

DESIGN STANDARDS

1. **GENERAL:** This section contains the design criteria for storm drainage outside the building, including catch basins, trench grates, piping exfiltration trenches, and trench grates.
2. Avoid locating manholes and catch basins at walkways and pedestrian areas.
3. Drainage systems shall comply with City of Houston standards.
 - 3.1 Site grading shall be designed to promote positive drainage away from the building.
4. Coordination of Drawings: The Architect and his consulting engineers shall comply with the following:
 - 4.1 Show manholes and other structures, pipe sizes, locations, and flow line elevations. Include details of underground structures and connections. Show other piping in same trench and clearances from storm sewer system piping. Indicate interface and spatial relationship between piping and proximate structures.
 - 4.2 At complex areas of interface/intersection of multiple utility pipe systems, show system piping in elevation. Draw profiles at horizontal scale of not less than 1-inch equals 50 feet (1:500) and vertical scale of not less than 1 inch equals 5 feet (1:50). Indicate underground structures and pipe. Show types, sizes, materials, and elevations of each utilities crossing system piping.
5. Specifications shall require that plastic structures, pipe, and fittings not be stored in direct sunlight. Pipes, pipe fittings, and seals shall be protected from dirt and damage. Precast concrete manholes and other structures shall be handled according to the manufacturer's written rigging instructions.
6. **EXISTING PROJECT CONDITIONS:** The Architect shall review the project site survey from the University and shall review the available University and public utility records to determine the location of existing utilities and shall notify the University's Project Manager of any recommendations for field verification. The Architect shall identify existing structures and piping to be closed and abandoned.
7. The Architect shall include in his documents the requirement as defined in Division 1 regarding Contractor notification of utility interruption during the course of construction.

PRODUCT STANDARDS

1. For general lawn and landscape areas provide subsurface drainage products that comply with the following guidelines:
 - 1.1 Catch basin area drain grates are to be a minimum size of 18" x 18" cast iron.
 - 1.1.1 Place catch basins a minimum of 5 feet from adjacent sidewalks and hardscape.

DIVISION 2
STORM DRAINAGE (Catch Basins and Grates)

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- 1.1.2 For area drains at the 5' minimum, set the "top of grate" a minimum of 2" and max of 4" below the elevation of the adjacent "top of pavement".
- 1.2 In small special landscape areas PVC catch basin and grates may be considered if approved by the University's Project Manager.
- 1.3 All storm drainage lines are to be PVC Type SD 8" minimum diameter.
- 1.4 All storm drainage lines are to be placed a minimum of 30" below grade unless approved by the University's Project Manager.
- 1.5 Trench drains may be jobsite constructed concrete, precast concrete or pre-manufactured PVC as approved by the University's Project Manager.
 - 1.5.1 Provide cast iron or bronze grates for all trench drains. Where grates are subject to regular pedestrian traffic provide grate design compliant with ADA requirements.

PERFORMANCE STANDARDS

1. THE DESIGN PROFESSIONAL: The Architect shall retain a Texas Registered Civil engineer with demonstrated experience in similar projects as a sub-consultant for work related to this section.
2. THE INSTALLER: The subcontractor shall have a minimum of three years of experience in the field and a minimum of five projects completed with similar scope. The installer shall be licensed by the State of Texas.
3. The Architect shall require the Contractor to examine field conditions to their own satisfaction.
4. Architect shall request from Contractor and submit to the University's Project Manager the product information including manufacturer's and fabricator's specifications, installation instructions, and general recommendations. Include certification or other data substantiating that materials comply with requirements.
5. STORAGE AND HANDLING: Follow manufacturer recommendations for storage and handling. The following are general considerations:
 - 5.1 All materials shall be stored in a guarded location before application. Materials shall be stored per manufacturer's guidelines.
 - 5.2 Whenever possible, materials shall be delivered to the job site just before installation.
6. COORDINATION: Coordinate with other trades and utilities prior to installation of drainage system.

End of Division 2 – Storm Drainage (Catch Basins and Grates)