

## SECTION VII. STORM SEWERS

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### A. GENERAL REQUIREMENTS

**1. Extent of Work:** The developer shall supply and install storm drains, cross-drains, catch basins, retention/detention ponds and all other structures required to adequately dispose of the rain fall events listed in 3 below. The developer may be responsible for providing “off-site” storm drain extensions in order to satisfactorily dispose of drainage.

**2. Plans:** The developer shall submit to the City for approval a complete storm water drainage plan of the entire development designed by a professional engineer licensed in the State of Utah. This plan shall meet all state and federal regulations and the City storm water pollution prevention policy. All existing drainage features shall be identified and incorporated into the design. Drainage structures shall conform to the Standard Construction Drawings.

**a.** If the development is to be platted in phases, a general drainage plan for the entire area shall be presented with the first phase, and appropriate development stages for the drainage structures shall be indicated.

**b.** All proposed surface drainage structures shall be indicated on the plans.

**c.** All appropriate designs, details, and dimensions needed to clearly explain proposed construction materials and elevations shall be included in the drainage plans.

**3. Design of the System:** The drainage system shall be designed to adequately dispose of the flows developed within the limits of the development along with the existing flows entering the proposed development from adjacent properties;

**a.** Handle the 10 year frequency storm for detention systems

**b.** Handle the 100 year frequency storm for retention systems

**c.** Permit the unimpeded flow of natural watercourses or accommodate the expected flow from those watercourses

**d.** Ensure adequate drainage of all low points

## **B. IRRIGATION DITCHES, PIPES & CANALS**

**1. Ditches & Canals:** No ditch or canal shall be approved as suitable for the use of storm drainage without the written permission from the appropriate irrigation company or the water users. No ditch or canal shall be used for storm water unless adequately improved to handle such water as might be reasonably expected to flow from canal and ditch water, development runoff water, and other water expected to reach such canal or ditch. At the discretion of the City, ditches, canals or other waterways may be prohibited on property dedicated or to be dedicated for public use. The developer shall remove such waterways from property to be so dedicated before approval of the final plat shall be granted.

**2.** The developer shall work with irrigation, drainage or ditch companies and the City with regards to ditches or canals as to:

- a.** The methods of covering, realigning or eliminating ditches or canals within or adjoining the development.
- b.** The size of pipe and culverts required.
- c.** The responsibility for the periodic inspecting, cleaning and maintaining of such ditches, pipes and culverts.

## **C. CULVERT PIPE AND INCIDENTAL CONSTRUCTION**

### **1. Material:**

**a.** All pipe required for the storm sewer shall be standard strength, tongue and groove, reinforced concrete culvert pipe. All culvert pipe shall conform to the ASTM Specifications for Reinforced Concrete Culvert Pipe, latest designation D-76 or as provided in the special provisions.

**b.** In lieu of concrete, double-wall high density polyethylene (HDPE) pipe may be used. All HDPE pipe that is installed under streets, driveways and parking lots shall be UDOT-rated for use under roadways.

**2. Testing Of Pipe:** Every manufacturer furnishing pipe under these specifications shall furnish all facilities necessary to carry out the tests required in these specifications.

**3. Line And Grade:** Line and grade shall be accurately maintained. Laser method is preferred.

**4. Method Of Laying Pipe:** As per manufacturers specifications.

## D. DRAIN STRUCTURES

**1. Definition:** All items shown on the plans as catch basins, gutter cross-drains, clean-out boxes, retention/detention systems, inlet boxes, junction boxes, etc. shall be designated as structures.

**2. Concrete:** See section IX.

**3. Pre-Cast Structures:** Pre-cast concrete drain structures may be used in lieu of those cast- in-place.

**4. Survey Markers & Protection:** The developer's engineer shall set a grade stake at each catch basin or drain manhole indicating its location, the flow line of the pipe, and the finish grade of the cover or grate. Once set, the developer shall take care not to disturb any drain structures and will protect them from mud and silt from the construction site using silt fences, silt covers, or other protective devices. Any storm drain pipe or structure that contains silt or debris will not be accepted by the City.

## E. WATERWAYS

**1. Description:** Waterways shall include the construction of box culverts and flumes, the finishing and placing of concrete and metal pipe culverts and other type of culverts specified, in street sections, or in ditches paralleling streets, the construction of clean-out boxes and the furnishing and placing of clean-out frames and covers, and the construction of head gates and diversion works and all other work incidental thereto, in accordance with the plans and specifications.

**2. Concrete Box Culverts, Flumes and Clean-out Boxes:** Concrete waterways shall be constructed from concrete meeting the requirements in section IX, to the dimensions at the locations shown on the plans. Concrete waterways shall be reinforced as shown on the plans.

**3. Reinforced Concrete Pipe:** Reinforced concrete pipe shall meet the requirements of Standard Specifications for Reinforced Concrete Culvert Pipe, ASTM latest Designation C76.

**4. Plain Concrete Pipe:** Plain non-reinforced concrete pipe shall meet the requirements of Standard Specifications for Concrete Sewer Pipe, ASTM latest Designation C14. Except that pipe ends shall be tongue and groove.

**5. Corrugated Metal Pipe:** Corrugated metal pipe shall meet the requirements of AASHO Specifications M-36.

**6. Corrugated High Density Polyethylene (HDPE):** Corrugated high density polyethylene shall meet the requirements of AASHO Specifications M 252, M-294 and MP7-97.

**7. Placing And Covering:** As per manufacturer's specifications.

**8. Concrete Encased Pipe:** Where shown on the plans, waterway pipe shall be encased in four inches (4") of Class A concrete. The bottom of the trench shall be excavated circular in form and to a radius four inches (4") larger than the outside of the pipe. The pipe shall be laid to line and grade on suitable blocking after which the concrete shall be poured around the pipe. The concrete shall be brought up just above the bottom of the pipe and thoroughly spaded and rammed under the pipe to ensure a solid foundation.