YEOMANS

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SERIES 6150

HORIZONTAL COUPLED
NON-CLOG PUMPS

SUGGESTED SPECIFICATIONS

PART I GENERAL

DESCRIPTION

Work Included: Under this section, the contractor shall provide all labor, equipment and material necessary to furnish, install, test and place in operation Horizontal Dry-Pit Pumping Units designed for wastewater service as shown in the plans and as specified herein.

Other Project Specific Work

1.2 Related Work Described Elsewhere: *Project Specific*

1.3 GENERAL

Furnish and install ____Horizontal Flexible Coupled Dry Pit Pumping Units complete with all accessories and appurtenances as shown in the plans and specified herein or as required for a complete operating system. Each Pumping Unit shall be rated for continuous duty in accordance with the operating conditions defined in Table 1 of these specifications. Each unit shall be furnished with pump, driver horizontal pump/motor baseplate with flexible coupling and guard.

1.4 QUALITY ASSURANCE

Qualifications of Manufacturers: The pumps shown and specified are based on the products manufactured by Yeomans Pump, Aurora, Illinois. Catalog numbers and references are given only as an indication of the quality of materials and workmanship to be used. Pumps are to be engineered and manufactured under a written Quality Assurance program. The Quality Assurance program is to have been in effect for at least five (5) years and shall include a written record of periodic internal and external audits to confirm compliance with such program.

1.5 QUALITY CONTROL

The Dry Pit Pumping Units shall conform to all applicable requirements of ASTM, ANSI and Hydraulic Institute. For purposes of this specification, the revision and/or version of the referenced standards in effect on the date of public bid opening shall apply.

The Dry Pit Pumping Units specified shall be the products of reputable manufacturers who have been regularly engaged in the design, manufacture and furnishing of Wastewater Pumping Equipment for at least ten (10) years. The manufacturer of the pump shall assume full responsibility for compatibility of the supplied components with the application.

PART 2 PUMP CONSTRUCTION

2.1 CASING

Note: Delete reference to raw sewage if not applicable and insert the fluid type

The casing shall be designed for handling (raw sewage) and shall be of cast iron conforming to ASTM A48, Class 30 or better, of sufficient thickness and suitably ribbed to withstand all stresses and strains of service at full operating pressure.

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The volute shall be side-flanged, tangential discharge and designed to be installed at positions of 45 degree increments. A handhole shall be provided in the casing to provide convenient access to the impeller and interior parts of the pump. The inner contours of the handhole cover shall match the contours of the casing. No stationary guides or splitters will be permitted on either the suction or discharge sides of the casing. The casing shall be provided with tapped and plugged (removable) vent, drain, and gauge connections. The discharge connection shall be a 125 lb. standard raised face flange positioned as indicated on the Drawings.

2.2 IMPELLER

The impeller shall be balanced non-clogging type made of close-grained cast iron conforming to ASTM A48 Class 30 or better. The impeller shall be single suction, enclosed, two to four vane, radial flow design with well rounded leading vanes and then tapered toward the trailing edge for a circular flow pattern. The waterways through the impeller shall have extremely smooth contours, devoid of sharp corners, so as to prevent rags or stringy fibrous material from catching or dogging. Wiper vanes are required on the back shroud of the impeller to minimize end thrust and reduce pressure on the stuffing box.

The impeller shall be cast in one piece and shall be dynamically balanced. Rotation of the impeller shall correspond to the pump discharge orientation as indicated on the Drawings. The design of the impeller and the shape of the blades shall be such that rags or similar materials will not clog the pump or seriously affect the efficiency. The impeller shall be keyed to the shaft and firmly held in place by a streamlined 316 stainless steel or bronze locking device. The arrangement shall be such that the impeller cannot be loosened by torque from either forward or reverse rotation.

2.3 WEAR RINGS (Optional)

Removable hardened stainless steel wear rings shall be provided for both the suction cover and the impeller, with the wearing surfaces normal to the axis of rotation. They shall be securely fastened with counter-sunk, machine-head, stainless steel screws to prevent any relative motions and designed for easy replacement. Both wear rings shall be a minimum of 3/8 inch thick and shall be made of hardened 400 series stainless steel, with the impeller ring hardened to 325 to 375 Brinell and the casing ring hardened to 425 to 475 Brinell and designed to compensate for a minimum of one-quarter inch wear.

2.4 STUFFING BOX

The stuffing box shall be readily accessible and its construction shall permit the use of either a standard commercially available mechanical seal or teflon seal ring and packing without special machining. The stuffing box shall be designed for a minimum of five (5) rings of packing in addition to a seal ring and suitable for use of dean water for sealing. The stuffing box shall be provided with a horizontally split removable cast iron (bronze) gland to facilitate packing replacement. The seal ring shall be located adjacent to and on the outboard side of the second packing ring The stuffing box shall be drilled and tapped for a 1/4 inch minimum water seal connection. The seal ring shall be a split ring 25 percent glass filled TFE type, of sufficient strength for the intended service, drilled and tapped for easy removal, and suitably positioned to assure uniform distribution of the sealing medium. The back of the pump casing cover shall be provided with a lip suitable for use as a reservoir to retain stuffing box leakage and a 1/2 inch minimum NPT tapped hole to permit leakage to be drained away.

2.5 PUMP SHAFT

The pump shaft shall be made from high grade heat treated alloy steel, rigid shaft type, of sufficient size to transmit the full driver horsepower with a liberal safety factor, accurately machined over its entire length and free from any harmful or damaging vibrations. The pump shaft shall include a tapered end for positive alignment and ease of removal at the impeller hub. Shaft deflection shall not exceed .002 inch at the stuffing box at $\pm$ 40% of the best efficiency point of the impeller curve furnished. A renewable stainless steel shaft sleeve shall be provided extending from the impeller hub through the stuffing box. The shaft sleeve shall be internally ground and positively secured to the shaft to prevent relative rotation. Passage of

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water between the shaft and sleeve shall be prevented by O-ring or other approved means. Shrink fit shaft sleeves will not be acceptable. The shaft sleeve shall be hardened 400 series stainless steel with a 425 to 475 Brinell hardness and a 32 micro-inch surface finish.

2.6 PUMP BEARINGS

The pump shall be provided with radial and thrust anti-friction ball or tapered-spherical roller type bearings of ample size to carry all loads imposed under continuous operation without overheating. The bearings shall be grease lubricated and a relief port lip seal shall be provided so that excessive grease pressure will not damage the bearings. The pump bearing frame shall be designed so that the complete rotating element can be removed from the pump casing without disconnecting of the suction or discharge piping. The bearings shall be designed in accordance with AFBMA standards for a minimum L-1 0 life of 40,000 hours at the most extreme operating points on the pump performance curve and a minimum of 100,000 hours at the primary duty point.

2.7 BEARING FRAME

The pump bearing frame shall be made of ASTM A48 Class 30 cast iron material. The bearing frame shall be shoulder fitted, accurately centered and rigidly fixed to the pump casing and backplate. The bearing frame shall contain jacking bolts and shims for the axial adjustment of the rotating element when necessary to provide the manufacturers recommended clearance between the impeller and suction cover over the life of the pump.

2.8 SUCTION AND BACKPLATE

The suction and backplate shall be of the same material as the casing, cast separate from the volute and built to allow complete removal of the bearings, shaft and impeller without disturbing the pump suction or discharge piping connections. The suction and backplate shall be shoulder fitted to the casing and assembled with studs to assure accurate alignment. The backplate shall be designed to support the rotating assembly and shall have a convertible stuffing box of ample depth and design to accommodate either a mechanical seal or packing. The suction plate shall be provided with a separate suction nozzle with handhole. The inner contours of the handhole cover shall match the contours of the suction elbow. The pump suction shall be of the size specified; 125 lb. standard raised face flanged and shall be provided without the use of pipe adaptors.

2.9 PUMP AND MOTOR SUPPORT BASEPLATE

The pump support system shall be of sufficient size, strength and rigidity to support the unit and prevent harmful or damaging vibration. The combination pump and driver base shall be a heavy—duty fabricated steel open channel base with large access openings to facilitate grouting. The baseplate shall be anchored to the concrete floor/pad using a minimum of four stainless steel anchor bolts sized as recommended by the manufacturer.

2.10 COUPLING & COUPLING GUARD

Each pump shall be provided with a shaft coupling and guard. The coupling shall be a (Standard-Flexible type) (Optional-Spacer type) designed to permit removal of the rotating assembly without disturbing the motor or the suction or discharge piping. The guard shall be all-metal, OHSA approved, and shall completely enclose the coupling.

PART 3 **MOTOR**

Each pump shall be driven by a horizontal, foot mounted solid shaft squirrel cage induction electric motor with a maximum horsepower and speed as specified. The motor shall be mounted and supported by the fabricated steel baseplate. The motor shall have a (ODP) (TEFO) (TEXP) enclosure and shall meet all the requirements of NEMA, IEEE and NEC. Motors shall be rated for phase, _____volts, ____hertz electrical service and shall conform to all applicable requirements of Div. 16.

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PART 5 TESTING

5.1 The natural frequency of the assembled pump and its supporting structure shall be at least 25 percent higher than the maximum pump excitation frequency. The pump shall operate within the vibration limits of the Hydraulic Institute

5.2 The pumps shall be performance tested at the manufacturer's plant before shipment in accordance with Hydraulic Institute standards. Upon request, certified copies of the test curves shall be submitted to the engineer.

5.3 Each pump shall be hydrostatically tested at the manufacturer's plant before shipment in accordance with Hydraulic Institute standards. Upon request, certified copies of the test results shall be submitted to the engineer.

PART 6 FIELD SERVICE

Days of Field Service shall be provided by an authorized, factory trained representative of the Pump Manufacturer. Services shall include, but not necessarily be limited to, inspection of the completed installation to ensure that it has been performed in accordance with the manufacturer's instructions and recommendations, supervision of all field testing and activation of the Manufacturer's Prescribed Warranty.

The Contractor shall be responsible for coordinating the required field services with the Pump Manufacturer.

END OF SECTION

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TABLE 1 PERFORMANCE DATA

Rate of Flow at Duty Point (USGPM)	_____
Total Dynamic Head at Duty Point (Ft)	_____
Maximum Rotating Speed at Duty Point (RPM)	_____
Maximum Net Positive Suction Head Required at Duty Point (Ft)	_____
Minimum Pump Efficiency at Duty Point (Percent)	_____
Minimum Impeller Diameter (In)	_____
Minimum Shut-Off Head (Ft)	_____

Minimum Spherical Diameter Solids Passage (In)	_____
Minimum Motor HP	_____
Maximum Motor Speed (RPM)	_____
Electrical Power (Voltage, Phase , Cycles)	_____