



GREENPRINT PARTNERS

Unlocking the Value of Green Infrastructure
Incentive Programs for Urban Agriculture by
Leveraging Public and Private Investment

Webinar
October 26th, 2023



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The Core Team



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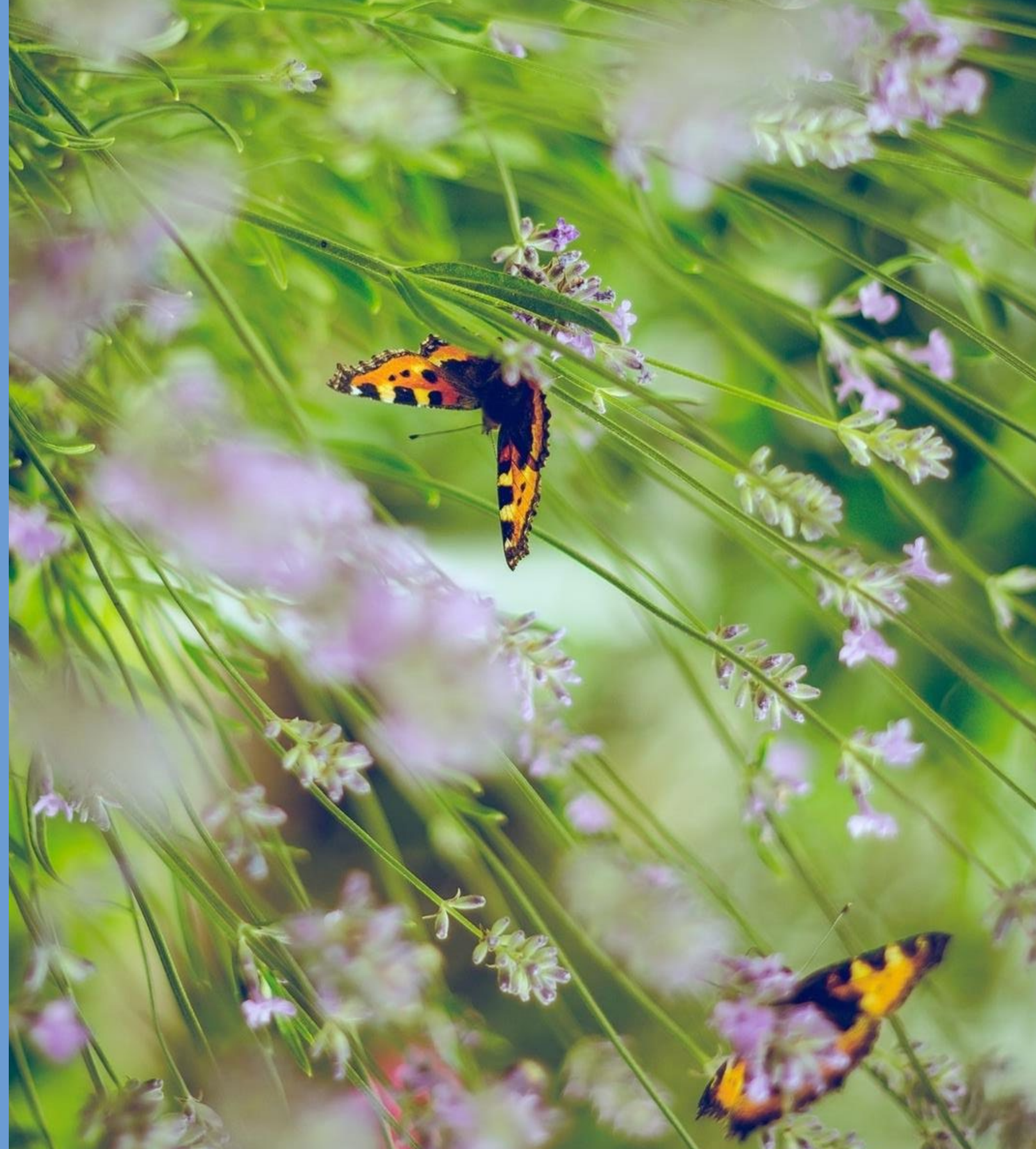
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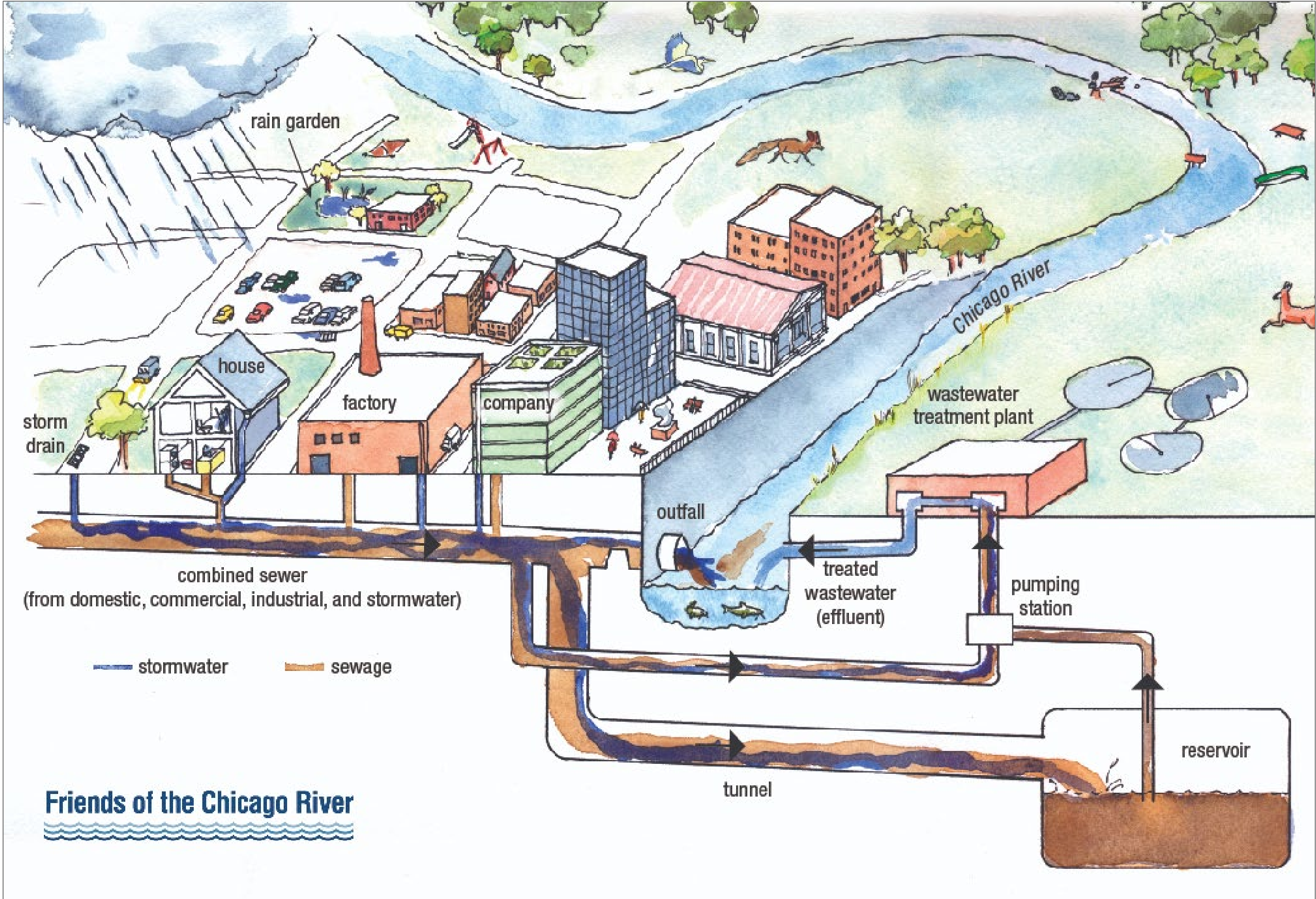


PROJECT BACKGROUND



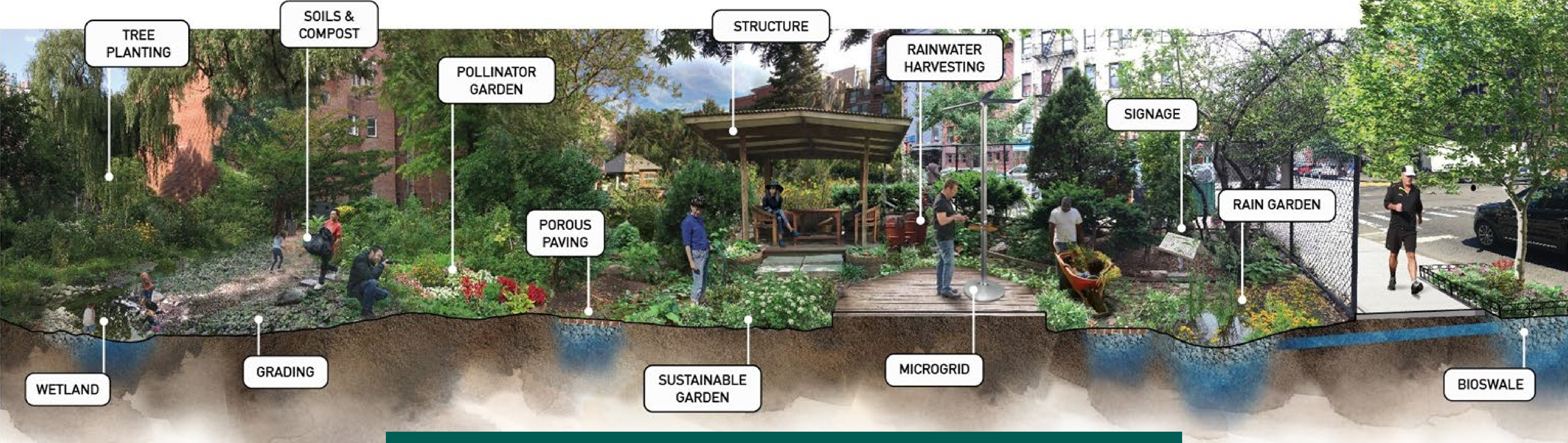
Combined Sewer Systems

These systems collect rainwater, sewage from toilets, and industrial wastewater in a *combined* pipe.



Green infrastructure is a multi-benefit solution.

Green stormwater infrastructure (“GSI”) is the use of vibrant natural systems to manage water where it falls.



To maximize its benefits, green infrastructure must be implemented at scale and maintained for the long-term.

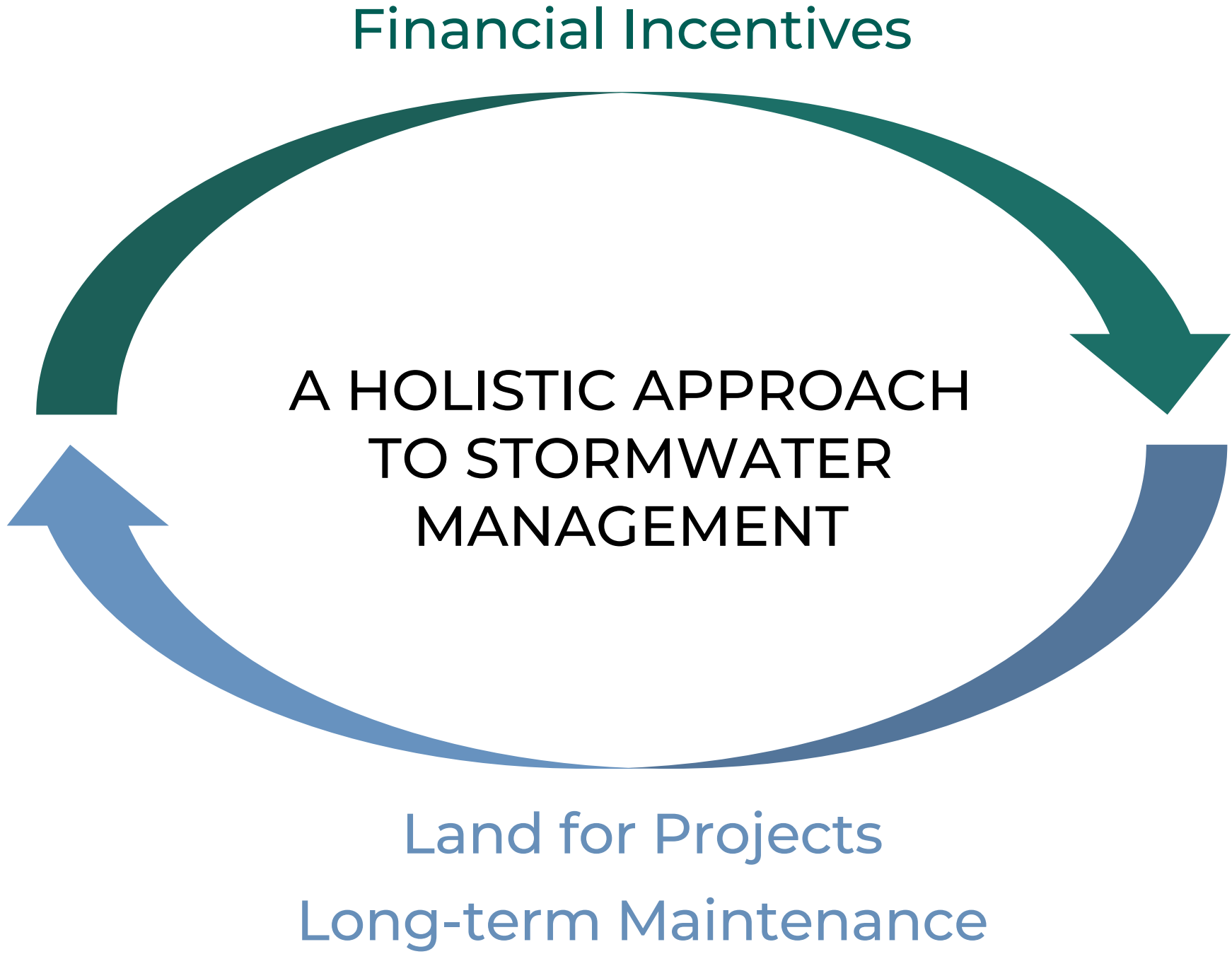
Illustration credit: We Design

What are 'Green Infrastructure Incentive' (GI2) Programs?

Water utilities offer **financial incentives** for private property owners to install green stormwater infrastructure that meets utility specifications.



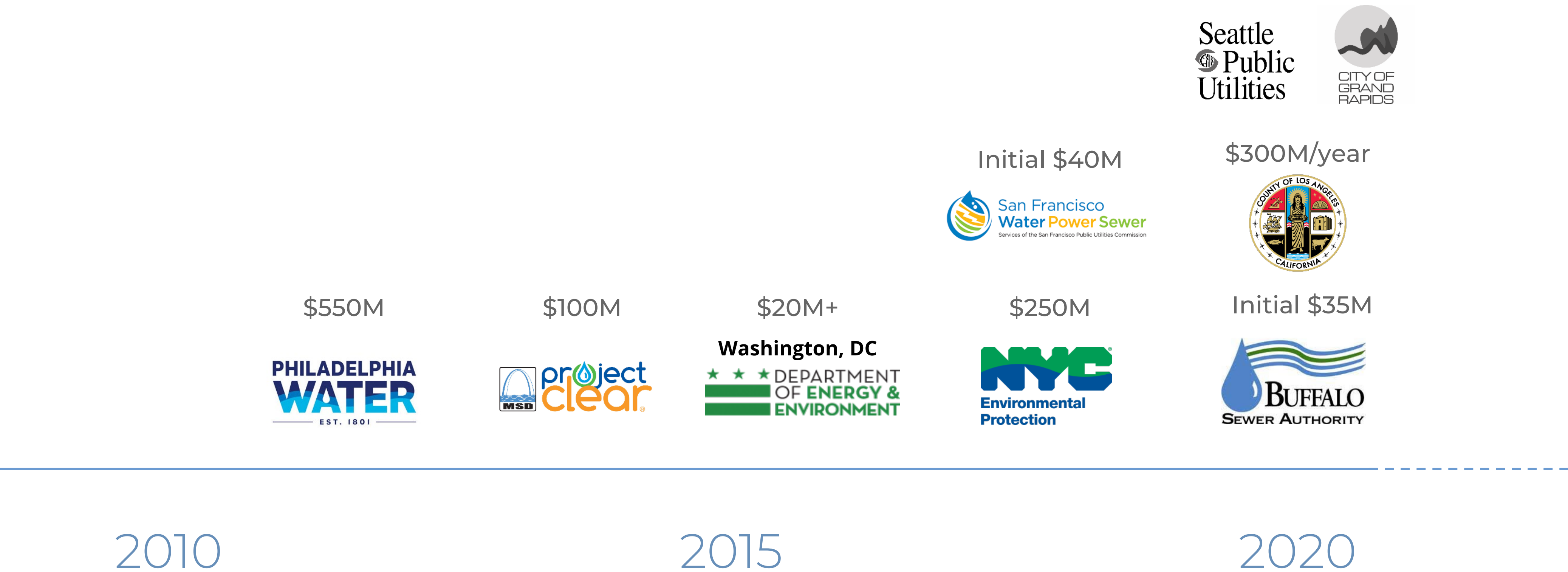
Cities / utilities seeking to scale green infrastructure need access to cost effective projects on private property



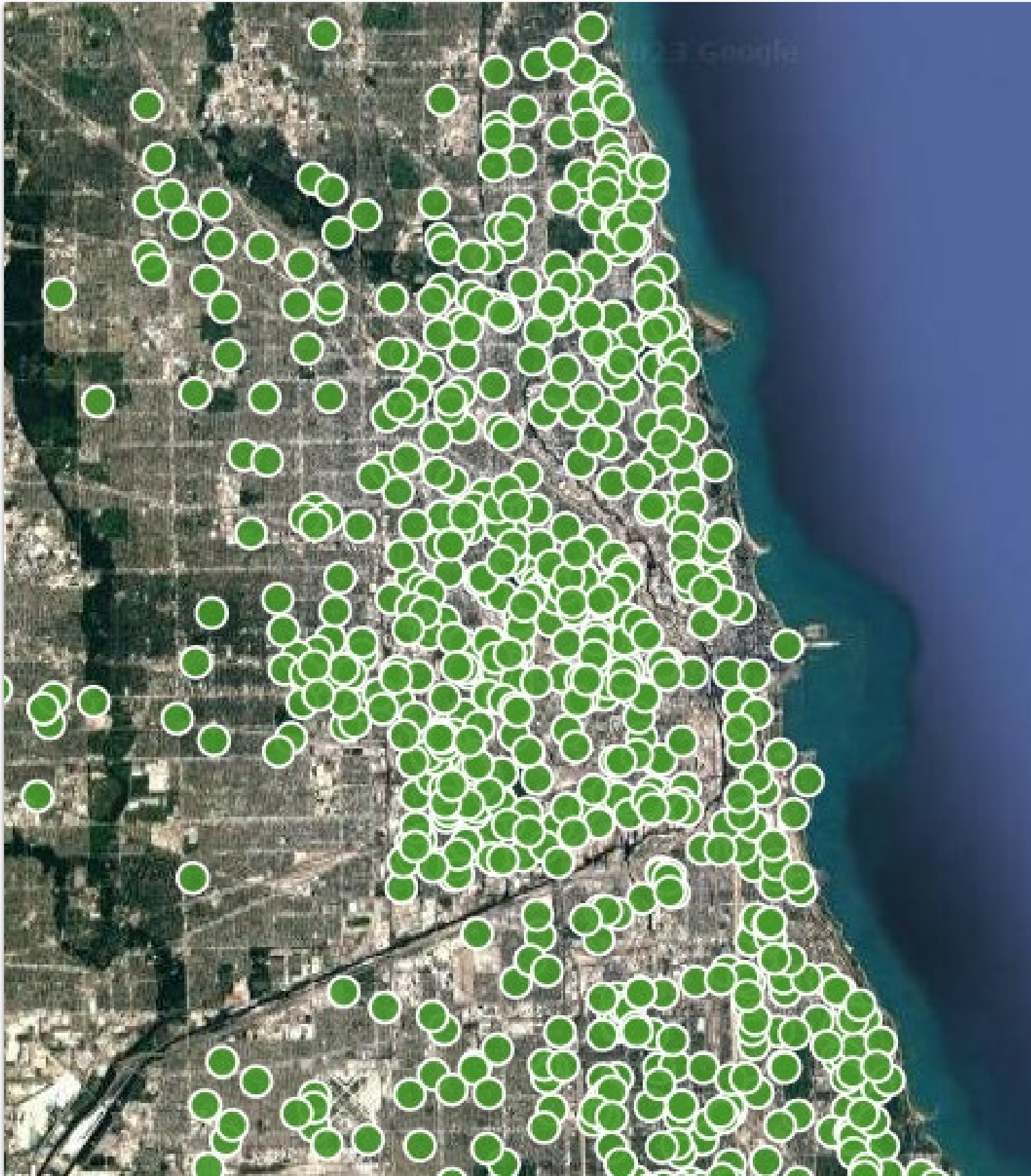
Private property owners benefit from grant-funded green space and (in some cases) reduced stormwater fees

GI2 program adoption is reaching an inflection point.

The following water utilities offer a financial incentive for landowners to retrofit their property with green infrastructure, creating a new marketplace.



Urban agriculture practices are on the rise.



Urban Agriculture Up Close

How Green Stormwater Infrastructure works on Urban Farms and Community Gardens

Native plants are best adapted to support pollinators and tolerate flooding, drought, disease, and pests

Clippings from plants in GSI can be used in on-site compost

Farm volunteers, managers, and employees can help maintain GSI

Neighbors and community members are important to bring into decision making about GSI design

Rainwater harvested from neighboring buildings can be used on site for GSI or to drip-irrigate crops

Trees provide shade for rest areas and areas for outdoor classrooms

Common farm tools can be used for GSI maintenance

Trees planted near buildings provide shade that cools the building and reduces energy use and costs.

People who visit the farm, are involved in distributing food, and receiving food are important to bring into GSI design decision.

Educational signage

Raingardens can remediate toxins from the soil

Plant Benefits

Plants used in GSI can help boost urban farm productivity and health. Here are a few ways:

- Provide habitat for pollinators
- Provide beneficial insect habitat
- Early growing grasses beat out weeds
- Soak up polluted water and toxins from the soil
- Bring carbon from the air to the soil

1. Bioswales collect runoff from pavement and provide a buffer for crops	2. Blue Roofs temporarily store rainwater	3. Cisterns store building runoff for use on site	4. Subsurface Systems store runoff underground	5. Bump-outs collect street runoff, calm traffic, and shorten the the street crossing distance	6. Green Roofs reduce the heat island effect and absorb rainwater
7. Tree Pits take in water from the street and provide shade to people walking by	8. Permeable Surfaces allow water to trickle directly into the soil	9. Planter Boxes absorb runoff and attract pollinators	10. Raingardens create a buffer for crops, and provide habitat for pollinators and beneficial insects	11. Vegetated Buffers and Filter Strips absorb contaminated water and runoff from crop rows	

The Well Farm, Peoria IL



Photos by Doug and Eileen Leunig

Using our knowledge to expand urban agriculture.

How can we duplicate
some of the successes of
the Well Farm to develop
a program that co-locates
GSI with Urban
Agriculture?

INITIAL LEARNINGS & SHIFT



Project Goals

USDA is funding Greenprint to develop a GSI program that co-locates GSI with urban agriculture.

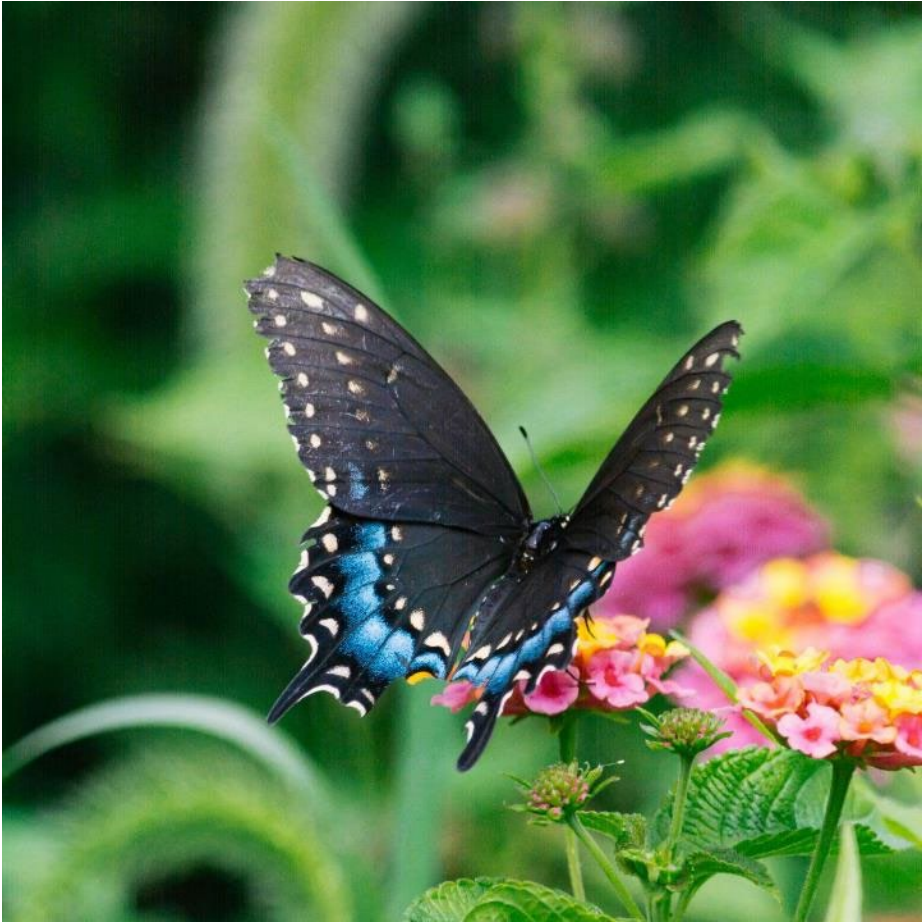


Initial Assumptions

What did we assume going into this project?

Assumption #1: Urban ag practitioners are not taking advantage of utility GSI incentive programs

Assumption #2: Practitioners stand to benefit due to the potential to:



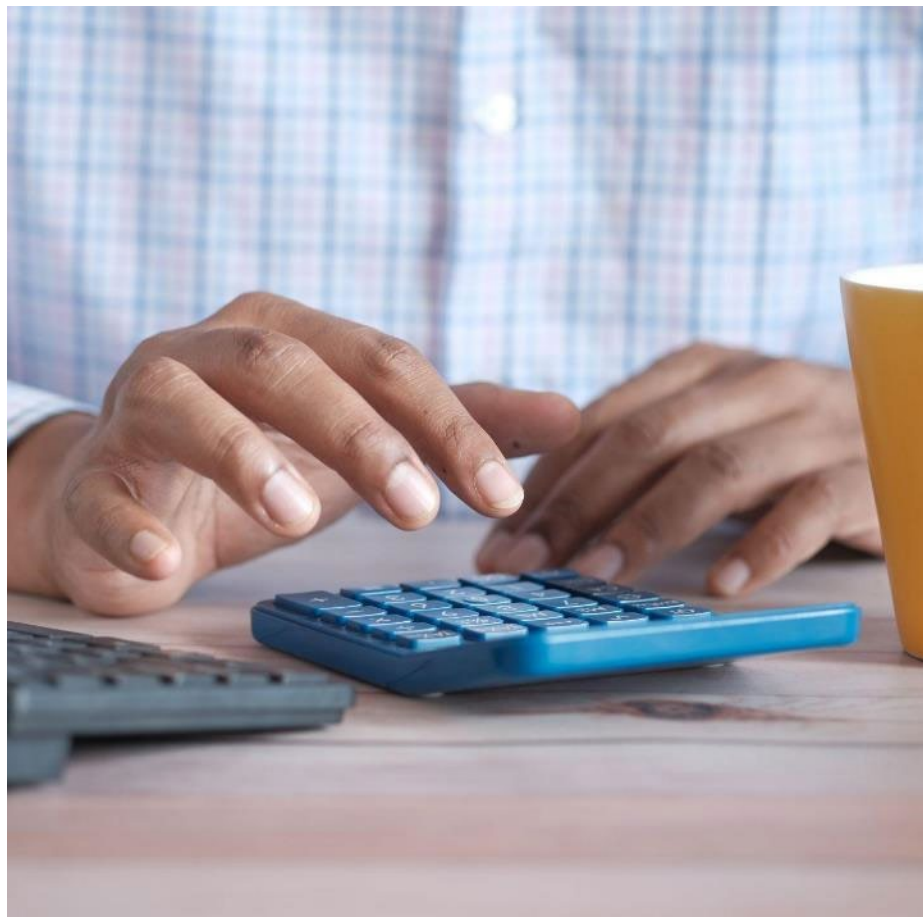
Support pollinator habitat



Manage excessive rainfall to reduce crop loss



Create a protective buffer between production spaces and urban ROW



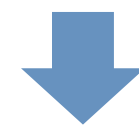
Reduce operational costs

Financial Modeling

APPROACH: Greenprint selected a community garden in the Botanical Heights neighborhood of St. Louis to be the pilot site that Quantified Ventures (QV) and Center for Neighborhood Technology (CNT) would focus on. QV and CNT explored the application of various intervention practices to the site and what, if any, outcomes the practices would produce.



FINDING: The project partners used the CNT Green Values Stormwater Management Calculator, a formula-driven research-backed quantification method, to measure the stormwater impacts in economic values [TABLE 1]. While the pilot site is estimated to reduce over 30,000 gallons of stormwater each year, this would have a negligible effect on the economics for the water utility if measured strictly on reduced treatment costs. However, utilities may be more inclined to invest in similarly sized GSI projects if there are other external considerations, such as fulfilling a consent decree or meeting site-specific needs.



TAKEAWAY: Given this finding, the project partners decided to pivot strategy and explore a model of using existing funding sources to complement potential outcomes-based financing and make the green stormwater infrastructure installations financially viable.

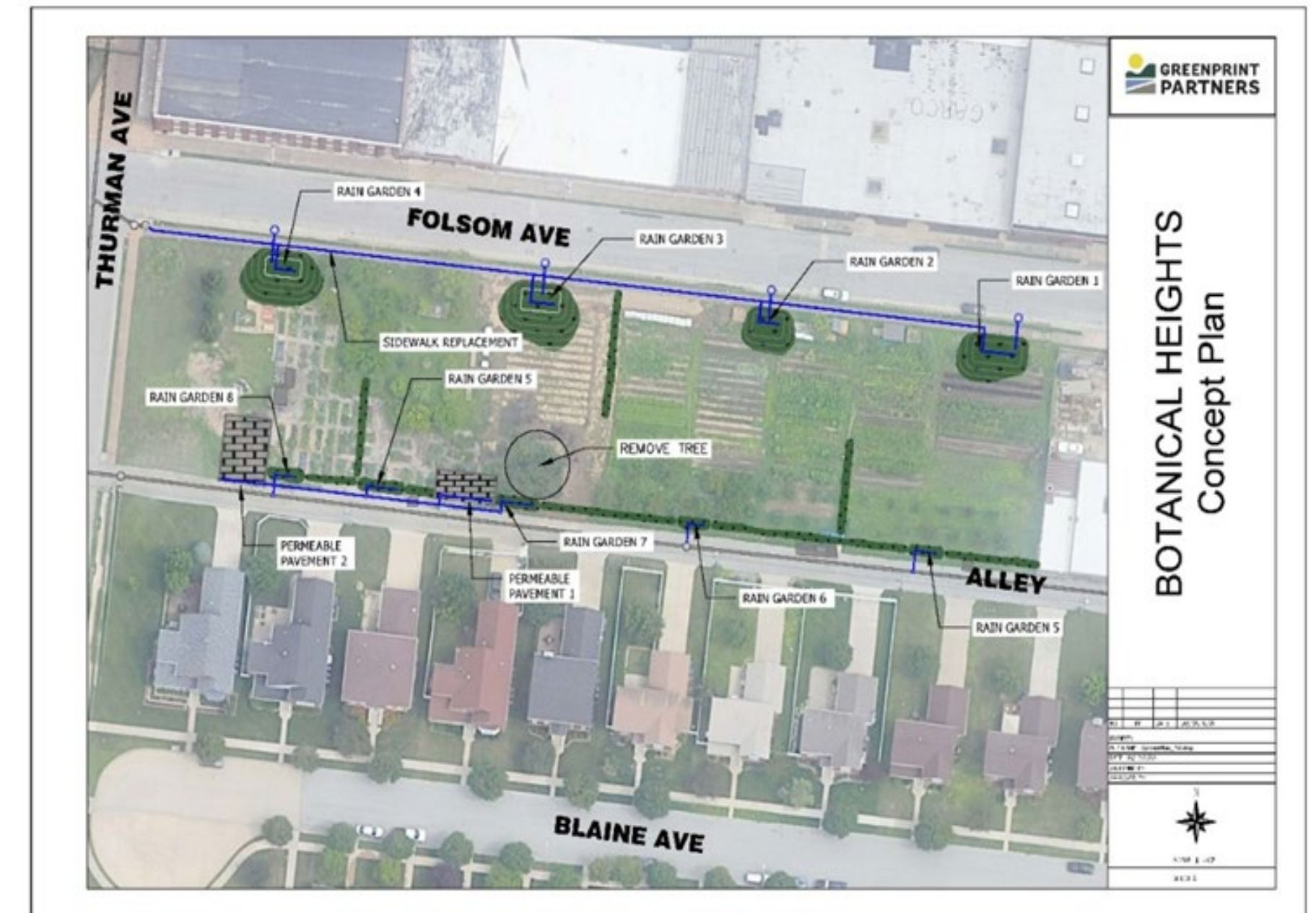


TABLE 1. Measurable Economic Impacts of GSI at Botanical Heights Community Garden

Estimated Total Site Area (sq. ft)	71,534
Annual value from groundwater replenishment	\$18.33
Reduced treatment benefit	\$6.35
Total gallons reduced per year	30,327

Key Learnings

What is informing our new direction with CIG?



Pilot Development in STL

- Assumed benefits were NOT highest priorities for urban ag practitioners
- Urban ag already maximizing creative use of their space
- Challenging to develop cost effective projects on existing urban ag sites
- Continued interest



MMSD Insights

- Interest from schools to integrate additional nature-based features like urban ag alongside their GSI projects
- Funding is disparate and uncoordinated



National Interest

- Utilities increasingly seeking ways to drive community benefit and support integrating additional nature-based features alongside GSI
- Restricted from funding these features and have asked private partners to find ways to fill the gap

PROJECT
PORTFOLIO

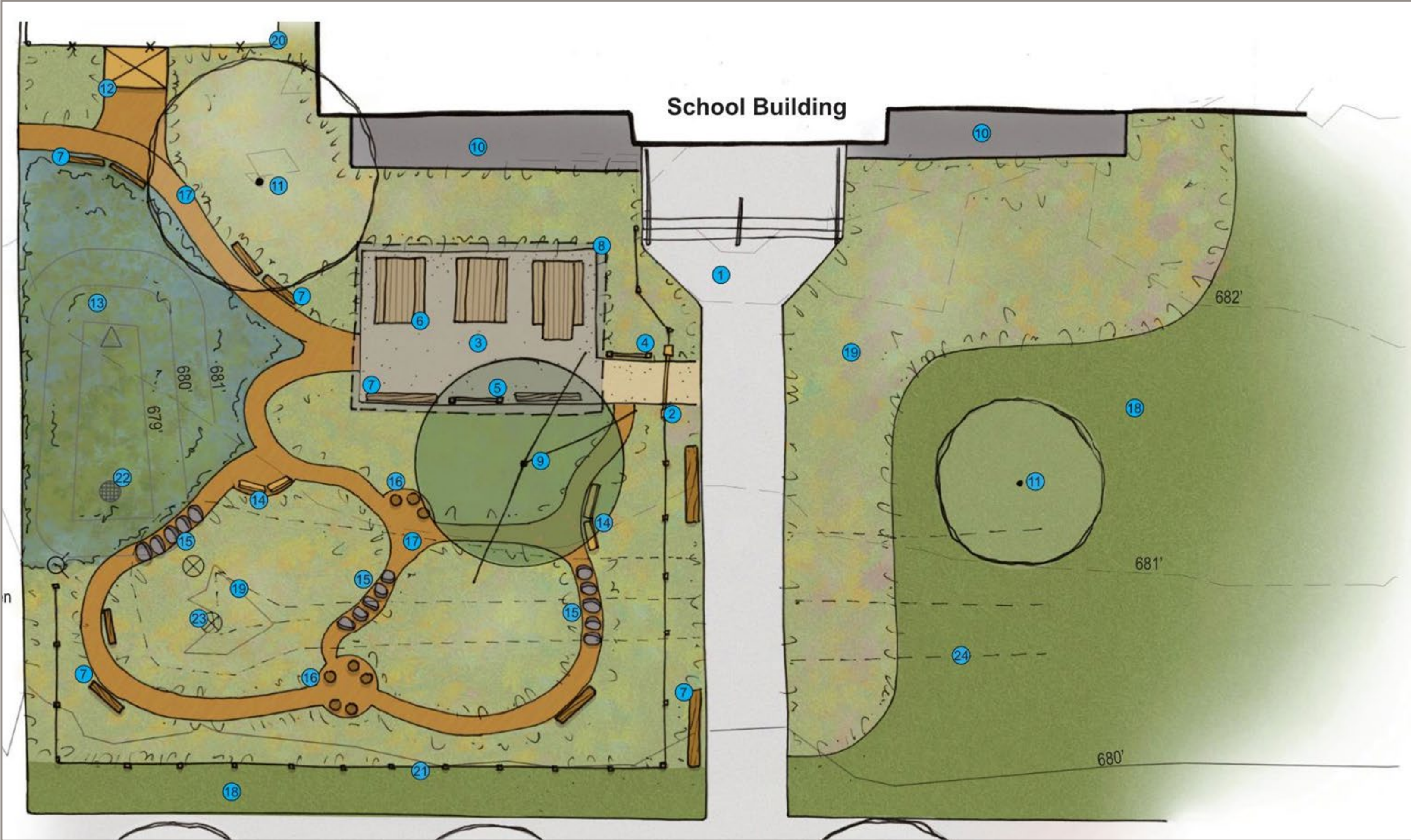


Horace Mann Elementary



Horace Mann’s courtyard (pictured above) will be transformed into a new outdoor learning space.

Shorewood High School

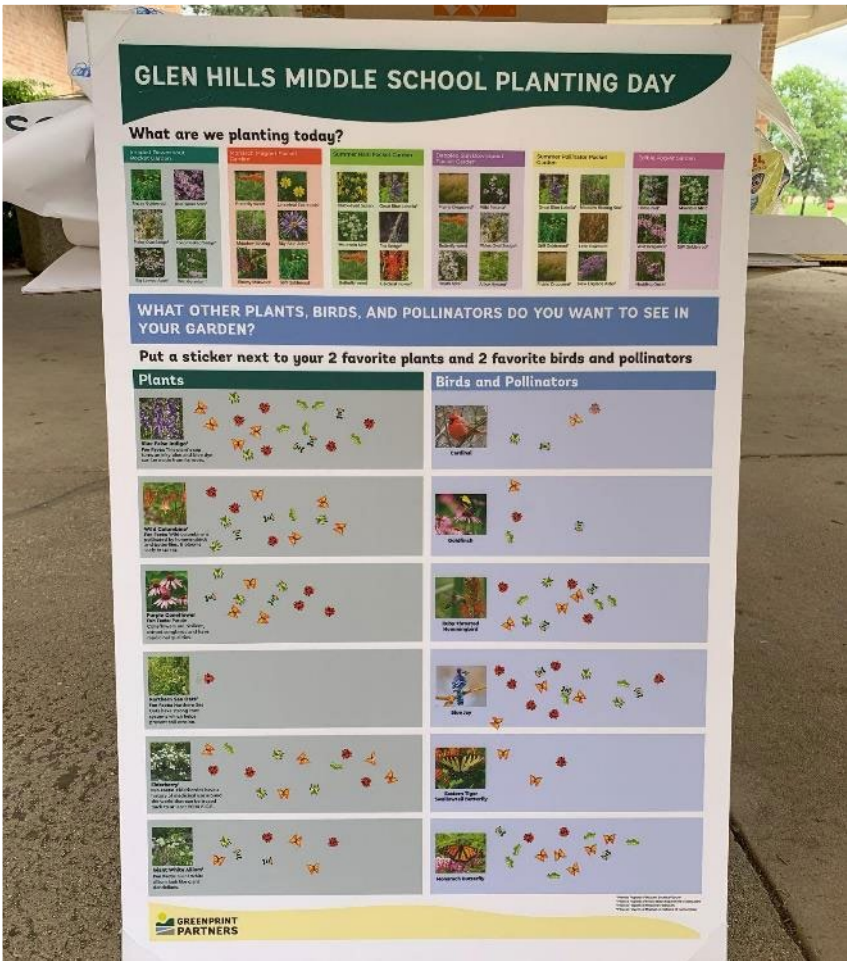


The existing community garden on the school's property (depicted above) will benefit from the new prairie area designed to attract pollinators to the site.

Glen Hills Middle School



Aerial photo (right) of site for Glen Hill's new outdoor gathering and garden space.



During the school planting day, community members voted (pictured left) on the native plants and animals they hoped to see in their green schoolyard.

St. Luke's Episcopal Church



BREAK/Q&A

Are there any questions about
the presentation so far?



What would this
look like scaled
up?





Quantified Benefits of Green Stormwater Infrastructure & Edible Gardens in U.S. Schoolyards

Jen McGraw
Center for Neighborhood Technology

USDA NRCS Webinar: Unlocking the Value of Green Infrastructure Incentive Programs for Urban Agriculture by Leveraging Public & Private Investment

October 5, 2023

Schoolyard Gardens as a Stormwater Solution

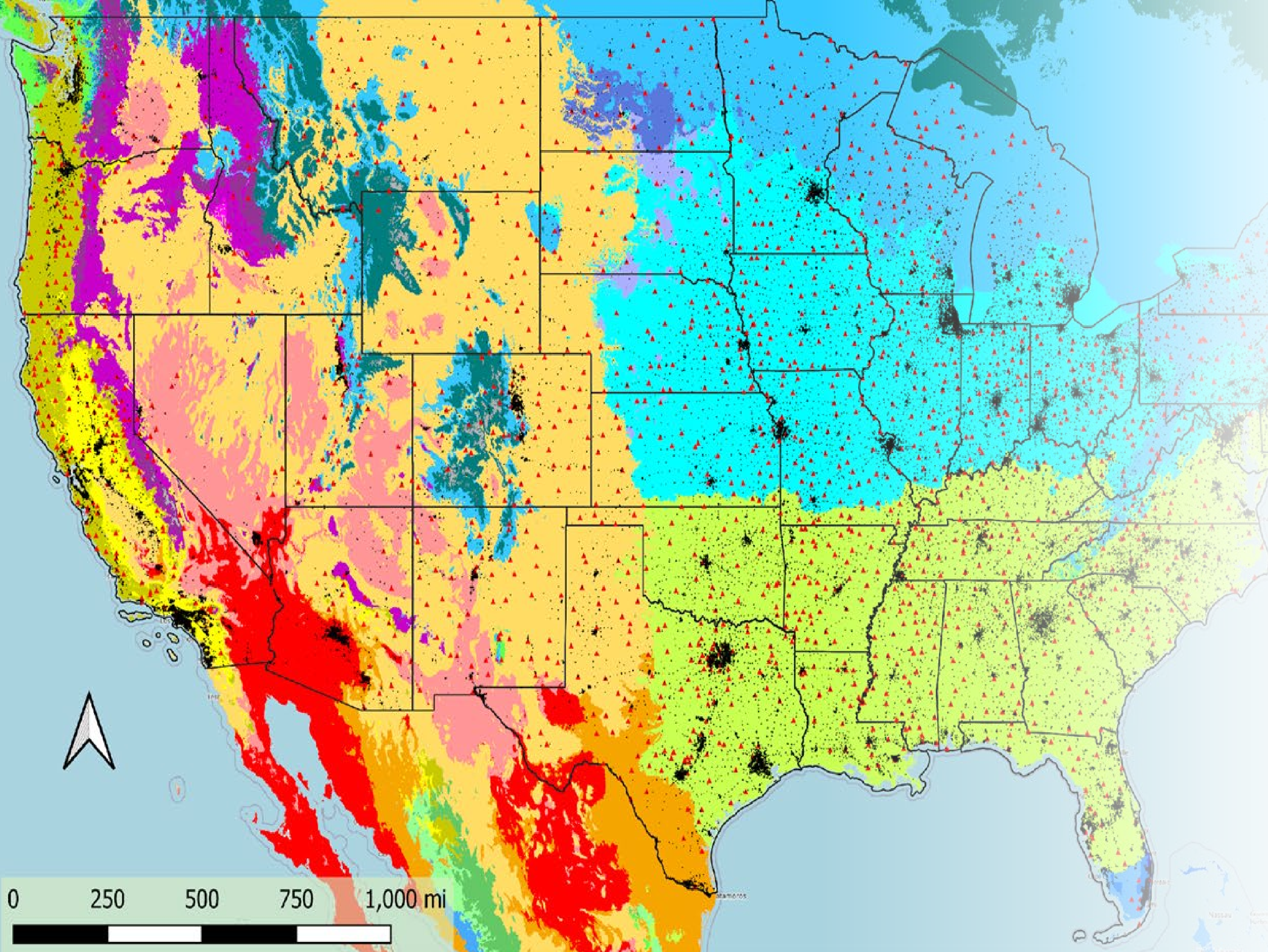
National GSI & edible garden schoolyard potential:

- 39 billion gallons of stormwater runoff avoided per year
- 34% of runoff that would typically occur on these sites



Analyzing Schoolyards

- Detailed assessments of Buffalo, NY & Milwaukee, WI schoolyards for model development
- Runoff scenarios for “typical” schools with & without green stormwater infrastructure & edible gardens
- Scaled nationally—analyzed 67,650 urban & suburban (K-12) U.S. public schools



Climate Zones			
	Temperate, dry summer, hot summer		Temperate, no dry season, cold summer
	Tropical, rainforest		Temperate, dry summer, warm summer
	Tropical, monsoon		Cold, dry summer, hot summer
	Tropical, savannah		Cold, dry summer, warm summer
			Cold, dry summer, cold summer
			Cold, no dry season
			Cold, no dry season
			Cold, no dry season

Green Values Calculator

Added school, farm, & garden templates

Schoolyard scenario modeled:

- Raised beds
- Rain garden
- Parking lot swale
- Native vegetation

https://greenvalues.cnt.org

CNT GREEN VALUES® STORMWATER MANAGEMENT CALCULATOR

About Calculator Resources

Site Information Green Improvements

Commercial

Large lot 50,000 ft² (250' x 200')

- a building
- parking lot
- driveway
- small amount of landscaping

Urban Park Area

6.8 Acres Area With a Park

- 3 Acre park
- Streets and sidewalks
- Residential buildings, lawns and landscaping

Community Garden

Small lot 6,075 ft² (135' x 45')

- 5 100' x 4' Raised Beds
- Paved Sidewalks
- Staging Area
- Lawn Walkways

Urban Farm

One Acre Lot

- .75 Acres Cultivated
- 2 Hoop houses
- Small tool shed
- Shipping Container
- Paved Staging Area
- Lawn Walkways

Urban School Grounds

Large Urban Lot (375' x 330')

- School Building
- Auxiliary Building
- Parking Lot
- Paved Play Area
- Playground
- Sidewalks etc

Custom Scenario

Customize:

- A single site
- Multiple sites
- A Large Area

0.0% Volume Captured 100

Total Cost: \$0

Site Overview Volume Runoff Costs Benefits

Total Land Use
Choose a template or design a custom scenario.

Land Use	Original Area	Area including BMP(s)
Total Impervious Area	0 ft ²	0 ft ²
Total Landscape Area	0 ft ²	0 ft ²
Total BMP Area		0 ft ²
Total Lot Area	0 ft ²	0 ft ²
Other Volume Control		0 gallons



Benefits Beyond Stormwater Runoff

Environmental, resilience, & social, including:

- water quality
- heat island reduction
- carbon sequestration
- reduced energy use
- groundwater recharge
- student academic achievement
- nutrition

Transformation requires support

Nature-Based Schoolyards & Academic Achievement

Access to nature improves **concentration, emotional wellbeing, & school performance**

Literature shows positive correlations with test scores & schoolyard greening

CNT applied findings to the national schoolyard scenario

Achieving results requires incorporating curricula & activities to support achievement





School Gardens Resilience Opportunities

- Growing food (even a small amount)
- Supporting biodiversity & pollination—focus on planting natives & whole ecosystems
- Serving as resilience hubs—e.g., food bank site; emergency services; learning, capacity building, & building power through connections

Equity Best Practices in Urban Schoolyard Gardens

- School collaboration with CBOs or NGOs for technical or financial support
- Funds made available without grant writing requirements to help under-resourced schools
- Sharing natural resources between school networks (seeds, soil, etc.)
- Relevant JEDI programming & curricula
- Student-led processes from ideation to implementation
- A well-rounded feedback loop, prioritizing community
- Shifting to prioritizing schools with an objective assessment of historic lack of investments






Potential Benefits of Equity Best Practices

- Increasing BIPOC student & community access to green, beautiful, & aesthetic spaces
- A full-sensory experience to ease the learning process of neurodivergent students
- Enhancing students' socio-emotional learning
- Therapeutic safe space for students who need it most
- Providing trauma-informed practices to students who deal with generational &/or racism-induced trauma
- Partially increasing access to fresh & nutritious produce to areas that face food apartheid
- Honoring cultural & ethnic backgrounds of students, their families, & their food traditions
- Teaching students to be more okay with each other's differences
- Evolving onwards from normalized gender stereotypes

Recommendations

1 

Host informational sessions and provide resources at local, urban-based NRCS Offices to both urban producers and local schools on how to leverage funds from other entities, such as local stormwater management organizations or the U.S. Department of Education.

2 

More actively promote NRCS office connections in urban areas for USDA grant application support.

3 

Build relationships between NRCS offices and stormwater agencies to enable joint education sessions and to explore streamlining funding requirements for combined GSI and urban ag projects.

4 

Make securing USDA grant funding easier to access for small, urban producers and small-scale projects with turnkey/pre-defined project “check-the-box” applications.

Thank you!



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