

## Michigan Municipal Separate Storm Sewer System (MS4) Permit Pollution Prevention and Good Housekeeping Activities

### Introduction

The National Pollutant Discharge Elimination System (NPDES), Municipal Separate Storm Sewer System (MS4) program requires permittees to implement best management practices (BMPs) for the minimum measures specified in the permit. One minimum measure is pollution prevention and good housekeeping activities for municipal operations, located in the Watershed General Permit, Part I.A.4.b.6), page 17, and the Jurisdictional General Permit, Part I.A.10., page 13.

Permittees are required to develop, implement, and ensure compliance with a program of operation and maintenance of BMPs, with the ultimate goal of preventing or reducing pollutant runoff to the maximum extent practicable from municipal operations that discharge storm water to surface waters of the state. Permittees are encouraged to use BMP guidance and training materials that are available from federal, state, local agencies, or other organizations.

Municipal operations cover a wide variety of activities and land uses that are potential sources of storm water pollutants. These include, but are not limited to:

- Roadways
- Parking lots
- Transportation and equipment garages
- Fueling areas
- Warehouses
- Stockpiles of salt and other raw materials
- Open ditches and storm sewers
- Turf and landscaping for all municipal properties, including parks
- Waste handling and disposal areas

### Discussion

In order to meet the Watershed General Permit Storm Water Pollution Prevention Initiative (SWPPI) or Jurisdictional General Permit Storm Water Management Program (SWMP) requirements for pollution prevention and good housekeeping activities, permittees are encouraged to utilize materials from federal, state, or local sources. This compliance assistance document is designed to help permittees locate many of these existing resources. The permit contains five topics that shall be addressed by the pollution prevention and good housekeeping components of the SWPPI or SWMP:

1. Employee/contractor training related to storm water management activities
2. Structural storm water control effectiveness
3. Roadways, parking lots and bridges, including total suspended solids reduction requirements and estimation
4. Fleet maintenance and storage yards
5. Managing vegetated properties



**Employee/Contractor Training Related to Storm Water Management Activities**

Staff and contractors associated with potential storm water pollutant sources shall be trained on topics that affect water quality entering the MS4. The training topics shall be determined by the permittee. Under the Watershed General Permit Part I.A.4.b.6)a), page 17, permittees may collaborate with watershed partners.

Example training topics include, but are not limited to:

- Landscaping practices
- Fleet maintenance and maintenance garage operations
- Cleaning procedures and proper disposal of wastewaters
- Soil erosion and sedimentation control
- Storm sewer system inspection and maintenance
- Structural control inspection and maintenance

Training can be met in a number ways. Some examples include:

- Off-site workshop
- In-house training
- Training at the job-site
- DVD or online module
- New employee orientation

Employee Training

Existing employees shall participate in one training session prior to the expiration of the permits. New employees shall participate in one training session during the first year of employment.

Contractor Training

Contractor training is specific to those contractors that perform work related to, or impacting, storm water runoff. Examples of this type of work may include the following:

- Construction/maintenance of any infrastructure, including roads, water mains, sanitary sewers, storm sewers, and storm water BMPs
- Grounds maintenance (parks, golf courses)
- Fleet maintenance

Contractors shall be trained in the work-specific storm water compliance requirements before they perform the contract work. The permittee may meet this requirement in a number of ways, a few examples include:

**Employee/Contractor Training Resources**

There are a number of training materials available.

The U.S. Environmental Protection Agency (U.S. EPA) has a menu of BMPs specific to MS4 storm water at <http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm>. Click on "Pollution Prevention/Good Housekeeping."

Michigan State University Extension has free downloadable fact sheets on many topics at <http://web2.msue.msu.edu/bulletins/mainsearch.cfm>. Under Subject, scroll to "water and water quality." Then do a search (e.g., "turf" or "landscaping").

The University of Michigan has guidance on various topics at [www.oseh.umich.edu/stormwater](http://www.oseh.umich.edu/stormwater). Click on "Management Practices" for a list.

The Department has online video resources for employee training on storm water practices at: [www.michigan.gov/deqstormwater](http://www.michigan.gov/deqstormwater). Under "Information" choose "Industrial Program." Then Scroll down to "Industrial Training Videos."

Southeast Michigan Council of Government has Power Point presentations and fact sheets on various topics, including contractor bid specifications, at [www.semccog.org](http://www.semccog.org).

The Stormwater Manager's Resource Center has fact sheets and slide shows on various topics at [www.stormwatercenter.net](http://www.stormwatercenter.net).

There are many groups and organizations that host workshops, or lend training resources, including a DVD that provides a good overview of storm water pollution at the municipal level. Your Department contact can direct you to local groups that assist communities in meeting this permit requirement.

- Conduct annual training for contractors interested in performing work for the permittee
- Conduct specific training for each contractor (e.g., during pre-construction meetings)
- Provide training materials to the contractor
- Include storm water control requirements in bid specifications and contracts

Permittees shall retain documentation of meeting this training requirement. This documentation should include detailed information on training topics, as well as the mechanism, to document training was conducted.

### **Structural Storm Water Control Effectiveness**

Structural storm water controls are installed or operated by the permittee to remove pollutants from storm water or to reduce the quantity of storm water.

Examples of storm water structural controls include the following:

1. Storm Water Devices
  - a) Catch basins and grit traps
  - b) Secondary containment
  - c) Oil/water separators
2. Detention or Retention Facilities
  - a) Wet or dry basins
  - b) Extended detention dry/wet basins
  - c) Underground storm water storage vaults, tanks or pipes
3. Low Impact Development (LID)
  - a) Infiltration basins
  - b) Infiltration trenches
  - c) Rain gardens/bioretenion
  - d) Porous pavements
  - e) Bioswales
  - f) Vegetated Swales
  - g) Constructed wetlands
  - h) Filter strips

### Inspection and Maintenance of Storm Water Structural Controls

Storm water structural controls owned or operated by the permittee shall be inspected at a frequency appropriate for the BMP design and site conditions. Inspection frequencies shall be identified in the SWPPI or SWMP.

The permittee shall ensure that structural controls are maintained properly so they perform as designed, and reduce the contribution of pollutants to surface waters of the state. Maintenance schedules shall be identified in the SWPPI or SWMP. For new development and redevelopment, the Post-Construction Storm Water Control Compliance Assistance Document describes the Operation and Maintenance Plan requirement.

**Inspection/Maintenance Resources**

- The “LID manual for Michigan” contains an appendix that includes maintenance inspection checklists for detention, infiltration, bioretention, and bioswale BMPs. This is available at [www.semco.org](http://www.semco.org).
- The Center for Watershed Protection has information at [www.cwp.org](http://www.cwp.org).
- The U.S. EPA’s Menu of BMPs has information at <http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm>.
- Click on “Pollution Prevention/Good Housekeeping” then go to “Municipal Facilities Management.”
- The Alliance of Rouge Communities has developed a guidebook, “Maintaining Your Detention Basin.” This is available at <http://allianceofrougecommunities.com>.

Summary List of Municipal Properties and Structural Storm Water Controls

The SWPPI or SWMP shall include a summary list of municipal properties and structural storm water controls owned or operated by the permittee. The list needs to include the type and number of municipal properties and an estimate of storm water structural controls. It does not initially need to include location information. The municipal property list should focus on property that is more permanent in nature, such as parks, cemeteries, public works yards, city hall, composting facilities and landfills, libraries, and fire and police stations. The list does not need to include more transient permittee ownership, such as foreclosed properties.

If the number of structural storm water controls is an estimate, the SWPPI or SWMP shall explain the rationale for determining the number. For example, a city may estimate the number of catch basins in city streets by determining the average number of catch basins per paved block, then multiplying this number by the total number of paved blocks.

The permittee shall have location information of these properties and storm water structural controls by the first progress report. The information can be included in the Illicit Discharge Elimination Plan/Program storm sewer system maps maintained under the Watershed General Permit, Part I.A.4.b.3)b)(1), page 13, and Jurisdictional General Permit, Part I.A.7.b.1), page 9. The location information shall be retained by the permittee, and updated whenever new municipal properties and structural storm water controls are added. The Department may ask to review this information upon advance notice.

Procedures for Proper Disposal of Waste

The permittee shall develop procedures to dispose of operation and maintenance waste (e.g., dredge spoil, accumulated sediments, floatables) in accordance with Part 111 (hazardous waste), Part 115 (solid waste), and Part 121 (liquid industrial waste).

The combined solid and liquid waste stream (solid/liquid waste) from cleaning storm sewer systems is legally defined as “liquid industrial

**Street Sweepings**

Street sweeping material often includes sand, salt, leaves, chemicals, and debris removed from roads and is classified as Solid Waste under the Solid Waste Management Act, known as Part 115.

To properly dispose of street sweeping material, permittees shall take sweepings to a licensed landfill. Unless the street sweepings have been characterized appropriately under Part 115, permittees should contact the landfill to obtain their individual testing

waste” pursuant to Part 121, Liquid Industrial Wastes (Part 121) of Natural Resources and Environmental Protection Act (NREPA). For a complete description of how to properly manage this type of waste, see the Department’s “Catch Basin Cleaning Activities Guidance Document,” available on the Municipal Storm Water web page at [www.michigan.gov/deqstormwater](http://www.michigan.gov/deqstormwater). Under “Information” choose “Municipal Program/MS4 Compliance Assistance,” then scroll down to “MS4 Compliance Assistance Documents.”

The following are options recommended to properly manage the waste stream generated from catch basin cleaning activities:

1. Have the waste transported to drying beds to separate the solid/liquid waste. This is usually performed at a publicly owned treatment plant or at a privately owned permitted facility where the liquid portion of the waste stream is separated from the solids and treated.
2. Request permission from the local wastewater treatment plant operator to discharge the combined solid/liquid waste into the sanitary system. Most treatment plants will require pre-treatment prior to the discharge. All applicable local ordinance provisions shall be followed.
3. When conducting catch basin maintenance activities where the above options are not available, the following methods can be used in dry weather conditions only, as long as there are no discharges to surface waters.
  - Conduct visual inspection to ensure the water in the sump has not been contaminated. If necessary, collect a grab sample of the water and look for signs of contamination such as visible sheen, discoloration, obvious odor, etc. If there is any doubt of the quality of the water, it should be collected into the Vactor truck and treated as waste under Part 121 or Part 115 Solid Waste Management of NREPA.
  - Using a sump pump, or any other pumping mechanism, remove the majority of water in the sump of the basin without disturbing the solid material below. Do not use pumps connected to the Vactor truck’s holding tank.
  - The clear water may then be directly discharged to one of the following:
    - Sanitary system (with prior approval from local sewer authority)
    - Curb and gutter
    - Back into the storm sewer system as long as it is contained within the system during dry weather condition to ensure no discharge into surface water
    - Applied to the ground adjacent to the catch basin (evenly distributed at a maximum rate of 250 gallons/acre/year)
  - The remaining liquid/solid in the sump should be collected with a Vactor truck and disposed of off-site in accordance with Parts 115 or 121.

#### Adding Facilities or Storm Water Structural Controls

When a permittee adds a new facility or structural control for water quantity, treatment, or removal, controls shall be designed, installed, and maintained based on the criteria specified in the permittee’s post-construction storm water control regulations. Retrofitting existing facilities and structural controls is encouraged, although not a permit requirement.

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### **Roadways, Parking Lots, and Bridges**

The permittee shall construct, operate, and maintain its streets, roads, highways, parking lots, and other permittee-owned or operated impervious infrastructure in a manner that reduces the discharge of pollutants into the MS4 and surface waters of the state. There are a variety of pollution prevention and removal practices that should be considered by the permittee. The considerations below apply to all stages of the design, construction, and maintenance processes for impervious infrastructure. One of the primary pollutants from roadways, parking lots, and bridges is total suspended solids (TSS). A section of this document is devoted to assisting permittees with reducing the discharge of TSS to the MS4 and estimating the reduction in accordance with the Watershed General Permit, Parts I.A.4.b.6)c)(2), page 18, and I.B.1.b.4)c), page 23, and Jurisdictional General Permit, Parts I.A.10.c.2), page 14, and I.B.1.b.1)c), page 18.

#### Pollution Prevention Considerations

- Do not use volatile organic compounds (VOCs) to liquefy asphalt (commonly referred to as cutback asphalt)
- Mix limited amounts of asphalt or concrete and only what is needed for the job
- Schedule all activities for dry weather
- Use proper pollution prevention practices during bridge maintenance to capture pollutants like paint, solvents, rust, concrete cutting or pulverizing slurry, and paint scrapings. The Michigan Department of Transportation's specifications for construction and bridge maintenance are available online at <http://mdotwas1.mdot.state.mi.us/public/specbook/>
- Minimize roadside spraying of vegetation
- Implement a ten foot zero application buffer adjacent to surface waters
- Mow rather than spray, where appropriate
- Protect storm drain inlets and manholes from sediment and wastes created during paving operations and repairs
- Pre-heat or load hot material away from storm drains or watercourses
- Use drip pans and absorbent materials to limit leaks and spills from machinery

#### Pollutant Removal Considerations

1. Street sweeping
  - Consideration of sweeper type and ability to remove fine sediments
  - Routine equipment maintenance to ensure proper operation
  - Removal of sediment from curb gutters
  - Sweeping frequency based on location, traffic loads, and amount of pollutants in area
  - Sweeping before spring snowmelt to reduce pollutant loads from traction aids applied over the winter
2. Catch Basins
  - Evaluate and clean catch basins on a consistent schedule to remove accumulated sediment as needed
  - Consider catch basin inserts
  - Consider a hooded outlet, or 90-degree pipe elbow, to prevent floatable materials, such as debris, from exiting the sump

- Prioritize catch basins for evaluation and cleaning based on estimated sediment contributions due to local activities (increased construction activity, higher industrial activity, etc.)
- When cleaning, remove sediment and debris from the surface grates and the interior of the structure and the sump
- Consider cleaning catch basins before they are half full to maintain sump capacity

#### Treatment Considerations

- Utilize roadside vegetation that includes native species that are salt tolerant
- Reduce mowing of turf along roadside
- Utilize bioswales or other infiltration devices
- Avoid using bridge scupper drains for new bridges and consider retrofits of existing scupper drains to provide storm water pollution and flow control

#### Snow Removal

Permittees shall reduce the discharge of pollutants into the MS4 to maximum extent practicable from snow removal practices. BMPs to consider include:

- Pile snow on grassed areas or other porous surfaces to help prevent surface water contamination
- Pile snow where there is an adequate depth of soil (approx. 30 inches) between the ground level and the water table. The soil and vegetation will act as a filter for pollutants in the melting snow
- Do not plow snow into surface waters (stream beds, rivers, lakes, wetlands)
- Prevent piling snow on or near storm drains
- A silt fence may need to be installed to prevent litter from blowing offsite or into waterways
- Remove sediment and debris from the site during the snow season and after spring thaw
- To filter pollutants out of the meltwater, a vegetative buffer strip should be maintained during the growing season between the disposal site and adjacent waterbodies or storm drains that discharge to surface water
- Restore the site after spring thaw if needed. If channels have formed from snowmelt, regrade the soil and reseed with appropriate vegetation.

#### Road Salt/Sand Application and Storage

Salt and sand applied to improve traction shall be prevented from entering MS4s and surface waters of the state to the maximum extent practicable. While the application of salt and sand is often necessary to protect public safety, there are measures that can be implemented to mitigate the environmental impact.

*Salt/sand application practices to consider:*

- Proximity to surface waters and other sensitive areas
- Frequency and amount of application should reflect site-specific characteristics
- Less environmentally harmful deicing alternatives near sensitive areas
- Devices to automatically control rate of material, and routinely calibrating them
- Devices on trucks that accurately measure road surface temperature
- Place barriers in site-specific locations (along streams) where appropriate and practical to route material away from watercourses

- Reduce plowing speed to more efficiently target material applications
- Stop sidecast sweeping within 50 feet of structures over water
- Clean storm drains prior to first rain
- Develop a road salt management plan that establishes realistic salt reduction target goals and continually strives to implement sound best practices

When applying anti-icing or deicing materials, operators should be aware of local areas that are sensitive to salt. These areas may include:

- Groundwater recharge areas
- Areas with exposed or shallow water tables
- Sources of drinking water
- Salt-sensitive vegetative communities
- Wetlands, rivers, streams, ponds and lakes
- Salt-sensitive agricultural areas
- Salt-sensitive habitats for wildlife species at risk

*Salt/sand storage practices to consider:*

- Cover piles and store on impervious surfaces with runoff controls
- Comply with Part 5 Rules (Rules 324.2001 through 324.2009 of the Michigan Administrative Code) for spill/leak containment
- Load salt in covered areas, or during good weather if possible, to reduce material loss
- After loading, immediately sweep area (spills) and replace material in covered area

#### Dust Control Considerations

The permittee shall implement BMPs to control dust and TSS in runoff from unpaved roads and parking lots. Some dust control considerations include:

*Gravel road maintenance*

- Divert runoff through vegetated filter areas and/or rock-lined turnouts
- Avoid sending storm water runoff directly to surface waters
- Keep runoff velocities low and avoid concentrating runoff
- Minimize areas of disturbance and stabilize disturbed areas
- Road graders should travel at top speeds of 3-5 miles-per-hour to minimize dust and displacement of gravel into ditches.
- Use good gravel. Gravel is a mixture of three sizes or types of material: stone, sand and fines. Without a good blend of these three sizes, the gravel will perform poorly.
- Remove gravel ridges formed from snow plowing as necessary in early spring to allow water to run off the road and into vegetated areas

*Other dust control activities to consider*

- Consider the road salt application guidance provided above
- Comply with Part 22 Rules for Groundwater Quality including authorized substances to suppress dust according to Rule 323.2210(b)(i) of the Michigan Administrative Code

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### Coal Tar Emulsions

The permittee is prohibited from using coal tar emulsions to seal asphalt surfaces on roadways, parking lots or bridges it owns or operates.

### TSS Reduction Requirements and Estimation

In accordance with the Jurisdictional General Permit, Part I.A.10.c.2), page 14, and Watershed General Permit, Part I.A.4.b.6)c)(2), page 18, permittees shall reduce TSS in storm water discharges from their paved surfaces to the maximum extent practicable.

The MS4 Jurisdictional General Permit, Part I.A.10.c.2), page 14, states:

*The permittee shall reduce the runoff of TSS from all of its paved surfaces to the maximum extent practicable, with a goal of reducing the annual TSS loading from paved surfaces to surface waters by 25 percent, as compared to annual loading from runoff with no suspended solids controls.*

The Watershed General Permit, Part I.A.4.6)c)(2), page 18, has a related requirement. The permittee shall reduce TSS “to the maximum extent practicable,” but does not specifically have a 25% reduction goal. Watershed permittees are encouraged to work collaboratively with their partners to seek watershed-based alternative approaches to meeting the TSS reduction.

Controlling TSS runoff from paved surfaces can be accomplished through various types of structural and managerial BMPs. This can be achieved through pollution prevention (e.g., improved material handling), removal (cleaning streets and catch basins) or treatment (settling, filtration, or infiltration devices).

Structural BMPs may include (but are not limited to):

1. Bioretention
2. Vegetated Filter Strips
3. Catch Basin Inserts

Managerial BMPs may include (but are not limited to):

1. Storm Water Disconnections
2. Impervious Surface Reduction
3. Street and Catch Basin Cleaning

More BMPs, and some designs, can be found in:

1. The *Guidebook of Best Management Practices for Michigan Watersheds*
2. The *Low Impact Development Manual for Michigan*

Permittees are required to describe the current level of control related to TSS discharges from paved surfaces and estimate the load reduction from existing controls in the first progress report in accordance with the Watershed General Permit, Part I.B.1.b.4)c), page 23, and Jurisdictional General Permit, Part I.B.1.b.1)c), page 18. The following steps are recommended to meet this permit requirement.

### *Initial Analysis*

To analyze how the permittee can meet the TSS reduction requirements, the permittee should decide how to most effectively use its existing budget, knowing it may need to expand over time. For example, because street cleaning is a common practice, it has the potential of becoming the permittees most important asset in meeting the requirements based on the TSS reduction

potential. It is therefore recommended that permittees consider their current street cleaning practices as the first step toward meeting the TSS reduction requirements.

If a permittee cannot meet the TSS reduction requirements with street cleaning alone, additional BMPs will need to be implemented. Although watershed permittees are not obligated to meet a specific TSS reduction they must still demonstrate they have reduced TSS runoff to the maximum extent practicable.

*Calculating Existing TSS Loads and Reductions*

Both the Watershed and Jurisdictional General Permits require permittees to provide an estimate in their first progress report of the TSS loading reduction achieved from existing controls. The reduction can be measured for the entire MS4 rather than each individual paved surface owned or operated by a permittee. For example, if a municipality owns six facilities with paved surfaces that discharge to the MS4, the combined TSS reduction for all six facilities may be considered.

Keeping in mind that watershed permittees may have a different goal than jurisdictional permittees, the simplest way to meet the 25 percent TSS reduction goal is to implement controls at each paved surface. Most structural controls listed in the Center for Watershed Protection’s National Pollutant Removal Performance Database (see link below) perform better than 25 percent TSS removal. No calculation is necessary as long as structural controls achieving the TSS reduction requirements are implemented at all paved surfaces. If only managerial BMPs are used to achieve the TSS reduction requirements, such as street sweeping and catch basin cleaning, the permittee should calculate the amount of material collected to determine the BMP efficiency.

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

Some permittees may not be able to implement BMPs on all paved surfaces, or may use BMPs on some paved surfaces that do not meet the 25% reduction. In this case, to show the reduction over the entire MS4, a simple calculation can be done. Permittees shall report the estimate of load reductions to the Department in the first progress report.

*To calculate TSS loads:*

1. First determine the untreated TSS load in lbs/ft<sup>3</sup> from each paved surface, using the appropriate reference value in the table below.

**Mean TSS runoff values for several land uses**

Land Use Category	TSS Concentration	
	Mean (mg/l)	Mean (lbs/ft <sup>3</sup> )
Residential (Houses, Streets, Sidewalks)	70	0.0044
Commercial (Buildings, Parking, Streets, Sidewalks)	77	0.0048
Industrial (Fleet Maintenance, Storage Yards)	149	0.0093
Highways and Major Roads	141	0.0088

Adapted from "Rouge River Wet Weather Demonstration Project, Selection of Stormwater Pollutant Loading Factors", RPO-MOD-TM34.00, October 1994, Table 3-13

To convert the mean TSS concentration from mg/l to lbs/ft<sup>3</sup> multiply the TSS concentration mean in mg/l by 6.243 X 10<sup>-5</sup>.

To calculate the annual TSS load for each paved surface select the appropriate mean TSS concentration value in lbs/ft<sup>3</sup> from the chart above and use in the formula below.

$$TSSLoad(lbs / year) = TSSConcentration(lbs / ft^3) \times P(in / year) / 12 \times Area(ft^2)$$

P = Average Annual Precipitation in inches (See Appendix A)

2. Calculate the annual TSS load generated at each paved surface the permittees owns or operates. Add up all the loads. This is the untreated TSS load from paved surfaces to the MS4.
3. Select BMPs (that are already in place or that you are considering) for each paved surface and calculate the annual pounds of TSS removed after BMP implementation for each paved surface based on the chosen BMP. To perform this calculation, multiply the efficiency for each BMP by the untreated TSS load calculated in Step 1 for each paved surface to calculate the pounds of TSS removed. The following chart provides removal efficiencies for common BMPs.

**Suspended Solids Removal Efficiency of Select BMPs**

Treatment Method	Median Suspended Solids Removal Efficiency (%)
Dry Detention <sup>1</sup>	49
Wet Detention <sup>1</sup>	80
Wetland <sup>1</sup>	72
Filter Practices <sup>1</sup>	86
Bioretention <sup>1</sup>	59
Permeable Pavement <sup>2</sup>	95
Infiltration <sup>1</sup>	89
Grass Channel <sup>2</sup>	68
Dry Swale <sup>2</sup>	93

<sup>1</sup>National Pollutant Removal Database, Version 3 by Center for Watershed Protection, 2007 and <sup>2</sup>Version 2, 2000.

1. The removal efficiency is based on sampling concentration in and concentration out. Volume removed and the pollutants contained in that volume are not included in the calculation.
2. Incoming pollutant concentrations vary considerably. BMPs monitored that had a high incoming pollutant concentration could show a higher efficiency due to the opportunity to remove pollutants. Incoming concentrations of relatively clean water could show a low or even negative BMP efficiency because there is no pollutant to remove.

The following additional resources are recommended for use in calculating BMP efficiencies for TSS load reduction:

- The Center for Watershed Protection's National Pollutant Removal Performance Database [www.cwp.org/Resource\\_Library/Controlling\\_Runoff\\_and\\_Discharges/sm.htm](http://www.cwp.org/Resource_Library/Controlling_Runoff_and_Discharges/sm.htm).
- The Environmental Protection Agency's Menu of BMPs <http://cfpub.epa.gov/npdes/stormwater/menuofbmps/>.

Some BMPs may not be listed or detailed in these references. Therefore, the Department agrees that permittees may use other acceptable literature, or studies, provided they are scientifically defensible.

4. Add up the pounds of TSS removed for each paved surface that discharges to the MS4. This is the amount of TSS removed from the MS4 after BMPs are implemented.
5. Divide the sum of the pounds removed from all paved surfaces after BMPs are implemented by the sum of the untreated TSS load from all paved surfaces before BMPs are applied.
6. The result, times 100, is the percentage reduction of TSS.

$$\left[ \frac{\text{Sum of the pounds of TSS removed from all paved surfaces}}{\text{Sum of the untreated TSS load from all paved surfaces}} \right] \times 100 = \% \text{ TSS reduced}$$

**Example 1**

The following is an example table of the calculations for a township that owns or operates an MS4 at a township hall and park with a small amount of impervious surface surrounded by green space. The township does not own or operate an MS4 associated with major roads in their jurisdiction.

Land Use	Mean TSS Concentration (lbs/ft <sup>3</sup> )	Annual P (in/year)	Paved Surfaces A (ft <sup>2</sup> )	Untreated TSS Load (lbs/year)	BMP Efficiency or method of removal	TSS Removed after BMP Implemented (lbs/year)	Percent Reduced (%)
Residential (Parks)	0.0044	32	50,000	587	0.86 Filter Practices	505	86
Commercial (Township Hall)	0.0048	32	100,000	1280	0.49 Dry Detention	627	49
Totals				1867 <b>X</b>		1132 <b>Y</b>	61 <b>Z</b>

P = Average annual precipitation in inches per year  
A = Area of paved surfaces to be treated in square feet

In the example above:

X = sum of the untreated TSS load from all paved surfaces  
Y = sum of the TSS pounds removed from all paved surfaces

Therefore **(Y / X) x 100 = Z**, where Z is the % TSS reduced from all paved surfaces to the MS4.

**Example 2**

The following is an example of a small city that owns or operates an MS4 associated with a city hall, fire station, fleet maintenance area, major roads, and a park with significant impervious surface in their jurisdiction.

Land use	Mean TSS Concentration (lbs/ft <sup>3</sup> )	Annual P (ft)	Paved Surfaces A (ft <sup>2</sup> )	Untreated TSS Load (lbs/ year)	BMP Efficiency or Method of Removal	TSS Removed after BMP Implemented (lbs/year)	Percent Reduced (%)
Commercial (Park)	0.0048	32	100,000	1280	0.86 Vegetated Buffer	1101	86
Major Roads 10 Miles	0.0088	32	1,320,000	30,976	0.68 Open Channels (grassed)	21,064	68
Major Roads 5 Miles	0.0088	32	660,000	15,488	Street Sweeping Actual annual amount removed	5,000	32
Industrial (Fleet Maintenance)	0.0093	32	50,000	1240	Catch Basin Inserts Actual annual amount removed	1000	81
Commercial (City Hall and Fire Station)	0.0048	32	43,560	558	0.49 Dry Detention Basin	273	49
Totals				49,542 <b>X</b>		28,438 <b>Y</b>	57 <b>Z</b>

P = Average annual precipitation in inches per year

A = Area of paved surfaces to be treated in square feet. To calculate the area for major roads, an assumption of 25 feet of road width per mile was used. In the example above (10 miles of road)(25 ft)(5280 ft/mile) = 1,320,000 ft<sup>2</sup>. The actual width of the road shall be used when performing these calculations.

In the example above:           X = sum of the untreated TSS load from all paved surfaces  
  Y = sum of the TSS pounds removed from all paved surfaces

Therefore **(Y / X) x 100 = Z**, where Z is the % TSS reduced from all paved surfaces to the MS4

**Fleet Maintenance and Storage Yards**

Permittees shall implement a SWPPP for all municipal fleet maintenance and storage yards that are not regulated as industrial activities. It is recommended that each facility have a separate SWPPP; however, one SWPPP may be developed to cover all of a permittee’s facilities. This may be appropriate in the case of a complex of two or more facilities. In the event that one SWPPP is developed, all permit requirements shall be met for each facility (e.g., a site map for each facility). A SWPPP contains information, maps, and inspection details that are specific to the individual facility, thus the rationale for developing an individualized SWPPP. The SWPPP shall be retained at the respective facility and shall be available to those employees responsible for storm water management measures (regardless if the SWPPP is individualized or combined).

The watershed permit allows the elements of the SWPPP to be incorporated into the SWPPI; however, because SWPPPs are specific to individual facilities and because the required information is much different from the information contained in a SWPPI, it is often more efficient and user-friendly to develop separate, individualized SWPPPs.

If a permittee does not have maintenance activities or materials that are exposed to storm water, a SWPPP may not be required; however, this determination shall be made separately for each fleet maintenance facility or storage yard.

The SWPPI or SWMP shall identify the permittee's fleet maintenance and storage yard facilities (including those for any nested jurisdictions), and indicate if a SWPPP has been developed for each facility and if it has been implemented under the supervision of a certified storm water operator. The SWPPP shall be written and implemented by the SWPPI or SWMP due date.

If a permittee determines that a SWPPP is not required for a particular facility, then a simple statement shall be included in the SWPPI or SWMP, such as, "[List Permittee Name] has conducted an evaluation of the [List Facility Name] and has determined that the [List Facility Name] is not a fleet maintenance nor a storage yard, does not perform maintenance activities nor store vehicle maintenance materials in any area exposed to storm water runoff and does not store or handle significant materials in any area exposed to storm water runoff."

The SWPPP shall be overseen by a certified storm water operator. To meet the SWPPP and certified storm water operator requirements under the Watershed General Permit, permittees may opt to incorporate the SWPPP into the SWPPI to be overseen by the Storm Water Program Manager in accordance with Part I.A.4.b.5)d)(1), page 19.

#### Determining Which Facilities Need to Develop and Implement a SWPPP

Municipally-owned or operated facilities that are not designated by the Industrial Storm Water regulations, which meet any of the following criteria, must develop and implement a SWPPP.

- Any facility that has a fleet (three or more vehicles) and maintenance activity in an area with storm water runoff to surface waters of the state
- Any facility that meets the definition of a storage yard with storm water runoff to surface waters of the state. (Even if there are no vehicle maintenance activities at a storage yard the SWPPP will need to be developed)
- A facility with poor housekeeping practices (i.e., there are oil stained soils)

#### **Fleet Maintenance and Storage Yard Resources**

A variety of resources are available at the Department's storm water Web site: [www.michigan.gov/deqstormwater](http://www.michigan.gov/deqstormwater).

- For compliance assistance documents: under "Information," choose "Industrial Storm Water." There you will find compliance assistance for industrial operations that are also applicable to many municipal operations. Also, information is available on the Part 5 regulations (storage and handling of oil and polluting materials). Sample SWPPP templates can be downloaded.
- For the certified operator training manual and exam schedule: scroll down to the bottom, right-hand corner of the Department's main storm water page.

The U.S. EPA has Industrial Storm Water resources at <http://cfpub.epa.gov/npdes/stormwater/indust.cfm>.

Several fact sheets and templates have been developed by SEMCOG and are available at [www.semco.org](http://www.semco.org).

In addition, some regional organizations are assisting member governments in developing the SWPPP. Your Department contact can help you get in touch with these organizations.

The industrial storm water certified operator training provides instruction for the development and implementation of the SWPPP.

Contact District Water Bureau District Staff to schedule training.  
The manual is located at [www.michigan.gov/deqstormwater](http://www.michigan.gov/deqstormwater), in the lower right-hand corner under "Certified Operator Training."

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## Definitions

**Areas:** Distinct parts or sections of land that are exposed to storm water runoff

**Fleet:** A group of vehicles owned or operated as a unit  
(For the purposes of this guidance - three or more vehicles)

**Illicit Discharge:** Means any discharge to, or seepage into a separated storm sewer or surface waters of the state that is not composed entirely of storm water or uncontaminated ground water or non-storm water discharges listed in the MS4 permits. Includes, but is not limited to:

- Discharges from floor drains
- Vehicle washing water
- Decant from catch basin cleanout

*Please note: All illicit discharges  
must be eliminated.*

**Maintenance:** Includes, but is not limited to:

- Adding or changing vehicle fluids
- Fueling
- Lubrication
- Painting
- Mechanical repairs
- Parts degreasing
- Vehicle or equipment washing

**Significant Material:** Any material that can degrade water quality

**Storage Yard:** Includes, but is not limited to:

- Areas where vehicles are stored. This implies more than being parked overnight or for the weekend (e.g., a staff parking lot would not be a storage yard, but an area used to store vehicles or vehicles for spare parts may be a storage yard)
- Areas where vehicles are impounded
- Areas where road maintenance materials are stored (e.g., salt, sand, aggregates, posts, guard rails, etc.)
- Areas where vehicle maintenance materials are stored (e.g., used tires, used parts, dumpsters containing waste materials associated with vehicle maintenance such as oil filters, oil and antifreeze containers, grease tubes, scrap bins, used batteries, etc...)
- Areas where chemicals in bulk are stored and handled (e.g., pesticides, herbicides, fertilizers)
- Areas where refuse from catch basin cleanout is stored
- Areas where maintenance equipment like mowers, tractors, vactors, sweepers, loaders, graders, etc., are stored
- It does not include storage areas that are temporary in nature where the only materials exposed to storm water are designed to be used outside and the materials do not contaminate storm water

**Surface Waters of the State:** Are defined consistent with the Part 4 Rules (Rules 323.1041 through 323.1117 of the Michigan Administrative Code) to mean all of the following, but not including drainage ways and ponds (detention and retention ponds or lagoons) used solely for wastewater conveyance, treatment, or control:

- The Great Lakes and their connecting waters
- All inland lakes

- Rivers
- Streams
- Impoundments
- Open drains
- Other surface bodies of water within the confines of the state

**Vehicle:** A wheeled conveyance used on land for carrying people or goods. Includes, but is not limited to: cars, trucks, buses, garbage trucks, tractors, lawn mowers, equipment for earth moving.

Some municipally operated facilities require industrial storm water permit coverage for storm water discharges. For more information please view the [Introduction to the Industrial Storm Water Program](#) located at [www.michigan.gov/degstormwater](http://www.michigan.gov/degstormwater) on the Industrial Program page.

A SWPPP needs to be developed and implemented for each facility that meets the requirements. The SWPPP shall be written and implemented by the SWPPI or SWMP due date.

The No Exposure Certification Guidance defines “No Exposure” and is designed to assist in the determination if exposure exists at a facility. The guidance document can be found at: [www.michigan.gov/degstormwater](http://www.michigan.gov/degstormwater) on the Industrial Program Page and in the Industrial Storm Water Certified Operator Training Manual in Appendix D.

**Types of Facilities Not Likely to be Exempted:**

- DPWs
- Road commission facilities
- Mosquito control agencies
- Parks and recreation equipment storage yards
- Impound yards
- School bus garages
- Composting areas

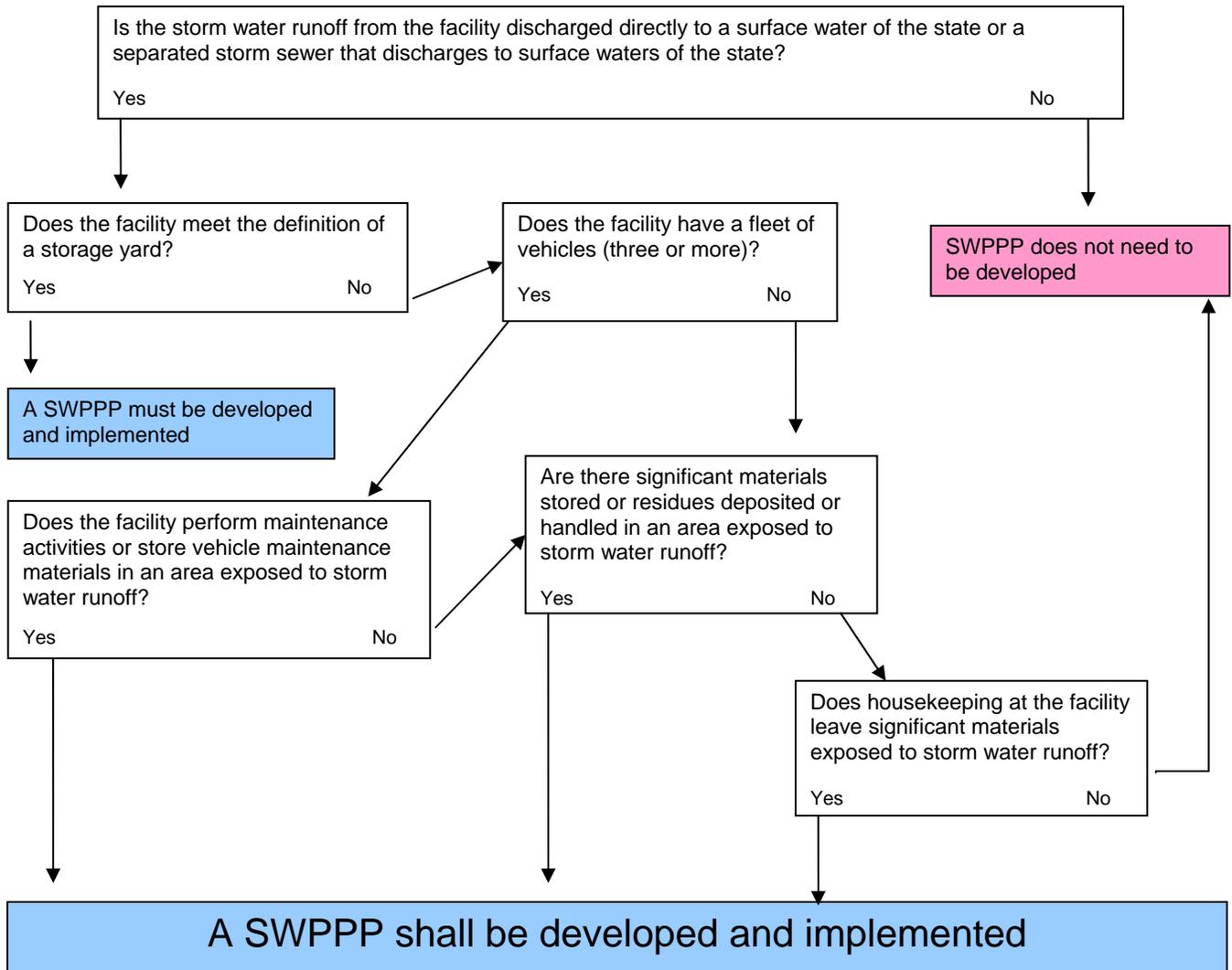
**Types of Facilities Likely to be Exempted:**

- Fire stations where all vehicle maintenance occurs indoors, there is no outside dumpster with vehicle maintenance wastes, and it can be demonstrated that floor drains have been directed to the appropriate destination
- Police or sheriff stations where all vehicle maintenance occurs indoors, there is no outside dumpster with vehicle maintenance wastes and it can be demonstrated that floor drains have been directed to the appropriate destination
- Storage yards that are temporary in nature that contain materials to be used on a construction project that will not contaminate storm water runoff, i.e., guard rails, posts, signs, etc.

PIPP and SPCC plans may be incorporated into the SWPPP,  
but do not contain all of the information required in the SWPPP.

**To determine if a SWPPP needs to be developed and implemented answer the following questions:**

- 1) Is the storm water runoff from the facility discharged directly to a surface water of the state or a separate storm sewer that discharges to a surface water of the state?  
If Yes, go to question 2  
If No, a SWPPP does not need to be developed
- 2) Does the facility meet the definition of a storage yard?  
If Yes, a SWPPP must be developed and implemented  
If No, go to question 3
- 3) Does the facility have a fleet of vehicles (three or more)?  
If Yes go to questions 4  
If No go to question 5
- 4) Does the facility perform maintenance activities or store vehicle maintenance materials in an area exposed to storm water runoff?  
If Yes, a SWPPP must be developed and implemented  
If No, go to question 5
- 5) Are there significant materials stored or residues deposited or handled in an area exposed to storm water runoff?  
If Yes, a SWPPP must be developed and implemented  
If No, go to question 6
- 6) Does housekeeping at the facility leave significant materials exposed to storm water runoff? (e.g., there are oil stained soils at the facility indicating equipment needs maintenance, salt spillage on the ground or pavement, open dumpsters or areas with spillage around dumpsters)  
If Yes, a SWPPP must be developed and implemented  
If No, and the facility maintains good housekeeping and minimizes exposure of significant materials a SWPPP is not needed



Who is Responsible for SWPPP Compliance?

The SWPPP shall be overseen by a certified industrial storm water operator. To meet the certified storm water operator requirements under the Watershed General Permit, a permittee may opt to incorporate the requirements identified in the SWPPP into the SWPPI to be overseen by the Storm Water Program Management. However, it is recommended that the permittee's storm water management staff receive the certified storm water operator training. This training provides specific information on developing a SWPPP and implementing the required components, including both routine (bi-weekly) and comprehensive (quarterly) inspections. Permittees may request in writing Department approval of an alternate schedule for comprehensive site inspections.

The Certified Operator training is free and available from the Department to assist with meeting permit requirements. The Department's storm water web site includes an industrial exam schedule, which can be found on the lower right hand corner of the main page.

Also, District Staff may be available to provide in-house training upon request by a group.

A completed SWPPP shall be signed by the facility manager and a certified industrial storm water operator, or the storm water program manager, and retained on-site at the facility that generates the storm water discharge. The permittee shall also retain on-site the other supporting materials (e.g., inspection reports and annual SWPPP reviews) required in the SWPPP.

Elements of a SWPPP

The following are the primary components of a SWPPP. The Industrial Storm Water Certified Operator Training Manual describes how to develop a SWPPP (pages 14-38). The Storm Water Certified Operator Training Manual and a sample SWPPP template are both available at the Department's storm water web site [www.michigan.gov/degstormwater](http://www.michigan.gov/degstormwater), click on Industrial Program.

1. Source Identification

- A. Site Map – with the 13 items listed in the appendix.
- B. A list of all significant materials that could pollute storm water (this would include storing, handling, or transporting ANYTHING that can come into contact with storm water and degrade water quality). Such materials may include, but are not limited to:
- street sweepings
  - salt
  - trash
  - recycling materials
  - wastes materials
  - scrap bins
  - compost
  - sawdust/mulch
  - parts
  - oil
  - paint
  - drums
  - cleaners
  - fire suppressants
  - pesticides
  - fertilizers
  - fuel
  - solids/floatables

For each significant material listed, the SWPPP shall include each of the following descriptions:

1. Ways in which each type of material has been, or has reasonable potential to become, exposed to storm water.

2. An evaluation, and written description, of the reasonable potential for contribution of significant materials to run off from at least the following areas or activities (if applicable):
  - (a) Loading, unloading, and other material handling operations
  - (b) Outdoor storage, including secondary containment structures
  - (c) Outdoor manufacturing or processing activities
  - (d) Significant dust or particulate generating processes (such as grinding)
  - (e) Discharge from vents, stacks, and air emission controls
  - (f) On-site waste disposal practices
  - (g) Maintenance and cleaning of vehicles, machines, and equipment
  - (h) Areas of exposed and/or erodible soils
  - (i) Sites of environmental contamination listed under Part 201 of the Michigan Act
  - (j) Areas of significant material residues (usually caused by ongoing drips that build/cake up)
  - (k) Areas where domestic animals congregate and deposit wastes (such as animal control facilities, overpopulated geese at detention ponds)
  - (l) Other areas where storm water may contact significant materials (such as temporary offloading areas).
  
3. Identification of the discharge point(s) through which the material may discharge if released.

C. List of significant spills/leaks over the last three years prior to the issuance of the permit. The list shall include:

- The date
- Volume released
- Location of release
- Action taken to clean up the release
- Action taken to prevent exposure

Any release that occurs after the SWPPP is developed shall be controlled in accordance with the SWPPP. The SWPPP shall then be updated, if deemed necessary, within 14 days of the spill.

D. Sampling data – If available, sampling data shall be summarized, describing pollutants from the facility as well as suspected sources.

## 2. Preventive Measures and Source Controls, Non-Structural

The SWPPP shall include each of the following nonstructural controls:

- A. Routine preventative maintenance, with routine inspections, of all storm water control devices. A log shall be maintained.
- B. Comprehensive site inspection program to be performed at least quarterly. Reports shall be maintained.
- C. Description of the good housekeeping procedures and inspections.
- D. Material handling and spill prevention procedures and equipment (see box below).
- E. Areas that have a high potential for soil erosion and measures to control it.
- F. A description of employee training program.
- G. For facilities in a Total Maximum Daily Load (TMDL) watershed, a list of actions to meet that TMDL requirement.
- H. List of significant materials still present after nonstructural controls are implemented.

For the Department's guidance on proper storage and handling of oil and polluting materials, go to the main site at [www.michigan.gov/deq](http://www.michigan.gov/deq) and from the left side, click on "Water," then click on "Part 5 Rules: Spillage of Oil/Polluting Material."

### 3. Structural Controls

Where nonstructural controls do not control discharges, the SWPPP shall describe structural controls for prevention and treatment. The description shall include:

- Location
- Function
- Design criteria

Structural controls may be necessary to divert clean water, treat or recycle contaminated water, or reduce contact with significant materials.

### 4. Keep Plans Current

- A. Review SWPPP annually
- B. Update under new permit requirements
- C. Update when changes are made, when the Department finds the SWPPP inadequate, or other necessary updates are needed
- D. Updates and reviews shall be signed, dated, and retained.

### 5. Recordkeeping – See Record Keeping Compliance Assistance Document

More information can be found in the Recordkeeping Compliance Assistance Document.

## **Managing Vegetated Property**

The permittee shall minimize the discharge of pollutants related to the management of vegetation on land the permittee owns or operates.

### Training

Permittees shall have a process to train employees and contractors on the proper storage, handling, and use of pesticides, herbicides, and fertilizers before they handle or apply them.

The Natural Resources and Environmental Protection Act, 451 of 1994, as amended, Part 83, and Regulation 637 both require pesticide applicators to attend a Michigan Department of Agriculture approved IPM Training Program before pesticide applications are made in schools, public buildings, and health care facilities.

### Phosphorus-Free Fertilizers for Turf Grass

The permittee may only use phosphorus-free fertilizers for turfgrass on areas it owns or operates. Phosphorus may be added to turfgrass if soils are tested for nutrients every four years and a need for phosphorus is demonstrated. Phosphorus fertilizers shall be applied to lands that the permittee owns and operates only as prescribed in the soil test results.

Program to Minimize Impacts

The permittee shall also have a program to minimize the storm water impacts from all of the permittee's managed vegetated properties (e.g., golf courses, parks, sports fields, turf and trees on municipal properties or along road rights of way).

*Examples include, but may not be limited to:*

- Implement and maintain riparian buffer zones along surface waters and sensitive areas
- Utilize native landscaping techniques
- Utilize Integrated Pest Management (IPM) techniques
- Sweep grass clippings back onto the lawn.
- Prevent leaves from entering storm drains and surface waters by blowing or raking them back onto vegetated areas.
- Mow dry leaves into the lawn during the fall or compost them.
- 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](http://www.landscape.org))
- Aerate compacted soil
- Mulch grass clippings during mowing activities

**More information regarding vegetated property management can be found at the following Web sites:**

Michigan Turfgrass Environmental Stewardship Program: [www.mtesp.org](http://www.mtesp.org)

Integrated Pest Management (IPM): [www.ipm.msu.edu](http://www.ipm.msu.edu)

Soil Testing through Michigan State University Extension:  
<http://web1.msue.msu.edu/monroe/soilweb2/index.htm>

Landscaping for Water Quality, and other resources at the Department's NPS webpage at [www.michigan.gov/deqnonpointsourcepollution](http://www.michigan.gov/deqnonpointsourcepollution), choose Information and Education.

# Appendix A

## Average Annual Precipitation in Michigan

