MICRON PUMP STATION WELL PUMP NO. 4

SAWS Job No. 16-6004
SAWS Solicitation No. CO-00315

ADDENDUM NO. 1
March 12, 2020

To Bidder of Record:

This addendum, applicable to work referenced above, is an amendment to the bidding documents and as such will be a part of and included in the Contract Documents. Acknowledge receipt of this addendum by entering the addendum number and issue date in the space provided in the submitted bid proposal.

RESPONSES TO QUESTIONS RECEIVED

Question 1: Per the reference bid, is Flowserve an approved manufacture for the pump bowl?

Response: Yes, Flowserve is a SAWS-approved pump manufacturer.

Question 2: We are requesting that Deming be listed as an approved manufacture for the well pump. Attached is the curve for the bowl we are proposing.

Response: Deming is not a SAWS-approved pump manufacturer.

Question 3: Electrical sheet E-2.1 One-line diagram and Keyed Note 11 on Sheet E-1.1 shows a 5kV rated Motor Disconnect at the well pump, however there is no specifications for the disconnect switch. Specifications does however refer to a Power Factor Correction Capacitor, which does not show on the One-line diagram nor the site plans. Please clarify.

Response: Yes E-2.1 does show the Power Factor Correct Capacitor it is upstream of the Soft Starter. The site plans do not need to show it because these power factor capacitors are inside the New Soft Start Cabinet, plus we don't show the Power Factor Correction on Site Plan. A Specification 16361A will be provided as an attached for the 4160V/ 3phase/ 600A disconnect switch.

Question 4: Please provide a lighting schedule or clarify the fixture needed for the MCC under canopy lights.

Response: Please Use Lithonia Canopy Lighting Model # DMW 2 LED L24 3000LM PCL WD MVOLT GZ1 30K 80 CRIPMP4X WLFEND24X.

Question 5: There is no specification for Lightning Protection. Please verify that lightning protection is not required for the MCC Canopy.

Response: In response to your question yes there will be Lightning Protection. Please refer to Spec : 16770 – Lightning Protection Systems.

Question 6: Please make arrangement to be able to access the Electrical Vault below the existing MCC to examine the cable tray routing in the vault during the site visit on the 3/3/2020.

Response: Access to the Electrical Vault was provided at the pre-bid site visit on Tuesday, March 3, 2020.

Question 7: Pump motor control wiring to Well Pump Control Panel to Motor Starter as required on Sheet E-4.1 is missing from the Ductbank sections. Please clarify whether to utilize designed spares or new conduits are to be included in the Ductbanks and the cable type to be used.

Response: Please see revised Electrical Drawing E-1.1 sealed for additions of wiring and spare conduit.

Question 8: Sheet 1.2 does not have Scale, although drawing state SCALE AS NOTED.

Response: We have revised the drawing to add the scale and it has been sealed please see attached drawing E-1.2

Question 9: 2.04 B & Attachment A 3.I.iii: The spec asks for flanged column pipes and the Attachment A asks for threaded, which is correct?

Response: Flanged.

Question 10: 2.04 C: The lines should have straight threads, correct?

Response: Correct, for the shafts.

Question 11: 2.04 D.1 & Attachment A 3.b: The spec shows A48 Cl 40 cast iron and the Attachment A shows A48 Cl 30 cast iron, which is correct?

Response: Cl 30.

Question 12: 2.04 D.1 & 2.04 D.2 & Attachment A 3.g: D.1 asks for C903 bronze bearings, D.2 asks for C844 bronze bearings, and Attachment A asks for C932 bronze, which is correct?

Response: C903.

Question 13: 3.05 A Table: The maximum outside diameter is shown to be 22 inches, is this for the bowl assembly only? What is the actual casing ID?

Response: 22 inches refers to the maximum bowl diameter. The casing ID is 29 inches.

CLARIFICATIONS TO SOLICITATION

1. The project name will change from "Micron Well Fit Out P2" to "Micron Pump Station Well Pump No. 4."

MODIFICATIONS TO THE BIDDING AND CONTRACT REQUIREMENTS

1. Due to an update in the General Wage Decision for Building Construction Type, remove the building wage decision document from the solicitation in entirety and replace with the revised version attached (rev. 02/14/2020, General Decision Number TX20200231). This version should be utilized by the awarded contractor for the project.
2. Due to an update of Exhibit C titled "Security Procedures", remove the current document dated 4/12/2019 from the solicitation in its entirety and replace with the revised version attached (rev.3/6/2020). This version should be utilized by the awarded contractor for the project.

MODIFICATIONS TO THE SPECIFICATIONS

1. Section 01504 "Temporary Facilities and Controls" – ADD to paragraph 2.06(B) the following: "Temporary security fencing shall be secured in place to provide the same level of intrusion protection as the existing security fencing whenever personnel are not present at the breached opening. Trench openings below existing security fencing shall be made secure at the same level of intrusion protection as the existing fencing whenever personnel are not present at the trench opening."
2. Section 15163 "Lineshaft Deep Well Pumps" – REPLACE the entire section with the version included in this addendum.
3. Section 16361A, "Medium Voltage Load Interrupter Switchgear" – NEW section.
4. Section 16770, "Lightning Protection Systems" – NEW section.

MODIFICATIONS TO THE PLANS

1. Replace plan sheet C-1.0 with revised version in this addendum (reflects COSA phone number revision).
2. Sheet S-2.0 STRUCTURAL CANOPY PLANS AND SECTIONS
    a. <u>Sheet Notes:</u>
        i. Add Sheet Note 2 as follows "2. Provide Lightning Protection System on canopy per Section 16770 "Lightning Protection Systems"."
3. Sheet C-10.0 36" DRAIN LINE PLAN AND PROFILE
    a. <u>Call out at Junction Box-1:</u>
        i. Revise the call out as follows:
        "APPROX. 24" STORM DRAIN TIE-IN
        SEE NOTES 1 AND 7"
    b. <u>Sheet Notes</u>:

i. Add Sheet Note 7 as follows: "7. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTING EXISTING DRAINAGE FACILITIES FROM DAMAGE. ANY DAMAGE TO EXISTING DRAINAGE SYSTEMS, WHETHER OR NOT SHOWN ON THE PLANS, SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REPAIR AT HIS EXPENSE. THE CONTRACTOR SHALL NOTIFY COSA STORM WATER ENGINEERING AT 210-207-8052 AS SOON AS CONFLICTS WITH UTILITIES ARE ENCOUNTERED OR ANY DRAINAGE SYSTEM IS DAMAGED DURING CONSTRUCTION."

4. Replace plan sheets E-1.1, E-1.2, and E-5.1 with the revised versions in this addendum.

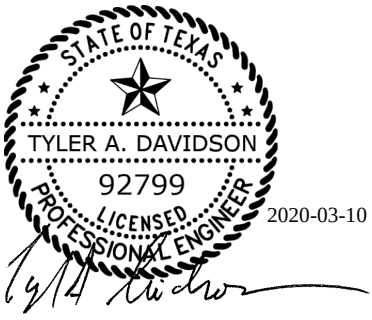
END ADDENDUM 1

This Addendum, is (45) pages in its entirety.

Attachments:
General Wage Decision Number 20200231 (rev. 02/14/2020) (7 pages)
Exhibit "C" Updated Security Procedures (rev 03/04/2020) (3 pages)
Revised Section 15163, Lineshaft Deep Well Pumps (14 pages)
New Section 16361A, Medium Voltage Load Interrupter Switchgear (6 pages)
New Section 16770, Lightning Protection Systems (4 pages)
Revised Plan Sheets C-1.0, E-1.1, E-1.2, and E-5.1

MICRON WELL FIT OUT P2
SAWS Job No. 16-6004
SAWS Solicitation No. CO-00315

ADDENDUM NO. 1



WSP USA, Inc
Texas Firm #2263

Sections 01504 and 15163

MICRON WELL FIT OUT P2
SAWS Job No. 16-6004
SAWS Solicitation No. CO-00315

ADDENDUM NO. 1

03/10/2020

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

Sheet S-2.0

MICRON WELL FIT OUT P2
SAWS Job No. 16-6004
SAWS Solicitation No. CO-00315

ADDENDUM NO. 1

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

Sheet C-10.0

"General Decision Number: TX20200231 02/14/2020

Superseded General Decision Number: TX20190231

State: Texas

Construction Type: Building

County: Bexar County in Texas.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.80 for calendar year 2020 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.80 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2020. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate,if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/03/2020
1	02/14/2020

ASBE0087-014 01/01/2018

	Rates	Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR (Duct, Pipe and Mechanical System Insulation)	$ 22.72	10.02

BOIL0074-003 01/01/2017

	Rates	Fringes
BOILERMAKER	$ 28.00	22.35

ELEC0060-003 06/01/2019

	Rates	Fringes
ELECTRICIAN (Communication Technician Only)	$ 22.55	9%+5.45

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* ELEC0060-004 06/01/2019

	Rates	Fringes
ELECTRICIAN (Excludes Low Voltage Wiring)	$ 28.60	18%+5.45

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* ELEV0081-001 01/01/2020

	Rates	Fringes
ELEVATOR MECHANIC	$ 41.90	34.765

FOOTNOTES:

A. 6% under 5 years based on regular hourly rate for all hours worked. 8% over 5 years based on regular hourly rate for all hours worked.

B. Holidays: New Year's Day; Memorial Day; Independence Day; Labor Day; Thanksgiving Day; Friday after Thanksgiving Day; Christmas Day; and Veterans Day.

ENGI0450-002 04/01/2014

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
Cranes	$ 34.85	9.85

IRON0066-013 06/01/2019

	Rates	Fringes
IRONWORKER, STRUCTURAL	$ 22.70	6.73

IRON0084-011 06/01/2019

	Rates	Fringes
IRONWORKER, ORNAMENTAL	$ 24.42	7.12

PLUM0142-009 08/07/2019

	Rates	Fringes
HVAC MECHANIC (HVAC Electrical Temperature Control Installation Only)	$ 30.25	13.36
HVAC MECHANIC (HVAC Unit Installation Only)	$ 30.25	13.36

PIPEFITTER (Including HVAC Pipe Installation).....$ 31.05 13.76
Including HVAC Pipe Installation
PLUMBER (Excludes HVAC Pipe Installation).....$ 31.05 13.76
Excludes HVAC Pipe Installation

SFTX0669-002 04/01/2019

	Rates	Fringes
SPRINKLER FITTER (Fire Sprinklers)	$ 29.53	21.27

SHEE0067-004 06/01/2019

	Rates	Fringes
Sheet metal worker		
Excludes HVAC Duct Installation	$ 26.81	16.80
HVAC Duct Installation Only	$ 26.81	16.80

SUTX2014-006 07/21/2014

	Rates	Fringes
BRICKLAYER	$ 22.15	0.00
CARPENTER (Acoustical Ceiling Installation Only)	$ 17.83	0.00
CARPENTER (Form Work Only)	$ 13.63	0.00
CARPENTER, Excludes Acoustical Ceiling Installation, Drywall Hanging, Form Work, and Metal Stud Installation	$ 16.86	4.17
CAULKER	$ 15.00	0.00
CEMENT MASON/CONCRETE FINISHER	$ 22.27	5.30
DRYWALL FINISHER/TAPER	$ 13.81	0.00
DRYWALL HANGER AND METAL STUD INSTALLER	$ 15.18	0.00
ELECTRICIAN (Low Voltage Wiring Only)	$ 20.39	3.04
IRONWORKER, REINFORCING	$ 12.27	0.00
LABORER: Common or General	$ 10.75	0.00
LABORER: Mason Tender - Brick	$ 11.88	0.00

LABORER: Mason Tender - Cement/Concrete	$ 12.00	0.00
LABORER: Pipelayer	$ 11.00	0.00
LABORER: Roof Tearoff	$ 11.28	0.00
LABORER: Landscape and Irrigation	$ 8.00	0.00
OPERATOR: Backhoe/Excavator/Trackhoe	$ 15.98	0.00
OPERATOR: Bobcat/Skid Steer/Skid Loader	$ 14.00	0.00
OPERATOR: Bulldozer	$ 14.00	0.00
OPERATOR: Drill	$ 14.50	0.00
OPERATOR: Forklift	$ 12.50	0.00
OPERATOR: Grader/Blade	$ 23.00	5.07
OPERATOR: Loader	$ 12.79	0.00
OPERATOR: Mechanic	$ 18.75	5.12
OPERATOR: Paver (Asphalt, Aggregate, and Concrete)	$ 16.03	0.00
OPERATOR: Roller	$ 12.00	0.00
PAINTER (Brush, Roller and Spray), Excludes Drywall Finishing/Taping	$ 13.07	0.00
ROOFER	$ 12.00	0.00
TILE FINISHER	$ 11.32	0.00
TILE SETTER	$ 14.94	0.00
TRUCK DRIVER: Dump Truck	$ 12.39	1.18
TRUCK DRIVER: Flatbed Truck	$ 19.65	8.57
TRUCK DRIVER: Semi-Trailer Truck	$ 12.50	0.00
TRUCK DRIVER: Water Truck	$ 12.00	4.11

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

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

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

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

Union Rate Identifiers

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

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

Survey Rate Identifiers

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

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

Union Average Rate Identifiers

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

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

WAGE DETERMINATION APPEALS PROCESS

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

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

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

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

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

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

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

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

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

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

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

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END OF GENERAL DECISION"

Exhibit "C"
SECURITY PROCEDURES

If work will be conducted on SAWS property, on SAWS infrastructure, on a SAWS customer's property, or involve any SAWS networks, or any SAWS facility, the Contractor shall provide background screening information of their employees and sub-contractors to CastleBranch, the SAWS-approved vendor of background screening services, at sawsbackgroundcheck@castlebranch.com. Any person found to have an unacceptable background check will not be allowed to perform work under this Contract (however, at SAWS's sole discretion, a waiver may be given by SAWS Security for an unacceptable finding, provided that it must first be approved and signed off on by the Director of SAWS Security). Any sub-contractors performing work must also receive a background screening by CastleBranch. Contractor shall be responsible for the accuracy of information on the background screening information sent to sawsbackgroundcheck@castlebranch.com. For further questions about background screening, call CastleBranch at 910-679-2979 or 888-723-4263 ext. 7857 and advise them the Contractor is working for SAWS. Once background screening is approved by SAWS Security, Contractor must also complete a Project Contractor Data Form ("PCDF"). The PCDF will be sent to securitygroup@saws.org. The PCDF is required for the Contactor and its sub-contractors to receive the required badges and parking tags necessary to fulfill the work under this Contract. The PCDF must be sent electronically to securitygroup@saws.org.

Each employee and agent of Contractor shall obtain a SAWS photo identification badge (a "Contractor's Badge") and parking tag prior to any work on SAWS property or asset, which shall be used only for purposes necessary to perform the work under this Contract. SAWS Badge Office hours are Monday, Wednesday and Friday from 9:00am to 12:00pm, excluding SAWS holidays (hours are subject to change). SAWS Security staff can be contacted at (210) 233-3177 or (210) 233-3338. Once the Project is completed, the Contractor shall return all Contractor Badges and parking tags to the Security Office. A Contractor who does not return the

Contractor Badges or parking tags is not in compliance with these procedures.

SAWS facilities require a SAWS employee to physically escort the Contractor at all times. SAWS may, at its sole discretion, waive the escort requirements if the PCDF and a "clean" background screening from CastleBranch are approved. Waiver of the escort requirement shall only be through a written correspondence to Contractor from SAWS Security.

Sub-contractors must always be under escort of Contractor while performing work on any SAWS property or asset. Sub-contractors must display the Contractor's Badge at all times while working on any SAWS property or asset. Sub-contractors are required to complete a background screening and be listed on the PCDF regardless of receiving a Contractor's Badge. The Contractor is solely responsible for the actions of its employees, agents, sub-contractors and consultants.

Contractor shall advise their SAWS Project Manager/Inspector of any employee terminations or changes to personnel performing work under this Contract, and the Contractor shall immediately turn in any and all Contractor's Badges and/or parking tags of employees or agents who are terminated or no longer performing work under this Contract. If Contractor becomes aware of any changes in the information contained in the PCDF or the background screening information, Contractor shall immediately notify the SAWS Project Manager/Inspector and provide an updated PCDF to securitygroup@saws.org and background screening information to sawsbackgroundcheck@castlebranch.com.

Contractor is responsible for being in compliance with SAWS Security requirements and for maintaining security of SAWS property, infrastructure, SAWS customer's property, networks, and facilities for the length of the Project. Security incidents must be reported to SAWS Security immediately at (210) 233-3338.

If the Contractor plans to leave the site unsecure or open during the Project, they must provide a SAWS-approved security guard to monitor ingress and egress to the SAWS site.

If Contractor takes any action that diminishes the security of a SAWS site, Contractor will be responsible for providing additional security requirements at its expense. Some examples of additional requirements that SAWS may require include hiring of SAWS approved security guards, temporary fencing, mobile Closed Circuit Television Monitoring trailer(s), or extra lighting. Notwithstanding anything herein to the contrary, any provisions in these Security Procedures that may appear to give SAWS the right to direct Contractor as to details of doing any work under this Contract or to exercise a measure of control over any security measures or such work shall be deemed to mean that Contractor shall follow the desires of SAWS in the results of the work or security measures only.

Advance coordination by Contractor with SAWS Security for these security requirements is necessary to ensure no delays with timely performance of work. Any other provision of this Contract notwithstanding, in the event Contractor fails to comply with SAWS Security requirements, SAWS may, with no penalty, claim of any nature (including but not limited to breach of contract) against SAWS by the Contractor:

- Issue a Work Stoppage Order until the security violation (s) are remedied
- Ask any unidentified or improperly identified person or equipment to leave SAWS site immediately and not return until items or deficiencies are remedied to SAWS's satisfaction.

Section 15163

LINESHAFT DEEP WELL PUMPS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Requirements for furnishing, installing and testing a deep well lineshaft pump at the site indicated on Drawings. The complete installation to include new lineshaft pump, steel discharge head, column pipe, shafting, centering spiders, air line and associated strainer and suction adapter to affect the complete operational water well pumping system.

1.02 UNIT PRICES

A. No separate payment will be made for Work as required by this Section. Price for pump equipment is included as Item 2 in Document BP – Bid Proposal and adjusted as necessary with Item 16.

1.03 ORDERING OF PUMP AND MOTOR

A. The pump and motor shall not be ordered without written instructions or approval of Owner. Once Owner approves the submittals and instructions are received, the Contractor shall order the pump and motor as soon as practicable. No pump bowl assembly shall be assembled or released for shipment without the written approval of the Owner.

1.04 REFERENCES

A. The pumping unit shall conform to the latest edition of each of the following standards as applicable, unless otherwise specifically stated in this section. Pumps shall comply with all local and state sanitary and safety regulations.

1. ANSI B58.1 (AWWA E101) - Vertical Turbine Pumps, Lineshaft and Submersible Types.
2. The Hydraulic Institute - Centrifugal Pump Section.

1.05 SUBMITTALS

A. Submittals shall conform to requirements of Section 01330 - Submittal Procedures.

B. Submit complete descriptive matter and data showing details of construction and other pertinent information pertaining to the equipment the Contractor proposes to furnish including rated capacities, weights, accessories, electrical data and wiring diagrams.

C. Submit the following pump and motor information to Owner for approval, prior to Owner issuing approval for ordering.

1. Make of pump and pump designation _____
2. Number of stages for present conditions _____
3. O.D. of bowls, inches _____
4. I.D. of column and wall thickness, inches _____
5. O.D. of column couplings, inches _____
6. Length of column sections, feet and inches _____
7. Calculated thrust at design condition for present operation, pounds _____
8. Motor thrust bearing capacity at specified RPM, pounds _____
9. Motor thrust bearing life, years _____
10. Brake horsepower at design condition for present operation, HP _____
11. Field efficiency of pump at design condition for present operation, percent _____
12. Wire-to-water efficiency at design condition for present operation, percent _____
13. Make of motor and rated horsepower _____
14. Speed of motor, RPM _____
15. Motor efficiency, percent:
    a. Half load _____
    b. Three-quarter load _____
    c. Full load _____
16. Motor power factor, percent:
    a. Half load _____

b. Three-quarter load _____

c. Full load _____

D. Submit curves for Owner approval showing guaranteed field performance of the pump the Contractor proposes to furnish based on present operating conditions. Curves shall show head-capacity, brake horsepower, motor input horsepower, pump efficiency, and overall (wire-to-water) efficiency. Note that field and not laboratory performance is to be shown on curves at scales subject to approval of Owner.

E. Submit installation, operation and maintenance manuals, parts description, and similar instruction books. Provide three copies of each.

1.06 EXTRA MATERIALS

A. Furnish for each pump:

1. Complete set packing.
2. Complete set bearings.
3. Complete set gaskets and O-ring seals.
4. Complete set of shaft sleeves.
5. Complete set keys, dowels, pins, etc.
6. One complete set of any special tools required to dismantle pump.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Floway Pumps

B. Goulds Pumps

C. Peerless Pumps

D. Simflo Pumps

E. Flowserve Pumps

2.02 GENERAL

A. Pumps to be of the deep well, multi-stage, vertical turbine, water lubricated, lineshaft type. Column pipe friction losses and losses of strainer, discharge elbow and pump are not included in scheduled total field head.

2.03 PUMP SELECTIONS

A. Select pumps conservatively for scheduled conditions. Furnish pumps which have highest available efficiencies, with peak efficiency at or near rated conditions. Select pumps that have a steep head-capacity curve within 300 gpm of rated conditions and continuously rising head from runout to shutoff.

B. The selected pump shall have a non-witness factory test performed prior to shipment. Furnish the factory test report that includes test data sheets, curve test results, performance test logs, certified by a registered professional engineer. The factory test shall be performed at the specified RPM of the motor.

C. Provide motors of the type and speed scheduled. Select motors that are not overloaded throughout the entire range of pump operation.

D. Operating Conditions

1. Definitions:
    a. Total field head, or field head, as stipulated in these Specifications is the sum of the pressure head, in feet, at the center line of the pump discharge plus the vertical distance, in feet, from the center line of the pump discharge to the pumping level in the well.
    b. Brake horsepower is the horsepower supplied to the shaft of an installed pump by the driver.
    c. Field efficiency of an installed pump is the ratio of output power to input power supplied to the shaft, expressed as percent.
    d. Overall efficiency of a pump installation is the ratio of the output power to input power supplied to the driver, expressed as percent.
    e. Setting is the normal distance from the base plate to the top of the bowl assembly.
2. Design Condition:
    a. The pump is to be designed to meet the present operating conditions given herein.
    b. The Contractor is to state the number of stages required for the present conditions.
    c. Curves showing guaranteed overall field performance of the pump offered for the present operating conditions shall be submitted to Owner for approval before ordering the pump. All components of the pump to be installed under this contract shall be designed to withstand 1-1/2 times shutoff pressure developed by the pump with the stages and column setting required for the operating conditions and with the static water level no lower than 200 feet. Any balancing of the impellers for high thrust conditions required by the future operating conditions shall be incorporated in the construction of the present pump before it is assembled.

E. Provide pumps to meet the following anticipated capacities and conditions:

1. Micron Well 4:

a.	Design pumping rate, gpm	7,000
b.	Estimated static water level, feet	160
c.	Estimated pumping water level, feet	171
d.	Estimated discharge head above ground, feet	40
e.	Total Dynamic Head, feet	221
f.	Maximum diameter of pump bowls, inches	14
g.	Column pipe setting, feet	260
h.	Minimum column pipe diameter, inches	18
i.	Minimum column pipe wall thickness, inches	0.375
j.	Minimum pump shaft diameter, inches	2-3/16
k.	Minimum motor name plate, horsepower	600
l.	Motor speed, rpm	1,800
m.	Motor voltage, volts	4,160
n.	Minimum pump efficiency at design pumping rate, percent	80

2.04 COMPONENTS (Additional Requirements in Attachment A)

A. Pump Head: The pump head shall be fabricated steel, with Class 150-pound ANSI flange. Design head to support pump set to a depth of at least 400 feet, column, motor and maximum hydraulic thrust with 25 percent reserve. Head to have sufficient space so that coupling can be installed below motor for easy motor removal. If unit weighs more than 28,000 pounds add steel lifting plate fitted with steel base plate. The discharge head shall be equipped with two openings herein described: 1-1/2-inch top tapped for air-line tubing. The head shall also be tapped for drain and bearing pre-lube openings. Holes in the discharge head also shall be provided for the anchor bolts set in the pump foundation. The column pipe will be 18-inch diameter while the discharge piping will be 20-inch diameter. The pump head shall be the same diameter and bolt pattern as the existing heads on the wells at the water plant.

B. Column Pipe: The total length of the column assembly on each pump shall be as specified from the base of the discharge head to the top of the bowl assembly. The column pipe shall be API-5L or ASTM A 53, Grade B seamless prime pipe. “Limited service” or “Mill Reject” pipe will not be acceptable. The column pipe shall be furnished in interchangeable sections not exceeding 10 feet in length and shall be connected with 150-pound flanges. Pipes shall be connected to insure perfect alignment after assembly. The flanges shall be designed to provide the required strength, with ample safety factor should the pump be lowered and stages added to meet future operating conditions. The top column and shall be factory machined of the proper length so that no cutting or machine work in the field in required to set the pump. The column pipe shall be coated and lined with an NSF approved fusion-bonded epoxy.

C. Shafting: The line shaft shall be of stainless steel A276, Grade 416 turned, ground and polished. The shaft diameter shall be of sufficient size for the required pump horsepower. The shafting shall be supplied in interchangeable, threaded sections not over 10 feet long, with the ends having 8 threads per inch with 3/16-inch taper per foot thread and faced parallel to butt against the Hi-Lube Vesconite centering bearings to form accurate alignment. The shaft sections shall be connected with extra strong steel couplings machined from solid bar stock which must be of ample dimensions to provide a connection of greater strength than the shaft itself. Shafts must be true and straight before and after installation.

D. Bowl Assembly:

1. Pump bowls, including discharge and suction cases, shall be of close-grained ASTM A 48-83, Class 30, cast iron. Bowls shall have bronze sleeve type bushings to support and guide the shaft. Bushing material shall be bronze, ASTM B 584 alloy C903. Impeller shall be of the enclosed type, ASTM B148-958 nickel-aluminum-bronze, accurately cast, machined, dynamically balanced and filed for optimum performance and minimum vibration. The impeller shall be single keyed or securely fastened to the bowl shaft with taper collets of Grade 416 stainless steel. The bowls shall have wear rings matching the impeller material of ASTM B148-958 nickel-aluminum-bronze.
2. The pump shaft shall be of stainless steel A276, Grade 416 turned, ground and polished. It shall be supported by bronze bearings of ASTM B 584 alloy C903 above and below each impeller. The size of the shaft shall be no less than that determined by ANSI/AWWA Specifications E101, Section A4.3, paragraph 4.3.3.

E. Suction Pipe: five to ten feet of steel suction pipe, same size as pump suction fitting.

F. MOTOR: The pump shall be driven by a premium efficiency, 4,160-volt, 3 phase, 60 hertz, nominal 1,800 rpm, direct-connected vertical solid shaft induction motors with 1.15 service factor, shielded, drip-proof, totally enclosed fan cooled (TEFC) enclosure for outdoor operation with non-reverse ratchet. The motor leads shall be ASTM B 173, Class G stranded copper and insulation shall be Class H, Class B temperature rise not to exceed insulation temperature rating when operating at service factor rating and 40^{o}C ambient according to NEMA M.G. 1-1978-12.42. Wiring insulation to include extra dips and bakes for Gulf Coast high humidity. Conduit box shall be a cast iron, water-tight, and weatherproof. The motors are to be equipped with 120-volt space heaters and 120-ohm nickel stator RTD’s for winding and bearing temperature protection.

The bearings in the motors shall be ball or spherical roller oil-lubricated. The thrust bearing in each of the vertical h shaft motors shall have an external thrust capacity capable of carrying 1.5 times the weight of all rotating parts of the pump plus the

hydraulic load imposed by the impellers when the pump is operating at the capacity and total field head given for the future conditions. Radial and thrust bearings are to have a L-10 life of 100,000 hours and to have a bearing housing large enough to hold sufficient lubricant to minimize the need for frequent lubrication. Facilities are to be provided for adding new oil or grease and draining old oil without major motor disassembly.

Minimum motor efficiency to be 95.0 percent at full load. The minimum power at rating is to be 0.85.

The motor is to be equipped with a stainless steel name plate securely attached to the motor with stainless steel screws. All data is to be permanently stamped into the name plate including the motor horsepower, rpm, NEMA design, phase, hertz, service factor, ambient temperature, frame size, duty, class of insulation, locked KVA code, full load amps, locked rotor amps, model and catalogue number, bearing identification by AFBMA number and NEMA nominal efficiency. The motor shall be the same diameter and have the same bolt pattern as the motors on the existing wells at the water plant.

The motors shall be manufactured by Nidec (U.S. Motors), General Electric, TECO-Westinghouse, or Siemens. No substitutions accepted.

2.05 PUMP FOUNDATION

A. The new pump foundation shall be of reinforced cast in place concrete as shown on the drawings.

B. If it is necessary to make any change to the pump foundation to install a pump, the Contractor shall obtain prior approval of Owner and shall make the change at his own expense.

2.06 AIR-LINE TUBING

A. The air-line tubing shall be type 1005-44204 Dekoron, 1/4-inch O.D., single line, stainless steel tubing with 0.032-inch wall thickness, PVC coating, as manufactured by Eaton Control Systems, or must meet or exceed the requirements of this specification. The run of air-line tubing shall be one continuous length from end to end without any splice or joint.

PART 3 EXECUTION

3.01 INSTALLATION

A. Pump shall be installed in accordance with manufacturer's written instructions by a water well contractor with specific experience installing lineshaft deep well pump.

B. Equipment will be installed in accordance with manufacturer's instructions, if included, using lifting lugs, as provided, or by slings attached to the equipment. No temporary lifting lugs shall be utilized. Equipment shall be handled with sufficient care to prevent damage. Slings shall have adequate protection to prevent marring the surfaces of the equipment.

C. Air-Line Tubing: The air-line tubing shall be one unbroken continuous length from the bowl assembly discharge case through the discharge head base to the air-line gauge assembly. The tubing shall be secured to each column pipe joint, a minimum of one location, utilizing vinyl filament tape. The tubing shall be secured to the top side of the discharge head base utilizing a CGB connector, straight male thread, steel finish, 1-inch I.P. thread size, complete with gland nut and neoprene bushing (catalog No. CGB 293) as manufactured by Crouse-Hinds, or must meet or exceed the requirements of this specification.

D. Air-Line Gauge: Marshalltown, 4-1/2-inch, dual scale, calibrated in feet of water and pounds per square inch.

E. Air Pump: Provide hand air pump and Schraeder or Deming snifter valve.

3.02 EFFICIENCY AND TESTING

A. The overall wire-to-water efficiency of the installed pump and motor shall be determined by measurement of capacity, field head, and kilowatt input to the motor. An overall wire-to-water efficiency test shall be conducted by the Contractor on the pump after installation and before final acceptance.

The Contractor shall supply all equipment, instruments, and labor necessary for such test and the Owner's representative shall be present during the test.

B. Readings shall be taken at three points from about 70 percent of design capacity to maximum capacity for a 3-hour period. A watt-meter shall be used to determine kilowatt input to the motor. Electric current shall be measured on the incoming power side.

C. Contractor shall prepare a field head-capacity curve from test data and submit four copies of it to Owner. Any deficiencies in the head-capacity or efficiency or operation of a pump and motor shall be corrected by the Contractor at its expense prior to acceptance.

D. Vibration Testing:

1. Conducted at startup by an independent third party agreed to by Owner and Contractor.
2. Test with unit installed and in normal operation, and discharging to the connected piping systems at rates between low discharge head and high discharge head conditions, and with actual building structures and

foundations provided shall not develop vibration exceeding 80 percent of the limits specified in HIS 9.6.4.

3. If unit exhibits vibration in excess of limits specified, adjust or modify as necessary. Unit that cannot be adjusted or modified to conform as specified shall be replaced.

3.03 WARRANTY

A. The pump manufacturer shall warrant the units being supplied to Owner against defects in workmanship and material for a period of two years after the date of the Conditional Letter of Acceptance. The warranty shall be in printed form and apply to all units.

3.04 STERILIZATION

A. Disinfection procedures shall be in accordance with AWWA Standards for Disinfection of Wells--ANSI/AWWA C654-87.

B. Samples for bacteriological analysis shall be collected in a sterile container at the pump discharge, and a test made for coliform organisms. After sterilization, the well shall be pumped at open discharge until at least 500,000 gallons of water have been pumped before the samples are first sample is collected. The samples shall be collected on three consecutive days and shall be tested for coliform organisms at a testing laboratory approved by Owner. Samples shall be collected and analyzed on three successive days without chlorination between sampling. If any coliform organisms are found present in any of the samples, the Contractor shall re-sterilize the pump and well and have the water resampled as stated above until such time as no coliform organisms are found present in the water samples collected after water has been pumped to remove chlorine residual from the well after the last well chlorination prior to collecting the first sample and two additional samples are collected on three successive days following sterilization. All expenses of sterilization of the pump and analyses for coliform organisms shall be borne by the Contractor.

C. The water discharged by the pump following disinfection shall be dechlorinated to a level of 2.0 or less mg/l chlorine before it is allowed to leave the site.

3.05 MANUFACTURER'S SERVICES

A. Manufacturer's Representative: Present at Site or classroom designated by Owner, for minimum person-days listed below, travel time excluded:

1. 2 person-days for installation assistance and inspection.

2. 2 person-days for functional and performance testing and completion of Manufacturer's Certificate of Proper Installation.

3. 1/2 person-day for prestartup classroom or Site training.

PUMP DIMENSIONS SCHEDULE
(Anticipated initial conditions)

Pumping Rate, gpm	7,000
Static Level, ft.	160
Pumping Level, ft.	171
Column Pipe Diameter, in.	18
Column Pipe Setting, ft.	270
Air-Line Tubing, ft.	270
Lineshaft Motor, hp	600
Voltage, volts	4,160
Maximum rpm	1,800
Minimum Bowl Efficiency, percent	80
Maximum Outside Diameter of Pump Bowls, in.	22

END OF SECTION

Attachment A

VERTICAL TURBINE PUMP STANDARDS

1. ACCEPTABLE PUMP MANUFACTURERS
    a. Floway
    b. Goulds
    c. Peerless
    d. Simflo
    e. Flowserve
2. ACCEPTABLE MOTOR MANUFACTURERS
    a. TECO-Westinghouse
    b. Siemens
    c. Nidec (U.S. Motors)
    d. General Electric
3. MATERIALS
    a. Anti-Vortex Basket
        i. AISI Type 316 stainless steel
    b. Pump Bowls
        i. Cast iron, ASTM A48, Class 30
    c. Bowl Wearing Ring
        i. ASTM B148-958 nickel-aluminum-bronze
    d. Impeller
        i. ASTM B148-958 nickel-aluminum-bronze
        ii. The impeller shall be enclosed type.
        iii. The impeller shall be statically and dynamically balanced.
    e. Impeller Wearing Ring
        i. Match impeller material
    f. Bowl Assembly Shaft
        i. High Grade Alloy 416 Stainless Steel
    g. Pump Shaft Bearings
        i. Bronze, ASTM B584-903, water lubricated
    h. Lineshaft
        i. High Grade Alloy 416 Stainless Steel
    i. Open Lineshaft Bearings

i. HI-LUBE VESCONITE BEARINGS

j. Mechanical Seals
   i. Metal parts – 316 Stainless steel
   ii. Rotating face – ceramic or silicon carbide
   iii. Stationary face – carbon

k. Discharge Head
   i. The discharge head shall have flanged end discharged conforming ANSI/ASME standards.
   ii. Tapped drain and bearing pre-lube openings shall be provided.
   iii. Pump discharge head shall be equipped with lifting lugs.
   iv. Pump discharge head shall include ports for drains and airlines.

l. Pump Column
   i. The pipe shall conform to ASTM A53 Grade A Schedule 40 pipe.
   ii. The Column pipe shall be coated and lined with an NSF approved fusion-bonded epoxy.
   iii. Column sections shall be furnished in interchangeable sections and be no greater than 10 feet in length.

m. Drawdown Gage
   i. A .25 inch OD Dekoron Type 1005 plastic coated single-line Type 316 stainless steel tube shall be provided for the purpose of measuring drawdown.
   ii. The gauge shall be graduated in feet of water.
   iii. The gauge shall be Marshalltown Figure 44K

4. PUMP EFFICIENCY
   a. Minimum Bowl Efficiency shall be 80%.
5. ACCESSORIES
   a. Lifting Lugs
   b. Gauges shall be equipped with a shutoff cocks and snubbers to conform to ASME B40.1. Trerice or Ashcroft, 4" size, liquid filled, stainless steel material.
   c. Nameplate. 16-gauge stainless steel with 1/4-inch die-stamped equipment tag number securely mounted in a readily visible location with manufacturer name, model number, serial number, gpm at rated head, rpm, impeller size, pertinent bearing and bearing lube information, and date of manufacture.
   d. Each pumping unit shall be provided with a suitable backstop, anti-reverse device.
   e. Metal equipment guards shall be provided on all equipment driven by open shafts.
6. COATINGS
   a. Interior Finish. Pump interior must be primed with an NSF approved product:

Belzona 1341 N (25 mils minimum total DFT) or fusion bonded epoxy (25 mils minimum DFT)

b. Exterior Finish. Two coats at 4-6 mils nominal dry film thickness per coat. Epoxy primer & polyurethane finish coat.

7. MECHANICAL SEALS
   a. Split-type cartridge seal with Viton O-ring gaskets and carbon stationary face.
   b. Flex-a-Seal Style 85
   c. Chesterton Style 442
   d. John Crane Type I
8. SHOP TESTS
   a. All tests and test reports shall be made in conformity with the requirements and recommendations of the Hydraulic Institute Standards. Acceptance testing shall be Table 14.6.3.4 Grade 1B.
   b. Hydrostatic test of pressure-containing components. The minimum hydrostatic test pressure shall be 1.5 times shutoff head plus max suction pressure.
   c. Noise test.
   d. Vibration test.
   e. Motor test per IEEE 112.
   f. Each pump shall be tested at the factory for capacity, power requirements, and efficiency at specified rated head, evaluated head, shutoff head, operating head extremes, and at as many other points as necessary for accurate performance curve plotting.
9. AC INDUCTION MOTORS
   a. Maximum ambient temperature not greater than 40 degrees C.
   b. Maximum motor speed shall be 1800 rpm.
   c. Motor type shall be solid shaft.
   d. Service Factor shall be 1.15 minimum.
   e. Suitable for full voltage direct-on-line starting.
   f. The motor shall be rated NEMA Premium in accordance with NEMA MG1 9.21.4.1.
   g. The motor manufacturer's nameplates shall be engraved or embossed on stainless steel and fastened to the motor frame with stainless steel screws or drive pins.
   h. The motor nameplate horsepower shall be equal to or greater than the maximum load which will be imposed on it by the pump when operating at any point in the operating head range.
   i. Motors shall have an oversized, gasketed, cast iron conduit (terminal) box, field adjustable in 90- degree increments unless the box contains equipment, diagonally split with tapped NPT threaded conduit entrance hole, and shall exceed the minimum volumes defined in IEEE 841-2001.

j. Class H insulation system.
k. Totally Enclosed Fan Cooled (TEFC) enclosure.
l. Locked Rotor Code shall be "G".
m. Rotor cage shall be constructed of copper or copper alloy bars.
n. Motor leads shall be made of ASTM B 173, class G stranded copper.
o. Bearings shall have a minimum 100,000 hours L-10 bearing life as defined in AFBMA 9 and 11. Oil reservoir with oil level sight glass shall be provided. Sight glass shall be marked with the proper static and operating oil levels.
p. The noise level as measured by IEEE Standard 85, the maximum noise level shall be 85 dBA at 1 meter.
q. Motors shall be furnished with a space heater.
r. All motors shall be provided with 120-ohm nickel stator RTD's for winding and bearing temperature protection.
s. Motor efficiency shall not be less than 95% and power factor not less than 85% when operating at maximum speed, service factor load and rated voltage and frequency.
t. Lightning arrester (4.5 Kv) is required to limit the magnitude of the transient voltage spike.
u. Surge capacitor (0.5 microfarad) is required to limit the rate of rise of voltage.
v. Motors shall have a maximum temperature rise, by resistance, of 80°C (Class B) for continuous operation at rated load.
w. Motors shall be provided with an anti-reverse ratchet to prevent reversing due to phase reversal or backspin at shutdown.
x. Rotors shall be dynamically balanced. Vibration displacement shall not exceed 0.001 inches peak-to-peak.
y. A fabricated steel coupling guard shall be provided.
z. Certified test reports for motor factory performance tests shall be provided.

SECTION 16361A

MEDIUM VOLTAGE LOAD INTERRUPTER SWITCHGEAR

PART 1 GENERAL

1.01 SCOPE

A. The Contractor shall furnish and install the medium voltage load interrupter switchgear as specified herein and as shown on the contract drawings.

1.02 RELATED SECTIONS

1.03 REFERENCES

A. The medium voltage load interrupter switchgear and all components shall be designed, manufactured and tested in accordance with the latest applicable standards as follows:
   1. ANSI/IEEE C37.20.3
   2. ANSI/IEEE C37.20.4
   3. ANSI C37.22
   4. ANSI C37.57, C37.58
   5. NEMA SG5
   6. NEMA SG6
   7. CSA 22.2 No.31-M89 (5/15 kV ratings only)
   8. EEMAC G8-3.3

B. Listing by Underwriters Laboratories (UL) or Canadian Standards Association (CSA) shall be provided for 5 kV or 15 kV class medium voltage load interrupter switchgear.

1.04 SUBMITTALS – FOR REVIEW/APPROVAL

A. The following information shall be submitted to the Engineer:
   1. Master drawing index
   2. Front view elevation
   3. Floor plan
   4. Top view
   5. Single line
   6. Nameplate schedule
   7. Component list
   8. Conduit entry/exit locations
   9. Assembly ratings including:
      a. Short-circuit rating
      b. Voltage

c. Continuous current
d. Basic Impulse Level

10. Major component ratings including:
    a. Voltage
    b. Continuous current
    c. Interrupting ratings
11. Cable terminal sizes

B. Where applicable or required by the Engineer the following additional information shall be submitted to the Engineer:

1. Bus duct connection
2. Connection details between close-coupled assemblies
3. Composite floor plan of close-coupled assemblies
4. Electrical schematic diagram
5. Key interlock scheme drawing and sequence of operations
6. Descriptive bulletins
7. Product data sheets

1.05 SUBMITTALS – FOR CONSTRUCTION

A. The following information shall be submitted for record purposes:

1. Final as-built drawings and information for items listed in Paragraph 1.04, and shall incorporate all changes made during the manufacturing process
2. Wiring diagrams
3. Certified production test reports
4. Installation information including equipment anchorage provisions
5. Seismic certification as specified

1.06 QUALIFICATIONS

A. The manufacturer of the assembly shall be the manufacturer of the major components within the assembly.

B. For the equipment specified herein, the manufacturer shall be ISO 9001 or 9002 certified.

C. The manufacturer of this equipment shall have produced similar electrical equipment for a minimum period of five (5) years. When requested by the Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

1.07 DELIVERY, STORAGE AND HANDLING

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

B. Each switchgear assembly shall be split into shipping groups for handling as indicated on the drawings or per the manufacturer's recommendations. Shipping groups shall be designed to be shipped by truck, rail or ship. Shipping groups shall be bolted to skids. Accessories shall

be packaged and shipped separately. Each switchgear shipping group shall be equipped with lifting eyes for handling solely by crane.

1.08 OPERATION AND MAINTENANCE MANUALS

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

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Eaton

B. Square D

C. Siemens

The listing of specific manufacturers above does not imply acceptance of their products that do not meet the specified ratings, features and functions. Manufacturers listed above are not relieved from meeting these specifications in their entirety. Products in compliance with the specification and manufactured by others not named will be considered only if pre-approved by the Engineer ten (10) days prior to bid date.

2.02 RATINGS

A. Switchgear assembly ratings shall be as follows:

1.	Nominal System Voltage	5 kV three-phase three wire
2.	System Grounding	solid
3.	Main Cross Bus Continuous Current	600 A
4.	Maximum Design Voltage	5 kV
5.	BIL	60 kV
6.	Main Cross Bus Momentary Current (10 Cycle)	61 kA Asymmetrical RMS
7.	Main Cross Bus 2-Second Short Circuit Current	38 kA Symmetrical RMS
8.	Non-Fused Switch (Continuous and Load Break)	600 Amperes
9.	Non-Fused Momentary withstand	40 kA Asym RMS
10.	Non-Fused Switch Fault close (3 times minimum, for 4.76 & 15 kV)	40 kA Asymmetrical
11.	Non-Fused Switch 2-Second Short Circuit Current	25 kA Sym RMS

2.03 CONSTRUCTION

A. The metal-enclosed load interrupter switchgear shall consist of deadfront, completely metal-enclosed vertical sections containing load interrupter switches and fuses (where shown) of the number, rating and type noted on the drawings or specified herein.

B. The following features shall be supplied on every vertical section containing a three-pole, two-position open-closed switch:

1. A minimum 8-inch x 16-inch high-impact viewing window that permits full view of the position of all three switch blades through the closed door. The window shall not be more than 58-inches above the switch pad level to allow ease of inspection
2. The door shall be interlocked with the switch so that:
    a. The switch must be opened before the door can be opened.
    b. The door must be closed before the switch can be closed.
3. A hinged grounded metal barrier that is bolted closed in front of every switch to prevent inadvertent contact with any live part, yet allows for a full-view inspection of the switch blade position
4. Provision for padlocking the switch in the open or closed position
5. Green OPEN, Red CLOSED switch position indicators with the words “Open” and “Closed” in French, Spanish and English
6. A hinged cover with rustproof quarter turn nylon latches over the switch operating mechanism to discourage casual tampering
7. The switch shall be removable from the structure as a complete operational component

C. Vertical section construction shall be of the universal frame type using die-formed and bolted parts. All enclosing covers and doors shall be fabricated from steel with thickness equal to or greater than that specified in ANSI/IEEE C37.20.3. No owner removable hardware for covers or doors shall be thread-forming type. To facilitate installation and maintenance of cables and bus in each vertical section, a split removable top cover and padlockable hinged rear door held closed by bolts shall be provided. A G90 grade galvanized base shall isolate equipment from contact with the concrete pad providing protection from rust. Heavy-duty hot dipped galvanized anchor clips shall be provided to anchor the switchgear to the concrete pad.

D. Each vertical section containing a switch shall have a single, full-length, flanged front door and shall be equipped with two (2) rotary latch-type padlockable handles. Provision shall be made for operating the switch and storing the removable handle without opening the full length door.

E. Each load interrupter switch shall have the following features:
1. Three-pole gang-operated mechanism
2. Manual quick-make, quick-break over-toggle-type mechanism that does not require the use of a chain or a cable for operation, and utilizes a heavy-duty coil spring to provide opening and closing energy
3. The speed of opening and closing the switch shall be independent of the operator, and it shall be impossible to tease the switch into any intermediate position under normal operation
4. Separate main and break contacts to provide maximum endurance for fault close and load interrupting duty
5. Insulating barriers between each phase and between the outer phases and the enclosure
6. A maintenance provision for slow closing the switch to check switch blade engagement and slow opening the switch to check operation of the arc interrupting contacts

2.04 BUS

A. All phase bus conductors shall be tin-plated copper.

B. Ground bus shall be silver-plated copper and be directly fastened to a galvanized metal surface of each vertical section, and be of a size sufficient to carry the rated (2-second) current of the switchgear assembly.

2.05 BUS INSULATION SYSTEM

A. All bus shall be supported utilizing a high strength and high creep support providing 10.5-inch of creep distance between phases and ground. The molded fins shall be constructed of high track resistant cycloaliphatic epoxy.

B. All standoff insulators on switches and fuse mountings shall be cycloaliphatic epoxy.

2.06 WIRING/TERMINATIONS

A. One (1) terminal pad per phase shall be provided for attaching contractor-supplied cable terminal lugs for a maximum of two (2) conductors per phase of the sizes indicated on the drawings. Sufficient space shall be allowed for contractor supplied electrical stress relief termination devices.

B. Small wiring, fuse blocks and terminal blocks within the vertical section shall be furnished as indicated on the drawings. Each control wire shall be labeled with wire markers. Terminal blocks shall be provided for owner's connections to other apparatus.

2.07 ENCLOSURES

A. Enclosures shall be constructed per IEEE/ANSI C37.20.3 Outdoor specifications. (Exceeds NEMA 3R.)

B. Each vertical section shall have a sloped weatherproof roof with labyrinth shaped joints. Use of gasket or caulking to make roof joints weatherproof shall not be permitted. All exterior openings shall be screened to prevent the entrance of small animals and barriered to inhibit the entrance of snow, sand, etc. A minimum of one (1) 250-watt, 120-volt space heater shall be provided in each vertical section. Power for the space heater(s) shall be furnished as indicated on the drawings. The design shall be non-walk-in type.

C. Each vertical section shall be ventilated at the top and bottom, both front and rear, to allow airflow to provide cooling and help prevent buildup of moisture within the structure. The ventilated covers shall be externally removable to allow safe maintenance of the filter media without providing access to live parts.

D. Enclosure shall be Dust Resistant. All ventilated openings shall be filtered to inhibit the ingress of dust. The ventilated covers shall be externally removable to allow safe maintenance of the filter media without providing access to live parts. All external doors and covers shall be gasketed.

2.08 NAMEPLATES

A. A nameplate shall be mounted on the front door of each switch vertical section.

2.09 FINISH

A. Prior to assembly, all enclosing steel shall be thoroughly cleaned and phosphatized. A powder coating shall be applied electrostatically, then fused-on by baking in an oven. The coating is to have a thickness of not less than 1.5 mils. The finish shall have the following properties:

Impact resistance (ASTM D-2794)	60 direct/60 indirect
Pencil hardness (ASTM D-3363)	H
Flexibility (ASTM D-522)	Pass 1/8-inch mandrel
Salt spray (ASTM B117-85 [20])	600 hours
Color	ANSI 61 gray

PART 3 EXECUTION

3.01 FACTORY TESTING

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

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

3.02 FIELD QUALITY CONTROL/FIELD TESTING

A. In accordance with Section 16950, Electrical Testing.

3.03 MANUFACTURER'S CERTIFICATION

A. The Contractor shall provide a qualified factory-trained manufacturer's representative shall certify in writing that the equipment has been installed, adjusted and tested in accordance with the manufacturer's recommendations.

B. The Contractor shall provide three (3) copies of the manufacturer's representative's certification.

3.04 TRAINING

A. The Contractor shall provide a training session for up to five (5) owner's representatives for 2 normal workdays at a job site location determined by the owner.

B. The training session shall be conducted by a manufacturer's qualified representative and consist of instruction on the assembly, switches and major components.

3.05 INSTALLATION

A. The Contractors shall install all equipment per the manufacturer's recommendations and the contract drawings.

B. All necessary hardware to secure the assembly in place shall be provided by the Contractor.

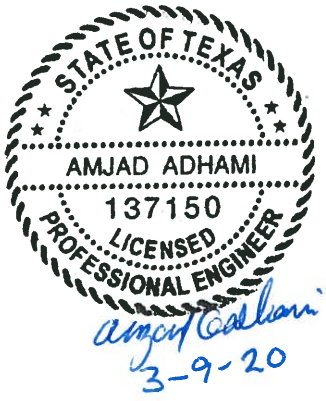
3.06 WARRANTY

A. Manufacturer warrants equipment to be free from defects in materials and workmanship for 2 years from the date of final acceptance. Warranty shall comply with Division 1.

END OF SECTION

SECTION 16770

LIGHTNING PROTECTION SYSTEMS



PART 1 GENERAL

1.01 SECTION INCLUDES

A. Air terminals and interconnecting conductors

B. Grounding and bonding for lightning protection.

1.02 SYSTEM DESCRIPTION

A. Lightning Protection System: System consisting of air terminals on roofs, roof mounted mechanical equipment, bonding of structure and other metal objects, grounding electrodes, and interconnecting conductors.

1.03 SUBMITTALS

A. Shop Drawings:
Provide minimum 1/8" = 1'-0" scale drawings indicating layout of air terminals, grounding electrodes and bonding connections to structure and other metal objects. Include terminal electrode, connections, conductor sizes and termination details.

B. Product Data:
Provide dimensions and bill of materials for each component and include indication of listing in accordance with UL 96.

C. Manufacturers Certificate:
Certify that products meet or exceed specified requirements.

D. As-Builts: Record actual locations of air terminals, grounding electrodes, bonding connections and routing of system conductors in project record documents. Dimension components to permanent structures or column lines. Submit certificate of compliance from LPI and UL's Master Label indicating approval of lightning protection systems.

1.04 REGULATORY COMPLIANCE

A. Materials manufactured within scope of Underwriters Laboratories shall conform to UL Standards and have an applied UL listing mark. Product shall be listed to UL 96 and LPI-176.

1.05 RELATED SECTIONS

A. 16451 GROUNDING

1.06 REFERENCES

A. LPI 175: Lightning Protection Installation Standard.

B. LPI 176: Lightning Protection Systems Material and Components Standard.

C. LPI 177: Inspection Guide for LPI Certified Systems.

D. NFPA 78: Lightning Protection Code.

E. UL 96: Lightning Protection Components.

F. UL 96A: Installation Requirements for Lightning Protection Systems.

1.07 QUALITY ASSURANCE

A. Perform work in accordance with NFPA 78.

B. Perform Work in accordance with UL 96A and provide Master Label.

C. Perform Work in accordance with LPI 175 and provide LPI Certification.

1.08 QUALIFICATIONS

A. Manufacturer: Company specializing in lightning protection equipment with minimum five years documented experience and member of the Lightning Protection Institute.

B. Installer: Authorized installer of manufacturer with minimum five years documented experience and certified by the Lightning Protection Institute.

1.09 COORDINATION

A. Verify that field measurements are as indicated on shop drawings.

B. Coordinate work with roofing and exterior/interior finish installations.

PART 2 PRODUCTS

2.01 COMPONENTS

A. Air Terminals: Copper unless aluminum is required to match roofing materials.

B. Grounding Rods: Copper clad steel.

C. Roof Conductors: Copper, minimum 12 gauge, 28 strands weighing not less than 375 lbs per 1000 feet. Use aluminum conductors if required to match roofing materials.

D. Down Conductors: Copper, minimum 12 gauge, 28 strands weighing not less than 375 lbs per 1000 feet. Use aluminum conductors if required to match roofing materials.

E. Counterpoise conductor(if required by NFPA 780): Copper, 211 MCM, 28 strands.

F. Connectors: Bronze. Use bimetallic fittings for lightning protection components of dissimilar metals. Use exothermic welds below grade.

2.02 MANUFACTURERS

A. ERICO

B. BURNDY

C. THOMPSON

D. HARGER

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work.

B. Verify that field measurements are as shown on Drawings.

C. Beginning of installation means installer accepts existing conditions

3.02 PROTECTION OF SURROUNDING ELEMENTS

A. Protect elements surrounding work of this sectionfrom damage or disfiguration.

3.03 INSTALLATION

A. Install in accordance with NFPA 78, UL 96A, and LPI-175.

B. Install air terminals not more than 20' apart.

C. Securely bond all metallic objects located on the roof to the lightning protection system.

D. Install all down conductors concealed unless approved otherwise by Architect.

E. Include provisions for future extension of lightning protection system either vertically or horizontally.

F. Locate all ground rods 3' from edge of building

G. Interconnect all system ground rods to form a continuous ground loop.

3.04 FIELD QUALITY CONTROL

A. Obtain the services of Underwriters Laboratories, Inc. to provide inspection and master label for the lightning protection system in accordance with UL 96A.

B. Obtain the services of the Lightning Protection Institute to provide inspection and certification of lightning protection system in accordance with LPI-177.

C. This specification recognizes that UL will not Master Label structures or additions that are attached to a structure which does not fully comply with current UL96A lightning protection standards. Therefore, all attached structure(s) shall be reviewed for compliance. The attached structure(s) not fully complying because of damaged systems, missing systems or improperly installed systems shall be fully protected and/or repaired in order to obtain all required inspections and certifications for the owner.

END OF SECTION

GENERAL CONSTRUCTION NOTES

1. ALL CONSTRUCTION SHALL CONFORM TO THE CITY OF SAN ANTONIO STANDARD SPECIFICATIONS FOR CONSTRUCTION JUNE 2008 (OR LATEST) AND SPECIFICATIONS FOR SAN ANTONIO WATER SYSTEM APRIL 2014 (OR LATEST).

2. NO EXTRA PAYMENT SHALL BE ALLOWED FOR WORK CALLED FOR ON THE PLANS, BUT NOT INCLUDED IN THE BID PROPOSAL. THIS INCIDENTAL WORK WILL BE REQUIRED AND SHALL BE INCLUDED IN THE PAY ITEM TO WHICH IT RELATES.

3. THE CONTRACTOR SHALL PROVIDE ACCESS FOR THE DELIVERY OF MAIL BY THE U.S. POSTAL SERVICE.

4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING TO ITS ORIGINAL OR BETTER CONDITION ANY DAMAGE DONE TO EXISTING FENCES, SIGNS, CONCRETE ISLANDS, STREET PAVING, CURBS, SHRUBS, BUSHES OR DRIVES. (NO SEPARATE PAY ITEM.)

5. IT IS THE CONTRACTOR'S RESPONSIBILITY TO SEE THAT ALL SIGNS AND BARRICADES ARE PROPERLY INSTALLED AND MAINTAINED. ALL LOCATIONS AND DISTANCES WILL BE DECIDED UPON IN THE FIELD BY THE CONTRACTOR USING THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES". THE CITY'S CONSTRUCTION INSPECTOR AND TRAFFIC ENGINEERING REPRESENTATIVE WILL ONLY BE RESPONSIBLE TO INSPECT BARRICADES AND SIGNS. IF, IN THE OPINION OF THE TRAFFIC ENGINEERING REPRESENTATIVE AND THE CONSTRUCTION INSPECTOR, THE BARRICADES AND SIGNS DO NOT CONFORM TO ESTABLISHED STANDARDS OR ARE INCORRECTLY PLACED OR ARE INSUFFICIENT IN QUANTITY TO PROTECT THE GENERAL PUBLIC. THE CONSTRUCTION INSPECTOR SHALL HAVE THE OPTION TO STOP OPERATIONS UNTIL SUCH TIME AS THE CONDITIONS ARE CORRECTED.

6. IF THE NEED ARISES, ADDITIONAL BARRICADES AND DIRECTIONAL DEVICES MAY BE ORDERED BY THE TRAFFIC ENGINEERING REPRESENTATIVE AT THE CONTRACTOR'S EXPENSE.

7. DUE TO FEDERAL REGULATIONS TITLE 49, PART 192.171 C.P.S. MUST MAINTAIN ACCESS TO GAS VALVES AT ALL TIMES. THE CONTRACTOR MUST PROTECT AND WORK AROUND ANY GAS VALVES THAT ARE IN THE PROJECT AREA.

8. CONTRACTOR SHALL NOTIFY SAWS INSPECTOR TWENTY FOUR (24) HOURS PRIOR TO BACKFILL OF ANY UTILITY TRENCHES TO SCHEDULE FOR DENSITY TEST AS REQUIRED.

9. CONTRACTOR SHALL PRESERVE ALL CONSTRUCTION STAKES, MARKS, ETC. IF ANY ARE DESTROYED OR REMOVED BY THE CONTRACTOR OR HIS EMPLOYEES, THEY SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.

10. CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES PRIOR TO CONSTRUCTION TO DETERMINE THE LOCATION OF EXISTING UTILITIES. CONTRACTOR SHALL NOTIFY THE FOLLOWING AT LEAST FORTY-EIGHT (48) HOURS PRIOR TO EXCAVATION OPERATION:

SAN ANTONIO WATER SYSTEM (SAWS)	210-233-2010
COSA DRAINAGE	210-207-8052
COSA SIGNAL OPERATIONS	210-207-7765
TEXAS STATE WIDE ONE CALL LOCATOR	1-800-344-8377
- CITY PUBLIC SERVICE ENERGY	
-TIME WARNER	
-AT&T	
-MCI	

11. THE EXISTENCE AND LOCATION OF UNDERGROUND UTILITIES INDICATED ON THE PLANS ARE TAKEN FROM AVAILABLE RECORDS AND ARE NOT GUARANTEED, BUT SHALL BE INVESTIGATED AND VERIFIED BY THE CONTRACTOR BEFORE STARTING WORK. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ANY DAMAGE TO AND FOR THE MAINTENANCE AND PROTECTION OF THE EXISTING UTILITIES EVEN IF THEY ARE NOT SHOWN ON THE PLANS. LOCATION AND DEPTH OF EXISTING UTILITIES SHOWN HERE ARE APPROXIMATE ONLY. ACTUAL LOCATIONS AND DEPTH MUST BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION AND HE SHALL BE RESPONSIBLE FOR PROTECTION OF SAME DURING CONSTRUCTION.

12. ALL WASTE MATERIAL SHALL BECOME PROPERTY OF THE CONTRACTOR AND SHALL BE HIS SOLE RESPONSIBILITY TO DISPOSE OF THIS MATERIAL OFF THE LIMITS OF THE PROJECT. NO WASTE MATERIAL SHALL BE PLACED IN EXISTING LOWS THAT WILL BLOCK OR ALTER FLOW LIMITS OF EXISTING ARTIFICIAL OR NATURAL DRAINAGE.

13. THE CONTRACTOR SHALL NOT PLACE ANY WASTE MATERIAL IN THE 100-YEAR FLOOD PLAIN WITHOUT FIRST OBTAINING AN APPROVED FLOOD PLAIN DEVELOPMENT PERMIT.

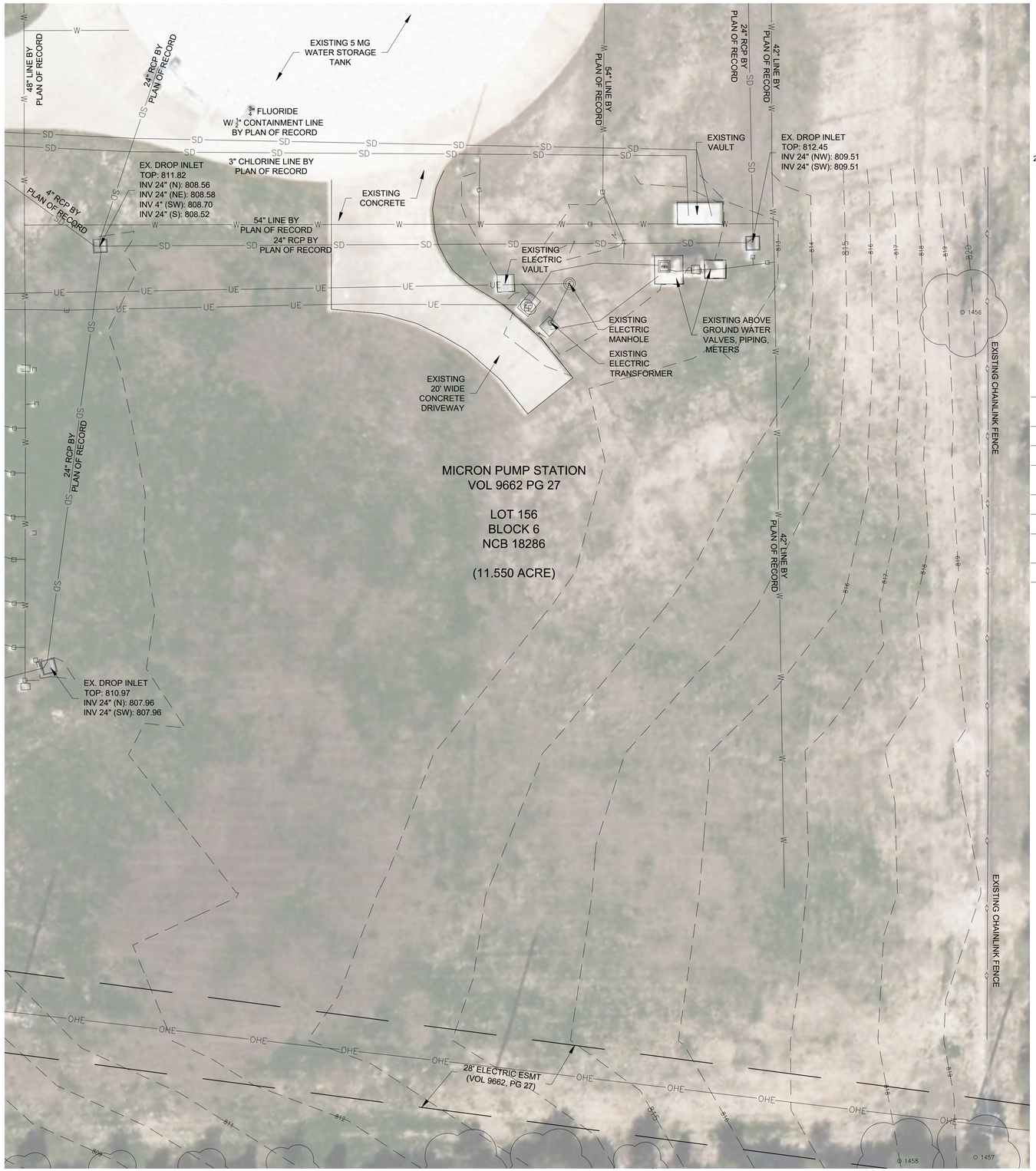
14. THE CONTRACTOR SHALL MAINTAIN ALL ADJOINING STREETS AND TRAVELED ROUTES FREE FROM SPILLED AND/OR TRACKED CONSTRUCTION MATERIALS AND/OR DEBRIS.

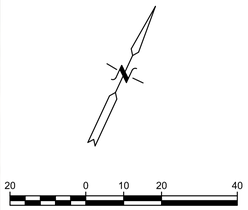
15. IF THE CONTRACTOR ENCOUNTERS ANY ARCHAEOLOGICAL DEPOSITS DURING CONSTRUCTION OPERATIONS, THE CONTRACTOR MUST STOP EXCAVATION IMMEDIATELY, CONTACT THE CITY INSPECTOR, AND CALL THE HISTORIC PRESERVATION OFFICE AT 207-7306 OR 207-3327 FOR AN ARCHAEOLOGICAL INVESTIGATION. THE CONTRACTOR CANNOT BEGIN EXCAVATION AGAIN WITHOUT WRITTEN PERMISSION FROM THE CITY. IF MORE THAN THREE (3) DAYS ARE REQUIRED FOR INVESTIGATION(NOT INCLUDING HOLIDAY AND WEEKENDS) AND IF THE CONTRACTOR IS UNABLE TO WORK IN OTHER AREAS, THEN THE CONTRACTOR WILL BE ALLOWED TO NEGOTIATE FOR ADDITIONAL CONSTRUCTION TIME UPON WRITTEN REQUEST WITHIN TEN (1) DAYS AFTER THE FIRST NOTICE TO THE CITY OF ARCHAEOLOGICAL INVESTIGATION FOR EACH EVENT. IF THE TIME REQUIRED FOR INVESTIGATION IS LESS THAN OR EQUAL TO THREE (3) DAYS FOR EACH EVENT, CONTRACT DURATION WILL NOT BE EXTENDED.

16. IF SUSPECTED CONTAMINATION IS ENCOUNTERED DURING CONSTRUCTION OPERATIONS, C.O.S.A. SHALL BE NOTIFIED IMMEDIATELY WHEN CONTAMINATED SOILS AND/OR GROUNDWATER ARE ENCOUNTERED AT LOCATIONS NOT IDENTIFIED IN THE PLANS. THE NOTIFICATION SHOULD INCLUDE THE STATION NUMBER, TYPE OF CONTAMINATED MEDIA, EVIDENCE OF CONTAMINATION AND MEASURES TAKEN TO CONTAIN THE CONTAMINATED MEDIA AND PREVENT PUBLIC ACCESS. THE CONTAMINATED SOIL AND/OR GROUNDWATER SHALL NOT BE REMOVED FROM THE LOCATION WITHOUT PRIOR C.O.S.A. APPROVAL. THE CONTRACTOR MUST STOP THE EXCAVATION IMMEDIATELY AND CONTACT THE C.O.S.A. INSPECTOR. THE CONTRACTOR CANNOT BEGIN EXCAVATION ACTIVITIES WITHOUT WRITTEN PERMISSION FROM THE CITY.

17. CONTRACTOR SHALL NOT REMOVE OR ADJUST ANY VIA FACILITIES. THE CONTRACTOR MUST CONTACT VIA FOURTEEN DAYS PRIOR, FOR THE REMOVAL OF BENCHES, STOP POLES OR ANY OTHER VIA FACILITIES THAT MAY BE PRESENT. PLEASE PROVIDE THIRTY DAYS PRIOR NOTICE FOR SHELTER REMOVAL (TELEPHONE NOS: (210) 362-2155 OR (210) 362-2096). THE CONTRACTOR WILL BE LIABLE FOR ANY DAMAGES TO VIA FACILITIES NOT REMOVED BY VIA. THE CONTRACTOR IS REQUIRED TO REPLACE ALL FLATWORK REMOVED OR DAMAGED IN THE COURSE OF EXECUTING THE CONTRACT UNLESS OTHERWISE NOTED BY VIA. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROTECTING VIA FACILITIES IF ADJACENT TO WORK AREA.

18. THE CONTRACTOR SHALL COMPLY WITH CITY OF SAN ANTONIO OR OTHER MUNICIPALITY'S TREE ORDINANCES WHEN EXCAVATING NEAR TREES.





LEGEND

- EXISTING TREE
- OHE — EXISTING OVERHEAD ELECTRIC LINE
- W — EXISTING WATER LINE
- 24"W — EXISTING 24" WATER LINE
- SS — EXISTING SANITARY SEWER LINE
- GAS — EXISTING GAS LINE
- SD — EXISTING STORM DRAIN LINE
- UE — EXISTING UNDERGROUND ELECTRIC LINE
- EXISTING CHAIN LINK FENCE
- 822 — EXISTING CONTOURS

NO.	BY	CK	APP	DATE	REVISIONS AND RECORD OF ISSUE

STATE OF TEXAS
RUSSELL RINCON
111669
LICENSED PROFESSIONAL ENGINEER
03/11/2020

WSP USA Inc.
1101 S Capital of Texas Hwy
Suite B-220
Austin, Texas 78746
512-327-9640
PE Firm #2263 · PG Firm #50561

BAIN, MEDINA, BAIN, INC.
ENGINEERS & SURVEYORS
8722 Pin Oak Road
San Antonio, Texas 78216
210/494-7223
TBPE NO. F-1712

SITE SURVEY

DESIGNED:	RR
DETAILED:	RR
CHECKED:	HJ
APPROVED:	HJ
DATE:	03/11/2020

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

BMB JOB NO.
C-1449

SAWS JOB NO.

C-1.0
SHEET 2 OF 35

Date: Mar 11, 2020, 2:53pm User ID: RRincon
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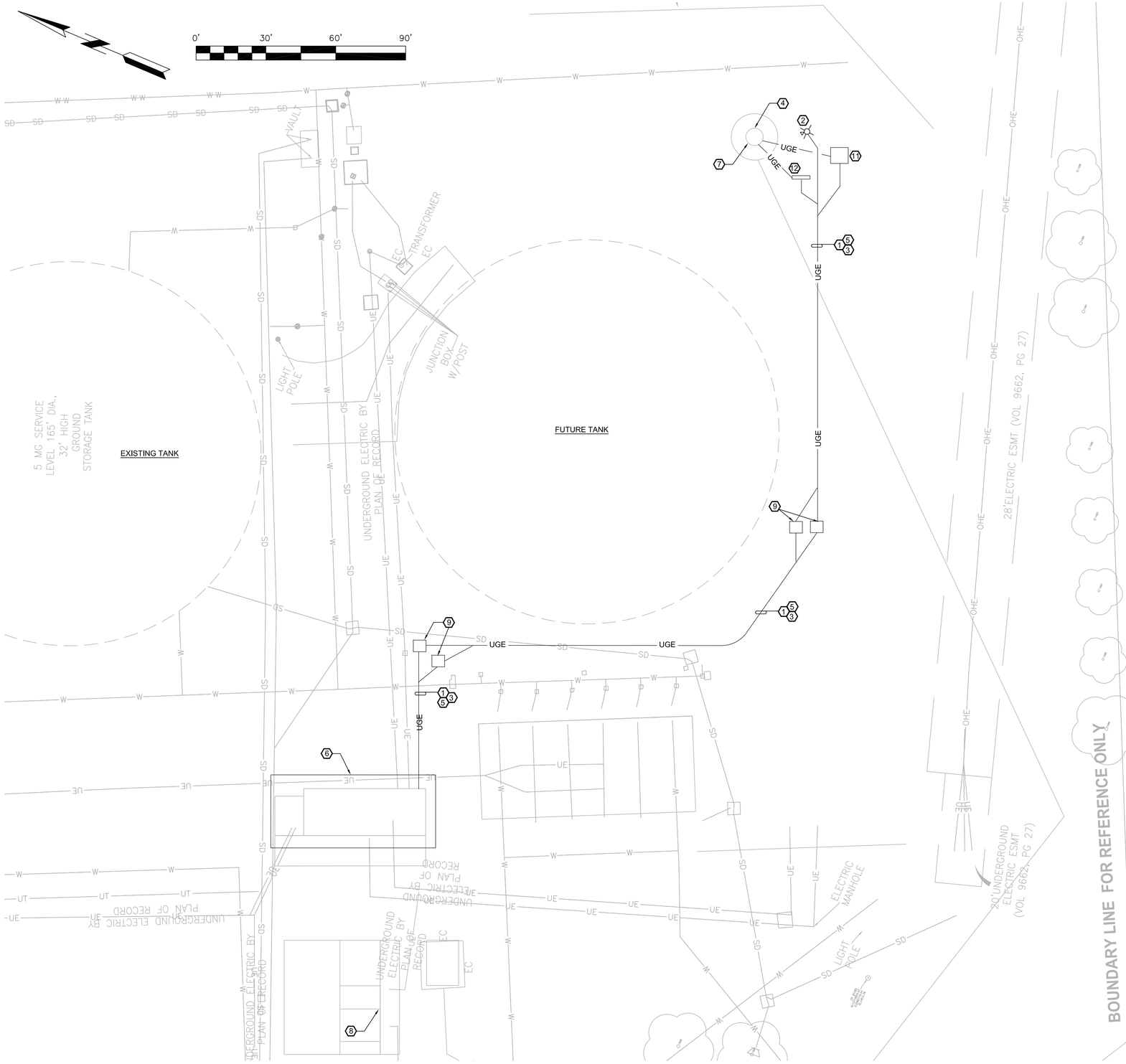
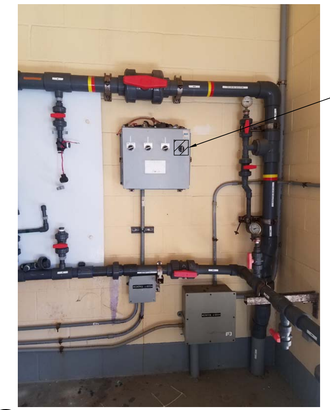


A ELECTRICAL SITE PLAN
SCALE: AS SHOWN.



B CHLORINE ROOM ELECTRICAL DETAILS
SCALE: AS SHOWN.

GRUBB ENGINEERING, INC.
ELECTRICAL POWER SYSTEMS
DESIGN AND TESTING
TBPE FIRM REGISTRATION NO. 3904
2727 N. ST. MARY'S ST, SAN ANTONIO, TEXAS 78212
BUS: (210) 658 7250 FAX: (210) 658 9805

KEYED NOTES:

1. NEW UNDERGROUND DUCTBANK, CONDUIT AND CABLES FROM EXISTING VAULT BELOW MCC TO NEW WELL PUMP NO. 4. SEE DUCTBANK DETAIL A ON SHEET E-5.1.
2. SITE LIGHT FIXTURE MOUNTED ON 20' POLE. FIXTURE TYPE TO BE LITHONIA #KADLED30C70040KMVOLTSPD09LPI-SSA205GDM19VDDDB OR APPROVED BY OWNER. PROVIDE FIXTURE WITH PHOTOCELL. REFER TO POLE MOUNTING DETAIL C ON SHEET E-5.2.
3. REFER TO ONE LINE FOR CONDUIT AND CABLE FOR POWER TO MOTOR. THE FOLLOWING CABLE AND CONDUITS SHALL BE PROVIDED FROM THE WELL PUMP TO THE MCC:
   2#8 THWN, 1#12 GND, 2-1" CONDUITS(1 SPARE) FOR MOTOR SPACE HEATER
   8#16 TW/SH/TRIAD, 2-1.5" CONDUITS (1 SPARE) FOR MOTOR RTD'S.
   2#12 THWN, 1#12 GND, 2-1" CONDUITS(1 SPARE) FOR PRE-LUBE SOLENOID VALVE.
   2#6, 1#10 GND, 2-1" CONDUITS(1 SPARE) FOR RECEPTACLE AND WORK LIGHT.
   2#8, 1#12 GND, 2-1" CONDUITS(1 SPARE) FOR HEAT TRACE.
   2#8, 1#12 GND, 2-1" CONDUITS(1 SPARE) FOR SITE LIGHT.
   2#10, 1#12 GND, 2-1" CONDUITS(1 SPARE) FOR FLOW METER.
   2#10 THWN, 2#10 GND
   USING SPARE 1" CONDUIT USED FOR SPACE HEATER TO RUN WIRING.
   FROM PANEL B2, CKT#30, 2#10THWN, 1#10GND TO 5kV DISCONNECT SWITCH FOR 250 WATT HEATER. USE SPARE 1" CONDUIT AVAILABLE. (1)
4. HEAT TRACE PROCESS PIPING AND PRE-LUBE. REFER TO CIVIL DRAWINGS FOR LOCATION. REFER TO HEAT TRACE DETAIL ON SHEET E-5.2.
5. THE FOLLOWING CABLE AND CONDUITS SHALL BE PROVIDED FROM THE WELL PUMP TO THE SCADA PANEL:
   2#16 TW/SH/PR , 2-1" CONDUITS(1 SPARE) FOR FLOW TRANSMITTER
6. MCC 'B' LOCATION AND SCADA ROOM. REFER TO ENLARGED MCC PLAN VIEW ON SHEET E-3.1 FOR DETAILS IN THIS AREA.
7. NEW WELL PUMP NO. 4. REFER TO CIVIL SHEET C10.0 FOR EXACT LOCATION.
8. REFER TO DETAIL B ON THIS SHEET FOR MODIFICATIONS IN THE CHLORINE ANALYZER ROOM.
9. NEW LOW VOLTAGE AND MEDIUM VOLTAGE ELECTRICAL MANHOLE.
10. PROVIDE NEW HOA SWITCH FOR CHLORINE SHUTOFF SOLENOID VALVE CONTROLS FOR NEW WELL PUMP NO. 4. EXTEND WIRE AND CONDUIT FROM CONTROL PANEL TO NEW VALVES. PROVIDE PROPER LABELING ON FRONT PANEL.
11. NEW WELL PUMP NO. 4 PAD MOUNT DISCONNECT SWITCH.
12. NEW WELL PUMP ELECTRICAL RACK. REFER TO RACK ELEVATION DETAILS ON SHEET E-5.3.

NO.	BY	CK	APP	DATE	REVISIONS AND RECORD OF ISSUE
1	SG	AA	AA	3/9/2020	ADDENDUM

WSP USA Inc.
1101 S Capital of Texas Hwy
Suite B-220
Austin, Texas, 78746
512-327-9640
PE Firm #2263 - PG Firm #50561

SAN ANTONIO WATER SYSTEM
MICRON PUMP STATION
ELECTRICAL SITE LAYOUT

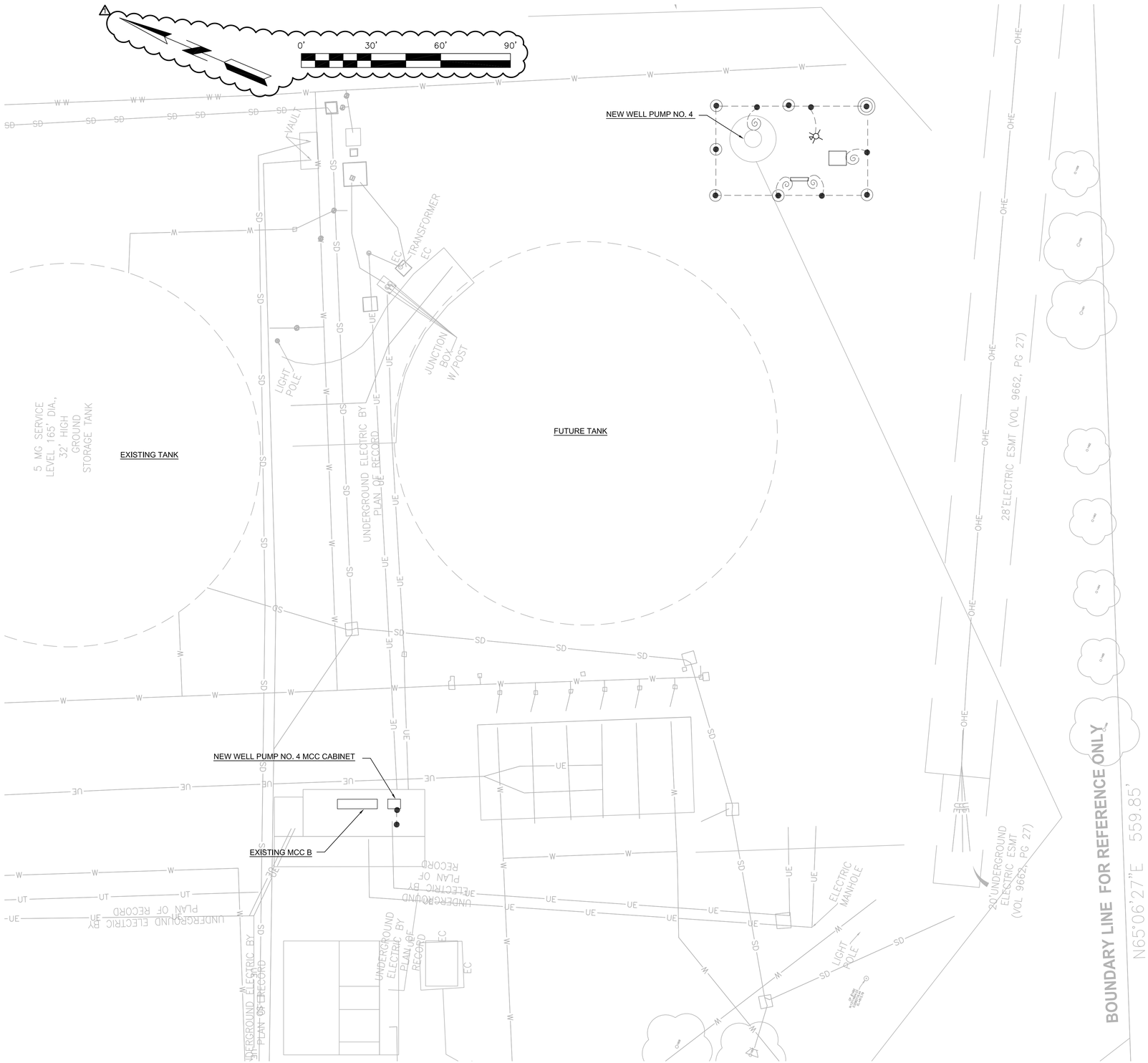
DESIGNED:	JDP
DETAILED:	SG
CHECKED:	SM
APPROVED:	RDG
DATE:	7/20/2017

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

SAWS JOB NO.
XX-XXXX

E-1.1
SHEET
23 OF 35

STATE OF TEXAS
AMJAD ADHAMI
137150
LICENSED PROFESSIONAL ENGINEER
amjad adhami
3-9-20



A ELECTRICAL GROUND PLAN
SCALE: AS SHOWN.

GRUBB ENGINEERING, INC.
ELECTRICAL POWER SYSTEMS
DESIGN AND TESTING
TBPE FIRM REGISTRATION NO. 3904
2727 N. ST. MARY'S ST, SAN ANTONIO, TEXAS 78212
BUS: (210) 658 7250 FAX: (210) 658 9805

NOTES

1. GROUNDING SYSTEM IS A SOLIDLY GROUNDED NEUTRAL SYSTEM THAT IS MULTI GROUNDED. THE GROUNDING ELECTRODE IS THE GROUNDING RING FORMED BY THE CONDUCTORS.
2. GROUND WIRE TO BE INSTALLED NOT LESS THAN 30" DEEP.
3. SEE DRAWING E-5.4 FOR GROUNDING DETAILS.
4. GROUND GRID RESISTANCE SHALL NOT EXCEED 5 OHMS.
5. LIGHT POLES TO BE GROUNDED WITH GROUND ROD. SEE SHEET E-5.2 DETAIL C.
6. BOND NEW WELL PUMP NO. 4 MCC ENCLOSURE TO EXISTING GROUND GRID.

LEGEND

- GROUNDING CONNECTION EXOTHERMIC OR COMPRESSION
- GATE FLEXIBLE GROUNDING STRAP.
- GROUND ROD CONNECTION 3/4" X 10' LONG. RODS TO BE SPACED A MINIMUM OF 20' APART.
- TEST WELL WITH GROUND ROD CONNECTION 3/4" X 10' LONG
- #2/0 STRANDED BARE COPPER WIRE, SOFT DRAWN.
- ABOVE GRADE TAIL FOR EQUIPMENT CONNECTION. TO BE LOCATED FOR PROPER EQUIPMENT ENTRANCE. PENETRATION THRU CONCRETE TO HAVE SCHEDULE 80 PVC PIPE SEGMENT.

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Suite B-220
Austin, Texas, 78746
512-327-9640
PE Firm #2263 • PG Firm #50561

SAN ANTONIO WATER SYSTEM
MICRON PUMP STATION
ELECTRICAL GROUND PLAN

DESIGNED:	JDP
DETAILED:	SG
CHECKED:	SM
APPROVED:	RDG
DATE:	7/20/2017

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

SAWS JOB NO.
XX-XXXX

E-1.2
SHEET
24 OF 35

STATE OF TEXAS
AMJAD ADHAMI
137150
LICENSED
PROFESSIONAL ENGINEER
amjad adhami
3-9-20

GRUBB ENGINEERING, INC.
ELECTRICAL POWER SYSTEMS
DESIGN AND TESTING
TBPE FIRM REGISTRATION NO. 3904
2727 N. ST. MARY'S ST, SAN ANTONIO, TEXAS 78212
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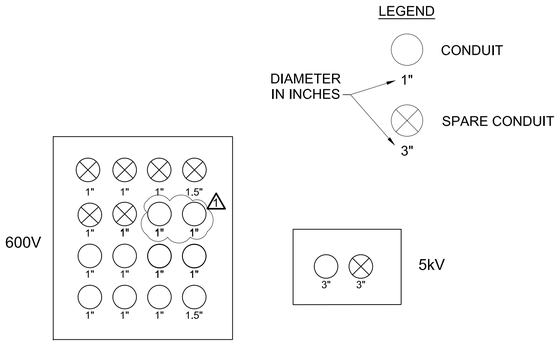
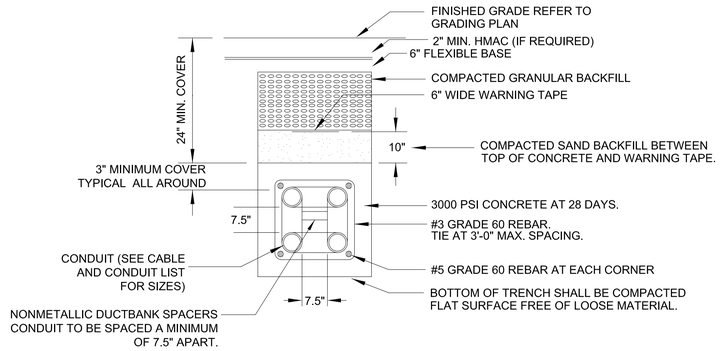
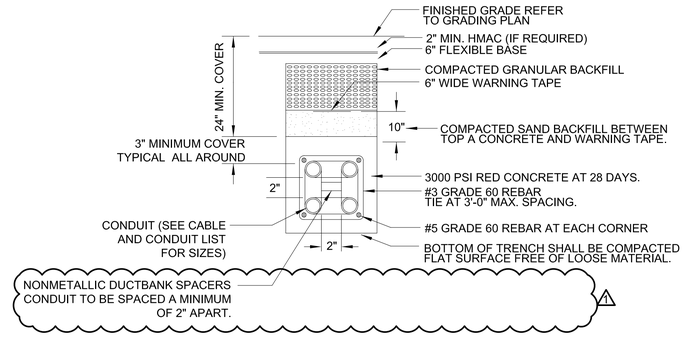


A DUCTBANK SECTION #1
SCALE: N.T.S.



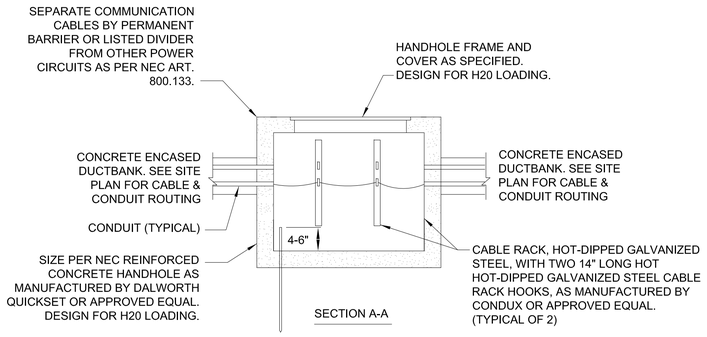
B TYPICAL MEDIUM VOLTAGE DUCT BANK SECTION
SCALE: N.T.S.

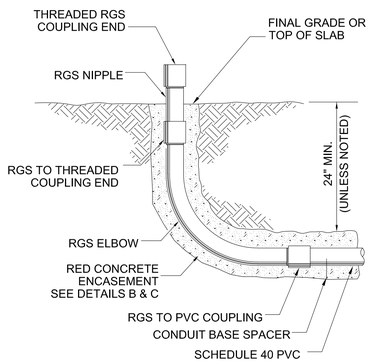


C TYPICAL LOW VOLTAGE DUCT BANK SECTION
SCALE: N.T.S.

NOTES:

1. CONTRACTOR SHALL COORDINATE WITH UNDER GROUND PIPING
2. PROVIDE 100% CONCRETE ENCASEMENT BOTH HORIZONTALLY & VERTICALLY.





D TYPICAL DUCT BANK TRANSITION DETAIL
SCALE: N.T.S.

NOTES:

1. CONTRACTOR SHALL COORDINATE WITH UNDER GROUND PIPING
2. PROVIDE 100% CONCRETE ENCASEMENT BOTH HORIZONTALLY & VERTICALLY.

E PRECAST VAULT DETAILS
SCALE: N.T.S.

NO.	BY	CK	APP	DATE	REVISIONS AND RECORD OF ISSUE
1	SG	AA	AA	3/9/2020	ADDENDUM

WSP USA Inc.
1101 S Capital of Texas Hwy
Suite B-220
Austin, Texas 78746
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PE Firm #2263 • PG Firm #50561

SAN ANTONIO WATER SYSTEM
MICRON PUMP STATION

DUCTBANK DETAILS

DESIGNED:	JDP
DETAILED:	SG
CHECKED:	SM
APPROVED:	RDG
DATE:	7/20/2017

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

SAWS JOB NO.
XX-XXXX

E-5.1
SHEET
29 OF 35

STATE OF TEXAS
AMJAD ADHAMI
137150
LICENSED PROFESSIONAL ENGINEER
amjad adhami
3-9-20