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## SECTION 22 14 00 \_STORM WATER PIPING SYSTEMS

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Storm water piping
  - 2. Roof drains.
  - 3. Area drains.
  - 4. Cleanouts.
  - 5. Sump pumps.

#### 1.2 Related Sections:

- A. Section 22 05 00– Common Work for Plumbing Systems
- B. Section 22 05 01 – Common Requirements for Plumbing Systems
- C. Section 22 07 00 – Plumbing Insulation.
- D. Section 22 13 00 – Sanitary Sewer Piping Systems

#### 1.3 DESIGN REQUIREMENTS

- A. All sump pumps shall be on emergency power.
- B. Plastic rain water pipe shall not be used above grade in any University of Delaware Newark Campus buildings. Use only cast or ductile iron for above grade installations.
- C. Insulate all horizontal rain water conductors.

#### 1.4 SUBMITTALS

- A. Shop Drawings: Indicate dimensions, weights, and placement of openings and holes for sump-pumps, catch basins and manholes.
- B. Product Data:

1. Piping: Submit data on pipe materials, fittings, and accessories. Submit manufacturers catalog information.
  2. Valves: Submit manufacturers catalog information with valve data and ratings for each service.
  3. Hangers and Supports: Submit manufacturers catalog information including load capacity.
  4. Storm Drainage Specialties: Submit manufacturers catalog information, component sizes, rough-in requirements, service sizes, and finishes.
  5. Pumps: Submit pump type, capacity, certified pump curves showing pump performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable. Include electrical characteristics and connection requirements.
- C. Manufacturer's Installation Instructions: Submit installation instructions for material and equipment.
- D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
- 1.5 CLOSEOUT SUBMITTALS
- A. Project Record Documents: Record actual locations of equipment and clean-outs.
  - B. Operation and Maintenance Data: Submit spare parts lists, exploded assembly views for pumps and equipment.
- 1.6 DELIVERY, STORAGE, AND HANDLING
- A. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the Work, and isolating parts of completed system.
- 1.7 ENVIRONMENTAL REQUIREMENTS
- A. Do not install underground piping when bedding is wet or frozen.
- 1.8 FIELD MEASUREMENTS
- A. Verify field measurements prior to fabrication.
- 1.9 WARRANTY
- A. Furnish five year manufacturer parts only warranty for sump pumps.

1.10 EXTRA MATERIALS

- A. Furnish two sets of pump seals for each sump pump.

**PART 2 PRODUCTS**

2.1 STORM WATER PIPING

- A. If cast iron pipe and fittings are used they must be extra heavy weight hub-less with neoprene gaskets and stainless steel clamp and shield assemblies.
- B. If ductile iron pipe and fittings are used they must be extra heavy weight hub-less with neoprene gaskets and stainless steel clamp and shield assemblies.
- C. If PVC pipe is used it must have bell and spigot solvent sealed ends. PVC Pipe: ASTM D2729, polyvinyl chloride (PVC) material, bell and spigot solvent sealed ends.

2.2 ROOF DRAINS

- A. Acceptable Manufacturers:
  - 1. Ancon
  - 2. J.R. Smith
  - 3. Josam
  - 4. Zurn

2.3 AREA DRAINS

- A. Acceptable Manufacturers:
  - 1. Ancon
  - 2. J.R. Smith
  - 3. Josam
  - 4. Zurn

2.4 CLEANOUTS

- A. Acceptable Manufacturers:
  - 1. Ancon
  - 2. J.R. Smith
  - 3. Josam
  - 4. Zurn

2.5 SUBMERSIBLE SUMP PUMPS

- A. Acceptable Manufacturers:

1. Goulds
  2. Zoeller
- B. Pump Type: Completely submersible, vertical, centrifugal.
- C. Casing: Cast iron pump body and oil filled motor chamber.
- D. Impeller: Cast iron closed, stainless steel shaft.
- E. Bearings: Ball bearings.
- F. Sump: Fiberglass basin with steel checkered cover plate
- G. Electrical: Hard wired to fused disconnect switch
- H. Servicing: Slide-away coupling consisting of discharge elbow secure to sump floor, movable bracket, guide pipe system, lifting chain and chain hooks.
- I. Controls: Motor control panel containing across-the-line electric motor starters with ambient compensated quick trip overloads in each phase with manual trip button and reset button, circuit breaker, control transformer, electro-mechanical alternator, hand-off-automatic selector switches, pilot lights, high water alarm pilot light, reset button and alarm horn. Furnish mercury switch liquid level controls, steel shell switch encased in polyurethane foam with cast iron weight for each pump, pump off (common), and alarm.
- J. Sequence of Operations:
1. 1<sup>st</sup> float energizes control circuit.
  2. 2<sup>nd</sup> float starts lead pump
  3. 3<sup>rd</sup> float energizes alarm
  4. 4<sup>th</sup> float starts lag pump

### **PART 3 EXECUTION**

#### **3.1 EXAMINATION**

- A. Verify excavations are to required grade, dry, and not over-excavated.

#### **3.2 PREPARATION**

- A. Ream pipe and tube ends. Remove burrs. [Bevel plain end ferrous pipe.]
- B. Remove scale and dirt, on inside and outside, before assembly.

- C. Prepare piping connections to equipment with flanges or unions.
- D. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

### 3.3 INSTALLATION - PIPE

- A. Verify connection to existing piping system, size, location, and invert.
- B. Remove scale and dirt on inside of piping before assembly.
- C. Install pipe on prepared bedding.
- D. Route pipe in straight line.
- E. Establish invert elevations, slopes for drainage per relevant code having authority.
- F. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Provide clearances at cleanout for snaking drainage system.
- G. Encase exterior cleanouts in concrete flush with grade.
- H. Install floor cleanouts at elevation to accommodate finished floor.
- I. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
- J. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
- K. Install piping to maintain headroom. Do not spread piping, conserve space.
- L. Group piping whenever practical at common elevations.
- M. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- N. Provide clearance in hangers and from structure and other equipment for installation of insulation.
- O. Provide access where valves and fittings are not accessible.
- P. Install piping penetrating roofed areas to maintain integrity of roof assembly.
- Q. Install bell and spigot pipe with bell end upstream.

- R. Sleeve pipes passing through partitions, walls and floors.
- S. Install firestopping at fire rated construction perimeters and openings containing penetrating sleeves and piping
- T. Support cast iron drainage piping at every joint.

3.4 INSTALLATION - PUMPS

- A. Provide pumps operating at specified system fluid temperatures without vapor binding and cavitation, non-overloading in parallel or individual operation, and operating within 25 percent of midpoint of published maximum efficiency curve.
- B. Provide shaft length allowing ejector pumps to be located minimum 24 inches below lowest invert into sump pit and minimum 6 inches clearance from bottom of sump pit.
- C. Provide air cock and drain connection on horizontal pump casings.
- D. Provide line sized gate] valve, line sized check valve, and balancing valve on pump discharge.
- E. Decrease from line size with long radius reducing elbows or reducers. Support piping adjacent to pump independently of pump casings. Install supports under elbows on pump discharge line sizes 4 inches) and larger.
- F. Check, align, and certify alignment of pumps prior to start-up.

3.5 FIELD QUALITY CONTROL

- A. Test storm water piping system in accordance with City of Newark Water Department requirements.

**END OF SECTION**