAC transformer type press to test. Pilot lights shall be Type ZB or equal.

M. Terminal Blocks

1. Terminal blocks shall be high density, solderless box lug style, with 600-volt rating. Terminal blocks shall be Wago spring cage clamp type or equal.

2.21 SPARE PARTS

A. The following spare parts shall be furnished with the Belt Filter Press

1. One (1) set of filter belts.
2. Two (2) sets of doctor blades.
3. One (1) set of rubber seals for the gravity zone, wedge zone and washbox.
4. One (1) set of bearings of each sized used.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Section 017000: "Execution and Closeout Requirements: Requirements for Installation Examination."
- B. Verify that field dimensions are as indicated on Drawings.

3.2 PREPARATION

- A. Section 017000: "Execution and Closeout Requirements: Requirements for Installation Preparation."

3.3 INSTALLATION

- A. The installation of the equipment furnished by the manufacturer shall be installed by certified technicians from the equipment manufacturer with assistance from the Contractor.

3.4 START-UP AND OPERATOR TRAINING

- A. Services of the manufacturer's factory trained representative, who is specifically knowledgeable in the type of equipment specified herein, shall be provided during the equipment installation period. Upon complete installation of equipment by installing contractor, including placement of equipment, setting and leveling the equipment, piping and electrical connections to all the equipment specified herein, the manufacturer's service representative will approve the installation and begin start up and training.
- B. Upon approval of the installation, the services of the manufacturer's factory trained representative shall be provided at the project site for equipment start up and calibration. During the startup and calibration phase the manufacturer's representative shall inspect all system components for proper connection and alignment and assist the installation contractor in placing the equipment in a proper operating condition.
- C. Upon satisfactory completion of the startup and calibration, a representative of the manufacturer shall be provided to instruct Owner's personnel in the proper operation and maintenance of the equipment. The manufacturer's representative who will be providing the instruction shall have prior operation, maintenance and instructing experience acceptable to the Engineer.
- D. The manufacturer's representative shall complete all of the above sessions in one trip to the jobsite. The equipment manufacturer will request in writing that all installation prior to arriving at the jobsite be completed by the contractor. If the equipment manufacturer arrives at the jobsite and equipment installation is not complete, the equipment manufacturer shall bill the contractor for the installation time, which is not covered under this contract.

Period

Number of 8-hour days

· Inspection / Start Up and Calibration	2
Operator Training	1

3.5 FIELD QUALITY CONTROL

A. Section 014000: "Quality Requirements: Requirements for Inspecting and Testing."

B. Inspection:

1. Inspect for equipment for damage and for other defects that may be detrimental as determined by Engineer.
2. Repair or replace damaged equipment.
3. After installation, inspect for proper installation.

END OF SECTION 461802

SECTION 463643 – LIME FEED EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide one (1) lime storage, metering & control system designed to store up to four (4) cubic feet of dry chemical and meter the dry pebble quick lime at a rate of .2 to 0.83 cubic feet per hour to the sludge conveyor.
- B. Equipment includes:
 - 1. Bag Unloading Dust Collector
 - 2. Storage Hopper
 - 3. Volumetric Feeder
 - 4. Discharge Chute Adapter
 - 5. NEMA 4X Control Panel
 - 6. Operator Platform
- C. Related Requirements:
 - 1. The lime feed system control panel will be controlled by the Main Belt Press Control Panel.

1.2 REFERENCES

- A. Design, manufacturing and assembly of elements of the equipment herein specified shall be accordance with the standards of the below listed organizations. Where reference is made to a standard of one of the following or other organizations, the version of the standard in effect at the time of the bid opening shall apply.
 - 1. American Gear Manufacturing Association (AGMA)
 - 2. American Institute of Steel Construction (AISC)
 - 3. American Iron and Steel Institute (AISI)
 - 4. American Society of Mechanical Engineers (ASME)
 - 5. American National Standards Institute (ANSI)
 - 6. American Society for Testing Materials (ASTM)
 - 7. American Water Works Association (AWWA)
 - 8. American Welding Society (AWS)
 - 9. Anti-Friction Bearing Manufacturers Association (AFBMA)
 - 10. Institute of Electrical and Electronics Engineers (IEEE)
 - 11. National Electrical Code (NEC)
 - 12. National Electrical Manufacturers Association (NEMA)
 - 13. Occupational Safety and Health Administration (OSHA)
 - 14. Steel Structures Painting Council (SSPC)
 - 15. Underwriters Laboratories, Inc. (UL)

1.3 SUBMITTALS

- A. The following information shall be submitted to the engineer. In accordance with Section 013300, copies of all materials required to establish compliance with this Section.
- B. A copy of this specification section and all referenced and applicable sections, with addendum updates included and with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements is required under this section. Check marks (✓) shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated, and therefore requested by the Contractor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph, referenced to a detailed written explanation of the reasons for requesting the deviation. The Engineer shall be the final authority for determining acceptability of requested deviations. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specifications. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.
- C. Product Data: Include the following:
 - 1. Descriptive literature, brochures, catalogs, cut-sheets and other detailed descriptive material of the equipment.
 - 2. Motor characteristics and performance information.
 - 3. Gear reducer data including service factor, efficiency, torque rating, and materials.
 - 4. Parts list including a list of recommended spare parts.
- D. Shop Drawings: Include the following:
 - 1. Manufacturer's installation drawings.
 - 2. Wiring and schematic diagrams.
- E. Operations and maintenance manual: See Section 017823.
- F. Detailed installation instructions, with clear step-by-step points on the correct mechanical and electrical installation procedures.
- G. Equipment weights and lifting points.
- H. Recommendations for short and long term storage.
- I. A copy of the manufacturer's warranty.

1.4 QUALITY ASSURANCE

- A. **Single Source Responsibility:** To ensure that all equipment required for the installation of the lime feed equipment and controls is properly coordinated and shall function as a unit in accordance with the intent of these specifications, the Contractor shall obtain all the equipment specified under this Section, from a single supplier in whom the responsibility for the proper function of all the equipment, regardless of manufacturer, as an integrated and coordinated system shall be vested. The intent of this paragraph is to establish unit responsibility for all the equipment with the screw press equipment supplier. The use of the work "responsibility" relating to the equipment supplier is in no way intended to relieve the Contractor's ultimate responsibility for equipment coordination, installation, operation, and guarantee.
- B. **Basis of Design:** The drawings and specifications have been developed based on lime feed equipment manufactured by Velocity Dynamics of Louisville, CO. Any costs resulting from changes made necessary by the approval of other lime feed equipment shall be borne by the Contractor. This shall include all design work and drawing and specification revisions by the Engineer. Also, the Contractor shall submit drawings to the Engineer for approval showing all changes made necessary by the other equipment two (2) weeks prior to bid opening.
- C. Equipment provided, whether specified or not, shall be modified as required to meet these specifications in full. Manufacturer shall have established an ISO 9001 certified quality management system.

1.5 MANUFACTURER'S WARRANTY

- A. The lime feed equipment manufacturer shall warrant the following components:
 - 1. The manufacturer shall warrant against any defects in material or workmanship to the equipment specified herein for a period of 12 months from date of Substantial Completion.
 - 2. The manufacturer shall repair or replace any parts of the equipment that are found to be defective in workmanship or materials during the warranty period, provide said equipment is operated in accordance with the manufacturer's written operating instructions, and provided that the Owner notifies the manufacturer in writing within 10 days after such defect becomes apparent.

1.6 DELIVERY, HANDLING, AND STORAGE

- A. Equipment shall be shipped and delivered fully assembled, except where partial disassembly is required in order to conform to transportation regulations or for the protection of components.
- B. Contractor shall be responsible for unloading and shall have equipment on-site at the time of delivery permitting proper hoisting and storage of the equipment.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURER

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include but are not limited to the following:
1. Velocity Dynamics
 2. Keystone Conveyor, Inc.

2.2 LIME FEED SYSTEM

A. Lime Storage & Metering Skid:

1. Provide a stainless steel skid incorporating the lime storage bag unloader hopper system & volumetric flexible conveyor system. The system shall be the Velocity Dynamics model Barracuda 3000A or equal.
2. Dry Material Storage:
 - a. A storage hopper shall be provided having a minimum capacity of 4 cu. ft.
 - b. The storage hopper shall be 50# bag unloading type with dust collector and shall have an internal bag shelf positioned at roughly 40" above the platform.
 - c. The hopper shall be fabricated of not less than 10- gauge 304 stainless steel with the lower portion of the hopper tapering to facilitate flow of the dry product to the ensuing screw feeder / conveyor.
 - d. The storage hopper shall include a rotary bin indicator type low level sensor positioned at roughly 2 cubic feet of remaining storage.
3. Volumetric Screw Feeder:
 - a. Provide a volumetric screw feeder to accurately and reliably meter pebble quicklime from the feed hopper to the process.
 - b. The volumetric feeder body shall be fabricated of not less than 10 gauge 304 stainless steel. The lower portion of the hopper shall be not less than 70 degrees to facilitate flow of the dry product with varying degrees of angle of repose to the ensuing screw feeder.
 - c. The drive shall be mounted to the feeder body with a stainless steel adapter having a double lip seal to seal the feed section of the hopper from the feeder drive.
 - d. The screw auger shall be direct driven by a minimum 1 ½ HP, 56C frame motor and a heavy duty right angle gear reducer. Maximum auger speed shall not exceed 90 RPM. Light-weight gear motors and or chain drives shall not be used.
 - e. The screw auger shaft shall be supported by dual, heavy duty bearings.
 - f. The auger shall be 304 stainless steel and of the solid shaft design or

- Open helix screw.
- g. Auger shall be connected to the hollow drive shaft via reverse threading the auger directly to the drive shaft.
- h. The auger and spout shall be easy to remove from the face of the feeder without any tools.
- i. In order to optimize accuracy and repeatability of polymer feed, the auger shall maintain even flow of pebble quicklime to the metering screw by a concentric conditioning helix.
- j. The volumetric feeder design shall allow the motor, gear reducer and auger to be removed as a single unit. Accessing the hopper from the storage section shall not be required.
- k. The screw feeder shall be sized to supply pebble quicklime at a feed rate of 0.2 ft³ to 0.8 ft³ per hour based on 60 #/CF.
- l. All welds shall be ground & polished smooth and passivated.
- m. The volumetric feeder shall be the Barracuda series by VeloDyne or equal.

B. Lime Storage & Metering System Control Panel:

1. One control panel shall be supplied to monitor and control the entire lime storage and metering system.
2. Major components of the lime storage & conveyor system control panel shall include, but not be limited to, the following items:
 - a. NEMA 4X enclosure (304 stainless steel)
 - b. Rotary breaker disconnect
 - c. Emergency stop button
 - d. Selector switches
 - e. Potentiometers
 - f. Indicator lights
 - g. Digital displays
 - h. Control relays
 - i. Control power transformer
 - j. VFD Motor Controllers
 - k. VFD Line Reactors
 - l. Motor starters
 - m. Control circuit breaker (fuses shall not be used)
 - n. Circuit breakers for each motor (fuses shall not be used)
 - o. Terminal blocks
3. The control panel shall be mounted on the operator platform assembly and pre-wired to the operator platform mounted components.
4. A main power, door mounted, rotary disconnect switch shall be provided.
5. Main power supply shall be terminated directly to the disconnect switch. The disconnect switch shall allow for connection of at least 10 AWG wires.

6. An emergency stop push button with red knob shall be provided labeled "EMERGENCY STOP".
7. All relays, motor starters, breakers, timers, transformers, motor controllers and appurtenances required for manual and fully automatic operation shall be provided.
8. Terminal blocks with number tabs and legend shall be provided for connection of all external wiring to the panels, excluding the main power supply connection. Control wiring terminal blocks shall be sized for 14 AWG copper wires and shall be as manufactured by Allen Bradley, or equal.
9. All interior connecting wiring and wiring to terminals for external connection shall be in accordance with NFPA 79. Whereby, circuits rated to 10 Amps circuits are of 16 AWG, circuits rated to 15 Amps circuits are of 14 AWG, and circuits rated to 20 Amps circuits are of 12 AWG. All wiring shall be insulated for not less than 600 volts with a moisture and heat-resistant material and flame retardant nonmetallic covering. All wiring shall be grouped or cabled and firmly attached to the panel through wire raceways.
10. All instruments and devices shall be separately fused to protect the equipment.
11. Auxiliary relays and timers shall have 120 VAC, 60 Hz continuous duty coils and 10 ampere, 120 VAC contacts.
12. Provide a LOCAL / REMOTE selector switch:
 - a. In LOCAL mode, start / stop push buttons shall be provided for local start / stop control.
 - b. In REMOTE mode the system shall start and stop based on a remote dry contact closure from the screw press main control panel. Provide a warning label indicating "CAUTION – EQUIPMENT STARTS AUTOMATICALLY".
13. Provide a MANUAL / AUTO rate control selector switch:
 - a. In MANUAL mode the rate of the volumetric screw feeder shall be manual via a NEMA 4X ten-turn potentiometer.
 - b. In AUTO mode the rate of the volumetric screw feeder shall be automatically controlled via a 4-20mA signal from the screw press main control panel.
14. Dust Collector ON/AUTO:
 - a. In ON mode, the dust collector shall start.
 - b. In AUTO mode a heavy duty limit switch mounted on the hopper door shall start the dust collector when hopper door is opened, and stop the dust collector when the door is closed.

15. The following indicators shall be provided:
 - a. Main power ON
 - b. Screw Feeder Running
 - c. Screw Feeder Stopped
 - d. LED Speed Indicator (0-100%)
 - e. Screw Feeder VFD Fault
 - f. Hopper Dust Collector Motor Overload
 - g. Hopper Low Level
16. Additionally the panel shall provide a normally open contact only for remote indication of the following:
 - a. Common Alarm.
17. Additionally the panel shall provide a 4-20mA output proportional to screw feeder auger speed for remote indication.
18. Selector switches and lights shall be Allen Bradley 800H series, when supplied.
19. Control panel shall be fabricated using UL listed components and have a UL approval label.

C. Operator Platform:

1. The entire lime feed system and control panel will be located on an elevated operator platform with stairs for operator access. The platform will situate the volumetric feeder such that the horizontal discharge shall empty into the cake conveyor.
2. The platform will have a dedicated space for 50# bags to be raised via forklift or scissor lift and accessed by the operator without having to carry the bags up the stairs.

PART 3 - EXECUTION

3.1 INSTALLATION, START-UP AND OPERATOR TRAINING

- A. Provide the services of a factory-direct start-up and training technician for three (3) days. Generally, the first day shall be for system inspection and calibration. The second day shall be for system start-up and operator training, the third day shall be for system monitoring and additional training as necessary.

3.2 PERFORMANCE GUARANTEE

- A. The lime feed equipment shall be tested at the normal plant operating conditions and shall provide results equal to or greater than specified herein.

END OF SECTION 463643

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"General Decision Number: WV20220012 03/18/2022

Superseded General Decision Number: WV20210012

State: West Virginia

Construction Type: Building

County: Jackson County in West Virginia.

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	. Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least \$15.00 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2022.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	. Executive Order 13658 generally applies to the contract. . The contractor must pay all covered workers at least \$11.25 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2022.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Modification Number	Publication Date
0	01/07/2022
1	02/18/2022
2	02/25/2022
3	03/18/2022

	Rates	Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR.....	\$ 34.00	27.92

BOIL0667-005 01/01/2021		
	Rates	Fringes
BOILERMAKER.....	\$ 41.63	26.38

BRWV0001-004 08/01/2021		
	Rates	Fringes
BRICKLAYER.....	\$ 28.00	25.28

BRWV0009-001 12/01/2021		
	Rates	Fringes
BRICK POINTER/CAULKER/CLEANER....	\$ 30.15	25.24

BRWV0015-010 06/01/2021		
	Rates	Fringes
MASON - STONE.....	\$ 30.25	24.58

CARP0443-009 05/01/2021		
	Rates	Fringes
MILLWRIGHT.....	\$ 35.50	26.75

CARP1024-001 06/01/2021		
	Rates	Fringes
CARPENTER (Scaffold Builder Only).....	\$ 29.40	24.57

CARP1159-003 12/01/2020		
	Rates	Fringes
CARPENTER (Including Drywall Hanging).....	\$ 30.03	23.65

CARP1911-004 12/01/2020		
	Rates	Fringes
CARPENTER (Floor Laying - Carpet, Hardwood, Resilient and Vinyl Only).....	\$ 30.03	23.65

ENGI0132-007 12/01/2018		
	Rates	Fringes
POWER EQUIPMENT OPERATOR: GROUP 1.....	\$ 39.56	19.95

GROUP 2.....	\$ 39.21	19.95
GROUP 3.....	\$ 38.21	19.95
GROUP 4.....	\$ 27.71	19.95

GROUP 1: All Friction Cranes, Tower Cranes and all Cranes with 180 ft. or more of boom including mast and jibs or lifting capacity of 100 tons or more and hoists with 30,000 pound line pull or more

GROUP 2: Operating Cranes and Tower Cranes with a lifting capacity of 15 tons and over

GROUP 3: Backhoe, all other Cranes

GROUP 4: Bobcat/Skid Steer/Skid Loader, Roller, Oiler

 IRON0549-006 12/01/2021

	Rates	Fringes
IRONWORKER (Ornamental).....	\$ 34.44	24.61

 IRON0787-006 06/01/2021

	Rates	Fringes
IRONWORKER (Reinforcing).....	\$ 30.68	23.05

 LABO0379-019 12/01/2020

	Rates	Fringes
LABORER Wacker Roller Operator.....	\$ 26.32	16.50

 LABO0453-003 12/01/2017

	Rates	Fringes
LABORER Concrete Saw (Hand Held/Walk Behind).....	\$ 22.76	16.75
Grouting.....	\$ 22.11	17.25

 LABO0543-003 06/01/2020

	Rates	Fringes
LABORER.....	\$ 25.41	16.75

LABORER CLASSIFICATIONS

Asphalt Raker, Jack Hammer, Motorized Buggy Operator, Water Boy

 LABO0984-005 12/01/2020

	Rates	Fringes
LABORER Group 2.....	\$ 21.94	15.75

LABORER CLASSIFICATIONS

GROUP 2: Airtool Operator, Asbestos Abatement (Removal from Floors, Walls, and Ceiling), Bobcat Operator (Clean up/Demolition), Dewatering, Rodman, Skytrak Forklift Operator

LAB01085-003 06/01/2020

	Rates	Fringes
LABORER		
Common or General.....	\$ 22.76	16.85
Mortar Mixer.....	\$ 22.76	16.85
Scaffold Builder (Brick and Masonry).....	\$ 22.76	16.85

PAIN0970-007 12/01/2021

	Rates	Fringes
PAINTER (Drywall Finishing/Taping).....	\$ 29.85	17.70

PAIN1195-002 12/01/2021

	Rates	Fringes
GLAZIER.....	\$ 31.50	11.38

PLAS0926-007 06/01/2018

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER....	\$ 31.63	21.26

PLAS0926-008 06/01/2018

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER....	\$ 31.63	21.26
PLASTERER.....	\$ 30.06	20.36

* UAVG-WV-0001 01/01/2021

	Rates	Fringes
CARPENTER (Form Work Only).....	\$ 29.81	23.45

* UAVG-WV-0005 01/01/2019

	Rates	Fringes
LABORER (Carpenter Tender).....	\$ 23.69	16.32
LABORER (Chipping Guns).....	\$ 24.78	16.25
LABORER (Concrete Worker).....	\$ 23.57	16.17
LABORER (Grade Checker).....	\$ 23.45	16.16
LABORER (Landscape).....	\$ 23.08	16.35
LABORER (Pipelayer).....	\$ 24.06	16.34
LABORER (Tamper - Hand Held).....	\$ 23.33	16.04

* UAVG-WV-0028 01/01/2019

	Rates	Fringes
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PLUMBER.....	\$ 32.54	24.58

SUNV2012-010 08/13/2012		
	Rates	Fringes
ELECTRICIAN.....	\$ 28.16	15.11
IRONWORKER, STRUCTURAL.....	\$ 26.01	12.18
LABORER: Demolition.....	\$ 20.58	9.47
LABORER: Mason Tender - Brick...	\$ 21.47	8.29
LABORER: Mason Tender - Cement/Concrete.....	\$ 22.05	8.54
OPERATOR: Bulldozer.....	\$ 30.24	10.26
OPERATOR: Excavator.....	\$ 30.31	10.81
OPERATOR: Forklift.....	\$ 33.09	3.00
PAINTER: Brush, Roller and Spray.....	\$ 22.03	9.95
PIPEFITTER, Includes HVAC Pipe Installation.....	\$ 27.64	18.09
ROOFER.....	\$ 24.28	9.32
SHEET METAL WORKER, Includes HVAC Duct Installation.....	\$ 25.61	15.68
Truck Driver: Single and Double Axle Dump Trucks.....	\$ 28.52	3.00

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date

for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISIO"

"General Decision Number: WV20220061 02/25/2022

Superseded General Decision Number: WV20210061

State: West Virginia

Construction Type: Heavy

Counties: Barbour, Braxton, Calhoun, Fayette, Gilmer, Greenbrier, Jackson, Lewis, Mason, McDowell, Mingo, Monroe, Nicholas, Pendleton, Pocahontas, Randolph, Ritchie, Roane, Summers, Tucker, Upshur, Webster and Wyoming Counties in West Virginia.

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	<ul style="list-style-type: none">. Executive Order 14026 generally applies to the contract.. The contractor must pay all covered workers at least \$15.00 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2022.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	<ul style="list-style-type: none">. Executive Order 13658 generally applies to the contract.. The contractor must pay all covered workers at least \$11.25 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2022.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Modification Number Publication Date

0 01/07/2022
 1 02/18/2022
 2 02/25/2022

CARP0443-008 05/01/2021

	Rates	Fringes
MILLWRIGHT.....	\$ 35.50	26.75

ELEC0307-008 11/28/2021

	Rates	Fringes
ELECTRICIAN.....	\$ 35.72	18.44

ENGI0132-014 12/01/2021

	Rates	Fringes
POWER EQUIPMENT OPERATOR:		
GROUP 1.....	\$ 38.95	19.55
GROUP 2.....	\$ 36.19	19.55
GROUP 3.....	\$ 35.08	19.55
GROUP 4.....	\$ 31.62	19.55

POWER EQUIPMENT OPERATOR CLASSIFICATIONS

GROUP 1: Cranes (All types), Boom trucks, Loaders of six (6) cubic yard capacity and over, Excavators and shovels with an operating weight of one hundred ten thousand (110,000) pounds and over.

GROUP 2: Loaders up to six (6) cubic yard capacity, Backhoe, Bulldozers, Bobcat/Skid Steer/Skid Loader, Forklift, Drill, Excavators and shovels with an operating weight of up to one hundred ten thousand (110,000) pounds

GROUP 3: Roller.

GROUP 4: Oiler

 ENGI0132-027 12/01/2021

	Rates	Fringes
POWER EQUIPMENT OPERATOR:		
(PIPELINE)		
GROUP 1.....	\$ 38.95	19.55
GROUP 2.....	\$ 36.19	19.55

POWER EQUIPMENT OPERATOR PIPELINE CLASSIFICATIONS

GROUP 1: Boom, Bulldozer, Excavator, Mechanic, Pipe Bending Machine

GROUP 2: Oiler.

 ENGI0132-029 12/01/2021

	Rates	Fringes
POWER EQUIPMENT OPERATOR:		

Single and Double Axle
 Dump Trucks.....\$ 36.19 19.55

IRON0549-011 12/01/2021

	Rates	Fringes
IRONWORKER, ORNAMENTAL.....	\$ 34.44	24.61

IRON0568-020 12/01/2020

	Rates	Fringes
IRONWORKER, REINFORCING AND STRUCTURAL.....	\$ 33.70	22.04

LABO0379-040 12/01/2020

	Rates	Fringes
LABORER: (PIPELINE).....	\$ 25.26	16.50

LABORER CLASSIFICATIONS:

Chain Saw, Common, Flagger, Landscape, Pipelayer, Sandblaster

LABO0379-043 12/01/2021

	Rates	Fringes
LABORER:		
GROUP 1.....	\$ 27.35	16.50
GROUP 2.....	\$ 26.32	16.50
GROUP 3.....	\$ 25.26	16.50

GROUP 1: Tunnel Driller, Tunnel Miner.

GROUP 2: Air Tool Operator, Chain Saw, Compactor (Dirt) Hand
 Held, Concrete Worker, Hand Held Drill, Form Work Only,
 Grade Checker, Grouting, Pipelayer, Skytrak Forklift
 Operator, Tamper (Hand Held), Wacker Roller Operator.

GROUP 3: Carpenter Tender, Common or General, Flagger,
 Landscape

PLAS0926-001 06/01/2018

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER...	\$ 31.63	21.26

* UAVG-WV-0010 01/01/2019

	Rates	Fringes
LABORER (Mason Tender - Cement/Concrete).....	\$ 26.17	16.50

* UAVG-WV-0012 01/01/2019

	Rates	Fringes
POWER EQUIPMENT OPERATOR		

(Mechanic).....\$ 35.45 18.30

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division

U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISIO"

"General Decision Number: WV20220080 02/25/2022

Superseded General Decision Number: WV20210080

State: West Virginia

Construction Type: Highway

Counties: West Virginia Statewide.

HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects & railroad construction; bascule, suspension & spandrel arch bridges designed for commercial navigation, bridges involving marine construction; and other major bridges).HIGHWAY CONSTRUCTION PROJECTS

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	. Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least \$15.00 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2022.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	. Executive Order 13658 generally applies to the contract. . The contractor must pay all covered workers at least \$11.25 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2022.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

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Modification Number	Publication Date
0	01/07/2022
1	02/25/2022

* SUWV2015-001 01/01/2014

	Rates	Fringes
BRICKLAYER		
Barbour, Berkeley, Doddridge, Gilmer, Grant, Hampshire, Hardy, Harrison, Jefferson, Lewis, Marion, Mineral, Monongalia, Morgan, Pendleton, Pocahontas, Preston, Randolph, Taylor, Tucker, Upshur, Webster.....	\$ 30.74	18.21
Boone, Braxton, Clay, Fayette, Greenbrier, Kanawha, Logan, McDowell, Mercer, Monroe, Nicholas, Putnam, Raleigh, Summers, Wyoming.....	\$ 29.66	20.20
Brooke, Hancock.....	\$ 29.94	16.22
Cabell, Lincoln, Mason, Mingo, Wayne.....	\$ 30.61	20.88
Calhoun, Jackson, Pleasants, Ritchie, Roane, Wirt, Wood.....	\$ 30.33	15.27
Marshall, Ohio, Tyler, Wetzel.....	\$ 30.01	16.26
CARPENTER		
Berkeley, Grant, Hampshire, Hardy, Jefferson, Mineral, Morgan, Pendleton.....	\$ 31.26	15.90
Brooke, Hancock, Marshall, Ohio.....	\$ 27.86	19.30
Remaining Counties.....	\$ 27.72	19.44
CEMENT MASON/CONCRETE FINISHER		
All Counties.....	\$ 28.67	18.85
DIVER		
Berkeley, Grant, Hampshire, Hardy, Jefferson, Mineral, Morgan, Pendleton Diver Tender.....	\$ 31.26	15.90
Diver.....	\$ 32.25	15.90
Brooke, Hancock, Marshall, Monongalia, Ohio, Wetzel Diver Tender.....	\$ 32.01	16.76
Diver.....	\$ 48.02	16.76
Remaining Counties Diver Tender.....	\$ 27.72	19.44
Diver.....	\$ 28.27	19.44
ELECTRICIAN (SIGNAL & LIGHTING)		
Equipment Operator.....	\$ 23.30	17.99
Flagger.....	\$ 17.00	7.39
Groundman/Truck Driver.....	\$ 20.79	17.89

Installer.....	\$ 26.21	18.11
Technician.....	\$ 29.12	18.22

ELECTRICIAN

Barbour, Doddridge, Harrison, Lewis, Marion, Monongalia, Pendleton, Pocahontas, Preston, Randolph, Taylor, Tucker, Upshur.....	\$ 30.14	21.14
Berkeley, Grant, Hampshire, Hardy, Jefferson, Mineral, Morgan..	\$ 30.50	15.78
Boone, Braxton, Calhoun, Clay, Fayette, Gilmer, Kanawha, Nicholas, Putnam, Raleigh, Roane, Summers, Webster, Wyoming.....	\$ 35.34	16.62
Brooke, Marshall, Ohio, Wetzel.....	\$ 28.35	22.74
Cabell, Lincoln, Logan, Mason, Mingo, Wayne.....	\$ 32.62	21.70
Greenbrier, McDowell, Mercer, Monroe.....	\$ 25.05	16.32
Hancock.....	\$ 34.00	29.10
Jackson, Pleasants, Ritchie, Tyler, Wirt, Wood..	\$ 31.56	21.43

IRONWORKER

Barbour, Brooke, Hancock, Harrison, Marion, Marshall, Monongalia, Ohio, Taylor, Tyler, Wetzel..	\$ 35.74	22.84
Berkeley, Grant, Hampshire, Hardy, Jefferson, Mineral, Morgan, Pendleton, Preston, Tucker.....	\$ 33.29	17.39
Boone, Braxton, Clay, Fayette, Kanawha, Lincoln, Logan, McDowell, Mingo, Nicholas, Putnam, Raleigh, Randolph, Webster, Wyoming..	\$ 34.87	19.50
Cabell, Wayne.....	\$ 33.89	21.98
Calhoun, Doddridge, Gilmer, Jackson, Lewis, Mason, Pleasants, Ritchie, Roane, Upshur, Wirt, Wood...\$	33.02	20.10
Greenbrier, Mercer, Monroe, Pocahontas, Summers..\$	35.43	16.13

LABORER

Class 1.....	\$ 26.95	16.30
Class 2.....	\$ 25.92	16.30
Class 3.....	\$ 24.86	16.30

LABORER CLASSIFICATIONS:

GROUP 1: Powderman, Laser Screed Operator, and GPS Operator.
 GROUP 2: Pipelayer (Including Laser Beam Set Up), Form Setter
 (Road), Drill Operator, Air Tool Operator, Grade Checker and
 Asphalt Raker, Vibrator Man, Whacker, Chainsaw Operator,
 Mortarman, Brick Mason Tender, Cement Finisher Tender, Drill
 Tender, Powderman Tender, Water Proofer, Sheeter & Shorer,
 Placement of Lagging, Pipelayer Tender, Bull-Float Man,
 Pavement Reinforcing Placer, Handyman, Signal Man,
 Greencutter, Georgia Power Buggie, Burner, Cement Blower Man,

Bituminous Hand Sprayer, Bork 250 Remote Control Ditch Witch and Walk Behind Concrete Saw, Mulcher and Seeder (hand and machine), Installation of Ground Mounted Beams and Signs including Concrete Footers, Installation of Overhead Sign Supports and Signs including Concrete Footers, Installation of Guardrail and Anchors Assemblies, Tree Trimmer, Caisson Bottom Man, Bush Hammering, Core Drilling, Placement and Mixing of Grout and Bridge Demolition Specialist.**

GROUP 3: Flag Person, Traffic Control Maintenance Person, Carpenter's Tender, and General Laborer.

PAINTER

Barbour, Berkeley,		
Doddridge, Gilmer, Grant,		
Hampshire, Hardy,		
Harrison, Jefferson,		
Lewis, Marion, Mineral,		
Monongalia, Morgan,		
Pendleton, Preston,		
Randolph, Taylor, Tucker,		
Upshur, Webster.....	\$ 31.87	14.20
Boone, Braxton, Cabell,		
Calhoun, Clay, Fayette,		
Greenbrier, Kanawha,		
Lincoln, Logan, Mason,		
McDowell, Mercer, Mingo,		
Monroe, Nicholas,		
Pocahontas, Putnam,		
Raleigh, Summers, Wayne,		
Wyoming.....	\$ 32.05	14.30
Brooke, Hancock, Marshall,		
Ohio, Wetzel.....	\$ 30.95	14.36
Jackson, Pleasants,		
Ritchie, Roane, Tyler,		
Wirt, Wood.....	\$ 30.84	14.30

PILEDRIVERMAN

Berkeley, Grant,		
Hampshire, Hardy,		
Jefferson, Mineral,		
Morgan, Pendleton.....	\$ 32.25	15.90
Brooke, Hancock, Marshall,		
Monongalia, Ohio, Wetzel....	\$ 32.01	16.76
Remaining Counties.....	\$ 28.27	19.44

POWER EQUIPMENT OPERATOR:

Class 1.....	\$ 33.25	18.60
Class 2.....	\$ 30.49	18.60
Class 3.....	\$ 29.38	18.60
Class 4.....	\$ 25.92	18.60
Class 5A.....	\$ 26.04	18.60
Class 5B.....	\$ 28.64	18.60
Class 5C.....	\$ 26.94	18.60

POWER EQUIPMENT OPERATOR CLASSIFICATIONS:

GROUP 1: Cranes, tower cranes, derricks, derrick boats, draglines, clamshells, cableways, boom truck, loaders of 6 cubic yard capacity and over, excavators and shovels with an operating weight of 110,000 pounds and over.

GROUP 2: Loaders up to 6 cubic yard capacity, gradall, hoist 2 drums or more, mixer plant (2 or more mixers including batch control), pile driver operator, core drill, trencher, backhoe, asphalt paver, cement paver, rotary drill, bulldozers, concrete pump, controlled fine grade machine, slip form paver, log loader, log skidder, motor grader, rubber tired scraper, tractor pan, Roto Miller, tow or work boat, mobile conveyor,

transloader, articulating equipment, material hauler, carry deck, compactor with blade, skidsteer including attachments, fork lift, self-propelled concrete spreader, concrete finishing machine, derrick (single drum), hoist (single drum), single drum paver, air tugger, Ross Carrier, multiple concrete saw, hydraulic post driver, horizontal road-boring machine, tie distributor, track lining machine, ballast tamper, anchor application machine, ribbon rail puller, ballast regulator, auto sled, turn table, pavement breaker, asphalt batch plant, concrete batch plant, crushing plant, compactor with blade, power broom, vac-all truck, self-propelled concrete spreader and concrete finishing machine, mechanics with tools and greasers, excavators, and shovels with an operating weight of up to 110,000 pounds.

GROUP 3: Asphalt roller

GROUP 4: Air compressor, concrete mixer (under 1 cubic yard), light plant, mechanic's tender, assistant engineer, screedman, spreader box man, joint sealer and pump, steam jenny, stationary conveyor (belt or bucket), A-frame, tire man, screening and washing plant, form sub-grader, power form handling equipment, burlap and curing machine, form grader, bull float, bar and joint installing machine, roller and compactor, hydroblaster, concrete mixer (single drum, 1 cu. yd. or over), portable concrete saw and highway striping operator. Utility operators shall be paid Group 2 rate when operating 1 to 5 air compressors, pumps, stationary conveyors (belt or bucket), light plants, and gasoline or diesel powered welders and all farm type tractors.

GROUP 5A: Those operating off-road trucks in the following counties: Barbour, Braxton, Boone, Calhoun, Clay, Doddridge, Fayette, Gilmer, Greenbrier, Harrison, Jackson, Kanawha, Lewis, Marion, Mercer, McDowell, Monongalia, Monroe, Nicholas, Pleasants, Pocohontas, Preston, Putnam, Raleigh, Randolph, Roane, Ritchie, Summers, Taylor, Tucker, Tyler, Upshur, Webster, Wirt, Wood, and Wyoming.

GROUP 5B: Those operating off-road trucks in the following counties: Cabell, Lincoln, Logan, Mason, Mingo, and Wayne.

GROUP 5C: Those operating off-road trucks in the following counties: Berkeley, Grant, Hampshire, Hardy, Jefferson, Mineral, Morgan and Pendleton.

FOOTNOTE: \$2.00 per hour shall be added to the Group 1 rate for individuals operating a lattice boom crane with a fixed boom of 150 feet or more. \$0.25 per hour shall be added to all of the above schedules for underground work.

TRUCK DRIVER

Berkeley, Grant,		
Hampshire, Hardy,		
Jefferson, Mineral,		
Morgan, Pendleton		
Class 1.....	\$ 25.72	18.11
Class 2.....	\$ 26.61	18.11
Class 3.....	\$ 27.38	18.11
Brooke, Hancock		
Class 1.....	\$ 29.17	13.86
Class 2.....	\$ 30.92	13.86
Class 3.....	\$ 31.71	13.86
Cabell, Lincoln, Logan,		
Mason, Mingo, Wayne		
Class 1.....	\$ 29.79	15.60
Class 2.....	\$ 30.76	15.60
Class 3.....	\$ 31.55	15.60
Marshall, Ohio, Wetzel		
Class 1.....	\$ 26.26	16.81
Class 2.....	\$ 27.16	16.81

Class 3.....	\$ 27.76	16.81
Remaining Counties		
Class 1.....	\$ 26.97	16.15
Class 2.....	\$ 27.76	16.15
Class 3.....	\$ 28.44	16.15

TRUCK DRIVER CLASSIFICATIONS:

GROUP 1: Single Axle Trucks used as Dumps, Supply, Fuel, Water, Van, Flatbody, Monorail, Distributor (other than Bituminous Distributors) including Towed Single Units, Material Checkers and Receivers, Greasers, Tireman and Mechanic Tenders (Trucks), Warehouse, Yardmen and Pick-up trucks.

GROUP 2: Tandem and Tri-Axle Trucks used as Dumps, Supply, Fuel, Water, Van, Flatbody, Monorail and including Towed Single Units, Truck Tractors used in combination with Dump, Van, Tank, Flatbed, Low platform or Pole Trailers, Bituminous Distributors, Agitator or Mixer Trucks (up to 20 cubic-yards), Rubber-tired tractors (towing and pushing), Drag and Tag-alongs.

GROUP 3: Mobile Metered Mixer, Agitator or Mixer Trucks (over 20 cubic yards), & Mechanic Truck.

A. Double Hitch equipment operated by 1 driver shall pay 50% more than the wages set out above.

B. \$0.25 per hour shall be added for tunneling and all other underground work.

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular

rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

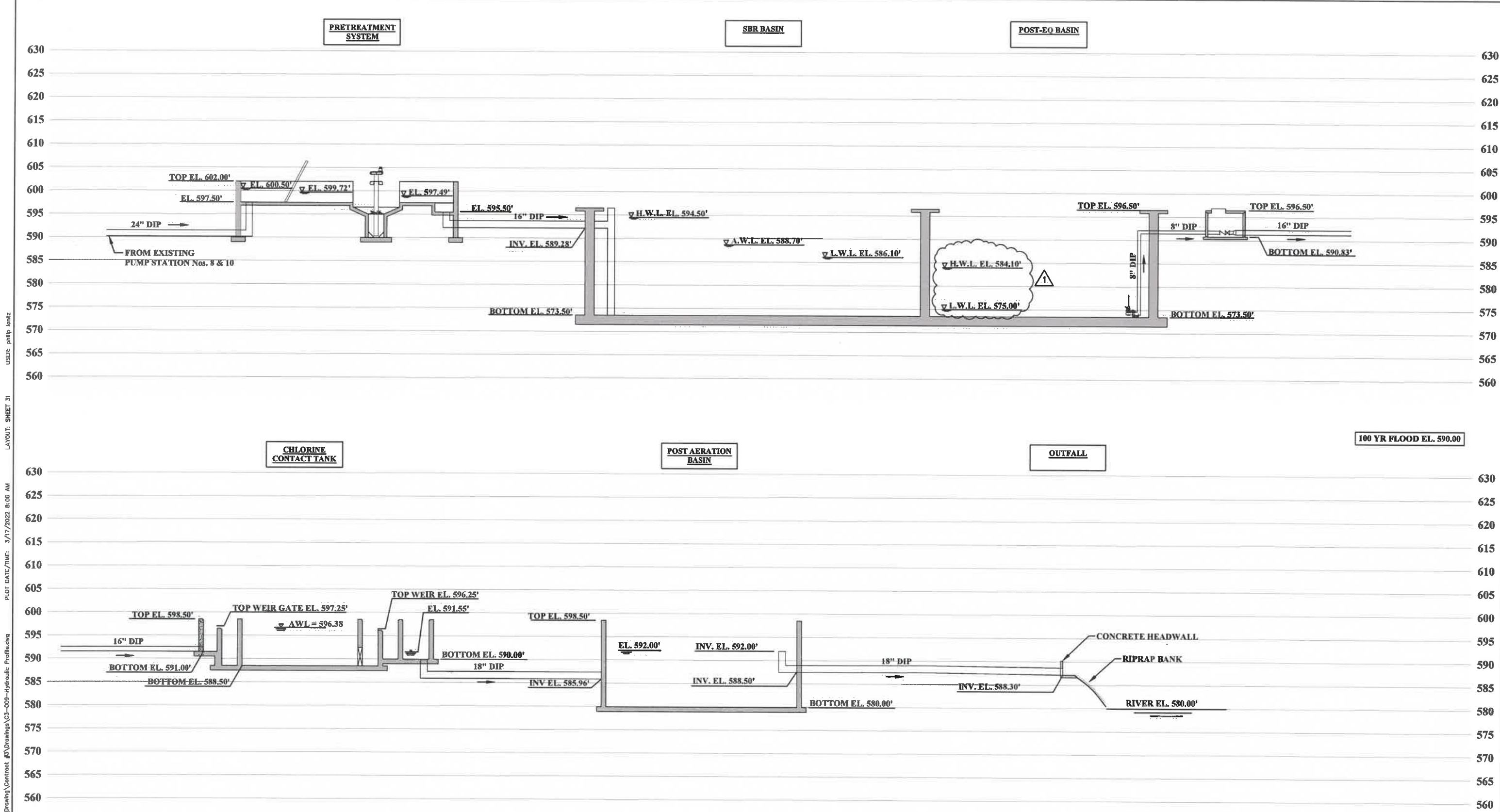
3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

=====

END OF GENERAL DECISIO"



PLANT HYDRAULIC PROFILE

NOTE: PRE-EQ BASIN, FLOW METERS AND VALVE VAULTS ARE NOT SHOWN FOR CLARITY.

USER: philip_lantz
 LAYOUT: SHEET 31
 PLOT DATE/TIME: 3/17/2022 8:06 AM
 C:\Users\p_lantz\OneDrive\Documents\Drawings\Ripley\Drawing\Contract\811\Drawings\C03-006-hydraulic Profile.dwg

1	PL	3/17/22	ADDENDUM No. 2
NO.	BY	DATE	DESCRIPTION

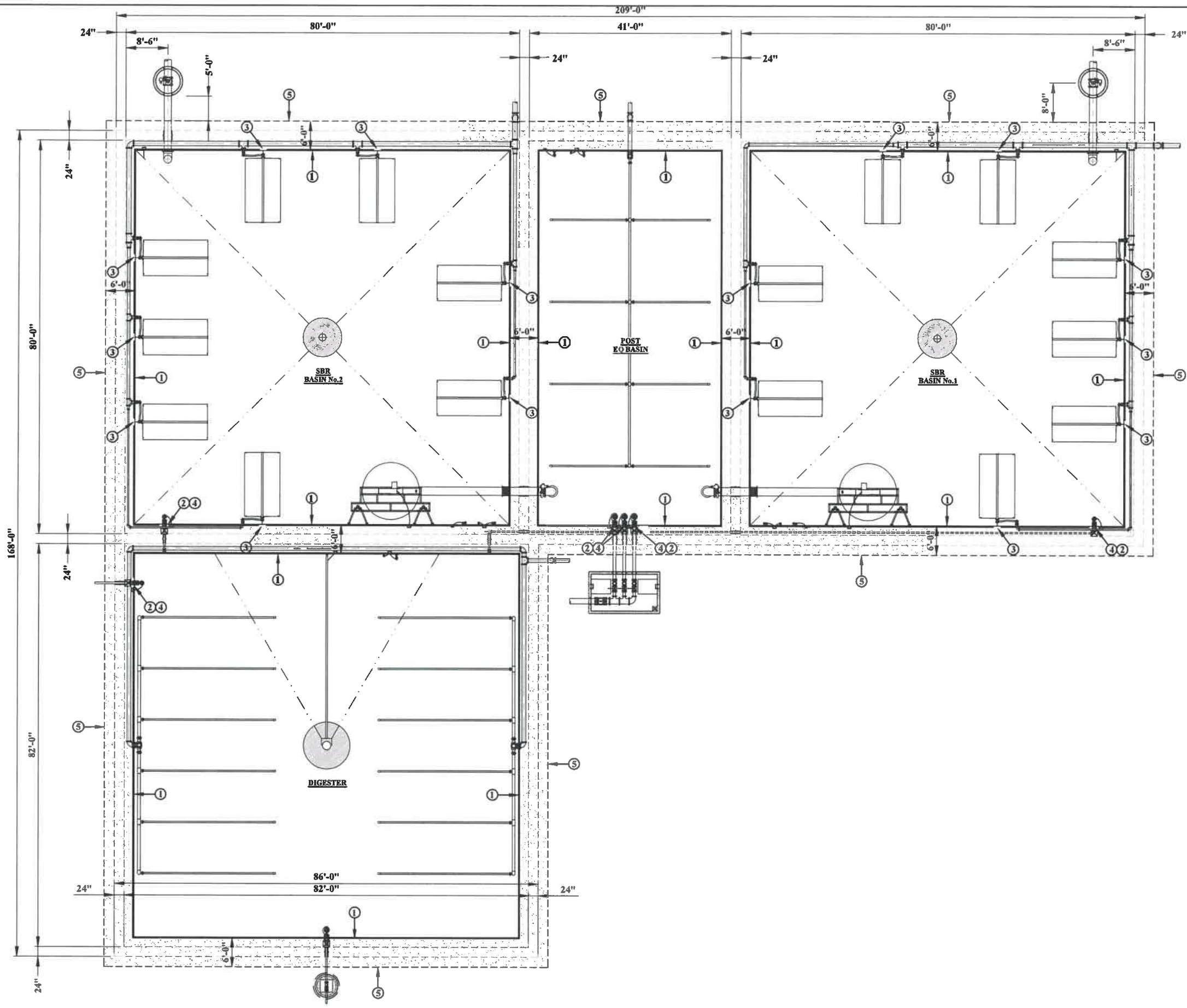


SCALE: NOT TO SCALE	
DRAWN: P.LANTZ	DATE: 9/2021
CHECKED: R. HUDKINS	DATE: 1/2022
APPROVED: D. FERRELL	DATE: 2/2022
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FIELD BOOK No.:	

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PHASE No.
CONTRACT No.
3
PROJECT No.
101-020-1535

CITY OF RIPLEY
 PROPOSED 1.2 MILLION GALLONS PER DAY
 WASTEWATER TREATMENT PLANT
 PROPOSED WASTE WATER TREATMENT PLANT
 PROPOSED HYDRAULIC PROFILE



NOTES

- ① 1-1/2"Ø ALUMINUM HANDRAIL.
- ② 3/16" S.S. SAFETY CHAIN AND SECURE TO POST WITH S.S. EYE BOLTS. PROVIDE CHAINS AT TOP AND INTERMEDIATE RAILS.
- ③ 1'-6" OPENING.
- ④ 2'-0" OPENING.
- ⑤ NO HANDRAIL IN THIS AREA.

GENERAL NOTE: 1. ALL HARDWARE/FASTENERS SHALL BE STAINLESS STEEL.
 2. NO PAINTED STEEL.
 3. SUPERNANT PUMP TO BE SUPPLIED BY THE CONTRACTOR.
 4. SLUDGE FEED PUMP TO BE SUPPLIED BY THE CONTRACTOR.

SBR BASIN	
80.0' x 80.0'	
23.0' BASIN DEPTH	
21.0' MAXIMUM WATER DEPTH	
12.6' MINIMUM WATER DEPTH	
POST-EQUALIZATION BASIN	
80.0' x 41.0'	
23.0' BASIN DEPTH	
10.6' MAXIMUM WATER DEPTH	
1.5' MINIMUM WATER DEPTH	
DIGESTER BASIN	
82.0' x 82.0'	
23.0' BASIN DEPTH	
21.0' MAXIMUM WATER DEPTH	
14.7' MINIMUM WATER DEPTH	

CAD FILE: R:\020\020-1535-WWTP-RIPLEY-Drawing\Contract #3\Drawings\C3-011-SBR.dwg
 PLOT DATE/TIME: 3/17/2022 8:06 AM
 LAYOUT: SHEET 45
 USER: philip lantz

1	PL	3/17/22	ADDENDUM No. 2
NO.	BY	DATE	DESCRIPTION



SCALE: 3/32"=1'-0"	
DRAWN: P.LANTZ	DATE: 9/2021
CHECKED: R. HUDKINS	DATE: 1/2022
APPROVED: D. FERRELL	DATE: 2/2022
SURVEY DATE:	
SURVEY BY:	
FIELD BOOK No.:	

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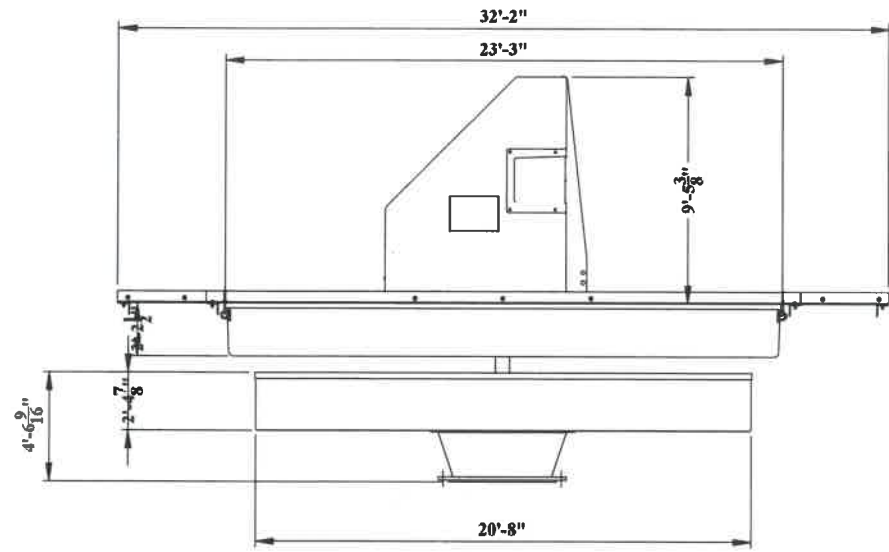
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PHASE No.	
CONTRACT No.	
	3
PROJECT No.	
	101-020-1535

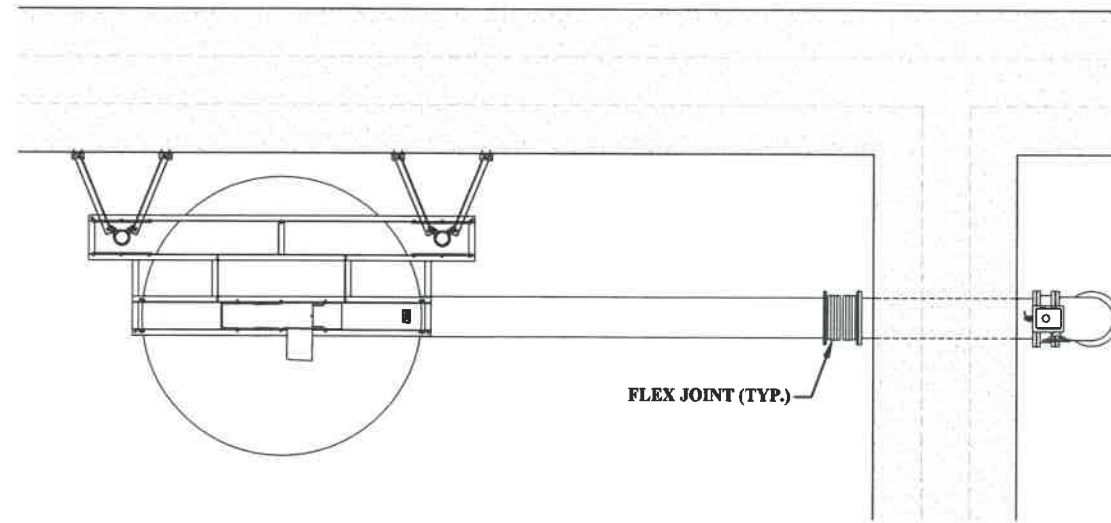
CITY OF RIPLEY
PROPOSED 1.2 MILLION GALLONS PER DAY
WASTEWATER TREATMENT PLANT
SBR TREATMENT SYSTEM
SBR LAYOUT & HANDRAIL PLAN

SHEET No.	
	45

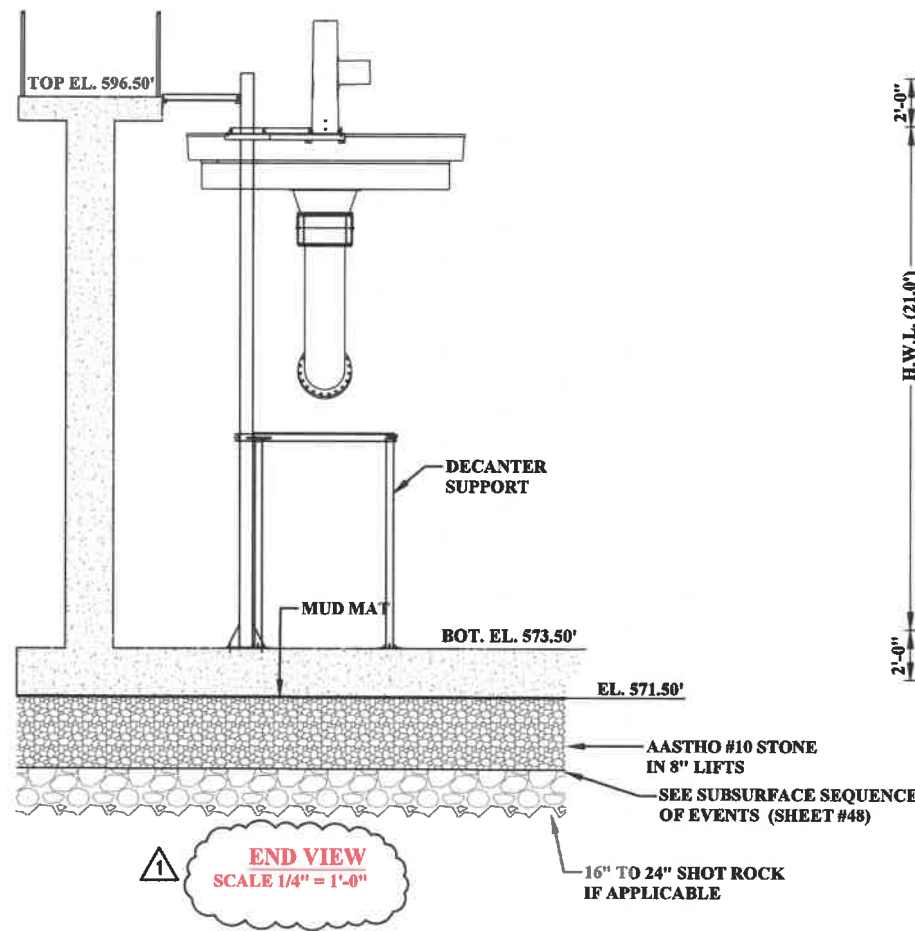
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 LAYOUT: SHEET 49
 USER: philip lantz



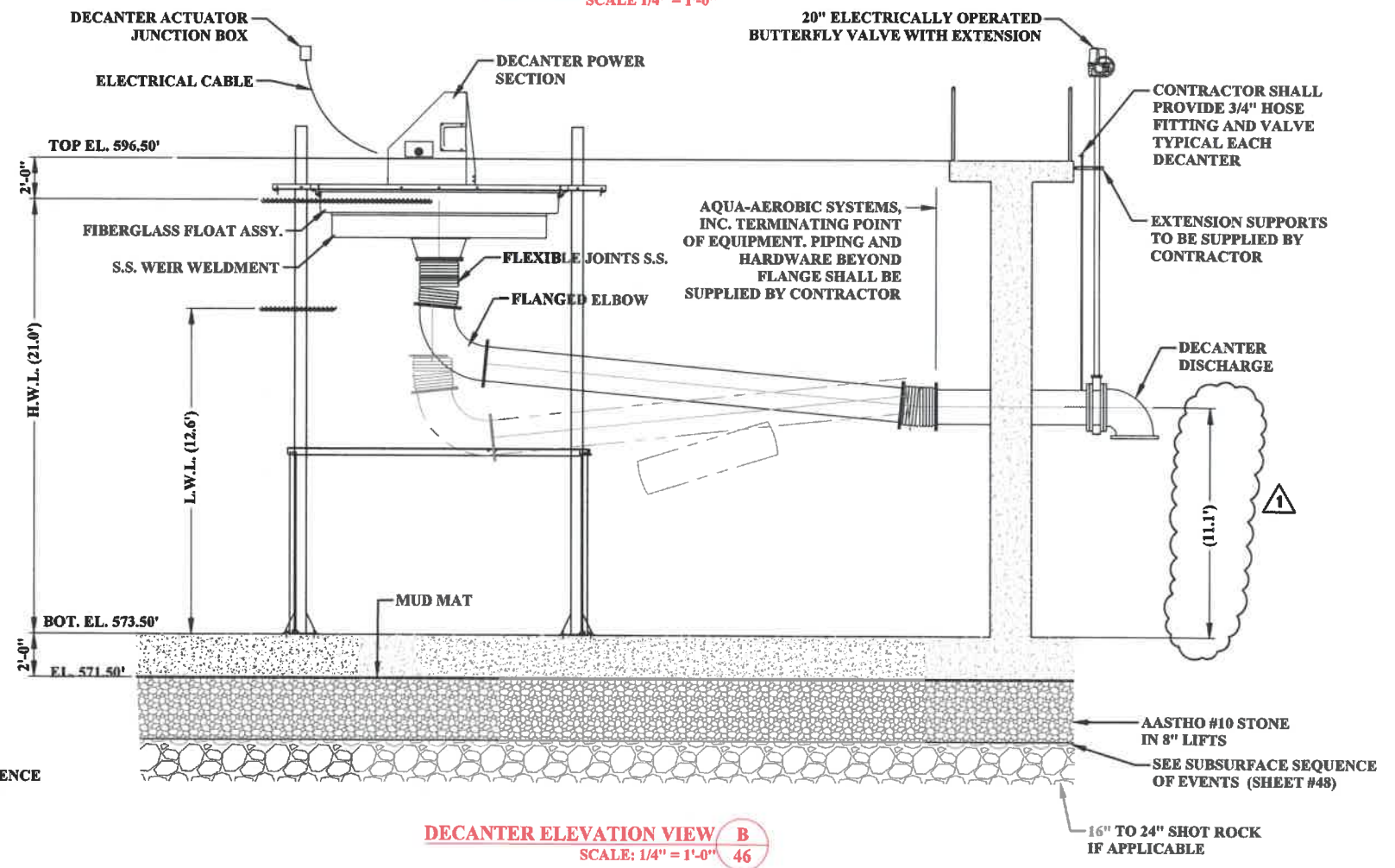
DECANTER DETAILS
SCALE 1/4" = 1'-0"



DECANTER PLAN VIEW
SCALE 1/4" = 1'-0"



END VIEW
SCALE 1/4" = 1'-0"



DECANTER ELEVATION VIEW B
SCALE: 1/4" = 1'-0" 46

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1	PL	3/17/22	ADDENDUM No. 1



SCALE: 1/4" = 1'-0"
 DRAWN: P.LANTZ DATE: 9/2021
 CHECKED: R. HUDKINS DATE: 1/2022
 APPROVED: D. FERRELL DATE: 2/2022
 SURVEY DATE:
 SURVEY BY:
 FIELD BOOK No.:

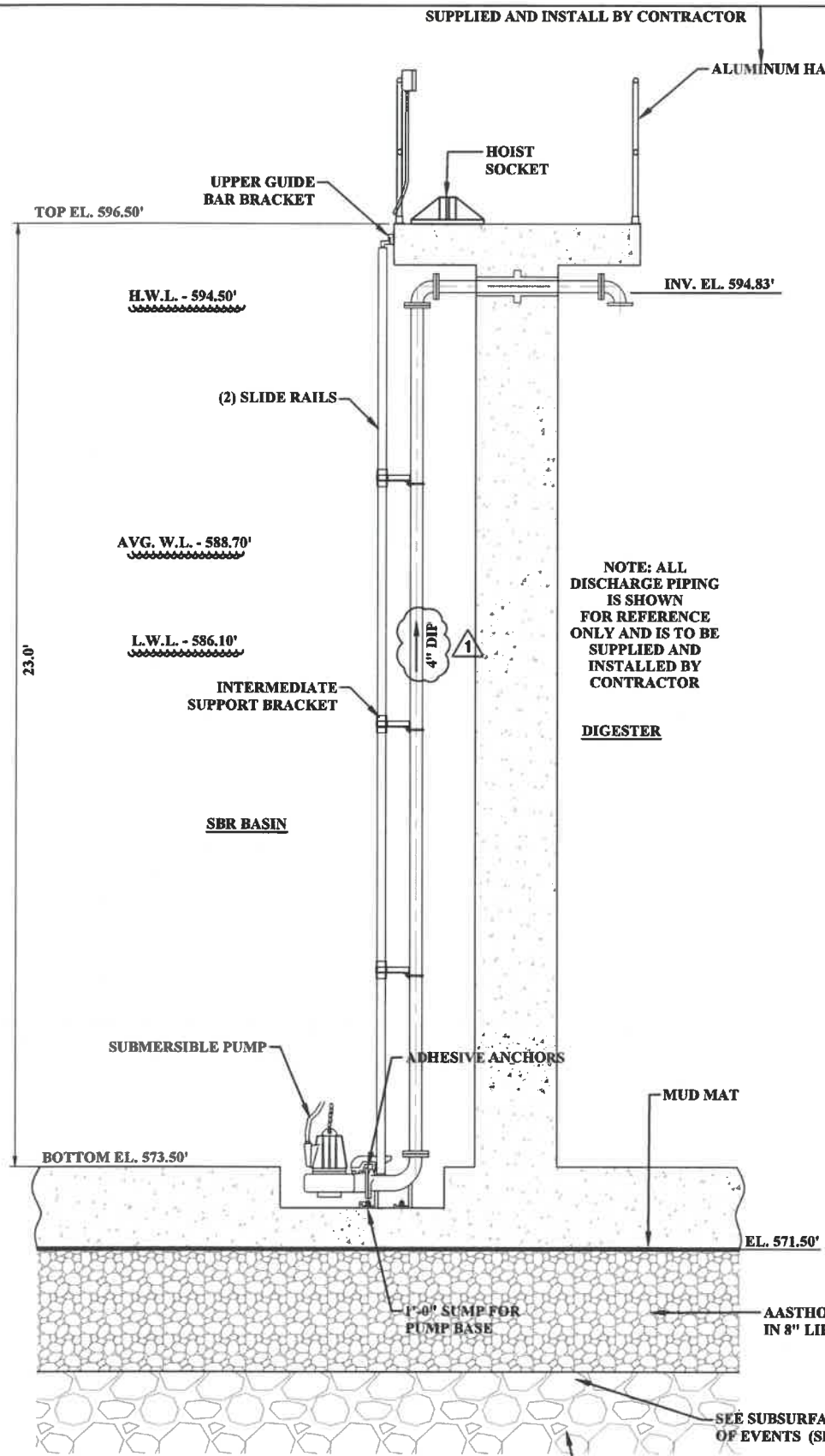
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CONTRACT No.	3
PROJECT No.	101-020-1535

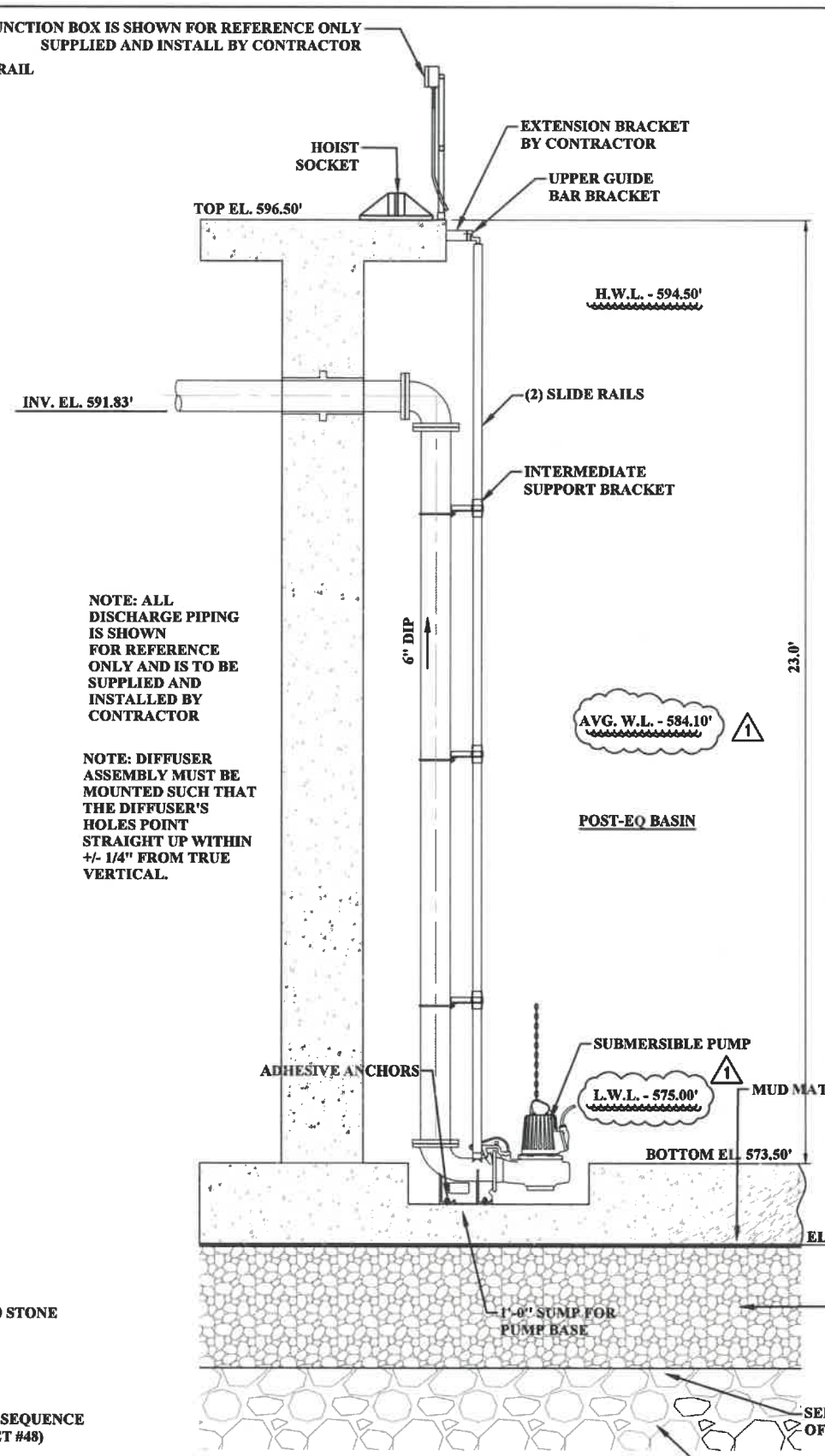
CITY OF RIPLEY
 PROPOSED 1.2 MILLION GALLONS PER DAY
 WASTEWATER TREATMENT PLANT
 SBR TREATMENT SYSTEM
 SBR DECANTER SECTION AND DETAILS

SHEET No.
49

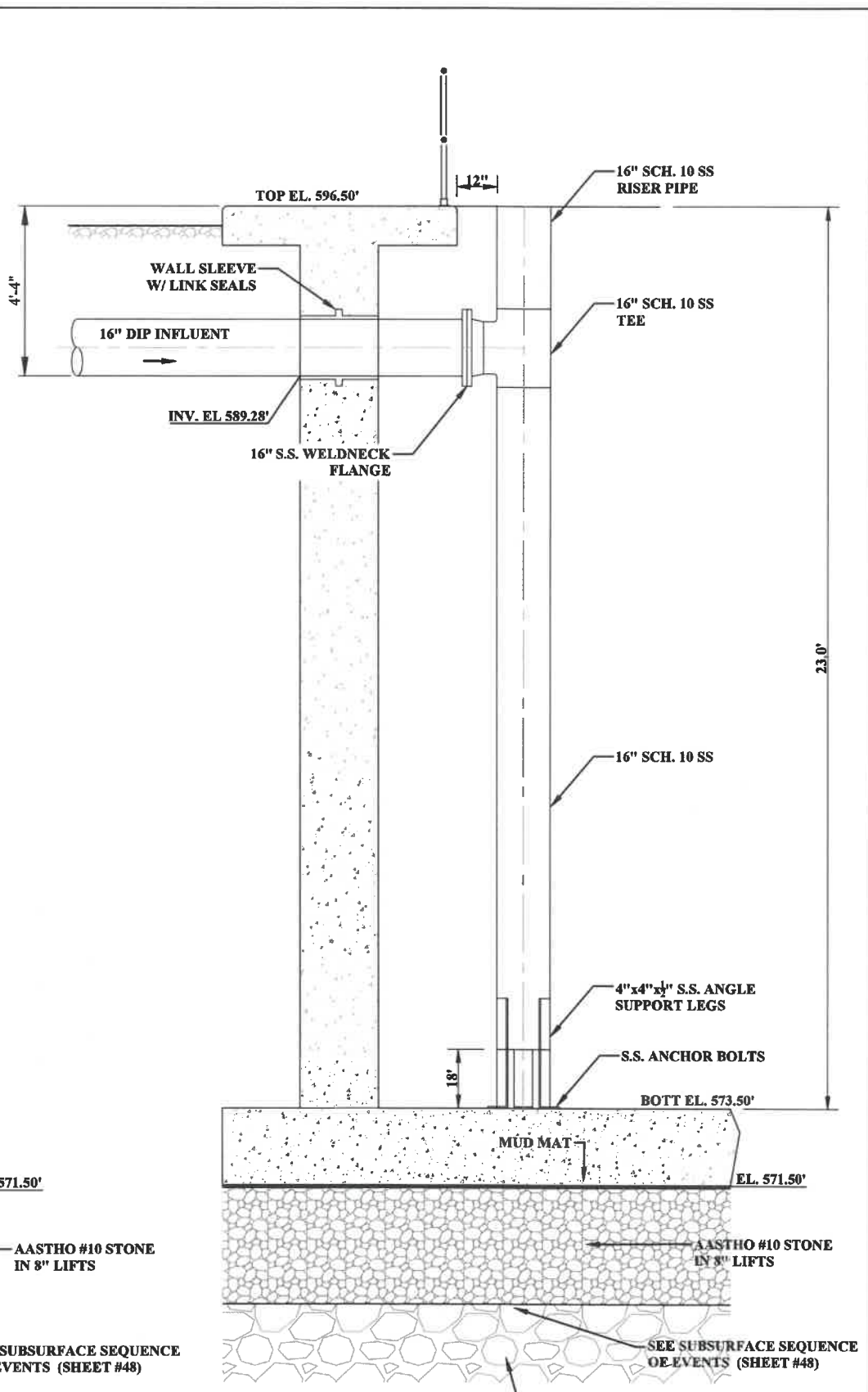
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 PLOT DATE/TIME: 3/17/2022 8:18 AM
 LAYOUT: SHEET 51
 USER: philip.lantz



SBR TRANSFER PUMP DETAIL D
SCALE 1/2" = 1'-0"
46



E POST-EQ TRANSFER PUMP DETAIL
SCALE 1/2" = 1'-0"
46



F INFLUENT BAFFLE ASSEMBLY DETAIL
SCALE 1/2" = 1'-0"
46

NO.	BY	DATE	DESCRIPTION
1	PL	3/17/22	ADDENDUM No. 2



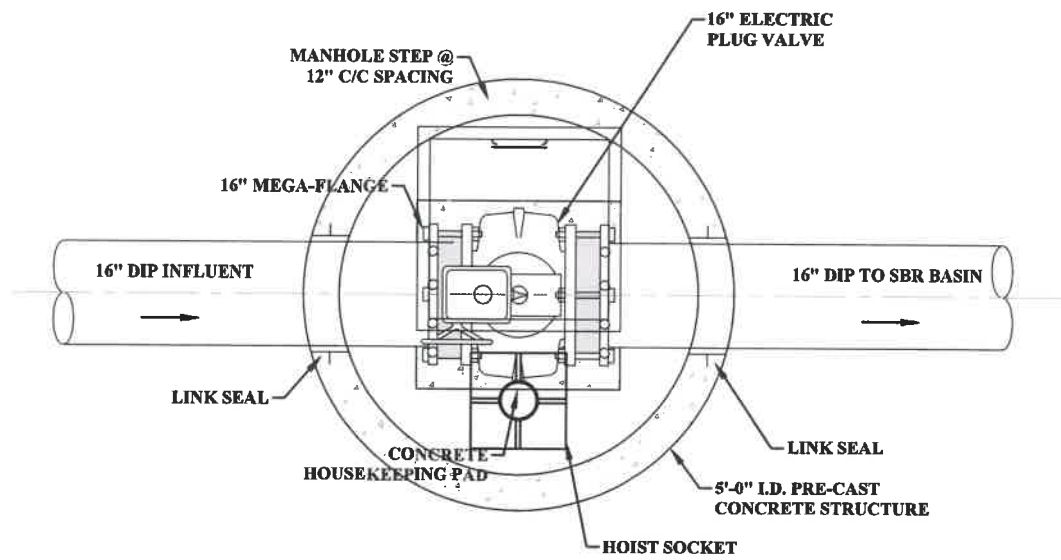
SCALE: 1/2" = 1'-0"
 DRAWN: P.LANTZ DATE: 9/2021
 CHECKED: R. HUDKINS DATE: 1/2022
 APPROVED: D. FERRELL DATE: 2/2022
 SURVEY DATE:
 SURVEY BY:
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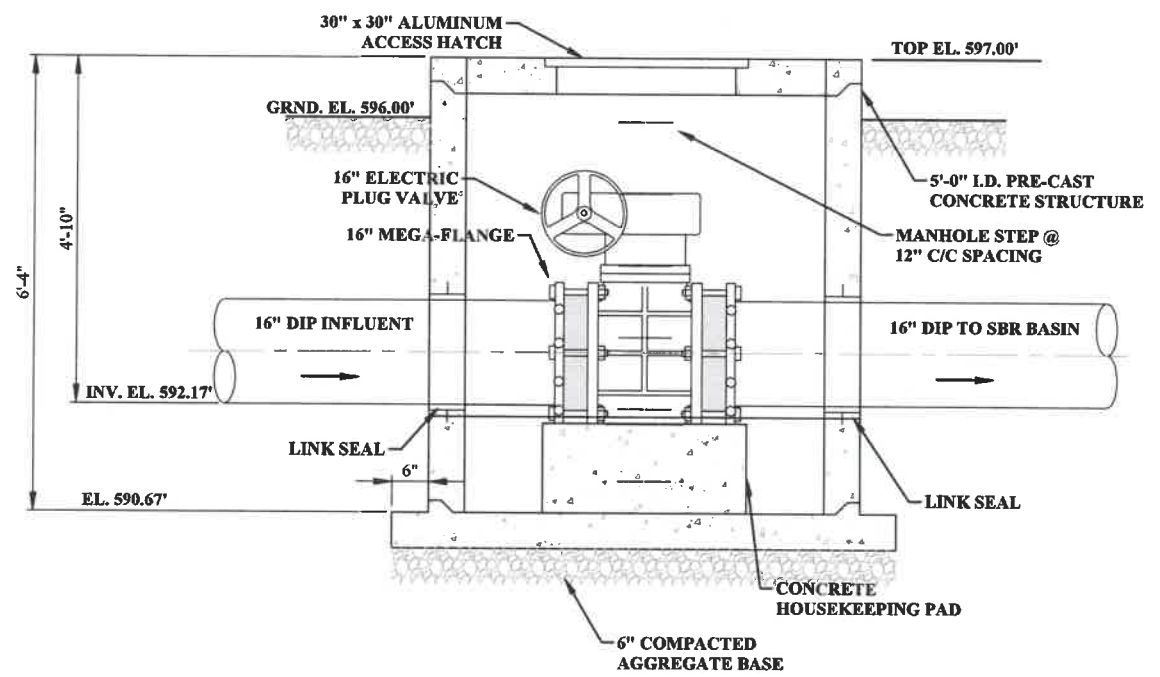
PHASE No.
 CONTRACT No.
3
 PROJECT No.
101-020-1535

CITY OF RIPLEY
 PROPOSED 1.2 MILLION GALLONS PER DAY
 WASTEWATER TREATMENT PLANT
 SBR TREATMENT SYSTEM
 SBR PUMP SECTIONS AND DETAILS

SHEET No.
51

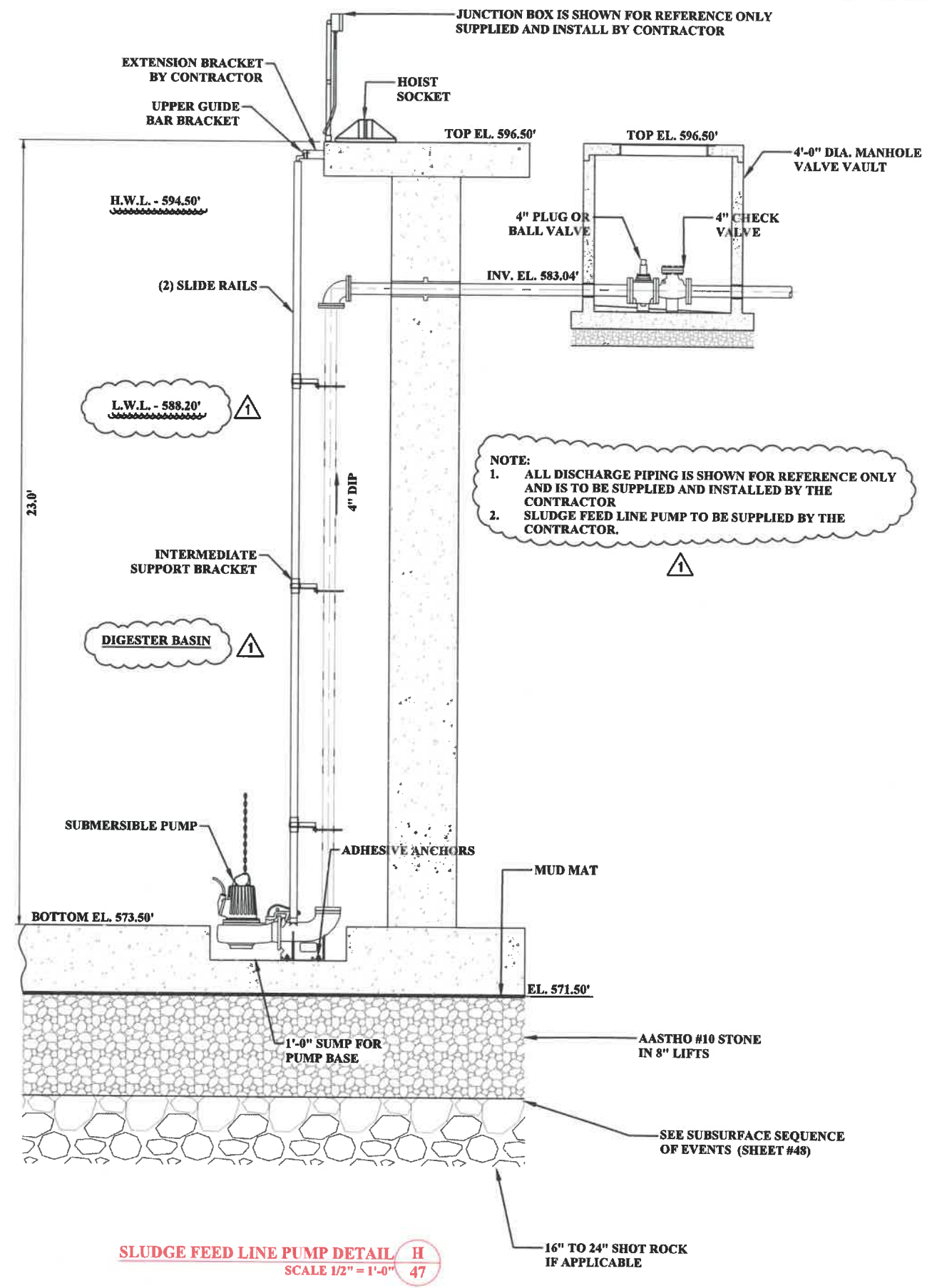


PLAN



SECTION
SBR INFLUENT VALVE VAULT
SCALE 3/4" = 1'-0"

- NOTES:**
1. PRE-CAST CONCRETE SHALL CONFORM TO ASTM C478, LATEST EDITION.
 2. ALL PIPING INSIDE VAULT SHALL BE FLANGED DUCTILE IRON.
 3. AFTER FIELD INSTALLATION, ALL PIPING, FITTINGS AND VALVES SHALL BE PAINTED PER SECTION 099010.
 4. 16" ELECTRIC PLUG VALVE SHALL BE SUPPLIED BY THE SBR MANUFACTURER.



SLUDGE FEED LINE PUMP DETAIL H
SCALE 1/2" = 1'-0" 47

CAD FILE: R:\020\020-1535-WWTP-RIPLET-Drawing\Contract #3\Drawings\C3-011-SBR.dwg
 PLOT DATE/TIME: 3/17/2022 8:31 AM
 LAYOUT: SHEET 52
 USER: philip lantz

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NO.	BY	DATE	DESCRIPTION
1	PL	3/17/22	ADDENDUM No. 2



SCALE: AS NOTED

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APPROVED: D. FERRELL	DATE: 2/2022
SURVEY DATE:	
SURVEY BY:	
FIELD BOOK No.:	

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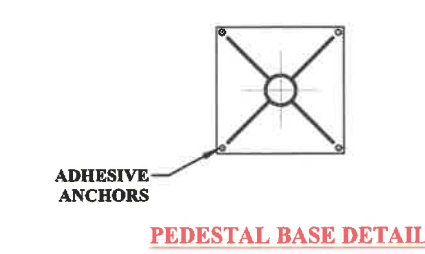
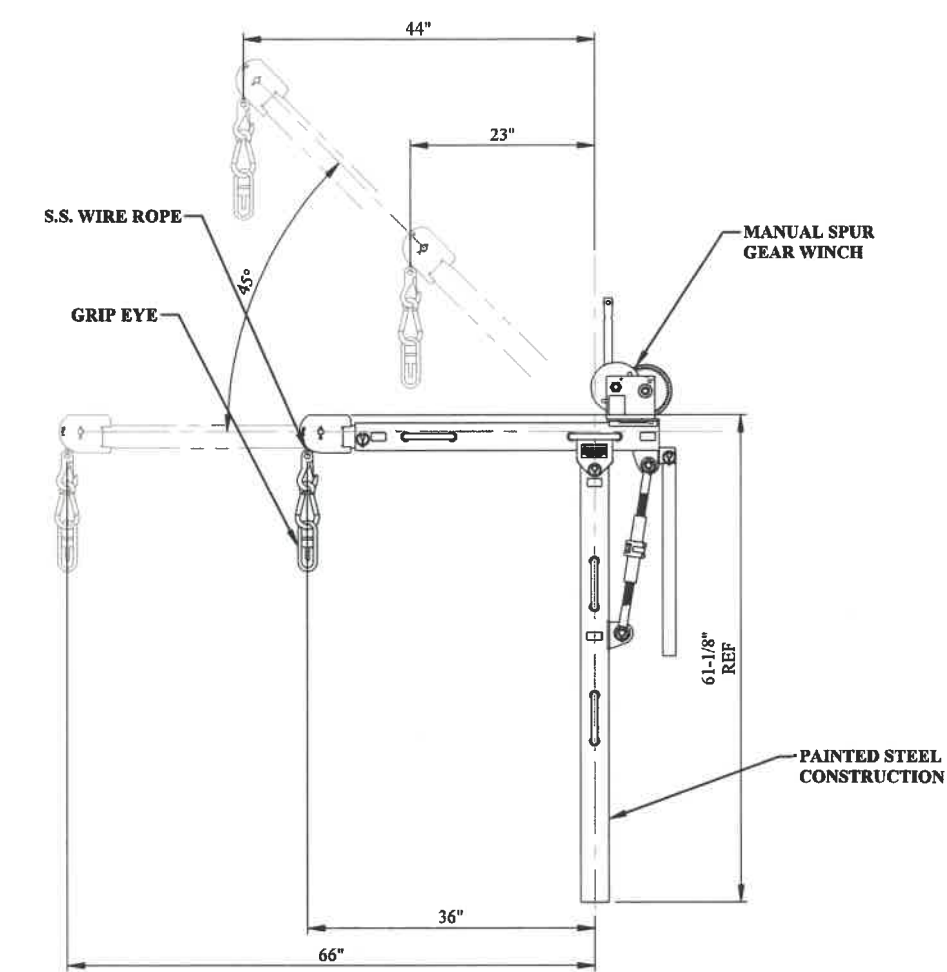
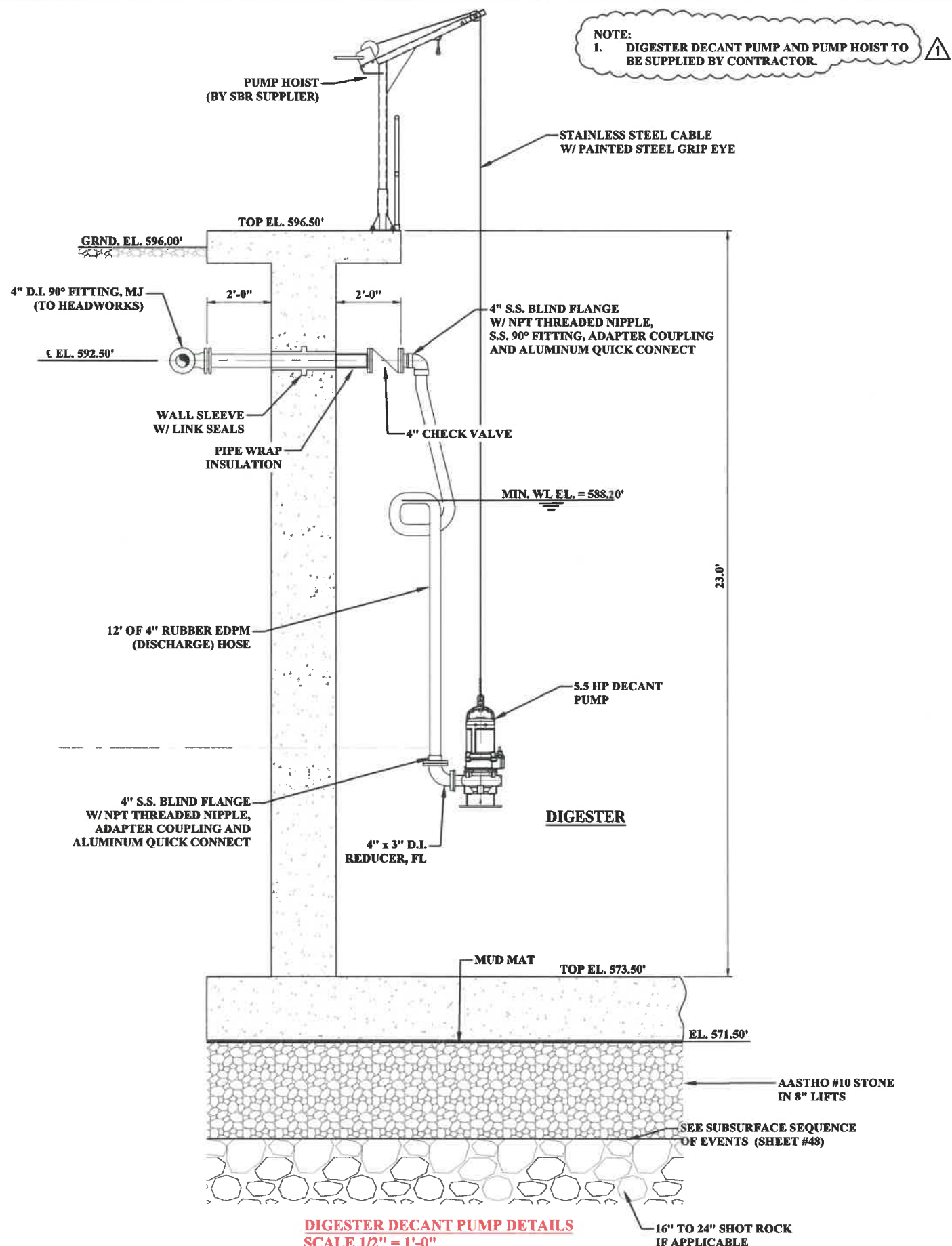
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PHASE No.	
CONTRACT No.	3
PROJECT No.	101-020-1535

CITY OF RIPLEY
 PROPOSED 1.2 MILLION GALLONS PER DAY
 WASTEWATER TREATMENT PLANT
 SBR TREATMENT SYSTEM
 INFLUENT VALVE VAULT & BAFFLE DETAILS

SHEET No.	52
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USER: philip lantz
 LAYOUT: SHEET 53
 PLOT DATE/TIME: 3/17/2022 8:43 AM
 CAD FILE: R:\020\020-1535-WWTP-RIPLEY-Drawing\Contract #3\Drawings\C3-011-SBR.dwg



NO.	BY	DATE	DESCRIPTION
1	PL	3/17/22	ADDENDUM No. 2

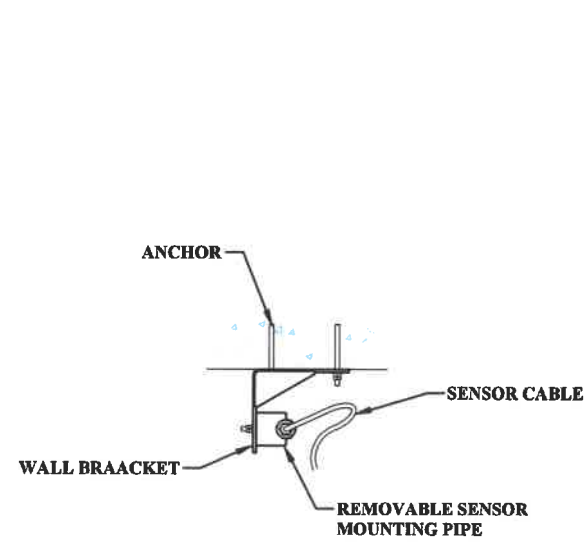


SCALE: 1/2"=1'-0"	DATE: 9/2021
DRAWN: P.LANTZ	DATE: 1/2022
CHECKED: R. HUDKINS	DATE: 2/2022
APPROVED: D. FERRELL	DATE: 2/2022
SURVEY DATE:	
SURVEY BY:	
FIELD BOOK No.:	

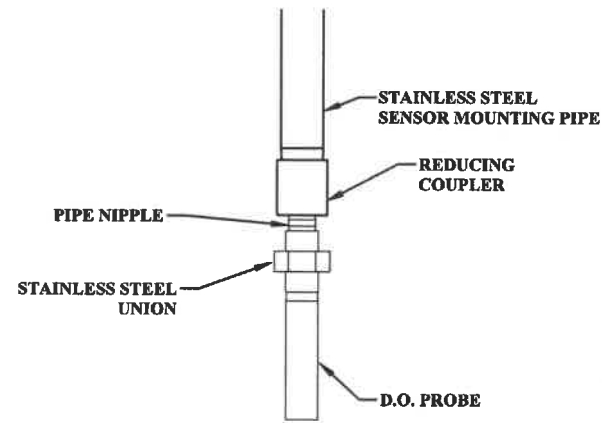
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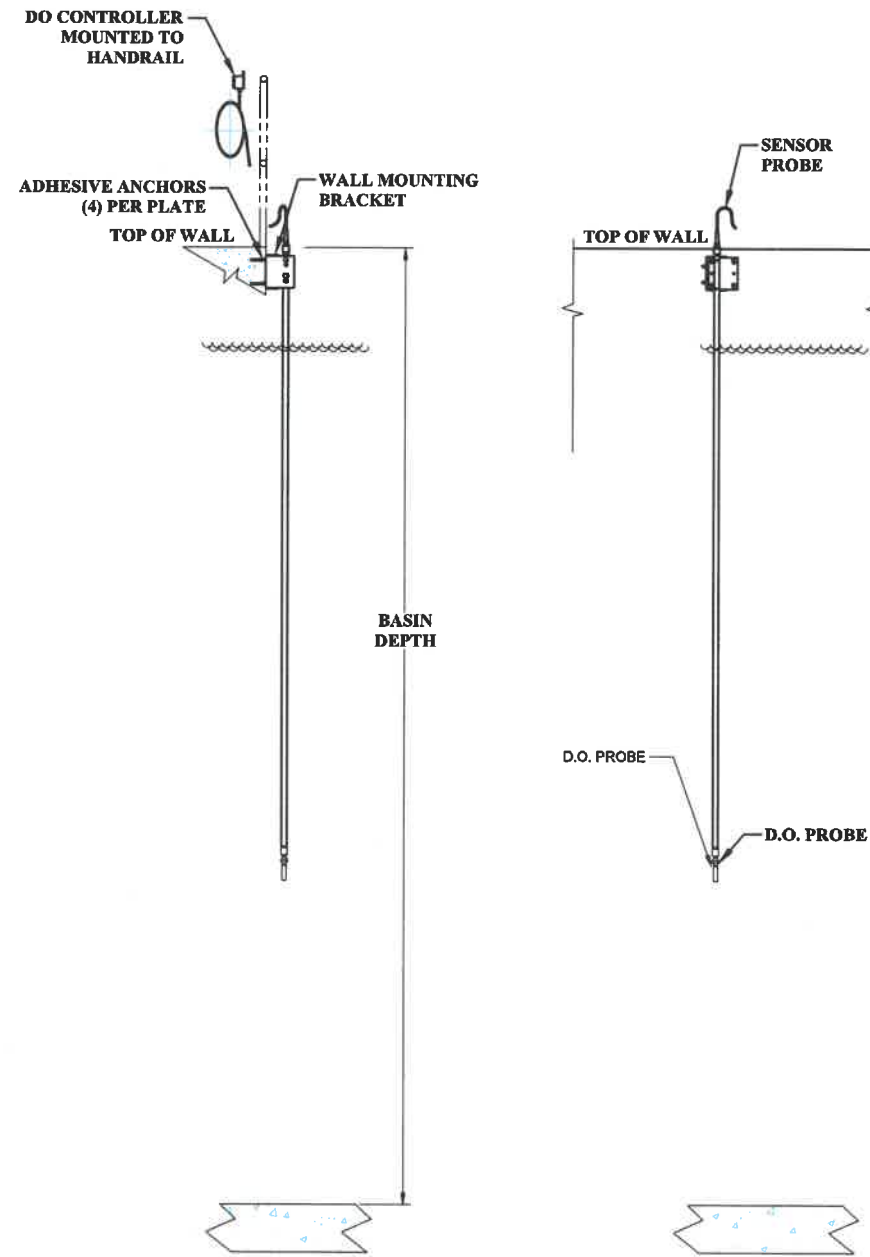
PHASE No.		CITY OF RIPLEY PROPOSED 1.2 MILLION GALLONS PER DAY WASTEWATER TREATMENT PLANT SBR TREATMENT SYSTEM, PORTABLE HOIST & DIGESTER DECANT PUMP SECTION & DETAILS	SHEET No. 53
CONTRACT No.	3		
PROJECT No.	101-020-1535		



ENLARGED TOP VIEW



ENLARGED SENSOR ASSEMBLY



DISSOLVED OXYGEN PROBE DETAILS

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NO.	BY	DATE	DESCRIPTION
1	PL	3/17/22	ADDENDUM No. 2 (REPLACEMENT SHEET)



SCALE: 3/8"=1'-0"
 DRAWN: P.LANTZ DATE: 9/2021
 CHECKED: R. HUDKINS DATE: 1/2022
 APPROVED: D. FERRELL DATE: 2/2022
 SURVEY DATE:
 SURVEY BY:
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PHASE No.
 CONTRACT No.
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 PROJECT No.
101-020-1535

CITY OF RIPLEY
 PROPOSED 1.2 MILLION GALLONS PER DAY
 WASTEWATER TREATMENT PLANT
 SBR TREATMENT SYSTEM
 SBR INSTRUMENT DETAILS

SHEET No.

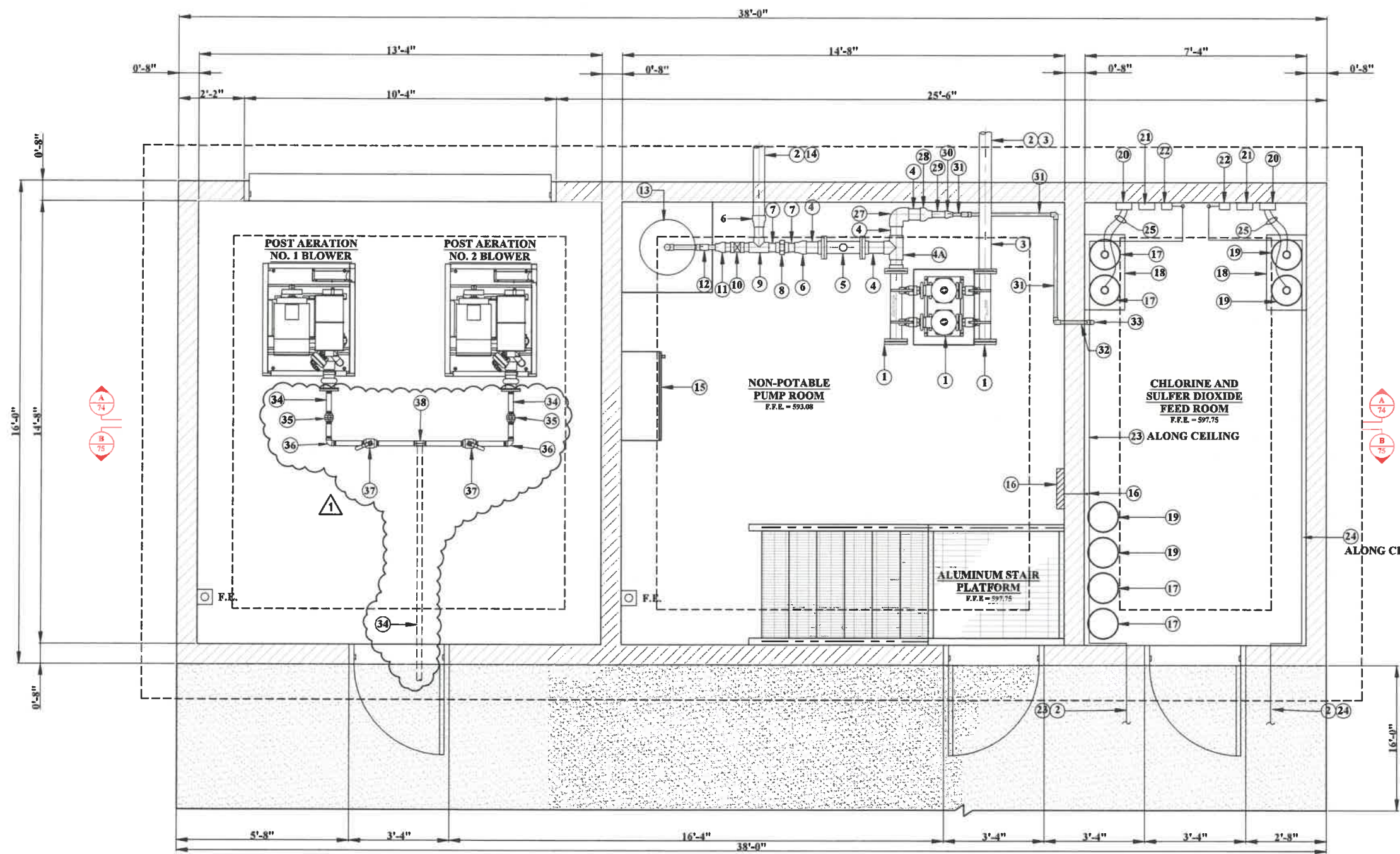
56

GENERAL NOTES

1. REFER TO SHEET 76 FOR ROOM SCHEDULE AND DOOR DETAILS.

PIPING LEGEND NOTES

- ① DUPLEX NON-POTABLE WATER PUMP SKID ASSEMBLY (REFER TO SPECIFICATION 461320), MOUNT ON 2'-0"W x 2'-6"L x 9-11/16" HIGH CONCRETE HOUSE KEEPING PAD.
- ② REFER TO SHEET 4 FOR CONTINUATION.
- ③ 4" DIP PUMP SUCTION.
- ④ 4" SCH. 80 PVC.
- ④A 4" SCH. 80 PVC TEE.
- ⑤ 4" D.I. FL. WYE STRAINER.
- ⑥ 4" x 3" SCH. 80 PVC REDUCING BUSHING.
- ⑦ 3" SCH. 80 PVC.
- ⑧ 3" SCH. 80 PVC UNION.
- ⑨ 3" SCH. 80 PVC TEE.
- ⑩ 3" PVC BALL VALVE.
- ⑪ 3" x 1-1/2" SCH. 80 PVC REDUCING BUSHING.
- ⑫ 1-1/2" SCH. 80 PVC.
- ⑬ 52 GALLON HYDRO-PNEUMATIC TANK ON 3'-0" x 3'-0" x 4" HIGH CONCRETE HOUSEKEEPING PAD.
- ⑭ 4" DIP DISCHARGE.
- ⑮ NPW PACKAGED BOOSTER PUMP CONTROL PANEL.
- ⑯ CHLORINE GAS DETECTOR AND SENSOR. PROVIDE AIR TIGHT SEAL FOR SENSOR CABLE THRU WALL. MOUNT DETECTION DISPLAY 5'-0" A.F.F. AND SENSOR 12" A.F.F.
- ⑰ 150 LB CHLORINE GAS CYLINDERS.
- ⑱ DUAL CYLINDER ELECTRONIC SCALE.
- ⑲ 150 LB SULFUR DIOXIDE GAS CYLINDER.
- ⑳ PRESSURE RELIEF VALVE ASSEMBLY.
- ㉑ METERING PANEL ASSEMBLY.
- ㉒ SMART VALVE CONTROLLER.
- ㉓ 1" SCH. 80 PVC CHLORINE SOLUTION TO CHLORINE CONTACT TANK.
- ㉔ 1" SCH. 80 PVC SO2 SOLUTION TO CHLORINE CONTACT TANK.
- ㉕ SCH. 80 PVC OR PVC TUBING.
- ㉖ REFER TO SHEET 141 FOR WATER SERVICE TO CHLORINE ROOM.
- ㉗ 4" SCH. 80 PVC 90° BEND.
- ㉘ 4" x 2" SCH. 80 PVC REDUCING BUSHING.
- ㉙ 2" SCH. 80 PVC.
- ㉚ 2" x 1" SCH. 80 PVC REDUCING BUSHING.
- ㉛ 1" SCH. 80 PVC.
- ㉜ 1" SCH. 80 PVC UP THRU WALL. PROVIDE AIR TIGHT SEAL.
- ㉝ REFER TO SHEET 141 FOR CONTINUATION.
- ㉞ 2" SCH. 40 BLACK STEEL AIR PIPE
- ㉟ 2" SCH. 40 BLACK STEEL UNION
- ㊱ 2" SCH. 40 BLACK STEEL 90° BEND
- ㊲ 2" THREADED BALL VALVE
- ㊳ 2" SCH. 40 BLACK STEEL TEE



CHLORINE / NPW BUILDING - FLOOR PLAN
SCALE: 1/2" = 1'-0"

LEGEND

○ FE FIRE EXTINGUISHER

CAD FILE: R:\020\020-1535-WWTP-RIPLET-Drawing\Contract #3\Drawing\03-015-Chem Buildings.dwg
 USER: philip lantz
 LAYOUT: SHEET 71
 PLOT DATE/TIME: 3/17/2022 9:36 AM

1	PL	3/17/22	ADDENDUM No. 2
NO.	BY	DATE	DESCRIPTION



SCALE: 1/2"=1'-0"
 DRAWN: P.LANTZ DATE: 9/2021
 CHECKED: R. HUDKINS DATE: 1/2022
 APPROVED: D. FERRELL DATE: 2/2022
 SURVEY DATE:
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PHASE No.	
CONTRACT No.	3
PROJECT No.	101-020-1535

CITY OF RIPLEY
 PROPOSED 1.2 MILLION GALLONS PER DAY
 WASTEWATER TREATMENT PLANT
 CHLORINE / NPW BUILDING
 PROPOSED FLOOR PLAN

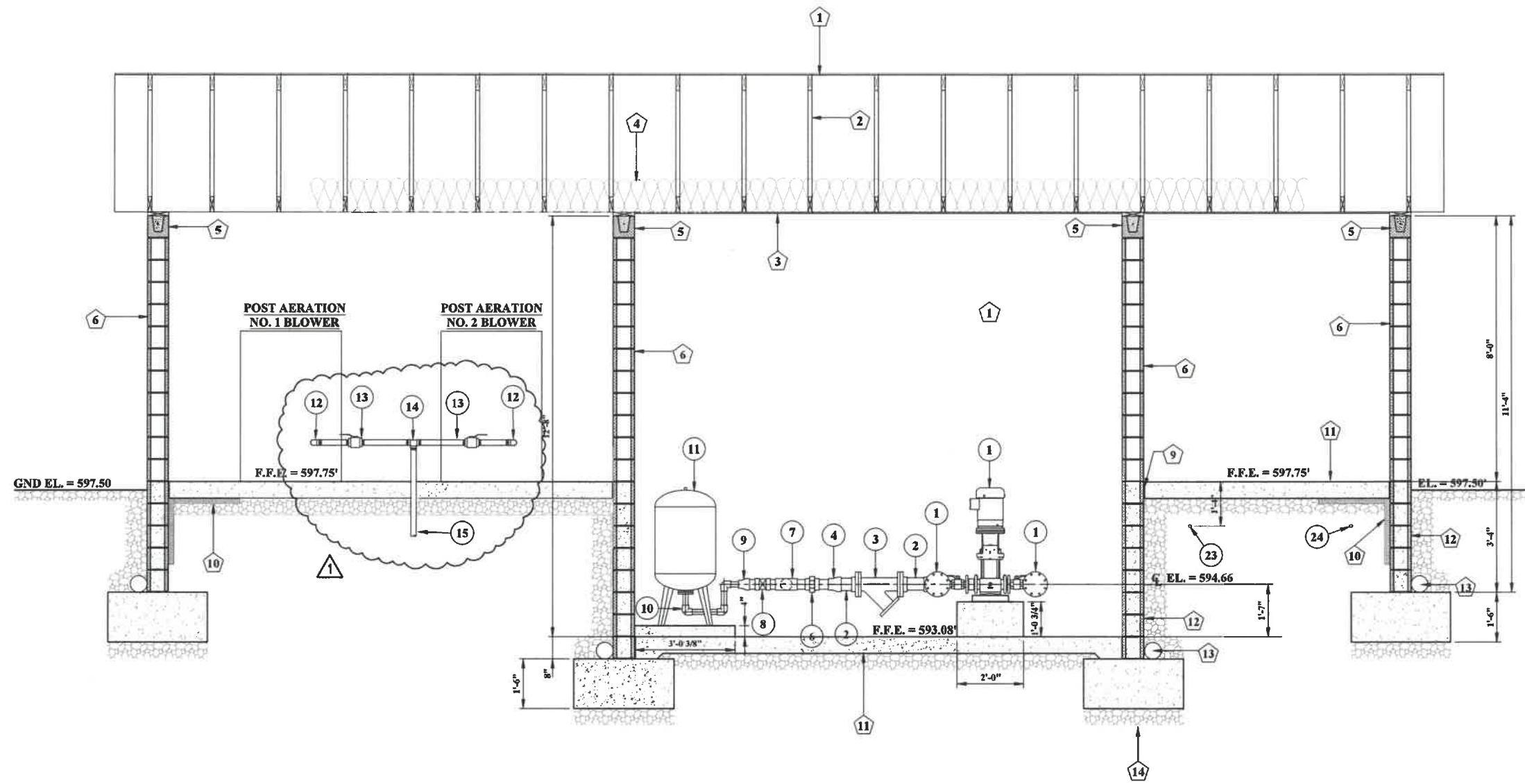
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 PLOT DATE/TIME: 3/17/2022 10:11 AM
 LAYOUT: SHEET 74
 USER: philip lantz

BUILDING LEGEND NOTES

- ① STANDING SEAM METAL ROOF OVER FELT PAPER, 5/8" PLYWOOD.
- ② PRE-ENGINEERED ROOF TRUSSES AT 16" O.C.
- ③ 5/8" PLYWOOD (PAINTED).
- ④ 6" FIBERGLASS INSULATION WITH KRAFT PAPER BACKING.
- ⑤ 8" SMOOTH FACE CMU BOND BEAM W/ 2-#5 BARS CONTINUOUS.
- ⑥ 8" SPLIT FACE BLOCK.
- ⑦ VINYL SOFFIT (VENTED), 6" FASCIA PANEL, ALUMINUM DRIP EDGE. (NOT SHOWN IN THIS SECTION)
- ⑧ 6" ALUMINUM GUTTER WITH 5" x 6" ALUMINUM DOWNSPOUT AND PRECAST CONCRETE SPLASH PAD. (NOT SHOWN IN THIS SECTION)
- ⑨ 3/4" DEEP JOINT SEALANT OVER 3/8" EXP. JOINT MATERIAL.
- ⑩ FOUNDATION INSULATION BOARD.
- ⑪ 6" CONCRETE SLAB OVER 10 MIL. VAPOR BARRIER.
- ⑫ 8" SMOOTH FACE MASONRY FOUNDATION WALL - GROUT VOIDS SOLID W/ CONCRETE FILL.
- ⑬ 6" PERF. PVC FOUNDATION DRAIN IN STONE TRENCH WRAPPED WITH FILTER FABRIC.
- ⑭ 6" COMPACTED AGGREGATE BASE.

PIPING LEGEND NOTES

- ① DUPLEX NON-POTABLE WATER PUMP SKID ASSEMBLY (REFER TO SPECIFICATION 461320). MOUNT ON 2'-0"W x 2'-6"L x 9-11/16" HIGH CONCRETE HOUSE KEEPING PAD.
- ② 4" SCH. 80 PVC.
- ③ 4" D.I. FL. WYE STRAINER.
- ④ 4" X 3" SCH. 80 PVC REDUCING BUSHING.
- ⑤ 3" SCH. 80 PVC.
- ⑥ 3" SCH. 80 PVC UNION.
- ⑦ 3" SCH. 80 PVC TEE.
- ⑧ 3" PVC BALL VALVE.
- ⑨ 3" x 1-1/2" SCH. 80 PVC REDUCING BUSHING.
- ⑩ 1-1/2" SCH. 80 PVC.
- ⑪ 52 GALLON HYDRO-PNEUMATIC TANK ON 3'-0" x 3'-0" x 4" HIGH CONCRETE HOUSEKEEPING PAD.
- ⑫ 2" SCH. 40 BLACK STEEL 90° BEND
- ⑬ 2" THREADED BALL VALVE
- ⑭ 2" SCH. 40 BLACK STEEL TEE
- ⑮ 2" SCH. 40 BLACK STEEL PIPE



SECTION A
 SCALE 1/2" = 1'-0" 71

NO.	BY	DATE	DESCRIPTION
1	PL	3/17/22	ADDENDUM No. 2



SCALE: 1/2" = 1'-0"
 DRAWN: P.LANTZ DATE: 9/2021
 CHECKED: R. HUDKINS DATE: 1/2022
 APPROVED: D. FERRELL DATE: 2/2022
 SURVEY DATE:
 SURVEY BY:
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PHASE No.	
CONTRACT No.	3
PROJECT No.	101-020-1535

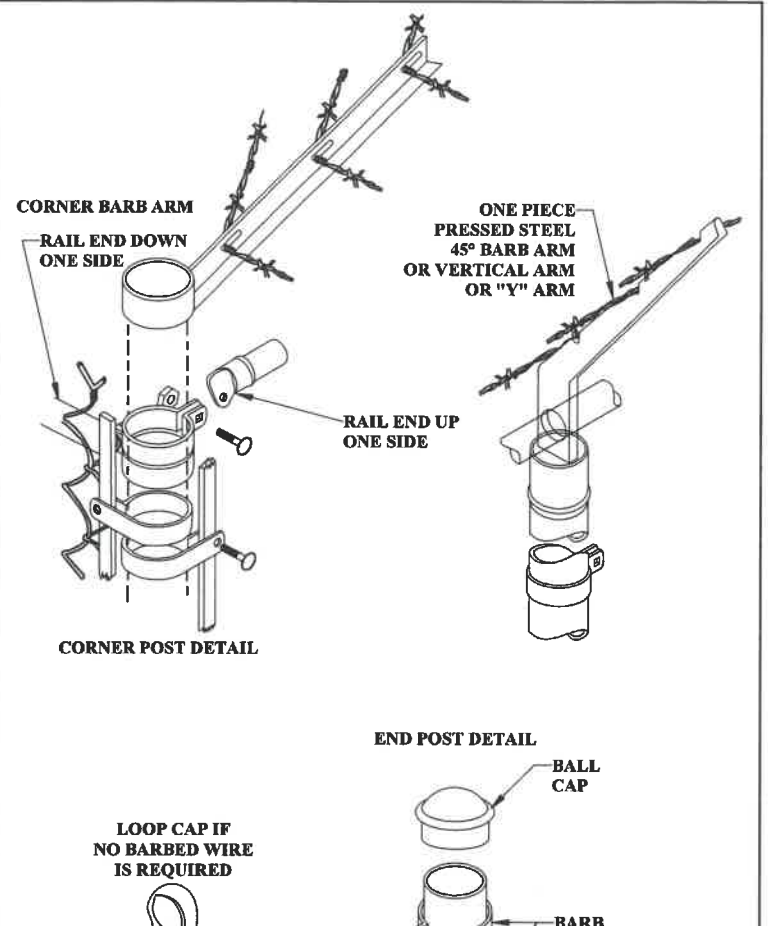
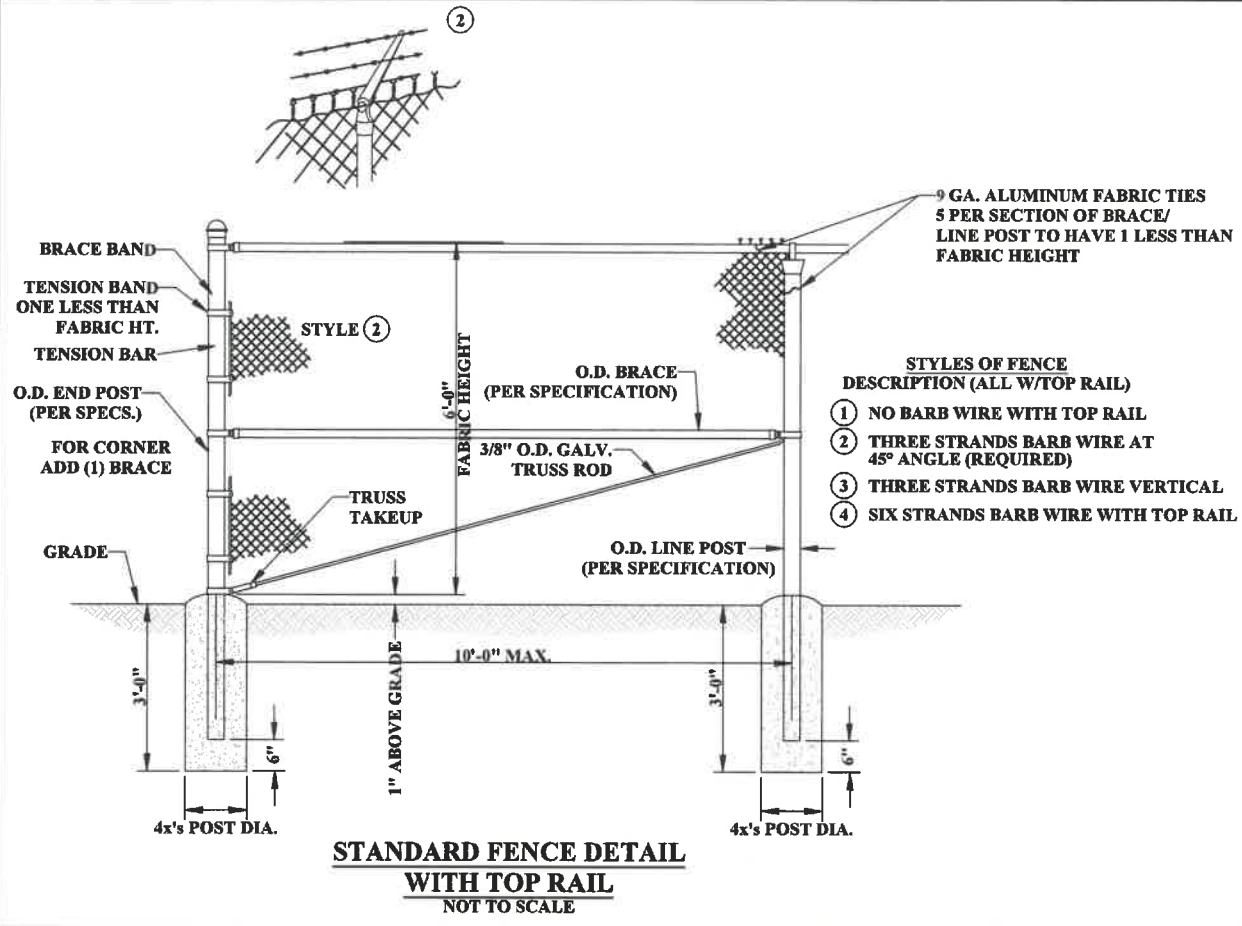
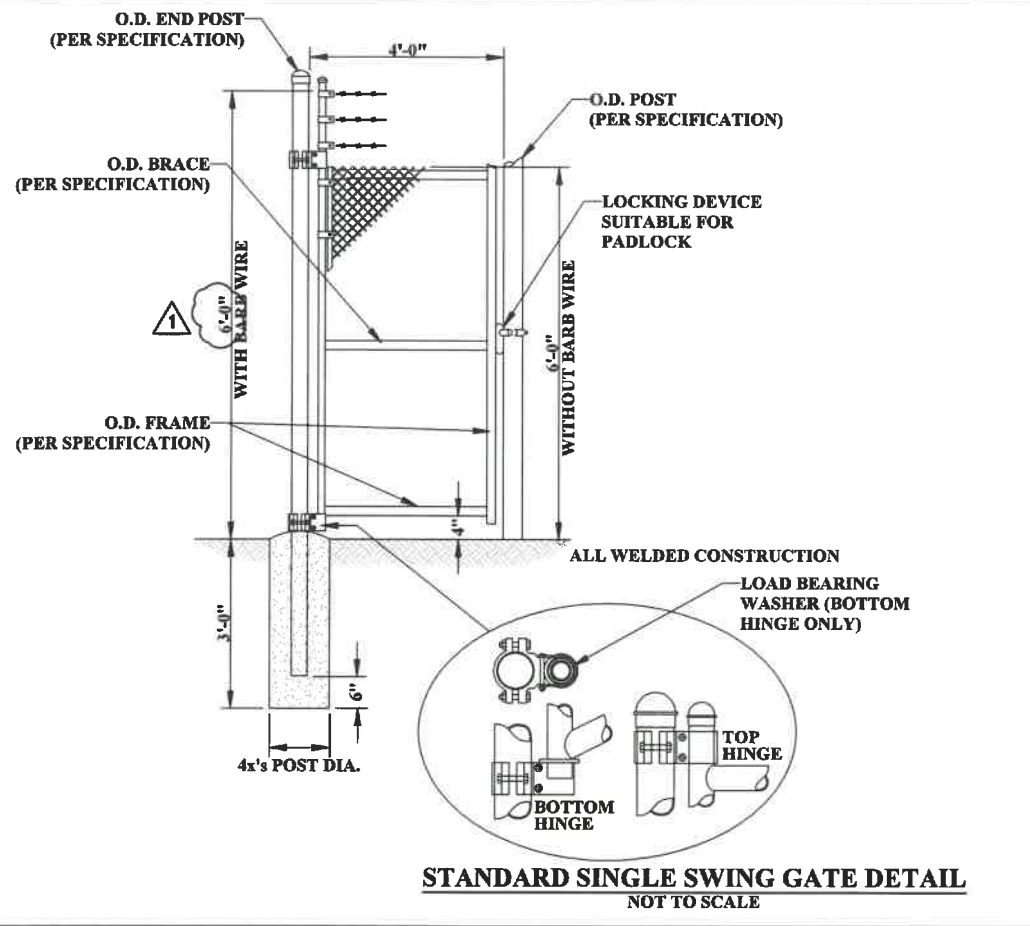
CITY OF RIPLEY
PROPOSED 1.2 MILLION GALLONS PER DAY
WASTEWATER TREATMENT PLANT
CHLORINE / NPW BUILDING
PROPOSED SECTION A

SHEET No.
74

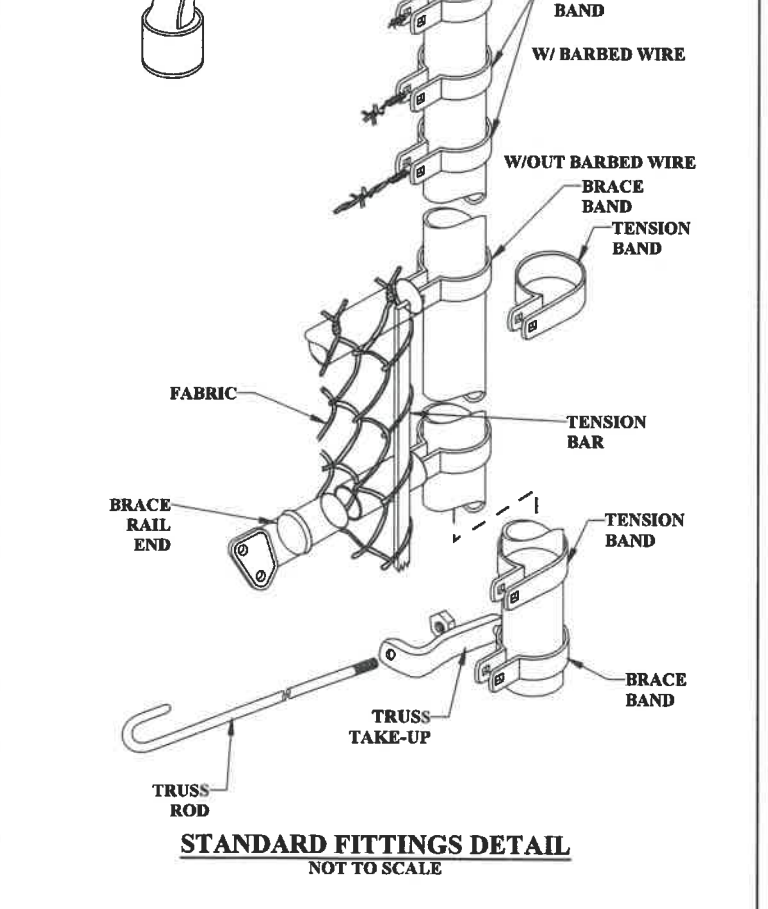
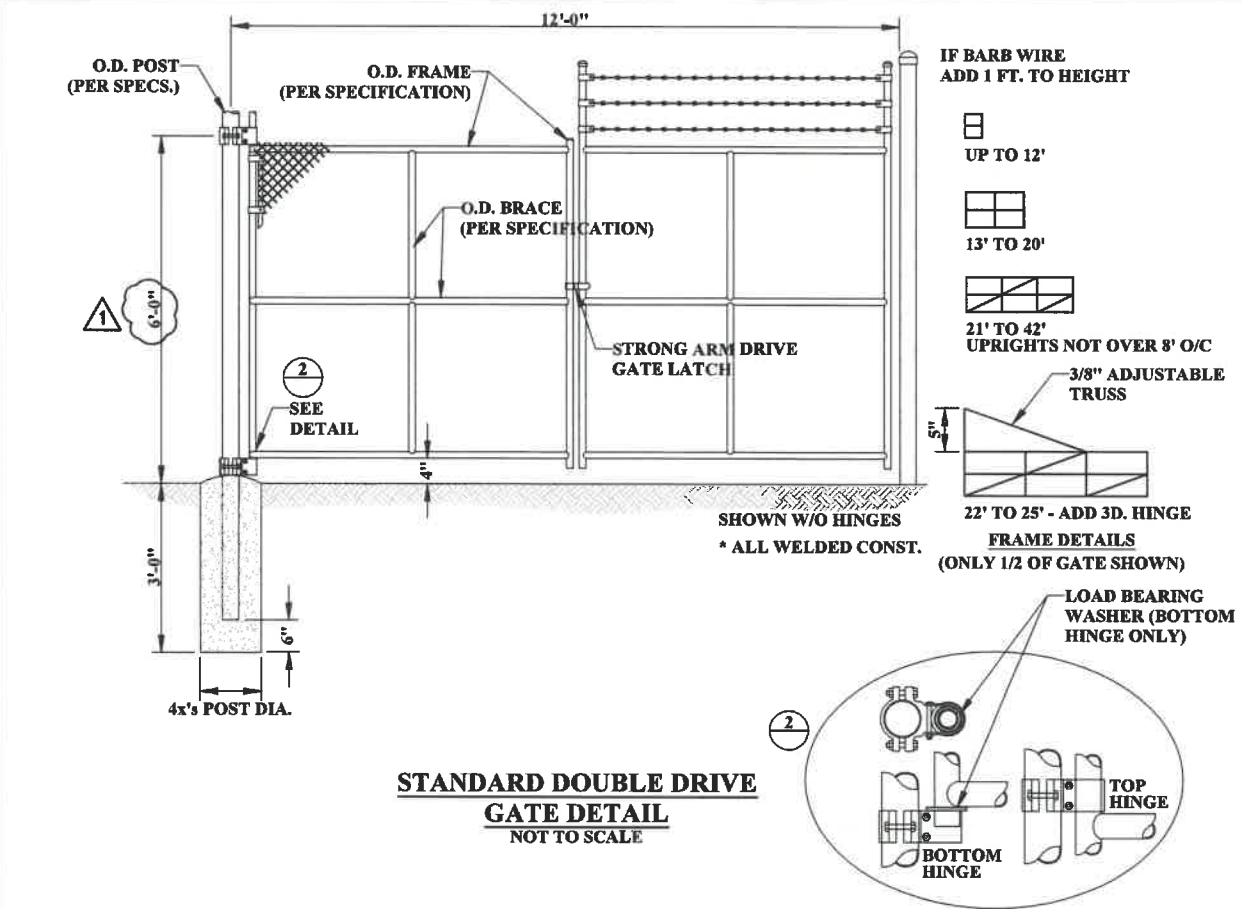
USER: philip_lantz

LAYOUT: SHEET 104

PLOT DATE/TIME: 3/21/2022 11:08 AM



NOTE: CHAIN LINK FENCE AND GATE SPECIFICATIONS ARE LOCATED IN SECTION 323113



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NO.	BY	DATE	DESCRIPTION



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CHECKED: R. HUDKINS DATE: 1/2022
APPROVED: D. FERRELL DATE: 2/2022
SURVEY DATE:
SURVEY BY:
FIELD BOOK No.:

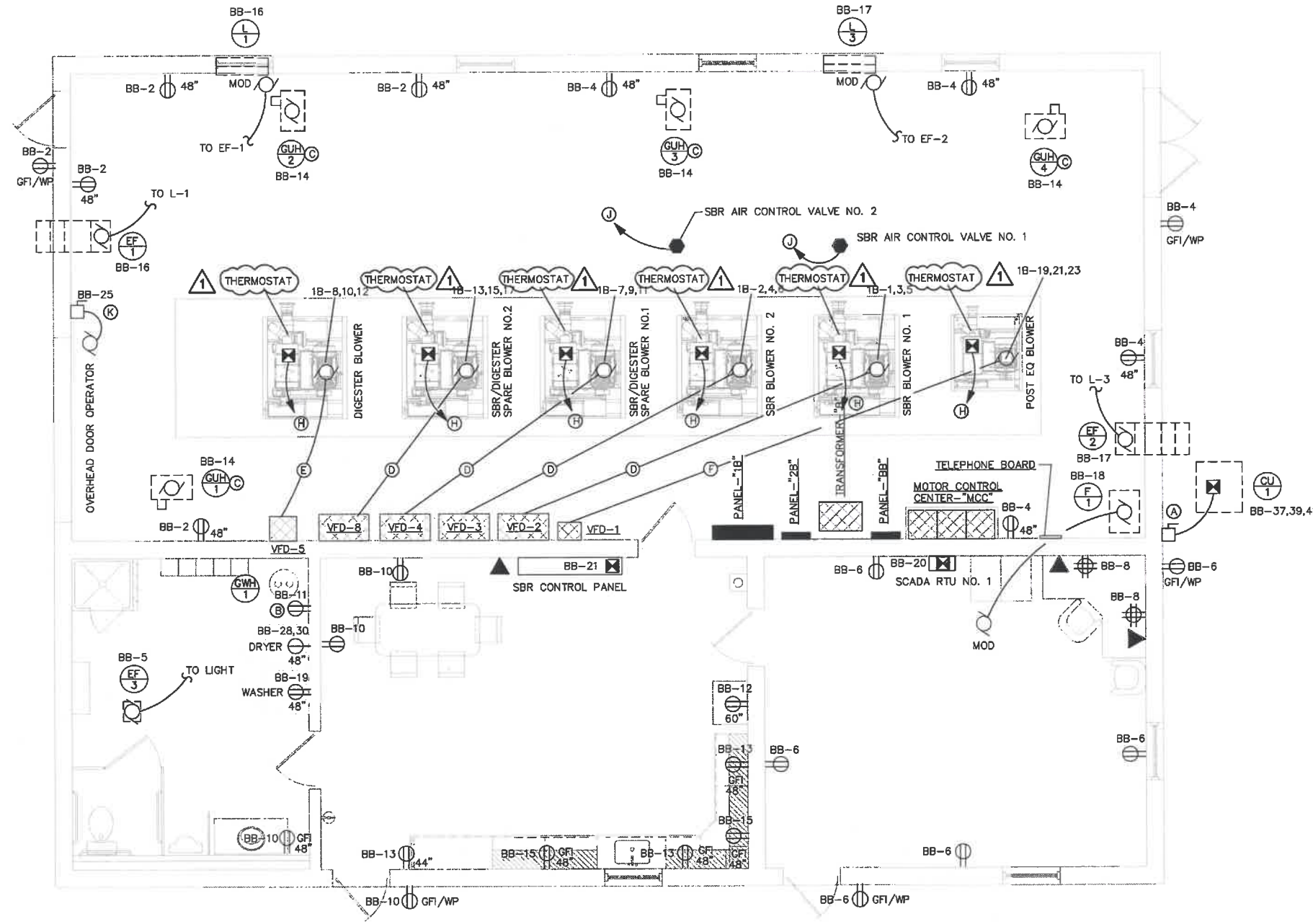
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CHARLESTON, WV 25311
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PHASE No.
CONTRACT No.
3
PROJECT No.
101-020-1535

CITY OF RIPLEY
PROPOSED 1.2 MILLION GALLONS PER DAY
WASTEWATER TREATMENT PLANT
PROPOSED WASTEWATER TREATMENT PLANT
PROPOSED TYPICAL DETAILS

SHEET No.
104

USER: philip lantz
 LAYOUT: SHEET 153
 PLOT DATE/TIME: 3/17/2022 8:59 AM
 CAD FILE: R:\020\020-1535-WWP-RRIPLEY-Drawing\Contract #\Drawing\CS-03-03-Electrical Branding



PLAN NOTES:

- (A) 3P-30A, 208V, 3Ø, 3W HEAVY DUTY NEMA-4X STAINLESS STEEL FUSED SAFETY SWITCH.
- (B) RECEPTACLE FOR WATER HEATER CONTROL.
- (C) PROVIDE MANUAL MOTOR SWITCH WITHOUT THERMAL OVERLOAD PROTECTION.
- (D) 2" CONDUIT WITH 3-3/0, 1-#6 GROUND. CONDUCTORS SHALL BE XHHW-2.
- (E) 2" CONDUIT WITH 3-1/0, 1-#6 GROUND. CONDUCTORS SHALL BE XHHW-2.
- (F) 1" CONDUIT WITH 3-#6, 1-#8 GROUND. CONDUCTORS SHALL BE XHHW-2.
- (H) 3/4" CONDUIT WITH 2-#12, 1-#12 GROUND TO SBR CONTROL PANEL.
- (J) 3/4" CONDUIT WITH 7-#12, 1-#12 GROUND TO SBR CONTROL PANEL.
- (K) 2P-30A, 120V, 1Ø, 2W HEAVY DUTY NEMA-1 FUSED SAFETY SWITCH.

CONTROL / BLOWER BUILDING - POWER PLAN
 SCALE: 1/4" = 1'-0"

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1	PL	3/17/22	ADDENDUM No. 2
NO.	BY	DATE	DESCRIPTION



SCALE:	DATE: 9/2021
DRAWN: P.LANTZ	DATE: 1/2022
CHECKED: R. HUDKINS	DATE: 2/2022
APPROVED: D. FERRELL	
SURVEY DATE:	
SURVEY BY:	
FIELD BOOK No.:	

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PHASE No.	
CONTRACT No.	3
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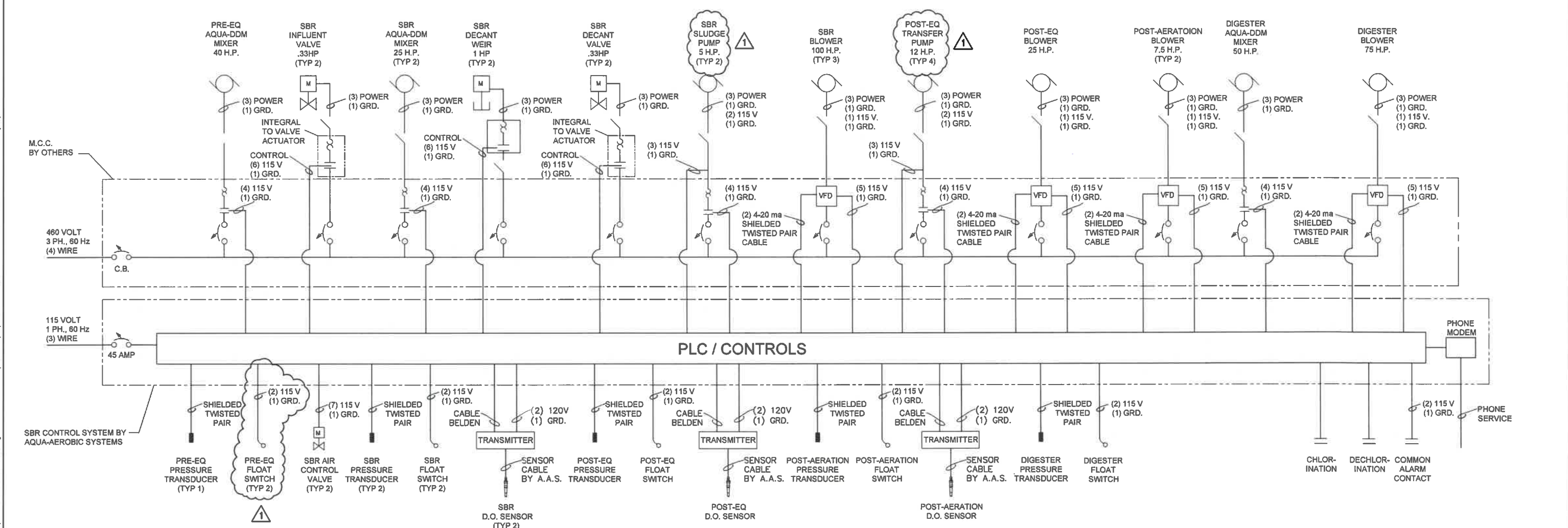
CITY OF RIPLEY
 PROPOSED 1.2 MILLION GALLONS PER DAY
 WASTEWATER TREATMENT PLANT
 PRO. CONTROL & PROCESS BLOWER BUILDING
 POWER PLAN

SHEET No.
153

SYMBOL KEY

	MOTOR		CIRCUIT BREAKER		ELECTRICAL DISCONNECT		VARIABLE FREQUENCY DRIVE		PRESSURE TRANSDUCER		MOTOR OPERATED WEIR		STARTER CONTACTOR
	MOTOR OPERATED VALVE		D.O. SENSOR PROBE		MOTOR OVERLOAD		PNEUMATIC OPERATED VALVE		FUSE		TRANSFORMER		PNEUMATIC OPERATED WEIR

NOTE: SOME SYMBOLS MAY NOT BE APPLICABLE



SINGLE LINE DIAGRAM NOT TO SCALE

NOTE: IF PUMPS, MIXERS, AND AERATORS ARE PROVIDED A MULTI-CONDUCTOR S.O. CABLE SHALL BE INCLUDED. THE CABLE SHALL TERMINATE AT A JUNCTION BOX/DISCONNECT PROVIDED BY OTHERS.

NOTE: SUBMERSIBLE PUMPS ARE PROVIDED WITH CONTROL WIRES FOR THE THERMAL SWITCH EMBEDDED IN THE WINDINGS OF THE PUMP. (TWO CONTROL AND ONE GROUND)

NOTE: ANCILLARY EQUIPMENT MONITORING AND/OR CONTROL REQUIREMENTS ARE YET TO BE DETERMINED. ELECTRICAL REQUIREMENTS FOR AQUA-AEROBIC SYSTEMS CONTROL PANEL ARE SUBJECT TO CHANGE, PENDING VERIFICATION OF ANCILLARY EQUIPMENT CONTROL FOR MONITORING REQUIREMENTS.

NOTE: IF REQUIRED, SKIMMER LOCAL CONTROL POWER MAY BE PROVIDED VIA ANY SOURCE IN LIEU OF THE SBR CONTROL PANEL.

USER: philip lantz
 LAYOUT: SHEET 171
 PLOT DATE/TIME: 3/17/2022 9:04 AM
 CAD FILE: R:\020\020-1535-WWTP-RIPLEY-Drawing\Contract_#3\Drawings\CS-035-Electrical\Bion.dwg

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1	PL	3/17/2022	ADDEDUM No. 2
NO.	BY	DATE	DESCRIPTION



SCALE:	
DRAWN: P.LANTZ	DATE: 9/2021
CHECKED: R. HUDKINS	DATE: 1/2022
APPROVED: D. FERRELL	DATE: 2/2022
SURVEY DATE:	
SURVEY BY:	
FIELD BOOK No.:	

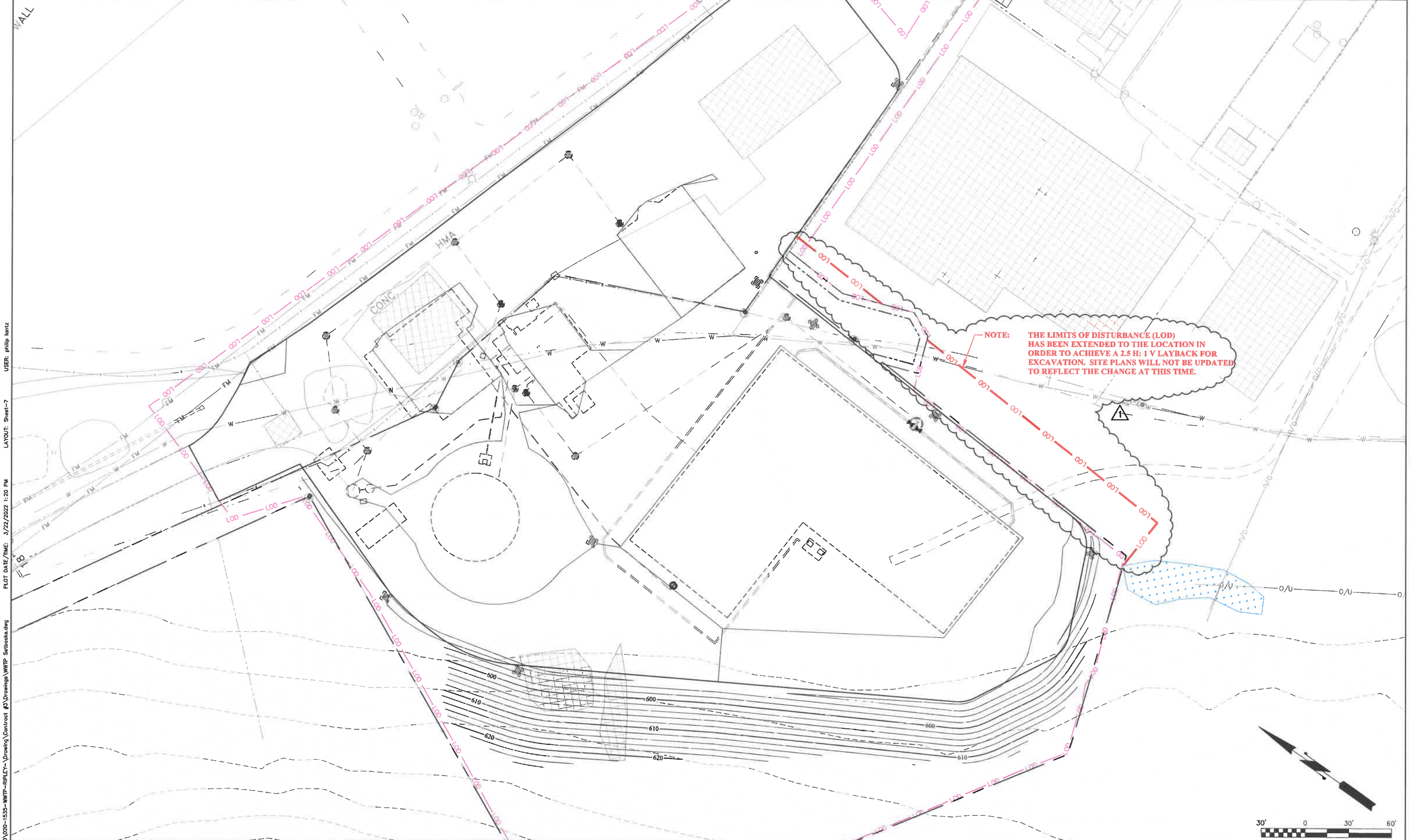
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CONTRACT No.	
PROJECT No.	3
101-020-1535	

CITY OF RIPLEY
PROPOSED 1.2 MILLION GALLONS PER DAY
WASTEWATER TREATMENT PLANT
PROPOSED SBR TREATMENT SYSTEM
SINGLE LINE DIAGRAM

SHEET No.
171



NOTE: THE LIMITS OF DISTURBANCE (LOD) HAS BEEN EXTENDED TO THE LOCATION IN ORDER TO ACHIEVE A 2.5 H: 1 V LAYBACK FOR EXCAVATION. SITE PLANS WILL NOT BE UPDATED TO REFLECT THE CHANGE AT THIS TIME.

CAD FILE: R:\020\020-1535-WWTP-RIPLEY-Drawing\Contract #3\Drawings\WWTP_Setbacks.dwg
 PLOT DATE/TIME: 3/22/2022 1:20 PM
 LAYOUT: Sheet-7
 USER: philip lantz

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NO.	BY	DATE	DESCRIPTION
1	PL	3/21/22	ADDENDUM No. 2



SCALE: 1"=30'
 DRAWN: P.LANTZ DATE: 9/2021
 CHECKED: R. HUDKINS DATE: 1/2022
 APPROVED: D. FERRELL DATE: 2/2022
 SURVEY DATE:
 SURVEY BY:
 FIELD BOOK No.:

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101-020-1535

CITY OF RIPLEY
 PROPOSED 1.2 MILLION GALLONS PER DAY
 WASTEWATER TREATMENT PLANT
 PROPOSED WEST SIDE SITE
 CONSTRUCTION SETBACKS

SHEET No.
X