



## **REQUEST FOR PROPOSAL**

### **LIFT STATION #26 – GOLDEN CREEK STANDBY POWER GENERATOR RETRO-FIT**

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**Prepared By**

**Fayetteville Public Works Commission  
Water Resources Engineering  
Department**

**December 2021**

**FAYETTEVILLE PUBLIC WORKS COMMISSION  
FAYETTEVILLE, NORTH CAROLINA**

**LIFT STATION #26 – GOLDEN CREEK  
STANDBY POWER GENERATOR RETRO-FIT**

**BIDDING AND CONTRACT REQUIREMENTS**

General Terms and Conditions

Proposal

Bidder Information

Certificate of Insurance

Copy of General Contractor's License

Notice of Award

Construction Agreement

Performance Bond

Payment Bond

Notice to Proceed

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Contract Drawings

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## **REQUEST FOR PROPOSAL**

### **LIFT STATION #26 – GOLDEN CREEK STANDBY POWER GENERATOR RETRO-FIT**

#### **FAYETTEVILLE PUBLIC WORKS COMMISSION**

### **GENERAL TERMS AND CONDITIONS**

#### **A. Scope of Work**

Pursuant to N.C.G.S. 143-131, The Fayetteville Public Works Commission is currently seeking qualified contractors to perform the following work:

The Contractor shall furnish all materials, labor, equipment, mobilization and incidentals required to install a new standby power generator complete with an automatic transfer switch at the LS #26 – Golden Creek located at 3340 Gillespie Street, Fayetteville, N.C.

Refer to the attached Contract Drawings and Technical Specifications for a detailed description of the project scope of work.

#### **B. Bid Proposal**

Prospective bidders should complete the enclosed bid proposal, sign and date where indicated, and return the completed proposal to the Fayetteville Public Works Commission. All proposals shall be sealed in an envelope and addressed to:

Fayetteville Public Works Commission  
Attention: Nikole Bohannon, Procurement Advisor  
955 Old Wilmington Road  
Fayetteville, NC 28301

All proposals must be received by **5:00 pm, Friday, January 21, 2022**, in order to be considered. The successful contractor will be notified in writing at the earliest possible date after the bid opening. Late bids will not be considered and will be returned to the Bidder unopened. This is an informal bid; therefore, there will be no formal bid opening. Bids will be opened the next business day and a bid tabulation will be provided to all bidders.

Bids will be examined promptly after opening and an award will be made at the earliest possible date.

All questions regarding this project shall be submitted in writing to Nikole Bohannon, Procurement Advisor, by e-mail to [nikole.bohannon@faypwc.com](mailto:nikole.bohannon@faypwc.com). All questions shall be submitted no later than **5:00 p.m., Tuesday, January 11, 2022**, in order to be considered. Oral explanations and interpretations made prior to bid opening shall not be binding.

The Fayetteville Public Works Commission will provide all bidders with the questions and answers. If the questions result in revisions to the plans and/or this Request for Proposal, an addendum will be issued. It is anticipated that the responses to the questions and any necessary addendum will be issued on or before **Friday, January 14, 2022**.

**Bidders are expressly prohibited from contacting any Fayetteville Public Works Commission official or employee associated with this Request for Proposals, except as noted above. Violation of this prohibition is grounds for the immediate disqualification of the bidder.**

### **C. General Conditions**

- a. Award of Contract – The Fayetteville Public Works Commission will prepare a Construction Agreement to the successful bidder, in the bid amount.
- b. The Fayetteville Public Works Commission will issue a written Notice to Proceed to the Contractor upon receipt of the Contractor's bonds and insurance information.
- c. The Fayetteville Public Works Commission reserves the right to reject any and all bids, to waive any and all informalities, and to disregard all non-conforming, non-responsive, or conditional bids. Also, The Fayetteville Public Works Commission reserves the right to request additional information from any, or all bidders for evaluation purposes. Failure or refusal to furnish additional information as requested may result in rejection of the proposal.
- d. The Fayetteville Public Works Commission reserves the right to request tests on any or all materials and workmanship by a certified testing firm. Initial tests shall be completed at the expense of the Fayetteville Public Works Commission. Re-inspections and re-testing required due to failure of previous tests shall be at the Contractor's expense.
- e. All prices submitted herein shall be firm against any increase for the contract period.

- f. The Fayetteville Public Works Commission reserves the right to delete any single item or combination of items from the successful bidder's proposal.
- g. All work required on the plans, specified herein or as directed by the Fayetteville Public Works Commission in the field to satisfactorily complete the above project is the Contractor's responsibility. The Contractor shall be responsible for performing any excavation and grading, furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the work, leaving the site in a neat and satisfactory condition.
- h. Payment shall be monthly estimates approved by the Fayetteville Public Works Commission on the work completed. The Contractor shall review all pay application quantities with the Fayetteville Public Works Commission's Project Coordinator, prior to submitting an official application for payment. The monthly estimates shall be based on the work completed as of the last Friday of the month.
- i. The Fayetteville Public Works Commission shall make monthly payment to the Contractor on the basis of a duly certified and approved estimate for the work performed during the preceding month under the Contract
- j. The Contractor shall commence work to be performed under this agreement on a date specified in a written Notice to Proceed from the Fayetteville Public Works Commission and shall fully complete all work hereunder within **90** consecutive calendar days from said date.
- k. Statutory Requirements for Contracting with PWC:
  - LICENSING: The Contractor shall be licensed as a North Carolina Public Utilities Contractor, Unlimited, pursuant to NCGS Chapter 87, Article 1 and 1A

#### **D. Insurance**

The insurance required for this contract is as follows:

- (a) Commercial General Liability ISO #CG 00 01 10 93: The Contractor shall take out and maintain during the life of this contract commercial general liability insurance with limits of \$1,000,000 per occurrence; \$2,000,000 aggregate other than products/completed operations; \$2,000,000 aggregate for products/completed.
- (b) Automobile Liability ISO #CA 00 01 12 93: The Contractor shall take out and

maintain during the life of this contract automobile liability insurance in an amount not less than \$1,000,000 combined single limit per accident for bodily injury and property damage from owned, non-owned, and hired automobiles.

- (c) **Workers' Compensation and Employers' Liability Insurance:** The Contractor shall take out and maintain during the life of this contract workers' compensation insurance as required by the laws of the State of North Carolina and Employers' Liability with limits of \$100,000 each accident, \$500,000 policy limit and \$100,000 each employee for all employees employed on the project. In case any employee(s) engaged in work under this contract is or are not protected under the Workers' Compensation Statute, the Contractor shall provide adequate coverage for the protection of employees not otherwise protected.
  
- (d) **Property Insurance:** If contracted to construct a building, the Contractor shall purchase and maintain "Builder's Risk" insurance. This insurance shall include the interests of the Fayetteville Public Works Commission, the Contractor and Subcontractors and shall be written on a one hundred percent (100%) completed value basis (full value as of the date that all construction is finished and includes the Contractor's total cost plus profit), and to remain in force until the project is completed and accepted by the Fayetteville Public Works Commission. Regardless of the nature of the work to be performed, coverage must also be provided for the theft or damage of building materials and supplies, which are not permanently attached and stored on site for any period of time. This coverage shall be an "Installation Floater," and where no building construction is involved, the amount of the coverage shall equal the value of the materials stored on site.

It is the responsibility of the Contractor to inform the policy provider of any and all change orders which increase the building's value. Any penalties or losses incurred due to the Contractor's failure to adequately ensure the building during construction will be the Contractor's responsibility.

- (e) **Owner's and Contractor's Protective Liability I.S.O. #CG 00 09 10 93:** The Contractor shall secure and maintain during the life of the contract, an Owner's and Contractor's Protective Liability insurance policy for the Fayetteville Public Works Commission, with minimum limits of \$1,000,000 per occurrence/\$2,000,000 aggregate.

Acceptability of Insurance

All insurance policies shall be written by insurers licensed to do business in North Carolina. It is realized that certain business activities may not be readily insurable by admitted carriers. If insurance is written by non-admitted carriers whose names appear on the current listing of approved and non-admitted carriers prepared by the North Carolina Department of Insurance, such carriers will be favorably considered assuming they meet all other requirements. Non-admitted carriers should be so identified on the Certificate of Insurance form. Non-admitted carriers must be approved in writing by the Fayetteville Public Works Commission. The Fayetteville Public Works Commission reserves the right to reject any and all certificates or policies issued by insurers with a Best's rating less than A.

Other Provisions:

- (1) Any deductible or self-insured retention must be declared to and approved by the Fayetteville Public Works Commission.
- (2) The policies are to contain, or be endorsed to contain, the following provisions:
  - (a) Commercial General Liability Coverage
    - 1) The Fayetteville Public Works Commission, its officials, employees and volunteers are to be covered as additional insured as respects: liability arising out of activities performed by or on behalf of the Contractor; products and completed operations of the Contractor; premises owned, leased or used by the Contractor; or automobiles owned, leased, hired or borrowed by the Contractor. The coverage shall contain no special limitations on the scope of protection afforded to the Fayetteville Public Works Commission, its officials, employees or volunteers.
    - 2) The Contractor's insurance coverage shall be primary insurance as respects the Fayetteville Public Works Commission, its officials, employees and volunteers. Any insurance or self-insurance maintained by the Fayetteville Public Works Commission, its officials, employees or volunteers shall be excess of Contractor's insurance and shall not contribute with it.
    - 3) Coverage shall state that Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.



(b) All Coverages

Each insurance policy required by this clause shall be endorsed to state that coverage shall not be suspended, voided, canceled by either party, reduced in coverage or in limits except after thirty (30) calendar days prior written notice by certified mail, return receipt requested, has been given to:

Fayetteville Public Works Commission  
Attn: Trent Ensley, Procurement Manager  
P.O. Box 1089  
Fayetteville, NC 28302-1089

Any failure to comply with reporting provisions of the policies shall not affect coverage provided to the Fayetteville Public Works Commission, its officials, employees, and volunteers. In the event the Fayetteville Public Works Commission is damaged by the failure of the Contractor to maintain such insurance and to so notify the Fayetteville Public Works Commission, the Contractor shall bear all reasonable costs properly attributable thereto.

(c) Subcontractors

Contractor shall include all subcontractors as insurers under its policies OR shall furnish separate certificates and endorsements for each subcontractor. All coverages for subcontractors shall be subject to all of the requirements stated herein.

(d) No Waiver of Immunity

Any insurance coverage required by the terms of this contract shall not be deemed a contract of insurance purchased by the Fayetteville Public Works Commission nor a waiver of the Fayetteville Public Works Commission's immunity pursuant to NCGS 160A-485.

## **E. Performance and Payment Bonds**

- a. The Contractor, at the time of the execution of the Contract shall be required to furnish a Performance Bond and Payment Bond in an amount equal to at least one-hundred percent (100%) of the Contract price as security for the faithful performance of this Contract and as security for the payment of all persons

performing labor and furnishing materials and equipment in connection with this Contract in accordance with N.C.G.S. Chapter 44A, Article 3.

- b. The corporate surety furnishing the bonds shall be authorized to do business in the state of North Carolina and shall be acceptable to the Fayetteville Public Works Commission. All contract payment bonds, and contract performance bonds shall be executed on “Performance Bond” and “Payment Bond” forms provided in this Proposal and be countersigned by a regularly authorized agent of the corporate surety who is resident in North Carolina and who is licensed by the North Carolina Department of Insurance.
- c. In all Performance and Payment Bonds, the provision that no suit, action, or proceeding by reason of any default whatsoever shall be brought on this Bond after a specified number of months shall be fixed at twelve (12) months. The face value of the Bond shall be one-hundred percent (100%) of the Contract price for a period of twelve (12) months following the day when the last of the labor was performed, or equipment was furnished, or final settlement was made with the Contractor, whichever occurs last.

#### **F. Project Specifications**

The attached project specifications are hereby incorporated into these Construction Documents. PWC technical specifications referenced within this Request for Proposal are hereby incorporated. All other standard specifications and details referenced throughout this Contract shall be incorporated herein. The latest revision of those specifications and details as of the bid date of this Contract, shall apply.

PWC technical specifications referenced within these Special Conditions are hereby incorporated into this Contract and are as follows:

- A. Section 16010 – Electrical, Lift Stations
- B. Section 16231 – Standby Power Systems, Lift Stations

The preceding specifications are included as an attachment in the Request for Proposal.

All requirements regarding sewer construction referenced in the Fayetteville Public Works Commission Design Manual (most recent edition) and the standard PWC details are also hereby incorporated into this Contract. Each of these specifications and/or details is available upon request, or via the Fayetteville Public Works Commission website ([www.faypwc.com](http://www.faypwc.com)).

#### **G. Project Location**

Lift Station #26 (Golden Creek) is located at 3340 Gillespie Street, Fayetteville, NC 28301.

## **H. Contract Drawings**

The attached Contract Drawings are hereby incorporated into these Contract Documents.

## **I. Special Conditions**

These Special Conditions are intended to supplement and amplify the requirements of this Contract. Where any article or item of this Contract is modified or deleted by this section, the remaining unaltered provisions of that article, paragraph, subparagraph, or clause shall remain in effect. In the event of a conflict, these Special Conditions shall take precedence.

1. Pre-Construction Conference: There will be a Pre-Construction conference following execution of the Agreement between the PWC and the Contractor. The purpose of the conference is to discuss general project items, including, but not limited to:

- a. Contractor's responsible person and contact information
- b. Emergency contact information
- c. Submittal schedule
- d. Contract issues
- e. Safety
- f. Project schedule (including Notice to Proceed)
- g. Sales Tax Certificate/Pay Applications
- h. Warranty requirements
- i. Site restoration and clean-up

2. Customer Service

The Contractor is expected to make every effort to reduce the impact of its operation to Fayetteville Public Works Commission's operation and maintenance of the lift station. Full cooperation and coordination with Fayetteville Public Works Commission personnel and other contractors is expected. It is expected that the Contractor will promptly respond to any concerns voiced by Fayetteville Public Works Commission personnel and make every effort to resolve them immediately. Providing exemplary customer service shall be incidental to this Contract, and no additional payment will be made for this service.

3. Submittals

The Contractor shall provide submittal information as outlined below.

The Contractor shall not perform any portion of the work requiring submittal and review until the respective submittal has been approved by the Fayetteville Public Works Commission. Work performed prior to review and acceptance shall be at the Contractor's risk.

The Contractor shall submit to the Fayetteville Public Works Commission five (5) copies of all required submittal data for review and approval. The Contractor shall furnish, prior to use of the materials, satisfactory written certification of his compliance with the manufacturer's standards for all materials, conformance with the methods of the manufacturer, and accordance with all standards specified and referenced within these specifications. If requested by the Fayetteville Public Works Commission, the manufacturer of materials, equipment, or product shall submit evidence of having consistently produced materials of satisfactory quality and performance for a period of at least two (2) years.

The Contractor shall provide submittals on all materials and shall furnish the manufacturers' certifications that all of the lining materials follow the specifications, codes, and standards referenced in these Contract Documents. The submittals shall include installation instructions and details of all component materials and construction methods.

All information contained within the submittals shall be in accordance with these Contract Documents. Facsimile (fax) copies of the submittals or re-submittals will not be acceptable.

The Fayetteville Public Works Commission shall review and approve, disapprove, or approve with comment the submittal within 10 business days of receipt. All notifications on the submittals will be provided to the Contractor in writing. The Fayetteville Public Works Commission shall return three (3) marked copies of the submittals to the Contractor.

The Fayetteville Public Works Commission's review of the submittals will cover only general conformity to these Contract Documents, external connections, and dimensions which affect the layout. The Fayetteville Public Works Commission's review does not

indicate a thorough review of all dimensions, quantities, and details of the material, equipment, device, or item shown. The Fayetteville Public Works Commission's review shall not relieve the Contractor of the Contractor's sole responsibility for errors, omissions, or deviations in the Contract drawings and data, nor of the Contractor's sole responsibility for compliance with these Contract Documents.

The Fayetteville Public Works Commission's submittal review shall be 10 working days in length and shall commence on the first calendar day immediately following the date of arrival of the submittal or re-submittal in the Fayetteville Public Works Commission's office. The time required mailing the submittal or re-submittal back to the Contractor shall not be considered part of the submittal review period.

When the submittal is returned marked "Not Approved" or "Revised and Resubmit", the corrections shall be made as noted thereon and as instructed by Fayetteville Public Works Commission and five (5) corrected copies shall be re-submitted.

When the submittal is returned marked "Approved" or "Approved as Noted", no additional copies need to be furnished, unless otherwise specifically requested by the Fayetteville Public Works Commission.

The Contractor shall accept full responsibility for the completeness of each re-submittal. The Contractor shall verify that all corrected data and additional information previously requested by the Fayetteville Public Works Commission are provided on the re-submittal.

When corrected copies are re-submitted, the Contractor shall in writing direct specific attention to all revisions and shall list separately any revisions made other than those called for by Fayetteville Public Works Commission on previous submissions.

Requirements specified for initial submittals shall also apply to re-submittals. Re-submittals shall be made within 30 days of the date the letter returning the material to be modified or corrected, unless within 14 days the Contractor submits an acceptable request for an extension of the stipulated time period, listing the reasons the re-submittal cannot be completed within that time.

Any need for more than one (1) re-submission, or any other delay in obtaining the Fayetteville Public Works Commission's review of submittals, will not entitle the Contractor to an extension of the contract duration, unless the delay of the work is

directly caused by a change in the work authorized by a Change Order or by failure of the Fayetteville Public Works Commission to review any submittal within the submittal review period specified herein and to return the submittal to the Contractor.

4. Spill Response

The Contractor shall not discharge or pump any sewage, solids, or debris on the ground, streets, storm water system, ditches, or streams. Any accidental sewage spills shall be immediately reported to the PWC Water Resources Construction Department, (910) 223-4716. After normal business hours, the Contractor shall contact the PWC Dispatch Center, (910) 678-7400.

In the event that raw sewage is spilled, discharged, leaked or otherwise deposited in the open environment, due to the Contractor's work, the Contractor is responsible for any cleanup of solids and disinfection of the area affected. This work will be performed at the Contractor's expense with no additional cost to the Fayetteville Public Works Commission. The Contractor is also responsible for complying with any and all regulatory requirements in regard to the size spill with no additional cost to the Fayetteville Public Works Commission. The Contractor shall cooperate fully with the Fayetteville Public Works Commission and the applicable State agencies in responding to and cleaning up the spill. Any work completed by the Fayetteville Public Works Commission in responding to a spill caused by the Contractor's operations shall be billed to the Contractor.

Where sewage has backed up into a property due any aspect of the Contractor's operation, the Contractor shall immediately notify the Fayetteville Public Works Commission, inspect the property with the Fayetteville Public Works Commission and agree on remedial measures. The Contractor shall be responsible for all cleaning, repair and / or replacement of damaged property, temporary relocation of all occupants of the affected properties, if required, all to the satisfaction of the property owner. These actions shall be undertaken immediately upon learning of the backup. Cleaning shall be performed by firms specializing in this type of work. All costs associated with the cleaning, repair, replacement of damages, occupant accommodations, insurance and spill remediation shall be borne by the Contractor. All remediation measures required as part of a spill response are part of acceptance of the project, and final payment shall not be made until such time all required measures are addressed and approved by the appropriate regulatory agency.

5. Equipment and Material Storage

The Contractor may utilize the existing Lift Station #26 – Golden Creek site for storage of materials and equipment during the performance of the work. The Contractor shall

coordinate the specific location to be used for storage with the Fayetteville Public Works Commission, to ensure that the location does not interfere with daily activities at the lift station. Upon completion of the work, prior to releasing final payment, the Contractor shall ensure that the site is left in a neat and satisfactory condition.

6. Sanitary Provisions

The Contractor shall provide a portable restroom for its crews while the lift station is out of service. The cost for this shall be included in the unit prices bid.

7. Availability

The Contractor shall be capable of providing crews as needed to complete the work without undue delay and shall begin work on the date indicated in the executed Notice to Proceed.

8. Resolving Discrepancies

Except as may be otherwise specifically stated in these Contract Documents, the following order of precedence shall be adhered to for resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents:

- a. The Construction Agreement
- b. Any addendum issued prior to the opening of Bids
- c. Special Conditions
- d. Measurement and Payment
- e. Approved Contract Drawings
- f. Fayetteville Public Works Commission Standard Details
- g. Fayetteville Public Works Commission Technical Specifications

9. Guarantee

All material and workmanship involved with these Contract Documents shall be guaranteed by the Contractor for a period of one (1) year from the date of final acceptance and all latent structural defects shall be guaranteed by the Contractor for a period of two (2) years from the date of final acceptance. During that period, all serious defects discovered in the work, as determined by the Fayetteville Public Works Commission, shall be removed and replaced in a satisfactory manner by the Contractor at no cost to the Fayetteville Public Works Commission. The Fayetteville Public Works Commission may conduct an independent inspection, at its sole expense, of the completed work prior to the completion of the one (1) year guarantee period.

Should the Fayetteville Public Works Commission's inspection determine that the work is not in accordance with these Contract Documents; the Contractor shall mobilize and

make all necessary repairs at no expense to the Fayetteville Public Works Commission. The Contractor will receive written notification from the Fayetteville Public Works Commission and be allowed the chance to review any available inspection pictures or other documentation. The Contractor shall respond to the Fayetteville Public Works Commission with a plan of action within 30 calendar days of receiving notification. Failure to respond to the Fayetteville Public Works Commission's notification may result in the Fayetteville Public Works Commission withholding payments to the Contractor. Alternatively, the Fayetteville Public Works Commission reserves the right to contract with another party to complete the warranty work, at the sole expense of the Contractor.

#### 10. Working Times

The Contractor shall limit its operations to Monday through Friday, during normal business hours. Regular working hours shall not exceed 40 hours per week, 8 hours per day (between 7:00 a.m. and 5:00 p.m.), Monday through Friday. No work is permitted on legal Holidays (to include weekends). No work, unless otherwise required due to an emergency and authorized by the Fayetteville Public Works Commission, shall be performed on weekends or after hours without prior written approval from the Fayetteville Public Works Commission. Requests to work other than regular working hours must be submitted in writing to the Fayetteville Public Works Commission a minimum of two (2) business days in advance in order to arrange for appropriate personnel to be at the site of the work. Requests shall only be approved if the Fayetteville Public Works Commission determines that the work is necessary in order to meet the contract completion date. The written request shall include a proposed schedule for the work to be completed.

During the course of construction, it may be necessary to complete portions of the work outside of the normal working hours, to accommodate the utility owner's operations, traffic, and/or public convenience. The Contractor, the Fayetteville Public Works Commission, and the utility owner will determine an acceptable schedule required for work during such hours. The costs for such work shall be considered incidental to the Project and no additional payment will be made.

Legal holidays observed by the Fayetteville Public Works Commission include New Year's Day, Martin Luther King's Birthday, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving (2 days), and Christmas (2 days).

The Contractor shall plan its activities in order to maintain compliance with the requirements set forth in this section. Failure of the Contractor to properly plan and



complete its activities within the times indicated, shall result in the Fayetteville Public Works Commission issuing a Non-Compliance Notice.

11. Equipment

The Contractor shall be equipped with equipment perfectly adaptable for the type of construction required; all such equipment shall be of sufficient capacity to handle the work in an expeditious and safe manner. The Fayetteville Public Works Commission reserves the right to deny the use of inadequate equipment or of equipment not capable of performing the work in an acceptable manner.

With respect to the foregoing, it is the intent of the Fayetteville Public Works Commission to require that the Contractor be equipped to perform the work shown and specified, expeditiously and in accordance with the best modern practice.

12. Materials

All materials to be utilized are to be in new condition. Materials are to be stored in strict accordance with the manufacturer's directions. Materials are to be of the type and brand specified within these Contract Documents, including Technical Specifications. **No alternative or substitute materials shall be considered.**

The Contractor shall be responsible for providing all of the specified products, along with required documentation necessary for the Fayetteville Public Works Commission to review and verify that the products specified are being used.

13. Limits of Construction

The Contractor shall confine its rehabilitation operations to the existing property controlled by PWC and titled in the name of the City of Fayetteville. The Contractor may use additional area for staging, storage or other operations, provided that written permission is obtained from the property owner and all disturbed areas are restored.

14. Agreements with Property Owners

Any and all agreements between the Contractor and individual property owners for work, services, rent of staging areas, etc. located outside of any easements or public rights-of-way shall not obligate the City of Fayetteville or the Fayetteville Public Works Commission in any manner. Prior to performing any work on private property, which could remotely infer the Contractor acting on behalf of the Fayetteville Public Works Commission, the Contractor shall furnish to the Fayetteville Public Works Commission a signed and witnessed statement executed by the Property Owner acknowledging that the City and the Fayetteville Public Works Commission are not liable for any agreements between the Property Owner and the Contractor. Additionally, the Contractor shall have

the responsibility to secure any and all agreements with property owners for any actions taken by its Subcontractors.

Should the Contractor, after good faith efforts, fail to gain necessary access across private property, the Fayetteville Public Works Commission may provide assistance. In such cases, it is the Contractor's responsibility to address any access concerns with the Fayetteville Public Works Commission in advance of the work, so the Fayetteville Public Works Commission may provide assistance as necessary. The Fayetteville Public Works Commission will work with the Contractor to provide access and coordination with the homeowner, but this is not a guarantee that the Fayetteville Public Works Commission will provide assistance at all times.

Prior to release of final payment, the Contractor shall obtain written releases from the property owners for satisfaction, completion, and restoration. Copies of those written releases shall be submitted to Fayetteville Public Works Commission with the final pay application.

The Contractor bears complete responsibility for any damage to private properties outside of the sewer easements and/or rights-of-way.

15. Warranty Against License Agreements

The Contractor shall warrant to the Fayetteville Public Works Commission that the equipment used on this Contract, where covered by patents or license agreements, is furnished in accordance with such agreements and that the prices included herein cover all applicable royalties and fees in accordance with such license agreements.

16. Site Restoration

Once construction is completed, the Contractor shall be responsible for restoring the site to as good as, or better than, existing conditions. All exposed areas are to be replaced with seed or sod and mulch (to include erosion control matting) to insure against erosion, in accordance with the Soil Erosion and Sedimentation Control requirements and as outlined in these Contract Documents.

17. Water

The Fayetteville Public Works Commission will allow the Contractor to use water from its existing water system. The Contractor shall utilize proper backflow prevention devices when obtaining water from the Fayetteville Public Works Commission's system. The Contractor shall contact the Fayetteville Public Works Commission's Environmental System Protection Department at 910-223-4699 to determine the required backflow

prevention devices, and to obtain a bulk water use permit. The Contractor shall be responsible for payment of the bulk water permit fee. The Contractor shall provide documentation on the amount of water used for its operations and provide a monthly statement to the Fayetteville Public Works Commission.

18. Final Inspection/Acceptance of Work

When the Project Coordinator deems the project completed and ready for final inspection, the Project Coordinator shall notify the Project Engineer. During the final inspection any items documented shall be compiled in a final punch list and provided to the Contractor within five (5) business days. The Contractor shall be required to complete each item in the final inspection punch list within 30 calendar days of receipt. Failure to complete the punch list in that time may result in liquidated damages being assessed. The project will not be considered complete until all punch list items are completed and accepted, unless otherwise determined by the Project Engineer. All punch list items shall be completed prior to release of final payment. Once the deficiencies have been addressed to the Fayetteville Public Works Commission's satisfaction, a final acceptance letter will be issued to the Contractor.

19. COVID-19

As North Carolina and the nation continues to deal with the COVID 19 pandemic, we must all take necessary steps to ensure the health and safety of employees, coworkers, family, friends, associates and people that we come in contact with on a daily basis. At PWC we implemented measures including requiring our employees to conduct temperature and wellness checks, wear a face covering or mask, whenever possible, maintain proper social distancing (minimum of 6 feet) and take other actions such as washing their hands, using approved sanitizer and wiping down surfaces, especially commonly shared equipment or tools. This applies to employees working in our facilities, working in public or at field sites. For firms who are under contract with PWC or working under purchase orders, those firms are expected to comply with all OSHA/EPA guidelines, CDC recommendations including any applicable North Carolina Executive Orders regarding the performance of work under COVID 19 conditions. Examples of such guidance can be found at the following:

**OSHA COVID-19 Overview**

<https://www.osha.gov/SLTC/covid-19/>

**OSHA COVID-19 – Control and Prevention / Construction Work**

[https://www.osha.gov/SLTC/covid-](https://www.osha.gov/SLTC/covid-19/construction.html#:~:text=Keep%20in%20person%20meetings%20(including,Fill%20hand%20sanitizer%20dispensers%20regularly.)

[19/construction.html#:~:text=Keep%20in%20person%20meetings%20\(including,Fill%20hand%20sanitizer%20dispensers%20regularly.](https://www.osha.gov/SLTC/covid-19/construction.html#:~:text=Keep%20in%20person%20meetings%20(including,Fill%20hand%20sanitizer%20dispensers%20regularly.)

<https://www.osha.gov/Publications/OSHA4000.pdf>

**North Carolina COVID-19 Executive Orders**

<https://www.nc.gov/covid-19/covid-19-executive-orders>

**Center for Disease Control**

<https://www.cdc.gov/coronavirus/2019-ncov/index.html>

**Implementing Safety Practices for Critical Infrastructure Workers**

<https://www.cdc.gov/coronavirus/2019-ncov/community/critical-workers/implementing-safety-practices.html>

**Essential Staff- Do's & Don'ts**

[https://www.cdc.gov/coronavirus/2019-ncov/downloads/Essential-Critical-Workers\\_Dos-and-Donts.pdf](https://www.cdc.gov/coronavirus/2019-ncov/downloads/Essential-Critical-Workers_Dos-and-Donts.pdf)

**NC Licensing Board for General Contractors**

<https://www.nclbnc.org/2020/07/02/board-buzz-summer/>

**NC Association of General Contractors**

<https://www.cagc.org/CAGC/SafetyHR/CAGC/Safety/SafelyHomeInitiative.aspx?hkey=e3439388-0c36-4755-91bd-4c8fc6d22a41>

**NC Department of Health and Human Services**

<https://covid19.ncdhhs.gov/>

**Cumberland County Health Department**

<https://www.co.cumberland.nc.us/departments/public-health-group/public-health>

**Department of Homeland Security**

<https://www.ready.gov/pandemic>

**Cape Fear Valley- What to do if you have COVID symptoms**

[https://www.youtube.com/watch?time\\_continue=1&v=tD0D7Apa\\_vw&feature=emb\\_log](https://www.youtube.com/watch?time_continue=1&v=tD0D7Apa_vw&feature=emb_log)

**FAYPWC COVID Response**

<https://www.faypwc.com/covid-19-update/>

**Small Business Administration**

<https://www.sba.gov/page/coronavirus-covid-19-small-business-guidance-loan-resources>

As an additional step to ensure the health and safety of contractor employees and PWC employees, should a contractor's employee test positive for COVID 19 the contractor must immediately inform the PWC project manager/supervisor or the Contractor's primary point of contact at PWC and the employee should be performing work at PWC facilities or field sites until medically cleared. This is necessary so PWC can inform our employees, conduct our own method of contact tracing for our employees and take any measures necessary such as quarantining PWC employees who may have been in contact with the individual who tested positive.

These actions are necessary to ensure the health and safety of all and to ensure that contract performance can be achieved under the conditions of this pandemic.

Contractor must provide a plan with its proposal that describes its plan for working under COVID-19 conditions. The plan should address the Contractor's approach to protect its employees, PWC employees, along with any other Contractor's working on PWC's locations. This may include the Contractor's approach towards employee use of PPE, such as face masks, sanitizing commonly shared tools or equipment, practicing social distancing as work conditions permit, and working within close proximity of others. The plan may also address any other actions that the Contractor will be taking, such as conducting daily temperature checks, conducting symptom checks and trackers, and any other actions the Contractor deems appropriate to protect the health and safety of its employees, PWC employees, and any other Contractors working on PWC's locations.

## 20. FINAL COMPLETION DOCUMENTATION

Prior to receiving final payment, the Contractor shall complete and/or provide the following:

- Complete all punch list items to the satisfaction of the Project Engineer.
- Provide all labor and manufacture warranties required.

### **J. Measurement and Payment**

The total lump sum bid price shall be full compensation for the work required to install a new standby power generator complete with an automatic transfer switch at the LS #26 – Golden Creek located at 3340 Gillespie Street, Fayetteville, N.C.

**LIFT STATION #26 – GOLDEN CREEK  
STANDBY POWER GENERATOR RETRO-FIT**

**FAYETTEVILLE PUBLIC WORKS COMMISSION**

**PROPOSAL**

The undersigned hereby signifies that it is \_\_\_\_\_

(his or their)

intention and purpose to enter into a Contract to furnish all materials, labor, equipment, mobilization and incidentals required to install a new standby power generator complete with an automatic transfer switch at the LS #26 – Golden Creek located at 3340 Gillespie Street, Fayetteville, N.C., as described in this Request for Proposal by the Fayetteville Public Works Commission, in accordance with the terms outlined herein.

**THAT:** The undersigned carefully examined this Request for Proposal and the attachments and fully understand them.

**THAT:** The undersigned carefully examined the site of the project and is familiar with the conditions under which the work is to be done and the conditions which must be fulfilled in furnishing and/or erection or construction of any or all items of the project, and the furnishing only of any materials, equipment or apparatus specified in connection therewith.

**THAT:** The undersigned will provide all necessary tools, machinery, apparatus, and all means necessary to do all the work and will furnish all materials, equipment, apparatus, and all else necessary to complete such Contract as may be entered into, in the manner prescribed in the Contract and Specifications and requirements under them of the Engineer, in the first-class manner.

**THAT:** The right of the Fayetteville Public Works Commission and the recommendation of the Fayetteville Public Works Commission are not to be questioned in the award of the Contract.

**THAT:** It is the intention of the Fayetteville Public Works Commission, subject to the conditions set forth, to award Contracts for the project on the basis of bids received at this letting and in such manner as they may decide as being in the best interests of the Commission.

**THAT:** On being awarded the Contract, the undersigned will submit a Performance Bond and Payment Bond, satisfactory to the Commission on the forms included hereinafter, each equal to one hundred (100) percent of the Contract Price, as Surety for the faithful performance of the

Contract.

**THAT:** The Performance Bond and Payment Bond shall be written by a surety licensed in the State of North Carolina and acceptable to the Commission.

**THAT:** A Proposal made by a corporation must be signed by its proper officers in a legal manner and its official address stated herein.

**THAT:** A Proposal made by a firm shall be signed with the name of each member of said firm and the firm name added, with the official address of said firm.

**THAT:** The undersigned will complete such Contract as is hereby proposed to enter into within the time stated herein.

**THAT:** The undersigned shall furnish all superintendence, labor, skill, materials, equipment, and other items necessary to install a new standby power generator for the existing Lift Station #26 (Golden Creek). All work and materials shall be in accordance with the requirements of the project General Terms and Conditions, Special Provisions, Contract Drawings and Technical Specifications attached herein, complete and ready for use:

**TOTAL LUMP SUM BID:** \$ \_\_\_\_\_

( \_\_\_\_\_ )

**(Write out Total Bid LUMP SUM PRICE in words)**

The BIDDER has received, acknowledged, and used the following addenda in completing the Bid. (Initial and Date as appropriate).

Addendum No. 1 \_\_\_\_\_ Dated \_\_\_\_\_

Addendum No. 2 \_\_\_\_\_ Dated \_\_\_\_\_

The undersigned BIDDER certifies that they are a licensed as a Contractor under the provisions of the Act of North Carolina Legislature, Session 1952 as amended regulating the practice of General Contracting, and that their license number is \_\_\_\_\_ (License Number).

It is further agreed that the Bidder will finish completely the work contemplated in the award made to the Bidder by the Fayetteville Public Works Commission, within the time set forth above.

Respectfully submitted this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

Name of CONTRACTOR: \_\_\_\_\_

By: \_\_\_\_\_

Title: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Phone No. \_\_\_\_\_ Fax No. \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

Federal I.D. No. \_\_\_\_\_

License No: \_\_\_\_\_

DBE, Minority or Woman Owned Business Enterprise: \_\_\_\_\_ Yes \_\_\_\_\_ No

Witness: \_\_\_\_\_



# **CERTIFICATE OF INSURANCE**

# **CONTRACTOR'S LICENSE**

**FAYETTEVILLE PUBLIC WORKS COMMISSION  
FAYETTEVILLE, NORTH CAROLINA**

**NOTICE OF AWARD**

**TO:** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**PROJECT DESCRIPTION:           LIFT STATION #26 – GOLDEN CREEK  
STANDBY POWER GENERATOR RETRO-FIT**

The OWNER has considered the BID submitted by you for the above described work in response to its Advertisement for Bids dated \_\_\_\_\_ and information for Bidders.

You are hereby notified that your BID has been accepted for items in the amount of \$CONTRACT AMOUNT.

You are required by the Instructions to Bidders to execute the Agreement and furnish the required Performance Bond, Payment Bond, and Certificates of Insurance within ten (10) calendar days from the date of this NOTICE to you.

If you fail to execute said Agreement and to furnish said Bonds within ten (10) days from the date of this Notice, said Owner will be entitled to consider all your rights arising out of the OWNER's acceptance of your BID as abandoned and as a forfeiture of your Bid Bond. The Owner will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this NOTICE OF AWARD to the OWNER.

Dated this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

**FAYETTEVILLE PUBLIC WORKS COMMISSION**

BY: \_\_\_\_\_  
Trent K. Ensley  
TITLE: Procurement Manager

**FAYETTEVILLE PUBLIC WORKS COMMISSION  
FAYETTEVILLE, NORTH CAROLINA**

**ACCEPTANCE OF AWARD**

**LIFT STATION #26 – GOLDEN CREEK  
STANDBY POWER GENERATOR RETRO-FIT**

Receipt of the preceding NOTICE OF AWARD is hereby acknowledged this the \_\_\_\_\_  
day of \_\_\_\_\_, 20\_\_\_\_.

**CONTRACTOR**

By: \_\_\_\_\_

Title: \_\_\_\_\_

## CONSTRUCTION AGREEMENT

THIS CONSTRUCTION AGREEMENT (“Agreement” or “Contract”) is made by and between the Fayetteville Public Works Commission (“PWC”), a North Carolina public authority, and [REDACTED] (“Contractor”), a [REDACTED] (*specify type of legal entity, state of formation, and if not formed in NC, confirm NC registration to do business*) (each of each of PWC and Contractor is a “Party” and both are collectively the “Parties”) as of the date of execution last written below (the “Effective Date”). The Parties agree as follows:

1. The Construction Project. Contractor shall furnish and bear solely the entire cost of all labor and materials necessary for the construction and/or renovation of the Project (defined hereinbelow) as specified in the Contract Documents (defined hereinbelow) and complete all work on the Project in a workmanlike manner in strict accordance with the Contract Documents, schedule delivery of the new materials, furnish and bear solely the entire cost of all supervision, contract administration, equipment, tools, and other means necessary to complete the Project, perform every obligation imposed by the Contract Documents, and be solely responsible for the clean-up and disposal of all materials and debris relating to or arising from the construction and renovation, subject to any exceptions that are specifically set forth in the Contract Documents. Except as otherwise specifically provided in the Contract Documents, Contractor is solely responsible for all construction means, methods, techniques, sequences, procedures, safety precautions or programs, supervising, coordinating, and performing all the work necessary to complete the Project; provided, however, PWC shall have the right, without incurring any liability to the Contractor, to suspend Contractor’s performance when a PWC employee, in his or her opinion, observes a safety violation involving a threat to life or imminent danger of bodily injury, and the suspension shall remain in effect until Contractor remedies the safety violation.

2. Terms. Capitalized terms used in this Agreement have the meaning specified below:

“Business Day” means each calendar day that is not a Saturday, Sunday, holiday observed by the federal government for its employees, or holiday observed by the State of North Carolina for its employees.

“Completion of the Project” means: (i) the Project is completed in accordance with this Agreement, except for punch list items; (ii) PWC has received any required temporary or final certificate of occupancy from the governmental agency with jurisdiction over the Project; and (iii) the registered architects or engineers (the “Designer(s)”) who designed portions or components of the Project have issued certificates of Completion of the Project as to those portions or components.

“Contract Documents” means the following documents that were either made available to Contractor by PWC during the bid solicitation process (including Drawings) or executed by the Parties or both, which are all incorporated by reference herein:

- a. This Agreement
- b. Request for Proposal (including General Terms and Conditions)

- c. Proposal
- d. Bidder Information
- e. Certificate of Insurance
- f. Copy of General Contractor's License
- g. Notice of Award
- h. Acceptance of Award
- i. Performance Bond
- j. Payment Bond
- k. Notice to Proceed
- l. Technical Specifications

Contract Drawings

The following documents may be delivered or issued on or after the Effective Date of the Agreement and may not be attached to this Agreement, but are considered Contract Documents when executed by the Parties:

- m. Notice to Proceed and Acceptance of Notice
- n. Work Change Directive(s)
- o. Change Order(s)
- p. Field Order(s)

There are no Contract Documents other than those identified in this Agreement. The Contract Documents may only be amended, modified, or supplemented as provided in this Agreement in a writing signed by the Parties.

"Fault" means a breach of contract by Contractor, negligent, reckless, or intentional act(s) or omission(s) constituting a tort under applicable statutes or common law by one or more Responsible Persons, or violation(s) of applicable statute(s) or regulation(s) by a Responsible Person.

"Project" means Lift Station #26 – Golden Creek Standby Power Generator Retro-fit, as more specifically set forth in the Contract Documents.

"Responsible Person" means the Contractor and each of its employees, agents, representatives, subcontractors, or other persons and entities for which Contractor may be liable or responsible as a result of any statutory, tort, or contractual duty.

The terms used in this Agreement shall have the meaning as stated herein and in the Definitions and Terminology. In the event of a conflict between the terms of this Agreement and any other component(s) of the Contract Documents, the terms of this Agreement shall govern.

3. Contract Price. PWC shall pay Contractor for Completion of the Project in accordance with the Contract Documents the amount identified in the accepted Bid Form of Contractor, being in the total amount of \$ \_\_\_\_\_ (the "Price"). Contractor understands and acknowledges that the Price is derived from a specific appropriation of funds provided for the Project. Contractor agrees and acknowledges the Price is equal to the aggregate cost of all work to be done on the Project, including all labor, materials, equipment, apparatus, and supplies, set in accordance with the amount specified on the Bid Form submitted by Contractor and accepted by PWC.

4. Contract Times. The Parties shall perform their obligations under this Agreement in compliance with all scheduling deadlines set forth in the Contract Documents. The Contractor shall commence the work to be performed under this Agreement on a date to be specified in accordance with the Notice to Proceed issued by PWC. Contractor shall achieve Completion of the Project no later than 90 consecutive calendar days after [REDACTED], plus any modifications thereof allowed in accordance with the Contract Documents (the "Completion Date").

5. Payment. PWC shall pay Contractor in installment payments plus a final payment, as set forth in the Contract Documents. For each applicable installment payment, Contractor shall submit an application for payment in accordance with the Contract Documents. An application for payment will be processed by PWC as provided in the Contract Documents. Such installment payments shall reflect the actual cost of the work, not to exceed in total the Price, and the allocable portion of the total Price for said installment. PWC shall make payment to the Contractor, less any applicable retainage set forth in the Contract Documents; provided, however, that PWC may withhold all or a portion of a payment on account of (1) incomplete work, (2) defective or nonconforming work, (3) claims filed or a reasonable basis to believe that such claims will be filed imminently, (4) failure of the Contractor to make payments properly for labor, services, materials, equipment or subcontracts, (5) damages caused to PWC or another party by one or more Responsible Persons, or (6) failure to comply with the terms and conditions of this Agreement. In the final payment, PWC shall pay the balance of the Price, including all retained amounts, less any Liquidated Damages and other applicable damage and claim amounts, to Contractor within forty-five (45) days of Completion of the Project; provided, however, that PWC may withhold a reasonable sum from the final payment to ensure correction of any final items or condition on the Project.

6. Retainage. Subject to any restrictions applicable to any federal grant funds that may be utilized for the Project, PWC may, in its discretion, retain up to five percent (5%) of any periodic payment due Contractor; provided, however, when the Project is fifty percent (50%) complete, PWC, with written consent of the surety, shall not retain any further retainage from periodic payments due Contractor if Contractor continues to perform satisfactorily and any nonconforming work identified in writing prior to that time by PWC or the Designer has been corrected by Contractor and accepted by PWC or the Designer, and provided further that full payment, less authorized deductions, shall also be made for those line item trades that have reached one hundred percent (100%) completion of their contract obligations by or before the Project is fifty percent (50%) complete if Contractor has performed satisfactorily in accordance with G.S. 143-134.1(b2), contingent upon PWC's receipt of an approval or certification from the Designer that the work performed by the subcontractor is acceptable and in accordance with the Contract Documents. If PWC determines Contractor's performance is unsatisfactory, PWC may, in its discretion, reinstate retainage for each subsequent periodic application for payment as authorized in this Section up to the maximum amount of five percent (5%). The Project shall be deemed fifty percent (50%) complete when Contractor's gross project invoices, excluding the value of materials stored off-site, equal or exceed fifty percent (50%) of the Price, except the value of materials stored on-site shall not exceed twenty percent (20%) of Contractor's gross project invoices for the purpose of determining whether the Project is fifty percent (50%) complete. Within 60 days after the submission of a pay request and one of the following occurs, as specified in the Contract Documents, PWC, with written consent of the surety, shall release to Contractor all retainage on payments held by PWC: (i) PWC receives a certificate of substantial completion from the Designer in charge of the Project; or (ii) PWC receives beneficial occupancy or use of the Project; provided, however, PWC may in its discretion retain

sufficient funds to secure Completion of the Project or corrections on any work. If PWC retains funds, the amount retained shall not exceed two and one-half times the estimated value of the work to be completed or corrected. Any reduction in the amount of the retainage on payments shall be with the consent of Contractor's surety. The existence of any third-party claims against Contractor or any additive change orders to the Construction Documents shall not be a basis for delaying the release of any retainage on payments. Notwithstanding anything in this Section to the contrary, following fifty percent (50%) completion of the Project, PWC shall be authorized to withhold additional retainage from a subsequent periodic payment, not to exceed five percent (5%), in order to allow PWC to retain two and one-half percent (2.5%) total retainage through the Completion of the Project. In the event that PWC elects to withhold additional retainage on any periodic payment subsequent to release of retainage on a line-item of work pursuant to G.S. 143-134.1(b2), Contractor may also withhold from the subcontractors remaining on the project sufficient retainage to offset the additional retainage held by PWC, notwithstanding the actual percentage of retainage withheld by PWC of the Project as a whole. Neither PWC's nor Contractor's release of retainage on payments as part of a payment in full on a line-item of work pursuant to G.S. 143-134.1(b2) shall affect any applicable warranties on work done by Contractor or subcontractor, and the warranties shall not begin to run any earlier than either PWC's receipt of a certificate of substantial completion from the Designer in charge of the Project or PWC receives beneficial occupancy.

7. Liquidated Damages. Time is of the essence with respect to performance of each of the Parties' obligations under this Agreement. Contractor recognizes and acknowledges that PWC will suffer financial and other losses if the Project is not completed by the Completion Date. The Parties recognize and agree that the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by PWC if the Project is not completed by the Completion Date. Accordingly, instead of requiring any such proof, Contractor and PWC agree that in the event Contractor fails to achieve Completion of the Project by the Completion Date, Contractor shall pay to PWC as liquidated damages to compensate PWC for damages related to the delayed Completion of the Project one thousand dollars (\$1000.00) per day ("Liquidated Damages") for each calendar day Contractor fails to achieve completion of the work by the Completion Date.

8. Contractor's Representations and Warranties. In order to induce PWC to enter into this Agreement, Contractor makes the following representations and warranties to PWC:

a. Contractor is duly licensed in the State of North Carolina to complete all work necessary for the Project, is duly organized, validly existing and in good standing and has all requisite powers, rights, and authority to execute, enter into, and perform this Agreement in accordance with the terms and conditions of this Agreement, and this Agreement constitutes a legal, valid, and binding obligation of Contractor enforceable against it in accordance with its terms.

b. Contractor has read the Contract Documents, and acknowledges and understands all data, materials, specifications, and requirements identified in the Contract Documents.

c. Contractor has visited the site for the Project, conducted a thorough, visual examination of the site and adjacent areas, and become familiar with and is satisfied as to the general, local, and site conditions that may affect cost, progress, and performance in completing the Project.



d. Contractor is familiar with and is satisfied as to all laws and regulations that may affect cost, progress, and performance to complete the Project.

e. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the site and all drawings of physical conditions relating to existing surface or subsurface structures at the site that have been identified in the Contract Documents and any accompanying reports and drawings, and (2) reports and drawings relating to hazardous environmental conditions, if any, at or adjacent to the site that have been identified in the Contract Documents and any accompanying reports and drawings.

f. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, if any, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (3) Contractor's safety precautions and programs.

g. Based on the information and observations referred to in subsection e. of this Section, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the work at the Price commencing on the commencement date and in accordance with the other terms and conditions of the Contract.

h. Contractor is aware of the general nature of work to be performed by PWC and others at the Site that relates to the work as indicated in the Contract Documents.

i. Contractor has given PWC's Designer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by the Designer is acceptable to Contractor.

j. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the work.

k. Contractor's entry into this Agreement constitutes an incontrovertible representation by Contractor that, without exception, all prices in the Agreement are premised upon performing and furnishing the work required by the Contract Documents.

l. Contractor has no business or personal relationship with any PWC Commissioner, officer, director, manager, or supervisor and Contractor covenants to disclose immediately to PWC any such relationship that develops during the performance of work on the Project.

9. Contractor's Payment Obligations. Contractor shall pay all of its obligations arising out of or in connection with the Project in a timely manner to all persons supplying materials in the prosecution of the work and to all laborers and others employed thereon.

10. Performance and Payment Bonds. Contractor shall obtain and deliver to PWC a performance bond in the amount of one hundred percent (100%) of the Price, conditioned upon the faithful performance of the Project and all work in accordance with the Contract Documents, which bond shall be solely for the protection of PWC. Contractor shall obtain and deliver to PWC a payment bond in the amount of one hundred percent (100%) of the Price, conditioned upon the prompt payment for all labor or materials for which the Contractor or one or more of its subcontractors is liable, which payment bond shall be solely for the protection of the persons furnishing materials or performing labor for which the Contractor is liable. The performance bond and the payment bond shall be executed by one or more surety companies legally authorized to do business in the State of North Carolina, shall become effective upon the awarding of the construction contract by PWC to Contractor, and shall at all times comply with the requirements set forth in Article 3 of North Carolina General Statutes Chapter 44A. In the event PWC deems the surety or sureties upon any bond necessary for this Agreement and the completion of the Project, or if for any reason, such bond ceases to be adequate to cover the performance and/or payment of the work, Contractor shall, at its expense, within five (5) days after the receipt of notice from PWC, furnish an additional bond or bonds in such form and amount, and with such surety or sureties as shall be satisfactory to PWC. In such event no further payment to Contractor shall be deemed to be due under this Agreement until new or additional security for the performance and payment of the Project shall be furnished in manner and form satisfactory to PWC. Contractor understands and acknowledges that PWC, as a public authority, is not subject to the provisions of Articles 1 and 2 of Chapter 44A of the General Statutes, in accordance with G.S. 44A-34 and applicable law.

11. Contractor's Damage Repair Obligations. Contractor shall be responsible for all damages to the property of the City of Fayetteville and of PWC that may result from the normal procedure of a Responsible Person's actions in the prosecution of the work or that may be caused by or result from the negligence of a Responsible Person during the progress of or connected with the prosecution of the work, whether within the limits of the work or elsewhere. Contractor shall promptly restore all such property so damaged to a condition as good as it was immediately prior to Contractor initiating the work on the Project.

12. Defective Work. The Project shall be subject to observation and approval by PWC, Designer, and representatives of governmental agencies with jurisdiction over the Project. PWC and Designer shall be entitled to enter at all reasonable times the premises subject to construction or renovation to inspect the work performed by or on behalf of Contractor, provided that such entry and inspection does not materially interfere with the progress of construction. Contractor shall correct promptly, at no cost to PWC, all work reasonably rejected by PWC or by its representatives. Should Contractor fail to correct rejected work, PWC may, acting in its sole discretion, correct such work and the Contractor shall pay PWC's actual costs of correction and any other applicable amounts identified in the Contract Documents.

13. As-Built Drawings. Contractor shall maintain during the progress of the Project as-built drawings indicating the current status of the Project as actually performed. Upon Completion of the Project, Contractor shall prepare a final version of such as-built drawings and submit them to PWC for approval.

14. Assignment. This Agreement shall be binding upon and inure to the benefit of the Parties, their legal representatives, successors, and assigns. Contractor may not assign, transfer, convey, or encumber, whether voluntarily or by operation of law, this Agreement or any obligations, rights under, or interests in this Agreement to a third party without the prior

written consent of PWC; and, specifically, but without limitation, money that may become due and money that is due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

15. Indemnity. Contractor shall indemnify, defend, and hold harmless PWC and its Commissioners, officers, employees, agents, and representatives and the City of Fayetteville and its elected officials, managers, employees, agents, and representatives and Designer (collectively "Indemnitees") from and against all claims, actions, liabilities, damages, losses, costs, and expenses (including, without limitation, injury to or death of any persons and damage to property, economic and consequential damages and attorneys' fees) asserted by one or more third parties against one or more of the Indemnitees if the Fault of one or more Responsible Persons is a proximate cause of the loss, damage, or expense indemnified. Contractor's obligation to indemnify, defend, and hold harmless the Indemnitees shall survive the termination of this Agreement.

16. Insurance. Contractor shall maintain during the completion of the Project and for at least three (3) years thereafter the insurance coverage set forth in the Contract Documents, which insurance shall be placed with insurance companies authorized to do business in the State of North Carolina and rated A minus VII or better by the current edition of Best's Key Rating Guide or otherwise approved in writing by PWC. Prior to initiating any work on the Project, Contractor shall deliver certificates of insurance confirming each such coverage required by the Contract Documents, and Contractor shall direct its insurers to provide annually to PWC certificates confirming each such coverage during the coverage period. PWC shall be named as an additional insured in the comprehensive automobile and commercial liability insurance policies. Commercial general liability coverage shall be written on an "occurrence" basis. Contractor shall not reduce or allow the required insurance coverages to lapse without PWC's prior written approval. All policies for insurance must be endorsed to contain a provision giving PWC a thirty (30) calendar day prior written notice by certified mail of any cancellation of that policy or material reduction in coverage. Should a notice of cancellation be issued for non-payment of premiums or any part thereof, or should Contractor fail to provide and maintain certificates as set forth herein, PWC shall have the right, but shall not have the obligation, to pay such premium to the insurance company or to obtain such coverage and to deduct such payment from any sums that may be due or become due to Contractor, or to seek reimbursement for said payments from Contractor. Any such sums paid by PWC shall be due and payable immediately by Contractor upon notice from PWC. The insurance provisions of this Agreement shall not be construed as a limitation on Contractor's responsibilities and liabilities pursuant to the terms and conditions of this Agreement. Contractor's obligation to maintain insurance for three (3) years after Completion of the Project shall survive the termination of this Agreement.

17. Warranty. The Contractor hereby grants to PWC a warranty on all materials and workmanship involved in the Project for a period of one (1) year from the Completion Date and a period of two (2) years from the Completion Date for any latent structural defects. PWC shall give written notice to Contractor of any claim under this Section within the time specified hereinabove. This warranty shall be in addition to, and not in derogation of, all other rights and privileges which PWC may have under law, equity, or instrument, and shall survive the Completion Date and the final settlement and shall be binding on Contractor notwithstanding any provision in any other writing executed by PWC heretofore or contemporaneous with the execution of the Agreement or prior to the Completion Date.

18. Waiver. No failure on the part of any party to exercise, and no delay in exercising, any right, power, or privilege hereunder shall operate as a waiver thereof, nor shall any single or partial exercise of any right hereunder preclude any other or further cumulative and not exclusive of any remedies provided by law. This Agreement shall be binding upon and inure to the benefit of the parties, their legal representatives, successors, and assigns. This Agreement may not be assigned, transferred, conveyed, or encumbered, whether voluntarily or by operation of law, by either party without the prior written consent of the other party, which consent shall not be unreasonably withheld.

19. Law. THIS AGREEMENT SHALL BE GOVERNED BY AND INTERPRETED AND ENFORCED IN ACCORDANCE WITH THE LAWS OF THE STATE OF NORTH CAROLINA WITHOUT GIVING EFFECT TO THE CHOICE OF LAW PROVISIONS THEREOF. The Contractor shall at all times comply with all applicable Federal, state, and local laws and building codes in the performance of its obligations under the Agreement.

20. Dispute Resolution. In the event of any dispute, controversy, or claim of any kind or nature arising under or in connection with this Agreement (a "Dispute") and involving any two or more of the following parties, PWC, Designer, Contractor or any subcontractor of Contractor, the party initiating the Dispute shall serve written notice of a Dispute on the party(ies) to the dispute, and those parties shall endeavor to settle the dispute first through direct, informal discussions between the parties' selected representatives. Any such representative(s) shall have binding authority to settle the Dispute. In the event the parties do not settle the Dispute within ten (10) days from the date of written notice of the Dispute, any party to the Dispute may, by written notice to the other party(ies), engage a mediator certified under the laws of the State of North Carolina to mediate the Dispute within thirty (30) days of such notice. The parties to the Dispute shall attend mediation in good faith. In the event mediation is unsuccessful, any party to the dispute may initiate arbitration proceedings. Any controversy or claim arising out of or relating to the Contract Documents, or the breach thereof, shall be settled by binding arbitration administered by the American Arbitration Association under its Construction Industry Arbitration Rules, and judgment on the award rendered by the arbitrator(s) may be entered in any court having jurisdiction thereof. All of the foregoing dispute resolution procedures shall be held in Cumberland County, North Carolina. The costs of the mediator and arbitrator in a dispute resolution process shall be divided equally among the parties to the process; provided, however, PWC shall bear at least one-third of the cost if PWC is a party to the dispute resolution and the remainder of the cost shall be divided equally among the other parties participating in the dispute resolution. PWC shall, in its contractual arrangements with Designer, and Contractor shall, in its contracts with subcontractors and they in their contracts with lower-tier subcontractors authorize and direct such parties to participate in the dispute resolution procedures set forth in this Section. Unless otherwise directed in writing by PWC, Contractor shall continue the Project and maintain compliance with the scheduling deadlines set forth in the Contract Documents during any dispute resolution proceedings. If Contractor continues to perform, PWC shall make payments due for the continued performance in accordance with this Agreement. The provisions of this Section shall not extend any applicable statutes of limitation or repose.

21. Execution; Modification; Entire Agreement; Severability. This Agreement may be executed in counterparts with the same effect as if the signatures to each counterpart were upon a single instrument, and all such counterparts together shall be deemed an original of this Agreement. For purposes of this Agreement, a facsimile copy or scanned copy or photocopy of a party's signature shall be sufficient to bind such party. This Agreement shall be subject to

execution by electronic means in accordance with Article 40 of Chapter 66 of the North Carolina General Statutes. No oral communication, promise, understanding, or agreement before, contemporaneous with, or after the execution of this Agreement shall affect or modify any of the terms and conditions and obligations of the Contract Documents. The Contract Documents shall be modified only by a subsequent writing signed by both Parties. The Contract Documents shall be conclusively considered to contain and express all the terms and conditions agreed upon by the Parties, notwithstanding any prior or contemporaneous written communication, promise, understanding or agreement. Should any provision of this Agreement or any of the Contract Documents at any time be in conflict with any law, statute, rule, regulation, order, or ruling and thus be unenforceable, or be unenforceable for any other reason, then the remaining provisions of this Agreement shall remain in full force and effect and the court or arbitrator shall give the offending provision the fullest meaning and effect permitted by law. The titles of the Sections throughout this Agreement are for convenience only and the words contained therein shall in no way be held to explain, modify, amplify or aid in the interpretation, construction, or meaning of the provisions of this instrument.

22. Notices. Any notice which either Party is required or desires to give the other hereunder shall be deemed sufficiently given if, in writing, it is delivered personally, or sent by certified U.S. mail, return-receipt requested, postage prepaid, to the addresses listed herein below, or such other address as either Party shall give to the other Party by written notice in accordance herewith. Any notice given herein by personal delivery shall be deemed delivered when received. Any properly addressed notice given herein by certified mail shall be deemed delivered on third Business Day after the same is deposited in an official United States Post Office, postage prepaid, or if sooner upon the date when the return receipt therefore is signed, or refusal to accept the mailing by the addressee is noted thereon by the postal authorities.

To PWC:  
Fayetteville Public Works Commission  
Attn: Elaina L. Ball, CEO/General Manager  
PO Box 1089  
Fayetteville, NC 28302

To Contractor:  
[INSERT MAILING ADDRESS]

23. Termination. PWC may terminate this Agreement immediately if during the progress of the work or during the warranty period, the Contractor:

- a. Persistently fails to prosecute the work properly and in accordance with this contract, including but not limited to include failure to provide sufficient crews, equipment, or resources, or failure to adhere to the schedule;
- b. Demonstrates disregard for the policies, procedures, or requirements of PWC;
- c. Demonstrates complete disregard of the authority of PWC or its designated representatives; or
- d. Violates in any substantial way the provisions and requirements of this Agreement.

Such termination shall be effective upon written notice to Contractor and its surety. PWC may terminate the contract for its convenience by providing Contractor at least seven (7) calendar

days prior written notice, in which event Contractor shall be paid for all work completed, plus other expenses as mutually agreed upon between PWC and Contractor.

24. Compliance. Contractor hereby acknowledges that “E-Verify” is the federal E-Verify program operated by the US Department of Homeland Security and other federal agencies which is used to verify the work authorization of newly hired employees pursuant to federal law and in accordance with Article 2, Chapter 64 of the North Carolina General Statutes. Contractor further acknowledges that all employers, as defined by Article 2, Chapter 64 of the North Carolina General Statutes, must use E-Verify and after hiring an employee to work in the United States, shall verify the work authorization of the employee through E-Verify in accordance with N.C.G.S. §64-26(a). Contractor hereby pledges, attests, and warrants through execution of this Agreement that Contractor complies with the requirements of Article 2, Chapter 64 of the North Carolina General Statutes and further pledges, attests, and warrants that all subcontractors currently employed by or subsequently hired by Contractor shall comply with all E-Verify requirements. Failure to comply with the above requirements shall be considered a breach of this Agreement. Contractor hereby further acknowledges that the execution and delivery of this Agreement constitutes Contractor’s certification to PWC and to the North Carolina State Treasurer that, as of the date of the Effective Date of this Agreement, Contractor is not listed on (a) the Final Divestment List created and maintained by the North Carolina Department of State Treasurer pursuant to the Iran Divestment Act of 2015, Chapter 147, Article 6E of the General Statutes of North Carolina (the “Iran Divestment Act”); or (b) the list of companies that the North Carolina State Treasurer determines to be engaged in a boycott of Israel in accordance with Article 6G of Chapter 147 of the General Statutes of North Carolina. Contractor represents and warrants to Commission that Contractor, and all persons and entities owning (directly or indirectly) an ownership interest in it: (i) are not, and will not become, a person or entity with whom a party is restricted from doing business with under regulations of the Office of Foreign Asset Control (“OFAC”) of the Department of the Treasury (including, but not limited to, those named on OFAC’s Specially Designated and Blocked Persons list) or under any statute, executive order (including, but not limited to, the September 24, 2001, Executive Order 13224 Blocking Property and Prohibiting Transactions with Persons Who Commit, Threaten to Commit, or Support Terrorism), or other governmental action; and (ii) are not knowingly engaged in, and will not knowingly engage in, any dealings or transactions or be otherwise associated with such persons or entities described in clause (i) above. Contractor also shall at all times during the term of this Agreement comply with Executive Order 11246, including but not limited to the Equal Opportunity Clause requirements set forth in 41 C.F.R. § 60-1.4. Contractor shall abide by the requirements of 41 CFR 60–300.5(a) and 60–741.5(a) prohibiting discrimination against qualified individuals on the basis of protected veteran status or disability and requiring affirmative action by covered prime contractors and subcontractors to employ and advance in employment qualified protected veterans and individuals with disabilities.

IN WITNESS WHEREOF, the Parties have executed this Agreement by their duly authorized representatives.

Fayetteville Public Works Commission

**[CONTRACTOR FULL LEGAL NAME]**

By: \_\_\_\_\_  
Elaina L. Ball, CEO/General Manager

By: \_\_\_\_\_  
\_\_\_\_\_, \_\_\_\_\_  
(Printed Name) (Title)

Date: \_\_\_\_\_

Date: \_\_\_\_\_

**This instrument has been preaudited in the manner required by the Local Government Budget and Fiscal Control Act (N.C. Gen. Stat. § 159-1 et seq.).**

By: \_\_\_\_\_  
Rhonda Haskins, Chief Financial Officer

Approved as to form:

\_\_\_\_\_  
James P. West, Chief Legal Officer

**PERFORMANCE BOND**

Date of Execution: \_\_\_\_\_

Name of Principal: \_\_\_\_\_  
(Contractor)

Name of Surety: \_\_\_\_\_

Name of Contracting  
Body: Fayetteville Public Works Commission, N.C.

**Amount of Bond:** \_\_\_\_\_

**PROJECT: LIFT STATION #26 – GOLDEN CREEK  
STANDBY POWER GENERATOR RETRO-FIT**

KNOW ALL MEN BY THESE PRESENTS, That We, the Principal and Surety above named, are held and firmly bound unto the above named Contracting Body, hereinafter called the Contracting Body, in the penal sum of the amount stated above the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these present.

THE CONDITION OF THIS OBLIGATION IS SUCH that whereas the Principal entered into a certain Contract with the Contracting Body, identified as shown above and hereto attached.

NOW, THEREFORE, if the Principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of said Contract during the original term of said Contract and any extensions there of that may be granted by the Contracting Body, with or without notice to the Surety, and during the life of any Guaranty required under the Contract, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of any and all duly authorized modifications of said Contract that may hereafter be made, notice of which modifications to the Surety being hereby waived, then, this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above bounded parties have executed this instrument under the several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed, and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.



Executed in \_\_\_\_\_ counterparts.

Witness:

CONTRACTOR:

\_\_\_\_\_  
(Proprietorship of Partnership)

\_\_\_\_\_  
(Trade or Corporate Name)

By: \_\_\_\_\_

Title: \_\_\_\_\_  
(Owner, Partner, Corporate President or  
Vice-President, Only)

ATTEST:

By: \_\_\_\_\_

**(CORPORATE SEAL)**

Title: \_\_\_\_\_  
(Corporate Secretary or  
Assistant Secretary, Only)

SURETY COMPANY:

Witness:

\_\_\_\_\_

By: \_\_\_\_\_

\_\_\_\_\_

Title: \_\_\_\_\_  
(Attorney in Fact)

Countersigned:

\_\_\_\_\_

**(SURETY CORPORATE SEAL)**

\_\_\_\_\_  
N.C. Licensed Resident Agent

\_\_\_\_\_  
Name and Address-(Surety Agent)

\_\_\_\_\_

\_\_\_\_\_  
Surety Company Name and N.C.  
Regional or Branch Office Address

**PAYMENT BOND**

Date of Execution: \_\_\_\_\_

Name of Principal: \_\_\_\_\_  
(Contractor)

Name of Surety: \_\_\_\_\_

Name of Contracting Body: Fayetteville Public Works Commission, N.C.

Amount of Bond: \_\_\_\_\_

**PROJECT: LIFT STATION #26 – GOLDEN CREEK  
STANDBY POWER GENERATOR RETRO-FIT**

KNOW ALL MEN BY THESE PRESENTS, that We, the PRINCIPAL and Surety above named, are held and firmly bound unto the above named Contracting Body, hereinafter called the Contracting Body, in the penal sum of the amount stated above the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that whereas the Principal entered into a certain Contract with the Contracting Body, identified as shown above and hereto attached.

NOW, THEREFORE, if the Principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of said Contract during the original term of said Contract and any extensions there of that may be granted by the Contracting Body, with or without notice to the Surety, and during the life of any guaranty required under the Contract, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of any and all duly authorized modifications of said Contract that may hereafter be made, notice of which modifications to the Surety being hereby waived, then, this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above bounded parties have executed this instrument under the several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed, and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Executed in \_\_\_\_\_ counterparts.

Witness:

CONTRACTOR:

\_\_\_\_\_  
(Trade or Corporate Name)

\_\_\_\_\_  
(Proprietorship or Partnership)

By: \_\_\_\_\_

ATTEST:

Title: \_\_\_\_\_  
(Owner, Partner, or Corporate  
President or Vice-President, Only)

By: \_\_\_\_\_

Title: \_\_\_\_\_  
(Corporate Secretary or  
Assistant Secretary, Only)

**(CORPORATE SEAL)**

SURETY COMPANY:

Witness:

\_\_\_\_\_

By: \_\_\_\_\_

\_\_\_\_\_

Title: \_\_\_\_\_  
(Attorney in Fact)

Countersigned:

\_\_\_\_\_

**(SURETY CORPORATE SEAL)**

\_\_\_\_\_  
N.C. Licensed Resident Agent

\_\_\_\_\_  
Name and Address-Surety Agent

\_\_\_\_\_  
Surety Company Name and N.C.  
Regional or Branch Office Address

**NOTICE TO PROCEED**

TO: \_\_\_\_\_ DATE: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**PROJECT: LIFT STATION #26 – GOLDEN CREEK  
STANDBY POWER GENERATOR RETRO-FIT**

You are hereby notified to commence work in accordance with the Contract dated \_\_\_\_\_  
\_\_\_\_\_, 20\_\_\_, on \_\_\_\_\_, 20\_\_\_, and  
you are to complete the work by \_\_\_\_\_, 20\_\_\_.

**FAYETTEVILLE PUBLIC WORKS COMMISSION**

\_\_\_\_\_  
BY: Trent K. Ensley  
TITLE: Procurement Manager

**ACCEPTANCE OF NOTICE**

Receipt of the above NOTICE TO PROCEED is hereby acknowledged this \_\_\_\_\_ day  
the of \_\_\_\_\_, 20\_\_\_.

**CONTRACTOR**

BY: \_\_\_\_\_  
TITLE: \_\_\_\_\_

## Table of Contents

### Golden Creek Lift Station Generator Retro-Fit

1. 16010 Electrical, Lift Stations
2. 16231 Standby Power Systems, Lift Stations



16010            ELECTRICAL, LIFT STATIONS

PART 1 - GENERAL

1.1    THE REQUIREMENT

- A.    Furnish all labor, materials, equipment and incidentals required for a complete electrical installation for the Work associated with the Contract Documents, as hereinafter specified and shown on the Drawings. It is the intent of these Specifications that the electrical system shall be suitable in every way for the service required. All material and all work which may be reasonably implied as being incidental to the work of this Section shall be furnished at no extra cost. All workmanship shall be of the highest quality; sub standard work will be rejected.
- B.    Certain equipment will be furnished as specified in other sections of these Specifications which will require mounting and wiring there to and/or complete installation as indicated. All materials necessary for the complete installation shall be furnished and installed by the Contractor to provide complete power, lighting, communication systems, instrumentation, wiring, and control systems as indicated on the Drawings and/or as specified herein.
- C.    Provide complete grounding systems for all equipment and structures as required by the National Electric Code (NEC), as specified herein, shown on the contract documents, and as required for specific pieces of equipment per manufacturer.
- D.    The work shall include complete testing of all equipment and wiring at the completion of the work and making any minor connection changes or adjustments necessary for the proper functioning of the system and equipment.
- E.    Electrical work shall conform to the construction schedule and progress of other trades. All power interruptions to existing equipment shall be at the PWC's convenience. Each interruption shall have prior approval.

1.2    RELATED WORK SPECIFIED ELSEWHERE

- A.    Pump Control Panel with RTU
  - 1.    New Pump Control Panel with RTU furnished by the Owner, installed by Contractor. Cable, conduit and terminations by Contractor.
- B.    Additional related sections include but are not necessarily limited to the following:
  - 1.    Division 0 - Bidding Requirements, Contract Forms, and Conditions of the Contract.

2. Division 1 - General Requirements.
3. Section 03301 – Concrete Construction

1.3 CODES AND STANDARDS:

- A. The electrical system and associated equipment shall comply with the following codes and standards as well as any others within the specifications and drawings.
  1. Applicable federal, state, county, and municipal code requirements.
  2. PWC Water Resources Manual for the Design and Construction of Water and Wastewater System Extensions
  3. Applicable standards of the National Fire Protection Association (NFPA)
    - a. National Electrical Code (NEC).
    - b. National Electric Safety Code
  4. American Iron and Steel Institute (AISI):
    - a. Steel Products Manual - Stainless and Heat Resisting Steel.
  5. American Society for Testing and Materials (ASTM):
    - a. A36, Specification for Structural Steel.
    - b. A153, Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
    - c. D698, The Moisture-Density Relations of Soils using a 5.5 LB Rammer and a 12-inch Drop.
  6. Factory Mutual System (FM):
    - a. A Guide to Equipment, Materials and Services.
  7. Institute of Electrical and Electronics Engineers (IEEE):
    - a. 141, Recommended Practice for Electrical Power Distribution for Industrial Plants.
    - b. 242, Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems.
  8. National Electrical Manufacturers Association (NEMA):
    - a. 250, Enclosures for Electrical Equipment (1000 V Maximum)
    - b. ICS 6, Enclosures for Industrial Control and Systems
  9. National Fire Protection Association (NFPA):
    - a. 70, National Electrical Code (NEC).
    - b. 70E, Standard for Electric Safety in the Workplace
    - c. 79, Electrical Standard for Industrial Machinery
    - d. 820, Standard for Fire Protection in Wastewater Treatment and Collection Facilities

10. Underwriters Laboratories, Inc (UL):
  - a. 508, Industrial Control Equipment
  - b. 508A, Industrial Control Panels
  - c. 698, Industrial Control Equipment for Use in Hazardous Locations.
  
- B. When a specific code or standard has not been cited, the applicable codes and standards of the following code-making authorities and standards organizations shall apply:
  1. American Association of State Highway and Transportation Officials (AASHTO).
  2. American Iron and Steel Institute (AISI).
  3. American National Standard Institute (ANSI).
  4. American Society for Testing and Materials (ASTM).
  5. ETL Testing Laboratories, Inc (ETL).
  6. Insulated Cable Engineers Association (ICEA).
  7. Institute of Electrical and Electronic Engineers (IEEE).
  8. Illuminating Engineering Society of North America (IES).
  9. Instrument Society of America (ISA).
  10. Lightning Protection Institute (LPI).
  11. National Electrical Manufacturers Association (NEMA).
  12. National Fire Protection Association (NFPA).
  13. Occupational, Health and Safety Administration (OSHA).
  14. Underwriters Laboratories Inc (UL).
  
- C. In case of conflict or disagreement between codes, standards, laws, ordinances, rules, regulations, drawings and specifications, or within either document itself, the more stringent condition shall govern.

#### 1.4 AREA CLASSIFICATIONS

- A. Outdoor Areas: Those locations on the project site where the equipment is normally exposed to wind, dust, rain, snow, etc. Outdoor areas include areas protected by a roof or rain/sun shields but not enclosed within four walls of a structure. Outdoor locations may contain wet, corrosive and hazardous areas:
  1. Corrosive and hazardous areas are specified herein or identified on the Drawings. Areas not identified as such shall be considered wet.
  
- B. Indoor Areas: Those locations on the project site where the equipment is normally protected from wind, dust, rain, snow, etc. Indoor locations may contain unclassified, damp, wet, corrosive and hazardous areas:
  1. Damp, wet, corrosive and hazardous areas are specified herein or identified on the Drawings. Areas not identified as such but provided with



heating shall be considered unclassified. Areas not identified as such but provided without heating shall be considered damp.

C. Hazardous Locations:

1. Hazardous locations shall be as defined in NFPA 70 NEC, NFPA 820 Standard for Fire Protection in Wastewater Treatment and Collection Facilities, and other applicable standards or codes governing the classification of a particular type of facility or location. In addition, areas are classified as shown on drawings and as follows:
  - a. Class I Division 2 areas are identified on Drawings and at the following locations:
    - 1) Residential Only Wastewater (Sewer) Pump Station Wetwells. Systems of 5 or less residences are not classified as a hazardous location.
    - 2) Wastewater Pump Station Drywells.
    - 3) Dry areas of enclosed wastewater piping (i.e. valve vaults, meter vaults, etc.).
  - b. Class I Division I areas are identified on Drawings and at the following locations:
    - 1) Wastewater Pump Station Wetwells.

1.5 SUBMITTALS:

- A. **Every submittal with any deviations or exceptions from Contract Documents shall have a separate section entitled "Requested Deviations from Electrical System Specifications"** which shall clearly define and explain all deviations and exceptions to this specification and corresponding drawings detailing the electrical system requirements.
- B. Shop Drawings:
  1. **Shop drawings shall be arranged and labeled according to specifications section and/or contract documents.**
  2. Submit shop drawings prior to purchase or fabrication of equipment. See individual specification sections for specific requirements.
  3. Prior to submittals of shop drawings, coordinate electrical equipment, particularly motor control equipment, control panels, and instrumentation, with all applicable equipment and systems interfacing with that equipment.
  4. Submittals shall be made in the following combinations:
    - a. Conduits, busway, wireway, cable tray, ductbank details, wire and cable 600 V and below, boxes, fittings, and wiring devices.
    - b. Disconnect Switches, , grounding.
    - c. Lamps, interior lighting, exterior building lighting, site lighting.

- d. Provide a conductor identification schedule for all power, control, communication and protective circuits. The schedule shall include the following information:
    - 1) Conductor identification number.
    - 2) Conductor size.
    - 3) Number of conductors.
    - 4) Type of conductor.
    - 5) Size of conductor.
    - 6) Size of conductor usage descriptions.
    - 7) Conductor run (to and from).
    - 8) Conduit size and type.
  - 5. For each product, clearly identify manufacturer by name.
  - 6. Provide manufacturer's technical information on products to be used, including:
    - a. Product descriptive bulletin.
    - b. Electrical data pertinent to the project and necessary to assure compliance with Specifications and Drawings.
    - c. Equipment dimensions, where applicable.
    - d. Evidence that the products submitted meet the requirements of the standards referenced.
  - 7. When general data sheets are provided as part of the submittal, specifically identify the products to be used on this project.
  - 8. Ensure that all submittals clearly indicate the equipment is UL or ETL listed or is constructed utilizing UL or ETL listed or UL recognized components. Where a UL standard has not been established clearly identify that no UL standard exists for that equipment.
  - 9. For all equipment, provide manufacturer's installation instructions.
- C. Two copies of manufacturer's warranties.
- D. When a quality standard has been established by identification of a specific manufacturer or catalog number, submittals for proposed alternates and substitutions shall include:
- 1. Alternate and substitute equipment cross-referenced to the equipment it is replacing. Submittal shall be marked to show how differences will be accommodated.
  - 2. Calculations and other detail data to allow determination of alternate and substitute equipment equivalency to the equipment it is replacing. Data supplied shall allow detailed comparison of all significant characteristics upon which the design equipment is based.

3. Dimensioned drawings, of the same or larger scale as the Contract Drawings, for all alternate and substitute equipment, which differs in size, configuration, service accessibility or in any significant way from the equipment it is replacing.
  - a. Complete system layout, except that portion which is identical to the Contract Document Drawings.
  - b. Redesign and modifications to all work required by the alternate or substitute equipment.
  
- E. Operation and Maintenance Manuals: Shall be submitted according to the individual specification section, contract drawings, and/or contract documents. Two(2) hard copies and an electronic version of all O & M shall be provided.
  
- F. Record Drawings:
  1. The Contractor shall maintain a marked up set of Contract Document Drawings showing actual installed circuit numbers, conduit sizes, cable tray routing, number of conductors, conductor sizes (other than #12) and all other deviations from the design drawings.
  2. All underground conduit and concealed items shall be dimensioned on the Drawings from permanent, visible, building features.
  3. Provide actual motor size, starter size, and heater size, along with all other protective equipment for all motor circuits as part of the one-line record drawings.
  4. Revise all conductor identification and circuit schedules to indicate as installed conditions.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. The Contractor shall unload and handle materials using methods, rigging, and equipment that will prevent damage to the materials. Care shall be used to prevent damage to painted and galvanized surfaces.
  1. Bare wire rope slings shall not be used for unloading and handling materials and equipment, except with the specific written permission of the Engineer.
  
- B. Stored equipment and materials shall be adequately supported and protected to prevent damage.
  1. Stored materials and equipment shall not be allowed to contact the ground.
  2. Equipment and materials which incorporate electrical equipment or which have finished painted surfaces, and other items which would be damaged by outdoor exposure, shall be stored indoors.

- a. Provide covering and shielding for all equipment to protect from damage.
  - b. When such storage would present an unreasonable building space or volume requirement, the equipment or materials may, when acceptable to the Engineer, be stored under weatherproof coverings on shoring or platforms.
3. All small loose items that could be easily lost, stolen, broken, or misused shall not be stored on open platforms or shoring.
4. All storage methods and schedules shall be acceptable to the Engineer.
- C. Ensure that equipment is not used as steps, ladders, scaffolds, platforms, or for storage-either inside or on top of enclosures.
- D. Protect nameplates on electrical equipment to prevent defacing.
- E. Repair, restore or replace damaged, corroded and rejected items at no additional cost to the PWC.

## PART 2 - PRODUCTS

### 2.1 GENERAL REQUIREMENTS:

- A. In accordance with North Carolina Building Code Council, all electrical utilization equipment furnished and installed under this Contract, including all electrical, instrumentation, and equipment control panels, instrument devices, power distribution equipment, electric valve actuators, and miscellaneous electrical devices, shall bear the label of a North Carolina approved nationally recognized testing laboratory (NRTL). The label shall convey the laboratory's declaration of the equipment safety and suitability for intended use on this project. A list of the approved testing laboratories per equipment type is available at the following web address:
- [www.ncdoi.com/OSFM/Engineering/BCC/engineering\\_bcc\\_third\\_party.asp](http://www.ncdoi.com/OSFM/Engineering/BCC/engineering_bcc_third_party.asp)
- B. Shop Fabricated: Manufactured or assembled equipment for which a UL test procedure has not been established. When equipment is shop fabricated for the project, the electrical devices and enclosures utilized shall be UL or ETL listed and labeled or shall be UL recognized.
- C. Outdoor equipment may be subjected to wind, rain, lightning, and corrosives in the environment with ambient temperatures from -20 to 40 degrees C and relative humidity from 10 to 95 percent. All supports, brackets and interconnecting hardware shall be aluminum, 304 or 316 stainless steel, or as shown on the installation detail drawings.

- D. Trade names and catalog numbers may be used in the Drawings or Specifications to establish quality standards and basics of design.
- E. Layout dimensions will vary between manufacturers and the layout area indicated on the drawings is based on typical values. Contractor shall review the contract drawings, the manufacturer's layout drawings and installation requirements, and make any modifications required for proper installation subject to acceptance by Engineer.
- F. Shop or Factory Finishes: Interiors of other painted equipment shall be either white or light gray.
- G. Enclosures for Use with Electrical Equipment shall be provided as follows unless specifically shown or specified elsewhere in the Contract Documents:
  - 1. NEMA 12: Use in unclassified indoor locations.
  - 2. NEMA 3R: Use with non-electronic equipment in wet outdoor locations protected from weather by means of a roof or rain/sun shield as approved by the Engineer.
  - 3. NEMA 4:
    - a. Use in wet indoor locations.
    - b. Use in wet outdoor locations. Enclosed electronic equipment shall be provided with rain/sun shields.
  - 4. NEMA 4X: Use in all corrosive locations.
    - a. Nonmetallic enclosures shall not be used in areas subject to physical damage or sun without approval by the Engineer.
    - b. Outdoor locations for enclosed electronic equipment shall be provided with rain/sun shields.
  - 5. NEMA 7: Use in all Class I, Division {1}{2}, Group {A}, {B},{C},{D} locations.
    - a. Unless other enclosures are approved and UL listed for the application.
  - 6. NEMA 9: Use in all Class II, Division {1}{2}, Group {E}{F}{G} and Class III, Division {1}{2} locations.
    - a. Unless other enclosures are approved and UL listed for the application.
  - 7. Exceptions:
    - a. As modified in other specification sections.
    - b. As otherwise indicated on the Drawings.

## 2.2 WIRE AND CABLE

- A. The wire and cable to be furnished and installed for this project shall be the product of manufacturers who have been in the business of manufacturing wire and cable for a minimum of ten (10) years. It is intended to be standard equipment of proven performance as manufactured by the Okonite Company, BICC Industrial Cable Company (Cablec), or approved equal. Wire and cable shall be designed, constructed and installed in accordance with the best practices of the trade, and shall operate satisfactorily when installed as specified herein and shown on the Drawings. Only one manufacturer for each cable type shall be permitted.
- B. All power wiring shall be color coded and all control wiring shall be color coded or numbered.
- C. 600 Volt Power Wire and Cable: 600 volt power cable and wire shall consist of stranded, copper conductor with insulation rated THHN, 90°C for wet locations and THWN, 75°C for dry locations. 600 volt cable and wire for below grade service entrances or below grade runs between structures shall consist of stranded, copper conductor with insulation rated XHHN-2, 90°C for wet or dry locations. Conductors shall be tin or alloy coated, stranded copper per ASTM-B8, B-33 and B-189, Class B or C stranding contingent on the size unless otherwise specified. Minimum size wire shall be No. 12 AWG. Uncoated conductors shall only be allowed if specifically accepted by the Engineer. 600 volt individual power wire and cable shall be Okoseal-N as manufactured by the Okonite Company, BICC Industrial Cable Company (Cablec) equivalent, or approved equal. Multi-conductor power cables shall be Okoseal-N Type TC Cable as manufactured by the Okonite Company, BICC Industrial Cable Company (Cablec) equivalent, or approved equal.
- D. 600 Volt Control Cable: 600 volt control cable shall consist of stranded, copper conductor with insulation rated THHN, 90°C for dry locations and THWN, 75°C for wet locations. The individual conductors of the multiple conductor cable shall be color coded for proper identification. Color coding shall be equal to ICEA S-68-514, Table K-1. Cables shall meet requirements of IEEE-383. Conductors shall be tin or alloy coated stranded copper per ASTM B-8 and B 33 or B-189, Class B or C stranding contingent on the size unless otherwise specified. Minimum wire size shall be No. 14 AWG. Uncoated conductors shall only be allowed if specifically accepted by the Engineer. 600 volt individual conductor control wire shall be Okoseal-N as manufactured by the Okonite Company, BICC Industrial Cable Company (Cablec) equivalent, or approved equal. Multi-conductor control cable shall be Okoseal-N Type TC Cable as manufactured by the Okonite Company, BICC Industrial Cable Company (Cablec) equivalent, or approved equal.

- E. Lighting and Receptacle Wire and Cable: The lighting and receptacle branch circuit wire shall consist of stranded, copper conductors with insulation rated THHN, 90°C for wet locations and THWN, 75°C for dry locations. Conductors shall be tin or alloy coated, stranded copper per ASTM-B8, B-33 and B-189, Class B or C stranding contingent on the size unless otherwise specified. Minimum size wire shall be No. 12 AWG. Uncoated conductors shall only be allowed if specifically accepted by the Engineer. Lighting and receptacle cables and wire shall be Okoseal-N as manufactured by the Okonite Company, BICC Industrial Cable Company (Cablec) equivalent, or approved equal.
  
- F. Instrumentation Cable: The instrumentation cable for analog signals shall be individually shielded twisted pair cable (TSP) or individually shielded twisted multi-pair cable (M#TSP, where # = number of pairs). Conductors shall be tin or alloy coated, soft, annealed copper, 16 AWG minimum with a minimum of 19 strands with 600 volt insulation rated for 75°C. Pairs shall have 100% coverage foil shields with a 18 AWG tinned copper drain wire. Outer jackets shall be chromed PVC. The instrumentation cable shall be Belden 8719 or Okonite Okoseal-N Type P-OS for single pair applications and Okonite Okoseal-N Type SP-OS for multiple pair applications, or approved equal.

### 2.3 CONDUIT AND RACEWAYS

- A. Rigid Steel Conduit (RGS): Rigid steel conduit shall be heavy wall, hot-dip galvanized, shall conform to ANSI C80.1, and shall be manufactured in accordance with UL 6.
  
- B. Liquidtight Flexible Metal Conduit (LT): Liquidtight flexible metal conduit shall be hot dip galvanized steel, shall be covered with a moistureproof polyvinyl chloride jacket, and shall be UL labeled. Refer to PVC-Coated Rigid Steel Conduit for fittings, condulets, and mounting accessories in non indoor dry areas.
  
- C. Rigid Nonmetallic Conduit (PVC): PVC conduit shall be heavy wall, Schedule 80, UL labeled for aboveground and underground uses, and shall conform to NEMA TC 2 and UL 651. PVC conduit shall be rated for direct sunlight exposure, 90°C wire, and fire retardant with low smoke emission.
  
- D. PVC-Coated Rigid Steel Conduit (RGS-PVC): The conduit shall be rigid steel. Before the PVC coating is applied, the hot dip galvanized surfaces shall be coated with a primer to obtain a bond between the steel substrate and the coating. The PVC coating shall be bonded to the primed outer surface of the conduit. The bond on conduit and fittings shall be stronger than the tensile strength of the PVC coating. The thickness of the PVC coating shall be at least 40 mils.

A chemically cured two-part urethane coating, at a nominal 2 mil thickness, shall be applied to the interior of all conduit and fittings. The coating shall be

sufficiently flexible to permit field bending the conduit without cracking or flaking of the coating.

Every female conduit opening shall have a PVC sleeve extending one conduit diameter or 2 inches, whichever is less, beyond the opening. The inside diameter of the sleeve shall be the same as the outside diameter of the conduit before coating. The wall thickness of the sleeve shall be at least 40 mils.

All fittings, condulets, mounting hardware, and accessories shall be PVC coated. All hollow conduit fittings shall be coated with the interior urethane coating described above. The screw heads on condulets shall be encapsulated by the manufacturer with a corrosion-resistant material.

PVC coated rigid steel conduit shall be manufactured by Ocal, Perma-Cote, Robroy, or approved equal.

#### 2.4 BURIED ELECTRICAL WARNING TAPE

- A. All buried conduits, wire, and ductbanks shall be provided with warning tape. Warning tape shall be constructed of 3.5 mils thick x 6 inches wide polyethylene with a magnetic layer, have a tensile strength of 1750 psi, and have a continuous preprinted permanently imbedded warning message.

#### 2.5 JUNCTION BOXES, PULL BOXES, AND GUTTERS

- A. Indoor boxes (larger than switch, receptacle, or fixture type) and gutters shall be constructed of sheet steel, shall be galvanized after fabrication, and shall be rigidly supported by hot-dip galvanized hardware and framing materials, including nuts and bolts.
- B. Indoor boxes and gutters in corrosive or wet areas indicated on the drawings and outdoor boxes and gutters shall be NEMA Type 4X, ABS or stainless steel and shall be rigidly supported by PVC coated or stainless steel framing materials. Mounting hardware, which includes nuts, bolts, and anchors, shall be stainless steel. All damaged coatings shall be repaired according to the manufacturer's instructions.
- C. Bolt on box covers with any dimension larger than 3 feet or heavier than 25 lbs shall have rigid handles. Covers larger than 3 by 4 feet shall be split.

#### 2.6 SEPARATELY ENCLOSED CIRCUIT BREAKERS

- A. Unless otherwise specified or shown, circuit breakers shall be 3 pole, 240 volt, molded case circuit breakers of not less than 32,000 amperes interrupting rating at 240 volts AC, complete with thermal and instantaneous trip elements.



- B. Breaker enclosures shall have NEMA designations appropriate for the locations where they will be installed. NEMA Type 4X stainless steel enclosures shall be provided for outdoor locations. Each breaker shall be manually operated with a quick make, quick break, trip free toggle mechanism. Bimetallic thermal elements shall withstand sustained overloads and short circuit currents without injury and without affecting calibration.
- C. Circuit breakers shall have an operating handle as an integral part of the enclosure base. Each circuit breaker shall have a handle whose position is easily recognizable and which can be locked in the "Off" position. The "On" and "Off" positions shall be clearly marked. Circuit Breakers shall have defeatable door interlocks that prevent the door from being opened while the operating handle is in the "On" position.
- D. Circuit Breakers shall be manufactured by Square D, Cutler-Hammer, General Electric, or approved equal.

## 2.7 OUTDOOR ELECTRICAL EQUIPMENT RACKS

- A. Refer to outdoor equipment rack detail drawing.

## PART 3 – EXECUTION

### 3.1 POWER AND SERVICE ENTRANCE

- A. Contractor shall consult the local electric utility regarding connection to existing meter. Contractor shall install all power service equipment components as required for new service disconnect.
- B. Power utility is PWC.

### 3.2 INSTALLATION

- A. Equipment shall be installed in accordance with the requirements of the NEC.
- B. Coordinate the installation of electrical equipment with other trades.
  - 1. Arrange for the building in of equipment during structure construction.
  - 2. Where equipment cannot be built-in during construction, arrange for sleeves, box-outs, openings, etc., as required to allow installation of equipment after structure construction is complete.
- C. Verify that equipment will fit layouts indicated.
- D. Equipment Dimensions and Clearances:

1. Do not use equipment that exceeds the indicated dimensions, except as approved in writing by the Engineer.
  2. Do not use equipment or arrangements of equipment that reduce required clearances or exceed the space allocation.
- E. Install equipment in accordance with the manufacturer's instructions.
- F. Equipment Access:
1. Install equipment so it is readily accessible for operation and maintenance.
  2. Equipment shall not be blocked or concealed.
  3. Do not install electrical equipment such that it interferes with normal maintenance requirements of other equipment.
- G. Equipment shall be installed plumbed, square and true with the structure construction and shall be securely fastened.
- H. Outdoor wall-mounted equipment shall be provided with corrosion-resistant spacers to maintain 1/4-inch separation between the equipment and the wall.
- I. Screen or seal all openings into outdoor equipment to prevent the entrance of rodents and insects.
- J. Equipment fabricated from aluminum shall not be placed in direct contact with earth or concrete.
- K. Provide all necessary anchoring devices and supports.
1. Use supports as detailed on the Drawings and as specified. Where not detailed on the Drawings or specified, use supports, and anchoring devices rated for the equipment load and as recommended by the manufacturer.
  2. Supports and anchoring devices shall be rated and sized based on dimensions and weights verified from approved equipment submittals.
  3. Hardware shall be malleable type, corrosion resistant and shall be supported by heavily plated machine screws or brass, bronze or stainless-steel bolts.
  4. Do not cut, or weld to, building structural members.
  5. Do not mount safety switches and external equipment to other equipment enclosures, unless enclosure-mounting surface is properly braced to accept mounting of external equipment.
- L. Contractor shall verify exact rough-in location and dimensions for connection to electrical items furnished by others.
1. Shop drawings shall be secured from those furnishing the equipment.

2. Proceeding without proper information may require the Contractor to remove and replace work that does not meet the conditions imposed by the equipment supplied, at no cost to the Owner.
  3. Provide sleeves wherever openings are required through new concrete or masonry members. Place sleeves accurately and coordinate locations with the Engineer.
  4. Should any cutting and patching be required on account of failure of the Contractor to coordinate penetrations, such cutting and patching shall be done at the sole expense of the Contractor.
    - a. Contractor shall not endanger the stability of any structural member by cutting, digging, chasing, or drilling and shall not, at any time, cut or alter the work without the Engineer's written consent.
      - i. Provide additional reinforcing if required.
      - ii. Cutting shall be done neatly using proper tools and methods.
    - b. Subsequent patching to restore walls, ceilings, or floors to their original condition shall be done by workmen skilled in their particular field.
- M. Provide concrete foundations or pads required for electrical equipment as indicated or specified.
- N. To avoid interference with structural members and equipment of other trades, it may be necessary to adjust the intended location of electrical equipment. Unless specifically dimensioned or detailed, the Contractor may, at his discretion, make minor adjustments in equipment location without obtaining the Engineer's approval. Deviations in equipment location that are specifically dimensioned or detailed or exceed those defined above require the Engineer's prior approval.
- O. Device Mounting Schedule:
1. Dimensions are to center of item unless otherwise indicated.
  2. Mounting heights as indicated below unless otherwise indicated on the Contract Drawings:
    - a. Light switch: 48 IN.
    - b. Receptacle in all other locations: 48 IN.
    - c. Disconnect / Safety switch: 54 IN.

### 3.3 BYPASS PUMPING PROVIDED BY OWNER

Owner will provide up to eight (8) hours (continuous) of bypass pumping to connect to existing power service. If longer is required, Contractor responsible for bypass pumping after this eight (8) hour period.

### 3.4 CABLE INSTALLATION

- A. General. Except as otherwise specified or indicated on the drawings, cable shall be installed according to the following procedures, taking care to protect the cable and to avoid kinking the conductors, cutting or puncturing the jacket, contamination by oil or grease, or any other damage.
1. Stranded conductor cable shall be terminated by lugs or pressure type connectors. Wrapping stranded cables around screw type terminals is not acceptable.
  2. Stranded conductor cable shall be spliced by crimp type connectors. Twist-on wire connectors may be used for splicing solid cable and for terminations at lighting fixtures.
  3. Splices shall be made only at readily accessible locations.
  4. Cable terminations and splices shall be made as recommended by the cable manufacturer for the particular cable and service conditions. All shielded cable stress cone terminations shall be IEEE Class 1 molded rubber type. Shielded cable splices shall be tape or molded rubber type as required. Shielded cable splices and stress cone terminations shall be made by qualified splicers. Materials shall be by 3M Company, Plymouth/Bishop, Raychem Electric Power Products, or approved equal.
  5. Cable shall not be pulled tight against bushings nor pressed heavily against enclosures.
  6. Cable-pulling lubricant shall be compatible with all cable jackets; shall not contain wax, grease, or silicone; and shall be Polywater "Type J".
  7. Spare cable ends shall be taped, coiled, and identified.
  8. Cables shall not be bent to a radius less than the minimum recommended by the manufacturer.
  9. All cables in one conduit, over 1 foot long, or with any bends, shall be pulled in or out simultaneously.

10. Circuits shall not be combined to reduce conduit requirements unless acceptable to Engineer.
  11. All power wiring shall be color coded and all control wiring shall be color coded or numbered.
- B. Underground Cable Pulling Procedure. Care shall be taken to prevent excessive physical stresses that would cause mechanical damage to cables during pulling.

### 3.5 CONDUIT INSTALLATION.

- A. Contractor shall be responsible for routing all conduits. This shall include all conduits indicated on the one-lines, riser diagrams, and home-runs shown on the plan drawings. Conduits shall be routed as defined in these specifications. Where conduit routing is shown on plans, it shall be considered a general guideline and shall be field verified to avoid interferences.
- B. Except as otherwise specified or indicated on the drawings, conduit installation and identification shall be completed according to the following procedures.
- C. Installation of Interior and Exposed Exterior Conduit. This section covers the installation of conduit inside structures, above and below grade, and in exposed outdoor locations. In general, conduit inside structures shall be concealed. Large conduit and conduit stubs may be exposed unless otherwise specified or indicated on the drawings. No conduit shall be exposed in water chambers unless so indicated on the drawings.
- D. Unless otherwise indicated on the drawings, Contractor shall be responsible for routing the conduit to meet the following installation requirements:
1. Conduit installed in all exposed indoor locations, except corrosive areas indicated on the drawings, and in floor slabs, walls, and ceilings of hazardous (classified) locations, shall be intermediate metal. Exposed conduit shall be rigidly supported by hot-dip galvanized hardware and framing materials, including nuts and bolts.
  2. Conduit installed in floor slabs and walls in non-hazardous locations shall be rigid Schedule 80 PVC.
  3. Conduit installed in all exposed outdoor locations shall be PVC-coated rigid steel, rigidly supported by PVC-coated framing materials. Mounting hardware, which includes nuts, bolts, and anchors, shall be stainless steel. All damaged coatings shall be repaired according to the manufacturer's instructions.

4. Final connections to dry type transformers, to motors without flexible cords, and to other equipment with rotating or moving parts shall be liquidtight flexible metal conduit with watertight connectors installed without sharp bends and in the minimum lengths required for the application, but not longer than 6 feet unless otherwise acceptable to Engineer.
5. Terminations and connections of rigid steel and intermediate metal conduit shall be taper threaded. Conduits shall be reamed free of burrs and shall be terminated with conduit bushings.
6. Exposed conduit shall be installed either parallel or perpendicular to structural members and surfaces.
7. Two or more conduits in the same general routing shall be parallel, with symmetrical bends.
8. Rigid Schedule 80 PVC conduit shall have supports and provisions for expansion as required by NEC Article 352.
9. Metallic conduit connections to sheet metal enclosures shall be securely fastened by locknuts inside and outside.
10. Rigid Schedule 80 PVC conduit shall be secured to sheet metal device boxes using a male terminal adapter with a locknut inside or by using a box adapter inserted through the knockout and cemented into a coupling.
11. Conduits in walls or slabs, which have reinforcement in both faces, shall be installed between the reinforcing steel. In slabs with only a single layer of reinforcing steel, conduits shall be placed under the reinforcement. Conduits larger than 1/3 of the slab thickness shall be concrete encased under the slab.
12. Conduits that cross structural joints where structural movement is allowed shall be fitted with concrete tight and watertight expansion/deflection couplings, suitable for use with metallic conduits and rigid Schedule 40 PVC conduits. The couplings shall be Appleton Type DF, Crouse-Hinds Type XD, O-Z Type DX, or approved equal.
13. Conduit shall be clear of structural openings and indicated future openings.
14. Conduits shall be capped during construction to prevent entrance of dirt, trash, and water.

15. Exposed conduit stubs for future use shall be terminated with galvanized pipe caps.
  16. Concealed conduit for future use shall be terminated in equipment or fitted with couplings plugged flush with structural surfaces.
  17. Where the drawings indicate future duplication of equipment wired hereunder, concealed portions of conduits for future equipment shall be provided.
  18. Conduit shall not be routed across the surface of a floor or walkway unless approved by PWC.
  19. PVC-coated rigid steel conduit shall be threaded and installed as recommended by the conduit manufacturer's installation procedure using appropriate tools.
  20. All conduits that enter enclosures shall be terminated with acceptable fittings that will not affect the NEMA rating of the enclosure.
  21. Nonmetallic conduit, which turns out of concrete slabs or walls, shall be connected to a 90 degree elbow of PVC-coated rigid steel conduit before it emerges.
- E. Underground Conduit Installation. All excavation, backfilling, and concrete work shall conform to the respective sections of these specifications. Underground conduit shall conform to the following requirements:
1. All underground conduits shall be concrete encased as indicated on drawings, within 15 feet of building entrances and under and within 5 feet of roadways.
  2. Concrete encased conduit shall be Schedule 40 PVC. Conduits shall have end bells where terminated at walls. All joints shall be solvent welded in accordance with the recommendations of the manufacturer.
  3. Underground conduits indicated not to be concrete encased shall be rigid Schedule 80 PVC.
  4. Underground conduit bend radius shall be at least 2 feet at vertical risers and at least 3 feet elsewhere.
  5. Underground conduits and conduit banks shall have at least 2 feet of earth cover, except where indicated otherwise.

6. Underground nonmetallic conduits, which turn out of concrete or earth in outdoor locations, shall be connected to 90-degree elbows of PVC-coated rigid steel conduit before they emerge.
  7. Conduits not encased in concrete and passing through walls, which have one side in contact with earth, shall be sealed watertight with special rubber-gasketed sleeve and joint assemblies or with sleeves and modular rubber sealing elements.
  8. Underground conduits shall be sloped to drain to handholes / manholes.
  9. Instrument cables shall be separated the maximum possible distance from all power wiring in pull-boxes, manholes, and handholes.
- F. Sealing of Conduits. After cable has been installed and connected, conduit ends shall be sealed by forcing nonhardening sealing compound into the conduits to a depth at least equal to the conduit diameter. This method shall be used for sealing all conduits at handholes, manholes, electrical enclosures with connecting conduit routed below grade, and for 1 inch and larger conduit connections to equipment.
1. Conduits entering hazardous (classified) areas and submersible or explosion proof enclosures shall have Appleton "Type ESU" or Crouse-Hinds "EYS" sealing fittings with sealing compound.
- G. Reuse of Existing Conduits. Existing conduits may be reused subject to the concurrence of Engineer and compliance with the following requirements:
1. A wire brush shall be pulled through the conduit to remove any loose debris.
  2. A mandrel shall be pulled through the conduit to remove sharp edges and burrs.

### 3.6 GROUNDING AND BONDING

- A. Ground Rods: Ground rods shall be rolled to a commercially round shape from a welded copper clad steel manufactured by the molten welding process or by the electro formed process (molecularly bonded). They shall have an ultimate tensile strength of 75,000 pounds per square inch (psi) and an elastic limit of 49,000 psi. The rods shall be not less than 3/4 inch in diameter by 10 feet in length; and the proportion of copper shall be uniform throughout the length of the rod. The copper shall have a minimum wall thickness of 0.013 inch at any point on the rod.
- B. Fittings: Grounding connections to equipment shall be bolted. Cable end connections may be made by use of the crucible weld process or bolted type connectors. Bolted type connectors for this application shall consist of corrosion



resistant copper alloy with silicone bronze bolts, nuts and lockwashers which are designed for this purpose.

- C. Grounding Conductors: A green, insulated equipment grounding conductor, which shall be separate from the electrical system neutral conductor, shall be furnished and installed for all circuits. Equipment grounding conductors shall be furnished and installed in all conduits. Use of conduits as the NEC required equipment grounding conductor is not acceptable. Where specified or shown a copper strap shall be furnished and installed as the grounding conductor.
- D. The maximum resistance to ground of a driven ground rod shall not exceed 10 ohms under normally dry conditions. Where the resistance obtained with one (1) ground rod exceeds 10 ohms, additional ground rods shall be installed not less than 10 feet on centers. Except where specifically indicated otherwise, all exposed non current carrying metallic parts of electrical equipment, metallic raceway systems, grounding conductors in nonmetallic raceways and neutral conductors of wiring systems shall be grounded.
- E. The ground connection shall be made at the main service equipment and shall be extended to the point of entrance of the metallic water service. Connection to the water pipe shall be made by a suitable ground clamp or lug connection to a plugged tee. If flanged pipes are encountered, connection shall be made with the lug bolted to the street side of the flanged connection. If there is not suitable metallic water service to the facility, the ground connection shall be made to the driven ground rods on the exterior of the building.
- F. Where ground fault protection is employed, care shall be taken so that the connection of the ground and neutral does not interfere with the correct operation of the ground fault protection system.
- G. Equipment grounds shall be solid and continuous from a connection at earth to all distribution panelboards. Ground connections at panelboards, outlets, equipment, and apparatus shall be made in an approved and permanent manner.
- H. Metal surfaces where grounding connections are to be made shall be clean and dry. Steel surfaces shall be ground or filed to remove all scale, rust, grease, and dirt. Copper and galvanized steel shall be cleaned with emery cloth to remove oxide before making connections.
- I. A main ground grid shall be provided for each structure and interconnecting structure grids consisting of driven ground rods. The ground rods shall be driven deep enough to obtain a ground resistance of not more than 10 ohms and shall be interconnected by the use of copper cable bus (3" strap minimum), or a bare copper conductor sized to the largest service entrance ground, welded to the rods by the crucible weld process. The grounding cables shall be installed after the excavations for the building have been completed and prior to the pouring of concrete for the

footings, mats, etc. Copper "pigtails" shall be connected to the ground system and shall enter the buildings and structure from the outside and shall be connected to steel structures, and equipment as described in this Section and as required to provide a complete grounding system.

- J. Grounding conductors shall be continuous between points of connection; splices shall not be permitted. Where conductors are exposed and subject to damage from personnel, traffic, etc., conductors shall be installed in metal raceway. The raceway shall be bonded to the grounding system. Connections to ground rods shall be exposed to permit maintenance and inspection for continuity and effectiveness of grounding system. Where subsurface conditions do not permit use of driven ground rods to obtain proper ground resistance, rods shall be installed in a trench or plate electrodes shall be provided, as applicable and necessary to obtain proper values of resistance.
- K. Conduit which enters equipment such as motor controls, instrument and control panels, and similar equipment shall be bonded to the ground bus, where provided, and as otherwise required by the NEC.

### 3.7 IDENTIFICATION.

- A. Cable. Except for lighting and receptacle circuits, each individual wire in power, control, indication, and instrumentation circuits shall be provided with identification markers at the point of termination. The wire markers shall be of the heat-shrinkable tube type, with custom typed identification numbers. The wire numbers shall be as indicated on the equipment manufacturer's drawings. The wire markers shall be positioned to be readily visible for inspection. Power wires shall be color coded with electrical tape or colored wire jacket; white-N, black, and red for 120/240 volt, 3-wire; and gray-N, brown, orange and yellow for 480/277 volt, 4-wire circuits.
- B. Circuit Breakers. Circuit breakers shall be provided with nameplates identifying related equipment. Nameplates shall be laminated black-over-white plastic, with 1/8-inch engraved letters, and shall be securely fastened with stainless steel screws to the circuit breakers.
- C. Disconnect Switches. All switches shall have front cover-mounted permanent nameplates that include switch type, manufacturer's name and catalog number, and horsepower rating. An additional nameplate, engraved or etched, laminated black-over-white plastic, with 1/8-inch letters, shall be provided to identify the associated equipment. Both nameplates shall be securely fastened with stainless steel screws to the enclosure.
- D. Arc Flash Hazard Labels. Lighting panels, power panels, power centers, and meter socket enclosures shall be provided with permanent labels warning the risk of arc flash and shock hazard. Labels shall be designed in accordance with ANSI Z535.4-1998, NFPA 70E, and shall include the following:

## **WARNING**

### **Arc Flash and Shock Hazard**

**Appropriate personal protection equipment (PPE) required.  
SEE NFPA 70E. Equipment must be accessed by qualified  
personnel only. Turn off all power sources prior to working on  
or inside equipment.**

#### 3.8 FIELD QUALITY CONTROL

- A. Equipment furnished under this Contract for use on future work and all concealed equipment, including conduits, shall be dimensioned, on the record drawings, from visible and permanent building features.
- B. After installation, all equipment shall be tested as recommended by the manufacturer.
- C. Verify all components are operational.
- D. Perform ground-fault performance testing as required by NEC Article 230-95(c).
- E. Test Equipment Interface:
  - 1. Verify systems coordination and operation.
- F. Set all adjustable trip protective devices as required for system protection and coordination.
- G. Verify all system and equipment ground continuity.
- H. Adjust installed equipment for proper operation of all electrical and mechanical components.
- I. Replace equipment and systems found inoperative or defective and re-test.
  - 1. If equipment or system fails re-test, replace it with products that conform to Contract Documents.
  - 2. Continue remedial measures and re-tests until satisfactory results are obtained.
  - 3. Remedial measures and re-tests will be done at no cost to the PWC.
- J. Tests shall be performed in the presence of the Engineer.

1. Tests shall be scheduled with the Engineer and Owner, a minimum of two (2) weeks in advance.
2. Required certificates of testing or review shall be presented to the Engineer upon completion of the tests.

K. At Completion of Installation:

1. Test to ensure all equipment is free of short circuits and improper grounds.
2. Test to ensure all equipment is operational.

3.9 CLEANING

- A. Clean dirt and debris from all surfaces.
- B. Apply touch-up paint as required to repair scratches, etc.
- C. Replace nameplates damaged during installation.
- D. Thoroughly vacuum the interior of all enclosures to remove dirt and debris.

3.10 DEMONSTRATION

- A. Demonstrate equipment in accordance with Contract and Bidding Requirements.
- B. PWC to provide a final inspection and approval to ensure equipment, quality of workmanship, and installation are in accordance with PWC's published design standards.

16231            STANDBY POWER SYSTEMS, LIFT STATIONS

PART 1 - GENERAL

1.1     THE REQUIREMENTS

- A.     This section shall consist of providing a packaged standby power system with all required accessories as specified and shown on the drawings. The equipment supplier must be the authorized distributor for each component of the products specified herein. The work includes the furnishing of all labor, materials, equipment, and testing to provide a complete and workable system, including the generator set, generator set controls, sub-base fuel tank system, weatherproof generator enclosure, transfer switch, transfer switch controls, and installation as shown on the drawings and specifications herein. It is the intent of these specifications to have a single source responsibility for warranty, parts, and service through a local representative with factory-trained servicemen.
  
- B.     It is the intent of this specification to secure a standby power system that has been tested during design verification, production and at the final job site. All finished equipment shall be of the latest commercial design and will be complete with all of the necessary accessories for complete installation as shown on the drawings and specifications herein.
  
- C.     The equipment shall be produced by a manufacturer who has produced this type of equipment for a period of at least 10 years and who ISO 9001 certified for the design, development, production, installation, and service of their complete product line. The manufacturer and its distributor shall maintain a 365 day 24-hour parts and service organization within 150 miles of the project site. This organization shall be regularly engaged in a maintenance contract program to perform preventive maintenance and service on equipment provided.
  
- D.     System shall operate the following loads when sequenced in the following order:
  - 1.    8 KW of miscellaneous lighting and heating loads.
  - 2.    20 hp, Code G motor operated on a full voltage starter.
  - 3.    20 hp, Code G motor operated on a full voltage starter.
  
- E.     When required, engine-generator internal loads shall be provided with external power supply circuits of appropriate rating from circuit breakers dedicated to generator loads. These circuits shall be coordinated with the supplied generator, sized per the National Electric Code (NEC), and provided whether shown on the contract drawings or not. Depending on the generator, supplied provisions for power supply circuits may be required for, but not limited to, the following:

1. Engine-generator starting system battery charger.
2. Engine jacket water heater.
3. Enclosure lights.
4. Sub-base tank fuel system.
5. Enclosure intake and exhaust louvers
6. Automatic transfer switch

## 1.2 CODES AND STANDARDS:

A. The Standby Power System shall be designed and constructed in accordance with the latest applicable requirements of the standard specifications and codes of ANSI, ASTM, NEMA, IEEE, EEI, HEI, ISO, NFPA, SAE, and other such regularly published and accepted standards as well as state and local codes. In addition, the Standby Power System shall comply with following codes and standards as stated:

1. IEC8528 part 4. Control Systems for Generator Sets
2. IEC Std 801.2, 801.3, and 801.5 for susceptibility, conducted, and radiated electromagnetic emissions.
3. IEEE446 – Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications
4. NEMA Standard IC10 (formerly ICS 2-447) Automatic Transfer Switches.
5. NFPA70 – National Electrical Code. Equipment shall be suitable for use in systems in compliance to Article 700, 701, and 702.
6. NFPA110 – Emergency and Standby Power Systems. The generator set shall meet all requirements for Level 1 systems. Level 1 prototype tests required by this standard shall have been performed on a complete and functional unit, component level type tests will not substitute for this requirement.
7. UL 508 – Standard for industrial Control Equipment
8. UL 1008 - Standard for Automatic Transfer Switches
9. UL2200. The generator set shall be listed to UL2200 or submit to an independent third-party certification process to verify compliance as installed.

B. In the event of any conflict between these codes, regulations, standards, and Contract Documents, the most restrictive shall apply.

## 1.3 SUBMITTALS:

A. The Standby Power System submittal shall include contact information for the 24-hour parts and service organization. Submittals without this information will be rejected.

B. Submit sizing calculations for the engine-generator and automatic transfer switch with respect to the existing pumps.

- C. Complete assembly and installation drawings, together with detailed specifications and data covering materials, drive unit, parts, devices and accessories forming a part of the equipment furnished, shall be submitted in accordance with the Submittals specification section. The data and specifications for each unit shall include, but shall not be limited to, the following:
1. Manufacturer, model, and type:
    - a. Engine.
    - b. Alternator.
    - c. Enclosure.
    - d. Battery charger and battery.
    - e. Fuel oil cooler (if required by engine design).
    - f. Silencer.
  2. Engine output horsepower and efficiency curves at rated capacity.
  3. Fuel consumption at rated capacity.
  4. Ratings at specified conditions:
    - a. Engine (net horsepower).
    - b. Engine (maximum performance horsepower bare engine).
    - c. Generator kW at specified power factor.
    - d. Volts.
    - e. Amperes.
  5. Overall dimensions and weight:
    - a. Length.
    - b. Width.
    - c. Height.
    - d. Net weight.
  6. Footing design
  7. Wiring diagrams and schematics, including the engine control panel and generator line circuit breaker.
  8. Alternator insulation class and temperature ratings.
  9. Alternator winding pitch.
  10. Generator line circuit breaker rating.
  11. Control panel layout, identifying location of all instrumentation being supplied.
  12. Engine drawing to include location of all piping connections.
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13. Operation instructions.
14. Battery sizing calculations.
15. Battery charger sizing calculations.
16. Maximum output short circuit kVA available.
17. Exhaust gas emission data, maximum valves at loads of 1/2, 3/4, and full:
  - a. Carbon Monoxide (CO), lb/hr
  - b. Nitrogen Oxides (NO<sub>x</sub>), lb/hr
  - c. Temperature, F
  - d. Flow, acfm
18. Letter from the engine-generator manufacturer confirming that the unit is in full compliance with Federal EPA and local emission requirements.
19. Equipment skid drawing including material list.
20. Confirmation that the exhaust through the exhaust silencer does not exceed the specified maximum pressure loss at the specified power outage capacity of the unit and that the exhaust silencer provides sound attenuation equal to or greater at the specified frequencies.
21. Letter from the engine-generator manufacturer confirming that the enclosure is suitable for the specified wind velocity and is designed as specified for rain penetration when the unit is operating.
22. Drawings showing engine-generator inside the enclosure that shows location of all enclosure mounted and engine-generator mounted equipment. Drawings to indicate maintenance access clearances for electrical and mechanical equipment. Drawing to show location of all enclosures bracing and location of doors and removable panels.
23. Automatic transfer switch prototype test certification and specification sheets showing all standard and optional accessories to be supplied, schematic wiring diagrams, dimension drawings, and interconnection diagrams identifying by terminal number, each required interconnection between the generator set and the transfer switch.

## PART 2 – PRODUCTS

### 2.1 TOOLS, SUPPLIES, AND SPARE PARTS



- A. The following spare parts and accessories for each shall be furnished in substantial cardboard boxes sealed in plastic wrap with identifying labels and delivered to:

Public Works Commission  
Central Maintenance Office  
1099 Public Works Drive  
Fayetteville, NC 28301

1. Two (2) of each type of fuel, oil, or air filter provided.
2. Two (2) of each accessory belt provided.

## 2.2 GENERAL REQUIREMENTS:

- A. Standby Power Systems shall be designed to operate under the following service conditions:
1. Seismic zone: per NC Building Code and site location
  2. Ambient air temperature range: -5 to 105 °F
  3. Design wind speed: 110 mph
  4. Site elevation: 500 ft
- B. Standby Power Systems will be used as a power unit for selected electrical loads when the utility supplied power fails. Standby Power Systems shall be suitable for “black start” conditions. Each engine-generator shall automatically start and connect to the electrical loads when initiated from the automatic transfer switch.
- C. Each engine-generator shall be a current production model. The engine-generator shall be manufactured by the supplier Caterpillar, Kohler, Cummins, MTU, or approved equal.
- D. The manufacturer of the engine-generator unit shall have a full-time, fully factory trained technical staff and an equipped 24-hour service facility having all personnel and all equipment required to maintain, repair, or overhaul the engine-generator unit and associated equipment. The repair facility shall be within 150 miles from the installation location.

## 2.3 PERFORMANCE AND DESIGN REQUIREMENTS

- A. Each engine-generator unit shall be designed for the operating conditions and requirements as follows:

Generator

Minimum power rating capacity with accessories, for generator voltage output	60 kW
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and service conditions specified herein.

Output frequency.	60	Hz
Output voltage.	120/208-240	VAC
Output power factor.	0.80	
Output phase and configuration.	Three phase, 4	wire
Maximum voltage dip.	20	%

Engine

Fuel supply.	No. 2 diesel
Maximum speed.	1800 rpm
Minimum piston displacement.	320 In <sup>3</sup>
Black start required.	Yes
Max engine generator length.	12 ft
Max engine generator width.	6 ft

- B. Each engine-generator shall be designed to operate during a power outage for a minimum of 24 continuous hours.
- C. Engine-generators submitted with ratings in excess of current published data will not be acceptable.
- D. The engine-generator shall at a minimum meet the required Environmental Protection Agency New Source Performance Standards emission regulations. The engine-generator supplier shall coordinate with the local air quality management authority to ensure the equipment meets all current local air emissions requirements.
- E. Engine-generator supplier shall guarantee the equipment supplied meets all local air emission requirements in place at the time of startup.
- F. Each engine-generator unit, including any air intake or discharge plenums furnished shall be of a design that can be accommodated in the space as indicated on the drawings.
- G. Fuel for the engine-generator will be furnished from a sub-base double walled fuel storage tank.
- H. Each engine shall be 4-stroke cycle type and shall be equipped with the following:

1. Electronic governor for isochronous regulation of engine speed from no load to full load alternator output.
2. Dry type air cleaner with replaceable elements.

#### 2.4 ALTERNATOR

- A. Each engine-generator alternator shall be a 4 pole, revolving field design with temperature compensated solid state voltage regulator, brushless rotating rectifier exciter system, and drip-proof construction with amortisseur windings. The alternator shall be directly connected to the engine flywheel housing, and the rotor shall be driven through a semi-flexible driving flange to ensure permanent alignment.
- B. Frequency regulation shall be isochronous  $\pm 0.15$  Hz from no load to rated load. Voltage regulation shall be within  $\pm 2$  percent of rated voltage, steady state, from no load to full load. The momentary voltage drop shall not exceed the specified percent without starter coils dropping out or stalling the engine at any time when applying or starting the specified loads. Recovery to stable operation shall occur within 2 seconds.
- C. The alternator shall have Class F insulation (or better) as defined by NEMA MG1-1.65 and temperature rise shall be within NEMA MG1-22.40 definition at rated condition.

#### 2.5 FUEL SYSTEM

- A. Each engine-generator unit shall be furnished with a complete fuel system including engine-driven fuel pump, double wall sub base fuel storage tank engine supply and return lines, and all accessories required for proper operation and to meet local and state codes. All items shall be suitable for the specified fuel, located inside the enclosure, and serviceable from inside the enclosure. The engine driven fuel pump shall transfer the fuel from the sub-base fuel storage tank to the engine-generator.
- B. All flexible connectors provided for the fuel supply and return lines shall be stainless steel.
- C. The combination fuel filter/separator shall be located inside the enclosure and upstream from the flexible connectors. The combination fuel filter/separator shall be a manifold unit with shutoff valves and shall permit servicing the filter/separator without engine shutdown. Filter/separator shall be manufactured by Racor or equal.
- D. The fuel storage tank shall be sub-base type double wall, located below the engine-generator. The tank shall be UL 142 listed, vented, meet all EPA, state and local requirements and shall normally be used to store diesel fuel at atmospheric pressure.

- E. The fuel storage tank shall have a minimum usable capacity to provide storage for 24 hours of continuous operation of the engine generator when operating at 100 percent capacity. Fuel storage tank shall be 200 gallons minimum. The sub-base tank shall be constructed to permit access to the electrical stub up area.
- F. The fuel storage tank shall be provided with the following:
1. Secondary containment tank.
  2. Vent cap.
  3. Primary tank emergency vent.
  4. Secondary tank emergency vent.
  5. Spill containment box per state and local codes. (may be external to enclosure)
  6. Immersion level gauge capable or measuring the fuel level without the engine running that is visible from the manual fill connection.
- G. The fuel storage tank shall be provided with the following connections
1. Engine fuel supply.
  2. Engine fuel return.
  3. Manual fill with dry type quick fill coupling.
  4. Vent with 12' extension
  5. Primary tank emergency vent.
  6. Secondary tank emergency vent.
  7. Low level switch.
  8. Leak detection.
  9. High level switch with externally mounted alarm horn and silence button to be located within audible range of fill connection.
  10. Secondary tank testing with cap.
- H. The fuel storage tank shall have instrumentation that includes, but is not limited to the following:
1. Level switch with electrically isolated dry contacts for remote low-level annunciation on the engine control panel. The Low Fuel alarm shall be set to annunciate when the tank contents above the engine supply connection drop below 25 percent or less of the tank's capacity.
  2. Level switch with electrically isolated dry contacts for remote leak detection on the engine control panel.
  3. High level switch for annunciating audible alarm at 90 percent capacity in the fuel storage tank. Audible alarm shall be an externally mounted alarm horn with silence button that is located near the fill connection.
  4. One common isolated dry type contact to be monitored by the local control system and shall close for any fuel system alarm.

- I. The secondary tank shall be closed top, encircle the tank, prevent the containment area from being contaminated, and be sized to contain minimum 110 percent of the tank's capacity. All connections required for field-testing the secondary tank shall be furnished.
- J. The manual fill connection shall include a dry type quick disconnect coupling sized to accommodate the local fuel distributor.
- K. At 90 percent capacity, an audible alarm shall sound to alert the fill operator to prevent overflow of the fuel storage tank. A silence button shall be provided to silence the alarm horn, automatically resetting when the fuel tank level has dropped below the high-level condition.
- L. Tank fill connection (may not be internal) and level gauge shall be accessible at ground level through a lockable access door in the enclosure.
- M. A suitably sized vent connection and vent cover shall be provided for the storage tank vent. The vent cover shall be installed outside the enclosure. The cover shall have an aluminum body, screen over the outlet, and shall prevent rain from entering the vent line.
- N. Suitable sized emergency vent connections for the primary and secondary tank and emergency vents shall be provided for the fuel storage tank. Each emergency relief vent shall be installed outside the enclosure and shall be designed as required to relieve excessive internal pressure caused by fire exposure. The vent line and each emergency relief vent line shall terminate just above the enclosure.

## 2.6 EXHAUST SYSTEM

- A. Each engine-generator unit shall be furnished with a complete exhaust system including an exhaust silencer, exhaust piping, stainless steel bellows expansion joints, and accessories required for a complete operating system.
- B. The silencer shall be chamber type, all welded AISI Type 304L stainless steel construction. Exhaust piping shall be Schedule 10S, AISI Type 304L stainless steel with butt-welded fittings. The exhaust silencer shall be furnished with suitable stainless steel bracket supports for horizontal mounting on top of the enclosure. As an alternate, the exhaust silencer and mounting brackets may be aluminized steel instead of stainless steel construction provided they are installed within the generator enclosure. The silencer shall be sized so that the back pressure at rated capacity of the engine does not exceed one half the manufacturer's maximum allowable back pressure. The exhaust from the engine shall enter either the bottom or side. Silencers shall be Maxim "M51", Nelson "300" or approved equal.
- C. The exhaust shall discharge vertically at the silencer outlet. A rain cap shall be provided to prevent rain from entering the exhaust pipe. The rain cap shall open

from exhaust pressure from the engine and shall close when exhaust flow stops. The cap shall be stainless steel counter-balancing with vertical discharge.

## 2.7 STARTING SYSTEM AND CONTROL POWER

- A. Each engine-generator unit shall be furnished with a complete electric motor start system including starting motors, battery pack with rack, cables, and battery charger.
- B. The batteries shall be of the high-rate, lead acid type and have a 12 or 24-volt output. The batteries shall be sized for five 10 second cranks with battery and engine oil temperature of 30°F, and a battery end voltage of 70 percent of system voltage.
- C. The battery charger shall float-charge the battery pack and shall be solid state, full wave bridge rectified type, utilizing silicon controlled rectifiers for power control. Battery charger shall be provided with cord and plug for connection to standard 120 Vac receptacle.
- D. The battery charger shall be suitable for the lead acid battery pack. The charger shall have a minimum DC output of 10 amperes. The battery charger shall be provided with a NEMA 12 corrosion resistant enclosure and shall be provided with the following: on/off switch, DC ammeter, DC voltmeter, AC input and DC output circuit breakers or fuses, floating voltage equalization, and relays with form C contacts for remote annunciation of loss of AC power, low battery voltage, and high battery voltage.
- E. The battery rack frame shall be constructed of corrosion resistant material. A battery compartment (tray) shall prevent failed batteries from leaking acid outside of the compartment.

## 2.8 COOLING SYSTEM

- A. Each engine-generator unit shall be cooled with unit-mounted radiator cooling system complete with radiator, expansion tank, water pump, belt-driven fan, fan guard, thermostatic temperature control, high-water temperature cutout, electric jacket water heater and all accessories required for proper operation. The radiator shall be sized with sufficient capacity for cooling of the engine and all other accessories required for proper operation. The fan shall draw air over the engine and discharge through the radiator.
- B. The cooling system shall be filled with a permanent antifreeze mixture of the ethylene glycol type with rust inhibitor.
- C. The electric jacket water heater shall be furnished to maintain jacket water at 90°F [32°C] with a winter ambient temperature as specified herein. The jacket water heater shall be thermostatically controlled. Jacket heater shall be provided with cord and plug for connection to standard 120 Vac receptacle.

2.9 ENGINE-GENERATOR ENCLOSURE

- A. Each engine-generator unit, including its control panel, battery rack, battery charger, power panel, and other ancillary equipment, shall be housed in a steel or aluminum weatherproof enclosure, of the non-walk-in type. The enclosure shall be shop mounted on the engine generator skid.
- B. Steel enclosures shall be constructed with a support frame of not less than 14 gage steel and roof panels of 16 gage. Aluminum enclosure shall be formed sheet aluminum construction, made of modular panels and louvers. Posts, rails, channels, and roof bows shall be 6061-T6 extruded aluminum. The panels shall be 0.040 inch thick minimum.
- C. The enclosure shall consist of two side walls, two end walls, and roof. The roof shall be braced as necessary to support the exhaust silencer. The enclosure shall be designed to withstand the specified wind velocity without damage. All bracing and reinforcing members shall be integral to the enclosure. Roof penetrations for the installation of the silencer shall be gasketed to prevent the entrance of rain.
- D. Doors shall be provided and located for easy access to the engine-generator, controls, and accessories and to provide easy accessibility for maintenance. Doors shall be lockable with stainless steel hardware.
- E. Engine oil and coolant drains shall be piped to outside of enclosure, with lockable shutoff valves and caps. All enclosure penetrations shall be gasketed or sealed to prevent the entry of rodents.
- F. The enclosure shall be provided with intake and exhaust louvers. Louvers shall be sized for 120 percent of the cooling air requirements.. The louvers shall be screened from the inside to prevent the entry of birds.
- G. The enclosure shall be rain tight type and shall be designed to prevent the entrance of rain at the specified wind velocity when the unit is operating and the wind direction at 90 degrees to the intake louvers. "Rain Resistant" louvers, vertical air turning plenums, or a combination of the two shall be provided. Drain holes for any water that may collect.
- H. The System shall require requiring only external connection to the power panel, ATS, and the control panel outputs. The installing Contractor will provide receptacles for connection of battery charger and jacket heater. All other equipment shall be pre-wired.
- I. If required by the manufacturer, the enclosure shall be provided with vertical air turning plenums for cooling air intake.

- J. If required by the manufacturer, the enclosure shall be provided with vertical air tuning plenums for radiator discharge air. The radiator discharge plenum shall direct the air and mechanical noise upwards away from the unit, and shall be supplied with a bottom sump area, with a one-inch drain and shutoff valve to remove any moisture.
- K. The entire enclosure, except for the louvered openings, shall be provided with noise suppression insulation and be designed to limit mechanical noise to not more than 71 dB(A) at 7 meters from any point of the enclosure when operating at full capacity. Field sound tests shall be performed on each unit as specified in the installation section of this specification.
- L. The enclosure shall be thoroughly cleaned after assembly and etched to allow both the interior and exterior surfaces to be shop painted.

## 2.10 CONTROL PANEL

- A. Each engine-generator unit shall have a control panel mounted inside the enclosure with panel mounted controls accessible when the enclosure doors are open. The panel shall be provided with vibration isolators to prevent damage to the instruments from engine-generator vibration.
- B. The control panel shall be automatic and safety type and shall, at a minimum, include all items required by NFPA 110, Level 1.
- C. The control panel shall be provided with a three-position selector switch with the following positions: “RUN-OFF-AUTO”. In the “RUN” position, the engine starting sequence shall be initiated providing local control for maintenance. In the “AUTO” position, the engine-generator will be remotely started and stopped by a run contact from the automatic transfer switch as described herein. Isolated contacts for when the unit is not in the “AUTO” position shall be provided for remote indication.
- D. Adequate clearance shall be provided between the panel and the engine to allow engine maintenance without moving the control panel. The control panel shall be provided with the following instruments and control devices in addition to those required by NFPA 110, Level 1.
  - 1. Tachometer.
  - 2. Non-resettable hour meter.
  - 3. AC voltmeter, AC ammeter, voltmeter/ammeter selector switch.
  - 4. Two normally open dry contacts which close when the engine is running and open with it is stopped.
  - 5. Dry contact that closes for remote common alarm.
  - 6. Dry contact that closes when the control selector switch is in “auto” mode.
  - 7. Indicating lights with common alarm for the following:
    - a. Fuel storage tank low fuel level.



- b. Fuel storage tank leak detection.

## 2.11 GENERATOR LINE AND COMPONENT OVERCURRENT PROTECTION

- A. A generator line circuit breaker rated for the generator output voltage, having the trip rating indicated on the drawings, shall be provided on the output terminals. The line circuit breaker shall be pre-wired to the generator output terminals and shall be provided within the generator enclosure. Circuit breaker shall be service entrance rated.
- B. Overcurrent protection devices shall be provided as needed by the system design to protect generator rotor and excitation system components.
- C. If circuit breaker handle height exceeds 6'-6", provide aluminum platform for access.

## 2.12 SHOP PAINTING

- A. All steel, and iron surfaces shall be protected by suitable coatings applied in the shop. Surfaces which will be inaccessible after assembly shall be protected for the life of the equipment. Coatings shall be suitable for the environment where the equipment is installed. Exposed surfaces shall be finished, thoroughly cleaned, and filled as necessary to provide a smooth, uniform base for painting. Electric motors, engine, alternator, enclosure, piping, and valves shall be shop primed and finish painted prior to shipment to the site.
- B. Stainless steel, nonferrous, and nonmetallic surfaces shall not be painted.

## 2.13 SHOP TESTS

- A. The manufacturer shall shop test each engine-generator set with its control panel and unit mounted radiator to demonstrate that the equipment conforms to specified requirements for load capacity.
- B. All items included on the control panel shall be assembled, wired, and tested in the manufacturer's shop.
- C. The tests shall consist of repeated starts and stops, operation under a load bank at specified capacity frequency, voltage, phase, and power factor (0.8) for a minimum of 1 continuous hour, and tests to demonstrate that each safety shutdown device is working properly. Contractor shall submit certified copies of the shop test results prior to shipping the unit.

## 2.14 OPERATION INSTRUCTION

- A. Step-by-step instructions shall be furnished by each engine manufacturer for each unit. The instructions shall include, but not be limited to, the following procedures or information:
  - 1. Startup of the unit.
  - 2. Normal shutdown of the unit.
  - 3. Emergency shutdown of the unit.
  - 4. Normal operation of the unit, typical temperatures, pressures, speed, etc., for gauges and instruments which are displayed on the panel.
  
- B. The operation instructions shall be submitted for review in accordance with the submittals section. When the review is complete, the instruction sheets shall be printed on heavy paper or cardboard stock and laminated with clear plastic. Two copies of the laminated instructions shall be furnished with the unit. One copy shall be located or displayed at the control panel for the unit. The reserve copy shall be delivered to the PWC Central Maintenance Office, located at 1099 Public Works Drive. The instructions specified here are in addition to the operation and maintenance manuals required by the Submittals section.

## 2.15 AUTOMATIC TRANSFER SWITCHES

- A. The automatic transfer switch shall be UL listed for use in standby power systems in accordance with National Electric Code Article 701, Legally Required Standby Systems, as service entrance equipment and, as required. The automatic transfer switch shall be a product of a manufacturer who has supplied such equipment for at least 5 years. The automatic transfer switch shall be manufactured by Automatic Switch Co. (ASCO), GE Zenith Controls, Onan, Russelectric Inc., or an approved equal switch as manufactured by the generator manufacturer.
  
- B. The automatic transfer switch shall be an electrically operated double throw switch. Switches composed of molded case breakers, contactors, or similar components not specifically designed for automatic transfer switch applications will not be acceptable. The automatic transfer switches shall transfer electric loads from the normal source of electric power to an emergency source of power as indicated on the drawings. The transfer switches shall automatically transfer the electrical load circuits upon an interruption or a decrease in the voltage of the normal source of power and shall transfer the loads back to the normal source when it becomes available. The automatic transfer switches shall be so designed that the load circuits cannot be connected to more than one source of power at a time.
  
- C. The ATS shall include neutral and ground bar.
  
- D. The transfer switches shall be furnished without integral overcurrent protection. The switches shall be electrically operated but mechanically held in both the normal and emergency positions. The operating mechanism shall be momentarily energized from the source to which the load is being transferred. All main and arcing contacts

and control elements shall be removable from the front of the switches without removing the switch from the enclosure and without removing the power cables. The automatic transfer switches shall be magnetic contactor type. Main contacts shall be silver composition. Main and arcing contacts shall be visible without major disassembly to facilitate inspection and maintenance. A manual handle shall be provided for maintenance.

- E. Automatic transfer switches shall be rated for continuous duty in both normal and emergency positions. The switches shall have the number of poles, as required, and shall be double-throw. Ampere ratings, and 3-cycle closing and withstand ratings shall be as required. Switches shall have a solid neutral.
- F. The automatic transfer switch and controls shall be enclosed in a NEMA 4X stainless steel enclosure. A thermostatically controlled space heater, sized to prevent condensation within the enclosure, shall be provided. A disconnect switch shall be provided for the heater circuit. The space heater shall be rated for 120 volts AC and will be powered from incoming source.
- G. The ATS shall be lockable with a padlock.
- H. The ATS shall have dual lugs on load side for connecting conductors indicated on the drawings.
- I. The control system shall consist of all control devices necessary to operate the switch as described herein. The system shall incorporate a microprocessor control module connected to the power transfer components by a wire harness and keyed disconnect plugs. The control module shall be completely enclosed with a protective cover and shall be mounted separately from the transfer switch unit for safety and ease of maintenance. Sensing and control logic shall be provided on plug-in circuit boards. All interface relays shall be identical and shall be control grade, plug-in type, with dust covers. All control components shall meet or exceed the voltage withstand capability in accordance with IEEE 472 and NEMA ICS 1-109.
- J. The automatic transfer switch shall be designed to function in accordance with the following requirements:
  - 1. The voltage of each phase of the normal source shall be monitored and the pickup voltage shall be adjustable from 85 percent to 100 percent of nominal, and the dropout voltage shall be adjustable from 75 percent to 98 percent of the pickup value. The transfer to emergency will be initiated upon reduction of the normal source to 85 percent of the normal voltage, and retransfer to normal shall occur when the normal source restores to 90 percent of the normal voltage.
  - 2. A time delay to override momentary normal source outages to delay all transfer switch and engine starting signals shall be provided. The time delay

- shall be field adjustable from 0.5 to 6 seconds and shall be factory set at 1 second.
3. A time delay to retransfer to the normal source shall be provided. The time delay shall be automatically bypassed if the emergency source fails and the normal source is available. The time delay shall be field adjustable from 0 to 30 minutes and shall be factory set at 10 minutes.
  4. An in-phase monitor shall be provided to control transfer so motor load inrush currents do not exceed normal starting currents. The monitor shall compare the phase relationship and frequency difference between the normal and emergency sources and shall permit transfer only at acceptable values of voltage, phase relationship, and frequency differential.
  5. An unloaded running time delay for engine-generator cool-down shall be provided. The time delay shall be field adjustable from 0 to 60 minutes and shall be factory set at 5 minutes.
  6. Exercise times and time delays shall be field adjustable by the Owner from local keypad and controls.
- K. The automatic transfer switch shall include indication features in accordance with the following requirements:
1. A detailed step-by-step operating instruction plate shall be provided on the front of the switch.
  2. Indicating lights shall be provided for, but shall not be limited to, the following:
    - a. Normal source available.
    - b. Emergency source available.
    - c. Automatic transfer switch in normal position.
    - d. Automatic transfer switch in emergency position.
    - e. Automatic transfer switch in test mode.
  3. An auxiliary contact shall be provided that is closed when the automatic transfer switch is connected to normal and one contact that is closed when the automatic transfer switch is connected to emergency.
  4. A contact, which will close when the normal source fails, shall be provided to initiate engine starting.

## PART 3 – EXECUTION

### 3.1 INSTALLATION

- A. Standby Power Systems shall be installed in accordance with Specification Section 16010.
- B. Installation checks and start-up shall be performed by the manufacturer's local representative to ensure proper installation and readiness for operation.

### 3.2 TESTING

- A. The complete system (engine, generator, fuel system, fuel tank, controls, automatic transfer switch, etc.) shall be field tested together by the manufacturer's local representative as a complete system to assure compatibility. Load and performance tests shall be performed. Load testing shall be performed with a reactive load bank or with a resistive load bank and the installed pumps. Performance testing shall be performed with the actual equipment loads. PWC and the Engineer shall be notified at least 2 weeks prior to the date of each test. The tests shall include but not be limited to the following:
  - 1. Each engine-generator set shall be tested to demonstrate that the equipment conforms to specified requirements for load capacity, and starting duty. The load test shall consist of repeated starts and stops, operation under a reactive load bank at the specified power rating for a minimum of four continuous hours. Contractor shall furnish the lubricants, load bank, and the fuel for the tests. The following items shall be measured, recorded at 15 minute intervals, and submitted in a field test report:
    - a. Outdoor ambient temperature
    - b. Barometric pressure
    - c. Generator output in volts, amps, kw, frequency
    - d. Engine speed, rpm
    - e. Engine jacket water temperature
    - f. Engine oil pressure
    - g. Engine start / stop times
    - h. Test start and completion times
  - 2. Start-up under test mode to check for exhaust leaks, path of exhaust gases outside the building/enclosure, cooling air flow, movement during starting and stopping, vibration during running, normal and emergency line-to-line voltage and frequency, and phase rotation.
  - 3. Automatic start-up by means of simulated power outage to test remote-automatic starting, transfer of the load, and automatic shutdown. Prior to this test, all transfer switch timers shall be adjusted for proper system coordination.

- 4. Each unit shall be mechanically checked for proper operation. Each alarm and safety shutdown shall be checked by artificially simulating an alarm condition. Defective equipment and controls disclosed by the tests shall be replaced or corrected, and the packages placed in satisfactory operating condition.
  
- B. All costs of modifications and retesting to prove the Standby Power System meets specified requirements shall be at no cost to PWC.
  
- C. Test reports shall verify that the specified tests have been performed and shall state results. Test results shall be submitted as required in the Submittals section and be included in the O&M manuals.

### 3.3 WARRANTY & MAINTENANCE

- A. A one-year service agreement and warranty shall be provided and shall include complete corrective and preventative maintenance for one year from the date of successful testing. The service agreement shall include adjustment to the generator set, transfer switch, and switchgear controls as required, and certification in PWC's maintenance log of repairs made and proper functioning of all systems. All required materials and labor shall be provided. A contract shall be submitted to PWC for extending the service agreement and warranty to five (5) years.
  
- B. **The generator set manufacturer and its distributor shall maintain a 365 day 24-hour parts and service organization within 150 miles of the project site.** This organization shall be regularly engaged in a maintenance contract program to perform preventive maintenance and service on equipment provided.

### 3.4 MANUALS & KEYS

- A. Two (2) sets of operation and maintenance manuals shall be provided ATS and generator system. Each set shall include installation, operation, maintenance, and parts manuals. Each set of manuals shall be bound and labeled. Manuals shall be delivered to the Owner upon delivery of the engine-generator.
  
- B. Two (2) sets of keys for generator and ATS shall be provided upon delivery of engine-generator.

# PWC ELECTRIC & WATER UTILITIES

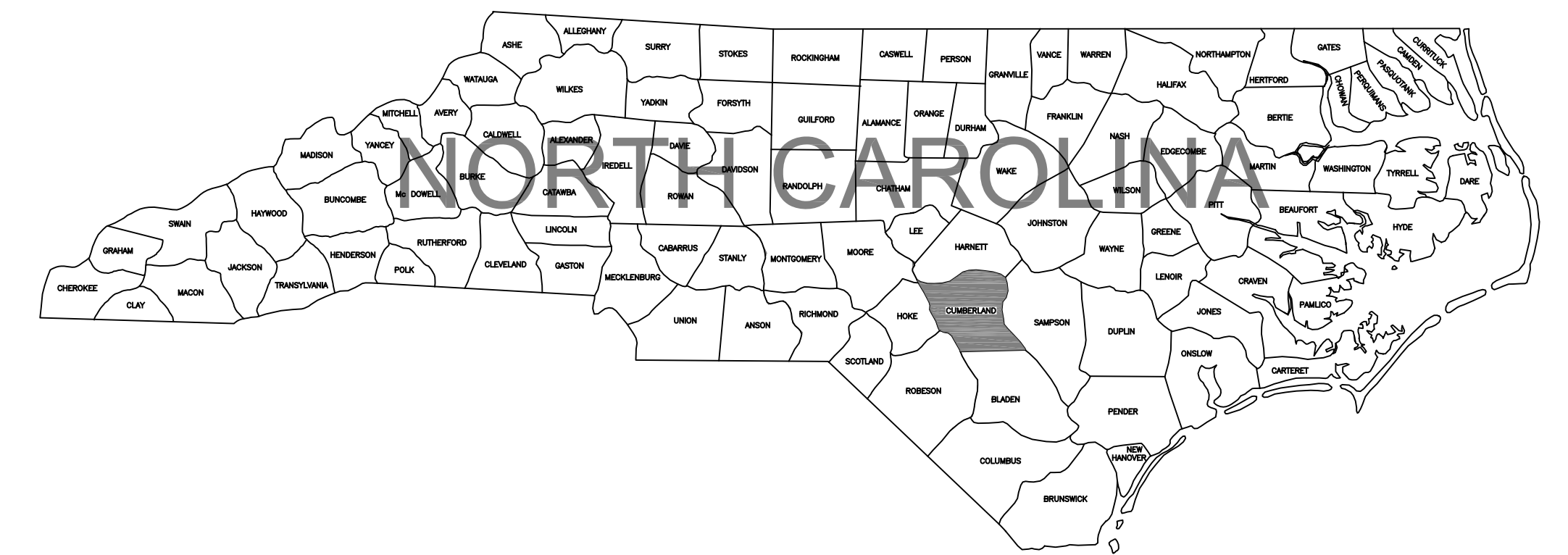
## GOLDEN CREEK LIFT STATION

### NO. 26 LIFT STATION GENERATOR

### RETRO-FIT, PWC TASK NO.

## 31300020253

### FAYETTEVILLE, NORTH CAROLINA 28301



LOCATION MAP  
NOT TO SCALE



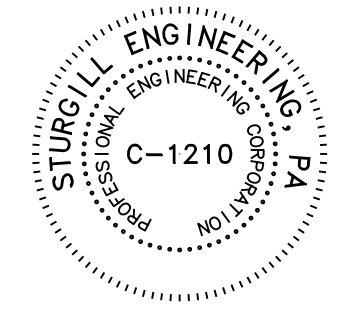
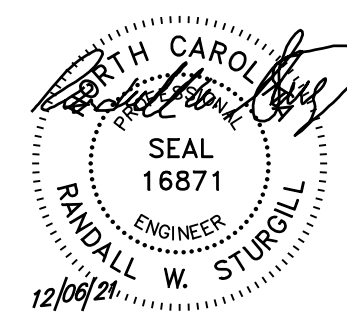
VICINITY MAP  
NOT TO SCALE



- SHEET LIST:
- E1 ELECTRICAL LEGEND, NOTES, MISC. DETAIL
  - E2 EXISTING ELECTRICAL AND MODIFIED SITE PLAN
  - E3 EXISTING AND MODIFIED ELECTRICAL ONE-LINE DIAGRAMS

Version: 1

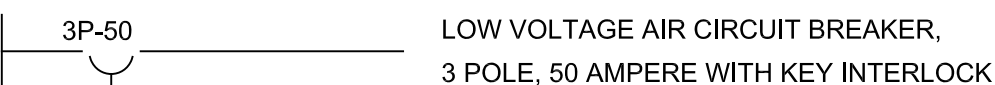
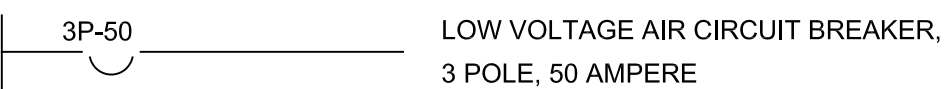
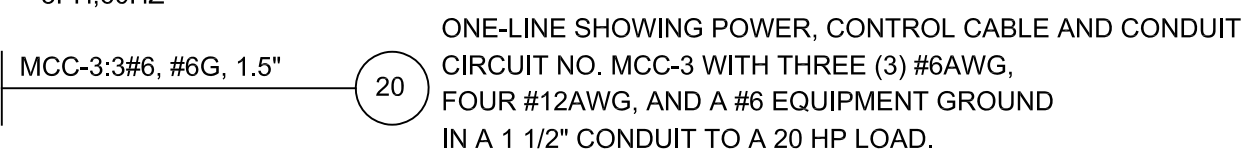
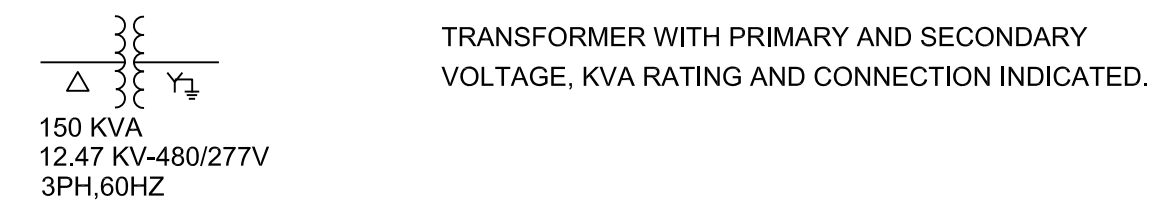
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 ONE SOUTH MAIN ST.  
 LEXINGTON, NC 27292  
 (336) 238-1249 PH.  
 (336) 236-6393 FAX



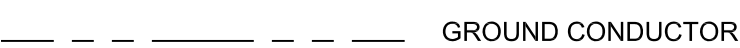
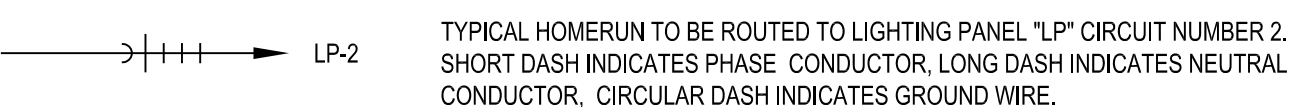
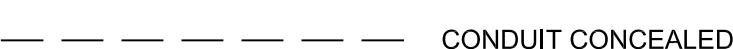
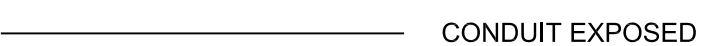
JUNE 2019  
 JOB NO. 01281  
 FOR CONSTRUCTION

# ELECTRICAL LEGEND AND ABBREVIATIONS

## ONE-LINES



## PLANS

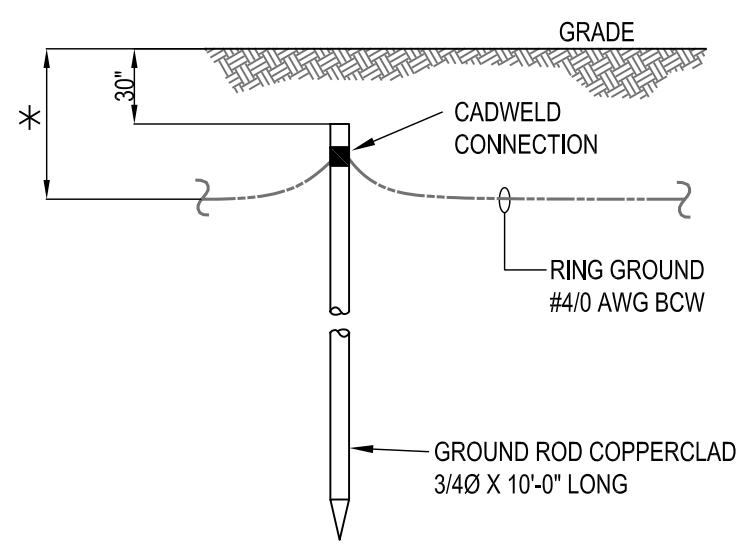
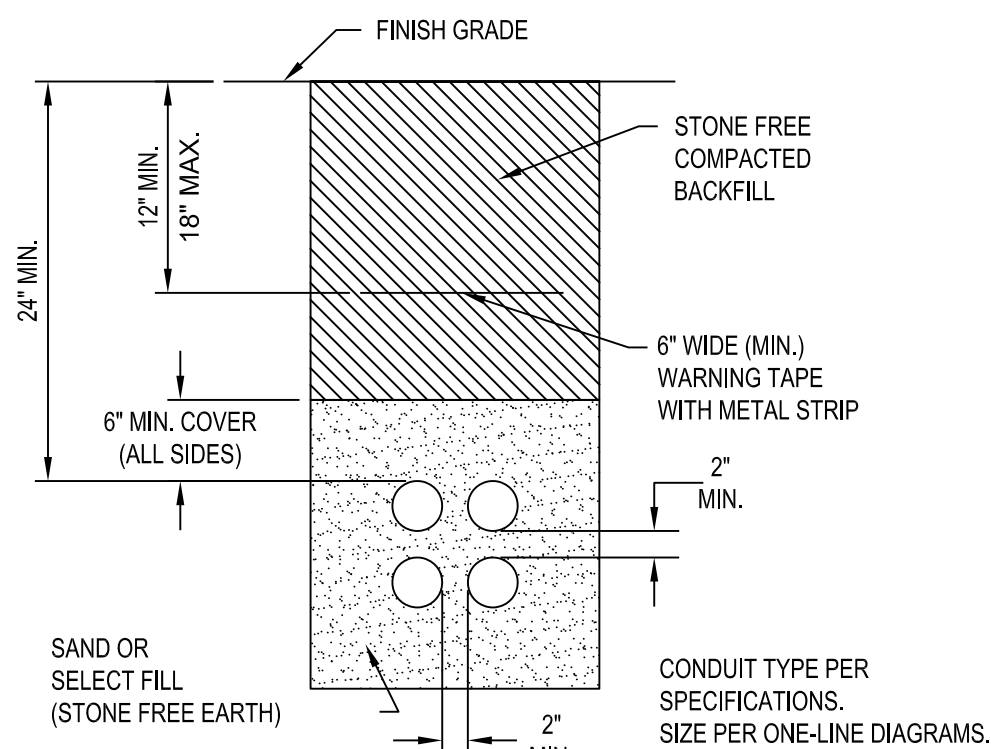


## ABBREVIATIONS

- ATS AUTOMATIC TRANSFER SWITCH
- CB CIRCUIT BREAKER
- DS DISCONNECT SWITCH
- DSU DISCONNECT SWITCH UTILITY
- EX EXISTING
- MPC MINI POWER CENTER
- MTS MANUAL TRANSFER SWITCH
- PCP PUMP CONTROL PANEL
- REC RECEPTACLE
- RTU REMOTE TERMINAL UNIT

## GENERAL NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR ROUTING ALL CONDUITS. THIS SHALL INCLUDE ALL CONDUITS INDICATED ON THE ONE-LINES, PLANS, AND PANEL SCHEDULES.
2. WETWELL IS CLASSIFIED HAZARDOUS, CLASS 1, DIVISION 1, GROUP D BY THE NEC. ALL CONDUITS ENTERING THIS AREA SHALL BE PROVIDED WITH SUITABLE SEALOFFS. CONDUITS FROM WETWELL TO PUMP CONTROL PANEL SHALL BE RIGID STEEL.
3. CONTRACTOR SHALL FIELD VERIFY EQUIPMENT LOCATIONS PRIOR TO INSTALLATION OF CABLE AND CONDUIT.
4. ALL ELECTRICAL WORK SHALL CONFORM TO THE NEC, NC STATE BUILDING CODE, AND ALL LOCAL CODES AND ORDINANCES.
5. ALL ELECTRICAL EQUIPMENT SHALL BE THIRD PARTY LISTED AS REQUIRED BY THE STATE OF NORTH CAROLINA.
6. UNLESS OTHERWISE NOTED, EXPOSED CONDUIT SHALL BE RIGID STEEL. CONDUIT FOR TELEPHONE AND CONDUIT NOT ENTERING HAZARDOUS AREAS MAY BE PVC SCHEDULE 80.
7. ANY AND ALL NUTS, BOLTS, ANCHORS, FASTENERS, OR OTHER MISC. METALS SHALL BE OF 316 STAINLESS STEEL UNLESS OTHERWISE DIRECTED BY THE ENGINEER PRIOR TO INSTALLATION. INSURE THAT NO DISSIMILAR METALS ARE IN CONTACT WITH EACH OTHER. USE NYLON WASHERS OR SPACERS TO PREVENT CONTACT.
8. COORDINATE EXACT UTILITY REQUIREMENTS WITH SERVING UTILITY.
9. GROUND SERVICE AND EQUIPMENT IN ACCORDANCE WITH NEC ARTICLE 250. (CURRENT EDITION)
10. GROUND ALL METAL PARTS AND COMPONENTS.



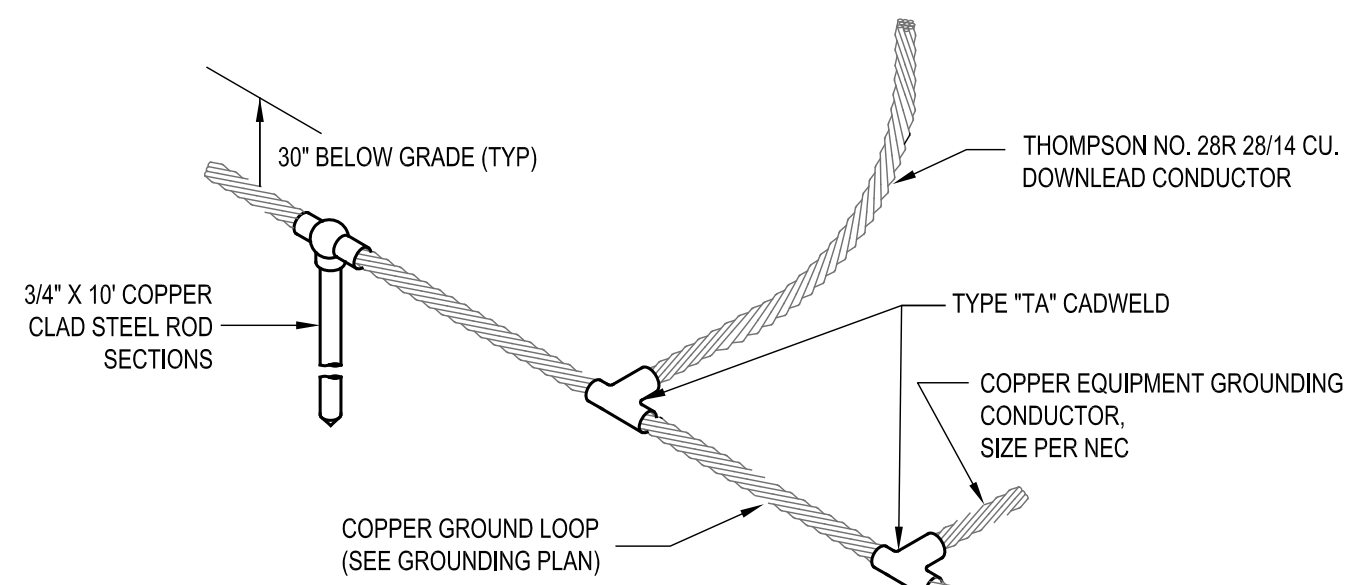
## TYPICAL DIRECT BURIED CONDUIT SECTION

NOT TO SCALE

\* 2'-6" OR 6" BELOW FROST LINE, WHICHEVER IS DEEPER

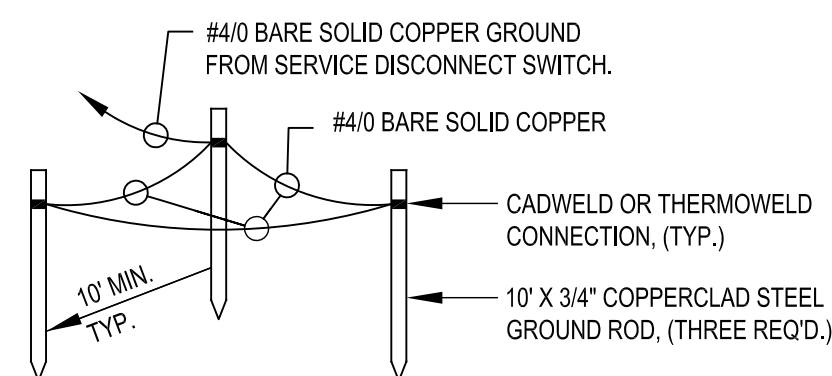
## GROUND ROD

SCALE: NOT TO SCALE



## GROUND LOOP DETAIL

SCALE: NOT TO SCALE

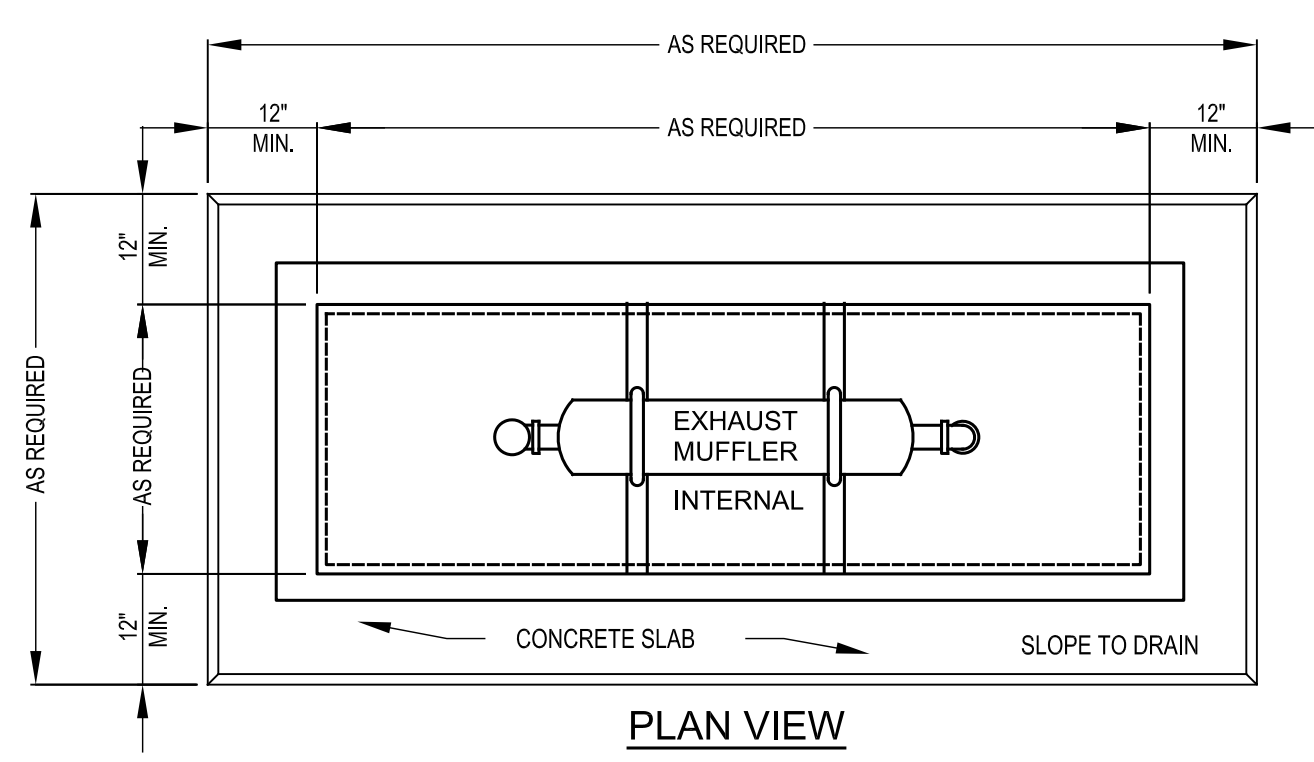
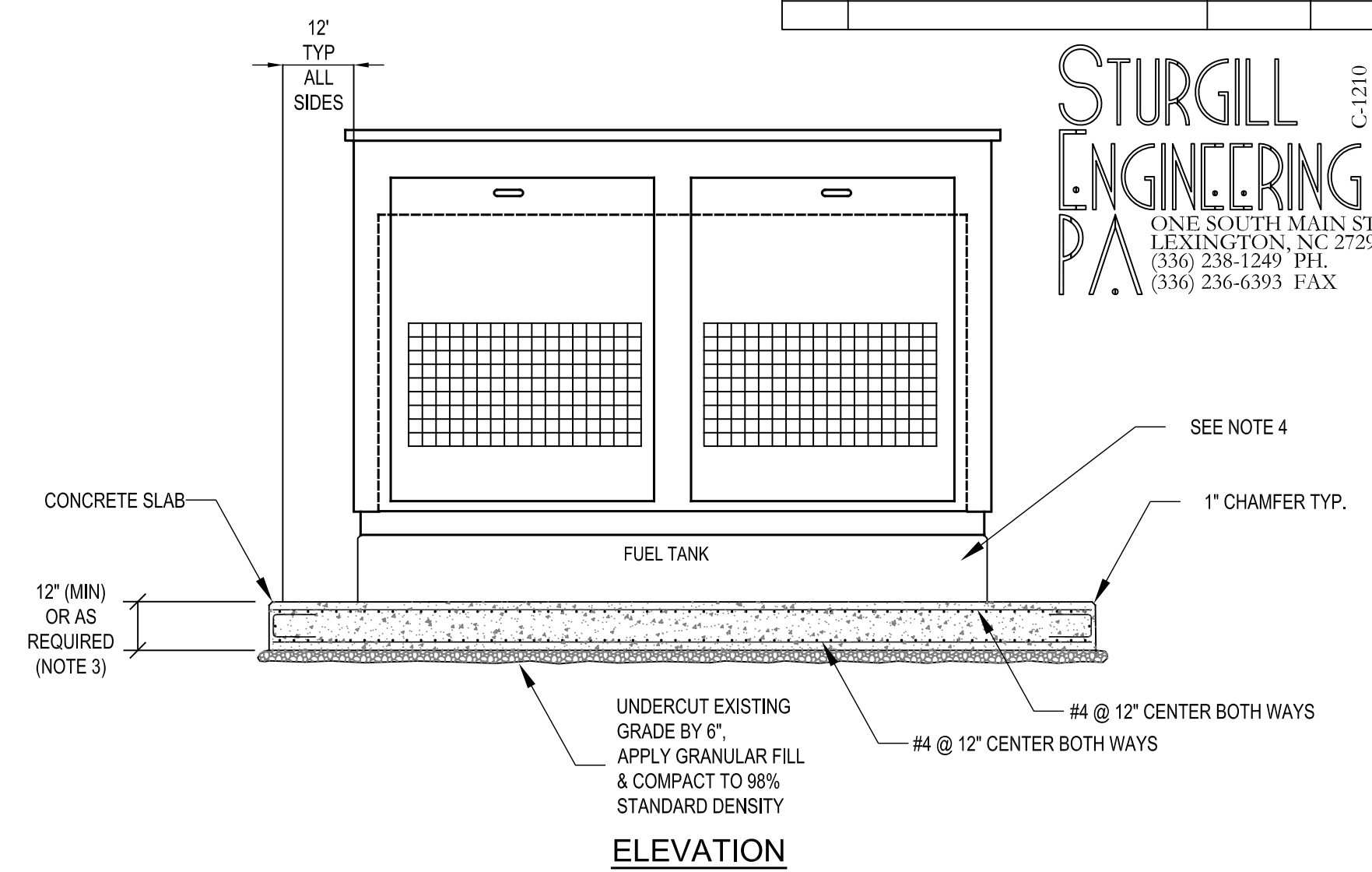
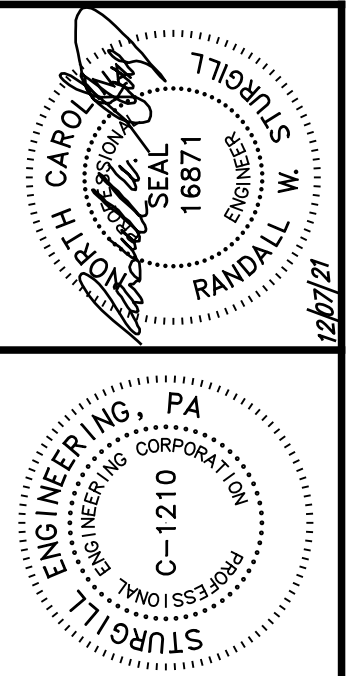


## TYPICAL MADE GROUNDING ELECTRODE

SCALE: NOT TO SCALE

REVISIONS			
SYM.	DESCRIPTION	DATE	BY

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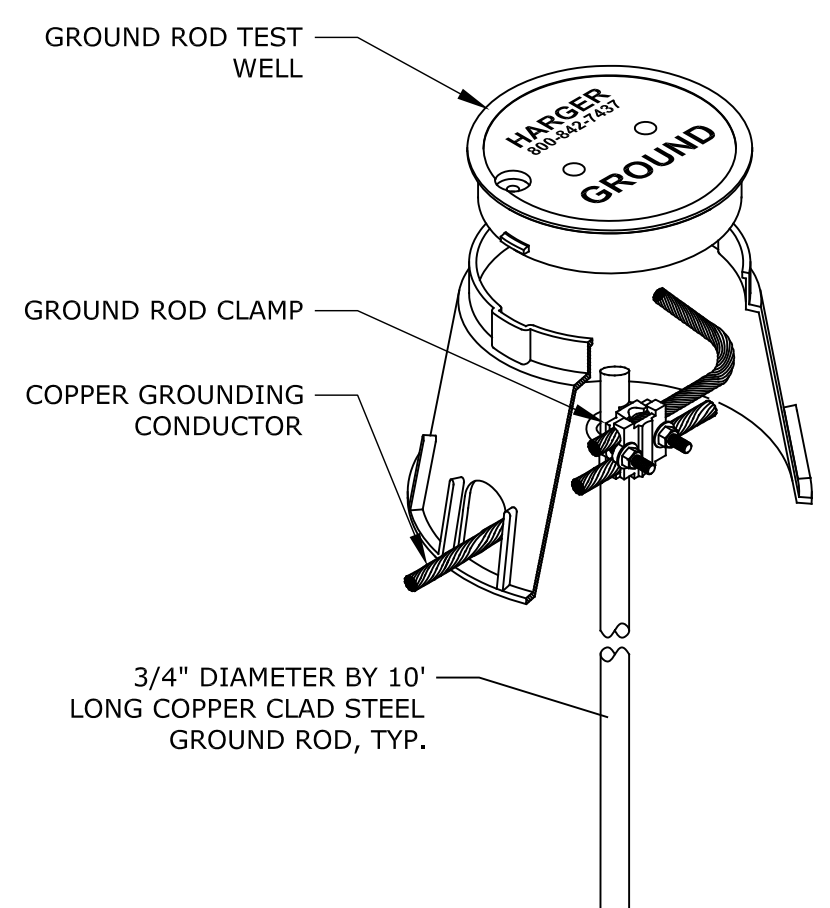


## GENERATOR NOTES:

1. GENERATOR FURNISHED BY OWNER UNDER SEPARATE CONTRACT AND INSTALLED BY CONTRACTOR.
2. GENERATOR IS TO BE ANCHOR BOLTED TO SLAB PER MANUFACTURER'S INSTRUCTIONS. VIBRATION ISOLATION PAD TO BE INSTALLED BETWEEN PAD AND GENERATOR.
3. CONTRACTOR SHALL CONFIRM PAD DESIGN WITH SUPPLIER PRIOR TO INSTALLATION. PAD SHALL BE ABOVE GRADE TO AVOID RUNOFF OR STANDING WATER.
4. CONTRACTOR SHALL INSTALL FUEL TANK PER SUPPLIER'S RECOMMENDATIONS.

## GENERATOR DETAIL

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## GROUND ROD TEST WELL DETAIL

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THE SCALE BAR SHOWN BELOW MEASURES ONE INCH LONG ON THE ORIGINAL DRAWING.

PWC ELECTRIC AND WATER UTILITIES  
GOLDEN CREEK LIFT STATION NO. 26  
LIFT STATION GENERATOR RETRO-FIT  
FAYETTEVILLE, NC 28301

ELECTRICAL LEGEND AND MISC. DETAILS

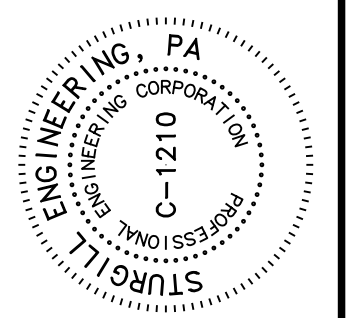
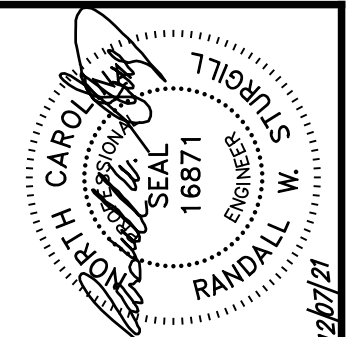
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Sheet No.:	E1
Of:	Version:

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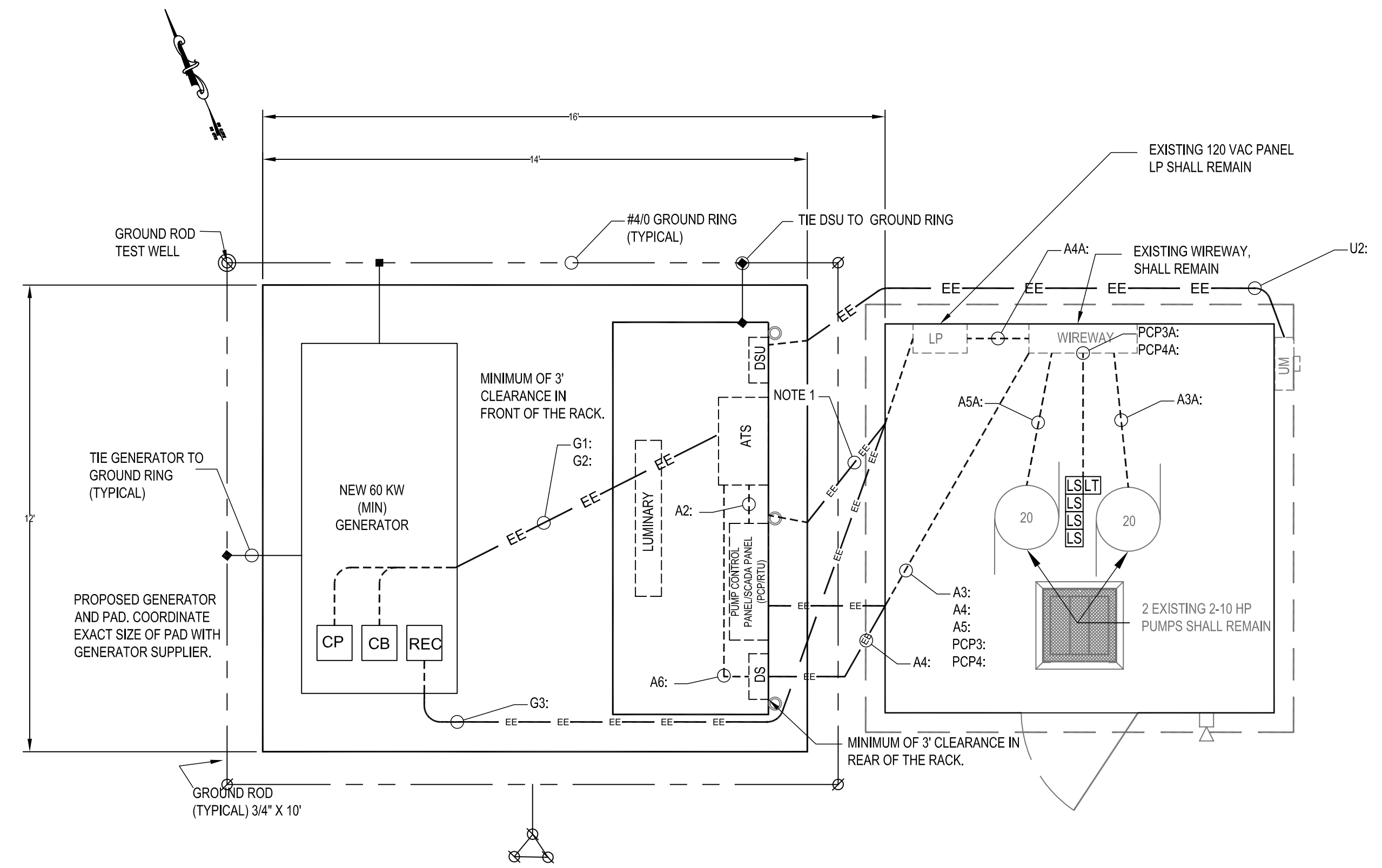
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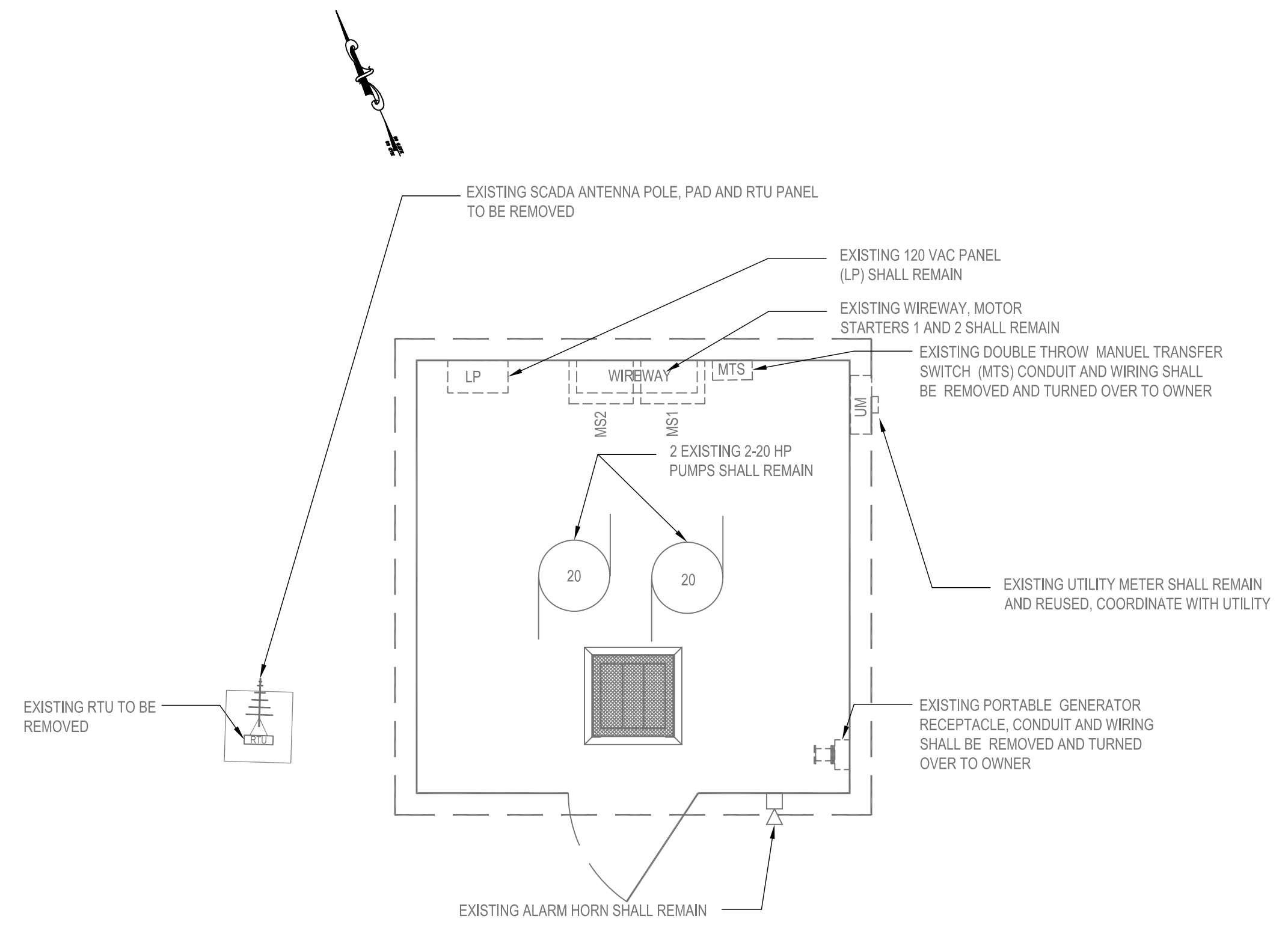
EXISTING ELECTRICAL AND  
 MODIFIED, SITE PLAN

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 Drawn: REH  
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 Sheet No.: **E2**  
 Of: \_\_\_ Version: \_\_\_



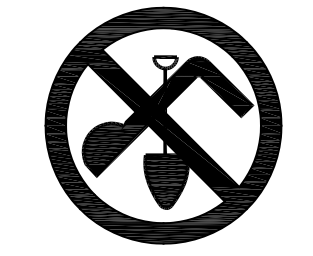
**MODIFIED LIFT STATION PLAN**  
 SCALE : 3/8" = 1'-0"

- NOTES:
1. ADD A 1P-20A BREAKER TO LP FOR HOOD LIGHT AND GFI RECEPTACLE WITH 2#12, #12G, 1°C.



**EXISTING LIFT STATION PLAN**  
 SCALE : 3/8" = 1'-0"

- DEMOLITION NOTES:
1. SEE E1 FOR ELECTRICAL LEGEND, ABBREVIATIONS, GENERAL NOTES AND MISC. DETAILS.
  2. EXISTING FACILITIES TO REMAIN IN OPERATION OR BE TOTALLY BYPASSED BY TEMPORARY PUMPING EQUIPMENT DURING CONSTRUCTION. ALL ACTIVITIES WHICH IMPACT EXISTING OPERATIONS SHALL BE COORDINATED WITH PWC.
  3. ELECTRICAL CONDUITS, AIR LINES, AND MISC. PIPING SHALL BE FIELD ROUTED TO AVOID CONFLICTS.
  4. ALL MISCELLANEOUS ELECTRICAL CONDUITS AND CONNECTIONS TO EQUIPMENT BEING REMOVED OR REPLACED SHALL BE CUT, PLUGGED OR REMOVED AS NECESSARY.
  5. CONTRACTOR SHALL TERMINATE CONDUCTORS IN RTU AS DIRECTED BY PWC.
  6. EXISTING CABLE & CONDUIT TO REMAIN.
  7. EXISTING CABLE & CONDUIT TO REMAIN. RECONNECT IN WIREWAY.

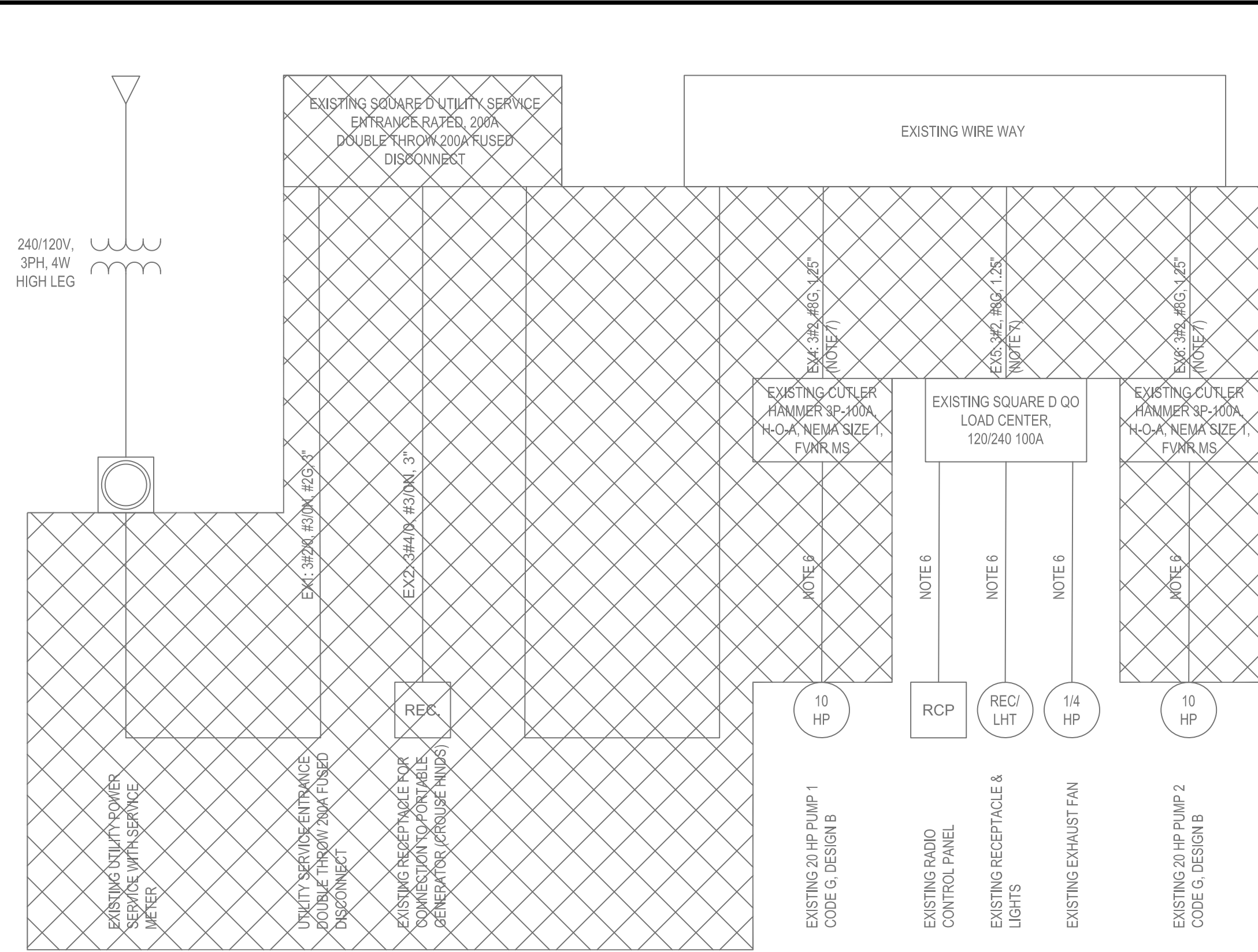


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 INCH LONG ON THE  
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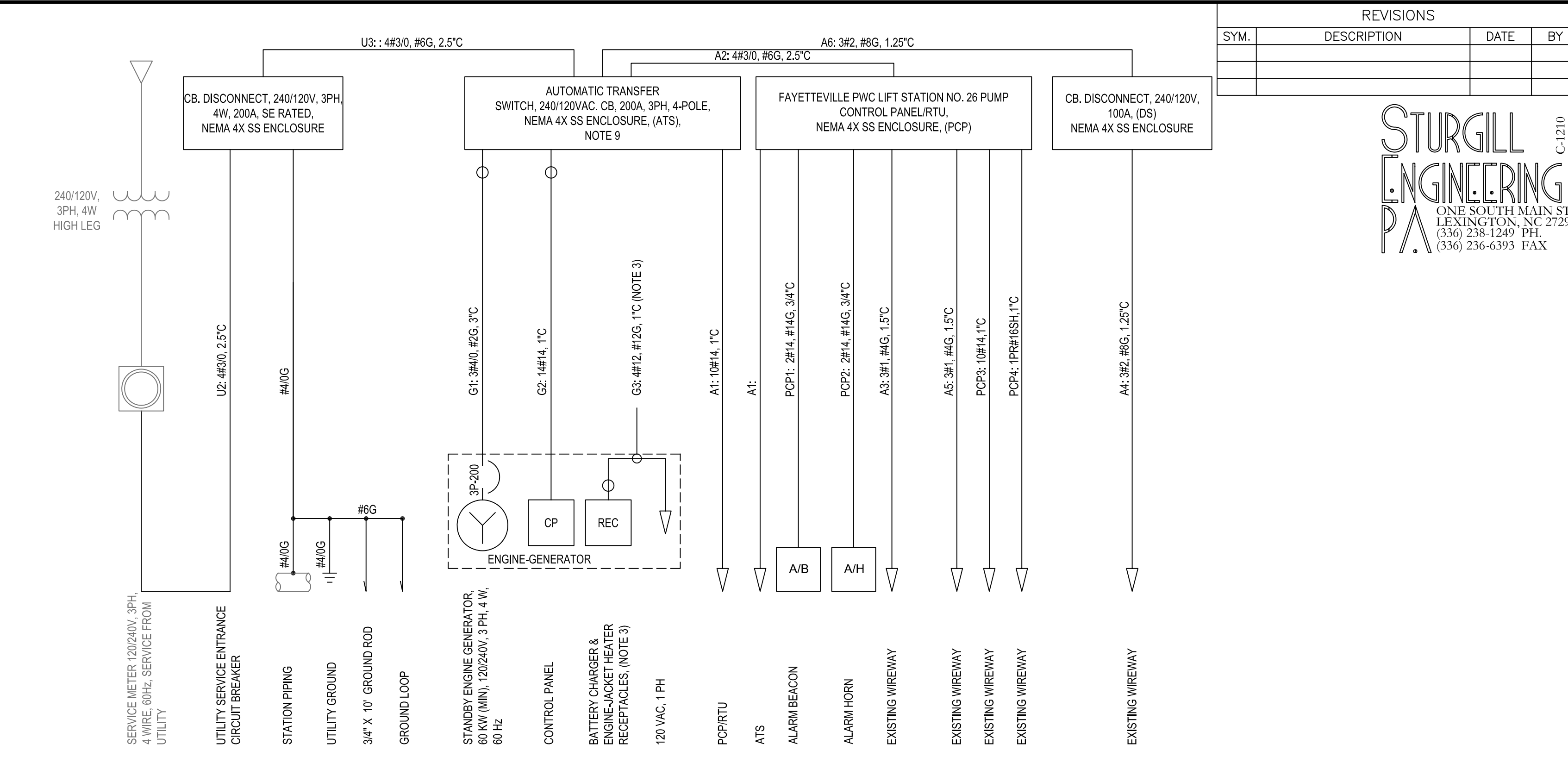


EXISTING ELECTRICAL ONE-LINE DIAGRAM

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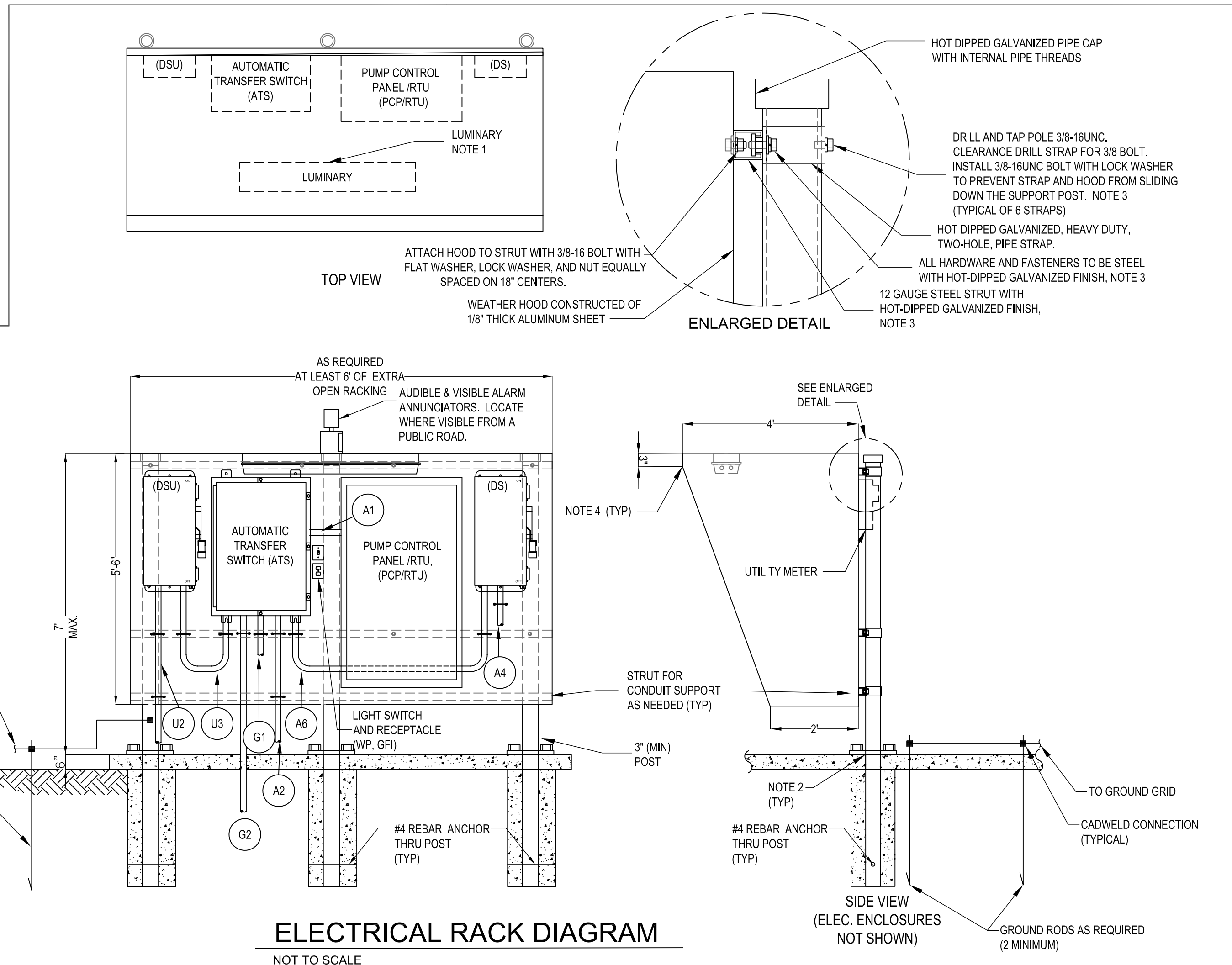
- DEMOLITION & REVISED ELECTRICAL NOTES: 1. SEE E1 FOR ELECTRICAL LEGEND, ABBREVIATIONS, GENERAL NOTES AND MISC. DETAILS. 2. EXISTING FACILITIES TO REMAIN IN OPERATION OR BE TOTALLY BYPASSED BY TEMPORARY PUMPING EQUIPMENT DURING CONSTRUCTION...

- NOTES: 1. LUMINARY IN WEATHER HOOD SHALL BE 4-FOOT LED MINIMUM 8000 LUMENS WITH ENCLOSED FIBERGLASS HOUSING, WET LABEL LISTED: LITHONIA FEM4LED-9L57-IMACD, COLUMBIA HEM4-50HL-DCA-EU, METALUX 4VT2-LD4-8-DR-UNV-L850-CD1-WL OR EQUAL.



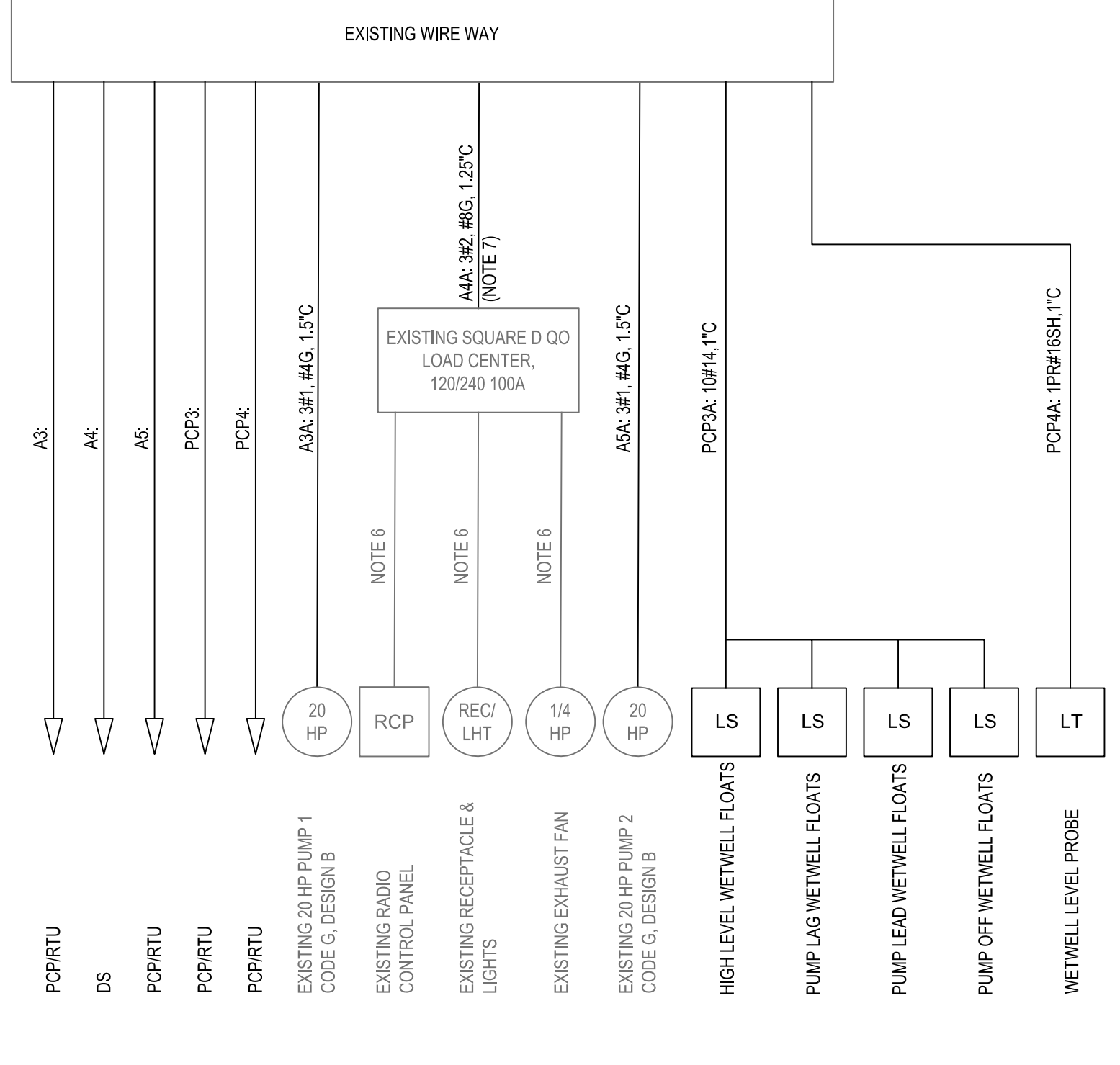
REVISED ELECTRICAL ONE-LINE DIAGRAM

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ELECTRICAL RACK DIAGRAM

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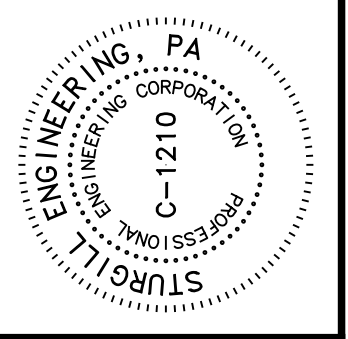
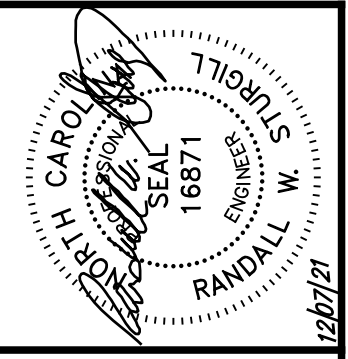


REVISED ELECTRICAL ONE-LINE DIAGRAM

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REVISIONS table with columns for SYM., DESCRIPTION, DATE, and BY.

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PWC ELECTRIC AND WATER UTILITIES GOLDEN CREEK LIFT STATION NO. 26 LIFT STATION GENERATOR RETRO-FIT FAYETTEVILLE, NC 28301

MODIFIED ELECTRICAL ONE-LINES, SITE PLAN, PANEL SCHEDULE AND EQUIPMENT RACK DETAIL

Scale: AS SHOWN Date: JUNE, 2019 Drawn: REH Checked: RWS Job No.: 01261 Sheet No.: E3 Of: - Version: -



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