Meghan Pump Station (RFCSP)
Solicitation Number: CO-00645
Job No.: 19-1006

ADDENDUM 4
October 20, 2023

To Respondent of Record:

This addendum, applicable to the work referenced above, is an amendment to the price proposal, plans, and specifications 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 on the space provided in submitted copies of the Respondent Questionnaire.

RESPONSES TO QUESTIONS

1. A couple of contractors have reached out to Global Treat Inc., to provide a quote for this project. We would like to submit Hydro Instruments as an acceptable/equal manufacturer for the following sections…

- SECTION 15262 - CHLORINATION EQUIPMENT
- SECTION 15265 - CHLORINE ANALYZERS
- SECTION 15416 - CHLORINE LEAK DETECTION EQUIPMENT

We will also supply quotes for scales and auto shut-off valves from the manufacturers listed.

Response: Hydro Instruments products may be considered by SAWS during submittal review by the awarded contractor.

2. We are requesting to have "Goulds Water Technologies" added in Section 15230.2.3.A. Section 15230.2.3.A currently lists ITT Goulds which is technically a different manufacturer.

Response: See #2, Changes to the Specifications, in this addendum. Goulds Water Technologies has been added to section 15230.2.3.A.

3. Electrical Building drawings does not show the location of Lighting Contactor Panel and photo cell circuit #18 on conduit schedule sheet E9 is routed to the Autosensory panel. Is it the intention for the Autosensory panel to include Lighting Contactor & Time Clock shown on E12 and E11 item #6 & item #19?

Response: See #1, Changes to Plans, in this addendum. The Lighting Contactor shall be installed adjacent to LPA inside of the Control Building. Photocell and photocell circuit (#18) is located on the East side of building routed to Autosensory Panel as shown on E3 & E20. Modifications to include location of Lighting Contactor on E3 have been made.

4. Related to the above, shouldn't all exterior lighting circuits be routed to Lighting Contactor panel? Wherever it may be, current conduit schedules shows routed directly to LPA. Also the LPA circuits #3, #7, #9 to be routed to the lighting contactor is not showing on any plans?

Response: All exterior lighting circuits shall be routed through the Lighting Contactor but powered through their respective LPA circuits as shown on E11 and E20.

5. Is there a reason for two (2) E2 sheets? Pages 35 & 36 of 66.

Response: Sheets indicated a difference in primary conduit/conductor to XFMR. Both sheets are included as part of contract documents.

6. Reference Duct Bank Marker Detail on Sheet E23. Detail provided does not seem to be a typical duct bank marker for SAWS Projects. With the 2" Galvanized pipe protruding 6" above grade, we would think that it would be a tripping hazard, if not for site maintenance nuisance. Please review and confirm that it is indeed what's desired.

Response: The detail on Sheet E23 is acceptable as it was reviewed and approved by SAWS.

7. Sheet E-1 Note 6 states all exterior above grade conduit shall be rigid galvanized steel conduit and duct bank elbows and risers shall be PVC coated RGS. Which conflicts with Specification Section 16111 3.2. A - which states PVC Schedule 80 conduit chemical process areas and wet areas. B - Ridid Aluminum conduits are to be only utilized in dry, inside, air-conditioned, and outdoor locations only and PVC Coated Rigid Aluminum conduits in all wastewater plants outdoor and dry environments. SAWS Standards in recent projects have been Rigid Aluminum Conduit above ground regardless of indoors or outdoors (except for chemical areas) and with PVC-Coated Rigid Aluminum conduit in ductbank elbows and risers to above ground. Please confirm which is correct applications to be utilized for the project.

Response: See #2 Changes to Plans, in this addendum. Rigid aluminum conduit is acceptable and note 6 on Sheet E1 has been modified accordingly.

8. In response to the engineer's previous response to question number 67 (Addendum 2): The engineer is stating "Welded steel pipe shall be installed per SAWS Specification 816.5 Subsections 23.e. and 23.f. The interior surfaces of all steel piping, fittings, and specials shall be cleaned by sandblasting and then primed and coated with a cement mortar lining. Cement mortar lined and coated steel pipe shall be used for 4-inch and larger pipe."

SAWS Specifications 816.5, 23.e. and 23.f. are applicable for shop fabricated and lined pipe, but it is ***not*** possible to repair the pipe's interior coating system on smaller diameter pipe (less than 24" diameter) after field welds have been performed. Once a field weld has been made there will no longer be access to the interior of the pipe to allow for the sand blasting, priming, and coating of the connection that was just welded. The steel pipe on this

project is all smaller than 24" diameter and because we can only transport pipe up to a certain length, there will be many locations that it is required to make field connections, which are currently specified to be welded in place on site. If steel pipe is required and it needs to be 100% coated and lined, which we know it is, can we use another type of field connection, such as steel couplings or flanged connections?

Response: Steel couplings or flanged connections will be acceptable in cases where the sections of piping are too long to be transported in one piece.

CHANGES TO THE SPECIFICATIONS

1. Remove the Price Proposal in its entirety and replace with the attached revised Price Proposal. The line item for Preparation of Right-of-Way has been removed due to it not being applicable. Respondents shall use the revised bid proposal when submitting a bid for this project. Failure to use the revised version may result in the proposal being found non-responsive.

2. Remove 15230 in its entirety and replace with the version attached to this addendum.

CHANGES TO THE PLANS

1. Remove Sheet 37 (E3) in its entirety and replace it with the version attached to this addendum.
2. Remove Sheet 35 (E1) in its entirety and replace it with the version attached to this addendum.
3. The correct solicitation number for this project is CO-00645. The cover sheet of the plans erroneously lists CO-00388. That number can be disregarded.

END OF ADDENDUM 4

This Addendum is twenty (20) pages in its entirety including the attachments.

Attachments

Price Proposal (2 pages)
Specification 15230 (13 pages)
Sheets E3 and E1 (2 pages)

10/23/2023

STATE OF TEXAS
TOBY W. McQUEARY
93710
LICENSED PROFESSIONAL ENGINEER

QUIDDITY ENGINEERING, LLC.
(F-23290)

STATE OF TEXAS
C. J. TROUTT
41075
LICENSED PROFESSIONAL ENGINEER

10/23/2023
QUIDDITY ENGINEERING, LLC.
(F-23290)

PRICE PROPOSAL

PROPOSAL OF _____, a corporation

a partnership consisting of _____

an individual doing business as _____

THE SAN ANTONIO WATER SYSTEM:
Pursuant to Instructions and Invitation to Competitive Sealed Proposals, the undersigned proposes to furnish all labor and materials as specified and perform the work required for the project as specified, in accordance with the Plans and Specifications for the following prices in the Price Proposal to wit:

PLEASE SEE ATTACHED LIST OF BID ITEMS.

_____
RESPONDENT'S SIGNATURE & TITLE

_____
FIRM'S NAME (TYPE OR PRINT)

_____
FIRM'S ADDRESS

_____
FIRM'S PHONE NO. /FAX NO.

_____
FIRM'S EMAIL ADDRESS

The Contractor herein acknowledges receipt of the following:
Addendum No(s). _____

OWNER RESERVES THE RIGHT TO ACCEPT THE OVERALL MOST RESPONSIBLE PROPOSAL.

The Respondent offers to construct the Project in accordance with the Contract Documents for the contract price, and to complete the Project within **730** calendar days after the start date, as set forth in the Authorization to Proceed. **The respondent understands and accepts the provisions of the contract Documents relating to liquidated damages of the project if not completed on time.**

Complete the additional requirements of the Price Proposal which are included on the following pages.

Statement on President's Executive Orders

Has your firm previously performed work subject to the President's Executive Orders Numbers 11246 and 11375 or any preceding similar executive orders (Numbers 10925 and 11114)? Yes ☐ No ☐

Price Proposal

Line No.	Item No.	Item Description	Unit	Quantity	Unit Price	Total
1		Tank Construction	LS	1		
2		Pump Station	LS	1		
3		Erosion and Stormwater Pollution Control	LS	1		
4	550	Trench Excavation and Protection	LF	1,800		
5	103	Revegetation of Disturbed Areas	LS	1		
					SUBTOTAL (ITEMS 1-5)	
6	100	Mobilization Maximum 10% of line items 1-5	LS	1		
7	100A	Intermediate Mobilization and Demobilization - This item shall include project move-in and move-out of personnel and equipment, for all work including furnishing all labor, materials, tools, equipment, and incidentals required to mobilize, demobilize, bond and insure the Work for the project in accordance with the Contract Documents, complete in place.	EA	1		
8		Allowance #1: On-Site Security Guard Allowance	LS	1	$30,000.00	30,000.00
9		Allowance #2: Permitting Allowance	LS	1	$10,000.00	10,000.00
10		Allowance #3: CPS Allowance	LS	1	$40,000.00	$40,000.00
11		Allowance#4: Foundation Subgrade Allowance	LS	1	$100,000.00	$100,000.00

Mobilization lump sum bid shall be limited to a maximum 10% of the Line Items "1-5" Sub-total amount. **In the event of a discrepancy between the written percentage and dollar amount shown for Mobilization line item the written percentage will govern. If the percentage written exceeds the allowable maximum stated for mobilization, SAWS reserves the right to cap the amount at the percentage shown and adjust the extension of the proposal item accordingly.**

TOTAL PRICE (TO INCLUDE LINE ITEMS 1- 11)	

SECTION 15230
VERTICAL TURBINE PUMPS

PART 1.0 – GENERAL

1.1 SCOPE

A. Provide all labor, materials, and equipment as shown and specified to furnish and install vertical turbine pumps, electric motors, pump columns, shafts, bases, bearings, suction barrels, and all appurtenances, complete in place, and operable.

1.2 RELATED SECTIONS

A. All sections of the Contract Documents and technical specifications are related sections. Failure to review Contract Documents and technical specifications does not relieve the Contractor supplier or manufacturer of complying with the requirements herein.

1.3 REFERENCES

A. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified:
1. American National Standards Institute (ANSI)
2. American Society for Testing and Materials (ASTM)
3. Anti-Friction Bearing Manufacturers Association (AFBMA)
4. Hydraulic Institute (HI)
5. Institute of Electrical and Electronic Engineers (IEEE)
6. National Electric Code (NEC)
7. National Electrical Manufacturers Association (NEMA)
8. Steel Structures Painting Council (SSPC)
9. American Water Works Association (AWWA)
10. National Sanitation Foundation (NSF)

1.4 SUBMITTALS

A. Provide submittal data, manuals and drawings as specified in Section 01340, Shop Drawings.

B. Pump Data
1. Certified pump curves shall identify shut-off head, duty point, and range at which the pump operates without vibration and cavitation. For pumps that are to be operated by variable speed units, provide a minimum of five curves with at least three different speeds between the maximum and minimum RPM of the pump.
2. Certified pump curves shall identify the torque versus speed requirements for the pump and motor.
3. Net positive suction head (NPSH) requirements
4. Brake horsepower
5. Pump inertia
6. Pump thrust
7. Pump efficiency and pump speed

8. Materials used in fabrication of all pump components including dimensions, weights, coating requirements, and cross sectional views
9. Factory performance test results and certifications
10. Performance test results with permanent pump installed and vibration analysis
11. Names and addresses of the nearest factory authorized service organization
12. Elevation drawings noting sizes, depths, lengths, and dimensions; foundation and anchoring details; total weight of pump unit including pump, column, head, and motor
13. Factory non-witness test requiring Engineer approval prior to shipment
14. Minimum submergence requirements
15. Manufacturer's specification
16. Engineering data
17. Minimum submergence required over suction bell
18. Impeller diameter
19. Diameter of pump can and suction can design
20. Critical Speed
21. L-10 bearing life calculations for radial thrust bearings at pressure heads and flow rates shown
22. Parts diagram
23. Bill of Materials furnished

C. Motor Data
1. Horsepower
2. Electrical characteristics
3. Bearing life ratings
4. Insulation ratings
5. Weight
6. Thrust Bearing
7. Wiring Diagram
8. Space Heaters
9. Dimensions

D. Instruction Books
1. Service and maintenance manual
2. Service parts list
3. Outline drawing

E. Manufacturer's Certifications
1. Submit manufacturer's certification that Contract Documents have been examined by the manufacturer for proposed electrical, mechanical, and structural systems affecting performance of the pumping equipment, and that the equipment will thoroughly and efficiently meet the specified performance requirements.
2. Submit manufacturer's certification that the maximum power requirement, if used, shall not exceed the motor rating under operating conditions on the pump characteristic curve.
3. Submit seal manufacturer's certification that the seal is designed for service and application specified and is installed and aligned properly.

1.5 QUALITY ASSURANCE

A. Pumping units shall be specifically designed for heavy duty, continuous use, and municipal/industrial grade. Irrigation or agricultural grade units are not allowable. Use new materials of high grade, and with properties best suited to the work required.

B. Pumping units and motors shall be the product of manufacturers with at least 10 years of successful experience in the design, manufacturing and application of pumping units of the type, size and performance capabilities as specified. The pump manufacturer shall have at least three similar size pumps of the model, type, and size of pump in service and operational for at least five years. Manufacturers shall provide a list of references for those pumps.

C. All components of the pump shall be supplied, assembled, and warranted by one of the approved pump manufacturers. Pump components shall not be acquired from separate entities and assembled as a final product by a manufacturer's representative. All pumps shall be supplied by the same manufacturer.

D. Pumps, as an assembled unit, shall be compliant to NSF/ANSI Standard 61 and meet the requirements of the US Safe Drinking Water Act.

E. Pumps shall include a nameplate displaying NSF-G certified.

F. Deliver materials to the site to ensure uninterrupted progress of the Work. Deliver anchor bolts and anchorage devices which are to be embedded in cast-in-place concrete in ample time to prevent delay of Work.

G. Store material to permit easy access for inspection and identification. Keep all materials off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration. Store and maintain equipment in accordance with manufacturer's direction.

H. Factory Tests
   1. Pump Test
      a. The pump manufacturer shall perform a non-witness factory performance test of the entire pump assembly to demonstrate compliance with the specifications and to verify guaranteed performance of the pump. A calibrated factory driver may be used in lieu of the job driver.
      b. The factory test shall include the actual flow, total dynamic head, pump horsepower, and pump efficiency for all the duty points listed.
      c. Tests shall be sufficient to determine the curves of head, input horsepower, and efficiency relative to capacity from shutoff to 150% of design flow.
      d. Test pump and recirculate water for at least one hour under simulated service conditions.
      e. The test shall also check for excessive vibration and leaks in all piping and seals.
      f. A minimum of six points, including shutoff, shall be taken for each test. At least one point of the six shall be taken as near as possible to each specified condition.
   2. The Contractor shall submit the factory test results and certification to the Owner and Engineer for approval before the pump is released for shipment.

I. In-Place Test

1. Perform a complete pump test including flow rates, motor amperage, and all other information normally checked on a maintenance- type pump test on an existing booster pump. Run the pump test at:
   a. 100 psi discharge
   b. 122 psi discharge
   c. 128 psi discharge

1.6 OPERATION AND MAINTENANCE DATA

A. The manuals shall be prepared specifically for this installation and shall include all required cut sheets, drawings, equipment lists, descriptions, etc. In addition to the requirements of Section 01340, Shop Drawings, the manuals shall include the following at a minimum:

1. Complete column assembly, pumping equipment, suction can, discharge head, oiler, parts list, test reports, maintenance data and schedules, spare parts information, and cross-referenced to exploded view of assembly drawings
2. Dimensional drawings for all provided components with their respective weights

PART 2.0 – PRODUCTS

2.1 GENERAL

A. Provide vertical, multistage, turbine pumps complete with pump bowl, electric motor, column assembly, discharge head, bearings, and all accessories and appurtenances necessary to provide a complete operating pumping system. Select pump and motor combination on overall efficiency. Pump and all components shall conform to AWWA, ANSI B58. 1-1961 "American Standard for Vertical Turbine Pumps" and the Hydraulic Institute Standards for Centrifugal Pumps.

2.2 PERFORMANCE

A. When operating at the maximum output speed of the motor, under load and including slip (at 60Hz), the pumping units shall meet all minimum conditions listed in the table below. Pump capacity, head and efficiency defined in the data corresponding to Design Point One shall be the “guaranty point”.

Design Conditions	Units	BP-03-301, 401, 501	BP-03-101	BP-03-201
Location	N/A	Booster Pump Station	Booster Pump Station	Booster Pump Station
Number of Pumps Required	Ea	3	1	1
Liquid Being Pumped	N/A	Treated Potable Water	Treated Potable Water	Treated Potable Water
pH	N/A	6.8 to 8.0	6.8 to 8.0	6.8 to 8.0
Maximum Free Chlorine	mg/L	4	4	4
Maximum Chlorides	mg/L	250	250	250
Temperature	°F	32 to 105	32 to 105	32 to 105
Specific Gravity	N/A	1	1	1
Variable or Constant Speed	N/A	Constant	Constant	Constant
Maximum Motor Size	HP	125	50	50
Maximum Pump Operating Speed	RPM	1800	1800	1800
Pump Bowl Max. Diameter	Inch	12	10	10
Discharge Flange Diameter	inch	12	6	6
Shaft Bearing Lubrication	N/A	Pumped Liquid	Pumped Liquid	Pumped Liquid
Type of Impeller	N/A	Enclosed	Enclosed	Enclosed
Type of Shaft	N/A	Open	Open	Open
Minimum Shaft Diameter	inch	1 1/2	1 1/4	1 1/4
Number of Suction Barrels	Ea	3	1	1
Minimum Suction Barrel Diameter	inch	18	18	12
Shut Off Head	ft	482	329	329
Max NPSHr	ft	15	20	20
Duty Point No. 1				
Design Flow (1st Design Point)	gpm	1,050	300	300
Total Dynamic Head (1st Design Point)	ft	300	300	300
Minimum Bowl Efficiency (1st Design Point)	%	80	75	75
Duty Point No. 2				
Design Flow (2nd Design Point)	gpm	1,277	417	417
Total Dynamic Head (2nd Design Point)	ft	231	231	231
Minimum Bowl Efficiency (2nd Design Point)	%	76	74	74

B. The pump shall have a Capacity vs Head curve with an increasingly rising slope steeper or equal to the slope of the line between the two duty points.

C. Select equipment which is designed and built for continuous service at all points within the specified range of operation, without overheating, without cavitation, and without excessive vibration or strain.

D. Select a pump and impeller that meets the performance requirements using an impeller that is at least one size smaller than the largest impeller size that can be furnished with that pump size.

2.3 ACCEPTABLE MANUFACTURERS

A. The following is a list of acceptable manufacturers for BP-03-101 & 201.
   1. Fairbanks Morse/Pentair
   2. Flowserve
   3. ITT Goulds
   4. Peerless
   5. Goulds Water Technologies

B. The following is a list of acceptable manufacturers for BP-03-301, 401, & 501.
   1. Fairbanks Morse/Pentair
   2. Flowserve
   3. ITT Goulds
   4. Peerless
   5. Goulds Water Technologies

C. Listing as an acceptable manufacturer will not relieve the manufacturer from conforming to these Specifications.

2.4 PUMP COMPONENTS

A. Pump Bowl Assembly
   1. Provide pump bowls fabricated of fine grained, high tensile strength iron, ASTM A 48, Class 30 or better, with smooth surfaces devoid of blow holes and other irregularities. Use clean, sound casting without defect. Do not plug, weld or otherwise repair defects.
      a. The pump bowl assembly shall be designed for use with a water lubricated enclosed bearing column.
      b. Pump interior to be lined/coated with an NSF approved fusion bonded epoxy.
      c. Pump bowl wear rings shall be constructed of 400 series stainless steel.
      d. Pump bowl bearings shall be constructed of nickel-aluminum-bronze, ASTM B505.
      e. The bowls shall be hydrostatically tested at 1.5 times the pressure produced at shut-off head.
      f. The bowls shall be smooth and free of sharp projections and be connected by flanged and bolted construction. Bowl shall be porcelain enameled on the bowl interior or epoxy-lined.
   2. Install impellers of the enclosed type.
      a. Impeller shall be enclosed type constructed of nickel-aluminum-bronze.
      b. The impellers shall be machined and finished smooth to insure proper performance. They are to be balanced prior to assembly.
      c. They shall be securely fastened to the shaft with SS Type 416 tapered lock collets, threaded lock collets or double keys.
      d. The impellers shall be adjustable vertically by external means at the driver location.
      e. Wear rings shall be 400 series SS. Impeller wear rings shall be a minimum of 50 BHN different than the bowl 400 series SS wear rings.
      f. Pump shaft shall be constructed of SS Type 416 HT material. It shall be supported by nickel-aluminum-bronze bearings above and below each impeller.

3. Employ a bronze suction case bearing, packed with insoluble grease, and protected against entry of sand or other abrasives.
4. Provide sufficient lateral in the pump bowls to allow operation at shutoff head.
5. Provide bearing support for shaft above and below each impeller.

B. Column

1. Column pipe shall be coated and lined with fusion-bonded epoxy, white in color, certified to NSF/ANSI 61.
2. Column pipe in sizes 4-inch through 12-inch diameter shall be interchangeable sections not over 10 feet in length, and shall be connected with threaded, sleeve-type couplings or flanged. Column pipe 14-inch diameter and larger shall be flanged and furnished in interchangeable sections not over 10 feet in length.
3. All shaft joints shall be designed so that they will not loosen during forward or reverse rotation of the shaft.
4. Shaft diameter shall be sized to meet that required for the nameplate horsepower rating and to prevent distortion and vibration over the continuous operating range. The size of the shaft shall be no less than determined by the applicable ANSI/AWWA standards and shall be such that elongation due to hydraulic thrust will not exceed the actual clearance of the impellers in the pump bowls.
5. Column pipe shaft bearings shall be compatible with the operating conditions and fluid properties provided.
6. The line shafts shall be of SS Type 416, turned and ground.
7. SS line shaft couplings with a safety factor of 1.5 times the shaft safety factor shall join the line shafts. These threaded couplings shall have left-hand threads to tighten during pump operation.
8. The shaft joints shall be torqued with supplier provided torque wrenches tightened to accomplish a completed butt joint.
9. Shaft thread compound shall be tested, verified, and provided by the installer with documented and Owner approved application procedures.

C. Discharge Head

1. The discharge head shall be of fabricated steel of the proper configuration and construction for the application including to support the pumping unit and motor.
2. Fabricated steel discharge heads should have 300-lb ANSI discharge nozzle flanges.
3. The top of the discharge head shall have a registered fit for mounting driving motor.
4. The head shaft shall be 416SS and shall be turned and ground. The head shaft or top shaft shall not exceed 10 feet in length. The pump manufacturer shall include a method of adjusting the pump impellers at the top of the head shaft. This shall be through an adjustable flanged coupling between the motor shaft and the pump top shaft. This method shall provide a positive locking device.
5. The discharge head shall be configured with openings for maintenance.
6. Pump discharge head shall be equipped with lifting lugs.

D. Seal Arrangement

1. Provide a balanced single cartridge mechanical seal with a vent and flush port on gland, floating seal rings and a static O-ring. The adjusting studs and nuts shall be stainless steel for the

mechanical seal housing. The materials shall be 316 stainless steel for all metal components, graphite-loaded sintered silicon carbide for the rotating seal ring, sintered silicon carbide for the stationary seal ring, hastellow C-276 for the spring, and Viton or Fluoroelastomer for the O-ring.

2. Provide ¾-inch diameter galvanized pipe from pump head to a point along the ground to carry any water that leaks past the seal to the ground away from the pumps.

2.5 ELECTRIC MOTOR

A. Pump Motor Characteristics

1. NEMA Design B squirrel-cage, induction, shell type design, housed in a TEFC enclosure, inverter duty, suitable for 460V,3 phase, 60 HZ.
2. The motor shall be designed for an ambient temperature of 40°C. Stator winding and stator leads insulated with moisture resistant inverter duty insulation which will resist a temperature of at least 356°F. The magnet wire shall be specially made for inverter duty and the end turns and phase-to-phase insulation shall be increased. Motors not used in conjunction with VFDs may use class F non-hygroscopic insulation.
3. The motor shall be a premium efficiency model with a full load. The rotor and stator shall be built of low loss steel, and the thrust bearings shall be shielded against non-sinewave power if VFDs are used.
4. The rotor and stator shall be built of low loss steel.
5. The motor shall have a refined balance and stress relieved rotor assembly.
6. Designed for continuous duty, capable of sustaining a minimum of 6 starts per hour, evenly spaced. The motor shall meet or exceed the requirements of NEMA MG1 Table 12.
7. Capable of operating at liquid temperature of 104°F in conformance with Factory Mutual requirements without overheating or operating in the service factor.
8. Non-overloading over the entire range of the pump operating curve within the nameplate horsepower.
9. The motor shall include properly sized space heaters. Provide a conduit box for the power leads.
10. Size the motor to be non-overloading at the any point on the characteristic curve of the pump, including run-out. Provide a motor with a power draw that does not exceed the nameplate rating while the pump is operating between the normal minimum and maximum system curves, using a service factor of 1.15. Do not exceed the total capacity of the motor, including service factor, while the pump is operating between the normal minimum and emergency, run-out system curves.
11. Provide in addition to the manufacturer's standard data a certified dimensional print, performance curves, reed critical frequency data, speed vs. torque vs. amps curves.
12. Provide power factor capacitor as required to conform to motor manufacturer requirement to correct the motor's power factor to 0.95 without overexciting the motor. Power factor to be installed a minimum of 10 circuit feet from the solid state reduced voltage motor starter.
13. Refer to Section 16013 - ELECTRIC MOTORS under Division 16, Electrical for motor information not specified in this section.

2.6 SUCTION BARREL

A. Provide suction barrels for pump with adequate number of bowls and suitable length to accommodate suction barrel. Reference plans, section 2.2(A) of this specification, and HI standards for dimension requirements of suction barrel.

B. Provide suction barrels of fabricated steel. Fabricate the barrels of the diameter and wall thickness required, and of suitable lengths to accommodate the number of bowls specified.

C. Barrels shall be coated with NSF certified epoxy, inside and out.

D. Barrels shall have the top flange tack welded to the barrel at deliver in order to set level in the field. Contractor shall full seam weld the top flange to the barrel once the barrel has been leveled.

E. The suction barrel shall be designed and provided by the manufacturer of the pumps and meet the latest HI standards.

F. Suction barrels with anticipated maximum flows in excess of 3,000 gpm shall have internal straightening vanes and an inlet pipe splitter plate the entire length of the inlet, as required by HI latest standards.

G. All suction barrels shall have the top flange installed in the factory and the level should be verified in the field prior to pouring concrete. Each top flange shall have a drilled and tapped bolt pattern that is equal to a standard 150 lb flange. Bolt holes shall straddle the centerline of the suction barrel inlet. The bolting to attach the discharge head to the suction barrel shall be Type 304 stainless steel and furnished by the barrel manufacturer. The top surface shall have a O-ring groove with O-ring for sealing purposes. A gasket will not be acceptable.

H. The barrel inlet shall be as shown on the plan sheets and shall be flanged with an AWWA C207-94 Class D steel flange.

I. The barrel length shall be as shown on the plan sheets and per HI standards. Provide a bottom cap plate in equal thickness to the top flange. Four evenly spaced, 3” x3” x 3/8” angles, with a 1-inch hole in each, shall be welded to the outside diameter on the barrel to assist the installing Contractor in mounting and aligning the suction barrel.

J. The barrel shall be fitted with two ¾-inch couplings to serve as a vent for the barrel.

2.7 ACCESSORIES

A. Nameplates
   1. Provide each pump and motor with a stainless steel nameplate securely affixed in a conspicuous place.
   2. Do not paint over nameplate.
   3. Nameplates shall be imprinted.
   4. Pump Nameplate
      a. Each pump nameplate will show the duty point, at rated speed in revolutions per minute, serial number, impeller number, and number of stages.
   5. Motor Nameplate
      a. See Electric Motor section in Division 16.

B. Vortex Suppressor/Basket Strainer
   1. When shown, pumps shall have a vortex suppressor/basket strainer installed on the pump’s suction except for pumps installed in suction barrel constructed with internal vanes and anti-

cross in suction barrel bottom. The vortex suppressor/basket strainer shall be constructed to meet the following requirements:

a. Performance requirements
   i. Approach velocity
      A) 3.0 feet per second, maximum, at design flow
   ii. Net open area
      A) 65%

b. Design requirements
   i. Basket-type with solid bottom plate and internal straightening vanes.
   ii. Screen
      A) 0.120-inch woven wire cloth on 5/8-inch centers
   iii. Materials
      A) Wire cloth to be 316 stainless steel material.
      B) All other materials to be 304 stainless steel with a minimum thickness of 3/16-inch.
   iv. Mounting
      A) Bolted to the pump suction bell using 5/16-inch minimum diameter 18-8 SST bolts. “Clips” are not acceptable

2.8 COATING SYSTEM

A. Provide a factory applied NSF certified epoxy primer, coatings shall be as specified, to the pump bowls exterior, motor, discharge head exterior, and column exterior.

B. Provide a high solids epoxy lining on the pump discharge head exterior

C. Provide a fusion-bonded epoxy lining inside the pump bowls.

2.9 LIFTING, ALIGNMENT, AND ACCESS

A. Provide lifting lugs capable of supporting the weight of the entire pump and motor.

B. Provide the motor support pedestal with an accurate, machine-registered fit for alignment of the driver.

C. Provide suitable openings for each access to the seal.

PART 3.0 – EXECUTION

3.1 INSPECTION

A. Install all equipment and connecting piping in accordance with Manufacturer’s instructions. Prior to testing and start-up, FPR and manufacturer’s representative to inspect to verify the system is complete.

B. Inspect and verify that structures or surfaces on which equipment will be installed have no defects which adversely affect installation.

C. Promptly report defects which may affect Work to Engineer.

3.2 INSTALLATION

A. Clean all new piping prior to testing.

B. The top flange of suction barrels shall be leveled to within 0.002 of an inch per foot of diameter of the flange.

C. Install products in accordance with manufacturer's written instructions.

D. Provide sufficient clearances for thermal expansion and contraction.

E. Install Type 316 stainless steel hex head bolts, nuts, and washers for anchoring to a suction barrel.

F. Tolerances for plumbness shall be in accordance with Hydraulic Institute standards.

3.3 FIELD PAINTING

A. Field painting shall conform to the requirements of Section 09920.

B. Motor and discharge head exterior shall be field coated by removing factory primer and applying a final protective coating.

C. Number the pumps with 6-inch or larger stencils using black alkyd paint. Pump numbers are to correspond to wiring in MCC.

3.4 FIELD PERFORMANCE TEST

A. After pumps have been completely installed and started-up under the direction of the Manufacturer, conduct field tests to demonstrate that pump operation conforms to these Specifications.

B. If the pump performance does not comply with Specifications, take corrective measures or remove and replace pumps with pumps which satisfy the conditions specified, at no additional cost.

C. The Contractor shall provide all necessary test equipment, including temporary flow meters, pressure gauges, piping plugs or caps, or temporary bulkheads, and current meters.

D. Contractor shall ensure there is sufficient volume of water available to conduct test and that all downstream components are capable of receiving pumped liquid. If there is no available water, the Contractor shall provide water for testing purposes. If downstream components are not in place, Contractor shall make provisions for recycling pumped water and disposal.

E. Contractor shall verify that all structures, pipes, and equipment are installed correctly and make any adjustments required before start-up of pump. Any component parts which are damaged as a result of this testing or which fail to meet the requirements of these specifications shall be replaced, reinstalled, and re-tested at the Contractor's expense.

F. No form of energy shall be turned on to any part of the system prior to approval of Manufacturer's service representative.

G. Field tests shall consist of operating the pumps under normal and abnormal conditions.

H. Flow, pressure, vibration, and current shall be measured and documented for at least three operating points on each pump.

I. Pumps shall be checked for proper alignment to avoid imbalance and excessive vibration. Any misalignment of greater than ¼-inch shall be remedied prior to demonstration period.

J. Provide a testing acceptance letter from the Manufacturer on his letterhead that states the pump was installed in accordance with the manufacturer's instructions, has met all performance requirements, and has been accepted by the Manufacturer.

K. Should the tests indicate any malfunction, CONTRACTOR shall make any necessary repairs and adjustments, and then re-test the equipment. Such tests and adjustments shall be repeated until, in the opinion of the ENGINEER, the installation is complete and the equipment is functioning properly and accurately, and is ready for permanent operation.

3.5 DEMONSTRATION PERIOD

A. Satisfactory operation of pumps, under the Owner's control, for the specified Demonstration Period shall commence a minimum of 48 hours after successful field testing. If malfunctions of other operational problems halt the Demonstration Period, the Contractor shall make appropriate corrections and restart the Demonstration Period.

B. Substantial Completion will not occur until after the Demonstration Period has been accepted by the Engineer and Owner.

3.6 SERVICES BY MANUFACTURER

A. A factory trained representative of the Manufacturer shall provide services for installation supervision, start-up and test services and operation and maintenance personnel training services.

B. The Manufacturer's Representative shall make a minimum of 2 visits, minimum 4 hours on-site for each visit, to the Site. The first visit shall be for assistance in the installation of equipment. Subsequent visits shall be for checking the completed installation, start-up, testing, and training on the system.

C. Manufacturer's Representative shall provide a written report certifying that the installation has been checked, is adequate for the intended purpose, all power connections have been checked, all controls are functional, and that the equipment is ready to be placed into service.

D. Manufacturer's Representative shall start-up and operate the system in the presence of the Engineer, and conduct the field performance test to verify that the equipment meets or exceeds the specified requirements. Representative shall revisit the Site as often as necessary until all trouble is corrected and the installation is entirely satisfactory. The Manufacturer's Representative shall provide a written report documenting the results of the field testing.

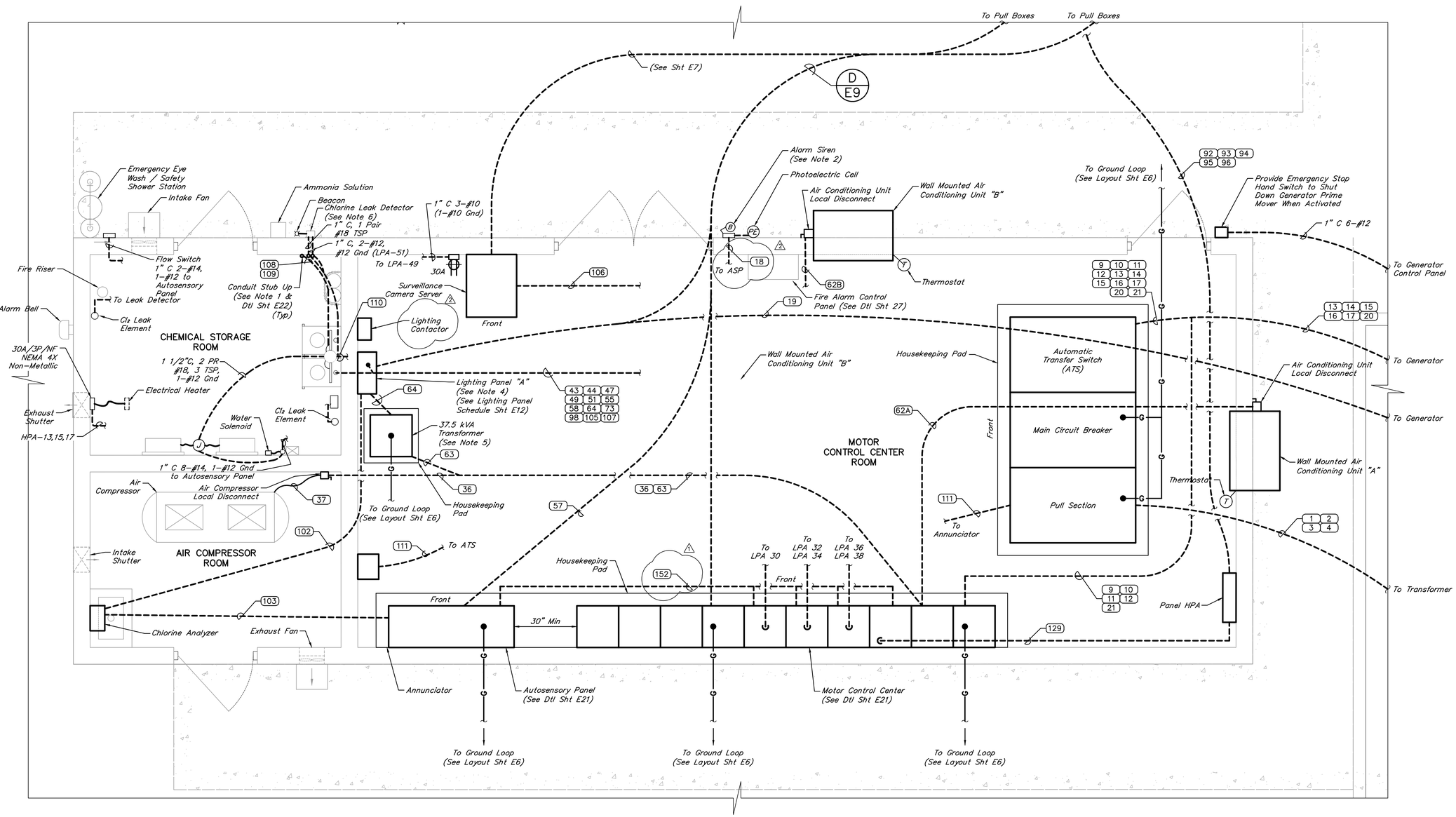
E. All costs, including travel, lodging, meals and incidentals, for additional visits shall be at no additional cost to the Owner.

3.7 FINAL ACCEPTANCE

A. Final acceptance use will not occur until after the following activities have been performed and accepted by the Engineer.
   1. Training the Owner’s operating and maintenance personnel by the Manufacturer’s Representative.
   2. Satisfactory completion of the Demonstrative Period under the Owner's control.

END OF SECTION

0 1 2 3 4 5 ORIGINAL SCALE IN INCHES FOR REDUCED PLANS



CONTROL BUILDING POWER LAYOUT

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

0 .5 1 2 4 6

SCALE: 1/2" = 1'

GENERAL NOTES:

1. Conduit stub ups shall be capped and sealed.
2. Alarm siren shall be mounted to the edge of the roof using stainless steel hardware and straps.
3. All enclosures inside control building to be NEMA 1 Stainless Steel.
4. Provide and install NEMA 1 gutter under lighting panel as needed.
5. See Sheet E6 for grounding. Provide Housekeeping Pad 3" larger than Transformer on all sides. Maintain 3" offset between Housekeeping Pad and adjacent wall.
6. The chlorine leak detection system, including lights, alarms, beacons, horns, and all other components, shall be powered through the autosensory panel UPS.

NO.	DATE	REVISIONS	APP.
2	10.19.23	REVISIONS FOR ADDENDUM NO. 4	CJT
1	10.9.23	REVISIONS FOR ADDENDUM NO. 1	CJT

SAN ANTONIO WATER SYSTEM

MEGHAN PUMP STATION

ELECTRICAL BUILDING POWER LAYOUT

QUIDDITY
Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23290
4350 Lockhill-Selma Road, Suite 100•San Antonio, Texas 78249•210.494.5511

SCALE: 1/2" = 1' - 0" DGN. BY: SHUDSON
DATE: AUGUST 2022 DWN. BY: SHUDSON
JOB NO. S0406-0045-00 DWG. NO.
SUBMITTED: SURV. BY:
F.B. NO.

STATE OF TEXAS
C. J. TROUTT
41075
LICENSED
PROFESSIONAL ENGINEER
10/23/2023

SHEET NO.
E3
37 OF 67

K:\S0406\S0406-0045-00 Blackbuck Regional Pump Station, San Ant\2 Design Phase\CAD\Blackbuck Booster Station\S0406-0045-00 ELEC.dwg

0 1 2 3 4 5 ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

ELECTRICAL PLAN SHEET SYMBOLS

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
(A)	LIGHT FIXTURE (LETTER INDICATES TYPE PER SCHEDULE)	(FS)—	FLOAT SWITCH
A	SINGLE SPECIAL PURPOSE RECEPTACLE (LETTER INDICATES TYPE PER SCHEDULE)	(S)—	SOLENOID VALVE
		(T)—	ELECTRIC THERMOSTAT
	TELEPHONE UTILITY SYSTEM OUTLET	T—	TEMPERATURE ACTUATED DEVICE
	CLASS 1, DIV I, CONDUIT SEAL	$	SINGLE POLE TOGGLE SWITCH
WP	RECEPTACLE, WP INDICATES A WET PROOF LOCATION COVER. NEMA 3R, UNLESS OTHERWISE INDICATED.	$2	DOUBLE POLE TOGGLE SWITCH
		$3	3 – WAY SWITCH
	UNFUSED SAFETY SWITCH – WP, 3P, 30A, 600V, NEMA 3R, UNLESS OTHERWISE INDICATED.	$T	MANUAL ROTARY TIMER LIGHT SWITCH
30	FUSED SAFETY SWITCH – 3P, 600V, 30A MINIMUM, NEMA 3R OR AS REQUIRED TO ACCOMMODATE FUSE SIZE INDICATED	$WP	SINGLE POLE TOGGLE SWITCH, WP INDICATES WEATHERPROOF COVER
	COMBINATION PROTECTIVE DEVICE & MAGNETIC STARTER	(J)	JUNCTION BOX
	SINGLE UNIT PUSHBUTTON STATION	———	EXPOSED CONDUIT
	2–UNIT PUSHBUTTON STATION	- - - - - -	UNDERGROUND CONDUIT
		— —G— —	BARE STRANDED UNDERGROUND CONDUCTOR
	ON/OFF SELECTOR SWITCH	——T——	TELEPHONE CONDUCTORS
S/S	"START/STOP" SELECTOR SWITCH	——E——	EMPTY CONDUIT
	AIR TERMINAL	———	CAPPED CONDUIT
	FLEX CONDUIT	——OH——	POWER COMPANY OVERHEAD POLE LINE
	EXPOSED PUMP CABLE	LS	LIMIT SWITCH
	CONDUIT CONCEALED IN FLOOR SLAB OR UNDER FLOOR SLAB. (CONDUITS 1–1/2" OR LARGER SHALL BE INSTALLED UNDER FLOOR SLAB). CONDUITS RUN UNDER FLOOR SLAB SHALL BE ENCASED IN CONCRETE. SEE NOTE 2	FLS	FLOW SWITCH
		PS	PRESSURE SWITCH
	HOMERUN TO PANEL OR MCC AS NOTED	TS	TORQUE SWITCH
A ED E	CONCRETE ENCASED DUCTBANK (SECTION INDICATES CONDUIT CONFIGURATION & DESIGNATIONS)	PES	PNUEMATIC/ELECTRIC SWITCH
		PLS	PROXIMITY LIMIT SWITCH
	LIGHTING PANEL		
	UTILITY METERING CABINET	DS	MAGNETIC REED DOOR SWITCH
	TELEPHONE UTILITY SYSTEM BACKBOARD	T	TRANSFORMER
	DISTRIBUTION PANEL	■	DEVICE AS DESIGNATED
	CABINET OR PULL BOX		EXISTING POWER COMPANY POLE
	EXISTING		PROPOSED POWER COMPANY POLE
	PROPOSED	XXX	CONDUIT/CONDUCTOR TAGS
	DEMOLITION WORK ITEMS		

CONTROL DIAGRAM SYMBOL LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
CR	CONTROL RELAY		HOLDING COIL CONTACT (NORMALLY OPEN–NORMALLY CLOSED)
TD	TIME DELAY RELAY	CR CR	CONTROL RELAY CONTACT (NORMALLY OPEN–NORMALLY CLOSED)
	LED TYPE PILOT LIGHT PUSH–TO–TEST W–WHITE; R–RED; G–GREEN TEST WIRING NOT SHOWN FOR CLARITY	(F)	FLOAT SWITCH
	THERMOSTAT	PE	PHOTOELECTRIC SWITCH
TD 0–0–X	TIME DELAY CONTACT (O=OPEN, X=CLOSED, DESIGNATION INDICATES CONTACT POSITION WHEN RELAY IS RESET–TIMING–TIMED OUT)		BELL
	SPACE HEATER	ETM	ELASPED TIME METER
TD1 NO–TC	CONTACT ON TIME DELAY RELAY TIME DELAY CLOSED AFTER ENERGIZATION		CONTROL POWER TRANSFORMER
		M	MOTOR STARTER OPERATING COIL
OFF–ON	ON–OFF SWITCH, 2 POSITION TOGGLE	A	LIGHT FIXTURE, A = TYPE
	PUSHBUTTON, NORMALLY CLOSED		MOTOR CONTROL STATION
	PUSHBUTTON, NORMALLY OPEN		HAND–OFF–AUTO SELECTOR SWITCH
	SELECTOR SWITCH	SC	SURGE CAPACITOR
	CONTROL STATION/DISCONNECT SWITCH		SURGE ARRESTER
	MOMENTARY RESET PUSHBUTTON		CONDUIT STUB UP
M	AUXILIARY STARTER CONTACTS	H O A	HAND SELECTOR SWITCH
	PRESSURE SWITCH, OPENS ON RISE		
	PRESSURE SWITCH, CLOSES ON RISE		FUSE
	LEVEL OR LEAK DETECTION SWITCH		SOLENOID VALVE
	LIMIT SWITCH, NORMALLY CLOSED		
	LIMIT SWITCH, NORMALLY OPEN		
	LIMIT SWITCH, NORMALLY OPEN, HELD CLOSED		
	LIMIT SWITCH, NORMALLY CLOSED, HELD OPEN		
	TEMPERATURE ACTUATED SWITCH, OPENS ON RISE		
	TEMPERATURE ACTUATED SWITCH, CLOSES ON RISE		
PFC	POWER FACTOR CORRECTION CAPACITOR		
OL'S X2	OVERLOADS		
	GROUND CONNECTION		
R	PUSH–TO–TEST INDICATING LIGHT		
■	ITEM LOCATED ON FACE OF AUTOSENSORY PANEL		

ONE–LINE DIAGRAM LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	MOLDED CASE CIRCUIT BREAKER	L S	LOCK–STOP STATION (MAINTAINED CONTACT)
	COMBINATION "MCP" MOTOR STARTER	HOA	HAND–OFF–AUTO SWITCH
PFR	PHASE FAILURE RELAY	ETM	ELAPSED TIME METER
	SPACE HEATER	MS	MOISTURE SENSOR
F	EXHAUST FAN	NG	NEUTRAL/GROUND PAD
G	INDICATING LIGHT (COLOR NOTED)	TS	TEMPERATURE SENSOR IN MOTOR
3/4	3 PHASE MOTOR (HORSEPOWER NOTED)	VS	VIBRATION SENSOR IN MOTOR
SPD	SURGE PROTECTIVE DEVICE	GB	GROUND BUS
	SYSTEM GROUND	IC	MICRO–SWITCH – STARTER DISCONNECT TO PREVENT CONTROL OPERATION WHEN MOTOR IS DE–ENERGIZED
	SERVICE HEAD	RVSS	REDUCED VOLTAGE SOFT STARTER W/INTERNAL BYPASS CONTACTOR
	TRANSFORMER		
	CURRENT TRANSFORMER	FS	FLOAT SWITCH
	FUSE		FUSED SWITCH
	POWER FACTOR CORRECTION CAPACITOR		LED TYPE PILOT LIGHT PUSH–TO–TEST W–WHITE; R–RED; G–GREEN TEST WIRING NOT SHOWN FOR CLARITY
M	SERVICE METER	MCP	MOTOR CIRCUIT PROTECTOR
3	CONTROL CONTACT, 3 = NEMA STARTER SIZE		THERMAL OVERLOAD
PM	3 PHASE POWER MONITOR (SINGLE PHASE PROTECTION RELAY)		AUTOMATIC SWITCH
3 OL'S M	NEMA STANDARD MAGNETIC MOTOR STARTER OPERATING COIL	▲	ITEM LOCATED ON FACE OF MCC

ABBREVIATIONS

A	AMP	N. mS	MILLISECOND
ADJ	ADJUSTABLE	MTH	MOTOR TEMPERATURE SWITCH
AFF	ABOVE FINISHED FLOOR	MTS	MANUAL TRANSFER SWITCH
AI	ANALOG INPUT		NEUTRAL
ALT	ALTERNATOR	N3R	NEMA 3R
AO	ANALOG OUTPUT	N4X	NEMA 4X
ASP	AUTOSENSORY PANEL	N.C.	NORMALLY CLOSED
ATS	AUTOMATIC TRANSFER SWITCH	NEC	NATIONAL ELECTRICAL CODE
C	CONDUIT	NEUT	NEUTRAL
CA	CABLE	N.O.	NORMALLY OPEN
CAB	CABINET	OL	OVERLOAD
CAT.	CATALOG	P	POLE
CB	CIRCUIT BREAKER	PLC	PROGRAMMABLE LOGIC CONTROLLER
CKT	CIRCUIT	POS	POSITION
CNP	CENTERPOINT POWER	PS	PRESSURE SWITCH
COMM	COMMUNICATIONS	PVC	POLYVINYL CHLORIDE
CONT	CONTINUED	PVC RGS	PVC COATED RIGID GALV CONDUIT
CPT–N	CONTROL POWER TRANSFORMER NEUTRAL	PWR	POWER
		R	RELAY
CPU	CENTRAL PROCESSING UNIT	RALM	PUMP ALARM RELAY
CT	CURRENT TRANSFORMER	REE	ELEC BLDG ENTRY AUX RELAY
CU	COPPER	RGS	RIGID GALVANIZED CONDUIT
CW	COOL WHITE	RHLA	HIGH LEVEL ALARM RELAY
DI	DISCRETE INPUT	RM	PUMP RUN AUX RELAY
DIREC	DIRECTIONAL	RMOR	MOTOR OVERLOAD AUX RELAY
DIV	DIVISION	RMTH	MOTOR TEMPERATURE RELAY
DN	DOWN	RPLC	PLC MODE AUX RELAY
DO	DISCRETE OUTPUT	RPLCOR	PLC OVERRIDE
ETM	ELAPSED TIME METER	RPLM	PLC PUMP RUN RELAY
G.E.	GENERAL ELECTRIC	RPLMP	BACKUP SYSTEM RUN RELAY
GFI	GROUND FAULT INTERRUPT	RR	RUN RELAY
GND	GROUND	RRST	PUMP RESET AUX RELAY
HL&P	HOUSTON LIGHTING & POWER	RRST5	MODEM RESET RELAY
H–O–A	HAND OFF AUTO	RTAH	TEMPERATURE ALARM AUX RELAY
HPS	HIGH PRESSURE SODIUM	RUV	UNDERVOLTAGE AUX RELAY
INC	INCANDESCENT	RVSS	REDUCED VOLTAGE SOFT STARTER
JB	JUNCTION BOX	RWD	WATCHDOG RELAY
KA SYM	THOUSAND AMPS SYMMETRICAL	SEC	SECONDS
KS	KEY SWITCH	SL	SEAL LEAK SWITCH
KVA	KILO–VOLT–AMPS	SN	SOLID NEUTRAL
KW	KILO–WATT	SP	SURGE PROTECTOR
L	LINE	SPD	SURGE PROTECTION DEVICE
LOS	LOCK OUT STOP	SPST	SINGLE POLE SINGLE THROW
LS	LIMIT SWITCH	SS	SELECTOR SWITCH
LSI	LONG TIME, SHORT TIME, INSTANTANEOUS	S.S.	STAINLESS STEEL
		SW	SWITCH
LSIG	LONG TIME, SHORT TIME, INSTANTANEOUS, GROUND FAULT	TEMP	TEMPERATURE
		TD	TIME DELAY RELAY
LV	LOW VOLTAGE	TDLP	LOSS OF POWER TIME DELAY RELAY
LVN	LOW VOLTAGE NEUTRAL	TDRM	PUMP TIME DELAY RELAY
M	MOTOR RUN CONTACT	TSP	TWISTED SHIELDED PAIR
MADC	MILLIAMPERE DIRECT CURRENT	UPS	UNINTERRUPTIBLE POWER SUPPLY
MCC	MOTOR CONTROL CENTER	V	VOLTS
MCP	MOTOR CIRCUIT PROTECTOR	VA	VOLT–AMP
MIN.	MINUTES	VAC	VOLTS ALTERNATING CURRENT
MOR	MOTOR OVERLOAD RELAY	VDC	VOLTS DIRECT CURRENT
		W	WATT OR WIRE
		WM	WATT MISER (HIGH EFFICIENCY LAMP)
		WP	WEATHER PROOF
		XFMR	TRANSFORMER

NOTES:

1. All construction shall comply with local and national codes and requirements.
2. Conduits shall not be routed across walkways, paths of access, travel, or egress. Route beneath gratings, in concrete structures, or around equipment. Do not route in conflict with other piping, conduits, equipment, or structures. Conduits imbedded in structural concrete (floor slabs, etc.) shall be so located as not to unduly impair the strength of the construction and shall be spaced not less than two times the conduit OD between adjacent conduits except where crossing or otherwise approved by the engineer.
3. Field verify exact location of all underground pipes, conduits, and structures before digging. Repair any damage done to original condition.
4. Contractor shall be responsible for obtaining any and all permits associated with the work. The costs of the permits, if any, shall be borne by the Contractor.
5. This contract includes field installation and completion of vendor supplied components. All solenoids, float switches, transducers, motor operated valves, drive motors, alarm contacts, run lights, etc. are to be wired to vendor's panel or site motor controls as required. Contractor is to verify vendor–supplied components and provide a complete and operable system.
6. All exterior above grade conduit shall be rigid aluminum steel conduit. Duct bank elbows and risers shall be PVC coated rigid aluminum conduit. All conduits in duct banks shall be schedule 40 PVC. Unless otherwise noted, all mounting hardware shall be galvanized steel. ⚠
7. Items in bold are proposed, all others are future.
8. Repair all damage to existing roads and sidewalks related to this construction to pre–existing conditions or better.
9. Any proposed underground duct banks crossing existing duct banks and pipes shall be routed a minimum 1–foot underneath existing or proposed obstruction.
10. Support all outdoor above ground conduit every 6 feet with galvanized steel mounting hardware.
11. Wiring for lighting, receptacles and other miscellaneous circuits shall conform to the circuiting indicated on the drawings with arrangement and routing as required. The wiring shall be so arranged that no more than 4 current carrying conductors shall be installed per conduit and and circuits of different panels shall be installed in separate raceways.
12. Any conduit without further designation shall be 3–#10 and 1–#12 GND in 1" conduit.
13. XHHW conductors shall be used for underground installations and THHN/THWN conductors for above ground installations, unless otherwise noted.

NO.	DATE	REVISIONS	APP.
⚠1	10.19.23	REVISIONS FOR ADDENDUM NO. 4	CJT

SAN ANTONIO WATER SYSTEM

MEGHAN PUMP STATION

ELECTRICAL LEGENDS, SYMBOLS, AND ABBREVIATIONS

QUIDDITY
Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23290
4350 Lockhill-Selma Road, Suite 100•San Antonio, Texas 78249•210.494.5511

SCALE: NO SCALE DGN. BY: SHUDSON
DATE: AUGUST 2022 DWN. BY: SHUDSON
JOB NO. S0406–0045–00 DWG. NO.
SUBMITTED: SURV. BY:
F.B. NO.

STATE OF TEXAS · D. J. TROUTT · 41075 · LICENSED PROFESSIONAL ENGINEER
10/23/2023

SHEET NO. E1
35 OF 67

K:\S0406\S0406–0045–00 Blackbuck Regional Pump Station, San Ant\2 Design Phase\CAD\Blackbuck Booster Station\S0406–0045–00 ELEC.dwg