NOVA SCOTIA
Environment

NOVA SCOTIA WATERCOURSE ALTERATION SPECIFICATIONS (2006)

Pipe Culverts:

The following applies to the new installation, construction or total replacement of a single pipe culvert.

C1. The exemption under Section 5(1)(d) of the *Activities Designation Regulations* applies to the installation of a culvert during the period June 1 to September 30 only. Installation of a culvert outside this time frame will require formal approval. Installation of a culvert inside this time frame must be preceded with the submission of a watercourse alteration application with culvert notification indicated in Section 5A of the application at the designated District Office, Nova Scotia Environment.

C2. The exemption applies to a single pipe culvert installation with the following maximum dimensions:

a) 1.8 metres in diameter for a single pipe culvert;
b) 18.3 metres in length in all cases.

C3. The size of the culvert shall be based on a minimum of 1:100 year estimated storm flows.

C4. No fording shall take place during the installation of the culvert.

C5. Prior to the culvert installation, erosion and sediment control measures shall be installed to prevent sedimentation of the watercourse and maintained as required, these controls shall remain in place until all exposed erodible soil adjacent to both the watercourse and the road surface are stabilized within 30 m of the watercourse.

C6. The culvert shall be installed during periods of low flow. All work operations shall are be conducted in a manner to protect the watercourse from the release of silt and sediment.

C7. The culvert is to be aligned with the existing watercourse channel.

C8. Water control shall be accomplished using one of the following methods:
a) Diverting the watercourse, temporarily, through a diversionary channel.
b) Pumping the stream flow around the installation.

C9. All construction activities must be carried out in isolation of the streamflow (in the dry). Water control devices such as cofferdams or aquadams are to be used to separate the entire work area from the flowing watercourse. Cofferdams must be constructed of

sandbags faced with plastic, sheet piling or other material authorized in writing by the Minister or Administrator.

If Cofferdams are to be used, there must be of sufficient height and strength to hold back the 1:2 year return rainfall event (bank full conditions).

C10. Excavation of temporary diversion channels shall be conducted in the dry from the downstream end. Diversion channels constructed in erodible or silt-forming materials are to be stabilized with protective rock, plastic sheeting, or other approved materials authorized in writing by the Minister or Administrator, before any flow is diverted.

C11. The watercourse is not to be disturbed outside the footprint of the culvert. The bottom of the culvert should be embedded at least 0.2D (Defined as 20% or 1/5th of the diameter of the culvert) below the bed of the watercourse at the upstream and downstream end of the structure. For example, 1800 mm culvert x 0.2D = 360 mm of the culvert is to be embedded.)

C12. The pipe culvert must be installed at a maximum slope of 0.5% on firm ground. A soft foundation shall be replaced with clean, granular material to prevent sagging. If the natural stream gradient exceeds 0.5%, an open-bottom structure or bridge shall be considered as an alternative, and a separate approval will be required.

C13. The culvert must extend a minimum of 0.3 metres beyond the upstream and downstream toe of the fill placed around the structure.

C14. When more than one length of corrugated steel culvert is required, the culverts are to be connected with couplings provided by the manufacturer. In any case, the culvert length is not to exceed 18.3 meters.

C15. All erosion protection material used in the installation of the pipe culvert must be clean, non-ore bearing, non-toxic and obtained from a non- watercourse source. Stabilization of fill shall be at a maximum 2 horizontal to 1 vertical slope unless headwalls are to be used.

C16. Lumber treated with creosote must not be used in the construction or maintenance of any part of the structure. Uuntreated hemlock, tamarack/ juniper, or cedar, pre-cast concrete, corrosion resistant steel or plastic; or ACQ (Alkaline Copper Quaternary) or CCA (Chromated Copper Arsenate treated wood, if treated in accordance with Best Management Practices (BMPs) as outlined in the 1997 industry guide published jointly by the Canadian Institute of Treated Wood (CITW) and the US based Western Wood Preservers Institute are considered acceptable materials.

C17. A designed energy dissipation plunge pool is required to prevent scour at the downstream end of the pipe culvert. The width of the pool shall be 2.0 times the culvert diameter; the length of the pool shall be 3.0 times the culvert diameter and the depth shall be a minimum of 1.0 metre.

C18. All excavated material shall be placed in a location where it will not enter the watercourse. All debris resulting from construction activities shall be disposed of at a facility which is Approved to accept the specific material. Any material not regulated by the Department shall be removed to an area where flood water will not come in contact with the debris and excavated material must be removed from the areas adjacent to the watercourse and be disposed of in a manner acceptable to the Department.

C19. The road fill at each end of a culvert must be stabilized to prevent erosion or collapse. Rip rap and or headwalls and wingwalls must be placed at both ends of the culvert to an elevation of at least one half of a pipe diameter above the top of the pipe and a minimum of one pipe diameter on each side of the culvert immediately upon completion of the culvert installation. The following uniformly-graded, stone-rip rap material is to be used for embankment protection unless alternate materials have been authorized in writing by the Minister or Administrator.

Class 1	Class 1
Local velocity up to 3m per second	At least 70% of the riprap shall be between 200mm and 450mm
Class 2	Class 2
Local velocity up to 4m per second	At least 70% of the riprap shall be between 300mm and 760mm
Class 3	Class 3
Local velocity up to 4.5m per second	At least 70% of the riprap shall be between 500mm and 1200mm