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Stormwater Quality Management Plan

Report

Village of

Campbellsport, WI

December 2016

STRAND ASSOCIATES®

Report for

Village of Campbellsport, Wisconsin

Stormwater Quality Management Plan

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

This report is for the Village of Campbellsport (Village) to develop stormwater planning efforts for the Village and to reduce the adverse impacts of nonpoint source stormwater runoff to adjacent water resources including the Milwaukee River, the West Branch of the Milwaukee River, nearby wetlands, and groundwater resources. Proposed Best Management Practices (BMPs) and associated recommendations are summarized within the report. Achieving reduction in nonpoint source pollution requires a variety of measures along with cooperation and participation from numerous different groups, organizations, and the community. Each measure below includes an individual plan and a measurable goal for the Village to help assess the implementation of the stormwater quality plan as required by the Wisconsin Department of Natural Resources (WDNR).

1. Public Education and Outreach
2. Public Involvement and Participation
3. Illicit Discharge Detection and Elimination
4. Construction Site Pollution Control
5. Post-Construction Stormwater Management
6. Pollution Prevention for Municipal Operations
7. Stormwater Quality Management
8. Storm Sewer System Map

The Village owns and operates municipal separate storm sewer systems (MS4s) that discharges to nearby water resources and waters of the state. The Village's drainage system consists of storm sewers, detention basins, and grass-lined ditches. The Village drains through these systems to the waterbodies identified above. Discharges from the MS4 may consist of runoff from rain events or snow melt and fluids from spills or illicit connections. Pollutants of concern found in storm sewer system discharges include organic materials, suspended solids, metals, nutrients, bacteria, pesticides, fertilizers, and traces of toxic materials. Along with stormwater runoff, the stormwater drainage system carries sediment, oil, grease, and other pollutants that accumulate on pavement areas in the Village. In addition, pet waste, fertilizer, and other nutrients from lawns and other open areas may discharge to local waterways.

To supplement the United States Environmental Protection Agency (USEPA) requirements, the WDNR adopted NR 151 Runoff Management Rules. These rules previously required affected municipalities to reduce total suspended solids (TSS) discharged to waters of the state by 20 percent by March 10, 2008, and 40 percent by March 10, 2013. However, these rules have been modified since the passing of the 2011 Wisconsin Act 32 which does not allow the state to enforce the 40 percent reduction requirement. Currently, the Village is not a WPDES permitted municipality, nor is it required to obtain a permit to discharge stormwater runoff to waters of the state and meet NR 151 TSS reduction goals. However, the Village may need to apply for permit coverage in the future if a Total Maximum Daily Load (TMDL) is established for the Milwaukee River Basin. If the Village would become a permitted municipality, the NR 151 20 percent TSS reduction goal and the TMDL requirements for the Milwaukee River Basin would need to be met, along with the other permit requirements.

A TMDL is defined as the amount of a pollutant a stream, river, or lake can receive before exceeding water quality standards. A TMDL is also a plan to reduce the amount of specific pollutants reaching an impaired lake or stream to the extent that water quality standards will be met.

The objectives of this plan are consistent with goals of the USEPA and the WDNR in addressing nonpoint source runoff sources. These objectives include the following:

1. Improve the quality of water in receiving waterways, which include the Milwaukee River, the west branch of the Milwaukee River, and groundwater recharged by infiltrated stormwater.

2. Increase citizen awareness of issues associated with stormwater runoff.

3. Implement Best Management Practices (BMPs) to comply with USEPA/WDNR requirements.

Implementation of BMPs is an effective means of reducing the discharge of nonpoint source pollutants to area waterways. A BMP can be described as any program, technology, process, siting criteria, operational method, measure, or device that controls, prevents, removes, or reduces pollution. BMPs may include nonstructural measures, such as public information and education of homeowners to reduce their impacts on nonpoint source pollution, “source controls” such as street sweeping and leaf collection, or structural BMPs such as construction of detention basins, infiltration basins, vegetated swales, and similar measures.

A stormwater quality analysis of the baseline and existing conditions was conducted to check the performance and efficiency of the Village’s BMPs. The results of the analysis are summarized in the table below.

	2016 Modeling Existing TSS Reduction	2016 Modeling Existing TP Reduction
MR Basins	6.8%	6.0%
WB Basins	24.2%	21.3%
Village-wide	12.5%	9.7%

Table ES-1 Summary of Modeling Results

This report proposes a series of structural and nonstructural BMPs to be implemented by Village. Since the Village is currently a non-permitted community and it is unlikely the Village will become permitted in the near future and the section of the Milwaukee River the Village drains to is no longer a 303(d) listed waterway, the alternatives analysis will focus mainly on projects that will address current stormwater issues rather than increase TSS and TP reductions. These recommendations and alternatives are described in Section 5. A summary of the alternatives and associated costs are shown in Table ES-2.

The implementation and funding of this plan is discussed in Section 6, including a table that includes necessary activities described in the report with their associated cost and potential funding source. Given the ongoing costs necessary to maintain general ongoing capital costs, it is recommended the Village utilize WDNR and USEPA grants for design and construction of the necessary improvements.

Alt.	Alternative Description	Cost	Cost Rank
1	Construct wet detention basin at flooded parcel on North Poplar Street	$ 135,000.00	2
2	Diversion of flows from Ladwig Street to a newly constructed wet detention basin on the corner of South Helena Street and Ladwig Street.	$ 288,240.00	3
3	Abandon existing storm sewer crossing private property and redirect flows west down Mill Street.	$ 59,460.00	1

Table ES-2 Summary of Recommended Stormwater Control Improvements

SECTION 1
INTRODUCTION

1.01 BACKGROUND

This project has been prompted by the need for the Village of Campbellsport (Village) to develop stormwater planning efforts for the Village and to reduce the adverse impacts of nonpoint source stormwater runoff discharging from the Village to adjacent water resources including the Milwaukee River, the West Branch of the Milwaukee River, nearby wetlands, groundwater resources, and other Village natural resources.

This report provides an overview of current stormwater management infrastructure, policies, and programs in the Village and provides a plan for future improvements. The primary goal of this report is to provide a means of addressing existing stormwater quality issues. Figure 1.01-1 shows the Village boundary, Village parks, and public works buildings.

This report is comprised of six sections:

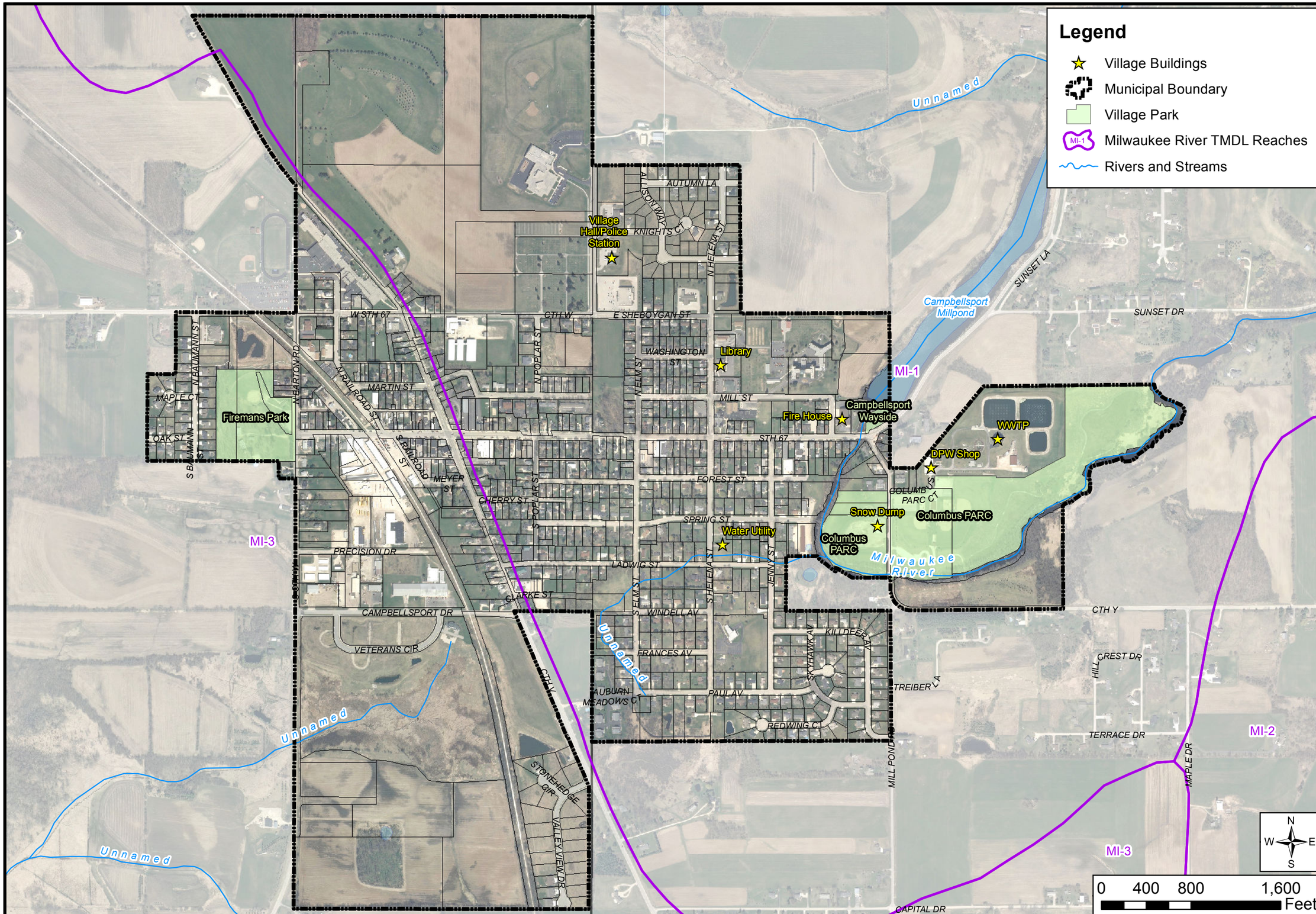
1. Section 1 provides introductory and general information regarding stormwater management practices (SMPs) and methodologies used in the study.
2. Section 2 provides information about the contributing watershed(s).
3. Section 3 provides an overview of current policies, practices, and issues in the Village and recommends possible modifications for consideration to improve nonpoint source runoff quality.
4. Section 4 summarizes water quality modeling for baseline and current conditions in the Village.
5. Section 5 discusses stormwater management alternatives investigated.
6. Section 6 provides a possible funding and implementation plan.

This project is partially funded by a Wisconsin Department of Natural Resources Urban Nonpoint Source and Stormwater (WDNR UNPS&SW) Grant (Grant No. USP-MI06-20111-14). The Village is providing the grant administration for this project.

1.02 PLAN OBJECTIVES AND CRITERIA

A. Regulatory Issues

A primary concern in land development has historically been quickly draining stormwater runoff. Typically, curbs, gutters, and storm sewer systems have been constructed to provide for efficient stormwater drainage. Unfortunately, along with efficiently transporting stormwater runoff, storm sewers are also efficient at conveying accumulated pollutants from parking lots, streets, rooftops, lawns, and other areas to adjacent waterways. Sediment, heavy metals, pesticides, nutrients, bacteria and oxygen-demanding organic waste from pollutant “source areas” have been recognized as a cause of water quality degradation in our streams, lakes, ponds, and other water resources. Drainage of developed lands employing a “rural” road cross section with grassed swales somewhat mitigates the effect of development but solely is not able to meet WDNR stormwater quality goals.



LOCATION MAP

STORMWATER QUALITY MANAGEMENT PLAN
VILLAGE OF CAMPBELLSPORT
FOND DU LAC COUNTY, WISCONSIN

2010 ORTHO PHOTOGRAPHY

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FIGURE 1.01-1
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Wisconsin State Legislature developed Chapter NR 151 in 1997 to set regulations for stormwater runoff management. The Chapter establishes nonpoint pollution performance standards for agricultural, non-agricultural, and transportation facilities.

Achieving reduction in nonpoint source pollution requires a variety of measures along with cooperation and participation from numerous different groups, organizations, and the community. Implementing the following measures and tracking these measures through identification of quantifiable goals helps achieve the pollution reduction goals.

1. Public Education and Involvement Outreach: Implementation of a public education and involvement outreach program to increase community awareness of stormwater pollution impacts on waters of the state thereby encouraging changes in public behavior to reduce such impacts.

2. Illicit Discharge Detection and Elimination: Development of an illicit discharge detection and elimination program with the primary goal of eliminating nonstormwater discharges to the storm sewer system. A primary component of this program is development of mapping to identify storm sewer outfalls to adjacent water bodies. In addition, the illicit discharge ordinance should be updated.

3. Construction Site Pollution Control: Development of a program to reduce pollutants in stormwater runoff from construction activities that result in a land disturbance of greater than or equal to one acre. This includes requesting authority to regulate erosion control at public buildings from the Wisconsin Department of Commerce pursuant to s. 101.1205(4), Wis. Stats.

4. Postconstruction Stormwater Management: Development of a program to control the quality of stormwater runoff from new development and redevelopment projects after construction is completed that disturb an area greater than or equal to one acre.

5. Pollution Prevention: Development and implementation of an operation and maintenance program to prevent pollution and facilitate good housekeeping practices for municipal operations.

6. Stormwater Quality Management: Development and implementation of a municipal stormwater management program that to the “maximum extent practicable,” as documented by stormwater quality modeling, achieves a reduction in total suspended solids (TSS) and overall pollutant loading throughout the Municipal Separate Storm Sewer Systems (MS4).

7. Storm Sewer System Map: Development of a storm sewer system map of the municipality.

B. Plan Objectives

The objectives of this plan are consistent with goals of the WDNR in addressing nonpoint source runoff sources. These objectives include the following:

1. Improve the quality of water in receiving waterways, which include the Milwaukee River, the West Branch of the Milwaukee River, nearby wetlands, and groundwater recharged by infiltrated stormwater.

2. Increase citizen awareness of issues associated with stormwater runoff.

3. Implement Best Management Practices (BMPs) to comply with the United States Environmental Protection Agency (USEPA)/WDNR requirements.

C. Best Management Practices

The WDNR defines BMPs as structural or nonstructural measures, practices, techniques, or devices employed to avoid or minimize soil, sediment, or pollutants carried in runoff to waters of the state. A BMP may include any program, technology, process, siting criteria, operational method, measure, or device that controls, prevents, removes, or reduces pollution. Nonstructural measures may include public information and education of homeowners to reduce their impacts on nonpoint source pollution and “source controls,” such as street sweeping and leaf collection. Structural BMPs may include construction of wet detention basins, infiltration basins, vegetated swales, and similar measures.

An effective stormwater management program will include a mixture of structural and nonstructural BMPs and effective source controls to reduce nonpoint source runoff to receiving waterways. This report will discuss or recommend a series of Village-wide and basin-specific BMPs to reduce nonpoint source runoff to the Milwaukee River, the West Branch of the Milwaukee River, and other waters of the state.

1.03 SCOPE OF STUDY

This study was undertaken to meet requirements of the NR 151 and regional water resource protection objectives. Primary tasks included development of an updated stormwater management plan for the Village, which are summarized as follows.

A. Project Management consisting of maintaining communications with the Village, managing project budget, facilitating staffing, and implementing quality control measures.

B. Development of an Illicit Discharge Detection and Elimination Program and Ordinance.

C. Development of a Public Information and Education Plan that is in compliance with the WDNR guidance.

D. Development of a Postconstruction Stormwater Management Ordinance and a Construction Site Erosion Control Ordinance.

E. Performance of water quantity analysis. The HydroCAD computer modeling program was used to determine peak discharge and volume of stormwater runoff during various storm events in order to assess the adequacy of existing stormwater facilities.

F. Performance of water quality analysis. The Source Loading and Management Model (SLAMM) computer model was used to determine the TSS loading under baseline (no-control) and existing conditions. Existing BMPs, such as grass swale drainage, is incorporated in the existing conditions model.

G. Development of recommendations and implementation plan, specifically the following:

1. Recommendations of BMPs to be employed by the Village to achieve stormwater management goals and objectives.

2. Accounting of an opinion of probable capital cost and annual operations and maintenance costs for each aspect of the Stormwater Quality Management Plan. Alternatives for funding the plan are included.

H. Preparation for and attending meetings with the Village to identify potential alternatives and locations, present the draft plan, and submit the final plan.

I. Preparation of stormwater management report. This report was completed for submission to the Village and the WDNR in draft and final formats. This report includes a narrative discussion of study issues, criteria and goals, analytical methods, results, and recommendations.

1.04 DEFINITIONS

The following definitions and abbreviations are presented as an aid to the reader.

A. Definitions

Average sediment depth–The average depth of deposited sediment measured over the entire pond area.

Average current normal pool depth–The average depth of water measured over the entire pond area. This is the difference between the water surface and the top of sediment.

Average current total pond depth–The average depth of the pond if all deposited sediment were removed. This is the difference between the water surface and the existing bottom of the pond.

Best management practices–Also known as BMPs, structural or nonstructural measures, practices, techniques, or devices that are employed to avoid or minimize soil, sediment, or pollutants carried in runoff to waters of the state.

Catch basins–An inlet to a storm sewer equipped with a sediment sump and sometimes a hood on its outlet pipe to the downstream storm sewer.

Control structure–The manmade structure that controls the water released from a stormwater facility to the outfall.

Curve number–The Soil Conservation Service has devised a method of computing the runoff from an area based on a system of curve numbers. The curve number for an area of land is obtained by examining the land use and soil type of the land area.

Design storm–A hypothetical discrete rainstorm characterized by a specific duration, temporal distribution, rainfall intensity, return frequency, and total depth of rainfall.

Detention basin–A stormwater management structure that temporarily detains runoff and discharges it through a hydraulic structure to a stream or receiving waterway.

Drainage basin–A geographical area that contributes surface water runoff to a particular point.

Erosion–The process by which soil, rocks, and other land forms are worn away by repetitive wind, water, or ice activity.

Final stabilization–When all land disturbing construction activities at the construction site have been completed and 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.

Flume–The structure or channel upstream of the stormwater facility used to convey stormwater to the facility.

Forebay–The area of the pond near the inlet where heavy sediments are encouraged to settle out of the stormwater that enters the pond.

Illicit discharge–Any discharge to a municipal separate storm sewer system that is not composed entirely of runoff, except discharges authorized by a WPDES permit or any other discharge not requiring a WPDES permit such as water line flushing, landscape irrigation, individual residential car washing, fire fighting, and similar discharges.

Impervious surface–A ground cover such as concrete, rooftops, asphalt, gravel or other surface which inhibits precipitation or runoff from infiltrating or penetrating the surface. A surface which releases as runoff all or most of the precipitation that falls on it.

In-fill development–Development that occurs in an undeveloped area which is located within or is surrounded by a developed area.

Infiltration–The entry of precipitation or runoff into or through the soil.

Inlet–An entryway to the storm sewer system usually located at street corners and low points.

Karst feature–An area or surficial geological feature subject to bedrock dissolution so that it is likely to provide a conduit to groundwater, and may include caves, enlarged fractures, mine features, exposed bedrock surfaces, sinkholes, springs, seeps, or swallets.

Maximum extent practicable–Abbreviated as MEP, a level of implementing BMPs to achieve a performance standard that takes into account the best available technology, cost-effectiveness, and other competing issues such as human safety and welfare, endangered and threatened resources, historic properties, and geographic features.

New development–Development resulting from the conversion of previously undeveloped land or agricultural land uses.

Nonpoint Source Pollution-Stormwater runoff that moves over a large area of land or through the ground and carries natural and human-made pollutants. The polluted runoff cannot be traced back to one specific point.

Outfall–The piping, channel, or other equipment downstream of the control structure used to transfer water out of the control structure to the surrounding environment.

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

Recurrence interval–The probability that a given rainfall event will occur in a given year. For example, a 100-year rainfall event has a 1 percent chance of occurring in a given year (1/100 = 0.01 = 1 percent), a 5-year rainfall event has a 20 percent chance of occurring in a given year (1/5 = 0.20 = 20 percent).

Redevelopment–Areas where development is replacing older development.

Retention basin–A stormwater management structure that captures stormwater runoff and does not discharge to a surface water body. The water is discharged by infiltration or evaporation.

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 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 draining to a stormwater treatment device or system.
d. Discharges directly or indirectly to waters of the state.

Sheet flow runoff–Water, usually storm runoff, flowing in a thin layer over the ground; also called overland flow.

Subbasin–The parts of a drainage basin that, when combined, create the entire drainage basin for a facility.

Time of concentration (Tc)–"… the time for runoff to travel from the hydraulically most distant point of the watershed to a point of interest within the watershed," SCS, 1986.

Time distribution of rainfall–The amount of rainfall that has fallen during a storm event versus the amount of time that has elapsed during a storm event.

Total maximum daily load (TMDL)–The amount of a pollutant a stream, river, or lake can receive before exceeding water quality standards.

Weir–A wall spanning the control structure. When the water level of the pond reaches the top of the weir, water flows over the weir and out of the pond.

B. Abbreviations

BMP	Best Management Practices
CWA	Clean Water Act
CWFP	Clean Water Fund Program
CWP	Center for Watershed Protection
EIF	Environment Improvement Fund
FEMA	Federal Emergency Management Agency
HSG	Hydrologic Soils Groups
IDDE	Illicit Discharge Detection and Elimination
GIS	Geographic Information System
MEP	maximum extent practicable
MMSD	Milwaukee Metropolitan Sewerage District
NPDES	National Pollutant Discharge Elimination System
NRCS	National Resource Conservation Service
PAH	polynuclear aromatic hydrocarbons
PCB	polychlorinated biphenyls
SEWRPC	Southeastern Wisconsin Regional Planning Commission
SLAMM	Source Loading and Management Modeling
SMP	stormwater management practices
SCS	Soil Conservation Service
Tc	time of concentration
TMDL	total maximum daily load
TSS	total suspended solids
UA	urbanized areas
USEPA	United States Environmental Protection Agency
WDNR	Wisconsin Department of Natural Resources
WDNR UNPS&SW	WDNR Urban Nonpoint Source and Stormwater Construction Grant
WPDES	Wisconsin Pollutant Discharge Elimination System

SECTION 2
CONTRIBUTING WATERSHED CHARACTERISTICS

2.01 WATERSHED DESCRIPTION

This section describes land characteristics in the Village that impact stormwater runoff. Stormwater runoff and nonpoint pollutant loading from a watershed depend on physical characteristics such as watershed size and topography, land use, soil types, degree of saturation, and type of drainage system (storm sewers, open channels). Figure 2.01-1 (in pocket folder at back of Section 2) shows the drainage system and drainage basin boundaries in the Village and storm sewer/culverts, detention ponds, wetlands, and outfalls.

A. Population and Land Use

The Village is located in Fond du Lac County. According to the United States Census Bureau from 2010, the population of the Village is approximately 2,016. The total municipal area of the Village is approximately 1.35 square miles.

Existing land use in the Village is shown in Figure 2.01-2 and graphically summarized in Figure 2.01-3. It should be noted that Figure 2.01-2 is not a zoning map, rather it identifies SLAMM land use designations within the MS4 area. Detailed land use for each watershed is included in Table 2.01-1 (located after Page 2-2). Existing land use is based on geographic information system (GIS) data provided by the Village and Fond du Lac County and supplemented by field investigation.

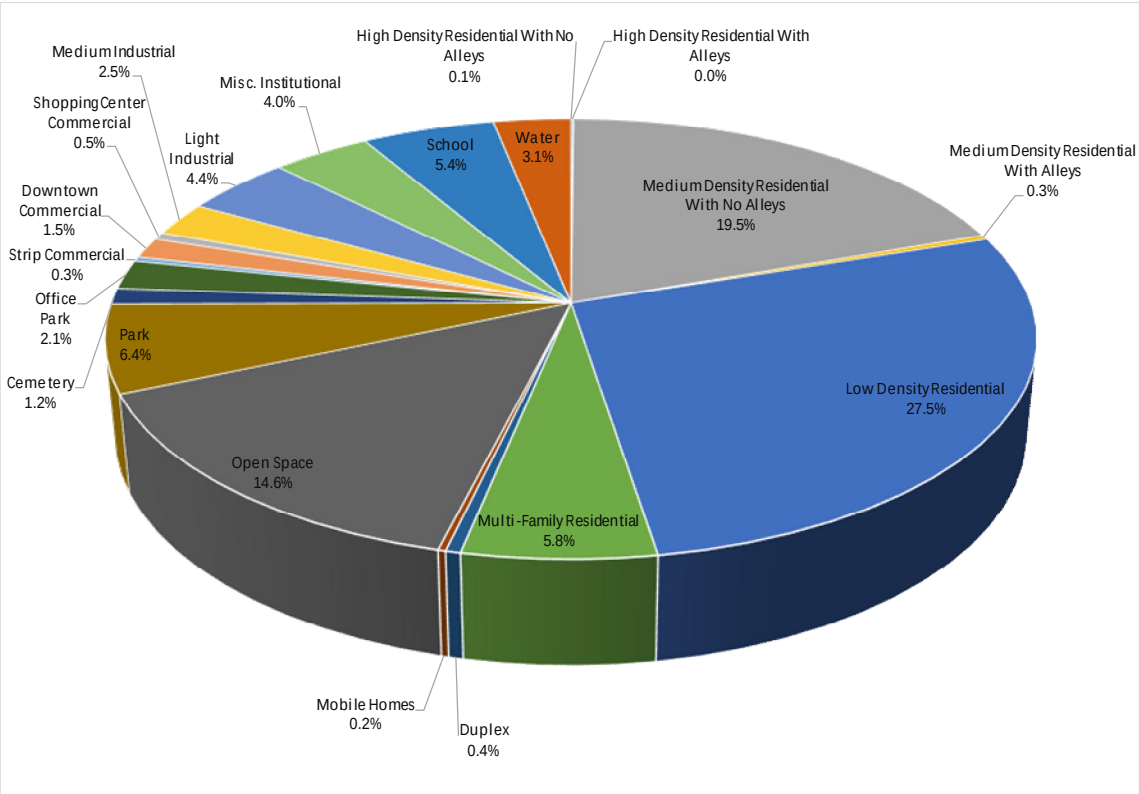
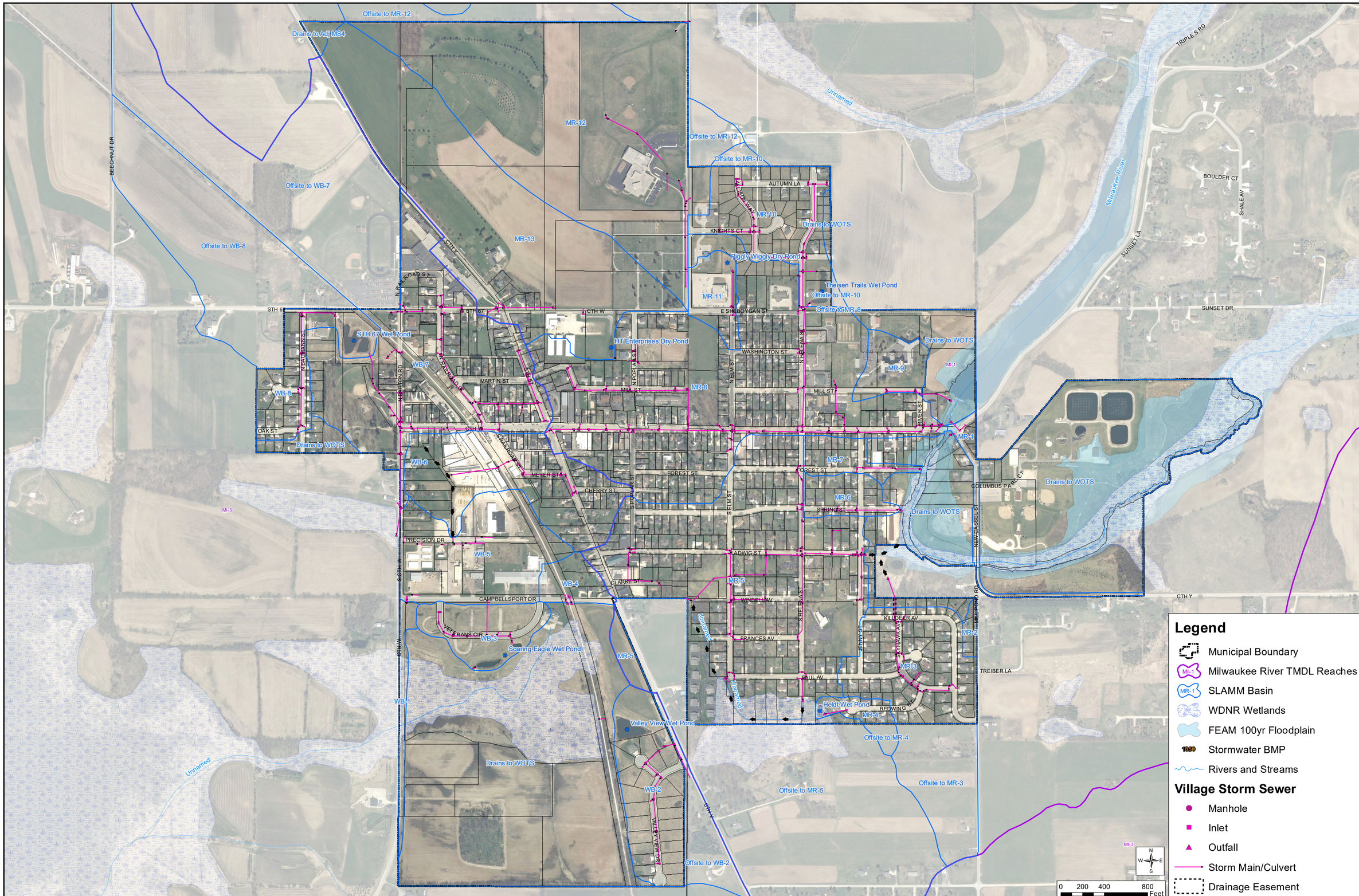


Figure 2.01-3 General Land Use Classification

STORM SEWER SYSTEM MAP

STORMWATER QUALITY MANAGEMENT PLAN
VILLAGE OF CAMPBELLSPORT
FOND DU LAC COUNTY, WISCONSIN

2010 ORTHO PHOTOGRAPHY



Legend

- Municipal Boundary
- Milwaukee River TMDL Reaches
- SLAMM Basin
- WDNR Wetlands
- FEAM 100yr Floodplain
- Stormwater BMP
- Rivers and Streams

Village Storm Sewer

- Manhole
- Inlet
- Outfall
- Storm Main/Culvert
- Drainage Easement

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FIGURE 2.01-1
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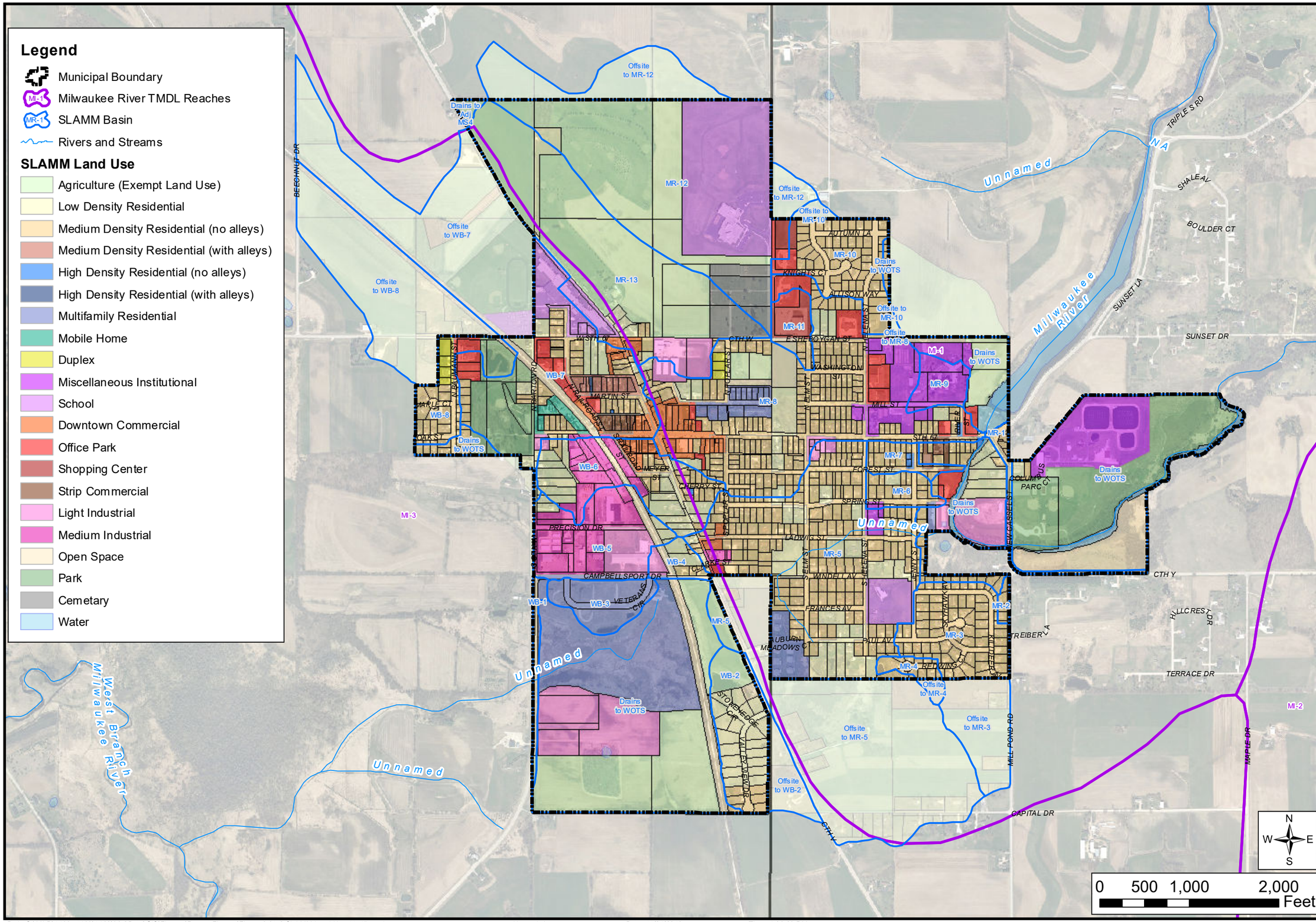

SLAMM LAND USE

STORMWATER QUALITY MANAGEMENT PLAN
VILLAGE OF CAMPBELLSPORT
FOND DU LAC COUNTY, WISCONSIN

2010 ORTHO PHOTOGRAPHY

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FIGURE 2.01-2
1482.031

Path: S:\MAD\1400--1499\1482\031\Data\GIS\Figures\Report Figures\Figure 2.01-2 SLAMM Land Use 11x17.mxd User: christyr Date: 11/21/2016 Time: 4:28:29 PM

B. Watershed Description

The Village drains to two major waterbodies surrounding the Village including flow over land or through ditches, storm sewers, or culverts to the Milwaukee River and the West Branch of the Milwaukee River. The north- and south-eastern portions of the Village drain generally east to the Milwaukee River. The north- and south-western portions of the Village drain generally southwest to the West Branch of the Milwaukee River that ultimately drains to the main branch of the Milwaukee River. The Village is located in the West Branch Milwaukee River and the Milwaukee River sub-watersheds of the East-West Branches Milwaukee River watershed. The East-West Milwaukee River watershed includes a 266-square-mile area in portions of Fond du Lac, Dodge, Ozaukee, Sheboygan, and Washington Counties. The watershed covers mostly rural land use and drains portions of the City of West Bend and the Villages of Campbellsport, Kewaskum, and Newburg.

The section of the Milwaukee River that passes through the Village was removed from the state's 303(d) list of impaired waters in 2006. However, there are sections of the Milwaukee River downstream of the Village that are still included on the state's 303(d) list of impaired waters. The impaired waters list is derived from data available on the WDNR Surface Water Data Viewer. A waterbody is considered impaired if (1) the current water quality does not meet the numeric or narrative criteria in a water quality standard or (2) the designated use that is described in Wisconsin Administrative Code is not being achieved. The WDNR addresses impaired waters by analyzing the waterbody to create a Total Maximum Daily Load (TMDL) as described below.

A TMDL is defined as the amount of a pollutant a stream, river, or lake can receive before exceeding water quality standards. A TMDL is also a plan to reduce the amount of specific pollutants reaching an impaired lake or stream to the extent that water quality standards will be met. As part of the TMDL, the amount of a pollutant that the water can tolerate and still meet water quality standards must be identified. That identified amount is allocated between point sources (wasteload allocation) and nonpoint sources (load allocation). As part of the TMDL, the WDNR identifies how it will implement the TMDL. Wasteload allocations will be implemented through the WPDES permit program. Load allocations will be implemented through Wisconsin's nonpoint source program. The USEPA provides final approval of all TMDLs.

The WDNR has partnered with the Milwaukee Metropolitan Sewerage District (MMSD) and are in the process of developing a TMDL for the Milwaukee River Basin. The pollutants MMSD is creating TMDLs for include fecal coliform, bacteria, phosphorous, and sediment. More information regarding this plan can be found on MMSD's website (http://www.mmsd.com/waterquality/total-maximum-daily-loads). The TMDL is divided up into reachsheds based on the stream segment, lake, or reservoir that the area drains to. The Village is located within two reachsheds, Reach MI-1 and MI-3. Watersheds within Reach MI-1 were assigned a MR-xx designation and watersheds within Reach MI-3 were assigned a WB-xx designation. Table 2.01-1 lists the watersheds for this plan.

Table 2.01-1 SLAMM Land Use by Subbasin (Acres) To Village Boundary (Including Exempt Areas)

Basin ID	Agriculture	Low Density Residential	Medium Density Residential	High Density Residential	Multi-Family Residential	Duplex	Mobile Home	Institutional	Downtown Commercial	Office Park	Shopping Center Commercial	Strip Commercial	Park	Light Industrial	Open Space	School	Cemetery	Medium Industrial	Water	Total
MR-1		0.55	1.35										0.60	0.39	1.30				0.03	4.22
MR-2			1.31																	1.31
MR-3			24.87													0.00				24.87
MR-4			3.17																	3.17
MR-5	2.39	20.24	59.14		5.59			1.44	1.23	0.54				0.90	0.21	6.26		0.98		98.92
MR-6		0.51	5.40		0.15			0.37		0.08				0.14						6.65
MR-7		0.23	4.88	0.37						0.22		0.22							0.00	5.92
MR-8	3.15	10.41	47.65	0.29	5.48	1.17		10.61	7.48	10.02	0.04	0.39		2.37	4.03				0.04	103.14
MR-9	0.02	0.07	0.06					6.99		0.02										7.17
MR-10			21.07							1.67	0.57									23.32
MR-11		0.06	1.34							1.02	4.02				0.67					7.11
MR-12	48.19	1.11	0.00							0.87	1.27				0.00	39.72	7.74			98.90
MR-13	57.57	4.45	1.30						1.21				0.02	5.66	0.00	3.26	5.38			78.86
WB-1	0.34				1.06									0.03	2.32					3.74
WB-2	4.02	13.28	3.10												0.67					21.06
WB-3					12.00															12.00
WB-4		1.83	1.02		0.20									1.08	1.22					5.37
WB-5	0.01	1.87	0.09		1.62									6.36	1.54			17.00		28.49
WB-6		11.72	6.76	0.09					2.30					0.23	0.97			9.19		31.26
WB-7		6.26	16.31	0.19			2.55		4.30	5.89		1.87	12.68	0.46	3.15	7.38		0.48		61.51
WB-8			7.51			2.12				1.38			3.13		0.33					14.46
Subtotal	**115.68**	**72.59**	**206.35**	**0.94**	**26.11**	**3.29**	**2.55**	**19.41**	**16.52**	**21.71**	**5.89**	**2.47**	**16.43**	**17.63**	**16.41**	**56.61**	**13.12**	**27.65**	**0.07**	**641.45**
Off-site Drainage Area	159.49	45.52	0.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.31	0.00	29.30	2.91	0.00	0.00	0.00	253.02
Total	**275.17**	**118.11**	**206.85**	**0.94**	**26.11**	**3.29**	**2.55**	**19.41**	**16.52**	**21.71**	**5.89**	**2.47**	**31.74**	**17.63**	**45.70**	**59.53**	**13.12**	**27.65**	**0.07**	**894.47**

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2.02 LOCAL SOURCE AREAS AND OUTFALLS

A. Pollutant Source Areas

In addition to land use, pollutant loading from urban areas is dependent on the characterization of "source areas." Various urban source areas will contribute different quantities of runoff and associated pollutants depending on their characteristics. For instance, impervious areas such as roadways and parking lots will generally generate more runoff and pollutants than pervious areas such as lawns and gardens, especially for smaller, more frequent storms. However, pervious areas will contribute a larger portion of the runoff and pollutants as storm events get larger. For the smallest of rainfall events, almost all runoff and pollutants will be generated by impervious area. Rooftops contribute to increased runoff volumes but tend to contribute fewer pollutants than parking lots or streets.

Impervious cover in a watershed can be organized into two main categories:

1. Rooftops–Created by buildings, homes, garages, stores, warehouses, and other buildings.

2. Transport systems–Impervious cover created by roads, sidewalks, driveways, and parking lots.

For modeling purposes, all impervious surface area is described in two basic ways (1) total impervious area or (2) effective impervious area. The total impervious area in a watershed includes all impervious cover, both rooftops and transport systems. The effective impervious area is the portion of total impervious cover that is directly connected to the storm drain network. Often, roof drains are directed to lawns or other pervious surface, allowing some stormwater runoff to infiltrate, which removes these rooftops from effective impervious area.

B. Stormwater Drainage System

1. Description of Drainage System

The main drainage systems in the Village consist of storm sewer with a few areas that are served by swales that discharge either to the Milwaukee River or the West Branch of the Milwaukee River.

Historically, stormwater management in the Village has focused on draining stormwater from developed areas as quickly as possible. BMPs are primarily focused on construction of engineered drainage systems consisting of graded ditches, curb and gutter, and storm sewer. Detention basins within the Village are primarily privately owned and operated, with one Village-owned pond located in Fireman's Park. The Village has Stormwater Maintenance Agreements with the owners of the privately-owned ponds.

2. Outfall Locations

Based on field investigation and review of the storm sewer system map, 27 storm sewer outfalls (ditches, storm sewers or culverts) were identified in the Village. Outfalls are defined as ditches or culverts that discharge either to a water of the state or to an adjacent MS4. Of the 27 identified, there are 4 major outfalls. Major outfalls are defined as outfalls that are 36-inch-diameter (or equivalent cross sectional area) or larger and are associated with a drainage area of 50 acres or larger. Outfalls with an inside diameter of 12 inches or more are also classified as major outfalls if they receive stormwater runoff from land zoned for industrial activity with 2 or more acres of industrial activity.

Outfall and major outfall locations are identified in Figure 2.01-1 (in pocket folder at back of Section 2)

3. Existing Village Stormwater Management Issues

a. Stormwater Quantity Issues

The Village has three areas within the municipal limits that experiences flooding. The three areas of concern are listed below.

(1) East Ladwig Street/South Poplar Street area
(2) Village-owned parcel on North Poplar Street
(3) Grass swale starting at southeast corner of County Highway W/N Barton Road intersection running southeast to Precision Drive.

Section 5 explores different alternatives to address the flooding issues at these locations.

2.03 TOPOGRAPHY, SOILS, AND PRECIPITATION

A. Topography

Topographic features, particularly slope steepness, have a direct bearing on the potential for soil erosion and the sedimentation of surface waters. Slope steepness affects the velocity and, accordingly, the erosive potential of runoff. As a result, steep slopes may place limitations on urban development and contribute to high levels of nonpoint source pollution associated with construction sites.

The primary drainage features in the Village are the Milwaukee and the West Branch of the Milwaukee River. For the most part, land within the Village drains toward these waterways. Elevations range from 974 feet above mean sea level (AMSL) to 1,102 feet AMSL.

B. Soils

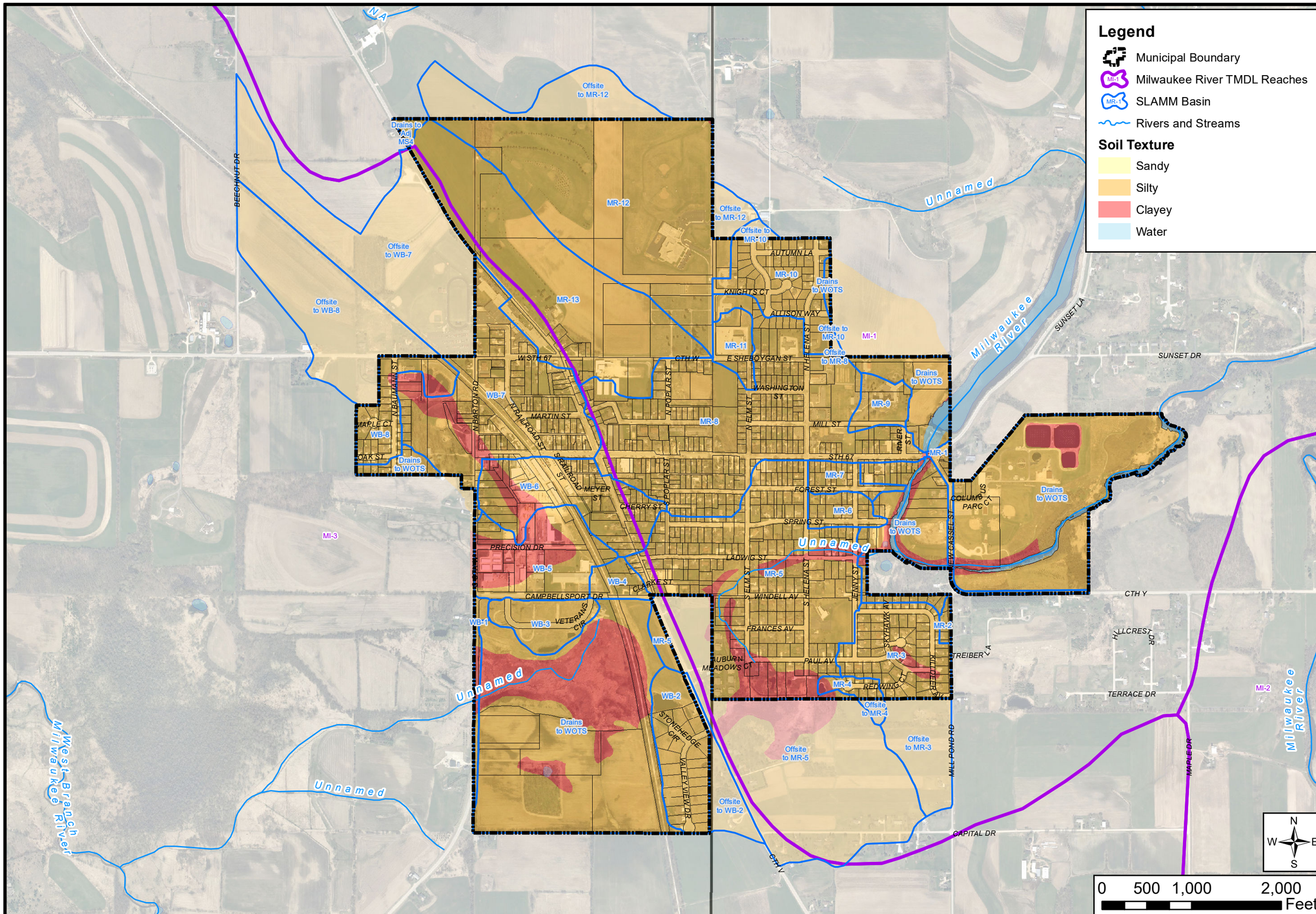
The amount of stormwater runoff produced by a storm event is impacted by the types of soil underlying the watershed. Soils having a high percentage of sand and gravel will absorb and infiltrate a higher percentage of stormwater runoff than will soils having high clay content. This means that sandy soil generally produces less runoff than clayey soil.

The Natural Resource Conservation Service (NRCS) classifies soil types in categories known as Hydrologic Soil Groups (HSG). Group A soils consist of sandy soils having high infiltration rates and low runoff potential. Group B soils have moderately fine to moderately coarse textures and moderate runoff potential. Group C soils are typically sandy clay loam soils having moderately fine to fine textures and a low infiltration capacity. Group D soils have a very low infiltration capacity and have high runoff potential. Examples of Group D soils are clays, soils with a permanent high water table, and shallow soils over nearly impervious material.

Soil types in the Village were determined by NRCS soils maps based on their respective amount of silt, sand, and clay. Soils used for the purposes of this plan in the Village are identified in Table 2.03-1 and illustrated in Figure 2.03-1. These soils are classified by the NRCS as mainly HSG Group B and Group C. Infiltration rates for the Group B soils range from 0.15 to 0.30 inches per hour. Infiltration rates for the Group C soils range from 0.05 to 0.15 inches per hour. Infiltration rates for Group A soils are generally greater than 0.30 inches per hour.

Symbol	Soil Name	HSG	Acres	% of Total Area		Symbol	Soil Name	HSG	Acres	% of Total Area
Am	Alluvial land	B	14.40	1.26%		LmB	Lamartine	C	27.98	2.45%
An	Alluvial land, wet	B/D	10.77	0.94%		LwB	Lomira	B	0.36	0.03%
BsA	Brookston	B/D	10.52	0.92%		LwB2	Lomira	B	3.79	0.33%
BtA	Brookston	D	3.05	0.27%		MoA	Mayville	B	1.06	0.09%
CeB	Casco	B	1.95	0.17%		MoB	Mayville	B	31.93	2.79%
CeC2	Casco	B	9.33	0.82%		M-W	Water	B	4.72	0.41%
DdA	Dodge	B	26.43	2.31%		PhA	Pella	B/D	58.79	5.14%
DdB	Dodge	B	89.43	7.82%		RoF2	Rodman	B/D	0.12	0.01%
FoB2	Fox	B	4.35	0.38%		ScB	St. Charles	B	46.58	4.07%
FsA	Fox	B	13.12	1.15%		SnA	Sebewa, deep	B/D	4.4	0.38%
FsB	Fox	B	16.56	1.45%		ThA	Theresa	B/D	4.01	0.35%
FsB2	Fox	B	15.99	1.40%		ThB	Theresa	C	208.12	18.20%
FsC2	Fox	B	0.8	0.07%		ThB2	Theresa	C	257.55	22.52%
HmB2	Hochheim	B	2.78	0.24%		ThC	Theresa	C	2.45	0.21%
HmC2	Hochheim	B	15.95	1.39%		ThC2	Theresa	C	38.64	3.38%
HoB3	Hochheim	B	14.1	1.23%		TrC3	Theresa	C	2.43	0.21%
HoC3	Hochheim	B	53.62	4.69%		TsB2	Theresa	C	5.65	0.49%
HoD3	Hochheim	B	14.61	1.28%		TsD2	Theresa	C	0.8	0.07%
Hu	Houghton	B	12.16	1.06%		VgA	Virgil	B	67.63	5.91%
IoA	Ionia	B	23.37	2.04%		VgB	Virgil	B	4.26	0.37%
IoB	Ionia	B	0.63	0.06%		W	Water		1.37	0.12%
JuA	Juneau	B	10.48	0.92%		WsA	Washtenaw	C/D	4.22	0.37%
JuB	Juneau	B	0.5	0.04%		WsB	Washtenaw	B	0.84	0.07%
KwE2	Knowles	B	0.99	0.09%						

Table 2.03-1 Soil Types



SOILS MAP

STORMWATER QUALITY MANAGEMENT PLAN
VILLAGE OF CAMPBELLSPORT
FOND DU LAC COUNTY, WISCONSIN

STRAND ASSOCIATES®

FIGURE 2.03-1
1482.031

Path: S:\MAD\1400--1499\1482\031\Data\GIS\Figures\Report Figures\Figure 2.03-1 Soils 11x17.mxd User: christyr Date: 10/3/2016 Time: 9:20:05 AM

C. Precipitation

The depth and duration of rainfall in a watershed for a given storm event has a major impact on the amount of stormwater runoff produced.

Expected rainfall depths for the Village from NOAA Atlas 12, Volume 8, Version 2 for storm events of various frequencies are summarized in Table 2.03-2.

Recurrence Interval and Precipitation Frequency (inches)[1]						
Storm Duration	**2 Years**	**5 Years**	**10 Years**	**25 Years**	**50 Years**	**100 Years**
5 Minutes	0.397	0.503	0.589	0.704	0.791	0.875
10 Minutes	0.581	0.736	0.862	1.03	1.16	1.28
15 Minutes	0.708	0.898	1.05	1.26	1.41	1.56
30 Minutes	0.964	1.23	1.44	1.73	1.94	2.15
60 Minutes	1.23	1.56	1.84	2.22	2.52	2.82
2 Hours	1.49	1.89	2.23	2.71	3.10	3.50
3 Hours	1.66	2.09	2.47	3.02	3.48	3.96
6 Hours	1.95	2.43	2.87	3.55	4.13	4.75
12 Hours	2.27	2.79	3.29	4.08	4.77	5.53
24 Hours	2.60	3.20	3.77	4.69	5.49	6.37
48 Hours	2.97	3.67	4.34	5.38	6.29	7.29
72 Hours	3.24	3.96	4.65	5.74	6.68	7.71
7 Days	4.08	4.93	5.72	6.92	7.94	9.04
10 Days	4.63	5.57	6.42	7.69	8.74	9.87

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration seris (PDS)

Source: NOAA Atlas 14, Volume 8, Version 2

Table 2.03-2 Expected Rainfall Depths from NOAA Atlas 14

For stormwater quality modeling purposes, the 5-year average annual rainfall for the Milwaukee area (WisReg–Milwaukee Five Year Rainfall.ran) is used with run dates for our modeling of March 28 to December 6 (nonwinter season) as required by the WDNR.

2.04 CURRENT STORMWATER PRACTICES AFFECTING STORMWATER QUALITY

This section summarizes existing programs that impact stormwater runoff in the study area. Information in this section is intended to identify existing conditions for stormwater pollutant load modeling.

A. Street Sweeping

Street sweeping, while historically conducted primarily for aesthetic and maintenance purposes, is an effective stormwater management practice (SMP). However, in rural road sections drained by grass-lined drainage swales, this practice is not practical because of the lack of curb and gutter. The Village is primarily drained by curb and gutter, with small portions of grass-lined ditches/swales. In general, street sweeping is an effective practice for the Village and is performed on all Village streets twice a year. Street sweeping is completed by the Village staff, and debris collected is appropriately disposed.

B. Catch Basin Cleaning

It should be noted the WDNR only allows water quality credit in SLAMM for sumps that are greater than 1 foot in depth. At this point, the Village has limited information on the number of catch basins with sumps and whether the sumps are 1-foot deep or greater. Therefore, catch basin cleaning was not incorporated into the SLAMM modeling as an existing stormwater quality control at this time. However, once more information is gained on the sumps, it is recommended the Village incorporate the BMP into the SLAMM modeling. To update the modeling, it is recommended that the WDNR's August 3, 2009, Modeling Stormwater Control Practices in Series using WinSLAMM be consulted to ensure proper modeling and credit for these catch basins. It appears that catch basins upstream of wet detention basins would not be given TSS reduction credit.

C. Stormwater Detention Basins

Within the Town's MS4 area there are four wet detention basins and two dry detention basins. Five of the six BMPs are privately owned. It should be noted that the WDNR previously did not give stormwater quality credit to dry detention basins because of their propensity to resuspend sediment during storm events; however, the WDNR has indicated that, on a case-by-case basis, it may be acceptable to model a dry detention basin as an infiltration basin or a wide grassed swale. Key factors to utilize these basins include the facility would need to be fully vegetated, protected from scour, and designed to ensure the water will distribute evenly across the basin to allow infiltration and/or infiltration. The Village owns and maintains the first BMP listed below and has long-term maintenance agreements for each of the private wet detention basins.

1. North Barton Road and State Highway 67 Wet Detention Basin (Figure 2.04-1)–This basin is located southwest of the State Highway 67/North Barton Road intersection.

Figure 2.04-1 North Barton Road and State Highway 67 Wet Detention Basin

2. Private Wet and Dry Detention Basins–There are four private wet detention basins and two private dry detention basin (see Figure 2.01-1 for locations) located throughout the Village. At the present time, the Village has a Stormwater Maintenance Agreement with all six of these facilities with the exception of Heldt Wet Pond.

Figure 2.04-2 Theisen Trails Wet Detention Basin

Figure 2.04-3 Soaring Eagles Wet Detention Basin 1

Figure 2.04-4 Soaring Eagles Wet Detention Basin 2

Figure 2.04-5 Valley View Wet Detention Basin

Figure 2.04-6 Heldt Wet Detention Basin (Private)

Figure 2.04-7 Piggly Wiggly Dry Detention Basin

Figure 2.04-8 HT Enterprises Dry Detention Basin

D. Grass-Lined Ditches/Swales

The WDNR gives stormwater quality credit to areas drained by grass-lined ditches/culverts. Although the Village is mostly drained by storm sewer, the Village does have small portions of grass-lined ditches within its municipal limits. The existing conditions modeling incorporates this practice for the subbasins containing grass-lined ditches.

E. Routine Inspection and Maintenance of Stormwater Facilities

It is recommended that the Village assign staff, typically from the Department of Public Works (DPW), to handle inspections and maintenance of stormwater management facilities. Currently, the Village responds to stormwater-related issues after receiving calls from local residents or after discovery by DPW staff as part of routine daily activities.

SECTION 3
EVALUATION OF CURRENT VILLAGE PRACTICES

3.01 CURRENT STORMWATER POLICES AND PRACTICES

This section summarizes existing plans and programs in the Village. Information included in this section is intended to identify baseline conditions for inclusion in preparation of the Village's Stormwater Quality Management Plan. Section 3.02 recommends program modifications for compliance with NR 151 requirements and reduction of annual pollutant loading to Village water resources.

A. Public Information and Education Practices

1. Illicit Discharges

The Village currently does not have an illicit discharge detection program. This plan develops an Illicit Discharge Detection and Elimination Program for the Village to adopt and implement.

2. Public Meetings

The Village Board provides public notice of all public meetings during which residents may voice concerns/complaints regarding stormwater issues. The Village then proactively deals with these concerns/complaints.

3. Material Management

The Village maintains a website describing Village programs, news, and general information. The website is located at http://www.campbellsport.govoffice.com/.

4. Yard Waste and Fertilizer/Pesticide Use

The Village provides curbside leaf collection services during the fall season. Collection begins when residents begin piling leaves and continues throughout the fall season as weather permits. The Village requires residents to pile leaves in the terrace and not in the street.

The Village also maintains a dumpster where residents may dispose of leaves, yard waste, and grass clippings. The dumpster is available for use April through November. Village crews do wood chipping of brush and limbs on the first and third Monday of each month, as well. The Village website has details regarding leaf pickup, the organic dumpster, and brush chipping at the following link:

http://www.campbellsport.govoffice.com/index.asp?Type=B_BASIC&SEC={00033BDA-2CAF-419E-B9CC-C5D57BCEEE62}

5. Locations of Stormwater Concern

The Village has no major stormwater polluters; however, there are a few areas that experience periodic flooding. These areas are described in Section 2.02 of this Plan.

6. Promotion of Environmentally Sensitive Land Development

The Village educates developers on environmentally sensitive land development by requiring conformance NR 151.

The following existing plans promote environmentally sensitive land development designs by developers and designers.

1. *Village of Campbellsport Comprehensive Plan, Adopted March 20, 2006*

This plan includes a section on Agricultural, Natural and Cultural Resources, starting on page 51. This section discusses the importance of preserving and protecting the region's natural resources, identifies threats to several natural resources that development can cause, and states actions that can be taken to prevent and reduce the negative impacts on the land and resources.

2. SEWRPC Regional Water Quality Management Plan, Planning Report No. 40

Chapter X, Table X-2, Page 102 of this document recommends the "…Implementation of the nonagricultural (urban) performance standards of Chapter NR 151." The Village ordinances implement NR 151.

B. Illicit Discharge Detection and Elimination

The Village currently does not have nor follow an illicit discharge detection ordinance. As part of this plan, an Illicit Discharge Detection and Elimination ordinance has been developed for the Village's use. The complete Illicit Discharge Detection and Elimination Ordinance is in Section 3.02, Part C. of this report.

The Village provides flyers for residents about the county's occasional Clean Sweep program. The program allows residents to dispose of household hazardous waste. The Village website has information regarding the program at the following link:

http://www.campbellsport.govoffice.com/index.asp?SEC=E9B5C9F6-BB49-4E9F-92AB-0164E9D933C2&Type=B_BASIC

C. Construction Site Erosion Pollutant Control

1. Erosion Control Ordinance

The Village adopted a new Construction Site Erosion Control ordinance in October 2015. The complete ordinance can be found in Appendix A.

2. Erosion Control Ordinance Site Review Procedures and Enforcement

The Village currently administers this ordinance with coordination between the Village Board and Plan Commission. Applicable development plans are reviewed for conformance with the Village Construction Site Erosion Control Ordinance. During construction, Village Board or Plan Commission staff check for conformance with approved plans for erosion control on an

as-needed basis and site visits are documented. During site inspections, staff members recommend proactive steps and corrective actions, as necessary. If violations are noted, they are required to be fixed prior to the continuation of construction activities. The Village's erosion control ordinance includes enforcement provisions.

D. Postconstruction Stormwater Management

1. Postconstruction Stormwater Management Ordinance

The Village adopted a postconstruction stormwater management ordinance in October 2015. The complete ordinance can be found in Appendix A.

2. Postconstruction Stormwater Management Ordinance Site Review Procedures and Enforcement

The Village currently administers this ordinance with coordination between the Village Board and Plan Commission. Applicable development plans are reviewed for conformance with the Village Postconstruction Stormwater Management Ordinance. During construction, Village Board or Plan Commission staff check for conformance with approved plans for postconstruction stormwater BMPs on an as-needed basis and site visits are documented. During site inspections, staff members recommend proactive steps and corrective actions, as necessary. If violations are noted, they are required to be fixed prior to the continuation of construction activities. The Village's stormwater management ordinance includes enforcement provisions.

E. Pollution Prevention–Municipal Operations

1. Maintenance of Existing Municipally Owned/Operated Stormwater BMPs

As described in Section 2.04, the Village provides maintenance of stormwater BMPs on an as-needed or periodic basis.

2. Street Sweeping

As described in Section 2.04, the Village performs street sweeping twice a year with a mechanical brush street sweeper on all roads (approximately 21 curb miles) and disposes of the collected material at an appropriate fill site.

3. Catch Basin Cleaning

As described in Section 2.04, the Village performs catch basin cleaning on an as needed basis. Catch basins are cleaned using a vacuum truck.

4. Deicing and Snow Removal

The Village uses 100 percent rock salt as its deicing agent. During the 2013-2014 winter season, the Village used 166 tons of salt for deicing the Village roads. The Village dispatches

trucks during any slippery condition, usually based on Department of Public Works staff recommendation.

Salt is stored at an enclosed shed in the Public Works Yard. The shed is inspected annually. The Village also supplies sand for residents' use. The sand is stored in the cold storage building at the Wastewater Treatment Plant site and also in boxes at intersections and sidewalk approaches. Further details regarding sidewalk snow and ice removal is posted on the Village website at the following link:

http://www.campbellsport.govoffice.com/index.asp?SEC=59CFAA90-0834-45F3-989F-C754D9A52130&Type=B_BASIC

Table 3.01-1 shows the rainfall and snowfall amounts at the Milwaukee International Airport (MKE) as obtained from the National Oceanic and Atmospheric Administration (NOAA) website. The average rainfall amount is 30.32 inches each year and the average snowfall each winter season is 68.40 inches. Higher than average seasonal snowfall is an indicator of the potential for higher level of deicer usage and is therefore requested to be tracked by the WDNR.

	2011 Rainfall (in)	2011 Snowfall (in)	2012 Rainfall (in)	2012 Snowfall (in)	2013 Rainfall (in)	2013 Snowfall (in)	2014 Rainfall (in)	2014 Snowfall (in)
January	0.83	10.9	1.27	15.1	2.58	1.0	0.88	9.7
February	1.43	25.8	1.30	11.1	2.37	17.4	1.06	7.4
March	1.80	3.9	3.62	5.0	1.31	2.6	0.31	8.4
April	3.15	0.0	2.02	0.0	6.80	0.0	5.60	0.1
May	2.03	0.0	3.81	0.0	5.10	0.0	3.15	0.0
June	4.91	0.0	0.71	0.0	6.71	0.0	6.81	0.0
July	3.19	0.0	1.72	0.0	2.35	0.0	2.14	0.0
August	1.26	0.0	2.28	0.0	1.15	0.0	4.17	0.0
September	6.63	0.0	2.01	0.0	2.72	0.0	1.25	0.0
October	1.43	0.0	4.45	0.0	2.25	0.0	2.52	0.0
November	1.89	0.0	0.30	0.0	2.00	1.2	0.89	0.7
December	2.32	0.0	1.41	4.7	0.65	11.6	0.73	0.2
Totals	**30.87**	**40.6**	**24.9**	**35.9**	**35.99**	**33.8**	**29.51**	**26.5**

Table 3.01-1 Rainfall and Snowfall at Milwaukee Timmerman Airport

5. Leaf and Grass Clipping Management

The Village provides curbside leaf collection services during the fall season. Program details are available on the following Village website,

http://www.campbellsport.govoffice.com/index.asp?Type=B_BASIC&SEC={00033BDA-2CAF-419E-B9CC-C5D57BCEEE62}

It reads as follows:

> "The Village provides curbside leaf pickup during the fall season only. Leaves should be piled at the curbside on the terrace area and should not be piled in the streets! Leaves in the street clog storm sewers and can cause a fire hazard for parked vehicles.

> Department of Public Works crews will begin vacuuming leaves each fall as soon as residents begin piling them at curbside. Leaf pickup services will continue throughout the fall season as weather permits.
>
> Please note that there is no leaf pickup in spring, so please do not pile leaves at the curbside during spring yard cleanup. Spring and summer yard waste can be taken to the organic dumpster, however."

The Village Ordinance, *Solid Waste and Recycling Management* (Ord. No. 231, Sec. 14-162) states the following:

> "Yard waste shall be bagged in clear plastic bags available at the village office, and bags shall be twist-tied and placed by curbside for pick up on the designated day set by the village office. Bags should not weigh more than 50 pounds each. Brush, branches and shrub trimmings shall be tied in bundles not exceeding four feet in length nor 75 pounds in weight."

The Village currently has an agreement with a local farm at W1332 Butzke Lane, Campbellsport, Wisconsin, where half of the leaves collected are beneficially reused and tilled into the fields. The remaining collected leaves are burned and composted.

6. Municipal Garage and Storage Area Management

The Village owns and operates the Department of Public Works Yard. The facility is located at Columbus Parc Court, Campbellsport, WI. Village vehicles are washed inside with drainage going to the sanitary sewer via trench drains. Figure 3.01-1 shows the facility.

Source: Campbellsport's website, Department of Public Works Building-Project Images

Figure 3.01-1 Public Works Garage

7. Turf Maintenance Policies

In general, the Village does not apply fertilizer to any Village property.

8. Measures to Reduce Municipal Sources of Stormwater within Source Water Protection Areas

The Village is served by the Village Sanitary District and private wells. The Village has a Wellhead Protection Ordinance which protects lands within the protection areas. The *Wellhead Protection Pla*n (July 2008) contains a map showing the protection area for each well.

G. Storm Sewer System Map

The Village storm sewer system map was updated as part of this plan and is shown in Figure 2.01-1. Refer to the Table of Contents for a complete list of maps and figures.

3.02 RECOMMENDED STORMWATER MANAGEMENT PROGRAM

To comply with state regulations and requirements, we recommend the following program.

An outside consultant may need to be retained to address the recommended activities outlined in this section. Costs for the recommended activities are outlined in Table 6.03-1.

A. Public Information and Education Practices

We recommend enhancing the program to educate Village residents of measures they can take to reduce nonpoint source discharges to Village water resources. The information and education program is intended to raise awareness among individuals and organizations concerning stormwater runoff and the measures that can be taken to minimize its harmful effects. We recommend that the Village implement the recommended activities and measureable goals listed in Table 3.02-1.

Table 3.02-1 Public Information and Education Plan and Measurable Goals

	Activity	Measurable Goal	Responsible Party	Anticipated Completion Date
1	Distribute leaflets and pamphlets regarding such topics as proper usage of lawn care products, disposal of oil and other car care products, proper approaches to vehicle washing, pet waste collection, water conservation practices for homeowner, and proper disposal of household hazardous wastes. Preprinted materials may be available from sources such as the UW-Extension and the WDNR to minimize development costs. These may be distributed at such locations as the Village Hall, Village Library, or through mailings included with utility bills.	Have the following informational brochures available starting in 2017. 1. Lawn, pet, and household waste. 2. Fertilizer/Pesticide Management. 3. Hazardous waste and oil management and illicit discharges. 4. Streambank and Shoreline Management. 5. Infiltration. Note: Brochures will be numbered to track usage.	DPW	On-going
2	Include stormwater information resources on the Village's website. Evaluate expanding this to have a dedicated Department of Public Works link that accesses the Village Stormwater Quality Management Plan and Stormwater Utility Information. Also, provide a link in this same location to the MMSD Household Hazardous Waste website and other stormwater-related websites.	Evaluate updating the Village website to include additional links.	Village staff	On-going
3	The Village will have periodic articles in a Village newsletter/publication to promote detection of illicit discharges, promote proper management of lawn and garden waste, waste oil, pet waste, and household waste. It will also include infiltration of stormwater runoff where feasible, and general stormwater pollution prevention techniques.	One stormwater management flyer each year starting in 2017.	DPW	Complete by December 31 of each year.
4	Develop a stormwater or erosion control-related newspaper article for publishing in the local newspaper. There is potential to augment or replace article with educational video.	One article each year starting in 2017. Note: Obtain newspaper circulation data for publishing dates of the article(s) to track distribution of message.	DPW	Complete by May 1 of each year.
5	Stencil storm drains to discourage dumping of oil and other pollutants. A cost-effective approach may be to work with Boy Scouts and other groups and school organizations to promote this activity as an educational program.	Stencil all storm drains in the municipal limits.	DPW	On-going
6	Provide educational displays (at various public events and gatherings) on how to improve water quality.	Provide displays at least four times a year.	Village Staff	On-going
7	Establish a policy for receiving and addressing stormwater management issues. This includes providing a standard form to residents with stormwater concerns (see Appendix B), performing a stormwater review based on the submitted form, and responding within a reasonable time frame. Stormwater complaint forms will be maintained in a file at the Town Hall.	On-going.	Village Staff	On-going.

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B. Illicit Discharge Detection and Elimination Plan

1. Introduction

a. Background and Definitions

As discussed in Section 2, the Village's storm drainage system discharges to local water resources including the Milwaukee River, West Branch Milwaukee River, and other waterways at approximately 27 outfall locations throughout the Village. In addition to stormwater runoff, the storm drainage system connected to each of these outfalls has the potential to carry other discharges introduced to the storm drainage system such as sanitary sewage, waste oil, industrial waste, and other substances that may harm downstream water quality. The term "illicit discharge" is generally used to refer to any discharge to a storm drainage system that is not composed entirely of stormwater, except those discharges allowed by an ordinance or permit. Such allowable discharges may include those from firefighting activities, air-conditioning condensate, and related "clean water" flows.

The Center for Watershed Protection (CWP) has published a manual titled *Illicit Discharge Detection and Elimination, A Guidance Manual for Program Development and Technical Assessments* (October 2004). This document (referred to as the "CWP Guide" in this report) uses a four-part definition for illicit discharges, including the following:

(1) Illicit discharges have a measurable flow during dry weather containing pollutants and/or pathogens. Storm drains having measurable flow but no pollutants are simply considered a discharge.

(2) Illicit discharges have a unique frequency, composition, and mode of entry in the storm drainage system.

(3) Illicit discharges may be caused when the sewage disposal system interacts with the storm drainage system through illegal cross connections or other sources.

(4) Illicit discharges may be produced from specific source areas and operations known as "generating sites." An understanding of the interaction between these potential generating sites and the storm drainage system can be helpful in locating and preventing illicit discharges.

b. Modes of Entry

The CWP Guide describes potential direct and indirect modes of entry for illicit discharges to the storm drainage system. Direct entry means the discharge is directly connected to the storm drain through a sewage pipe, shop drain, or other kind of pipe. Indirect entry means that flows generated outside the storm drainage system enter through storm drain inlets or by infiltrating through the joints of the pipe.

Primary sources of direct entry include the following:

(1) Sewage cross connections.

(2) Straight pipe connections–Straight pipe connections refer to small diameter (typically) pipes that intentionally bypass the sanitary connection or septic drain fields, producing direct discharge to open channels, streams, lakes, or other water resources.

(3) Industrial and commercial cross connections–These occur when industrial or commercial wash water, process water, or other illicit flows enter the storm drainage system, typically through floor drains connected to systems improperly connected to the storm drainage system. These are most prevalent in older industrial areas.

Primary sources of indirect entry to the storm drainage system include the following:

(1) Groundwater seepage–Groundwater seepage usually consists of relatively clean water but can mask other illicit discharges. For example, groundwater seepage may include diluted sewage if the storm and sanitary sewer systems are close together.

(2) Spills–These may occur when a spill travels across an impervious surface and enters a storm drain inlet.

(3) Dumping liquid into a storm drain inlet–This occurs when liquid wastes such as oil, grease, paint, solvents, and various automotive fluids are dumped into the storm drain. One example of an intermittent discharge of this type is cleaning deep fryers in the parking lot of fast food operations.

(4) Outdoor washing activities–This may or may not produce illicit discharges, depending on the nature of the activity. Routine washing of fueling or outdoor storage areas, power washing of parking lots, and cleaning construction equipment outdoors are examples of activities that may produce illicit discharges.

c. Land Use and Generating Sites

Experience in other communities indicates that land use can be a good predictor of the likelihood of illicit discharges. For example, residential areas may be sources of indirect discharges from activities such as failing septic systems (unlikely in the Village), waste oil dumping, or car washing. Commercial areas are most prominently sources of discharges from outdoor washing, disposal of food wastes, car fueling, repair, and washing, and other activities.

Table 3.02-2, which is an excerpt from the CWP Guide, provides an overview of common discharges from various land use types. It should be noted that WDNR regulations exempt some of the activities listed in Table 3.02-2 such as individual residential car washing.

Table 3.02-2 Typical Land Uses and Activities That Produce Illicit Discharges (Excerpt)*

Table 2: Land Uses, Generating Sites and Activities That Produce Indirect Discharges		
Land Use	**Generating Site**	**Activity that Produces Discharge**
Residential	• Apartments • Multi-family • Single Family Detached	• Car Washing • Driveway Cleaning • Dumping/Spills (e.g., leaf litter and RV/boat holding tank effluent) • Equipment Washdowns • Lawn/Landscape Watering • Septic System Maintenance • Swimming Pool Discharges
Commercial	• Campgrounds/RV parks • Car Dealers/Rental Car Companies • Car Washes • Commercial Laundry/Dry Cleaning • Gas Stations/Auto Repair Shops • Marinas • Nurseries and Garden Centers • Oil Change Shops • Restaurants • Swimming Pools	• Building Maintenance (power washing) • Dumping/Spills • Landscaping/Grounds Care (irrigation) • Outdoor Fluid Storage • Parking Lot Maintenance (power washing) • Vehicle Fueling • Vehicle Maintenance/Repair • Vehicle Washing • Washdown of greasy equipment and grease traps
Industrial	• Auto recyclers • Beverages and brewing • Construction vehicle washouts • Distribution centers • Food processing • Garbage truck washouts • Marinas, boat building and repair • Metal plating operations • Paper and wood products • Petroleum storage and refining • Printing	• All commercial activities • Industrial process water or rinse water • Loading and un-loading area washdowns • Outdoor material storage (fluids)
Institutional	• Cemeteries • Churches • Corporate Campuses • Hospitals • Schools and Universities	• Building Maintenance (e.g., power washing) • Dumping/Spills • Landscaping/Grounds Care (irrigation) • Parking Lot Maintenance (power washing) • Vehicle Washing
Municipal	• Airports • Landfills • Maintenance Depots • Municipal Fleet Storage Areas • Ports • Public Works Yards • Streets and Highways	• Building Maintenance (power washing) • Dumping/Spills • Landscaping/Grounds Care (irrigation) • Outdoor Fluid Storage • Parking Lot Maintenance (power washing) • Road Maintenance • Spill Prevention/Response • Vehicle Fueling • Vehicle Maintenance/Repair • Vehicle Washing

* Excerpted from Table 2 of *Illicit Discharge Detection and Elimination, A Guidance Manual*, Center for Watershed Protection, October 2004.

d. Regulatory Requirements

In recognition of the potentially harmful impacts of illicit discharges, WDNR has identified development of an Illicit Discharge Detection and Elimination (IDDE) program to be essential in reducing the pollutant loads to the MS4 and Waters of the State. In general, the program must include the following:

(1) An ordinance or other regulatory mechanism to prevent and eliminate illicit discharges and connections to the MS4. At a minimum, the ordinance or other regulatory mechanism must prohibit the discharge, spilling, or dumping of nonstormwater substances or materials into Waters of the State or the MS4, identify nonstormwater discharges or flows that are not considered illicit discharges, and establish inspection and enforcement authority.

(2) Initial field screening at all major outfalls during dry weather periods. At a minimum, field screening shall be documented and include visual observation, and field analysis if flow is observed.

(3) Ongoing dry weather field screening of outfalls.

(4) Procedures for responding to known or suspected illicit discharges.

(5) Procedures to remove illicit discharges from its MS4 system as soon as possible (within three working days to the maximum extent practicable).

(6) Immediately notify WDNR in accordance with ch. NR 706 Wis. Adm. Code. Contact shall be made with the WDNR via the WDNR 24-hour toll free spill hotline at 1-800-943-0003.

(7) Notice to the affected municipality within one working day in the case of an illicit discharge that originates from the municipality's jurisdiction land that discharges directly to a municipal separate storm sewer or property under the jurisdiction of another municipality.

(8) The name, title, and phone number of the individual(s) responsible for responding to reports of illicit discharges and spills shall be included in the illicit discharge response procedure and submitted to the Department of Public Works.

2. Illicit Discharge Detection and Elimination Ordinance

The Village currently does not have an illicit discharge detection and elimination ordinance. The following procedures stated below have been developed for the Village to adopt and implement.

3. Initial Field Screening Procedures

a. Screening Requirements

Initial field screening shall be conducted at all major outfalls during dry weather periods. In the event that now or in the future a major outfall is a ditch rather than a pipe, the nearest upstream pipe discharge point should be used as a field screening point. Table 3.02-3 identifies recommended field screening points. Field screening shall be documented on the form included in Appendix C (which includes a spreadsheet of the major outfalls) and will include:

(1) Visual Observation–A narrative description of visual observations including color, odor, turbidity, oil sheen or surface scum, flow rate, and any other relevant observations regarding the potential presence of nonstormwater illicit discharges.

(2) Field Analysis–If flow is observed, a field analysis shall be conducted to determine the presence of nonstormwater illicit discharges. The field analysis shall include sampling for pH, total chlorine, total copper, total phenol, and detergents.

(a) Field screening points shall, where possible, be located downstream of any source of suspected illicit activity.

(a) Field screening points shall be located where practicable at the farthest manhole or other accessible location downstream in the system. Safety of personnel and accessibility of the location shall be considered in making this determination.

(b) If field analysis indicates higher than expected range for pH, total chlorine, total copper, total phenol, and detergents, the discharge will need to be tracked upstream and eliminated.

(3) Database–The Village will maintain a file or database of all field screening forms.

4. Ongoing Dry Weather Screening Program

a. Outfall Screening Priorities

Outfalls recommended for evaluation on an ongoing basis are identified in Table 3.02-3 and Appendix C. In identifying field screening locations, consideration has been given to hydrological conditions, total drainage area of the site, population density of the site, traffic density, age of the structures or buildings in the area, history of the area, and land use types. Table 3.02-3 includes a summary of outfalls, predominant land use, and recommended screening frequency. In general, it is recommended all priority outfalls must be screened initially and yearly thereafter, major outfalls screened at least once every five years, and minor outfalls require no regular screening frequency.

Table 3.02-3 Outfall Screening Frequency

Outfall ID	Location	Contributing Subbasin	Contributing Area (ac)	Predominant Land Use	Major/Minor[1]	Priority	Watershed	Size (in)	Recommended Screening Frequency
1	State Hwy 67 (Near NE corner of Fire House)	MR-9	3.53	Institutional	Minor	Y	Milwaukee River	36"	Once a year
2	State Hwy 67 (Across from 617 E. Main St.)	MR-8	99.34	Medium Density Residential	Major	N	Milwaukee River	36"	Every five years
3	State Hwy 67 (Across from 617 E. Main St., SE side of bridge)	MR-1	1.25	Low Density Residential	Minor	N	Milwaukee River	12"	Screening Not Necessary
4	State Hwy 67 (Across from 617 E. Main St., NE side of bridge)	MR-1	1.27	Medium Density Residential	Minor	N	Milwaukee River	15"	Screening Not Necessary
5	Forest St.	MR-7	5.92	Medium Density Residential	Minor	N	Milwaukee River	15"	Screening Not Necessary
6	East end of Spring St. (South outfall)	MR-6	4.54	Medium Density Residential	Minor	N	Milwaukee River	18"	Screening Not Necessary
7	316 Jenny St.	MR-5	170.96	Medium Density Residential	Major	N	Milwaukee River	38"x60"	Every five years
8	124 Killdeer Ave.	MR-3	41.99	Medium Density Residential	Minor	N	Milwaukee River	27"	Screening Not Necessary
9	N. Poplar St. (Across 235 E. Poplar St.)	MR-8	2.11	Duplex Residential	Minor	N	Milwaukee River	32"	Screening Not Necessary
10	S. Helena St. (Behind 503 Paul Ave.)	MR-5	3.85	Medium Density Residential	Minor	N	Milwaukee River	15"	Screening Not Necessary
11	508 Redwing Ct.	MR-4	4.50	Medium Density Residential	Minor	N	Milwaukee River	12"	Screening Not Necessary
12	County Rd. W	MR-12	121.24	Institutional-School, Open Space	Minor	Y	Milwaukee River	18"	Once a year
13	310A Auburn Meadows Ct.	MR-5	3.53	Medium Density Residential	Minor	N	Milwaukee River	36"	Screening Not Necessary
14	595A Veterans Cir.	WB-3	11.99	Multifamily Residential	Minor	N	West Branch Milwaukee River	8"	Screening Not Necessary
15	N. Barton Rd.	WB-7	3.38	Low Density Residential	Minor	N	West Branch Milwaukee River	12"	Screening Not Necessary
16	280 N. Baumann St.	WB-8	14.89	Medium Density Residential	Minor	N	West Branch Milwaukee River	24"	Screening Not Necessary
17	East end of Clarke St.	MR-5	12.14	Medium Density Residential	Minor	N	Milwaukee River	15"	Screening Not Necessary
18	County Rd. W	WB-7, WB-8	57.58	Open Space & Commercial	Major	N	West Branch Milwaukee River	38"x60"	Every five years
19	595A Veterans Cir.	WB-3	8.28	Multifamily Residential	Minor	N	West Branch Milwaukee River	24"	Screening Not Necessary
20	627 Valley View Dr. (West side of parcel)	WB-2	4.88	Low Density Residential	Minor	N	West Branch Milwaukee River	24"	Screening Not Necessary
21	627 Valley View Dr. (East side of parcel)	Offsite to WB-2	7.06	Low Density Residential	Minor	N	West Branch Milwaukee River	24"	Screening Not Necessary
22	County Rd. W	MR-13	6.16	Institutional-School	Minor	Y	Milwaukee River	18"	Once a year
23	450 Grandview Ave. (Piggly Wiggly)	MR-11	3.04	Commercial	Minor	N	Milwaukee River	18"	Screening Not Necessary
24	Campbellsport Dr. (West side of bike path)	WB-4	1.62	Industrial, Open Space	Minor	N	West Branch Milwaukee River	24"	Screening Not Necessary
25	Campbellsport Dr. (East side of bike path)	WB-4	3.75	Low Density Residential, Open Space	Minor	N	West Branch Milwaukee River	18"	Screening Not Necessary
26	County Rd. W	MR-13	65.67	Agricultrue	Major	N	Milwaukee River	29"x45"	Every five years
27	S. Railroad St.	WB-6	17.11	Medium Density Residential, Industrial	Minor	Y	West Branch Milwaukee River	24"	Once a year

1 - Major outfalls are defined as outfalls that are 36 inches in diameter (or equivalent cross-sectional area) or larger and are associated with a drainage area of 50 acres or larger. Outfalls with an inside diameter of 12 inches or more (or equivalent conveyance) that receives runoff from lands zoned industrial with 2 or more acres of industrial activity are also classified as major outfalls.

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5. Response Procedures

a. Identification of Suspected Spill or Illicit Discharge

Where field screening indicates the possible presence of an illicit discharge or other nonstormwater discharge, the following procedure shall be implemented as soon as possible:

(1) The field analysis described in Section 3.02 C. 3. A. (2) shall be conducted.

(2) The suspected illicit discharge shall be tracked by screening manholes and other screening points upstream until the source of the spill or discharge is identified.

(3) Measures shall be taken to prevent or contain spills that have discharged or may discharge into the drainage system.

(4) The WDNR shall be notified immediately in accordance with NR 706, Wisconsin Administrative Code, in the event that a spill or release of a hazardous substance is identified that has resulted or may result in the discharge of pollutants into Waters of the State. The WDNR shall be notified via the 24-hour toll free spill hotline at 1-800-943-0003. The Village will cooperate with WDNR staff in efforts to investigate and prevent such discharges from polluting Waters of the State.

(5) The Village shall take appropriate action to remove illicit discharges from its MS4 system as soon as possible. If it will take more than three days to remove an illicit connection, the Village will contact the WDNR to discuss an appropriate action and/or timeframe for removal.

(6) If a suspected illicit discharge that originates from the Village's municipal area is found to discharge directly to a storm sewer or property under the jurisdiction of another municipality, the Village shall notify the affected municipality within one working day.

b. Leakage from Sanitary Conveyance System

Leakages from sanitary conveyance system into the MS4 shall be eliminated to the maximum extent practicable. Any actions taken to eliminate sanitary conveyance leakage will be recorded and reported to the WDNR.

c. Dye Testing Notification

The Village will provide the WDNR with advance notice of the time and location of dye testing within an MS4.

6. Responsible Parties

Director of Public Works
Village of Campbellsport
177 E. Main Street
Campbellsport, WI 53010
(920) 533-8321

7. Measurable Goals

We recommend implementation of the following activities with their associated measurable goal, responsible party, and anticipated completion date as described in Table 3.02-4.

	Activity	Measurable Goal	Responsible Party	Anticipated Completion Date
1	Adopt the illicit discharge detection and elimination plan.	Adopt in late-2017.	Village of Campbellsport	December 2017
3	Implement the illicit discharge detection and elimination program described in Section 3.02 C.	See above	DPW	On-going
4	Conduct field screening for illicit discharges as described in Section 3.02 C. using the blank field screening form in Appendix C.	See above	DPW	Annually
5	Track the illicit discharge detection and elimination program activities.	Once each year	DPW	Once each year

Table 3.02-4 Illicit Discharge Detection and Elimination Plan and Measurable Goals

C. Construction Site Pollution Control

1. Erosion Control Requirement Revisions

A Construction Site Erosion Control Ordinance has been developed for and adopted by the Village in October 2015. Since the adoption of this ordinance, there have been modifications to the WDNR model ordinance. It is recommended that the Village review the Erosion Control and Stormwater Management Requirements document and update the language to be consistent with the current WDNR model ordinances available.

2. Measurable Goals

Section 3.01 documents existing Village activities. It is recommended that the Village continues those activities and supplement them with the recommendations included in Table 3.02-5.

	Activity	Measurable Goal	Responsible Party	Anticipated Completion Date
1	Document the number of erosion control permits issued each year.	On-going	DPW	On-going
2	Document the number and nature of inspections and enforcement actions conducted to ensure compliance with the adopted erosion control ordinance.	On-going	DPW	On-going

Table 3.02-5 Construction Site Pollution Control Plan and Measurable Goals

D. Postconstruction Stormwater Management

1. Stormwater Management Requirement Revisions

A Postconstruction Stormwater Management Ordinance has been developed for and adopted by the Village in October 2015. Since the adoption of this ordinance, there have been modifications to the WDNR model ordinance. It is recommended that the Village review the Erosion Control and Stormwater Management Requirements document and update the language to be consistent with the current WDNR model ordinances available.

2. Measurable Goals

Section 3.01 documents existing Village activities. It is recommended that the Village continue those activities and supplement them with the recommendations included in Table 3.02-6.

	Activity	Measurable Goal	Responsible Party	Anticipated Completion Date
1	Document the number of stormwater management permits issued each year.	On-going	DPW	On-going
2	Document the number and nature of inspections and enforcement actions conducted to ensure compliance with the adopted Postconstruction Site Stormwater Management Ordinance.	On-going	DPW	On-going

Table 3.02-6 Postconstruction Stormwater Management Plan and Measurable Goals

E. Pollution Prevention for Municipal Operations

In Section 3.01, we documented existing Village activities. We recommend that the Village continue those activities and supplement them with the recommendations included in Table 3.02-7.

	Activity	Measurable Goal	Responsible Party	Anticipated Completion Date
1	Create an Inspection/Maintenance Schedule of Existing Municipally Owned/Operated Stormwater BMPs. Track these maintenance operations. A proposed maintenance schedule is provided in Appendix D.	On-going	Village of Campbellsport	On-going
2	Street Sweeping–Continue existing program.	On-going	DPW	On-going
3	Catch Basin Cleaning–Create a map of the catch basins in the Village. Clean catch basins yearly.	Complete map. Continue yearly catch basin cleaning.	DPW	Map-December 2017 Cleaning-Yearly by December 30
4	Deicing and Snow Removal–Continue current operations and look for possible ways to decrease deicer use while still maintaining public safety. References regarding deicers include: -WisDOT Highway Maintenance Manual, Chapter 35 -http://www.dot.wisconsin.gov/business/extranet Also, track the quantity of salt and deicer used by the Town each year. Track monthly precipitation amounts.	On-going	Village of Campbellsport	On-going
5	Leaf and Grass Management–Continue to promote home composting. Track the quantities of leaves hauled off-site each year.	On-going	Village of Campbellsport	On-going
6	Municipal Garage and Storage Area Management–Continue existing operations. Track quantity of used oil recycled each year.	On-going	Village of Campbellsport	On-going

Table 3.02-7 Pollution Prevention for Municipal Operations Plan and Measurable Goals

F. Stormwater Quality Management

Section 5 provides an alternatives analysis to look at cost-effective ways to address current stormwater issues in the Village, and Section 6 recommends stormwater planning activities to reduce TSS loads. We recommend the implementation of the activities stated in Sections 5 and 6 to reduce the nonpoint source pollution amounts within the Village.

G. Storm Sewer System Map

We recommend the storm sewer system map be updated on an annual basis as needed.

SECTION 4
STORMWATER QUALITY MODELING

4.01 INTRODUCTION

A. General

Water quality analysis for the Village of Campbellsport was completed using the Source Loading and Management Model (WinSLAMM v10.1.6), herein referred to as SLAMM. SLAMM is a computer model approved by WDNR to address the requirements of NR 151 that analyzes nonpoint source pollution abatement. SLAMM has been calibrated using extensive water quality data throughout the United States. As this model is used for regulatory purposes, the results can be compared to other past and ongoing studies. SLAMM is regularly updated to include additional water quality monitoring data to further refine its predictive capabilities.

SLAMM is a planning-level tool that enables municipalities to make decisions regarding BMPs necessary to achieve nonpoint source runoff standards described in NR 151. SLAMM specifically analyzes control practices including street sweeping, wet detention ponds, catch basin and inlet sumps, infiltration devices, porous pavements, and grass swales. SLAMM also predicts relative pollutant contributions from “source areas” including rooftops, parking lots, driveways, streets, sidewalks, and pervious space.

B. Regulatory Requirements

For communities where a Stormwater Permit will be required, it will be necessary that all drainage basins to major outfalls to Waters of the State be analyzed individually for compliance with NR 151 municipal performance standards using a pollutant loading analysis tool, such as SLAMM. Currently, the Village of Campbellsport is not mandated by the WDNR to prepare and submit a Stormwater Permit. However, it is possible in the future that the Village may be required to submit a Stormwater Permit. The water quality modeling was conducted as if the Village were mandated to meet current WDNR standards.

The WDNR is also in the process of developing a Total Maximum Daily Load (TMDL) to address sediment and phosphorus pollution in the Milwaukee River Basin watersheds. The TMDL will provide a quantitative analysis of the amount of sediment and/or phosphorus that the waterbodies can receive from point and nonpoint sources and still meet water quality standards. The WDNR has hired a consultant to prepare the TMDL report under WDNR’s management using a grant provided by the USEPA. When the TMDL is implemented, the Village may be required to limit sediment and phosphorus loadings from point and nonpoint sources.

At a minimum, the Stormwater Permit requires an estimate of the average annual TSS and phosphorus loads for the cumulative discharge from all outfalls for the “controls/existing” and “no controls/baseline” conditions. For the no controls condition, the modeling must estimate the theoretical annual average mass of TSS generated for the entire area served by the Village’s stormwater management system with no controls or BMPs applied. The controls condition must estimate the Village’s current level of pollutant reductions based on current Village practices such as street sweeping, wet detention basins, sumped catch basins, and swale drainage. The controls condition must be judged against the no controls condition to determine the percent of TSS reduction.

The pollutant loading analysis will be used by the WDNR to evaluate compliance with mandated pollutant reduction goals.

B. Analysis Methodology

Village land use was divided for SLAMM modeling purposes into the categories of residential, commercial, industrial, institutional, and open space. The standard land use files were used for these categories. Source areas considered for each of these land uses include rooftops, driveways, parking lots, streets, sidewalks, unconnected areas (impervious areas that drain directly to pervious areas), other connected impervious areas, and pervious areas. Table 4.01-1 lists the percentage of source area for each land use category, excluding transportation right-of-way, from the WDNR Standard Land Use. Table 4.01-2 lists the distribution of impervious source areas by land use class from the WDNR Standard Land Use. Table 4.01-3 lists the distribution of pervious source areas by land use class from the WDNR Standard Land Use. Refer to Figure 2.01-2, which shows the Modeled SLAMM Landuse.

4.02 WDNR SLAMM GUIDANCE

The following WDNR guidance was referred to for the Town's MS4 modeling. Copies of each guidance document are provided in Appendix E.

A. *TMDL Guidance for MS4 Permits: Planning, Implementation, and Modeling Guidance, Addendum B (Internally Drained Areas),* May 2016

B. *TMDL Guidance for MS4 Permits: Planning, Implementation, and Modeling Guidance, Addendum A (Percent Reduction),* February 2016.

C. *Modeling Post-Construction Storm Water Management Treatment,* May 2015.

D. *TMDL Guidance for MS4 Permits: Planning, Implementation, and Modeling Guidance,* October 20, 2014.

E. *Developed Urban Areas and the 20% and 40% TSS Reductions Sections NR 151.13(2) and NR 216.07(6), Wis. Adm. Code,* November 24, 2010.

F. *Process to Assess and Model Grass Swales for ss. NR 151.13(2) and NR216.07(6), Wis. Adm. Code - Total Suspended Solids Reduction,* November 24, 2010

G. Modeling of dry detention basins for TSS removal, April 1, 2010

H. *Developed Urban Areas and the 20% and 40% TSS Reductions Internally Drained Areas*, April 6, 2009.

I. *Errata for Process to Assess and Model Existing Grass Swales (TSS Reduction): Modifications to Double-Ring Infiltrometer Test Procedures in Technical Standard 1002,* August 2008.

Pursuant to the guidelines provided in the memorandum, a portion of the Town lands can be exempted from inclusion in the lands required to be modeled in SLAMM. Figure 2.01-1 shows the watersheds modeled in SLAMM.

Table 4.01-1 Source Area by Land Use

Class	Land Use	Roof (percent)	Driveway (percent)	Sidewalk (percent)	Paved Parking/ Storage (percent)	Unpaved Parking/ Storage (percent)	Playground (percent)	Large Landscaped (percent)	Undeveloped (percent)	Small Landscaped (percent)	Other Pervious (percent)	Isolated Water Body (percent)	Directly Connected Impervious (percent)	Partially Connected Impervious (percent)	Street Area (percent)	Total (percent)
Residential	High Density Residential With Alleys (<1/4 acre lots)	24.20	0.70	6.40	0.40	0.00	0.00	0.00	0.30	41.50	6.30	0.00	0.00	0.00	20.20	100.00
	High Density Residential Without Alleys (<1/4 acre Lots)	21.40	14.10	4.0	0.00	0.00	0.00	0.00	0.00	41.00	5.90	0.10	0.00	0.00	13.50	100.00
	Medium Density Residential (1/4 to 1/2 acre lots)	15.00	7.50	2.20	0.20	0.00	0.00	0.20	0.40	57.50	4.00	0.20	0.00	0.00	12.80	100.00
	Low Density Residential (>1/2 acre lots)	8.00	4.50	0.70	0.10	0.00	0.00	0.00	4.40	74.80	0.20	0.20	0.10	0.00	7.00	100.00
	Duplex	16.54	5.31	3.96	0.00	0.00	0.00	0.00	0.00	60.88	0.00	0.00	0.00	0.00	13.31	100.00
	Multifamily	20.70	2.80	4.20	10.80	0.50	0.10	1.40	3.00	38.00	3.80	0.10	0.00	0.00	14.60	100.00
	Mobile Home	16.90	12.30	1.00	13.40	0.60	0.00	0.00	4.50	44.70	0.00	1.00	2.00	0.00	3.60	100.00
Commercial	Commercial	9.44	0.00	2.28	26.31	0.00	0.00	58.66	0.00	0.00	0.00	0.00	0.00	0.00	3.31	100.00
	Commercial Downtown	40.73	1.48	8.35	22.61	0.00	0.00	0.00	0.00	3.56	0.62	0.00	0.00	0.08	22.17	99.60
	Shopping Center	21.61	1.81	0.54	60.68	0.34	0.00	0.00	2.93	4.53	0.82	0.00	0.35	0.00	6.39	100.00
	Strip Commercial	23.40	2.00	4.30	40.90	1.40	0.00	0.00	0.20	5.80	1.90	0.00	0.00	0.00	20.10	100.00
Institutional	Institutional	14.41	3.00	2.20	27.21	0.00	3.40	5.34	1.83	26.55	2.65	0.00	0.00	1.33	12.08	100.00
	School	15.00	1.98	2.91	10.65	0.00	17.33	22.09	0.42	17.43	2.19	0.00	0.00	1.35	8.65	100.00
Industrial	Light Industrial	25.35	2.56	1.28	32.94	6.34	0.00	3.51	4.34	9.86	2.77	0.00	0.00	0.21	10.84	100.00
	Medium Industrial	23.11	2.80	0.90	34.09	14.61	0.00	2.81	5.37	4.00	4.53	0.00	0.00	0.23	7.55	100.00
Other Urban	Cemetery	1.10	7.67	0.06	2.24	0.07	0.00	86.40	0.48	0.23	0.00	0.28	0.00	0.03	1.44	100.00
	Open Space	0.55	0.00	0.58	0.00	0.00	0.00	0.59	94.54	0.00	0.00	0.00	0.00	0.00	3.74	100.00
	Park	0.46	1.21	0.49	4.19	0.22	1.80	77.95	0.00	0.85	0.00	7.08	0.00	2.48	3.27	100.00

Source: WDNR Standard Land Use Files

Table 4.01-2 Distribution of Impervious Source Areas by Land Use Class

Class	Land Use	Pitched Roofs		Flat Roofs		Driveways		Sidewalks		Parking/Storage		Unpaved Parking/Storage		
		Connected (percent)	Unconnected (percent)	Connected (percent)	Unconnected (percent)	Connected (percent)	Unconnected (percent)	Connected (percent)	Unconnected (percent)	Connected (percent)	Unconnected (percent)	Connected (percent)	Unconnected (percent)	Total (percent)
Residential	High Density Residential With Alleys (<1/4 acre lots)	42.9	33.4	0.0	0.0	2.2	0.0	10.1	10.1	1.3	0.0	0.0	0.0	100.0
	High Density Residential Without Alleys (<1/4 acre lots)	26.0	28.1	0.0	0.0	35.7	0.0	5.1	5.1	0.0	0.0	0.0	0.0	100.0
	Medium Density Residential (1/4 to 1/2 acre lots)	18.1	42.2	0.0	0.0	22.5	7.6	4.4	4.4	0.8	0.0	0.0	0.0	100.0
	Low Density Residential (>1/2 acre lots)	14.3	45.9	0.0	0.0	24.1	9.8	2.6	2.6	0.8	0.0	0.0	0.0	100.0
	Duplex	17.4	46.7	0.0	0.0	20.6	0.0	15.3	0.0	0.0	0.0	0.0	0.0	100.0
	Multifamily	36.2	8.2	8.7	0.0	4.9	2.3	5.4	5.4	27.7	0.0	1.3	0.0	100.0
	Mobile Home	0.0	0.0	38.2	0.0	27.8	0.0	1.1	1.1	30.3	0.0	0.0	1.4	100.0
Commercial	Commercial	2.0	0.0	12.4	10.5	0.0	0.0	6.0	0.0	69.2	0.0	0.0	0.0	100.0
	Commercial Downtown	0.0	0.0	55.7	0.0	2.0	0.0	11.4	0.0	30.9	0.0	0.0	0.0	100.0
	Shopping Center	0.0	0.0	25.4	0.0	2.1	0.0	0.6	0.0	71.4	0.0	0.4	0.0	100.0
	Strip Commercial	5.1	0.0	27.4	0.0	2.8	0.0	6.0	0.0	56.8	0.0	0.0	1.9	100.0
Institutional	Institutional	18.0	1.2	11.5	0.0	6.4	0.0	4.7	0.0	58.1	0.0	0.0	0.0	100.0
	School	0.0	0.0	49.1	0.0	6.5	0.0	9.5	0.0	34.9	0.0	0.0	0.0	100.0
Industrial	Light Industrial	3.8	0.0	30.0	3.3	3.7	0.0	1.9	0.0	48.1	0.0	0.0	9.3	100.0
	Medium Industrial	2.5	0.0	22.3	5.9	2.4	1.3	0.6	0.6	45.2	0.0	0.0	19.4	100.0
Other Urban	Cemetery	0.0	4.9	4.9	0.0	68.9	0.0	0.5	0.0	20.1	0.6	0.0	0.0	100.0
	Open Space	0.0	0.0	48.7	0.0	0.0	0.0	51.3	0.0	0.0	0.0	0.0	0.0	100.0
	Park	1.7	3.8	1.5	0.0	18.4	0.0	7.5	0.0	63.8	0.0	0.0	3.4	100.0

Source: WDNR Standard Land Use Files

Table 4.01-3 Distribution of Pervious Source Areas by Land Use Class

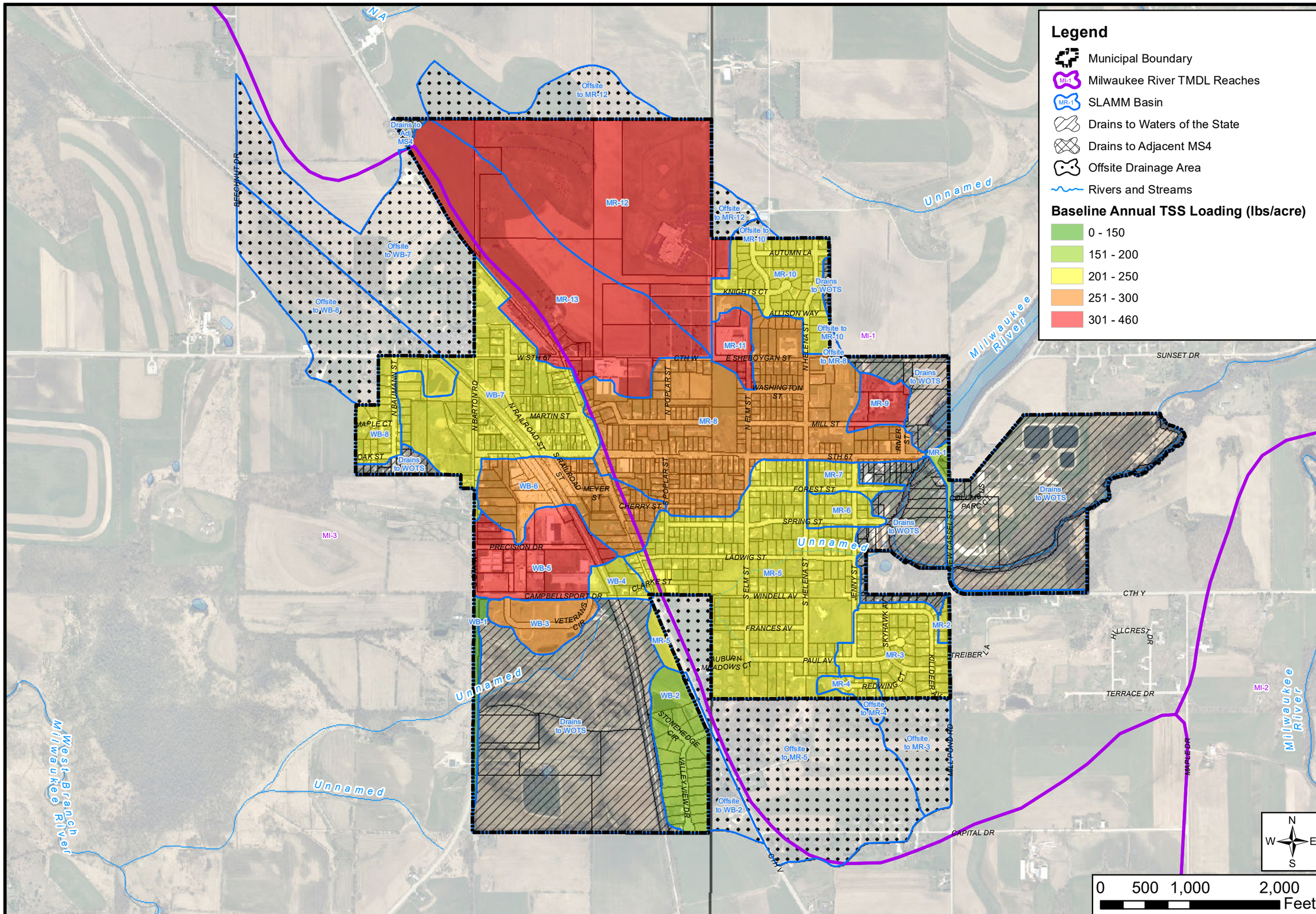
Class	Land Use	Playground		Pervious Areas							
		Connected (percent)	Unconnected (percent)	Large Landscaped Area (percent)	Undeveloped (percent)	Small Landscaped Area (percent)	Other Pervious (percent)	Isolated Water Body (percent)	Other Partially Connected (percent)	Other Directly Connected (percent)	Total (percent)
Residential	High Density Residential With Alleys (<1/4 acre lots)	0.0	0.0	0.0	0.6	86.3	13.1	0.0	0.0	0.0	100.0
	High Density Residential Without Alleys (<1/4 acre lots)	0.0	0.0	0.0	0.0	87.2	12.6	0.2	0.0	0.0	100.0
	Medium Density Residential (1/4 to 1/2 acre lots)	0.0	0.0	0.3	0.6	92.3	6.4	0.3	0.0	0.0	100.0
	Low Density Residential (>1/2 acre lots)	0.0	0.0	0.0	5.5	93.9	0.3	0.3	0.1	0.0	100.0
	Duplex	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	100.0
	Multifamily	0.0	0.2	3.0	6.5	81.9	8.2	0.2	0.0	0.0	100.0
	Mobile Home	0.0	0.0	0.0	8.6	85.6	0.0	1.9	0.0	3.8	100.0
Commercial	Commercial	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	Commercial Downtown	0.0	0.0	0.0	0.0	83.6	14.6	0.0	1.9	0.0	100.0
	Shopping Center	0.0	0.0	0.0	34.0	52.5	9.5	0.0	0.0	4.1	100.0
	Strip Commercial	0.0	0.0	0.0	2.5	73.4	24.1	0.0	0.0	0.0	100.0
Institutional	Institutional	4.1	4.1	13.0	4.5	64.6	6.5	0.0	3.2	0.0	100.0
	School	28.5	0.0	36.3	0.7	28.7	3.6	0.0	2.2	0.0	100.0
Industrial	Light Industrial	0.0	0.0	17.0	21.0	47.7	13.4	0.0	1.0	0.0	100.0
	Medium Industrial	0.0	0.0	16.6	31.7	23.6	26.7	0.0	1.4	0.0	100.0
Other Urban	Cemetery	0.0	0.0	98.8	0.6	0.3	0.0	0.3	0.0	0.0	100.0
	Open Space	0.0	0.0	0.6	99.4	0.0	0.0	0.0	0.0	0.0	100.0
	Park	1.0	1.0	86.5	0.0	0.9	0.0	7.9	2.8	0.0	100.0

Source: WDNR Standard Land Use Files

4.03 BASELINE CONDITIONS ANALYSIS

To evaluate the effectiveness of the Village's existing stormwater management practices and proposed management practices, baseline conditions were modeled using SLAMM. Models were run to estimate the TSS loadings for each watershed. Baseline conditions are considered to have no BMPs employed, in accordance with guidelines specified by the WDNR. For example, the Village is assumed to be drained completely by a curb and gutter system. Also, no wet detention basins, catch basin sumps, street sweeping, or infiltration practices were modeled for the baseline conditions.

Results of the baseline condition model are shown in Figure 4.03-1. This figure helps identify potential "hot spots" that may be good locations for BMPs to help reduce TSS loads. Table 4.03-1 and 4.03-2 list the baseline annual TSS and phosphorus loads by subbasin, respectively. As can be seen, the total annual pounds of TSS in the baseline condition is 146,124. This equates to an average Village-wide TSS loading rate of 0.14 tons/acre/year. The Village-wide total annual pounds of total phosphorus (TP) in the baseline conditions is 341.3 pounds, which equates to an average 0.65 lbs/acre.



BASELINE LOADING - TOTAL SUSPENDED SOLIDS

STORMWATER QUALITY MANAGEMENT PLAN
VILLAGE OF CAMPBELLSPORT
FOND DU LAC COUNTY, WISCONSIN

2010 ORTHO PHOTOGRAPHY

STRAND ASSOCIATES®

FIGURE 4.03-1
1482.031

Path: S:\MAD\1400--1499\1482\031\Data\GIS\Figures\Report Figures\Figure 4.03-1 SLAMM Baseline Loading Map 11x17.mxd User: tomh Date: 12/12/2016 Time: 2:42:57 PM

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Table 4.03-1 Pollutant Loading Calculation Results Baseline and Existing Controls Conditions

Basin	Total MS4 Basin Area[1] (Acres)	Off-site Drainage Area[1] (Acres)	Exempt MS4 Area in Basin[1] (Acres)	Modeled MS4 Area in Basin[1] (Acres)	2016 Baseline Conditions			2016 Existing Conditions			Percent Reduction	Major Soil Type	Current Practices	Swale dynamic infiltration rate
					5-Yr TSS (lbs)	Annual TSS (lbs)	Annual TSS Loading (lbs/acre)	5-Yr TSS (lbs)	Annual TSS (lbs)	Annual TSS Loading (lbs/acre)				
MR-1	4.2			4.2	3,569	714	169	1,074	215	51	69.9%	SILTY	GS	0.07
MR-2	1.3			1.3	1,377	275	211	805	161	123	41.5%	SILTY	GS	0.07
MR-3	24.9	17.1		24.9	26,338	5,268	212	26,164	5,233	210	0.7%	SILTY	CG, SS	
MR-4	3.2	1.3		3.2	3,392	678	214	3,370	674	212	0.6%	SILTY	CG, SS	
MR-5	98.9	85.9	2.4	96.5	110,414	22,083	229	109,836	21,967	228	0.5%	SILTY	CG, SS	
MR-6	6.7			6.7	7,608	1,522	229	7,566	1,513	227	0.6%	SILTY	CG, SS	
MR-7	5.9			5.9	6,871	1,374	232	6,832	1,366	231	0.6%	SILTY	CG, SS	
MR-8	103.1	0.1	3.2	99.9	133,967	26,793	268	133,447	26,689	267	0.4%	SILTY	CG, SS	
MR-9	7.1			7.1	14,147	2,829	396	14,131	2,826	396	0.1%	SILTY	CG, SS	
MR-10	23.3	2.2		23.3	27,039	5,408	232	5,378	1,076	46	80.1%	SILTY	CG, SS, WP	
MR-11	7.1			7.1	13,119	2,624	369	12,496	2,499	351	4.7%	SILTY	CG, SS, SW	0.07
MR-12	98.9	27.1	48.2	50.7	99,977	19,995	394	97,211	19,442	383	2.8%	SILTY	CG, SS, GS	0.07
MR-13	78.9		57.6	21.3	42,654	8,531	401	38,882	7,776	365	8.8%	SILTY	GS	0.07
MR Subtotal	**463.5**	**133.7**	**111.3**	**352.2**	**490,472**	**98,094**	**279**	**457,191.90**	**91,438**	**260**	**6.8%**			
WB-1	3.7		0.3	3.4	2,158	432	127	948	190	56	56.1%	SILTY	GS	0.07
WB-2	21.1	8.6	4.0	17.0	13,722	2,744	161	1,985	397	23	85.5%	SILTY	WP, CG, SS	
WB-3	12.0			12.0	16,886	3,377	282	3,071	614	51	81.8%	SILTY	WP, CG, SS	
WB-4	5.4			5.4	6,095	1,219	227	5,122	1,024	191	16.0%	SILTY	GS, SS	0.07
WB-5	28.5			28.5	64,911	12,982	456	56,384	11,277	396	13.1%	SILTY	CG, SS, GS	0.04
WB-6	31.3			31.3	45,193	9,039	289	41,992	8,398	269	7.1%	SILTY	CG, SS	
WB-7	61.5	64.2		61.5	75,987	15,197	247	69,670	13,934	227	8.3%	SILTY	CG, SS	
WB-8	14.5	46.5		14.5	15,196	3,039	210	2,795	559	39	81.6%	SILTY	CG, SS, WP	
WB Subtotal	**177.9**	**119.3**	**4.4**	**173.5**	**240,148**	**48,030**	**277**	**181,967**	**36,393**	**210**	**24.2%**			
Total (MR+WB)	**641.4**	**253.0**	**115.6**	**525.7**	**730,620**	**146,124**	**278**	**639,159**	**127,832**	**243**	**12.5%**			

Notes:
1. Adjustment made to account for Mechanical Street Sweeping with first pass each year

Footnotes:
[1]"Total MS4 Area" is all the area within the municipality.
"Off-site Drainage Area" is the area outside the municipal jurisdiction.
"Exempt MS4 Area" is the area draining to the MS4 but the municipality is not responsible for the loading (e.g. Agricultural, WisDOT Right-of-way, and County Right-of-way land use).
"Regulatory MS4 Area" is the area which loading is assessed for the municipality.

Abbreviation	Name
SS	Street Sweeping
SW	Swale
DP	Dry Pond
WP	Wet Pond
GS	Grass Swale
CG	Curb and Gutter

Table 4.03-2 Phosphorus Loading Results Baseline and Existing Controls Conditions

					Annual Dissolved Phosphorus					Annual Particulate Phosphorus						Total Annual Phosphorus				
Basin ID	Total MS4 Basin Area[1] (Acres)	Off-site Drainage Area[1] (Acres)	Exempt MS4 Area in Basin[1] (Acres)	Modeled MS4 Area in Basin[1] (Acres)	Baseline Dissolved Phosphorus (lbs)	Adjusted Baseline Dissolved Phosphorus[2] (lbs)	Existing Dissolved Phosphorus (lbs)	Adjusted Existing Dissolved Phosphorus[2] (lbs)	WinSLAMM Reduction in Dissolved Phosphorus (%)	Baseline Particulate Phosphorus (lbs)	Adjusted Baseline Particulate Phosphorus[2] (lbs)	Existing Particulate Phosphorus (lbs)	Adjusted Existing Particulate Phosphorus[2] (lbs)	WinSLAMM Reduction in Particulate Phosphorus (%)	Adjusted Reduction in Particulate Phosphorus (%)	Baseline Total Phosphorus (lbs)	Adjusted Baseline Total Phosphorus[2] (lbs)	Existing Total Phosphorus (lbs)	Adjusted Existing Total Phosphorus[2] (lbs)	Reduction in Total Phosphorus (%)
MR-1	4.2	0.0	0.0	4.2	0.8	0.8	0.4	0.4	53.5%	1.6	1.6	0.5	0.5	71.7%	71.7%	2.5	2.5	0.8	0.8	65.7%
MR-2	1.3	0.0	0.0	1.3	0.3	0.3	0.2	0.2	26.0%	0.8	0.8	0.5	0.5	40.2%	40.2%	1.1	1.1	0.7	0.7	36.1%
MR-3	24.9	17.1	0.0	24.9	6.0	3.0	6.0	3.0	0.0%	14.8	6.9	14.7	6.9	0.5%	0.7%	20.8	9.9	20.8	9.8	0.5%
MR-4	3.2	1.3	0.0	3.2	0.8	0.5	0.8	0.5	0.0%	1.9	1.3	1.9	1.3	0.5%	0.6%	2.7	1.8	2.7	1.8	0.5%
MR-5	98.9	85.9	2.4	96.5	38.8	22.9	38.8	22.9	0.0%	85.1	44.4	58.7	44.2	31.0%	0.5%	123.9	67.3	97.5	67.1	0.3%
MR-6	6.7	0.0	0.0	6.7	1.6	1.6	1.6	1.6	0.0%	4.0	4.0	4.0	4.0	0.5%	0.5%	5.6	5.6	5.5	5.5	0.4%
MR-7	5.9	0.0	0.0	5.9	1.4	1.4	1.4	1.4	0.0%	3.7	3.7	3.6	3.6	0.5%	0.5%	5.1	5.1	5.0	5.0	0.4%
MR-8	103.1	0.1	3.2	99.9	22.2	21.6	22.2	21.6	0.0%	63.7	62.2	63.4	61.9	0.3%	0.4%	85.8	83.7	85.6	83.5	0.3%
MR-9	7.1	0.0	0.0	7.1	1.3	1.3	1.3	1.3	0.0%	5.7	5.7	5.7	5.7	0.1%	0.1%	7.0	7.0	7.0	7.0	0.1%
MR-10	23.3	2.2	0.0	23.3	5.8	5.4	5.8	5.4	0.0%	14.9	13.9	2.8	2.8	81.0%	80.1%	20.7	19.3	8.7	8.2	57.6%
MR-11	7.1	0.0	0.0	7.1	1.3	1.3	1.2	1.2	3.8%	5.1	5.1	4.9	4.9	4.5%	4.5%	6.4	6.4	6.1	6.1	4.4%
MR-12	98.9	27.1	48.2	50.7	25.4	11.9	24.9	11.6	2.1%	64.9	30.2	48.9	29.4	24.6%	2.8%	90.3	42.1	73.8	41.0	2.6%
MR-13	78.9	0.0	57.6	21.3	13.9	3.5	13.5	3.4	2.9%	29.8	3.3	17.6	3.0	40.7%	8.8%	43.7	6.8	31.1	6.4	5.8%
MR Subtotal	**463.5**	**133.7**	**111.3**	**352.2**	**119.6**	**75.5**	**118.1**	**74.6**	**1.2%**	**295.8**	**183.1**	**227.2**	**168.6**	**23.2%**	**7.9%**	**415.5**	**258.6**	**345.4**	**243.2**	**6.0%**
WB-1	3.7	0.0	0.3	3.4	0.7	0.7	0.5	0.5	32.4%	1.0	0.8	0.5	0.4	54.1%	56.1%	1.7	1.5	1.0	0.8	45.4%
WB-2	21.1	8.6	4.0	17.0	5.3	3.0	5.3	3.0	0.0%	11.4	5.6	1.2	0.8	89.1%	85.5%	16.7	8.6	6.5	3.8	55.6%
WB-3	12.0	0.0	0.0	12.0	2.7	2.7	2.7	2.7	0.0%	8.3	8.3	1.5	1.5	81.7%	81.7%	11.0	11.0	4.2	4.2	61.6%
WB-4	5.4	0.0	0.0	5.4	1.1	1.1	1.1	1.1	4.2%	2.5	2.5	2.2	2.2	11.2%	11.2%	3.6	3.6	3.3	3.3	9.0%
WB-5	28.5	0.0	0.0	28.5	6.8	6.8	6.3	6.3	6.7%	17.1	17.1	15.0	15.0	12.5%	12.5%	23.9	23.9	21.3	21.3	10.8%
WB-6	31.3	0.0	0.0	31.3	6.4	6.4	6.4	6.4	0.0%	17.4	17.4	16.3	16.3	6.5%	6.5%	23.9	23.9	22.7	22.7	4.8%
WB-7	61.5	64.2	0.0	61.5	11.8	0.2	11.8	0.2	0.0%	36.2	6.7	33.8	6.1	6.6%	8.3%	48.0	6.9	45.6	6.4	8.0%
WB-8	14.5	46.5	0.0	14.5	10.8	2.4	10.8	2.4	0.0%	22.3	1.0	1.5	0.2	93.3%	81.6%	33.1	3.4	12.3	2.6	23.3%
WB Subtotal	**177.9**	**119.3**	**4.4**	**173.5**	**45.6**	**23.3**	**44.8**	**22.6**	**3.1%**	**116.2**	**59.4**	**72.0**	**42.5**	**38.0%**	**28.5%**	**161.8**	**82.7**	**116.9**	**65.1**	**21.3%**
Total	**641.4**	**253.0**	**115.6**	**525.7**	**165.2**	**98.8**	**163.0**	**97.2**	**1.7%**	**412.1**	**242.5**	**299.3**	**211.0**	**27.4%**	**13.0%**	**577.3**	**341.3**	**462.2**	**308.3**	**9.7%**

Notes:
1. When off-site drainage areas and exempt areas are modeled in WinSLAMM, the program does not remove the dissolved phosphorus load from those areas. To account for this error, the baseline and existing dissolved phosphorus and total phosphorus loadings must be adjusted. The adjustments are shown below.

Footnotes:
[1]"Total MS4 Area" is all the area within the municipality.
"Off-site Drainage Area" is the area outside the municipal jurisdiction.
"Exempt MS4 Area" is the area draining to the MS4 but the municipality is not responsible for the loading (e.g. Agricultural, WisDOT Right-of-way, and County Right-of-way land use).
"Regulatory MS4 Area" is the area which loading is assessed for the municipality.
[2]"Adjusted Baseline Dissolved Phosphorus" =Baseline Dissolved Phosphorus - [0.18lb/ac of dissolved P * (Off-site area + Exempt area)]
"Adjusted Existing Dissolved Phosphorus" =Existing Dissolved P - [0.18lb/ac*(Off-site area + Exempt area) * (1-Infiltration Rate)]. It is assumed the percent reduction for Dissolved Phosphorus from WinSLAMM is equal to the percent reduction for infiltration.
"Adjusted Baseline Particulate Phosphorus" =Baseline Particulate Phosphorus - [0.46lb/ac of particulate P * (Off-site area + Exempt area)]
"Adjusted Existing Particulate Phosphorus" =Adjusted Baseline Particulate P * (1- the respective TSS percent reduction for the basin)].
"Adjusted Baseline Total Phosphorus" =Adjusted Baseline Dissolved Phosphorus + Adjusted Baseline Particulate Phosphorus
"Adjusted Existing Total Phosphorus" =Adjusted Existing Dissolved Phosphorus + Adjusted Existing Particulate Phosphorus

4.04 EXISTING CONDITIONS ANALYSIS

Water quality modeling was completed for existing conditions to assess the effectiveness of current stormwater management practices in removing TSS and TP from stormwater. BMPs evaluated typically include street sweeping, grassed swales, wet detention basins, inlet and catch basin sumps, and infiltration areas. Descriptions of current practices and modeling results are summarized in this section.

A. Street Sweeping

As described in Section 2.04, the Village currently sweeps all roads with curb and gutter twice a year. All other areas of the Village are drained by either grass-lined swales or undeveloped roadside (areas with no ditches that drain by sheet flow laterally off of roadways). Areas of swale or undeveloped roadside drainage are not swept.

B. Wet Detention Basins

There is one existing Village-owned wet detention basin (North Baumann Street Wet Detention Basin) in the Village as shown on Figure 2.01-1 and in Table 4.04-2. There are four private wet detention basins throughout the Village. It is our understanding all of these detention basins, with the exception of one, have Stormwater Maintenance Agreements between the Village and the private owner.

It should be noted, however, it was assumed that the Heldt Wet Detention basin and the STH 67 wet detention basin receive 80 percent TSS reduction. In 2004, new performance standards requiring wet ponds to achieve a minimum 80 percent TSS reduction was adopted. The Heldt Wet Detention Basin was constructed post-2004; therefore, an 80 percent TSS reduction was assumed. For the STH 67 Wet Detention Basin, the minimum required permanent pool surface area to achieve 80 percent TSS reduction was calculated using the WDNR Wet Detention Basin Technical Standard (1001). The actual permanent pool surface area of the STH 67 pond is double the calculated minimum required size; therefore, it was assumed the pond achieves 80 percent TSS reduction.

However, if in the future the Village becomes a permitted community, specific information regarding the ponds would need to be obtained based on either record drawings or a field survey to confirm the actual pollutant reduction efficiency of the ponds.

C. Inlet and Catch Basin Sumps

As described in Section 2.04, inlet and catch basin sumps are not included in our modeling effort.

D. Infiltration Basins

There are no designed infiltration basins in the Village.

E. Dry Detention Basins

There are two existing Village-owned dry detention basins in the Village as identified in Table 4.04-2.

F. Grass-Lined Ditches/Swales

Areas drained by grass-lined ditches/swales were modeled as such in SLAMM. Ditch properties used in the modeling were conservatively assumed, and supplemented with GIS topographic data for cross-section geometry and horizontal slope. Swale cross-sections were sampled in seven general locations throughout the Village's MS4 area. Based on the samples, an average cross-section was used for each area. Table 4.04-1 shows the swale cross-sectional geometry used in the modeling. The SLAMM model includes 30,420 linear feet of grass-lined ditches/swales and 110,924 linear feet of curb and gutter.

Bottom Width (ft)	4.5
Side Slope (H:1)	8.5
Retardance Factor	C
Grass Height (in)	3

Table 4.04-1 Typical Swale

Pond ID	SLAMM Basin	Owner	Location	Wet/ Dry	Modeled in Existing Conditions?	Comments	Potential Retrofit?
1	MR-10	Private	Theisen Trails Wet Basin (406 N Helena Street)	Wet	Yes	Maintenance Agreement	NA
2	WB-8	Village	STH 67 Wet Basin	Wet	Yes	NA	NA
3	MR-11	Private	Piggly Wiggly Dry Basin (450 Grandview Avenue)	Dry	Yes	Maintenance Agreement	Yes-Dry to Wet Conversion
4	WB-3	Private	Soaring Eagle Wet Basin (Veterans Circle)	Wet	Yes	Maintenance Agreement	NA
5	WB-2	Private	CTH V and Valley View Drive Wet Basin	Wet	Yes	Maintenance Agreement	NA
6	MR-13	Private	HT Enterprises Dry Basin (Sheboygan Street)	Dry	No	Maintenance Agreement	Yes-Dry to Wet Conversion
7	MR-4	Private	Heldt Wet Basin	Wet	No	No Maintenance Agreement	NA

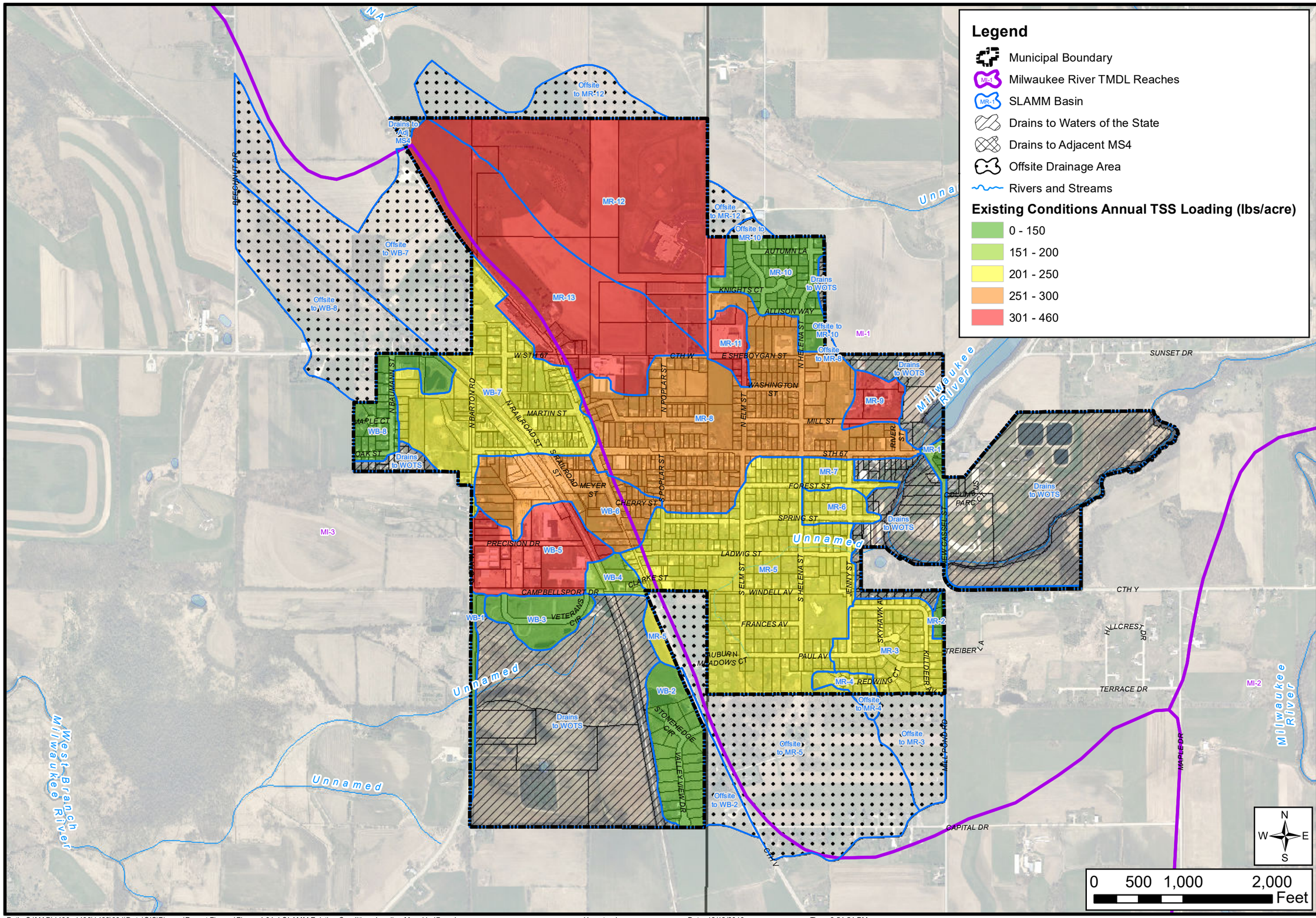
Table 4.04-2 Detention Basin Properties

G. Rain Gardens/Bioretention Basins

There are no designed rain gardens. There is one designed bioretention basin in the Village. This bioretention basin is privately owned and no long-term maintenance agreement exists between the owner and the Village; therefore, this BMP was not included in the SLAMM modeling.

Tables 4.04-1 and 4.04-2 list the existing conditions annual TSS and phosphorus loads by subbasin, respectively. The existing annual TSS loads is shown graphically in Figure 4.04-1.

The above practices were evaluated in the SLAMM model based on contour mapping, field review, and information supplied by the Village.



EXISTING CONDITIONS LOADING - TOTAL SUSPENDED SOLIDS

STORMWATER QUALITY MANAGEMENT PLAN
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FOND DU LAC COUNTY, WISCONSIN

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FIGURE 4.04-1
1482.031

Path: S:\MAD\1400--1499\1482\031\Data\GIS\Figures\Report Figures\Figure 4.04-1 SLAMM Existing Conditions Loading Map 11x17.mxd User: tomh Date: 12/12/2016 Time: 2:54:54 PM

4.05 WATER QUALITY MODELING CONCLUSIONS

A. Baseline Conditions

Baseline or “no controls” water quality modeling estimates the Village-wide annual TSS load to be approximately 146,124 pounds as modeled. This translates to an average unit load of 278 pounds per acre (lb/ac) for the 526 acres of Village land modeled as indicated in Table 4.03-1. The Village-wide annual TP load was modeled to be approximately 341.3 pounds which translates to 0.65 lbs/acre.

Of the 21 subbasins modeled, the unit loads ranged from approximately 127 lb/ac along County Highway W to 456 lb/ac along Campbellsport Drive. As shown in Table 4.03-1, higher unit loads of TSS are found in the areas of higher density residential occupancy, industrial areas, and commercial areas. Baseline and existing conditions modeling output is provided in Appendix F.

B. Existing Conditions

Water quality modeling of current conditions shows that the Village’s current BMPs have been effective in controlling nonpoint source pollution in stormwater runoff. Based on modeling, the estimate for the existing TSS load for the Village’s MS4 area is approximately 127,832 pounds as modeled, which translates to an average unit load of 243 lb/acre. The estimate for the existing TP load is approximately 308.3 pounds as modeled, which translates to an average unit load of 0.59 lb/acre. Specifically, modeling estimates that the existing conditions TSS reduction from baseline conditions is approximately 12.5 percent and the TP reduction is 9.7 percent as shown in Table 4.03-1. The required level of TSS reduction required by 2008 for National Pollutant Discharge Elimination System (NPDES) Phase II communities is 20 percent. If the Village is required to meet these same TSS reduction levels in the future, the 20 percent TSS reduction requirement would not be met without implementation of additional BMP’s. Section 5 evaluates alternatives for closing the TSS reduction gap. Baseline and existing conditions modeling output is provided in Appendix F.

D. TMDL Issues

If a TMDL were established and adopted by the WDNR, there is a chance that further treatment of stormwater discharging off Village lands may be necessary. Once a TMDL is established, a load allocation could be assigned to the Village. At this time, the WDNR does not have a schedule to complete a TMDL for the Village.

SECTION 5
BMP ALTERNATIVES ANALYSIS

5.01 INTRODUCTION

There are multiple areas throughout the Village that experience flooding during certain storm events. Since the Village is not a WPDES-permitted community, the alternatives presented provide solutions to reduce flooding in select areas and also gain additional TSS reduction where possible. The goal of the additional TSS reduction is to reach a Village-wide TSS reduction of 20 percent which is the minimum requirement of a WPDES-permitted community. As discussed previously, the Village is currently reducing TSS loading by 18.5 percent. The difference can be made up through the implementation of a number of BMPs including street sweeping with a vacuum sweeper, increases in street sweeping frequency, construction of new wet detention basins, conversion of dry detention basins to wet detention, construction of infiltration areas, and mechanical stormwater treatment devices. Structural alternatives that may be employed to reach 20 percent TSS reduction are described in this section.

Each alternative includes a description, the effects on stormwater quality, and the planning-level opinion of probable cost. Costs presented were estimated using historical bid costs, where available, and supplemented by other reference sources. All referenced project costs include allowances for engineering, contingencies and soils investigations, where necessary. The purpose of this report is to provide the Village with the information required to initiate the budgeting and planning phase for facilities improvements. All costs are presented in 4th quarter 2016 dollars. All costs presented in this section include a 10 percent construction contingency and 10 percent for engineering costs. Costs do not include utility conflict resolution, if any, unless noted. Appendix G includes detailed cost breakouts for each alternative. Future construction costs should be adjusted for inflation when final project schedules are determined. Opinions of probable construction cost should be updated during the design phase.

5.02 ALTERNATIVES CONSIDERED

The following three alternatives were considered as potential measures to improve the existing storm sewer system, reduce flooding in problem areas, and reduce nonpoint source stormwater pollution in the Village. The alternatives to reduce nonpoint source stormwater pollution focus on constructing two new wet detention basins. The performance of each alternative is summarized in Table 5.02-1 and further detailed in Table 5.07-1.

The alternatives analysis for Alternatives 1 and 2, as described in the following sections, addresses an analysis performed in order to achieve a 60 percent or 80 percent TSS reduction for that particular alternative. Though WDNR regulations described in Section 1.02 only require a 20 percent TSS reduction, the 20 percent TSS reduction is applicable Village-wide. In contrast, the 60 percent and 80 percent TSS reduction goals that are addressed in each of the aforementioned alternatives are for particular watersheds. By achieving a greater TSS reduction for the particular watershed in which the alternative is proposed, the Village is more apt to achieve the overall 20 percent TSS reduction. In each of the alternatives, the required surface area listed was derived from the WDNR Wet Detention Basin Technical Standard (1001). Appendix G includes a spreadsheet depicting these calculations. The values listed are critical to a complete understanding of the land area required to be dedicated to a particular wet detention basin in order to achieve either a 60 percent or an 80 percent TSS reduction. More wet surface area and, therefore, more land is required to be dedicated for a wet detention basin in order to achieve an 80 percent TSS reduction compared to a 60 percent TSS reduction. It is noted that Alternatives 1 and 2 assess the performance of proposed ponds using the WinSLAMM software

program and, therefore, a specific TSS reduction has been calculated and is listed in the applicable portions of the text.

Alternative 3 focuses on improving the storm sewer system between Mill Street and State Highway 67 that crosses through private property. This alternative will redirect flows down Mill Street into existing storm sewer.

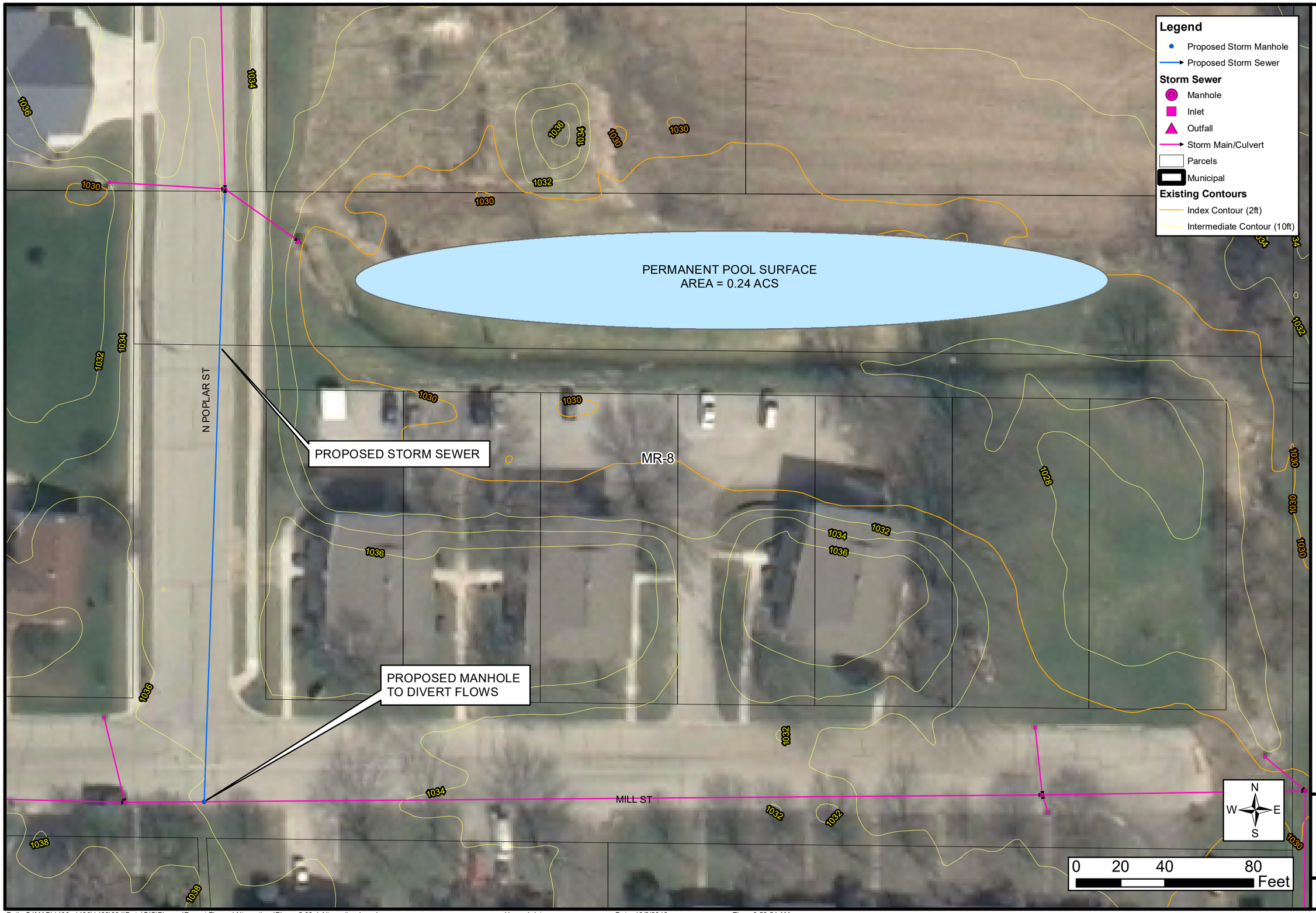
Condition	Watershed	Annual TSS Loading (lbs)	Total Percent Reduction	Additional Percent Reduction	Description
Baseline	MR	92,695	---	---	No Controls Condition
	WB	47,397	---	---	
Existing	MR	80,621	13.0%	---	Existing Conditions
	WB	33,488	29.3%	---	
Alternative 1	MR	76,852	17.1%	4.1%	Construct wet detention basin on Village-owned parcel N. Poplar St.
	WB	33,488	29.3%	--	
Alternative 2	MR	61,354	23.3%	10.3%	Diversion of flows from Ladwig St. to a newly constructed wet detention basin on the corner of S. Helena St. and Ladwig St.
	WB	33,488	29.3%	---	
Alternative 3	MR	80,621	13.0%	---	Abandon existing storm sewer crossing private property and redirect flows west down Mill St.
	WB	33,488	29.3%	---	

Table 5.02-1 Proposed Alternatives SLAMM Summary

5.03 ALTERNATIVE 1–CONSTRUCT A WET DETENTION BASIN ON NORTH POPLAR STREET (BASIN MR-8)

Currently, the Village-owned parcel on North Poplar Street experiences flooding during certain storm events. Alternative 1 proposes constructing a wet detention basin on this parcel to treat 20.71 acres in Basin MR-8 with a TSS percent reduction of 80 percent. Figure 5.03-1 shows the location of this basin. The required permanent pool surface area to provide 80 percent TSS reduction is 0.24 acres. This value was derived from calculations included in the WDNR Wet Detention Basin Technical Standards (1001). Appendix H includes a spreadsheet showing these calculations.

This alternative also includes the construction of about 290 linear feet of new storm sewer along North Poplar Street to redirect flows in that area to the new wet detention basin. Figure 5.03-1 shows the location of the new storm sewer. The pipe sizes of the existing storm sewer are not known at this time. During the design phase of this alternative, pipe elevations and sizes will need to be confirmed to ensure there is enough grade between the proposed manhole on Mill Street and the existing manhole on North Poplar Street. If a grade issue presents itself, there could be an option to move the proposed pond to the residential parcel at the east end of Mill Street given the property owner is willing to sell or dedicate some of his/her land. A wetland delineation will likely also be required prior to final design of the wet detention basin given that there are wetland indicator soils at the proposed site.



ALTERNATIVE 1
CONSTRUCT WET DETENTION BASIN AT N. POPLAR STREET

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FIGURE 5.03-1
1482.031

Path: S:\MAD\1400--1499\1482\031\Data\GIS\Figures\Report Figures\Alternatives\Figure 5.03-1 Alternative 1.mxd User: christyr Date: 10/3/2016 Time: 9:59:54 AM

Alternative 1 modeling shows the addition of this wet detention basin provides basin MR-8 with an additional 14 percent TSS reduction to bring the overall TSS reduction to 21.2 percent.

The overall effect of Alternative 1 is included in Table 5.02-1. The opinion of probable cost is shown in Table 5.07-1. The detailed opinion of cost is included in Appendix I.

5.04 ALTERNATIVE 2–CONSTRUCT A WET DETENTION BASIN AT THE NORTHEAST CORNER OF SOUTH HELENA STREET AND LADWIG STREET AND REDIRECT FLOWS TO NEW BASIN (BASIN MR-5)

Currently, the Village experiences flooding at the intersection of Ladwig Street and South Poplar Street. Alternative 2 proposes constructing new storm sewer along Ladwig Street to connect into the existing storm system at South Elm Street. Figure 5.04-1 shows the location of the proposed storm sewer. The construction of this storm sewer will redirect flows to a proposed wet detention basin that is also part of this alternative. The proposed wet detention basin is located on the northeast corner of South Helena Street and Ladwig Street that will treat about 74.5 acres in Basin MR-5. Figure 5.04-2 shows the location of this basin. The required permanent pool surface area to provide 80 percent TSS reduction is 0.28 acres. The parcel does not provide enough room for a pond of this size; therefore, a pond with a permanent pool surface area of 0.23 acres is proposed. This pond size will provide 60 percent TSS reduction. These surface area values were derived from calculations included in the WDNR Wet Detention Basin Technical Standards (1001). Appendix H includes a spreadsheet showing these calculations. A wetland delineation will likely also be required prior to final design of the wet detention basin given that there are wetland indicator soils at the proposed site.

Alternative 2 modeling shows the addition of this wet detention basin provides basin MR-5 with an additional 43.3 percent TSS reduction to bring the overall TSS reduction to 25.3 percent.

The overall effect of Alternative 1 is included in Table 5.02-1. The opinion of probable cost is shown in Table 5.07-1. The detailed opinion of cost is included in Appendix I.

5.05 ALTERNATIVE 3–ABANDON EXISTING STORM SEWER ON PRIVATE PROPERTY AND REDIRECT FLOWS WEST DOWN MILL STREET

Alternative 3 looks at abandoning the existing storm sewer that crosses under private property between Mill Street and State Highway 67 and redirecting the flows west down Mill Street to connect in existing storm sewer on North Helena Street. It is our understanding an existing storm sewer crosses under St. Matthews Church and School, and the pipe is exposed in the basement of this facility. Figure 5.05-1 shows the location of this existing storm sewer. The existing public pipe crossing under a private entity's structure poses a liability threat to the Village if the pipe should fail; therefore, it is recommended this issue be corrected.

Alternative 3 proposes abandoning the storm sewer at the southern existing inlet on Mill Street and redirect that flow north and then west down Mill Street and finally connect into the storm system on North Helena Street. In the basement of the church and school, it is proposed the storm sewer be removed and the basement floor restored to a level surface. To abandon the pipe at Mill Street, it is recommended flowable fill concrete be used to fill the pipe.

ALTERNATIVE 2
CONSTRUCT WET DETENTION BASIN AND DIVERSION OF FLOWS

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FIGURE 5.04-1
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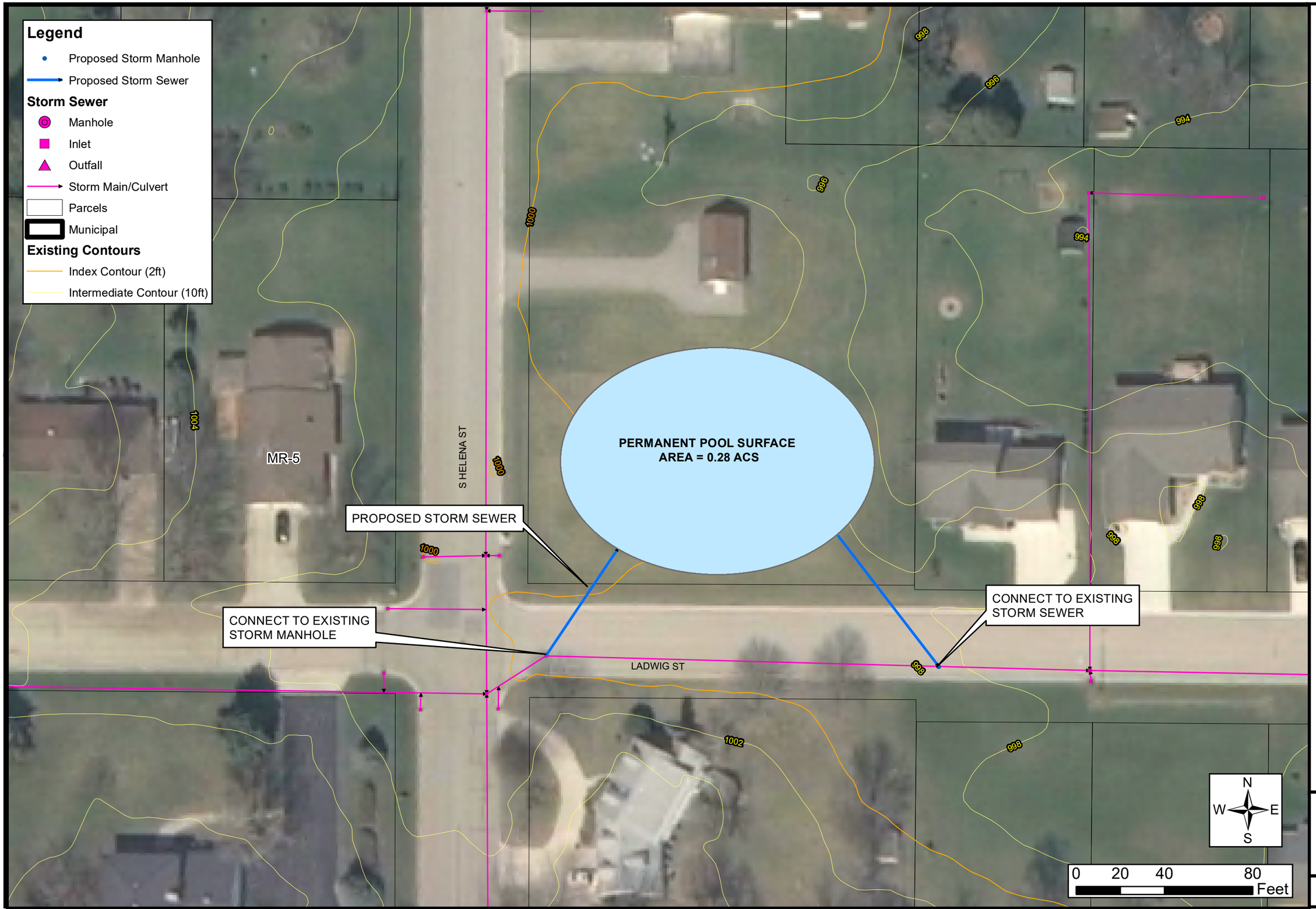

ALTERNATIVE 2
CONSTRUCT WET DETENTION BASIN AND DIVERSION OF FLOWS

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FIGURE 5.04-2
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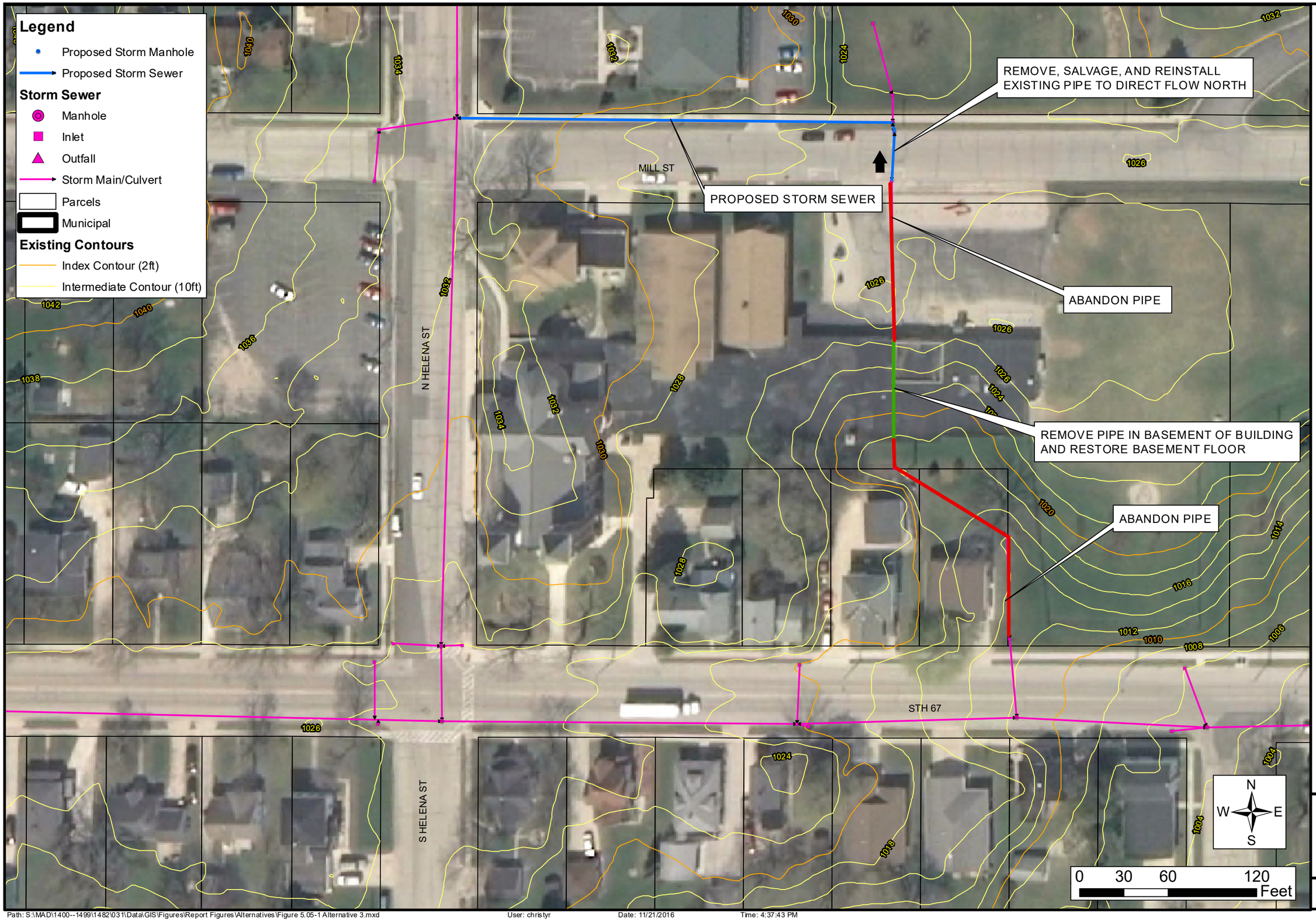

ALTERNATIVE 3

ABANDON AND REMOVE STORM SEWER BETWEEN MILL STREET AND STATE HWY 67

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FIGURE 5.05-1
1482.031

Path: S:\MAD\1400--1499\1482\031\Data\GIS\Figures\Report Figures\Alternatives\Figure 5.05-1 Alternative 3.mxd User: christyr Date: 11/21/2016 Time: 4:37:43 PM

The opinion of probable cost is shown in Table 5.07-1, and the detailed opinion of cost is included in Appendix I.

5.06 ACQUISITION OF DRAINAGE EASEMENTS ON PRIVATE PROPERTY

There are numerous areas within the Village where the public storm system is located on private property. For these areas, it is recommended the Village acquire drainage easements at these locations for maintenance reasons. The drainage easement would allow the Village staff to enter the private property, as necessary, to inspect and maintain the storm sewer. Figure 5.06-1 shows the locations of these areas where a drainage easement is needed.

5.07 EVALUATION OF ALTERNATIVES

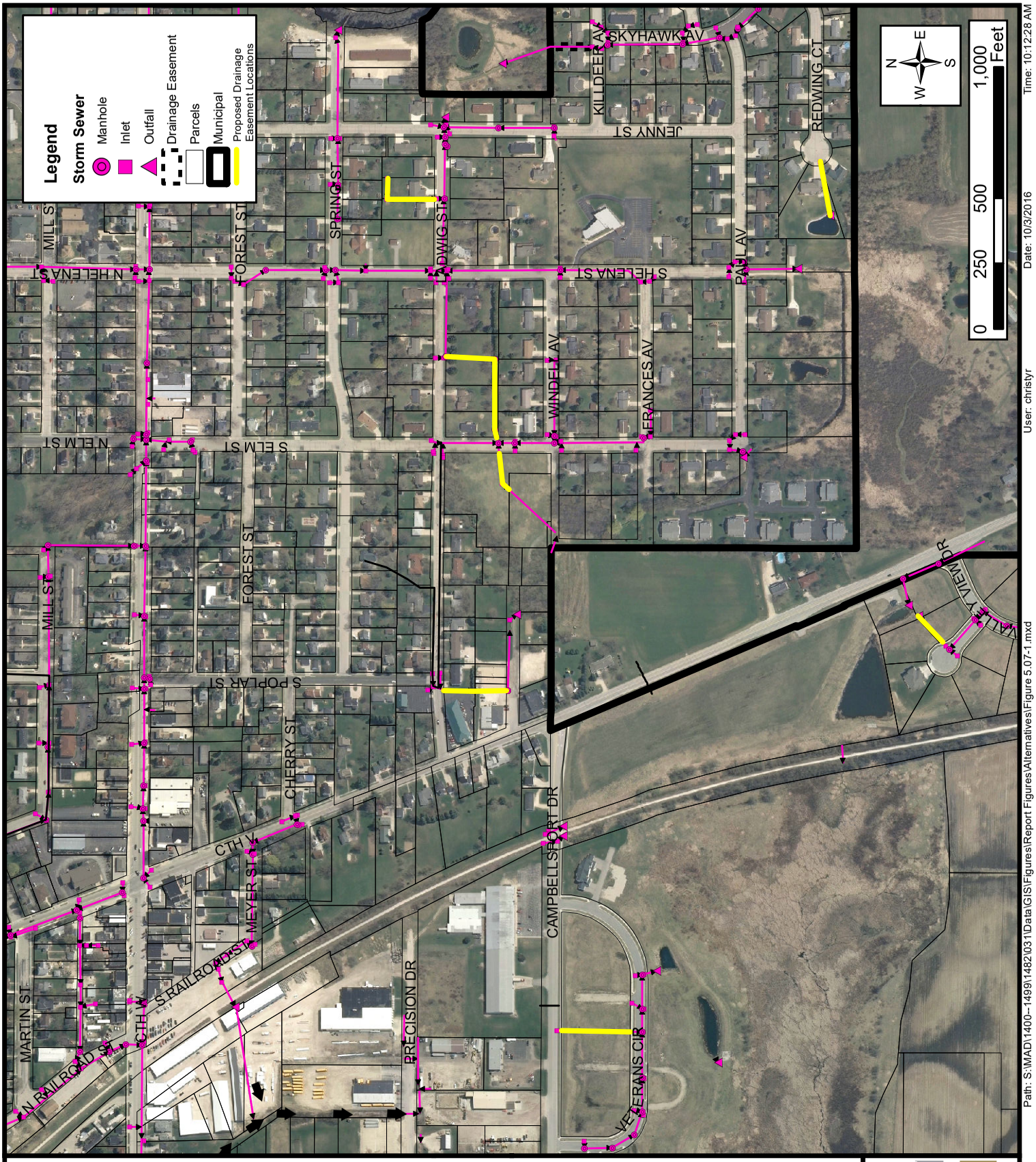
Table 5.07-1 summarizes the alternatives, the incremental TSS reduction, and the opinions of probable costs. Both alternatives analyzed considering TSS reductions achieve the 20 percent TSS reduction the Village would need to achieve as a minimum requirement as a permitted municipality.

The most cost-effective alternative is Alternative 3. This alternative solves a potential liability issue for the Village but does not combat flooding issues or increase TSS reductions.

Considering the two alternatives that help reduce flooding and pollutant loads, Alternative 2 is the most cost effective. It has a higher overall construction cost but treats a considerably larger amount of area.

Alt.	Alternative Description	Cost	Village-wide TSS Reduction	Cost per lb TSS Removed Above Existing Controls	Rank in Cost per lb Removed Above Existing Controls	Cost Rank
1	Construct wet detention basin at flooded parcel on North Poplar Street	$ 135,000.00	21.2%	$7.16	2	2
2	Diversion of flows from Ladwig Street to a newly constructed wet detention basin on the corner of South Helena Street and Ladwig Street	$ 288,240.00	25.3%	$5.95	1	3
3	Abandon existing storm sewer crossing private property and redirect flows west down Mill Street.	$ 59,460.00	N/A	N/A	N/A	1

Table 5.07-1 Summary of Alternatives–Cost



Path: S:\MAD\1400--1499\1482\031\Data\GIS\Figures\Report Figures\Alternatives\Figure 5.07-1.mxd User: christyr Date: 10/3/2016 Time: 10:12:28 AM

RECOMMENDED DRAINAGE EASEMENT LOCATIONS

STORMWATER QUALITY MANAGEMENT PLAN
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FOND DU LAC COUNTY, WISCONSIN

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FIGURE 5.06-1
1482.031

SECTION 6
CONCLUSIONS AND RECOMMENDATIONS

6.01 GENERAL

This section presents specific recommendations for achieving the goals of the Stormwater Quality Management Plan. These recommendations are based on the evaluations and information presented in Sections 2, 3, 4, and 5 of this Updated Plan.

6.02 RECOMMENDATIONS FOR ACHIEVING STORMWATER MANAGEMENT GOALS

Implementation of the following recommendations will aid the Village in achieving the goals and objectives contained in this Plan Update.

1. Continue to implement the recommended Public Information and Education Plan identified in Section 3 of this Plan. Meet the measurable goals for the program.

2. Perform illicit discharge inspections at major outfalls identified in Figure 2.01-1 once each year. Locate and eliminate any illicit discharges discovered according to the procedure described in Section 3.02 (B).

3. Continue to administer and enforce the recently adopted Village of Campbellsport's Construction Site Erosion Control Ordinance for construction site erosion and pollutant control.

4. Continue to administer and enforce the recently adopted Village of Campbellsport's Construction Site Erosion Control Ordinance for post-construction stormwater management.

5. Implement modifications to the Village's municipal operations as described in Section 3.

6. Update the Village's storm sewer system map on an annual basis.

7. Maintain grass-lined swales and wet detention basins according to the Maintenance and Inspection of Stormwater Management Facilities document provided in Appendix D.

8. Leverage funds from WDNR grants for design and construction for necessary improvements.

6.03 IMPLEMENTATION PLAN

Table 6.03-1 includes a breakdown of the selected stormwater management activities including the cost of each component, the implementation schedule, and possible funding source, if applicable. Many of the costs contained in the table are based on plans similar to the one herein.

Table 6.03-1 Projected Stormwater Management Costs and Implementation Plan

	Current Status		Year										
Activity	**Planning**	**Implementation**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**Potential Funding Source**
Public Information and Education													
Stormwater Management-Related Materials For Availability At Village Hall	In Report	Annual											General Fund
Expand Village Website to include additional links and information	In Report	On-going											General Fund
Village Stormwater Management Flyer and Article in Newspaper	In Report	Annual											General Fund
Promote environmentally sensitive development during concept plan review	In Report	On-going	$600	$612	$624	$637	$649	$662	$676	$689	$703	$717	General Fund
Continue Stormwater Policies and Practices Administration	In Report	On-going											General Fund
Work with Local Organization that Focuses on Stormwater Management Goals	In Report	Annual											General Fund
Village Board Meeting to Discuss Stormwater Issues	In Report	Annual											General Fund
Illicit Discharge Detection Program													
Implement Illicit Discharge Detection and Elimination Program	In Report	On-going	$2,500	$2,550	$2,601	$2,653	$2,706	$2,760	$2,815	$2,872	$2,929	$2,988	General Fund
Ongoing Field Screening	In Report	On-going											General Fund
Construction Site Erosion Control													
Continue Admin of Erosion Control Ordinance (Residential and Commercial)	In Report	On-going	$500	$510	$520	$531	$541	$552	$563	$574	$586	$598	General Fund
Site Plan Reviews		On-going											General Fund
Postconstruction Stormwater Management													
Continue Admin of Village Stormwater Management Requirements	In Report	On-going	$500	$510	$520	$531	$541	$552	$563	$574	$586	$598	General Fund
Site Plan Reviews	In Report	On-going											General Fund
Pollution Prevention Program Including Operation and Maintenance													
Create Inspection/Maintenance Schedule for Existing Stormwater BMPs	In Report	On-going											General Fund
Operation and Maintenance of Storm Sewers and Culverts		On-going											General Fund
Operation and Maintenance of Storm Sewer Endwalls		On-going											General Fund
Operation and Maintenance of Ditches		On-going											General Fund
Storm/Flood Emergency Responses		On-going	$25,000	$25,500	$26,010	$26,530	$27,061	$27,602	$28,154	$28,717	$29,291	$29,877	General Fund
Yard Waste/Brush/Grass Collection		On-going											General Fund
DPW Equipment Usage		On-going											General Fund
DPW Salary		On-going											General Fund
DPW Benefits		On-going											General Fund
Stormwater Quality Management													
Stormwater Quality Analysis (Baseline and Existing Conditions and TSS Reduction Analysis)	In Report	In Report	$8,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	General Fund
Storm Sewer Map													
Maintain Storm Sewer System Map	In Report	Annual	$500	$510	$520	$531	$541	$552	$563	$574	$586	$598	General Fund

	Current Status		Year										
Activity	**Planning**	**Implementation**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**Potential Funding Source**
Project Management													
Administration-Labor		Annual											General Fund
Administration-Benefits		Annual	$5,000	$5,100	$5,202	$5,306	$5,412	$5,520	$5,631	$5,743	$5,858	$5,975	General Fund
Administration-Direct Costs		Annual											General Fund
Capital Costs (From Village Budget)													
Capital Improvements and Planning		Annual	$45,000	$45,900	$46,818	$47,754	$48,709	$49,684	$50,677	$51,691	$52,725	$53,779	General Fund
Total			**$87,600**	**$81,192**	**$82,816**	**$84,472**	**$86,162**	**$87,885**	**$89,643**	**$91,435**	**$93,264**	**$95,129**	

6.04 PROGRAM FUNDING OPTIONS

Since the Village is currently not required to meet any TMDL requirements, construction of stormwater facilities for pollutant reduction purposes is not required. However, the Village may want to construct stormwater facilities to assist in flood control. If a stormwater project arises in the future, there are possible funding sources listed as follows.

A. Grants

Some of the more popular WDNR grant programs include the Urban Nonpoint Source and Stormwater Grant, Coastal Management Grant, Local Water Quality Management Planning Aids, Lake Planning Grant, Lake Protection and Classification Grant, and River Protection Grant. The WDNR UNPS Grant is the most appropriate for implementing stormwater quality BMPs recommended in this plan and has been successfully used by the Village in the past. Up to 50 percent of the design and construction of a stormwater quality BMP would be covered by the grant program should the Village be successful in obtaining a grant. Land acquisition is also funded through this grant program. The remaining percentage would be covered by Village funds. Scoring criteria dictates that if the Village were to pay a higher percentage, the score of the grant application would increase, potentially increasing the odds of grant award.

The Clean Water Fund administered through the WDNR is also a funding option with current funding providing a 30 percent principal forgiveness loan and a 70 percent low interest loan. The principal forgiveness loan is received through a competitive process. An Intent to Apply and Priority Evaluation Review Form would need to be submitted to the WDNR.

The Milwaukee Metropolitan Sewerage District (MMSD) initiated the Municipal Stormwater BMPs grant program in 2010. This program provides 75 percent MMSD/25 percent cost-sharing.

The USEPA Great Lakes Restoration Initiative provides funding for stormwater BMPs that protect the Great Lakes.

B. Fees

Fees are another common means of funding stormwater management improvements. Fees are charges for services rendered. Many municipalities, recover costs of constructing, designing, reviewing and/or inspecting new developments through fees assessed to developers. Impact fees and special assessments transfer the cost of infrastructure improvements needed for private development directly to developers or property owners. User fees recover costs over the life of a project. An increasingly common type of user fee related to stormwater management is a stormwater utility. A stormwater utility enables the municipality to recover costs of stormwater management improvements based on the amount of stormwater “generated” by a land use.

C. Bonds

Large capital improvement projects such as major storm sewers or detention facilities may be funded through bonds or grants. Bonds are a mechanism to borrow capital for a project and distribute repayment

over the life span of the project. A popular local bonding program is the Clean Water Fund Program (CWFP). This is one of the subsidized loan programs included in the WDNR Environmental Improvement Fund (EIF). The CWFP provides loans to municipalities for wastewater treatment and urban stormwater projects. This program has historically been used extensively for wastewater treatment plant construction. Recent program modifications allow funds to be used for stormwater management improvements.

Most CWFP projects receive a subsidized interest rate of 55, 65, or 70 percent of the EIF market interest rate. CWFP wastewater projects that meet certain criteria may be eligible to receive Hardship Financial Assistance, which may be in the form of a lower interest rate loan or include a grant.

D. Stormwater Utilities

A stormwater utility is a common way for municipalities to fund stormwater-related costs. A concept-level utility feasibility study would need to be conducted for the Village to determine if this would be an effective program for the Village.

E. Pollutant Trading/Watershed Adaptive Management

If the Village would ever need to minimize its pollutant reduction gap, the Village may also want to consider buying excess TSS and TP from upstream trading partners.

6.05 POLICIES AND PRACTICES

This Section includes a recommended policy for addressing drainage issues, which should be reviewed by the Village and, if appropriate, adopted as a formal policy.

1. Problem Identification and Drainage Evaluation

   a. After receiving a verbal or written complaint from a resident, the resident should be provided a Drainage Evaluation Form (Appendix B). The resident should complete Parts A, B, and C of the form and return it to the Village.

   b. Within 30 calendar days of receiving the form with completed Parts A, B, and C, a Village representative will inspect the location and review the information submitted by the resident. The Village representative will complete Part D of the form based upon this review.

   c. The Village representative will make a recommendation in Part E of the form regarding action to be taken (if any) to alleviate or mitigate the problem. Decision-making criteria will be clearly stated.

   d. A copy of the completed Drainage Evaluation Form will be returned to the resident. Additional copies will be maintained in the Village files and the form and complaint location will be incorporated into the Village's database for future analysis of drainage problem area trends.

2. Village of Campbellsport Authority

The Village authority should address individual drainage issues and make determinations on a case-by-case basis. Prior to the Village taking corrective action, the ownership of the properties causing the problem and being damaged should be verified. Where the Village has easement rights and the issue involves the obstruction of a natural watercourse (under Section 88.90 of the Wisconsin Administrative Code), the Village can move to correct the problem. If the drainage issue results from an activity that is not located on a Village property or right-of-way, does not violate a Village Ordinance, or does not involve obstruction of a natural watercourse, the Village may be without jurisdiction to act.

3. Determination of Village Responsibility

In cases where it is determined the Village can take corrective action to address the drainage deficiency, the following steps are recommended:

a. Alternative solutions to the identified problem should be developed and incorporated into the Village of Campbellsport Stormwater Quality Management Plan.

b. Opinions of probable engineering and construction costs of individual projects should be prepared.

c. As part of the annual budget process, projects to be constructed each year should be selected based upon priority ranking and funding availability.

6.06 CONCLUSION

The purpose of this report has been to provide the Village with erosion control and stormwater management ordinances and a stormwater quality management plan. The Village should continue to implement the recommendations included in Section 3. The Village is not required to implement any additional stormwater BMPs. However, the Village may want to implement a new stormwater BMP to reduce flooding in certain areas within the Village.

This investigation showed a few alternatives to effectively increase pollutant reductions and reduce flooding. Funding of the stormwater program is at the discretion of the Village. At this time, it appears the most economical way to implement a stormwater program is to apply for WDNR and EPA grants for the recommended program and plan updates.

APPENDIX A
STORMWATER MANAGEMENT ORDINANCE

Village of

Campbellsport

Erosion Control and Stormwater Management Requirements

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SECTION 1
TECHNICAL STANDARDS

1.01 TECHNICAL STANDARDS AND REFERENCES

A. Erosion Control and Stormwater Management Technical Standards

All drainage facilities and practices, located within the corporate limits and extraterritorial zoning area of the Village of Campbellsport, required to comply with the Erosion Control and Stormwater Management Ordinances shall incorporate technical standards and design methods specified in this document, maintained and periodically updated by the Village. Where not superceded by stricter requirements in this document, the following standards are also incorporated by reference:

1. Applicable design criteria, standards and specifications identified in the Wisconsin Department of Natural Resources' (DNR) Wisconsin Construction Site Best Management Practice Handbook, WDNR Pub. WR-222, or the latest revision.

2. Other design guidance and technical standards identified or developed by the DNR under subchapter V of chapter NR 151, Wisconsin. Administrative Code.

1.02 PRECIPITATION DEPTH, DISTRIBUTION AND AVERAGES

A. Precipitation Depths

The following references may be used as a source for design rainfall depths:

1. *Rainfall Frequency Atlas of the United States*, US Department of Commerce, Weather Bureau Technical Paper No. 40, May 1961.

2. Huff, Floyd A., and Angel, James R., *Rainfall Frequency Atlas of the Midwest*, Midwestern Climate Center, Bulletin 71, 1992.

B. Precipitation Distribution

1. Technical Paper No. 40 rainfall depths shall be used in conjunction with the SCS Type II rainfall distribution for a 24-hour storm duration. Technical Paper No. 40 rainfall depths shall not be allowed with Huff rainfall distributions.

2. Bulletin 71 rainfall depths shall be used in conjunction with the appropriate quartile Huff rainfall distribution for the storm duration producing the highest peak discharge.

C. Average Annual Rainfall

For applications requiring use of average annual rainfall, recorded City of Milwaukee depths for March 28 through December 6, 1969, shall be used.

1.03 DESIGN METHODS

A. Stormwater Runoff Calculations

1. For design of volume-dependent practices (detention basins, retention basins, infiltration systems, etc.), a hydrograph-producing method hydrologic model shall be developed. The following computer programs shall be allowed:

   a. TR-55
   b. TR-20
   c. HydroCAD
   d. HEC-HMS
   e. Other computer programs as allowed by the Village

2. The Rational Method may be used to calculate peak discharges for tributary areas less than 20 acres for purposes of conveyance system design.

3. Estimation of Required Storage Volume

   a. Final detention basin sizing shall be based on hydrograph routing through the basin with the proposed outlet structure.

   b. The Soil Conservation Service TR-55 Approximate Method may be utilized to calculate the required storage volume. This may be used for developments with watershed areas of less than 25 acres which do not involve significant off-site drainage that must be passed through the detention basin or routing of stormwater runoff through a series of detention basins. Soil Conservation Service Type II rainfall shall be utilized to estimate storage volume and peak inflow requirements.

4. Stormwater Conveyance System Design

   a. Storm Sewers shall be designed in accordance with procedures described in Procedures 13-25-35 through 13-25-45 of the Wisconsin

Department of Transportation (WisDOT) Facilities Design Manual (FDM).

b. Ditches shall be designed in accordance with procedures described in Procedures 13-30-5 through 13-30-10 of the WisDOT FDM.

c. Cross Culverts shall be designed in accordance with procedures described in Procedure 13-15-10 of the WisDOT FDM.

1.04 DESIGN CRITERIA

The design criteria identified in this section shall apply to new development or redevelopment within the Village. Applicants requesting approval for redevelopment may request a modification in the design criteria if the application is supported with calculations documenting that there will be no adverse impact to the surrounding property owners. NOTE: This criteria does not apply to retroactive applications, repair, replacement or rehabilitation of existing Village infrastructure but may be considered as guidance to follow on such Village projects.

A. Wet Detention Basins

Design in accordance with the Wet Detention Basin Conservation Practice Standard (DNR).

B. Dry Detention Basins

1. Minimum grades for the bottom of the basin shall be 1 percent unless underdrain is installed.

2. Basin side slopes shall not be steeper than 4:1 or flatter than 10:1.

3. Dry detention basins shall be designed to drain completely within 24 hours after the storm event.

4. Forebays shall be used to the maximum extent practical to prevent concentrated flow from entering the basin and allow sediment to settle prior to entering the basin.

   a. Forebay area should be 10 to 25 percent of the basin's surface area.
   b. Length to width ratio shall be at least 2:1.
   c. The forebay shall be located opposite of the basin's outlet to increase detention time.

5. The basin shall be designed with an emergency spillway designed to convey the 100-year peak discharge entering the basin. The emergency spillway shall be placed in a location and manner that minimizes the potential for damage to nearby property.

6. The basin shall have a ponding depth of less than 5 feet, with at least 1 foot of freeboard above the 100-year flood elevation or emergency spillway elevation, whichever is higher.

7. The basin shape should be designed with a length to width ratio of 3:1 in either a long narrow shape or a teardrop shape, to the maximum extent practical.

8. The basin shall be seeded with vegetation that is tolerant of inundation.

9. The basin outlet structure shall discharge to a stable outlet.

C. Infiltration Practices

Infiltration practices may be used in lieu of wet detention to achieve TSS reduction requirements. Design of infiltration practices shall be in conformance with Technical Standards and supporting guidelines published by the DNR.

D. Storm Sewers

1. Unless otherwise approved by the Village, all storm sewer in the public right-of-way (R/W) shall be constructed of reinforced concrete pipe of appropriate class for the expected loading. Storm sewer materials outside of the R/W shall be subject to approval of the Village.

2. The minimum allowable pipe diameter shall be 12 inches.

3. Sewer grades shall be designed so that, in general, a minimum 2-foot of ground cover is maintained over the top of the pipe. Pipe cover less than the minimum may be used upon site-specific approval by the Village. Uniform slopes shall be maintained between inlets, manholes and inlet to manhole. Minimum and maximum allowable slopes shall be those capable of producing velocities between 2 and 12 feet per second, respectively, when the sewer is flowing full. Velocities lower than the minimum or higher than the maximum may be used upon site-specific approval by the Village.

4. The maximum distance for overland flow of stormwater runoff to an underground storm sewer system shall be 600 feet unless a longer distance is approved by the Village.

5. All inlets and catch basins shall be constructed with a minimum 12-inch sump. If the drainage area is served by a wet detention pond, then sumps are not necessary.

E. Ditches

1. Ditch side slopes shall be no steeper than 4:1.

2. Underdrains may be required for ditch grades of 0.3 percent or less.

3. Ditches and open channels shall be protected with erosion mat as necessary to prevent erosion. The erosion mat shall be of an approved type and application specified in the "Erosion Control Product Acceptability List", most current revision, by the Wisconsin Department of Transportation.

F. Culverts

1. Culverts and similar structures shall have a capacity that meets or exceeds the capacity of the surface drainageway and shall be a minimum of 18 inches in diameter for culverts under roadways, unless otherwise approved by the Village, and 12 inches for culverts under private entrances. The flowline of a culvert shall match the flowline of the surface drainage way. Submitted plans shall indicate the sizes for all culverts including the opening size of culverts for private entrances.

2. Culvert pipe materials and cover requirements shall be the same as required for storm sewers in part D above.

3. Culverts shall not create backwater that adversely impacts upstream properties. Design of new culverts shall consider impacts of future upstream development.

4. End sections shall be provided for all culverts. Grates shall be required on end sections for all culverts greater than 18 inches in diameter.

SECTION 2
PERFORMANCE STANDARDS

2.01 EROSION AND SEDIMENT CONTROL PERFORMANCE STANDARDS

A. Total Suspended Solids Removal Goals

1. The Erosion and Sediment Control Plan shall include best management practices (BMPs) that, by design, achieve to the maximum extent practicable, a reduction of 80 percent of the sediment load carried in runoff based on an average annual rainfall, as compared with no sediment or erosion controls until the construction site has undergone final stabilization. An 80 percent sediment reduction shall meet the requirement of this paragraph. Erosion and sediment control BMPs may be used alone or in combination to meet the requirements of this paragraph. Credit toward meeting the sediment reduction may be given for limiting the duration or area, or both, of land-disturbing construction activity.

2. If BMPs cannot be designed and implemented to reduce the sediment load by 80 percent, based on an average annual rainfall, the plan shall include a written and site-specific explanation as to why the 80 percent reduction goal is not attainable, and the sediment load shall be reduced to the maximum extent practicable.

3. DNR is required to develop technical standards to provide guidance for measurement and evaluation of this performance standard. Measurement and evaluation of this performance standard shall be based on guidance published by the Department of Natural Resources. Until such guidance is published, total suspended solids removal shall be achieved to the maximum extent practical through implementation of approved BMP's.

B. Required Best Management Practices

Where appropriate, the plan shall include sediment controls to do all of the following to the maximum extent practicable:

1. Each site shall provide an access drive and parking area of sufficient dimensions and design, surfaced with a material that will prevent erosion and minimize tracking or washing of soil onto public or private roadways. All nonpaved access drives shall be designed so that stormwater runoff from adjacent areas does not flow down the drive surface.

2. Any significant amount of runoff from upslope land area, rooftops, or other surfaces that drain across the proposed land disturbance shall be diverted around the disturbed area, if practical. Any diversion of upslope runoff shall be done in a manner that prevents erosion of the flow path and the outlet.

3. Any cuts and fills shall be planned and constructed to minimize the length and steepness of slope and stabilized in accordance with the approved erosion control plan timelines and standards of this document.

4. Open channels shall be stabilized as required to prevent erosion.

5. Inlets to storm drains, culverts, and other stormwater conveyance systems shall be protected from siltation until final site stabilization.

6. Water pumped from the site shall be treated by temporary sedimentation basins or other appropriate controls designed for the highest dewatering pumping rate. Water may not be discharged in a manner that causes erosion of the site or receiving channels.

7. All waste and unused building materials shall be properly disposed of and not allowed to be carried by runoff into a receiving channel or storm sewer system.

8. All off-site sediment deposits occurring as a result of a storm event shall be cleaned up by the end of the next workday. All other off-site sediment deposits occurring as a result of land-disturbing activities shall be cleaned up by the end of the workday. Flushing may not be used unless the sediment will be controlled by a filter fabric barrier, sediment trap, sediment basin, or equivalent.

9. All activities on the site shall be conducted in a logical sequence to minimize the area of bare soil exposed at one time. Existing vegetation shall be maintained as long as possible.

10. Soil stockpiles shall be located no closer than 25 feet from lakes, streams, wetlands, ditches, drainageways, or roadway drainage systems. Stockpiles shall be stabilized by mulching, vegetative cover, tarps, or other means if remaining 20 days or more.

11. For any disturbed area that remains inactive for greater than 7 working days, or where grading work extends beyond annual permanent seeding deadlines, the Village of Campbellsport may require the site to be treated with temporary stabilization measures.

12. When the disturbed area has been stabilized by permanent vegetation or other means, temporary BMPs such as silt fences, straw bales, and sediment traps shall be removed and these areas stabilized.

2.02 STORMWATER MANAGEMENT PERFORMANCE STANDARDS

A. Total Suspended Solids

1. BMPs shall be designed, installed, and maintained to control total suspended solids carried in runoff from the postconstruction site as follows:

   a. For new development, by design, reduce to the maximum extent practicable, the total suspended solids load by 80 percent, based on the average annual rainfall, as compared to no runoff management controls. An 80 percent total suspended solids reduction shall meet the requirements of this subsection.

   b. For redevelopment sites, by design, reduce to the maximum extent practicable, the total suspended solids load by 40 percent from parking areas and roads, based on the average annual rainfall, as compared to no runoff management controls. A 40 percent total suspended solids reduction shall meet the requirements of this subsection.

   c. Notwithstanding items a. and b. if the design cannot achieve the applicable total suspended solids reduction specified, the stormwater management plan shall include a written and site-specific explanation why that level of reduction is not attained, and the total suspended solids load shall be reduced to the maximum extent practicable as determined by the Village.

   d. Measurement and evaluation of this standard shall be based on guidance published by the DNR. In the absence of such guidance, total suspended solids removal shall be achieved to the maximum extent practical through implementation of approved BMP's.

B. Peak Discharge

1. By design, BMPs shall be employed to maintain or reduce the peak runoff discharge rates, to the maximum extent practicable, as compared to pre-development conditions for the 2- through 100-year design storm applicable to the development site.

2. Predevelopment conditions shall assume "good hydrologic conditions" for appropriate land covers as identified in TR-55 or an equivalent methodology. The meaning of "hydrologic soil group" and "runoff curve number" are as determined in TR-55. However, when predevelopment land cover is cropland, rather than using TR-55 values for cropland, the runoff curve numbers in Table 2.02-1 shall be used.

Hydrologic Soil Group	A	B	C	D
Runoff Curve Number	56	70	79	83

Table 2.02-1 Maximum predevelopment Runoff Curve Numbers for Cropland Areas

C. Runoff Volume

At locations where site conditions permit and where technically feasible, infiltration of stormwater to reduce the volume of runoff likely will be required. If stormwater infiltration can be demonstrated, the reduced volume may be taken into account when designing practices to meet the peak flow control and pollution control requirements of this ordinance.

Where applicable, evaluation of the need for, appropriateness of, and required volume of infiltration shall be based on the most current DNR rules and technical standards. Infiltration shall not be permitted at locations specifically excluded in the DNR rules.

D. Oil and Grease

Fueling and vehicle maintenance areas shall have BMPs designed, installed, and maintained to reduce petroleum within runoff so that the runoff that leaves the site contains no visible petroleum sheen.

E. Protective Areas

1. A vegetated protective area with the width measured horizontally, specified in Table 2.02-3, shall be provided from the top of the channel (per definition in Section 5) of lakes, streams, and rivers or the delineated boundary of wetlands.

2. Impervious surfaces shall be kept out of the protective area unless impractical, with consideration of the planned use. The stormwater management plan shall contain a written site-specific explanation for any parts of the protective area that are disturbed during construction.

3. Where land-disturbing construction activity occurs within a protective area, and where no impervious surface is present, adequate sod or self-sustaining vegetative cover of 70 percent or greater shall be established and maintained. 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. Nonvegetative 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.

   In selecting the vegetative cover for the protective area, existing natural vegetative cover shall be left undisturbed, to the maximum extent practical. Where existing vegetative cover must be disturbed, consider revegetating the protective area with native plantings, where feasible.

Type of Resource	Protective Area
Outstanding and Exceptional Resource Waters	75 feet
Perennial/Intermittent Streams per USGS Map	50 feet
Lakes and Wetlands	50 feet
Other Waterways with Drainage Areas > 130 ac	10 feet

Table 2.02-3 Types of Resources and Protective areas

4. Best management practices such as filter strips, bioretention basins, swales, or wet detention basins that are designed to control pollutants from nonpoint sources may be located in the protective area.

5. The protective area requirement does not apply to:

    a. Redevelopment sites.

    b. In-fill development areas less than 5 acres.

    c. Structures that cross or access surface waters such as boat landings, bridges, and culverts.

    d. Structures constructed in accordance with s. 59.692(1v), Wis. Stats.

    e. Postconstruction sites from which runoff does not enter the surface water, except to the extent that vegetative ground cover is necessary to maintain bank stability.

6. Stormwater Conveyance Systems

    a. Storm Sewers shall be designed to convey the peak discharge for a 10-year frequency storm event. However, situations where no positive overland flow route is present, storm sewers shall be designed for a 100-year frequency storm event.

    b. Cross culverts shall be designed to convey the peak discharge for a 25-year frequency storm event. In certain cases, at the discretion on the Village of Campbellsport, cross culverts that serve larger watersheds and/or cross collector roads/streets shall be designed for a 100-year frequency storm event.

    c. Ditches shall be designed to convey the peak discharge for a 25-year frequency storm event. In certain cases, at the discretion on the Village of Campbellsport, ditches that serve larger watersheds and/or cross collector roads/streets shall be designed for a 100-year frequency storm event.

    d. All conveyance systems shall be designed to safely pass the 100-year storm flow without damage to adjacent structures. Unless waived by the Village of Campbellsport, all new structures shall be constructed at least 2 feet higher than the estimated 100-year overflow elevation.

SECTION 3
GENERAL CONSIDERATIONS

3.01 GENERAL CONSIDERATIONS

A. All concentrated stormwater discharges leaving a site must be conveyed into an existing channel, storm sewer, or overland flow route with adequate downstream stormwater capacity and shall not result in increased flood hazard, erosion, or other adverse impacts.

B. 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.

C. 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.

SECTION 4
SUBMITTAL REQUIREMENTS

4.01 EROSION AND SEDIMENT CONTROL PLAN

Submittal requirements for Erosion and Sediment Control Plans are summarized below. The Village may waive a portion of these submittal requirements where such information is not necessary to demonstrate compliance with Ordinance Title 10, Chapter 9. Two hard copies and one digital copy, on a CD or jump drive, shall be provided to the Village.

A. Responsible Party and Legal Description

1. 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.

2. A site location map at a recognizable scale and proper legal description of the property proposed to be developed, referenced to the US Public Land Survey system or to block and lot numbers within a recorded land subdivision plat.

B. Predevelopment Site Conditions Mapping

1. A USGS Quadrangle or other appropriate map approved by the Village Engineer showing the project location and nearby regional water resources potentially impacted by the project.

2. A copy of the applicable Soils Survey Map showing predominant soil types and hydrologic soil groups.

3. Mapping or description of existing cover type and condition.

4. A predeveloped conditions site map including the following information described below. Mapping shall include enough of the contiguous properties to show runoff patterns onto, through, and from the site.

   a. Existing topographic contours of the site at a contour interval not to exceed 1 foot.

   b. Property lines.

   c. Existing flow paths and direction across the site.

d. Outlet locations identifying where stormwater drainage leaves the property.

e. Drainage basin divides and subdivides to all outlet locations where stormwater drainage leaves the property.

f. Existing drainage structures on and adjacent to the site.

g. Watercourses that may affect or be affected by runoff from the site.

h. Lakes, streams, wetlands, channels, ditches, and other watercourses on and immediately adjacent to the site.

i. Limits of the 100-year floodplain.

C. Proposed Site Grading and Erosion Control Plan

A Site Grading and Erosion Control Plan shall be provided that includes the following items. The plan shall be at an appropriate scale for the size of the development.

1. Boundaries of the construction site.

2. Drainage patterns and approximate slopes anticipated after major grading activities.

3. Areas of soil disturbance.

4. Location of major structural and nonstructural controls identified in the plan.

   a. Location of areas where stabilization practices will be employed.

   b. Areas which will be vegetated following construction.

5. Extent of wetland acreage on the site and locations where stormwater is discharged to a surface water or wetland.

D. Calculations

Calculations shall be provided including computer modeling input and output files, as needed, to demonstrate compliance with ordinance performance standards. All major assumptions used in developing input parameters shall be clearly stated. The drainage basin areas used in making the calculations shall be clearly cross-referenced to the required map(s).

E. Narrative

A narrative description of the proposed Erosion and Sediment Control Plan shall be provided, including the following:

1. Name of the immediate named receiving water from the United States Geological Service 7.5 minute series topographic maps, as well as locations of all surface waters and wetlands within one mile of the construction site.

2. A description of the site and the nature of the construction activity.

3. A sequence of construction of the development site, including stripping and clearing; rough grading; construction of utilities, infrastructure, and buildings; and final grading and landscaping. Sequencing shall identify the expected date on which clearing will begin, the estimated duration of exposure of cleared areas, areas of clearing, installation of temporary erosion and sediment control measures, and establishment of permanent vegetation.

4. Estimates of the total area of the site and the total area of the site that is expected to be disturbed by construction activities.

5. Estimates, including calculations, if any, of the runoff coefficient of the site before and after construction activities are completed.

6. A description of appropriate controls and measures that will be performed at the site to prevent pollutants from reaching waters of the state. The plan shall clearly describe the appropriate control measures for each major activity and the timing during the construction process that the measures will be implemented. The description of erosion controls shall include, when appropriate, the following minimum requirements:

    a. Description of interim and permanent stabilization practices, including a practice implementation schedule. Site plans shall ensure that existing vegetation is preserved where attainable and that disturbed portions of the site are stabilized.

b. Description of structural practices to divert flow away from exposed soils, store flows, or otherwise limit runoff and the discharge of pollutants from the site. Unless otherwise specifically approved in writing by the Village of Campbellsport, structural measures shall be installed on upland soils.

c. Descriptions of any other practices proposed to meet requirements of Ordinance Title 10, Chapter 9 and prevent erosion from the site.

4.02 STORMWATER MANAGEMENT PLAN SUBMITTAL REQUIREMENTS

Submittal requirements for Stormwater Management Plans are summarized below. The Village may waive a portion of these submittal requirements where such information is not necessary to demonstrate compliance with Ordinance Title 10, Chapter 9.

A. Responsible Party and Legal Description

The required stormwater management plan should contain, at a minimum, the following information:

1. 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.

2. 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.

B. Predevelopment Site Conditions Mapping

1. A USGS Quadrangle or other appropriate map showing the project location and nearby regional water resources potentially impacted by the project.

2. A copy of the applicable Soils Survey Map showing predominant soil types and hydrologic soil groups.

3. Mapping or description of existing cover type and condition.

4. A predeveloped conditions site map at a recognizable scale including the following information described below. Mapping shall include enough of the contiguous properties to show runoff patterns onto, through, and from the site:

   a. Existing topographic contours of the site at a contour interval not to exceed 2 feet.

   b. Property lines.

   c. Existing flow paths and direction across the site.

   d. Outlet locations identifying where stormwater drainage leaves the property.

   e. Drainage basin divides and subdivides to all outlet locations where stormwater drainage leaves the property.

   f. Existing drainage structures on and adjacent to the site.

   g. Watercourses that may affect or be affected by runoff from the site.

   h. Lakes, streams, wetlands, channels, ditches, and other watercourses on and immediately adjacent to the site.

   i. Limits of the 100-year floodplain.

   j. Location of wells and wellhead protection areas covering the project area and delineated pursuant to s. NR 811.16, Wis. Adm. Code.

C. <u>Postdevelopment Site Conditions Mapping</u>

1. Proposed pervious areas including vegetative cover type and condition.

2. Proposed impervious surfaces including all buildings, structures, and pavement.

3. Proposed topographic contours of the site at a scale not to exceed one foot.

4. Proposed drainage network including enough of the contiguous properties to show runoff patterns onto, through, and from the site; locations and dimensions of drainage easements.

5. Locations of maintenance easements specified in the maintenance agreement.

6. Flow path and direction for all stormwater conveyance sections.

7. Location and type of all stormwater management conveyance and treatment practices, including the on-site and off-site tributary drainage area.

8. 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 drainageway.

9. Proposed drainage divides and subdivides identified to each outlet location where stormwater will discharge from the proposed development site.

D. Detailed Drawings

Detailed drawings including cross sections and profiles of all permanent stormwater conveyance and treatment practices.

E. Calculations

Calculations, including computer modeling input and output files, as needed to demonstrate compliance with ordinance performance standards. All major assumptions used in developing input parameters shall be clearly stated. The drainage basin areas used in making the calculations shall be clearly cross-referenced to the required map(s).

F. Narrative

A narrative including, at a minimum, the following:

1. A description of methodologies and major assumptions used in developing hydrologic and hydraulic analyses.

2. A summary of analysis results and conclusions that shall include the following:

   a. Tables summarizing predeveloped and postdeveloped hydrologic parameters for each drainage basin. Tables shall include subbasin areas, runoff curve numbers, impervious areas, and times of concentration for predeveloped and postdeveloped conditions.

b. Tables summarizing peak discharge rates for the 2-year, 5-year, 10-year, 25-year, and 100-year storm events for predeveloped, post-developed without stormwater control practices, and postdeveloped with stormwater control practices conditions.

3. 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.

4. Explanation of any restrictions on stormwater management measures in the development area imposed by wellhead protection plans, any applicable Wellhead Protection district indicated on the zoning map of the Village and its extraterritorial zoning area, and associated regulations in Section 10-1-0506 of the zoning ordinance.

5. Results of investigations of soils and groundwater required for the placement and design of stormwater management measures.

6. A description and installation schedule for the stormwater management practices needed to meet the performance standards.

7. A maintenance plan developed for the life of each stormwater management practice including the required maintenance activities and maintenance activity schedule. Permanent post-construction stormwater management facilities to be located on private lands and/or to be privately maintained shall submit a long-term stormwater maintenance agreement in accordance with Village ordinance 10-9-25. The Village will record the stormwater maintenance agreement after the stormwater management permit has been issued.

8. Cost estimates for the construction, operation, and maintenance of each stormwater management practice.

9. Other information requested in writing by the Village of Campbellsport to determine compliance of the proposed stormwater management measures with the provisions of this ordinance.

G. <u>Certification of Site Investigations, Plans, Designs, Computations, and Drawings</u>

All site investigations, plans, designs, computations, and drawings shall be certified by a Wisconsin-licensed professional engineer to be prepared in accordance with accepted engineering practice and requirements of the ordinance.

SECTION 5
DEFINITIONS

5.01 DEFINITIONS

1) **"Agricultural facilities and practices "** has the meaning given in s. 281.16, Wis. Stats.
2) **"Average annual rainfall"** means a calendar year of precipitation, excluding snow, which is considered typical. For applications requiring use of average annual rainfall, recorded City of Milwaukee depths for March 28 through December 6, 1969, shall be used.
3) **"Best management practice" or "BMP"** means structural or non-structural measures, practices, techniques or devices employed to avoid or minimize sediment or pollutants carried in runoff to waters of the state.
4) **"Business day"** means a day the office of the Village is routinely and customarily open for business.
5) **"Cease and desist order"** means a court-issued order to halt land disturbing construction activity that is being conducted without the required permit.
6) **"Connected imperviousness"** means an impervious surface that is directly connected to a separate storm sewer or water of the state via an impervious flow path.
7) **"Construction Site"** means 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 where multiple separate and distinct land disturbing construction activities may be taking place at different times on different schedules but under one plan.
8) **"Design storm"** means a hypothetical discrete rainstorm characterized by a specific duration, temporal distribution, rainfall intensity, return frequency, and total depth of rainfall.
9) **"Development"** means residential, commercial, industrial or institutional land uses and associated roads.
10) **"Director of Public Works"** means the Village of Campbellsport Director of Public Works or designee.
11) **"Division of land"** means the act or process of dividing land into two or more parcels, as defined by Section 26-7 of the Village of Campbellsport Subdivision Ordinance.
12) **"Effective infiltration area"** means 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.
13) **"Erosion"** means the process by which the land's surface is worn away by the action of wind, water, ice or gravity.
14) **"Exceptional resource waters"** means waters listed in s. NR 102.11, Wis. Adm. Code.
15) **"Extraterritorial Zoning Jurisdiction"** means the unincorporated area within 1½ miles of the Village as defined by Section 26-7 of the Village of Campbellsport Subdivision Ordinance.
16) **"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% of the cover, for the unpaved areas and areas not covered by permanent structures, or employment of equivalent permanent stabilization measures.
17) **"Financial guarantee"** means a performance bond, maintenance bond, surety bond, irrevocable letter of credit, or similar guarantees submitted to the Village by the responsible party to assure that requirements of the ordinance are carried out in compliance with the stormwater management plan.
18) **"Governing body"** means the Village Board of Trustees.

19) **"Impervious surface"** means 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 areas that typically are impervious.
20) **"In-fill area"** means an undeveloped area of land located within existing development or which adjacent properties on at least three sides are developed or in public rights-of-way, as determined by the Village.
21) **"Infiltration"** means the entry of precipitation or runoff into or through the soil.
22) **"Infiltration system"** means 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.
23) **"Karst feature"** means an area or geologic feature subject to bedrock dissolution so that it is likely to provide a conduit to groundwater, and may include caves, enlarged fractures, mine features, exposed bedrock surfaces, sinkholes, springs, seeps or swallets.
24) **"Land Development Activity"** means any construction related activity that results in the addition or replacement of impervious surfaces such as rooftops, roads, parking lots, and other structures. Measurement of areas impacted by land development activity includes areas that are part of a larger common plan of 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.
25) **"Land disturbing construction activity"** means 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 sediment into waters of the state. Land disturbing construction activity includes clearing and grubbing, demolition, excavating, pit trench dewatering, filling and grading activities.
26) **"Maintenance agreement"** means a legal document that provides for long-term maintenance of stormwater management practices.
27) **"MEP" or "maximum extent practicable"** means a level of implementing best management practices in order to achieve a performance standard specified in this ordinance which takes into account the best available technology, cost effectiveness and other competing issues such as human safety and welfare, endangered and threatened resources, historic properties and geographic features. MEP allows flexibility in the way to meet the performance standards and may vary based on the performance standard and site conditions.
28) **"New development"** means development resulting from the conversion of previously undeveloped land or agricultural land uses, except for development of In-Fill areas as described above.
29) **"Off-site"** means located outside the property boundary described in the permit application.
30) **"On-site"** means located within the property boundary described in the permit application.
31) **"Ordinary high-water mark"** has the meaning given in s. NR 115.03(6), Wis. Adm. Code.
32) **"Outstanding resource waters"** means waters listed in s. NR 102.10, Wis. Adm. Code.

33) "**Percent fines"** means the percentage of a given sample of soil, which passes through a # 200 sieve.
34) **"Performance standard"** means a narrative or measurable number specifying the minimum acceptable outcome for a facility or practice.
35) **"Permit"** means a written authorization made by the Village to the applicant to conduct land disturbing construction activity or to discharge post-construction runoff to waters of the state.
36) **"Permit administration fee"** means a sum of money paid to the Village of Campbellsport by the permit applicant for the purpose of recouping the expenses incurred by the authority in administering the permit. Refer to the fee schedule adopted by the Village Board.
37) **"Pervious surface"** means 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.
38) **"Pollutant"** has the meaning given in s. 283.01(13), Wis. Stats.
39) **"Pollution"** has the meaning given in s. 281.01(10), Wis. Stats.
40) **"Post-construction site"** means a construction site following the completion of land disturbing construction activity and final site stabilization.
41) **"Pre-development condition"** means 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.
42) **"Preventive action limit"** has the meaning given in s. NR 140.05(17), Wis. Adm. Code.
43) **"Redevelopment "** means areas where development is replacing older development
44) **"Responsible party"** means any entity holding fee title to the property.
45) **"Runoff"** means stormwater or precipitation including rain, snow or ice melt or similar water that moves on the land surface via sheet or channelized flow.
46) **"Sediment"** means settleable solid material that is transported by runoff, suspended within runoff or deposited by runoff away from its original location.
47) **"Separate storm sewer"** means 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 draining to a stormwater treatment device or system.
    d. Discharges directly or indirectly to waters of the state.
48) **"Site"** means the entire area included in the legal description of the land on which the land disturbing construction activity is proposed.
49) **"Stop work order"** means an order issued by the Village which requires that all construction activity on the site be stopped.
50) **"Stormwater management plan"** means a comprehensive plan designed to reduce the discharge of pollutants from stormwater after the site has under gone final stabilization following completion of the construction activity.
51) **"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.
52) **"Technical standard"** means a document that specifies design, predicted performance and operation and maintenance specifications for a material, device or method.
53) **"Top of the channel"** means 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.

54) **"TR-55"** means 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.

55) **"Waters of the state"** has the meaning given in s. 281.01 (18), Wis. Stats.

SECTION 6
FORMS

GENERAL INFORMATION
STORMWATER MANAGEMENT PERMIT APPLICATION

Send Application to:

Village of Campbellsport
PO Box 709
Campbellsport, Wisconsin 53010

Official Use Only

Date Received _____
Number _____
Fee Received _____
Reviewer _____

This application applies to the any of the following:

1. Any development that results in 20,000 square feet or more of land disturbing activity.
2. Any development that results in the addition of 10,000 square feet or more of impervious area.
3. A subdivision plat.
4. A certified survey map intended for commercial or industrial use.

Instructions: Please type or print. Read all instructions before completing application. Refer to the Fee Schedule adopted by the Village Board for applicable fees. See Section 10-1-0302 for development activity exemptions. Submit 2 hard copies and 1 digital copy on CD or jump drive.

Name of Project: _____

Applicant/Entity Receiving Permit

Name of Applicant: _____
First Name of Contact: _____Last Name:_____
Street (1): _____
Street (2): _____
City: _____State: _____ Zip Code: ___
Telephone Number: (____) _____
Fax Number: (____) _____

Property Owner

First Name: _____ Last Name:_____
Street (1): _____
Street (2): _____
City: _____State: _____ Zip Code: _____
Telephone Number: (_____) _____
Parcel Identification Number(s): _____

Engineer

Name of Firm: _____
First Name of Contact: _____Last Name:_____
Street (1): _____
Street (2): _____
City: _____State: _____ Zip Code: ____
Telephone Number: (_____) _____
Fax Number: (_____) _____

Village of Campbellsport
Stormwater Management Plan
Application Checklist

Permit #: _____

Project Name: _____ **Date:**_____

Please check the appropriate box: I = Included; NA = Non-Applicable *(If "NA" is checked, an explanation must be entered.)*

Plan Requirement	I	NA	Explanation/Location in Plan
A. Submittal Requirements			
1. Permit Application Form			
2. Maintenance Agreement			
3. Application Fee			
4. Financial Guarantee			
5. Certification/Stamp by Wisconsin Prof. Engineer			
B. Predevelopment Site Conditions Mapping			
1. Location Map			
2. Soils Survey Map			
3. Existing Land Use Mapping			
4. Predeveloped Site Conditions			
a. Existing Contours			
b. Property lines			
c. Existing flow paths and direction			
d. Outlet locations			
e. Drainage basin divides and subdivides			
f. Existing drainage structures on and adjacent to the site.			
g. Nearby Watercourses			
h. Lakes, streams, wetlands, channels, ditches, etc.			
i. Limits of the 100-year floodplain;			
j. Wells/Wellhead Protection Areas			
C. Post-Development Site Conditions Mapping			
1. Pervious Surfaces			
2. Impervious Surfaces			
3. One Foot Topographic Contours			
4. Proposed Drainage System (including applicable off-site)			
5. Proposed Easement Locations			
6. Proposed Flow Paths, Overland Flow Routes			
7. Proposed Outlets/Drainage Divides			
D. Drawings/Details			
1. Practice Location/Layout/Cross Sections			
2. Outlet Structure Details			
3. Ditch/Storm Sewer Plan/Profile			
4. Other			
E. Calculations, including computer modeling input and output files.			
1. Hydrograph Parameter Calculations			
2. Computer Modeling Input/Output (Pre- and Postdeveloped)			
3. Detention Pond Routing			
4. Conveyance System Design			

Village of Campbellsport
Stormwater Management Plan
Application Checklist

Permit #: _____

Project Name: _____ **Date:**_____

Please check the appropriate box: I = Included; NA = Non-Applicable *(If "NA" is checked, an explanation must be entered.)*

Plan Requirement	I	NA	Explanation/Location in Plan
5. Other			
F. Narrative			
1. Methodologies and Assumptions			
2. Results/Conclusions			
a. Pre-, and Post-developed parameter summary			
b. Pre-, and Post-developed peak discharge Summary			
3. Provisions to preserve natural topography/cover features			
4. Limitations from wellhead protection plans and ordinances.			
5. Results of investigations of soils and groundwater			
6. Practice Installation Schedule			
7. Maintenance Plan			
8. Cost Estimates			
9. Other Information			

Applicant Name _____ Phone _____

Applicant Signature _____ Email _____

Village of Campbellsport, Revised 07/15/2014

Village of Campbellsport
Stormwater Management Plan Application Checklist
Summary Tables

Hydrologic Parameters

Basin Name	Drainage Area (Ac)		Runoff Curve Number		Time of Concentration (min.)	
	Existing	Proposed	Existing	Future	Existing	Future

Village of Campbellsport
Application Checklist
Summary Tables

Peak Discharge Summary

Outfall No._____

Storm Frequency	Peak Discharge (cfs)		
	Predev.	Postdev.	Postdev. w/Detention
2-Year			
5-Year			
10-Year			
25-Year			
50-Year			
100-Year			

Note: Provide 1 table for each oufall location.

Detention Basin Summary

Detention Basin _____

Storm Frequency	Storage Volume (ac-ft)	Peak Discharge (cfs)		
		Inflow	Discharge	Pond Elevation
2-Year				
5-Year				
10-Year				
25-Year				
50-Year				
100-Year				

Note: Provide 1 table for each detention basin.

VILLAGE OF CAMPBELLSPORT

STORMWATER MANAGEMENT PERMIT NO. _____

Date of Application _____
Site Address_____
Plat Name_____
Certified Survey Map_____
Lots No. (s) _____

I have reviewed and understand Chapter 10-9 of the Village of Campbellsport general ordinances regarding stormwater management and I shall implement the stormwater management plan for this project as approved by the Village.

General Conditions:

(a) All storm water management measures shall be installed in accordance with the approved storm water management plan and this permit.

(b) The Village shall be notified at least 3 business days before commencing any work in conjunction with the storm water management plan, and within 3 business days upon completion of the storm water management practices.

(c) Practice installations shall be certified "as built" by a licensed professional engineer. Completed storm water management practices must pass a final inspection by the Village or its designee to determine if they are in accordance with the approved storm water management plan and ordinance.

(d) The Village shall be notified of any significant proposed modifications to an approved storm water management plan.

(e) All storm water management practices shall be maintained in accordance with the storm water management plan until the practices either become the responsibility of the Village of Campbellsport or are transferred to subsequent private owners as specified in the approved maintenance agreement.

(f) The Village of Campbellsport is authorized to perform any work or operations necessary to bring storm water management measures into conformance with the approved storm water management plan, and consent 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 S.10.

(g) If so directed by the Village, all damage to adjoining facilities and drainage ways caused by runoff, where such damage is caused by activities that are not in compliance with the approved storm water management plan shall be repaired at the permitee's expense.

(h) Access is permitted to the Village or its designee for the purpose of inspecting the property for compliance with the approved storm water management plan and this permit.

APPLICANT MUST FILL IN BOXED AREA

Owner _____
(please print or type full name)
Address_____
_____
_____
Signature or Owner or Authorized Representative

Gross Aggregate Area (Square Feet) _____

SPECIAL CONDITIONS: _____

_____

_____

_____

CONDITIONAL APPROVAL: _____

Administrative Authority Title Date

Permit VALID for a period of twelve (12) months from date of issuance by Village and all work must be completed prior to the expiration unless authorized in writing from the Village.

This permit applies to the any of the following:

1. Any development that results in 20,000 square feet or more of land disturbing activity.
2. Any development that results in the addition of 10,000 square feet or more of impervious area.
3. A subdivision plat.
4. A certified survey map intended for commercial or industrial use.

GENERAL INFORMATION
CONSTRUCTION SITE EROSION CONTROL PERMIT APPLICATION

Official Use Only	
Date Received	_____
Number	_____
Fee Received	_____
Reviewer	_____

Send Application to:

Village of Campbellsport
PO Box 709
Campbellsport, Wisconsin 53010

This application applies to construction sites that have 4,000 square feet of land disturbing construction activity. See 10-9-3 of the Village's Construction Site and Erosion Control Ordinance for exemptions.

Instructions: Please type or print. Read all instructions before completing application. Refer to the Fee Schedule adopted by the Village Board for applicable fees.

Name of Project:_____

Applicant/Entity Receiving Permit

Name of Applicant: _____
First Name of Contact: _____Last Name:_____
Street (1): _____
Street (2): _____
City: _____State: _____ Zip Code: ___
Telephone Number: (____) _____
Fax Number: (____) _____

Property Owner

First Name: _____ Last Name:_____
Street (1): _____
Street (2): _____
City: _____State: _____ Zip Code: _____
Telephone Number: (_____)_____
Parcel Identification Number(s): _____

Engineer (Where Applicable)

Name of Firm: _____
First Name of Contact: _____Last Name:_____
Street (1): _____
Street (2): _____
City: _____State: _____ Zip Code: ____
Telephone Number: (_____)_____
Fax Number: (_____) _____

Village of Campbellsport
Construction Site Erosion Control Plan
Application Checklist

(Sites >= 4,000 sq. ft of land disturbing activity)

Permit #: _____

Project Name: _____ **Date:**_____

Please check the appropriate box: I = Included; NA = Non-Applicable *(If "NA" is checked, an explanation must be entered.)*

Plan Requirement	I	NA	Explanation/Location in Plan
A. Submittal Requirements			
1. Permit Application Form			
2. Application Fee			
B. Predevelopment Site Conditions Mapping			
1. Location Map			
2. Soils Survey Map			
3. Existing Land Use Mapping			
4. Predeveloped Site Conditions			
a. Existing Contours			
b. Property lines			
c. Existing flow paths and direction			
d. Outlet locations			
e. Drainage basin divides and subdivides			
f. Existing drainage structures on and adjacent to the site.			
g. Nearby Watercourses			
h. Lakes, streams, wetlands, channels, ditches, etc.			
i. Limits of the 100-year floodplain;			
C. Proposed Site Grading and Erosion Control Plan			
1. Boundaries of the construction site.			
2. Drainage Patterns/slopes after grading activities			
3. Areas of land disturbance			
4. Locations of structural and nonstructural controls			
5. Drainage basin delineations and outfall locations			
D. Drawings/Details			
1. Practice Location/Layout/Cross Sections			
2. Construction Details			
E. Calculations, as required to demonstrate ordinance compliance			
F. Narrative			
1. Name of receiving waters			
2. Site Description/Nature of construction activity			
3. Sequence of Construction			
4. Estimate of site area and disturbance area			
5. Pre- and postdeveloped runoff coefficients			
6. Description of proposed controls, including			
a. Interim and permanent stabilization practices			
b. Practices to divert flow from exposed soils			
c. Practices to store flows or trap sediment			
d. Any other practices proposed to meet ordinance			

_____ _____
Applicant Name Phone

_____ _____
Applicant Signature Email

VILLAGE OF CAMPBELLSPORT

CONSTRUCTION SITE EROSION CONTROL PERMIT NO. _____

Date of Application _____
Site Address_____
Plat Name_____
Certified Survey Map _____
Lots No.(s) _____

Permit Conditions:

(a) Permittee shall notify the Village 48 hours prior to commencing any land disturbing construction activity.

(b) Permittee shall notify the Village of practice installation within 5 days of installation.

(c) Permittee shall obtain permission in writing from the Village prior to any modification pursuant to Section 10-9-8 of the erosion and sediment control ordinance.

(d) Permittee shall install all practices as identified in the approved erosion and sediment control plan.

(e) Permittee shall maintain all road drainage systems, stormwater drainage systems, BMPs and other facilities identified in the erosion and sediment control plan.

(f) Permittee shall repair any siltation or erosion damage to adjoining surfaces and drainage ways resulting from land disturbing construction activities and document repairs in a site erosion control log. Remove accumulated sediment from downstream culverts, storm sewers, and other drainage facilities.

(g) Permittee shall inspect the practices within 24 hours after each rain of 0.5 inches or more which results in runoff during active construction periods, and at least once each week, make needed repairs and document the findings of the inspections in a site erosion control log with the date of inspection, the name of the person conducting the inspection, and a description of the present phase of the construction at the site.

(h) Permittee shall allow the Village 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. Permittee shall keep a copy of the erosion and sediment control plan at the construction site.

APPLICANT MUST FILL IN BOXED AREA

Owner _____
(please print or type full name)

Address _____
_____

Signature of Owner or Authorized Representative _____

Area of Land Disturbance (Square Feet) _____

SPECIAL CONDITIONS: _____
_____
_____
_____

CONDITIONAL APPROVAL: _____
Administrative Authority Title Date

This permit applies to construction sites that have 4,000 square feet of land disturbing construction activity. 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 Village may extend the period one or more times for up to an additional 180 days. The Village may require additional BMPs as a condition of the extension if they are necessary to meet the requirements of this ordinance.

AGREEMENT TO MAINTAIN
STORMWATER FACILITIES
BY AND BETWEEN
THE VILLAGE OF CAMPBELLSPORT AND
_____, AND
ITS HEIRS, SUCCESSORS, OR ASSIGNS

The upkeep and maintenance of stormwater facilities and the implementation of pollution source control best management practices (BMPs) is essential to the protection of water resources in the Village of Campbellsport. All property owners are expected to conduct business in a manner that minimizes impacts of stormwater runoff. This Agreement contains specific provisions with respect to maintenance of stormwater facilities. The authority to require maintenance and pollution source control is provided in the Village of Campbellsport Construction Site Erosion Control and Stormwater Management Ordinance.

FACILITY LOCATION AND AREA SERVED (Attach Map if Necessary):

Whereas, Owner has constructed improvements, including but not limited to, buildings, pavement, and stormwater facilities on the property described above. In order to further the goals of the stormwater management goals of the Village of Campbellsport, the Village and Owner hereby enter into this Agreement. The responsibilities of each party to this Agreement are identified below.

OWNER SHALL:

(1) Implement the stormwater facility maintenance plan included herein as Attachment A.

(2) Implement the stormwater management plan included herein as Attachment B.

(3) Allow the Village or designee to access the property to conduct inspections of storm water management practices as necessary to ascertain that the practices are being maintained and operated in accordance with the agreement.

(4) Undertake corrective actions required by Village within a reasonable time frame as set by the Village.

(5) Maintain a record of steps taken to implement the programs referenced in (1) and (2) above. Record shall be available for inspection by Village staff at Owners business during normal business hours. The record shall catalog the action taken, who took it, when it was done, how it was done, and any problems encountered or follow-on actions recommended.

THE VILLAGE OF CAMPBELLSPORT SHALL:

(1) Provide technical assistance to Owner in support of its operation and maintenance activities

conducted pursuant to its maintenance and source control programs. Said assistance shall be provided upon request, and as Village time and resources permit.

(2) Maintain public records of the results of the site inspections, inform the party responsible for maintenance of the inspection results, and specifically indicate any corrective actions required to bring the storm water management practice into proper working condition.

(3) Notify the Owner of maintenance problems that require correction.

REMEDIES:

(1) If corrective actions required by the Village are not completed within the time set by the Village, written notice will be sent to the persons who were given notice stating the Village intention to perform such maintenance and bill the owner for all incurred expenses.

(2) If at any time the Village determines that the existing system creates any imminent threat to public health or welfare, the Village may take immediate measures to remedy said threat. No notice to the persons listed in (1), above, shall be required under such circumstances.

(3) The owner grants unrestricted authority to the Village for access to any and all stormwater system features for the purpose of performing maintenance or repair as may become necessary under Remedies (1) and/or (2).

(4) The persons listed in (1), above, shall assume all responsibility for the cost of any maintenance and for repairs to the stormwater facility. Such responsibility shall include reimbursement to the Village within 30 days of the receipt of the invoice for any such work performed. Overdue payments will require payment of interest at the current legal rate for liquidated judgments. If legal action ensues, any costs or fees incurred by the Village will be borne by the parties responsible for said reimbursements.

(5) The owner hereby grants to the Village a lien against the above-described property in an amount equal to the cost incurred by the Village to perform the maintenance or repair work described herein.

This Agreement is intended to protect the value and desirability of the real property described above and to benefit all the citizens of the Village. It shall run with the land and be binding on all parties having or acquiring from Owner or their successors any right, title, or interest in the property or any part thereof, as well as their title, or interest in the property or any part thereof, as well as their heirs, successors, and assigns. They shall inure to the benefit of each present or future successor in interest of said property or any part thereof, or interest therein, and to the benefit of all citizens of the Village.

_____

_____

STATE OF WISCONSIN)
) ss
COUNTY OF _____)

On this day and year above personally appeared before me, a Notary Public in and for the State of Wisconsin duly commissioned and sworn, personally appeared _____, to me known to be the _____ of _____ and acknowledge the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that _____ is authorized to execute the said instrument and that the seal affixed is the corporate seal of said corporation.

WITNESS my hand and official seal the day and year first above written.

_____

Notary Public in and for the State of
Wisconsin, residing in _____

My Commission Expires: _____

Dated at Campbellsport, Wisconsin, this _____ day of _____, _____.

VILLAGE OF CAMPBELLSPORT

By:_____
Authorized Agent for the Village of Campbellsport

Village of Cambellsport
Stormwater Management Plan

Financial Guarantee

To: [permit holders name]
Date:
Subject: **Financial Guarantee** in the Amount of $_____
Check # _____ Received by (staff initials): _____

Project Name: _____

Location: Section [no.], Town of [public land survey township name]

This memo shall serve as a receipt for the above noted Financial Guarantee and as an agreement of the purpose and conditions for release by the Village of Campbellsport (herein referred to as the "Village").

Authority.
The authority of the Village to collect and hold this Financial Guarantee is stated in Title 10, Chapter 9, Section 26 of the Village of Prairie Du Sac Code of Ordinances – Stormwater Management Ordinance (herein referred to as the "Ordinance").

Purpose.
The purpose of this Financial Guarantee is to ensure compliance with Ordinance Title 10, Chapter 9 and the terms and conditions of a Stormwater Management Permit issued for the above noted project and location.

Conditions For Release.
Terms for release of the Financial Guarantee shall include all of the following:

1. Construction Certification. A professional engineer licensed in Wisconsin shall certify that construction of all stormwater management practices comply with the approved plans and the technical standards of the Village. "As-built" plans shall be submitted for stormwater management practices showing actual location, elevations, GPS locations, materials, construction methods and other items as deemed necessary by the Village to determine compliance.

2. Maintenance Agreement. A copy of an approved maintenance agreement for all stormwater management practices associated with this project must be provided to the Village. The agreement shall be stamped by the Register of Deeds, showing that it has been recorded for all applicable properties.

3. Final Inspection. The Village shall complete a final inspection of the property and certify compliance with the permit and Ordinance Title 10, Chapter 9.

If the Village should use any portion of the Financial Guarantee to complete permit activities, due to default or improper action by the permit holder, the Village shall withhold any amounts owed for this work, in accordance with Ordinance Title 10, Chapter 9.

APPENDIX A
CONSTRUCTION SITE EROSION CONTROL ORDINANCE

CHAPTER 9

ARTICLE 1: Construction Site Erosion Control Ordinance

§ 10-9-1 Authority
§ 10-9-2 Findings and Purpose
§ 10-9-3 Applicability and Jurisdiction
(1) Applicability
(2) Jurisdiction
(3) Exclusions
§ 10-9-4 Definitions
§ 10-9-5 Technical Standards
(1) Design Criteria, Standards and Specifications
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(1) Responsible Party
(2) Plan
(3) Erosion and Other Pollutant Control Requirements
(4) Location
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§ 10-9-7 Permitting Requirements, Procedures and Fees
(1) Permit Required
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(3) Review and Approval of Permit Application
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§ 10-9-8 Erosion and Sediment Control Plan and Amendments
(1) Plan Requirements
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§ 10-9-9 Fee Schedule
§ 10-9-10 Inspection
§ 10-9-11 Exemptions and Waivers
(1) General
(2) Conditions
(3) Procedures
§ 10-9-12 Enforcement
§ 10-9-13 Appeals
(1) Board of Zoning Appeals
(2) Who May Appeal
§ 10-9-14 Severability
§ 10-9-15 Effective Date

SEC. 10-9-1 AUTHORITY

(1) Ordinance Title 10, Chapter 9, Article 1 is adopted by the Village of Campbellsport under the authority granted by s. 61.354, Wis. Stats. This ordinance supersedes all provisions of any ordinance previously enacted under 61.35, Wis. Stats., that relate to construction site erosion control. Except as otherwise specified in s. 61.354 Wis. Stats., s. 61.35 Wis. Stats., applies to this ordinance and to any amendments to this ordinance.

(2) The provisions of this ordinance are deemed not to limit any other lawful regulatory powers of the same governing body.

(3) The Village of Campbellsport hereby will administer and enforce the provisions of this ordinance.

(4) The requirements of this ordinance do not pre-empt more stringent erosion and sediment control requirements that may be imposed by any of the following:

(a) Wisconsin Department of Natural Resources administrative rules, permits or approvals including those authorized under ss. 281.16 and 283.33, Wis. Stats.

(b) Targeted non-agricultural performance standards promulgated in rules by the Wisconsin Department of Natural Resources under s. NR 151.004, Wis. Adm. Code.

SEC. 10-9-2 FINDINGS AND PURPOSE

(1) FINDINGS. The Village of Campbellsport 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 Village of Campbellsport and its extraterritorial zoning jurisdiction.

(2) PURPOSE. It is the purpose of this ordinance 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 Village of Campbellsport and its extraterritorial zoning jurisdiction.

SEC. 10-9-3 APPLICABILITY AND JURISDICTION

(1) APPLICABILITY.

(a) This ordinance applies to construction sites that have 4,000 square feet of land disturbing construction activity except as provided under sub. (b):

(b) This ordinance does not apply to the following:

1. Land disturbing construction activity that includes the construction of a building and is otherwise regulated by the Wisconsin Department of Safety and Professional Services in chs. SPS 320 to 325 or 361 to 366, Wis. Adm. Code.

2. A construction project that is exempted by federal statutes or regulations from the requirement to have a national pollutant discharge elimination system permit issued under Chapter 40, Code of Federal Regulations, part 122, for land disturbing construction activity.

3. Nonpoint discharges from agricultural facilities and practices.

4. Nonpoint discharges from silviculture activities.

5. Routine maintenance for project sites under 5 acres of land disturbance if performed to maintain the original line and grade, hydraulic capacity or original purpose of the facility.

(c) Notwithstanding the applicability requirements in paragraph (a), this ordinance applies to construction sites of any size that, in the opinion of the Village, are 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.

(2) JURISDICTION. This ordinance applies to land disturbing construction activities on lands within the boundaries and jurisdiction of the Village of Campbellsport and its Extraterritorial Zoning Jurisdiction.

(3) EXCLUSIONS. This ordinance is not applicable to activities conducted by a state agency, as defined under s. 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 s. 281.33 (2), Wis. Stats.

SEC. 10-9-4 DEFINITIONS

(1) ADMINISTERING AUTHORITY means a governmental employee, or a regional planning commission empowered under s. 61.354 Wis. Stats., that is designated by the Village of Campbellsport to administer this ordinance.
(2) AGRICULTURAL FACILITIES AND PRACTICES has the meaning in s. 281.16(1), Wis. Stats.
(3) AVERAGE ANNUAL RAINFALL means a calendar year of precipitation, excluding snow, which is considered typical. For applications requiring use of average annual rainfall, recorded City of Milwaukee depths for March 28 through December 6, 1969, shall be used.
(4) BEST MANAGEMENT PRACTICE or BMP means 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.
(5) BUSINESS DAY means a day the office of the Village is routinely and customarily open for business.
(6) CEASE AND DESIST ORDER means a court-issued order to halt land disturbing construction activity that is being conducted without the required permit.
(7) CONSTRUCTION SITE means 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 where multiple separate and distinct land disturbing construction activities may be taking place at different times on different schedules but under one plan.
(8) DIRECTOR OF PUBLIC WORKS means the Village of Campbellsport Public Works Director or designee.
(9) DIVISION OF LAND means the act or process of dividing land into two or more parcels, as defined by Section 26-7 of the Village of Campbellsport Subdivision Ordinance.
(10) EROSION means the process by which the land's surface is worn away by the action of wind, water, ice or gravity.
(11) EROSION AND SEDIMENT CONTROL PLAN means a comprehensive plan developed to address pollution caused by erosion and sedimentation of soil particles or rock fragments during construction.

(12) EXTRATERRITORIAL JURISDICTION means the unincorporated area within 1½ miles of the Village as defined by Section 26-7 of the Village of Campbellsport Subdivision Ordinance.

(13) 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.

(14) GOVERNING BODY means the Village Board of Trustees.

(15) LAND DISTURBING CONSTRUCTION ACTIVITY means 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 sediment into waters of the state. Land disturbing construction activity includes clearing and grubbing, demolition, excavating, pit trench dewatering, filling and grading activities.

(16) MEP or MAXIMUM EXTENT PRACTICABLE means a level of implementing best management practices in order to achieve a performance standard specified in this chapter which takes into account the best available technology, cost effectiveness and other competing issues such as human safety and welfare, endangered and threatened resources, historic properties and geographic features. MEP allows flexibility in the way to meet the performance standards and may vary based on the performance standard and site conditions.

(17) PERFORMANCE STANDARD means a narrative or measurable number specifying the minimum acceptable outcome for a facility or practice.

(17) PERMIT means a written authorization made by the Village to the applicant to conduct land disturbing construction activity or to discharge post-construction runoff to waters of the state.

(18) POLLUTANT has the meaning given in s. 283.01 (13), Wis. Stats.

(19) POLLUTION has the meaning given in s. 281.01 (10), Wis. Stats.

(20) RESPONSIBLE PARTY means the entity holding fee title to the property or performing services to meet the performance standards of this ordinance through a contract or other agreement.

(21) RUNOFF means stormwater or precipitation including rain, snow or ice melt or similar water that moves on the land surface via sheet or channelized flow.

(22) SEDIMENT means settleable solid material that is transported by runoff, suspended within runoff or deposited by runoff away from its original location.

(23) SEPARATE STORM SEWER means a conveyance or system of conveyances including roads with drainage systems, streets, catch basins, curbs, gutters, ditches, constructed channels or storm drains, which is designed or used for collecting and conveying stormwater runoff and is not part of a combined sewer system.

(24) SITE means the entire area included in the legal description of the land on which the land disturbing construction activity is proposed in the permit application.

(25) STOP WORK ORDER means an order issued by the Village which requires that all construction activity on the site be stopped.

(26) TECHNICAL STANDARD means a document that specifies design, predicted performance and operation and maintenance specifications for a material, device or method.

(27) WATERS OF THE STATE has the meaning given in s. 281.01 (18), Wis. Stats.

SEC. 10-9-5 TECHNICAL STANDARDS

(1) DESIGN CRITERIA, STANDARDS AND SPECIFICATIONS. All drainage facilities and practices required to comply with this ordinance shall incorporate technical standards and design methods specified in the document Village of Campbellsport Erosion Control and Stormwater Management Requirements, maintained and periodically updated by the Village Engineer. Where not superseded by stricter requirements in Village of

Campbellsport Erosion Control and Stormwater Management Requirements, the following standards are also incorporated by reference:

(a) Applicable design criteria, standards and specifications identified in the *Wisconsin Construction Site Best Management Practice Handbook,* WDNR Pub. WR-222, or the latest revision.

(b) Other 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) OTHER STANDARDS. Other technical standards not identified or developed in sub. (1), may be used provided that the methods have been approved by the Village.

SEC. 10-9-6 PERFORMANCE STANDARDS

(1) RESPONSIBLE PARTY. The entity holding fee title to the property shall be responsible for either developing and implementing an erosion and sediment control plan, or causing such plan to be developed and implemented through contract or other agreement. This plan shall be developed in accordance with Section 10-9-8, that incorporates the requirements of this section.

(2) PLAN. A written plan shall be developed in accordance with Section 10-9-8 and implemented for applicable land development activities.

(3) EROSION AND SEDIMENT CONTROL PERFORMANCE STANDARDS. All drainage facilities and practices required to comply with this ordinance shall meet performance standards specified in the document Village of Campbellsport Erosion Control and Stormwater Management Requirements, maintained and periodically updated by the Village.

(4) LOCATION. The BMPs used to comply with this section shall be located prior to runoff entering waters of the state.

(5) ALTERNATE REQUIREMENTS. The Village may establish alternative erosion and sediment control requirements to those set forth in Village of Campbellsport Erosion Control and Stormwater Management Requirements, if the Village determines that an added level of protection is needed or that extraordinary hardships or practical difficulties may result from strict compliance with these regulations. Exceptions or waivers to requirements set forth in this ordinance and Village of Campbellsport Erosion Control and Stormwater Management Requirements shall be considered in accordance with Section 10-9-11.

SEC. 10-9-7 PERMITTING REQUIREMENTS, PROCEDURES AND FEES

(1) PERMIT REQUIRED. No responsible party may commence a land disturbing construction activity subject to this ordinance without receiving prior approval of an erosion and sediment control plan for the site and a permit from the Village.

(2) PERMIT APPLICATION AND FEES. The responsible party desiring to undertake a land disturbing construction activity subject to this ordinance shall submit an application for a permit and an erosion and sediment control plan that meets the requirements of Section 10-9-8. The applicant shall pay an application fee consistent with the fee schedule maintained by the Village. By submitting an application, the applicant is authorizing the Village to enter the site to obtain information required for the review of the erosion and sediment control plan.

(3) REVIEW AND APPROVAL OF PERMIT APPLICATION. The Village 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:

(a) The Village may request additional information if required for a complete application within 15 business days of receipt of any permit application. Within 30 business days of the receipt of a complete permit application, including all items as required by sub. (2), the Village shall inform the applicant whether the application, plan and maintenance agreement are approved or disapproved based on the requirements of this ordinance.

(b) If the permit application and plan are approved, the Village shall issue the permit.

(c) If the permit application or plan is disapproved, the Village shall state in writing the reasons for disapproval.

(d) The Village may request additional information from the applicant. If additional information is submitted, the Village shall have 10 business days from the date the additional information is received to inform the applicant that the plan is either approved or disapproved.

(4) FINANCIAL GUARANTEE. As a condition of approval and issuance of the permit, the Village may require the applicant to deposit a surety bond or irrevocable letter of credit to guarantee a good faith execution of the approved erosion control plan and any permit conditions.

(5) PERMIT REQUIREMENTS. All permits shall require the responsible party to:

(a) Notify the Village 2 full business days prior to commencing any land disturbing construction activity.

(b) Notify the Village of completion of any BMPs within 3 full business days after their installation.

(c) Obtain permission in writing from the Village prior to any modification pursuant to Section 10-9-8(2) of the erosion and sediment control plan.

(d) Install all BMPs as identified in the approved erosion and sediment control plan.

(e) Maintain all road drainage systems, stormwater drainage systems, BMPs and other facilities identified in the erosion and sediment control plan.

(f) Repair any siltation or erosion damage to adjoining surfaces and drainage ways resulting from land disturbing construction activities and document repairs in a site erosion control log. Remove accumulated sediment from downstream culverts, storm sewers, and other drainage facilities.

(g) Inspect the BMPs within 24 hours after each rain of 0.5 inches or more which results in runoff during active construction periods, and at least once each week, make needed repairs and document the findings of the inspections in a site erosion control log with the date of inspection, the name of the person conducting the inspection, and a description of the present phase of the construction at the site.

(h) Allow the Village 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 at the construction site.

(6) PERMIT CONDITIONS. Permits issued under this section may include conditions established by Village in addition to the requirements set forth in sub. (5), where needed to assure compliance with the performance standards in Section 10-9-6.

(7) 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 Village may extend the period one or more times for up to an additional 180 days. The Village may require additional BMPs as a

condition of the extension if they are necessary to meet the requirements of this ordinance.

(8) MAINTENANCE. The responsible party throughout the duration of the construction activities shall maintain all BMPs necessary to meet the requirements of this ordinance until the site has undergone final stabilization.

SEC. 10-9-8 EROSION AND SEDIMENT CONTROL PLAN AND AMENDMENTS

(1) PLAN REQUIREMENTS. An Erosion and Sediment Control Plan shall be prepared and submitted to the Village. The Erosion and Sediment Control Plan shall include, at a minimum, information required in the Village of Campbellsport Erosion Control and Stormwater Management Requirements, maintained and periodically updated by the Village.

(2) AMENDMENTS. The applicant shall amend the plan if any of the following occur:

(a) There is a change in design, construction, operation or maintenance at the site which has the reasonable potential for the discharge of pollutants to waters of the state and which has not otherwise been addressed in the plan.
(b) The actions required by the plan fail to reduce the impacts of pollutants carried by construction site runoff.
(c) The Village notifies the applicant of changes needed in the plan to comply with this ordinance or the Village of Campbellsport Erosion Control and Stormwater Management Requirements.

SEC. 10-9-9 FEE SCHEDULE

The fees referred to in other sections of this ordinance shall be established by the Village and may from time to time be modified by resolution. A schedule of the fees established by the Village Board shall be available at the Village Hall.

SEC. 10-9-10 INSPECTION

If land disturbing construction activities are being carried out without a permit required by this ordinance, the Village may enter the land pursuant to the provisions of ss. 66.0119(1), (2), and (3), Wis. Stats.

SEC. 10-9-11 EXCEPTIONS AND WAIVERS

(1) GENERAL. Where the Village finds that extraordinary hardships or practical difficulties may result from strict compliance with these regulations and/or the purposes of these regulations may be served to a greater extent by an alternative proposal, it may approve exceptions and waivers to these regulations so that substantial justice may be done and the public interest secured, provided the exception or waiver shall not have the effect of nullifying the intent and purpose of these regulations; and further provided the Village shall not approve exceptions and waivers unless it shall make findings based upon the evidence presented to it that all of the following conditions are met by the petitioner.

(a) The granting of the exception or waiver will not be detrimental to the public safety, health, or welfare or injurious to other property;

(b) The conditions upon which the request is based are unique to the property for which the relief is sought and are not applicable generally to other property;

(c) Because of the location or conditions affecting the specific property involved, a particular hardship to the owner would result, as distinguished from a mere inconvenience, if the strict letter of these regulations is carried out;

(d) The relief sought will not materially alter the provisions of any existing regional stormwater management plan except that this document may be amended in the manner prescribed by law.

(e) The granting of the exception or waiver will not result in a violation of State or Federal laws or permits.

(2) CONDITIONS. In approving exceptions or waivers, the Village may require such conditions as will in his judgement secure substantially the purposes described in this ordinance and accompanying written stormwater management and erosion control requirements.

(3) PROCEDURES. A petition for an exception or waiver shall be submitted in writing by the responsible party at the time when the development is filed for the consideration of the Village. The petition shall state fully the grounds for the application and all of the facts relied upon by the petitioner.

SEC. 10-9-12 ENFORCEMENT

(1) The Village may post a stop-work order if any of the following occurs:

(a) Any land disturbing construction activity regulated under this ordinance is being undertaken without a permit.
(b) The erosion and sediment control plan is not being implemented in a good faith manner.
(c) The conditions of the permit are not being met.

(2) 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 Village may revoke the permit.

(3) If the responsible party, where no permit has been issued, does not cease the activity after being notified by the Village, or if a responsible party violates a stop-work order posted under sub. (1), the Village may request the Village attorney to obtain a cease and desist order in any court with jurisdiction.

(4) The Village may retract the stop-work order issued under sub. (1) or the permit revocation under sub. (2).

(5) After posting a stop-work order under sub. (1), the Village may issue a notice of intent to the responsible party of its intent to perform work necessary to comply with this ordinance. The Village may go on the land and commence the work after issuing the notice of intent. The costs of the work performed under this subsection by the Village, plus interest at the rate authorized by the Village shall be billed to the responsible party. 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.

(6) Any person violating any of the provisions of this ordinance shall be subject to a forfeiture of not less than $100 nor more than $500 and the costs of prosecution for each violation. Each day a violation exists shall constitute a separate offense.

(7) 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 injunctional proceedings.

SEC. 10-9-13 APPEALS

(1) BOARD OF APPEALS. The board of appeals, created pursuant to Section 34-409, of the Village of Campbellsport ordinances pursuant to s. 61.354(4)(b) Wis. Stats.:

(a) Shall hear and decide appeals where it is alleged that there is error in any order, decision or determination made by the Village in administering this Chapter except for cease and desist orders obtained under Section 10-9-12(3).

(b) 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 this ordinance will result in unnecessary hardship; and

(c) Shall use the rules, procedures, duties and powers authorized by statute in hearing and deciding appeals and authorizing variances.

(2) WHO MAY APPEAL. Appeals to the board of appeals or extraterritorial board of appeals may be taken by any aggrieved person or by any office, department, board, or bureau of the Village of Campbellsport affected by any decision of the Village.

SEC. 10-9-14 SEVERABILITY

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

SEC. 10-9-15 EFFECTIVE DATE

This ordinance shall be in force and effect from and after its adoption and publication. The above and foregoing ordinance was duly adopted by the Village of Campbellsport of the Village of Campbellsport on the ____ day of ____, 20__.

Approved: _____
Attested _____
Published on [day, month, and year].

APPENDIX B
STORMWATER MANAGEMENT ORDINANCE

CHAPTER 9

ARTICLE 2: Stormwater Management Ordinance

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(2) Intent
§ 10-9-19 Applicability and Jurisdiction
(1) Applicability
(2) Jurisdiction
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§ 10-9-21 Technical Standards and Design Methods
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§ 10-9-23 Permitting Requirements, Procedures and Fees
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§ 10-9-24 Stormwater Management Plan
(1) Plan Requirements
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§ 10-9-25 Maintenance Agreement
(1) Maintenance Agreement Required
(2) Agreement Provisions
§ 10-9-26 Financial Guarantee
(1) Establishment of the Guarantee
(2) Conditions for Release
§ 10-9-27 Fee Schedule
§ 10-9-28 Impact Fees
§ 10-9-29 Exemptions and Waivers
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(2) Conditions
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§ 10-9-30 Enforcement
§ 10-9-31 Appeals
(1) Board of Appeals or Adjustment
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§ 10-9-32 Severability
§ 10-9-33 Effective Date

SEC. 10-9-16 AUTHORITY

(1) Ordinance Title 10, Chapter 9, Article 2 is adopted by the Village of Campbellsport under the authority granted by s. 61.354, Wis. Stats. This ordinance supersedes all provisions of any ordinance previously enacted under 61.35, Wis. Stats., that relate to storm water management regulations. Except as otherwise specified in s. 61.354 Wis. Stats., s. 61.35 Wis. Stats., applies to this ordinance and to any amendments to this ordinance.

(2) The provisions of this ordinance are deemed not to limit any other lawful regulatory powers of the same governing body.

(3) The Village of Campbellsport hereby will administer and enforce the provisions of this ordinance.

(4) The requirements of this ordinance do not pre-empt more stringent erosion and sediment control requirements that may be imposed by any of the following:

(a) Wisconsin Department of Natural Resources administrative rules, permits or approvals including those authorized under ss. 281.16 and 283.33, Wis. Stats.
(b) Targeted non-agricultural performance standards promulgated in rules by the Wisconsin Department of Natural Resources under s. NR 151.004, Wis. Adm. Code.

SEC. 10-9-17 FINDINGS OF FACT

The Village of Campbellsport 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:

(1) Degrade physical stream habitat by increasing stream bank erosion, increasing streambed scour, diminishing groundwater recharge, diminishing stream base flows and increasing stream temperature.
(2) 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.
(3) Alter wetland communities by changing wetland hydrology and by increasing pollutant loads.
(4) Reduce the quality of groundwater by increasing pollutant loading.
(5) Threaten public health, safety, property and general welfare by overtaxing storm sewers, drainage ways, and other minor drainage facilities.
(6) Threaten public health, safety, property and general welfare by increasing major flood peaks and volumes.
(7) Undermine floodplain management efforts by increasing the incidence and levels of flooding.

SEC. 10-9-18 PURPOSE AND INTENT

(1) PURPOSE. The general purpose of this ordinance 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:

(a) Further the maintenance of safe and healthful conditions.
(b) 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.

(c) 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.

(2) INTENT. It is the intent of the Village of Campbellsport that this ordinance regulates post-construction stormwater discharges to waters of the state. This ordinance may be applied on a site-by-site basis. The Village of Campbellsport recognizes, however, that the preferred method of achieving the stormwater performance standards set forth in this ordinance 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 s. 281.16, Wis. Stats., for regional stormwater management measures and have been approved by the Village of Campbellsport, it is the intent of this ordinance that the approved plan be used to identify post-construction management measures acceptable for the community.

SEC. 10-9-19 APPLICABILITY AND JURISDICTION

(1) APPLICABILITY.

(a) Where not otherwise limited by law, this ordinance applies to land development activity that meets any of the following criteria:

1. Any development, including redevelopment and in-fill development, that results in 20,000 square feet or more of land disturbing activity.
2. Any development, including redevelopment and in-fill development, that results in the addition of 10,000 square feet or more of impervious area.
3. A subdivision plat.
4. A certified survey map intended for commercial or industrial use.

(b) A site that meets any of the criteria in this paragraph is exempt from the requirements of this ordinance.

- A site with less than 10% connected imperviousness based on complete development of the post-construction site, provided the cumulative area of all parking lots and rooftops is less than one acre.
- Nonpoint discharges from agricultural facilities and practices.
- Nonpoint discharges from silviculture activities.
- Routine maintenance for project sites under 5 acres of land disturbance if performed to maintain the original line and grade, hydraulic capacity or original purpose of the facility.
- Underground utility construction such as water, sewer and fiberoptic lines. This exemption does not apply to the construction of any above ground structures associated with utility construction.

(c) Notwithstanding the applicability requirements in paragraph (a), this ordinance applies to land development activity of any size that, in the opinion of the Village, 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.

(2) JURISDICTION

This ordinance applies to land disturbing construction activities on lands within the boundaries and jurisdiction of the Village of Campbellsport and its Extraterritorial Zoning Jurisdiction.

(3) EXCLUSIONS.

This ordinance is not applicable to activities conducted by a state agency, as defined under s. 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 s. 281.33 (2), Wis. Stats.

SEC. 10-9-20 DEFINITIONS

(1) AGRICULTURAL FACILITIES AND PRACTICES has the meaning given in s. 281.16, Wis. Stats.
(2) AVERAGE ANNUAL RAINFALL means a calendar year of precipitation, excluding snow, which is considered typical.
(3) BEST MANAGEMENT PRACTICE or "BMP means structural or non-structural measures, practices, techniques or devices employed to avoid or minimize sediment or pollutants carried in runoff to waters of the state.
(4) BUSINESS DAY means a day the office of the Village is routinely and customarily open for business.
(5) CEASE AND DESIST ORDER means a court-issued order to halt land disturbing construction activity that is being conducted without the required permit.
(6) COMBINED SEWER SYSTEM means a system for conveying both sanitary sewage and stormwater runoff.
(7) CONNECTED IMPERVIOUSNESS means an impervious surface that is directly connected to a separate storm sewer or water of the state via an impervious flow path.
(8) DESIGN STORM means a hypothetical discrete rainstorm characterized by a specific duration, temporal distribution, rainfall intensity, return frequency, and total depth of rainfall.
(9) DEVELOPMENT means residential, commercial, industrial or institutional land uses and associated roads.
(10) DIRECTOR OF PUBLIC WORKS means the Village of Campbellsport Director of Public Works or designee.
(11) DIVISION OF LAND means the act or process of dividing land into two or more parcels, as defined by Section 26-7 of the Village of Campbellsport Subdivision Ordinance.
(12) EFFECTIVE INFILTRATION AREA means 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.
(13) EROSION means the process by which the land's surface is worn away by the action of wind, water, ice or gravity.
(14) EXCEPTIONAL RESOURCE WATERS means waters listed in s. NR 102.11, Wis. Adm. Code.
(15) EXTRATERRITORIAL JURISDICTION means the unincorporated area within 1½ miles of the Village as defined by Section 26-7 of the Village of Campbellsport Subdivision Ordinance.
(16) 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% of the cover, for the unpaved areas and areas not covered by permanent structures, or employment of equivalent permanent stabilization measures.
(17) FINANCIAL GUARANTEE means a performance bond, maintenance bond, surety bond, irrevocable letter of credit, or similar guarantees submitted to the Village by the

responsible party to assure that requirements of the ordinance are carried out in compliance with the stormwater management plan.

(18) GOVERNING BODY means the Village Board of Trustees.

(19) IMPERVIOUS SURFACE means 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 areas that typically are impervious.

(20) IN-FILL AREA means an undeveloped area of land located within existing development or which adjacent properties on at least three sides are developed or in public rights-of-way, as determined by the Village.

(21) INFILTRATION means the entry of precipitation or runoff into or through the soil.

(22) INFILTRATION SYSTEM means 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.

(23) KARST FEATURE means an area or geologic feature subject to bedrock dissolution so that it is likely to provide a conduit to groundwater, and may include caves, enlarged fractures, mine features, exposed bedrock surfaces, sinkholes, springs, seeps or swallets.

(24) LAND DEVELOPMENT ACTIVITY means any construction related activity that results in the addition or replacement of impervious surfaces such as rooftops, roads, parking lots, and other structures. Measurement of areas impacted by land development activity includes areas that are part of a larger common plan of 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.

(25) LAND DISTURBING CONSTRUCTION ACTIVITY means 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 sediment into waters of the state. Land disturbing construction activity includes clearing and grubbing, demolition, excavating, pit trench dewatering, filling and grading activities.

(26) MAINTENANCE AGREEMENT means a legal document that provides for long-term maintenance of stormwater management practices.

(27) MEP or MAXIMUM EXTENT PRACTICABLE means a level of implementing best management practices in order to achieve a performance standard specified in this ordinance which takes into account the best available technology, cost effectiveness and other competing issues such as human safety and welfare, endangered and threatened resources, historic properties and geographic features. MEP allows flexibility in the way to meet the performance standards and may vary based on the performance standard and site conditions.

(28) NEW DEVELOPMENT means development resulting from the conversion of previously undeveloped land or agricultural land uses.

(29) OFF-SITE means located outside the property boundary described in the permit application.

(30) ON-SITE means located within the property boundary described in the permit application.

(31) ORDINARY HIGH-WATER MARK has the meaning given in s. NR 115.03(6), Wis. Adm. Code.

(32) OUTSTANDING RESOURCE WATERS means waters listed in s. NR 102.10, Wis. Adm. Code.

(33) PERCENT FINES means the percentage of a given sample of soil, which passes through a # 200 sieve.

(34) PERFORMANCE STANDARD means a narrative or measurable number specifying the minimum acceptable outcome for a facility or practice.

(35) PERMIT means a written authorization made by the Village to the applicant to conduct land disturbing construction activity or to discharge post-construction runoff to waters of the state.

(36) PERMIT ADMINISTRATION FEE means a sum of money paid to the Village by the permit applicant for the purpose of recouping the expenses incurred by the authority in administering the permit.

(37) PERVIOUS SURFACE means 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.

(38) POLLUTANT has the meaning given in s. 283.01(13), Wis. Stats.

(39) POLLUTION has the meaning given in s. 281.01(10), Wis. Stats.

(40) POST-CONSTRUCTION SITE means a construction site following the completion of land disturbing construction activity and final site stabilization.

(41) PRE-DEVELOPMENT CONDITION means 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.

(42) PREVENTIVE ACTION LIMIT" has the meaning given in s. NR 140.05(17), Wis. Adm. Code.

(43) REDEVELOPMENT means areas where development is replacing older development in the determination of the Village.

(44) RESPONSIBLE PARTY means any entity holding fee title to the property.

(45) RUNOFF means stormwater or precipitation including rain, snow or ice melt or similar water that moves on the land surface via sheet or channelized flow.

(46) SEPARATE STORM SEWER means 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 draining to a stormwater treatment device or system.

(d) Discharges directly or indirectly to waters of the state.

(47) SITE means the entire area included in the legal description of the land on which the land disturbing construction activity occurred.

(48) STOP WORK ORDER means an order issued by the Village which requires that all construction activity on the site be stopped.

(49) STORMWATER MANAGEMENT PLAN means a comprehensive plan designed to reduce the discharge of pollutants from stormwater after the site has under gone final stabilization following completion of the construction activity.

(50) 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.

(51) TECHNICAL STANDARD means a document that specifies design, predicted performance and operation and maintenance specifications for a material, device or method.

(52) TOP OF THE CHANNEL means 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.

(53) TR-55 means 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.

(54) TYPE II DISTRIBUTION means a rainfall type curve as established in the "United States Department of Agriculture, Soil Conservation Service, Technical Paper 149, published 1973". The Type II curve is applicable to all of Wisconsin and represents the most intense storm pattern.

(55) WATERS OF THE STATE has the meaning given in s. 281.01 (18), Wis. Stats.

SEC. 10-9-21 TECHNICAL STANDARDS AND DESIGN METHODS

DESIGN CRITERIA, STANDARDS AND SPECIFICATIONS. All drainage facilities and practices required to comply with this ordinance shall incorporate technical standards and design methods specified in the document Village of Campbellsport Erosion Control and Stormwater Management Requirements, maintained and periodically updated by the Village. Where not superseded by stricter requirements in Village of Campbellsport Erosion Control and Stormwater Management Requirements, the following standards are also incorporated by reference:

(a) Applicable design criteria, standards and specifications identified in the *Wisconsin Construction Site Best Management Practice Handbook,* WDNR Pub. WR-222, latest revision.

(b) Other 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.

(c) Other technical standards not identified or developed in sub. (1), may be used provided that the methods have been approved by the Village.

SEC. 10-9-22 PERFORMANCE STANDARDS

(1) RESPONSIBLE PARTY. The entity holding fee title to the property shall be responsible for either developing and implementing a stormwater management plan, or causing such plan to be developed and implemented through contract or other agreement. This plan shall be developed in accordance with Section 10-9-24, which incorporates the requirements of this section.

(2) PLAN. A written plan shall be developed in accordance with Section 10-9-24 and implemented for applicable land development activities.

(3) STORMWATER MANAGEMENT PERFORMANCE STANDARDS. All drainage facilities and practices required to comply with this ordinance shall meet performance standards specified in the document Village of Campbellsport Erosion Control and Stormwater Management Requirements, maintained and periodically updated by the Village.

(4) LOCATION AND REGIONAL TREATMENT OPTION.

(a) Stormwater Management Facilities required to meet this ordinance may be located on-site or off-site as part of a regional stormwater device, practice or system.

(b) The Village may approve off-site management measures provided that all of the following conditions are met:

1. The Village determines that the post-construction runoff is covered by a stormwater management system plan that is approved by the Village of Campbellsport and that contains management requirements consistent with the purpose and intent of this ordinance.
2. The off-site facility meets all of the following conditions:

a. The facility will be in place before the need for the facility arises as a result of on-site construction activities.
b. The facility is designed and adequately sized to provide a level of stormwater control equal to or greater than that which would be afforded by on-site practices meeting the performance standards of this ordinance.
c. The facility has a legally obligated entity responsible for its long-term operation and maintenance.

d. Where a regional treatment option exists such that the Village may exempt 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 Village. In determining the fee for post-construction runoff, the Village shall consider an equitable distribution of the cost for land, engineering design, construction, and maintenance of the regional treatment option.

(5) ALTERNATE REQUIREMENTS. The Village may establish alternative stormwater management requirements to those set forth in Village of Campbellsport Erosion Control and Stormwater Management Requirements, if the Village determines that an added level of protection is needed for to address downstream stormwater management issues; or that extraordinary hardships or practical difficulties may result from strict compliance with these regulations. Exceptions or waivers to stormwater management requirements set forth in this ordinance and Village of Campbellsport Erosion Control and Stormwater Management Requirements shall be considered in accordance with Section 10-9-28.

SEC. 10-9-23 PERMITTING REQUIREMENTS, PROCEDURES, AND FEES

(1) PERMIT REQUIRED. No responsible party may undertake a land disturbing construction activity without receiving a post-construction runoff permit from the Village prior to commencing the proposed activity.

(2) PERMIT APPLICATION AND FEES. Unless specifically excluded by this ordinance, any responsible party desiring a permit shall submit to the Village a permit application made on a form provided by the Village for that purpose.

(a) Unless otherwise excepted by this ordinance, a permit application must be accompanied by a stormwater management plan, a maintenance agreement (where required) and, where not otherwise covered by a developer's agreement, a non-refundable permit administration fee. The permit administration fee, where applicable, shall be consistent with a fee schedule maintained by the Village.

(b) The stormwater management plan shall be prepared to meet the requirements of Section 10-9-22 and Section 10-9-24, the maintenance agreement shall be prepared to meet the requirements of 10-9-25, the financial guarantee shall meet the requirements of Section 10-9-26, and fees shall be those established by the Village of Campbellsport as set forth in Section 10-9-27.

(3) REVIEW AND APPROVAL OF PERMIT APPLICATION. The Village 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:

(a) The Village may request additional information if required for a complete application within 15 business days of receipt of any permit application. Within 30 business days of the receipt of a complete permit application, including all items as required by sub. (2), the Village shall inform the applicant whether the application, plan and maintenance agreement are approved or disapproved based on the requirements of this ordinance. The 30 day review period begins once the Village has received all information necessary for the review and deems the application is complete or within 15 business days of receipt of the permit application if additional information has not been requested.

(b) 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, the Village shall issue the permit.

(c) If the stormwater permit application, plan or maintenance agreement is disapproved, the Village shall detail in writing the reasons for disapproval.

(d) The Village may request additional information from the applicant. If additional information is submitted, the Village shall have 10 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.

(4) PERMIT REQUIREMENTS. All permits issued under this ordinance shall be subject to the following conditions, and holders of permits issued under this ordinance shall be deemed to have accepted these conditions. The Village may suspend or revoke a permit for violation of a permit condition, following written notification of the responsible party. An action by the Village to suspend or revoke this permit may be appealed in accordance with Section 10-9-30.

(a) 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.

(b) 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.

(c) The responsible party shall notify the Village at least 2 business days before commencing any work in conjunction with the stormwater management plan, and within 3 business days upon completion of the stormwater management practices. If required as a special condition under sub. (5), the responsible party shall make additional notification according to a schedule set forth by the Village so that practice installations can be inspected during construction.

(d) Practice installations required as part of this ordinance shall be certified "as built" by a licensed professional engineer. Completed stormwater management practices must pass a final inspection by the Village or its designee to determine if they are in accordance with the approved stormwater management plan and ordinance. The Village 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.

(e) The responsible party shall notify the Village of any significant proposed modifications to an approved stormwater management plan. The Village 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.

(f) 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 Village of Campbellsport, or are transferred to subsequent private owners as specified in the approved maintenance agreement.

(g) The responsible party authorizes the Village 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 Section 10-9-26.

(h) If so directed by the Village, the responsible party shall repair at the responsible party's own expense all damage to adjoining 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.

(i) The responsible party shall permit property access to the Village or its designee for the purpose of inspecting the property for compliance with the approved stormwater management plan and this permit.

(j) Where site development or redevelopment involves changes in direction, increases in peak rate and/or total volume of runoff from a site, the Village may

require the responsible party to make appropriate legal arrangements with affected property owners.

(k) The responsible party is subject to the enforcement actions and penalties detailed in 10-9-14, if the responsible party fails to comply with the terms of this permit.

(5) PERMIT CONDITIONS. Permits issued under this subsection may include conditions established by Village related to the requirements needed to meet the performance standards in Section 10-9-22 or a financial guarantee as provided for in Section 10-9-26.

(6) PERMIT DURATION. Permits issued under this section shall be valid from the date of issuance through the date the Village notifies the responsible party that all stormwater management practices have passed the final inspection required under sub. (4)(d). The permit shall be invalid if work is not commenced within 1 year of permit issuance.

SEC. 10-9-24 STORMWATER MANAGEMENT PLAN

(1) PLAN REQUIREMENTS. A Stormwater Management Plan shall be prepared and submitted to the Village. The Stormwater Management Plan shall include, at a minimum, information required in the Village of Campbellsport Erosion Control and Stormwater Management Requirements, maintained and periodically updated by the Village. The Village may waive certain submittal requirements if determined by the Village to be unnecessary to demonstrate compliance with ordinance standards.

(2) ALTERNATE REQUIREMENTS. The Village may prescribe alternative submittal requirements for applicants seeking an exemption to on-site stormwater management performance standards under Section 10-9-22 (5) or Section 10-9-28.

SEC. 10-9-25 MAINTENANCE AGREEMENT

(1) MAINTENANCE AGREEMENT REQUIRED. The maintenance agreement required under Section 10-9-23 (2) for stormwater management practices shall be an agreement between the Village and the responsible party to provide for maintenance of stormwater practices beyond the duration period of this permit. The maintenance agreement shall be filed by the applicant 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.

(2) AGREEMENT PROVISIONS. The maintenance agreement shall contain the following information and provisions and be consistent with the maintenance plan required by 10-9-23 (2).

(a) Identification of the stormwater facilities and designation of the drainage area served by the facilities.

(b) A schedule for regular maintenance of each aspect of the stormwater management system consistent with the stormwater management plan required under 10-9-22 (2).

(c) Identification of the property or easement owner, 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 10-9-22 (2).

(d) 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 par. (b).

(e) Authorization for the Village 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.

(f) A requirement on the Village 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.

(g) Agreement that the party designated under par. (c), as responsible for long term maintenance of the stormwater management practices, shall be notified by the Village of maintenance problems which require correction. The specified corrective actions shall be undertaken within a reasonable time frame as set by the Village.

(h) Authorization of the Village to perform the corrected actions identified in the inspection report if the responsible party designated under par. (c) does not make the required corrections in the specified time period. The Village 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.

SEC. 10-9-26 FINANCIAL GUARANTEE

(1) ESTABLISHMENT OF THE GUARANTEE. The Village may require the submittal of a financial guarantee, the form and type of which shall be acceptable to the Village. The financial guarantee shall be in an amount determined by the Village to be the estimated cost of construction and the estimated cost of maintenance of the stormwater management practices during the period that the designated party in the maintenance agreement has maintenance responsibility. The financial guarantee shall give the Village 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 ordinance have not been met.

(2) CONDITIONS FOR RELEASE. Conditions for the release of the financial guarantee are as follows:

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

(b) The Village shall release the portion of the financial guarantee established under this section to assure maintenance of stormwater practices and facilities, less any costs incurred by the Village, at such time that the responsibility for practice or facility maintenance is passed on to another entity via an approved maintenance agreement.

SEC. 10-9-27 FEE SCHEDULE

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

SEC. 10-9-28 IMPACT FEES

Impact fees shall be enforced per the Village of Campbellsport Schedule of Fees.

SEC. 10-9-29 EXCEPTIONS AND WAIVERS

(1) GENERAL. Where the Village finds that extraordinary hardships or practical difficulties may result from strict compliance with these regulations and/or the purposes of these regulations may be served to a greater extent by an alternative proposal, it may approve exceptions and waivers to these regulations so that substantial justice may be done and the public interest secured, provided the exception or waiver shall not have the effect of nullifying the intent and purpose of these regulations; and further provided the Village shall not approve exceptions and waivers unless it shall make findings based upon the evidence presented to it that all of the following conditions are met by the petitioner.

(a) The granting of the exception or waiver will not be detrimental to the public safety, health, or welfare or injurious to other property;

(b) The conditions upon which the request is based are unique to the property for which the relief is sought and are not applicable generally to other property;

(c) Because of the location or conditions affecting the specific property involved, a particular hardship to the owner would result, as distinguished from a mere inconvenience, if the strict letter of these regulations is carried out;

(d) The relief sought will not materially alter the provisions of any existing regional stormwater management plan except that this document may be amended in the manner prescribed by law.

(e) The granting of the exception or waiver will not result in a violation of State or Federal laws or permits.

(2) CONDITIONS. In approving exceptions or waivers, the Village may require such conditions as will in his judgement secure substantially the purposes described in this ordinance and accompanying written stormwater management and erosion control requirements.

(3) PROCEDURES. A petition for an exception or waiver shall be submitted in writing by the responsible party at the time when the development is filed for the consideration of the Village. The petition shall state fully the grounds for the application and all of the facts relied upon by the petitioner.

SEC. 10-9-30 ENFORCEMENT

(1) Any land disturbing construction activity or post-construction runoff initiated after the effective date of this ordinance by any person, firm, association, or corporation subject to the ordinance provisions shall be deemed a violation unless conducted in accordance with the requirements of this ordinance.

(2) The Village 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.

(3) Upon receipt of written notification from the Village under sub. (2), 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 Village in the notice.

(4) If the violations to a permit issued pursuant to this ordinance are likely to result in damage to properties, public facilities, or waters of the state, the Village may enter the land and take emergency actions necessary to prevent such damage. The costs incurred by the Village plus interest and legal costs shall be billed to the responsible party.

(5) The Village is authorized to post a stop work order on all land disturbing construction activity that is in violation of this ordinance, or to request the Village Attorney to obtain a cease and desist order in any court with jurisdiction.

(6) The Village may revoke a permit issued under this ordinance for non-compliance with ordinance provisions.

(7) Any permit revocation, stop work order, or cease and desist order shall remain in effect unless retracted by the Village, Village Attorney, or by a court with jurisdiction.

(8) The Village is authorized to refer any violation of this ordinance, or of a stop work order, or of a cease and desist order issued pursuant to this ordinance, to the village attorney for the commencement of further legal proceedings in any court with jurisdiction.

(9) Any person, firm, association, or corporation who does not comply with the provisions of this ordinance shall be subject to a forfeiture of not less than 100 dollars or more than 500 dollars per offense, together with the costs of prosecution. Each day that the violation exists shall constitute a separate offense.

(10) Compliance with the provisions of this ordinance 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 injunctional proceedings.

(11) When the Village determines that the holder of a permit issued pursuant to this ordinance 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 Village or a party designated by the Village 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 Village 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 Section 10-9-26 of this ordinance. 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 for the year in which the work is completed.

SEC. 10-9-31 APPEALS

(1) BOARD OF APPEALS. The board of appeals, created pursuant to Section 34-409, of the Village of Campbellsport ordinances pursuant to s. 61.354(4)(b) Wis. Stats.:

(a) Shall hear and decide appeals where it is alleged that there is error in any order, decision or determination made by the Village in administering this Chapter except for cease and desist orders obtained under Section 10-9-30(5).

(b) 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 this ordinance will result in unnecessary hardship; and

(c) Shall use the rules, procedures, duties and powers authorized by statute in hearing and deciding appeals and authorizing variances.

(2) WHO MAY APPEAL. Appeals to the board of appeals or extraterritorial board of appeals may be taken by any aggrieved person or by an officer, department, board, or bureau of the Village of Campbellsport affected by any decision of the Village.

SEC. 10-9-32 SEVERABILITY

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

SEC. 10-9-33 EFFECTIVE DATE

This ordinance shall be in force and effect from and after its adoption and publication. The above and foregoing ordinance was duly adopted by the Village of Campbellsport of the Village of Campbellsport on the ____ day of ____, 20__.

Approved: _____
Attested _____
Published on [day, month, and year].

APPENDIX B
DRAINAGE EVALUATION FORM

Village of Campbellsport, Wisconsin

Drainage Evaluation Form

(Applicable to Village-Owned Property and ROW Only)

Part A–General (To be completed by resident)

Today's Date:

Location of Drainage Problem (include building name, parking lot number or feature name):

Building Manager / Contact Name:

Phone Number:_____(Office)
_____(Mobile/Pager)

Part B–Description of Problem (To be completed by resident)

Provide detailed description or sketch or photo of the problem in the space below:

Village of Campbellsport, Wisconsin

Drainage Evaluation Form

(Applicable to Village-Owned Property and ROW Only)

How frequently or under what conditions does this problem occur (heavy rain, prolonged wet weather, frozen ground, etc.)?

Provide approximate dates of occurrence:

Describe damages incurred on your property. Note exterior versus interior damage:

Have you attempted to correct this problem? If so, what measures were taken?

Part C–Attachments

1. Photographs Attached?_____Yes_____No
2. Building or Utility Plans (if available) Attached?_____Yes_____No
3. Reports/Records (if available) Attached?_____Yes_____No
4. Other (Describe)

Part D–DPW Inspection

Name of Inspector:

Date of Field Inspection:

Inspector's Notes:

List of properties affected:

Photos: Attached or N/A

Is drainage problem:

1. Located on Village property? _____Yes_____No

2. Associated with a Village-owned or -maintained storm sewer facility or drainage way? Yes_____No

3. Caused by damage to the storm sewer or obstruction of the drainage way?_____Yes____No

Part E–Evaluation/Responsibility (To be completed by DPW)

Recommended Action:

Comments:

Village of Campbellsport, Wisconsin

Drainage Evaluation Form

ROUTING: (PLACE CHECK MARK BY APPLICABLE REVIEWERS)

DPW	(All Submittals)
Village Building Inspector	(Where Applicable)

REVIEWED BY:

_____

DPW

_____

Village Building Inspector

APPENDIX C
ILLICIT DISCHARGE DETECTION

BLANK FIELD SCREENING FORM

FIELD SCREENING—VISUAL OBSERVATION

NAME		WEATHER	
DATE		TIME	
OUTFALL # (Type this # in GPS Unit)		LOCATION	
WISDOT # (leave blank unless structure plate is present)			

Outfall Type (Circle One)

Swale Pipe Box Culvert Elliptical Buried Sewer Other: _____

If Outfall includes pipe: Pipe Size _____ Material: _____

Major or Minor? **(Major is any outfall which is greater than 36". Use best guess when you can't determine pipe sizes.)**

Describe below how storm water flows to Outfall and where it goes.

IS THERE A FLOW PRESENT? ☐ Yes ☐ No
(If flow is present, then refer to illicit discharge notification procedures.)

IF THERE IS A FLOW, PROVIDE A NARRATIVE DESCRIPITON OF:

COLOR _____

ODOR _____

TURBIDITY _____

OIL SHEEN ☐ Yes ☐ No

SURFACE SCUM ☐ Yes ☐ No

DESCRIBE ANY OTHER RELEVANT OBSERVATIONS REGARDING POTENTIAL PRESENCE OF NON-STORM WATER DISCHARGES OR ILLEGAL DUMPING

GPS Point #: **Photos Taken:**

MAJOR OUTFALLS

Major Outfalls

Outfall ID	Location	Contributing Subbasin	Contributing Area (ac)	Predominant Land Use	Major/Minor[1]	Priority	Watershed	Size (in)	Recommended Screening Frequency
2	State Hwy 67 (Across from 617 E. Main St.)	MR-8	99.34	Medium Density Residential	Major	N	Milwaukee River	36"	Every five years
7	316 Jenny St.	MR-5	170.96	Medium Density Residential	Major	N	Milwaukee River	38"x60"	Every five years
18	County Rd. W	WB-7, WB-8	57.58	Open Space & Commercial	Major	N	West Branch Milwaukee River	38"x60"	Every five years
26	County Rd. W	MR-13	65.67	Agricultrue	Major	N	Milwaukee River	29"x45"	Every five years

APPENDIX D
STORMWATER FACILITY MAINTENANCE PROGRAM

MAINTENANCE AND INSPECTION OF STORMWATER MANAGEMENT BEST MANAGEMENT PRACTICES VILLAGE OF CAMPBELLSPORT OCTOBER 2016

1. BEST MANAGEMENT PRACTICE (BMP) OWNERSHIP

    a. Municipality-owned/maintained stormwater BMP.
        i. Develop a site specific maintenance plan/program, if necessary
        ii. Follow the maintenance plan/program, herein.
    b. Privately-owned/maintained BMP.
        i. Obtain a maintenance agreement that has an attached maintenance plan as required by the stormwater management ordinance.
        ii. Follow the maintenance plan/program, herein.

2. MAINTENANCE

The cornerstone of a preventive maintenance program is establishment of a routine inspection program. This program must contain routine and non-routine maintenance. The program is defined below. Use the attached Inspection and Maintenance Documentation Form to document the inspections and maintenance performed. Submit the forms by February 1 of each year to the Village of Campbellsport Village Engineer/Director of Public Works documenting the previous year's activities.

    a. Routine Maintenance
        i. Inspections
            1. Inspect wet and dry detention basins, bioretention basins, and grass-lined swales after major storm events (2-year, 24 hour storm event: 2.6 inches) and at a minimum once per year.
            2. Obtain the construction as-built plans for reference during the inspection.

        ii. Mowing
            1. Wet Detention Basins – Mow the side slopes, embankments, and swales on a regular basis to discourage weeds, woody plants, and invasive species.
            2. Dry Detention Basins- Mow the side slopes, embankments, bottom and swales on a regular basis to discourage weeds, woody plants, and invasive species.
            3. Grass-Lined Swales – Mow the side slopes and bottom twice per year to maintain a dense stand of grass.
            4. Bioretention Basins - Mow the side slopes on a regular basis to discourage weeds, woody plants, and invasive species. With a string trimmer, trim the bottom of basin to height of 6 to 9 inches in the fall of each year.
            5. Mow at heights beneficial to the planted and desired vegetation cover.
                a. 3 to 4 inches for grasses.
                b. 6 inches for native plantings.
                c.
        iii. Debris/Litter Removal
            1. Remove debris and litter on a monthly basis from the basin edges, embankments, bottom (for dry detention basins) and outlet structure including the emergency spillway, as applicable.

iv. Erosion Control/Revegetation

Eroded areas of the basin edges, embankments, bottom (for dry detention basins), emergency spillway, and rip rapped areas shall be repaired in a timely manner. Consider reseeding/replanting with native vegetation with appropriate erosion control mat suited to site condition with possible consultation with an ecological-restoration company. For grass-lined swales, reseed and repair eroded areas with appropriate erosion control mat.

v. Nuisance Control – Provide control of algae and mosquitoes per recommendations from a pond maintenance contractor, as necessary.

b. Non-Routine Maintenance (Dry and Wet Detention Basins)

It is recommended that a more detailed inspection be done every 3 years on wet detention basins (forebay and permanent pool) to determine sediment depth. A forebay is typically located where flows enter the detention basin and has the purpose of settling out sediment in a more convenient location for ease of maintenance. At this time, a sediment depth survey should be performed to determine the approximate average depth of sediment. The survey would normally be done by obtaining the water surface elevation by surveyor's level and then measuring the distance from water surface to top of sediment from a boat using applicable safety standards. The depth is converted to an elevation to determine depth of sediment and to determine the permanent pool depth. The survey can be completed by the Village if the capability exists. Otherwise, this would be consulted out. Sediment survey and sampling would normally be consulted out once a sediment removal project is necessary.

i. Outlet Structure – Provide maintenance, as needed. Replace outlet structure when not performing as originally intended.

ii. Sediment Removal/Excavation from Wet Detention Basins

1. Sediment Forebay

a. Maintain 3 feet of water depth except on safety shelves which will be shallower.
b. When the forebay accumulates sediment and there is 3 feet or less water depth, perform sediment removal /excavation to original depth (typically 5 feet or more). See as-builts for original elevations.
c. Sediment Removal/Excavation Frequency: Every 3 to 5 years, depending on source area loadings. Maintain records of sediment loading.

2. Permanent Pool

a. Maintain 3 feet of water depth except on safety shelves which will be shallower.
b. When the forebay accumulates sediment and there is 3 feet or less water depth, perform sediment removal /excavation to original depth (typically 5 feet or more). See record drawings for original elevations.

c. Sediment Removal/Excavation Frequency: Every 15 to 20 years, depending on source area loadings. Maintain records of sediment removal.

3. Sediment Removal/Excavation/Disposal Regulations-Perform sediment removal/excavation according to applicable state, federal and local regulations.

   a. NR 103.06(4) (a)-Artificial wetland exemptions – Allows maintenance of ponds that revert to wetlands. Contact DNR for confirmation.
   b. Contact DNR for Chapter 30 jurisdictional determination.
   c. NR 216 Stormwater Discharge Permit (NOI) necessary for disturbance of one or more acres of land.
   d. Sediment Sampling-Contact DNR to determine if sediment sampling is necessary.
      i. Sediment and parent material sampling procedures should follow DNR guidance documents and NR 347 and NR 528.
      ii. Resources:
         1. *Guidance for Applying the Sediment Sampling Requirements of NR 347,* Wisconsin Administrative Code, WDNR Publication WT-778, 2003.
         2. *Technical Guidance for Contaminated Sediment Cleanup Decisions in Wisconsin.* WDNR. December 21, 1995
         3. *Consensus-Based Sediment Quality Guidelines (CBSQG), Recommendations for Use and Application, Interim Guidance*, WDNR, December 2003.
         4. Laboratory results to be checked for conformance with NR 204.07(5) pollutant concentration limits. Consult NR 204 land application standards.
         5. NR 528-Management of Accumulated Sediment From Stormwater Management Structures
   e. Sediment Disposal-See NR 528 and the above resources. Contact the WDNR.

iii. Sediment Removal/Excavation from Dry Detention Basins-Remove sediment and dispose of properly to maintain the originally-designed flood-storage capaVillage of the facility.

c. Non-Routine Maintenance (Bioretention Basins)

Bioretention basins are designed to capture sediment on the surface of the bioretention basin. Plug planting in the bottom of the basins is typically initially protected with a hardwood mulch layer. Over time, a bioretention basin may become clogged causing ponding on the surface of the bioretention basin. Bioretention basins are typically designed to drawdown within 24 hours of the end of a storm event. If the drawdown time of a bioretention basin is greater than 36 hours, maintenance shall occur consisting of: (1) remove all hardwood mulch material while not disturbing established native vegetation, (2) Gently scarify the engineered soil surface to promote infiltration into the engineered soil while not disturbing established native vegetation, (3) replace bioretention soil mixture per WDNR Bioretention for Infiltration Technical Standard 1004 as necessary, (4) replace hardwood mulch layer per WDNR Bioretention for Infiltration

Technical Standard 1004. Maintenance shall occur only during dry conditions while taking measures to minimize compaction of remaining engineered soil.

If bioretention basins are experiencing scour, consider removing mulch and engineered soil in those areas to allow for replacing with geotextile and appropriately sized stone to provide energy dissipation.

If bioretention basins have appreciable bare areas, plant with appropriate native plugs.

If bioretention basins appear to be experiencing compaction due to snow storage in the footprint of the bioretention basin, reinforce with the property owner that snow storage is not allowed within the footprint of the bioretention basin.

If bioretention basins appear to be experiencing clogging due to underdrain failure, underdrains shall be inspected. If necessary, underdrains shall be jetted to remove debris. If needed, the underdrain and all components of the bioretention basin above the underdrain shall be replaced per the WDNR Bioretention for Infiltration Technical Standard 1004.

Inspection and Maintenance Documentation Form
Stormwater Best Management Practices (BMPs)
Wet and Dry Detention Basins, Bioretention Basins, and Grass-Lined Swales
Village of Campbellsport, Wisconsin

Inspection Date: _____
Maintenance Date: _____

Inspector Name: _____
Company Name: _____
Company Address: _____
_____
Company Phone Number: _____
Company Fax Number: _____

Maintenance Provided by: _____
Phone Number: _____
_____
_____
_____

Stormwater Facility Location:_____
_____

Wet Detention Basin ☐
Dry Detention Basin ☐
Bioretention Basin ☐
Grass-Lined Swale ☐

Items Inspected	Checked		Maintenance Needed		Remarks
	Yes	No	Yes	No	
Wet and Dry Detention Basin (Items below are applicable to both wet and dry basins. Items in italics are applicable to only wet basins)					
A. Berms					
1. Settlement					
2. Breaks					
3. Erosion					
4. Signs of Piping Leakage					
5. Signs of Seepage					
B. Vegetation					
1. Woody growth on berm					
2. Need for cutting/trimming					
3. Need for reseeding					
4. Ruts					
5. Dead vegetation at water's edge					
C. Shoreline					
1. Erosion and rip rap failure					
2. Undermining					
3. Damage or deterioration					
4. Rodent or wildlife damage					

Items Inspected	Checked		Maintenance Needed		Remarks
	Yes	No	Yes	No	
Wet and Dry Detention Basin					
D. Outlet Structure and Emergency Outlet					
1. Obstruction blocking outlet pipe, channel, or spillway					
2. Condition of outlet and inlet structure					
a. Seepage					
b. Separation of joints					
c. Cracks, breaks or deterioration					
d. Differential Settlement					
e. Sediment level in relation to crest of inlet structure					
f. Sediment level in relation to crest of inlet structure					
g. Scour and erosion at outlet					
h. Condition of trash racks					
i. Gates or valves (Operate them twice per year)					
j. Damage by debris, ice, or freezing.					
k. Outlet channel condition downstream.					
E. Inlets					
1. Is trash on or inside pipe grate?					
2. Any ice damage to pipe outlet?					
3. Undermining of any of the pipe?					
F. Sediment Forebay					
1. Approximate depth of sediment =_____					
2. Sediment Removal Necessary					
3. Floating debris					
G. Permanent Pool					
1. Approximate depth of sediment =_____					
2. Sediment Removal Necessary					
3. Floating debris					

Items Inspected	Checked		Maintenance Needed		Remarks
	Yes	No	Yes	No	
Wet and Dry Detention Basin					
H. Access for Maintenance Equipment					
1. Obstructions					
2. Soft Areas					
3. Visible pollution					
4. Shoreline problems					
5. Other (specify)					
I. Safety Features					
1. Access Controls to Hazardous Areas					
2. Fences					
a. Loose or damaged posts					
b. Loose or broken wires					
c. Accumulated debris in fences?					
d. Condition of gates					
Bioretention Basins					
A. Sediment buildup					
B. Clogging/ponding of water					
C. Eroded areas					
D. Bare spots					
E. Trash					
F. Overflow Structure					
G. Plant health					
H. Compaction due to snow storage					
I. Adequate mulch layer					
Grass-Lined Swales					
A. Eroded areas					
B. Bare spots					
C. Mowing Necessary					

NOTES:

1. Inspection/Maintenance Comments:

   _____

   _____

   _____

   _____

2. Overall Condition of Facility (Check One)

____ Acceptable
____ Unacceptable
_____ Maintenance Completed

APPENDIX E
WDNR GUIDANCE DOCUMENTS

WDNR OCTOBER 20, 2014
TMDL GUIDANCE MEMO

BUREAU OF WATERSHED MANAGEMANT PROGRAM GUIDANCE

Storm Water Management Program

TMDL Guidance for MS4 Permits: Planning, Implementation, and Modeling Guidance

Effective: October 20, 2014
Guidance #: 3800-2014-04

Notice: 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.

APPROVED:

Pam Biersach

Pam Biersach, Director
Bureau of Watershed Management

10/28/14
Date

A. Statement of Problem

The U.S. Environmental Protection Agency (EPA) requires the wasteload allocations (WLAs) developed as part of a Total Maximum Daily Load (TMDL) be reflected and implemented through permits. In Wisconsin, storm water discharge permits are issued pursuant to ch. NR 216, Wis. Adm. Code. As part of the TMDL process, permitted Municipal Separate Storm Sewer Systems (MS4s) are assigned individual TMDL WLAs. The placement of the WLA in a storm water permit can create numerous challenges including defining the municipal area encompassed by the WLA and modeling conditions to which the storm water WLA is to be applied. Department staff, municipal officials and storm water management plan developers need guidance to clarify how assessment of permit compliance with a WLA is to be demonstrated.

B. Background

A TMDL quantifies the amount of pollution that a waterbody can assimilate and still meet water quality standards. EPA requires that waters listed as impaired on Wisconsin's 303-d list have TMDLs developed. At a minimum, TMDLs must allocate the assimilative capacity between the load allocation, the WLA, and a margin of safety. The WLA is the portion of the assimilative capacity that is allocated to point sources. Nonpoint sources receive load allocations (LAs). WLAs are established for continuous point source discharges and also intermittent pollutant releases such as permitted storm water discharges.

Establishing WLAs for storm water sources requires an understanding of under what flow conditions impairments occur, and how storm water discharges are contributing to the identified impairments. Establishing WLAs for storm water sources also requires an understanding of exactly where the discharges are occurring. In many cases, municipal separate storm sewer systems (MS4s) have multiple discharge points that can be located in more than one reachshed[1]. In a TMDL, WLAs are assigned for each pollutant of concern and by reach. In a TMDL a MS4 can have multiple and different pollutant reduction goals within its municipal jurisdiction.

C. Discussion

Once EPA has approved a TMDL that contains permitted MS4s, the next permit issued must contain an expression of the WLAs consistent with the assumptions and requirements contained in the TMDL. As part of the TMDL process EPA approves the WLAs and generally these WLAs are mirrored directly in the permit. While this seems like a relatively straight forward permit process, the direct application of the WLA can present certain challenges in implementation due to assumptions required during the development of the TMDL. These assumptions revolve around aerial extent of the MS4 and its boundary, incorporation of new areas and expansion of the municipal boundary, and modeling differences between the tools used to create the TMDL versus the compliance tools used by the MS4. In addition, permitted MS4s have already performed municipal wide analysis to comply with requirements stipulated in ch. NR 151.13, Wis. Adm. Code. These requirements expressed reduction goals as a percent reduction from a defined no controls scenario with defined climate records.

[1] Reachsheds are also referred to as subwatersheds or segment sheds in TMDL development. A reach is a stream segment or individual lake or reservoir that is artificially assigned a compliance point or "pour point" where the applicable in-stream water quality standards must be met. Breaks for stream reaches are made at changes in stream listing (each individually named 303(d) water must have their own set of TMDLs), changes in water quality criteria, and at pour points or compliance points just upstream of significant changes in flow/assimilative capacity.

To build on established methodologies contained in s. NR 151.13, DNR's preferred option for implementing TMDLs is using a percent reduction methodology similar to s. NR 151.13. The use of a percent reduction strategy will utilize reduction goals consistent with the TMDL and allow implementation to continue to build on the same percent reduction strategy employed in s. NR 151.13 using the same models and tools that MS4s have already been utilizing. Since EPA only approves the WLA and not the corresponding percent reduction it is important that the TMDL reports and permit fact sheets, as appropriate, highlight that the percent reductions being used for implementation are consistent with the approved WLAs in the TMDL.

The usage of a percent reduction framework for implementation allows both the MS4 and DNR the ability to implement the reductions without having to reallocate and track WLAs across reachsheds, MS4s, and other land uses. This will minimize the need to continually update the TMDL as municipal boundaries evolve and ease reporting requirements. In some rare cases allocations may need to be adjusted. This is discussed in Attachment A.

D. Guidance

This document divides DNR's guidance for implementing TMDL WLAs for permitted MS4s into three parts:

- **Part 1** – Expressing WLAs and Reduction Targets
- **Part 2** – Implementation and Compliance Benchmarks
- **Part 3** – Modeling

PART 1 – Expressing WLAs and Reduction Targets

An MS4 will have a WLA for each pollutant of concern addressed by the TMDL. Generally the pollutant of concern for TMDLs in Wisconsin include total suspended solids (TSS) and total phosphorus (TP); however, allocations for other pollutants such as bacteria or chlorides are possible depending on what pollutants are causing impairments to surface waters.

Unlike the requirements contained in s. NR 151.13, individual MS4s may be divided in multiple reachsheds. As such, MS4s may have multiple WLAs and percent reductions instead of the uniform municipal wide percent reduction employed in s. NR 151.13. Multiple WLAs and percent reductions are the result of needing to meet water quality requirements for all water bodies and account for changes in water body type, changes in water quality criteria or targets, changes in flow, changes in designated use, and other similar factors. Compliance with TMDL requirements will need to be achieved on a reach by reach basis.

Due to the complexity of natural systems, the WLAs identified in the TMDL are the best estimate for meeting water quality standards and are modeled or simulated predictions. Initial implementation of the TMDL will be in most cases by design using SLAMM, P-8, or equivalent methodologies to estimate and track pollutant reductions. The MS4 is typically not required to perform ambient monitoring to assess if water quality standards are being met, but MS4s do need to track implementation activities and reductions achieved, and report on TMDL implementation in MS4 annual reports. Once an adequate level of implementation has been achieved, ambient monitoring can be used to judge progress and monitoring will ultimately be needed to de-list impaired waters and show compliance with the TMDL.

During the first term of an MS4 permit, after EPA approval of a TMDL, DNR will request that each permitted MS4 report its actual MS4 area served within each reachshed. Existing MS4 permittees should already have

sewershed mapping completed to satisfy previous MS4 permit conditions and this should be used to verify the current MS4 area served within each reachshed. The Department will provide the GIS data sets used for the TMDL reachshed boundaries through its website. The main reasons for reporting this information are to determine if the MS4 area served by each permittee corresponds to each other and does not overlap or omit MS4 service areas and to provide a detailed accounting of MS4 areas and responsible parties.

In most TMDLs, non-traditional MS4s such as permitted universities and state and county highway facilities were not given unique WLAs and these areas will need to be identified. In addition, most TMDLs are not able to account for modifications in drainage due to manmade conveyance systems such as storm sewers. These modifications may require modification of reachshed boundaries. To account for this, the MS4 permit (MS4 General Permit see section 1.5.4.3) will require that permittees submit information to the DNR to verify appropriate boundaries and areas. To accomplish this DNR will require the following information:

- Updated storm sewer system map that identifies:
    - The current municipal boundary/permitted area. For city and village MS4s, identify the current municipal boundary. For MS4s that are not a city or village, identify its permitted area. The permitted area for towns, counties and non-traditional MS4s pertains to the area within the Urbanized Area of the 2010 Decennial Census.
    - The TMDL reachshed boundaries within the municipal boundary, and the area in acres of each TMDL reachshed within the municipal boundary.
    - The MS4 drainage area boundary associated with each TMDL reachshed, and the area in acres of the MS4 drainage area associated with each TMDL reachshed.
- Identification of areas on a map and the acreage of those areas within the municipal boundary that the permittee believes should be excluded from its analysis to show compliance with its WLA (see "WLA Analysis Area" in Part 3 of this document"). In addition, the permittee shall provide an explanation of why each area identified should not be its responsibility.
  Note: This information is to be acquired by the DNR through an MS4 annual report.

DNR will evaluate this information and consider whether modifications to the TMDL are warranted. It is common for TMDL derived MS4 areas and reachsheds to deviate from the actual MS4 drainage areas. Such deviations can have an impact on the TMDL; however in most cases, these deviations will not have a significant effect on the calculated percent reduction needed to meet the TMDL allocations.

To assist in understanding allocations the TMDLs developed in Wisconsin have in many cases expressed reduction goals in both a WLA format (a load expressed as a mass) and a percent reduction format. The percent reduction is calculated from the baseline condition used in the TMDL to quantify what is needed to meet water quality standards. During the development of the TMDLs, the percent reduction is calculated using the following equation:

$$\text{Percent Reduction (from baseline)} = 100 * (1 - (\text{WLA Loading Condition} / \text{Baseline Loading Condition}))$$

The baseline loading condition should be described in the TMDL. While there is some variation across TMDLs in Wisconsin, the baseline loading condition should reflect the regulatory conditions stipulated in s. NR 151.13 and utilize either the 20% TSS control requirement or the 40% TSS control requirement as the starting point for TMDL allocations. This is because TMDLs are required, at a minimum, to meet existing regulatory requirements.

In 2011, the Wisconsin Legislature approved Act 32 which prohibited the Department from enforcing the 40% TSS reduction contained in s. NR 151.13, Wis. Adm. Code. As such, TMDLs under development and approved by EPA prior to January 1, 2012 used the 40% reduction as the baseline loading condition. For TMDLs approved by EPA after January 1, 2012, the 20% reduction serves as the baseline loading condition. The 20% reduction required under s. NR 151.13, Wis. Adm. Code, was to have been achieved by 2008.

For consistency with existing s. NR 151.13 guidance and requirements, the permittee's MS4 permit (MS4 General Permit - see section 1.5.4.4.1) will be requiring that the no-controls modeling condition be used such that the TMDL percent reduction goals will be measured from the no controls modeling condition. Since TMDL development uses the 20% or 40% TSS reduction baseline loading condition, implementation planning will necessitate converting the TMDL stipulated percent reduction back to a no-controls percent reduction for pollutants of concern such as TSS and Total Phosphorus (TP). As identified in the approved Rock River TMDL, a 40% TSS reduction corresponds with a 27% Total Phosphorus (TP) reduction. Based on loading data from the WinSLAMM model, a 20% TSS reduction for MS4s from the no-controls condition corresponds with a 15% TP reduction. This can be done using a mathematical conversion:

For a TMDL that uses 20% TSS reduction as the baseline loading condition (TMDLs approved after January 1, 2012) the conversion to the no-controls modeling condition is:

TSS Percent Reduction (no-controls) = 20 + (0.80 * % control from baseline in TMDL)
TP Percent Reduction (no-controls) = 15 + (0.85 * % control from baseline in TMDL)

For a TMDL that uses 40% reduction as the baseline loading condition (TMDLs approved prior to January 1, 2012) the conversion to the no-controls modeling condition is:

TSS Percent Reduction (no-controls) = 40 + (0.60 * % control from baseline in TMDL)
TP Percent Reduction (no-controls) = 27 + (0.73 * % control from baseline in TMDL)

The above calculated reductions correspond to the percent reduction measured from no-controls as required by the permittee's MS4 permit (MS4 General Permit - see section 1.5.4.4.1). These percent reductions can be compared to the reduction already achieved with existing management practices as required under the permittee's MS4 permit (MS4 General Permit - see section 1.5.4.4.4). This comparison, needed for each reachshed, will determine if additional reductions are needed to meet the TMDL requirements. The MS4 percent reductions from the no-controls condition for the Rock River TMDL and Lower Fox River TMDL are given in Attachments C and D.

For the MS4 area contained in each reachshed, the no controls load is calculated using SLAMM, P-8, or equivalent. The MS4 area includes the entire acreage that the MS4 is responsible for excluding areas not under the jurisdiction of the permittee. As new MS4 area is added or subtracted, the TMDL percent reduction applied to these areas remains the same. The percent reduction from no controls to meet the TMDL is applied to the MS4's modeled no-controls load to obtain the necessary load reduction to meet the TMDL. This load reduction may be different from that needed to meet the stipulated TMDL WLA; however, MS4 implementation of the TMDL is driven by the percent reduction and its corresponding load reduction.

For permittees that elect to use water quality trading or where adaptive management may lead to water quality trading, the load reduction calculated from the no-controls percent reduction should be used when evaluating the necessary mass.

TMDLs do not negate requirements stipulated in s. NR 151.13, Wis. Adm. Code. Therefore, both TMDL percent reductions and s. NR 151.13 requirements must be met. Once an MS4 meets the s. NR 151.13 requirement of 20% TSS control, an MS4 does not need to continue to update their s. NR 151.13 development urban area modeling. This is because s. 281.16 (2)(am)3., Wis. Stats., requires a municipality to maintain storm water treatment practices that are already in place prior to July 1, 2011.

TMDL reports may include both an average annual WLA and a percent reduction for MS4s. For implementation, MS4s should use the percent reduction. The average annual allocations represent the sum of allocations over the year and do not account for the monthly variations in the loading capacity of the receiving water. The percent reductions provided in the TMDL are based on monthly reductions and better reflect the reductions required to meet the water quality standards.

> Example: Appendix V in the Rock River TMDL lists annual mass allocations for Reach 81. The City of Beloit has a baseline loading for TSS of 181.75 tons and a WLA of 259.62 tons (a net increase). However, Appendix I identifies that Beloit needs a 7% reduction in TSS for Reach 81 from the 40% TSS baseline condition. This is because on an overall annual basis Beloit meets its allocation but in certain individual months it does not. The percent reduction is calculated based on the average of the monthly allocations used to determine compliance with the water quality standards.

PART 2 – Implementation and Compliance Benchmarks

Storm Water Management Planning (SWMP)

As described in the permittee's MS4 permit (MS4 General Permit - see sections 1.5.4.4 and 1.5.4.5), DNR will be requiring a TMDL implementation analysis and plan be completed by MS4 permittees subject to TMDL WLAs. This analysis and plan should be incorporated in the SWMP as required by the permittee's MS4 permit (MS4 General Permit - see section 1.5.4). Each MS4 permittee should evaluate all potentially cost-effective alternatives to reduce its discharge of pollutants of concern so that its discharge is comparable to the percent reductions stipulated in the TMDL. MS4 permittees may work together with other MS4s that reside in the same reachshed.

A focus of the SWMP should be on improving storm water treatment for areas of existing development during times of redevelopment. Older, urban development patterns typically did not include the same level of stormwater management controls that new development does. Reductions achieved through redevelopment can be counted towards compliance with WLAs. Each municipality should estimate the pollutant reductions that are expected to be achieved over time through redevelopment of both public and private facilities, including roadway reconstruction. The rate of redevelopment should be estimated in order to provide a gauge as to how long it would take to improve storm water management in areas of redevelopment.

When developing components of a TMDL implementation plan, municipalities should, at a minimum, consider the following implementation methods:

- **Ordinance Review and Updates** – A municipality may elect to revise its current post-construction storm water management ordinance to require greater levels of pollutant control for redevelopment and highway reconstruction that are above the minimum performance standards of ch. NR 151, Wis. Adm. Code and are consistent with the reduction requirements contained in the TMDL.

  Current ch. NR 151 post-construction performance standards for areas of new development include an 80% TSS control level and maintaining 60 - 90% of predevelopment infiltration (with certain exemptions

and exclusions). Areas that have stormwater management practices designed and maintained to meet these performance standards should already be controlling TSS and total phosphorus to levels comparable to TMDL water quality targets.

In addition, core provisions in the municipality's SWMP could be strengthened. For example, if bacteria are a pollutant of concern the MS4 may want to place greater emphasis on detecting and eliminating cross-connections between wastewater pipes and storm sewers or stronger pet waste programs.

- **Quantifiable Management Practices** – These practices include, but are not limited to, structural controls such as wet detention ponds, infiltration basin, bioretention, sump cleaning, low impact development (LID), street cleaning and vegetated swales where reductions can be quantified through water quality modeling such as WinSLAMM and P-8.

- **Non-Quantifiable Management Practices –** Quantifiable pollutant reductions may be difficult to determine for some practices such as residential leaf and yard debris management programs, lawn fertilizer bans and information and education outreach activities. This could also include strengthened provisions of the core SWMP. For example, if bacteria is a pollutant of concern the MS4 may place greater emphasis on detecting and eliminating cross connections, stronger pet waste programs and greater focus on elimination of leaching from dumpsters. As data becomes available to quantify reductions the appropriate credit will be given toward meeting the TMDL reduction requirements. In the interim, DNR and the permittee should be able to come to an agreement as to whether the measure is beneficial. In cases where quantifiable reductions are not possible, the use of a non-quantifiable but beneficial practice shall be deemed as making progress toward compliance with the TMDL reductions. The DNR, in consultation with stakeholders, will evaluate these practices as new science and data becomes available.

- **Stabilization of MS4** – Stabilization of eroding streambanks are eligible for a 50% cost share match through DNR's Runoff Management Grant Program. DNR considers streambank stabilization activities an important step in reducing the discharge of sediment. However, TMDL baseline modeling already assumes that drainage systems are stable; therefore, it is not appropriate to take credit against the WLA or percent reduction in the TMDL for stabilization of a drainage ditch or channel of the MS4. However stabilization projects should be identified in the TMDL implementation plan and can serve as a compliance benchmark toward meeting overall TMDL goals.

- **Streambank Stabilization Outside of the Permitted MS4** – Permitted MS4s may take credit through pollutant trading for stabilization of channels and streambanks which are outside of the area served by their MS4. Applicable credit thresholds and trade ratios would apply.

- **Water Quality Trading and Adaptive Management -** If economically beneficial, a MS4 may wish to participate in one of these programs. MS4s are eligible to participate in water quality trading to help meet WLAs. MS4 permittees with areas in the same reachshed can share load reduction credits for practices within those reachsheds using a 1:1 trade ratio. Also a MS4 may be invited by a Waste Water Treatment Facility (WWTF) to participate in an adaptive management program pursuant to s. NR 217.18, Wis. Adm. Code, to reduce phosphorus. Water quality trading and adaptive management guidance are covered under separate DNR guidance documents available on the DNR website.

- **Constructed Wetland Treatment –** Wetlands constructed for the purpose of providing storm water treatment are eligible for treatment credit provided that a long-term maintenance plan is implemented. Wetlands that receive runoff pollutants are expected to, at some point, reach a certain equilibrium point

where they would provide minimal pollutant removal or even act as a pollutant source unless they are maintained by harvesting vegetation and/or have accumulated sediment removed from them. Additionally, constructed wetlands installed need to be maintained as stormwater treatment areas in order to maintain their "non-waters-of-the-state" status. Per federal regulations, wetlands constructed as part of wetland mitigation cannot be used for treatment credit.

- **Storm Water Practices and Existing Wetlands** - Wetlands are waters of the state and wetland water quality standards under ch. NR 103, Wis. Adm. Code apply. Additionally, the U.S. Army Corps of Engineers has authority to protect wetlands as well. As such, existing wetlands cannot be used for treatment, however, in limited circumstances storm water practices can be installed in a wetland provided all applicable state and federal wetland permits are obtained. It is often difficult to obtain state and federal permits to construct a storm water treatment facility in a wetland. Contact the local DNR water management specialist to discuss whether this project might be permissible and the associated written justification needed to support a wetland permit application.

As discussed, SWMPs for municipalities with approved TMDLs should identify what pollutant reduction measures will be employed and over what time frame reductions will occur (i.e. 20 tons/yr TSS for redevelopment sites over the next 20 years).

Compliance Schedule and Benchmarks

Once a TMDL is approved, affected MS4 permittees will receive a TMDL implementation planning requirement within their next (or potentially initial) permit term. TMDL implementation planning will include determining storm water management treatment and other measures needed and their associated implementation costs and timelines to achieve TMDL reductions consistent with the TMDL WLAs. It is expected that the following MS4 permit term will include a compliance schedule to implement pollutant reduction measures in accordance with a storm water management plan to meet applicable TMDL reductions.

The compliance schedule will require that the permittee be able to show continual progress by meeting 'benchmarks' of performance within each permit term. In this case, a 'benchmark' means a progress increment – a level of pollutant reduction or an application of a pollutant reduction measure, which is part of a larger TMDL implementation plan designed to bring the overall MS4 discharge of pollutants of concern down to a level which is comparable to the MS4's TMDL WLA. It is possible that certain benchmarks will not be easily quantifiable but there needs to be evidence that such benchmarks will provide a legitimate step toward reducing the discharge of pollutants of concern.

DNR may elect to place specific benchmarks in an MS4 permit. However, it is expected that MS4 permittees will have the primary role in establishing their own benchmarks for each 5-year permit term. Benchmarks should be reevaluated at least once every 5 years and are interim steps/goals of compliance. Where substantial reductions are required multiple benchmarks of compliance will be needed and likely implemented over more than one permit cycle. However, the schedule should lead to meeting the TMDL WLA as quickly as is feasible.

Redevelopment ordinances designed to implement stormwater management controls to achieve compliance with the TMDL requirements are an excellent tool to show progress in meeting the WLA with smart growth and development patterns. Management practices should be installed as infrastructure is replaced. For example, it may be most cost-effective for municipalities to install storm water treatment and infiltration practices as other street or sewer projects are scheduled.

Under a TMDL, EPA does not acknowledge the concept of maximum extent practicable as defined in s. NR 151.006, Wis. Adm. Code, but rather compliance schedules can be structured in SWMPs and permits to allow MS4s the flexibility needed to meet TMDL goals. Any storm water control measures employed by the MS4 permittee to reduce its pollutant discharge to comply with the TMDL reductions will need to be maintained or replaced with comparable stormwater control measures to ensure that load reductions will be maintained into the future.

Runoff Treatment Outside of the MS4's Jurisdiction
In order for an MS4 to take credit for the control of pollutants by another municipality or private property owner (i.e. industry or riparian property owner), the MS4 must have an agreement with the entity with control over such treatment measure. This agreement must specify how the pollutant reduction credit will be shared or otherwise granted to an MS4. Responsibilities for maintenance of the BMPs and preservation of the BMPs over time should also be addressed in any such agreement.

Tracking
The permittee will need to track and show progress in reducing discharges of pollutants of concern. This tracking should assist in showing that MS4 permit compliance benchmarks have been achieved in accordance with an overall storm water management plan to achieve compliance with the TMDL percent reduction targets.

A tabular TMDL compliance summary of pollutant loading per reach will be required to be submitted to DNR with the MS4 report at least once every MS4 permit term. The summary should identify the following: reach name and number (consistent with the name and number in the TMDL report), the MS4 outfall numbers, named/labeled drainage areas, the applicable TMDL percent reduction target(s), pollutant reduction benchmarks, storm water management control measures implemented, and pollutant reduction achieved as compared to no controls. Attachment B is an example of a tabular TMDL MS4 compliance summary.

PART 3 – Modeling

Discussion

The following discussion highlights the main compatibility challenges between TMDL development and MS4 implementation and how they will be addressed.

TMDL waste load allocations are by definition expressed as daily loads. There is flexibility, however, to implement the loads using monthly, seasonal, or annual load allocations. Due to the variability of storm water events and associated pollutant loadings, MS4's have historically used modeling to estimate flows and pollutant loadings using a percent reduction format for the purpose of s. NR151.13 compliance. As part of TMDL implementation, average percent reductions have been developed for MS4s for each reach. These percent reductions generally reflect an average of monthly reductions needed to meet allocations because waters are evaluated against the phosphorus criteria based on monthly sampling protocols. This will allow MS4s to continue using water quality models such as WinSLAMM and P-8 for demonstrating compliance with TMDL allocations. As with s. NR 151.13, TMDL compliance for MS4s will be by design.

Since the modeling tools used to demonstrate compliance with s. NR151.13 pollutant loadings are the same tools used to demonstrate compliance with TMDL pollutant load allocations, much of the existing mapping, water quality modeling, and planning methodologies used for s. NR151.13 compliance can be used or adjusted for TMDL compliance planning.

Generally, the modeling completed as part of TMDL development is at a less detailed scale than the modeling completed by individual MS4s. Due to the scale at which the respective models are completed, it is not unusual to have differences in the drainage areas and the pollutant mass loadings associated with them. Because of the scale at which they are developed, allocations from a TMDL have generally been applied across the entire urban area that is served by the permitted MS4. It is important to note that while many components of existing planning efforts and modeling results can be used for TMDL implementation, adjustments will likely be necessary to account for a TMDL focus on compliance by reachshed.

There may be inconsistencies between the TMDL modeled drainage areas to the actual MS4 drainage areas. Actual MS4 drainage areas may not follow the surface drainage areas and MS4 drainage areas commonly expand due to urban development. For example, the modeled versus actual MS4 drainage areas commonly deviated by 30% and by as much as 60% in the Rock River TMDL. Although these deviations may have a significant effect on a mass wasteload allocation, its affects are greatly moderated on a percent reduction basis across the reachshed. Area deviations commonly affect the MS4 percent reductions by only a few percent. Given the modeling assumptions that have gone into TMDL modeling, deviations by even 10% are within the expected error range of TMDL modeling. Modeling is not an exact science and the TMDL MS4 percent reductions are still considered valid implementation targets to work toward achieving in-stream water quality.

As noted above, MS4s subject to a TMDL should perform analyses and planning to identify cost-effective approaches for reducing discharges of pollutants of concern. To cost-effectively achieve pollutant reductions, MS4s should look for opportunities such as site redevelopment and road reconstruction projects, implementation of streambank stabilization and wetland restoration projects, implementation of traditional BMPs, and possibly water quality trading and adaptive management[2]. Each of these elements can be considered for implementation to meet the requirements of a TMDL. It is likely that existing MS4 water quality modeling and mapping can be used and adjusted as necessary for SWM planning needs for TMDL implementation.

Guidance

TMDL-established WLAs and LAs are 'targets' of treatment performance and/or pollutant control for point and non-point sources. The WLAs and LAs are TMDL modeled estimates of the level of pollutants that can be discharged and still meet in-stream standards. The ultimate goal of a TMDL is for continual reduction of pollutants discharged so that both the listed impaired waters and other waters meet in-stream water quality standards, which would then allow for removal of waters from the 303-d impaired waters list. Municipalities should consider the drainage area served by their MS4 and look for the most cost-effective means to reduce discharges of pollutants of concern until their discharge is comparable with its TMDL requirements.

TMDL Analysis Area

An MS4 is to include all areas within its corporate boundary unless it is listed as optional. Although the MS4 permit focuses on current areas served by an MS4, it may be appropriate to include future land use planning areas.

Incorporation of rural areas: A city or village may have incorporated the entire township or a large portion of the rural township in which it resides. In this situation, the city or village needs to include all areas within the most

2 The Department has prepared separate guidance documents on water quality trading and adaptive management. MS4s are considered non-point sources for the purposes of adaptive management. This does not preclude them from participating in an adaptive management program if approached by a traditional point source such as a municipal or industrial wastewater treatment facility. The "Adaptive Management Technical Handbook" is available for download at http://dnr.wi.gov/topic/surfacewater/adaptivemanagement.html

recent urbanized area, adjacent developed and developing areas whose runoff is connected or will connect to their MS4.

Highways: A permitted MS4 owner/operator of a highway needs to account for the pollutants generated within the Right-Of-Way (ROW). An exception would be a roadway crossing over a highway where the owner of the roadway crossing structure is responsible for the pollutants associated with their bridge and approach structure within the lower highway's ROW. WisDOT is responsible for state highways that are not connected highways. A county is responsible for county highways that it maintains. Cities and villages need to include connecting highways as identified and listed in the Official Highway State Truck Highway System Maps at: http://www.dot.wisconsin.gov/localgov/highways/connecting.htm

Optional: The pollutant loads associated with the following areas are optional for an MS4 to include:

1. Area that never passes through a permittee's MS4 such as a riparian area.
2. Land zoned for agricultural use and operating as such.
3. Manufacturing, outside storage and vehicle maintenance areas of industrial facilities permitted under subch. II of ch. NR 216, Wis. Adm. Code, are optional to include. This does not include any industrial facilities that have certified a condition of "no exposure" pursuant to s. NR 216.21(3), Wis. Adm. Code. *Note: DNR recommends that municipalities include all industrial facility areas within their WLA analysis area instead of creating 'holes' within its area of analysis.*
4. Any area that discharges to an adjacent municipality's MS4 (Municipality B) without passing through the jurisdictional municipality's MS4 (Municipality A). Municipality B that receives the discharge into their MS4 may choose to be responsible for this area from Municipality A. If Municipality B has a stormwater treatment practice that serves a portion of A as well as a portion of B, then the practice must be modeled as receiving loads from both areas, independent of who carries the responsibility for the area. However, if runoff from an area within Municipality A's jurisdiction drains into Municipality B's MS4 but then drains back into Municipality A's MS4 farther downgradient, then Municipality B does not have the option of including the load from Municipality A in their analysis and the load from that area is Municipality A's responsibility.
5. For county and towns, the area outside of the most recent urbanized area as defined by the US Census Bureau. This area is classified as non-permitted urban and part of the non-point source load allocation (NPS LA).

MS4 Water Quality Models and Related Information

To model pollutants such as TSS and total phosphorus in the area served by the MS4, the municipality must select a model such as SLAMM, P8 or an equivalent method deemed acceptable by the Department. For the analysis to show compliance, SLAMM version 9.2 or P8 version 3.4 or a subsequent version of these models may be used.

All roadway right-of-ways within the urbanized area that are part of a county or town's MS4 are the responsibility of the county or town. Model the road based on the urban land use that will most typify the traffic, even if agricultural land use is on one or both sides of the road (for example commercial or residential) and include that area in the corresponding standard land use file.

A municipality is not required to use the standard land use files if it has surveyed the land uses in its developed urban area and has "real" source area data on which to base the input files. The percent connected imperviousness beyond the standard land use files must be verified in the field. Disconnection may be assumed for residential rooftops where runoff has a flow path of 20 feet or greater over a pervious area in good condition. Disconnection for impervious surfaces other than residential rooftops may be assumed provided all of the following are met:

- The source area flow length does not exceed 75 feet,

- The pervious area is covered with a self-sustaining vegetation in “good” condition and at a slope not exceeding 8%,
- The pervious area flow length is at least as long as the contributing impervious area and there can be no additional runoff flowing into the pervious area other than that from the source area.
- The pervious area must receive runoff in a sheet flow manner across an impervious area with a pervious width at least as wide as the contributing impervious source area.

Water quality modeling is a means to determine a storm water management control practice’s treatment efficiency. If the model cannot predict efficiencies for certain storm water management control measures that a municipality identifies as a water quality management practice, then a literature review should be conducted to estimate the reduction value. Proprietary stormwater management control measures that utilize settling as their means of TSS reduction should be modeled in accordance with DNR Technical Standard 1006 (Method for Predicting the Efficiency of Proprietary Storm Water Sedimentation Devices).

When designing storm water management practices, runoff draining to a management practice from off-site must be taken into account in determining the treatment efficiency of the measure. Any impact on the efficiency must be compensated for by increasing the size of the measure accordingly.

Storm water management practices on private property that drain to an MS4 can be given treatment credit, provided the municipality enters into an agreement or has an equivalent enforceable mechanism with the facility/land owner that will ensure the management practice is properly maintained. The municipality will need a tracking system that includes maintenance of treatment practices. An operation and maintenance plan, including a maintenance schedule, must be developed for the stormwater management practice in accordance with relevant DNR technical standards. The agreement or equivalent mechanism between the municipality and the private owner should include the following:

- A description of the stormwater management practice including dimensions and location.
- Identify the owner of the property on which the stormwater management practice is located.
- Identify who is responsible for implementing the operation and maintenance plan.
- Outline a means of terminating the agreement that includes notifying DNR.

The efficiency of a storm water management practice on both public and private property must be modeled using the best information the municipality can obtain on the design of the practice. For example, permanent pool area is not sufficient information to know the pollutant reduction efficiency of a wet detention basin even if it matches the area requirements identified in Technical Standard 1001 Wet Detention Basin for an 80% reduction. Information on the depth of the wet pool and the outlet design are critical features that determine the level of control a detention pond is providing.

Modeling Clarifications

- A TMDL might remove certain internally drained areas from its analysis. If an internally drained area is removed from the TMDL analysis, the MS4 permittee shall not include such area in its MS4 analysis to show compliance with its TMDL requirements. Under this scenario if stormwater is pumped from inside the internally drained area to an external drainage area, then this additional pollutant discharge needs to be accounted for in the MS4 analysis to show compliance with its TMDL requirements.
- Where an internally drained area is included in the TMDL analysis, an MS4 permittee has the option of including this area in its TMDL analysis to show compliance with its TMDL requirements. However, credit for pollutant removal in internally drained areas may only be taken provided the April 6, 2009 DNR Internally Drained Area guidance memo is met with respect to taking pollutant reduction credit within internally drained areas.

- When water is pumped rather than gravity drained from an internally drained area of many acres in area, the MS4 will be expected to use monitoring data to determine the annual average mass of pollutants discharged to the surface water to which the TMDL applies. This does not apply to dewatering covered under a DNR storm water construction site general permit.
- If a portion of a municipality's MS4 drains to a stormwater treatment facility in an adjacent municipality, the municipality generating the load will not receive any treatment credit due to the downstream municipality's treatment facility unless there is an inter-municipal agreement where the downstream municipality agrees to allow the upstream municipality to take credit for such treatment. DNR anticipates that such an agreement would have the upstream municipality assist with the construction and/or maintenance of the treatment facility. This contract must be in writing with signatures from both municipalities specifying how the treatment credit will be shared.
- For reporting purposes, the pollutant reductions must be summarized by TMDL reachshed. Additionally, pollutant loads for grouped drainage areas as modeled shall also be reported. Drainage areas may be grouped at the discretion of the modeler for such reasons as to emphasize higher priority areas, balance model development with targeting or for cost-effectiveness.
- The additional runoff volume from areas that are outside of the analysis area needs to be accounted for when it drains into treatment devices. The pollutant load can be "turned off" but the runoff hydrology needs to be accounted for to properly calculate the treatment efficiency of the device.
- Due to concerns of sediment resuspension, basins with an outlet on the bottom are generally not eligible for pollutant removal based solely on settling. However, credit may be taken for treatment due to infiltration or filtration. Filtration might occur through engineered soil or proprietary filters. Features to prevent scour should always be included for any practice where appropriate.
- Credit should not be taken for street cleaning unless a curb or equivalent barrier is present which leads to sediment buildup on the street.
- To model a combination of mechanical broom and vacuum assisted street cleaning, it may require an analysis of several model runs depending on the timing of the mechanical and vacuum cleaning. If mechanical broom and vacuum cleaning occur at generally the same time (e.g. within two weeks of each other) then only the removal efficiency of the vacuum cleaning should be taken. If the municipality performs broom sweeping in the spring or fall and vacuum clean the remained of the year, calculate the combined cleaning efficiency using the following method:
  (A) Model the entire street cleaning program as if entire period is done by a mechanical broom cleaner.
  (B) Model just the period of time for vacuum cleaning (do not include the mechanical broom cleaning).
  (C) Model the same period as B) but with a mechanical broom.
  (D) The overall combined efficiency would be A + B – C.

WinSLAMM clarification

- WinSLAMM 9.4 and earlier versions of WinSLAMM result in double counting of pollutant removal for most treatment practices modeled in series. WinSLAMM 9.2 and subsequent versions contain warnings to help alert modelers of this issue. The modeler will need to make adjustments to ensure that the results do not include double credit for removal of the same particle size. PV & Associates has created a document titled 'Modeling Practices in Series Using WinSLAMM' which helps to guide a user as to whether and or how certain practices can be modeled in series and this document is available at: http://winslamm.com/Select_documentation.html
- In WinSLAMM 9.4 and earlier versions, when street cleaning is applied across a larger modeled area with devices that serve only a certain area within the larger modeled area, it is acceptable to first take credit for street cleaning across the entire larger area but then the treatment efficiency for other devices must be reduced by the efficiency of the street cleaning to prevent double counting.

P8 clarifications

- P8 does not account for scour and sediment resuspension. DNR requires that a wet basin with less than a 3-foot permanent pool have its treatment efficiency reduced. A basin with zero permanent pool depth should be considered to get zero credit for pollutant removal due to settling and a basin with 3 or more feet of permanent pool depth can be given the full pollutant removal efficiency credited by settling. The pollutant removal efficiency may be given straight-line depreciation such that a basin with a 1.5 foot-deep permanent pool would be eligible for 1/2 the pollutant removal efficiency that would be credited due to settling.
- A device that DNR gives no credit for pollutant removal may still be modeled if it is in series with other practices because of its benefit on runoff storage capacity that may enhance the treatment efficiency of downgradient treatment devices. To do so, turn the treatment efficiency off in P-8.
- P8 should be started an extra year or at least several months before the "keep dates", in order to allow the model to build up representative pollutant concentrations in wet basins.

CREATED:

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APPROVED:

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Runoff Management Policy Management Team approved on 9/30/14 (date).

Attachment A: Technical Notes

Establishing relationships between multiple point and nonpoint pollutant sources and their influences on stream flow and water quality is complex. This process is often further complicated by the spatial scale under which TMDLs are developed. In order to help make TMDL development manageable, TMDLs are often developed using large scale modeling approaches that can be difficult to translate to the smaller scale often needed for implementation. For instance, loadings from "non-traditional" permitted MS4s (WDOT and county highways and UW campus systems) are often aggregated with the loadings of traditional MS4s (cities, villages and towns). This loss in resolution can result in inconsistencies in the WLA assignment necessitating a more thorough examination and possible reallocation of a portion of the WLA to non-traditional MS4 permittees.

In many cases where there is an existing TMDL that aggregated WLAs, the Wisconsin Department of Natural Resources (DNR) will need to review, and may need to reallocate WLAs to MS4 permittees. MS4 permittees will then need to conduct storm water management planning to evaluate their current pollutant loads relative to the TMDL reduction goals and create and implement a plan to meet the TMDL reductions.

Whether or not a municipality changes in size or land use, the allowable pollutant load that the receiving water can handle does not change. In the TMDL, the total allowable permitted MS4 load was determined by reach and typically was distributed uniformly across permitted MS4s on a unit area load basis. Since the permitted MS4 allowable unit area load is the same across a reachshed, MS4 WLAs can be reallocated between each other based on area. However, this reallocation must occur at the same time step that was used in the TMDL development process.

> Example: the Rock River TMDL generated allocations on a monthly basis so any reallocation of the WLA between sources must also proceed on a monthly basis. Simply adding the monthly allocations into an annual load and reallocating using an average annual unit load approach will result in a misrepresentation of the TMDL allocations. Analysis must be conducted on a monthly basis.

It is expected that the extent area that will need to be modeled for the MS4 WLA will be larger than that modeled under the s. NR 151.13 (developed urbanized area modeling analysis). This is because the s. NR 151.13 modeling area has many optional and excluded areas, whereas, the TMDL WLA analysis generally lumps all of these areas into the WLA. Also, s. NR 151.13 modeling was based on year 2004 developed area condition versus a TMDL which generally considers most recent development information.

In municipalities that have recently experienced significant growth, there may be a significant increase in urban area. In addition, in some instances the total actual permitted MS4 area within a reachshed is different than that used in the TMDL development process. Initially DNR believed that it would be easy to reallocate a portion of the non-point source LA to the permitted MS4s based on a unit load approach; however, the task can be more difficult than it initially appears. As explained above, the reallocation needs to be conducted using the same time step used in the development of the TMDL and at the same critical flow period used to develop the TMDL. In many cases, this critical flow period used in the development of the TMDL may not correspond with an average annual unit load.

<u>Reallocation Option</u>: In some cases, where TMDL analysis was conducted on an average annual basis it may be appropriate to adjust WLAs based on the acreage associated with each MS4 by reachshed. If reallocating WLAs and LAs within the same reach will still not be adequate to address significant area differences between actual and TMDL modeled reachsheds, DNR will consider on a case-by-case basis as to whether a reallocation between reaches is warranted. For example, an MS4 may collect runoff from a substantial amount of area from one reachshed and discharge it directly into another reachshed.

DNR would include reallocated WLAs in the next reissued permit of affected MS4s. MS4s would have the opportunity to comment and/or adjudicate reallocated WLAs when the permit is public noticed.

Attachment B: TMDL Compliance Summary

TMDL Reach Number & Name: 64 (Yahara River, Lake Mendota & Lake Monona)
MS4 TMDL Percent Reductions needed (no controls): 73% (TSS) & 68% (TP)*
MS4 Existing Controls Percent Reduction (year 2014): 32% (TSS) & 24% (TP)
Modeled MS4 Annual Average Pollutant Load (no controls): 433 tons/yr (TSS) & 124 lb/yr
Modeled MS4 Annual Average Pollutant Load (existing controls): 294 tons/yr (TSS) & 94 lb/yr

Benchmark (BM)	Description of BM Measure	Outfalls Affected by BM control	Affected Drainage Areas (as modeled)	Implementation Date	Measure Treatment Performance	BM % Reduction toward TMDL Reduction	MS4 Cumulative % Control (from no controls)
N/A	Existing control measures	All	All	Ongoing	TSS: 32% TP: 24%	TSS: 32% TP: 24%	TSS: 32% TP: 24%
1	Increased SWM control for Roadway Reconstruction	All	All	1/1/2020	TSS: 60% TP: 40% to MEP	TSS: 0.6% (annually) TP: 0.4% (annually) (30% TSS reduction over 50 years)	TSS: 35% TP: 26% (Accounts for 5 years of reduction)
2	Implement Enhanced Street Cleaning Program	001 003 004 008	1A - 1D 3A – 3K 4C – 4F 8D	1/1/2020	TSS: 12% TP: 8% (no redundant controls)	TSS: 9% TP: 6% (eff. reduced for redundant measures)	TSS: 44% TP: 32%
3	Implement Enhanced Yard Waste Collection Program	All	All	1/1/2021	TSS: 2% TP: 6% (no redundant controls)	TSS: 1.6% TP: 5% (eff. reduced for redundant measures)	TSS: 46% TP: 37%
4	Ordinance Revised – Higher Redevelopment Standard	All	All	1/1/2022	TSS: 60% TP: 40% to MEP	TSS: 0.6% (annually) TP: 0.4% (annually) (30% of TSS reduction over 50 years)	TSS: 49% TP: 39% (Accounts for 5 years of reduction)
5	Retrofit 2nd St. Basin into wet basin	002	B4	1/1/2023	TSS: 60% TP: 40%	TSS: 2% TP: 1% (only serves part of MS4)	TSS: 51% TP: 40%
6	New Wet Basin B15	005	5B - 5H	1/1/2023	TSS: 60% TP: 40% to MEP	TSS: 3% TP: 2% (only serves part of MS4)	TSS: 54% TP: 42%
7	Stabilize MS4 Drainage Ways between X and Y streets	003	3D and 3E	1/1/2024	20 tons/year sediment reduction	N/A Streambank & MS4 stabilization does not count against TMDL reduction requirement	TSS: 54% TP: 42%

* The TSS and TP percent reductions were taken from the Rock River Report's Appendix H and I. All other mass and percent reductions listed are fictitious and shown for example purposes only.

Attachment C: Rock River TMDL MS4 Annual Average Percent Reductions

Reach	Appendix H TP reduction from baseline of 27%	Appendix I TSS reduction from baseline of 40%	Calculated TP reduction from no-controls	Calculated TSS reduction from no-controls
2	29%	1%	48%	41%
3	82%	26%	87%	56%
20	14%	0%	37%	40%
21	10%	0%	34%	40%
23	12%	11%	36%	47%
24	11%	12%	35%	47%
25	64%	32%	74%	59%
26	35%	29%	53%	57%
27	0%	0%	27%	40%
28	1%	0%	28%	40%
29	51%	7%	64%	44%
30	0%	0%	27%	40%
33	29%	9%	48%	45%
34	81%	31%	86%	59%
37	66%	54%	75%	72%
39	0%	0%	27%	40%
45	13%	8%	36%	45%
51	14%	0%	37%	40%
54	61%	6%	72%	44%
55	68%	43%	77%	66%
56	19%	0%	41%	40%
59	54%	15%	66%	49%
60	29%	1%	48%	41%
61	6%	2%	31%	41%
62	70%	70%	78%	82%
63	14%	11%	37%	47%
64	47%	55%	61%	73%
65	49%	46%	63%	68%
66	37%	37%	54%	62%
67	0%	0%	27%	40%
68	52%	18%	65%	51%
69	72%	21%	80%	53%
70	1%	1%	28%	41%
71	29%	31%	48%	59%
72	0%	0%	27%	40%
73	51%	49%	64%	69%
74	17%	20%	39%	52%
75	15%	19%	38%	51%
76	75%	29%	82%	57%
78	4%	0%	30%	40%
79	54%	37%	66%	62%
81	20%	7%	42%	44%
83	37%	25%	54%	55%

Baseline reductions of TP = 27% & TSS = 40% were identified in the RR TMDL report on pages 25 & 27.
% TP reduction from no-controls = 27 + [0.73 x (% TP control in Appendix H)]
% TSS reduction from no-controls = 40 + [0.60 x (% TSS control in Appendix I)]
Reaches that are not listed above did not have a permitted MS4 within the reach.

Table developed by: Eric Rortvedt, DNR Stormwater Engineer
Dated: 9/16/2014

Attachment D: Lower Fox River Basin TMDL MS4 Annual Average Percent Reductions

Sub-Basin	TMDL Report TP reduction from baseline of 15%	TMDL Report TSS reduction from baseline of 20%	Calculated TP reduction from no-controls	Calculated TSS reduction from no-controls
East River	30.0%	40.0%	41%	52%
Baird Creek	30.0%	40.0%	41%	52%
Bower Creek	30.0%	40.0%	41%	52%
Apple Creek	30.0%	40.0%	41%	52%
Ashwaubenon Creek	30.0%	40.0%	41%	52%
Dutchman Creek	30.0%	40.0%	41%	52%
Plum Creek	30.0%	40.0%	41%	52%
Kankapot Creek	30.0%	40.0%	41%	52%
Garners Creek	63.1%	49.9%	69%	60%
Mud Creek	39.0%	28.5%	48%	43%
Duck Creek	30.0%	40.0%	41%	52%
Trout Creek	30.0%	40.0%	41%	52%
Neenah Slough	30.0%	40.0%	41%	52%
Lower Fox River Main Stem	30.0%	65.2%	41%	72%
Lower Green Bay	30.0%	40.0%	41%	52%

Baseline reductions of TP = 15% & TSS = 20%.
% TP reduction from no-controls = 15 + [0.85 x (% TP control in Lower Fox TMDL Report)]
% TSS reduction from no-controls = 20 + [0.80 x (% TSS control Lower Fox TMDL Report)]

Table checked by : Eric Rortvedt and Amy Minser, DNR Stormwater Engineers
Dated: 9/16/2014

WDNR NOVEMBER 24, 2010 MS4 MODELING-
NR 151 20% AND 40% TSS STANDARD

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: November 24, 2010

TO: Regional Water Leaders, Basin Leader & Experts
Stormwater Permit Staff (via Email)

FROM: Russ Rasmussen, Director
Bureau of Watershed Management

SUBJECT: Developed Urban Areas and the 20% and 40% TSS Reductions
Sections NR 151.13(2) and NR 216.07(6), Wis. Adm. Code

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 document supersedes the guidance memo dated June 6, 2005, subsequent errata dated 8/15/05 and April, 2009 and the guidance memo dated May 14, 2010.***

Issue

Under s. NR 151.13 (2), Wis. Adm. Code, a municipality subject to the municipal stormwater permit requirements of subch. I of ch. NR 216, Wis. Adm. Code, must, to the maximum extent practicable, implement a 20% and a 40% reduction in total suspended solids in runoff that enters waters of the state as compared to no controls, by March 10, 2008 and March 10, 2013, respectively. Staff who work with affected municipalities need guidance on what areas under the municipalities' jurisdictions will be included in this requirement. They also need to know what is meant by "no controls" and "with controls", and what methods are acceptable for making these calculations.

Discussion

Chapter NR 216, Wis. Adm. Code, is the implementation code for the developed urban area performance standard. Applicability for permit coverage purposes is dictated by s. NR 216.02, Wis. Adm. Code. Under this provision, owners or operators of the following municipal separate storm sewer systems (MS4s) are required to obtain coverage under a WPDES municipal stormwater permit:

- MS4s serving populations of 100,000 or more.
- Previously notified owners or operators of municipal separate storm sewer systems.
- MS4s within urbanized areas as identified by EPA.
- MS4s serving populations over 10,000 unless exempted by DNR.

"MS4" is defined under s. NR 216.002 (17), Wis. Adm. Code, as a conveyance or system of conveyances, including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, constructed channels or storm drains, which meets all the following criteria:

- Owned or operated by a municipality.
- Designed or used for collecting or conveying stormwater.
- Not a combined sewer conveying both sanitary and stormwater.

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- Not part of a publicly owned wastewater treatment works that provides secondary or more stringent treatment.

"Waters of the state" is defined under s. 283.01 (20), Stats., and it includes surface water, wetlands and groundwater. Waters of the state may overlap with the definition of MS4. For this purpose, if a waterway meets the definition of an MS4, it will be regulated as an MS4. The significant language in that definition is whether or not the municipality owns or operates the drainage way (i.e., maintains, has easement access for work, dredges, etc.). For example, when a "stream" is designed or used for collecting or conveying stormwater such as flowing through a municipally owned or operated culvert or bridge restriction, that "stream" is part of the MS4.

Under s. NR 216.07 (6)(a), Wis. Adm. Code, a municipality must develop a stormwater management program to achieve compliance with the developed urban area performance standard (s. NR 151.13 (2), Wis. Adm. Code). Developed areas are generally those that were not subject to the post-construction performance standards (s. NR 151.12 or NR 151.24, Wis. Adm. Code). The total suspended solids control requirements of s. NR 151.13 (2)(b)1.b. and 2., Wis. Adm. Code, may be achieved on an individual municipal basis. Control does not have to apply uniformly across the municipality. The control may also be applied on a watershed or regional basis by involving several municipalities. However, note that the Department is proposing to revise s. NR 151.12, Wis. Adm. Code, to limit the geographic extent of the watershed or regional area that municipalities may collectively meet the developed urban area standard.

A municipality is required under s. NR 216.07 (6)(b), Wis. Adm. Code, to provide an assessment of the actions taken to comply with the performance standards. This assessment may take the form of an annual progress report. The initial assessment must include a pollutant-loading analysis using a model such as SLAMM, P8 or equivalent methodology that is approved by the department. At a minimum, a pollutant-loading analysis must be conducted for total suspended solids and phosphorus. A model would not be run again after the initial assessment unless significant management changes occurred that should be accounted for, or the progress report indicates a re-run is necessary.

DNR Guidance

To comply with the code, the developed urban area must be modeled under a "no control" condition and a "with controls" condition. The 20% and 40% TSS reductions are assessed against the "no control" condition for the entire area served by the MS4 as defined below. They are not applied uniformly across the municipality, nor are they applied drainage area by drainage area within the municipal boundary. In most cases however, a calculation drainage basin by drainage basin will be used to determine the total loading and the achieved reductions.

Areas Required to be Included in the Calculations

A municipality must include the following areas when calculating compliance with the developed urban area standard (s. NR 151.13, Wis. Adm. Code):

1. Any developed area that was not subject to the post-construction performance standards of s. NR 151.12 or 151.24, Wis. Adm. Code, for new development only, that drains to the MS4 owned or operated by the municipality. The baseline developed urban area does not change due to future redevelopment of existing urban areas.
2. Any area covered by an NOI submitted prior to October 1, 2004 where development is still underway. The pollutant load shall be based on full build out. If it is known that the future development of some parcels may require compliance with s. NR 151.12 or NR 151.24, Wis. Adm. Code, then these areas may be excluded from the calculation.
3. Any undeveloped (in-fill) areas under 5 acres. These areas must be modeled as fully developed, with a land use similar to the properties around them.
4. For municipalities with large areas of agricultural lands separating areas of development, only the developed areas within the urbanized area as defined by the U.S. Census Bureau.

5. Non-manufacturing areas of industrial facilities such as customer or employee parking lots. (The manufacturing, outside storage and vehicle maintenance areas of these industrial facilities are covered under subch. II of ch. NR 216, Wis. Adm. Code, industrial permit.)
6. Any industry that has certified a condition of "no exposure" in accordance with s. NR 216.21(3), Wis. Adm. Code.
7. Any connecting highways as identified and listed in the Official Highway State Truck Highway System Maps at: http://www.dot.wisconsin.gov/localgov/highways/connecting.htm

Areas Prohibited from Inclusion in the Calculations

Areas and loadings that shall not be included:

1. Lands zoned for agricultural use and operating as such.
2. Pollutant loadings from an upstream MS4 (independent of whether it is regulated under a ch. NR 216, Wis. Adm. Code, permit) unless the municipality has an agreement to share the pollutant control credit with the upstream municipality.
3. Undeveloped land parcels over 5 acres within the municipality. These areas will be subject to the new development post-construction performance standards of s. NR 151.12 or 151.24, Wis. Adm. Code, when developed.
4. Any internally drained area with natural infiltration. (This does not include engineered or constructed infiltration areas.) However, a separate guidance memo dated April 6, 2009 (Subject: Developed Urban Areas and the 20% and 40% Reductions - Internally Drained Areas) provides conditions under which an internally drained area may be included in the calculation.
5. Any active or inactive mining site unless it has been reclaimed into another land use. The pollutant load associated with a mining site is not included in the calculation. However, runoff which drains into a mining site would be eligible for treatment credit in accordance with the April 6, 2009 guidance memo.
6. Areas subject to the new development performance standards of s. NR 151.12, Wis. Adm. Code.

Optional Areas to Include in the Calculations

Areas a municipality may, but is not required to, include in the developed urban area load calculation:

1. Property that drains to *waters of the state* without passing through the permittee's MS4.
2. Any area that discharges to an adjacent municipality's MS4 (Municipality B) without passing through the jurisdictional municipality's MS4 (Municipality A). Municipality B that receives the discharge into their MS4 may choose to be responsible for this area from Municipality A. If Municipality B has a stormwater treatment practice that serves a portion of A as well as a portion of B, then the practice must be modeled as receiving loads from both areas, independent of who carries the responsibility for the area. However, if runoff from an area within Municipality A's jurisdiction drains into Municipality B's MS4 but then drains back into Municipality A's MS4 farther downgradient, then Municipality B does not have the option of including the load from Municipality A in their analysis and the load from that area is Municipality A's responsibility.
3. Industrial facilities subject to a permit under subch. II of ch. NR 216, Wis. Adm. Code, except the pollutant load associated with an active or inactive mining site. This exclusion covers the facilities that are required to have permit coverage. Contact the regional stormwater specialist or central office to get a list of permitted facilities within a municipality.
   - The industrial NR 216 permit covers areas with industrial materials and activities, specifically areas with manufacturing, vehicle maintenance, storage of materials, etc.

A municipality may include any of the areas identified above in their developed urban area as part of their load calculation provided the areas are not prohibited from inclusion in the calculation. If they choose to include an area, it must be included in both the "no controls" and "with controls" condition. Inclusion of areas they choose to be responsible for will allow them to take credit for any of those areas that may have controls in place. For example, if an industrial park would have been excluded because all the industries in the industrial park have an NR 216 industrial permit, but the municipality chooses to keep this area in their "no controls" area, then any best management practices existing or built to serve the industrial park can be included in the "with controls" scenario.

Model Inputs

Model Version:
To model the TSS load in the area served by the MS4, the municipality must select a model such as SLAMM, P8 or an equivalent method deemed acceptable by the Department. For the analysis to show compliance with the 40% developed urban area performance standard, SLAMM version 9.2 or P8 version 3.4 or a subsequent version of these models may be used. As part of the reporting process, the municipality must identify which model version is being used. The analysis must use the same version for both the "no controls" scenario and the "with controls" scenario unless it is verified that the "no controls" pollutant discharge load does not change between the model versions. If there is a change in the no controls pollutant discharge load then the new pollutant discharge load corresponding with the version of the model selected for the analysis needs to be utilized. An entire city-wide municipal "no controls" scenario does not need to be remodeled, only those areas being updated with the new version of the model.

"No control"
In SLAMM, the "no controls" condition generally will be based on the standard land use files for different land uses. This assumes certain default parameter files, an assumed level of disconnection and an assumed distribution of road smoothness. The "no controls" condition for each land use is based on this assumed percent of disconnected imperviousness. All land uses as modeled must be equal to the connected imperviousness values in the standard land use files unless site specific data is available. However under the "with controls" condition, land use that has a greater level of disconnection than the values in the standard land use files may take credit for volume and pollutant reduction. In P8, the help menu provides standard land use values that can be used for the percent directly connected versus indirectly connected impervious surfaces.

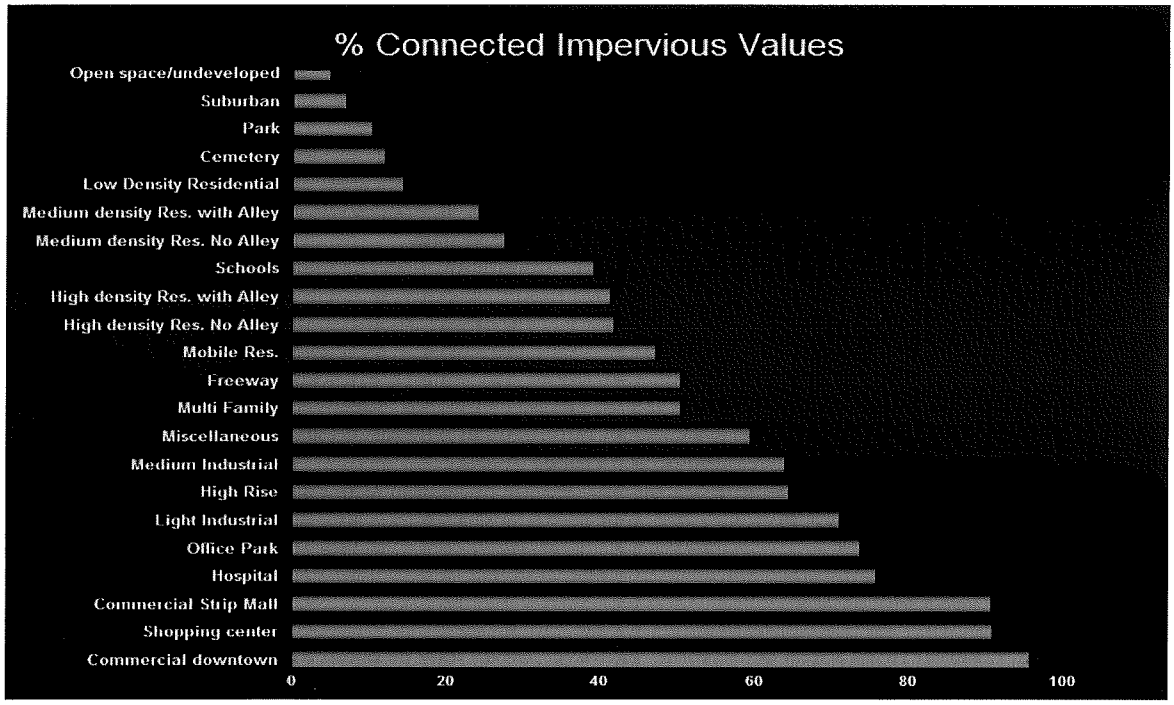
All roads within the urbanized area that are part of a county or town's MS4 are the responsibility of the county or town. To generate a load under "no controls", model the road based on the nearest urban land use, even if agricultural land use is on one or both sides of the road. Select the urban land use that will most likely typify the traffic that will be on that road (for example commercial or residential) and include that area in the corresponding standard land use file.

For the drainage system, the default will be curb and gutter (even if the drainage system is currently swale drainage), in fair condition. For "no controls" there will be no recognition of street sweeping, catch basin cleaning, swale drainage, or the existence of any engineered best management practices. These practices and facilities will be accounted for under the "with controls" condition.

A municipality is not required to use the standard land use files if it has surveyed the land uses in its developed urban area and has "real" source area data on which to base the input files. The percent connected imperviousness must be verified in the field. Disconnection may be assumed for residential rooftops where runoff has a flow path of 20 feet or greater over a pervious area in good condition. Disconnection for impervious surfaces other than residential rooftops may be assumed provided all of the following are met:

- The source area flow length does not exceed 75 feet,
- The pervious area is covered with a self-sustaining vegetation in "good" condition and at a slope not exceeding 8%,
- The pervious area flow length is at least as long as the contributing impervious area and there can be no additional runoff flowing into the pervious area other than that from the source area.
- The pervious area must receive runoff in a sheet flow manner across an impervious area with a pervious width at least as wide as the contributing impervious source area.

The table below shows the overall percent connected imperviousness that is associated with SLAMM standard land use files. The overall percent disconnection shown in this table is not input into SLAMM as the percent disconnection, rather the individual road, roof top, sidewalk, etc. areas have their own individual connectedness included in the standard land use files.



"With controls"

The "with controls" condition is applied to the developed urban area with the inclusion of the practices and facilities (existing and proposed). Modeling is a means to confirm a practice's efficiency for the conditions found in Wisconsin. If the model cannot predict efficiencies for certain practices that the municipality identifies as water quality practices, then a literature review must be conducted to estimate the reduction value. Proprietary stormwater practices that utilize settling as their means of solids reduction should be modeled in accordance with DNR Technical Standard 1006 (Method for Predicting the Efficiency of Proprietary Storm Water Sedimentation Devices).

When designing treatment practices, runoff draining to the practice from off-site must be taken into account in determining the treatment efficiency of the practice. Any impact on the efficiency must be compensated for by increasing the size of the practice accordingly.

Practices on private property that drain to an MS4 can be included in the "with controls" scenario for a municipality, provided the municipality enters into an agreement or equivalent enforceable mechanism with the stormwater treatment facility owner that will ensure the practice is properly maintained. An operation and maintenance plan, including a maintenance schedule, must be developed for the stormwater treatment facility in accordance with relevant DNR technical standards. The agreement or equivalent mechanism between the municipality and the private owner should include the following:

- A description of the stormwater treatment facility including dimensions and location.
- Identify the owner of the property on which the stormwater treatment facility is located.
- Identify who is responsible for implementing the operation and maintenance plan.
- Outline a means of terminating the agreement that includes notifying DNR.

The efficiency of the practice on private property must be modeled using the best information the municipality can obtain on the design of the practice. For example, permanent pool area is not sufficient information to know the pollutant reduction efficiency of a wet detention basin even if it matches the area requirements identified in Technical Standard 1001 Wet Detention Basin for an 80% reduction. Information on the depth of the wet pool and the outlet design are critical features that determine whether a detention pond is providing 80% TSS reduction.

Further clarifications

- If a portion of a municipality's MS4 drains to a stormwater treatment facility in an adjacent municipality, the municipality generating the load will not receive any treatment credit due to the downstream municipality's treatment facility unless there is an inter-municipal agreement where the downstream

municipality agrees to allow the upstream municipality to take credit for such treatment. DNR anticipates that such an agreement would have the upstream municipality assist with the construction and/or maintenance of the treatment facility. This contract must be in writing with signatures from both municipalities specifying how the treatment credit will be shared.

- The model results will be the basis for determining compliance with the permit for "no controls" and "with controls" TSS load.
- For reporting purposes, the pollutant load must be summarized as the cumulative total for the developed urban area served by the MS4. Additionally pollutant loads for grouped drainage areas as modeled shall also be reported. Drainage areas may be grouped at the discretion of the modeler for such reasons as to emphasize higher priority areas, balance model development with targeting or for cost-effectiveness.
- No credit should be taken for sweeping of non-curbed streets.
- The additional runoff volume from areas that are exempt or outside of the developed urban area to which the TSS standard applies needs to be accounted for when it drains into the treatment device. The pollutant load can be "turned off" but the runoff hydrology needs to be accounted for to properly calculate the treatment efficiency of the device.
- Due to concerns of sediment resuspension, basins with an outlet on the bottom are generally not eligible for pollutant removal based solely on settling. However, credit may be taken for treatment due to infiltration or filtration. Features to prevent scour should always be included for any practice where appropriate.
- When street cleaning is applied across a watershed with devices that serve only certain areas within the watershed, it is acceptable to first take credit for street cleaning across the entire watershed but then the treatment efficiency for devices must be reduced by the efficiency of the street cleaning to prevent double counting.
- To model a combination of mechanical broom and vacuum assisted street cleaning, it may require an analysis of several model runs depending on the timing of the mechanical and vacuum cleaning. If mechanical broom and vacuum cleaning occur at generally the same time (e.g. within two weeks of each other) then only the removal efficiency of the vacuum cleaning should be taken. If the municipality performs broom sweeping in the spring or fall and vacuum clean the remained of the year, calculate the combined cleaning efficiency using the following method:
  (A) Model the entire street cleaning program as if entire period is done by a mechanical broom cleaner.
  (B) Model just the period of time for vacuum cleaning (do not include the mechanical broom cleaning).
  (C) Model the same period as B) but with a mechanical broom.
  (D) The overall combined efficiency would be A + B – C.

WinSLAMM clarification:

- WinSLAMM 9.3.4 and earlier versions of WinSLAMM result in double counting of pollutant removal for most treatment practices modeled in series. WinSLAMM 9.2 and subsequent versions contain warnings to help alert modelers of this issue. The modeler will need to make adjustments to ensure that the results do not include double credit for removal of the same particle size. PV & Associates has created a document titled 'Modeling Practices in Series Using WinSLAMM' which helps to guide a user as to whether and or how certain practices can be modeled in series and this document is available at: http://winslamm.com/Select_documentation.html

P8 clarifications

- P8 does not account for scour and sediment resuspension. DNR requires that a wet basin with less than a 3-foot permanent pool have its treatment efficiency reduced. A basin with zero permanent pool depth should be considered to get zero credit for pollutant removal due to settling and a basin with 3 or more feet of permanent pool depth can be given the full pollutant removal efficiency credited by settling. The pollutant removal efficiency may be given straight-line depreciation such that a basin with a 1.5 foot-deep permanent pool would be eligible for 1/2 the pollutant removal efficiency that would be credited due to settling.
- A device that DNR gives no credit for pollutant removal may still be modeled if it is in series with other practices because of its benefit on runoff storage capacity that may enhance the treatment efficiency of downgradient treatment devices. To do so, turn the treatment efficiency off in P-8.

- P8 starts its model runs with no water in the basins. P8 should be started an extra year before the "keep dates", in order to allow the model to fill up ponds to the lowest outlet elevation.

Approved By:

Gordon Stevenson, Chief
Runoff Management Section

WDNR NOVEMBER 24, 2010 PROCESS TO ASSESS AND MODEL GRASS SWALES

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 x 359) + (10 x 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

Land use	Swale Density (ft/acre)
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/slamm/

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[1]?

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

[1] 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 ½ 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

WDNR APRIL 6, 2009 DEVELOPED URBAN AREAS AND INTERNALLY DRAINED AREAS

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: April 6, 2009

TO: Regional Water Leaders, Basin Leader
Storm Water Permit Staff (via Email)

FROM: Russ Rasmussen, Director
Bureau of Watershed Management

SUBJECT: Developed Urban Areas and the 20% and 40% TSS Reductions
Internally Drained Areas

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.

Issue

The Department of Natural Resources June 6, 2005 guidance memo, *Developed Urban Areas and the 20% and 40% TSS Reductions*, addresses areas prohibited from inclusion in the municipal modeling calculations including the following on page 3 of the guidance:

3. "Any internally drained area with natural infiltration. (This does not include engineered or constructed infiltration areas). However, an internally drained area that discharges to a karst feature is not likely to be receiving adequate treatment prior to contact with the groundwater. The municipality is encouraged to look at this area for possible treatment options."

Some municipal separate storm sewer systems (MS4s) contain areas that are internally drained, but drain to a constructed pond or quarry with no outlet under observed runoff event conditions. There are questions on how these areas could be included in the municipal analysis to demonstrate compliance with the developed urban area total suspended solids (TSS) performance standard of s. NR 151.13(2), Wis. Adm. Code.

Discussion

An internally drained area is an area where runoff from the MS4 does not enter a surface water of the state including wetlands. Determining if an area is internally drained may be made from aerial photos or historic data. If runoff from storm events up to a 10-year, 24-hour event does not leave the depression area, then this area is considered internally drained and shall not be included in the developed urban area analysis (i.e. not included in the base condition or any subsequent scenarios). If runoff leaves the depression area during lesser storm events, then this area is not internally drained and the drainage area to the depression area must be included in the developed urban area analysis.

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DNR Guidance

Notwithstanding the discussion above, there are situations where an internally drained area may be included in the analysis. For this to happen, all of the following conditions must be met:

1. Consistent with s. NR 151.12(5)(c)8., Wis. Adm. Code, the discharge of runoff from the MS4 into an internally drained area must 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 practice may not be installed or shall be modified to prevent infiltration to the maximum extent practicable. The municipality must assess the usual or potential presence of any toxic pollutant, the degradability of the pollutant and the capacity of the soil to remove the pollutant. A discharge to groundwater must remain below the enforcement standard at the point of standards application.

Note: Also consistent with s. NR 151.12(5)(c)5.i., Wis. Adm. Code, the following characteristics are believed to be protective of groundwater for the treatment of storm water: The soils between the bottom of an infiltration practice and the seasonal high groundwater or top of bedrock have at least a 3–foot soil layer with 20% fines or greater; or at least a 5–foot soil layer with 10% fines or greater or where the soil medium within the infiltration system provides an equivalent level of protection. "Percent fines" means the percentage of a given sample of soil, which passes through a # 200 sieve.

2. Any runoff from parking lots or roads in commercial, institutional or industrial areas directed into an internally drained area shall be pretreated to help prevent clogging of the internally drained area.

3. If the area is not owned by the municipality, then the municipality must have a long-term maintenance agreement in place with the property owner to ensure that the internally drained area will be maintained. If the municipality owns the area, then the municipality must include maintenance of the area in its storm water management program.

Where conditions 1-3 are met, internally drained areas can be included in the developed urban area analysis. Additional runoff may be directed to an internally drained area meeting conditions 1-3. One hundred percent credit for TSS removal may be taken for the runoff that stays within the internally drained area.

Department staff will assist in evaluating these determinations prior to allowing credit for TSS reduction from internally drained areas on a case by case basis. There may also need to be a determination regarding natural water features in the depression area prior to the Department's concurrence that these areas can be used toward the TSS removal credit.

Approved By:

Gordon Stevenson, Chief
Runoff Management Section

Mary Anne Lowndes
Storm Water Engineer

WDNR MAY 2016

TMDL GUIDANCE: ADDENDUM B (INTERNALLY DRAINED AREAS)

BUREAU OF WATERSHED MANAGEMANT PROGRAM GUIDANCE

Storm Water Management Program

TMDL Guidance for MS4 Permits: Planning, Implementation, and Modeling Guidance

Addendum B (Internally Drained Areas)

Effective: May 2016
Guidance #: 3800-2016-04

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APPROVED:

Pam Biersach, Director
Bureau of Watershed Management

May 17, 2016
Date

A. Statement of Problem

Permitted Municipal Separate Storm Sewer Systems (MS4s) will be subject to an annual average reduction for the discharge of a pollutant of concern to a surface water that has an approved TMDL. It is not clear in the MS4 TMDL guidance, dated October 2014, as to how an MS4's discharge to an internally drained area factors into compliance with a MS4 TMDL annual average percent reduction.

B. Background

At the time of TMDL development, there commonly is not sufficient information to separate out areas that may be internally drained. Additionally, due to underground storm sewer systems and pumping of runoff from an otherwise internally drained area; the surface drainage area does not necessarily match with the MS4 drainage area. An MS4 will need to determine its actual MS4 drainage areas that are to be assessed for compliance with TMDL annual average reductions.

C. Discussion

At first it may seem appropriate to just not include the internally drained area from the MS4 TMDL analysis. However, internally drained areas may change over time due to storm sewers or even pumping of water from the internal drainage area to control the water level. If the TMDL was based on the internal area draining to the surface waterbody, it may seem appropriate to give pollutant removal credit for the storm water that does not reach the waterbody for which the TMDL was designed. However, treatment credit within a wetland or navigable water is generally not allowed as wetlands and navigable water warrant protection from stormwater pollutant discharges.

D. Guidance

With respect to this guidance, "internally drained area" means an area that is located within a TMDL drainage basin that does not gravity-flow to surface water for which the TMDL was developed. Based on an annual average hydrologic condition, an internally drained area within a permitted MS4 is recommended to have its MS4 TMDL percent reduction analysis evaluated as follows:

Gravity versus Pumped Discharge from Internally Drained Area

1. If an internally drained area that existed in a pre-development condition is no longer an internally drained area because it is drained by gravity in a post-development condition, then the area shall be included in the MS4 TMDL analysis.

2. If storm water discharges from an internal drained area by means other than gravity-flow, modeling the situation will be case specific. The appropriate DNR storm water engineer should be contacted to help determine a representative modeling or other methodology in order to factor the discharge into the MS4 TMDL percent reduction analysis if appropriate. Depending upon the mass of discharged pollutants of concern from the internally drained area; it might be reasonable to remove the drainage area from the MS4 TMDL analysis area. For instance, if the mass of pollutant(s) of concern pumped out of the internally drained area is less than the TMDL WLA for that size of drainage area then removing the internal drainage area and its pumped discharge from the analysis would be acceptable.

Whether Navigable Water or Wetland Affected within Internally Drained Area

3. If MS4 runoff enters an internally drained wetland or navigable water, then this internally drained area should be removed from the MS4 TMDL analysis completely. Otherwise, the MS4 may include the internally drained area if the Department's Internally Drained guidance memo, dated April 6, 2009, is followed.

CREATED:

Eric S. Rortvedt, Water Resource Engineer
On Behalf of the MS4 Liaison Team

5/13/16
Date

APPROVED:

Kevin Kirsch, Water Resource Engineer
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5/16/16
Date

Mary Anne Lowndes, Chief
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5/16/16
Date

Runoff Management Policy Management Team approved on May 13, 2016.

WDNR MAY 2015

MODELING POST-CONSTRUCTION STORMWATER MANAGEMENT TREATMENT GUIDANCE

BUREAU OF WATERSHED MANAGEMANT PROGRAM GUIDANCE

Storm Water Management Program

Modeling Post-Construction Storm Water Management Treatment

Effective May 2015
Guidance #: 3800-2015-04

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APPROVED:

Pam Biersach, Director
Bureau of Watershed Management

5-22-15
Date

A. Statement of Problem Being Addressed

This document is intended to clarify how to model post-construction stormwater management treatment to comply with the post-construction performance standards of subchs. III (Non-Agricultural) and IV (Transportation) of ch. NR 151, Wis. Adm. Code. Modeling is not required, as compliance may also be demonstrated through hand calculations and or in combination with DNR technical standards developed under subch. V, of ch. NR 151, Wis. Adm. Code. However given the efficiency of models, they are commonly used to estimate runoff volumes and rates, treatment efficiency, infiltration rates and volumes, etc. Each model has certain assumptions and or limitations that need to be accounted for in order for the treatment practice to achieve the model's predicted treatment efficiency. Accounting for such issues might be through treatment design and or adjustment to the model's pollutant removal assumptions.

The methods set forth in this document are ways that the DNR's Runoff Management Program staff recognize as appropriate for meeting modeling requirements in the applicable parts of ss. NR 151.121-128 or ss. NR 151.241-249, Wis. Adm. Code. However, the procedures in this document are not mandatory, as other modeling approaches may also be used to satisfy these requirements, so long as they meet the applicable requirements in ch. NR 151, Wis. Adm. Code, and related regulatory standards.

This guidance also applies to modeling Municipal Separate Storm Sewer Systems (MS4s) to show compliance with the developed urban area standard under s. NR 151.13, Wis. Adm. Code, and Total Maximum Daily Load (TMDL) requirements for Total Suspended Solids (TSS) and Total Phosphorus (TP). Additional MS4 modeling guidance documents is available via: http://dnr.wi.gov/topic/stormwater/standards/ms4_modeling.html

Additionally, there are references to Technical Standards and related formal documents throughout this guidance. These are references to the formal technical standards developed under subch. V, of ch. NR 151, Wis. Adm. Code. This information is generally available at: http://dnr.wi.gov/topic/stormwater/standards/postconst_standards.html
Please contact DNR Storm Water Program staff, if you are unable to locate or need assistance with interpretation of a Technical Standard.

B. Guidance

Model Versions & Model Specific Issues

1. As noted under s. NR 151.122 (3), Wis. Adm. Code, use the most current model version of WinSLAMM or P8. Benefits of this include: (1) older versions of WinSLAMM do not have as many model warnings to notify a user about model limitations, (2) newer versions may provide more options to appropriately model treatment and (3) new versions may provide additional treatment credit. The DNR storm water runoff modeling web page for WinSLAMM and P8 is: http://dnr.wi.gov/topic/stormwater/standards/slamm.html

2. WinSLAMM 9.4 and earlier versions of WinSLAMM result in double counting of pollutant removal for most treatment practices modeled in series. This will result in impermissible overestimation of pollutant removal for modeling treatment practices. Beginning with version 9.2, warnings were added to WinSLAMM to help alert modelers of this issue. The modeler will need to make adjustments to ensure that the results do not include double credit for removal of the same particle size. PV & Associates has created a document titled 'Modeling Practices in Series Using WinSLAMM' which helps guide users on how certain

practices can be modeled in series. The document is available at:
http://winslamm.com/Select_documentation.html
Note: This is being offered only for informational purposes so that you may find this information, and is not an endorsement of PV & Associates or its products or services.

3. In WinSLAMM, when modeling a wet pond, if the "Initial Stage Elevation" is not changed from "0" to the outlet elevation, the model starts running with an empty pond. This must be changed as an empty pond does not represent a wet pond condition. Therefore, the "Initial Stage Elevation" of a wet pond must be set equal to the invert elevation of the lowest outlet.

4. P8 does not account for scour and sediment resuspension for any of its modeled treatment devices and this is identified within the P8 help menu, model limitation section. Ponds need to be designed to prevent resuspension in order to obtain the efficiency predicted by P8. DNR recommends that a 3-foot minimum permanent pool depth be maintained over the sediment storage area to help prevent sediment resuspension. A pond with zero permanent pool depth should be considered to get zero credit for pollutant removal due to settling. The DNR recommends using a straight-line depreciation such that a pond with a 1.5 foot-deep permanent pool would be eligible for 1/2 the pollutant removal efficiency that would be credited due to settling. The sediment storage depth should not count toward the permanent pool depth.

5. P8 gives pollutant removal credit for swales via infiltration and settling without accounting for sediment resuspension or scour. Swales are prone to scour and resuspension, which needs to be accounted for. DNR accepts the approach used in WinSLAMM to not give credit for trapping of particles smaller than 50 microns, without infiltration. WinSLAMM gives credit for trapping of sediment equivalent to the volume infiltrated plus removal of particles greater than 50 microns in runoff that drains through the swale. Based on the National Urban Runoff Program (NURP) particle size distribution, only about 16% of the particles (by mass) are larger than 50 microns. Whereas, about 11% of the Total Phosphorus (TP) is associated with the 16% of sediment (or TSS). If there were no infiltration, the maximum trapping efficiency for a grass swale would be about 16% of TSS and 11% of TP.
Example: If a swale achieves infiltration of 40% of the annual average runoff volume and achieves 16% particle entrapment for the remaining runoff volume, then the total TSS and TP removal credit would be calculated as follows:

Fraction infiltrated + 0.16 x fraction not infiltrated = TSS removal

$$0.40 + [0.16 \times (1 - 0.40)] = 0.496 \text{ or } 49.6\%$$

Fraction infiltrated + 0.11 x fraction not infiltrated = TP removal

$$0.40 + [0.11 \times (1 - 0.40)] = 0.466 \text{ or } 46.6\%$$

When taking credit for both infiltration and settlement in a swale, P8 can be run with the Particle Removal Scale Factor" set to zero in the swale device dialog box to obtain the TSS and TP remaining following swale treatment by infiltration only. The additional credit for settlement can be calculated by multiplying the TSS annual load remaining by the percent which is settled, such as 16% for TSS and 11% for TP. Subtract the settlement credit calculated from the TSS and TP load remaining to get the revised TSS and TP load remaining and adjust the percent removal accordingly. Note that additional credit for settlement may not be taken if the swale discharges to another treatment device which would result in double counting of particles removed.

6. P8 starts its model runs without an existing pollutant concentration in the storm water management system. P8 needs to be started long enough for the entire storm water system to

be flushed and starting P8 a month early may not be adequate. In order to be safe, DNR recommends that P8 be started an extra year before the "keep dates".

7. A device which may not be eligible for pollutant removal credit may still be modeled if it is in series with other practices because of its benefit on runoff storage (detention) capacity, which may enhance the treatment efficiency of downgradient treatment devices (e.g., a dry detention pond upstream of a wet detention pond). Turn off the treatment efficiency of such practices in P8.

8. **TSS Calculation**
   The Total Suspended Solids (TSS) standard for new development and redevelopment requires control of TSS originating from the post-construction site or certain source areas of the post-construction site. Control of TSS from runoff that originates off-site generally does not count toward meeting the standard. For a redevelopment site, TSS control credit is to be taken for runoff from parking lot and roadway areas but DNR allows credit for treatment of runoff from other parking and roadway areas that are owned by the permittee. As identified in s. NR 151.122 (4), Wis. Adm. Code, runoff draining to a treatment device from off–site shall be taken into account in determining the treatment efficiency of the practice. Any impact on the efficiency shall be compensated for by increasing the size of the treatment practice accordingly. The pollutant load from off-site can be "turned off" but the runoff volume at full build-out needs to be accounted for in calculating the treatment efficiency of the device. In order to minimize the size of a treatment device, it is beneficial to keep runoff that requires treatment segregated from other runoff until after it has been treated.

   In WinSLAMM, the "other control practice" can be used to adjust the pollutant load and volume that are generated. WinSLAMM v 10.1.6 and earlier versions give treatment reduction credit for this "other control practice;" therefore, simply turning off the pollutant load from an off-site source area will not by itself result in the appropriate treatment efficiency for the site as a whole using only one WinSLAMM model run.

   Note: WinSLAMM v 10.2.0, which is expected to be released at the end of May 2015, will allow a user to adjust for this so that multiple runs are unnecessary. The multiple WinSLAMM run method below would not be necessary where the issue is properly accounted for in WinSLAMM v10.2.0.

   To account for additional runoff from an area where the off-site pollutant load is to be removed from the model, multiple WinSLAMM model runs may be used. It is also possible to use one WinSLAMM model run along with some hand calculations to show that adequate mass from on-site areas have been controlled. The following method requires three model runs to account for this:

   - First, model run (A) is used to establish the TSS load generated from on-site areas without modeling any treatment practices (do not include any swales/drainage control).
   - Then, run a second model (B), which includes both off-site and on-site areas and no treatment practices (do not include swales/drainage control). Model run (B) will have an outfall "other control practice" applied to it and the modeler needs to adjust the "other control practice" 'pollutant concentration reduction' so that the TSS load generated from

model run (B) is equal to that in model run (A) and the 'water volume (flow) reduction' is not reduced.

- Finally, a third model run (C) is the same as the second model run (B) except that post-construction treatment practices are now included. Model run (C) will generate the appropriate TSS load discharged from the post-construction site which accounts for the additional runoff from off-site area but does not include the off-site pollutant load.
- Because WinSLAMM includes the pollutant load reduction from the "other control practice" in the overall percent particulates solid reduction and credit cannot be taken for control of off-site pollutant load, the percent reduction needs to be adjusted. The calculation should be made as follows:

$$\text{Adjusted \% Particulate Solids Reduction} = \left(1 - \frac{\text{Particulate Solids Yield After Controls from Model Run (C)}}{\text{Particulate Solids Yield Before Drainage System from Model Run (A)}}\right) \text{X } 100$$

9. The NURP particle distribution file is to be used for post-construction modeling. Other WinSLAMM and P8 parameter input files are identified and available at: http://dnr.wi.gov/topic/stormwater/standards/slamm.html

10. As discussed in item 4 above, ponds with an outlet on the bottom are prone to scour and resuspension and should not be given pollutant removal credit based on settling. However, credit may be taken for treatment due to infiltration or filtration. Features to prevent scour, when appropriate, should be included. (See the Flow Chart attached at the end of this document).

11. An aggressive and efficient street cleaning program might achieve a TSS removal efficiency of around 10 to 20%. Since the new development TSS performance standard is 80% control, street cleaning is not a viable option to provide TSS control for new development. Generally, credit for street cleaning should not be used to meet the redevelopment or highway reconstruction post-construction standard of 40% TSS control either. A developer will generally not have authority to ensure that street cleaning will be maintained and it is not expected to provide enough TSS control to meet the 40% TSS performance standard for redevelopment or highway reconstruction.

12. Runoff that infiltrates is assumed to have 100% TSS and TP removal efficiency provided the facility is designed to prevent scour and resuspension of sediment. Vegetated Infiltration Swale Standard 1005 has design criteria intended to prevent scour and resuspension, which includes a peak flow velocity not to exceed 1.5 fps and maximum flow depth of 12 inches for the 2-yr, 24 hr rainfall event.

13. The settling velocity of particles in runoff is affected by water density, which in turn is temperature dependent. The DNR recommends that a runoff temperature of no greater than 68 degrees Fahrenheit (20 degrees Celsius) be used to model pollutant removal efficiency.

Peak Flow

14. The post-construction peak flow requirement in ss. NR 151.123 and 151.243, Wis. Adm. Code, allows the peak flow standard to be met for the post-construction site as a whole. However, it is recommended that the peak flows not be increased at each outfall that leaves

the site to help limit the potential for off-site erosion.

15. The peak flow requirement does not apply to runoff from off-site which may enter the post-construction site. As identified in #8 above, the off-site runoff needs to be accounted for in determining the treatment performance of treatment devices. On-site drainage systems need to be properly designed to handle runoff from both on- and off-site areas.

16. Under s. NR 151.123 Wis. Adm. Code, the peak flow requirement does not have to be met if the post-construction site drains directly into a lake over 5,000 acres or a stream or river segment draining more than 500 square miles. These water bodies are identified in an attached map.

17. The use of composite CNs for determining compliance with ch. NR 151, Wis. Adm. Code, infiltration standard is not appropriate and may not be appropriate for peak flow calculation as well. Composite CNs for different land cover conditions may result in significantly different runoff volume for small rainfall events (i.e. smaller than 1-yr/24-hr rainfall events) including an annual average rainfall series.

    Use of CNs for peak flow calculations (i.e. 1-yr/24-hr rainfall events) is acceptable for pervious surfaces and disconnected impervious surfaces. Combining directly connected impervious surfaces with pervious surfaces may result in underestimation of peak flows, particularly during the 1 and 2 year rainfall events. On sites with storm sewers or directly connected imperviousness, the designer should either evaluate the connected impervious areas separately from the pervious areas or provide documentation that the runoff from the connected impervious area does not control the peak flows during the 1 and 2 year rainfall events.

    Note: HydroCad is a model that is commonly used for calculating peak flows. Hydrocad v 7.1 and earlier versions, calculate a single composite curve number for each subcatchment. Starting with HydroCad v 8.0, the model allows the option of calculating runoff from pervious and impervious areas separately within a subcatchment but it still averages CNs for pervious areas in a subcatchment. HydroCad v 10.0 allows the option of calculating flow independently from each area with a different CN without averaging.

18. For determining compliance with the peak flow requirement under s. NR 151.123 or 151.243, Wis. Adm. Code, DNR recommends use of the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 Precipitation Frequency Estimates for rainfall depth. The Natural Resources Conservation Service (NRCS) –Wisconsin has calculated county-specific Atlas 14 precipitation depths and they are to be used in combination with the appropriate NRCS Midwest/Southeast (MSE) 3 or 4 precipitation distribution. The NRCS calculated county-specific Atlas 14 precipitation depths and MSE3 and MSE4 precipitation distributions are available at:
    http://www.nrcs.usda.gov/wps/portal/nrcs/detail/wi/technical/engineering/?cid=nrcs142p2_025417
    Where the local flood control authority requires use of NRCS Technical Paper 40 (TP-40) or Bulletin 71 rainfall along with the corresponding type II rainfall distribution, they may be used.

Gravel and Dirt Road CNs

19. Technical Release 55 (TR-55) authored by the United States Department of Agriculture (USDA) Soil Conservation Service (now Natural Resources Conservation Service or NRCS),

presents simplified procedures to calculate urban hydrology (volume, peak flow, etc.) for small watersheds. TR-55 lists Curve numbers (CNs) which are used to characterize runoff properties for a particular soil and ground cover. TR-55 includes CNs for gravel roads and dirt roads that include right-of-way. HydroCAD documentation suggests that the CN is based on 30% road surface with a CN of 96 and 70% open space in poor condition. So 96 would be a reasonable CN value for gravel and dirt roads where there is not open space. Similarly, the CN for a gravel parking area should use the same CN as a gravel road (with no open space). Generally, gravel roads and parking areas should be considered an impervious surface as they generate substantially more runoff than the existing soil and ground cover condition.

Ballasted Railroad Tracks

20. Ballasted railroad tracks are designed to allow rainfall to efficiently drain laterally from its tracks and the underlying native soils are compacted, which generally allows for little to no infiltration. However, ballast rock does have a level of water retention. A Colorado Department of Transportation Report (No. CDOT-2012-8 Final Report) concluded that in general 0.3 to 0.4 inches of rainfall is detained in ballasted railroad tracks and with a 0.5 inch rainfall it produces only a small fraction of runoff. This correlates with a CN of about 84, which DNR feels is a reasonable CN for the area of the railroad ballasted tracks. With respect to TSS control, ballasted railroad tracks should be modeled as an unpaved parking source area.

Infiltration

21. The ch. NR 151, Wis. Adm. Code, infiltration standard is based on the pre-development infiltration volume that occurs on a post-construction site. For the purpose of compliance with the ch. NR 151, Wis. Adm. Code, infiltration standard, the "stay on" volume may be used to show compliance with the required infiltration volume. "Stay-on" includes infiltration, evapotranspiration, and runoff reuse for other uses. Runoff that does not leave the site via surface discharge is considered "stay-on".

22. The use of composite CNs for determining compliance with ch. NR 151, Wis. Adm. Code, infiltration standard is not appropriate and may not be appropriate for peak flow calculation as well. Composite CNs for different land cover condition may result in significantly different runoff volume for small rainfall events (i.e. smaller than 1-yr/24-hr rainfall events) including an annual average rainfall series.

    Use of CNs for peak flow calculations is generally considered acceptable for design storm events (i.e. 1-yr/24-hr rainfall events) for pervious surfaces and disconnected impervious surfaces. Combining directly connected impervious surfaces with pervious surfaces may result in underestimation of peak flows, particularly for 1 and 2 year rainfall events. On sites with storm sewers, the designer should either evaluate the connected impervious areas separately from the pervious areas or provide documentation that the runoff from the connected impervious area does not control the peak flow in the 1 and 2 year rainfall events.

    Note: HydroCad is a model that is commonly used for calculating peak flows. Hydrocad v 7.1 and earlier versions, calculate a single composite curve number for each subcatchment. Starting with HydroCad v 8.0, the model allows the option of calculating runoff from pervious and impervious areas separately within a subcatchment but it still averages CNs for pervious areas in a subcatchment. HydroCad v 10.0 allows the option of calculating flow independently from each area with a different CN without averaging.

23. RECARGA is a bioretention/rain garden sizing program developed by the UW-Madison Civil and Environmental Engineering Water Resources Group. It is publicly available and can be downloaded via the DNR Runoff Management Models web page:
http://dnr.wi.gov/topic/stormwater/standards/recarga.html
RECARGA may also be used to determine TSS removal credit for non-vegetated infiltration practices. To eliminate evapotranspiration, the root layer depth can be set at a very small value (such as 0.1") but it cannot be set at zero. TSS and TP removal credit of 100% is given for the recharge (infiltrated) volume.

24. Average annual runoff and infiltration volumes may be calculated using WinSLAMM or RECARGA. The following approaches could be used:
    - In WinSLAMM, the pre-development runoff volume is calculated by entering the pre-developed acreage and curve number in the "Pre-Development Runoff Volume" located under the "Tools" tab. The results are produced in the model output summary under the "Outfall" and "Runoff Volume" tabs. This can be accomplished in a single model run.
    - In RECARGA, the pre-development infiltration volume can be calculated using the "stay on" depth obtained from the "Target Stay-On (Annual Infiltration) Requirement" chart and multiplying the "stay on" depth by the pre-development area. This chart is available for download at:
      http://dnr.wi.gov/topic/stormwater/standards/postconst_standards_note.html
      However, calculation of the post-development infiltration volume may require a model run for each post-development drainage area including areas not draining to an infiltration practice.

25. Infiltration and bioretention facilities should have their surface outlet raised off the bottom to ensure infiltration occurs across the entire bottom of the facility. An elevated outlet also helps keep accumulated sediment within the facility. DNR generally recommends placing the outlet 6 to 12 inches above the top of the engineered soil, and designing the facility so the surface of the facility drains down within 24 hours.

26. DNR's engineered soil filtering layer defined in DNR Bioretention for Infiltration Standard 1004, part V.B.6.d. qualifies as a "filtering layer" as defined in s. NR 151.002(14r), Wis. Adm. Code. DNR's engineered soil mixture calls for 15 to 30% compost and 70 to 85% sand. The sand gradation required in the engineered soil mixture has a very low percent fines level, however, when mixed with compost, it is considered an acceptable filtering layer. If an infiltration facility is located in an area with a level of percent fines that does not meet the filtering layer standard, then 2 to 3 inches of compost may be tilled into the top 6 to 12 inches of native sand for it to qualify as an acceptable filtering layer.

27. The side infiltration rate of a bioretention facility should be set at zero or substantially reduced because the soils along the side of a bioretention facility are commonly less conducive to infiltration and may also be compromised by smearing or compaction.

28. An effective infiltration area should not be given double credit both as an infiltration device and also as an area with a pervious area CN. The effective infiltration area should be given a CN of 100 when modeled as an infiltration facility.

Engineered Soil

29. DNR allows 100% TSS and TP removal credit for the volume of runoff that is infiltrated into the underlying soil; 80% TSS and 0% TP removal credit for the volume of runoff that is filtered through an engineered soil filtering layer that meets the requirements of Technical

Standard 1004 (Bioretention for Infiltration), and that is discharged via an underdrain; and 0% removal credit for the volume of runoff that overflows or bypasses the filter. Biofiltration practices using engineered soil will continue to get TSS filtering credit based on the DNR allowable level that was in place at the time the DNR received a ch. NR 216, Wis. Adm. Code, Notice of Intent (NOI) for the construction project or when the practice was installed where no NOI was required (projects/installations prior to Dec. 20, 2011).

Note: In WinSLAMM, for "engineered soil type" input "manually entered;" then 80% can be manually entered for the "percent solids reduction due to engineered soil".

30. The DNR allows an engineered soil infiltration rate of up to 3.6 inches per hour and an engineered soil void ratio of 0.27. The DNR recommends a rock or sand storage area void ratio of 0.33.

31. The current engineered soil mixture specified in Technical Standard 1004 with 15 to 30% compost has not shown a reduction in TP that is filtered. DNR allows 100% TP removal credit for the volume of runoff that is infiltrated into the underlying soil and 0% removal credit for the remaining runoff volume. USGS and DNR are working to try to develop an engineered soil mixture that will reduce TP in filtered runoff. For instance, there are phosphorus sorbing materials such as iron filings that might be added to enhance phosphorus removal.

Sand Filter

32. The DNR will allow a filtering credit of 80% for TSS and 35% for TP for treatment through engineered soil consisting of 100% sand meeting one of the gradation options specified in Technical Standard 1004 and following the other design requirements contained in Technical Standard 1004. DNR is trying to develop an engineered soil mixture that would achieve a greater phosphorus removal benefit than a pure sand filter. DNR is currently monitoring a pure sand filter and may adjust its filtering credit based on its performance.

    Note: Although addition of compost in a filter does not help in removing phosphorus, it may still be beneficial as a soil amendment for certain plants and also increase the removal of metals and hydrocarbons from runoff that is filtered.

Permeable Pavement

33. Permeable pavement that is designed, installed and maintained in accordance with DNR Permeable Pavement Technical Standard 1008 is given filtering credit of 55% for TSS and 35% for TP. A 100% reduction credit is given for TSS and TP in the volume of runoff that is infiltrated. The design infiltration rate of the soil under the rock storage area should be based on DNR's Site Evaluation for Stormwater Infiltration – Standard 1002, Table 2, which gives design infiltration rates based on soil texture.

    In WinSLAMM, version 10 and subsequent versions should be used. In WinSLAMM 9.4 and earlier versions, the porous pavement calculation has an error in the calculation.

Green Roof

34. Green roofs are generally classified as "extensive" with 2 to 6 inches of soil media or "intensive" with 6 to 24 inches or more soil media. The soil media and accompanying vegetation may have a significant effect on runoff volume and peak flow control. However, roof runoff generally contains a relatively low level of TSS and a green roof may lead to an

increased discharge of nutrients. Therefore, no TSS or TP reduction credit should be taken for runoff filtered through a green roof.

Connected Imperviousness

35. "Connected Imperviousness" is defined under s. NR 151.002 (6), Wis. Adm. Code. The percent of connected imperviousness should be no greater than that in the appropriate WinSLAMM standard land use files unless the percent disconnection is known at the time of plan development. In P8, the help menu provides standard land use values that can be used as the percent directly connected versus indirectly connected impervious surfaces.

36. The actual percent connected imperviousness should be used for any site where the impervious surface drainage patterns are known at the time of stormwater plan development. This is generally the case for most commercial building sites, schools, condos, parking lot expansions, etc. Residential subdivisions and business parks are two development types where detailed building**,** parking and/or driveway drainage may not be known at the time of plan development.

37. Disconnection of rooftops from one- and two-family residential dwellings may be assumed provided the runoff has a flow length of at least 20 feet over a pervious area in good condition.

38. Disconnection for impervious surfaces other than rooftops from one- and two-family residential dwellings may be assumed provided all of the following are met:
    - The source area flow length does not exceed 75 feet,
    - The pervious area is covered with a self-sustaining vegetation in "good" condition and at a slope not exceeding 8%,
    - The pervious area flow length is at least as long as the contributing impervious area flow length and there can be no additional runoff flowing into the pervious area other than that from the source area.
    - The pervious area must receive runoff in a sheet flow manner across an impervious area with a pervious width at least as wide as the contributing impervious source area.

Hydrodynamic Proprietary Devices

39. Manufacturers of hydrodynamic proprietary devices commonly estimate TSS reduction efficiencies for their products. However, the modeled efficiency supplied by the manufacturer may only be used as long as the modeling and lab analysis conforms to Technical Standard 1006 "Proprietary Storm Water Sedimentation Devices". Otherwise, such devices should be modeled in WinSLAMM utilizing the Hydrodynamic Device source area control practice.

Transportation Facility – Swale Treatment Performance Standard

40. Section NR 151.249 (1)(b), Wis. Adm. Code, directs that swales shall comply with Technical Standard 1005 "Vegetated Infiltration Swale", except as authorized in writing by the DNR. DNR does not expect a transportation facility swale to be designed for infiltration and therefore, only certain sections of the standard are applicable. A transportation facility swale treatment section is to be designed to follow sections V.F. (Velocity and Depth) and V.G. (Swale Geometry Criteria) with a swale treatment length as long as that specified in section V.C. (Pre-Treatment). Transportation facility swale treatment does not have to comply with the other sections of Technical Standard 1005.

41. Some water quality models require a swale bottom width to be entered and which is not zero. If a "V" swale is proposed then a 0.1' bottom width should be entered.

42. Wide swales are prone to channelization. DNR recommends that flat bottom swales be no more than 6 feet in width to help prevent channelization.

Unclassified Hydrologic Soil Group (HSG) Soil

43. Wisconsin has areas where NRCS has not mapped out HSG classifications. In such areas, the criteria in Table 7-1 of the NRCS National Engineering Handbook Part 630, Chapter 7 (January 2009) may be used to determine a representative HSG classification. This handbook is accessible at: ftp://ftp.wcc.nrcs.usda.gov/wntsc/H&H/NEHhydrology/ch7.pdf

DRAFTED BY:

Eric Rortvedt, Water Resources Engineer
On behalf of the Storm Water Liaison Team

5/21/15
Date

APPROVED:

Mary Anne Lowndes, Chief
Runoff Management Section

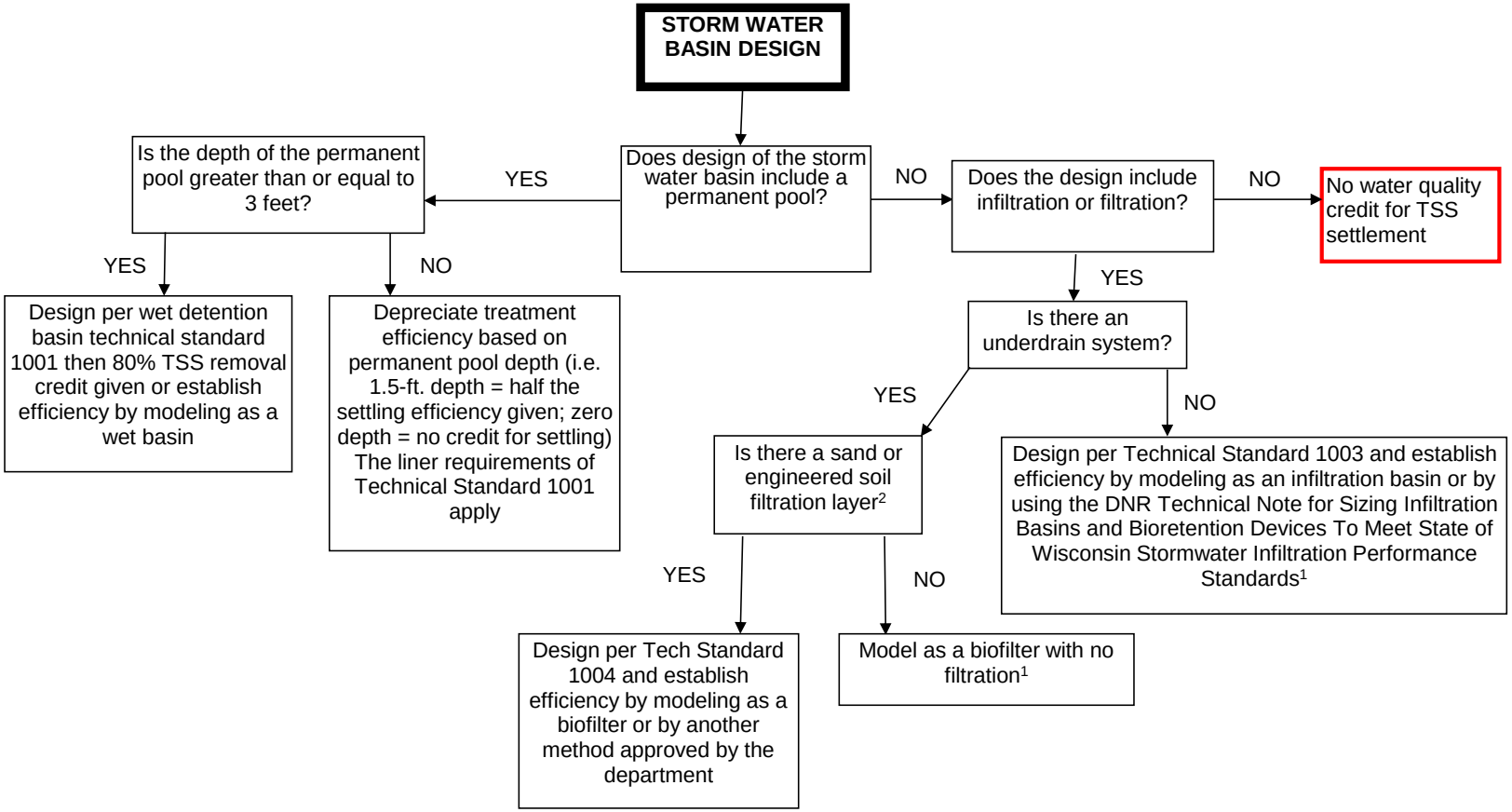
5/22/15
Date

Runoff Management Policy Management Team approved on May 22, 2015.

Attachments: Flow Chart – Determining Water Quality Credit for Stormwater Detention Basins
Map of Lakes Larger than 500 Acres & Streams Draining more than 500 squ. mi.

W:\Storm_Water\Guidance\Modeling Post-Const SW\Modeling Post-Construction SW Mgmt Treatment 3800-2015-04.pdf

DETERMINING WATER QUALITY CREDIT FOR STORM WATER DETENTION POND FOR COMPLIANCE WITH CONSTRUCTION AND MUNICIPAL PERFORMANCE STANDARDS



Notes:

1. This chart does not address pretreatment of runoff prior to infiltration. Pretreatment is required before infiltrating runoff from parking lots and new road construction in commercial, industrial and institutional areas under s. NR 151.124(7), Wis. Adm. Code.
2. Technical standard 1004 requires a two foot depth of engineered soil.

Updated: May 2015

Lakes Larger than 5000 Acres and Stream Segments Draining more than 500 Square Miles

WDNR FEBRUARY 2016

TDML GUIDANCE: ADDENDUM A (PERCENT REDUCTION)

BUREAU OF WATERSHED MANAGEMANT PROGRAM GUIDANCE

Storm Water Management Program

TMDL Guidance for MS4 Permits: Planning, Implementation, and Modeling Guidance

Addendum A (Percent Reduction)

Effective: February 2016
Guidance #: 3800-2015-13

Notice: 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.

APPROVED:

Pam Biersach

Pam Biersach, Director
Bureau of Watershed Management

February 12, 2016
Date

A. Statement of Problem

As permitted Municipal Separate Storm Sewer Systems (MS4s) are added in watersheds with approved TMDLs it is not always clear how to assign a percent reduction corresponding with the appropriate Waste Load Allocation (WLA) or Load Allocation (LA) for new, expanded, or missed MS4 areas.

B. Background

At the time of TMDL development, there may not be sufficient information to separate out individually permitted MS4s from other MS4s permitted areas. For example, state and county highway MS4s and UW campus MS4s may not have been able to be assigned a specific WLA and their allocation gets lumped in with the city/village/town WLA where it is located. However all permitted MS4s that are located within in a municipality that received a WLA will be subject to the same annual average percent reductions. Additionally, urban developed areas not regulated under an MS4 permit are by default considered part of the non-point source LA when a TMDL is developed; however, once permitted, the MS4 system must be addressed in a consistent methodology as the other permitted MS4s contained in the TMDL.

C. Discussion

As discussed in the MS4 TMDL guidance, dated October 2014, permitted MS4s will implement their assigned WLAs based on an annual average percent reduction. This approach will also apply to new, expanded, or missed MS4s that were not assigned WLAs or percent reductions in the EPA approved TMDL.

During the development of a TMDL, it is common to assign an average unit area load across the MS4 service area as the baseline condition from which allocations are then derived. From this baseline load condition, a percent reduction (often equivalent) is applied across all sources to come up with the applicable LAs and WLAs.

For sediment or Total Suspended Solids (TSS) and Total Phosphorus (TP), the baseline condition for agricultural non-point sources generally reflects compliance with NR 151 agricultural performance standards including tolerable soil loss rate and the phosphorus index. Neither of these performance standards have an easy or direct translation with the baseline condition and the NR 151 percent reductions used for permitted MS4s.

In order to be equitable and consistent with the baseline condition assumed in TMDLs for permitted MS4s, the “no-controls” and subsequent NR 151.13 percent reduction will be utilized as the baseline MS4 condition for all new, expanded, or missed permitted MS4s. Consistent with existing Department guidance, implementation of the TMDL for new, expanded, or missed MS4s will utilize a percent reduction framework consistent with the EPA approved TMDL. The methodologies outlined below are designed to be consistent with allocations needed to achieve water quality standards.

D. Guidance

The following approach is recommended for assigning MS4 annual average percent reductions to permitted MS4s that are not specifically identified in a TMDL but discharge to a receiving water to which the TMDL applies:

1. In a TMDL reach where there is a permitted MS4 that was assigned a WLA, the same annual average percent reduction will apply to new, expanded, or missed permitted MS4s in the same reach so long as the MS4 has the same baseline condition. In some TMDLs, such as the Wisconsin River TMDL, the MS4 baseline load condition may vary due to soil or other conditions. If this is the case, consult with the DNR and we will select or adjust the percent reduction as needed to ensure consistency with the EPA approved TMDL.

2. In a TMDL reach where there was no WLA assigned to any MS4, the following approach should be used:

For a TMDL that uses 20% TSS reduction as the baseline loading condition (TMDLs approved after January 1, 2012) the conversion to the no-controls modeling condition is calculated by reach as follows:

TSS % Reduction (no-controls) = 20 + (0.80 * % NPS reduction from baseline in TMDL)
TP % Reduction (no-controls) = 15 + (0.85 * % NPS reduction from baseline in TMDL)

For a TMDL that uses 40% reduction as the baseline loading condition (TMDLs approved prior to January 1, 2012) the conversion to the no-controls modeling condition is:

TSS % Reduction (no-controls) = 40 + (0.60 * % NPS reduction from baseline in TMDL)
TP % Reduction (no-controls) = 27 + (0.73 * % NPS reduction from baseline in TMDL)

Note: For TMDLs that specifically call out nonpermitted MS4 reductions, such as the Milwaukee TMDLs, use the % reduction assigned to the nonpermitted MS4s in the equations above instead of the "% NPS reduction from baseline in the TMDL" listed in the equations above.

The recommended calculation approach will give a somewhat different annual average percent reduction than if it had been calculated from conversion of a mass LA. However, the recommended approach will yield reductions that are consistent with those that would have been calculated had non-permitted MS4 area been included in the TMDL's calculation as an area of MS4 WLA instead of an area of LA.

Example Calculation: The Rock River TMDL report does not have MS4 annual average percent reductions calculated for Reach 80. Following the above guidance, the calculated MS4 annual average percent reductions for TSS and TP are as follows:

TSS % Reduction (no-controls) = 40 + (0.60 * % NPS reduction from baseline in TMDL)
*Appendix I of the approved RR TMDL report, dated July 2011, identifies the % NPS reduction from baseline for TSS as 25%.
TSS % Reduction (no-controls) = 40 + (0.60 * 25) = 55% (Rock River Basin Reach 80)

TP % Reduction (no-controls) = 27 + (0.73 * % NPS reduction from baseline in TMDL)
*Appendix H of the approved RR TMDL report, dated July 2011, identifies the % NPS reduction from baseline for TP as 49%.
TP % Reduction (no-controls) = 27 + (0.73 * 49) = 63% (Rock River Basin Reach 80)

CREATED:

Eric S. Rortvedt, Water Resource Engineer
On behalf of the Storm Water Liaison Team

2/10/16
Date

Kevin Kirsch, Water Resource Engineer
TMDL Development Coordinator

2/11/16
Date

APPROVED:

Mary Anne Lowndes, Chief
Runoff Management Section

2/12/16
Date

Runoff Management Policy Management Team approved on February 10, 2016.

WDNR JANUARY 8, 2010

ERRATA TO GUIDANCE ON PROCESS TO ASSESS GRASS SWALES

Errata to Guidance on 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

The following are clarifications or revisions to the Department of Natural Resources guidance dated April 24, 2008.

A. Measured Infiltration Rates in Swales

Recommendation: 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 result 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 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.

B. Pretreatment for Existing Swales

Step 1.A of the April 24, 2008 guidance memo states that "Swales in commercial or industrial areas should have pretreatment swales or equivalent pretreatment in accordance with Vegetated Swale Infiltration Standard, No. 1005." The pretreatment language in Standard No. 1005 is specifically intended for infiltration swales to reduce potential clogging due to the higher pollutant loads associated with commercial and industrial areas and to prevent pretreatment areas from being counted toward the effective infiltration area credited toward meeting the infiltration cap under s. NR 151.12 (5)(c). The pretreatment portion of a swale effectively removes TSS thus the pretreatment requirement in Standard No. 1005 should only be applied to areas of new development trying to meet the infiltration standard of s. NR 151.12 (5)(c).

Recommendation: The Department hereby revises its April 24, 2008 guidance to <u>not</u> require pretreatment for swale treatment where swales are used to meet the developed urban area standard of s. NR 151.13(2).

This Errata was approved by the Department's MS4 Liaison Team on January 8, 2010 and it is to be incorporated into an update of the Swale Guidance memo, dated April 24, 2008.

DRY DETENTION BASIN MODELING GUIDANCE–APRIL 1, 2010

Lindert, Jon

From: Lindert, Jon
Sent: Thursday, April 01, 2010 12:49 PM
To: Scott Brandmeier
Subject: FW: Modeling of Dry Detention Basins to gain MS4 TSS Reduction

Scott-This is the guidance received from the DNR regarding allowing for dry detention basin modeling to get TSS credit. I also talked with Mary Anne Lowndes and she said that the dry pond would also have to not be experiencing scour. Evidence would consist of pictures showing a flourishing turf that doesn't have sediment buildup that can be washed out during a storm event. If there is evidence, then the pond may have to have measures installed to guard against it, perhaps stone check dams at the inlet and outlet. I will send the draft scope of services and fee for your review shortly.

Have a nice Easter weekend. I am now off until Tuesday, April 6, but you could call me on my cell if you have any questions (608-669-6103)

Thanks,
Jon

Jon H. Lindert, P.E., LEED AP
Strand Associates, Inc.
608-251-4843
jon.lindert@strand.com

From: Rortvedt, Eric - DNR [mailto:Eric.Rortvedt@Wisconsin.gov]
Sent: Thursday, April 01, 2010 8:46 AM
To: McBroom, Maureen A - DNR; Lindert, Jon
Cc: Lowndes, MaryAnne - DNR; Sina, Tim; Hagie, Tom; Hartsook, Bryan D - DNR; Wood, Peter C - DNR
Subject: RE: Modeling of Dry Detention Basins to gain MS4 TSS Reduction

Jon,

Modeling a so called dry pond as a bioretention device with an appropriate static infiltration rate is acceptable.

Eric

From: McBroom, Maureen A - DNR
Sent: Thursday, April 01, 2010 8:18 AM
To: Lindert, Jon
Cc: Lowndes, MaryAnne - DNR; Rortvedt, Eric - DNR; Sina, Tim; Hagie, Tom; Hartsook, Bryan D - DNR; Wood, Peter C - DNR
Subject: RE: Modeling of Dry Detention Basins to gain MS4 TSS Reduction

Good morning, Jon-

The information below is from the WINSLAMM web-site, as well as comments from Bryan Hartsook, my stormwater engineer here in Waukesha. While we told folks they could not model dry ponds a few years ago, with the model updates, there are ways to include these structures to account for *some* credit. Usually not much. However, there is no standard guidance that I know of to explain how to do this. Why don't you take a look at this, and let the group cc'd above know if you have any questions or comments? Unfortunately, (mainly for me,) I will be in a deposition for most of the day, so I will not be available today.

Thanks - have a great day!

-McB

Dry Detention Ponds (June 2008)Q. How do you model dry ponds in WinSLAMM? After speaking with a few people at the WDNR, they were saying with the version 9.3 you can model them as wet ponds with a very small wet pool (like an inch) and get some credit for them. I have tried doing this and only came up with a 0.5% TSS reduction. Which I guess is some credit, but I would think it should be around 10%-15% (Similar to what I receive modeling swales)

A. The model currently calculates a reduced level of performance associated with dry ponds compared to wet ponds, due to scour. The dry pond literature is very confusing and conflicting; the wet pond literature is much more consistent. It takes a great deal of data to understand what is going on in a device having limited removals. Many of the available docs are limited in the number of samples obtained and the results vary greatly. In research that included much data, the long-term performance of dry ponds can approach zero. Also, there is a large variation in how dry ponds are defined.

The basic theory behind grass swales is different than the theory behind detention ponds in SLAMM. For grass swales, the runoff is being routed through a long area and thus the particles have more of an opportunity to be filtered out by the grass. Wet detention ponds are based on the settling of the particles in water. Therefore, the larger the surface area of the permanent pool, the more particles can settle out. The main difference between dry ponds and grass filters is the concentrated flows and flow depths present. Our plan is to eventually enhance the calculations for dry ponds based on recent grass filter research and on current scour research. During very low flows with a level spreader, high levels of particulate trapping will likely occur, as the water gets to be about 4 or 5 times the vegetation height, little trapping will occur. Scour will also occur in areas of concentrated flow, and if the water depth is shallow. When the water depth is about 3 ft, scour is minimized.

Another option for you to try is modeling the dry pond as an infiltration basin. The only reduction will be from the amount of runoff that is infiltrated into the native soil.

It is apparent that the door is open for modeling dry ponds in SLAMM for marginal TSS removal credit. But obvious problems with dry ponds such as concentrated flow paths from inlet to outlet and the potential for larger (larger meaning outside the limits of the "small storm hydrology" water quality model) to scour, resuspend, and flush particulates out the pipe, make modeling dry ponds a taboo? subject.

With the CYA part done, I am okay with what we worked out with Ruekert-Mielke with a couple more clarifications:

1) If a grass swale to dry basin 'system' is being modeled, the total swale length input for the model may be found by the following:

= A+B(C/D)

A) total swale length of the upstream grass swale

B) length of the dry basin from inlet to outlet

C) width of the dry basin

D) upstream swale bottom width plus the horizontal side slope value (this estimates the total width of the side slopes for a water depth of 0.5' or greater - conservative)

2) The 'average swale length to outlet' input parameter should not be adjusted to account for the added swale length used to represent the dry basin bottom since SLAMM uses this variable to calculate particulate filtering, and the flow path across the dry basin is from inlet to outlet and not along the entire 'zig-zag' length of the representative swale

3) Field evidence should be provided to document that the dry basin has similar capacity to infiltrate runoff volume as compared to the upstream drainage system since adding on the extra swale length in the basin increases the effective infiltration area of the swale 'system'.

4) If modeling just a dry basin (no upstream swale), then suggest modeling the dry pond as an infiltration basin with field evidence to support dynamic infiltration rate. (see other WinSLAMM FAQ notes above)

****Before finalizing any of the reported model runs for these dry basin scenarios, the modeler should submit the .dat files to WDNR for review and comment. ****

From: Lindert, Jon [mailto:Jon.Lindert@strand.com]
Sent: Tuesday, March 30, 2010 3:57 PM
To: McBroom, Maureen A - DNR
Cc: Lowndes, MaryAnne - DNR; Rortvedt, Eric - DNR; Sina, Tim; Hagie, Tom
Subject: Modeling of Dry Detention Basins to gain MS4 TSS Reduction

Maureen-As we discussed last week at the Town of Brookfield, I wanted to formally request that the DNR provide an email providing DNR guidance on how dry detention basins are being allowed to be modeled for TSS reduction. It sounds like the DNR is now allowing the infiltration dynamic of a dry detention basin to be modeled in WinSLAMM but not the filtration component. Any guidance on "how" the DNR would like to see these modeled (ie: drainage control: biofiltration without engineered soil or swale) or outfall control: biofiltration without engieneered soil or other control) would be appreciated. The Village of Fox Point would like to leverage this new guidance. When do you think you could provide this new guidance? If possible, I would like to get it by noon on Thursday, April 1, 2010.

A complicating factor is that for Fox Point and other communities drained by grass swales, it would be more difficult to just add in the length/width of the dry basin as a swale since there is really no place to add in another swale. Would it thus be acceptable to provide a weighted average for the swale serving the particular landuse? Or, could we just model the dry basin as a bioretention basin with no engineered soil and just with the in-situ static infiltration rate (use static because the water will be ponding)? It would seem that this would be acceptable (to model as a bioretention basin as described above) given that it is basically a turf rain garden.

We appreciate your assistance.

Thank you,
Jon

Jon H. Lindert, P.E., LEED AP

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608-251-4843
jon.lindert@strand.com

APPENDIX F
BASELINE AND EXISTING CONDITIONS
WATER QUALITY MODELING RESULTS (*PROVIDED ON CD)*

APPENDIX G
WDNR WET DETENTION BASIN TECHNICAL STANDARD (1001)

Appendix A—Calculation of Preliminary Permanent Pool Surface Area for TSS Reduction [1]

		80%	60%
Land Use/Description/Management[2]	Total Impervious (%)[3]	Minimum Surface Area of the Permanent Pool (% of Watershed Area)	Minimum Surface Area of the Permanent Pool (% of Watershed Area)
Residential • < 2.0 units/acre (>1/2 acre lots) (low density • 2.0 - 6.0 units/acre (medium density) • > 6.0 units/acre (high density)	8 - 28 >28 -41 >41 - 68	0.7 0.8 1.0	0.3
Commercial/Office Park/Institutional/Warehouse/Industrial/Manufacturing/Storage[4] (Non-retail related business, multi-storied buildings, large heavily used outdoor parking areas, material storage, or manufacturing operations	<60 60-80 80-90 >90	1.8 2.1 2.4 2.8	0.6
Parks/Open Space/Woodland/Cemeteries	0-12	0.6	0.2
Highways/Freeways (Includes right-of-way area) • Typically grass banks/conveyance • Mixture of grass and curb/gutter • Typically curb/gutter conveyance	<60 60-90 >90	1.4 2.1 2.8	1.0

[1] Multiply the value listed by the watershed area within the category to determine the minimum pond surface area. Prorate for drainage areas with multiple categories due to different land use, management, percent impervious, soil texture, or erosion rates. For example, to achieve an 80% TSS reduction, a 50 acre (residential, 50% imperviousness) x 0.01 (1% of watershed from table) = 0.5 acre + 50 acres (office park, 85% imperviousness) x 0.024 (2.4% of watershed) = 1.2 acre. Therefore 0.5 acre + 1.2 acre = 1.7 acres for the minimum surface area of the permanent pool.

[2] For offsite areas draining to the proposed land use, refer to local municipalities for planned land use and possible institutional arrangements as a regional stormwater plan.

[3] Impervious surfaces include rooftops, parking lots, roads, and similar hard surfaces, including gravel driveways/parking areas.

[4] Category includes insurance offices, government buildings, company headquarters, schools, hospitals, churches, shopping centers, strip malls, power plants, steel mills, cement plants, lumber yards, auto salvage yards, grain elevators, oil tank farms, coal and salt storage areas, slaughter houses, and other outdoor storage or parking areas.

Source: This table was modified from information in "The Design and Use of Detention Facilities for Stormwater Management Using DETPOND" by R. Pitt and J. Voorhees (2000).

APPENDIX H
WET DETENTION BASIN CALCULATIONS

ALTERNATIVE 1

MR-8 AREA LAND USE	AREA DRAINING TO WET POND (AC)	MINIMUM % OF WATERSHED AREA FOR 80% REDUCTION	SURFACE AREA NEEDED FOR 80% TSS REDUCTION (AC)
OSUD	1.47	0.6	0.0088
DUP	1.17	0.8	0.0094
MDRNA	5.84	0.8	0.0467
LDR	2.00	0.7	0.0140
HDR	0.00	1.00	0.0000
MFR	2.31	0.8	0.0185
SHOP	0.00	2.4	0.0000
CDT	2.69	2.8	0.0754
STRIP	0.00	2.4	0.0000
OFF	0.46	2.4	0.0111
INST	0.00	2.1	0.0000
LI	1.61	2.1	0.0339
AGR	3.15	0.6	0.0189
TOTAL	20.71		0.237

ALTERNATIVE 2

MR-5 AREA LAND USE	AREA DRAINING TO WET POND (AC)	MINIMUM % OF WATERSHED AREA FOR 80% REDUCTION	SURFACE AREA NEEDED FOR 80% TSS REDUCTION (AC)	MINIMUM % OF WATERSHED AREA FOR 60% REDUCTION	SURFACE AREA NEEDED FOR 60% TSS REDUCTION (AC)
OSUD	0.00	0.6	0.000	0.2	0.000
DUP	0.00	0.8	0.000	0.3	0.000
MDRNA	47.85	0.8	0.383	0.3	0.144
LDR	17.83	0.7	0.125	0.3	0.053
HDR	0.00	1.00	0.000	0.3	0.000
MFR	5.59	0.8	0.045	0.3	0.017
SHOP	0.00	2.4	0.000	0.6	0.000
CDT	0.79	2.8	0.022	0.6	0.005
STRIP	0.00	2.4	0.000	0.6	0.000
OFF	0.00	2.4	0.000	0.6	0.000
INST	0.76	2.1	0.016	0.6	0.005
MI	0.00	2.1	0.000	0.6	0.000
LI	0.90	0.6	0.019	0.6	0.005
CEM	0.00	0.6	0.000	0.2	0.000
PARK	0.00	0.6	0.000	0.2	0.000
AGR	0.01	0.6	0.000	0.2	0.000
SCH	0.76	1.8	0.014	0.6	0.005
TOTAL	74.50		0.623		0.233

APPENDIX I
ALTERNATIVES ANALYSIS DETAILED OPCC

ALTERNATIVE 1: WET POND AT N. POPLAR STREET
VILLAGE OF CAMPBELLSPORT, WISCONSIN
ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST: PLANNING-LEVEL

Item No.	Description	Quantity	Unit	Unit Price	Total Price
1	Clearing and Grubbing	1	LS	$ 1,000.00	$ 1,000.00
2	Wetland Delineation	1	LS	$ 5,000.00	$ 5,000.00
3	Stone Tracking Pad	1	EA	$ 800.00	$ 800.00
4	Silt Fence	500	LF	$ 2.00	$ 1,000.00
5	Inlet Protection, Type C	4	EA	$ 150.00	$ 600.00
6	Rock Excavation	10	LF	$ 75.00	$ 750.00
7	5-FT Manhole with Casting	1	EA	$ 3,000.00	$ 3,000.00
8	18-IN RCP	290	LF	$ 85.00	$ 24,650.00
9	Outlet Control Structure	1	EA	$ 10,000.00	$ 10,000.00
10	Asphaltic Concrete Pavement Restoration (INCL Base Course)	322	SY	$ 30.00	$ 9,650.00
11	Common Excavation and Grading	2945	CY	$ 5.00	$ 14,700.00
12	Clay Liner	890	CY	$ 20.00	$ 17,800.00
13	Rip Rap at Outfall	14	SY	$ 200.00	$ 2,800.00
14	Erosion Control Mat	2,515	SY	$ 3.61	$ 9,100.00
15	Detention Basin Turf Restoration	0.24	ACRE	$ 30,000.00	$ 7,100.00
16	Turf Restoration - Seed and Fertilizer	2,515	SY	$ 1.80	$ 4,550.00
				Constuction Total	$ 112,500.00
				Engineering, Legal, and Construction Contigencies (20%)	$ 22,500.00
				Grand Total	**$ 135,000.00**

ALTERNATIVE 2: WET POND AT S. HELENA STREET AND LADWIG STREET
VILLAGE OF CAMPBELLSPORT, WISCONSIN
ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST: PLANNING-LEVEL

Item No.	Description	Quantity	Unit	Unit Price	Total
1	Clearing and Grubbing	1	LS	$ 1,000.00	$ 1,000.00
2	Wetland Delineation	1	LS	$ 5,000.00	$ 5,000.00
3	Stone Tracking Pad	1	EA	$ 800.00	$ 800.00
4	Silt Fence	210	LF	$ 2.00	$ 400.00
5	Inlet Protection, Type C	18	EA	$ 150.00	$ 2,700.00
6	Abandon Existing Storm Sewer	1	LS	$ 500.00	$ 500.00
7	Asphaltic Concrete Pavement Restoration (INCL Base Course)	1368	SY	$ 30.00	$ 41,050.00
8	Rock Excavation	20	LF	$ 75.00	$ 1,500.00
9	5-FT Manhole with Casting	5	EA	$ 3,000.00	$ 15,000.00
10	18-IN RCP	1320	LF	$ 85.00	$ 112,200.00
11	18-IN Apron Endwall	1	EA	$ 3,000.00	$ 3,000.00
12	Outlet Control Structure	1	EA	$ 10,000.00	$ 10,000.00
13	Common Excavation and Grading	2866	CY	$ 5.00	$ 14,350.00
14	Clay Liner	1022	CY	$ 20.00	$ 20,450.00
15	Rip Rap at Outfall	14	SY	$ 46.36	$ 650.00
16	Erosion Control Mat	418	SY	$ 3.61	$ 1,500.00
17	Detention Basin Turf Restoration	0.28	ACRE	$ 30,000.00	$ 8,250.00
18	Turf Restoration - Seed and Fertilizer	418	SY	$ 1.80	$ 750.00
19	Curb and Gutter Removal	20	LF	$ 15.00	$ 300.00
20	Curb and Gutter Restoration	20	LF	$ 40.00	$ 800.00
				Constuction Total	$ 240,200.00
				Engineering, Legal, and Construction Contigencies (20%)	$ 48,040.00
				Grand Total	**$ 288,240.00**

ALTERNATIVE 3: ABANDON EXISTING STORM SEWER AND REDIRECT FLOWS ON MILL STREET
VILLAGE OF CAMPBELLSPORT, WISCONSIN
ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST: PLANNING-LEVEL

Item No.	Description	Quantity	Unit	Unit Price	Total
1	Stone Tracking Pad	1	EA	$ 800.00	$ 800.00
2	Inlet Protection, Type C	5	EA	$ 150.00	$ 750.00
3	Abandon Existing Storm Sewer	1	LS	$ 3,000.00	$ 3,000.00
4	Asphaltic Concrete Pavement Restoration (INCL Base Course)	52	SY	$ 30.00	$ 1,550.00
5	Remove, Salvage, and Reset Existing 12-IN RCP	40	LF	$ 80.00	$ 3,200.00
6	Rock Excavation	10	LF	$ 75.00	$ 750.00
7	18-IN RCP	295	LF	$ 85.00	$ 25,100.00
8	Erosion Control Mat	131	SY	$ 3.61	$ 450.00
9	Turf Restoration - Seed and Fertilizer	131	SY	$ 1.80	$ 250.00
10	Drive Apron and Sidewalk Removal	143	SY	$ 4.00	$ 550.00
11	Concrete Drive Apron Restoration	108	SF	$ 9.00	$ 950.00
12	Concrete Sidewalk Restoration	1180	SF	$ 8.00	$ 9,450.00
13	Curb and Gutter Removal	50	LF	$ 15.00	$ 750.00
14	Curb and Gutter Restoration	50	LF	$ 40.00	$ 2,000.00
				Constuction Total	$ 49,550.00
				Engineering, Legal, and Construction Contigencies (20%)	$ 9,910.00
				Grand Total	**$ 59,460.00**

APPENDIX J
AGENCY CORRESPONDENCE

Rasso, Christy

From: Minser, Amy J - DNR <Amy.Minser@wisconsin.gov>
Sent: Monday, December 12, 2016 9:29 AM
To: Rasso, Christy
Subject: [BULK] RE: Village of Campbellsport SWMP Modeling and Report

Importance: Low

Christy,

The calculation approach below is acceptable and the results appear more reasonable. I'll take a final look and send some correspondence in the next couple of days.

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Amy J. Minser, P.E.
Phone: (920) 662-5461
amy.minser@wisconsin.gov

From: Rasso, Christy [mailto:christy.rasso@strand.com]
Sent: Monday, December 12, 2016 8:52 AM
To: Minser, Amy J - DNR
Cc: Hagie, Tom; Hanson, Erin E - DNR; mgrubercport@yahoo.com
Subject: RE: Village of Campbellsport SWMP Modeling and Report

Amy,

We have reviewed your comments and our modeling results and agree that the 0.25 lbs/ac of dissolved Phosphorus (DP) is only typical for the other community and determined that 0.18lbs/ac of DP is appropriate for Campbellsport.

We also ran two test WinSLAMM models that included only the off-site drainage area from Campbellsport's basin MR-5. The first model did not include the Other Control Device. The second model did include the Other Control Device. The results of these models show two things:

1. The OD removes the existing Particulate Phosphorus loads, but the model takes 100% reduction credit for it.
2. The OD does not remove the baseline or existing DP loads.

Therefore, both the Particulate Phosphorus and the DP loading need to be adjusted. The DP adjustment is what we previously submitted (listed at the bottom of Table 4.03-2) and the particulate phosphorus adjustment is based off of the following steps.

The Particulate Phosphorus adjustment follows the steps listed below.

1. Adjustment of the Baseline Load
    a. Determine the lbs/ac of baseline particulate phosphorus
        1. Lbs/ac = (Sum of the baseline load)/(Off-site Area + Exempt Area + Modeled MS4 Area). For Campbellsport, it is 0.46 lbs/ac.
    b. Determine the amount of excess baseline load that needs to be removed.
        i. Multiply the sum of the Off-site Drainage Area and Exempt Area by the lbs/acre of Phosphorus [(Off-site Area + Exempt Area) * 0.46 lbs/ac]

c. Subtract the Excess Baseline load from the Existing Baseline load to get the new Adjusted Existing Baseline Load

2. Adjustment of the Existing Load
   a. Adjusted Existing load=Adjusted Baseline Load * (1-TSS Percent Reduction)
      i. We cannot base the adjusted existing load off of the existing percent reduction that the model calculates because that Particulate Phosphorus reduction is taking credit for the load being removed by the OD. As a result, we are assuming the Particulate Phosphorus reduction is close to the TSS reduction; therefore, we are basing the existing load reduction off of the respective TSS percent reduction.
         1. Basin MR-5 Example: the Adjusted Existing Particulate Phosphorus = 44.4 lbs*(1-0.5%)=44.2 lbs

I have attached the updated Section 4 of the report with the corrected loadings and reductions.

We need to submit this report to the Village by Tuesday, December 13th, 2016 so their board may approve it; therefore, if you could review these adjustments and provide approval before then it would be much appreciated.

Please let us know if you have any questions about this adjustment.

Thank you,
Christy

Christy Rasso
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608.251.4843 ext. 1215
christy.rasso@strand.com | www.strand.com

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From: Minser, Amy J - DNR [mailto:Amy.Minser@wisconsin.gov]
Sent: Monday, December 5, 2016 2:01 PM
To: Rasso, Christy <christy.rasso@strand.com>
Cc: Hagie, Tom <Tom.Hagie@strand.com>; Hanson, Erin E - DNR <ErinE.Hanson@wisconsin.gov>; mgrubercport@yahoo.com
Subject: RE: Village of Campbellsport SWMP Modeling and Report

Christy,

I discussed the issue on the Phosphorus control with Eric Rortvedt. The procedure used on a previous project used 2.5 lbs/acre of dissolved Phosphorus (DP) in the correction equations because that was typical for that community and resulted in values that appeared reasonable. The correction value is likely to be different for Campbellsport as it has different ratios of land uses. Please also double check the footnote for the Adjusted baseline DP—if the value is going down then there should be subtraction in the equation.

In addition, For MR-5, 12, and 13, the calculated % Total Phosphorus removals are significantly higher than the % TSS control values. This does not make any sense as most processes that remove Phosphorus also remove TSS. Please either revise the calculations and/or provide an explanation on what physical mechanism can account for the difference.

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Amy J. Minser, P.E.
Phone: (920) 662-5461
amy.minser@wisconsin.gov

From: Rasso, Christy [mailto:christy.rasso@strand.com]
Sent: Friday, December 02, 2016 4:30 PM
To: Minser, Amy J - DNR
Cc: Hagie, Tom; Hanson, Erin E - DNR; mgrubercport@yahoo.com
Subject: RE: Village of Campbellsport SWMP Modeling and Report

Amy,

Thank you for your review comments.

We were aware of the issue with the Other Device control as we have ran into the same problem on a couple other reports we've been working on. We worked with Eric Rortvedt at the DNR on how to address the issue, and the approach he approved is outline in the footnotes section at the bottom of Table 4.03-2 in the report.

Please see my responses to your comments below in yellow. The link below contains the files you requested for your review and approval.

https://strand.filetransfers.net/downloadFilePublic.php?filePassId=94873f01b7ec4b56646f52e8715ce351

These links will expire on 12/17/16, 4:05 pm CST

Let us know if you have any questions.

Thank you,
Christy

Christy Rasso
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608.251.4843 ext. 1215
christy.rasso@strand.com | www.strand.com

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From: Minser, Amy J - DNR [mailto:Amy.Minser@wisconsin.gov]
Sent: Friday, December 2, 2016 2:19 PM
To: Rasso, Christy <christy.rasso@strand.com>
Cc: Hagie, Tom <Tom.Hagie@strand.com>; Hanson, Erin E - DNR <ErinE.Hanson@wisconsin.gov>; mgrubercport@yahoo.com
Subject: RE: Village of Campbellsport SWMP Modeling and Report

Christy,

In addition to the comment below:

1. Please send the updated MR-11 WinSLAMM input/output—the one included with the last submission still contains a biofilter with a weir outlet. The correct file is included in the link above.

2. The infiltration rates for the swales should be half the static infiltration rate from Table 2 in Technical Standard 1002. Please revise all the swale modeling accordingly and resubmit. The swale infiltration rates have been modeled with a 0.07 in/hr rate (half of the silty soil dynamic rate of 0.13 in/hr). The files previously sent included this, but they are also in the link to ensure we are all referring to the same files. Also note the swale infiltration rate in WB-5 has been changed to 0.04 in/hr to account for the clayey soil where the swales are located.
3. Updates were noted to the Erosion control and Stormwater Management requirements. Was that text resubmitted? If so, which document was it in? Response to 13b and d. below should be "Noted." The Stormwater Management requirements were not updated but rather text was added in Report Section 3.02C and 3.02D that states updates would be needed should the community become permitted. Similar to response 13e. below.
4. For the Erosion Control and Storm Water Management ordinances, please add text to the report indicating that updates will be needed should the community become a permitted MS4. The text was included in the submitted report. Please refer to Sections 3.02C and 3.02D of the report.
5. As some of the responses to comments contain information relevant to the community should it become a permitted MS4, please include the comments and responses in an appendix to the report. Correspondence as an appendix as noted.

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Amy J. Minser, P.E.
Phone: (920) 662-5461
amy.minser@wisconsin.gov

From: Minser, Amy J - DNR
Sent: Friday, December 02, 2016 11:28 AM
To: 'Rasso, Christy'
Cc: Hagie, Tom; Hanson, Erin E - DNR; mgrubercport@yahoo.com
Subject: RE: Village of Campbellsport SWMP Modeling and Report

Christy,

I'm still reviewing, but wanted to let you know that the reason the phosphorus removals appear so high is that the Other Device in WinSLAMM toggle to take the pollutant load for offsite areas out of the summary appears to only work for TSS, not Phosphorus (particulate or dissolved). I ran MR-5 in WinSLAMM both with and without the Other Device and The No-Controls yields were the same for Particulate Phosphorus (PP), Dissolved Phosphorus, and Total Phosphorus (TP), but the With-controls yield was different for PP and TP. This will require revisions to Table 4.03-2.

Feel free to call with any questions.

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Amy J. Minser, P.E.
Phone: (920) 662-5461
amy.minser@wisconsin.gov

From: Rasso, Christy [mailto:christy.rasso@strand.com]
Sent: Monday, November 21, 2016 5:00 PM
To: Minser, Amy J - DNR

Cc: Hagie, Tom; Hanson, Erin E - DNR; mgrubercport@yahoo.com
Subject: RE: Village of Campbellsport SWMP Modeling and Report

Hi Amy,

Please see our comment responses below in green. All items have been modified per our discussion and the updated figures, report sections, and modeling are provided in the link below.

https://strand.filetransfers.net/downloadFilePublic.php?filePassId=f6c4e556421264f8415c7933b5a09243

These links will expire on 12/6/16, 4:46 pm CST

Once we receive your final approval we will send our final report to the DNR.

Let us know if you have any questions.

Thank you,
Christy

Christy Rasso
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From: Minser, Amy J - DNR [mailto:Amy.Minser@wisconsin.gov]
Sent: Monday, November 14, 2016 11:49 AM
To: Rasso, Christy <christy.rasso@strand.com>
Cc: Hagie, Tom <Tom.Hagie@strand.com>; Hanson, Erin E - DNR <ErinE.Hanson@wisconsin.gov>; mgrubercport@yahoo.com
Subject: RE: Village of Campbellsport SWMP Modeling and Report

Christy,

In general the responses are fine, but I did have a couple with clarifications below:

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Visit our survey at http://dnr.wi.gov/customersurvey to evaluate how I did.

Amy J. Minser, P.E.
Phone: (920) 662-5461
amy.minser@wisconsin.gov

From: Rasso, Christy [mailto:christy.rasso@strand.com]
Sent: Thursday, November 10, 2016 8:27 AM
To: Minser, Amy J - DNR
Cc: Hagie, Tom; Hanson, Erin E - DNR; mgrubercport@yahoo.com
Subject: RE: Village of Campbellsport SWMP Modeling and Report

Amy,

Please see our comments and responses below in red. Upon confirmation of our comments and methodology, we will make the appropriate modifications and send you the updates.

Let us know if you have any questions or would like to discuss anything in further detail.

Thank you,
Christy

From: Minser, Amy J - DNR [mailto:Amy.Minser@wisconsin.gov]
Sent: Thursday, November 3, 2016 5:10 PM
To: Rasso, Christy <christy.rasso@strand.com>
Cc: Hagie, Tom <Tom.Hagie@strand.com>; mgrubercport@yahoo.com; Hanson, Erin E - DNR <ErinE.Hanson@wisconsin.gov>
Subject: RE: Village of Campbellsport SWMP Modeling and Report

Christy,

Below are the review comments the Department has. I focused primarily on the modeling, so the other items received little if any review at this time. Please write responses to the comments and resubmit modified items.

1. Should the Village become a permitted MS4, the modeling for the 20% reduction will need to exclude post-2004 new development. It appears this is primarily located in NE edge of village. Noted.
2. Excluded areas should be depicted on a map in the report, and the reason for the exclusion identified. Need clarification. We believe these areas are depicted on Figure 2.01-1 and are labeled as "Drains to WOTS" or "Drains to Adj MS4". Areas excluded as agriculture should also be identified. Figure 2.01-1 Existing agriculture land use has been identified as exempt in the legend.
3. Thank you for resubmitting Table 2.01-1 with the revised data. Please remember to include the updated table in future versions of the report. Noted. It has been added.
4. General comment on modeling results: The % Total Phosphorus reduction appears high relative to the % TSS reduction. Typically it is around ¾ of the % TSS reduction. Please verify that the reported values are correct. Noted.
5. General comment: It would be helpful to add a column to Table 4.04-2 for the WinSLAMM basin name each pond is in. Noted. This has been added.
6. In Table 4.03-1, the annual TSS numbers for WB-3 do not match the WinSLAMM output. This has been updated.
7. The WinSLAMM runs for MR-10 and WB-8 use the 'Other Device' set to 80% rather than modeling the wet pond in series with the street cleaning. Therefore it is impossible to review if the wet pond is properly modeled. Please resubmit the modeling with the modeling of the wet pond. Please clarify. Specific pond information is not available for these two ponds. The wet pond in basin MR-10 was designed and constructed post-2004; therefore, it is assumed the pond is achieving a minimum of 80% TSS reduction. The TSS % reduction for the wet pond in basin WB-8 was analyzed using Appendix A in DNR Tech. Standard 1001. Based on this standard the minimum permanent pool surface area for 80% TSS reduction is 0.42 acres and the actual permanent pool surface area of the pond is 0.85 acres. Therefore, it was assumed 80% TSS reduction and the use of the 'Other Control Device' was utilized. If as-built plans are not available, the expectation is that the outlets and dimensions are surveyed so that the pond can be modeled. If the development was permitted through DNR, there is a chance we may have design plans, but we would need the land owner the pond was permitted under in order to search our files. If the development was permitted through Dept. of Commerce, the Department is unlikely to have any files on it. If the pond itself was permitted due to proximity to a waterway, the waterway and wetland program may have files. Most communities now require as-builts of ponds following

construction as an attachment to the maintenance agreement. A note has been added in Section 4.04B that states more information will be required if the Village becomes a permitted community.

8. The WinSLAMM run for MR-11 assumes the Piggly Wiggly Dry Detention basin has only a broad crested weir outlet. Typically dry ponds have an outlet at the bottom. Please confirm the outlet configuration for this basin. See also the comment below regarding infiltration rates. Noted. This detention basin will be modified to be modeled as a swale since specific outlet information is not available.
9. The Department has the following comments on the modeling for Drainage Area MR-13 (please revise and resubmit modeling for this drainage area and others for which the following comments apply):
    a. Portions of the agricultural land use area appear to be golf course rather than agricultural production. This area should be included as an urban land use-The Standard Land Use for a park may be used. Noted and updated.
    b. Street cleaning was included for all of the urban land uses except for open space. However only portions of the local streets are curbed on one or both sides. Street cleaning may only be applied to curbed streets. Noted and updated.
    c. Two of the streets in this drainage area are county highways. As such, they would be considered part of the County MS4 unless the Village has maintenance responsibility for the drainage system and pavement surface. The Village has responsibility for the road and storm sewer maintenance on these roads; therefore, these roads have been included in the analysis.
    d. Swale and biofilter infiltration rates should be location-specific, not Village-wide and based on either field testing or Table 2 in Technical Standard 1002. At minimum, soil survey data showing the soil textures of the mapped soils at the swale locations should be provided and the infiltration rate based on the most restrictive soil texture within 5 feet of the surface. A tested infiltration rate is preferred for existing facilities. The infiltration rates used were taken from WinSLAMM and based off the NRCS soil type in the swale's location. If these infiltration rates are not approved, the rates in Table 2 in Technical Standard 1002 will be used and reduced by 50% before being entered into the modeling. Please confirm how you would like to proceed. Please use the infiltration rates in Table 2 and convert to dynamic infiltration rates(divide by 2). The modeling has been updated with infiltration rates of 0.07 in/hr for grass swales. (Static infiltration rate for silty soils).
    e. The area modeled as a biofilter, the 'HT Enterprises Dry Detention Basin', does not appear to be functioning as a biofilter. The basin area appears unvegetated in the Photo on Page 2-12 of the report. No documentation is provided to justify the infiltration rate or document that the draw-down time is met. It appears to have standing water in the 2000 and 2010 aerial photos on the county website, the aerial photo on Google Maps, and the street-view photos on Google. Therefore credit cannot be taken for pollution control via this feature until it is repaired or modified such that it functions as either an infiltration BMP or a wet pond. This BMP will be modified to be modeled as a swale with a clay infiltration rate of 0.07 in/hr. According to the WDNR guidance document dated November 24, 2010, a clay infiltration rate should be used for swales less than 1% slope showing signs of ponding. Given the current condition of this particular Dry pond, it appears inappropriate to take any credit for pollution removal, including modeling as a swale. The swale leading into the dry pond is rock lined, so no infiltration can be assumed there, and the pool area is not vegetated, indicating the water is likely pooled so long it creates conditions where the infiltration surface may seal up. Per our discussion, this basin has been removed from the modeling.
    f. Typically 'Dry ponds' have an outlet on the bottom. Please confirm that additional outlets do not serve the basin. Noted. This basin will be modified to be modeled as a swale since specific outlet information is not available. See response above. Noted. Dry basins were updated as discussed. See other comment responses.

10. The Department has the following comments on the modeling for Drainage Area MR-13 (please revise and resubmit modeling for this drainage area and others for which the following comments apply):
    a. Street cleaning was included for all of the urban land uses except for open space. However only very small portions of the local streets in this area are curbed on one or both sides. Street cleaning may only be applied to curbed streets. Noted and Updated.
    b. One of the streets in this drainage area is a county highway. As such, it would be considered part of the County MS4 unless the Village has maintenance responsibility for the drainage system and pavement surface. The Village has responsibility for the road and storm sewer maintenance on these roads; therefore, these roads have been included in the analysis.
    c. No documentation was provided to document the swale infiltration rate. At minimum, soil survey data showing the soil textures of the mapped soils at the swale locations should be provided and the infiltration rate based on the most restrictive soil texture within 5 feet of the surface. The infiltration rates used were taken from WinSLAMM and based off the NRCS soil type in the swale's location. If these infiltration rates are not approved, the rates in Table 2 in Technical Standard 1002 will be used and reduced by 50% before being entered into the modeling. Please confirm how you would like to proceed. Please use the infiltration rates in Table 2 and convert to dynamic infiltration rates(divide by 2). The modeling has been updated with infiltration rates of 0.07 in/hr for grass swales. (Static infiltration rate for silty soils).
    d. Any swale with standing water should not be included in the total swale length as the majority of the pollution control for swales is assumed to occur through infiltration. Noted.
11. Comments on proposed alternatives:
    a. There are mapped wetland indicator soils at the proposed wet detention basin site on N. Poplar Street. A wetland delineation will be needed prior to design of the facility. Noted.
    b. There are mapped wetland indicator soils and a mapped stream through the proposed wet pond location at S. Helena Street and Ladwig Street. A wetland delineation and consultation with DNR Water Management Staff will be needed to confirm if construction of a wet pond is feasible at this location. Noted.
    c. Is acquisition and modification of the HT Enterprises Dry Detention Basin a possibility? This site also has mapped wetland indicator soils, so a wetland investigation would be required for any modifications. If wetland areas appear to meet the definition of artificial wetlands, then review by the Department is required to confirm whether exemptions apply. The Village will not be pursuing this alternative.
12. Comment on construction site erosion control: to be an MS4 compliant program, inspection should be implemented on regular intervals, such as monthly. Inspection following large rainfall events is also recommended. Noted.
13. Comments on Erosion Control and Stormwater Management Requirements (please revise this guidance document):
    a. P. 1-1, The WDNR Technical Standards available at http://dnr.wi.gov/topic/stormwater/standards/const_standards.html have replaced WDNR Pub. WR-222. Noted.
    b. P. 1-1, Consider including the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 Precipitation Frequency Estimates for rainfall depth with the appropriate NRCS Midwest/Southeast (MSE) 3 or 4 precipitation distribution. The NRCS calculated county-specific Atlas 14 precipitation depths and MSE3 and MSE4 precipitation distributions are available at: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/wi/technical/engineering/?cid=nrcs142p2_025417 While use of NRCS Technical Paper 40 (TP-40) or Bulletin 71 rainfall along with the corresponding type II

rainfall distribution is still accepted for storm water modeling, it is anticipated that use of the older rainfall depths and distributions will be phased out at some point in the future. Noted and updated.

c. P. 2-3 Section 2.02.A.1.d. Guidance has been published at http://dnr.wi.gov/topic/stormwater/standards/postconst_standards.html . Noted.

d. p. 2-4, the 1-year storm should also be included to remain consistent with NR 151.123. Noted and updated.

e. General: Language regarding infiltration and protective areas are outdated. DNR recommends using model ordinance language available at: http://dnr.wi.gov/topic/stormwater/documents/ModelOrdinances.pdf. Noted. The ordinances were created and approved a couple years ago, prior to the DNR's model ordinance language was updated. It will be recommended to the Village that the next time they go through the process of updating their ordinances they review and modify the Erosion Control and Stormwater Management Requirements language to follow the DNR model ordinance language, as necessary. However, the ordinance does state to reference the most current version of DNR documents, rules, and technical standards.

14. The Erosion Control and Storm Water Management Ordinances include outdated language and exemptions. The Department recommends revising the ordinances to be consistent with the current model ordinances available at: http://dnr.wi.gov/topic/stormwater/documents/ModelOrdinances.pdf. Noted. The ordinances were created and approved a couple years ago, prior to the DNR's model ordinance language was updated. It will be recommended to the Village that the next time they go through the process of updating their ordinances they review and modify the Erosion Control and Stormwater Management Requirements language to follow the DNR model ordinance language, as necessary. However, the ordinance does state to reference the most current version of DNR documents, rules, and technical standards.
15. The grant award contained budget for public involvement activities. Please provide documentation of these efforts, such as prepared meeting materials, agendas, etc. prior to grant close-out. Noted, documentation will be provided prior to grant close-out.

Feel free to call or email if you need clarification on any of the comments.

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Amy J. Minser, P.E.
Phone: (920) 662-5461
amy.minser@wisconsin.gov

From: Rasso, Christy [mailto:christy.rasso@strand.com]
Sent: Thursday, October 06, 2016 1:29 PM
To: Minser, Amy J - DNR
Cc: Hagie, Tom; mgrubercport@yahoo.com; Hanson, Erin E - DNR
Subject: RE: Village of Campbellsport SWMP Modeling and Report

Amy,

Thank you for the confirming you received and were able to download the files. We will touch base with you in a month or so if we don't hear from you sooner about the review.

Thanks,
Christy

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From: Minser, Amy J - DNR [mailto:Amy.Minser@wisconsin.gov]
Sent: Thursday, October 6, 2016 10:58 AM
To: Rasso, Christy <christy.rasso@strand.com>
Cc: Hagie, Tom <Tom.Hagie@strand.com>; mgrubercport@yahoo.com; Hanson, Erin E - DNR <ErinE.Hanson@wisconsin.gov>
Subject: RE: Village of Campbellsport SWMP Modeling and Report

Christy,

I have downloaded the files, but I am currently experiencing a high level of construction permitting workload. I will review the modeling as soon as I can. I will try to get to it within the next 30 days, but it will depend on other workload.

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Amy J. Minser, P.E.
Phone: (920) 662-5461
amy.minser@wisconsin.gov

From: Rasso, Christy [mailto:christy.rasso@strand.com]
Sent: Thursday, October 06, 2016 10:51 AM
To: Minser, Amy J - DNR
Cc: Hagie, Tom; mgrubercport@yahoo.com; Hanson, Erin E - DNR
Subject: Village of Campbellsport SWMP Modeling and Report

Good morning Amy,

We have completed our WinSLAMM modeling and the Stormwater Quality Management Plan for the Village of Campbellsport. Please find the WinSLAMM files and report in the link below for your review.

- *https://strand.filetransfers.net/downloadFilePublic.php?filePassId=d3e315c2e8afdcd67da77c1b33ff70c4*

These links will expire on 10/21/16, 8:08 am CDT

Do you have an estimated time for how long the review will take and when you will be able to provide comments or approval of the modeling?

Please let me know if you have any questions.

Thank you,
Christy

Christy Rasso
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December 13, 2016

Patrick Twohig, Village President
Village of Campbellsport
177 East Main Street
Campbellsport, WI 53010

Subject: Campbellsport's Stormwater Management Plan
Grant: USP-MI06-20111-14

Dear Mr. Twohig:

Thank you for submitting the following materials to the Wisconsin Department of Natural Resources (Department):

1. Village of Campbellsport Stormwater Quality Management Plan (the Plan) as revised on 12/02/2016 via email.
2. WinSLAMM files

The Department has reviewed the submitted materials prepared by Strand to meet the requirements of Nonpoint Source Urban Storm Water Planning Grant No. USP-MI06-20111-14. The project is in conformance with the applicable requirements of ch. NR 155 Wis. Adm. Code and is hereby approved for the purposes of grant closure and final reimbursement as long as the following items are submitted prior to grant closure:

1. Documentation of public involvement activities
2. 1 hard copy of the Village of Campbellsport Stormwater Quality Management Plan
3. 1 compiled .pdf of the Village of Campbellsport Stormwater Quality Management Plan on CD, thumb drive, or via .ftp site.

The Department has also reviewed the materials pursuant to the current Municipal Separate Storm Sewer System (MS4) permit requirements notes the following, should the Village become a permitted MS4 in the future:

1. Should the Village become a permitted MS4, the modeling for the 20% reduction will need to exclude post-2004 new development. It appears this is primarily located in NE edge of village.
2. There are mapped wetland indicator soils at the proposed wet detention basin site on N. Poplar Street. A wetland delineation will be needed prior to design of the facility.
3. There are mapped wetland indicator soils and a mapped stream through the proposed wet pond location at S. Helena Street and Ladwig Street. A wetland delineation and consultation with DNR Water Management Staff will be needed to confirm if construction of a wet pond is feasible at this location.
4. For the Village's construction site erosion control program, please note that to be an MS4 compliant program, inspection should be implemented on regular intervals, such as monthly. Inspection following large rainfall events is also recommended.
5. In order to become an MS4 compliant program, the construction site erosion Control and Stormwater Management guidance document should be updated as follows:
    a. P. 1-1, The WDNR Technical Standards available at http://dnr.wi.gov/topic/stormwater/standards/const_standards.html have replaced WDNR Pub. WR-222.
    b. P. 1-1, Consider including the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 Precipitation Frequency Estimates for rainfall depth with the appropriate NRCS Midwest/Southeast (MSE) 3 or 4 precipitation distribution. The NRCS calculated county-specific Atlas 14 precipitation depths and MSE3 and MSE4 precipitation distributions are available at: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/wi/technical/engineering/?cid=nrcs142p2_025417 While use of NRCS Technical Paper 40 (TP-40) or Bulletin 71 rainfall along with the corresponding type II rainfall distribution is still accepted for storm water modeling, it is anticipated that use of the older rainfall depths and distributions will be phased out at some point in the future.
    c. P. 2-3 Section 2.02.A.1.d. Guidance has been published at

http://dnr.wi.gov/topic/stormwater/standards/postconst_standards.html

d. p. 2-4, the 1-year storm should also be included to remain consistent with NR 151.123
e. General: Language regarding infiltration and protective areas are outdated. DNR recommends using model ordinance language available at: http://dnr.wi.gov/topic/stormwater/documents/ModelOrdinances.pdf

6. The Erosion Control and Storm Water Management Ordinances include outdated language and exemptions and would require updating to become an MS4 compliant program. The Department recommends revising the ordinances to be consistent with the current model ordinances available at: http://dnr.wi.gov/topic/stormwater/documents/ModelOrdinances.pdf
7. The grant award contained budget for public involvement activities. Please provide documentation of these efforts, such as prepared meeting materials, agendas, etc. prior to grant close-out.
8. Due to limited review time, materials related to Illicit Discharge Detection and Elimination (Appendix C) and Stormwater Facility Maintenance Program (Appendix D) were not reviewed.

Thank you for your work to improve the water quality within the Milwaukee River watershed. Please call me at 920-662-5461 or email Amy.Minser@wisconsin.gov if you have any questions. Thank you.

Sincerely,

Amy Minser, PE
Storm Water Engineer

cc: Christy Rasso, Strand (via email)
Erin Hanson, DNR Non-point Source Grant Coordinator (via email)
Tony Fischer, DNR Storm Water Specialist (via email)
Rick Stoll, DNR Runoff Management Supervisor (via email)

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