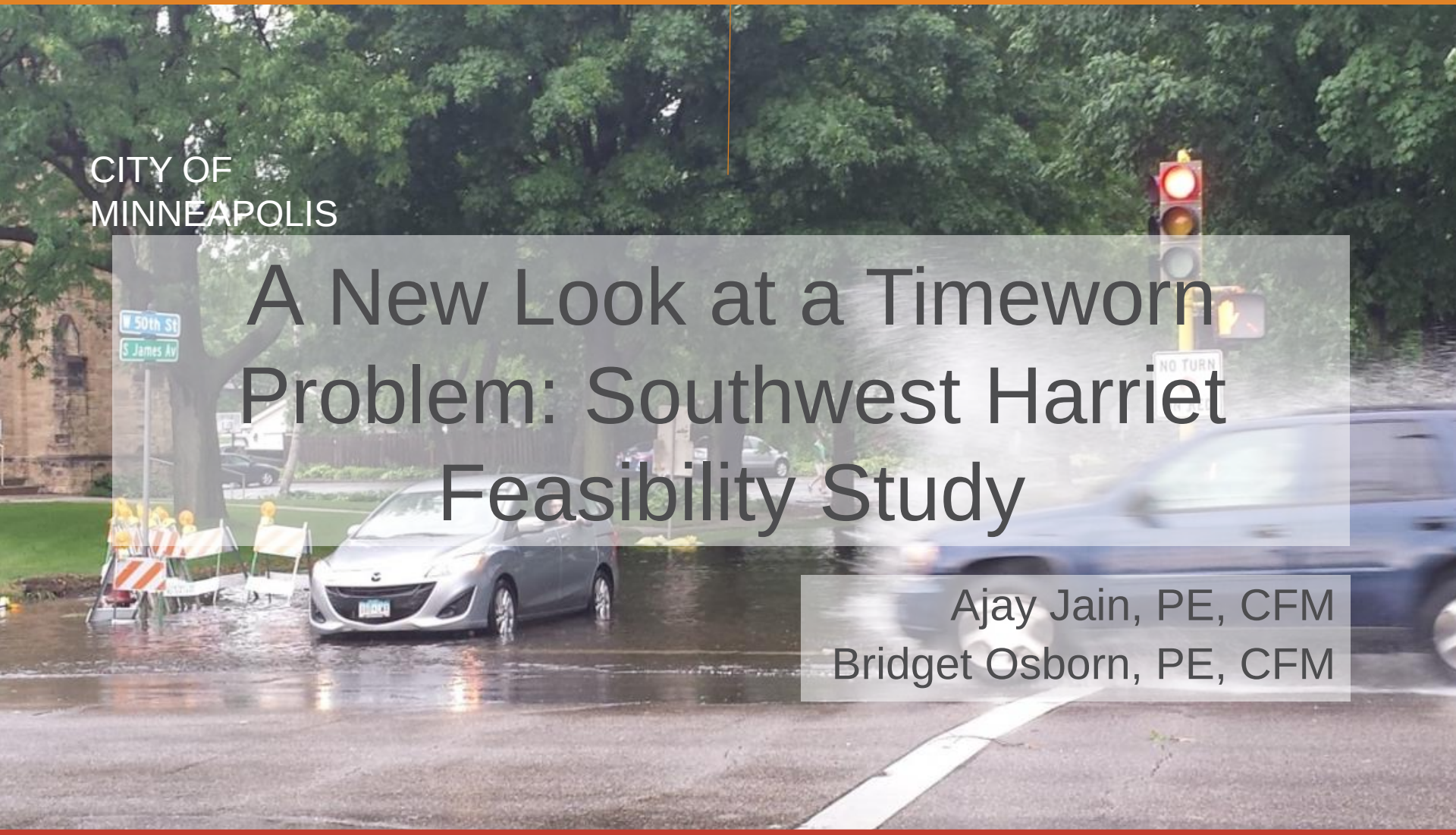


CITY OF MINNEAPOLIS

A New Look at a Timeworn Problem: Southwest Harriet Feasibility Study

Ajay Jain, PE, CFM
Bridget Osborn, PE, CFM

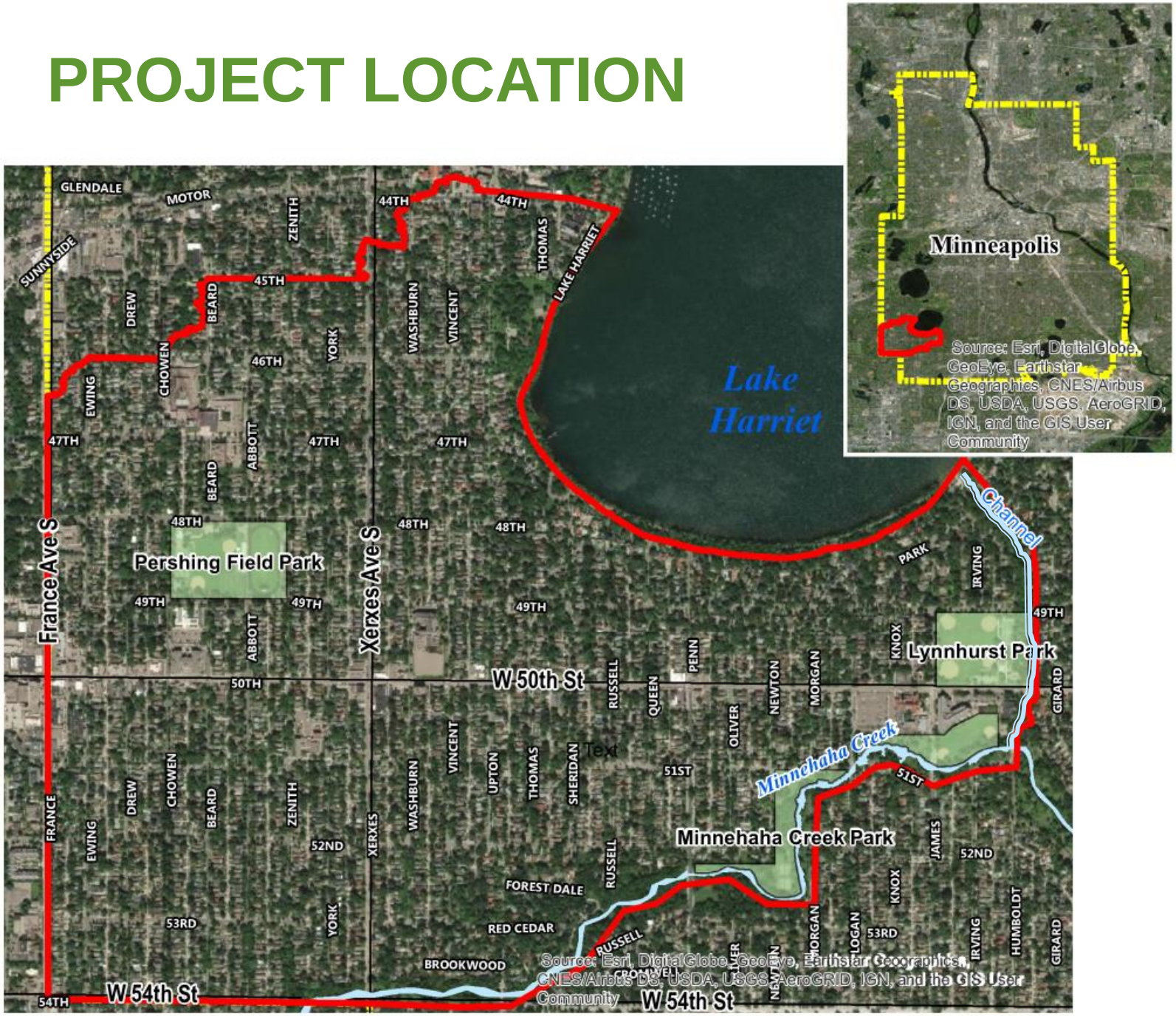
HR Green | Building Communities. Improving Lives.

Minneapolis
City of Lakes

Illinois Association of Floodplain and Stormwater Management Conference
March 13, 2019

HRGreen

PROJECT LOCATION



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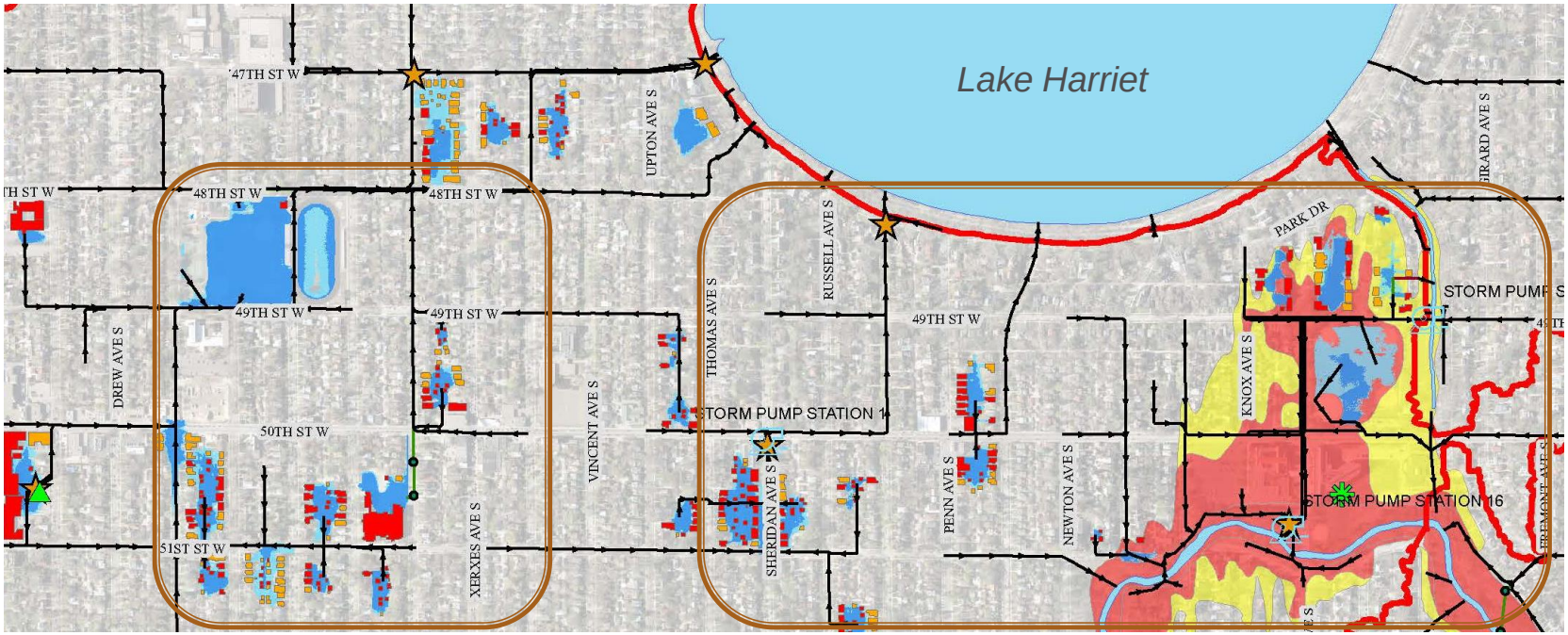
PROBLEM STATEMENT

How does a fully developed city address flooding due to undersized storm drain infrastructure in a cost effective manner with minimal disruption to residents?



Westerly Area *Easterly Area*

AGENDA

1. History of Flooding
2. Infrastructure Background
3. MOU Partnerships
4. Design Goals
5. Modeling (XP-SWMM & Optimatics)
6. Vetting Options
7. Cost Benefit
8. Next Steps

History of Flooding

- Area identified in 1978 flood report
  - Complaint based flood mapping

1991

History of Flooding

- More complaints were received over the years

2002

HISTORY OF FLOODING

- Per current H&H modeling, structure impacts in the study area are predicted to be:

2012

10-year storm
- 76 primary
- 113 secondary

100-year
- 125 primary
- 148 secondary

"Primary Structures" = residential, commercial, or institutional buildings
"Secondary Structures" = garages, sheds, or other non-habitable buildings

INFRASTRUCTURE BACKGROUND

- Similar to other problem flood areas in the city:
  - Old storm drain system throughout
    - For SW Harriet area: late 1930s
  - Design standards
    - Much smaller storm events
    - Different methodology for rainfall intensity
    - Did they design for full-build out?
  - Fully developed area = limited options
    - Lack of Open Space
    - Typical city roadway section with public and private utilities

INFRASTRUCTURE BACKGROUND

- Prior to the 1978 report
  - Some supplemental capacity added
    - Pipes and pumps
  - Didn't solve all of the issues

- Implementation since 1978 – not much….
  - Constructability, cost, and agency coordination issues

INFRASTRUCTURE BACKGROUND

- Detailed XP-SWMM models
  - Network defined at the manhole level
- 5 pilot feasibility studies planned or in progress
  - 3 using Optimizer by Optimatics - including SW Harriet
    - Takes standard range of solutions to determine best combination and location

MOU PARTNERSHIPS

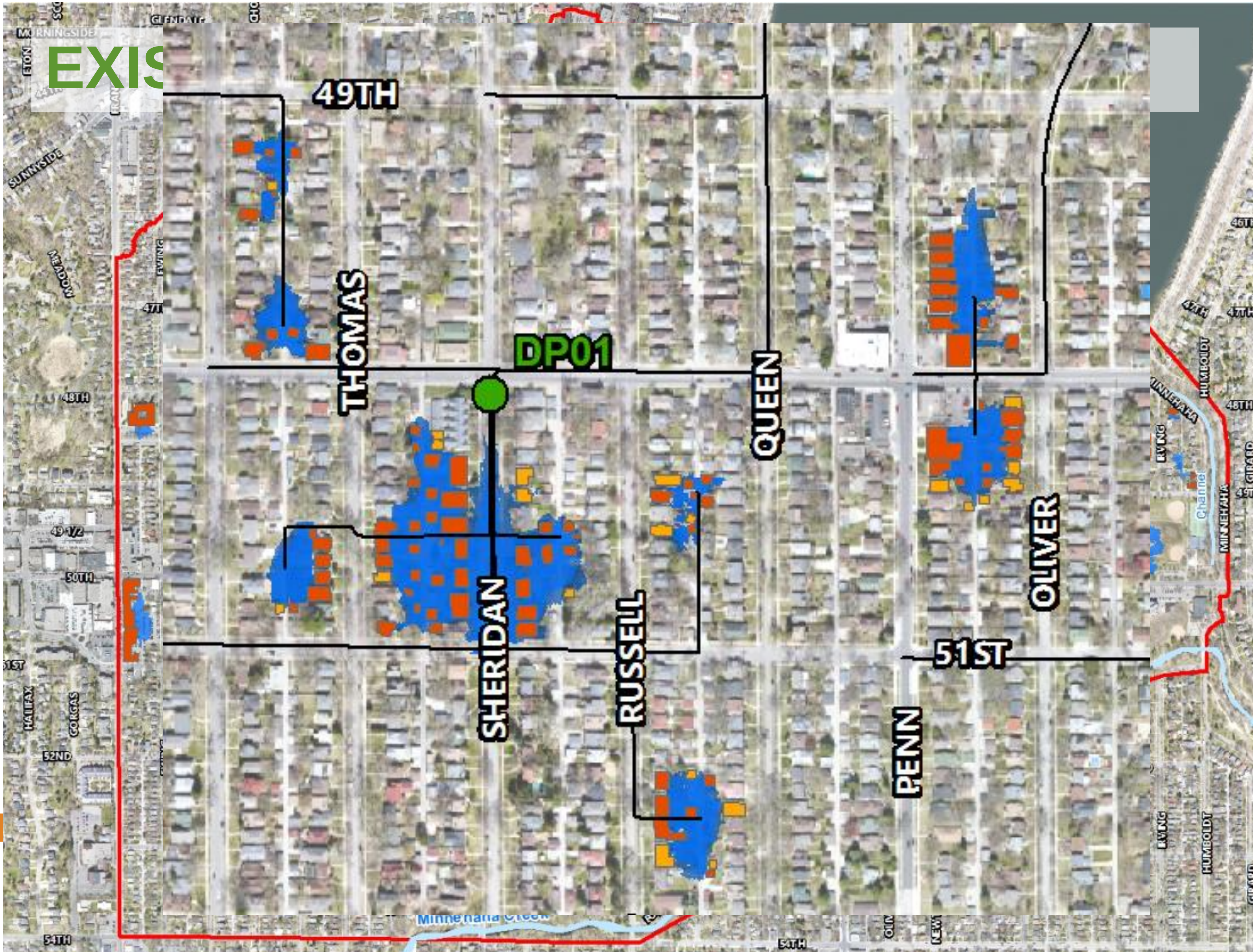
Minneapolis Park & Recreation Board

Minneapolis City of Lakes

MINNEHAHA CREEK WATERSHED DISTRICT

"The MOU memorializes a commitment to working together in order to integrate goals, plans and investment strategies that improve the environments within the Minnehaha Creek sub-watershed in Minneapolis."

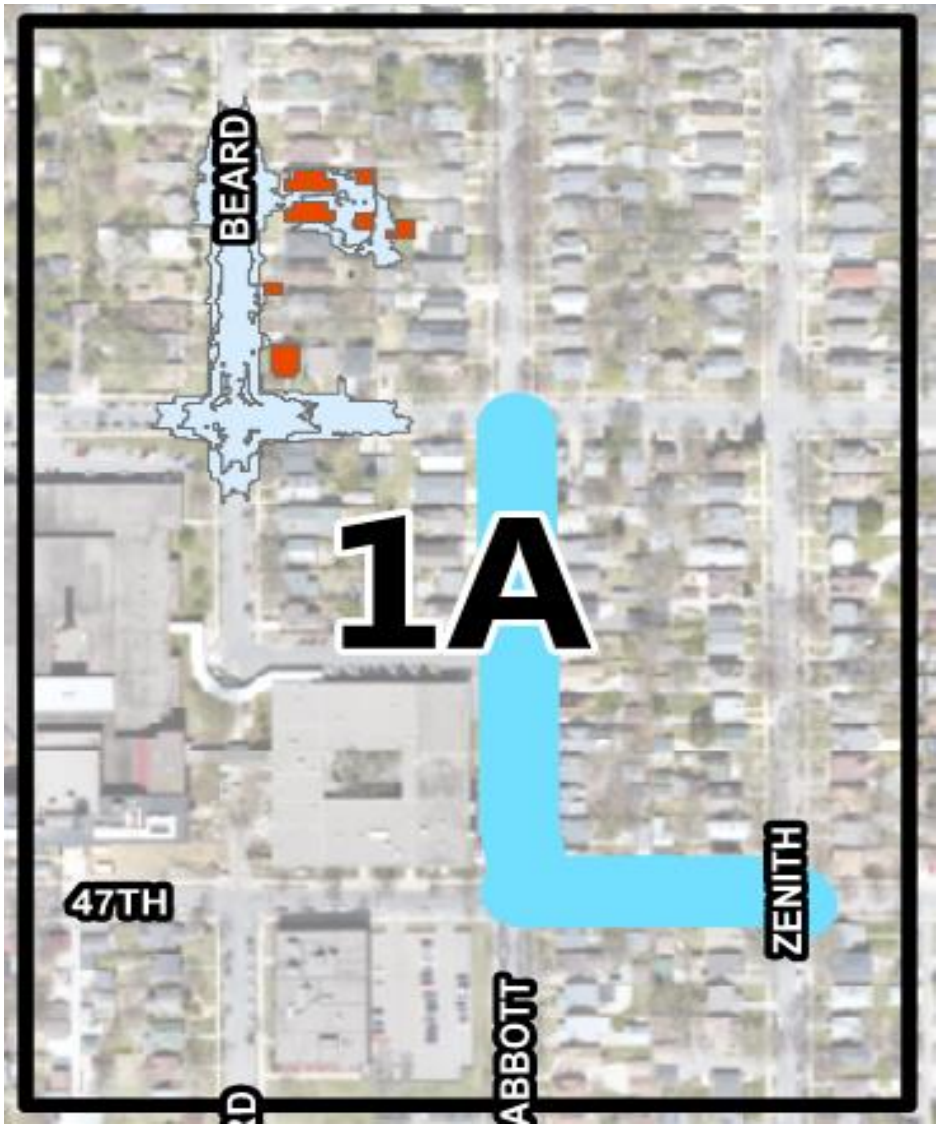
EXIS


49TH
THOMAS
DP01
QUEEN
SHERIDAN
RUSSELL
PENN
OLIVER
51ST
MORNINGSIDE
SUNNYSIDE
48TH
49 1/2
50TH
51ST
HALIFAX
GORGAS
52ND
54TH
46TH
47TH
48TH
49TH
HUMBOLDT
GIRARD
IRVING
MINNEHAHA
Minnehaha Creek
Channel
54TH

ves.

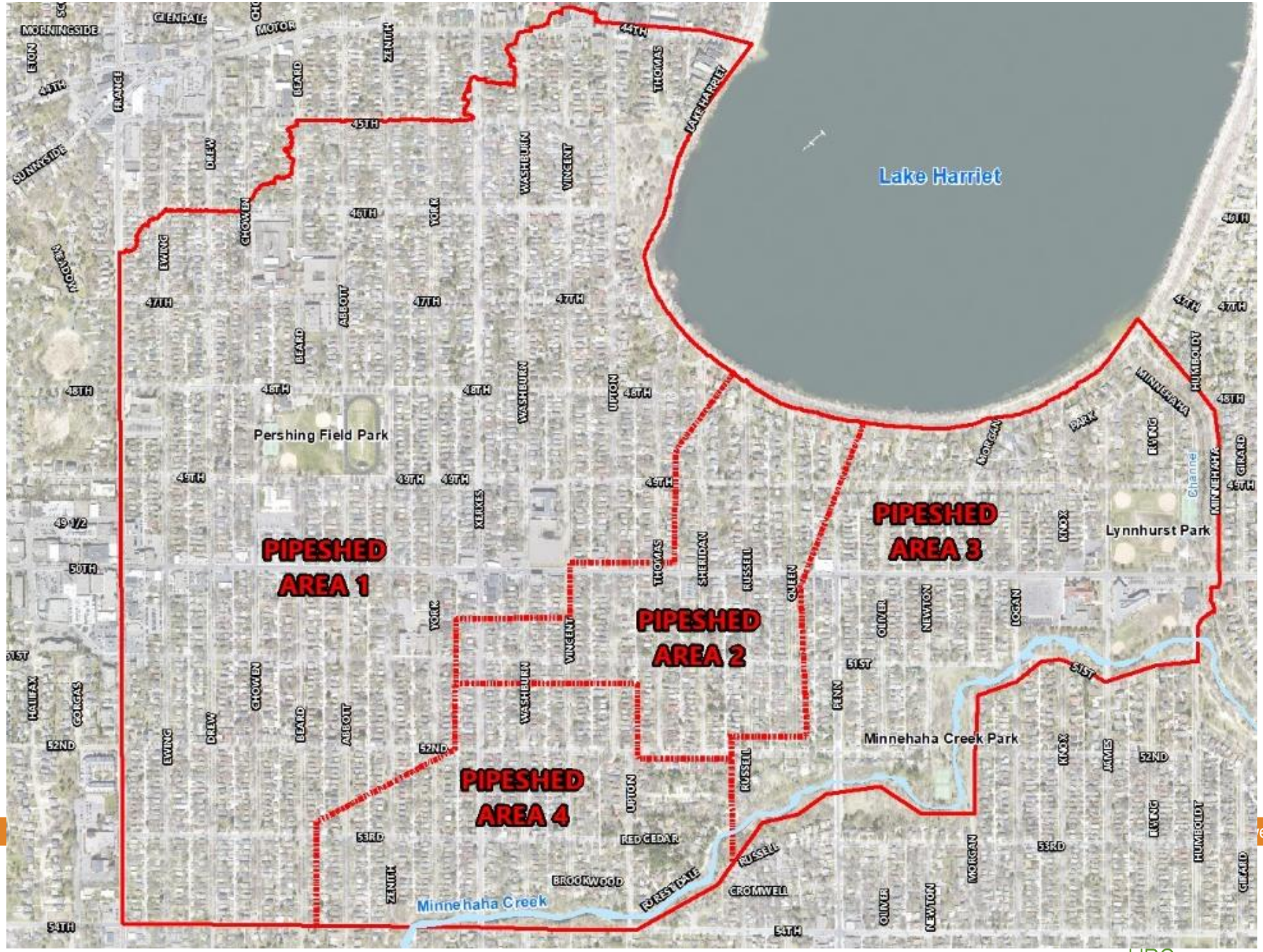
DESIGN GOALS

- Avoid home buy-outs that would reduce tax base.
- Reduce street flooding.
- Reduce property flooding.
- No change in flow rates to creek/lake/channel.



MODELING – Optimizer Pilot

A. Optimatics
   A. Optimizer
   B. Pilot Study
B. EPA SWMM Framework
   i. XP-SWMM -> EPA Conversion
   ii. Need to Validate EPA model has similar results to XP-SWMM
      i. Matching Hydrology
      ii. EPA SWMM Version
      iii. Continuity Errors

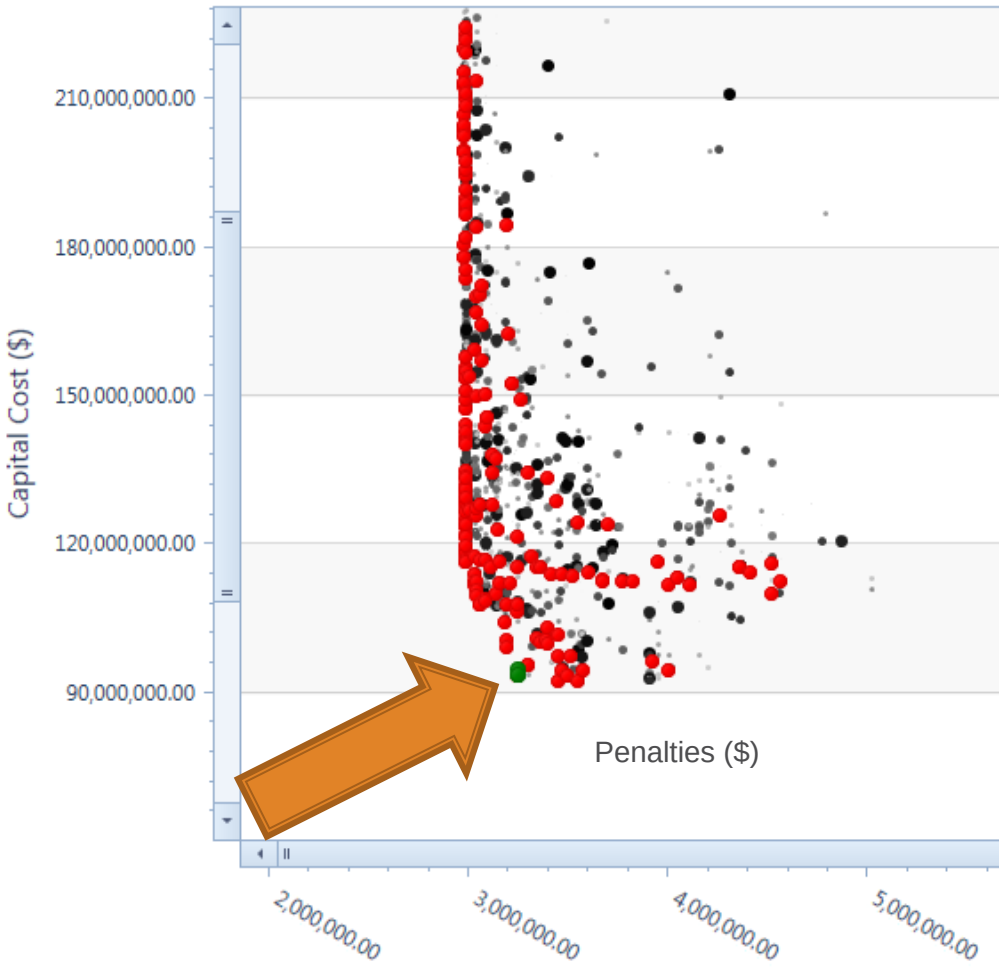

PIPESHED AREA 1
PIPESHED AREA 2
PIPESHED AREA 3
PIPESHED AREA 4
Lake Harriet
Pershing Field Park
Lynnhurst Park
Minnehaha Creek Park
Minnehaha Creek
MORNINGSIDE
GLENDALE
SUNNYSIDE
44TH
45TH
46TH
47TH
48TH
49TH
49 1/2
50TH
51ST
52ND
53RD
54TH
ZENITH
THOMAS
LAKEHARRIET
DREW
WASHBURN
VINCENT
CHOWEN
YORK
LYNG
ABBOTT
BEARD
UPTON
SHERIDAN
RUSSELL
QUEEN
KERXES
MORGAN
PARK
KNOX
OLIVER
NEWTON
LOGAN
PENN
JAMES
HUMBOLDT
GIRARD
MINNEHAHA
HALIFAX
COLFAX
RED CEDAR
BROOKWOOD
CROMWELL
FOREST DALE

OPTIMATICS MODELING

i. Entries
   - Costs
   - Penalties
   - Balancing Preferred Options

ii. Need to think about "alternatives analysis" differently

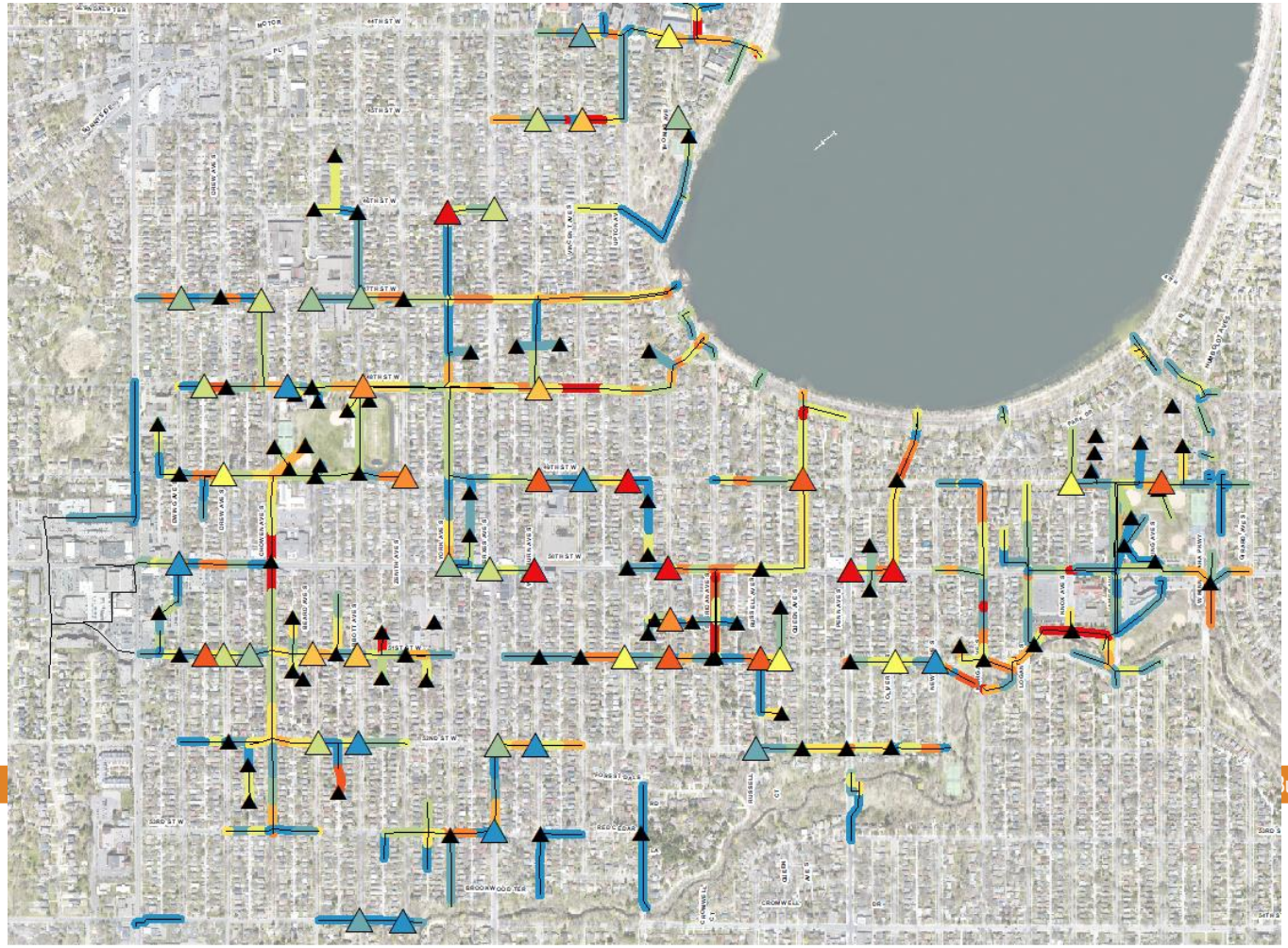
iii. Additions
   - New pipes
   - New storage locations



MODELING

iii. Outcomes

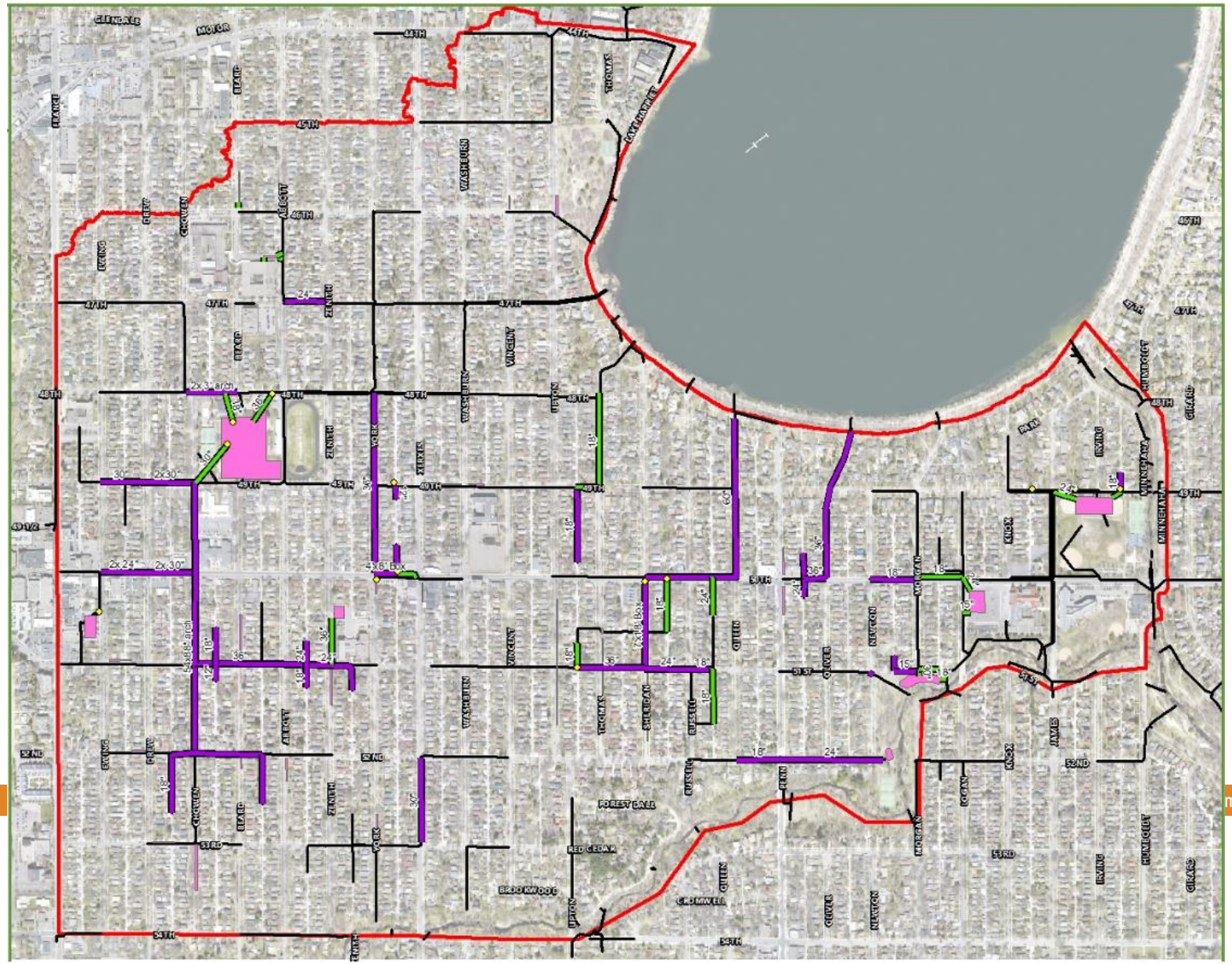
- Optimatics recommended pipe upsizing vs. storage.



VETTING OPTIONS

A. Feasibility/Constructability
B. Coordination with other City Departments and MOU Partners
C. Utility Conflicts
D. Tree Impacts

PROPOSED IMPROVEMENTS



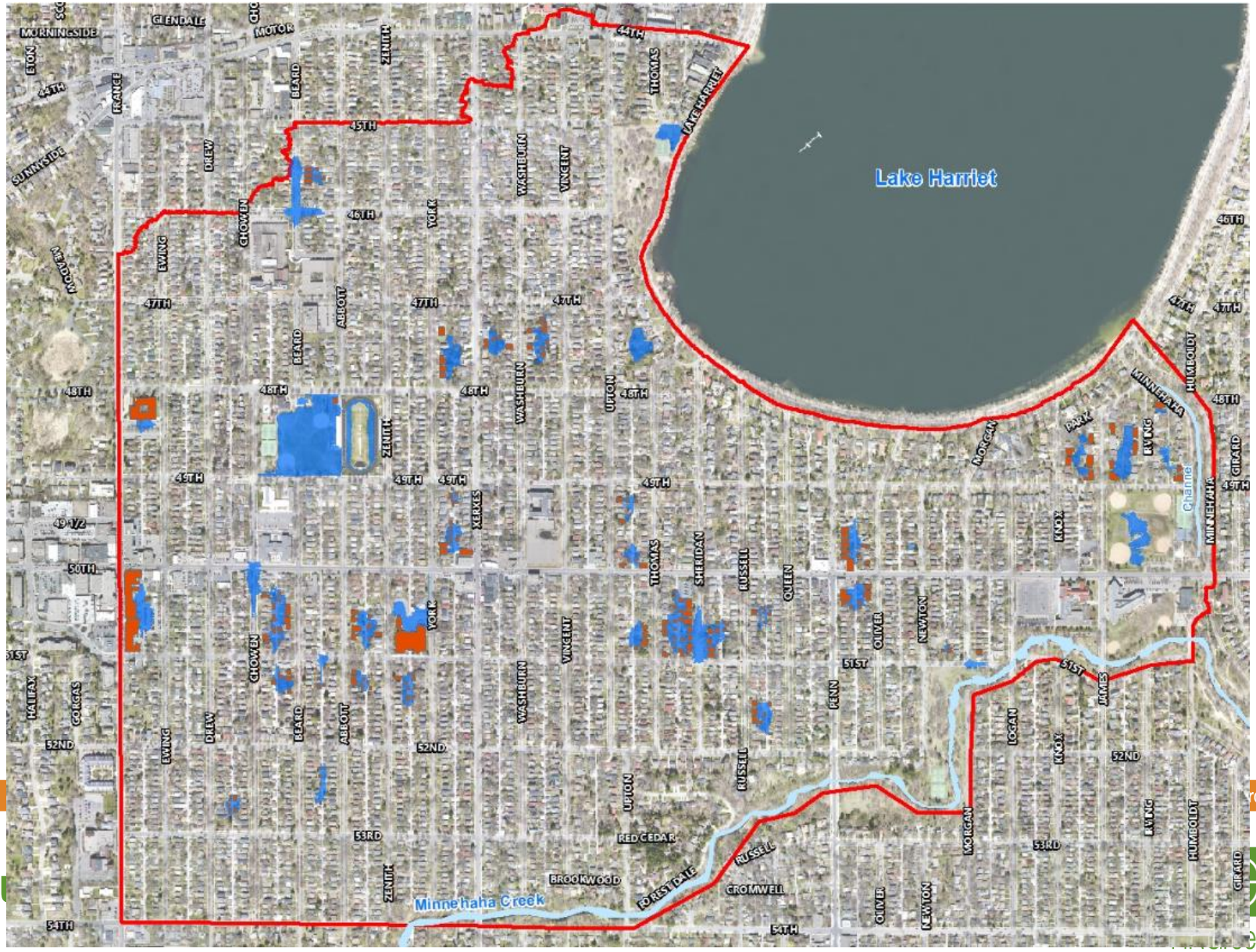

200.00 ft
1,939.85 ft
400.00 ft
1,800.00 ft
600.00 ft
1,600.00 ft
800.00 ft
1,400.00 ft
1,000.00 ft
1,200.00 ft
Chowen Ave S
Chowen Ave S
Basketball Court
W 49th St
W 49th St

ves.

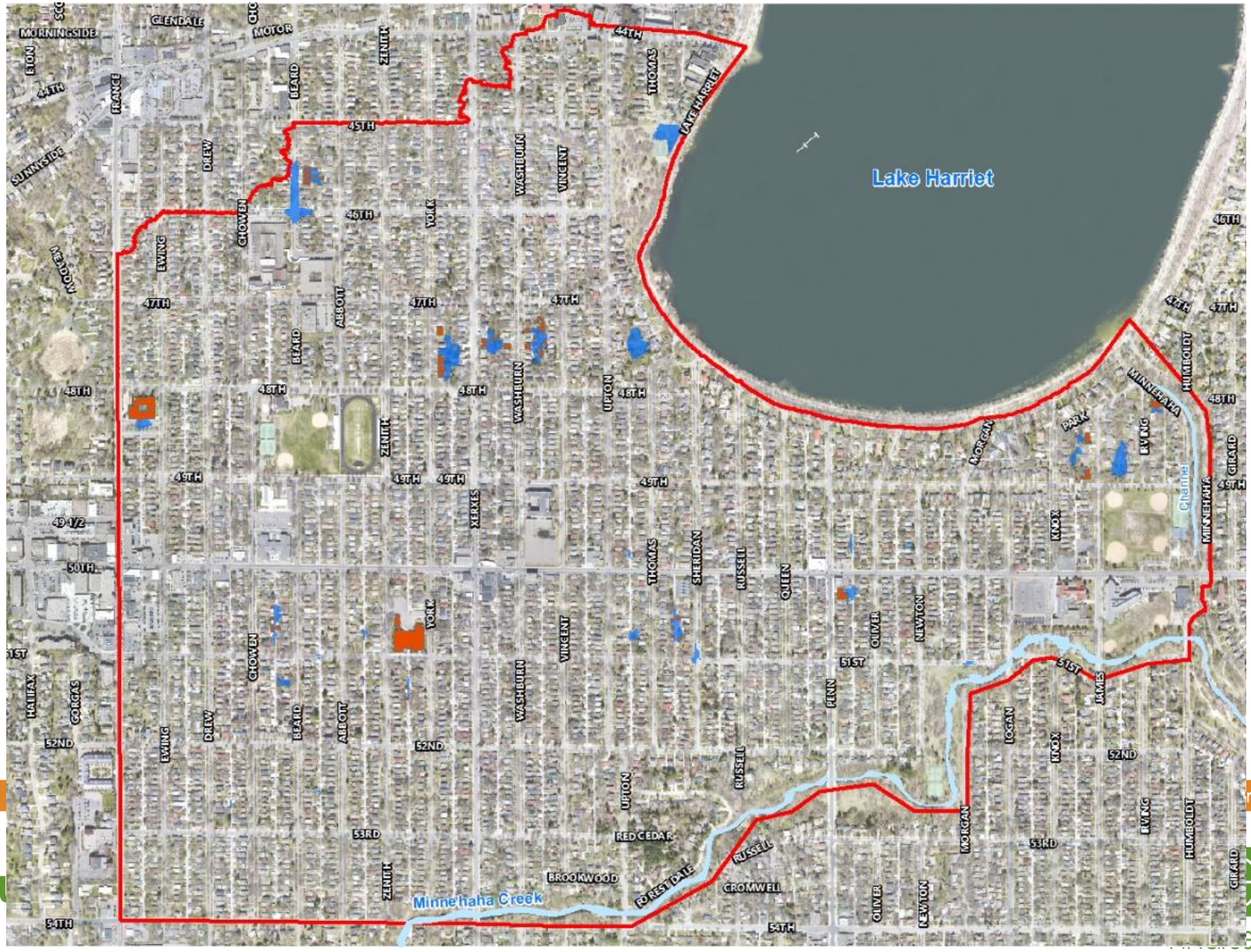
Southwest Harriet Feasibility Project | City of Minneapolis

HRGreen®

EXISTING FLOOD CONDITIONS



PROPOSED FLOOD CONDITIONS



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COST BENEFITS

Projects	EOPC	# of Primary Structures Removed (100-yr)	$/Primary Structure Removed	Inundated Area Removed (ac) (10-yr)	Flooded Streets Removed (LF) (10-yr)
Pipeshed 1					
All Proposed Projects	$ 36,844,000	35	$ 1,052,686	13.5	14919
Pipeshed 2					
All Proposed Projects	$ 18,088,000	11	$ 1,644,364	3.1	434
Pipeshed 3					
All Proposed Projects	$ 11,664,000	14	$ 833,143	2.6	2833
Pipeshed 4					
All Proposed Projects	$ 1,716,000	-	-	-	1145

NEXT STEPS

- Completion of detailed XP-SWMM modeling city-wide to understand full scope of problem areas
- Determination of next areas for feasibility studies
- City-wide prioritization and planning
  - Equity and risk driven vs. complaint driven
- Implementation
  - Time line TBD

Q&A

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