GWINNETT COUNTY
STORM SEWER PIPE STANDARDS

1.0 Standard Specifications

1.1 Unless otherwise specifically set forth herein or in the Gwinnett County Standard Drawings, all of the materials, methods of the construction, and workmanship for the work covered in reference to stormwater conveyance facility construction shall conform to the most recent Standard Specifications of the Georgia Department of Transportation (Georgia DOT).

1.2 Allowable pipe material for all applications in drainage easements and public street rights-of-way, except as specified below, are Aluminum Coated (Type 2) Corrugated Steel Pipe (ASP), Corrugated Aluminum Alloy Pipe, Smooth Lined Corrugated Polyethylene Pipe (PE), or Reinforced Concrete Pipe (RCP). Usage is summarized in the table below titled Pipe Material Alternatives. Allowable pipe materials are indicated by an “X” in the table.

1.3 For roads constructed with public funds, either wholly or in part, or roads classified as Major Thoroughfares, materials which meet the Georgia DOT design standards shall be used unless an alternative is specifically approved by the Gwinnett Department of Transportation.

1.4 Only Reinforced Concrete Pipe (RCP) shall be used for all dams 9 feet or more in height with an impounding capacity of 20 acre-feet or more unless the Georgia Safe Dams Program requires another material.

1.5 Reinforced Concrete Pipe (RCP) shall be used under non-local roads.

1.6 The Department of Public Utilities may approve an alternative pipe material

2.0 Minimum Pipe and Pipe Coating Requirements

The type of pipe material used shall be in accordance with section 1.0 herein.

2.1 Reinforced concrete pipe shall be in not less than 8 foot joint lengths. All joints shall be bell and spigot type, with a rubber gasket conforming to ASTM C-443. Pipe shall be manufactured in accordance with AASHTO M-170 and/or ASTM C-76. Class of pipe and wall thickness shall be in accordance with 1030-D, Georgia DOT specification, Table No.1.

2.2 Aluminum coated (Type 2) steel pipe shall comply with AASHTO M-274 for the
coating and AASHTO M-36 for the pipe fabrication. Aluminum alloy pipe shall comply with AASHTO M-196 for material and fabrication.

2.2.1 All corrugated aluminum coated steel or aluminum alloy pipe not carrying a live stream may be plain. All corrugated aluminum coated steel or aluminum alloy pipes, which will carry a live stream, shall have paved inverts pursuant to AASHTO M-190, Type C, except that the pipe need not be fully coated.

2.2.2 See the Standard Drawings for the minimum acceptable combinations of gages, diameters, and corrugation configurations for corrugated aluminum alloy pipe and pipe arches, and for corrugated aluminum coated steel pipe and pipe arches.

2.2.3 Each end of each pipe section, to be joined by a coupling band, shall have a minimum of two annular corrugations. Coupling bands shall be so constructed to lap on an equal portion of each of the pipe sections to be joined. The connecting bands shall have a minimum of two annular corrugations and fully engage, over the entire pipe periphery, one corrugation on each pipe. Bands shall be fabricated from the same material as the pipe. The minimum band gauges for aluminum pipe and aluminized pipe shall be as specified in AASHTO M-196, Section 19, and AASHTO M-36, Section 9, respectively.

2.2.4 Gaskets may be required as determined by the County in the field, and shall be either sleeve type or O-ring type and shall meet the requirements for gaskets as specified in AASHTO M-36, Section 9.3.

2.3 Structural plate drainage structures shall conform to the following specifications:

Corrugated aluminum alloy structural plate pipe, pipe arches and arches shall consist of aluminum plates and galvanized bolts and nuts of the size, shape and thickness as shown on the approved plans. These structures shall conform to the requirements of AASHTO M-219.

2.4 Smooth Interior Corrugated Polyethylene Pipe

2.4.1 This specification applies to high density polyethylene corrugated pipe with an integrally formed smooth interior (PE). PE pipe manufacturers shall be approved by the Department of Public Utilities.

2.4.2 This pipe shall conform to the requirements of AASHTO M-294 and AASHTO MP7, Type S and D.
2.4.3 Joints shall be as recommended by the manufacturer and approved by the County. Connections shall create a soil tight joint at a minimum and shall use a rubber gasket, which conforms to ASTM F-477.

2.4.4 Installation shall be in accordance with ASTM Recommended Practice D-2321, AASHTO Section 30, or as specified by the County.

2.5 Certification from the manufacturer that the product was manufactured, tested, and supplied in accordance with this specification shall be furnished to the County upon request.
## Pipe Material Alternatives

<table>
<thead>
<tr>
<th>Pipe Type</th>
<th>Reinforced Concrete Pipe</th>
<th>Aluminized Type 2 Steel</th>
<th>Polymer Precat Steel</th>
<th>Aluminum Alloy</th>
<th>Corrugated Polyethylene</th>
<th>Smoothed Lined High Density Polyethylene Type “S”</th>
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</thead>
<tbody>
<tr>
<td><strong>Specifications</strong></td>
<td>ASTM C76, AASHTO M170</td>
<td>ASTM A760, A929, AASHTO M36, M274</td>
<td>ASTM A742, A762, AASHTO M36, M245, M246</td>
<td>ASTM B744, B745, AASHTO M196, M197</td>
<td>AASHTO M252</td>
<td>ASTM F-2306, AASHTO M274</td>
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</table>

### Type Installation

<table>
<thead>
<tr>
<th></th>
<th>Longitudinal</th>
<th>Non-Local Road</th>
<th>Local Road</th>
<th>Lateral Systems</th>
<th>Slope Drain</th>
<th>Perforated Underdrain</th>
<th>Dams H&gt;9’ and V&gt;20 Ac-Ft</th>
<th>Perennial Streams</th>
<th>Minimum Allowable Design Velocity</th>
<th>Maximum Allowable Design Velocity</th>
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</thead>
<tbody>
<tr>
<td>Cross Drain &lt; 10% Slope</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>2.5 fps</td>
<td>15 fps</td>
</tr>
<tr>
<td>Cross Drain &gt; 10% Slope</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>5 fps (See Note 2)</td>
<td>15 fps (See Note 3)</td>
</tr>
</tbody>
</table>

**Notes:**
1.) All pipe materials shall meet the minimum requirements of the Georgia Department of Transportation Standard Specifications Construction of Transportation Systems, most current edition.
2.) Spiral Rib steel pipe allowed with a paved invert. Annular and helical corrugated steel pipe not allowed.
3.) Paved invert required where design velocity exceeds 5 feet per second. Maximum allowable velocity 15fps with paved inverts.
2.6 Additional Pipe Material Specifications:

2.6.1 From the CSP Durability Guide, the recommended environmental ranges for aluminized Type 2 CSP are as follows:
   i. \( 5 \leq \text{pH} \leq 9 \)
   ii. Soil Resistivity \( \geq 1,500 \text{ ohm-cm} \)
   iii. Maximum design velocity = 5 fps

2.6.2 The averages for pH and soil resistivity are:
   i. \( \text{pH} = 5.4 \)
   ii. Soil Resistivity = 13,070

2.6.3 Granular backfill will provide a more neutral pH and resistivity of 10,000-30,000.

2.6.4 From CSPI handbook (chapter 7, pg. 325), “…backfill material should preferably be granular to provide good performance.”

2.6.5 Bedding detail was developed assuming poor soil conditions so that optimal pipe performance could be realized. Flexible pipe such as metal and plastic are more susceptible to backfill conditions that rigid pipe such as RCP.

3.0 Pipe Installation

Reinforced concrete pipe, corrugated aluminum alloy pipe, corrugated aluminum coated steel pipe and smooth interior corrugated polyethylene pipe shall be installed in accordance with Section 550 of the Georgia DOT Standard Specifications, Construction of Roads and Bridges. Prior to approval of a Final Plat, the County may require the submittal of certification from a mandrel testing agency indicating that all installed pipe does not exceed 5% deflection. Based on field inspections, video surveillance may be conducted by the County or required by the County on storm drain installations before approval of the Final Plat or issuance of the Certificate of Occupancy. If required, video surveillance should be done after completion of all activities that may damage the pipe but prior to placement of base, paving or landscaping over or near the pipe. If video surveillance indicates problems such as pipe deformation, cracking or joint separation, the pipe shall be removed and replaced before approval.

3.1 Bedding

All pipe structures shall be placed on stable earth or fine granular foundation, the characteristics of which would be expected to provide long-term stability. In all live stream pipe installations, in areas of low bearing solid or non-uniform foundations, in area where rock is encountered at the foundation level, or in other locations where conditions warrant, a minimum of 6” of crushed stone bedding is required, (maximum size of stone shall be 3/4”). Geotextiles or geogrids may also be required by the County in problem areas.
Bedding Detail
3.2 Backfilling

Backfill on all pipe installations shall be constructed using foundation backfill material Type I or Type II, as specified in Section 812.01 and 812.02 respectively, in Georgia DOT Standard Specifications. These materials shall be placed in layers of not more than six inches loose. Compaction of these materials shall be accomplished by hand tamping or machine tamping. Required compaction levels are as follows:

3.2.1 Backfill within all street rights-of-way shall be compacted to 95% maximum density, tested using the AASHTO Method T-99.

3.2.2 Backfill in all other areas shall be compacted to 85% maximum density, tested using the AASHTO Method T-99.

3.3 Construction loads and minimum covers

If drainage pipe is installed prior to the completion of grading, a minimum of 4 feet of fill should be provided where needed to adequately protect the drainage structure during the land development phase, unless the structure itself is designed to withstand the anticipated live load during construction.

4.0 End Finish

Headwalls or other end treatments are required on all culverts (except under residential driveways) and at the outlet of all piped collection systems.

4.1 Headwalls are to be precast concrete, stone masonry with reinforced concrete footings, or poured-in-place, reinforced concrete with reinforced concrete footings. Precast concrete headwalls for corrugated aluminum coated steel pipe or aluminum alloy pipe shall be made with aluminum coated steel or aluminum alloy pipe stubs.

4.2 End treatments that conform to the slope may be pre-cast concrete end sections, aluminum coated steel or aluminum alloy end sections, masonry, PE end sections, reinforced poured-in-place slope collars, or grouted rip-rap. Concrete and metal flared end sections shall conform to Georgia DOT Standard Drawing 1120.

5.0 Junction Boxes and Catch Basins

5.1 Junction boxes and catch basins shall have metal manhole frames and lids for access.

5.2 Lids for storm drainage facilities shall be engraved in accordance with the Gwinnett
County Standard Drawings.

6.0 Other Structures

Natural bottom arches and box culverts may be used in accordance with the latest Standard Specifications of the Georgia Department of Transportation.