

## Metropolitan Water Reclamation District of Greater Chicago

Welcome to the April Edition of the 2024 M&R Seminar Series

#### **NOTES FOR SEMINAR ATTENDEES**

- Remote attendees' audio lines have been muted to minimize background noise. For attendees in the auditorium, please silence your phones.
- A question and answer session will follow the presentation.
- For remote attendees, please use the "<u>Chat</u>" feature to ask a question via text to "**Host.**" For attendees in the auditorium, please raise your hand and wait for the microphone to ask a verbal question.
- The presentation slides will be posted on the MWRD website after the seminar.
- This seminar is pending approval by the ISPE for one PDH and pending approval by the IEPA for one TCH. Certificates will only be issued to participants who attend the entire presentation.

# Joseph R. Kratzer, P.E., CFM Managing Civil Engineer Stormwater Management Section, Engineering Department MWRDGC



Joe Kratzer has been with the Metropolitan Water Reclamation District of Greater Chicago since 2003, and is the Managing Civil Engineer for the Stormwater Management Section.

Joe has a Bachelor of Science in Civil Engineering from Purdue University in West Lafayette, Indiana. He is a Certified Floodplain Manager and a member of the Illinois Association of Floodplain and Stormwater Managers. Prior to joining the District in 2003, Joe worked as a consulting engineer for seven years.

# 20 Years of Stormwater Management



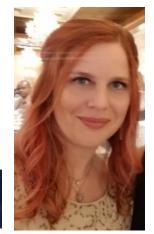




















# 20 Years of Stormwater Management

**Monitoring and Research Department Seminar Series** 

April 26, 2024

Overall Stormwater Program Timeline – Joe Kratzer

Regional Flood Control and Streambank Stabilization Projects – Justin Kirk

**Green Infrastructure – Holly Sauter** 

**Local Stormwater Partnerships – Dylan Cooney** 

Stormwater Master Planning – Rich Fisher

#### Phase I (Regional) DWP Projects Identified from the DWPs to address overbank flooding "riverine flooding" Phase II (Local) Projects and Green Infrastructure Plan Partnering with local communities and agencies to address local drainage problems. **Stormwater Master Planning** Investigate "urban flooding" issues and evaluate potential green and gray infrastructure solutions. 2014 2015 2016 2012 2022 2023 2024 2011 2004 2007 2013 Develop new Volumetric Approach to Stormwater Planning MWRD Adopted Cook **County Stormwater** Initiated Five Master Plan Pilot Studies Management Plan **Green Infrastructure Plan Adopted** The authority for general supervision of District's authority amended to allow for flood-prone property acquisition and to plan, implement, finance, and operate local stormwater stormwater management in Cook management projects. County was conveyed to the District by the **Detail Watershed Plans (DWPs)** completed for the 6 major watersheds of Cook County Illinois State

legislature.



#### Stormwater Program Statutory Background – Public Act 93-1049

#### PA 93-1049 Enacted By Illinois General Assembly in 2004

- Two key objectives of the Stormwater Program
  - Capital Improvement Program to address existing flooding concerns
  - Comprehensive stormwater regulations to prevent future development and redevelopment projects do not exacerbate flood damages
- The Act required the District to prepare and adopt by ordinance a countywide stormwater management plan ("CCSMP")

#### **CCSMP Adopted February 15, 2007**

- Established program mission to Plan, Implement and Finance
   Regional Stormwater Management Activities
- Defined Stormwater program structure, regulatory concepts, Detailed Watershed Planning (DWP) methodology, and Maintenance

Public Act 093-1049

SB2196 Enrolled

LRB093 15617 MKM 41224 b

#### "An Act concerning stormwater management"

Be it enacted by the People of the State of Illinois, represented in the General Assembly:

Section 5. The Property Tax Code is amended by changing Section 18-185 as follows:

(35 ILCS 200/18-185)

Sec. 18-185. Short title; definitions. This Division 5 may be cited as the Property Tax Extension Limitation Law. As used in this Division 5:

"Consumer Price Index" means the Consumer Price Index for All Urban Consumers for all items published by the United States Department of Labor.

"Extension limitation" means (a) the lesser of 5% or the percentage increase in the Consumer Price Index during the 12-month calendar year preceding the levy year or (b) the rate of increase approved by voters under Section 18-205.

"Affected county" means a county of 3,000,000 or more inhabitants or a county contiguous to a county of 3,000,000 or more inhabitants.

"Taxing district" has the same meaning provided in Section

#### PA 93-1049 Enacted By Illinois General Assembly in 2004

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#### COOK COUNTY STORMWATER MANAGEMENT PLAN

"A framework for the countywide program"



Metropolitan Water Reclamation District of Greater Chicago

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#### **Detailed Watershed Plans (DWPs) and Early Projects**

# Development of DWPs for each of the 6 major watersheds Purpose:

- Identify stormwater related problems in a watershed
- Develop alternative solutions to address regional flooding and erosion problems
- Evaluate the alternatives to determine those that are most effective in addressing the watershed's needs

# De De North De

# Early projects included Streambank Stabilization and Regional Flood Control Projects

- Following completion of DWPs, over 30 regional projects recommended for implementation
- CCSMP also provided for implementation of projects previously identified by the US Army Corps, IL DNR, or similar agencies

#### **Heritage Park Flood Control Facility**





#### **Stormwater Management Phase II Development – "and LOCAL"**

After a devastating storm event on April 18, 2013, the District took action to expand its program





#### Stormwater Management Phase II Development – "and LOCAL"

## **Expansion of the Stormwater Program required amendment to the District's Legislative Authority and the CCSMP**

- Board of Commissioner's authorized the implementation of
   Phase II of the Stormwater program to allow the District to assist local communities with flooding issues
- In 2013 and 2014, the District performed extensive outreach to communities, soliciting over 600 problem areas and/or requests for assistance with projects
- Projects prioritized and assistance provided in the form of funding, engineering, or both.
- CCSMP was amended July 10, 2014 to formally add authority to assist communities to address both region and "local" stormwater problems, and establish a flood-prone property acquisition program



On June 18, 2014, then Governor Pat Quinn signed HB 3912 into law, becoming Public Act 98-0652



#### In 2014, the District entered a Consent Decree with the USEPA that required implementation of a Green Infrastructure Plan.

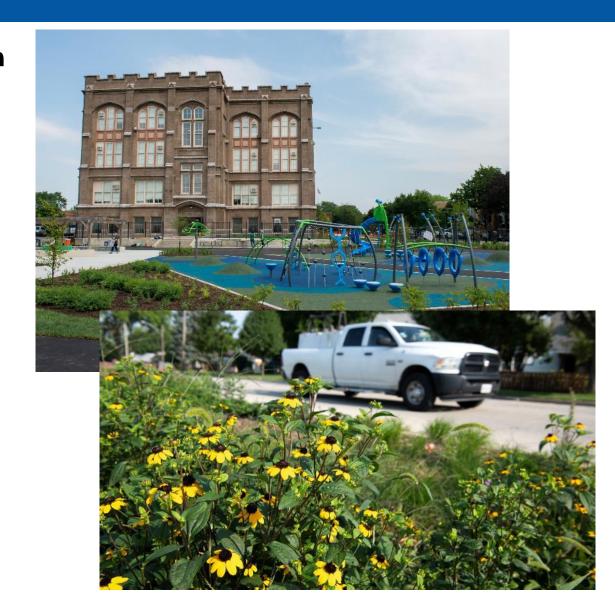
The District was required to implement GI projects that provided 10 million gallons in retention capacity by 2029.

In less than a decade over 100 green infrastructure projects have been completed throughout Cook County with the ability to capture more than 15 million gallons of stormwater per rain event.

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





#### Stormwater Call for Projects - Visit mwrd.org/stormwater/partnerships

Local governments and public agencies can apply to become partners on stormwater projects.



# **Green Infrastructure (GI) Partnership Program**

MWRD provides funding to build GI projects.



### Stormwater Partnership Program (SPP)

MWRD provides funding to build stormwater management projects that are in design or shovel-ready.



#### Flood-Prone Property Acquisition (FPPA) Program

MWRD provides funding to acquire flood-prone properties on a voluntary basis.



#### **Conceptual Projects**

MWRD provides technical assistance to study your flooding problem and design a solution.



# Regional Flood Control and Streambank Stabilization

**Monitoring and Research Department Seminar Series** 

April 26, 2024

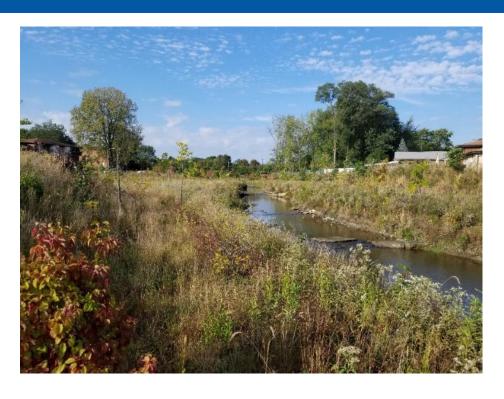


#### Regional Flood Control and Streambank Stabilization

#### **Regional Flood Control Projects**

- 24 projects to date
- 945 acre-feet of storage added
- >4,000 structures protected
- \$353M in total construction cost





#### **Streambank Stabilization Projects**

- 13 projects completed to date
- 9.3 miles of streambank restored
- >150 structures protected
- \$37M in total construction costs



#### Contract 13-370-3F, Buffalo Creek Reservoir Expansion

#### Location

Lake County, Illinois

#### **Description**

- Partnership with Lake County Forest Preserve District and the Village of Buffalo Grove to expand an existing flood control reservoir by 180 acre-feet.
- Project provides flood protection to 107 structures.
- Scope of work involved mass excavation, prairie and streambank restoration, over 2 miles of new trails and construction of 7 timber boardwalks.

#### **Construction Cost**

\$9,678,900.00

#### **Status**

• Project substantially completed in 2020. Currently in year 5/5 of post-construction monitoring and management period.





#### Contract 11-186-3F, Addison Creek Reservoir

#### Location

Village of Bellwood

#### **Description**

- 600-acre-foot reservoir which includes a control structure, inlet structure, spillway, and pumping station.
- In conjunction with Addison Creek Channel Improvements, the project will reduce flooding to 2,200 properties.

#### **Construction Cost**

\$81,304,221

#### **Status**

Construction completed in April 2024.





#### **Contract 11-187-3F, Addison Creek Channel Improvements**

#### Location

Villages of Bellwood, Broadview, Melrose Park, Northlake, Stone Park, and Westchester

#### **Description**

- Project includes a mix of natural design, gabion baskets, soldier pile walls, concrete, riprap, articulated concrete blocks, vegetation clearing, and removal of three bridges.
- Project improvements will reduce flooding to 2,200 properties along Addison Creek.

#### **Construction Cost**

\$77,307,780

#### **Status**

 Construction started in late 2023. Substantial completion is projected in August 2025.





#### Contract 12-056-5F, Flood Control Project on Prairie Creek

#### Location

City of Park Ridge and Maine Township

#### **Description**

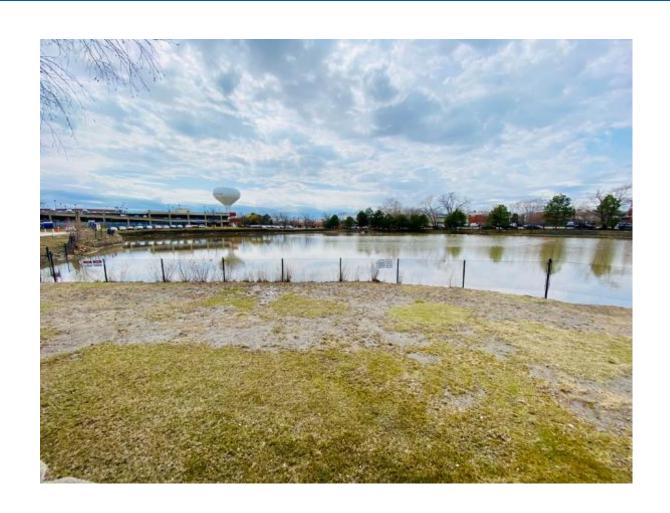
- Project includes conveyance improvements including new bridges and culverts, expansion of an existing detention pond, construction of a new diversion sewer, and streambank stabilization along Prairie Creek.
- Project will reduce flooding to over 100 properties.

#### **Estimated Construction Cost**

\$17,000,000.00

#### **Status**

- IGAs being negotiated with the City of Park Ridge and Maine Township. Coordination with Lutheran General Hospital ongoing.
- Construction expected to begin in early 2025



# Contract 18-249-AF, Central Park Stormwater Detention Basin and Separate Storm Sewer Improvements in Harvey

#### Location

City of Harvey

#### **Description**

- Construction of a 23-acre-foot stormwater detention basin in the combined sewer area.
- New storm sewer discharging to Wood Street storm sewer with low-flow connection to the existing combined system.
- 209 structures benefitted during a 100-year storm event.

#### **Estimated Construction Cost**

\$9,848,774

#### **Status**

- Project currently in final design
- FEMA's BRIC Program selected this project as having met the basic eligibility requirements for a \$5M grant and the project will enter the next phase of the awards review process.
- Construction scheduled to begin in Summer 2025.







#### **Green Infrastructure Call For Projects**

#### **Process**

Pre-Applications: due on December 31 of every year

Full Applications: due 6 weeks after opening

Review period

Recommendations submitted to the Board

Kick-offs/IGA process

Design and IGA done by December 31

Construction window the following year

#### **Post-Installation**

Maintenance inspections are required

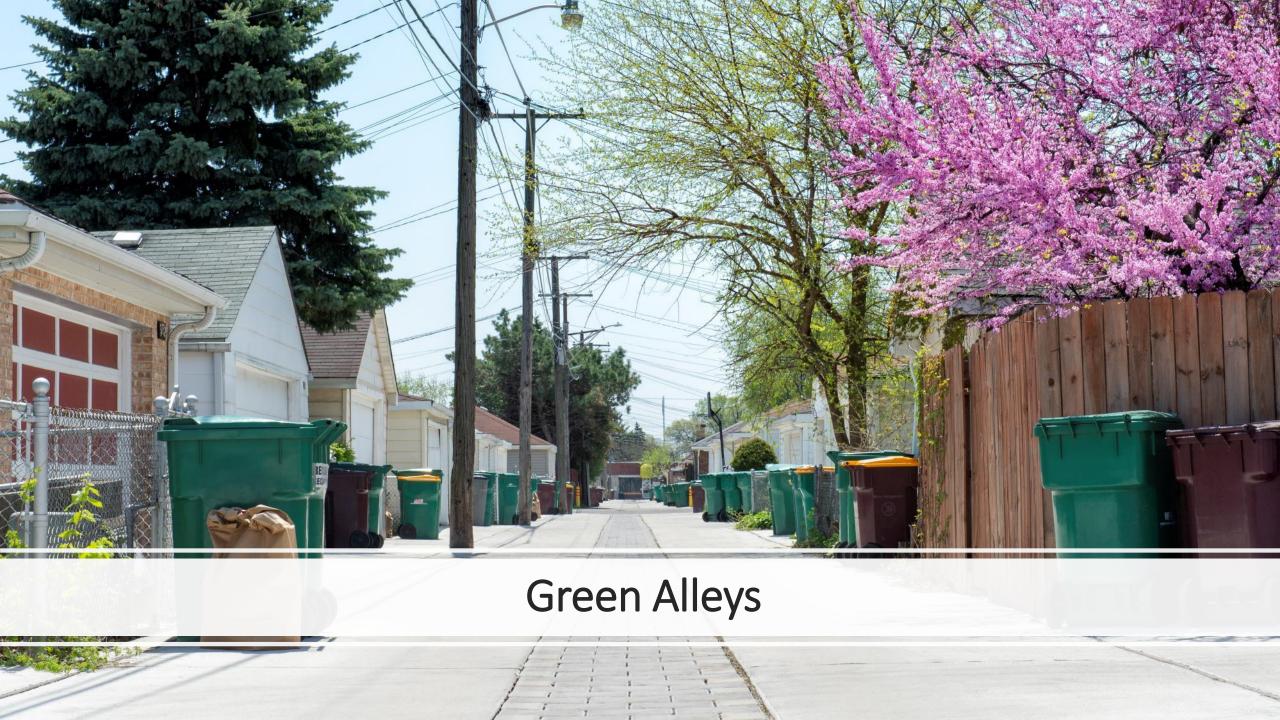
Staff inspections are completed

Typical life of a GI project is roughly 25 years











Rain Gardens



Green Roof at Racine Avenue Pumping Station

# Green Planner Guide

at a Glance

EACH BMP SECTION WILL PROVIDE YOU WITH:



## Application and Benefits

- Various land use scenarios
- Co-benefits
- Triple bottom line



#### **Design Guidance**

- Important considerations
- Opportunities
- Regulatory guidance
- · Standard details



## Construction & Maintenance

- Pre-construction meeting items
- Performance indicators



#### **Cost Considerations**

- Breakdown of variable and unit costs
- Cost benefits
- Potential cost offsets



#### This Guide Includes:

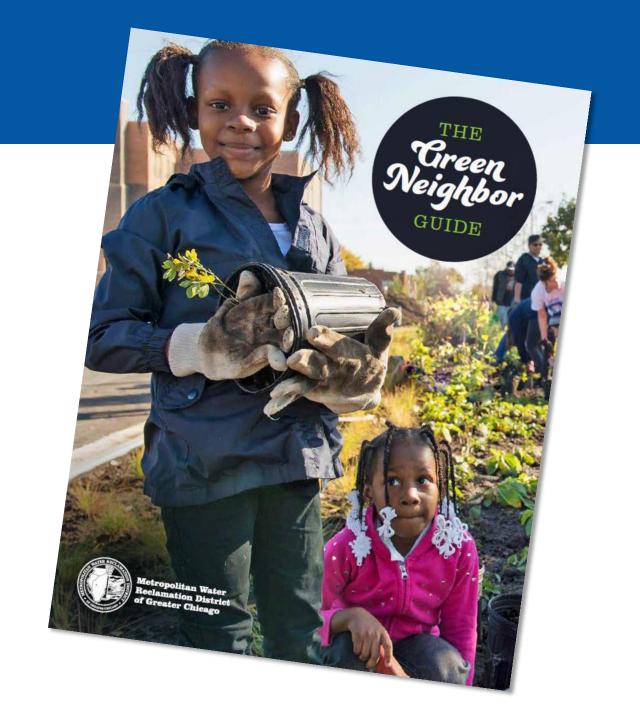
- ✓ Plant Lists
- ✓ Construction Checklists
- ✓ Inspection Checklists
- ✓ Cost breakdowns

Tentative Release Summer 2024



#### **Green Neighbor Guide**

Step-by-step instructions on how to manage stormwater on residential properties Covers rain barrels, rain gardens, permeable pavement, and dry wells Available for download at: https://tinyurl.com/d9f8s4af







Before After

#### **Wadsworth STEM**

Woodlawn Community, Chicago

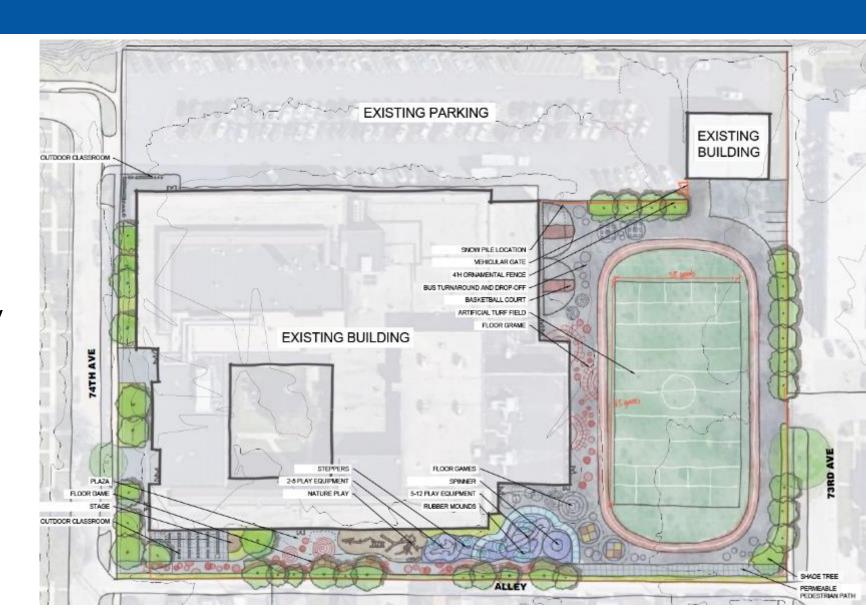
#### **Suburban Green Schoolyards**

#### Locations

Franklin Park, Cicero, Summit, Burnham

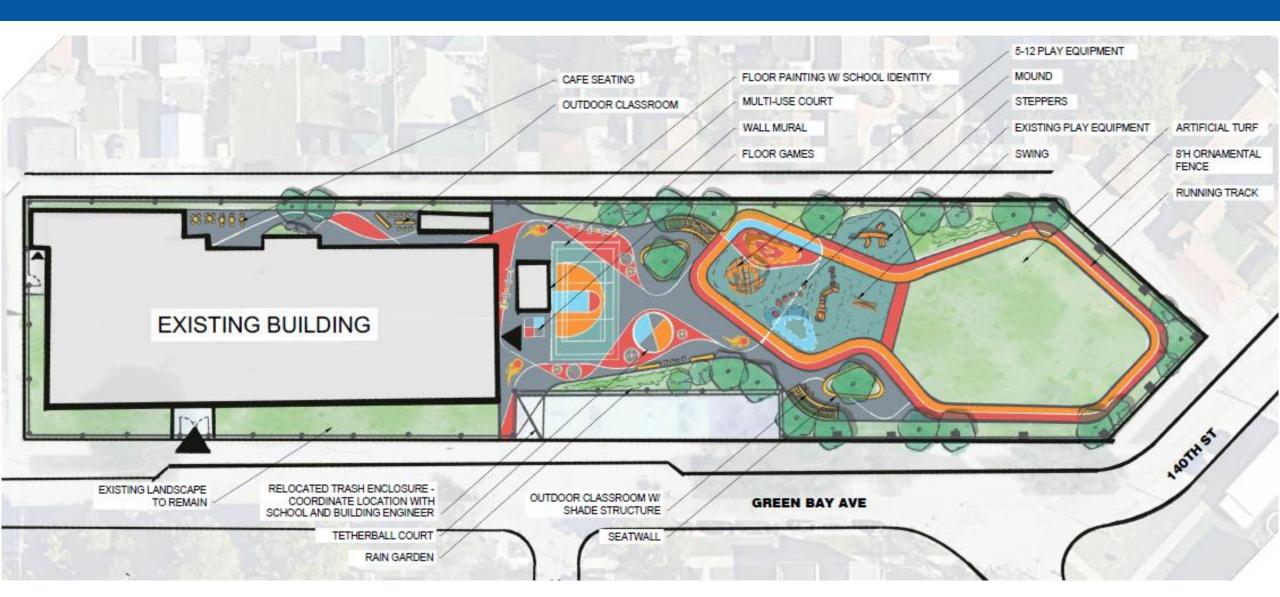
#### **Status**

- Design for elementary schools beyond 30%.
- Design for high schools is underway, 30% expected early summer.
- Final Design for all are anticipated Fall 2024.
- Funding still being sought.
- Construction expected Spring/ Summer 2025.
- IGAs will be needed executed.





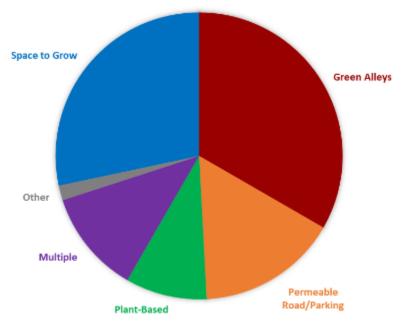
#### **Suburban Green Schoolyards**



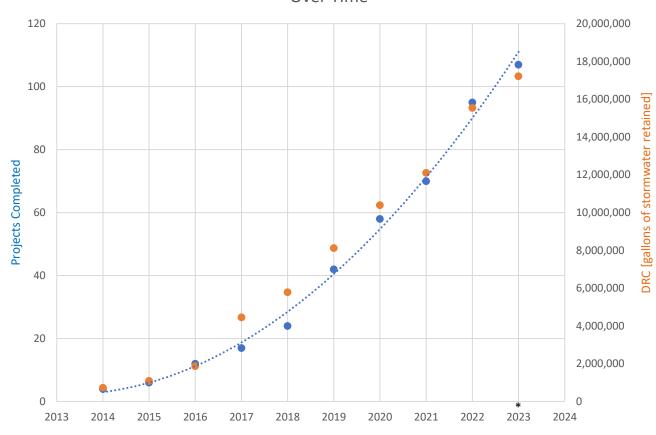
#### **Number of Projects**

- Completed: 107
- Ongoing (to be completed in 2024): 15

#### **Types of Projects**



### Projects Completed and Design Retention Capacity Over Time





# Local Stormwater Partnerships

Monitoring and Research Department Seminar Series

April 26, 2024

#### **The Local Stormwater Partnership Program encompasses:**









Voluntary Flood-Prone Property Acquisition



#### **Conceptual Projects**



#### **About the program**

Municipalities apply to MWRD for possible technical assistance in the form of preliminary engineering to investigate Stormwater problems and identify potential alternatives.

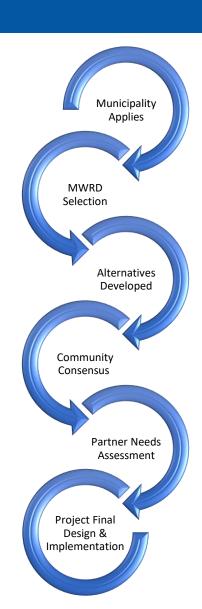
#### **How Does MWRD Provide Assistance?**

Selected conceptual project partners work with the MWRD to develop up to 30 percent design plans on an agreed-upon solution.

After finalizing the 30 percent design plans, the partner and MWRD assess the best path to move the project into final design.

#### **Future IGA Partnership**

Depending on the outlook of project implementation at the 30 percent design milestone, partners may enter into an intergovernmental agreement (IGA) with the MWRD in order to complete the project.





#### 14-253-5F, Robbins Flood Control Project on Midlothian Creek



#### Location:

Village of Robbins

#### **Lead Agency:**

**MWRDGC** 

#### **Description:**

To address flooding along Midlothian Creek in Robbins:

- Naturalized detention facility along the creek and a diversion channel to Cal-Sag Channel
- Channel improvements in the existing creek
- To reduce flood damages for over 92 structures

#### **Project Status:**

- Phase 1: Under construction, scheduled completion in Spring 2024
- Phase 2: Construction to begin Summer 2024





#### 14-253-5F, Robbins Flood Control Project on Midlothian Creek



#### **Partnership Assistance Included:**

- Land Acquisition
- Utility Coordination
- Permits and Easements
- Preliminary and Final Design
- Intergovernmental Agreements
  - CCLBA and Robbins
- Construction and Post Award
- Grant Applications

#### **Project Costs:**

- Phase 1: currently \$11.1M
- Phase 2: estimated \$20.0M





#### Conceptual to Partnership Project: Stony Creek, Oak Lawn

## <u>Conceptual Project</u>:18-250-5F, Stony Creek Flood Control Improvements

- Background: Multiple rainfall events caused damages to over 140 homes in a 1-square mile area tributary to Stony Creek, and the Village incurred significant expenses in flood responses.
- District performed preliminary engineering to evaluate flooding problems in Oak Lawn tributary to Stony Creek, evaluated a number of alternatives, and recommended a project to the Village for consideration
- 7 alternatives developed and reviewed by the Village for:
  - Number of benefiting structures
  - Project Cost
  - Volume of storage provided





#### Conceptual to Partnership Project: Stony Creek, Oak Lawn

<u>Partnership Project</u>: 23-IGA-11, Stormwater Storage at Community High School District 218 Administration Sports Field and Storm Sewer Improvements in Oak Lawn

 After preliminary engineering identified a feasible project to advance, the Village of Oak Lawn is now advancing it into final design and will manage construction.

 Through an Intergovernmental Agreement, the District will contribute towards the construction cost

Project stormwater improvements which include:

 27.5 acre-foot surface detention facility within the local high school district's ball fields and

 upsizing approximately 6,600 linear feet of storm sewers that discharge to Stony Creek





#### **Local Stormwater Partnership Program**



#### About the program

- The District help local government organizations fund construction of stormwater infrastructure.
- Eligible projects include those that address flooding through a variety of traditional engineering solutions including localized detention, upsizing critical storm sewers and culverts, pumping stations, and establishing drainage ways.
- The District solicits applications and selects projects for partnerships. The selected partner is responsible for the project's design, contract advertisement and award, construction, and long-term maintenance.



More Info at: <a href="https://mwrd.org/stormwater/spp">https://mwrd.org/stormwater/spp</a>



#### Burning Bush (18-IGA-25) & Aspen Trails (20-IGA-31)

## **Location**Mount Prospect

#### Description

The Village of Mount Prospect constructed two stormwater storage areas to relieve flooding in a low-lying residential area located in the interior of the Levee 37 drainage area. (13.4 acre-feet)

The Village of Mt. Prospect constructed approximately 17 acrefeet of underground flood storage and associated relief sewers at Aspen Trails Park.

#### **Project Benefits**

These projects removed 42 at-risk structures from the 10-year inundation area and provide flood reduction benefits to approximately 120 structures.

**Burning Bush** \$1.30M/\$4.30M **Aspen Trails** \$2.85M/\$5.93M





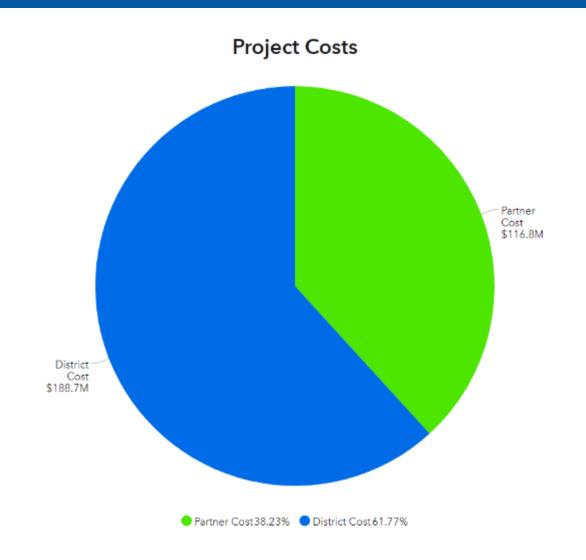
Burning Bush (above), Aspen Trails (right)





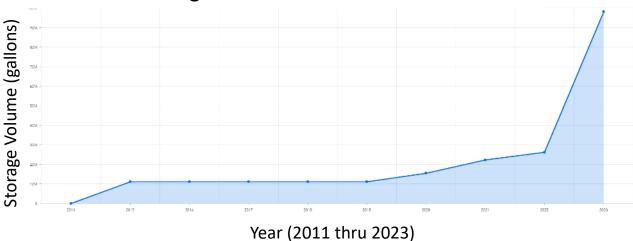


#### **Local Stormwater Program's Cumulative Statistics**



## Cumulative Number of Ongoing and Completed Projects 76 22 25 29 49 49 49 49 76







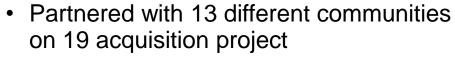
#### Flood-Prone Property Acquisition (FPPA) Program

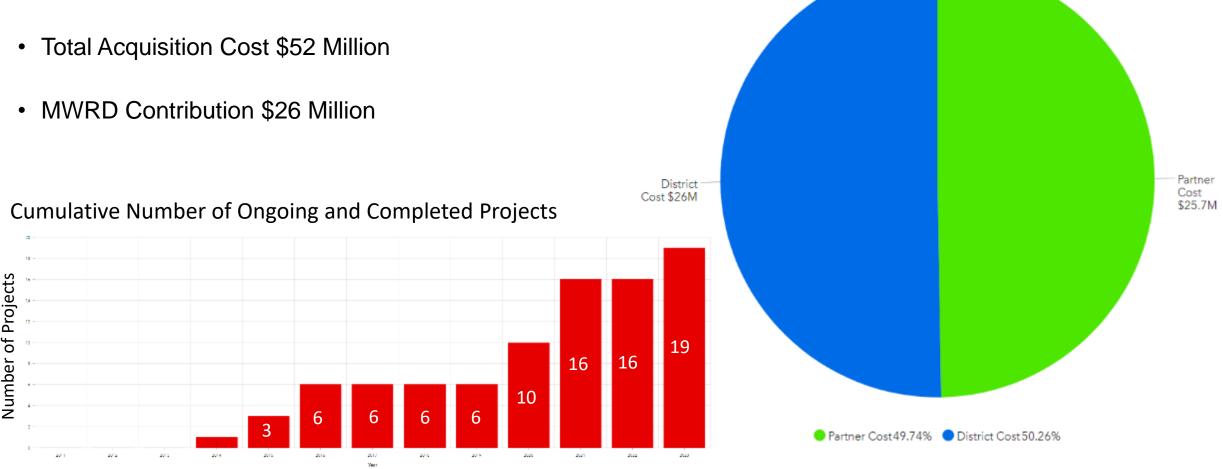


#### **About the program**

- The District helps local government organizations with funding for the voluntary acquisition of flood-prone properties.
- The FPPA program helps local municipalities acquire properties that sustain repetitive damage in flood-prone areas from willing sellers and restore the property to green space that can better manage stormwater.
- Selected partners are responsible for the overall acquisition and demolition of the flood-prone property, converting the parcel to permanent open space for public use, and long-term maintenance of the parcels.







**Project Costs** 

#### **Acquisition of Flood-Prone Properties in Lyons**

#### Location

Southview Ave and Circle Dr Village of Lyons

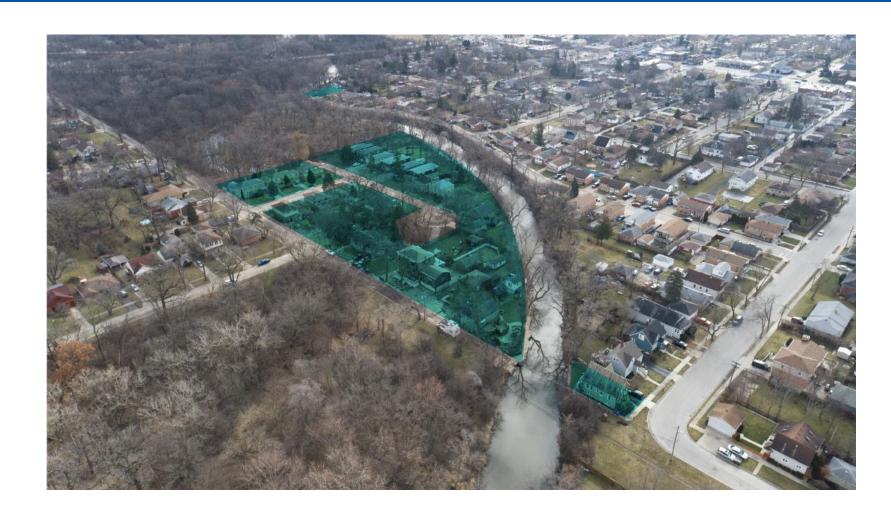
#### **Description**

Voluntary purchase of 26 flood-prone properties along Salt Creek

## **Estimated Acquisition Cost** \$5,771,119

#### **Status**

- Multiple properties acquired
- Lyons continuing acquisition of remaining properties





# Stormwater Master Planning

Monitoring and Research Department Seminar Series

April 26, 2024

## **Empowering Municipalities**

A regional authority providing guidance and county-wide (volumetric) planning



Municipalities

Champion and manage stormwater projects

Responsible for prioritizing and developing strategies to address local flooding issues and problems.



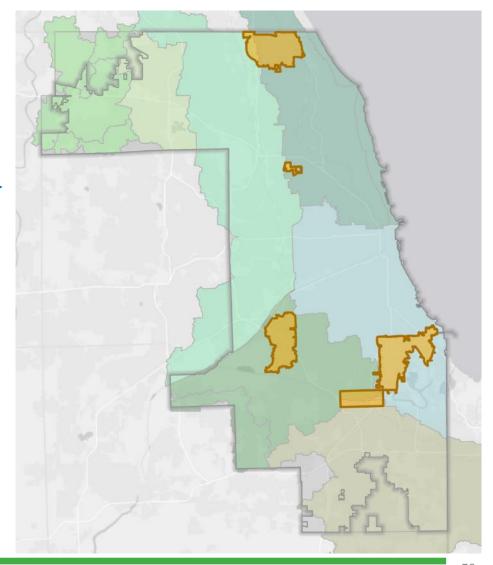
## District Stormwater Master Planning Evolution

#### **Stormwater Master Planning**

Investigate "urban flooding" issues and evaluate potential green and gray infrastructure solutions.

2015 2016 2017 2018 2019 2020 2021 2022 2023

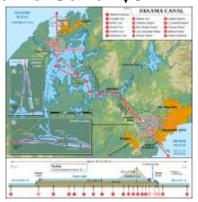
Five Master Plan Pilot Studies



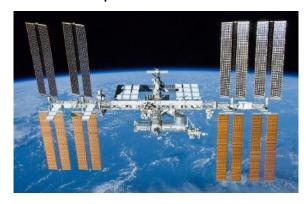
## Magnitude of the Problem

#### From Initial 5 Pilot Studies, projected Countywide to address Urban Flooding = \$70 Billion

#### Panama Canal \$9.4 Billion



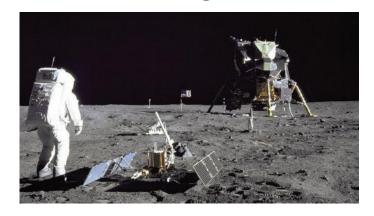
International Space Station \$60 Billion

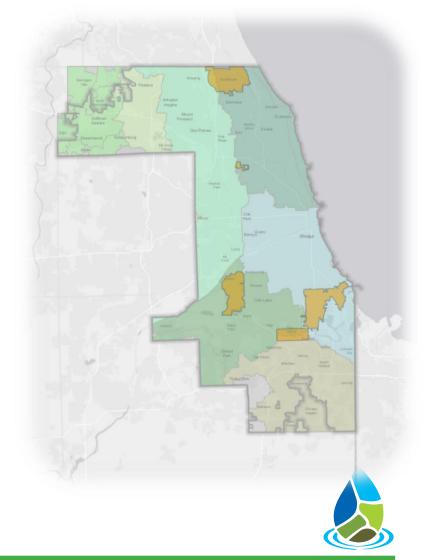


Chunnel \$36 Billion



**Moon Landing \$144 Billion** 





## District Stormwater Master Planning Evolution

#### **Stormwater Master Planning**

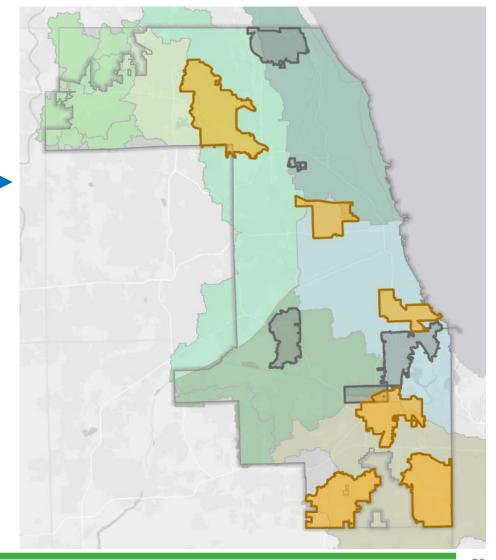
Investigate "urban flooding" issues and evaluate potential green and gray infrastructure solutions.

Six Stormwater Master Planning projects: Butterfield, North Creek/Deer, Willow/Weller, South Suburban, Chicago West and Chicago South

2015 2016 2017 2018 2019 2020 2021 2022 2023

Five Master Plan Pilot Studies

- Patchwork approach
- Plans become dated quickly and not adaptive/responsive to changing conditions



## How are flooding issues solved?

Conveyance





Storage



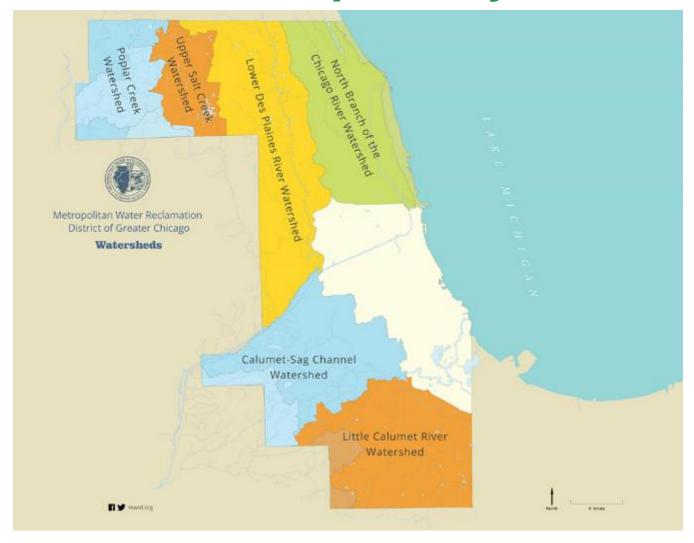








## **Adaptability**





## **Competing Priorities**

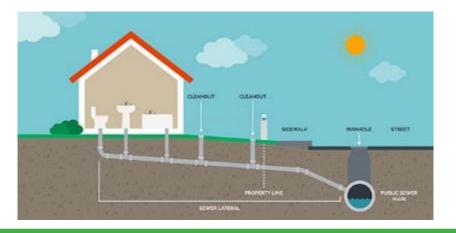
Roads



**Potable Water** 



**Sanitary Sewer** 





## **Guidelines for a County Wide Plan**

- Intuitive
- Timely
  - Time to develop
  - Up-to-date and relevant at point in time of need
  - A tool to quickly provide decision makers necessary guidance
- Able to track progress
- Cost Effective
- Adaptable-easily accepts more/new information to improve clarity



## District Stormwater Master Planning Evolution

#### **Stormwater Master Planning**

2015

Investigate "urban flooding" issues and evaluate potential green and gray infrastructure solutions.

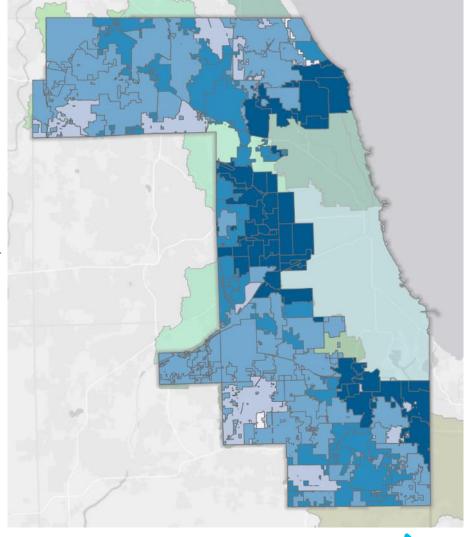
Six Stormwater Master Planning projects: Butterfield, North Creek/Deer, Willow/Weller, South Suburban, Chicago West and Chicago South

2016 2017 2018 2019 2020 2021 2022 2023 2024

Five Master Plan Pilot Studies

Stormwater Master Planning GIS Portal

- A GIS Portal to host all master planning data
- Continually updated, current and relevant
- Provide tools (web apps, storymaps, desktop references)
- Data will be used for Stormwater Partnership Program





## Use a volume-based approach to increase the city's capacity to manage stormwater

Strategy 1 Establish stormwater storage goals

	Level of Service (Storm Recurrence Interval)					
	5-year	10-year	25-year	50-year	100-year	
Rainfall Total (in) <sup>a</sup>	2.49	2.99	3.74	4.35	4.97	
Stormwater Storage Targets (ac-ft) <sup>b</sup>	7.5	15.2	27.9	39.0	50.7	
Estimated Cost (in 2023 dollars)	\$2,997,000	\$6,083,000	\$11,163,000	\$15,581,000	\$20,263,000	
Timeline	To achieve within 5 years	To achieve within 10 years				

a. Rainfall total for a 2-hour duration storms (Illinois State Water Survey Bulletin 75).



b. Storage targets are calculated for a 2-hour duration storm with a given recurrence interval.

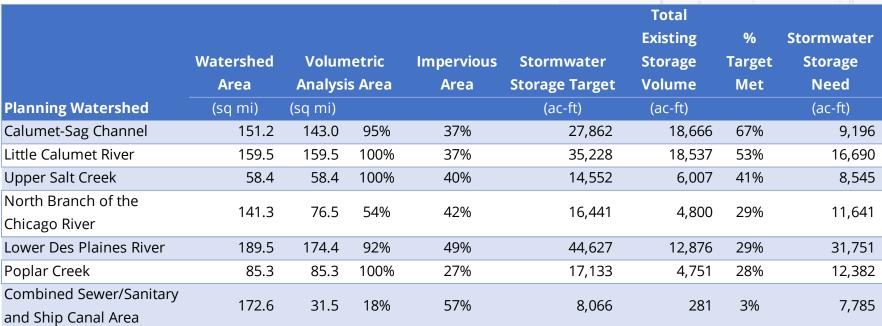


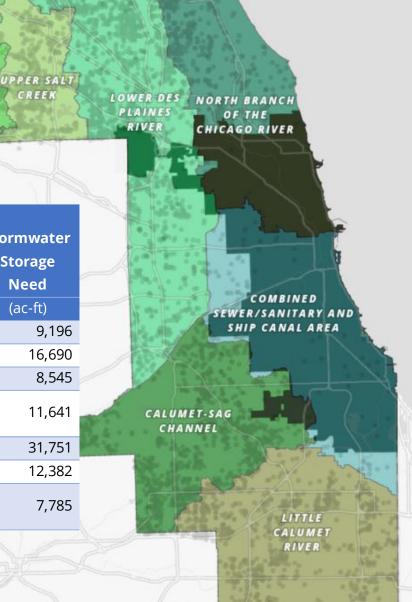
### Stormwater Project Opportunity Areas





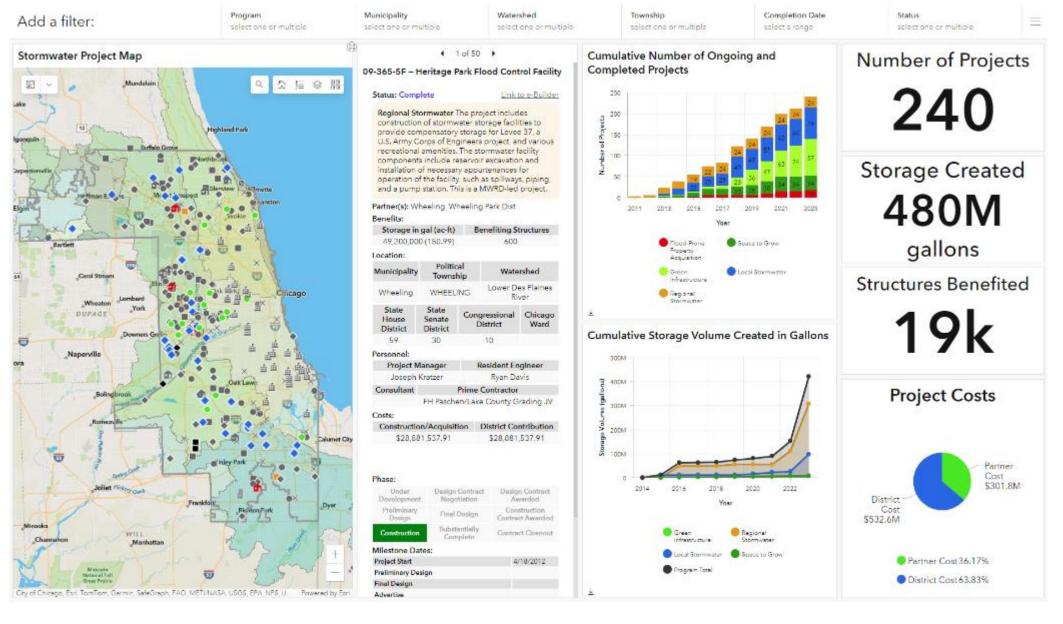
## **Volumetric Analysis** by Watershed





CREEK

POPLAR CREEK







### Stormwater Program to-date (nearly 500mGal of storage created)

Program Component	Current Number of Projects	Structures Protected / Removed	Construction / Acquisition Cost (\$Millions)	MWRD Cost (\$Millions)
Regional Stormwater Projects	24	4,142	\$353	\$272
Local Stormwater Partnerships	76	>11,000	\$306	\$189
Green Infrastructure Projects	121*	3,583	\$124	\$46
Flood Prone Property Acquisitions	19	177	\$52	\$26
Totals	240	>18,000	\$835	\$533

<sup>\*</sup>Includes all 34 Space to Grow projects completed through 2022.