Metropolitan Water Reclamation District of Greater Chicago

WELCOME

TO THE DECEMBER EDITION

OF THE 2018

M&R SEMINAR SERIES

BEFORE WE BEGIN

- SAFETY PRECAUTIONS
  - PLEASE FOLLOW EXIT SIGNS IN CASE OF EMERGENCY
  - AUTOMATED EXTERNAL DEFIBRILLATOR (AED) LOCATED OUTSIDE
- PLEASE SILENCE CELL PHONES OR SMART PHONES
- A QUESTION AND ANSWER SESSION WILL FOLLOW PRESENTATION
- PLEASE FILL OUT THE EVALUATION FORM
- SEMINAR SLIDES WILL BE POSTED ON THE MWRD WEBSITE (www. MWRD.org: Home Page ⇒ Reports ⇒ M&R Data and Reports ⇒ M&R Seminar Series ⇒ 2018 Seminar Series)
- VIDEO STREAM OF THE PRESENTATION WILL BE AVAILABLE ON MWRD WEBSITE (www.MWRD.org: Home Page ⇒ MWRDGC RSS Feeds)

Joseph R. Kratzer, P.E., CFM

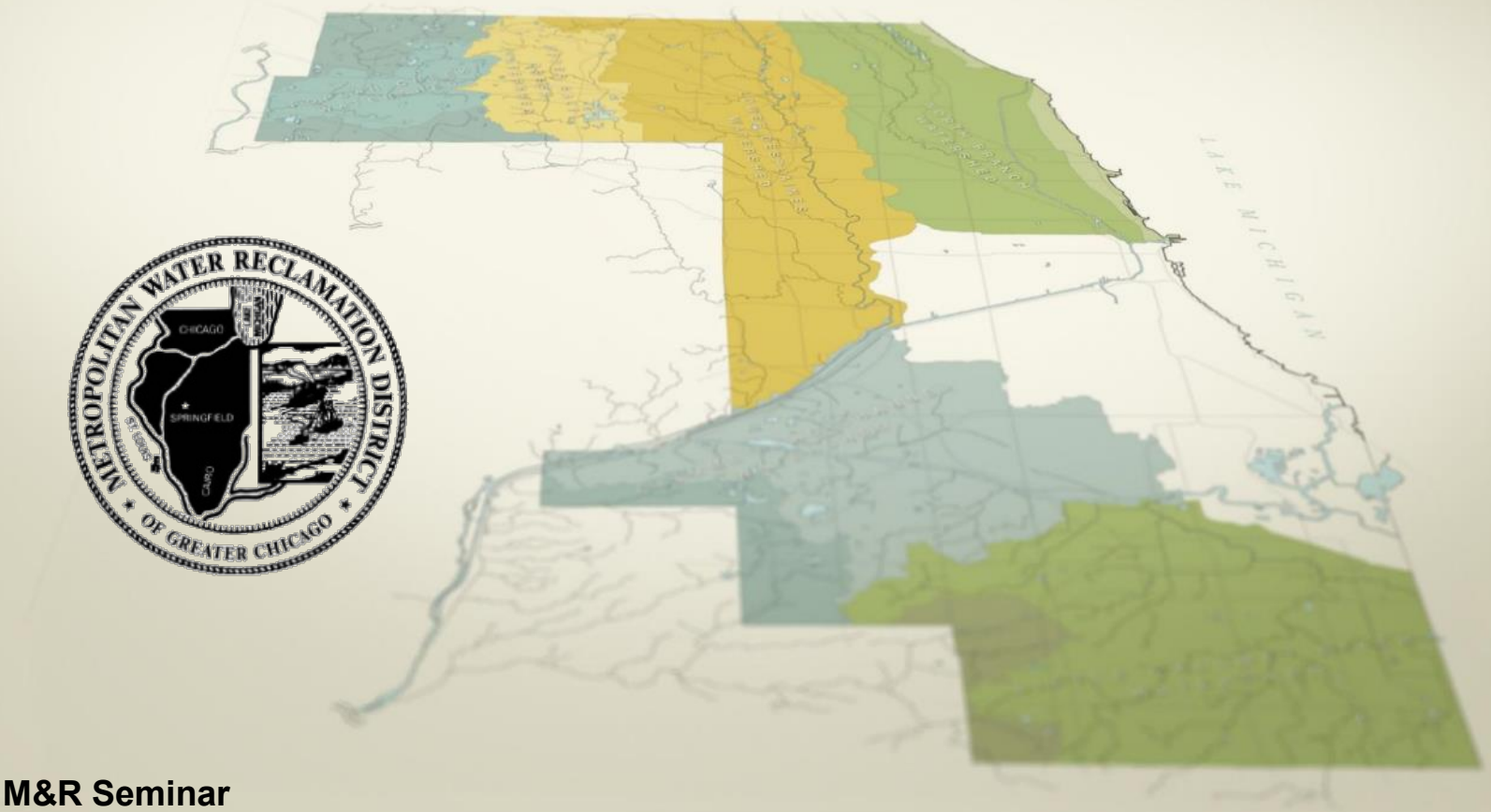
Joe Kratzer has been with MWRD for 15 years and is the Managing Civil Engineer for its Stormwater Management Section. Joe has a Bachelor of Science in Civil Engineering from Purdue University in West Lafayette, Indiana (May 1996). Prior to joining the MWRD in 2003, Joe worked as a consulting engineer for seven years.

Richard Fisher, P.E.

Rich Fisher has been with MWRD for 5 years and is a Senior Civil Engineer in the Stormwater Management Section. Rich has a Bachelor of Science in Civil Engineering from the University of Illinois at Chicago and a Master of Engineering from the Illinois Institute of Technology. Prior to joining MWRD in 2013, Rich worked as a consulting engineer for 20 years.

Metropolitan Water Reclamation District of Greater Chicago

Stormwater Management Program



MWRD M&R Seminar

December 14, 2018

Stormwater Management Programs

Agenda

- Stormwater Phase I (DWP) Projects
- Stormwater Phase II Projects
- Green Infrastructure
- Flood-Prone Property Acquisitions

- Stormwater Master Planning
- Green Guide

Stormwater Management Timeline

Phase I Projects
Identified from the DWPs to address overbank flooding “riverine flooding”

Phase II Projects
Working with local communities and agencies to address local drainage problems.

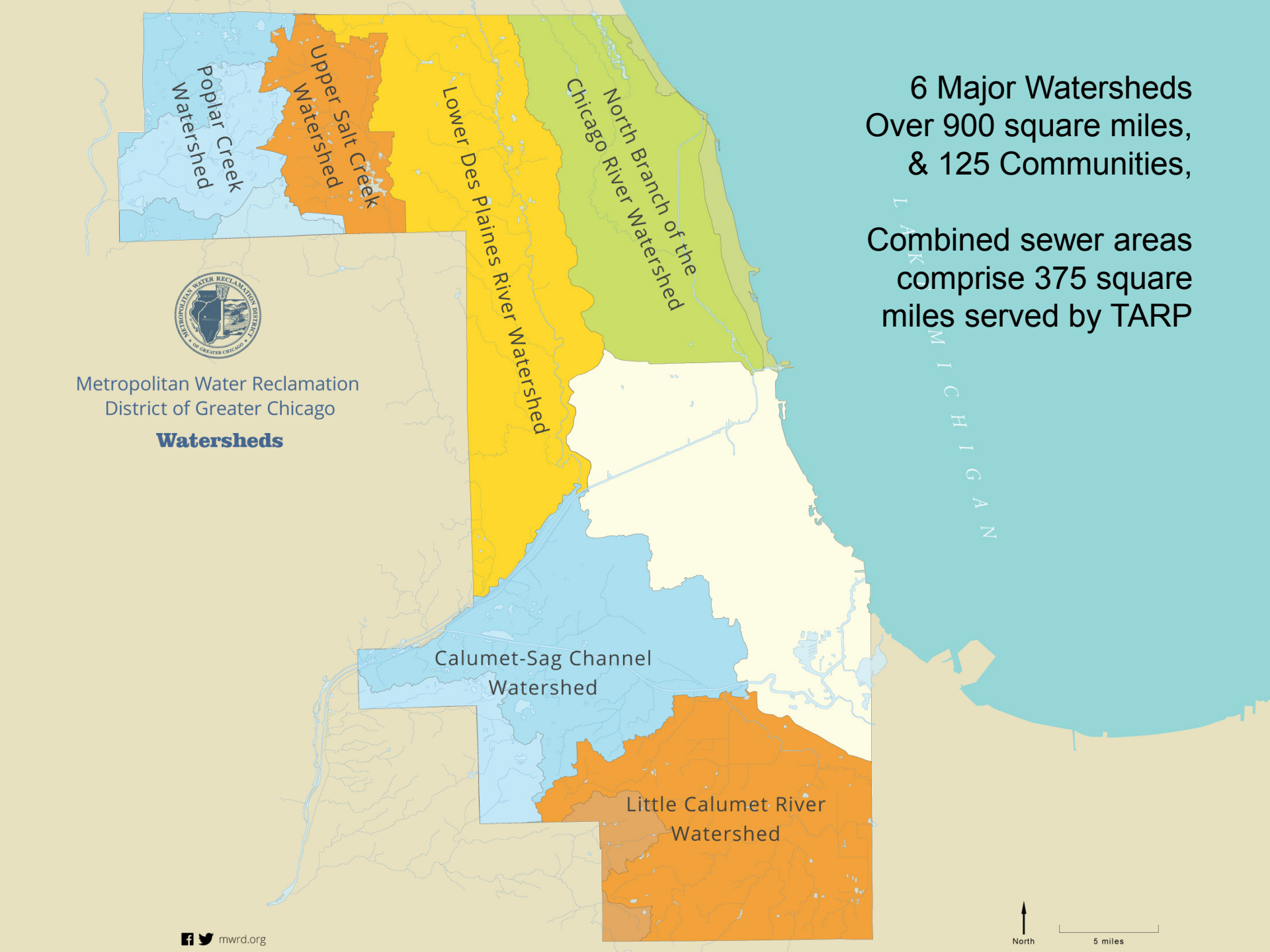
Stormwater Masterplans
Investigate “urban flooding” issues and evaluate potential green and gray infrastructure solutions.

2004 2011 2012 2013 2014 2015 2016 2017 2018

The authority for general supervision of stormwater management in Cook County was conveyed to the District by the Illinois State legislature.

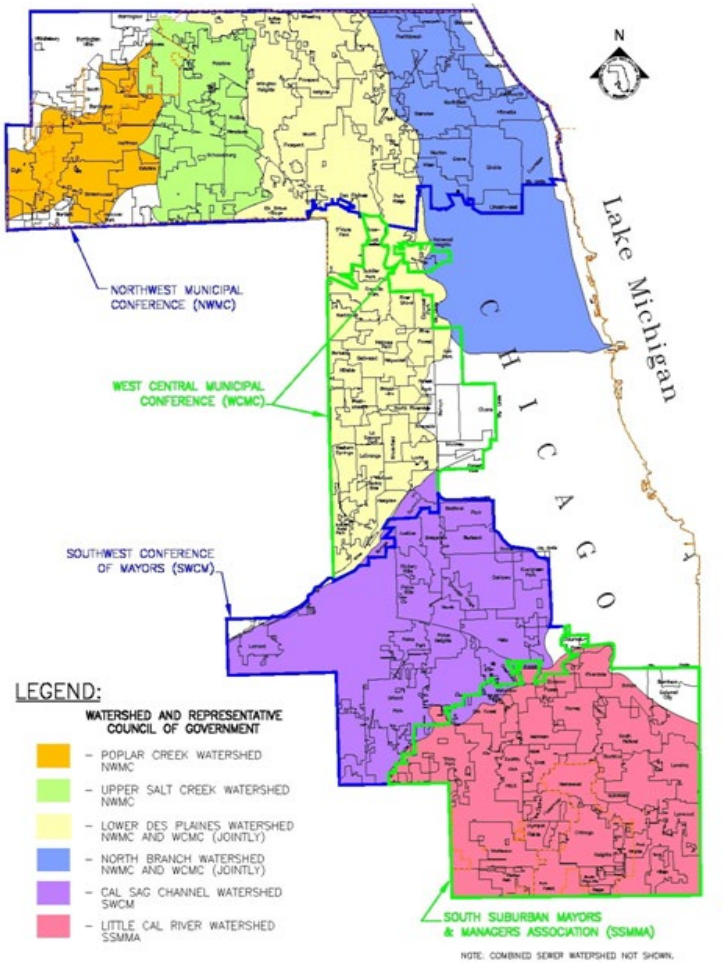
Detail Watershed Plans (DWPs) completed for the 6 major watersheds of Cook County: Cal-Sag Channel, Little Calumet River, Lower Des Plaines, North Branch of the Chicago River, Poplar Creek, and Upper Salt Creek.

District’s authority was amended to allow for flood-prone property acquisition and to plan, implement, finance, and operate local stormwater management projects.


6 Major Watersheds
Over 900 square miles,
& 125 Communities,
Combined sewer areas
comprise 375 square
miles served by TARP
Poplar Creek Watershed
Upper Salt Creek Watershed
Lower Des Plaines River Watershed
North Branch of the Chicago River Watershed
Calumet-Sag Channel Watershed
Little Calumet River Watershed
LAKE MICHIGAN
Metropolitan Water Reclamation District of Greater Chicago
Watersheds
mwrd.org
North
5 miles

Detailed Watershed Plan Development

- Poplar Creek
- Upper Salt Creek
- Lower Des Plaines River
- North Branch Chicago River
- Calumet-Sag Channel
- Little Calumet River

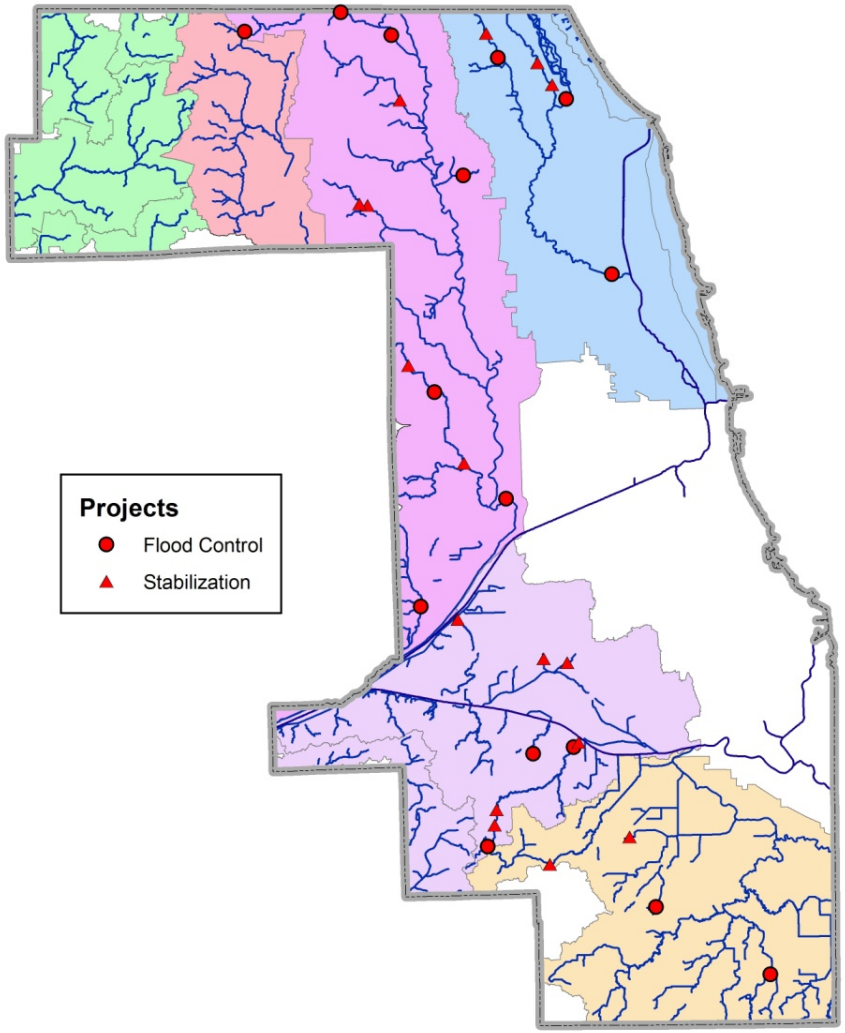


Recommended DWP Projects

15 Flood Control Projects to address overbank flooding

12 Streambank Stabilization Projects to address critical erosion

Prioritized based on Benefit-to-Cost Ratio and Distributed across Cook County



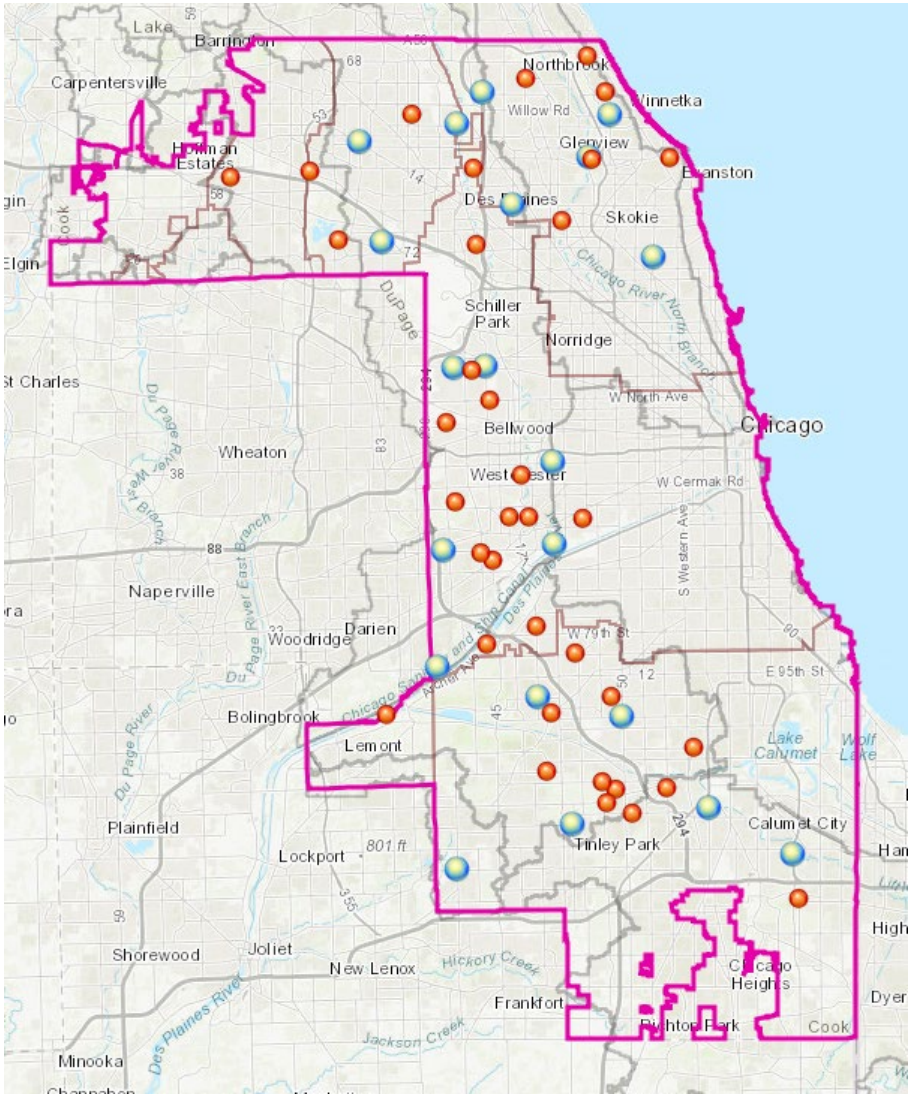
Phase II (Local) Stormwater Program

35 Phase II Shovel Ready Projects

- Over 5,000 Structures Protected/Removed
- $148M in Construction
- $56M in MWRD Dollars

18 Phase II Conceptual Projects

- Prelim/Final Design/Construction underway
- RFP for Preliminary Engineering for 6 new projects pending



Stormwater Management Projects

Approach to SW Projects

- Natural design is our goal where practical, incorporating water quality and habitat improvements

- Structural measures when necessary
  - Gabions
  - Storm Pipes
  - Pump Stations

- Coordinate with local communities and other stakeholders

Recently Completed Projects

Project Description	Cost
Flood Control/Streambank Stabilization on Tinley Creek, Crestwood	$7,222,220
Streambank Stabilization on Tinley Creek, Orland Hills	$664,000
Flood Control Project on the East Branch of Cherry Creek in Flossmoor	$3,465,725

Stormwater Projects under Construction

Project Description	Cost
Flood Control Project on Natalie Creek in Midlothian and Oak Forest	$7,629,000
Flood Control Project at Arrowhead Lake in Palos Heights	$1,615,000
Melvina Ditch Reservoir Improvements	$14,957,250
Buffalo Creek Reservoir Expansion	$9,678,900

Stormwater Projects Under Construction

Project Description	Cost
Streambank Stabilization Project for Addison Creek	$995,000
Streambank Stabilization on Oak Lawn Creek	$3,035,000
Lyons Levee Improvements (USACE)	$6,500,000

Stormwater Project Under Construction

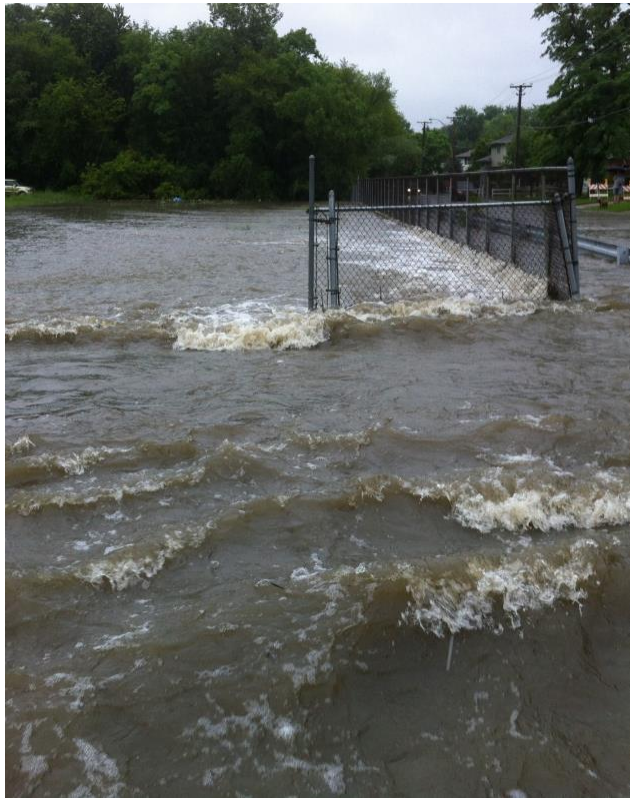
Melvina Ditch Reservoir Expansion

- 195 Acre-feet of New Stormwater Storage in Burbank
- Horizontal and vertical expansion (requires purchase of 15 homes and lowering of pump station)
- New emergency overflow structure
- >400 Structures Protected
- District responsible for design and construction
- City to assume grounds maintenance
- Build Illinois grant from IEPA for $10M

Stormwatwer Project Under Construction

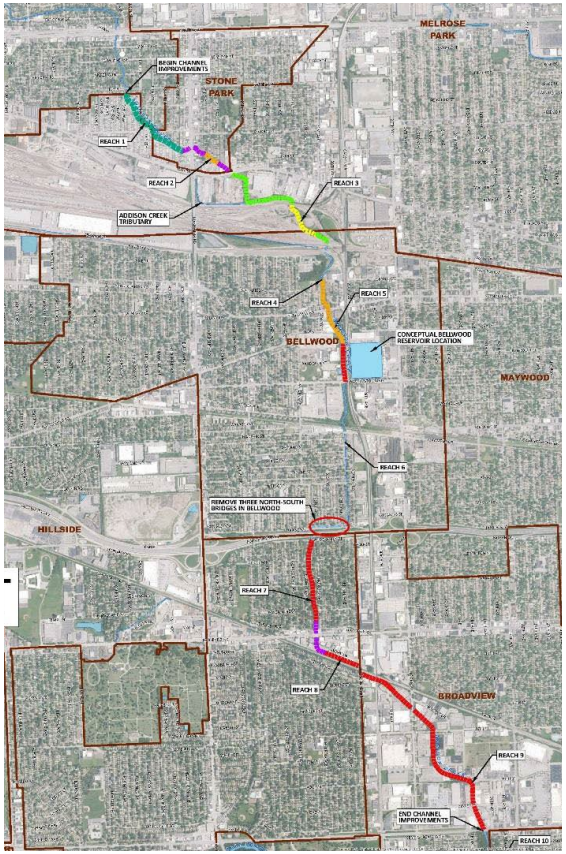
Natalie Creek Flood Control Project

- Conveyance and Storage Improvements in Midlothian and Oak Forest
- 237 structures to be protected
- MWRD responsible for design and construction (recently awarded contract)
- Municipalities to own and maintain all new improvements



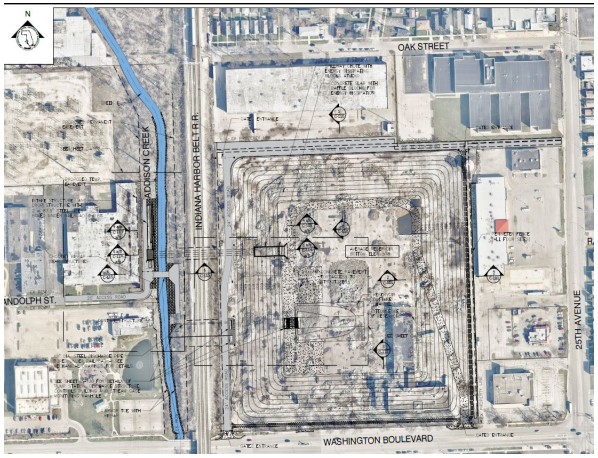
Future Stormwater Awards

Project Description	Cost
Addison Creek Channel Improvements	$95,760,600
Streambank Stabilization Project on Melvina Ditch	$10,600,000



Future Stormwater Awards

Project Description	Cost
Addison Creek Reservoir	$95,760,600
Flood Control Project on Farmers and Prairie Creeks	$14,100,000
Flood Control Project for Deer Creek	$3,440,000
Flood Control Project on Midlothian Creek in Robbins	$11,000,000



Stormwater Project Partnership Opportunities

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PROTECTING OUR ENVIRONMENT

Home | Commissioners | Departments | Services & Facilities | Public Affairs | Media Center | Business with Us | Reports | Employment

- Overview
- Cook County Stormwater Management Plan (CCSMP)
- Watershed Management Ordinance (WMO)
- Inundation Maps & Hydraulic Profiles
- Stormwater Annual Reports and Publications
- Stormwater Management and Flood Control Projects
- Stormwater Master Plan Pilot Studies
- Watershed Planning Council
- WPC Meetings
- Combined Sewer Communities
- **Partnership Opportunity - Acquisition of Flood-Prone Properties Program**

Services & Facilities >> Stormwater Management >> Partnership Opportunity - Acquisition of Flood-Prone Properties Program

Stormwater Project Partnership Opportunity

www.mwrd.org

Acquisition of Flood-Prone Properties Program

The District is currently inviting local governmental entities (i.e. municipalities, townships, and county agencies) to apply for assistance in acquiring flood prone properties. There are two avenues governmental agencies can utilize to participate in the District's program:

Des Plaines River Flooding

1. Local Sponsor Assistance - The District's top priority will be to facilitate the Illinois Emergency Management Agency's (IEMA) federally funded program by assisting Local Sponsor communities in providing their share of the cost for property acquisition. Please note that IEMA is currently accepting applications for this program. Communities interested in applying should contact Mr. Ron Davis, State Hazard Mitigation Officer, at (217) 524-1003 or ron.davis@illinois.gov. IEMA's current application period will be closing October 30th.

2. Local Government Application – This component of the program allows the District to provide assistance for acquisition projects that have not received federal funding through IEMA.

The District is asking all communities with potential flood-prone property acquisition projects to provide some basic summary information:

1. Pre-application

MWRD Partnership Requirements

- For local projects to be eligible for MWRD funding assistance, communities must follow MWRD Procurement Rules, Diversity Requirements, and comply with Multi-Project Labor Agreement
- Local communities must own and maintain new improvements
- Locals must provide up-front construction funding (MWRD funding is reimbursement-based)
- Project benefits must be clearly defined and quantifiable
- When possible, incorporate benefits that go beyond reducing flooding issues (eg. socio-economic) in coordination with other agencies.

Flood-Prone Property Acquisition Program

- Policy adopted by Board of Commissioners August 2014 after PA 98-0652
- Three Distinct Components
  1. Local Sponsor Assistance Program
  2. District Initiated Program
  3. Local Government Application

Photo Source: www.rblandmark.com

Flood-Prone Property Acquisition Program

Minimum Criterion

1. Property must be within 100-year floodplain and/or DWP inundation area.
2. The Project's Benefit-to-Cost Ratio must be greater than 1.0.

Factors Applicable to Each Program

1. Local government agency must serve as a local sponsor
2. Duties of local sponsor include:
   - Local Sponsor will be party responsible for direct contact with the private property owners during the acquisition process
   - Accept ownership of acquired property
   - Remove existing structures
   - Place deed restrictions against future development
   - Maintain property upon return to open land
   - Provide regular reports certifying property meets terms and conditions

Flood-Prone Property Acquisition Program

Program Progress

- Glenview - 17 homes purchased
- Des Plaines – City in process of purchasing 62 homes
- Riverside-Lawn – Cook County Land Bank purchasing 39 homes
- Northlake – City purchasing 5 homes
- Franklin Park - 32 homes identified in the executed IGA, currently performing appraisals
- Additional funding secured with Cook Co. CDBG-DR

Green Infrastructure

Program Components

- Rain Barrel Program
- Comprehensive Land Use Policy
- Public Outreach and Education
- Partnerships with Local Communities

Rain Barrel Program

The District's Rain Barrel Program utilized three distribution networks

- Municipalities
- NGOs and community groups
- campus-type facilities

Through 2016, nearly 110,000 MWRD rain barrels have been distributed in 108 communities across Cook County

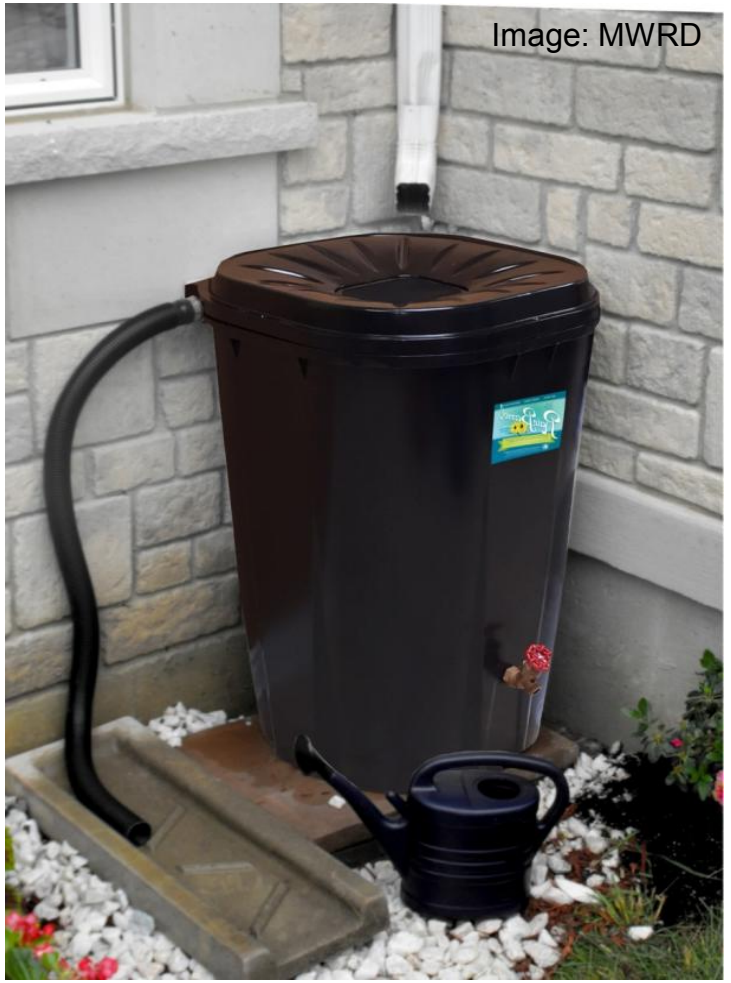


Image: MWRD

Green Infrastructure Requirements

MWRD's Comprehensive Land Use Policy

- Requires public entities leasing MWRD property to provide GI based on the size of the leasehold and the desired use
- Private entities leasing MWRD land are provided incentives to implement and maintain GI. Private entities installing GI receive a credit equal to $0.50 on the $1.00 up to 10% of the leasehold cost for GI improvements in excess of WMO requirements.

Watershed Management Ordinance – Volume Control Req'ts

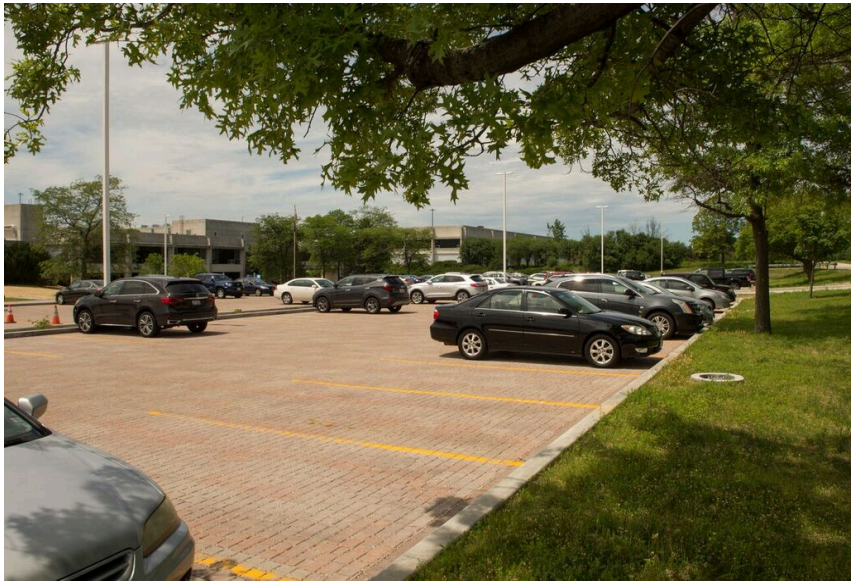
- Capture 1-inch of runoff from impervious surfaces using GI
- Through 2016, ~300 permits requiring nearly 20M Gallons of GI retention volume were issued
- Offsite volume control/detention trading exchange being evaluated

Green Infrastructure Public Outreach

MWRD is committed to promoting the benefits of Green Infrastructure to encourage its use.

GI can provide opportunities for community enhancements

MWRD has worked with numerous entities to share and gain knowledge on the design, installation, and maintenance of GI



Green Infrastructure Partnerships

Space to Grow

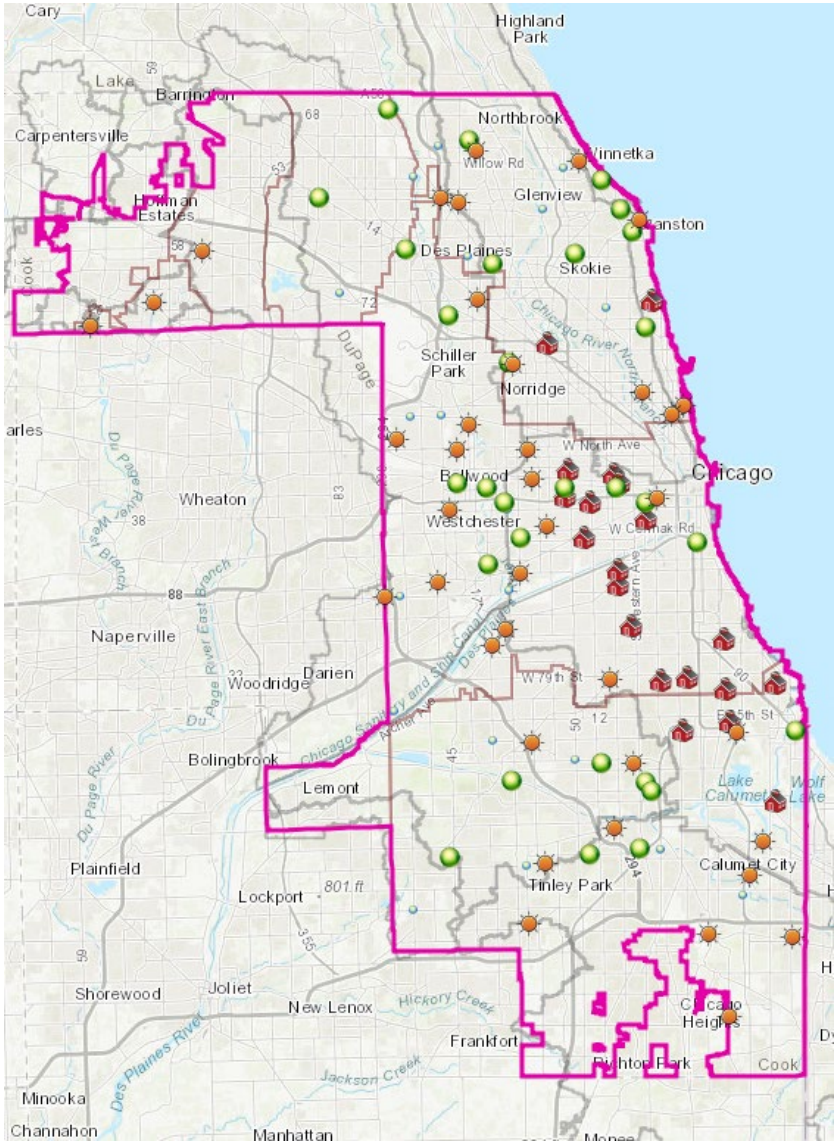
- Managed by Healthy Schools Campaign and Openlands
- Funding and technical assistance from
  - Chicago Public Schools
  - Chicago Dept. of Water Management
  - MWRDGC

Local Municipalities and other Governmental Organizations

- Evanston, Blue Island, Kenilworth, Wilmette, Northbrook, Niles, and Berwyn (complete)
- Skokie, Wheeling Park District, Maywood, etc. (under construction)

Green Infrastructure Partnerships

- 39 new GI partnership projects under design and construction (from 2017 and 2018 call for projects)
- Additional partnerships to be formalized through future calls for GI projects



GI Project Eligibility Requirements

- Projects must be within MWRD's boundaries.
- Projects must be designed to manage stormwater using green infrastructure.
- Applicants must have (or be able to obtain) perpetual ownership or easement for project site.
- Applicants will not use funding to satisfy requirements of the WMO or any other local, state, or federal regulations due to a private or public development project.
- The Applicant must be a public entity able to enter into an IGA with MWRD.
- District will consider whether potential partner agency is in compliance with WMO & IICP.

Call for Project Evaluation Factors

- Primary Selection Criteria
  - Project cost / gallon of DRC
  - Structures protected by project
  - Project timeframe
  - Median income of project area
- Other factors
  - Total cost of project
  - Combined or Separate Sewer Area
  - Resources and experience in performing maintenance
  - Project visibility/educational opportunity
  - Did applicant receive recent MWRD funding for similar projects

Virgil Grissom Elementary School
After

Blue Island Rain Garden

Blue Island Permeable Parking Lot

Evanston Bioswale

Egan WRP Permeable Parking Lot

Berwyn Green Alleys During Construction

Berwyn Green Alleys After Construction

Wadsworth School Before Construction

Wadsworth School After Construction

Stormwater Management Programs

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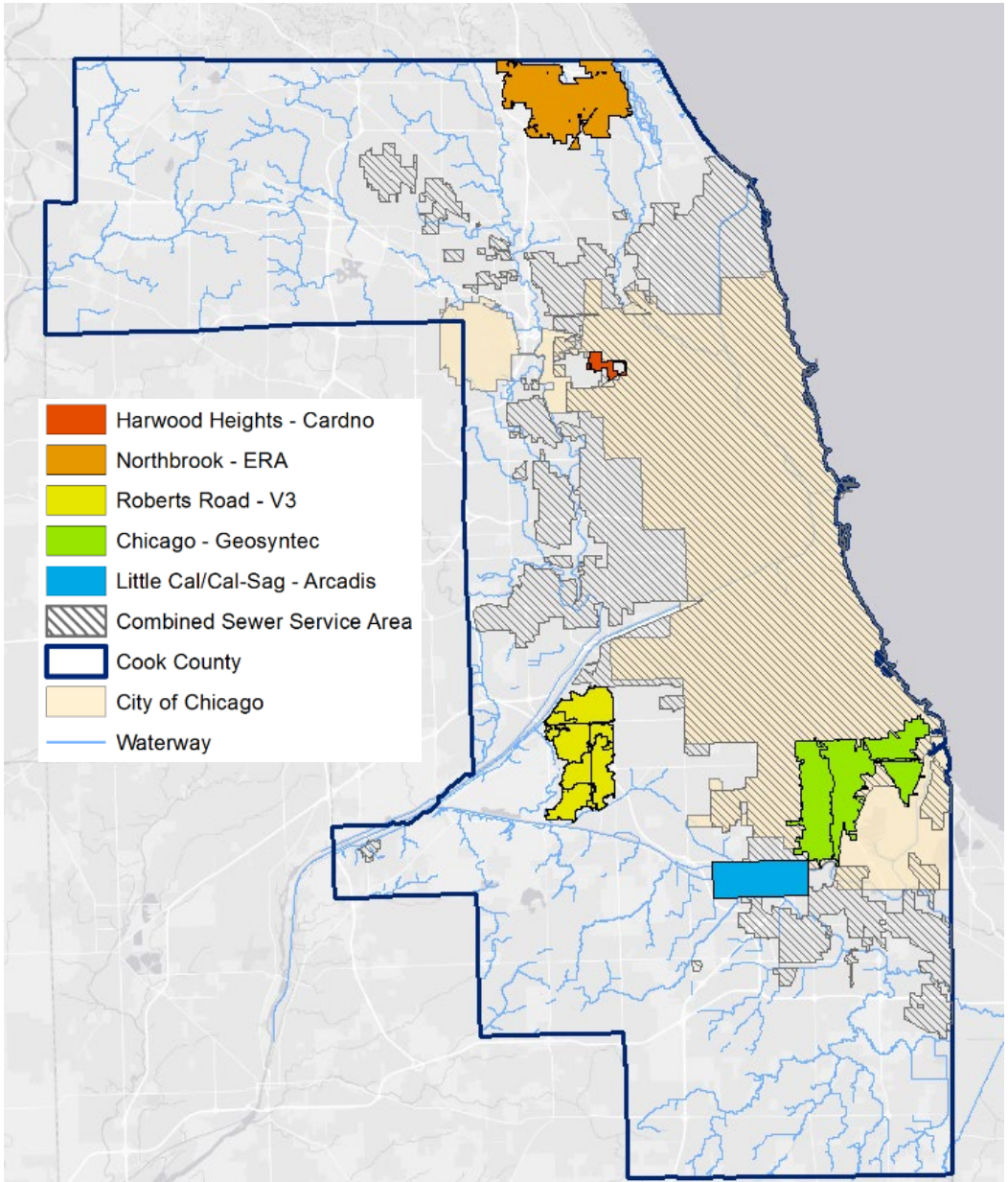
Initial Stormwater Masterplan Pilots



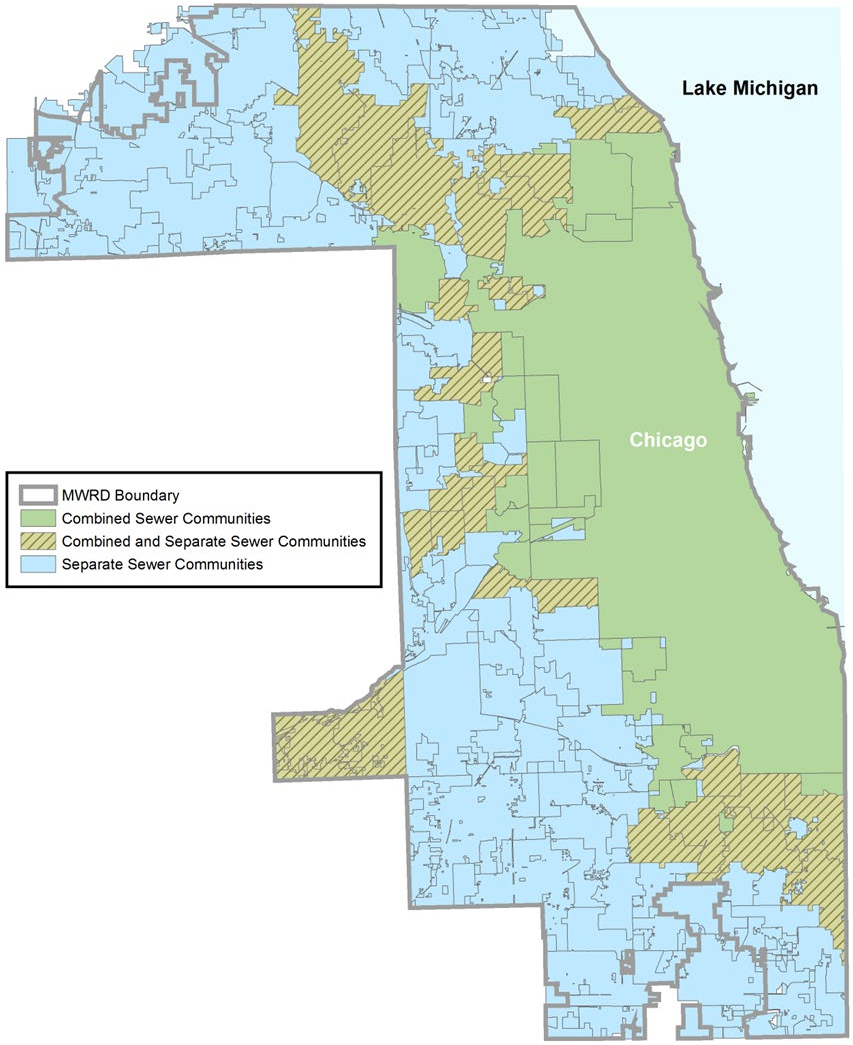

“Let’s design a flood control solution that will maximize local assets and spur economic development.”

Key Findings

- The investment required to provide 100-year level of protection utilizing traditional grey, green or even hybrid grey and green public infrastructure is exorbitant
- Private property interventions can provide cost effective means for addressing flooding
- Efficiencies in construction should be leveraged through coordination with other infrastructure improvements such as transportation or other utilities
- Need to adopt a holistic approach in developing stormwater solutions that engages key partners and other stakeholders in the planning and implementation process.
- Prioritizing Master Planning throughout the county based on flood risk, targeting areas in need of planning resources.

Moving Forward after Pilot SMPs

- Evaluate Master Planning needs throughout county
- Develop adaptive approach, centered on managing local stormwater issues with multi-disciplined teams
- Teams focused on separate and combined areas



Program Goals

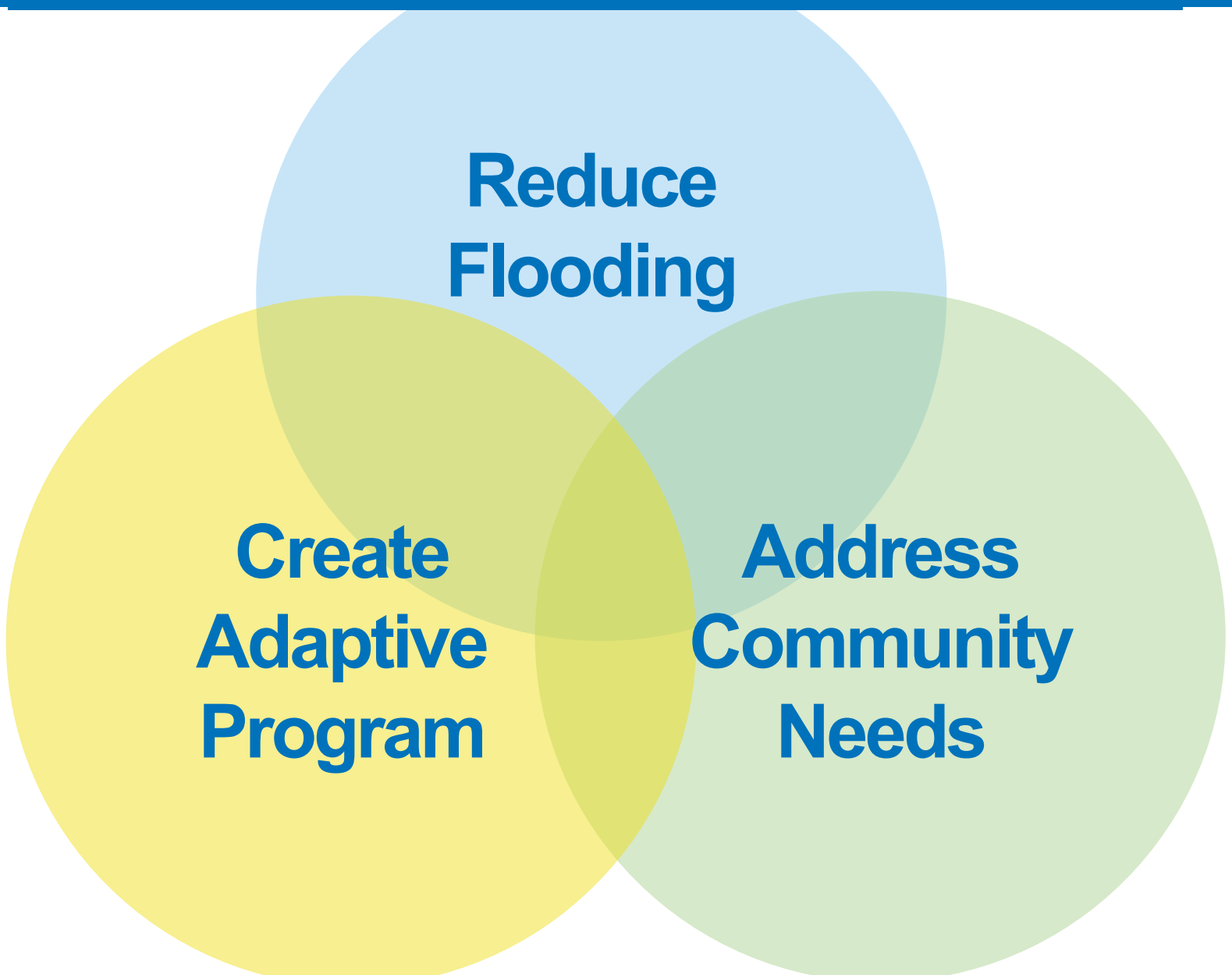
What will the program accomplish?

- Reduce the risk of flooding for Cook County homes, businesses and critical facilities
- Create partnerships among agencies and local communities to plan and implement priority projects
- Institute a transparent methodology to prioritize stormwater management investments

Guiding Principles

- Craft innovative approach for flood reduction
- Consider holistic solutions and opportunities
- Leverage and build upon work of others
- Develop a repeatable process
- Create actionable plans

Program Results



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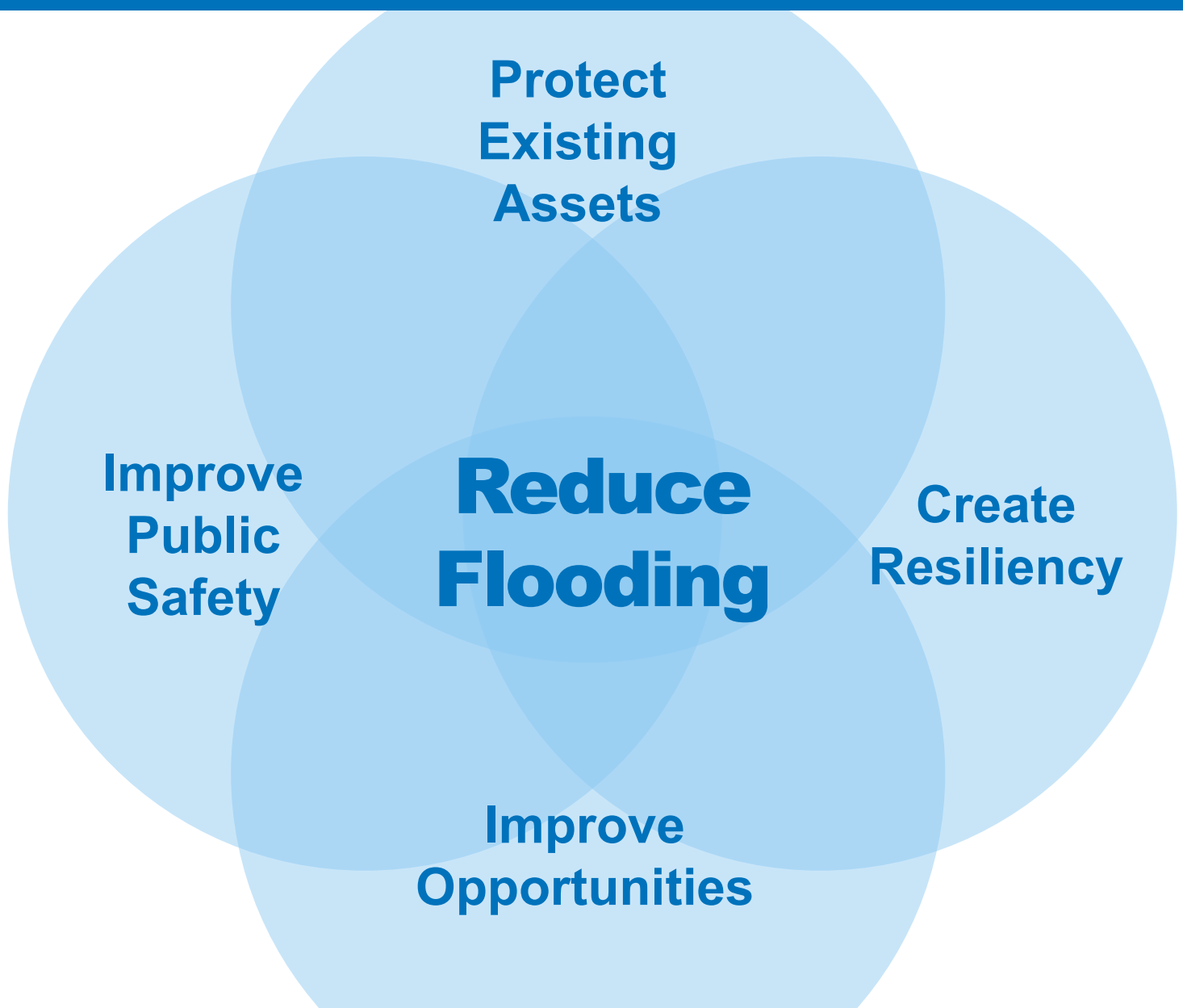
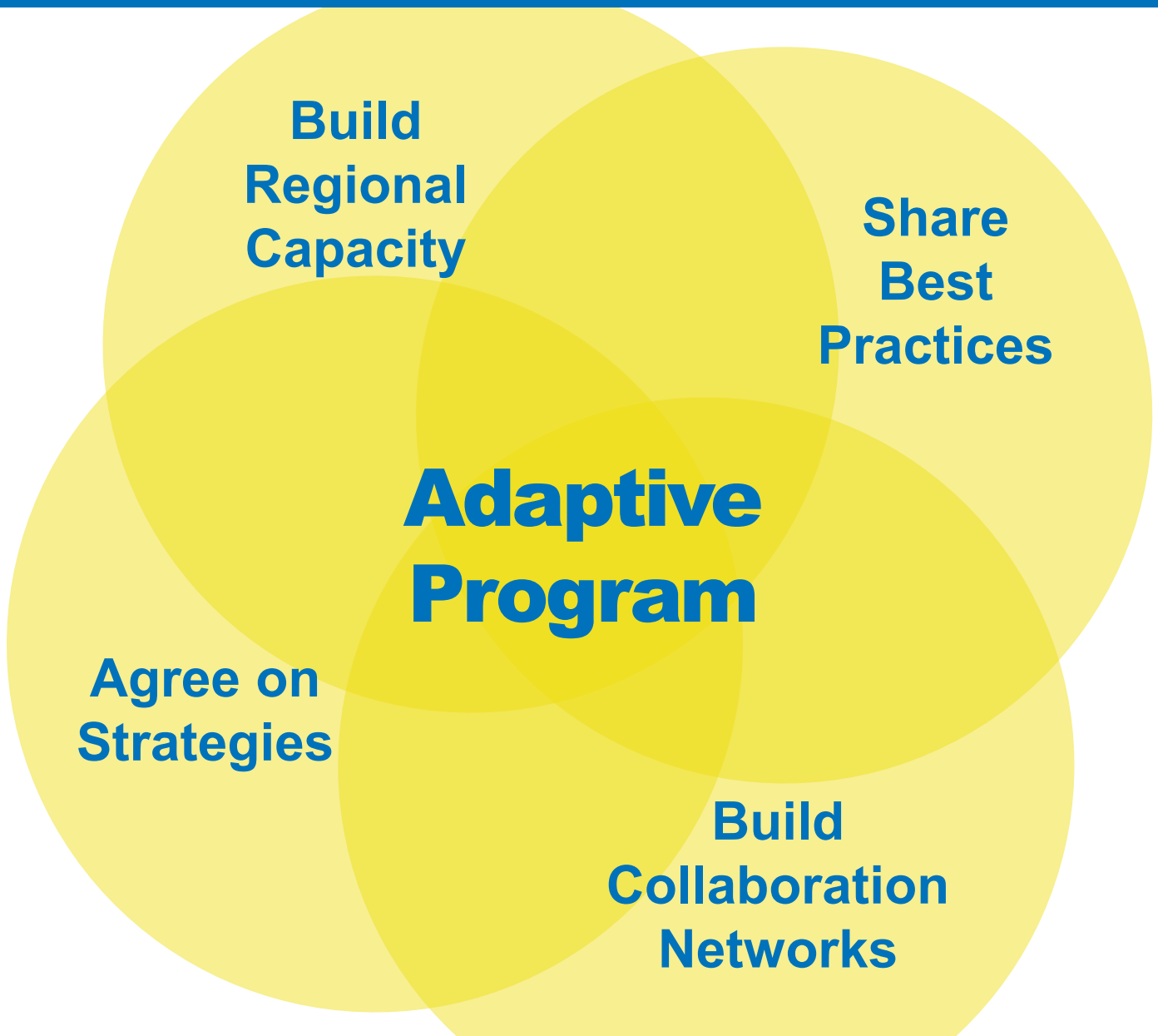
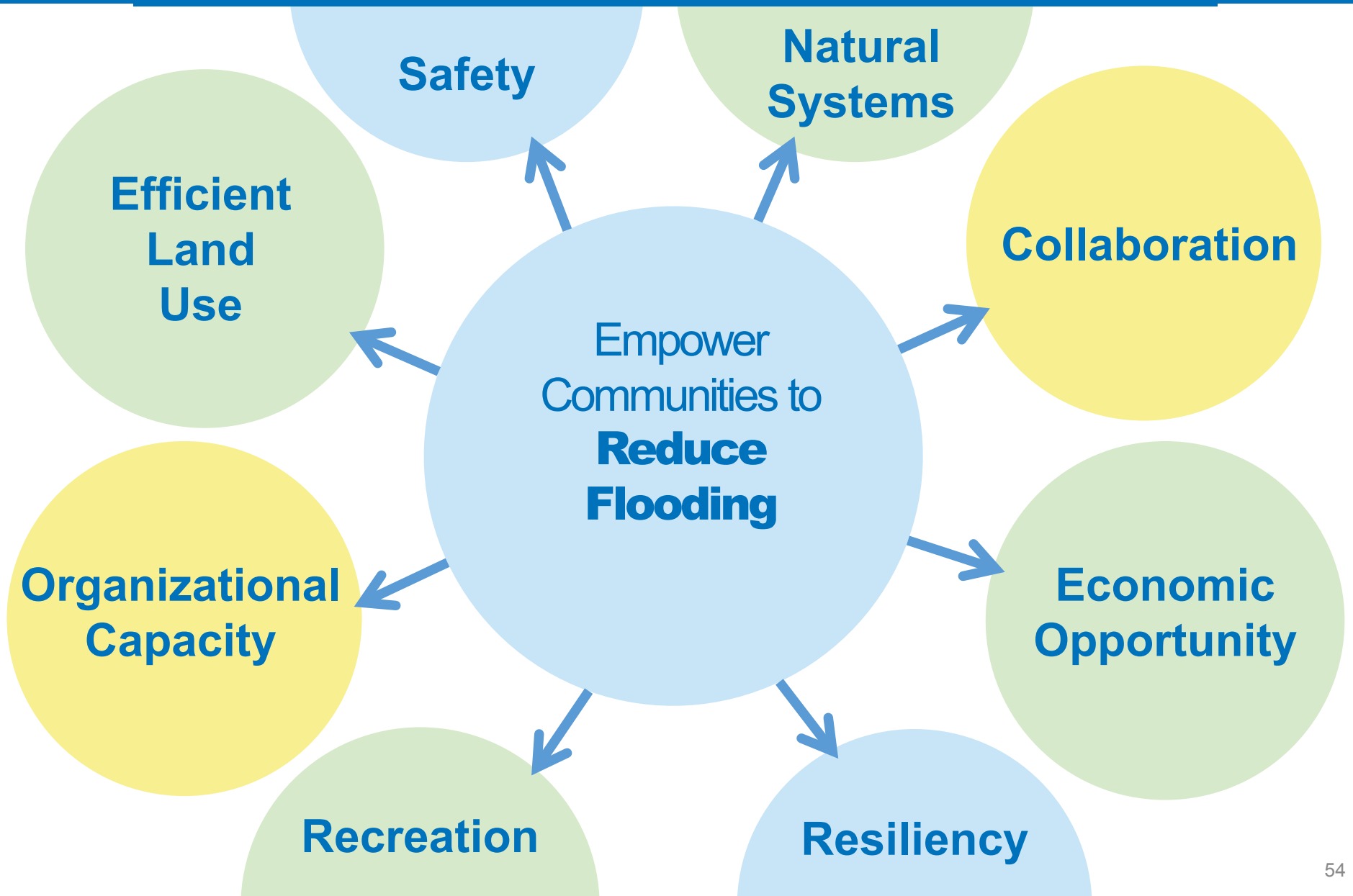


Potential Program Results

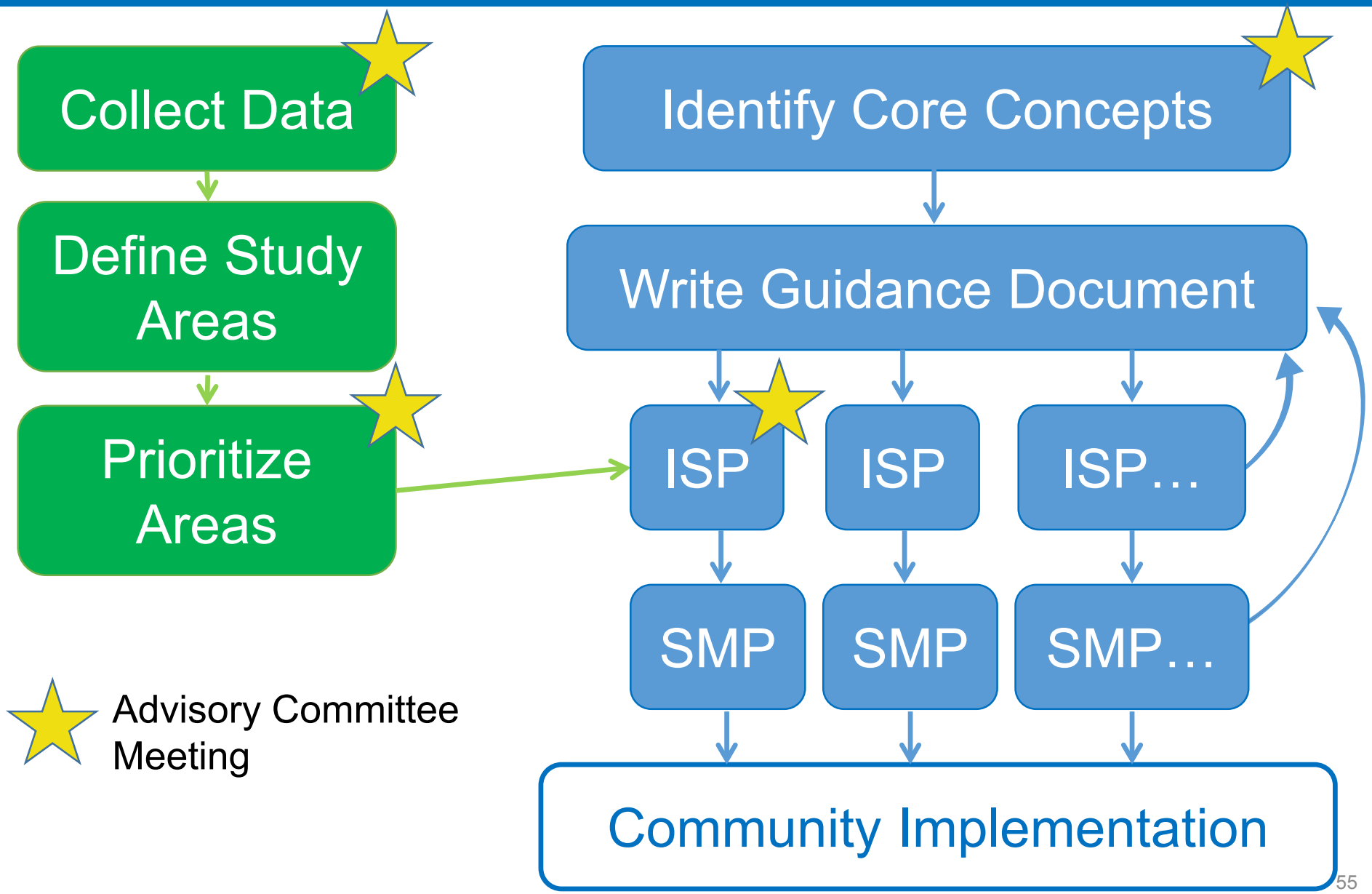
Potential Program Results



Program Results



Advisory Committee Milestones

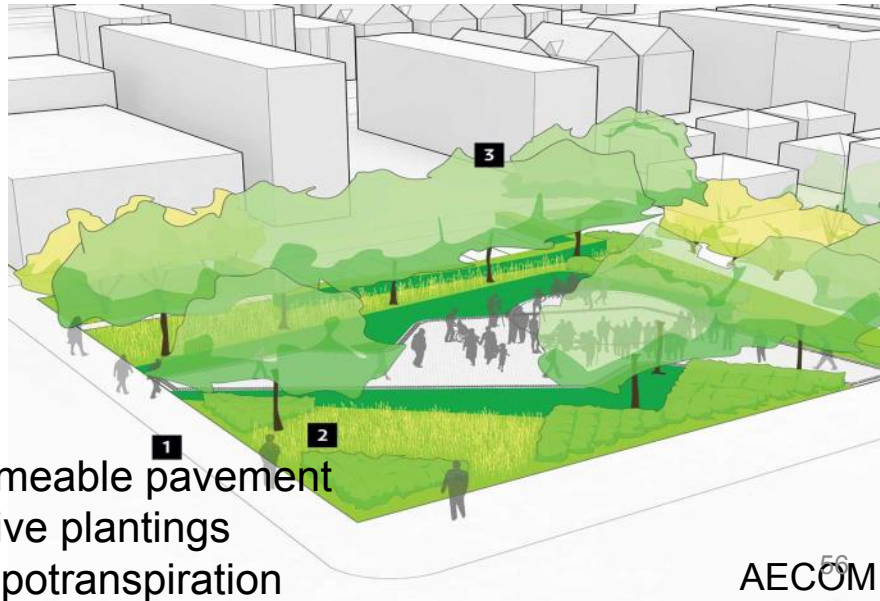


Core Concepts for SMPs

Redevelopment/Economic Development

- Maximize stormwater management opportunities
- Stormwater Parks could provide incredible asset to community, adding needed open space to many neighborhoods
- Vacant lots and abandoned buildings reduce quality of life and property values, discourage investment, and stress budgets

Cook County Assessor



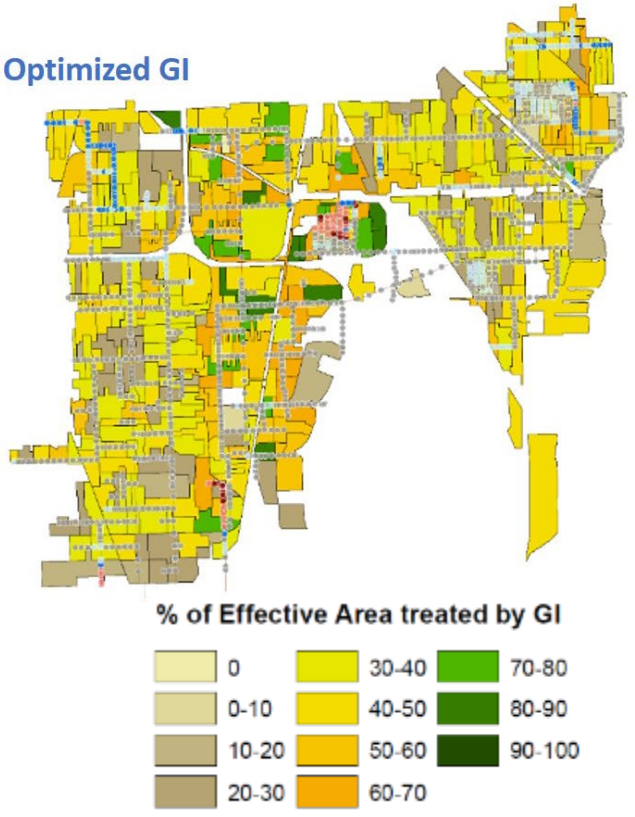
1. Permeable pavement
2. Native plantings
3. Evapotranspiration

AECOM

Core Concepts for SMPs

Technology and Innovation

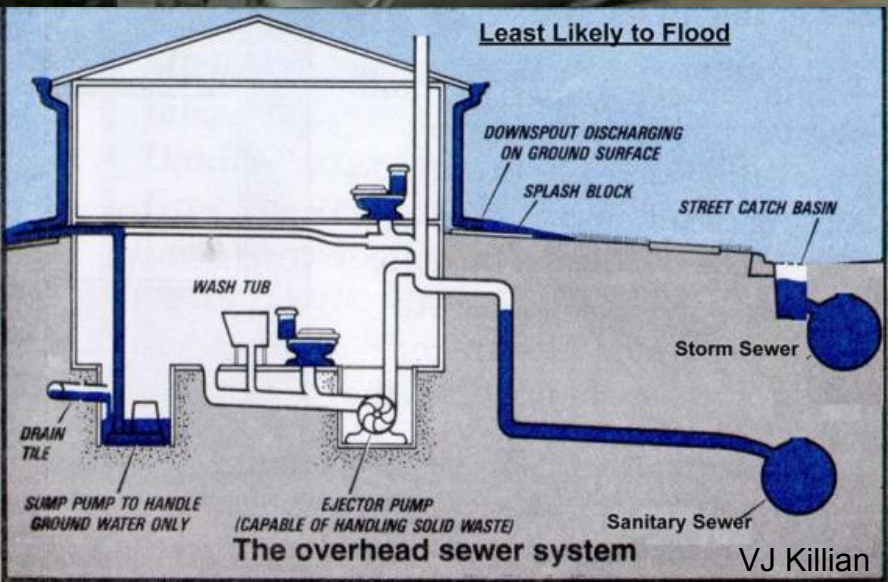
- Real time controls - actively manage and monitor stormwater infrastructure, maximize storage
- Optimization - leverage analytical tools to evaluate and identify optimized solution
- Innovation



Core Concepts for SMPs

Programs and Policy

- Adopt policies and foster programs to enhance flood reduction efforts



VJ Killian

Core Concepts for SMPs

Land Use & Planning

- Balanced land use development
- Land use efficiency
- Mid and higher density developments
- Strong links to infrastructure

Core Concepts for SMPs

Maximize Infrastructure Opportunities

- Modify existing infrastructure to fully utilize available and/or under-utilized capacity (wet bottom ponds, storm sewers, MWRDGC reservoirs)
- Look for regional storage opportunities
- Rethink roadway design
- Add stormwater improvements to capital projects.

Photo credit: Journal-topics.com, February 2012

Core Concepts for SMPs

Land Use & Planning

- Conserve habitats and natural systems
- Restore natural role of streams and wetlands


Lake Glenview

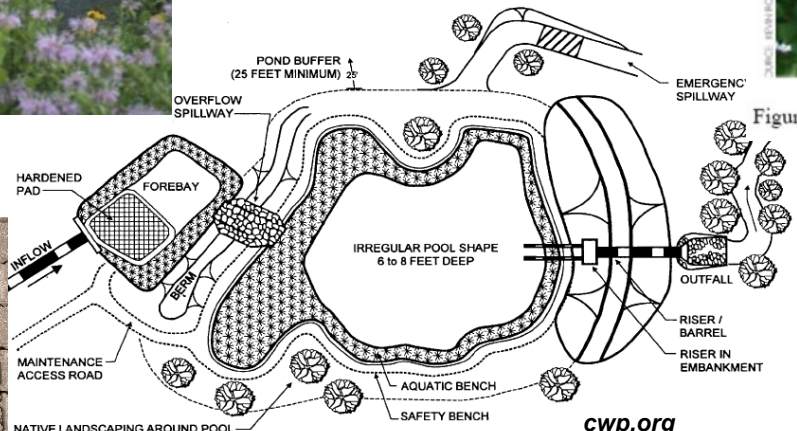

Springbrook Prairie Forest Preserve Naperville

Core Concepts for SMPs

Green Infrastructure

- Integrate green infrastructure as component of stormwater management *infrastructure*

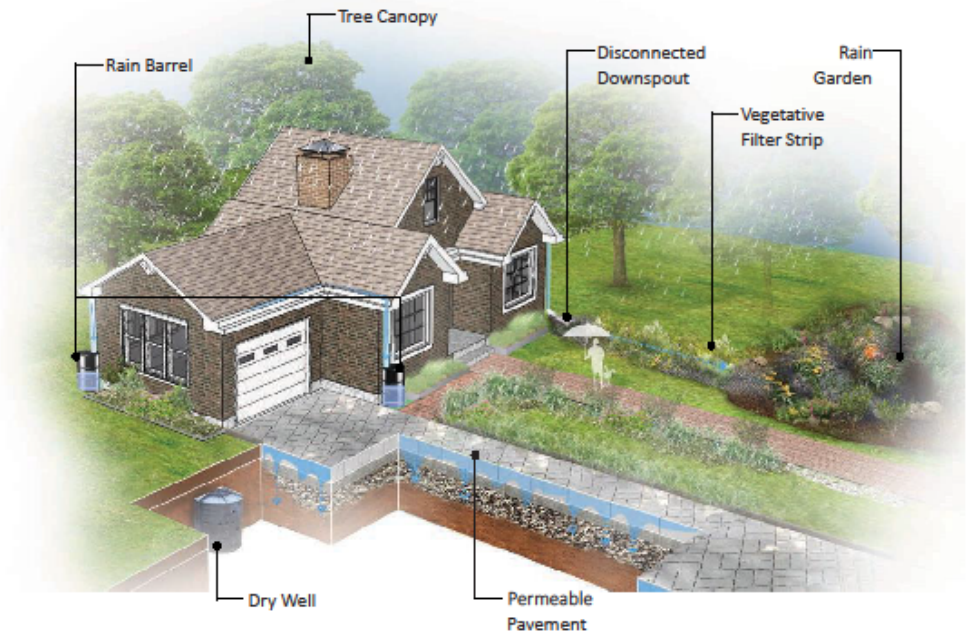
Figure 5-9: BMPs incorporated into a wide sidewalk (modified from San Mateo 2009)



cwp.org


DRAFT
METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO
GREEN GUIDE FOR HOMEOWNERS

Home Drainage System



BMP / Lot Size	Downspout Disconnection	Rain Barrel	Filter Strip	Rain Garden	Dry Well	Permeable Paving	Tree Canopy	Green Roofs	Green Walls
Small Urban	1						6		
Medium			2	3	4	5			
Large Suburban									

1.– If there's a suitable place for the stormwater to infiltrate
2.– If there's adequate space at a non-paved area
3.– If there's adequate space at a non-paved area
4.– If there's adequate space at a non-paved area
5.– If the paving is at least 10 feet from building foundations
6.– If there's adequate planting space

Appropriate for Lot Size: Yes | Maybe | No

Complexity: Low | Medium Complexity | High

Rain Garden How To

$$

What are rain gardens and why should I install them?

Rain gardens and vegetated depressions that capture stormwater and allow it to soak into the ground. They are typically placed at a low point and receive stormwater as it flows across the ground, but water can also be piped into them from downspouts or paved areas. They are typically designed to drain ponding water within 24 hours and planted with native vegetation that can survive inundation for that length of time.

Rain gardens remove pollutants as water moves down through the soil to recharge the water table. The native plants in them attract beneficial insects and pollinators and provide beautiful flower displays throughout the growing season.

step 1: Pick your location

When selecting a site, use the following considerations:

- Locate the rain garden at least 10 feet away from your house, garage, and outbuildings, and at least five feet from your property line.
- Locate the rain garden in a full or partly sunny location on a relatively level area that is downhill from the water source.
- Do not locate the rain garden over a septic field, well, or buried utility lines, or under large trees.
- Make sure water can get to a storm drain if the rain garden overflows.

step 2: Test the soil

A rain garden or bioswale needs to absorb stormwater within 48 hours or plants won't survive and mosquitos will breed. A simple way to test your soil is to dig a 10-inch deep hole and fill it with water. The soil is good for a rain garden if the water disappears within 48 hours. If the soil is dry, fill the hole three times and use the third fill as the test.

MWRD Green Book for Stormwater Professionals

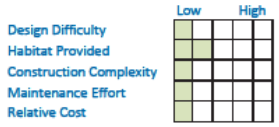
1.0 Introduction

This Green Book explains how stormwater management professionals can integrate stormwater best management practices (BMPs) into private residential and commercial developments, schools and institutions, parks, and the transportation right-of-way. It is a supplement intended to add clarification to the Metropolitan Water Reclamation District's (MWRD) "Technical Guidance Manual for the Implementation of the Watershed Management Ordinance" (TGM). While this Green Book incorporates several local stormwater management ordinances, it is important to cross reference local stormwater, transportation, and land development guidance documents when planning for BMP incorporation.

Section 2 of this book contains individual discussions by BMP type. Each section discusses different implementation issues relevant to design, habitat benefit, construction and inspection, short- and long-term maintenance, and cost. The appendices provide example checklists for construction inspection, short term maintenance, and long-term maintenance. Also included in the appendices are plant lists with growth characteristics and seasonal photos to aide designers and maintenance contractors in the selection and maintenance.

Figure 1.1. Constructed Wetland with river cobble channels and educational flood stage markers.

2.1 Vegetated Filter Strip



Filter strips are vegetated sections of land that treat sheet flow from adjacent impervious areas. Filter strips are beneficial because they remove pollutants from stormwater before they reach the receiving storm sewer system. Filter strips may provide some reduction in stormwater runoff volume, but their primary function is to filter out contaminants in stormwater runoff. Filter strips do not provide any quantifiable storage and are appropriate as flow-through practices only, as addressed on page 5-32 in Article 5 of the Technical Guidance Manual (TGM).

Example Applications of Filter Strips

In residential subdivisions, filter strips can be used to help meet pretreatment and water quality requirements. In these settings, BMP is typically located upstream of bioswales, constructed wetlands, or bioretention areas requiring pretreatment. Are better suited to manage sheet flow than concentrated flow, they are typically applied near curbless paved surfaces such as pool decks, athletic courts, and curbless streets or parking areas.

Figure 2.1.1 A Filter Strip Provides Pretreatment for an Infiltration Trench in a Residential Area

In commercial or multi-family areas, filter strips can be used to help meet pretreatment and water quality requirements. Pending the anticipated rate of flow, a level spreader such as a flush-curb or other curbless paved edge is needed to distribute flow into the filter strip. In these settings, the filter strip is typically located adjacent to a parking lot or other paved surface to manage sheet flow prior to entering a bioswale, constructed wetland, or bioretention area requiring pretreatment.

and formal access such as a trail or boardwalk. This type of interpretive information can help the public understand the reasons for the potential unsightliness and odor-generating anaerobic conditions that can develop in a sediment forebay.

2.2.1 Design

Sediment forebays (Figure 2.2.2) create performance opportunities and challenges that must be taken into consideration during design. These include the creation of an accessible location for easy sediment removal. Access by heavy maintenance vehicles and equipment must be considered. So, must the fact that sediment can cause forebays to retain water in an anaerobic state that can generate unsightliness and odor.

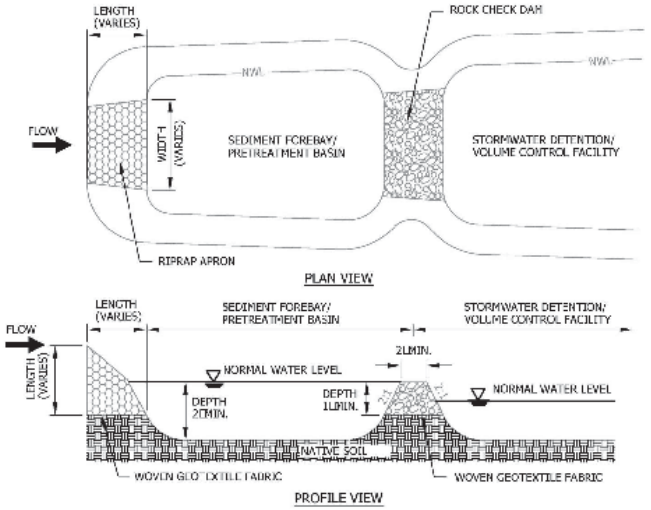


Figure 2.2.2 MWRD Technical Manual Typical Cross Section for Sediment Forebay

Placement

The designer should consider a sediment forebay's function and surrounding environment during design. Its maintenance function presents special consideration when placed near public use areas.

Sediment forebays shall be:

Facultative Upland Plant List (FACU)

Description	Spring	Summer	Fall
BUFFALO GRASS *Bouteloua dactyloides* • Size: 0.25'- 0.75' • Sun: Full Sun • Salt Tolerant: No			
EASTERN BEEBALM *Monarda bradburiana* • Size: 1.0'- 2.0' • Sun: Full Sun to Part Shade • Salt Tolerant: Yes			
SOLOMON'S SEAL *Polygonatum biflorum* • Size: 1.0'- 3.0' • Sun: Part Shade to Full Shade • Salt Tolerant: No			
KENTUCKY BLUEGRASS *Poa pratensis* • Size: 0.25'- 2.5' • Sun: Full Sun to Part Shade • Salt Tolerant: No			
SNOWCAP SPIDERWORT *Tradescantia 'Snowcap'* • Size: 1.0'- 2.0' • Sun: Full Sun to Part Shade • Salt Tolerant: Yes			

INSTALLATION CONTRACTOR MONTHLY MAINTENANCE CHECKLIST	
Inspector Name	**Date**
Location:	
Remove trash and debris	Note unusual debris, if any, and note potential sources:
Check and repair eroded areas	Note any recurring areas that may need supplemental erosion control measures.
Inspect for and remove excess sediment	Note location and amount of sediment accumulation:
Mow grass filter strips and bioretention turf cover	Mowing limited to grass strips installed as part of bioretention
Weed and rake mulch	
Replace dead or missing vegetation	Note extent of replacement needed:
Remulch to maintain a three inch layer	Note areas of eroded or missing mulch:
Prune trees and shrubs	Focus on runners or dead braches
Inspect for clogging or ponding water in the filter bed	Note days since preceding rain event:
Remove invasive plants. Herbicide allowable by licensed applicator.	Note species(if known) and extent of invasives, and type of herbicide (if any)
Inspect (and repair if needed) inlets, outlets, and structures	Note damage type and location

BIORETENTION QUARTERLY MAINTENANCE CHECKLIST	
Inspector Name	**Date**

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Chatham Pilot Study

- MWRD Partnering with City of Chicago
- Install backflow prevention and passive storage systems in up to 40 residential homes
- South end of the Chatham neighborhood
- To gain insight into the efficacy of these technologies.