South Carolina Department of Transportation

Engineering Directive

Directive Number: **ED-27** **Effective:** **November 1, 2005**

Subject: **Drainage Outfalls**

References: **See Paragraph 1 Below**

Purpose: **Proper Design of Drainage Outfalls**

This Directive Applies to: **Preconstruction**

Laws and Regulations Affecting Outfalls

The laws and regulations that apply to drainage for the South Carolina Department of Transportation (SCDOT) are Federal Highway Administration Regulation 23 CFR, Ch. 1, Part 650, Subparts A and B (April 1, 2003 Revision); Federal Emergency Management Agency (FEMA) National Flood Insurance Program and Related Regulations, 44 CFR, Ch. 1, Parts 9 and 10 (October 1, 2003 Revision); Environmental Protection Agency National Pollution Discharge Elimination System Regulations (NPDES) as administered though South Carolina Department of Health and Environmental Control (DHEC) NPDES General Permit; South Carolina Sediment and Erosion Control and Storm Water Management Regulations, S.C. Code of Regulations, Regulations 72-405 et seq.; South Carolina Department of Health and Environmental Control Office of Ocean and Coastal Resource Management Regulations, S.C. Code of Regulations, Regulations 30-1 et seq.; and State water law.

In this engineering directive, the following definitions shall apply:

Drainage outfall – Any ditch, channel, or stream into which surface water from SCDOT right-of-way discharges.

Limit of influence – The point along the outfall channel where the effect of SCDOT improvements on the right-of-way could cause damage to property.

No increase in water elevation or floodway width – SCDOT interprets no increase in water elevation for submittal threshold to FEMA to mean to the accuracy of the survey data or 0.1 foot for areas outside the Department's right-of-way. For floodway width, no change submittal threshold is rounded to the nearest foot for areas outside of the Department's right-of-way. Changes made within SCDOT's right-of-way are acceptable if water surface elevation does not increase by more than 1.0 foot above the base flood elevation. If a study is submitted to FEMA, FEMA interprets any change, either positive or negative, that is shown in the computer printouts as being significant and requires a conditional letter of map revision (CLOMR).

Surface waters – Waters flowing over the surface of the land but not in a recognizable channel.

Natural watercourse – A stream with recognizable channel banks and bottom.

Significant increase in flow – An increase in discharge that will cause damage to property.

Outfalls will be designed using the following criteria:

- Outfalls that are not natural channels shall be designed for 10-year discharge.

- For drainage outfalls that are natural watercourses, no modifications will be made to the channel except as necessary to prevent scour or erosion or to accommodate highway drainage structures.

Where SCDOT engineering personnel suspect that landowners adjacent to highway rights-of-way have violated the laws or regulations governing drainage, and such violation is detrimental to the Department, the suspected violations shall be reported to the SCDOT's Legal Division for consideration as to whether legal action is advisable. A violation is considered detrimental if it causes damage to SCDOT property or if it would increase the Department's liability for damage to another's property. All reports of suspected violations shall be supported by documentation verifying the violation, including reference to the specific law or regulation violated.

Basic Design Requirements

1. The outfall channel should be analyzed with the design discharge to determine, (a) that there is no anticipated damage caused to property and (b) the channel is stable. If there is potential property damage, (1) the channel will be improved, (2) detention storage will be designed to prevent property damage, or (3) a combination of channel improvement and detention will be used to prevent property damage. If the channel is unstable, protective measures will be designed utilizing the design methods in FHWA Hydraulic Engineering Circulars HEC-15 or HEC-11.

2. If detention storage is used to prevent property damage, a hydrograph should be routed through the pond and outfall down to any adjacent streams that may be susceptible to property damage. While the pond may decrease discharges into the outfall, a timing shift in the hydrograph could increase the peak discharge in other downstream waterways.

3. At sites where existing crossline pipes are undersized and must be enlarged to meet design standards, a determination of why the existing pipe is undersized will be made. If the cause is due to upstream development, an investigation will be conducted to determine if any drainage law or regulation has been violated. When there is a violation, documentation of the violation will be furnished to the Department's legal staff for consideration of possible legal action.

4. If the downstream channel has been blocked or restricted by downstream property owners and it appears that violations of State drainage laws or State or Federal regulations have occurred, documentation of the violation will be made and forwarded to the Department's legal staff for consideration of possible legal action.

5. If the outfall does not meet the South Carolina legal definition of a watercourse and the natural path downstream has been blocked by actions of the landowner, (1) an alternate

outfall should be located, (2) an alternate outfall route around the blockage should be located, (3) right-of-way negotiations should be conducted to locate the outfall through the blockage, or (4) failing on the preceding, then condemnation proceedings should be initiated to locate the outfall in its natural location.

6. When documentation of violations is prepared it should consist of photographs, videos, and aerial photography preferably showing before and after conditions; engineering studies; maps with the violation delineated; documentation of conversations with local residents; and plots of surveys. The specific law or regulation being violated should be referenced.

Detailed design procedures to be used in designating outfalls and a listing of supporting references are given in the South Carolina Department of Transportation "Requirements for Hydraulic Design Studies." Since SCDOT does not have a current drainage manual, the AASHTO "Model Drainage Manual" is adopted as the Department's working drainage manual.

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History: Issued on November 1, 2005