



Erosion and Sediment Control (ESC) Bylaw: Best Management Practices July 2010

Stormwater contains many pollutants which can enter our local creeks, rivers and marine systems, causing harm to native animals, plants, fish breeding habitats and recreational areas. Sediment and litter from building/development sites can be major sources of stormwater pollution. When rain falls on

exposed soil, it washes soil (sediment) away from the land. Runoff carries sediment, nutrients, and other pollutants into streets, storm systems, and ditches, where it then travels untreated to lakes, rivers, streams, or wetlands, and can cause:

- significant harm to our natural aquatic ecosystems, which is a violation of senior agency legislation (i.e. *Fisheries Act*);
- blocked stormwater system and raised inverts of watercourses, creating flooding and increased maintenance costs;
- weed infestation of watercourses caused by sediment settling on the creek beds and transporting nutrients;
- loss of valuable topsoil;
- significant public safety problems when soil is washed onto roads and intersections; and
- damage to recreational and commercial fishing.

The City of Abbotsford has adopted an Erosion and Sediment Control (ESC) Bylaw to help reduce the amount of sediment-laden water entering the City drainage system. The Bylaw requires the implementation of Best Management Practices (BMPs) on construction sites to ensure that site discharge water quality standards are met. The Bylaw applies to all sites where development activities are occurring that may cause sediment or sediment-laden water to enter the City drainage system. For more information on the bylaw, please refer to the following City handouts: (1) Erosion & Sediment Control (ESC) Bylaw (Bylaw No. 1989-2010): How the Bylaw applies to development sites that are exempted from the ESC Submission requirements and (2) Erosion & Sediment Control (ESC) Bylaw (Bylaw No. 1989-2010): How the Bylaw applies to development sites 2000m² or larger.

The goal of the ESC Bylaw is to eliminate or significantly reduce the amount of sediment that leaves construction sites and is deposited in the City's streets and storm sewers. Since our streets and storm sewers convey stormwater to natural watercourses, it is important that we keep these sediments and pollutants off our streets and out of our storm sewer system so that they will stay out of our streams, wetlands and lakes.

Save money, time and energy

Some of the benefits to home owners, builders and the building industry include:

- improved wet weather working conditions
- sites do not get boggy
- less mud and dust problems
- reduced stockpile losses
- reduced clean-up costs
- a better public image
- more marketable sites
- fewer public complaints
- reduced risk of fines
- better fishing for everyone
- healthier watercourses

There are techniques that you can employ on your site to control the erosion and sediment problems you may encounter. These techniques have been identified as "Best Management Practices" (BMPs). Erosion control techniques prevent erosion from occurring within the construction site through measures such as reducing the amount of disturbed soils, placing materials (e.g., poly tarps, straw, mulch, etc) over exposed soils, reducing runoff velocities, redirecting water around a site, etc. Sediment control techniques capture eroded sediments or sediment-laden water and



prevent them from leaving the site. Erosion control is more effective, less expensive and requires less maintenance. Sediment control is very difficult, as many areas have till soils with a high fraction of clay, which is very difficult/impossible to settle out.

In order to comply with the ESC Bylaw, and other pertinent senior government legislation, the property owner/agent is responsible for ensuring that BMPs are implemented on site.

Acceptable BMPs include those provided below, as well as those provided in Fisheries and Oceans Canada's *Land Development Guidelines for the Protection of Aquatic Habitat* (1993).

1. Clear only the areas necessary (leave vegetation in areas that don't require disturbance):

- Exposed soils are the most prone to erosion due to rainfall and runoff. Vegetation helps protect the soil from these forces, and provides natural erosion control. Plan construction to limit the amount of exposed area, and avoid grading activities during the rainy season (October through April) as much as possible.
- Clearing limits should be clearly marked and kept as small as possible.
- Clearing should occur in phases, as required by development activities.
- Avoid clearing and grubbing until ready for construction.

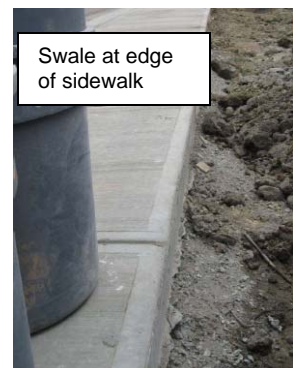
2. Establish a Stabilized Entry/Exit Point:

- To prevent vehicles and equipment from tracking sediment and mud off the site, a gravel access pad must be installed prior to excavation with a minimum 200mm of 50-90mm clear rock, placed from the street to the foundation. This will keep soil from sticking to tires and stop soil from washing off into the street (see Drawing ES-EC-2).
- Do not allow access for vehicles or machinery at any location that is not protected with a gravel access pad.
- Carry out periodic inspections and maintenance including washing, top-dressing with additional material, reworking, and compaction.
- Sediment tracked onto the street should be removed immediately by shovelling or sweeping and transported to a suitable disposal area where it will not be re-eroded. Plan for periodic street cleaning to remove any sediment that could not be swept up.
- The entry/exit point must be maintained throughout the course of construction.



3. Protect the perimeter of the site:

- The perimeter of the site must be protected to prevent erosion of materials off site. Wherever possible, preserve a buffer of existing vegetation around the site boundary. This will help to decrease runoff velocities and trap sediment suspended in the runoff. The perimeter can also be protected by installing a sediment/silt fence, a compost berm, or a swale along the low side(s) of the site (see Drawing ES-EC-4).
- Sediment/silt fences act to trap runoff behind the fence and enable the sediment to settle out of the water. Sediment fences should not be constructed in streams or used in V-shaped ditches. They are not an adequate method of sediment control for anything deeper than sheet or overland flow.
- Remove sediment behind the perimeter control facility on a regular basis and transfer it to an area where it will not be re-eroded.



4. Divert up-slope water around the work site (keep clean water clean):

- Divert clean upslope runoff away from disturbed areas by use of low berms (i.e. ~0.6m wide by ~0.5m high) and/or swales, as well as slope pipe drains (see Drawing ES-EC-19)
- Berms should be constructed prior to any excavation downslope of its location, and the berm must be stabilized (see #6) afterwards to ensure it is not eroded.
- Diverted runoff should be discharged onto stable ground (for example, turfed or grassed areas) and should not be diverted into neighbouring properties unless written permission is obtained from the land owner(s).
- Conveyance swales should be designed to minimize flow velocity and erosion while maximizing settling. This is done by placing appropriately spaced check dams within the swale and/or lining it (e.g., with rolled erosion control products) or armouring it (e.g., with rock) to prevent erosion (see Drawings ES-EC-7, ES-EC-8 and ES-EC-16).

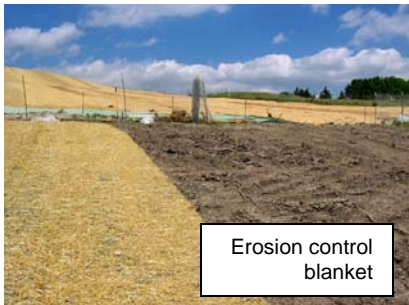


5. Roughen exposed soils:

- Roughen the soil surface by (1) leaving a rough soil surface during grading, (2) moving heavy tracked equipment up and down a slope (resulting depressions must be perpendicular to the slope), or (3) excavating shallow (10-20cm deep) furrows along the contour of the slope (see Drawings ES-EC-18, ES-EC-21 and ES-EC-22).

6. Temporarily stabilize disturbed earth:

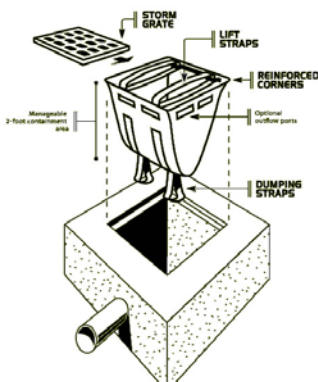
- Exposed soils should be temporarily stabilized with vegetation, sand, straw, compost, wood or bark chips, sod, plastic, or erosion control blankets. If using straw, ensure that it is applied thick enough that 80-100% of the soil is completely covered by straw (see Drawings ES-EC-11 and ES-EC-12).
- Soil should be seeded with grass in conjunction with the stabilization measure.
- Stabilization measures also help improve plant



germination and growth by increasing soil moisture and moderating soil temperatures.

7. Create temporary sediment detention facilities onsite:

- Where possible, collect runoff into a suitable sediment settling facility or facilities prior to discharge off-site (see Drawing ES-EC-17).
- Depending on the site conditions and design of the facility, these facilities trap 50-80% of suspended sediment. These facilities do not work to trap fine silts or clays.



8. Install inlet protection measures at all storm system inlets:

- Install and maintain inlet protection measures at all catch basins, lawn basins, exposed manholes or any other open storm sewer access points collecting runoff from the building site.
- Examples of inlet protection measures include: pre-manufactured re-usable catch basin inserts, silt fence around inlet, gravel bag barriers, fiber rolls and foam barriers, etc. The best approach is to use a pre-manufactured re-usable bag that is placed inside the catch basin, as these still allow water to

enter the catch basin, thereby reducing flooding/ponding around the inlet (see Drawing ES-EC-5).

- Maintain on a weekly basis by removing any sediment trapped behind the protection measure.
- Keep roads adjacent to inlets clean.

9. Place soil piles upslope of the perimeter protection and cover with plastic sheeting or erosion control blankets:

- Soil piles should be covered with plastic sheeting or erosion control blankets until the soil is either used or removed (see Drawing ES-EC-11).
- Piles should be situated so that sediment does not run into the street or adjoining yards (i.e. behind the perimeter protection measure).
- Backfill basement walls as soon as possible and rough grade the lot. That will eliminate the large soil mounds, which are highly erodible, and prepare the lot for temporary cover. After backfilling, remove excess soil from the site quickly to eliminate any sediment loss from surplus fill.
- Keep all sand, gravel, spoiled material, soil and concrete mix off of the paved surfaces.



10. Dewater to a contained part of the site and allow it to infiltrate into the soil:

- During construction, it may be necessary to pump groundwater or excess stormwater away from the site. This water can be contaminated with pollutants (including sediment) and cannot be discharged directly into the street or down a storm drain.
 - Holes requiring dewatering should be pumped to a vegetated area, suitable settling facility (permanent onsite settling pond or portable sediment pond), pumptruck for offsite disposal, or other safe location which will prevent sediment-laden water from accessing the City Drainage System.
 - For surface dewatering, utilize a floating suction hose, or other method, to minimize sediment being sucked off the bottom.
 - For discharges that will be directed to locations on-site, verify that the anticipated volume of water can be fully contained.
 - If discharging to a settling facility or portable sediment pond, chitosan socks can be placed in the discharge
- The topography and condition of the ground cover between the pump discharge point and potential receiving waters must be evaluated for potential erosion. Appropriate stabilization measures must be incorporated to prevent erosion.



hose, which will cause the sediment to settle out quickly. For more information on chitosan, speak with a local ESC supplies distributor, or see www.dungenessenviro.com.

11. Install roof downpipes as soon as practicable after the roof is laid:

- Keep the clean roof water clean, and direct it to an area where it can infiltrate into the ground or direct it into the storm system in such a way that it does not become dirty prior to reaching the storm system (i.e. by running it through a pipe that is directly connected to the storm system).

12. Ensure that all control measures are maintained in good working order:

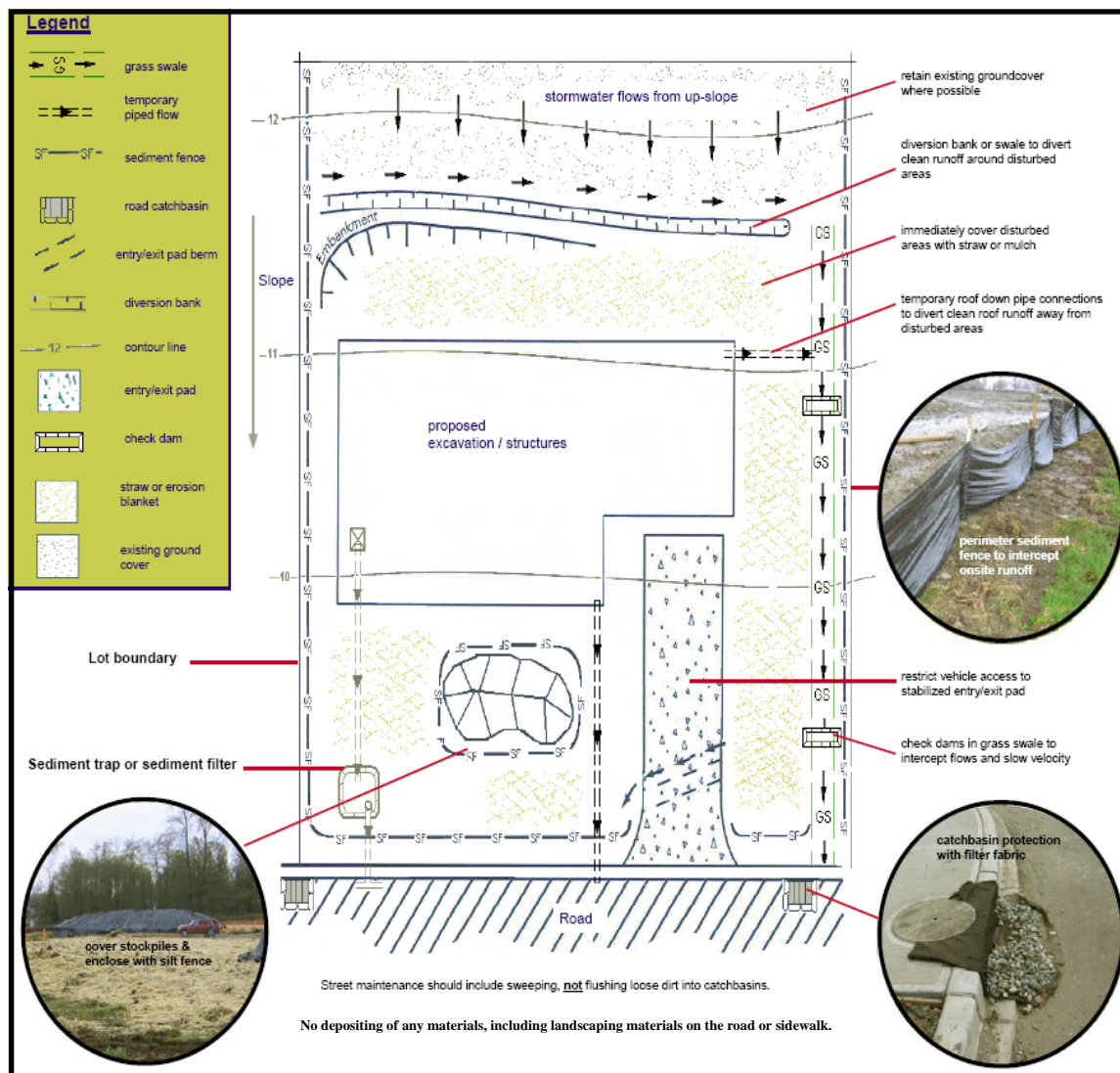
- Regular maintenance (at least weekly, and daily during/after a runoff producing storm event) though often-overlooked, is extremely important for the proper operation of BMPs.
- Regularly sweep roads (flushing of roadway is strictly prohibited).

- Reapply crushed rock to the entry/exit pad (rumble pad) if excessive sediment build-up occurs.
- Repair eroded drainage channels with rock, turf, erosion control blankets or matting.
- Ensure built-up sediment is removed at regular intervals from sediment barriers.
- Remove temporary ESC BMPs within 30 days after they are no longer needed.
- Permanently stabilize areas that are disturbed during the removal process.
- Anticipate potential risks and prepare for abnormal circumstances and emergencies (e.g., stockpile extra sediment fence, straw, poly sheeting, etc to facilitate emergency repairs).

13. Re-vegetate or otherwise permanently stabilize the site:

- Once construction is completed, the site must be permanently stabilized with topsoiling if needed, seed, plants, and/or sod.

The illustration below provides an example of the planning and implementation of BMPs on a single family residential lot.



Resources

City of Abbotsford Erosion and Sediment Control Web Page: www.abbotsford.ca/ESC

City of Abbotsford ESC Bylaw (navigate into the 'Regulatory Bylaws' subfolder of the 'Abbotsford Bylaws' folder in the left hand column, bylaws listed alphabetically)

<http://www.abbyviews.com/contentengine/launch.asp>

California Stormwater Best Management Practice Handbooks. Prepared by the California Stormwater Quality Association. Available for download from:

<http://www.cabmphandbooks.com>

Land Development Guidelines for the Protection of Aquatic Habitat. Published by Fisheries and Oceans Canada. May 1992. Available for download from: [http://www.dfo-](http://www.dfo-mpo.gc.ca/Library/165353.pdf)

[mpo.gc.ca/Library/165353.pdf](http://www.dfo-mpo.gc.ca/Library/165353.pdf)

Stormwater Management Manual for Western Washington. Prepared by Washington State Department of Ecology Water Quality Program. February 2005. Available for download from:

<http://www.ecy.wa.gov/programs/wq/stormwater/manual.html>

Vancouver Island University Erosion and Sediment Control Courses:

<http://www.viu.ca/nrep/programs.asp#environment>

University of Washington College of Engineering Erosion and Sediment Control Courses:

<http://www.engr.washington.edu/epp/cee/>

For more information

The staff in the Community Sustainability Division are happy to assist and help you comply with the Erosion and Sediment Control Bylaw. If you have any questions, please contact us at:

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