SECTION 333211 - FIELD-ERECTED WASTEWATER PUMPING STATIONS

This Section specifies excavation, submersible pump basins, pumps, control panels, and accessories for small public wastewater pumping stations, typically used for residential, commercial, industrial, or institutional purposes.

This Section divides materials for pumping stations by system as follows:

Basin system, including attendant cover with vent and access door, inlet and discharge, rail assembly for mounting pumps and controls, union ball valves, junction boxes, and level controls.

Pumping system, including pump, breakaway fittings, piping, check valves, and pump brackets.

Control system, including panel, enclosure, internal components, wiring, auxiliary power, and HIGH WATER alarm.

Consider using this Section for single (simplex) pump or multiple (duplex or triplex) pump installations. This Specification is for automatic pump operation, in which pump discharges effluent from pump basin into gravity interceptor or treatment facility via force main.

Designer will have to consider what portions of work will be undertaken by the C-Contract versus the E-Contract. Coordinate with the OGS Project Manager.

1. GENERAL
   * + 1. SUMMARY
          1. Section Includes:

Packaged public wastewater pumping station.

Initial operation of packaged public wastewater pumping station.

* + - * 1. Related Requirements:

List other Sections directly related to or affecting Work of this Section. Include Sections specifying information expected to be found in this Section as well as Sections required to describe complete system or assembly requirements.

Section 033000 - Cast-in-Place Concrete: Requirements for cast-in-place concrete pad, anti-flotation collar, and concrete cover.

Section 036000 - Grouting: Sealing of pipe penetrations in concrete basins.

Section 087100 - Door Hardware: Lock for access doors.

Section 262923 - Variable-Frequency Motor Controllers: Controls for variable-speed pumps.

Section 310001 - Earthwork Materials: Soil for direct-burial cable backfill.

Section 310000 - Earthwork: Basin and related excavation; Requirements for direct-burial cable to be placed by this Section.

Section 323113 - Chain Link Fences and Gates: Fencing and security gate.

Section 330561 - Concrete Manholes: Material and installation requirements for basins.

Section 330563 - Concrete Vaults and Chambers: Requirements for concrete basin, cover, and base pad.

Section 330576 - Fiberglass Manholes: Material and installation requirements for basins.

Section 333123 - Sanitary Sewerage Force Main Piping: Connections to force mains.

Section 400593 - Common Motor Requirements for Process Equipment: Requirements for electric motors as specified in this Section.

Section 406700 - Control System Equipment Panels and Racks: Hardware requirements for pump control panel.

* + - 1. REFERENCE STANDARDS

List reference standards included within text of this Section, with designations, numbers, and complete document titles.

LEED requires compliance with specific editions of referenced standards. Consider including publication dates for referenced standards in this Section to ensure the correct standard is used for LEED compliance.

* + - * 1. American Association of State Highway and Transportation Officials:

AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 10-lb Rammer and a 18-in. Drop.

* + - * 1. American Bearing Manufacturers Association:

ABMA 9 - Load Ratings and Fatigue Life for Ball Bearings.

* + - * 1. ASTM International:

ASTM A36 - Standard Specification for Carbon Structural Steel.

ASTM A48 - Standard Specification for Gray Iron Castings.

ASTM A126 - Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.

ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.

ASTM A709 - Standard Specification for Structural Steel for Bridges.

ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3).

ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3).

ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.

ASTM D2241 - Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).

ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.

ASTM D2467 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.

ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

* + - * 1. National Electrical Manufacturers Association:

NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

* + - * 1. National Fire Protection Association:

NFPA 70 - National Electrical Code (NEC).

* + - * 1. UL, Inc.

UL 83 - Thermoplastic-Insulated Wires and Cables.

* + - 1. COORDINATION
         1. Coordinate Work of this Section with connection to [**municipal utility service**] <**\_\_\_\_\_\_\_\_**> and trenching.
      2. PREINSTALLATION MEETINGS
         1. Convene minimum [**one week**] [**<\_\_\_\_\_\_\_\_> weeks**] prior to commencing Work of this Section.
      3. SUBMITTALS

Only request submittals needed to verify compliance with Project requirements.

* + - * 1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
        2. Manufacturer’s installation instructions shall be provided along with product data.
        3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
        4. Product Data:

Manufacturer catalog data for basin, cover, hinged door, slide rail assembly, [**lifting davit,**] [**winch,**] [**basket strainer,**] discharge piping, valves, junction box, level controls, and control panel.

Manufacturer pump information, performance curve, breakaway fittings data, and access frame data.

Control panel data and panel wiring schematic.

* + - * 1. Shop Drawings:

[**Indicate layout of pumping station at scale of <\_\_\_\_\_\_\_\_>**].

Show size, materials, and components of system.

Indicate basin size, inlet and discharge location, cover dimensions, vent location, lifting [**davit**] [**winch**] [**rope**] [**cable**] location, [**valve pit and**] valve locations, pump locations, discharge piping location, junction box locations, guide rail assembly location, level control locations, and ballast support flange dimensions.

* + - * 1. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

Include separate paragraphs for additional certifications.

Include following paragraph when Contractor is responsible for designing products or assemblies. List affected products when Section specifies more than one product.

* + - * 1. Delegated Design Submittals: Submit Shop Drawings with design calculations and assumptions. Shop Drawings shall be signed and sealed by a professional engineer licensed in the State of New York.
        2. Test and Evaluation Reports: Submit written report showing that factory pump inspections and that tests have been successfully performed.
        3. Manufacturer Instructions: Submit detailed instructions on installation requirements, including storage and handling procedures.
        4. Source Quality-Control Submittals: Indicate results of [**shop**] [**factory**] tests and inspections.
        5. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
        6. Manufacturer Reports:

Submit report of each visit of manufacturer's [**personnel**] [**representative**] <**\_\_\_\_\_\_\_\_**> to provide technical assistance during installation.

Submit startup report before final acceptance of [**pump**] [**pumps**] to document that pumping station operation meets performance requirements.

* + - * 1. Qualifications Statements:

Coordinate following subparagraphs with requirements specified in QUALIFICATIONS Article.

Submit qualifications for manufacturer, installer, and licensed professional.

Submit manufacturer's approval of installer.

Remove paragraph if not a LEED project.

* + - 1. SUSTAINABLE DESIGN SUBMITTALS
         1. Section 018113 - LEED Documentation Requirements: Requirements for sustainable design submittals.
         2. Manufacturer's Certificate:

Certify that products meet or exceed specified sustainable design requirements.

Insert material certifications list below to suit products specified in this Section and Project sustainable design requirements. Specific certificate submittal and supporting data requirements are specified in Section 018113.

Materials Resources Certificates:

Certify source and origin for [**salvaged**] [**and**] [**reused**] products.

Certify recycled material content for recycled content products.

Certify source for regional materials and distance from Project Site.

* + - * 1. Product Cost Data:

Submit cost of products to verify compliance with Project sustainable design requirements.

Exclude cost of labor and equipment to install products.

Provide cost data for following products:

Edit list of material cost data below to suit products specified in this Section and Project sustainable design requirements. Specific cost data requirements are specified in Section 018113.

Salvaged, refurbished, and reused products.

Products with recycled material content.

Regional products.

<**\_\_\_\_\_\_\_\_**>.

* + - 1. CLOSEOUT SUBMITTALS
         1. Section 017716 - Contract Closeout: Requirements for submittals.
         2. Project Record Documents: Record actual locations of packaged pumping stations, including basins and control panel.
      2. MAINTENANCE MATERIAL SUBMITTALS
         1. Operation and Maintenance Manual:

Provide Manufacturer’s Operation and Maintenance manuals for all components of the pumping station. Operation and Maintenance manuals shall be provided in a bound binder with separation between various system components. Provide three (3) hard copies to the Director’s Representative as well as a PDF electronic version.

* + - * 1. Extra Stock Materials:

Furnish [**one**] <**\_\_\_\_\_\_\_\_**> spare ball check valve and [**one**] <**\_\_\_\_\_\_\_\_**> spare ball valve.

* + - 1. QUALITY ASSURANCE

Include following paragraph only when cost of acquiring specified standards is justified.

* + - * 1. Maintain <**\_\_\_\_\_\_\_\_**> [**copy**] [**copies**] of each standard affecting Work of this Section on Site.
      1. QUALIFICATIONS

Coordinate following paragraphs with requirements specified in SUBMITTALS Article.

* + - * 1. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum [**three**] <**\_\_\_\_\_\_\_\_**> years' [**documented**] experience.
        2. Installer: Company specializing in performing Work of this Section with minimum [**three**] <**\_\_\_\_\_\_\_\_**> years' [**documented**] experience [**and approved by manufacturer**].
        3. Licensed Professional: [**Professional Engineer**] <**\_\_\_\_\_\_\_\_**> experienced in design of specified Work and licensed [**in the State of New York**].
      1. DELIVERY, STORAGE, AND HANDLING
         1. Section 016500 - Materials and Equipment: Requirements for transporting, handling, storing, and protecting products.
         2. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
         3. Handling: Support basin with nylon slings to structural lift points.
         4. Store materials according to manufacturer instructions.
         5. Protection:

Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.

Provide temporary end caps and closures on piping and fittings, and maintain in place until installation.

Provide additional protection according to manufacturer instructions.

* + - 1. AMBIENT CONDITIONS
         1. Do not install [**basin**] [**concrete basin base**] if bedding is wet or frozen.
      2. EXISTING CONDITIONS
         1. Field Measurements:

Verify field measurements prior to fabrication.

Indicate field measurements on Shop Drawings.

* + - 1. EXTENDED WARRANTY

This Article extends warranty period beyond one year. Extended warranties may increase construction costs and State enforcement responsibilities. Specify warranties with caution. Note that Extended Warranties are not typically used and need to be approved by the OGS Project Manager.

* + - * 1. Furnish [**five**] <**\_\_\_\_\_\_\_\_**>-year prorated manufacturer's warranty for pump seals.

1. PRODUCTS
   * + 1. SYSTEM DESCRIPTION
          1. Pumping Station:

Configuration: [**Simplex**] [**Duplex**] [**Triplex**] <**\_\_\_\_\_\_\_\_**>.

Assembly: [**Shop**] [**Field**].

Basin: [**Precast concrete**] [**Fiberglass**] [**PE**] <**\_\_\_\_\_\_\_\_**>.

Pump Type: [**Submersible**] [**, nonclog**] [**, and**] <**\_\_\_\_\_\_\_\_**>.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Pumping Station:

Configuration: [**Simplex**] [**Duplex**] [**Triplex**] <**\_\_\_\_\_\_\_\_**>.

Assembly: [**Shop**] [**Field**].

Basin: [**Fiberglass**] [**Precast concrete**] [**Cast-in-place concrete**].

Pump Type: [**Submersible**] [**Self-priming**] [**Nonclog**] [**Grinder**] [**Centrifugal**] <**\_\_\_\_\_\_\_\_**>.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Pumping Station:

Configuration: [**Simplex**] [**Duplex**] [**Triplex**] <**\_\_\_\_\_\_\_\_**>.

Assembly: [**Shop**] [**Field**].

Basin: [**Fiberglass**] [**Precast concrete**] [**Cast-in-place concrete**].

Pumps: [**Self-priming**] [**Centrifugal**] <**\_\_\_\_\_\_\_\_**>.

* + - 1. PERFORMANCE AND DESIGN CRITERIA
         1. Pumping System:

Design Flow Rate: <\_\_\_\_\_\_\_\_> gpm.

Design Flow Total Dynamic Head: <\_\_\_\_\_\_\_\_> feet.

Minimum Efficiency at Design Flow Rate: <**\_\_\_\_\_\_\_\_**> percent.

Minimum Flow Rate: <\_\_\_\_\_\_\_\_> gpm.

Minimum Flow Total Dynamic Head: <\_\_\_\_\_\_\_\_> feet.

Minimum Efficiency at Minimum Flow Rate: <**\_\_\_\_\_\_\_\_**> percent.

Maximum Flow Rate: <\_\_\_\_\_\_\_\_> gpm.

Maximum Flow Total Dynamic Head: <\_\_\_\_\_\_\_\_> feet.

Minimum Efficiency at Maximum Flow Rate: <**\_\_\_\_\_\_\_\_**> percent.

NPSH Available: <\_\_\_\_\_\_\_\_> feet.

Service Liquid: <**\_\_\_\_\_\_\_\_**>.

Specific Gravity: <**\_\_\_\_\_\_\_\_**>.

Maximum Pump Speed: <**\_\_\_\_\_\_\_\_**> rpm.

Maximum Motor Speed: <**\_\_\_\_\_\_\_\_**> rpm.

Capable of handling municipal wastewater with solids concentration of <**\_\_\_\_\_\_\_\_**> percent.

Discharge Connection Elbow: Permanently installed in chamber with discharge piping.

Connection: Automatic to discharge connection elbows when lowered into place, and easily removed for inspection or service.

* + - * 1. Basin Wall: Support water-saturated sand load of 120 pcf.
        2. Basin Cover: Support live load of [150] [300] <\_\_\_\_\_\_\_\_> psf.
        3. Operation Sequences:

Simplex Control:

When basin liquid level increases to [**PUMP START setting**] [**Elevation <\_\_\_\_\_\_\_\_>**], PUMP START switch energizes pump.

When sump liquid level decreases to [**PUMP STOP setting**] [**Elevation <\_\_\_\_\_\_\_\_>**], PUMP STOP switch de-energizes pump.

If basin liquid level continues to rise, HIGH-LEVEL alarm switch energizes alarm signal when liquid level reaches [**HIGH-LEVEL setting**] [**Elevation <\_\_\_\_\_\_\_\_>**].

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

Duplex Control Sequence:

When basin liquid level increases to [**LEAD PUMP START setting**] [**Elevation <\_\_\_\_\_\_\_\_>**], LEAD PUMP START switch energizes lead pump.

When basin liquid level decreases to [**PUMP STOP setting**] [**Elevation <\_\_\_\_\_\_\_\_>**], PUMP STOP switch de-energizes lead pump.

When lead pump is de-energized, alternating relay indexes such that lag pump starts on next rise in basin liquid level.

If basin liquid level continues to rise to [**LAG PUMP START setting**] [**Elevation <\_\_\_\_\_\_\_\_>**], LAG PUMP START switch energizes lag pump.

When basin liquid level decreases to [**PUMP STOP setting**] [**Elevation <\_\_\_\_\_\_\_\_>**], PUMP STOP switch de-energizes both pumps.

If basin liquid level continues to rise, HIGH LEVEL alarm switch energizes alarm signal when liquid level reaches [**HIGH-LEVEL setting**] [**Elevation <\_\_\_\_\_\_\_\_>**].

* + - * 1. Sound, Vibration, and Thermal Control:

Dampen or suppress noise.

Absorb vibration.

Accommodate thermal expansion and stresses.

Adjust or correct for misalignment in piping systems.

* + - 1. BASIN SYSTEM
         1. [Manufacturers](http://www.specagent.com/LookUp/?ulid=8783&mf=04&src=wd):

Barnes, A Crane Pumps and Systems Brand, (937) 773-2442, 420 Third St., Piqua, OH 45356.

Goulds Water Technology, (866) 672-3669, 2881 East Bayard St. Ext., Seneca Falls, NY 13148.

Liberty Pumps, (800) 543-2550, 7000 Apple Tree Ave., Bergen, NY 14416.

Approved equivalent.

Insert descriptive specifications below to identify Project requirements and to eliminate conflicts with products specified above.

* + - * 1. Description:

Submersible [**simplex**] [**duplex**] <**\_\_\_\_\_\_\_\_**> basin system, including cover with vent and door, rail assemblies, discharge and fittings, ball valves, junction box, and level controls.

Inlet Size: [**4**] <\_\_\_\_\_\_\_\_> inches.

Discharge Size: [**1-1/4**] [**1-1/2**] [**2**] [**2-1/2**] <\_\_\_\_\_\_\_\_> inches.

* + - * 1. Concrete Basin:

Description: [**Precast**] [**Cast-in-place**] reinforced concrete basin, as specified in Section [**330561 - Concrete Manholes**] [**330563 - Concrete Vaults and Chambers**] <**\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_**>.

Minimum Wall Thickness: [**6**] <\_\_\_\_\_\_\_\_> inches.

Diameter: [**48**] [**60**] [**72**] <\_\_\_\_\_\_\_\_> inches.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. PE Basin:

Description: HDPE, as specified in Section [**330573 - Polyethylene Manholes**] <**\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_**>.

Diameter: [**24**] [**36**] [**48**] <\_\_\_\_\_\_\_\_> inches.

Concrete for Anti-Flotation Collar: As specified in Section [**033000 - Cast-in-Place Concrete**] <**\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_**>.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Fiberglass Basin:

Description: Custom molded fiberglass-reinforced polyester resin, as specified in Section [**330576 - Fiberglass Manholes**] <**\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_**>.

Diameter: [**24**] [**36**] [**48**] <\_\_\_\_\_\_\_\_> inches.

Concrete for Anti-Flotation Collar: As specified in Section [**033000 - Cast-in-Place Concrete**] <**\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_**>.

Covers are available in polypropylene for packaged fiberglass basins, in steel with access door for concrete and fiberglass basins, or in concrete for concrete basins. Steel or aluminum doors for various loadings are also available. Use care when specifying basin covers and access hatches in areas receiving vehicular traffic.

* + - * 1. Plastic Cover:

Material: Polypropylene.

Minimum Thickness: [**3/8**] <\_\_\_\_\_\_\_\_> inch.

Attachment:

Bolted to basin with stainless-steel cap screws.

Embed zinc-plated nuts in upper flange of basin.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Steel Cover:

Comply with ASTM A36.

Coating: Black asphalt.

Vent:

Diameter: 2 inches.

Furnish insect screen.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Concrete Cover: Reinforced concrete as specified in Section [**330561 - Concrete Manholes**] [**330563 - Concrete Vaults and Chambers**] <**\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_**>.
        2. Access Hatch:

Material: [**Steel**] [**Aluminum**].

Thickness: [1/4] <\_\_\_\_\_\_\_\_> inch.

[**Pattern: Diamond.**]

Hinges: Stainless steel.

Furnish anchor flange, drainage coupling, and automatic hold-open arm to 90 degrees.

Hardware: Zinc plated [**and chromate sealed**].

Lock: As specified in Section [**087100 - Door Hardware**] <**\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_**>.

Consider using hubs, fittings, and couplings for fiberglass basins. Consider grouting inlet and discharge pipe openings in concrete basins. Consider using flexible discharge couplings to minimize noise, vibration, expansion, and stress, and to correct for pipe misalignment.

* + - * 1. Inlet Fittings:

Type: Flexible.

Material: [**PVC, SDR3.5; ASTM D2241**] [**PVC, Schedule 40; ASTM D2466**] [**PVC, Schedule 80; ASTM D2467**].

Size: [**4**] [**6**] <\_\_\_\_\_\_\_\_> inches.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

Consider using following paragraph if PVC or ABS gravity sewer is to be connected to station.

* + - * 1. Inlet Hub:

PVC adapter.

Size: 4 inches.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

Consider using following paragraph if cast-iron, ceramic, plastic, or ductile-iron gravity sewer pipe is to be connected to station.

* + - * 1. Inlet Hub:

Material: Cast iron.

Size: [**4**] [**6**] <\_\_\_\_\_\_\_\_> inches.

* + - * 1. Discharge Hub:

Material: Stainless steel.

Size: [**1-1/2**] [**2-1/2**] <\_\_\_\_\_\_\_\_> inches.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Flexible Discharge Coupling:

Description: Type 300 stainless-steel, inner corrugated hose and outer braid.

Pipe Size: [**1-1/4**] [**2**] [**1-1/2**] [**2-1/2**] inches.

Connection: Threaded.

* + - * 1. Rail System: Slide rail assembly consisting of Type 304 stainless-steel, upper and lower rail brackets and pump guide brackets.

Valves specified in this Section are located within basin only. Edit this Section to include separate valve box construction after discharge from basin, if required by Project.

* + - * 1. Ball Valves:

Description:

Material: Schedule 80 PVC; Cell Classification 1254-B.

O-Rings: EPDM.

Bore: Full flow.

Pressure Rating: 150 psig, nonshock, at 73 degrees F.

End Connections: Union "quick" disconnect.

Operation:

Extension Handle: Stainless steel.

Operation One-quarter turn.

Shutoff: Leak tight.

* + - * 1. Junction Box:

NEMA 250 Type [**6**] <**\_\_\_\_\_\_\_\_**>.

Furnish cable grips for incoming direct-burial cable.

* + - * 1. Level Controls:

Level Control System

The level control system shall be a pressure transducer type, comprising of a submersible pressure transducer: The submersible transducer shall be supply with a 4-20mADC level signal. The transducer shall have a temperature range of -40 to 125 degrees C and have an inaccuracy of plus or minus 0.1% of total range. The transducer shall be cable suspended and not dependent upon position. The sensor’s wetted materials shall be 316 stainless steel, provided with surge suppressor, polyurethane vented cable with bellows kit. The transducer shall be a Geotech pressure transducer or equal.

Secondary Level Sensing System

As a secondary sensing system, three (3) <\_\_\_\_\_> float backup circuits shall be provided: The float switches shall consist of a mechanically activated SPDT micro switch encased in a polypropylene float. Mercury activated switches shall not be allowed. The interrupting capacity of the switch shall be 250V AC IOA resistive load, 250V AC 3A inductive load, or a 30V DC 5A. The plastic components shall be screwed or welded together. Plastic casings joined by adhesives shall not be allowed. The cable shall consist of 3 conductors in a PVC sheath. The float switch shall operate in media temperatures of 0 to +60 degrees C, and in media densities of 0.65 to 1.5 g/cm3. The float switch shall be ENM10 by ITT Flygt or equal.

Mounting: To float pole.

* + - * 1. Float Pole:

Material: Schedule 40 PVC.

Comply with ASTM D1785.

Diameter: 1/2 inch.

Pumps shall be closely coordinated with the OGS Project Manual and Facility for any specific requirements.

* + - 1. PUMPS
         1. [Manufacturers](http://www.specagent.com/LookUp/?ulid=8773&mf=04&src=wd):

Barnes; A Crane Pumps and Systems Brand, (937) 773-2442, 420 Third St., Piqua, OH 45356.

Goulds Water Technology, (866) 672-3669, 2881 East Bayard St. Ext., Seneca Falls, NY 13148.

Zoeller Company, (502) 778-2731, 3649 Cane Run Rd., Louisville, KY 40211.

Approved equivalent.

Insert descriptive specifications below to identify Project requirements and to eliminate conflicts with products specified above.

Sewage pumps differ primarily in their ability to handle solids. Submersible nonclog centrifugal pumps are generally available in 2- through 8-inch discharge sizes. Nonclog pumps typically handle spherical solids of up to 4 inches for unscreened sewage or industrial waste applications, generate heads of up to 258 feet, and have capacities of up to 5,400 gpm.

Submersible grinder pumps reduce residential, commercial, institutional, and light industrial sewage and objects to finely ground slurry for small-diameter discharge piping [for example, 1-1/4 inches or 2 inches]. Grinder pumps are available for capacities up to 104 gpm and heads of up to 160 feet.

Submersible effluent pumps are capable of handling septic-tank effluent and raw domestic sewage. These pumps handle spherical solids of up to 3/4 inch in diameter with discharge piping up to 3 inches in diameter.

* + - * 1. Description:

Submersible [**nonclog**] [**effluent**] [**grinder**] [**pump**] [**pumps**] with [**vertical**] [**horizontal**] discharge, fittings, piping, check valve, and pump brackets.

Effluent Temperature Range:

Continuous Exposure: [**104**] [**200**] <\_\_\_\_\_\_\_\_> degrees F.

Intermittent Exposure: [**160**] <\_\_\_\_\_\_\_\_> degrees F.

Discharge Size: [**1-1/4**] [**1-1/2**] [**2**] [**2-1/2**] <\_\_\_\_\_\_\_\_> inches.

Following requirements use grinder pump characteristics; edit accordingly for other types of pumps.

* + - * 1. Volute:

Material: Cast iron.

Comply with ASTM A48, Class 30.

* + - * 1. Motor Housing:

Material: Cast iron.

Comply with ASTM A48, Class 30.

* + - * 1. Seal Plate:

Material: Cast iron.

Comply with ASTM A48, Class 30.

* + - * 1. Impeller:

Design:

Type: Vortex, with 10 vanes.

Furnish pump-out vanes on back side.

Dynamically balanced.

Material: 85-5-5-5 bronze.

* + - * 1. Materials:

Shredding Ring: Hardened 440C stainless steel to Rockwell C-55.

Cutter: Hardened 440C stainless steel to Rockwell C-55.

Shaft: Type 416 stainless steel.

Square Rings: Buna-N.

Hardware: Type 300 stainless steel.

* + - * 1. Finish:

Air-dry enamel.

As specified in [**Section 099114 - Exterior Painting**].

* + - * 1. Seal:

Design: Tandem mechanical, oil-filled reservoir.

Materials:

Rotating Faces: Carbon.

Stationary Faces: Ceramic.

Elastomer: Buna-N.

Hardware: Type 300 stainless steel.

* + - * 1. Electrical Cable:

Length: 15 feet <**Select as required for pump station depth**>.

Provide pressure grommet for sealing and strain relief.

* + - * 1. Speed: [**3450 rpm, nominal**] [**Variable**].
        2. Bearings:

Comply with ABMA 9.

Bearing life is percentage of failure at rated hours; for example, L-10 life at 40,000 hours means 10 percent of bearings may be expected to fail at 40,000 hours.

Minimum L-10 Life: 40,000 hours.

Upper Bearing:

Design: Single row, ball.

Lubrication: Oil.

Load: Radial.

Intermediate Bearing:

Design: Single row, ball.

Lubrication: Oil.

Load: Radial and thrust.

Lower Bearing:

Design: Sleeve.

Lubrication: Oil.

Load: Radial.

* + - * 1. Operation:

Electrical Characteristics:

As specified in Section 260583 - Wiring Connections.

[**<\_\_\_\_\_\_\_\_> hp**] [**<\_\_\_\_\_\_\_\_> RLA**].

Voltage: <**\_\_\_\_\_\_\_\_**> V, [**single**] [**three**] phase, 60 Hz.

Maximum [**Fuse Size**] [**Circuit Breaker Size**] [**Overcurrent Protection**]: <**\_\_\_\_\_\_\_\_**> A.

Minimum Circuit Ampacity: <**\_\_\_\_\_\_\_\_**>.

Minimum Power Factor: <**\_\_\_\_\_\_\_\_**> percent at rated load.

Controls: Mount double electrode in seal chamber to actuate remote alarm when water is detected in seal chamber.

* + - * 1. Motors:

As specified in Section 400593 - Common Motor Requirements for Process Equipment [**and Section 262923 - Variable-Frequency Motor Controllers**].

Type: Squirrel cage, induction.

Design: Shell type.

Housing: Air-filled, watertight chambers.

Insulation: Class B.

Non-overloading throughout entire pump performance range based on 1.0 service factor.

Duty: Continuous, capable of sustaining minimum of 10 starts per hour.

Indefinite operation without overheating when unsubmerged and operating in air.

Stators:

Dipped and baked three times in Class F varnish.

Heat-shrink-fitted into stator housings.

Furnish thermal sensors to monitor stator temperatures.

Include three thermal switches embedded in end coils of stator winding, for one switch in each stator phase.

Stator Windings and Leads: Insulated with moisture-resistant Class F insulation capable of resisting temperature of 311 degrees F.

Cooling System:

Water jacket encircling stator housing.

Furnish cooling media channels.

Junction Chamber:

Terminal board.

Sealed from motor by elastomeric compression seal (O-ring).

Connection cable conductors and stator leads with threaded, compressed-type binding post permanently affixed to terminal board.

* + - * 1. Breakaway Fittings Movable Subassembly:

Antisyphon Ball Check Valves, 1-1/4 and 2 Inches:

Housing: Cast iron; ASTM A48, Class 30.

Ball: Natural rubber.

Plug: PVC; ASTM D2466, Schedule 40.

Rated Temperature: 176 and 212 degree F peak.

Pressure Rating: 150 psig.

Antisyphon Ball Check Valves, 4 and 6 Inches:

Housing: Cast iron; ASTM A48, Class 30.

Seal: Natural rubber.

Ball: Natural rubber-covered hollow iron.

Hardware: 18-8 stainless steel.

Access Plate: Cast iron; ASTM A48, Class 30.

Rated Temperature: 176 and 212 degree F peak.

Pressure Rating: 125 psig.

Antisyphon Ball Check Valves, 1-1/4, 1-1/2, and 2 Inches:

Housing: PVC.

Ball: Nitrile or Buna-N.

Plug: PVC.

Rated Temperature: 176 and 212 degree F peak.

Pressure Rating: 150 psig.

Pump Brackets: Type 304 stainless steel.

Movable Components: Cast iron.

Discharge Piping: Stainless steel, Schedule 40.

* + - * 1. Lifting Device:

Polypropylene rope.

Diameter: 3/8 inch.

Twisted three strand, with knots in 18-inch increments.

Breaking Strength: [**2,440**] <\_\_\_\_\_\_\_\_> lbf.

Weight: [**0.028**] <\_\_\_\_\_\_\_\_> lbf/ft.

Davit Crane:

[Manufacturers](http://www.specagent.com/LookUp/?ulid=13274&mf=04&src=wd):

Thern Inc., (507) 858-6211, 5712 Industrial Park Rd., Winona, MN 55987.

Approved equivalent.

Insert descriptive specifications below to identify Project requirements and to eliminate conflicts with products specified above.

Operation: Hand winch.

* + - 1. CONTROL PANEL
         1. [Manufacturers](http://www.specagent.com/LookUp/?ulid=8784&mf=04&src=wd):

Aqualogics Systems, Inc., (315) 413-0400, 5 Dwight Park Dr., Syracuse, NY 13209.

Flygt, (914) 323-5700, 1 International Dr., Rye Brook, NY 10573.

Approved equivalent.

Insert descriptive specifications below to identify Project requirements and to eliminate conflicts with products specified above.

* + - * 1. Description.

Factory fabricated, self-contained.

[**Simplex operation, including PUMP ON and PUMP OFF, and HIGH-LEVEL ALARM**] [**Duplex operation, including ALL PUMPS STOP, LEAD PUMP START, LAG PUMP START, and HIGH-LEVEL ALARM**] <**\_\_\_\_\_\_\_\_**>.

Motor Control Panel: At remote location with short circuit and overload protection for [**pump**] [**pumps**] [**and alternator to alternate pump duty between pumps on successive cycles or switch operation of pumps on pump failure**].

Furnish HIGH-LEVEL ALARM light and RUN light to warn of high-level condition or failure of pump.

* + - * 1. Enclosure:

Rating: NEMA 250 Type [**3R**] [**4X**] <**\_\_\_\_\_\_\_\_**>.

Size: <\_\_\_\_\_\_\_\_> by <\_\_\_\_\_\_\_\_> by <\_\_\_\_\_\_\_\_> inches.

Mounting: As indicated on Drawings.

Material: [**Galvanized steel; G90 gray polyester powder finish**] [**Fiberglass**] [**Type 304 stainless steel**] <**\_\_\_\_\_\_\_\_**>.

Door:

Padlock hasp with captive stainless-steel screws for door closure.

Continuous stainless-steel piano hinge with stainless-steel removable pin.

Panel: Aluminum, drilled and tapped, with machine-screw-mounted components.

* + - * 1. Components:

Circuit breaker.

Starter: Electromagnetic.

Overload Relay: Bimetal type, ambient compensated.

Heater Element:

Class 10, quick trip.

One heater for each motor phase.

Switch:

HAND-OFF-AUTO.

Size: 1/2 inch.

NEMA 250 Type 1.

Light:

Pump motor RUN.

Size: 1/2 inch.

NEMA 250 Type 1.

Subplate: Switch and light mounting.

Transformer: [**115**] [**230**]-V control on [**single**] [**three**] phase.

[**Control Transformer Primary Fuse: Comply with requirements of NFPA 70.**]

Control Circuit Fuse: Comply with requirements of NFPA 70.

Terminal Strip: Box lugs for wiring.

Include lead-lag pump alternator for duplex operations only.

Alternator: Automatic.

Disconnect switch.

Terminal Strip: Box lugs for wiring.

Wiring: Color-code to NFPA 70 requirements.

Receptacles:

[**Two**] <**\_\_\_\_\_\_\_\_**> each.

120 A ac.

Control Relays:

[**Five**] <**\_\_\_\_\_\_\_\_**>.

3PDT, 10 A, 24 V ac.

Dust Covers: Clear.

Coils: Encapsulated.

LED Indicators: [**Five**] <**\_\_\_\_\_\_\_\_**> indicator lights adjacent to relays to indicate coil is energized.

Logic Chassis: Liquid-level wiring harness, marked at both ends with thermally engraved heat-shrink tubing as follows:

HIGH-LEVEL ALARM.

[**LAG PUMP START.**]

[**LEAD**] PUMP START.

[**ALL PUMPS**] [**PUMP**] STOP.

HIGH-LEVEL ALARM Light:

Description:

NEMA 250 Type [**4X**] <**\_\_\_\_\_\_\_\_**>.

Material: Red translucent plastic with vandal-resistant globe.

Lamp: 40 W.

Mounting:

On top of enclosure.

Stainless-steel screws and closed-cell neoprene gasket.

Attach to logic chassis to provide flashing light for failure alarm.

Seal Failure: Moisture-sensing relays to lock out appropriate pump motor starter and to illuminate red LED indicator on logic chassis.

Logic Chassis Permanent Markings: Identify components and functions.

Terminal Strip Connectors:

Audible alarm.

External alarm light.

Flasher.

Power monitor.

Pump monitors.

Power Failure: Pump lockout and alarm circuitry for power failure, phase loss, low voltage, seal failure, pump over temperature, and loss of prime.

* + - * 1. Lightning Arrestors:

[Manufacturers](http://www.specagent.com/LookUp/?ulid=8787&mf=04&src=wd):

Myers, F.E; Pentair Ltd., (888) 782-7483, 293 Wright St., Delavan, WI 53115.

OmniSite, (317) 885-6630, 203 West Morris Street, Indianapolis, IN 46225

Approved equivalent.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Lightning Arrestors: As specified in <\_\_\_\_\_>.
        2. Space Heater: Maintain internal temperature 1 to 3 degrees F above ambient temperature to prevent condensation.
        3. Auxiliary Power Supply: Emergency standby electric generating system suitable to meet pump station power handling.
        4. Direct Burial Cable:

Size: [**18/4**] [**18/6**] [**18/12**] [**10/4**], Type TC, THHN, THWN [**, or**] [**TEFN**].

Comply with UL 83 for Types THHN and THWN.

Diameter: [**0.312 to 0.375**] [**0.438 to 0.500**] <\_\_\_\_\_\_\_\_> inch.

Remove paragraph if not a LEED project.

* + - 1. SUSTAINABILITY CHARACTERISTICS

Insert sustainable design characteristics in this Article to suit content of this Section and Project sustainable design requirements specified in Section 018113.

* + - * 1. Section 018113 – LEED Documentation Requirements: Requirements for sustainable design compliance.
        2. Material and Resource Characteristics:

Recycled Content Materials: Furnish materials with maximum available recycled content [**including:**] [**.**]

Insert list of materials specified in this Section required to have recycled content.

<**\_\_\_\_\_\_\_\_**>.

Regional Materials: Furnish materials extracted, processed, and manufactured within 500 miles of Project Site [**including:**] [**.**]

Insert list of materials specified in this Section required to be regional materials.

<**\_\_\_\_\_\_\_\_**>.

* + - 1. MATERIALS
         1. Bedding, Ballast, and Backfill.

Select bedding and backfill material type for Project conditions. If more than one type is required, edit following paragraph accordingly. Caution: Use material "Type" coding from Section 310000 and Section 310000 in this Section for uniformity of reference.

Bedding: As specified in Section [**310001 – Earthwork Materials**] <**\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_**>.

Pumping station system manufacturers typically recommend sand or naturally rounded aggregate for fiberglass basins.

Aggregate Ballast and Backfill: As specified in Section [**310001 – Earthwork Materials**] <**\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_**>.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

Consider using following paragraph for concrete basins and direct-burial cable.

Soil Backfill to Finish Grade:

As specified in Section [**310001 – Earthwork Materials**] <**\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_**>.

Subsoil with no rocks of more than 6 inches in diameter, frozen earth, or foreign matter.

* + - * 1. Fiberglass Basin Pad: Cast-in-place concrete as specified in Section [**033000 - Cast-in-Place Concrete**] <**\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_**>.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Fiberglass Basin Pad: Precast-concrete type as specified in Section [**330563 - Concrete Vaults and Chambers**] <**\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_**>.
      1. ACCESSORIES

Consider using grout to seal pipe penetrations in concrete basins.

* + - * 1. Pipe Penetration Sealant: Industrial silicon.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Pipe Penetration Sealant in Concrete Structures: Grout, as specified in Section 036000 - Grouting.
        2. Anchor Bolts, Nuts, and Washers:

Bent Anchor Bolts: Comply with ASTM A709, Grade 36.

Nuts: Comply with ASTM A307, Grade A.

Washers: Comply with ASTM A126.

Galvanized Bolts, Nuts, and Washers: Comply with ASTM A153.

* + - * 1. Exterior Lighting: As indicated on Drawings.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Exterior Lighting: As specified in Section <**\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_**>.
        2. Fencing and Security Gate: As indicated on Drawings.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Fencing and Security Gate: As specified in Section 323113 - Chain Link Fences and Gates.
        2. Fresh Water Supply: As indicated on Drawings.
      1. SOURCE QUALITY CONTROL
         1. Provide shop inspection and testing of completed assembly.
         2. Inspection:

Verify that motor voltage and frequency are as shown on nameplate.

Verify that motor and cable insulation test for moisture content or insulation defects comply with UL 83.

* + - * 1. Testing:

Submerged Pump Run: Test to determine that pump meets hydraulic performance requirements.

Document and certify testing results in written report.

Include one or both of following paragraphs to require State’s inspection or witnessing of test at factory.

* + - * 1. Director’s Inspection:

Make completed pump assembly available for inspection at manufacturer's factory prior to packaging for shipment.

Notify Director’s Representative at least [**seven**] <**\_\_\_\_\_\_\_\_**> days before inspection is allowed.

* + - * 1. Director’s Witnessing:

Allow witnessing of factory inspections and tests at manufacturer's test facility.

Notify Director’s Representative at least [**seven**] <**\_\_\_\_\_\_\_\_**> days before inspections and tests are scheduled.

Include following paragraph if reliance on fabricator's approved quality-control program is sufficient for Project requirements.

* + - * 1. Certificate of Compliance:

If fabricator is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at fabricator's facility conforms to Contract Documents.

Specified shop tests are not required for Work performed by approved fabricator.

1. EXECUTION
   * + 1. EXAMINATION
          1. Verify that inlet and discharge piping connections are size, location, and elevation as indicated on Drawings.
       2. PREPARATION
          1. Establish elevations of packaged pumping station with minimum <\_\_\_\_\_\_\_\_> feet of cover.
          2. Establish minimum separation of <\_\_\_\_\_\_\_\_> feet from [**other services**] [**sanitary sewer piping**] <**\_\_\_\_\_\_\_\_**> piping according to <**\_\_\_\_\_\_\_\_**> code.
          3. Protect piping [**system pieces**] [**systems**] from entry of foreign materials and water by using temporary covers, completing sections of Work, and isolating parts of completed system.
       3. INSTALLATION
          1. Excavation:

Excavate direct-burial cable trench as specified in Section [**310000 - Earthwork**] <**\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_**>.

Excavate to required elevation to install basin on undisturbed subgrade as specified in Section [**310000 - Earthwork**] <**\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_**>.

Minimum Clearance: 4 inches between basin and surrounding earth.

* + - * 1. Basin:

Install basin as specified in Section <**\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_**>.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

Place, compact, and level aggregate bedding [**to minimum 8 inches**] [**as indicated on Drawings**].

Form and place concrete base pad, and trowel top surface level.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

Attach basin support flange to precast concrete pad with anchor bolts, as specified in Section 330563 - Concrete Vaults and Chambers, before placing basin in hole.

Install basin at proper grade and to indicated alignment on Drawings on [**aggregate base**] [**cast-in-place concrete base pad**].

Following two options do not apply to precast concrete pad construction.

Fasten basin support flange to concrete pad with anchor bolts around basin perimeter.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

Ballast basin with aggregate, over ballast support flange and around entire basin perimeter, to specific weight of not less than 63 lb. per cubic foot of basin volume.

Seal cover penetrations [**as specified in Section <\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_>**] [**with industrial silicone sealant**].

Set cover frames and covers level, without tipping, to correct elevations.

Assemble basin components, including inlet hub/fitting, discharge hub, cover, pump support rail system, level controls, and junction box.

Connect to inlet and discharge piping with flexible connector.

Seal joints watertight where inlet and discharge pipes penetrate sump wall.

Install freshwater supply system.

* + - * 1. Pumps:

Install pumps, including fittings, brackets, discharge piping, check valve to basin rail assembly, lifting device, and discharge.

Wire pump to junction box.

* + - * 1. Control Panel:

Mount and wire control panel for pumping station operation, including [**simplex**] [**duplex**] <**\_\_\_\_\_\_\_\_**> motor controls, circuit breaker, starter, control transformer, fuse box, terminal block, alternator, alarm, running lights, [**and**] [**auxiliary power supply generator**].

Wiring:

Comply with requirements of NFPA 70.

Size:

Power Circuits: Minimum 14 AWG.

Control Circuits: 16 AWG.

Color-Coding:

Power: Black.

White for neutral grounded conductors.

Number each conductor.

Tin ends of wires with 60/40 lead-tin-alloy solder.

Locate and connect direct-burial cable from control panel to basin junction box.

* + - * 1. Backfilling:

Basin and Direct-Burial Cable: As specified in Section [**310000 - Earthwork**] <**\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_**>.

Maintain optimum moisture content of fill material to attain required compaction density.

After hydraulic test [**and seven days after placing cast-in-place concrete pad**] <**\_\_\_\_\_\_\_\_**>, evenly backfill around entire periphery of basin by hand, place backfill material and hand tamp in [**4**] [**6**]-inch compacted layers to finish grade, and compact to [**95**] <**\_\_\_\_\_\_\_\_**> percent maximum density.

Do not use wheeled or tracked vehicles for tamping.

* + - 1. FIELD QUALITY CONTROL
         1. Preoperational Inspection:

Check pump and motor alignment.

Check for proper motor rotation.

Check pump and drive units for proper lubrication.

* + - * 1. Startup and Performance Testing:

Notify [**Director’s Representative**] <**\_\_\_\_\_\_\_\_**>, [**three**] <**\_\_\_\_\_\_\_\_**> days prior to flow rate testing.

Startup and Initial Testing: Coordinate and operate pumps in conjunction with [**other**] construction [**of gravity interceptor**] [**of treatment facility**].

Hydraulically test station to performance requirements by receiving, pumping, and discharging 500 gal. of water to and from basin.

Confirm general sequencing of pump and float operations at basin and control panel are according to performance requirements.

Document and certify startup results in startup report.

* + - * 1. Manufacturer Services: Furnish services of manufacturer's representative experienced in installation of products furnished under this Section for not less than <**\_\_\_\_\_\_\_\_**> days on Site for installation, inspection, startup, field testing, and instructing Facility personnel in operation and maintenance of equipment. Coordinate training with Director’s Representative.
        2. Equipment Acceptance:

Adjust, repair, modify, or replace system components failing to perform as specified and rerun tests. Coordinate repairs with Director’s Representative.

Make final adjustments to equipment under direction of manufacturer's representative.

Document adjustments, repairs, and replacements in manufacturer's field services certification.

* + - * 1. Furnish installation certificate from equipment manufacturer's representative attesting that equipment has been properly installed and is ready for startup and testing.
        2. Document and certify startup and testing results in written report.

Select test standards referenced in following optional paragraphs appropriate to fill materials and to Project requirements. Consult geotechnical report.

* + - * 1. Compaction Testing:

Select from among test standards referenced in following subparagraph appropriate for fill materials and Project requirements.

Consult geotechnical report to select compaction test method appropriate to fill materials being used and to Project requirements.

Comply with [**ASTM D1557**] [**ASTM D698**] [**ASTM D6938**].

When tests indicate Work does not meet specified requirements, remove Work, replace, and retest.

Testing Frequency: [**One**] [**Two**] <**\_\_\_\_\_\_\_\_**> for each lift.

* + - 1. ADJUSTING
         1. Adjust basin, pump, and control panel systems such that station operates to performance requirements and according to Specifications. Perform adjustments in presence of the Director’s Representative.
      2. DEMONSTRATION
         1. Demonstrate equipment startup, shutdown, routine maintenance, and emergency repair procedures to Facility personnel. Coordinate with Director’s Representative.
      3. ATTACHMENTS

When relying on separate schedules, tables, illustrations, or forms to specify product requirements, include list of each attachment. Include identical list of attachments in Project Manual table of contents.

Consider including schedule if Project includes more than one pumping station.

Insert attachments following END OF SECTION. Consider following examples when developing Project schedule.

* + - * 1. Pumping Station Schedule:

Basin No. 1:

Diameter: 24 inches.

Depth: 60 inches.

Pump Discharge: 1-1/4 inches.

Basin No. 2:

Diameter: 30 inches.

Depth: 96 inches.

Pump Discharge: 2 inches.

END OF SECTION 333211