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

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PROJECT LOCATION
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?
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:

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

2012
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
“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.”
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
Tips for Next Time

▪ No Multi-Links: 2 Separate Conduits
▪ Break-up Larger Models per Outfall/Smaller Networks

MODELING
OPTIMATICS MODELING

i. Entries
   - Costs
   - Penalties
   - Balancing Preferred Options

ii. Need to think about “alternatives analysis” differently

iii. Additions
   - New pipes
   - New storage locations
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
EXISTING FLOOD CONDITIONS
PROPOSED FLOOD CONDITIONS
## COST BENEFITS

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<th>EOPC</th>
<th># of Primary Structures Removed (100-yr)</th>
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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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