Operation and Maintenance Manual

Hillsburgh Trails Subdivision
Stormwater Management System

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GUELPH | OWEN SOUND | LISTOWEL | KITCHENER | LONDON | HAMILTON | GTA

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Table 1: Record of Revisions

Revision Number	Revised Sections	Revised By	Date of Revision	Description of Revision

Please keep this Record of Revisions as the front page of this Manual. Number all future revisions consecutively.

1. GENERAL INFORMATION & SYSTEM DESCRIPTION

1.1. Site Description

The Hillsburgh Trails Subdivision is located within the Town of Erin (Hillsburgh). The subject site is bounded by Wellington Road 22 to the east, an existing woodlot to the north, and residential and agricultural lands to the west and south.

1.2. Purpose

This manual was prepared to provide guidance on the various operation and maintenance activities related to the stormwater management (SWM) works servicing the Hillsburgh Trails Subdivision, hereafter referred to as "the works". This manual is to be revised on an as needed basis.

This Operation and Maintenance (O&M) manual applies to the stormwater management works located in the subdivision lands. The primary users of this O&M manual will be the Town of Erin staff. Prior to the Town assuming ownership of the Subdivision lands, the storm system and associated infrastructure, Thomasfield Homes Limited and their selected Contractor/Consultant will be responsible for the operation and maintenance of the Works.

Table 2 provides a list of contacts responsible or to be contacted regarding the operation and maintenance of the works prior to the subdivision being assumed by the Town of Erin.

Table 2: Operation and Maintenance Contacts

Name	Location	Telephone
Thomasfield Homes Limited		
GM BluePlan Engineering Limited (During Construction)		
Contractors, as retained by Thomasfield Homes Limited (until Assumption)	TBD	TBD

This manual and pertinent information (i.e. list of contacts) will need to be updated once the Town of Erin assumes ownership of the subdivision, or other changes occur.

1.3. Description of Stormwater Management System

The stormwater management system consists of a treatment train approach comprising of lot level, conveyance and end-of-pipe management practices, proposed to filter and remove sediments from stormwater runoff prior to discharge. The stormwater management system for the site has been designed to convey and attenuate the complete range of design storm events,

up to and including the 100-year design storm event. The stormwater management system drawings are located within Appendix A.

The following sections describe the works in detail as outlined in the SWM design.

1.3.1. Conveyance Controls

Conveyance controls will be achieved through municipal maintenance of the storm sewer system. The regular cleanout of the manholes and catchbasin sumps will remove the heavier sediments deposited from the runoff during storm events.

1.3.2. End-of-Pipe Controls

The proposed stormwater management facility is located near the south-easterly edge of the property, adjacent to the existing woodlot and within proximity to Wellington Road 22. The stormwater management facility will have two (2) outlet structures to maintain the existing drainage patterns for the site. Outlet Structure No. 1 consists of a will discharge to the existing Wellington Road 22 roadside ditch which drains to the Erin Branch of the Credit River downstream of the site. Outlet Structure No. 2 will discharge to a linear energy dissipation and dispersion trench which will spread the flows over a wide area preventing a point source discharge prior to outleting to the existing woodlot located east of the site and ultimately to the West Credit River Wetland Complex and Erin Branch of the Credit River.

The proposed stormwater management facility has been designed as wetland type facility complete with a forebay and a 0.3 m deep permanent pool to provide the required water quality controls. The proposed stormwater management facility will have a reverse draw outlet for the 4-hour 25 mm storm event (quality storm) to draw cooler water from the deeper parts of the stormwater management facility, prior to outleting to the existing Wellington Road 22 roadside ditch.

The proposed outlet structure is designed to provide a 48-hour extended detention of the 4-hour 25 mm design storm event as per the Credit Valley Conservation Authority requirements.

Runoff from Catchment 204, Street A connection to Wellington Road 22 and sanitary sewage pumping station block, will be attenuated by a proposed superpipe system located within the municipal right of way. The superpipe will provide attenuation for the runoff so that the pre-development peak flow rates to the Wellington Road 22 roadside ditch will not be exceeded. The superpipe system will consist of a 50m long 675mm diameter pipe at a slope of 0.2% complete with a 260mm diameter orifice plate proposed at the downstream manhole prior to discharging to the existing roadside ditch.

2. INSPECTION SCHEDULE

Regular inspections of Hillsburgh Trails Subdivision works shall be completed at minimum of once per year. During the construction phase, inspection shall be completed per the Sediment and Erosion Control and Stormwater System Checklist (Appendix B). Inspection reports

prepared by the developer/consultant during the maintenance period shall be provided to the Town for their records.

To ensure that the stormwater management system continues to function as designed and constructed, the following inspections and maintenance activities are recommended.

2.1. Storm Maintenance Holes and Catchbasins Visual Inspection

It is recommended that storm system maintenance holes and catchbasins be inspected semi-annually until construction activities are complete and the site is stabilized then on an annual basis thereafter to allow for an assessment of sediment or debris buildup and overall condition of the structures. Based on the results of visual inspection, additional maintenance actions can be recommended.

Visual inspection of storm maintenance holes and catchbasins is the primary method for identifying existing or potential problem areas. *Sediment accumulation shall be measured via the riser pipe using a dip tube & foot valve or sludge judge and the presence of oil is determined via the oil inspections port using an oil dip stick.* Temporary traffic control measures (as required) will be needed to provide a safe working zone due to the proximity of the catchbasins and storm maintenance holes to the active roadways. Pole-mounted cameras inserted down maintenance holes, catch basins and oil/grit separators enable crew personnel to observe the inlet and outlet sewers for the structural and hydraulic conditions in the system without the need to enter the confined space.

Crew personnel undertaking visual inspections of storm maintenance holes, catch basins and oil/grit separators shall complete the Storm Structure Inspection Checklist provided in Appendix B. Inspection reports prepared by the developer/consultant during the maintenance period shall be provided to the Town for their records.

Table 2: Frequency of Inspection for Storm Maintenance Holes and Catchbasins

Component	Frequency of Inspection
Storm Maintenance Holes	On an annual basis, preferably in the spring season, or as required (i.e. after paving operations or due to a blockage concern)
Catchbasins	On an annual basis, preferably in the spring season, or as required (i.e. after paving operations or due to a blockage concern)

2.2. Stormwater Management Facility Visual Inspection

It is recommended that the stormwater management facility, including all inlets, basins, outlets and weirs, be inspected semi-annually until construction activities are complete and the site is stabilized then on an annual basis thereafter to allow for an assessment of sediment or debris buildup and to assess the overall functionality of the facility.

Visual inspection of the stormwater management facility is the primary method for identifying existing or potential problems. Based on the results of the visual inspection, additional maintenance actions can be recommended.

Please refer to the Stormwater Pond Inspection Checklist provided in Appendix B and Table 2-2 below. Inspection reports prepared by the developer/consultant during the maintenance period shall be provided to the Town for their records.

Table 3: Frequency of Inspection for Stormwater Management Facility

Component	Frequency of Inspection
Inlets	On an annual basis, preferably in the spring season, or as required (i.e. after significant rainfall, sanitary overflows, or due to a sediment concern)
Stilling Basin	On an annual basis, preferably in the spring season, or as required (i.e. after significant rainfall, sanitary overflows, or due to a sediment concern)
Outlet	On an annual basis, preferably in the spring season, or as required (i.e. after significant rainfall, sanitary overflows, or due to a sediment concern)
Overflow Weir	On an annual basis, preferably in the spring season, or as required (i.e. after significant rainfall, sanitary overflows, or due to a sediment concern)

3. MAINTENANCE SCHEDULE

Maintenance to any component of the stormwater system is to be logged in the Maintenance Log book. Please refer to Appendix C. Maintenance logs prepared by the developer/consultant during the maintenance period shall be provided to the Town for their records.

3.1. Storm Maintenance Holes and Catchbasins Maintenance

Based on results of visual inspections, the need for cleaning or other required maintenance can be assessed on a case-by-case basis.

Storm maintenance holes, catchbasins and catchbasin maintenance holes provide inlets to the storm sewer system that contain sumps for the retention of sediment, grit, and debris. To prevent grit and sediment from filling the structure and passing untreated flow as well as minimize blockages in sewer lines, these basins shall be cleaned on a routine basis.

Catchbasins may be cleaned manually or using specialized equipment such as vacuum trucks. Best management practices suggest that catch basin cleaning shall be done once the depth of sediment reaches one-third the depth from the basin to the invert of the outlet pipe. The frequency of cleaning will vary based on grit load, surface drainage, land use, and winter control practices.

3.2. Stormwater Management Facility Maintenance

As calculated in Section 6.4.2 Sediment Loading and Cleanout Frequency Stormwater Management Planning and Design Manual (MOE, 2003), the sediment accumulated in the stormwater management facility should be removed every 10 years (Appendix A – Sediment Loading and Cleanout Frequency). This frequency should be adjusted based upon the yearly sediment depth inspections.

To gain access to the bottom of the forebay and outlet pool, the permanent pool must be drained. Once drawdown has occurred, grading/excavating equipment such as long-reach excavators will be used to remove the sediment from the stormwater management facility. Sediment should be placed in an open area adjacent to the stormwater management facility to allow for the material to dry out and for testing to occur. If the material is tested and is determined to be classified as hazardous waste, then it must be deposited at a hazardous waste facility. If the material is not hazardous it will be loaded and trucked to the nearest landfill.

Once the forebay and outlet pool have been cleaned of built-up sediment, any required re-establishment of plantings should be completed. The forebay and outlet pool should then be filled using municipal water to minimize erosion during the first storms after the maintenance activities are complete.

If sediment removal or maintenance is required within the remaining wetland portion of the stormwater management facility, the water level should be lowered so that maintenance can occur. Draining only the forebay and outlet pool area during sediment removal reduces the impacts to the aquatic and shoreline fringe vegetation within the remaining portions of the stormwater management facility.

Sediment removal within the stormwater management facility is to occur during dry weather conditions. A geosynthetic clay liner has been constructed within the stormwater management facility. Maintenance and specifications for the geosynthetic clay liner are included within Appendix E -Stormwater Management Pond Liner Specifications.

3.3. Grass Cutting

Generally, it is recommended that grass-cutting be limited or eliminated around stormwater management facilities since allowing grass to grow tends to enhance water quality. Short grass around a wet stormwater management facility provides an ideal habitat for nuisance animal species such as geese. Allowing the grass to grow is an effective means of discouraging geese. Grass growing within the boundary created by the maintenance/walking path should be cut only once in the fall to create seed source and mulch.

3.4. Vegetative Planting

Upland and flood fringe plantings are generally stable and should not need much maintenance or re-establishment. These plantings include ground cover such as grass, woody shrubs, and trees. Planting, if needed, should occur in the spring.

Shoreline fringe areas are subject to harsher conditions because of the frequent wetting and drying associated with this zone. A seed mixture with a soil nutrient medium (if required) and a biodegradable mesh-like blanket is suggested to establish ground cover in this zone. Shrubs and trees can be planted through openings created in the blanket. Planting should be carried out in mid-May to early June but after the water levels have subsided to a stable level.

Aquatic plantings are the hardest to initially establish and often require re-planting within the first two years of operation. Young shoots, as opposed to rhizomes or corms, are preferable for planting as these plants are already growing with an established root structure (for early stability). The plants should be at least 10 cm tall and planting should occur in late May to early June. Submerged rooted plants (including pondweeds) should be planted as mature vegetative growth if planted in late spring to early summer to take advantage of warmer water and sunlight penetration.

3.5. Trash Removal

Trash removal is an integral part of stormwater management maintenance. Trash can block outlet devices which will restrict the proper function of the stormwater management facility. Generally, a “spring cleanup” is needed to remove trash from all areas of the stormwater management facility.

4. SAFETY & EQUIPMENT

This section provides information pertaining to safety measures and protocols, training and licensing requirements, and the general use of equipment. Further details on safety and use of specialized equipment are provided in applicable Ministry of Labour regulations and Contractor/Consultant specific Health and Safety Plans (as applicable).

4.1. Training and Safety Requirements

Inspection crews are exposed to several challenging conditions in the field. Supervisors shall ensure that every appropriate safety measure is taken in accordance with requirements as determined by applicable Ministry of Labour (MOL), Standard Operating Procedures (SOPs) (as applicable), and applicable company specific safety policies.

Personnel shall be trained in the following (as required) prior to undertaking any work:

- Book 7 Traffic Protection and Plans
- Confined Space Entry Training and Certification
- Fall Protection and Working at Heights
- Atmospheric Monitoring and Ventilation Methods
- Personal Protective Equipment
- Workplace Hazardous Material Information System (WHMIS)
- Construction Projects Regulation

Personnel should also be made aware of potential environmental hazards such as poison ivy, hogweed, and ticks.

Confined space entries into any component of the system should be not attempted unless directed and planned for by the Management.

4.2. Equipment

4.2.1. Personal Protective Equipment

Appropriate personal protective equipment (PPE) should be used based on the requirements and type of inspections of the system. Suggested personal protective equipment (PPE) for work related to sanitary/storm sewers, maintenance holes, catch basins, and culverts includes (as required):

- Hard hat
- Safety glasses
- Safety footwear
- Safety vest
- Gloves
- Fall Arrest
- Harness (for confined space entry)
- Ventilation or breathing apparatus (for confined space entry)

4.2.2. Hand Tools

Basic hand tools typically required by the Inspection Crew include:

- Pick-axe (to lift maintenance hole covers)
- Sledge hammer
- Flashlight / mirror
- Debris retrieval device
- Sediment measuring and sampling device
- Traffic safety signage & control devices
- Other job specific tools / equipment, as required

5. RESPONSE PLAN

5.1. Spills and Pollution

Spills are defined as release of pollutants into the natural environment originating from a structure, vehicle, or other container that are abnormal considering all circumstances. Spills must be reported immediately to the Management and/or the Owner of the works, who shall report the spill to the MECP Spills Action Centre (SAC) (See Section 5.1.1) when the spill causes or is likely to cause any of the following:

- Impairment to the quality of the environment – air, water, or land

- Injury or damage to property or animal life
- Adverse health effects
- Safety risk
- Making property, plant, or animal life unfit for use
- Loss of enjoyment of normal use of property
- Interference with the normal conduct of business

5.1.1. Spill Prevention and Contingency Plan

When pollutants are spilled into the environment, the MECP's primary role is to ensure that the responsible party cleans up the site in accordance with Ministry guidelines. If a spill occurs, the SAC must be contacted immediately. Documentation of the report to the SAC must include the party contacted, the time, and a summary of the discussion. This information shall be kept readily available, as it will act as a key reference documenting the spill.

Every incident shall be recorded, even if it is not reported. Each incident report concerning a spill shall include:

- Date, time, location and duration of the release of the pollutant
- Identity of the pollutant released and the Owner's name
- Quantity of the pollutant released
- Circumstances and cause of the spill
- Details of the containment and clean-up efforts and the names of the persons involved in the clean-up
- An assessment of the success of the containment and clean-up efforts; the method used, in accordance with subsection 96 (1) of the Act, to dispose of or use the pollutant or any matter, thing, plant or animal or any part of the natural environment that is affected by the spill and the location of the disposal site, and
- Any adverse effects observed because of the spill

Contact information for spill notification shall include the Management, Municipality, MECP Spills Action Centre (available on 24-hour basis) and others as required:

Table 4: Spill Notification Contact List

Name/ Organization	Address/Department	Telephone
MECP Spills Action Centre	5775 Yonge Street, 5th Floor, North York, ON M2M 4J1	Toll-free: 1-800-268-6060
Others	TBD	TBD

6. RECORD KEEPING

All records and results of these inspections and any cleaning and maintenance operations undertaken must be documented in a logbook at the Owner's administration office for inspection by the Ministry.

7. REFERENCES

Ministry of the Environment. (2003). Stormwater Management Planning and Design Manual 2003 - Chapter 6. Queen's Printer for Ontario.

USEPA, 1999. Storm Water O&M Fact Sheet: Catch Basin Cleaning.

APPENDIX A

Sediment Loading and Cleanout Frequency

APPENDIX B

Inspection Forms and Checklist Forms

Sediment and Erosion Control
Stormwater Structures
Oil/Grit Separator Unit

STORMWATER FACILITY INSPECTION CHECKLIST

Inspection Date: | **Contract No.:**

Asset Name: | **Asset ID:**

Current Weather on Site:

Previous Weather on Site:

Measured Data:

Water Level _____ m Sediment Levels Accumulated in Bottom of Dry Pond: _____

Please note that any structures found to be worn, missing or damaged are to be repaired or replaced within 48 hours.

	Checklist:	Measure Condition			Comments / Action(s) Required
		Good	Fair	Poor	
1	Inspect the water level in the stormwater management facility. Is there water present in the dry pond?	☐	☐	☐	
2	Inspect the sediment level in the stormwater management facility. Is the sediment buildup impeding the function of the pond outlet pipe and/or overflow weir structures? Is the sediment depth allowing for standing water within the dry pond?	☐	☐	☐	
3	Is the vegetation around the pond unhealthy or dying?	☐	☐	☐	
4	Is there any indication of a spill? Is there an oily sheen on the water near the inlet or outlet? Is the water frothy? Is there an unusual coloring to the water?	☐	☐	☐	
5	Inspect the stormwater management facility for trash/litter and debris.	☐	☐	☐	
6	Inspect the pond bottom for any accumulated sediment or low points.	☐	☐	☐	
7	Inspect inlet swales for any accumulated sedimen, trash or debris.	☐	☐	☐	
8	Is there any noticeable damage to the pond structures (i.e. outlet structures, overflow weirs)?	☐	☐	☐	
9	Is there any noticeable damage to the grassed swales (i.e. erosion, blockages)?	☐	☐	☐	
10	Inspect the outlet structure. Is there sediment, trash/debris buildup at the outlet structure?	☐	☐	☐	
11	Inspect catch basin(s). Is there sediment, trash/debris buildup in the structure?	☐	☐	☐	

Maintenance

Pipe/Orifice Outlet to be inspected for and cleaned of any debris within 48 hrs of significant storm event

Overflow weirs to be inspected for and cleaned of any debris within 48 hrs of significant storm event

OVERALL REMARKS:

Signature of Inspector: _____

APPENDIX C

Maintenance Log

Site Location: Mitsubishi Chemical Advanced Materials Canada Inc. ("MCAMC Canada"), 495 Laird Road, Guelph, ON

MOE ECA No.: ECA No. 0631-BM7QS9

Operation, Maintenance, and Record Keeping Requirements[1]

- The Owner shall inspect and monitor the works as outlined in the Operations Manual Storm Water Management Works
- The Owner shall undertake an inspection of the condition of the Works, at least once a year, and undertake any necessary cleaning and maintenance to ensure that sediment, debris and excessive decaying vegetation are removed from the Works to prevent the excessive build-up of sediment, oil/grit, debris and/or decaying vegetation, to avoid reduction of the capacity and/or permeability of the Works, as applicable. The Owner shall also regularly inspect and clean out the inlet to and outlet from the Works to ensure that these are not obstructed.
- The Owner shall construct, operate and maintain the Works with the objective that the effluent from the Works is essentially free of floating and settleable solids and does not contain oil or any other substance in amounts sufficient to create a visible film, sheen, foam or discoloration on the receiving waters.
- The Owner shall maintain a logbook to record the results of these inspections, any cleaning and maintenance operations undertaken and shall keep the logbook at the Owner's administrative office for inspection by the Ministry. The logbook shall include the following:
    a) the name of the Works;
    b) the date and results of each inspection, maintenance and cleaning, including an estimate of the quantity of any materials removed and method of clean-out of the Works.

1 – Specific operation, maintenance, monitoring and record keeping requirements to be undertaken in accordance with the ECA No. 0631-BM7QS9

Example Maintenance Log

Date	Inspection / Maintenance	Storm System Component(s) included in visit	Details of Activity (Type of Inspection, Item Inspected, Maintenance Actions, etc.)	Name of Inspector
Date	*Inspection*	*Loading dock catch basin*	*Visual Inspection, debris check*	*John Doe*

APPENDIX D

Stormwater Management System Drawings

GM BluePlan Engineering Limited

APPENDIX E

Stormwater Management Pond Liner Specifications