

## **Technical Specification 019.01**

### **STORM WATER DRAINAGE SYSTEM**

#### **1.0 General**

- a) This specification provides general guidance for the installation, repair, removal, and reinstallation of storm water drainage systems and separation clearances required to public utilities.
- b) The contractor under this section is responsible for the removal and re-installation and/or installation of all storm water drainage pipes, manholes, headwalls, and other related structures where shown on the plans or as may be disturbed during construction. Re-installation and/or installation will conform to the requirements as specified in the North Carolina Department of Transportation (NCDOT) "Standard Specifications for Roads and Structures" and all applicable State and local rules concerning separation requirements to other utilities.

#### **2.0 Reuse and Replacement of Drainage Pipe and Structures**

- a) The contractor shall be required to exercise extreme care in the removal and handling of existing drainage pipe and structures to prevent damage. Existing reusable drainage pipe removed shall be temporarily cleaned and properly stored for re-installation upon completion of the contracted work.
- b) The contractor is to replace all damaged drainage pipe with new re-enforced pipe and shall dispose of damaged material.
- c) Existing drainage pipe that is not suitable for reuse as determined by the Engineer shall be replaced for the unit price found on the Bid Form. If the replacement drainage pipe is not of the sizes or material found in the Bid Form, the Contractor shall replace the pipe for price of material only. Contractor is to provide invoices to satisfaction of the Engineer for the cost of material. Any drainage pipe damaged as a result of Contractor's actions shall be replaced at Contractor's expense.
- d) All pipe shall be replaced as nearly as possible to the original grade and alignment; however, the grade and alignment shall be uniform. The covers and frames from displaced manholes and structures shall also be removed and stored for use on replacement manholes and structures.

#### **3.0 Replacement Drainage Pipe**

- a) Replacement drainage pipe for damaged sections shall be of size and grade of that being replaced except that all replaced pipe shall be reinforced. Concrete pipe shall conform to ASTM C-76, latest edition Class III with tongue and groove joints and preformed mastic joint filler. Size requirements shall meet minimum NCDOT standards in public rights-of-way.

#### 4.0 Replacement Drainage Structures

- a) Replaced manhole and inlet structures shall be precast concrete with preformed holes or knockout panels unless otherwise approved.

#### 5.0 Execution

- a) Excavation, trenching, backfilling, and compaction shall be in compliance with Technical Specification 013.01, "Excavating, Grading, Trenching, & Backfilling". Proper clearance between storm drainage pipe and public water, gravity sewer, low pressure sewer, and transmission force mains ~~other utilities~~ shall be provided as indicated in the Brunswick County Standard Details and per these minimum separations:

- 1) Minimum horizontal separation: 5 feet
- 2) Minimum vertical separation - without engineered support: 24 inches
- 3) Minimum vertical separation – with engineered support: as approved by county staff

#### 6.0 Drainage Pipe:

- a) Replacement drainage pipe shall be new pipe that is free of defects. Store in an acceptable manner until ready for installation. The pipe shall be installed from the lowest point of the system, true to line and grade, with bell or groove and facing upstream. The trench shall be maintained free of surface or ground water. Great care shall be taken to obtain well aligned and tight pipe lines to assure good flow and the exclusion of infiltration by ground water as much as possible. Installation shall conform to the respective recommendations of the pipe manufacturers or trade association.
- b) Special care shall be taken to insure the pipes are well bedded on a solid foundation, and no pipe shall be brought into position until the preceding length has been thoroughly embedded and secured in place. Whenever a pipe requires cutting to fit into the line or to bring it to the required location, the work shall be done in a satisfactory manner, so as to leave a smooth end, and without extra compensation. The pipe should be cleaned of all debris and soil as a result of construction.

#### 7.0 Drainage Structures:

- a) Provide six (6) inches Class 1 gravel beneath structures to six (6) inches outside of structure. Precast structures shall be set plumb, with pipes centered within knockout panels. Provide opening of minimum size to accommodate pipe. Grout pipe in place with non-shrink grout.

- c) Inverts shall be pre-formed or formed with concrete or brick and concrete. All lines entering structures shall be placed upon the concrete slab prior to beginning any brick work. Any masonry work shall be brought up snugly around the lines and a tight connection made to preclude any washout and cavities at the basin. Provide minimum one (1) inch per foot slope to the flow line of the structure.

#### **4.0 Technical Assistance**

Contact the Brunswick County Stormwater Engineer as needed with any questions concerning work on new or existing storm water drainage systems.