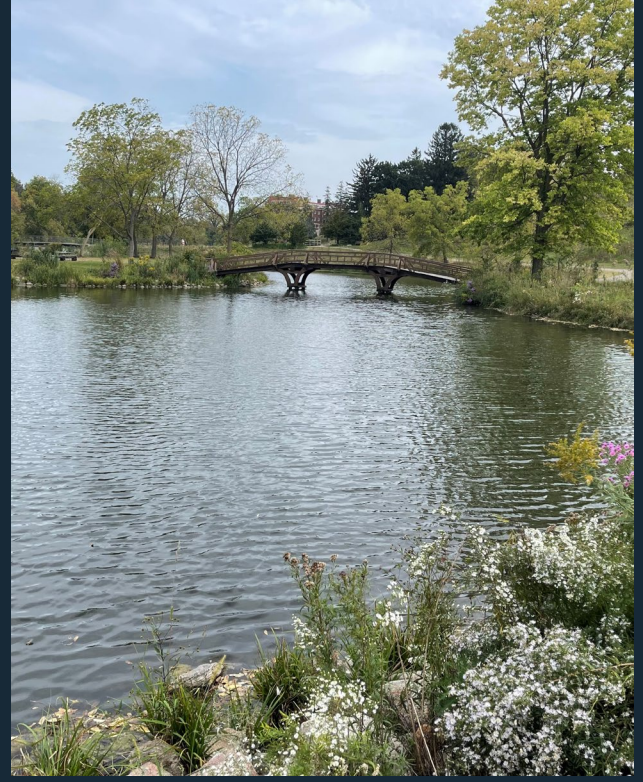


Northfield Wasteload Allocation (WLA) Implementation Plan

Greg Wilson

October 15, 2024

BARR

Agenda

1. Background
2. Water Quality Modeling
3. Pollutant Loading Assessment
4. Pollutant Reduction Goal Setting
5. Wasteload Allocation (WLA) Implementation Plan

Abbreviations

MPCA	Minnesota Pollution Control Agency
TP	Total Phosphorus
TSS	Total Suspended Solids
TMDL	Total Maximum Daily Load
WLAs	Waste Load Allocations
MS4	Municipal Separate Storm Sewer System
GIS WQM	Geographic Information System Water Quality Model
BMP	Best Management Practice

Background

Northfield authorized coverage by MPCA under MS4 General Permit

Under this permit, the city received WLAs from the TMDLs prepared in Cannon River Watershed and Restoration Protection Strategies report

Study intended to identify ways the City can further reduce storm water pollution and implement strategies to assist in meeting WLAs over next several decades

Barr was hired to develop WLA Implementation Plan and adaptive tool to support future modeling scenarios and plan development

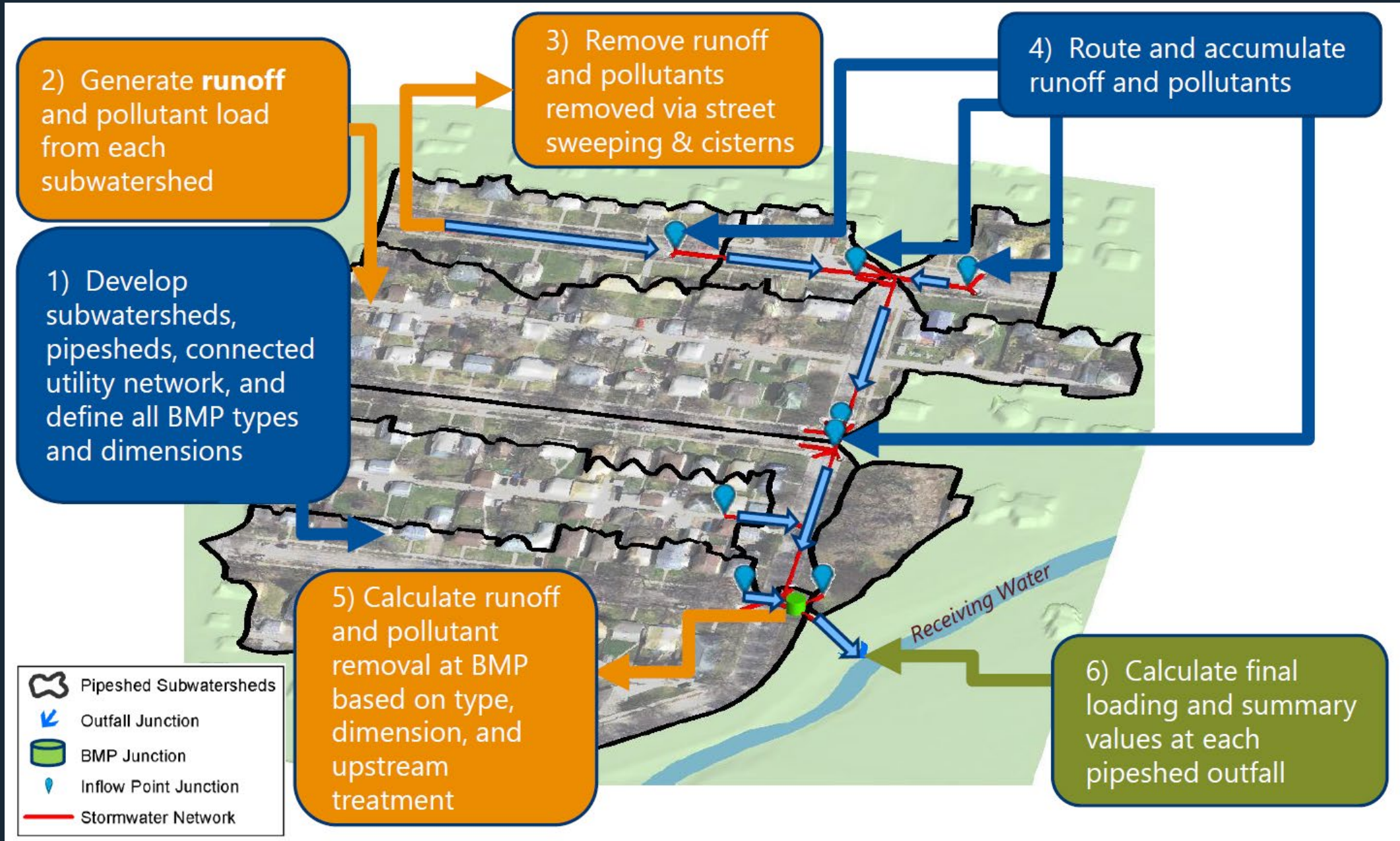
Applicable TMDL WLAs

TMDL MS4 WLAs for City of Northfield

TMDL Receiving Water	TP WLA (lbs/ac/yr)	TSS WLA (lbs/ac/yr)
Lake Byllesby	**0.20[1]**	
Cannon River Reach 509		**63.1[2]**
Chubb Creek Reach 528		61.7[2]
Lower Cannon River Reach 502		45.8[3]
Lower Cannon River Reach 646		47.5[3]
South Metro Mississippi River		154

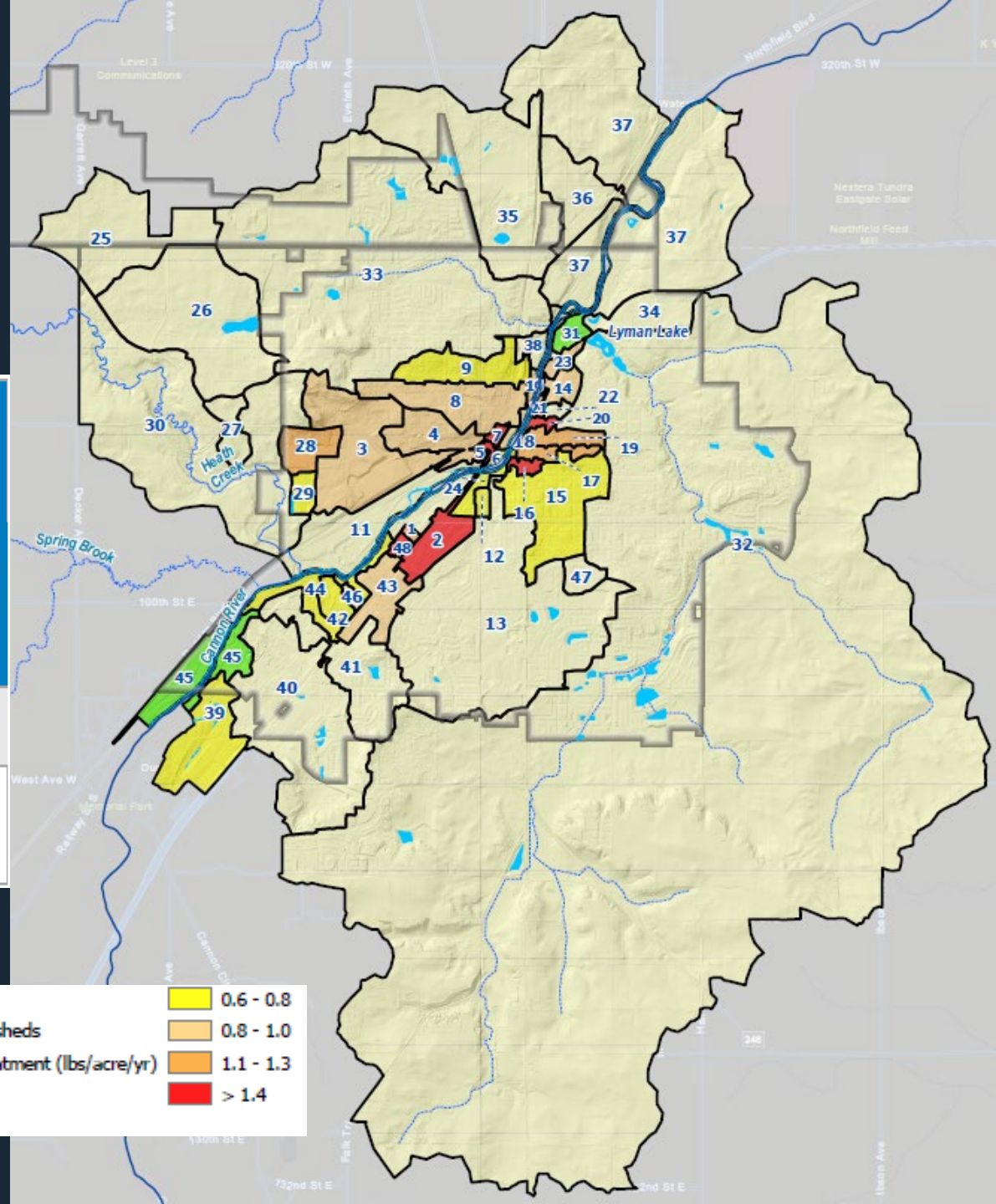
[1] 2003 baseline year
[2] 2012 baseline year
[3] 1998 baseline year

GIS WQM


2) Generate **runoff** and pollutant load from each subwatershed
3) Remove runoff and pollutants removed via street sweeping & cisterns
4) Route and accumulate runoff and pollutants
1) Develop subwatersheds, pipesheds, connected utility network, and define all BMP types and dimensions
5) Calculate runoff and pollutant removal at BMP based on type, dimension, and upstream treatment
6) Calculate final loading and summary values at each pipeshed outfall
Receiving Water
Pipeshed Subwatersheds
Outfall Junction
BMP Junction
Inflow Point Junction
Stormwater Network

GIS WQM—Pollutant Loading Assessment

Pollutant	Estimated Loading and Pollutant Removal in Northfield Assuming No Tributary Inflow			Estimated Loading and Pollutant Removal in Tributary Areas Only			Estimated Removal of Tributary Pollutants Provided by Northfield BMPs (lbs.)
	Total Raw Load (lbs.)	Pollutant Removed (lbs.) in BMPs/Street Sweeping	Load to River (lbs.)	Total Raw Load (lbs.)	Pollutant Removed (lbs.) in BMPs/Street Sweeping	Load to River (lbs.)	
Total Phosphorus	3,043	742	2,301	2,762	54	2,709	431
Total Suspended Solids	903,520	322,086	581,433	629,307	15,834	613,473	180,148



Pollutant Reduction Goal Setting

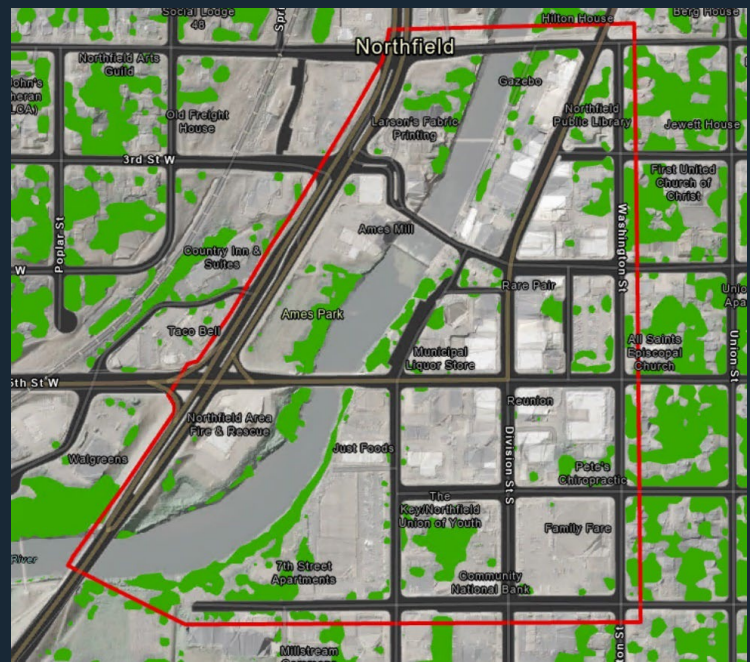
1. Quantified gaps between existing TP and TSS loading and WLA requirements
2. Lake Byllesby TMDL controls pollutant load reduction
3. Corresponds with 45% TP reduction from existing conditions
4. MPCA—must show progress toward meeting WLAs, compliance dates not specifically mandated, and credit can be applied towards other TP sources
5. TP load reduction rate of 4.5% per year results in 100-year compliance period
6. 4.5% load reduction rate corresponds with 20 pounds of additional TP loading that would need to be reduced each successive year

TMDL MS4 WLAs for City of Northfield

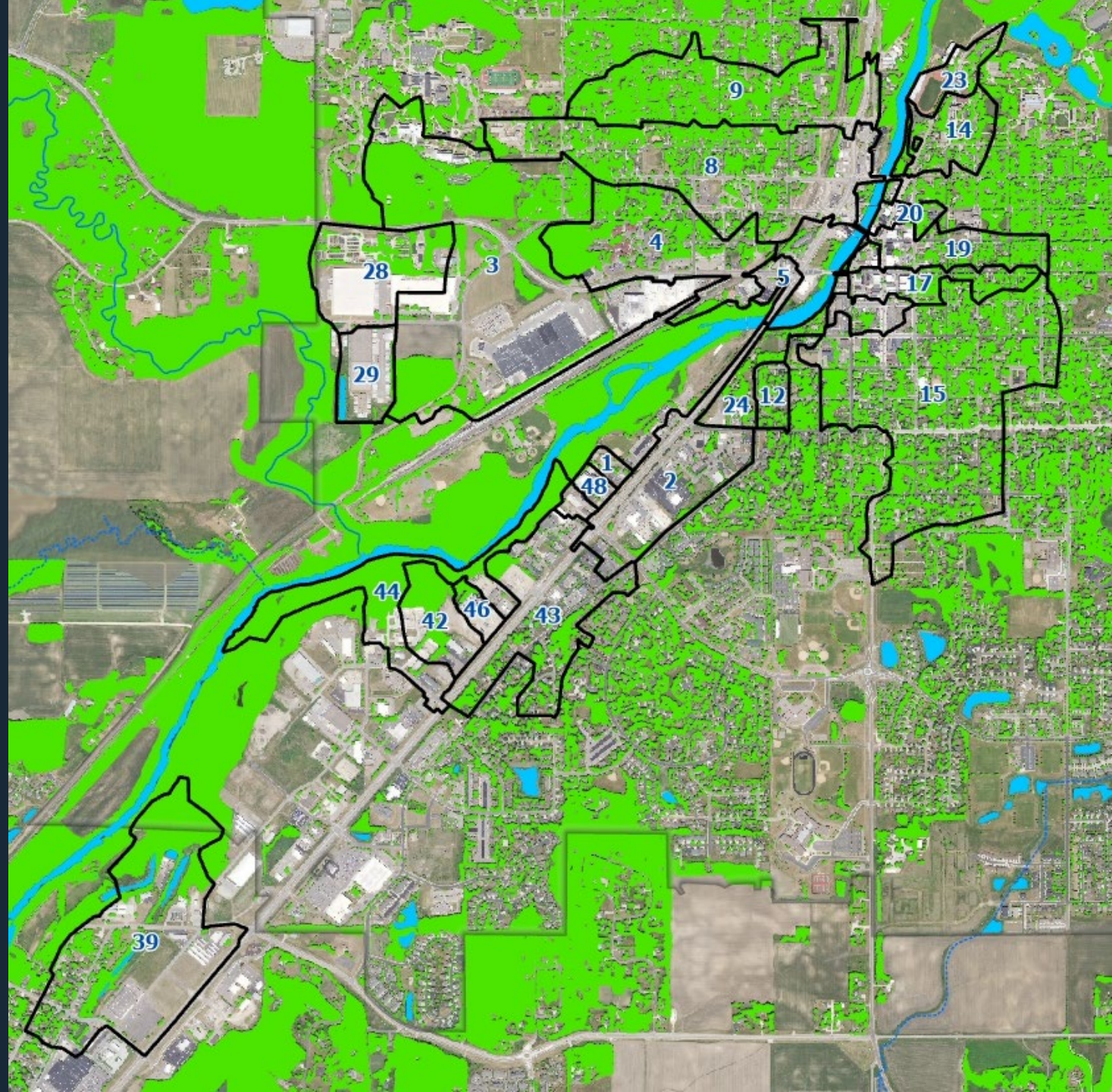
TMDL Receiving Water	TP WLA (lbs/ac/yr)	TSS WLA (lbs/ac/yr)
Lake Byllesby	0.20	
Cannon River Reach 509		63.1

WLA Implementation Plan

1. Street sweeping—emphasizes pipesheds outside of downtown zone (see figure) that currently lack stormwater treatment from structural BMPs
2. Street reclamation and overlay projects—implement structural BMPs in same pipesheds prioritized for street sweeping
3. Agricultural sources—credit structural BMPs implemented with future development
4. Streambank and bed erosion—inventory and stabilize existing sources of erosion
5. Chemical treatment of Spring Creek flow—survey/ verify existing TP load reduction; enhance TP load reduction with alum treatment (plant or aerial application)



Priority Pipesheds for BMPs and/or Street Sweeping



WLA Implementation Plan Summary

Water quality treatment goal is defined by 2,000 pounds of additional TP load reduction over the course of 100-year compliance period

1. Street sweeping—potential for 300-pound TP reduction by emphasizing priority pipesheds outside of downtown zone
2. Street reclamation and overlay projects—potential for 100-pound TP reduction by implementing structural BMPs in priority pipesheds
3. Agricultural sources—potential for at least 700-pound TP reduction from structural BMPs implemented with future development
4. Streambank and bed erosion—sources of erosion are unknown currently; it is recommended that the City inventory (and/or use new LiDAR data), and subsequently stabilize erosion
5. Chemical treatment of Spring Creek flow—potential for at least 500-pound TP reduction from this tributary; it is recommended that the City survey/verify existing TP load reductions that could be realized from alum treatment (plant or aerial lake application)

Questions??

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