



# Final Report

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Planning and Implementing Green Infrastructure to Improve Watershed Resiliency  
in the Saw Mill Brook Watershed and the Village of New Paltz

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## Executive Summary

With financial support from the Department of Environmental Conservation and the New England Interstate Water Pollution Control Commission (NEIWPCC), SUNY New Paltz constructed a 1,000 rainwater cistern at LeFevre Hall during the fall of 2014. The project demonstrates a rainwater harvesting system that captures and stores rainwater from the roof of LeFevre Hall for landscape irrigation. This project provides an environmental education opportunity, increases the campus' resiliency to climate change, increases the capacity of the college's rainwater management infrastructure, and reduces the severity and impact of large storm events. Prior to the installation of the rainwater harvesting system, the College used municipally treated water to irrigate landscaping plants. The new rainwater harvesting system enables SUNY New Paltz to use rainwater for landscape irrigation.

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# 1 Project Introduction

The original goals of the original Planning and Implementing Green Infrastructure to Improve Watershed Resiliency in the Saw Mill Brook Watershed and the Village of New Paltz grant were to:

- Improve water quality
- Provide environmental education opportunities
- Measurably increase resilience to climate change
- Increase the capacity of rainwater management infrastructure
- Reduce the severity and impact of floods

The original scope of the \$104,742 request was to continue water quality monitoring, establish a rainwater harvesting system at LeFevre Hall, and develop a stormwater mitigation master plan for north campus. The college was asked to reduce the scope of the request and the scope was narrowed to construct a rainwater harvesting system at LeFevre Hall.

This purpose of the rainwater harvesting system is to capture and store rainwater for landscape irrigation at SUNY New Paltz. This green infrastructure practice meets the original project goals of providing an environmental education opportunity, increasing the campus' resiliency to climate change, increasing the capacity of rainwater management infrastructure, and reducing the severity and impact of large storm events.

The rainwater cistern at LeFevre Hall is an example of the college adapting to climate change and taking advantage of a resource that is becoming more and more plentiful in the northeast: water. The US Global Change Research Program reported in *Regional Climate Trends and Scenarios: The Northeast US* that "average annual precipitation shows a clear shift towards greater amounts and more variability since 1970." The report found that "seasonal [precipitation] changes... indicate an increase in precipitation for winter, spring, and fall, but a decrease for summer." The rainwater cistern will collect and store water to irrigate selected plants that are under stress or that have been recently transplanted when they are most stressed during the summer time. The rainwater cistern treats rainwater as an asset and reduces the reliance on municipally treated water.

The rainwater cistern at LeFevre Hall is one of many types of green infrastructure practices demonstrated on campus. Other practices that have been implemented to date include bioswales, bioretention areas, permeable pavement, stormwater diffusers, and riparian buffers. A 12,500-gallon rainwater cistern for flushing toilets and urinals is currently under construction at the Wooster Building. Rain gardens are now under construction at Ridgeview Hall and the New Science Building. Adjacent to campus, is a stream daylighting project that was recently completed by the Village of New Paltz. With the variety of green infrastructure projects on and adjacent to campus, SUNY New Paltz has become a demonstration site for green infrastructure. The rainwater cistern for landscape irrigation demonstrates a new type of green infrastructure practice to showcase internally and externally.

The Department of Environmental Conservation and New England Interstate Water Pollution Control Commission (NEIWPC) provided financial support of \$20,000 for the project. The Research Foundation for SUNY managed contractual matters for this project. Architecture+ designed the rainwater cistern. MLB Construction Services and its subcontractor M. Sullivan Construction constructed the cistern. The Dormitory Authority of the State of New York (DASNY)

and Facilities Management staff of SUNY New Paltz oversaw design and construction. The Office of Campus Sustainability provided coordination and support for the project.

## 2 Tasks Completed

**Task # 1** – Execute agreement between the SUNY Research Foundation and New England Interstate Water Pollution Control Commission (NEIWPCC).

The agreement was fully executed on August 14, 2014.

**Task # 2** – Completion of Cistern

The rainwater cistern was constructed during September of 2014. The general contractor on the project was MLB Construction Services, LLC. The subcontractor that constructed the rainwater cistern was M. Sullivan Construction. The Dormitory Authority of the State of New York (DASNY) oversaw the construction, with support from Facilities Management of SUNY New Paltz.

The rainwater cistern includes the following components:

- 1,000 gallon concrete tank
- One submersible pump
- Lockable pump control panel
- Piping and fittings
- Manhole frame and cover
- Water spigot and foundation

No problems were encountered during construction.

The picture at right shows the visible elements of the rainwater cistern. The manhole at front provides access to the underground rainwater cistern. The rainwater flows out of the water spigot at right. On the side of the building is an on/off switch that provides power to the pump floating in the rainwater cistern. The red light on top of the white control box lights up when it water is running low.



**Task # 3** – Final Report

SUNY New Paltz Campus Sustainability Coordinator Lisa Mitten submitted a final report to Alene Onion of the Department of Environmental Conservation on October 17, 2014. Following feedback from the DEC, Lisa Mitten submitted a revised final report to Becky Thomas of the Department of Environmental Conservation on November 20, 2014.

### 3 Methodology

No research methods were employed in the project. The project was constructed by MLB Construction Services and M. Sullivan Construction.

### 4 Deliverables Completed

The deliverables for this project included:

- Construction of rainwater cistern. The rainwater cistern was scheduled to be complete in October of 2014. This deadline was met. There were no problems during construction.
- The final report was due on October 17, 2014. Lisa Mitten submitted the final report to Arlene Onion on October 17, 2014. Following feedback from the Department of Environmental Conservation, Lisa Mitten submitted a revised final report on November 20, 2014. The final report was completed by Lisa Mitten and took approximately 6 hours to complete.

### 5 Conclusions

All tasks were successfully completed. Now, with support from the Department of Environmental Conservation and NEIWPC, SUNY New Paltz can showcase another green infrastructure practice to the campus community and the region. The campus' rainwater management system has greater capacity and is more resilient. The campus has reduced its reliance on municipally treated water and is taking advantage of rainwater that will become more and more plentiful in the Northeast due to climate change.

The Office of Campus Sustainability of SUNY New Paltz continues to identify opportunities to incorporate green infrastructure practices across campus in new construction projects, existing infrastructure upgrades, and stand-alone GI projects. The Office of Campus Sustainability is considering transforming a portion of the terrace roof surrounding the Student Union Atrium and the Haggerty Administration Building to a green roof. During the summer of 2016, SUNY New Paltz will be making major repairs to the roof. Design work for this project is expected to begin in the winter/spring of 2015. The Office of Campus Sustainability is seeking outside for the green roof at the terrace to ensure that the green roof elements is not eliminated from the project should it go overbudget.

This location is ideal for a green roof GI demonstration project because it experiences some of the highest levels of traffic across campus, with high levels of exposure from both on campus and off-campus visitors. The Haggerty Administration Building houses the Visitors Center and high-level administrative offices on campus. The Student Union and Atrium is the "living room" of campus and attracts students, faculty, staff and hosts conferences for outside groups. A green roof at this high-traffic location would add another green infrastructure practice to the array of green infrastructure practices already on site or under construction: rain gardens, bioswales, permeable pavement, stormwater diffuser, rain cistern for irrigation, rain cistern for flushing toilets, and riparian buffers.

### 6 References

Kunkel, K.E, L.E. Stevens, S.E. Stevens, L. Sun, E. Janssen, D. Wuebbles, J. Rennells, A. DeGaetano, and J.G. Dobson, 2013: Regional Climate Trends and Scenarios for the U.S. National Climate Assessment. Part 1. Climate of the Northeast U.S., NOAA Technical Report NESDIS 142-1, 79 pp.