



RAINWATER HARVESTING PROJECT

Project Summary - May 2019





INTRODUCTION TO ALICE'S GARDEN

Alice's Garden provides a model of regenerative farming, community cultural development, and economic agricultural enterprises for the global landscape. We recognize the cultivating, preparing, and preserving of food, and food traditions, as cultural arts to be reclaimed and celebrated fully in urban agriculture.

Alice's Garden is one of the largest community supported gardens in the City of Milwaukee. The garden is located on a Milwaukee County owned property near North Avenue and 21st Street that once held a number of homes that had been razed for a highway project that never came to fruition. Under Venice Williams' leadership as Executive Director of The Table, the gardeners are actively engaged in equity, spirituality, community building, and sustainability initiatives.

INTRODUCTION TO THE RAINWATER HARVESTING PROJECT

Currently, an irrigation system is in place that brings city water to limited parts of the garden. Water bills have ranged from \$250 to \$750 quarterly, or as much as \$3,000 annually. The Rainwater Harvesting Project was planned to divert stormwater runoff from the adjacent Milwaukee Public School's (Brown Street Academy) asphalt schoolyard into a bioswale and then into an underground cistern where gardeners could use a new solar panel powered pump and filtration system to irrigate crops.

CURRENT PROJECT PARTNERS



- Alice's Garden Gardeners & Working Group Members
- Brown Street Academy
- City of Milwaukee Health Department
- Fox Point Lutheran Church
- Lake Park Lutheran Church
- Plymouth Church
- Milwaukee Area Spiritual Leaders and Healers
- Rozga Plumbing and Heating
- St. Matthew's Lutheran Church
- UW-Milwaukee
- Greater Milwaukee Synod of the ELCA
- Thrivent Financial
- Sweet Water
- Badger Meter
- Individual Donors
- Renew Wisconsin/ Solar for Good
- Vernon Lutheran Church



PROJECT STATUS



Alice's Garden has successfully completed construction of the Rainwater Harvesting Project and plans on maintaining it for many years to come

INVITATION FOR SUPPORT

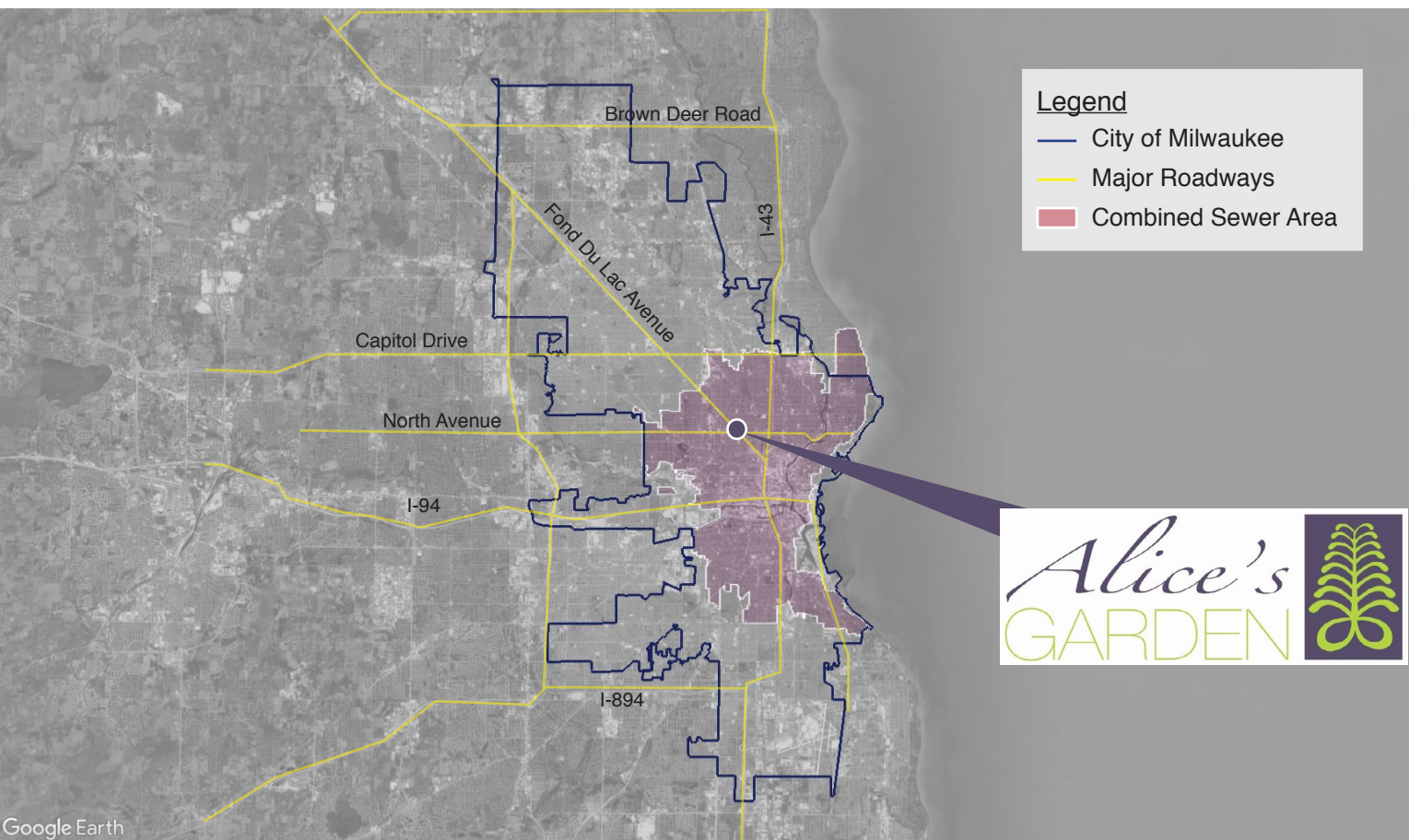
We invite your enthusiastic review of this project summary and welcome any questions you may have on how to support the Alice's Garden Rainwater Harvesting Project. Please contact:

Hannah Johnson-Breimeier
Gardener / Program Coordinator
alicesgardenh2o@gmail.com

Donations are being accepted through:

The Table
PO Box 270561
Milwaukee, WI 53227

For checks, please include
in the memo: "Rainwater
Harvesting Project"



PROJECT DESIGN

The Alice's Garden Rainwater Harvesting Project is designed to provide a more sustainable water source for the gardeners while also managing, through green infrastructure, a significant amount of stormwater runoff that would otherwise enter the combined sewer system. Through several years of planning, the project team has found a way to reduce stormwater management costs for the local public school, decrease water bills for the garden, reduce stormwater runoff in the neighborhood otherwise leading to basement backups, flooding, and combined sewer overflows that impair the health of our communities and rivers and lake, promote alternative energy, and further connect with gardeners, neighbors, visitors and students by showcasing how sustainability initiatives can be woven into meaningful community-based projects.

1. Watershed

Brown Street Academy's asphalt schoolyard has little to no vehicle traffic, resulting in relatively higher quality stormwater runoff

5. Water Educational Pavilion

The previously underutilized structure was converted into a water education space where attendees learn more about the importance of water conservation. The location is also where the irrigation pump and electrical system is managed.

2. Bioswale

The vacated alley between the two properties is fenced and was heavily vegetated. With some modifications, the space now treats the stormwater runoff naturally before it enters the cistern.

3. Underground Cistern

The 20,000 gallon cistern holds the harvested stormwater until it is needed for irrigation. The cistern includes a robust filtration system capable of further treating the water before use.

4. Solar Panel System

Solar panels on the garden pavilion power the irrigation system pump and filter system, as well as some new electrical outlets and lights for the garden.

▼ Asphalt schoolyard - watershed for the rainwater harvesting system

Vacated alley - pictured below before bioswale construction ▼



WATER QUALITY CONSIDERATIONS AND DESIGN

Watershed Management - the surface that we are harvesting rainwater from is asphalt, but it is not used as a parking lot, rather it is a schoolyard which is important because it will not have the same pollutant loading as a surface where cars are regularly in use (oils, coolants, heavy metals, etc.).

Settlement, Biosorption, and Filtration through the Bioswale - the rainwater from the schoolyard first travels through a system of check dams that will help to reduce garbage and larger particulates from entering into the infiltration bed of the bioswale. Then the plantings in the bioswale help absorb potential contaminants (PAHs, etc.) and the water is filtered through an engineered soil media (~70% sand to 30% loam/compost/organics) and filter fabric before entering the perforated underdrain to the vault which is connected to 20,000 gallon cistern.

Distribution System Filtration and Ultraviolet Light Treatment System - pumped water from the cistern travels through a two step cartridge filter system (20/10 um screen and 0.5 um carbon filter) and then through a UV disinfection system (treatment for bacteria and viruses) before distributing to the garden's tap stands and hoses.

Additional Risk Management Strategies:

- The harvested and treated rainwater is clearly marked as non-potable / non-drinkable
- Only trained gardeners have access to the harvested rainwater system (having gone through an training program where they learn about non-potable water and how to operate the system at Alice's Garden)
- It is also advised that harvested crops (especially leafy greens) be rinsed with potable water during food preparation, before consumption
- Water quality testing is performed regularly to confirm that the system is operating to design specifications

COSTS AND VALUE

	Est. Cost	Est. In-kind
Stormwater Green Infrastructure	\$138,500	\$13,500
Solar Powered Irrigation System	\$45,000	-
Other (project management, etc.)	\$7,000	\$55,000
Total Estimated Project Cost and In-kind	\$190,500	\$68,500
Total Estimated Project Value	\$259,000	

IMPACT

The rainwater harvesting project will result in reduced potable water utility costs for the gardeners, increasing the value and take-home pay for those gardeners/farmers that use the property as a source of income. The project resulted in approximately **160** engineering consultant hours, **400** hours of partner support from the nonprofit Reflo, **450** hours from volunteers who helped to build the Aquablox® cistern, **700** hours from contractors, and **400** hours from Alice's Garden volunteers in monthly planning meetings over the course of three years.

The project also reduces stormwater runoff from entering the combined sewer system which can reduce MMSD's stormwater management expenses. Additionally, Alice's Garden is a nationally recognized, highly visible project with thousands of visitors each year. Visitors to the site will be inspired by the use of green infrastructure which can result in increased awareness and willingness to manage stormwater where it falls.

DESIGN AND FUNDRAISING

Over several years, the Alice's Garden Rainwater Harvesting Committee and project partners including the nonprofit Reflo, worked to conceptually plan, raise funds, write grant applications, host tours of the garden and project, plan educational and outreach activities, and hire consultants and contractors to construct the project in 2018.



Cheri Johnson



Cheri Johnson

One of the community outreach sessions held in the garden where gardeners and interested community members could come and learn about the rainwater harvesting project.



Cheri Johnson

Over the course of the planning process, many came to support the project including a graduate student, that designed the irrigation system and created a poster on the project for her class.



Cheri Johnson

Several tours of the garden and project were held to help visualize what their contribution could mean to the project.



Justin Hegarty

Working group meetings were often held in the garden where gardeners and community members could join in the discussion.

PROJECT CONSTRUCTION

After a few iterations of adjusting the scope of the project to best fit the raised funding and after obtaining all of the necessary permits and permissions, construction began in September 2018. Construction included job opportunities for local contractors including Rozga Plumbing and Walnut Way who hires employees from the Lindsay Heights neighborhood.



Justin Hegarty



Cheri Johnson

Before the heavy equipment could get to work, volunteers at the garden helped to clear timbers, compost bins, gardening equipment, and tall grass from the construction area.



Cheri Johnson

Excavation for the 20,000-gal underground cistern resulted in finding building foundations of homeowners that were forced to vacate their properties for the Park East Highway project.



Cheri Johnson

Project engineers and foremen were on hand on a daily basis to ensure the project was constructed as intended.



Justin Hegarty

After many hours working on laying out the liner for the cistern, Walnut Way's crew were ready for the next challenge!

BLOX PARTY

To help construct the 20,000-gallon underground cistern, Reflo and Alice's Garden organized a 150+ person "Blox Party" on Saturday, September 15th 2018, where volunteers of all ages worked together to construct and place over 625 Aquablox®. Following the volunteer build, Walnut Way wrapped the cistern with an impermeable liner and protective fabric.



Michael Snowden



Justin Hegarty

An opening ceremony was held as a part of the build event where volunteers had an opportunity to learn about the importance of the project and how their work will support the community.



Michael Snowden

Volunteers of all ages worked along side new friends to build the 32-gallon water storage units. Rotating shifts allowed for everyone to get an opportunity to lend a hand.



Michael Snowden

A younger group of volunteers enjoyed pushing the blox down the ramp into the excavation where they were placed.



Chen Johnson

Companies like HNTB donated resources and sent teams of much needed volunteers to help build massive cistern.

SOLAR POWER AND RAINWATER HARVESTING SYSTEM

Once the construction of the underground cistern and accompanying vault were complete, the bioswale that diverts and treats the stormwater from the adjacent schoolyard was able to be installed along with the electrical components of the project including a 4.2kW solar panel array and battery backup system.



Michael Snowden



Cheri Johnson

In December 2018, Arch Electric installed the solar panels on the Alice's Garden pavilion. A team from Walnut Way was also provided an opportunity to learn from the solar installation.



Justin Hegarty

The bioswale between the garden and the schoolyard is the first step in a treatment process where the soils and vegetation help to filter stormwater before entering the vault/cistern.



Justin Hegarty

The system allows for the seasonal bypass of incoming stormwater over winter to continue to flow into the sewer system



Justin Hegarty

Additional water treatment includes the pictured two-step cartridge filter and UV disinfection system.

SPECIAL THANKS TO THE RAINWATER HARVESTING WORKING GROUP:

Patty Basthemer, Reformation Lutheran, Brookfield; Ann Brummitt, Milwaukee Water Commons; Lawarrell Cain, Gardener; Nicole Carver, Gardener; Brenda Coley, MCC; Stephen Davis, Gardener; Annette Gelhar, Lake Park Lutheran; Tony Gibson, Groundwork MKE; Justin Hegarty, Reflo; Brett Hess, HNTB; Cheri Johnson, Gardener; Hannah Johnson-Breimeier, Gardener; Kara Koch, GZA; Paul Kraugh, Gardener; Jayme Montgomery Baker, MCC; Mayumi Roos, Lake Park ; Heather Schmidt, Lake Park; Neal O'Reilly, UWM; Barbara Richards, Reflo; Wilniesha Smith, Reflo; Andy Vedder, Lake Park; Venice Williams, Alice's Garden / The Table



FOR MORE INFORMATION ON HOW TO SUPPORT THE ALICE'S GARDEN RAINWATER HARVESTING PROJECT, PLEASE CONTACT:

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