APPENDIX B
GUTTER FLOW

1.0 Introduction

Gutter flow hydraulics is an essential part of storm drainage system design because limiting spread to gutters, shoulders and sometimes portions of the traveled lane is essential to the service level and traffic safety. Several methods used in calculating gutter flow hydraulics are noted in Section 3.

Note: Spread is the width of stormwater flow in the gutter measured laterally from the roadway curb.

2.0 Gutter Types

The three most common types of gutters encountered in pavement drainage design are defined in **Chapter 8**.

3.0 Gutter Flow Calculations

Gutter capacities, average velocities, flow depths and flow widths can be determined using the Manning equation in modified form. The Manning equation has to be modified because the hydraulic radius in the conventional equation does not adequately describe a gutter cross-section.

Equations, nomographs and computer programs used in gutter flow analysis are presented in **Chapter 8**.

Methods to estimate pavement and off-site runoff are discussed in **Chapter 7**.

4.0 Design Objectives

- Gutters should be designed using the design discharge recurrence intervals listed in **Chapter 3**.

- When a design flow occurs, there is a spread or widening of the conveyed water surface. The water spreads to include not only the gutter width, but also parking lanes or shoulders, and portions of the traveled surface. Limiting spread to gutters, shoulders, and sometimes portions of the traveled lane is essential to the service level and traffic safety. The designer is referred to Appendix D for allowable spread of stormwater runoff flow.

- As gutter flow approaches the low point in a sag vertical curve the flow can exceed the allowable design spread values as a result of the continually decreasing gutter slope. The spread in these areas should be checked to insure it remains within allowable limits. If the computed spread exceeds design values, additional inlets should be provided to reduce the flow as it approaches the low point. Sag vertical curves and measures for reducing spread are discussed further in Appendix D.