RESOLUTION NO. 88-M-08

A RESOLUTION RELATING TO ROAD CONSTRUCTION STANDARDS: ADOPTING ORANGE COUNTY ROAD CONSTRUCTION SPECIFICATIONS: PROVIDING AN EFFECTIVE DATE.

RECITALS

1. The Orange County Commissioners of Orange County, Florida, ("Commission") has received recommendations from the County Engineer and from Orange County Road Construction Advisory Board concerning specifications and standards for road and highway construction.

2. The Commission desires to establish minimum standards for road and highway construction.

3. The Commission has received sufficient information to enable it to assess the economic impact of the proposed regulations and has determined that no additional information is necessary.

NOW THEREFORE BE IT RESOLVED BY THE ORANGE COUNTY COMMISSIONERS OF ORANGE COUNTY:

Section 1. Adoption of Orange County Road Construction Specifications. The Commission adopts the following minimum standards for road and highway construction in Orange County:

See Exhibit 1, attached

Section 2. Severability. If any part of this Resolution or the application of it to any person or circumstance is held invalid, the invalidity shall not effect the remaining provision or application which can be given effect without the invalid provision or application, and to this end, the provisions of this Resolution are declared severable.

Section 3. Effective date. This resolution shall take effect April 1, 1988 upon its adoption.

Orange County Commissioners
Orange County, Florida

BY: [Signature]
Chairman

ATTEST:

Thomas H. Locker Clerk
to the Orange County Commission

BY: [Signature]
Deputy Clerk

APPROVED BY THE ORANGE COUNTY COMMISSION AT THEIR MEETING

FEB 15, 1988
ARTICLE 13
CULVERTS AND STORM SEWERS

Section 13.01 SCOPE OF WORK

The work in this Section shall consist of furnishing and installing culverts and storm sewers with appurtenances in conformance with the specifications hereafter described and of the sizes and dimensions shown on the plans.

Section 13.02 PIPE

13.02.01 CONCRETE PIPE

Concrete pipe shall be of first quality, conforming to the latest revision of ASTM C-76 for round pipe and ASTM C-507 for elliptical pipe. The size and class shall be as shown on the plans. Lifting holes are prohibited. Joints for all round pipe shall be sealed by the use of round rubber gaskets and shall conform to the applicable provisions of ASTM C-361. Joints for elliptical pipe may be a tongue and groove type and sealed with a performed gasket material (Ram-Nek or equal). The performed gasket shall be applied to form a continuous gasket around the leading edges of both the primed tongue and groove in a manner that when the pipes are joined, the entire annular space will be filled with gasket material and there will be evidence of squeeze out of gasket material for the entire internal and external circumference of the joint. Elliptical concrete pipe joints shall be wrapped with filter fabric conforming to Article 15 of these specifications. Filter fabric material shall extend a minimum of three (3) feet on both sides of the joint and shall overlap a minimum of two (2) feet at the top of the joint.

13.02.02 CORRUGATED METAL PIPE

Metallic coated corrugated steel pipe shall conform to the current AASHTO Standard Specification M-36. Corrugated aluminum alloy pipe shall conform to the current AASHTO Standard Specification M-196. All corrugated metal pipe installed shall have a continuous helical lock seam or a continuous welded helical seam. Riveted seam, spot welded seams, or non-helical corrugated metal pipe shall not be installed under this specification. Aluminum culverts can be specified if the soil pH is between 5.5 and 8.5 and soil resistivity is 1500 ohm-cm or greater certified by a licensed geotechnical engineer. If soils fall outside of these ranges, prior approval of storm drainage materials shall be obtained from the County Engineer.

Zinc coated steel sheets for corrugated metal pipe shall conform to the current AASHTO Standard Specification M-218.
Aluminum coated steel sheets for corrugated metal pipe shall conform to the current AASHTO Standard Specification M-244.

Zinc coated corrugated metal pipe and aluminum coated corrugated metal pipe shall conform to the current Type A bituminous coated corrugated metal culvert pipe AASHTO Standard Specification M-190.

The ends of all corrugated metal pipe shall be recorrugated and the pipe supplied with a metal banding system. The metal band system shall have a minimum width of one (1) foot and a rubber gasket or approved equal, which shall fit snugly in the space between the recorrugated end and metal band.

The jointing system shall prevent soil infiltrating into the pipe. All joints under and within six feet (6') of the edge of a pavement shall be wrapped with filter fabrics in conformance with Article 15 underdrains. The material shall extend a minimum of three feet (3') on both sides of the joint and shall have a two foot (2') overlap on the top of the joint. Banding of the filter fabric may be required at the discretion of the County Engineer.

There shall be no elliptical corrugated metal pipe approved. Corrugated steel pipe and corrugated aluminum pipe shall conform to the minimum gages of metal set forth in the attached schedule. All accessories and hardware shall conform to Section 430 of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction.

Section 13.03 LAYING PIPE

All pipe shall be carefully laid, true to the lines and grades as shown on the plans. All pipe shall be laid "in the dry" unless specifically authorized otherwise by the County Engineer.

Section 13.03.01 CONCRETE PIPE

The joint shall be thoroughly lubricated and assembled according to the manufacturer's recommendations so that the maximum width of the joint opening shall not exceed that shown below.

<table>
<thead>
<tr>
<th>PIPE DIAMETER</th>
<th>MAXIMUM JOINT OPENING</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>5/8&quot;</td>
</tr>
<tr>
<td>15</td>
<td>5/8&quot;</td>
</tr>
<tr>
<td>18</td>
<td>5/8&quot;</td>
</tr>
<tr>
<td>24</td>
<td>7/8&quot;</td>
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<tr>
<td>30</td>
<td>7/8&quot;</td>
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<tr>
<td>36</td>
<td>7/8&quot;</td>
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<tr>
<td>42</td>
<td>7/8&quot;</td>
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<tr>
<td>48</td>
<td>7/8&quot;</td>
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<tr>
<td>54</td>
<td>7/8&quot;</td>
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<tr>
<td>60</td>
<td>7/8&quot;</td>
</tr>
<tr>
<td>66</td>
<td>7/8&quot;</td>
</tr>
<tr>
<td>72</td>
<td>1&quot;</td>
</tr>
</tbody>
</table>
If, while making the joint, the gasket comes loose and can be seen through the exterior joint recess when joint is pulled up within one inch of closure, the dry pipe shall be removed and the joint remade.

Section 13.03.02 CORRUGATED METAL PIPE

The metal band shall be drawn together in conformance with the manufactures specification. The rubber gasket shall be uniformly compressed around the circumference of the pipe. Re-corrugated ends and bands damaged shall be rejected and removed from the construction site.

Section 13.03.03 PIPE - INLET/MANHOLE JOINTS

The joints of pipe and inlet/manhole shall be carefully cleaned and completely filled with nonshrink mortar applied and cured in accordance with the manufacturer's recommendations. An asphaltic mastic material shall be applied twelve (12) inches in width from the joint around the exterior of the pipe(s) and on the exterior wall(s) of the inlet/manhole. A continuous twenty-four (24) inch width of filter fabric shall be wrapped around each joint and shall have a two (2) foot overlap on the top of the pipe-inlet/manhole joint. The filter fabric shall be thoroughly bonded to the asphaltic mastic material. Filter fabric shall conform with Article 15 Underdrains. All pipe shall be carefully laid, true to the lines and grades as shown on the plans. All pipe shall be laid "in the dry" unless specifically authorized otherwise by the County Engineer.

Section 13.04 BACKFILLING

Backfilling shall progress as rapidly as the construction and testing of the work will permit. All backfill material shall be suitable and free of deleterious material. The initial backfill shall be carefully deposited on both sides of the pipe at the same time and uniformly compacted around the barrel of the pipe until enough has been placed to provide a cover of one foot above the crown of the pipe. In no case shall backfill material be placed in the trench in a manner that will cause shock to, or unequal pressure on, the pipe. The backfill shall be placed and compacted to 95 percent of maximum density as determined by AASHTO T-180 under and within six (6') feet of the travelled way and under other existing hard surfaced or previously compacted areas. In all areas except for those stated, compaction must equal 90 percent of maximum density as determined by AASHTO T-180 or as directed by the County Engineer. Under no condition is construction debris, concrete, etc., to be included with the backfill.

Section 13.05 PIPE FOUNDATIONS

Where the nature of the foundation materials is of poor supporting value, the foundation material shall be replaced with sand or other material, or as approved by the County Engineer. The foundation
material shall be consolidated by mechanical methods to specified densities.

Section 13.06 TESTS

Section 13.06.01 COMPACtion TESTS

Compaction tests shall be required for each 300 linear feet of pipe as a minimum. The Orange County Engineer may determine that more compaction tests are required to certify the installation depending on field conditions. The locations of compaction tests within the trench shall be in conformance with the following schedule:

a. One test at the spring line of the pipe.
b. One test at an elevation one foot above the crown of the pipe.
c. One test for each two (2') feet of backfill placed above one foot above the crown of the pipe to subgrade elevation.

Section 13.06.02 PIPE CERTIFICATION

A pipe certification shall be submitted to the County Engineer for all pipe furnished or as approved by the County Engineer. The certification shall be signed and sealed by a registered professional engineer for the State of Florida. The certification shall state that the pipe installed and materials supplied complies with all applicable specifications contained herein.

Section 13.07 SUBSTITUTION OF MATERIAL

The substitution of corrugated metal pipe for concrete pipe or concrete pipe for corrugated metal pipe requires the written authorization of the County Engineer.
### MINIMUM

#### TABLE OF THICKNESS OF METAL PIPE

<table>
<thead>
<tr>
<th>CORRUGATED STEEL PIPE</th>
<th>CORRUGATED ALUMINUM PIPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Diameter or Equivalent (Inches)</td>
<td>Sheet Gage No.</td>
</tr>
<tr>
<td>15&quot; to 24&quot;</td>
<td>16</td>
</tr>
<tr>
<td>30&quot; to 36&quot;</td>
<td>14</td>
</tr>
<tr>
<td>42&quot; to 54&quot;</td>
<td>12</td>
</tr>
<tr>
<td>60&quot; to 72&quot;</td>
<td>10</td>
</tr>
<tr>
<td>78&quot; to 96&quot;</td>
<td>8</td>
</tr>
</tbody>
</table>

**NOTE:** For pipes larger than 96" approved as per County Engineer
<table>
<thead>
<tr>
<th>LINES UNDER OR WITHIN SIX (6') FEET OF THE EDGE OF PAVEMENT</th>
<th>CONC.</th>
<th>P.V.C.</th>
<th>C.I.</th>
<th>CORRUGATED STEEL PIPE</th>
<th>CORRUGATED ALUMINUM PIPE</th>
<th>STEEL CASING</th>
</tr>
</thead>
<tbody>
<tr>
<td>STORM WATER DRAIN</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>UTILITY CONDUIT</td>
<td>Yes</td>
<td>Yes (1)</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

1. a) Water or sanitary force main-SDR 21, Type I, Grade I, or approved equal  
   b) Gravity Sanitary Sewer-SDR 35, Type I, Grade I, or approved equal  
   c) Electrical Power-Schedule 40 in traveled way, DB in other parts of the right of way or approved equal  
   d) Telephone-Schedule 40, ATT Type "C" or approved equal  
   e) Cablevision-Schedule 40, or approved equal  
   f) Gas-Material as specified in regulations for the Transportation of Natural and other Gas by pipelines (Parts 191 and 192, Title 49 of the Code of Federal Regulations)
ARTICLE 14
INLETES AND MANHOLES

Section 14.01 Scope of Work

The work specified in this Section shall consist of construction inlets and manholes. These structures shall be constructed of portland cement concrete and reinforcing steel with the necessary metal frames and gratings. The shall be constructed in conformity with the detailed plans and in accordance with these specifications.

Section 14.02 Materials

Concrete shall have a minimum compressive strength of 3000 psi at 28 days. The mortar for masonry shall be of portland cement and sand mixed in the proportions of one part cement to three parts of sand. At the option of the Contractor, high early strength cement may be used.

Section 14.03 Forms

Forms shall be built true to line and grade, braced in a substantial and unyielding manner and so designed and constructed that they may be removed without injury to the concrete.

Section 14.04 Placing and Curing Concrete

The concrete shall be placed in the form to the depth shown on the plans and thoroughly tamped and spaded. After the concrete has hardened sufficiently, it shall be covered with suitable material and kept moist for a period of three days or longer, if necessary, and shall be protected in a satisfactory manner from the elements until thoroughly cured.

Section 14.05 Masonry Construction

Masonry construction shall be limited to completion of doghouses around pipes, adjusting manhole covers, etc., or as approved by the County Engineer. It is the intent of the specification that structures be constructed of precast concrete or cast in place concrete. All clay brick used shall conform to the current ASTM Designation C-55 Grade P-11.

Section 14.06 Precast Inlets and Manhole

Precast manholes, inlets and junction boxes shall be in accordance with ASTM C-478 or the standard specifications.
Section 14.07 Placing Pipes

The inlet and outlet pipes shall be flushed with the inside face of the wall. The joints of pipe and inlet/manhole shall be carefully cleaned and completely filled with nonshrink mortar applied and cured in accordance with the manufacturer's recommendations. An asphaltic mastic material shall be applied twelve (12) inches in width from the joint around the exterior of the pipe(s) and on the exterior wall(s) of the inlet/manhole. A continuous twenty-four (24) inch width of filter fabric shall be wrapped around each joint and shall have a two (2) foot overlap on the top of the pipe - inlet/manhole joint. The filter fabric shall be thoroughly bonded to the asphaltic mastic material. Filter fabric shall conform with Section 15 Underdrains.

Section 14.08 Flow Channels

A flow channel shall be formed in the invert of all inlets, manholes and junction boxes and shall extend to the spring line of the pipe.
ARTICLE 20

RESTORATION OF EXISTING RIGHT-OF-WAY

Section 20.01 Description

Restoration of existing right-of-way disturbed by the installation of utilities or adjacent construction projects shall be in conformance with the special conditions of the permit and this section of the Road Construction Specifications.

Section 20.02 Traffic Control


Section 20.03 Excavation

Excavation shall be in accordance with Article 6 of these specifications.

Section 20.04 Utility Foundations

Where the nature of the foundation materials is of poor supporting value, the foundation material shall be replaced with sand or other material, or as approved by the County Engineer. The foundation material shall be consolidated by mechanical methods to specified densities.

Section 20.05 Backfill and Compaction to Sub-Grade or Existing Ground

Backfilling shall progress as rapidly as the construction and testing of the work will permit. All backfill material shall be suitable and free of deleterious material. The initial backfill shall be carefully deposited on both sides of the utility at the same time and uniformly compacted around the utility until enough has been placed to provide a cover of one foot above the utility, at which time a density test shall be conducted. Material shall then be placed and compacted in two (2') foot lifts above the utility. In no case shall backfill material be placed in the trench in a manner that will cause shock to, or unequal pressure on, the utility. Under no conditions is construction debris, concrete, etc., to be included with the backfill.

20-1
Section 20.06 Compaction

Compaction density testing shall begin as stated in Section 20.05, and shall be tested for each two (2') foot increment, above that point. The last test shall be taken at existing ground level, or top of the sub-base, whichever applies.

Testing shall conform to the following:

a. Under and within six (6') feet of the travelled way and under other existing hard surfaced, or previously compacted areas. Compaction must equal 95 percent of maximum density as determined by AASHTO T-180.

b. In all areas except for the above, compaction must equal 90 percent of maximum density as determined by AASHTO T-180 or as directed by the County Engineer.

The following testing methods are acceptable to Orange County:

a. AASHTO T-180 (Modified)

Density tests for determination of the specific backfill, base, etc., compaction shall be made by a Geotechnical Engineer licensed in the State of Florida at the expense of the permittee, and reports submitted to the County Engineer.

Section 20.07 Base and Pavement Restoration

Pavement or roadway surfaces cut or damaged shall be replaced with the same type material that existed at the time of removal, or as approved by the County Engineer, to like or better condition than existing prior to the construction.

Where existing pavement is to be removed, the surface shall be mechanical saw cut prior to trench excavation, leaving a uniform and straight edge, with minimum disturbance to the remaining adjacent surfacing.

The base, during open cut restoration, shall be brought up to the grade of the existing pavement, and shall consist of a minimum thickness of 8 inches of 3000 psi high early strength concrete. The minimum width of the concrete shall be 12 inches each side of the open cut in addition to the width of the open cut as shown on the Standard Roadway Open Cut Detail.

In advance of pouring the concrete base, during final restoration, the existing asphalt surface shall be mechanically sawed straight and clean.
Immediately following the specified backfilling, compaction, testing and base construction, the final surface restoration shall be commenced in accordance with the applicable detail, and as approved on the permit. Asphalitic material shall be replaced with the same type of material, that existed at the time of removal and shall be a minimum of one (1"") inch thick, or as approved by the County Engineer.

Section 20.08 Unpaved Street Restoration

The top twelve (12"") inches of the excavation shall be stabilized with a mixture of clay and sand to a condition equal to or better than existing surface. Compaction density of this layer shall equal 95% of maximum density as determined by AASHTO Specification T-180.

Section 20.09 Grassing and Mulching

Grassing and Mulching shall be in accordance with Article 18 of these specifications.
ARTICLE 21

SPREADER SWALES

SECTION 21.01 SCOPE OF WORK

The work covered by this Section consists of the required use of Spreader Swales for storm water discharge into lakes within Orange County. Spreader Swales shall comply with sheets one and two of Exhibit A.
EXHIBIT "A"

Place Erosion Stabilization Mat as Shown as Approved by Orange County Engineering Dept. (See Detail "A")

Wrap with Filter Fabric as Shown as Approved by Orange County Engineering Dept. (See Detail "A")

Construct Gabion Berm (6'x3'x1') Stone Fill Shall be 3 1/2" Min. Size and Conform to Section 901 of the Florida Dept. of Transportation Standard Specification for Road and Bridge Construction.

SECTION "A-A"

SCALE: 1" = 3'

TYPICAL SPREADER SWALE

SHEET 2 OF 2