



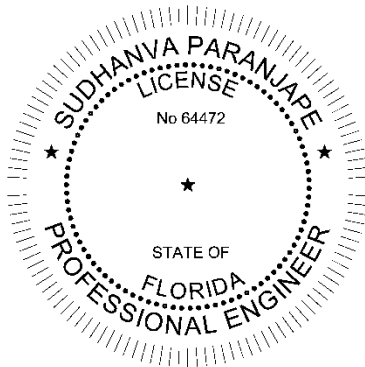
THE CITY OF DAYTONA BEACH UTILITIES DEPARTMENT
ENGINEERING DIVISION
P.O. BOX 2451
DAYTONA BEACH, FL 32115

WESTSIDE REGIONAL WRF BIOSOLIDS DEWATERING SYSTEM IMPROVEMENTS

**CONTRACT NO. 1307-1022
INVITATION TO BID NO. 20403**

**ADDENDUM NO. 5
TO THE
CONTRACT DOCUMENTS**

April 2020



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ADDENDUM NO. 5

DATE: April 29, 2020

PROJECT: **ITB 20403**

Westside Regional WRF BIOSOLIDS DEWATERING SYSTEM IMPROVEMENTS

OPENING DATE: ~~May 8, 2020~~ May 15, 2020

This addendum is hereby incorporated into the Bid Documents for the project referenced above. The following items are clarifications, corrections, additions, deletions and/or revisions to and shall take precedence over the original documents. Additions are indicated by underlining, deletions are indicated by ~~striketrough~~.

1. The Bid Opening Date is hereby CHANGED from ~~May 8, 2020~~ to May 15, 2020 at 2:00 p.m. The new deadline for submittal of questions is May 5. A final addendum will be issued shortly thereafter to address questions received before the deadline.
2. Section 14900 referenced in Addenda #4 but not included with that addendum is ATTACHED to this Addendum.
3. Answers to Bidders' questions:
 - a. Question 1: In regards to the temporary dewatering rental, what is the minimum time frame the unit will be needed (months)? Is the eight month time frame listed in the bid documents a minimum time frame?

Response 1: The Contractor shall develop a detailed project schedule, based on the construction sequence and constraints presented in Section 01140. It is the intent of the City to reduce the rental time to the extent possible. The eight months should be looked as the maximum time to allow for installation of the truck loading conveyors and certain piping on the 1st floor, which will require taking the existing truck loading conveyors and belt filter presses out of service.

- b. Question 2: Due to the very low solids in the sludge to be dewatered, can a combination of a thickener and a dewatering system be used for temporary dewatering.

Response 2: Yes it is the choice of the Contractor to rent the proper dewatering equipment that can achieve a minimum of 14% cake solids.

- c. Question 3: What is the anticipated delivery date of the new belt presses?

Response 3: The Contractor will procure the new belt presses. Typical delivery is 16 to 20 weeks after approval of shop drawings. Shop drawings are typically delivered 8 -10 weeks after receipt of the Purchase Order (in this case issued by the Contractor).

- d. Question 4: Is the equipment that is currently being used for dewatering functioning properly or is it being plagued with continuous breakdowns that would warrant the temporary dewatering to be needed prior to the anticipated delivery of belt presses.

Response 4: The existing belt filter presses are operational at this time.

- e. Question 5: What is the anticipated start date for the project to begin (assuming all the paperwork and permits are in order)?

Response 5: Notice to proceed is anticipated 6-8 weeks after bid opening.

- f. Question 6: Is the project considered a "time is of the essence" job.

Response 6: This project is replacing critical infrastructure that is aging and maintenance intensive. That being said, the existing units are still functional and all indications are that they could remain operational as long as spare parts are readily available.

- g. Question 7: Can the City please provide at least two years of dewatering records, specifically the number of gallons dewatered per day, percent cake solids, and wet and dry tons produced per day.

Response 7: The table below provides monthly averages for the past several months of sludge dewatered at the plant.

Month	WAS processed, (gallons per day)	Dewatered Cake (Wet tons/day)	Dewatered Cake (Dry tons/day)	% Cake Solids
March 2018	363,034	52.33	8.94	17.1
April 2018	377,636	53.87	9.12	16.89
May 2018	301,269	38.99	6.48	16.75
June 2018	221,629	32.42	5.20	15.10
July 2018	385,667	50.04	8.66	17.30
Aug. 2018	290,131	42.83	6.45	17.95

Month	WAS processed, (gallons per day)	Dewatered Cake (Wet tons/day)	Dewatered Cake (Dry tons/day)	% Cake Solids
Sept. 2018	393,023	47.18	7.71	17.64
Oct. 2018	367,611	43.38	6.22	16.55
Nov. 2018	320,673	45.99	6.47	15.80
Dec. 2018	309,980	46.02	6.58	15.79
Jan 2019	378,161	52.43	8.28	15.75
Feb 2019	363,974	60.36	8.35	15.6
Mar 2019	390,319	57.98	8.28	14.78
Apr 2019	400,707	58.08	8.49	15.75
May 2019	344,874	42.59	7.21	17.0
June 2019	420,528	48.34	8.05	16.78
July 2019	386,526	47.24	7.39	15.68
Aug 2019	385,012	46.71	7.12	15.33
Sept. 2019	341,187	34.96	5.58	15.99
Oct. 2019	179,425	30.49	4.99	16.45
Nov. 2019	334,030	52.91	8.25	15.81
Dec. 2019	365,083	39.13	5.93	16.7
Jan 2020	338,668	48.33	7.88	16.08
Feb 2020	334,003	56.89	9.06	15.87
Mar 2020	340,957	43.25	7.47	17.29

- h. Question 8: With the Coronavirus impacting visitors to the area, how has this impacted the sludge production and how long is this expected to last?.

Response 8: WAS Flows and Sludge Production are down about 35 to 45%.

- i. Question 9: Draft Contract, Article III - Commencement and Completion - Article III states that "Substantial Completion within 395 days after the Commencement Date and Final Completion within 30 days after the Commencement Date..." Please confirm that this should be changed to read "...Final Completion within 30 days of Substantial Completion..."

Response 9: Yes, Final Completion will be within 30 days after Substantial Completion.

- j. Question 10: Attachment A Certifications - Per the ITB, bidders are required to submit Attachment A with the Bid, listing all MBEs and WBEs contacted by the Bidder with a request to submit a subcontracting/supplier quote. Bidders are also advised to provide "copies of MBE/WBE certification for each MBE/WBE subcontractor and supplier". Please confirm, certification copies represent only MBE and WBE companies that have submitted a proposal.

Response 10: Bidders are *asked*, not "required" to submit Attachment A and B with their Bid. Copies of MBE/WBE certifications are requested for *all* MBE/WBE's listed. Attachment A demonstrates the Bidder's good faith effort to obtain contract participation. Whether or not they propose does not negate the fact that the Bidder made a good faith effort to obtain their proposal and eventually, potentially, their contract participation.

- k. Question 11: The Re-Use Water Feed on the South East Corner of the building is in conflict with the new Pipe Trench and Grating. Will this need to be kept in service throughout construction to the existing BFP's?

Response 11: The existing BFPs will be taken off-line for a period with the use of a temporary dewatering unit to be rented by the Contractor. The trench and modifications to the re-use piping will need to be completed when this occurs.

- l. Question 12: Site Visit, Addendum # 3 - Addendum 03 (dated April 14) revised a walk through date from April 17 to April 15. This did not provide enough notice for interested subs. Can another site visit be arranged?

Response 12: An additional site visit will not be arranged.

- m. Question 13: Specification 09910 - Specification 09910 indicates that "or equal" products may be permitted. Please advise if Benjamin Moore is an accepted manufacturer for products specified in section 09910 of the specifications?

Response 13: Yes Benjamin Moore is an acceptable manufacturer.

- n. Question 14: Specification 08120 - The Door Schedule on sheet S09 calls for aluminum doors to be fire rated, however the manufacturer specified in section 08120 does not make fire rated doors. Please advise if all aluminum doors are to require a fire rating?

Response 14: The doors shall be FRP per the attached specification section 08220. The fire rating shall be as indicated on the finish schedule doors D1, D2, D5, and D6. All other doors do not need a fire rating.

- o. Question 15: Specification 15052 - The piping schedule in specification 15052 does not list a pipe material for DR below grade. Please specify what Material the 4" DR shown on drawing C02 is supposed to be.

Response 15: The material for the drain piping below grade will be SDR 26 PVC gravity sewer pipe. See revised specification 15052.

- p. Question 16: Drawing 00N-07 - Do the new washwater pumps require seal water?
No seal water is shown on the washwater P&ID drawing 00n07, but a seal water detail M262 is provided on drawing TM01.
Response 16: Washwater pump does not need seal water.
- q. Question 17: Drawing M-01A - Confirm that the air compressor and dryer unit called out and shown on drawing M01A is an existing unit and no work is required for these units.
Response 17: Yes the air compressor and dryer unit shown on the drawings is working well and will remain in service. We will not require a new air compressor and dryer to replace this unit. Replace existing drawings MD03, MD04, M01A, M01B, M01C, 00E04, 00E15, 00E16, 00E17, 00E20, 00E21, 00E22 and 00E23 with attached.
- r. Question 18: Specification 05140 - The pre-engineered Aluminum Canopy is shown to be Aluminum. Would a pre-engineered steel canopy be accepted?
Response 18: Aluminum canopy is no longer required. Instead, steel canopy will be part of the base bid. Replace drawings S01 and S10 with the one attached to this Addendum. Also see attached Specification Section 13121.
- s. Question 19: Existing FRP Piping - Please confirm all the FRP piping on the roof is required to be demolished.
Response 19: Yes all FRP piping on the roof also needs to be demolished.
- t. Question 20: Existing FRP Piping - Is the FRP piping on the Westside of the building required to be demolished and removed below grade?
Response 20: FRP piping on the Westside of the building is also required to be demolished. However any below grade FRP will be abandoned in place.
- u. Question 21: Existing Concrete Coatings - There are existing coatings on the concrete floor on the first floor of the building. Are these coatings to be removed or repaired during construction?
Response 21: Any existing coatings shall be removed and the concrete surface prepared to receive proposed concrete (i.e. containment walls) and proposed coatings such as the floor coating in the electrical room. See revised Specification 09960. Added subparagraph 3.21.C.1.b describing the coatings for the containment area around the belt filter presses.

- v. Question 22: Temporary press - Is a fixed conveyor acceptable for the temporary press?

Response 22: Yes, fixed conveyor is acceptable as long as it is sufficiently high to allow dumping the cake in the trucks that will be used to haul the cake offsite. Coordinate with the Owner on location of the mobile dewatering system to facilitate ease of truck traffic movement.

- w. Question 23: Drawings 00E16 and 00E20 - Notes on sheets 00E16 and 00E20 state that 2nd floor lighting is to be an "Additive Bid Item" however this is not shown as such on the bid form. Please clarify.

Response 23: The bid form is modified to include the replacement of the lighting on the 2nd floor of the dewatering building as an "ADDITIVE BID ITEM". See revised Bid Schedule.

- x. Question 24: Specification 04220 - Please provide detail for masonry infill where FRP piping is to be removed.

Response 24: See additional detail 7 on sheet S11.

- y. Question 25: Drawings S03 - Drawing S03(A,B,C) indicates stucco patching at the building exterior. Please provide a specification for stucco.

Response 25: See attached specification section 09220.

- z. Question 26: Sheets S03B & S03C show areas of new construction to the existing building exterior, including stucco & painting required. Does the exterior of the existing building get painted in any other areas?

Response 26: None of the exterior of the existing building will be painted, other than what is shown on the drawings.

- aa. Question 27: Will C.C. Control be accepted as an Owner approved equal for the Single Instrument and Controls (I&C) Supplier?

Response 27: Yes C.C. Control is an accepted ISS for this project.

- bb. Question 28: Spec section 01324B-1.03B requires the contractor to provide the engineer with a stand-alone copy of the most current version of Primavera P6 Professional. Is the most current version of MS Project an acceptable alternate scheduling program?

Response 28: Yes MS Project is acceptable as alternate scheduling program. However all details as described in the section 01324B will be required to be shown.

cc. Question 29: Spec section 01010-1.02B.n calls for the painting of the walls of the new belt press room on the first floor. Is this the new electrical room being built on the first floor or all of the interior walls on the first floor of the existing building?

Response 29: See revised drawing S09 for finish schedule. All of the interior walls of the 1st floor including the new electrical room will be painted per this schedule.

dd. Question 30: Spec section 01150-2 requires the contractor to provide a certified site survey prior to proceeding with any work. As the majority of this project is inside an existing building, what are the limits of the site survey?

Response 30: The only site survey that will be required is the outside where the polymer canopy will be installed.

ee. Question 31: Specification section GC-17, item 6.7 states the contractor is to secure & pay for all permits. And that the City will reimburse the contractor for any City required permits. Will the building & electrical permit fees required to build this project be paid in a separate change order at the start of the project or will the fees be waived.

Response 31: The Contractor will be responsible for securing all permits, however the City will pay for the permits. As such the Contractor is not to include any permit costs in their bid price.

ff. Question 32: Specification 01568 requires the contractor to obtain a SWPPP. Not seeing silt fence or other on the plans, where is the erosion control to be installed?

Response 32: The erosion control needs to be installed around the construction of the polymer storage canopy.

gg. Question 33: CLX Engineering is a local (Seminole County) based Instrumentation and Controls firm and be a great addition to the list of pre-approved companies. Although our service coverage is nationwide, we have a strong local presence as well.

Response 33: CLX Engineering is not approved as a pre-approved ISS for this project. We will consider CLX Engineering for future projects.

- hh. Question 34: Does the City & its building department require no work to proceed until the belt press rental unit is processing sludge outside the dewatering building? If not, what work can be performed while the belt presses are operating on the 2nd floor? Electric room construction? New press foundations? Trench piping? Please advise in the next addendum.

Response 34: All of the trenching, press foundations, electrical room, installation of the belt filter presses, polymer system, connecting piping, new horizontal conveyors, etc. will be constructed on the 1st floor, while the City is still operating the existing belt filter presses and cake conveyor on the 2nd floor. However, the installation of the new truck loading conveyors will require the existing belt filter presses and associated conveyors to be taken offline. So a precursor to taking the existing presses online will be to bring in a rental dewatering system to allow the installation of the truck loading conveyors.

- ii. Question 35: Will the contractor be responsible for supplying a generator for the Mobile biosolids dewatering system or is plant power available.

Response 35: The plant has power available. There is no need to supplying a generator for the mobile dewatering system.

- jj. Question 36: Per the pre-bid meeting, we understand the sludge press equipment will be a direct purchase by the City. Is the cost of the sludge press equipment included in the \$3.6M budget?

Response 36: Yes, the cost of the sludge press equipment should be included in the Contractor's Bid. The City's budget (estimate) of \$3.6 M for this project includes the cost of this equipment.

- kk. Question 37: Does the City intend to award this project if it exceeds the \$3.6M budget?

Response 37: If the project exceeds the City's budget, the City will evaluate the bids and make a determination as whether to award as is or value engineer and re-bid.

- ll. Question 38: Does this project require AIS certification, USA only product documentation, &/or Davis-Bacon wage certification with onsite interviews? If so, do the current Heavy Construction Davis-Bacon wages apply?

Response 38: This project is funded with an SRF for AIS and Davis-Bacon wage rates will apply. Please refer to PDF page 108 of the "ITB-20403_Westside Reg WRF Biosolids Dewatering Imps.pdf" on the solicitation page for this project. Heavy Construction Davis-Bacon wages are listed beginning on that page.

mm. Question 39: Have any of the sludge press suppliers performed an onsite pilot test to determine if their equipment meets the performance specifications? If so, which suppliers?

Response 39: None of the sludge press suppliers have performed onsite pilot testing. Based on the plant data (see response to Question 7 above), the existing presses produce a dewatered cake with 15% to 17% cake solids. We anticipate the newer presses would perform equal or better than the existing presses. Our specification requires the new presses to meet a minimum cake of 16%. All named manufacturer have agreed to meet the specification requirement.

nn. Question 40: The minimum construction experience qualifications are process specific to belt filter presses. Will the City accept experience installing centrifuges & plate/frame filter presses as an equal, since they process sludge similarly?

Response 40: No. The project requires the Contractor having specific experience with procurement, installation and successful start-up, testing and training related to belt filter presses for sludge dewatering.

oo. Question 41: The minimum construction experience qualifications do not consider past projects successfully built for the City. Will the City consider this as well during an award review process?

Response 41: The project will be awarded to the lowest bidder who meets the minimum qualifications. Past work for the City is not part of the minimum qualifications and therefore won't be considered.

pp. Question 42: Specification section 03150-2.02 calls for 6" 316SS shop fabricated waterstop. Plan sheet S07 shows a hydrophilic waterstop as typical. Which waterstop is to be used?

Response 42: SS waterstops are not to be provided. Waterstops shall be as shown on the Drawings.

qq. Question 43: Drawing S10 shows a Pre-Engineered Aluminum Canopy. This Aluminum Canopy cannot be found in the specs. Can you please clarify?

Response 43: Aluminum canopy is no longer required. Instead, steel canopy will be part of the base bid. Replace drawing S10 with the one attached to this Addendum.

rr. Question 44: Drawing S03A shows crack repair. Is there an exact linear footage of repair? Can you please clarify?

Response 44: The stucco cracks are located in the vicinity shown on the Drawings. The Contractor shall assume a minimum of 300 L.F. of cracks are to be repaired.

CLARIFICATIONS

- a. Remove existing bridge crane on the 2nd floor of the dewatering building as part of ADDITIVE BID ITEM. See revised Bid Schedule.
- b. Attached are revised drawings C02 and M05, showing the changes made to the reuse water and potable water piping.
- c. Attached is revised Specification 11246, upsizing the polymer blending units.
 - 1) Revised paragraph 1.04 C.1.g.1) Westside Regional WRF: 0.75 to 15 gallons per hour.
 - 2) Revised paragraph 1.04 C.3.b.2) minimum output range: 0.75 to 15 gallons per hour

All other terms and conditions remain the same.

The Bidder shall acknowledge receipt of this addendum on the Bid Proposal Form.

The City of Daytona Beach
Joanne Flick, CPPO
Purchasing Agent

Posted online at <https://www.codb/841.us>

SECTION 08220

FIBERGLASS REINFORCED PLASTIC DOORS AND FRAMES

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards that may be referenced in this Section:
1. ASTM International (ASTM):
 - a. D635, Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.
 - b. E84, Standard Test Method for Surface Burning Characteristics of Building Materials.
 - c. D638 Tensile Strength Properties of Plastics.
 - d. D790, Flexural Strength Properties of Plastics.
 - e. E1886, Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Missiles.
 - f. C578, Standard Specification for Rigid, Cellular Polystyrene Thermal insulation.
 - g. D2843, Standard Test Method for Density of Smoke From the Burning of Decomposition of Plastics.
 2. National Fire Protection Association (NFPA): 80, Standard for Fire Doors and Windows.

1.02 SUBMITTALS

- A. Action Submittals:
1. Shop Drawings: Manufacturer's literature, and drawings prepared for this project showing types, sizes, fire ratings, complete details of door and frame construction, including resin used, glass/resin ration, cutouts and anchorage for units.
 2. Color: Manufacturer's full range color chart for color selection.
 3. Certification of manufacturer's and installer's qualifications.
- B. Informational Submittals:
1. Manufacturer's installation instructions.
 2. Manufacturer's instructions for handling and care of products.
 3. Executed guarantee.
- C. Submittals:
1. Summary door schedule indicating door number (as shown on Drawings, door size, type, frame type, size, handing and hardware.
 2. Door Schedule to include door and frame elevations.

3. State of Florida Product Approvals.

1.03 DELIVERY, STORAGE, AND HANDLING

A. Delivery:

1. Deliver doors to jobsite after moisture-producing construction operations are complete and building has reached average prevailing relative humidity of locality.
2. Deliver doors and frames in unopened packages, clearly marked with manufacturer's name, brand name, size, thickness, and identifying symbol or mark related to door numbers used in Contract Documents.

B. Storage and Handling:

1. In strict compliance with manufacturer's instructions and recommendations.
2. Minimize onsite storage time.
3. Handle with clean gloves.
4. Do not drag doors across one another or across other surfaces.
5. Store in dry area and protect from damage.

1.04 SPECIAL GUARANTEE

- A. As special guarantee, provide manufacturer's extended guarantee or warranty, with OWNER named in writing as beneficiary. Special guarantee shall provide for correction or removal and replacement of Work specified in this Section found defective during a period of 2 years after date of Substantial Completion. Duties and obligations for correction or removal and replacement of defective Work as specified in General Conditions.
- B. Defects include warp, separation or delamination from core, expansion of core, and failures due to corrosion.

1.05 QUALITY ASSURANCE

- A. Door and hardware assembly to meet positive and negative pressures as shown on Door Schedule.
- B. Doors for this Project are not required to meet impact requirements of the Florida Building Code.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Chem-Pruf Door Company.
- B. Other manufacturers with prior approval.

2.02 DOORS

A. General:

1. Flush construction, minimum 1-3/4 inches thick, with no seams, cracks, or joints.
2. Full length integral edge reinforcement.
3. Face shall not deviate more than 1/4 inch from a true plane at any point.
4. Reinforced to receive hardware specified.
5. Doors may be prehung at factory or hung in field.
6. Resins:
 - a. Formulate for extremely corrosive and humid environments above 50 percent relative humidity that may contain ammonia or chloride gas.
 - b. Fire retardant formulation plus antimony trioxide to achieve an ASTM E84 flame spread of 25 or less and be self-extinguishing in accordance with ASTM D635.
 - c. Contain Ultraviolet light inhibitor additives.
7. Prepare doors and frames for hardware only after receipt of hardware templates.
8. Make cutouts for openings at factory and furnish with FRP frames and stops that prevent moisture from entering or passing through door.
9. Door and frames to be constructed as required to meet Project design pressures.
10. Doors and frames to be custom color.

B. Doors:

1. Molded in one continuous piece.
2. Core of closed cell, nonabsorptive, 2 pounds per square foot density, isocyanurate or urethane rigid foam.
3. Finish: Contractor to match existing doors onsite.
4. Furnish astragals at joints between pairs and with transom panels.

2.03 FRAMES

- A. Manufacturer's standard one-piece-pultruded, three-piece built-up, or one-piece molded FRP with double rabbeted profile, reinforced for specified hardware, assembled with stainless steel fasteners, and furnished with wall anchors for installation after wall opening is complete.
- B. Furnished by door manufacturer with finish to match doors and prepared for hardware specified.

2.04 GLAZING

- A. Glass lites in doors shall be 7/16" thick laminated impact resistant with a 0.090 PVB interlayer.

PART 3 EXECUTION

3.01 INSPECTION

- A. Verify doors and frames comply with approved Shop Drawings and meet indicated requirements for type, size, hardware, location, and swing.
- B. Examine openings for conditions that would prevent proper installation.
- C. Do not proceed with installation until defects are corrected.
- D. Do not install doors in frames that would hinder operation of doors.

3.02 INSTALLATION

- A. Install, following manufacturer's written instructions, using only noncorrosive materials and methods.
- B. Tolerances:
 - 1. From Door Bottom to Floor Covering: 1/2 inch.
 - 2. From Bottom to Top of Threshold: 1/4 inch.
 - 3. Maximum From Top: 1/8 inch.
 - 4. Bevel Lock and Hinge Edges: 1/8 inch in 2 inches.
 - 5. Clearance of Meeting Stiles of Pairs of Doors: 1/8 inch.
- C. Install frames square, plumb, rigid, and in true alignment. Brace securely during construction to retain proper position and clearances. Anchor firmly in-place.
- D. Do not cut or otherwise alter integrity of door to allow door to fit frame.
- E. Frames Set in Concrete or Masonry: Secure each jamb with four stainless steel expansion anchors following manufacturer's instructions.

3.03 ADJUST AND CLEAN

- A. Replace or rehang doors that are hinge-bound and do not swing, latch or operate smoothly and freely.
- B. Remove and install new prefinished doors in-place of those damaged during installation.
- C. Modify doors and frames only at manufacturer's factory.

END OF SECTION

AD5 Addendum No. 5 – April 29, 2020

SECTION 09220

CEMENT PLASTER (STUCCO)

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. This section includes materials and installation of the exterior stucco finish with integral color.

1.02 SUBMITTALS

- A. Submit product data including manufacturer's literature demonstrating compliance with these specifications.
- B. Submit color chart showing integral coloring options for Owner's selection.

1.03 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following codes, specifications, and standards, except where more stringent requirements are shown or specified:
 - 1. FBC, Florida Building Code.
 - 2. Portland Cement Plastering Standards
- B. Use skilled workmen who are trained and experienced and who are familiar with the installation of the products specified herein.
- C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution. Mockup shall include decorative reveal panels as shown on wall section in the Drawings.

PART 2 - PRODUCTS

2.01 PLASTER MATERIALS

- A. Portland cement shall conform to ASTM C150, Type I or IA.
- B. Lime shall be special finishing hydrated lime conforming to ASTM C206, Type S.
- C. Sand shall be clean, natural and free from soluble salts and organic matter, and shall comply with ASTM C35 and when dry shall pass No. 4 sieve.

- D. Fiber shall be pure manilla, glass or synthetic fiber, good quality ½ inch to 2 inches in length, free from grease, oil, dirt and other impurities. No asbestos shall be used.
- E. Water shall be clean, fresh potable water.
- F. Bonding agent shall be Acryl 60 by Harris Specialty Chemicals, Inc.

2.02 STUCCO ACCESSORIES

- A. Stucco accessories shall be produced from weatherproof PVC as manufactured by Vinyl Tech Accessories Plastic Components, Inc.
- B. Corner beads shall be No. 1.
- C. Casing beads shall be No. 10.
- D. Stucco reveal shall be 708-75.
- E. Stucco reveal cross intersection shall be PRC-75.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas where the cement plaster (stucco) will be installed and bring any unsatisfactory conditions to the attention of the Contractor. Do not proceed with installation until the unsatisfactory conditions are corrected.

3.02 INSTALLATION

- A. Cement plaster (stucco) shall be 3 coat work on CMU or concrete with a minimum thickness of ¾ inch. The three coats shall be scratch coat, brown coat and finish coat.
- B. Apply scratch coat in a 3/8 inch minimum thickness with sufficient pressure to force it through and completely imbed metal lath or to form a good bond on masonry, and then scratch to roughen surface.
- C. Apply brown coat over scratch coat in a ¼ inch minimum thickness with sufficient pressure to form a good bond, rodged level and left rough.
- D. Apply finish coat over brown coat in a 1/8 inch minimum thickness. Float finish to a true, even surface and as required to produce a fine texture. Finish shall be sand finish.
- E. Moisture protection and curing. Dampen previous coats that have dried out prior to time for applications of next coat. Dampen with water as required for uniform suction.

3.03 CLEANUP

- A. Clean up any loose material upon completion of installation and dispose of in designated containers or off site.

END OF SECTION

^{AD5} Addendum No. 5 – April 29, 2020

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SECTION 09960

HIGH-PERFORMANCE COATINGS

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes: Field-applied coatings.

1.02 REFERENCES

- A. ASTM International (ASTM):
1. D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications.
 2. D4541 - Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.
- B. International Concrete Repair Institute (ICRI):
1. Guideline 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair.
- C. NACE International (NACE):
1. SP0178 - Design, Fabrication, and Surface Finish Practices for Tanks and Vessels to Be Lined for Immersion Service.
 2. SP0188 - Discontinuity (Holiday) Testing of Protective Coatings.
- D. National Association of Pipe Fabricators (NAPF):
1. 500-03 - Surface Preparation Standard for Ductile Iron Pipe and Fittings Receiving Special External Coatings and/or Special Internal Linings.
- E. NSF International (NSF):
1. 61 - Drinking Water System Components - Health Effects.
- F. Society for Protective Coatings (SSPC):
1. SP COM - Surface Preparation Commentary for Steel and Concrete Substrates.
 2. SP 1 - Solvent Cleaning.
 3. SP 2 - Hand Tool Cleaning.
 4. SP 3 - Power Tool Cleaning.
 5. SP 5 - White Metal Blast Cleaning.
 6. SP 6 - Commercial Blast Cleaning.
 7. SP 7 - Brush-Off Blast Cleaning.
 8. SP 10 - Near-White Blast Cleaning.
 9. SP 13 - Surface Preparation of Concrete.
- G. United States Environmental Protection Agency (EPA):
1. Method 24 - Surface Coatings.

1.03 DEFINITIONS

- A. Submerged metal: Steel or iron surfaces below tops of channel or structure walls that will contain water even when above expected water level.
- B. Submerged concrete and masonry surfaces: Surfaces that are or will be:
 - 1. Underwater.
 - 2. In structures that normally contain water.
 - 3. Below tops of walls of water-containing structures.
- C. Exposed surface: Any metal or concrete surface, indoors or outdoors, that is exposed to view.
- D. Dry film thickness (DFT): Thickness of fully cured coating, measured in mils.
- E. Volatile organic compound (VOC): Content of air polluting hydrocarbons in uncured coating product measured in units of grams per liter or pounds per gallon, as determined by EPA Method 24.
- F. Ferrous: Cast iron, ductile iron, wrought iron, and all steel alloys except stainless steel.
- G. Where SSPC surface preparation standards are specified or implied for ductile iron pipe or fittings, the equivalent NAPF surface preparation standard shall be substituted for the SSPC standard.

1.04 PERFORMANCE REQUIREMENTS

- A. Coating materials shall be especially adapted for use in wastewater treatment plants.
- B. Coating materials used in contact with potable water supply systems shall be certified to NSF 61.

1.05 SUBMITTALS

- A. General: Submit as specified in Section 01330 - Submittal Procedures.
- B. Shop drawings:
 - 1. Schedule of proposed coating materials.
 - 2. Schedule of surfaces to be coated with each coating material.
- C. Product data: Include description of physical properties of coatings including solids content and ingredient analysis, VOC content, temperature resistance, typical exposures and limitations, and manufacturer's standard color chips:
 - 1. Regulatory requirements: Submit data concerning the following:
 - a. VOC limitations.
 - b. Coatings containing lead compounds and polychlorinated biphenyls.
 - c. Abrasives and abrasive blast cleaning techniques, and disposal.
 - d. NSF certification of coatings for use in potable water supply systems.

- D. Samples: Include 8-inch square drawdowns or brush-outs of topcoat finish when requested. Identify each sample as to finish, formula, color name and number, sheen name, and gloss units.
- E. Certificates: Submit in accordance with requirements for Product Data.
- F. Manufacturer's instructions: Include the following:
 - 1. Special requirements for transportation and storage.
 - 2. Mixing instructions.
 - 3. Shelf life.
 - 4. Pot life of material.
 - 5. Precautions for applications free of defects.
 - 6. Surface preparation.
 - 7. Method of application.
 - 8. Recommended number of coats.
 - 9. Recommended DFT of each coat.
 - 10. Recommended total DFT.
 - 11. Drying time of each coat, including prime coat.
 - 12. Required prime coat.
 - 13. Compatible and non-compatible prime coats.
 - 14. Recommended thinners, when recommended.
 - 15. Limits of ambient conditions during and after application.
 - 16. Time allowed between coats (minimum and maximum).
 - 17. Required protection from sun, wind, and other conditions.
 - 18. Touch-up requirements and limitations.
 - 19. Minimum adhesion of each system submitted in accordance with ASTM D4541.
- G. Manufacturer's Representative's Field Reports.
- H. Operations and Maintenance Data: Submit as specified in Section 01770 - Closeout Procedures:
 - 1. Reports on visits to project site to view and approve surface preparation of structures to be coated.
 - 2. Reports on visits to project site to observe and approve coating application procedures.
 - 3. Reports on visits to coating plants to observe and approve surface preparation and coating application on items that are "shop coated."
- I. Quality Assurance Submittals:
 - 1. Quality assurance plan.
 - 2. Qualifications of coating applicator including List of Similar Projects.
- J. Certifications:
 - 1. Submit notarized certificate that:
 - a. All paints and coatings to be used on this project comply with current federal, state, and local VOC regulations.

1.06 QUALITY ASSURANCE

- A. Applicator qualifications:
 - 1. Minimum of 5 years of experience applying specified type or types of coatings under conditions similar to those of the Work:
 - a. Provide qualifications of applicator and references listing 5 similar projects completed in the past 2 years.
 - 2. Manufacturer-approved applicator when manufacturer has approved applicator program.
 - 3. Approved and licensed by polymorphic polyester resin manufacturer to apply polymorphic polyester resin coating system.
 - 4. Approved and licensed by elastomeric polyurethane (100-percent solids) manufacturer to apply 100-percent solids elastomeric polyurethane system.
 - 5. Applicator of off-site application of coal-tar epoxy shall have successfully applied coal-tar epoxy on similar surfaces in material, size, and complexity as on the Project.
- B. Regulatory requirements: Comply with governing agencies regulations by using coatings that do not exceed permissible VOC limits and do not contain lead:
 - 1. Do not use coal-tar epoxy in contact with drinking water or exposed to ultraviolet radiation.
- C. Certification: Certify that applicable pigments are resistant to discoloration or deterioration when exposed to hydrogen sulfide and other sewage gases and product data designates coating as suitable for wastewater service.
- D. Field samples:
 - 1. Prepare and coat a minimum 100-square-foot area between corners or limits such as control or construction joints of each system.
 - 2. Approved field sample may be part of the Work.
 - 3. Obtain approval before painting other surfaces.
- E. Pre-installation conference: Conduct as specified in Section 01312 - Project Meetings.
- F. Compatibility of coatings: Use products by same manufacturer for prime coats, intermediate coats, and finish coats on same surface, unless specified otherwise.
- G. Services of coating manufacturer's representative: Arrange for coating manufacturer's representative to attend pre-installation conferences. Make periodic visits to the project site to provide consultation and inspection services during surface preparation and application of coatings, and to make visits to coating plants to observe and approve surface preparation procedures and coating application of items to be "shop-primed and coated."

1.07 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products as specified in Section 01600 - Product Requirements.
- B. Remove unspecified and unapproved paints from Project site immediately.

- C. Deliver new unopened containers with labels identifying the manufacturer's name, brand name, product type, batch number, date of manufacturer, expiration date or shelf life, color, and mixing and reducing instructions.
 - 1. Do not deliver materials aged more than 12 months from manufacturing date.
- D. Store coatings in well-ventilated facility that provides protection from the sun weather, and fire hazards. Maintain ambient storage temperature between 45 and 90 degrees Fahrenheit, unless otherwise recommended by the manufacturer.
- E. Take precautions to prevent fire and spontaneous combustion.

1.08 PROJECT CONDITIONS

- A. Surface moisture contents: Do not coat surfaces that exceed manufacturer-specified moisture contents, or when not specified by the manufacturer, with the following moisture contents:
 - 1. Plaster and gypsum wallboard: 12 percent.
 - 2. Masonry, concrete, and concrete block: 12 percent.
 - 3. Interior located wood: 15 percent.
 - 4. Concrete floors: 7 percent.
- B. Do not apply coatings:
 - 1. Under dusty conditions or adverse environmental conditions, unless tenting, covers, or other such protection is provided for structures to be coated.
 - 2. When light on surfaces measures less than 15 foot-candles.
 - 3. When ambient or surface temperature is less than 55 degrees Fahrenheit unless manufacturer allows a lower temperature.
 - 4. When relative humidity is higher than 85 percent.
 - 5. When surface temperature is less than 5 degrees Fahrenheit above dew point.
 - 6. When surface temperature exceeds the manufacturer's recommendation.
 - 7. When ambient temperature exceeds 90 degrees Fahrenheit, unless manufacturer allows a higher temperature.
 - 8. Apply clear finishes at minimum 65 degrees Fahrenheit.
- C. Provide fans, heating devices, dehumidifiers, or other means recommended by coating manufacturer to prevent formation of condensate or dew on surface of substrate, coating between coats and within curing time following application of last coat.
- D. Provide adequate continuous ventilation and sufficient heating facilities to maintain minimum 55 degrees Fahrenheit for 24 hours before, during, and 48 hours after application of finishes.
- E. Dehumidification and heating for coating of high humidity enclosed spaces:
 - 1. Provide dehumidification and heating of digester interior spaces in which surface preparation, coating application, or curing is in progress according to the following schedule:
 - a. October 1 to April 30: Provide continuous dehumidification and heating as required to maintain the tanks within environmental ranges as specified in this Section and as recommended by the coating material manufacturer. For the purposes of this Section, "continuous" is defined as 24 hours per day and 7 days per week.

- b. May 1 to September 30: Provide temporary dehumidification and heating as may be required to maintain the tanks within the specified environmental ranges in the event of adverse weather or other temporary condition. At Contractor's option and at his sole expense, Contractor may suspend work until such time as acceptable environmental conditions are restored, in lieu of temporary dehumidification and heating. Repair or replace any coating or surface preparation damaged by suspension of work, at Contractor's sole expense.
- 2. Equipment requirements:
 - a. Capacity: Provide dehumidification, heating, and air circulation equipment with minimum capacity to perform the following:
 - 1) Maintain the dew point of the air in the tanks at a temperature at least 5 degrees Fahrenheit less than the temperature of the coldest part of the structure where work is underway.
 - 2) Reduce dew point temperature of the air in the tanks by at least 10 degrees Fahrenheit in 20 minutes.
 - 3) Maintain air temperature in the tanks at 60 degrees Fahrenheit minimum.
 - b. Systems:
 - 1) Dehumidification: Provide desiccant or refrigeration drying. Desiccant types shall have a rotary desiccant wheel capable of continuous operation. No liquid, granular, or loose lithium chloride drying systems will be allowed.
 - 2) Heating: Electric, indirect combustion, or steam coil methods may be used. Direct-fired combustion heaters will not be allowed during abrasive blasting, coating application, or coating cure time.
- 3. Design and submittals:
 - a. Contractor shall prepare dehumidification and heating plan for this project, including all equipment and operating procedures.
 - b. Suppliers of services and equipment shall have not less than 3 years of experience in similar applications.
 - 1) Manufacturers: The following or equal:
 - a) Cargocaire Corp. (Munters).
 - c. Submit dehumidification and heating plan for Engineer's review.
- 4. Monitoring and performance:
 - a. Measure and record relative humidity and temperature of air, and structure temperature twice daily (beginning and end of work shifts) to verify that proper humidity and temperature levels are achieved inside the work area after the dehumidification equipment is installed and operational. Test results shall be made available to the Engineer upon request.
 - b. Interior space of the working area and tank(s) shall be sealed, and a slight positive pressure maintained as recommended by the supplier of the dehumidification equipment.
 - c. The filtration system used to remove dust from the air shall be designed so that it does not interfere with the dehumidification equipment's ability to control the dew point and relative humidity inside the reservoir.
 - 1) The air from the tank, working area, or dust filtration equipment shall not be recirculated through the dehumidifier during coating application or when solvent vapors are present.

1.09 SEQUENCING AND SCHEDULING

- A. Sequence and Schedule: As specified in Section 01140 - Work Restrictions.

1.10 MAINTENANCE

- A. Extra materials: Deliver as specified in Section 01770 - Closeout Procedures. Include minimum 1 gallon of each type and color of coating applied:
 - 1. When manufacturer packages material in gallon cans, deliver unopened labeled cans as comes from factory.
 - 2. When manufacturer does not package material in gallon cans, deliver material in new gallon containers, properly sealed and identified with typed labels indicating brand, type, and color.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Special coatings: One of the following or equal:
 - 1. Carboline: Carboline.
 - 2. Ceilcote: International Protective Coatings.
 - 3. Dampney: The Dampney Co.
 - 4. Devoe: International Protective Coatings.
 - 5. Dudick: Dudick, Inc.
 - 6. GET: Global Eco Technologies.
 - 7. Henkel: Henkel North America.
 - 8. IET: Integrated Environmental Technologies.
 - 9. PPC: Polymorphic Polymers Corp.
 - 10. PPG Amercoat: PPG Protective & Marine Coatings.
 - 11. Rustoleum: Rustoleum Corp.
 - 12. Sanchem: Sanchem.
 - 13. Superior: Superior Environmental Products, Inc.
 - 14. S-W: Sherwin-Williams Co.
 - 15. Tnemec: Tnemec Co.
 - 16. Wasser: Wasser High Tech Coatings.
 - 17. ZRC: ZRC Worldwide Innovative Zinc Technologies.

2.02 PREPARATION AND PRETREATMENT MATERIALS

- A. Metal pretreatment:
 - 1. Manufacturers: One of the following or equal:
 - a. Henkel, Galvaprep 5.
 - b. International, AWLGrip Alumiprep 33.
- B. Surface cleaner and degreaser:
 - 1. manufacturers: One of the following or equal:
 - a. Carboline Surface Cleaner No. 3.
 - b. Devoe, Devprep 88.
 - c. S-W, Clean and Etch.

2.03 COATING MATERIALS

- A. Alkali-resistant bitumastic:
 - 1. Manufacturers: One of the following or equal:
 - a. Carboline, Bitumastic No. 50.
 - b. S-W, Targuard.
 - c. Wasser, MC-Tar.
 - d. As specified for Coal Tar Epoxy Substitute.
- B. Wax coating:
 - 1. Manufacturers: The following or equal:
 - a. Sanchem, No-Ox-Ild A special.
- C. High solids epoxy (self-priming) not less than 72 percent solids by volume:
 - 1. Manufacturers: One of the following or equal:
 - a. Carboline, Carboguard 891.
 - b. Devoe, Bar Rust 233H.
 - c. PPG Amercoat: Amerlock 2.
 - d. S-W, Macropoxy 646.
 - e. Tnemec, HS Epoxy Series 104.
- D. Aliphatic or aliphatic-acrylic polyurethane:
 - 1. Manufacturers: One of the following or equal:
 - a. Carboline, Carbothane 134 VOC.
 - b. Devoe, Devthane 379.
 - c. PPG Amercoat: Amershield VOC.
 - d. Non-submerged: S-W High Solids Polyurethane.
 - e. Tnemec, Endura-Shield II Series 1075 (U).
- E. Polymorphic polyester resin coating system: 2-component, modified styrene based thermoset resin, EPA approved for potable water, with 100 percent solids and maximum 10 grams per liter VOC.
 - 1. Manufacturers: One of the following or equal:
 - a. IET: IET Prime Coat DS-101, Intermediate Coat DS-301, and Finish Coat DS 401.
 - b. PPC: PPC Prime Coat, IC-Filler Coat, and FC-Final Coat.
- F. High-temperature coating 150 to 350 degrees Fahrenheit:
 - 1. Manufacturers: One of the following or equal:
 - a. Carboline, Thermaline 4900.
 - b. Dampney, Thermalox 245 Silicone - Zinc Dust.
 - c. PPG Amercoat: Amerlock 2/400 GFK.
- G. High-temperature coating 400 to 1,000 degrees Fahrenheit (dry):
 - 1. Manufacturers: One of the following or equal:
 - a. Carboline, Thermaline 4700.
 - b. Dampney, Thermolox 230C Series Silicone.
 - c. Devoe, HT-12, High Heat Silicone.
- H. High-temperature coating up to 1,400 degrees Fahrenheit:
 - 1. Manufacturers: The following or equal:
 - a. Dampney, Thermalox 240 Silicone Ceramix.

- I. Asphalt varnish: AWWA C 500.
- J. Protective coal tar:
 - 1. Manufacturers: One of the following or equal:
 - a. Carboline, Bitumastic No. 50.
 - b. PPG Amercoat: 78HB
 - c. As specified for Coal Tar Epoxy.
- K. Coal-tar epoxy:
 - 1. Manufacturers: One of the following or equal:
 - a. Carboline, 300-M, Bitumastic.
 - b. PPG Amercoat: 78HB.
 - c. S-W, Tar Guard 100.
 - d. Tnemec, Series 46H-413.
- L. Vinyl ester: Glass mat reinforced, total system 125 mils DFT:
 - 1. Manufacturers: One of the following or equal:
 - a. Carboline, Semstone 870.
 - b. Ceilcote, 6640 Ceilcrete.
 - c. Dudick, Protecto-Flex 800.
 - d. Tnemec, Chembloc Series 239SC.
- M. Elastomeric polyurethane, 100-percent solids, ASTM D16, Type V, (Urethane P):
 - 1. Manufacturers: The following or equal:
 - a. GET, Endura-Flex EF-1988.
- N. Concrete floor coatings:
 - 1. Manufacturers: One of the following or equal:
 - a. Carboline, Semstone 140SL.
 - b. Devoe, Devran 124.
 - c. Dudick, Polymer Alloy 1000.
 - d. Tnemec, Tneme-Glaze Series 282.
- O. Waterborne acrylic emulsion:
 - 1. Manufacturers: One of the following or equal:
 - a. S-W, DTM Acrylic B66W1.
 - b. Tnemec, Tneme-Cryl Series 6.
- P. Galvanizing zinc compound:
 - 1. Manufacturers: One of the following or equal:
 - a. ZRC, Cold Galvanizing Compound.

2.04 COATING MATERIALS

- A. Alkali-resistant bitumastic:
 - 1. Manufacturers: One of the following or equal:
 - a. Carboline, Bitumastic No. 50 WB.
 - b. S-W, Targuard 100.
 - c. As specified for Coal Tar Epoxy Substitute.
- B. Wax coating:
 - 1. Manufacturers: The following or equal:
 - a. Sanchem, No-Ox-Id A special.

- C. High solids epoxy (self-priming) not less than 72-percent solids by volume with a mixed applied flash point of 140 degrees Fahrenheit or less:
 - 1. Manufacturers: One of the following or equal:
 - a. Carboline:
 - 1) Non-submerged: Carboguard 890 VOC.
 - 2) Submerged: Phenoline 341 (100-percent solids, 2-component epoxy).
 - b. Devoe:
 - 1) Bar Rust 233 Low VOC.
 - 2) Devran 133 (100-percent solids, 2-component epoxy).
 - c. S-W:
 - 1) Non-submerged: Macropoxy 646-100.
 - d. PPG Amercoat: Amerlock 2 VOC.
- D. Aliphatic or aliphatic-acrylic polyurethane not less than 80-percent solids with a mixed flash point of 140 degrees Fahrenheit or less:
 - 1. Manufacturers: One of the following or equal:
 - a. Carboline, Carbothane 134MC.
 - b. Devoe, Devthane 379 H.
 - c. S-W, High Solids Polyurethane 100.
 - d. PPG Amercoat: Amershield VOC.
- E. Polymorphic polyester resin coating system: 2-component, modified styrene based thermoset resin, EPA approved for potable water, with 100 percent solids and maximum 10 grams per liter VOC:
 - 1. Manufacturers: One of the following or equal:
 - a. IET: IET Prime Coat DS-101, Intermediate Coat DS-301, and Finish Coat DS 401.
 - b. PPC: PPC Prime Coat, IC-Filler Coat, and FC-Final Coat.
- F. High-temperature coating 150 to 350 degrees Fahrenheit:
 - 1. Manufacturers: One of the following or equal:
 - a. Carboline, Thermaline 4900.
 - b. Dampney, Thermalox 245 Silicone - Zinc Dust.
 - c. PPG Amercoat: Amerlock 2/400 GFK.
- G. High-temperature coating 400 to 1,000 degrees Fahrenheit (Dry):
 - 1. Manufacturers: One of the following or equal:
 - a. Carboline, Thermaline 4700 VOC.
 - b. Dampney, Thermolox 230C Series Silicone.
 - c. Devoe, HT-12, High Heat Silicone.
- H. High-temperature coating up to 1,400 degrees Fahrenheit:
 - 1. Manufacturers: The following or equal:
 - a. Dampney, Thermalox 240 Silicone Ceramix.
- I. Asphalt varnish: AWWA C 500.
- J. Coal tar: Where coal tar, coal-tar epoxy, or coal-tar mastic are specified or indicated on the Drawings, coal-tar epoxy substitute, as specified, shall be used in their place. Coal tar shall not be allowed.

- K. Coal-tar epoxy substitute:
 - 1. Manufacturers: One of the following or equal:
 - a. Devoe, Devtar 5A HS.
 - b. S-W, Macropoxy 646 Black.
- L. Vinyl ester: Glass mat reinforced, total system 125 mils DFT, manufacturer's recommended topcoat.
 - 1. Manufacturers: One of the following or equal:
 - a. Carboline, Semstone 870.
 - b. Ceilcote, 6640 Ceilcrete.
 - c. Dudick, Protecto-Flex 800.
 - d. Tnemec, Chembloc Series 239SC.
- M. Elastomeric polyurethane 100-percent solids, ASTM D16, Type V, (Urethane P):
 - 1. Manufacturers: The following or equal:
 - a. GET, Endura-Flex EF-1988.
- N. Concrete floor coatings:
 - 1. Manufacturers: One of the following or equal:
 - a. Devoe, Devran 124.
 - b. Dudick, Polymer Alloy 1000.
 - c. Tnemec, Tneme-Glaze Series 282.
- O. Waterborne acrylic emulsion:
 - 1. Manufacturers: One of the following or equal:
 - a. S-W, DTM Acrylic B66W1.
 - b. Tnemec, Tneme-Cryl Series 6.
- P. Galvanizing zinc compound:
 - 1. Manufacturers: The following or equal:
 - a. ZRC, Cold Galvanizing Compound.

2.05 MIXES

- A. Mix in accordance with manufacturer's instructions.

PART 3 EXECUTION

3.01 GENERAL PROTECTION

- A. Protect adjacent surfaces from coatings and damage. Repair damage resulting from inadequate or unsuitable protection.
- B. Protect adjacent surfaces not to be coated from spatter and droppings with drop cloths and other coverings:
 - 1. Mask off surfaces of items not to be coated or remove items from area.
- C. Furnish sufficient drop cloths, shields, and protective equipment to prevent spray or droppings from fouling surfaces not being coated and, in particular, surfaces within storage and preparation areas.

- D. Place cotton waste, cloths, and material that may constitute a fire hazard in closed metal containers and remove daily from site.
- E. Remove electrical plates, surface hardware, fittings, and fastenings prior to application of coating operations. Carefully store, clean, and replace on completion of coating in each area. Do not use solvent or degreasers to clean hardware that may remove permanent lacquer finish.

3.02 GENERAL PREPARATION

- A. Prepare surfaces in accordance with coating manufacturer's instructions, unless more stringent requirements are specified in this Section.
- B. Protect the following surfaces from abrasive blasting by masking or other means:
 - 1. Threaded portions of valve and gate stems, grease fittings, and identification plates.
 - 2. Machined surfaces for sliding contact.
 - 3. Surfaces to be assembled against gaskets.
 - 4. Surfaces of shafting on which sprockets are to fit.
 - 5. Surfaces of shafting on which bearings are to fit.
 - 6. Machined surfaces of bronze trim, including slide gates.
 - 7. Cadmium-plated items except cadmium-plated, zinc-plated, or sherardized fasteners used in assembly of equipment requiring abrasive blasting.
 - 8. Galvanized items, unless scheduled to be coated.
- C. Protect installed equipment, mechanical drives, and adjacent coated equipment from abrasive blasting to prevent damage caused by entering sand or dust.
- D. Concrete:
 - 1. Allow new concrete to cure for minimum of 28 days before coating.
 - 2. Clean concrete surfaces of dust, mortar, fins, loose concrete particles, form release materials, oil, and grease. Fill voids so that surface is smooth. Prepare concrete surface for coating in accordance with SSPC SP 13. Provide ICRI 310.2 CSP-3 surface profile, or as recommended by coating manufacturer. All concrete surfaces shall be vacuumed clean prior to coating application.
- E. Ferrous metal surfaces:
 - 1. Remove grease and oil in accordance with SSPC SP 1.
 - 2. Remove rust, scale, and welding slag and spatter, and prepare surfaces in accordance with appropriate SSPC standard as specified.
 - 3. Abrasive blast surfaces prior to coating.
 - a. When abrasive blasted surfaces rust or discolor before coating, abrasive blast surfaces again to remove rust and discoloration.
 - b. When metal surfaces are exposed because of coating damage, abrasive blast surfaces and feather in to a smooth transition before touching up.
 - c. Ferrous metal surfaces not to be submerged: Abrasive blast in accordance with SSPC SP 10, unless blasting may damage adjacent surfaces, prohibited, or specified otherwise. Where not possible to abrasive blast, power tool clean surfaces in accordance with SSPC SP 3.
 - d. Ferrous metal surfaces to be submerged: Unless specified otherwise, abrasive blast in accordance with SSPC SP 5 to clean and provide roughened surface profile of not less than 2 mils and not more than 4 mils

- in depth when measured with Elcometer 123, or as recommended by the coating manufacturer.
4. All abrasive blast cleaned surfaces shall be blown down with clean dry air and/or vacuumed.
- F. Ductile iron pipe and fittings to be lined or coated: Abrasive blast clean in accordance with NAPF 500-03.
- G. Sherardized, aluminum, copper, and bronze surfaces: Prepare in accordance with coating manufacturer's instructions.
- H. Galvanized surface:
1. Degrease or solvent clean (SSPC SP 1) to remove oily residue.
 2. Power tool or hand tool clean or whip abrasive blast.
 3. Test surface for contaminants using copper sulfate solution.
 4. Apply metal pretreatment within 24 hours before coating galvanized surfaces that cannot be thoroughly abraded physically, such as bolts, nuts, or preformed channels.
- I. Shop-primed metal:
1. Certify that primers applied to metal surfaces in the shop are compatible with coatings to be applied over such primers in the field.
 2. Remove shop primer from metal to be submerged by abrasive blasting in accordance with SSPC SP 10, unless greater degree of surface preparation is required by coating manufacturer's representative.
 3. Correct abraded, scratched, or otherwise damaged areas of prime coat by sanding or abrasive blasting to bare metal in accordance with SSPC SP 2, SP 3, or SP 6, as directed by the Engineer. When entire shop priming fails or has weathered excessively (more than 25 percent of the item), or when recommended by coating manufacturer's representative, abrasive blast shop prime coat to remove entire coat and prepare surface in accordance with SSPC SP 10.
 4. When incorrect prime coat is applied, remove incorrect prime coat by abrasive blasting in accordance with SSPC SP 10.
 5. When prime coat not authorized by Engineer is applied, remove unauthorized prime coat by abrasive blasting in accordance with SSPC SP 10.
 6. Shop applied bituminous paint or asphalt varnish: Abrasive blast clean shop applied bituminous paint or asphalt varnish from surfaces scheduled to receive non-bituminous coatings.
- J. Cadmium-plated, zinc-plated, or sherardized fasteners:
1. Abrasive blast in the same manner as unprotected metal when used in assembly of equipment designated for abrasive blasting.
- K. Abrasive blast components that are to be attached to surfaces that cannot be abrasive blasted before components are attached.
- L. Grind sharp edges to approximately 1/16-inch radius before abrasive blast cleaning.
- M. Remove and grind smooth all excessive weld material and weld spatter before blast cleaning in accordance with NACE SP0178.

- N. Polyvinyl chloride (PVC) and FRP surfaces:
 - 1. Prepare surfaces to be coated by light sanding (de-gloss) and wipe-down with clean cloths, or by solvent cleaning in strict accordance with coating manufacturer's instructions.
- O. Cleaning of previously coated surfaces:
 - 1. Utilize cleaning agent to remove soluble salts such as chlorides and sulfates from concrete and metal surfaces:
 - a. Cleaning agent: Biodegradable non-flammable and containing no VOC.
 - b. Manufacturer: The following or equal:
 - 1) CHLOR*RID International, Inc.
 - 2. Steam clean and degrease surfaces to be coated to remove oils and grease.
 - 3. Cleaning of surfaces utilizing the decontamination cleaning agent may be accomplished in conjunction with abrasive blast cleaning, steam cleaning, high-pressure washing, or hand washing as approved by the coating manufacturer's representative and the Engineer.
 - 4. Test cleaned surfaces in accordance with the cleaning agent manufacturer's instructions to ensure all soluble salts have been removed. Additional cleaning shall be carried out as necessary.
 - 5. Final surface preparation prior to application of new coating system shall be made in strict accordance with coating manufacturer's printed instructions.

3.03 MECHANICAL AND ELECTRICAL EQUIPMENT PREPARATION

- A. Identify equipment, ducting, piping, and conduit as specified in Section 15075 - Equipment Identification.
- B. Remove grilles, covers, and access panels for mechanical and electrical system from location and coat separately.
- C. Prepare and finish coat primed equipment with color selected by the Engineer.
- D. Prepare and prime and coat insulated and bare pipes, conduits, boxes, insulated and bare ducts, hangers, brackets, collars, and supports, except where items are covered with prefinished coating.
- E. Replace identification markings on mechanical or electrical equipment when coated over or spattered.
- F. Prepare and coat interior surfaces of air ducts, and convactor and baseboard heating cabinets that are visible through grilles and louvers with 1 coat of flat black paint, to limit of sight line.
- G. Prepare and coat dampers exposed immediately behind louvers, grilles, and convactor and baseboard heating cabinets to match face panels.
- H. Prepare and coat exposed conduit and electrical equipment occurring in finished areas with color and texture to match adjacent surfaces.
- I. Prepare and coat both sides and edges of plywood backboards for electrical equipment before installing backboards and mounting equipment on them.

- J. Color code equipment, piping, conduit, and exposed ductwork and apply color banding and identification, such as flow arrows, naming, and numbering, in accordance with the Contract Documents.

3.04 GENERAL APPLICATION REQUIREMENTS

- A. Apply coatings in accordance with manufacturer's instructions.
- B. Coat metal unless specified otherwise:
 - 1. Aboveground piping to be coated shall be empty of contents during application of coatings.
- C. Verify metal surface preparation immediately before applying coating in accordance with SSPC SP COM.
- D. Allow surfaces to dry, except where coating manufacturer requires surface wetting before coating.
- E. Wash coat and prime sherardized, aluminum, copper, and bronze surfaces, or prime with manufacturer's recommended special primer.
- F. Prime shop-primed metal surfaces. Spot prime exposed metal of shop-primed surfaces before applying primer over entire surface.
- G. Multiple coats:
 - 1. Apply minimum number of specified coats.
 - 2. Apply additional coats when necessary to achieve specified thicknesses.
 - 3. Apply coats to thicknesses specified, especially at edges and corners.
 - 4. When multiple coats of same material are specified, tint prime coat and intermediate coats with suitable pigment to distinguish each coat.
 - 5. Lightly sand and dust surfaces to receive high-gloss finishes, unless instructed otherwise by coating manufacturer.
 - 6. Dust coatings between coats.
- H. Coat surfaces without drops, overspray, dry spray, runs, ridges, waves, holidays, laps, or brush marks.
- I. Remove spatter and droppings after completion of coating.
- J. Apply coating by brush, roller, trowel, or spray, unless particular method of application is required by coating manufacturer's instructions or these Specifications.
- K. Plural component application: Drums shall be premixed each day. All gauges shall be in working order prior to the start of application. Ratio checks shall be completed prior to each application. A spray sample shall be sprayed on plastic sheeting to ensure set time is complete prior to each application. Hardness testing shall be performed after each application.
- L. Spray application:
 - 1. Stripe coat edges, welds, nuts, bolts, and difficult-to-reach areas by brush before beginning spray application, as necessary, to ensure specified coating thickness along edges.

2. When using spray application, apply coating to thickness not greater than that recommended in coating manufacturer's instructions for spray application.
3. Use airless spray method, unless air spray method is required by coating manufacturer's instruction or these Specifications.
4. Conduct spray coating under controlled conditions. Protect adjacent construction and property from coating mist, fumes, or overspray.

M. Drying and recoating:

1. Provide fans, heating devices, or other means recommended by coating manufacturer to prevent formation of condensate or dew on surface of substrate, coating between coats and within curing time following application of last coat.
2. Limit drying time to that required by these Specifications or coating manufacturer's instructions.
3. Do not allow excessive drying time or exposure, which may impair bond between coats.
4. Recoat epoxies within time limits recommended by coating manufacturer.
5. When time limits are exceeded, abrasive blast clean and de-gloss clean prior to applying another coat.
6. When limitation on time between abrasive blasting and coating cannot be met before attachment of components to surfaces that cannot be abrasive blasted, coat components before attachment.
7. Ensure primer and intermediate coats of coating are unscarred and completely integral at time of application of each succeeding coat.
8. Touch-up suction spots between coats and apply additional coats where required to produce finished surface of solid, even color, free of defects.
9. Leave no holidays.
10. Sand and feather in to a smooth transition and recoat scratched, contaminated, or otherwise damaged coating surfaces so damages are invisible to the naked eye.

N. Concrete:

1. Apply first coat (primer) only when surface temperature of concrete is decreasing in order to eliminate effects of off-gassing on coating.

3.05 ALKALI-RESISTANT BITUMASTIC

A. Preparation:

1. Prepare surfaces in accordance with general preparation requirements.

B. Application:

1. Apply in accordance with general application requirements and as follows:
 - a. Apply at least 2 coats, 8 to 14 mils DFT each.

3.06 WAX COATING

A. Preparation:

1. Prepare surfaces in accordance with general preparation requirements.

B. Application:

1. Apply in accordance with general application requirements and as follows:
 - a. Apply at least 1/32-inch thick coat with 2-inch or shorter bristle brush.

- b. Thoroughly rub coating into metal surface with canvas covered wood block or canvas glove.

3.07 HIGH SOLIDS EPOXY SYSTEM

A. Preparation:

- 1. Prepare surfaces in accordance with general preparation requirements and as follows:
 - a. Abrasive blast ferrous metal surfaces to be submerged at jobsite in accordance with SSPC SP 5 prior to coating. When cleaned surfaces rust or discolor, abrasive blast surfaces in accordance with SSPC SP 10.
 - b. Abrasive blast non-submerged ferrous metal surfaces at jobsite in accordance with SSPC SP 10, prior to coating. When cleaned surfaces rust or discolor, abrasive blast surfaces in accordance with SSPC SP 6.
 - c. Abrasive blast clean ductile iron surfaces at jobsite in accordance with SSPC SP 7.

B. Application:

- 1. Apply coatings in accordance with general application requirements and as follows:
 - a. Apply minimum 2-coat system with minimum total DFT of 12 mils.
 - b. Recoat or apply succeeding epoxy coats within time limits recommended by manufacturer. Prepare surfaces for recoating in accordance with manufacturer's instructions.
 - c. Coat metal to be submerged before installation when necessary, to obtain acceptable finish, and to prevent damage to other surfaces.
 - d. Coat entire surface of support brackets, stem guides, pipe clips, fasteners, and other metal devices bolted to concrete.
 - e. Coat surface of items to be exposed and adjacent 1 inch to be concealed when embedded in concrete or masonry.

3.08 HIGH SOLIDS EPOXY AND POLYURETHANE COATING SYSTEM

A. Preparation:

- 1. Prepare surfaces in accordance with general preparation requirements and as follows:
 - a. Prepare concrete surfaces in accordance with general preparation requirements.
 - b. Touch up shop-primed steel and miscellaneous iron.
 - c. Abrasive blast ferrous metal surfaces at jobsite prior to coating. Abrasive blast clean rust and discoloration from surfaces.
 - d. Degrease or solvent clean, whip abrasive blast, power tool, or hand tool clean galvanized metal surfaces.
 - e. Lightly sand (de-gloss) fiberglass and PVC pipe to be coated and wipe clean with dry cloths, or solvent clean in accordance with coating manufacturer's instructions.
 - f. Abrasive blast clean ductile iron surfaces.

B. Application:

- 1. Apply coatings in accordance with general application requirements and as follows:
 - a. Apply a 3-coat system consisting of:

- 1) Primer: 4 to 5 mils DFT high solids epoxy.
 - 2) Intermediate coat: 4 to 5 mils DFT high solids epoxy.
 - 3) Topcoat: 2.5 to 3.5 mils DFT aliphatic or aliphatic-acrylic polyurethane topcoat.
2. Recoat or apply succeeding epoxy coats within 30 days or within time limits recommended by manufacturer, whichever is shorter. Prepare surfaces for recoating in accordance with manufacturer's instructions.

3.09 POLYMORPHIC POLYESTER RESIN SYSTEM

- A. Preparation:
 1. Prepare surfaces in accordance with general preparation requirements and as follows:
 2. Prepare concrete to obtain clean, open pore with exposed aggregate in accordance with manufacturer's instructions.
 3. Prepare ferrous metal surfaces in accordance with SSPC SP 5, with coating manufacturer's recommended anchor pattern.
 4. Complete abrasive blast cleaning within 6 hours of applying prime coat. Dew point shall remain 5 degrees above dew point 8 hours after application of coating. When cleaned surfaces rust or discolor, abrasive blast surfaces in accordance with SSPC SP 5.
 5. When handling steel, wear gloves to prevent hand printing.
 6. Adjust pH of concrete to within 5.5 to 8.0 before applying prime coat.
- B. Application:
 1. Apply coatings in accordance with general application requirements and as follows:
 - a. Apply minimum DFT system consisting of primer, tie coat and top coat in accordance with manufacturer's instructions as follows:
 - 1) Steel: 35 mils.
 - 2) Concrete: 45 mils.

3.10 HIGH-TEMPERATURE COATING

- A. Preparation:
 1. Prepare surfaces in accordance with general preparation requirements and as follows:
 - a. Abrasive blast surface in accordance with SSPC SP 10.
- B. Application:
 1. Apply coatings in accordance with general application requirements and as follows:
 - a. Apply number of coats in accordance with manufacturer's instructions.

3.11 ASPHALT VARNISH

- A. Preparation:
 1. Prepare surfaces in accordance with general preparation requirements.
- B. Application:
 1. Apply coatings in accordance with general application requirements and as follows:
 - a. Apply minimum 2 coats.

3.12 PROTECTIVE COAL TAR

- A. Preparation:
 - 1. Prepare surfaces in accordance with general preparation of coal-tar requirements.
- B. Application:
 - 1. Apply coatings in accordance with general application requirements and as follows:
 - a. Apply minimum 20 mils DFT coating.

3.13 COAL-TAR EPOXY

- A. Preparation:
 - 1. Prepare surfaces in accordance with general preparation requirements and as follows:
 - a. Abrasive blast iron or steel surfaces to be coated as submerged metal in accordance with SSPC SP 5. Prepare other metal surfaces to be coated with coal-tar epoxy in accordance with epoxy manufacturer's instructions.
- B. Application:
 - 1. Apply coatings in accordance with general application requirements and as follows:
 - a. Waterproofing outside surfaces of concrete structures: Apply minimum 2 coats with total DFT of 40 mils.
 - b. Apply 2 coats of 8 mils each for a total 16 mils DFT.
 - c. Apply coal-tar epoxy on blasted steel on same day that steel is blasted.
 - d. Apply succeeding coats over previous coat as soon as application does not cause sagging, within the following times, or as recommended by the coating manufacturer, whichever is sooner.

Average Temperature Degrees (Fahrenheit)	Maximum Time Between Coats (Hours)
50 to 60	36
60 to 70	24
70 to 80	12
80 to 120	4

- e. Apply additional coats required to obtain specified thickness.
- f. When previous coat has cured or set, or Maximum Time Between Coats has lapsed, abrasive blast previous coat until surface film is removed. Wash and clean surface with cleaning solvent. Apply succeeding coat within Maximum Time Between Coats or as recommended by coating manufacturer, whichever is sooner.
- g. When succeeding coat is applied over previous coat that has cured or set, or Maximum Time Between Coats has lapsed, and surface has not been abrasive blasted, remove entire coating system to substrate, and apply new coating system.
- h. Where coating system is applied to exterior concrete surfaces below grade, extend system at least 3 inches above finish grade in straight level.

Step extended system down 3 inches when extended system reaches 6 inches above finish grade.

3.14 COAL-TAR EPOXY SUBSTITUTE

- A. Preparation:
 - 1. Prepare surfaces in accordance with general preparation requirements and in accordance with the coating manufacturer's printed instructions.
- B. Application:
 - 1. Apply 2 coats at 6 mils to 8 mils each, for a minimum total DFT of 12 mils.

3.15 VINYL ESTER

- A. Preparation:
 - 1. Prepare surfaces in accordance with coating manufacturer's recommendations and as directed and approved by coating manufacturer's representative.
- B. Application:
 - 1. Apply prime coat, as required by coating manufacturer, base coat, glass mat, and topcoat to total dry film thickness of 125 mils minimum:
 - a. Final topcoat on floors shall include non-skid surface, applied in accordance with manufacturer's instructions.
 - 2. Perform high-voltage holiday detection test in accordance with NACE SP0188, over 100 percent of coated surface areas to ensure pinhole-free finished coating system.
 - 3. All work shall be accomplished in strict accordance with coating manufacturer's instructions and under direction of coating manufacturer's representative.

3.16 ELASTOMERIC POLYURETHANE (100 PERCENT SOLIDS)

- A. Preparation:
 - 1. Prepare surfaces in strict accordance with coating manufacturer's instructions and as directed and approved by coating manufacturer's representative.
- B. Application:
 - 1. Apply epoxy primer at DFT of 1 to 2 mils, in strict accordance with manufacturer's instructions.
 - 2. Apply polyurethane coating at minimum total DFT as follows:
 - a. Steel: 60 mils DFT.
 - b. Ductile iron and ductile iron pipe coating and lining: 30 mils DFT.
 - c. Concrete: 120 mils DFT.
 - d. Or as recommended by the coating manufacturer and accepted by the Engineer.
 - 3. For concrete application, provide saw cutting for coating terminations in strict accordance with manufacturer's instructions.
 - 4. Perform high voltage holiday detection test in accordance with NACE SP0188, over 100 percent of coated surface areas to ensure pinhole free finished coating system.

3.17 CONCRETE FLOOR COATINGS

- A. Preparation:
 - 1. Prepare surfaces in accordance with general application requirements and in strict accordance with coating manufacturer's instructions.
- B. Application:
 - 1. Apply primer if required by coating manufacturer.
 - 2. Apply 1 or more coats as recommended by coating manufacturer to receive a minimum total DFT of 25 mils; color as selected by the Owner.
- C. Final topcoat shall include non-skid surface, applied in strict accordance with coating manufacturer's instructions.

3.18 WATERBORNE ACRYLIC EMULSION

- A. Preparation:
 - 1. Remove all oil, grease, dirt, and other foreign material by solvent cleaning in accordance with SSPC SP 1.
 - 2. Lightly sand all surfaces and wipe thoroughly with clean cotton cloths before applying coating.
- B. Application:
 - 1. Apply 2 or more coats to obtain a minimum DFT of 5.0 mils.

3.19 FIELD QUALITY CONTROL

- A. Each coat will be inspected. Strip and remove defective coats, prepare surfaces, and recoat. When approved, apply next coat.
- B. Control and check DFT and integrity of coatings.
- C. Measure DFT with calibrated thickness gauge.
- D. DFT on ferrous-based substrates may be checked with Elcometer Type 1 Magnetic Pull-Off Gauge or PosiTector® 6000.
- E. Verify coat integrity with low-voltage sponge or high-voltage spark holiday detector, in accordance with NACE SP0188. Allow Engineer to use detector for additional checking.
- F. Check wet film thickness before coal-tar epoxy coating cures on concrete or nonferrous metal substrates.
- G. Arrange for services of coating manufacturer's field representative to provide periodic field consultation and inspection services to ensure proper surface preparation of facilities and items to be coated, and to ensure proper application and curing:
 - 1. Notify Engineer 24 hours in advance of each visit by coating manufacturer's representative.
 - 2. Provide Engineer with a written report by coating manufacturer's representative within 48 hours following each visit.

3.20 SCHEDULE OF ITEMS NOT REQUIRING COATING

- A. General: Unless specified otherwise, the following items do not require coating:
1. Items that have received final coat at factory and are not listed to receive coating in field.
 2. Aluminum, brass, bronze, copper, plastic (except PVC pipe), rubber, stainless steel, chrome, Everdur, or lead.
 3. Buried or encased piping or conduit.
 4. Exterior concrete.
 5. Galvanized steel wall framing, galvanized electrical conduits, galvanized pipe trays, galvanized cable trays, and other galvanized items:
 - a. Areas on galvanized items or parts where galvanizing has been damaged during handling or construction shall be repaired as follows:
 - 1) Clean damaged areas by SSPC SP 1, SP 2, SP 3, or SP 7 as required.
 - 2) Apply 2 coats of a galvanizing zinc compound in strict accordance with manufacturer's instructions.
 6. Grease fittings.
 7. Fiberglass ducting or tanks in concealed locations.
 8. Steel to be encased in concrete or masonry.

3.21 SCHEDULE OF SURFACES TO BE COATED IN THE FIELD

- A. In general, apply coatings to steel, iron, galvanized surfaces, and wood surfaces unless specified or otherwise indicated on the Drawings. Coat concrete surfaces and anodized aluminum only when specified or indicated on the Drawings. Color coat all piping as specified in Section 15075.
- B. The following schedule is incomplete. Coat unlisted surfaces with same coating system as similar listed surfaces. Verify questionable surfaces.
- C. Concrete:
1. High solids epoxy:
 - a. Safety markings.
 - a-b. Containment area around belt presses including interior vertical surface of containment walls, vertical surfaces of belt press support pedestals, and top of floor grout.^{AD5}
 2. Concrete floor coating:
 - a. The coating system for the polymer tote storage secondary containment and fill station shall be as follows:
 - 1) Surface Preparation:
 - a) All new concrete shall be cured for a minimum of 28 days prior to performing any surface preparation.
 - b) Remove all grease, oil, dirt, duct, mold, mildew, and other soluble contaminant by High Pressure Water Cleaning (min. 3,500 psi, 3 to 5 gallons per minute).
 - c) Abrasive blast all concrete vertical walls to remove all laitance, curing compounds, and hardeners to provide a surface profile equivalent to a minimum ICRI CSP 5(SSPC-SP13). The floor must meet a surface profile of a minimum ICRI CSP 3 (SSPC-SP13).

- d) Apply Tnemec Series 218 MortarClad (or equal) to all vertical surfaces @ 1/16 inch to fill all bugholes, voids, and build a monolithic surface to be coated.
 - e) Follow any floor cracks with a grinding disc (1/4 inch wide), grind a 1/2 inch deep groove. Make sure the groove is cleaned out, apply Tnemec Series 215 Surfacing Epoxy (or equal) with a putty knife or trowel, filling the groove and feathering out to nothing onto the surfaces on both sides of the groove.
 - f) All surfaces must be clean and dry prior to the application of any coatings.
- 2) Coating System for Bare Concrete:
- a) Prime: Apply (1) coat of:
 - (1) Tnemec Series 201 Epoxoprime @ a rate of 6.0 – 10.0 mils DFT.
 - (2) Or equal.
 - b) Base Coat: Apply (1) coat of:
 - (1) Tnemec Series 237SC-RCK @ a rate of 8.0 – 12.0 mils DFT.
 - (2) Or equal.
 - c) Fiberglass Mat: Immediately imbed:
 - (1) Tnemec Series 211-0215 SC Mat into Base Coat.
 - (2) Or equal.
 - d) Saturant Coat: Apply (1) coat of:
 - (1) Tnemec Series 237SC-RCK @ a rate of 8.0 – 12.0 mils DFT.
 - (2) Or equal.
 - e) Top Coat: Apply (1) coat of:
 - (1) Tnemec Series 280 Tneme-Glaze @ a rate of 6.0 – 10.0 mils DFT.
 - (2) Or equal.
- 3) The High Performance Coating System must exceed a minimum 65.0 mils DFT

D. Metals:

- 1. Alkali-resistant bitumastic:
 - a. Aluminum surfaces to be placed in contact with wood, concrete, or masonry.
- 2. High solids epoxy and polyurethane system: Interior and exterior non immersed ferrous metal surfaces including:
 - a. Doors, doorframes, ventilators, louvers, grilles, exposed sheet metal, and flashing.
 - b. Pipe, valves, pipe hangers, supports and saddles, conduit, cable tray hangers, and supports.
 - c. Motors and motor accessory equipment.
 - d. Drive gear, drive housing, coupling housings, and miscellaneous gear drive equipment.
 - e. Valve and gate operators and stands.
 - f. Structural steel including galvanized structural steel.
 - g. Crane and hoist rails.
 - h. Exterior of tanks and other containment vessels.
 - i. Mechanical equipment supports, drive units, and accessories.
 - j. Pumps not submerged.

- k. Degritters, grit classifiers, frames, supports, and associated equipment.
- l. Other miscellaneous metals.
- m. Grit separation and washer, frames, supports, and associated equipment.
- 3. High solids epoxy system:
 - a. Field priming of ferrous metal surfaces with defective shop-prime coat where no other prime coat is specified; for non-submerged service.
 - b. Bell rings, underside of manhole covers and frames.
 - c. Sump pumps and grit pumps, including underside of base plates and submerged suction and discharge piping.
 - d. Chlorine diffuser supports.
 - e. Exterior of submerged piping and valves other than stainless steel or PVC piping.
 - f. Submerged pipe supports and hangers.
 - g. Stem guides.
 - h. Vertical shaft mixers and aerators below supports.
 - i. Other submerged iron and steel metal unless specified otherwise.
 - j. Interior surface of suction inlet and volute of submersible influent pumps. Apply coating prior to pump testing.
 - k. Submerged piping.
 - l. Exterior of influent pumps and influent pump submerged discharge piping.
- 4. Asphalt varnish:
 - a. Underground valve boxes.
- 5. Protective coal tar:
 - a. Underground pipe flanges, excluding pipe, corrugated metal pipe couplings, flexible pipe couplings and miscellaneous underground metals not otherwise specified to receive another protective coating.
- E. Fiberglass and PVC pipe surfaces:
 - 1. Waterborne acrylic emulsion:
 - a. Exterior of fiberglass ducting and fan housings.
 - b. Fiberglass expose to sunlight.
 - c. PVC piping exposed to view.
 - d. ABS piping as determined by Design Engineer.

END OF SECTION

^{AD5} Addendum No. 5 – April 29, 2020

SECTION 11246

POLYMER BLENDING AND FEED EQUIPMENT-LIQUID

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes: Requirements for provision of 2 complete and operational automatic polymer blending and feed systems to handle dilution of concentrated liquid polymer and delivery of activated polymer for waste activated sludge dewatering using belt filter presses. Provide a skid-mounted vendor supplied control panel for each polymer system and all drivers and controllers necessary for a complete and operational automated dewatering polymer solution system. Refer to mechanical and instrumentation drawings for additional requirements.
- B. Coordinate with the Belt Filter Press manufacturer to integrate the polymer blending and feed equipment as specified herein and in Section 11362.
- C. The other elements of the dewatering polymer solution system include the following and will be furnished by the City^{AD4} and installed by the CONTRACTOR:
 - 1. Two bulk liquid polymer storage totes.
- D. Tag numbers:
 - 1. PDS-01: Westside Regional Polymer Dilution Skid System 1.
 - 2. PDS-02: Westside Regional Polymer Dilution Skid System 2.
 - 3. PDS-03: Westside Regional Polymer Dilution Skid System 3 (Future Unit).
 - 4. PDS-04: Westside Regional Polymer Dilution Skid System 4 (Future Unit).
- E. Related sections:
 - 1. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
 - 2. The following sections are related to the Work described in this Section. This list of related sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the MANUFACTURER and the installing Contractor to see that the completed Work complies accurately with the Contract Documents:
 - a. Section 01010 - Summary of Work.
 - b. Section 01600 - Product Requirements
 - c. Section 01756 - Testing, Training, and Facility Start-Up.
 - d. Section 01782 - Operation and Maintenance Data.
 - e. Section 09960 - High-Performance Coatings.
 - f. Section 15050 - Common Work Results for Mechanical Equipment.
 - g. Section 15958 - Mechanical Equipment Testing.
 - h. Section 16405 - Electric Motors.
 - i. Section 16485 - Variable Frequency Drives.
 - j. Section 17000 - Instrumentation and Controls.

- F. Inclusion of a specific manufacturer's name in the Specifications does not mean that the specific manufacturer's standard product will be acceptable. Specified manufacturer's or other manufacturer's standard product shall be modified as required to meet the Specifications.

1.02 REFERENCES

- A. CSA International (CSA).
- B. National Electrical Manufacturers Association (NEMA):
1. 250 - Enclosures for Electrical Equipment (1000 V Maximum).
- C. Underwriters Laboratories, Inc. (UL).

1.03 DEFINITIONS

- A. NEMA:
1. NEMA Type 4 enclosure in accordance with NEMA 250.
 2. NEMA Type 4X enclosure in accordance with NEMA 250.

1.04 SYSTEM DESCRIPTION

- A. Design requirements:
1. Provide 2 integrated polymer blending units capable of automatically metering, diluting, blending, activating, and feeding liquid polymer and water. Activate concentrated emulsion polymer in a multi-zone hydro-mechanical or hydraulic mixing vessel with a tapered mixing regime.
 2. Provide a NEMA 4X FRP skid mounted control panel for each polymer blending unit (2 in total) and all drivers, controllers, and microprocessors necessary for a complete and operational automated system. The polymer system control panel shall be programmed and provided by the manufacturer of the polymer blending units in accordance with these specifications. Coordinate with Belt Filter Press manufacturer as necessary.
 3. Under automatic control, the dewatering polymer blending system shall be capable of producing and maintaining a setpoint dilute polymer solution concentration through ratio control at a rate sufficient to meet the demands of each belt filter press downstream. There will be one polymer blending system dedicated for each belt filter press.
- B. Pre-assemble and shop-test system to ensure compliance with pressure, operational, and controls requirements.
- C. Design criteria:
1. Dewatering Polymer System:
 - a. Sludge type: Waste Activated Sludge.
 - b. Polymer type: Emulsion.
 - c. Neat Polymer Viscosity Range (centipoise): Up to 6,000.
 - d. Polymer activity (percent active): Up to 45.
 - e. Active polymer dose: Maximum 30 pounds per dry ton of solids.
 - f. Maximum Sludge Feed rate: 1,410 pounds per day of dry solids.
 - g. Active polymer volumetric consumption (design flow):
 - 1) Westside Regional WRF: ~~4-0.75~~ - ~~6-15~~^{AD5} gallons per hour.
 - h. Final percent solution desired: Normally 0.25 with a range up to 0.5.

- i. Percent solids of waste activated sludge feed: 0.6.
- j. Polymer injection location: Sludge feed lines on suction side of the existing double-disk sludge feed pumps.
- k. Anticipated backpressure: 5 to 15 psig.
- 2. Dilution Water:
 - a. Dilution water shall be non-potable water. Blending systems shall be suitable for this dilution water.
 - b. Dewatering:
 - 1) Dilution water flow rate range: 200 to 2,200 gallons per hour.
 - c. Minimum consistent water pressure available for dilution water is 30 psig:
 - 1) For polymer systems relying on higher than available working differential pressures for dilution water, manufacturer must provide integral, skid mounted booster pumps and appurtenances as a part of a fully operational, pre-packaged system:
 - a) Pressure regulating valve with stainless steel, liquid filled pressure gauges to monitor and control the pressure from the booster pump.
 - b) Booster pump to be controlled by polymer blending unit and must be able to fit in area indicated on the Drawings without any interferences or changes to the specified system.
 - 2) Pressure regulating valves with stainless steel, liquid filled pressure gauges shall be provided to protect systems against over-pressure from varying dilution water pressure.
- 3. Neat Polymer Metering Pump:
 - a. General:
 - 1) Each blender unit shall have 1 progressive cavity neat polymer metering pump integrally mounted on the system skid in a configuration that provides access and is easy to maintain.
 - 2) All motors shall meet the requirements of Section 16405.
 - 3) All variable frequency drives, if provided, shall meet the requirements of Section 16485.
 - b. Size:
 - 1) Type: Progressive Cavity.
 - 2) Minimum output range: ~~4-0.75~~ - ~~6-15~~^{AD5} gallons per hour.
 - 3) Minimum pump motor requirements: 1/2 horsepower, 1,750 revolutions per minute:
 - a) 480 VAC inverter duty TEFC wash down motor for pumps requiring variable frequency drives.
 - b) Otherwise, 90 VDC, TEFC wash down motor.
- 4. Mixing motor (if hydro-mechanical mixer is used):
 - a. All motors shall meet the requirements of Section 16405.
 - b. All variable frequency drives, if provided, shall meet the requirements of Section 16485.
 - c. Dewatering:
 - 1) Minimum 0.5 horsepower, 480 VAC inverter duty or 90 VDC, 1,750 revolutions per minute, TEFC, wash down motor.
 - 2) Alternatively, if variable frequency drive is not required, minimum 1 horsepower, 480 VAC, TEFC, wash down duty, 3,450 rpm.

1.05 SUBMITTALS

- A. Submit as specified in Section 15050 and 01330.
- B. Submit motor information as required per Section 16405.
- C. Product data:
 - 1. Submit data completely describing product, including plan and section views, and listing of all components and materials of construction.
 - 2. Hydrostatic level transmitter information.
- D. Shop drawings:
 - 1. Submit detailed specifications and shop drawings with both isometric and orthogonal views of the proposed installation, including dimensions, weights, and complete parts list.
 - 2. Submit wiring, control schematics, and control logic diagrams for all electrical and control components furnished.
 - 3. Submit hydraulic characteristics of the mixer.
 - 4. Submit polymer system local control panel layout, bill of materials, wiring diagrams, and associated cut sheets.
 - 5. Submit process flow schematic of the skid mounted system.
- E. Manufacturer's Qualifications: Submit all information proving conformance with manufacturer's qualifications requirements.
- F. Manufacturer's installation instructions:
 - 1. Installation and checkout instructions including lubrication and initial start-up procedures.
 - 2. Do not install equipment until all installation instructions have been supplied.
- G. Operations and Maintenance Manuals: As specified in Section 01782.
- H. Warranties.
- I. Certificates.
- J. Technician Qualifications Resume: Submit resume of technician to perform polymer system adjustments, inspections, performance testing, and training.
- K. Training Course Outline.

1.06 QUALITY ASSURANCE AND CONSIDERATION OF ALTERNATIVES

- A. Polymer Blending Unit Manufacturer Qualifications:
 - 1. Manufacturer must have at least 10 years' experience in the design, application, and supply of polymer blending systems of the type described in this Specification for the municipal wastewater market. Manufacturer shall provide a signed affidavit stating conformance with these requirements.
 - 2. Manufacturer must provide references for at least 10 currently operating installations of equipment of the same type as that to be provided under this project at municipal wastewater treatment plants in the United States.

- B. System to be pre-assembled and shop-tested to assure compliance with the pressure, operational, and control requirements, as specified in Section 01756 and Section 15050.
- C. Components and installation shall comply with the Uniform, Standard and National Building and Fire Codes.
- D. Certifications: Furnish affidavit from polymer blending unit manufacturer stating that the polymer feed systems have been tested and ready for installation as specified in Section 01756.
- E. BFP MANUFACTURER shall assume system responsibility by proper coordination with the manufacturer of the Polymer Blending Units as described herein.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. As specified in Section 01600 - Product Requirements.

1.08 WARRANTY

- A. The complete polymer blending units shall be covered by a minimum 2 year warranty against defects in materials and workmanship:
 - 1. Warranty period shall commence after on-site acceptance (after successful start-up and testing) of equipment by the Owner.
 - 2. The polymer blending mixing chamber shall be warranted for 2 years to be free of defects in workmanship or materials:
 - a. The polymer blending mixing chamber shall be warranted against failure due to mixing chamber plugging for any reason.
 - b. If the mixing chamber plugs a replacement mixing chamber will be provided at no cost to the Owner.
 - c. This extended warranty shall not apply if the damage is caused by freezing or other weather related damage or over-pressure.
 - d. Mixing chamber motors and seals shall be covered under the system warranty rather than this lifetime warranty.
 - 3. The warranty shall apply regardless whether potable or non-potable water is used for the dilution water.

1.09 MAINTENANCE

- A. As specified in Section 15050.
- B. Provide:
 - 1. One (1) complete set of special tools needed to assemble, disassemble, and clean the system.
 - 2. Other spare parts as recommended by system supplier.

PART 2 PRODUCTS

2.01 POLYMER BLENDING UNIT MANUFACTURERS

- A. One of the following only, no substitutions or equal:
 - 1. USGI PolyBlend, appropriate model.
 - 2. VeloDyne, appropriate model.
 - 3. Acrison, appropriate model.
 - 4. Approved Equal.
- B. For manufacturers to be considered as "Approved Equal", submit all documentation to the Owner as per Specification 01600, Section 1.05.E, 20 days prior to the bid date for review and approval.

2.02 IDENTIFICATION

- A. Identify each unit of equipment with a corrosion resistant nameplate, securely affixed in a conspicuous place:
 - 1. Nameplate information to include equipment model number, serial number, manufacturer's name, and location.

2.03 MATERIALS

- A. General:
 - 1. Turbine and shaft of mechanical mixers shall be Brass or Type 316 stainless steel:
 - a. Impellers constructed of other materials are not acceptable.
 - 2. Mixing chamber shall be constructed of clear Lexan or acrylic.
 - 3. Neat Polymer Check Valve:
 - a. Body shall be constructed of stainless steel, PVC or Teflon with Viton seals.
 - b. Valve poppet and spring shall be stainless steel.
 - 4. Brass, bronze, or stainless steel mixing chamber pressure or neat polymer pump relief valve and drain valve.
 - 5. System shall be constructed with a Type 316 stainless steel chassis.
 - 6. Hardware shall be Type 316 stainless steel.
 - 7. Piping and valves shall be Schedule 80 PVC.
 - 8. Hose shall be braided vinyl and hose fittings shall be Schedule 80 PVC. Nylon fittings are not acceptable.
 - 9. Any other components in contact with polymer or water shall be constructed of brass, stainless steel or an inert plastic.

2.04 EQUIPMENT

- A. Mixing requirements:
 - 1. Mixing energy shall be provided by a stainless steel or bronze mixing impeller or through a non-mechanical hydrodynamic blending device:
 - a. For systems with hydro-mechanical mixers:
 - 1) Mixing impellers shall be designed to produce both axial and radial flow.
 - 2) Plastic impellers are not acceptable.
 - 3) The volume of mixing chamber shall be 1.0 gallon minimum to provide sufficient residence time for polymer activation.

- b. Systems relying on differential hydraulic pressure for mixing shall be designed to provide necessary mixing energy with a dilution water pressure of 30 psig above the mixing chamber discharge pressure. If additional pressure is required systems shall be supplied with integral dilution water booster pumps as specified in Article 1.04 of this Section.
2. Mixing system shall be specifically designed to invert, disperse, and activate in solution emulsion polymers with viscosities up to 6,000 cps and active contents up to 45 percent.
3. The mixing system shall be designed to effectively induce high, non-damaging mixing energy over the system's full flow range.

B. Mixing chamber:

1. Mixing chamber shall be made of a suitable clear composite material such as Lexan, polycarbonate, or acrylic to view the mixing action and blending effectiveness.
2. Mixing chamber shall provide two stage mixing. The initial high energy mixing zone shall prevent fisheye formation with a G-value of 14,000 sec^{-1} (if applicable), followed by the low energy mixing zone with G-value of lower than 3,500 sec^{-1} (if applicable) to minimize fracturing hydrated polymer molecules.
3. Mixing chamber shall have a minimum rated pressure of 100 pounds per square inch.
4. Provide a stainless steel, brass, or bronze mixing chamber pressure relief valve and drain valve.
5. All bearings shall be external from the mixing chamber.
6. Neat polymer check valve:
 - a. Specifically designed to isolate neat polymer from dilution water.
 - b. Readily accessible for cleaning without the use of tools.
 - c. Installation inside the mixing chamber not allowed.
 - d. Mixing chamber disassembly for access not allowed.
 - e. Conventional ball type check valves, valves that rely on ball seals, and/or check valves installed inside the mixing chamber, or which require mixing chamber disassembly for servicing not allowed.

C. Dilution water system:

1. The dilution water will be provided as follows:
 - a. Owner will provide non-chlorinated UV-disinfected dilution water for the dewatering polymer system via the in-plant reclaimed service water system. Each polymer blending unit shall include an adjustable pressure regulator to maintain water flow and pressure to the necessary system pressure.
2. The plant reuse water will meet the Florida regulations for public access reuse and will have total suspended solids (TSS) less than 5 mg/L.
3. The dilution water shall have primary mixing and post-dilution (as part of the manufacturer's skid mounted unit, as applicable based on the polymer blending unit manufacturer) to expedite polymer activation by maximizing the value of breaker surfactant present in emulsion polymer, as per the AWWA Standard for Polymers (ANSI/AWWA B453-06).
4. Primary water flow shall supply the mixing chamber to make higher polymer solution concentration (0.5 percent - 1.0 percent optimum). Secondary water flow shall be used to post dilute the activated polymer solution to feed concentration (as part of the manufacturer's unit. These two streams shall be completely blended by a static mixer prior to exiting the polymer system.

5. The dilution water inlet assembly for each unit shall be ANSI 150 lb flange connection.
 6. The common dilution water supply line shall have a 40 mesh strainer unit, furnished and installed by the installing Contractor.
 7. Each polymer blending unit shall include:
 - a. A motorized ball valve for open/close control of dilution water.
 - b. A separate linear actuated flow control valve for automatic modulation of dilution water flow in response to the ratio controller.
 - c. The dilution water flow rate shall be monitored by a magnetic flow meter that meets the requirements of Section 17000 whichever is applicable. Downsize the flowmeter size as needed for the accurate flow range with appropriate reducer fittings as recommended by the Polymer skid supplier.
 - d. The flow meter shall provide the dilution water flow rate to the ratio controller.
 - e. Unions or flanges shall be provided on the inlet and outlet of the flowmeter to allow easy removal for cleaning or inspection.
 - f. A 2-inch stainless steel liquid filled pressure gauge to monitor dilution water inlet pressure. The pressure gauge shall read from 0 to 160 psig. Pressure gauges shall meet additional requirements as specified in Section 17000.
- D. Solution discharge system:
1. Pressure gauge:
 - a. Size: 2-inch.
 - b. Materials: Type 316 stainless steel.
 - c. Liquid filled with diaphragm seal.
 - d. The pressure gauge shall read from 0 to 160 psig.
 - e. Pressure gauges shall meet additional requirements as specified in Section 17000.
 2. Check valve:
 - a. Type: Flapper or diaphragm.
 - b. Materials: PVC and Viton.
 - c. Size: Same size as the solution discharge piping.
- E. System skid:
1. Frame:
 - a. Material: Type 316 stainless steel:
 - 1) Constructed of minimum 3/16-inch angle or structural stainless steel tubing.
 - 2) Mild steel not accepted.
 - b. Design: Easy access to all components.
 2. All piping rigidly supported with stainless steel supports.
 3. The skid shall include anchoring locations for mounting to concrete equipment pads.
- F. Neat polymer metering pump:
1. General:
 - a. Each blender unit shall have 1 progressive cavity neat polymer metering pump integrally mounted on the system skid in a configuration that provides access and is easy to maintain:
 - 1) Systems shall not exceed the footprint shown on the Drawings.

- b. Manufacturers: Moyno, or Seepex, (appropriate model) no equal.
- c. Materials of Construction:
 - 1) Type 316 stainless steel for all wetted components.
 - 2) Viton stators.
 - 3) Stuffing box and seal type as recommended by polymer blending and feed equipment manufacturer for neat polymer service.
- d. Each pump shall conform to the requirements herein, and mechanical requirements of Section 15050.
- e. Capable of pumping polymer with apparent viscosities of up to 6,000 cps.
- f. Metering pumps shall be capable of accurately metering the specified neat liquid polymers.
- g. Pump capacity adjustments shall give accurate and repeatable flows within 5 percent of calibrated values, and shall be free of drift during operation.
- h. Gear reducers shall be provided to produce a maximum pump shaft speed of not more than 350 rpm.
- i. Provide thermal flow switches for each pump to shut down due to run dry condition. Thermal flow switch shall be as recommended by the pump supplier and provide necessary relay, wirings, etc. in the Vendor Supplied Control Panel.
- j. Controllers:
 - 1) SCR motor controllers or VFDs located in the vendor supplied control panel.

G. Accessories:

- 1. For each blender unit, provide a calibration column sized and calibrated for 1 minute of drawdown at the maximum pump rate.
 - a. Graduation:
 - 1) Increments read in both mL and gph.
 - b. Construction: Clear polyvinyl chloride.
 - c. Configuration:
 - 1) Nipple and plug for system operation without cylinder.
 - 2) Full port PVC ball valves having Viton O-rings:
 - a) Locate 1 ball valve on the discharge of the calibration column.
 - b) Locate 1 ball valve on the neat polymer inlet pipe up stream of the calibration column discharge valve.
 - d. Assembly:
 - 1) Furnished and rigidly installed on polymer system skid.
 - 2) Use of piping for support is not acceptable.
- 2. For each blender unit, provide a polymer flow sensor to monitor the metering pump rate and protect the pump from running dry:
 - a. Polymer flow sensor:
 - 1) Meter polymer flow based on the progressing cavity meter pump rotational speed. Include a thermal switch in the stator of the meter pump to serve as a low polymer flow switch.
 - 2) Mount on system skid with Type 316 stainless steel bracket.
- 3. For each blender unit, provide pressure relief valve:
 - a. Materials: PVC and Viton.
 - b. Location: Discharge line of the pump.
 - c. Factory plumbed back to suction of the pump.

4. Pressure gauge:
 - a. Size: 2-inch.
 - b. Materials: Type 316 stainless steel.
 - c. Liquid filled with diaphragm seal.
 - d. Location: Discharge line of the pump.
 - e. The pressure gauge shall read from 0 to 160 psig.
 - f. Pressure gauges shall meet additional requirements as specified in Section 17000.

2.05 CONTROLS

- A. Polymer blending unit manufacture shall coordinate with the Belt Filter Press Manufacturer and the Instrumentation System Supplier and provide all necessary assistance.
- B. General:
 1. The polymer blending unit manufacturer's standard control packages shall be modified to provide the controls described herein.
 2. Dewatering Polymer Solution System:
 - a. Provide a skid mounted control panel for each polymer blending unit for control of the dewatering polymer blender units based on signals from the Plant SCADA system.
 - b. The control panel enclosure and all electrical and instrumentation components shall conform to the requirements stated in the Contract Documents.
 - c. Control panels and all components shall be UL listed and labeled.
 - d. Under AUTO control, the dewatering polymer solution system shall accept a polymer solution concentration setpoint and shall maintain that setpoint through ratio control. The system shall operate to produce the same volume of polymer solution as the volume used in the dewatering process by accepting a sludge flow and a TSS meter signal from the Plant PLC system, calculating the incoming mass of dry solids in tons and maintaining a flowrate which meets an operator selected polymer dose rate in pounds of polymer per dry tons of incoming solids.
 - e. System shall include instruments to sense loss of dilution water. Upon sensing that dilution water flow has been interrupted, system shall place the neat polymer pump on standby and annunciate a common fail alarm. The system shall restart the neat polymer pump automatically when flow is restored.
 - f. System shall include instruments to sense loss of polymer flow. Upon sensing that polymer flow has been interrupted, system shall stop and annunciate a common fail alarm. A manual local reset of the alarm condition will be required before the system can resume operation.
 - g. The controller/PLC in the control panel shall be pre-programmed from the factory by the manufacturer's software programmer.
- C. Dewatering Polymer Solution System Vendor Supplied Control Panels (VCP):
 1. Enclosures and control panel features:
 - a. Each VCP shall be powered from a 480 volt, 20 amp, 3-phase, 60 hertz power supply:
 - 1) Provide main breaker rated 20 amp, 480 volt, 3-phase with external handle disconnect.

- 2) The panel shall have 18kAIC rating for fault current.
 - 3) Provide control power transformers as required for any other required voltages. Size control power transformers according to the actual loads.
 - 4) Provide 480 volt, 3-phase surge protection device wired to protect motors and control equipment from lightning induced line surges.
- b. Components:
- 1) The controller/PLC and VFD (or SCR) unit shall be either mounted in a vendor supplied control panel or in two separate panels. Provide UPS for controller/PLC system. Each panel shall be provided with all necessary din-rail, switches, LED indication lights, relays, wiring, etc. for a complete and functional system.
 - 2) Front panel controls:
 - a) Provide in accordance with Section 17000 and as shown on instrumentation drawings.
 - b) Provide an emergency stop pushbutton.
 - c) System HAND/OFF/AUTO.
 - d) 1-turn potentiometer - mixer speed (if polymer solution system is supplied with a variable speed mixer).
 - e) 10-turn potentiometer - progressive cavity metering pump control, unless VFD controller is adjustable at the VCP without needing to open the panel.
 - f) Booster pump HAND/OFF/AUTO switch (if applicable and provided by the MANUFACTURER). If booster pump is needed, provide NEMA starter in the vendor control panel.
 - g) Main power ON light/Running Indication.
 - h) LCD display:
 - (1) Metering pump rate.
 - (2) Water flow rate.
 - (3) Solution concentration, if applicable.
 - i) Low water low water flow alarm light:
 - (1) Metering pump goes to stand-by mode when low dilution water flow occurs. The pump automatically restarts when flow returns. Should the water flow not return within adjustable time delay, the system stops and requires manual reset.
 - j) Low polymer flow alarm light:
 - (1) When low/loss of polymer flow occurs, the system stops and requires manual restart. An adjustable time delay relay shall be provided to prevent nuisance alarms from occurring.
 - k) Solution concentration fault light:
 - (1) When solution concentration is outside of the acceptable range, the PLC will stop the system and require manual restart. An adjustable time delay shall be provided to prevent nuisance alarms from occurring.
 - 3) Remote monitoring and control as shown on drawings and as describes herein:
 - a) Provide dry relay contact outputs for the following:
 - (1) System running.
 - (2) In AUTO mode.

- (3) Common fail alarm:
 - (a) Alarm condition shall be annunciated upon Loss of Level signal, Loss of Polymer Flow, Low Water Flow, or Solution Concentration Fault.
 - b) Accept discrete inputs for the following:
 - (1) Start/stop.
 - c) Provide 4-20mA outputs for the following:
 - (1) Neat Polymer pump speed feedback (if VFD is used).
 - (2) Polymer Dilution System water flow rate.
 - (3) Polymer Dilution System Calculated pump flow rate.
 - d) Accept 4-20mA inputs for the following:
 - (1) Polymer Solution Concentration Setpoint:
 - (a) Single setpoint shall be used to control either duty or standby unit.
 - (2) Polymer Pump Speed Command (if VFD is used).
 - c. Enclosure and associated components:
 - 1) In accordance with Section 17000 unless otherwise specified in this Section.
 - 2) NEMA Type 4X fiberglass reinforced plastic.
 - 3) Provide main disconnect handle.
 - 4) Provide a manual thermal magnetic circuit breaker to disconnect power from each motor installed within VCP.
 - d. Panel shall be skid-mounted:
 - 1) The control panel shall be skid mounted and will not accept external stand-alone control panel to be mounted away from the skid. Provide components necessary to assure adequate cooling.
 - e. Mixing chamber motor:
 - 1) Motor starter.
 - f. Neat polymer pump motor:
 - 1) Motor starter.
 - 2) SCR controllers or VFDs:
 - g. All components of each polymer blending unit shall be pre-wired to each control panel by the manufacturer. This includes motors, instruments, and ancillary devices.
 - h. Neat Polymer Pump protection:
 - 1) Supply each pump with self-contained pump protection components as follows.
 - 2) 120 VAC, 1-phase, power supply.
 - 3) Wired directly to the internal pump monitoring devices, including:
 - a) Stator thermal switches.
 - b) Motor temperature switch.
 - 4) Provide the following output contacts:
 - a) Stator thermal switches.
 - b) Motor temperature switch.
- 2. Control Description:
 - a. The Belt Filter Press manufacturer in coordination with the polymer blender manufacturer and the instrumentation Contractor(as necessary) shall provide all necessary controls/programming to provide the functionality described herein.

- b. The system shall be provided with LOCAL /REMOTE operating modes:
 - 1) LOCAL: In local manual mode, the neat polymer pump speed, the polymer dilution water pump and water flow rate shall respond to manual input at the vendor control panel.
 - 2) REMOTE: In remote mode the system shall accept remote start/stop dry contacts and 4-20 mA polymer solution concentration setpoint signal.
- c. Under Remote Mode:
 - 1) The polymer activation unit shall provide activated polymer solution at a setpoint solution concentration to continuously maintain a dose setpoint based on analog sludge flow and TSS transmitter signals from the plant PLC system.
 - 2) The solution concentration shall be maintained at a constant setpoint percentage using a microprocessor-based or PLC-based ratio control algorithm. In the remote mode the solution concentration set point shall be adjustable via a 4-20mA signal from the Plant SCADA system. Once the system is sent a start command, the system shall send polymer directly into the belt filter press feed manifold.
 - 3) The solution flow rate shall be variable to maintain a constant setpoint dosage in pounds of polymer per dry tons of incoming solids to the belt filter press. The polymer blending unit shall calculate this flow rate based on incoming flow and TSS signals. In the remote mode, the polymer dose shall be adjustable via a 4-20mA signal from the Plant SCADA system.

2.06 SOURCE QUALITY CONTROL

- A. Witnessing: Source or factory testing shall be witnessed by the Engineer or the Owner when scheduled; provide advanced notice of source testing. All travel expenses for the witnessing party shall be covered by the Manufacturer.
- B. Variable frequency drive and motor factory tests: Test as specified in the variable frequency drive section.
- C. Hydrostatic pressure tests: As specified for components in this Section.

PART 3 EXECUTION

3.01 EXAMINATION

- A. As specified in Section 15050.

3.02 INSTALLATION

- A. Polymer blending units shall be installed and programmed with adequate coordination with the Belt Filter Press manufacturer in strict conformance with the manufacturer's installation instructions and with favorable review shop drawings. Contractor and his instrumentation subcontractor shall be fully responsible and lead all necessary coordination with the manufacturers.

- B. Checkout of final installation, start-up, calibration, and instruction of operating personnel shall be performed by an authorized representative of the polymer blending unit manufacturer:
 - 1. Manufacturer shall provide Certificate of Proper Installation in accordance with Section 01756.
- C. Alignment of piping may vary from that indicated on the Drawings:
 - 1. Upon acceptance by the Engineer, align piping to suit the equipment furnished, without additional cost to the Owner.
- D. Installing Contractor to flush out reuse water line until water discharged from line is clear and free of debris.
- E. Installing Contractor to avoid exposing neat polymer lines to water at any point of the system.

3.03 FIELD COATING

- A. Pumps, piping, valves, and accessories: Field coat as specified in Section 09960.

3.04 TESTING

- A. Functional testing of the entire polymer feed system to be conducted following installation and cleaning of the polymer blending units. Contractor shall take the lead and responsibility to coordinate with the manufacturers as described below.
- B. Testing to be conducted by the polymer blending unit manufacturer's representative, Belt Filter Press manufacturer's Representative in coordination with the installing Contractor in the presence of the OWNER and Engineer to demonstrate that equipment is capable of performing its specified function in a satisfactory manner without mechanical or electrical defects, binding, or operational difficulties.
- C. Excessive vibration or noise shall be corrected, as specified in Section 15050.
- D. Installing Contractor shall verify and affirm that all connections are watertight.
- E. Accuracy of all polymer feed components shall be demonstrated and brought within the limits specified in this Section.
- F. During testing, installing Contractor shall make all final adjustments necessary to place equipment in satisfactory working order.
- G. Belt Filter Press manufacturer's representative in coordination with the polymer blending unit manufacturer's representative and the installing Contractor shall test and calibrate all controls, switches, automatic valves, and other instrumentation and control equipment associated with the polymer feed system specified, in accordance with the manufacturer's printed instruction over the full operating range of the equipment.
- H. Provide certified test report as specified in Section 01756.
- I. Coordinate testing with functional testing of other sludge dewatering equipment.

3.05 POLYMER BLENDING UNIT MANUFACTURER'S FIELD SERVICES

- A. Coordinate field service work with the Belt Filter Press manufacturer, installing Contractor, the Owner, and Engineer prior to initiating such work.
- B. Require Polymer Blending Unit Manufacturer's Representative to perform the following services as described below and as specified in Section 01756. The specified durations are the minimum required time on the jobsite. Additional services and/or longer durations shall be provided as needed at no cost to the Owner to meet the required quality of work:
 - 1. Dewatering Polymer Solution System:
 - a. Installation Assistance: 1 workday.
 - b. Installation Inspection: 1 Workday.
 - c. Start-up/Testing Assistance: 2 Workdays.
 - d. Training per Section 01756 and as further described below: 16 hours:
 - 1) Operations Training: 8 hours.
 - 2) Mechanical Maintenance Training: 6 hours.
 - 3) Electrical Maintenance Training: 2 hours.
 - e. Final Acceptance and Checkout: 1 Workday.
 - f. Post Start-up Field Visit: 1 Workday.
- C. Additional Training Requirements:
 - 1. The Contractor shall coordinate with the Belt Filter Press manufacturer and the Polymer Blending Unit manufacturer and shall submit a training course outline plan one month before training starts, with proposed class material and class schedule to the Owner for approval. Training will begin only if the class material and class schedule have been reviewed and approved by the Owner.
 - 2. Training will begin only after the dewatering system has successfully passed the performance test, has been started-up for at least one belt filter press, and has provided beneficial use to the Owner.
 - 3. Subjects of instruction shall include the following:
 - a. Start-up and shutdown procedures.
 - b. Troubleshooting.
 - c. System operation.
 - d. Operating adjustments for performance optimization.
 - e. Preventative mechanical and electrical maintenance.
 - f. Removal and replacement of system components.
 - g. Mechanical and electrical maintenance procedures.
 - h. Emergency procedures.
 - i. Record keeping.
 - j. Mechanical unit function and description.
 - k. Variable frequency drives and SCR controllers.
 - l. System controls.

3.06 DEMONSTRATION

- A. Provide system start-up as specified in Section 01756.

END OF SECTION

^{AD4} Addendum No. 4 – April 17, 2020

^{AD5} Addendum No. 5 – April 29, 2020

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SECTION 13121

PRE-ENGINEERED METAL BUILDING

PART 1 GENERAL

1.01 DESCRIPTION

- A. This section includes materials, installation, and manufacturer's design of prefabricated metal buildings.

1.02 SUBMITTALS

- A. Submit shop drawings in accordance with the General Conditions, Section 01300, and the following:
- B. Submit letter of certification identifying the metal building manufacturer is IAS (AC472) certified fabricator and that all building components will be designed in accordance with the current edition of the FBC Building Code.
- C. Submit certification that the metal building manufacturer has been in business for at least 10 years and has designed and supplied at least five buildings similar to the specified project building. Include names of owners and locations for the referenced buildings.
- D. Submit manufacturer's catalog data describing the building construction and components. Submit project-specific design and erection drawings, shop painting and finishing specifications, instruction manuals, and other data to describe the design, materials, sizes, layouts, construction details, fasteners, and erection.
- E. Submit engineering design calculations for structural members and covering components, bracing, equipment supports, and anchor bolts. Submit the stress values utilized in the analysis stating the design criteria and procedures used. Design calculations shall be signed by a civil engineer registered in the state of Florida.
- F. Submit certificate that the design meets the specified building codes.
- G. Submit erection drawings and diagrams for each building. Submit calculations verifying the base anchor/foundation assemblies indicated in the drawings are adequate to accommodate the project-specific metal building reactions. Show column base anchor details and anchor bolt sizes. Show roof and wall bracing.
- H. Submit color charts of the colors available for wall and roof panels, however, contract to include the cost to custom color match owners' preferred color for exterior and interior wall panels & liners, as indicated on the architectural elevation sheet in the design drawings.

1.03 GUARANTEE

- A. Buildings shall be guaranteed against water leaks arising out of or caused by ordinary wear and tear by the elements for a period of five years. Such guarantee is in addition to the guarantee required in the General Conditions and shall start upon final acceptance of the work by the Owner.
- B. Special Warranty on Metal Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period, ABC Standard.
- C. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 MATERIALS

2.01 MANUFACTURERS

- A. Prefabricated metal buildings shall be manufactured by American Buildings, Butler, Varco-Pruden, or equal.

2.02 DESIGN CRITERIA

- A. Buildings shall be of the size and shape shown, complete with all accessories.
- B. Design building for the dead load, specified live load, and the combinations of these loads as specified below. Reduction of loads due to tributary loaded area is permitted only for the rigid frames. Include the following loads in addition to the dead load:
 - 1. Live load 20 psf.
 - 2. A uniform collateral load of 8 psf in addition to the dead load of the building.
 - 3. Weights of mechanical equipment and process piping supported by the structure if greater than 8 psf.
 - 4. Wind load per the FBC requirements supplemented by ASCE 7-10: See Drawings.
- C. Rigid frame shall consist of welded up plate section columns and foot beam complete with necessary splice plates for bolted field assembly.
- D. End rigid frames shall be the same as interior rigid frames.
- E. Design structural steel members in accordance with AISC publication, "Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings." Design structural cold-formed steel framing members in accordance with AISI publication, "Specification for the Design of Cold-Formed Steel Structural Members."

- F. Purlins and Girts shall be 8 in. minimum deep "Z" sections, precision roll formed.
- G. Eve struts shall be 8in. minimum deep "C" sections.
- H. All columns shall be designed as "Pin" connected. Moment transfer to footings will not be allowed.
- I. The building foundation plan is a preliminary design, the foundation design will be reviewed by the engineer once the Prefabricated Metal Building submittal is approved.
- J. Design framed openings to replace structurally the covering and framing displaced.
- K. Welding of steel shall be in accordance with AWS D1.1.
- L. Except as modified hereinafter, design steel covering in accordance with AISI publication "Specification for the Design of Cold-Formed Steel Structural Members."
- M. Maximum wind load deflection for Primary Framing shall not exceed 1/60 of the eave height of the building.
- N. Maximum wind load deflection for wall sheets shall not exceed 1/180 of the span between supports, and maximum live load deflection for roof sheets shall not exceed 1/180 of the span between supports. Maximum deflections shall be based on sheets continuous across two or more supports with sheets unfastened and fully free to deflect.

2.03 BRACING

- A. Provide roof bracing. Design bracing for controlling wind or seismic load combinations. Brace compression flanges of structural members as required by the code.

2.04 ASSEMBLY AND DISASSEMBLY

- A. The size of the prefabricated components and the field connections required for erection shall permit easy assembly and disassembly by means of the building manufacturer's standard fasteners and construction tools. The maximum size of any shop-assembled component of the building shall permit transportation from factory to site by commercial carrier.
- B. Clearly and legibly mark each and every piece and part of the assembly to correspond with previously prepared erection drawings, diagrams, and/or instruction manuals.

2.05 EXTERIOR COVERING COMPONENTS – STEEL

- A. Roof Covering shall be standing seam with minimum 24-gauge galvanized steel conforming to ASTM A653, G90 coating designation, factory color finished. Panels shall have 2 major corrugations, 2 inches high not exceeding 24 inches.
- B. Wall Covering shall be rib panel with minimum 24-gauge galvanized steel conforming to ASTM A653, G90 coating designation, factory color finished.

2.06 ACCESSORIES

- A. Flashing, trim, metal closure strips, caps, and similar metal accessories shall be not less than the minimum thicknesses specified for covering. Molded closure strips shall be bituminous-saturated fiber, closed-cell or solid-cell synthetic rubber or neoprene, or PVC premolded to match configuration of the covering.

2.07 DISSIMILAR METAL ISOLATION

- A. Coat steel in contact with aluminum or aluminum-coated steel covering or provide rubber or nylon gaskets between steel and aluminum surfaces.

2.08 FASTENERS

- A. All structural framing shall utilize high-strength (H-S) bolts. H-S bolts, nuts, and washers shall conform to ASTM A325, Type 1 galvanized, ASTM A563, and ASTM F436, respectively.
- B. Use hot-dipped galvanized fasteners with an integral steel-backed washer.
- C. Provide gasketed washers of a material compatible with the covering and with a minimum diameter of 3/8 inch for structural connections to waterproof the fastener penetration on the exterior side. Gasketed portion of washers shall be neoprene or other equally durable elastomeric material approximately 1/8 inch thick. Exposed wall fasteners shall be factory color finished or provided with plastic color caps to match the covering.

2.09 PAINTING OF ROOF PANELS

- A. Color finish roof covering at the factory on exterior side. Prepare surfaces for coating by thoroughly cleaning, pretreating, and priming (if required by the finish coat) to provide a film that is compatible with the metal surface and the color finish. Treat galvanized steel surfaces per DOD-P-15328D. Clean surfaces of oil, grease, loose scale, and other foreign substances. Prime coat shall be in accordance with the manufacturer's standard system.
- B. Color finish shall consist of a Kynar 500/Hylar 5000 fluoropolymer coating.

- C. Dry-film coating thickness of the color coat shall be not less than 1.0 mil for exterior surface finish. The exterior and interior finishing systems shall meet the quality standards specified in The Aluminum Association publication, "Aluminum Standards and Data," except that for salt spray resistance, exposure shall be 450 hours, and maximum undercutting from the scored line shall not exceed 1/8 inch. Colors shall be as selected by the Owner's Representative from manufacturer's standard colors.

2.10 FINISH OF GIRTS, PURLINS, BEAMS, COLUMNS, BRACING, AND EAVE STRUT

- A. All framing (rigid frames, girts, purlins, eave strut, etc) shall receive a G90 galvanized coating per ASTM A653.

2.11 SEALANT

- A. Provide sealant of the type recommended by the building manufacturer at each joint.

2.12 SPARE PARTS

- A. Provide a minimum of 5% excess over the required amount of nuts, bolts, screws, washers, and other required fasteners with each building. Provide separate boxes for the parts for each building. Label each box with the name of the building to which it pertains; the building manufacturer's name; and the local representative's name, address, and telephone number. Provide individual boxes for each item (nuts, bolts, washers, etc.).

PART 3 EXECUTION

3.01 STORAGE AND PROTECTION

- A. Deliver, store, handle, and erect prefabricated components, sheets, panels, and other manufactured items such that they will not be damaged or deformed. Stock materials stored on the site before erection on platforms or pallets and cover with tarpaulins or other weathertight covering. Store metal sheets or panels so that water will drain off. Upon arrival on the jobsite, remove moisture on sheets and panels, restack, and protect until used.
- B. Do not store the sheets or panels in contact with materials that might cause staining. Remove stained, discolored, or damaged sheets from the site.

3.02 ERECTION

- A. Determine anchor bolt layouts before pouring concrete footings, walls, or slabs to support the buildings.

- B. Erect in accordance with the manufacturer's erection instructions and drawings and the requirements herein. Plug improper or mislocated drill holes with an oversize screw fastener and gasketed washers. Do not use sheets with an excess of such holes or with such holes in critical locations. Keep exposed surfaces clean and free from sealant, metal cuttings, and other foreign materials.
- C. Accurately set anchor bolts by template while the concrete is in a plastic state. Provide uniform bearing under baseplates and sill members using nonshrink grout. Accurately space members to assure proper fitting of covering. As erection progresses, securely fasten the work and brace to resist vertical loads and horizontal wind or earthquake loads.
- D. Apply wall covering with the longitudinal configurations in the vertical position. Apply roof covering with the longitudinal configurations in the direction of the roof slope.
- E. Except for self-framing buildings, make end laps over framing members with fasteners into framing members approximately 2 inches from the end of the overlapping sheet. Side lap distances, end lap distances, joint sealing, and spacing of fasteners shall be in accordance with the manufacturer's standard practice insofar as the maximum fastener spacing specified is not exceeded and provided such standard practice will result in a structure that will be free from water leaks and meet design requirements.
- F. Spacing of fasteners shall present an orderly appearance and shall not exceed 8 inches on center at end laps of covering, 12 inches on center at connection of covering to intermediate supports, 12 inches on center at side laps of roof coverings, and 18 inches on center at side laps of wall covering. Install fasteners in straight lines within a tolerance of 1/2 inch in the length of a bay.
- G. Seal side laps and end laps of roof and wall covering and joints at accessories. Drive fasteners normal to the surface and to a uniform depth to properly seat the gasketed washers. Fasten accessories into framing members.
- H. Insulate incompatible dissimilar materials that are in contact by means of gaskets or insulating compounds.

3.03 FIELD PAINTING

- A. Touch up factory-coated finish surfaces with the building manufacturer's touch-up paint for the particular finish coat used.

END OF SECTION.

^{AD5} Addendum No. 5 – April 29, 2020

SECTION 15052

COMMON WORK RESULTS FOR GENERAL PIPING

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes: Basic piping materials and methods.
- B. Related sections:
 - 1. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
 - 2. It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor's Work.
 - 3. The following Sections are related to the Work described in this Section. This list of Related Sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the Contractor to see that the completed Work complies accurately with the Contract Documents.
 - a. Section 01140 - Work Restrictions.
 - b. Section 09960 - High-Performance Coatings.
 - c. Section 15061 - Pipe Supports.
 - d. Section 15211 - Ductile Iron Piping: AWWA C151
 - e. Section 15956 - Piping Systems Testing.

1.02 REFERENCES

- A. American Society of Mechanical Engineers (ASME):
 - 1. B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 through 24.
 - 2. B16.47 - Large Diameter Steel Flanges: NPS 26 Through NPS 60 Metric/Inch Standard.
- B. American Water Work Association (AWWA):
 - 1. C207 - Standard for Steel Pipe Flanges for Waterworks Services-Size 4 In. Through 144 In.
- C. ASTM International (ASTM):
 - 1. A 193 - Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High Temperature or High Pressure Service and Other Special Purpose Applications.
 - 2. A 194 - Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both.
 - 3. A 307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - 4. F 37 - Standard Test Methods for Sealability of Gasket Materials.

1.03 DEFINITIONS

- A. Buried pipe: Pipe that is buried in the soil, or cast in a concrete pipe encasement that is buried in the soil.

- B. Exposed pipe: Pipe that is located above ground, or pipe that is located inside a structure, supported by a structure, or cast into a concrete structure.
- C. Underground piping: Piping actually buried in soil or cast in concrete that is buried in soil.
- D. Underwater piping: Piping below tops of walls in basins or tanks containing water.
- E. Wet wall: Wall with water on at least 1 side.

1.04 SUBMITTALS

- A. Product data:
 - 1. Escutcheons.
 - 2. Flange bolts.
 - 3. Gaskets.
 - 4. Link -type seals.
 - 5. Certifications of compliance with reference standard for lead limits.

PART 2 PRODUCTS

2.01 ESCUTCHEONS

- A. Material: Chrome-plated steel plate.
- B. Manufacturers: One of the following or equal:
 - 1. Dearborn Brass Company, Model Number 5358.
 - 2. Keeney Manufacturing Company, Model Number 102 or Number 105.

2.02 LINK TYPE SEALS

- A. Characteristics:
 - 1. Modular mechanical type, consisting of interlocking neoprene or synthetic rubber links shaped to continuously fill the annular space between the pipe and wall opening.
 - 2. Assemble links solely with stainless steel bolts and nuts to form a continuous rubber belt around the pipe.
 - 3. Provide a nylon polymer pressure plate with Type 316 stainless steel hardware. Isolate pressure plate from contact with wall sleeve.
- B. Manufacturers: One of the following or equal:
 - 1. Calpico, Incorporated.
 - 2. Pipeline Seal and Insulator, Inc., Link-Seal.

2.03 FLANGE BOLTS

- A. Ductile iron pipe:
 - 1. Bolts and nuts for ductile iron pipe flanges located indoors, outdoors above ground, or in dry vaults and structures and where pressures do not exceed 150 pounds per square inch shall be hot-dip galvanized carbon steel, ASTM A 307, Grade B.

2. Bolts and nuts for ductile iron pipe flanges located indoors, outdoors above ground, or in dry vaults and structures where the pressures exceed 150 pounds per square inch shall be alloy steel, ASTM A 193, Grade B7.
 3. Bolts and nuts for ductile iron pipe flanges submerged in water or wastewater, buried, in wet vaults or structures, adjacent to wet walls, or above open water-containing structures shall be Type 316 stainless steel in accordance with ASTM A 193, Grade B8M for bolts and in accordance with ASTM A 194, Grade 8M for nuts.
 4. Provide a washer for each nut. Washer shall be of the same material as the nut.
 5. Nuts shall be Heavy hex-head, Type 2H.
 6. Cut and finish flange bolts to project a maximum of 1/4 inch beyond outside face of nut after assembly.
 7. Tap holes for cap screws or stud bolts when used.
- B. Lubricant for stainless steel bolts and nuts:
1. Chloride-free.
 2. Manufacturers: One of the following or equal:
 - a. Huskey FG-1800.

2.04 GASKETS

- A. Gaskets for non-steam cleaned ductile iron and steel piping:
1. Suitable for pressures equal to and less than 150 pounds per square inch gauge, temperatures equal to or less than 250 degrees Fahrenheit, and raw sewage service.
 2. Gasket material:
 - a. Neoprene elastomer with minimum Shore A hardness value of 70.
 - b. Reinforcement: Inserted 13-ounce nylon fabric cloth for pipes 20 inch or larger.
 - c. Thickness: Minimum 3/32-inch thick for less than 10-inch pipe; minimum 1/8 inch thick for 10-inch and larger pipe.
 3. Manufacturers: One of the following or equal:
 - a. Pipe less than 20 inches in diameter:
 - 1) Garlock, Style 7797.
 - 2) John Crane, similar product.
 - b. Pipe 20 inches in diameter and larger:
 - 1) Garlock, Style 8798.
 - 2) John Crane, similar product.
- B. Gaskets for steam cleaned non glass-lined ductile iron and steel piping:
1. Suitable for pressures equal and less than 150 pounds per square inch gauge, temperatures equal or less than 360 degrees Fahrenheit, and raw sewage service.
 2. Material:
 - a. Neoprene elastomer, compressed, non-asbestos fiber reinforcement.
 3. Manufacturers: One of the following or equal:
 - a. Garlock, Bluegard 3300.
 - b. John Crane, similar product.

- C. Gaskets for flanged joints in polyvinyl chloride and polyethylene piping:
 - 1. Suitable for pressures equal to or less than 150 pounds per square inch gauge, with low flange bolt loadings, temperatures equal and less than 120 degrees Fahrenheit, and polymer, chlorine, caustic solutions, and other chemicals, except chemicals which liberate free fluorine including fluorochemicals and gaseous fluorine.
 - 2. Material: 0.125-inch thick Viton rubber.
 - 3. Manufacturers: One of the following or equal:
 - a. Garlock.
 - b. John Crane, similar product.
- D. Gaskets for flanged joints in low pressure air piping:
 - 1. Suitable for pressures equal to or less than 150 pounds per square inch gauge, temperatures equal to or less than 300 degrees Fahrenheit, and compressed air service.
 - 2. Material: EPDM elastomer, 1/8 inch thick, 60 Shore hardness, smooth surface.
 - 3. Manufacturers: One of the following or equal:
 - a. Garlock, Style 8314.
 - b. John Crane, similar product.
- E. Gaskets for flanged joints in ductile iron or steel water piping:
 - 1. Suitable for hot or cold water, pressures equal to or less than 150 pounds per square inch gauge, and temperatures equal to or less than 160 degrees Fahrenheit.
 - 2. Material:
 - a. Neoprene elastomer, compressed, with non-asbestos fiber reinforcement.
 - 3. Manufacturers: One of the following or equal:
 - a. Garlock, Bluegard 3300.
 - b. John Crane, similar product.
- F. Provide gaskets suitable for the specific fluids and pressure and temperature conditions.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of existing conditions:
 - 1. Locate and expose existing structures, piping, conduits, and other facilities and obstructions that may affect construction of underground piping before starting excavation for new underground piping and appurtenances.
 - 2. Verify sizes, elevations, locations, and other relevant features of existing facilities and obstructions. Determine conflicts for the construction of the new underground piping and appurtenances.
 - 3. Make piping location and grade adjustments to resolve conflicts between new piping and existing facilities and obstructions.

3.02 INSTALLATION

A. General:

1. Piping drawings:
 - a. Except in details, piping is indicated diagrammatically. Not every offset and fitting, or structural difficulty that may be encountered has been indicated on the Drawings. Sizes and locations are indicated on the Drawings.
 - b. Perform minor modifications to piping alignment where necessary to avoid structural, mechanical, or other type of obstructions that cannot be removed or changed.
 - 1) Modifications are intended to be of minor scope, not involving a change to the design concept or a change to the Contract Price or Contract Times.
2. Piping alternatives:
 - a. Provide piping as specified in this Section, unless indicated on the Drawings or specified otherwise.
 - b. Alternative pipe ratings:
 - 1) Piping with greater pressure rating than specified may be substituted in lieu of specified piping without changes to the Contract Price.
 - 2) Piping of different material may not be substituted in lieu of specified piping.
 - c. Valves in piping sections: Capable of withstanding specified test pressures for piping sections and fabricated with ends to fit piping.
 - d. For flanged joints, where 1 of the joining flanges is raised face type, provide a matching raised face type flange for the other joining flange.
3. Unless otherwise indicated on the Drawings, piping at pipe joints, fittings, couplings, and equipment shall be installed without rotation, angular deflection, vertical offset, or horizontal offset.

B. Wall and slab penetrations:

1. Provide sleeves for piping penetrations through aboveground masonry and concrete walls, floors, ceilings, roofs, unless specified or otherwise indicated on the Drawings.
2. For piping 1 inch in nominal diameter and larger, provide sleeves with minimum inside diameters of 1 inch plus outside diameter of piping. For piping smaller than 1 inch in nominal diameter, provide sleeve of minimum twice the outside diameter of piping.
 - a. Arrange sleeves and adjacent joints so piping can be pulled out of sleeves and replaced without disturbing the structure.
 - b. Cut ends of sleeves flush with surfaces of concrete, masonry, or plaster.
 - c. Conceal ends of sleeves with escutcheons where piping runs through floors, walls, or ceilings of finished spaces within buildings.
 - d. Seal spaces between pipes and sleeves with link-type seals when not otherwise specified or indicated on the Drawings.
3. Provide flexibility in piping connecting to structures to accommodate movement due to soil settlement and earthquakes. Provide flexibility using details indicated on the Drawings.
4. Core drilled openings:
 - a. Do not damage or cut existing reinforcing bars, electrical conduits, or other items embedded in the existing concrete without acceptance by Engineer.

- b. Determine location of reinforcing bars or other obstructions with a non-destructive indicator device.
 - c. Remove dust and debris from hole using compressed air.
- C. Exposed piping:
 - 1. Install exposed piping in straight runs parallel to the axes of structures, unless otherwise indicated on the Drawings:
 - a. Install piping runs plumb and level, unless otherwise indicated on the Drawings.
 - 1) Slope plumbing drain piping with a minimum of 1/4 inch per foot downward in the direction of flow.
 - 2. Install exposed piping after installing equipment and after piping and fitting locations have been determined.
 - 3. Support piping: As specified in Sections 15061:
 - a. Do not transfer pipe loads and strain to equipment.
 - 4. In addition to the joints indicated on the Drawings, provide unions, flexible couplings, flanged joints, flanged coupling adapters, and other types of joints or means which are compatible with and suitable for the piping system, and necessary to allow ready assembly and disassembly of the piping.
 - 5. Assemble piping without distortion or stresses caused by misalignment:
 - a. Match and properly orient flanges, unions, flexible couplings, and other connections.
 - b. Do not subject piping to bending or other undue stresses when fitting piping.
 - c. Do not correct defective orientation or alignment by distorting flanged joints or subjecting flange bolts to bending or other undue stresses.
 - d. Flange bolts, union halves, flexible connectors, and other connection elements shall slip freely into place.
 - e. Alter piping assembly to fit, when proper fit is not obtained.
 - f. Install eccentric reducers or increasers with the top horizontal for pump suction piping.
- D. Buried piping:
 - 1. Bury piping with minimum 3-foot cover without air traps, unless otherwise indicated on the Drawings.
 - 2. Where 2 similar services run parallel to each other, piping for such services may be laid in the same trench.
 - a. Lay piping with sufficient room for assembly and disassembly of joints, for thrust blocks, for other structures, and to meet separation requirements of public health authorities having jurisdiction.
 - 3. Laying piping:
 - a. Lay piping in finished trenches free from water or debris. Begin at the lowest point with bell ends up slope.
 - b. Place piping with top or bottom markings with markings in proper position.
 - c. Lay piping on an unyielding foundation with uniform bearing under the full length of barrels.
 - d. Where joints require external grouting, banding, or pointing, provide space under and immediately in front of the bell end of each section laid with sufficient shape and size for grouting, banding, or pointing of joints.
 - e. At the end of each day's construction, plug open ends of piping temporarily to prevent entrance of debris or animals.
 - 4. Concrete encase all buried pipe installed under concrete slabs or structures.

- E. Venting piping under pressure:
 - 1. Lay piping under pressure flat or at a continuous slope without air traps, unless otherwise indicated on the Drawings.
 - 2. Install plug valves as air bleeder cocks at high points in piping.
 - a. Provide 1-inch plug valves for water lines, and 2-inch plug valves for sewage and sludge lines, unless otherwise indicated on the Drawings.
 - 3. Provide additional pipe taps with plug cocks and riser pipes along piping as required for venting during initial filling, disinfecting, and sampling.
 - 4. Before piping is placed into service, close plug valves and install plugs. Protect plugs and plug valves from corrosion in as specified in Section 09960.
- F. Restraining piping:
 - 1. Restrain piping at valves and at fittings where piping changes direction, changes sizes, and at ends:
 - a. When piping is underground, use concrete thrust blocks, mechanical restraints, or push-on restraints.
 - b. When piping is aboveground or underwater, use mechanical or structural restraints.
 - c. Determine thrust forces by multiplying the nominal cross sectional area of the piping by design test pressure of the piping.
 - 2. Provide restraints with ample size to withstand thrust forces resulting from test pressures:
 - a. During testing, provide suitable temporary restraints where piping does not require permanent restraints.
 - 3. Place concrete thrust blocks against undisturbed soil.
 - 4. Place concrete so piping joints, fittings, and other appurtenances are accessible for assembly and disassembly.
 - 5. Provide underground mechanical restraints where specified in the Piping Schedule.
- G. Connections to existing piping:
 - 1. Expose existing piping to which connections are to be made with sufficient time to permit, where necessary, field adjustments in line, grade, or fittings:
 - a. Protect domestic water/potable water supplies from contamination:
 - 1) Make connections between domestic water supply and other water systems in accordance with requirements of public health authorities.
 - 2) Provide devices approved by Owner of domestic water supply system to prevent flow from other sources into the domestic supply system.
 - 2. Make connections to existing piping and valves after sections of new piping to be connected have been tested and found satisfactory.
 - 3. Provide sleeves, flanges, nipples, couplings, adapters, and other fittings needed to install or attach new fittings to existing piping and to make connections to existing piping.
 - 4. For flanged connections, provide stainless steel bolts with isolation bushings and washers, and full-face flange gaskets.
- H. Connections to in-service piping:
 - 1. As specified in Section 01140.

- I. Connections between ferrous and nonferrous metals:
 - 1. Connect ferrous and nonferrous metal piping, tubing, and fittings with dielectric couplings especially designed for the prevention of chemical reactions between dissimilar metals.
 - 2. Nonferrous metals include aluminum, copper, and copper alloys.
- J. Flanged connections between dissimilar metals such as ductile iron pipe and steel pipe:
 - 1. Provide stainless steel bolts with isolation bushings and washers, and full-face flange gaskets.

3.03 CLEANING

- A. Piping cleaning:
 - 1. Upon completion of installation, clean piping interior of foreign matter and debris.
 - 2. Perform special cleaning when required by the Contract Documents.
- B. Cleaning potable water piping:
 - 1. Flush and disinfect potable water piping.
- C. Cleaning air piping:
 - 1. Perform special cleaning of filtered air piping from the intake clean air plenums to the discharge points and high-pressure air piping.
 - a. Protect surfaces from contamination.
 - 2. Special cleaning shall include wire brushing, power tool cleaning, wiping down with lint-free cloths, brooming, and vacuuming to remove rust, scale, weld spatter, dust, dirt, oil, and other matter deleterious to operation of the air system:
 - a. Do not sandblast installed piping.
 - 3. To the greatest extent possible, clean piping immediately prior to final closure of piping systems:
 - a. Enter piping, clean and wipe down surfaces, and vacuum out residue.
 - b. Clean surfaces not accessible to this cleaning operation after installation within 6 hours preceding installation.
 - 4. Subsequent to cleaning, protect surfaces from contamination by dust, dirt, construction debris, and moisture, including atmospheric moisture:
 - a. Whether or not pipe upstream has been cleaned, temporarily seal openings in partially completed work except when installation is actively in progress.
 - b. When installation is actively in progress, seal openings at the end of each day's construction or when construction is temporarily stopped.
 - 5. Suspend cleaning and seal openings when inclement weather, including dust storms, is imminent.
 - 6. Use clean, dry air for testing the piping and other elements of the system.
 - 7. Prior to introduction of air to the system, blow piping clean.
 - a. Blow with maximum discharge rate possible for minimum 4 hours, using new blowers or compressors and filters.
 - 8. Clean surfaces that become contaminated prior to acceptance.

3.04 PIPING SCHEDULE

A. Abbreviations:

1. The following abbreviations used in the column of test method refer to the respective methods as specified in Section 15956.

AM	Air method
GR	Gravity method
HH	High head method
LH	Low head method
SC	Special case

2. Abbreviations to designate piping include the following:

ASP	Asphaltic
BFPF	Belt Filter Press Feed
B&S	Special case
B&SP	Bell & Spigot
BSP	Black Steel Pipe
CI	Cast iron
CISP	Cast Iron Soil Pipe
CD	Chemical Drain
CE	Ceramic Epoxy
CND	Condensate Drain
CL	Class, followed by the designation
CM	Cement Mortar
CMP	Corrugated Metal Pipe
CPVC	Chlorinated Polyvinyl Chloride
CTP	Coal Tar Pitch
CU	Copper Tubing
DIP	Ductile iron piping
FL	Flanged
HTC	High Temperature Coating
FRP	Fiberglass Reinforced Pipe
GA	Gauge, preceded by the designation
GE	Grooved end joint
GL	Glass Lined
GSP	Galvanized Steel Pipe
HPC	High Performance Coating

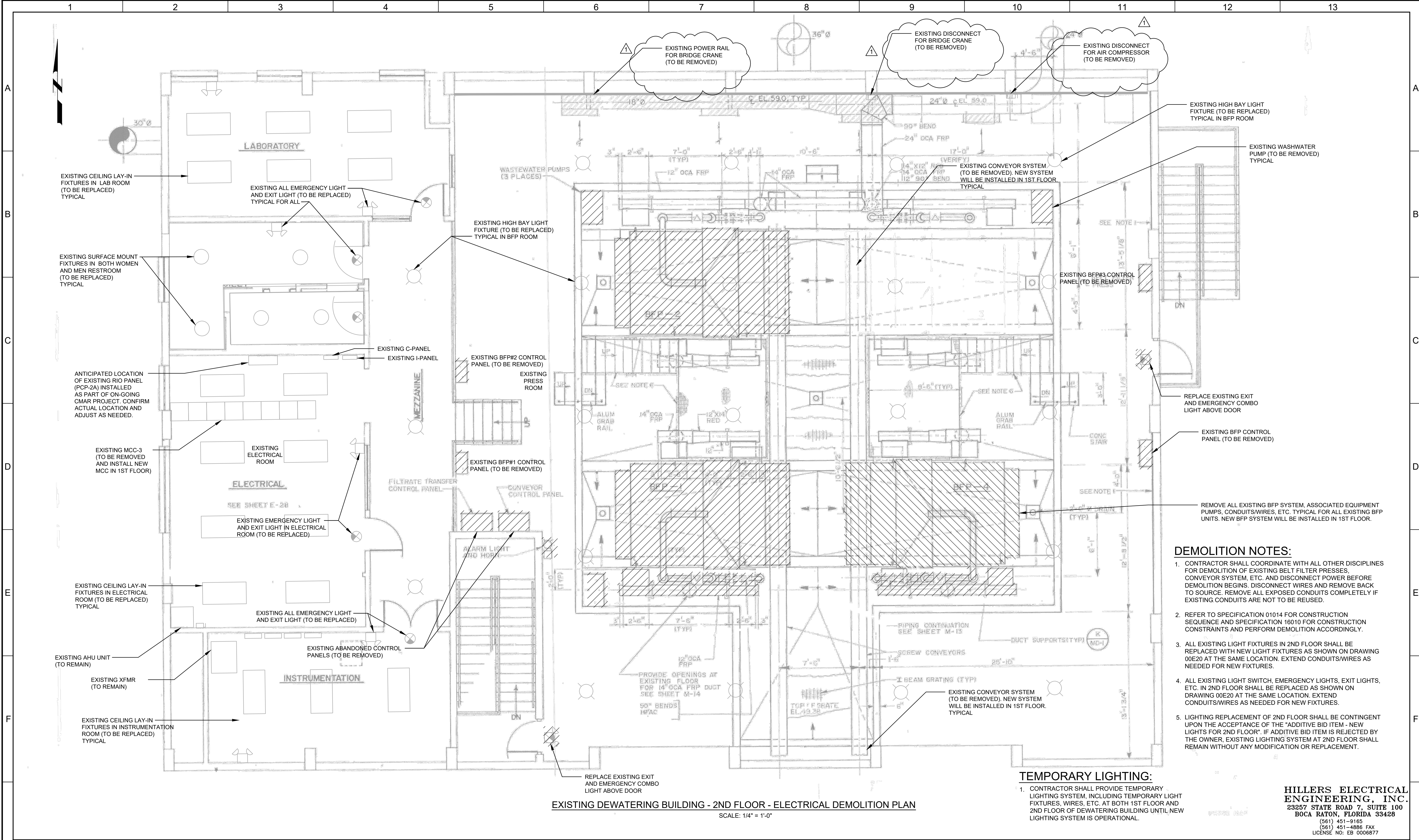
HSE	High Solids Epoxy
HSEP	High Solids Epoxy and Polyurethane
MJ	Mechanical Joint
NPS	Nominal pipe size, followed by the number in inches
PE	Polyethylene
PEE	Polyethylene Encasement
PJ	Push on Joint
psi	pounds per square inch
psig	pounds per square inch gauge
PTW	Plastic Tape Wrap
PVC	Polyvinyl Chloride
Restr	Reinforced Concrete Pipe
RCP	Restrained
RDL	Roof Drain Leader
SCH	Schedule, followed by the designation
SCRD	Screwed
SDR	PVC - SDR Series Pipe
SST	Stainless steel
SW	Solvent Weld
TW	Tape Wrap
VE	Chemical Vent
VCP	Vitrified clay piping
WLD	Welded

PIPING SCHEDULE									
Process Abbrev.	Service	Nominal Diameter (inches)	Material	Pressure Class Special Thickness Class Schedule Wall Thickness	Pipe Spec. Section	Joints/Fittings	Test Pressure/Method	Lining	Coating
WAS	Waste Activated Sludge								
	Above Ground	4	DIP	Thickness CL 53 (min)	15211	FL	75 psig/HH	CE ⁽¹⁾	HSEP
WW or RW	Washwater								
	Below Ground	10	DIP	Thickness CL 53 (min)	15211	Restrained MJ	50 psig/HH	Cement Lined	Per manufacturer
	Above Ground	1 - 6	PVC (INSIDE BFP ROOM)	80 sch	15249	SW	50 psig/HH		
DR	Drain								
	Above Ground	1 - 10	PVC	SDR 26	15247	SW	10 psig/LH	None	None
	<u>Under Ground</u> ^{AD5}	<u>1 – 10</u> ^{AD5}	<u>PVC</u> ^{AD5}	<u>SDR 26</u> ^{AD5}	<u>15247</u> ^{AD5}	<u>SW</u> ^{AD5}	<u>10 psig/LH</u> ^{AD5}	<u>None</u> ^{AD5}	<u>None</u> ^{AD5}
Notes: 1. Contractor shall provide PROTECTO 401 Ceramic Epoxy or Permite Permox PCS-9043 Type II Glass Flake Epoxy lining for ductile iron pipes.									

END OF SECTION

^{AD5} Addendum No. 5 – April 29, 2020

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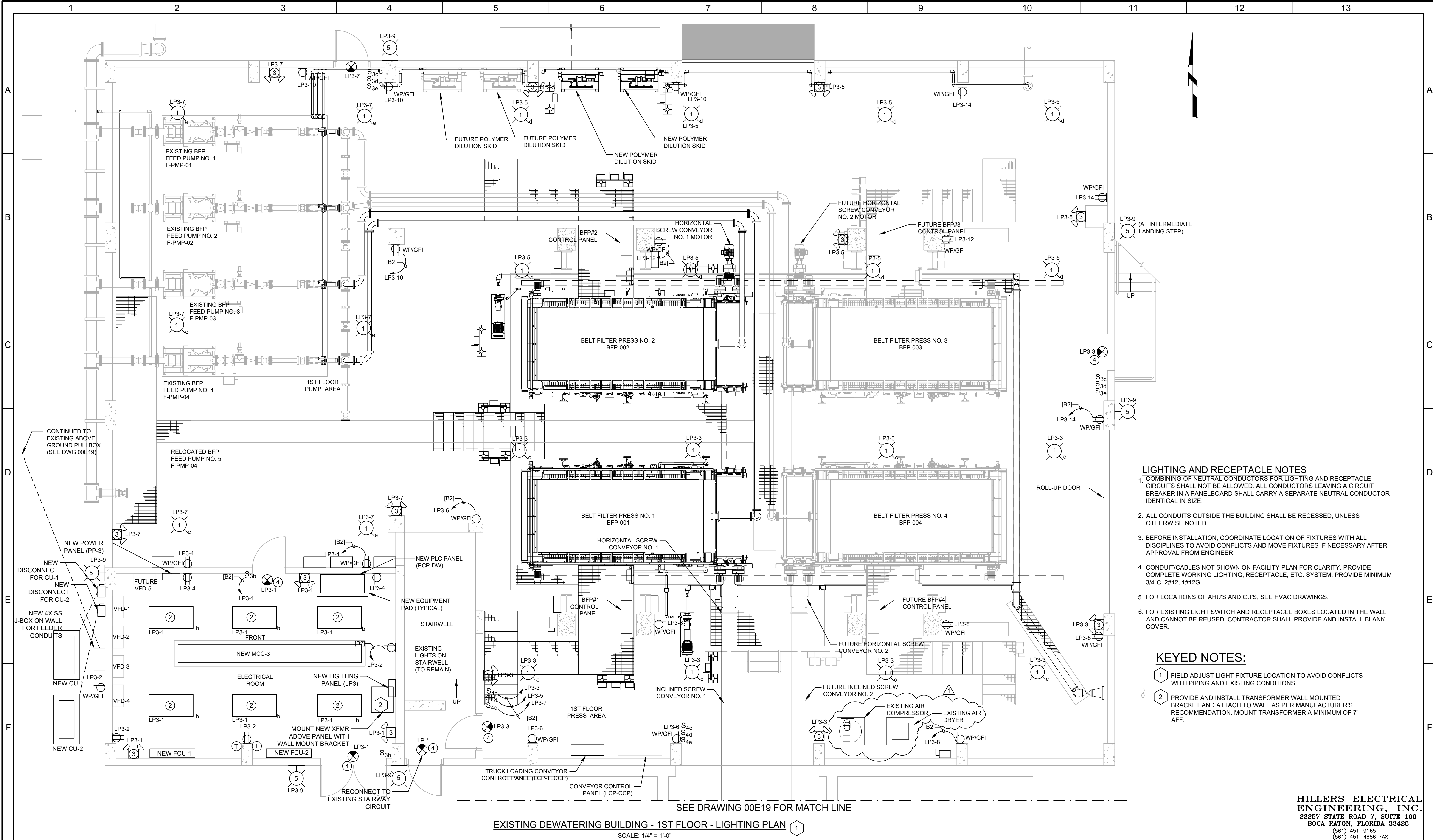
EXISTING DEWATERING BUILDING - 2ND FLOOR - ELECTRICAL DEMOLITION PLAN
SCALE: 1/4" = 1'-0"

- DEMOLITION NOTES:**
- CONTRACTOR SHALL COORDINATE WITH ALL OTHER DISCIPLINES FOR DEMOLITION OF EXISTING BELT FILTER PRESSES, CONVEYOR SYSTEM, ETC., AND DISCONNECT POWER BEFORE DEMOLITION BEGINS. DISCONNECT WIRES AND REMOVE BACK TO SOURCE. REMOVE ALL EXPOSED CONDUITS COMPLETELY IF EXISTING CONDUITS ARE NOT TO BE REUSED.
 - REFER TO SPECIFICATION 01014 FOR CONSTRUCTION SEQUENCE AND SPECIFICATION 16010 FOR CONSTRUCTION CONSTRAINTS AND PERFORM DEMOLITION ACCORDINGLY.
 - ALL EXISTING LIGHT FIXTURES IN 2ND FLOOR SHALL BE REPLACED WITH NEW LIGHT FIXTURES AS SHOWN ON DRAWING 00E20 AT THE SAME LOCATION. EXTEND CONDUITS/WIRES AS NEEDED FOR NEW FIXTURES.
 - ALL EXISTING LIGHT SWITCH, EMERGENCY LIGHTS, EXIT LIGHTS, ETC. IN 2ND FLOOR SHALL BE REPLACED AS SHOWN ON DRAWING 00E20 AT THE SAME LOCATION. EXTEND CONDUITS/WIRES AS NEEDED FOR NEW FIXTURES.
 - LIGHTING REPLACEMENT OF 2ND FLOOR SHALL BE CONTINGENT UPON THE ACCEPTANCE OF THE "ADDITIVE BID ITEM - NEW LIGHTS FOR 2ND FLOOR". IF ADDITIVE BID ITEM IS REJECTED BY THE OWNER, EXISTING LIGHTING SYSTEM AT 2ND FLOOR SHALL REMAIN WITHOUT ANY MODIFICATION OR REPLACEMENT.

- TEMPORARY LIGHTING:**
- CONTRACTOR SHALL PROVIDE TEMPORARY LIGHTING SYSTEM, INCLUDING TEMPORARY LIGHT FIXTURES, WIRES, ETC. AT BOTH 1ST FLOOR AND 2ND FLOOR OF DEWATERING BUILDING UNTIL NEW LIGHTING SYSTEM IS OPERATIONAL.

**HILLERS ELECTRICAL
ENGINEERING, INC.**
23257 STATE ROAD 7, SUITE 100
BOCA RATON, FLORIDA 33428
(561) 451-9165
(561) 451-4886 FAX
LICENSE NO: EB 0006877

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					DRAWN TW				WRWRF BIOSOLIDS DEWATERING IMPROVEMENTS		BAR IS ONE INCH ON ORIGINAL DRAWING	DRAWING NO. 00E16				
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200 East Robinson Street, Suite1400
Orlando, FL 32801
Phone (407) 478-4642
CA No. 8571



CITY OF DAYTONA BEACH

WRWRF BIOSOLIDS DEWATERING IMPROVEMENTS

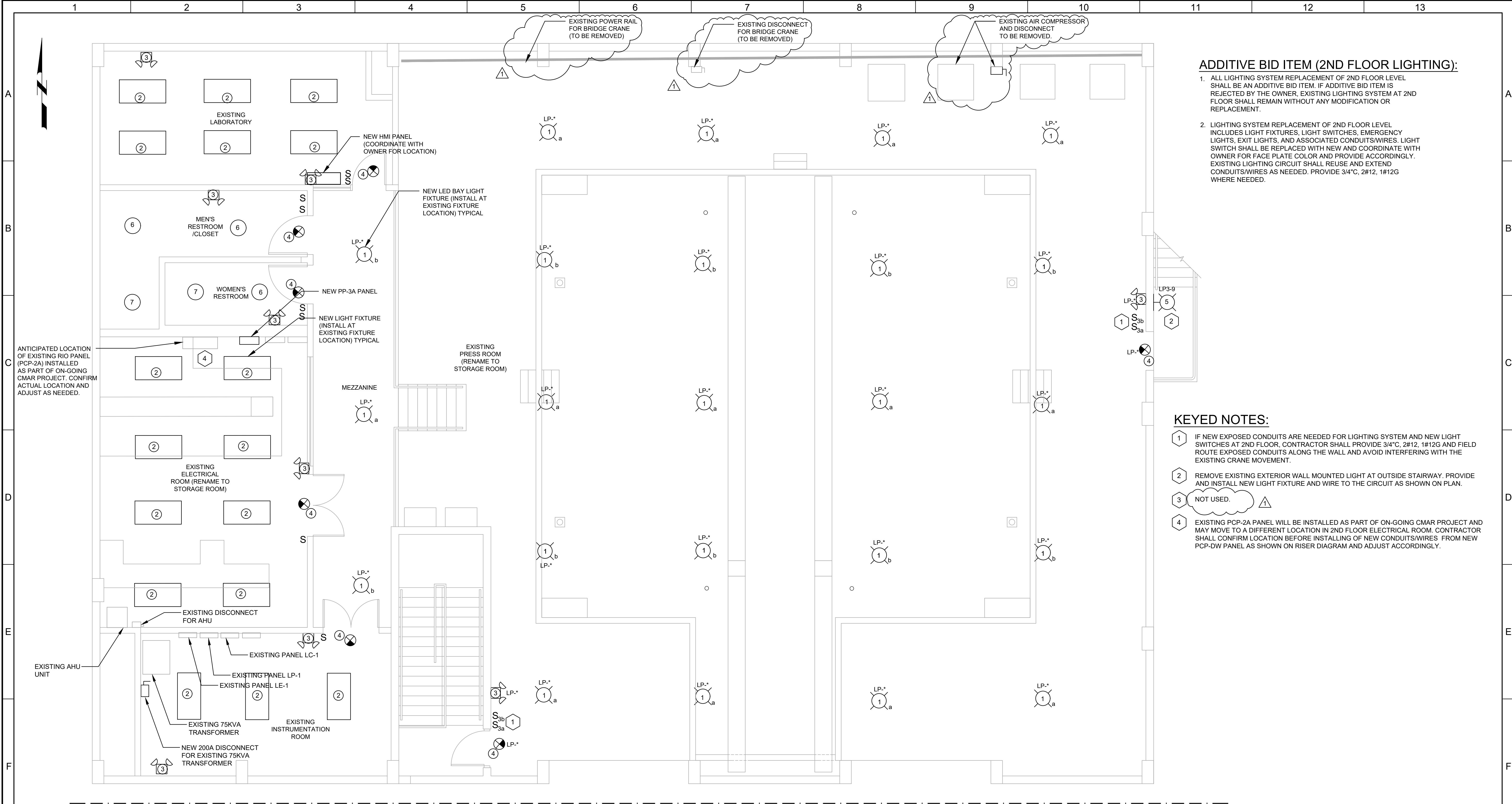
ELECTRICAL

DEWATERING BUILDING - 1ST FLOOR LIGHTING PLAN

HILLERS ELECTRICAL
ENGINEERING, INC.
23257 STATE ROAD 7, SUITE 100
BOCA RATON, FLORIDA 33428
(561) 451-9165
(561) 451-4886 FAX
LICENSE NO: EB 0006877

VERIFY SCALES	JOB NO. 8290U.10
BAR IS ONE INCH ON ORIGINAL DRAWING	DRAWING NO. 00E17
0 1"	SHEET NO.
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	

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ADDITIVE BID ITEM (2ND FLOOR LIGHTING):

1. ALL LIGHTING SYSTEM REPLACEMENT OF 2ND FLOOR LEVEL SHALL BE AN ADDITIVE BID ITEM. IF ADDITIVE BID ITEM IS REJECTED BY THE OWNER, EXISTING LIGHTING SYSTEM AT 2ND FLOOR SHALL REMAIN WITHOUT ANY MODIFICATION OR REPLACEMENT.
2. LIGHTING SYSTEM REPLACEMENT OF 2ND FLOOR LEVEL INCLUDES LIGHT FIXTURES, LIGHT SWITCHES, EMERGENCY LIGHTS, EXIT LIGHTS, AND ASSOCIATED CONDUITS/WIRES. LIGHT SWITCH SHALL BE REPLACED WITH NEW AND COORDINATE WITH OWNER FOR FACE PLATE COLOR AND PROVIDE ACCORDINGLY. EXISTING LIGHTING CIRCUIT SHALL REUSE AND EXTEND CONDUITS/WIRES AS NEEDED. PROVIDE 3/4"C, 2#12, 1#12G WHERE NEEDED.

KEYED NOTES:

- 1 IF NEW EXPOSED CONDUITS ARE NEEDED FOR LIGHTING SYSTEM AND NEW LIGHT SWITCHES AT 2ND FLOOR, CONTRACTOR SHALL PROVIDE 3/4"C, 2#12, 1#12G AND FIELD ROUTE EXPOSED CONDUITS ALONG THE WALL AND AVOID INTERFERING WITH THE EXISTING CRANE MOVEMENT.
- 2 REMOVE EXISTING EXTERIOR WALL MOUNTED LIGHT AT OUTSIDE STAIRWAY. PROVIDE AND INSTALL NEW LIGHT FIXTURE AND WIRE TO THE CIRCUIT AS SHOWN ON PLAN.
- 3 NOT USED.
- 4 EXISTING PCP-2A PANEL WILL BE INSTALLED AS PART OF ON-GOING CMAR PROJECT AND MAY MOVE TO A DIFFERENT LOCATION IN 2ND FLOOR ELECTRICAL ROOM. CONTRACTOR SHALL CONFIRM LOCATION BEFORE INSTALLING OF NEW CONDUITS/WIRES FROM NEW PCP-DW PANEL AS SHOWN ON RISER DIAGRAM AND ADJUST ACCORDINGLY.

SEE DRAWING 00E19 FOR MATCH LINE

EXISTING DEWATERING BUILDING - 2ND FLOOR - ELECTRICAL PLAN (ALFA LAVAL)

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

HILLERS ELECTRICAL ENGINEERING, INC.
23257 STATE ROAD 7, SUITE 100
BOCA RATON, FLORIDA 33428
(561) 451-9165
(561) 451-4886 FAX
LICENSE NO: EB 0006877



200 East Robinson Street, Suite1400
Orlando, FL 32801
Phone (407) 478-4642
CA No. 8571



CITY OF DAYTONA BEACH
WRWRF BIOSOLIDS DEWATERING IMPROVEMENTS

ELECTRICAL
**DEWATERING BUILDING - 2ND FLOOR
LIGHTING PLAN**

VERIFY SCALES

BAR IS ONE INCH ON ORIGINAL DRAWING

0 1"

IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO.
8290U.10

DRAWING NO.

00E20

SHEET NO.

**100% SUBMITTAL
ISSUE FOR BID**

DESIGNED
TW

DRAWN
TW

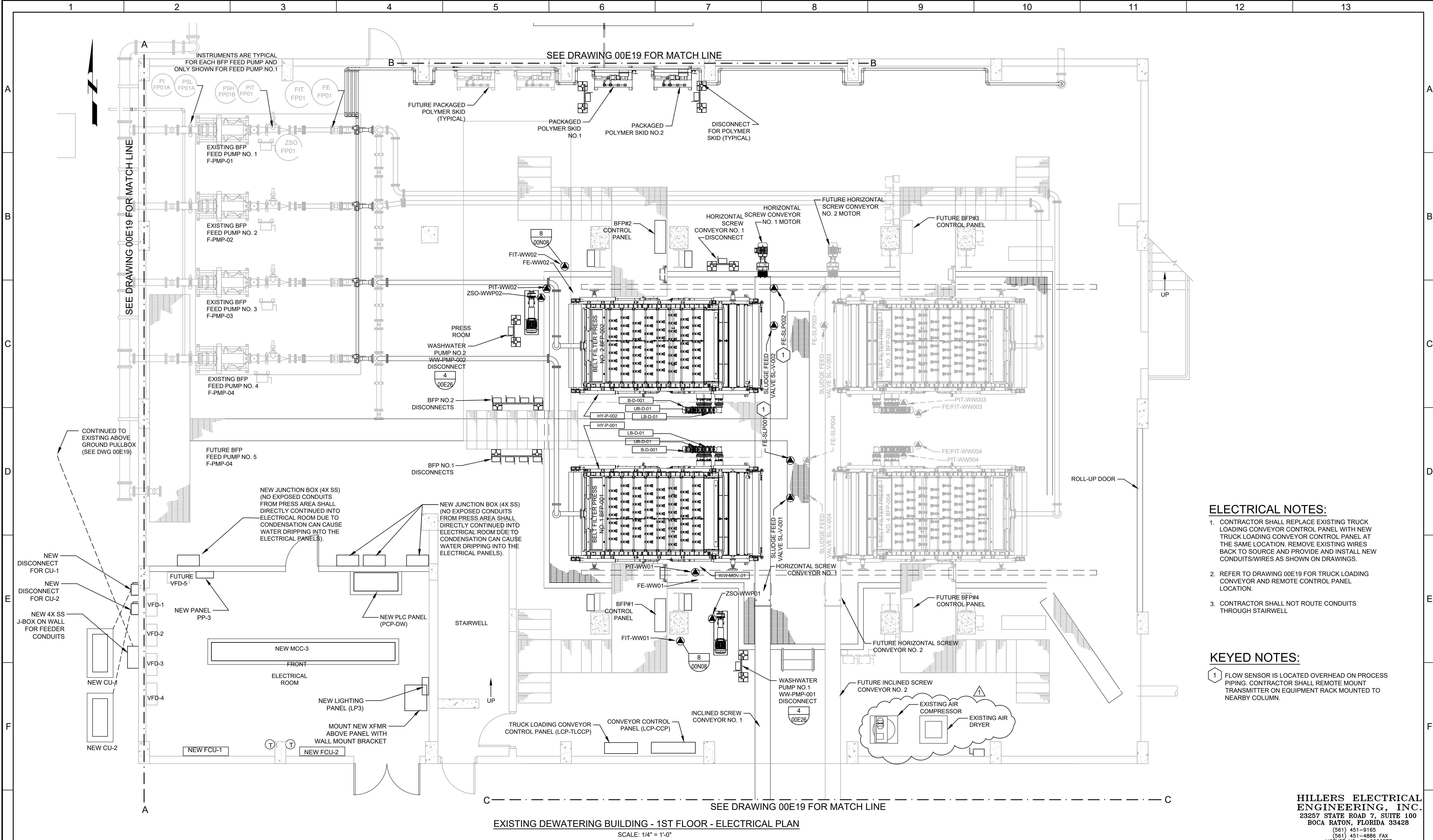
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FEBRUARY 2020

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1	4/2020	TW	ADDENDUM NO.5	



ELECTRICAL NOTES:

1. CONTRACTOR SHALL REPLACE EXISTING TRUCK LOADING CONVEYOR CONTROL PANEL WITH NEW TRUCK LOADING CONVEYOR CONTROL PANEL AT THE SAME LOCATION. REMOVE EXISTING WIRES BACK TO SOURCE AND PROVIDE AND INSTALL NEW CONDUITS/WIRES AS SHOWN ON DRAWINGS.
2. REFER TO DRAWING 00E19 FOR TRUCK LOADING CONVEYOR AND REMOTE CONTROL PANEL LOCATION.
3. CONTRACTOR SHALL NOT ROUTE CONDUITS THROUGH STAIRWELL

KEYED NOTES:

1. FLOW SENSOR IS LOCATED OVERHEAD ON PROCESS PIPING. CONTRACTOR SHALL REMOTE MOUNT TRANSMITTER ON EQUIPMENT RACK MOUNTED TO NEARBY COLUMN.

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CITY OF DAYTONA BEACH
WRWRF BIOSOLIDS DEWATERING IMPROVEMENTS
ELECTRICAL
DEWATERING 1ST FLOOR - ELECTRICAL PLAN (ANDRITZ)

VERIFY SCALES
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0 1"
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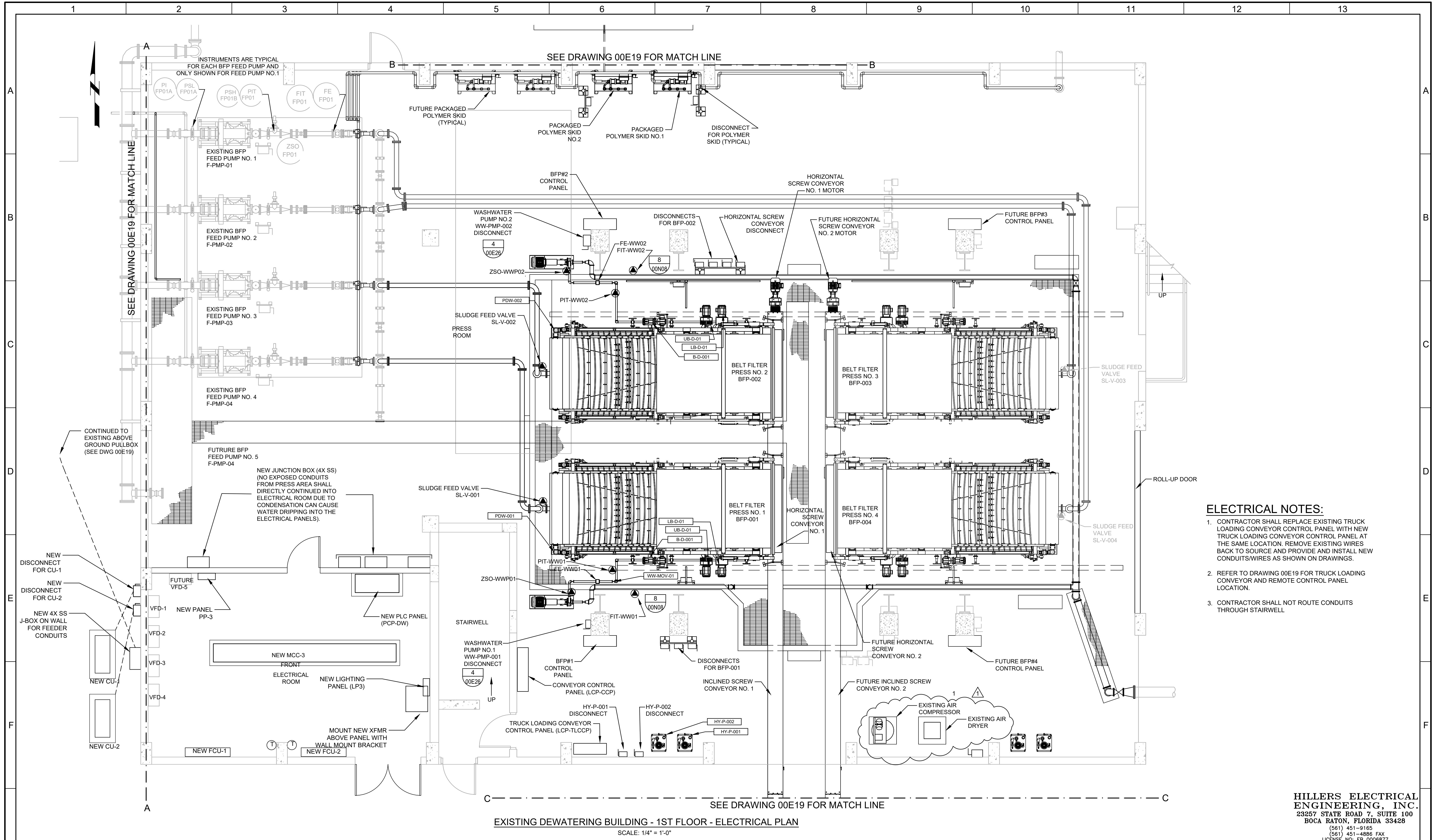
JOB NO.
8290U.10
DRAWING NO.
00E21
SHEET NO.

**100% SUBMITTAL
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1	4/2020	TW	ADDENDUM NO.5

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- ELECTRICAL NOTES:**
1. CONTRACTOR SHALL REPLACE EXISTING TRUCK LOADING CONVEYOR CONTROL PANEL WITH NEW TRUCK LOADING CONVEYOR CONTROL PANEL AT THE SAME LOCATION. REMOVE EXISTING WIRES BACK TO SOURCE AND PROVIDE AND INSTALL NEW CONDUITS/WIRES AS SHOWN ON DRAWINGS.
 2. REFER TO DRAWING 00E19 FOR TRUCK LOADING CONVEYOR AND REMOTE CONTROL PANEL LOCATION.
 3. CONTRACTOR SHALL NOT ROUTE CONDUITS THROUGH STAIRWELL.

100% SUBMITTAL
ISSUE FOR BID

1	4/2020	TW	ADDENDUM NO.5
REV	DATE	BY	DESCRIPTION
1			

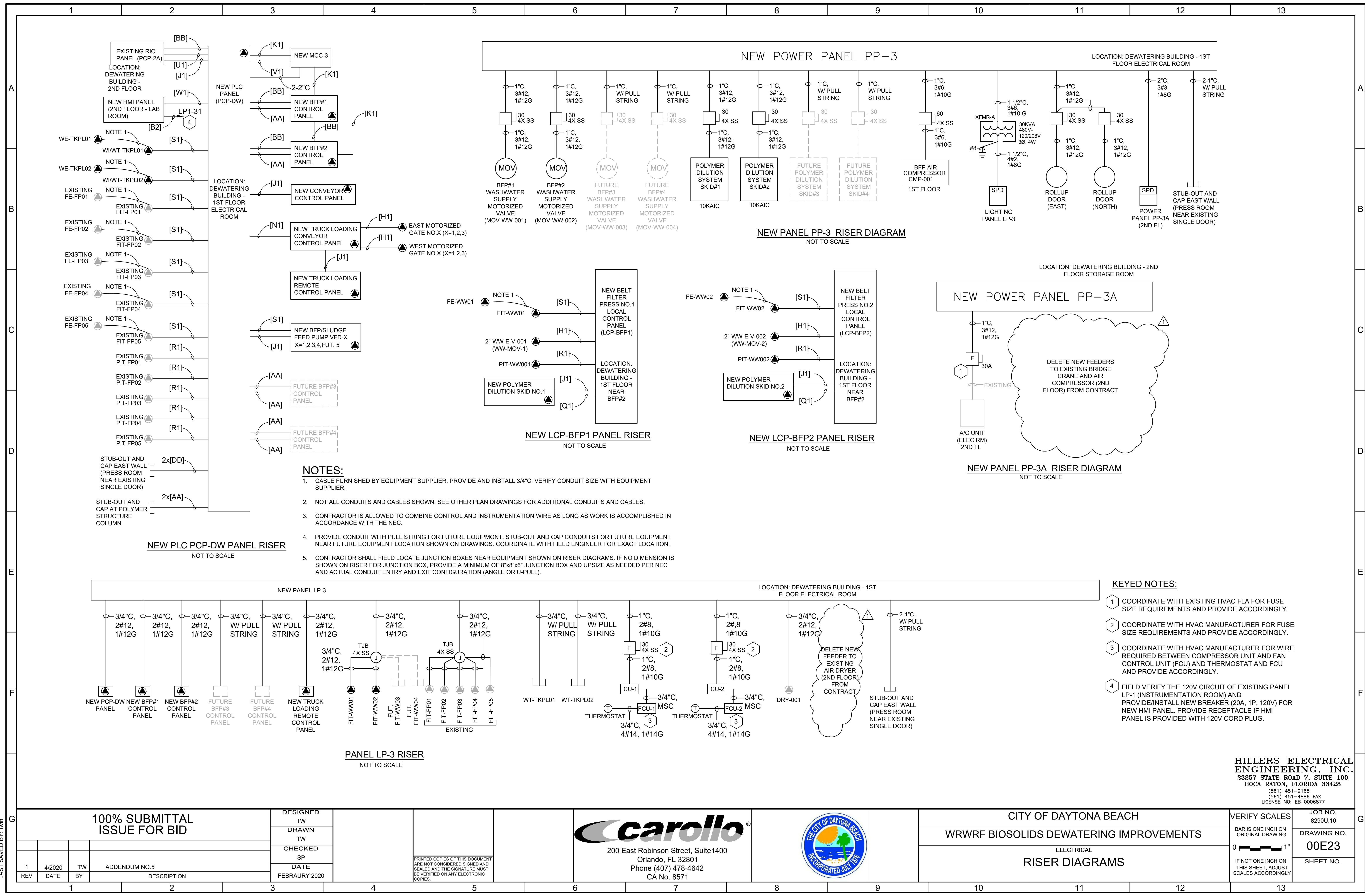
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DATE FEBRUARY 2020	

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CA No. 8571

CITY OF DAYTONA BEACH
WRWRF BIOSOLIDS DEWATERING IMPROVEMENTS
ELECTRICAL
DEWATERING 1ST FLOOR -
ELECTRICAL PLAN (BDP)

VERIFY SCALES BAR IS ONE INCH ON ORIGINAL DRAWING 0 1"	JOB NO. 8290U.10 DRAWING NO. 00E22 SHEET NO.
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PROJECT NO. FILE NAME: 8290U10_E22.dwg

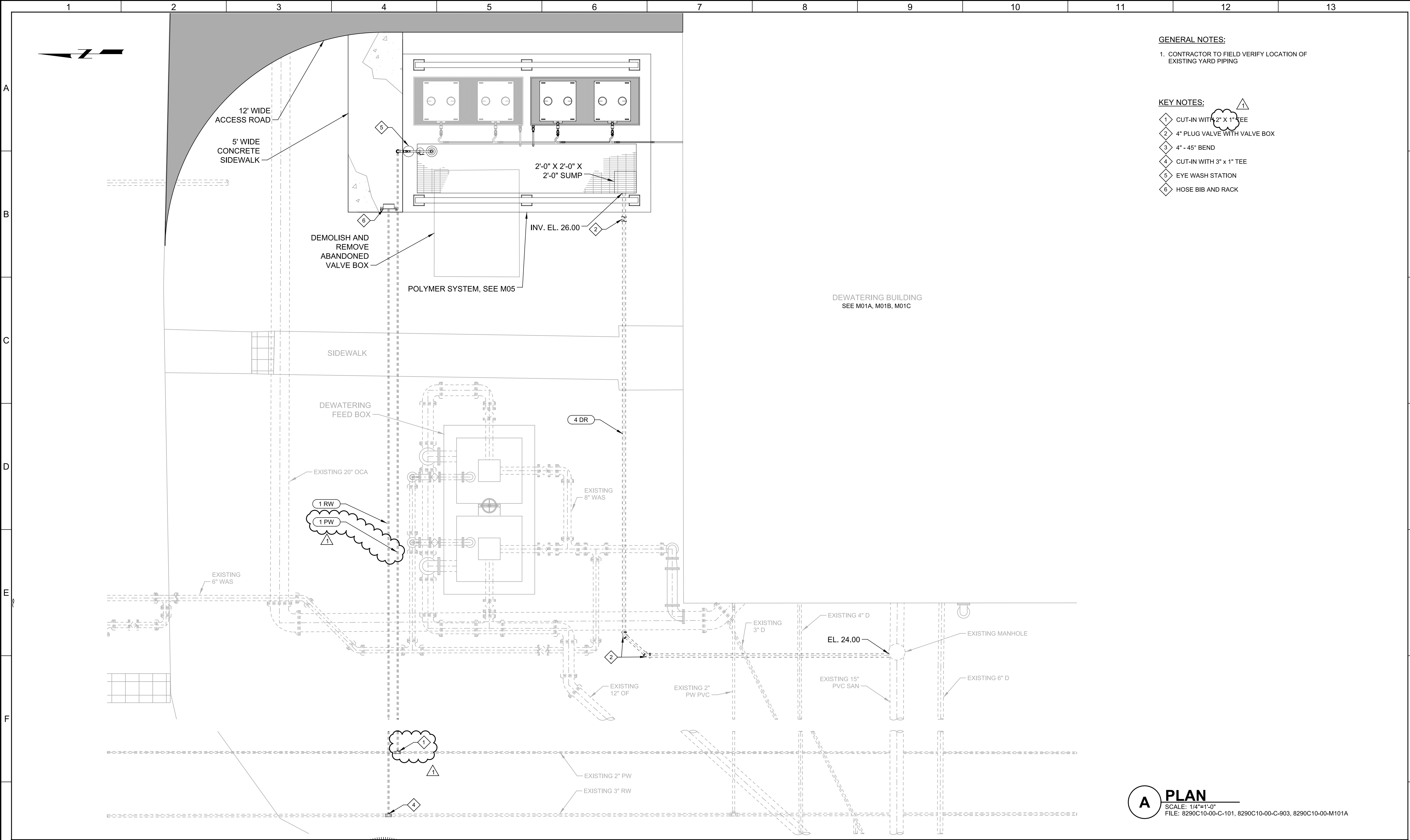


Plot Date: 27-APR-2020 12:21:39 PM

User: svcPW

Model: Layout1 ColorTable: gshade.ctb DesignScript: Carollo Std Pen_v0905.pen PlotScale: 1:1

LAST SAVED BY: John Builrigo

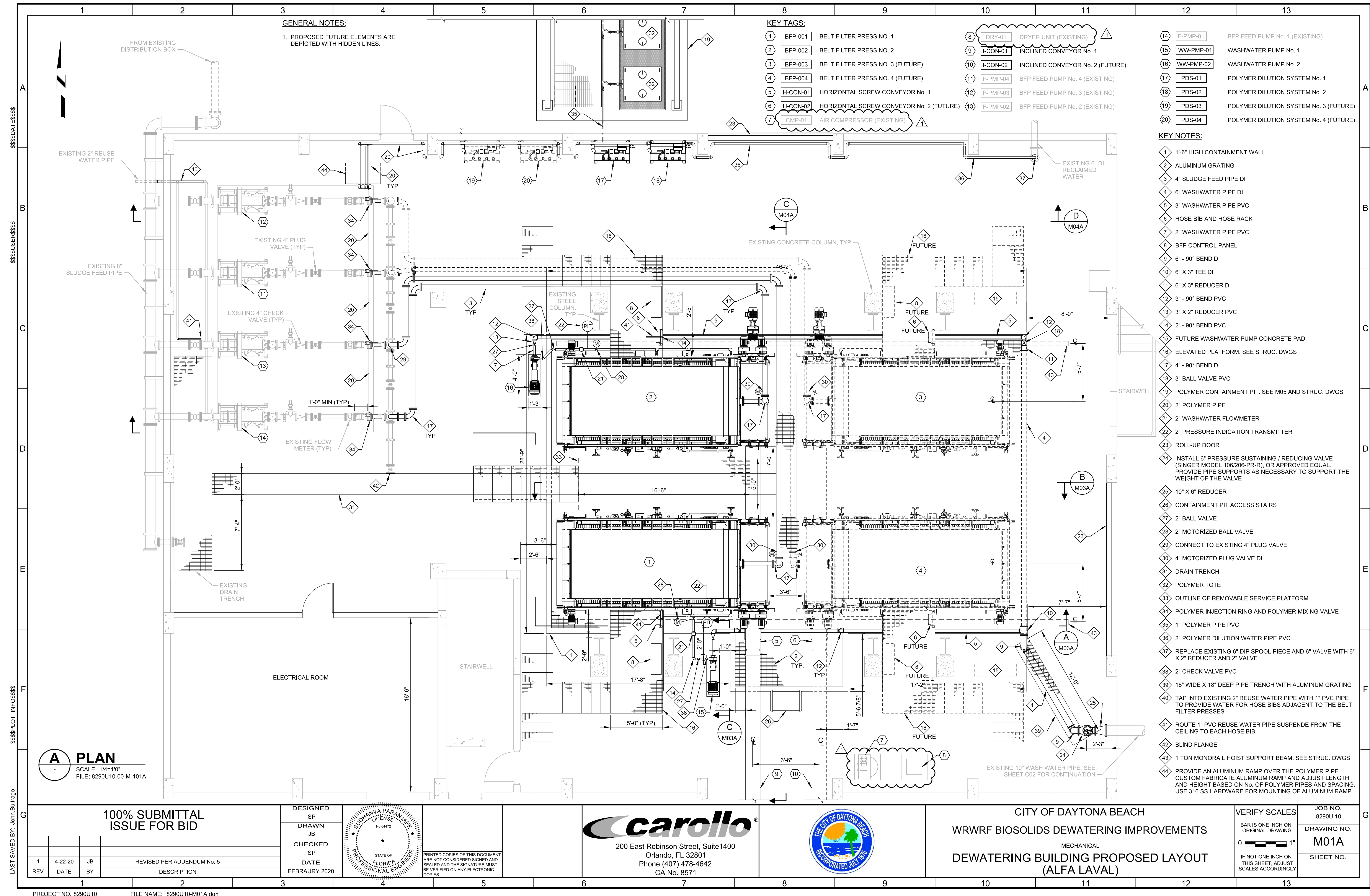


GENERAL NOTES:
1. CONTRACTOR TO FIELD VERIFY LOCATION OF EXISTING YARD PIPING

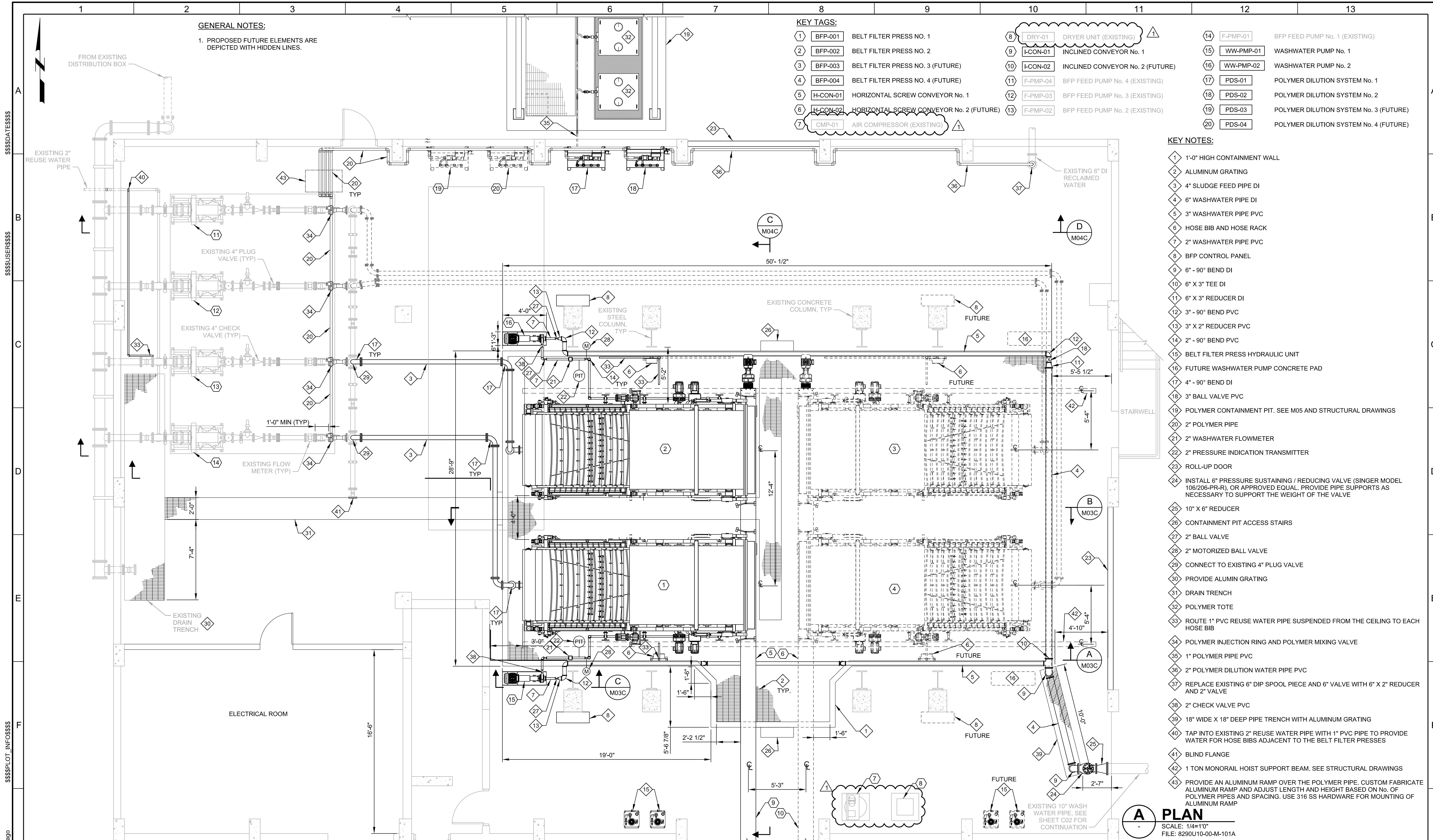
- KEY NOTES:
- 1 CUT-IN WITH 2" X 1" TEE
 - 2 4" PLUG VALVE WITH VALVE BOX
 - 3 4" - 45° BEND
 - 4 CUT-IN WITH 3" x 1" TEE
 - 5 EYE WASH STATION
 - 6 HOSE BIB AND RACK

A PLAN
SCALE: 1/4"=1'-0"
FILE: 8290C10-00-C-101, 8290C10-00-C-903, 8290C10-00-M101A

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				DRAWN JB					WRWRF BIOSOLIDS DEWATERING IMPROVEMENTS				BAR IS ONE INCH ON ORIGINAL DRAWING	DRAWING NO. C02
				CHECKED SP					CIVIL				0 1"	SHEET NO.
				DATE FEBRAURY 2020					POLYMER SYSTEM YARD PIPING PLAN				IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	
1	4-22-20	JB	REVISED PER ADDENDUM No. 5											
REV	DATE	BY	DESCRIPTION											







GENERAL NOTES:
1. PROPOSED FUTURE ELEMENTS ARE
DEPICTED WITH HIDDEN LINES.

- KEY TAGS:
- | | | |
|----|-----------|--|
| 1 | BFP-001 | BELT FILTER PRESS NO. 1 |
| 2 | BFP-002 | BELT FILTER PRESS NO. 2 |
| 3 | BFP-003 | BELT FILTER PRESS NO. 3 (FUTURE) |
| 4 | BFP-004 | BELT FILTER PRESS NO. 4 (FUTURE) |
| 5 | H-CON-01 | HORIZONTAL SCREW CONVEYOR No. 1 |
| 6 | H-CON-02 | HORIZONTAL SCREW CONVEYOR No. 2 (FUTURE) |
| 7 | CMP-01 | AIR COMPRESSOR (EXISTING) |
| 8 | DRY-01 | DRYER UNIT (EXISTING) |
| 9 | I-CON-01 | INCLINED CONVEYOR No. 1 |
| 10 | I-CON-02 | INCLINED CONVEYOR No. 2 (FUTURE) |
| 11 | F-PMP-04 | BFP FEED PUMP No. 4 (EXISTING) |
| 12 | F-PMP-03 | BFP FEED PUMP No. 3 (EXISTING) |
| 13 | F-PMP-02 | BFP FEED PUMP No. 2 (EXISTING) |
| 14 | F-PMP-01 | BFP FEED PUMP No. 1 (EXISTING) |
| 15 | WW-PMP-01 | WASHWATER PUMP No. 1 |
| 16 | WW-PMP-02 | WASHWATER PUMP No. 2 |
| 17 | PDS-01 | POLYMER DILUTION SYSTEM No. 1 |
| 18 | PDS-02 | POLYMER DILUTION SYSTEM No. 2 |
| 19 | PDS-03 | POLYMER DILUTION SYSTEM No. 3 (FUTURE) |
| 20 | PDS-04 | POLYMER DILUTION SYSTEM No. 4 (FUTURE) |

- KEY NOTES:
- 1 1'-0" HIGH CONTAINMENT WALL
 - 2 ALUMINUM GRATING
 - 3 4" SLUDGE FEED PIPE DI
 - 4 6" WASHWATER PIPE DI
 - 5 3" WASHWATER PIPE PVC
 - 6 HOSE BIB AND HOSE RACK
 - 7 2" WASHWATER PIPE PVC
 - 8 BFP CONTROL PANEL
 - 9 6" - 90° BEND DI
 - 10 6" X 3" TEE DI
 - 11 6" X 3" REDUCER DI
 - 12 3" - 90° BEND PVC
 - 13 3" X 2" REDUCER PVC
 - 14 2" - 90° BEND PVC
 - 15 BELT FILTER PRESS HYDRAULIC UNIT
 - 16 FUTURE WASHWATER PUMP CONCRETE PAD
 - 17 4" - 90° BEND DI
 - 18 3" BALL VALVE PVC
 - 19 POLYMER CONTAINMENT PIT. SEE M05 AND STRUCTURAL DRAWINGS
 - 20 2" POLYMER PIPE
 - 21 2" WASHWATER FLOWMETER
 - 22 2" PRESSURE INDICATION TRANSMITTER
 - 23 ROLL-UP DOOR
 - 24 INSTALL 6" PRESSURE SUSTAINING / REDUCING VALVE (SINGER MODEL 106/206-PR-R), OR APPROVED EQUAL. PROVIDE PIPE SUPPORTS AS NECESSARY TO SUPPORT THE WEIGHT OF THE VALVE
 - 25 10" X 6" REDUCER
 - 26 CONTAINMENT PIT ACCESS STAIRS
 - 27 2" BALL VALVE
 - 28 2" MOTORIZED BALL VALVE
 - 29 CONNECT TO EXISTING 4" PLUG VALVE
 - 30 PROVIDE ALUMIN GRATING
 - 31 DRAIN TRENCH
 - 32 POLYMER TOTE
 - 33 ROUTE 1" PVC REUSE WATER PIPE SUSPENDED FROM THE CEILING TO EACH HOSE BIB
 - 34 POLYMER INJECTION RING AND POLYMER MIXING VALVE
 - 35 1" POLYMER PIPE PVC
 - 36 2" POLYMER DILUTION WATER PIPE PVC
 - 37 REPLACE EXISTING 6" DIP SPOOL PIECE AND 6" VALVE WITH 6" X 2" REDUCER AND 2" VALVE
 - 38 2" CHECK VALVE PVC
 - 39 18" WIDE X 18" DEEP PIPE TRENCH WITH ALUMINUM GRATING
 - 40 TAP INTO EXISTING 2" REUSE WATER PIPE WITH 1" PVC PIPE TO PROVIDE WATER FOR HOSE BIBS ADJACENT TO THE BELT FILTER PRESSES
 - 41 BLIND FLANGE
 - 42 1 TON MONORAIL HOIST SUPPORT BEAM. SEE STRUCTURAL DRAWINGS
 - 43 PROVIDE AN ALUMINUM RAMP OVER THE POLYMER PIPE. CUSTOM FABRICATE ALUMINUM RAMP AND ADJUST LENGTH AND HEIGHT BASED ON No. OF POLYMER PIPES AND SPACING. USE 316 SS HARDWARE FOR MOUNTING OF ALUMINUM RAMP

A PLAN
SCALE: 1/4"=1'-0"
FILE: 8290U10-00-M-101A

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				DRAWN JB					WRWRF BIOSOLIDS DEWATERING IMPROVEMENTS				BAR IS ONE INCH ON ORIGINAL DRAWING	DRAWING NO. M01C
				CHECKED SP					MECHANICAL				0 1"	SHEET NO.
				DATE FEBRUARY 2020					DEWATERING BUILDING PROPOSED LAYOUT (BDP)				IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	
1	2	3	4	5	6	7	8	9	10	11	12	13		

PROJECT NO. 8290U10 FILE NAME: 8290U10-M01C.dgn

Plot Date: 27-APR-2020 12:22:08 PM

User: svcPW

Model: Layout1 ColorTable: gshade.ctb DesignScript: Carollo Std Pen_v0905.pen PlotScale: 1:1

LAST SAVED BY: John Bullrago

GENERAL NOTES:

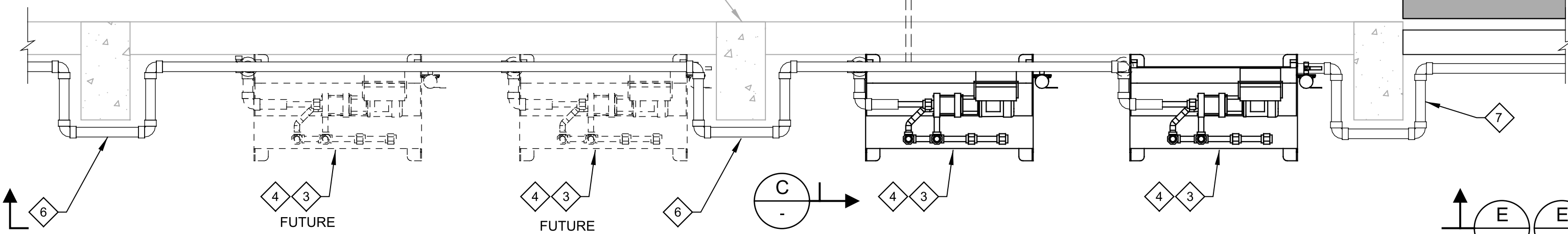
1. NOT ALL VALVES AND APPURTANCES ARE SHOWN ON POLYMER SYSTEM PIPING, REFER TO P&ID AND SPECIFICATIONS FOR FULL CHEMICAL SYSTEM REQUIREMENTS.
2. NOT ALL REQUIRED PIPE SUPPORTS ARE SHOWN.

KEY NOTES:

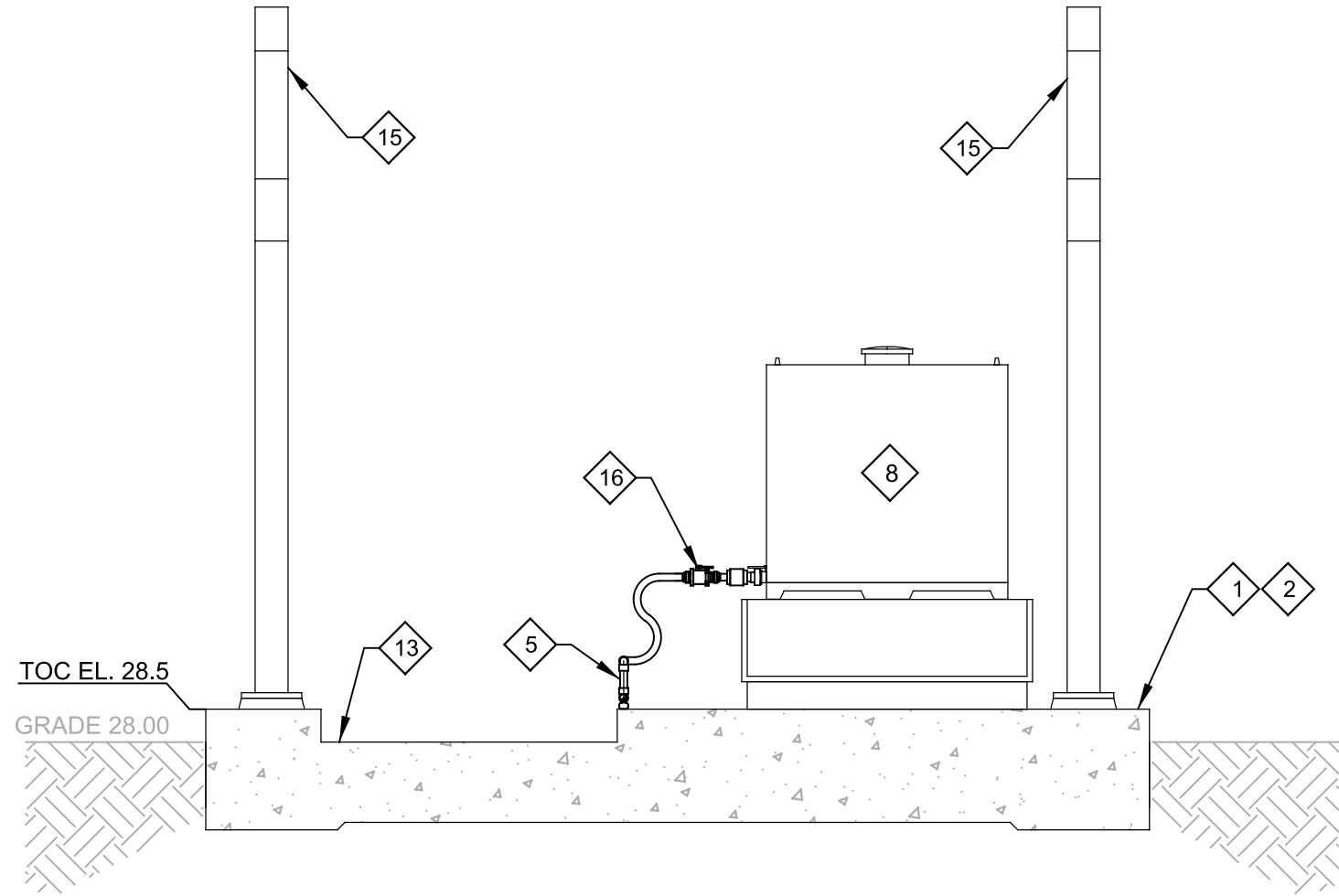
- 1 POLYMER CONTAINMENT AREA (SEE STRCUTURAL DRAWINGS)
- 2 POLYMER CONTAINMENT AREA INCLUDING FLOOR AND WALLS AROUND POLYMER TANKS SHALL HAVE AN APPROPRIATE COATING. COORDINATE WITH THE POLYMER SUPPLIER FOR RECOMENDATION OF THE APPROPRIATE COATING
- 3 POLYMER DILUTION UNIT
- 4 PREFABRICATED, PRE-PIPED, PRE-WIRED LIQUID POLYMER FEED SYSTEM COMPLETE WITH A PROGRESSIVE CAVITY PUMP, DILUTION WATER ASSEMBLY AND NEMA 4X CONTROL PANEL
- 5 1" POLYMER PIPING PVC
- 6 2" POLYMER PIPING PVC
- 7 2" POLYMER DILUTION WATER PVC
- 8 POLYMER STORAGE TOTE
- 9 EYE WASH STATION (M270 TYP)
- 10 5' WIDE CONCRETE SIDEWALK
- 11 2" EMERGENCY POLYMER DILUTION UNIT BYPASS PIPE PVC
- 12 2" BALL VALVE
- 13 6" DEEP TRENCH
- 14 1" DRAIN PIPING
- 15 CANOPY SUPPORT COLUMN
- 16 PROVIDE A FLEXIBLE HOSE CONNECTION WITH A GATE VALVE AND CAM-LOCK FITTING
- 17 HOSE BIB AND RACK (M276 TYP, M280 TYP)
- 18 4" PLUG VALVE WITH VALVE BOX
- 19 2'-0" X 2'-0" X 2'-0" SUMP

SEE C02 FOR CONTINUATION

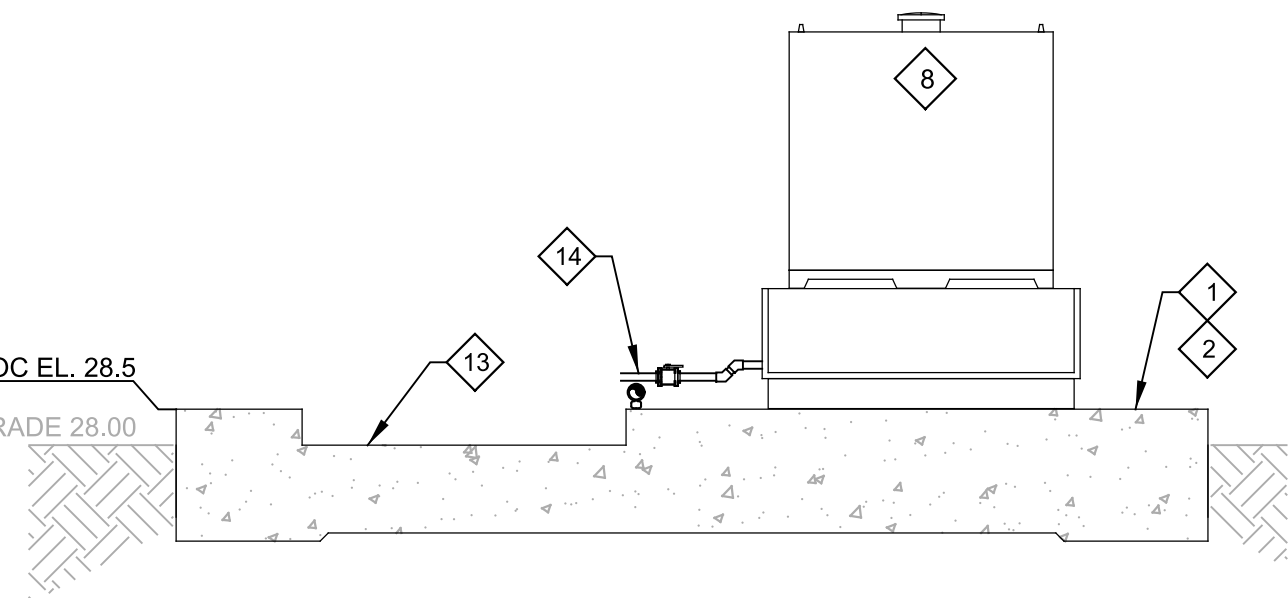
SEE C03 FOR CONTINUATION



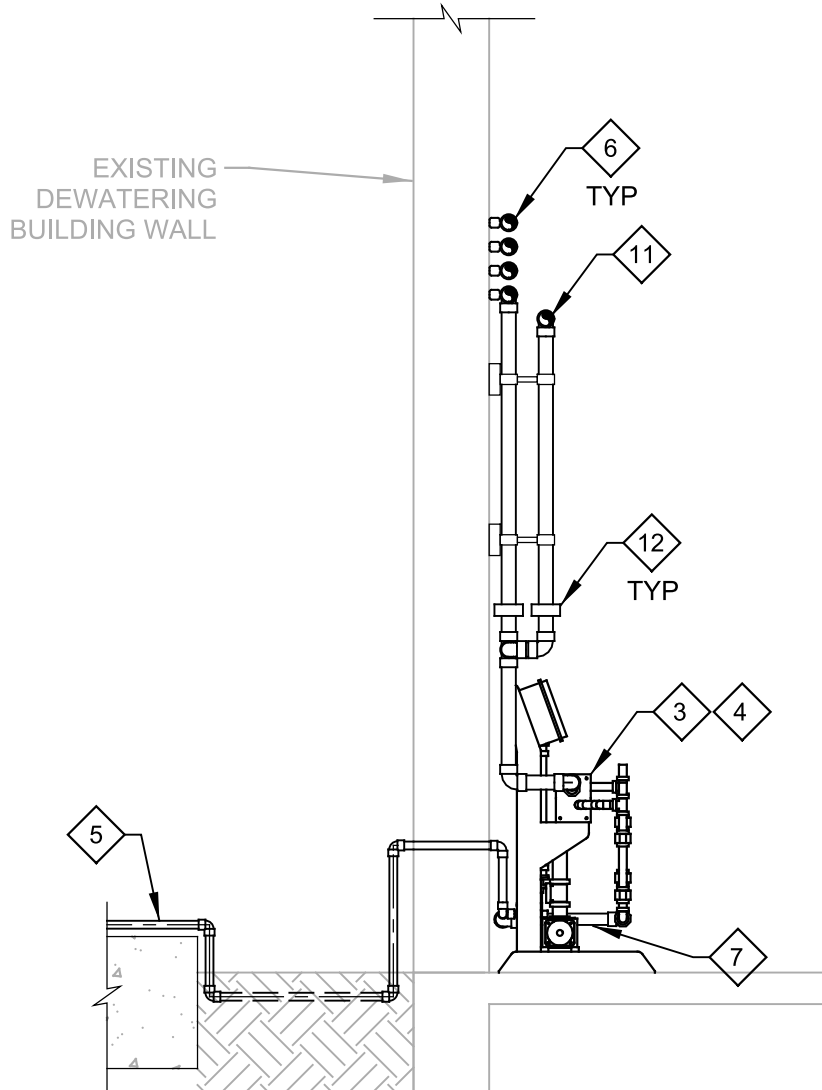
A PLAN
SCALE: 1/2"=1'-0"
FILE: 8290U10-00-M-101A



B SECTION
SCALE: 3/8"=1'-0"
FILE: 8290U10-00-M-301A



D SECTION
SCALE: 3/8"=1'-0"
FILE: 8290U10-00-M-301A



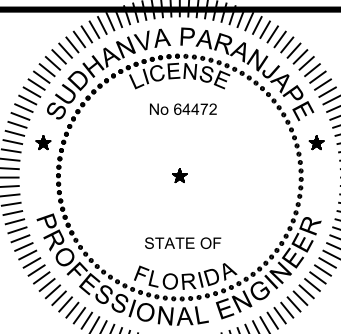
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SCALE: 3/8"=1'-0"
FILE: 8290U10-00-M-301A



E POLYMER TOTE CONNECTION SAMPLE
SCALE: NTS
FILE: -

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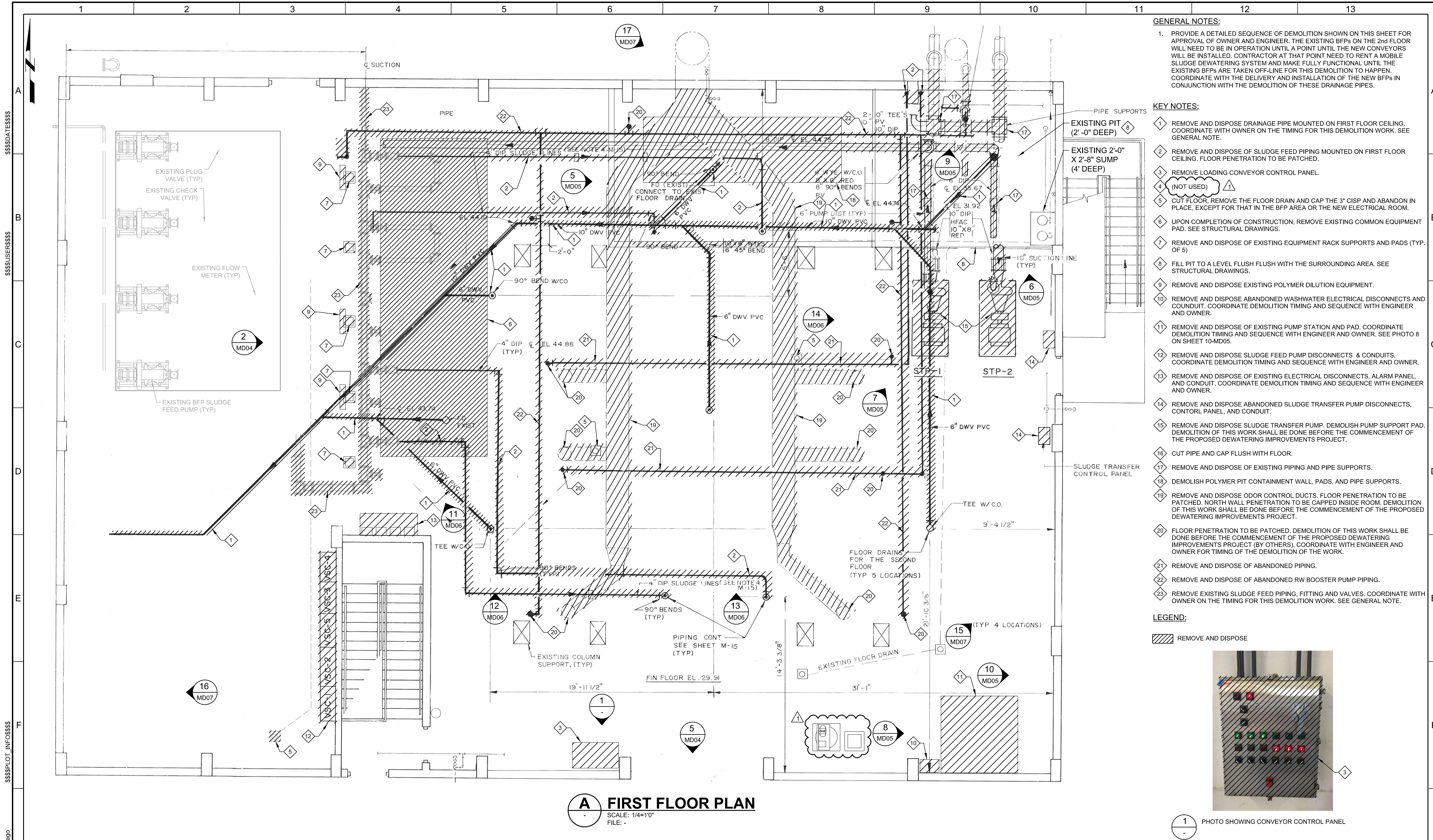
carollo
200 East Robinson Street, Suite1400
Orlando, FL 32801
Phone (407) 478-4642
CA No. 8571



CITY OF DAYTONA BEACH
WRWRF BIOSOLIDS DEWATERING IMPROVEMENTS
MECHANICAL
POLYMER SYSTEM
PLAN AND SECTION

VERIFY SCALES
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0 1"
IF NOT ONE INCH ON
THIS SHEET, ADJUST
SCALES ACCORDINGLY

JOB NO.
8290U.10
DRAWING NO.
M05
SHEET NO.



- GENERAL NOTES:**
1. PROVIDE A DETAILED SEQUENCE OF DEMOLITION SHOWN ON THIS SHEET FOR APPROVAL OF OWNER AND ENGINEER. THE EXISTING BFPs ON THE 2nd FLOOR WILL NEED TO BE IN OPERATION UNTIL A POINT UNTIL THE NEW CONVEYORS WILL BE INSTALLED. CONTRACTOR AT THAT POINT NEED TO RENT A MOBILE SLUDGE DEWATERING SYSTEM AND MAKE FULLY FUNCTIONAL UNTIL THE EXISTING BFPs ARE TAKEN OFF-LINE FOR THIS DEMOLITION TO HAPPEN. COORDINATE WITH THE DELIVERY AND INSTALLATION OF THE NEW BFPs IN CONJUNCTION WITH THE DEMOLITION OF THESE DRAINAGE PIPES.
- KEY NOTES:**
- 1 REMOVE AND DISPOSE DRAINAGE PIPE MOUNTED ON FIRST FLOOR CEILING. COORDINATE WITH OWNER ON THE TIMING FOR THIS DEMOLITION WORK. SEE GENERAL NOTE.
 - 2 REMOVE AND DISPOSE OF SLUDGE FEED PIPING MOUNTED ON FIRST FLOOR CEILING. FLOOR PENETRATION TO BE PATCHED.
 - 3 REMOVE LOADING CONVEYOR CONTROL PANEL.
 - 4 (NOT USED)
 - 5 CUT FLOOR, REMOVE THE FLOOR DRAIN AND CAP THE 3" CISP AND ABANDON IN PLACE, EXCEPT FOR THAT IN THE BFP AREA OR THE NEW ELECTRICAL ROOM.
 - 6 UPON COMPLETION OF CONSTRUCTION, REMOVE EXISTING COMMON EQUIPMENT PAD. SEE STRUCTURAL DRAWINGS.
 - 7 REMOVE AND DISPOSE OF EXISTING EQUIPMENT RACK SUPPORTS AND PADS (TYP. OF 5)
 - 8 FILL PIT TO A LEVEL FLUSH FLUSH WITH THE SURROUNDING AREA. SEE STRUCTURAL DRAWINGS.
 - 9 REMOVE AND DISPOSE EXISTING POLYMER DILUTION EQUIPMENT.
 - 10 REMOVE AND DISPOSE ABANDONED WASHWATER ELECTRICAL DISCONNECTS AND CONDUIT. COORDINATE DEMOLITION TIMING AND SEQUENCE WITH ENGINEER AND OWNER.
 - 11 REMOVE AND DISPOSE OF EXISTING PUMP STATION AND PAD. COORDINATE DEMOLITION TIMING AND SEQUENCE WITH ENGINEER AND OWNER. SEE PHOTO 8 ON SHEET 10-MD05.
 - 12 REMOVE AND DISPOSE SLUDGE FEED PUMP DISCONNECTS & CONDUITS. COORDINATE DEMOLITION TIMING AND SEQUENCE WITH ENGINEER AND OWNER.
 - 13 REMOVE AND DISPOSE OF EXISTING ELECTRICAL DISCONNECTS, ALARM PANEL, AND CONDUIT. COORDINATE DEMOLITION TIMING AND SEQUENCE WITH ENGINEER AND OWNER.
 - 14 REMOVE AND DISPOSE ABANDONED SLUDGE TRANSFER PUMP DISCONNECTS, CONTROL PANEL, AND CONDUIT.
 - 15 REMOVE AND DISPOSE SLUDGE TRANSFER PUMP. DEMOLISH PUMP SUPPORT PAD. DEMOLITION OF THIS WORK SHALL BE DONE BEFORE THE COMMENCEMENT OF THE PROPOSED DEWATERING IMPROVEMENTS PROJECT.
 - 16 CUT PIPE AND CAP FLUSH WITH FLOOR.
 - 17 REMOVE AND DISPOSE OF EXISTING PIPING AND PIPE SUPPORTS.
 - 18 DEMOLISH POLYMER PIT CONTAINMENT WALL, PADS, AND PIPE SUPPORTS.
 - 19 REMOVE AND DISPOSE ODOR CONTROL DUCTS. FLOOR PENETRATION TO BE PATCHED. NORTH WALL PENETRATION TO BE CAPPED INSIDE ROOM. DEMOLITION OF THIS WORK SHALL BE DONE BEFORE THE COMMENCEMENT OF THE PROPOSED DEWATERING IMPROVEMENTS PROJECT.
 - 20 FLOOR PENETRATION TO BE PATCHED. DEMOLITION OF THIS WORK SHALL BE DONE BEFORE THE COMMENCEMENT OF THE PROPOSED DEWATERING IMPROVEMENTS PROJECT (BY OTHERS). COORDINATE WITH ENGINEER AND OWNER FOR TIMING OF THE DEMOLITION OF THE WORK.
 - 21 REMOVE AND DISPOSE OF ABANDONED PIPING.
 - 22 REMOVE AND DISPOSE OF ABANDONED RW BOOSTER PUMP PIPING.
 - 23 REMOVE EXISTING SLUDGE FEED PIPING, FITTING AND VALVES. COORDINATE WITH OWNER ON THE TIMING FOR THIS DEMOLITION WORK. SEE GENERAL NOTE.
- LEGEND:**
- REMOVE AND DISPOSE



1 PHOTO SHOWING CONVEYOR CONTROL PANEL

A FIRST FLOOR PLAN
SCALE: 1/4"=1'-0"
FILE: -

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				DRAWN JB					WRWRF BIOSOLIDS DEWATERING IMPROVEMENTS		DEMOLITION		DRAWING NO. MD03
				CHECKED SP					DEWATERING BUILDING				SHEET NO.
				DATE FEBRAURY 2020					FIRST FLOOR DEMOLITION PLAN				
1	4-22-20	JB	REVISED PER ADDENDUM No. 5										
REV	DATE	BY	DESCRIPTION										

PROJECT NO. FILE NAME: 8290U10-MD03.dgn

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A

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C

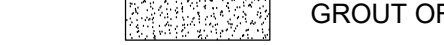
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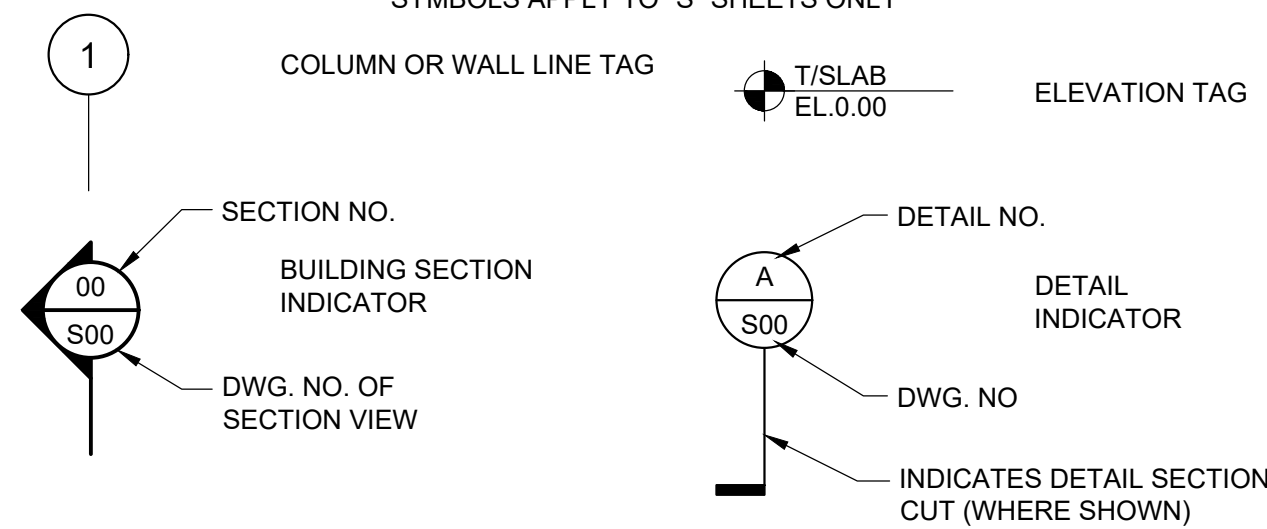
F

@	AND	EXIST	EXISTING	PCS	PIECES
#	AT	EXP	EXPANSION	PMB	PRE-ENGINEERED
ADDTL	NUMBER	FE	FIRE EXTINGUISHER		METAL BUILDING
ALUM	ADDITIONAL	FF	FAR FACE, FINISHED	PERP	PERPENDICULAR
AEWS	ALUMINUM		FLOOR	PL	PLATE
	AUTOMATIC END	FG	FINISHED GRADE	PLF	POUND PER LINEAR
	WELDED STUD(S)	FRP	FIBER REINFORCED		FOOT
ALT	ALTERNATE		PLASTIC	PT	PRESSURE TREATED
APROX	APPROXIMATE(LY)	FT	FOOT	PROJ	PROJECTION
BLD	BUILDING	FTG	FOOTING	PSF	POUNDS PER SQUARE
BM	BEAM	FV	FIELD VERIFY		FOOT
BOT	BOTTOM	GA	GAGE	PSI	POUNDS PER SQUARE
CJ	CONTROL JOINT	GALV	GALVANIZED		
CL	CENTER LINE	HK	HOOK	PVC	POLYVINYL CHLORIDE
CLR	CLEAR	HORIZ	HORIZONTAL	R	RADIUS
CMU	CONCRETE MASONRY	HSS	HOLLOW STRUCTURAL	REINF	REINFORCING
	UNIT		SECTION	REQD	REQUIRED
COL	COLUMN	HP	HIGH POINT	RO	ROUGH OPENING
CONC	CONCRETE	ID	INSIDE DIAMETER	SCHED	SCHEDULE(D)
CONN	CONNECTION	JT	JOINT	SIM	SIMUL
CONST JT	CONSTRUCTION JOINT	LB(S)	POUND(S)	SJ	SAWCUT JOINT
CONT	CONTINUOUS	LONG	LONGITUDINAL	SMS	SHEET METAL SCREW
DIA	DIAMETER	LP	LOW POINT	SPECS	SPECIFICATIONS
DIM	DIMENSION	MANUF	MANUFACTURER	SQ	SQUARE
DEG	DEGREE(S)	MATL	MATERIAL	SS	STAINLESS STEEL
DO	DITTO	MAX	MAXIMUM	STD	STANDARD
DWG	DRAWING	MECH	MECHANICAL	STL	STEEL
DWL	DOWEL(S)	MFR	MANUFACTURER	TJ	TOP OF
(E)	EXISTING	MIN	MINIMUM	TB	TIE BEAM
ECA	EACH	MISC	MISCELLANEOUS	TBB	TOP AND BOTTOM
EF	EACH FACE	MO	MASONRY OPENING	THK	THICK
EJ	EXPANSION JOINT	MTL	METAL	THRU	THROUGH
EL	ELEVATION	NO	NUMBER	TOC	TOP OF CONCRETE
ELEC	ELECTRICAL	NTS	NOT TO SCALE	TOS	TOP OF STEEL
EMBED	EMBEDMENT	OC	ON CENTER	TYP	TYPICAL
EQ	EQUAL	OD	OUTSIDE DIAMETER	UNO	UNLESS NOTED
EW	EACH WAY	OH	OPPOSITE HAND		OTHERWISE
		OPNG	OPENING	VERT	VERTICAL
				WT	WEIGHT
				WWF	WELDED WIRE FABRIC

STRUCTURAL LEGEND APPLIES TO "S" SHEETS ONLY



SYMBOLS APPLY TO "S" SHEETS ONLY



JOB NO.
8290U.10

DRAWING NO.
S01

SHEET NO.

