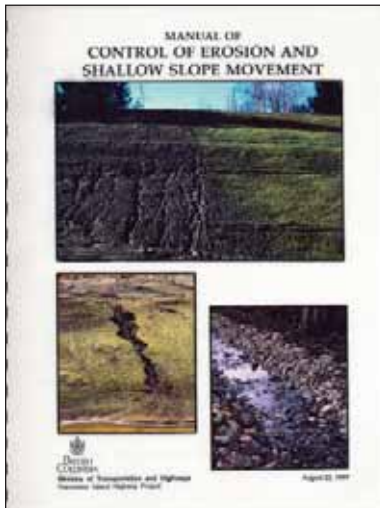


Erosion and Sediment Control

6.1 Erosion and Sediment Control

Many highway maintenance activities involve the disturbance of ground surfaces. These activities can cause erosion of soils and the release of sediment which must be managed.



Environmental Issues

Primary environmental issues relating to the management of erosion and sediment generated from highway maintenance activities are summarized in the following table. It should be noted that site-specific or activity-specific conditions (e.g., topography, weather) may present additional issues you will need to address in planning and undertaking your works.

Work Activity	Potential Environmental Impacts	Performance Standards and Legal Requirements
Excavation	May introduce sediment or other deleterious substances to a watercourse through erosion and transport from areas of newly disturbed soils occurring in excavations and/or stockpiles	No release of any substance that could be deleterious (toxic) to fish or fish habitat (<i>Fisheries Act</i> , Sections 34(1) and 36(3)).
	May release fine sediment and particulate matter to air	Control of fugitive dust to avoid air quality impacts in accordance with local bylaws. Provincial environmental objectives include air quality criteria for the 10 micrometer particulate fraction (PM10) generated by aggregate dust—a 24-hour average PM10 less than 50 µg/m ³ (BC Ambient Air Quality Objectives).

Work Activity	Potential Environmental Impacts	Performance Standards and Legal Requirements
Fills	May introduce sediment or other deleterious substances to a watercourse through erosion and transport from newly placed or disturbed soils	No release of any substance that could be deleterious (toxic) to fish or fish habitat (<i>Fisheries Act</i> , Sections 34(1) and 36(3)).
	May release fine sediment and particulate matter to air	Control of fugitive dust to avoid air quality impacts in accordance with local bylaws. Provincial environmental objectives include air quality criteria for the 10 micrometer particulate fraction (PM10) generated by aggregate dust—a 24-hour average PM10 less than 50 µg/m ³ (BC Ambient Air Quality Objectives).
Grading	May introduce sediment or other deleterious substances to a watercourse through erosion and transport from areas of newly disturbed soils	No release of any substance that could be deleterious (toxic) to fish or fish habitat (<i>Fisheries Act</i> , Sections 34(1) and 36(3)).
	May release fine sediment and particulate matter to air	Control of fugitive dust to avoid air quality impacts in accordance with local bylaws. Provincial environmental objectives include air quality criteria for the 10 micrometer particulate fraction (PM10) generated by aggregate dust—a 24-hour average PM10 less than 50 µg/m ³ (BC Ambient Air Quality Objectives).



Environmental Best Practices

The following BPs are provided as guidelines to help you ensure your routine works are completed in compliance with the performance standards and environmental legislation. Please note that the BPs provided below generally apply to most work activities. However, BPs specific to certain activities are described in earlier sections of this document.

Regulatory Agency Contact

- Identify any sensitive habitat areas, including wetted ditches and natural watercourses—streams, lakes and marine foreshores, found within your work area. Determine how much impact your required works will have on the identified areas and if any specialized erosion and sediment protection measures are required. Are you planning to re-grade a non-vegetated roadside drainage ditch that only conveys storm water? Are you required to remove debris jams from a permanently wetted fish-bearing watercourse that crosses the highway right-of-way? What type of equipment and materials are you planning to use to stabilize a large lakeside section of highway embankment that has been damaged by erosion? Are there any areas within your jurisdiction prone to regular debris accumulations or erosion issues? By asking these questions, you should be able to identify any planned works or areas that may be of concern to regulatory agencies.

Erosion and Sediment Control

- Meet with the appropriate regulatory agency contact, as listed in Section 8, to discuss site-specific environmental protection measures. Refer to Section 7 for information on the Memorandum of Understanding with MoE, and the recommended protocol for maintaining regular communications with regulatory agencies.

Timing of Works

Erosion Prevention

- Plan proactively for erosion and sediment control. Prior to beginning work, anticipate what techniques will be needed by your maintenance activity and arrange for needed materials.
- Manage potential erosion before it becomes a problem. Sediment controls have a limited capacity to remove mobilized sediment and should be used to support well-planned and properly installed erosion controls.

Sediment Control

- Vegetative covers take time to establish; install them early in the growing season to support their growth.
- Installation of controls, like most works, is preferably undertaken during periods of dry weather (e.g., summer) as this allows easier control of sediment. Typically this is also a less sensitive period for fish and wildlife than other seasons. If unfavourable weather is the driver for the installation of additional controls, plan to use prefabricated and easily installed control structures to reduce the potential for sediment release from the controls themselves.
- If your erosion and sediment controls have the potential to interrupt fish passability (e.g., within seasonally wetted channels or crossings), you must schedule their use and removal to coincide with your region's instream work window. Contact your local MoE and DFO offices for further information on timing windows in your District.

Site Management

Preservation of Vegetation

- Retain existing vegetation and ground cover where possible to limit areas of exposed soils which may be transported to watercourses through overland flow.
- Restrict vehicle or equipment access to paved or surfaced areas to minimize disruption of existing site vegetative cover.

Erosion Control

- To reduce erosion potential, convey surface runoff through swales or drainages designed to minimize flow velocity and erosion, while maximizing settling potential. Use trenched silt fences or earthen berms to direct surface runoff away from exposed soils.

- Completely cover temporary stockpiles or erodible material with polyethylene or tarps to control loss of material by rainfall impact.
 - Revegetate finished construction areas.

Sediment Control

- Install silt fencing around stockpiles, at the top of banks of disturbed slopes and around areas of disturbance to reduce the potential for transportation of sediment to watercourses.
- Filter fabric bags may be temporarily installed inside catch basins, or other runoff collection structures to contain sediment transported from the work area.
- Where possible, collect runoff into a suitable sediment settling pond or trap prior to discharge off-site.
- Contain any sediment-laden water generated during your works in an isolated work cell. Use a pump to draw sediment-laden water out of the work cell and discharge it to a level vegetated area where sediment can settle as the water infiltrates the ground.

Re-vegetation

- Re-vegetate exposed soils as quickly as possible, and use plant species that are native and/or adapted to the area to aid in site stabilization, long-term erosion and sediment control, and invasive plant control.
- Replace any vegetation removed within 15 m of the top of bank of a drainage course that has fish habitat values. Trees and shrubs used for re-vegetation should be species native to the area.
- Hydroseeding with mulch or dry seeding with a covering of straw or compost is an effective technique for quickly establishing a protective grass cover. Where seeding is impractical but surface protection is needed, consider straw mulching, erosion blankets, or other covering for interim surface erosion control.
- Refer to MoT's Standard Specification for Highway Construction 757 – Re-vegetation Seeding, which provides MoT's standard seed mixes and quality standards.

Monitoring and Maintenance

- Check for signs of erosion (e.g., formation of rills and gullies, slumping, the presence of sediment-laden runoff water) on slopes and banks, particularly after storm events.
- Clean accumulated sediment from filter fabric bags and the base of silt fences.
- To continue to prevent the movement of sediment to nearby watercourses, ensure that all sediment control structures are installed, maintained and monitored until they are no longer needed.

Erosion and Sediment Control

- Regularly collect loose material and sediment accumulating within your work area.



Key Information Sources

The documents and websites listed below are recommended resources for roadside vegetation management. They can provide examples of existing protocols and management strategies, as well as additional information on specific operational BPs (e.g., erosion and sediment control techniques).

MoT Technical Circulars:

MoT Technical Circulars are available at:

http://www.th.gov.bc.ca/Publications/Circulars/Current_technical.asp

Locally Developed BPs

(Provide any locally-developed BPs):

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Other Resources:

Protection of the Environment – Section 165 – 2008 Standard Specifications for Highway Construction. 2008. BC Ministry of Transportation and Infrastructure.

http://www.th.gov.bc.ca/Publications/const_maint/contract_serv/standard_specs/2009_Stand_Specs_Vol_1.pdf

Revegetation Seeding – Section 757 – 2008 Standard Specifications for Highway Construction. 2008. BC Ministry of Transportation and Infrastructure.

http://www.th.gov.bc.ca/Publications/const_maint/contract_serv/standard_specs/2009_Stand_Specs_Vol_2.pdf

Manual of Control of Erosion and Shallow Slope Movement. August 1997. BC Ministry of Transportation.

http://www.th.gov.bc.ca/Publications/eng_publications/environment/references/Man_Control_Erosion.pdf

Standards and Best Practices For Instream Works. March 2004. Ministry of Water, Land and Air Protection.

<http://www.env.gov.bc.ca/wld/documents/bmp/iswstdsbpsmarch2004.pdf>

Erosion and Sediment Control Guide for Roadway Projects. 2005.

Transportation Association of Canada.

<http://www.transportationassociation.ca/english/information/services/tacnews/summer2005-17.htm>

Erosion and Sediment Control Field Manual. June 1999.
California Regional Water Quality Control Board.
<http://www.saratoga.ca.us/pdf/ErosionFieldManual.pdf>

Aggregate Operators Best Management Practices Handbook for British Columbia
<http://www.empr.gov.bc.ca/Mining/MineralStatistics/MineralSectors/ConstructionAggregates/ReportsandPublications/Pages/AggregateOperators.aspx>

Water Quality Best Management Practices Compendium Website.
Environmental Protection Division, Ministry of Environment.
http://www.env.gov.bc.ca/wat/wq/nps/BMP_Compendium/nps_bmp.htm

Catalogue of Stormwater Best Management Practices. September 2005.
Idaho Department of Environmental Quality.
http://www.deq.state.id.us/water/data_reports/storm_water/catalog/index.cfm



Checklist for Environmental Protection Requirements

- Is your proposed work considered a “routine” maintenance activity? If not, approvals or permits may be required. Contact your local municipal, provincial, or federal regulatory agency staff.
- Has this project been discussed with local environmental regulatory staff? In addition to the BP information presented, other site-specific conditions may apply.
- Have site-specific environmental protection requirements been identified? List below:
 - _____
 - _____
 - _____
 - _____