



Date: December 7, 2016
To: Infrastructure Review and Advisory Board
From: Public Works – Engineering (Storm Drainage)
Subject: Proposed Updates to the following:

- Engineering Design Standards - Chapter 11 Drainage Improvements
- Engineering Design Standards - Chapter 12 Erosion & Sediment Control
- Supplemental Standard Specifications for Storm Sewer Construction – Section 200

Engineering staff propose the following updates to Engineering Design Standards.

11.8.9.5 BEST MANAGEMENT PRACTICES – RETENTION POND DESIGN PROCEDURE AND CRITERIA

11.8.9.5.e Step 5. Outlet Control

Provide outlet controls that limit WQCV to depths identified in Chapter 11 Appendix~~to 2 feet or less~~. Use a water quality outlet that is capable of releasing the WQCV in no less than a 12-hour period. Refer to Figures 11.62, 11.63, 11.64, and 11.65 (Appendix) for schematics pertaining to structure geometry; grates, trash racks, and screens; outlet type; orifice plate or perforated riser pipe; cutoff collar size and location; and all other necessary components.

FIGURE 11.7D ALLOWABLE SHEAR STRESSES FOR OUTLET PROTECTION

<u>FIGURE NO. 11.7D - ALLOWABLE SHEAR STRESSES FOR OUTLET PROTECTION</u>		
<u>LINING TYPE</u>	<u>COMMENTS</u>	<u>SHEAR STRESS, Td (Lbs/Square Foot)</u>
<u>ROCK RIPRAP</u>	<u>CLASS A</u>	<u>4.00</u>
<u>ROCK RIPRAP</u>	<u>CLASS B</u>	<u>5.00</u>
<u>ROCK RIPRAP</u>	<u>CLASS C</u>	<u>7.80</u>

12.4 DRAINAGEWAY PROTECTION

12.4.3 Outlet Protection

The outlets of slope drains, culverts, sediment traps, and sediment basins shall be protected from erosion and scour. Outlet protection shall be provided where the velocity of flow will exceed the maximum permissible velocity of the material where discharge occurs. This may require the use of a riprap apron at the outlet location. The use of Class A rip-rap or smaller shall only be allowed if accepted by the City Engineer's office.

Engineering staff propose the following updates to Supplemental Standard Specifications for Storm Sewer Construction – Section 200.

2.2 PIPE JOINT MATERIALS

2.2.1 Reinforced Concrete Pipe:

~~If concrete pipe tongue and groove joints are tight and true, as determined by the Engineer, they need not be grouted; but when such joints are open and/or skewed, they shall be mortared both inside and outside. The specified joints shall be jointed with cement mortar composed of one (1) part Portland cement and two (2) parts of sand and enough water to make a workable mixture, unless otherwise stipulated on the plans or by the Special Information. All lift holes in RCP Storm Sewer shall be plugged with a concrete mortar plug and sealant or with a flexible butyl lift hole patch. All RCP storm sewer pipe joints shall be sealed with mastic material or butyl rope.~~

2.2.1.1 Gasketed Joints: Gasketed RCP shall comply with ASTM C443 Standard Specification for Joint for Concrete Pipe and Manholes, Using Rubber Gaskets and ASTM C1628 Standard Specification for Joints for Concrete Gravity Flow Sewer Pipe, Using Rubber Gaskets.

2.2.1.2 Tongue and Groove Joints: Tongue and groove joints shall be sealed with mastic material or butyl rope.

~~2.4~~ ~~2.3.1.5~~ **Mortar:**

Mortar shall be Standard Portland Cement, Type I, hydrated lime, and clean, sharp, well-graded sand, free from foreign materials. The mortar shall be composed of one (1) part Portland cement and two (2) parts of sand and enough water to make a workable mixture. The minimum design compressive strength of mortar shall be no less than 4000 psi.

~~2.5~~ ~~2.3.2~~ **Bedding Material**

Bedding material shall meet the requirements as stated on the City of Sioux Falls Standard Plates. On-site material may be used if approved by the Engineer.

2.6 2.3.3 **Select Backfill Material**

Select backfill material shall meet the requirements stated on the City of Sioux Falls Standard Plates. On-site material may be used if approved by the Engineer.

3.10 INSTALLATION OF PIPE

3.10.1 Lift Holes: All lift holes in Reinforced Concrete Pipe shall be filled with a concrete mortar plug and sealant or with a flexible butyl patch.

3.11 PIPE JOINTS

~~3.11.1 RCP Storm Sewer Reinforced Concrete Pipe. All RCP storm sewer pipe shall be sealed with mastic material or butyl rope. Seating of pipe shall conform to manufacturer's recommendations.~~

3.11.1.1 Gasketed Joints: Seating of pipe shall conform to manufacturer's recommendations.

3.11.1.2 Tongue and groove Joints: Joints shall be sealed with mastic material or butyl rope. Seating of pipe shall conform to manufacturer's recommendations. Joints as determined by the Engineer when open and/or skewed, shall have mortar placed on the interior and exterior of the pipe joint.

4.7 BEDDING MATERIAL

Pipe bedding material shall be measured and paid by the lineal foot. Bedding material shall be measured from pipe end to end with no deduction for length through the structure. The measured length shall be rounded up to the nearest one-foot increment.

Payment for pipe bedding material will be full compensation for furnishing and installing of the pipe bedding material and all appurtenances necessary for the proper installation of the bedding material. Pipe bedding material shall be incidental for reinforced concrete pipe.