

# Connection / Impact Fee Report

## Jennerjohn Pond

Prepared For The



OUTAGAMIE COUNTY, WISCONSIN

JUNE 22, 2015

McM. No. G0014-9-14-00273

PTK/jlh

**McMAHON**  
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## 1.0 OVERVIEW

The Town of Greenville constructed the Jennerjohn Pond in 2013. The Jennerjohn Pond was constructed to improve stormwater quality and assist with Municipal (MS4) Stormwater Permit compliance. The purpose of this report is to calculate an appropriate connection or impact fee for the Jennerjohn Pond. Connection or impact fees are typically established as one-time charges to a developer (new development or re-development site), property owner, or other MS4 permitted entity that desires to use the pond to satisfy one or more post-construction stormwater management requirements. The connection or impact fee also provides the Town with a method to recover a part of the project's total capital cost.

## 2.0 METHODOLOGY

For purposes of this report, two methodologies were used to calculate the connection / impact fee for each pond. The two methodologies are described in greater detail below:

### A. Impervious Area Method

The impervious area method calculates the impact fee by dividing the total project cost by the total impervious area within a pond's contributing watershed. The total impervious area is calculated by multiplying the area of each land use within the contributing watershed by its average percent imperviousness. The average percent

Connection / Impact Fee Report

imperviousness for each land use is based on the standard land use files developed by the WI Department of Natural Resources (DNR). An engineer may be required to perform the impervious area calculations.

## **B. Watershed Area Method**

The watershed area method calculates the impact fee by dividing the total project cost by the total contributing watershed. This method does not require detailed watershed characteristic information and may be considered the least equitable. For example, this method does not consider the fact that a commercial site produces more runoff than a residential site. This method is, however, the easiest to calculate and use for Town staff.

## **3.0 RESULTS**

A map depicting contributing watershed for the Jennerjohn Pond is provided in Appendix A. The results of the connection / impact fee calculations can be found in Appendix B. The calculations provide more detailed information including: total project cost, impervious area and watershed area. Proposed connection / impact fees are provided for both the impervious area method and watershed area method. It is recommended that the Town adopt a resolution or ordinance identifying the methodology of choice to establish connection / impact fees for the Jennerjohn Pond.

## **4.0 SUMMARY**


In summary, connection or impact fees are typically established as one-time charges to a developer (development or redevelopment site), property owner, or other MS4 permitted entity that desires to use one of the ponds to satisfy one or more stormwater management requirements. The connection / impact fees calculated in this report could be used by the Town to recover some of the initial capital cost for the Jennerjohn Pond project. It is recommended that the Town adopt a resolution or ordinance identifying the methodology of choice to establish connection / impact fees for each pond.

## APPENDIX A


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### WATERSHED MAP




 Study Area Boundary


**MS4 Drainage System**


 Storm Sewer System


 Culvert


 Flow Arrow


**Other Mapped Features**

 Municipal Boundary

 Parcel Line

 Railroad Centerline

 Stream

 Surface Water

Source: Outagamie County, 2014-16;

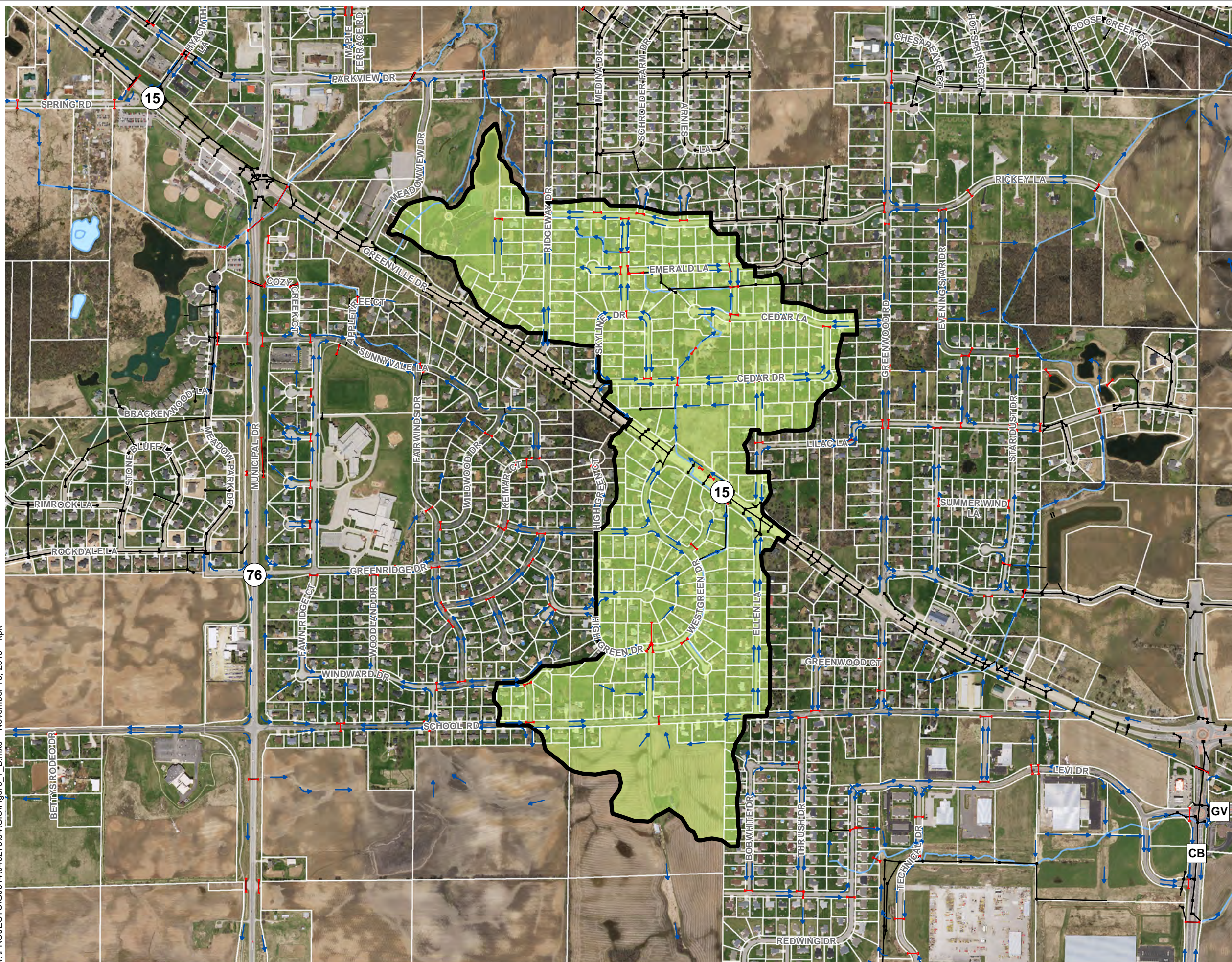
Disclaimer: The property lines, right-of-way lines, and other property information on this drawing were developed or obtained as part of the County Geographic Information System or through the County property tax mapping function. McMAHON does not guarantee this information to be correct, current, or complete. The property and right-of-way information are only intended for use as a general reference and are not intended or suitable for site-specific uses. Any use to the contrary of the above stated uses is the responsibility of the user and such use is at the user's own risk.



0 800 1,600  
Feet



**FIGURE 1**  
**STUDY AREA**  
JENNERJOHN PARK POND  
STORMWATER MANAGMENT PLAN  
TOWN OF GREENVILLE  
OUTAGAMIE COUNTY, WISCONSIN



## **APPENDIX B**

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### **CONNECTION / IMPACT FEE CALCULATIONS**



## Jennerjohn Pond Connection / Impact Fee Calculations

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### A. Total Project Cost

Engineering	\$89,069
Permits, Soil Borings, etc.	\$3,150
Construction	\$676,704
<b>Total Project Cost</b>	<b>\$768,923</b>

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### B. Connection / Impact Fee Calculations (Future Land Use)

Impervious Area within Watershed*:	69.2	acres
Watershed Area:	224.5	acres

#### Connection/ Impact Fee:

<b>Impervious Area Method:</b>	<b>\$11,111</b>	<b>per acre of imperviousness</b>
<b>Watershed Area Method:</b>	<b>\$3,425</b>	<b>per acre of watershed</b>

\*Based on WDNR standard land use files

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### C. Cost Method Considerations

#### Impervious Area Method

- \* Method does not consider runoff volume, soil types, or poorly drained soils
- \* Concept is identical to the ERU method that is used for the Town's Stormwater Utility
- \* Few calculations are needed, may need Engineer for calculations

#### Watershed Area Method

- \* Method does not consider land use, imperviousness, runoff volume, soil types, or poorly drained soils
- \* Residential will pay more and commercial will pay less than the amount of runoff generated by the site.
- \* Least accurate of the two methods used to develop an "impact fee".
- \* Basic calculations needed, easy for Town Staff to manage

# Infiltrometer Testing

## For Assessing & Modeling Grass Swales for Water Quality Credit

Prepared For The



OUTAGAMIE COUNTY, WISCONSIN

JUNE 22, 2015  
Updated: SEPTEMBER 26, 2016

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# Infiltrometer Testing

For Assessing & Modeling Grass  
Swales for Water Quality Credit

Prepared For The



OUTAGAMIE COUNTY, WISCONSIN

JUNE 22, 2015

Updated: SEPTEMBER 26, 2016

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Appendix B	WDNR Grass Swale Guidance Document
Appendix C	Infiltrometer Testing Results & Photos

# Infiltrometer Testing

## For Assessing & Modeling Grass Swales for Water Quality Credit

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## 1.0 INTRODUCTION

In 2008, the Town of Greenville developed a municipal wide Stormwater Management Plan to assist in complying with their WPDES Municipal Stormwater Discharge Permit. The Town's Stormwater Management Plan identified grass swales as a Best Management Practice (BMP) that provides water quality benefits for the community. In 2008, grass swales were evaluated using the best available information, including Wisconsin Department of Natural Resources (WDNR) guidance documents, Natural Resources Conservation Service (NRCS) soil survey maps, and design soil infiltration rates. At that time, the design soil infiltration rates were selected from Table 2 of WDNR Conservation Technical Standard No. 1002 – Site Evaluation for Stormwater Infiltration.

On November 24, 2010, the WDNR issued a new guidance document that provides a basis for assessing and modeling grass swales for water quality credit. The 2010 WDNR guidance document outlines a procedure for determining appropriate design infiltration rate(s), including measuring the soil infiltration rate in the field using a double-ring infiltrometer test. The soil infiltration rate is a required input variable within the WinSLAMM water quality computer model that is used to evaluate the water quality benefits provided by a specific grass swale. Since a majority of the Town's surface drainage is comprised of grass swales, the Town decided to perform double-ring infiltrometer tests along swales within their developed urban area.

Infiltrometer Testing

The purpose of this report is to summarize the results of the performed double-ring infiltrometer tests and describe how the results were used to determine appropriate design soil infiltration rates. For reference, a copy of the 2010 WDNR grass swale guidance document can be found within Appendix B.

## 2.0 STUDY AREA

The study area is depicted in Figure 1 within Appendix A and defines the developed urban area within the Town. The study area was developed using 2010 census urban maps and other WDNR guidance. Figure 1 also depicts the locations of the double-ring infiltrometer tests and the various types of surface drainage present within the study area.

## 3.0 SOILS

Soil information was obtained from the U.S. Department of Agriculture (USDA) / NRCS Web Soil Survey at <http://websoilsurvey.nrcs.usda.gov/>. Specifically, the soil survey from *Outagamie County (WI087)* was needed for the study area. The USDA / NRCS have classified soil types into four hydrologic soil groups (HSG). The four hydrologic soil groups (i.e. A, B, C and D) are classified according to the minimum infiltration rate of the soil column. Group A soils have the highest infiltration rate or lowest runoff potential, whereas Group D soils have the lowest infiltration rate or highest runoff potential. The infiltrometer tests were performed along grass swales with various underlying hydrologic soil textures and HSG's in order to provide representative soil information within the study area. The USDA / NRCS Soils information and locations of the double-ring infiltrometer tests are depicted in Figure 2 within Appendix A.

## 4.0 INFILTRMETER TESTING

The 2010 WDNR grass swale guidance document outlines a procedure for measuring the soil infiltration rate of a grass swale in the field using a double-ring infiltrometer test. Specifically, the 2010 WDNR grass swale guidance document allows for several modifications to the procedures in ASTM D3385. The purpose of these modifications is to provide a more cost-effective approach to obtaining a reasonable estimate of the soil infiltration rates within existing grass swales. For reference, the field test procedure for the double-ring infiltrometer tests are described in the 2010 WDNR grass swale guidance document found in Appendix B.

A total of 20 double-ring infiltrometer tests were performed along various existing grass swales within the study area. The locations of test sites are depicted in Figures 1-3 within Appendix A.



**Double-Ring Infiltrometer Test**

Per the 2010 WDNR grass swale guidance document, the lowest infiltration rate observed at each test location is considered the static soil infiltration rate. The static soil infiltration rate at each test site is then reduced by 50% to represent the dynamic soil infiltration rate. The dynamic soil infiltration rate is ultimately used to model a specific grass swale within the WinSLAMM water quality model. For reference, the infiltrometer test results and photos for each test location are included in Appendix C.

## **5.0 RESULTS**

The results from the 20 individual double-ring infiltrometer tests are provided in Table 1 within Appendix C. To assist with analyzing the infiltrometer test results, the design infiltration rates based on the underlying USDA / NRCS soil textures at each test location were also provided within Table 1. The design infiltration rates were taken from Table 2 of WDNR Conservation Technical Standard No. 1002 – Site Evaluation for Stormwater Infiltration. As shown in Table 1 within Appendix C, the measured dynamic soil infiltration rates are considerably higher than the design soil infiltration rates from Table 2 of WDNR Conservation Technical Standard No. 1002. In addition, several test locations had very high measured dynamic soil infiltration rates ( $> 3.60$  in/hr). Table 2 of WDNR Conservation Technical Standard No. 1002 – Site Evaluation for Stormwater Infiltration lists 3.6 in/hr as the highest design infiltration rate for a sandy soil. In order to provide more appropriate and representative results, it was determined that any measured dynamic soil infiltration rate that was greater than 3.60 in/hr should be removed from the data set. As such, the results from test locations 2 and 15 were removed from the data set due to their measured dynamic soil infiltration rate being greater than 3.60 in/hr.

The 2010 WDNR grass swale guidance states that the geometric mean of the test results shall be used to determine an ‘average’ infiltration rate. However, equally important is to consider whether the measured infiltration rates should be ‘grouped’ in order to apply separate geometric means to different areas. Grouping of results may be done based on soil type, spatial reasons or done as a method to help provide more representative results. After reviewing the data, it was determined that the remaining measured dynamic soil infiltration rates should be

‘grouped’ by their associated HSG as depicted in Table 2 within Appendix C. The ‘average’ dynamic infiltration rate was determined by taking the geometric mean of the data set for each HSG. Table 5-1 below summarizes the ‘average’ dynamic infiltration rates determined for each of the four HSG’s.

**Table 5-1**  
**Dynamic Infiltration Rates**

<b>Hydrologic Soil Group (HSG)</b>	<b>‘Average’ Dynamic Infiltration Rate (in/hr)</b>
A	2.26
B	0.52
C	0.37
D	0.20

Figure 3 within Appendix A depicts the ‘average’ dynamic soil infiltration rates based on the underlying HSG within the study area. Ultimately, this information will be used to calculate a composite dynamic soil infiltration rate for a particular grass swale catchment area based on the acreage of the underlying HSG(s) and corresponding average dynamic infiltration rate. This composite dynamic soil infiltration rate will be input to the WinSLAMM water quality model to evaluate the water quality credits provided by any of the Town’s grass swales.

## 6.0 SUMMARY

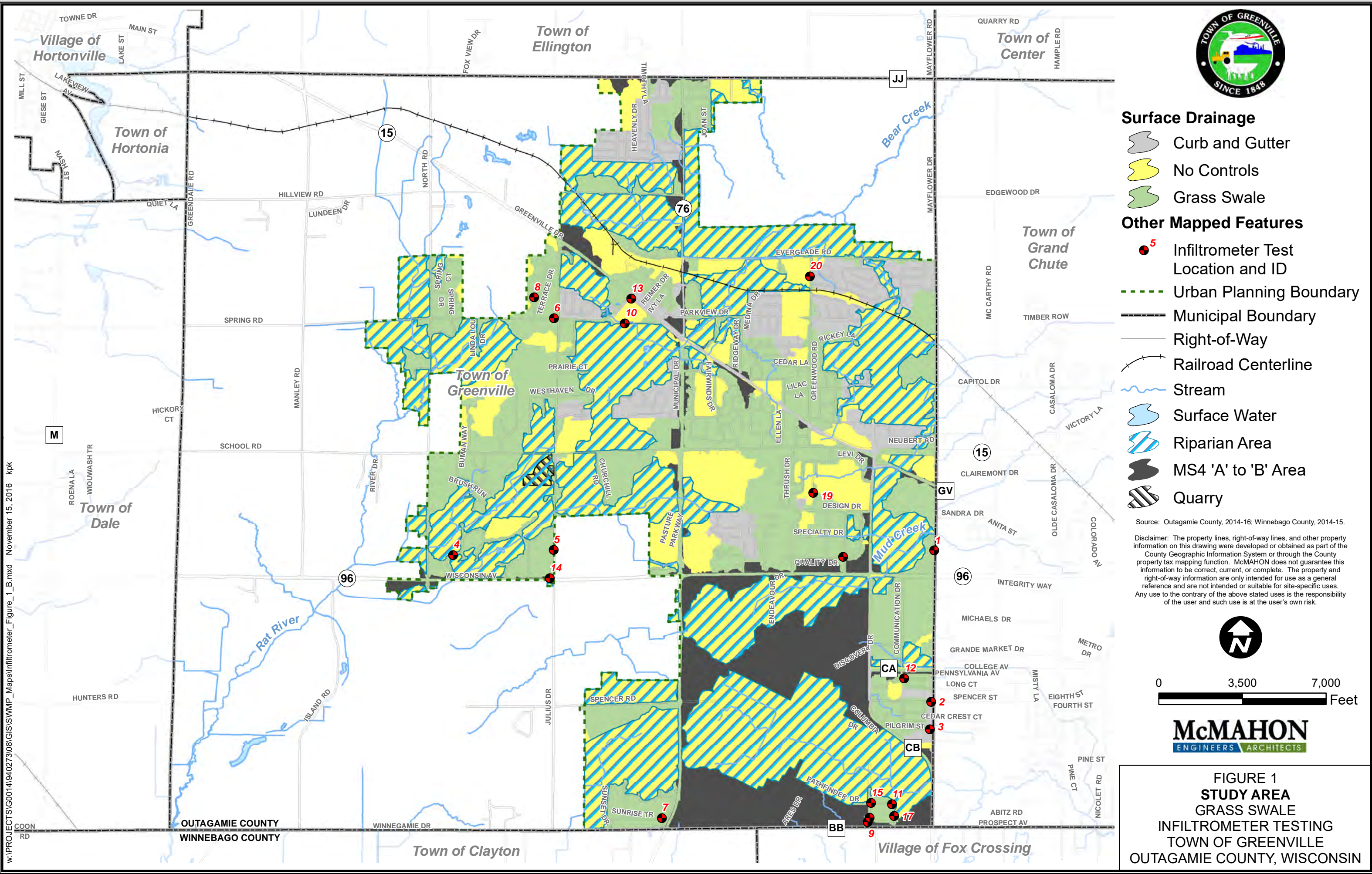
In summary, the double-ring infiltrometer tests performed have provided a basis for determining the representative dynamic soil infiltration rates for grass swales within the study area. The ‘average’ dynamic soil infiltration rates determined from this report will be used to evaluate the water quality credits provided by any of the Town’s grass swales. The water quality credits provided by Town grass swales can be found in the Towns Municipal-Wide Stormwater Quality Management Plan.

## APPENDIX A

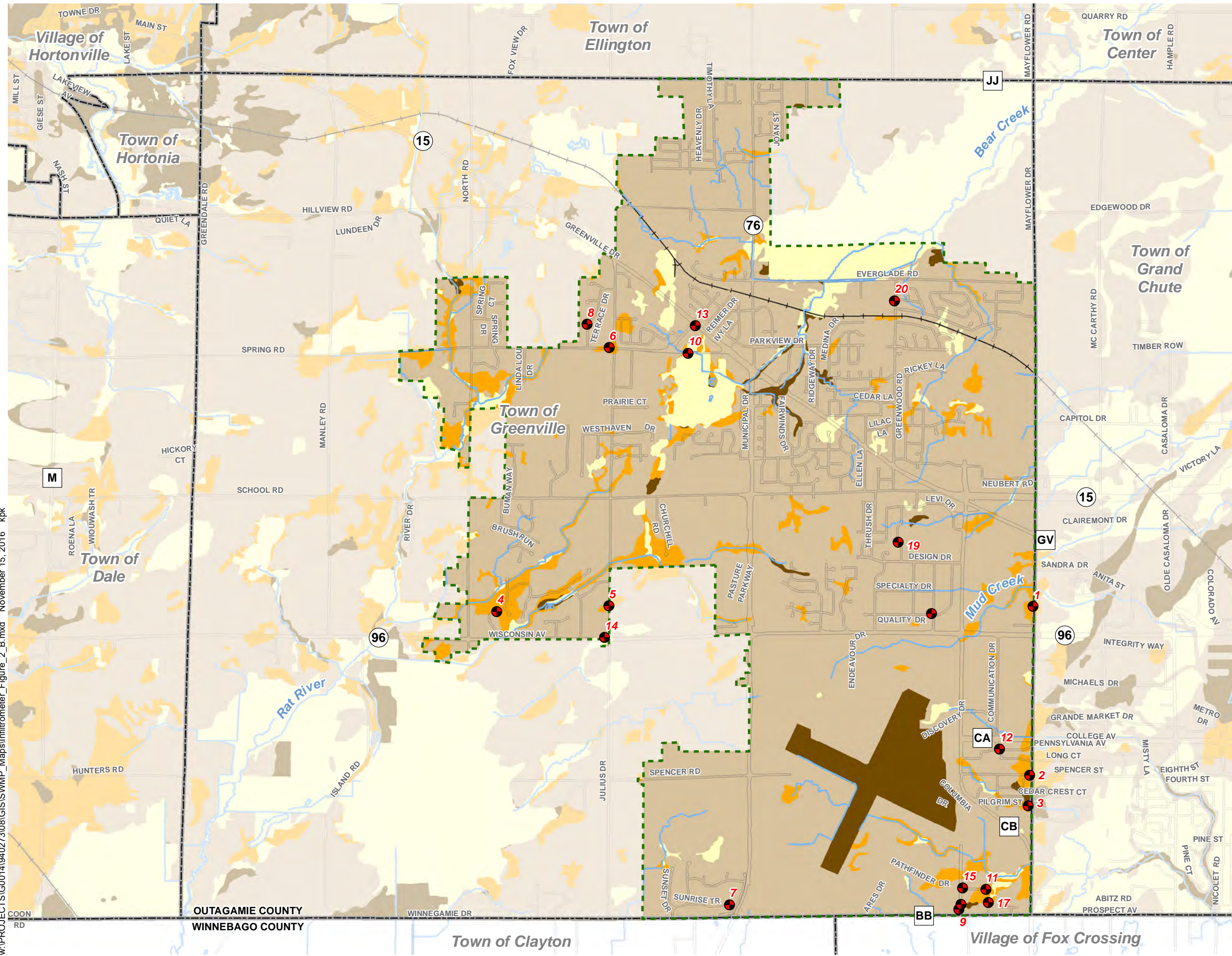
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### FIGURES

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### Hydrologic Soil Group (HSG)

- HSG A
- HSG B
- HSG C
- HSG D

### Other Mapped Features

- Infiltrometer Test Location and ID
- Urban Planning Boundary
- Municipal Boundary
- Right-of-Way
- Railroad Centerline
- Stream
- Surface Water

Source: Outagamie County, 2014-16; Winnebago County, 2014-15; USDA/NRCS, 2014.

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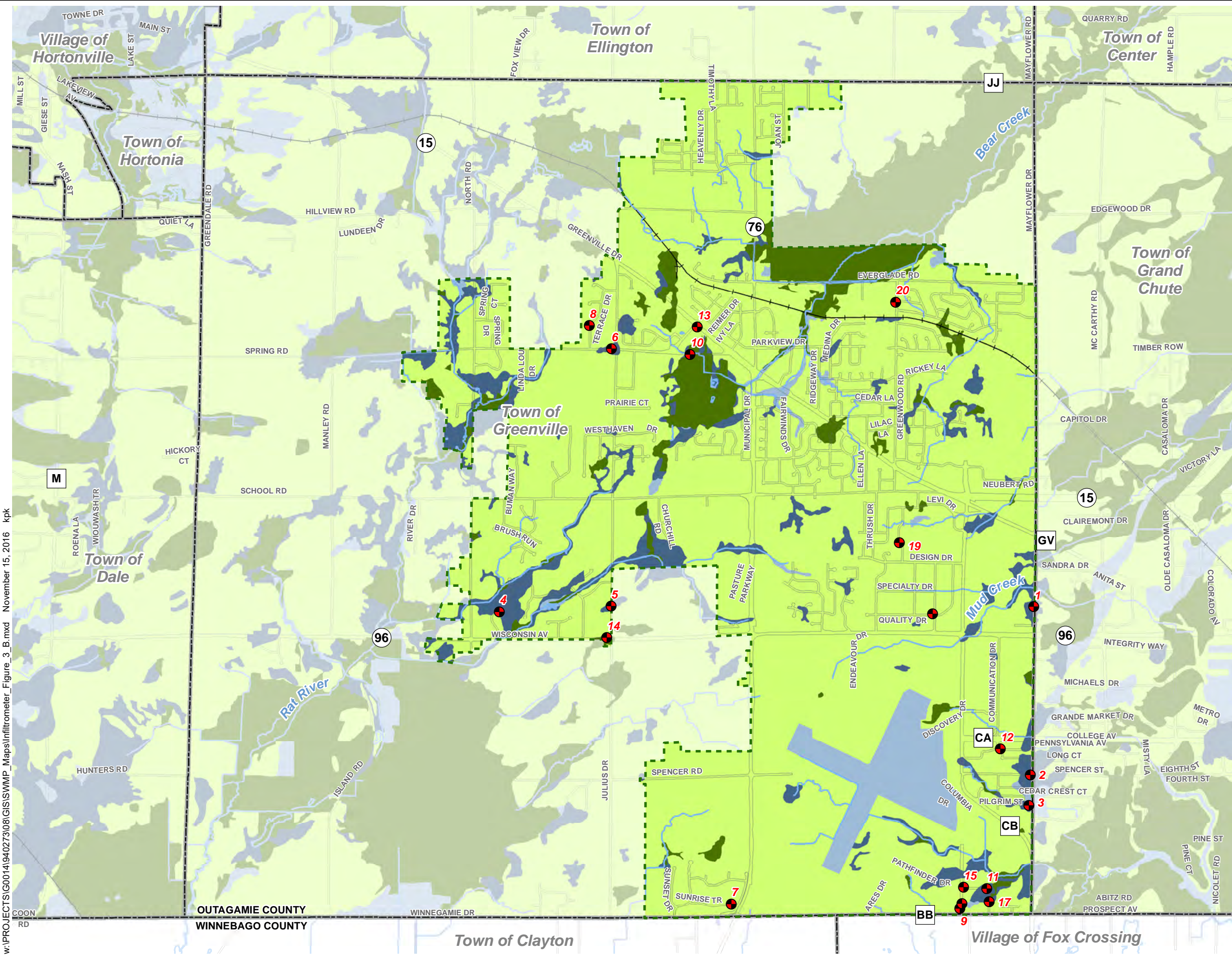


0 3,500 7,000 Feet



FIGURE 2  
SOILS AND TEST LOCATIONS  
GRASS SWALE  
INFILTROMETER TESTING  
TOWN OF GREENVILLE  
OUTAGAMIE COUNTY, WISCONSIN

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**Average Infiltration Rates  
(Inches Per Hour)**

- 2.26
- 0.52
- 0.37
- 0.20

**Other Mapped Features**

- Infiltrometer Test Location and ID
- Urban Planning Boundary
- Municipal Boundary
- Right-of-Way
- Railroad Centerline
- Stream
- Surface Water

Source: Outagamie County, 2014-16; Winnebago County, 2014-15; USDA/NRCS, 2014.

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0 3,500 7,000 Feet



**FIGURE 3  
INFILTRATION RATES  
GRASS SWALE  
INFILTROMETER TESTING  
TOWN OF GREENVILLE  
OUTAGAMIE COUNTY, WISCONSIN**

## **APPENDIX B**

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### **WDNR GRASS SWALE GUIDANCE DOCUMENT**

# CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: November 24, 2010

TO: Regional Water Leaders, Basin Leaders and Experts  
Storm Water Permit Staff (via email)

FROM: Russ Rasmussen, Director, Bureau of Watershed Management  
DNR Storm Water Permit Engineers 

SUBJECT: Process to Assess and Model Grass Swales for ss. NR 151.13(2) and NR 216.07(6), Wis. Adm. Code  
- Total Suspended Solids Reduction

*This document is intended solely as guidance, and does not contain any mandatory requirements except where requirements found in statute or administrative rule are referenced. This guidance does not establish or affect legal rights or obligations, and is not finally determinative of any of the issues addressed. This guidance does not create any rights enforceable by any party in litigation with the State of Wisconsin or the Department of Natural Resources. Any regulatory decisions made by the Department of Natural Resources in any matter addressed by this guidance will be made by applying the governing statutes and administrative rules to the relevant facts. **This guidance document supersedes the guidance document on Dated April 24, 2008 and subsequent erratas dated August, 2008 and April, 2009.***

## Issue

Under s. NR 151.13(2), Wis. Adm. Code, a municipality subject to the municipal storm water permit requirements of s. NR 216.07(6), Wis. Adm. Code, must implement a 20% reduction in total suspended solids (TSS), by March 10, 2008 or 24 months from coverage under the Municipal Separate Storm Sewer System (MS4) general permit, and a 40% TSS reduction by March 10, 2013. This memorandum provides DNR staff with guidance to advise affected municipalities and their consultants on how to evaluate grassed swales in the developed urban area for water quality credit. (This guidance does not address design of grassed swales to serve new development. The Vegetated Infiltration Swale, Interim Technical Standard, No. 1005 provides information on construction of new grassed swales.)

## Discussion

To meet the requirements of the MS4 permit and the TSS reduction goal of s. NR 151.13(2), Wis. Adm. Code, a municipality must assess existing best management practices (BMPs) for TSS control and propose additional BMPs if the performance standard cannot be met with existing practices. One BMP available to many permitted municipalities is the grassed swale. This guidance provides a basis for assessing and modeling swales for TSS reduction to foster consistent application of this practice in all permitted municipalities. The goals of this guidance are to:

- Determine which water quality swales in the MS4 are eligible to receive TSS reduction credit, and
- Identify a typical swale geometry that can be considered representative. (It may be appropriate to develop more than one typical swale geometry if the swale characteristics in the MS4 are highly variable.)

## DNR Guidance

**Step 1.** Identify which swales in the municipality can be considered water quality swales for the purpose of meeting the 20% and 40% TSS reduction goal.

The following apply to all swales in the developed urban area if they are to be considered water quality swales:

- A. Swales are not required to have pretreatment swales or equivalent pretreatment.
- B. The longitudinal slope must be less than 4% unless slope interruption devices are installed in the swales to ensure low flow velocities. Slope interruption devices must be consistent with Ditch Check Technical

Standard, No. 1062. Swales with slope interruption devices will be evaluated using a modified longitudinal slope of 1%.

- C. The Department is concerned about channel scouring and re-suspension of previously settled particles in swales that are being used for MS4 pollutant removal credit. To address this concern, all swales should be inspected for visual evidence of scour. Swales with visual evidence of scour, such as channel cuts in the bottom or areas of bare soil, can not be included.

There are two ways of identifying water quality swales within an MS4:

- A. If swale survey data is available, determine the locations of water quality swales and arrive at typical swale geometry based on statistical methods.
- B. In the absence of survey data, a desktop and field survey would be appropriate. The desktop and field procedure is as follows:
  1. Identify potential water quality swale areas by using available topographic, land use and soil information.
  2. Based on results of the desktop evaluation, select a representative number of typical swale locations in the MS4 by conducting a field survey. A minimum of five locations should be selected. At each location:
    - Measure the width of the swale bottom using a tape measure.
    - For side slopes, measure the vertical drop over the level length using a carpenter's level and tape measure.
    - Select at least three cross-sections of the swale and average the results to determine the bottom width and side slopes.
    - Determine longitudinal slope using 2-ft contour mapping or other available topographic information.
  3. Use the typical swale geometry that best represents each drainage area.

**Step 2.** Model the swales identified in **Step 1.** using a model such as SLAMM or P8.

When modeling swales in SLAMM or P8 the following must be considered:

**How should drainage basins with a mix of swale and storm sewer conveyance systems be evaluated?**

Drainage basins with a combination of swales and storm sewer should be subdivided by conveyance system type and the subdivisions modeled separately. In SLAMM, swales need to be modeled separately because drainage system type (e.g., swale vs. storm sewer) cannot be assigned to individual source areas.

Where swale density varies within a modeled area, the swale density should be an area weighted average across the model area. For example, if a 100 acre modeled area has 90 acres of residential land use with an average swale density of 359 ft/acre and 10 acres of strip commercial with an average swale density of 412 ft/acre then the area weighted average across modeled area is  $[(90 \times 359) + (10 \times 412)] / 100 = 364$  ft/acre.

Table 1 identifies the average swale density used in the standard land use files from SLAMM version 9.2. It is recommended that rather than using these averages, the municipality should identify the actual swale density for each of the representative areas.

**TABLE 1**

<u>Land use</u>	<u>Swale Density (ft/acre)</u>
Low density residential	238
Medium density residential	359
High density residential	385
Strip commercial	412
Shopping centers	92
Industrial	265
Freeway (Shoulder only)	1309
Freeway (Shoulder and Center)	1964

Note: These average swale density figures are from the SLAMM version 9.2 Standard Land Use files available on the USGS website at: <http://wi.water.usgs.gov/slammm/>

**Should swales be modeled using the “wetted perimeter” or “typical swale geometry” option?**

The typical swale geometry option must be used. Both SLAMM and P8 calculate wetted perimeter from the geometry for each storm event, which is more accurate than a user selected defined wetted perimeter.

**What Manning’s “n” should be used for the typical swale geometry<sup>1</sup>?**

A Manning’s “n” value of 0.30 or less is recommended, based on type of vegetation, mowing height and depth of flow. Supporting documentation should be provided if Manning’s “n” values greater than 0.30 are used

**How should the infiltration rate be determined?**

The guidance provided in the Site Evaluation for Stormwater Infiltration Technical Standard, No. 1002 should be followed. The swale infiltration rate should be determined based on the representative soil texture identified in the NRCS soil survey or other soil data if available. When the representative soil texture has been determined, the appropriate design infiltration rate should be selected from Table 2 of the Technical Standard, No. 1002. If the infiltration rate is measured in the field using a scientifically credible field test method, the measured value can be used for the static infiltration rate without using the correction factors in Table 3 of Technical Standard, No. 1002. **Prior to entering an infiltration rate in the model, the design infiltration rate from Table 2, or the measured infiltration rate must be reduced by 50%.** The SLAMM default “infiltration rate by soil type” values should not be used.

**Existing language in Technical Standard 1002 V. Step C. 4.b indicates that a measured infiltration rate using a double-ring infiltrometer test must follow the requirements of ASTM D3385. While this may be appropriate for designing new swales, is there any flexibility for measuring an existing swale using a double-ring infiltrometer test?**

To determine the static infiltration rate of existing swales using a double-ring infiltrometer the following modifications to procedures in ASTM D3385 are allowed:

While the dimension and materials used for the double-ring should be based on the requirements of ASTM D3385, the infiltration rate can be measured in a time frame of a minimum of 2 hours instead of 24 hours and the water level in both rings does not have to stay constant during the test. The following procedure is a more cost-effective

<sup>1</sup> SLAMM version 9.3 will adjust Manning’s “n” based on flow, swale geometry and vegetative retardance classifications

approach to obtaining a reasonable estimate of the infiltration rate of existing grass swales. For most soil types the infiltration rate measured by the procedure should represent the soils under more saturated conditions. Sandier soil types might not be represented by saturated conditions, but the higher infiltration rate will probably represent reality for the duration of most storm events. The lowest infiltration rate observed is the one to be used for estimating the TSS reduction for the swales and is considered a static infiltration rate. The static rate should be cut in half to represent the dynamic infiltration rate in the model.

#### Field Test Procedure for Double-Ring Infiltrometer

1. Select a relatively flat test area so that the double-ring infiltrometer will not be placed at an angle.
2. Cut the grass to a height of between two to four inches.
3. Gently drive the infiltrometer into the ground.
4. Inspect the soil seal around each ring to make sure that it is even and smooth.
5. Pour clean water into the inner chamber and allow it to overflow and fill up the outer ring. Maintain a level in the outer ring approximately equal to the level in the inner ring.
6. Add more water to both rings when the level in the inner ring has dropped a measurable amount. For most soil types this should be less than an inch.
7. Repeat this step until the rate the water level drops begins to decline.
8. When the rate of decline begins to slow, bring the water level up to the top and start timing the decrease in water level.
9. Record the start time.
10. Stop timing when the water level in the inner ring has gone down a measureable level (the ASTM standard requires keeping the water level constant). Timing the rate of decline should probably be started almost immediately for more clayey soils, since it might be difficult to observe when the rate change has slowed.
11. Record the time, elapsed time, and change in water level.
12. Refill both rings and restart the timing.
13. Record the time, elapsed time, change in water level, and the elapsed time since the beginning of the first measurement.
14. Repeat the timing steps until the infiltration rate has become relatively constant or the test has been conducted for a minimum of two hours. (The ASTM standard requires 24 hours).
15. The measured rate of infiltration is considered a static infiltration rate. The dynamic infiltration rate is  $\frac{1}{2}$  the static rate. Be aware some models, such as WinSLAMM, call for the dynamic rate for swales.

**I have taken a number of measurements along a swale length and have several infiltration rates to average. How do I average the results of my in-field tests?**

The geometric mean(s) of infiltration testing results should be used. However, equally important is to consider whether the measured infiltration rates should be 'grouped' in order to apply separate geometric means to different areas in order to provide representative TSS results across a municipality. Grouping of results might be done based on soil type, spatial reasons or simply done as a method to help provide representative results. For instance, if there are several relatively low infiltration rates measured and the geometric mean of the entire data set is quite high, it may be prudent to group the relatively low rates together and assign them to a representative area.

Note: In order to calculate a geometric mean, the data set of values must be greater than zero. Where the infiltration rate is too low to measure, a rate of 0.03 in/hr may be used to calculate a geometric mean of the data set.

**Are velocity calculations required?**

The swales that were not eliminated by visual inspection should be evaluated for scour and re-suspension using the results of velocity or shear stress calculations conducted at the representative swale locations

from **Step 1**. Velocity or shear stress calculations should be conducted based on the peak discharge rate for a 2-yr, 24-hr design event (or a reasonably equivalent event from the SLAMM or P8 rainfall file for the area) to verify that scour and re-suspension will not be a problem.

**Do water quality swales need to meet the slope parameters identified in Vegetated Infiltration Swale, Interim Technical Standard, No. 1005?**

If functioning as vegetated conveyance systems, swales with longitudinal slope less than 1% can be used. However, there is concern that swales with slopes less than 1% can clog. Where visual evidence indicates that the infiltration rate has been reduced (e.g., significant duration of ponded water or evidence of wetland vegetation), infiltration rates appropriate for clay soils should be used.

**How do I model road runoff that sheet flows off the road and is dispersed with no apparent concentrated flow path?**

For roads where runoff sheet flows off to the side of the road and is dispersed into adjacent pervious areas with no concentrated flow path in the vicinity, the roadway would be considered a disconnected impervious surface. Currently, SLAMM does not have the option of disconnecting a roadway, whereas rooftops and driveways can be disconnected. Therefore, an alternative method is needed to give treatment credit for such a system. If there is no concentrated flow path near the roadway and the runoff is dispersed as sheet flow across healthy vegetated areas, model this as a very broad, flat swale unless there is an option to model it as a vegetated filter strip.

Approved By:



Gordon Stevenson, Chief  
Runoff Management Section

## **Errata for Process to Assess and Model Existing Grass Swales (TSS Reduction) Modifications to Double-Ring Infiltrometer Test Procedures in Technical Standard 1002**

Existing language in Technical Standard 1002 V. Step C. 4.b.:

*Measured Infiltration Rate - The tests shall be conducted at the proposed bottom elevation of the infiltration device. If the infiltration rate is measured with a Double-Ring Infiltrometer the requirements of ASTM D3385 shall be used for the field test.*

Modifications to procedures in ASTM D3385:

If the infiltration rate is measured with a Double-Ring Infiltrometer, the dimension and materials used for the double-ring should be based on the requirements of ASTM D3385. The following procedure should be used when using the double-ring infiltrometer for a field test in an existing grass swale. The procedure differs from the field procedures in ASTM D3385 by accepting the infiltration rate measured in a time frame of a minimum of 2 hrs. instead of 24 hours and the water level in both rings does not have to stay constant during the test. The procedure is a more cost-effective approach to obtaining a reasonable estimate of the infiltration rate of existing grass swales. For most soil types the infiltration rate measured by the procedure should represent the soils under more saturated conditions. More sandy soil types might not be represented by saturated conditions, but the higher infiltration rate will probably represent reality for the duration of most storm events. The lowest infiltration rate observed is the one to be used for estimating the TSS reduction for the swales and is considered a static infiltration rate. The static rate should be cut in half to represent the dynamic infiltration rate required by WinSLAMM.

### **Field Test Procedure for Double-Ring Infiltrometer**

1. Select a relatively flat test area so that the double-ring infiltrometer will not be placed at an angle.
2. Cut the grass to a height of between two to four inches.
3. Gently drive the infiltrometer into the ground.
4. Inspect the soil seal around each ring to make sure that it is even and smooth.
5. Pour clean water into the inner chamber and allow it to overflow and fill up the outer ring. Maintain a level in the outer ring approximately equal to the level in the inner ring.
6. Add more water to both rings when the level in the inner ring has dropped a measurable amount. For most soil types this should be less than an inch.
7. Repeat this step until the rate the water level drops begins to decline.
8. When the rate of decline begins to slow, bring the water level up to the top and start timing the decrease in water level.
9. Record the start time.
10. Stop timing when the water level in the inner ring has gone down a measureable level (the ASTM standard requires keeping the water level constant). Timing the rate of decline should probably be started almost immediately for more clayey soils, since it might be difficult to observe when the rate change has slowed.
11. Record the time, elapsed time, and change in water level.
12. Refill both rings and restart the timing.
13. Record the time, elapsed time, change in water level, and the elapsed time since the beginning of the first measurement.
14. Repeat the timing steps until the infiltration rate has become relatively constant or the test has been conducted for a minimum of two hours. (The ASTM standard requires 24 hours).
15. The measured rate of infiltration is considered a static infiltration rate. The dynamic infiltration rate is  $\frac{1}{2}$  the static rate. Be aware some models, such as WinSLAMM, call for the dynamic rate for swales.

## **APPENDIX C**

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### **INFILTROMETER TESTING RESULTS & PHOTOS**



**TOWN OF GREENVILLE  
INFILTROMETER TESTING / DESIGN INFILTRATION RATES**

**TABLE 1  
GRASS SWALE INFILTROMETER TEST RESULTS**

Test #	NRCS Soil Symbol	NRCS Soil Name	Hydrologic Soil Group (HSG)	NRCS Surface Soil Texture	<sup>2</sup> Design Infiltration Rate	<sup>1</sup> NRCS Representative Soil Texture	<sup>2</sup> Design Infiltration Rate	Measured Static Infiltration Rate (in/hr)	<sup>3</sup> Measured Dynamic Infiltration Rate (in/hr)
1	MsB	Menominee	B	loamy fine sand	0.50	sandy loam	0.50	7.19	3.59
2	CcB	Casco	B	loam	0.24	sand to gravel	3.60	36.82	18.41
3	MeB	Manistee	A	loamy fine sand	0.50	clay	0.07	6.84	3.42
4	MsB	Menominee	B	loamy fine sand	0.50	sandy loam	0.50	0.13	0.07
5	SzA	Symco	B	silt loam	0.13	sand & gravel	3.60	0.41	0.20
6	ShA	Shiocton	B	silt loam	0.13	very fine sand	0.50	6.50	3.25
7	HrB	Hortonville	C	silt loam	0.13	loam	0.24	2.00	1.00
8	HrC2	Hortonville	C	silt loam	0.13	loam	0.24	0.19	0.09
9	HnB	Hortonville	C	fine sandy loam	0.50	fine sandy loam	0.50	0.70	0.35
10	SyA	Symco	C	silt loam	0.13	loam	0.24	2.25	1.13
11	NfB	Nichols	B	very fine sandy loam	0.50	fine sand	0.50	0.75	0.38
12	HrB	Hortonville	C	silt loam	0.13	loam	0.24	0.50	0.25
13	KhC2	Kewaunee	C	silt loam	0.13	silty clay loam	0.04	0.44	0.22
14	McA	Manawa	D	silty clay loam	0.04	silty clay	0.07	0.41	0.20
15	Gp	Gravel Pits	C	coarse sand	3.60	coarse sand	3.60	11.31	5.65
16	AdA	Allendale	A	loamy fine sand	0.50	silty clay	0.07	3.00	1.50
17	MfB	Manistee	B	fine sandy loam	0.50	clay	0.07	0.66	0.33
18	HrB	Hortonville	C	silt loam	0.13	loam	0.24	1.75	0.88
19	Po	Poygan	C	silty clay loam	0.04	clay	0.07	0.19	0.09
20	HrB	Hortonville	C	silt loam	0.13	loam	0.24	1.50	0.75

- Removed from the data set, measured dynamic infiltration rate greater than 3.60 in /hr

<sup>1</sup>Least permeable soil horizon 5' below infiltration system

<sup>2</sup>From 1002 Code (Site Evaluation for Stormwater Infiltration)

<sup>3</sup>Dynamic infiltration rate is 50% of static infiltration rate; Input into WinSLAMM for grass swale modeling

**TABLE 2  
GRASS SWALE INFILTROMETER TEST RESULTS**

Test #	NRCS Soil Symbol	NRCS Soil Name	Hydrologic Soil Group (HSG)	Measured Static Infiltration Rate (in/hr)	Measured Dynamic Infiltration Rate (in/hr)
3	MeB	Manistee	A	6.84	3.42
16	AdA	Allendale	A	3.00	1.50
1	MsB	Menominee	B	7.19	3.59
4	MsB	Menominee	B	0.13	0.07
5	SzA	Symco	B	0.41	0.20
6	ShA	Shiocton	B	6.50	3.25
11	NfB	Nichols	B	0.75	0.38
17	MfB	Manistee	B	0.66	0.33
7	HrB	Hortonville	C	2.00	1.00
8	HrC2	Hortonville	C	0.19	0.09
9	HnB	Hortonville	C	0.70	0.35
10	SyA	Symco	C	2.25	1.13
12	HrB	Hortonville	C	0.50	0.25
13	KhC2	Kewaunee	C	0.44	0.22
18	HrB	Hortonville	C	1.75	0.88
19	Po	Poygan	C	0.19	0.09
20	HrB	Hortonville	C	1.50	0.75
14	McA	Manawa	D	0.41	0.20

T. Greenville  
Infiltrometer Test Photos



**Test Site #1**



**Test Site #2**

T. Greenville  
Infiltrometer Test Photos



**Test Site #3**

**No Photo Available**

**Test Site #4**

T. Greenville  
Infiltrometer Test Photos



**Test Site #5**



**Test Site #6**

T. Greenville  
Infiltrrometer Test Photos



**Test Site #7**



**Test Site #8**

T. Greenville  
Infiltrrometer Test Photos



**Test Site #9**



**Test Site #10**

T. Greenville  
Infiltrometer Test Photos



**Test Site #11**



**Test Site #12**

T. Greenville  
Infiltrrometer Test Photos



**Test Site #13**



**Test Site #14**

T. Greenville  
Infiltrrometer Test Photos



**Test Site #15**



**Test Site #16**

**No Photo Available**

**Test Site #17**



**Test Site #18**

T. Greenville  
Infiltrometer Test Photos



**Test Site #19**



**Test Site #20**

# Ordinances

For The

## CONSTRUCTION SITE EROSION CONTROL & POST-CONSTRUCTION STORMWATER MANAGEMENT PROGRAMS

Prepared For The



**TOWN OF GREENVILLE**  
OUTAGAMIE COUNTY, WISCONSIN

DECEMBER 13, 2016

McM No. G0014-9-14-00273

NAV;jlh

**McMAHON**  
ENGINEERS ARCHITECTS

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Mailing P.O. BOX 1025 | NEENAH, WI 54957-1025  
PH 920.751.4200 FX 920.751.4284 MCMGRP.COM

# Ordinances

For The

## CONSTRUCTION SITE EROSION CONTROL & POST-CONSTRUCTION STORMWATER MANAGEMENT PROGRAMS

Prepared For The



### TOWN OF GREENVILLE OUTAGAMIE COUNTY, WISCONSIN

DECEMBER 13, 2016  
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For The

## CONSTRUCTION SITE EROSION CONTROL & POST-CONSTRUCTION STORMWATER MANAGEMENT PROGRAMS

Prepared For The



### TOWN OF GREENVILLE OUTAGAMIE COUNTY, WISCONSIN

DECEMBER 13, 2016  
McM. No. G0014-9-14-00273

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#### I. OVERVIEW

Several documents were updated or developed to assist the Town of Greenville with Municipal Stormwater Permit compliance and stormwater quality improvement. The documents are as follows:

- *Construction Site Erosion Control Program:* The Town's construction site erosion control ordinance and reference guide were updated to conform with recent modifications to Wisconsin Administrative Code NR 151. In addition, an educational brochure was developed to help landowners better understand which construction activities require ordinance compliance. These ordinance and educational activities are anticipated to reduce the amount of sediment, phosphorus and other stormwater pollutants discharging from construction sites. A copy of the educational brochure, construction site erosion control ordinance and reference guide are provided in Appendix A.
- *Post-Construction Stormwater Management Program:* The Town's post-construction stormwater management ordinance and reference guide were updated to conform with

ORDINANCES

recent modifications to Wisconsin Administrative Code NR 151. In addition, an educational brochure was developed to help landowners better understand which post-construction activities require ordinance compliance. These ordinance and educational activities are anticipated to reduce the amount of sediment, phosphorus and other stormwater pollutants discharging from post-construction sites. A copy of the educational brochure, post-construction stormwater management ordinance, and reference guide are provided in Appendix B.

## **APPENDIX A**

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### **CONSTRUCTION SITE EROSION CONTROL PROGRAM**

# Construction Site Erosion Control Permit

## Protecting Our Lakes, Rivers & Streams

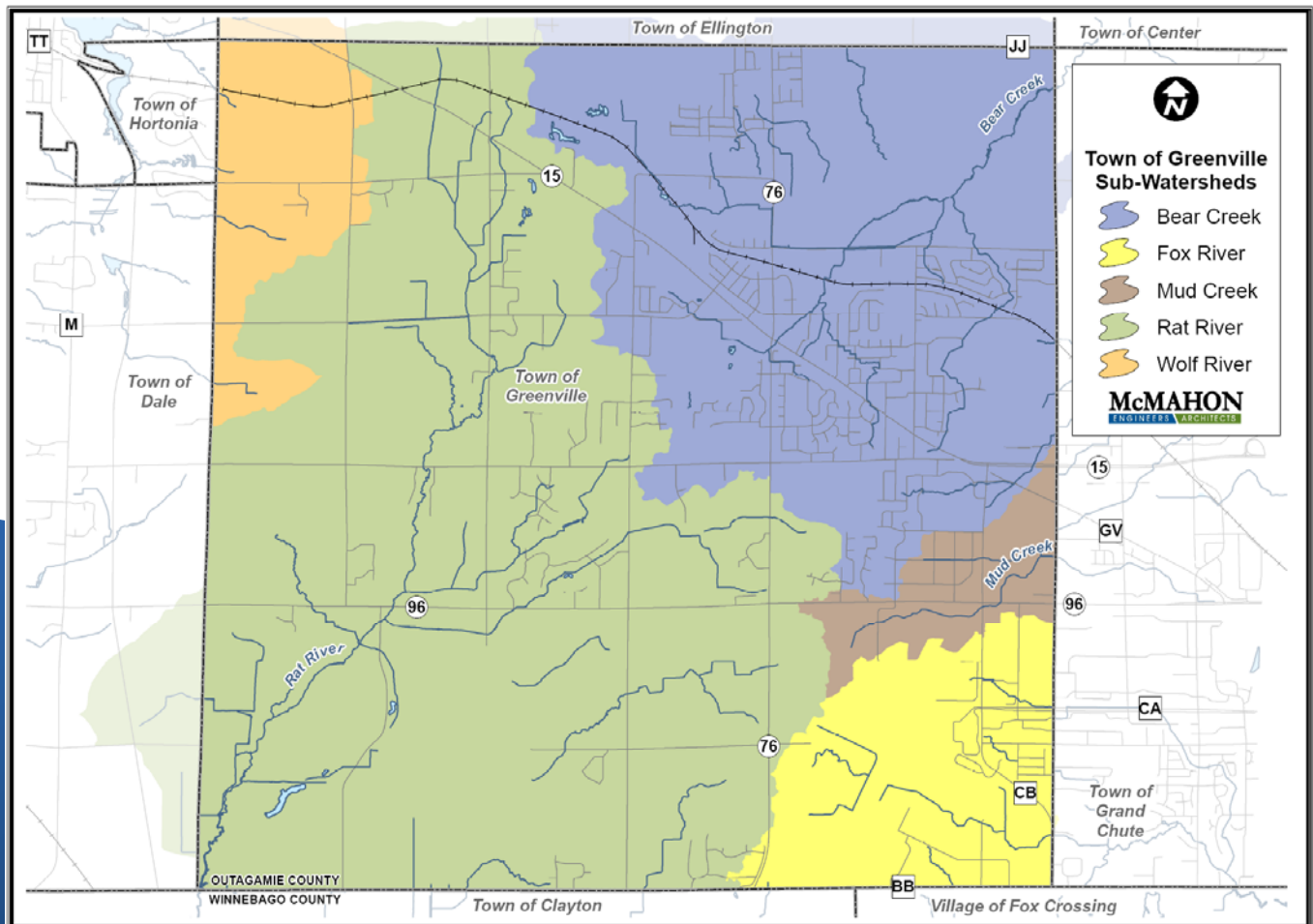
The Town of Greenville is required by the Wisconsin Department of Natural Resources to reduce the amount of stormwater pollutants discharging into Bear Creek, Mud Creek, Rat River, Wolf River and the Fox River. Stormwater pollutants include sediment, phosphorus, bacteria, heavy metals, motor oil, toxins, solvents, pesticides, litter and other pollutants.

Decreasing the amount of sediment and phosphorus is anticipated to improve water clarity and reduce algae blooms in streams, rivers and lakes. Reduced algae will increase the amount of oxygen available for fish and aquatic species survival. Also, greater water clarity and decreased algae will improve recreational opportunities and scenic beauty.

The Town's drainage system is a network of swales, pipes and storm inlets that carry stormwater pollutants directly to Bear Creek, Mud Creek, Rat River, Wolf River and the Fox River. As shown on the watershed map, the majority of the Town's developed urban area is located within the Bear Creek and Rat River Sub-Watersheds. The Town's Construction Site Erosion Control Ordinance requires the use of best management practices (BMPs) to reduce soil erosion and pollutant discharges from a construction site.



**Fox River: Sediment & Poor Water Clarity**



# Frequently Asked Questions...

## When is compliance required?

Ordinance compliance is required for all construction sites located within the Town.

## Who is responsible for compliance?

Landowners, developers, builders, contractors, subcontractors, landscapers, utility companies and other persons involved with a construction site are responsible for ordinance compliance.

## When is a Town permit required?

The Town's ordinance requires an erosion control permit for construction sites with 4,000 square feet or more of land disturbance. Although a permit is not typically required for construction sites with less than 4,000 square feet of land disturbance, ordinance compliance is still required.

## What is required by the ordinance?

The Town's ordinance requires implementation and maintenance of best management practices (BMPs).

- **Non-Permitted Site** – Refer to the list of required BMPs for a non-permitted construction site.
- **Permitted Site** – In addition to the BMPs required for a non-permitted site, a written erosion and sediment control plan is required for a permitted site. If the site has 1 acre or more of land disturbance, the site also needs to comply with a maximum 5 ton per acre per year sediment performance standard.



### BMPs Required for Non-Permitted Site:

- Do not track soil onto streets by vehicles.
- Do protect storm inlets from sediment.
- Do protect adjacent streams, rivers, lakes and wetlands from sediment.
- Do protect storm sewers, culverts and ditches that carry runoff off the site.
- Do not discharge sediment during site dewatering activities.
- Do protect soil stockpiles that exist for more than 7 days from erosion.
- Do not discharge chemicals, cement and other building materials into storm sewers, ditches, streams, rivers, lakes and wetlands.



FOR ADDITIONAL INFORMATION:



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**McMAHON**  
ENGINEERS ARCHITECTS

The Town Board of the Town of Greenville does hereby ordain that Chapter 117 of the code of ordinances of the Town of Greenville is repealed and recreated to read as follows:

## **Chapter 117. Erosion and Sediment Control.**

### **§ 117-1. Authority.**

- A. This chapter is adopted by the Town of Greenville Board under the authority granted by § 60.627, Wis. Stats. This chapter supersedes all provisions of an ordinance previously enacted under § 60.62, Wis. Stats., that relate to construction site erosion control. Except as otherwise specified in § 60.627 Wis. Stats., § 60.62, Wis. Stats., applies to this chapter and to any amendments to this chapter.
- B. The provisions of this chapter are deemed not to limit any other lawful regulatory powers of the same governing body.
- C. The Town Board hereby designates the Public Works Department to administer and enforce the provisions of this chapter.
- D. The requirements of this chapter do not pre-empt more stringent erosion and sediment control requirements that may be imposed by any of the following:
  - (1) Wisconsin Department of Natural Resources administrative rules, permits or approvals including those authorized under §§ 281.16 and 283.33, Wis. Stats.
  - (2) Targeted performance standards promulgated in rules by the Wisconsin Department of Natural Resources under § NR 151.004, Wis. Adm. Code.

### **§ 117-2. Findings of fact.**

The Town Board finds that runoff from land disturbing construction activity carries a significant amount of sediment and other pollutants to the waters of the state in the Town of Greenville.

### **§ 117-3. Purpose.**

It is the purpose of this chapter to further the maintenance of safe and healthful conditions; prevent and control water pollution; prevent and control soil erosion; protect spawning grounds, fish and aquatic life; control building sites, placement of structures and land uses; preserve ground cover and scenic beauty; and promote sound economic growth, by minimizing the amount of sediment and other pollutants carried by runoff or discharged from land disturbing construction activity to waters of the state in the Town of Greenville.

### **§ 117-4. Applicability and jurisdiction.**

- A. Applicability.
  - (1) Where not otherwise limited by law, this chapter applies to all construction sites, unless the site is otherwise exempt under § 117-4A(2) or (3):

- (a) A permit is required for a construction site with 4,000 square feet or greater of land disturbing construction activity. The responsible party shall comply with all applicable provisions of this chapter for a permitted site, including the § 117-7B performance standards, § 117-8 permit requirements, and § 117-9 plan requirements.
  - (b) A permit is not required for a construction site with less than 4,000 square feet of land disturbing construction activity. The responsible party shall comply with all applicable provisions of this chapter for a non-permitted site, including the § 117-7A performance standards.
  - (c) Notwithstanding the applicability requirements in § 117-4A(1)(a) and (b), a permit is required for a construction site with less than 4,000 square feet of land disturbing construction activity if the administering authority determines that permit coverage is needed in order to improve chapter compliance, meet targeted performance standards, or protect waters of the state. If a permit is required, the responsible party shall comply with all applicable provisions of this chapter for a permitted site, including the § 117-7B performance standards, § 117-8 permit requirements, and § 117-9 plan requirements.
  - (d) Utility work and other disturbances of a continuous distance of 100 feet of road ditch, nonagricultural grass waterway or other nonagricultural land area where drainage occurs in a watercourse.
- (2) This chapter does not apply to the following:
- (a) Nonpoint discharges from agricultural activity areas.
  - (b) Nonpoint discharges from silviculture activities.
- (3) A construction site exempted by federal statutes or regulations from the requirement to have a national pollutant discharge elimination system permit issued under 40 CFR 122, for land disturbing construction activity, shall comply with § 117-7A performance standards if less than one acre of land disturbing construction activity. The § 117-7B performance standards, § 117-8 permit requirements, and § 117-9 plan requirements are not applicable.
- B. Jurisdiction. This chapter applies to land disturbing construction activity on construction sites located within the boundaries and jurisdiction of the Town of Greenville.
- C. Exclusions. This chapter is not applicable to activities conducted by a state agency, as defined under § 227.01 (1), Wis. Stats., but also including the office of district attorney, which is subject to the state plan promulgated or a memorandum of understanding entered into under § 281.33 (2), Wis. Stats.

## **§ 117-5. Definitions.**

As used in this chapter, the following terms shall have the meanings indicated:

### **ADMINISTERING AUTHORITY**

A governmental employee or their designees empowered under s. 60.627, Wis. Stats., to administer this chapter. For the purpose of this ordinance, it is the Town of Greenville Public Works Department under guidance from the Town Board.

**AGRICULTURAL ACTIVITY AREA**

The part of the farm where there is planting, growing, cultivating and harvesting of crops for human or livestock consumption and pasturing or outside yarding of livestock, including sod farms and silviculture. Practices in this area may include waterways, drainage ditches, diversions, terraces, farm lanes, excavation, filling and similar practices. The agricultural activity area does not include the agricultural production area.

**AGRICULTURAL PRODUCTION AREA**

The part of the farm where there is concentrated production activity or impervious surfaces. Agricultural production areas include buildings, driveways, parking areas, feed storage structures, manure storage structures, and other impervious surfaces. The agricultural production area does not include the agricultural activity area.

**ATLAS 14**

The National Oceanic and Atmospheric Administration (NOAA) Atlas 14 Precipitation-Frequency Atlas of the United States, Volume 8 (Midwestern States), published in 2013.

**BEST MANAGEMENT PRACTICE or BMP**

Structural or non-structural measures, practices, techniques or devices employed to avoid or minimize soil, sediment or pollutants carried in runoff to waters of the state.

**BUSINESS DAY**

A day the office of the administering authority is routinely and customarily open for business.

**CEASE AND DESIST ORDER**

A court-issued order to halt land disturbing construction activity that is being conducted without the required permit.

**COMMON PLAN OF DEVELOPMENT OR SALE**

A development or sale where multiple separate and distinct land disturbing construction activities may be taking place at different times on different schedules but under one plan. A common plan of development or sale includes, but is not limited to, subdivision plats, certified survey maps, and other developments.

**CONSTRUCTION SITE**

An area upon which one or more land disturbing construction activities occur, including areas that are part of a larger common plan of development.

**DESIGN STORM**

A hypothetical discrete rainstorm characterized by a specific duration, temporal distribution, rainfall intensity, return frequency and total depth of rainfall. The TP-40, Type II, 24-hour design storms for Town of Greenville are: 1-year, 2.2 inches; 2-year, 2.5 inches; 5-year, 3.3 inches; 10-year, 3.8 inches; 25-year, 4.4 inches; 50-year, 4.9 inches; and 100-year, 5.3 inches. The Atlas 14, MSE4, 24-hour design storms for the Town of Greenville are: 1-year, 2.14 inches; 2-year, 2.45 inches; 5-year, 3.01 inches; 10-year, 3.51 inches; 25-year, 4.24 inches; 50-year, 4.85 inches; and 100-year, 5.50 inches.

**DEVELOPMENT**

Residential, commercial, industrial, institutional, or other land uses and associated roads.

**DIVISION OF LAND**

The creation from one or more parcels or building sites of additional parcels or building sites where such creation occurs at one time or through the successive partition within a 5 year period.

#### **EROSION**

The process by which the land's surface is worn away by the action of wind, water, ice or gravity.

#### **EROSION AND SEDIMENT CONTROL PLAN**

A comprehensive plan developed to address pollution caused by erosion and sedimentation of soil particles or rock fragments during construction.

#### **EXTRATERRITORIAL**

The unincorporated area within 3 miles of the corporate limits of a first, second, or third class city, or within 1.5 miles of a fourth class city or village.

#### **FINAL STABILIZATION**

Means that all land disturbing construction activities at the construction site have been completed and that a uniform perennial vegetative cover has been established, with a density of at least 70 percent of the cover, for the unpaved areas and areas not covered by permanent structures, or that employ equivalent permanent stabilization measures.

#### **GOVERNING BODY**

Town Board of Supervisors, county board of supervisors, city council, village board of trustees or village council.

#### **LAND DISTURBING CONSTRUCTION ACTIVITY OR DISTURBANCE**

Any man-made alteration of the land surface resulting in a change in the topography or existing vegetative or non-vegetative soil cover, that may result in runoff and lead to an increase in soil erosion and movement of pollutants into the municipal separate storm sewer or waters of the state. Land disturbing construction activity includes clearing and grubbing, demolition, excavating, pit trench dewatering, filling and grading activities, and soil stockpiling.

#### **MEP or MAXIMUM EXTENT PRACTICABLE**

The highest level of performance that is achievable but is not equivalent to a performance standard identified within this chapter. Maximum extent practicable applies when the permit applicant demonstrates to the administering authority's satisfaction that a performance standard is not achievable and that a lower level of performance is appropriate. In making the assertion that a performance standard is not achievable and that a level of performance different from the performance standard is the maximum extent practicable, the permit applicant shall take into account the best available technology, cost effectiveness, geographic features, and other competing interests such as protection of public safety and welfare, protection of endangered and threatened resources, and preservation of historic properties.

#### **MSE4 DISTRIBUTION**

A specific precipitation distribution developed by the USDA, NRCS, using precipitation data from Atlas 14.

#### **PERFORMANCE STANDARD**

A narrative or measurable number specifying the minimum acceptable outcome for a facility or practice.

#### **PERMIT**

A written authorization made by the administering authority to the applicant to conduct land disturbing construction activity or to discharge post-construction runoff to waters of the state.

**POLLUTANT**

Has the meaning given in § 283.01 (13), Wis. Stats.

**POLLUTION**

Has the meaning given in § 281.01 (10), Wis. Stats.

**PROTECTIVE AREA**

Has the meaning given in § 255-7C(4) of Chapter 255, Stormwater Management.

**RESPONSIBLE PARTY**

Any entity holding fee title to the property or performing services to meet the performance standards of this chapter through a contract or other agreement.

**RUNOFF**

Stormwater or precipitation including rain, snow or ice melt or similar water that moves on the land surface via sheet or channelized flow.

**SEDIMENT**

Settleable solid material that is transported by runoff, suspended within runoff or deposited by runoff away from its original location.

**SEPARATE STORM SEWER**

A conveyance or system of conveyances including roads with drainage systems, streets, catch basins, curbs, gutters, ditches, constructed channels or storm drains, which meets all of the following criteria:

- A. Is designed or used for collecting water or conveying runoff.
- B. Is not part of a combined sewer system.
- C. Is not part of a publicly owned wastewater treatment works that provides secondary or more stringent treatment.
- D. Discharges directly or indirectly to waters of the state.

**SILVICULTURE ACTIVITIES**

Activities including tree nursery operations, tree harvesting operations, reforestation, tree thinning, prescribed burning, and pest and fire control. Clearing and grubbing of an area of a construction site is not a silviculture activity.

**SITE**

The entire area included in the legal description of the land on which the land disturbing construction activity is proposed in the permit application.

**STOP WORK ORDER**

An order issued by the administering authority which requires that all construction activity on the site be stopped.

**TARGETED PERFORMANCE STANDARD**

A performance standard that will apply in a specific area, where additional practices beyond those contained in this chapter, are necessary to meet water quality standards. A total maximum daily load is an example of a targeted performance standard.

#### **TECHNICAL STANDARD**

A document that specifies design, predicted performance and operation and maintenance specifications for a BMP, material, device or method.

#### **TOTAL MAXIMUM DAILY LOAD or TMDL**

The amount of pollutants specified as a function of one or more water quality parameters, that can be discharged per day into a water quality limited segment and still ensure attainment of the applicable water quality standard.

#### **TP-40**

The Technical Paper No. 40, Rainfall Frequency Atlas of the United States, published in 1961.

#### **TR-55**

The United States department of agriculture, natural resource conservation service (previously soil conservation service), Urban Hydrology for Small Watersheds, Second Edition, Technical Release 55, June 1986, which is incorporated by reference for this chapter.

#### **TYPE II DISTRIBUTION**

A rainfall type curve as established in the "United States Department of Agriculture, Soil Conservation Service, Technical Paper 149, published 1973", which is incorporated by reference for this chapter. The Type II curve is applicable to all of Wisconsin and represents the most intense storm pattern.

#### **WATERS OF THE STATE**

Has the meaning given in § 283.01 (20), Wis. Stats.

### **§ 117-6. Technical standards.**

- A. Design criteria, standards and specifications. All BMPs required to comply with this chapter shall meet the design criteria, standards and specifications based on any of the following:
- (1) Design guidance and technical standards identified or developed by the Wisconsin Department of Natural Resources under Subchapter V of Chapter NR 151, Wis. Adm. Code.
  - (2) Technical standards and other guidance identified within the Town of Greenville Erosion and Sediment Control Reference Guide.
  - (3) Soil loss prediction tools such as the Revised Universal Soil Loss Equation 2 (RUSLE2) that estimate the sediment load leaving the site under varying land and management conditions may be used to show compliance with the sediment performance standards contained in § 117-7B.
  - (4) For this chapter, average annual basis is calculated using the appropriate annual rainfall or runoff factor, also referred to as the R factor, or an equivalent design storm using a Type II distribution, with consideration given to the geographic location of the site and the period of disturbance.

- B. Other standards. Other technical standards not identified in § 117-6 may be used provided that the methods have been approved by the administering authority.

## **§ 117-7. Performance standards.**

A. Non-permitted sites.

- (1) Responsible party. The landowner of the construction site or other person contracted or obligated by other agreement with the landowner to implement and maintain construction site BMPs is a responsible party and shall comply with this chapter.
- (2) Requirements. At each site where land disturbing construction activity is to occur, BMPs shall be used to prevent or reduce all of the following:
  - (a) The deposition of soil from being tracked onto streets by vehicles.
  - (b) The discharge of sediment from disturbed areas into stormwater inlets.
  - (c) The discharge of sediment from disturbed areas into adjacent waters of the state.
  - (d) The discharge of sediment from drainage ways that flow off the site.
  - (e) The discharge of sediment by dewatering activities.
  - (f) The discharge of sediment eroding from soil stockpiles existing for more than 7 days.
  - (g) The discharge of onsite chemicals, cement and other building compounds and materials into waters of the state or offsite separate storm sewers during the construction period. However, projects that require the placement of these materials in waters of the state, such as constructing bridge footings or BMP installations, are not prohibited by this chapter.
- (3) Location. BMPs shall be located so that treatment occurs before runoff enters waters of the state and offsite separate storm sewers. However, projects that require BMP placement in waters of the state, such as a turbidity barrier, are not prohibited by this chapter.
- (4) Implementation. The BMPs used to comply with this section shall be implemented as follows:
  - (a) Erosion and sediment control practices shall be constructed or installed before land disturbing construction activities begin.
  - (b) Erosion and sediment control practices shall be maintained until final stabilization.
  - (c) Final stabilization activity shall commence when land disturbing activities cease and final grade has been reached on any portion of the site.
  - (d) Temporary stabilization activity shall commence when land disturbing activities have temporarily ceased and will not resume for a period exceeding 14 calendar days.
  - (e) BMPs that are no longer necessary for erosion and sediment control shall be removed by the responsible party.

- (5) Alternate requirements. The administering authority may establish erosion and sediment control requirements more stringent than those set forth in this chapter if the administering authority determines that an added level of protection is needed to protect resources.

B. Permitted sites.

- (1) Responsible party. The landowner or other person performing services to meet the performance standards of this chapter, through a contract or other agreement with the landowner, is a responsible party and shall comply with this chapter.
- (2) Plan. A written erosion and sediment control plan shall be developed and implemented by the responsible party in accordance with § 117-9. The erosion and sediment control plan shall meet all of the applicable requirements contained in this chapter.
- (3) Requirements. The erosion and sediment control plan shall meet all of the following:
  - (a) The plan shall use BMPs to prevent or reduce all of the following:
    - [1] The deposition of soil from being tracked onto streets by vehicles.
    - [2] The discharge of sediment from disturbed areas into stormwater inlets.
    - [3] The discharge of sediment from disturbed areas into adjacent waters of the state.
    - [4] The discharge of sediment from drainage ways that flow off the site.
    - [5] The discharge of sediment by dewatering activities.
    - [6] The discharge of sediment eroding from soil stockpiles existing for more than 7 days.
    - [7] The discharge of sediment from erosive flows at outlets and in downstream channels.
    - [8] The discharge of onsite chemicals, cement and other building compounds and materials into waters of the state or offsite separate storm sewers during the construction period. However, projects that require the placement of these materials in waters of the state, such as constructing bridge footings or BMP installations, are not prohibited by this chapter.
    - [9] The discharge of untreated wash water from vehicle and wheel washing into waters of the state or offsite separate storm sewers.
  - (b) For sites with one acre or more of land disturbing construction activity, the plan shall meet the following sediment performance standards:
    - [1] BMP's that, by design, discharge no more than 5 tons per acre per year, or to the maximum extent practicable, of the sediment load carried in runoff from initial grading to final stabilization.
    - [2] Except as provided in § 117-7B(6), the administering authority may not require any person to employ more BMPs than are needed to meet the 5 tons per acre per year sediment performance standard in order to comply with maximum extent practicable. Erosion and sediment control BMPs may be combined to meet the sediment

performance standard. The administering authority may give credit toward meeting the sediment performance standard for limiting the duration or area, or both, of land disturbing construction activity, or for other appropriate mechanisms.

- [3] Notwithstanding § 117-7B(3)(b)[1] and [2], if BMPs cannot be designed and implemented to meet the 5 tons per acre per year sediment performance standard, the plan shall include a written, site-specific explanation of why the sediment performance standard cannot be met and how the sediment load will be reduced to the maximum extent practicable.

(c) The plan shall incorporate all of the following preventative measures:

- [1] Maintenance of existing vegetation, especially adjacent to surface waters whenever possible.
- [2] Minimization of soil compaction and preservation of topsoil.
- [3] Minimization of land disturbing construction activity on slopes of 20% or more.
- [4] Development of spill prevention and response procedures.

(4) Location. BMPs shall be located so that treatment occurs before runoff enters waters of the state and offsite separate storm sewers. However, projects that require BMP placement in waters of the state, such as a turbidity barrier, are not prohibited by this chapter.

(5) Implementation. The BMPs used to comply with this chapter shall be implemented as follows:

- (a) In accordance with the plan developed pursuant to § 117-9, the erosion and sediment control practices shall be constructed or installed before land disturbing construction activities begin.
- (b) Erosion and sediment control practices shall be maintained until final stabilization.
- (c) Final stabilization activity shall commence when land disturbing activities cease and final grade has been reached on any portion of the site.
- (d) Temporary stabilization activity shall commence when land disturbing activities have temporarily ceased and will not resume for a period exceeding 14 calendar days.
- (e) BMPs that are no longer necessary for erosion and sediment control shall be removed by the responsible party.

(6) Targeted performance standards. The administering authority may establish numeric water quality requirements that are more stringent than those set forth in § 117-7B(3) in order to meet targeted performance standards, total maximum daily loads, and/or water quality standards for a specific water body or area. The numeric water quality requirements may be applicable to any permitted site, regardless of the size of land disturbing construction activity.

(7) Alternate requirements. The administering authority may establish erosion and sediment control requirements more stringent than those set forth in this section if the administering authority determines that an added level of protection is needed to protect resources. Also, the administering authority may establish erosion and sediment control requirements less stringent

than those set forth in this section if the administering authority determines that less protection is needed to protect resources. However, the alternative requirements shall not be less stringent than those requirements promulgated in rules by Wisconsin Department of Natural Resources under NR 151 Wisconsin Administrative Code.

## **§ 117-8. Permitting requirements, procedures and fees.**

- A. Permit required. When a permit is required, no responsible party may commence a land disturbing construction activity subject to this chapter without receiving prior approval of an erosion and sediment control plan for the site and a permit from the administering authority.
- B. Permit application and fees. When a permit is required, at least one responsible party desiring to undertake a land disturbing construction activity subject to this chapter shall submit an application for a permit and an erosion and sediment control plan that meets the requirements of § 117-9 and shall pay an application fee according to the fee schedule to the Town of Greenville. By submitting an application, the applicant is authorizing the administering authority to enter the site to obtain information required for the review of the erosion and sediment control plan.
- C. Review and approval of permit application. The administering authority shall review any permit application that is submitted with an erosion and sediment control plan, and the required fee. The following approval procedure shall be used:
  - (1) Within 20 business days of the receipt of a complete permit application, as required by § 117-8B, the administering authority shall inform the applicant whether the application and plan are approved or disapproved based on the requirements of this chapter.
  - (2) If the permit application and plan are approved, the administering authority shall issue the permit.
  - (3) If the permit application or plan is disapproved, the administering authority shall state in writing the reasons for disapproval.
  - (4) The administering authority may request additional information from the applicant. If additional information is submitted, the administering authority shall have 20 business days from the date the additional information is received to inform the applicant that the plan is either approved or disapproved.
  - (5) Failure by the administering authority to inform the permit applicant of a decision within 20 business days of a required submittal shall be deemed to mean approval of the submittal and the applicant may proceed as if a permit had been issued.
- D. Financial guarantee. As a condition of approval and issuance of the permit, the administering authority may require the applicant to deposit a surety bond, cash escrow, or irrevocable letter of credit to guarantee a good faith execution of the approved erosion and sediment control plan and any permit conditions. The financial guarantee shall be in an amount determined by the administering authority for the estimated construction and maintenance of the practices called for in the erosion and sediment control plan. The administering authority may require the site to be certified by a professional engineer. The financial guarantee shall give the administering authority the funds to complete the erosion and sediment control practices if the landowner defaults or does not properly implement the approved erosion and sediment control plan. Improper implementation of

the plan shall be upon written notice by the administering authority that the requirements of this ordinance have not been met.

- (1) The administering authority shall release the portion of the financial guarantee established under this section, less any costs incurred by the administering authority to complete installation of practices, upon submission of "as built plans" by a licensed professional engineer. The administering authority may make provisions for a partial prorated release of the financial guarantee based on the completion of various development stages.

E. Permit requirements. All permits issued under this chapter shall be subject to the following conditions, and holders of permits issued under this chapter shall be deemed to have accepted these conditions. The administering authority may suspend or revoke a permit for violation of a permit condition, following written notification of the responsible party. An action by the administering authority to suspend or revoke this permit may be appealed in accordance with § 117-13.

- (1) Notify the administering authority within 48 hours of commencing any land disturbing construction activity.
- (2) Notify the administering authority of completion of any BMPs within 10 business days after their installation.
- (3) Obtain permission in writing from the administering authority prior to any modification pursuant to § 117-9B of the erosion and sediment control plan.
- (4) Install all BMPs as identified in the approved erosion and sediment control plan.
- (5) Maintain all road drainage systems, stormwater drainage systems, BMPs and other facilities identified in the erosion and sediment control plan.
- (6) Repair any siltation or erosion damage to adjoining surfaces and drainage ways resulting from land disturbing construction activities and document repairs in weekly inspection reports.
- (7) Conduct construction site inspections at least once per week and within 24 hours after a precipitation event of 0.5 inches or greater. Repair or replace erosion and sediment control BMPs as necessary within 24 hours of an inspection or notification that repair or replacement is needed. Maintain, at the construction site, weekly written reports of all inspections. Weekly inspection reports shall include all of the following: date, time and location of the construction site inspection; the name of individual who performed the inspection; an assessment of the condition of erosion and sediment controls; a description of any erosion and sediment control BMP implementation and maintenance performed; and a description of the present phase of land disturbing construction activity at the construction site.
- (8) Allow the administering authority to enter the site for the purpose of inspecting compliance with the erosion and sediment control plan or for performing any work necessary to bring the site into compliance with the control plan. Keep a copy of the erosion and sediment control plan, stormwater management plan, amendments, weekly inspection reports, and permit at the construction site until permit coverage is terminated.
- (9) The permit applicant shall post the "Certificate of Permit Coverage" in a conspicuous location at the construction site.

- F. Permit conditions. Permits issued under this section may include conditions established by administering authority in addition to the requirements set forth in § 117-8E, where needed to assure compliance with the performance standards in § 117-7.
- G. Permit duration. Permits issued under this section shall be valid for a period of 180 days, or the length of the building permit or other construction authorizations, whichever is longer, from the date of issuance. The administering authority may extend the period one or more times for up to an additional 180 days. The administering authority may require additional BMPs as a condition of the extension if they are necessary to meet the requirements of this chapter.
- H. Maintenance. The responsible party throughout the duration of the construction activities shall maintain all BMPs necessary to meet the requirements of this chapter until the site has undergone final stabilization.
- I. Alternate requirements. The administering authority may prescribe requirements less stringent for applicants seeking a permit for a construction site with less than one acre of land disturbing construction activity.

### **§ 117-9. Erosion and sediment control plan.**

- A. Plan requirements. The erosion and sediment control plan required under § 117-7B shall comply with the Town of Greenville Erosion and Sediment Control Reference Guide and contain at a minimum the following information:
  - (1) Name, address, and telephone number of the landowner and responsible parties.
  - (2) A legal description of the property proposed to be developed.
  - (3) A site map with property lines, disturbed limits, and drainage patterns.
  - (4) Total area of the site and total area of the construction site that is expected to be disturbed by construction activities.
  - (5) Performance standards applicable to site.
  - (6) Proposed best management practices.
  - (7) Erosion and sediment control plan narrative.
  - (8) Construction sequence and construction schedule.
  - (9) The erosion and sediment control plan shall include, at a minimum, the items specified in the Town of Greenville Erosion and Sediment Control Reference Guide and RUSLE2.
- B. Amendments. The applicant shall amend the plan if any of the following occur:
  - (1) There is a change in design, construction, operation, maintenance or schedule at the site which has the reasonable potential for the discharge of pollutants to waters of the state or separate storm sewers, and which has not otherwise been addressed in the plan.

- (2) The actions required by the plan fail to reduce the impacts of pollutants carried by construction site runoff.
  - (3) The administering authority notifies the applicant of changes needed in the plan.
- C. Alternate requirements. The administering authority may prescribe requirements less stringent for applicants seeking a permit for a construction site with less than one acre of disturbance.

## **§ 117-10. Fee schedule.**

The fees referred to in other sections of this chapter shall be established by the Town of Greenville Board and may from time to time be modified by resolution. A schedule of the fees established by the Town Board shall be available for review in the Town Hall.

## **§ 117-11. Inspection.**

Whenever land disturbing construction activities are being carried out, the administering authority may enter the land pursuant to the provisions of §§ 66.0119(1), (2), and (3), Wis. Stats.

## **§ 117-12. Enforcement.**

- A. The administering authority may post a stop-work order if any of the following occurs:
  - (1) Any land disturbing construction activity is being undertaken without a permit and, pursuant to § 117-4A of this chapter, a permit is required for the construction site.
  - (2) The erosion and sediment control plan is not being implemented in a good faith manner.
  - (3) The conditions of the permit are not being met.
  - (4) Any land disturbing construction activity is in violation of the chapter.
- B. If the responsible party does not cease activity as required in a stop-work order posted under this section or fails to comply with the erosion and sediment control plan or permit conditions, the administering authority may revoke the permit.
- C. If the responsible party, where no permit has been issued, does not cease the activity after being notified by the administering authority, or if a responsible party violates a stop-work order posted under § 117-12A, the administering authority may request the town attorney to obtain a cease and desist order in any court with jurisdiction.
- D. The administering authority or the Board of Appeals may retract the stop-work order issued under § 117-12A or the permit revocation under § 117-12B.
- E. After posting a stop-work order under § 117-12A, the administering authority may issue a notice of intent to the responsible party of its intent to perform work necessary to comply with this chapter. The administering authority may go on the land and commence the work after issuing the notice of intent. The costs of the work performed under this chapter by the administering authority, plus interest at the rate authorized by Town Board shall be billed to the responsible party or recovered from the surety bond, cash escrow, or irrevocable letter of credit. In the event a responsible party fails to pay

the amount due, the clerk shall enter the amount due on the tax rolls and collect as a special assessment against the property pursuant to Subch. VII of Ch. 66, Wis. Stats.

- F. The forfeiture amount of a violation, upon conviction, shall be as set from time to time by ordinance in the Fine and Forfeiture Schedule of the Town of Greenville. Each calendar day a violation exists shall constitute a separate offence.
- G. Compliance with the provisions of this chapter may also be enforced by injunction in any court with jurisdiction. It shall not be necessary to prosecute for forfeiture or a cease and desist order before resorting to injunctive proceedings.

## **§ 117-13. Appeals.**

- A. Board of Appeals. The Board of Appeals created pursuant to Article XXXIII, Board of Appeals, of Chapter 320, Zoning, and pursuant to § 60.65, Wis. Stats.:
  - (1) Shall hear and decide appeals where it is alleged that there is error in any order, decision or determination made by the administering authority in administering this chapter except for cease and desist orders obtained under § 117-12C.
  - (2) Upon appeal, may authorize variances from the provisions of this chapter which are not contrary to the public interest and where owing to special conditions a literal enforcement of the provisions of the chapter will result in unnecessary hardship; and
  - (3) Shall use the rules, procedures, duties and powers authorized by statute in hearing and deciding appeals and authorizing variances.
- B. Who may appeal. Appeals to the Board of Appeals may be taken by any aggrieved person or by any office, department, board, or bureau of the Town of Greenville affected by any decision of the administering authority.

## **§ 117-14. Variances.**

In any particular case where the landowner can show that, by reason of exceptional topography or other physical condition, strict compliance with any requirement of this ordinance would cause unnecessary hardship, the Board of Appeals may grant a variance provided such relief may be granted without detriment to the public good and without impairing the intent and purpose of this ordinance or the desirable general development of the Town. No variance shall be granted by the Board which is contrary to provisions of the Wisconsin Administrative Code or the Wisconsin Statutes.

## **§ 117-15. Severability.**

If a court of competent jurisdiction judges any section, clause, provision or portion of this chapter unconstitutional or invalid, the remainder of the chapter shall remain in force and not be affected by such judgment.

## **§ 117-16. Limitations on municipal responsibility.**

Nothing in this chapter creates or imposes, nor shall be construed to create or impose, any greater obligation or responsibility on the municipality which has adopted this chapter than those minimum

requirements specifically required by State of Wisconsin Statutes and Department of Natural Resources regulations.

**§ 117-17. Effective date.**

This chapter shall be in force and effect from and after its adoption and publication. The above and foregoing chapter was duly adopted by the Town Board of the Town of Greenville on the \_\_\_\_\_ day of February, 2017.

TOWN OF GREENVILLE

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Jack Anderson, Town Chairman

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Wendy Helgeson, Town Clerk-Treasurer

TOWN OF GREENVILLE  
EROSION & SEDIMENT CONTROL REFERENCE GUIDE

FOR THE:

EROSION & SEDIMENT CONTROL ORDINANCE



DATE:  
December 30, 2016

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## EXECUTIVE SUMMARY

The Town's Erosion & Sediment Control Reference Guide (Reference Guide) has been created to act as a companion to the Town's Erosion & Sediment Control Ordinance (Ordinance). The Ordinance cites the Reference Guide as the resource for details that were omitted from the Ordinance. Items in the Reference Guide can be changed without the public hearing process as the changes are typically administrative and/or technical and do not affect the Ordinance's intent and requirements. The Reference Guide is organized similar to the Erosion & Sediment Control Ordinance for ease of relating the Reference Guide to the appropriate sections in the Ordinance.

The Erosion & Sediment Control Ordinance (Ordinance) applies to all construction sites, regardless of the land disturbance size. The Ordinance requires a permit for a construction site with 4,000 square feet or greater of land disturbance. Please refer to 117-4A(1)(c) of the Ordinance and 117-4A of this Reference Guide for a description of other construction sites that may require a permit.

Construction Site Erosion Control Ordinance								
Site	Requirements <sup>a</sup>							
	Sediment (TSS)	Vehicle Tracking	Protect Storm Inlets	Protect Waters of State	Protect Drainage Ways	Dewater Properly	Manage Soil Stockpile	Manage Building Materials
<b>Less than 1 Acre</b>	No Numeric Standard <sup>b</sup>	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>1 Acre or More</b>	5 tons / acre / year	Yes	Yes	Yes	Yes	Yes	Yes	Yes

<sup>a</sup> Summary of Section 117-7 Performance Standards of the Erosion & Sediment Control Ordinance. See Ordinance and this Reference Guide for specific requirements, exemptions and prohibitions.

<sup>b</sup> Construction sites regulated by the Wisconsin Department of Safety and Professional Services are required to comply with a numeric performance standard, regardless of the size of land disturbance. See SPS 360.20(3) and SPS 321.125(3) for specific requirements. The local municipality may also be acting as an agent of the Wisconsin Department of Safety and Professional Services.

## **117-1 AUTHORITY**

## **117-2 FINDINGS OF FACT**

## **117-3 PURPOSE**

## **117-4 APPLICABILITY AND JURISDICTION**

### **A. APPLICABILITY**

Pursuant to 117-4A(1)(c), the administering authority may require a permit for construction sites with less than 4,000 square feet of land disturbance. Currently, the administering authority's policy is to require a permit for the following construction sites with less than 4,000 square feet of land disturbance:

- Installation, replacement, or maintenance of underground pipes, cables, fiber optics, or wires with 100 linear feet or greater of length.
- Routine ditch maintenance with 100 linear feet or greater of length.
- Land disturbing activities located in waters of the state, wetlands, or protective areas. Wetlands shall be delineated in accordance with s. NR 103.08(1m), Wis. Adm. Code.

### **B. JURISDICTION**

### **C. EXCLUSIONS**

The Wisconsin Department of Transportation (WisDOT) has entered into a memorandum of understanding with the Wisconsin Department of Natural Resources that satisfies s. 281.33 (2), Wis. Stats., such that activities directed and supervised by WisDOT are exempt from this Ordinance.

Activities directed and supervised by the local municipality are covered by this Ordinance.

## **117-5 DEFINITIONS**

## **117-6 TECHNICAL STANDARDS**

### **A. DESIGN CRITERIA, STANDARDS AND SPECIFICATIONS**

Below is a list of Technical Standards and Guidance Documents that shall be used to satisfy Performance Standards contained in the ordinance. Technical Standards specify the minimum criteria for a best management practice (BMP). Guidance Documents contain recommendations and additional "how to" guidance. Performance Standards take precedence over Technical Standards and Technical Standards take precedence over Guidance Documents.

- (a) **Technical Standards:** The following are applicable Wisconsin Department of Natural Resources (DNR) Conservation Practice Standards or Technical Standards. These standards may be found on the DNR website ([http://dnr.wi.gov/topic/stormwater/standards/const\\_standards.html](http://dnr.wi.gov/topic/stormwater/standards/const_standards.html)).

- 1050 Land Application of Additives for Erosion Control
- 1051 Water Application of Additives for Sediment Control
- 1052 Non-Channel Erosion Mat
- 1053 Channel Erosion Mat
- 1054 Vegetative Buffer for Construction Sites
- 1055 Sediment Bale Barrier (Non-Channel)
- 1056 Silt Fence
- 1057 Stone Tracking Pad and Tire Washing
- 1058 Mulching for Construction Sites
- 1059 Seeding for Construction Site Erosion Control
- 1060 Storm Drain Inlet Protection for Construction Sites
- 1061 De-watering
- 1062 Ditch Check (Channel)
- 1063 Sediment Trap
- 1064 Sediment Basin
- 1065 Rip-rap / Stabilized Outlet (pending completion)
- 1066 Construction Site Diversion
- 1067 Temporary Grading Practices for Erosion Control
- 1068 Dust Control on Construction Sites
- 1069 Turbidity Barrier
- 1070 Silt Curtain
- 1071 Interim Manufactured Perimeter Control & Slope Interruption Products

- (b) **Local Modifications to Technical Standards:** The following are local requirements that are intended to supplement, clarify, or supersede DNR Technical Standards.
- (c) **Guidance Documents:** The following are the applicable Guidance Documents. Many of these Guidance Documents can be found on the DNR website ([http://dnr.wi.gov/topic/stormwater/standards/const\\_standards.html](http://dnr.wi.gov/topic/stormwater/standards/const_standards.html)).
- Guidance for the Establishment of Protective Areas for Wetlands
  - "Construction Site" Definition – "Common Plan of Development"
  - Meeting New State Standards: Construction Erosion Control Workshops (<http://dnr.wi.gov/topic/Stormwater/construction/practices.html>)
  - Estimating Residue Using the Line Transect Method (UW-Extension A3533).
  - Wisconsin Department of Transportation - Erosion Control Product Acceptability Lists (PAL) for Multi-Modal Applications
  - Wisconsin Department of Transportation - Facilities Development Manual
  - Wisconsin DOT Standard Specifications for Highway and Structure Construction
  - Other National Publications

## B. OTHER STANDARDS

### 117-7 PERFORMANCE STANDARDS

#### A. NON-PERMITTED SITES

Construction sites with less than 4,000 square feet of land disturbance are required to satisfy a numeric performance standard if the construction site is regulated by the Wisconsin Department of Safety and Professional Services. Please refer to SPS 360.20(3) and SPS 321.125(3) for specific requirements.

Pursuant to 117-7A(5) of the Ordinance, the administering authority may establish more stringent erosion and sediment control requirements for non-permitted sites if the administering authority determines that an added level of protection is needed.

## **B. PERMITTED SITES**

Construction sites with 1 acre or more of land disturbance are required to meet the ordinance's numeric performance standards.

Construction sites with less than 1 acre of land disturbance are required to satisfy a numeric performance standard if the construction site is regulated by the Wisconsin Department of Safety and Professional Services. Please refer to SPS 360.20(3) and SPS 321.125(3) for specific requirements.

Pursuant to 117-7B(6) or (7) of the Ordinance, the administering authority may establish more stringent erosion and sediment control requirements for permitted sites if the administering authority determines that an added level of protection is needed.

### **Computer Models:**

The Wisconsin Department of Natural Resources (DNR) developed a USLE spreadsheet tool for construction site erosion control and determining compliance with the 5 tons/acre/year requirement. The USLE spreadsheet model can be found on the DNR website at [http://dnr.wi.gov/topic/stormwater/standards/const\\_standards.html](http://dnr.wi.gov/topic/stormwater/standards/const_standards.html).

## **C. CLARIFICATIONS:**

*Erosion Control Practices* - Erosion control practices are used to prevent sediment particles from becoming dislodged and suspended in runoff. Erosion control practices include land application of polyacrylamide, mulching, seeding, and erosion mats. Grading practices can be used to supplement these practices.

*Sediment Control Practices* - Sediment control practices are used to remove sediment particles that are suspended in runoff and being transported. Sediment control practices used for sheet flow conditions include vegetative buffers, sediment bale barriers (non-channel), silt fence, and perimeter control / slope interruption products. Sediment control practices used for concentrated flow conditions include storm drain inlet protection (< 1 acre), ditch checks (< 1 acre), sediment traps (< 5 acres), sediment basins (< 100 acres), and polymers. Sediment control practices used for lakes, rivers, and streams include turbidity barriers and silt curtains.

*Construction Site Diversions* - Construction site diversions are used to divert clear-water runoff away from disturbed areas. Construction site diversions are also designed to convey sediment-laden runoff from disturbed areas to sediment control practices such as ditch checks, sediment traps, and sediment basins.

*Dust Control Practices* - Dust control practices are used to prevent wind erosion.

*Dewatering* - Dewatering practices are used to remove sediment from ponding surface water or groundwater. A DNR permit is required for pumping 70 gpm or more (<http://dnr.wi.gov/topic/wells/highcapacity.html>). The discharge must be sampled in accordance with DNR requirements.

*Non-Erosive Flows* - Velocity dissipation devices shall be placed at outfall locations and

along the length of any channel, as necessary, to provide a non-erosive flow so that the natural, physical, and biological characteristics and functions are maintained and protected. Velocity dissipation devices could include erosion mat (channel), rip-rap, drop structures, stilling basins, and other energy dissipation devices.

Maximum Permissible Velocities for Channels			
Channel Cover	Slope Range %	Erosion-resistant soils	Easily eroded soils
Bare Soil	0-5	3-6 fps*	1.5-2 fps*
	Do not use on slopes steeper than 5%, except for side slopes in a combination channel.		
Bermuda Grass	0-5	8 fps	6 fps
	5-10	7 fps	5 fps
	>10	6 fps	4 fps
Buffalo grass, Kentucky bluegrass, Smooth brome, blue grama	0-5	7 fps	5 fps
	5-10	6 fps	4 fps
	>10	5 fps	3 fps
Grass mixture	0-5	5 fps	4 fps
	5-10	4 fps	3 fps
	Do not use on slopes steeper than 10%, except for side slopes in a combination channel.		
Lespedeza sericea, weeping love grass Ischaemum (yellow bluestem), kudzu, alfalfa, crabgrass	0-5	3.5 fps	2.5 fps
	Do not use on slopes steeper than 5%, except for side slopes in a combination channel.		
Annuals – used on mild slopes or as temporary protection until permanent covers are established, common lespedeza, Sudan grass	0-5	3.5 fps	2.5 fps
	Use on slopes steeper than 5% is not recommended		

\* Maximum permissible velocities depend on specific soil properties and shear stress. Typically, the maximum velocity for sand = 1.5 fps, silt and loam = 1.7 to 2.5 fps, fine gravel = 2.5 fps, clay = 3.7 fps, coarse gravel = 4.0 fps, cobbles = 3.7 to 5.0 fps, and shale / hard pan = 6.0 fps.  
Source – Chow Open Channel Hydraulics & Civil Engineering Reference Manual for the PE Exam, Ninth Edition

**Materials** - No sediment or solid materials, including building materials, may be discharged in violation of the following federal, state, and local regulations:

- Navigation, Dams, & Bridges (Chapter 30 and 31, Stats.)
- Wetland Water Quality Standards (NR 103)
- Wetlands (US Army Corps of Engineers Section 404 regulations)
- Shoreland Management (NR 115, NR 117, & local regulations)
- Floodplain Management (NR 116 & local regulations).

**Wastewaters** - Wastewaters, such as from concrete truck washout, need to be properly managed to limit the discharge of pollutants to the municipal separate storm sewer system or waters of the state. A separate permit may be needed from the DNR where a wastewater discharge has the potential to adversely impact waters of the state. The appropriate DNR wastewater specialist should be contacted to determine if wastewater permit coverage is needed where wastewater will be discharged to the municipal separate storm sewer system or waters of the state.

*Wetland Delineations* - Wetland delineations shall be performed by a professional soil scientist, professional hydrologist, or other qualified individual approved by the administering authority. The individual performing the delineation shall classify the wetland as a less susceptible wetland, highly susceptible wetland, exceptional resource water, or outstanding resource water.

*Protective Areas* - Protective areas may be disturbed as part of a construction project, if necessary. Disturbed areas must be stabilized from erosion and restored with an adequate sod or self-sustaining vegetative cover. Best Management Practices (ponds, swales, etc.) may be located in protective areas.

*Type of Vegetation* - It is recommended that seeding of non-invasive vegetative cover be used in the protective areas. Vegetation that is flood and drought tolerant and can provide long-term bank stability because of an extensive root system is preferable. Vegetative cover can be measured using the line transect method described in the University of Wisconsin Extension publication number A3533, titled "Estimating Residue Using the Line Transect Method".

*Adjacent Property Owners* - If a stream or channel is permanently placed or relocated along a property line, an easement or letter of permission is required from any property owners impacted by the protective area's new location. Also, if a stormwater facility or structure is proposed within an onsite stream or channel, 100-year flood elevations shall be evaluated to determine if offsite property owners are impacted by backwater or a flood elevation increase. An easement or letter of permission is required from any property owners impacted by backwater. Changes to a stream, wetland, or channel should be discussed during the pre-design meeting. Changes to a navigable stream, wetland or other waters of the state will require permits from the DNR, Army Corps of Engineers, and local municipality.

*Agricultural Activity Areas* - Agricultural Activity Areas (i.e. farm fields and other cropland areas) are exempt from the ordinance.

*Agricultural Production Areas* - Agricultural Production Areas (i.e. farm buildings, structures, and other impervious surfaces) are not exempt from the ordinance. The County Land Conservation Department (LCD) may be available to prepare Erosion & Sediment Control Plans for farm structures and disturbances in the Agricultural Production Areas. Construction of farm structures and disturbances in Agricultural Production Areas of one acre or greater must also be covered by an NR 216 permit.

*Regional Wet Detention Ponds* - A regional wet detention pond (post-construction site) may be used as a sediment basin (construction site) until final stabilization of the wet detention pond and expiration of the erosion control permit associated with construction of the regional wet detention pond. While regional stormwater management facilities are appropriate for control of post-construction pollutants, they should not be used for construction site sediment removal at other construction sites located within the wet detention pond's watershed.

## **117-8 PERMITTING REQUIREMENTS, PROCEDURES AND FEES**

- A. PERMIT REQUIRED**
- B. PERMIT APPLICATION AND FEES**
- C. REVIEW AND APPROVAL OF PERMIT APPLICATION**

Meetings between the permit applicant, designer, and plan reviewer are encouraged during the pre-design, design, and plan review process. The meetings are used to educate each other about regulatory requirements, environmentally sensitive areas, and design challenges. The number of meetings held is typically commensurate with the size and complexity of the project. Meetings can be face-to-face or via telephone.

A pre-construction conference is encouraged before the start of all construction projects. For sites with 1 acre or more of land disturbance, a pre-construction conference is required. The permit applicant, designer, plan reviewer, contractor, and inspector are encouraged to attend. The purpose of the meeting is to exchange contact information, review the Erosion & Sediment Control Plan, and identify individuals responsible for permit compliance, plan amendments, and weekly inspection reports.

- D. FINANCIAL GUARANTEE**

Construction sites with 1 acre or more of land disturbance are required to have a financial guarantee. The financial guarantee includes the cost associated with erosion and sediment control BMPs, site inspections, project administration, and contingencies.

Construction sites with less than 1 acre of land disturbance are not typically required to have a financial guarantee.

Portions of the financial guarantee may be released as the construction project progresses. The last portion of the financial guarantee is not released until the municipal inspector performs a final inspection and the permit applicant pays final inspection fees.

- E. PERMIT REQUIREMENTS**

The permit applicant is required to post the "Certificate of Permit Coverage" in a conspicuous place at the construction site.

- F. PERMIT CONDITIONS**

- G. PERMIT DURATION**

- H. MAINTENANCE**

- I. ALTERNATE REQUIREMENTS**

## **117-9 EROSION AND SEDIMENT CONTROL PLAN**

- A. PLAN REQUIREMENTS**

### **Sites With Less Than 1 Acre of Land Disturbance:**

The erosion and sediment control plan for construction sites with less than 1 acre of land disturbance shall contain, at a minimum, the following information unless other municipal ordinances or state regulations require more detailed information:

- (a) The name, contact person, title, mailing address, e-mail address, telephone number, and fax number of the following individuals or organizations: permit applicant, landowner, consultant or plan preparer, and contractor (if known).
- (b) Anticipated project start date and projected project end date.
- (c) Total area of the construction site and the total area of the construction site that is expected to be disturbed by land disturbing activities.
- (d) Sufficient detail so as to document ordinance compliance.
- (e) Location of all BMPs to be employed.
- (f) Pre-construction ground surface contour lines at intervals appropriate for conditions present within the proposed disturbed areas.
- (g) Identify the initial downstream receiving water of the state.

**Sites With 1 Acre or More of Land Disturbance:**

The erosion and sediment control plan for construction sites with 1 acre or more of land disturbance shall contain, at a minimum, the following information:

- (a) The name, contact person, title, mailing address, e-mail address, telephone number, and fax number of the following individuals or organizations: permit applicant, landowner, consultant or plan preparer, and contractor (if known).
- (b) Anticipated project start date and projected project end date.
- (c) Description of the construction site and the nature of the land disturbing construction activity, including representation of the limits of land disturbance on a USGS 7.5-minute series topographical map.
- (d) Description of the intended sequence of major land disturbing construction activities for major portions of the construction site, including clearing; stripping topsoil; rough grading; installation of erosion and sediment controls; construction of utilities, streets, and buildings; finish grading; and permanent stabilization.
- (e) Total area of the construction site and the total area of the construction site that is expected to be disturbed by land disturbing activities.
- (f) Available data describing the surface soil as well as sub-soils, including representation of the limits of land disturbance on a NRCS soils map.
- (g) Wherever permanent infiltration devices will be employed or were evaluated, the depth to the nearest seasonal high groundwater elevation or top of bedrock shall be identified.
- (h) Name of the immediate named receiving water from the United States Geological Service 7.5 minute series topographic maps.
- (i) Calculations demonstrating compliance with the 5 tons per acre per year sediment performance standard (calculations may not be feasible until RUSLE2 is completed).

The erosion and sediment control plan for construction sites with 1 acre or more of land disturbance shall include a site map. The site map shall include the following items and shall be at a scale not greater than 100 feet per inch and at a contour interval not to exceed two feet:

- (a) Existing topography, vegetative cover, impervious surfaces, natural and engineered drainage systems, roads, surface waters, and 100-year floodplains. Identify slopes of 20% or more that are to be disturbed.
- (b) Boundaries of the construction site.
- (c) Drainage patterns and approximate slopes anticipated after grading activities. Identify drainage ways that flow off the site.
- (d) Areas of soil disturbance, including soil stockpile locations.
- (e) Location of major structural and non-structural controls identified in the erosion and sediment control plan, including standard detail drawings and specifications where appropriate.

- (f) Location of areas where stabilization practices will be employed.
- (g) Areas that will be vegetated following land disturbing construction activities.
- (h) Area and location of wetland acreage on the construction site and locations where stormwater is discharged to a surface water or wetland within one-quarter mile downstream of the construction site.
- (i) Areas used for infiltration of post-construction stormwater runoff.
- (j) An alphanumeric or equivalent grid overlying the entire construction site.

The erosion and sediment control plan for construction sites with 1 acre or more of land disturbance shall include a description of appropriate erosion and sediment control best management practices that will be installed and maintained at the construction site to prevent pollutants from reaching waters of the state. The erosion and sediment control plan shall clearly describe the appropriate erosion and sediment control best management practices for each major land disturbing construction activity and the timing during the period of land disturbing construction activity that the erosion and sediment control best management practices will be implemented. The description of erosion controls shall include, when appropriate, the following minimum requirements:

- (a) Description of any interim and permanent stabilization practices, including a schedule for implementing the practices. The erosion and sediment control plan shall ensure that existing vegetation is preserved where attainable and that disturbed portions of the construction site are stabilized.
- (b) Description of any structural practices to divert flow away from exposed soils, store flows or otherwise limit runoff and the discharge of pollutants from the construction site. Unless otherwise specifically approved in writing by the local municipality, structural measures shall be installed on upland soils.
- (c) Management of overland flow at all areas of the construction site, unless otherwise controlled by outfall controls.
- (d) Trapping of sediment in channelized flow.
- (e) Staging land disturbing activities to limit exposed soil areas subject to erosion. Soil stockpiles exposed for more than 7 days shall be stabilized.
- (f) Protection of downslope drainage or storm water inlets where they occur.
- (g) Minimization of tracking at all vehicle and equipment entry and exit locations of the construction site.
- (h) Clean up of off-site sediment deposits by the end of each work day.
- (i) Proper disposal and management of onsite chemicals, cement, and other building compounds and materials.
- (j) Stabilization of drainage ways, including consideration of erosive flows at outlets and in downstream channels.
- (k) Installation of permanent stabilization as soon as possible after final grading.
- (l) Minimization of dust to the maximum extent practicable.
- (m) Dewatering activities.
- (n) Control of untreated wash water from vehicle and wheel washing into waters of the state or offsite separate storm sewers.
- (o) Spill prevention and response procedures.
- (p) Implementation of BMPs.

For construction sites with 1 acre or more of land disturbance, prepare a narrative describing the following: site location, total site area and disturbed area, purpose of project, drainage system and outfalls, drainage area for each outfall, stream and wetland locations, topsoil and subsoils, depth to groundwater and bedrock, erosion and sediment controls, sequence of construction, BMP inspection and maintenance responsibilities, weekly inspection reports, and plan amendments.

For construction sites with 1 acre or more of land disturbance, the erosion and sediment control plan shall include a statement or narrative which includes the following: (a)

erosion and sediment control practices shall be repaired or replaced within 24 hours of an inspection; and (b) when the failure of erosion or sediment control practices results in an immediate threat of sediment entering waters of the state or an offsite drainage system, procedures shall be implemented immediately to repair or replace the practices.

**B. AMENDMENTS**

**C. ALTERNATE REQUIREMENTS**

**117-10 FEE SCHEDULE**

**117-11 INSPECTION**

**117-12 ENFORCEMENT**

**117-13 APPEALS**

**A. BOARD OF APPEALS**

**B. WHO MAY APPEAL**

W:\PROJECTS\G0014\940273\02\EC Ordinance\Greenville Construction Site Erosion Control Reference Guide 2016 Dec 30 tracked.doc

## **APPENDIX B**

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### **POST-CONSTRUCTION STORMWATER MANAGEMENT PROGRAM**

# Post-Construction Stormwater Permit

## Protecting Our Lakes, Rivers & Streams

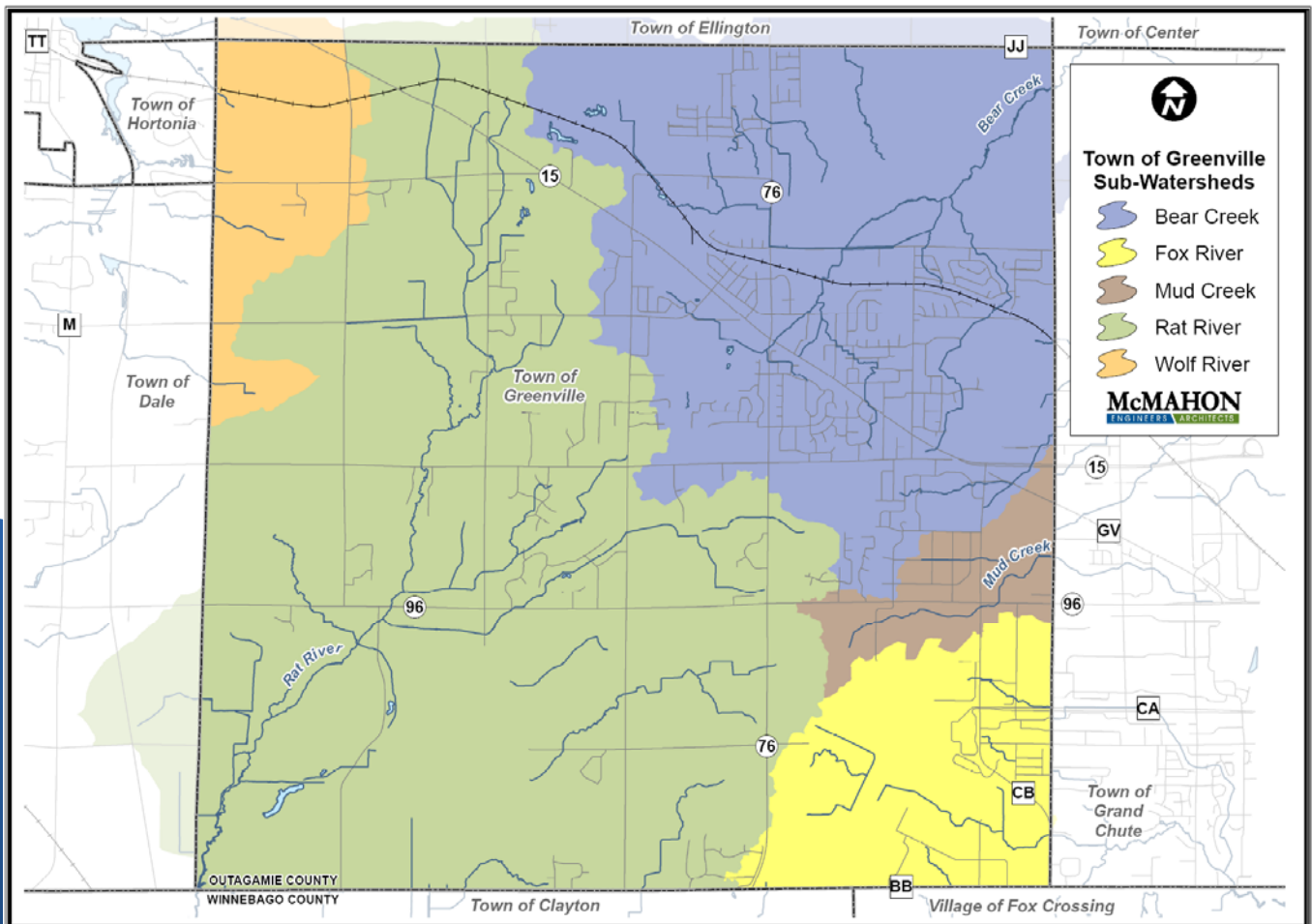
The Town of Greenville is required by the Wisconsin Department of Natural Resources to reduce the amount of stormwater pollutants discharging into Bear Creek, Mud Creek, Rat River, Wolf River and the Fox River. Stormwater pollutants include sediment, phosphorus, bacteria, heavy metals, motor oil, toxins, solvents, pesticides, litter and other pollutants.

Decreasing the amount of sediment and phosphorus is anticipated to improve water clarity and reduce algae blooms in streams, rivers and lakes. Reduced algae will increase the amount of oxygen available for fish and aquatic species survival. Also, greater water clarity and decreased algae will improve recreational opportunities and scenic beauty.



**Fox River: Algae & Poor Water Clarity**

The Town's drainage system is a network of swales, pipes and storm inlets that carry stormwater pollutants directly to Bear Creek, Mud Creek, Rat River, Wolf River and the Fox River. As shown on the watershed map, the majority of the Town's developed urban area is located within the Bear Creek and Rat River Sub-Watersheds. The Town's Post-Construction Stormwater Ordinance requires a different amount of pollutant reduction depending on which watershed the post-construction site is located within (see watershed map).



# Frequently Asked Questions...

## When is compliance required?

Ordinance compliance is required for all post-construction sites located within the Town.

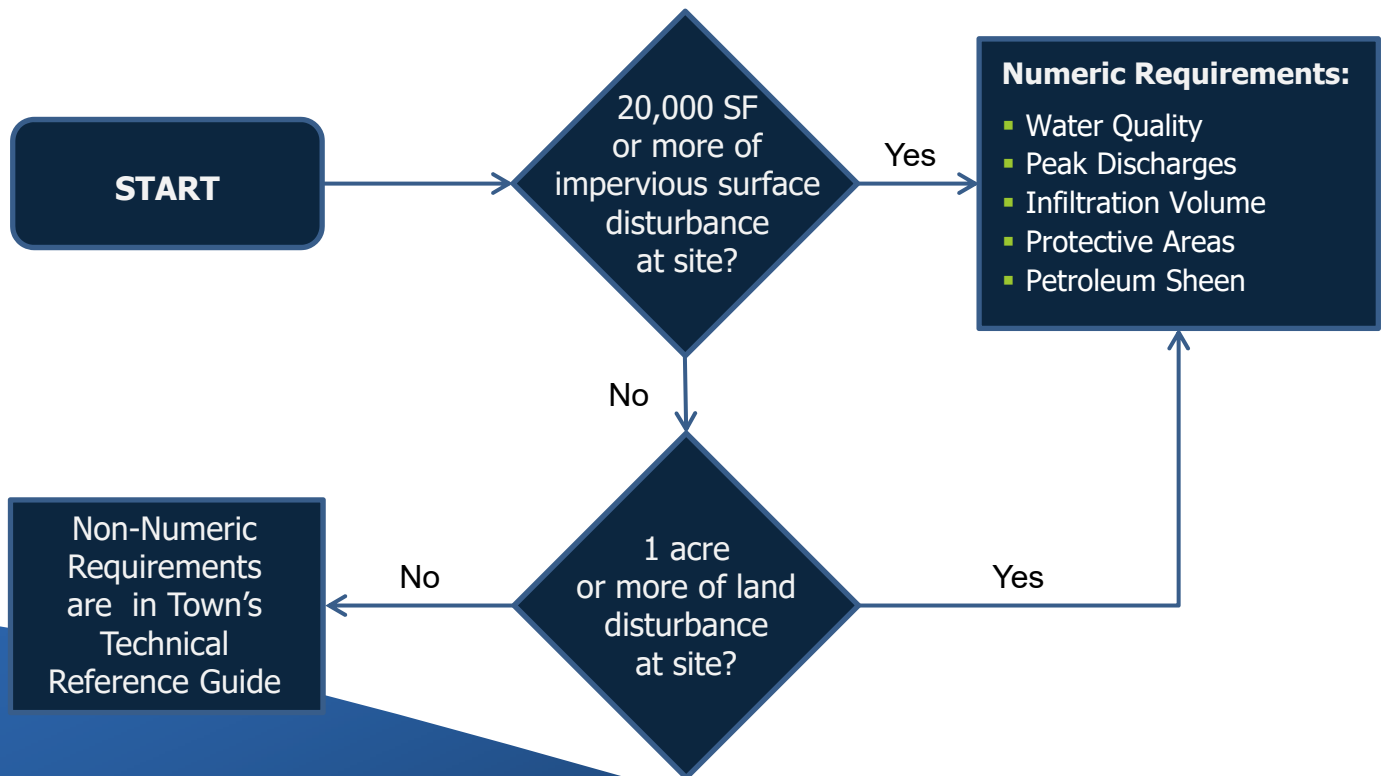
## Who is responsible for compliance?

Landowners, developers, builders, contractors, subcontractors, landscapers, utility companies and other persons involved with the post-construction site are responsible for ordinance compliance.



## What is required by the ordinance?

The Town's Post-Construction Stormwater Management Ordinance requires design, installation and maintenance of best management practices (BMPs). The Town's permit application, ordinance and Technical Reference Guide can be downloaded from the website. Please refer to the ordinance for specific requirements and exemptions. Generally, the below flow chart describes when a permit applicant needs to satisfy the ordinance's numeric or non-numeric requirements.



FOR ADDITIONAL INFORMATION:



Town of Greenville

W6860 Parkview Drive, P.O. Box 60  
Greenville, WI 54942

P: 920-757-5151 F: 920-757-0543

[www.townofgreenville.com](http://www.townofgreenville.com)



**McMAHON**  
ENGINEERS ARCHITECTS

The Town Board of the Town of Greenville does hereby ordain that Article 1 of Chapter 255 of the code or ordinances of the Town Greenville is repealed and recreated to read as follows:

## **Chapter 255. Stormwater Management**

### **Article I. Post-Construction Stormwater Management**

#### **§ 255-1. Authority.**

- A. This article is adopted by the Town of Greenville Board under the authority granted by § 60.627, Wis. Stats. This article supersedes all provisions of an ordinance previously enacted under § 60.62, Wis. Stats., that relate to post-construction stormwater management regulations. Except as otherwise specified in § 60.627, Wis. Stats., § 60.62, Wis. Stats., applies to this article and to any amendments to this article.
- B. The provisions of this article are deemed not to limit any other lawful regulatory powers of the same governing body.
- C. The Town Board hereby designates the Public Works Department to administer and enforce the provisions of this article.
- D. The requirements of this article do not pre-empt more stringent stormwater management requirements that may be imposed by any of the following:
  - (1) Wisconsin Department of Natural Resources administrative rules, permits or approvals including those authorized under §§ 281.16 and 283.33, Wis. Stats.
  - (2) Targeted performance standards promulgated in rules by the Wisconsin Department of Natural Resources under § NR 151.004, Wis. Adm. Code.

#### **§ 255-2. Findings of fact.**

The Town Board finds that uncontrolled, post-construction runoff has a significant impact upon water resources and the health, safety and general welfare of the community and diminishes the public enjoyment and use of natural resources. Specifically, uncontrolled post-construction runoff can:

- A. Degrade physical stream habitat by increasing stream bank erosion, increasing streambed scour, diminishing groundwater recharge, diminishing stream base flows and increasing stream temperature.
- B. Diminish the capacity of lakes and streams to support fish, aquatic life, recreational and water supply uses by increasing pollutant loading of sediment, suspended solids, nutrients, heavy metals, bacteria, pathogens and other urban pollutants.
- C. Alter wetland communities by changing wetland hydrology and by increasing pollutant loads.
- D. Reduce the quality of groundwater by increasing pollutant loading.
- E. Threaten public health, safety, property and general welfare by overtaxing storm sewers, drainage ways, and other minor drainage facilities.

- F. Threaten public health, safety, property and general welfare by increasing major flood peaks and volumes.
- G. Undermine floodplain management efforts by increasing the incidence and levels of flooding.

### **§ 255-3. Purpose and intent.**

- A. Purpose. The general purpose of this article is to establish long-term, post-construction runoff management requirements that will diminish the threats to public health, safety, welfare and the aquatic environment. Specific purposes are to:
  - (1) Further the maintenance of safe and healthful conditions.
  - (2) Prevent and control the adverse effects of stormwater; prevent and control soil erosion; prevent and control water pollution; protect spawning grounds, fish and aquatic life; control building sites, placement of structures and land uses; preserve ground cover and scenic beauty; and promote sound economic growth.
  - (3) Control exceedance of the safe capacity of existing drainage facilities and receiving water bodies; prevent undue channel erosion; control increases in the scouring and transportation of particulate matter; and prevent conditions that endanger downstream property.
- B. Intent. It is the intent of the Town Board that this article regulates post-construction stormwater discharges to waters of the state. This article may be applied on a site-by-site basis. The Town Board recognizes, however, that the preferred method of achieving the stormwater performance standards set forth in this article is through the preparation and implementation of comprehensive, systems-level stormwater management plans that cover hydrologic units, such as watersheds, on a municipal and regional scale. Such plans may prescribe regional stormwater devices, practices or systems, any of which may be designed to treat runoff from more than one site prior to discharge to waters of the state. Where such plans are in conformance with the performance standards developed under § 281.16, Wis. Stats., for regional stormwater management measures and have been approved by the Town Board, it is the intent of this article that the approved plan be used to identify post-construction management measures acceptable for the community.

### **§ 255-4. Applicability and jurisdiction.**

- A. Applicability.
  - (1) Where not otherwise limited by law, this article applies to all post-construction sites, unless the site is otherwise exempt under Subsection A(2).
  - (2) A post-construction site that meets any of the following criteria is exempt from the requirements of this article.
    - (a) One- and two-family residential dwellings that are not part of a larger common plan of development or sale and that result in less than one acre of disturbance.
    - (b) Non-point discharges from agricultural activity areas.
    - (c) Non-point discharges from silviculture activities.

(d) Mill and crush operations.

(3) Notwithstanding the applicability requirements in Subsection A(1), this article applies to post-construction sites of any size that, in the opinion of the administering authority, is likely to result in runoff that exceeds the safe capacity of the existing drainage facilities or receiving body of water, that causes undue channel erosion, that increases water pollution by scouring or the transportation of particulate matter or that endangers property or public safety.

B. Jurisdiction. This article applies to post-construction sites within the boundaries and jurisdiction of the Town of Greenville.

C. Exclusions. This article is not applicable to activities conducted by a state agency, as defined under § 227.01 (1), Wis. Stats., but also including the office of district attorney, which is subject to the state plan promulgated or a memorandum of understanding entered into under § 281.33 (2), Wis. Stats.

## **§ 255-5. Definitions.**

As used in this article, the following terms shall have the meanings indicated:

### **ADEQUATE SOD or SELF-SUSTAINING VEGETATIVE COVER**

Maintenance of sufficient vegetation types and densities such that the physical integrity of the streambank or lakeshore is preserved. Self-sustaining vegetative cover includes grasses, forbs, sedges and duff layers of fallen leaves and woody debris.

### **ADMINISTERING AUTHORITY**

A governmental employee or their designees empowered under s. 60.627, Wis. Stats., to administer this article. For the purpose of this ordinance, it is the Town of Greenville Public Works Department under guidance from the Town Board.

### **AGRICULTURAL ACTIVITY AREA**

The part of the farm where there is planting, growing, cultivating and harvesting of crops for human or livestock consumption and pasturing or outside yarding of livestock, including sod farms and silviculture. Practices in this area may include waterways, drainage ditches, diversions, terraces, farm lanes, excavation, filling and similar practices. The agricultural activity area does not include the agricultural production area.

### **AGRICULTURAL PRODUCTION AREA**

The part of the farm where there is concentrated production activity or impervious surfaces. Agricultural production areas include buildings, driveways, parking areas, feed storage structures, manure storage structures, and other impervious surfaces. The agricultural production area does not include the agricultural activity area.

### **ATLAS 14**

The National Oceanic and Atmospheric Administration (NOAA) Atlas 14 Precipitation-Frequency Atlas of the United States, Volume 8 (Midwestern States), published in 2013.

### **AVERAGE ANNUAL RAINFALL**

A typical calendar year of precipitation as determined by the Wisconsin DNR for users of models such as SLAMM, P8, or equivalent methodology. The average annual rainfall is chosen from a Wisconsin DNR publication for the location closest to the municipality.

**BEST MANAGEMENT PRACTICES or BMP**

Structural or non-structural measures, practices, techniques or devices employed to avoid or minimize soil, sediment or pollutants carried in runoff to waters of the state.

**BUSINESS DAY**

A day the office of the administering authority is routinely and customarily open for business.

**CEASE AND DESIST ORDER**

A court-issued order to halt land disturbing construction activity that is being conducted without the required permit.

**COMBINED SEWER SYSTEM**

A system for conveying both sanitary sewage and stormwater runoff.

**COMMON PLAN OF DEVELOPMENT OR SALE**

A development or sale where multiple separate and distinct land disturbing construction activities may be taking place at different times on different schedules but under one plan. A common plan of development or sale includes, but is not limited to, subdivision plats, certified survey maps, and other developments.

**CONNECTED IMPERVIOUS**

An impervious surface connected to the waters of the state via a separate storm sewer, an impervious flow path, or a minimally pervious flow path.

**CONSTRUCTION SITE**

An area upon which one or more land disturbing construction activities occur, including areas that are part of a larger common plan of development or sale.

**DESIGN STORM**

A hypothetical discrete rainstorm characterized by a specific duration, temporal distribution, rainfall intensity, return frequency, and total depth of rainfall. The TP-40, Type II, 24-hour design storms for Town of Greenville are: 1-year, 2.2 inches; 2-year, 2.5 inches; 5-year, 3.3 inches; 10-year, 3.8 inches; 25-year, 4.4 inches; 50-year, 4.9 inches; and 100-year, 5.3 inches. The Atlas 14, MSE4, 24-hour design storms for the Town of Greenville are: 1-year, 2.14 inches; 2-year, 2.45 inches; 5-year, 3.01 inches; 10-year, 3.51 inches; 25-year, 4.24 inches; 50-year, 4.85 inches; and 100-year, 5.50 inches.

**DEVELOPMENT**

Residential, commercial, industrial, institutional, or other land uses and associated roads.

**DIRECT CONDUITS TO GROUNDWATER**

Wells, sinkholes, swallets, fractured bedrock at the surface, mine shafts, nonmetallic mines, tile inlets discharging to groundwater, quarries, or depressional groundwater recharge areas over shallow fractured bedrock.

**DIVISION OF LAND**

The creation from one or more parcels or building sites of additional parcels or building sites where such creation occurs at one time or through the successive partition within a 5 year period.

**EFFECTIVE INFILTRATION AREA**

The area of the infiltration system that is used to infiltrate runoff and does not include the area used for site access, berms or pretreatment.

#### **EROSION**

The process by which the land's surface is worn away by the action of wind, water, ice or gravity.

#### **EXCEPTIONAL RESOURCE WATERS**

Waters listed in § NR 102.11, Wis. Adm. Code.

#### **EXISTING DEVELOPMENT**

Development in existence on October 1, 2004 or development for which a stormwater permit in accordance with Subch. III of Ch. NR 216, Wis. Adm. Code, was received on or before October 1, 2004.

#### **EXTRATERRITORIAL**

The unincorporated area within 3 miles of the corporate limits of a first, second, or third class city, or within 1.5 miles of a fourth class city or village.

#### **FILTERING LAYER**

Soil that has at least a 3-foot deep layer with at least 20 percent fines; or at least a 5-foot deep layer with at least 10 percent fines; or an engineered soil with an equivalent level of protection as determined by the administering authority for the site.

#### **FINAL STABILIZATION**

That all land disturbing construction activities at the construction site have been completed and that a uniform, perennial, vegetative cover has been established, with a density of at least 70% of the cover, for the unpaved areas and areas not covered by permanent structures, or that employ equivalent permanent stabilization measures.

#### **FINANCIAL GUARANTEE**

A performance bond, maintenance bond, surety bond, irrevocable letter of credit, or similar guarantees submitted to the administering authority by the responsible party to assure that requirements of the article are carried out in compliance with the stormwater management plan.

#### **GOVERNING BODY**

Town Board of Supervisors, county board of supervisors, city council, village board of trustees or village council.

#### **GROUNDWATER**

Waters of the state, as defined in § 281.01 (18), Wis. Stats., occurring in a saturated subsurface geological formation of rock or soil.

#### **HIGH GROUNDWATER LEVEL OR SUBSURFACE SATURATION**

Higher of either the elevation to which the soil is saturated as observed as a free water surface in an unlined hole, or the elevation to which the soil has been seasonally or periodically saturated as indicated by soil color patterns throughout the soil profile, as defined in Technical Standard 1002, Site Evaluation for Stormwater Infiltration.

#### **HIGHWAY**

Has the meaning given in § 340.01 (22), Wis. Stats.

**HIGHWAY RECONDITIONING**

Has the meaning given in § 84.013 (1)(b), Wis. Stats.

**HIGHWAY RECONSTRUCTION**

Has the meaning given in § 84.013(1)(c), Wis. Stats.

**HIGHWAY RESURFACING**

Has the meaning given in § 84.013(1)(d), Wis. Stats.

**IMPERVIOUS SURFACE**

An area that releases as runoff all or a large portion of the precipitation that falls on it, except for frozen soil. Rooftops, sidewalks, driveways, parking lots and streets are examples of surfaces that typically are impervious. Gravel surfaces are considered impervious, unless specifically designed to encourage infiltration.

**IMPERVIOUS SURFACE DISTURBANCE**

Any land disturbing construction activity in which any new impervious surfaces are created or existing impervious surfaces are redeveloped.

**IN-FILL**

An undeveloped area of land or new development area located within an existing urban sewer service area, surrounded by development or development and natural or man-made features where development cannot occur. "In-fill" does not include any undeveloped area that was part of a larger new development for which a stormwater permit in accordance with Subch. III of Ch. NR 216, Wis. Adm. Code, was required to be submitted after October 1, 2004 to the Wisconsin Department of Natural Resources or Wisconsin Department of Safety and Professional Services (formerly Department of Commerce).

**INFILTRATION**

The entry and movement of precipitation or runoff into or through soil.

**INFILTRATION SYSTEM**

A device or practice such as a basin, trench, rain garden or swale designed specifically to encourage infiltration, but does not include natural infiltration in pervious surfaces such as lawns, redirecting of rooftop downspouts onto lawns or minimal infiltration from practices, such as swales or road side channels designed for conveyance and pollutant removal only.

**LAND DISTURBING CONSTRUCTION ACTIVITY (OR DISTURBANCE)**

Any man-made alteration of the land surface resulting in a change in the topography or existing vegetative or non-vegetative soil cover, that may result in runoff and lead to an increase in soil erosion and movement of pollutants into the municipal separate storm sewer or waters of the state. Land disturbing construction activity includes clearing and grubbing, demolition, excavating, pit trench dewatering, filling and grading activities, and soil stockpiling.

**MAINTENANCE AGREEMENT**

A legal document that provides for long-term maintenance of stormwater management and best management practices.

**MEP or MAXIMUM EXTENT PRACTICABLE**

The highest level of performance that is achievable but is not equivalent to a performance standard identified within this article. Maximum extent practicable applies when the permit applicant

demonstrates to the administering authority's satisfaction that a performance standard is not achievable and that a lower level of performance is appropriate. In making the assertion that a performance standard is not achievable and that a level of performance different from the performance standard is the maximum extent practicable, the permit applicant shall take into account the best available technology, cost effectiveness, geographic features, and other competing interests such as protection of public safety and welfare, protection of endangered and threatened resources, and preservation of historic properties.

#### **MINOR RECONSTRUCTION OF A HIGHWAY**

Reconstruction of a highway that is limited to 1.5 miles in continuous or aggregate total length of realignment and that does not exceed 100 feet in width of roadbed widening, and that does not include replacement of a vegetated drainage system with a non-vegetated drainage system except where necessary to convey runoff under a highway or private road or driveway.

#### **MSE4 DISTRIBUTION**

A specific precipitation distribution developed by the USDA, NRCS, using precipitation data from Atlas 14.

#### **NAVIGABLE WATERS AND NAVIGABLE WATERWAY**

Has the meaning given in § 30.01(4m), Wis. Stats.

#### **NEW DEVELOPMENT**

That portion of a post-construction site where impervious surfaces are being created or expanded. Any disturbance where the amount of impervious area for the post-development condition is greater than the pre-development condition is classified as new development. For purposes of this article, a post-construction site is classified as new development, redevelopment, routine maintenance, or some combination of these three classifications as appropriate.

#### **OFF-SITE**

Located outside the property boundary described in the permit application.

#### **ON-SITE**

Located within the property boundary described in the permit application.

#### **ORDINARY HIGH-WATER MARK**

Has the meaning given in § NR 115.03(6), Wis. Adm. Code.

#### **OUTSTANDING RESOURCE WATERS**

Waters listed in § NR 102.10, Wis. Adm. Code.

#### **PERCENT FINES**

The percentage of a given sample of soil, which passes through a # 200 sieve.

#### **PERFORMANCE STANDARD**

A narrative or measurable number specifying the minimum acceptable outcome for a facility or practice.

#### **PERMIT**

A written authorization made by the administering authority to the applicant to conduct land disturbing construction activity or to discharge post-construction runoff to waters of the state.

**PERMIT ADMINISTRATION FEE**

A sum of money paid to the administering authority by the permit applicant for the purpose of recouping the expenses incurred by the authority in administering the permit.

**PERVIOUS SURFACE**

An area that releases as runoff a small portion of the precipitation that falls on it. Lawns, gardens, parks, forests or other similar vegetated areas are examples of surfaces that typically are pervious.

**POLLUTANT**

Has the meaning given in § 283.01(13), Wis. Stats.

**POLLUTION**

Has the meaning given in § 281.01(10), Wis. Stats.

**POST-CONSTRUCTION SITE**

A construction site following the completion of land disturbing construction activity and final site stabilization.

**POST-DEVELOPMENT**

The extent and distribution of land cover types present after the completion of land disturbing construction activity and final site stabilization.

**PRE-DEVELOPMENT**

The extent and distribution of land cover types present before the initiation of land disturbing construction activity, assuming that all land uses prior to development activity are managed in an environmentally sound manner.

**PREVENTIVE ACTION LIMIT**

The meaning given in § NR 140.05(17), Wis. Adm. Code.

**REDEVELOPMENT**

That portion of a post-construction site where impervious surfaces are being reconstructed, replaced, or reconfigured. Any disturbance where the amount of impervious area for the post-development condition is equal to or less than the pre-development condition is classified as redevelopment. For purposes of this article, a post-construction site is classified as new development, redevelopment, routine maintenance, or some combination of these three classifications as appropriate.

**RESPONSIBLE PARTY**

Any entity holding fee title to the property or other person contracted or obligated by other agreement to implement and maintain post-construction stormwater BMPs.

**ROUTINE MAINTENANCE**

That portion of a post-construction site where pre-development impervious surfaces are being maintained to preserve the original line and grade, hydraulic capacity, drainage pattern, configuration, or purpose of the facility. Remodeling of buildings and resurfacing of parking lots, streets, driveways, and sidewalks are examples of routine maintenance, provided the lower ½ of the impervious surface's granular base is not disturbed. The disturbance shall be classified as redevelopment if the lower ½ of the granular base associated with the pre-development impervious surface is disturbed or if the soil located beneath the impervious surface is exposed. For purposes of this article, a post-construction site is classified as new development, redevelopment, routine maintenance, or some combination of these three classifications as appropriate.

**RUNOFF**

Stormwater or precipitation including rain, snow or ice melt or similar water that moves on the land surface via sheet or channelized flow.

**SEDIMENT**

Settleable solid material that is transported by runoff, suspended within runoff or deposited by runoff away from its original location.

**SEPARATE STORM SEWER**

A conveyance or system of conveyances including roads with drainage systems, streets, catch basins, curbs, gutters, ditches, constructed channels or storm drains, which meets all of the following criteria:

- A. Is designed or used for collecting water or conveying runoff.
- B. Is not part of a combined sewer system.
- C. Is not part of a publicly owned wastewater treatment works that provides secondary or more stringent treatment.
- D. Discharges directly or indirectly to waters of the state.

**SILVICULTURE ACTIVITIES**

Activities including tree nursery operations, tree harvesting operations, reforestation, tree thinning, prescribed burning, and pest and fire control. Clearing and grubbing of an area of a construction site is not a silviculture activity.

**SITE**

The entire area included in the legal description of the land on which the land disturbing construction activity occurred.

**STOP WORK ORDER**

An order issued by the administering authority which requires that all construction activity on the site be stopped.

**STORMWATER MANAGEMENT PLAN**

A comprehensive plan designed to reduce the discharge of pollutants from stormwater after the site has undergone final stabilization following completion of the construction activity.

**STORMWATER MANAGEMENT SYSTEM PLAN**

Is a comprehensive plan designed to reduce the discharge of runoff and pollutants from hydrologic units on a regional or municipal scale.

**TARGETED PERFORMANCE STANDARD**

A performance standard that will apply in a specific area, where additional practices beyond those contained in this article, are necessary to meet water quality standards. A total maximum daily load is an example of a targeted performance standard.

**TECHNICAL STANDARD**

A document that specifies design, predicted performance and operation and maintenance specifications for a material, device or method.

**TOP OF CHANNEL**

An edge, or point on the landscape, landward from the ordinary high-water mark of a surface water of the state, where the slope of the land begins to be less than 12% continually for at least 50 feet. If the slope of the land is 12% or less continually for the initial 50 feet, landward from the ordinary high-water mark, the top of the channel is the ordinary high-water mark.

**TOTAL MAXIMUM DAILY LOAD or TMDL**

The amount of pollutants specified as a function of one or more water quality parameters, that can be discharged per day into a water quality limited segment and still ensure attainment of the applicable water quality standard.

**TP-40**

The Technical Paper No. 40, Rainfall Frequency Atlas of the United States, published in 1961.

**TR-55**

The United States Department of Agriculture, Natural Resources Conservation Service (previously Soil Conservation Service), Urban Hydrology for Small Watersheds, Second Edition, Technical Release 55, June 1986, which is incorporated by reference for this article.

**TRANSPORTATION FACILITY**

A public street, a public road, a public highway, a railroad, a public mass transit facility, a public-use airport, a public trail, or any other public work for transportation purposes such as harbor improvements under § 85.095(1)(b), Wis. Stats. "Transportation facility" does not include building sites for the construction of public buildings and buildings that are places of employment that are regulated by the Wisconsin Department of Natural Resources pursuant to § 281.33, Wis. Stats.

**TYPE II DISTRIBUTION**

A rainfall type curve as established in the "United States Department of Agriculture, Soil Conservation Service, Technical Paper 149, published 1973", which is incorporated by reference for this article. The Type II curve is applicable to all of Wisconsin and represents the most intense storm pattern.

**WATERS OF THE STATE**

Has the meaning given in § 283.01 (20), Wis. Stats.

**§ 255-6. Technical standards.**

The following methods shall be used in designing and maintaining the water quality, peak discharge, infiltration, protective area, fueling / vehicle maintenance, and swale treatment components of stormwater practices needed to meet the water quality standards of this article:

- A. Technical standards identified, developed or disseminated by the Wisconsin Department of Natural Resources under Subchapter V of Chapter NR 151, Wis. Adm. Code.
- B. Technical standards and guidance identified within the Town of Greenville Stormwater Reference Guide.
- C. Where technical standards have not been identified or developed by the Wisconsin Department of Natural Resources, other technical standards may be used provided that the methods have been approved by the administering authority.

- D. In this article, the following year and location has been selected as average annual rainfall(s): Green Bay, 1969 (Mar. 29-Nov. 25).
- E. Stormwater facilities located within an airport zoning district shall be designed, operated, and maintained in conformance with Chapter 10 of the Outagamie County Code of Ordinances.

## **§ 255-7. Performance standards.**

- A. Responsible party. The responsible party shall develop and implement a post-construction stormwater management plan that incorporates the requirements of this section.
- B. Plan. A written stormwater management plan shall be developed and implemented by the responsible party in accordance with § 255-9. The stormwater management plan shall meet all of the applicable requirements contained in this article.
- C. Requirements. The stormwater management plan shall meet the following minimum requirements to the maximum extent practicable:
  - (1) Water quality. BMPs shall be designed, installed and maintained to control pollutants carried in runoff from the post-construction site. The design shall be based on the average annual rainfall, as compared to no runoff management controls.

- (a) For post-construction sites with one acre or more of land disturbance, the following is required:

[1] Except as provided in § 255-7C(1)(a)[2], a pollutant reduction is required as follows:

Watershed	Total Suspended Solids (TSS) & Total Phosphorus (TP) Reduction					
	New Development		Redevelopment		Routine Maintenance	
	TSS	TP	TSS	TP	TSS	TP
Bear Creek	80%	-	40%	-	40%	-
Fox River	80%	41%	72%	41%	72%	41%
Mud Creek	80%	48%	43%	48%	43%	48%
Rat River	80%	-	40%	-	40%	-
Wolf River	80%	-	40%	-	40%	-

[2] A pollutant reduction is not required for routine maintenance areas that are part of a post-construction site with less than five acres of disturbance.

- (b) For post-construction sites with less than one acre of land disturbance, reduce the pollutant load using BMPs from the Town of Greenville Stormwater Reference Guide or other practices approved by the administering authority.
  - (c) Sites, including common plan of development sites, with a cumulative addition of 20,000 square feet or greater of impervious surfaces after October 1, 2004 are required to satisfy the performance standards within § 255-7C(1)(a)[1] and [2].
  - (d) The amount of pollutant control previously required for the site shall not be reduced as a result of the proposed development or disturbance.

- (e) When designing BMPs, runoff draining to the BMP from offsite areas shall be taken into account in determining the treatment efficiency of the practice. Any impact on the BMP efficiency shall be compensated for by increasing the size of the BMP accordingly. The pollutant load reduction provided by the BMP for an offsite area shall not be used to satisfy the required onsite pollutant load reduction, unless otherwise approved by the administering authority in accordance with § 255-7E.
  - (f) If the design cannot meet the water quality performance standards of § 255-7C(1)(a) through (e), the stormwater management plan shall include a written, site specific explanation of why the water quality performance standard cannot be met and why the pollutant load will be reduced only to the maximum extent practicable. Except as provided in § 255-7F, the administering authority may not require any person to exceed the applicable water quality performance standard to meet the requirements of maximum extent practicable.
- (2) Peak discharge. BMPs shall be designed, installed and maintained to control peak discharges from the post-construction site.
- (a) The following is required for post-construction sites with one or more of the following: 20,000 square feet or more of impervious surface disturbance, or one acre or more of land disturbance.
    - [1] The peak post-development discharge rate shall not exceed the peak pre-development discharge rate for the 1-year, 2-year, 10-year, and 100-year, 24-hour design storms. These peak discharge requirements apply to new development and redevelopment areas. No peak discharge control is required for routine maintenance areas, unless runoff from the routine maintenance area discharges into a proposed peak flow control facility.
    - [2] Peak discharge calculations shall use TR-55 methodology. Atlas 14 rainfall depths and the MSE4 rainfall distribution shall be used unless the site is to be served by a previously constructed peak discharge facility. At the permittee's discretion, the TP-40 rainfall depths and the Type II rainfall distribution can be used for sites that are to be served by a previously constructed peak discharge facility. The meaning of "hydrologic soil group" and "runoff curve number" are as determined in TR-55. Unless the site is currently woodland, peak pre-development discharge rates shall be determined using the following runoff curve numbers for a "meadow" vegetative cover:

Maximum Pre-Development Runoff Curve Numbers				
Vegetative Cover	Hydrologic Soil Group			
	A	B	C	D
Meadow	30	58	71	78
Woodland	30	55	70	77

- (b) For post-construction sites with less than 20,000 square feet of impervious surface disturbance, prepare a plan that shows how the peak post-development discharge rates are reduced using BMPs from the Town of Greenville Stormwater Reference Guide or other practices approved by the administering authority. If 90% of the proposed impervious surfaces discharge to BMPs, these sites are not required to satisfy a numeric performance standard.

- (c) Sites with a cumulative addition of 20,000 square feet or greater of impervious surfaces after October 1, 2004 are required to satisfy the performance standards within § 255-7C(2)(a)[1] and [2].
- (d) The amount of peak discharge control previously required for the site shall not be reduced as a result of the proposed development or disturbance.
- (e) When designing BMPs, runoff draining to the BMP from offsite areas shall be taken into account in determining the performance of the practice. Any impact on the BMP performance shall be compensated for by increasing the size of the BMP accordingly. The peak discharge reduction provided by the BMP for an offsite area shall not be used to satisfy the required onsite peak discharge reduction, unless otherwise approved by the administering authority in accordance with § § 255-7E.
- (f) An adequate outfall shall be provided for each point of concentrated discharge from the post-construction site and shall:
  - [1] Consist of non-erosive discharge velocities and reasonable downstream conveyance.
  - [2] Discharge to the municipal separate storm sewer system, waters of the state, or an appropriate drainage easement. If a site is not able to meet this requirement, the adequate outfall may be permitted if it diffuses the outfall within the site boundary in accordance with the Town of Greenville Stormwater Reference Guide.
- (g) New buildings with basements shall be designed to provide a minimum one foot of vertical separation between the lowest floor surface and the estimated high groundwater level. If less than one foot of vertical separation is provided, groundwater flow shall be estimated for each basement during site or subdivision design. In addition, the onsite stormwater systems shall be designed to accommodate the additional water flow and volume from groundwater.
- (h) New development sites that discharge to direct conduits to groundwater shall be designed in conformance with Chapter 38 of the Outagamie County Code of Ordinances.
- (i) New development sites located near a closed depression and/or flood prone area shall be designed to provide a minimum one foot of vertical separation between the lowest ground surface elevation at the building's perimeter and the overland relief elevation for the flood prone area. The Town of Greenville maintains a Flood Prone Area map to assist with identifying higher risk areas. If less than one foot of vertical separation is provided, a detailed stormwater analysis shall be performed to identify and reasonably manage 100-year flooding risks for buildings or structures located within the flood prone area.
- (j) Agricultural production areas shall meet the intent of this article by following the BMPs listed in the Town of Greenville Stormwater Reference Guide.
- (k) *Exemptions.* The peak discharge performance standards do not apply to the following:
  - [1] A transportation facility where the discharge is directly into a lake over 5,000 acres or a stream or river segment draining more than 500 square miles.
  - [2] Except as provided under § 255-7C(2)(d) to (f), a highway reconstruction site.

- [3] Except as provided under § 255-7C(2)(d) to (f), a transportation facility that is part of a redevelopment project.
- (3) Infiltration. BMPs shall be designed, installed, and maintained to infiltrate runoff from the post-construction site, except as provided in § 255-7C(3)(i) through (m).
- (a) The following is required for post-construction sites with one or more of the following: 20,000 square feet or more of impervious surface disturbance, or one acre or more of land disturbance.
- [1] *Low Imperviousness.* For development up to 40 percent connected imperviousness, such as parks, cemeteries, and low density residential development, infiltrate sufficient runoff volume so that the post-development infiltration volume shall be at least 90 percent of the pre-development infiltration volume, based on an average annual rainfall. However, when designing appropriate infiltration systems to meet this requirement, no more than one percent of the post-construction site is required as an effective infiltration area.
- [2] *Moderate imperviousness.* For development with more than 40 percent and up to 80 percent connected imperviousness, such as medium and high density residential, multi-family development, industrial and institutional development, and office parks, infiltrate sufficient runoff volume so that the post-development infiltration volume shall be at least 75 percent of the pre-development infiltration volume, based on an average annual rainfall. However, when designing appropriate infiltration systems to meet this requirement, no more than 2 percent of the post-construction site is required as an effective infiltration area.
- [3] *High imperviousness.* For development with more than 80 percent connected imperviousness, such as commercial strip malls, shopping centers, and commercial downtowns, infiltrate sufficient runoff volume so that the post-development infiltration volume shall be at least 60 percent of the pre-development infiltration volume, based on an average annual rainfall. However, when designing appropriate infiltration systems to meet this requirement, no more than 2 percent of the post-construction site is required as an effective infiltration area.
- (b) Pre-development condition shall assume “good hydrologic conditions” for appropriate land covers as identified in TR-55 or an equivalent methodology approved by the administering authority. The meaning of “hydrologic soil group” and “runoff curve number” are as determined in TR-55. The actual pre-development vegetative cover and the following pre-development runoff curve numbers shall be used:

Maximum Pre-Development Runoff Curve Numbers				
Vegetative Cover	Hydrologic Soil Group			
	A	B	C	D
Woodland	30	55	70	77
Grassland	39	61	71	78
Cropland	55	69	78	83

- (c) For post-construction sites with less than 20,000 square feet of new impervious surfaces, infiltrate runoff volume using BMPs from the Town of Greenville Stormwater Reference

Guide or other practices approved by the administering authority. These sites are not required to satisfy a numeric performance standard.

- (d) Sites with a cumulative addition of 20,000 square feet or greater of impervious surfaces after October 1, 2004 are required to satisfy the performance standards within § 255-7C(3)(a) and (b).
- (e) The amount of infiltration previously required for the site shall not be reduced as a result of the proposed development or disturbance.
- (f) Agricultural production areas shall infiltrate runoff volume using BMPs from the Town of Greenville Stormwater Reference Guide.
- (g) When designing BMPs, runoff draining to the BMP from offsite areas shall be taken into account in determining the performance of the practice. Any impact on the BMP performance shall be compensated for by increasing the size of the BMP accordingly. The runoff volume reduction provided by the BMP for an offsite area shall not be used to satisfy the required onsite runoff volume reduction, unless otherwise approved by the administering authority in accordance with § 255-7E.
- (h) *Pretreatment.* Before infiltrating runoff, pretreatment shall be required for parking lot runoff and for runoff from road construction in commercial, industrial and institutional areas that will enter an infiltration system. The pretreatment shall be designed to protect the infiltration system from clogging prior to scheduled maintenance and to protect groundwater quality in accordance with § 255-7C(3)(o). Pretreatment options may include, but are not limited to, oil/grease separation, sedimentation, biofiltration, filtration, swales or filter strips.
- (i) *Source area prohibitions.* Runoff from the following areas may not be infiltrated and may not qualify as contributing to meeting the requirements of § 255-7C(3) unless demonstrated to meet the conditions of § 255-7C(3)(o).
  - [1] Areas associated with a tier 1 industrial facility identified in § NR 216.21(2)(a), Wis. Adm. Code, including storage, loading, and parking. Rooftops may be infiltrated with the concurrence of the administering authority.
  - [2] Storage and loading areas of a tier 2 industrial facility identified in § NR 216.21(2)(b), Wis. Adm. Code.
  - [3] Fueling and vehicle maintenance areas. Rooftops of fueling and vehicle maintenance areas may be infiltrated with the concurrence of the administering authority.
  - [4] Agricultural production areas that contain livestock, animal waste, or feed storage.
- (j) *Source area exemptions.* Runoff from the following areas may be credited toward meeting the requirement when infiltrated, but the decision to infiltrate runoff from these sources is optional:
  - [1] Parking areas and access roads less than 5,000 square feet for commercial development.

- [2] Parking areas and access roads less than 5,000 square feet for industrial development not subject to the prohibitions under § 255-7C(3)(i).
  - [3] Except as provided under § 255-7C(3)(e), redevelopment and routine maintenance areas.
  - [4] In-fill development areas less than five acres.
  - [5] Roads in commercial, industrial and institutional land uses, and arterial residential roads.
  - [6] Except as provided under § 255-7C(3)(e), transportation facility highway reconstruction and new highways.
- (k) *Prohibitions.* Infiltration practices may not be located in the following areas:
- [1] Areas within 1,000 feet upgradient or within 100 feet downgradient of direct conduits to groundwater.
  - [2] Areas within 400 feet of a community water system well as specified in § NR 811.16(4), Wis. Adm. Code, or within the separation distances listed in § NR 812.08, Wis. Adm. Code, for any private well or non-community well for runoff infiltrated from commercial, including multi-family residential, industrial, and institutional land uses or regional devices for one- and two-family residential development.
  - [3] Areas where contaminants of concern, as defined in § NR 720.03(2), Wis. Adm. Code, are present in the soil through which infiltration will occur.
- (l) *Separation distances.* Infiltration practices shall be located so that the characteristics of the soil and the separation distance between the bottom of the infiltration system and the elevation of seasonal high groundwater or the top of bedrock are in accordance with the following:

Separation Distances and Soil Characteristics		
Source Area	Separation Distance	Soil Characteristics
Industrial, Commercial, Institutional Parking Lots and Roads	5 feet or more	Filtering Layer
Residential Arterial Roads	5 feet or more	Filtering Layer
Roofs Draining to Subsurface Infiltration Practices	1 foot or more	Native or Engineered Soil with Particles Finer than Coarse Sand
Roofs Draining to Surface Infiltration Practices	Not Applicable	
All Other Impervious Source Areas	3 feet or more	Filtering Layer

Notwithstanding § 255-7C(3)(l), applicable requirements for injection wells classified under Ch. NR 815, Wis. Adm. Code, shall be followed.

- (m) *Infiltration rate exemptions.* Infiltration practices located in the following areas may be credited toward meeting the requirement under the following conditions, but the decision to infiltrate under these conditions is optional:
    - [1] Where the infiltration rate of the soil measured at the proposed bottom of the infiltration system is less than 0.6 inches per hour using a scientifically credible field test method.
    - [2] Where the least permeable soil horizon to five feet below the proposed bottom of the infiltration system using the U.S. Department of Agriculture method of soils analysis is one of the following: sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, or clay.
  - (n) *Alternate uses.* Where alternate uses of runoff are employed, such as for toilet flushing, laundry or irrigation or storage on green roofs where an equivalent portion of the runoff is captured permanently by rooftop vegetation, such alternate use shall be given equal credit toward the infiltration volume required by § 255-7C(3).
  - (o) *Groundwater standards.*
    - [1] Infiltration systems designed in accordance with this § 255-7C(3) shall, to the extent technically and economically feasible, minimize the level of pollutants infiltrating to groundwater and shall maintain compliance with the preventive action limit at a point of standards application in accordance with Ch. NR 140, Wis. Adm. Code. However, if site specific information indicates that compliance with a preventive action limit is not achievable, the infiltration BMP may not be installed or shall be modified to prevent infiltration to the maximum extent practicable.
    - [2] Notwithstanding § 255-7C(3)(o)[1], the discharge from BMPs shall remain below the enforcement standard at the point of standards application.
  - (p) Where the conditions of § 255-7C(3)(i) through (m) limit or restrict the use of infiltration practices, the performance standard of § 255-7C(3) shall be met to the maximum extent practicable.
- (4) *Protective areas.*
- (a) “Protective area” means an area of land that commences at the top of the channel of lakes, streams and rivers, or at the delineated boundary of wetlands, and that is the greatest of the following widths, as measured horizontally from the top of the channel or delineated wetland boundary to the closest impervious surface. However, in § 255-7C(4), “protective area” does not include any area of land adjacent to any stream enclosed within a pipe or culvert, such that runoff cannot enter the enclosure at this location.
    - [1] For outstanding resource waters and exceptional resource waters, 75 feet.
    - [2] For perennial and intermittent streams identified on a United States geological survey 7.5-minute series topographic map, or a county soil survey map, whichever is more current, 50 feet.
    - [3] For lakes, 50 feet.

- [4] For wetlands not subject to § 255-7C(4)(a)[5] or [6], 50 feet.
  - [5] For highly susceptible wetlands, 75 feet. Highly susceptible wetlands include the following types: calcareous fens, sedge meadows, open and coniferous bogs, low prairies, coniferous swamps, lowland hardwood swamps, and ephemeral ponds.
  - [6] For less susceptible wetlands, 10 percent of the average wetland width, but no less than 10 feet nor more than 30 feet. Less susceptible wetlands include: degraded wetlands dominated by invasive species such as reed canary grass; cultivated hydric soils; and any gravel pits, or dredged material or fill material disposal sites that take on the attributes of a wetland.
  - [7] In § 255-7C(4)(a)[4] to [6], determinations of the extent of the protective area adjacent to wetlands shall be made on the basis of the sensitivity and runoff susceptibility of the wetland in accordance with the standards and criteria in §. NR 103.03, Wis. Adm. Code.
  - [8] Wetlands shall be delineated. Wetland boundary delineations shall be made in accordance with § NR 103.08(1m), Wis. Adm. Code. § 255-7C(4) does not apply to wetlands that have been completely filled in compliance with all applicable state and federal regulations. The protective area for wetlands that have been partially filled in compliance with all applicable state and federal regulations shall be measured from the wetland boundary delineation after fill has been placed. Where there is a legally authorized wetland fill, the protective area standard need not be met in that location.
  - [9] For concentrated flow channels with drainage areas greater than 130 acres, 10 feet.
  - [10] Notwithstanding § 255-7C(4)(a)[1] to [9], the greatest protective area width shall apply where rivers, streams, lakes, and wetlands are contiguous.
- (b) § 255-7C(4) applies to all post-construction sites located within a protective area, except those areas exempted pursuant to § 255-7C(4)(e).
- (c) The following requirements shall be met:
- [1] Impervious surfaces shall be kept out of the protective area entirely or to the maximum extent practicable. If there is no practical alternative to locating an impervious surface in the protective area, the stormwater management plan shall contain a written, site-specific explanation.
  - [2] Where land disturbing construction activity occurs within a protective area, adequate sod or self-sustaining vegetative cover of 70 percent or greater shall be established and maintained where no impervious surface is present. The adequate sod or self-sustaining vegetative cover shall be sufficient to provide for bank stability, maintenance of fish habitat, and filtering of pollutants from upslope overland flow areas under sheet flow conditions. Non-vegetative materials, such as rock riprap, may be employed on the bank as necessary to prevent erosion, such as on steep slopes or where high velocity flows occur.

- [3] Best management practices such as filter strips, swales, or wet detention ponds, that are designed to control pollutants from non-point sources, may be located in the protective area.
- (d) A protective area established or created after October 1, 2004 shall not be eliminated or reduced, except as allowed in § 255-7C(4)(e)[2], [3], or [4].
- (e) *Exemptions.* The following areas are not required to meet the protective area requirements of § 255-7C(4):
  - [1] Redevelopment and routine maintenance areas provided the minimum requirements within § 255-7C(4)(d) are satisfied.
  - [2] Structures that cross or access surface waters such as boat landings, bridges and culverts.
  - [3] Structures constructed in accordance with § 59.692(1v), Wis. Stats.
  - [4] Areas of post-construction sites from which the runoff does not enter the surface water, including wetlands, without first being treated by a BMP to meet the requirements of § 255-7C(1) and (2), except to the extent that vegetative ground cover is necessary to maintain bank stability.
- (5) Fueling and vehicle maintenance areas. Fueling and vehicle maintenance areas shall have BMPs designed, installed and maintained to reduce petroleum within runoff, so that the runoff that enters waters of the state contains no visible petroleum sheen, or to the maximum extent practicable.
- (6) Swale treatment for transportation facilities. This § 255-7C(6) is not applicable to transportation facilities that are part of a larger common plan of development or sale.
  - (a) *Requirement.* Except as provided in § 255-7C(6)(b), transportation facilities that use swales for runoff conveyance and pollutant removal are exempt from the requirements of § 255-7C(1), (2), and (3), if the swales are designed to do all of the following or to the maximum extent practicable:
    - [1] Swales shall be vegetated. However, where appropriate, non-vegetative measures may be employed to prevent erosion or provide for runoff treatment, such as rock riprap stabilization or check dams.
    - [2] Swales shall comply with the Wisconsin Department of Natural Resources Technical Standard 1005, "Vegetated Infiltration Swale", except as otherwise authorized in writing by the Wisconsin Department of Natural Resources.
  - (b) *Other Requirements.* Notwithstanding § 255-7C(6)(a), the administering authority may, consistent with water quality standards, require that other requirements, in addition to swale treatment, be met on a transportation facility with an average daily traffic rate greater than 2,500 and where the initial surface water of the state that the runoff directly enters is any of the following:
    - [1] An outstanding resource water.

- [2] An exceptional resource water.
  - [3] Waters listed in section 303(d) of the federal clean water act that are identified as impaired in whole or in part, due to nonpoint source impacts.
  - [4] Waters where targeted performance standards are developed pursuant to § NR 151.004, Wis. Adm. Code.
- (7) Exemptions. The following areas are not required to meet the performance standards within § 255-7C:
- (a) Underground utility construction such as water, sewer, gas, electric, telephone, cable television, and fiber optic lines. This exemption does not apply to the construction of any above ground structures associated with utility construction.
  - (b) The following transportation facilities are exempt, provided the transportation facility is not part of a larger common plan of development or sale.
    - [1] A transportation facility post-construction site with less than 10 percent connected imperviousness, based on the area of land disturbance, provided the cumulative area of all impervious surfaces is less than one acre. Notwithstanding this exemption, the protective area requirements of § 255-7C(4) still apply.
    - [2] Reconditioning or resurfacing of a highway.
    - [3] Minor reconstruction of a highway. Notwithstanding this exemption, the protective area requirements of § 255-7C(4) apply to minor reconstruction of a highway.
    - [4] Routine maintenance for transportation facilities that have less than five acres of land disturbance if performed to maintain the original line and grade, hydraulic capacity or original purpose of the facility.
    - [5] Routine maintenance if performed for stormwater conveyance system cleaning.
- D. General considerations for on-site and off-site stormwater management measures. The following considerations shall be observed in managing runoff:
- (1) Natural topography and land cover features such as natural swales, natural depressions, native soil infiltrating capacity, and natural groundwater recharge areas shall be preserved and used, to the extent possible, to meet the requirements of this section.
  - (2) Emergency overland flow for all stormwater facilities shall be provided to prevent exceeding the safe capacity of downstream drainage facilities and prevent endangerment of downstream property or public safety.
- E. BMP location and credit.
- (1) General. To comply with § 255-7C performance standards, the BMPs may be located on-site or off-site as part of a regional stormwater device, practice or system.
  - (2) Offsite or regional BMP.

- (a) The amount of credit that the administering authority may give an offsite or regional BMP for purposes of determining compliance with the performance standards of § 255-7C is limited to the treatment capability or performance of the BMP.
- (b) The administering authority may authorize credit for an off-site or regional BMP provided all of the following conditions are satisfied:
  - [1] The BMP received all applicable permits.
  - [2] The BMP shall be installed and operational before the construction site has undergone final stabilization.
  - [3] The BMP shall be designed and adequately sized to provide a level of stormwater control equal to or greater than that which would be afforded by on-site BMPs meeting the § 255-7C performance standards.
  - [4] The owner of the BMP has entered into a § 255-10 maintenance agreement with the Town of Greenville, or another municipal entity, such that the BMP has a legally obligated entity responsible for its long-term operation and maintenance. Legal authority exists if a municipality owns, operates and maintains the BMP.
  - [5] The owner of the BMP has provided written authorization which indicates the permit applicant may use the BMP for § 255-7C performance standard compliance.
  - [6] Where an off-site or regional BMP option exists such that the administering authority exempts the applicant from all or part of the minimum on-site stormwater management requirements, the applicant shall be required to pay a fee in an amount determined in negotiation with the administering authority. In determining the fee for post-construction runoff, the administering authority shall consider an equitable distribution of the cost for land, engineering design, construction, and maintenance of the off-site or regional BMP.
- (3) BMP in non-navigable waters. For purposes of determining compliance with the performance standards of § 255-7C, the administering authority may give credit for BMPs that function to provide treatment for runoff from existing development and post-construction runoff from new development, redevelopment, and routine maintenance areas and that are located within non-navigable waters.
- (4) BMP in navigable waters.
  - (a) *New Development Runoff.* Except as allowed under § 255-7E(4)(b), BMPs designed to treat post-construction runoff from new development areas may not be located in navigable waters and, for purposes of determining compliance with the performance standards of § 255-7C, the administering authority may not give credit for such BMPs.
  - (b) *New Development Runoff Exemption.* BMPs to treat post-construction runoff from new development areas may be located within navigable waters and may be creditable by the administering authority under § 255-7C, if all the following are met:
    - [1] The BMP was constructed prior to October 1, 2002 and received all applicable permits.

- [2] The BMP functions or will function to provide runoff treatment for the new development area.
- (c) *Existing Development & Post-Construction Runoff From Redevelopment, Routine Maintenance, & Infill Development Areas.* Except as provided in § 255-7E(4)(d), BMPs designed to treat post-construction runoff for existing development and post-construction runoff from redevelopment, routine maintenance and infill development areas may not be located in navigable waters and, for purposes of determining compliance with the performance standards of § 255-7C, the administering authority may not give credit for such BMPs.
- (d) *Existing Development & Post-Construction Runoff From Redevelopment, Routine Maintenance, & Infill Development Areas Exemption.* BMPs that function to provide treatment of runoff from existing development and post-construction runoff from redevelopment, routine maintenance and infill development areas may be located within navigable waters and, for purposes of determining compliance with the performance standards of § 255-7C, the administering authority may give credit for such BMPs, if any of the following are met:
  - [1] The BMP was constructed, contracts were signed or bids advertised and all applicable permits were received prior to January 1, 2011.
  - [2] The BMP is on an intermittent waterway and all applicable permits are received.
- (5) Water quality trading. To comply with § 255-7C(1) performance standards, the administering authority may authorize credit for water quality trading provided all of the following conditions are satisfied:
  - (a) The treatment practices associated with a water quality trade shall be in place, effective and operational before credit can be authorized.
  - (b) The water quality trade shall comply with applicable trading ratios established by the Wisconsin Department of Natural Resources or the Town of Greenville.
  - (c) The water quality trade shall comply with applicable regulations, standards, and guidance developed by the Wisconsin Department of Natural Resources or the Town of Greenville.
  - (d) The responsible party shall furnish a copy of executed water quality trading agreements or other related information deemed necessary by the administering authority in order to authorize credit.
- F. Targeted performance standards. The administering authority may establish numeric water quality requirements that are more stringent than those set forth in § 255-7C in order to meet targeted performance standards, total maximum daily loads, and/or water quality standards for a specific water body or area. The numeric water quality requirements may be applicable to any permitted site, regardless of the size of land disturbing construction activity.
- G. Alternate requirements. The administering authority may establish stormwater management requirements more stringent than those set forth in this section if the administering authority determines that an added level of protection is needed to protect sensitive resources. Also, the administering authority may establish stormwater management requirements less stringent than

those set forth in this section if the administering authority determines that less protection is needed to protect sensitive resources and provide reasonable flood protection. However, the alternative requirements shall not be less stringent than those requirements promulgated in rules by Wisconsin Department of Natural Resources under NR 151 Wisconsin Administrative Code. The established additional requirements shall be provided to the applicant in writing.

## **§ 255-8. Permitting requirements, procedures and fees.**

- A. Permit required. No responsible party may undertake a land disturbing construction activity without receiving a post-construction runoff permit from the administering authority prior to commencing the proposed activity.
- B. Permit application and fees. Unless specifically excluded by this article, any responsible party desiring a permit shall submit to the administering authority a permit application made on a form provided by the administering authority for that purpose.
  - (1) Unless otherwise excepted by this article, a permit application must be accompanied by a stormwater management plan, a maintenance agreement and a non-refundable permit administration fee.
  - (2) The stormwater management plan shall be prepared to meet the requirements of § 255-7 and § 255-9, the maintenance agreement shall be prepared to meet the requirements of § 255-10, the financial guarantee shall meet the requirements of § 255-11, and fees shall be those established by the Town Board as set forth in § 255-12.
- C. Review and approval of permit application. The administering authority shall review any permit application that is submitted with a stormwater management plan, maintenance agreement, and the required fee. The following approval procedure shall be used:
  - (1) Within 20 business days of the receipt of a complete permit application, including all items as required by § 255-8B, the administering authority shall inform the applicant whether the application, plan and maintenance agreement are approved or disapproved based on the requirements of this article.
  - (2) If the stormwater permit application, plan and maintenance agreement are approved, or if an agreed upon payment of fees in lieu of stormwater management practices is made pursuant to § 255-7E, the administering authority shall issue the permit.
  - (3) If the stormwater permit application, plan or maintenance agreement is disapproved, the administering authority shall detail in writing the reasons for disapproval.
  - (4) The administering authority may request additional information from the applicant. If additional information is submitted, the administering authority shall have 20 business days from the date the additional information is received to inform the applicant that the plan and maintenance agreement are either approved or disapproved.
  - (5) Failure by the administering authority to inform the permit applicant of a decision within 20 business days of a required submittal shall be deemed to mean approval of the submittal and the applicant may proceed as if a permit had been issued.

- D. Permit requirements. All permits issued under this article shall be subject to the following conditions, and holders of permits issued under this article shall be deemed to have accepted these conditions. The administering authority may suspend or revoke a permit for violation of a permit condition, following written notification of the responsible party. An action by the administering authority to suspend or revoke this permit may be appealed in accordance with § 255-14.
- (1) Compliance with this permit does not relieve the responsible party of the responsibility to comply with other applicable federal, state, and local laws and regulations.
  - (2) The responsible party shall design and install all structural and non-structural stormwater management measures in accordance with the approved stormwater management plan and this permit.
  - (3) The responsible party shall notify the administering authority at least 10 business days before commencing any work in conjunction with the stormwater management plan, and within 10 business days upon completion of the stormwater management practices. If required as a special condition under § 255-8E, the responsible party shall make additional notification according to a schedule set forth by the administering authority so that practice installations can be inspected during construction.
  - (4) Practice installations required as part of this article shall be certified "as built" by a licensed professional engineer. Completed stormwater management practices must pass a final inspection by the administering authority or its designee to determine if they are in accordance with the approved stormwater management plan and article. The administering authority or its designee shall notify the responsible party in writing of any changes required in such practices to bring them into compliance with the conditions of this permit.
  - (5) The responsible party shall notify the administering authority of any significant modifications it intends to make to an approved stormwater management plan. The administering authority may require that the proposed modifications be submitted to it for approval prior to incorporation into the stormwater management plan and execution by the responsible party.
  - (6) The responsible party shall inspect BMPs annually and after runoff events in accordance with the stormwater management plan and maintenance agreement. The responsible party shall have a licensed professional submit a stamped written inspection report to the administering authority for review and approval every five years. All written inspection reports prepared by the responsible party shall accompany the stamped report prepared by the licensed professional.
  - (7) The responsible party shall maintain all stormwater management practices in accordance with the stormwater management plan until the practices either become the responsibility of the Town of Greenville, or are transferred to subsequent private owners as specified in the approved maintenance agreement.
  - (8) The responsible party authorizes the administering authority to perform any work or operations necessary to bring stormwater management measures into conformance with the approved stormwater management plan, and consents to a special assessment or charge against the property as authorized under Subch. VII of Ch. 66, Wis. Stats., or to charging such costs against the financial guarantee posted under § 255-11.
  - (9) If so directed by the administering authority, the responsible party shall repair at the responsible party's own expense all damage to adjoining municipal facilities and drainage ways caused by

runoff, where such damage is caused by activities that are not in compliance with the approved stormwater management plan.

- (10) The responsible party shall permit property access to the administering authority or its designee for the purpose of inspecting the property for compliance with the approved stormwater management plan and this permit.
  - (11) Where site development or redevelopment involves changes in direction, increases in peak rate and/or total volume of runoff from a site, the administering authority may require the responsible party to make appropriate legal arrangements with affected property owners concerning the prevention of endangerment to property or public safety.
  - (12) The responsible party is subject to the enforcement actions and penalties detailed in § 255-13, if the responsible party fails to comply with the terms of this permit.
  - (13) The permit applicant shall post the "Certificate of Permit Coverage" in a conspicuous location at the construction site.
- E. Permit conditions. Permits issued under this subsection may include conditions established by administering authority in addition to the requirements needed to meet the performance standards in § 255-7 or a financial guarantee as provided for in § 255-11.
  - F. Permit duration. Permits issued under this section shall be valid from the date of issuance through the date the administering authority notifies the responsible party that all stormwater management practices have passed the final inspection required under § 255-8D(4).
  - G. Alternate requirements. The administering authority may prescribe alternative requirements for applicants seeking an exemption to on-site stormwater management performance standards under § 255-7E or for applicants seeking a permit for a post-construction site with less than 20,000 square feet of impervious surface disturbance.

## **§ 255-9. Stormwater management plan.**

- A. Plan requirements. The stormwater management plan required under § 255-7B and § 255-8B shall comply with the Town of Greenville Stormwater Reference Guide and contain at a minimum the following information:
  - (1) Name, address, and telephone number of the landowner and responsible parties.
  - (2) A legal description of the property proposed to be developed.
  - (3) Pre-development site map with property lines, disturbed limits, and drainage patterns.
  - (4) Post-development site map with property lines, disturbed limits, and drainage patterns.
    - (a) Total area of disturbed impervious surfaces within the site.
    - (b) Total area of new impervious surfaces within the site.
    - (c) Performance standards applicable to site.

- (d) Proposed best management practices.
  - (e) Groundwater, bedrock, and soil limitations.
  - (f) Separation distances. Stormwater management practices shall be adequately separated from wells to prevent contamination of drinking water.
- (5) Inspection and maintenance schedules for stormwater BMPs.
- B. Alternate requirements. The administering authority may prescribe alternative submittal requirements for applicants seeking an exemption to on-site stormwater management performance standards under § 255-7E or for applicants seeking a permit for a post-construction site with less than 20,000 square feet of impervious surface disturbance.

## **§ 255-10. Maintenance agreement.**

- A. Maintenance agreement required. The maintenance agreement required under § 255-8B for stormwater management practices shall be an agreement between the Town of Greenville and the responsible party to provide for maintenance of stormwater practices beyond the duration period of this permit. The maintenance agreement shall be filed with the County Register of Deeds as a property deed restriction so that it is binding upon all subsequent owners of the land served by the stormwater management practices.
- B. Agreement provisions. The maintenance agreement shall contain the following information and provisions and be consistent with the plan required by § 255-8B:
- (1) Identification of the stormwater facilities and designation of the drainage area served by the facilities.
  - (2) A schedule for regular maintenance of each aspect of the stormwater management system consistent with the stormwater management plan required under § 255-8B.
  - (3) Identification of the responsible party(s), organization or city, county, town or village responsible for long term maintenance of the stormwater management practices identified in the stormwater management plan required under § 255-8B.
  - (4) Requirement that the responsible party(s), organization, or city, county, town or village shall maintain stormwater management practices in accordance with the schedule included in § 255-10B(2).
  - (5) Authorization for the administering authority to access the property to conduct inspections of stormwater management practices as necessary to ascertain that the practices are being maintained and operated in accordance with the agreement.
  - (6) A requirement on the administering authority to maintain public records of the results of the site inspections, to inform the responsible party responsible for maintenance of the inspection results, and to specifically indicate any corrective actions required to bring the stormwater management practice into proper working condition.
  - (7) Agreement that the party designated under § 255-10B(3), as responsible for long term maintenance of the stormwater management practices, shall be notified by the administering

authority of maintenance problems which require correction. The specified corrective actions shall be undertaken within a reasonable time frame as set by the administering authority.

- (8) Authorization of the administering authority to perform the corrected actions identified in the inspection report if the responsible party designated under § 255-10B(3) does not make the required corrections in the specified time period. The administering authority shall enter the amount due on the tax rolls and collect the money as a special charge against the property pursuant to Subch. VII of Ch. 66, Wis. Stats.
- C. Alternate requirements. The administering authority may prescribe alternative requirements for applicants seeking an exemption to on-site stormwater management performance standards under § 255-7E or for applicants seeking a permit for a post-construction site with less than 20,000 square feet of impervious surface disturbance.

## **§ 255-11. Financial guarantee.**

- A. Establishment of the guarantee. The administering authority may require the submittal of a financial guarantee, the form and type of which shall be acceptable to the administering authority. The financial guarantee shall be in an amount determined by the administering authority to be the estimated cost of construction and the estimated cost of maintenance of the stormwater management practices during the period which the designated party in the maintenance agreement has maintenance responsibility. The financial guarantee shall give the administering authority the authorization to use the funds to complete the stormwater management practices if the responsible party defaults or does not properly implement the approved stormwater management plan, upon written notice to the responsible party by the administering authority that the requirements of this article have not been met.
- B. Conditions for release. Conditions for the release of the financial guarantee are as follows:
- (1) The administering authority shall release the portion of the financial guarantee established under this section, less any costs incurred by the administering authority to complete installation of practices, upon submission of "as built plans" by a licensed professional engineer. The administering authority may make provisions for a partial pro-rata release of the financial guarantee based on the completion of various development stages.
  - (2) The administering authority shall release the portion of the financial guarantee established under this section to assure maintenance of stormwater practices, less any costs incurred by the administering authority, at such time that the responsibility for practice maintenance is passed on to another entity via an approved maintenance agreement.
- C. Alternate requirements. The administering authority may prescribe alternative requirements for applicants seeking an exemption to on-site stormwater management performance standards under § 255-7E or for applicants seeking a permit for a post-construction site with less than 20,000 square feet of impervious surface disturbance.

## **§ 255-12. Fee schedule.**

The fees referred to in other sections of this article shall be established by the Town Board and may from time to time be modified by resolution. A schedule of the fees established by the Town Board shall be available for review in the Town Hall.

## **§ 255-13. Enforcement.**

- A. Any land disturbing construction activity or post-construction runoff initiated after the effective date of this article by any person, firm, association, or corporation subject to the article provisions shall be deemed a violation unless conducted in accordance with the requirements of this article.
- B. The administering authority shall notify the responsible party by certified mail of any non-complying land disturbing construction activity or post-construction runoff. The notice shall describe the nature of the violation, remedial actions needed, a schedule for remedial action, and additional enforcement action which may be taken.
- C. Upon receipt of written notification from the administering authority under Subsection B, the responsible party shall correct work that does not comply with the stormwater management plan or other provisions of this permit. The responsible party shall make corrections as necessary to meet the specifications and schedule set forth by the administering authority in the notice.
- D. If the violations to a permit issued pursuant to this article are likely to result in damage to properties, public facilities, or waters of the state, the administering authority may enter the land and take emergency actions necessary to prevent such damage. The costs incurred by the administering authority plus interest and legal costs shall be billed to the responsible party.
- E. The administering authority is authorized to post a stop work order on all land disturbing construction activity that is in violation of this article, or to request the Town Attorney to obtain a cease and desist order in any court with jurisdiction.
- F. The administering authority may revoke a permit issued under this article for non-compliance with article provisions.
- G. Any permit revocation, stop work order, or cease and desist order shall remain in effect unless retracted by the administering authority or by a court with jurisdiction.
- H. The administering authority is authorized to refer any violation of this article, or of a stop work order or cease and desist order issued pursuant to this article, to the Town Attorney for the commencement of further legal proceedings in any court with jurisdiction.
- I. Any person, firm, association, or corporation who does not comply with the provisions of this article shall be subject to a forfeiture amount set from time to time by ordinance in the Fine and Forfeiture Schedule of the Town of Greenville. Each calendar day the violation exists shall be deemed a separate offense.
- J. Compliance with the provisions of this article may also be enforced by injunction in any court with jurisdiction. It shall not be necessary to prosecute for forfeiture or a cease and desist order before resorting to injunctive proceedings.
- K. When the administering authority determines that the holder of a permit issued pursuant to this article has failed to follow practices set forth in the stormwater management plan, or has failed to comply with schedules set forth in said stormwater management plan, the administering authority or a party designated by the administering authority may enter upon the land and perform the work or other operations necessary to bring the condition of said lands into conformance with requirements of the approved plan. The administering authority shall keep a detailed accounting of the costs and expenses of performing this work. These costs and expenses shall be deducted from any financial

security posted pursuant to § 255-11 of this article. Where such a security has not been established, or where such a security is insufficient to cover these costs, the costs and expenses shall be entered on the tax roll as a special charge against the property and collected with any other taxes levied thereon.

## **§ 255-14. Appeals.**

- A. Board of Appeals. The Board of Appeals, created pursuant to Article XXXIII of Chapter 320 and pursuant to § 60.65, Wis. Stats, shall hear and decide appeals where it is alleged that there is error in any order, decision or determination made by the administering authority in administering this article. The Board shall also use the rules, procedures, duties, and powers authorized by statute in hearing and deciding appeals. Upon appeal, the Board may authorize variances from the provisions of this article that are not contrary to the public interest, and where owing to special conditions a literal enforcement of the article will result in unnecessary hardship.
- B. Who may appeal. Appeals to the Board of Appeals may be taken by any aggrieved person or by an officer, department, board, or bureau of the Town of Greenville affected by any decision of the administering authority.

## **§ 255-15 Variances.**

In any particular case where the landowner can show that, by reason of exceptional topography or other physical condition, strict compliance with any requirement of this ordinance would cause unnecessary hardship, the Board of Appeals may grant a variance provided such relief may be granted without detriment to the public good and without impairing the intent and purpose of this ordinance or the desirable general development of the Town. No variance shall be granted by the Board which is contrary to provisions of the Wisconsin Administrative Code or the Wisconsin Statutes.

## **§ 255-16. Severability.**

If any section, clause, provision or portion of this article is judged unconstitutional or invalid by a court of competent jurisdiction, the remainder of the article shall remain in force and not be affected by such judgment.

## **§ 255-17. Limitations on municipal responsibility.**

Nothing in this article creates or imposes, nor shall be construed to create or impose, any greater obligation or responsibility on the municipality which has adopted this article than those minimum requirements specifically required by State of Wisconsin Statutes and Department of Natural Resources regulations.

## **§ 255-18. Effective date.**

This article shall be in force and effect from and after its adoption and publication. The above and foregoing article was duly adopted by the Town Board of the Town of Greenville on the \_\_\_\_\_ day of February, 2017.

TOWN OF GREENVILLE

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Jack Anderson, Town Chairman

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Wendy Helgeson, Town Clerk-Treasurer

TOWN OF GREENVILLE  
STORMWATER REFERENCE GUIDE

FOR THE:

POST-CONSTRUCTION STORMWATER MANAGEMENT ORDINANCE



DATE:  
December 30, 2016

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## EXECUTIVE SUMMARY

The Town's Stormwater Reference Guide (Reference Guide) has been created to act as a companion to the Town's Post-Construction Stormwater Management Ordinance (Ordinance). The Ordinance cites the Reference Guide as the resource for details that were omitted from the Ordinance. Items in the Reference Guide can be changed without the public hearing process as the changes are typically administrative and/or technical and do not affect the Ordinance's intent and requirements. The Reference Guide is organized similar to the Post-Construction Stormwater Management Ordinance for ease of relating the Reference Guide to the appropriate sections in the ordinance.

Post-Construction Stormwater Management Ordinance						
Site		Requirements <sup>a</sup>				
		Water Quality	Peak Discharge	Infiltration	Protective Area	Fueling & Vehicle Maintenance Areas
< 20,000 ft <sup>2</sup> Impervious Surface <sup>b</sup>		No Numeric Standard	No Numeric Standard	No Numeric Standard	Width Varies	No Visible Petroleum Sheen
> 20,000 ft <sup>2</sup> Impervious Surface	New Development	Numeric Standard Varies <sup>d</sup>	1, 2, 10 & 100-year	90% to 60% of pre-development infiltration volume	Width Varies	No Visible Petroleum Sheen
	Redevelopment	Numeric Standard Varies <sup>d</sup>	1, 2, 10 & 100-year	Exempt	Potentially Exempt	No Visible Petroleum Sheen
	Routine Maintenance Area	Numeric Standard Varies <sup>d</sup>	None, unless discharging into a BMP	Exempt	Potentially Exempt	No Visible Petroleum Sheen
Transportation Facilities <sup>c</sup>		- Grass swales comply with Technical Standard 1005 "Vegetated Infiltration Swale". - Other requirements may apply if discharging to ORW, ERW, 303(d) water body, etc.				

<sup>a</sup> Summary of Section 255-7 Performance Standards of the Post-Construction Stormwater Management Ordinance. See Ordinance and this Reference Guide for specific requirements, exemptions and prohibitions.

<sup>b</sup> The impervious surface areas created after the adoption date of the Ordinance are cumulative. For example, if a landowner first adds 18,000 ft<sup>2</sup> of parking and then adds a 2,001 ft<sup>2</sup> building the following year, the site is held to the >20,000 ft<sup>2</sup> performance standards at the time of the 2,001 ft<sup>2</sup> building addition.

<sup>c</sup> Provides alternative criteria for transportation facilities with grass swale drainage systems. The alternative criteria may be used by the applicant to satisfy the Water Quality, Peak Discharge, and Infiltration Performance Standards. The alternative criteria may not be used for transportation facilities that are part of a larger common plan of development.

<sup>d</sup> Please refer to the Post-Construction Storm Water Management Ordinance for the required water quality reductions. Water quality reductions and pollutants of concern may vary by watershed.

## **255-1 AUTHORITY**

## **255-2 FINDINGS OF FACT**

## **255-3 PURPOSE AND INTENT**

### **A. PURPOSE**

### **B. INTENT**

## **255-4 APPLICABILITY AND JURISDICTION**

### **A. APPLICABILITY**

### **B. JURISDICTION**

### **C. EXCLUSIONS**

The Wisconsin Department of Transportation (WisDOT) has entered into a memorandum of understanding with the Wisconsin Department of Natural Resources that satisfies s. 281.33 (2), Wis. Stats., such that activities directed and supervised by WisDOT are exempt from this Ordinance.

Activities directed and supervised by the local municipality are covered by this Ordinance.

## **255-5 DEFINITIONS**

“Biofiltration system” means a bioretention system which does not qualify for any infiltration credit pursuant to 255-7C(3) of the Post-Construction Stormwater Management Ordinance.

“Structural height” means the difference in elevation in feet between the point of lowest elevation of the top of the embankment before overtopping and the lowest elevation of the downstream toe of embankment.

## **255-6 TECHNICAL STANDARDS**

Below is a list of Technical Standards and Guidance Documents that shall be used to satisfy Performance Standards contained in the ordinance. Technical Standards specify the minimum criteria for a best management practice (BMP). Guidance Documents contain recommendations and additional “how to” guidance. Performance Standards take precedence over Technical Standards and Technical Standards take precedence over Guidance Documents.

- (a) **Technical Standards:** The following are applicable Wisconsin Department of Natural Resources (DNR) Conservation Practice Standards or Technical Standards. These standards may be found on the DNR website ([http://dnr.wi.gov/topic/stormwater/standards/postconst\\_standards.html](http://dnr.wi.gov/topic/stormwater/standards/postconst_standards.html)).

- 1001 Wet Detention Pond
- 1002 Site Evaluation for Stormwater Infiltration
- 1003 Infiltration Basin
- 1004 Bioretention For Infiltration
- 1005 Vegetated Swale
- 1006 Method for Predicting the Efficiency of Proprietary Storm Water Sedimentation Devices
- 1007 Infiltration Trench
- 1008 Permeable Pavement

- S100 Compost
- 1100 Interim Turf Nutrient Management

- (b) **Local Modifications to Technical Standards:** The following are local requirements which are intended to supplement, clarify, or supersede DNR Technical Standards.

**1001 - Wet Detention Pond**

*Dry Detention Pond-*

- Dry detention ponds shall be designed to meet requirements in Technical Standard 1001, except criteria contained in Sections V.B.1.a. through g., V.B.2.c., and V.B.2.k.
- Dry detention ponds shall be designed to meet the local modifications provided below for Technical Standard 1001, except permanent pool and water quality criteria.
- Dry detention ponds shall not receive any water quality credit, unless written approval is obtained from the DNR. The approval letter must specifically indicate the amount of water quality credit provided by the dry pond.
- Dry detention pond shall have a minimum bottom slope to the principal outlet of 1%. The applicant may request a waiver from the administering authority if site characteristics create a hardship.
- As part of the Operation & Maintenance Plan, sediment accumulation in the dry pond shall be monitored. In lieu of criteria contained in Section VI.B. of Technical Standard 1001, accumulated sediment in a dry detention pond shall be removed when 5% to 10% of the storage volume is lost for the 2-year, 24-hour design storm. At a minimum, include details in the Operation & Maintenance Plan for inspecting sediment depths, frequency of accumulated sediment removal, and disposal locations for accumulated sediment.

*Pond Watershed-*

- Wet ponds are not recommended for small watersheds (< 15 acres in clay soil). A wet pond located in a small watershed may develop stagnation problems within the permanent pool and become a public nuisance. Public acceptance of stormwater BMPs is important to the success of a local stormwater program. Dry ponds, biofiltration, proprietary devices, and other BMPs are recommended for small watersheds.

*100-Year Floodplain-*

- Wet and dry detention ponds shall not be located in a 100-year floodway or 100-year flood storage area unless a hydrologic and hydraulic study is conducted in accordance with NR 116. Easements will be required if the flood study indicates the 100-year floodway or flood storage area is impacted by the pond or its embankment. Ponds shall not impede 100-year flood conveyance along navigable streams and non-navigable channels.

*Permanent Pool-*

- Pool Shape- A minimum length to width ratio of 3:1 is required between the principal inlet and principal outlet of the wet detention pond. The applicant may request a waiver if site characteristics create a hardship. Redevelopment and

pond retrofit projects may be eligible for a waiver. Typically, new development is not eligible for a waiver.

#### *Water Quality-*

- If the wet pond's pollutant removal is not determined with SLAMM or P8, the 1-year, 24-hour design storm shall be released from the wet pond using the criteria contained in Section V.B.1.a. and b. of Technical Standard 1001.

#### *Peak Flow Control-*

- Do not use Table 1 in Technical Standard 1001. Use the maximum pre-development runoff curve numbers contained in the Post-Construction Stormwater Management Ordinance.
- It is recommended that the developer and designer contact the local municipality to discuss peak discharge requirements for the site early in the design process. The local municipality may have adopted alternative peak discharge requirements for the site which are different than the Post-Construction Stormwater Management Ordinance. At a minimum, the peak discharge requirements contained in NR 151 shall be met.

#### *Inflows-*

- Pipe inlets shall be protected from soil washouts due to seepage along the pipe's granular bedding and backfill. Rip-rap or other protection shall be placed around the entire pipe perimeter.
- Other inflow points shall be protected from scour and erosion.

#### *Principal Outlet-*

- All flows shall pass through the principal outlet during the 1-year, 2-year and 10-year, 24-hour design storms. The principal outlet shall consist of one or more flow control structures and discharge pipes.
- Pipes- Generally concrete, PVC, or CMP are the preferred pipe materials. Corrugated PE will tend to jack-up due to frost heave and flotation. The minimum recommended pipe diameter is 12-inches.
- Orifices- Orifices smaller than 4 inches are not recommended due to the potential for clogging. Consider using a 6-inch perforated drain pipe and restrictor plate (refer to Section V.B.8 of Technical Standard 1004 for guidance). The total opening area of all perforation holes combined shall be sufficient to allow the drain pipe to discharge at full capacity, as would occur if there were no orifice restriction. Backfilling the drain pipe with 1-inch washed stone provides protection from clogging.
- Trash racks or other equivalent litter control devices are required for all outlet openings that control the 1-year and 2-year, 24-hour design storm. The maximum bar spacing shall be less than 2-inches and less than  $\frac{1}{2}$  the smallest opening dimension, whichever is more restrictive. The minimum surface area for the trash rack shall be 5 to 10 times the outlet's cross sectional area to prevent clogging. Trash racks keep litter and debris in the pond and prevent it from discharging into streams, rivers, and lakes.
- Trash racks are also required for other outlet openings that have a width, height, or diameter less than 12-inches. The maximum bar spacing shall be less than  $\frac{1}{2}$  the smallest opening dimension. The minimum surface area for the trash rack shall be at 5 to 10 times the outlet's cross sectional area to prevent clogging.

- Reverse-sloped pipes and other underwater outlets may impact a wet pond's pollutant removal efficiency. Outlets that draw water from below the permanent pool's surface elevation reduce the effective surface area and depth of the permanent pool. If reverse-sloped pipes and other underwater outlets are used, special consideration is required for SLAMM, DETPOND & P8 modeling to ensure accurate water quality results. Also, underwater outlets may freeze during winter.

#### *Flap Gates-*

- Flap gates are required if the 1-year, 2-year or 10-year, 24-hour design storm flows backward through the principal outlet. Backwater from a down slope conveyance system may impact a pond's water quality and/or flood control performance.
- Flap gates shall not impede flow in down slope pipes, channels or streams.
- Ice accumulation within the down slope conveyance system shall be considered during flap gate and principal outlet design.

#### *Tailwater-*

- Tailwater conditions shall be evaluated at the pond outlet.
- Tailwater conditions along lakes, rivers, and streams may be obtained from available 100-year floodplain studies.
- Tailwater conditions may require that 1, 2, 10, and/or 100-year, 24-hour runoff volumes be held in the pond, without release, until the down slope hydrograph allows the pond and flap gate to discharge flow.
- It is recommended that the designer contact the local municipality to discuss tailwater conditions early in the design process. The local municipality may have information available to assist with the tailwater evaluation.

#### *Emergency Spillway-*

- The routed 1-year, 2-year and 10-year, 24-hour design storm may not pass through the emergency spillway. The routed 100-year, 24-hour design storm may not pass through the emergency spillway if the pond is designed to have a:
  - Structural height > 6 feet and flood storage capacity > 50 acre-feet, or
  - Structural height > 25 feet and flood storage capacity > 15 acre-feet.
- Backwater from a down slope conveyance system may not pass through the emergency spillway during the 1-year, 2-year or 10-year, 24-hour design storm. Also, backwater may not pass through the emergency spillway during the 100-year, 24-hour design storm, unless a hydrologic and hydraulic evaluation indicates the site's peak discharge requirements are still satisfied, despite the backwater.
- When feasible, the emergency spillway should not be constructed on an embankment or over fill material. Spillways constructed on an embankment or over fill material are more prone to failure.
- The emergency spillway shall be constructed of permanent materials (i.e. poured concrete, riprap, articulated concrete block, etc.) if the spillway is constructed on an embankment. The permanent material shall extend from the top of embankment to the down slope toe of embankment. The permanent material shall be shaped to contain flows and reduce potential for erosion and embankment failure.

#### *Topsoil & Seeding-*

- Topsoil is required in the safety shelf to encourage wetland plant growth (12-inch minimum thickness).
- When feasible, install a wetland seed mix or mature plants in the safety shelf to improve pond safety, reduce wave erosion along the shoreline, improve pollutant removal, and discourage geese residence. Use non-invasive species.
- When feasible, maintain a high grass buffer around the permanent pool's perimeter. The high grass buffer will further improve pond safety and geese control. Also, the perimeter of the permanent pool is typically the most difficult area to mow due to saturated soil conditions.

#### *Record Drawings-*

- Surveyed record drawings certified by a Professional Engineer shall be submitted upon completion of construction of all wet and dry ponds. As part of the record drawings, the Professional Engineer may need to verify BMP performance using computer modeling. Refer to record drawing checklist for requirements.

### **1002 - Site Evaluation for Stormwater Infiltration**

- A site layout should not be developed until Step B is complete. Information obtained from Step B is used to:
  - Identify soil textures within the site.
  - Identify infiltration exclusions and exemptions.
  - Develop a site layout and identify potential infiltration device locations.
- For Step B, the minimum number of initial test pits or soil borings required for a new development area are as follows:
  - Two for the initial 10 acres, plus one per 10 acres thereafter.
  - One per soil unit. Soil units are depicted on NRCS Soil Survey Maps.
  - Example calculations:
    - 4 acres with 1 soil unit = min. of 2 test pits or soil borings
    - 20 acres with 2 soil units = min. of 3 test pits or soil borings.
    - 20 acres with 5 soil units = min. of 5 test pits or soil borings.
    - 34 acres with 3 soil units = min. of 4 test pits or soil borings.
- Upon completion of Step B, it is recommended that the developer and designer meet with the municipality to discuss infiltration requirements for the development to avoid redesign during permit submittal.
- Information obtained from Step C is used to design each infiltration device. As part of Step C, a second set of test pits or soil borings are required. Refer to Table 1, Technical Standard 1002 for test pit or soil boring requirements.

### **1003 - Infiltration Basin**

- SLAMM, P8 or an equivalent methodology shall be used if the designer desires pollutant reduction credit for the infiltration basin. Pursuant to Technical Standard 1003, pretreatment is required for an Infiltration Basin.
- *Record Drawings-* Surveyed record drawings certified by a Professional Engineer shall be submitted upon completion of construction of all infiltration basins. As part of the record drawings, the Professional Engineer may need to verify BMP performance using computer modeling. Refer to record drawing checklist for requirements.

#### **1004 - Bioretention For Infiltration**

- Biofiltration systems shall be designed to meet requirements in Technical Standard 1004, except for the storage layer and sand/native soil interface layer.
- Rain Gardens shall be designed to meet requirements in Technical Standard 1004, except for the engineered soil planting bed, storage layer, underdrain, and sand/native soil interface layer. Rain Gardens are typically used in residential areas. Rain Gardens are primarily intended for roof runoff, but may also be used for lawn, sidewalk and driveway runoff.
- SLAMM, P8 or an equivalent methodology shall be used to evaluate the pollutant reduction associated with a bioretention, biofiltration, or rain garden BMP.
- *Record Drawings*- Surveyed record drawings certified by a Professional Engineer shall be submitted upon completion of construction of all bioretention and biofiltration facilities. As part of the record drawings, the Professional Engineer may need to verify BMP performance using computer modeling. Also, as part of the record drawings, the contractor shall certify the bioretention or biofiltration device was constructed in accordance with the approved construction plans and that the installed engineered soil complies with the material specifications. Refer to record drawing checklist for requirements.

#### **1005 – Vegetated Infiltration Swale**

- Grass swales shall meet the following design criteria if the applicant plans to take credit for pollutant reductions calculated by SLAMM or P8.
  - The grass swale infiltration rate used in SLAMM or P8 shall be obtained from Table 2, Technical Standard 1002. The design infiltration rate shall be based on the least permeable soil horizon to 5 feet below the grass swale's bottom elevation.
  - Minimum longitudinal slope for a grass swale is 1%. The applicant may request a waiver if site characteristics create a hardship. If a longitudinal slope less than 1% is requested by the applicant, the stormwater management plan shall contain a written, site-specific explanation of how soil compaction, standing water, and poor soil drainage will be remedied by the responsible party or landowner such that water quality requirements are still satisfied. Drainage or standing water problems may develop along grass swales with a longitudinal slope less than 1%, particularly in sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay or clay soils. Concrete ditch liners and underdrain pipes installed between driveway culvert openings can remedy a standing water problem, but do not provide any water quality credit.
  - Grass swales shall be designed for a maximum 2-inch lawn height. If an alternative height is desired, it is recommended that the developer and designer contact the local municipality early in the design process to obtain approval. The local municipality may have ordinances or other design criteria which dictate the allowable mowing height.
  - Driveway culverts shall be considered when the swale length (density) is determined for purposes of SLAMM or P8 modeling. The maximum allowable culvert length for each lot shall be specified on the plans.
  - Minimize or mitigate soil compaction during grading activities.
  - Grassed swales shall be designed for the proper drainage area. Generally, it will be best to have one or two sizes to be used wherever needed throughout the development. The design shall be based on the largest drainage area served.

- Grassed swales shall be designed according to the planned vegetation type and maintenance that will be provided. Generally, grassed channels will be designed to have stable velocities when the vegetation is shortest and adequate capacity when the vegetation is longest.

#### **1006 - Method for Predicting the Efficiency of Proprietary Storm Water Sedimentation Devices**

- *Record Drawings*- Surveyed record drawings certified by a Professional Engineer shall be submitted upon completion of construction of all proprietary devices. As part of the record drawings, the Professional Engineer may need to verify BMP performance using computer modeling. Refer to record drawing checklist for requirements.

#### **1007 - Infiltration Trench**

- SLAMM, P8 or an equivalent methodology shall be used if the designer desires pollutant reduction credit for the infiltration trench. Pursuant to Technical Standard 1007, pretreatment is required for an Infiltration Trench.
- *Record Drawings*- Surveyed record drawings certified by a Professional Engineer shall be submitted upon completion of construction of all infiltration trenches. As part of the record drawings, the Professional Engineer may need to verify BMP performance using computer modeling. Refer to record drawing checklist for requirements.

(c) **Guidance Documents:** The following are the applicable Guidance Documents ([http://dnr.wi.gov/topic/Stormwater/standards/postconst\\_standards.html](http://dnr.wi.gov/topic/Stormwater/standards/postconst_standards.html)):

- The Wisconsin Stormwater Manual
- S100 Compost
- Technical Note for Sizing Infiltration Basins and Bioretention Devices
- Rain Gardens: A How-To Manual for Homeowners (see above local modifications to Technical Standard 1004).
- Updates to Post-Construction Standards: Errata
- Errata to swale guidance
- Internally Drained Area Guidance
- Modeling Post-Construction Storm Water Management Treatment
- Storm Water Detention Ponds Site Safety Design
- Establishment of Protective Areas for Wetlands
- NR 528 Technical Guidance: Management of Accumulated Sediment from Storm Water Structures (<http://dnr.wi.gov/topic/waste/nr528.html>)
- Artificial recharge of groundwater: hydrogeology and engineering ([http://dnr.wi.gov/topic/Stormwater/standards/gw\\_mounding.html](http://dnr.wi.gov/topic/Stormwater/standards/gw_mounding.html))
- "Construction Site" Definition – "Common Plan of Development" (<http://dnr.wi.gov/topic/stormwater/construction/overview.html>)
- Technical Note for Sizing Infiltration Basins and Bioretention Devices
- Meeting New State Regulations: Post-Construction Stormwater Management Workshops (<http://dnr.wi.gov/topic/Stormwater/construction/practices.html>)
- Estimating Residue Using the Line Transect Method (UW-Extension A3533).
- Wisconsin Department of Transportation (DOT) - Facilities Development Manual
- Wisconsin DOT Standard Specifications for Highway and Structure Construction
- Other National Publications

(d) **Local Easement Requirements:**

- Easements are typically required for BMPs and conveyance systems that serve more than one property owner or lot. Conveyance systems include storm sewers, grass swales, channels, streams, and overland relief paths. Easement widths will vary.
- An ingress / egress easement or direct access to a public street is typically required for BMPs that serve more than one property owner or lot.
- It is recommended that the developer and designer contact the local municipality early in the design process to discuss easements and width requirements.

## 255-7 PERFORMANCE STANDARDS

### A. RESPONSIBLE PARTY

### B. PLAN

### C. REQUIREMENTS

#### (1) WATER QUALITY

Post-construction sites with 20,000 sq.ft. or more of impervious surface disturbance and post-construction sites with 1 acre or more of land disturbance are required to meet the ordinance's numeric performance standards. All other post-construction sites are not required to meet a numeric performance standard. BMP design guidance is provided below in Section (h) for sites with less than 20,000 sq.ft. of impervious surface disturbance.

#### Computer Models:

Pollutant loading models such as SLAMM, DETPOND, P8 or an approved equivalent methodology may be used to evaluate the efficiency of the design in removing pollutants. Information on how to access SLAMM and P8 is available at <http://dnr.wi.gov/topic/stormwater/standards/slam.html> or contact the stormwater coordinator in the runoff management section of the bureau of watershed management at (608) 267-7694.

Use the most recent version of SLAMM, DETPOND and P8. The applicant may request a waiver of this requirement.

#### Design Clarifications:

*No Controls* - "No Controls" is the baseline condition for each site. No water quality credit is provided for meeting the baseline condition. The baseline condition is defined as follows:

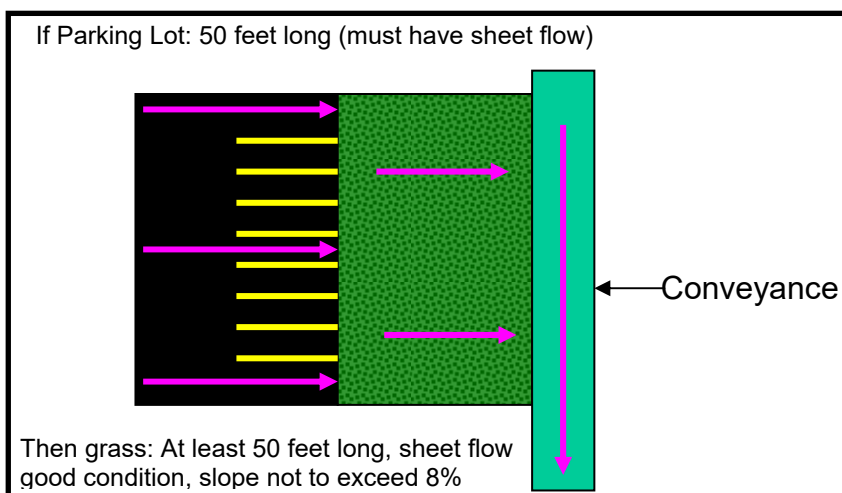
- Assume site is stabilized (no erosion).
- Assume proposed impervious surfaces are in place. Impervious surface reductions (e.g. reduced street width) cannot be used to claim water quality credit; however, impervious surface reductions will lower runoff volumes which will reduce the required size for stormwater management BMPs.
- Assume no stormwater management BMPs.
- Assume curb and gutter / storm sewer drainage system in fair condition.
- If the applicant intends to claim water quality credit for disconnecting an impervious surface, the "No Controls" condition shall be based on the "typical" percent connected impervious values established by the DNR:

LAND USE	% CONNECTED
Open space / undeveloped	5
Suburban Residential	7
Park	10
Cemetery	12

Low Density Residential	14
Medium Density Residential – With Alley	25
Medium Density Residential – No Alley	28
Schools - Institutional	39
High Density Residential – With Alley	42
High Density Residential – No Alley	42
Mobile Home Residential	47
Freeway	51
Multi-Family Residential	51
Miscellaneous Institutional	59
Medium Industrial	64
High Rise Residential	65
Light Industrial	71
Office Park – Commercial	74
Hospital – Institutional	76
Commercial Strip Mall	91
Shopping Center – Commercial	91
Commercial Downtown	96

*Disconnection* - Water quality credit is provided for runoff volume reductions associated with disconnecting impervious surfaces beyond the “typical” percent connected impervious values established by the DNR. In order to consider an impervious surface as “disconnected”, the following criteria shall be met:

- Residential Roofs: Discharge runoff over a minimum 20-foot long pervious surface that is in good condition and graded for sheet flow.
- Other Impervious Surfaces:
  - Source area flow length may not exceed 75 feet.
  - Source area and pervious area must be graded for sheet flow.
  - Pervious area must be in good condition, have a slope less than 8%, and have a flow length at least as long as the contributing impervious area's length (but never less than 20 feet).



Source: DNR Post-Construction Stormwater Management Workshops

*Street Sweeping & Catch Basin Cleaning* - No water quality credit is provided for street sweeping, catch basin cleaning, or other management type BMPs in new development areas.

*Infiltration Rate* - The design infiltration rate for a BMP shall be based on the least permeable soil horizon to 5 feet below the BMP's bottom elevation. Infiltration rates shall be obtained from Table 2, Technical Standard 1002.

*Grass Swale* - The grass swale infiltration rate used in SLAMM or P8 shall be obtained from Table 2, Technical Standard 1002. For SLAMM, the typical swale geometry shall be entered in lieu of using the “Wetted Width” option. SLAMM will calculate the “Wetted Width” for each rain event based on the typical swale geometry.

*Uncontrolled Areas* - The performance standard for water quality is a site standard, not a BMP standard. Often, a site contains uncontrolled areas that do not flow through a BMP (e.g. wet pond, grass swale). Typically, it is necessary to increase the water quality reduction provided by other onsite BMPs in order to offset or over compensate for these uncontrolled areas.

*Routine Maintenance Areas* – No performance standard or water quality reduction is required for routine maintenance areas that are part of a post-construction site with less than 5 acres of disturbance. However, the applicant is responsible for proper performance of onsite BMPs. In order to ensure proper BMP performance, the applicant has two options:

- Divert the routine maintenance area around onsite BMPs, or
- Include runoff volumes from the routine maintenance area in onsite BMP calculations. However, no water quality credit is provided for the routine maintenance area unless it is reclassified as redevelopment.

*Offsite Drainage Areas* – The applicant is not responsible for satisfying water quality performance standards for offsite areas that drain into the project site. However, the applicant is responsible for proper performance of onsite BMPs. In order to ensure proper onsite BMP performance, the applicant has two options:

- Divert offsite runoff around onsite BMPs, or
- Include offsite runoff volumes in onsite BMP calculations. The amount of onsite water quality credit is determined by multiplying the BMP’s percent pollutant reduction by the “no controls” baseline pollutant load for the onsite area.

#### **Example Calculation #1:**

The development site currently contains 30 acres of institutional land uses and 70 acres of agricultural land uses. The entire 100 acre site will be disturbed as part of the proposed project. Within the 100 acre site, the developer plans to:

- Redevelop 20 acres (existing institutional) into a new commercial area.
- Conduct routine maintenance on 10 acres of existing asphalt parking lot (existing institutional). Parking lot will be part of new commercial area.
- Develop 70 acres (existing agriculture) into a new residential area.

The “No Controls” or base TSS load is computed as follows:

- Onsite Commercial =  $(20 + 10) \text{ acres} \times 600 \text{ lbs/acre} = 18,000 \text{ lbs}$   
(water quality reductions are required for routine maintenance areas that are part of a post-construction site with > 5 acres of disturbance)
- Onsite Residential =  $70 \text{ acres} \times 400 \text{ lbs/acre} = 28,000 \text{ lbs}$
- “No Controls” TSS Load =  $18,000 + 28,000 = 46,000 \text{ lbs}$

The “TSS Reduction Required” is computed as follows:

- Onsite Commercial =  $18,000 \text{ lbs} \times 40\% \text{ (redevelopment)} = 7,200 \text{ lbs}$
- Onsite Residential =  $28,000 \text{ lbs} \times 80\% \text{ (new development)} = 22,400 \text{ lbs}$
- “TSS Reduction Required” =  $(7,200 + 22,400) / 46,000$   
= 0.64 or 64%

A wet pond is proposed for the site. The pond achieves an 80% TSS reduction for its 130 acre watershed. The 130 acre watershed includes 20 acres of commercial area, 10 acres of commercial parking lot, 60 acres of residential area, and 40 acres of offsite residential area.

- Onsite Commercial (30 acres) = 18,000 lbs x 80% (wet pond) = 14,400 lbs
- Onsite Residential (60 acres) = 24,000 lbs x 80% (wet pond) = 19,200 lbs
- Offsite Residential (40 acres) = 16,000 lbs x 80% (wet pond) = 12,800 lbs
- Pond TSS Reduction =  $(14,400 + 19,200 + 12,800) / 58,000$   
= 0.80 or 80%

The "TSS Reduction Provided" is computed as follows:

- Onsite Commercial = 18,000 lbs x 80% (wet pond) = 14,400 lbs
- Onsite Residential (60 acres) = 24,000 lbs x 80% (wet pond) = 19,200 lbs
- Onsite Residential (10 acres) = 4,000 lbs x 0% (uncontrolled) = 0 lbs
- "TSS Reduction Provided" =  $(14,400 + 19,200 + 0) / 46,000$   
= 0.73 or 73%

73% > 64%, therefore the TSS requirement is satisfied.

In Example #1, the 40 acre offsite residential area could have been included in the "TSS Reduction Required" and "TSS Reduction Provided" calculations if it was a regional pond, as opposed to an onsite pond. A regional pond would have allowed the owner of the 40 acre offsite residential area to take credit for the TSS reduction provided by the wet pond.

#### **Example Calculation #2:**

The development site currently contains 1.5 acres of commercial land use and 3 acres of agricultural land use. The entire 4.5 acre site will be disturbed as part of the proposed project. Within the 4.5 acre site, the developer plans to:

- Develop 3 acres of existing agriculture into a new commercial area.
- Redevelop 1 acre of existing commercial into a new commercial area.
- Conduct routine maintenance on 0.5 acres of existing commercial parking lot. Existing parking lot will be part of new commercial area.

The "No Controls" or base TSS load is computed as follows:

- Onsite Commercial (new development) = 3 acre x 600 lbs/ac = 1,800 lbs
- Onsite Commercial (redevelopment) = 1 acre x 600 lbs/ac = 600 lbs
- Onsite Commercial (routine maintenance) = 0.5 acres x 0 lbs/ac = 0 lbs  
(water quality reductions are not required for a routine maintenance area if the post-construction site has < 5 acres of disturbance)
- "No Controls" TSS Load = 1,800 + 600 + 0 = 2,400 lbs

The "TSS Reduction Required" is computed as follows:

- Onsite Commercial (new development) = 1,800 lbs x 80% = 1,440 lbs
- Onsite Commercial (redevelopment) = 600 lbs x 40% = 240 lbs
- "TSS Reduction Required" =  $(1,440 + 240) / 2,400$   
= 0.70 or 70%

Four biofilters and a dry detention pond are proposed for the site. The biofilters achieve a 72% TSS reduction for 4.9 acres. The 4.9 acres includes 4 acres of onsite commercial (new and redevelopment), 0.5 acres of onsite commercial parking lot (routine maintenance) and 0.4 acres of offsite commercial.

- Onsite Commercial (3 acres) = 1,800 lbs x 72% (biofilters) = 1,296 lbs
- Onsite Commercial (1 acre) = 600 lbs x 72% (biofilters) = 432 lbs
- Onsite Parking Lot (0.5 acres) = 300 lbs x 72% (biofilters) = 216 lbs
- Offsite Commercial (0.4 acres) = 240 lbs x 72% (biofilters) = 173 lbs
- Biofilter TSS Reduction =  $(1,296 + 432 + 216 + 173) / 2,940$   
= 0.72 or 72%

The "TSS Reduction Provided" is computed as follows:

- Onsite Commercial (4 acres) = 2,400 lbs x 72% (biofilters) = 1,728 lbs
- "TSS Reduction Provided" =  $1,728 / 2,400$   
= 0.72 or 72%

72% > 70%, therefore the TSS requirement is satisfied.

In Example #2, the 0.5 acre onsite commercial parking lot could have been included in the "TSS Reduction Required" and "TSS Reduction Provided" calculations if it was reclassified as redevelopment, as opposed to routine maintenance. The reclassification would have allowed the applicant to plan for future reconstruction of the 0.5 acre onsite commercial parking lot.

In Example #2, the 0.4 acre offsite commercial area could have been included in the "TSS Reduction Required" and "TSS Reduction Provided" calculations if it was a regional BMP, as opposed to an onsite BMP. A regional BMP would have allowed the owner of the 0.4 acre offsite commercial area to take credit for the TSS reduction provided by the onsite BMP.

## (2) PEAK DISCHARGE

Post-construction sites with 20,000 sq.ft. or more of impervious surface disturbance and post-construction sites with 1 acre or more of land disturbance are required to meet the ordinance's numeric performance standards. All other post-construction sites are not required to meet these numeric performance standards. BMP design guidance is provided below in Section (h) for sites with less than 20,000 sq.ft. of impervious surface disturbance.

### **Computer Models:**

Peak discharge rates shall be evaluated using TR-55 methodology and a computer model. NRCS released a new Windows version of TR-55 referred to as WinTR-55. Unfortunately, WinTR-55 has some unacceptable restrictions in computing  $T_c$  and the computations for outlet structures are too approximate to be useable. Therefore, WinTR-55 is not acceptable software.

Other software packages are acceptable if they match the results and methodology of TR-55 (DOS version). There are multiple hydrology/pond routing computer programs available. They must be approved by the administering authority. Examples of common computer programs are HEC-HMS, XPSWMM, HydroCAD, HydraFlow, PondPack, etc.

Each pre-development watershed or site outfall shall be evaluated for peak discharge. It is not accurate or necessary to "link" all of the pre-development watersheds to determine the ultimate allowable discharge for the site. The allowable discharge for each outfall shall be determined based on the individual pre-development watershed as discussed below in "TR-55 Methodology Clarifications".

### **TR-55 Methodology Clarifications:**

*Time of Concentration ( $T_c$ ) -*

#### Pre-Development Requirements

- The  $T_c$  route shall be the route that takes the longest time to reach the outfall and not necessarily the furthest point in the watershed.
- The  $T_c$  route shall be shown to scale on the pre-development contours with each flow segment labeled.

- The pre-development  $T_c$  should typically be at least 30 minutes in NE Wisconsin. This may not apply to small sites.
- A Manning's "n" value of 0.24 shall be used for sheet flow "meadow" conditions. For redevelopment areas, assume impervious surfaces do not exist.
- The sheet flow length before development in NE Wisconsin is usually 250' to 300'. This may not apply to small sites.
- For shallow concentrated flow, "unpaved" or "paved" shall be used to represent vegetated swales and paved swales, respectively.

#### Post-Development Requirements

- The  $T_c$  route shall incorporate and represent the development. If the development is large, consider dividing the development into multiple watersheds.
- $T_c$  will almost always be shorter after development.
- The  $T_c$  route shall be shown to scale on the post-development drainage plan with each flow segment labeled.
- The sheet flow length after development will seldom be greater than 50' to 100' due to the grading around homes and buildings. A sheet flow length of greater than 100 feet requires approval from the reviewing authority (except for large paved parking areas).
- A Manning's "n" value of 0.24 is appropriate for sheet flow "lawn" conditions.
- The minimum sheet flow slope shall be 2% for residential lawns.
- For shallow concentrated flow, "unpaved" or "paved" shall be used to represent vegetated swales and paved swales, respectively.
- The  $T_c$  flow path stops when it reaches the inflow of a wet or dry detention basin.
- The post-development  $T_c$  is important for determining the correct storage volume required. See the Storage Volume for Detention Basins section below.

#### *Runoff Curve Numbers (CN) -*

#### Pre-Development Requirements

- Unless the site is currently woodland, peak pre-development discharge rates shall be determined using the following runoff curve numbers for a "meadow" vegetative cover:

Maximum Pre-Development Runoff Curve Numbers				
Vegetative Cover	Hydrologic Soil Group			
	A	B	C	D
Meadow	30	58	71	78
Woodland	30	55	70	77

- Soil units can be found in the applicable County Soil Survey (or, if provided, on the Town's website.)
- The appropriate hydrologic soil groups are located at the following website: <http://soildatamart.nrcs.usda.gov/County.aspx?State=WI>

To get an online soils report, do the following:

1. Select the appropriate County.
2. Select the "Generate Reports" button.
3. Select the appropriate soils for the site (hold the ctrl key for multiple).

4. Select the report type (RUSLE2 Related Attributes or Water Features) below to get the Hydrologic Group(s) for the site.
5. Select the "Generate Report" button.

**\*\*Notice that a number of soils have different hydrologic soil groups than those shown in the original County USDA Soils book. The Internet groups are the ones to use.**

#### Post-Development Requirements

- The Runoff Curve Number for lawns shall be used for developed areas that will be vegetated. Woods, wetland, or prairie areas preserved with a recorded document may be modeled as such.

#### Pre/Post-Development Curve Number Determination for Permeable Soils

- Refer to the Site Evaluation for Infiltration Report to verify that soils mapped in hydrologic groups A or B are well drained. If not well drained use the County USDA Soils Books hydrologic group explanation to determine the appropriate hydrologic group.
- If the existing site consists of multiple hydrologic groups, especially a combination of highly permeable and non-permeable, consideration shall be given to the proposed site balance cut/fill. See Appendix A of TR-55 for discussion on disturbed soil profiles as a result of urbanization.

Example: The site consists of 30% Hydrologic Group A soils and 70% Hydrologic Group C soils. The following scenarios shall be handled as noted:

1. If the site earthwork does not balance within the respective Hydrologic Group and it is anticipated that the "C" soils will be filled on the "A" soils, the "C" soil RCN shall be used.
2. If the site earthwork balances within each respective Hydrologic Group and it is anticipated that offsite fill will be required to achieve the desired dwelling elevations, the "C" soil RCN shall be used.
3. If the site balances within each respective Hydrologic Group and no or minimal fill is anticipated on the "A" soils, compaction mitigation shall be provided.

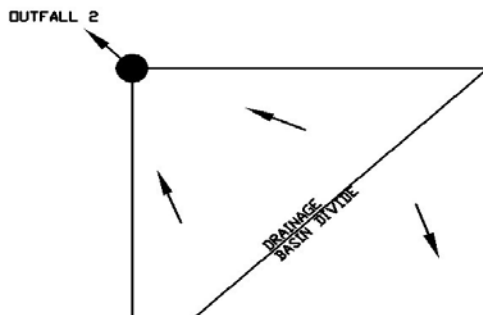
#### *Drainage Area -*

#### Pre-Development Requirements

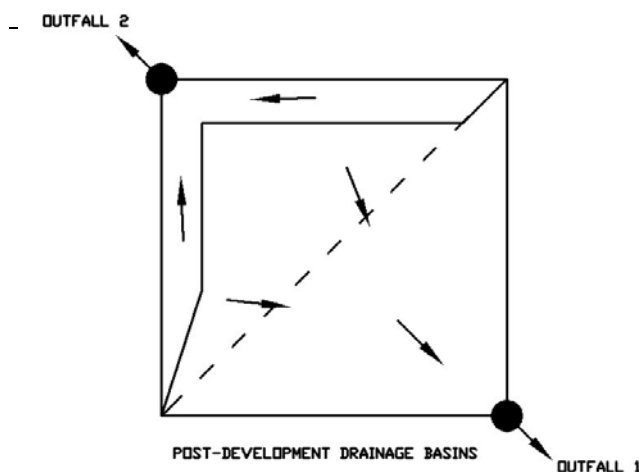
- Determine the total contributing drainage area to the development, including offsite properties.
- If the pre-developed site consists of multiple drainage areas, each outfall shall be evaluated for peak discharge.

Example:

The pre-development site shown below is 40 acres and consists of 2 drainage areas, each 20 acres. Each outfall has a peak discharge of 2, 4, 8, and 12 cfs for the 1, 2, 10, and 100-year design storms, respectively.



The post-development site shown below is the same 40 acres; however, Outfall 1 now has 30 acres draining to it and Outfall 2, 10 acres.



The post-development discharges for Outfall 2 are 1, 3, 6, and 9 cfs for the 1, 2, 10, and 100-year design storms, respectively. Outfall 2 meets the peak discharge requirements of the Ordinance because the post-development peak discharges are below the pre-development discharges for Outfall 2.

The post-development discharges for Outfall 1 are 6, 12, 24, and 36 cfs for the 1, 2, 10, and 100-year design storms, respectively. Outfall 1 does not meet the peak discharge requirements of the Ordinance. As such, stormwater facilities are required to lower the post-development peak discharges to the pre-development discharges of 2, 4, 8, and 12 cfs for the 1, 2, 10, and 100-year design storms, respectively.

Below is an example of appropriate Stormwater Management Plan summary tables as required:

Pre-Development Peak Discharges				
Location	1-year	2-year	10-year	100-year
Outfall 1	2 cfs	4 cfs	8 cfs	12 cfs
Outfall 2	2 cfs	4 cfs	8 cfs	12 cfs

Post-Development Peak Discharges				
Location	1-year	2-year	10-year	100-year
Outfall 1 (undetained)	1.8 cfs (6 cfs)	3.6 cfs (12 cfs)	7.5 cfs (24 cfs)	10.9 cfs (36 cfs)
Outfall 2	1.5 cfs	3 cfs	6 cfs	9 cfs

#### Post-Development Requirements

- The design of stormwater runoff control facilities shall be based on the total contributing drainage area, not just the area being developed. Any off-site drainage area must be included in the plan facilities or safely diverted around the planned facilities.
- Off-site contributing areas that are not diverted must use the meadow condition runoff curve number for pre-development flow computations whether the off-site area is presently developed or not.
- Offsite contributing areas that are diverted shall use the highest anticipated runoff curve number for the offsite area for a safe design. Also, the diversion shall provide 0.3' of freeboard and assume 10% settlement for the 100-year flow. The conveyance shall be contained within an easement. The discharge location for the diversion shall be at the pre-developed outfall or at a stable location.
- If more than 30% of the drainage area will be impervious, it will often be necessary to divide the drainage area into a pervious sub-area and impervious sub-area for correct computation of peak flow.

*Peak Discharge Method -*

- For Wisconsin, use the Type II, 24-hour rainfall distribution for design storms.
- Natural depressions shall be evaluated or considered when determining peak discharge rates for the predevelopment condition.

*Storage Volume for Detention Ponds (TR-55) -*

- The approximate storage-routing curves should not be used if the adjustment for ponding (discussed above in the peak discharge section) is used.
- This manual method is good for determining quick estimates of the effects of temporary detention on peak discharges. Computer programs that utilize TR-20 provide more accurate methods of analysis and routing.
- The procedure should not be used to perform final design if an error in storage of 25 percent cannot be tolerated. Figure 6-1 may significantly overestimate the required storage capacity.
- When the peak outflow discharge is too close to post-development peak inflow discharge, parameters that affect the rate of rise of a hydrograph become especially significant.

**Design Clarifications:**

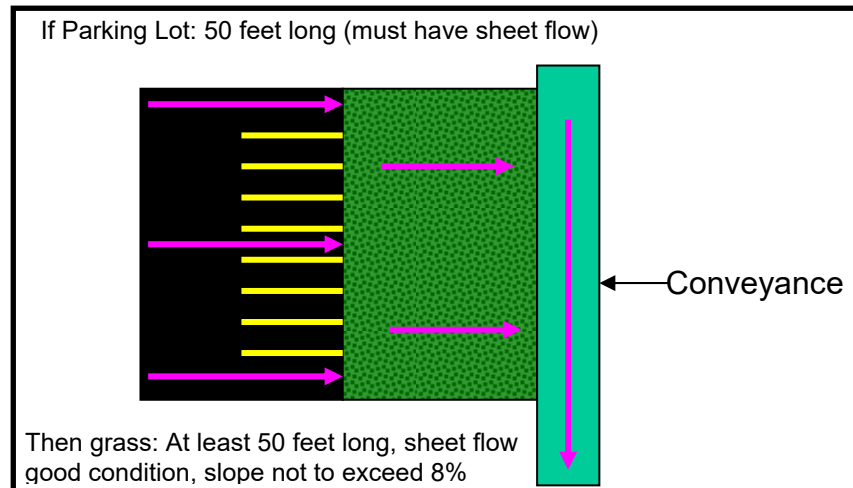
It is recommended that the developer and designer contact the local municipality to discuss peak discharge requirements for the site early in the design process. The local municipality may have adopted alternative peak discharge requirements for the site which are different than the Post-Construction Stormwater Management Ordinance. At a minimum, the peak discharge requirements contained in NR 151 shall be met.

*Outfalls* - Performance standards for peak discharge shall be satisfied at each outfall associated with the site. Written approval is required from down slope property owners if post-development peak discharge rates are not less than or equal to pre-development peak discharge rates at each outfall.

*Disconnection* - Disconnecting impervious surfaces can help achieve the peak discharge requirement. Disconnecting impervious surfaces not only reduces

runoff volumes, but also increases time of concentrations. In order to consider an impervious surface as “disconnected”, the following criteria shall be met:

- Residential Roofs: Discharge runoff over a minimum 20 foot long pervious surface that is in good condition and graded for sheet flow.
- Other Impervious Surfaces:
  - Source area flow length may not exceed 75 feet.
  - Source area and pervious area must be graded for sheet flow.
  - Pervious area must be in good condition, have a slope less than 8%, and have a flow length at least as long as the contributing impervious area’s length (but never less than 20 feet).



Source: DNR Post-Construction Stormwater Management Workshops

*Uncontrolled Areas* - The performance standard for peak discharge is an outfall standard. Often, a site contains an uncontrolled area for each outfall that does not flow through a BMP (e.g. wet pond). Typically, it is necessary to increase the peak discharge control provided by the onsite BMP in order to offset or over compensate for the uncontrolled area.

*Routine Maintenance Areas* – No performance standard or peak discharge reduction is required for routine maintenance areas. However, the applicant is responsible for proper performance of onsite BMPs. In order to ensure proper BMP performance, the applicant has two options:

- Divert the routine maintenance area around onsite BMPs, or
- Include runoff volumes from the routine maintenance area in onsite BMP calculations. For the predevelopment condition, routine maintenance areas shall be modeled as a meadow land use. For the post-development condition, routine maintenance areas shall be modeled using the post- construction conditions.

*Offsite Drainage Areas* – The applicant is not responsible for satisfying peak discharge performance standards for offsite areas that drain into the project site. However, the applicant is responsible for proper performance of onsite BMPs. In order to ensure proper onsite BMP performance, the applicant has two options:

- Divert offsite runoff around onsite BMPs, or
- Include offsite runoff volumes in onsite BMP calculations. Use a meadow vegetative cover for the off-site pre-development runoff curve number, regardless of whether the off-site area is currently developed or undeveloped. Use the current or future vegetative cover / impervious surface coverage for the off-site post-development runoff curve number.

### (3) INFILTRATION

Post-construction sites with 20,000 sq.ft. or more of impervious surface disturbance and post-construction sites with 1 acre or more of land disturbance are required to meet the ordinance's numeric performance standards. All other post-construction sites are not required to meet these numeric performance standards. BMP design guidance is provided below in Section (h) for sites with less than 20,000 sq.ft. of impervious surface disturbance.

#### **Computer Models:**

A model that calculates runoff volume, such as RECARGA, SLAMM, P8, TR-55, or an approved equivalent methodology may be used to evaluate the efficiency of the infiltration design. Information on how to access RECARGA, SLAMM, or P8 is available at <http://dnr.wi.gov/topic/stormwater/standards/slamm.htm> or contact the stormwater coordinator in the runoff management section of the bureau of watershed management at (608) 267-7694.

Use the most recent version of RECARGA, SLAMM, and P8. The applicant may request a waiver of this requirement.

Depending on the type of infiltration device, groundwater mounding may need to be evaluated. Refer to Table 1, Technical Standard 1002 for groundwater mounding requirements. A model that calculates groundwater mounding is available at [http://dnr.wi.gov/topic/stormwater/standards/gw\\_mounding.html](http://dnr.wi.gov/topic/stormwater/standards/gw_mounding.html) or contact the stormwater coordinator in the runoff management section of the bureau of watershed management at (608) 267-7694.

#### **Design Clarifications:**

Maximum required Effective Infiltration Area (EIA) is calculated as follows:

- Prohibited and exempted areas located within the post-construction site are included in the EIA cap calculation.
- The maximum required EIA cap may be voluntarily exceeded.

*Prohibitions* - Runoff from prohibited areas does not have to be included in calculating the infiltration goal. However, if runoff from a prohibited area flows through an infiltration BMP, the following is required:

- Use caution. These source areas and locations are excluded from the ordinance's infiltration requirement due to groundwater contamination concerns. The municipality is not responsible for the applicant's decision to infiltrate this runoff. The applicant is solely responsible for NR 140 compliance and groundwater protection.
- The BMP design must take runoff from prohibited areas into account to assure the device can safely handle the additional flow and volume.

*Exemptions* - Infiltration from exempted areas is not required. Despite the ordinance, the applicant may choose to infiltrate exempted runoff. If exempted runoff is infiltrated, credit will be given toward achieving the infiltration requirement. Runoff from exempted areas does not have to be included in calculating the infiltration goal. However, if runoff from an exempted area flows through an infiltration BMP, the BMP design must take it into account to assure the device can safely handle the additional flow and volume.

*Groundwater Protection* - It is the applicant's sole responsibility to protect groundwater. Compliance with Preventative Action Limits (PAL) contained in NR 140 must be maintained. Also, infiltration system discharges must remain below Enforcement Standards (ES) contain in NR 140. DNR Technical Standards should meet these groundwater protection requirements.

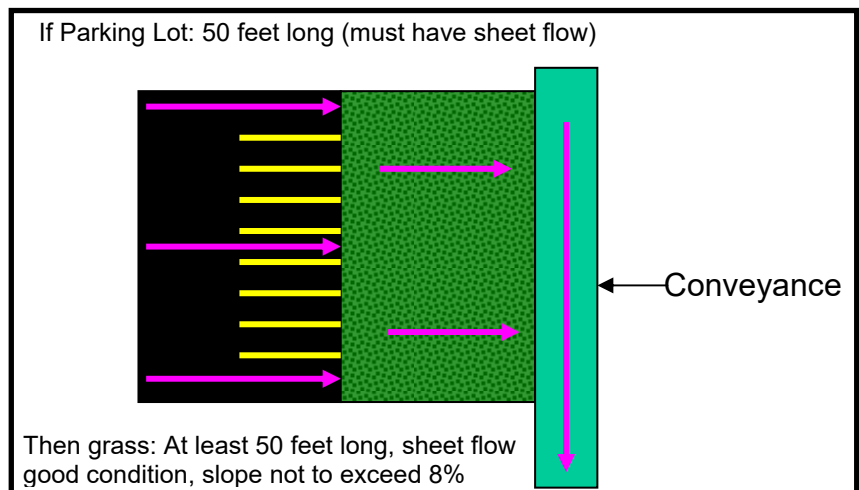
*Maximum Extent Practicable (MEP):*

- Definition takes into consideration best available technology, cost-effectiveness, natural resource protection, historic preservation, human safety & welfare, and site conditions (see ordinance).
- Topography- To achieve the infiltration requirement, maximum extent practicable should not be interpreted to require significant topography changes that create an excessive financial burden. Two feet or less of elevation change is considered reasonable and to the MEP.
- Pumping- To achieve the infiltration requirement, maximum extent practicable should not be interpreted to require stormwater pumping.

*Roof Runoff* - To minimize potential groundwater impacts, it is desirable to infiltrate the cleanest runoff. To achieve this, a design may propose greater infiltration of runoff from low pollutant sources such as roofs, and less from higher pollutant source areas such as parking lots.

*Disconnection* - Disconnection of impervious surfaces can be used to help achieve the infiltration requirement. However, disconnection is not considered to be part of an infiltration system. Therefore, disconnected areas do not count toward the maximum effective infiltration area calculation. In order to consider an impervious surface as “disconnected”, the following criteria shall be met:

- Residential Roofs: Discharge runoff over a minimum 20 foot long pervious surface that is in good condition and graded for sheet flow.
- Other Impervious Surfaces:
  - Source area flow length may not exceed 75 feet.
  - Source area and pervious area must be graded for sheet flow.
  - Pervious area must be in good condition, have a slope less than 8%, and have a flow length at least as long as the contributing impervious area's length (but never less than 20 feet).



Source: DNR Post-Construction Stormwater Management Workshops

*Routine Maintenance Areas* – No performance standard or infiltration requirement is provided for routine maintenance areas. However, the applicant is responsible for proper performance of onsite BMPs. In order to ensure proper BMP performance, the applicant has two options:

- Divert the routine maintenance area around onsite BMPs, or
- Include runoff volumes from the routine maintenance area in onsite BMP calculations. The applicant will receive credit for infiltrating runoff from the routine maintenance area provided it is not a prohibited area.

*Offsite Drainage Areas* – The applicant is not responsible for satisfying infiltration performance standards for offsite areas that drain into the project site. However, the applicant is responsible for proper performance of onsite BMPs. In order to ensure proper onsite BMP performance, the applicant has two options:

- Divert offsite runoff around onsite BMPs, or
- Include offsite runoff volumes in the onsite BMP calculations. The amount of onsite credit is determined by prorating the infiltration volume. The applicant will not receive credit for infiltrating offsite runoff, unless the BMP is a regional facility.

*Alternative Uses* - The volume of runoff used for alternative uses will be credited towards the infiltration requirement. Alternative uses may include toilet flushing, laundry, and irrigation (e.g. cisterns, rain barrels, green roofs). In addition to the stormwater benefits, these alternative uses may also reduce municipal invoices for drinking water.

### **Example Calculations:**

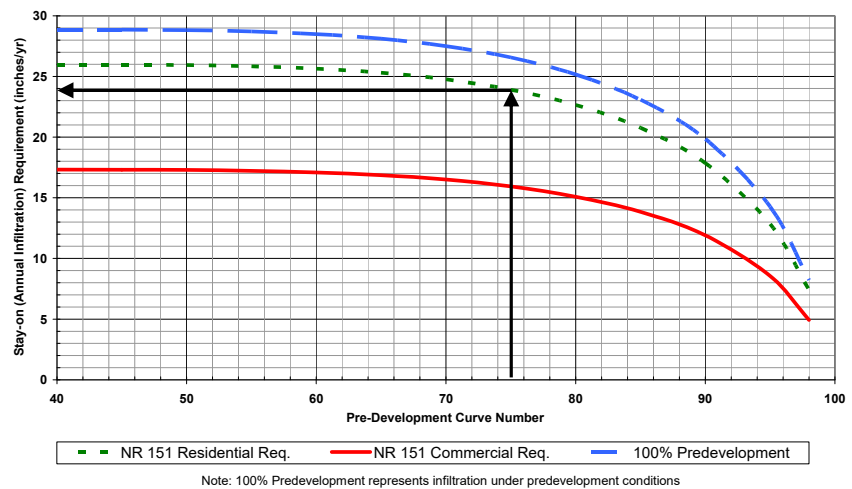
The site is currently 100 acres of cropland. Following development, the site will be 30 acres medium residential, 20 acres commercial, and 50 acres cropland. Native soils in the area to be developed are sandy loams, silt loams and silty clay loams. Hydrologic soil groups are B and C with an average pre-development curve number of 75. A site investigation using Step B of the DNR Technical Standard 1002, Site Evaluation for Stormwater Infiltration, determined that 10 of the acres to be developed into medium residential have an infiltration rate of 0.10 in/hr and are therefore exempt from the infiltration requirements. The site investigation also determined that 10 acres to be developed into commercial are excluded from the infiltration requirements. The post-development curve number for the pervious portions of the residential and commercial components will be 80, based on TR-55. The residential component will contain up to 40% connected imperviousness. The commercial component will contain more than 80% connected imperviousness.

The residential and commercial components will meet the infiltration requirements using two infiltration basins. Upon completion of a preliminary site layout, two locations were chosen for investigation using Step C of Technical Standard 1002. The first location investigated was in the residential area that is not exempt from the infiltration requirements. The soil texture at the residential infiltration basin site is a sandy loam with a design infiltration rate of 0.5 in/hr. The second location investigated was in the commercial area that is not excluded from the infiltration requirements. The soil texture at the commercial infiltration basin site is a loamy sand with a design infiltration rate of 1.63 in/hr.

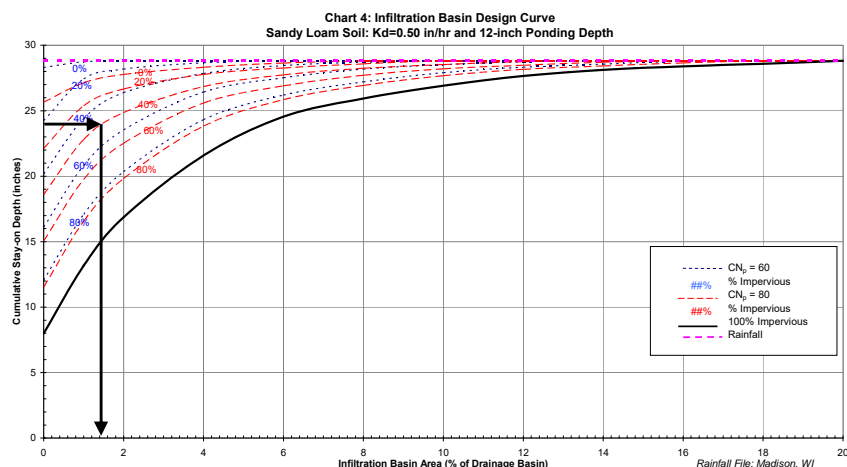
### **Step 1: Determine Infiltration Basin Size - Residential Component**

**Step 1A: Determine Target Stay-on Depth – Residential**  
Using Chart 1, the target stay-on depth is 24 inches/year.

**CHART 1 - TARGET STAY-ON (ANNUAL INFILTRATION) REQUIREMENT**  
Based on the annual 1981 Rainfall for Madison, WI



**Step 1B: Determine Preliminary Effective Infiltration Area – Residential**  
Using Chart 4, the preliminary effective infiltration area needed for the infiltration basin is 12,197 square feet ( $43,560 \times 20 \text{ acres} \times 1.4\%$ ).



**Step 1C: Maximum Required Effective Infiltration Area – Residential**

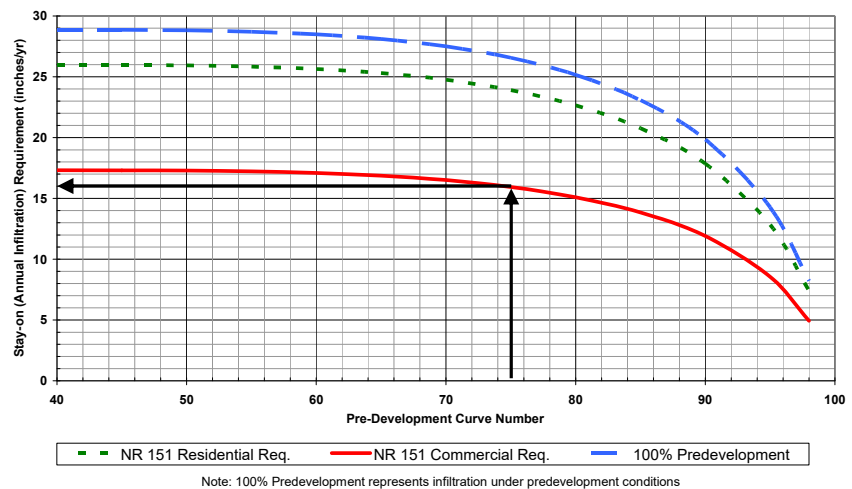
- Residential Land Disturbance (30 acres total)
  - Building roof 5 acres
  - Driveway & sidewalk 2 acres
  - Street 5 acres
  - Lawn / landscaping 18 acres
- Maximum Required EIA = 13,068 sq.ft. ( $43,560 \times 30 \text{ acres} \times 1\%$ )

**Step 1D: Determine Final Effective Infiltration Area – Residential**  
Using Technical Standard 1003, the preliminary effective infiltration area of 12,197 sq.ft. needs to be adjusted (depth, slope, cell configuration) to determine the final effective infiltration area. Groundwater mounding also needs to be checked. The maximum EIA cap does not appear to impact the infiltration basin's size ( $12,197 \text{ sq.ft.} < 13,068 \text{ sq.ft.}$ ).

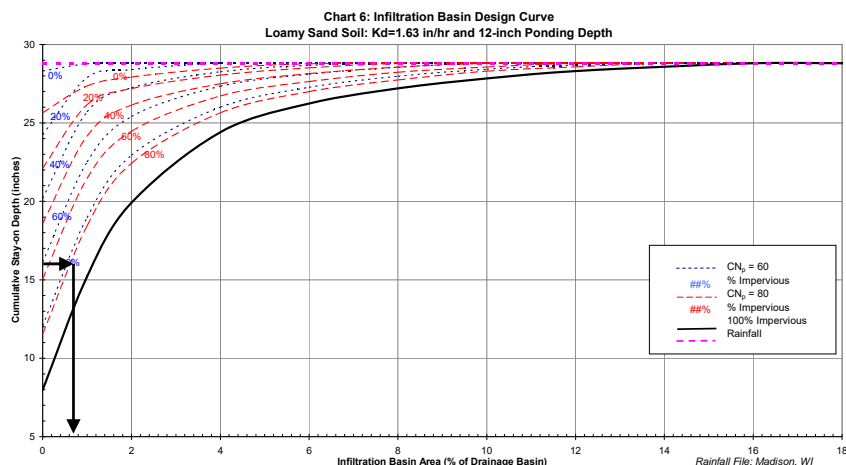
**Step 2: Determine Infiltration Basin Size – Commercial Component**

**Step 2A: Determine Target Stay-on Depth – Commercial**  
Using Chart 1, the target stay-on depth is 16 inches/year.

**CHART 1 - TARGET STAY-ON (ANNUAL INFILTRATION) REQUIREMENT**  
Based on the annual 1981 Rainfall for Madison, WI



**Step 2B: Determine Preliminary Effective Infiltration Area – Commercial**  
Using Chart 6, the preliminary effective infiltration area needed for the infiltration basin is 2,614 square feet ( $43,560 \times 10 \text{ acres} \times 0.6\%$ ).



**Step 2C: Maximum Required Effective Infiltration Area – Commercial**

- Commercial Land Disturbance (20 acres total)
  - Building roof 6 acres
  - Parking lot 7 acres
  - Street 3 acres
  - Lawn / landscaping 4 acre
- Maximum Required EIA = 17,424 sq.ft. ( $43,560 \times 20 \text{ acres} \times 2\%$ )

**Step 2D: Determine Final Effective Infiltration Area – Commercial**

Using Technical Standard 1003, the preliminary effective infiltration area of 2,614 sq.ft. needs to be adjusted (depth, slope, cell configuration) to determine the final effective infiltration area. Groundwater mounding also needs to be checked. The maximum EIA cap does not appear to impact the infiltration basin's size ( $2,614 \text{ sq.ft.} < 17,424 \text{ sq.ft.}$ ).

#### (4) PROTECTIVE AREAS

All post-construction sites are required to meet the ordinance's protective area performance standards.

### **Design Clarifications:**

*Adjacent Property Owners* - If a stream or channel is placed or relocated along a property line, an easement or letter of permission is required from any property owners impacted by the protective area's new location. Also, if a stormwater facility or structure is proposed within an onsite stream or channel, 100-year flood elevations shall be evaluated to determine if offsite property owners are impacted by backwater or a flood elevation increase. An easement or letter of permission is required from any property owners impacted by backwater.

*Wetland Delineations* - Wetland delineations shall be performed by a professional soil scientist, professional hydrologist, or other qualified individual approved by the administering authority. The individual performing the delineation shall classify the wetland as a less susceptible wetland, highly susceptible wetland, exceptional resource water, or outstanding resource water.

*Disturbances* - Protective areas may be disturbed as part of a project, if necessary. Disturbed areas must be stabilized from erosion and restored with a self-sustaining vegetation.

*Type of Vegetation* - It is recommended that seeding of non-invasive vegetative cover be used in the protective areas. Vegetation that is flood and drought tolerant and can provide long-term bank stability because of an extensive root system is preferable. Vegetative cover can be measured using the line transect method described in the University of Wisconsin Extension publication number A3533, titled "Estimating Residue Using the Line Transect Method".

#### **Best Management Practices -**

- BMPs may be located in protective areas (ponds, swales, etc.)
- Other state and local regulations may apply to BMPs located in protective areas and waters of the state, including the following:
  - Navigation, Dams, & Bridges (Chapter 30 and 31, Stats.)
  - Wetland Water Quality Standards (NR 103)
  - Wetlands (US Army Corps of Engineers Section 404 regulations)
  - Shoreland Management (NR 115, NR 117, & local regulations)
  - Floodplain Management (NR 116 & local regulations).
- For purposes of section 255-7C(4)(e)[4] of the ordinance, a vegetated protective area to filter runoff pollutants from post-construction sites is not necessary since runoff is not entering the surface water at that location. Other practices, necessary to meet the requirements of this section, such as a swale or pond, will need to be designed and implemented to reduce runoff pollutants before the runoff enters a surface water of the state.

### **(5) FUELING AND VEHICLE MAINTENANCE AREAS:**

All post-construction sites are required to meet the ordinance's no visible petroleum sheen performance standard.

### **Design Clarifications:**

The following BMPs are recommended to meet the performance standards contained within section 255-7C(5) of the ordinance:

- Enclose vehicle maintenance areas in a building or under a roof.
- Install a roof or canopy over fueling areas.
- Divert runoff away from fueling and vehicle maintenance areas.
- Keep adsorbent spill cleanup materials onsite at all times.
- Install an oil / water separator and/or biofiltration device.

- Post the spill response phone numbers in conspicuous onsite locations. The municipality's Illicit Discharge Ordinance requires reporting of hazardous spills. The local municipality's spill response phone number is 911 and the DNR's 24-hour spill response phone number is 1-800-943-0003.

(6) SWALE TREATMENT FOR TRANSPORTATION FACILITIES

Post-construction sites with 20,000 sq.ft. or more of impervious surface disturbance and post-construction sites with 1 acre or more of land disturbance are required to meet the ordinance's numeric performance standards. All other post-construction sites are not required to meet these numeric performance standards. BMP design guidance is provided below in Section (h) for sites with less than 20,000 sq.ft. of impervious surface disturbance.

**Design Clarifications:**

For purposes of section 255-7C(6)(a)[1] of the ordinance, it is preferred that tall and dense vegetation be maintained within the swale due to its greater effectiveness at enhancing runoff pollutant removal. However, the local municipality may have ordinances or other design criteria which dictate the allowable mowing height for grass swales.

For purposes of section 255-7C(6)(a)[2] of the ordinance, check dams may be included in the swale design to slow runoff flows and improve pollutant removal. Transportation facilities with continuous features such as curb and gutter, sidewalks or parking lanes do not comply with the design requirements of section 255-7C(6)(a)[2] of the ordinance. However, a limited amount of structural measures such as curb and gutter may be allowed as necessary to account for other concerns such as human safety or resource protection.

For purposes of section 255-7C(6)(b) of the ordinance, the Department of Natural Resource's regional stormwater staff can determine if additional BMPs, beyond a water quality swale, are needed.

(7) EXEMPTIONS FOR 255-7C PERFORMANCE STANDARDS

Projects that consist of only the construction of bicycle paths or pedestrian trails generally meet the exception found under section 255-7C(7)(b)[1] of the ordinance, as these facilities have minimal connected imperviousness.

(8) SITES WITH LESS THAN 20,000 SQ.FT. OF IMPERVIOUS SURFACE DISTURBANCE

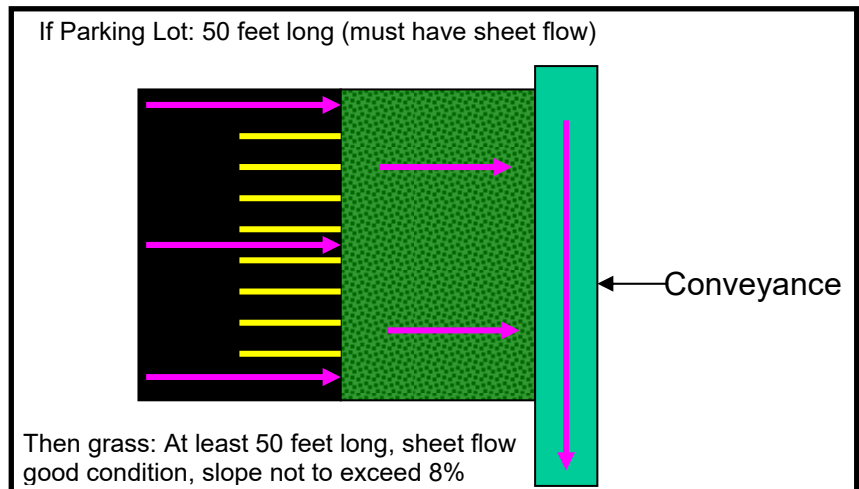
Pursuant to 255-7G of the ordinance, the municipality may establish stormwater management requirements more stringent than those set forth in this section if the municipality determines that an added level of protection is needed.

**Design Clarifications:**

For a post-construction site with less than 20,000 sq.ft. of impervious surface disturbance, the applicant shall comply with the protective area requirements in section 255-7C(4) of the ordinance, petroleum sheen requirements in section 255-7C(5) of the ordinance, and one of the two requirements provided below. It is recommended that the developer and designer contact the local municipality early in the design process to discuss which requirement must be complied with:

1. Disconnect impervious surfaces. 90% or more of disturbed impervious surfaces must be disconnected. In order to consider an impervious surface as "disconnected", the following criteria shall be met:

- Roofs: Discharge runoff over a minimum 20 foot long pervious surface that is in good condition and graded for sheet flow.
- Other Impervious Surfaces:
  - Source area flow length may not exceed 75 feet.
  - Source area and pervious area must be graded for sheet flow.
  - Pervious area must be in good condition, have a slope less than 8%, and have a flow length at least as long as the contributing impervious area's length (but never less than 20 feet).



Source: DNR Post-Construction Stormwater Management Workshops

2. Use the following best management practices and good housekeeping practices to improve water quality, reduce peak flow rates, and encourage infiltration:
  - Vehicle and equipment maintenance shall be performed inside buildings when feasible. Used fluids / batteries shall be stored and disposed of properly. Repair any vehicle leaks as soon as possible.
  - Outdoor trash bins are required for fast food restaurants, convenience stores, and gas stations. Litter shall be cleaned up daily and disposed of properly.
  - Fertilizers shall be used sparingly for lawn areas. Fertilizers shall be immediately swept off streets, parking lots, driveways, and sidewalks. Soil testing and compliance with Technical Standard 1100 (Turf Nutrient Management) is also encouraged.
  - Stream, shoreline, swale, and other erosion problems shall be repaired as part of the development project when feasible.
  - Roof downspouts, parking lots, driveways, and sidewalks shall discharge stormwater runoff to lawn or other pervious areas when feasible. Rain barrels are also encouraged at roof downspouts to store water for irrigation and watering landscaped areas (reduces municipal water invoice).
  - Create depressions in lawn areas and other landscape areas to temporarily store and treat stormwater runoff from roofs, parking lots, driveways and sidewalks when feasible. Grass swales, biofiltration devices, bioretention devices, and rain gardens are also encouraged when feasible.
  - Filter baskets shall be installed in parking lot catch basins when feasible.
  - Preserve wooded areas, trees, shrubs, and other native vegetation that are in good condition when feasible.

(9) OTHER DESIGN REQUIREMENTS

- Topographic surveys and plans shall be on municipality's vertical datum.
- Grass swales shall be designed with a minimum longitudinal slope of 1%.
- Storm sewers shall be designed for a 10-year design storm. A copy of storm sewer design calculations, time of concentration paths, tailwater conditions, and watershed maps shall be submitted.
- Culverts shall be designed for a 25, 50 or 100-year design storm, depending on location. Contact the municipality for more specific design guidance. A copy of culvert design calculations, time of concentration paths, tailwater conditions, and watershed maps shall be submitted.
- Overland flow paths shall be designed for a 100-year design storm. Flow paths shall be provided for street low points and other depressions. The location of overland flow paths shall be shown on the plans. The 100-year design storm shall be contained within the street right-of-way whenever feasible and ideally, the maximum depth of ponding at street low points shall be 6-inches. The 6-inch depth is measured at the street centerline.
- Minimum finished ground elevations shall be provided for buildings if deemed necessary to provide reasonable flood protection. The minimum finished ground elevation shall be > 1 foot above the 100-year flood elevation and extend at least 15 feet beyond the building. Minimum elevations may need to be specified for lakes, rivers, streams, ponds, and overland flow paths.
- A letter of permission may be required from down slope property owners if a post-development "point discharge" was "sheet flow" during the pre-development condition.
- The applicant may request a waiver or lesser design standard if site characteristics create a hardship.

Maximum Permissible Velocities for Channels			
Channel Cover	Slope Range %	Erosion-resistant soils	Easily eroded soils
Bermuda Grass	0-5	8 fps	6 fps
	5-10	7 fps	5 fps
	>10	6 fps	4 fps
Buffalo grass, Kentucky bluegrass, Smooth brome, blue grama	0-5	7 fps	5 fps
	5-10	6 fps	4 fps
	>10	5 fps	3 fps
Grass mixture	0-5	5 fps	4 fps
	5-10	4 fps	3 fps
	Do not use on slopes steeper than 10%, except for side slopes in a combination channel.		
Lespedeza sericea, weeping love grass Ischaemum (yellow bluestem), kudzu, alfalfa, crabgrass	0-5	3.5 fps	2.5 fps
	Do not use on slopes steeper than 5%, except for side slopes in a combination channel.		
Annuals – used on mild slopes or as temporary protection until permanent covers are established, common lespedeza, Sudan grass	0-5	3.5 fps	2.5 fps
	Use on slopes steeper than 5% is not recommended		

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Source – Chow Open Channel Hydraulics

#### **D. CONSIDERATIONS FOR ONSITE / OFFSITE STORMWATER MANAGEMENT MEASURES**

All proposed land development activities should be planned, designed, and implemented:

1. In a manner that best fits the terrain of the site, avoiding steep slopes and other environmentally sensitive areas;
2. According to the unique resource conditions at, around, and downstream from a given site;
3. According to the principles of Low Impact Development. Use source controls rather than end-of-pipe treatment. Reduce, prevent and mitigate the adverse impacts of development by maintaining infiltration, reducing frequency and volume of discharges, reducing peak flows, and maintaining groundwater recharge. These goals can be accomplished by using:
  - Reduced impervious surfaces
  - Functional grading to slow runoff and thereby lengthen the time of concentration
  - Vegetated channels rather than paving or pipes
  - Disconnection of impervious surfaces; drain to vegetated areas
  - Bioretention (rain gardens) and filtration (buffer) landscape areas
  - Any other techniques that reduce the runoff curve number (RCN) or increase the time of concentration (Tc)
  - Use wet detention ponds after all source area practices and techniques have been employedOverall, the goal is to design the site as an integral, living part of the environment with careful use of principles and practices that are both low impact on runoff and simple for people to maintain and live with.
4. To maintain groundwater recharge areas and the infiltration capacity of native soils by avoiding the unnecessary filling of large natural depressions or compaction of upper soil horizons by construction equipment;
5. To maintain soil infiltration by keeping all topsoil on site;
6. To provide the protective area, shoreland, wetland, and environmentally sensitive area setback along all water courses; and
7. According to the sequence in the “Treatment Train”:
  - a. First do source controls:
    - Reduce impervious areas to the maximum extent possible
    - Maintain undisturbed soil
    - Maintain existing trees, shrubs and vegetation
  - b. Next do lot controls
    - Grade lots to create long areas of overland flow rather than channels
    - Minimize directly connected impervious areas by such practices as directing roof water to vegetated areas and draining driveways to grass rather than the street
    - Include “rain gardens” (undrained areas that will pond water)
  - c. Then do site controls
    - Use grassed waterways and diversions rather than paved channels
    - Maintain wetlands
    - Use vegetated road ditches rather than curb and gutter
    - Use wet detention ponds. They can have pools 5 or more feet deep or may be designed as wetlands, but existing wetlands cannot be incorporated into stormwater facilities.

- Use off line detention basins
- d. Finally, do Regional controls such as regional detention basins.

**E. BMP LOCATION AND CREDIT**

When using the regional treatment option, a letter is required from the owner of the regional facility. At a minimum, the letter shall state the following:

- Regional facility complies with ordinance requirements,
- Site can use regional facility for ordinance compliance, and
- Maintenance agreement for regional facility has been recorded at the County Register of Deeds.

**F. TARGETED PERFORMANCE STANDARDS**

**G. ALTERNATE REQUIREMENTS**

**255-8 PERMITTING REQUIREMENTS, PROCEDURES AND FEES**

**A. PERMIT REQUIRED**

**B. PERMIT APPLICATION AND FEES**

**C. REVIEW AND APPROVAL OF PERMIT APPLICATION**

**D. PERMIT REQUIREMENTS**

The permit applicant is required to post the permit in a conspicuous place at the construction site.

*Record Drawings -*

- Post-construction sites with 20,000 sq.ft. or more of impervious surface disturbance and post-construction sites with 1 acre or more of land disturbance are required to have record drawings. Record drawings shall be signed by a licensed Professional Engineer. Agricultural land uses, unless they are exceptionally large or special in some other way, are not required to have record drawings. Typically, agricultural land uses will not need anything more than review and acceptance by the administering authority.
- Post-construction sites with less than 20,000 sq.ft. of impervious surface disturbance are not typically required to have record drawings. Typically, sites with less than 20,000 sq.ft. of impervious surface disturbance will not need anything more than review and acceptance by the administering authority.

**E. PERMIT CONDITIONS**

**F. PERMIT DURATION**

**G. ALTERNATE REQUIREMENTS**

**255-9 STORMWATER MANAGEMENT PLAN**

**A. PLAN REQUIREMENTS**

**Sites With Less Than 20,000 Square Feet of Impervious Surface Disturbance:**

The stormwater management plan for post-construction sites with less than 20,000 square feet of impervious surface disturbance shall contain, at a minimum, the following

information unless other municipal ordinances or state regulations require more detailed information:

- (a) Name, address, and telephone number for the following or their designees: landowner; developer; project engineer for practice design and certification; person(s) responsible for installation of stormwater management practices; and person(s) responsible for maintenance of stormwater management practices prior to the transfer, if any, of maintenance responsibility to another party.
- (b) A description and installation schedule for the stormwater management practices needed to meet the performance standards in 255-7.
- (c) Total area of impervious surface disturbance at the post-construction site. Total area of the post-construction site and the total area of the post-construction site that is expected to be disturbed by land disturbing activities.
- (d) Sufficient detail so as to document ordinance compliance.
- (e) Location of all BMPs to be employed.
- (f) Pre-construction ground surface contour lines at intervals appropriate for conditions present within the proposed disturbed areas.
- (g) Identify the initial downstream receiving water of the state.

**Sites With 20,000 Square Feet or More of Impervious Surface Disturbance:**

The stormwater management plan for post-construction sites with 20,000 sq.ft. or more of impervious surface disturbance and post-construction sites with 1 acre or more of land disturbance shall contain, at a minimum, the following information.

- (a) Name, address, and telephone number for the following or their designees: landowner; developer; project engineer for practice design and certification; person(s) responsible for installation of stormwater management practices; and person(s) responsible for maintenance of stormwater management practices prior to the transfer, if any, of maintenance responsibility to another party.
- (b) A proper legal description of the property proposed to be developed, referenced to the U.S. Public Land Survey system or to block and lot numbers within a recorded land subdivision plat.
- (c) Total area of impervious surface disturbance at the post-construction site. Total area of the post-construction site and the total area of the post-construction site that is expected to be disturbed by land disturbing activities.
- (d) Sufficient detail so as to document ordinance compliance.
- (e) Location of all BMPs to be employed.
- (f) Identify the initial downstream receiving water of the state.
- (g) Pre-development site conditions, including:
  - 1. One or more site maps at a scale of not less than 1 inch equals 100 feet. The site maps shall show the following: site location and legal property description; predominant soil types and hydrologic soil groups; existing cover type and condition; one or two foot topographic contours of the site; topography and drainage network including enough of the contiguous properties to show runoff patterns onto, through, and from the site; watercourses that may affect or be affected by runoff from the site; flow path and direction for all stormwater conveyance sections; watershed boundaries used in hydrology determinations to show compliance with performance standards; lakes, streams, wetlands, channels, ditches, and other watercourses on and immediately adjacent to the site; limits of the 100 year floodplain; location of wells and wellhead protection areas covering the project area and delineated pursuant to s. NR 811.16, Wis. Adm. Code.
  - 2. Hydrology and pollutant loading computations as needed to show compliance with performance standards. All major assumptions used in developing input parameters shall be clearly stated. The geographic areas used in making the calculations shall be clearly cross-referenced to the required map(s).
- (h) Post-development site conditions, including:

1. Explanation of the provisions to preserve and use natural topography and land cover features to minimize changes in peak flow runoff rates and volumes to surface waters and wetlands.
2. Explanation of any restrictions on stormwater management measures in the development area imposed by wellhead protection plans and ordinances.
  - a. Stormwater infiltration systems and ponds shall be located at least 400 feet from a well serving a community water system unless the Wisconsin Department of Natural Resources and municipality concur that a lesser separation distance would provide adequate protection of a well from contamination.
  - b. Stormwater management practices shall be located with a minimum separation distance from any well serving a non-community or private water system as listed within s. NR 812.08.
3. One or more site maps at a scale of not less than 1 inch equals 100 feet showing the following: post-construction pervious areas including vegetative cover type and condition; impervious surfaces including all buildings, structures, and pavement; post-construction one or two foot topographic contours of the site; post-construction drainage network including enough of the contiguous properties to show runoff patterns onto, through, and from the site; locations and dimensions of drainage easements; locations of maintenance easements specified in the maintenance agreement; flow path and direction for all stormwater conveyance sections; location and type of all stormwater management conveyance and treatment practices, including the onsite and offsite tributary drainage area; location and type of conveyance system that will carry runoff from the drainage and treatment practices to the nearest adequate outlet such as a curbed street, storm drain, or natural drainage way; watershed boundaries used in hydrology and pollutant loading calculations and any changes to lakes, streams, wetlands, channels, ditches, and other watercourses on and immediately adjacent to the site.
4. Hydrology and pollutant loading computations as needed to show compliance with performance standards. The computations shall be made for each discharge point in the development, and the geographic areas used in making the calculations shall be clearly cross-referenced to the required map(s).
5. Results of investigations of soils and groundwater required for the placement and design of stormwater management measures. When permanent infiltration systems are used, appropriate onsite testing shall be conducted to determine if seasonal groundwater elevation or top of bedrock is within 5 feet of the proposed infiltration system. Detailed drawings including cross-sections and profiles of all permanent stormwater conveyance and treatment practices.
  - (i) A description and installation schedule for the stormwater management practices needed to meet the performance standards in 255-7.
  - (j) A maintenance plan developed for the life of each stormwater management practice including the required maintenance activities and maintenance activity schedule.
  - (k) Cost estimates for the construction, operation, and maintenance of each stormwater management practice.
  - (l) Other information requested in writing by the administering authority to determine compliance of the proposed stormwater management measures with the provisions of this ordinance.
  - (m) All site investigations, plans, designs, computations, and drawings shall be certified by a licensed professional engineer to be prepared in accordance with accepted engineering practice and requirements of this ordinance.

## **B. ALTERNATE REQUIREMENTS**

## **255-10 MAINTENANCE AGREEMENT**

### **A. MAINTENANCE AGREEMENT REQUIRED**

Post-construction sites with 20,000 sq.ft. or more of impervious surface disturbance and post-construction sites with 1 acre or more of land disturbance are required to have a maintenance agreement. The applicant shall use the municipality's standard forms for the maintenance agreement. The local municipality is responsible for recording the signed maintenance agreement at the County Register of Deeds.

Post-construction sites with less than 20,000 sq.ft. of impervious surface disturbance are not typically required to have a maintenance agreement.

Sites utilizing the regional treatment option are not typically required to have a maintenance agreement. However, a maintenance agreement is required for the regional facility.

### **B. AGREEMENT PROVISIONS**

### **C. ALTERNATE REQUIREMENTS**

## **255-11 FINANCIAL GUARANTEE**

### **A. ESTABLISHMENT OF GUARANTEE**

Post-construction sites with 20,000 sq.ft. or more of impervious surface disturbance and post-construction sites with 1 acre or more of land disturbance are required to have a financial guarantee. The financial guarantee includes the cost associated with stormwater BMPs, record drawings, project administration, and contingencies.

Post-construction sites with less than 20,000 sq.ft. of impervious surface disturbance are not typically required to have a financial guarantee.

Sites utilizing the regional treatment option are not typically required to have a financial guarantee.

### **B. CONDITIONS FOR RELEASE**

The financial guarantee shall not be released until the applicant conducts a final inspection with a municipal representative, submits "record drawings" certified by a licensed Professional Engineer, completes punch list items, and pays fees.

### **C. ALTERNATE REQUIREMENTS**

## **255-12 FEE SCHEDULE**

## **255-13 ENFORCEMENT**

## **255-14 APPEALS**

### **A. BOARD OF APPEALS**

### **B. WHO MAY APPEAL**