

SECTION 11
SURFACE DRAINAGE

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SECTION 11 **SURFACE DRAINAGE**

11.1 GENERAL

Generally, wherever possible surface drainage should be handled with roadway catch basins located before and after the bridge. When it is not possible to handle all the surface drainage off the bridge, the entire deck drainage system shall be designed to be as maintenance free as possible. Wherever possible, drainage routes shall be short and direct, and abrupt changes in direction shall be avoided. Pipes and troughs shall be sized to handle design flows, and slopes shall be maximized. Clean-outs shall be provided at strategic locations to simplify maintenance of the system.

Where pollution of streams, ponds and water supply areas may be a factor, further consideration is required.

11.2 DESIGN GUIDELINES

Adequate facilities shall be provided to collect and dispose of the surface water on the structure by means of suitable scuppers, troughs and leaders where required by drainage requirements. Direct discharge from scuppers, etc., is preferable over waterways, and all other areas where the discharge will not be detrimental to the area below. This discharge shall not be allowed to fall on any components of the structure. The FHWA document entitled "Design of Bridge Deck Drainage" (**HEC-21**) or its successor shall be used.

11.2.1 Scuppers

Scuppers are to be located to avoid long runs of pipe/trough and shall be designed to satisfy the structural and drainage requirements. Scuppers shall be designed in accordance with the provisions of the latest edition of the **Drainage Manual**.

11.2.2 Drainage Piping

Drainage piping shall have a minimum diameter of 8 inches. For aesthetic reasons, leaders shall be located on the inside face of the fascia girders, on the rear face of piers, and recessed into the front face of abutments. Piping shall not be located within concrete pier columns. Piping should not be used where runs are required with an angle of less than 30 degrees to the horizontal.

11.2.3 Open Troughs

Where piping is not appropriate, open troughs shall be used. Troughs shall be of adequate depth and shall have a self-cleaning pitch of 3% or greater to carry the discharge and minimize the possibility of spilling or clogging. Provisions must be made to contain the splashing where scuppers spill into the troughs.

11.2.4 Underground Pipe

The underground drainage beyond the bridge piping must conform to the requirements of the **Drainage Manual** and shall be included in the roadway items.