



BID ADDENDUM NO. 2
ITB/004/16/KL
CITY OF WINTER SPRINGS
WTP NO. 1 WATER QUALITY IMPROVEMENTS

March 7, 2016

To prospective bidders & others concerned:

This addendum sets forth changes and/or information as referenced and is hereby made a part of, and should be attached to, the subject Contract Documents.

A. General

1. Bid Date to be extended to March 18, 2016. Bids are due by 2:00 pm Local Time.
2. Additional questions will be accepted until March 10, 2016. Questions received after 5:00 pm local time will not be addressed.
3. List of Attendees at the Follow-up Site Visit is attached.
4. List of Current Plan Holders (as of March 4, 2016) is attached.
5. **Clarification of Amendment No. 1, Responses to Bidder2, Question 1-1**
 - a. **Existing Generator Building Section:** Patch and paint any and all exterior disturbed or damaged areas or walls. Exterior walls shall be painted masonry block. Match existing wall color and finish. Paint the newly inserted wall (louver replacement) shown on the South Elevation with a color to match the existing color using System 15. In addition, clean the existing exterior painted walls and paint with two (2) final coats of paint in accordance with System 15. Paint Filler coat is not required on existing painted walls.
6. **Follow-up to Amendment No. 1 Response to Bidders Comment No. 3-7 & No. 3-8:**

Comment No. 3-7: E-5 & E-6 call for removal and replacement of the DEF electrical service and meter. Will the City pay for all the fees incurred by DEF? If this is to be the responsibility of the Contractor, please include a DEF Allowance.

Response No. 3-7: See attached response provided by Electrical Engineer.

Comment No. 3-8: E-12 & E-13 call for removal of the existing generator and construction of the new electrical room. Will a temporary generator be required onsite for this work? If so, who will be responsible for providing the temporary generator and fuel? We recommend this be provided by the City or an Allowance be provided because the generator will only be used in unknown outages.

Response No. 3-8: See attached response provided by Electrical Engineer.

B. Contract Documents and Specifications

1. **Revise Section 05500.2.02.D.5.a – Delete** 145 mph. **Insert** 140 mph.
2. **Revise Section 01110.1.09.A. – Delete** General Conditions. **Insert** Agreement. The OWNER will not accept title to the equipment until the project is substantially complete in accordance with the ~~General Conditions Agreement~~.

C. Contract Drawings

1. **Revise Sheet G-1 - Update** Index of Drawing Titles
2. **Revise Sheet G-5 – Add** motorized pressure vessel draindown valve to spent regenerate wastewater tanks. **Identify** new chlorine analyzers. **Identify** existing pressure sensor, flow meter chlorine analyzer and pH analyzer on TW/FW line. **Correct** TW/FW line to be 16-inch.
3. **Revise Sheet G-6 – Delete** PIT 1. **Delete** FIT 4.
4. **Revise Sheet C-4 – Correct** Tag List No. 10 to 16-inch Gate Valve.
5. **Revise M-1 – Update** base sheet Electrical and Instrumentation area to match E-17.
6. **Revise Sheet M-4 – Add Note 5**, Caustic squeeze pump to be a Watson Marlow Peristaltic Model 620 SN Pump Compatible with up to 50% NaOH. Stand location to be coordinated after installation of the brine dilution panel.
7. **Revise Sheet M-5 – Add** level sensor at top of bulk tanks near access hatch. **Revise Note 1: Coordinate relocation of existing bulk chlorine storage tanks to the sodium hypochlorite room area in the containment area.**
8. **Revise Sheet M-6 – Add** pipe hanger to 2-inch corrosion inhibitor fill line.
9. **Revise Sheet S-1. Update** chlorine storage tank pad to 9'-0" diameter.

D. Responses to Bidders

1. TLC Diversified, Inc., RFI Dated 02/24/16:

Comment No.1-1: Sheet S-4 in section F indicate the Hypo-Chlorite Pads are 9'-0" in diameter, but sheet S-1 shows these as being 8'-0" in diameter. Please clarify.

- Response No. 1-1: Both chlorine storage tank pads are 9'-0" diameter. Chlorine Storage tanks are each 102-inch diameter.
- Comment No.1-2: The structural sheets indicate "grate" over the sump areas. What material is this grate?
- Response No. 1-2: Sump grate to be fiberglass.
- Comment No.1-3: Sheet S-2 notes the building to be "by others." We are assuming this is to mean the building is to be designed and installed by a single supplier, and this cost is to be included in the bid under bid item #2. Please confirm.
- Response No. 1-3: Yes, prefabricated metal building to be designed and installed either by the supplier or contractor certified to install manufacturers building under contract of CONTRACTOR.
- Comment No.1-4: Sheet C-3 indicates to relocate the corrosion inhibitor building, but the site plan doesn't indicate where. Please indicate where this building is to be placed and if there is going to be a concrete pad required.
- Response No. 1-4: CONTRACTOR to salvage and remove corrosion inhibitor building from site as necessary after the flow meter transmitters are moved to the wells and the corrosion inhibitor chemical feed skid is moved to the new chemical containment area. A new concrete pad will not be required.
- Comment No.1-5: Please provide slab requirements (structural drawings or details) for the generator and fuel area.
- Response No. 1-5: See attached details for new generator and fuel tank slab requirements.
- Comment No.1-6: The Bid Form has two bid item #4. Can we assume Instrumentation and SCADA will be 5, Electrical will be 6, and All Other Items will be 7?
- Response No. 1-6: See attached Revised Bid Tabulation Sheet.

2. Warton-Smith, Inc, RFI Dated 02/24/16:

- Comment No. 2-1: The note above Article 10 – Disadvantaged Business Enterprises (FDEP-4 through FDEP 5) in the FDEP Supplementary Conditions indicates that Article 10 only applies to Federal Cap Grant Projects. Are you able to clarify if this project is indeed a Federal Cap Grant Project?

Response No. 2-1: Yes, This is a Federal Cap Grant Project. The Good Faith Efforts Package and documentation shall only be submitted by the successful bidder.

3. Tonka Water, RFI Dated 02/24/16:

Comment No. 3-1: Section 11700, 2.14.A of the spec states "Ion Exchange system is to be supplied with a *single* control panel...", yet Section 13315, 1.03 C & F contradicts this and requires a Process Control Panel (PCP-2) and Remote Control Panel (RCP2A). Looking to the drawings, it is also confusing. Sheet M-1 has PCP-2 located in the same location where the RCP-2A is located in Sheet E-17 (detail). Please clarify if the anion exchange supplier is to provide one (1) control panel, or two (2) control panels?

Response No. 3-1: See attached response provided by Electrical Engineer.

4. Warton Smith, RFI Dated 02/29/16:

Comment No. 4-1: Could you please provide the load that the hanging pipes put on the rigid frames of the PEMB?

Response No. 4-1: 1-inch schedule 80 PVC pipe is approximately 0.7 lbs/ft.
2-inch schedule 80 PVC pipe is approximately 2.2 lbs/ft.
6-inch schedule 80 PVC pipe is approximately 16.3 lbs/ft.

5. Public Works Constructors, LLC., RFI Dated 02/29/16:

Comment No. 5-1: Please note, drawing C-3 states that the diesel fuel tank be relocated. Please provide a drawing detailing the existing tank and relocation details.

Response No. 5-1: Sheet C-4 shows location for the location for relocated diesel fuel tank. See attached details for new generator and fuel tank slab requirements.

Comment No. 5-2: Please note, drawing C-3 states that the bulk chlorine tanks are to be relocated. Please provide a drawing detailing the existing tanks and the relocation details.

Response No. 5-2: Existing bulk chlorine tanks are Snyder Industries, Inc. 2500-gallon dual lined tanks. Sheet M-5 provides the details for the tank relocations.

Comment No. 5-3: Please note drawing C-3 states the existing corrosion inhibitor feed pumps and building are to be relocated. Please provide a

drawing detailing the existing pumps and building relocation details.

Response No. 5-3: See previous response provided to Addendum No.2 Comment 1-4.

Comment No. 5-4: Please note, drawing C-4 shows one 2" PW and one ½" Post Chlorine pipe line proceeding south from the new Ion exchange plant. Please clarify where these line terminate and provide the appropriate details.

Response No. 5-4: 2" Potable Water Supply to IEX process - Tap the 18-inch finished water DIP line in the finished water meter vault using a service saddle (Section 02512.2.12) and corporation stop (Section 02512.2.22).

½" Post Chlorine terminates in the chlorine injection vault. Connect to existing injection assembly.

Comment No. 5-5: Note 1 on drawing C-4 references repair of irrigation, please clarify and detail where this repair work is required?

Response No. 5-5: When running the 2-inch wasteline to the gravity main outside of the fence, irrigation lines may be encountered between the 6 - foot privacy brick wall and side walk. CONTRACTOR to repair irrigation lines if damaged.

Comment No. 5-6: Note 1 on drawing M-5 states to relocate existing bulk storage tanks. Please clarify where these tanks are located and to where they are to be moved?

Response No. 5-6: Existing bulk chlorine storage tanks to be relocated to the containment area shown on Sheet M-5

Comment No. 5-7: Please note drawing M-4 shows a caustic squeeze pump stand, please provide a specification for this equipment.

Response No. 5-7: Caustic squeeze pump to be a Watson Marlow Peristaltic Model 620 SN Pump compatible for up to 50% NaOH. Stand location to be coordinated after installation of brine dilution panel.

Comment No. 5-8: Please note Drawing E-16 Generator and Fuel Tanks – Electrical Plan. It would seem that the Generator is sitting on a concrete pad of some type. Please confirm that a concrete pad is required and provide details of size, location with details of rebar and specified concrete type.

Response No. 5-8: See attached details for new generator and fuel tank slab

requirements.

Comment No. 5-9: Please note Drawing E-16 Generator and Fuel Tanks – Electrical Plan. It would seem that the Generator Fuel tanks are sitting on some type of platform. Please confirm that the diesel tanks are sitting on a platform and provide details of what type of platform with detailed drawings on how to construct it.

Response No. 5-9: See attached details for new generator and fuel tank slab requirements.

Comment No. 5-10: Please see Addendum No. 1 A. GENERAL, 8 which reads *“CITY may direct purchase of the IEX Equipment, Generator & Fuel Tank or Chemical Feed Skids for CONTRACTOR to install, per section 01100.1.08. OWNER Furnished Products”*. Please confirm that the specification section should read per section 01110.1.08.

Response No. 5-10: Correct. Owner Furnished Products is Section 01110.1.08.

Comment No. 5-11: Please see Bid Tabulation Sheet. Please confirm that No. of ITEMS should read 1 through 7.

Response No. 5-11: See attached Revised Bid Tabulation Sheet.

Comment No. 5-12: Please see Specification Section 11700 Hybrid Biological and Anion Exchange System for Sulfide and TOC Removal, PART 2 PRODUCTS, 2.02 Materials / Equipment, C, which reads *“Materials and equipment herein described shall comply with the law commonly known as “American Iron and Steel” or “Buy American” (H.R. 3547 – Division G, Title IV), requiring that all of the iron and steel products used in this project conform to the provisions of this law.”* Please clarify the following:

- a. Does the *“American Iron and Steel”* or *“Buy American”* only apply to the equipment within Specification Section 11700?
- b. Does the *“American Iron and Steel”* or *“Buy American”* only apply all steel used throughout the entire project?
- c. Please provide *“American Iron and Steel”* or *“Buy American”* Act information required for this project.

Response No. 5-12: American Iron and Steel (AIS) requirements apply to all steel used throughout the entire project. Bids should meet compliance with Florida Department of Environmental Protection Drinking Water

State Revolving Fund American Iron and Steel requirements per Section 00020 Advertisement for Bids. See FDEP SRF Supplementary Conditions for Formally Advertised Construction Procurement for AIS details.

6. Revere Control, RFI Dated 02/29/16:

Comment No. 6-1: Please confirm loop no. FQIT-0045 on drawing I-2 is an existing flowmeter.

There appears to be some instruments on drawing I-3 & I-4 which are not referenced in specifications section 13310 and lay outside of the dashed lines indicating equipment furnished under section 11700. Please advise regarding the following instruments not included in 13310.

- Loop 2155 magmeter
- Loop 8410 level transmitter (pressure)
- Loop 8411 submersible level sensor
- Loop 7131 submersible level sensor
- Loop 7132 submersible level sensor
- Loop 7150 magmeter

Please confirm loop no. LE/LIT-9101 and 9201 on drawing I-4 is to be furnished by the section 16216 diesel engine generator system supplier.

Response No. 6-1: See attached response provided by Electrical Engineer.

7. Public Works Constructors, LLC., RFI Dated 02/29/16:

Comment No. 7-1: Please see Drawings S-4, Micro Channel Detail. Please provide a specification section for this product. Is it plastic? Do you prefer a particular manufacturer?

Response No. 7-1: Frontier Deck Drain with removable top – Heavy Duty, Durable Plastic Pool Deck Drain with double wall base and a snap in top. Color Gray. For new cast-in-place, Manufacturer requires a #3 bar 15-inch long at 3 ft O.C. in the construction base for stabilization.

8. Sawcross, Inc., RFI Dated 02/29/16:

Comment No. 8-1: Please will you confirm “yes” or “no” this project has a MBE requirement as stated in “Appendix A, FDEP SRF Supplementary

Conditions?

Response No. 8-1: There is an M/WBE goal on this project. The goals are 5% MBE and 5% WBE. This is a Federal Cap Grant Project. The Good Faith Efforts Package and documentation shall only be submitted by the successful bidder.

9. Florida Design Contractors, RFI Dated 03/01/16:

Comment No. 9-1: Do you have a project address for the above referenced bid?

Response No. 9-1: Project address is 851 Northern Way, Winter Springs Florida 32708.

10. TLC Diversified, RFI Dated 03/01/16:

Comment No. 10-1: Is there is a MBE /WBE goal on this project? If so what is the goal?

Response No. 10-1: Yes, there is an M/WBE goal on this project. The goals are 5% MBE and 5% WBE.

Comment No. 10-1: Is this a Federal Cap Grant Project?

Response No. 10-1: Yes, This is a Federal Cap Grant Project. The Good Faith Efforts Package and documentation shall only be submitted by the successful bidder.

11. McMahan Construction Co., Inc., RFI Dated 03/02/16:

Comment No. 11-1: Sheet C-4 shows a tag list with item #10 as 12" MJ GVs. Is item #10 to be 16" MJ GVs?

Response No. 11-1: Yes, Item No. 10 are 16-inch MJ GVs.

Comment No. 11-2: Sheet C-5 shows concrete paving connecting to the existing parking area. Is there a detail specifying the concrete thickness & compaction required?

Response No. 11-2: Yes, See Sheet S-7 for concrete pavement details. New concrete pavement not to be connected to existing pavement. Provide an expansion joint filler.

Comment No. 11-3: Is the City providing potable water for the bacteriological clearance testing required?

Response No. 11-3: Yes, City will provide potable water for bacteriological clearance testing.

Comment No. 11-4: Can the existing raw water mains shown to be removed on sheet

C-3 be capped or plugged & abandoned in place?

Response No. 11-4: No, existing raw water mains to be removed.

Comment No. 11-5: Spec 05500-2 section 2.01 A calls for the metal building to be by one of 3 manufacturers which two are owned by the same company. Can Nucor Building Systems be added to the acceptable manufacturer's?

Response No. 11-5: Yes.

Comment No. 11-6: Spec 5500-3 section 2.02 D. 1. says for design to be per 2010 FBC while plans on sheet S-7 call for 2014 FBC. Which are we to use?

Response No. 11-6: Prefabricated Metal Building to be designed per current 2014 FBC.

Comment No. 11-7: Spec 5500-3 Section 2.02 D. 5. a. calls for 145 mph wind load while plans on sheet S-7 calls for 140 mph wind load. Which are we to use?

Response No. 11-7: Use 140 mph per ASCE 7-10 for Seminole County, Florida; Category Risk II.

Comment No. 11-8: Spec 5500-5 Section 2.08 C. calls for self-tapping screws to be class #410 Stainless. Some manufacturer's do not recommend this due to dissimilar metals and will not warrant if they are used. Can we use their standard long life carbon alloy screws that they warrant?

Response No. 11-8: Yes, standard long life carbon alloy screws are acceptable provided the screws meet the manufacturer's recommendation for the application.

Comment No. 11-9: Spec 5500-5 Section 2.09 A & B calls for the gutters and downspouts to be Aluminum. The gutter and downspouts from the manufacturer's are made of the same material as roof and walls, which is a galvalume. Is galvalume acceptable?

Response No. 11-9: Yes, galvalume is acceptable. Gutter and downspouts to be compatible with the steel structure.

Comment No. 11-10: Spec 5500-5 Section 2.10 A. calls for the color finish to be factory on both sides. Are you asking for the kynar finish to be on both sides of the roof and wall panels or do you want kynar on outside with standard siliconized wash coat on the inside. With this small of a quantity, it will be a minimum order charge premium to get Kynar on both sides. Which do you want?

Response No. 11-10: Provide Kynar on both sides.

Comment No. 11-11: Pre-engineered metal building will need to have bracing on both of the sidewalls. Do you want us to use X-bracing or Portal Frames? And what bay would you like the bracing installed in?

Response No. 11-11: Bracing shall be as determined by the supplier to meet wind load conditions. We prefer maximum open space for installation and removal of storage tanks.

Comment No. 11-12: Are above ground valves to all have rising OS&Y stems?

Response No. 11-12: Above ground isolation valves to be standard stem. Use OS&Y stems where appropriate per Section 15100.2.03.C.5.(d).

Comment No. 11-13: Per spec 02515-8, is any polyethylene piping encasement required for the DIP?

Response No. 11-13: Yes, use polyethylene piping encasement for DIP per Section 02515.

Comment No. 11-14: Per spec 15191-5, is the GC to provide schedule 40 316SS fuel piping or is black iron fuel piping acceptable?

Response No. 11-14: Schedule 40 black iron fuel piping is acceptable. See Section 15191.2.02.B. for fuel piping details.

Comment No. 11-15: Sheets M-1 & M-2 designate containment piping for several chemical feed lines. Is there a specification for the containment piping or are we to use a 4" pvc sleeve with fittings(or 2" where shown) to house the chemical lines?

Response No. 11-15: Use pressure class PVC pipe with fittings to house chemical feed line.

12. Vogel Bros Building Co., RFI Dated 03/02/16:

Comment No. 12-1: I have noticed that there are microchannel drains to the sump but there is no drain or sump pump from the sump. With there being no walls on the structure, won't there be substantial amounts of rain water to deal with in the containment area? Just a thought from past projects.

Response No. 12-1: No sump pump is required.

13. Revere Control, RFI Dated 03/02/16:

Comment No. 13-1: Table 13326-4 lists the I/O for 'RIO-2A', please confirm this I/O is

for RCP-2A, advise if otherwise.

Response No. 13-1: See attached response provided by Electrical Engineer.

Comment No. 13-2: Please confirm PLC-2 doesn't have any Ethernet I/O, advise if otherwise.

Response No. 13-2: See attached response provided by Electrical Engineer.

14. LBS Power Technologies, Inc., RFI Dated 03/02/16:

Comment No. 14-1: Our company has reviewed the specifications on this project, and in regards to UPS systems, it states that Eaton supplies or its' approved equal will be supplied.

Do you have approved equals already defined, if not, how do we (LBS Power Technologies, Inc.) become approved?

Response No. 14-1: See attached response provided by Electrical Engineer.

15. Layne, RFI Dated 03/02/16:

Comment No. 15-1: Specification Section 00800 Paragraph 8 Unsuitable Materials. Can an allowance or a unit price be added to the bid form for this item?

Response No. 15-1: Follow the specification.

Comment No. 15-2: Within the schedule of values to be turned in with the executed contract, Item 30 permit fees allowance. Should we include the \$20,000 in the base bid or will it be added to the contract after award?

Response No. 15-2: Include \$20,000 in base bid. See Revised bid sheet.

Comment No. 15-3: There are no details on the concrete pad shown on sheet M-7 for the chemical injection system.

Response No. 15-3: Chemical Injection Assembly maintenance pad 6" thick concrete slab with WW/M 6x6 – W1.4xW1.4. No slope.

Comment No. 15-4: There are no details on the concrete pads shown on sheet M-10 for the wells.

Response No. 15-4: Well concrete pads are maintenance slabs. Pads shall be 3000 psi non-reinforced concrete. Use 6" compacted base to 98%. Pads should match existing pad elevations. Pads should provide 3 ft walk around for above ground piping. Assume pads are each approximately 7 ft wide by 20 ft long.

- Comment No. 15-5: Relocated Generator and Fuel tanks due not have details for concrete pads. Reference sheets E-4, E-16.
- Response No. 15-5: See attached details for new generator and fuel tank slab requirements.
- Comment No. 15-6: There are no details on electrical concrete equipment pads.
- Response No. 15-6: Pads shall be 3000 psi non-reinforced concrete mitered edge 4-inch thick. Length and width as required by electrical panels.
- Comment No. 15-7: The Agreement Form references both “Supplementary Conditions” and “Special Conditions”. There are no apparent Supplementary Conditions in the contract, and the Special Conditions are not defined as Contract Documents. Please clarify.
- Response No. 15-7: See **Appendix A** for FDEP SRF Supplementary Conditions for Formally Advertised Construction Procurement. Special Conditions are part of the Contract Documents.
- Comment No. 15-8: It is unclear if the Liquidated Damages in Article 6 of the Agreement Form are tied to Substantial Completion or Final Completion. Please clarify.
- Response No. 15-8: Liquidated Damages are tied to Substantial Completion.
- Comment No. 15-9: The Order of Precedence in the Agreement Form does not include the Technical Specifications. Please clarify
- Response No. 15-9: Technical Specifications and Drawings are the same Order of Precedence. Per General Condition 00700.11, Definition and Coordination of Contract Documents, “Any Item shown on drawings shall be considered as included in the specifications, whether specifically mentioned therein or not, and vice versa.”
- Comment No. 15-10: Please define “acceptance” as used in Article 15.e. of the Agreement Form.
- Response No. 15-10: No further definition is to be provided at this time
- Comment No. 15-11: Article 13 of the Agreement Form appears to assign the traditional Engineer responsibilities to the Owner. There is no reference to the Engineer’s roles, responsibilities, or authority in the Agreement Form, nor in the General or Special Conditions. However, Division 1, General Requirements, contains numerous references and responsibilities for the Engineer? What are the Engineer’s roles, responsibilities, and authority for this project?

Response No. 15-11: Agreement is between CITY and CONTRACTOR

Comment No. 15-12: Is Appendix B, Geotechnical Report, a contract document? If not, to what degree may the Contractor rely upon the information contained in the report?

Response No. 15-12: The Geotechnical Engineering Report is part of the Technical Specifications. The report presents findings of subsurface exploration and provides geotechnical recommendations for design and construction of proposed improvements.

Comment No. 15-13: Are there any known Hazardous Environmental Conditions at or near the project site?

Response No. 15-13: No Hazardous Environmental Conditions have been identified at this time. Site is available for inspection upon request.

Comment No. 15-14: What are the provisions for managing Differing Site Conditions?

Response No. 15-14: None provided at this time.

Comment No. 15-15: What are the provisions for managing undisclosed Hazardous Environmental Conditions?

Response No. 15-15: None provide at this time.

Comment No. 15-16: Section 01110, Summary of Work, Article 1.09.A. states "The OWNER will not accept title to the equipment until the project is substantially complete in accordance with the General Conditions". The General Conditions do not address Substantial Completion. Please define and explain the provisions for achieving and documenting "Substantial Completion" and "Final Completion".

Response No. 15-16: Section 00500 Agreement Form Item 5. Contract Time provides 365 days for substantial completion and 395 days to final completion.

Comment No. 15-17: What are the Claim provisions for the contract?

Response No. 15-17: None provide at this time.

Comment No. 15-18: What are the provisions for time extensions due to abnormal weather?

Response No. 15-18: See Section 00500. Agreement Form Item 9. Force Majeure.

Comment No. 15-19: Article 31, Sovereign Immunity, of the Agreement Form states "Notwithstanding any other provision set forth in this Agreement,

nothing contained in this Agreement shall be construed as a waiver of the CITY'S right to sovereign immunity under Section 768.28, or other limitations imposed on the CITY'S potential liability under state or federal law. As such, the CITY shall not be liable, under this Agreement for punitive damages or interest for the period before judgment. Further, the CITY shall not be liable for any claim or judgment, or portion thereof, to any one person for more than one hundred thousand dollars (\$100,000.00), or any claim or judgment, or portion thereof, which, when totaled with all other claims or judgments paid by the State or its agencies and subdivisions arising out of the same incident or occurrence, exceeds the sum of two hundred thousand dollars (\$200,000.00). However we understand the Florida Legislature increased the damage caps effective October 1, 2011. Article (5) of Section 768.28 states:

The state and its agencies and subdivisions shall be liable for tort claims in the same manner and to the same extent as a private individual under like circumstances, but liability shall not include punitive damages or interest for the period before judgment. Neither the state nor its agencies or subdivisions shall be liable to pay a claim or a judgment by any one person which exceeds the sum of \$200,000 or any claim or judgment, or portions thereof, which, when totaled with all other claims or judgments paid by the state or its agencies or subdivisions arising out of the same incident or occurrence, exceeds the sum of \$300,000. However, a judgment or judgments may be claimed and rendered in excess of these amounts and may be settled and paid pursuant to this act up to \$200,000 or \$300,000, as the case may be; and that portion of the judgment that exceeds these amounts may be reported to the Legislature, but may be paid in part or in whole only by further act of the Legislature. Notwithstanding the limited waiver of sovereign immunity provided herein, the state or an agency or subdivision thereof may agree, within the limits of insurance coverage provided, to settle a claim made or a judgment rendered against it without further action by the Legislature, but the state or agency or subdivision thereof shall not be deemed to have waived any defense of sovereign immunity or to have increased the limits of its liability as a result of its obtaining insurance coverage for tortious acts in excess of the \$200,000 or \$300,000 waiver provided above. The limitations of liability set forth in this subsection shall apply to the state and its agencies and subdivisions whether or not the state

or its agencies or subdivisions possessed sovereign immunity before July 1, 1974.

Please revise Article 31 to reflect the current statutory limits

Response No. 15-19: Noted.

Comment No. 15-20: Please specify the “consultants” in referenced Article 7., Hold Harmless Agreement, of the General Conditions.

Response No. 15-20: No further definition is provide at this time.

16. Revere Control, RFI Dated 03/02/16:

Comment No. 16-1: Section 13300, part 1.03E, subsection 3 suggests panel RCP-2A is supplied under division 11.

Section 13300, part 1.03F, subsection 1C suggests panel PCP-2 is supplied under section 11700.

Please confirm panels RCP-2A and PCP-2 are furnished under division 11.

Response No. 16-1: See attached response provided by Electrical Engineer.

17. Layne, RFI Dated 03/02/16:

Comment No. 17-1: The Documents state that there are MBE and WBE requirements if the project is CAP funded. Are there MBE or WBE requirements or goals?

Response No. 17-1: There are MBE and WBE goals on this project. The goals are 5% MBE and 5% WBE. This is a Federal Cap Grant Project. The Good Faith Efforts Package and documentation shall only be submitted by the successful bidder.

E. Attachments

1. List of Attendees at February 28, 2016 Follow-Up Site Visit.
2. List of Current Plan Holders, as of March 4, 2016.
3. Revised Bid Tabulation Sheet
4. Details for New Generator and Fuel Tank Slab
5. Memorandum Electrical Engineer Addendum No. 2 Responses

END

JOB NAME _____ BY RMG DATE 2-24-16 SHEET NO. 1 of 1

JOB NO. _____ CHECKED BY _____ DATE _____ SCALE _____



Name	Organization	phone	email
Robbre Gonzalez	CPH	(707) 443-0264	rgonzalez@cphcorp.com
Kevin Brand	Chinchor Electric	386-774-1020	KBrand@ChinchorElectric.com
HEITH HAYS	ECONOMY ELECTRIC	386-852-6573	HEITH-HAYSECONOMYELECTRICCO.COM
JOHN JUSTIS JR	McMANN CONSTRUCTION	386-734-1071	jejmcciebellsouth.net
ADAM BRANG	PWC JOINT VENTURES LLC	(352) 258-6091	jhart@pwc-llc.com

No.	Date	Name	Company	Contact Person	Email	Address	City	State	Zip	Telephone	Comments
1	2/8/2016	Olivia Miller	Construction Journal	Olivia Miller	oliviam@thejcj.com	400 SW 7th Street	Stuart	FL	34994	800-785-5165	
2	2/8/2016	John Mayhut	KLJ Engineering	John Mayhut	john_mayhut@kljeng.com	12510 World Plaza Lane, Suite 1	Fort Myers	FL	33907	239-208-9527	
3	2/8/2016	Reporter	The Builders Exchange	Reporter	info@tampabx.com	4728 N. Hubert Avenue	Tampa	FL	33614	813-253-5733	
4	2/8/2016	Corliss Fur Furo	Prime Construction Group, Inc.	Corliss M. Fur Furo	estimating@pcginc.org	1000 Jetstream Drive	Orlando	FL	32824	407-856-8180	
5	2/8/2016	BidNet	Government Contracts USA	Kurt Pitzer	gbs@bidnet.com	15 British American Blvd.	Latham	NY	12110	800-677-1997	
6	2/8/2016	rick cole	fl research	rick cole	info@flresearch.com	436 east shore dr	Clearwater	FL	33767	727-441-4101	
7	2/9/2016	Dawn Bragg	Wharton-Smith, Inc.	Dawn Bragg	dbragg@whartonsmith.com	750 Monroe Road	Sanford	FL	32771	407-321-8410	
8	2/9/2016	BJ Lorenzo	CrossroadsSite Development LLC	BJ Lorenzo	Crossroadsdu@aol.com	96 Driftwood Ave	Ormond Beach	FL	32176	386-672-4200	
9	2/10/2016	Brittany	Isqft	Brittany	bfiorito@isqft.com	4500 Lake Forest Dr	Cincinnati	OH	45242	800-364-2059	
10	2/10/2016	mike sow	Monhar Construction	Mike	sow_michael@yahoo.com	1110 highway 26	simcoe	AL	45236	705 720 1079	
11	2/10/2016	Linda Moore	TLC Diversified, Inc.	Linda Moore	lmoores@tlcdiv.com	2719 17th Street East	Palmetto	FL	34221	941-722-0621	
12	2/10/2016	DONNA MCCARTY	CENSTATE CONTRACTORS	DONNA MCCARTY	donna@censtate.com	PO DRAWER 552	WINTER HAVEN	FL	33882	863-324-3882	Please send us this bid set. Thank you.
13	2/10/2016	Richard Neal	CS3 WaterWorks	Richard Neal	cs3.rneal@cs3waterworks.com	8327 Lexington View Lane	Orlando	FL	32835	407-398-9868	
14	2/10/2016	Jay Libo-on	Bailey Engineering Consultants	Jay Libo-on	jlibo-on@baileyengineering.com	10620 Griffin Road, Suite 202	Cooper City	FL	33328	954-448-7930	
15	2/10/2016	Joe Fisher	Petticoatschmitt Civil Contractors	Joe Fisher	jfisher@petticoatschmitt.com	6380 Phillips Highway	Jacksonville	FL	32216	904-751-0888	We are interested in bidding on the Water Plant #1
16	2/10/2016	Elissa LaPerna	Florida Design Contractors, Inc.	Elissa LaPerna	bids@floridadesigncontractors.com	1326 S. Killian Drive	Lake Park	FL	33403	561-275-2278	We are interested in bidding on the Water Plant #1
17	2/10/2016	Chuck Tweedy	Tonka Water	Chuck Tweedy	ctweedy@tonkawater.com	13305 Watertower Circle	Plymouth	MN	55441	763-252-0074	
18	2/10/2016	Don Hasco	Chinchor Electric, Inc.	Don Hasco	dhasco@chinchorelectric.com	P.O. Box 4311	Enterprise	FL	32725	386-774-1020	
19	2/10/2016	Cory Peavy	Environmental Equipment Services	Cory Peavy	cnp@ees-fl.com	3616 Harden Blvd, #337	Lakeland	FL	33803	863-450-3595	
20	2/11/2016	Mike Worrell	McDade Waterworks, Inc.	Mike Worrell	mike@mcdadewaterworks.com	6520 Harney Road	Tampa	FL	33610	813-740-1144	
21	2/12/2016	Jeanie Lucas	Layne Heavy Civil, Inc.	Jeanie Lucas	jeanie_lucas@layne.com	12421 SanJose Blvd. Ste. 200B	Jacksonville	FL	32223	904-695-9290	
22	2/12/2016	Laura	Builders Exchange & Reprographics	Laura	Dorice@bxrepro.com	130 S Ridgewoods Ave	Daytona Beach	FL	32114	386-253-7888	
23	2/12/2016	buddy mims	KC Petroleum	buddy mims	bmims@kcpetroleum.com	650 talleyrand ave	Jacksonville	FL	32202	904-874-2373	
24	2/12/2016	James W	IMS	James W	fi@imsinfo.com	945 Hornblend Street, Suite G	San Diego	CA	92109	858-490-8800	
25	2/12/2016	Raymond Rcoha	Rocha Controls	Raymond Rocha	rocha@rochacontrols.com	5025 W. Rio Vista Ave	Tampa	FL	33634	813-628-5584	
26	2/15/2016	Kila Pyle	Florida Bid Reporting	Kila Pyle	kila@floridabid.com	P. O. Box 37189	Tallahassee	FL	32315	850-539-7522	
27	2/15/2016	Morgan Stinson	iSqft	Morgan Stinson	project@isqft.com	4500 Lake Forest Drive, Suite 502	Cincinnati	OH	45242	800-364-2059	
28	2/15/2016	VIELKA GARCIA	ORTEGA INDUSTRIAL CONTRACTORS	VIELKA GARCIA	VGARCIA@ORTEGAINDUSTRIAL.COM	6415 GREENLAND RD	JACKSONVILLE	FL	32258	904-268-2181	
29	2/15/2016	Melissa Stone	Close Construction, LLC	Melissa Stone	melissa@closeconstruction.us	301 NW 4th Avenue	Okeechobee	FL	34972	863.467.0831	
30	2/15/2016	Fred Trippensee	Trippensee & Company, Inc.	Fred Trippensee	trippensee@htn.net	4906 U S Hwy 27 S	Sebring	FL	33870	863-382-2101	
31	2/15/2016	Lisa Blanchette	Harrington Industrial Plastics	Lisa Blanchette	lblanchette@hipco.com	4201 SW 34th Street	Orlando	FL	32811	407-835-1558	
32	2/15/2016	Michelle Spiegel	Ferguson Water Works	Michelle Spiegel	michelle.spiegel@ferguson.com	801 Thorpe Road	Orlando	FL	32824	40-785-97473	
33	2/15/2016	Melinda Lindsay	RTD Construction, Inc.	Melinda Lindsay	bids@rtdconstruction.com	38038 North Avenue	Zephyrhills	FL	33542	813-783-9119	
34	2/15/2016	dennis saunders	ferguson waterworks - plant division	dennis saunders	dennis.saunders@ferguson.com	10039 Industrial drive	Pineville	NC	28134	704-554-0383	
35	2/16/2016	Brett Lefever	L7 Construction, Inc.	Brett Lefever	blefever@l7constructs.com	4380 Saint Johns Parkway Suite 140	Sanford	FL	32771	321-972-9325	
36	2/16/2016	Karen Wolfe	EnviroSales of Florida, Inc.	Karen Wolfe	Karen@EnviroSalesofFlorida.com	1101 US 27 South	Sebring	FL	33870	863-314-0616	
37	2/16/2016	Marie Baker	Sawcross, Inc.	Marie Baker	marieb@sawcross.com	10970 New Berlin Road	Jacksonville	FL	32226	904-751-7500	
38	2/17/2016	Stephen Scala	Superior Power Products	Steve Scala	stephen.scala@sppreps.com	PO BOX 1188	Gotha	FL	34734	954-401-6224	

39	2/18/2016	sourcegmt@onvia.com	Onvia	sfs	6898965@163.com	6898965@163.com	Seattle	WA	DG	206-373-9500
40	2/18/2016	Carrie Ertle	MCG Services, LLC	Carrie Ertle	ertlec@mcg-s.com	2915 langely park ct	Orlando	FL	32835	407-476-4476
41	2/18/2016	John Justus Jr.	McMahan Construction Co., Inc.	John Justus Jr.	jejmcc@bellsouth.net	P.O. Box 223	Deland	FL	32721	386-734-1071
42	2/19/2016	Lex Ann Thomas	Dodge Data & Analytics	Lex Ann Thomas	lex.ann.thomas@construction.com	3315 Central Ave	Hot Springs	AR	71913	800-393-6343
43	2/19/2016	Robert Parks	PWC Joint Venture LLC	Robert Parks	rparks@pwc-llc.com	871 Venetia Bay Blvd Suite 230	Venice	FL	34285	(239)898-3812
44	2/19/2016	Marie Brood	Southeast Drilling Services, Inc.	Bart Ziegler	sebid@seasoutheastdrilling.net	10614 East US Hwy 92	Tampa	FL	33610	813-968-7277
45	2/21/2016	Syed Kamal	Sigma Industries	Syed Kamal	sigmaid2003@yahoo.com	5350 DTC Parkway	Greenwood Village	CO	80111	303-782-6944
46	2/22/2016	preeya	citetc	preeya	s.preeya@gmail.com	WaterlooRrd	Sydney	AB	2113	99283500
47	2/22/2016	Troy Lyn	Globaltech, Inc.	Troy Lyn	tlyn@globaltechdb.com	6001 Broken Sound Parkway NW, Suit	Boca Raton	FL	33487	561-997-6433
48	2/22/2016	Jeffrey Foy	CEC Controls	Jeffrey Foy	jfoy@cecontrols.com	300 Royal Ct	forest	Va	24551	757-335-0772
49	2/22/2016	Adam	Osprey Constructors, LLC.	Adam Brang	adam@ospreyconstructors.com	414 SW 140th terrace #140	Newberry	FL	32669	352-332-7953
50	2/23/2016	Ryan Wilkins	Sterling Enterprises, L.L.C.	Tracie Estes	tracie@sterlingenterprisesllc.com	PO Box 714	Lake Helen	FL	32744	386-532-2100
51	2/23/2016	David L. Orr	PSI	David Orr	david.orr@psiusa.com	1748 33rd Street	Orlando	FL	32839	407-304-5560
52	2/24/2016	Lorry	Moss Kelley, Inc.	Lorry Robles	lorry@mosskelley.com	725 Primera Boulevard, Suite 155	Lake Mary	FL	32746	407-805-0063
53	2/24/2016	Matt Curls	Barneys Pumps	Matt Curls	curlsM@barneypumps.com	P.O. Box 3529	Lakeland	FL	33802	863-665-8500
54	2/25/2016	David Ketchum	Trident Building Systems	David Ketchum	dketchum@tridentbuildingsystems.com	2812 Tallevast	Sarasota	FL	34207	941-755-7073
55	2/25/2016	Robert Sharrer	Sharrer ElectricCompany, Inc.	Robert Sharrer	rss@sharrerelectric.com	3507 SW 13th Street	Ocala	FL	34474	352-236-6650
56	2/29/2016	JR Hill	Badger Daylighting	JR Hill	jhill@badger-corp.com	8930 Motorsports Way	Brownsburg	IN	46112	407-487-6389 Nations largest non destructive hydrovan excavation company.
57	2/29/2016	Christina Tabor	CFE Corp	Christina Tabor	ctabor75@aol.com	910 Belle Ave, Ste 1040	Winter Springs	FL	32708	407-834-6115
58	2/29/2016	Jeffrey James	Vogel Brothers	Jeffrey James	james@vogelbldg.com	2720 Drane Field Road	Lakeland	FL	33811	863-577-0464
59	2/29/2016	John Cathcart	Cathcart Construction Company - Florida, LLC	John Cathcart	cathcart01@yahoo.com	2564 Connection Pt	Oviedo	FL	32765	407-341-6465
60	3/1/2016	Jennifer I Kintzer	Aerzen USA	Jennifer Kintzer	jkintzer@aerzenusa.com	108 Independence Way	Coatesville	PA	19320	484-718-3705
61	3/1/2016	michael gautier	gautier fabrication	michael	gautier.fab@hotmail.com	1049 endeavor ct.	nokomis	FL	34275	941-485-2464
62	3/2/2016	Jacqueline E. Webb	John B. Webb & Associates, Inc.	Jacqueline E. Webb	jbwa@aol.com	925 Denning Dr	Winter Park	FL	32789	407-622-9322
63	3/2/2016	Mike Turtle	Driveway Maintenance Inc.	Mike Turtle	Mturtle@Driveway.net	677 Fairvilla Road	Orlando	FL	3208	407-298-8558
64	3/2/2016	P Sinclair	Aero Photo	P Sinclair	pasha.aerophoto@gmail.com	4000 16th St N	St Petersburg	FL	33703	727-520-8181
65	3/2/2016	Sheryl Richardson	Sdtr consulting llc	Sheryl Richardson	Sdtrconsulting@gmail.com	4928 San Marino cir	Lake Mary	FL	32746	407-221-2138
66	3/2/2016	Don Hasco	Chinchor Electric, Inc.	Don Hasco	dhasco@chinchoelectric.com	P.O. Box 4311	Enterprise	FL	32725	386-774-1020
67	3/3/2016	Michael Parnell	Instrument Specialties Inc.	Michael Parnell	mikep@isisales.com	3885 St. Johns Parkway	Sanford	FL	32771	407-324-7800
68	3/4/2016	Bruce Daggett	Chalmers & Kubeck - South	Bruce Daggett	bdaggett@candksouth.com	PO Box 622088	Oviedo	FL	32768	407-257-8738
69	3/4/2016	Bill Hatzimarkos	Central Florida Construction Walls, Inc.	Bill Hatzimarkos	vxmarkos@gmail.com	216 Secret Way	Casselberry	FL	32707	407-925-7617
70										

Bid Tabulation

The Bidder hereby indicates the following total units and total prices which represent all materials, labor, equipment, transportation, performance of all operations relative to construction of the project, overhead, and costs of all kinds and profit to complete the work items in accordance with the Project Manual, plans, and permits.

Work for which there is not a listed item below shall be considered incidental to the Contract and no additional compensation will be allowed. The detailed Schedule of Values shall be provided by the lowest responsible bidder and be included with their executed contract, as attached.

No.	ITEM	UNIT	QUANTITY	TOTAL PRICE
1	Furnish & Install IEX Process and Waste Handling System (Two (2) IEX Pressure Vessels)	LS	1	
2	Furnish & Install Prefabricated Metal Roof with Concrete Containment Area Structures	LS	1	
3	Furnish & Install Chemical Feed Systems	LS	1	
4	Furnish & Install Generator and Fuel Storage Tank	LS	1	
5	Furnish & Install Instrumentation/SCADA Improvements	LS	1	
6	Furnish & Install Electrical Improvements	LS	1	
7	All other Items to Upgrade WTP #1	LS	1	
8	Permit Fees Allowance	LS	1	\$20,000
	TOTAL LUMP SUM PRICE (BASE BID)			
A1	Additive Bid Item No. 1 Furnish & Install One (1) Additional IEX Pressure Vessel	LS	1	

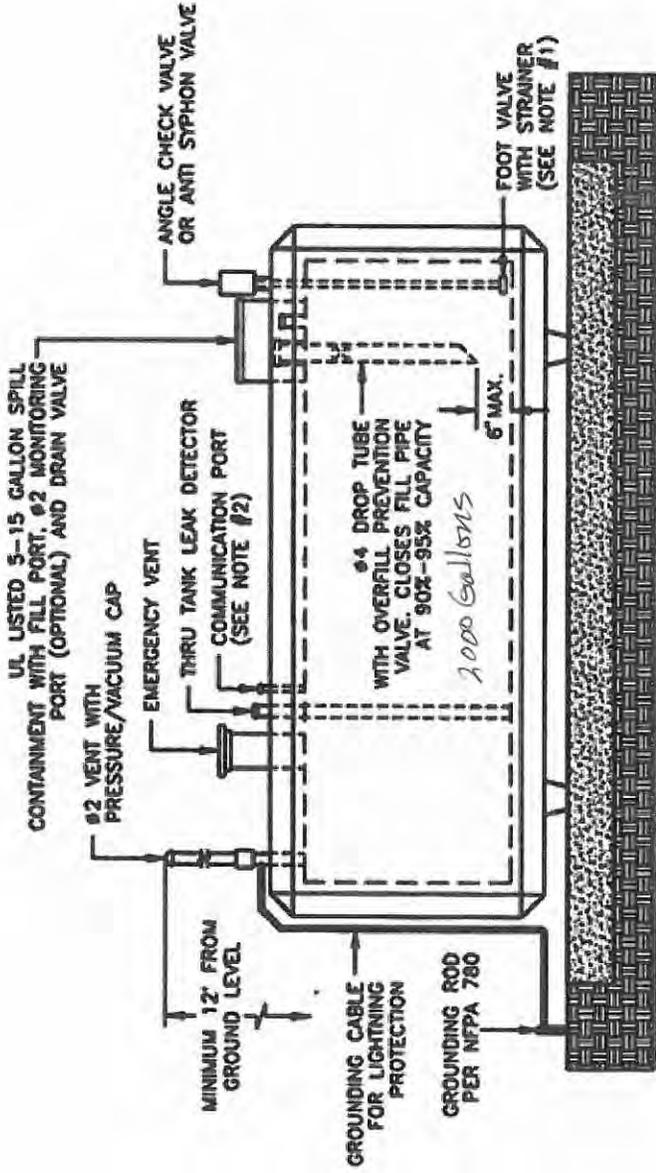
**Detailed Schedule of Values
to be Provided by Successful Bidder with Executed Contract**

No.	ITEM	UNIT	QUANTITY	TOTAL PRICE
1	Mobilization, Bonds, & General Conditions	LS	1	
2	Site Layout / Survey	LS	1	
3	Record Drawings & Closeout	LS	1	
4	Demolition	LS	1	
5	Cut/Fill, Grade Site and Furnish & Install Stormwater Lines	LS	1	
6	Furnish & Install Yard Piping (Raw & Treated Water Lines)	LS	1	
7	Furnish & Install IEX Bypass System	LS	1	
8	Furnish IEX System (Two (2) Pressure Vessels)	LS	1	
9	Install IEX System (Two (2) Pressure Vessels)	LS	1	
10	Furnish & Install IEX System Headers	LS	1	
11	Furnish & Install IEX Spent Regenerate System	LS	1	
12	Construct Concrete Slab, Equipment Pads, Containment Wall and Supports for New IEX System	LS	1	
13	Furnish & Install Prefabricated Metal Roof for IEX System Containment Area	LS	1	
14	Furnish Chlorine Chemical Feed Skids	LS	1	
15	Install Chlorine and Corrosion Inhibitor Chemical Feed Skids	LS	1	
16	Furnish & Install Chemical Feed Lines, Static Mixers and Injection Assemblies	LS	1	
17	Furnish & Install Corrosion Inhibitor Bulk Storage Tank	LS	1	
18	Furnish Generator and Fuel Tank	LS	1	

Winter Springs WTP #1 Upgrades**00300-5**

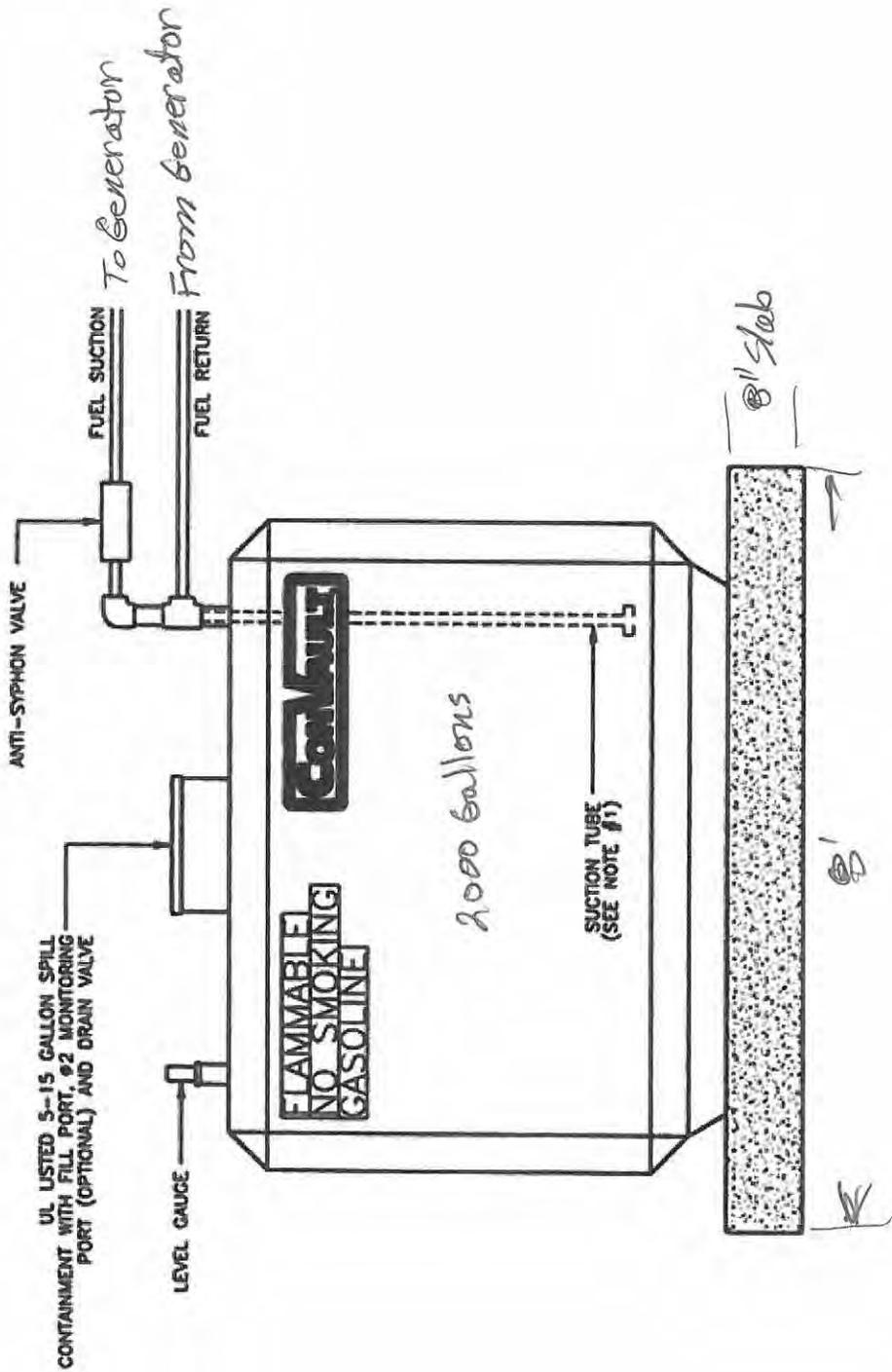
No.	ITEM	UNIT	QUANTITY	TOTAL PRICE
19	Install Generator and Fuel Tank	LS	1	
20	Furnish & Install Instruments and SCADA System Improvements	LS	1	
21	Furnish & Install Electrical Systems	LS	1	
22	Furnish & Install New Security Fence	LS	1	
23	Furnish & Install Utility Lines (Potable Water, Safety Showers, Air, Power & Communications)	LS	1	
24	Furnish & Install Sample Lines	LS	1	
25	Construct Concrete Driveways	LS	1	
26	Provide Site Restoration	LS	1	
27	Debris Removal	LS	1	
28	Startup	LS	1	
29	Salt Load for Start-up	LS	1	
30	Permit Fees Allowance	LS	1	\$20,000
	TOTAL LUMP SUM PRICE (BASE BID)			\$
A1	Additive Bid Item Furnish & Install One (1) Additional IEX Pressure Vessel	LS	1	

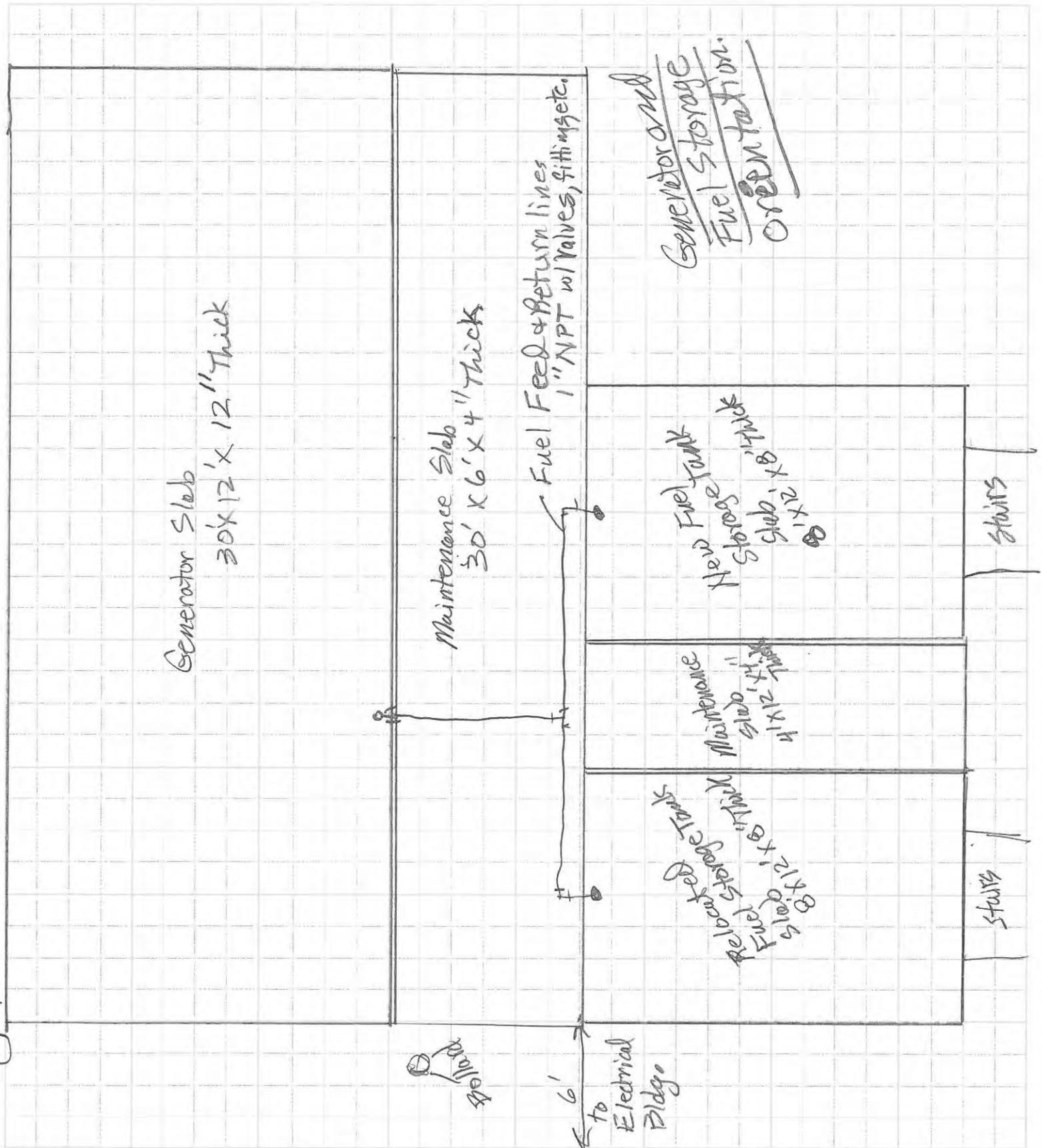
END OF SECTION



soil
 Compact to 98%
 Modified Proctor
 Density

Concrete Slab
 8" Thick
 #4 Rebars @ 12" OC. EWEEF;
 For 2000 Gallon Tank Slab is 8' x 12'





JOB NAME: _____ BY: _____ DATE: _____ SHEET NO.: _____
 JOB NO.: _____ CHECKED BY: _____ DATE: _____ SCALE: _____



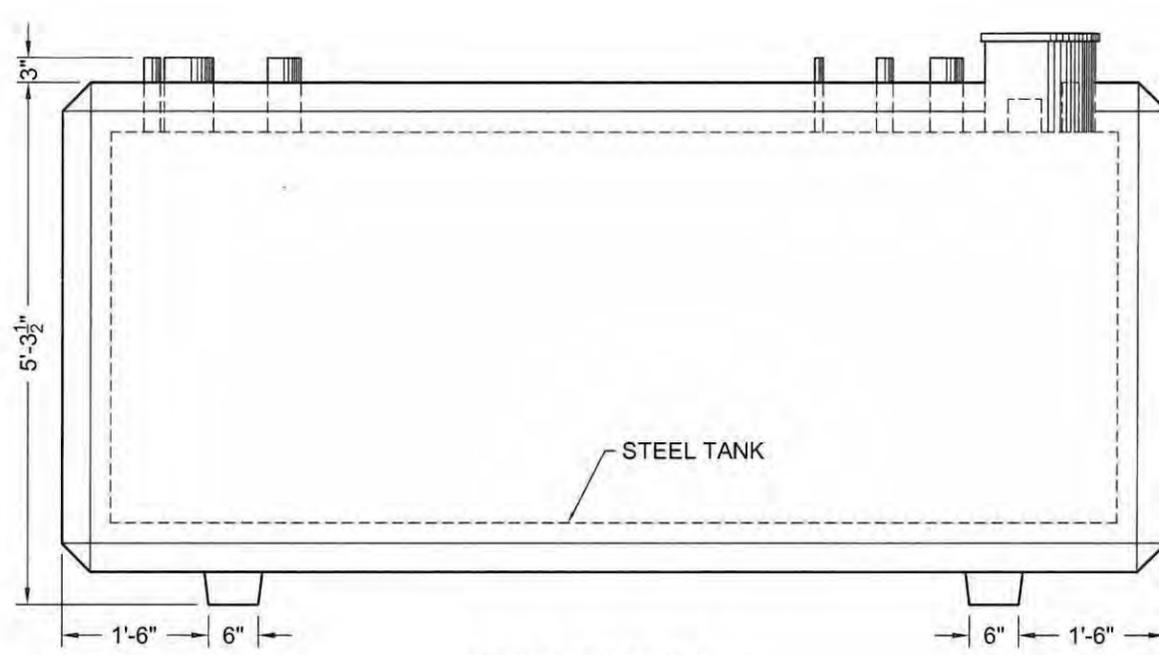
Fuel Storage Tanks
Support and Maintenance Slabs



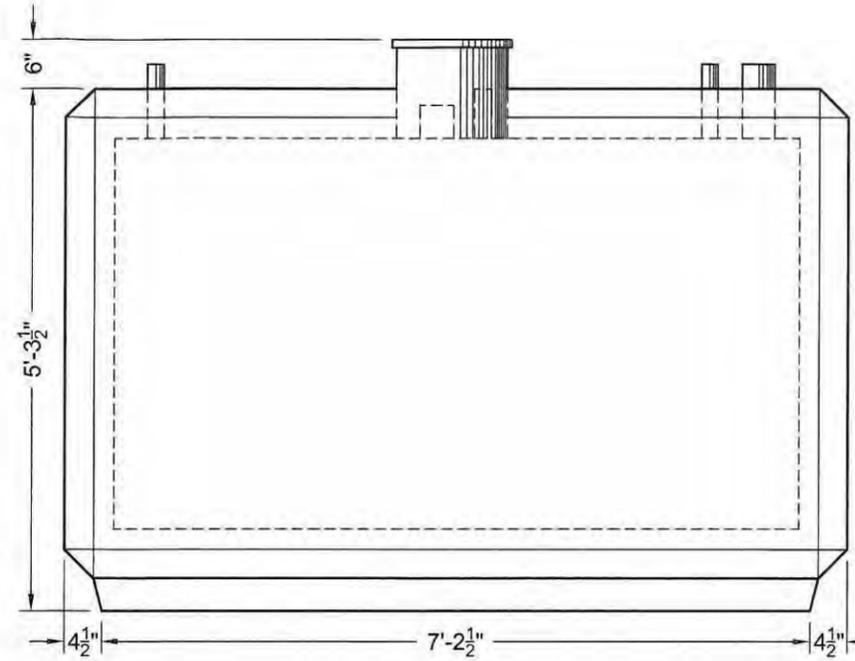
#4 Bars EW EF @ 12" O.C.

8" Thick
 support Tank
 slab under
 the corner

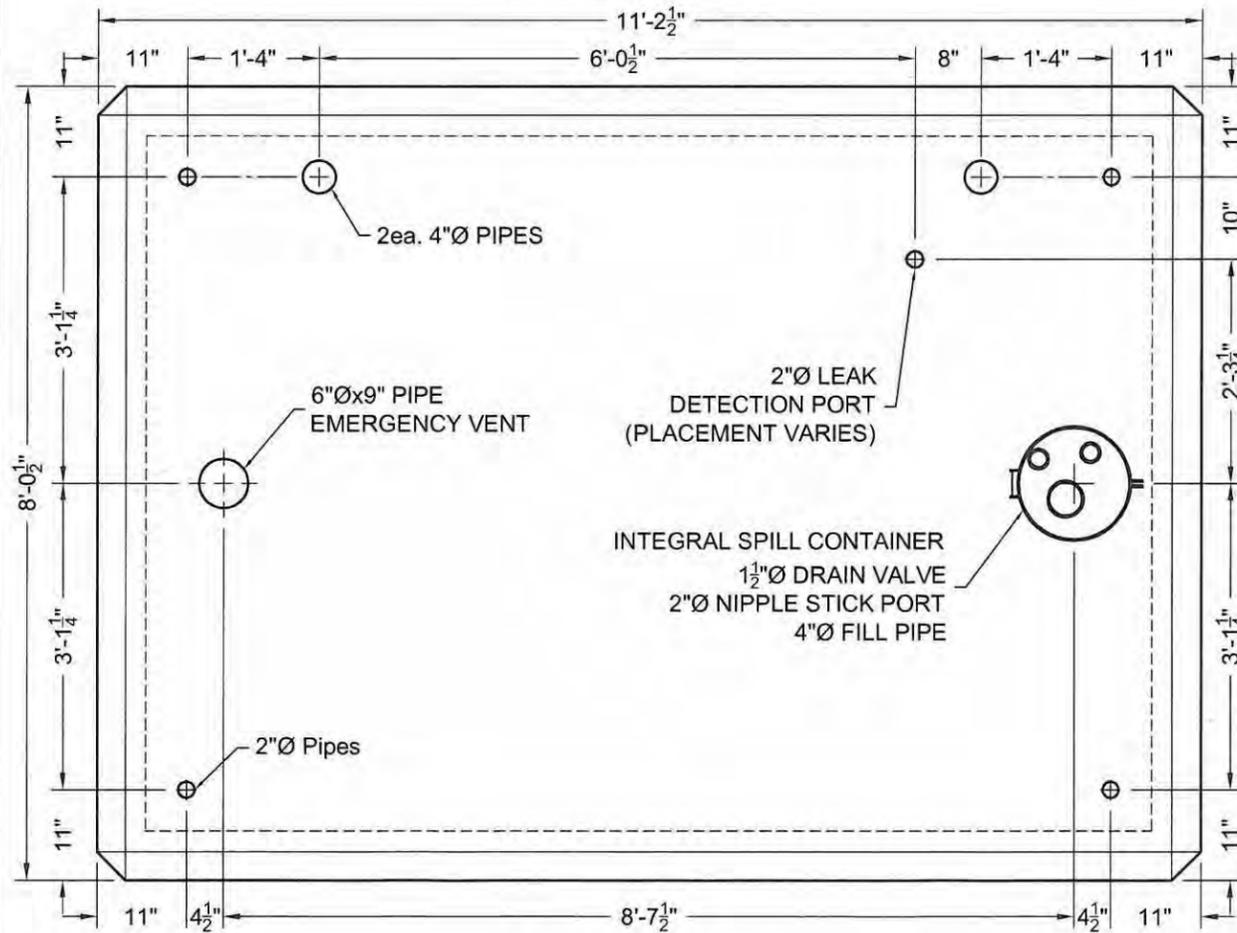
12



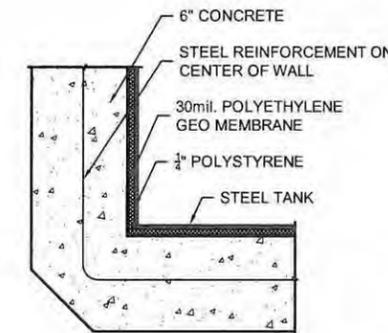
TYPICAL SIDE VIEW



TYPICAL END VIEW



TYPICAL PLAN VIEW



WALL DETAIL

NOTES:

1. STEEL TANK SHALL BE U.L. 142 LISTED FOR ABOVE GROUND STORAGE OF FLAMMABLE LIQUIDS.
2. STEEL TANK SKIN SHALL BE 3/16" THICK A.S.T.M. A-36 STEEL PLATE.
3. ALL EXPOSED METAL WITH THE EXCEPTION OF STAINLESS STEEL MUST BE POWDER COATED TO INHIBIT CORROSION.
4. STEEL TANKS SHALL BE RECTANGULAR IN SHAPE AND HAVE CONTINUOUS WELDS ON THE OUTSIDE.
5. STEEL TANK AND SECONDARY CONTAINMENT SHALL BE ENCASED IN SIX INCHES OF 4000 P.S.I. REINFORCED CONCRETE.
6. STEEL TANK SHALL BE PRESSURE TESTED AT 5 P.S.I.G. FOR 24 HOURS WITHOUT PRESSURE DROP.
7. TANK WALL SYSTEM SHALL BE LISTED IN ACCORDANCE WITH U.L. STANDARD 2085 AND SHOWN TO HAVE A TWO HOUR FIRE RATING
8. VAULTS SHALL HAVE THE CAPABILITY OF PHYSICAL MONITORING BETWEEN THE PRIMARY AND THE SECONDARY CONTAINMENT.
9. THE SECONDARY CONTAINMENT SHALL CONSIST OF A 30 ML HIGH DENSITY POLYETHYLENE GEO LINEAR.
10. THE VAULT SHALL BE OF A MONOLITHIC (SEAMLESS AND CONTINUOUS) CONCRETE POUR AND CONTAIN NO COLD JOINTS OR HEAT SINKS (HEAT TRANSFER POINTS) ON THE BOTTOM OR SIDES.
11. VAULT SHALL HAVE COATED CONCRETE EXTERIOR TO RESIST WEATHER AND REFLECT SUNLIGHT.



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CONVAULT STORAGE TANK
2000 GALLON

CUSTOMER					
DATE	SALES	DRAWN	ENGINEER	CHECKED	SALES ORDER
10/21/13					
DRAWING NUMBER			REVISION		SHEET
Sales Drawings			REV DATE		OF





Generator Slab

30'-0"

Note: 1) Outside Enclosure for the generator was assumed to be

330" L x 132.5" W x 150.5" H. (Enclosure size may vary by Manufacturer)

2) Enclosure rated for 180 mph winds.

3) Total weight w/ Gen set 33,707 lbs.

4) Contractor shall coordinate slab with the manufacturer for sizing/ placement and attachment.

Plan

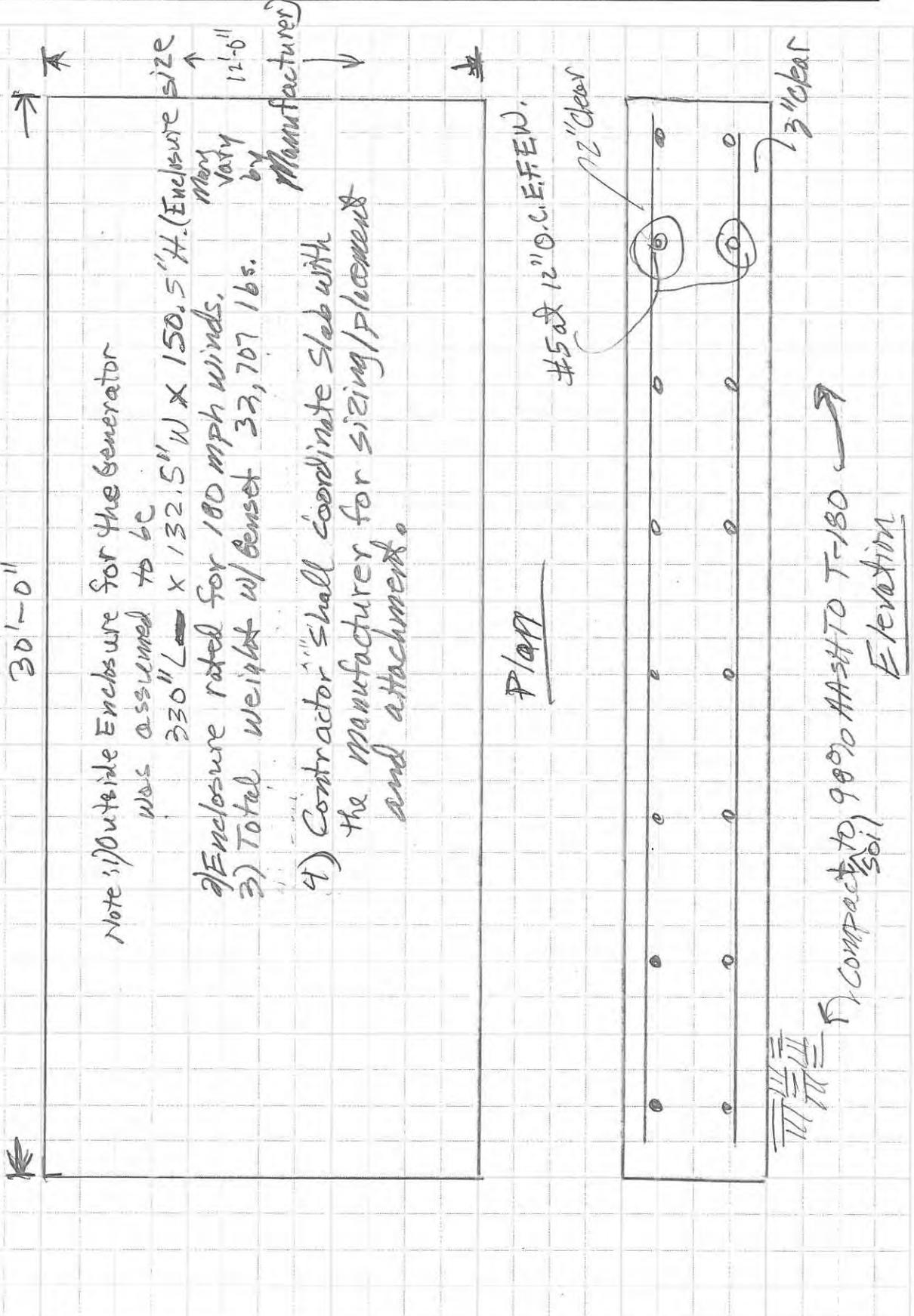
#5 @ 12" O.C. E.F.F.W.

12" clear

11/11/11

Compact to 90% AASHTO T-180

Elevation



Zaudtke, Terry M. (P.E.)

From: Dameion Donaldson <ddonaldson@goeda.com>
Sent: Friday, November 06, 2015 5:42 PM
To: Zaudtke, Terry M. (P.E.)
Cc: Stephen Bailey
Subject: RE: CPH, Winter Sprngs WTP #1, Generator and Fuel Storage

Terry,

The generator and enclosure drawings that we previously provided were conceptual drawings obtained directly from the enclosure manufacturer. In speaking with the enclosure manufacturer, he indicated the following:

1. For this type of enclosure, the air intake is from the top so there is no need to remove grass or dirt at finished grade other than for the pad to support the unit.
2. The fuel day tank supply and return lines can be oriented to either side of the enclosure.
3. The generator day tank will include a supply pump which pulls fuel from the main tank. It will also include a return pump to return fuel to the main tank. This will need to be spec'd.

The generator enclosure supplier is available to answer any additional questions or confirmation of the above items. Please feel free to contact him at:

Joseph Scofield
President
Advanced Manufacturing & Power Systems, Inc.
1965 Bennett Dr.
DeLand, FL 32724
Tel: 386-822-5565
Fax: 386-822-9669
Email: jscofield@amps.cc

Best regards,

Dameion Donaldson, P.E.
(954) 448-7930

From: Zaudtke, Terry M. (P.E.) [mailto:tzaudtke@cphcorp.com]
Sent: Thursday, October 29, 2015 10:56 AM
To: Dameion Donaldson <ddonaldson@goeda.com>; Stephen Bailey <sbailey@baileyengineering.com>
Subject: FW: CPH, Winter Sprngs WTP #1, Generator and Fuel Storage

I need to know from the generator people if I need a separate pump to supply the generator day tank, or just a direct connection to the tow fule storage tanks.

From: Zaudtke, Terry M. (P.E.)
Sent: Thursday, October 29, 2015 10:28 AM
To: 'Dameion Donaldson'
Cc: Stephen Bailey
Subject: RE: CPH, Winter Sprngs WTP #1, Generator and Fuel Storage

You state below that the enclosure is 132.5 inches wide. The plan view drawing shows 126". There is apparently a frame piece that extends out on both sides that accounts for the difference. I was going to make the slab 30'(360") by 12'(144"). I think this will be sufficient. However, I need to know what you mean by no sand or grass by the intake. Do I need to provide a concrete slab for an area in front of the intake? If yes, how big?

I noticed that the 1" NPT Fuel Supply /Return lines are shown on the plan view drawing at the top of the page. We would like the generator to be oriented such that these lines are on the south side directly across from the fuel storage. Is this orientation possible?

From: Dameion Donaldson [<mailto:ddonaldson@goeda.com>]
Sent: Tuesday, October 27, 2015 12:37 PM
To: Zaudtke, Terry M. (P.E.)
Cc: Stephen Bailey
Subject: RE: CPH, Winter Sprngs WTP #1, Generator and Fuel Storage

Terry,

Please see attached generator and enclosure conceptual drawings as received from the generator enclosure supplier.

Dimensions for enclosure including the generator is: 330" L x 132.5" W x 150.5" H. Weights are also shown on the drawings.

We are available for a conference call today to discuss, if needed.

Best regards,

Dameion Donaldson, P.E.
(954) 448-7930

From: Stephen Bailey
Sent: Monday, October 26, 2015 9:54 AM
To: Zaudtke, Terry M. (P.E.) <tzaudtke@cphcorp.com>
Cc: Dameion Donaldson <ddonaldson@goeda.com>
Subject: RE: CPH, Winter Sprngs WTP #1, Generator and Fuel Storage

Will do

From: Zaudtke, Terry M. (P.E.) [<mailto:tzaudtke@cphcorp.com>]
Sent: Monday, October 26, 2015 9:52 AM
To: Stephen Bailey <sbailey@baileyengineering.com>
Cc: Dameion Donaldson <ddonaldson@goeda.com>
Subject: RE: CPH, Winter Sprngs WTP #1, Generator and Fuel Storage

As soon as you get the generator sizing, please copy us.

From: Stephen Bailey [<mailto:sbailey@baileyengineering.com>]
Sent: Friday, October 23, 2015 12:58 PM
To: Zaudtke, Terry M. (P.E.)
Cc: Dameion Donaldson
Subject: CPH, Winter Sprngs WTP #1, Generator and Fuel Storage

Terry,

Please CC Dameion all emails. He and I are working on the final design element from this point further.

1. The proposed location is good as shown on your sketch.
2. We are working with the suppliers now to obtain sizing information.
3. Code is 4 feet, however, I would prefer 6 feet. We want the intake louver area to have concrete or gravel beneath it, no grass or dirt.
4. We do not think the enclosure will require stairs or a catwalk. There is no base tank.
5. We have requested generator information from the suppliers.
6. I think the placement I the sketch is a better option. Ultimately it is the client's decision I would assume.

S. Bailey

From: Zaudtke, Terry M. (P.E.) [<mailto:tzaudtke@cphcorp.com>]

Sent: Friday, October 23, 2015 11:31 AM

To: Stephen Bailey <sbailey@baileyengineering.com>

Subject: Generator and Fuel Storage

I do not like the placement shown on the current drawings. It has some access issues.

Please provide us with input on this revised location.

- 1) Is this a better location/configuration?
- 2) What is the size of the new generator including the enclosure?
- 3) What clearances will be required around the generator?
- 4) Does the generator need outside catwalk or stairs?
- 5) I assume that it needs a slab and what I need is the dimensions required for the slab.
- 6) An option is to locate the generator behind the Electrical building with access to the north; either way, we need to consider initial placement and service requirements.

Terry M. Zaudtke, P.E.

CPH

Phone 407-425-0452 x 2003

MEMORANDUM
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To: CPH, Inc.

From: Bailey Engineering Consultants, Inc.

Date: March 3, 2016

Project: **Winter Springs WTP #1 Water Quality Improvements (ITB/004/16/KL)**

Subject: ADDENDUM NO. 2

The Contract Documents, Specifications and Drawings are hereby amended as follows:

A. CONTRACT DOCUMENTS AND SPECIFICATIONS:

Specification Section 11700:

1. **Delete** paragraph 2.14, A

Insert the following new paragraph 2.14, A in its place:

"A. Ion exchange system is to be supplied with two control panels each designed for 120 volt, single phase service. The panels shall be designed for the equipment supplied and furnished in accordance with the requirements set forth in Division 13 and as further defined herein. The control panels shall be provided by the hybrid biological and anion exchange system MANUFACTURER. The Main Control Panel (designated Process Control Panel No. 2, PCP-2) shall be a NEMA 12, wall-mounted enclosure located in the Electrical Building and contain a CPU based rack for process control. The Remote Control Panel (designated Remote Control Panel No. 2A, RCP-2A) shall be a NEMA 4X, free-standing 316 Stainless Steel enclosure located adjacent to the process equipment. RCP-2A shall be provided with a front-panel mounted Operator Interface Unit and contain a remote input/output module based rack. PCP-2 and RCP-2A shall be interconnected via a fiber optic link. The panels shall be provided with all necessary hardware, components, enclosure, relays, switches, alarms, input and output modules (I/O), network communications, and other items necessary for a complete operational system."

2. **Delete** the text in paragraph 2.14, B that reads:

"B. Panel shall be a free-standing NEMA 4 steel panel, constructed in accordance with UL 508 requirements for enclosed industrial control panels and shall bear the serialized UL label. Enclosure shall include the following:"

Insert the following new text into paragraph 2.14, B in its place:

"B. Panels shall be constructed in accordance with UL 508 requirements for enclosed industrial control panels and shall bear the serialized UL label. Enclosures shall meet the following requirements:"

3. **Delete** the text in paragraph 2.14, B, 1 that reads:

“...NEMA 4 rated ...”

4. **Delete** paragraph 2.14, C, 2 that reads:

“2. Programmable Controller (PLC): The panel shall include a PLC for all control logic. The PLC shall be Allen-Bradley CompactLogix series. PLC I/O to include a minimum of 10% spare I/O capacity including digital and analog I/O. PLC shall be programmed using RSLogix 5000 software, a copy of which is not required to be furnished to the OWNER under this Section.”

Insert the following new paragraph 2.14, C, 2 in its place:

“2. Programmable Controller (PLC): The PLC shall be Allen-Bradley CompactLogix series. PLC I/O to include a minimum of 10% spare I/O capacity including digital and analog I/O. PLC shall be programmed using RSLogix 5000 software. A licensed, copy of the programming software shall be furnished to the OWNER under this Section.”

5. **Delete** paragraph 2.14, C, 5 that reads:

“5. Fiber Optic Interface: The panel PLC shall communicate with the new plant PLC network over a fiber optic link and with the OIT via a copper link using a mixed media Ethernet switch. The Ethernet switch shall contain a minimum of four copper and two fiber ports. Provide Allen Bradley Stratix 5700 series or approved equal. Fiber optic cable and terminations shall be provided under Division 16 and 13, respectively.”

Insert the following new paragraph 2.14, C, 5 in its place:

“5. Communication Interfaces: PCP-2 shall be provided with a protocol converter to allow the PLC to communicate using Modbus TCP/IP protocol with the new plant PLC via a copper link to the network switch in PCP-1. PCP-2 and RCP-2A shall communicate over a fiber optic link using DH-RIO protocol. Fiber optic cable and terminations shall be provided under Division 16 and 13, respectively.”

6. **Delete** the text in paragraph 2.14, C, 6 that reads:

“... via the fiber optic communications link.”

7. **Delete** the text in paragraph 2.14, L that reads:

“Control interface shall be via communications between the panel PLC and the plant operator work stations over the fiber optic link.”

Insert new text in paragraph 2.14, L in its place that reads:

“Control interface with the PICS shall be via communications between the panel PLC and the plant operator work stations over the PICS Ethernet network.”

8. **Delete** the text in paragraph 2.14, L, 2 that reads:

“... will be from the MCC which will be terminated at the plant PLC and sent to the control panel PLC via the fiber optic link.”

Insert new text in paragraph 2.14, L, 2 in its place that reads:

“...will be from the MCC which will be terminated at the PLC in PCP-2.”

9. **Delete** the text in paragraph 2.14, L, 12 that reads:

“... will be from the MCC which will be terminated at the plant PLC and sent to the control panel PLC via the fiber optic link.”

Insert new text in paragraph 2.14, L, 12 in its place that reads:

“...will be from the MCC which will be terminated at the PLC in PCP-2.”

10. **Delete** the text in paragraph 2.14, L, 13 that reads:

“...will be sent to the MCC through the plant PLC and sent from the control panel PLC via the fiber optic link.”

Insert new text in paragraph 2.14, L, 13 in its place that reads:

“...will be sent to the MCC from the PLC in PCP-2.”

11. **Insert** the following text at the end of paragraph 2.15, A that reads:

“All field instrumentation shall be furnished in accordance with the requirements set forth in Division 13.”

Specification Section 13300:

1. **Insert** the following text at the end of paragraph 1.01, E that reads:

“5. Commerce Controls, Inc.”

2. **Insert** the following new paragraph 1.02, G, renumbering subsequent paragraphs accordingly:

“G. Specification Section 13330 defines requirements for the telemetry system to implement connections between PICS equipment at the WTP and the two remote wells.”

3. **Delete** the text in paragraph 1.03, F, 1, g that reads:

“...over Ethernet ...”

Specification Section 13310:

1. **Delete** paragraph 2.03, A

Insert new paragraph 2.03, A in its place which reads:

“A. Total Chlorine Residual (Loops 3518 and 3528). The total chlorine analysis system shall use colorimetric DPD chemistry to continuously monitor and indicate

the total chlorine residual level. It shall comprise two main elements: the Analysis Element (AE), a sample conditioning system and sensor, and the Analysis Indicating Transmitter (AIT). The conditioning system shall continuously pump reagent and buffer solutions into the sample. The total residual of the conditioned sample shall be measured by an amperometric sensor. The analyzer shall convert the sensor signal into an analog signal proportional to the residual reading.

1. Performance:
 - a. Measurement Range: 0-10 ppm (mg/L) unaffected by sample pH variations.
 - b. Low maintenance unit with 15 minute or less per month, is required.
 - c. Response time of less than 5 minutes to 90% of reading following step change.
 - d. Two programmable alarm contacts (process level or system fault).
2. Materials:
 - a. Suitable for application.
3. Electrical:
 - a. Power Supply: 120 VAC.
 - b. Residual output: 4-20 mA DC.
 - c. Backlit LCD display.
 - d. Alarm Contact – Dual SPDT relay outputs for system warning and shut-down alarms.
4. Options/Accessories Required:
 - a. The system must have built-in self-diagnostics.
 - b. Provide self-priming, 120 VAC / 60 Hz sample pump capable of providing 20 feet suction at the flow rate required by the analyzer.
5. Manufacturer:
 - a. Hach Model CL17.
 - b. No equal.”

2. **Delete** the text in paragraph 2.03, C that reads:

“C. Chlorine Analyzer (Loops 3208, 3518 and 3528). The analysis system shall continuously measure the level of free or combined chlorine within the sample automatically compensating for pH and temperature without the use of sample conditioning.”

Insert new text in paragraph 2.03, C in its place that reads:

“C. Free Chlorine Analyzer (Loop 3208). The analysis system shall continuously measure the level of free chlorine within the sample automatically compensating for pH and temperature without the use of sample conditioning.”

3. **Delete** paragraph 2.03, C, 2, b and renumber subsequent paragraphs accordingly.

Specification Section 13315:

1. **Insert** the following new paragraph 1.03, B, 8, renumbering subsequent paragraphs accordingly:

“8. Relay logic for back-up operation of the high service pumps.”

2. **Delete** the text in paragraph 1.03, C that reads:

“... free-standing ...”

Insert the following new text into paragraph 1.03, C in its place:

“... wall-mounted ...”

3. **Delete** the text in paragraph 1.03, F that reads:

“... rack-mounted ...”

Insert the following new text into paragraph 1.03, F in its place:

“... free-standing ...”

Specification Section 13320:

1. **Insert** the following new paragraph 2.03, C, 2, renumbering subsequent paragraphs accordingly:

“2. 500 tag Development and Run-Time Reporting Software, Dream Reports DR-500”.

Specification Section 13325

1. **Insert** a new paragraph 1.02, D, that reads:

“D. Specification Section 13330 defines requirements for the telemetry system to implement the wireless links between PICS equipment at the WTP and the two remote wells.”

2. **Delete** paragraph 2.03, D, without substitution and renumber subsequent paragraphs accordingly.

Specification Section 13326

1. **Delete** the following entries from Table 13326-1:

FS	5331	High Service Pump #1 Flow Switch	DI	No Flow	Flow
FS	5332	High Service Pump #2 Flow Switch	DI	No Flow	Flow
FS	5333	High Service Pump #3 Flow Switch	DI	No Flow	Flow
LT	9101	Fuel Tank Level	AI	0-???	FEET
XS	9109	Fuel Tank Leak Status	DI	Normal	Leak

2. **Insert** the following entries into Table 13326-1:

MC	5331	High Service Pump #1 Control	DO	Stop	Start
MC	5332	High Service Pump #2 Control	DO	Stop	Start
MC	5333	High Service Pump #3 Control	DO	Stop	Start
HS-A	7151	Waste Pump #1 Auto Mode	DI	Not Auto	Auto
HS-B	7151	Waste Pump #1 Manual Mode	DI	Not Manual	Manual
MC	7151	Waste Pump #1 Control	DO	Stop	Start
RS	7151	Waste Pump #1 Running Status	DI	Stopped	Running
SC	7151	Waste Pump #1 Speed Control	AO	0-100	%
ST	7151	Waste Pump #1 Speed	AI	0-100	%
XS-A	7151	Waste Pump #1 Motor Status	DI	Normal	Failure
XS-B	7151	Waste Pump #1 VFD Status	DI	Normal	Failure
ZS	7151	Waste Pump #1 Mode	DI	Normal	Bypass
HS-A	7152	Waste Pump #2 Auto Mode	DI	Not Auto	Auto
HS-B	7152	Waste Pump #2 Manual Mode	DI	Not Manual	Manual
MC	7152	Waste Pump #2 Control	DO	Stop	Start
RS	7152	Waste Pump #2 Running Status	DI	Stopped	Running
SC	7152	Waste Pump #2 Speed Control	AO	0-100	%
ST	7152	Waste Pump #2 Speed	AI	0-100	%
XS-A	7152	Waste Pump #2 Motor Status	DI	Normal	Failure
XS-B	7152	Waste Pump #2 VFD Status	DI	Normal	Failure
ZS	7152	Waste Pump #2 Mode	DI	Normal	Bypass
LT	9101	Fuel Tank No. 1 Level	AI	0-???	FEET
XS	9109	Fuel Tank No.1 Leak Status	DI	Normal	Leak
LT	9201	Fuel Tank No. 2 Level	AI	0-???	FEET
XS	9209	Fuel Tank No.2 Leak Status	DI	Normal	Leak

3. **Insert** the following entries into Table 13326-2:

HS	2071	Air Wash Blower Auto Status	DI	Not in Auto	In Auto
MC	2071	Air Wash Blower Control	DO	Stop	Start
RS	2071	Air Wash Blower Running Status	DI	Stopped	Running
XS	2071	Air Wash Blower Fault Status	DI	Normal	Failure

4. **Delete** the following entries from Table 13326-3

MC	5331	High Service Pump #1 Control	DO	Stop	Start
MC	5332	High Service Pump #2 Control	DO	Stop	Start
MC	5333	High Service Pump #3 Control	DO	Stop	Start

5. **Delete** the following entries from Table 13326-4

HS	2071	Air Wash Blower Auto Status	DI	Not in Auto	In Auto
MC	2071	Air Wash Blower Control	DO	Stop	Start
RS	2071	Air Wash Blower Running Status	DI	Stopped	Running
XS	2071	Air Wash Blower Fault Status	DI	Normal	Failure
HS-A	7151	IEX Waste Pump #1 Auto Mode	DI	Not Auto	Auto
HS-B	7151	IEX Waste Pump #1 Manual Mode	DI	Not Manual	Manual
MC	7151	IEX Waste Pump #1 Control	DO	Stop	Start
RS	7151	IEX Waste Pump #1 Running Status	DI	Stopped	Running
SC	7151	IEX Waste Pump #1 Speed Control	AO	0-100	%
ST	7151	IEX Waste Pump #1 Speed	AI	0-100	%
XS-A	7151	IEX Waste Pump #1 Motor Status	DI	Normal	Failure
XS-B	7151	IEX Waste Pump #1 VFD Status	DI	Normal	Failure
ZS	7151	IEX Waste Pump #1 Mode	DI	Normal	Bypass
HS-A	7152	IEX Waste Pump #2 Auto Mode	DI	Not Auto	Auto
HS-B	7152	IEX Waste Pump #2 Manual Mode	DI	Not Manual	Manual
MC	7152	IEX Waste Pump #2 Control	DO	Stop	Start
RS	7152	IEX Waste Pump #2 Running Status	DI	Stopped	Running
SC	7152	IEX Waste Pump #2 Speed Control	AO	0-100	%
ST	7152	IEX Waste Pump #2 Speed	AI	0-100	%
XS-A	7152	IEX Waste Pump #2 Motor Status	DI	Normal	Failure
XS-B	7152	IEX Waste Pump #2 VFD Status	DI	Normal	Failure
ZS	7152	IEX Waste Pump #2 Mode	DI	Normal	Bypass

6. **Insert** the following entries into Table 13326-4

ZT	7121	IEX Waste Valve Position	AI	0-100	%
ZC	7121	IEX Waste Valve Position Control	AO	0-100	%
HS	7122	IEX Drain Down Valve Mode	DI	Not in Auto	In Auto
MC	7122	IEX Drain Down Valve Control	DO	Close	Open
ZSH	7122	IEX Drain Down Valve Open Status	DI	Not Open	Open
ZSL	7122	IEX Drain Down Valve Closed Status	DI	Not Closed	Closed

Specification Section 13330:

1. **Insert** new Specification Section 13330 in its entirety issued as part of this addendum.

Specification Section 15100:

1. **Delete** the text in paragraph 2.12, D, 1, (a) that reads:

“... 460 volt three-phase ...”

Insert the following new text into paragraph 2.12, D, 1, (a) in its place:

“... 120 volt, single-phase ...”

Specification Section 15181:

1. **Insert** the following new paragraph 1.01, C that reads:

“Refer to Specification Section 13310 for lightning and surge protection requirements for field instruments.”

Specification Section 15191:

1. **Delete** the text in paragraph 2.05, F that reads:

“...provided under Specification Section 13310.”

Specification Section 16050:

1. **Delete** paragraph 1.02, A through D.

Insert the following new paragraphs 1.02, A through F in its place:

- “A. Permanent electrical power shall be provided by Duke Energy-Florida (DEF) at the voltages indicated on the drawings. The existing DEF pad mounted transformer shall be utilized for the new electrical service as shown on Drawings E-6 and E-13.
- B. The CONTRACTOR shall be responsible for all coordination with DEF. The CONTRACTOR shall include \$2,000.00 in his bid for any DEF costs associated with connection of the new service conductors to the existing DEF pad mounted transformer and disconnection of existing service conductors from the existing DEF pad mounted transformer.
- C. The CONTRACTOR shall schedule all power interruptions with DEF and the OWNER. All interruptions shall have OWNER approval and 48 hour notification.
- D. Furnish and install the new conduits and wire as required to extend the new service to the new service entrance equipment as shown on the Drawings.
- E. The existing electrical service, existing service entrance equipment, feeders and loads shall temporarily remain in service until energization and start-up of the new electrical service equipment is complete.
- F. The DEF contact is Mr. Mitchell Bogle, phone number (407) 359-4895.”

Specification Section 16107:

1. **Delete** Specification Section 16107 in its entirety.

Insert Revised Specification Section 16107 in its entirety issued as part of this addendum.

Specification Section 16108:

1. **Insert** the following new paragraphs 2.01, G, H, and I that reads:

“G. Detectable Polyethylene Warning Tape:

1. Warning tape shall be 5 mil red polyethylene film, 6 inch minimum width. Tape shall be capable of being detected by either conductive or inductive location techniques.
2. Warning tape shall be Mutual Industries Part No. 17774 or equal.

H. Equipment Mounting Stands:

1. Mounting stands shall be custom fabricated from ¼ inch 316 stainless steel plate and 3-inch stainless steel channel, unless otherwise shown on the drawings.
2. All hardware shall be 316 stainless steel.

I. Break-Glass Emergency (Shunt Trip) Stations:

1. Break-Glass Emergency Station shall be of the break glass design with a weatherproof cast metal outer case finished in fire red and have an attached chain hung “Hammer”. A glass panel shall be mounted in front of the push button operator. Switch contacts shall be 1-open, 1-closed, rated 10 amps, 600 Volts.
2. Emergency stations shall be NEMA 4X stainless steel heavy-duty type.”

Specification Section 16110:

1. **Delete** the text in paragraph 1.02, A, 2 that reads:

“2. Instrumentation circuits (4-20 mA signal wire) and VFD power circuits above ground in dry non-corrosive areas shall be installed in GRS conduit.”

Insert the following new text into paragraph 1.02, A, 2 in its place:

“2. Instrumentation circuits (4-20 mA signal wire) above ground in dry non-corrosive areas shall be installed in GRS conduit.”

2. **Delete** the text in paragraph 1.02, A, 3 that reads:

“3. Instrumentation circuits (4-20 mA signal wire) and VFD power circuits underground or in non-corrosive areas shall be installed in PVC coated GRS conduit.”

Insert the following new text into paragraph 1.02, A, 3 in its place:

“3. Instrumentation circuits (4-20 mA signal wire) above ground in dry non-corrosive areas shall be installed in GRS conduit.”

3. **Insert** the following new paragraph 1.02, A, 4, renumbering subsequent paragraphs accordingly:

- “4. Above ground VFD output power cable shall be installed in aluminum conduit. Below ground VFD output power cable shall be installed in schedule 80 PVC conduit.”

Specification Section 16120:

1. **Delete** the text in paragraph 1.03, B that reads:

“... power motor ...”

Insert the following new text into paragraph 1.03, B in its place:

“... non-VFD power motor ...”

2. **Insert** the following new paragraph 1.03, C, renumbering subsequent paragraphs accordingly:

“C. Wire for all VFD output power cable shall be type XLPE RHH/RHW-2. See section 2.03 of this specification for additional requirements.”

3. **Insert** the following new paragraph 2.03, renumbering subsequent paragraphs accordingly:

“2.03 Variable Frequency Drive (VFD) Output Power Cable:

A. Section applies to power cables routed between the output of VFD's and motor terminals.

B. Cable shall be rated for 2000 volts and shall meet the requirements below:

1. Conductors shall be stranded Class B bare copper.
2. All wire shall be brought to the job in unbroken packages and shall bear the data of manufacturing; not older than 12 months.
3. Type of wire shall be XLPE RHH/RHW-2 rated 90 degrees C suitable for wet locations.
4. Provide overall 5 millimeter metallic shield (copper tape shield) overlapped 50%.
5. No wire smaller than No. 12 gauge shall be used unless specifically indicated.
6. Cable construction shall consist of three insulated current-carrying phase conductors and three bare ground conductors, symmetrically placed between the phase conductors, and twisted beneath a continuous overall PVC polymeric jacket.

C. Each ground conductor size (circular mil area) shall be one-third (1/3) of the NEC required size (circular mil area) for a single ground conductor. If one third of the required circular mil area does not correspond to a standard size (circular mil area) of construction, the next largest size of standard construction shall be used. All conductors shall be megger tested after installation and insulation must be in compliance with the Insulated Power Cable Engineers Association Minimum Values of Insulation Resistance.

D. Manufacturers:

1. General Cable
2. Southwire
3. Approved Equal.”

Specification Section 16160:

1. **Delete** the text in paragraph 2.03, B, 4 that reads:

“... 120/208V ...”

Insert the following new text into paragraph 2.03, B, 4 in its place:

“... 120/208V and 120/240V ...”

2. **Insert** the following new paragraph 2.03, C, 5 that reads:

“5. Panelboards installed in the Ion Exchange covered area shall be NEMA 4X 316 stainless steel. Panelboards installed in the Electrical Building shall be NEMA 1.”

3. **Insert** the following new paragraph 2.03, E, 2 that reads:

“2. 120/240V, single phase, 3-wire, and 120/208V 3-phase, 4-wire panelboards shall be type NLAB as manufactured by the General Electric Company, Square D Co., Type NQOB, or approved equal.”

Specification Section 16216:

1. **Insert** the following new paragraph 1.01, D renumbering subsequent paragraphs accordingly:

“D. Prior to demolition of the existing emergency generator, the Contractor shall furnish and install a temporary trailer mounted portable diesel engine driven generator, 277/480 volt, 3-phase, 4-wire WYE, with required fuel. The portable generator shall be capable of starting two (2)-150HP high service pumps, one (1)-50HP well pump, one (1)-30HP well pump and 50 KVA of miscellaneous loads. The portable generator shall be connected to the existing automatic transfer switch in the existing High Service Pump Building immediately after the disconnection of the existing generator. Location on site shall be coordinated with the Owner. Contractor shall furnish and install a minimum of 100ft of cabling for connection from the portable generator to the existing automatic transfer switch.”

2. **Delete** paragraph 2.04, A in its entirety.

Insert the following new paragraph 2.01, A in its place:

“A. Refer to Specification Sections 15191 and 15600 for fuel oil piping and generator fuel storage system requirements.”

3. **Delete** the text in paragraph 2.06, I, 1 that reads:

“... 30 amp ...”

Insert the following new text into paragraph 2.06, I, 1 in its place:

“... 60 amp ...”

4. **Delete** paragraph 2.07, A that reads:

“A. Refer to “Generator Fuel System” specification for above ground fuel tank and fuel monitoring system requirements.

Insert the following new paragraph 2.07, A in its place:

“A. Refer to Specification Section 15600 for generator fuel storage system requirements.”

Specification Section 16265:

1. **Delete** Specification Section 16265 in its entirety.

Insert Revised Specification Section 16265 in its entirety issued as part of this addendum.

Specification Section 16370:

1. **Insert** new Specification Section 16370 in its entirety issued as part of this addendum.

Specification Section 16402:

1. **Insert** new Specification Section 16402 in its entirety issued as part of this addendum.

Specification Section 16921:

1. **Delete** the text in paragraph 2.03, B, 1 that reads:

“... 60,000 amperes ...”

Insert the following new text into paragraph 2.03, B, 1 in its place:

“... 65,000 amperes ...”

B. CONTRACT DRAWINGS:

1. **Delete** Sheets E-1, E-3, E-4, E-5, E-6, E-7, E-8, E-9, E-10, E-11, E-12, E-13, E-14, E-15, E-16, E-17, E-18, E-19, E-20, E-23, E-24, E-25, E-26, E-27, E-28, , E-29, E-30, H-2, I-2, I-3 and I-4 in their entirety.

Insert Revised Sheets E-1, E-3, E-4, E-5, E-6, E-7, E-8, E-9, E-10, E-11, E-12, E-13, E-14, E-15, E-16, E-17, E-18, E-19, E-20, E-23, E-24, E-25, E-26, E-27, E-28, E-29, E-30, H-2, I-2, I-3 and I-4 in their entirety issued as part of this addendum.

C. RESPONSES TO BIDDERS:

1. Florida Design Contractors, RFI dated February 22, 2016:

Comment No. 7: E-5 & E-6 call for removal and replacement of the DEF electrical service and meter. Will the City pay for all the fees incurred by DEF? If this is to be the responsibility of the Contractor, please include a DEF Allowance.

Response No. 7: Contractor shall include \$2000.00 in his bid for any associated DEF costs. Please refer to Specification Section 16050 changes included as part of this addendum.

Comment No. 8: E-12 & E-13 call for removal of the existing generator and construction of the new electrical room. Will a temporary generator be required onsite for this work? If so, who will be responsible for providing the temporary generator and fuel? WE recommend this be provided by the City or an Allowance be provided because the generator will only be used in unknown outages.

Response No. 8: Yes, the Contractor is required to provide temporary trailer mounted generator and fuel. Please refer to Specification Section 16216 changes included as part of this addendum.

2. Tonka Water, RFI dated February 24, 2016:

Comment No. 1: Section 11700, 2.14.A of the spec states "Ion Exchange system is to be supplied with a single control panel...", yet Section 13315, 1.03 C & F contradicts this and requires a Process Control Panel (PCP-2) and Remote Control Panel (RCP2A).

Response No. 1: Specifications revised in this addendum to reflect two panels, PCP-2 in the Electrical Building and RCP-2A at the process equipment (Ion Exchange Building).

Comment No. 2: Looking to the drawings, it is also confusing. Sheet M-1 has PCP-2 located in the same location where the RCP-2A is located in Sheet E-17 (detail).

Response No. 2: RCP-2A is located as shown on sheet E-17.

Comment No. 3: Please clarify if the anion exchange supplier is to provide one (1) control panel, or two (2) control panels.

Response No. 3: Specifications revised in this addendum to reflect two panels, PCP-2 in the Electrical Building and RCP-2A at the process equipment (Ion Exchange Building).

3. Tonka Water, RFI dated February 29, 2016:

Comment No. 1: On sheet M-4, PCP-2 is shown as wall mounted, yet on Specification 13315-2 the PCP-2 is specified as free-standing. There will be minimal equipment in this enclosure and it could

likely be wall mounted. PCP-2 is also shown on E-13 in the Electrical Building. Can you clarify?.

Response No. 1: Specifications revised in this addendum to reflect wall-mounted NEMA 12 enclosure for PCP-2.

4. Revere Control, RFI dated February 29, 2016:

Comment No. 1: Please confirm loop no. FQIT-0045 on drawing I-2 is an existing flowmeter.

Response No. 1: Confirmed, loop no. FQIT-0045 is an existing flowmeter.

Comment No. 2: There appears to be some instruments on drawing I-3 & I-4 which are not referenced in specifications section 13310 and lay outside of the dashed lines indicating equipment furnished under section 11700. Please advise regarding the following instruments not included in 13310.

*Loop 2155 magmeter
Loop 8410 level transmitter (pressure)
Loop 8411 submersible level sensor
Loop 7131 submersible level sensor
Loop 7132 submersible level sensor
Loop 7150 magmeter*

Response No. 2: Loop 2155 magmeter. As noted on sheet I-3, this instrument is furnished under Specification Section 11700.

Loop 8410 level transmitter (pressure). This instrument is a salt level detector furnished under Specification Section 11700.

Loop 8411 submersible level sensor. As noted on sheet I-3, this instrument is furnished under Specification Section 11700.

Loop 7131 submersible level sensor. This instrument is furnished under Specification Section 11700.

Loop 7132 submersible level sensor. This instrument is furnished under Specification Section 11700.

Loop 7150 magmeter. This instrument is furnished under specification Section 15181.

Comment No. 3: Please confirm loop no. LE/LIT-9101 and 9201 on drawing I-4 is to be furnished by the section 16216 diesel engine generator system supplier.

Response No. 3: Loop numbers LE/LIT-9101 and 9201 are being furnished under section 15600.

5. Revere Control, RFI dated March 02, 2016:

Comment No. 1: Table 13326-4 lists the I/O for 'RIO-2A', please confirm this I/O is for RCP-2A, advise if otherwise.

Response No. 1: Confirmed. RIO-2A is the remote I/O drop contained within RCP-2A and is furnished under Specification Section 11700.

Comment No. 2: Please confirm PLC-2 doesn't have any Ethernet I/O, advise if otherwise.

Response No. 2: Confirmed. PLC-2 is furnished under Specification Section 11700.

*Comment No. 3: Section 13300, part 1.03E, subsection 3 suggests panel RCP-2A is supplied under division 11.
Section 13300, part 1.03F, subsection 1C suggests panel PCP-2 is supplied under section 11700.
Please confirm panels RCP-2A and PCP-2 are furnished under division 11.*

Response No. 3: Confirmed. These panels are furnished under Specification Section 11700.

6. LBS Power, RFI dated March 02, 2016:

Comment No. 1: Our company has reviewed the specifications on this project, and in regards to UPS systems, it states that Eaton supplies or its' approved equal will be supplied. Do you have approved equals already defined, if not, how do we become approved? I left a message with reception, just wanted to follow-up and reach to let you know we are interested. Thank you for your time, and I look forward to hearing from you.

Response No. 1: LBS Power is not approved.

END OF ADDENDUM No. 2

SECTION 13330**PROCESS INSTRUMENTATION AND CONTROL SYSTEM****TELEMETRY SYSTEM****PART 1 GENERAL****1.01 Scope of Work**

- A. This Specification Section covers work related to the provision and installation of a communications infrastructure linking the Winter Springs Water Treatment Plant No. 1 (WTP) with remote raw water wells and existing lift stations. This comprises the following elements:
1. Provision of a new antenna cable between the existing lift station antenna and the existing lift station master radio relocated from the WTP No. 1 High Service Pump Building - Control Room to the new Process Control Panel No. 1 (PCP-1) in the new Electrical Building.
 2. Provision of new 902/928 MHz FHSS radio telemetry links between PCP-1 and the two remote raw water wells nos. 2E and 4E.
 3. Installation of antenna masts and appurtenances at WTP No. 1 and each raw water well to support the new telemetry links.
 4. Performance of a radio survey to confirm the viability of the new telemetry links.
- B. The SYSTEM SUPPLIER defined in Specification Section 13300 shall conduct a radio path survey for the two links between the WTP and the remote raw water wells in accordance with the requirements defined in part 3 hereof.
- C. In the Contract Price, the CONTRACTOR shall provide for equipment necessary to support the antennae at a height of twenty (20) feet at each location. Should the radio survey determine a different height is required at any of the three locations, the CONTRACTOR shall submit a Change Order Request for approval.
- D. The foundation and mast designs complete with all appurtenances shall be certified as compliant with applicable codes by a Florida-registered Professional Engineer.

1.02 Related Work

- A. Specification Section 13300 defines general requirements applicable to the Work.

- B. Specification Section 13325 defines the equipment to be interconnected by the telemetry system.
- C. Division 16 - Electrical. All conduits are provided and installed under Division 16, Electrical.

1.03 Submittals

- A. Furnish, as prescribed under the General Requirements, all required submittals covering the items included under this section.
- B. Submit complete, neat, orderly, and indexed submittal packages. Handwritten diagrams are not acceptable and all documentation submittals shall be made using CADD generated utilities as specified herein.
- C. Partial submittals or submittals that do not contain sufficient information for complete review or are unclear will not be reviewed and will be returned by the ENGINEER as not approved.
- D. Provide all shop drawing submittals on disk in PDF format.
- E. Submit a radio path field survey report for the new telemetry links and, as a minimum, containing the following:
 - 1. Description of test apparatus used, including model number and configuration of radio transceivers.
 - 2. The latitude and longitude of each site.
 - 3. Photographs of site vicinity in direction of the other site.
 - 4. Date, time and prevailing weather conditions for the test.
 - 5. Path length and RSSI readings for the path.
 - 6. Recommended antenna height for each location.
- F. Provide a communications equipment submittal complete with data sheets and installation details covering the equipment and appurtenances to be furnished hereunder.
- G. Provide an antenna mast submittal providing construction and installation drawings for each location. The drawings shall be stamped by a Florida registered Professional Engineer.

1.04 Standards

- A. The design, testing, assembly, and methods of installation of the wiring materials, electrical equipment and accessories proposed under this Contract shall conform

to the National Electrical Code and to applicable state and local requirements. UL listing and labeling shall be adhered to under this Contract.

- B. Any equipment that does not have a UL, FM CSA, or other approved testing laboratory label shall be furnished with a notarized letter signed by the supplier stating that the equipment furnished has been manufactured in accordance with the National Electric Code and OSHA requirements.
- C. Any additional work needed resulting from any deviation from codes or local requirements shall be at no additional cost to the OWNER.

1.05 Warranty and Guarantee

- A. The CONTRACTOR shall furnish to the OWNER a written two year guarantee commencing with substantial completion, that all equipment and parts thereof, material and/or workmanship are of top quality and free from defects.

PART 2 PRODUCTS

2.01 Antenna Mast

- A. The mast shall be self-supporting and triangular in cross-section. It shall comprise three main elements:
 - 1. Base section.
 - 2. Standard sections as required to ensure the antenna meets the requirements of the radio survey.
 - 3. Top section with pole.
- B. Each section shall be constructed from three 1-1/2 inch diameter, 11 GA steel tubing side rails interconnected with continuous 7/16- inch diameter solid steel zig-zag bracing. The sections shall be hot dip galvanized following fabrication.
- C. The base section shall be 5 feet and embedded into a suitably sized concrete foundation. Provide Rohn SSB55 or approved equal.
- D. Standard sections shall be 10 feet. Provide Rohn 55G or approved equal.
- E. The top section shall be 7 feet including a 2 3/8-inch O.D. pole. Provide Rohn 55TDM2S3KD or approved equal.
- F. The sections shall connect to each other by double bolted joints.
- G. All masts shall be equipped with a climber safety device.

2.02 Antenna Cable

- A. Antenna cable for the new well telemetry links shall meet the following requirements:
1. Nominal diameter: 1/2 inch.
 2. Jacket material: PE.
 3. Dielectric material: Foam PE.
 4. Impedance: 50 ohms.
 5. Attenuation at 900 MHz: less than 2.18 dB/100 feet.
 6. Andrews Heliax LDF4-50A or approved equal.
- B. Antenna cable for the relocated master lift station radio shall meet the following requirements:
1. Nominal diameter: 7/8 inch.
 2. Jacket material: PE.
 3. Dielectric material: Foam PE.
 4. Impedance: 50 ohms.
 5. Attenuation at 900 MHz: less than 1.23 dB/100 feet.
 6. Andrews Heliax LDF5-50A or approved equal.

2.03 Antenna

- A. Antennae at the two (2) raw water well sites shall meet the following requirements:
1. 890-960 MHz Yagi directional.
 2. Impedance: 50 ohm.
 3. Polarization: Linear.
 4. Gain: 12 dBd.
 5. Weidmuller WI-ANT-900MHZ-12DB-2' or approved equal.
- B. Antenna at the WTP shall meet the following requirements:
1. 902/928 MHz band omni-directional.
 2. Impedance: 50 ohm.
 3. Polarization: Vertical.
 4. Gain: 7 dB.
 5. Weidmuller WI-ANT-900MHZ-7DB or approved equal.

2.04 Antenna Cable Surge Suppressors:

- A. Flange mounted, DC block, single transmitter coaxial lightning protection for 125MHZ to 1GHZ with N-Female connectors.
- B. Surge: Rated 20kA.
- C. Manufacturer/model:
 - 1. In-line surge suppressor-Polyphaser IS-50NX-C2
 - 2. Approved equal

PART 3 EXECUTION**3.01 Radio Survey**

- A. Prior to ordering the antenna mast or certifying mast installation, perform a radio path field survey to confirm the viability of a 902/928 MHz band path between the WTP and each of the two raw water wells with the antenna at 20 feet above ground level at each location.
- B. In performing the survey, use the same communication equipment that will be furnished for the link.
- C. If the RSSI under the proposed operating conditions is insufficient to provide a minimum of 20 dB fade margin, modify the operating conditions and/or antenna height until a sufficiently viable path is determined.
- D. Document all field measurements in the report defined in Part 1 hereof.

3.02. Installation and set-up

- A. Install materials and equipment in a workmanlike manner utilizing craftsmen skilled in the particular trade. Provide work which has a neat and finished appearance.
- B. Install antenna mast in accordance with the approved, P.E. certified design drawings.
- C. Tie the antenna cable to a supporting leg of the mast using stainless steel tie wraps at least every 4 feet.

- D. Install the following miscellaneous components as shown on sheet E-30 of the Contract Drawings:
1. Cable sheath grounding kits at the top and bottom of the masts.
 2. Surge protectors at the base of the mast and where the cable terminates at the control panel.

END OF SECTION

SECTION 16107**SWITCHBOARDS – LOW VOLTAGE GROUP MOUNTED FEEDERS****PART 1 GENERAL****1.01 Scope**

- A. The Contractor shall furnish and install, where indicated, a free-standing, dead-front type low voltage distribution switchboard, utilizing group mounted circuit protective devices as specified herein, and as shown on the contract drawings.

1.02 References

- A. The low voltage distribution switchboards and all components shall be designed, manufactured and tested in accordance with the latest applicable following standards:
1. ANSI/NFPA 70 - National Electrical Code (NEC).
 2. ANSI/IEEE C12.1 - Code for Electricity Metering.
 3. ANSI C39.1 - Electrical Analog Indicating Instruments.
 4. ANSI C57.13 - Instrument Transformers.
 5. NEMA AB 1 - Molded Case Circuit Breakers and Molded Case Switches.
 6. NEMA KS 1 - Enclosed Switches.
 7. NEMA PB 2 - Deadfront Distribution Switchboards, File E8681
 8. NEMA PB 2.1 - Proper Handling, Installation, Operation and Maintenance of Deadfront Switchboards Rated 600 Volts or Less.
 9. NEMA PB 2.2 - Application Guide for Ground Fault Protective Devices for Equipment.
 10. UL 50 - Cabinets and Boxes.
 11. UL 98 - Enclosed and Dead Front Switches.
 12. UL 489 - Molded Case Circuit Breakers.
 13. UL 891 - Dead-Front Switchboards.
 14. UL 943 - Ground Fault Circuit Interrupters.
 15. UL 1053 - Ground-Fault Sensing and Relaying Equipment.
 16. UL 977 - Fused Power Circuit Devices.

1.03 Submittals – For Review/Approval

- A. The following information shall be submitted to the Engineer:
1. Master drawing index
 2. Front view elevation
 3. Floor plan
 4. Top view
 5. Single line

6. Schematic diagram
 7. Nameplate schedule
 8. Component list
 9. Conduit entry/exit locations
 10. Assembly ratings including:
 - a. Short-circuit rating
 - b. Voltage
 - c. Continuous current
 11. Major component ratings including:
 - a. Voltage
 - b. Continuous current
 - c. Interrupting ratings
 12. Cable terminal sizes
 13. Product data sheets
- B. Where applicable, the following additional information shall be submitted to the Engineer:
1. Busway connection
 2. Connection details between close-coupled assemblies
 3. Composite floor plan of close-coupled assemblies
 4. Key interlock scheme drawing and sequence of operations

1.04 Submittals – For Construction

- A. The following information shall be submitted for record purposes:
1. Final as-built drawings and information for items listed in Paragraph 1.04, and shall incorporate all changes made during the manufacturing process
 2. Wiring diagrams
 3. Certified production test reports
 4. Installation information
 5. Seismic certification and equipment anchorage details as specified

1.05 Qualifications

- A. The manufacturer of the assembly shall be the manufacturer of the major components within the assembly.
- B. For the equipment specified herein, the manufacturer shall be ISO 9001 or 9002 certified.
- C. The manufacturer of this equipment shall have produced similar electrical equipment for a minimum period of five (5) years. When requested by the Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

1.06 Regulatory Requirements

- A. The low-voltage switchboard shall be UL labeled.

1.07 Delivery, Storage and Handling

- A. Equipment shall be handled and stored in accordance with manufacturer's instructions. One (1) copy of these instructions shall be included with the equipment at time of shipment.

1.08 Operation and Maintenance Manuals

- A. Equipment operation and maintenance manuals shall be provided with each assembly shipped and shall include instruction leaflets, instruction bulletins and renewal parts lists where applicable, for the complete assembly and each major component.

PART 2 PRODUCTS**2.01 Manufacturers**

- A. Eaton Cutler-Hammer
- B. Square D
- C. GE Energy

The listing of specific manufacturers above does not imply acceptance of their products that do not meet the specified ratings, features and functions. Manufacturers listed above are not relieved from meeting these specifications in their entirety. Products in compliance with the specification and manufactured by others not named will be considered only if pre-approved by the Engineer.

2.02 Ratings

- A. The assembly shall be rated to withstand mechanical forces exerted during short-circuit conditions when connected directly to a power source having available fault current 65,000 amperes symmetrical at rated voltage.
- B. Voltage rating to be as indicated on the drawings.

2.03 Construction

- A. Switchboard shall consist of the required number of vertical sections bolted together to form a rigid assembly. The sides and rear shall be covered with

removable bolt-on covers. All edges of front covers or hinged front panels shall be formed. Provide adequate ventilation within the enclosure.

- B. All sections of the switchboard shall be front and rear aligned with depth as shown on the drawings. All protective devices shall be group mounted. Devices shall be front removable and load connections front accessible enabling switchboard to be mounted against a wall.

2.04 Bus

- A. All bus bars shall be silver-plated copper. Main horizontal bus bars shall be mounted with all three phases arranged in the same vertical plane. Bus sizing shall be based on NEMA standard temperature rise criteria of 65 degrees C over a 40 degrees C ambient.
- B. Provide a full capacity neutral bus where a neutral bus is indicated on the drawings.
- C. A copper ground bus (minimum 1/4 x 2 inch) shall be furnished firmly secured to each vertical section structure and shall extend the entire length of the switchboard.
- D. All hardware used on conductors shall be high-tensile strength and zinc-plated. All bus joints shall be provided with conical spring-type washers.

2.05 Wiring/Terminations

- A. Small wiring, necessary fuse blocks and terminal blocks within the switchboard shall be furnished as required. Control components mounted within the assembly, such as fuse blocks, relays, pushbuttons, switches, etc., shall be suitably marked for identification corresponding to appropriate designations on manufacturer's wiring diagrams.
- B. Mechanical-type terminals shall be provided for all line and load terminations suitable for copper or aluminum cable rated for 75 degrees C of the size as indicated on the drawings.
- C. Lugs shall be provided in the incoming line section for connection of the main grounding conductor. Additional lugs for connection of other grounding conductors shall be provided as indicated on the drawings.
- D. All control wire shall be type SIS, bundled and secured with nylon ties. Insulated locking spade terminals shall be provided for all control connections, except where saddle type terminals are provided integral to a device. All current transformer secondary leads shall first be connected to conveniently accessible short-circuit terminal blocks before connecting to any other device. All groups of

control wires leaving the switchboard shall be provided with terminal blocks with suitable numbering strips. Provide wire markers at each end of all control wiring.

2.06 Accessories

- A. Provide shunt trips, bell alarms and auxiliary switches as shown on the contract drawings.

2.07 Miscellaneous Devices

- A. Control power transformers with primary and secondary protection shall be provided, as indicated on the drawings, or as required for proper operation of the equipment.

2.08 Customer Metering

- A. SHALL be Eaton Power Xpert 8000, Square D PowerLogic PM8244, or GE Multilin PQMII.

2.09 Enclosures

- A. NEMA 1 Enclosure.

2.10 Nameplates

- A. Engraved nameplates, mounted on the face of the assembly, shall be furnished for all main and feeder circuits as indicated on the drawings. Nameplates shall be laminated plastic, black characters on white background. Characters shall be 3/16-inch high, minimum. Nameplates shall give item designation and circuit number as well as frame ampere size and appropriate trip rating. Furnish master nameplate giving switchboard designation, voltage ampere rating, short-circuit rating, manufacturer's name, general order number, and item number.
- B. Control components mounted within the assembly, such as fuse blocks, relays, pushbuttons, switches, etc., shall be suitably marked for identification corresponding to appropriate designations on manufacturer's wiring diagrams.

2.11 Finish

- A. All exterior and interior steel surfaces of the switchboard shall be properly cleaned and provided with a rust-inhibiting phosphatized coating. Color and finish of the switchboard shall be ANSI 61 light gray.

2.12 Surge Protective Device

- A. Provide surge protective device integral to the switchboard as shown on the electrical drawings.
- B. All shall comply with UL1449 3rd edition.

PART 3 EXECUTION**3.01 Factory Testing**

- A. The following standard factory tests shall be performed on the equipment provided under this section. All tests shall be in accordance with the latest version of ANSI and NEMA standards.

The switchboard shall be completely assembled, wired, adjusted, and tested at the factory. After assembly, the complete switchboard will be tested for operation under simulated service conditions to ensure the accuracy of the wiring and the functioning of all equipment. The main circuits shall be given a dielectric test of 2200 volts for one (1) minute between live parts and ground, and between opposite polarities. The wiring and control circuits shall be given a dielectric test of 1500 volts for one (1) minute between live parts and ground.

- B. The manufacturer shall provide three (3) certified copies of factory test reports.

3.02 Manufacturer's Certification

- A. A certified test report of all standard production tests shall be available to the Engineer upon request.

3.03 Installation

- A. The Contractor shall install all equipment per the manufacturer's instructions, contract drawings and National Electrical Code.
- B. The assembly shall be provided with adequate lifting means and shall be capable of being moved into installation position and bolted directly to the floor is level to 1/8 inch per 3-foot distance in any direction. All necessary hardware to secure the assembly in place shall be provided by the Contractor.

3.04 Field Adjustments

- A. The Contractor shall perform field adjustments of the protective devices as required to place the equipment in final operating condition. The settings shall be

SECTION 16265

STATIC UNINTERRUPTIBLE POWER SUPPLY – SINGLE PHASE (15KVA)

PART 1- GENERAL

1.01 Scope

- A. The Contractor shall furnish and install a single-phase continuous duty, on-line, double conversion, solid-state uninterruptible power system, hereafter referred to as the UPS with a minimum battery backup time of 18 minutes. The UPS shall operate in conjunction with the building electrical system to provide power conditioning, back-up and distribution for critical electrical process instrumentation loads as shown on the electrical drawings. The UPS shall consist of the UPS module, batteries or other DC storage systems, and accessory cabinets for maintenance bypass and distribution applications, and other features as described in this specification.

1.02 Related Sections

1.03 System Description

The UPS system will include a minimum of (1) rectifier, (1) inverter, (1) static bypass, (1) maintenance bypass, (1) battery system and associated control and monitoring panel.

- A. Components:
 - 1. Rectifier
 - 2. Inverter
 - 3. Sealed Lead Acid Batteries
 - 4. Battery Charger
 - 5. Automatic Bypass
 - 6. User Interface Panel
 - 7. Serial (RS-232) Communication Interface
 - 8. Communication Card Slots (2)
 - 9. Relay Output Contact (2)

10. Environmental Inputs (2)
 11. Hardwired Input, Output
 12. External Matching Battery Cabinets
 13. Maintenance Bypass Module
 - a. MBP internal to UPS module
 14. SNMP/Web Adapter
- B. Modes of Operation: The UPS shall operate as an online, double-conversion UPS with the following modes:
1. Normal During the Normal or Double-conversion Mode the rectifier shall derive power as needed from the commercial AC utility or generator source and supply filtered and regulated DC power to the online inverter. The inverter shall convert the DC power to highly regulated and filtered AC power for the critical loads.
 2. Battery Upon failure of the AC input source, the critical load must continue to be supplied by the inverter without switching. The inverter must obtain its power from the battery. There must be no interruption in power to the critical load upon failure or restoration of the AC input source.
 3. Recharge Upon restoration of the AC input source, the rectifier/battery charger must recharge the battery. The inverter shall, without interruption of power, regulate the power to the critical load.
 4. Bypass: The static bypass switch must be used for transferring the critical load to the AC utility supply without interruption. Automatic re-transfer to normal operation must also be accomplished without interruption of power to the critical load. The static bypass switch must be capable of manual operation.
 5. Integral Maintenance Bypass: The maintenance bypass is used for supplying the load directly from the AC utility supply, while the UPS is isolated for maintenance or repair.

1.04 References

A. The UPS and all components shall be designed, manufactured and tested in accordance with the latest applicable standards of NEMA and UL as follows. Where a conflict arises between these documents and statements made herein, the statements in this specification shall govern.

1. Safety

- a. IEC 62040-1-1 or EN 62040-1-1
- b. EN 60950
- c. UL 1778

2. Emission and Immunity:

- a. EN 50091-2 (Emissions Class A and Harmonics)
- b. EN61000-4-2,-3,-4,-5 - Slow high energy surges in input/output lines: 1 kV. line/earth, 0.5 kV line/line (IEC 61000-4-5) - Fast low energy transients in power lines: 2 kV. line/earth (IEC 61000-4-4) - Fast low energy transients (burst) in control and signal lines: 1 kV line/earth (IEC 61000-4-4) - Electrostatic discharge (ESD): 8 kV air discharge, 6 kV contact discharge (IEC 61000-4-2) - Electromagnetic field: IEC 61000-4-3 level 3
- c. FCC Class A15J

B. Markings

1. UL, cUL, and NOM

1.05 Submittals – For Review/Approval

A. Submit one copy of a concise operation and maintenance manual.

1.06 Submittals – For Construction

A. Submit one copy of a concise operation and maintenance manual.

1.07 Qualifications

A. The manufacturer of the unit shall have a minimum of forty years experience in the design, manufacture and testing of Uninterruptible Power Supplies.

- B. For the equipment specified herein, the manufacturer shall be ISO 9001.
- C. Provide Seismic tested equipment as follows:
 - 1. The equipment and major components shall be suitable for and certified to meet all applicable seismic requirements of the California Building Code (CBC) through zone 4 application.

1.08 Regulatory Requirements

- A. The UPS shall be UL labeled.

1.09 Delivery, Storage And Handling

- A. Equipment shall be handled and stored in accordance with manufacturer's instructions. One (1) copy of these instructions shall be included with the equipment at time of shipment.

1.10 Operation And Maintenance Manuals

- A. Equipment operation and maintenance manuals shall be provided with each assembly shipped and shall include instruction leaflets, instruction bulletins and renewal parts lists where applicable, for the complete assembly and each major component, products.

1.11 Manufacturers

- A. Eaton – Powerware, Schneider Electric – APC or approved equal.

1.12 Ratings

- A. System Input
 - 1. Input Voltage Operation Range
 - a. Nominal 120/240 VAC, 3-wire plus ground
 - b. +10% to –15% from nominal
 - 2. Input Frequency
 - a. 45 to 65 Hz
 - b. auto-sensing

- c. capable of 50 to 60 Hz or 60 to 50 Hz frequency conversion
 - 3. Input Power Factor: 0.99
 - 4. Input Current Distortion: 2% THD maximum at full rated linear load
 - 5. Inrush Current:
 - a. <2x branch rating without input transformer
 - b. <5x branch rating with input transformer
 - 6. Surge Protection:
 - a. Line to Line 180J
 - b. Line to Ground 450J
- B. System Output, Normal Mode -Nominal Output Voltage 240/120 VAC.
- 1. Voltage regulation: +/-3% of selected output voltage in steady state
 - 2. Transient Voltage Response: Meets Class 1 performance of IEC62040-3
 - 3. Voltage THD:
 - a. 2% Total Harmonic Distortion (THD) maximum phase to neutral into a maximum rated linear load (5% phase to phase)
 - b. 5% THD maximum phase to neutral into a maximum rated non-linear load (7% phase to phase)
 - 4. Nominal Frequency: 50 or 60 Hz selectable
 - 5. Frequency Regulation:
 - a. 50/60 Hz +/- 0.5 to +/- 3.0 Hz selectable, synchronized to mains, +/- 0.005 Hz free running single units
 - b. +/- 0.15 Hz parallel units
 - 6. Slew rate:
 - a. selectable to 1.0, 2.0, 3.0 Hz/s for single units,
 - b. < 0.5 Hz/s for parallel units;

- c. Generator Mode (6 / 7.5 Hz/s) for single units selectable through software parameters that can be configured via LCD and service PC interface
 - 7. Output Current: Maximum output current (at nominal output voltage) for the UPS shall be:
 - a. 15 kVA system: 63 A @ 240 V
 - 8. Current Overload Capability without Bypass:
 - a. 150% for 5 seconds
 - b. 220% for 300 ms
 - 9. Bypass:
 - a. Automatic bypass shall provide an alternate path to power in the case of overload, inverter failure or other UPS failure
 - b. Internal Maintenance Bypass can be utilized with the UPS to allow servicing of the UPS
 - c. Transfer time to and from any internal bypass shall be no-break
 - 10. Efficiency: Typical >89% while in normal mode.
- C. System Output, Battery Mode
- 1. Nominal Output Voltage: This shall be the user-selected output voltage
 - 2. Voltage Regulation: +/-1% phase to neutral of selected nominal voltage (+/-2% phase to phase)
 - 3. Transient Voltage Response
 - a. Meets Class 1 performance of IEC62040-3
 - 4. Voltage THD:
 - a. 2% Total Harmonic Distortion (THD) maximum into a maximum rated linear load
 - b. 5% THD maximum phase to neutral into a maximum rated non-linear load (7% phase to phase)

5. Frequency Regulation: +/-0.005 Hz of selected nominal frequency
6. Overload Capacity:
 - a. 150% for 5 seconds
 - b. 220% for 300 ms

1.13 Construction

- A. The UPS system shall be provided as a single-module, non-redundant system. The UPS shall be field-upgradeable for power rating 15 kVA, additional parallel capacity or for redundant operation. The system shall be configured with the following options:
 1. External Matching Battery Cabinets
 2. Several Connectivity Options
 3. Internal Maintenance Bypass Switch
- B. Converter (rectifier): Incoming power shall be filtered and converted to DC by a sine-wave rectifier. The rectifier corrects the input power factor to 0.99 and draws sinusoidal current (with less than 5% THD) from the utility. In the event of utility failure, the DC-DC converter shall be supplied power without interruption from the internal or external batteries.
 1. Overload Capacity: The converter shall be capable of supplying up to 150% of rated load for at least five (5) seconds if no bypass is available.
- C. Inverter: The inverter converts the DC power from the rectifier or converter to regulated AC power for output to critical loads.
 1. Output Voltage: The inverter output voltage is specified in section 1.12.B.
 2. Voltage Regulation: The inverter steady state voltage regulation is +/- 1% phase to neutral, 2% phase to phase. Dynamic regulation meets Class 1 performance of IEC62040-3.
 3. Frequency Control: The inverter steady state frequency regulation is +/- 0.005 Hz, free running in steady state. UPS is synchronized to Utility in normal operation.

D. Mechanical Construction

1. All materials and components of the UPS shall be new, of current manufacture, and shall not have been in prior service except as required during factory testing. The UPS shall be constructed of replaceable subassemblies. All active electronic devices shall be solid-state.
2. The UPS unit is comprised of an input rectifier, battery charger, inverter, bypass, and battery consisting of the appropriate number of sealed battery modules, and shall be housed in a single freestanding enclosure. The UPS cabinet shall be cleaned, primed, and painted with the manufacturer's standard color. Casters and leveling feet shall be provided as standard.
3. Matching external battery cabinets shall be available in different sizes.

1.14 System Input & Output Connections**A. AC Input:**

1. All UPS units shall be capable of utilizing hardwired input. Option cabinets will contain sufficient power cabling to connect to the UPS power terminals when the Option cabinets are placed adjacent to the UPS.
2. Input neutral is required for proper UPS operation unless input transformer option is used.

B. AC Output:

C. All UPS units shall be capable of utilizing hardwired output

D. Extended Battery Connector: External battery cabinets include cable to connect each battery cabinet to the UPS or daisy chain external battery cabinets.

E. Serial (RS-232) Communication Interface: A 9-pin sub-D connector shall provide capability for communicating with manufacture-supplied software package. The UPS shall also provide signals for indication of UPS alarm status.

F. (2) Communication Card Slots: The UPS shall provide (2) communication X-slots in the back of the UPS allowing for additional connectivity options, including SNMP/Web, AS/400 relays, Modbus/Jbus capabilities, etc.

G. (2) Programmable Input Connections: The UPS shall provide built-in inputs for field connection (environmental input). The inputs shall be parameter programmable to suit the needs of the application.

1.15 User Interface

- A. Front Panel Display: The UPS shall include a front panel display consisting of a graphical LCD display with backlight, four status LED's, and a four-key keypad.
 - 1. Graphical LCD display: Includes basic language (English and local selectable language), display of unit function and operating parameters. It shall be used to signify the operating state of the UPS, for indicating alarms, for changing operations control parameters and set points.
 - 2. Four status LED's, which indicate:
 - a. Alarms, with a red LED
 - b. On Battery, with a yellow LED
 - c. On Bypass, with a yellow LED
 - d. Power On, with a green LED
 - 3. Four-Key Multifunction Keypad: UPS shall have keypad to allow user to adjust UPS parameters, view alarm and inverter logs, change UPS operational modes, and turn the UPS on and off.
- B. Power Management Software Package: The UPS shall include serial communications interface that provides the following communication capabilities:
 - 1. Monitor and graphically display input and output voltage and other operating characteristics
 - 2. Notify end-users in the event of a power anomaly via network, E-mail or page.
 - 3. Communication Ports:
 - a. Communication Card Slots: The UPS shall provide (2) communication X-slots in the back of the UPS allowing for additional connectivity options, including SNMP/Web, AS/400 relays, Modbus/Jbus capabilities, etc
 - b. Serial communications (via RS-232) with manufacturer-supplied power management software package

1.16 Batteries

- A. Battery Type: Valve Regulated Lead Acid (VRLA), minimum three-year warranted float service life at 25 degrees C
- B. UPS Holdover Time (Runtime): Each UPS system, consisting of a minimum of three battery strings (32 battery blocks) for each power module shall have a minimum holdover time of 13.3 minutes, depending on kVA rating.
- C. Extended Holdover Time (Runtime): Each UPS system shall have capability for addition of extra matching battery cabinets (in two cabinet configurations) to increase the total holdover time.
- D. Battery Recharge Time:
 - 1. Base UPS system consisting of 2 (2) battery strings will have a recharge time of max. 1.45 hours to 95% usable capacity @ nominal line after a full load discharge (15 kVA).
- E. Bus Voltage: Nominal bus voltage is 192 VDC. Each string consists of 16 battery blocks in series with 9 Ah capacity.
- F. Battery Protection:
 - 1. Short Circuit Protection: Over-current protection shall protect the batteries from all short circuit fault conditions.
 - 2. Battery Module Protection: Internal battery circuit breaker shall be provided.
 - 3. Under-voltage Protection:
 - a. Inverter cutoff voltage: Battery operation shall be terminated when the battery voltage drops to the 1.7 VPC set point
 - b. Protective shutdown voltage: Inverter shall shutdown after 1 minute when the battery voltage drops below 1.7 VPC volts-per-cell typical.
 - 4. Over-voltage Protection: If the UPS system's battery bus voltage exceeds the predetermined set point then the UPS will disable the charger and alarm a high battery condition.
- G. Advanced Battery Management:

1. Battery recharge: After recharging batteries to full capacity, the charger will enter the rest mode to increase the battery lifetime according the ABM cycle. Hence, continuous float charging of the battery shall not be allowed. The active battery charger states are constant-current (charge mode), constant-voltage (float mode) and no-charge (rest mode).
2. Battery Runtime Monitoring: UPS shall monitor batteries and provide status to end user of battery runtime via front panel, serial communications, or both. Runtime calculations to be based on load demand and analysis of battery health.
3. Battery Health Monitoring: UPS shall periodically test and monitor battery health and provide warnings visually, audibly and/or serially when battery capacity falls below 80% of original capacity. Battery testing may also be user initiated via front panel or serial communications.

1.17 Nameplates

- A. Provide a printed nameplate for the UPS.

1.18 Environmental Conditions

- A. The UPS shall be certified to the following safety standards:
 1. EN 62040-1-1, IEC 62040-1-1, EN 60950
- B. The UPS shall meet CISPR22 Class A (EN50091-2) for Emissions and EN50091-2 (IEC6100032 for 16 amps or less) for Harmonics
- C. Audible Noise: Less than 57 dBA (A weighted) at one (1) meter from all sides in all system modes
- D. Ambient Temperature
 1. Operating: UPS 0 deg C to +40 deg C
 2. Storage: UPS 0 deg C to +25 deg C
- E. Relative Humidity
 1. Operating: 5 to 95% non-condensing.
 2. Storage: 5 to 95% non-condensing.
- F. Altitude

1. Operating: To 3000 meters--de-rating or reducing operating temperature range may be required for higher altitudes
 2. Transit: To 10,000 meters
- G. Electrostatic Discharge: The UPS shall be able to withstand a minimum 8 kV without damage and without affecting the critical load

PART 2 EXECUTION

2.01 Factory Testing

- A. The following standard factory tests shall be performed on the equipment provided under this section. All tests shall be in accordance with the latest version of NEMA and UL standards.
1. Standard Computer-automated UPS system test
 2. Hipot test

2.02 Installation

- A. The Contractors shall install all equipment per the manufacturer's recommendations.

2.03 Field Quality Control

- A. Provide the services of a qualified factory-trained manufacturer's representative to assist the Contractor in installation and start-up of the equipment specified under this section for a period of 2 working days. The manufacturer's representative shall provide technical direction and assistance to the Contractor in general assembly of the equipment, connections and adjustments, and testing of the assembly and components contained therein.
- B. The Contractor shall provide three (3) copies of the manufacturer's field start-up report.

2.04 Warranty

- A. All components of the UPS system shall be covered by a standard one-year limited factory warranty and service protection package.

- B. One-year limited factory warranty shall include replacement coverage for the UPS parts for a period of 18 months from shipment or 12 months from start-up, whichever occurs sooner. Labor coverage is for 90 days after product startup.
- C. One-year service protection package shall include 7x24 on-site repair/replacement labor for UPS parts and batteries; 7x24 technical support coverage; and 7x24 remote monitoring service (with monthly reports for UPS and battery performance). Standard response time shall be 8 hours from receipt of call. Manufacturer shall also offer, as an option, 7x24 on-site service support with guaranteed response times of 4, or 2 hours in certain major metropolitan areas. Additional preventive maintenance visits shall be available as an option for both UPS and battery components.
- D. Manufacturer shall also include Start-up services consisting of: 7x 24 Start-up service of UPS and batteries. On-site user training, Site Audit, installation and commissioning of monitoring service, and validation of one-year limited factory warranty will be performed during the start-up.
- E. Manufacturer shall also offer an optional service plan to provide 7x24 on-site coverage (preventive and corrective) for UPS and batteries, guaranteed response time, remote monitoring, Web access to service site history, annual Site Audit, UPS and battery preventive maintenance visit, and discounts on upgrade and modification kits. Manufacturer shall also provide a battery service plan to provide parts-and-labor coverage for partial and full battery strings, either with preventive maintenance or replacement coverage.

END OF SECTION

in accordance with the approved short-circuit study, protective device evaluation study and protective device coordination study.

- B. Necessary field settings of devices, adjustments and minor modifications to equipment to accomplish conformance with an approved short circuit and protective device coordination study shall be carried out by the Contractor at no additional cost to the owner.

END OF SECTION

SECTION 16265

STATIC UNINTERRUPTIBLE POWER SUPPLY – SINGLE PHASE (15KVA)

PART 1- GENERAL

1.01 Scope

- A. The Contractor shall furnish and install a single-phase continuous duty, on-line, double conversion, solid-state uninterruptible power system, hereafter referred to as the UPS with a minimum battery backup time of 18 minutes. The UPS shall operate in conjunction with the building electrical system to provide power conditioning, back-up and distribution for critical electrical process instrumentation loads as shown on the electrical drawings. The UPS shall consist of the UPS module, batteries or other DC storage systems, and accessory cabinets for maintenance bypass and distribution applications, and other features as described in this specification.

1.02 Related Sections

1.03 System Description

The UPS system will include a minimum of (1) rectifier, (1) inverter, (1) static bypass, (1) maintenance bypass, (1) battery system and associated control and monitoring panel.

- A. Components:
 - 1. Rectifier
 - 2. Inverter
 - 3. Sealed Lead Acid Batteries
 - 4. Battery Charger
 - 5. Automatic Bypass
 - 6. User Interface Panel
 - 7. Serial (RS-232) Communication Interface
 - 8. Communication Card Slots (2)
 - 9. Relay Output Contact (2)

10. Environmental Inputs (2)
 11. Hardwired Input, Output
 12. External Matching Battery Cabinets
 13. Maintenance Bypass Module
 - a. MBP internal to UPS module
 14. SNMP/Web Adapter
- B. Modes of Operation: The UPS shall operate as an online, double-conversion UPS with the following modes:
1. Normal During the Normal or Double-conversion Mode the rectifier shall derive power as needed from the commercial AC utility or generator source and supply filtered and regulated DC power to the online inverter. The inverter shall convert the DC power to highly regulated and filtered AC power for the critical loads.
 2. Battery Upon failure of the AC input source, the critical load must continue to be supplied by the inverter without switching. The inverter must obtain its power from the battery. There must be no interruption in power to the critical load upon failure or restoration of the AC input source.
 3. Recharge Upon restoration of the AC input source, the rectifier/battery charger must recharge the battery. The inverter shall, without interruption of power, regulate the power to the critical load.
 4. Bypass: The static bypass switch must be used for transferring the critical load to the AC utility supply without interruption. Automatic re-transfer to normal operation must also be accomplished without interruption of power to the critical load. The static bypass switch must be capable of manual operation.
 5. Integral Maintenance Bypass: The maintenance bypass is used for supplying the load directly from the AC utility supply, while the UPS is isolated for maintenance or repair.

1.04 References

A. The UPS and all components shall be designed, manufactured and tested in accordance with the latest applicable standards of NEMA and UL as follows. Where a conflict arises between these documents and statements made herein, the statements in this specification shall govern.

1. Safety

- a. IEC 62040-1-1 or EN 62040-1-1
- b. EN 60950
- c. UL 1778

2. Emission and Immunity:

- a. EN 50091-2 (Emissions Class A and Harmonics)
- b. EN61000-4-2,-3,-4,-5 - Slow high energy surges in input/output lines: 1 kV. line/earth, 0.5 kV line/line (IEC 61000-4-5) - Fast low energy transients in power lines: 2 kV. line/earth (IEC 61000-4-4) - Fast low energy transients (burst) in control and signal lines: 1 kV line/earth (IEC 61000-4-4) - Electrostatic discharge (ESD): 8 kV air discharge, 6 kV contact discharge (IEC 61000-4-2) - Electromagnetic field: IEC 61000-4-3 level 3
- c. FCC Class A15J

B. Markings

1. UL, cUL, and NOM

1.05 Submittals – For Review/Approval

A. Submit one copy of a concise operation and maintenance manual.

1.06 Submittals – For Construction

A. Submit one copy of a concise operation and maintenance manual.

1.07 Qualifications

A. The manufacturer of the unit shall have a minimum of forty years experience in the design, manufacture and testing of Uninterruptible Power Supplies.

- B. For the equipment specified herein, the manufacturer shall be ISO 9001.
- C. Provide Seismic tested equipment as follows:
 - 1. The equipment and major components shall be suitable for and certified to meet all applicable seismic requirements of the California Building Code (CBC) through zone 4 application.

1.08 Regulatory Requirements

- A. The UPS shall be UL labeled.

1.09 Delivery, Storage And Handling

- A. Equipment shall be handled and stored in accordance with manufacturer's instructions. One (1) copy of these instructions shall be included with the equipment at time of shipment.

1.10 Operation And Maintenance Manuals

- A. Equipment operation and maintenance manuals shall be provided with each assembly shipped and shall include instruction leaflets, instruction bulletins and renewal parts lists where applicable, for the complete assembly and each major component, products.

1.11 Manufacturers

- A. Eaton – Powerware, Schneider Electric – APC or approved equal.

1.12 Ratings

- A. System Input
 - 1. Input Voltage Operation Range
 - a. Nominal 120/240 VAC, 3-wire plus ground
 - b. +10% to –15% from nominal
 - 2. Input Frequency
 - a. 45 to 65 Hz
 - b. auto-sensing

- c. capable of 50 to 60 Hz or 60 to 50 Hz frequency conversion
 3. Input Power Factor: 0.99
 4. Input Current Distortion: 2% THD maximum at full rated linear load
 5. Inrush Current:
 - a. <2x branch rating without input transformer
 - b. <5x branch rating with input transformer
 6. Surge Protection:
 - a. Line to Line 180J
 - b. Line to Ground 450J
- B. System Output, Normal Mode -Nominal Output Voltage 240/120 VAC.
 1. Voltage regulation: +/-3% of selected output voltage in steady state
 2. Transient Voltage Response: Meets Class 1 performance of IEC62040-3
 3. Voltage THD:
 - a. 2% Total Harmonic Distortion (THD) maximum phase to neutral into a maximum rated linear load (5% phase to phase)
 - b. 5% THD maximum phase to neutral into a maximum rated non-linear load (7% phase to phase)
 4. Nominal Frequency: 50 or 60 Hz selectable
 5. Frequency Regulation:
 - a. 50/60 Hz +/- 0.5 to +/- 3.0 Hz selectable, synchronized to mains, +/- 0.005 Hz free running single units
 - b. +/- 0.15 Hz parallel units
 6. Slew rate:
 - a. selectable to 1.0, 2.0, 3.0 Hz/s for single units,
 - b. < 0.5 Hz/s for parallel units;

- c. Generator Mode (6 / 7.5 Hz/s) for single units selectable through software parameters that can be configured via LCD and service PC interface
 - 7. Output Current: Maximum output current (at nominal output voltage) for the UPS shall be:
 - a. 15 kVA system: 63 A @ 240 V
 - 8. Current Overload Capability without Bypass:
 - a. 150% for 5 seconds
 - b. 220% for 300 ms
 - 9. Bypass:
 - a. Automatic bypass shall provide an alternate path to power in the case of overload, inverter failure or other UPS failure
 - b. Internal Maintenance Bypass can be utilized with the UPS to allow servicing of the UPS
 - c. Transfer time to and from any internal bypass shall be no-break
 - 10. Efficiency: Typical >89% while in normal mode.
- C. System Output, Battery Mode
- 1. Nominal Output Voltage: This shall be the user-selected output voltage
 - 2. Voltage Regulation: +/-1% phase to neutral of selected nominal voltage (+/-2% phase to phase)
 - 3. Transient Voltage Response
 - a. Meets Class 1 performance of IEC62040-3
 - 4. Voltage THD:
 - a. 2% Total Harmonic Distortion (THD) maximum into a maximum rated linear load
 - b. 5% THD maximum phase to neutral into a maximum rated non-linear load (7% phase to phase)

5. Frequency Regulation: +/-0.005 Hz of selected nominal frequency
6. Overload Capacity:
 - a. 150% for 5 seconds
 - b. 220% for 300 ms

1.13 Construction

- A. The UPS system shall be provided as a single-module, non-redundant system. The UPS shall be field-upgradeable for power rating 15 kVA, additional parallel capacity or for redundant operation. The system shall be configured with the following options:
 1. External Matching Battery Cabinets
 2. Several Connectivity Options
 3. Internal Maintenance Bypass Switch
- B. Converter (rectifier): Incoming power shall be filtered and converted to DC by a sine-wave rectifier. The rectifier corrects the input power factor to 0.99 and draws sinusoidal current (with less than 5% THD) from the utility. In the event of utility failure, the DC-DC converter shall be supplied power without interruption from the internal or external batteries.
 1. Overload Capacity: The converter shall be capable of supplying up to 150% of rated load for at least five (5) seconds if no bypass is available.
- C. Inverter: The inverter converts the DC power from the rectifier or converter to regulated AC power for output to critical loads.
 1. Output Voltage: The inverter output voltage is specified in section 1.12.B.
 2. Voltage Regulation: The inverter steady state voltage regulation is +/- 1% phase to neutral, 2% phase to phase. Dynamic regulation meets Class 1 performance of IEC62040-3.
 3. Frequency Control: The inverter steady state frequency regulation is +/- 0.005 Hz, free running in steady state. UPS is synchronized to Utility in normal operation.

D. Mechanical Construction

1. All materials and components of the UPS shall be new, of current manufacture, and shall not have been in prior service except as required during factory testing. The UPS shall be constructed of replaceable subassemblies. All active electronic devices shall be solid-state.
2. The UPS unit is comprised of an input rectifier, battery charger, inverter, bypass, and battery consisting of the appropriate number of sealed battery modules, and shall be housed in a single freestanding enclosure. The UPS cabinet shall be cleaned, primed, and painted with the manufacturer's standard color. Casters and leveling feet shall be provided as standard.
3. Matching external battery cabinets shall be available in different sizes.

1.14 System Input & Output Connections**A. AC Input:**

1. All UPS units shall be capable of utilizing hardwired input. Option cabinets will contain sufficient power cabling to connect to the UPS power terminals when the Option cabinets are placed adjacent to the UPS.
2. Input neutral is required for proper UPS operation unless input transformer option is used.

B. AC Output:

C. All UPS units shall be capable of utilizing hardwired output

D. Extended Battery Connector: External battery cabinets include cable to connect each battery cabinet to the UPS or daisy chain external battery cabinets.

E. Serial (RS-232) Communication Interface: A 9-pin sub-D connector shall provide capability for communicating with manufacture-supplied software package. The UPS shall also provide signals for indication of UPS alarm status.

F. (2) Communication Card Slots: The UPS shall provide (2) communication X-slots in the back of the UPS allowing for additional connectivity options, including SNMP/Web, AS/400 relays, Modbus/Jbus capabilities, etc.

G. (2) Programmable Input Connections: The UPS shall provide built-in inputs for field connection (environmental input). The inputs shall be parameter programmable to suit the needs of the application.

1.15 User Interface

- A. Front Panel Display: The UPS shall include a front panel display consisting of a graphical LCD display with backlight, four status LED's, and a four-key keypad.
 - 1. Graphical LCD display: Includes basic language (English and local selectable language), display of unit function and operating parameters. It shall be used to signify the operating state of the UPS, for indicating alarms, for changing operations control parameters and set points.
 - 2. Four status LED's, which indicate:
 - a. Alarms, with a red LED
 - b. On Battery, with a yellow LED
 - c. On Bypass, with a yellow LED
 - d. Power On, with a green LED
 - 3. Four-Key Multifunction Keypad: UPS shall have keypad to allow user to adjust UPS parameters, view alarm and inverter logs, change UPS operational modes, and turn the UPS on and off.
- B. Power Management Software Package: The UPS shall include serial communications interface that provides the following communication capabilities:
 - 1. Monitor and graphically display input and output voltage and other operating characteristics
 - 2. Notify end-users in the event of a power anomaly via network, E-mail or page.
 - 3. Communication Ports:
 - a. Communication Card Slots: The UPS shall provide (2) communication X-slots in the back of the UPS allowing for additional connectivity options, including SNMP/Web, AS/400 relays, Modbus/Jbus capabilities, etc
 - b. Serial communications (via RS-232) with manufacturer-supplied power management software package

1.16 Batteries

- A. Battery Type: Valve Regulated Lead Acid (VRLA), minimum three-year warranted float service life at 25 degrees C
- B. UPS Holdover Time (Runtime): Each UPS system, consisting of a minimum of three battery strings (32 battery blocks) for each power module shall have a minimum holdover time of 13.3 minutes, depending on kVA rating.
- C. Extended Holdover Time (Runtime): Each UPS system shall have capability for addition of extra matching battery cabinets (in two cabinet configurations) to increase the total holdover time.
- D. Battery Recharge Time:
 - 1. Base UPS system consisting of 2 (2) battery strings will have a recharge time of max. 1.45 hours to 95% usable capacity @ nominal line after a full load discharge (15 kVA).
- E. Bus Voltage: Nominal bus voltage is 192 VDC. Each string consists of 16 battery blocks in series with 9 Ah capacity.
- F. Battery Protection:
 - 1. Short Circuit Protection: Over-current protection shall protect the batteries from all short circuit fault conditions.
 - 2. Battery Module Protection: Internal battery circuit breaker shall be provided.
 - 3. Under-voltage Protection:
 - a. Inverter cutoff voltage: Battery operation shall be terminated when the battery voltage drops to the 1.7 VPC set point
 - b. Protective shutdown voltage: Inverter shall shutdown after 1 minute when the battery voltage drops below 1.7 VPC volts-per-cell typical.
 - 4. Over-voltage Protection: If the UPS system's battery bus voltage exceeds the predetermined set point then the UPS will disable the charger and alarm a high battery condition.
- G. Advanced Battery Management:

1. Battery recharge: After recharging batteries to full capacity, the charger will enter the rest mode to increase the battery lifetime according the ABM cycle. Hence, continuous float charging of the battery shall not be allowed. The active battery charger states are constant-current (charge mode), constant-voltage (float mode) and no-charge (rest mode).
2. Battery Runtime Monitoring: UPS shall monitor batteries and provide status to end user of battery runtime via front panel, serial communications, or both. Runtime calculations to be based on load demand and analysis of battery health.
3. Battery Health Monitoring: UPS shall periodically test and monitor battery health and provide warnings visually, audibly and/or serially when battery capacity falls below 80% of original capacity. Battery testing may also be user initiated via front panel or serial communications.

1.17 Nameplates

- A. Provide a printed nameplate for the UPS.

1.18 Environmental Conditions

- A. The UPS shall be certified to the following safety standards:
 1. EN 62040-1-1, IEC 62040-1-1, EN 60950
- B. The UPS shall meet CISPR22 Class A (EN50091-2) for Emissions and EN50091-2 (IEC6100032 for 16 amps or less) for Harmonics
- C. Audible Noise: Less than 57 dBA (A weighted) at one (1) meter from all sides in all system modes
- D. Ambient Temperature
 1. Operating: UPS 0 deg C to +40 deg C
 2. Storage: UPS 0 deg C to +25 deg C
- E. Relative Humidity
 1. Operating: 5 to 95% non-condensing.
 2. Storage: 5 to 95% non-condensing.
- F. Altitude

1. Operating: To 3000 meters--de-rating or reducing operating temperature range may be required for higher altitudes
 2. Transit: To 10,000 meters
- G. Electrostatic Discharge: The UPS shall be able to withstand a minimum 8 kV without damage and without affecting the critical load

PART 2 EXECUTION

2.01 Factory Testing

- A. The following standard factory tests shall be performed on the equipment provided under this section. All tests shall be in accordance with the latest version of NEMA and UL standards.
1. Standard Computer-automated UPS system test
 2. Hipot test

2.02 Installation

- A. The Contractors shall install all equipment per the manufacturer's recommendations.

2.03 Field Quality Control

- A. Provide the services of a qualified factory-trained manufacturer's representative to assist the Contractor in installation and start-up of the equipment specified under this section for a period of 2 working days. The manufacturer's representative shall provide technical direction and assistance to the Contractor in general assembly of the equipment, connections and adjustments, and testing of the assembly and components contained therein.
- B. The Contractor shall provide three (3) copies of the manufacturer's field start-up report.

2.04 Warranty

- A. All components of the UPS system shall be covered by a standard one-year limited factory warranty and service protection package.

- B. One-year limited factory warranty shall include replacement coverage for the UPS parts for a period of 18 months from shipment or 12 months from start-up, whichever occurs sooner. Labor coverage is for 90 days after product startup.
- C. One-year service protection package shall include 7x24 on-site repair/replacement labor for UPS parts and batteries; 7x24 technical support coverage; and 7x24 remote monitoring service (with monthly reports for UPS and battery performance). Standard response time shall be 8 hours from receipt of call. Manufacturer shall also offer, as an option, 7x24 on-site service support with guaranteed response times of 4, or 2 hours in certain major metropolitan areas. Additional preventive maintenance visits shall be available as an option for both UPS and battery components.
- D. Manufacturer shall also include Start-up services consisting of: 7x 24 Start-up service of UPS and batteries. On-site user training, Site Audit, installation and commissioning of monitoring service, and validation of one-year limited factory warranty will be performed during the start-up.
- E. Manufacturer shall also offer an optional service plan to provide 7x24 on-site coverage (preventive and corrective) for UPS and batteries, guaranteed response time, remote monitoring, Web access to service site history, annual Site Audit, UPS and battery preventive maintenance visit, and discounts on upgrade and modification kits. Manufacturer shall also provide a battery service plan to provide parts-and-labor coverage for partial and full battery strings, either with preventive maintenance or replacement coverage.

END OF SECTION

SECTION 16370

VARIABLE FREQUENCY DRIVES

PART 1 GENERAL

1.01 Scope of Work

- A. Furnish all labor, materials, equipment and incidentals required to furnish and install variable frequency drives as shown on the Drawings and as specified herein.
- B. These specifications are intended to give a general description of what is required, but do not cover all details which will vary in accordance with the requirements of the equipment furnished. They are, however, intended to cover the furnishing, the shop testing, the delivery and complete installation and field testing, of all materials, equipment and appurtenances for the variable frequency drives herein specified.

1.02 Description of System

- A. All VFDs furnished for this project shall be the responsibility of the Contractor. The CONTRACTOR shall be responsible for complete system operation and all required coordination with all disciplines.
- B. The variable frequency drives will operate motors as specified in Division 11 and Division 16. The drives furnished herein under shall be totally compatible and adequately sized with the Motors to be supplied.
- C. High Service Pump VFDs shall be free standing. All other VFDs shall be integral to the MCC.
- D. High Service Pump VFDs shall be provided with bypass Solid State Starters (SSS) as shown on the Drawings.
- E. High Service Pump VFDs shall be provided with Ethernet communications as shown on the Drawings.

1.03 Qualifications

- A. Variable speed drives shall be sized to operate the ampacity shown on the electrical drawings. To assure unit responsibility, all equipment specified in this section of the specifications shall be furnished and coordinated by the CONTRACTOR. The CONTRACTOR shall be responsible for coordinating the sizing of all VFDs.

- B. The drives covered by these Specifications are intended to be equipment of proven ability as manufactured by reputable manufacturers having long experience in the production of identical units. The equipment furnished shall be designed, constructed and installed in accordance with the best practice and methods, and shall operate satisfactorily when installed.
- C. The variable frequency control shall operate satisfactorily when connected to a bus supplying other solid state power conversion equipment which may be causing up to 10% total harmonic voltage distortion and commutation notches up to 36,500 volt microseconds, or when other variable frequency drives are operated from the same bus.

Individual or simultaneous operation of the variable frequency drives shall not add more than 3% total harmonic voltage distortion to the normal bus, nor more than 10% while operating from standby generator (if applicable) per IEEE 519, latest edition. The load side of the utility transformer shall be the point of common coupling (PCC). The short circuit current at point of common coupling under utility operation is approximately 21,480 symmetrical amperes at 277/480 volts. A harmonic (voltage and current) analysis must be submitted by the variable frequency drive manufacturer with shop drawings. This must include all calculations; simply a statement of compliance is not acceptable. Voltage and current harmonics compliance per IEEE519 shall be verified by the variable frequency drive manufacturer with field measurements of the harmonic distortion difference at the point of common coupling with and without variable frequency drives operating. See testing requirements.

- D. The variable frequency drive manufacturer shall maintain and staff engineering service and repair shops through the United States, including the State of Florida, trained to do start up service, emergency service calls, repair work, service contracts and training of customer personnel.
- E. The variable frequency drives shall be as manufactured by Eaton Cutler-Hammer, Square "D" Company, Allen Bradley or Danfoss.

1.04 Submittals

- A. Copies of all materials required to establish compliance with the specifications shall be submitted. Submittals shall include at least the following:
 - 1. Certified shop and erection drawings showing all important details of construction, dimensions and anchor bolt locations.

2. Descriptive literature, bulletins and/or catalogs of the equipment.
3. Data on the characteristics and performance of the variable frequency drives. Data shall include certification that the variable frequency drives are warranted for use with the motors specified in Division 11 and Division 16.
4. Complete drawings shall be furnished for approval before proceeding with manufacture and shall consist of master wiring diagrams, elementary or control schematics including coordination with other electrical control devices operating in conjunction with the variable frequency drive, and suitable outline drawings with sufficient details for locating conduit stub-ups and field wiring. Generic schematics not specific to this project shall not be acceptable.
5. A list of the manufacturer's recommended spare parts with the manufacturer's current price for each item. Include gaskets, packing, etc. on the list. List bearings by the bearing manufacturer's numbers only.

1.05 Operating Instructions

- A. Three copies of the operating and maintenance manuals shall be furnished. The manuals shall be prepared specifically for this installation and shall include all required cuts, drawings, equipment lists, descriptions, etc. that are required to instruct operating and maintenance personnel unfamiliar with such equipment.
- B. A factory representative who has complete knowledge of proper operation and maintenance shall be provided for one (1) day after completion of all training to instruct representatives of the Owner on proper operation and maintenance.

1.06 Tools and Spare Parts

- A. One (1) set of all special tools required for normal operation and maintenance shall be provided. If no special tools are required then a statement to this effect shall be provided.
- B. The Contractor shall supply the following spares:
 - a. One can of touch up paint for the enclosures.
 - b. Fuses.

- c. Relays.
- d. Surge Suppressors.

1.07 Product Handling

- A. All parts shall be properly protected so that no damage or deterioration will occur during a prolonged delay from the time of shipment until installation is completed and the units and equipment are ready for operation.
- B. All equipment and spare parts must be properly protected against any damage during a prolonged period at the site.
- C. Factory assembled parts and components shall not be dismantled for shipment unless permission is received in writing from the Engineer.
- D. Each box or package shall be properly marked to show its net weight in addition to its contents.

1.08 Start-Up and Warranty

- A. A factory-authorized service technician shall perform start-up on each drive. ("Start up" shall not include installation or termination of either power or control wiring.) Start-up costs provided with the bid shall include time and travel for the estimated number of visits required, but shall not be less than at least one half-day with travel. Additional labor or return trips to the site shall be billed at the VFD supplier's published straight-time rates. The rates shall be submitted with the VFD shop drawings. Upon completion, a start-up service report shall be provided.
- B. A 5-year on-site warranty shall be provided such that the Owner is not responsible for any warranty costs including travel, labor, parts, or other costs for a full 5 years from the date of manufacture of the Drive. The warranty shall cover all Drive failures for any reason, no exceptions. The cost of the warranty shall be included by the Supplier.

PART 2 PRODUCTS

2.01 General

- A. The CONTRACTOR shall furnish complete variable frequency drive systems for installation by the Contractor. The CONTRACTOR is responsible for the start up of all VFD drives furnished on this project.

- B. The Contractor shall be responsible for the erection and installation of all equipment defined in this section of the contract documents.
- C. The variable frequency drive shall be comply with the latest applicable standards of ANSI, NEMA, IEEE, and the National Electrical Code.
- D. Variable frequency drive shall operate as specified on standby generators or normal power sources.
- E. The CONTRACTOR shall provide a listing of all programmable parameters that are different from the factory default values. For each indicate:
 - 1. The factory default and meaning
 - 2. The revised value and meaning
- F. The CONTRACTOR shall provide a copy of PC compatible remote programming/ diagnostic software and any required cables to the supplier of the control system. Refer to Division 13. The software shall be able to communicate to the VFDs via an ethernet network connection.
- G. Reduced Voltage Solid State Bypass Starter:
 - 1. Reduced voltage starter shall be combination solid state motor controller with circuit breaker.
 - 2. Starters shall be provided with isolation and full voltage bypass contactors with overloads. Selector switch shall be on inner door. AIC rating shall be 25,000 amps.
 - 3. Motor starter shall have a 120 volt operating coil, overload relay in each phase and control power transformer.
 - 4. Motor starter shall have 1 N.O. and 1 N.C. auxiliary contacts. Additional auxiliary contacts shall be furnished where shown on the Drawings or as required by the control scheme.
 - 5. Overload relays shall be adjustable and manually reset by push button in compartment door. Replaceable individual overload relay heaters of the proper size shall be installed in each phase.
 - 6. Control power transformer shall be sized for additional load where required. Transformer secondaries shall be equipped with time delay fuses.
 - 7. Motor circuit protector shall be molded case with adjustable magnetic trip only. They shall be specifically designed for use with solid state reduced voltage starters. Motor circuit protectors shall have auxiliary disconnect contacts when used with starters having external control circuits.
 - 8. The following options shall be required:

- a. Soft start
- b. Soft stop
- c. Protective module - line side of each starter

2.02 Construction

- A. Each variable frequency drive shall consist of a 460V, 3-phase rectifier, DC link and variable frequency inverter with features, functions and options as specified. The inverter shall be voltage source design using pulse width modulation (PWM) techniques.
- B. The variable frequency drives shall be designed to provide continuous speed adjustment of three-phase motors. The variable frequency output voltage shall provide constant volts-per-Hertz excitation to the motor terminals up to 60 Hertz.
- C. Inverters shall be capable of converting incoming three phase, 460V (+10 to -10%) and 60 Hertz (+/-2) Hertz power to DC bus levels. The DC voltage shall be inverted to an variable frequency output.
- D. Controllers shall be rated for an ambient temperature of 0°C to 40°C and humidity of 0 to 95% non-condensing.
- E. VFDs shall have complete front accessibility. All VFD openings shall be filtered.
- F. The following standard basic control features shall be provided on the inverter:
 1. Start, Stop, "Power On" indicating light and speed control potentiometer. Terminations for remote mounted operator control devices shall be furnished.
 2. Unidirectional operation, coast to rest upon stop.
 3. Variable linear independent timed acceleration.
 4. Variable torque performance from 4 to 60 Hertz.
 5. Frequency stability of 2% for 24 hours with voltage regulation of +2% of maximum rated output voltage.
 6. LCD status indication for Power On, Run, Inverter Enable, Overcurrent, Overvoltage, Overtemperature, Low Supply, and Phase Loss.
 7. 115V AC control power for operator devices.

8. Phase insensitive to input power.
 9. Automatic restart upon return of power following a utility outage. Drive shall require manual reset after three (3) attempts in a 60 second period.
- G. The following protective features shall be provided on the drive:
1. Input AC circuit breaker with an interlocked, pad lockable handle mechanism and AC input line current limiting fuses for fault current protection of AC to DC converter section and circuit breaker. Minimum short circuit rating of 65,000 AIC shall be provided.
 2. Electronic overcurrent trip for instantaneous overload protection.
 3. Undervoltage and phase loss protection of output.
 4. Over-frequency protection.
 5. Over-temperature protection.
 6. Surge protection from input AC line transients.
 7. Electrical isolation between the power and logic circuits, as well as between the 115V AC control power and the static digital sequencing.
 8. Drive to be capable of withstanding output terminal line short or open circuits without component failure.
 9. di/dt and dv/dt protection for converter semiconductors.
 10. Units shall have an English language (no codes) alphanumeric diagnostic display. LED indication of over frequency, instantaneous overcurrent, DC over voltage, AC undervoltage/loss-of-phase, emergency stop, overload, over temperature, inverter pole trip and standby modes shall be provided and door mounted. Additional door mounted status indicating LEDs for self-diagnostic including run, phase loss, micro-processor fault, as well as board mounted LEDs including one for each inverter pole gating signal, each inverter pole status and each logic level VDC used. A comprehensive microprocessor based digital diagnostic system which monitors its own control functions and displays faults and operating conditions is also approved.
- H. The following standard independent adjustments shall be provided on the inverter:

1. Minimum speed (12 to 54 HZ).
 2. Maximum speed (40 to 60 HZ).
 3. Acceleration time 6 to 60 Sec. (minimum).
 4. Deceleration time 6 to 60 Sec. (minimum).
 5. Volts per Hertz.
 6. Stability adjustment, if required.
 7. Voltage boost (100 to 600 percent of nominal V/HZ ratio at 1 HZ tapering to 100 percent at 20 HZ).
- I. The following shall be furnished with each controller:
1. Isolated process instrument speed input signal of 4-20 mA DC.
 2. Isolated process instrument speed output signal 4-20 mA DC.
 3. Relay output auxiliary contacts as shown on the drawings or as required herein, in Division
 4. Door-mounted output load ammeter, voltmeter, and speed output indicating meters.
 5. Built-in self diagnostics.
 6. Relay output auxiliary contacts as shown on the drawings.
 7. Local/Off/Remote and Start/Stop selector switches.
 8. Input line reactors.
 9. Input filter is required for IEEE519 compliance.
 10. All openings in the VFD shall be filtered.
- J. The Variable Frequency Drive shall allow Ethernet communications.
1. The embedded web server shall contain web-pages that provide the ability to configure, control, monitor and diagnose the AC drives via Internet Explorer. No additional software shall be required.
 2. The embedded web-pages must be secured by use of a customizable User Name and Password.

- K. The Ethernet Communications Card shall support the following services via the standard ethernet Port 502:
 - 1. TCP/Modbus Client, with support for periodic I/O Scanning
 - 2. HTTP Server for drive configuration, control, and monitoring.
 - 3. ICMP client to support certain IP services such as the "ping" command.
 - 4. BOOTP client to assign an IP Address via an address server.
 - 5. FTP Server for modifying, deleting or creating embedded web pages

PART 3 EXECUTION

3.01 Installation

- A. Installation shall be in strict accordance with the manufacturer's instructions and recommendations in the locations shown on the Drawings. Field wiring shall be in accordance with manufacturer's recommendations. Anchor bolts shall be stainless steel and set in accordance with the manufacturer's recommendations.

3.02 Shop Painting

- A. Prior to shop painting, all surfaces shall be thoroughly cleaned, dry, and free from all mill/scale, rust, grease, dirt, and other foreign matter.
- B. Drives shall be shop painted.

3.03 Testing

- A. Tests and Check
 - 1. The drive manufacturer shall test the drive controller with a motor load prior to shipment. The motor shall have equal or greater full load current than the specified motor.
 - 2. A certified copy of all tests and checks performed in the field, complete with meter readings and recordings, where applicable, shall be submitted to the Owner.
- B. The Supplier shall provide the services of a competent and experienced equipment manufacturer's factory field engineer to supervise start-up and provide training to the Owner's personnel. The factory field engineer shall be available for one (1) - eight

(8) hour day to inspect the installed equipment and supervise the start-up demonstration and testing as specified in Section 01650: Start-up, and additional testing and training as specified herein. The factory field engineer shall be available for two (2) additional eight (8) hour days (a total of three (3) - eight (8) hour days) to provide factory and on-site training to the Owner's personnel as specified herein. Training of the Owner's personnel will only be considered valid for approval by the Engineer if it takes place after the successful start-up and demonstration test.

3.04 Training

- A. The training and instruction shall be directly related to the System being supplied.
- B. The Supplier shall provide classroom training detailed manuals to supplement the training courses. The manuals shall include specific details of equipment supplied and operations specific to the project.
- C. The Supplier shall make use of teaching aids, manuals, slide/video presentations, etc. After the training services, such materials shall be delivered to Owner.
- D. The training program shall represent a comprehensive program covering all aspects of the variable frequency drive and maintenance of the system.
- E. All training schedules shall be coordinated with, and at the convenience of the Owner. Shift training may be required to correspond to the Owner's working schedule.
- F. Factory Training: Factory training shall be conducted before the System is commissioned, and subsequent to final manual submittals. Two days of factory training shall be provided and consist of schooling and hands on experience for two people covering the following:
 - 1. Theory of Operation
 - 2. Use of Software
 - 3. Troubleshooting
- G. On-site Training: On-site (field) training shall be conducted at the Owner's Plant Site and shall provide detailed hands-on instruction to Owner's personnel covering: system debugging, program modification, trouble-shooting, maintenance procedures, calibration procedures, and system operation.

END OF SECTION

SECTION 16402{PRIVATE }

UNDERGROUND SYSTEM

PART 1 GENERAL

1.01 Scope of Work

- A. Furnish and install a complete underground system of ducts, manholes and handholes all as hereinafter specified and shown on the Drawings.

1.02 Related Work

- A. Excavation and backfilling is included in Division 2.
- B. All concrete and reinforcing steel shall be included under Division 3.
- C. Conduit for ducts shall be as specified under Section 16110.
- D. Ground rods and other grounding materials and methods shall be as specified under other Sections of Division 16.

PART 2 PRODUCTS

2.01 Materials

- A. Ducts shall be PVC type DB encased in concrete, unless otherwise noted.
- B. Cable racks, supports, pulling-in irons, manhole steps, and hardware shall be stainless steel manufactured by Cope or approved equal. All hardware shall be 316 stainless steel.
- C. Precast manholes and handholes shall be heavy duty type, designed for a Class H20 wheel load. Precast manholes and handholes shall be as manufactured by Brooks Products Co., or approved equal.
- D. Handhole covers and frames shall be provided as required.

PART 3 EXECUTION

3.01 Installation

- A. Ducts shall be installed to drain away from buildings; ducts between manholes or handholes shall drain toward the manholes or handholes. Duct slopes shall not be less than 3 inches per 100 feet.

- B. Duct lines shall be laid in trenches on a clean backfill bedding not less than 6 inches thick and well graded.
- C. Plastic spacers shall be used to hold ducts in place whether concrete encased or not. Spacers shall provide not less than 2-inch clearance between ducts.
- D. The minimum cover for duct lines shall be 24 inches unless otherwise permitted by the Engineer.
- E. Duct entrances to buildings and structures shall be made with steel conduit not less than 10 feet long.
- F. PVC duct terminations at manholes shall be with PVC end bells. Steel conduits shall be terminated with insulated, grounding-type bushings.
- G. Where bends in ducts are required, long radius elbows, sweeps and offsets shall be used.
- H. All ducts shall be rodded and a mandrel drawn through followed by a swab to clean out any obstructions which may cause cable abrasions. The mandrel shall be 12 inches in length and the diameter 1/2 inch less than the inside diameter of the duct.
- I. Spare ducts shall be plugged and sealed watertight at all manholes, buildings and structures.
- J. Ducts in use shall be sealed watertight at all manholes, buildings and structures.
- K. Pulling-in irons shall be installed opposite all duct entrances to manholes, equal to Cope Cat. No. 311-9.
- L. Cable racks shall be cut to length for one, two, three or four vertical tiers of cables. Racks shall be mounted with 1/2 inch by 4 inch expansion bolts on manhole walls. Arms similar and equal to Cope Cat. No. 325-T4, 325-T75 and/or 325-T10 for one, two and/or three cables respectively shall be furnished and installed with Cat. No. 326-T22 porcelain insulators for support of cables. Lock clips shall be furnished and installed to secure hooks in position.
- M. Cables shall be trained in manholes and supported on racks and hooks at intervals not greater than 3 feet-0 inches and supports shall be installed on each side of all splices. Furnish inserts on all manhole walls for mounting future racks as well as racks required for present installation. Branch circuit conductors shall not be run in manholes.
- N. PVC coated rigid steel conduit shall be used for risers. For fiber runs, a fiber to

- PVC coated rigid steel conduit adapter shall be used at the lower end of the elbow and the elbow and all exposed conduit shall be PVC coated.
- O. All risers from underground shall be given a heavy coat of bitumastic paint from a point 1 foot-0-inch below grade to a point not less than 6 inches above grade or surface of slab.
 - P. All joints shall be made so as to prevent the passage of concrete inside the conduit to form obstructions or cause cable abrasions.
 - Q. Manhole covers in streets shall finish flush with finished paving and in other areas shall finish 3 inches above crown of adjacent roadway. Floor elevations of manholes shall be so set that the center line of the lowest conduit entering will be not less than 1-foot above the floor and center line of the highest conduit entering will be not less than 1 foot below the roof slab.
 - R. Concrete monuments shall be provided at each stubbed conduit location. Monuments shall be as shown on the Drawings and shall be installed in the same manner outlined for manhole covers.
 - S. A #6 bare copper wire (stranded) shall be installed in each 4-inch PVC conduit.
 - T. A 5/8-inch by 20-foot copperclad ground rod shall be driven in the bottom of each manhole. All bond wires and galvanized steel conduits shall be bonded to the ground rod.

END OF SECTION

PLAN SYMBOLS

	HOME RUN TO PANELBOARD. NO. OF ARROWS INDICATE NO. OF CIRCUITS, HASH MARKS INDICATE NO. OF #12 AWG. CONDUCTORS. NO HASH MARKS INDICATE 2 #12 CONDUCTORS.
	CONDUIT CONCEALED IN WALL, IN SLAB ABOVE, OR ABOVE CEILING
	CONDUIT CONCEALED IN OR BELOW FLOOR OR UNDERGROUND.
	CONDUIT RUN EXPOSED. RUN PARALLEL OR PERPENDICULAR TO STRUCTURE OR WALL.
	FLEXIBLE CONDUIT WITH EQUIPMENT CONNECTION.
	CONCRETE ENCASED DUCTBANK.
	LED LIGHTING FIXTURE, CEILING MOUNTED. 2
	EXTERIOR LUMINAIRE AND MOUNTING STANDARD.
	EMERGENCY BATTERY PACK LIGHTING FIXTURE.
	JUNCTION BOX N.E.C. SURFACE MOUNTED UNLESS INDICATED OTHERWISE.
	JUNCTION BOX PER N.E.C., FLUSH MOUNTED UNLESS INDICATED OTHERWISE.
	FLUSH OR SURFACE MOUNTED LIGHTING PANELBOARD.
	FLUSH OR SURFACE MOUNTED POWER PANELBOARD.
	DRY TYPE TRANSFORMER. NO. INDICATES KVA RATING.
	LIQUID FILLED TRANSFORMER, KVA RATING AS SHOWN
	20A, 125V, 3W DUPLEX RECEPTACLE IN FLUSH OUTLET BOX, 18" ABOVE FINISHED FLOOR.
	20A, 125V, 3W DUPLEX RECEPTACLE IN FLUSH OUTLET BOX, 48" ABOVE FINISHED FLOOR OR 6" ABOVE FINISHED COUNTER AS REQUIRED (AFC)
	20A, 125V, 3W DUPLEX RECEPTACLE, SURFACE MOUNTED.
	SURFACE MOUNTED GROUND FAULT DUPLEX WEATHERPROOF RECEPTACLE, RATED NEMA 4 WHILE IN USE, 20A, 125V, 3W - MOUNTED 48" ABOVE FINISHED FLOOR, UNLESS OTHERWISE NOTED. 2
	FLUSH MOUNTED GROUND FAULT DUPLEX RECEPTACLE 20A, 125V, 3W - MOUNTED 48" ABOVE FINISHED FLOOR. 2
	DISCONNECT RACK MOUNTED.
	OFF REMOTE/DISCONNECT RACK MOUNTED WITH NEMA 4X SS JUNCTION BOX MOUNTED BELOW OFF REMOTE
	SINGLE POLE SWITCH IN FLUSH OUTLET BOX, 48" ABOVE FINISHED FLOOR, UNLESS OTHERWISE NOTED (TYPICAL).
	SINGLE POLE SWITCH, SURFACE MOUNTED.
	THREE-WAY SWITCH IN FLUSH OUTLET BOX.
	FOUR-WAY SWITCH IN FLUSH OUTLET BOX.
	NON-FUSIBLE DISCONNECT SWITCH, 30A,3P UNLESS OTHERWISE INDICATED.
	NON-FUSIBLE DISCONNECT SWITCH, 30A,3P UNLESS OTHERWISE INDICATED, WITH REMOTE CONTROL STATION AS REQUIRED BY ELEMENTARY DIAGRAMS OR SPECS.
	ELECTRIC A.C. MOTOR, NO. INDICATES HORSEPOWER.
	MOTORIZED VALVE
	COMBINATION MOTOR STARTER, DISCONNECT SWITCH
	ELECTRIC HEATER
	CONTROL PULLBOX.
	POWER PULLBOX. 2
	FLOW ELEMENT
	LIQUID LEVEL SWITCH
	PRESSURE INDICATING TRANSMITTER
	FLOW INDICATING TRANSMITTER
	TEMPERATURE SWITCH
	SPACE HEATER
	FLUSH OUTLET BOX AND TELEPHONE COVER PLATE AND SUITABLE FOR DATA DEVICE CONNECTION 48" ABOVE FINISHED FLOOR.

SINGLE LINE DIAGRAM SYMBOLS

	COMBINATION MOTOR STARTER
	FUSE
	CAPACITOR
	MOLDED CASE CIRCUIT BREAKER
	TYPICAL SELECTOR SWITCH AND CONTROL. SEE ELEMENTARY DIAGRAMS FOR EXACT TYPE.
	ELECTRIC A.C. MOTOR, NO. INDICATES HORSEPOWER.
	SERVICE OR EQUIPMENT GROUND.
	NON-FUSIBLE DISCONNECT SWITCH, 30A,3P UNLESS OTHERWISE INDICATED.
	NON-FUSIBLE DISCONNECT SWITCH, 30A,3P UNLESS OTHERWISE INDICATED, WITH REMOTE CONTROL STATION AS REQUIRED BY ELEMENTARY DIAGRAMS OR SPECS.
	LIGHTING PANELBOARD
	POWER PANELBOARD.
	CURRENT TRANSFORMERS
	POTENTIAL TRANSFORMERS
	PRESSURE SWITCH
	OFF/REMOTE
	SEAL FAIL
	LIMIT SWITCH
	LIQUID LEVEL SWITCH
	LEAK DETECTION SWITCH
	LEVEL ELEMENT SWITCH
	LEVEL INDICATING TRANSMITTER
	ANALYTICAL ELEMENT
	ANALYSIS INDICATING TRANSMITTER
	SMOKE DETECTOR
	SOLENOID VALVE
	FLOW SWITCH 2

CONTROL DIAGRAM SYMBOLS

	DUPLEX RECEPTACLE
	NORMALLY OPEN CONTACT
	NORMALLY CLOSED CONTACT
	LIMIT SWITCH, NORMALLY OPEN
	LIMIT SWITCH, NORMALLY CLOSED
	PRESSURE SWITCH, NORMALLY OPEN
	PRESSURE SWITCH, NORMALLY CLOSED
	FLOAT SWITCH, NORMALLY OPEN
	FLOAT SWITCH, NORMALLY CLOSED
	FLOW SWITCH, NORMALLY OPEN
	FLOW SWITCH, NORMALLY CLOSED
	TEMPERATURE SWITCH, NORMALLY OPEN
	TEMPERATURE SWITCH, NORMALLY CLOSED
	NORMALLY OPEN, TIMED TO CLOSE CONTACT
	NORMALLY CLOSED, TIMED TO OPEN CONTACT
	NORMALLY CLOSED, TIMED TO CLOSE CONTACT
	NORMALLY OPEN, TIMED TO OPEN CONTACT
	EMERGENCY STOP SWITCH
	FLOW SWITCH
	PRESSURE SWITCH
	SOLENOID VALVE
	LIQUID LEVEL SWITCH
	ALARM RELAY
	ALARM TIMER
	CONTROL RELAY
	MOTOR STARTER
	TIMING RELAY
	TORQUE SWITCH
	ALARM INDICATING LIGHT
	RUN INDICATING LIGHT
	MOMENTARY CONTACT PUSHBUTTON
	MOMENTARY BREAK PUSHBUTTON OR RESET
	KEYED SWITCH
	MAINTAINED CONTACT ON-OFF SWITCH
	START/STOP(S/S) CONTROL SWITCH
	MAINTAINED CONTACT
	THREE POSITION MAINTAINED CONTACT SELECTOR SWITCH
	FUSE
	MOLDED CASE CIRCUIT BREAKER
	CONTROL POWER TRANSFORMER
	REMOTE TERMINAL BLOCK POINT

ABBREVIATIONS

A	AMPERES
AFF	ABOVE FINISHED FLOOR
AIC	AMPS INTERRUPTING CURRENT
BKR	BREAKER
BLDG	BUILDING
CKT	CIRCUIT
CPT	CONTROL POWER TRANSFORMER
CT	CURRENT TRANSFORMER
CTU	CENTRAL TELEMETRY UNIT
DH	DATA HIGHWAY
DISC	DISCONNECT
EFF	EFFLUENT
ELEC	ELECTRICAL
EM	EMERGENCY
ENCL	ENCLOSURE
ESB	ENERGY SAVING BALLAST
ETM	ELAPSED TIME METER
EXH	EXHAUST
EXIST	EXISTING
FRP	FIBER REINFORCED PLASTIC
FPP	FIBER PATCH PANEL
FTC	FLOAT CABLE TERMINATION CABINET
FVNR	FULL VOLTAGE NON-REVERSING
GFR	GROUND FAULT RECEPTACLE
GEI	GROUND FAULT INTERRUPTER
GLP	GENERATOR LIGHTING PANEL 2
GND	GROUND
GRS	GALVANIZED RIGID STEEL
HCP	HEADWORKS CONTROL PANEL
HOA	HAND-OFF-AUTOMATIC
HOR	HAND-OFF-REMOTE
HP	HORSEPOWER
HWY	HIGHWAY
IEX	ION EXCHANGE
IT	INFORMATION TECHNOLOGY
KVA	KILO VOLT-AMPERES
KW	KILOWATT
IEX	ION EXCHANGE
LA	LIGHTNING ARRESTOR
LDP	LEAK DETECTION PANEL
LTG	LIGHTING
MAX	MAXIMUM
MCC	MOTOR CONTROL CENTER
MFR	MANUFACTURER
MH	METAL HALIDE
MIN	MINIMUM
MLO	MAIN LUGS ONLY
MPZ	MINI POWER ZONE
MTD	MOUNTED
NEC	NATIONAL ELECTRIC CODE
N	NEUTRAL
NIP	NETWORK INTERFACE PANEL
NIU	NOT IN USE
NTS	NOT TO SCALE
OH	OVERHEAD
P	POLE
PBD	PANELBOARD
PCP	PROCESS CONTROL PANEL
PEF	PROGRESS ENERGY OF FLORIDA
PM	PHASE MONITOR
PMP	PRESSURE MONITORING PANEL
PNL	PANEL
PVC	POLYVINYL CHLORIDE
RAP	REMOTE ANNUNCIATOR PANEL
RCP	REMOTE CONTROL PANEL
RIO	REMOTE INPUT OUTPUT
RTU	REMOTE TELEMETRY UNIT
SC	SURGE CAPACITOR
SH	SHIELDED
SPD	SURGE PROTECTION DEVICE
SS	STAINLESS STEEL
SSS	SOLID STATE STARTER
STR	STARTER
SW	SWITCH
SWBD	SWITCHBOARD 2
TBR	TO BE REMOVED
TC	TERMINATION CABINET
TYP	TYPICAL
UG	UNDERGROUND
UPS	UNINTERRUPTABLE POWER SUPPLY
V	VOLT
VFD	VARIABLE FREQUENCY DRIVE
W	WATT
W/	WITH
WP	WEATHERPROOF
WPCP	WELL PUMP CONTROL PANEL
Ø	PHASE

NOTES

- ELECTRICAL CONTRACTOR SHALL SUPPLY AND INSTALL ALL NEW ELECTRICAL WORK INDICATED.
- ELECTRICAL CONTRACTOR SHALL VISIT JOB SITE AND FAMILIARIZE HIMSELF WITH ALL CONDITIONS AFFECTING ELECTRICAL INSTALLATION AND MAKE PROVISIONS AS TO THE COST THEREOF. EXISTING CONDITIONS OF ELECTRICAL EQUIPMENT, LIGHT FIXTURES, ETC... THAT ARE PART OF THE FINAL SYSTEM SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO SUBMITTING HIS BID.
- ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE AND SHALL COMPLY WITH ALL LOCAL RULES AND ORDINANCES.
- MINIMUM WIRE SIZE SHALL BE #12 A.W.G. EXCLUDING CONTROL WIRING, UNLESS OTHERWISE NOTED.
- IT IS NOT THE INTENT OF THESE PLANS TO SHOW EVERY MINOR DETAIL OF CONSTRUCTION. THE CONTRACTOR IS EXPECTED TO FURNISH AND INSTALL ALL ITEMS FOR A COMPLETE ELECTRICAL SYSTEM AND PROVIDE ALL REQUIREMENTS NECESSARY FOR THE EQUIPMENT TO BE PLACED IN PROPER WORKING ORDER.
- ELECTRICAL SYSTEM SHALL BE COMPLETE AND EFFECTIVELY GROUNDED AS REQUIRED BY THE LATEST EDITION OF THE N.E.C. OR LOCAL CODES. ALL CONDUITS SHALL HAVE A BOND WIRE SIZED PER TABLE 250-122 OF THE NATIONAL ELECTRIC CODE.
- ALL MATERIALS SHALL BE NEW AND BEAR UNDERWRITERS' LABELS WHERE APPLICABLE.
- ALL WORK SHALL BE PERFORMED BY A LICENSED ELECTRICAL CONTRACTOR IN A FIRST CLASS WORKMANLIKE MANNER. THE COMPLETED SYSTEM SHALL BE FULLY OPERATIVE AND ACCEPTED BY ENGINEER/OWNER.
- CONTRACTOR SHALL GUARANTEE ALL MATERIALS AND WORKMANSHIP FREE FROM DEFECTS FOR A PERIOD OF NOT LESS THAN TWO YEARS FROM DATE OF SUBSTANTIAL COMPLETION.
- CORRECTION OF ANY DEFECTS SHALL BE COMPLETED WITHOUT ADDITIONAL CHARGE AND SHALL INCLUDE REPLACEMENT OR REPAIR OF ANY OTHER PHASE OF THE INSTALLATION WHICH MAY HAVE BEEN DAMAGED.
- CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CUTTING AND PATCHING REQUIRED OF HIS WORK.
- ELECTRICAL CONTRACTOR SHALL LABEL ALL PANELS W/ TYPE WRITTEN DIRECTORIES (NEW & EXISTING).
- ALL ELECTRICAL WIRING SHALL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR.
- DO NOT SCALE THE ELECTRICAL DRAWINGS. REFER TO THE MECHANICAL DRAWINGS & THE APPROVED MANUFACTURER'S SHOP DRAWINGS FOR THE EXACT LOCATION OF ALL EQUIPMENT.
- NON-SHADED TEXT DENOTES NEW EQUIPMENT, STRUCTURES AND WORK. SHADED AND SLANTED TEXT DENOTES EXISTING EQUIPMENT OR STRUCTURES.
- ALL CONTROL PANELS SHALL BE UL LISTED AND SHALL COMPLY WITH ARTICLE 409 OF THE NEC.
- ALL EMPTY CONDUITS TO BE INSTALLED WITH PULLSTRING.
- ALL NEW FLOOR MOUNTED ELECTRICAL EQUIPMENT SHALL BE INSTALLED ON WITH 4" HIGH CONCRETE EQUIPMENT PAD.

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BIDSET

ELECTRICAL NOTES, SYMBOLS
AND ABBREVIATIONS

Sheet No.
E-1

Drawing name: F:\Active Projects\CPH\Engineers\Winter Springs\Water Spings WTP #1 Treatment Improvements\10_A\Addendum No.2\0216.80727.RK.dwg

No.	Date	Revision	By	No.	Date	Revision	By
Δ	2/3/16	BIDSET-SIGNED/SEALED ORIGINAL AT CITY HALL	DD	Δ			
Δ	3/3/16	ADDENDUM NO. 2	DD	Δ			

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Drawn by:	DRM	Scale:	AS NOTED
Checked by:	SEB		
Approved by:	SEB		
Job No.	W04167	©	2016

CITY OF WINTER SPRINGS
WATER TREATMENT PLANT 1
WATER QUALITY IMPROVEMENTS

Seminole County, Florida

Plans Prepared By:	CPH, Inc.
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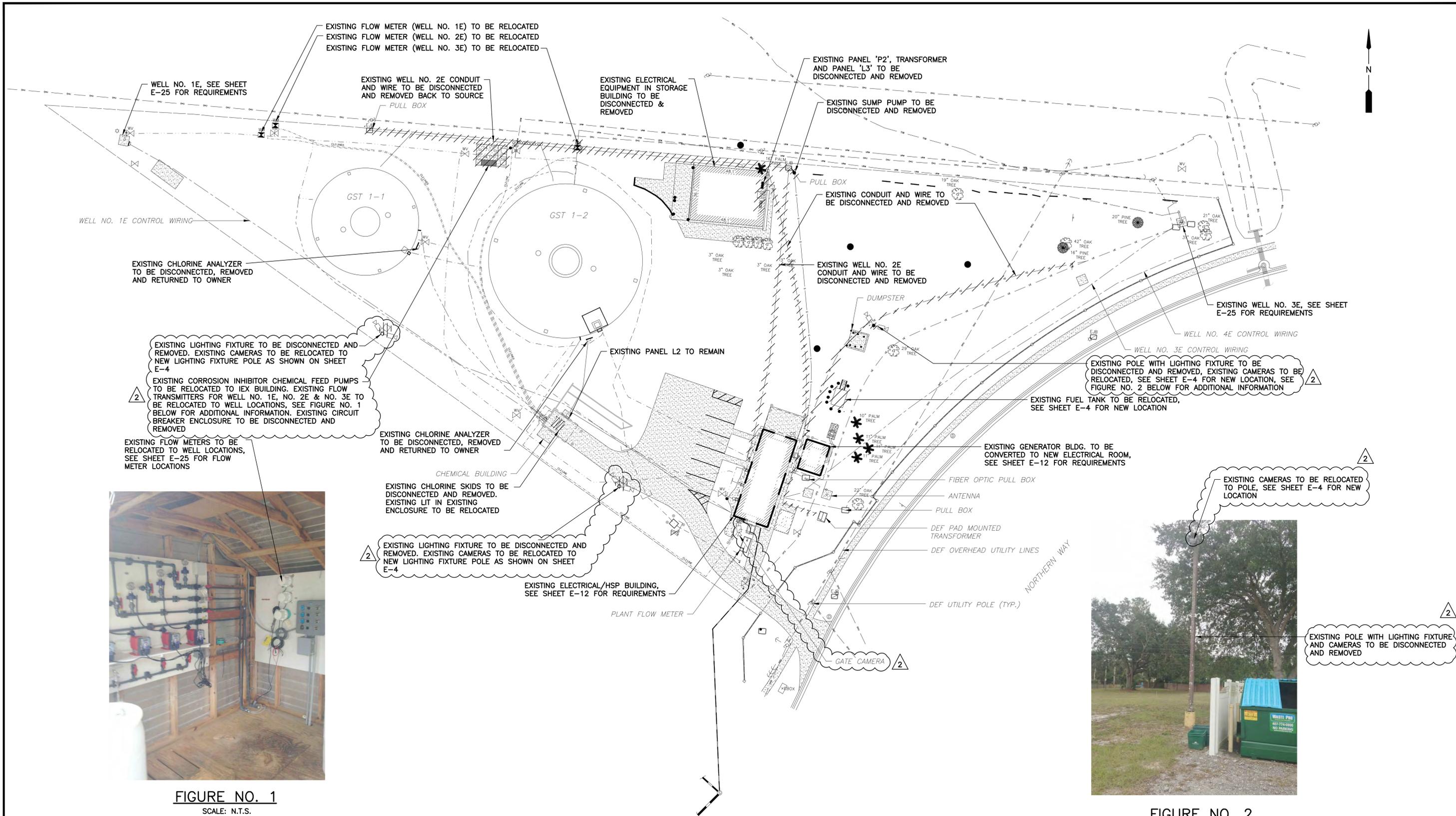


FIGURE NO. 1
SCALE: N.T.S.



FIGURE NO. 2
SCALE: N.T.S.

ELECTRICAL DEMOLITION SITE PLAN

SCALE: 1"=30'-0"
30 15 0 30'

No.	Date	Revision	By	No.	Date	Revision	By
Δ	2/3/16	BIDSET-SIGNED/SEALED ORIGINAL AT CITY HALL	DD	Δ			
Δ	3/3/16	ADDENDUM NO. 2	DD	Δ			

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 Approved by: SEB
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CITY OF WINTER SPRINGS
WATER TREATMENT PLANT 1
WATER QUALITY IMPROVEMENTS
Seminole County, Florida

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BIDSET

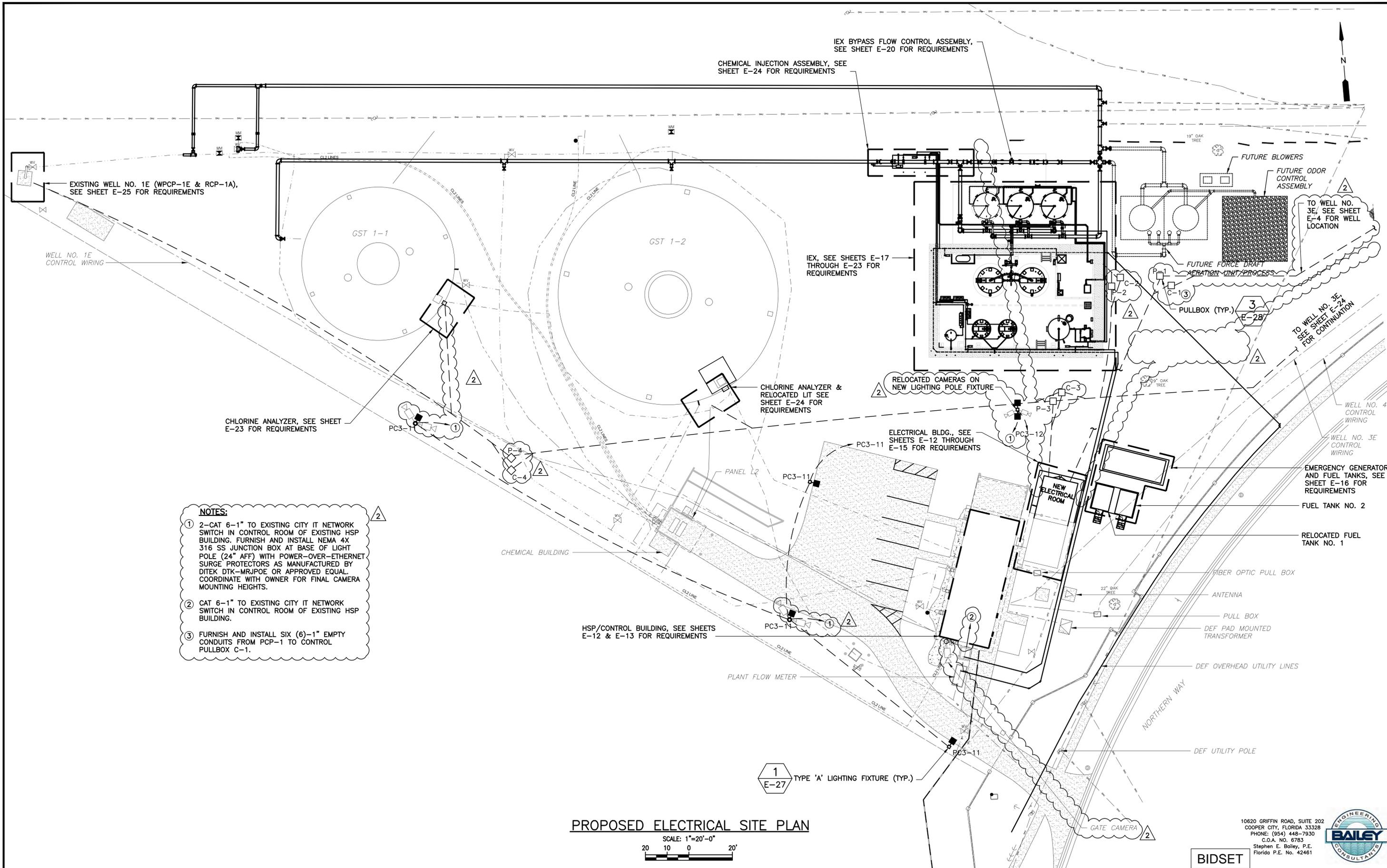
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ELECTRICAL DEMOLITION SITE PLAN

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Sheet No.
E-3



- NOTES:**
- ① 2-CAT 6-1" TO EXISTING CITY IT NETWORK SWITCH IN CONTROL ROOM OF EXISTING HSP BUILDING. FURNISH AND INSTALL NEMA 4X 316 SS JUNCTION BOX AT BASE OF LIGHT POLE (24" AFF) WITH POWER-OVER-ETHERNET SURGE PROTECTORS AS MANUFACTURED BY DITEK DTK-MRJP0E OR APPROVED EQUAL. COORDINATE WITH OWNER FOR FINAL CAMERA MOUNTING HEIGHTS.
 - ② CAT 6-1" TO EXISTING CITY IT NETWORK SWITCH IN CONTROL ROOM OF EXISTING HSP BUILDING.
 - ③ FURNISH AND INSTALL SIX (6)-1" EMPTY CONDUITS FROM PCP-1 TO CONTROL PULLBOX C-1.

PROPOSED ELECTRICAL SITE PLAN

SCALE: 1"=20'-0"
 20 10 0 20'

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 WATER TREATMENT PLANT 1
 WATER QUALITY IMPROVEMENTS
 Seminole County, Florida

Plans Prepared By:
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 1117 E. Robinson St. Orlando, FL 32801
 Ph: 407.425.0452
 Licenses:
 Eng. C.O.A. No. 3215 Arch. Lic. No. AA2600926
 Survey L.B. No. 7143 Landsc. Lic. No. LC0000298

STEPHEN E. BAILEY
 REG.# 42461

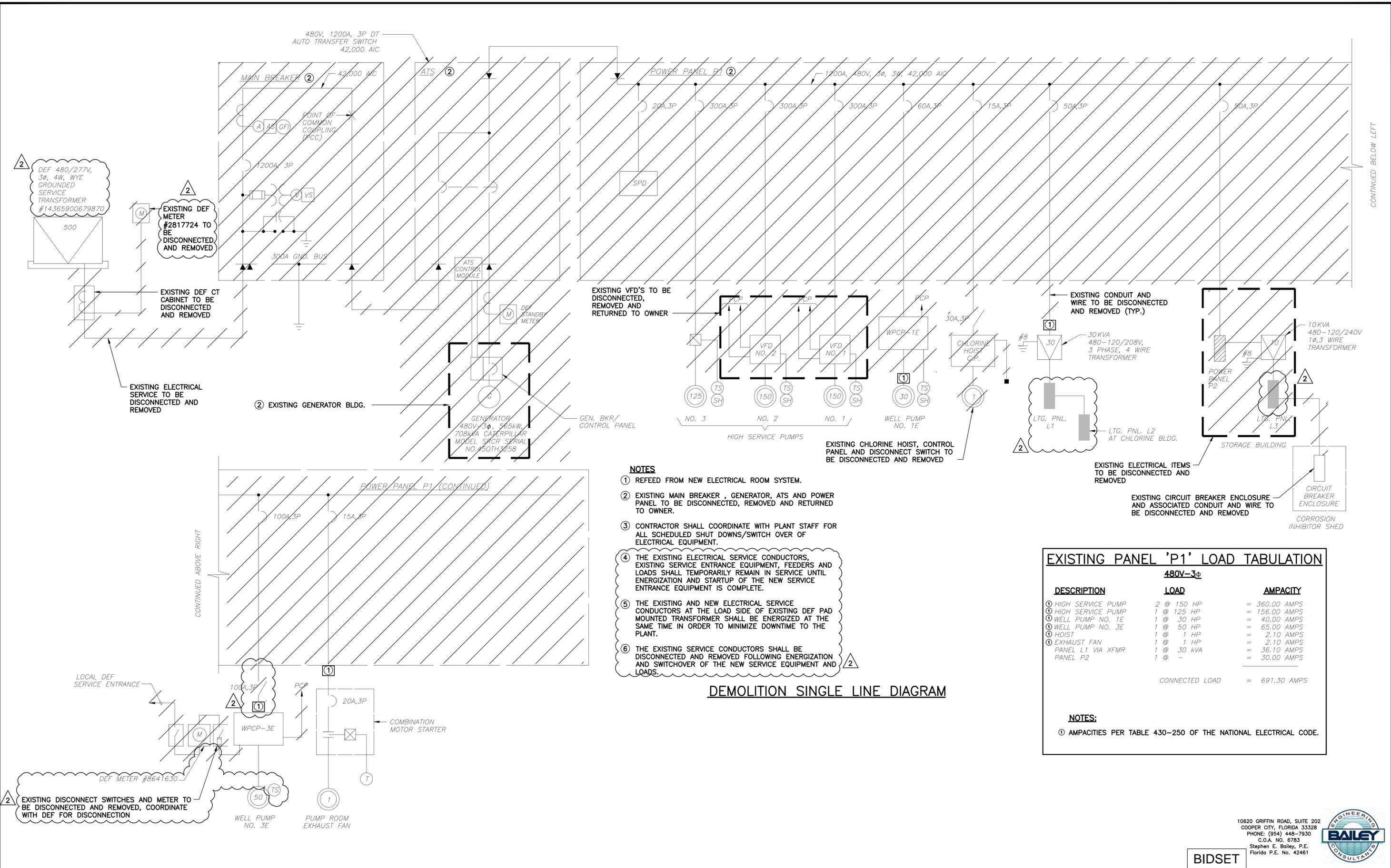
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 COOPER CITY, FLORIDA 33328
 PHONE: (954) 449-7930
 C.O.A. NO. 6783
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Sheet No.
E-4



- NOTES**
- REFEED FROM NEW ELECTRICAL ROOM SYSTEM.
 - EXISTING MAIN BREAKER, GENERATOR, ATS AND POWER PANEL TO BE DISCONNECTED, REMOVED AND RETURNED TO OWNER.
 - CONTRACTOR SHALL COORDINATE WITH PLANT STAFF FOR ALL SCHEDULED SHUT DOWNS/SWITCH OVER OF ELECTRICAL EQUIPMENT.
 - THE EXISTING ELECTRICAL SERVICE CONDUCTORS, EXISTING SERVICE ENTRANCE EQUIPMENT, FEEDERS AND LOADS SHALL TEMPORARILY REMAIN IN SERVICE UNTIL ENERGIZATION AND STARTUP OF THE NEW SERVICE ENTRANCE EQUIPMENT IS COMPLETE.
 - THE EXISTING AND NEW ELECTRICAL SERVICE CONDUCTORS AT THE LOAD SIDE OF EXISTING DEF PAD MOUNTED TRANSFORMER SHALL BE ENERGIZED AT THE SAME TIME IN ORDER TO MINIMIZE DOWNTIME TO THE PLANT.
 - THE EXISTING SERVICE CONDUCTORS SHALL BE DISCONNECTED AND REMOVED FOLLOWING ENERGIZATION AND SWITCHOVER OF THE NEW SERVICE EQUIPMENT AND LOADS.

DEMOLITION SINGLE LINE DIAGRAM

EXISTING PANEL 'P1' LOAD TABULATION

480V-3φ

DESCRIPTION	LOAD	AMPACITY
① HIGH SERVICE PUMP	2 @ 150 HP	= 360.00 AMPS
① HIGH SERVICE PUMP	1 @ 125 HP	= 156.00 AMPS
① WELL PUMP NO. 1E	1 @ 30 HP	= 40.00 AMPS
① WELL PUMP NO. 3E	1 @ 50 HP	= 65.00 AMPS
① HOIST	1 @ 1 HP	= 2.10 AMPS
① EXHAUST FAN	1 @ 1 HP	= 2.10 AMPS
① PANEL L1 VIA XFMR	1 @ 30 kVA	= 36.10 AMPS
PANEL P2	1 @ -	= 30.00 AMPS
CONNECTED LOAD		= 691.30 AMPS

NOTES:

- AMPACITIES PER TABLE 430-250 OF THE NATIONAL ELECTRICAL CODE.

Drawing name: F:\Active Projects\CPH\Engineers\Winter Springs\WTP #1 Treatment Improvements\10_Addendum No.20\gpaE-05 SLD.dwg, Mar.03, 2016 - 8:09am amsan
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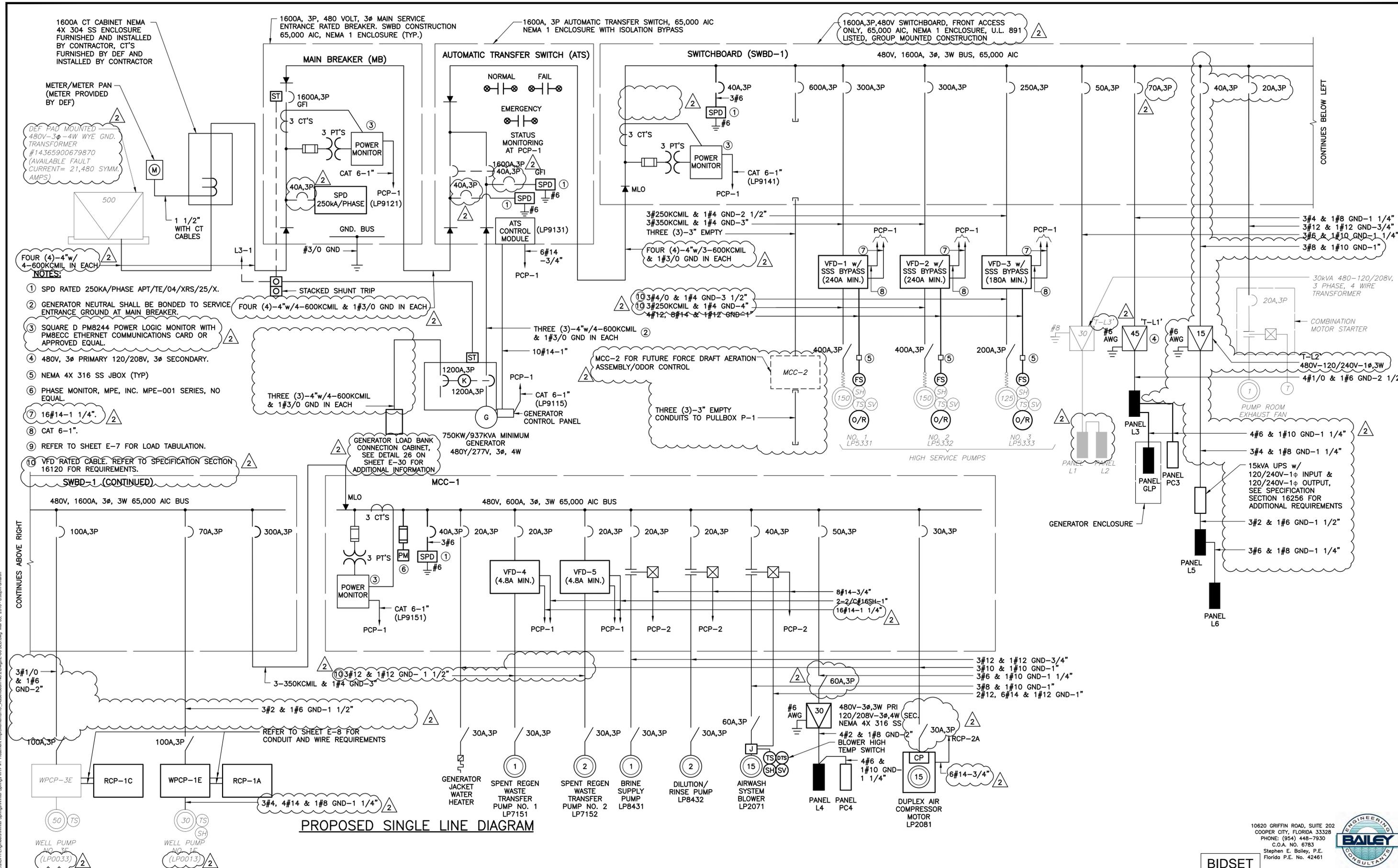
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DEMOLITION SINGLE LINE DIAGRAM

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Sheet No.
F-5



- NOTES:**
- SPD RATED 250KA/PHASE APT/TE/04/XRS/25/X.
 - GENERATOR NEUTRAL SHALL BE BONDED TO SERVICE ENTRANCE GROUND AT MAIN BREAKER.
 - SQUARE D PM8244 POWER LOGIC MONITOR WITH PM8ECC ETHERNET COMMUNICATIONS CARD OR APPROVED EQUAL.
 - 480V, 3Ø PRIMARY 120/208V, 3Ø SECONDARY.
 - NEMA 4X 316 SS JBOX (TYP)
 - PHASE MONITOR, MPE, INC. MPE-001 SERIES, NO EQUAL.
 - 16#14-1 1/4".
 - CAT 6-1".
 - REFER TO SHEET E-7 FOR LOAD TABULATION.
 - VFD RATED CABLE. REFER TO SPECIFICATION SECTION 16120 FOR REQUIREMENTS.

PROPOSED SINGLE LINE DIAGRAM

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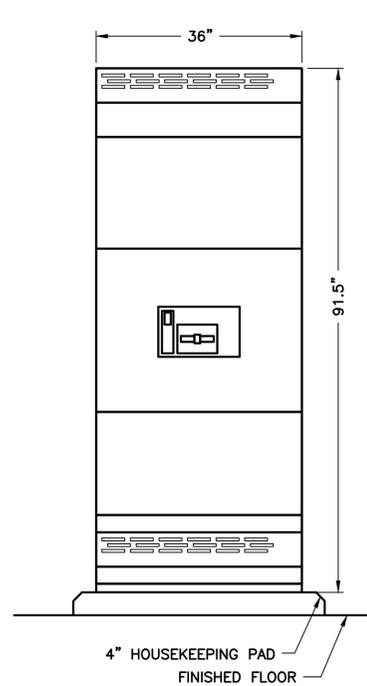
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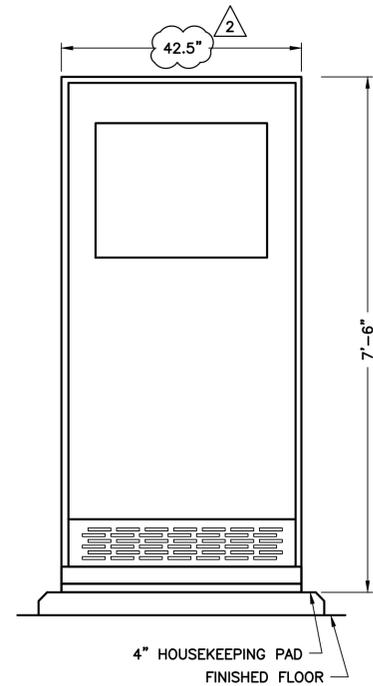
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Sheet No. **E-6**



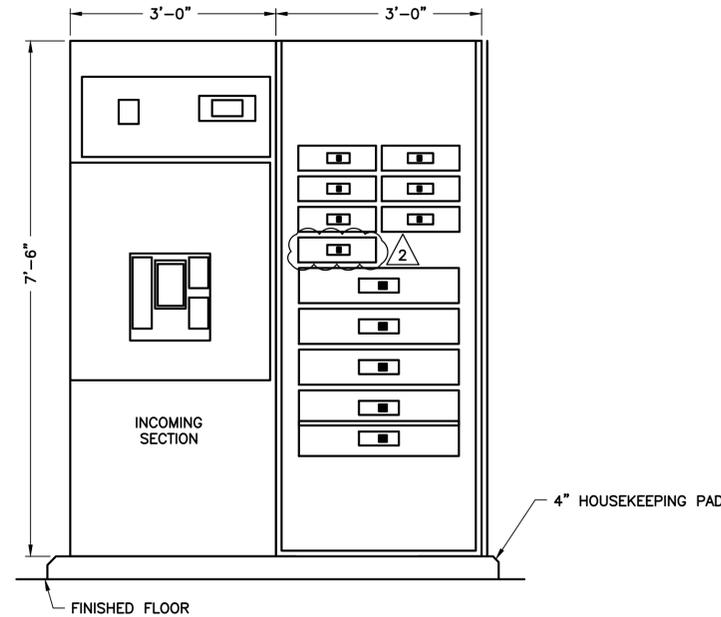
MB FRONT VIEW

SCALE: 3/4"=1'-0"
6" 0 1 2'



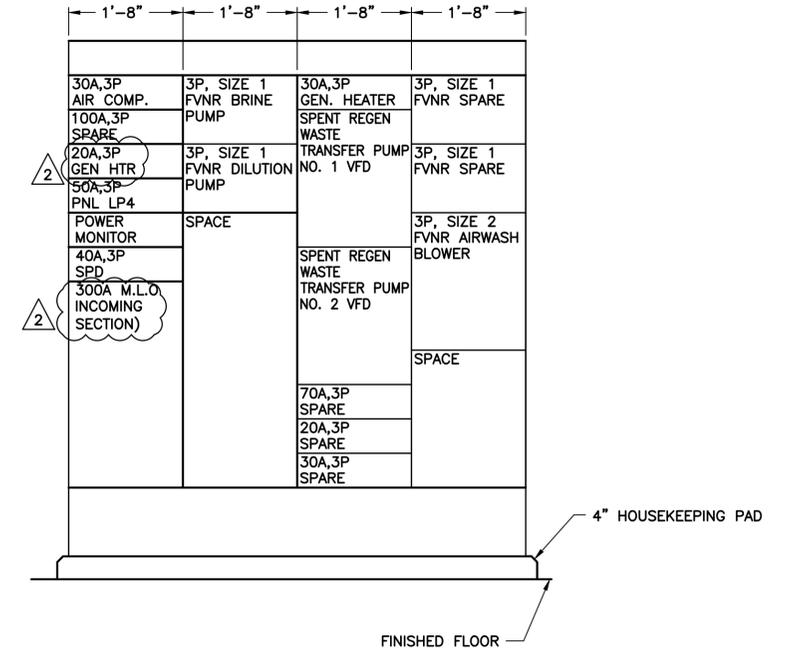
ATS FRONT VIEW

SCALE: 3/4"=1'-0"
6" 0 1 2'



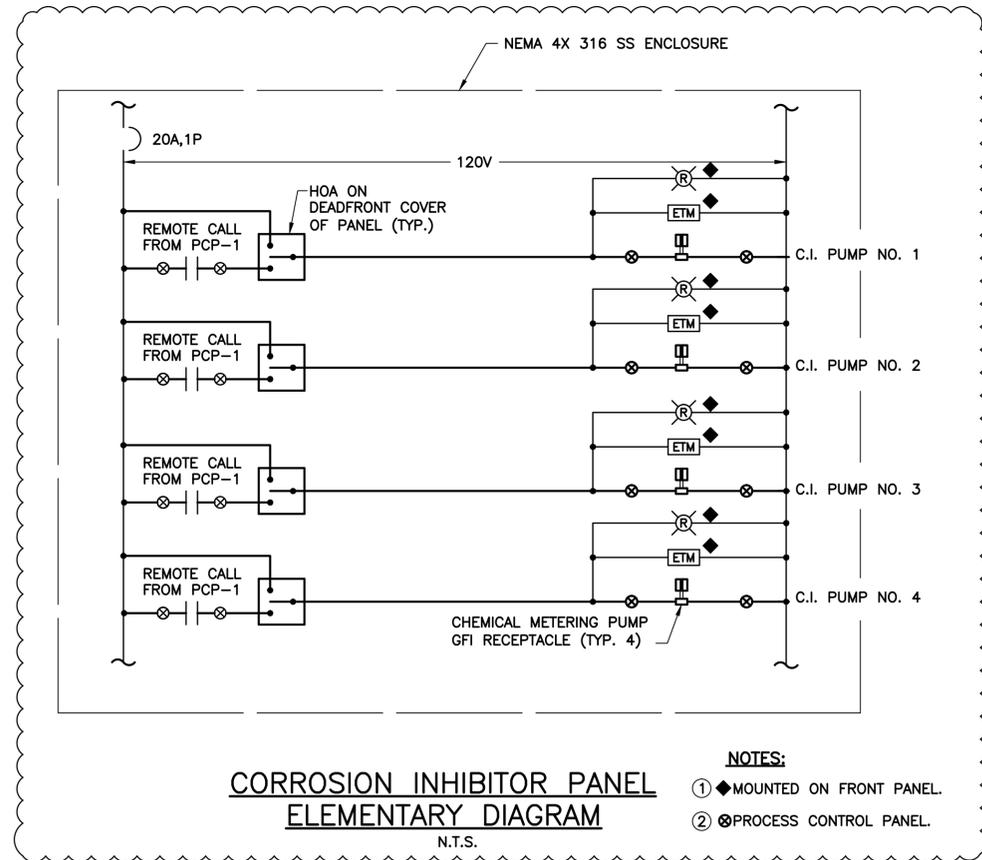
SWBD-1 FRONT VIEW

SCALE: 3/4"=1'-0"
6" 0 1 2'



MCC-1 FRONT VIEW

SCALE: 3/4"=1'-0"
6" 0 1 2'



CORROSION INHIBITOR PANEL ELEMENTARY DIAGRAM

NOTES:
① ◆ MOUNTED ON FRONT PANEL.
② ⊗ PROCESS CONTROL PANEL.

SWBD-1 LOAD TABULATION

DESCRIPTION	LOAD	AMPACITY
MCC-1	-	= 99.50 AMPS
FUTURE MCC-2	-	= 300.00 AMPS
① HSP	2 @ 150 HP	= 360.00 AMPS
① HSP	1 @ 125 HP	= 156.00 AMPS
PANEL L3 VIA XFMR	1 @ 45 KVA	= 54.13 AMPS
① EXHAUST FAN	1 @ 1 HP	= 2.10 AMPS
① WELL PUMP NO. 1E	1 @ 30 HP	= 40.00 AMPS
① WELL PUMP NO. 3E	1 @ 50 HP	= 65.00 AMPS
PANEL L1 VIA XFMR	1 @ 30 KVA	= 36.01 AMPS
PANEL L5 VIA XFMR	1 @ 15 KVA	= 31.25 AMPS
CONNECTED LOAD		= 1143.99 AMPS
② SERVICE ENTRANCE		= 1143.99 AMPS + (0.25)(180.00) = 1188.99 AMPS

NOTES:
① AMPACITIES PER TABLE 430-250 OF THE NATIONAL ELECTRICAL CODE.
② SERVICE ENTRANCE MINIMUM SIZE AS PER ARTICLE 230 OF THE NATIONAL ELECTRICAL CODE.

MCC-1 LOAD TABULATION

DESCRIPTION	LOAD	AMPACITY
PANEL L4 VIA XFMR	1 @ 30 KVA	= 36.10 AMPS
① BRINE PUMP	1 @ 1 HP	= 2.10 AMPS
① DILUTION PUMP	1 @ 2 HP	= 3.60 AMPS
① AIR WASH BLOWER	1 @ 15 HP	= 21.00 AMPS
① AIR COMPRESSOR	1 @ 15 HP	= 21.00 AMPS
① SPENT TRANSFER PUMP	1 @ 1 HP	= 2.10 AMPS
① SPENT TRANSFER PUMP GEN. JACKET HEATER	1 @ 2 HP	= 3.60 AMPS
CONNECTED LOAD		= 99.50 AMPS

NOTES:
① AMPACITIES PER TABLE 430-250 OF THE NATIONAL ELECTRICAL CODE.

Drawing name: F:\Active Projects\CPH Engineers\Winter Springs\Water Springs WTP #1 Treatment Improvements\10_Addendum No.2\0216.81002.dwg, Mar 03, 2016, 8:00pm dmanin

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WATER QUALITY IMPROVEMENTS
Seminole County, Florida

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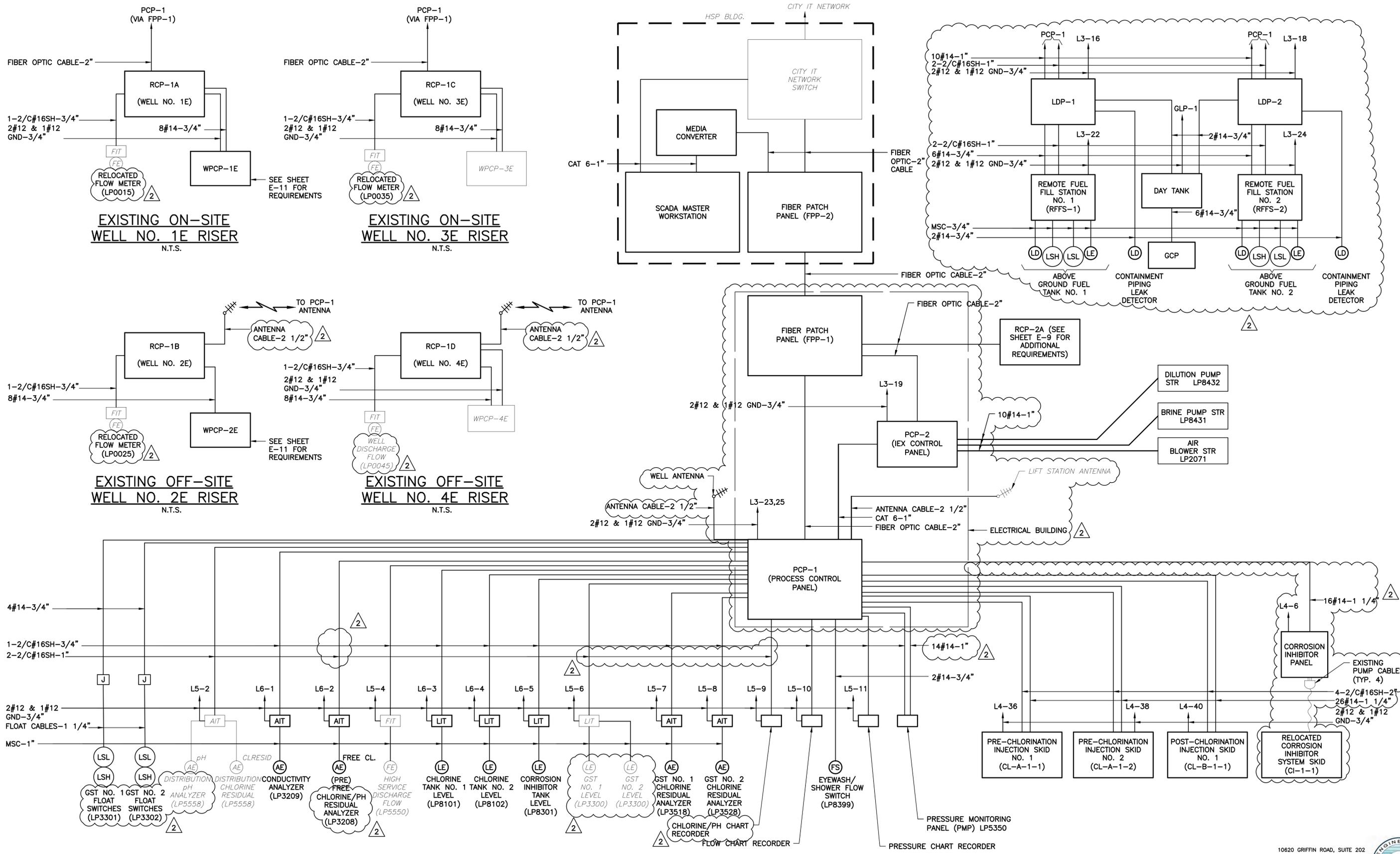
EQUIPMENT FRONT VIEWS
AND LOAD TABULATIONS

STEPHEN E. BAILEY
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Sheet No.
E-7



WTP NO. 1 OVERALL CONTROL WIRING DIAGRAM
SCALE: N.T.S.

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Seminole County, Florida

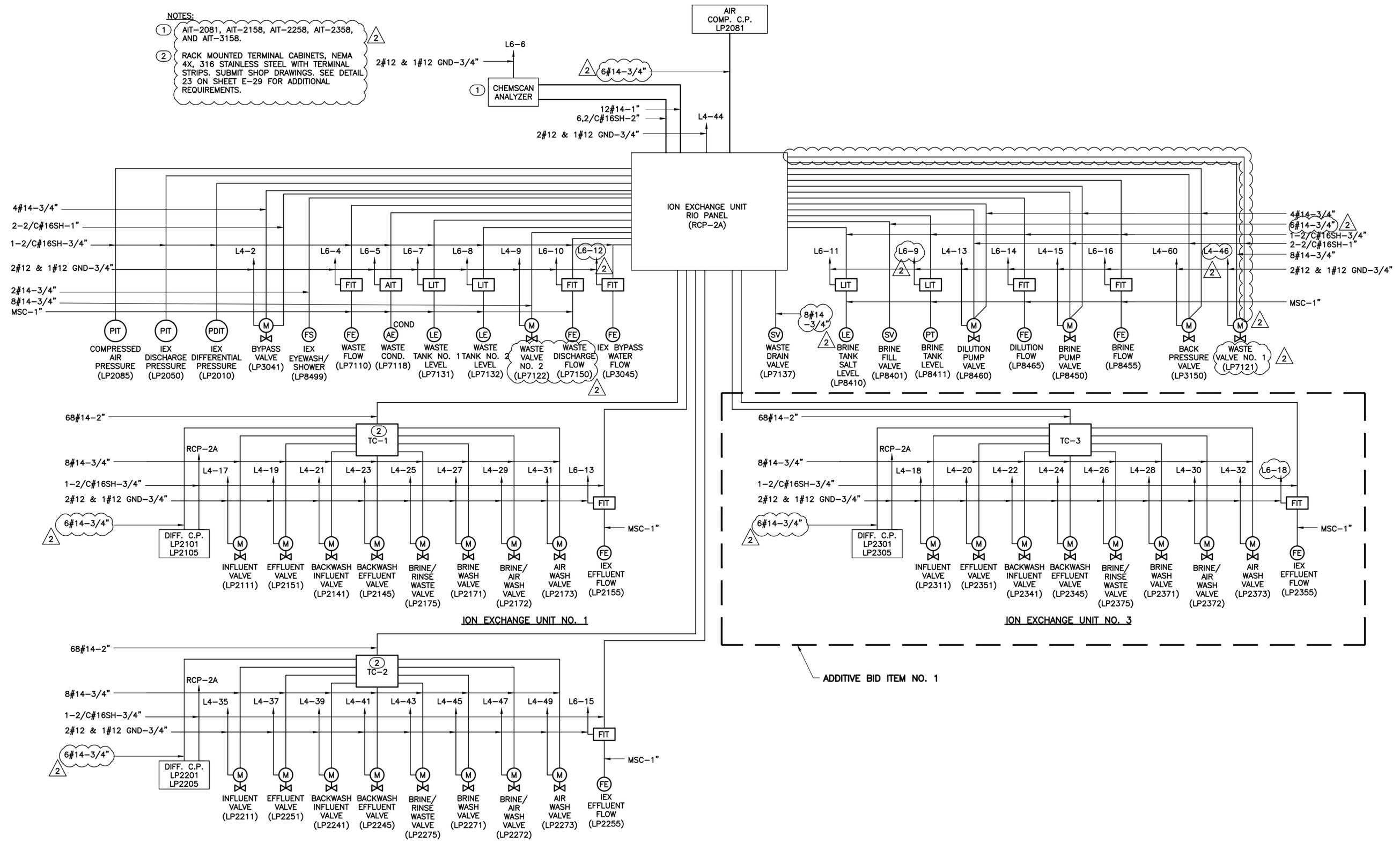
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REG-# 42461

CONTROL WIRING DIAGRAM

Sheet No.
F-8

- NOTES:**
- ① AIT-2081, AIT-2158, AIT-2258, AIT-2358, AND AIT-3158.
 - ② RACK MOUNTED TERMINAL CABINETS, NEMA 4X, 316 STAINLESS STEEL WITH TERMINAL STRIPS. SUBMIT SHOP DRAWINGS. SEE DETAIL 23 ON SHEET E-29 FOR ADDITIONAL REQUIREMENTS.



WTP NO. 1 IEX PCP CONTROL WIRING RISER DIAGRAM

SCALE: N.T.S.

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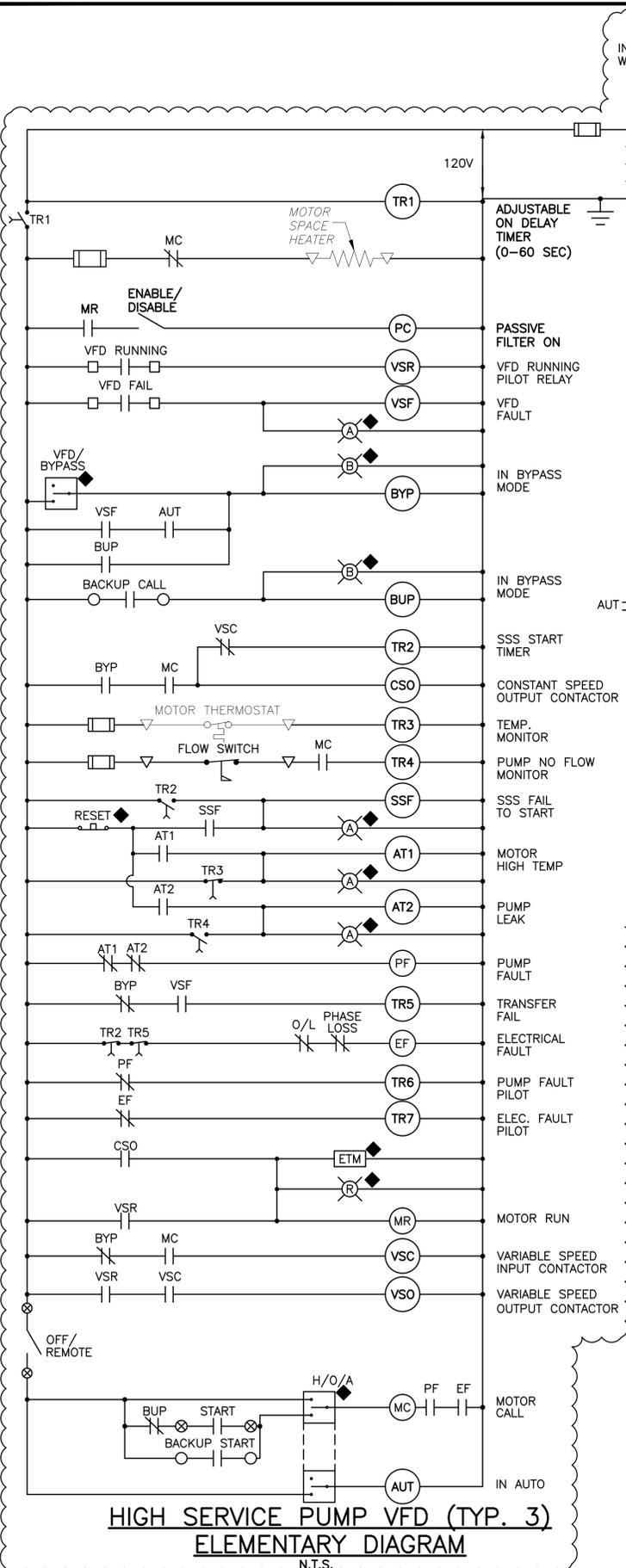
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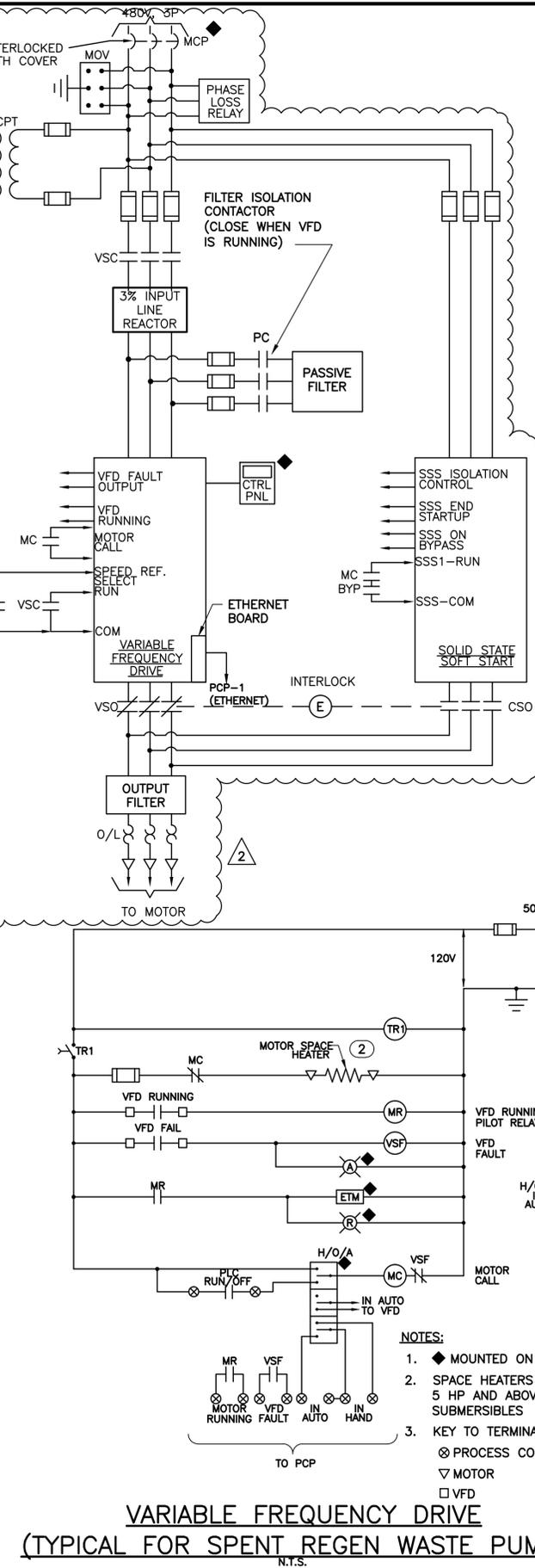
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ION EXCHANGE CONTROL WIRING DIAGRAM

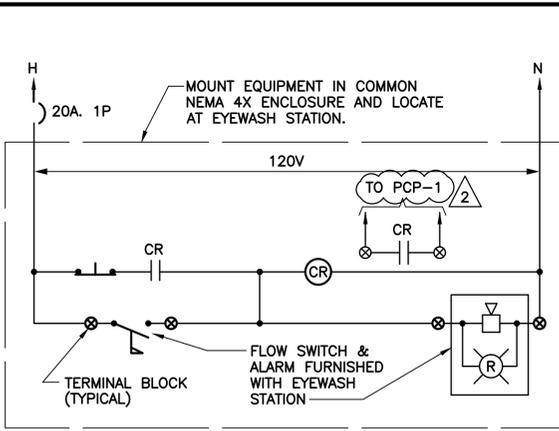
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F-9



**HIGH SERVICE PUMP VFD (TYP. 3)
ELEMENTARY DIAGRAM**
N.T.S.

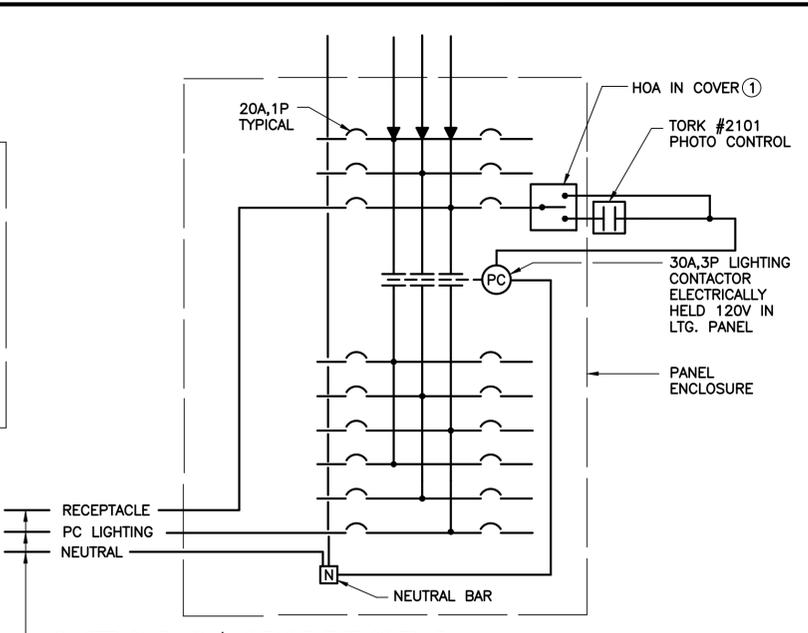


**VARIABLE FREQUENCY DRIVE
(TYPICAL FOR SPENT REGEN WASTE PUMPS)**
N.T.S.



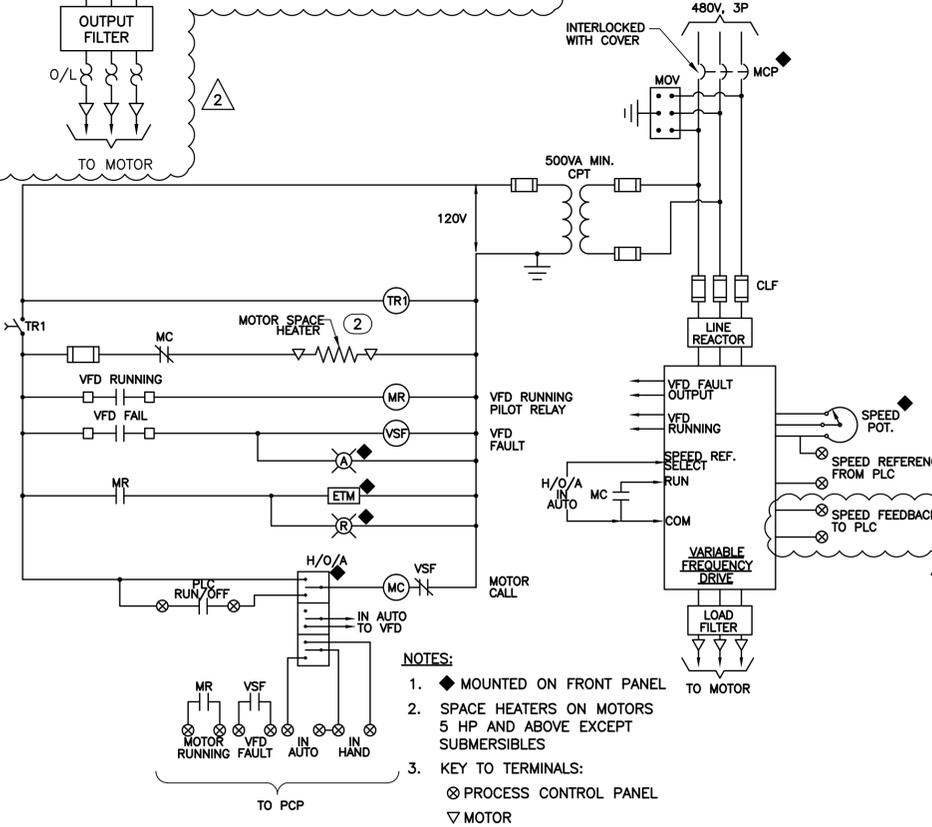
**EYEWASH ALARM & RESET PANEL
SCHEMATIC WIRING DIAGRAM**
N.T.S.

- NOTES:**
- ① ◆ MOUNTED ON FRONT PANEL.
 - ② KEY TO TERMINALS:
 ⊗ PROCESS CONTROL PANEL (HARD-WIRED)
 ○ BACKUP CONTROL PANEL
 ▽ MOTOR/FIELD
 □ VFD OR SSS

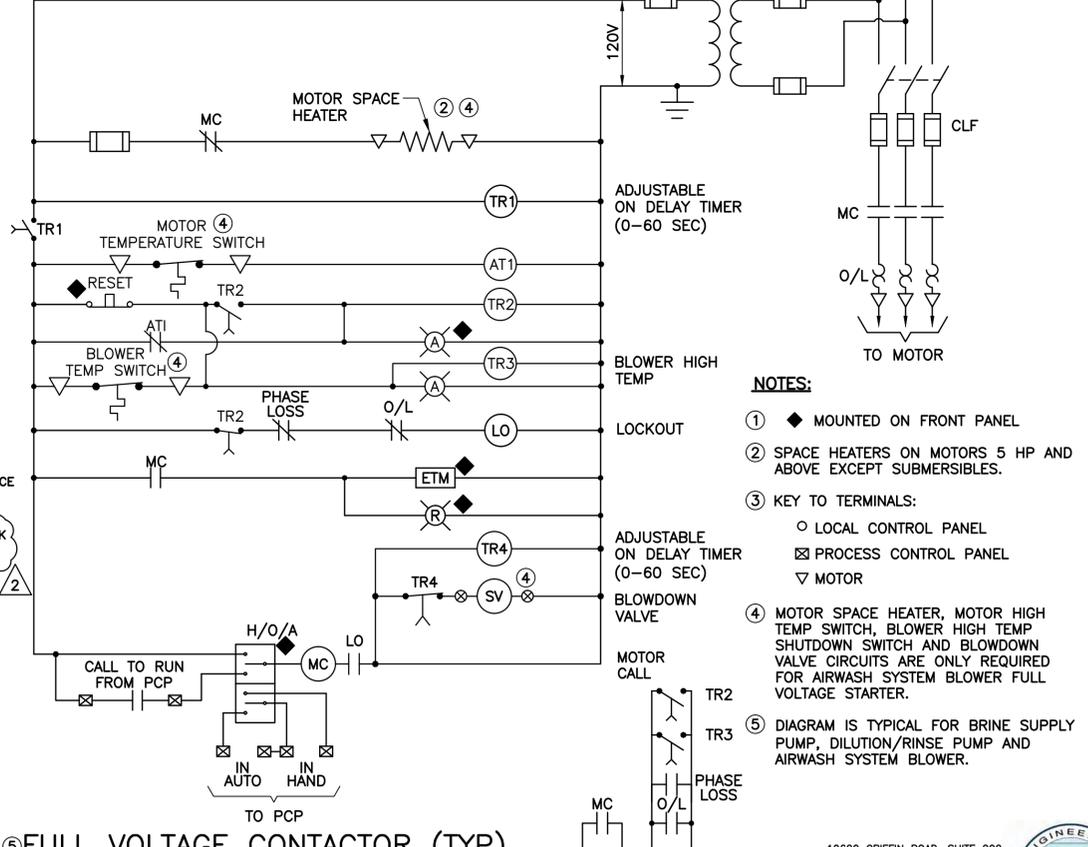


LIGHTING CONTACTOR PANEL PC3 & PC4
SCALE: N.T.S.

- NOTES:**
- ① HOA SWITCH SHALL BE INSTALLED THROUGH OUTER DOOR OF CONTACTOR PANEL.
 - ② LIGHTING CONTACTOR PANEL TO BE BUILT TO U.L. 508 STANDARDS.



⑤ FULL VOLTAGE CONTACTOR (TYP)
N.T.S.



- NOTES:**
- ① ◆ MOUNTED ON FRONT PANEL.
 - ② SPACE HEATERS ON MOTORS 5 HP AND ABOVE EXCEPT SUBMERSIBLES.
 - ③ KEY TO TERMINALS:
 ○ LOCAL CONTROL PANEL
 ⊗ PROCESS CONTROL PANEL
 ▽ MOTOR
 - ④ MOTOR SPACE HEATER, MOTOR HIGH TEMP SWITCH, BLOWER HIGH TEMP SHUTDOWN SWITCH AND BLOWDOWN VALVE CIRCUITS ARE ONLY REQUIRED FOR AIRWASH SYSTEM BLOWER FULL VOLTAGE STARTER.
 - ⑤ DIAGRAM IS TYPICAL FOR BRINE SUPPLY PUMP, DILUTION/RINSE PUMP AND AIRWASH SYSTEM BLOWER.

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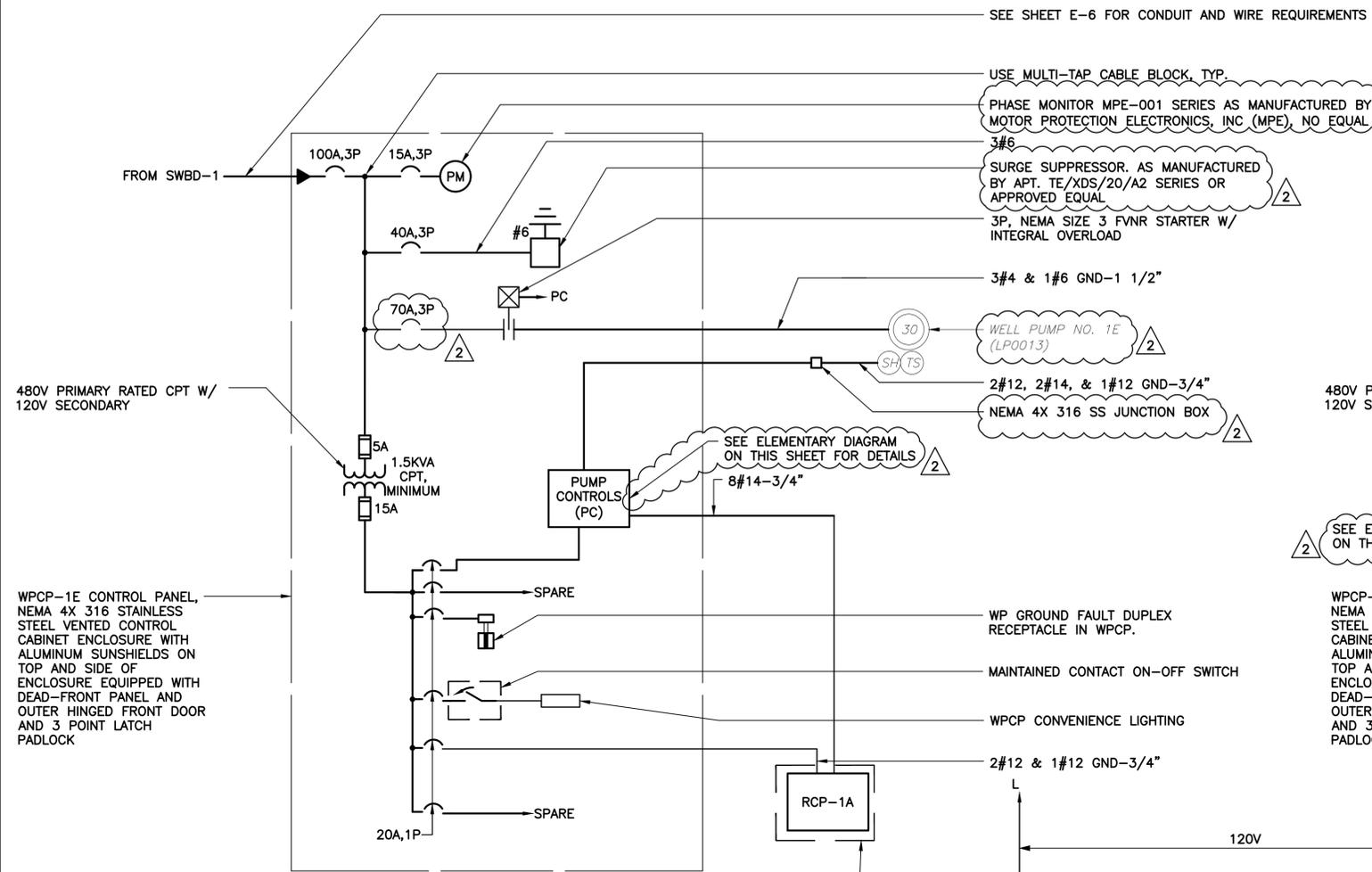
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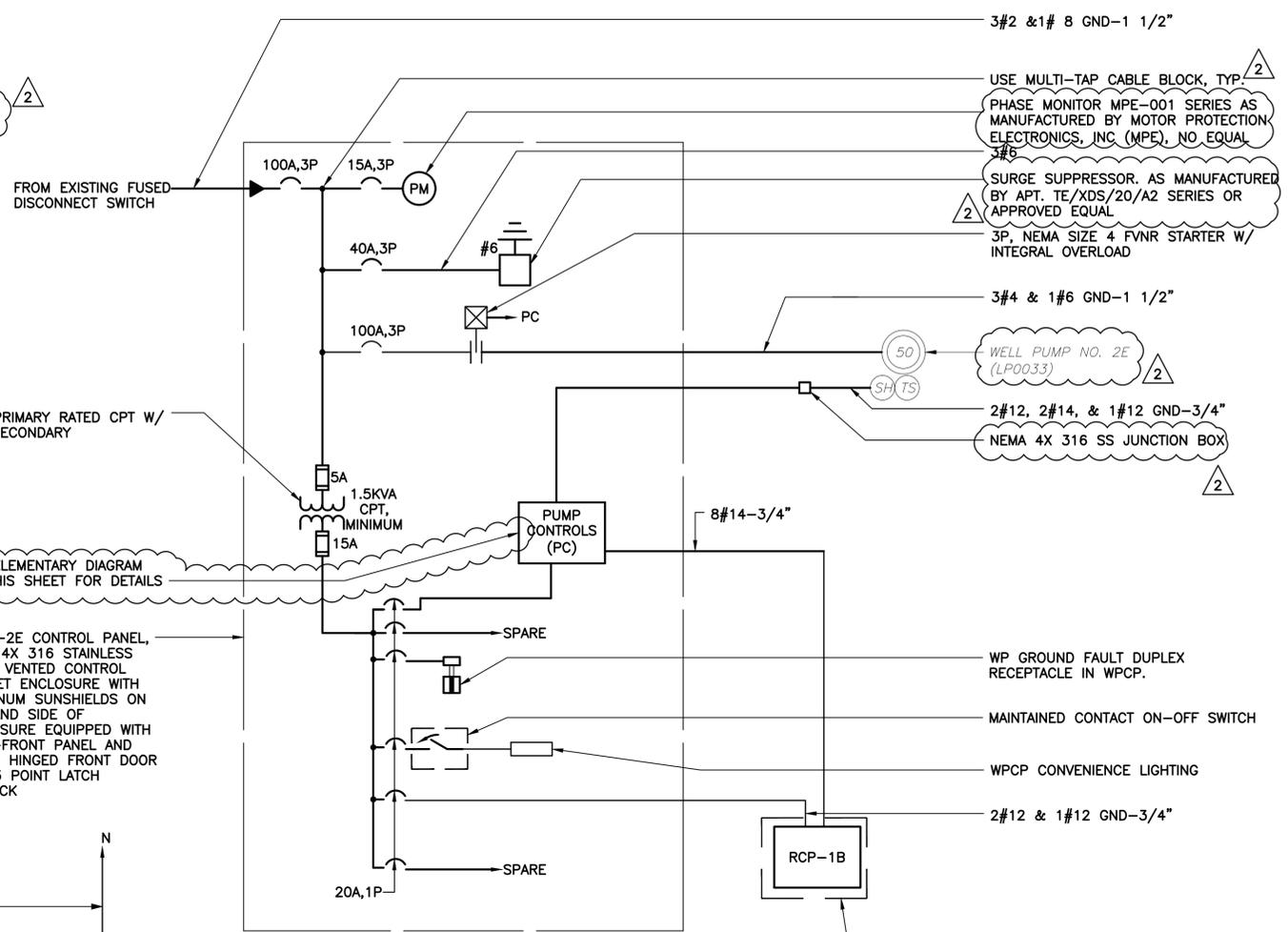
ELEMENTARY DIAGRAMS

Sheet No.
E-10



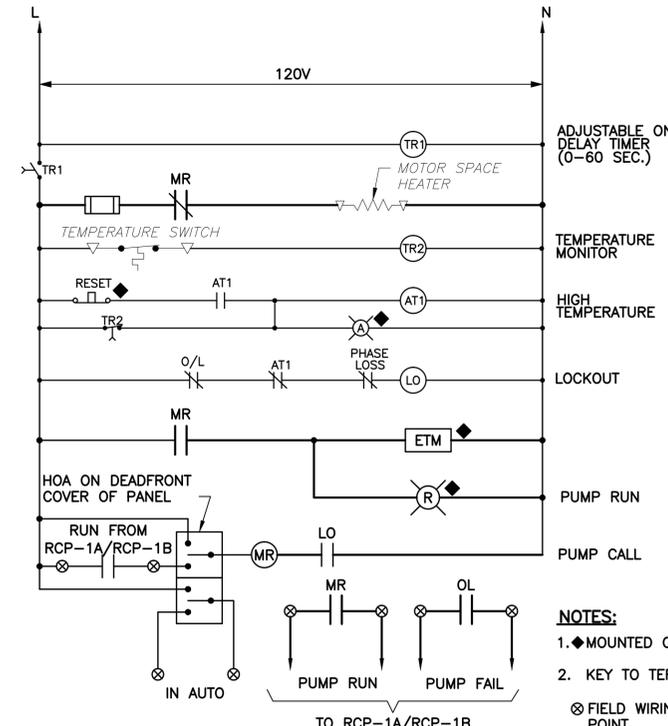
WPCP-1E RISER DIAGRAM
N.T.S.

SEE SHEET E-8 FOR ADDITIONAL INFORMATION



WPCP-2E RISER DIAGRAM
N.T.S.

SEE SHEET E-8 FOR ADDITIONAL INFORMATION



WELL PUMP NO. 1E AND 2E ELEMENTARY DIAGRAM
N.T.S.

- NOTES:**
- ◆ MOUNTED ON FRONT PANEL.
 - KEY TO TERMINALS.
- ⊗ FIELD WIRING/REMOTE TERMINAL BLOCK POINT.
- ▽ MOTOR CONNECTION.

WPCP-1E CONTROL PANEL, NEMA 4X 316 STAINLESS STEEL VENTED CONTROL CABINET ENCLOSURE WITH ALUMINUM SUNSHIELDS ON TOP AND SIDE OF ENCLOSURE EQUIPPED WITH DEAD-FRONT PANEL AND OUTER HINGED FRONT DOOR AND 3 POINT LATCH PADLOCK

WPCP-2E CONTROL PANEL, NEMA 4X 316 STAINLESS STEEL VENTED CONTROL CABINET ENCLOSURE WITH ALUMINUM SUNSHIELDS ON TOP AND SIDE OF ENCLOSURE EQUIPPED WITH DEAD-FRONT PANEL AND OUTER HINGED FRONT DOOR AND 3 POINT LATCH PADLOCK

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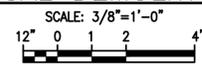
BIDSET

WELL PUMP RISER DIAGRAMS



Sheet No.
E-11

WTP NO. 1 EXISTING HIGH SERVICE PUMP BLDG. & GENERATOR BLDG. ELECTRICAL DEMOLITION PLAN



EXISTING DAY TANK ELECTRICAL ITEMS TO BE DISCONNECTED AND REMOVED

EXISTING GENERATOR TO BE DISCONNECTED AND REMOVED

EXISTING BATTERIES TO BE DISCONNECTED AND REMOVED

EXISTING RETURN TANK ELECTRICAL ITEMS TO BE DISCONNECTED AND REMOVED

EXISTING DEF STANDBY METER TO BE DISCONNECTED AND REMOVED

EXISTING BACKUP ALARM PANEL TO BE DISCONNECTED, REMOVED AND RETURNED TO OWNER

EXISTING GENERATOR CONTROL PANEL TO BE DISCONNECTED AND REMOVED

EXISTING LIGHTING PANEL TO BE DISCONNECTED AND REMOVED

DEMOLITION NOTES:

- ALL EXISTING LIGHTING, RECEPTACLES, POWER AND CONTROL CONDUIT AND WIRE TO BE DISCONNECTED AND REMOVED.
- EXISTING PCP ENCLOSURE TO BE DISCONNECTED AND REMOVED.
- ALL EXISTING CONDUITS IN THE SLAB AND/OR WALLS SHALL BE CUT AT THE POINT OF CONCEALMENT, THREADED AND CAPPED, TYPICAL.
- SEE DEMOLITION SINGLE LINE DIAGRAM ON SHEET E-5 FOR ADDITIONAL REQUIREMENTS.

EXISTING AT'S TO BE DISCONNECTED AND REMOVED

EXISTING PANEL P1 TO BE DISCONNECTED AND REMOVED

EXISTING UTILITY METER & CT CABINET TO BE DISCONNECTED AND REMOVED

EXISTING PANEL L1 TO REMAIN

EXISTING TRANSFORMER TO REMAIN
WELL NO. 3 DISCONNECT SWITCH TO BE DISCONNECTED AND REMOVED

EXISTING HSP NO. 3 DISCONNECT/STARTER TO BE DISCONNECTED AND REMOVED

EXISTING MAIN BREAKER TO BE DISCONNECTED AND REMOVED

EXISTING VFD'S AND BYPASS CONTACTORS TO BE DISCONNECTED, REMOVED AND RETURNED TO OWNER (TYP.)

EXISTING HSP NO. 1 & NO. 2 LINE REACTORS TO BE DISCONNECTED AND REMOVED

EXISTING PRESSURE SWITCHES TO BE DISCONNECTED AND REMOVED

EXISTING HSP PRESSURE SWITCH RESET ENCLOSURE TO BE DISCONNECTED AND REMOVED

EXISTING HSP NO. 3 TIMER RELAY PANEL TO BE DISCONNECTED AND REMOVED

EXISTING PCP TO BE DISCONNECTED AND REMOVED. EXISTING RADIO TO BE RELOCATED TO NEW PCP-1 IN ELEC. BLDG.

EXISTING FPP (ABOVE PCP) TO REMAIN

EXISTING PRESSURE CHART RECORDER TO BE DISCONNECTED AND REMOVED

EXISTING CHLORINE CHART RECORDER TO BE DISCONNECTED AND REMOVED

EXISTING FLOW CHART RECORDER TO BE DISCONNECTED AND REMOVED

EXISTING FIT (LP5550) TO BE RELOCATED TO HSP ROOM, SEE SHEET E-13 FOR NEW LOCATION

EXISTING HSP NO. 3 TIMER RELAY PANEL TO BE DISCONNECTED AND REMOVED

EXISTING HSP PRESSURE SWITCH RESET ENCLOSURE TO BE DISCONNECTED AND REMOVED

EXISTING HSP NO. 3 TIMER RELAY PANEL TO BE DISCONNECTED AND REMOVED

EXISTING HSP NO. 3 TIMER RELAY PANEL TO BE DISCONNECTED AND REMOVED

EXISTING HSP NO. 3 TIMER RELAY PANEL TO BE DISCONNECTED AND REMOVED

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EXISTING HSP NO. 3 TIMER RELAY PANEL TO BE DISCONNECTED AND REMOVED

EXISTING HSP NO. 3 TIMER RELAY PANEL TO BE DISCONNECTED AND REMOVED



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CITY OF WINTER SPRINGS
WATER TREATMENT PLANT 1
WATER QUALITY IMPROVEMENTS
Seminole County, Florida

Plans Prepared By:
CPH, Inc.
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Ph: 407.425.0452
Licenses:
Eng. C.O.A. No. 3215 Arch. Lic. No. AA2600926
Survey L.B. No. 7143 Landscp. Lic. No. LC0000298

STEPHEN E. BAILEY
REG-# 42461

WTP NO. 1 EXISTING HSP BLDG. & GENERATOR BUILDING ELECTRICAL DEMOLITION PLAN

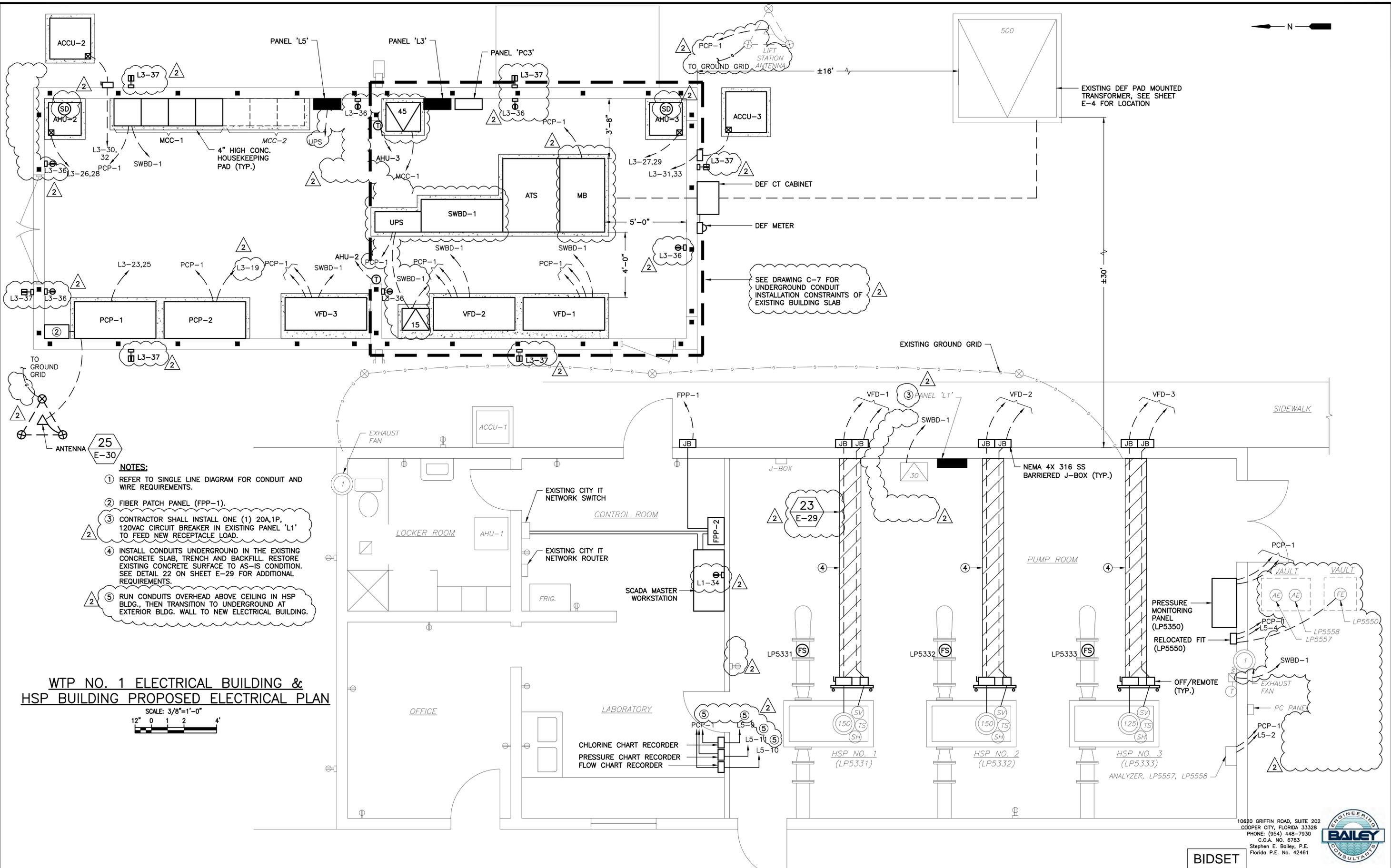
Sheet No.
E-12



BIDSET

SHUNT TRIP STATION
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- NOTES:**
- REFER TO SINGLE LINE DIAGRAM FOR CONDUIT AND WIRE REQUIREMENTS.
 - FIBER PATCH PANEL (FPP-1).
 - CONTRACTOR SHALL INSTALL ONE (1) 20A, 1P, 120VAC CIRCUIT BREAKER IN EXISTING PANEL 'L1' TO FEED NEW RECEPTACLE LOAD.
 - INSTALL CONDUITS UNDERGROUND IN THE EXISTING CONCRETE SLAB, TRENCH AND BACKFILL. RESTORE EXISTING CONCRETE SURFACE TO AS-IS CONDITION. SEE DETAIL 22 ON SHEET E-29 FOR ADDITIONAL REQUIREMENTS.
 - RUN CONDUITS OVERHEAD ABOVE CEILING IN HSP BLDG., THEN TRANSITION TO UNDERGROUND AT EXTERIOR BLDG. WALL TO NEW ELECTRICAL BUILDING.

WTP NO. 1 ELECTRICAL BUILDING & HSP BUILDING PROPOSED ELECTRICAL PLAN

SCALE: 3/8"=1'-0"
 12" 0 1 2 4'

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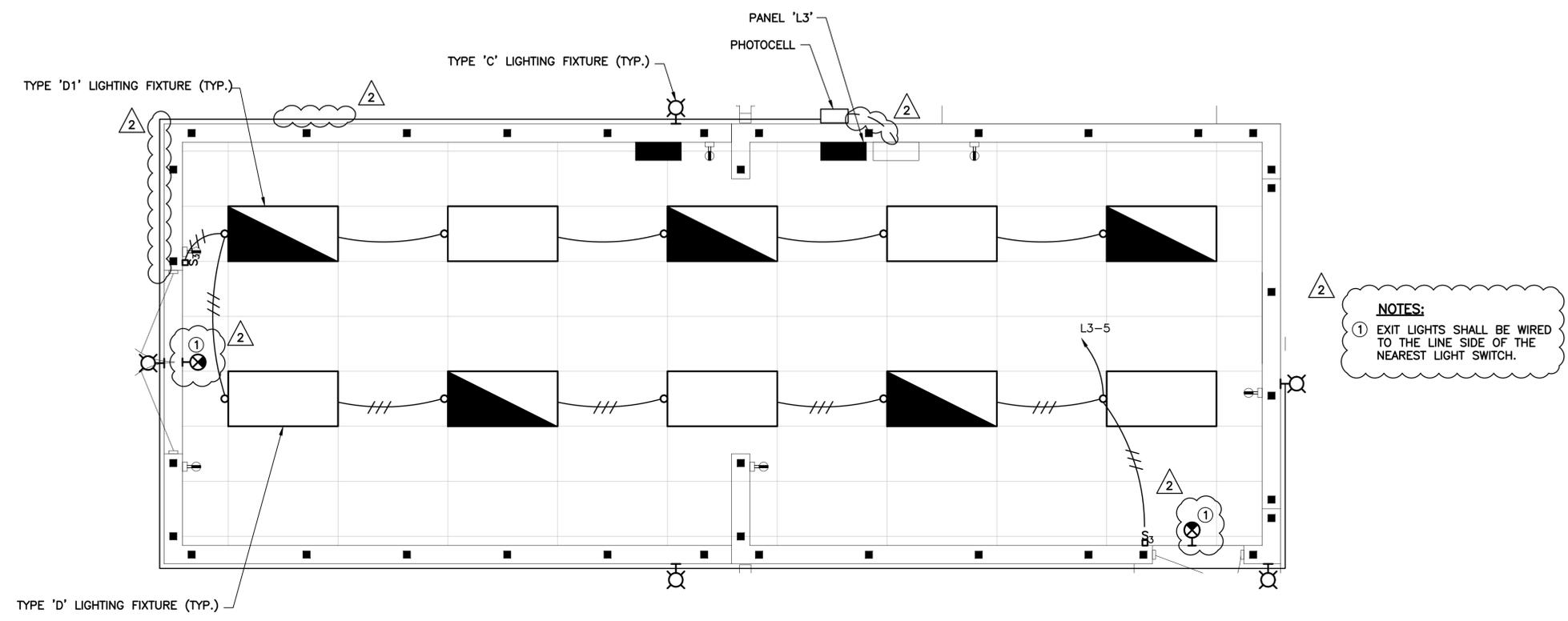
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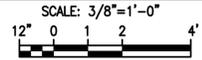
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Sheet No.
E-13

WTP NO. 1 ELECTRICAL BLDG. & HSP BLDG.
 PROPOSED ELECTRICAL PLAN



WTP NO. 1 ELECTRICAL BUILDING PROPOSED LIGHTING PLAN



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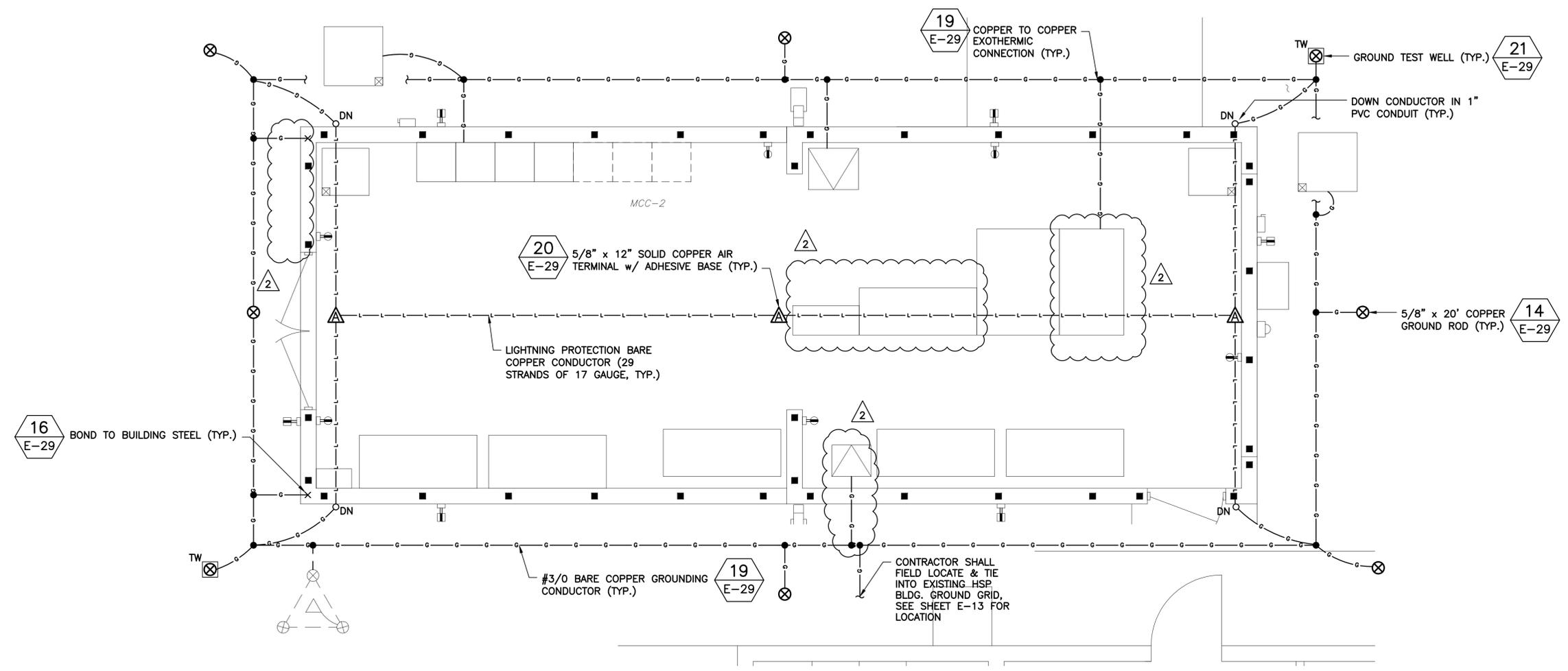
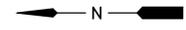
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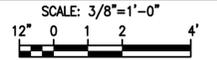
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WTP NO. 1 ELECTRICAL BUILDING
 PROPOSED LIGHTING PLAN

Sheet No.
E-14



WTP NO. 1 ELECTRICAL BUILDING PROPOSED LIGHTNING PROTECTION/GROUNDING PLAN



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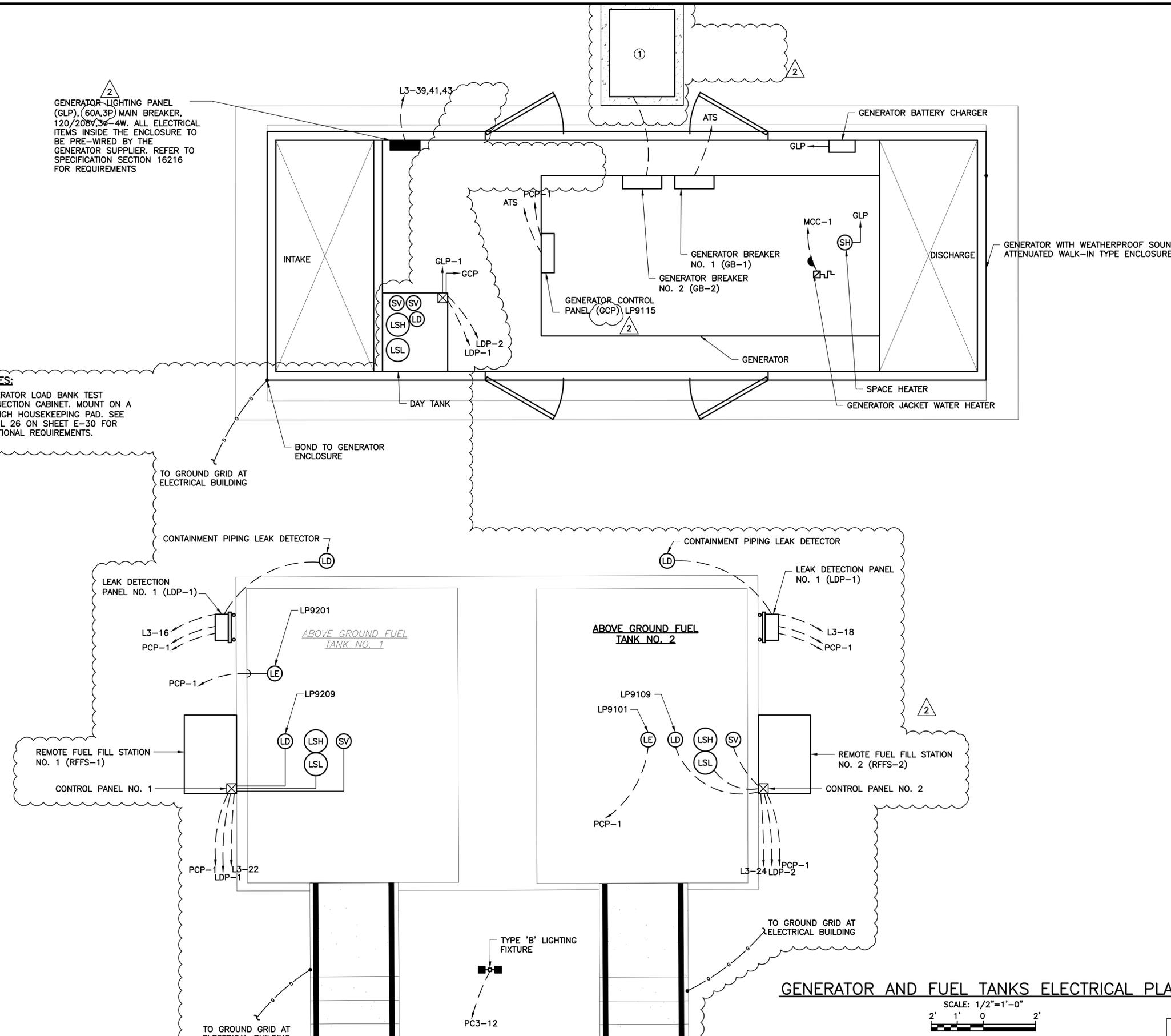
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Sheet No.
E-15

GENERATOR LIGHTING PANEL (GLP), (60A, 3P) MAIN BREAKER, 120/208V, 3Ø-4W. ALL ELECTRICAL ITEMS INSIDE THE ENCLOSURE TO BE PRE-WIRED BY THE GENERATOR SUPPLIER. REFER TO SPECIFICATION SECTION 16216 FOR REQUIREMENTS

NOTES:
 ① GENERATOR LOAD BANK TEST CONNECTION CABINET. MOUNT ON A 4" HIGH HOUSEKEEPING PAD. SEE DETAIL 26 ON SHEET E-30 FOR ADDITIONAL REQUIREMENTS.



GENERATOR AND FUEL TANKS ELECTRICAL PLAN

SCALE: 1/2" = 1'-0"
 2' 1' 0 2'

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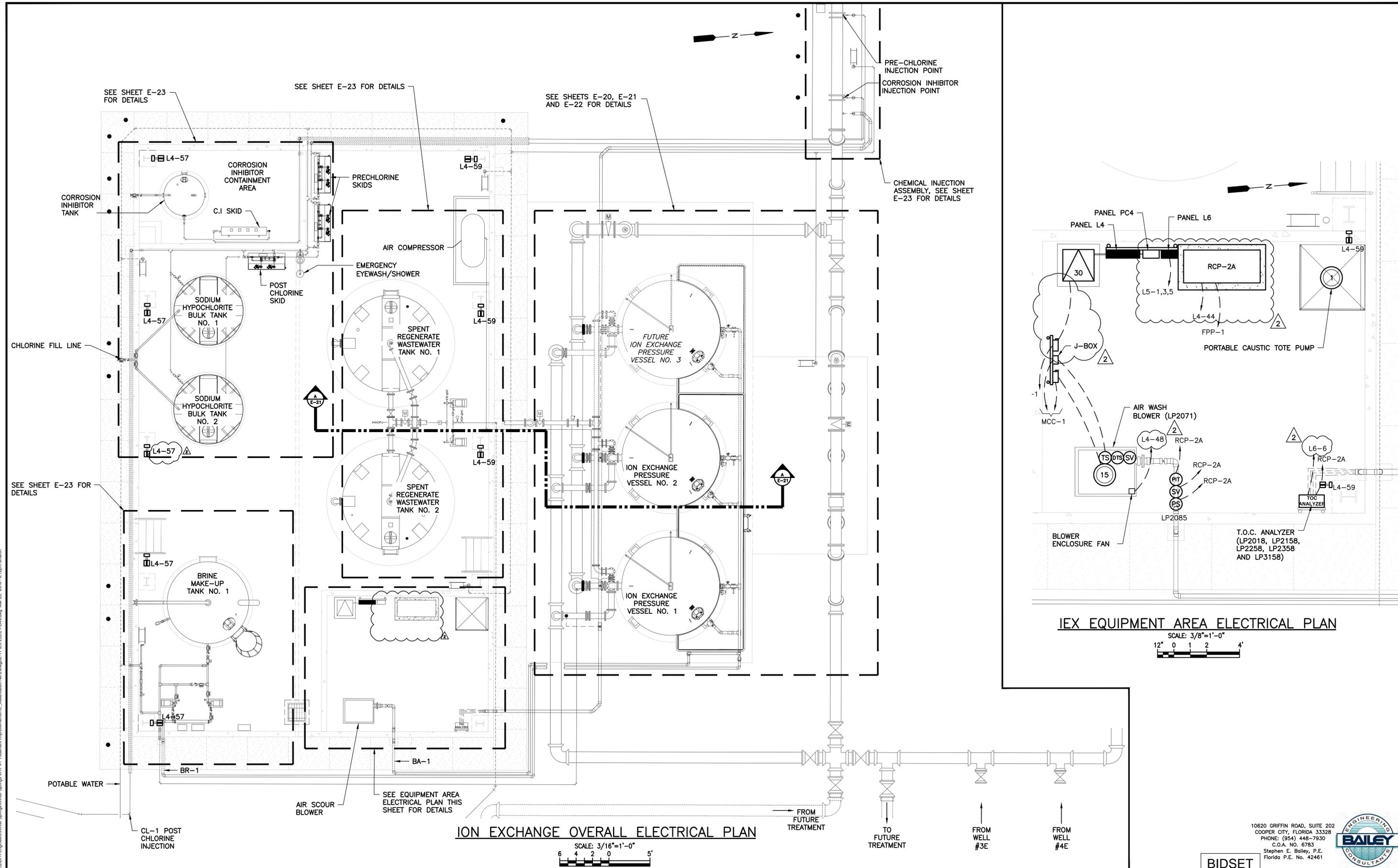
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GENERATOR AND FUEL TANKS
 ELECTRICAL PLAN

Sheet No.
E-16



ION EXCHANGE OVERALL ELECTRICAL PLAN

SCALE: 3/16"=1'-0"
 6 4 2 0 5'

IEX EQUIPMENT AREA ELECTRICAL PLAN

SCALE: 3/8"=1'-0"
 12" 0 1 2 4'

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 REG.# 42461

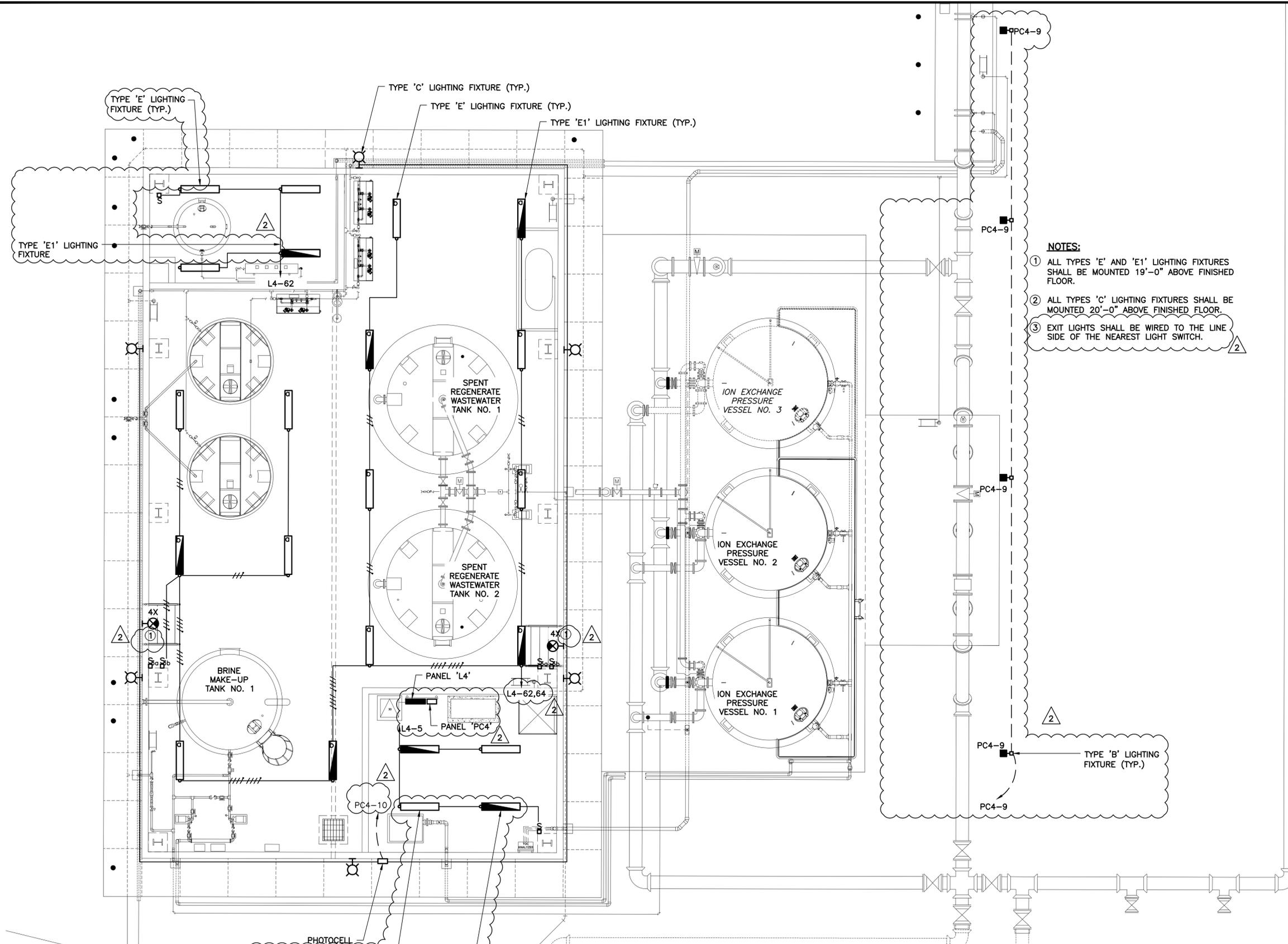
BIDSET
 ION EXCHANGE OVERALL
 ELECTRICAL PLAN

Sheet No.
E-17

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- NOTES:**
- ① ALL TYPES 'E' AND 'E1' LIGHTING FIXTURES SHALL BE MOUNTED 19'-0" ABOVE FINISHED FLOOR.
 - ② ALL TYPES 'C' LIGHTING FIXTURES SHALL BE MOUNTED 20'-0" ABOVE FINISHED FLOOR.
 - ③ EXIT LIGHTS SHALL BE WIRED TO THE LINE SIDE OF THE NEAREST LIGHT SWITCH.

ION EXCHANGE BUILDING LIGHTING PLAN



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 Date: 3/16/2016 11:23:14 AM

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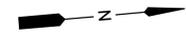
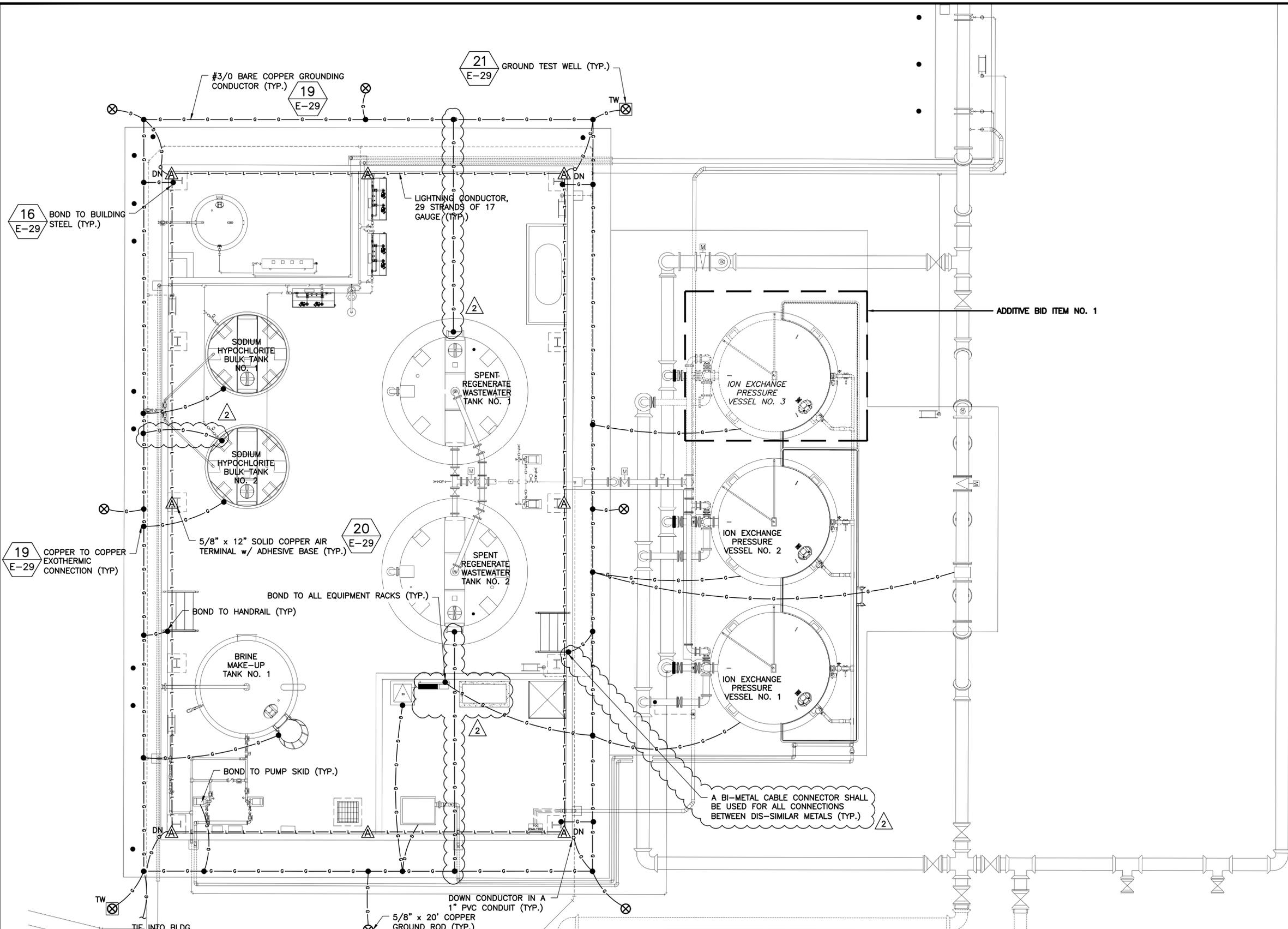
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ION EXCHANGE BUILDING LIGHTING PLAN

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Sheet No.
E-18



ION EXCHANGE LIGHTNING PROTECTION/GROUNDING PLAN

SCALE: 3/16"=1'-0"
 6 4 2 0 5'

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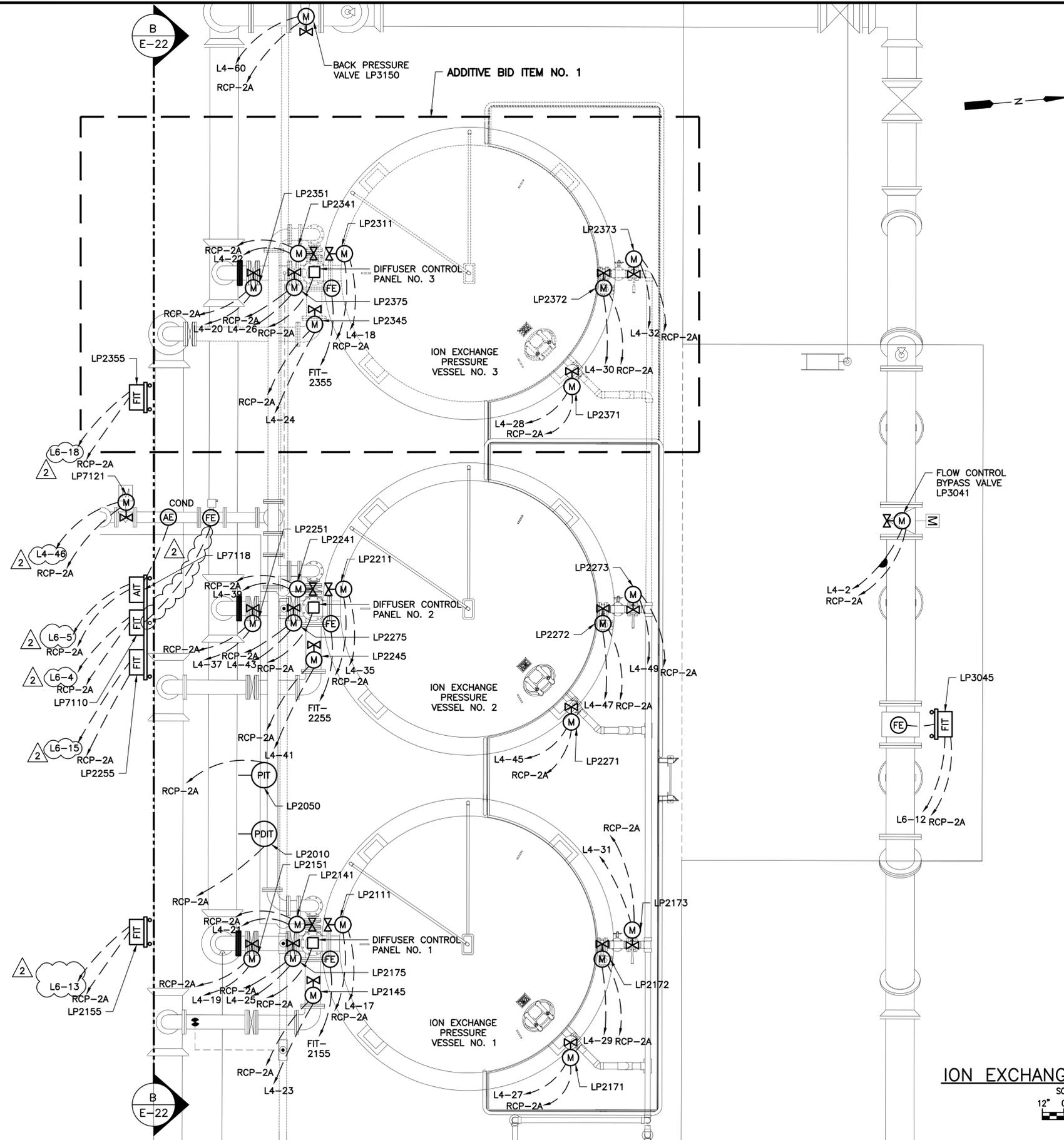
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ION EXCHANGE BLDG.
 LIGHTNING PROTECTION/
 GROUNDING PLAN

Sheet No.
E-19



ION EXCHANGE ELECTRICAL PLAN

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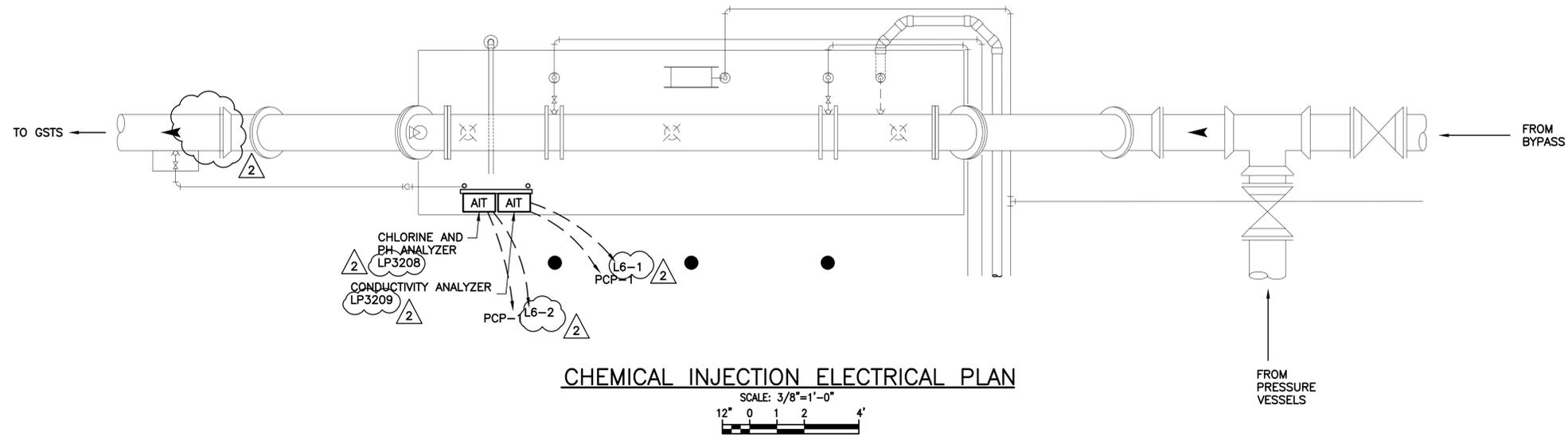
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ION EXCHANGE TANKS ELECTRICAL PLAN

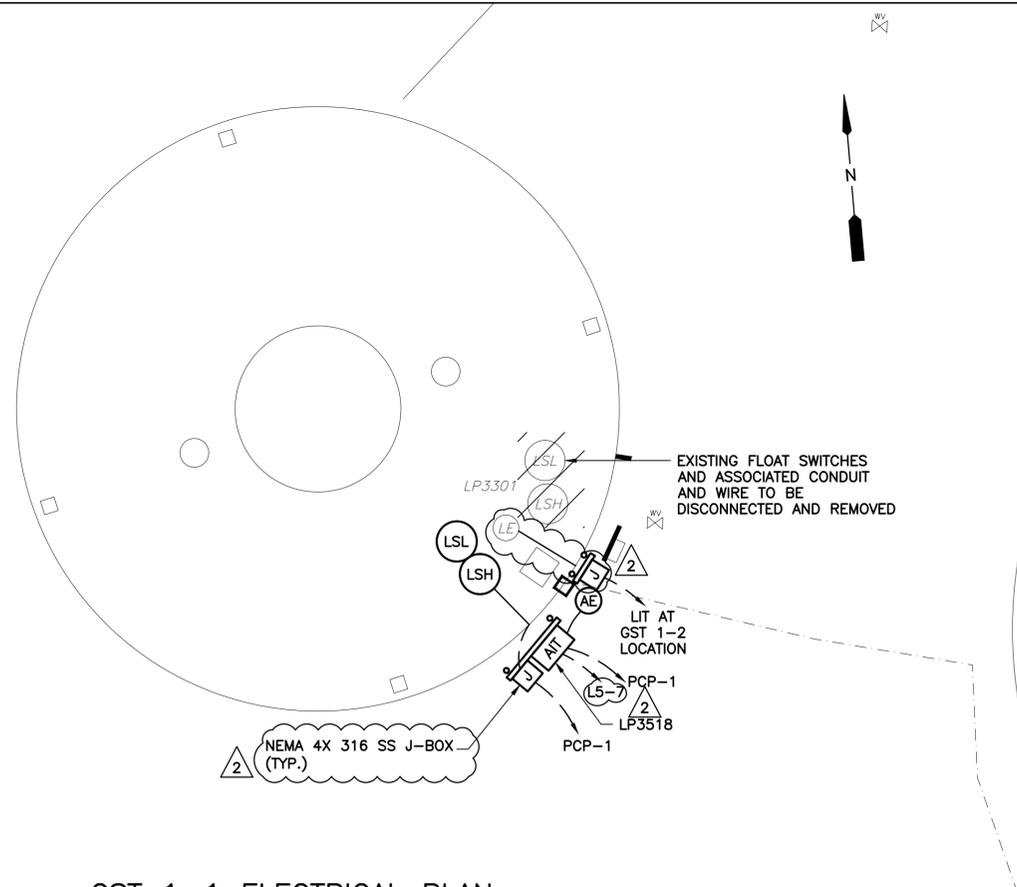
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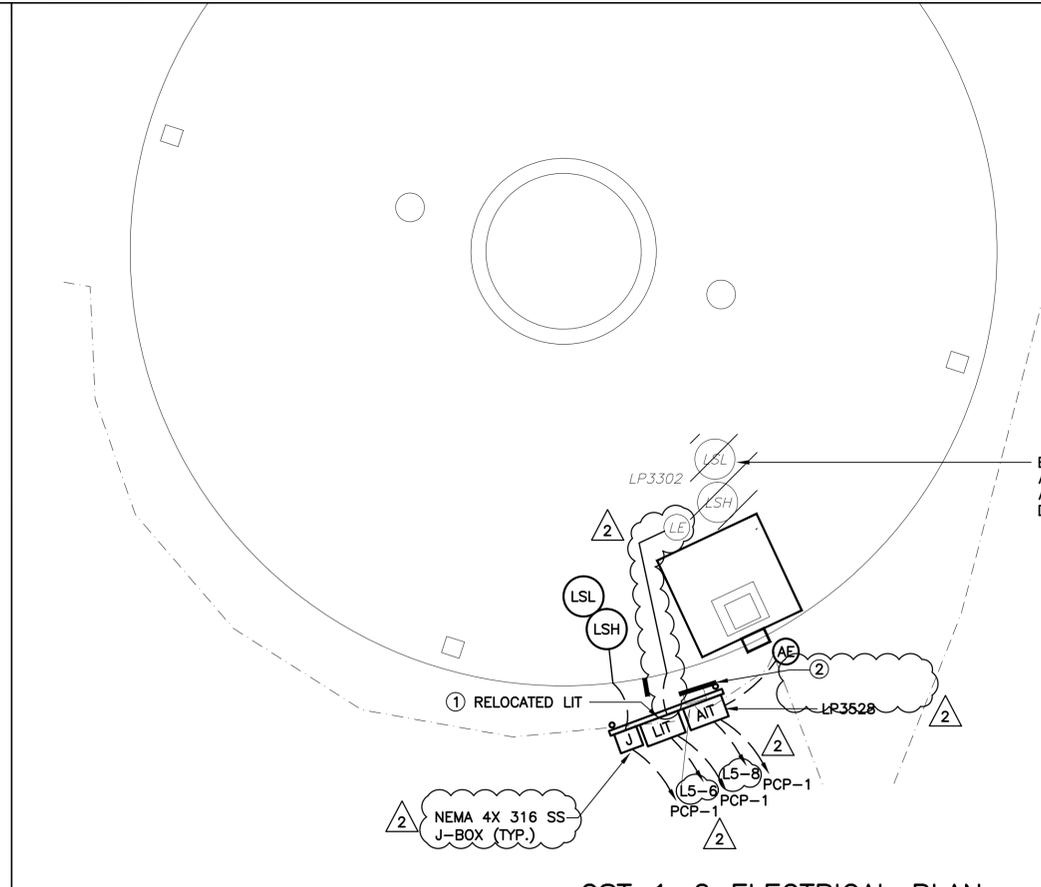
CHEMICAL INJECTION ELECTRICAL PLAN

SCALE: 3/8"=1'-0"
12" 0 1 2 4'



GST 1-1 ELECTRICAL PLAN

SCALE: 3/32"=1'-0"
10 8 6 4 2 0 11'



GST 1-2 ELECTRICAL PLAN

SCALE: 3/32"=1'-0"
10 8 6 4 2 0 11'

- NOTES:**
- 1 PROVIDE SURGE PROTECTION DEVICE FOR RELOCATED LIT PER DIVISION 13 SPECIFICATIONS.
 - 2 EXISTING AIT/LIT ENCLOSURE TO BE DISCONNECTED AND REMOVED. EXISTING LIT SHALL BE MOUNTED IN NEW ENCLOSURE AS SHOWN.

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Δ	2/3/16	BIDSET-SIGNED/SEALED ORIGINAL AT CITY HALL	DD	Δ			
Δ	3/3/16	ADDENDUM NO. 2	DD	Δ			
Δ				Δ			
Δ				Δ			

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Designed by: DD Date: 3/03/2016
Drawn by: DRM Scale: AS NOTED
Checked by: SEB
Approved by: SEB
Job No. W04167 © 2016

CITY OF WINTER SPRINGS
1999

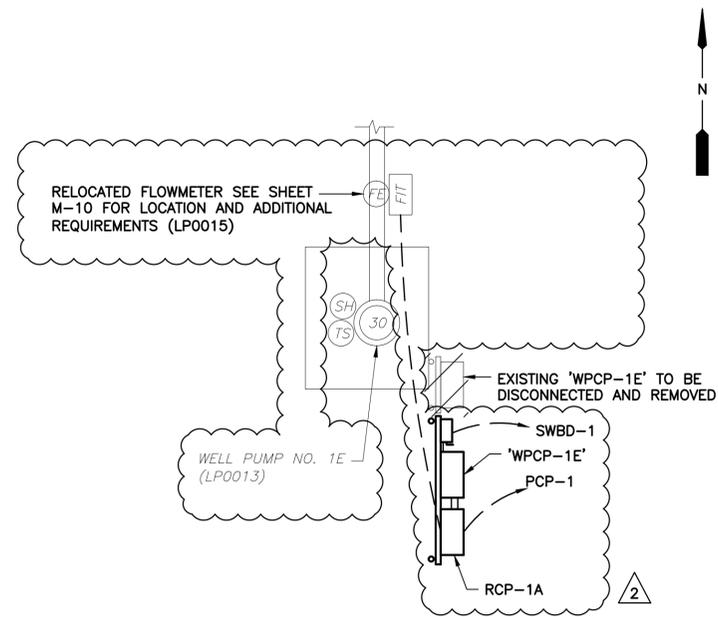
CITY OF WINTER SPRINGS
WATER TREATMENT PLANT 1
WATER QUALITY IMPROVEMENTS
Seminole County, Florida

Plans Prepared By:
CPH, Inc.
1117 E. Robinson St. Orlando, FL 32801
Ph: 407.425.0452
Licenses:
Eng. C.O.A. No. 3215 Arch. Lic. No. AA2600926
Survey L.B. No. 7143 Landscp. Lic. No. LC0000298

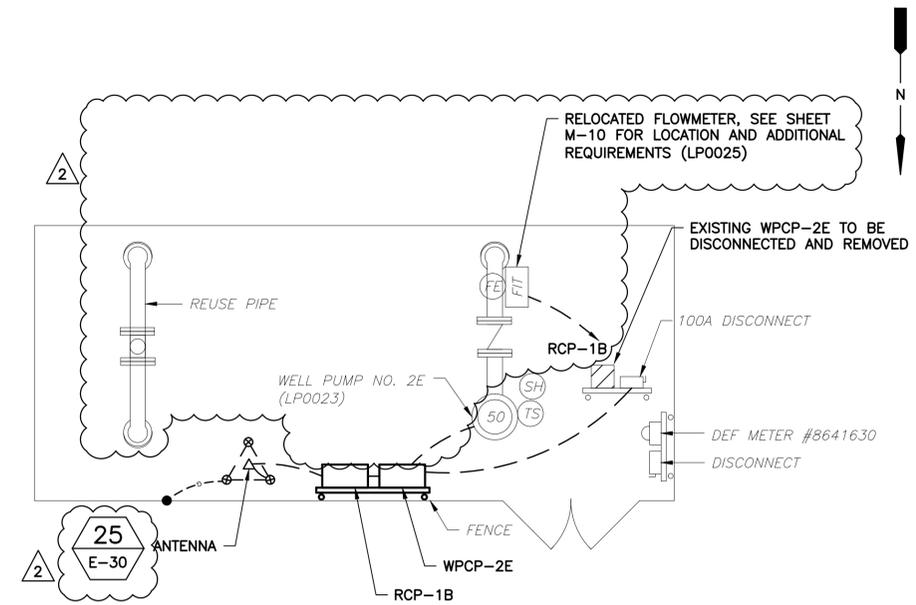
STEPHEN E. BAILEY
REG-# 42461

MISCELLANEOUS ELECTRICAL PLANS

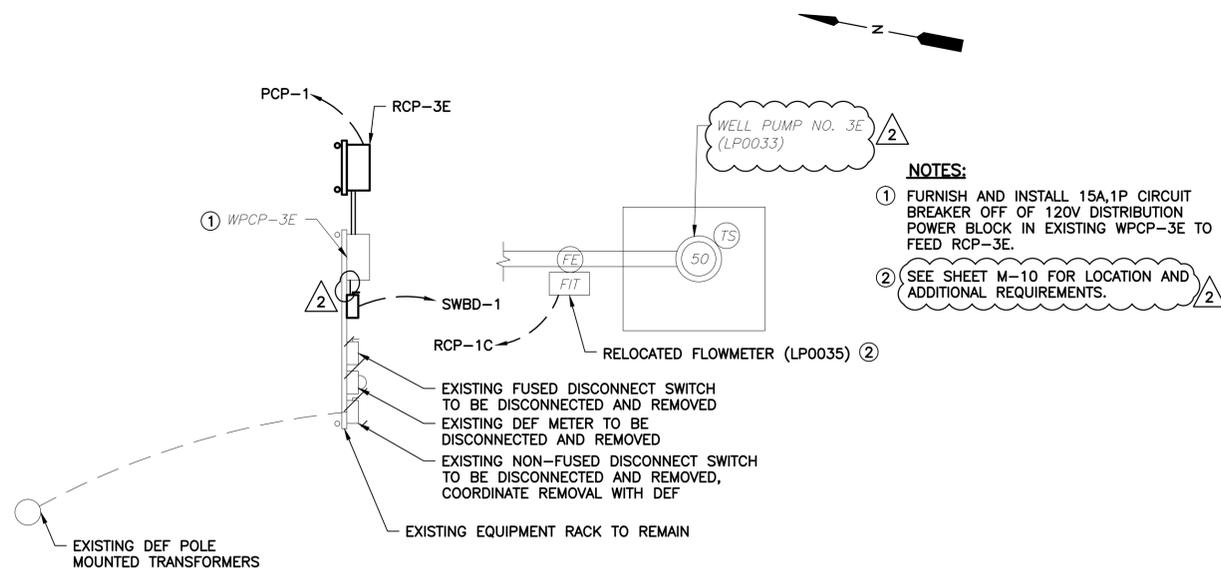
Sheet No.
E-24



EXISTING WELL NO. 1E ELECTRICAL PLAN
SCALE: N.T.S.

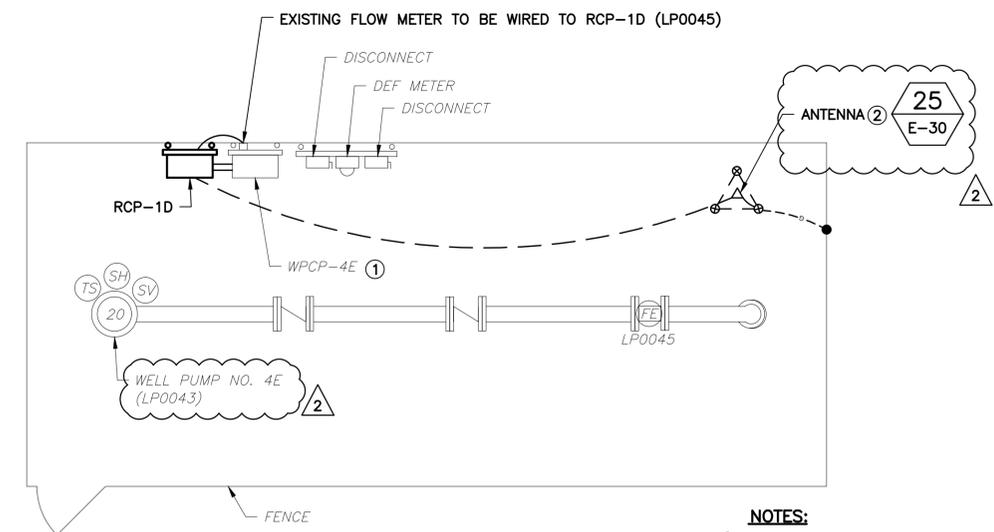


EXISTING WELL NO. 2E ELECTRICAL PLAN
SCALE: N.T.S.



EXISTING WELL NO. 3E ELECTRICAL PLAN
SCALE: N.T.S.

- NOTES:**
- FURNISH AND INSTALL 15A,1P CIRCUIT BREAKER OFF OF 120V DISTRIBUTION POWER BLOCK IN EXISTING WPCP-3E TO FEED RCP-3E.
 - SEE SHEET M-10 FOR LOCATION AND ADDITIONAL REQUIREMENTS.



EXISTING WELL NO. 4E ELECTRICAL PLAN
SCALE: N.T.S.

- NOTES:**
- FURNISH AND INSTALL 15A,1P CIRCUIT BREAKER OFF OF 120V DISTRIBUTION POWER BLOCK IN EXISTING WPCP-4E TO FEED RCP-1D.
 - EXISTING METAL CAGE ABOVE EXISTING WELL AREA TO BE MODIFIED FOR INSTALLATION OF ANTIENNA TOWER. COORDINATE WITH OWNER.

Drawing name: F:\Active Projects\CPH\Engineers\Water Springs\WTP #1 Treatment Improvements\10_Addendum No.2\02p1E-25 WELL PICS.dwg Mar.03. 2016 - 8:14pm dmanin

No.	Date	Revision	By	No.	Date	Revision	By
Δ	2/3/16	BIDSET-SIGNED/SEALED ORIGINAL AT CITY HALL	DD	Δ			
Δ	3/3/16	ADDENDUM NO. 2	DD	Δ			
Δ				Δ			
Δ				Δ			



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Scale: AS NOTED

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CITY OF WINTER SPRINGS
WATER TREATMENT PLANT 1
WATER QUALITY IMPROVEMENTS
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STEPHEN E. BAILEY
REG-# 42461

BIDSET

WELLS
ELECTRICAL DETAILS



Sheet No.
E-25

PANEL: L3										BUS: 225 AMP			VOLT: 120/208V-3φ-4W					
LOCATION: WTP NO. 1 - ELECTRICAL BUILDING										MAINS: 150A,3P MB			REMARKS: PROVIDE SPD					
MOUNTING: SURFACE										POLES: 54			A.I.C. SYMM: 10,000					
AMPS	POLE	WIRE	GND.	COND.	LOAD SERVED	BUS KVA			BUS A B C			LOAD SERVED	WIRE	GND.	COND.	POLE	AMPS	
						A	B	C	A	B	C							
20	1	12	12	3/4"	SHUNT TRIP	0.20			1	2			SPARE			1	20	
20	1				SPARE				3	4			SPARE			1	20	
20	1	12	12	3/4"	INT. LTG			0.70	5	6			SPARE			1	20	
20	1				SPARE				7	8			SPARE			1	20	
20	1				SPARE				9	10			SPARE			1	20	
20	1				SPARE				11	12			SPARE			1	20	
30	3	10	10	1"	PANEL PC3	0.65			13	14			SPARE			1	20	
								0.65	15	16		0.30	LDP-1	12	12	3/4"	1	20
									17	18		0.30	LDP-2	12	12	3/4"	1	20
20	1	12	12	3/4"	PCP-2	0.50			19	20			SPARE			1	20	
20	1				SPARE				21	22		0.20	RFFS-1	12	12	3/4"	1	20
20	1	12	12	3/4"	PCP-1			0.50	23	24		0.20	RFFS-2	12	12	3/4"	1	20
20	1	12	12	3/4"	PCP-1 BACK-UP CIRCUIT	0.20			25	26		0.90	AHU-2	12	12	3/4"	2	15
15	2	12	12	3/4"	AHU-3			0.90	27	28		0.90						
								0.90	29	30		3.13	ACCU-2	8	10	1"	2	40
40	2	8	10	1"	ACCU-3	3.13			31	32		3.13						
								3.13	33	34			SPARE			1	20	
20	2				SPARE			0.10	35	36		1.08	INTERIOR RECEPT.	12	12	3/4"	1	20
20	1	12	12	3/4"	EXT. RECEPT.	1.08			37	38			SPARE			1	20	
60	3	6	10	1 1/4"	PANEL GLP			2.00	39	40			SPARE			1	20	
								2.00	41	42			SPARE			1	20	
									43	44			SPARE			1	20	
20	1				SPARE				45	46			SPARE			1	20	
20	1				SPARE				47	48			SPARE			1	20	
20	1				SPARE				49	50		0.10						
20	1				SPARE				51	52		0.10	SURGE SUPPRESSOR	6	6		3	40
20	1				SPARE				53	54		0.10						
TOTAL (PHASE):						7.76	6.68	4.85		4.13	1.50	4.81	NOTES:					
TOTAL KVA:									29.73									
TOTAL AMPS:									82.52									
TOTAL DEMAND AMPS:									82.52									

SURGE SUPPRESSOR
APT TE/XDS SERIES → SPD

PANEL: PC3										BUS: 100 AMP RATED			VOLT: 208Y/120V,3φ,4W					
LOCATION: WTP NO. 1 ELECTRICAL ROOM										MAINS: 30 AMP - 3 POLE			REMARKS: -					
MOUNTING: SURFACE										POLES: 18			A.I.C. SYMM: 10,000					
AMPS	POLE	WIRE	GND.	COND.	LOAD SERVED	BUS KVA			BUS A B C			LOAD SERVED	WIRE	GND.	COND.	POLE	AMPS	
						A	B	C	A	B	C							
20	1				SPARE				1	2			SPARE			1	20	
20	1				SPARE				3	4		0.10	SPD	10	10		3	30
20	1				SPARE				5	6		0.10						
20	1				SPARE				7	8		0.10						
					30A CONTACTOR								30A CONTACTOR					
20	1				SPARE				9	10		0.37	ELEC BLDG. EXT. LTG.	12	12	3/4"	1	20
20	1	10	10	1"	WEST SITE LTG.			0.92	11	12		0.36	CENTER SITE LTG.	10	10	1"	1	20
20	1				SPARE				13	14			SPARE			1	20	
20	1				SPARE				15	16			SPARE			1	20	
20	1				SPARE				17	18			SPARE			1	20	
TOTAL (PHASE):						0.92				0.10	0.47	0.46	NOTES:					
TOTAL KVA:									1.95									
TOTAL AMPS:									5.41									
TOTAL DEMAND AMPS:									5.41									

SURGE SUPPRESSOR
APT TE/XDS SERIES → SPD

PANEL: L4										BUS: 225 AMP			VOLT: 120/208V-3φ-4W					
LOCATION: WTP NO. 1 IEX BUILDING										MAINS: 100A,3P MB			REMARKS: PROVIDE SPD					
MOUNTING: RACK MOUNTED										POLES: 72			A.I.C. SYMM: 10,000					
AMPS	POLE	WIRE	GND.	COND.	LOAD SERVED	BUS KVA			BUS A B C			LOAD SERVED	WIRE	GND.	COND.	POLE	AMPS	
						A	B	C	A	B	C							
20	1	12	12	3/4"	PCP-2	0.50			1	2		0.20	BYPASS VALVE LP3041	12	12	3/4"	1	20
20	1	12	12	3/4"	EMERGENCY EYEWASH LP8499		0.10		3	4			SPARE			1	20	
20	1	12	12	3/4"	C.I. SUMP PUMP RECEPT.			0.18	5	6		0.72	C.I. PANEL	12	12	3/4"	1	20
20	1				SPARE				7	8			SPARE			1	20	
20	1	12	12	3/4"	WASTE VALVE NO. 2 LP7122		0.20		9	10			SPARE			1	20	
20	1	12	12	3/4"	ELEC. AREA LTG			0.64	11	12			SPARE			1	20	
20	1	12	12	3/4"	DILUTION PUMP VALVE LP8465	0.20			13	14			SPARE			1	20	
20	1	12	12	3/4"	BRINE PUMP VALVE LP8450		0.20		15	16			SPARE			1	20	
20	1	12	12	3/4"	IEX #1 INF. VALVE LP2111			0.20	17	18		0.20	IEX #3 INF. VALVE LP2311	12	12	3/4"	1	20
20	1	12	12	3/4"	IEX #1 EFF. VALVE LP2151	0.20			19	20		0.20	IEX #3 EFF. VALVE LP2351	12	12	3/4"	1	20
20	1	12	12	3/4"	IEX #1 BW. INF. VALVE LP2141		0.20		21	22		0.20	IEX #3 BW. INF. VALVE LP2341	12	12	3/4"	1	20
20	1	12	12	3/4"	IEX #1 BW. INF. VALVE LP2145			0.20	23	24		0.20	IEX #3 BW. INF. VALVE LP2345	12	12	3/4"	1	20
20	1	12	12	3/4"	IEX #1 BRINE WASTE VALVE LP2175	0.20			25	26		0.20	IEX #3 BRINE WASTE VALVE LP2375	12	12	3/4"	1	20
20	1	12	12	3/4"	IEX #1 BRINEWASH VALVE LP2171		0.20		27	28		0.20	IEX #3 BRINEWASH VALVE LP2371	12	12	3/4"	1	20
20	1	12	12	3/4"	IEX #1 BRINE/AIRWASH VALVE LP2172			0.20	29	30		0.20	IEX #3 BRINE/AIRWASH VALVE LP2372	12	12	3/4"	1	20
20	1	12	12	3/4"	IEX #1 AIRWASH VALVE LP2173	0.20			31	32		0.20	IEX #3 AIRWASH VALVE LP2373	12	12	3/4"	1	20
20	1				SPARE				33	34			SPARE			1	20	
20	1	12	12	3/4"	IEX #2 INF. VALVE LP2211			0.20	35	36		0.20	PRE-CL2 SKID 1	12	12	3/4"	1	20
20	1	12	12	3/4"	IEX #2 EFF. VALVE LP2251	0.20			37	38		0.20	PRE-CL2 SKID 2	12	12	3/4"	1	20
20	1	12	12	3/4"	IEX #2 BW. INF. VALVE LP2241		0.20		39	40		0.20	POST-CL2 SKID 1	12	12	3/4"	1	20
20	1	12	12	3/4"	IEX #2 BW. INF. VALVE LP2245			0.20	41	42		0.20	CI SKID 1	12	12	3/4"	1	20
20	1	12	12	3/4"	IEX #2 BRINE WASTE VALVE LP2275	0.20			43	44		0.20	RCP-2A	12	12	3/4"	1	20
20	1	12	12	3/4"	IEX #2 BRINEWASH VALVE LP2271		0.20		45	46		0.20	WASTE VALVE NO. 1 LP7121	12	12	3/4"	1	20
20	1	12	12	3/4"	IEX #2 BRINE/AIRWASH VALVE LP2272			0.20	47	48		0.50	AIRWASH BLOWER FAN	12	12	3/4"	1	20
20	1	12	12	3/4"	IEX #2 AIRWASH VALVE LP2273	0.20			49	50			SPARE			1	20	
20	1				SPARE				51	52			SPARE			1	20	
20	1				SPARE				53	54			SPARE			1	20	
20	1				SPARE				55	56			SPARE			1	20	
20	1	12	12	3/4"	INTERIOR RECEPTACLES			0.72	57	58			SPARE			1	20	
20	1	12	12	3/4"	INTERIOR RECEPTACLES			0.72	59	60		0.20	BACK PRESSURE VALVE LP3150	12	12	3/4"	1	20
20	1				SPARE		0.10		61	62		0.90	INTERIOR LIGHTING	12	12	3/4"	1	20
30	3	10	10	1"	PANEL PC4			0.64	63	64			SPARE			1	20	
									65	66			SPARE			1	20	
								0.64	67	68		0.10	SPD	6	6		3	40
20	1				SPARE				69	70		0.10						
20	1				SPARE				71	72		0.10						
TOTAL (PHASE):						2.64	2.66	3.38		2.20	1.10	2.52	NOTES:					
TOTAL KVA:									14.50			① NEMA 4X 316 SS PANEL						
TOTAL AMPS:									40.25									
TOTAL DEMAND AMPS:									40.25									

SURGE SUPPRESSOR
APT TE/XDS SERIES → SPD

PANEL: PC4										BUS: 100 AMP RATED			VOLT: 208Y/120V,3φ,4W					
LOCATION: WTP NO. 1 IEX BLDG.										MAINS: 30 AMP - 3 POLE			REMARKS: -					
MOUNTING: SURFACE										POLES: 18			A.I.C. SYMM: 10,000					
AMPS	POLE	WIRE	GND.	COND.	LOAD SERVED	BUS KVA			BUS A B C			LOAD SERVED	WIRE	GND.	COND.	POLE	AMPS	
						A	B	C	A	B	C							
20	1	12	12	3/4"	IEX POLE RECEPTACLES	0.72			1	2			SPARE			1	20	
20	1				SPARE				3	4		0.10	SPD	10	10		3	30
20	1				SPARE				5	6		0.10						
20	1				SPARE				7	8		0.10						
					30A CONTACTOR								30A CONTACTOR					
20	1	12	12	3/4"	IEX POLE LTG			0.53	9	10		0.37	IEX BLDG. EXT. LTG.	12	12	3/4"	1	20
20	1				SPARE				11	12			SPARE			1	20	
20	1				SPARE				13	14			SPARE			1	20	
20	1				SPARE													

LIGHTING FIXTURE SCHEDULE

TYPE	WATT	DESCRIPTION	MANUFACTURER
A	208	REFER TO LIGHTING FIXTURE DETAILS THIS SHEET.	AS NOTED
B	100	REFER TO LIGHTING FIXTURE DETAILS THIS SHEET.	AS NOTED
C	44.5	FULL CUT-OFF WALLPACK. DECORATIVE, DIE-CAST ALUMINUM HOUSING AND DOOR. WHITE BRONZE POWDER PAINT FINISHES PROVIDING A LASTING APPEARANCE IN OUTDOOR ENVIRONMENTS. 18 HIGH POWER LEDS, 2038 LUMENS. 4000K/70 CRI. 120V, TYPE III DISTRIBUTION.	RAB LIGHTING OR EQUAL
D	50	2'X4' HIGH EFFICIENCY SURFACE MOUNTED LED FIXTURE WITH 16 GAUGE COLD ROLLED STEEL. 5000K, 4600 LUMENS, ACRYLIC LENS, WHITE FINISH, 120V, UL LISTED FOR DAMP AND WET LOCATIONS.	LITHONIA LIGHTING OR EQUAL
D1	50	SAME AS TYPE 'C'. EXCEPT WITH EMERGENCY BATTERY PACK.	LITHONIA LIGHTING OR EQUAL
E	144	4 FOOT HIGH EFFICACY INDUSTRIAL ENCLOSED AND GASKETED LED HIGH BAY. VERY HIGH LUMEN, FROST IMPACT RESISTANT ACRYLIC, WIDE DISTRIBUTION, FIXED OUTPUT DRIVER, 18,000 LUMENS, FIBERGLASS HOUSING, STAINLESS STEEL LATCHING AND MOUNTING STRAPS. 120V. 67 CRI, 5000K CCT COLOR TEMPERATURE, UL LISTED FOR DAMP AND WET LOCATIONS.	COLUMBIA LXEW SERIES OR EQUAL
E1	144	SAME AS TYPE 'E'. EXCEPT WITH EMERGENCY BATTERY PACK.	COLUMBIA LXEW SERIES OR EQUAL
⊗	5	LED WALL MOUNTED EXIT SIGN WITH CAST ALUMINUM HOUSING AND ALUMINUM STENCIL FACE. BLACK BAKED ENAMEL FINISH, SEALED NICKEL CADMIUM BATTERY, SELF CONTAINED AND AUTO-CHARGING, WALL OR CEILING MOUNTED AS REQUIRED, 120V.	LITHONIA LIGHTING OR EQUAL
⊗ 4		NEMA 4X, SUITABLE FOR USE IN DAMP LOCATIONS. WATERTIGHT AND DUST-TIGHT SEAL, CORROSION RESISTANT POLYCARBONATE HOUSING AND COVER, RED HIGH OUTPUT LEDS, MAINTENANCE FREE NICKEL CADMIUM BATTERY, EXIT SIGNS. 120VOLTS	LITHONIA LIGHTING OR EQUAL

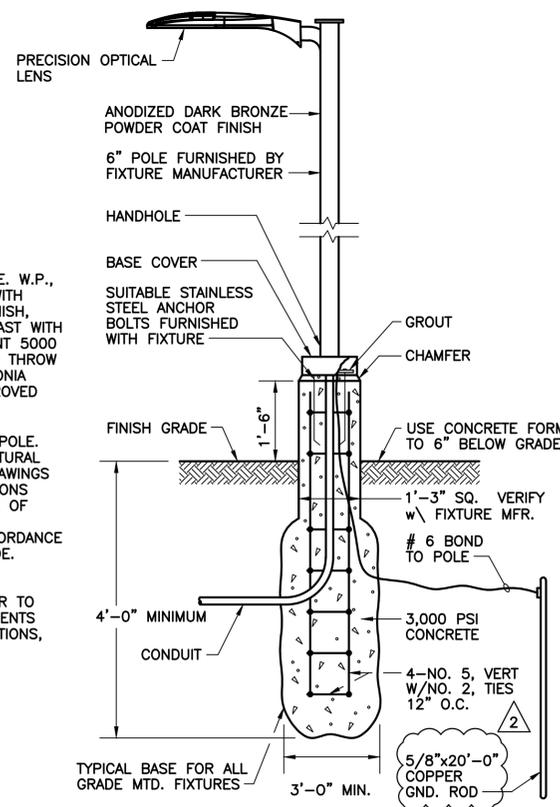
PANEL: L5										BUS: 100 AMP				VOLT: 240/120V, 1Ø, 3W				
LOCATION: WTP NO.1-ELECTRICAL BUILDING										MAINS: 80A, 2P MB				REMARKS: PROVIDE SPD				
MOUNTING: SURFACE										POLES: 24				A.I.C. SYMM: 10,000				
AMPS	POLE	WIRE	GND.	COND.	LOAD SERVED	BUS KVA		BUS		BUS KVA		LOAD SERVED		WIRE	GND.	COND.	POLE	AMPS
						A	B	A	B	A	B							
50	2	6	8	1 1/4"	PANEL L6	0.30		1	2	0.10		AIT LP5558	12	12	3/4"	1	20	
-	-	-	-	-	-		0.30	3	4	0.10		FIT LP5550	12	12	3/4"	1	20	
-	-	-	-	-	-			5	6	0.10		LIT LP3300	12	12	3/4"	1	20	
20	1	12	12	3/4"	AIT LP3518		0.10	7	8		0.10	AIT LP3528	12	12	3/4"	1	20	
20	1	12	12	3/4"	CHLORINE/PH CHART RECORDER	0.10		9	10	0.10		FLOW CHART RECORDER	12	12	3/4"	1	20	
20	1	12	12	3/4"	PRESSURE CHART RECORDER		0.10	11	12			SPARE	-	-	-	1	20	
20	1	-	-	-	SPARE			13	14			SPARE	-	-	-	1	20	
20	1	-	-	-	SPARE			15	16			SPARE	-	-	-	1	20	
20	1	-	-	-	SPARE			17	18			SPARE	-	-	-	1	20	
20	1	-	-	-	SPARE			19	20			SPARE	-	-	-	1	20	
20	1	-	-	-	SPARE			21	22	0.10		SPD	10	10	-	2	30	
20	1	-	-	-	SPARE			23	24	0.10		-	-	-	-	-	-	
TOTAL (PHASE):						0.40	0.50			0.30	0.20	NOTES:						
TOTAL KVA:												-						
TOTAL AMPS:												5.83						
TOTAL DEMAND AMPS:												5.83						

SURGE SUPPRESSOR
APT TE/XDS SERIES

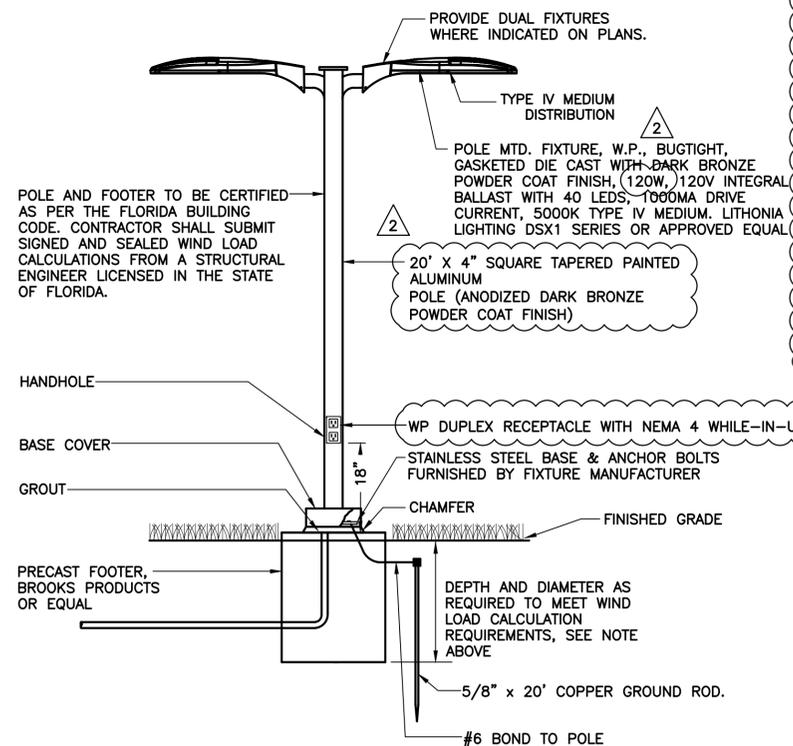
PANEL: L6										BUS: 100 AMP				VOLT: 240/120V, 1Ø, 3W				
LOCATION: IEX BLDG.										MAINS: 50A, 2P MB				REMARKS: PROVIDE SPD				
MOUNTING: RACK										POLES: 30				A.I.C. SYMM: 10,000				
AMPS	POLE	WIRE	GND.	COND.	LOAD SERVED	BUS KVA		BUS		BUS KVA		LOAD SERVED		WIRE	GND.	COND.	POLE	AMPS
						A	B	A	B	A	B							
20	1	12	12	3/4"	AIT LP3209	0.10		1	2	0.10		AIT LP3208	12	12	3/4"	1	20	
20	1	12	12	3/4"	LIT LP8101		0.10	3	4		0.10	LIT LP8102	12	12	3/4"	1	20	
20	1	12	12	3/4"	LIT LP8301	0.10		5	6	0.10		CHEMSCAN ANALYZER	12	12	3/4"	1	20	
20	1	12	12	3/4"	LIT LP7131		0.10	7	8		0.10	LIT LP7132	12	12	3/4"	1	20	
20	1	12	12	3/4"	LIT LP8411	0.10		9	10	0.10		FIT LP7150	12	12	3/4"	1	20	
20	1	12	12	3/4"	LIT LP8410		0.10	11	12		0.10	FIT LP3045	12	12	3/4"	1	20	
20	1	12	12	3/4"	IEX #1 EFF. FLOW LP2155	0.10		13	14	0.10		FIT LP8465	12	12	3/4"	1	20	
20	1	12	12	3/4"	IEX #2 EFF. FLOW LP2255		0.10	15	16		0.10	FIT LP8455	12	12	3/4"	1	20	
20	1	-	-	-	SPARE			17	18	0.10		IEX #3 EFF. FLOW LP2355	12	12	3/4"	1	20	
20	1	-	-	-	SPARE			19	20			SPARE	-	-	-	1	20	
20	1	-	-	-	SPARE			21	22			SPARE	-	-	-	1	20	
20	1	-	-	-	SPARE			23	24			SPARE	-	-	-	1	20	
20	1	-	-	-	SPARE			25	26			SPARE	-	-	-	1	20	
20	1	-	-	-	SPARE			27	28		0.10	SPD	10	10	-	2	30	
20	1	-	-	-	SPARE			29	30	0.10		-	-	-	-	-	-	
TOTAL (PHASE):						0.40	0.40			0.60	0.50	NOTES:						
TOTAL KVA:												1.90						
TOTAL AMPS:												7.92						
TOTAL DEMAND AMPS:												7.92						

SURGE SUPPRESSOR
APT TE/XDS SERIES

- NOTES:**
- POLE MTD. LED LIGHTING FIXTURE. W.P., BUGTIGHT, GASKETED DIE CAST WITH DARK BRONZE POWDER COAT FINISH, 208W MULTI-TAP INTEGRAL BALLAST WITH 60 LEDS, 1000MA DRIVE CURRENT 5000 K COLOR TEMPERATURE. FORWARD THROW MEDIUM MANUFACTURED BY LITHONIA LIGHTING, DSX1 SERIES OR APPROVED EQUAL. TYPE III DISTRIBUTION.
 - 25' ROUND TAPERED ALUMINUM POLE. CONTRACTOR TO PROVIDE STRUCTURAL POLE AND FOOTING DETAILED DRAWINGS INCLUDING WIND LOAD CALCULATIONS SIGNED AND SEALED BY A STATE OF FLORIDA STRUCTURAL ENGINEER. CALCULATIONS SHALL BE IN ACCORDANCE WITH THE FLORIDA BUILDING CODE.
 - DETAIL IS NOT INTENDED AS AN INSTALLATION DETAIL. CONTRACTOR TO CONFIRM INSTALLATION REQUIREMENTS BASED ON STRUCTURAL CALCULATIONS, SEE NOTE ABOVE.



1 TYP. **TYPE 'A' POLE MOUNTED FIXTURE DETAIL**
N.T.S.



2 TYP. **POLE MOUNTED TYPE 'B' FIXTURE DETAIL**
N.T.S.

F:\Active Projects\CPH\Engineers\Winter Springs\WTP #1 Treatment Improvements\10_Addendum No.2\2016\8-17-16\PH.dwg

No.	Date	Revision	By	No.	Date	Revision	By
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Approved by: SEB
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CITY OF WINTER SPRINGS
WATER TREATMENT PLANT 1
WATER QUALITY IMPROVEMENTS
Seminole County, Florida

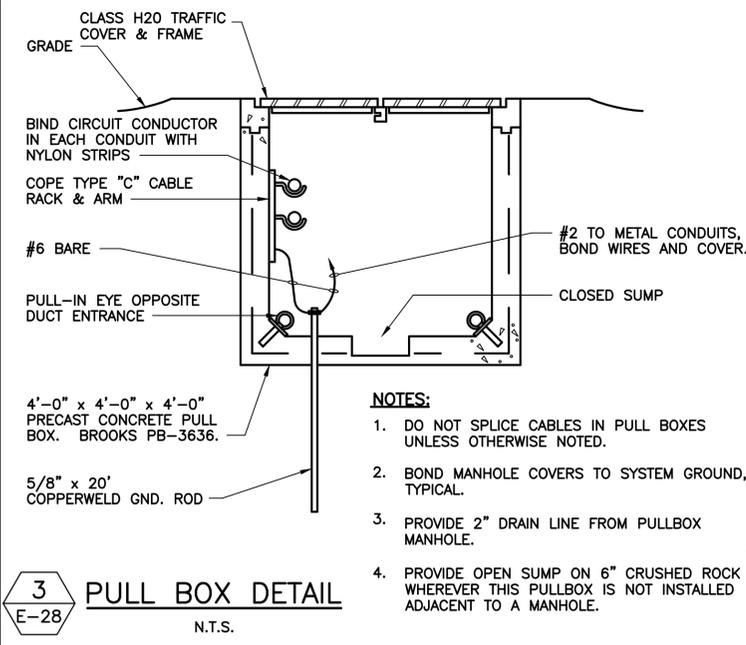
Plans Prepared By:
CPH, Inc.
1117 E. Robinson St. Orlando, FL 32801
Ph: 407.425.0452
Licenses:
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BIDSET

STEPHEN E. BAILEY
REG.# 42461

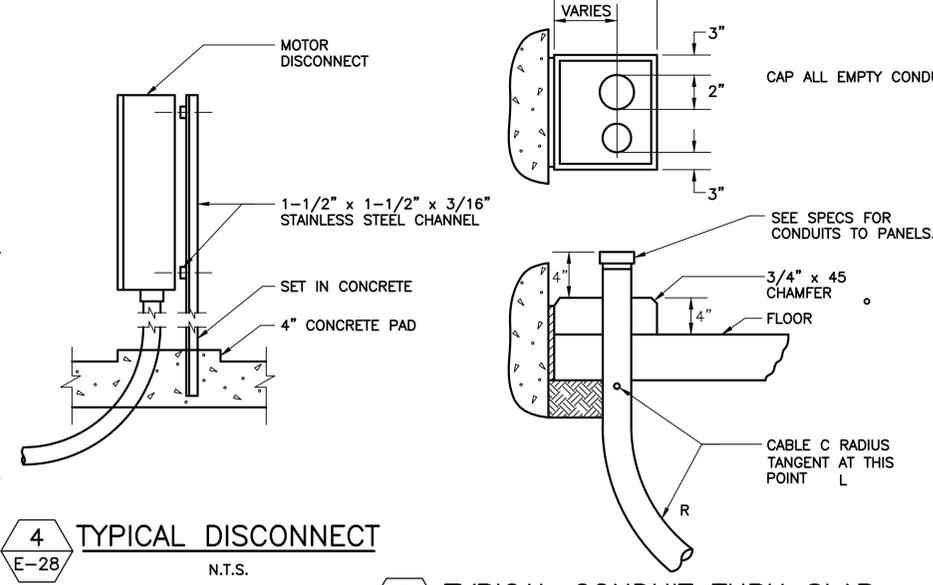
LIGHTING DETAILS & PANEL SCHEDULES

Sheet No.
E-27

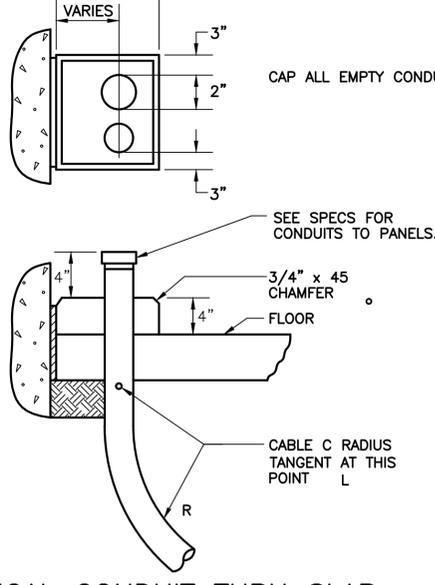


3
E-28 **PULL BOX DETAIL**
N.T.S.

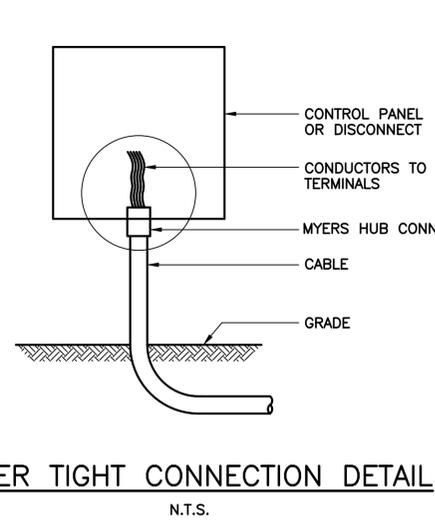
- NOTES:**
- DO NOT SPLICE CABLES IN PULL BOXES UNLESS OTHERWISE NOTED.
 - BOND MANHOLE COVERS TO SYSTEM GROUND, TYPICAL.
 - PROVIDE 2" DRAIN LINE FROM PULLBOX MANHOLE.
 - PROVIDE OPEN SUMP ON 6" CRUSHED ROCK WHEREVER THIS PULLBOX IS NOT INSTALLED ADJACENT TO A MANHOLE.



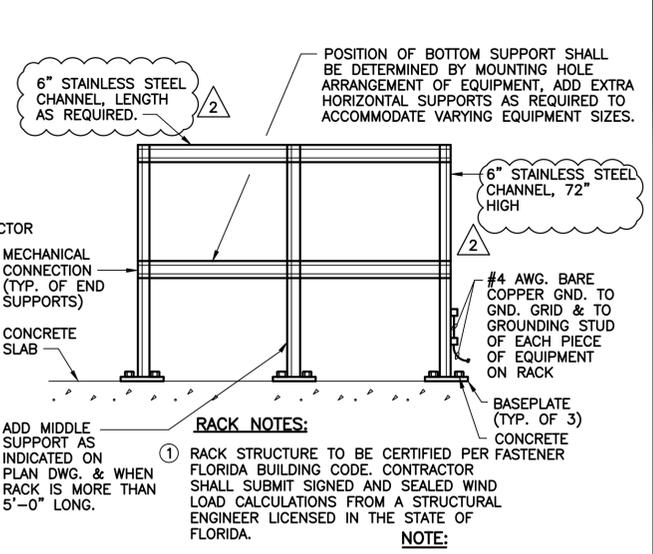
4
E-28 **TYPICAL DISCONNECT**
N.T.S.



5
E-28 **TYPICAL CONDUIT THRU SLAB**
N.T.S.



6
E-28 **WATER TIGHT CONNECTION DETAIL**
N.T.S.

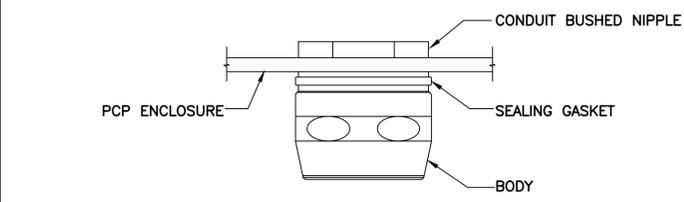


7
E-28 **EQUIPMENT RACK DETAIL**
N.T.S.

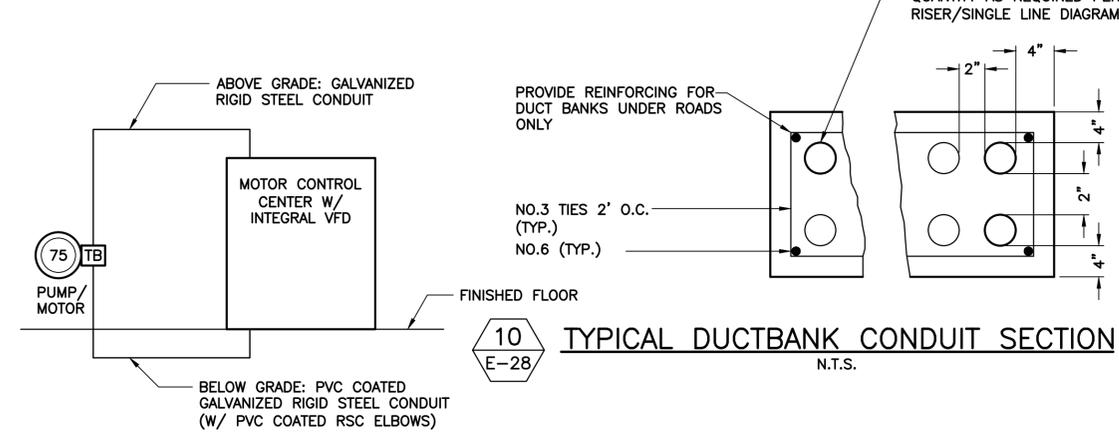
RACK NOTES:

- RACK STRUCTURE TO BE CERTIFIED PER FASTENER FLORIDA BUILDING CODE. CONTRACTOR SHALL SUBMIT SIGNED AND SEALED WIND LOAD CALCULATIONS FROM A STRUCTURAL ENGINEER LICENSED IN THE STATE OF FLORIDA.

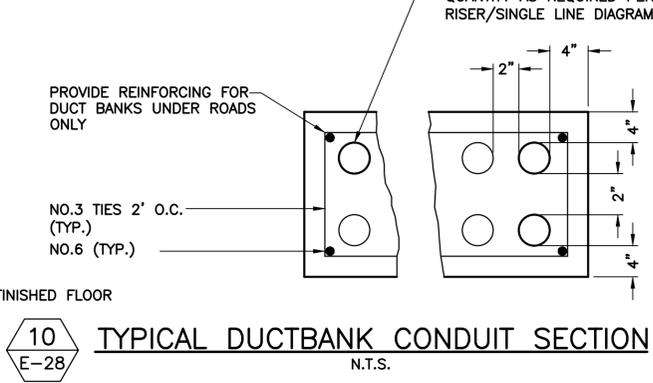
NOTE:
ALL HARDWARE SHALL BE STAINLESS STEEL.



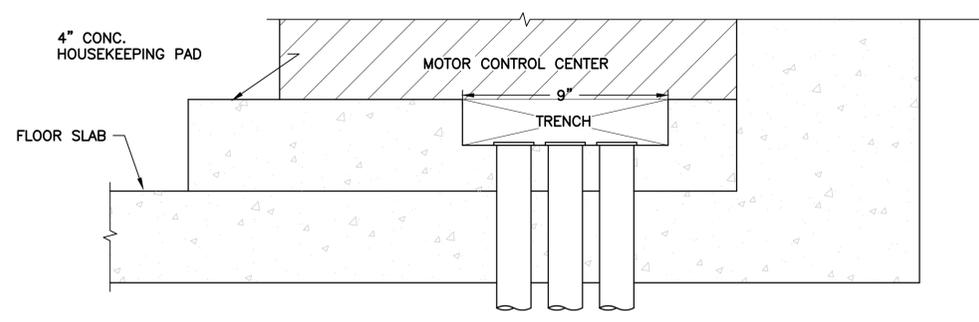
8
E-28 **CONDUIT HUB CONNECTION DETAIL**
N.T.S.



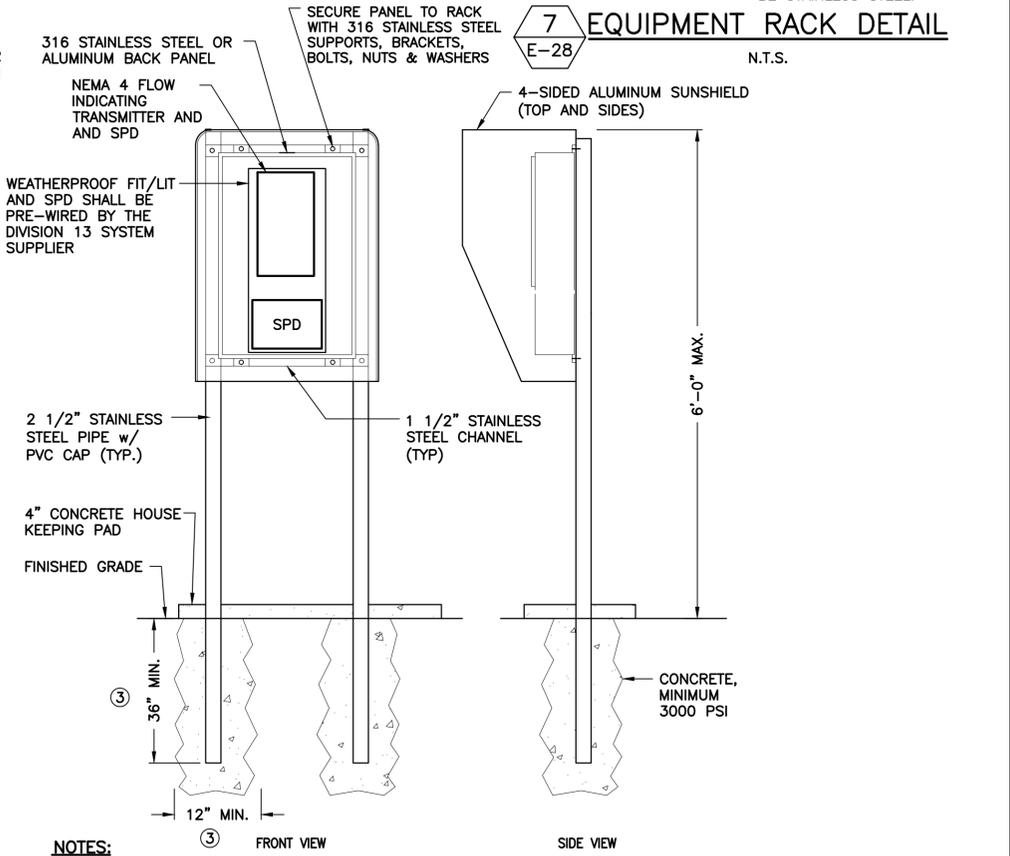
9
E-28 **TYPICAL VFD CONDUIT DETAIL**
N.T.S.



10
E-28 **TYPICAL DUCTBANK CONDUIT SECTION**
N.T.S.



11
E-28 **TYPICAL MCC TRENCH DETAIL**
SCALE: N.T.S.



12
E-28 **TRANSMITTER MOUNTING DETAIL DETAIL**
SCALE: N.T.S.

NOTES:

- ALL EXPOSED EDGES TO BE GRIND SMOOTH AND BURR FREE.
- CONTRACTOR TO PROVIDE STRUCTURAL AND FOOTING DETAILED DRAWINGS AND WIND LOAD CALCULATIONS SIGNED AND SEALED BY A LICENSED STRUCTURAL ENGINEER IN ACCORDANCE WITH THE FLORIDA BUILDING CODE.
- DEPTH AND WIDTH AS REQUIRED TO MEET STRUCTURAL CALCULATIONS.
- ALL HARDWARE SHALL BE STAINLESS STEEL UNLESS OTHERWISE NOTED.

Drawing name: F:\Active Projects\CPH\Engineers\Water Springs\Water Springs\WTP #1 Treatment Improvements\10_Addendum No.20\Drawings\22.4.14.3\2016.8.15.16pm.dwg

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CITY OF WINTER SPRINGS
WATER TREATMENT PLANT 1
WATER QUALITY IMPROVEMENTS
Seminole County, Florida

Plans Prepared By:
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1117 E. Robinson St. Orlando, FL 32801
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Survey L.B. No. 7143 Landsc. Lic. No. LC0000298

STEPHEN E. BAILEY
REG.# 42461

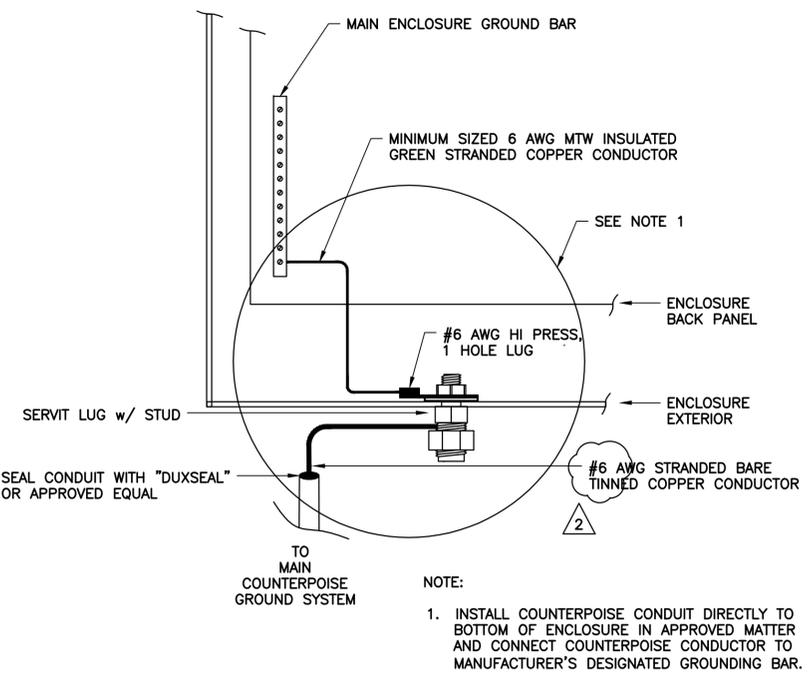
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C.O.A. NO. 6783
Stephen E. Bailey, P.E.
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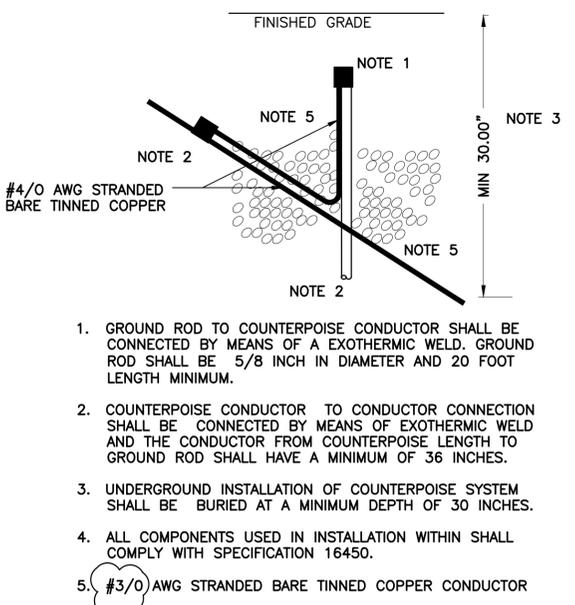
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ELECTRICAL DETAILS-1

Sheet No.
E-28

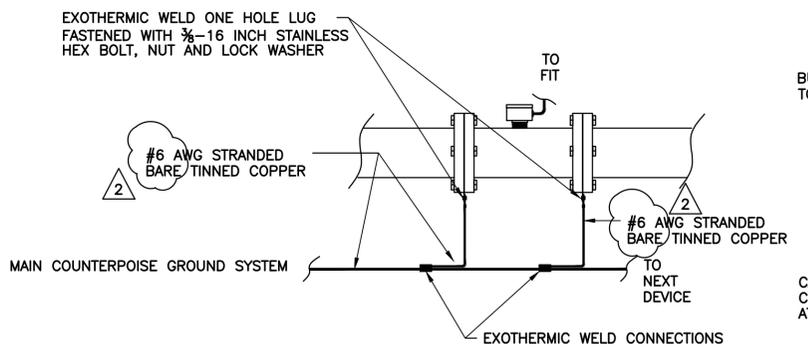


13
E-29
CONTROL, JUNCTION AND INSTRUMENT PEDESTAL ENCLOSURES GROUNDING DETAIL
NOT TO SCALE

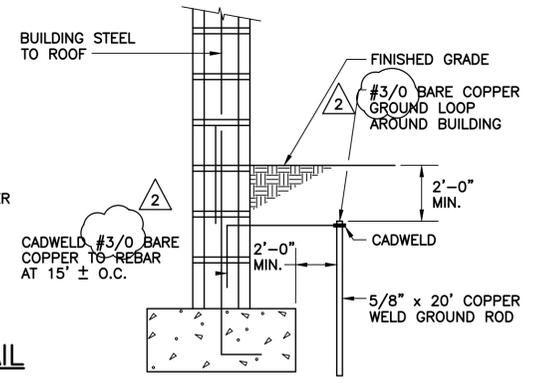


14
E-29
COUNTERPOISE GROUND ROD CONNECTION DETAIL
NOT TO SCALE

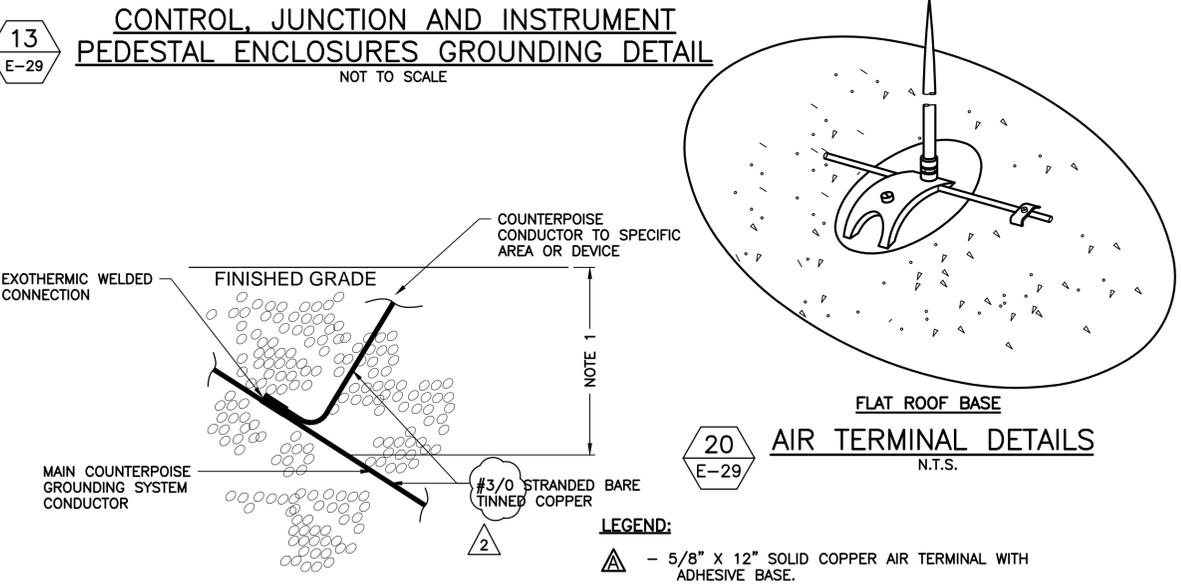
- GROUND ROD TO COUNTERPOISE CONDUCTOR SHALL BE CONNECTED BY MEANS OF AN EXOTHERMIC WELD. GROUND ROD SHALL BE 5/8 INCH IN DIAMETER AND 20 FOOT LENGTH MINIMUM.
- COUNTERPOISE CONDUCTOR TO CONDUCTOR CONNECTION SHALL BE CONNECTED BY MEANS OF EXOTHERMIC WELD AND THE CONDUCTOR FROM COUNTERPOISE LENGTH TO GROUND ROD SHALL HAVE A MINIMUM OF 36 INCHES.
- UNDERGROUND INSTALLATION OF COUNTERPOISE SYSTEM SHALL BE BURIED AT A MINIMUM DEPTH OF 30 INCHES.
- ALL COMPONENTS USED IN INSTALLATION WITHIN SHALL COMPLY WITH SPECIFICATION 16450.
- #3/0 AWG STRANDED BARE TINNED COPPER CONDUCTOR



15
E-29
FLOW METER/ACTUATOR PIPE GROUNDING DETAIL
NOT TO SCALE



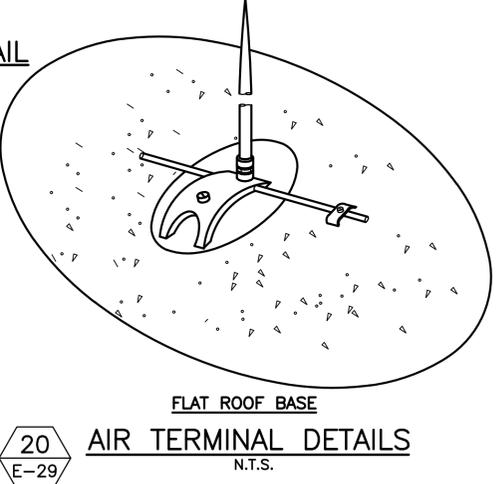
16
E-29
BUILDING STRUCTURE BONDING
N.T.S.



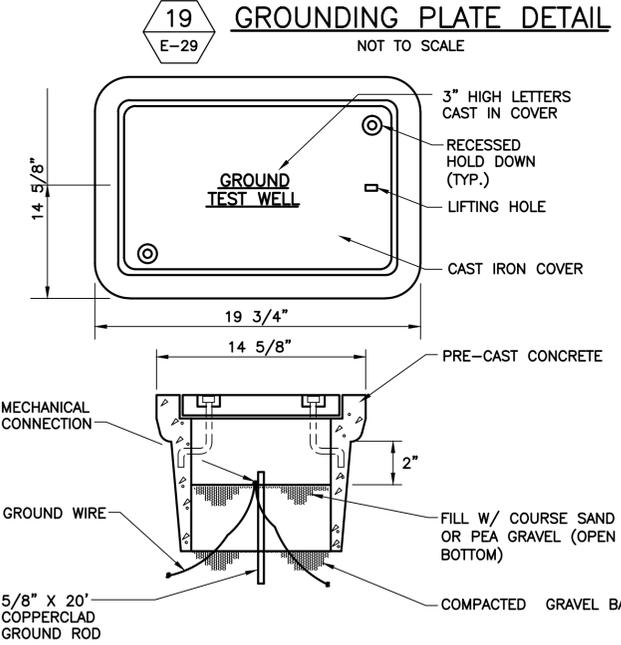
19
E-29
COUNTERPOISE CONDUCTOR CONNECTION DETAIL
NOT TO SCALE

- UNDERGROUND INSTALLATION OF COUNTERPOISE SYSTEM SHALL BE BURIED AT A MINIMUM DEPTH OF 30 INCHES.
- ALL COMPONENTS USED IN INSTALLATION WITHIN SHALL COMPLY WITH SPECIFICATION 16450.

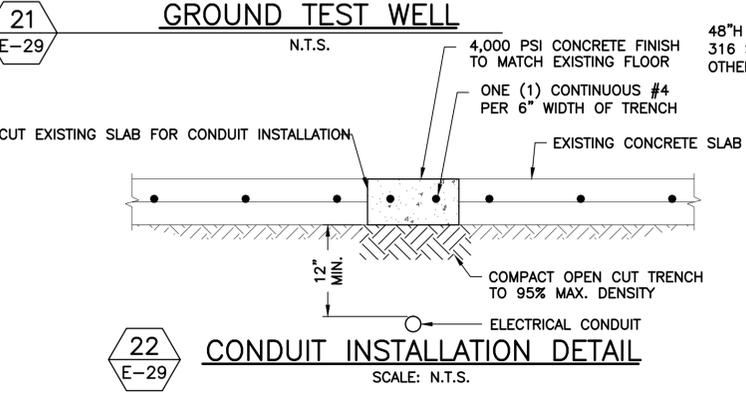
- LEGEND:**
- ▲ - 5/8" X 12" SOLID COPPER AIR TERMINAL WITH ADHESIVE BASE.
 - - CADWELD
 - ⊗ - 5/8" X 20'-0" (MIN) COPPER GROUNDING ROD (TYP)
- LIGHTNING PROTECTION INSTALLATION NOTES:**
- INSTALLATION SHALL COMPLY IN ALL RESPECTS TO L.P.I. CODE 175. INSTALLATION SHALL BE MADE BY OR UNDER THE SUPERVISION OF AN L.P.I. CERTIFIED MASTER INSTALLER. COMPLETED INSTALLATION TO RECEIVE SYSTEM CERTIFICATION INCLUDING SUBMITTAL OF FORMS L.P.I. 175-A AND 175-B.
 - ALL MATERIALS SHALL BE UNDERWRITERS LABORATORIES APPROVED WITH "A" LABEL ON EACH AIR TERMINAL AND "B" LABEL AT 10'-0" ALONG ALL MAIN CONDUCTORS. COMPLETED INSTALLATION AS SHOWN SHALL BEAR U.L. MASTER LABEL "C" AS PER U.L. CODE 96A.
 - INTERCONNECT LIGHTNING PROTECTION GROUND TO ELECTRIC, TELEPHONE, AND OTHER BUILDING GROUND SYSTEMS AS SHOWN OR AS REQUIRED BY CODES.
 - ALL CABLE TO CABLE, CABLE TO LUG & CABLE TO GROUND ROD CONNECTIONS SHALL BE MADE WITH CADWELD.



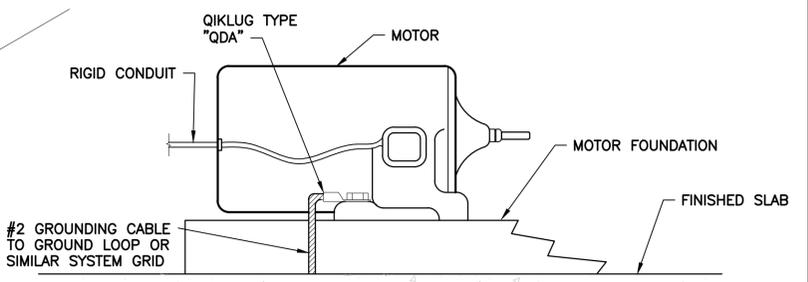
20
E-29
AIR TERMINAL DETAILS
N.T.S.



19
E-29
GROUNDING PLATE DETAIL
NOT TO SCALE

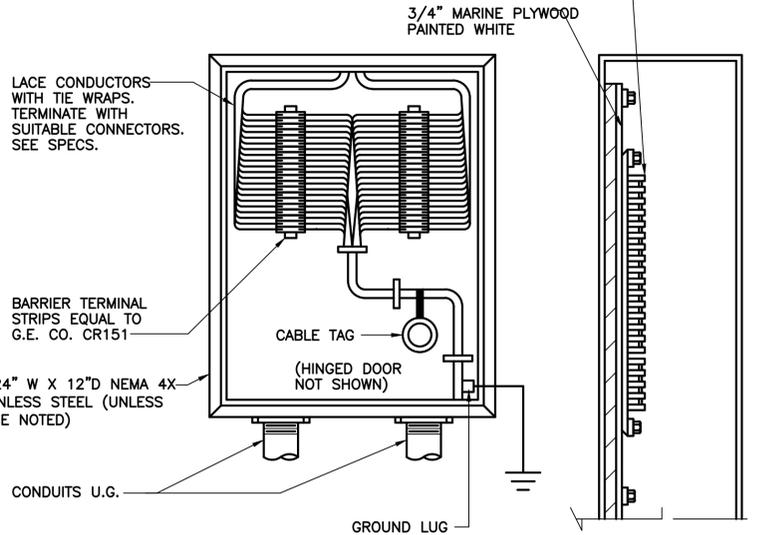


21
E-29
GROUND TEST WELL
N.T.S.



18
E-29
EQUIPMENT GROUNDING DETAIL
SCALE = N.T.S.

- NOTE:**
THIS GROUND IS IN ADDITION TO THE GROUND FROM THE MAIN ELECTRICAL SERVICE.
- TERMINAL STRIPS SIZE AS REQUIRED NUMBER EACH TERMINAL & PROVIDE A TERMINAL BLOCK SCHEDULE



23
E-29
TYPICAL TERMINAL CABINET
N.T.S.



22
E-29
CONDUIT INSTALLATION DETAIL
SCALE: N.T.S.

BIDSET

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COOPER CITY, FLORIDA 33228
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C.O.A. NO. 6783
Stephen E. Bailey, P.E.
Florida P.E. No. 42461



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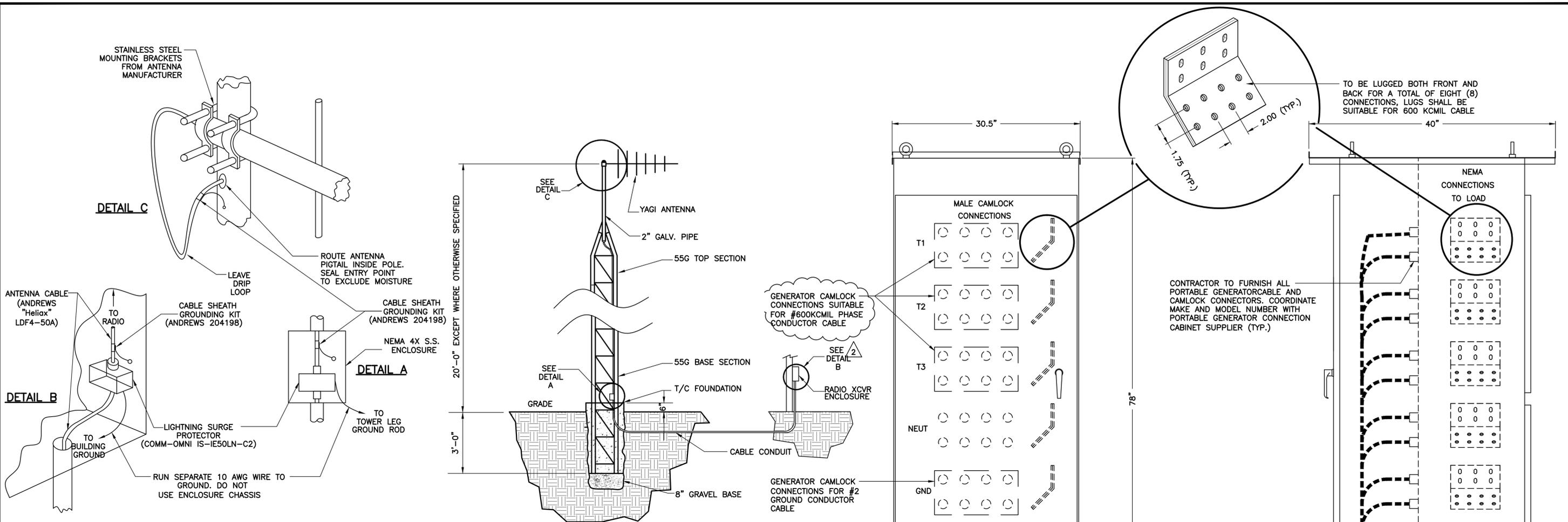
CITY OF WINTER SPRINGS
WATER TREATMENT PLANT 1
WATER QUALITY IMPROVEMENTS
Seminole County, Florida

Plans Prepared By:
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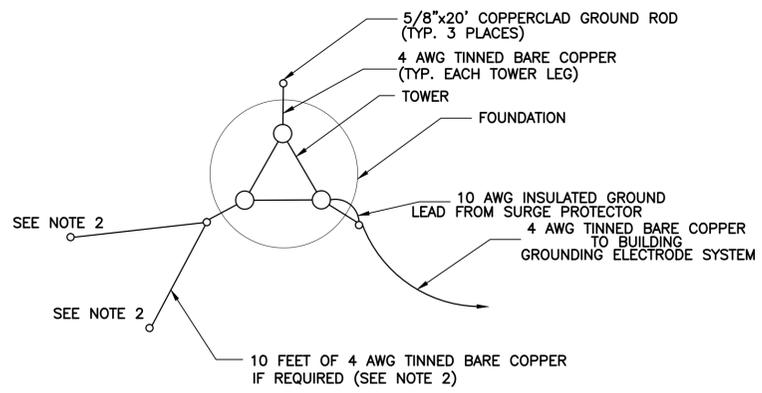
ELECTRICAL DETAILS-2

Sheet No.
E-29



24 REMOTE ANTENNA & MAST INSTALLATION
E-30

NOT TO SCALE



- MEGGER GROUND SYSTEM FOLLOWING INSTALLATION.
- IF READING IS GREATER THAN 5 OHMS, INSTALL TWO ADDITIONAL GROUND RODS RADIALLY FROM EACH LEG AS SHOWN UNTIL A VALUE OF 5 OHMS OR LESS IS ATTAINED.
- IF READING IS STILL ABOVE 5 OHMS, INCREASE THE LENGTH OF EACH ROD IN 20 FEET INCREMENTS UNTIL THE REQUIRED VALUE IS OBTAINED.
- ALL ELECTRODE SYSTEM CONNECTIONS TO BE EXOTHERMALLY BONDED
- USE MOST STRINGENT REQUIREMENT OF THESE DETAILS OR APPLICABLE CODES.

25 TOWER GROUNDING PLAN
E-30

NOT TO SCALE

ENCLOSURE NOTES:

- (A) FREESTANDING CONSTRUCTION
- (B) FABRICATED FROM 14 GA. STEEL
- (C) HINGED FRONT DOOR(S)
- (D) REMOVABLE REAR PANELS
- (E) FRONT AND REAR ACCESS REQUIRED
- (F) OPEN BOTTOM FOR CABLE ENTRY
- (G) NEMA 3R STAINLESS STEEL ENCLOSURE
- (H) DOOR STOPS PROVIDED ON EACH DOOR.
- (I) 3-POINT LATCHING PAD LOCKABLE DOOR HANDLE.
- (J) GASKETED DOOR (NEMA).
- (K) UTILITY SEAL PROVISION.

ENCLOSURE NOTES (CONTINUED):

- (L) ALL DIMENSIONS EXPRESSED IN INCHES (78"H x 30.5"W x 40"D).
- (M) LAKE SHORE ELECTRIC OR APPROVED EQUAL GENERATOR LOAD BANK CONNECTION CABINET WITH HINGED FRONT DOOR AND REMOVABLE SIDE ACCESS PANEL. INTERNAL BUS SHALL BE SIZED FOR 2500A, 3Ø, 5 WIRE, WITH NEMA 2-HOLE PATTERN TERMINALS FOR CONNECTION OF PORTABLE GENERATOR. ENCLOSURE SHALL BE NEMA 3R STAINLESS STEEL, 14-GAUGE FREESTANDING CONSTRUCTION. ENCLOSURE DOORS SHALL BE PAD-LOCKABLE. CABLE ENTRY SHALL BE PROVIDED THROUGH BOTTOM SWING DOOR TO CONSERVE NEMA TYPE 3R RATING WHEN CABLES ARE CONNECTED, OR THROUGH REMOVABLE BOTTOM PANEL FOR PERMANENT CABLE ROUTING UNDERGROUND.
- (N) CONTRACTOR SHALL SUBMIT SIGNED AND SEALED WIND LOAD CALCULATIONS FROM A STRUCTURAL ENGINEER LICENSED IN THE STATE OF FLORIDA. SERVICE RACK TO BE CERTIFIED PER THE FLORIDA BUILDING CODE.

QUICK CONNECTORS:

- PHASE T1 - (8) BROWN CONNECTORS.
- PHASE T2 - (8) ORANGE CONNECTORS.
- PHASE T3 - (8) YELLOW CONNECTORS.
- NEUTRAL - (8) WHITE CONNECTORS.
- GROUND - (3) GREEN CONNECTORS.

26 GENERATOR LOAD BANK CONNECTION CABINET
E-30

SCALE: N.T.S.

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WATER TREATMENT PLANT 1
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Seminole County, Florida

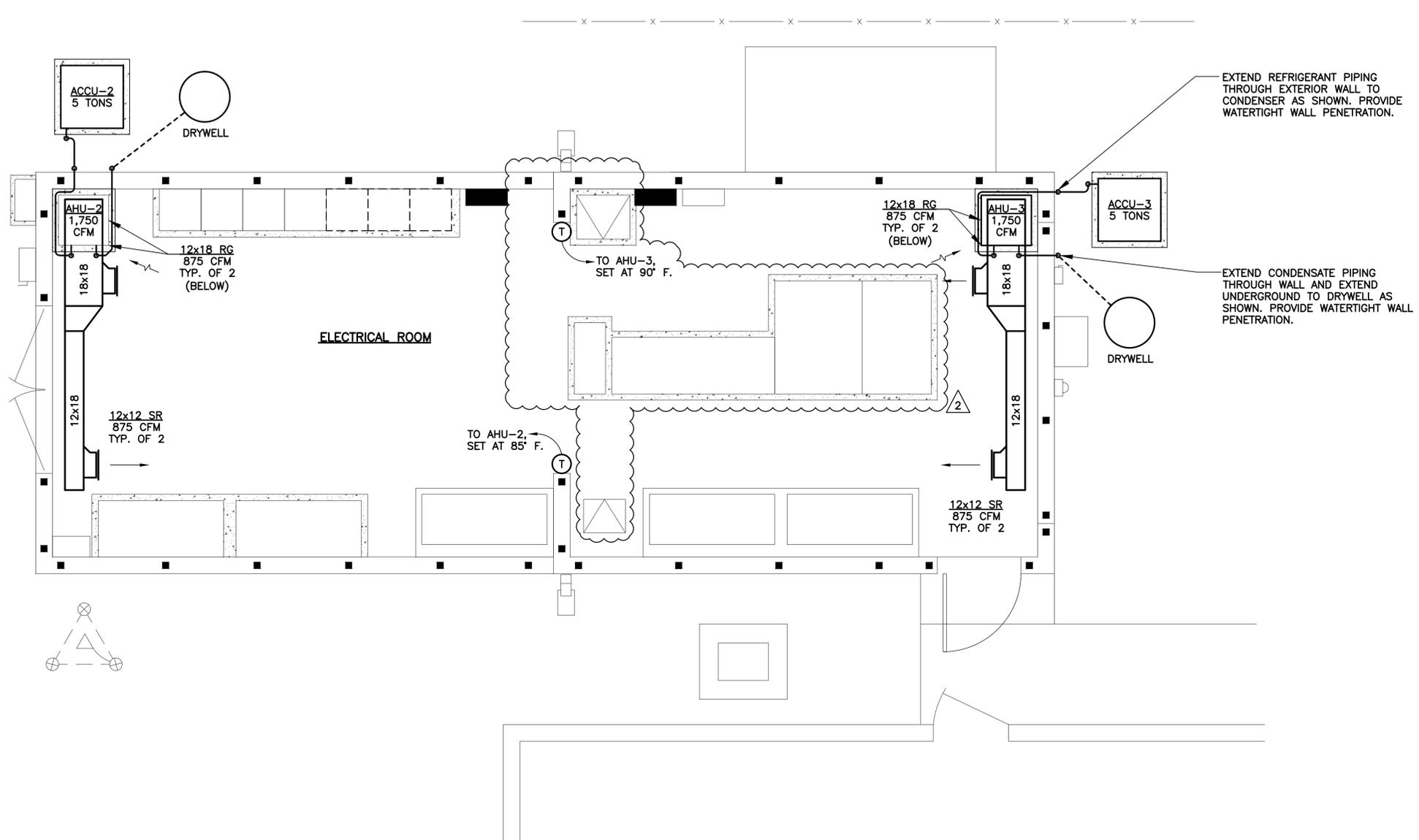
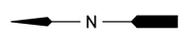
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REG-# 42461

ELECTRICAL DETAILS-3



Sheet No.
E-30



WTP NO. 1 ELECTRICAL BUILDING HVAC PLAN



Drawing name: F:\Active Projects\CPH\Engineers\Winter Springs\Water\WTP #1 Treatment Improvements\10_Addendum No.2\03p14-02 GEN HVAC PLAN.dwg, Mar 03, 2016 - 8:16pm dmanan

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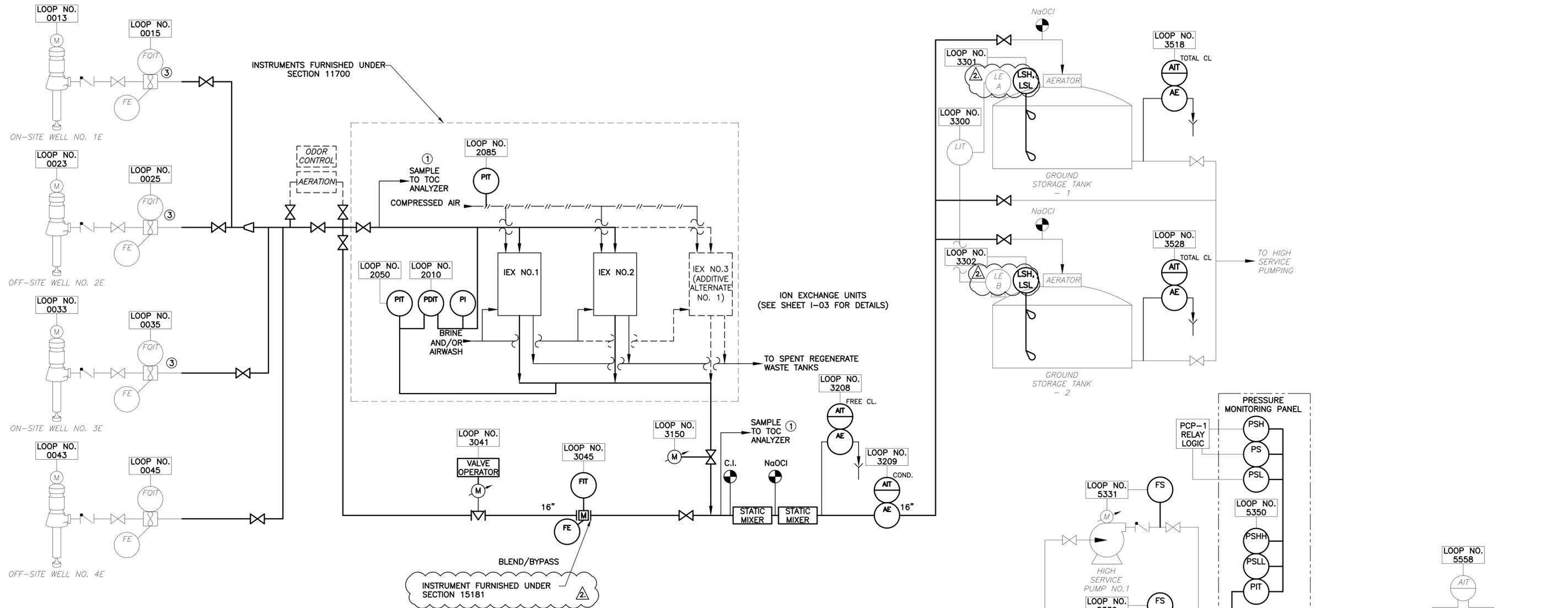
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 REG-# 42461

WTP NO. 1 ELECTRICAL BUILDING HVAC PLAN

Sheet No.
H-2



① THE TOC ANALYZER IS A SIX SAMPLE UNIT BY CHEM-SCAN FURNISHED UNDER SECTION 11700. THE UNIT AUTOMATICALLY CYCLES BETWEEN SAMPLES AND PROVIDES INDIVIDUAL OUTPUTS FOR THE TOC READING FOR EACH SAMPLE. THE SAMPLE POINTS AND SIGNAL TAG NUMBERS ARE SHOWN IN THE FOLLOWING TABLE:

TAG NO.	SAMPLE SOURCE
AIT-2018	IEX COMBINED INFLUENT
AIT-2158	IEX#1 EFFLUENT
AIT-2258	IEX#2 EFFLUENT
AIT-2358	IEX#3 EFFLUENT
AIT-3158	COMBINED BLENDED EFFLUENT

② SEE SHEET I-03 FOR ADDITIONAL SAMPLE POINTS NOT SHOWN ON THIS SHEET.
 ③ EXISTING FLOW METERS ARE TO BE RE-LOCATED TO WELL LOCATION.

Drawing Name: F:\Active Projects\CPH\Engineers\Water Springs\WTP #1 Treatment Improvements\10_Addendum No.2\02\02 PID-TRT\WTP.dwg, Mar 03, 2016 - 8:16am dmanin
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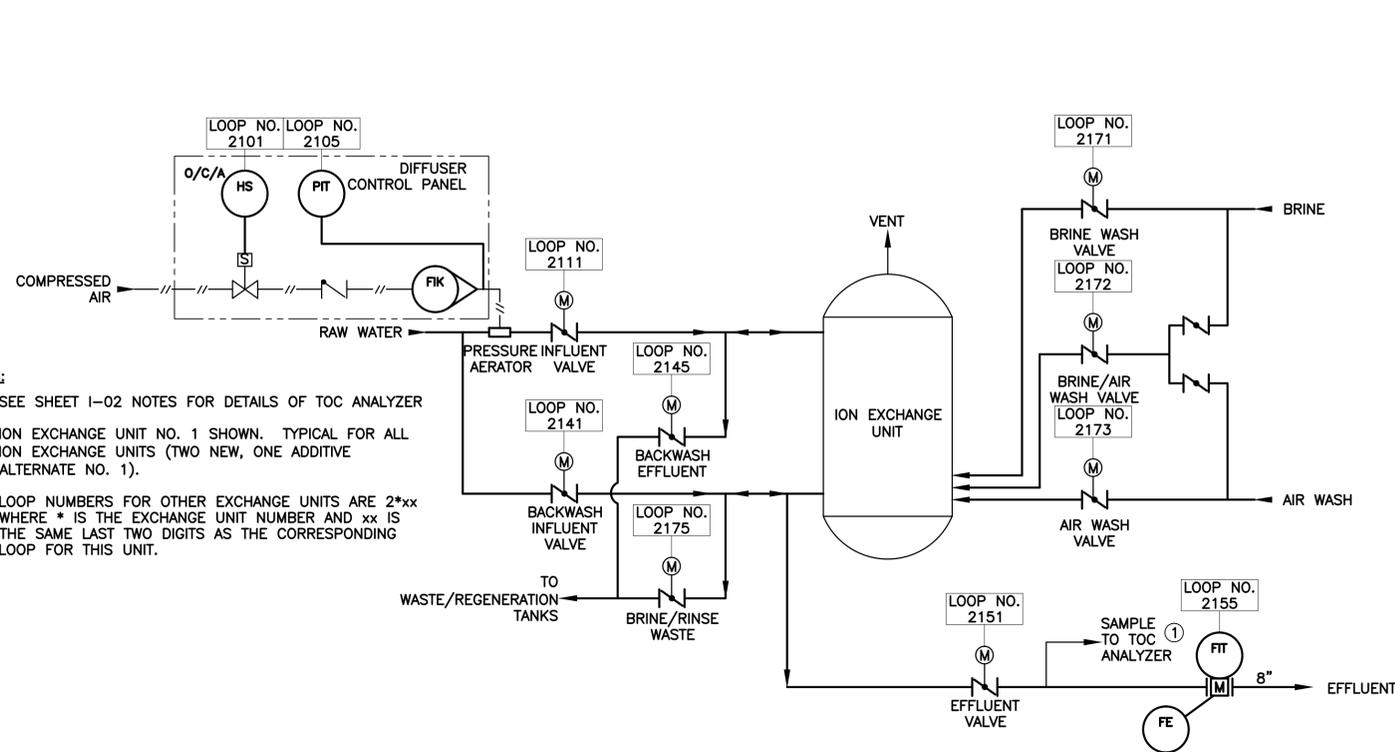
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PROCESS AND INSTRUMENTATION
 DIAGRAM - TREATMENT

10620 GRIFFIN ROAD, SUITE 202
 COOPER CITY, FLORIDA 33328
 PHONE: (954) 448-7930
 C.O.A. NO. 6783
 Stephen E. Bailey, P.E.
 Florida P.E. No. 42461

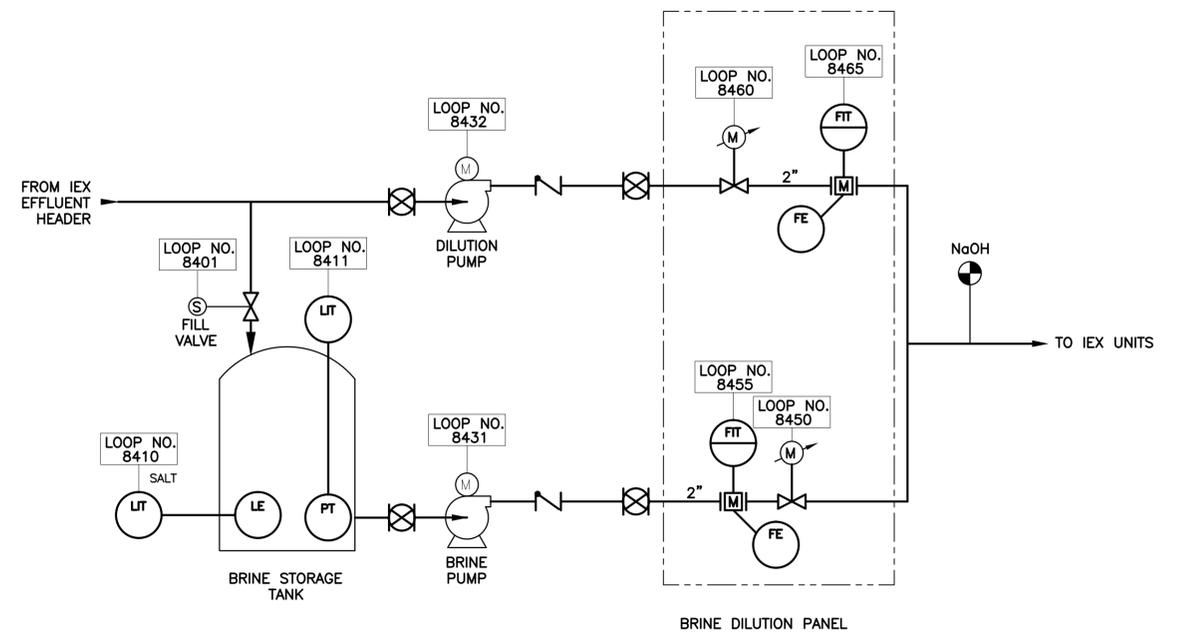
BAILEY
 ENGINEERING
 CONSULTANTS

Sheet No.
1-2

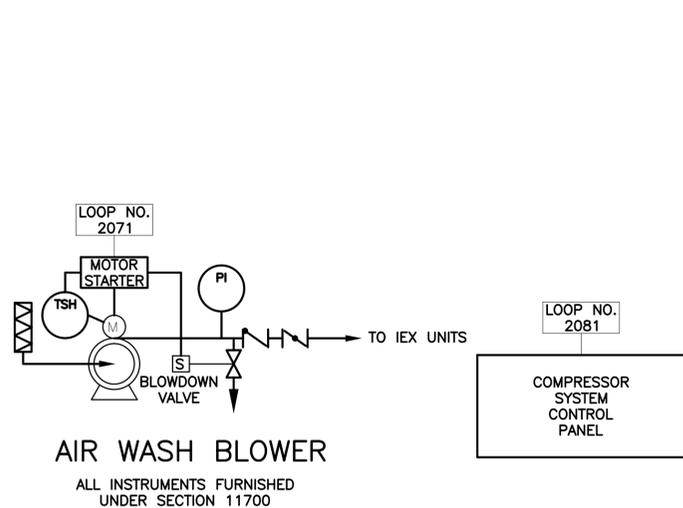


- NOTES:**
- SEE SHEET I-02 NOTES FOR DETAILS OF TOC ANALYZER
 - ION EXCHANGE UNIT NO. 1 SHOWN. TYPICAL FOR ALL ION EXCHANGE UNITS (TWO NEW, ONE ADDITIVE ALTERNATE NO. 1).
 - LOOP NUMBERS FOR OTHER EXCHANGE UNITS ARE 2*xx WHERE * IS THE EXCHANGE UNIT NUMBER AND xx IS THE SAME LAST TWO DIGITS AS THE CORRESPONDING LOOP FOR THIS UNIT.

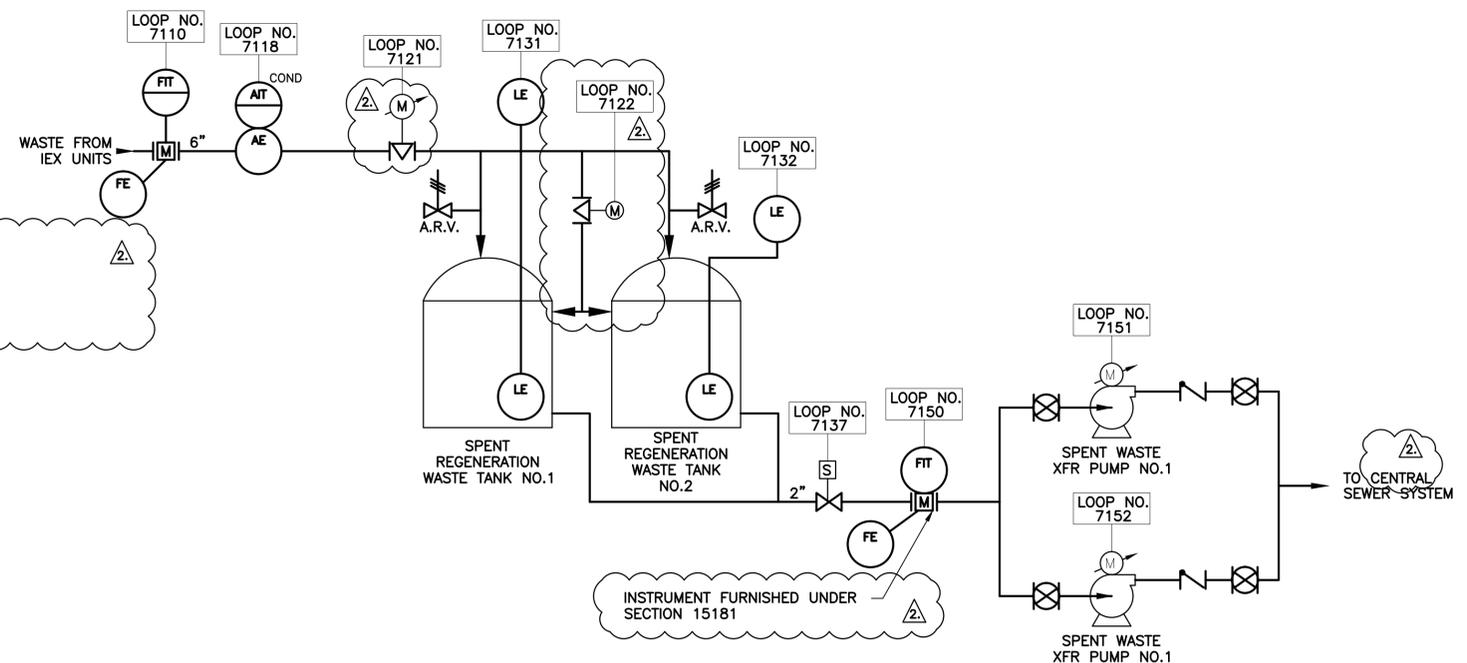
ION EXCHANGE UNIT NO. 1
ALL INSTRUMENTS FURNISHED UNDER SECTION 11700



BRINE SYSTEM
ALL INSTRUMENTS FURNISHED UNDER SECTION 11700



COMPRESSED AIR SYSTEM
ALL INSTRUMENTS FURNISHED UNDER SECTION 11700



WASTE DISPOSAL
EXCEPT WHERE OTHERWISE NOTED, ALL INSTRUMENTS FURNISHED UNDER SECTION 11700

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BIDSET

BAILEY ENGINEERING CONSULTANTS

No.	Date	Revision	By	No.	Date	Revision	By
Δ	2/3/16	BIDSET-SIGNED/SEALED ORIGINAL AT CITY HALL	DD	Δ			
Δ	3/3/16	ADDENDUM NO. 2	JRN	Δ			

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Designed by: JRN Date: 3/04/2016
Drawn by: JRN Scale: AS NOTED
Checked by: SEB
Approved by: SEB
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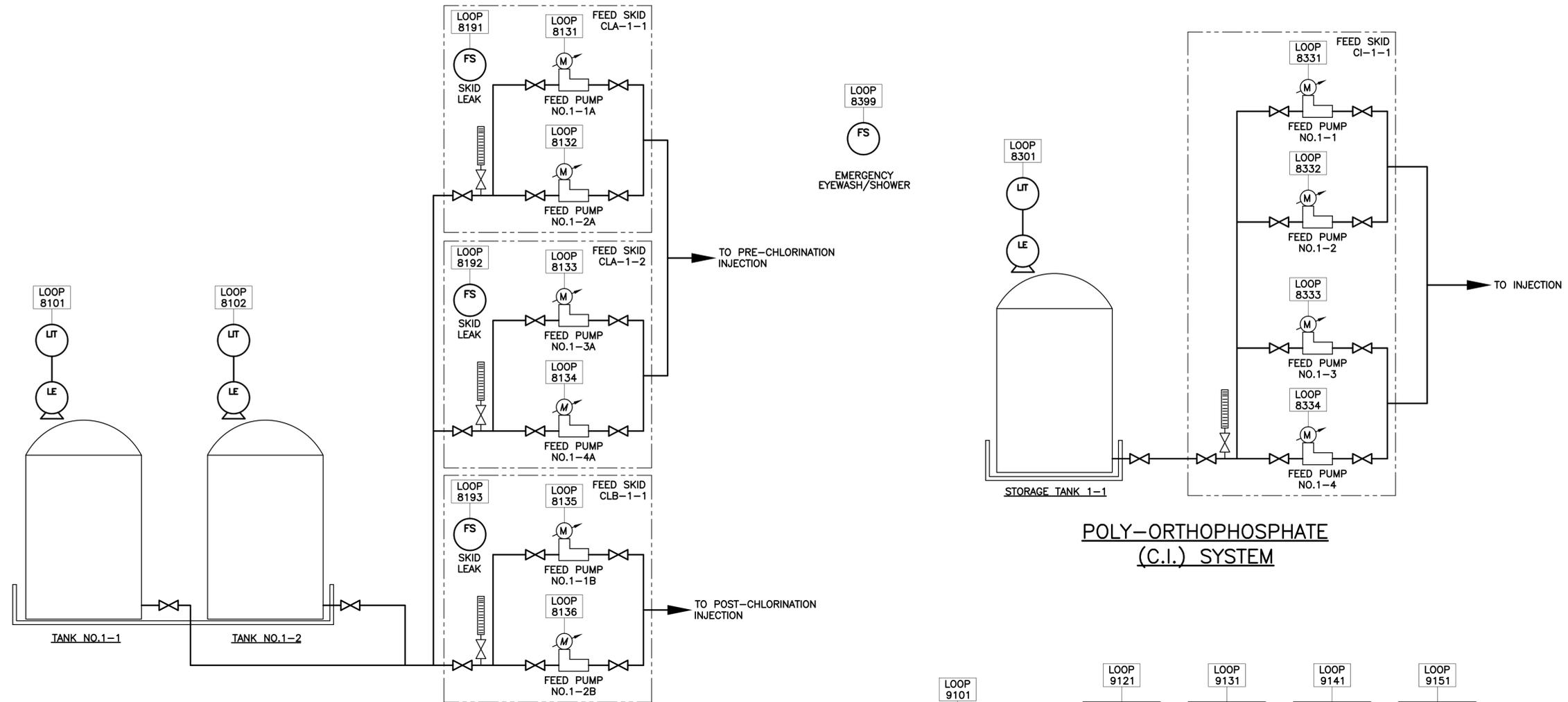
CITY OF WINTER SPRINGS
CITY OF WINTER SPRINGS
WATER TREATMENT PLANT 1
WATER QUALITY IMPROVEMENTS
Seminole County, Florida

Plans Prepared By:
CPH, Inc.
1117 E. Robinson St. Orlando, FL 32801
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Licenses:
Eng. C.O.A. No. 3215 Arch. Lic. No. AA2600926
Survey L.B. No. 7143 Landscp. Lic. No. LC0000298

STEPHEN E. BAILEY
REG-# 42461

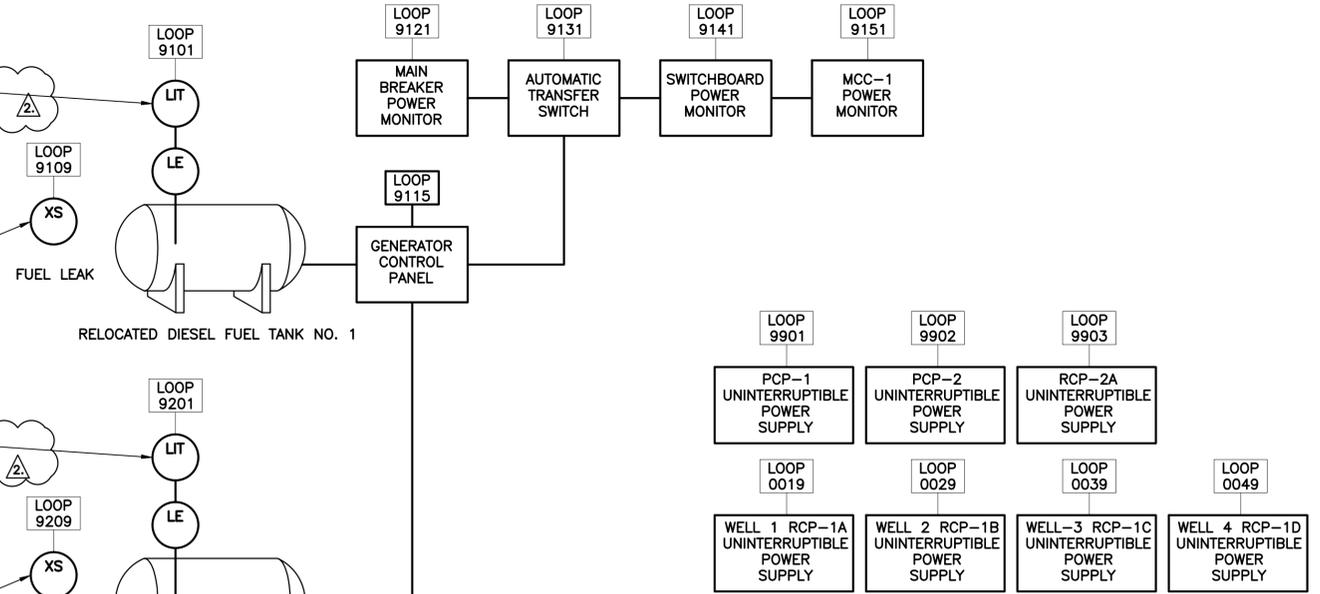
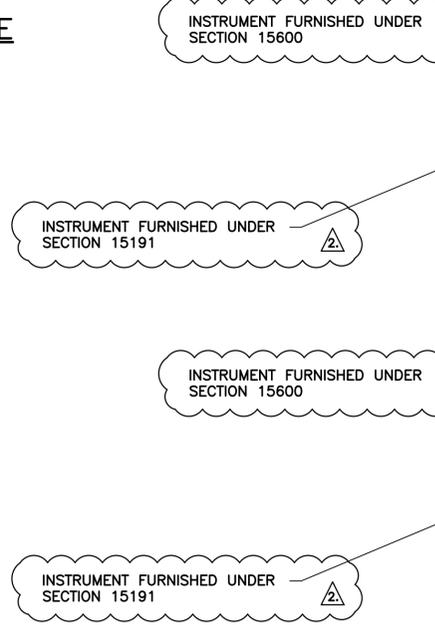
**PROCESS AND INSTRUMENTATION
DIAGRAM - ION EXCHANGE**

Sheet No.
1-3



SODIUM HYPOCHLORITE SYSTEM

POLY-ORTHOPHOSPHATE (C.I.) SYSTEM



POWER MONITORING

Drawing Name: F:\Active Projects\CPH\Engineers\Winter Springs\Water Springs\WTP #1 Treatment Improvements\10_Addendum No.2\Digital\CPH\MSD.dwg, Mar. 03, 2016 - 8:17pm dminin
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Δ				Δ			
Δ				Δ			

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 WATER TREATMENT PLANT 1
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BIDSET

PROCESS AND INSTRUMENTATION
 DIAGRAM - MISCELLANEOUS

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