

SECTION 11319 - SUBMERSIBLE LIFT STATION

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Scope: Furnish all labor, equipment and material to construct one duplex Submersible pumping station consisting of pumps, motors, wet basin, separate valve pit, valves, piping, hatches, guide rails, pump removal components, control center, float switches, remote monitor, interconnecting electrical wiring, incoming power supply, and other features regularly and normally required as a part of a complete and functional facility.
 - 1. All work shall be in accordance with site requirements, details, these specifications, the manufacturer's recommendations, and all applicable codes, specifications and standards.
 - 2. All of the mechanical and electrical equipment shall be an integral Package supplied by the pump manufacturer with local representation so as to provide undivided responsibility. The package shall be equal in construction and performance to Hydromatic Pump equipment.
- B. Codes, specifications, and standards referred to by number of title shall form a part of this specification to the extent required by the references thereto. Latest revisions shall apply, unless otherwise specified. Where used in these specifications, the following acronyms shall represent:
 - 1. ANSI - American National Standards Institute.
 - 2. ASTM - American Society for Testing & Materials
 - 3. HI - Hydraulic Institute.
 - 4. NEMA - National Electric Manufacturer's Association.

1.2 QUALITY ASSURANCE

- A. The pumping unit manufacturer shall test each pump for mechanical and electrical correctness.
- B. Perform field test specified in this Section.

1.3 SUBMITTALS

- A. Submittals shall be submitted to the Town Superintendent who shall review and render a decision in writing regarding acceptably of the equipment. Without prior written approval, the item of work may not be accepted.

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- B. Submit the following:
1. Manufacturer's Certificate of compliance certifying compliance with the referenced specifications and standards.
 2. Six (6) sets of Shop drawings with performance data, detailed specifications, and physical characteristics.
 3. Manufacturer's installation instructions.
 4. Manufacturer's operation and maintenance manuals.
 5. Certified copies of test reports.
 6. Pump warranty.

Any exceptions to this standard or associated approved plans shall be submitted in writing and clearly stated. The exceptions must be approved by the Town Superintendent prior to proceeding with the work,

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. The Contractor shall be responsible for the proper delivery, storage, and handling of products.
- B. Load and unload all pumps, motors, and appurtenances by hoists or skidding. Do not drop products. Do not skid or roll products on or against other products. Pad slings and hooks in such a manner to prevent damage to products.
- C. The pumps furnished shall be packaged in such a manner as to provide ample protection from damage handling shipment, and outdoor storage at the lift station site. All openings shall be capped with dustproof closures and all edges sealed or taped to provide a dust-tight closure.
- D. Promptly remove damaged products from the job site. Replace damaged products with undamaged products.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All components of the lift station that are exposed to weather shall be constructed of material that is resistant to corrosion and will not require surface protection throughout the expected life of the lift station.
- B. Operating Conditions:

Each pump shall have a capacity of _____ gallons per minutes at a total dynamic head of _____ feet when operating at _____% minimum efficiency. The pump motor shall be a minimum _____ horsepower, _____ RPM, _____ volt, 3 phase, 60 cycle. Each pump shall be provided with _____ feet of power cable and sensor

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cable. The pump shall be pump model no. _____ as manufactured by Hydromatic, or an approved equal.

- C. Pumping units shall meet the requirements of the latest editions of the following specifications:

| <u>Material</u> | <u>ASTM or ANSI Designation</u> |
|-------------------|---|
| Cast Iron | A-48 Class 30 |
| Stainless Steel | ANSI Type 316L, 304, and 431 |
| Bronze | B-144 Class 3B |
| Hot rolled Steel | A 107-50-T Gr. 1015 .20 Cu. Min. |
| Cold Rolled Steel | A 108-50-T Gr. 1141 Turned, Ground & Polished |
| Pipe | ANSI A21.51 |

- D. Where applicable specifications are not designed herein, supply high class commercial grades or materials that meet the requirements specified and which are satisfactory to the Town.

2.2 PUMP EQUIPMENT

- A. Pumps shall be of the submersible type for handling raw unscreened sewage. Pump volute, motor and seal housing are to be high quality gray cast iron. Impeller shall be either cast iron or cast bronze of a non-clog design capable of handling minimum three (3) inch sphere solids, fibrous material, heavy sludge and other matter found in normal sewage applications. Impeller shall have pump out vanes on the back shroud of the impeller to keep pumped material away from the seal area and increase operating life. Impeller shall be either slip fit or taper fit with key to securely lock the impeller to the driving shaft. The pump volute shall be fit with a replaceable bronze wear ring to minimize wear on the impeller and help achieve a longer balanced operating life. All fasteners shall be of stainless steel.
- B. All mating surfaces where water tight sealing is required shall be machined and fitted with nitrile rubber O-rings. Sealing shall be accomplished when metal-to-metal contact is made, resulting in controlled compression of the rubber O-rings without requirement of a specific torque limit.
- C. The pump shall be provided with a mechanical rotating shaft seal system running in an oil reservoir having separate, constantly lubricated lapped seal faces. The lower seal unit between the pump and oil chamber shall consist of one (1) stationary seat and one (1) rotating ring held in place by its own spring. The lower seal shall be removable without disassembling the seal chamber. The upper seal between the motor and the seal chamber shall be of the same design with its own separate spring system. The seals shall require neither maintenance nor adjustment, but shall be easily inspected and replaceable. Shaft seals with

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conventional double seal utilizing a single spring between the two seals and requiring a pressure differential to offset external pressure shall not be considered acceptable nor equal to the dual independent seal system specified. The shaft sealing system shall be capable of operating submerged to pressures equivalent to two hundred (200) feet. No seal damage shall result from operating the pump unit out of its liquid environment. The seal system shall not rely upon the pumped media for lubrication. Pumps with bronze bushing between mechanical seals will not be acceptable. The seal chamber shall also be equipped with a seal failure sensor probe which will sense water intrusion through the lower seal. This sensor is to be connected to an alarm in the control panel to indicate lower seal failure.

- D. The stator winding, rotor and bearings are to be mounted in a sealed submersible type housing. Insulation utilized in the stator windings shall be class H with maximum temperature capability of 155 degrees Centigrade. Motor housing shall be filled with a high-dielectric oil to give superior heat transfer and allow the bearings to run in a clean, well lubricated environment. Pumps with motor that are air filled with grease lubricated bearings shall not be acceptable. The pump and motor are to be specifically designed so that they may be operated partially or completely submerged in the liquid being pumped. The pump should not require cooling water jackets. Stators shall be securely held in place with a removable end ring and threaded fasteners so that is may be easily removed in the field without use of heat or a press without exception.

The shaft shall be of stainless steel and supported by ball bearings. Motor shall be provided with heat sensing units attached to the motor windings, which shall be connected to the control panel to shut down the pump if overheating occurs.

- E. The pump motor cable and heat sensor/seal failure sensor cable shall be suitable for submersible pump applications and this shall be indicated by a code or legend permanently embossed on the cable. Cable sizing shall conform to NEC specifications for pump motors and shall be of adequate size to allow motor voltage conversion without replacing the cable. Cable of the proper length shall be provided to eliminate the need for splices or junction boxes between the pump and the 'Control Center'. The cable shall enter the motor through a cord cap assembly which is double-sealed allowing disassembly. Disconnect of the wires at the motor shall not damage the sealed characteristics of the motor housing. Each individual conductor shall be color coded in accordance with generally accepted industry standards. The color coding shall designate the application of the conductor.
- F. The pump mounting base shall include adjustable guide rail supports and a discharge connection with a one hundred twenty-five (1250 pound standard flange. The base and the discharge piping shall be permanently mounted in place.
- G. The pump, with all of its appurtenances and cables, shall be capable of continuous submergence under water without loss of watertight integrity to a depth of 65 feet.

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2.3 GUIDE SYSTEM

- A. A rail system shall be provided for easy removal of the pump and motor assembly for inspection and service. The system shall not require a man to enter the wet well to remove the pump and motor assembly. One (1) H type fiberglass reinforced plastic (FRP) I-Beam shall be provided for each pump.
- B. The pumps shall be equipped with sliding brackets or rail guides. To insure easy removal of the pumps, the rail guides attached to each pump shall not encircle the rails. A stainless steel lifting chain of adequate length for the basin depth shall be provided for each pump.
- C. The rails and rail guides shall function to allow the complete weight of the pumping unit to be lifted on dead center without binding and stressing the pump housing. The rail system shall function to automatically align the pumping unit to the discharge connection by a simple downward movement of the pump. No twisting or angle approach will be considered acceptable. The actual sealing of the discharge interface will be done by hydraulically sealing the diaphragm type assembly with removable Buna-N diaphragm.

2.4 DISCONNECT SWITCH

- A. A single main disconnect switch of adequate size to provide power for the 'Control Center' and its related components shall be provided by the Contractor.
- B. The disconnect switch shall be housed in a NEMA 4X stainless steel enclosure.

2.5 TRANSFER SWITCH

- A. A manual transfer switch of adequate size to provide power via the incoming electrical service or emergency generator power shall be provided.
- B. The transfer switch shall be built in the same enclosure as the main control center.
- C. A receptacle shall be provided to fit the Town of Fortville's generator.

2.6 CONTROL CENTER

- A. The control center shall be built in a NEMA 3R stainless steel enclosure with 3-point latch and shall be suitable for the specified horsepower and voltage for the pumping equipment. The outer door of the panel shall be hinged dead front with provisions for locking with a padlock. Inside shall be a separate hinged panel to protect all electrical components. No wiring or switches shall be mounted on this hinged panel. They shall be mounted on standoffs and shall protrude through panel door. The enclosure shall be provided with a door limit switch actuated panel light.

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- B. The control center shall include a micro-processor base pump controller manufactured by Digital Controls model 11928-5 (without exceptions) to control the pumps and to maintain the level in the wet well. The controller shall also receive a signal from the back-up floats and automatically switch to back-up if the 4-20ma signal is lost. Also included shall be all necessary components for the above controller to operate.
- C. A circuit breaker and magnetic starter (NEMA Rated) with three (3) leg overload protection (2 leg overload for single phase applications) and manual reset shall be provided for each pump. Starters shall have auxiliary contacts, on three phase applications, to operate both pumps on over-ride condition. A separate circuit breaker shall be supplied for power to the control circuit. The control center shall include a control voltage transformer to reduce supply to 120 volt, single (1) phase. An alternating relay shall be provided to alternate pumps on each successive cycle of operation. A green light and H-O-A switch shall be provided for each pump. A terminal strip shall be provided to make field connections of pump power leads, float switches, seal sensor leads, and remote monitor panel interconnections.
- D. The control center shall incorporate connections for heat sensors which are installed in the pumps. The connection shall disconnect the starter upon high temperature signal, and will automatically reconnect when condition has been corrected.
- E. The control center shall incorporate connections for seal failure sensors which are installed in the pumps. The panel will have a seal failure alarm light for each pump. This alarm indicates failure of the lower mechanical seal in the pump. This will be a alarm light only and will not shut down the pump.
- F. The control center shall include an hour meter for each pump to register the elapsed operating time of each pump.
- G. The control center shall have a high water alarm built-in the main enclosure. The high water alarm shall consist of a watertight flashing alarm light with red Lexan plastic cover or red glass globe with metal guard mounted on top of the enclosure such that it is visible from all directions. Lighting intensity shall be 1,000,000 (1 million) peak candle power. An alarm horn shall be mounted on the side of the enclosure. A push to test horn and light button as well as a push to silence horn button shall be provided and mounted on the side of the enclosure.
- H. The control center shall include a thermostatically controlled, properly sized condensate heater to protect against condensation inside the enclosure. The heater shall be placed so as not to damage any other component or wiring in the control center.

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- I. The incoming power wiring shall be terminated at distribution lugs and shall be provided with voltage surge arresters to protect all equipment mounted within the enclosure from switching surges and lightning induced surges.
- J. The control center shall incorporate an alternator selector switch to allow selection of automatic alternation or manual selection of the lead pump.
- K. The control center shall include a GFI convenience outlet with a 20 AMP breaker and suitable transformer or power supply to provide 100 single (1) phase power to the convenience outlet.
- L. The control center shall be suitable for connection to a remote monitor package model XR50 manufactured by Omni-Site.net and shall have all the necessary components. The main control must include the following interconnection capability:
 - 1. Circuit breaker to power remote monitor panel as described above.
 - 2. Relay contact to signal high water alarm.
 - 3. Relay contact to signal tripping of the overload of any of the pumps.
 - 4. Relay contact to transmit signal of seal failure trip of any of the pumps.
- M. A minimum four (4) inch PVC schedule 40 or galvanized steel wall conduit shall be provided from the wet well basin to the control center which will allow the pump power cables, sensor cables and float switch cables to be pulled through without difficulty and allow the use of one (1) piece cables from the pumps and float switches to the control center. The conduit shall be sealed at the control center to avoid entrance of moisture and gas vapors into the control panel. All wiring within the enclosure shall be terminated at terminal blocks. Splices shall not be permitted.
- N. The control center and associated components shall be mounted on a 12” stainless steel leg kit. The control center shall be located so as to provide safe access to the panel while the wet well hatch doors are opened.
- O. All components of the control center shall be American made and available from local sources. In particular, items such as circuit breakers, overload protection, relays, etc. shall be available and in stock by local sources.
- P. In order to maintain unit responsibility and warranty on the pumping equipment and control center, the control center must be accepted in writing by the pump manufacturer, as suitable for operation with the pumping equipment.
- Q. The control panel shall bear a UL label and meet UL508 criteria.

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2.7 LEVEL CONTROLS

- A. The liquid level of the wet well shall be sensed by a submersible level transducer model 6100 as manufactured by Sigma. The transducer shall be a 2-wire type to operate from a supply voltage of 15 to 45 VDC and produce a 4-20 mA instrumentation signal in direct proportion to the measured level excursion over a factory-calibrated range which will be indicated by readout on the front panel. It shall be of the head pressure sensing type, suitable for continuous submerged, operation and shall be installed in accordance with the manufacturer's instructions. The bottom diaphragm face of the sensor will be installed where shown on the plans. The diaphragm, face shall be a minimum of 2.5 inches outside diameter.
- B. Backup Mercury Float Switches: Sealed float type mercury switches shall be supplied to control sump level and alarm signal. The mercury tube switches shall be sealed in a solid polyurethane float for corrosion and shock resistance. The support wire shall have a heavy Neoprene jacket and a weight shall be attached to the cord above the float to hold the float in place in the sump. The floats shall also be capable of supporting themselves from a stainless steel float bracket.
- C. Backup System Operation: On sump level rise, the lower mercury switch shall first be energized, then the upper level switch shall next energize and start the lead pump. With the lead pump operating, sump level shall lower to lowest switch and turn off the pump. The alternating relay in the 'Control Center' shall index on stopping of the pump so that the lag pump will start on the next operation. If sump level continues to rise when lead pump is operating, the override switch shall energize and start the lag pump. Both lead and lag pumps shall operate together until the lower level switch turns off both pumps. If the level continues to rise when both pumps are operating, the alarm level switch shall energize and signal the alarm. If one pump should fail for any reason, the second pump shall operate on the override switch. All level switches shall be adjustable for level setting from the surface.

2.8 REMOTE SITE MONITORING AND ALARM

- A. The alarm monitoring system shall allow complete integration with the Town's existing system. The lift station shall be equipped with OmniSite automatic control and alarm monitoring components or an approved equal. Components installed shall be standard, catalogued, stocked products of the system supplier to assure on source responsibility, immediately available spare/replacement parts, proper system interconnections and reliable long term operation.
- B. Communications with the remote lift station shall be by cellular modem. The microRTU's shall have the ability to be configured, programmed, and setup using any standard Internet web browser software.

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- C. The Contractor shall ensure that the cellular network system work is properly interfaced with all necessary equipment. The supplier shall install, make final connections, adjust, test, and start-up the complete cellular radio network.
- D. Wiring shall be minimum 600 volt UL type MTW. or AWM and have a current carrying capacity of not less than 125% of the full load current. The conductors shall be in complete conformity with the national electric codes, state, local, and NEMA electrical standards. For ease of servicing and maintenance, all wiring shall be color coded. The wire color code shall be clearly shown on the drawings with each wire's color indicated.
- E. All control wiring shall be contained within plastic/PVC wiring duct covers. Where dimensional constraints prevent the use of wiring duct, wires shall be trained to panel components in groupings. the wire groupings shall be bundled and tied not less than every 3 inches with nylon self-locking cable ties as manufactured by Pandiut or equal.
- F. Every other cable tie shall be fastened to the enclosure door or inner device panel with a cable tie mounting plate with pressure tape. Where wiring crosses hinged areas such as when trained from the inner device panel to the enclosure door, spiral wrap shall be used.
- G. Each remote lift station shall be equipped with the following
 1. Surge arrestor
 2. OmniSite Remote Telemetry Unit or an approved equal
 3. Power supply, charger, battery, and filter
 4. Transient Protector
 5. 12VDC power supply
- H. The regulated 12VDC power supply for the radio(s) and other monitoring system shall include a terminal block for incoming AC, output DC and ground connections. The power supply shall be powered from a 120 VAC and shall include tapered charge type battery charging circuitry to maximize the battery life. The power supply shall be rated at a minimum of 2.0A @ 12 VDC. The power supply shall include one (1) 12 volt battery sized to allow for 36 hours continued system operation during a power outage.
- I. Transient Protector shall be provided with all equipment to protect instrumentation and telemetry devices either receiving or sending signals. The transient protector shall be 4000V optical isolators which shall effectively arrest most transients encountered in an instrumentation environment.
- J. Automatic dialing and voice annunciation software shall provide the following:
 1. Upon alarm condition, facilitate the compilation and transmission of alarm

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information to commercially available alphanumeric, numeric, or voice pager systems.

2. Upon alarm condition, facilitate the compilation and transmission of alarm information over standard telephone lines to residential or commercial sites, or cellular phones, provide for verbalization of alarm information and allow for the password secured remote acknowledgment of such alarms.
3. Allows for the voice dial-in connection via telephone line to facilitate the acknowledgment of active alarms and/or the inquiry of and the alteration of values of digital tags.
4. Both voice dial-in and voice dial-out access modes shall be protected by mandatory redundant password entry system.

2.9 PIPING MATERIALS

- A. Ductile iron pipe shall meet the requirements of ANSI Specification A21.51 (AWWA Standard C151). Design and manufacture pipe for a working pressure of 150 psi plus 100 psi surge and a safety factor of 2 and a depth of cover indicated on the drawings and specified in this Section. Minimum thickness class shall be 350.
- B. Pipe joints shall be push-on type. Joints shall meet the requirements of ANSI/AWWA A21.11/C111. Restrained joints shall be Lok-Ring, Lok-Fast, Lok-Tyte, or equal.
- C. Fittings shall be cast iron or ductile iron. Fittings shall meet the requirements of ANSI/AWWA C110. Design and manufacture fittings for a pressure rating of 150 psi. Fitting joints shall be mechanical joints or restrained push-on joints. Joints shall meet the requirements of ANSI/AWWA A21.11/C111. Thrust blocking or restrained joints may be as required or necessary.
- D. Gate valves 4-inch and larger shall be full ductile iron body, epoxy fusion bounded inside and out, non-rising stem gate valves. Valves shall meet the requirements of ANSI/AWWA C500 or C509 and shall have mechanical joint ends. Exposed bolts and nuts shall be stainless steel. Joint accessories shall meet the requirements of ANSI/AWWA C11/A21.11. Valve opening direction shall be counter-clockwise.
 1. Gate valves 4-inch and larger installed in structures shall be full ductile iron body, outside screw, and yoke gate valves. Valves shall meet the requirements of ANSI/AWWA C500 or C509, except those parts of ANSI/AWWA C500 or C509 only applicable to non-rising stem gate valves and wrench nuts. Outside screw and yoke gate valves shall have flange joint ends and malleable iron handwheels. Flange joints and accessories

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shall meet the requirements of ANSI/AWWA C110. Nuts and bolts shall be stainless steel. Gaskets shall be full face and shall be red rubber or equal.

2. Gate valves shall be as manufactured by Waterous, U.S. Valve, or equal.
- E. Single disc, swing check valves, 4-inch and larger, shall be used in sewage pump stations and shall be iron body, bronze-mounted, swing check, bolted cover, flanged ends, 125 psig working pressure, AWWA Standard C508, suitable for use in a horizontal position. Flanges shall conform in dimensions and drilling to ANSI B16.1.
 1. Swing check valves shall have an outside weight and lever.

2.10 BASIN, VALVE PIT AND ACCESSORIES

- A. The basin and valve pit are to be constructed of precast concrete. The actual arrangement of the structures is to be as shown in the approved plans. The wet well basin top shall be provided with a four (4) inch PVC vent having a downward pointing inlet and screen over the inlet opening.
- B. The basin, valve pit, flat tops and base slabs are to be constructed of precast reinforced concrete manhole sections conforming to ASTM C-478. All joints between precast sections shall be made with an approved rubber O-ring in accordance with ASTM C-443 and a ½ inch diameter non-asphaltic mastic conforming to AASHTO M-198 and Federal Specification SS-521-A. In addition, the outside wall below grade is to be coated with bituminous waterproofing material. The top and bottom of the chambers shall be precast or may be poured in place concrete if approved by the Town.
- C. A swing check valve with external swing arm and an eccentric plug valve shall be installed in the valve pit in each pump's discharge piping. A minimum clearance of twelve (12) inches shall be allowed from the bottom of the valves to invert of the pit. A drain pipe and ball valve shall be installed to drain the valve pit back to the wet basin, but not allow the wet basin liquid to enter the valve pit.

2.11 FRAME AND COVERS

- A. The pump supplier shall provide an aluminum two-door access hatch frame and door assembly to be installed in the concrete basin top. This door assembly shall provide access for removal of the pumps and shall support the guide rails. The doors shall be provided with a lifting handle, a safety latch to hold the door in the open position and a hasp suitable for a padlock. The doors shall have a nonskid finish, designed for light, medium, or heavy duty, depending upon the location of the pumping station.
- B. An aluminum single door access hatch frame and door assembly shall be provided

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for use as entry to the valve pit. Minimum opening for the valve box entry shall be thirty-six (36) inches by thirty-six (36) inches.

- C. Frame shall be 1/4-inch extruded aluminum with built-in neoprene cushion and with strap anchors bolted to exterior. Cover leaf shall be 1/4-inch aluminum reinforced with aluminum stiffeners as required. Stainless steel hinges shall be bolted to the underside. All stainless bolts and hardware shall be used. The cover shall open to 90 degrees and lock automatically in that position. A vinyl grip handle shall be provided to release and close the cover with one hand. Covers shall be built to withstand a live load of 150 pounds per square foot, and equipped with a snap lock and removable handle. When closed, covers shall not protrude above the operating surface in which they are installed. Factory finish shall be aluminum lacquer. Surfaces contacting concrete shall have a bituminous coating.
- D. Covers shall be diamond pattern plate and shall be Bilco Type K or KD, Durred Products Type SLA, DLA or TLA, or equal.
- E. Provide two wrenches for opening when flush mounted covers are furnished
- F. Valve vault cover shall be water tight with an integral drain system.
- G. The Contractor shall provide padlocks for the new wet well and valve vault covers. The locks shall be keyed alike with a lock provided by the Town.

PART 3 - EXECUTION

3.1 INSPECTION

Inspect all pumps, motors, and appurtenances prior to installation of the work. Promptly remove damaged or unsuitable products from the job site. Replace damaged or unsuitable products with new, undamaged and suitable products.

3.2 INSTALLATION

- A. Install the submersible pumps in accordance with the approved drawings and the manufacturer's written instructions.
- B. The discharge elbow of each pump shall be securely anchored to the wet well base and properly aligned with the guide system and upper guide bracket.
- C. The discharge piping shall be properly anchored and supported inside the manhole.
- D. All electrical work shall be done by a qualified electrician and shall conform to the National Electric Code.

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- E. The services of a factory trained, qualified representative shall be provided to install the monitoring components, make necessary adjustments, test, and place the system in operation.

3.3 TESTING

- A. Each pump shall be fully tested in accordance with manufacturer's written instructions. Certified copies of the test results shall be furnished with each pumping unit. Record the test voltage and amperage measurements.
- B. The manufacturer shall provide the services of a qualified and factory trained representative for a period of one day for each lift station to perform initial start-up of the pumping station, to instruct operating personnel in the operation and maintenance of the equipment, and to demonstrate satisfactorily the performance of each piece of equipment. Any installation deficiencies shall be remedied by the Contractor prior to acceptance by the Town.
- C. The Contractor shall notify the Town Representative when testing is scheduled and the station is ready for inspection.
- D. The submersible List Station Data sheet and the Final Inspection Checklist included in this section shall be completed and submitted to the Town's Representative at the completion of the final inspection.

3.4 WARRANTY

- A. The pump manufacturer shall warrant the pumps being supplied to the Town against defects in workmanship and materials for a period of five years under normal use, operation, and service. In addition, the manufacturer shall replace certain parts which shall become defective through normal use and wear or a progressive schedule of cost for a period of five years; parts included are the mechanical seal, impeller, pump housing, wear ring, and ball bearings. The warranty shall be in published form and shall apply to all similar units. The warranty shall not start until the equipment has been placed in operation for beneficial use as determined by the Town.
- B. All equipment supplied and installed under this item of the specifications shall meet the requirements of the Occupational Safety & Health Act of 1970.
- C. Manufacturer shall provide any special tools and materials needed for equipment operation or maintenance.
- D. The monitoring equipment and components shall be guaranteed against defects in material and workmanship for a period of one (1) year from the date of the Town's final inspection and acceptance. Defects shall be repaired or replaced during this period at no cost or obligation to the Town.

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3.5 OPERATION AND MAINTENANCE MANUALS

Three (3) sets of complete manufacturer's Operation and Maintenance manuals shall be submitted by the Contractor prior to acceptance of the Station by the Town.

PART 4 - FIGURES

4.1 STANDARD DETAILS

| <u>FIGURE</u> | <u>DESCRIPTION</u> |
|---------------|---------------------------|
| 11319A | Lift Station Plan View |
| 11319B | Lift Station Section View |
| 11319C | Lift Station Panel |

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SUBMERSIBLE LIFT STATION DATA SHEET

1. GENERAL INFORMATION

A. Lift Station Name: _____

B. Application: Wastewater

C. Location: _____

2. OPERATING CONDITIONS

A. Pumping Temperature Range: 55° - 70° F

B. Vapor Pressure: 1 psig

C. Product Handled: Domestic Wastewater

D. Suction Head: _____

3. PUMP CHARACTERISTICS

| <u>Flow Rate (gpm)</u> | <u>Total Dynamic Head (feet)</u> | <u>Efficiency (%)</u> |
|------------------------|--------------------------------------|-----------------------|
|------------------------|--------------------------------------|-----------------------|

(List three or four points on pump curve)

4. PUMP DATA

A. No. of Pumps: 2

B. Type: Submersible Non-Clog

C. RPM: _____

D. Discharge Size: _____

E. Motor HP: _____

F. Motor Electrical Data: _____

G. Manufacture & Model: _____

5. AVERAGE DESIGN FLOW: _____ gpm

6. WET WELL: 6'-0" Diameter

7. PUMP OPERATING RANGE: _____

8. AVERAGE WET WELL DETENTION TIME: _____

END OF SECTION 11319

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