Attachment 7
To MDEQ Stormwater Discharge Permit Application

(Facility Table 3)
(Pollution Prevention Procedure)

Pollution Prevention Procedure
Attachment 7 to MDEQ Storm water Discharge Permit Application

Pollution Prevention and Good Housekeep Program:

62. Provide the procedure for updating and revising the inventory in Question 60 and map (or maps) identified in Question 61 as facilities and structural storm water control are added, removed, or no longer owned or operated by the applicant. A suggested timeframe for updating/revising the inventory and map(s) is 30 days following adding/removing a facility or structural storm water control.

As part of the new permit cycle a request for changes o the site inventory, not only development/redevelopment, but changes to the facilities, maintenance practices and structural storm water control will be used to update and revise the inventory and also these changes will be logged and reported annually when we do the annual report. Any changes will be reported to the State at that time. We will also notify the Genesee County Drain Commission as well as send on the DEQ upon request.

63. Provide the procedure for assessing each facility identified in Question 60 for the potential to discharge pollutants to surface waters of the state. The procedure shall include a process for updating and revising the assessment. *A recommended timeframe for updating/revising the assessment is 30 days prior to discharging storm water from a new facility and within 30 days of determining a need to update/revise the facility assessment.*

The applicant should consider the following factors when assessing each facility:
- Amount of urban pollutants stored at the site (e.g., sediment, nutrient, metals, hydrocarbons, pesticides, fertilizers, herbicides, chlorides, trash, bacteria, or other site-specific pollutants)
- Identification of improperly stored materials
- The potential for polluting activities to be conducted outside (e.g., vehicle washing)
- Proximity to waterbodies
- Poor housekeeping practices
- Discharge of pollutants of concern to impaired waters

A procedure for assessing the potential discharge pollutants to surface waters of the state was developed. The following factors were considered for assessing facilities in the urbanized area:

1. Amount of urban pollutants stored at the site (e.g., sediment, nutrients, metals, hydrocarbons, pesticides, fertilizers, herbicides, chlorides, trash, bacteria, or other site-specific pollutants)
2. Identification of improperly stored materials
3. The potential for polluting activities to be conducted outside (e.g., vehicle washing)
4. Proximity to waterbodies
5. Poor housekeeping practices
6. Discharge of pollutants of concern to impaired water

7. Did Facilities under 2008 permit have facilities that were required (per Industrial Program) to have a SWPPP in 2010.

Each Facility under Vienna Township's jurisdiction was evaluated using these factors. Evaluation of new facilities will occur for inclusion in the annual report with the rationale being that mowing forward all new construction will address the quality and quantity as per the storm water development standards and therefore be low threats. The re-evaluation of the above assessment criteria will occur for the next permit application.

Low and Medium potential property located within a Non-Urbanized area was not ranked, and was not included in this permit. Shown for information purposes only.

Updated as changes occur. This will correspond with the annual report.

70. Provide the procedure identifying the BMPs currently implemented or to be implemented during the permit cycle to prevent or reduce pollutant runoff at each facility with the medium and lower potential for the discharge of pollutants to surface water of the state using the assessment and prioritized list in Questions 63 and 64.

Procedure:
BMP's are identified in Table 3. For those sites considered Low or Medium priority there are no BMP's that have been identified as needed.

Each site was looked at when prioritized. Vacant, administration buildings, public parking lots, or road beds. It was determined that these sites have little potential to discharge pollutants to a water of the State. It did not make sense to spend money on adding BMP's to systems that have little potential to discharge pollutants.

If a potential pollution source is identified with an appropriate BMP(s) is necessary, a schedule (not to exceed 2-years) would be developed to implement the BMP(s).

71. Provide the procedure for prioritizing each catch basin for routine inspection, maintenance, and cleaning based on preventing or reducing pollutant runoff. The procedure shall include assigning a priority level for each catch basin and the associated inspection, maintenance and cleaning schedule based on preventing or reducing pollutant runoff. The procedure include a process for updating/revising the priority level for a catch basin giving consideration to inspection findings and citizen complaints. *A recommended timeframe for updating/revising the procedure is 30 days following the construction of a catch basin or a change in priority level.*

Due to the fact that there are only 16 catch basins as shown on Table 3, instead of prioritizing, all catch basins will be inspected annually in the fall. Maintenance and/or cleaning will be done on inspection and completed within 30 to 60 days.

72. Provide the geographic location of the catch basins priority level using either a narrative description or map.

> Maps attached.

73. Provide the procedure for inspecting, cleaning, and maintaining catch basins to ensure proper performance. Proper cleaning methods include ensuring accumulated pollutants are not discharged during cleaning and are removed prior to discharging to surface waters of the state. *A compliance assistance document titled Catch Basin Cleaning Activities Guidance Document is available at* http://www.michigan.gov/documents/deq/wb-stormwater-CatchBasinGuidance_216198_7.pdf.

> All Township owned catch basins will be inspected annually in the fall. The inspections will be contracted through a qualified service provider. Based on the findings of that inspection, maintenance may be required. If a catch basin should have a depth of waste more than 40%, it will need to be cleaned. If structure failure is present, other forms of maintenance may be ordered. All catch basins will have the same priority. The annual report will show any additions or subtractions to the inventory.

74. Provide the procedure for dewatering and disposal of materials extracted from catch basins.
A compliance assistance document title Catch Basin Cleaning Activities Guidance Document is available at
http://www.michigan.gov/documents/deq/wb-stormwater-CatchBasinGuidance_216198_7.pdf.

> Same as answer to Question 73.

75. Provide the procedure for inspection and maintaining the structural storm water controls identified in Question 60, excluding the structural storm water controls included in an SOP as part of Question 65 and catch basins. The procedure shall include a description and a schedule for inspecting and maintaining each structural storm water control and the process for disposing of maintenance waste materials. **The procedure shall require that control be maintained to reduce to the maximum extent practicable the contribution of pollutants to storm water.** The procedure shall include a process for updating revising the procedure to ensure a maintenance and inspection program for each structural storm water control. *A recommended timeframe for updating/revising the procedure is 30 days following the implementation of a new structural storm water control.*

> The detention basin vegetative swales will be inspected annually and cleaned out and/or maintained as needed. Any material removed during cleaning or maintenance will be

disposed of at an appropriate landfill. This procedure will apply to all existing and future structural stormwater controls.

76. Provide the procedure requiring new applicant-owned or operated facilities or new structural stormwater controls for water **quantity** be designed and implemented in accordance with the post-construction stormwater runoff control performance standards and long-term operation and maintenance requirements.

The Ordinance/ regulatory mechanism in (questions 32-33) in regards to stormwater controls for water quantity also apply to property owned by the municipality being acquired and operated, developed or redeveloped.
See Attachment 6, Procedure for Post Construction Stormwater, Page 1

77. Provide the procedure with the assessment of the applicant's operation and maintenance activities for the potential to discharge pollutants to surface waters of the state. The assessment shall identify all pollutants that could be discharged from each applicable operation and maintenance activity and the BMPs being implemented or to be implemented to prevent or reduce pollutant runoff. The procedure shall include a process for updating and revising the assessment. *A suggested timeframe for updating/revising the assessment is 30 days following adding/removing BMPs to address new and existing operation and maintenance activities.*

At a minimum, the procedure shall include assessing the following municipal operation and maintenance activities if applicable:
- Road, parking lot, and sidewalk maintenance (e.g., pothole, sidewalk, and curb and gutter repair)
- Bridge maintenance
- Right-of-way maintenance
- Unpaved road maintenance
- Cold weather operations (e.g., plowing, sanding, application of deicing agents, and snow pile disposal)
- Vehicle washing and maintenance of applicant-owned vehicles (e.g., police, fire, school bus, public works)

Vienna Township has been following the Pollution Prevention/Good Housekeeping for Municipal Operations: Manual of Best Management Practices since early 2010 (Genesee County Good Housekeeping Manual). The Manual identifies pollutants associated with most of the municipal maintenance activities and identifies appropriate BMP's to use to mitigate impacts. The three activities not currently covered in The Genesee County Good Housekeeping Manual are cold weather operations, unpaved road maintenance and water and sewer maintenance. Cold weather operations and unpaved roads are covered in the Supplemental to the Genesee County Good Housekeeping Manual. Water and Sewer Utility Maintenance has been added to the end of the Supplemental. Both the manual and the Supplemental are included in **Attachment 7**.

Process for updated and revising assessment:

> An annual update of the assessment of operation activities is the most efficient way to program. This will correspond with the annual report.

78. Provide the procedure for prioritizing applicant-owned or operated streets, parking lots, and other impervious infrastructure for street sweeping based on the potential to discharge pollutants to surface waters of the state. The procedure shall include assigning a priority level for each parking lot and street and the associated cleaning schedule (i.e., sweeping frequency and timing) based on preventing or reducing pollutant runoff. The procedure shall include a process for updating/revising the priority level giving consideration to street sweeping findings and citizen complaints. *A recommended timeframe for updating/revising the prioritization is 20 days following the construction of a new street. Parking lot, or other applicant-owned or operated impervious surface or within 30 days of identifying a need to revise a priority level.*

> Vienna Twp. is not responsible for cleaning streets, MDOT & the Genesee County Road Commission are. While the Twp. does own parking lots, we do no street sweep them. All cleaning is done by hand and debris is bagged and put tin trash on an as needed basis. Lawn and leaf material is done in the same manner as our trash pickup includes yard waste pickup.

79. Provide the geographic location of the streets, parking lots, and other impervious surfaces in each priority level using either a narrative description or map.

> The following addresses makeup the location of the parking lots in question 78:
> 3400 W Vienna, 3370 W Vienna, 3291 W Vienna, 2080 W Vienna, 2136 W Vienna
> All addresses are Clio, MI 48420

80. Provide the procedure identifying the sweeping methods based on the applicant's sweeping equipment and use of additional resources in sweeping seasonal leaves or pick-up of other materials. *Proper sweeping methods include operating sweeping equipment according to the manufacturers'*

> While Vienna Twp. Does not street sweep, all equipment used during cleanup of parking lots (brooms, vacs, etc.) are used according to manufacturer's operating instructions and in accordance with the Genesee County Good Housekeeping/Pollution Prevention guidelines.

operating instructions and to protect water quality.

81. Provide the procedure for dewatering and disposal of street sweeper waste material. *A compliance assistance document titled Catch Basin Cleaning Activities Guidance Document is available at http://www.michigan.gov/documents/deq/wb-stormwater-CatchBasinGuidance_216198_7.pdf.*

> Not applicable. Vienna Township does not do street sweeping.
> All hand sweeping is bagged and put in trash as stated in #78.

82. Provide the procedure requiring the applicant's pesticide applicator to be certified by the State of Michigan as an applicator in the applicable category, to prevent or reduce pollutant runoff from the vegetated land. A description of the categories is located at http://www.michigan.gov/mdard/0,4610,7-125-1569_16988_35289-11992--,00.html

Vienna Township only hires pesticide applicators that are certified by the State of Michigan. The contractor is required to provide evidence of said certification the Township.

83. Provide the procedure requiring contractors hired by the applicant to perform municipal operation and maintenance activities comply with all pollution prevention and good housekeeping BMPs as appropriate. The procedure shall include the process implemented for providing oversight of contractor activities to ensure compliance.

The Pollution Prevention Good Housekeeping Manual will be incorporated by reference into all maintenance contracts. Contractors will be required to provide employee training at least once during the permit cycle. Oversight will be provided by the Township staff who are trained in good housekeeping practices and familiar with the contract and will see that the contract and practices are adhered to.

84. Provide the employee training program to train employees involved in implementing the pollution prevention and good housekeeping program. The program shall include the training schedule. At a minimum, existing staff shall be trained once during the permit cycle and new hires within the first of their hire date.

Program: Good housekeeping training. Manual is in Attachment 7.
Training covers:
- Good Housekeeping Practices
- Contracts
- Inspection & Maintenance of Infrastructure.

GCDC-SWM is in the process of being able to provide training on a CD or via the internet to facilitate in house training.
Also, those Departments or Nested Jurisdictions that have a SWPPP, have one or more staff that has attended the industrial training and certification put on by the MDEQ.
Any employee working outdoors will be given training every 2 years, all other employees will take training every 3 years. All employees will receive training at least once per permit cycle and within the first year of hire. Training shall take place in late March/Early April in order to coincide wih the changing of seasons.

Goals for this program are as follows:
100% of employees trained in good housekeeping practices. Training will be tracked and logged.
100% of Illicit Discharges and spills addressed and corrected. Discharges and spills will be tracked, logged and classified.
100% of Township owned catch basin inspections performed & maintenance completed as necessary on an annual basis. Inspections logged along with any maintenance activity needed.
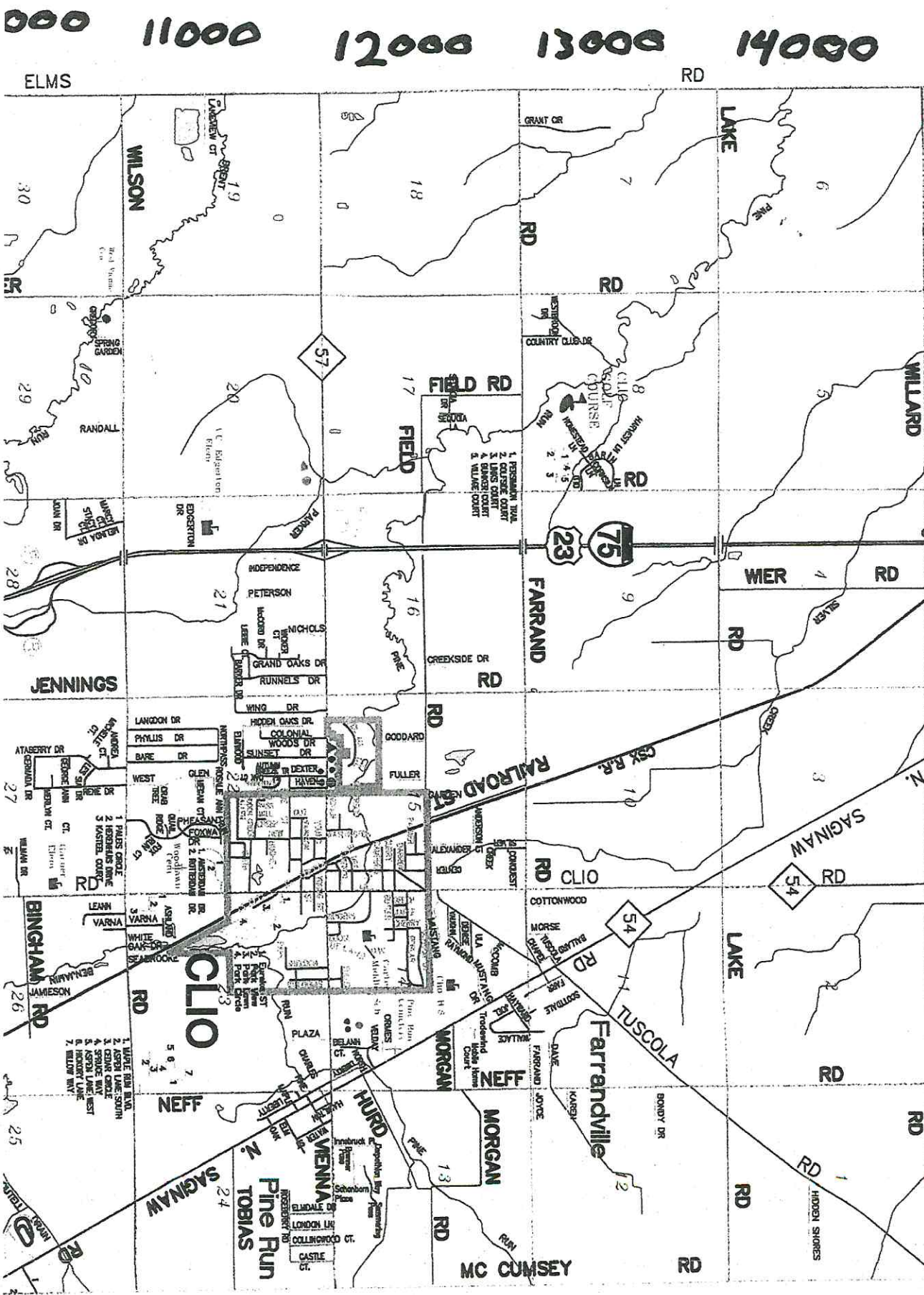100% of pesticide applications done to Township owned properties shall have amounts of all pesticides logged by the professional doing the application. This information will be kept on file.

CHARTER TOWNSHIP OF VIENNA STREET MAP

6000
5000
4000   T9N-R6E
3000
2000
1000

ELMS   RD

WILSON

GRANT DR

LAKE

PINE

RD

MAPLE RD

57

FIELD RD

FIELD

CLIO GOLF COURSE

MILLARD

S. BEYERS RD

RANDALL

EDGERTON DR

INDEPENDENCE
PETERSON

1. PERSIMMON TRAIL
2. COURSE COURT
3. LINKS COURT
4. BUNKER COURT
5. VILLAGE COURT

75
23

WIER   RD

SILVER

JENNINGS

NICHOLS
GRAND OAKS DR
RUNNELS DR
WING   DR

CREEKSIDE DR

FARRAND   RD

PINE

RD

SAGINAW

GERA RD

LANGDON DR
PHYLIS DR
BARE   DR
WEST

HIDDEN OAKS DR
COLONIAL
WOODS DR
SUNSET   DR

GODDARD

FULLER

RAILROAD ST

CSX R.R.

54

RD

54

CLIO

COTTONWOOD

BINGHAM RD

LEANN
VARNA
WHITE OAKS DR
SEABROOKE

CLIO

RD

MORSE

LAKE

TUSCOLA

NEFF

RD

S. BLOCK RD

JAMIESON

PLAZA
BELANN CT.

NEFF
MORGAN

Farrandville

RD

HURD

MORGAN

BONDY DR

CLIO

NEFF

N. SAGINAW

VIENNA
Pine Run
TOBIAS

INNSBRUCK PL
ELMDALE DR
LONDON LN
COLLINGWOOD CT
CASTLE CT.

RD

RD

HIDDEN SHORES

MC CUMSEY   RD

REESE RD

© Fire St
▲ Vienna Townshi

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Michigan Department of Environmental Quality – Water Resources Division

STORMWATER DISCHARGE PERMIT APPLICATION

Table 3: Inventory of Applicant Owned or Operated Facilities and storm water structural controls with a discharge of Stormwater to surface waters of the state.

Applicant Owned/ Operated Facility	Address or Parcel ID of Facility	Potential to discharge pollutants to surface waters of the state.	Catch basins	Detention basins	Oil/water separators	Pump Stations	Secondary containment	Constructed wetlands	Infiltration basins and	Porous pavement	Rain gardens	Underground storage vaults or tanks	Vegetated swales	Other structural storm water controls – Provide a description
Administration Buildings	3400 W. Vienna Rd., Clio, MI 48420	Low	4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0	0	n/a	n/a
Equipment storage and maintenance facilities	3370 W. Vienna Rd., Clio, MI 48420	Low	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Cemeteries	5459 W. Wilson Rd., Clio, MI 48420	Low	2	0	0	0	0	n/a	0	0	0	0	0	0
Parks	19-20-200-007	Low	0	0	0	0	0	0	0	0	0	0	1	0
Vacant land and open space	3313 W. Vienna Rd., Clio, MI 48420	Low	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Fire Stations	3291 W. Vienna Rd., Clio, MI 48420	Low	4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Libraries	2080 W. Vienna Rd., Clio, MI 48420	Low	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Other facilities – Provide a description below:	Senior Center 2136 W. Vienna Rd., Clio, MI 48420	Low	4	2	0	0	0	0	0	0	0	0	0	0

If you have any other facilities not listed above enter here

Other Facility: Senior Center   Address / PID 2136 W. Vienna Rd., Clio, MI 48420

Narrative of storm water controls on other facility.

Delete Rows that are not Applicable. Add address/ PID, Potential Discharges are Low, medium or High, see Attachment 7 for facility assessment and priority guide, place the number of storm water controls in each box. (Example: your administration bldg has 3 catch basins you would put [3] in the appropriate box) you can put N/A or 0 for those storm water controls that you do not have on those facilities.

POLLUTION PREVENTION/GOOD HOUSEKEEPING
FOR MUNICIPAL OPERATIONS:
MANUAL
OF
BEST MANAGEMENT PRACTICES

Genesee County Drain Commissioner
Surface Water Management

November 2010

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**POLLUTION PREVENTION/GOOD HOUSEKEEPING
FOR MUNICIPAL OPERATIONS:
A GUIDANCE DOCUMENT OF BEST MANAGEMENT PRACTICES**

Introduction

This Manual of Pollution Prevention/Good Housekeeping Best Management Practices is intended to minimize the effects that municipal operations have on stormwater (see Table 1 and 2). The information contained in the manual is intended as guidance material for implementing measures to comply with a Stormwater Phase II Municipal Separate Storm Sewer System (MS4) Permit and is not designed to be comprehensive in all aspects of each topic. Municipalities should be "flexible" in their use of this information as pertains to their own unique municipal operations.

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Glossary of Terms

Biochemical oxygen demand – Depletion of dissolved oxygen in water caused by decomposition of biologic matter or chemical oxidation.

Catch Basin – A unit that is installed to capture and retain debris, particulate matter, or other solid materials, but allows stormwater to "flow through" to its discharge location

Drip Irrigation –irrigation via a perforated device (i.e. hose) that allows for a slow watering method with reduced evaporation and runoff losses

Hydraulic – Referring to water

(IPM) Integrated Pesticide Management – An environmentally sensitive approach to pest management (**not** elimination) that uses the least toxic control method – a sustainable approach to managing pests by combining biological, cultural, physical, and chemical tools.

Loading – Term used in conjunction with *sediment* and *hydraulic* to describe excessive amounts (of the term that is described)

Naturescaping – An alternative landscaping technique that incorporates native plants and creates beneficial wildlife habitat – also conserves water and energy, reduces soil/water pollution.

Oil/Water Separator – A unit that is installed "in line" to a wastewater discharge pipe which is devised to capture petroleum derived materials that float on water

Pesticides – Products that are toxic and are used to kill pests - can be classified as insecticides, rodenticides, biocides, aquacides.

POTW – Publicly Owned Treatment Works -- a municipal wastewater treatment plant

Scupper – an opening (in a bridge deck) to allow water drainage – it does not capture debris, particulate matter, or other solid materials

Sediments - Small particles of matter that settle to the bottom of a body of water

Silt – Material consisting of mineral soil particles ranging in diameter from 0.02 millimeters to 0.002 millimeters

Stormwater -rainwater runoff or snow melt waters – these waters can interact with different types of materials, transporting contaminants to surface waters (i.e. streams, creeks, rivers)

Toxicity –The relative degree of being poisonous

Xeriscaping – An alternative landscaping technique that conserves water and protects the environment through planting native vegetation.

Zero input, low input (lawns) - minimal need for care (i.e. addition of fertilizers/pesticides, water)

1.0   Pollution Prevention through BMPs

What are BMPs?

BMPs are the practices, procedures, policies, prohibitions, schedules of activities, structures or devices that are implemented to prevent or minimize pollutants coming in contact with precipitation, storm water runoff, or non-storm water flows. Table 1 illustrates the pollutants associated with Municipal *facilities* while Table 2 presents the pollutants associated with municipal *activities*. BMPs are also structures or devices that remove pollutants from storm water runoff before the runoff enters a storm water drainage system or surface water. Therefore, BMPs are often categorized as either "source control" BMPs or "treatment control" BMPs.

Source control BMPs include all types of measures designed to prevent pollution at the source, that is, to keep storm water from contacting pollutants in the first place. Source control BMPs are generally simple, low-maintenance, cost-effective and are broadly applicable. They may be categorized as either non-structural or structural. Good housekeeping is an example of a non-structural source control BMP; a canopy is an example of a structural source control BMP. Preventative maintenance may be required for both non-structural and treatment controls.

Treatment control BMPs are methods of treating storm water runoff to remove pollutants and are frequently more costly to design, install, and operate than source control BMPs. More importantly, treatment control BMPs are typically not as effective as source control BMPs, and the effectiveness is highly dependent on regular maintenance. Nevertheless, they can be appropriate and effective under certain conditions. However, treatment controls typically do not remove all pollutants from storm water runoff and should not be regarded as disposal systems.

The Manual is divided into two sections: 1) Good Housekeeping and 2) preventative maintenance of Treatment Controls.

1.2 Pollutants Associated with Municipal Facilities

Table 0-1: Potential pollutants likely associated with specific municipal facilities

Municipality Facility Activity	Sediment	Nutrients	Trash	Metals	Bacteria	Oil & Grease	Organics	Pesticides	Oxygen Demanding
Building and Grounds Maintenance and Repair	X	X	X	X	X	X	X	X	X
Parking/Storage Area Maintenance	X	X	X	X	X	X	X		X
Waste Handling and Disposal	X	X	X	X	X	X	X	X	X
Vehicle and Equipment Fueling			X	X		X	X		
Vehicle and Equipment Maintenance and Repair				X		X	X		
Vehicle and Equipment Washing and Steam Cleaning	X	X	X	X		X	X		
Outdoor Loading and Unloading of Materials	X	X	X	X		X	X	X	X
Outdoor Container Storage of Liquids		X		X		X	X	X	X
Outdoor Storage of Raw Materials	X	X	X			X	X	X	X
Outdoor Process Equipment	X		X	X		X	X		
Overwater Activities			X	X	X	X	X	X	X
Landscape Maintenance	X	X	X		X			X	X

Table 0-2: Potential pollutants likely associated with municipal activities

Municipal Program	Activities	Sediment	Nutrients	Trash	Metals	Bacteria	Oil & Grease	Organics	Pesticides	Oxygen Demanding
Roads, Streets, and Highways Operation and Maintenance	Sweeping and Cleaning	X		X	X		X			X
	Street Repair, Maintenance, and Striping/Painting	X		X	X		X	X		
	Bridge and Structure Maintenance	X		X	X		X	X		
Plaza, Sidewalk, and Parking Lot Maintenance and Cleaning	Surface Cleaning	X	X			X	X			X
	Graffiti Cleaning	X	X		X			X		
	Sidewalk Repair	X			X					
	Controlling Litter	X		X			X	X		X
Fountains, Pools, Lakes, & Lagoons Maintenance	Fountain and Pool Draining		X					X		
	Lake and Lagoon Maintenance	X	X	X		X			X	X
Landscape Maintenance	Mowing/Trimming/Planting	X	X	X		X			X	X
	Fertilizer & Pesticide Management	X	X						X	
	Managing Landscape Wastes			X					X	X
	Erosion Control	X	X							
Drainage System Operation and Maintenance	Inspection/and Cleaning of Stormwater Conveyance Structures	X	X	X		X		X		X
	Controlling Illicit Connections and Discharges	X	X	X	X	X	X	X	X	X
	Controlling Illegal Dumping	X	X	X	X	X	X	X	X	X
	Maintenance of Inlet and Outlet Structures	X		X	X		X			X
Waste Handling and Disposal	Solid Waste Collection		X	X	X	X	X	X		X
	Waste Reduction and Recycling			X	X					X
	Household Hazardous Waste Collection			X	X		X	X	X	
	Controlling Litter			X	X	X		X		X
	Controlling Illegal Dumping	X		X			X	X	X	X
Water and Sewer Utility Operation and Maintenance	Water Line Maintenance	X					X	X		
	Sanitary Sewer Maintenance	X					X	X		X
	Spill/Leak/Overflow Control, Response, and Containment	X	X			X		X		X

Source: California Stormwater BMP Handbook (http://www.cabmphandbooks.com/)

2.0 Good Housekeeping

Good housekeeping practices include activities that are intended to maintain a clean site and keep equipment in good working order to prevent storm water quality problems from occurring. Daily cleanup and inspections are the most effective means of achieving good housekeeping. For the most part, good housekeeping is a day-to-day activity that does not require a large expenditure of time or expense, and should be implemented on an ongoing basis. Examples of good housekeeping practices are:

- Tools and materials should be returned to designated storage areas after use;

- Waste materials should be collected and properly disposed after the completion of each job, shift, or day as appropriate;

- Indoor work areas should be neat, uncluttered, and well-ventilated to discourage outdoor work and to allow leaks and spills to be quickly detected and controlled;

- Outdoor work areas should be swept regularly (not hosed) and kept neat and clean;

- Occasionally outdoor work areas may need cleaning beyond sweeping. In such cases, all wash waters should be contained, collected, and properly disposed; and

- Outdoor waste or trash receptacles should be covered and emptied regularly and the adjacent areas inspected for misplaced or wind-blown litter.

Preventive Maintenance

Preventive Maintenance BMPs include regular inspections and maintenance intended to minimize storm water pollution by performing maintenance activities before problems arise. The NPDES Storm Water permit stipulates that municipalities must implement maintenance schedules for municipal sites and practices aimed at reducing the introduction of pollutants to waterways. Therefore, in addition to your good housekeeping practices it is necessary to periodically inspect the facilities and sites themselves. For example, an annual inspection of maintenance sheds for potential sources of pollutants is warranted as is inspection of municipal properties (e.g. city parks) to determine if BMPs are being kept up on site.

2.1 Landscaping and Lawn Care

1. ### Identify Impacts to/on Stormwater/Receiving Waters (Surface Waters)
   - Nutrient loading (nitrogen and phosphorous) from fertilizer runoff can cause excessive aquatic plant growth

2. ### Problem Evaluation: Assess Impact on Receiving Waters, Prioritize
   - Biochemical Oxygen Demand

3. ### Identify (and choose appropriate) Solutions (BMP's)
   - Purchase only enough lawn care products necessary for one year – store properly to avoid waste generation (spills, leaks)
   - Use slow release or naturally derived (organic) fertilizers
   - Train employees in the proper application of lawn care products
   - Develop zero input/low input lawns
   - Consider alternative landscape techniques (i.e. naturescaping, xeriscaping)
   - Plant trees away from sewer lines or other underground utilities
   - Use drip irrigation techniques for landscaping

4. ### Inspection Procedures
   - Routinely monitor lawns to identify problems during their early stages
   - Identify nutrient/water needs of plants, inspect for problems by testing soils

5. ### Maintenance Procedures
   - Minimize/eliminate fertilizer application. Either conduct soil tests to justify the use of Phosphorous fertilizer of use no-Phosphorous fertilizer.
   - Leave grass clippings on lawn, or mulch clippings into lawn
   - Limit watering as necessary to supplement rainwater (1 inch/week is adequate)
   - Mow with sharpened blades set high (3 inches) – remove only the top 1/3 of the leaves
   - Water plants in the early A.M.

6. ### Advisory
   - Refer to Landscaping for Water Quality, and other resources at DEQ's NPS webpage: www.michigan.gov/deqnonpointsourcepollution, choose Information and Education.
   - If contracting lawn care services, request the "Healthy Lawn Care Program for Watershed Protection", currently endorsed by the Michigan Green Industry Association (www.landscape.org).

2.2 Spill Response and Prevention

For spills, the old saying, "an ounce of prevention is worth a pound of cure" is appropriate. Spill clean-up can be labor-intensive and costly involving expenses to contain the spill, collecting the spilled substance, proper disposal of spill materials, and report filing to regulatory agencies, not to mention possible monetary fines. Spills and leaks are some of the most significant sources of water pollution and are, in most cases, avoidable.

Spill prevention and control procedures include:

- Placing bollards, berms and containment features around structures or areas where fluids are stored, so releases can be prevented, easily detected, and controlled;
- Using drip pans for maintenance operations involving fluids and under leaking vehicles and equipment waiting repair;
- Placing spill kits in areas where fluids are stored or in areas where activities may result in a spill;
- Providing training for proper use of materials and equipment used during operations and maintenance activities;
- Providing training for proper use of spill response equipment and supplies; and
- Conducting outdoor maintenance activities on paved surfaces to allow for easy detection, control, and cleanup of spills.

Spill prevention, control, and cleanup applies to all materials and wastes—not only hazardous substances. The toxic water quality effects from spills of hazardous substances (e.g., acids, oils, greases, fuels, solvents, pesticides) are commonly understood. However, non-hazardous materials—for example, sand, litter, corn oil, sweeteners, soaps, and milk, among others—can also greatly impact water quality.

Identify Materials That Impact Stormwater/Receiving Waters (Surface Waters)

- Liquids associated with vehicle/equipment maintenance products (oils, fuels, antifreeze, etc.)
- Rock salt
- Chemicals (fertilizers, pesticides)

2. Problem Evaluation: Assess Impact on Receiving Waters, Prioritize

- Toxicity
- Biochemical oxygen demand

3. Identify (and choose appropriate) Solutions (BMP's)

- Keep all materials properly stored in closed, labeled containment systems
- Use secondary containment systems where appropriate
- Obtain spill recovery materials for immediate response to a spill

4. Inspection Procedures

- Inspect secondary containment systems, oil/water separators periodically
- Inspect containers for leaks, areas near storm receiver inlets and outlets, floor drains for indications of spills

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5. **Maintenance Procedures**
   - Pump out oil water separators as needed
   - Protect drains with oil absorbent materials
   - Clean out receivers on regular schedule
   - Remove spilled salt from salt loading area

6. **Advisory**
   - Report petroleum spills to 911
   - If the problems are related to sanitary please contact the Genesee County Health Department at (810) 257-3612.
   - MDNRE's Pollution Emergency Alerting System Information (PEAS) hotline 1-800-292-4706. The PEAS hotline should be used to report environmental pollution emergencies such as tanker accidents, pipeline breaks, and releases of reportable quantities of hazardous substances as required.

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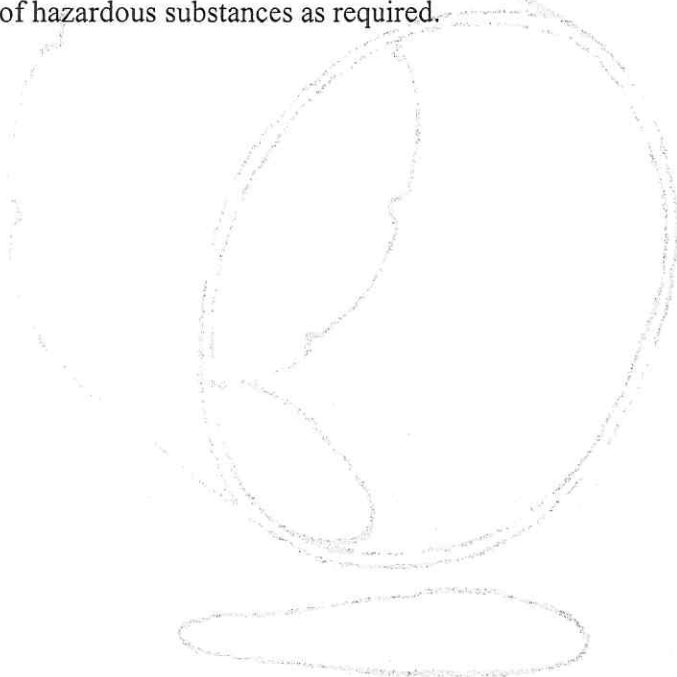
2.3   Pest Control

1.   **Identify Impacts to/on Stormwater/Receiving Waters (Surface Waters)**
   - Runoff of pesticides may harm aquatic life, may contaminate water/sediment

2.   **Problem Evaluation: Assess Impact on Receiving Waters, Prioritize**
   - Toxicity to aquatic plants and animals

3.   **Identify (and choose appropriate) Solutions (BMP's)**
   - Purchase only enough pesticides necessary for one year – store properly to avoid waste generation (spills, leaks, product deterioration)
   - Minimize/eliminate pesticide application, use lowest toxicity pesticides
   - Do not apply pesticides immediately prior to or during rain events
   - Ensure that employees are properly trained and certified in pesticide application techniques and safety
   - Develop zero input, low input lawns
   - Eliminate food, water, and shelter for pests
   - Adopt integrated pest management (IPM) techniques
   - Adopt alternatives to pesticides options (use physical, mechanical, or biological controls)

4.   **Inspection Procedures**
   - Identify pests – are levels acceptable or must action be taken to control pests?
   - Inspect pesticide inventory – properly dispose of out-of-date pesticide materials

5.   **Maintenance Procedures**
   - Inspect pest traps (i.e. bait boxes) regularly – remove (and properly dispose of) dead pests
   - Block/eliminate access to buildings/structures for pests
   - Remove pests (insects) by hand

6.   **Advisory**
   - Refer to MSU's Integrated Pest Management site: IPM: www.ipm.msu.edu

2.4 Pet Waste Collection

1. **Identify Impacts To/On Stormwater/Receiving Waters (Surface Waters)**
   - Municipal animal shelters

2. **Problem Evaluation: Assess Impact on Receiving Waters, Prioritize**
   - Biochemical oxygen demand
   - Solids loading

3. **Identify (and choose appropriate) Solutions (BMP's)**
   - House all animals in an enclosed, roofed structure
   - ID/utilize "permitted" waste disposal facilities for animal wastes

4. **Inspection Procedures**
   - Inspect shelter regularly for necessary cleanup/removal of wastes

5. **Maintenance Procedures**
   - Remove spilled food, animal wastes on a regular basis

6. **Advisory**
   - None

2.5   Septic System Management

1. **Identify Impacts to/on Stormwater/Receiving Waters (Surface Waters)**
   - Ponding of improperly treated wastewaters (on the surface of a leach field or a sand filter system) can increase the biochemical oxygen demand of receiving waters.
   - Excessive amounts of disinfectant (i.e. chlorine) applied to a wastewater discharge from a sand filter system can cause toxicity to aquatic plants and animals

2. **Problem Evaluation: Assess Impact on Receiving Waters, Prioritize**
   - Biochemical oxygen demand

3. **Identify (and choose appropriate) Solutions (BMP's)**
   - Divert stormwater runoff (i.e. from roof drains) away from septic system
   - Divert groundwater (sump pump) discharges away from septic system
   - Locate swimming pools away from the septic system (at least 20' from the septic tank, at least 35' from the closest edge of the leach field or sand filter system)
   - Prevent problems caused by vegetation - growth of woody plants on the system
   - Prevent hydraulic loading - "Spread out" the use of devices which use large volumes of water across the entire day – clothes washing, dish washing, bathing, repair leaky fixtures
   - Minimize water usage by using flow restrictors on potable water distribution devices (i.e. shower heads, water faucets)

4. **Inspection Procedures**
   - Physical evidence of problems:
     o "back up" of wastewater in sewer lines
     o sewage odors
     o leach field/sand filter - wetness/ponding on surface
     o overflow of wastes from system components
     o heavy vegetation (woody plants) growth on system components

5. **Maintenance Procedures**
   - "Pump out" the septic tank as needed (recommended once/year)
   - Mow surface vegetation regularly
   - Prevent "heavy equipment" from driving on top of the system components

6. **Advisory**
   - Obtain site plan/site sketch of system, and retain for reference.

2.6 Vehicle/Equipment Maintenance

1. **Identify Impacts to/on Stormwater/Receiving Waters (Surface Waters)**
   - Trace amounts of metals/hydrocarbons are found in materials (e.g. fuels, antifreeze, batteries, motor oils, grease, parts cleaning solvents) that are typically used in maintenance operations

2. **Problem Evaluation: Assess Impact On Receiving Waters, Prioritize**
   - Toxicity
   - Biochemical oxygen demand

3. **Identify (and choose appropriate) Solutions (BMP's)**
   - Conduct maintenance work indoors – if work must be performed outside, guard against spillage of materials that could discharge to storm receivers
   - Seal floor drains that discharge directly to the environment, if possible
   - Initiate single purpose use of vehicle bays – dedicate one (or more) bays that have no (or sealed) floor drains for repairs/maintenance
   - Clean up spilled materials immediately, using "dry" methods
   - Install pretreatment systems (oil/water separators) where necessary in sewer lines to capture contaminants (oil, grit), and maintain as needed
   - Never leave vehicles unattended while refueling
   - Identify appropriate recycling/disposal options for wastes

4. **Inspection Procedures**
   - Inspect (for maintenance purposes) floor drain systems, oil/water separators
   - Monitor "parked" vehicles/equipment for leaks

5. **Maintenance Procedures**
   - Maintain a clean work area – remove contaminants from floors, drains, catch basins, using "dry" methods
   - Use non-hazardous cleaners. Use non chlorinated solvents instead of chlorinated solvents
   - Repair or replace any leaking containers
   - Use steam cleaning /pressure washing instead of solvent for parts cleaning
   - Store waste fluids in properly capped, labeled storage containers
   - Store batteries in leak-proof, compatible (i.e. non reactive) containers
   - Rinse grass from lawn care equipment on permeable (grassed) areas
   - Protect against pollution if outside maintenance is necessary (cover storm receivers, use secondary containment vessels, etc.)

6. **Advisory**
   - Report petroleum spills to 911

- MDNRE's Pollution Emergency Alerting System Information (PEAS) hotline 1-800-292-4706. The PEAS hotline should be used to report environmental pollution emergencies such as tanker accidents, pipeline breaks, and releases of reportable quantities of hazardous substances as required.

- See MDNRE for http://www.michigan.gov/deq/0,1607,7-135-3313_3682_3716-24366--,00.html (Pollution Prevention and Good Housekeeping Activities) and http://www.michigan.gov/documents/deq/wb-sw-FleetMaintenance_Guidance_304720_7.pdf additional information.

2.7 Vehicle/Equipment Washing

1. **Identify Impacts to/on Stormwater/Receiving Waters (Surface Waters)**
    - Nutrients (biodegradable soaps)
    - Metals
    - Hydrocarbons

2. **Problem Evaluation: Assess Impact On Receiving Waters, Prioritize**
    - Biochemical oxygen demand from nutrient sources
    - Toxicity
    - Hydraulic loading

3. **Identify (and choose appropriate) Solutions (BMP's)**
    - Initiate single purpose use of vehicle bays - dedicate only one bay for washing (with floor drain system)
    - Rinse with hoses that are equipped with automatic shutoff devices and spray nozzles
    - Steam clean (without soap) where wastes can be captured for proper disposal (i.e. oil/water separator)

4. **Inspection Procedures**
    - Inspect floor drain systems regularly - use only those that discharge to a sanitary sewer, identify the need for cleaning of catch basins, oil/water separators

5. **Maintenance Procedures**
    - Map storm drain locations accurately to avoid illegal discharges
    - Perform steam cleaning or pressure washing where wastes can be captured for proper disposal
    - Take precautions against excess use of/spillage of detergents

6. **Advisory**
    - Require all facilities to connect floor drain systems to sanitary sewers (if available)
    - See MDNRE for http://www.michigan.gov/deq/0,1607,7-135-3313_3682_3716-24366--,00.html and http://www.michigan.gov/documents/deq/wb-sw-FleetMaintenance_Guidance_304720_7.pdf additional information.

2.8 Roadway and Bridge Maintenance

1. **Identify Impacts to/on Stormwater/Receiving Waters (Surface Waters)**
    - Road salt components - sodium, calcium, and chlorides
    - Hydrocarbons
    - Particulates – such as dry paint or abrasive compounds
    - Debris

2. **Problem Evaluation: Assess Impact On Receiving Waters, Prioritize**
    - Particulate matter
    - Toxicity

3. **Identify (and choose appropriate) Solutions (BMP's)**
    - Incorporate preventive maintenance and planning for regular operations & maintenance activities
    - Pave in dry weather only.
    - Stage road operations and maintenance activity (patching, potholes) to reduce spillage. Cover catch basins and manholes during this activity.
    - Clean up fluid leaks or spills from paving equipment/materials immediately
    - Restrict the use of herbicides/pesticide application to roadside vegetation
    - Sweep and vacuum paved roads and shoulders to remove debris and particulate matter
    - Maintain roadside vegetation; select vegetation with a high tolerance to road salt
    - Control particulate wastes from bridge sandblasting operations
    - Use calcium magnesium acetate for deicing around bridges to minimize corrosion
    - Clean out bridge scuppers and catch basins regularly
    - Direct water from bridge scuppers to vegetated areas
    - Mechanically remove (i.e. sweep) debris from bridge deck and structure prior to washing

4. **Inspection Procedures**
    - Inspect paving, sweeping, vacuuming, and all other maintenance vehicles/equipment as appropriate
    - Inspect roads and bridges for implementation of applicable BMP's

5. **Maintenance Procedures**
    - Clean bridge scuppers routinely and keep free of debris
    - Direct runoff water from bridges to vegetated areas
    - Install catch basins in place of bridge scuppers
    - Use tarps, booms, and vacuums during painting or blasting activities (refer to reference information to control/capture particulate matter)
    - Repair leaking/defective containers or equipment on paving equipment

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6. Advisory

- See MDNRE for http://www.michigan.gov/deq/0,1607,7-135-3313_3682_3716-24366--,00.html (Pollution Prevention and Good Housekeeping Activities) and http://www.michigan.gov/documents/deq/wb-sw-FleetMaintenance_Guidance_304720_7.pdf additional information.
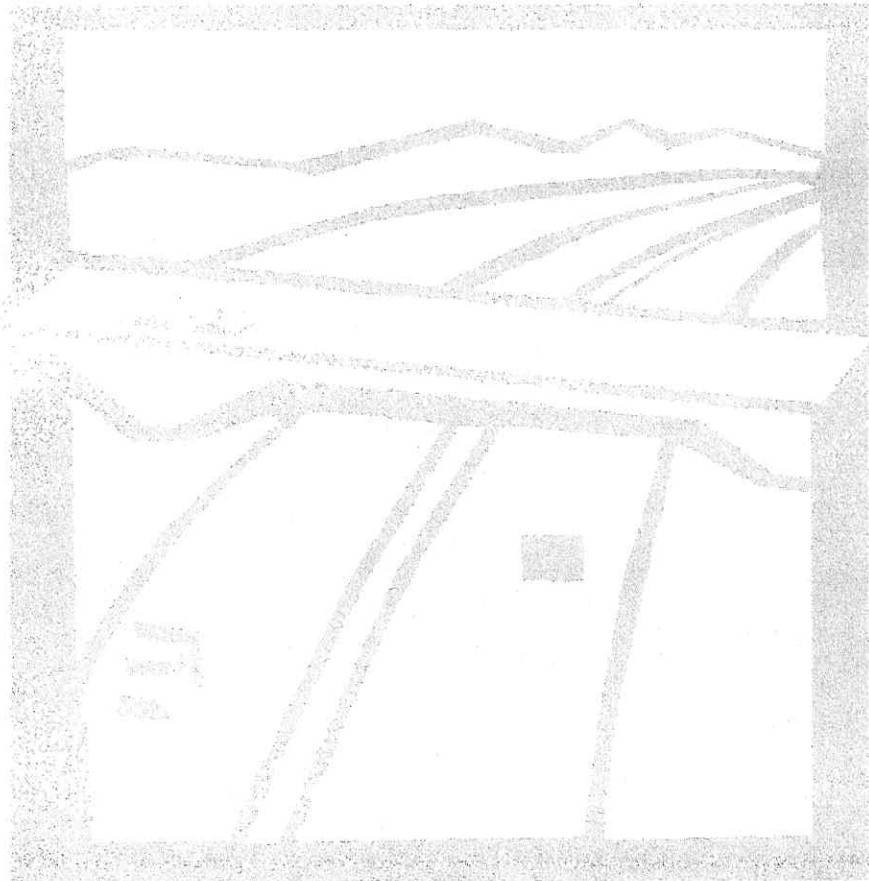
2.9   Hazardous and Waste Materials Management

1. **Identify Impacts to/on Stormwater/Receiving Waters (Surface Waters)**
   - Lube oils
   - Coatings and their compatible solvents (paints, thinners, etc.)
   - Anti freeze
   - Cleaning agents
   - Fuels (gas, diesel, kerosene)

2. **Problem Evaluation: Assess Impact on Receiving Waters, Prioritize**
   - Biochemical oxygen demand
   - Toxicity to aquatic plants and wildlife
   - Particulate loading

3. **Identify (and choose appropriate) Solutions (BMP's)**
   - Ensure that all materials are stored in closed, labeled containers – if stored outside, drums should be placed on pallets, away from storm receivers – inside storage areas should be located away from floor drains
   - Eliminate floor drain systems that discharge to storm drains, if possible
   - Use a pretreatment system to remove contaminants prior to discharge
   - Reduce stock of materials "on hand" – use "first in/first out" management technique
   - Use the least toxic material (i.e. non hazardous) to perform the work
   - Install/use secondary containment devices where appropriate
   - Eliminate wastes by reincorporating coating/solvent mixtures into the original coating material for reuse
   - Recycle materials if possible, or ensure proper disposal of wastes

4. **Inspection Procedures**
   - Physical on-site verification of sealed floor drains (or redirected to sanitary sewer)
   - Regular inspection of material storage areas (inside and outside)
   - Regular inspection and cleaning of oil/water separators by qualified contractor
   - Inspect stormwater discharge locations regularly (for contaminants, soil staining, plugged discharge lines)

5. **Maintenance Procedures**
   - Repair or replace any leaking/defective containers, and replace labels as necessary
   - Maintain caps and/or covers on containers
   - Maintain aisle space for inspection of products/wastes

6. **Advisory**
   - None

2.10 Operational By-products/Wastes

1. **Identify Impacts to/on Stormwater/Receiving Waters (Surface Waters)**
   - Potential for leaching of toxic and biologic contaminants to receiving waters

2. **Problem Evaluation: Assess Impact on Receiving Waters, Prioritize**
   - Toxicity
   - Biochemical oxygen demand

3. **Identify (and choose appropriate) Solutions (BMP's)**
   - Post "no dumping" signs
   - Illuminate area if possible
   - Prevent access – erect barriers
   - Identify the by products/wastes that should be recycled (i.e. paper, cardboard) or can be legally disposed of on municipal lands (i.e. deer carcasses).

4. **Inspection Procedures**
   - Regularly scheduled inspections - for maintenance concerns
   - Unscheduled patrolling of areas by police

5. **Maintenance Procedures**
   - Clean area
   - Clean up and dispose of "illegally dumped" materials, trash/debris in accordance with environmental regulations
   - Cut and remove vegetation

6. **Advisory**
   - See MDNRE for http://www.michigan.gov/deq/0,1607,7-135-3313_3682_3716-24366--,00.html (Pollution Prevention and Good Housekeeping Activities).

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2.11 Catch Basin and Storm Drain System Cleaning

1. **Identify Impacts to/on Stormwater/Receiving Waters (Surface Waters)**

   - **Catch basins** capture grit and debris, which, if not removed in a timely fashion, can discharge toxic and biological pollutants during rain and/or snow melt events
   - **Storm drainage** systems, while not designed for capture of solid materials, can perform in the same manner with similar results.
   - **Storm ditches**, if stripped of vegetation during cleaning, can result in silt deposition in receiving waters

2. **Problem Evaluation: Assess Impact on Receiving Waters, Prioritize**

   - Toxicity – heavy metals, organic compounds, etc.
   - Biochemical oxygen demand
   - Sediment loading

3. **Identify (and choose appropriate) Solutions (BMP's)**

   - Address:
     - storm drain receivers and (below grade) storm sewer systems
     - parking lot receivers
     - open ditches
     - catch basins and floor drain systems inside of buildings should be either:
       - sealed to prevent discharge
       - "permitted" by if required
       - discharged to sanitary sewers
   - Contaminated wastewaters should not be discharged to a catch basin/street receiver
   - Increase frequency of cleaning, as necessary
   - Repair/replace storm drain receiver and catch basin receiver grates as necessary

4. **Inspection Procedures**

   - Physical inspection – prioritize storm drain systems and catch basins – catch basins on steep grades may need more frequent cleaning
   - Clean catch basin when depth of deposits are >1/3 the depth from the bottom of the basin to the invert of the lowest pipe/opening into or out of basin – Institute temporary street parking bans to facilitate access to catch basins
   - Ditch inspections – ID problems while traveling to job site
   - Storm event inspection – identify pollution problems (i.e. sediments) to determine the need for additional protective measures
   - Post storm event inspection – ID problems (i.e. blockages)

5. **Maintenance Procedures**

   - Catch basins/storm sewer pipe – cleaning in spring to remove sand/grit/salt from winter road maintenance, cleaning in fall to remove leaves/silt/debris

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- Established ditch:
  - Maintain proper slope
  - Maintain vegetation by cutting (to capture sediment) – Do not allow vegetation to grow to a height that would impair sight lines of drivers of motor vehicles
  - Remove obstacles/ debris – (i.e. trash, tree branches, brush, cut vegetation)
  - Excavation/ditch scraping – if necessary, use devices (i.e. hay bales, silt fence) to capture sediment prior to stormwater discharge into receiving waters, reseed ditch
- New installation – capture particulate matter – install sediment basins/other devices in ditch
- Proper disposal of debris

6. Advisory

- For more information please see: http://www.michigan.gov/documents/deq/wb-stormwater-catchBasinGuidance_216198_7.pdf
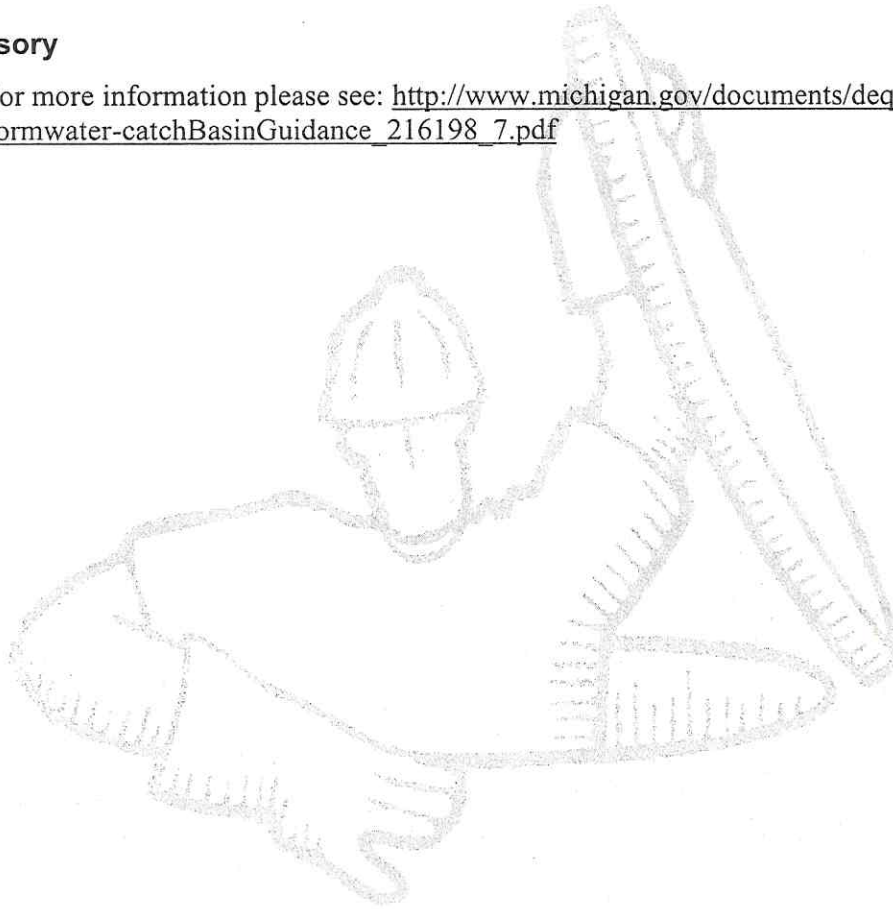
2.12 Street Cleaning and Maintenance

1.   Identify Impacts to/on Stormwater/Receiving Water (Surface Waters)

- Poorly maintained streets allow for a "build up" of trash, grit, and debris, from which sediment and toxic/biological pollutants can be "washed out" during rain and/or snow melt events.
- Street repair/paving processes use materials that can contaminate receiving waters if they interact with stormwater.

2.   Problem Evaluation: Assess Impact on Receiving Waters, Prioritize

- Particulate matter – can cause sediment loading
- Biochemical oxygen demand
- Toxicity to aquatic plants and wildlife

3.   Identify (and choose appropriate) Solutions (BMP's)

- Street sweeping/vacuuming - at regular intervals, and "as needed"
- Perform operations such as paving in dry weather only.
- Prior to road reconstruction, consider the use of "shouldered roads" instead of "curbed roads"
- Maintain roadside vegetation; select plants/trees that can withstand the action of road salt and direct runoff to these areas.

4.   Inspection Procedures

- Inspect streets, and plan (as needed) for maintenance/repairs
- Prioritize – some streets (i.e. those on flat grades/with many trees) may need more frequent cleaning

5.   Maintenance Procedures

- Spring sweeping/vacuuming – remove salt/sand residues
- Fall sweeping, collection of leaves at appropriate time intervals
- Dry sweep or vacuum streets during dry weather
- Initiate temporary street by street parking bans to allow access for cleaning
- Maintain equipment - check for/repair fluid leaks
- Stage road operations and maintenance activity (patching, potholes) to reduce spillage of materials. Cover catch basins and manholes during activity

6.   Advisory

- Also see: http://www.michigan.gov/deq/0,1607,7-135-3313_3682_3716-24366--,00.html (Total Suspended Solids Reductions for Roadways, Parking Lots, and Bridges (Draft)).

2.13 Road Salt Storage and Application

1. Identify Impacts to/on Stormwater/Receiving Waters (Surface Waters)

- In high concentrations it can have a harmful effect on plants and aquatic life.

2. Problem Evaluation: Assess Impact on Receiving Waters, Prioritize

- Toxicity

3. Identify (and choose appropriate) Solutions (BMP's)

- Require covered facility for salt storage (prevents lumping and run-off loss), and size properly for seasonal needs
- Store salt on highest ground elevation to mitigate contact with stormwater
- Calibrate salt spreaders as necessary
- Consider alternative deicing materials (i.e. calcium chloride, magnesium chloride)
- Use a wetting agent with salt to minimize "bouncing" during application
- Cover salt loading area, or build into storage shed
- Unload salt deliveries directly into storage facility, or move inside immediately

4. Inspection Procedures

- Look for physical evidence of problems:
  - inspect salt storage shed for leaks, other problems
  - inspect salt piles for proper coverage, tarps for leaks or tears
  - inspect salt application equipment
  - inspect salt regularly for lumping or water contamination
  - inspect surface areas for evidence of runoff – salt stains on ground near and
  - around salt shelters, loading areas, or downslopes - inspect for excessive amounts of salt

5. Maintenance Procedures

- Service trucks and calibrate spreaders regularly to ensure accurate, efficient distribution
- Educate and train operators on hazards of over-salting to roads and environment
- Repair salt storage shed (leaks)
- Repair/replace tarps

6. Advisory

- See MDNRE for http://www.michigan.gov/deq/0,1607,7-135-3313_3682_3716-24366--,00.html (Pollution Prevention and Good Housekeeping Activities).

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2.14 Road Kill/Composting Operations

1. **Identify Impacts to/on Stormwater/Receiving Waters (Surface Waters)**
   - Potential for leaching of biologic contaminants to receiving waters

2. **Problem Evaluation: Assess Impact on Receiving Waters, Prioritize**
   - Biochemical oxygen demand
   - Bateria

3. **Identify (and choose appropriate) Solutions (BMP's)**
   - Establish compost pile/windrow on a well drained, impervious surface that has minimal slope – segregate from other operations
   - Identify the proper types of materials that should be composted
   - Locate compost piles at least 200 ft. from receiving waters or wetlands
   - Prevent access by vermin/scavengers – erect barriers (i.e. snow fence) around pile

4. **Inspection Procedures**
   - Check for odors, temperature of compost, exposed carcasses
   - Keep records (use a daily log)

5. **Maintenance Procedures**
   - Monitor temperatures
   - Take samples, analyze for pathogens
   - Establish windrows
   - Prevent erosion
   - Recycle completely composted material

6. **Advisory**
   - None

2.15 Construction and Land Disturbance

1. **Identify Impacts to/on Stormwater/Receiving Waters (Surface Waters)**
   - Sediment runoff (i.e. silt, debris) can affect fish reproduction and habitat
   - Removal of shade trees from stream banks can increase water temperature which can result in reduced dissolved oxygen content in streams

2. **Problem Evaluation: Assess Impact on Receiving Waters, Prioritize**
   - Particulate matter – can cause sediment loading
   - Biochemical oxygen demand – increases with temperature, depletes oxygen

3. **Identify (and choose appropriate) Solutions (BMP's)**
   - Plan the construction and/or land clearing activities so that soil is not exposed for long periods of time
   - Minimize compaction of soils and impervious cover
   - Maximize opportunities for infiltration
   - Install sediment control devices before disturbing soil
   - Limit grading to small areas
   - Stabilize site to protect against sediment runoff
   - Protect against sediment flowing into storm drains
   - Maintain native vegetation (especially near waterways)
   - Install sediment barriers on slopes or divert stormwater

4. **Inspection Procedures**
   - Regularly scheduled inspections (of erosion safeguards)
   - Inspect during storm or snow melt events

5. **Maintenance Procedures**
   - Check/repair all devices that have been installed to ensure protection against erosion

6. **Advisory**
   - See MDNRE for http://www.michigan.gov/deq/0,1607,7-135-3313_3682_3716-24366--,00.html (Construction Storm Water Runoff Control (Draft).

2.16 Marina Operations

1. **Identify Impacts to/on Stormwater/Receiving Waters (Surface Waters)**
   - Liquids associated with boat maintenance products (oils, fuels, antifreeze, wood preservatives, etc.) and particulate matter (i.e. boat bottom paint from hull sanding) can contain toxics
   - Boat sewage can contain pathogenic bacteria that contribute increased biochemical oxygen demand to waterways
   - Barren soils can contribute to sedimentation

2. **Problem Evaluation: Assess Impact on Receiving Waters, Prioritize**
   - Biochemical oxygen demand
   - Toxicity
   - Sediment loading

3. **Identify (and choose appropriate) Solutions (BMP's)**
   - Construct and maintain pump out stations (for sanitary wastes)
   - Build and maintain fish cleaning stations
   - Stabilize shoreline
   - Designate locations for boat maintenance away from the water
   - Minimize impervious areas – install vegetated buffer strips (i.e. grass, shrubs)
   - Provide spill clean up kits at fueling stations, covered trash receptacles
   - Educate (posters, signage) boaters and other marina users of potential problems

4. **Inspection Procedures**
   - Identify areas of runoff that lack vegetation
   - Regularly inspect fueling stations (including tanks and piping), maintenance areas for spills, other potential sources of pollution
   - Regularly check (empty as necessary) fish cleaning stations, sewage pump out stations, trash cans

5. **Maintenance Procedures**
   - Empty trash cans and pump out stations as needed
   - Maintain vegetated areas between the water and work areas
   - Replace spill clean up kits as necessary

6. **Advisory**
   - Refer to: Shipshape Shores and Waters: A Handbook for Marina Operators and Recreational Boaters -http://www.epa.gov/owow/nps/marinashdbk2003.pdf

2.17 Calculating TSS Reductions

The simplest way to meet the 25% TSS reduction goal is to implement controls that are <u>expected</u> to provide that reduction. Most structural practices listed in the Center for Watershed Protection's National Pollutant Removal Performance Database perform better than 25% removal. The watershed general permit stipulates that permittees must reduce TSS from municipal sites to the maximum extent practicable.

Some permittees may not be able to implement BMPs at all sites, or use additional BMPs at some facilities. In this case, to show the reduction over the entire system, a simple calculation can be done. Calculations need to be understood in order to make the best decisions regarding BMPs to add, change, or upgrade so the TSS load reduction goal may be met. In addition, these calculations need to be reported to the Department.

> It should be noted that removal efficiencies assume the controls are being utilized according to design criteria, or product specifications, and are adequately maintained.

To calculate TSS load(s):

1. Determine the uncontrolled load -- with the following formula – for each facility. Annual precipitation can be found in the LID manual, Chp 3, pg 16) and Mean TSS values in the Table below.

> Gallons X MG X 3.785 L X 1 Pound

Example: First figure out the annual precipitation (runoff) in gallons from the facility's paved areas. If the Impervious area is 1,000,000 ft^2 and precipitation is 2.5 ft per year (calculate: area X precipitation X 7.48 gallons per ft 3) -- then total rainfall is <u>18,700,000 gallons/year.</u>

Plug the rest of the numbers into the formula above. Using 77 mg/l TSS from the table below, the result (in bold) is the uncontrolled load for this site.

18,700,000 g/y X 77mg/l X 3.785l/g X 1lb/453600mg = <u>**12,015 lbs/year**</u>

Mean TSS runoff values for several land uses.

Land Use Category	% Imperviousness	Mean TSS (mg/l)
Forest/Rural Open	2	51
Urban Open	11	51
Agricultural /Pasture	2	145
Low Density Residential	19	70
Medium Density Residential	38	70
High Density Residential	51	97
Commercial	56	77
Industrial	76	149
Highways	53	141
Water/Wetlands	51	6

Taken from "Rouge River Wet Weather Demonstration Project, Selection of Stormwater Pollutant Loading Factors", RPO-MOD-TM34.00, October 1994, Table 3-13. (Another way to convert mg/l to lbs/ft^3 is to multiply the mg/l by 6.243 X 10).

2. Add up the uncontrolled load for each site that discharges to the same waterbody. This is the TSS loading for that system.

3. Select BMPs for each site (that are already in place or that you are considering) and calculate the TSS load, after implementation, for each site based on the chosen BMPs. The following references are approved for use in calculating reduction efficiencies for TSS load reduction controls:

  - The National Pollutant Removal Performance Database, at:
    www.cwp.org/Resource_Library/Center_Docs/SW/NPRPD_ver3.mdb
    The technical memo is at:
    www.cwp.org/Resource_Library/Center_Docs/SW/bmpwriteup_092007_v3.pdf

  - The Environmental Protection Agency's database of BMPs at:
    http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm

  - The Environmental Protection Agency's Urban BMP effectiveness tool at:
    http://cfpub.epa.gov/npdes/stormwater/urbanbmp/bmpeffectiveness.cfm

4. Add up the new loads for each site that discharge to the same water body. This is the TSS load for that system after BMPs are implemented.

5. Divide the sum of the TSS loading from the system, after BMPs are applied, by the sum of the loading from the same system, before BMPs are applied.

6. 1- The result, times 100, is the percentage reduction.

$$1 - \frac{TSSLoad1 \times BMPefficiency1 + ... + TSSLoadN \times BMPefficiencyN}{TSSLoad1 + ... + TSSLoadN} \times 100 = \%TSS\ reduced$$

Some BMPs may not be listed or detailed in these references. Therefore, the Department agrees that permittees – or their consultants – may use other acceptable literature, or their own studies, provided they are scientifically defensible and submitted to the Department for review.

Example Community

Using 30 inches (2.5 feet) for the annual precipitation for this community, calculate the uncontrolled loading, assuming all listed sites are located in one watershed (one system). Remember, the formula is:

$$\underline{Gallons}\ \ X\ \ \underline{MG}\ \ X\ \ \underline{3.785\,L}\ \ X\ \ \underline{1\ Pound}$$

Facility	Load rate	Impervious Area	Precipitation/year	lbs of TSS/year
TWP Hall	77 mg/l	150,000 ft2	2,805,000 gallons	1,802 pounds
Police/Fire Station 1	77 mg/l	250,000 ft2	4,675,000 gallons	3,004 pounds
Storage Yard	149 mg/l	150,000 ft2	2,805,000 gallons	3,487 pounds
Athletic Park	51 mg/l	220,000 ft2	4,114,000 gallons	1,751 pounds
Uncontrolled TSS Annual Loading				**10,044 pounds**

Then calculate the reduction in TSS with current and/or proposed BMP implementation for each site. Add up the TSS from each site.

Facility	Load rate	BMP	Reduction	New rate	lbs TSS/year
TWP Hall	77 mg/l	Detention Pond	35% from the EPA BMP database [1]	50.05 mg/l	1,171 pounds
Police/Fire Station 1	77 mg/l	Sweeping/CB Cleaning	Annual pounds collected = 500	NA	2,504 pounds
Storage Yard	149 mg/l	None	none	149 mg/l	3,487 pounds
Athletic Park	51 mg/l	Vegetated Swale	60% from the EPA BMP database[1]	20.4 mg/l	700 pounds
Controlled TSS Annual Loading					**7862 pounds**

1. BMP must meet the specifications of that design and for the same purpose, criteria, management, etc. Percent reduction cannot be used from the database simply because it is the best number found.

Using the formula for percent TSS reduction plug in the numbers:

1 – (7,862/10,044) X 100 = 22% reduction with the BMPs listed

This will give you the percentage of TSS reduction for all municipal facilities.

2.18 Identifying Illicit Discharges

1. **Recognize Sources**
   - Dry Weather Flow (no rain event in the last 72 hours)
   - Staining
   - Smell – Sanitary, Surfactant, Other
   - Pipes to Catch Basin or Drain
   - Debris/Waste (e.g. foam, leaks)
   - Sediment

2. **Typical Examples**
   - Laundry Connections
   - Leaky Dumpsters
   - Car Washing
   - Equipment Washing
   - Construction Sites

For incident reporting, please use the Illicit Discharge Reporting Sheet.

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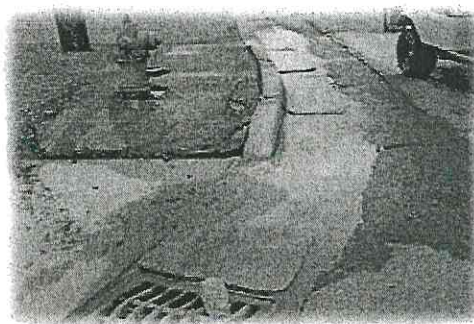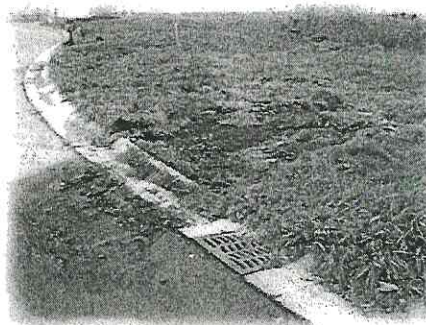
3.0 Preventive Maintenance of Treatment Controls

Preventive Maintenance BMPs include regular inspections and maintenance intended to optimize the pollutant removal efficiency of existing treatment controls. Treatment control that fail or function poorly may result in the discharge of pollutants to the storm water drainage system. Therefore, to reduce the likelihood of breakdown or failure, treatment controls should have a preventive maintenance schedule for inspection, repair, or replacement of forebays, vegetation, and revetments. Paved areas and landscaping should not be allowed to degrade to the point where they erode and contribute pollutants to runoff. Cracked pavement and berms, and any other enclosure or structural defects that may impact the quality of storm water runoff should be promptly repaired. Structural BMPs and storm drains within facility boundaries also need to be inspected and maintained regularly.

3.1   Catch Basins
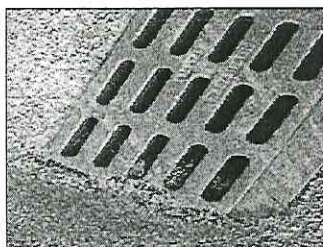
Structurally Sound

Grate/Cover Free of Debris

Sump Clean or Less than 50% Full

No Evidence of Illicit Discharge

GOOD
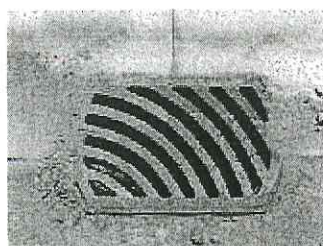
Structure Slightly Damaged

Some Debris On/Around Grate/Cover

Sump Near 50% Full of Sediment

No Evidence of Illicit Discharge

Minor Construction Runoff Entering Sump
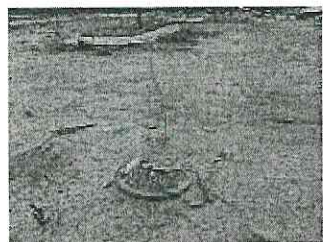
FAIR

Surrounding Structure Failing

Not Functioning, Evidence of Flooding

Sump More Than 50% Full

Evidence of Illicit Discharge

POOR

Table 3.2: Catch Basins: Typical Maintenance

Activity	Schedule
• Stabilize Erosion • Repair Broken or Failing Concrete/Asphalt Around Structure • Repair Earth Scouring Around Structure • Replace Broken or Cracked Covers • Report Illicit Discharge • Protect Inlet from Construction Runoff	As needed
• Vactor Sump • Remove Debris	Semi-annually / Annually

3.2 Culverts
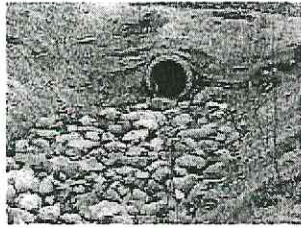
No Erosion

Minimal Debris Accumulation

No Sedimentation

Pipes Structurally Sound

Minimal Scour Pool/Channelization

GOOD

Slight Erosion

Debris or Trash Accumulation

Slight Sedimentation

Pipe Slightly Crushed or Separated

FAIR

Severe Erosion Around Pipe

Heavy Debris Accumulation

Heavy Sediment Buildup

Pipe Crushed, Settled or Separated

POOR

Table 3.2: Culverts: Typical Maintenance

Activity	Schedule
• Stabilize Erosion • Replace Crushed/Cracked Pipe • Fortify with Rip Rap • Re-grade Around Outfall and Replant as Needed	As needed
• Clean Up Trash and Debris • Remove Sediment	Semi-annually / Annually

3.3   Oil/Grit Separator
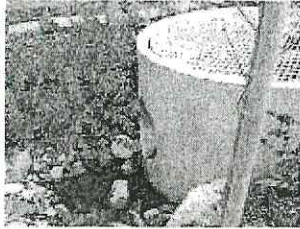
GOOD

Structurally Sound

Clean Outflow

No Trash or Debris Buildup

Unit Less Than 10% Full

FAIR

Structurally Sound

Clean Outflow

Minor Trash/Debris Buildup

Unit Less Than 30% Full

POOR

Structure Compromised

Outflow Carrying Debris or Solids

Excessive Trash/Debris Buildup

Unit More Than 50% Full

Table 3.3: Oil/Grit Separator: Typical Maintenance

Activity	Schedule
• Repair Structural Defects	As needed
• Pump Accumulated Oil • Vactor Grit/Sediment out of Chamber • Clean up Trash/Debris	Semi-annually / Annually

3.4   Stormwater Outfalls

GOOD

Structurally Sound

Pipe in Good Condition

No Sedimentation/Debris Buildup
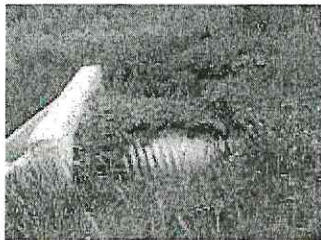
Minimal Erosion

FAIR

Minor Structural Problems

Pipe Damaged but Functional

Minimal Sedimentation/Debris Buildup

Minimal erosion

POOR

Structure Severely Compromised

Pipe Crushed or Separated, not Functional

Sediment Constricting More than 30% of Pipe

Heavy Erosion

Deep Scour Pool

Table 3.4: Stormwater Outfall: Typical Maintenance

Activity	Schedule
• Reinforce Structure with Rip Rap as Needed • Replace Crushed/Broken Pipes • Repair/Install Energy Dissipater as Needed • Report Suspected illicit Discharges	As needed
• Remove Excess Sediment • Clean Trash Rack, Remove Accumulated Debris	Annually

3.5 Porous Pavement
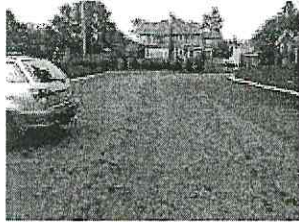
GOOD

Pavement Clean of Dirt/Organic Debris

No Surface Ponding

No Settling

No Excessive Grass/Moss Growth

FAIR

Minor Dirt/Debris Accumulation

No Surface Ponding

No Settling

Moderate Grass/Moss Growth
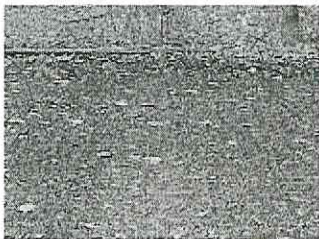
POOR

Excessive Dirt/Debris

Surface Ponding or Runoff

Pavement/Pavers Settling

Excessive Plant Growth

Table 3.5: Permeable Pavement: Typical Maintenance

Activity	Schedule
⚬ Do Not Power Wash ⚬ Remove Excessive Grass, Weeds or Moss around Pavers ⚬ Clean Up Oil and Grease ⚬ Replace Gravel Fill Between Pavers	As needed
⚬ Remove accumulated sediment and particulates from the permeable pavement void spaces with high efficiency vacuum sweepers	Annually

3.6   Detention Pond

GOOD

Inlets/Outlets clear of Debris and Trash

Minimal Sediment Buildup in Forebay

Minimal Scalping from Mowing

Surrounding Vegetation Healthy

Invasive/Non-Native Plants Absent

FAIR

Some Trash Present

Sediment Buildup in Forebay

Scalping/Improper Mowing

Dead/Dying Vegetation

Some Non-Native Plants Present
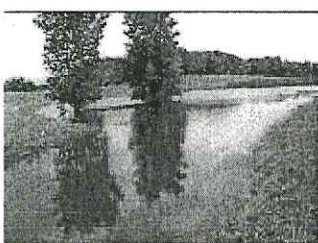
POOR

Excessive Trash Present

Forebay full of Sediment

Severe Bank Erosion

Inlets or Outlets Not Functional

Flooding

Table 3.6: Detention Pond: Typical Maintenance

Activity	Schedule
● Water plants as necessary during the first growing season ● Mow High, Avoid "Scalping" when Mowing ● Leave Un-Mowed Buffer Around Water	As needed
● Inspect pretreatment, inlet, and outlet for clogging ● Remove Trash ● Clean Inlet and Outlet Pipes and Trash Racks ● Check and Clear Draw-Down Pipes ● Remove Non-Native, Invasive Species ● Check for Rodent Damage (Muskrat, Beaver)	Semi-annually
● Inspect device for winter salting damage ● Check Weir Integrity ● Check Fence and Security Integrity	Annually

3.7 Infiltration Basin
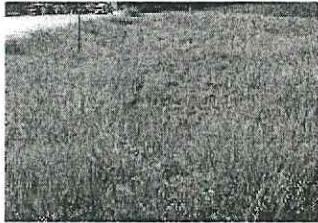
GOOD

Inlets Free From Debris

Vegetation Healthy, Covers Structure

No Scalping from Mowing

No Standing Water 1 Day After Rain

Small Amount of Trash or Debris
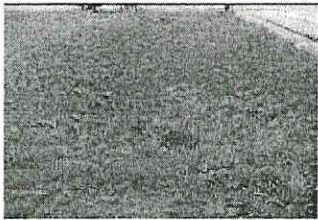
FAIR

Debris Around Inlet Pipe

Bare Spots in Vegetation Cover

Mowed Too Low (Scalping)

Limited Standing Water 1 Day After Rain

Small Amount of Erosion

Trash and Debris Present

POOR

Inlets Clogged with Debris

Vegetation Mostly Absent

Severe Scalping/Erosion

Evidence of Runoff or Excessive Ponding

Excessive Trash Present

Table 3.7: Infiltration Basin: Typical Maintenance

Activity	Schedule
• Mow at High Setting (Greater than 6 inches) • Inspect pretreatment area and trench and remove accumulated sediment and debris • Remove Trash • Check for Standing Water	As needed
• Remove Sediment from Inlet	Semi-annually
• Stabilize any eroded areas in pretreatment area • Check Inlet Integrity • Assess Plant Health and Abundance • Check Energy Dissipaters • Check for Channelization and Scouring	Annually

3.11 Constructed Wetland
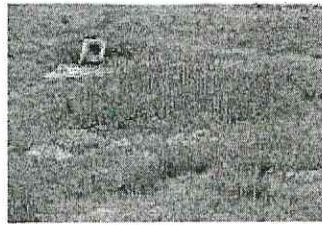
GOOD

Healthy Plant Life

Non-Native Plant Species Few or Absent

Minimal Litter or Trash

Inlet/Outlets Clean and free Flowing

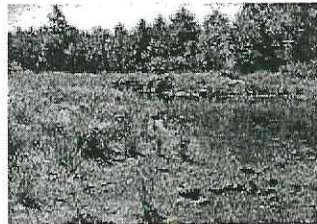Sediment in Forebay More Than one Foot

FAIR

Plants Unhealthy or Sparse

Some Non-Native, Invasive Plant Species

Litter or Trash Present

Inlets/Outlets Contain Sediment Buildup or Debris

Sediment in Forebay More Than one foot

POOR

Plants Dead or Missing

Excessive Non-Native, Invasive Plant Species

Excessive Litter or Trash

Inlets/Outlets Clogged or Not Functioning

Sediment in Forebay Less than One Foot From Water Surface

Table 3.11: Stormwater Wetland: Typical Maintenance

Activity	Schedule
• Remove and replace unsuccessful or diseased plants • Remove trash and debris • Inspect Security Fence/Gate and Repair as Necessary • Repair Erosion Damage • Mow Bank on High Setting	As needed
• Remove accumulated sediment and debris from the wetland and its control structures • Remove Debris/Sediment from Forebay	Annually

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