



Driveway Installation Instructions

Permits

Complete the Work Within Highway Right-of-Way Permit. A representative from Public Works will assess the proposed driveway for adequate sight distance and determine if a drainage culvert is required, and if so, the size required. To aid in this, you are requested to mark the proposed driveway with stakes prior to making your application. These stakes are to be placed at the backside of the ditch seven metres apart at desired driveway locations. You will be notified if the permit has been approved and what size culvert, if any, is required. If approved, work on the driveway may commence.

To ensure the driveway is installed to Department specifications, a refundable deposit is required. This deposit must be paid at our office, in the amount of \$300.00. If the driveway does not meet Department specifications, we will advise the applicant that a new driveway must be constructed, or the existing driveway must be brought up to Department specifications. The deposit will be refunded upon satisfactory completion of the work, as determined by the Department.

Entrance & Grades

Public and private entrances should have an angle of intersection with the public road at or near 90 degrees. The minimum acceptable angle is 70 degrees for two-way entrances and 60 degrees for entrances serving right-out or right-in only

To facilitate ease of ingress and egress, and to ensure adequate sight distances, all entrances should have a relatively flat area where the entrance meets the public highway, referred to as the “apron”. To provide adequate drainage, the apron area must have a minimum grade of 0.5%. The entrance apron area should slope away from the road, however an apron area sloped towards the highway may be considered where there is curb and gutter or where an on-site property drainage system is provided that can adequately control drainage from the entrance. Where a sidewalk crosses an entrance the cross slope on the sidewalk should not exceed 2%.

The table below provides information on required apron lengths, maximum allowable grades and maximum allowable grade changes between the highway cross slope and the entrance apron and between the apron and the rest of the entrance. On high volume entrances with larger grade changes it may be desirable to use vertical curves.

DRIVEWAY GRADES

Road Classification	Min. Apron Length (m)	Max. Apron Grade	Max. Grade Change (road cross section to apron)	Max. Grade Change (apron to driveway)
Arterial	10	+/- 3%	2%	3%
Collector	7.5	+/- 4%	4%	6%
Local	5	+/- 6%	6%	Control by vehicle clearance *

A maximum grade change of 12% over 3m satisfies clearance requirements for most vehicles.

Determining Culvert End Treatment

For new or upgraded controlled access 100 series highways the driveway side slopes, and culvert ends for all driveways must be 6:1. See Appendix D for more information. For all other roads the culvert ends may either be flat and protected by riprap or beveled to match the natural slope of material used for driveway construction to a maximum of 2:1 or a concrete headwall.

Construction of the Driveway

The applicant is responsible for all aspects of construction, including but not limited to supply of culvert pipe and backfill materials, rip rap, concrete headwall or natural slope of driveway materials labour, traffic control, and environmental measures. While the work may be completed by the applicant or a contractor engaged by the applicant, ultimate responsibility for the installation rests with the applicant.

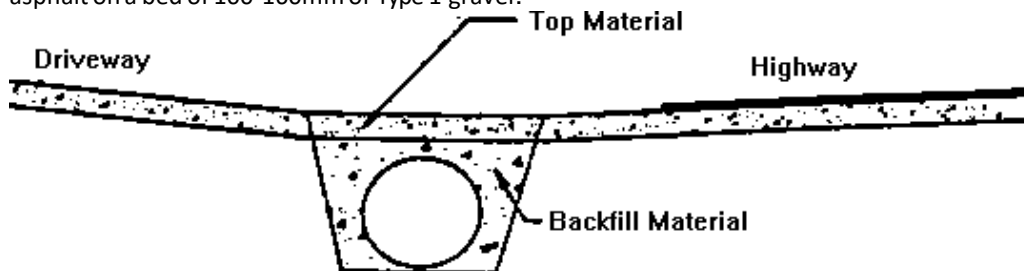
Every effort should be made to expose as little soil to the elements as possible during the construction process. If the culvert is within 100 m of a watercourse, or there is any chance that sediment may enter a watercourse then erosion and sedimentation control measures must be employed, in accordance with Nova Scotia Environment regulations.

Materials

Culvert Pipe: Unless warranted by specific conditions as determined by Department staff, pipe size for a new culvert installation shall be a minimum of either 500mm diameter aluminized corrugated steel or aluminum alloy, or 450mm smooth inside wall diameter Class 65D concrete or double walled smooth interior High Density Polyethylene (HDPE) pipe. The HDPE pipe shall be Highway Grade conforming to CSA-B182.8 having a minimum stiffness of 320 kpa. In the case of open top culverts, treated wood may be used, however the design of the structure must be approved by the Department. Driveway tops shall be a minimum of 5.5 m wide. The length of pipe will vary with the depth of the ditch and with the class of the road. The maximum width of driveway top should be 10 m.

Backfill: material shall be 20-25mm gravel or good native soil with no stones over 75mm in the largest dimension. All backfill must be packed in layers of 160mm. The top two layers must be clean gravel and the top layer must not contain stones larger than 20mm in dimension. Slate may be used only if it is from a source approved Nova Scotia Environment.

Top Material: 100-160mm of Type 1 (20mm) gravel, sloped to prevent water from running onto roadway. Minimum slope requirement is 2%. If pavement is desired, it should consist of a minimum of 75mm of hot mix asphalt on a bed of 100-160mm of Type 1 gravel.



Rip Rap

- Where flat pipe end is used, materials shall be 400-500mm flat stones stacked in place. Slate may be used only if it is from a source approved by the Nova Scotia Environment.
- Where a beveled pipe is used, driveway material or other approved stone to a natural repose with a maximum slope of 2:1.
- Where a concrete headwall is used, rip rap is not required. Concrete blocks will not be an acceptable rip rap material Bed

Excavation

- Prepare an area for the pipe in the lowest point of the ditch, aligned with the direction of flow. Excavate ditch to a depth of 160mm below existing flow line of ditch.
- Fill excavated area with 125mm of Type 1 gravel.

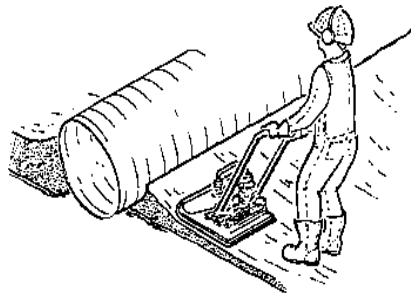
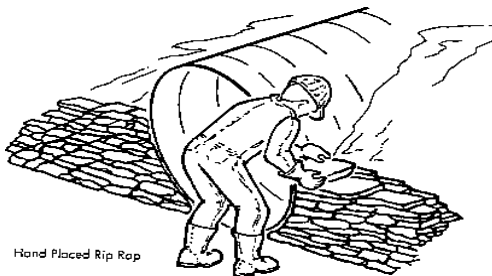
Pipe Length

For all roads except controlled access 100 series highways the pipe length is equal to the sum of the driveway width and thickness of the riprap or concrete headwall. Where the natural slope of driveway material is used, the pipe length is the sum of the driveway width plus the difference in elevation between driveway top and ditch bottom on one side multiplied by 2 plus the elevation difference between the driveway top and ditch bottom on the other side multiplied by 2.

On 100 series-controlled access highways the pipe length is equal to the sum of the driveway width plus the difference in elevation between the driveway top and ditch bottom multiplied by 6 on one side of the driveway plus the elevation difference between the driveway top and ditch bottom multiplied by 6 on the other side plus the width of the driveway.

Pipe Installation

- Place pipe on the prepared bed of gravel, following the natural slope of the ditch. This should allow the pipe flow line to be approximately 25mm below the flow line of the ditch. If two or more pieces of pipe are required, join with approved couplers, available from the pipe manufacturer. Install couplers as per manufacturer's instructions.
- Backfill approximately 160mm deep on each side of the pipe and compact with a vibrating compactor. Continue to backfill in 160mm lifts and compact on each side of the pipe before adding more fill. Compacted fill must be kept even on both sides of pipe and must extend the width of the ditch. When backfill material is very granular, clay material should be used to seal the ends to prevent water from flowing through the backfill material.



- Controlled access highways the vertical side slopes or side slopes matching the natural angle of repose for backfill material may be used.
- For vertical side slopes place rip rap across the upstream and downstream ends of the installation as soon as possible to prevent erosion. With approval, a prefabricated concrete headwall can be used in place of rip rap, providing the system is installed so that the bottom of pipe is not above the bottom of ditch on either end and the posted speed limit does not exceed 60 km/hr. The headwall must not be higher than the roadway shoulder. The Department is not responsible for damage occurring to a raised headwall which is struck by a plow. Once backfilled, place top material. Backfill plus top material should extend: a minimum of 300mm above the top of the pipe.

Inspection

- Culvert is in new condition with no major dents or bends through its length. Culvert is of the size noted on the Work Within Highway Right-of-Way Permit.
- On non 100 series-controlled access highways side slopes constructed using backfill material at 2:1 slope or rock rip rap, made of stones at least 300mm in length and 400mm deep, is placed on the ends to within 100mm of the finished top surface. Vertical precast concrete head walls may be permitted at the discretion of the Supervisor. On controlled access 100 series highways side slopes constructed at 6:1 slope.
- There is at least 300mm of cover over the pipe with the top 160mm being gravel with stones no larger than 20mm (Type 1 gravel) from the road edge to the edge of the highway right-of-way (approximately 10 m from the centre of the road). Driveway is level with the road shoulder where it meets the road. The headwall is no higher than the roadway shoulder. The ditch and road shoulder are left in a neat condition the driveway is sloped so that any water exiting the property via the driveway will enter the ditch rather than run onto the road.
- Once the driveway is completely installed, notify the office to arrange for an inspection. If the Department is satisfied with the installation, they will approve a refund of the deposit. If not, you will be notified of the deficiencies and asked to correct them. Another inspection will then be required. If the driveway is not installed properly after two inspections, PW reserves the right to remove the entrance. In this case, the deposit will not be refunded. The removed pipe will be left on the applicant's property.

Responsibilities

After the driveway is installed and approved, should the culvert deteriorate from age and use, DPW will replace the driveway as required, subject to the following conditions:

Residential (three dwelling units or less) - up to one 5.5 m wide top width completely at the expense of the Department. (Where the driveway alignment and/or side slopes are such that it is not possible to achieve a useable 5.5 m wide top width with a standard 6 m culvert length, a longer culvert may be installed.)

Churches, Cemeteries, and other non-profit Agencies - up to two 9m wide top width completely at the expense of the Department. Commercial operations (non-residential), including Lumber and Pulp Wood operations; and entrances to private roads will be completely at the owner's expense.

When replacing a driveway, the existing pipe length and end treatment may be removed and replaced with another configuration in accordance with this procedure. Replacement pipe and end treatment will be of the type commonly used by the Department at the time of replacement.

The Department will not maintain the driveway top, except for normal shouldering operations, and in that case only to the extent of the shoulder and not the road limit. Frost heave of the culvert will only be corrected if it is causing a problem with water flow in the ditch.

The owner is expected to keep the culvert free from obstructions, maintain the rip rap or other side slopes on the ends and keep the top graded as to prevent water flow onto the roadway.