SEMINOLE GLEN WATERSHED STUDY

AE2S

Fitchburg
WISCONSIN

Why Are We Here?

- Update Stormwater Plan from 2000 for Seminole Glen

1987

2000

2022

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  - Significant flooding of kettles east of park

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Why Are We Here?

- Update Stormwater Plan from 2000 for Seminole Glen
  - Significant flooding of kettles east of park
  - Flooding causing erosion/washouts/tree die-off
  - Concerns about water quality impacts to kettles

Why Are We Here?

October 2021

City issued a request for proposals to complete a feasibility study and design concepts to mitigate flooding in the Seminole Glen kettles and evaluate water quality impacts.

Why Are We Here?

January 2023

Project kick-off

First Public Information Meeting held

Goals, Objectives, and Public Comments

Project Timeline

August 2022: City Approved Funding for Study

September 2022 – January 2023: Gathered Data and Complete Existing Watershed Analysis

January 2023: Public Involvement #1

February 2023: Collect Resident Feedback and Refine Modeling

February 2023: Evaluate Solutions

June 2023: Public Involvement #2

We are here

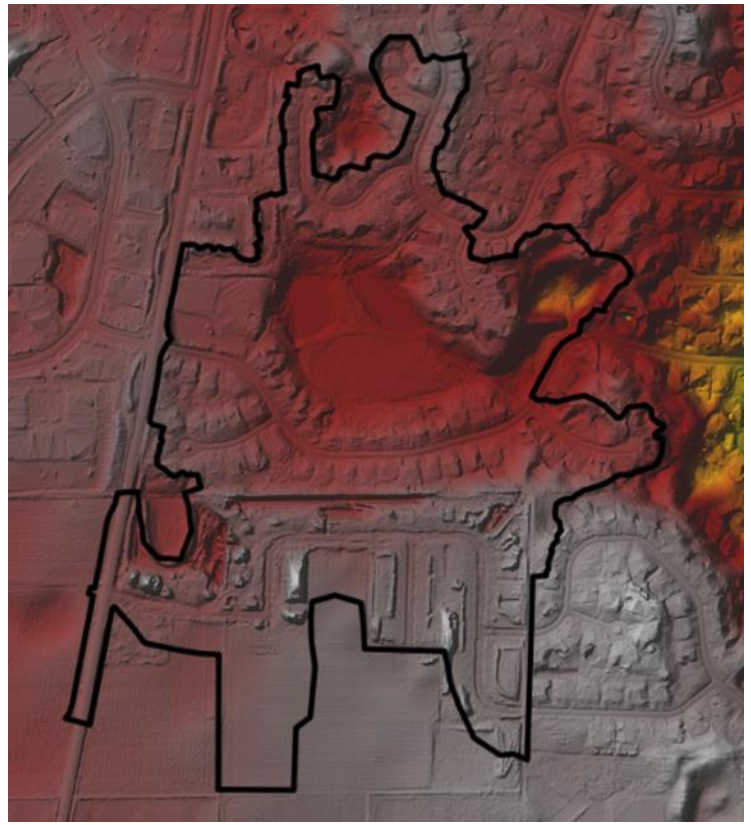
July 2023: Report and Project Wrap Up

Contact Information

- Your input is valuable to a successful plan
  - Email Ben Schulte at City Engineering at:
    - Ben.Schulte@fitchburgwi.gov
    - 608-270-4262
  - Additional project information provided on the City's website:
    - https://www.fitchburgwi.gov/234/Projects

Recap of Public Information Meeting #1

- Causes of flooding
  - Internally drained kettles
  - Continued urban development in watershed
  - Historically wet climate



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  - Determine specific causes of flooding
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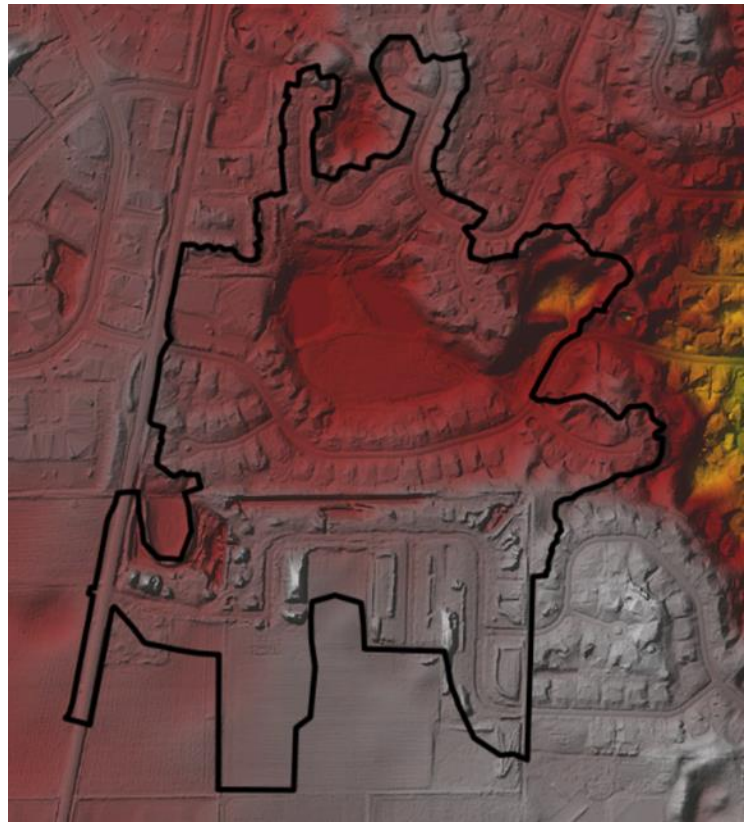

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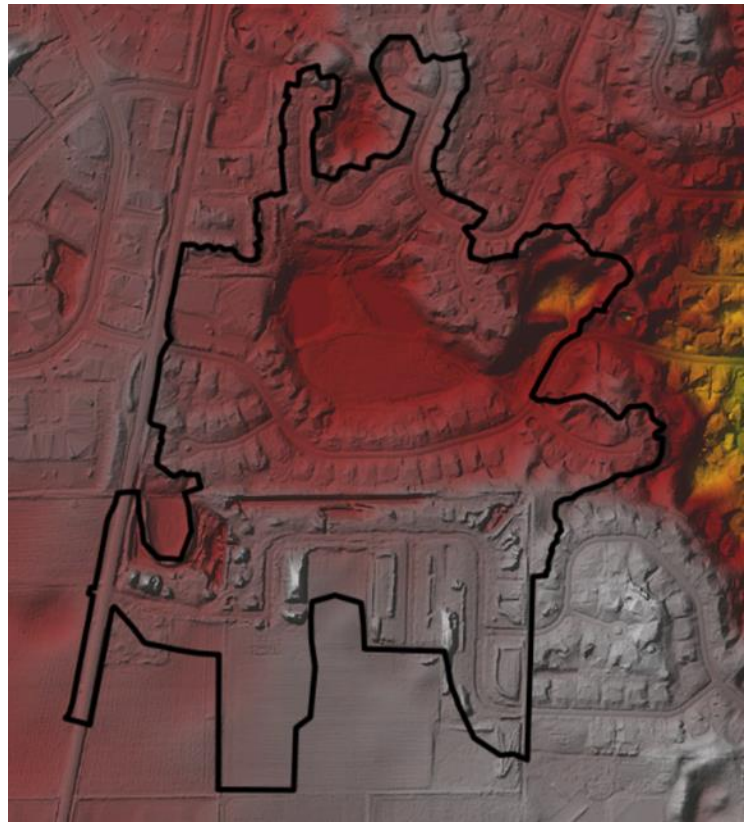
- Existing Model Results



Outline for Public Information Meeting #2

- Existing Model Results

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- Alternatives Considered and Results

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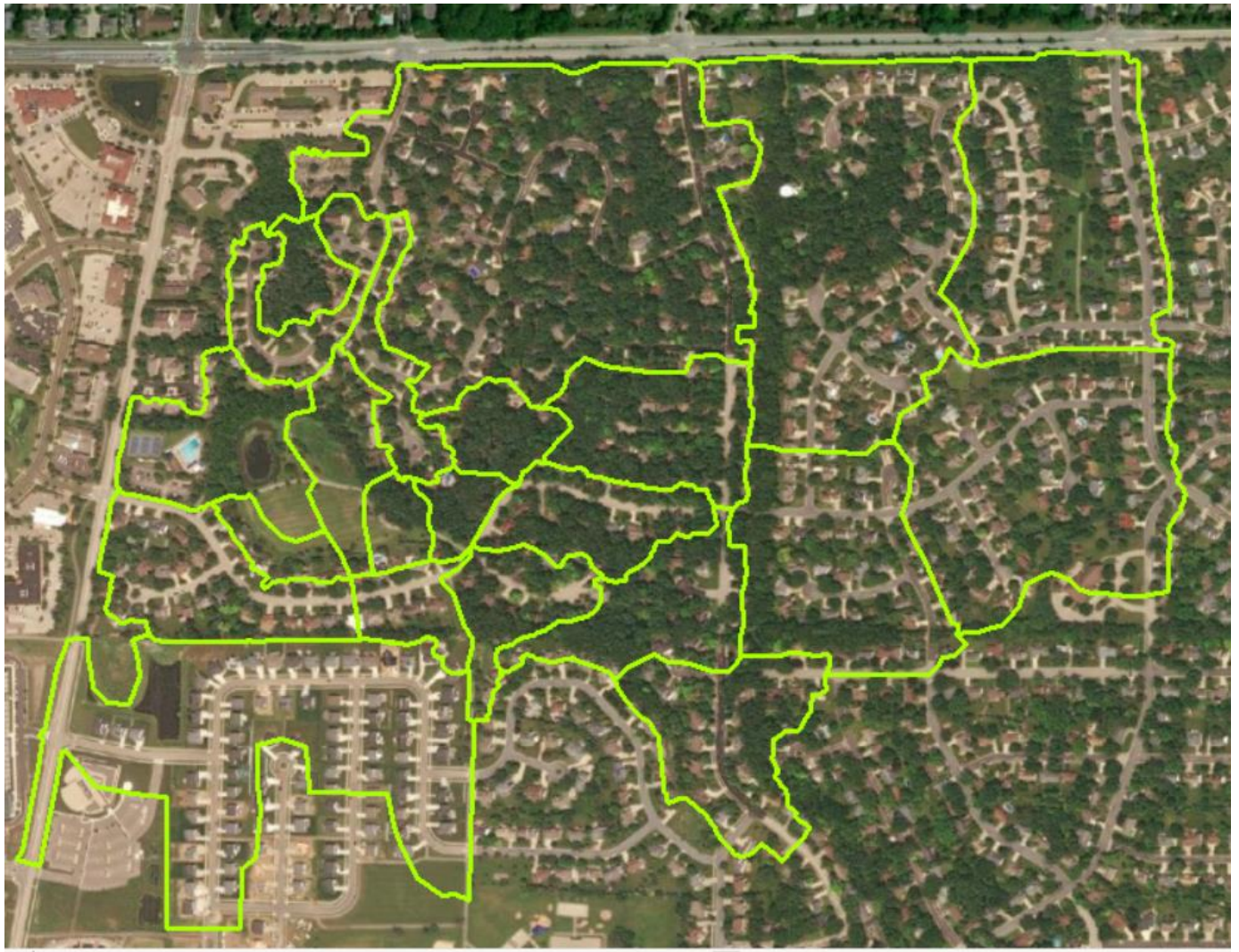
- Next Steps

Existing Conditions Model Construction

- Model Inputs
  - Subcatchments



Existing Conditions Model Construction

- Model Inputs
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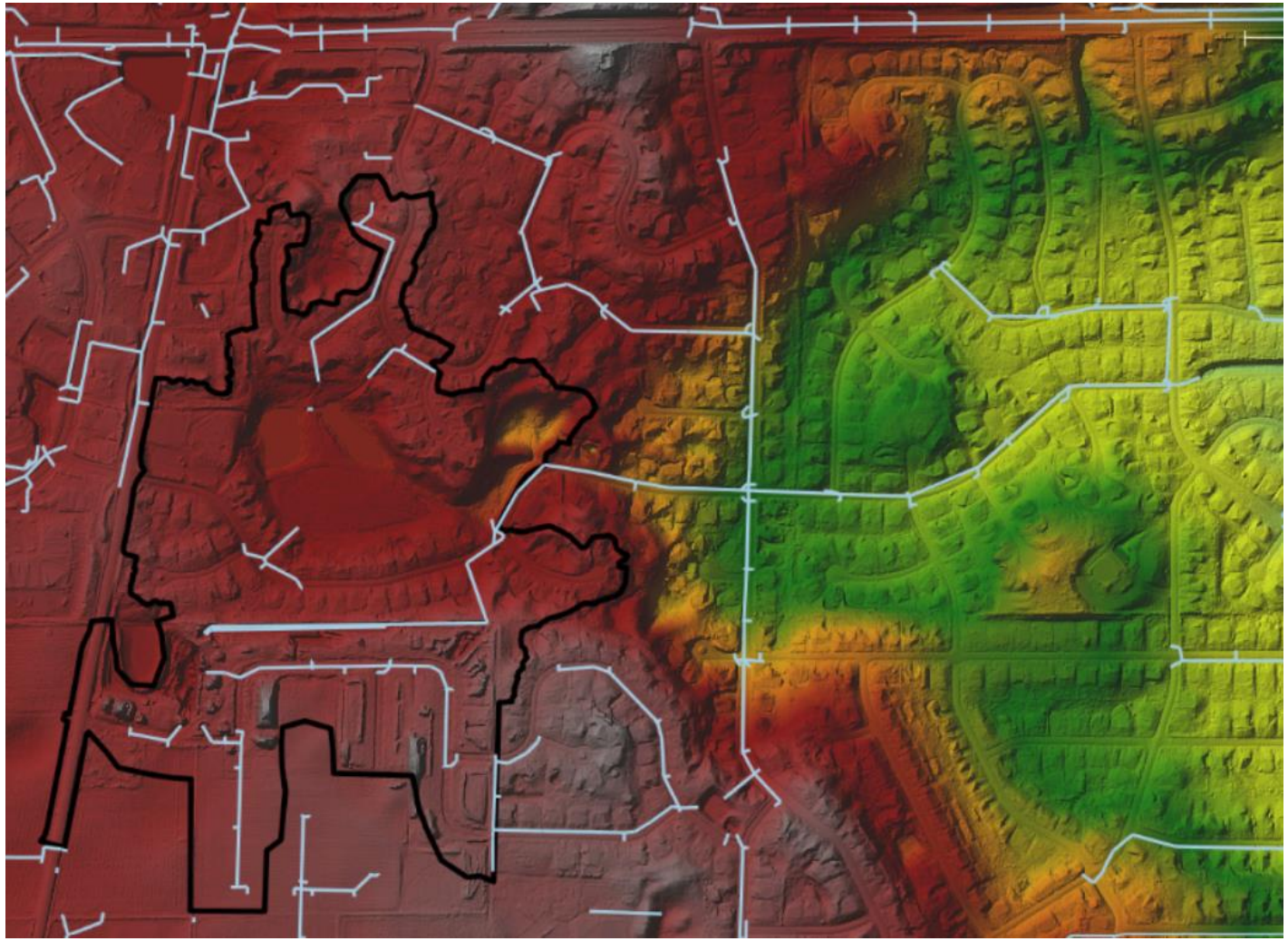
  - Storm sewer



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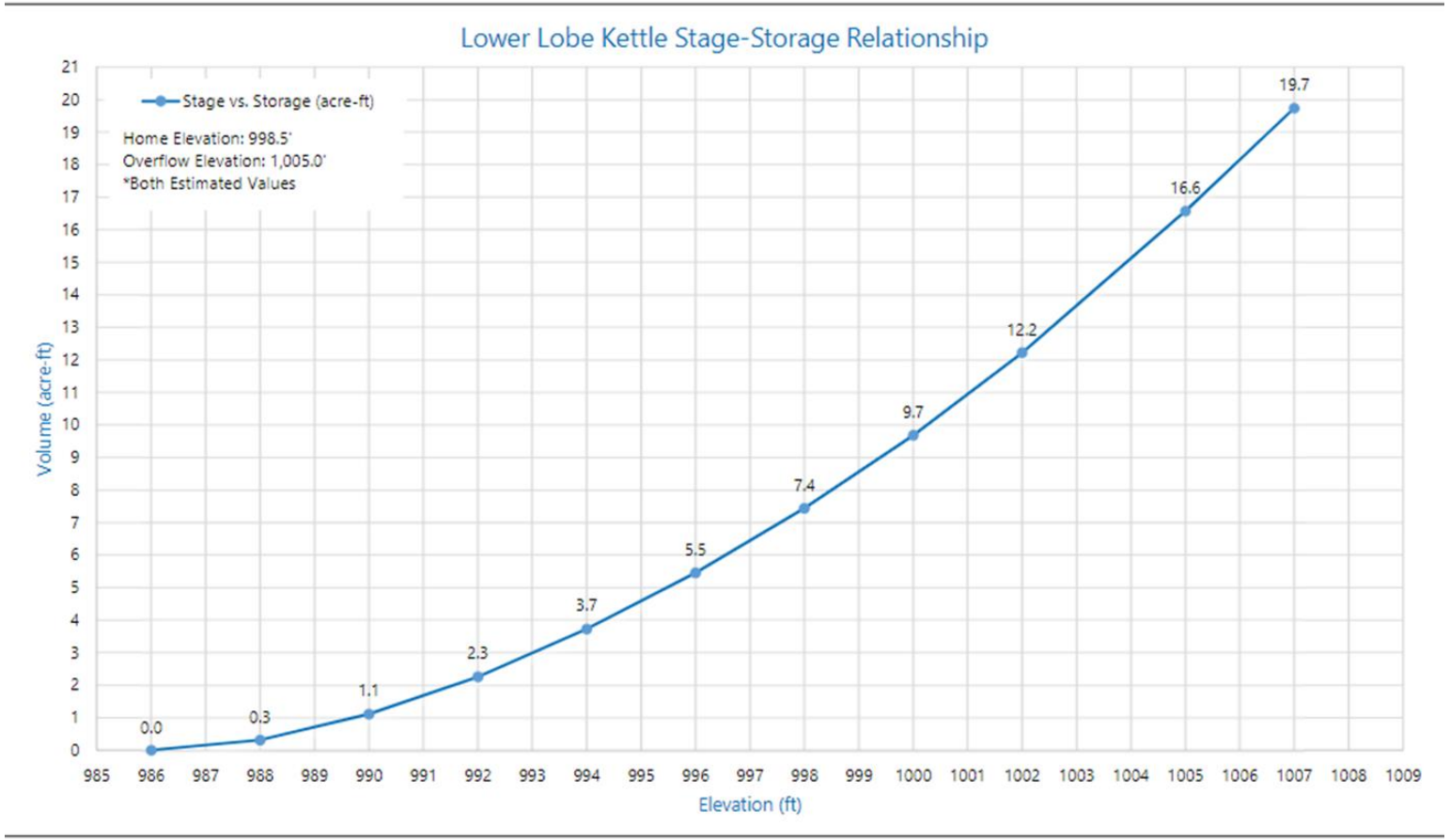
  - Storage in park ponds and kettles



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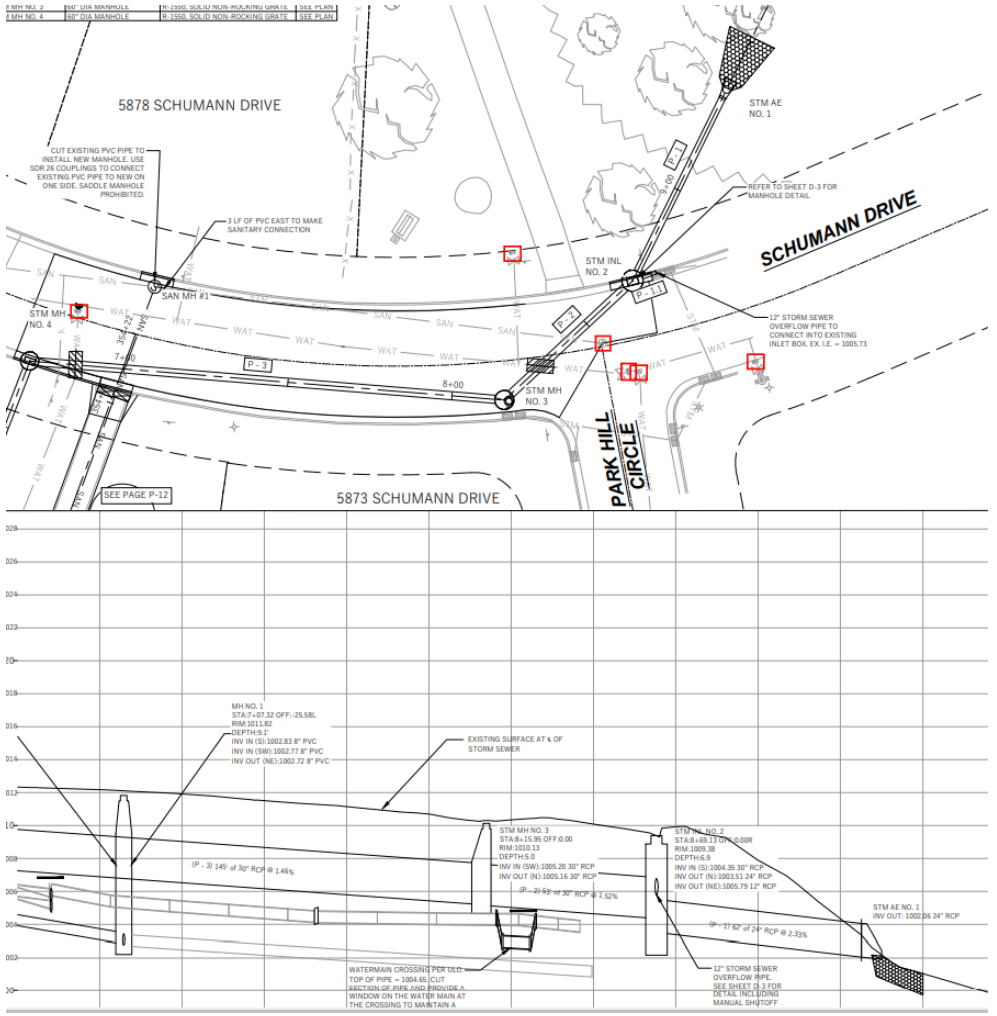
  - Gate structure between North Stoner Prairie and Schuman Drive



Existing Conditions Model Construction

- Model Inputs
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  - Storm sewer
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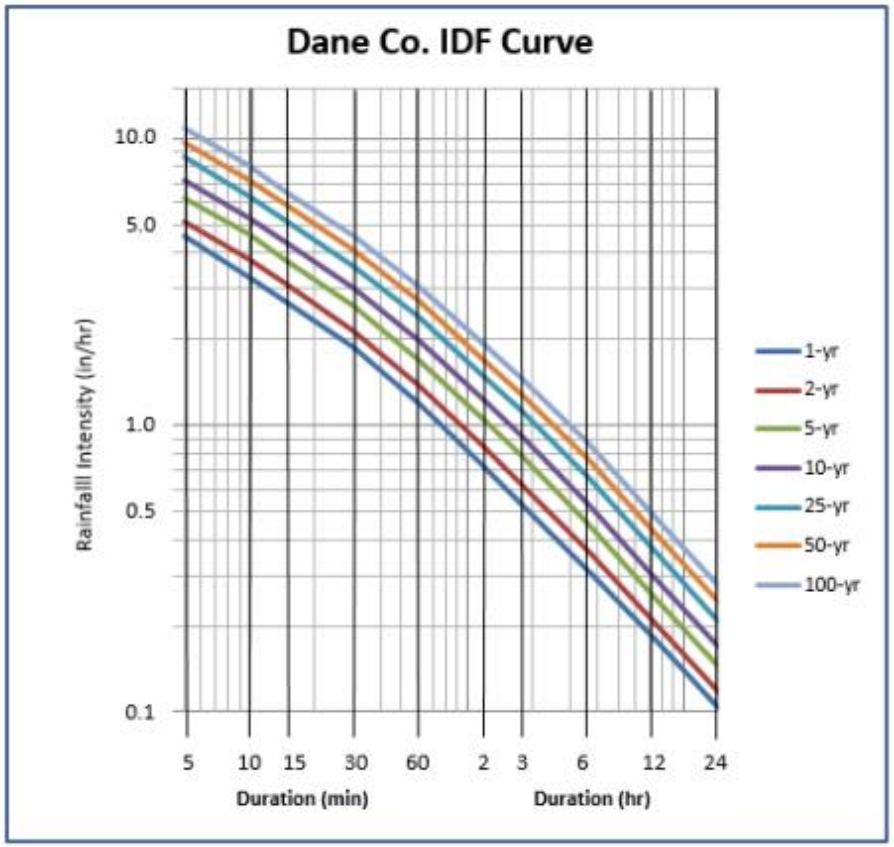
  - Rainfall Information

Name	Distribution	Rainfall Depth					
		2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Adams	MSE3	2.69	3.26	3.82	4.71	5.50	6.38
Ashland	MSE4	2.75	3.46	4.15	5.27	6.27	7.37
Barron	MSE3	2.88	3.57	4.17	5.03	5.72	6.44
Bayfield	MSE4	2.73	3.45	4.14	5.23	6.18	7.24
Brown	MSE4	2.37	2.94	3.45	4.22	4.87	5.56
Buffalo	MSE3	2.90	3.63	4.32	5.39	6.32	7.33
Burnett	MSE4	2.84	3.52	4.12	5.02	5.76	6.54
Calumet	MSE4	2.47	3.06	3.60	4.45	5.17	5.96
Chippewa	MSE3	2.76	3.41	4.00	4.87	5.60	6.38
Clark	MSE3	2.77	3.37	3.91	4.74	5.44	6.19
Columbia	MSE4	2.76	3.38	3.96	4.88	5.66	6.52
Crawford	MSE4	2.94	3.64	4.35	5.50	6.53	7.68
Dane	MSE4	2.84	3.49	4.09	5.01	5.80	6.66



Existing Conditions Model Findings

Approximate walkout elevation at 5856 Schumann Drive is 999 ft

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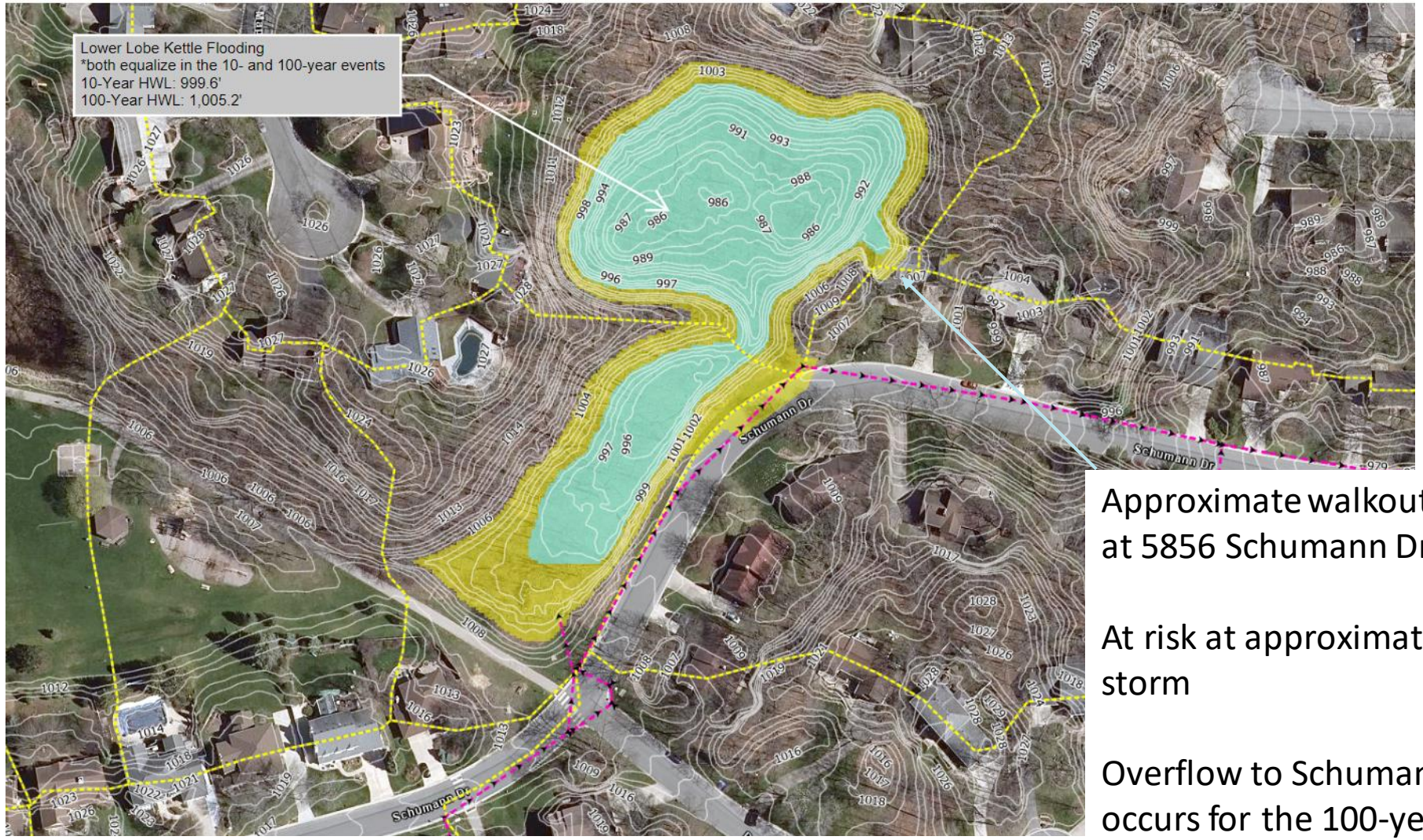

Approximate walkout elevation at 5856 Schumann Drive is 999 ft

At risk at approximately 10-year storm

Overflow to Schumann Drive occurs for the 100-year storm

Alternatives Evaluated

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- Alternative 4: Construct berm in park only—this alternative was discarded

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Note: Additional infiltration was considered but determined to be infeasible because of groundwater/soil properties.

Alternatives Evaluated

- Alternative 1: Keep North Stoner Prairie valve closed (do nothing)
- Alternative 2: Reconstruct Schumann Drive storm sewer at a lower elevation with increased capacity
- Alternative 3: Construct berm between kettle wetlands and forested kettle lobes
- Alternative 4: Combination of Alternative 2 and 3

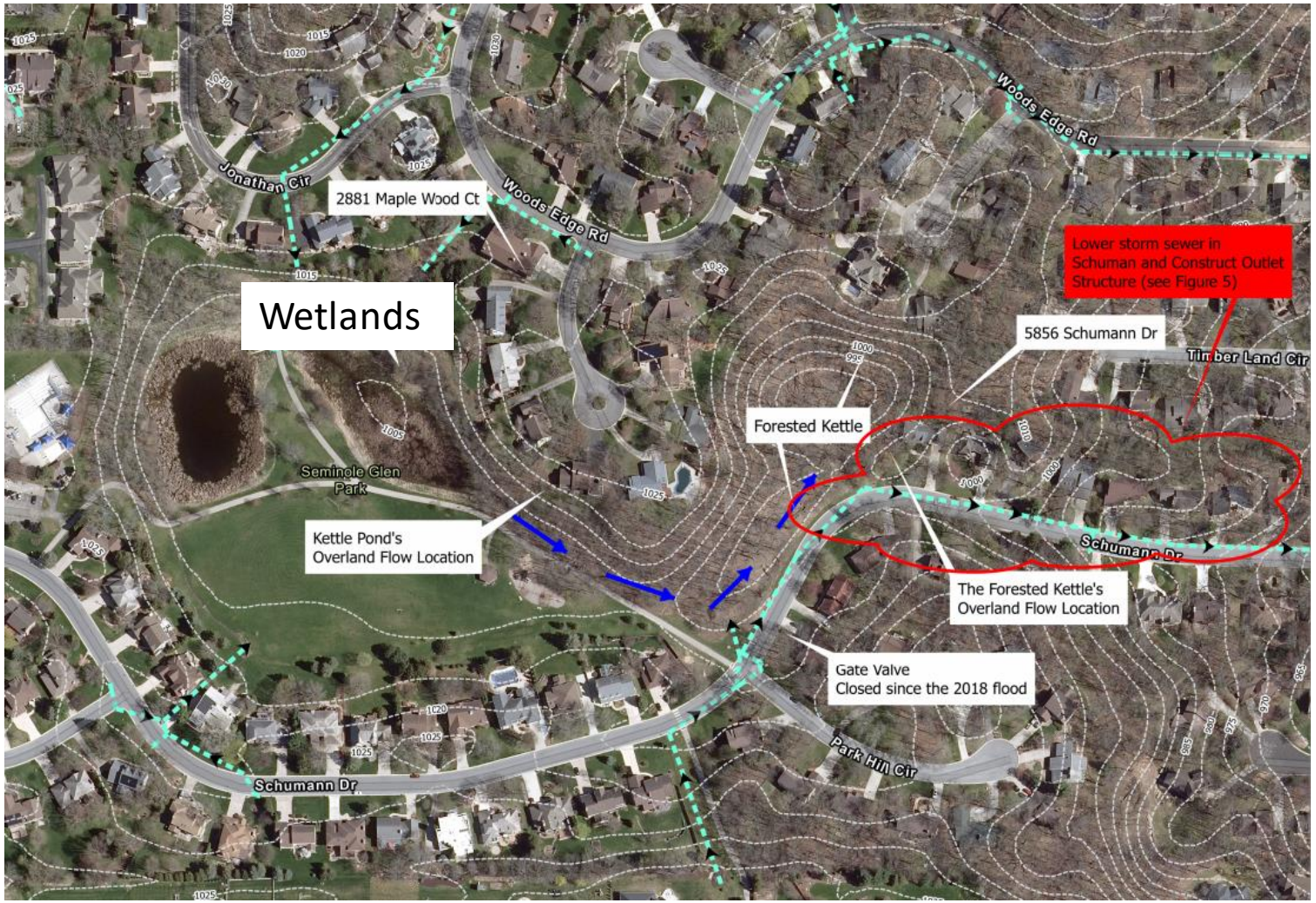
Note: Additional infiltration was considered but determined to be infeasible because of groundwater/soil properties.

Water quality impacts modeled separately from flood risk reduction alternatives

Alternative 1: Keep Valve Closed

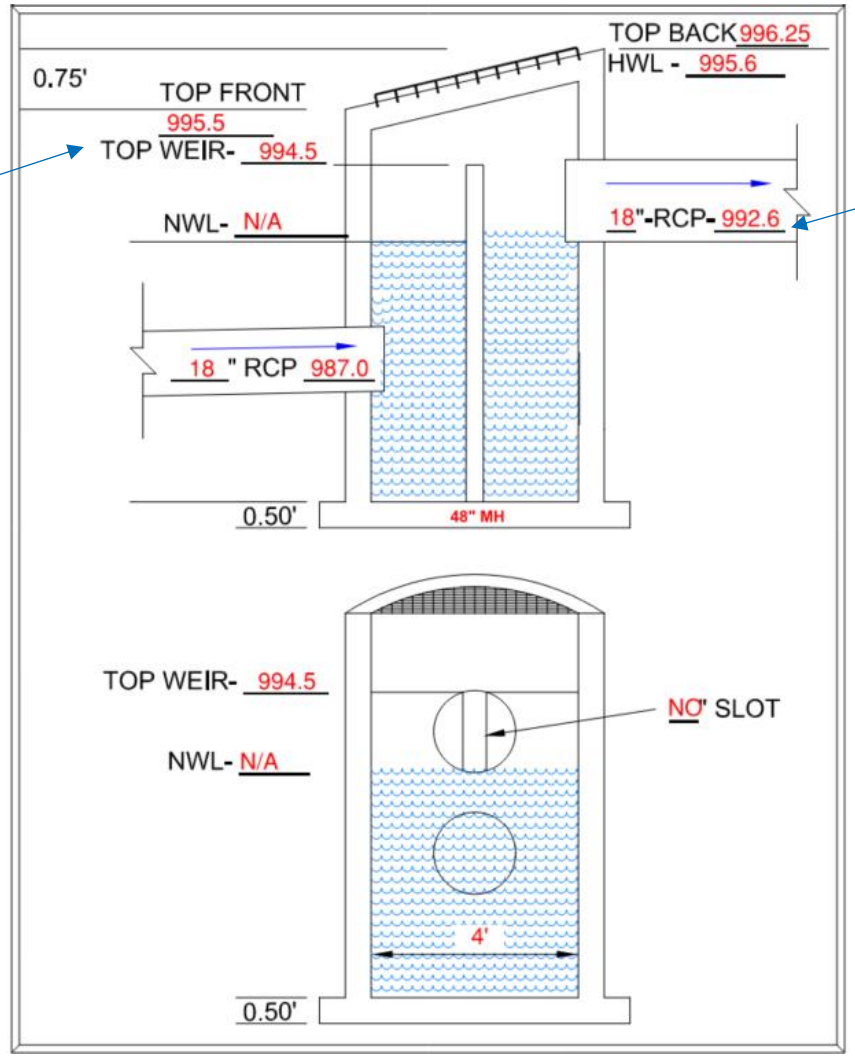
Alternative 2: Lower Schumann Dr. Storm Sewer

In addition to Alternative 1. Gate valve to North Stoner Prairie Neighborhood remains closed



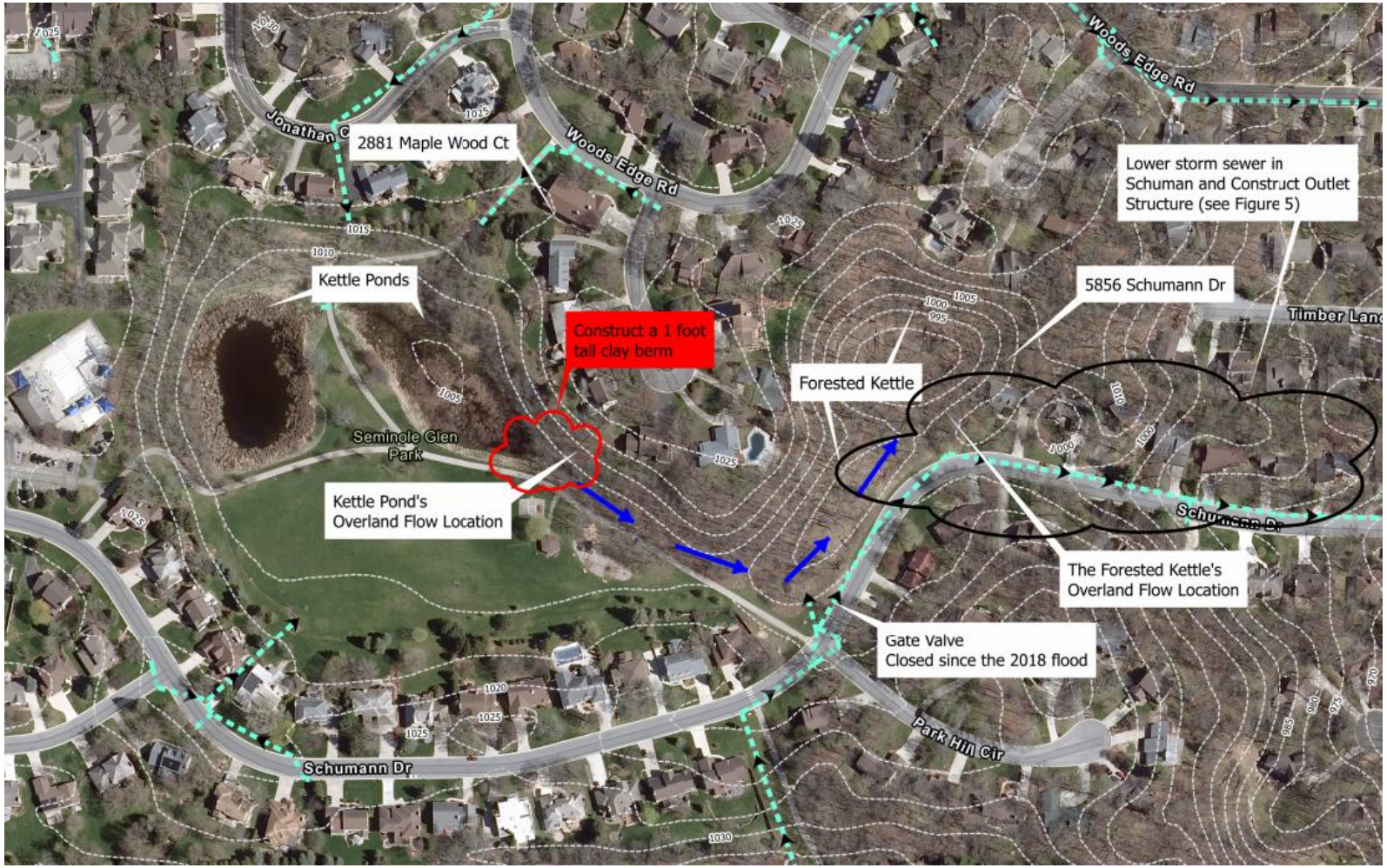
Alternative 2: Lower Schumann Dr. Storm Sewer

10-yr water surface elevation in forested kettle



Existing elevation = 1000.2 ft

Alternative 3 & 4: Construct Berm in Park



Flood Risk Results Summary

Peak Flood Elevations & Flow Rates at the Kettle Ponds

Scenario	2-Year Flood Elevation[1,2] (ft)	10-Year Flood Elevation[1,2] (ft)	100-Year Flood Elevation[1,2] (ft)	2-Year Flow Rate[3] (cfs)	10-Year Flow Rate[3] (cfs)	100-Year Flow Rate[3] (cfs)
Alternative 1[4]	*1006.3*	*1007.0*	*1008.2*	0.4	4.7	31.0
Alternative 2[4]	*1006.3*	*1007.0*	*1008.2*	0.4	4.7	31.0
Alternative 3[5]	*1006.3*	*1007.2*	*1008.2*	0.0	1.1	25.7

1 Elevation 1021 feet = the approximate low opening elevation of the lowest adjacent property (2881 Maple Wood Court)
2 Dry elevation of the Kettle Ponds = 1004.2 feet
3 Overland Flow (discharge from the Kettle Ponds to the Forested Kettle)
4 Overland Flow Elevation = 1006 feet
5 Overland Flow Elevation = 1007 feet

Flood Risk Results Summary

Peak Flood Elevations & Flow Rates at the Forested Kettle

Scenario	2-Year Flood Elevation[1,2] (ft)	10-Year Flood Elevation[1,2] (ft)	100-Year Flood Elevation[1,2] (ft)	2-Year Flow Rate[3] (cfs)	10-Year Flow Rate[3] (cfs)	100-Year Flow Rate[3] (cfs)
Alternative 1[4]	*989.3*	*994.5*[5]	*1000.9*	0.0	0.0	0.0
Alternative 2[4]	*989.3*	*994.5*	*996.6*	0.0	0.0	0.0
Alternative 3[4]	*987.3*	*991.0*	*995.6*	0.0	0.0	0.0

1 Elevation 999 feet = the approximate low opening elevation of the lowest adjacent property (5856 Schumann Drive backyard walkout)

2 Dry elevation of the Forested Kettle = 986.0 feet

3 Overland Flow (discharge from the Forested Kettle to Schumann Drive, not within a pipe)

4 Overland Flow Elevation = 1006 feet

5 Engineered passive outlet set at the 10-year elevation of Alternative 1 (existing conditions)

Water Quality Modeling

- Water Quality based on smaller, more frequent storms

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- Used WinSLAMM—approved by Wisconsin DNR
- Runoff quality into wetlands and kettles not impacted by proposed alternatives
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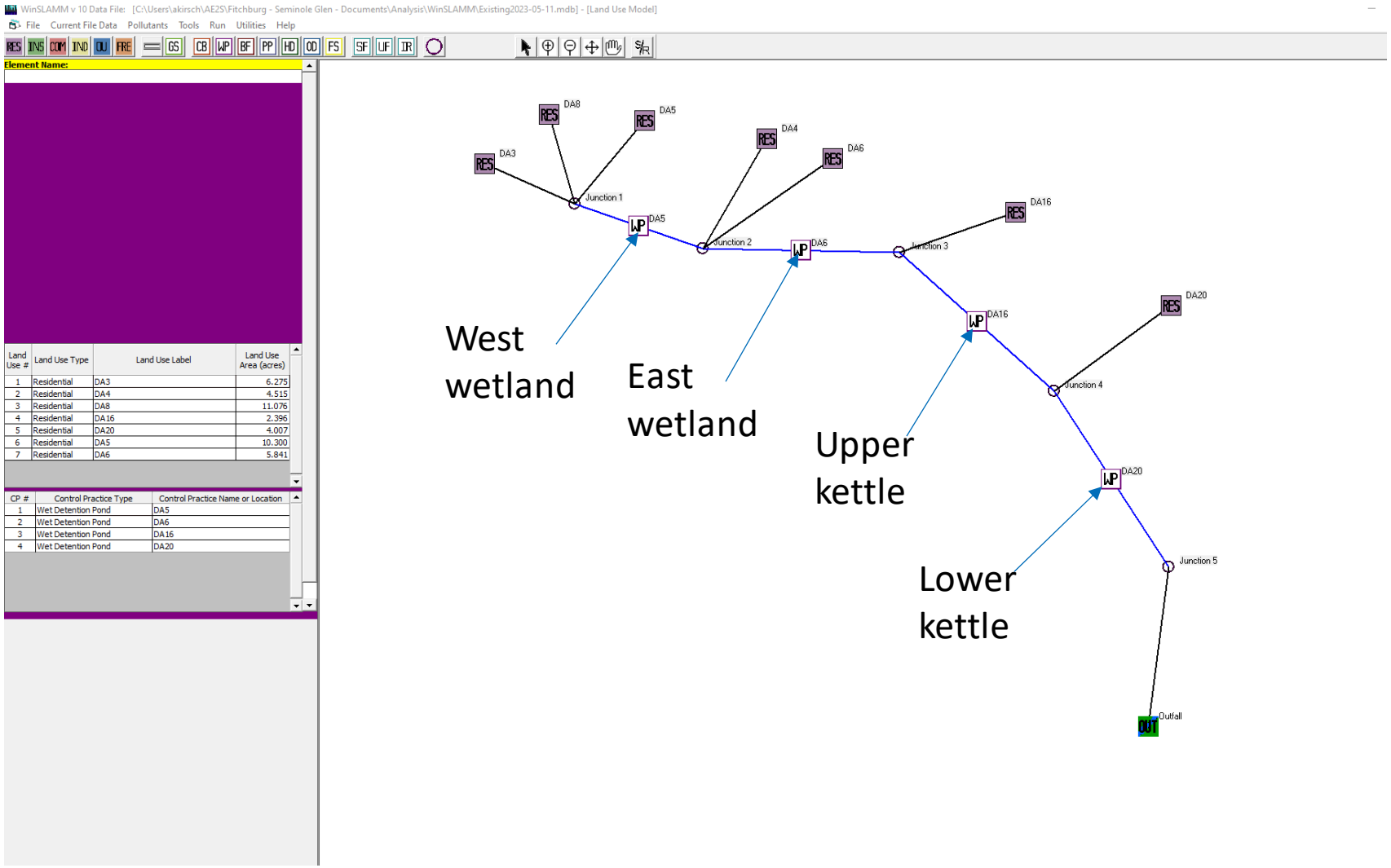
- Seminole Glen area neither counts “for” or “against” City for WPDES permit, because considered internally drained

WinSLAMM Model

Wetland areas modeled as wet ponds with no infiltration

Kettles modeled as wet ponds with infiltration



WinSLAMM Results

File Name:

C:\Users\akirsch\AE2S\Fitchburg - Seminole Glen - Documents\Analysis\WinSLAMM\Proposed_Alt2_2023-05-11.mdb

Outfall Output Summary

	Runoff Volume (cu. ft.)	Percent Runoff Reduction	Runoff Coefficient (Rv)	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Total of All Land Uses without Controls	3.308E+06		0.64	207.4	42822	
Outfall Total with Controls	0	100.00 %	0.00	0	0	100.00 %
Current File Output: Annualized Total After Outfall Controls	0	Years in Model Run:	1.00		0	

Print Output Summary to .csv File

Print Output Summary to Text File

Print Output Summary to Printer

Total Area Modeled (ac): 44.410

Total Control Practice Costs

Capital Cost	N/A
Land Cost	N/A
Annual Maintenance Cost	N/A
Present Value of All Costs	N/A
Annualized Value of All Costs	N/A

Perform Outfall Flow Duration Curve Calculations

Receiving Water Impacts Due To Stormwater Runoff

(CWP Impervious Cover Model)

	Calculated Rv	Approximate Urban Stream Classification
Without Controls	0.64	Fair
With Controls	0.00	Good

Data File: C:\Users\akirsch\AE2S\Fitchburg - Seminole Glen - Documents\Analysis\WinSLAMM\Proposed_Alt2_20

Rain File: WisReg - Madison WI 1981.RAN

Date: 06-22-23 Time: 8:12:16 AM

Site Description:

Runoff Volume Total (cf) at the Outfall

Rain Number	Start Date	Rain Total (in)	Outfall Total (cf)	Rv	Total Losses (in.)	Calculated CN*	Event Peak Flow (cfs)
13	02/27/81	-	-	-	-	-	-
14	03/10/81	-	-	-	-	-	-
15	03/25/81	0.07	0	0.000	0.07	n/a	0.000
16	03/29/81	0.05	0	0.000	0.05	n/a	0.000
17	03/29/81	0.06	0	0.000	0.06	n/a	0.000
18	03/29/81	0.07	0	0.000	0.07	n/a	0.000
19	04/03/81	0.02	0	0.000	0.02	n/a	0.000
20	04/03/81	0.26	0	0.000	0.26	n/a	0.000
21	04/07/81	0.71	0	0.000	0.71	n/a	0.000
22	04/08/81	0.41	0	0.000	0.41	n/a	0.000
23	04/10/81	1.06	0	0.000	1.06	n/a	0.000
24	04/12/81	0.13	0	0.000	0.13	n/a	0.000
25	04/13/81	0.32	0	0.000	0.32	n/a	0.000
26	04/16/81	0.01	0	0.000	0.01	n/a	0.000
27	04/19/81	0.04	0	0.000	0.04	n/a	0.000
28	04/22/81	0.01	0	0.000	0.01	n/a	0.000
29	04/22/81	0.02	0	0.000	0.02	n/a	0.000
30	04/23/81	0.05	0	0.000	0.05	n/a	0.000
31	04/28/81	0.30	0	0.000	0.30	n/a	0.000
32	04/28/81	0.06	0	0.000	0.06	n/a	0.000
33	04/30/81	0.02	0	0.000	0.02	n/a	0.000
34	05/04/81	0.09	0	0.000	0.09	n/a	0.000
35	05/10/81	0.08	0	0.000	0.08	n/a	0.000
36	05/13/81	0.01	0	0.000	0.01	n/a	0.000
37	05/23/81	0.02	0	0.000	0.02	n/a	0.000
38	05/24/81	0.10	0	0.000	0.10	n/a	0.000
39	05/29/81	0.34	0	0.000	0.34	n/a	0.000
40	06/02/81	0.01	0	0.000	0.01	n/a	0.000
41	06/03/81	0.01	0	0.000	0.01	n/a	0.000
42	06/08/81	0.01	0	0.000	0.01	n/a	0.000
43	06/08/81	0.33	0	0.000	0.33	n/a	0.000

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- Public education regarding backyard improvements

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- Improve smaller ditches from existing storm outfalls to wetlands.
- Public education regarding backyard improvements
- Wetland scrape unlikely, but possible.

Next Steps

- Documentation/Report
- Design and Construction
  - Seminole Glen Park 2023/2024 in CIP
  - Schumann Drive Storm Sewer, including Kettle outlet structure 2025 per CIP

Questions?