

334000 Storm Drainage Utilities

Sections Included In This Standard:

- 1.1 General
- 1.2 Identification of Underground Utilities and Piping
- 1.3 Piping
- 1.4 Quality Assurance
- 1.5 Manholes and Structures

1.1 GENERAL

Storm systems shall be designed to not have standing water in the pipes so as to not breed mosquitoes.

1.2 IDENTIFICATION OF UNDERGROUND UTILITIES AND PIPING

- A. **WARNING TAPE:** All underground piping and utilities shall have non-detectable warning tape that conforms to the following requirements to identify the specific system buried below. Warning tape shall meet OSHA regulation 1926-956 (C) (I). Tape shall be 6" wide with black lettering imprinted on a color coded background that conforms to APWA color code specifications. Tape shall be installed between 18" to 30" above the top of the pipe and a minimum of 6" below grade.
- B. **TRACER WIRE:** All non- metallic pipes installed underground (except pipe containing electric wires and traceable communication lines) and all piping installed 6 feet or more below grade shall have a tracer wire installed along the length of the pipe. The tracer wire shall be taped to the pipe and not allowed to "float freely" within the backfill. The tracer wire shall be continuous without splicing from access point to access point along the length of the pipe. The tracer wire shall be accessible at all structures (valve boxes, meter pits, manholes, pull boxes, lift stations) along the length of the pipe. The tracer wire shall have an access point at the beginning and ending points of the pipe run with no distance between access points to exceed 400 feet within the pipe run. The tracer wire shall have a color coded jacket as follows:

Storm Sewer & Drain Lines – Green

Tracer wire for piping less than 12" diameter shall be a #12 AWG and for piping greater than 12" diameter or 6 feet or more below grade shall be a #10 AWG and HS-CCS high-strength copper clad steel conductor (HS-CCS), insulated with a 30 mil, high-density, high molecular weight polyethylene (HDPE) insulation, rated for direct burial use at 30 volts. HS-CCS conductor must be 21% conductivity for locating purposes, Break load 380# minimum. HDPE insulation shall be RoHS compliant and utilize virgin grade material. Insulation color shall meet the APWA color code standard for identification of buried utilities. Tracer wire shall be *Copperhead*TM HS-CCS HDPE 30 mil insulation or *pre-approved* equal and made in the USA. Any disturbance of this tape requires replacement after work is completed.

1.3 PIPING

- A. Schedule 40 PVC piping shall be used for storm sewer piping up to 10 inches. Black corrugated HDPE piping shall be used for storm sewer piping above 10 inches. Where circumstances warrant, double walled HDPE (lined corrugated) pipe can be used. RCP and other types of successfully field-tested piping are acceptable alternates if FDOT-

approved.

- B. The use of corrugated metal pipe or vitrified clay pipe is not acceptable.
- C. CLEANOUTS: Cleanouts shall be provided at grade. Cleanout caps shall be made of brass. Surround cleanouts with concrete pad with chamfered edges. Pad shall be 18" x 18" x 6" with #10 gauge welded wire mesh.

1.4 **QUALITY ASSURANCE**

All newly installed stormwater piping shall be television inspected and recorded. The TV inspection recording shall provide a clear picture with audio. The picture shall contain the number of linear feet from the center of the manhole. The recording shall be turned over to PPD at Substantial Completion in DVD or MPEG format.

1.5 **MANHOLES AND STRUCTURES**

A. GENERAL

- 1. All manholes and underground utility structures shall either be constructed with precast concrete units or reinforced cast-in-place concrete.
- 2. All manhole openings shall be installed so as to minimize surface water intrusion through the lid.
 - (a) In grassed areas, the opening shall be 3" above surrounding grade with a continuous gradual slope down from the opening; maximum slope is 1" per foot.
 - (b) In paved areas, the opening shall be 1" above the surrounding grade with a continuous gradual slope down from the opening; maximum slope is 1/3" per foot.

B. STRUCTURAL REQUIREMENTS

- 1. Manholes and underground utility structures shall be designed by an engineer registered in the State of Florida based on ASTM C857 Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures with A-16 (AASHTO HS20) wheel loads. An additional load case consisting of A-12 (AASHTO HS15) wheel loads with 1/3 of the ASTM C857 impact and with Live Load Spacing of 32 inches rather than 4 feet shown in ASTM C857 Figure 1 shall also be considered.
- 2. As an alternate, precast, and reinforced cast-in-place, concrete manholes and underground utility structures with top slabs not longer than 48 inches maximum inside dimension conforming to the 2008 Florida Department of Transportation Design Standards Index No. 200 and Index No. 201 may be utilized without design by an engineer registered in the state of Florida.
- 3. Joints between precast units shall be made using "Ram-Nek" sealant.

C. STORM DRAINAGE MANHOLES & STRUCTURES

1. MANHOLES

- (a) Entrance Neck: 24" maximum length.

- (b) Ladder: No integral ladder is to be installed.
 - (c) Manhole Spacing: Maximum spacing between storm sewer manholes shall be 350 feet.
 - (d) Covers: Provide 24" minimum diameter lids permanently marked "STORM." Lids shall not read "City of Gainesville" or "FDOT STORM SEWER." Acceptable products are: U.S. Foundry 170E lids and covers.
2. INLETS AND CURB INLETS: Storm sewerage inlets shall conform to Florida Department of Transportation Design Standards, shall satisfy AASHTO HS-20 loading, and shall be suitable for bicycle traffic. Grates that allow bicycle tires to "drop in" or "get stuck" are not considered safe.
- (a) Grates typically approved elsewhere may not be considered bicycle-safe and may require modification prior to installation.
 - (b) Build up bottoms of catch basins to pipe inverts to create a natural flushing action during storm events.
 - (c) Do not locate curb inlets on the radius of curves such as on the corners at intersections.

END OF SECTION