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February 25, 2025

City of Big Lake, Texas
High Service Pump Station Pump Replacement

Addendum No. 1

Attention is called to the following modifications to the Plans, Specifications and Contract Documents (collectively Proposal Documents) for the above referenced project. The City of Big Lake will receive sealed Proposals for the High Service Pump Station Pump Replacement Project, until **4:30 p.m.** local time on **Tuesday March 04, 2025**, at City Hall located at 203 Plaza, Big Lake, Texas 76932. Proposals will be publicly opened and read aloud. We hereby modify the documents as follows:

SPECIFICATIONS:

1. Section 11311 – Vertical Turbine Pumps: **REPLACE** the specification in its entirety with the one attached.

This addendum consists of **eight (8)** pages and becomes a part of the referenced plans, specifications and contract documents and **SHALL BE ACKNOWLEDGED** by the Proposer and attached to the Proposal submitted.

By: Sage Diller, P.E. #96645
Vice President

2/25/2025

PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

SECTION 11311

VERTICAL TURBINE PUMPS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. This Section specifies vertical turbine pumps (P – 101 and P -102) for the High Service Pump Station:

B. Furnish, install, test and place in satisfactory operation the vertical turbine pumps as shown in the drawings and specified herein.

C. See the pump schedule at the end of this section.

1.2 REFERENCES:

A. NSF 61: ANSI/NSF 61 National Sanitation Foundation Standard 61, Drinking Water Treatment Components.

B. American Society Of Mechanical Engineers (Asme): B16.1, Cast Iron Pipe Flanges and Flanged Fittings - Classes 25, 125 and 250.

C. Society of Automotive Engineers (SAE).

D. American Iron and Steel Institute (AISI)

E. Safe Drinking Water Act (SDWA)

1.3 SUBMITTALS:

A. Submit under provisions of Section 01300.

B. Product Data:

1. Submit product data for approval. As a minimum, include the following:

a. Manufacturer's standard descriptive bulletins, listing data including materials of construction and parts list.

b. Dimensional drawings of equipment.

c. Pump performance curves showing performance of pumps to be provided. Include curves for operation at 100% power and reduced power for pumps with VFDs. All extraneous information and curves shall be deleted. Specified operating points shall be indicated on the curve. Curves shall be 8-1/2 inch by 11 inch format. One pump application per curve. The performance curve shall indicate the following:

i. Pump performance over the entire range from shutoff head to maximum flow.

ii. Horsepower versus capacity over entire range.

d. Motor performance data, wiring diagrams, one-line diagrams and conduit entry dimensions and details.

C. Operation and Maintenance Information:

Submit operation and maintenance information to include: procedures for routine maintenance; parts lists with illustrations; lubrication identification and recommendations.

1.4 WARRANTY

A. The manufacturer shall provide a warranty on equipment against manufacturer's defects for twelve (12) months, commencing on the date of Owner-accepted substantial completion of the project. If the equipment should fail during the warranty period due to a defective part, it shall be replaced and the unit restored at no cost to the owner, including both service and parts.

1.5 PERFORMANCE REQUIREMENTS:

A. Performance characteristics shall be such as to ensure stable operation and steady flow through the range of operating conditions. Pumps shall be capable of meeting the operating conditions shown in the schedule below.

B. Pump Characteristics:

1. Pump selection design point shall be within plus or minus 5 percent of the best efficiency point for the pump.

2. The submitted curve shall not exceed 95% of the nameplate horsepower rating at any point on the curve. When tested the pump shall not overload the nameplate horsepower of the motor at any point of operation.

PART 2 PRODUCTS:

2.1 MANUFACTURER:

A. Pumps and accessories:

1. American Turbine Pump Co.
2. Flowserve of Smith Pump
3. Sulzer
4. Or Engineer pre-approved equal.

2.2 EQUIPMENT:

A. Pumps will be installed outdoors and shall be supplied to withstand ambient conditions.

B. Pumps shall be affixed with a permanent nameplate that shall show pertinent pump design information.

C. Manufacturer to provide a spare parts list.

D. All wetted components of pumps shall consist of materials and coatings that comply with the Safe Drinking Water Act and are NSF 61 certified.

E. Bowl Assembly: The intermediate bowls, suction bowl, and discharge adaptor shall be flanged-type from a close grained cast iron, and shall conform to ASTM A48, Class 30.

1. The suction bowl shall be provided with a non-soluble grease packed bronze bearing, and a bronze sand collar shall be incorporated in the pump design to protect the bearing from abrasives. The bearing housing shall have a sufficient opening at the bottom for easy removal of the bearing.

2. Impellers: The impellers shall be constructed from C958 nickel-aluminum-bronze. Either enclosed or open type impellers are acceptable. The impellers shall be free from defects and must be accurately cast, machined, balanced, and filed for optimum performance, and minimum vibration. Impellers shall be dynamically balanced per ISO 1940 G6.3. Impellers are to be standard product of the pump manufacturer and shall not contain special workmanship to temporarily increase efficiency. They shall be securely fastened to the bowl shaft with taper locks of Type 416 stainless steel. Impeller clearance shall be adjustable by means of a top shaft adjusting nut.

3. Wear rings: If of the enclosed impeller type, pumps 6 inches and larger shall be fitted with replaceable lead-free bronze (B271 Alloy C952) or stainless steel (CA-15) wear rings, in the suction bowl and intermediate bowls. Wear rings shall have the minimum practical clearance to the mating cylindrical surface of the impeller to provide adequate sealing independent of vertical positioning of the impellers. Integral wear rings are not acceptable.

4. The bowl shaft shall be constructed from ASTM A582 type 416 stainless steel. It shall be supported by water lubricated bearings suitable for application.

F. Column Assembly:

1. Water Lubricated: Pump speeds up to 2200 rpm shall have intermediate column lengths and line shaft bearing spacing not to exceed 10 feet. Pump speeds between 2200 rpm and 3600 rpm shall have intermediate column length and bearing spacing no greater than 5 feet. Bronze centering spiders of the drop-in-type shall be furnished for shaft stabilization at each column pipe coupling. Bearings shall be fluted rubber retained in the spider by a shoulder on each end of the bearing.

G. Column pipe: The column pipe shall be type A53 steel, grade A-B steel. Wall thickness shall be adequate for the bowl pressures under all operating conditions. Inside diameter of the pipe shall be such that the head losses shall not be over 5 feet per 100 feet of pipe. Pumps shall have intermediate column sections of a maximum length of 10 feet each. For dry pit installations, column

pipe connections shall be flanged with Buna-N O-rings. For wet pit installations, either flanged or threaded sleeve coupling type connections are acceptable. For threaded connections, pipe ends shall be machined with 8 threads per inch with 3/16-inch taper and faced parallel to butt against centering spiders.

H. Line Shaft: Line shaft shall be of ample size to operate the pump without distortion or vibration. Diameter of the shaft shall be such that it is adequate to withstand the maximum torque and tensile forces imposed upon it. Shaft shall be furnished in interchangeable sections not over ten feet in length, and shall be coupled with extra-strong threaded steel coupling machined from solid bar steel. Line shaft and couplings shall be Type 416 or Type 17-4PH stainless steel.

I. Discharge Head: The discharge head shall be ASTM A36 fabricated steel and A53 Gr. B pipe, designed to move resonant frequencies outside of the operating speed range. The discharge head shall have an ANSI class discharge flange rated for the expected operating pressure, but not rated less than the shut-off head for the pump provided. The flanges shall extend beyond the head base such that the pump can be removed without disturbing adjacent piping. The top shall have a register to ensure alignment of the pump driver. The discharge head shall include the head shaft, which extends through the pump driver. A base plate shall be provided such that the head can be seated on a flat, level surface. The head shaft shall terminate above the packing assembly, so that the driver can be removed without lifting over the shaft.

The shaft shall be sealed in the discharge head by a packing assembly. The packing box shall contain a long, bronze throttle bearing and the upper section shall be bored to accept a minimum of 5 rings of packing. The packing box shall have both pressure relief and grease ports extending into the packing cavity to a point where lantern rings will be situated. The packing shall be compressed by a two-piece split gland. The splint gland shall be bronze, secured in place with noncorrosive studs and nuts. The bearing shall be SAE 660 bronze, removable in a manner that does not require any other parts to be disturbed to change the shaft bearing.

J. Driver: The pump driver shall meet the criteria listed in the "Operating Requirements" Section. The power required to operate the bowl assembly, power losses in thrust bearings, and mechanical losses in shafting shall all be included in determining the driver load. The driver will be sized not to have its nameplate rating overloaded at the pump design point and the service factor shall not be overloaded at any operating condition from shut off to open flow. The driver will house the pump thrust bearing that is to be rated for the maximum down thrust of the entire pump. The bearing shall also be capable of handling a momentary up thrust force equivalent to a maximum of 30 percent of its down thrust rating.

K. Fasteners: All fasteners shall be Type 316L stainless steel, including anchor bolts, other bolts, washers, and nuts.

L. Strainer: the pump suction bell shall be fitted with a heavy gauge wire woven basket type strainer, of Type 316L stainless steel. The strainer shall have a net inlet area equal to at least four times the suction pipe area. The maximum opening shall not be more than 75% of the minimum opening of the water passage through the bowl and impeller. The strainer shall be secured to the

suction bell by means of Type 316L stainless steel cap screws, bolts, or clips as required.

M. Driver: The pump driver shall meet the criteria listed in the "Performance Requirements" Section and the Schedule below. The power required to operate the bowl assembly, power losses in thrust bearings, and mechanical losses in shafting shall all be included in determining the driver load. The driver shall be sized not to have its nameplate rating overloaded at any operating condition from shut off to open flow. The driver shall house the pump thrust bearing that is to be rated for the maximum down thrust of the entire pump. The bearing shall also be capable of handling a momentary up thrust force equivalent to a maximum of 30 percent of its down thrust rating.

1. Electric Motor: The motor shall be a heavy duty squirrel cage induction type, NEMA design B vertical hollow shaft motor, with a non-reverse ratchet to prevent reverse rotation of the rotating elements. A suitable thrust bearing shall be incorporated in the upper end of the motor adequate to receive the entire hydraulic thrust load of the pump unit plus the weight of the rotating parts under all conditions of operation.

2. For variable speed units the motor shall be Inverter Duty per NEMA MG1 part 31 for variable torque applications and provided with provisions to prevent premature bearing failure. At a minimum these provisions shall include a shaft grounding ring or brush, and an insulated end bearing.

3. Enclosure: WPI

4. Insulation Class: F

5. Service Factor: 1.15

6. Speed: 1800 rpm

7. Power Supply: 460 V, 60 Hz, 3 phase

2.3 PAINTS AND COATINGS:

A. All paints and coatings on wetted parts of pump (bowl, shaft, column, inside of head, etc.) shall be suitable and approved for potable water service. See Specification Section 09800, Painting.

PART 3 EXECUTION

3.1 INSTALLATION:

A. Install the equipment as indicated and in accordance with the manufacturer's written instructions.

3.2 EQUIPMENT STORAGE

A. The Contractor shall be responsible for receipt, protection and storage in accordance with manufacturer's recommendations of all items shipped to the site from the time of delivery until installation is completed and the units and equipment are ready for operation. The equipment shall be suitably covered and protected at all times.

3.3 FIELD QUALITY CONTROL:

A. Provide services of factory-trained manufacturer's representative to inspect installation and test pump operation after pump station, pipeline and elevated storage tank is a fully operational system so that potable water can be pumped from the intake to the elevated storage tank. Representative shall demonstrate satisfactory system operation and provide a minimum of four (4) hours of hands-on instruction to Owner's personnel on pump operation and maintenance. Site visit by manufacturer's representative shall be at least one full 8- hour working day for pump installation inspection and a total of two (2) additional 8-hour days for testing of P-101 and P-102 pump operation, as well as Owner instruction.

3.4 FIELD VIBRATION/OPERATION TEST:

A. Under the supervision of the manufacturer's representative, operate each pumping unit throughout its full range of operating heads. Unit shall be checked for excessive noise or vibration, misalignment, and any other operational problems.

B. Pumps and motors shall be tested per Hydraulic Institute Standard test method 1U at factory.

C. Record the following data during test and submit to Engineer:

1. Discharge pressure

2. Suction pressure (dry pit application only if available)

3. Motor voltage and current

4. Kilowatt consumption

5. Vibration levels in two axes at motor base. Measurements shall be made in line with pump discharge and at 90 degrees from discharge.

6. Shaft speed.

Application/Location	High Service Pump Station
Tag Number(s)	P-101 P-102
Number of Pumps	2
Environment	Outdoors
P-101 Design Points Capacity: TDH:	 500 gpm 185 feet
P -102 Design Points Capacity: TDH:	 1500 gpm 185 feet
Minimum pump efficiency*	82%
P-101 Column pipe size: P-102 Column pipe size:	12 inches 12 inches
P-101 discharge flange size P-102 discharge flange size	8 inches 12 inches
Lubrication	Water
Column Pipe Coupling	Flanged
Operation	Constant Speed
P-101 Minimum Motor Size: P-102 Minimum Motor Size:	30 h.p. Constant Speed 75 h.p. Constant Speed
Motor Ambient Temperature Rating	40 °C

* Pump efficiency is not to be confused with bowl efficiency. The stated efficiency is for the entire pumping unit including the column assembly, head and bowl assembly.

END OF SECTION