# Best Management Practices Plan
# (Surface Water, Sediment & Erosion Control)
# West Carleton Environmental Centre

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**D R A F T**


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# Table of Contents



## References

## Appendices

# 1. Purpose

This report was prepared to outline the Best Management Practices (BMPs) to be employed for protection of surface water at the West Carleton Environmental Centre (WCEC) in order to manage and minimize on-site hazards and potential environmental effects. The intent of surface water control is also to protect adjacent properties and watercourses from any drainage related impacts originating from the landfill site.

The stormwater management system is designed to meet objectives and goals outlined in Ontario Regulation 232/98 and other applicable regulations and guidelines.

The objectives include the following:

- Control surface water coming onto site and discharging from the site
- Flooding control
- Surface water quality control
- Surface water quantity control
- Erosion and sediment control

In order to achieve these objectives, the proposed stormwater management system was designed to include several large scale structural BMPs as follows:

- Stormwater ponds (wet ponds)
- Infiltration basins
- Special treatment system (oil/grit separator-Stormceptor)
- Adequately sized conveyance system

Maintenance activities related to the stormwater management system are presented in Section 5.

This report should be read in conjunction with Development & Operations Report(Ref. 1), which describes the landfill site including the stormwater management system. Other BMP reports have been prepared by other consultants.

# 2. Responsibilities

WM will be responsible for ensuring the requirements of this plan. To accomplish this, employees will be properly trained to be familiar with the plan requirements. Surface water monitoring requirements are presented in Environmental Monitoring Plan (EMP)[(Ref.2)].

The Site Manager will be responsible for:

- Providing training to staff
- Providing guidance on surface water control measures
- Maintaining this plan

# 3. Training

The Site Manager is responsible to provide training to staff in surface water and erosion control. These individuals will have the responsibility to evaluate drainage system conditions and implement control actions on an on-going basis. The control actions will include upkeep of stormwater conveyance system including vegetation cover, sediment removal, maintenance of stormwater storage facilities, grade control and other pertinent activities. The list of individuals identified as well as the date when they were trained will be listed in the Surface Water Control Training Log. The list will be updated every 5 years or upon employee turnover. **Appendix A** includes an example of the Surface Water Control Training Log.

WM employees will be trained in the procedure determining the precipitation forecast for the site. At a minimum, the Environment Canada Weather Office under the current website of www.weatheroffice.gc.ca or other similar website will be checked. On-site meterological station will be also used and compared for this purpose. If a heavy or severe storm event is forecasted, landfilling operations shall be planned accordingly to account for anticipated weather conditions.

WM representatives will also be trained in the recordkeeping and reporting procedures as required. Refer to Section 6 for more details.

# 4. General Information

Good landfilling practices are important in protection of surface water resources and include the following:

- Adequate compaction and covering of daily disposal cell
- Minimize extent of open, disturbed areas
- Maximize extent of permanent and interim vegetation cover including natural vegetation buffers
- Divert surface water away from active waste disposal areas to the extent possible
- Avoid construction of steep slopes
- Adequate horizontal and vertical grade control

Other general principles/tasks, which are important in management and protection of surface water at the waste disposal site include:

- Prompt and proactive control of leachate seeps
- Good litter control
- Spill prevention/control and fuel handling practices
- Prevent mud tracking
- Regular road sweeping and snowploughing
- Equipment washing at designated location(s)

Refer to D & O[(Ref.1)] for details related to these activities. All the above noted practices are intended to minimize adverse surface water impacts and may be complimented by other general practices as follows:

- Preservation of natural habitat features as much as possible
- Construction design, review, inspection and enforcement
- Education and training of WM staff and contractors working on site

# 5. Inspection and Maintenance Activities

The site superintendent and properly trained WM staff will be responsible for all these activities. All maintenance activities will be recorded. An example of the Stormwater Management System Inspection and Dispatch Log is included in **Appendix A**.

## 5.1 Structural BMPs

Structural BMPs inspection and maintenance activities are presented in the following table.

**Table 5.1** – Inspection and Maintenance Activities

| Factor | Inspection | Maintenance/Action |
|---|---|---|
| **Stormwater Ponds** | | |
| Locations | Pond 1 and 2 | |
| Frequency | Monthly or after every severe storm (>25 mm) or after any on-site spills or upsets unless frozen or covered with snow | |
| Items to Observe & Record | | |
| Erosion of banks, liner exposure | Record location | Repair as required |
| Rip-rap, drainage gravel | Record repair required and location | Repair as required |
| Stains, sheens | Determine source (inspect weekly) | Close effluent valve and investigate |
| Floating foam or scum | Determine source (inspect weekly) | Close effluent valve and investigate |
| Sediment depth in forebay - 200 to 300 mm deep | Inspect annually | Clean forebay. Repair, replace any displaced gravel/rip rap |
| Sediment depth in main pond area >200 mm | Inspect annually | Clean out main pond area. Repair, replace any displaced gravel/rip rap |
| **Infiltration Basins** | | |
| Locations | Infiltration Basin 1 and 2 | |
| Frequency | Monthly or after severe storm (>25 mm) unless frozen and covered with snow | |
| Items to observe & record | | |
| Water level | Record weekly | Use data for scheduling of base rejuvenation activities and monitoring of basin performance |
| Erosion of banks and inflow points | Record location | Repair as required |
| Unwanted vegetation growth/debris, etc. | Record location | Remove as required |
| Sediment accumulation and clogging | Record location | Clean as required. Rake or till the base. Replace surficial 50-100 mm layer of permeable soil |
| **Oil/Grit Separator (Stormceptor)** | | |
| Location | Mini Transfer Area | |
| Frequency | Semi-annually and after each spill event or as required based on measurement results | |
| Items to observe & record | | |
| Sediment and oil depth measurement | Record monthly | Use data for scheduling of cleaning |
| Sediment and oil removal | As required | Use vacuum truck for sediment and oil removal |
| **Ditches/Culverts/Storm Sewers** | | |
| Locations | All. Where required | |
| Frequency | Monthly or after severe storm | |
| Items to observe & record | | |
| Erosion (rills, gullies, washouts, etc.) | Record where | Repair as required |
| Pipe physical damage/blockage | Record where | Repair/replace as required |
| Increased vegetation required | Record where | Repair as required in spring/fall |
| Rip-rap damage | Record where | Repair as required |
| Stains or leachate seep | Record where | Investigate source & repair |
| Floating foam | Record where | Investigate source & repair |
| Sheen or water stain | Record where | Investigate source and repair |
| Overtopping/flood out | Record where | Clean culverts downstream or other appropriate action |
| Sediment deposit excessive | Record where | Clean out. Reinstate vegetation. |
| Grass/vegetation height | | Cut as required |

All structural BMPs will be accessible to maintenance vehicles.

Maintenance of the drainage system will be customized and tailored for inclement and/or winter weather conditions to ensure that the system is operational at all times and there are no blockages. This is particularly important early in the spring when ditches, inlets and outlets may be blocked with snow or ice at priority locations. Snow and ice cleanup/removal will be developed over time.

## 5.2 Erosion and Sediment Control BMPs

Erosion and sediment resulting from land disturbance may degrade surface water quality. Effective erosion control practices can reduce soil loss and minimize maintenance requirements of the structural BMPs. WCEC landfill design/development minimizes the extent of disturbed areas and duration of bare soil exposure. Mitigation measures will be used for erosion and sediment control to prevent sediment from entering adjacent water bodies and leaving the site. The primary principles associated with erosion and sediment control are as follows:

- Minimize soil mobilization and duration of bare soil exposure by stabilizing and protecting disturbed areas
- Keep runoff velocities low
- Protect disturbed areas from runoff
- Trap sediment as close to the source as possible
- Implement a maintenance and follow-up program

Various erosion/sediment control BMPs associated with the above noted principles will be utilized as follows:

**Table 5.2** – Erosion and Sediment Control Measures

| | |
|---|---|
| Design and Construction Management | • Preserve natural vegetation<br>• Establish or keep vegetated buffer zones<br>• Dust control |
| Ground Surface Stabilization | • Temporary or permanent seeding<br>• Mulching and matting<br>• Rip-rap on geotextile or other ground reinforcement<br>• Stabilization of roadways & maintenance<br>• Inlet/outlet protection |
| Flow Diversion | • Diversion channels<br>• Runoff diversion berms<br>• Subsurface drains |
| Sediment Trapping | • Silt fences<br>• Straw bales<br>• Check dams<br>• Temporary sediment traps<br>• Stormwater/sediment ponds |

Erosion and sediment control measures for ground stabilization and sediment trapping will be positioned to be close to the source of soil erosion so they are most effective in sediment capture/control. All the above noted BMPs must be inspected and maintained regularly and after each severe storm event to ensure effectiveness.

Selection of erosion/sediment control BMPs is influenced by the land topography. The primary topographic considerations are slope steepness and slope length. Slope gradients can be grouped into three (3) general ranges of soil erodibility:

- 0 -7% - low erosion hazard
- 7 – 15% - moderate erosion hazard
- Over 15% - high erosion hazard

Within these slope gradient ranges, the greater the slope length, the greater erosion potential. The erosion hazard will become significant if slope lengths exceed the following values:

- 0 -7% - 100 m
- 7 – 15% - 50 m
- Over 15% - 25 m

These distances may be shorter in areas of highly erodible soils.

It is recommended that concentrated flow over cut or fill slopes be prevented as much as possible unless adequate surface reinforcement/lining is provided. In order to reduce flow velocity and dissipate water energy, rock check dams and rip-rap aprons will be used at critical locations.

Native on site soils belong to soil group A (sand, loamy sand or sandy loam) and B (loam or silt loam) and are considered erodible. Soil to be used for waste covering may be imported and may vary in texture and erodibility. Final cap is specified as clayey silt, which is cohesive relatively tight soil of moderate to low erodibility. Rough surface finish with horizontal depressions is preferred to smooth surface because it provides instant erosion protection.

Final selection and exact location of ground stabilization and sediment trapping BMPs will be completed under final design and during construction.

Various mulches may be used such as hay, straw, wood fibre, wood chips and hydroseeding hydraulic mulches. Erosion blankets (mats or nets) may be used over critical steep slopes where erosion protection is critical. Erosion blankets must be properly anchored and applied in good contact with the underlying soil. Mats can be used to assist in protection while awaiting vegetation growth.

# 6. Record Keeping/Complaints

Throughout this document, there is reference to a surface water control log that will be maintained on site. This log will include notation of the items listed previously as well as any other notes relevant to stormwater management at the site. The log will be kept in a three-ringed binder that will contain portioned sections for training, inspection, dispatch of site crews for clean-up/repair, general notes and complaints. Notes may be prepared/maintained in the field and inserted to the binder on a monthly basis. The log will contain all training, inspection, dispatch and complaint records for at least one (1) year or until included in annual monitoring report.

From time to time, there may be complaints regarding stormwater management system and surface water conditions on or off site. **Appendix A** includes a sample complaint form with the following information:

- Name of complainant
- Time of complaint
- Time that the incident occurred
- Nature of complaint
- Operational details at the time of the complaint
- Weather conditions at the time of the complaint
- Details of investigation

All complaints will be included in the surface water control log. On an annual basis, the log will be reviewed and any unfavourable trends will be further examined to identify corrective actions. A summary of the complaints received and the corrective actions will be presented in the site annual report.

# 7. EA Commitments and EA Conditions

This report was prepared to fulfill commitments made under the Environmental Assessment (EA) and satisfy conditions of the EA Notice of Approval dated August 28, 2013. The following table provides summary of the EA commitments and EA conditions that have been addressed in this document.

**Table 7.1** – Overview of EA Commitments and EA Conditions

| EA Commitments | Covered in BMPP | EA Conditions |
|---|---|---|
| Develop a Surface Water BMP Plan that may include the following mitigation and monitoring measures: | | • Condition 2.2: The proponent shall fulfill all commitments made during the environmental assessment process.<br>• Section 4.0: Compliance Monitoring<br>○ Section 4.1: The proponent shall prepare and submit to the Director for the public record, an environmental assessment compliance monitoring plan.<br>○ Section 4.3: The program shall include monitoring of the proponent's implementation of the undertaking in accordance with the environmental assessment and the conditions in this Notice with respect to mitigation measures, public consultation and additional studies and work to be carried out. The program shall also include monitoring of compliance with all commitments made in the environmental assessment and the subsequent review assessment with respect to mitigation measures, public consultation and additional studies of work to be carried out. |
| • Construction of SWM ponds to provide stormwater control during landfill cell and site development; | Section 5.1 | |
| • Direction of runoff and overland flow away from working areas and areas of exposed soils and maximize length of overland flow through to points where stormwater is collected; | Section 4 | |
| • Installation of swales and culverts, as required, to allow for surface flow to pass under the on-site roads; | Section 5.1 | |
| • Construct two-stage SWM facilities to address surface water runoff from the site and emergency response to accidental leachate seeps or spills; | Section 5.1 | |
| • Monitor inflow to SWM ponds regularly to identify emergency response situations, including leachate seeps and onsite spills; | Section 5.1 | |
| • Implement emergency response actions, as required, when emergency response situations occur, including leachate seeps and onsite spills; and | Section 4 | |
| • Monitor annual and periodic SWM pond inflow for parameters as identified by MOE in their surface water "assessment criteria" as it relates to landfill sites. | Refer to EMP (Ref.2) | |
| Develop a Sediment and Erosion Control BMP Plan that may include the following mitigation and monitoring measures: | | |
| • Installation of silt fences, blankets and/or berms around construction areas to prevent sediment runoff and erosion; | Section 5.2 | |
| • Retention of sediment and erosion control measures around construction areas until stabilized; | Section 5.2 | |
| • Storage and stabilization of stockpiled materials to prevent sediment runoff; | Section 5.2 | |
| • Storage and refuelling of equipment to prevent potential fuel, oil and grit runoff; | Section 4 | |
| • Implementation of vehicle and equipment cleaning procedures to minimize mud, dirt and debris tracking along the access routes and areas where sediment and control measures are not in place; | Section 4 | |
| • Monitoring of function and integrity of sediment and erosion control measures; and | Section 5.2 | |
| • Restoration and re-vegetation of the site to provide sediment and erosion control, when conditions allow. | Sections 4 & 5.2 | |

# References

1. Development & Operations Report, West Carleton Environmental Centre, WSP Canada Inc.

2. Environmental Monitoring Plan, Groundwater, Surface Water, Leachate & Subsurface Gas Components, West Carleton Environmental Centre, Ottawa, Ontario, WESA, a division of BluMetric Environmental Inc.

# Appendix A

# Forms

**West Carleton Environmental Centre Best Management Practices Plan**
**(Surface Water, Sediment & Erosion Control)**
**Control Training Log**

| Trained Employee Name | Date of Training | Supervisor Signature |
|---|---|---|
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**West Carleton Environmental Centre Best Management Practices Plan**
**(Surface Water, Sediment and Erosion Control)**
**Stormwater Management System Inspection and Dispatch Log**

**Inspected by: _____ Inspection date: _____**

Areas to inspect include: _____

| Area Inspected/Date/Reason for Inspection | Description of Problem/Cause | Notes/Remedial Action Required | Date and Time of Action Taken |
|---|---|---|---|
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**West Carleton Environmental Centre Best Management Practices Plan (Surface Water, Sediment and Erosion Control)**
**Complaint Form**

| | |
|---|---|
| WM Personnel: | |

| | | | |
|---|---|---|---|
| Date of Call | | Time of Call | |
| Complainant Name | | Complainant Contact Number | |
| Complainant Address | | | |

| | | | |
|---|---|---|---|
| Date of Incident | | Time of Incident | |
| Description of Event | | | |

| | |
|---|---|
| Operations at Time of Incident | |
| Weather at Time of Incident | |
| Investigation Results and Corrective Action | |