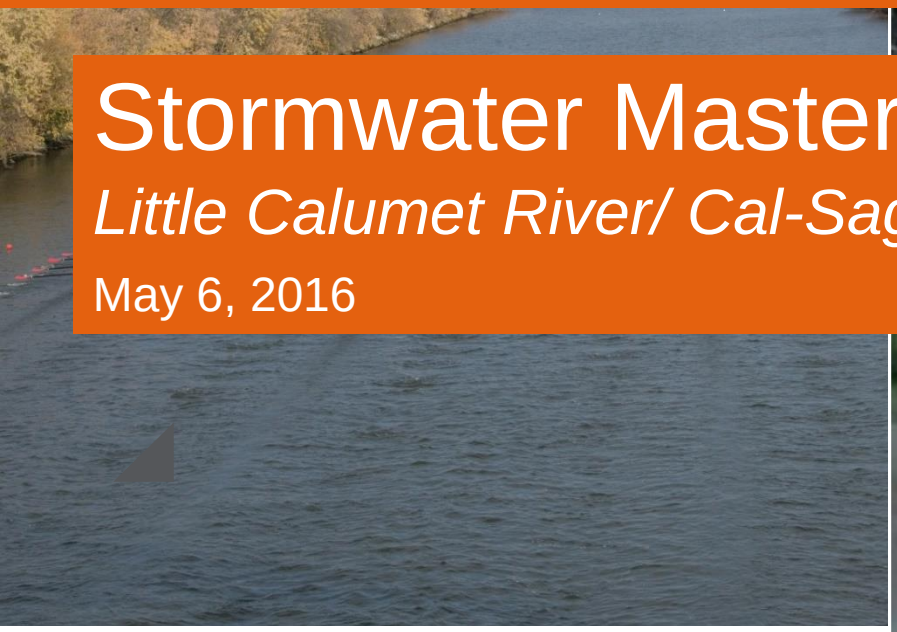
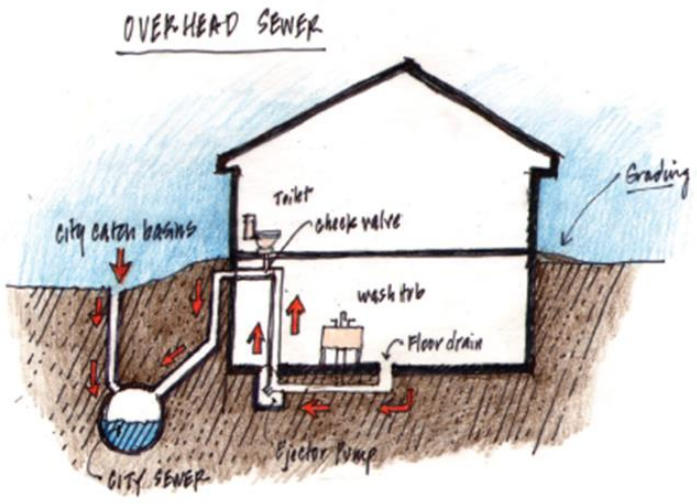
Stormwater Master Plan Update

Little Calumet River/ Cal-Sag Channel Drainage Area

May 6, 2016





Protecting Our Water Environment

Metropolitan Water Reclamation District of Greater Chicago

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Agenda

1. Project Introduction
2. Alternatives Analysis
3. Findings
4. Lessons Learned

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PROJECT INTRODUCTION

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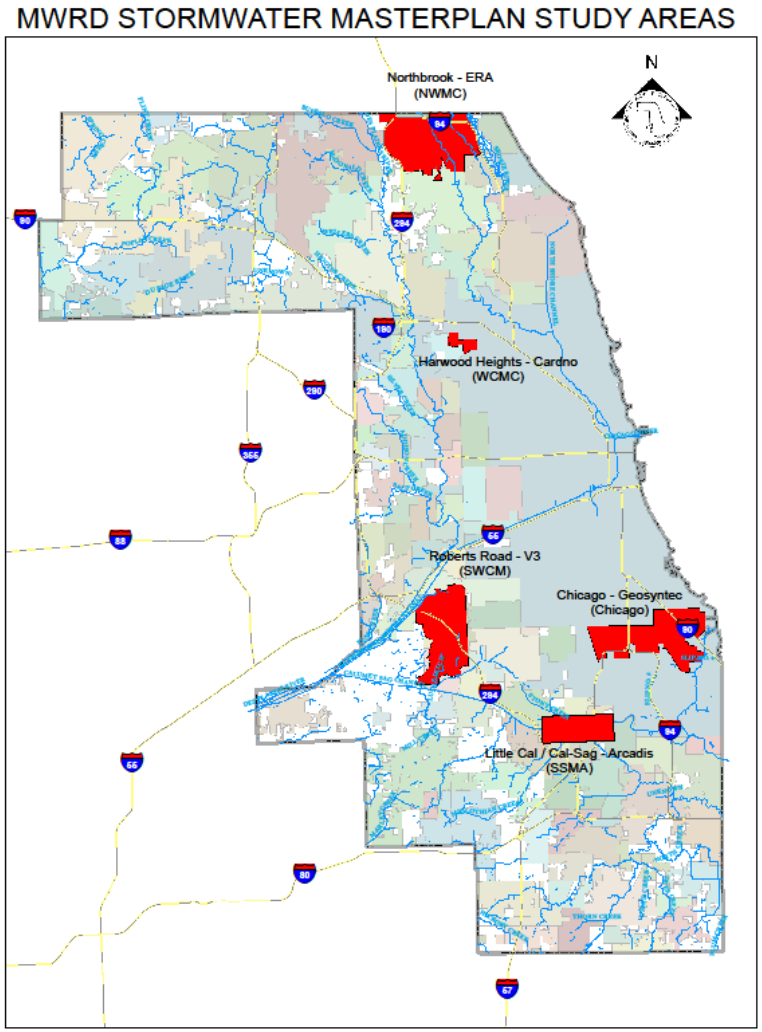
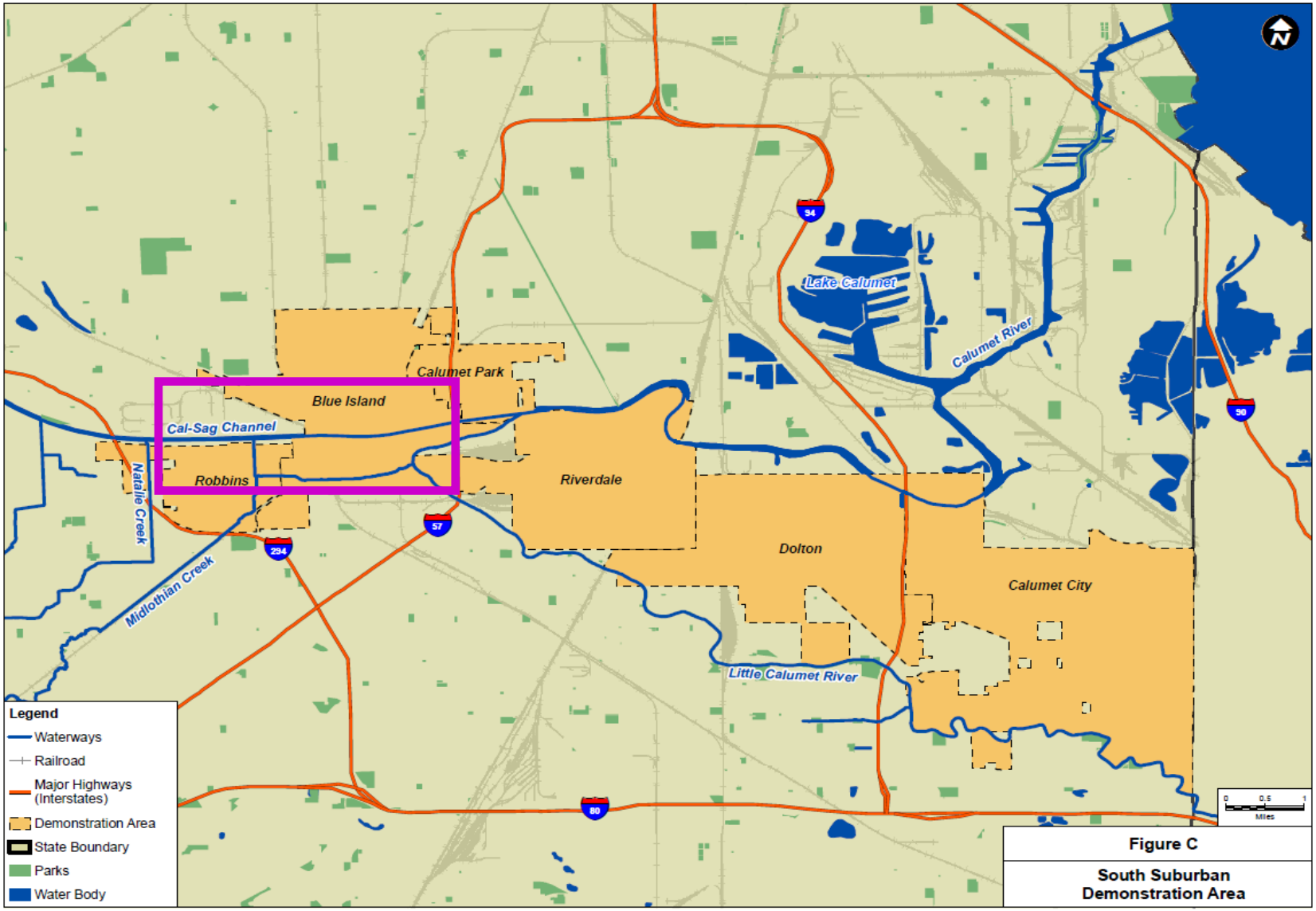
Five Stormwater Master Plans

1. Study Areas
   - One per Council of Government
   - One in City of Chicago
2. Purpose
   - Investigate urban flooding issues
   - Evaluate conceptual solutions, especially green-gray infrastructure
   - Develop community-based and supported plans to address local flooding



Little Calumet River/ Cal-Sag Channel Pilot Area



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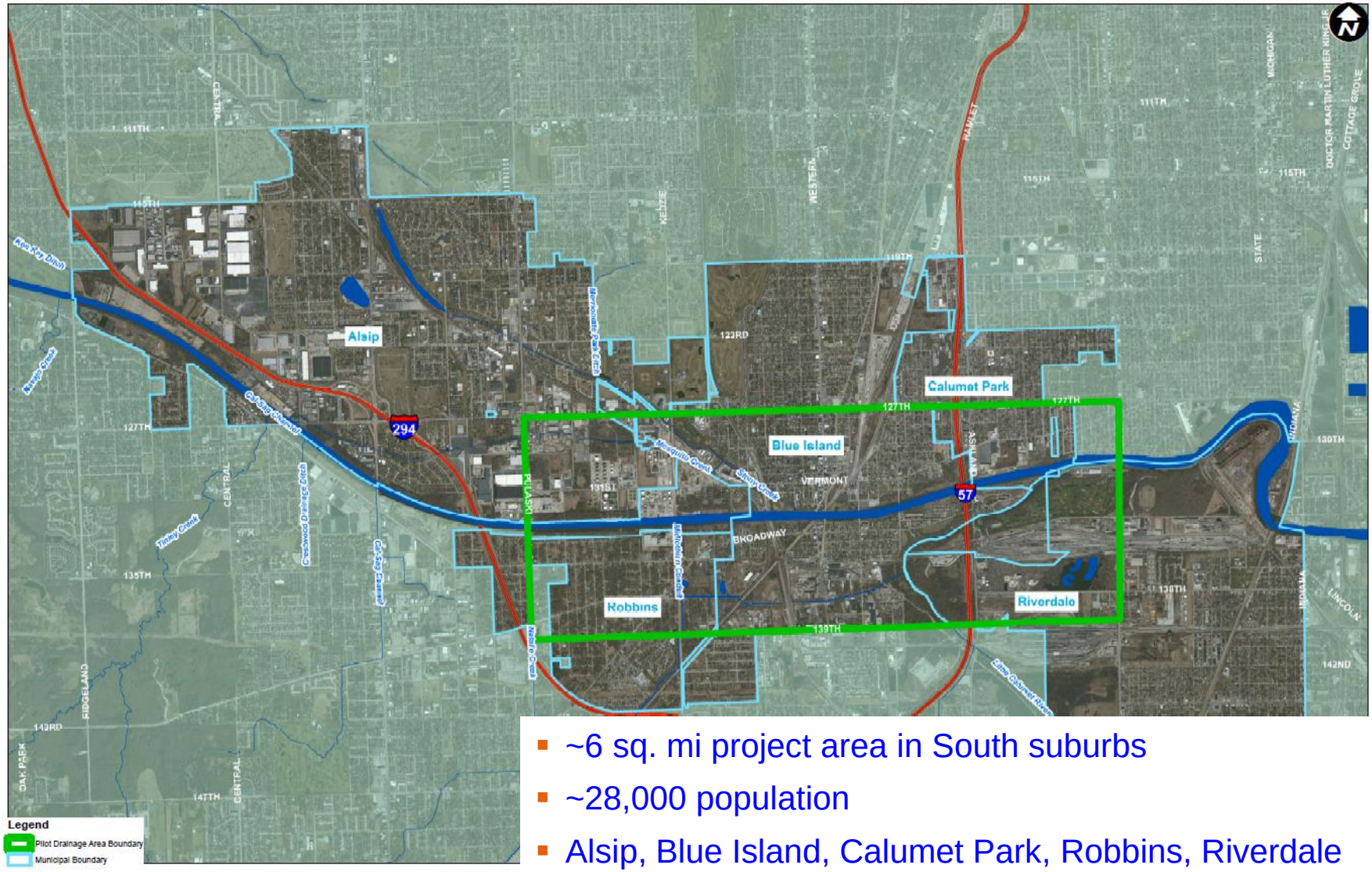
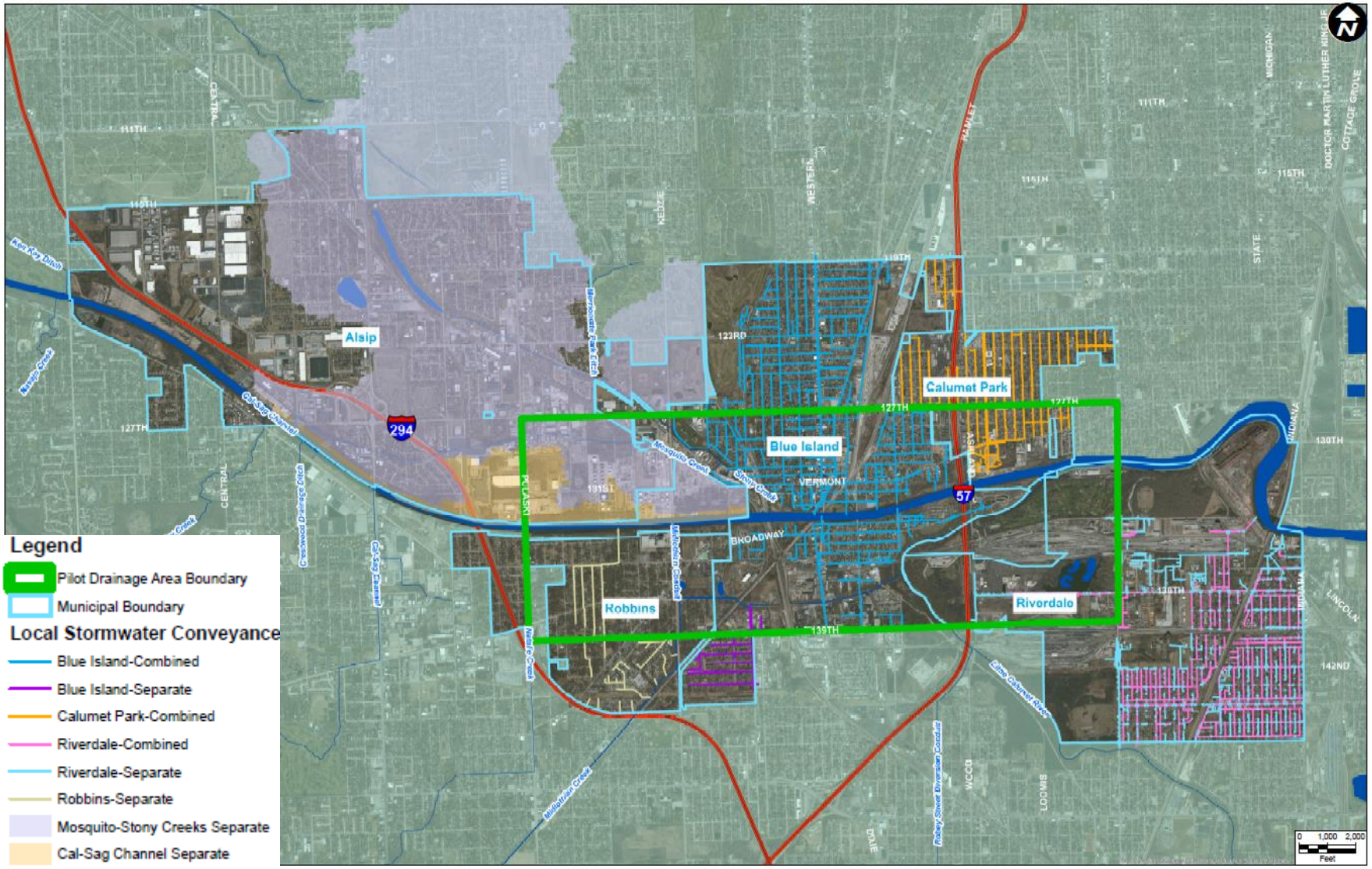
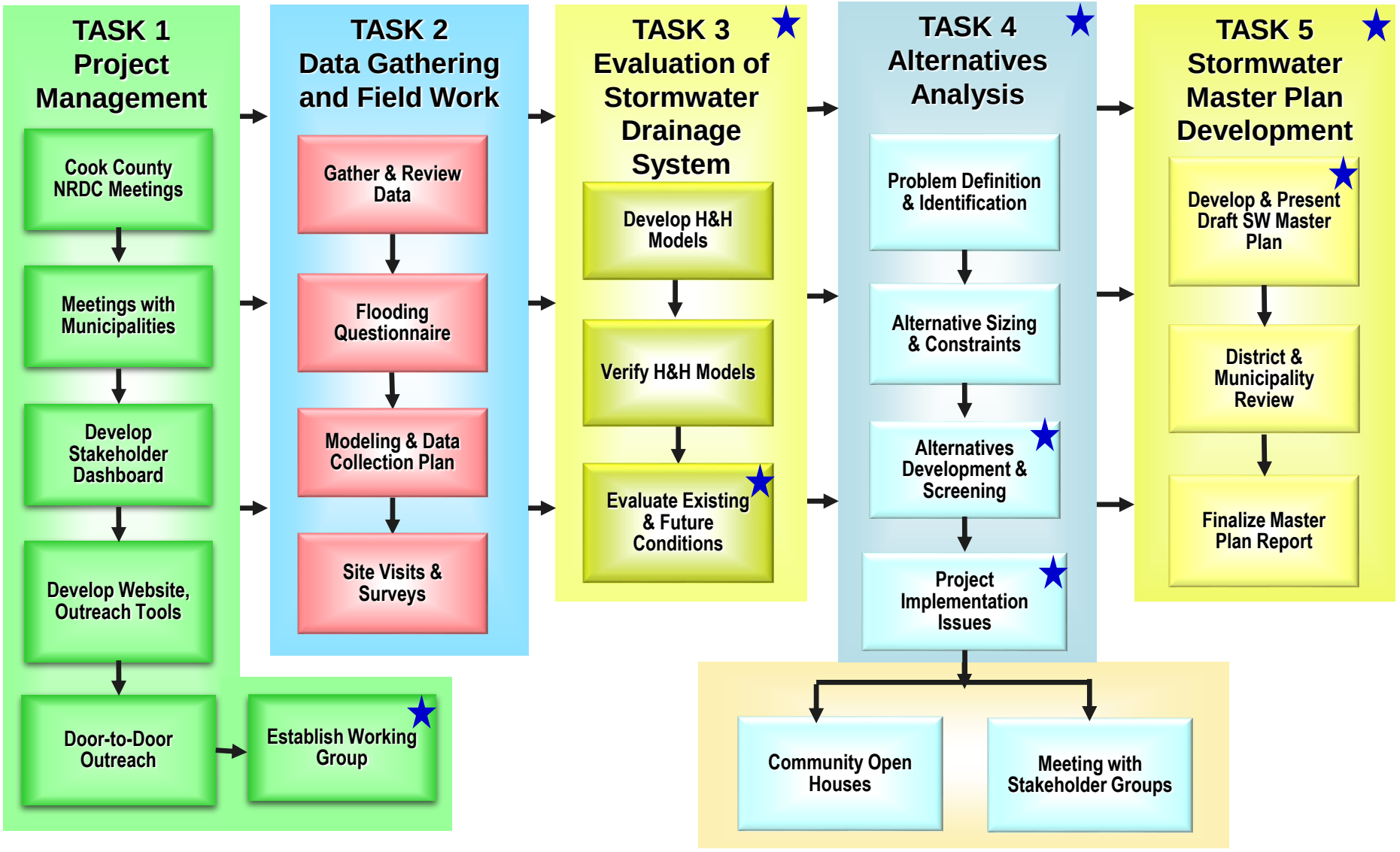


- ~6 sq. mi project area in South suburbs
- ~28,000 population
- Alsip, Blue Island, Calumet Park, Robbins, Riverdale

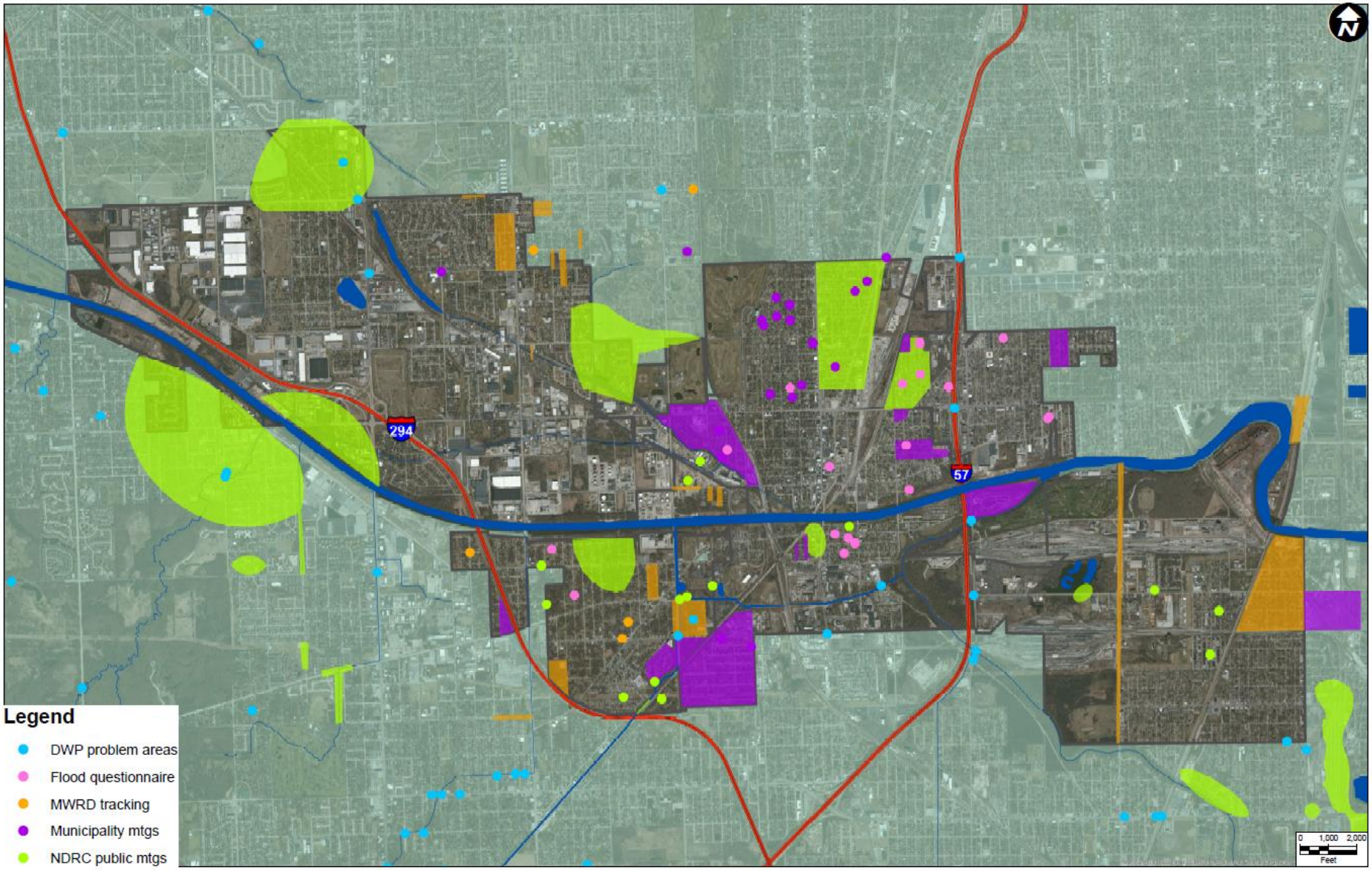
Little Calumet River/ Cal-Sag Channel Local Stormwater Conveyance



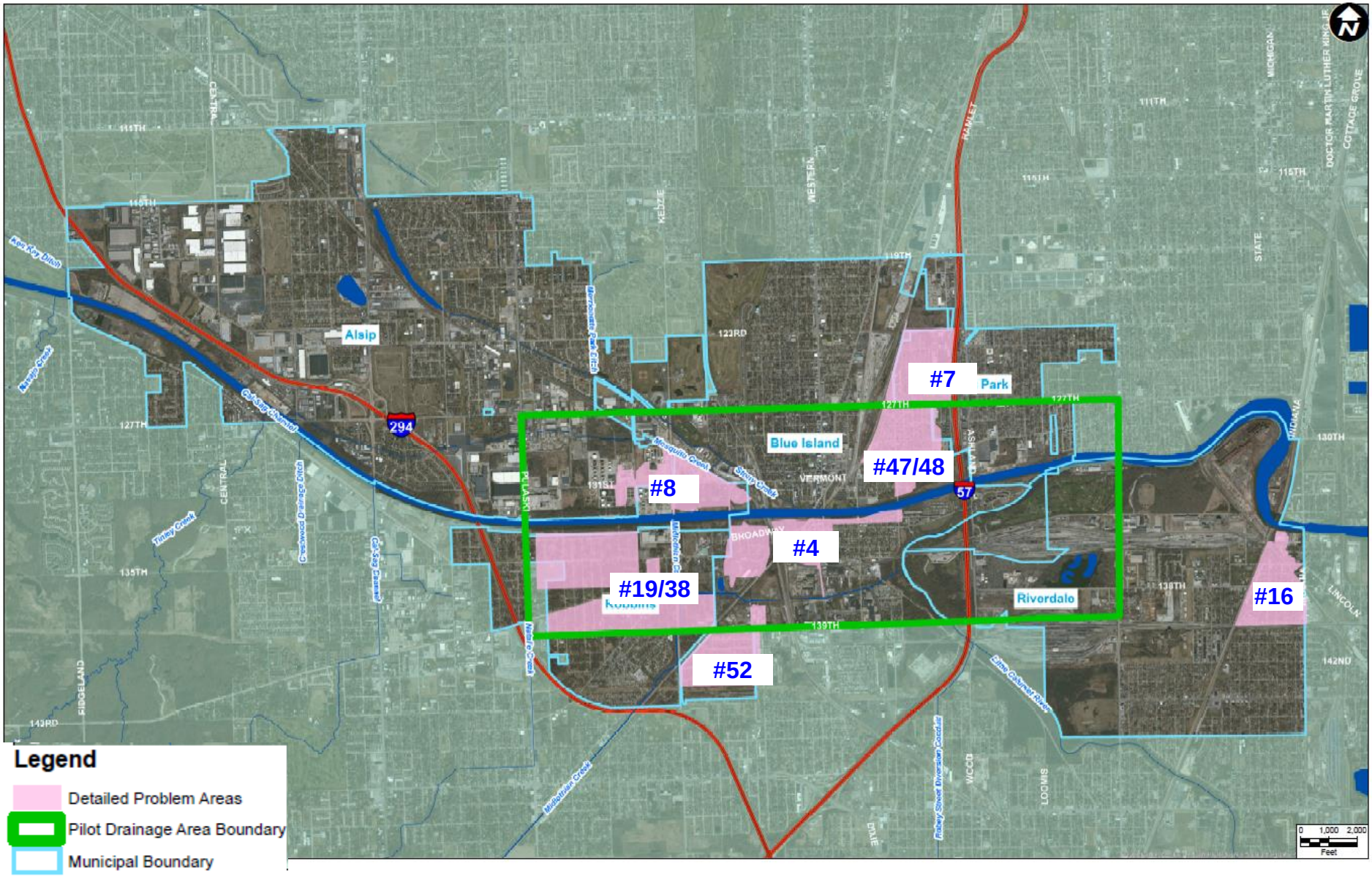
Project Approach



Initial Problem Areas within Pilot Area



Selected Problem Areas



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ALTERNATIVES ANALYSIS

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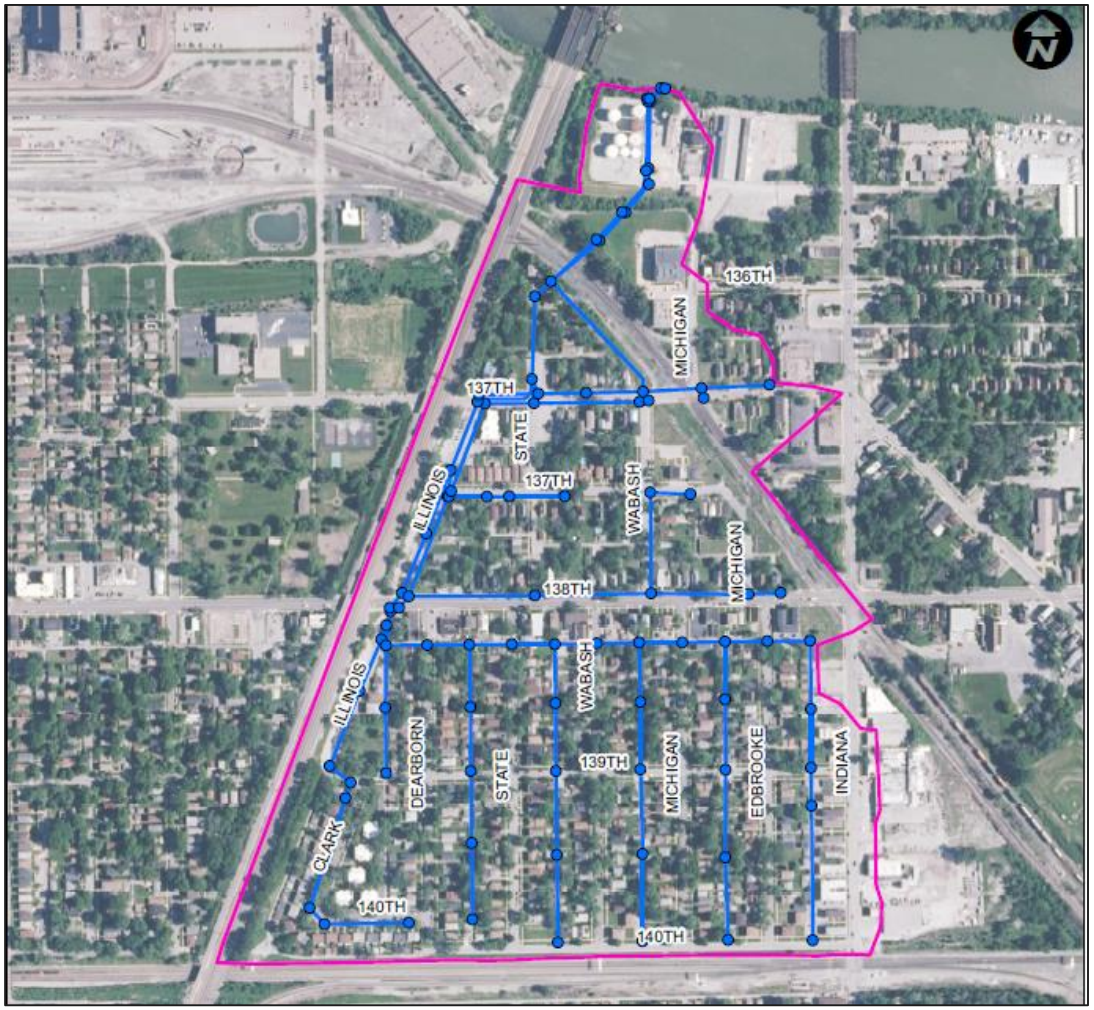
Residential Area Example – Riverdale Area #16

- Highest priority flooding area for Village
- Basement backups and surface flooding occurring several times per year recently
- 123-acre drainage area
- 447 mostly residential properties



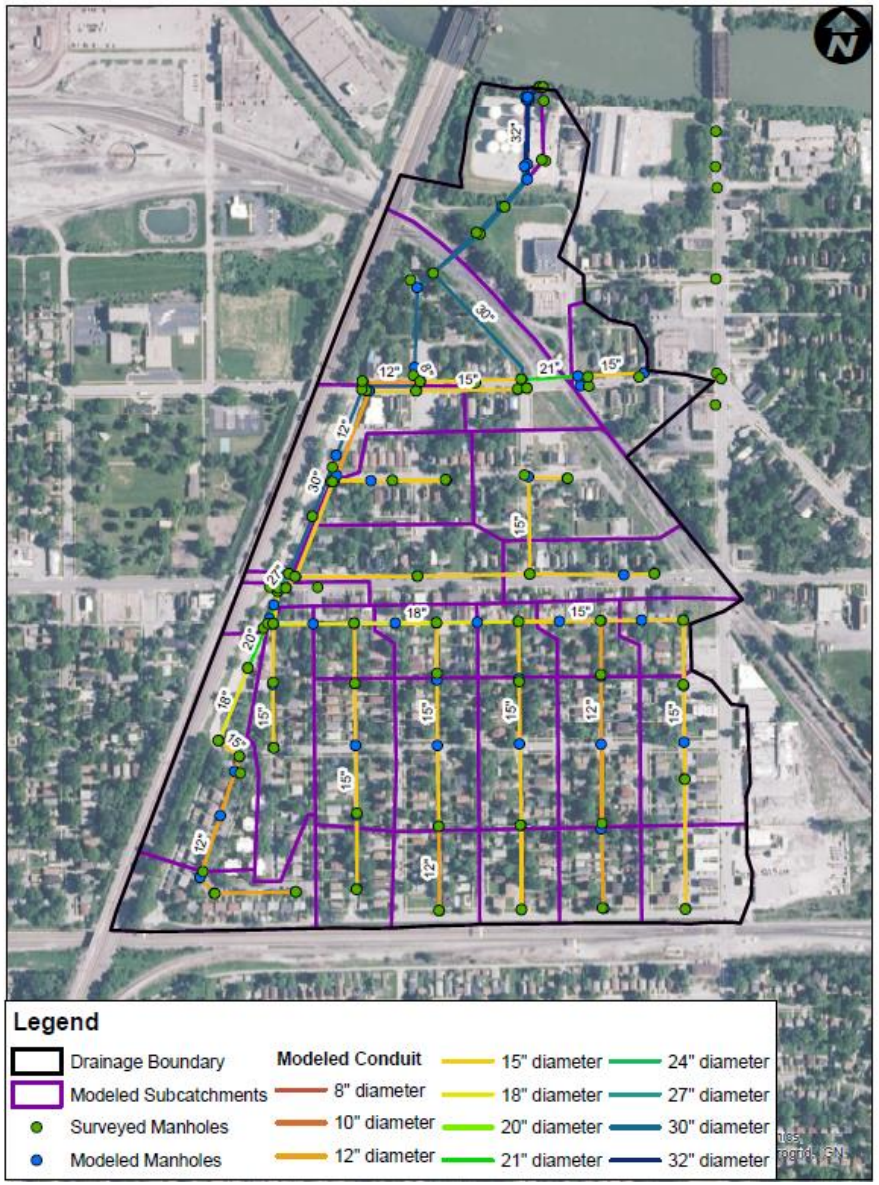
Problem Area Evaluation Criteria

1. Rainfall Data

- Rainfall depths from *Bulletin 71*
- SCS Type 2 distribution

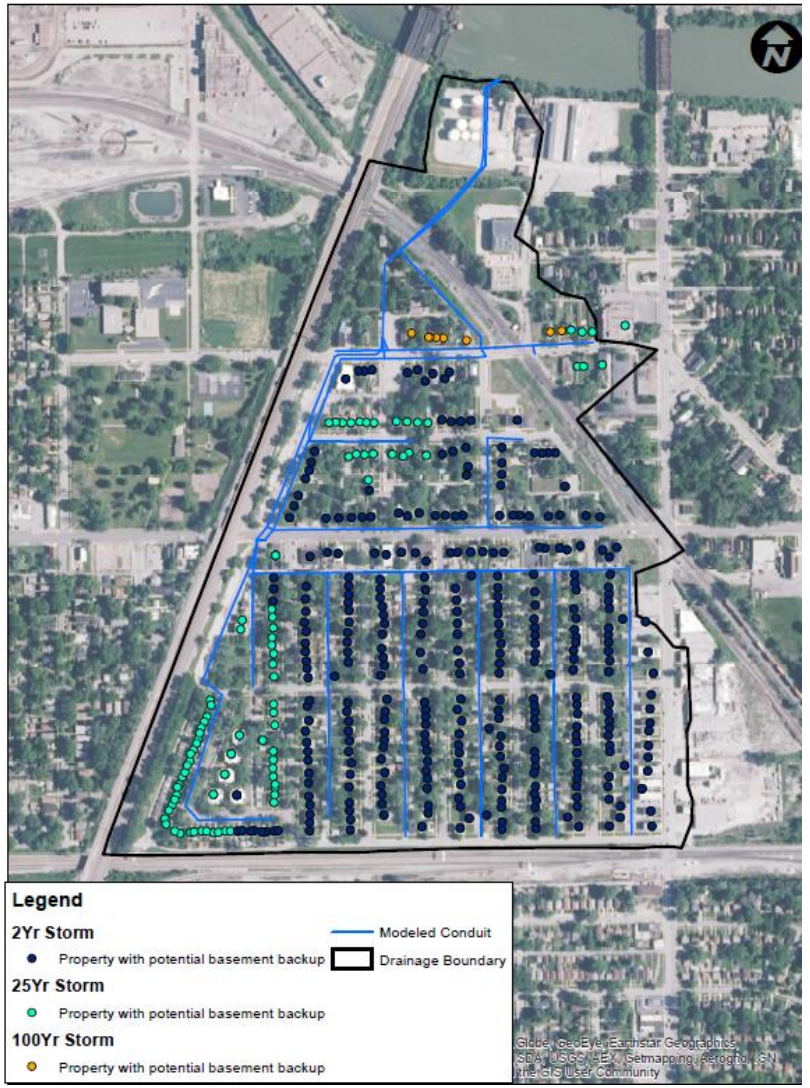
2. Drainage Analysis

- Coarse alternatives evaluation
- H&H modeling of existing conditions and recommended alternative for structure counts



Riverdale (Area #16) – Urban Flooding Issues

1. Basement backups have significant impacts
   - 73% of structures affected by 2-yr 24-hr storm
   - 96% by the 100-yr/24-hr storm
2. Overland flooding effects are less
   - 12% of structures affected by 2-yr 24-hr storm
   - 45% by the 100-yr 24-hr storm



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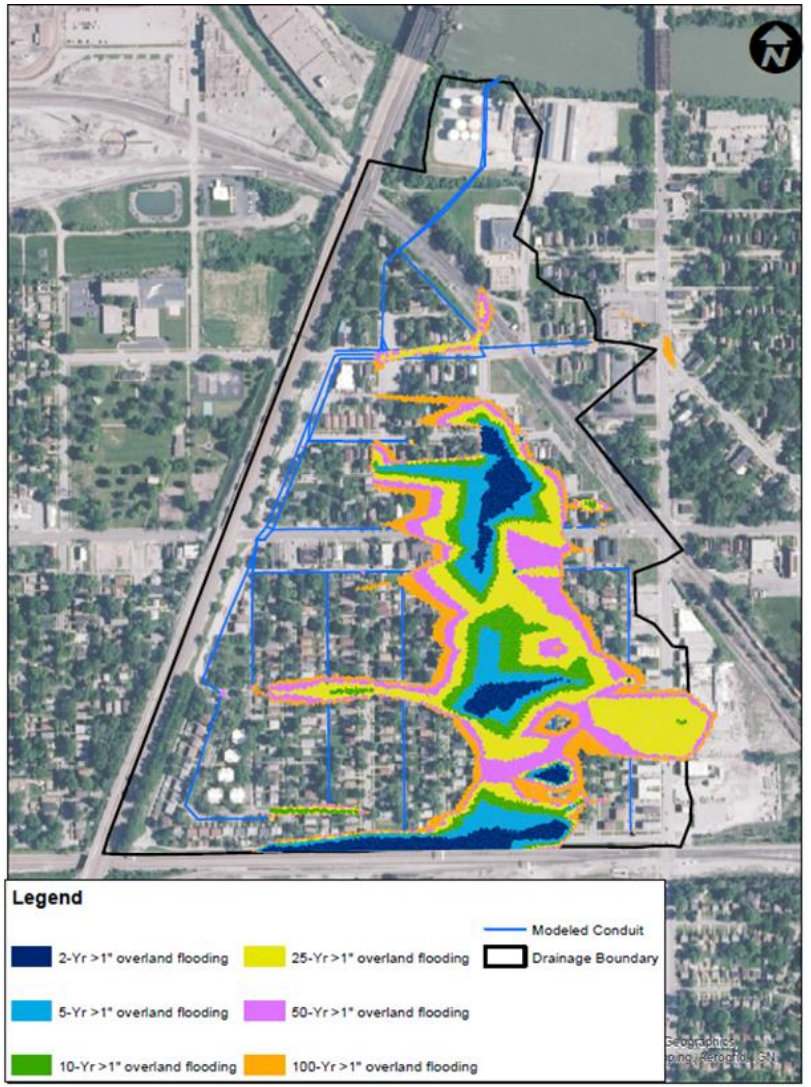

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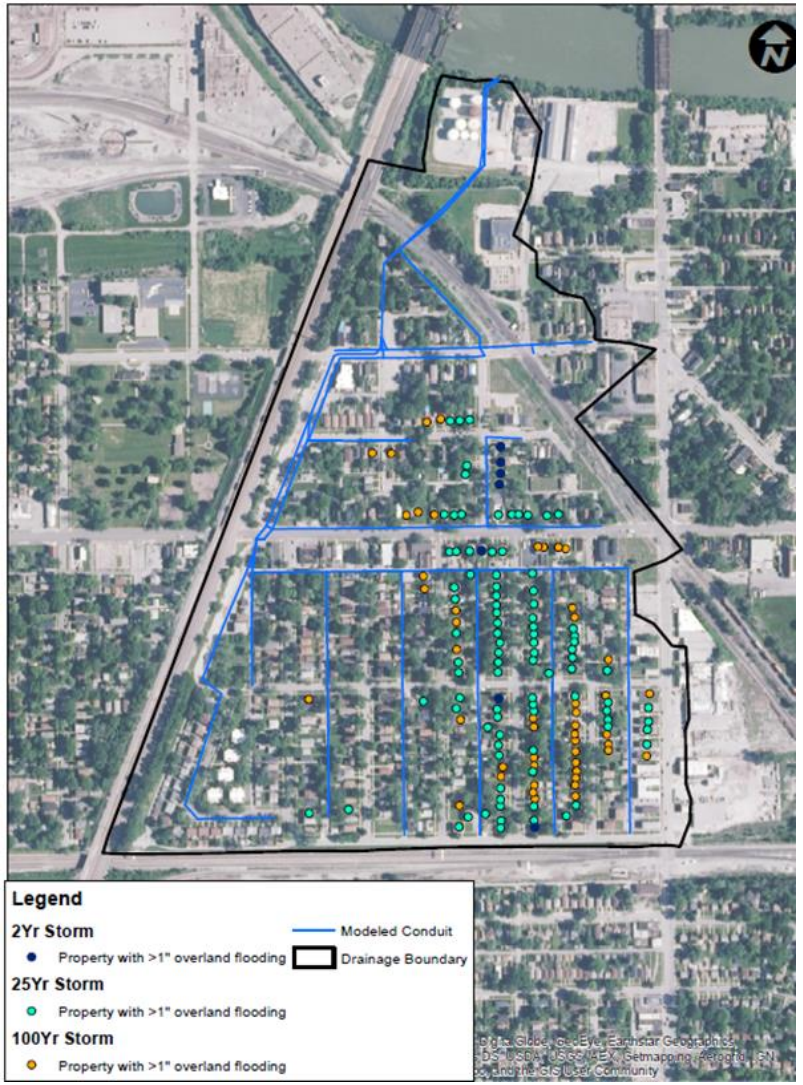
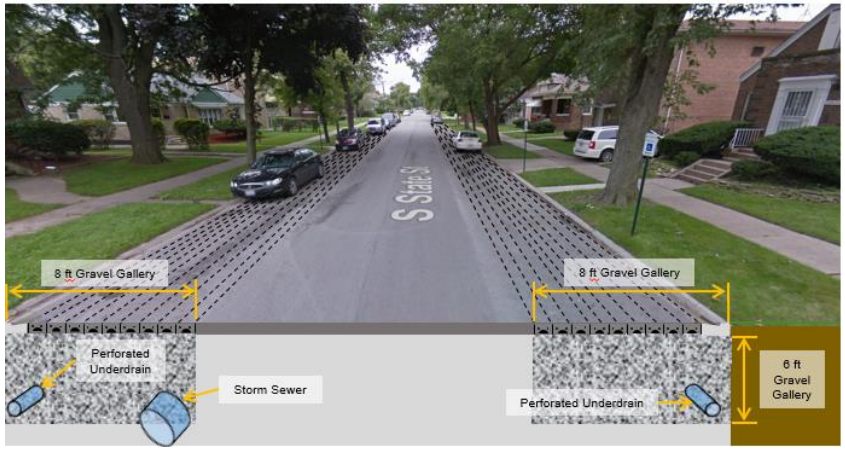


Alternative Technologies Evaluated

1. Gray infrastructure
2. Green infrastructure
3. Green/gray infrastructure
4. All storage
5. Green infrastructure on private property
6. Green/gray infrastructure on private property
7. Purchase of flood-prone properties



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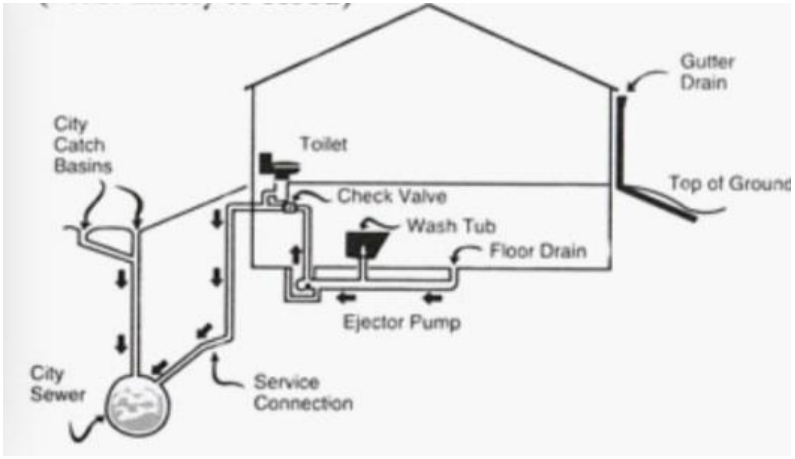


Gray Infrastructure: Advantages and Disadvantages

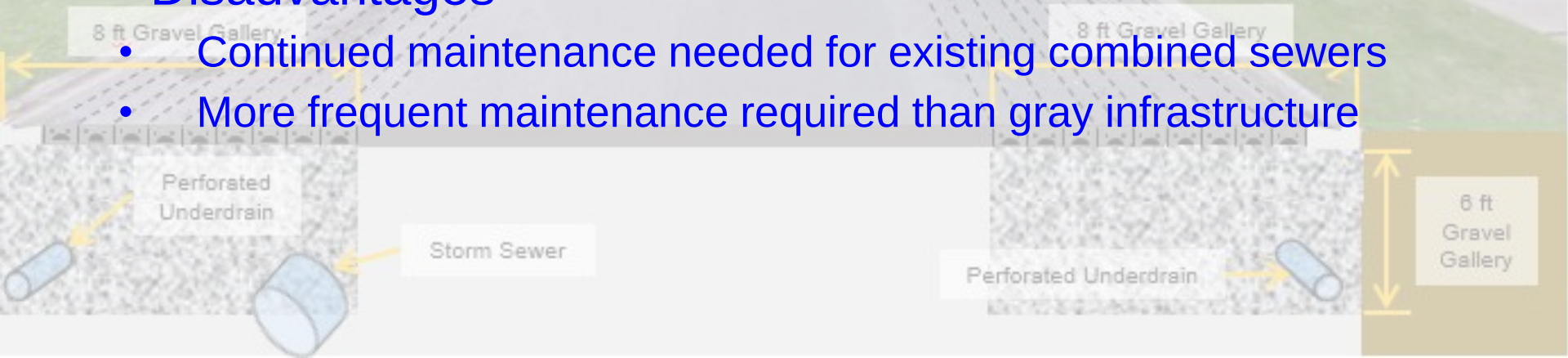
- Advantages
  - Reduces flooding, when sized for smaller design storms
  - Eliminates flooding when sized for the 100-year storm
  - Less frequent maintenance than green infrastructure
- Disadvantages
  - Does not eliminate flooding unless sized for 100-year storm
  - Does not provide GI co-benefits

Green Infrastructure: Advantages and Disadvantages

- Advantages
  - Medium cost alternative
  - Provides neighborhood with new streets
  - Reduces flooding when sized for smaller design storms
  - Eliminates flooding when sized for the 100-year storm
  - Runoff volume decrease with each incremental increase in green streets extents
- Disadvantages
  - Green streets storage still discharges to combined sewers
  - Does not eliminate flooding unless sized for 100-year storm
  - More frequent maintenance required than gray infrastructure

Green/Gray Infrastructure: Advantages and Disadvantages

- Advantages
  - Medium cost alternative for smaller design storms
  - Provides neighborhood with new streets
  - Reduces flooding when sized for smaller design storms
  - Runoff volume decreases with each incremental increase in green streets extents
- Disadvantages
  - Continued maintenance needed for existing combined sewers
  - More frequent maintenance required than gray infrastructure



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FINDINGS

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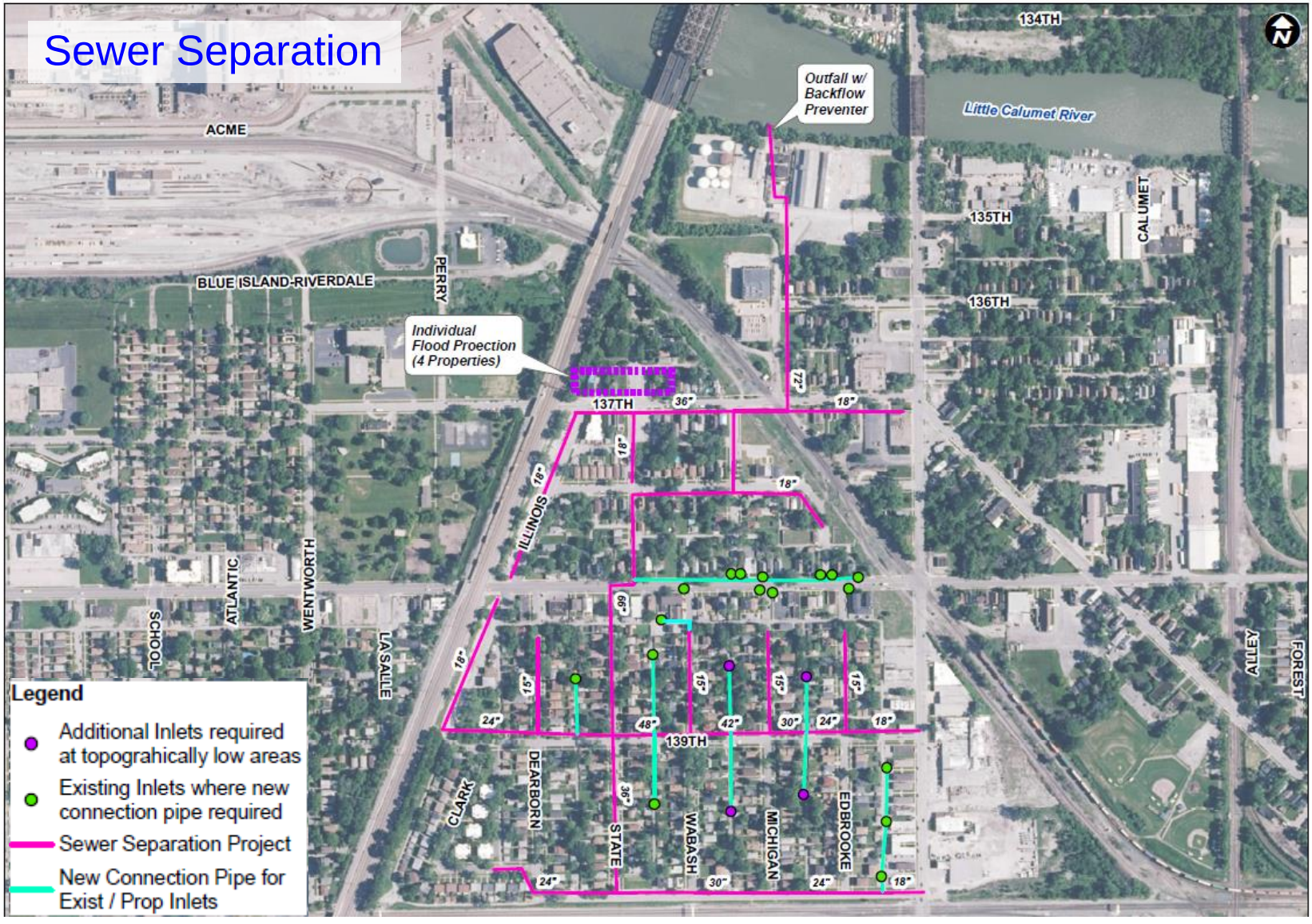
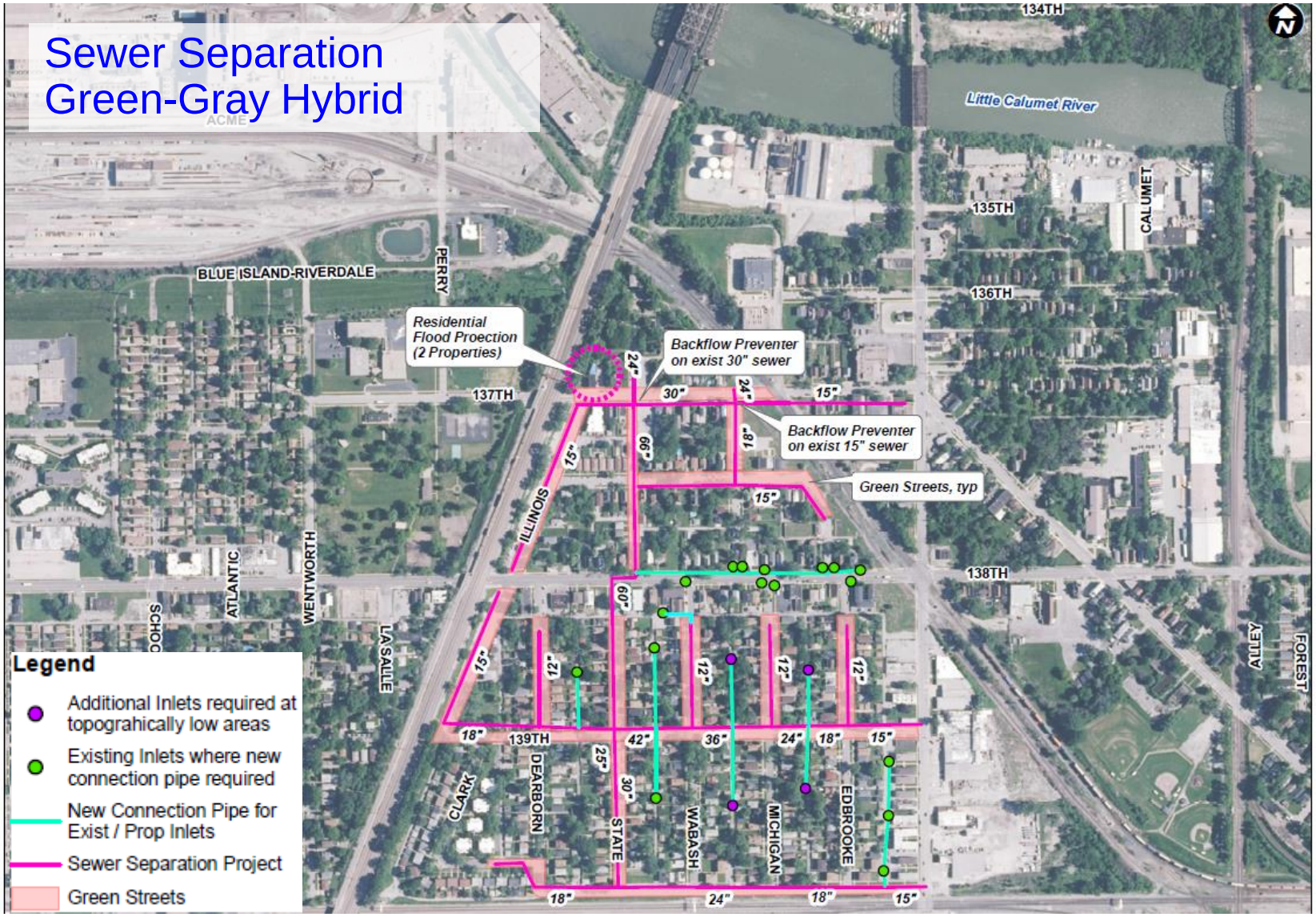
Riverdale (Area #16) – Recommended Alternative

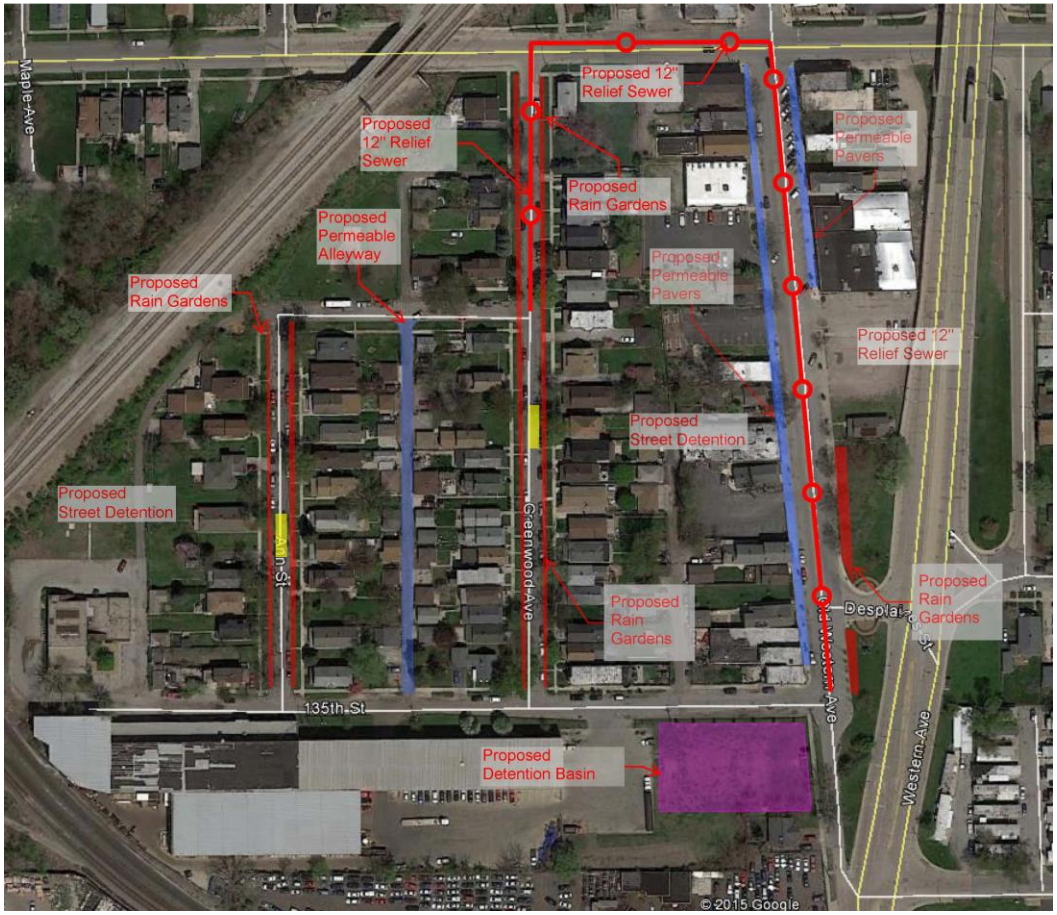


Riverdale (Area #16) – Recommended Alternative



Blue Island (Area #4) – Recommended Alternative

- Mixed use example
- Incorporates City's desire for green infrastructure
- Looks at public and private flood mitigation opportunities
- Ties recommended alternatives to planned capital improvements



Alsip (Area #8) – Recommended Alternative

- Industrial area example
- Addresses localized flooding at downstream end of the village
- Provides low cost solution
- Looks at potential use of GI as part of redevelopment opportunities

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LESSONS LEARNED

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Replicability

1. Solutions on Public Property

- Small existing collection system capacity in older areas (< 1-yr design storm) strongly affects cost effectiveness and alternatives selection
  - Existing conveyance system needs significant upgrades for any flooding relief, so gray only is much more attractive.
  - Costs for 100-year storm improvements increase much less over the 10 and 25-year costs
- Implementation of a regular maintenance program may limit the amount of infrastructure improvements needed

2. Solutions on Private Property

- Overhead sewers economically eliminate basement backups but don't address surface flooding
- Rain barrels, rain gardens, etc. help to minimize sewer peak flows and provide protection for small rain events
- Use of private property GI has minimal impact on large storm events, unless residents are willing to use large portions of property for SW controls

Implementation Considerations

1. Opportunities for Collaboration
   - Partnering Situations
   - Funding
2. Actions Needed for Implementation
   - Standards and Ordinance Review/Update
   - Infrastructure Maintenance
   - Plan of Action/Project Design

Lessons Learned: Public Feedback

- Take Proposed Solutions to the Public to Get Feedback and Gain Buy-in
- Provide Education on Stormwater Management (Green vs Gray, Public vs Private, etc.)
- Consider Demographics/ Community Budget when Selecting Alternatives

Questions?

1. Master Plan
   - http://calsagstormwaterplan.org
2. Contact information
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     (312) 751-5479
     FisherR@mwrd.org
   - Gunilla Goulding, Arcadis
     (847) 805-1046
     Gunilla.goulding@arcadis-us.com