Example of street flooding on N 72nd St in July 2010

Schoonmaker Creek: Preliminary Engineering Analysis

Wauwatosa Community Affairs Meeting

October 15th, 2024

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Schoonmaker Creek: Preliminary Engineering Analysis

Presentation Outline

- Project Team Introductions
- Project History and Timeline
- Alternatives Selected for Preliminary Engineering Analysis
- Modeling Overview and Findings
- Alternative Descriptions
  - Option A Tunnel
  - Option B Storm Sewer
- Summary of Cost Estimates
- Summary of Alternatives Decision Matrix
- Q & A

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Project Team

City of Wauwatosa

- **Bill Wehrley, City Engineer**
- **Mike Steiner, Assistant City Engineer**
- **Maggie Anderson, Senior Civil Engineer**
- **David Simpson, Public Works Director**
- Chris Jain, Senior Civil Engineer
- Mike Maki, Senior Civil Engineer
- Bryan Theisen, Senior Engineering Technician

MSA Professional Services

- **Bill Pinnow, Project Manager**
- **Eric Thompson, Sr. Water Resources Team Leader**
- Amber Converse, Senior GIS Analyst
- Matt Wathke, Project Engineer
- Alistair Hancox, Water Resources Engineer

CDM Smith

- Greg Sanders, Geotechnical Engineer

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Project History & Timeline

March 5, 2013
Wauwatosa's Common Council approved a resolution to request the Milwaukee Metropolitan Sewerage District (MMSD) jurisdiction March 5, 2013.

March 25, 2014
MMSD Commission approved the jurisdiction request on March 25, 2014
Jurisdiction covers Schoonmaker Creek from W. Lloyd St to the confluence with the Menomonee River
Local storm sewers, ponded areas and sanitary sewer systems are the responsibility of the city

2014
In 2014, MMSD requested that the Southeastern Wisconsin Regional Planning Commission (SEWRPC) perform a planning study of alternative approaches to mitigate flooding within the Schoonmaker Creek Watershed.

2016-2017
Many years of work followed the request, including stakeholder and public input. Summary of results were presented to public officials on June 14, 2016 and to neighborhood associations on January 24, 2017.

Dec. 2020
Comprehensive report with 16 alternatives was finalized by SEWRPC in December of 2020.

2021-2022
Throughout 2021 and into 2022, city staff evaluated sixteen alternatives and recommended a detailed analysis for three options.

July 2022
The Community Affairs Committee and Wauwatosa's Common Council recommended a detailed analysis of two of the 3 recommended alternatives by city staff. The third alternative, including work to the open channel portion of the watershed, was removed from consideration.

Spring 2023
In the Spring of 2023, the city hired a consulting engineer to perform the two analyses.

Sept. 12, 2024
The public is invited to attend an information meeting to learn more about the project on Thursday, Sept. 12, 2024.

Oct. 2024
City staff will present final recommendations to the Community Affairs Committee and Wauwatosa's Common Council in October 2024.

2027
The earliest any construction would begin is 2027.

MSA

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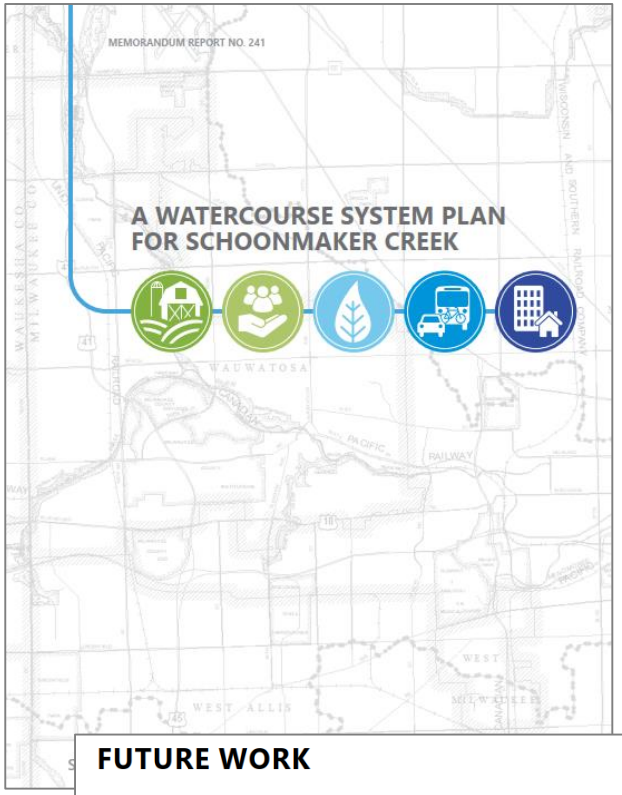

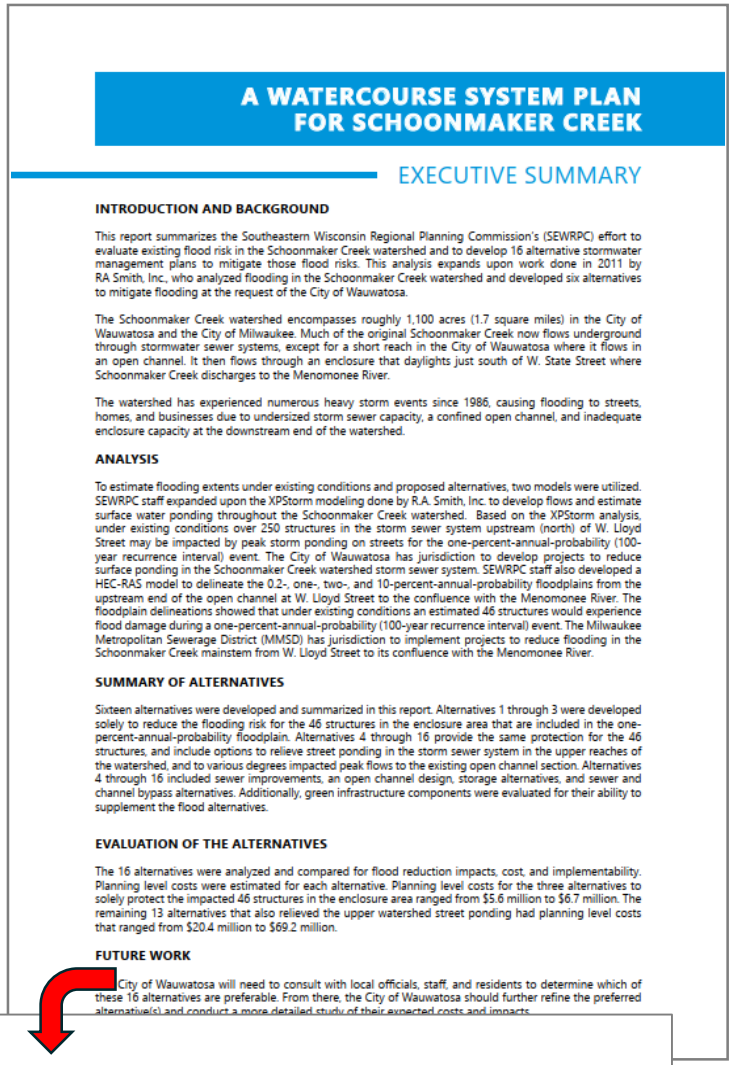

A WATERCOURSE SYSTEM PLAN FOR SCHOONMAKER CREEK

EXECUTIVE SUMMARY

INTRODUCTION AND BACKGROUND

This report summarizes the Southeastern Wisconsin Regional Planning Commission's (SEWRPC) effort to evaluate existing flood risk in the Schoonmaker Creek watershed and to develop 16 alternative stormwater management plans to mitigate those flood risks. This analysis expands upon work done in 2011 by RA Smith, Inc., who analyzed flooding in the Schoonmaker Creek watershed and developed six alternatives to mitigate flooding at the request of the City of Wauwatosa.

The Schoonmaker Creek watershed encompasses roughly 1,100 acres (1.7 square miles) in the City of Wauwatosa and the City of Milwaukee. Much of the original Schoonmaker Creek now flows underground through stormwater sewer systems, except for a short reach in the City of Wauwatosa where it flows in an open channel. It then flows through an enclosure that daylights just south of W. State Street where Schoonmaker Creek discharges to the Menomonee River.

The watershed has experienced numerous heavy storm events since 1986, causing flooding to streets, homes, and businesses due to undersized storm sewer capacity, a confined open channel, and inadequate enclosure capacity at the downstream end of the watershed.

ANALYSIS

To estimate flooding extents under existing conditions and proposed alternatives, two models were utilized. SEWRPC staff expanded upon the XPStorm modeling done by R.A. Smith, Inc. to develop flows and estimate surface water ponding throughout the Schoonmaker Creek watershed. Based on the XPStorm analysis, under existing conditions over 250 structures in the storm sewer system upstream (north) of W. Lloyd Street may be impacted by peak storm ponding on streets for the one-percent-annual-probability (100-year recurrence interval) event. The City of Wauwatosa has jurisdiction to develop projects to reduce surface ponding in the Schoonmaker Creek watershed storm sewer system. SEWRPC staff also developed a HEC-RAS model to delineate the 0.2-, one-, two-, and 10-percent-annual-probability floodplains from the upstream end of the open channel at W. Lloyd Street to the confluence with the Menomonee River. The floodplain delineations showed that under existing conditions an estimated 46 structures would experience flood damage during a one-percent-annual-probability (100-year recurrence interval) event. The Milwaukee Metropolitan Sewerage District (MMSD) has jurisdiction to implement projects to reduce flooding in the Schoonmaker Creek mainstem from W. Lloyd Street to its confluence with the Menomonee River.

SUMMARY OF ALTERNATIVES

Sixteen alternatives were developed and summarized in this report. Alternatives 1 through 3 were developed solely to reduce the flooding risk for the 46 structures in the enclosure area that are included in the one-percent-annual-probability floodplain. Alternatives 4 through 16 provide the same protection for the 46 structures, and include options to relieve street ponding in the storm sewer system in the upper reaches of the watershed, and to various degrees impacted peak flows to the existing open channel section. Alternatives 4 through 16 included sewer improvements, an open channel design, storage alternatives, and sewer and channel bypass alternatives. Additionally, green infrastructure components were evaluated for their ability to supplement the flood alternatives.

EVALUATION OF THE ALTERNATIVES

The 16 alternatives were analyzed and compared for flood reduction impacts, cost, and implementability. Planning level costs were estimated for each alternative. Planning level costs for the three alternatives to solely protect the impacted 46 structures in the enclosure area ranged from $5.6 million to $6.7 million. The remaining 13 alternatives that also relieved the upper watershed street ponding had planning level costs that ranged from $20.4 million to $69.2 million.

FUTURE WORK

City of Wauwatosa will need to consult with local officials, staff, and residents to determine which of these 16 alternatives are preferable. From there, the City of Wauwatosa should further refine the preferred alternative(s) and conduct a more detailed study of their expected costs and impacts.

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MSA

Alternatives Selected for Further Analysis

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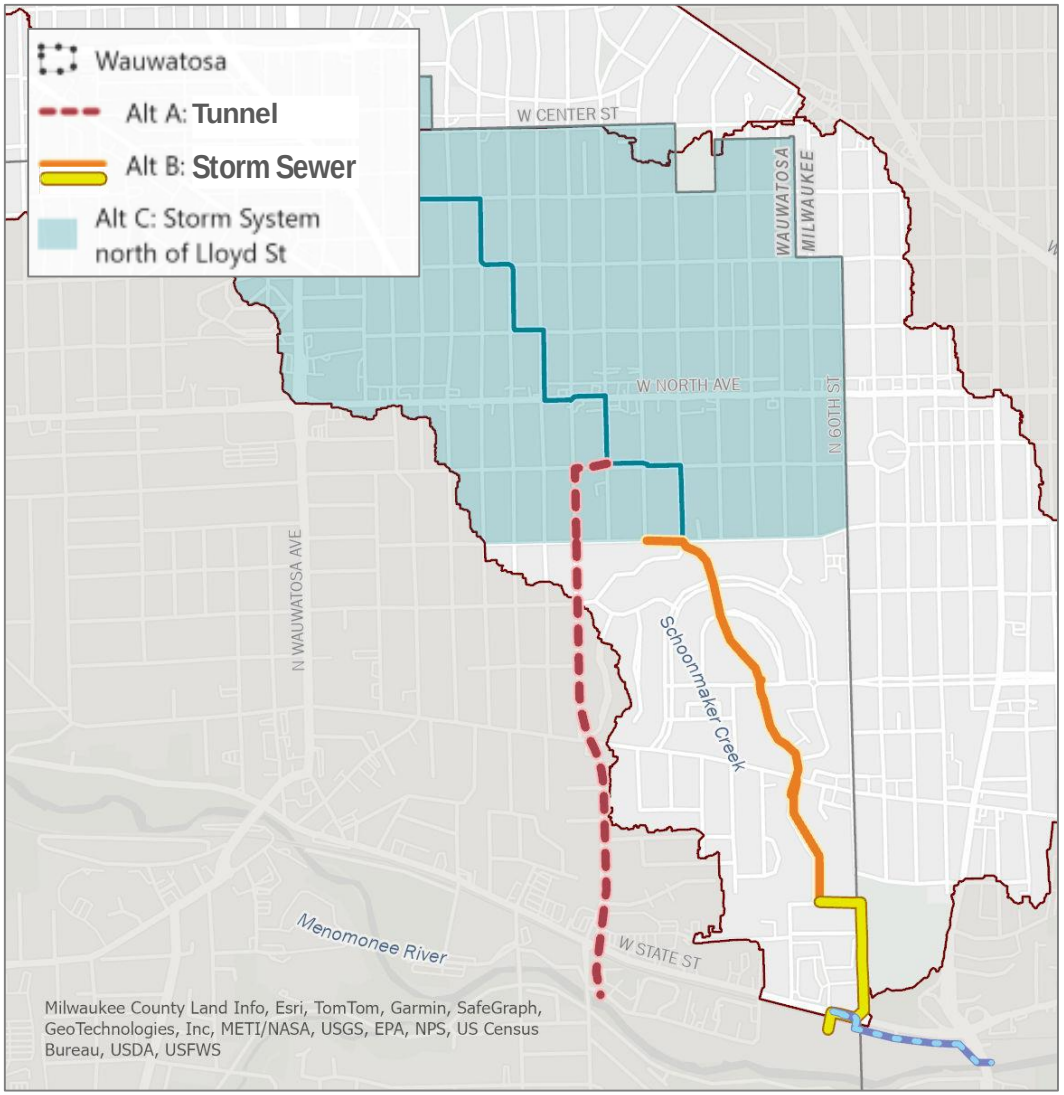

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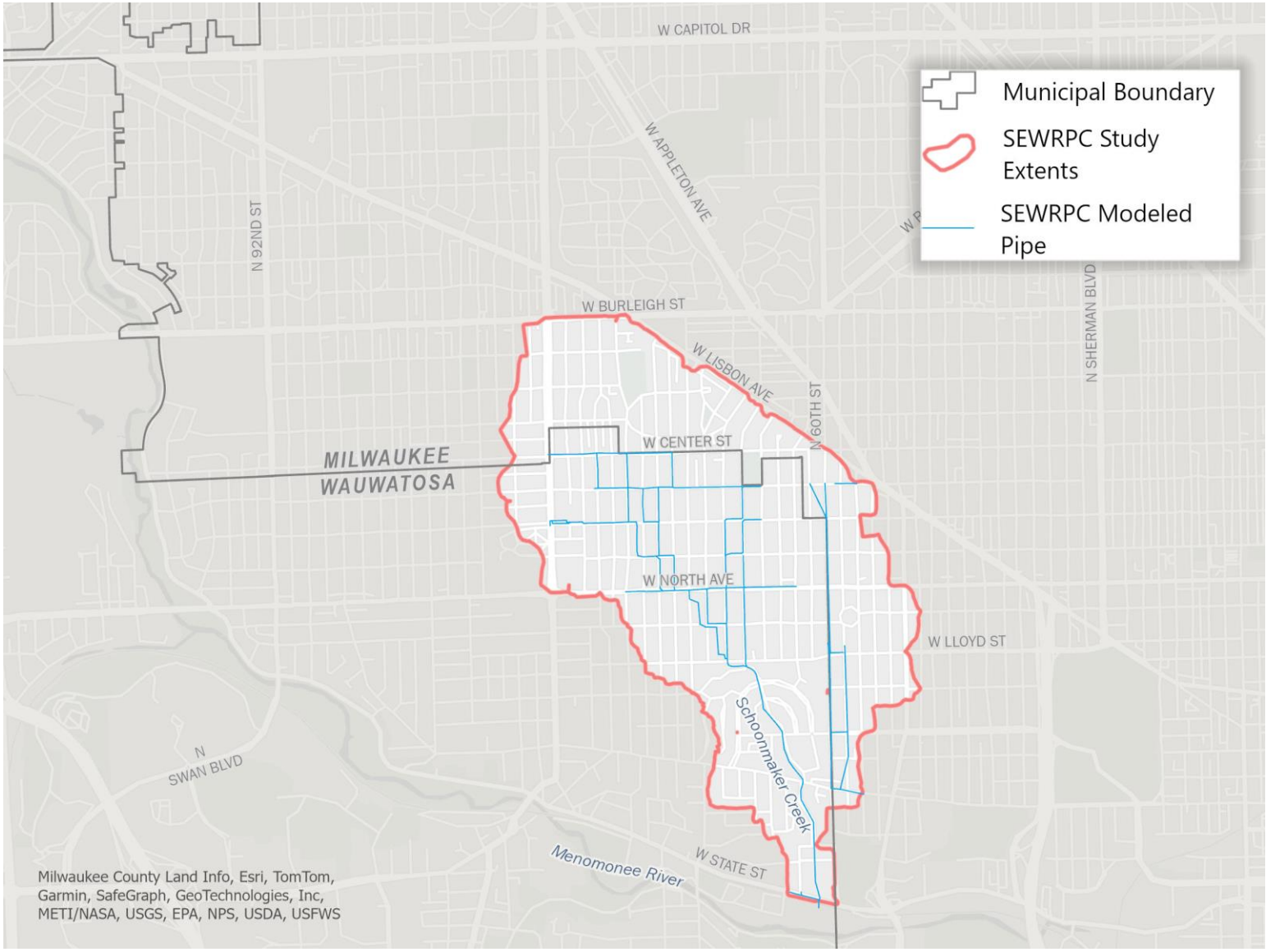
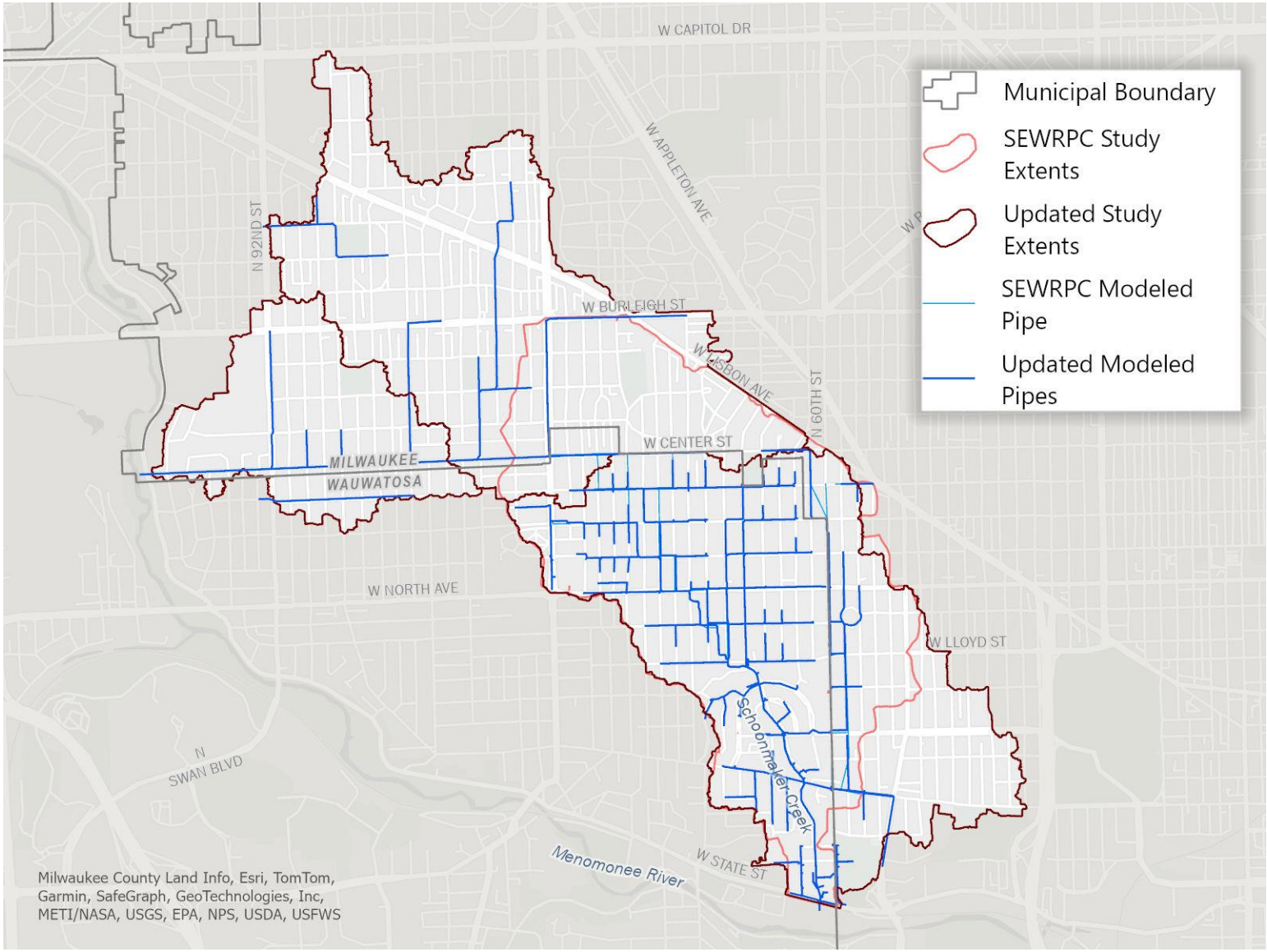
Model Level of Detail

2010 SEWRPC Model



Model Level of Detail

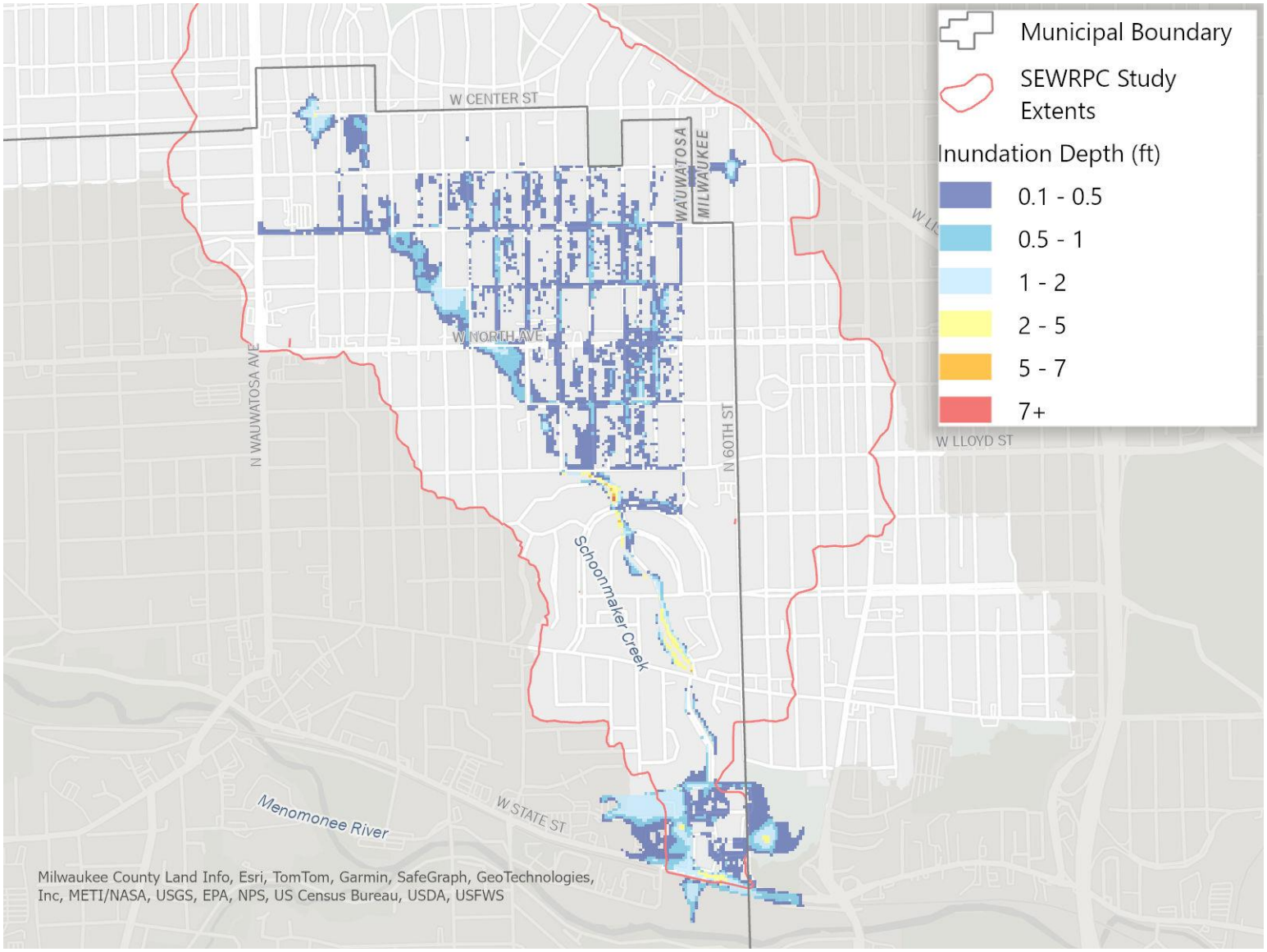
2024 City Model



Model Level of Detail

2010 SEWRPC Model

100-yr 3-hr rainfall (4.28 inches)



Model Level of Detail

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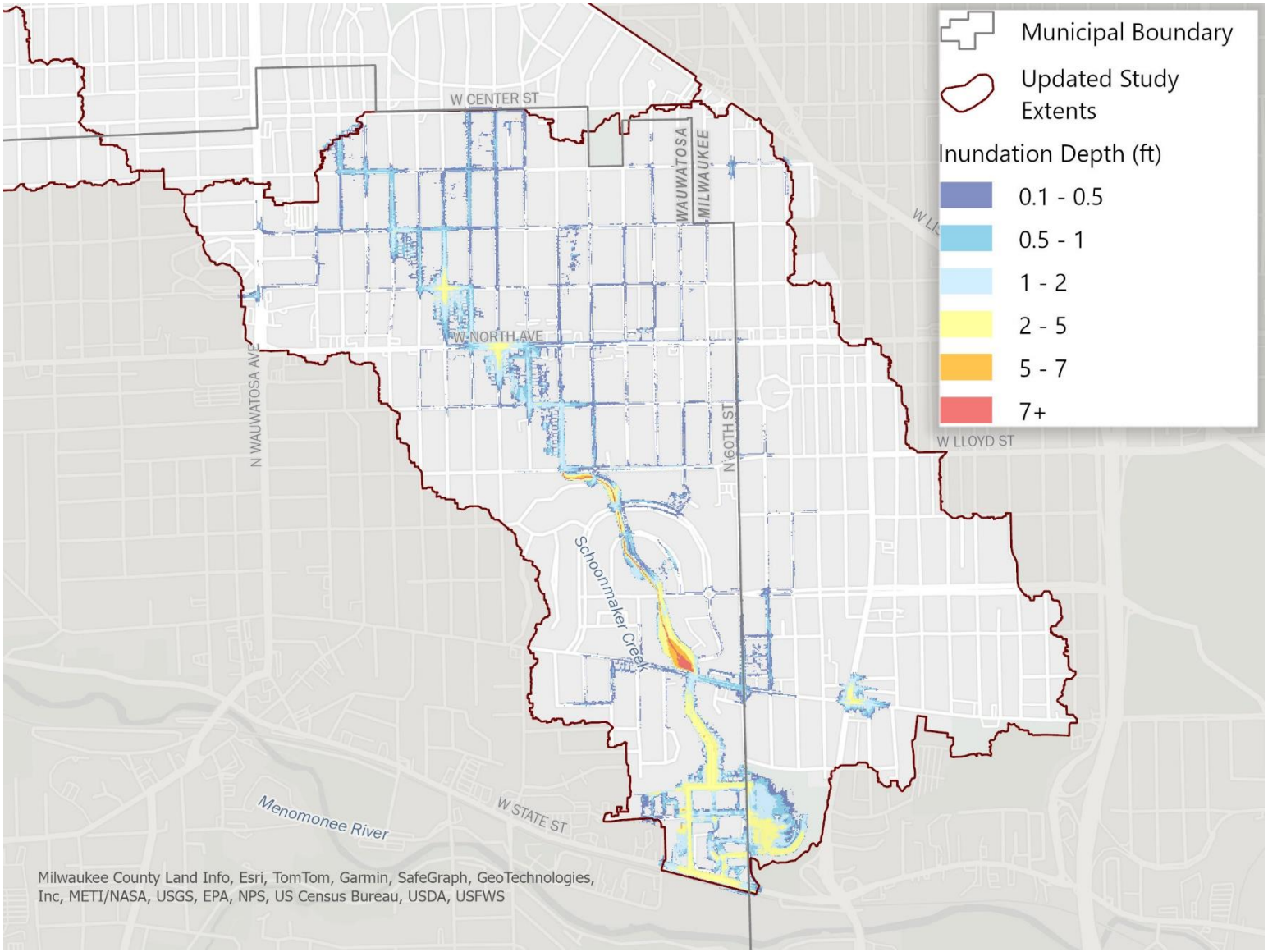
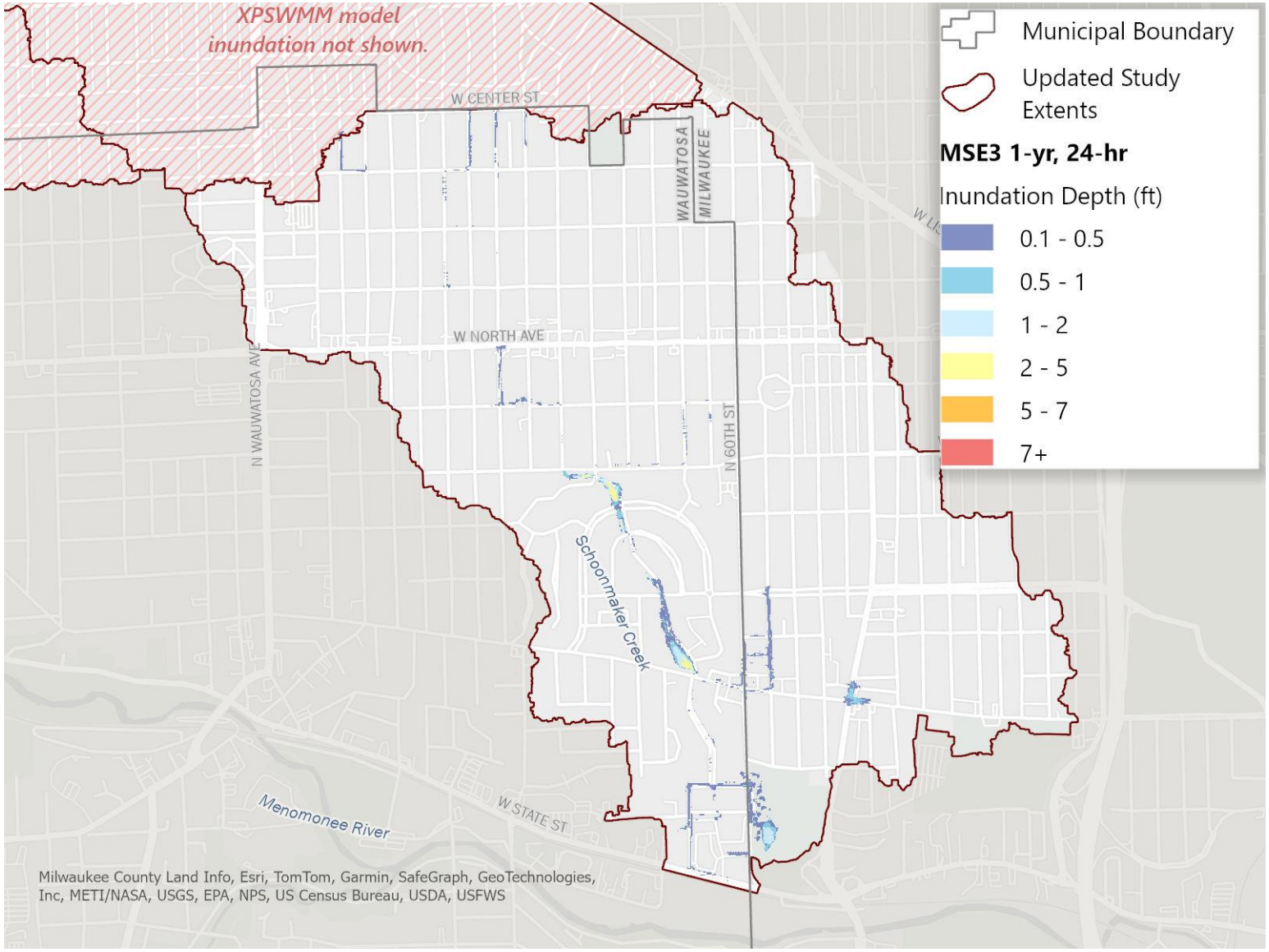


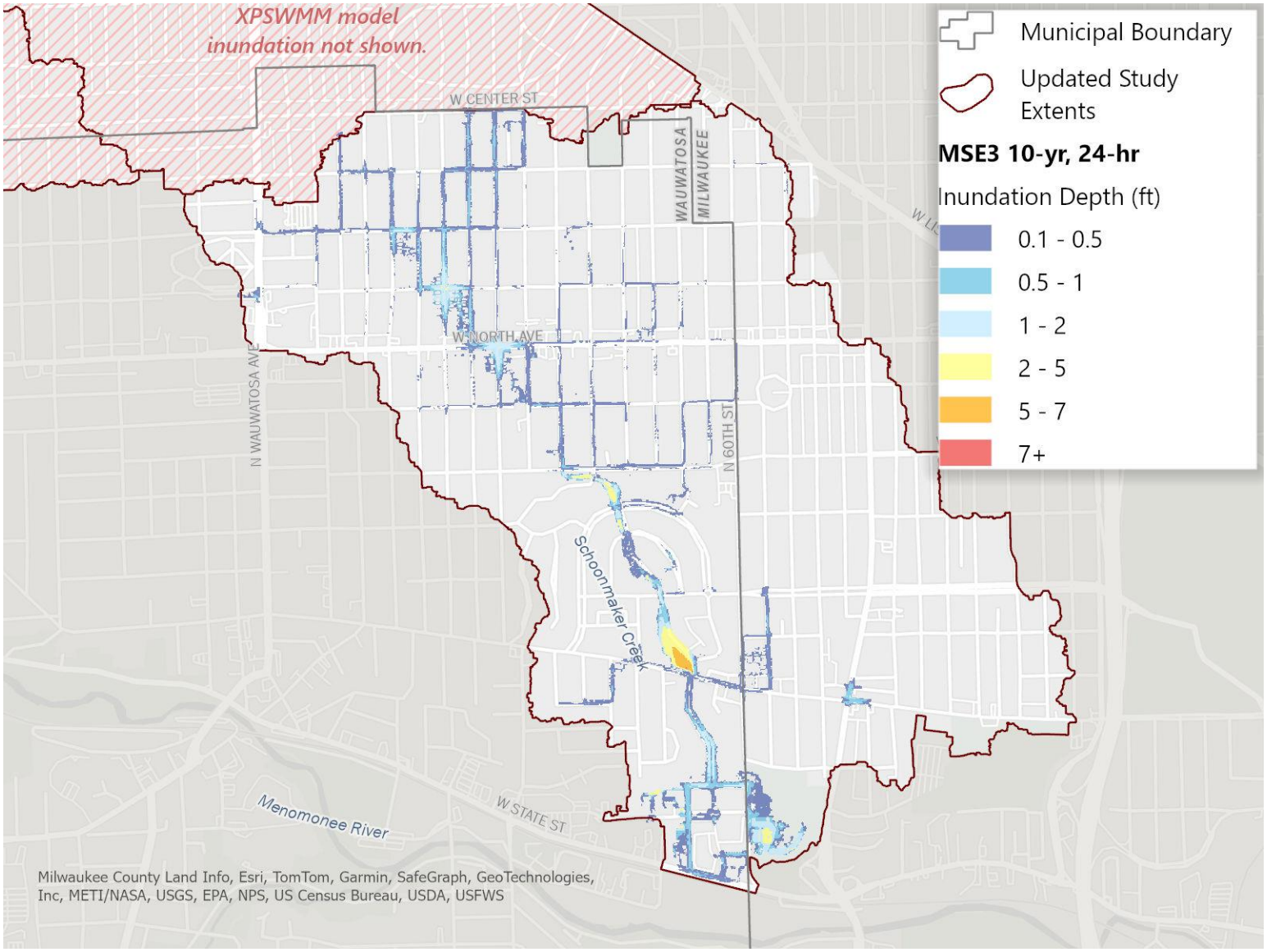
Existing Conditions

1-yr 24-hr rainfall (2.34 inches)



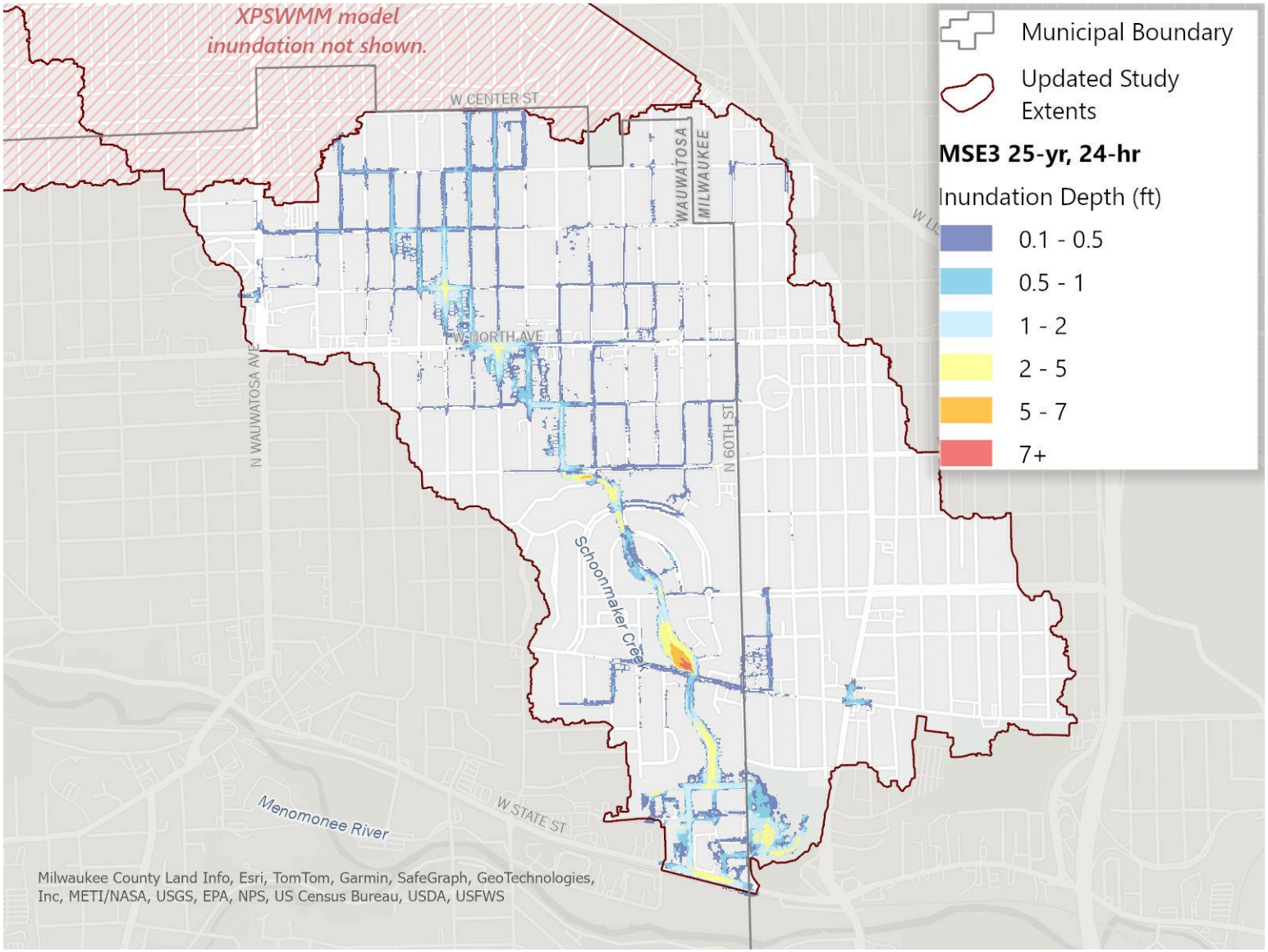
Existing Conditions

10-yr 24-hr rainfall (3.73 inches)



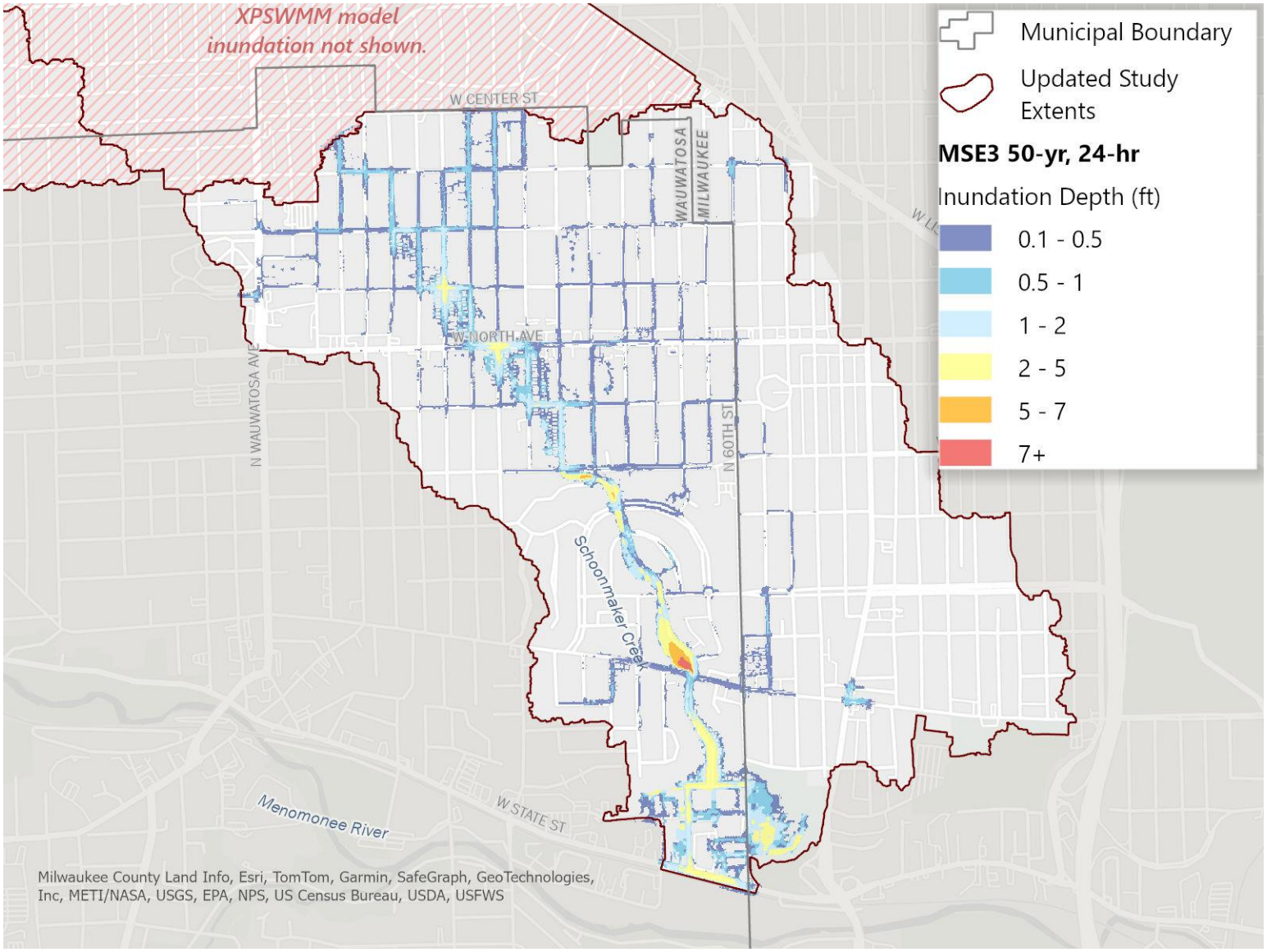
Existing Conditions

25-yr 24-hr rainfall (4.56 inches)



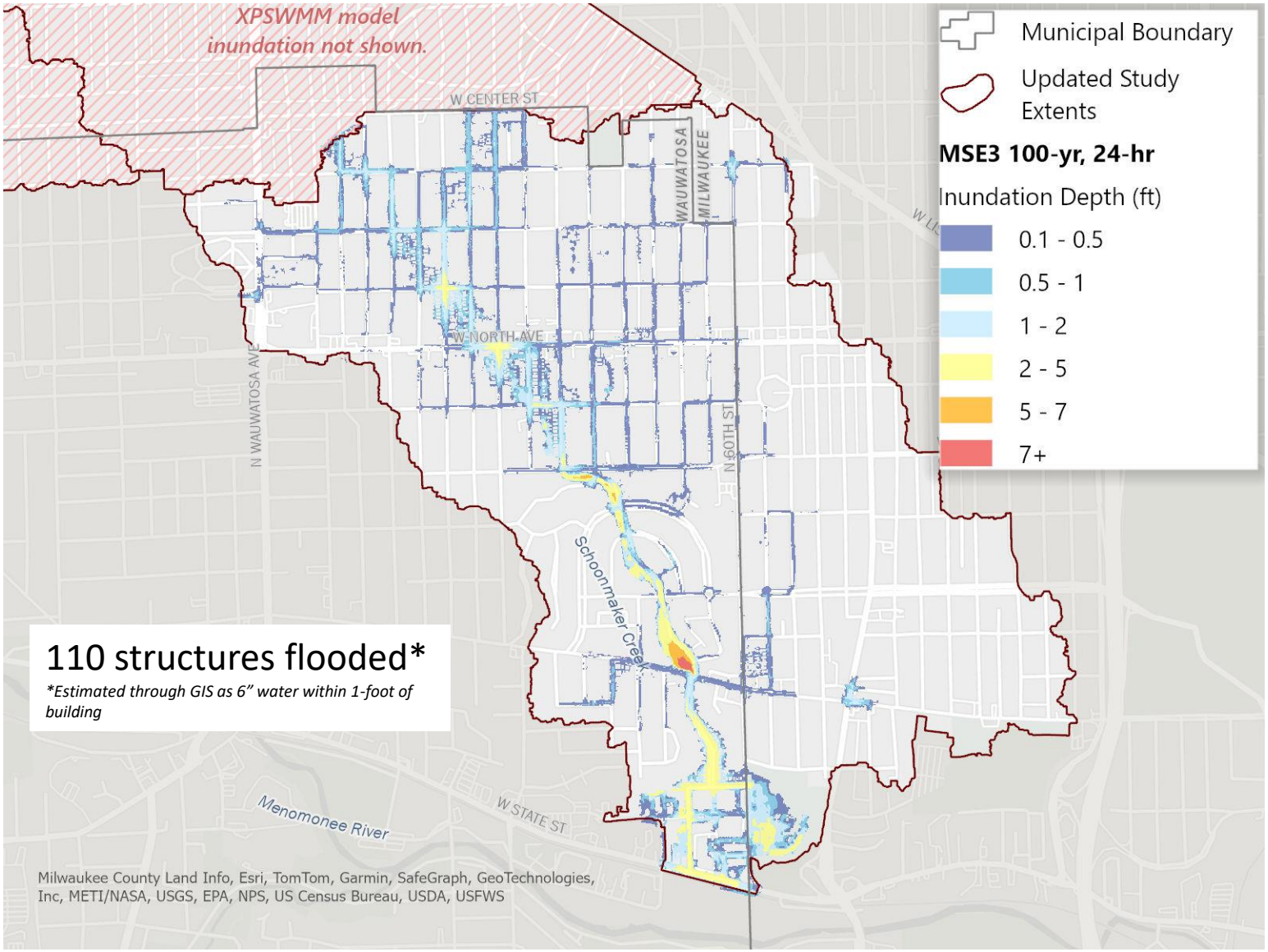
Existing Conditions

50-yr 24-hr rainfall (5.28 inches)



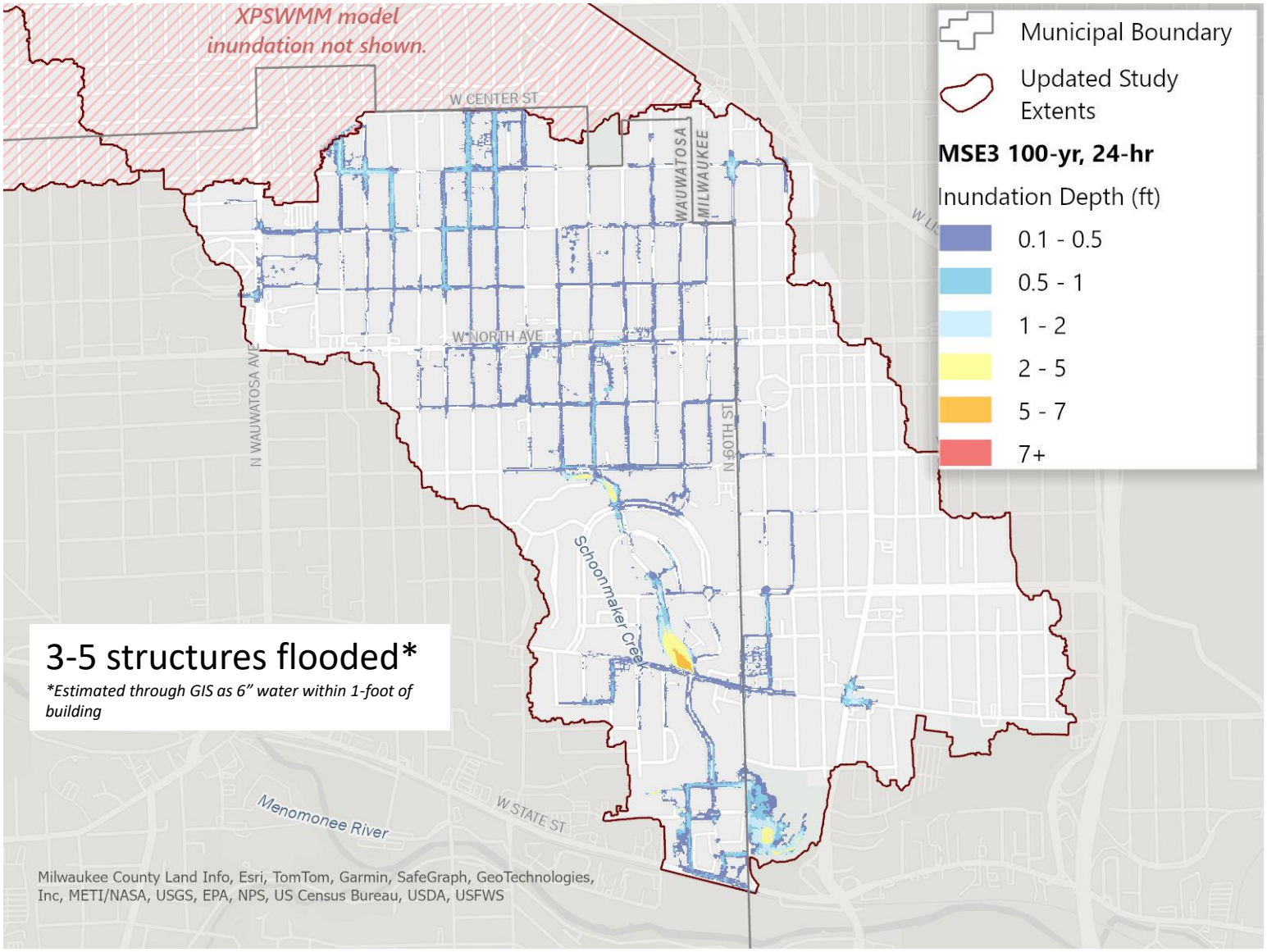
Existing Conditions

100-yr 24-hr rainfall (6.06 inches)



Proposed Conditions

100-yr 24-hr rainfall (6.06 inches)



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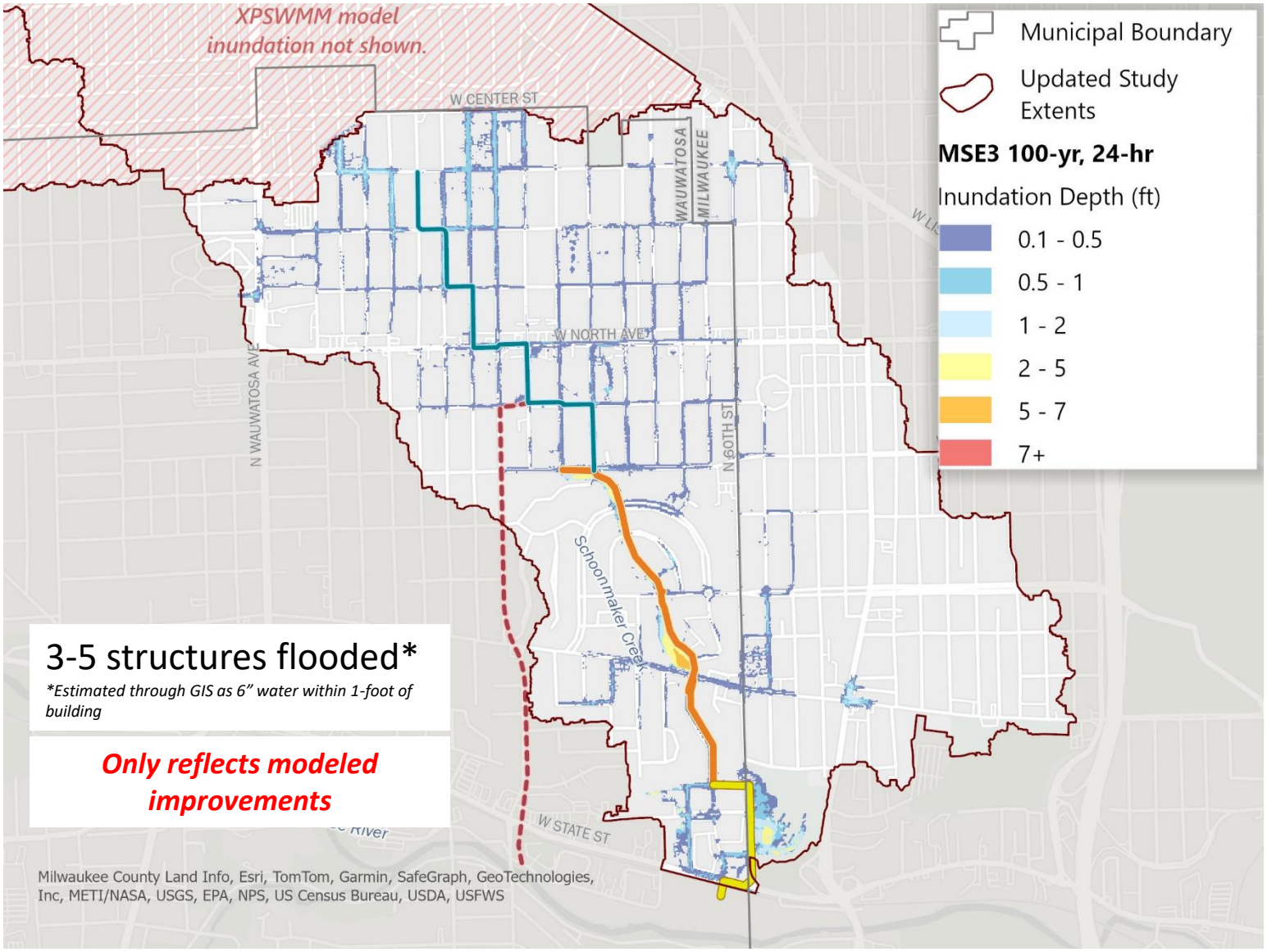

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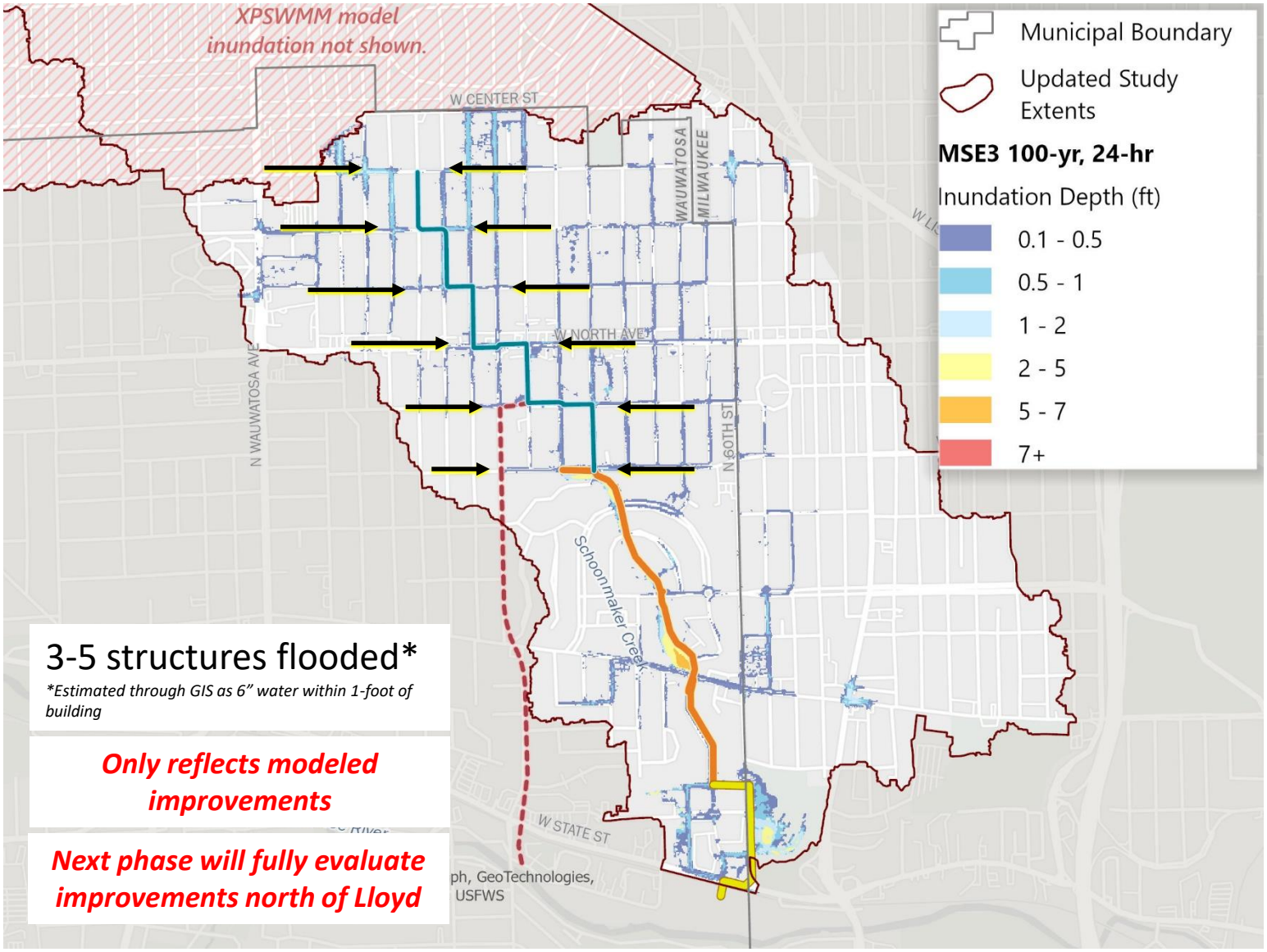
100-yr 24-hr rainfall (6.06 inches)



3-5 structures flooded*

**Estimated through GIS as 6" water within 1-foot of building*

Only reflects modeled improvements

Next phase will fully evaluate improvements north of Lloyd

Option A: Tunnel

CDM Smith

Memorandum

To: *Mike Steiner*

From: *Greg Sanders, P.E. (CDM Smith)*

Date: *4/8/24*

Subject: *Preliminary Tunnel Alignment Evaluation – Schoonmaker Creek Watershed Project*

WISCONSIN PROFESSIONAL ENGINEER
GREGORY SANDERS
E-47148-6
KANSAS CITY
MO

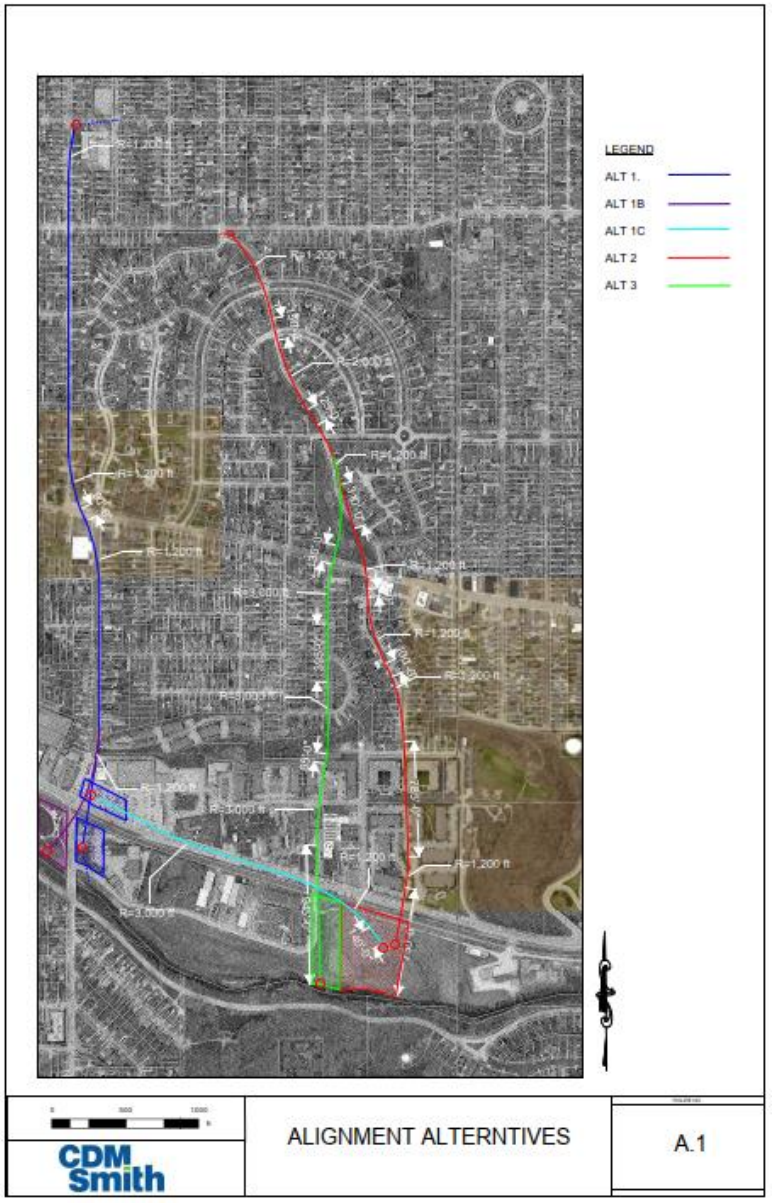
1. Introduction and Background

CDM Smith Inc. (CDM Smith) has prepared this Technical Memorandum (TM) as part of the preliminary design of the Schoonmaker Creek Watershed Project (the Project) for the City of Wauwatosa, Wisconsin. This memorandum was prepared to document the evaluation and recommendations for the possible future tunnel alignment. This TM is being submitted as draft at this time since there are ongoing subsurface investigations that are and will be completed this year and the results of these may change some of the conclusions and recommendations included here. This technical memorandum will evaluate the alignment feasibility and analyze potential construction methods as well as provide special requirements and an estimate of probable construction costs. Elevations (El.) herein are in feet and referenced to the Milwaukee Vertical Datum. The Milwaukee Vertical Datum can be converted to the North American Vertical Datum of 1988 (NAVD 88) by adding 580.327 feet. Stations (STA) herein are also referenced in feet.

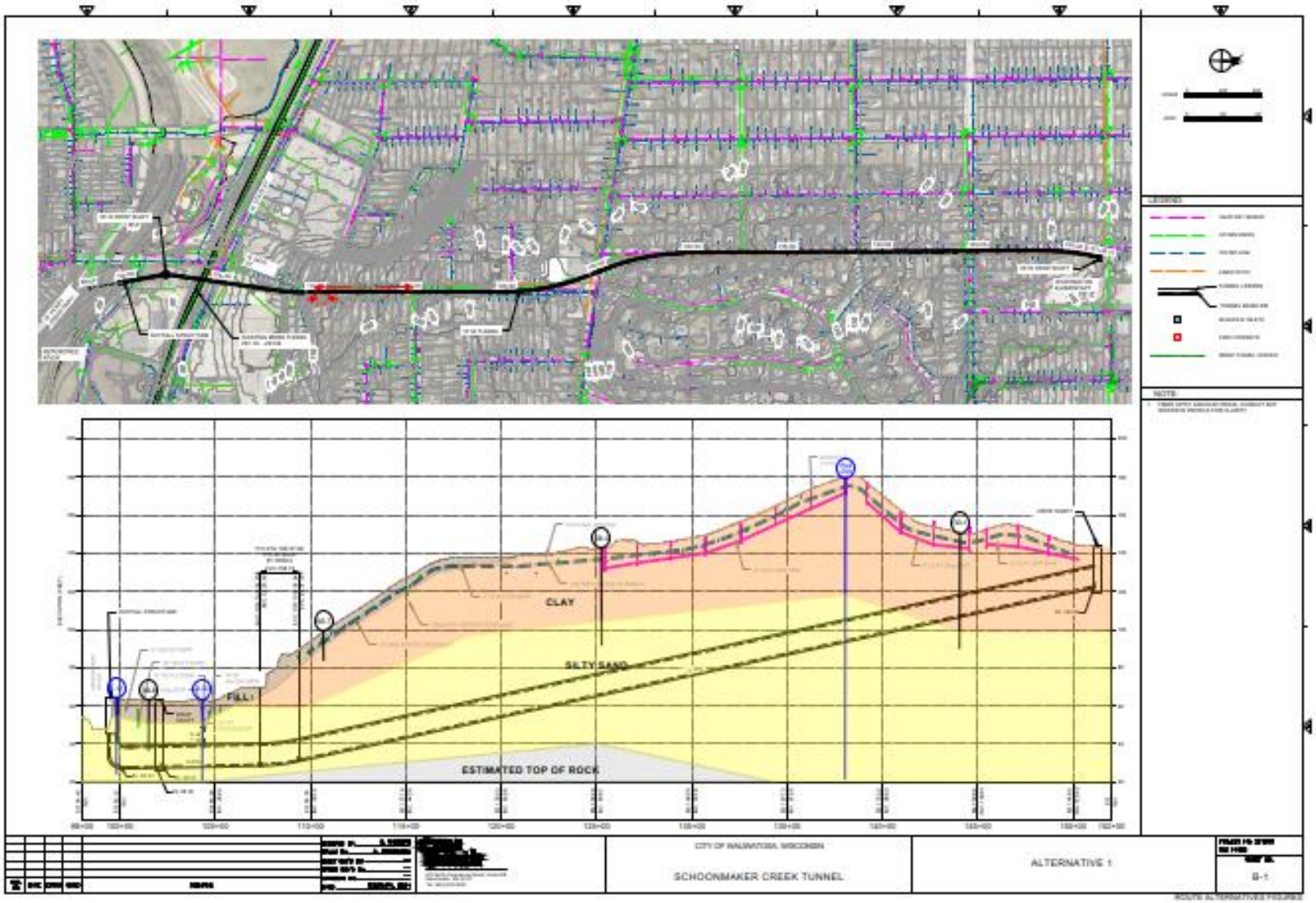
1.1 Project Description

The Schoonmaker Creek watershed is made up of roughly 1,100 acres (1.7 square miles) in the City of Wauwatosa and the City of Milwaukee. Historically the Schoonmaker Creek flowed in open channels from 74th and Center to the Menomonee River near 60th and State. Currently the creek now flows through a combination of open channel and underground stormwater sewer systems that daylight just south of West State Street where Schoonmaker Creek discharges to the Menomonee River.

The watershed has experienced numerous heavy storm events since 1986, causing flooding to streets, homes, and businesses due to undersized storm sewer capacity, a confined open channel, and inadequate enclosure capacity at the downstream end of the watershed. The goal of this portion of the project is to determine the most advantageous tunnel alternative to convey stormwater within the Schoonmaker Creek Watershed from the vicinity of 65th Street and Lloyd Street to the Menomonee River. Based on the initial modeling a internal tunnel diameter of 10 feet will be required.



Option A: Tunnel



Option A: Tunnel

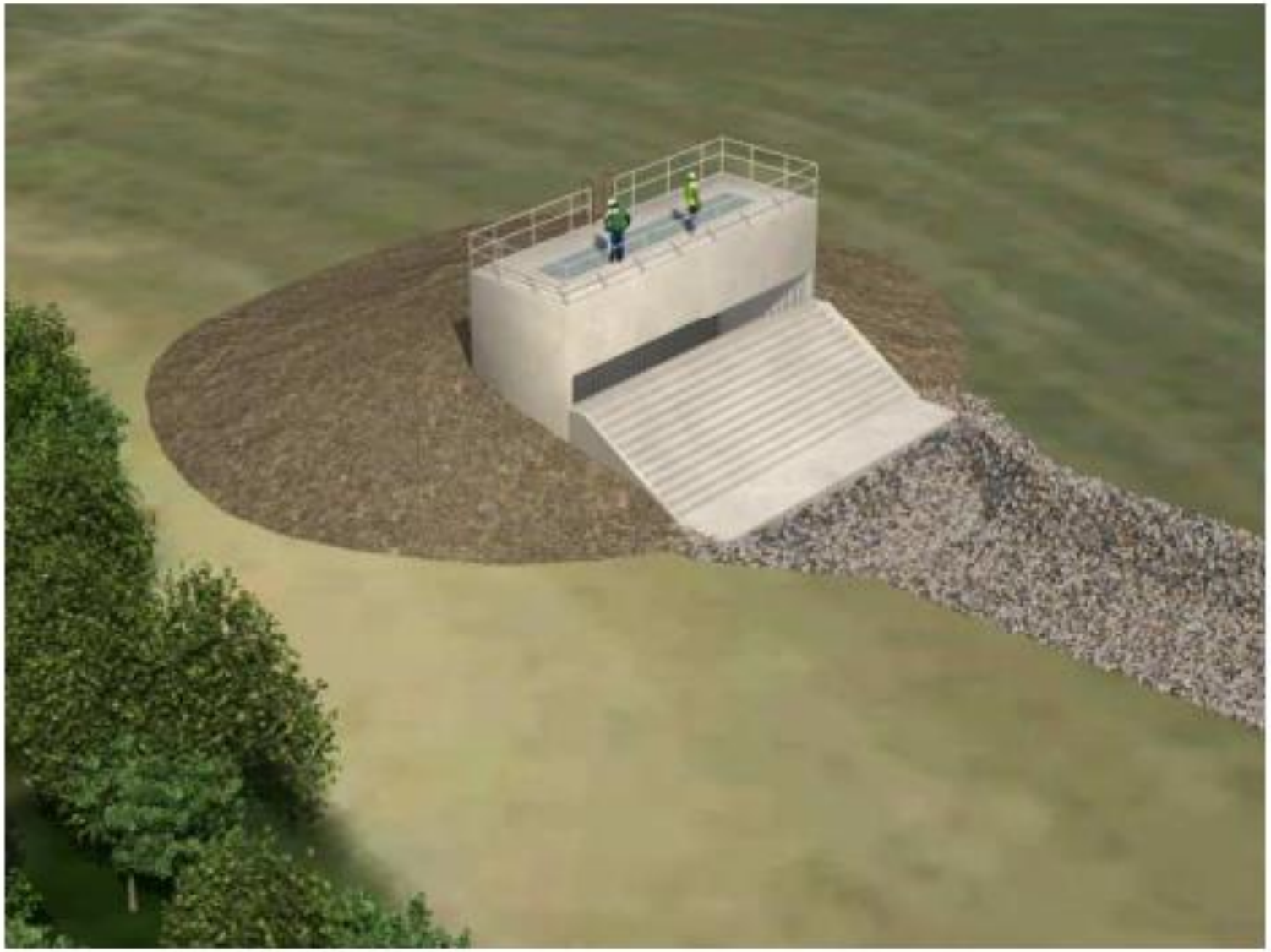
Tunnel Launch Site

(Alignment 1)

Tunnel Receiving Site

(Alignment 1)

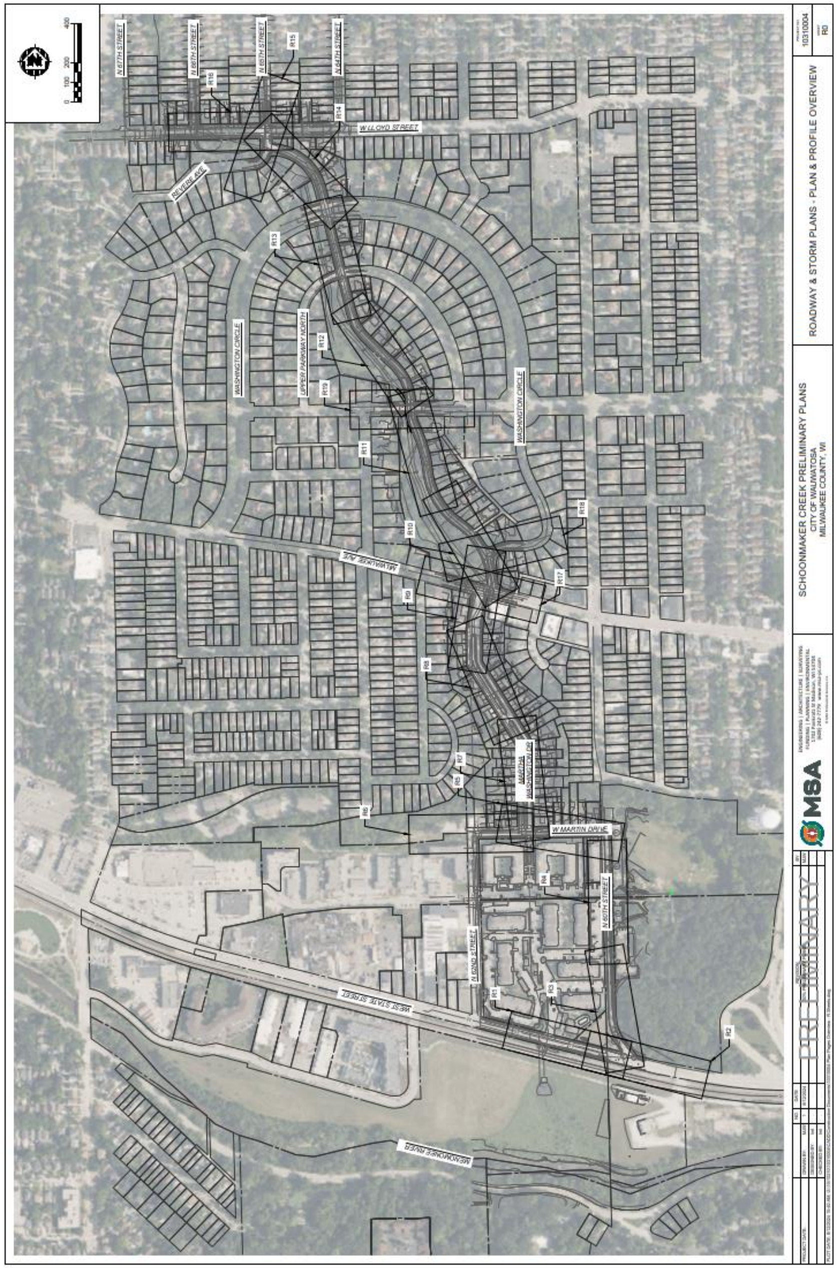
Option A: Tunnel



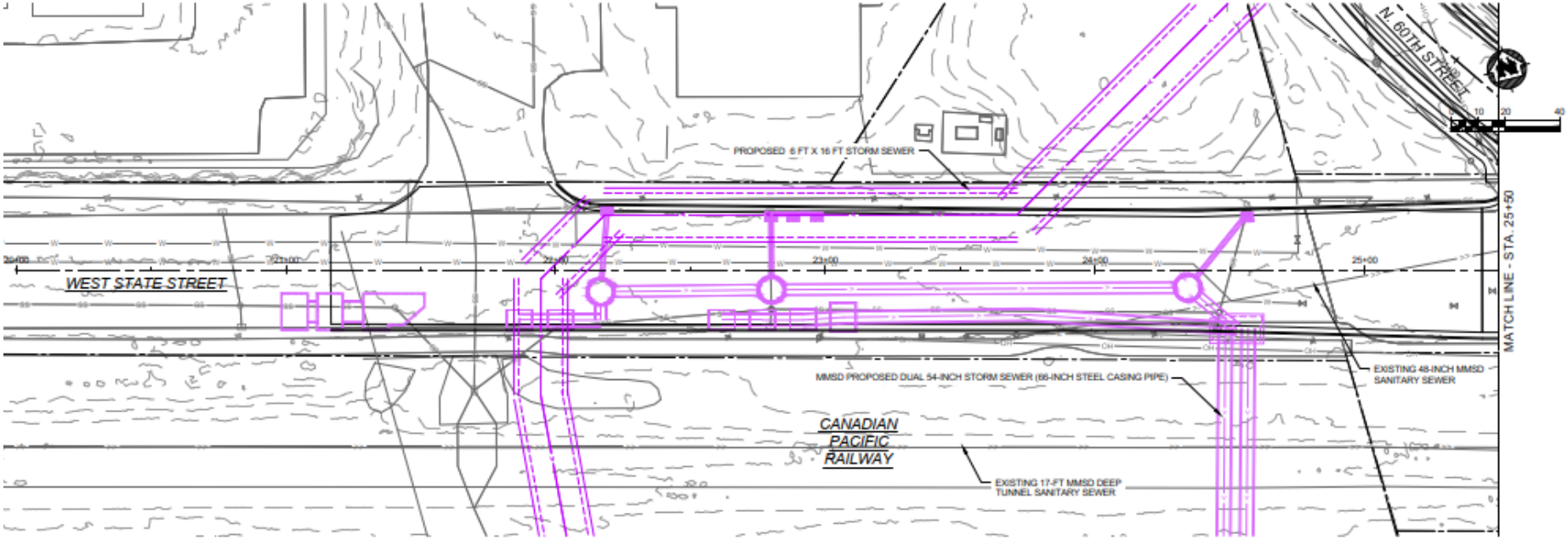
Tunnel Outlet Concept Rendering

Option B: Storm Sewer

MSA

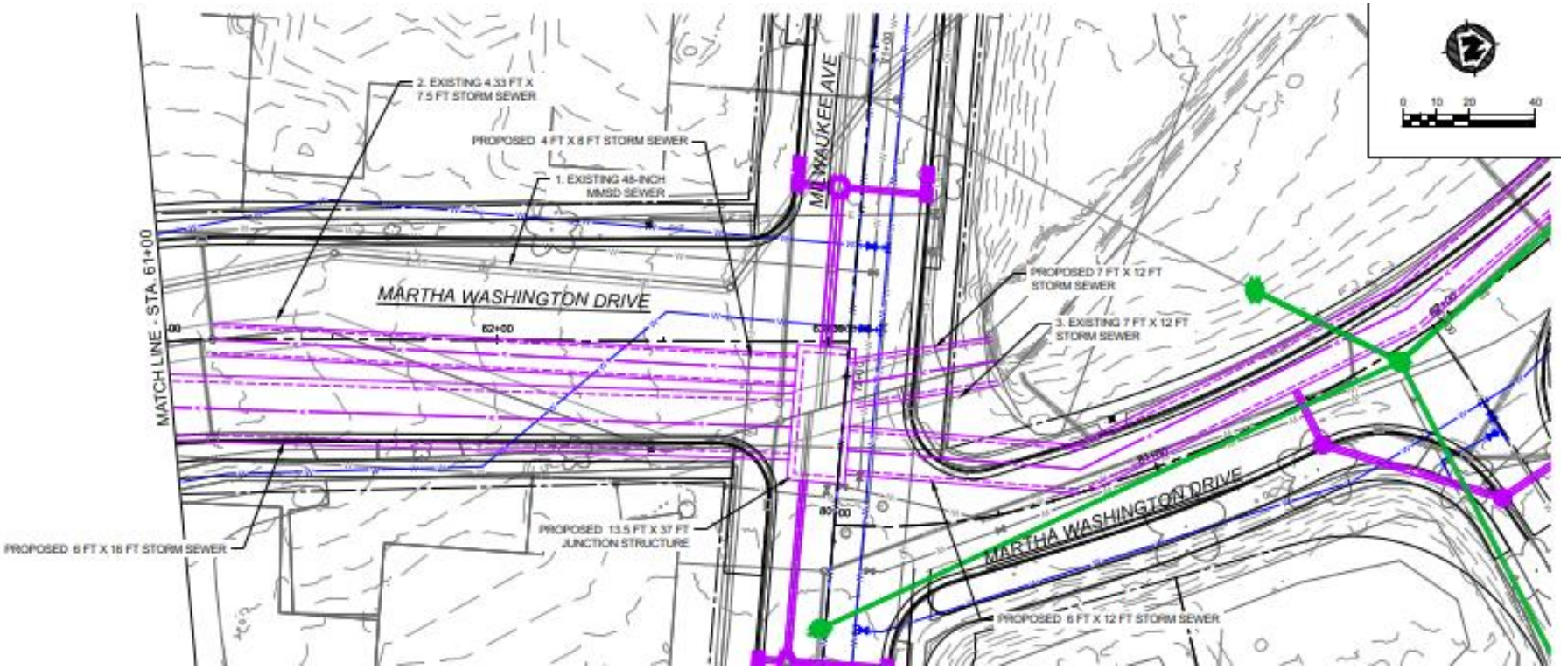


Option B: Storm Sewer



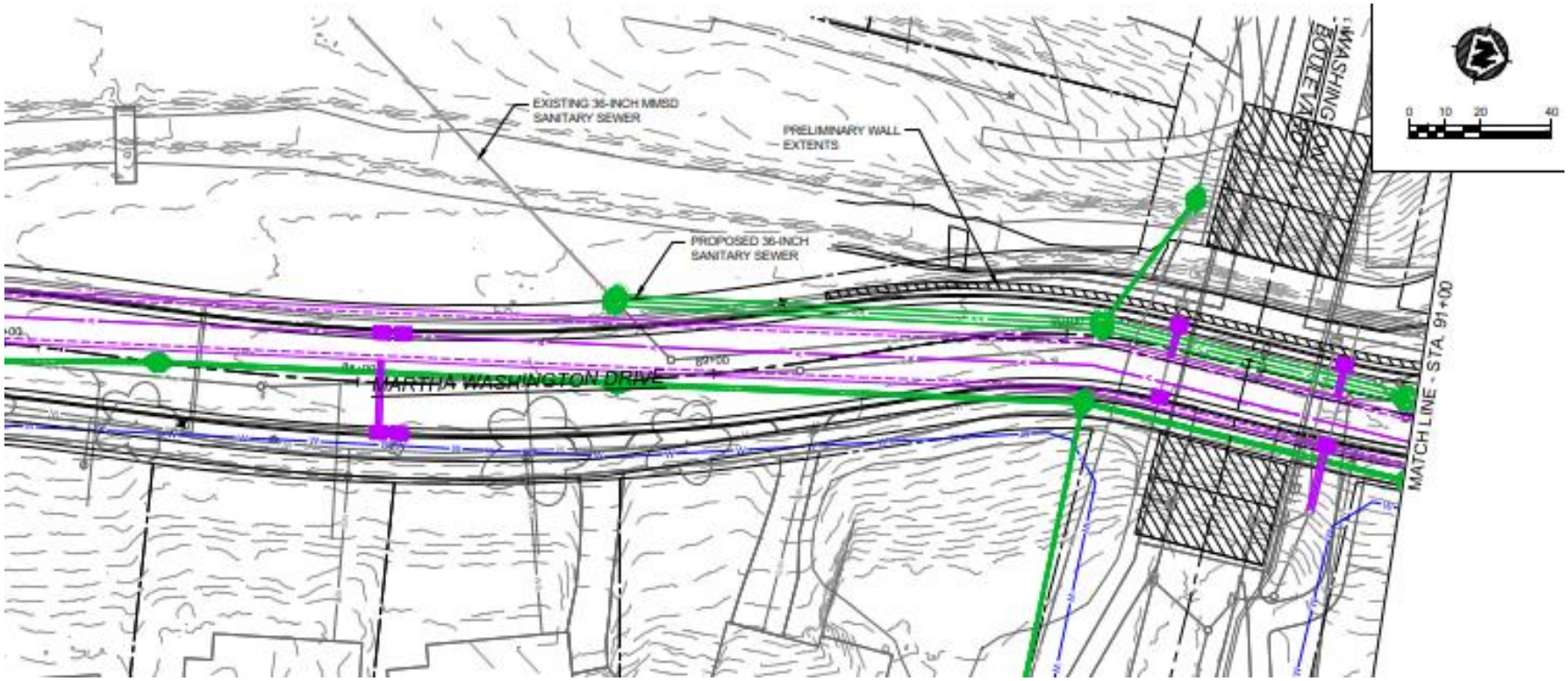
6-ft x 16-ft Box Storm Sewer at W. State St.

Option B: Storm Sewer



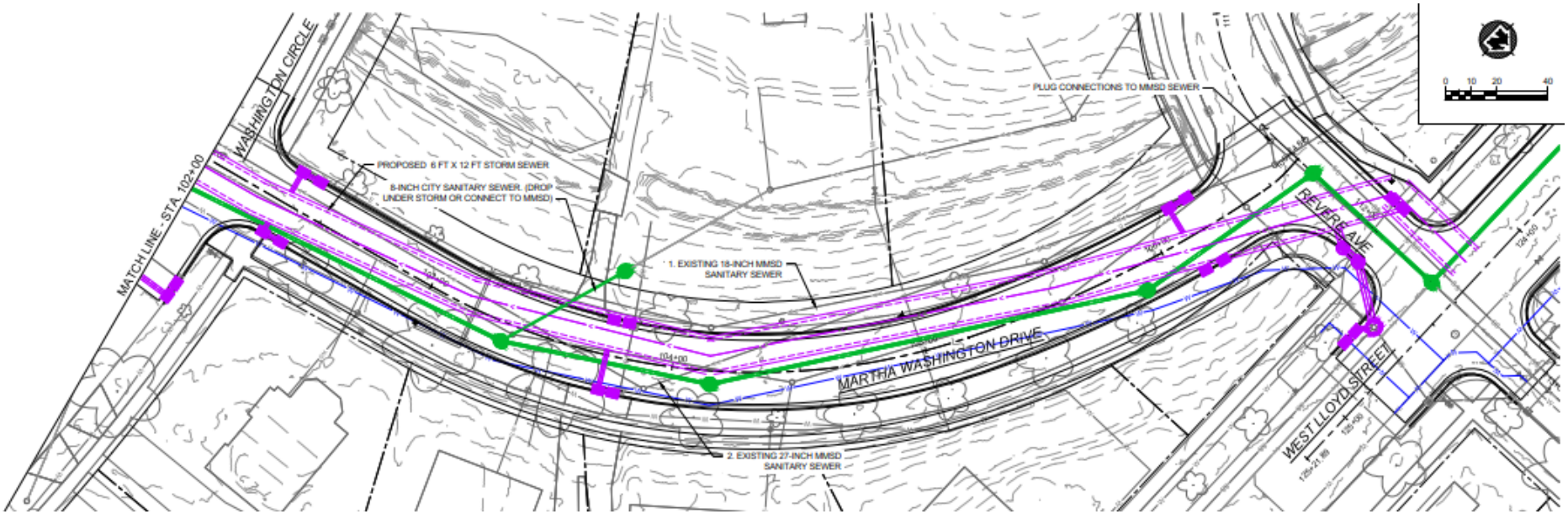
6-ft x 16-ft Transition to 6-ft x 12-ft Box Storm Sewer at Milwaukee Ave

Option B: Storm Sewer



6-ft x 12-ft Box Storm Sewer at Washington Blvd.

Option B: Storm Sewer



6-ft x 12-ft Box Storm Sewer at Revere Ave.

Alternative Cost Estimates

Option A: Tunnel

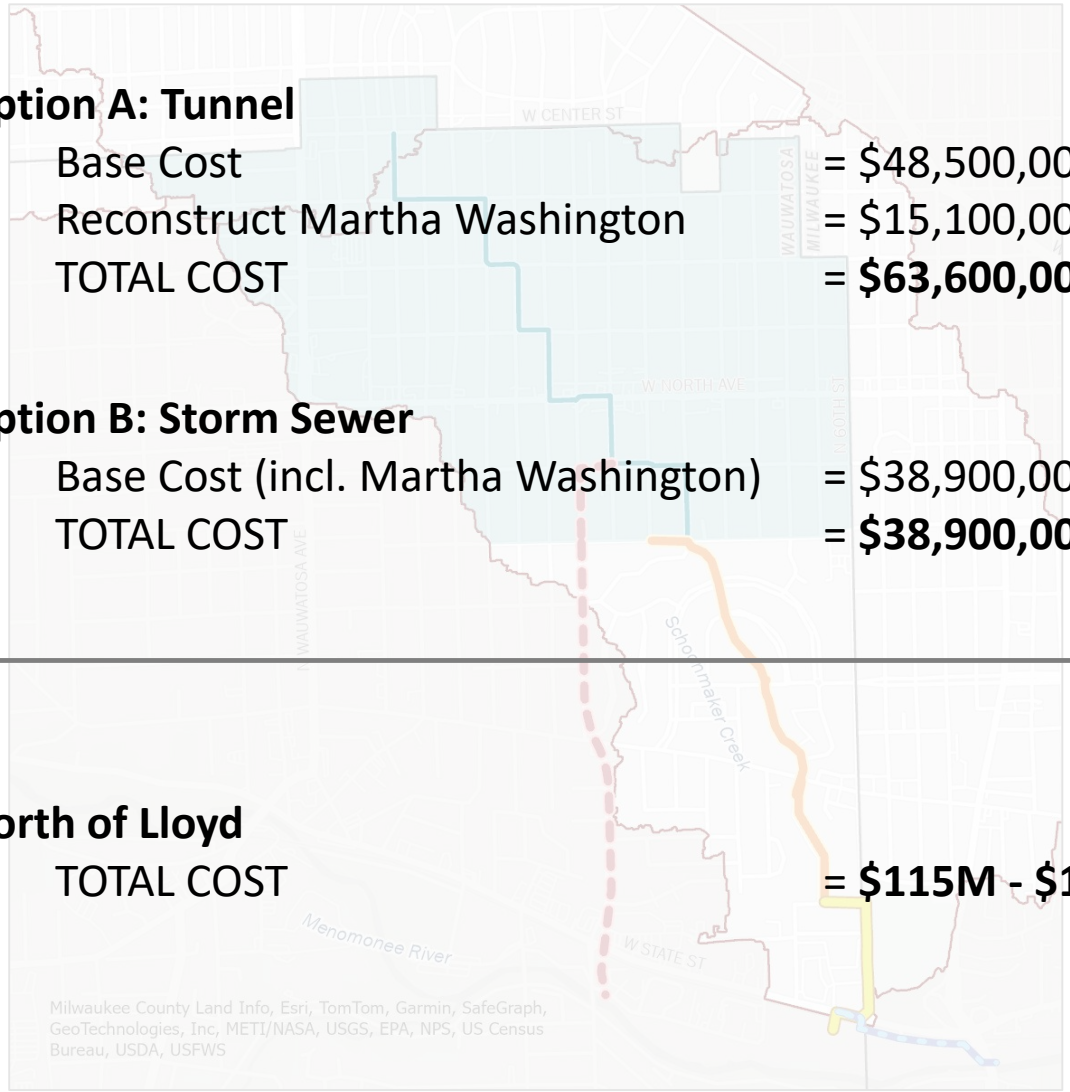
Base Cost	= $48,500,000
Reconstruct Martha Washington	= $15,100,000
TOTAL COST	= **$63,600,000**

Option B: Storm Sewer

Base Cost (incl. Martha Washington)	= $38,900,000
TOTAL COST	= **$38,900,000**

North of Lloyd

TOTAL COST	= **$115M - $135M**



Alternative Decision Matrix

DECISION MAKING MATRIX SUMMARY		WEIGHT (1-5)
	FACTORS	
1	Impacts to residential properties	5
2	Political and community support of project	5
3	Necessity to obtain temporary / permanent easements	5
4	Impacts / coordination with railroad	5
5	Complexity of permitting	5
6	Preliminary cost determination	5
7	Option "solves" the flooding problem for the City	5
8	Does option require city to enter into agreement with property owners for long term liability	5
9	Impacts to commercial/business properties	4
10	Complexity of construction	4
11	Impacts to City infrastructure	4
12	Impacts to MIS/MMSD infrastructure	4
13	Additional long term improvements needed from City of Milwaukee to address flooding	4
14	Impacts to local traffic during construction	3
15	Number of trees impacted due to construction within "Tree City"	3
16	Option allows for additional concurrent improvements (ie street, sanitary,water, sidewalk, etc) to be constructed	3
17	Level of city effort required to deliver project	3
18	Duration of project and phasing required	3
19	Potential for state or federal funding availability	3
20	Number of intersections impacted	2
21	Potential for bedrock to impact construction	2
22	Contribution of cost from MMSD	2
23	Property acquisition required for option	2
24	Potential archaeological impacts	1
25	Potential endangered resources impacted	1
26	Potential wetland impacts	1
TOTALS		
WEIGHTED TOTAL SCORE (Range from -89 to 89)		89

Alternative Decision Matrix

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LEGEND	
WEIGHT SYSTEM ASSIGED TO FACTORS	
DESCRIPTION	**WEIGHT**
Minimal Significance	1
Moderately Low Significance	2
Moderate Signficance	3
Moderately High Significance	4
High Signficance	5
SCORE SYSTEM ASSIGED TO OPTIONS FOR EACH FACTOR	
DESCRIPTION	**SCORE**
Option provides less benefit or introduces more impediments than other option	-1
Option does not provide benefit over other option	0
Option provides more benefit or introduces less impediments than the other option	1

20	Number of intersections impacted	2
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Moderate Signficance	3
Moderately High Significance	4
High Signficance	5
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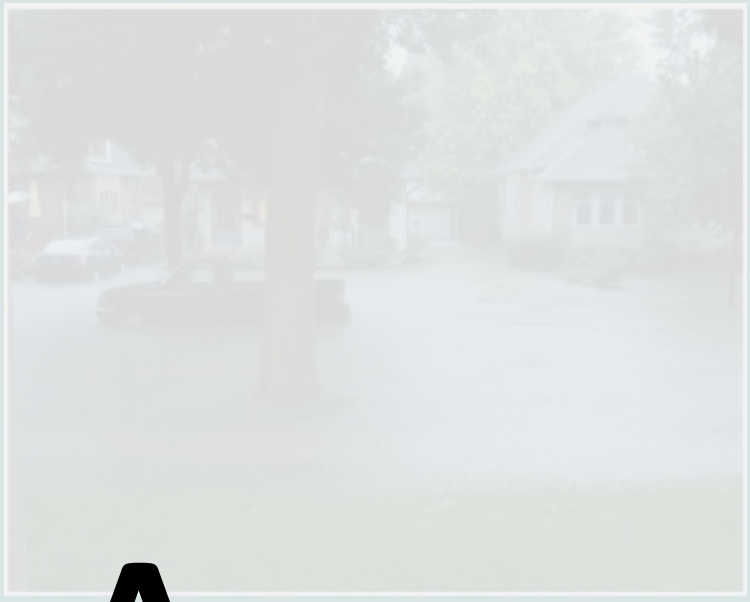
23	Property acquisition required for optio	2
24	Potential archaeological impacts	1
25	Potential endangered resources impacted	1
26	Potential wetland impacts	1
TOTALS		
WEIGHTED TOTAL SCORE (Range from -89 to 89)		89

Opt A: Tunnel Score = -1
Opt B: Storm Sewer Score = +11



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Q & A

Wauwatosa Community Affairs Meeting

October 15th, 2024

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