

# SECTION 11308

## PACKAGED GRINDER PUMPING STATIONS

### PART 1 - GENERAL

#### 1.01 COMMENTARY

- A. This Authority recognizes the fact that there are many types of grinder pumps and manufacturers. The Authority is also aware that costs of grinder pumping stations operation and maintenance are significant.
- B. Therefore, the Developer shall do or cause the following elements to be done:
  - 1. Whenever possible, a pressure sewer system with grinder pumping station shall not be used.
  - 2. Prior to design of a pressure sewer system, the Developer shall discuss the proposed system in detail with the Authority.
  - 3. Any pressure sewer system and grinder pumping station design shall be of a type satisfactory to the Authority and shall meet all applicable requirements of DEP.
  - 4. The intent of the Authority is to standardize components, as much as possible, that are used in pressure sewer systems and/or grinder pumping station applications to facilitate inventory control, equipment familiarization, and safety.

#### 1.02 SECTION INCLUDES

- A. Furnish all labor, materials and equipment to install grinder pumping station(s) and appurtenances as shown on the Drawings and as specified herein. Work shall include but not be limited to:
  - 1. Excavation
  - 2. Enclosure and Component Placement
  - 3. Control Panel and Wiring
  - 4. Internal and external piping with required supports and concrete encasement
  - 5. Backfill

#### 1.03 RELATED SECTIONS

- A. Section 01010 - Summary of Work
- B. Section 01039 - Coordination and Meetings
- C. Section 01300 - Submittals
- D. Section 01400 - Quality Control
- E. Section 01600 - Material and Equipment
- F. Section 01650 - Starting of Systems
- G. Section 01700 - Contract Closeout
- H. Section 02225 - Excavating, Backfilling and Compacting for Utilities

- I. Section 02600 - Utility Piping
- J. Section 02605 - Manholes
- K. Section 03300 - Cast-In-Place Concrete
- L. Appendix A - Standard and Special Construction Detailed Drawings

#### **1.04 REFERENCES**

- A. Pennsylvania Department of Transportation Publication 408, Latest Edition
- B. ASTM C-478 - Specifications for Pre-Cast Reinforced Concrete Manhole Sections
- C. National Electric Code - N.E.C.
- D. National Electric Safety Code
- E. Standard and Special Construction Detailed Drawing Nos. 16 and 17 for General Schematics of Grinder Pumping Stations.

#### **1.05 JOB CONDITIONS**

- A. Job Conditions shall generally meet those of the related Sections.
- B. Specific conditions will be included with each project as may be required.

#### **1.06 SUBMITTALS**

- A. Submit shop drawings/product data from manufacturers' descriptive literature and specifications for all materials used in this Section. Submit in accordance with Section 01300.
- B. Specific submittals will be included with each project as may be required for testing, warranties, project manuals, etc.

#### **1.07 QUALITY ASSURANCE**

- A. **Qualifications of Workmen:** Provide at least one person who shall be thoroughly trained and experienced in the skills required, who shall be completely familiar with the design and application of work described for this Section, and who shall be present at all times during progress of the work of this Section and shall direct all work performed under this Section.

## **PART 2 - PRODUCTS**

### **2.01**

- A. Grinder pump stations shall normally be designed using components as specified herein or with only approved equals. This is done to improve inventory control (standardization), equipment familiarization, and safety.
- B. Products listed are not all inclusive. Refer to applicable project drawings and specifications.

## **2.02 PUMPS**

- A. Grinder Pump Stations - Environment One Series 2010
- B. Or Equal – Must be of positive displacement type, w/low speed/high torque characteristics. Must also be a complete unit, w/ encapsulated pump and have a holding capacity of approximately 70 gallons. Equality will solely be determined by the Authority.

## **2.03 WET WELL**

- A. The tank shall be a wetwell/drywell design made of high density polyethylene, with a grade selected to provide the necessary environmental stress cracking resistance. Corrugated sections are to be made of a double wall construction with the internal wall being generally smooth to promote scouring. The corrugations of the outside wall are to be a minimum amplitude of 1-1/2" to provide necessary transverse stiffness. Any incidental sections of a single wall construction are to be 0.250" thick (minimum). All seams created during tank construction are to be thermally welded and factory tested for leak tightness. The tank wall and bottom must withstand the pressure exerted by saturated soil loading at maximum burial depth. All station components must function normally, when exposed to 150 percent of the maximum external soil and hydrostatic pressure.

## **2.04 VALVE PIT ENCLOSURES**

- A. Valve pit enclosures shall be constructed of high-density polypropylene located in non-traffic areas. Pits shall be installed to prevent freezing of the pressure force main running through it.

## **2.05 CONTROLS**

- A. All controls shall be located in the top housing of the core unit attached with stainless steel fasteners. The pumps shall be controlled automatically by an integral, air-bell level sensor connected to a pressure switch. High level sensing will be accomplished with a separate air-bell sensor and pressure switch. A breather assembly shall also be equipped with each core unit.

## **2.06 ALARM/DISCONNECT PANEL**

- A. Each grinder pump station shall have a separate alarm/disconnect panel. The panel shall be permanently mounted, preferably to a structure or building. The panel shall be located so that the alarm horn and light are not hidden.
  - 1. Enclosure
    - a. Wall mounted NEMA 3R thermoplastic electrical enclosure designed to accommodate the appropriate power requirements.
    - b. The size of the enclosure shall not exceed a 8.75 inch height or a 7.5 inch width.
    - c. The enclosure shall have a dead front and be equipped with padlock facilities.
  - 2. Control Panel
    - a. One (1)-15 amp, double pole circuit breaker for the power circuit.
    - b. One (1)-15 amp, single pole circuit breaker for the alarm circuit.
    - c. Push to run switch.

- d. High level (redundant) pump starting control.
  - e. Terminal blocks, integral power bus, push to run feature, and complete alarm circuits.
3. Alarms
- a. Visual - Red alarm lamp mounted to top of enclosure.
  - b. Audio - Printed circuit breaker board with an 86 dB buzzer with quick mounting terminal strip mounted in the interior of enclosure. A de-activating push-type switch encapsulated in a weatherproof silicone boot shall be mounted on the bottom of the enclosure.

## **2.08 PIPE**

- A. PVC Pipe Section 02600, Sub-Section 2.01 A.1.b.

## **2.09 VALVES**

- A. The package grinder pump station shall be contain pre-installed check valve, anti-siphon valve, and redundant check valve.
- B. Pressure lateral shall have a shut-off valve and a check valve located in a valve pit.

## **2.10 CEMENT CONCRETE**

- A. Concrete shall meet the requirements of Section 03300, Cast-In-Place Concrete for Class AA.
- B. Concrete anchor shall contain 6 cu. ft. plus 2 cu. ft. for each foot of access way.

## **2.11 MONITORING EQUIPMENT**

- A. Monitoring of equipment shall be site specific as to method and scope.

## **2.12 OTHER MATERIALS**

- A. All other materials, not specifically described but required for proper and complete installation of the work of this Section, shall be selected by the Contractor subject to the approval of the Authority.

# **PART 3 - EXECUTION**

## **3.01 INSPECTION**

- A. Examine the areas and conditions under which Work of this Section will be installed. Correct conditions detrimental to proper and timely completion of the Work. Do not proceed until unsatisfactory conditions of site have been corrected.

## **3.02 INSTALLATION**

- A. Install equipment with skilled labor in accordance with manufacturer's instructions and details

as shown on the Drawings.

- B. All grinder pump station pits shall be placed on a minimum six (6) inch depth of AASHTO No. 57 aggregate. The subgrade for the aggregate shall be properly compacted to requirements of Section 02225.
- C. Install internal/external piping using specified materials.
- D. Install concrete anchor around unit.
- E. Install and connect electrical components.
- F. Equipment installed shall be inspected, adjusted, approved and certified satisfactory by the manufacturer. Provide certification(s) that equipment is ready for operation.

### **3.03 BACKFILL AND COMPACTION**

- A. Proper backfill is essential to the long term reliability of any underground structure. Several methods of backfill are available to produce favorable results with different native soil conditions. The most highly recommended method of backfilling is to surround the unit to grade using Class I or Class II backfill material as defined in ASTM 2321. Class 1A and Class 1B are recommended where frost heave is a concern. Class 1B is a better choice when the native soil is sand or if a high, fluctuating water table is expected. Class 1, angular crushed stone offers an added benefit in that it doesn't need to be compacted.

Class II, naturally rounded stone, may require more compactive effort, or tamping, to achieve the proper density. If the native soil condition consists of clean compactable soil, with less than 12 percent fines, free of ice, rocks, roots, and organic material, it may be an acceptable backfill. Soil must be compacted in lifts not to exceed one foot to reach a final Proctor Density of between 85 percent and 90 percent. Heavy, non-compactable clays and silts are NOT suitable backfill for this or any underground structure such as inlet or discharge lines.

If you are unsure of the consistency of the native soil, it is recommended that a geotechnical evaluation of the material is obtained before specifying backfill.

Another option is the use of a flowable fill (i.e. low slump concrete). This is particularly attractive when installing grinder pump stations in augered holes where tight clearances make it difficult to assure proper backfilling and compaction with dry materials. Flowable fills should not be dropped more than 4 feet from the discharge to the bottom of the hole to avoid separation of the constituent materials.

- B. Backfill around exterior piping and enclosure shall be as detailed in Section 02225 or as specifically shown on project Drawings.
- C. Compaction shall meet the requirements of Section 02225.

### **3.04 OPERATION**

- A. Contractor shall fulfill the requirements of Section 01650 - Starting of Systems.

### **3.05 TESTING**

- A. All piping shall be tested in accordance with Section 02600 and/or as may be directed by the Authority.

**END OF SECTION**