Each of these channel types are artificial systems designed to provide specific drainage capacities. The right-of-way ditch functions as a type of relief ditch, handling drainage needs other than those for the roadway and thus freeing roadside ditches from carrying anything except roadway runoff. Right-of-way ditches can also act as interceptor ditches to provide a method for intercepting offsite flows or subsurface groundwater flows above cut slopes, thereby controlling slope erosion.

In general, roadside or median ditches are relatively shallow trapezoidal channels or swales (which are shallow triangular channels). Both types are designed to handle local surface runoff from roadway surfaces, or to lower water table elevations by intercepting groundwater. In some cases, they may also handle other than project drainage. Outfall ditches or canals are designed in most cases as receptors of runoff from numerous secondary drainage facilities, such as side ditches or storm drains. The use of a roadside ditch as an outfall ditch is not recommended, since its probable depth and size could create a potential hazard.

311.05 BRIDGE HYDRAULICS

Bridge hydraulic designs shall be documented in the Bridge Location and Hydraulics Report (BLHR). Design information shall be summarised on the Bridge Hydraulics Recommendations Sheet (BHRS). The format for the BHRS is provided in Section 3.11.

BLHR and the BHRS shall be prepared for the projects listed below:

1. Bridges and large culverts (culverts larger than 1800 mm dia pipes or 1200 mm x 1200m box culverts) on new alignments
2. Bridge and large culvert replacements on existing alignments
3. For other bridge and large culvert projects involving actions within the Base Flood Plain (work within the 100 yr. Flood elevation) e.g., bridge widening and large culvert extensions.

311.05.01 Bridge Location and Hydraulics Report

A. Documentation: Documentation shall be provided in detail commensurate with the complexity of the project. Documentation shall be sufficient enough so that an independent engineer with expertise in bridge hydraulics, but not involved with the design, can fully interpret, follow and understand the logic, methods, computations, analysis and considerations used to develop the final design.

Documentation for bridge and large culvert designs shall include as a minimum the following:

1. Hydrologic analysis including sources of data and methodology.

2. Alternative analysis or evaluation of structure sizes (length and vertical height/clearance). This evaluation shall be done consistent with Department criteria for bridge hydraulic design and shall include consideration of:

    a. cost
    b. design standards
    c. structure hydraulic performance, including backwater, velocity and scour
    d. Impacts of the structure on adjacent property
    e. environmental impacts

3. The alternative analysis shall include the reasons for selecting the recommended structure and a clear explanation as to why it is the most economical structure for the site in question. As a minimum, the following structure sizes shall be evaluated:

    a. The minimum structure size required to meet hydraulic standards for vertical and horizontal clearance, scour and backwater.
    b. Existing structure size if applicable.
    c. The recommended structure size if different from (a) or (b).

4. Design recommendations for bridges recommendations shall include: