



Greening the City of Champaign: Stormwater Utility Fees as a Strategy to Increase Green Infrastructure



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Executive Summary



Stormwater Utility Fees (SWU) are being explored as an option to fund stormwater improvements. Cities with flooding concerns utilize SWU fees to phase out or upgrade traditional gray infrastructure (pipes, drains, gutters, etc), and to implement green infrastructure.

SWU fees usually include incentive and credit programs to encourage residents and private property owners to install Best Management Practices (BMPs) to reduce their contribution of runoff to the stormwater system. BMPs are practices that manage stormwater runoff by mimicking natural hydrological processes. Examples include rain gardens, green roofs, and detention/retention ponds.

This report addresses the components of effective incentive and credit programs. The benefits of green infrastructure, which is implemented from these fees, is discussed as well.

Four case studies of cities similarly situated to Champaign are explored: Duluth, Des Moines, Ann Arbor, and Peoria. Their approaches to stormwater management are placed in two categories: Strong city and educational. Strong city are cities that lead by example, whereas educational focuses on involving citizens to contribute to the solution. Some of the cities exhibit both approaches.

Finally, the report discusses the steps to implementing the programs discussed in the prior sections. There are seven steps to follow, which include identifying internal and external obstacles, and designing tailored solutions. Equity is also explored through Minneapolis's green zones program.

This report acts as a preliminary guide for Champaign to explore how to modify the existing SWU fee and associated incentive and credit programs to advance Champaign's green infrastructure goals.



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Stormwater Utility Fees: Overview

Stormwater Utility Fees (SWU) fees are an increasingly common way to raise funding for stormwater programs and green infrastructure. In the last decade, SWU fees have increased 150%¹. Although they have grown considerably, less than 10% of cities in the U.S. have an SWU fee. The most common way of calculating the fee is through an ERU: Equivalent Residential Unit. It is typically the average of impervious area on a single-family residential parcel². Fees are calculated for non-residential properties using an ERU. The table below demonstrates an example of how the fee is calculated.

Property Area	ERU Value Calculation	ERU Value	SWU Fee per ERU	Monthly Fee Calculation	Monthly Fee
20,000 sqft	20,000 sqft / ERU (2,800 sqft)	7.14	\$11	7.14 * \$11	\$78.54

Incentive programs were created to encourage private property owners to adopt BMPs. An incentive is a one time payment for installation of the feature. Credit differs because it is a recurring reduction of the stormwater utility bill. These are given when a property owner reduces a portion of stormwater runoff from their property. The most common incentive programs are cost sharing and site assessment with BMP design assistance.

Participation in these types of programs is historically low at 1-5%³. Low fee prices and low program visibility explain most of this trend. Other factors include: Long-term maintenance contracts, permanent easement requirements, risks related to duration and credit renewal policies, and lack of knowledge of stormwater issues and the credit program itself.

What is the best SWU fee structure?

- High fee + moderate credit
- High fee + high credit
- Moderate fee with high credit works if green infrastructure capital and annual maintenance costs are low-median range

Fee credits and incentive programs work best in these scenarios:

1. Cost of capital and fee credits being paid by SWU, and the cost of annual maintenance (equal to credit) is paid by property owner
2. Incentives that reduce or completely offset capital costs of the retrofit
3. Fee credits are equal to the annual maintenance costs for green infrastructure or traditional BMPs

Community Benefits

Stormwater fees help create a steady stream of funding for stormwater management. Since most of these fees are based on impervious area, they attribute costs in proportion to how much stormwater runoff a property is generating⁴. SWU fees can also increase funding for green infrastructure projects, which host a variety of benefits.

Green Infrastructure Community Benefits⁵:

- Provides stormwater management
- Reduces exposure to harmful substances and conditions
- Provides opportunities for recreation and physical activity
- Promotes community identity and a sense of well-being
- Decreases impervious surface and increases natural habitat and permeable surfaces
- Open soil and permeable pavements increase stormwater filtration and storage capacity; slows and reduces stormwater runoff and harmful discharge

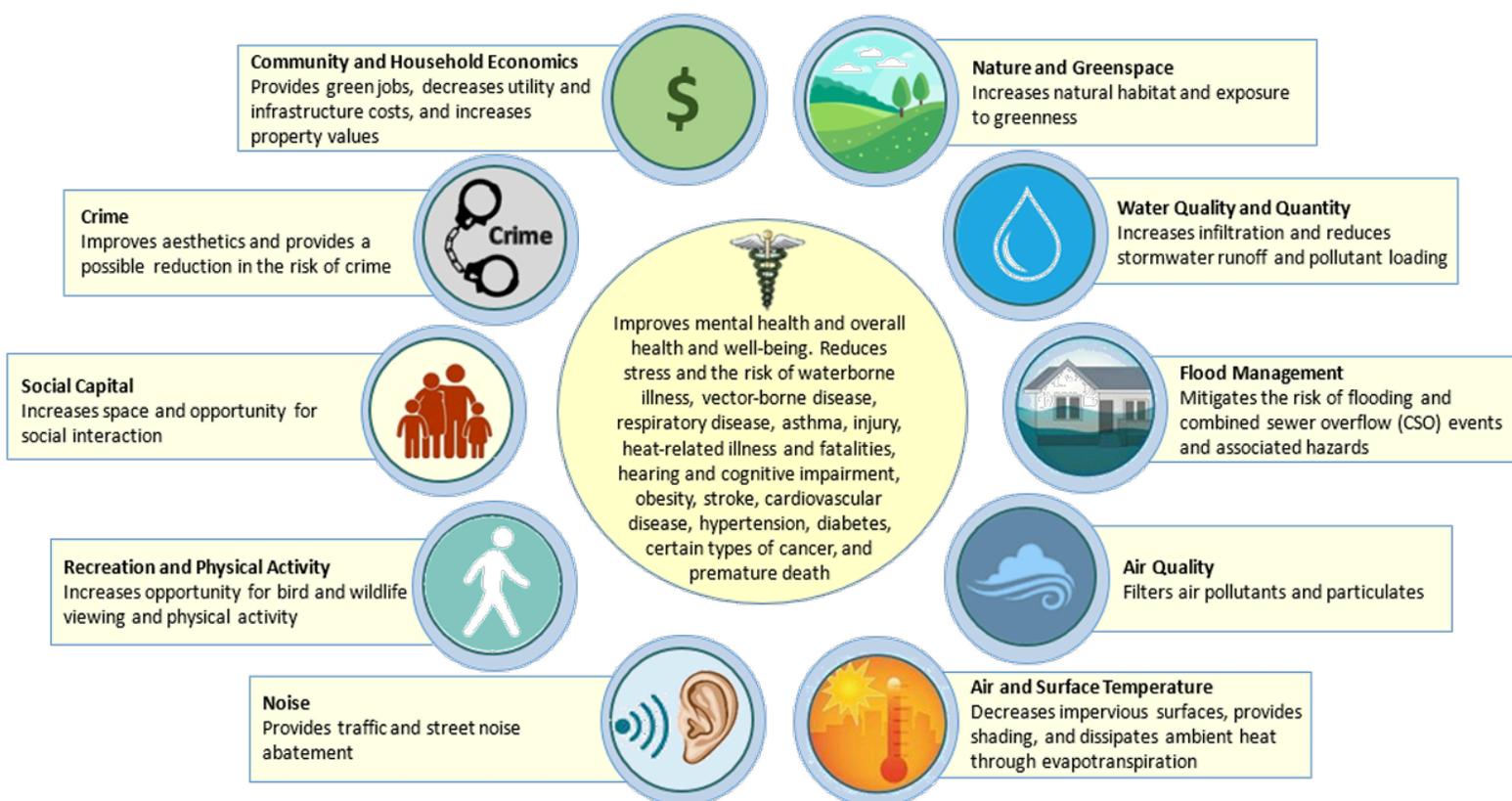


Figure 1: Benefits of Green Infrastructure⁴

Case Study 1: Duluth, MN

Overview

Location: Port city on Lake Superior, Minnesota

Population: 86,372 (U.S Census, 2021)

Stormwater History: Duluth's stormwater system was built in 1880 . They have 411 miles of pipe, 10,931 catch basins, 5,044 manholes, and over 100 miles of ditches. The system is over 100 years old, which requires extensive repairs. Their stormwater goes to local streams and eventually Lake Superior. Their stormwater is NOT treated at a sewage treatment plant, so they rely on preventative actions, best management practices and proper maintenance to keep it clean. In 2012, they experienced a flood that caused over \$100 million in damages. This spurred further stormwater action.

Stormwater Utility Details

- Established 1998. ERU = 2,228 sqft impervious surface
- Cost per ERU: \$8.35/year
- Residential is billed 1 ERU per living unit
- Commercial: Amount Billed is calculated by Total Impervious Surface/2,228ft (1 ERU). This gives the amount of ERUs which is then billed at \$8.35 per ERU.

Incentives and Credits

Duluth's programs are not widely advertised on their website. Residents must email to begin the application process.

Approach

Duluth takes on a strong city approach, and leads by example. Their website showcases how the city is tackling stormwater issues in the community. The city commissioned a vulnerability assessment and climate adaptability report to inform how to use city land and resources to manage stormwater issues⁶.

Examples

Stormwater Story

One doesn't need to dig very deep to see how important the Duluth stormwater system is. The flood of 2012 is a perfect example of what happens when a stormwater system fails. The floods resulted in over \$100 million in damages and have had a lasting impact on the entire city. Even without such a severe flood event, homes, businesses, and roads in Duluth can be damaged by water infiltration during any large weather event. [The climate of Duluth has already changed](#), and further changes are predicted, including more rainfall overall, and stronger and more frequent storms. As storms become larger and more common, having a system that is able to handle more runoff is necessary for overall community wellbeing.

Having an effective stormwater system is vital to our community, but it requires ongoing maintenance and investment. Starting in 1880 the stormwater system was built to handle snowmelt, rainfall, and runoff; it was designed to carry damaging and potentially dangerous water away from homes, businesses, and roads. Ideally this system prevents flooding and protects our streets and other infrastructure.

Our Current Stormwater System is made up of:

- 411 miles of pipe
- 10,931 catch basins
- 5,044 manholes
- Over 100 miles of ditches

Being over 100 years old, the Duluth stormwater system needs repairs, and this work can be expensive. Preventative maintenance is key, however if a part of the system fails, the repairs must be dealt with right away. Maintenance and planning for the system are managed by a busy team of skilled workers and engineers. These folks are led by City of

CONTACT

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- Imagine Duluth 2035 Plan
- Climate Action Work Plan
- Duluth Climate Vulnerability Study
- City Metrics
- getgreen Duluth App

Figure 4: Homepage, city of Duluth

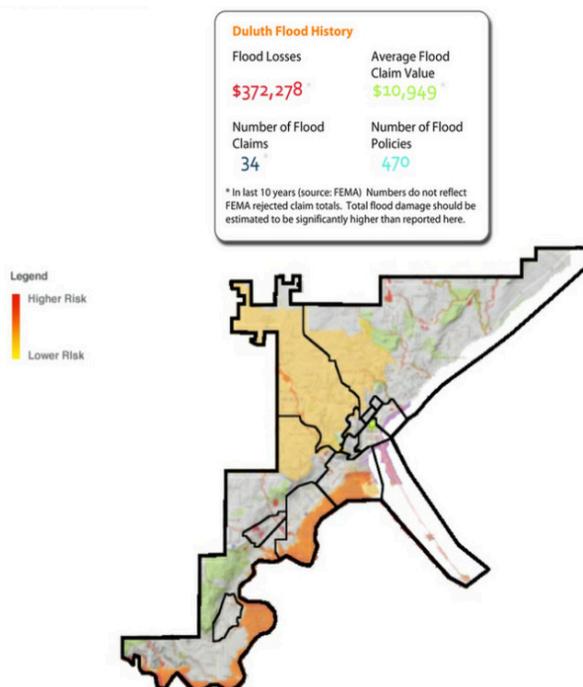


Figure 2: Flood vulnerability in Duluth⁵

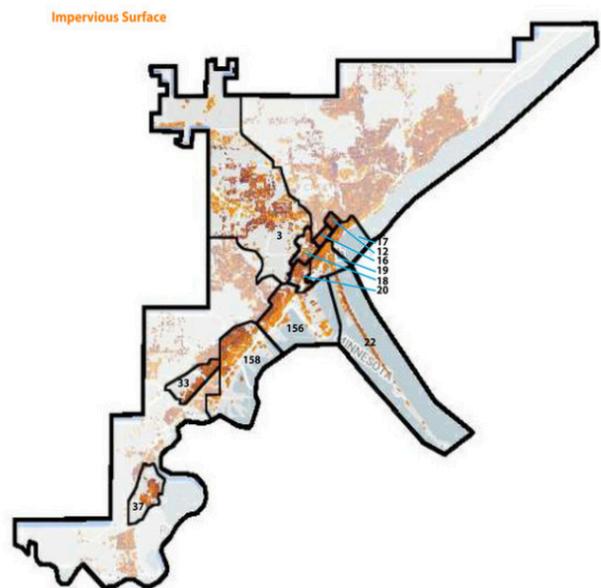


Figure 3: Impervious surfaces Duluth⁵

Case Study 2: Peoria, IL

Overview

Location: Central Illinois

Population: 111,666 (U.S Census, 2021)

Stormwater History: The city of Peoria's stormwater system is 125 years old, which requires substantial maintenance and upkeep. Their stormwater goals are to protect the Illinois River, mitigate flooding, and prevent erosion. Similar to Champaign, they have a flat topography which makes the city susceptible to flooding events. They have a coordinated sewer overflow system which the EPA has mandated they update. In response, Peoria invested resources to improve their system and educate residents.

Stormwater Utility Details

- Established: 2018 at \$3 per 1,000 sqft impervious area
- Rate increased to \$5 January 2021. Increases annually with inflation

Incentives and Credits

- Peoria has a 57-page 2022 Stormwater Utility Credit and Grant Manual available for residents interested in reducing their bill.
- Residents must pay application fees ranging from \$0-\$100, depending on the project. The lowest fee is \$0 (rain water barrel) and the highest is \$100 (stormwater infrastructure).
- Grant applications are accepted until money for the year runs out.
- The BMP must be in service for at least 4 years to continue qualifying for credit.
- Existing BMPs can receive credit as long as they meet the current guidelines and requirements of installation.

Approach

Peoria combines the educational and strong city approaches. Their website has educational resources combined with visuals to make the information accessible to a general audience. Peoria has completed projects which serve as positive examples for their residents.

Examples

It Starts with Simple Steps

Ready to start taking action to reduce runoff and pollution on your property or in your neighborhood? Explore these simple, sustainable solutions.



Capture Rainwater

Install rain barrels to capture the rainwater that runs off your roof. Use it to water your flowers or grass.



Plant a Rain Garden

Beautify your property and reduce runoff by putting in a rain garden filled with perennials.



Go Permeable

Choose porous pavers or permeable pavement for your patio or driveway. Consider mulch for walkways instead of hard surfaces.



Choose Native Plants

Make your yard thirstier with native plants, grasses and shrubs. Deep root systems help hold soil in place.

Figure 5: Educational materials employ visuals and light text



Step 1

Prepare the appropriate forms by downloading from this site or pick up hard copy from Public Works.



Step 2

Submit forms, fees and attachments to the Public Works Department.



Step 3

City will review application within 30 working days and notify applicant of credit or grant determination, including



Step 4

If the credit or grant is denied, the applicant may address identified deficiencies and resubmit a revised application.



Step 5

If a credit or grant is denied, the applicant may appeal the determination following guidelines in Article IV of Chapter

Figure 6: Visualizations break down how to apply for credits

Table 2. Available Stormwater Management Grants

Grant Type ¹	Grant Amount
Rain Barrel	\$50 each up to \$100 max
Green Infrastructure 1-inch storm (1yr-30 min. storm) ²	\$1/ SF (Max payment the smaller of \$30,000 or 10 yr of SWU bill.)
Green Infrastructure 2-inch storm (5yr-60 min. storm) ²	\$2/ SF (Max payment the smaller of \$60,000 or 20 yr of SWU bill.)
Private Property Drainage Assistance	75% of Project Cost up to \$10,000 max
Stormwater Infrastructure Investment Grant	75% of Project Cost up to \$100,000 max

Figure 7: Grants that Peoria offers

Case Study 3: Des Moines, IA

Overview

Location: Central Iowa

Population: 212,031 (U.S. Census, 2021)

Stormwater History: Des Moines has a history of flooding caused by flat topography. The city experienced a flash flood in 2018 that prompted stormwater infrastructure improvements. The city will invest \$145 million in flood mitigation and BMPs throughout the city over the next six years.

Stormwater Utility Details

- Residential: 1 ERU (1,400 - 4,900 sqft) = \$15.87/mo
- Greater than 4,900 sqft = \$23.81/mo
- Non-residential: Based on impervious square footage. The total area of the property's impervious surface is divided by 2,349 per ERU to find fee amount

Incentives and Credits

- Des Moines reimburses property owners 50% of the cost (up to \$2000) for qualified work that reduces stormwater runoff.
- City staff provides free site evaluations and consultations.

Approach

- Des Moines takes an educational approach to stormwater management.
- They encourage residents to redirect roof drains, use phosphorous free fertilizer, clean up pet waste, and use BMPs.
- The city's stormwater best management practices program provides detailed materials on BMPs.

Examples

Stormwater in the City of Des Moines is managed by the Clean Water Program. Although it is the responsibility of the Clean Water Program to manage the city's stormwater, residents can also assist in many ways.

4 Ways to Reduce Stormwater Runoff and Improve Stormwater Runoff Quality

- **Redirect Roof Drains:** Make sure the drains coming off your roof are directed into nearby gardens or other vegetated areas, not the sanitary sewer.
- **Use Phosphorous-Free Fertilizer:** Purchasing and using phosphorus-free fertilizer helps reduce algae blooms as it is not a needed nutrient for central Iowa lawns. Phosphorus is the middle number displayed on fertilizer bags. (For example, 20-0-20).
- **Clean Up Pet Waste:** Clean up pet waste to prevent excess nutrients and harmful bacteria from entering water bodies.
- **Use Best Management Practices:** The City of Des Moines will reimburse property owners 50% of the cost (up to \$2,000) for qualified work that reduces stormwater runoff.

Residents should also be aware of the City of Des Moines' [Stormwater Best Management Practices Program](#), which will reimburse property owners 50% of the cost (up to \$2,000) for qualified work that reduces stormwater runoff. City staff will provide free site evaluations and consultations, then give recommendations residents can implement to help enhance the water quality of stormwater runoff and/or decrease the amount of stormwater runoff that enters the stormwater drainage system. Learn more about [privately owned stormwater controls here](#).

Figure 8: Example of their educational approach

Streambank Stabilization

Streambank stabilization is a process in which streambanks are reconstructed or armored to reduce streambank erosion and subsequent sediment flows. If your property contains a streambank, City employees will give a free site evaluation to see what can be done to stabilize it.

Price Range: Varies greatly based on size and scope of work



LEARN MORE

APPLY FOR REBATE

Figure 9: Example of how they explain how to install various BMPs

Case Study 4: Ann Arbor, MI

Overview

Location: Southeast Michigan

Population: 121, 536 (U.S Census, 2021)

Stormwater History: The city of Ann Arbor's stormwater system is over 100 years old. It was developed for a smaller, drier city. The city has grown more than 45% in 50 years. They have had a stormwater utility since 1980. The Huron River is their primary source of drinking water. The drain system is designed to protect this river. Much of their stormwater focus is centered around preventing contaminants from entering the Huron River watershed.

Stormwater Utility Details

They have four tiers for residential properties (single family and duplexes)

- Tier 1: up to 2,187 sqft: \$34.46 (quarterly)
- Tier 2: 2,187 - 4,175 sqft: \$60.30 (quarterly)
- Tier 3: 4,175 - 7,110 sqft: \$103.36 (quarterly)
- Tier 4: 7,110 sqft+: \$180.90 (quarterly)

Commercial and other (multi-family, office, industrial, etc)

- Billed on impervious area for \$929.77 a quarter, plus \$4.31 customer charge

Incentives and Credits

- River Safe Home Partner: helps residents identify water quality protections they currently practice in their homes, and informs them on additional pollution prevention programs. Participation saves \$1.38 a quarter. Enrollment is free.
- Rain barrels are purchased through the county online. 1-5 rain barrels can save \$3.65 per quarter. City does not sell or provide rain barrels.
- Rain gardens, dry wells, and cisterns can save \$7.56 a quarter.

Approach

Ann Arbor takes an educational focus. They have a stormwater FAQ document that answers resident questions, explains what the funds are used for, and why the SWU fee was created. They emphasize behavior change to benefit the community as a whole.

Examples

Ways for you to make a big difference by being Stormwater Smart.

If you don't have fun doing important work, the important work may not get done. So, we work hard at coming up with fun ways (seriously) for you and your family to be Stormwater Smart. Each person has the potential to not only change their own behavior but also to influence other community members.

Here are options to consider:



RAIN GARDEN



RAIN BARRELS



SCAVENGER HUNT



ADOPT-A-STORMDRAIN



COLORING PAGES



BECOME A RIVERSAFE HOME

Figure 10: Each of these icons links to a page, see Figures 11 and 12 for page samples

Rain gardens for kids



Involve your kids and learn about rain gardens together. Download the Stormwater Smart rain garden coloring page!

[DOWNLOAD NOW](#)

Stormwater utility credit

Installing a rain garden can result in a savings of \$7.56 per quarter. The requirements for this stormwater utility credit are:

- 1) **Roof drainage** of at least 50% of your property's roof area (at least half of your home's downspouts) should drain to the rain garden OR the rain garden must capture runoff from an impervious area on your property that is equal to 50% of your roof area.
- 2) **Size**
 - Minimum 130 square feet
 - 3 to 6 inches deep throughout

3) Vegetation

Rain gardens must have plenty of plants to absorb stormwater runoff and snowmelt. Native perennial plants are the best for soaking up and filtering the most water possible (also called infiltration).

4) Infiltration

Within 24 hours, your happy rain garden should be drinking up and cleaning that stormwater. Testing the ground must take place before installing:



About Rain Gardens

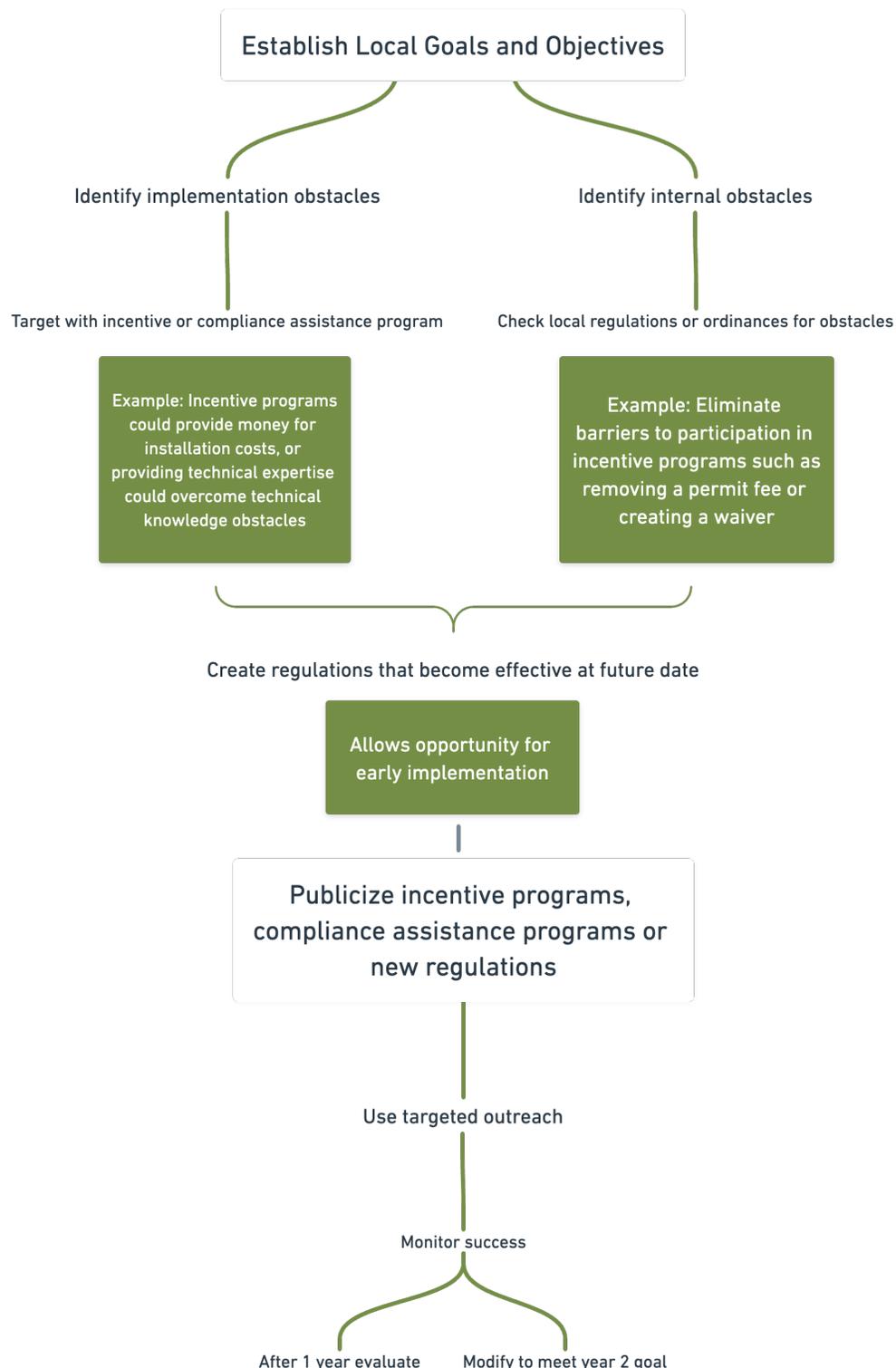
	BUILDING A RAIN GARDEN LOCATION	▼
	DEPTH AND SOIL	▼
	PLANTS	▼
	MAINTENANCE	▼

Figure 12: The drop down menus include more detail

Figure 11: Explanation of credit requirements

Implementation

Implementing green infrastructure retrofits or BMPs for municipalities can be broken into the following steps⁷.



Equity Considerations

Minneapolis implemented a green zone and equity credits to encourage green infrastructure and BMPs in certain areas. These green zones are areas that the city designated as having high levels of pollution, and racial, political and economic marginalization.

- Commercial properties receive an 80% reduction in SWU fees in these green zones compared to 70% for all other properties. Residential properties can reduce their SWU fees 45% compared to 35% to other properties.
- These reductions are received by earning a combination of different credit types, implementing certain BMPs and removing pollutants from stormwater by retaining it onsite

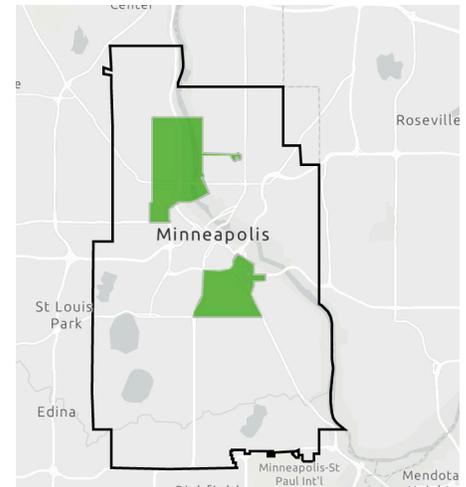


Figure 13: Green Zones in Minneapolis
Retrieved from city website

Incentive Program Accessibility Concerns

A study of 65 incentive programs across the U.S. found three types of green stormwater infrastructure incentive programs⁸: reimbursements, credits, and grants. The amounts ranged from \$20 rebates to \$500,000 grants. The review of these programs found three categories of requirements that are potential barriers for marginalized communities to participate:

- **Distribution Methods:** Over half of the programs required participants to pay up front, and some only partially covered the costs. Grants are potentially more equitable since they provide funds up front, however, these are usually offered to institutions.
- **Property Ownership:** Most of the credit and reimbursement applications reviewed (64.7%), required ownership.
- **Expertise/Knowledge:** Half of grant programs and 35.5% of credit and reimbursement programs surveyed required professional expertise. Average residents without expertise in these areas would need extensive education or a professional network to help them apply. The application documents were also complicated and dense in some cases, which is an additional barrier.

Resources

[Model Storm Water Ordinance: Iowa Stormwater Educational Partnership](#)

[Western Kentucky University Stormwater Utility Survey 2022](#)

[CNT Green Values Stormwater Management Calculator](#)

[Local Codes and Ordinance Audit Guide](#)

[Model Landscape Ordinance Guide](#)

[Regulatory Tools to Implement Green Infrastructure](#)

Sources

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Images from title and executive summary pages were sourced from City of Champaign Website. They depict Mattis and West Side Parks.