Stormwater Management Plan

Town-Wide Stormwater Quality Management Plan

Prepared For The

TOWN OF GREENVILLE
SINCE 1848

OUTAGAMIE COUNTY, WISCONSIN

NOVEMBER 18, 2016

McM. No. G0014-9-14-00273

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I. INTRODUCTION

At the request of the Town of Greenville, McMAHON prepared the following Town-Wide Stormwater Quality Management Plan. The Town obtained an Urban Nonpoint Source and Stormwater Planning (UNPS&SW) Grant from the Wisconsin Department of Natural Resources (WDNR) to assist with preparation of the plan.

The purpose of the plan is to provide the Town with the long-term guidance necessary to comply with Wisconsin Administrative Code NR 216 stormwater regulations and improve water quality in receiving waters. Pursuant to NR 216, the Town obtained a WPDES Municipal Stormwater Discharge Permit from the WDNR on December 15, 2006. The renewed WPDES Municipal Stormwater Discharge Permit has an effective date of May 1, 2014. The purpose of the permit is to regulate discharges from Municipal Separate Storm Sewer Systems (MS4) and reduce urban non-point source pollution.

A. Relationship to Other Plans

This Stormwater Quality Management Plan compliments and is part of efforts to implement recommendations contained in several existing resource management plans. These related resource management plans include the following:

- The Lower Green Bay Remedial Action Plan (RAP) recommends 50% TP reduction for the Green Bay Area of Concern. The RAP also recommends a reduction in other urban stormwater pollutants such as sediment, heavy metals, toxics, and bacteria. The RAP was finalized by WDNR in 1993. The RAP recommends that municipalities develop and implement programs for construction site erosion control, post-construction stormwater management, illicit discharges, and shoreland / wetland zoning. The RAP also recommends that municipalities develop and implement programs that preserve, restore and enhance environmental corridors, shoreline buffers, wetlands, habitat, and public access for shoreline fishing, boating and other water-based recreation. To meet these goals, the RAP recommends planning and implementation of BMP to reduce nonpoint source pollutants. The RAP also recommends that municipalities seek innovative and alternative ways to achieve nonpoint source goals.

- The Total Maximum Daily Load (TMDL) developed for the Lower Fox River Basin identifies total suspended solids (TSS) and total phosphorus (TP) allocations for urban stormwater, wastewater, and agricultural sources located within the Lower Fox River Basin. The TMDL was approved by the U.S. Environmental Protection Agency (EPA) in 2012. More specifically, the TMDL identifies allocations for urban stormwater in the Fox River and Mud Creek Sub-Watersheds. The TP and TSS waste load allocations identified in the TMDL Report for the Town's municipal boundary are summarized in Tables 4-1 and 4-2, respectively.

- The Comprehensive Plan for the Town of Greenville contains several recommendations related to natural resource and stormwater management: (1) actively promote and utilize methods to protect its local and regional surface water features; (2) consider the issuance of tax credits or other incentives which favor the installation of distributed stormwater controls such as native landscaping systems, green roofs, bio-swales, porous paving, level spreaders, rain gardens and rain barrels/cisterns; (3) consider implementing recommendations contained in its 2008 Stormwater Management Plan; and (4) effectively manage stormwater runoff to protect wetlands and woodlands.

II. OVERVIEW OF STUDY AREA

The Town of Greenville is located in Outagamie County, Wisconsin. The study area for this Stormwater Management Plan is depicted in Figure 1. The study area contains approximately 10,674 acres of area and is considered the urban planning boundary. The urban planning boundary was defined using the 2010 US Census Bureau developed urban area maps, including any contiguous developed urban areas. The Town of Greenville is part of the Appleton Urbanized Area as determined by the US Census Bureau. As shown in Figure 2, several MS4 jurisdictions are located within and directly adjacent to the Town.

A. Basins

The WDNR divided the state into 24 basins or Water Management Units (WMU). The Town's study area is located in the Lower Fox River and Wolf River Basins. The basin boundaries are similar to the federally designated 8-digit Hydrologic Unit Code (HUC) boundaries.

Exhibit 2-1: Lower & Upper Fox River Basins

B. Watersheds

The WDNR divided the Lower Fox River Basin into 6 watersheds and the study area is located in one of these watersheds: Fox River – Appleton (LF04-13). The WDNR divided the Wolf River Basin into 20 watersheds. The Town's study area is located in two of these watersheds: Arrowhead River and Daggets Creek (WR01) and Wolf River-New London and Bear Creek (WR12).

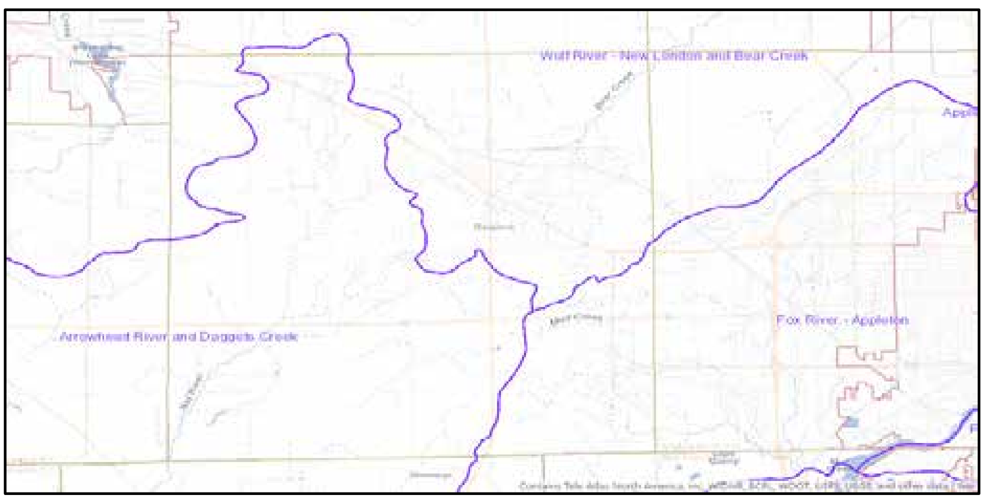


Exhibit 2-2: Arrowhead River & Daggets Creek, Wolf River-New London & Bear Creek, Fox River-Appleton Watersheds

C. Sub-Watersheds

For purposes of this stormwater management plan, the Town was divided into five sub-watersheds. The Town's study area covers four of these sub-watersheds. The sub-watersheds are depicted in Figure 3 and summarized in Table 2-1. The sub-watersheds were delineated after considering the locally designated stormwater planning boundaries, federally designated 12-digit Hydrologic Unit Code (HUC) boundaries, and state designated TMDL sub-basin boundaries.

Table 2-1: Sub-Watersheds

Sub-Watershed	HUC-12	TMDL Sub-Basin Name
Bear Creek	Town of Greenville-Bear Creek (040302021401)	TBD
Fox River	Mud Creek (040302040202)	Lower Fox River Main Stem
Mud Creek	Mud Creek (040302040202)	Mud Creek
Rat River	Medina Junction-Rat River (0403020022101)	TBD
Wolf River	Black Otter Lake-Wolf River (040302021404)	TBD

D. Natural Resources

Natural resource features include surface waters (lakes, rivers, streams), wetlands, and endangered or threatened resources. Natural resource features located in the study area are depicted in Figure 4. Some of these natural resource features are protected with a special regulatory designation such as outstanding resource water, exceptional resource water, 303(d) impaired water, endangered species, and threatened species. Natural resource features located in the study area with one of these special regulatory designations are identified below.

Outstanding and exceptional resource waters are pristine surface waters which are not significantly impacted by human activities and provide valuable fisheries, unique hydrological or geological features, outstanding recreational opportunities, or unique environmental settings. For example, cold water trout streams and natural waterfalls are typically classified as outstanding or exceptional resource waters. The Town does not discharge stormwater runoff into any outstanding resource waters or exceptional resource waters.

Impaired water bodies are degraded surface waters which are not meeting water quality standards or their potential uses, such as fishing and swimming, due to pollutants and poor water quality. The US EPA requires each state to update its 303(d) impaired waters list every two years, including Wisconsin. The Town's study area discharges stormwater runoff into four 303(d) impaired waters:

- Bear Creek: Bear Creek is a 303(d) impaired water body due to non-point source pollution. Pollutants of concern include total phosphorus. Impairments include water quality use restrictions. The attainable use for Bear Creek is a warm water forage fishery. Currently, Bear Creek is not supporting its attainable use. A TMDL is currently being developed for the Upper Fox and Wolf River Basins, which will include Bear Creek.

- Fox River: The Fox River is a 303(d) impaired water body due to a blend of point source and non-point source pollution. Pollutants of concern include total phosphorus and polychlorobiphenyls (PCBs). Impairments include low dissolved oxygen and contaminated fish tissue. The attainable use for the Fox River is fish and aquatic life community and unrestricted fish consumption. Currently, the Fox River is not supporting its attainable uses. A TMDL was developed for the River Lower Fox Basin, which includes the Fox River.

- Mud Creek: Dutchman Creek is a 303(d) impaired water body due to a blend of point and non-point source pollution. Pollutants of concern include sediment and total phosphorus. Impairments include degraded habitat. The attainable use for Mud Creek is a fish and aquatic life community. Currently, Mud Creek is not supporting its attainable use. A TMDL has been developed for the Lower Fox River Basin, which includes Mud Creek.

- Rat River: Rat River is a 303(d) impaired water body due to non-point source pollution. Pollutants of concern include total phosphorus. Impairments include low dissolved oxygen. The attainable use for the Rat River is warm water forage fishery. Currently, the Rat River is not supporting its attainable use. A TMDL is currently being developed for the Upper Fox and Wolf River Basins, which will include the Rat River.

Endangered and threatened resources are wild animal and plant species which are either in danger of extinction throughout all or a significant portion of its range or likely to become endangered in the foreseeable future. Typically, the location of an endangered or threatened species is tracked in Wisconsin's Natural Heritage Inventory and is only identified by township. Sensitive species that are particularly vulnerable to collection or disturbance are only identified by county. The Natural Heritage Inventory maps and species lists are routinely updated by WDNR. To prevent collection or disturbance of sensitive species, endangered and threatened resources are not depicted in Figure 4.

E. Cultural Resources

Cultural resources are places of cultural significance. Some cultural resources are protected with a special regulatory designation such as archeological sites and historical sites. The State of Wisconsin maintains maps and a computer database on the location and nature of archaeological sites. Special permission is required to view these maps and databases. The location of archaeological sites is exempt from public disclosure to prevent collection or disturbance of valuable artifacts. Archeological sites may be located within the study area, but cannot be disclosed by law. The Wisconsin Historical Society's State Register indicates there are two historical sites located within the study area. Historical sites located on the National or State Register are depicted on Figure 4 and summarized in Table 2-2.

Table 2-2: Historical Sites – State Register

I.D.	Historic Name	Location	Reference No.
1	Greenville State Bank	252 Municipal Drive	82000691
2	Joseph Kronser Hotel & Saloon	246 Municipal Drive	88001153

The Wisconsin Historical Society also maintains the Architecture and History Inventory (AHI), which is a list of historic buildings, structures and objects throughout Wisconsin that have no special status, rights or benefits. Most properties became part of the AHI as a result of architectural, archaeological or historical surveys. In many cases, the information may be outdated and some properties may be altered or no longer exist. The inventory is continually changing and should be accessed on the Wisconsin Historical Society's website to find the most updated version. Historical sites currently on the AHI within the Town's study area are depicted on Figure 4.

F. **Remediation & Waste Disposal Sites**

Remediation sites are places where cleanup of environmental soil or groundwater contamination is ongoing or completed. Remediation sites may involve hazardous wastes, underground storage tanks, or other contaminant sources. Waste disposal sites are places where solid wastes are stored. Understanding the location of remediation and waste disposal sites is an important consideration when evaluating potential stormwater retrofit locations. The approximate location of WDNR identified remediation sites (open and closed sites) and waste disposal sites (not archived) are depicted in Figure 4.

G. **Soils**

Soil information is from the Natural Resource Conservation Service / U.S. Department of Agriculture web soil survey for Outagamie County. The U.S. Department of Agriculture has classified soil types into four hydrologic soil groups (HSG). The four hydrologic soil groups (i.e. A, B, C and D) are classified according to the minimum infiltration rate of the soil column. Group A soils have the highest permeability rate or lowest runoff potential, whereas Group D soils have the lowest permeability rate or highest runoff potential. Hydrologic soil groups are depicted in Figure 5.

H. **MS4 System**

The MS4 consists of publicly owned or operated conveyance systems including streets, curbs, gutters, catch basins, storm sewers, swales, channels, culverts, and occasionally bridges. The MS4 system is depicted in Figure 6.

The MS4 system contains several structural best management practices (BMPs). The structural BMPs are depicted in Figure 7 and summarized in Table 2-3. Structural BMPs include wet detention ponds, dry detention ponds, biofilters, proprietary devices, and other devices. Some of these structural BMPs are publicly owned and others are privately owned. As part of their stormwater program, the Town typically obtains maintenance authority for privately owned BMPs through maintenance agreements. Table 2-3 identifies the private BMPs the Town has maintenance authority over. For purposes of this plan, only Town owned BMPs or private BMPs with maintenance agreements in place were considered for the water quality analysis.

Table 2-3: Structural BMPs

BMP ID	BMP Name	Type of Structural BMP	BMP Owner	Maintenance Agreement
B1p1	Coldwell Banker Pond	Wet Pond	Private	TBD
B1s	Country Meadows Pond	Wet Pond	Town	Yes
B2a2	Faith United Methodist Church Pond	Dry Pond	Private	TBD
B2a2	Living Tree Estates Pond	Wet Pond	Private	TBD
B3c2	Municipal Garage Pond	Dry Pond	Town	Yes
B3m3	Jennerjohn Park Pond	Wet Pond	Town	Yes
B3o	Waterlefe Estates Pond	Wet Pond	Private	Yes
B4a1	Glen Valley Pond	Wet Pond	Town	Yes
B4d	Country View Estates Pond	Dry Pond	Town	Yes
B4m1	HSD North Greenville Elementary Pond	Wet Pond	Private	TBD
B4m2	HSD Transportation Facility Pond	Wet Pond	Private	TBD
B5c3	Amber Meadows Pond	Wet Pond	Town	Yes
B6f	The Ponds at Maple Springs NE Pond	Wet Pond	Private	Yes
B6g	The Ponds at Maple Springs NW Pond	Wet Pond	Private	Yes
B6q	Beacon Hills SW Pond	Wet Pond	Private	Yes
B6r	Beacon Hills NW Pond	Wet Pond	Private	Yes
B6s	Amber Fields Pond	Wet Pond	Town	Yes
B7f	Jeffs Water Repair Pond	Wet Pond	Private	TBD
B9f	Beacon Hills NE Pond	Wet Pond	Private	Yes
B6e1	Moon Shadow Drive Pond	Wet Pond	Town	Yes
B6c1	Wolf River Community Bank Pond	Wet Pond	Private	TBD
B6c2	Bulk Priced Food Shoppe North Biofilter	Biofilter	Private	TBD
B6c3	Bulk Priced Food Shoppe East Biofilter	Biofilter	Private	TBD
B8u	Greenville Crossing Pond	Wet Pond	Private	Yes
B8q1	Route 15 East Biofilter	Biofilter	Private	TBD
B8q2	Route 15 South Biofilter	Biofilter	Private	TBD
B2e	Brook Farms East Pond	Wet Pond	Private	Yes
B2g3	Brook Farms West Pond	Wet Pond	Private	Yes
B2z1	Green Gates Pond	Wet Pond	Private	TBD
B2o1	Spring Lake Condominiums North Pond	Wet Pond	Private	TBD
B2o2	Spring Lake Condominiums South Pond	Wet Pond	Private	TBD
B2n	Green Ridge Pond	Wet Pond	Private	Yes
B6b1	Tuckaway Storage Pond	Wet Pond	Private	TBD

Table 2-3: Structural BMPs

BMP ID	BMP Name	Type of Structural BMP	BMP Owner	Maintenance Agreement
B8l1	Levi Drive North Biofilter	Biofilter	Town	Yes
B8l2	Levi Drive South Biofilter	Biofilter	Town	Yes
M9d1	Climastore Pond	Wet Pond	Private	TBD
B8d	Pebble Ridge Park Pond	Wet Pond	Town	Yes
M8l1	Valley Bakers Pond	Wet Pond	Private	TBD
M8n1	Valley Bakers Biofilter	Biofilter	Private	TBD
R3a2	Moonlight Meadows West Pond	Wet Pond	Private	TBD
R3a3	Moonlight Meadows South Pond	Wet Pond	Private	TBD
B2p1	Moonlight Meadows East Pond	Wet Pond	Private	TBD
B2q1	Fox West YMCA North Biofilters	Biofilter		TBD
B2q2	Fox West YMCA Pond	Dry Pond	Private	TBD
R4b2	Fox West YMCA South Biofilter	Biofilter	Private	TBD
M8m1	Great Lakes Mechanical Biofilter	Biofilter	Private	TBD
M8m2	Great Lakes Mechanical Pond	Dry Pond	Private	TBD
R4d	Greenville Lions Park Pond	Wet Pond	Town	Yes
R3a4	Immanuel Lutheran Church Biofilter	Biofilter	Private	TBD
B2l1	Immanuel Lutheran Church Pond	Wet Pond	Private	TBD
M8g2	Jansport Biofilter	Biofilter	Private	TBD
M7d	Miller Electric Pond	Dry Pond	Private	TBD
B3b2	Municipal Drive Chiropractic	Dry Pond	Private	TBD
M7c1	Plexus North Pond	Wet Pond	Private	TBD
M7c2	Plexus South Pond	Wet Pond	Private	TBD
M8n6	Print Pro Biofilter	Biofilter	Private	TBD
M8n5	Schwan's Home Service Pond	Wet Pond	Private	TBD
B8b1	Midwest Properties (Cintas?) Pond	Wet Pond	Private	TBD
R4a1	Towering Pines Pond	Wet Pond	Private	TBD
M8i1	RR Donnelley Biofilters	Biofilter	Private	TBD
B8k1	Zebra Technologies West Biofilter	Biofilter	Private	TBD
B8k2	Zebra Technologies East Biofilter	Biofilter	Private	TBD
M7b1	Budget/Avis Rental Pond	Wet Pond	Private	TBD
M5l	Mayflower Storage Pond	Wet Pond	Private	TBD
R4g2	Ventures Unlimited? Pond	Wet Pond	Private	TBD
R3i	Season Fields Pond	Wet Pond	Private	Yes
R3k	The Farms at South Creek North Pond	Wet Pond	Private	Yes
R3f	The Farms at South Creek South Pond	Wet Pond	Private	Yes
B2b1	Christus Church Pond	Wet Pond?	Private	TBD

TBD – To be determined. Town is researching maintenance agreements

The MS4 system is based on available records. The MS4 system contains three different types of surface drainage: curb and gutter, grass swales, and areas not served by a control measure. The types of surface drainage are depicted in Figure 8.

I. WPDES Industrial Permits

As shown in Figure 9 and summarized in Table 2-4, there are 10 industrial operations with coverage under a WPDES Industrial Permit that are currently located within the Town. WPDES Industrial Permits are regulated by the WDNR. Some WPDES Industrial Permits may allow discharges into the MS4 system during dry weather. Understanding the location of the WPDES Industrial Permitted sites is important to effective implementation of the Town's stormwater program.

Table 2-4: WPDES Industrial Permits

I.D.	Facility Name	Facility Address
1	Trico Excavating Steinacker Pit	SE 1/4 S18 T21N R16E
2	Jentz Sand & Gravel Inc Jentz Pit	W8347 School Road
3	Van Handel Properties Jamison Pit	1719 East Edgewood Drive (Not Site Address)
4	Calnin & Goss Inc Kelly Pit	T21N R16E Sec21
5	VF Outdoor Inc	N850 County Hwy CB
6	Miller Electric Mfg Co Greenville	555, N720, N822 Communication Dr
7	Plexus Corp	N700 County Road CB
8	Plexus Corp AWI	N800 County Highway CB
9	Gulfstream Aerospace Corp	W6365 Discovery Drive
10	Appleton International Airport	W6390 Challenger Dr

J. Drinking Water System

The Town obtains drinking water from groundwater aquifers using four municipal wells. The municipal wells are depicted on Figure 9. Two of the wells currently have a wellhead protection plan or ordinance. According to the WDNR, the Greenville system is susceptible to contamination by nitrate, arsenic, nickel and chromium. The system has moderate susceptibility to contamination by volatile organic compounds (VOCs), synthetic organic compounds (SOCs), microbes and barium. The system has low susceptibility to ethylene dibromide (EDB).

K. Land Uses

The location of publicly owned parks, recreational areas, open lands, and municipal facilities are depicted in Figure 9. Understanding the location of publicly owned land is important to effective implementation of the municipal stormwater program. Figure 9 also depicts the airport overlay zoning district and buffers from the airport operations area (AOA). BMPs located within the airport overlay or buffers will typically need to comply with Federal Aviation Administration (FAA) Advisory Circular 150/5200-33B.

Land uses on or before October 1, 2004 are depicted in Figure 10 and summarized in Table 2-5. Table 2-5 summarizes the 2004 land uses located within the study area. For purposes of the NR 151 pollutant analysis, undeveloped sites less than 5 acres are shown to be developed based on adjoining land uses. Undeveloped sites greater than 5 acres are shown as agriculture, woods, grass, or another undeveloped open space, as appropriate.

2015 land uses are depicted in Figure 11 and summarized in Table 2-5 for the study area. For purposes of the TMDL pollutant analysis, the undeveloped in-fill sites are shown as agriculture, grass, woods, wetland or another undeveloped open space, as appropriate.

Future land uses are depicted in Figure 12 and summarized in Table 2-5 for the study area. For purposes of the TMDL pollutant analysis, the future land uses generally match the 2015 land uses, except the appropriate undeveloped sites are converted to a future land use based on adjoining land uses and information from the Town.

Table 2-5: Land Uses

Land Use	2004 Land Use		2015 Land Use		Future Land Use	
	(acres)	(%)	(acres)	(%)	(acres)	(%)
Residential						
High Density	0	0.0%	15	0.1%	17	0.2%
Low Density	1,019	9.5%	1,087	10.2%	1,126	10.5%
Med Density	976	9.1%	1,116	10.5%	2,845	26.7%
Mobile Home	24	0.2%	24	0.2%	24	0.2%
Multi-Family	15	0.1%	15	0.1%	36	0.3%
Suburban	1,445	13.5%	1,481	13.9%	1,683	15.8%
Commercial						
Commercial Strip	70	0.7%	84	0.8%	356	3.3%
Commercial Downtown	0	0.0%	0	0.0%	0	0.0%
Office Park	145	1.4%	164	1.5%	185	1.7%
Shopping Center	0	0.0%	0	0.0%	0	0.0%
Institutional						
Hospital	0	0.0%	5	0.0%	4	0.0%
Misc. Institutional	36	0.3%	43	0.4%	282	2.6%
School	26	0.2%	52	0.5%	63	0.6%
Industrial						
Airport	1,645	15.4%	1,649	15.5%	1,649	15.5%
Light Industrial	403	3.8%	443	4.1%	941	8.8%
Medium Industrial	63	0.6%	68	0.6%	84	0.8%
Open Space						
Cemetery	7	0.1%	7	0.1%	7	0.1%
[1]Park	384	3.6%	416	3.9%	461	4.3%
Quarry	53	0.5%	53	0.5%	56	0.5%
Railroad	40	0.4%	40	0.4%	40	0.4%
[2]Undeveloped	3,994	37.4%	3,585	33.6%	520	4.9%
Highway/Freeway/Rural Rd	330	3.1%	327	3.1%	296	2.8%
Total:	10,674	100.0%	10,674	100.0%	10,674	100.0%

[1]Includes grass and water associated with stormwater ponds/facilities.
[2]Undeveloped land includes agriculture, grass, woods, wetlands, and open water.

III. NR 151 POLLUTANT ANALYSIS

A. Performance Standard

Pursuant to the Municipal Stormwater Discharge (MS4) Permit and NR 151.13, the Town is required to reduce the TSS load by 20% and 40% for urban areas developed before October 1, 2004. The TSS reductions are calculated from a baseline load that does not include any stormwater BMPs, such as street sweeping and wet ponds. The compliance schedules for the required TSS reductions are as follows:

- A 20% TSS reduction is required within 2 years of receiving MS4 Permit coverage. The Town received permit coverage from the WDNR on December 15, 2006. As such, the Town is required to achieve the 20% TSS reduction before December 15, 2008.

- A 40% TSS reduction is required before March 31, 2013. If the 40% reduction cannot be achieved by March 31, 2013, the Town is required to prepare a long-term stormwater management plan that identifies the control measures already implemented, the control measures to be implemented, and a schedule for achieving the 40% TSS reduction. As part the MS4 Permit, the Town is required to track phosphorus, but no NR 151.13 performance standard is provided for phosphorus.

The 2011 Wisconsin Act 32 modified the compliance schedule for the NR 151.13 performance standards. According to Wisconsin Act 32, the WDNR may enforce the Town's compliance date for achieving the required 20% TSS reduction, but the WDNR is currently prohibited from enforcing a specific compliance date for achieving the required 40% TSS reduction. Also, the 2011 Wisconsin Act 32 requires that the pollutant reduction benefits associated with all structural BMPs implemented before July 1, 2011 must be maintained.

B. Methodology

The NR 151 pollutant analysis uses the Source Loading and Management Model for Windows (version 10.2.1). WinSLAMM is a stormwater quality model that predicts runoff volumes and non-point source pollution loads for urban land uses. WinSLAMM also calculates the amount of pollutant removal provided by BMPs such as street sweeping, catch basin cleaning, grass swales, grass filter strips, biofiltration, infiltration basins, wet detention ponds, permeable pavement, proprietary devices, and other BMPs. The NR 151 pollutant analysis uses the series of small rainfall events that occurred between March 29, 1968 and November 25, 1972 in Green Bay, Wisconsin. For purposes of MS4 Permit compliance, this 5-year rainfall series was determined by the WDNR to represent an average annual rainfall condition for municipalities located in Northeast Wisconsin.

The NR 151 pollutant analysis uses data files developed by the United States Geological Survey (USGS) and WDNR for the WinSLAMM model. The data files identify typical runoff volumes, pollutant concentrations, pollutant distributions, pollutant deliveries, and pollutant particle size distributions for typical urban stormwater runoff. The WinSLAMM data files obtained from the USGS and used in the NR 151 pollutant analysis are as follows:

- WisReg - Green Bay Five Year Rainfall.ran
- WI_GEO03.ppdx
- WI_SL06 Dec06.rsv
- V10.1 WI_avg01.pscx
- WI_Res and Other Urban Dec06.std
- WI_Com Inst Indust Dec06.std
- Freeway Dec06.std
- Nurp.cpz

The NR 151 pollutant analysis is based on the standard land use files developed by the WDNR for WinSLAMM. The standard land use files identify the amount of roof, parking lot, driveway, sidewalk, street, and lawn source areas which are typical for each standard land use. The standard land use files also identify the amount of connected imperviousness for each source area.

The NR 151 pollutant analysis uses the WinSLAMM batch processor to generate baseline (no-controls) pollutant loads for each standard land use file. Baseline pollutant loads for each drainage and BMP catchment area are calculated using batch processor database files and GIS. A WinSLAMM model is developed for each existing and proposed structural BMP to determine the BMPs pollutant reduction. The pollutant reduction provided by each BMP is then applied to each drainage or BMP catchment area, as appropriate.

C. Analysis Area

The NR 151 pollutant analysis uses the study area depicted in Figure 1 and the 2004 land uses depicted in Figure 10. For purposes of the NR 151 pollutant analysis, the study area contains 10,674 acres. The NR 151 pollutant analysis also uses the developed urban area depicted on the 2010 US Census Bureau Map, including contiguous developed urban areas. Per WDNR guidance, the following areas are either prohibited from inclusion or classified as optional for inclusion in the NR 151 pollutant analysis.

- Agricultural Areas: Lands zoned for agricultural use and operating as such are prohibited from inclusion in the NR 151 pollutant analysis. Of the 10,674 acres within the study area, 2,846 acres are classified as agriculture and consequently, are excluded from the analysis.

- Internally Drained Areas: Internally drained areas with natural infiltration are prohibited from inclusion in the NR 151 pollutant analysis. There is one internally drained area within the study area and it’s the Calnin and Goss Kelly Pit quarry located near the intersection of School Road and Julius Drive. Of the 10,674 acres within the study area, 22 acres were classified as internally drained/quarry and consequently, are excluded from the analysis.

- Waters of the State: Waters of the state are optional for inclusion in the NR 151 pollutant analysis. Lakes, rivers, streams and mapped wetlands are classified as "waters of the state". Of the 10,674 acres within the study area, 522 acres are classified as "waters of the state" and consequently, are excluded from the analysis.

- Undeveloped lands over 5 acres: Undeveloped lands over 5 acres are prohibited from inclusion in the NR 151 pollutant analysis. These areas will be classified as new development in the future and subject to NR 151.12 or 151.24 performance standards when developed. Of the 10,674 acres within the study area, 576 acres are classified as undeveloped lands over 5 acres and consequently, are excluded from the analysis.

- State & County Highways: State freeways, state truck highways, and county highways are typically excluded from the NR 151 pollutant analysis. The Wisconsin Department of Transportation (WisDOT) is responsible for pollutant loads from state freeway and state trunk highway right-of-ways and Outagamie County is responsible for pollutant loads from county highway right-of-ways. The only time the Town is responsible for pollutant loads from a state or county highway right-of-way is if the highway is classified as a "connecting highway" by the WisDOT or if the Town has a bridge structure that allows a Town street to cross over the state or county highway. Of the 10,674 acres within the study area, 210 acres are classified as State (WisDOT) MS4 jurisdiction and 85 acres are classified as County MS4 jurisdiction. The combined 295 acres of state and county highway right-of-way are excluded from the analysis.

- Riparian Areas: Riparian areas are optional to include in the NR 151 pollutant analysis. Riparian areas are private properties that do not discharge runoff into the Town's MS4, but rather discharge directly into a river, stream, or lake. Riparian areas that discharge directly into Bear Creek, Fox River, Mud Creek, Rat River or other navigable streams without passing through the Town's MS4 are depicted in Figure 8. Of the 10,674 acres within the study area, 1,223 acres are classified as riparian and consequently, are excluded from the analysis.

- MS4 "A" to "B": Areas that discharge into an adjacent municipality's MS4 (Municipality B) without passing through the Town's MS4 (Municipality A) are optional to include in the NR 151 pollutant analysis. Many of these areas are located along state and county right-of-ways where runoff from private property drains directly into a State or County MS4 and then discharges directly into a river, stream, or lake. Of the 10,674 acres within the study area, 311 acres are classified as MS4 "A" to "B" and consequently, are excluded from the analysis.

- Appleton International Airport: The Appleton International Airport is owned and operated by Outagamie County, another MS4 permitted entity. Outagamie County already improves stormwater quality at the airport through its WPDES MS4 Stormwater and Industrial permits. The airport property (MS4 "A") drains directly into the Towns MS4 or into other MS4's (MS4 "B") and is therefore optional to include in the NR 151 pollutant analysis. Of the 10,674 acres within the study area, 1,645 acres are owned by Outagamie County / Appleton International Airport and consequently, are excluded from the analysis.

- WPDES Industrial Permits: Industrial facilities permitted under NR 216 are optional to include in the NR 151 pollutant analysis. The Town plans to achieve the required TSS and TP reductions for these industrial permitted areas for the following reasons: the Town has legal authority to regulate stormwater runoff; the Town has legal authority to charge a stormwater utility fee; it is difficult to determine which portions of an industrial site are covered by a WPDES Industrial Permit; and the pollutant load is the Town's responsibility if the WPDES Industrial Permit is terminated or certified "No Exposure" in the future. For purposes of the NR 151 pollutant analysis, industrial areas with coverage under a WDPES Industrial Permit are included in the analysis.

Based on the prohibited and optional areas mentioned above, the NR 151 pollutant analysis will apply to the remaining 3,234 acres of developed urban areas that existed on October 1, 2004.

D. Baseline Condition

The NR 151 baseline loads for the 3,234 acres of developed urban area are summarized in Table 3-1. These baseline or "no control" loads exclude the pollutant reduction benefits of existing BMPs. Per NR 151.13, the baseline or "no control" loads are used to determine the required 20% and 40% TSS load reduction.

Table 3-1: NR 151 Pollutant Analysis - Baseline Loadings (WinSLAMM)

Sub-Watershed	Urban Area (acres)	Baseline TSS Load (lbs/yr)	Required Load Reduction				Baseline TP Load (lbs/yr)
			TSS (%)	TSS (lbs/yr)	TSS (%)	TSS (lbs/yr)	
Bear Creek	2,050	434,137	20%	86,827	40%	173,655	1,517
Fox River	284	98,274	20%	19,655	40%	39,310	220
Mud Creek	133	59,937	20%	11,987	40%	23,975	116
Rat River	767	125,943	20%	25,189	40%	50,377	531
Total:	3,234	718,290	20%	143,658	40%	287,316	2,383

As shown in Table 3-1, the baseline TSS and TP loads are 718,290 pounds per year and 2,383 pounds per year, respectively. Based on the total TSS baseline load, the Town is required to achieve a composite 143,658 pound per year TSS reduction in order to achieve compliance with the required 20% TSS reduction.

E. 2004 Best Management Practices

Several BMPs qualified for NR 151 pollutant reduction credit in 2004: street sweeping (high efficiency sweeper, once per twelve weeks, no parking controls), grass swales and thirteen wet detention ponds. The 2004 BMPs are depicted in Figure 13. As shown in Table 3-2, the 2004 BMPs provided a 336,618 pound per year TSS reduction and a 953 pound per year TP reduction. As such, the 2004 BMPs provided a 47% TSS reduction and 40% TP reduction for the developed urban area during 2004.

Table 3-2: NR 151 Pollutant Analysis - 2004 BMPs (WinSLAMM)

Sub-Watershed	Urban Area (acres)	Total Suspended Solids (TSS)			Total Phosphorus (TP)		
		Baseline Load (lbs/yr)	Load Reduction		Baseline Load (lbs/yr)	Load Reduction	
			(lbs/yr)	(%)		(lbs/yr)	(%)
Bear Creek	2,050	434,137	217,717	50%	1,517	614	41%
Fox River	284	98,274	31,772	32%	220	72	33%
Mud Creek	133	59,937	20,035	33%	116	36	31%
Rat River	767	125,943	67,094	53%	531	230	43%
Total:	3,234	718,290	336,618	47%	2,383	953	40%

F. 2008 Best Management Practices

Several BMPs qualified for NR 151 pollutant reduction credit in 2008: street sweeping (high efficiency sweeper, once per twelve weeks, no parking controls), grass swales, twenty-one wet detention ponds and two biofilters. The 2008 BMPs are depicted in Figure 14. As shown in Table 3-3, the 2008 BMPs provided a 337,092 pound per year TSS reduction and a 954 pound per year TP reduction. As such, the 2008 BMPs provided a 47% TSS reduction and 40% TP reduction for the developed urban area during 2008. As such, the Town achieved compliance with the required 20% TSS reduction for the developed urban area in 2008. Although no longer required, the Town was also achieving the 40% TSS reduction for the developed urban area in 2008.

Table 3-3: NR 151 Pollutant Analysis - 2008 BMPs (WinSLAMM)

Sub-Watershed	Urban Area (acres)	Total Suspended Solids (TSS)			Total Phosphorus (TP)		
		Baseline Load (lbs/yr)	Load Reduction		Baseline Load (lbs/yr)	Load Reduction	
			(lbs/yr)	(%)		(lbs/yr)	(%)
Bear Creek	2,050	434,137	218,120	50%	1,517	616	41%
Fox River	284	98,274	31,772	32%	220	72	33%
Mud Creek	133	59,937	20,035	33%	116	36	31%
Rat River	767	125,943	67,165	53%	531	230	43%
Total:	3,234	718,290	337,092	47%	2,383	954	40%

G. 2015 Best Management Practices

Several BMPs qualified for NR 151 pollutant reduction credit in 2015: street sweeping (high efficiency sweeper, once per twelve weeks, no parking controls), grass swales and twenty-five wet detention ponds and two biofilters. The 2015 BMPs are depicted in Figure 15. As shown in Table 3-4, the 2015 BMPs provided a 378,319 pound per year TSS reduction and a 1,068 pound per year TP reduction. As such, the 2015 BMPs provided a 53% TSS reduction and 45% TP reduction for the developed urban area during 2015. As such, the Town continues to achieve compliance with the required 20% TSS reduction for the developed urban area.

Table 3-4: NR 151 Pollutant Analysis - 2015 BMPs (WinSLAMM)

Sub-Watershed	Urban Area (acres)	Total Suspended Solids (TSS)			Total Phosphorus (TP)		
		Baseline Load (lbs/yr)	Load Reduction		Baseline Load (lbs/yr)	Load Reduction	
			(lbs/yr)	(%)		(lbs/yr)	(%)
Bear Creek	2,050	434,137	256,288	59%	1,517	719	47%
Fox River	284	98,274	31,772	32%	220	72	33%
Mud Creek	133	59,937	20,035	33%	116	36	31%
Rat River	767	125,943	70,225	56%	531	241	45%
Total:	3,234	718,290	378,319	53%	2,383	1,068	45%

For reference, more detailed water quality results for the NR 151 analysis can be found in Appendix B.

IV. TMDL POLLUTANT ANALYSIS

A Total Maximum Daily Load (TMDL) is the maximum amount of a pollutant that a water body can receive and still meet water quality standards. The goal of a TMDL is to improve water quality so the impaired water body meets it's loading capacity and is no longer considered impaired. A TMDL for TP and TSS pollutants was developed by the WDNR for the Lower Fox River Basin. The TMDL for the Lower Fox River Basin was approved by the US Environmental Protection Agency (EPA) on May 18, 2012.

The Lower Fox River Basin has 14 streams and rivers that are impaired by phosphorus and/or sediment pollutants. Excessive amounts of these pollutants cause poor water clarity, increase algae, impact swimming, and degrade aesthetics. The top photograph depicts Fox River algae during 2008 (WDNR photo) and the bottom photograph depicts sediment discharging into Green Bay during 2011 (Steve Seilo photo).

The Lower Fox River Basin TMDL was calibrated and developed using stream, river and lake monitoring data collected by the United States Geological Survey, WDNR, University of Wisconsin-Green Bay, UW-Milwaukee, and NEW Water (Green Bay MSD).

As shown in Figure 6, the Town's storm sewer system discharges to two impaired Lower Fox River Basin waterways: the Fox River and Mud Creek. These two impaired waterways are specifically included in the Lower Fox River Basin TMDL. The portion of the Town's study area discharging into Bear Creek or the Rat River is not part of the Lower Fox River Basin TMDL. Bear Creek and the Rat River sub-watersheds are part of the Upper Fox-Wolf Basin. A TMDL for the Upper Fox-Wolf Basin is currently being developed and is anticipated to be completed during 2017. As such, this Town-Wide Stormwater Quality Management Plan will need to be updated following completion of the Upper Fox-Wolf Basin TMDL for the Bear Creek and Rat River sub-watersheds. Although no TMDL pollutant load reductions are currently identified for the Bear Creek and Rat River sub-watersheds, baseline pollutant loadings and current BMP reductions are included in this TMDL analysis.

A. Performance Standard

The TMDL Report developed for the Lower Fox River Basin states that a Municipal Stormwater Discharge Permit (MS4) Permit cannot be reissued without a waste load allocation that is consistent with an EPA approved TMDL. WPDES General Permit WI-

S050075-2 became effective May 1, 2014 and now includes language for MS4's that discharge to receiving waters with an approved TMDL.

The TMDL Report developed for the Lower Fox River Basin identifies waste load allocations for the Town's MS4 area. The TMDL requires specific TP and TSS reductions that vary by sub-watershed. The TP and TSS waste load allocations and reductions identified in the TMDL Report for the Town's municipal boundary are summarized in Tables 4-1 and 4-2, respectively.

Table 4-1: Phosphorus Allocations from TMDL Report

TMDL Sub-Watershed	Town Urban Area (acres)	Total Phosphorus (TP)			
		Baseline (lbs/yr)	Allocated (lbs/yr)	Reduction (lbs/yr)	Reduction (%)
Fox River	1,168	738	516.6	221.4	30.0%
Mud Creek	489	288	175.7	112.3	39.0%
Total:	1,657	1,026	692.3	333.7	32.5%

Table 4-2: Sediment Allocations from TMDL Report

TMDL Sub-Watershed	Town Urban Area (acres)	Total Suspended Solids (TSS)			
		Baseline (lbs/yr)	Allocated (lbs/yr)	Reduction (lbs/yr)	Reduction (%)
Fox River	1,168	373,661	130,029	243,632	65.2%
Mud Creek	489	127,695	91,315	36,380	28.5%
Total:	1,657	501,356	221,344	280,012	55.9%

As shown in Tables 4-1 and 4-2, the TMDL Report expresses the MS4 allocation as both a load reduction (pounds per year) and a percent reduction. Based on WDNR guidance, the TMDL's percent reduction should be used for MS4 permit compliance, rather than the TMDL's load reduction (pounds per year). However, the TMDL's percent reduction requires adjustment to a "no controls" condition before using for MS4 permit compliance. WDNR guidance describes the TMDL adjustment methodology in greater detail. Table 4-3 summarizes the adjusted TP and TSS percent reductions for the Town. The adjusted TMDL percent reductions in Table 4-3 are based on the "no-controls" condition and are used for evaluating alternatives for MS4 permit compliance.

Table 4-3: Adjusted TMDL Percent Reductions

TMDL Sub-Watershed	Adjusted TP Reduction from No-Controls	Adjusted TSS Reduction from No-Controls
Bear Creek	TBD	TBD
Fox River	40.5%	72.2%
Mud Creek	48.2%	42.8%
Rat River	TBD	TBD

B. Methodology

The TMDL pollutant analysis uses the Source Loading and Management Model for Windows (WinSLAMM version 10.2.1). WinSLAMM is a stormwater quality model that predicts runoff volumes and non-point source pollution loads for urban land uses. WinSLAMM also calculates the amount of pollutant removal provided by BMPs such as street sweeping, catch basin cleaning, grass swales, grass filter strips, biofiltration, infiltration basins, wet ponds, proprietary devices, and other BMPs.

The TMDL pollutant analysis uses the series of small rainfall events that occurred between March 29, 1968 and November 25, 1972 in Green Bay, Wisconsin. For purposes of MS4 Permit compliance, this 5-year rainfall series was determined by the WDNR to represent an average annual rainfall condition for municipalities located in Northeast Wisconsin.

The TMDL pollutant analysis uses data files developed by the United States Geological Survey (USGS) and WDNR for the WinSLAMM model. The data files identify typical runoff volumes, pollutant concentrations, pollutant distributions, pollutant deliveries, and pollutant particle size distributions for typical urban stormwater runoff. The WinSLAMM data files obtained from the USGS and used in the TMDL pollutant analysis are as follows:

- WisReg - Green Bay Five Year Rainfall.ran
- WI_GEO03.ppdx
- WI_SL06 Dec06.rsv
- V10.1 WI_avg01.pscx
- WI_Res and Other Urban Dec06.std
- WI_Com Inst Indust Dec06.std
- Freeway Dec06.std
- Nurp.cpz

The TMDL pollutant analysis is based on the standard land use files developed by the WDNR for WinSLAMM. The standard land use files identify the amount of roof, parking lot, driveway, sidewalk, street, and lawn source areas which are typical for each standard land use. The standard land use files also identify the amount of connected imperviousness for each source area.

The TMDL pollutant analysis uses the WinSLAMM batch processor to generate baseline (no-controls) pollutant loads for each standard land use file. Baseline pollutant loads for each drainage and BMP catchment area are calculated using batch processor database files and GIS. A WinSLAMM model is developed for each existing and proposed structural BMP to determine the BMPs pollutant reduction. The pollutant reduction provided by each BMP is then applied to each drainage or BMP catchment area, as appropriate.

C. Analysis Area

The TMDL pollutant analysis uses the study area depicted in Figure 1, the sub-watersheds depicted in Figure 3, and the 2015 land uses depicted in Figure 11. For purposes of the TMDL pollutant analysis, the study area contains 10,674 acres. The TMDL pollutant analysis also uses the developed urban area depicted on the 2010 US Census Bureau Map, including contiguous developed urban areas. Per WDNR guidance, the following areas are either prohibited from inclusion or classified as optional for inclusion in the TMDL pollutant analysis.

- Agricultural Areas: Lands zoned for agricultural use and operating as such are optional to include in the TMDL pollutant analysis. Of the 10,674 acres within the study area, 2,494 acres are classified as agriculture and consequently, are excluded from the analysis.

- Internally Drained Areas: Internally drained areas with natural infiltration are prohibited from inclusion in the TMDL pollutant analysis. There is one internally drained area within the study area and it's the Calnin and Goss Kelly Pit quarry located near the intersection of School Road and Julius Drive. Of the 10,674 acres within the study area, 22 acres were classified as internally drained/quarry and consequently, are excluded from the analysis.

- Waters of the State: Waters of the state are optional for inclusion in the TMDL pollutant analysis. Lakes, rivers, streams and mapped wetlands are classified as "waters of the state". Of the 10,674 acres within the study area, 516 acres are classified as "waters of the state" and consequently, are excluded from the analysis.

- State & County Highways: State freeways, state truck highways, and county highways are typically excluded from the TMDL pollutant analysis. The Wisconsin Department of Transportation (WisDOT) is responsible for pollutant loads from state freeway and state trunk highway right-of-ways and Outagamie County is responsible for pollutant loads from county highway right-of-ways. The only time the Town is responsible for pollutant loads from a state or county highway right-of-way is if the highway is classified as a "connecting highway" by the WisDOT or if the Town has a bridge structure that allows a Town street to cross over the state or county highway. Of the 10,674 acres within the study area, 210 acres are State (WisDOT) MS4 jurisdiction and 90 acres are County MS4 jurisdiction. The combined 300 acres of state and county highway right-of-way are excluded from the analysis.

- Riparian Areas: Riparian areas are optional to include in the TMDL pollutant analysis. Riparian areas are private properties that do not discharge runoff into the Town's MS4, but rather discharge directly into a river, stream, or lake. Riparian areas that discharge directly into Bear Creek, Fox River, Mud Creek, Rat River or other navigable streams without passing through the Town's MS4 are depicted in Figure 8. Of the 10,674 acres within the study area, 1,680 acres are classified as riparian and consequently, are excluded from the analysis.

- MS4 "A" to "B": Areas that discharge into an adjacent municipality's MS4 (Municipality B) without passing through the Town's MS4 (Municipality A) are optional to include in the TMDL pollutant analysis. Many of these areas are located along state and county right-of-ways where runoff from private property drains directly into a State or County MS4 and then discharges directly into a river, stream, or lake. Of the 10,674 acres within the study area, 311 acres are classified as MS4 "A" to "B" and consequently, are excluded from the analysis.

- Appleton International Airport: The Appleton International Airport is owned and operated by Outagamie County, another MS4 permitted entity. Outagamie County already improves stormwater quality at the airport through its WPDES MS4 Stormwater and Industrial permits. The airport property (MS4 "A") drains directly into the Towns MS4 or into other MS4's (MS4 "B") and is therefore optional to include in the TMDL pollutant analysis. Of the 10,674 acres within the study area, 1,649 acres are owned by Outagamie County / Appleton International Airport and consequently, are excluded from the analysis.

- WPDES Industrial Permits: Industrial facilities permitted under NR 216 are optional to include in the TMDL pollutant analysis. The Town plans to achieve the required TSS and TP reductions for these industrial permitted areas for the following reasons: the Town has legal authority to regulate stormwater runoff; the Town has legal authority to charge a stormwater utility fee; it is difficult to determine which portions of an industrial site are covered by a WPDES Industrial Permit; and the pollutant load is the Town's responsibility if the WPDES Industrial Permit is terminated or certified "No Exposure" in the future. For purposes of the TMDL pollutant analysis, industrial areas with coverage under a WDPES Industrial Permit are included in the analysis.

Based on the prohibited and optional areas mentioned above, the TMDL pollutant analysis will apply to the remaining 3,701 acres of developed urban areas that existed in 2015.

D. Baseline Condition

The TMDL baseline loads for the 3,701 acres of developed urban area are summarized in Table 4-4. These baseline or "no control" loads exclude the pollutant reduction benefits of existing BMPs. Per WDNR guidance, the "no control" loads are used in conjunction with the adjusted TP and TSS percent reductions to determine the required load reductions.

Table 4-4: TMDL Pollutant Analysis – Baseline Condition (WinSLAMM)

Sub-Watershed	Urban Area (acres)	Total Phosphorus (TP)			Total Suspended Solids (TSS)		
		Baseline Load (lbs/yr)	Required TMDL Load Reduction		Baseline Load (lbs/yr)	Required TMDL Load Reduction	
			(%)	(lbs/yr)		(%)	(lbs/yr)
Bear Creek	2,335	1,717	TBD	TBD	492,919	TBD	TBD
Fox River	321	239	40.5%	96.9	105,681	72.2%	76,260
Mud Creek	149	124	48.2%	59.8	63,537	42.8%	27,194
Rat River	896	595	TBD	TBD	139,667	TBD	TBD

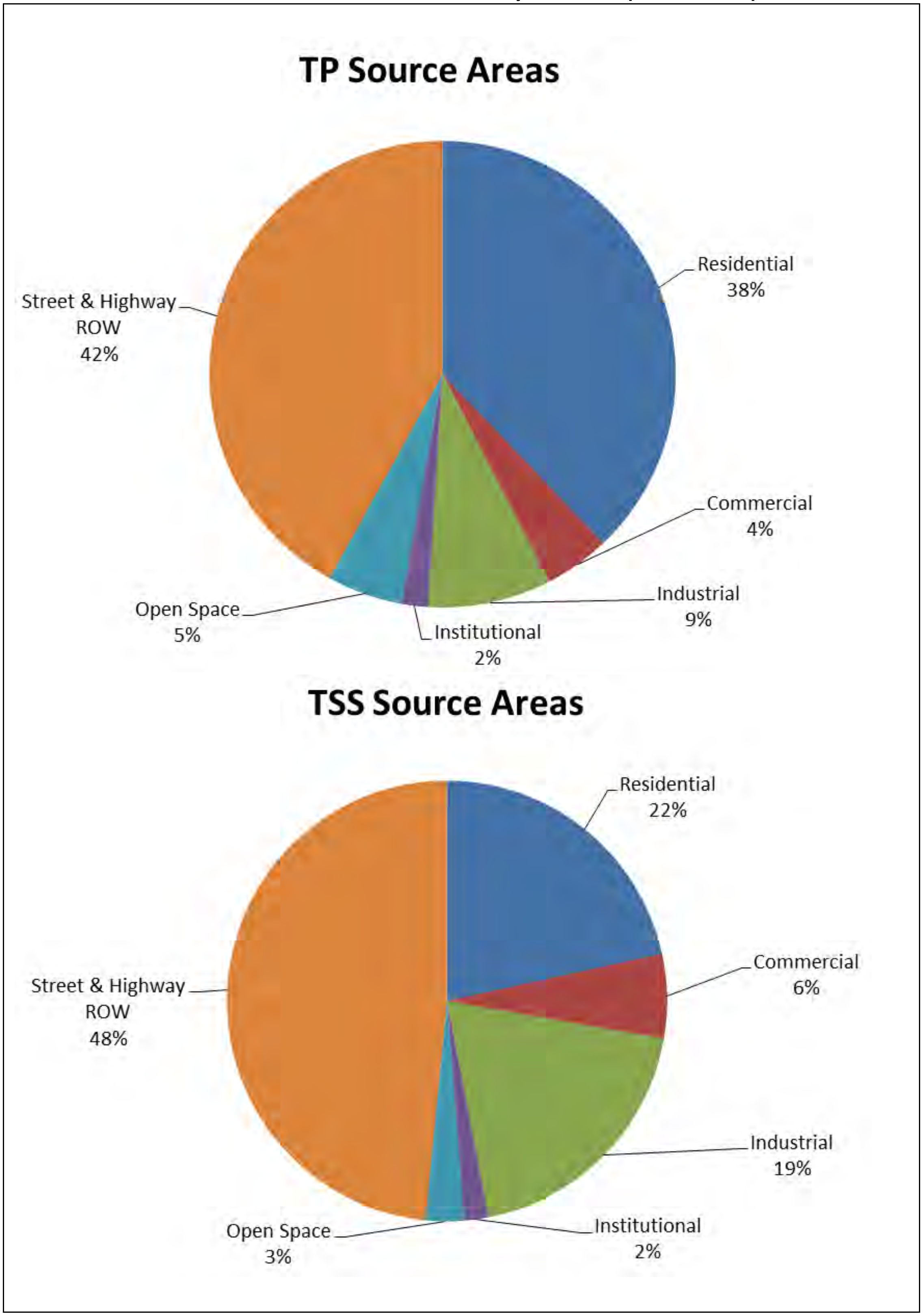
The TMDL baseline loads from WinSLAMM are also summarized by land use in Table 4-4 and Exhibit 4-1. These baseline or "no control" loads exclude the pollutant reduction benefits of existing BMPs. As shown in Table 4-5 and Exhibit 4-1, residential land use comprises the majority of land area, but street and highway land use generates a larger portion of the pollutant loads.

Table 4-5: TMDL Baseline Loads by Land Use (WinSLAMM)

Land Use	Area (acres)	Area (%)	TSS (lbs/yr)	TSS (%)	TP (lbs/yr)	TP (%)
Residential	2,115	57%	172,922	22%	1,014	38%
Commercial	157	4%	49,510	6%	121	5%
Industrial	362	10%	154,173	19%	229	9%
Institutional	59	2%	14,335	2%	49	2%
Open Space	368	10%	22,575	3%	140	5%
Street & Highway ROW	640	17%	388,288	48%	1,122	42%
Totals	3,701		801,804		2,675	

Appendix A contains a list of TMDL baseline pollutant yields (pounds per acre per year) and baseline loads (pounds per year) from WinSLAMM for TP and TSS. The baseline pollutant yields and loads are ranked by both drainage area and BMP catchment area from highest to lowest within the Bear Creek, Fox River, Mud Creek and Rat River Sub-Watersheds. Figures in Appendix A depict the TMDL baseline pollutant yields and loads by drainage area and BMP catchment area.

Exhibit 4-1: TMDL Baseline Loads by Land Use (WinSLAMM)



E. 2015 Best Management Practices

Several BMPs qualified for TMDL pollutant reduction credit in 2015: street sweeping (high efficiency sweeper, once per twelve weeks, no parking controls), grass swales, twenty-five wet detention ponds, and two biofilters. The 2015 BMPs are depicted in Figure 15. Water quality results for each sub-watershed are summarized below.

- Bear Creek: Table 4-6 indicates the 2015 BMPs provided a 46.8% TP and 58.8% TSS reduction within the Bear Creek Sub-Watershed. Once the Upper Fox-Wolf Basin TMDL is approved, the Town can compare Table 4-6 to the required pollutant load reductions for the Bear Creek Sub-Watershed to determine if additional BMPs are required to target phosphorus or sediment pollutants. It's of note that the percent reduction identified in the approved Upper Fox-Wolf Basin TMDL may require an adjustment to a "no controls" condition before using for MS4 permit compliance. WDNR guidance describes the TMDL adjustment methodology in greater detail.

- Fox River: Table 4-6 indicates the 2015 BMPs provided a 31.5% TP reduction within the Fox River Sub-Watershed, which does not satisfy the 40.5% TP reduction required in Table 4-3. Also, Table 4-6 indicates the 2015 BMPs provided a 31.1% TSS reduction within the Fox River Sub-Watershed, which does not satisfy the 72.2% TSS reduction required in Table 4-3. As such, additional BMPs are needed within the Fox River Sub-Watershed to target phosphorus and sediment pollutants.

- Mud Creek: Table 4-6 indicates the 2015 BMPs provided a 30.5% TP reduction within the Mud Creek Sub-Watershed, which does not satisfy the 48.2% TP reduction required in Table 4-3. Also, Table 4-5 indicates the 2015 BMPs provided a 33.4% TSS reduction within the Mud Creek Sub-Watershed, which does not satisfy the 42.8% TSS reduction required in Table 4-3. As such, additional BMPs are needed within the Mud Creek Sub-Watershed to target phosphorus and sediment pollutants.

- Rat River: Table 4-6 indicates the 2015 BMPs provided a 45.1% TP and 56.3% TSS reduction within the Rat River Sub-Watershed. Once the Upper Fox-Wolf Basin TMDL is approved, the Town can compare Table 4-6 to the required pollutant load reductions for the Rat River Sub-Watershed to determine if additional BMPs are required to target phosphorus or sediment pollutants. It's of note that the percent reduction identified in the approved Upper Fox-Wolf Basin TMDL may require an adjustment to a "no controls" condition before using for MS4 permit compliance. WDNR guidance describes the TMDL adjustment methodology in greater detail.

Table 4-6: TMDL Pollutant Analysis - 2015 BMPs (WinSLAMM)

Sub-Watershed	Town MS4 (acres)	Total Phosphorus (TP)			Total Suspended Solids (TSS)		
		Baseline Load (lbs/yr)	Provided Load Reduction		Baseline Load (lbs/yr)	Provided Load Reduction	
			(lbs/yr)	(%)		(lbs/yr)	(%)
Bear Creek	2,335	1,717	804	46.8%	492,919	289,676	58.8%
Fox River	321	239	75	31.5%	105,681	32,892	31.1%
Mud Creek	149	124	38	30.5%	63,537	21,237	33.4%
Rat River	896	595	268	45.1%	139,667	78,629	56.3%

For reference, more detailed water quality results for the TMDL analysis can be found in Appendix B.

V. POLLUTANT REDUCTION ANALYSIS

WinSLAMM (version 10.2.1) was used in conjunction with national literature to analyze the stormwater quality benefits and cost-effectiveness of proposed urban storwater BMPs such as street sweeping, catch basin cleaning, grass swales, grass filter strips, biofiltration, infiltration basins, wet detention ponds, proprietary devices, and mechanical / biological treatment.

The capital costs contained in Tables 5-1 through 5-16 include the estimated present value capital costs for the BMP. The capital costs include an allowance for construction, land acquisition, engineering, legal, and contingency costs. The 20-year costs provided in the tables are the estimated present value costs per pound of TSS removed during a 20-year period. The 20-year costs include an allowance for capital costs and long-term operation and maintenance costs. The 20-year period was determined to be a reasonable life cycle or planning period for evaluating BMP cost-effectiveness. A longer planning period would improve the cost-effectiveness of structural BMPs (e.g. wet detention pond) as compared to non-structural BMPs (e.g. street sweeping). The results of the pollutant reduction analysis are summarized herein. More detailed water quality results are provided in Appendix B.

A. Street Sweeping

Street sweeping is effective at collecting large sediment particles (sand sized particles), trash, debris and leaves. Limited pollutant removal occurs for fine-grained particles such as silt, clay, metals and nutrients. Research indicates that street pollutants tend to accumulate within 3 feet of the street's curb and gutter. Wind turbulence from traffic tends to blow pollutants toward the curb. The curb acts as a barrier and traps pollutants. For streets without curb, wind turbulence generated by a passing vehicle tends to blow pollutants onto the adjacent grass area. As such, for street sweeping to be effective, the street must have curb.

The effectiveness of a municipal street sweeping program depends on the type of street sweeper, number of curb-miles, sweeping frequency, traffic volume, time of year, rainfall, and operator knowledge. In addition, the benefits of sweeping are significantly reduced when vehicles are parked along the curb. Whenever a street sweeper needs to maneuver around a parked car, the pollutants under the car are not removed. As such, the more cars parked along a street, the less pollutant removal.

There are two types of street sweeper: mechanical and high efficiency. Mechanical street sweepers use a broom to remove pollutants from the street surface and high efficiency street sweepers use a vacuum system to remove pollutants. Typically, the high efficiency sweeper is more effective at removing pollutants as compared to the mechanical sweeper. The Town currently contract for the use of a high efficiency street sweeper. The Town currently sweeps once every twelve weeks with no parking controls. Table 5-1 summarizes the average annual TSS and TP costs per pound for various Town-wide sweeping routines. Table 5-1 identifies the percent reduction for the street corridors only.

Table 5-1: Street Sweeping

Sweeper Type, Frequency & Parking Controls for Street Corridor Land Uses	Pollutant Load Reduction		Avg. Annual TSS Cost ($/lb)
	TSS (%)	TP (%)	
H.E. Sweeper (Once every 12 weeks, with parking ordinance)	15%	11%	$0.8
H.E. Sweeper (Once every 8 weeks, with parking ordinance)	16%	12%	$1.1
H.E. Sweeper (Once every 4 weeks, with parking ordinance)	21%	16%	$1.7
H.E. Sweeper (Once every 12 weeks, no parking ordinance)*	7%	5%	$1.7
H.E. Sweeper (Once every 2 weeks, with parking ordinance)	30%	23%	$2.3
H.E. Sweeper (Once every 8 weeks, no parking ordinance)	7%	6%	$2.4
H.E. Sweeper (Once every week, with parking ordinance)	40%	31%	$3.5
H.E. Sweeper (Once every 4 weeks, no parking ordinance)	9%	7%	$3.9
H.E. Sweeper (Once every 2 weeks, no parking ordinance)	13%	10%	$5.3
H.E. Sweeper (Twice every week, with parking ordinance)	46%	35%	$6.1
H.E. Sweeper (Once every week, no parking ordinance)	20%	15%	$7.2

*Towns current sweeper type, frequency & parking controls

As shown in Table 5-1, street sweeping every 12 weeks with a high efficiency street sweeper and adoption of a parking control ordinance is the most cost effective street sweeping alternative for the Town. The Town currently sweeps every 12 weeks with a high efficiency street sweeper but has not adopted a parking control ordinance. It's of note that most of the Town's curb and gutter streets are within pond watersheds where the pollutant reduction is quantified by the performance of the pond, not the sweeping routine. Although adopting a parking control ordinance would provide the Town with additional pollutant load reduction, the total net gain to the Town is minimal. As such, the Town's current sweeping routine (H.E sweeper, once every 12 weeks, no parking controls) was used for the TMDL alternatives analysis. The Town may elect to revise their street sweeping routine and/or adopt a parking control ordinance in the future to provide additional water quality benefits or for other reasons such as improving aesthetics, reducing storm inlet clogging, etc.

B. Catch Basin Cleaning

Catch basin cleaning is effective at collecting large sediment particles (sand sized particles), trash, debris and leaves. Limited pollutant removal occurs for fine-grained particles such as silt, clay, metals and nutrients. Catch basin sumps are effective for parking lots and streets that serve a small drainage area (less than 1 acre). Ideally, a catch basin sump has a minimum 3 foot depth to prevent scouring of previously settled pollutants during a rainfall.

The Town currently does not have any known catch basin sumps within their MS4 system. Table 5-2 summarizes the average annual TSS and TP costs per pound reduced for street catch basin cleaning, including the costs to add catch basin sumps as part of a street retrofit or reconstruction project for various land use corridors.

Table 5-2: Street Catch Basin Cleaning

Street Corridor Land Use	Pollutant Load Reduction		Avg. Annual TSS Cost ($/lb)		
	TSS (%)	TP (%)	Cleaning	Retrofit & Cleaning	Reconstruct & Cleaning
Commercial Corridors	16%	14%	$0.3	$2.0	$1.6
Industrial Corridors	16%	9%	$0.2	$1.2	$1.0
Institutional Corridors	18%	16%	$0.2	$1.5	$1.3
Residential Corridors	13%	11%	$0.5	$2.2	$1.8
Open Space Corridors	9%	7%	$0.3	$1.1	$0.9

Table 5-3 summarizes the average annual TSS and TP costs per pound reduced for parking lot catch basin cleaning, including the costs to add catch basin sumps as part of a parking lot retrofit or reconstruction project for various land use corridors.

Table 5-3: Parking Lot Catch Basin Cleaning

Street Corridor Land Use	Pollutant Load Reduction		Avg. Annual TSS Cost ($/lb)		
	TSS (%)	TP (%)	Cleaning	Retrofit & Cleaning	Reconstruct & Cleaning
Commercial Corridors	15%	13%	$0.5	$3.8	$3.2
Industrial Corridors	14%	10%	$0.3	$2.1	$1.7
Institutional Corridors	17%	14%	$0.5	$4.1	$3.4
Residential Corridors	14%	11%	$1.4	$5.7	$4.9
Open Space Corridors	12%	8%	$0.8	$2.9	$2.5

Based on WDNR Guidance, the Town cannot obtain water quality credit for both catch basin cleaning and street sweeping. In the Town, street sweeping is a priority since sweeping helps maintain aesthetics, reduces public complaints, and reduces catch basin grate clogging. For these reasons, the Town prefers street sweeping as compared to catch basin cleaning.

C. Grass Swales

Grass swales remove pollutants from concentrated stormwater by filtration through the grass and infiltration into the soil. The filtering capacity depends on the flow depth in the swale as compared to the grass height. Typically, when the flow depth is above the grass, filtering is minimal and scouring of previously settled pollutants is a concern. The water quality benefits of a grass swale are largely determined by the infiltrating capacity of underlying soils and depth to groundwater. For instance, a grass swale located in sandy soil has a much higher pollutant removal as compared to a grass swale located in clay soil. Other factors influencing grass swale performance include longitudinal swale slope, swale cross section, and flow volume. WDNR Technical Standard 1005 – Vegetated Infiltration Swale discusses design criteria for grass swales.

Grass swales are typically located along streets. As shown in Figure 8, most streets in the Town are drained via grass swales, rather than curb and gutter. As shown in Figure 5, soils in the Town are predominately clay (hydrologic soil group C and D). As such, the infiltrating capacity of the underlying soils is limited by the clay soils. Figures B4a-B4m within Appendix B depict the Town's existing grass swales and associated catchment areas. Detailed water quality results and costs for the Town's existing grass swales can also be found in Appendix B. Table 5-4 summarizes the cost and water quality benefits of the Town constructing grass swales along an urban street as a street retrofit or reconstruction project.

Table 5-4: Grass Swales

BMP	Pollutant Load Reduction		Avg. Annual TSS Cost ($/lb)			
			Retrofit		Reconstruct	
	TSS (%)	TP (%)	Sand	Clay	Sand	Clay
Grass Swales	14%	11%	$8,951	$48,716	$3,517	$18,716

The percent reductions provided in Table 5-4 are for clay soils, but the cost per pound provides a range depending on soil type.

D. <u>Grass Filter Strips</u>

Grass filter strips remove pollutants from stormwater by filtration through the grass and infiltration into the soil. The filtering capacity of a grass filter strip depends on its longitudinal slope, length and grass density. The water quality benefits of a grass filter strip are largely determined by the infiltrating capacity of underlying soils. A grass filter strip located in sandy soil has a higher pollutant removal as compared to a grass filter strip located in clay soil.

Grass filter strips are effective for parking lots that serve small drainage areas (less than 1 acre). Typically, grass filter strips need to be a minimum of 20 feet long, but at least as long as the contributing impervious surface length. A 64 foot wide parking lot would typically require a 64 foot long grass filter strip. As such, grass filter strips require a significant amount of land area as compared to other BMPs.

In order for a grass filter strip to be effective, the stormwater flowing into the filter strip cannot be concentrated within a swale, ditch, channel, gutter, or other similar conveyance system. Rather, the stormwater must be flowing across the surface of a parking lot, lawn or other ground surface in a very thin sheet of dispersed water.

As shown in Figure 8, the Town does not currently have any grass filter strips. As shown in Figure 5, soils in the Town are predominately clay (hydrologic soil group C and D), but there are limited areas of sand and silt soils (hydrologic soil group A and B). Due to the land requirements and predominately clay soils in the Town, the construction and land costs to retrofit a grass filter strip are high as compared to the water quality benefit provided. Table 5-5 summarizes the cost and water quality benefits of a grass filter strip retrofit of a parking lot.

Table 5-5: Grass Filter Strips

BMP	Pollutant Load Reduction TSS (%)	Pollutant Load Reduction TP (%)	Avg. Annual TSS Cost ($/lb)
Grass Filter Strips – Retrofit Parking Lot (Clay Soil)	95%	91%	$4.0

E. Biofiltration Devices

Biofiltration devices remove pollutants from stormwater by filtration through an engineered soil mixture. Typically, the engineered soil is a minimum of two feet deep and consists of a sand and compost mixture. A diverse mix of prairie flowers, grasses, shrubs and/or trees are typically planted in a mulch layer located above the engineered soil. During a rainfall, stormwater is temporarily stored above the mulch layer until it can be filtered through the engineered soil. A perforated underdrain pipe located beneath the engineered soil collects the filtered water and discharges it into an adjacent storm sewer or other conveyance system. Biofiltration devices are effective for small drainage areas (less than 2 acres). Biofiltration devices are able to obtain 100% TSS and TP credit for stormwater that is infiltrated into the underlying soil and an 80% TSS and 0% TP removal credit for stormwater that is filtered through the engineered soil layer and is discharged via an underdrain. Therefore, in clay soils, a biofiltration device is an effective BMP for TSS reduction, but has limited effectiveness for TP reduction due to low soil infiltration or high ground water. Biofiltration is much more effective for TP reduction in sandy soils due to higher soil infiltration rates (refer to following "bioretention" device discussion). As shown in Figure 5, the Town is comprised of mostly clay soils.

Biofiltration devices are called a "bioretention" device when the native soils located beneath the engineered soil layer are permeable and the majority of stormwater infiltrates into the native soils. In sandy soils, it may be feasible to eliminate the perforated underdrain pipe to further increase infiltration. Bioretention devices are used to recharge groundwater and improve stormwater quality, whereas biofiltration devices are primarily used to improve stormwater quality. WDNR Technical Standard 1004 – Bioretention for Infiltration discusses design criteria for bioretention and biofiltration.

Biofiltration devices are sometimes called a "bio-swale" if the device contains a longitudinal slope to facilitate flow conveyance. Bio-swales are typically installed within parking lots or along streets and have a linear configuration. Bio-swales can be used to recharge groundwater and/or improve stormwater quality. As such, a bio-swale may or may not include a perforated underdrain pipe.

The costs to incorporate biofiltration into a street retrofit or reconstruction project are summarized in Table 5-6 for sand and clay soils. The percent reductions provided in Table 5-6 are for clay soils, but the cost per pound provides a range depending on soil type.

Table 5-6: Street Biofiltration

Street Corridor Land Use	Pollutant Load Reduction		Avg. Annual TSS Cost ($/lb)			
	TSS (%)	TP (%)	Retrofit		Reconstruct	
			Sand	Clay	Sand	Clay
Commercial Corridors	80%	0%	$2.6	$7.9	$1.5	$5.0
Industrial Corridors	80%	0%	$1.6	$5.0	$0.9	$3.1
Institutional Corridors	80%	0%	$1.7	$5.1	$0.9	$3.2
Residential Corridors	80%	0%	$3.3	$9.4	$1.8	$5.8
Open Space Corridors	80%	0%	$3.2	$8.9	$1.7	$5.5

The costs to incorporate biofiltration into a parking lot retrofit or reconstruction project are summarized in Table 5-7 for sand and clay soils. The percent reductions provided in Table 5-7 are for clay soils, but the cost per pound provides a range depending on soil type.

Table 5-7: Parking Lot Biofiltration

Parking Lot Land Use	Pollutant Load Reduction		Avg. Annual TSS Cost ($/lb)			
	TSS (%)	TP (%)	Retrofit		Reconstruct	
			Sand	Clay	Sand	Clay
Commercial Corridors	80%	0%	$10.8	$38.2	$6.8	$23.8
Industrial Corridors	80%	0%	$5.9	$36.9	$3.6	$22.5
Institutional Corridors	80%	0%	$10.4	$28.2	$6.3	$17.2
Residential Corridors	80%	0%	$12.5	$38.4	$7.6	$23.4
Open Space Corridors	80%	0%	$5.0	$18.4	$3.0	$11.2

Proprietary biofiltration devices are also available to achieve pollutant reductions. The proprietary devices are pre-manufactured structures which are typically placed along a street or within a parking lot island. The structure is filled with engineered soil with an underdrain system for biofiltration. Examples of proprietary biofiltration devices include Filterra®, TreePod™, UrbanGreen™, and many other products. The costs to incorporate proprietary biofiltration into a street or parking lot retrofit or reconstruction project for sand and clay soils are summarized in Table 5-8. The percent reductions provided in Table 5-8 are for clay soils, but the cost per pound provides a range depending on soil type.

Table 5-8: Proprietary Biofiltration

BMP Location	Pollutant Load Reduction TSS (%)	Pollutant Load Reduction TP (%)	Avg. Annual TSS Cost ($/lb) Retrofit Sand	Retrofit Clay	Reconstruct Sand	Reconstruct Clay
Proprietary Biofiltration-Street	80%	0%	$5.6	$18.9	$5.0	$16.8
Proprietary Biofiltration-Parking Lot	80%	0%	$21.1	$76.5	$18.2	$66.4

F. Sand Filters

A sand filter is similar to a biofiltration device except the engineered soil consists of 100% sand meeting one of the gradation options specified in Technical Standard 1004. Per WNDR guidance, a sand filter may obtain 80% TSS and 35% TP reduction for the filtering component of the devices. The WDNR is currently researching development of an engineered soil mixture that would achieve a greater TP removal credit than a sand filter. The costs to incorporate a sand filters into a street or parking lot retrofit or reconstruction project will be primarily the same as the biofiltration costs listed in Tables 5-6 and 5-7. The only difference between sand filters and biofiltration is that sand filters provide some level of TP removal for the filtered component.

G. Rain Gardens

Bioretention devices are sometimes called a “rain garden” if the device does not contain an engineered soil layer. Although pollutant removal is provided, rain gardens are typically installed for groundwater recharge purposes rather than stormwater pollutant removal. Often, runoff from a residential roof, patio, sidewalk or driveway is directed to a rain garden. These residential source areas have a low pollutant load but generate a significant amount of runoff volume. Whenever a source area has a high pollutant load (i.e. street or parking lot), an engineered soil layer is recommended to provide a higher capacity filter media. A high capacity filter media reduces the device’s surface area, ponding duration, and clogging potential. If stormwater is allowed to pond on the surface of a rain garden, bioretention device, or biofiltration device for more than 24 hours, the plants may become diseased or die due to wet conditions or poor system hydrology. The costs to retrofit rain gardens on private residential property are summarized in Table 5-9.

Table 5-9: Rain Gardens

BMP	Pollutant Load Reduction TSS (%)	Pollutant Load Reduction TP (%)	Avg. Annual TSS Cost ($/lb)
Rain Garden – Retrofit Residential Lot	98%	98%	$72

H. Infiltration Basins

An infiltration basin is a water impoundment constructed over a highly permeable soil. The purpose of an infiltration basin is to temporarily store stormwater and allow it to infiltrate through the bottom and sides of the infiltration basin. Pollutants are removed by the filtering action of the underlying soil. The primary functions of an infiltration basin are to provide groundwater recharge, reduce runoff volumes, and reduce peak discharge rates. The secondary function of an infiltration basin is water quality. WDNR Technical Standard 1003 – Infiltration Basin discusses design criteria for infiltration basins.

Infiltration basins require pretreatment to prevent clogging and failure. WDNR Technical Standard 1003 - Infiltration Basin requires a pretreatment system to reduce the TSS load entering an infiltration basin by 60% for a residential land use and 80% for a commercial, industrial, or institutional land use. Typically, a wet detention pond or biofiltration device is used as the pretreatment system. The pretreatment system prevents the infiltration basin from failing and helps reduce the risk of groundwater contamination due to pollutants contained in stormwater. Not all stormwater runoff should be infiltrated due to concern for groundwater contamination.

In order for an infiltration basin to be feasible, the depth to groundwater typically needs to be 5 feet or more and the soil needs to be a loam, silt or sand. As shown in Figure 5, soils in the Town are predominately clay (hydrologic soil group C and D). Sand and silt soils are found in limited locations in the Town (hydrologic soil group A and B). As such, the feasibility of an infiltration basin is very limited within the Town.

Finally, a significant amount of the water quality benefit is provided by the infiltration basin's pretreatment system. Typically, the pretreatment system is a wet detention pond or biofiltration device. From a water quality perspective, an infiltration basin is not cost effective after considering the pretreatment costs. As such, infiltration basin costs are not included in the analysis; rather pretreatment system costs are included in the analysis (i.e. wet detention ponds and biofiltration devices).

I. Hydrodynamic Separator Devices

Hydrodynamic separator devices are pre-manufactured underground devices which use cyclonic separation to provide pollutant reduction for stormwater. Hydrodynamic separator devices are typically placed in place of a storm sewer manhole within a storm sewer discharge pipe and are typically used to treat smaller (< 2 acre) drainage areas. Collected pollutants are typically removed with a vacuum truck. Examples of hydrodynamic separators include Vortechs®, CDS™, Aqua-Swirl®, and many other products. The costs to incorporate hydrodynamic separators into a street retrofit or reconstruction project are summarized in Table 5-10.

Table 5-10: Street Hydrodynamic Separator Devices (HSD)

Street Corridor Land Use	Pollutant Load Reduction		Avg. Annual TSS Cost ($/lb)	
	TSS (%)	TP (%)	Retrofit	Reconstruct
Commercial Corridors	21%	18%	$5.5	$4.4
Industrial Corridors	23%	13%	$4.4	$3.5
Institutional Corridors	23%	20%	$4.3	$3.5
Residential Corridors	21%	17%	$7.4	$5.9
Open Space Corridors	21%	17%	$6.8	$5.4

The costs to incorporate hydrodynamic separators into a parking lot retrofit or reconstruction project are summarized in Table 5-11.

Table 5-11: Parking Lot Hydrodynamic Separator Devices (HSD)

Parking Lot Land Use	Pollutant Load Reduction		Avg. Annual TSS Cost ($/lb)	
	TSS (%)	TP (%)	Retrofit	Reconstruct
Commercial Corridors	19%	16%	$15.5	$12.4
Industrial Corridors	20%	16%	$10.6	$8.4
Institutional Corridors	20%	15%	$18.7	$15.0
Residential Corridors	21%	15%	$26.3	$21.2
Open Space Corridors	31%	20%	$31.7	$25.3

J. <u>Stormwater Filtration Devices</u>

Stormwater filtration devices are pre-manufactured underground stormwater treatment systems that use filters to reduce pollutants in stormwater. The filters are typically media filled cartridges which can be customized to target specific pollutants placed within a pre-cast or cast-in-place underground concrete structure and are typically used to treat smaller (< 2 acre) drainage areas. As clogging occurs within the filters, they can be cleaned underground and/or replaced when clogged. Examples of Stormwater Filtration include Stormfilter®, Perk Filter™, Aqua-Filter™, and many other products. The costs to incorporate stormwater filtration into a street retrofit project or a street reconstruction project are summarized in Table 5-12.

Table 5-12: Street Stormwater Filtration Devices

Street Corridor Land Use	Pollutant Load Reduction		Avg. Annual TSS Cost ($/lb)	
	TSS (%)	TP (%)	Retrofit	Reconstruct
Commercial Corridors	38%	38%	$6.9	$6.0
Industrial Corridors	43%	26%	$5.3	$4.6
Institutional Corridors	42%	42%	$5.3	$4.6
Residential Corridors	39%	35%	$8.9	$7.7
Open Space Corridors	39%	35%	$8.4	$7.2

The costs to incorporate hydrodynamic separators into a parking lot retrofit or reconstruction project are summarized in Table 5-13.

Table 5-13: Parking Lot Stormwater Filtration Devices

Parking Lot Land Use	Pollutant Load Reduction		Avg. Annual TSS Cost ($/lb)	
	TSS (%)	TP (%)	Retrofit	Reconstruct
Commercial Corridors	36%	34%	$26.5	$25.2
Industrial Corridors	39%	37%	$16.9	$16.0
Institutional Corridors	39%	35%	$29.8	$28.2
Residential Corridors	42%	34%	$41.0	$38.9
Open Space Corridors	61%	45%	$50.9	$48.2

K. Permeable Pavement

Permeable pavement is a pavement system which allows stormwater to drain through paved surfaces into the underlying soil or to an underground reservoir for treatment. In addition to pollutant reduction, permeable pavement is also used to reduce peak flow rates and stormwater runoff volumes for development sites. Permeable pavement includes but is not limited to: pervious concrete or asphalt, pervious pavers and open jointed blocks. WDNR allows for 100% TSS and TP credit for the volume of runoff that infiltrates into the native soil. Any runoff that discharges through an underdrain pipe receives a 55% TSS and 35% TP credit. The costs to incorporate a permeable pavement into a street retrofit project or a street reconstruction project are summarized in Table 5-14.

Table 5-14: Permeable Pavement

BMP Location	Pollutant Load Reduction TSS (%)	TP (%)	Avg. Annual TSS Cost ($/lb) Retrofit Sand	Retrofit Clay	Reconstruct Sand	Reconstruct Clay
Permeable Pavement-Street	72%	65%	$14.0	$16.1	$10.1	$11.6
Permeable Pavement-Parking Lot	73%	54%	$47.0	$45.1	$32.4	$31.1

L. <u>Wet Detention Ponds / Wetland Systems</u>

Wet detention ponds and wetland systems are effective at removing sediment, nutrients, heavy metals, oxygen demanding compounds (BOD), hydrocarbons, and bacteria. Pollutant removal within a wet pond and wetland system is primarily due to gravity settling of particulate pollutants and sediment. Filtration, adsorption and microbial decomposition also remove pollutants, particularly within a wetland system. WDNR Technical Standard 1001 – Wet Detention Pond discusses design criteria for wet detention ponds.

Typically, a wet detention pond or wetland system must contain a minimum water depth of 5 feet within a portion of the permanent pool to minimize re-suspension of pollutants during a rainfall event. The WDNR requires that wet detention ponds and wetland systems be sized using the National Urban Runoff Project (NURP) particle size distribution. To achieve an 80% reduction in TSS, a wet detention pond or wetland system typically needs to remove the 3 to 5 micron sediment particle.

Existing dry detention ponds located in the Town were evaluated to determine the feasibility of converting into wet detention ponds. Currently, WDNR does not allow water quality credit for dry detention ponds. Existing dry detention ponds located within the Town are depicted in Figure 7 and summarized in Table 2-3. Generally, wet detention ponds are not recommended for small watersheds (less than 15 to 20 acres in clay soil). A wet detention pond located in a small watershed may develop stagnation problems and become a public nuisance. Public acceptance of stormwater BMPs is important to the success of the Town's stormwater program.

In the 2002 version of the NR 151 rule, BMPs associated with post-construction sites containing new development may not be located in navigable waters to receive credit for meeting any performance standard in Chapter NR 151. This restriction has been retained in the revised rule. Also in the 2002 version of the rule, BMPs for existing development, re-development or in-fill development could receive water quality credit for wet detention ponds / wetland systems constructed within both perennial and intermittent streams if all applicable permits are received. As of January 1, 2011, NR 151.003 only allows water quality credit for newly constructed wet detention ponds /

wetland systems constructed within intermittent streams for which all applicable permits are received.

A cost analysis was completed to determine the most cost-effective retrofits within the Town. As part of the analysis, aerial photographs were used to identify potential undeveloped properties that could be used for a retrofit. The location of storm sewer pipes and the watershed size in relation to the undeveloped property was also considered. Table 5-15 summarizes the cost and water quality benefits of those wet detention ponds / wetland systems within the Fox River and Mud Creek Sub-Watersheds analyzed for the Town (partial list of analyzed ponds). A detailed structural BMP cost analysis can be found in Appendix C and includes the full list of ponds and other BMPs analyzed for all sub-watersheds within the study area. BMP Concept drawings for the facilities listed in Table 5-15 and are also provided in Appendix C

Table 5-15: Potential Wet Detention Ponds / Wetland Systems

Wet Detention Pond / Wetland System	Drainage Area (acres)	Pollutant Reduction		Capital Costs	Capital & O&M Costs Over 20 Years	Avg. Annual TSS Cost ($/lb)
		TSS (%)	TP (%)			
Business Park Pond - Alt 1	118	83%	61%	$652,200	$1,072,332	$2.20
Miller Electric Pond	128	83%	59%	$679,700	$1,124,341	$2.29
Business Park Pond - Alt 2	172	84%	61%	$1,209,300	$1,803,754	$3.41
Contractor Pond	24	86%	64%	$367,200	$526,641	$4.42
Communication Pond	33	84%	61%	$605,600	$773,963	$4.81
Maple Hill Pond	174	85%	62%	$538,400	$726,612	$5.27
Spencer Pond	89	83%	58%	$42,900	$71,223	$5.97
Pennings Pond & Business Park Dry Pond	504	80%	59%	$3,361,000	$4,213,781	$8.50
Mayflower Pond	82	83%	63%	$466,400	$693,034	$10.78
Wisconsin Pond	54	83%	59%	$418,900	$636,504	$17.70
Shagbark Pond	66	81%	60%	$325,300	$521,199	$32.52

In addition to wet detention ponds, underground detention is another alternative to provide similar pollutant reduction, allowing for full build out of a proposed development site. The detention may be provided with a permanent pool of water in an underground piping system allowing for pavement above the stormwater device. The sediment accumulation is typically removed by vacuum truck or other method. The underground detention system is more expensive than wet detention ponds, but maximizes development area of sites.

M. Enhanced Settling (Alum Treatment)

In the future, the Town may want to investigate the feasibility of adding polymers or flocculants such as Alum to wet detention ponds to enhance pollutant removal efficiencies. Polymer or flocculent additions will likely require installation of mechanical injection systems. The WDNR is currently discussing if Wisconsin will allow the use of polymers and flocculants in wet detention ponds. This TMDL pollutant analysis will likely require updating after WDNR guidance documents regarding the use of polymer and flocculants in ponds is completed. Table 5-16 summarizes the cost and water quality benefits of those wet detention ponds with Alum treatment analyzed for the Town.

Table 5-16: Potential Wet Detention Ponds with Alum Treatment

Wet Detention Pond With Alum Treatment	Drainage Area (acres)	Pollutant Reduction		Capital Costs	Capital & O&M Costs Over 20 Years	Avg. Annual TSS Cost ($/lb)
		TSS (%)	TP (%)			
Miller Electric Pond with Alum	128	90%	85%	$849,964	$2,332,917	$4.3
Maple Hill Pond with Alum	174	90%	85%	$589,574	$1,712,467	$11.5
Mayflower Pond with Alum	82	90%	85%	$591,980	$1,495,354	$18.4
Spencer Pond with Alum	89	90%	85%	$50,787	$433,387	$29.3

N. Mechanical / Biological Treatment Facilities

Mechanical / biological treatment facilities are not currently used in Wisconsin, with the exception of combined sewer systems that treat wastewater and stormwater. A mechanical / biological treatment facility would be difficult to implement for stormwater given the number of storm sewer outfalls located within the Town. Significant storm sewer pumping would likely be needed to convey stormwater from each outfall to a regional stormwater treatment facility, similar to a wastewater treatment facility. As a result, stormwater treatment facilities are not typically cost effective BMPs. A mechanical / biological treatment facility and associated pumping systems are estimated to have an average annual cost that is well above $20 per pound of TSS removed. In addition, diverting low flows from all storm sewer outfalls to a regional treatment facility may dry up existing wetlands and streams located near the Town's current storm sewer outfalls.

O. Alternatives

The Town is responsible for reducing phosphorus and sediment loads to satisfy the Lower Fox River Basin TMDL percent reductions listed in Table 4-3. Three alternatives were developed to satisfy the Lower Fox River Basin TMDL percent reductions. Each alternative identifies a combination of existing and proposed BMPs that satisfies the TMDL allocations for the Town.

- Alternative 1 – As shown in Figure 16, Alternative 1 includes the existing wet ponds, existing biofilters, and proposed ponds including the Miller Electric Pond and Business Park Pond – Alt 1, as well as obtaining maintenance authority for the Climastore Pond. In addition, Alternative 1 includes high efficiency street sweeping once every 12 weeks with no parking control ordinance. Alternative 1 uses overtreatment within the Mud Creek Sub-Watershed to satisfy the TSS reductions for the Fox River Sub-Watershed. The excess TSS reduction being provided in the Mud Creek Sub-Watershed is applied to the Fox River Sub-Watershed to satisfy the required TSS reduction requirement.

- Alternative 2 – As shown in Figure 17, Alternative 2 includes the existing wet ponds, existing biofilters, and proposed ponds including the Contractor Pond, Communication Pond, Maple Hill Pond and Business Park Pond – Alt 1, as well as obtaining maintenance authority for the Plexus North Pond, Plexus South Pond and Climastore Pond. In addition, Alternative 1 includes high efficiency street sweeping once every 12 weeks with no parking control ordinance. Alternative 2 uses overtreatment within the Mud Creek Sub-Watershed to satisfy the TSS reductions for the Fox River Sub-Watershed. The excess TSS reduction being provided in the Mud Creek Sub-Watershed is applied to the Fox River Sub-Watershed to satisfy the required TSS reduction requirement.

- Alternative 3 – As shown in Figure 18, Alternative 3 includes the existing wet ponds, existing biofilters, and proposed ponds including the Mayflower Pond, Spencer Pond, Communication Pond, Maple Hill Pond, Miller Electric Pond and Wisconsin Pond, as well as obtaining maintenance authority for the Mayflower Storage Pond, Valley Bakers Pond, Valley Bakers Biofilter, Great Lake Mechanical Biofilter, Schwanns Pond, Print Pro Biofilter and Climastore Pond. In addition, Alternative 3 includes high efficiency street sweeping once every 12 weeks with no parking control ordinance. Alternative 3 uses overtreatment within the Fox River Sub-Watershed to satisfy the TSS reductions for the Mud Creek Sub-Watershed. The excess TSS reduction being provided in the Fox River Sub-Watershed is applied to the Mud Creek Sub-Watershed to satisfy the required TSS reduction requirement.

Costs associated with the proposed street sweeping program and proposed structural BMPs are provided in Table 5-17. The capital costs provided in Table 5-17 are the estimated present value capital costs for the proposed structural BMPs. The capital costs include an allowance for construction, land acquisition, engineering, legal, and contingency costs.

Table 5-17: TMDL Alternatives Analysis

Town MS4 Alternative	Proposed Street Sweeping*			Proposed Structural BMPs
	Type of Sweeper	Sweeping Frequency	Parking Control	Capital Costs
1	H.E.	Once / 12 Weeks	No	$1.4 million
2	H.E.	Once / 12 Weeks	No	$2.2 million
3	H.E.	Once / 12 Weeks	No	$2.8 million

* Street sweeping begins March 29 and ends November 25 of each year. High efficiency (H.E.). Mechanical (M).

VI. IMPLEMENTATION & RECOMMENDATIONS

Below are various recommendations for the Town to consider when implementing the Stormwater Quality Management Plan and working toward MS4 Permit compliance.

A. Resource Management Plans

Several resource management plans were discussed in Section 1.0 of this Stormwater Quality Management Plan. It is recommended that the priorities and recommendations contained in these resource management plans be incorporated into this plan by reference.

B. Plan of Action

It is recommended that the Town develop a Plan of Action for stormwater quality after completion of this report. It is recommended that pollutants of concern associated with the Lower Fox River Basin TDML be targeted during implementation. Pollutant loads and pollutant yields depicted in Figures 13 through 16 can be used to target specific drainage areas with heavier pollutant loads or yields. In addition, the pollutant load and BMP analysis contained in this report can be used to target specific source areas with a heavier load or BMPs with a more favorable cost.

C. Public Education & Public Involvement

Public education and public involvement are recommended during development and implementation of the Plan of Action. Potential stakeholders include the general public, elected officials, Town Staff, developers, regulatory entities, individual property owners and other regulated entities. Although this stormwater quality management plan includes a cost versus benefit analysis, the plan does not take into consideration intangibles such as public sentiment, public opinion, land availability, etc.

D. Redevelopment Sites

It is recommended that the Town evaluate public / private partnerships with landowners when developing and implementing its Plan of Action. As required by NR 151.12 and the Town's Post-Construction Stormwater Management Ordinance, redevelopment sites with 1 acre or more of land disturbance are required to achieve a TSS reduction. Compliance with the TSS reduction is only required when a construction project occurs on the site. As such, these redevelopment sites do not have a specific timeline for achieving a TSS reduction. Nonetheless, when redevelopment occurs on commercial, industrial, institutional and multi-family residential parcels, stormwater quality improvements will be required. Public / private partnerships provide an opportunity to work together such that both the landowner and Town benefit.

For example, redevelopment of a 20 acre shopping center may provide an opportunity to increase the site's TSS reduction to 80% or provide an opportunity to provide water quality treatment for other nearby properties or streets. In some instances, cost sharing can be used as a financial incentive or the Town cost share through of public / private partnership with the landowners. Typically, it is more cost effective to incorporate stormwater quality improvements into an already planned construction project as compared to retrofitting a BMP without considering other construction activities in the watershed.

E. Inter-Governmental Agreements

It is recommended that the Town evaluate inter-governmental agreements when developing and implementing the Plan of Action. It may be more cost effective to work together with adjoining municipal jurisdictions, such as the Wisconsin Department of Transportation or Outagamie County Highway Department. Also, it may be beneficial to work together with adjoining cities, Towns and townships to construct a mutually beneficial stormwater BMP, share equipment, restore a wetland, or improve water quality using other methods.

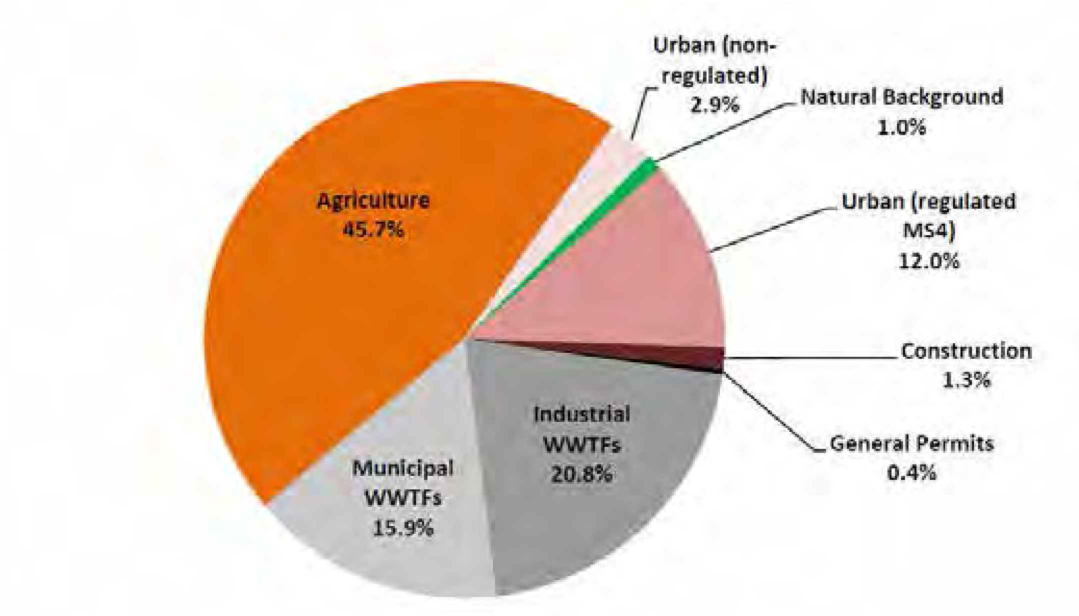
F. Water Quality Trading

It is recommended that the Town evaluate the feasibility and cost effectiveness of water quality trading when developing and implementing its Plan of Action. The cost for achieving compliance with TMDL allocations is not uniform among dischargers and source areas. As such, compliance with TMDL allocations may be more cost-effectively achieved by trading with other dischargers. Water quality trading is allowed between wastewater treatment facilities, agricultural landowners, and other urban stormwater dischargers. In order to be eligible for water quality trading, specific criteria needs to be satisfied. The WDNR recently developed a water quality trading framework for Wisconsin. This framework has led to two additional guidance documents for trading implementation.

G. Watershed Adaptive Management

It is recommended that the Town evaluate the feasibility and cost effectiveness of Watershed Adaptive Management when developing and implementing its Plan of Action. Adaptive management is a watershed approach that focuses on meeting water quality standards within a river, stream or lake in a more cost-effective manner. Watershed Adaptive Management needs to be initiated by a wastewater treatment facility owner, but would likely involve cooperation among other phosphorus dischargers including agricultural, urban stormwater, and wastewater dischargers. Exhibit 6-1 depicts the portion of phosphorus that is being generated by agriculture, urban stormwater and wastewater treatment facilities within the Lower Fox River Basin. Exhibit 6-1 was obtained from the Lower Fox River Basin TMDL Report.

Exhibit 6-1: Phosphorus Sources in Lower Fox River Basin



H. Municipal Leaf Collection Program

It is recommended that the Town review and potentially revise their municipal leaf collection programs after the WDNR and United States Geological Survey (USGS) complete their scientific research. Currently, the WDNR and USGS are sampling and monitoring stormwater runoff in the Town of Madison to determine the amount of phosphorus reduction associated with different municipal leaf collection techniques. The study results will help the Town evaluate their municipal leaf collection programs. The study may indicate that the Town is already using the best leaf collection technique for purposes of reducing phosphorus loads.

I. Stream, Shoreline & Channel Stabilization

It is recommended that the Town undertake high priority stream, shoreline and channel stabilization projects to reduce the discharge of sediment and phosphorus pollutants associated with bed, bank or steep slope erosion. In addition to the water quality benefits, stabilization projects provide an opportunity to improve habitat, remove invasive species, and potentially restore wetland areas. Grant funding is available to assist with stabilization projects.

J. 5-Year Capital Improvement Plan

It is recommended that the Town develop a 5-year to 20-year capital improvement plan based on this stormwater quality management plan and the Plan of Action. We recommend that the capital improvement plan include ample time for public education, public input, BMP design, land acquisition, regulatory permits, grant applications, financing, and construction. The capital improvement plan should also take into consideration other local capital improvement projects, such as street reconstruction projects, utility projects, and private development projects.

K. Financing Plan

It is recommended that the Town develop a financing plan. The financing plan will allow the Town to implement its Plan of Action and 5-year Capital Improvement Plan. Below is a discussion of various funding sources which may be available to the Town. Depending on the project, funding options may be used individually or in combination.

- Debt / Bonds: General obligation and revenue bonds may be used to secure funding for stormwater projects. Property taxes and revenue fees are used for long-term debt payments.

- Special Assessments: Special assessments may be used to generate funds for a specific project. Property owners that benefit from the project pay the assessment fee. Typically, other funding sources are needed to pay for project costs until property owners pay the assessment.

- Impact Fees: Impact fees may be charged to developers for stormwater projects that benefit the development. Impact fees are usually paid during initial stages of development. Typically, projects include regional stormwater facilities or improvements to deficient downstream infrastructure. Often, other funding sources are needed to pay for project costs until developers and property owners are required to pay the impact fee. Impact fees are recommended as needed to fund the municipal stormwater program.

- Tax Incremental Financing (TIF) District: TIF Districts may be used by Cities and Towns to fund stormwater projects that benefit property located within the District. Property value increases within the TIF District generate additional tax revenue that is used for long-term debt payments.

- Stormwater Utility: Stormwater utilities are similar to sanitary and water utilities. Stormwater utilities generate revenue for stormwater related projects by charging property owners an annual service fee. Annual service fees are based upon the amount of runoff generated by a specific property. Properties with more impervious area (i.e. roofs, parking lots, driveways, etc.) are charged a higher fee as compared to properties with less impervious area. All properties, including tax exempt properties, pay the service fee. Rate adjustments are recommended as needed to fund the municipal stormwater program.

- Grants / Loans: State and federal grant / loans are available for certain stormwater projects. Typically, only a certain percent of the total project cost is eligible for grant / loan money with remaining revenues to be generated by the applicant. Below are a few grant / loan programs which the Town may or may not be familiar with. Grant applications are recommended.

  - Urban Non-Point Source and Stormwater Construction Grant
  - Targeted Runoff Management Construction Grant
  - Great Lakes Basin Program
  - Community Development Block Grant
  - Clean Water Fund

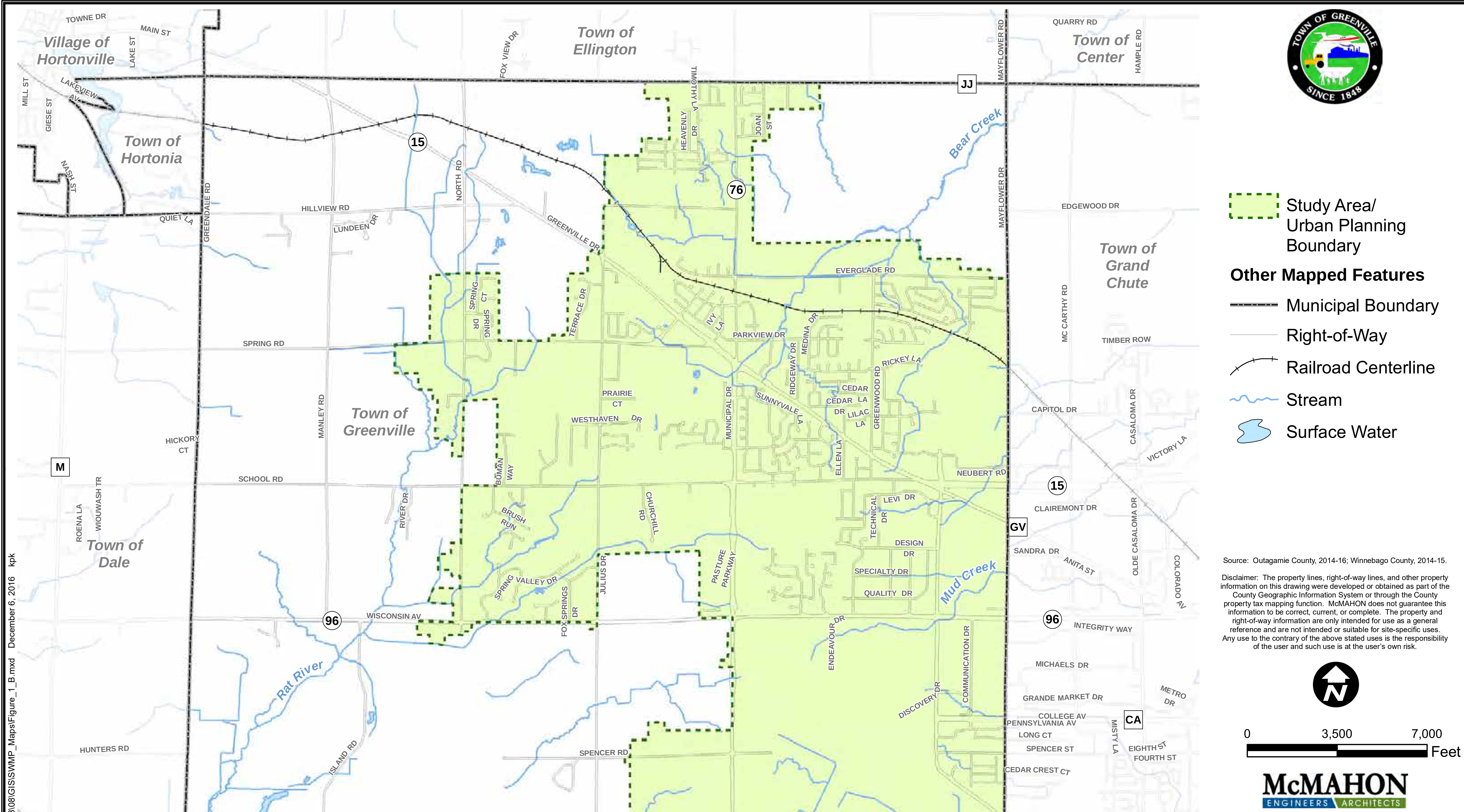
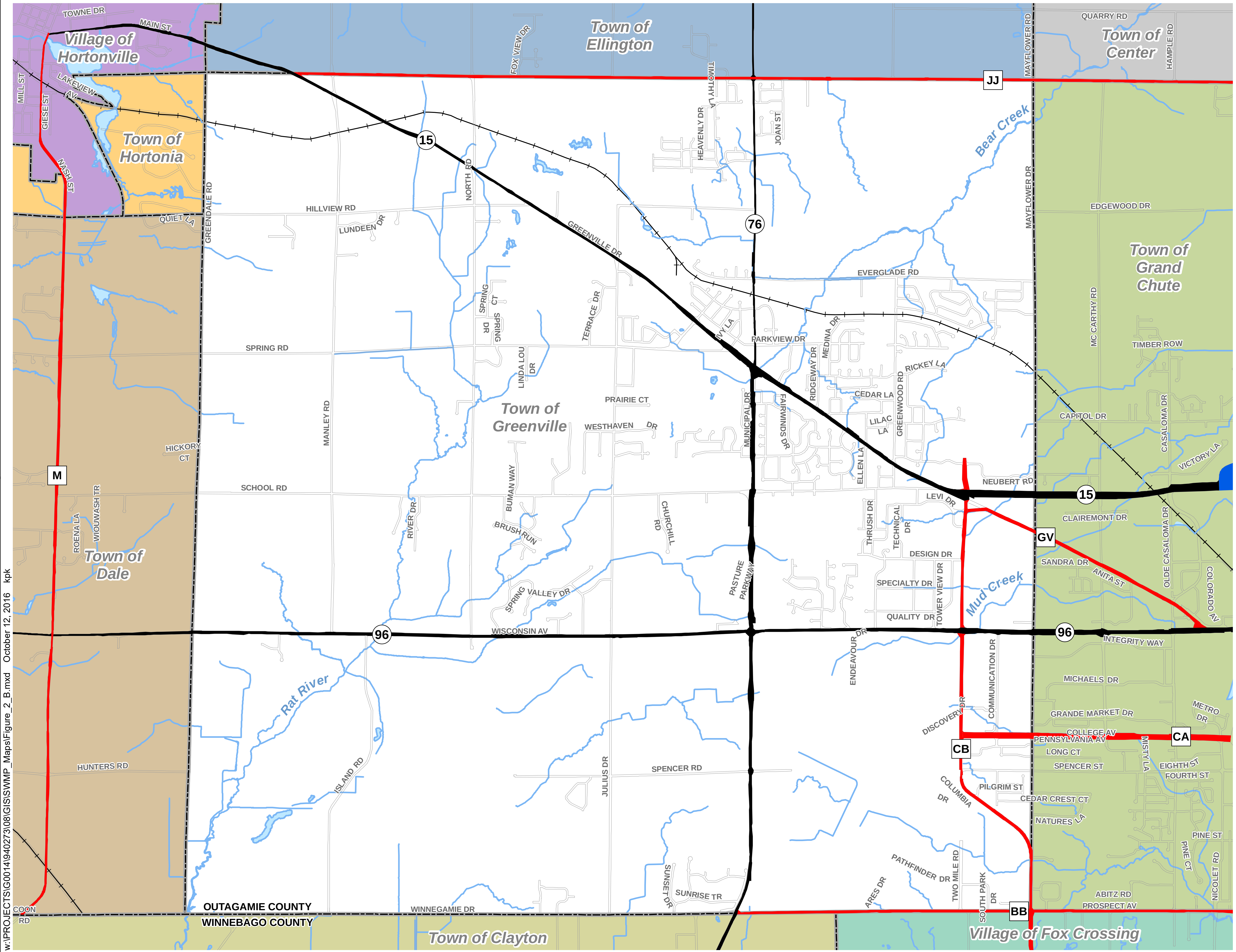


FIGURE 1
STUDY AREA
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN



Municipal Jurisdiction

- Town of Center
- Town of Clayton
- Town of Dale
- Town of Ellington
- Town of Grand Chute
- Town of Greenville
- Town of Hortonia
- Village of Hortonville
- Village of Fox Crossing

Highway Jurisdiction

- Connecting Highway (NA)
- County Trunk Highway
- State Trunk Highway
- State Freeway

Other Mapped Features

- Municipal Boundary
- Right-of-Way
- Railroad Centerline
- Stream
- Surface Water

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

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

0 3,500 7,000 Feet

McMAHON ENGINEERS ARCHITECTS

FIGURE 2
MS4 JURISDICTION
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN

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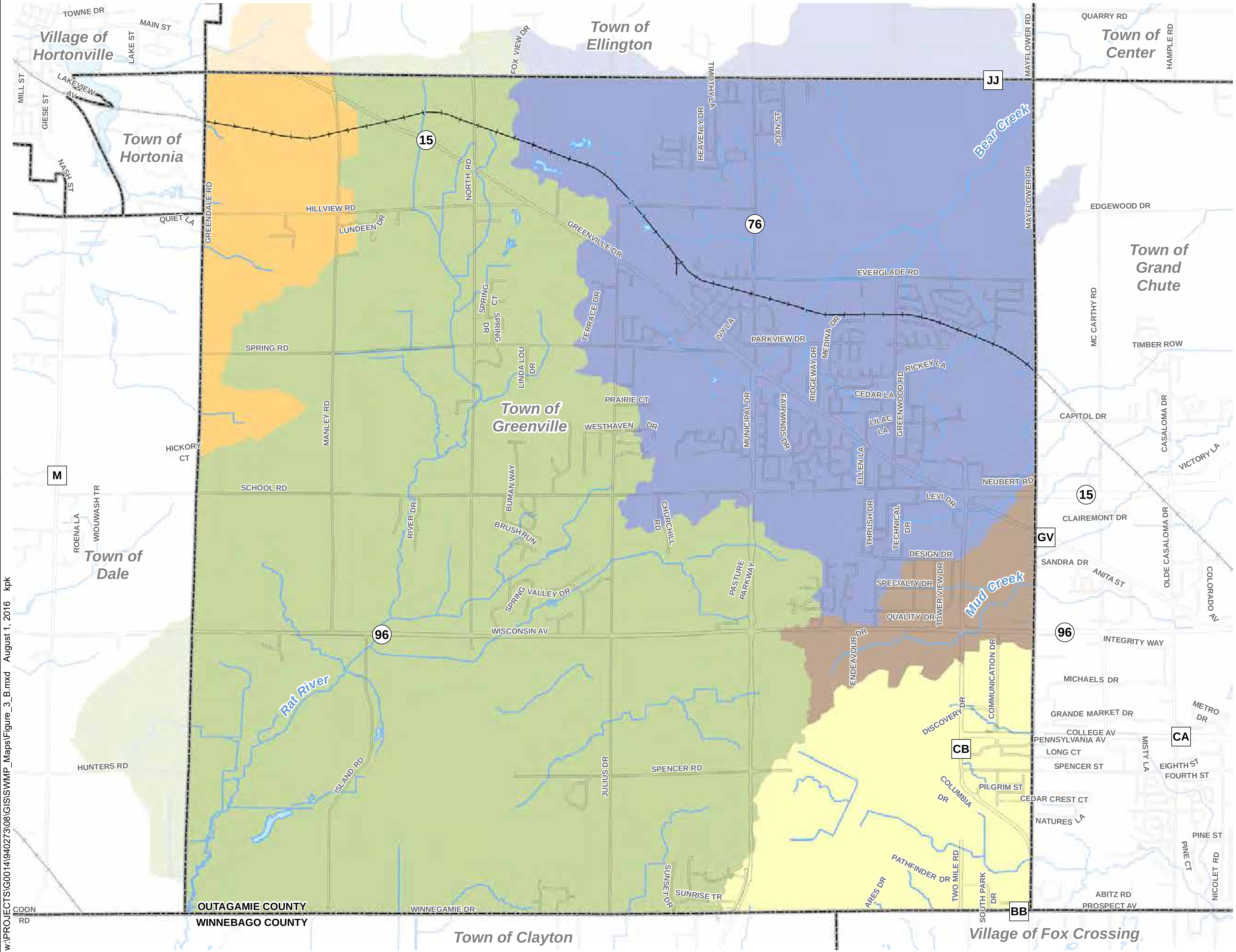

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Sub-Watersheds

- Bear Creek
- Fox River
- Mud Creek
- Rat River
- Wolf River

Other Mapped Features

- Municipal Boundary
- Right-of-Way
- Railroad Centerline
- Stream
- Surface Water

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

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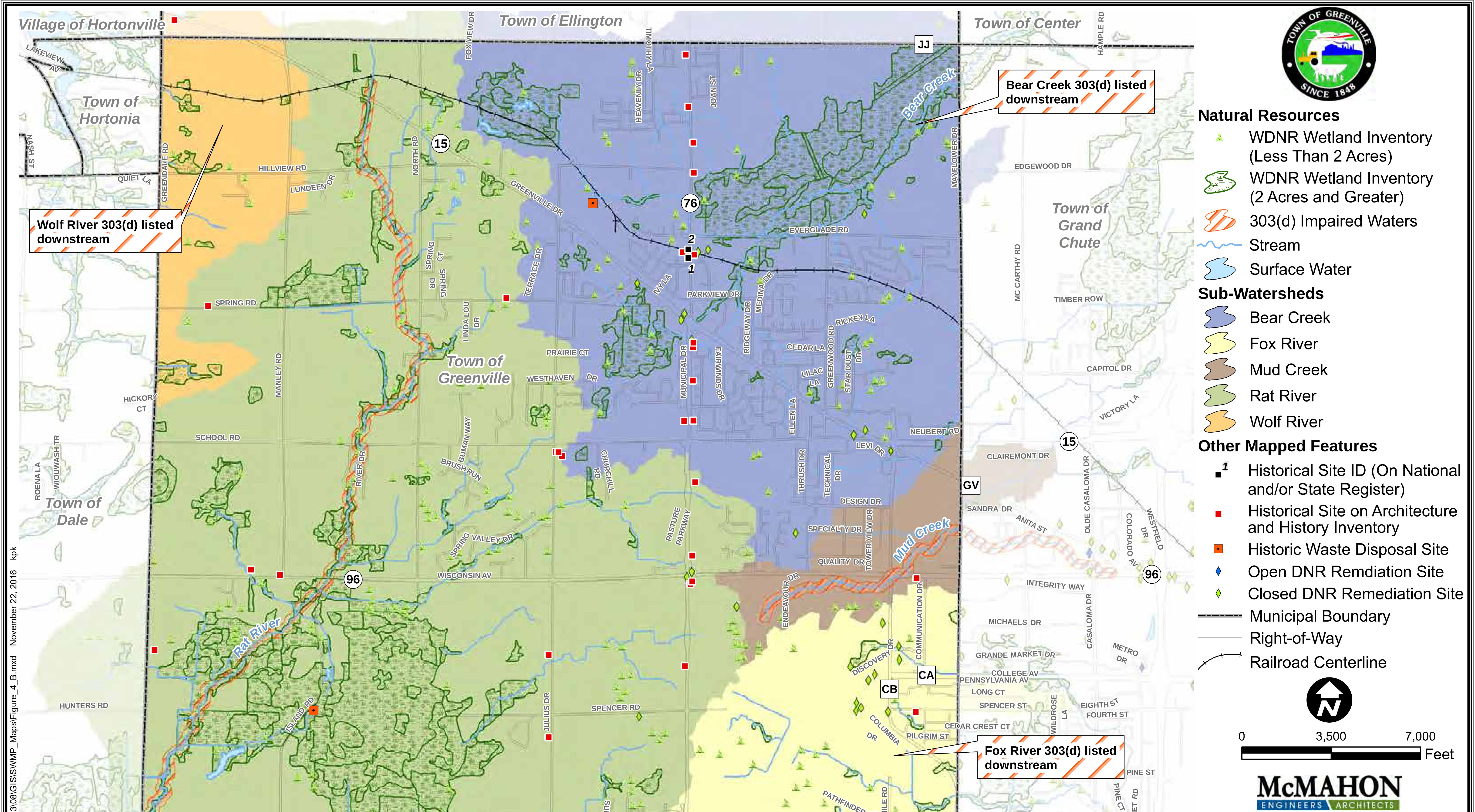
0 3,500 7,000 Feet

McMAHON ENGINEERS ARCHITECTS

FIGURE 3
SUB-WATERSHEDS
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN



Source: Outagamie County, 2014-16; Winnebago County, 2014-15; WDNR, 1993, 2016; Wisconsin Historical Society, 2016.

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

McMAHON ENGINEERS | ARCHITECTS

FIGURE 4
NATURAL RESOURCES
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN

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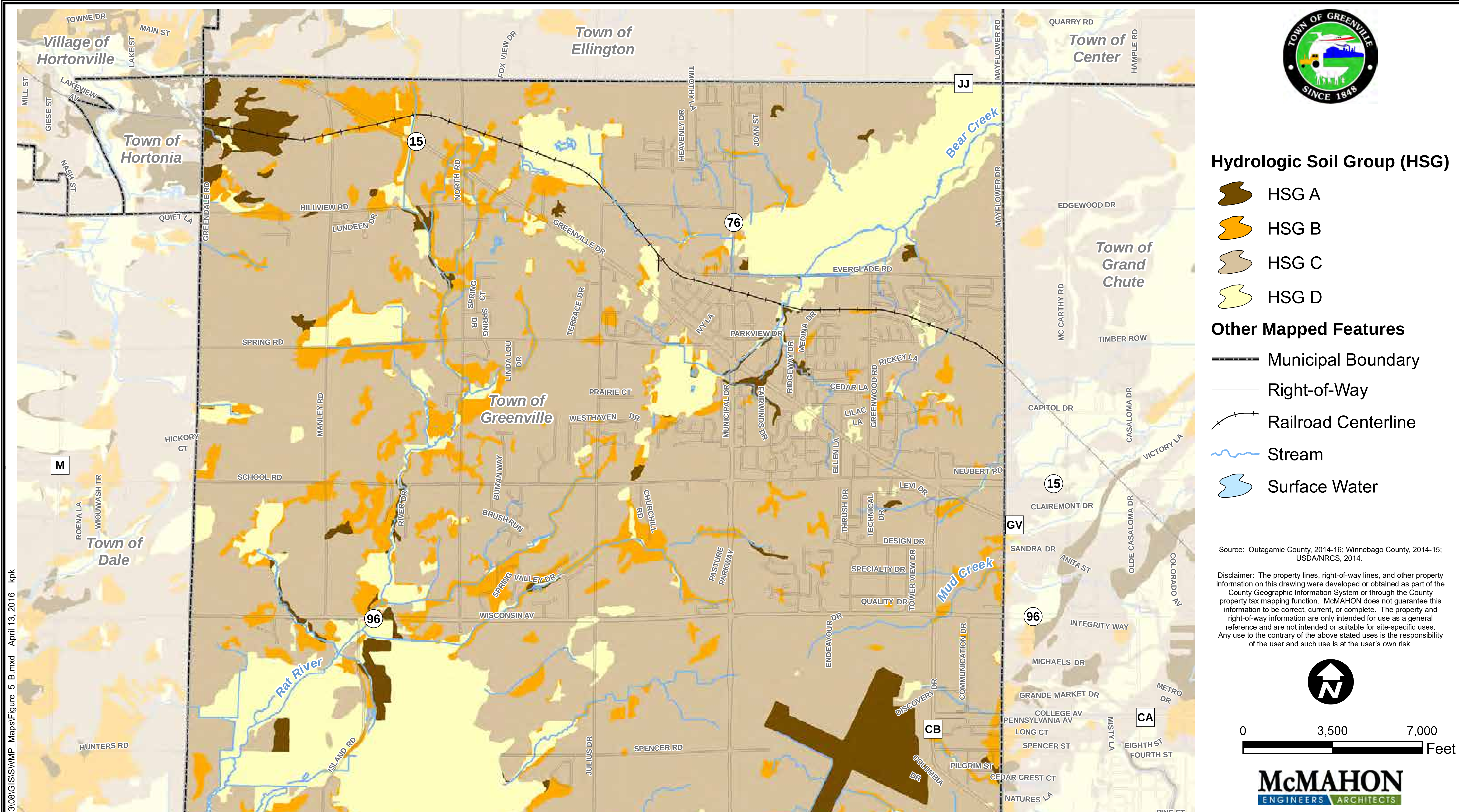

FIGURE 5
SOILS
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN

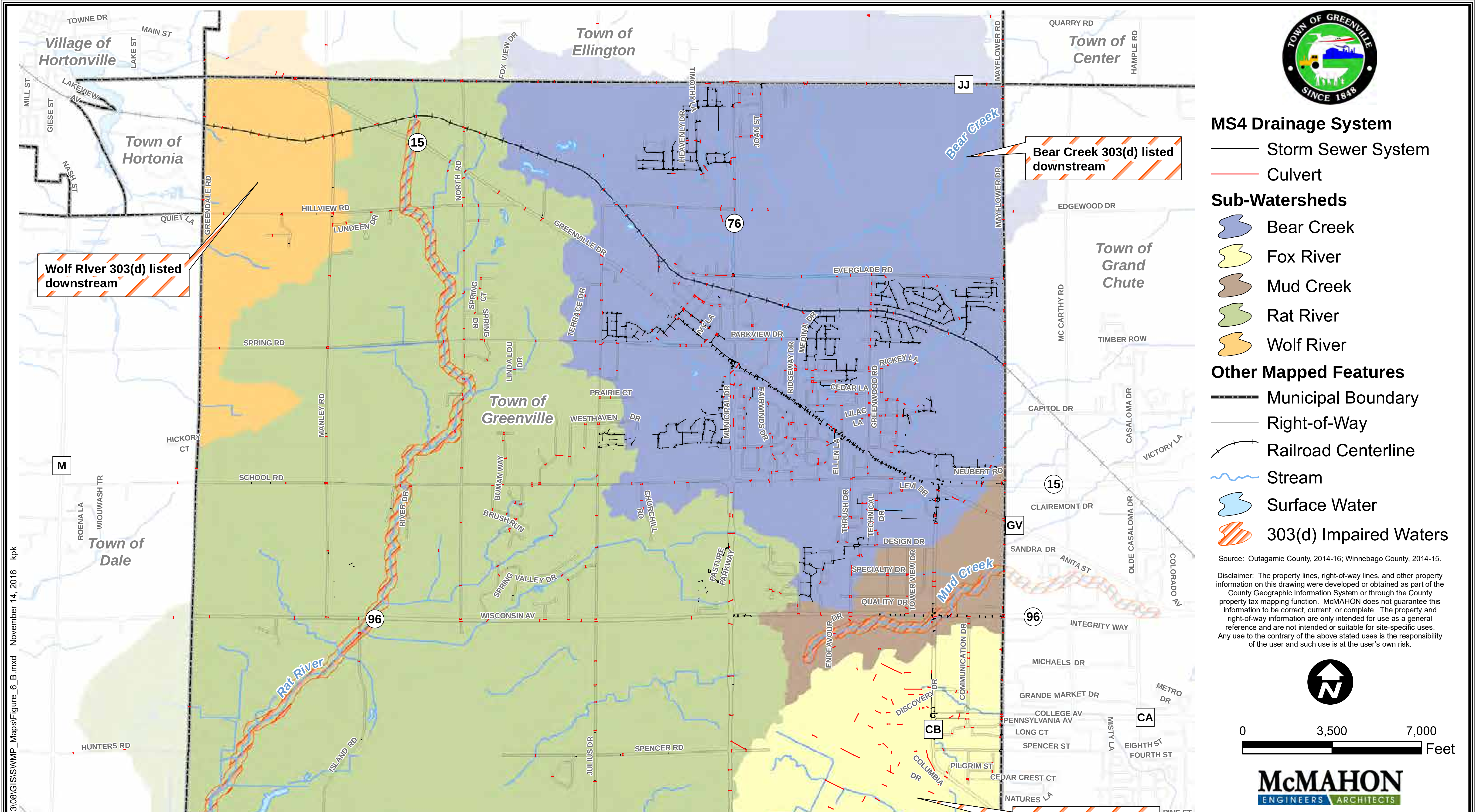

FIGURE 6
MS4 SYSTEM
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN

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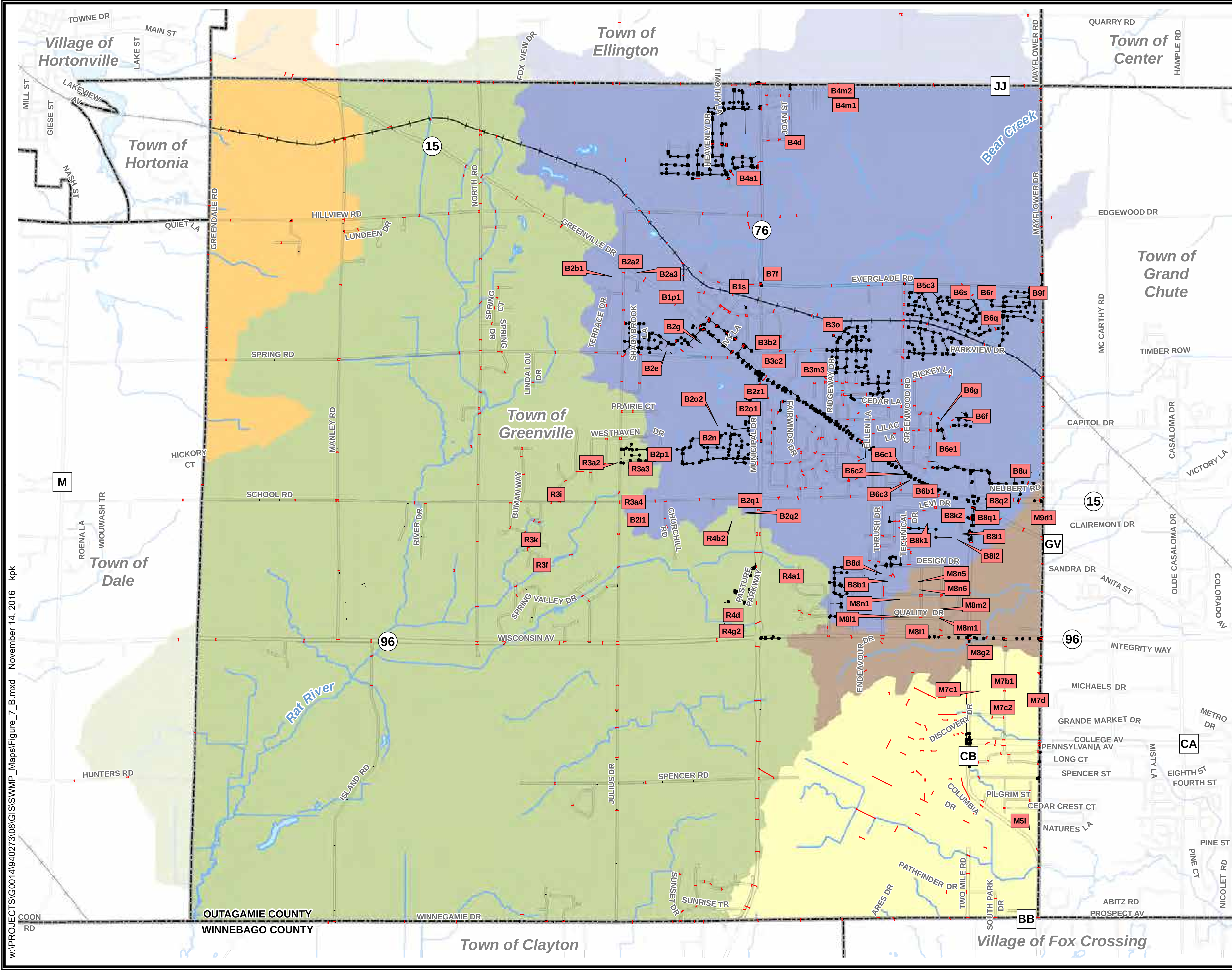

MS4 Drainage System

- B2e Structural BMP ID
- Storm Sewer System
- Culvert

Sub-Watersheds

- Bear Creek
- Fox River
- Mud Creek
- Rat River
- Wolf River

Other Mapped Features

- Municipal Boundary
- Right-of-Way
- Railroad Centerline
- Stream
- Surface Water

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

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0 3,500 7,000 Feet

McMAHON ENGINEERS ARCHITECTS

FIGURE 7
STRUCTURAL BMPs
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN

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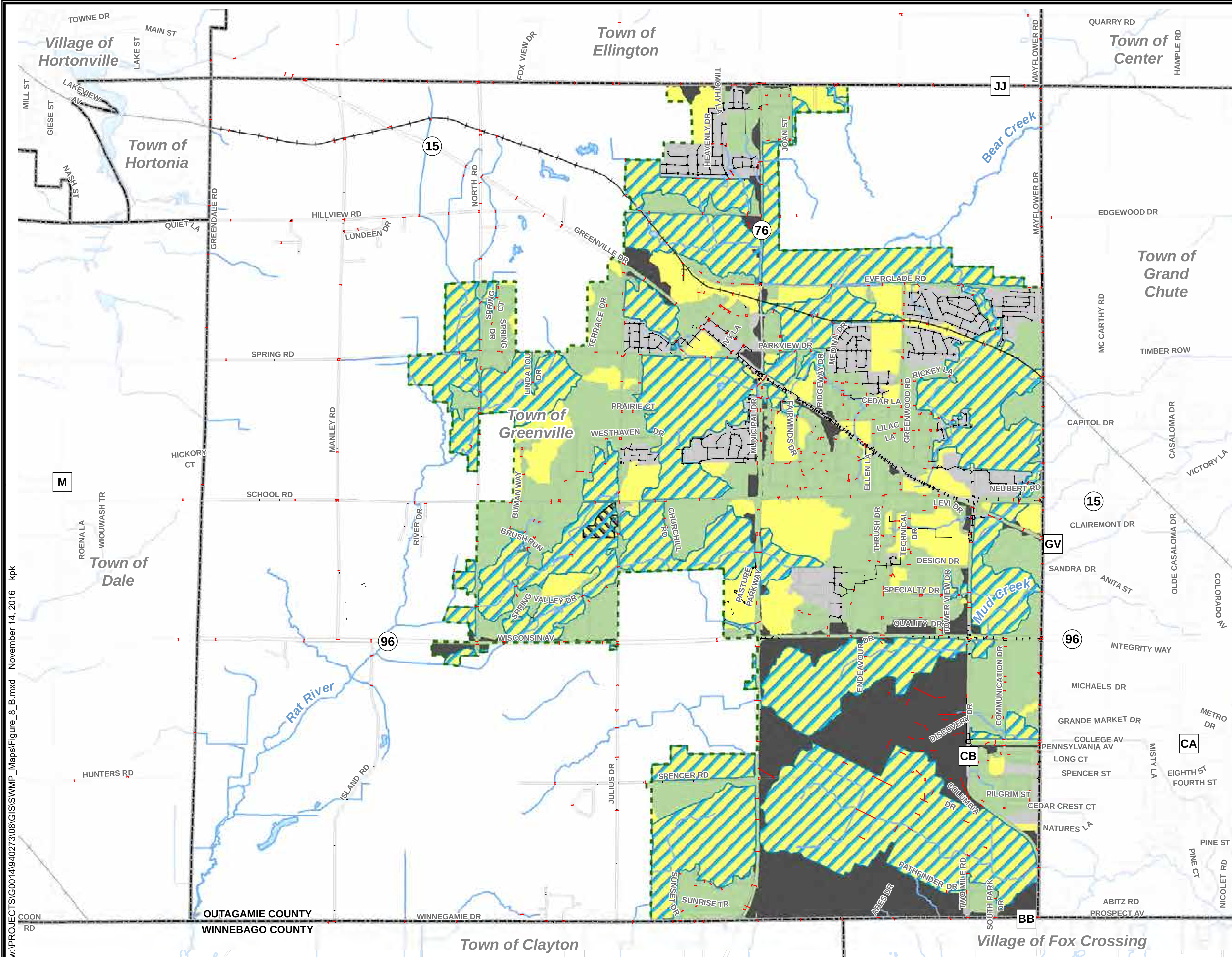

TOWN OF GREENVILLE SINCE 1848

MS4 Drainage System

- Storm Sewer System
- Culvert

Surface Drainage

- Curb and Gutter
- No Controls
- Grass Swale

Other Mapped Features

- Urban Planning Boundary
- Municipal Boundary
- Right-of-Way
- Railroad Centerline
- Stream
- Surface Water
- Riparian Area
- MS4 'A' to 'B' Area
- Quarry

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

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N

0 3,500 7,000 Feet

McMAHON ENGINEERS ARCHITECTS

FIGURE 8
SURFACE DRAINAGE
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN

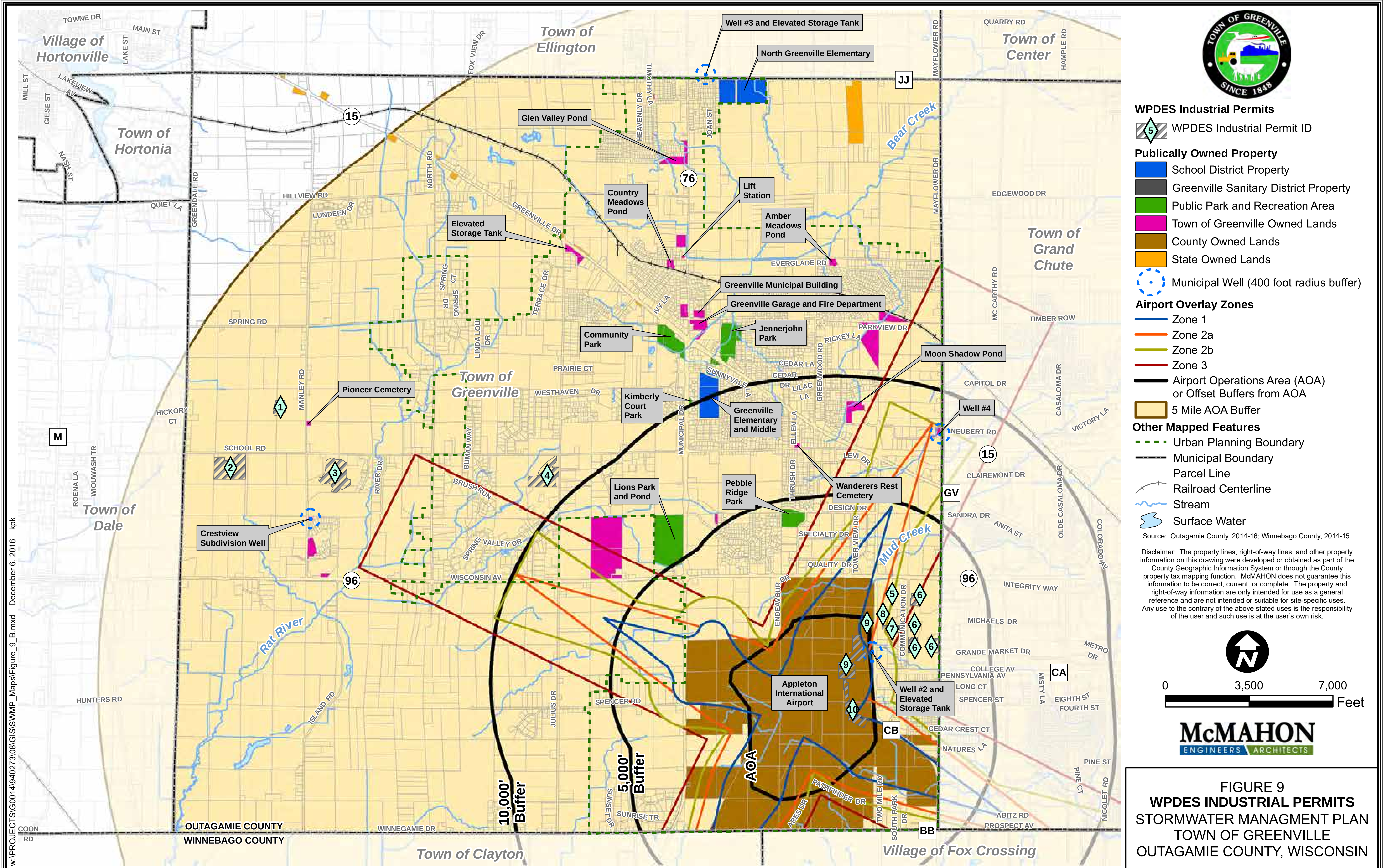
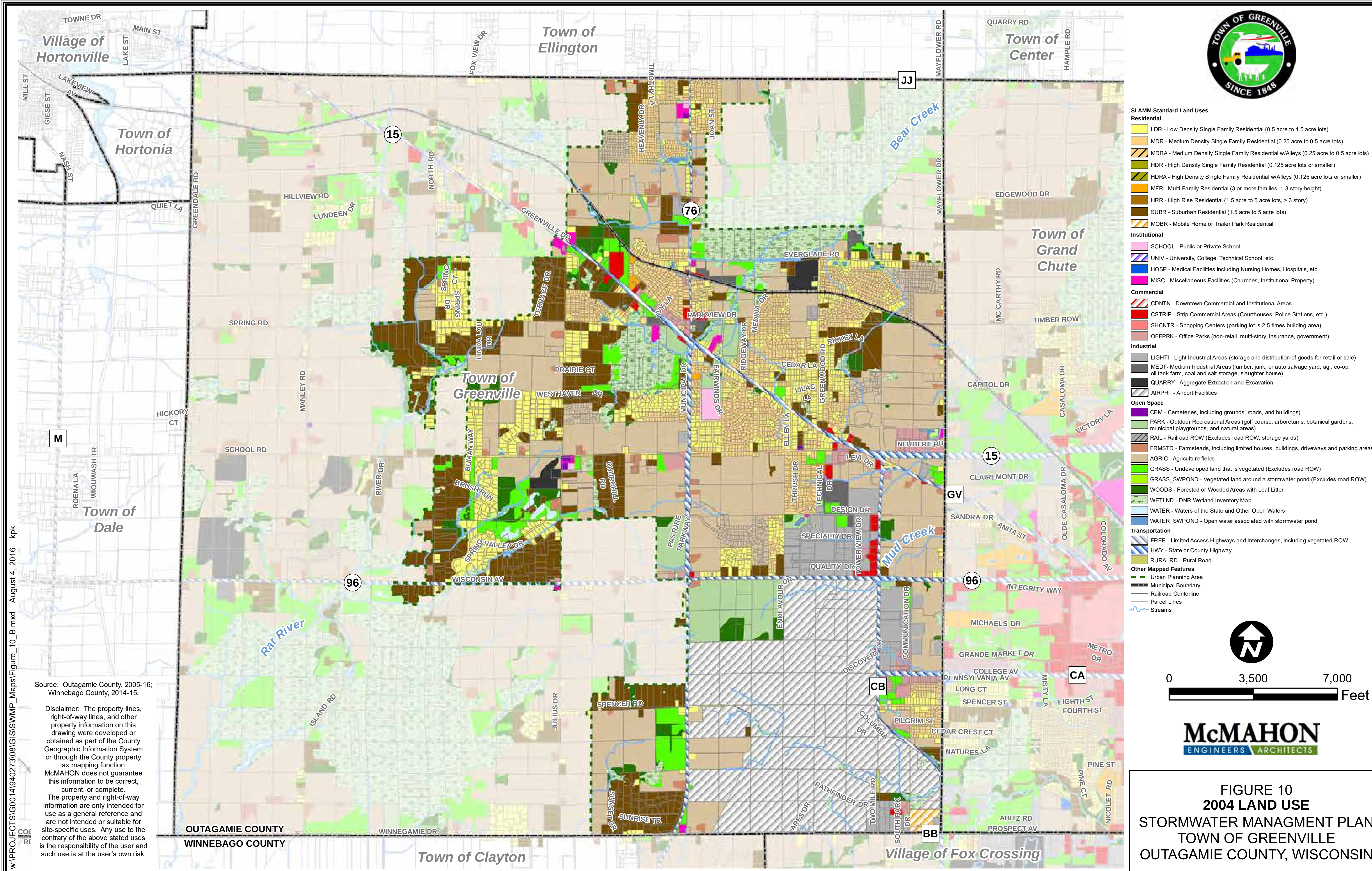


FIGURE 9
WPDES INDUSTRIAL PERMITS
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN

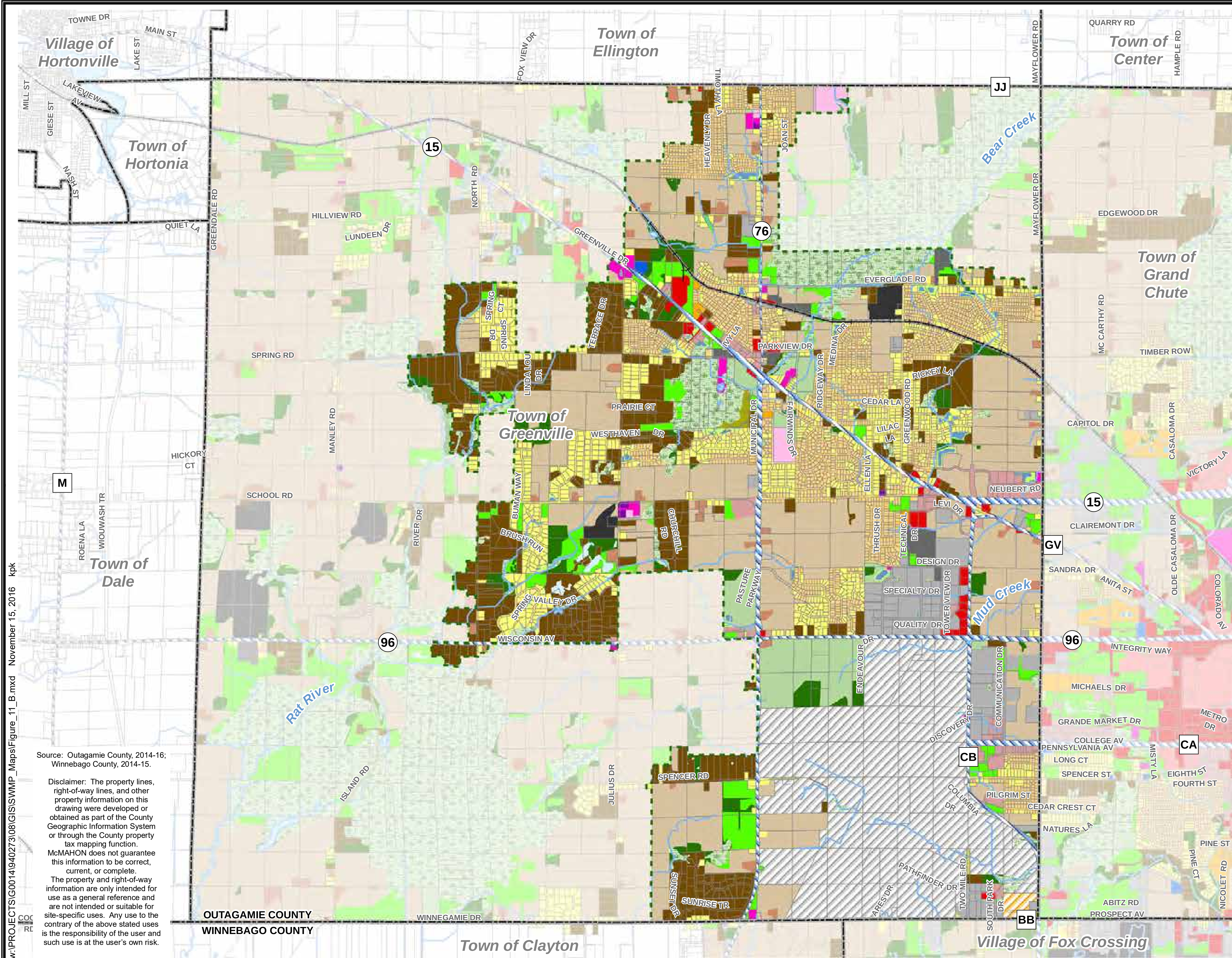


Source: Outagamie County, 2005-16; Winnebago County, 2014-15.

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

McMAHON ENGINEERS ARCHITECTS

FIGURE 10
2004 LAND USE
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN



SLAMM Standard Land Uses

Residential
- LDR - Low Density Single Family Residential (0.5 acre to 1.5 acre lots)
- MDR - Medium Density Single Family Residential (0.25 acre to 0.5 acre lots)
- MDRA - Medium Density Single Family Residential w/Alleys (0.25 acre to 0.5 acre lots)
- HDR - High Density Single Family Residential (0.125 acre lots or smaller)
- HDRA - High Density Single Family Residential w/Alleys (0.125 acre lots or smaller)
- MFR - Multi-Family Residential (3 or more families, 1-3 story height)
- HRR - High Rise Residential (1.5 acre to 5 acre lots, > 3 story)
- SUBR - Suburban Residential (1.5 acre to 5 acre lots)
- MOBR - Mobile Home or Trailer Park Residential

Institutional
- SCHOOL - Public or Private School
- UNIV - University, College, Technical School, etc.
- HOSP - Medical Facilities including Nursing Homes, Hospitals, etc.
- MISC - Miscellaneous Facilities (Churches, Institutional Property)

Commercial
- CDNTN - Downtown Commercial and Institutional Areas
- CSTRIP - Strip Commercial Areas (Courthouses, Police Stations, etc.)
- SHCNTR - Shopping Centers (parking lot is 2.5 times building area)
- OFFPRK - Office Parks (non-retail, multi-story, insurance, government)

Industrial
- LIGHTI - Light Industrial Areas (storage and distribution of goods for retail or sale)
- MEDI - Medium Industrial Areas (lumber, junk, or auto salvage yard, ag., co-op, oil tank farm, coal and salt storage, slaughter house)
- QUARRY - Aggregate Extraction and Excavation
- AIRPRT - Airport Facilities

Open Space
- CEM - Cemeteries, including grounds, roads, and buildings)
- PARK - Outdoor Recreational Areas (golf course, arboretums, botanical gardens, municipal playgrounds, and natural areas)
- RAIL - Railroad ROW (Excludes road ROW, storage yards)
- FRMSTD - Farmsteads, including limited houses, buildings, driveways and parking areas
- AGRIC - Agriculture fields
- GRASS - Undeveloped land that is vegetated (Excludes road ROW)
- GRASS_SWPOND - Vegetated land around a stormwater pond (Excludes road ROW)
- WOODS - Forested or Wooded Areas with Leaf Litter
- WETLND - DNR Wetland Inventory Map
- WATER - Waters of the State and Other Open Waters
- WATER_SWPOND - Open water associated with stormwater pond

Transportation
- FREE - Limited Access Highways and Interchanges, including vegetated ROW
- HWY - State or County Highway
- RURALRD - Rural Road

Other Mapped Features
- Urban Planning Area
- Municipal Boundary
- Railroad Centerline
- Parcel Lines
- Streams

0 3,500 7,000 Feet

McMAHON ENGINEERS ARCHITECTS

FIGURE 11
2015 LAND USE
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN

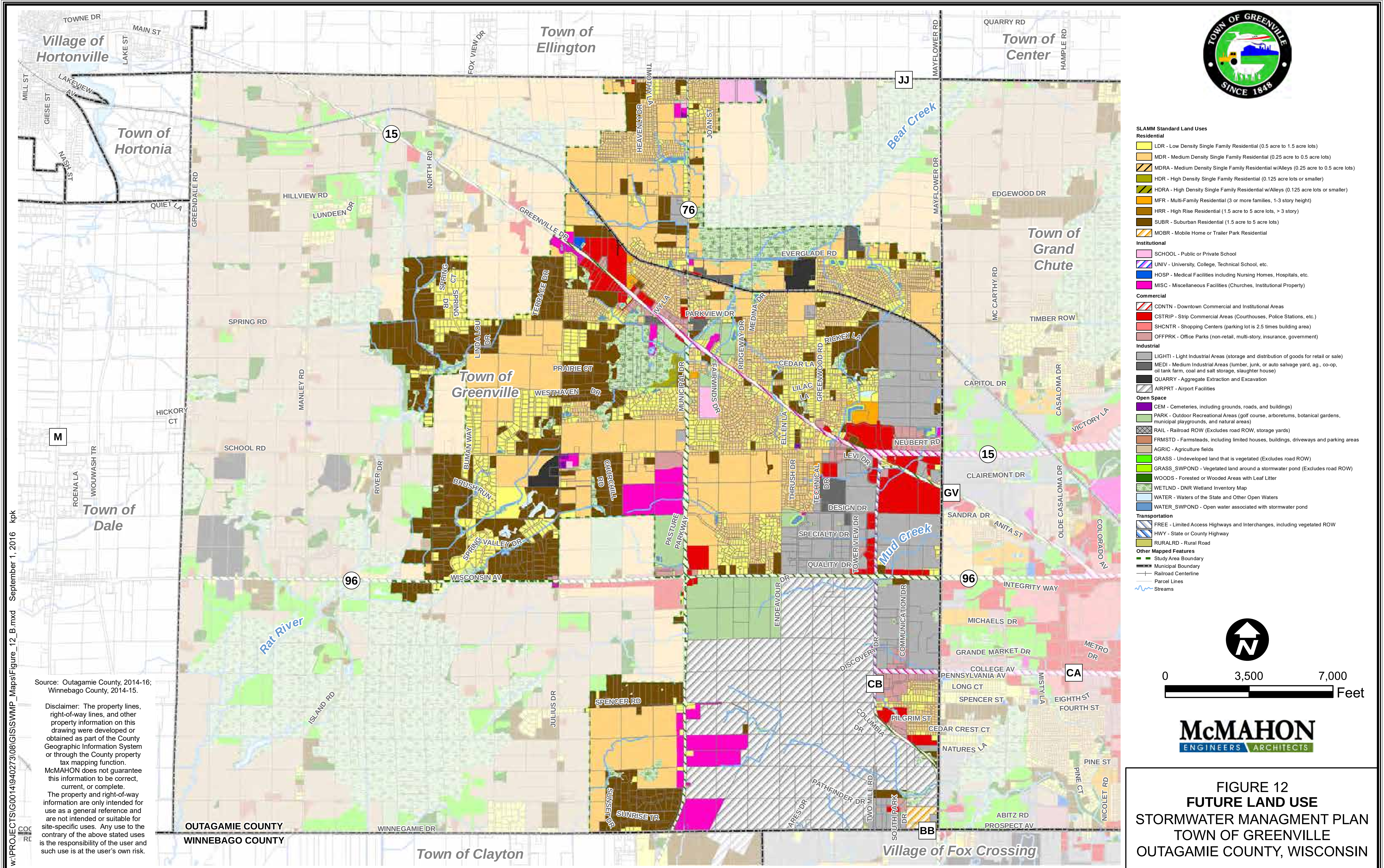
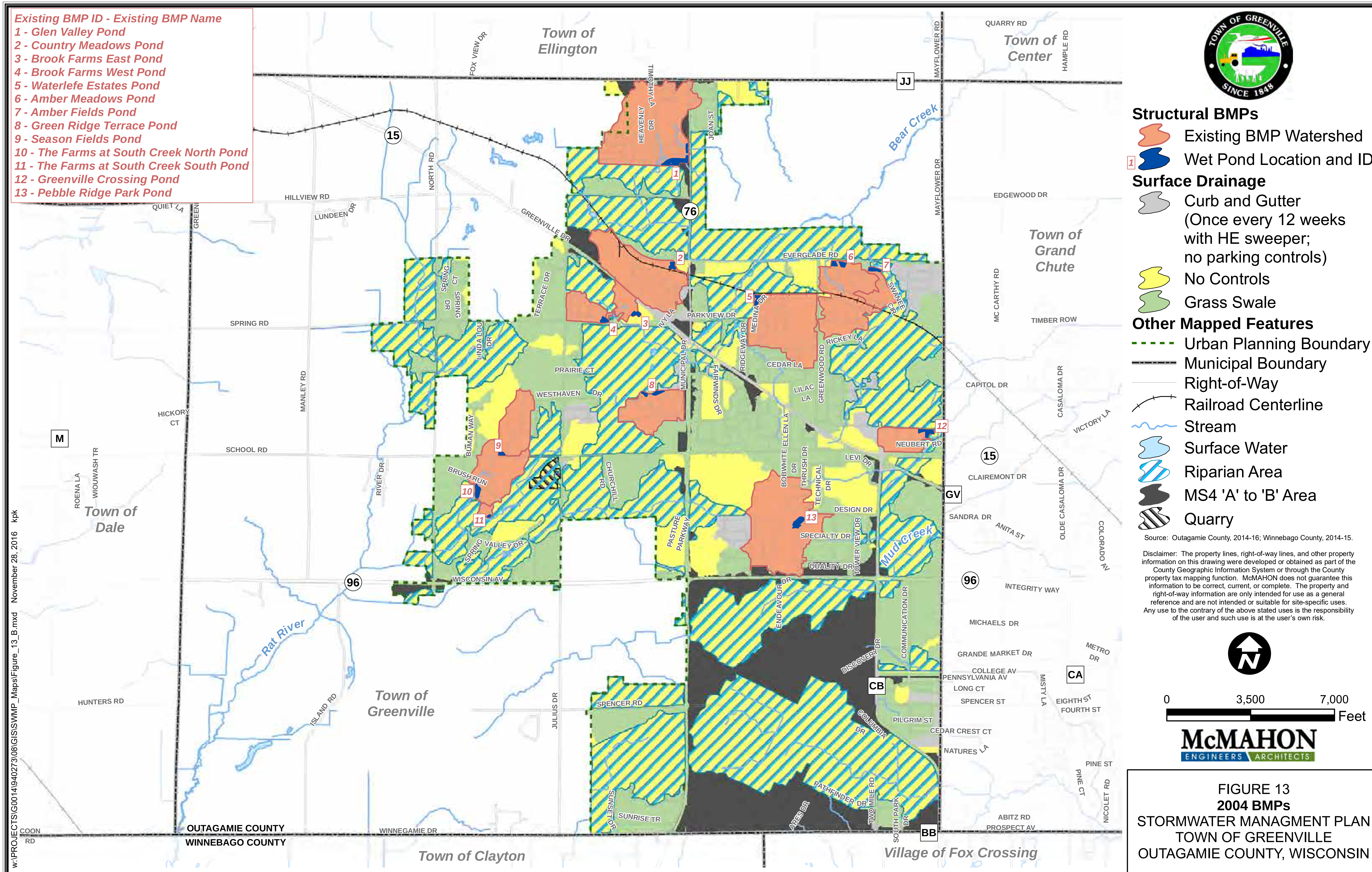


FIGURE 12
FUTURE LAND USE
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN



Existing BMP ID - Existing BMP Name
1 - Glen Valley Pond
2 - Country Meadows Pond
3 - Brook Farms East Pond
4 - Brook Farms West Pond
5 - Waterlefe Estates Pond
6 - Amber Meadows Pond
7 - Amber Fields Pond
8 - Green Ridge Terrace Pond
9 - Season Fields Pond
10 - The Farms at South Creek North Pond
11 - The Farms at South Creek South Pond
12 - Greenville Crossing Pond
13 - Pebble Ridge Park Pond
Town of Ellington
Town of Center
Town of Grand Chute
Town of Dale
Town of Greenville
Town of Clayton
Village of Fox Crossing
OUTAGAMIE COUNTY
WINNEBAGO COUNTY
Bear Creek
Mud Creek
Rat River
TOWN OF GREENVILLE SINCE 1848
Structural BMPs
Existing BMP Watershed
Wet Pond Location and ID
Surface Drainage
Curb and Gutter (Once every 12 weeks with HE sweeper; no parking controls)
No Controls
Grass Swale
Other Mapped Features
Urban Planning Boundary
Municipal Boundary
Right-of-Way
Railroad Centerline
Stream
Surface Water
Riparian Area
MS4 'A' to 'B' Area
Quarry
Source: Outagamie County, 2014-16; Winnebago County, 2014-15.
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0 3,500 7,000 Feet
McMAHON ENGINEERS ARCHITECTS
FIGURE 13
2004 BMPs
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN
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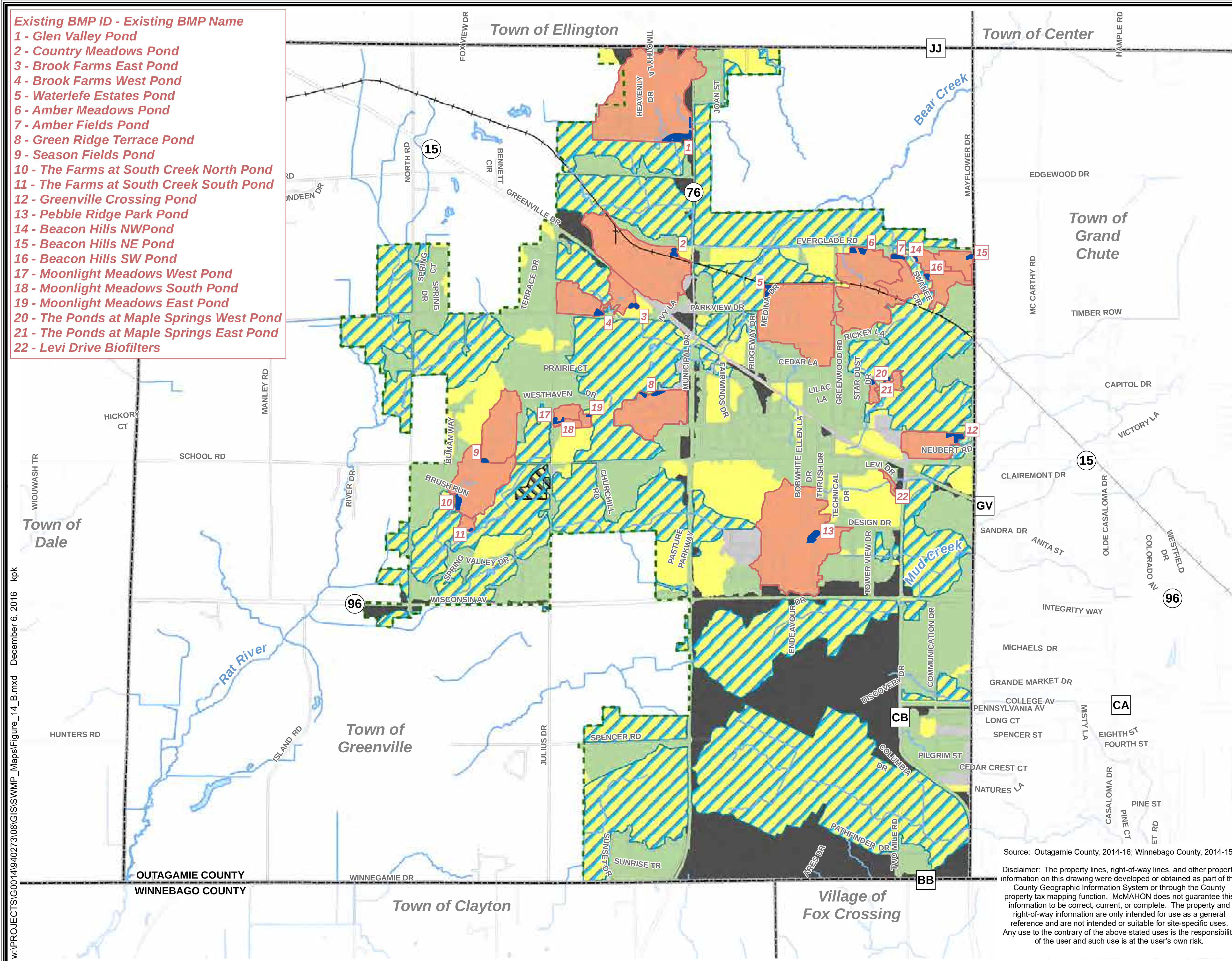

Source: Outagamie County, 2014-16; Winnebago County, 2014-15.

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FIGURE 14
2008 BMPs
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN

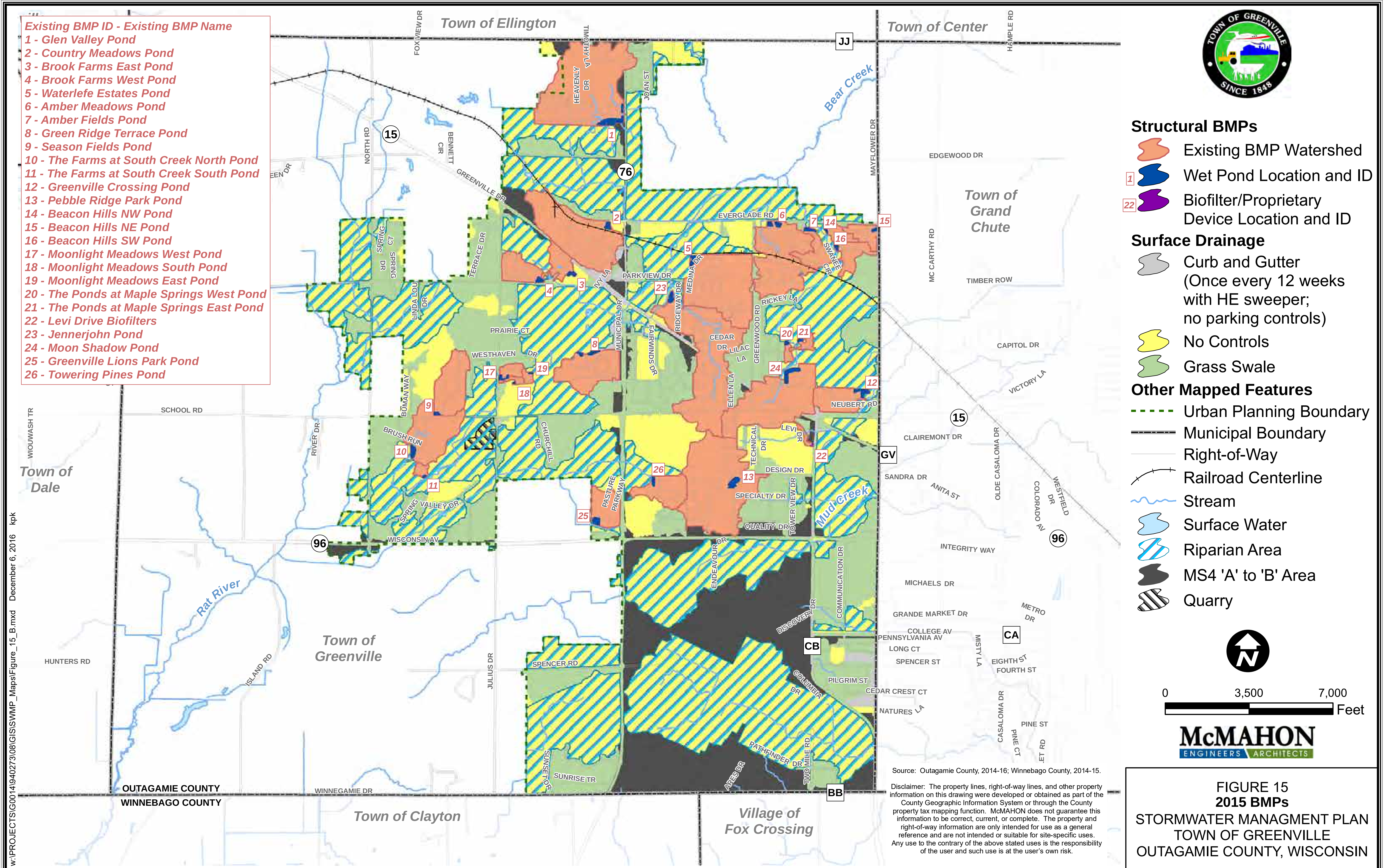


FIGURE 15
2015 BMPs
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN

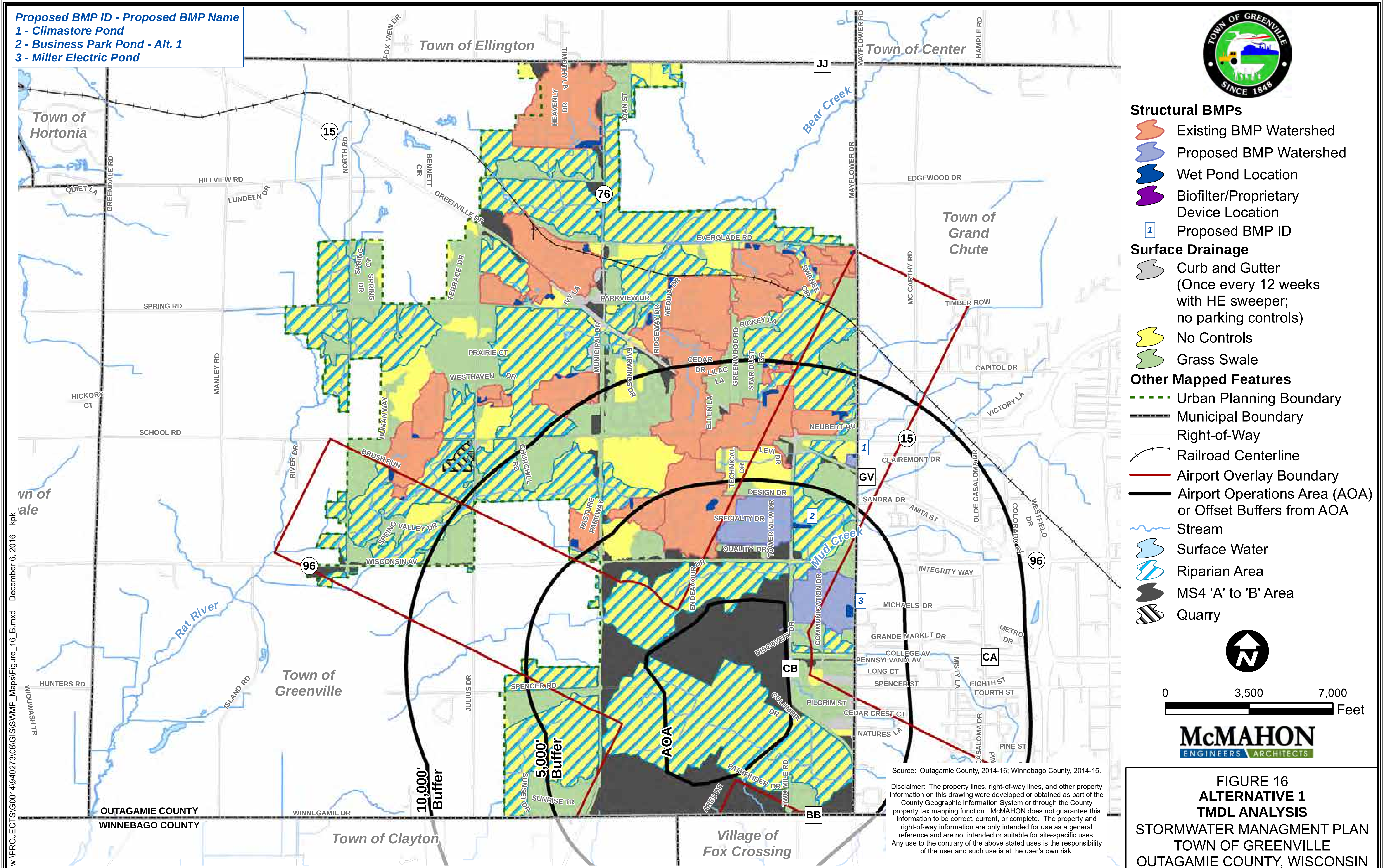


FIGURE 16
ALTERNATIVE 1
TMDL ANALYSIS
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN

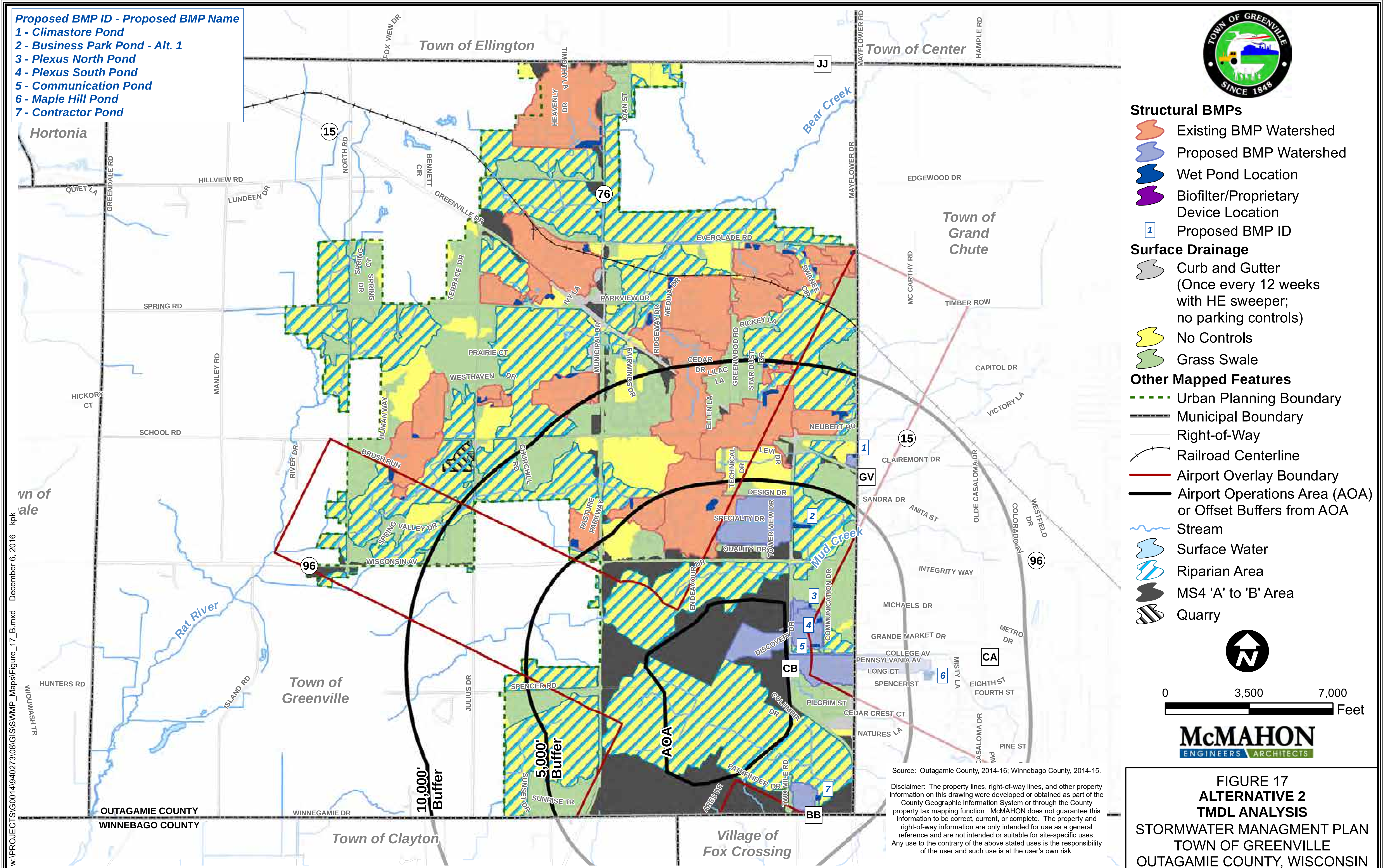


FIGURE 17
ALTERNATIVE 2
TMDL ANALYSIS
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN

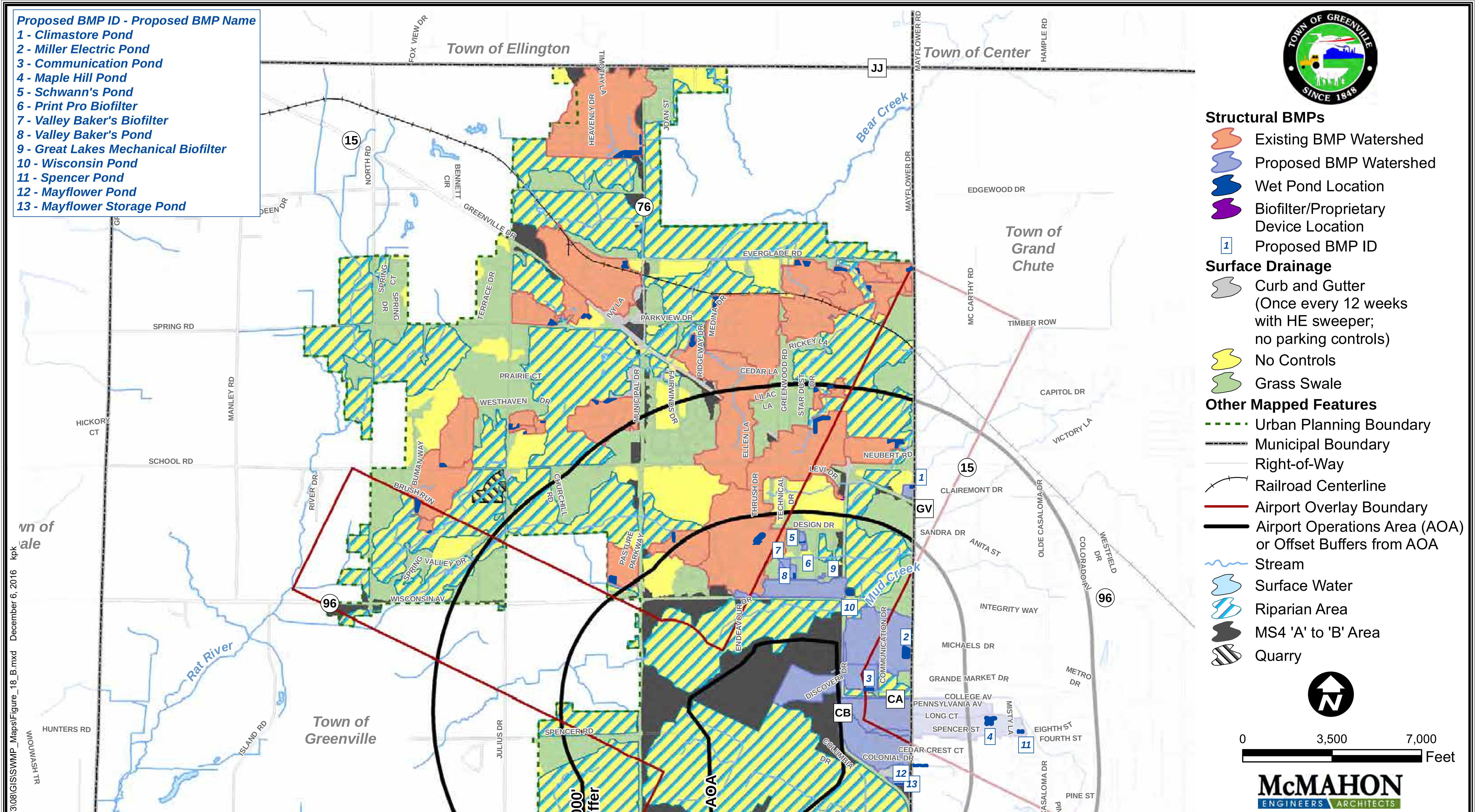


FIGURE 18
ALTERNATIVE 3
TMDL ANALYSIS
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN

APPENDIX A

BASELINE POLLUTANT LOAD & YIELD RANKINGS

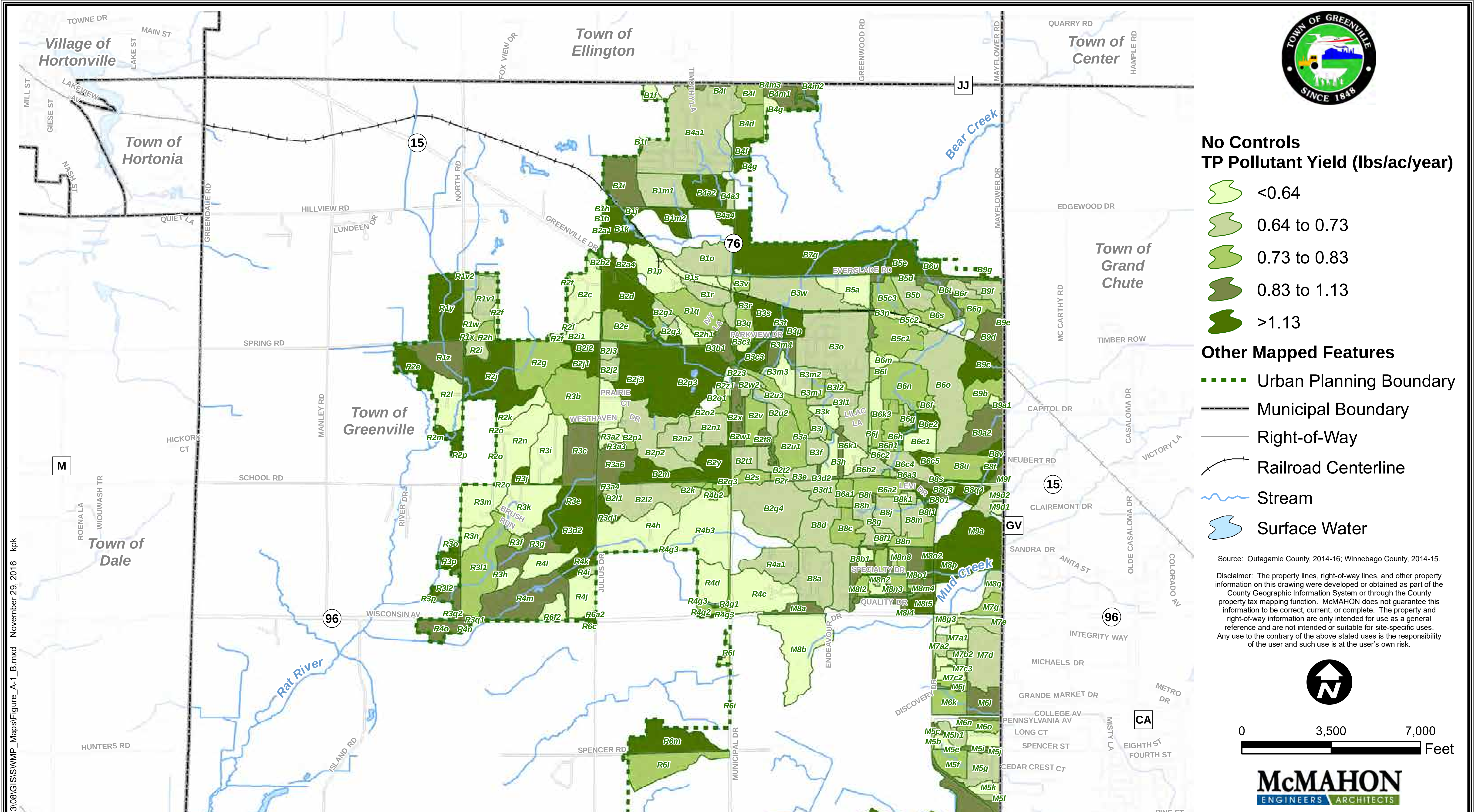
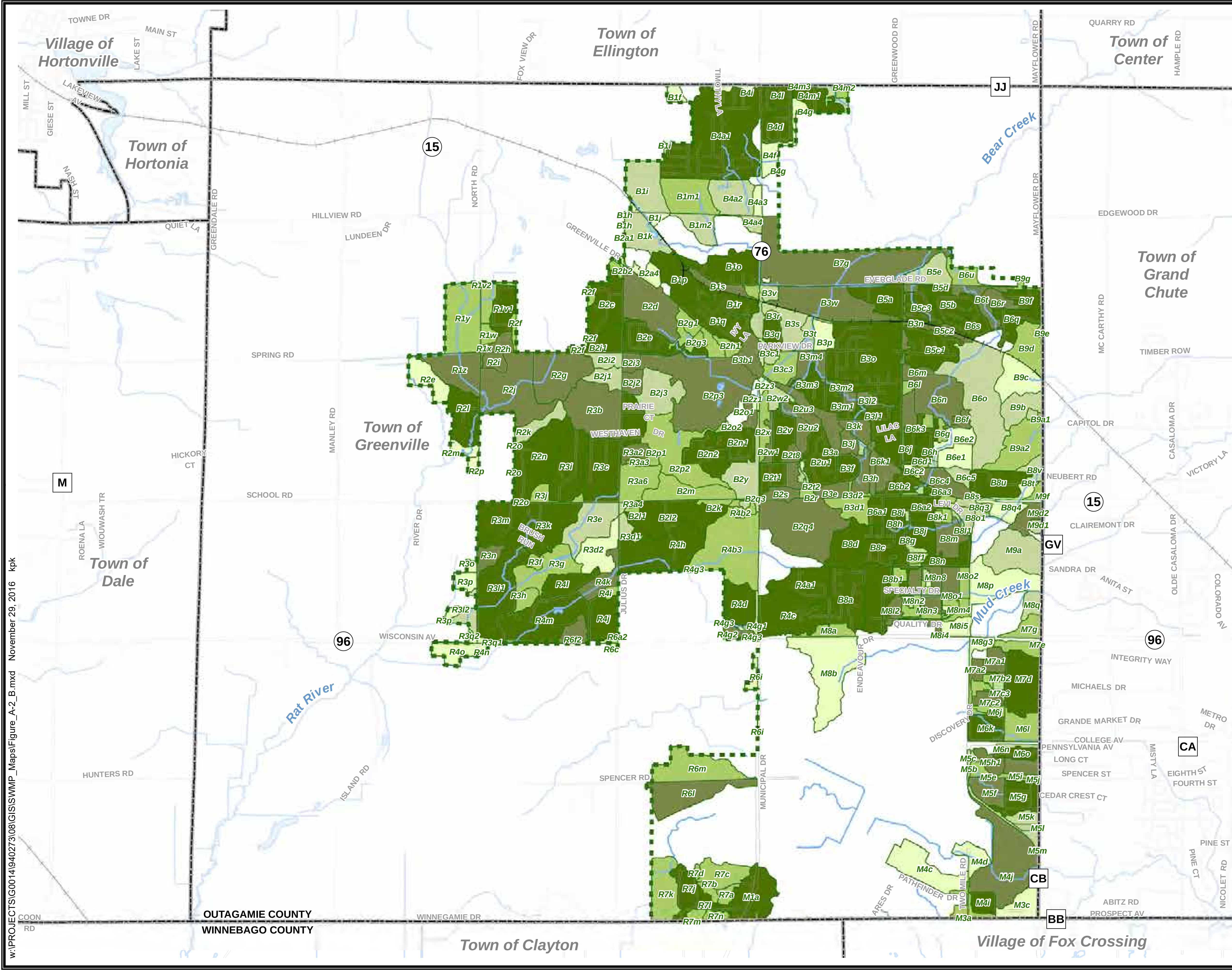


FIGURE A-1
DRAINAGE AREA
TP POLLUTANT YIELD
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN



No Controls
TP Pollutant Load (lbs/year)

- <1.2
- 1.2 to 3.0
- 3.0 to 6.5
- 6.5 to 12.0
- >12.0

Other Mapped Features

- Urban Planning Area
- Municipal Boundary
- Right-of-Way
- Railroad Centerline
- Stream
- Surface Water

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

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

0 3,500 7,000 Feet

McMAHON ENGINEERS ARCHITECTS

FIGURE A-2
DRAINAGE AREA
TP POLLUTANT LOAD
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN

w:\PROJECTS\G0014\940273\08\GIS\SWMP_Maps\Figure_A-2_B.mxd November 29, 2016 kpk

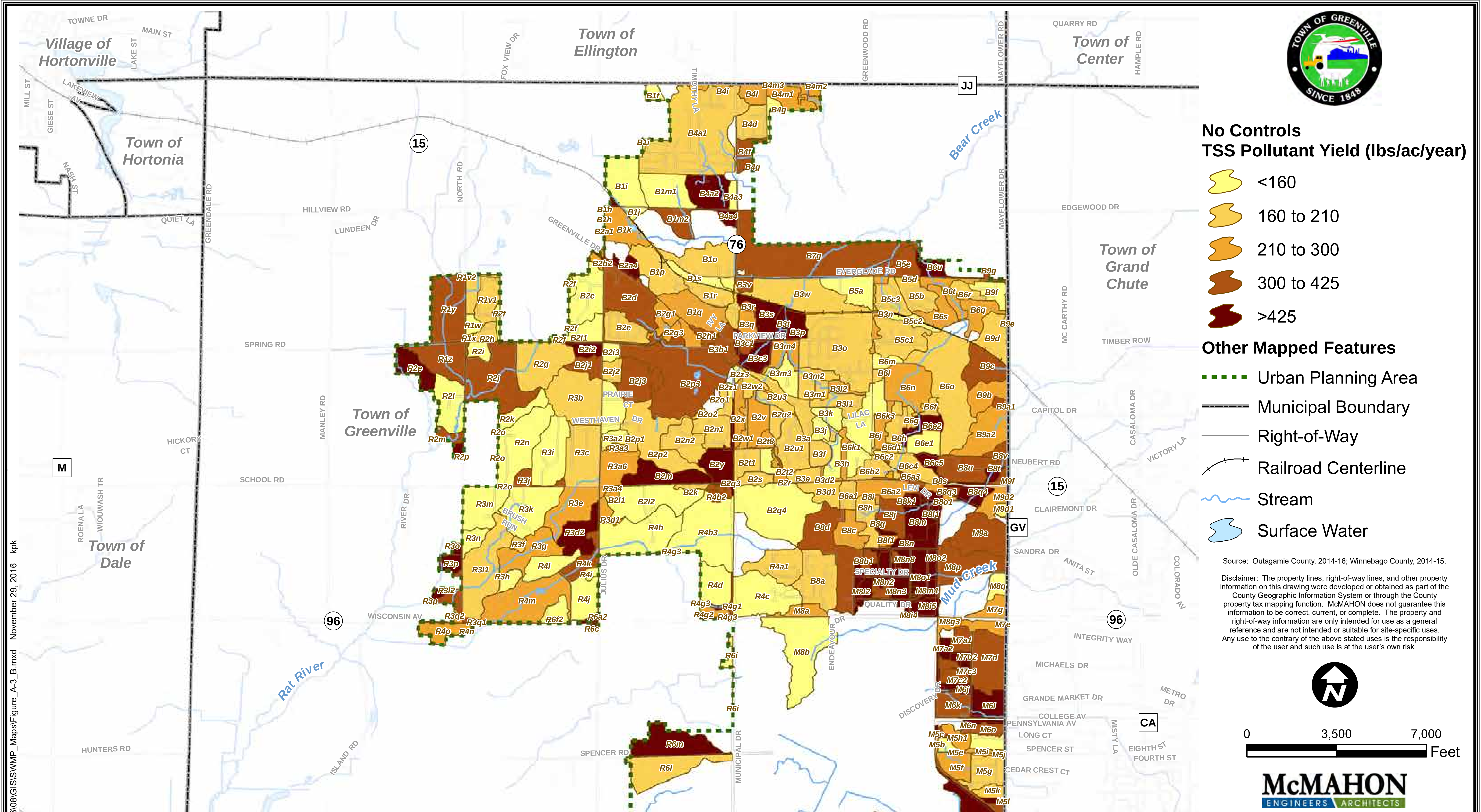
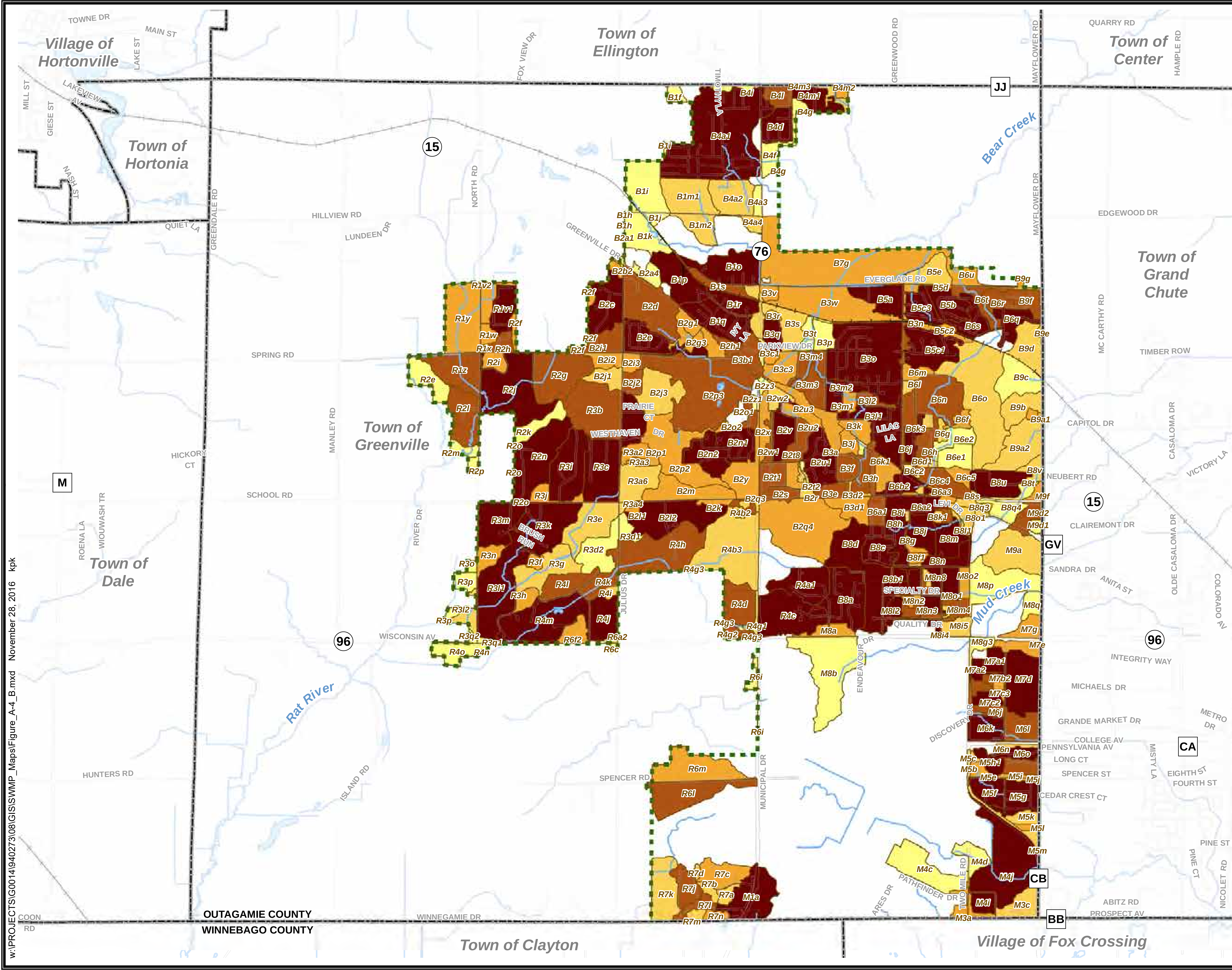


FIGURE A-3
DRAINAGE AREA
TSS POLLUTANT YIELD
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN



No Controls TSS Pollutant Load (lbs/year)

- <400
- 400 to 1,000
- 1,000 to 2,000
- 2,000 to 3,500
- >3,500

Other Mapped Features

- Urban Planning Area
- Municipal Boundary
- Right-of-Way
- Railroad Centerline
- Stream
- Surface Water

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

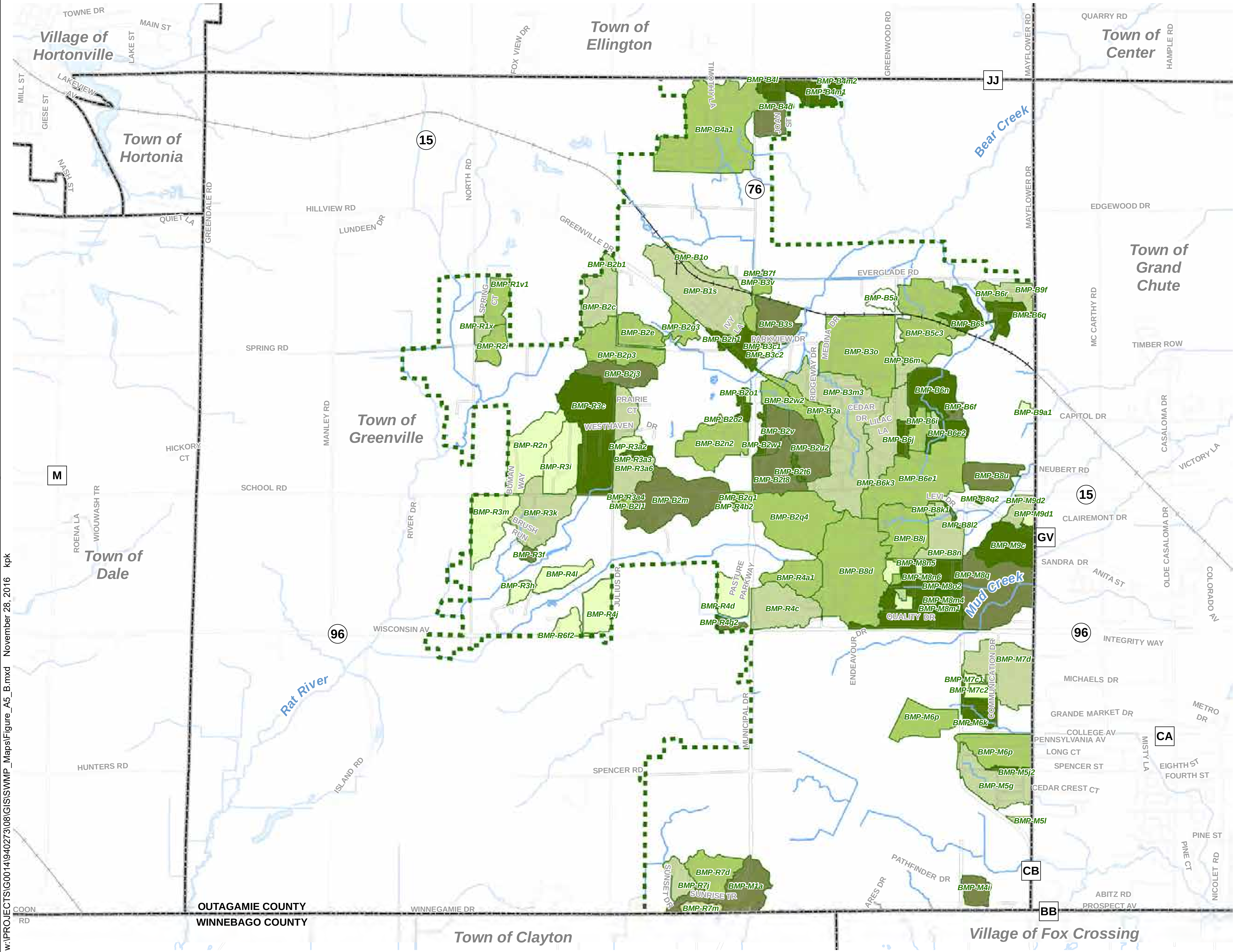
Disclaimer: The property lines, right-of-way lines, and other property information on this drawing were developed or obtained as part of the County Geographic Information System or through the County property tax mapping function. McMAHON does not guarantee this information to be correct, current, or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

0 3,500 7,000 Feet

McMAHON ENGINEERS ARCHITECTS

FIGURE A-4
DRAINAGE AREA
TSS POLLUTANT LOAD
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN

w:\PROJECTS\G0014\940273\08\GIS\SWMP_Maps\Figure_A-4_B.mxd November 28, 2016 kpk



No Controls
TP Pollutant Yield (lbs/ac/year)

- <0.62
- 0.62 to 0.70
- 0.70 to 0.75
- 0.75 to 0.80
- >0.80

Other Mapped Features

- Urban Planning Area
- Municipal Boundary
- Right-of-Way
- Railroad Centerline
- Stream
- Surface Water

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

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

0 3,500 7,000 Feet

McMAHON ENGINEERS ARCHITECTS

FIGURE A-5
BMP CATCHMENTS
TP POLLUTANT YIELD
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN

w:\PROJECTS\G0014\940273\08\GIS\SWMP_Maps\Figure_A5_B.mxd November 28, 2016 kpk

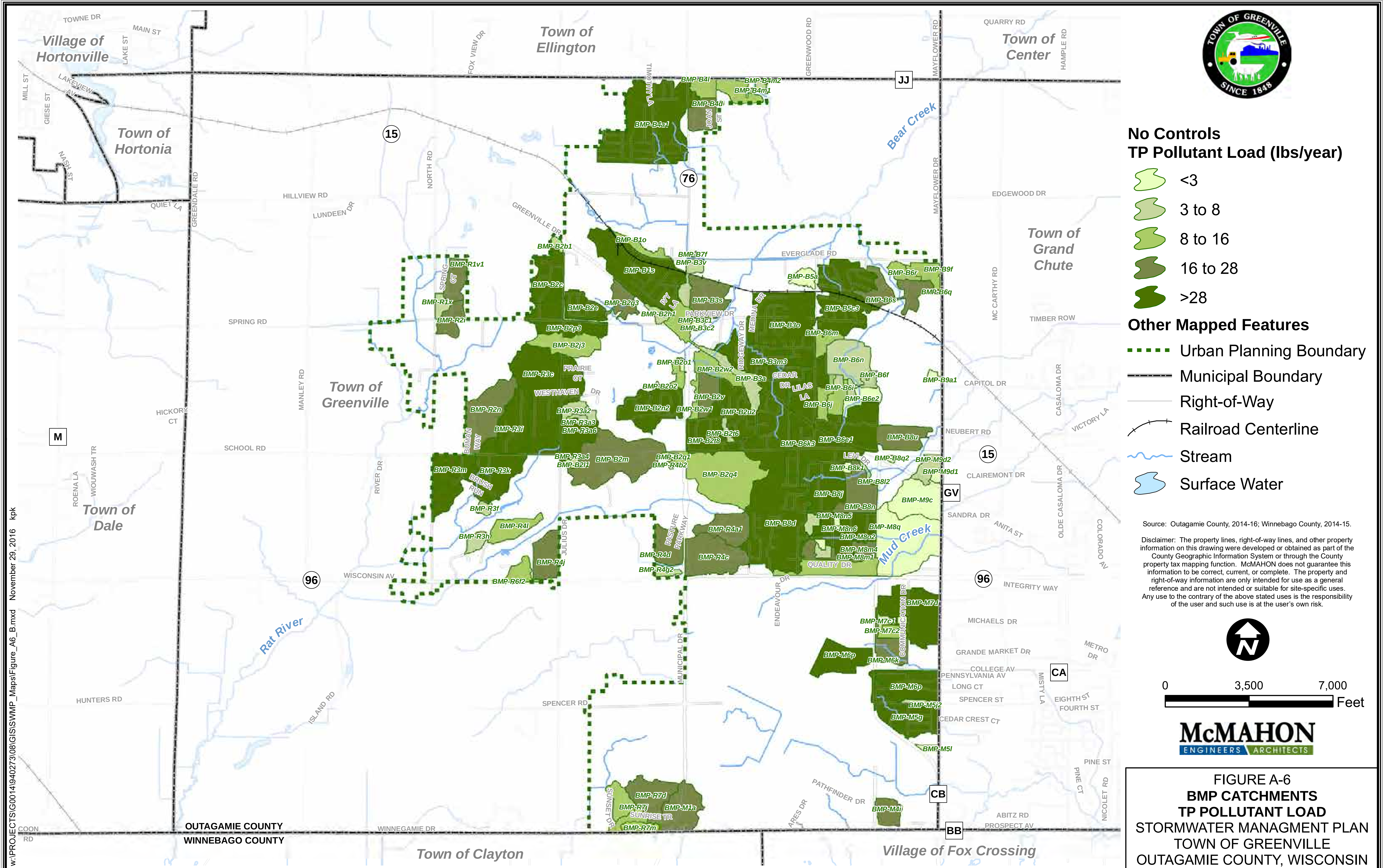


FIGURE A-6
BMP CATCHMENTS
TP POLLUTANT LOAD
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN

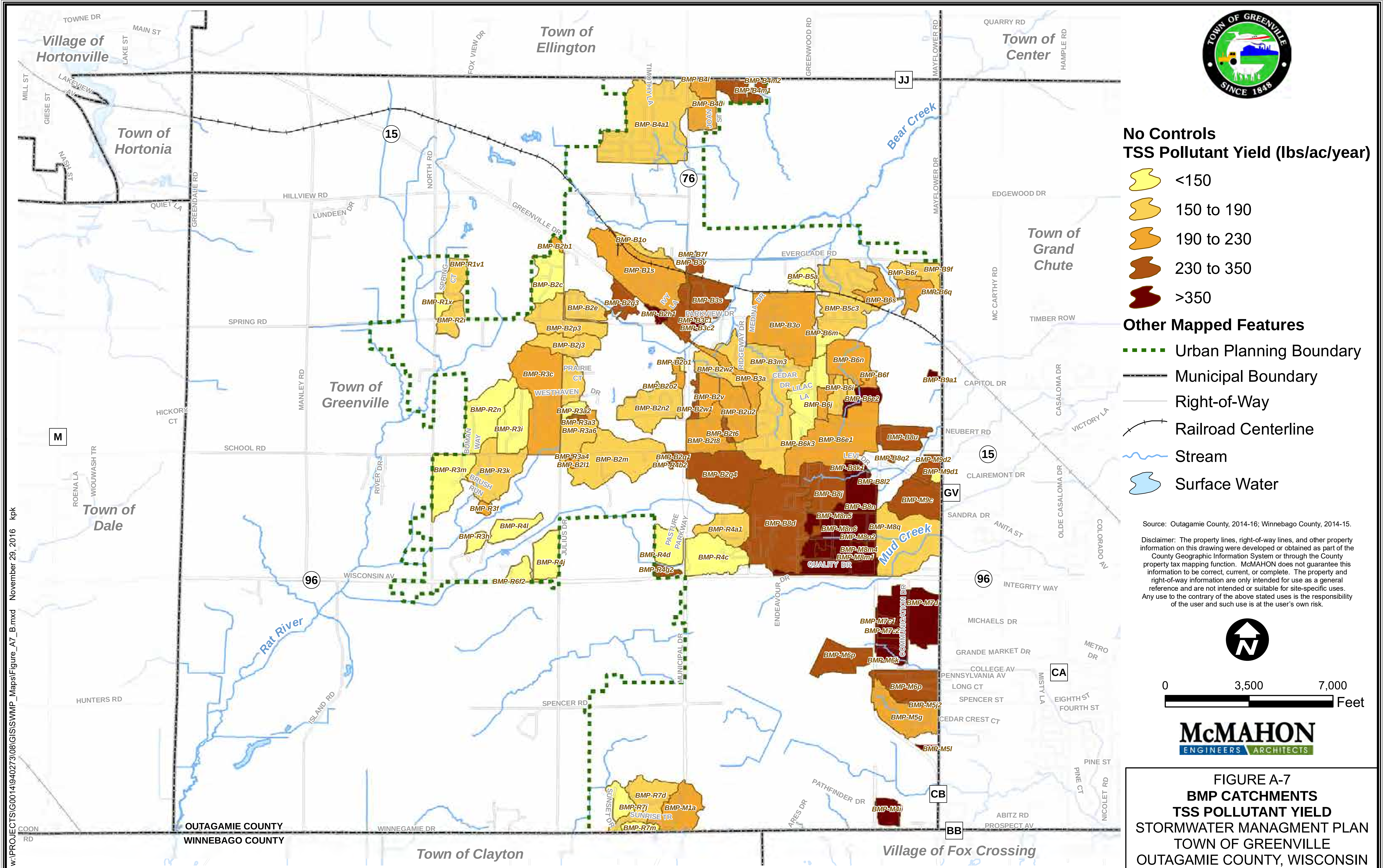


FIGURE A-7
BMP CATCHMENTS
TSS POLLUTANT YIELD
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN

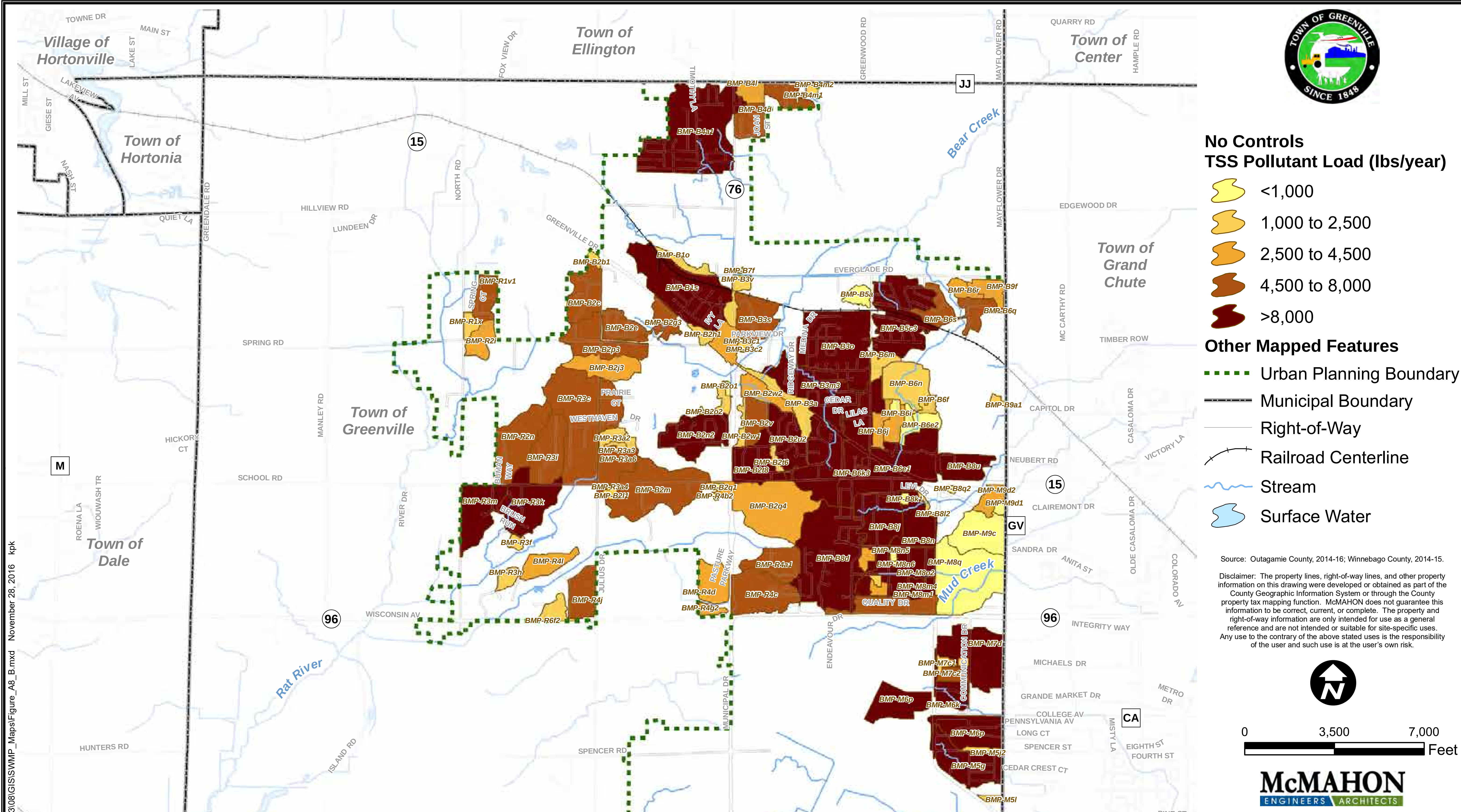


FIGURE A-8
BMP CATCHMENTS
TSS POLLUTANT LOAD
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN

Town of Greenville
Pollutant Load & Yield Summary
Bear Creek Drainage Area Rankings

Rank	Catchment Area ID	TSS Load (lbs/yr)
1	B4a1	33,975
2	B3o	23,450
3	B8d	15,965
4	B1q	12,445
5	B8a	11,990
6	B5c1	10,691
7	B8j	10,679
8	B8u	10,179
9	B8b2	9,923
10	B2u1	9,695
11	B1p	8,816
12	B6a2	8,783
13	B8n	8,457
14	B2v	7,291
15	B2e	7,248
16	B2c	6,984
17	B8m	6,982
18	B2n1	6,495
19	B6s	6,432
20	B8c	6,353
21	B4d	6,103
22	B2n2	5,978
23	B5c3	5,828
24	B8h	5,785
25	B5b	5,428
26	B1r	5,254
27	B6k2	5,016
28	B4m1	4,905
29	B3l1	4,887
30	B6q	4,605
31	B3m2	4,455
32	B3q	4,018
33	B2l2	4,008
34	B5a	3,995
35	B2f	3,875
36	B6j	3,812
37	B6b2	3,704
38	B8b1	3,565
39	B1o	3,562
40	B4l	3,451
41	B2i1	3,443
42	B6a1	3,374
43	B9f	3,332
44	B3f	3,323
45	B6h	3,275
46	B3m3	3,248
47	B2t1	3,222
48	B3b1	3,185
49	B2s	3,032
50	B2p3	2,993
51	B6c4	2,957
52	B6k3	2,731
53	B2j2	2,596
54	B3e	2,591
55	B2u2	2,577
56	B6r	2,542
57	B3g	2,537
58	B2t8	2,500
59	B2d	2,436
60	B1s	2,435
61	B2w1	2,390
62	B3n	2,327
63	B2o1	2,277
64	B3h	2,230
65	B3l2	2,111
66	B2h1	2,093
67	B3m4	2,079
68	B8k2	2,068
69	B2q2	2,053
70	B6n	2,019
71	B6t	2,019
72	B2h2	1,991
73	B3m1	1,959
74	B2g2	1,952

Rank	Catchment Area ID	TSS Load (lbs/ac/yr)
1	B8q4	904
2	B8l1	874
3	B8l2	855
4	B8o1	819
5	B6c5	810
6	B8s	809
7	B2q3	796
8	B2a4	755
9	B2b2	717
10	B3c3	640
11	B8t	636
12	B3b2	628
13	B6e2	608
14	B2i2	603
15	B3c1	596
16	B3p	585
17	B4a2	573
18	B4a4	568
19	B8q3	554
20	B8b2	524
21	B6u	511
22	B8g	503
23	B3s	501
24	B3t	495
25	B2y	476
26	B2m	466
27	B1h	456
28	B8n	448
29	B8f2	442
30	B8k2	429
31	B8k1	429
32	B8m	429
33	B8e	420
34	B8v	408
35	B8j	398
36	B2p3	395
37	B2j1	395
38	B8b1	392
39	B6a3	388
40	B1m2	387
41	B9a1	384
42	B3v	380
43	B7g	379
44	B2d	377
45	B5e	369
46	B2j3	361
47	B3c2	358
48	B9c	353
49	B2h1	351
50	B4f	349
51	B6c3	343
52	B8q1	343
53	B6c2	342
54	B2f	337
55	B8u	333
56	B3b1	325
57	B9g	320
58	B2q2	319
59	B8q2	317
60	B8d	314
61	B2t4	303
62	B2q1	302
63	B6b1	300
64	B4i	297
65	B2a1	292
66	B8i	291
67	B2t8	290
68	B2t6	288
69	B2t3	288
70	B6a2	283
71	B4m1	282
72	B3n	273
73	B8o2	268
74	B9a2	265

Rank	Catchment Area ID	TP Yield (lbs/yr)
1	B4a1	138.3
2	B3o	87.6
3	B8a	49.0
4	B5c1	43.6
5	B1q	42.8
6	B2u1	37.9
7	B8d	33.2
8	B2c	32.8
9	B1p	32.3
10	B2e	28.0
11	B2n1	26.2
12	B2v	25.7
13	B2n2	24.5
14	B4d	24.2
15	B8c	24.1
16	B6s	24.1
17	B6a2	24.0
18	B8u	23.6
19	B5c3	22.8
20	B5b	22.6
21	B6k2	22.1
22	B8h	20.3
23	B3l1	20.3
24	B1r	19.1
25	B8j	18.3
26	B8b2	17.8
27	B2l2	17.8
28	B6q	17.4
29	B3m2	17.2
30	B2i1	16.4
31	B4m1	15.4
32	B5a	14.8
33	B6j	14.5
34	B9f	14.4
35	B3m3	14.3
36	B6b2	14.2
37	B1o	14.1
38	B8n	13.9
39	B3f	13.5
40	B3q	13.5
41	B2t1	13.5
42	B6h	13.3
43	B2f	13.2
44	B4l	13.1
45	B6a1	13.0
46	B6k3	11.9
47	B2s	11.8
48	B3g	11.6
49	B6c4	11.3
50	B3e	10.8
51	B2j2	10.7
52	B1s	10.6
53	B6r	10.5
54	B8m	10.4
55	B2u2	9.8
56	B2p3	9.2
57	B2o1	8.7
58	B3b1	8.7
59	B2w1	8.5
60	B3k	8.5
61	B3h	8.2
62	B5c2	8.1
63	B3l2	8.1
64	B2t8	8.0
65	B6k1	8.0
66	B3n	8.0
67	B3m1	7.8
68	B7g	7.8
69	B6n	7.8
70	B2t7	7.7
71	B3m4	7.6
72	B3w	7.6
73	B6t	7.4
74	B2d	7.3

Rank	Catchment Area ID	TP Yield (lbs/ac/yr)
1	B8l1	2.02
2	B8l2	1.96
3	B8o1	1.90
4	B6e2	1.82
5	B2i2	1.79
6	B3p	1.75
7	B4a2	1.73
8	B2a4	1.72
9	B4a4	1.70
10	B3t	1.66
11	B8q4	1.65
12	B6u	1.57
13	B2m	1.57
14	B7g	1.52
15	B3c3	1.52
16	B6c5	1.51
17	B3s	1.51
18	B8s	1.51
19	B2q3	1.49
20	B1h	1.46
21	B1m2	1.41
22	B2b2	1.41
23	B1k	1.37
24	B3b2	1.32
25	B5e	1.29
26	B2j1	1.28
27	B8q3	1.28
28	B1j	1.26
29	B8t	1.25
30	B9c	1.22
31	B2p3	1.21
32	B2j3	1.20
33	B2y	1.19
34	B3c1	1.17
35	B4f	1.17
36	B9g	1.16
37	B8e	1.15
38	B2f	1.15
39	B8v	1.14
40	B2d	1.13
41	B2t4	1.05
42	B4i	1.03
43	B2a1	1.03
44	B2t6	1.01
45	B2t3	1.01
46	B6a3	1.01
47	B9e	0.96
48	B8i	0.96
49	B8o2	0.95
50	B8b2	0.94
51	B3n	0.94
52	B3d2	0.94
53	B2w1	0.93
54	B2t8	0.93
55	B2t5	0.93
56	B2t2	0.92
57	B9a2	0.91
58	B6t	0.90
59	B9d	0.89
60	B3h	0.89
61	B3b1	0.89
62	B4m1	0.88
63	B8g	0.88
64	B2z3	0.88
65	B4m2	0.87
66	B4m3	0.87
67	B2x	0.87
68	B3m4	0.87
69	B1i	0.87
70	B5d	0.85
71	B3r	0.84
72	B6c3	0.83
73	B8q1	0.83
74	B6c2	0.83

Rank	Catchment Area ID	TSS Load (lbs/yr)
75	B7g	1,938
76	B2g1	1,903
77	B3w	1,865
78	B6f	1,847
79	B2g3	1,812
80	B3a	1,794
81	B2t7	1,780
82	B5d	1,777
83	B2u3	1,770
84	B5c2	1,680
85	B3k	1,629
86	B3j	1,611
87	B8f2	1,586
88	B6k1	1,581
89	B3c3	1,545
90	B6m	1,527
91	B9a1	1,522
92	B2i3	1,516
93	B8f1	1,487
94	B2q4	1,484
95	B2p2	1,483
96	B6a3	1,474
97	B3d1	1,467
98	B3c2	1,340
99	B2x	1,334
100	B2m	1,334
101	B6c5	1,204
102	B3v	1,189
103	B2k	1,155
104	B2y	1,155
105	B6u	1,107
106	B4m2	1,103
107	B2p1	1,079
108	B2l1	1,072
109	B2b1	1,038
110	B9g	1,009
111	B2i2	1,006
112	B8l2	992
113	B8o1	961
114	B1m1	921
115	B2r	913
116	B8k1	912
117	B9a2	908
118	B3d2	900
119	B6g	893
120	B6l	889
121	B6i	880
122	B2q3	864
123	B3r	826
124	B1t	801
125	B3u	786
126	B5e	772
127	B6d1	757
128	B4a4	750
129	B8v	734
130	B2t6	719
131	B1m2	711
132	B2q1	686
133	B8g	685
134	B6o	674
135	B9b	655
136	B8o2	650
137	B3c1	642
138	B8i	587
139	B9d	561
140	B8l1	554
141	B8q3	549
142	B2w2	541
143	B6b1	528
144	B4a2	527
145	B2j3	506
146	B8q2	500
147	B2j1	483
148	B4m3	478
149	B3s	448
150	B2b2	448
151	B8e	442
152	B8t	438
153	B9e	432
154	B6d2	412
155	B2a4	387
156	B3i	376
157	B3t	360
158	B1k	355

Rank	Catchment Area ID	TSS Load (lbs/ac/yr)
75	B8f1	264
76	B2w1	262
77	B3d2	260
78	B2t5	259
79	B2t2	255
80	B2g3	251
81	B9b	249
82	B1k	248
83	B2h2	247
84	B2g2	245
85	B6t	244
86	B2x	244
87	B3h	241
88	B4m3	240
89	B4m2	240
90	B3m4	238
91	B1q	230
92	B2b1	226
93	B3r	226
94	B2l1	225
95	B2v	222
96	B6s	221
97	B5d	220
98	B3q	219
99	B6n	215
100	B4l	215
101	B6q	214
102	B3l2	214
103	B8c	213
104	B6j	211
105	B2r	210
106	B2g1	210
107	B2p1	209
108	B2o1	209
109	B6f	208
110	B2w2	207
111	B6a1	207
112	B2s	204
113	B3a	201
114	B2k	201
115	B1r	200
116	B3i	199
117	B8h	198
118	B2u1	198
119	B3u	195
120	B5c3	194
121	B3o	193
122	B4d	192
123	B9e	190
124	B2e	190
125	B3m1	189
126	B6b2	189
127	B6d1	187
128	B6i	186
129	B6d2	186
130	B3m2	184
131	B6l	183
132	B6h	181
133	B2n1	181
134	B2u2	180
135	B5c1	179
136	B3f	178
137	B1o	177
138	B2u3	177
139	B3w	177
140	B6c4	175
141	B2p2	175
142	B2n2	174
143	B2j2	173
144	B4a1	172
145	B6r	172
146	B3e	171
147	B3l1	171
148	B8a	171
149	B2t1	167
150	B1p	165
151	B5b	165
152	B3d1	165
153	B6g	163
154	B6o	162
155	B9d	162
156	B1j	160
157	B2z3	158
158	B4a3	156

Rank	Catchment Area ID	TP Yield (lbs/yr)
75	B2u3	7.1
76	B6m	7.1
77	B3j	7.0
78	B5d	6.9
79	B6f	6.9
80	B2i3	6.7
81	B3a	6.6
82	B2q4	6.6
83	B2g2	6.2
84	B2p2	6.2
85	B3d1	6.2
86	B2g1	5.9
87	B8b1	5.5
88	B2g3	5.0
89	B2q2	5.0
90	B2h2	4.9
91	B2h1	4.8
92	B2x	4.8
93	B2k	4.6
94	B2m	4.5
95	B1m1	4.4
96	B2p1	4.1
97	B4m2	4.0
98	B6a3	3.8
99	B3c3	3.7
100	B6g	3.7
101	B9g	3.6
102	B6l	3.6
103	B6i	3.5
104	B2r	3.5
105	B1t	3.5
106	B8f1	3.4
107	B6u	3.4
108	B2l1	3.4
109	B3d2	3.2
110	B9a2	3.1
111	B8k2	3.1
112	B9d	3.1
113	B2b1	3.1
114	B3r	3.1
115	B6d1	3.0
116	B2i2	3.0
117	B2y	2.9
118	B6o	2.9
119	B3u	2.8
120	B5e	2.7
121	B1m2	2.6
122	B2t6	2.5
123	B8f2	2.5
124	B3v	2.4
125	B9a1	2.4
126	B8o2	2.3
127	B8l2	2.3
128	B4a4	2.2
129	B6c5	2.2
130	B8o1	2.2
131	B9e	2.2
132	B3c2	2.1
133	B8v	2.0
134	B9b	2.0
135	B1k	2.0
136	B8i	1.9
137	B2w2	1.9
138	B4m3	1.7
139	B1i	1.7
140	B2q1	1.7
141	B2j3	1.7
142	B6d2	1.7
143	B2q3	1.6
144	B4a2	1.6
145	B2j1	1.6
146	B3i	1.5
147	B6b1	1.4
148	B8k1	1.4
149	B3s	1.3
150	B8l1	1.3
151	B8q2	1.3
152	B8q3	1.3
153	B3c1	1.3
154	B8e	1.2
155	B3t	1.2
156	B8g	1.2
157	B2t5	1.2
158	B1j	1.1

Rank	Catchment Area ID	TP Yield (lbs/ac/yr)
75	B6s	0.83
76	B6n	0.83
77	B4l	0.82
78	B3l2	0.82
79	B6q	0.81
80	B8c	0.81
81	B2h1	0.81
82	B6j	0.81
83	B2r	0.81
84	B2p1	0.80
85	B2o1	0.80
86	B8q2	0.80
87	B2k	0.80
88	B6a1	0.80
89	B2s	0.79
90	B1q	0.79
91	B2g2	0.78
92	B2v	0.78
93	B3i	0.78
94	B6b1	0.77
95	B2u1	0.77
96	B6a2	0.77
97	B2q2	0.77
98	B9b	0.77
99	B8u	0.77
100	B6f	0.77
101	B4d	0.76
102	B5c3	0.76
103	B3v	0.75
104	B3m1	0.75
105	B6d2	0.75
106	B6i	0.75
107	B6d1	0.75
108	B3a	0.75
109	B2q1	0.74
110	B6l	0.74
111	B6h	0.73
112	B8n	0.73
113	B3q	0.73
114	B2e	0.73
115	B5c1	0.73
116	B2p2	0.73
117	B2n1	0.73
118	B6b2	0.73
119	B2w2	0.72
120	B3f	0.72
121	B1r	0.72
122	B3o	0.72
123	B3w	0.72
124	B2j2	0.71
125	B2u3	0.71
126	B2n2	0.71
127	B3l1	0.71
128	B3e	0.71
129	B2l1	0.71
130	B3m2	0.71
131	B6r	0.71
132	B1m1	0.71
133	B4a1	0.70
134	B2t1	0.70
135	B1o	0.70
136	B8a	0.70
137	B8f2	0.70
138	B8h	0.70
139	B2g3	0.69
140	B3d1	0.69
141	B6o	0.69
142	B3u	0.69
143	B2u2	0.69
144	B2l2	0.69
145	B5b	0.69
146	B8j	0.68
147	B6c4	0.67
148	B6g	0.67
149	B2b1	0.67
150	B2t7	0.66
151	B3j	0.66
152	B6k2	0.66
153	B9f	0.66
154	B2i3	0.66
155	B4a3	0.65
156	B8d	0.65
157	B2g1	0.65
158	B2q4	0.64

Rank	Catchment Area ID	TSS Load (lbs/yr)
159	B2t5	321
160	B2t4	298
161	B3p	297
162	B2t2	281
163	B4a3	264
164	B1i	249
165	B6c2	247
166	B9c	221
167	B4i	211
168	B6c3	202
169	B1h	194
170	B2o2	193
171	B2z3	190
172	B2t3	184
173	B3b2	181
174	B8q4	179
175	B6e1	168
176	B4f	167
177	B8q1	160
178	B1j	145
179	B6c1	142
180	B2a1	135
181	B8s	133
182	B2z1	123
183	B6e2	32
184	B4g	26
185	B1f	15

Rank	Catchment Area ID	TSS Load (lbs/ac/yr)
159	B2l2	155
160	B2t7	154
161	B3j	153
162	B9f	152
163	B6k2	149
164	B1m1	149
165	B2i3	148
166	B1t	146
167	B6k3	145
168	B2q4	144
169	B1s	142
170	B3g	135
171	B6m	135
172	B2c	133
173	B1i	128
174	B2i1	127
175	B3m3	126
176	B5c2	124
177	B2o2	116
178	B6k1	111
179	B5a	109
180	B3k	107
181	B4g	98
182	B1f	76
183	B6c1	67
184	B2z1	58
185	B6e1	32

Rank	Catchment Area ID	TP Yield (lbs/yr)
159	B4a3	1.1
160	B2z3	1.1
161	B6e1	1.0
162	B2t4	1.0
163	B2t2	1.0
164	B6c1	1.0
165	B2z1	0.9
166	B3p	0.9
167	B2a4	0.9
168	B2o2	0.9
169	B2b2	0.9
170	B8t	0.9
171	B9c	0.8
172	B4i	0.7
173	B2t3	0.6
174	B1h	0.6
175	B6c2	0.6
176	B4f	0.6
177	B6c3	0.5
178	B2a1	0.5
179	B8q1	0.4
180	B3b2	0.4
181	B8q4	0.3
182	B8s	0.2
183	B4g	0.1
184	B6e2	0.1
185	B1f	0.1

Rank	Catchment Area ID	TP Yield (lbs/ac/yr)
159	B8k2	0.64
160	B8m	0.64
161	B8k1	0.64
162	B6k3	0.63
163	B1t	0.63
164	B6m	0.63
165	B2c	0.62
166	B1s	0.62
167	B3g	0.62
168	B2h2	0.61
169	B8f1	0.61
170	B2i1	0.61
171	B8b1	0.60
172	B1p	0.60
173	B5c2	0.60
174	B9a1	0.60
175	B3c2	0.57
176	B6k1	0.56
177	B3k	0.56
178	B3m3	0.56
179	B2o2	0.53
180	B4g	0.52
181	B1f	0.47
182	B6c1	0.46
183	B2z1	0.42
184	B5a	0.40
185	B6e1	0.20

McMAHON ENGINEERS ARCHITECTS

Town of Greenville
Pollutant Load & Yield Summary
Fox River Drainage Area Rankings

Rank	Catchment Area ID	TSS Load (lbs/yr)	Rank	Catchment Area ID	TSS Load (lbs/ac/yr)	Rank	Catchment Area ID	TP Yield (lbs/yr)	Rank	Catchment Area ID	TP Yield (lbs/ac/yr)
1	M7d	14,562	1	M3a	679	1	M7d	27.1	1	M4c	1.75
2	M6k	8,418	2	M3b	610	2	M5g	25.5	2	M4d	1.61
3	M4i	7,627	3	M4c	596	3	M1a	20.9	3	M3a	1.42
4	M5g	6,743	4	M4d	583	4	M6k	16.0	4	M3b	1.19
5	M7a1	5,572	5	M6l	572	5	M4i	12.7	5	M6l	1.04
6	M7c2	5,544	6	M3c	537	6	M6o	12.3	6	M6n	1.00
7	M1a	5,079	7	M6i	534	7	M5f	10.8	7	M5c	0.98
8	M7a2	4,636	8	M7c3	525	8	M5h1	10.6	8	M3c	0.97
9	M6o	4,540	9	M4j	480	9	M5h2	10.5	9	M6i	0.96
10	M5h1	3,845	10	M6n	471	10	M7a1	10.4	10	M7c3	0.94
11	M4j	3,811	11	M6j	461	11	M7c2	8.4	11	M5m	0.90
12	M5f	3,657	12	M5c	460	12	M7a2	7.1	12	M5j	0.88
13	M6l	3,492	13	M4i	450	13	M4j	6.8	13	M4j	0.86
14	M6j	3,388	14	M7a2	440	14	M6l	6.3	14	M5i	0.84
15	M7c1	2,489	15	M7b2	429	15	M6j	5.4	15	M5d	0.83
16	M5h2	2,488	16	M7b1	429	16	M5e	4.9	16	M6o	0.83
17	M7b2	2,419	17	M5l	429	17	M5i	4.2	17	M6k	0.81
18	M6i	2,291	18	M6k	424	18	M6i	4.1	18	M5f	0.78
19	M3a	1,878	19	M7c2	405	19	M3a	3.9	19	M1a	0.78
20	M5l	1,807	20	M7c1	397	20	M7c1	3.8	20	M4i	0.75
21	M3b	1,728	21	M7d	390	21	M7b2	3.7	21	M6j	0.74
22	M7c3	1,481	22	M5d	359	22	M3b	3.4	22	M7d	0.73
23	M5i	1,145	23	M5m	339	23	M5j	2.8	23	M5h1	0.70
24	M7b1	1,143	24	M7a1	334	24	M5l	2.7	24	M5g	0.68
25	M5e	1,125	25	M6o	306	25	M7c3	2.6	25	M7a2	0.67
26	M5j	780	26	M5f	264	26	M5k	2.2	26	M7b2	0.65
27	M6n	749	27	M5h1	253	27	M5d	1.7	27	M5l	0.64
28	M5d	740	28	M5j	246	28	M7b1	1.7	28	M7b1	0.64
29	M5m	638	29	M5i	228	29	M5m	1.7	29	M5k	0.64
30	M3c	575	30	M5b	202	30	M6n	1.6	30	M5b	0.63
31	M5k	573	31	M1a	190	31	M3c	1.0	31	M7a1	0.62
32	M4d	377	32	M5g	180	32	M4d	1.0	32	M5h2	0.61
33	M4c	234	33	M5k	164	33	M4c	0.7	33	M7c1	0.61
34	M5c	59	34	M5h2	146	34	M5b	0.2	34	M7c2	0.61
35	M5b	49	35	M5e	135	35	M5c	0.1	35	M5e	0.59

Town of Greenville
Pollutant Load & Yield Summary
Mud Creek Drainage Area Rankings

Rank	Catchment Area ID	TSS Load (lbs/yr)
1	M8o1	5,967
2	M8n4	5,904
3	M8n3	5,226
4	M8l2	5,085
5	M8n8	4,851
6	M8i4	4,419
7	M8n7	3,115
8	M8l1	2,928
9	M8m3	2,746
10	M9d2	2,715
11	M8m4	2,481
12	M8l3	2,351
13	M8o2	1,919
14	M9f	1,899
15	M7g	1,724
16	M7e	1,660
17	M8n2	1,575
18	M8n1	1,371
19	M8a	1,048
20	M8n5	997
21	M8m2	734
22	M8i5	505
23	M8n6	469
24	M9a	435
25	M8q	376
26	M9d1	308
27	M8g3	306
28	M8m1	279
29	M8p	145
30	M8b	0

Rank	Catchment Area ID	TSS Load (lbs/ac/yr)
1	M8i5	789
2	M8o2	604
3	M8n2	597
4	M8o1	550
5	M8n7	539
6	M8l3	537
7	M8i4	536
8	M8n8	488
9	M8n3	482
10	M8l2	482
11	M8n4	482
12	M8m4	466
13	M8m3	446
14	M8m2	429
15	M8n1	429
16	M8n6	429
17	M8m1	429
18	M8l1	402
19	M9f	377
20	M8n5	376
21	M9a	330
22	M8p	311
23	M7e	280
24	M7g	272
25	M8a	271
26	M9d2	262
27	M8g3	224
28	M8q	143
29	M8b	89
30	M9d1	68

Rank	Catchment Area ID	TP Yield (lbs/yr)
1	M8o1	11.0
2	M8n4	9.9
3	M8n3	8.7
4	M8l2	8.5
5	M8n8	8.2
6	M8i4	8.0
7	M9d2	6.9
8	M8n7	5.7
9	M7g	5.2
10	M8m3	5.2
11	M8m4	5.0
12	M8l1	4.4
13	M9f	4.3
14	M8l3	4.3
15	M7e	4.1
16	M8o2	3.9
17	M8a	3.7
18	M8n2	3.1
19	M9d1	2.2
20	M8n1	2.0
21	M8q	1.7
22	M9a	1.7
23	M8n5	1.6
24	M8m2	1.1
25	M8i5	1.0
26	M8g3	0.7
27	M8n6	0.7
28	M8p	0.7
29	M8m1	0.4
30	M8b	0.0

Rank	Catchment Area ID	TP Yield (lbs/ac/yr)
1	M8i5	1.63
2	M8p	1.45
3	M9a	1.31
4	M8o2	1.24
5	M8n2	1.16
6	M8o1	1.02
7	M8n7	0.98
8	M8l3	0.97
9	M8i4	0.97
10	M8a	0.96
11	M8m4	0.95
12	M9f	0.86
13	M8m3	0.84
14	M8n8	0.83
15	M7g	0.82
16	M8n3	0.81
17	M8l2	0.81
18	M8n4	0.80
19	M7e	0.70
20	M9d2	0.67
21	M8q	0.66
22	M8m2	0.64
23	M8n1	0.64
24	M8n6	0.64
25	M8m1	0.64
26	M8l1	0.61
27	M8n5	0.60
28	M8g3	0.53
29	M9d1	0.48
30	M8b	0.47

McMAHON ENGINEERS ARCHITECTS

Town of Greenville
Pollutant Load & Yield Summary
Rat River Drainage Area Rankings

Rank	Catchment Area ID	TSS Load (lbs/yr)
1	R3k	7,704
2	R3i	7,188
3	R3m	6,661
4	R4m	5,857
5	R3c	5,359
6	R4a1	5,358
7	R1v1	5,347
8	R3a1	4,912
9	R4c	4,749
10	R2n	4,729
11	R4j	4,339
12	R3l1	3,724
13	R2j	3,528
14	R4d	3,459
15	R4l	3,116
16	R7l	2,967
17	R7j	2,958
18	R2l	2,582
19	R4g2	2,581
20	R4h	2,486
21	R6l	2,486
22	R2h	2,357
23	R1z	2,312
24	R2g	2,031
25	R3b	2,009
26	R4k	2,006
27	R2i	1,951
28	R3a2	1,938
29	R1y	1,920
30	R6m	1,819
31	R6f2	1,759
32	R3n	1,575
33	R3h	1,464
34	R7c	1,342
35	R1v2	1,325
36	R1w	1,256
37	R3j	1,220
38	R3f	1,204
39	R7n	1,202
40	R3a3	1,106
41	R2f	1,099
42	R4b3	957
43	R3a6	954
44	R3g	926
45	R7a	922
46	R7d	866
47	R3a5	850
48	R7b	819
49	R7k	800
50	R3l2	765
51	R7m	737
52	R4i	694
53	R4b1	673
54	R3e	417
55	R4g3	398
56	R3d1	382
57	R3p	328
58	R4o	327
59	R2p	302
60	R1x	299
61	R3d2	287
62	R2o	287
63	R4b2	271
64	R6a2	194
65	R3o	188
66	R3q1	163
67	R2m	155
68	R6c	141
69	R3a4	134
70	R2k	133
71	R4n	101
72	R3q2	91
73	R2e	91
74	R4g1	27
75	R6i	1

Rank	Catchment Area ID	TSS Load (lbs/ac/yr)
1	R6c	799
2	R4g3	654
3	R3o	601
4	R6m	579
5	R2p	546
6	R3p	519
7	R6a2	505
8	R2e	463
9	R3d2	447
10	R2m	425
11	R1y	392
12	R4n	386
13	R4g1	361
14	R7c	360
15	R4k	359
16	R3j	343
17	R2j	343
18	R2o	339
19	R3l2	321
20	R3q1	317
21	R1z	312
22	R4b2	302
23	R4b1	302
24	R7k	300
25	R3e	295
26	R4g2	294
27	R4o	291
28	R7d	291
29	R3d1	289
30	R3g	286
31	R3a5	280
32	R4m	256
33	R3a6	255
34	R3a3	251
35	R3q2	247
36	R3a4	245
37	R3c	208
38	R6l	198
39	R3b	193
40	R1x	192
41	R3f	192
42	R7l	188
43	R2g	188
44	R2h	182
45	R3l1	180
46	R4a1	178
47	R1v1	167
48	R1v2	164
49	R2i	153
50	R7n	147
51	R3a2	147
52	R4i	146
53	R3k	140
54	R4c	139
55	R7j	138
56	R3a1	137
57	R1w	132
58	R2l	129
59	R3i	128
60	R3m	120
61	R3h	120
62	R7b	119
63	R7m	115
64	R4h	115
65	R6f2	110
66	R7a	109
67	R4l	109
68	R4j	108
69	R2n	106
70	R3n	95
71	R2f	89
72	R4b3	88
73	R4d	85
74	R6i	76
75	R2k	12

Rank	Catchment Area ID	TP Yield (lbs/yr)
1	R3i	33.7
2	R3k	33.5
3	R3m	32.8
4	R2n	23.1
5	R3a1	22.8
6	R1v1	22.5
7	R4j	22.3
8	R3c	21.6
9	R4a1	21.4
10	R4c	21.2
11	R4m	21.0
12	R4d	18.4
13	R4l	15.8
14	R3l1	15.2
15	R7j	13.7
16	R2l	12.7
17	R4h	12.3
18	R7l	12.1
19	R2j	11.8
20	R6l	9.9
21	R2h	9.6
22	R6f2	9.1
23	R3n	8.8
24	R2i	8.5
25	R2g	8.2
26	R3a2	8.0
27	R3b	7.9
28	R1z	7.9
29	R4k	6.9
30	R4g2	6.6
31	R2f	6.2
32	R3h	6.2
33	R1y	6.1
34	R1w	5.8
35	R1v2	5.5
36	R6m	5.5
37	R7n	5.4
38	R4b3	5.1
39	R7a	4.8
40	R3f	4.8
41	R7c	4.5
42	R3j	4.3
43	R7b	4.1
44	R3a3	3.9
45	R7m	3.7
46	R3a6	3.5
47	R3g	3.1
48	R4i	3.1
49	R7d	3.0
50	R7k	3.0
51	R3a5	2.8
52	R3l2	2.6
53	R2k	2.4
54	R3e	2.0
55	R4b1	1.7
56	R3d1	1.5
57	R1x	1.2
58	R4o	1.1
59	R3d2	1.0
60	R3p	1.0
61	R2o	1.0
62	R2p	0.9
63	R4g3	0.7
64	R4b2	0.7
65	R2m	0.6
66	R3o	0.6
67	R3q1	0.6
68	R6a2	0.4
69	R3a4	0.4
70	R3q2	0.3
71	R4n	0.3
72	R2e	0.3
73	R6c	0.3
74	R4g1	0.1
75	R6i	0.0

Rank	Catchment Area ID	TP Yield (lbs/ac/yr)
1	R3o	1.80
2	R6m	1.75
3	R2p	1.65
4	R3d2	1.62
5	R2e	1.60
6	R3p	1.60
7	R2m	1.56
8	R6c	1.53
9	R3e	1.41
10	R4n	1.25
11	R1y	1.25
12	R4k	1.24
13	R4g3	1.22
14	R3j	1.20
15	R7c	1.20
16	R6a2	1.15
17	R2j	1.14
18	R3d1	1.14
19	R7k	1.13
20	R2o	1.13
21	R3l2	1.09
22	R3q1	1.09
23	R1z	1.06
24	R7d	1.02
25	R4o	1.02
26	R3g	0.97
27	R3a6	0.95
28	R4m	0.92
29	R3q2	0.91
30	R3a5	0.91
31	R3a3	0.90
32	R3c	0.84
33	R4g1	0.80
34	R6l	0.79
35	R1x	0.77
36	R7l	0.76
37	R2g	0.76
38	R3b	0.76
39	R3f	0.76
40	R4g2	0.75
41	R4b2	0.74
42	R4b1	0.74
43	R2h	0.74
44	R3l1	0.73
45	R3a4	0.71
46	R4a1	0.71
47	R1v1	0.70
48	R1v2	0.68
49	R2i	0.67
50	R7n	0.66
51	R4i	0.65
52	R7j	0.64
53	R3a1	0.64
54	R2l	0.63
55	R4c	0.62
56	R1w	0.62
57	R3k	0.61
58	R3a2	0.61
59	R3i	0.60
60	R3m	0.59
61	R7b	0.59
62	R7m	0.58
63	R4h	0.57
64	R6f2	0.57
65	R7a	0.57
66	R4j	0.55
67	R4l	0.55
68	R3n	0.53
69	R2n	0.52
70	R3h	0.51
71	R2f	0.51
72	R6i	0.47
73	R4b3	0.47
74	R4d	0.45
75	R2k	0.21

Town of Greenville
Pollutant Load & Yield Summary
Bear Creek Catchment Area Rankings

Rank	Catchment Area ID	TSS Load (lbs/yr)
1	BMP-B8d	44,232
2	BMP-B4a1	33,964
3	BMP-B3m3	33,324
4	BMP-B1s	28,950
5	BMP-B6e1	23,950
6	BMP-B5c3	23,627
7	BMP-B3o	23,450
8	BMP-B8j	21,251
9	BMP-B8n	17,507
10	BMP-B2n2	12,473
11	BMP-B2u2	12,273
12	BMP-B2t8	11,448
13	BMP-B8u	10,179
14	BMP-B6k3	9,328
15	BMP-B2e	7,248
16	BMP-B2c	6,984
17	BMP-B2p3	6,793
18	BMP-B2v	6,763
19	BMP-B2m	6,497
20	BMP-B6s	6,432
21	BMP-B4d	6,103
22	BMP-B2g3	5,668
23	BMP-B3s	5,293
24	BMP-B4m1	4,905
25	BMP-B6q	4,605
26	BMP-B2q4	4,400

Rank	Catchment Area ID	TSS Load (lbs/ac/yr)
1	BMP-B8l2	862
2	BMP-B6e2	608
3	BMP-B3c1	596
4	BMP-B8n	438
5	BMP-B8k1	429
6	BMP-B8b1	392
7	BMP-B9a1	384
8	BMP-B3c2	358
9	BMP-B2h1	351
10	BMP-B3b1	334
11	BMP-B8u	333
12	BMP-B8q2	323
13	BMP-B8j	305
14	BMP-B2q1	302
15	BMP-B4m1	282
16	BMP-B2t6	279
17	BMP-B3v	276
18	BMP-B2w1	262
19	BMP-B8d	261
20	BMP-B2q4	247
21	BMP-B4m2	240
22	BMP-B2g3	234
23	BMP-B3s	231
24	BMP-B6e1	226
25	BMP-B2b1	226
26	BMP-B2l1	225

Rank	Catchment Area ID	TP Yield (lbs/yr)
1	BMP-B4a1	138.3
2	BMP-B3m3	138.2
3	BMP-B8d	124.1
4	BMP-B1s	104.8
5	BMP-B5c3	97.2
6	BMP-B3o	87.6
7	BMP-B6e1	77.8
8	BMP-B2n2	50.7
9	BMP-B8j	48.9
10	BMP-B2u2	47.8
11	BMP-B2t8	44.5
12	BMP-B6k3	41.9
13	BMP-B2c	32.8
14	BMP-B2p3	28.7
15	BMP-B2e	28.0
16	BMP-B8n	27.4
17	BMP-B2m	26.9
18	BMP-B4d	24.2
19	BMP-B6s	24.1
20	BMP-B2v	23.9
21	BMP-B8u	23.6
22	BMP-B3s	17.9
23	BMP-B6q	17.4
24	BMP-B2g3	17.1
25	BMP-B4m1	15.4
26	BMP-B6j	14.5

Rank	Catchment Area ID	TP Yield (lbs/ac/yr)
1	BMP-B8l2	1.98
2	BMP-B6e2	1.82
3	BMP-B3c1	1.17
4	BMP-B2t6	0.98
5	BMP-B2w1	0.93
6	BMP-B3b1	0.90
7	BMP-B4m1	0.88
8	BMP-B4m2	0.87
9	BMP-B6s	0.83
10	BMP-B6n	0.83
11	BMP-B4l	0.82
12	BMP-B6q	0.81
13	BMP-B8q2	0.81
14	BMP-B2h1	0.81
15	BMP-B6j	0.81
16	BMP-B2p1	0.80
17	BMP-B2o1	0.80
18	BMP-B2v	0.79
19	BMP-B3s	0.78
20	BMP-B2m	0.78
21	BMP-B8u	0.77
22	BMP-B6f	0.77
23	BMP-B4d	0.76
24	BMP-B2t8	0.76
25	BMP-B2j3	0.76
26	BMP-B2u2	0.76

Rank	Catchment Area ID	TSS Load (lbs/yr)
27	BMP-B6j	3,812
28	BMP-B8b1	3,565
29	BMP-B4l	3,451
30	BMP-B3b1	3,366
31	BMP-B9f	3,332
32	BMP-B6h	3,275
33	BMP-B2j3	3,079
34	BMP-B2w2	2,839
35	BMP-B6r	2,542
36	BMP-B6m	2,417
37	BMP-B2w1	2,390
38	BMP-B2o1	2,277
39	BMP-B1o	2,202
40	BMP-B2h1	2,093
41	BMP-B6n	2,019
42	BMP-B3v	1,975
43	BMP-B6f	1,847
44	BMP-B2t6	1,802
45	BMP-B3a	1,793
46	BMP-B8l2	1,546
47	BMP-B9a1	1,522
48	BMP-B3c2	1,340
49	BMP-B4m2	1,103
50	BMP-B2p1	1,079
51	BMP-B2l1	1,072
52	BMP-B2b1	1,038
53	BMP-B8k1	912
54	BMP-B6g	893
55	BMP-B6i	880
56	BMP-B5a	750
57	BMP-B2q1	686
58	BMP-B8q2	661
59	BMP-B3c1	642
60	BMP-B2o2	193
61	BMP-B2z1	123
62	BMP-B6e2	32

Rank	Catchment Area ID	TSS Load (lbs/ac/yr)
27	BMP-B2v	223
28	BMP-B6s	221
29	BMP-B6n	215
30	BMP-B4l	215
31	BMP-B6q	214
32	BMP-B6j	211
33	BMP-B2p1	209
34	BMP-B2o1	209
35	BMP-B6f	208
36	BMP-B3a	202
37	BMP-B2t8	195
38	BMP-B2u2	194
39	BMP-B3o	193
40	BMP-B4d	192
41	BMP-B1s	192
42	BMP-B2e	190
43	BMP-B2j3	189
44	BMP-B2m	189
45	BMP-B2w2	186
46	BMP-B6i	186
47	BMP-B6h	181
48	BMP-B2n2	177
49	BMP-B5c3	174
50	BMP-B4a1	172
51	BMP-B6r	172
52	BMP-B2p3	167
53	BMP-B3m3	166
54	BMP-B6g	163
55	BMP-B1o	162
56	BMP-B9f	152
57	BMP-B6m	149
58	BMP-B6k3	140
59	BMP-B2c	133
60	BMP-B2o2	116
61	BMP-B2z1	58
62	BMP-B5a	50

Rank	Catchment Area ID	TP Yield (lbs/yr)
27	BMP-B9f	14.4
28	BMP-B6h	13.3
29	BMP-B2q4	13.2
30	BMP-B4l	13.1
31	BMP-B2j3	12.3
32	BMP-B2w2	10.9
33	BMP-B6m	10.7
34	BMP-B6r	10.5
35	BMP-B3b1	9.1
36	BMP-B1o	8.9
37	BMP-B2o1	8.7
38	BMP-B2w1	8.5
39	BMP-B6n	7.8
40	BMP-B6f	6.9
41	BMP-B3a	6.6
42	BMP-B2t6	6.4
43	BMP-B8b1	5.5
44	BMP-B3v	5.1
45	BMP-B2h1	4.8
46	BMP-B2p1	4.1
47	BMP-B4m2	4.0
48	BMP-B6g	3.7
49	BMP-B8l2	3.6
50	BMP-B6i	3.5
51	BMP-B2l1	3.4
52	BMP-B2b1	3.1
53	BMP-B5a	2.7
54	BMP-B9a1	2.4
55	BMP-B3c2	2.1
56	BMP-B2q1	1.7
57	BMP-B8q2	1.7
58	BMP-B8k1	1.4
59	BMP-B3c1	1.3
60	BMP-B2z1	0.9
61	BMP-B2o2	0.9
62	BMP-B6e2	0.1

Rank	Catchment Area ID	TP Yield (lbs/ac/yr)
27	BMP-B6i	0.75
28	BMP-B3a	0.75
29	BMP-B2q1	0.74
30	BMP-B2q4	0.74
31	BMP-B6e1	0.74
32	BMP-B6h	0.73
33	BMP-B2e	0.73
34	BMP-B8d	0.73
35	BMP-B3o	0.72
36	BMP-B2n2	0.72
37	BMP-B3v	0.72
38	BMP-B5c3	0.71
39	BMP-B2w2	0.71
40	BMP-B2l1	0.71
41	BMP-B6r	0.71
42	BMP-B2g3	0.71
43	BMP-B2p3	0.70
44	BMP-B8j	0.70
45	BMP-B4a1	0.70
46	BMP-B1s	0.69
47	BMP-B3m3	0.69
48	BMP-B8n	0.68
49	BMP-B6g	0.67
50	BMP-B2b1	0.67
51	BMP-B6m	0.66
52	BMP-B1o	0.66
53	BMP-B9f	0.66
54	BMP-B8k1	0.64
55	BMP-B6k3	0.63
56	BMP-B2c	0.62
57	BMP-B8b1	0.60
58	BMP-B9a1	0.60
59	BMP-B3c2	0.57
60	BMP-B2o2	0.53
61	BMP-B2z1	0.42
62	BMP-B5a	0.18

Town of Greenville
Pollutant Load & Yield Summary
Fox River Catchment Area Rankings

Rank	Catchment Area ID	TSS Load (lbs/yr)
1	BMP-M7d	28,671
2	BMP-M6k	13,677
3	BMP-M5g	12,374
4	BMP-M6p	11,623
5	BMP-M4i	11,104
6	BMP-M7c2	5,544
7	BMP-M1a	5,079
8	BMP-M7c1	2,489
9	BMP-M5j2	1,924
10	BMP-M5l	1,807
11	BMP-M7b1	1,143

Rank	Catchment Area ID	TSS Load (lbs/ac/yr)
1	BMP-M4i	459
2	BMP-M6k	444
3	BMP-M7b1	429
4	BMP-M5l	429
5	BMP-M7c2	405
6	BMP-M7c1	397
7	BMP-M7d	393
8	BMP-M6p	239
9	BMP-M5j2	235
10	BMP-M5g	199
11	BMP-M1a	190

Rank	Catchment Area ID	TP Yield (lbs/yr)
1	BMP-M7d	50.9
2	BMP-M5g	43.3
3	BMP-M6p	35.0
4	BMP-M6k	24.8
5	BMP-M1a	20.9
6	BMP-M4i	19.0
7	BMP-M7c2	8.4
8	BMP-M5j2	7.0
9	BMP-M7c1	3.8
10	BMP-M5l	2.7
11	BMP-M7b1	1.7

Rank	Catchment Area ID	TP Yield (lbs/ac/yr)
1	BMP-M5j2	0.85
2	BMP-M6k	0.80
3	BMP-M4i	0.78
4	BMP-M1a	0.78
5	BMP-M6p	0.72
6	BMP-M5g	0.70
7	BMP-M7d	0.70
8	BMP-M5l	0.64
9	BMP-M7b1	0.64
10	BMP-M7c1	0.61
11	BMP-M7c2	0.61

Town of Greenville
Pollutant Load & Yield Summary
Mud Creek Catchment Area Rankings

Rank	Catchment Area ID	TSS Load (lbs/yr)
1	BMP-M8o2	28,557
2	BMP-M8m4	13,397
3	BMP-M8i5	4,924
4	BMP-M8l1	2,928
5	BMP-M9d2	2,715
6	BMP-M8n1	1,371
7	BMP-M8n5	997
8	BMP-M8q	521
9	BMP-M8n6	469
10	BMP-M9c	435
11	BMP-M9d1	308
12	BMP-M8m1	279

Rank	Catchment Area ID	TSS Load (lbs/ac/yr)
1	BMP-M8i5	554
2	BMP-M8o2	515
3	BMP-M8m4	476
4	BMP-M8n1	429
5	BMP-M8n6	429
6	BMP-M8m1	429
7	BMP-M8l1	402
8	BMP-M8n5	376
9	BMP-M9c	330
10	BMP-M9d2	262
11	BMP-M8q	168
12	BMP-M9d1	68

Rank	Catchment Area ID	TP Yield (lbs/yr)
1	BMP-M8o2	50.5
2	BMP-M8m4	24.1
3	BMP-M8i5	9.0
4	BMP-M9d2	6.9
5	BMP-M8l1	4.4
6	BMP-M8q	2.4
7	BMP-M9d1	2.2
8	BMP-M8n1	2.0
9	BMP-M9c	1.7
10	BMP-M8n5	1.6
11	BMP-M8n6	0.7
12	BMP-M8m1	0.4

Rank	Catchment Area ID	TP Yield (lbs/ac/yr)
1	BMP-M9c	1.31
2	BMP-M8i5	1.02
3	BMP-M8o2	0.91
4	BMP-M8m4	0.86
5	BMP-M8q	0.78
6	BMP-M9d2	0.67
7	BMP-M8n1	0.64
8	BMP-M8n6	0.64
9	BMP-M8m1	0.64
10	BMP-M8l1	0.61
11	BMP-M8n5	0.60
12	BMP-M9d1	0.48

Town of Greenville
Pollutant Load & Yield Summary
Rat River Catchment Area Rankings

Rank	Catchment Area ID	TSS Load (lbs/yr)
1	BMP-R3k	8,924
2	BMP-R3m	8,235
3	BMP-R3c	7,368
4	BMP-R3i	7,188
5	BMP-R3a6	6,716
6	BMP-R4a1	5,358
7	BMP-R1v1	5,347
8	BMP-R4j	5,033
9	BMP-R4c	4,749
10	BMP-R2n	4,729
11	BMP-R2i	4,309
12	BMP-R7d	3,949
13	BMP-R4d	3,459
14	BMP-R4l	3,116
15	BMP-R7l	2,967
16	BMP-R7j	2,958
17	BMP-R4g2	2,581
18	BMP-R7m	1,940
19	BMP-R3a2	1,938
20	BMP-R6f2	1,759
21	BMP-R1x	1,555
22	BMP-R3h	1,464
23	BMP-R3f	1,204
24	BMP-R3a3	1,106
25	BMP-R4b2	271
26	BMP-R3a4	134

Rank	Catchment Area ID	TSS Load (lbs/ac/yr)
1	BMP-R4b2	302
2	BMP-R4g2	294
3	BMP-R3a3	251
4	BMP-R3a4	245
5	BMP-R3c	204
6	BMP-R3f	192
7	BMP-R7l	188
8	BMP-R7d	179
9	BMP-R4a1	178
10	BMP-R2i	168
11	BMP-R1v1	167
12	BMP-R3a6	158
13	BMP-R3k	152
14	BMP-R3a2	147
15	BMP-R1x	141
16	BMP-R4c	139
17	BMP-R7j	138
18	BMP-R7m	133
19	BMP-R3i	128
20	BMP-R3h	120
21	BMP-R3m	115
22	BMP-R4j	112
23	BMP-R6f2	110
24	BMP-R4l	109
25	BMP-R2n	106
26	BMP-R4d	85

Rank	Catchment Area ID	TP Yield (lbs/yr)
1	BMP-R3m	41.6
2	BMP-R3k	37.7
3	BMP-R3i	33.7
4	BMP-R3c	29.5
5	BMP-R3a6	29.1
6	BMP-R4j	25.4
7	BMP-R2n	23.1
8	BMP-R1v1	22.5
9	BMP-R4a1	21.4
10	BMP-R4c	21.2
11	BMP-R4d	18.4
12	BMP-R2i	18.1
13	BMP-R7d	16.3
14	BMP-R4l	15.8
15	BMP-R7j	13.7
16	BMP-R7l	12.1
17	BMP-R7m	9.1
18	BMP-R6f2	9.1
19	BMP-R3a2	8.0
20	BMP-R1x	7.1
21	BMP-R4g2	6.6
22	BMP-R3h	6.2
23	BMP-R3f	4.8
24	BMP-R3a3	3.9
25	BMP-R4b2	0.7
26	BMP-R3a4	0.4

Rank	Catchment Area ID	TP Yield (lbs/ac/yr)
1	BMP-R3a3	0.90
2	BMP-R3c	0.82
3	BMP-R7l	0.76
4	BMP-R3f	0.76
5	BMP-R4g2	0.75
6	BMP-R4b2	0.74
7	BMP-R7d	0.74
8	BMP-R3a4	0.71
9	BMP-R4a1	0.71
10	BMP-R2i	0.70
11	BMP-R1v1	0.70
12	BMP-R3a6	0.68
13	BMP-R3k	0.64
14	BMP-R1x	0.64
15	BMP-R7j	0.64
16	BMP-R7m	0.63
17	BMP-R4c	0.62
18	BMP-R3a2	0.61
19	BMP-R3i	0.60
20	BMP-R3m	0.58
21	BMP-R6f2	0.57
22	BMP-R4j	0.57
23	BMP-R4l	0.55
24	BMP-R2n	0.52
25	BMP-R3h	0.51
26	BMP-R4d	0.45

Town of Greenville
Pollutant Load & Yield Summary
Bear Creek Catchment Area Rankings

Rank	Catchment Area ID	TSS Load (lbs/yr)
1	BMP-B8d	44,232
2	BMP-B4a1	33,964
3	BMP-B3m3	33,324
4	BMP-B1s	28,950
5	BMP-B6e1	23,950
6	BMP-B5c3	23,627
7	BMP-B3o	23,450
8	BMP-B8j	21,251
9	BMP-B8n	17,507
10	BMP-B2n2	12,473
11	BMP-B2u2	12,273
12	BMP-B2t8	11,448
13	BMP-B8u	10,179
14	BMP-B6k3	9,328
15	BMP-B2e	7,248
16	BMP-B2c	6,984
17	BMP-B2p3	6,793
18	BMP-B2v	6,763
19	BMP-B2m	6,497
20	BMP-B6s	6,432
21	BMP-B4d	6,103
22	BMP-B2g3	5,668
23	BMP-B3s	5,293
24	BMP-B4m1	4,905
25	BMP-B6q	4,605
26	BMP-B2q4	4,400

Rank	Catchment Area ID	TSS Load (lbs/ac/yr)
1	BMP-B8l2	862
2	BMP-B6e2	608
3	BMP-B3c1	596
4	BMP-B8n	438
5	BMP-B8k1	429
6	BMP-B8b1	392
7	BMP-B9a1	384
8	BMP-B3c2	358
9	BMP-B2h1	351
10	BMP-B3b1	334
11	BMP-B8u	333
12	BMP-B8q2	323
13	BMP-B8j	305
14	BMP-B2q1	302
15	BMP-B4m1	282
16	BMP-B2t6	279
17	BMP-B3v	276
18	BMP-B2w1	262
19	BMP-B8d	261
20	BMP-B2q4	247
21	BMP-B4m2	240
22	BMP-B2g3	234
23	BMP-B3s	231
24	BMP-B6e1	226
25	BMP-B2b1	226
26	BMP-B2l1	225

Rank	Catchment Area ID	TP Yield (lbs/yr)
1	BMP-B4a1	138.3
2	BMP-B3m3	138.2
3	BMP-B8d	124.1
4	BMP-B1s	104.8
5	BMP-B5c3	97.2
6	BMP-B3o	87.6
7	BMP-B6e1	77.8
8	BMP-B2n2	50.7
9	BMP-B8j	48.9
10	BMP-B2u2	47.8
11	BMP-B2t8	44.5
12	BMP-B6k3	41.9
13	BMP-B2c	32.8
14	BMP-B2p3	28.7
15	BMP-B2e	28.0
16	BMP-B8n	27.4
17	BMP-B2m	26.9
18	BMP-B4d	24.2
19	BMP-B6s	24.1
20	BMP-B2v	23.9
21	BMP-B8u	23.6
22	BMP-B3s	17.9
23	BMP-B6q	17.4
24	BMP-B2g3	17.1
25	BMP-B4m1	15.4
26	BMP-B6j	14.5

Rank	Catchment Area ID	TP Yield (lbs/ac/yr)
1	BMP-B8l2	1.98
2	BMP-B6e2	1.82
3	BMP-B3c1	1.17
4	BMP-B2t6	0.98
5	BMP-B2w1	0.93
6	BMP-B3b1	0.90
7	BMP-B4m1	0.88
8	BMP-B4m2	0.87
9	BMP-B6s	0.83
10	BMP-B6n	0.83
11	BMP-B4l	0.82
12	BMP-B6q	0.81
13	BMP-B8q2	0.81
14	BMP-B2h1	0.81
15	BMP-B6j	0.81
16	BMP-B2p1	0.80
17	BMP-B2o1	0.80
18	BMP-B2v	0.79
19	BMP-B3s	0.78
20	BMP-B2m	0.78
21	BMP-B8u	0.77
22	BMP-B6f	0.77
23	BMP-B4d	0.76
24	BMP-B2t8	0.76
25	BMP-B2j3	0.76
26	BMP-B2u2	0.76

Rank	Catchment Area ID	TSS Load (lbs/yr)
27	BMP-B6j	3,812
28	BMP-B8b1	3,565
29	BMP-B4l	3,451
30	BMP-B3b1	3,366
31	BMP-B9f	3,332
32	BMP-B6h	3,275
33	BMP-B2j3	3,079
34	BMP-B2w2	2,839
35	BMP-B6r	2,542
36	BMP-B6m	2,417
37	BMP-B2w1	2,390
38	BMP-B2o1	2,277
39	BMP-B1o	2,202
40	BMP-B2h1	2,093
41	BMP-B6n	2,019
42	BMP-B3v	1,975
43	BMP-B6f	1,847
44	BMP-B2t6	1,802
45	BMP-B3a	1,793
46	BMP-B8l2	1,546
47	BMP-B9a1	1,522
48	BMP-B3c2	1,340
49	BMP-B4m2	1,103
50	BMP-B2p1	1,079
51	BMP-B2l1	1,072
52	BMP-B2b1	1,038
53	BMP-B8k1	912
54	BMP-B6g	893
55	BMP-B6i	880
56	BMP-B5a	750
57	BMP-B2q1	686
58	BMP-B8q2	661
59	BMP-B3c1	642
60	BMP-B2o2	193
61	BMP-B2z1	123
62	BMP-B6e2	32

Rank	Catchment Area ID	TSS Load (lbs/ac/yr)
27	BMP-B2v	223
28	BMP-B6s	221
29	BMP-B6n	215
30	BMP-B4l	215
31	BMP-B6q	214
32	BMP-B6j	211
33	BMP-B2p1	209
34	BMP-B2o1	209
35	BMP-B6f	208
36	BMP-B3a	202
37	BMP-B2t8	195
38	BMP-B2u2	194
39	BMP-B3o	193
40	BMP-B4d	192
41	BMP-B1s	192
42	BMP-B2e	190
43	BMP-B2j3	189
44	BMP-B2m	189
45	BMP-B2w2	186
46	BMP-B6i	186
47	BMP-B6h	181
48	BMP-B2n2	177
49	BMP-B5c3	174
50	BMP-B4a1	172
51	BMP-B6r	172
52	BMP-B2p3	167
53	BMP-B3m3	166
54	BMP-B6g	163
55	BMP-B1o	162
56	BMP-B9f	152
57	BMP-B6m	149
58	BMP-B6k3	140
59	BMP-B2c	133
60	BMP-B2o2	116
61	BMP-B2z1	58
62	BMP-B5a	50

Rank	Catchment Area ID	TP Yield (lbs/yr)
27	BMP-B9f	14.4
28	BMP-B6h	13.3
29	BMP-B2q4	13.2
30	BMP-B4l	13.1
31	BMP-B2j3	12.3
32	BMP-B2w2	10.9
33	BMP-B6m	10.7
34	BMP-B6r	10.5
35	BMP-B3b1	9.1
36	BMP-B1o	8.9
37	BMP-B2o1	8.7
38	BMP-B2w1	8.5
39	BMP-B6n	7.8
40	BMP-B6f	6.9
41	BMP-B3a	6.6
42	BMP-B2t6	6.4
43	BMP-B8b1	5.5
44	BMP-B3v	5.1
45	BMP-B2h1	4.8
46	BMP-B2p1	4.1
47	BMP-B4m2	4.0
48	BMP-B6g	3.7
49	BMP-B8l2	3.6
50	BMP-B6i	3.5
51	BMP-B2l1	3.4
52	BMP-B2b1	3.1
53	BMP-B5a	2.7
54	BMP-B9a1	2.4
55	BMP-B3c2	2.1
56	BMP-B2q1	1.7
57	BMP-B8q2	1.7
58	BMP-B8k1	1.4
59	BMP-B3c1	1.3
60	BMP-B2z1	0.9
61	BMP-B2o2	0.9
62	BMP-B6e2	0.1

Rank	Catchment Area ID	TP Yield (lbs/ac/yr)
27	BMP-B6i	0.75
28	BMP-B3a	0.75
29	BMP-B2q1	0.74
30	BMP-B2q4	0.74
31	BMP-B6e1	0.74
32	BMP-B6h	0.73
33	BMP-B2e	0.73
34	BMP-B8d	0.73
35	BMP-B3o	0.72
36	BMP-B2n2	0.72
37	BMP-B3v	0.72
38	BMP-B5c3	0.71
39	BMP-B2w2	0.71
40	BMP-B2l1	0.71
41	BMP-B6r	0.71
42	BMP-B2g3	0.71
43	BMP-B2p3	0.70
44	BMP-B8j	0.70
45	BMP-B4a1	0.70
46	BMP-B1s	0.69
47	BMP-B3m3	0.69
48	BMP-B8n	0.68
49	BMP-B6g	0.67
50	BMP-B2b1	0.67
51	BMP-B6m	0.66
52	BMP-B1o	0.66
53	BMP-B9f	0.66
54	BMP-B8k1	0.64
55	BMP-B6k3	0.63
56	BMP-B2c	0.62
57	BMP-B8b1	0.60
58	BMP-B9a1	0.60
59	BMP-B3c2	0.57
60	BMP-B2o2	0.53
61	BMP-B2z1	0.42
62	BMP-B5a	0.18

McMAHON ENGINEERS ARCHITECTS

Town of Greenville
Pollutant Load & Yield Summary
Fox River Catchment Area Rankings

Rank	Catchment Area ID	TSS Load (lbs/yr)
1	BMP-M7d	28,671
2	BMP-M6k	13,677
3	BMP-M5g	12,374
4	BMP-M6p	11,623
5	BMP-M4i	11,104
6	BMP-M7c2	5,544
7	BMP-M1a	5,079
8	BMP-M7c1	2,489
9	BMP-M5j2	1,924
10	BMP-M5l	1,807
11	BMP-M7b1	1,143

Rank	Catchment Area ID	TSS Load (lbs/ac/yr)
1	BMP-M4i	459
2	BMP-M6k	444
3	BMP-M7b1	429
4	BMP-M5l	429
5	BMP-M7c2	405
6	BMP-M7c1	397
7	BMP-M7d	393
8	BMP-M6p	239
9	BMP-M5j2	235
10	BMP-M5g	199
11	BMP-M1a	190

Rank	Catchment Area ID	TP Yield (lbs/yr)
1	BMP-M7d	50.9
2	BMP-M5g	43.3
3	BMP-M6p	35.0
4	BMP-M6k	24.8
5	BMP-M1a	20.9
6	BMP-M4i	19.0
7	BMP-M7c2	8.4
8	BMP-M5j2	7.0
9	BMP-M7c1	3.8
10	BMP-M5l	2.7
11	BMP-M7b1	1.7

Rank	Catchment Area ID	TP Yield (lbs/ac/yr)
1	BMP-M5j2	0.85
2	BMP-M6k	0.80
3	BMP-M4i	0.78
4	BMP-M1a	0.78
5	BMP-M6p	0.72
6	BMP-M5g	0.70
7	BMP-M7d	0.70
8	BMP-M5l	0.64
9	BMP-M7b1	0.64
10	BMP-M7c1	0.61
11	BMP-M7c2	0.61

Town of Greenville
Pollutant Load & Yield Summary
Mud Creek Catchment Area Rankings

Rank	Catchment Area ID	TSS Load (lbs/yr)
1	BMP-M8o2	28,557
2	BMP-M8m4	13,397
3	BMP-M8i5	4,924
4	BMP-M8l1	2,928
5	BMP-M9d2	2,715
6	BMP-M8n1	1,371
7	BMP-M8n5	997
8	BMP-M8q	521
9	BMP-M8n6	469
10	BMP-M9c	435
11	BMP-M9d1	308
12	BMP-M8m1	279

Rank	Catchment Area ID	TSS Load (lbs/ac/yr)
1	BMP-M8i5	554
2	BMP-M8o2	515
3	BMP-M8m4	476
4	BMP-M8n1	429
5	BMP-M8n6	429
6	BMP-M8m1	429
7	BMP-M8l1	402
8	BMP-M8n5	376
9	BMP-M9c	330
10	BMP-M9d2	262
11	BMP-M8q	168
12	BMP-M9d1	68

Rank	Catchment Area ID	TP Yield (lbs/yr)
1	BMP-M8o2	50.5
2	BMP-M8m4	24.1
3	BMP-M8i5	9.0
4	BMP-M9d2	6.9
5	BMP-M8l1	4.4
6	BMP-M8q	2.4
7	BMP-M9d1	2.2
8	BMP-M8n1	2.0
9	BMP-M9c	1.7
10	BMP-M8n5	1.6
11	BMP-M8n6	0.7
12	BMP-M8m1	0.4

Rank	Catchment Area ID	TP Yield (lbs/ac/yr)
1	BMP-M9c	1.31
2	BMP-M8i5	1.02
3	BMP-M8o2	0.91
4	BMP-M8m4	0.86
5	BMP-M8q	0.78
6	BMP-M9d2	0.67
7	BMP-M8n1	0.64
8	BMP-M8n6	0.64
9	BMP-M8m1	0.64
10	BMP-M8l1	0.61
11	BMP-M8n5	0.60
12	BMP-M9d1	0.48

Town of Greenville
Pollutant Load & Yield Summary
Rat River Catchment Area Rankings

Rank	Catchment Area ID	TSS Load (lbs/yr)
1	BMP-R3k	8,924
2	BMP-R3m	8,235
3	BMP-R3c	7,368
4	BMP-R3i	7,188
5	BMP-R3a6	6,716
6	BMP-R4a1	5,358
7	BMP-R1v1	5,347
8	BMP-R4j	5,033
9	BMP-R4c	4,749
10	BMP-R2n	4,729
11	BMP-R2i	4,309
12	BMP-R7d	3,949
13	BMP-R4d	3,459
14	BMP-R4l	3,116
15	BMP-R7l	2,967
16	BMP-R7j	2,958
17	BMP-R4g2	2,581
18	BMP-R7m	1,940
19	BMP-R3a2	1,938
20	BMP-R6f2	1,759
21	BMP-R1x	1,555
22	BMP-R3h	1,464
23	BMP-R3f	1,204
24	BMP-R3a3	1,106
25	BMP-R4b2	271
26	BMP-R3a4	134

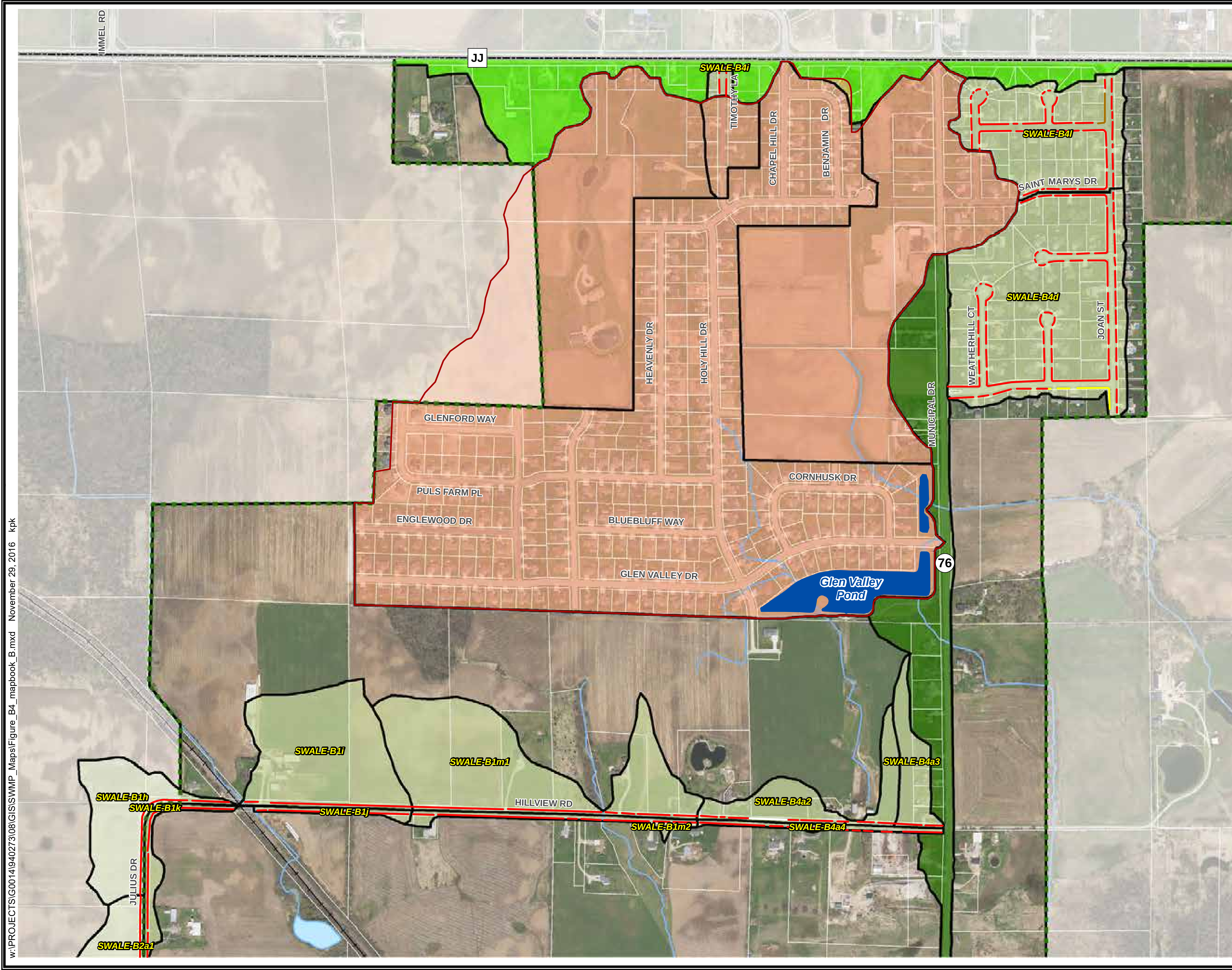
Rank	Catchment Area ID	TSS Load (lbs/ac/yr)
1	BMP-R4b2	302
2	BMP-R4g2	294
3	BMP-R3a3	251
4	BMP-R3a4	245
5	BMP-R3c	204
6	BMP-R3f	192
7	BMP-R7l	188
8	BMP-R7d	179
9	BMP-R4a1	178
10	BMP-R2i	168
11	BMP-R1v1	167
12	BMP-R3a6	158
13	BMP-R3k	152
14	BMP-R3a2	147
15	BMP-R1x	141
16	BMP-R4c	139
17	BMP-R7j	138
18	BMP-R7m	133
19	BMP-R3i	128
20	BMP-R3h	120
21	BMP-R3m	115
22	BMP-R4j	112
23	BMP-R6f2	110
24	BMP-R4l	109
25	BMP-R2n	106
26	BMP-R4d	85

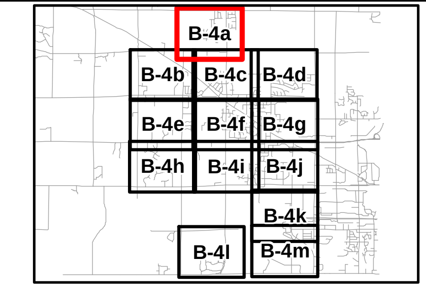
Rank	Catchment Area ID	TP Yield (lbs/yr)
1	BMP-R3m	41.6
2	BMP-R3k	37.7
3	BMP-R3i	33.7
4	BMP-R3c	29.5
5	BMP-R3a6	29.1
6	BMP-R4j	25.4
7	BMP-R2n	23.1
8	BMP-R1v1	22.5
9	BMP-R4a1	21.4
10	BMP-R4c	21.2
11	BMP-R4d	18.4
12	BMP-R2i	18.1
13	BMP-R7d	16.3
14	BMP-R4l	15.8
15	BMP-R7j	13.7
16	BMP-R7l	12.1
17	BMP-R7m	9.1
18	BMP-R6f2	9.1
19	BMP-R3a2	8.0
20	BMP-R1x	7.1
21	BMP-R4g2	6.6
22	BMP-R3h	6.2
23	BMP-R3f	4.8
24	BMP-R3a3	3.9
25	BMP-R4b2	0.7
26	BMP-R3a4	0.4

Rank	Catchment Area ID	TP Yield (lbs/ac/yr)
1	BMP-R3a3	0.90
2	BMP-R3c	0.82
3	BMP-R7l	0.76
4	BMP-R3f	0.76
5	BMP-R4g2	0.75
6	BMP-R4b2	0.74
7	BMP-R7d	0.74
8	BMP-R3a4	0.71
9	BMP-R4a1	0.71
10	BMP-R2i	0.70
11	BMP-R1v1	0.70
12	BMP-R3a6	0.68
13	BMP-R3k	0.64
14	BMP-R1x	0.64
15	BMP-R7j	0.64
16	BMP-R7m	0.63
17	BMP-R4c	0.62
18	BMP-R3a2	0.61
19	BMP-R3i	0.60
20	BMP-R3m	0.58
21	BMP-R6f2	0.57
22	BMP-R4j	0.57
23	BMP-R4l	0.55
24	BMP-R2n	0.52
25	BMP-R3h	0.51
26	BMP-R4d	0.45

APPENDIX B

WATER QUALITY RESULTS





Swale Categories

- Non-Water Quality Swale (Channel Cuts or Bare Soil)
- Non-Water Quality Swale (Rock or Ditch Liner)
- Non-Water Quality Swale (Slopes Greater than 4%)
- Non-Water Quality Swale (Ditch Enclosure)
- Water Quality Swale
- Water Quality Swale (Standing Water-Wetland Vegetation)

Swale Jurisdiction

- State
- County
- Town of Greenville

Structural BMPs

- Existing BMP Watershed
- Stormwater Pond
- Biofilter

Other Mapped Features

- Urban Planning Boundary
- Municipal Boundary
- Right-of-Way
- Railroad Centerline
- Stream
- Surface Water

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

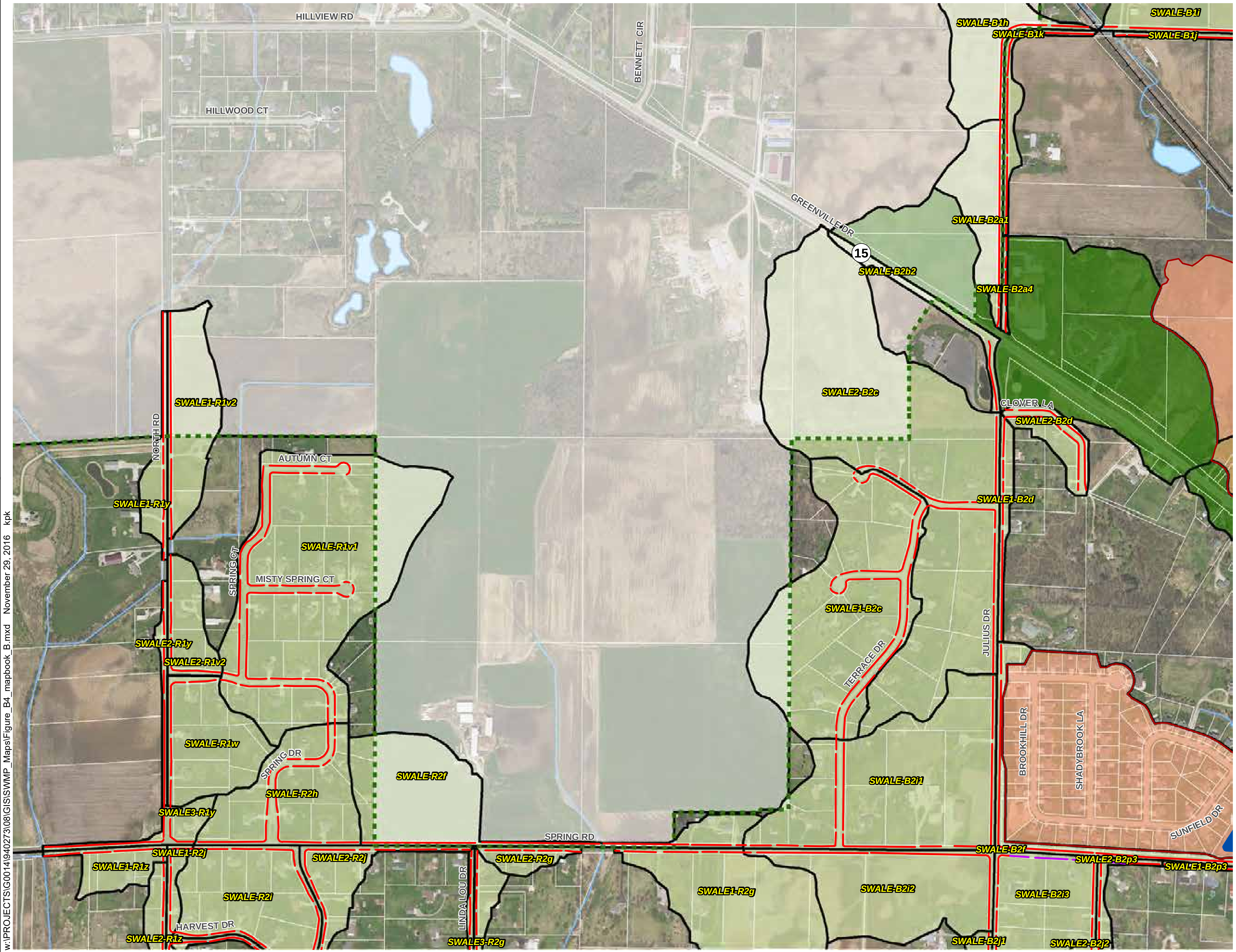
Disclaimer: The property lines, right-of-way lines, and other property information on this drawing were developed or obtained as part of the County Geographic Information System or through the County property tax mapping function. McMAHON does not guarantee this information to be correct, current, or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

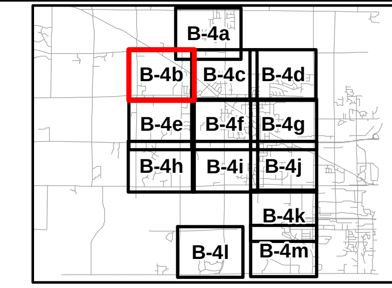
N

0 600 1,200 Feet

McMAHON ENGINEERS ARCHITECTS

FIGURE B-4a
SWALE CATCHMENTS
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN





Swale Categories
- Non-Water Quality Swale (Channel Cuts or Bare Soil)
- Non-Water Quality Swale (Rock or Ditch Liner)
- Non-Water Quality Swale (Slopes Greater than 4%)
- Non-Water Quality Swale (Ditch Enclosure)
- Water Quality Swale
- Water Quality Swale (Standing Water-Wetland Vegetation)

Swale Jurisdiction
- State
- County
- Town of Greenville

Structural BMPs
- Existing BMP Watershed
- Stormwater Pond
- Biofilter

Other Mapped Features
- Urban Planning Boundary
- Municipal Boundary
- Right-of-Way
- Railroad Centerline
- Stream
- Surface Water

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

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0 600 1,200 Feet

McMAHON ENGINEERS | ARCHITECTS

FIGURE B-4b
SWALE CATCHMENTS
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN

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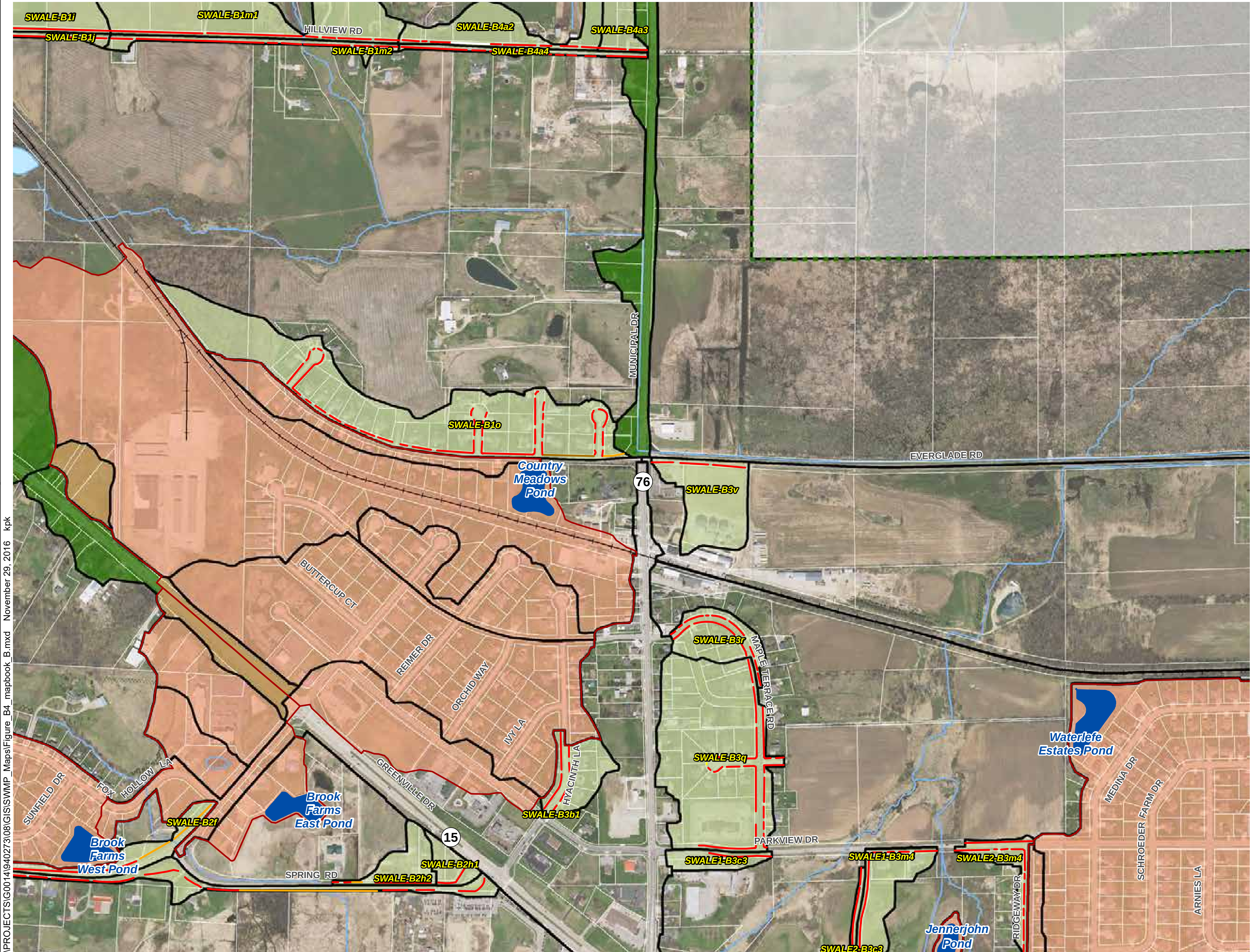

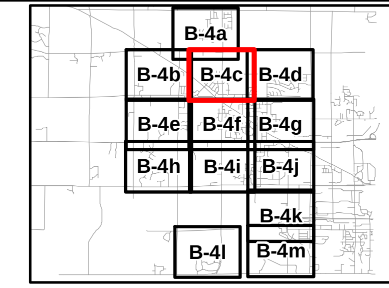

Swale Categories

- Non-Water Quality Swale (Channel Cuts or Bare Soil)
- Non-Water Quality Swale (Rock or Ditch Liner)
- Non-Water Quality Swale (Slopes Greater than 4%)
- Non-Water Quality Swale (Ditch Enclosure)
- Water Quality Swale
- Water Quality Swale (Standing Water-Wetland Vegetation)

Swale Jurisdiction

- State
- County
- Town of Greenville

Structural BMPs

- Existing BMP Watershed
- Stormwater Pond
- Biofilter

Other Mapped Features

- Urban Planning Boundary
- Municipal Boundary
- Right-of-Way
- Railroad Centerline
- Stream
- Surface Water

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

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0 600 1,200 Feet

McMAHON ENGINEERS ARCHITECTS

FIGURE B-4c
SWALE CATCHMENTS
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN

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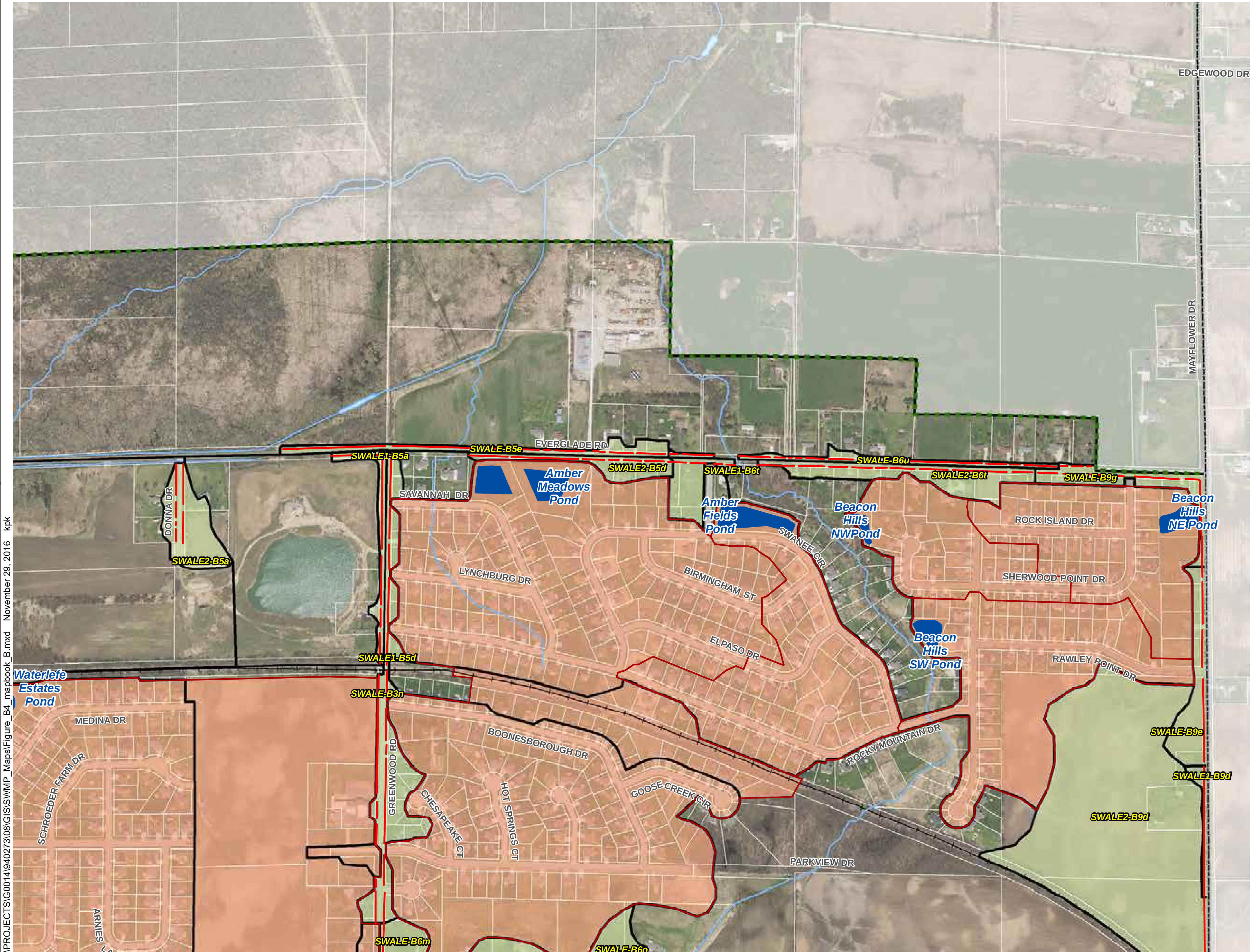

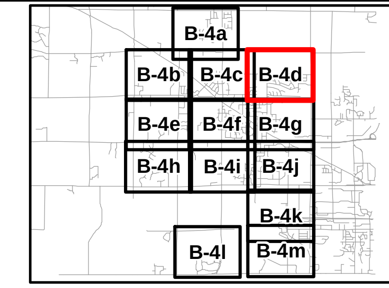

Swale Categories

- Non-Water Quality Swale (Channel Cuts or Bare Soil)
- Non-Water Quality Swale (Rock or Ditch Liner)
- Non-Water Quality Swale (Slopes Greater than 4%)
- Non-Water Quality Swale (Ditch Enclosure)
- Water Quality Swale
- Water Quality Swale (Standing Water-Wetland Vegetation)

Swale Jurisdiction

- State
- County
- Town of Greenville

Structural BMPs

- Existing BMP Watershed
- Stormwater Pond
- Biofilter

Other Mapped Features

- Urban Planning Boundary
- Municipal Boundary
- Right-of-Way
- Railroad Centerline
- Stream
- Surface Water

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

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

N

0 600 1,200 Feet

McMAHON ENGINEERS ARCHITECTS

FIGURE B-4d
SWALE CATCHMENTS
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN

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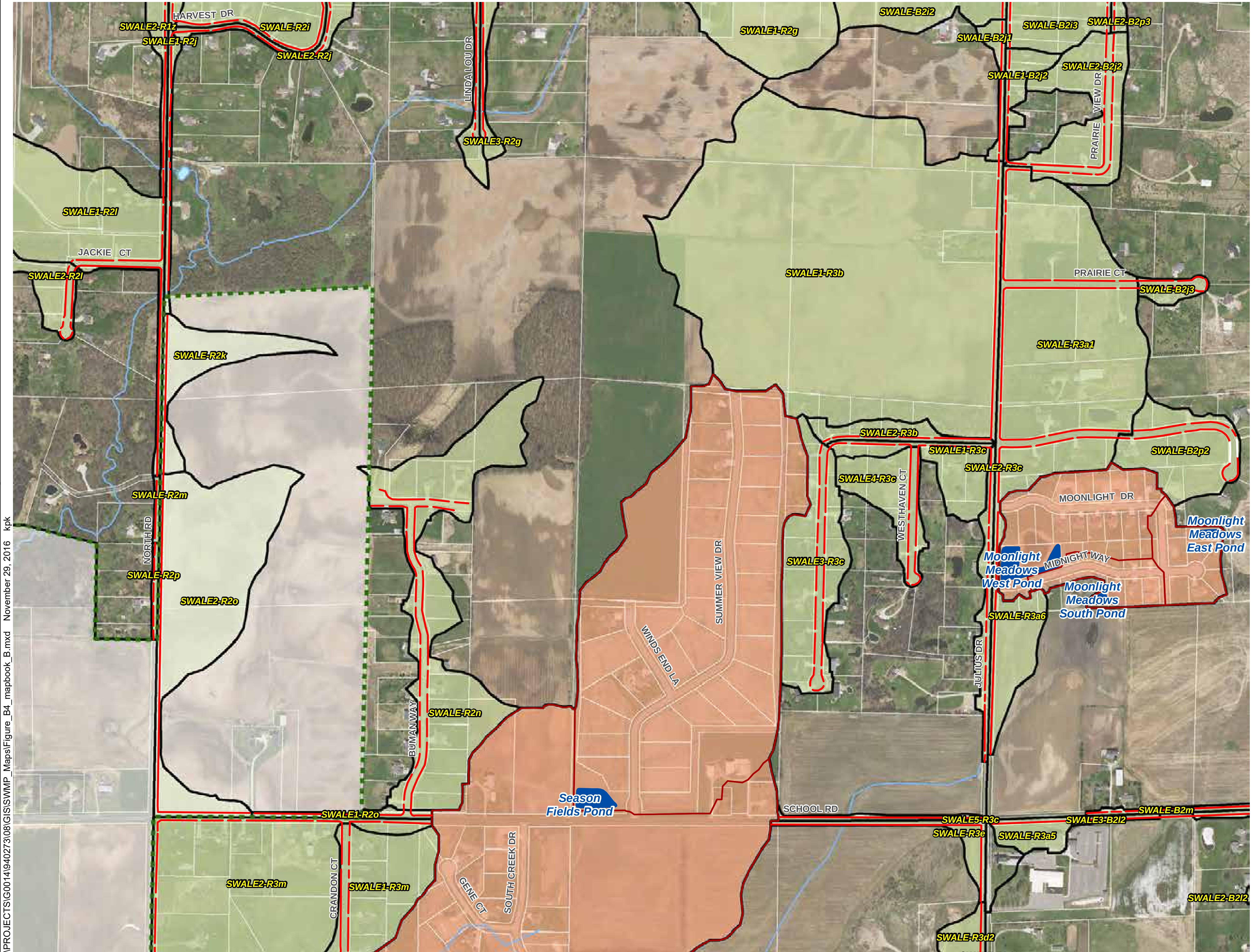

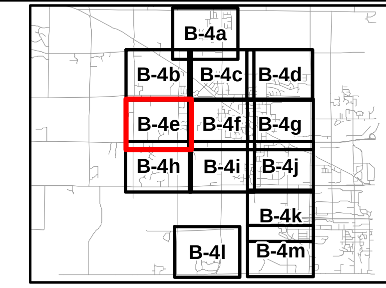

Swale Categories

- Non-Water Quality Swale (Channel Cuts or Bare Soil)
- Non-Water Quality Swale (Rock or Ditch Liner)
- Non-Water Quality Swale (Slopes Greater than 4%)
- Non-Water Quality Swale (Ditch Enclosure)
- Water Quality Swale
- Water Quality Swale (Standing Water-Wetland Vegetation)

Swale Jurisdiction

- State
- County
- Town of Greenville

Structural BMPs

- Existing BMP Watershed
- Stormwater Pond
- Biofilter

Other Mapped Features

- Urban Planning Boundary
- Municipal Boundary
- Right-of-Way
- Railroad Centerline
- Stream
- Surface Water

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

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N

0 600 1,200 Feet

McMAHON ENGINEERS ARCHITECTS

FIGURE B-4e
SWALE CATCHMENTS
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN

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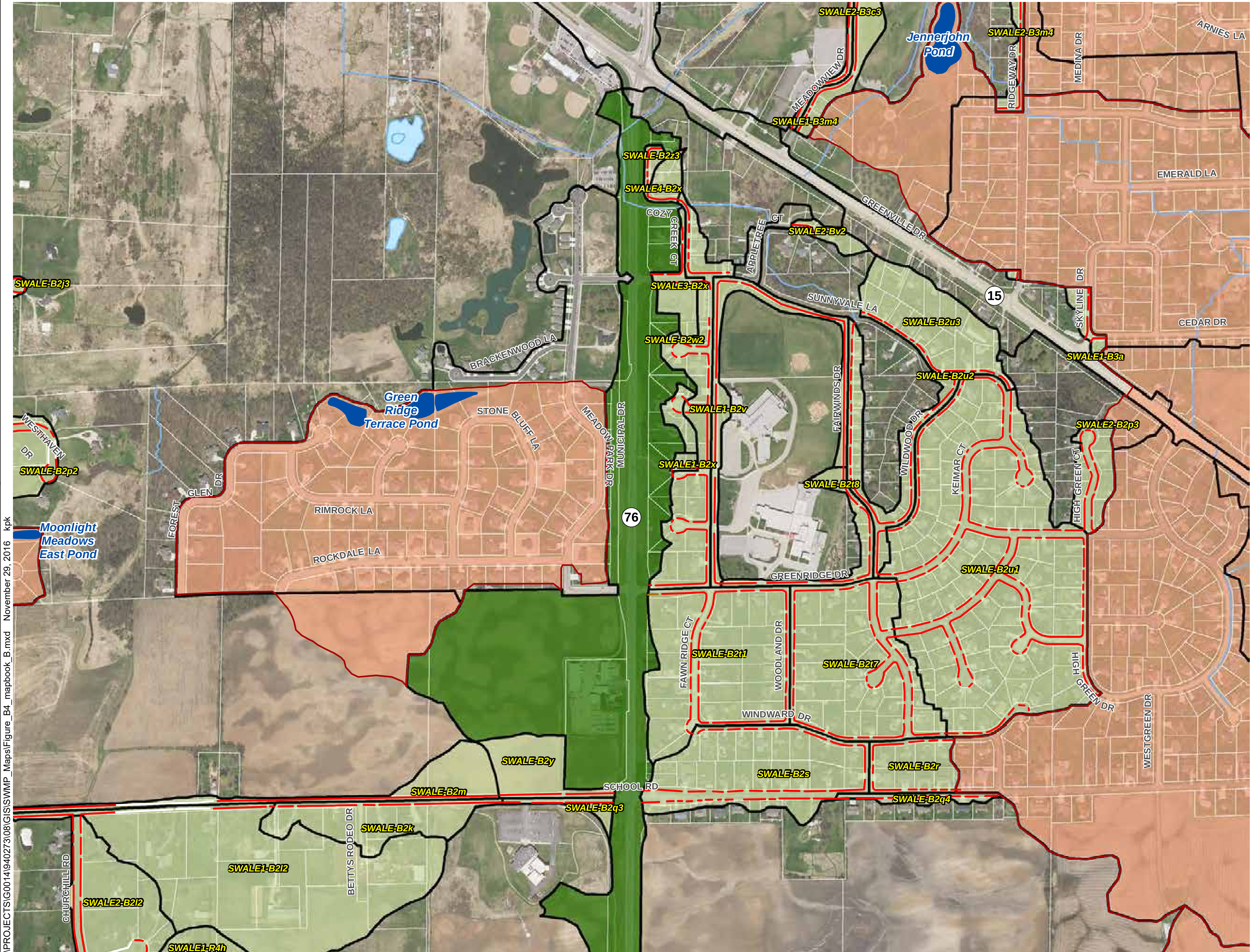

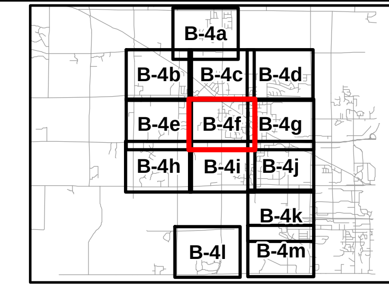

Swale Categories
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- Non-Water Quality Swale (Rock or Ditch Liner)
- Non-Water Quality Swale (Slopes Greater than 4%)
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- Water Quality Swale
- Water Quality Swale (Standing Water-Wetland Vegetation)

Swale Jurisdiction
- State
- County
- Town of Greenville

Structural BMPs
- Existing BMP Watershed
- Stormwater Pond
- Biofilter

Other Mapped Features
- Urban Planning Boundary
- Municipal Boundary
- Right-of-Way
- Railroad Centerline
- Stream
- Surface Water

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N

0 600 1,200 Feet

TOWN OF GREENVILLE SINCE 1848

McMAHON ENGINEERS ARCHITECTS

FIGURE B-4f
SWALE CATCHMENTS
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN

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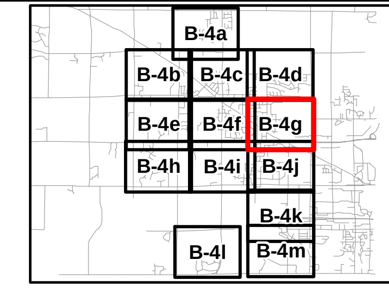

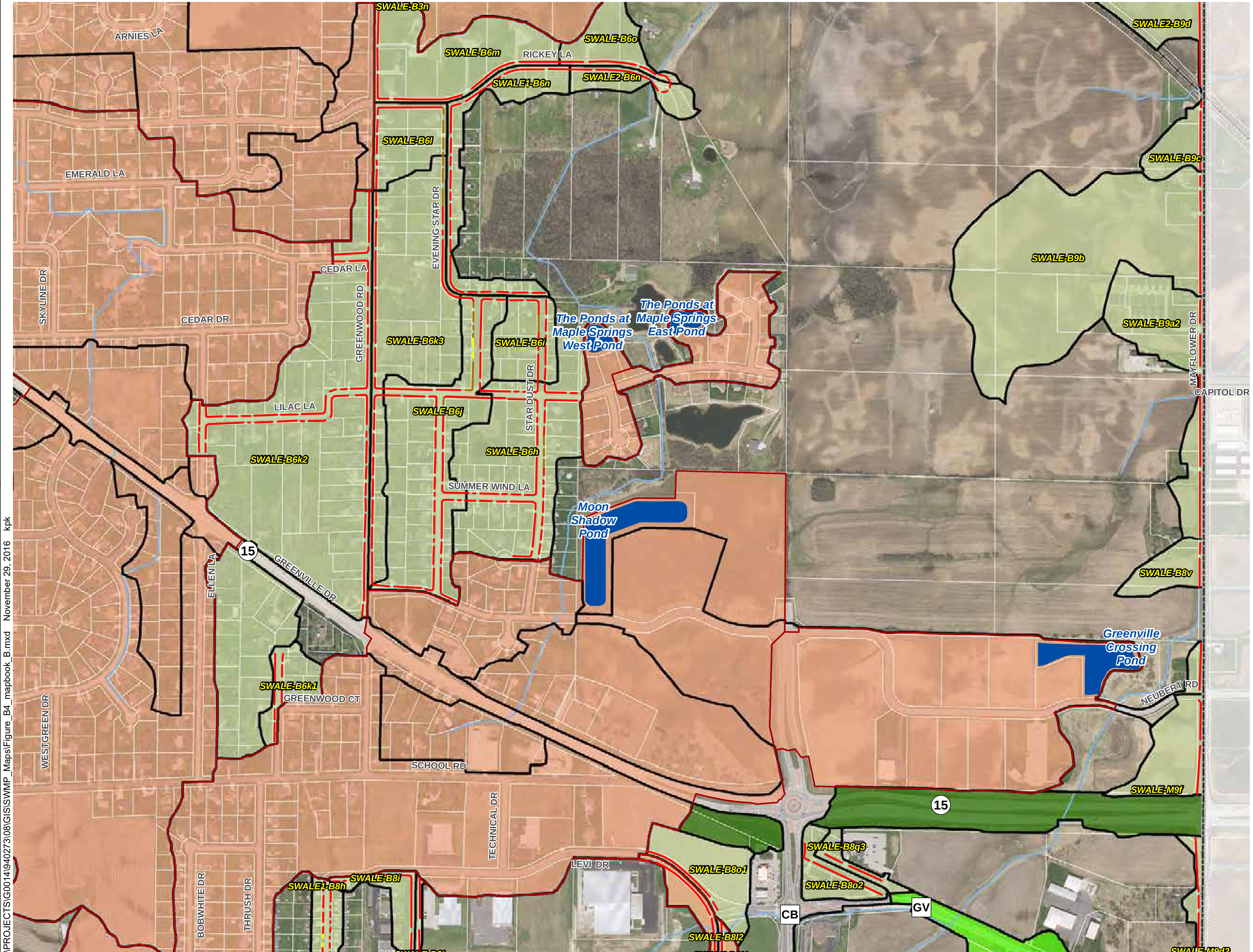

Swale Categories
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- Non-Water Quality Swale (Rock or Ditch Liner)
- Non-Water Quality Swale (Slopes Greater than 4%)
- Non-Water Quality Swale (Ditch Enclosure)
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- Water Quality Swale (Standing Water-Wetland Vegetation)

Swale Jurisdiction
- State
- County
- Town of Greenville

Structural BMPs
- Existing BMP Watershed
- Stormwater Pond
- Biofilter

Other Mapped Features
- Urban Planning Boundary
- Municipal Boundary
- Right-of-Way
- Railroad Centerline
- Stream
- Surface Water

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N

0 600 1,200 Feet

TOWN OF GREENVILLE SINCE 1848

McMAHON
ENGINEERS | ARCHITECTS

FIGURE B-4g
SWALE CATCHMENTS
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN

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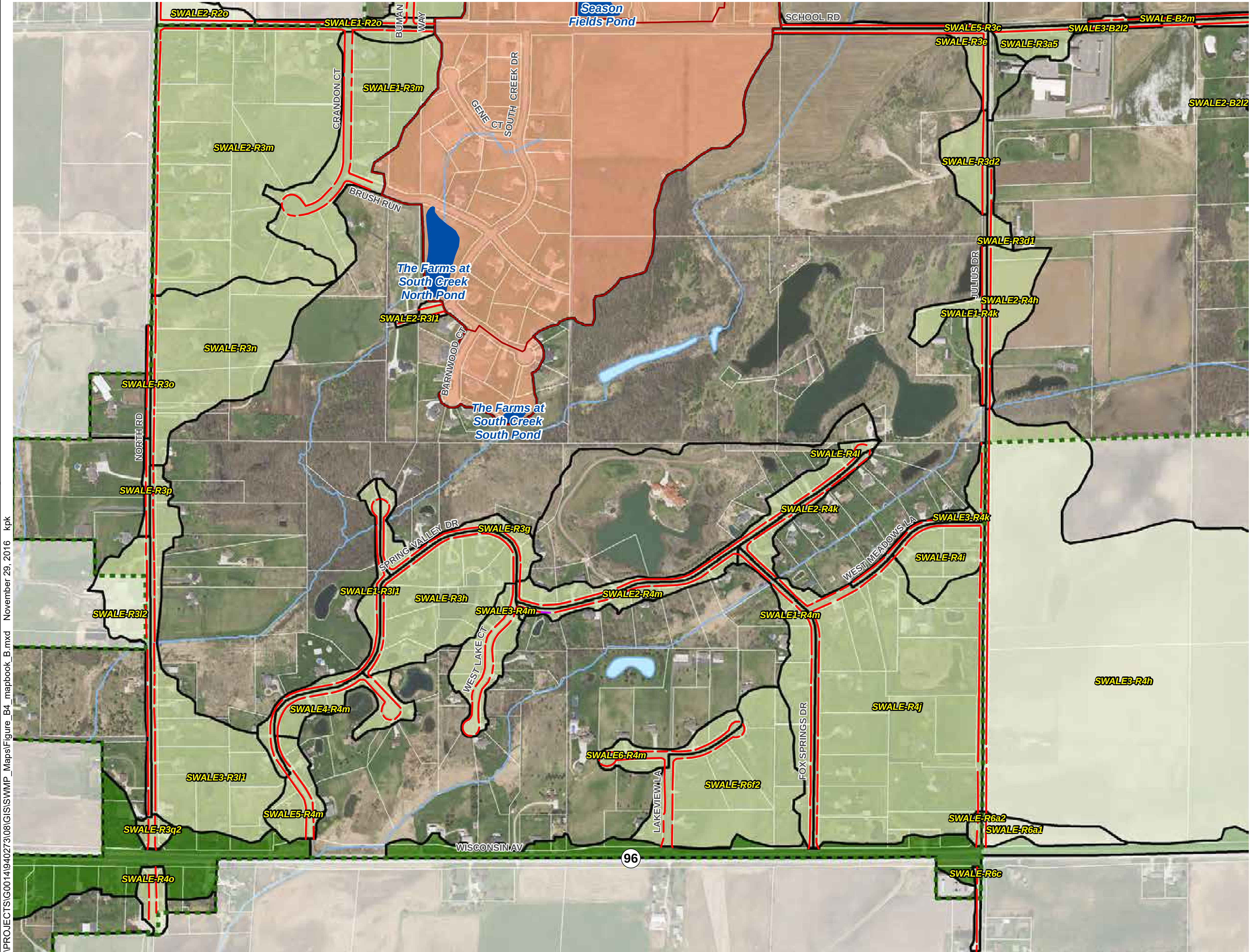

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B-4a
B-4b B-4c B-4d
B-4e B-4f B-4g
B-4h B-4i B-4j
B-4k
B-4l B-4m

Swale Categories
- Non-Water Quality Swale (Channel Cuts or Bare Soil)
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Swale Jurisdiction
- State
- County
- Town of Greenville

Structural BMPs
- Existing BMP Watershed
- Stormwater Pond
- Biofilter

Other Mapped Features
- Urban Planning Boundary
- Municipal Boundary
- Right-of-Way
- Railroad Centerline
- Stream
- Surface Water

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

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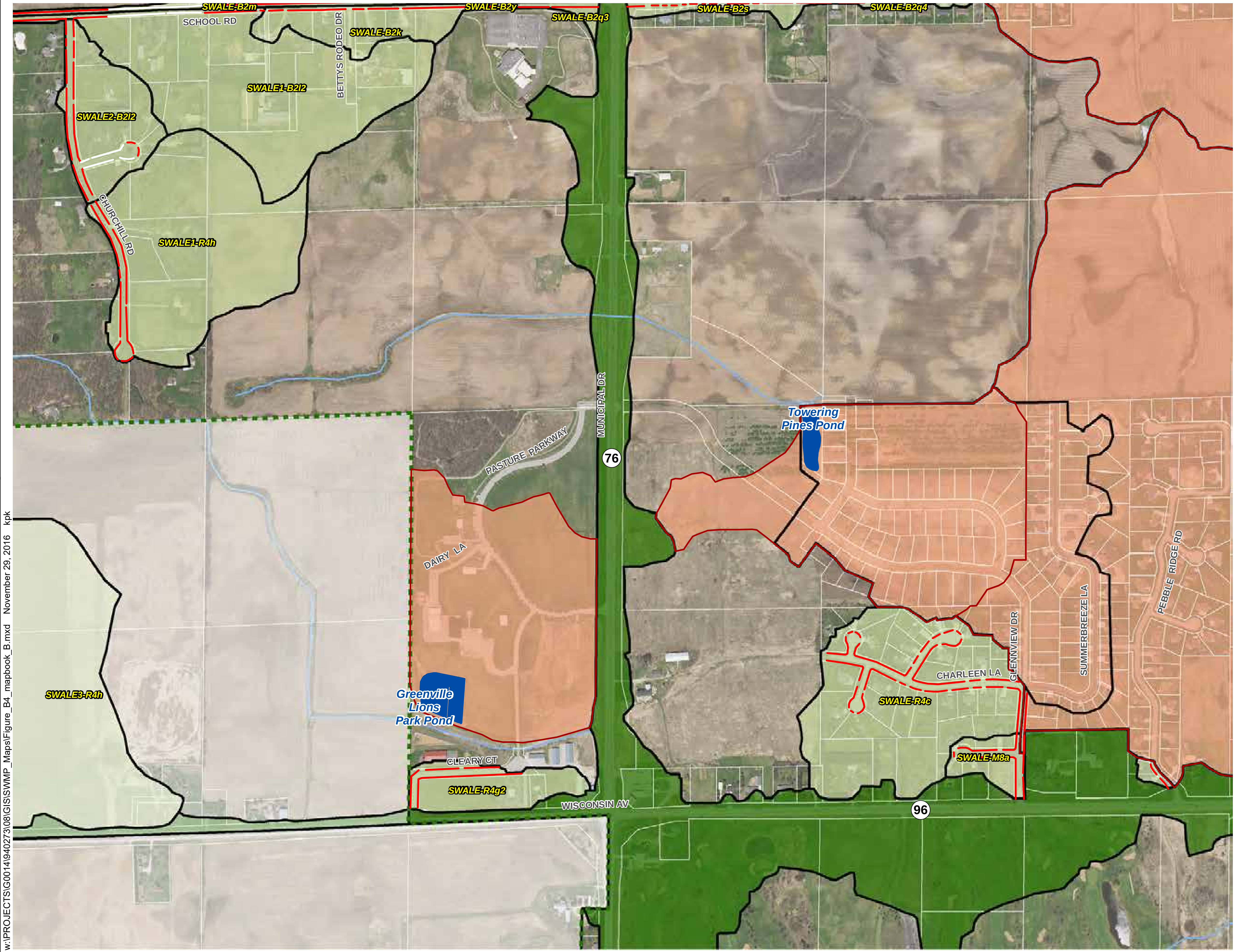
N

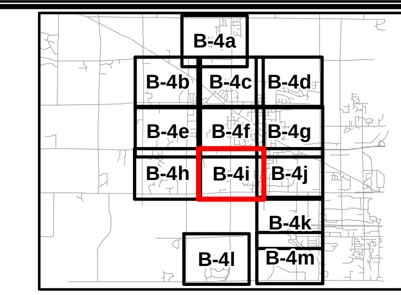
0 600 1,200 Feet

TOWN OF GREENVILLE SINCE 1848

McMAHON ENGINEERS ARCHITECTS

FIGURE B-4h
SWALE CATCHMENTS
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN





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Swale Jurisdiction

- State
- County
- Town of Greenville

Structural BMPs

- Existing BMP Watershed
- Stormwater Pond
- Biofilter

Other Mapped Features

- Urban Planning Boundary
- Municipal Boundary
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- Railroad Centerline
- Stream
- Surface Water

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N

0 600 1,200 Feet

TOWN OF GREENVILLE SINCE 1848

McMAHON ENGINEERS ARCHITECTS

FIGURE B-4i
SWALE CATCHMENTS
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN

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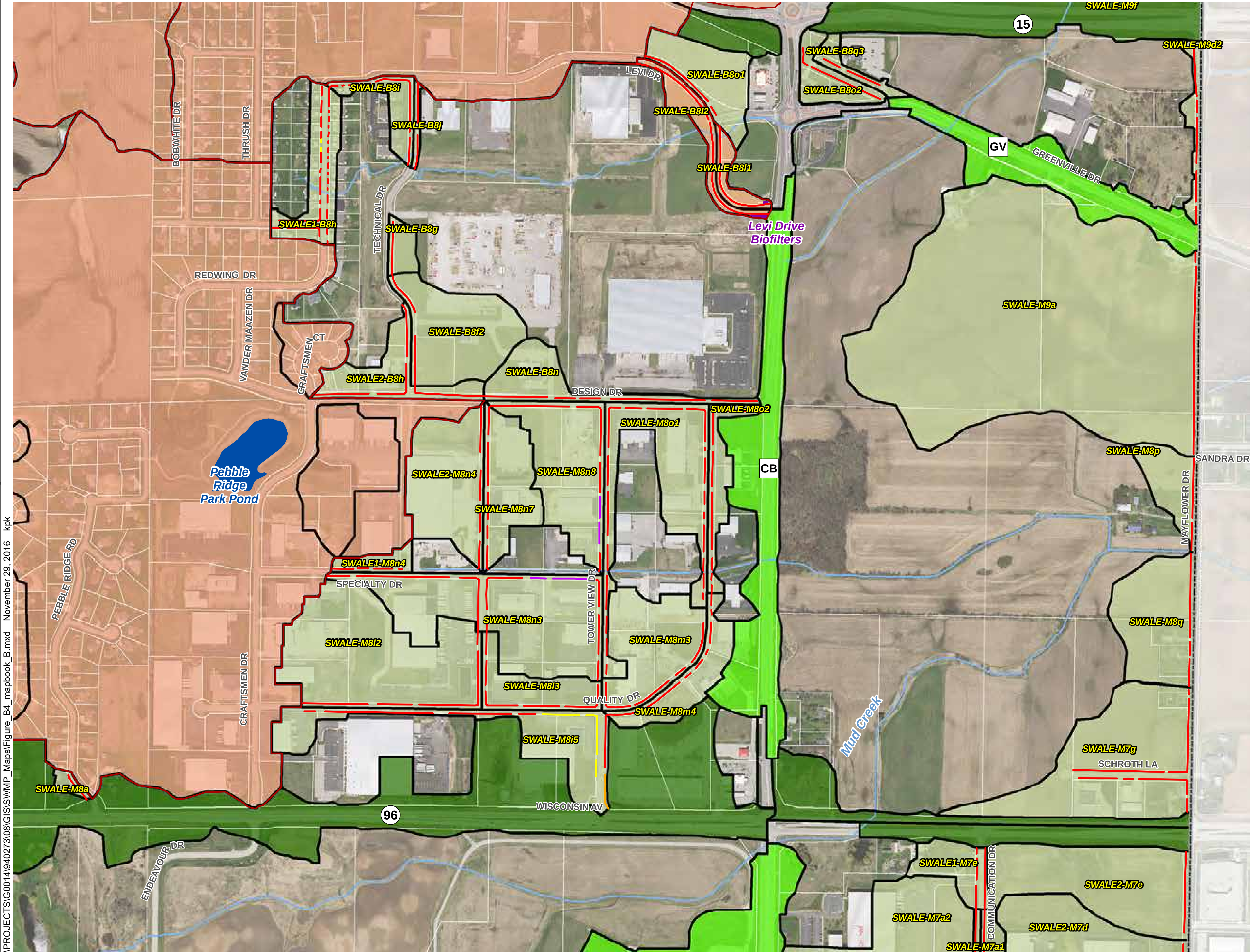

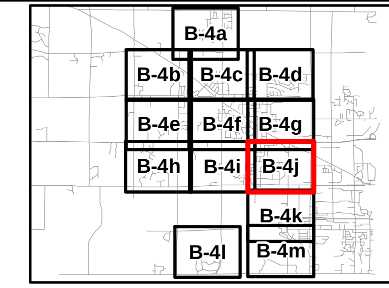

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Swale Jurisdiction

- State
- County
- Town of Greenville

Structural BMPs

- Existing BMP Watershed
- Stormwater Pond
- Biofilter

Other Mapped Features

- Urban Planning Boundary
- Municipal Boundary
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- Railroad Centerline
- Stream
- Surface Water

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0 600 1,200 Feet

TOWN OF GREENVILLE SINCE 1848

McMAHON ENGINEERS ARCHITECTS

FIGURE B-4j
SWALE CATCHMENTS
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN

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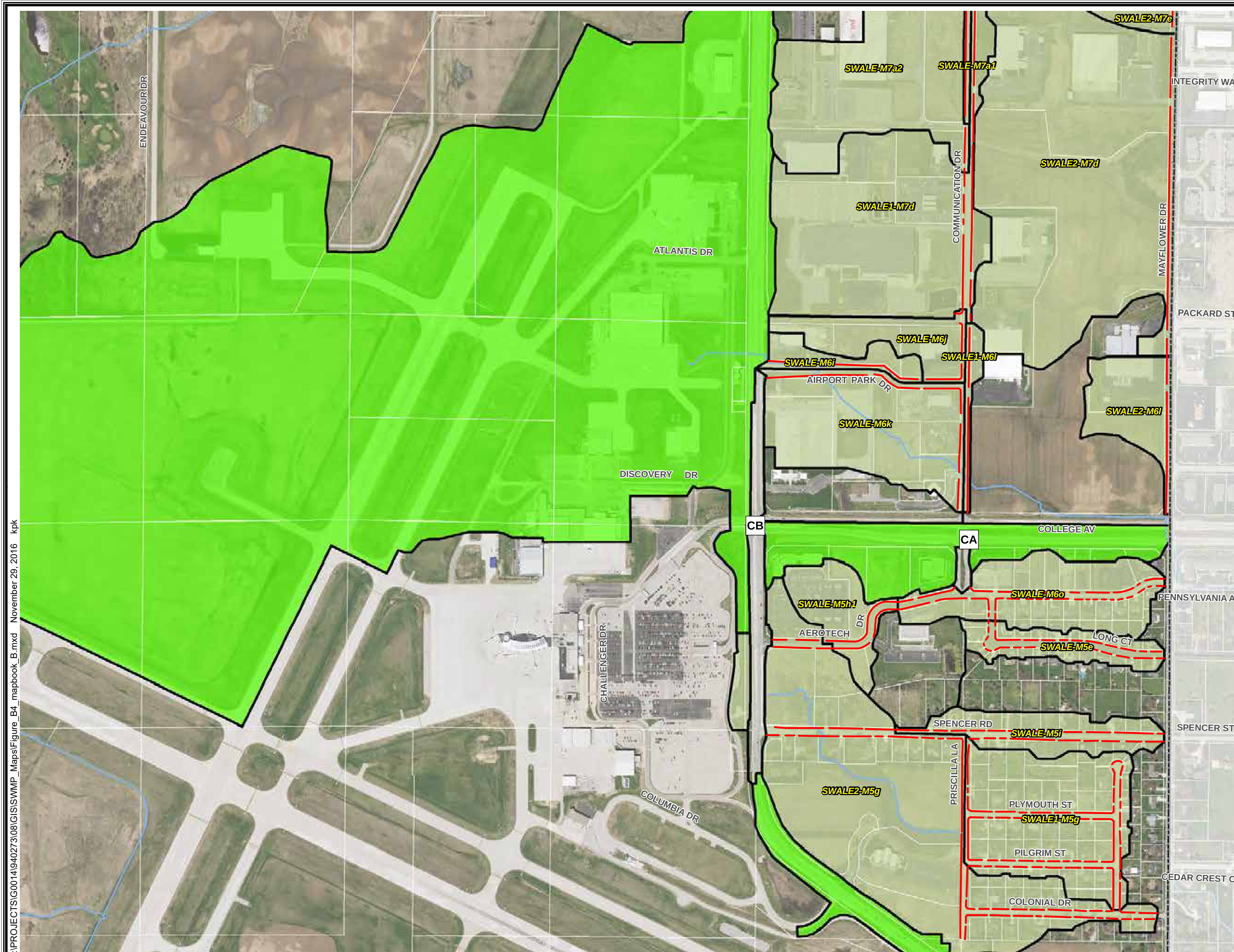

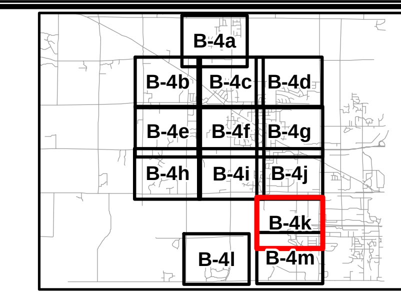

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Swale Jurisdiction

- State
- County
- Town of Greenville

Structural BMPs

- Existing BMP Watershed
- Stormwater Pond
- Biofilter

Other Mapped Features

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N

0 600 1,200 Feet

TOWN OF GREENVILLE SINCE 1848

McMAHON ENGINEERS ARCHITECTS

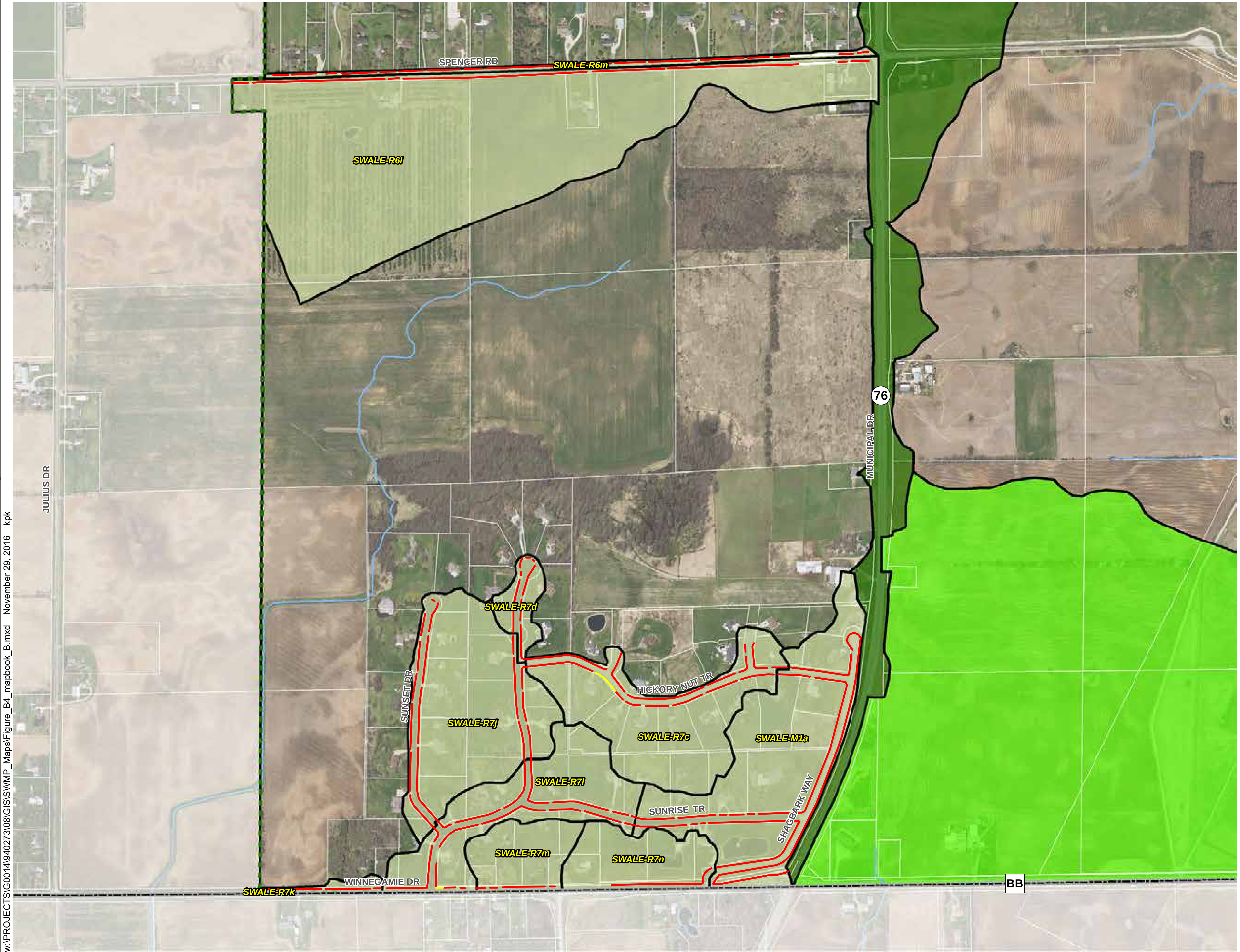
FIGURE B-4k

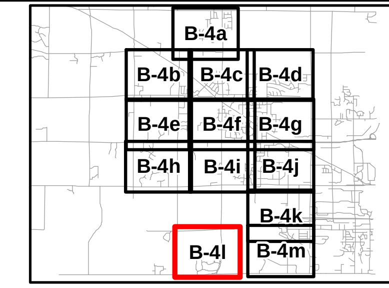
SWALE CATCHMENTS

STORMWATER MANAGMENT PLAN

TOWN OF GREENVILLE

OUTAGAMIE COUNTY, WISCONSIN





Swale Categories
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Swale Jurisdiction
- State
- County
- Town of Greenville

Structural BMPs
- Existing BMP Watershed
- Stormwater Pond
- Biofilter

Other Mapped Features
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0 600 1,200 Feet

McMAHON ENGINEERS ARCHITECTS

FIGURE B-4l
SWALE CATCHMENTS
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN

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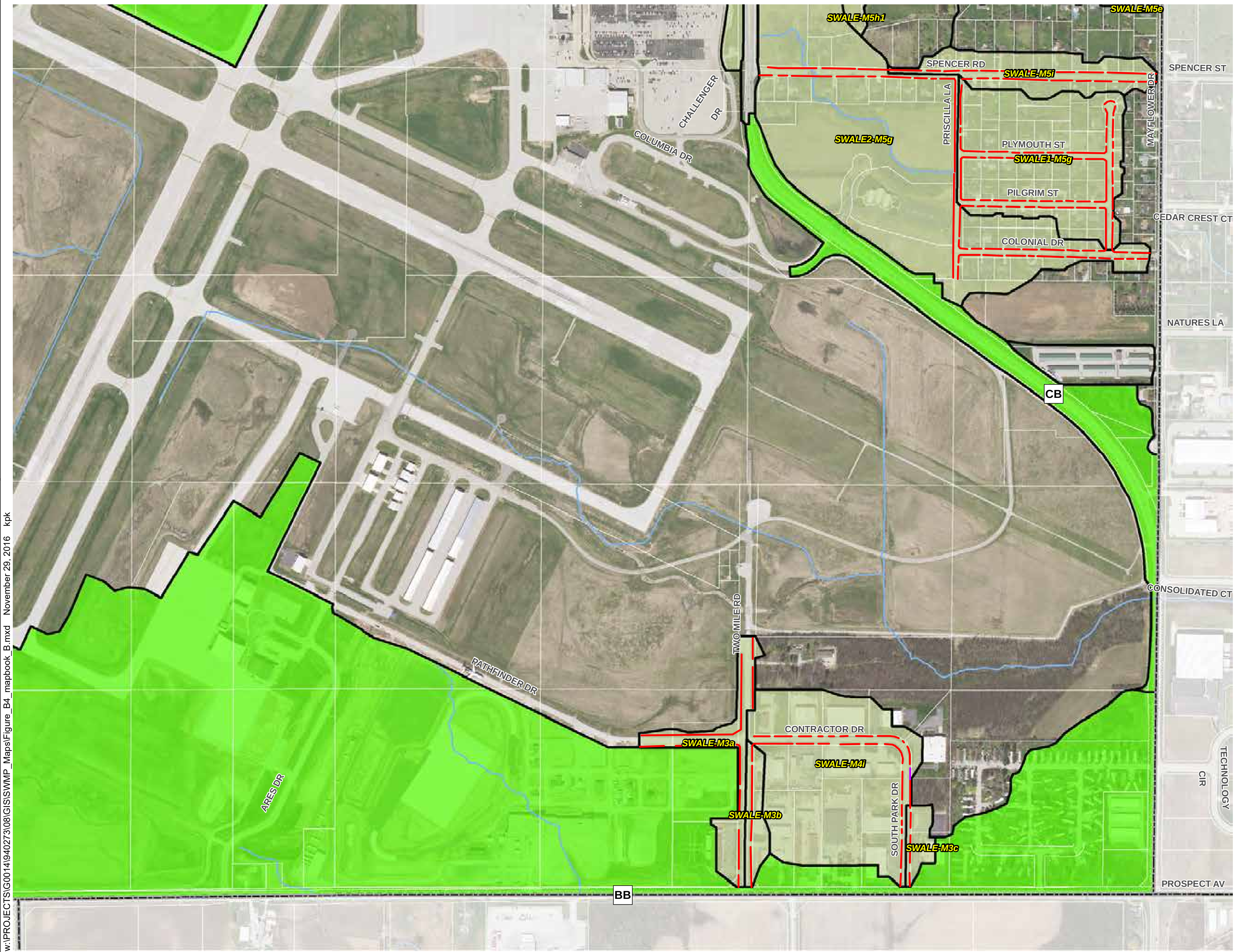

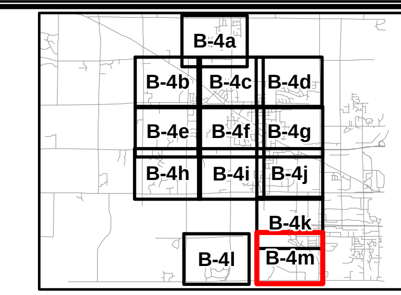

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- County
- Town of Greenville

Structural BMPs
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- Stormwater Pond
- Biofilter

Other Mapped Features
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- Municipal Boundary
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- Railroad Centerline
- Stream
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N

0 600 1,200 Feet

McMAHON ENGINEERS ARCHITECTS

FIGURE B-4m
SWALE CATCHMENTS
STORMWATER MANAGMENT PLAN
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN

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NR 151 Pollutant Analysis Summary - 2004 BMPs

Town of Greenville - Urban Study Area

Sub-Watershed	Area (acres)	TSS							
		Before Drain System (lbs/yr)	After Outfall Control (lbs/yr)	Total Load Reduct (lbs)	Total Load Reduct (%)	NR 151 Load Redct Req'd (lbs)	NR 151 Load Redct Req'd (%)	Addt'l Load Redct Req'd (lbs)	NR 151 TSS Redct Satsified (y/n)
Bear Creek	2,049.8	434,137	216,420	217,717	50.1%	86,827	20.0%	-130,890	yes
Fox River	284.3	98,274	66,502	31,772	32.3%	19,655	20.0%	-12,117	yes
Mud Creek	132.5	59,937	39,902	20,035	33.4%	11,987	20.0%	-8,048	yes
Rat River	767.1	125,943	58,849	67,094	53.3%	25,189	20.0%	-41,906	yes
Totals:	**3,233.7**	**718,290**	**381,672**	**336,618**	**46.9%**	**143,658**	**20.0%**	**-192,960**	yes

Sub-Watershed	Area (acres)	TP							
		Before Drain System (lbs/yr)	After Outfall Control (lbs/yr)	Total Load Reduct (lbs)	Total Load Reduct (%)	NR 151 Load Redct Req'd (lbs)	NR 151 Load Redct Req'd (%)	Addt'l Load Redct Req'd (lbs)	NR 151 TP Redct Satsified (y/n)
Bear Creek	2,049.8	1,516.6	902.3	614.3	40.5%	227.5	15.0%	-386.8	yes
Fox River	284.3	220.0	148.1	71.9	32.7%	33.0	15.0%	-38.9	yes
Mud Creek	132.5	115.6	79.4	36.2	31.3%	17.3	15.0%	-18.8	yes
Rat River	767.1	530.8	300.6	230.2	43.4%	79.6	15.0%	-150.6	yes
Totals:	**3,233.7**	**2,382.9**	**1,430.4**	**952.6**	**40.0%**	**357.4**	**15.0%**	**-595.1**	yes

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B1a. NR 151 Pollutant Analysis

2004 Condition: 2004 Land Use, 2004 BMP's, 2004 Drainage System with the following Street Sweeping routines: HE Sweeper-Once every 3 months-No Parking Control Ordinance

			Town of Greenville												
			Urban Study Area*												
				Total Suspended Solids (TSS)						Total Phosphorus (TP)					
Sub-Watershed	Drainage System or BMP Catchment ID	BMP Name	Area (acres)	Before Drain System (lbs/yr)	After Drain System (lbs/yr)	BMP Reduct (%)	After Outfall Control (lbs/yr)	Total Load Reduct (%)	Net Gain (lbs/yr)	Before Drain System (lbs/yr)	After Drain System (lbs/yr)	BMP Reduct (%)	After Outfall Control (lbs/yr)	Total Load Reduct (%)	Net Gain (lbs/yr)
Bear Creek	No Controls		50.9	9,721	9,721		9,721	0.0%	0	36.7	36.7		36.7	0.0%	0.00
Bear Creek	Swales		115.2	35,177	17,021		17,021	51.6%	0	121.7	65.8		65.8	45.9%	0.0
Bear Creek	Sweeping		2.0	1,289	1,195		1,195	7.3%	0	3.4	3.2		3.2	5.6%	0.0
Bear Creek	BMP-B1o		10.4	2,187	1,245		1,245	43.1%	0	8.4	5.3		5.3	36.2%	0.0
Bear Creek	BMP-B1s	Country Meadows Pond	117.9	26,034	25,883	61.7%	9,982	61.7%	15,902	89.5	89.2	46.5%	47.9	46.5%	41.3
Bear Creek	BMP-B2b1		4.6	1,038	1,038		1,038	0.0%	0	3.1	3.1		3.1	0.0%	0.0
Bear Creek	BMP-B2c		51.9	6,935	3,224		3,224	53.5%	0	32.4	17.6		17.6	45.6%	0.0
Bear Creek	BMP-B2e	Brook Farms West Pond	38.2	7,248	6,948	93.9%	442	93.9%	6,506	28.0	27.3	71.3%	8.0	71.3%	19.3
Bear Creek	BMP-B2g3	Brook Farms East Pond	24.2	4,056	3,935	94.4%	226	94.4%	3,709	16.0	15.8	75.0%	4.0	75.0%	11.7
Bear Creek	BMP-B2h1		5.6	2,071	1,882		1,882	9.2%	0	4.7	4.4		4.4	6.1%	0.0
Bear Creek	BMP-B2j3		16.3	3,079	1,525		1,525	50.5%	0	12.3	7.2		7.2	41.9%	0.0
Bear Creek	BMP-B2l1		1.9	449	449		449	0.0%	0	1.5	1.5		1.5	0.0%	0.0
Bear Creek	BMP-B2m		32.5	6,133	2,935		2,935	52.1%	0	25.8	14.6		14.6	43.4%	0.0
Bear Creek	BMP-B2n2	Green Ridge Terrace Pond	70.3	12,474	11,940	84.7%	1,907	84.7%	10,033	50.7	49.5	60.4%	20.1	60.4%	29.4
Bear Creek	BMP-B2o1		6.2	1,627	1,538		1,538	5.4%	0	5.8	5.6		5.6	3.5%	0.0
Bear Creek	BMP-B2o2		0.4	20	20		20	0.0%	0	0.1	0.1		0.1	0.0%	0.0
Bear Creek	BMP-B2p3		40.8	6,793	2,744		2,744	59.6%	0	28.7	13.2		13.2	54.0%	0.0
Bear Creek	BMP-B2q1		2.3	686	686		686	0.0%	0	1.7	1.7		1.7	0.0%	0.0
Bear Creek	BMP-B2q4		17.6	4,386	3,709		3,709	15.5%	0	13.1	11.6		11.6	11.6%	0.0
Bear Creek	BMP-B2t6		6.5	1,802	710		710	60.6%	0	6.4	2.9		2.9	54.2%	0.0
Bear Creek	BMP-B2t8		58.7	11,449	5,823		5,823	49.1%	0	44.5	25.2		25.2	43.5%	0.0
Bear Creek	BMP-B2u2		63.3	12,274	4,049		4,049	67.0%	0	47.8	18.0		18.0	62.3%	0.0
Bear Creek	BMP-B2v		30.3	6,763	5,134		5,134	24.1%	0	23.9	19.9		19.9	16.9%	0.0
Bear Creek	BMP-B2w1		9.1	2,390	1,183		1,183	50.5%	0	8.5	4.7		4.7	44.9%	0.0
Bear Creek	BMP-B2w2		15.2	2,839	2,048		2,048	27.9%	0	10.9	8.1		8.1	25.3%	0.0
Bear Creek	BMP-B3a		8.9	1,794	1,184		1,184	34.0%	0	6.6	4.7		4.7	29.2%	0.0
Bear Creek	BMP-B3b1		10.1	3,366	2,924		2,924	13.1%	0	9.1	7.8		7.8	14.2%	0.0
Bear Creek	BMP-B3c1		1.1	643	442		442	31.2%	0	1.3	0.9		0.9	24.5%	0.0
Bear Creek	BMP-B3c2		3.7	1,340	1,340		1,340	0.0%	0	2.1	2.1		2.1	0.0%	0.0
Bear Creek	BMP-B3m3		196.3	33,036	33,036		33,036	0.0%	0	136.1	136.1		136.1	0.0%	0.0
Bear Creek	BMP-B3o	Waterlefe Estates Pond	121.5	23,450	22,771	84.1%	3,726	84.1%	19,045	87.6	86.1	61.4%	33.8	61.4%	52.2
Bear Creek	BMP-B3s		22.9	5,293	3,450		3,450	34.8%	0	17.9	12.6		12.6	29.8%	0.0
Bear Creek	BMP-B3v		7.2	1,975	1,659		1,659	16.0%	0	5.1	4.6		4.6	9.7%	0.0
Bear Creek	BMP-B4a1	Glen Valley Pond	162.8	25,182	24,464	92.2%	1,972	92.2%	22,492	106.6	104.9	69.0%	33.0	69.0%	71.9
Bear Creek	BMP-B4d		31.8	6,103	3,479		3,479	43.0%	0	24.2	15.3		15.3	36.9%	0.0
Bear Creek	BMP-B4l		16.1	3,451	1,872		1,872	45.8%	0	13.1	7.9		7.9	40.2%	0.0
Bear Creek	BMP-B4m1		1.2	120	120		120	0.0%	0	0.6	0.6		0.6	0.0%	0.0
Bear Creek	BMP-B5a		15.1	750	750		750	0.0%	0	2.7	2.7		2.7	0.0%	0.0
Bear Creek	BMP-B5c3	Amber Meadows Pond	136.2	23,629	22,769	77.6%	5,298	77.6%	17,472	97.2	95.2	55.0%	43.7	55.0%	51.5
Bear Creek	BMP-B6e1		90.9	21,118	21,118		21,118	0.0%	0	69.5	69.5		69.5	0.0%	0.0
Bear Creek	BMP-B6h		17.4	3,210	1,852		1,852	42.3%	0	12.9	8.3		8.3	36.0%	0.0
Bear Creek	BMP-B6i		4.7	880	367		367	58.3%	0	3.5	1.7		1.7	51.1%	0.0
Bear Creek	BMP-B6j		18.0	3,812	1,826		1,826	52.1%	0	14.5	7.9		7.9	45.8%	0.0
Bear Creek	BMP-B6k3		66.7	9,328	5,410		5,410	42.0%	0	41.9	27.5		27.5	34.4%	0.0
Bear Creek	BMP-B6m		16.2	2,417	1,038		1,038	57.0%	0	10.7	5.5		5.5	49.0%	0.0
Bear Creek	BMP-B6n		9.4	2,005	526		526	73.7%	0	7.7	2.6		2.6	66.7%	0.0
Bear Creek	BMP-B6q		0.3	179	167		167	6.7%	0	0.5	0.5		0.5	5.1%	0.0
Bear Creek	BMP-B6r		3.3	238	238		238	0.0%	0	1.5	1.5		1.5	0.0%	0.0
Bear Creek	BMP-B6s	Amber Fields Pond	29.1	6,436	6,138	85.5%	933	85.5%	5,205	24.1	23.4	61.3%	9.3	61.3%	14.1
Bear Creek	BMP-B8b1	Pebble Ridge Park Pond	9.1	3,565	3,565	74.8%	898	74.8%	2,668	5.5	5.5	53.0%	2.6	53.0%	2.9
Bear Creek	BMP-B8d	Pebble Ridge Park Pond	136.3	38,715	38,650	74.8%	9,748	74.8%	28,901	101.0	100.9	53.0%	47.5	53.0%	53.4
Bear Creek	BMP-B8j		55.2	18,649	15,432		15,432	17.3%	0	40.5	33.5		33.5	17.3%	0.0
Bear Creek	BMP-B8l2		0.4	67	21		21	68.3%	0	0.5	0.2		0.2	55.7%	0.0
Bear Creek	BMP-B8n		34.5	15,356	14,224		14,224	7.4%	0	23.9	22.1		22.1	7.7%	0.0
Bear Creek	BMP-B8u	Greenville Crossing Pond	29.3	8,997	8,860	90.9%	822	90.9%	8,038	21.5	21.2	76.2%	5.1	76.2%	16.2
Bear Creek	BMP-B9a1		0.0	1	0		0	33.1%	0	0.0	0.0		0.0	27.2%	0.0
Bear Creek	BMP-B9f		1.7	112	112		112	0.0%	0	0.8	0.8		0.8	0.0%	0.0
Fox River	No Controls		3.9	284	284		284	0.0%	0	1.6	1.6		1.6	0.0%	0.0
Fox River	Swales		14.4	8,677	4,404		4,404	49.2%	0	17.3	9.7		9.7	44.1%	0.0
Fox River	Sweeping		1.0	610	570		570	6.6%	0	1.8	1.7		1.7	5.1%	0.0
Fox River	BMP-M1a		26.7	5,266	1,838		1,838	65.1%	0	21.0	8.8		8.8	58.1%	0.0
Fox River	BMP-M4i		24.2	11,104	7,540		7,540	32.1%	0	19.0	13.4		13.4	29.3%	0.0
Fox River	BMP-M5g		52.5	11,771	4,981		4,981	57.7%	0	39.0	17.7		17.7	54.4%	0.0
Fox River	BMP-M5j2		8.2	1,924	933		933	51.5%	0	7.0	3.8		3.8	45.7%	0.0
Fox River	BMP-M5l		4.5	287	287		287	0.0%	0	2.0	2.0		2.0	0.0%	0.0
Fox River	BMP-M6k		30.8	13,682	10,260		10,260	25.0%	0	24.8	19.3		19.3	22.0%	0.0
Fox River	BMP-M6p		44.6	11,349	8,401		8,401	26.0%	0	33.0	25.7		25.7	22.1%	0.0
Fox River	BMP-M7b1		2.7	1,143	829		829	27.4%	0	1.7	1.3		1.3	25.2%	0.0
Fox River	BMP-M7c1		6.3	2,685	1,950		1,950	27.4%	0	4.0	3.0		3.0	25.2%	0.0
Fox River	BMP-M7c2		13.7	5,877	4,267		4,267	27.4%	0	8.8	6.6		6.6	25.2%	0.0
Fox River	BMP-M7d		50.7	23,616	19,961		19,961	15.5%	0	38.9	33.4		33.4	14.1%	0.0
Mud Creek	Swales		18.3	5,468	3,061		3,061	44.0%	0	16.0	9.5		9.5	41.0%	0.0
Mud Creek	BMP-M8i5		8.9	4,924	2,624		2,624	46.7%	0	9.0	5.3		5.3	41.7%	0.0
Mud Creek	BMP-M8l1		7.3	3,125	2,375		2,375	24.0%	0	4.7	3.7		3.7	21.3%	0.0
Mud Creek	BMP-M8m1		0.6	279	219		219	21.3%	0	0.4	0.3		0.3	18.1%	0.0
Mud Creek	BMP-M8m4		28.1	13,397	9,416		9,416	29.7%	0	24.1	17.7		17.7	26.5%	0.0
Mud Creek	BMP-M8n1		3.2	1,371	945		945	31.1%	0	2.0	1.5		1.5	27.5%	0.0
Mud Creek	BMP-M8n5		0.1	54	31		31	42.3%	0	0.1	0.0		0.0	38.1%	0.0
Mud Creek	BMP-M8n6		1.1	469	270		270	42.3%	0	0.7	0.4		0.4	38.1%	0.0
Mud Creek	BMP-M8o2		52.7	27,362	18,200		18,200	33.5%	0	48.7	33.9		33.9	30.4%	0.0
Mud Creek	BMP-M8q		3.1	508	223		223	56.1%	0	2.4	1.2		1.2	50.0%	0.0
Mud Creek	BMP-M9c		1.3	435	321		321	26.2%	0	1.7	1.3		1.3	22.0%	0.0
Mud Creek	BMP-M9d1		0.2	23	23		23	0.0%	0	0.1	0.1		0.1	0.0%	0.0
Mud Creek	BMP-M9d2		7.5	2,523	2,192		2,192	13.1%	0	5.5	4.4		4.4	20.7%	0.0
Rat River	No Controls		27.7	4,304	4,304		4,304	0.0%	0	17.6	17.6		17.6	0.0%	0.0
Rat River	Swales		156.5	35,954	15,285		15,285	57.5%	0	135.8	68.4		68.4	49.6%	0.0
Rat River	Sweeping		0.1	60	55		55	7.4%	0	0.2	0.2		0.2	5.6%	0.0
Rat River	BMP-R1v1		31.7	5,333	2,389		2,389	55.2%	0	22.4	11.6		11.6	48.0%	0.0
Rat River	BMP-R1x		11.1	1,555	863		863	44.5%	0	7.1	4.5		4.5	36.6%	0.0
Rat River	BMP-R2i		25.7	4,309	1,505		1,505	65.1%	0	18.1	7.6		7.6	57.9%	0.0
Rat River	BMP-R2n		34.1	4,680	2,995		2,995	36.0%	0	21.2	15.7		15.7	26.0%	0.0
Rat River	BMP-R3a2		0.1	8	8		8	0.0%	0	0.1	0.1		0.1	0.0%	0.0
Rat River	BMP-R3a4		0.5	134	85		85	36.1%	0	0.4	0.3		0.3	30.0%	0.0
Rat River	BMP-R3a6		38.4	6,347	3,547		3,547	44.1%	0	27.1	16.8		16.8	38.0%	0.0
Rat River	BMP-R3c		36.2	7,368	3,287		3,287	55.4%	0	29.5	15.2		15.2	48.5%	0.0
Rat River	BMP-R3f	The Farms at South Creek South Pond	6.3	1,204	1,204	90.1%	119	90.1%	1,085	4.8	4.8	62.4%	1.8	62.4%	3.0
Rat River	BMP-R3h		12.2	1,464	845		845	42.3%	0	6.2	4.0		4.0	35.5%	0.0
Rat River	BMP-R3i	Season Fields Pond	56.1	7,188	7,188	81.7%	1,317	81.7%	5,871	33.7	33.7	57.7%	14.3	57.7%	19.5
Rat River	BMP-R3k	The Farms at South Creek North Pond	42.4	8,354	8,354	81.7%	1,530	81.7%	6,824	32.8	32.8	57.7%	13.9	57.7%	18.9
Rat River	BMP-R3m		64.5	7,750	4,350		4,350	43.9%	0	38.1	24.4		24.4	36.0%	0.0
Rat River	BMP-R4a1		0.6	46	46		46	0.0%	0	0.3	0.3		0.3	0.0%	0.0
Rat River	BMP-R4b2		0.9	271	271		271	0.0%	0	0.7	0.7		0.7	0.0%	0.0
Rat River	BMP-R4c		32.9	4,652	2,170		2,170	53.4%	0	20.7	11.2		11.2	45.9%	0.0
Rat River	BMP-R4d		40.6	3,584	3,584		3,584	0.0%	0	18.9	18.9		18.9	0.0%	0.0
Rat River	BMP-R4g2		2.9	847	518		518	38.8%	0	2.0	1.4		1.4	32.6%	0.0
Rat River	BMP-R4j		44.9	5,033	2,280		2,280	54.7%	0	25.4	13.2		13.2	47.9%	0.0
Rat River	BMP-R4l		10.7	1,940	791		791	59.2%	0	7.7	4.1		4.1	46.8%	0.0
Rat River	BMP-R6f2		16.0	1,759	878		878	50.1%	0	9.1	5.3		5.3	42.1%	0.0
Rat River	BMP-R7d		22.0	3,949	1,809		1,809	54.2%	0	16.3	8.7		8.7	46.7%	0.0
Rat River	BMP-R7j		21.5	2,958	1,355		1,355	54.2%	0	13.7	7.4		7.4	46.3%	0.0
Rat River	BMP-R7l		15.8	2,967	1,365		1,365	54.0%	0	12.1	6.4		6.4	46.6%	0.0
Rat River	BMP-R7m		14.5	1,926	1,298		1,298	32.6%	0	9.0	6.8		6.8	25.0%	0.0
		Totals:	**3,233.7**	**718,290**	**535,422**		**381,672**	**46.9%**	**153,750**	**2,382.9**	**1,835.6**		**1,430.4**	**40.0%**	**405.29**

*Excludes Riparian Areas, MS4"A" to "B" Areas, Undveloped Areas (>5 acres), Other MS4 Jurisdictions, Quarries, Agricultural Areas & Waters of the State

Town of Greenville - Urban Study Area									
NR 151 Pollutant Analysis Summary - 2008 BMPs									
		Total Suspended Solids (TSS)							
Sub-Watershed	Area (acres)	Before Drain System (lbs/yr)	After Outfall Control (lbs/yr)	Total Load Reduct (lbs)	Total Load Reduct (%)	NR 151 Load Redct Req'd (lbs)	NR 151 Load Redct Req'd (%)	Addt'l Load Redct Req'd (lbs)	NR 151 TSS Redct Satsified (y/n)
Bear Creek	2,049.8	434,137	216,017	218,120	50.2%	86,827	20.0%	-131,293	yes
Fox River	284.3	98,274	66,502	31,772	32.3%	19,655	20.0%	-12,117	yes
Mud Creek	132.5	59,937	39,902	20,035	33.4%	11,987	20.0%	-8,048	yes
Rat River	767.1	125,943	58,777	67,165	53.3%	25,189	20.0%	-41,977	yes
Totals:	**3,233.7**	**718,290**	**381,198**	**337,092**	**46.9%**	**143,658**	**20.0%**	**-193,434**	yes

NR 151 Pollutant Analysis Summary - 2008 BMPs									
		Total Phosphorus (TP)							
Sub-Watershed	Area (acres)	Before Drain System (lbs/yr)	After Outfall Control (lbs/yr)	Total Load Reduct (lbs)	Total Load Reduct (%)	NR 151 Load Redct Req'd (lbs)	NR 151 Load Redct Req'd (%)	Addt'l Load Redct Req'd (lbs)	NR 151 TP Redct Satsified (y/n)
Bear Creek	2,049.8	1,516.6	900.8	615.8	40.6%	227.5	15.0%	-388.3	yes
Fox River	284.3	220.0	148.1	71.9	32.7%	33.0	15.0%	-38.9	yes
Mud Creek	132.5	115.6	79.4	36.2	31.3%	17.3	15.0%	-18.8	yes
Rat River	767.1	530.8	300.4	230.4	43.4%	79.6	15.0%	-150.8	yes
Totals:	**3,233.7**	**2,382.9**	**1,428.7**	**954.2**	**40.0%**	**357.4**	**15.0%**	**-596.8**	yes