



**Bridgewater Raritan Middle School  
Student Rain Garden Demonstration Project  
128 Merriwood Rd, Bridgewater Township, New Jersey 08807**

**Project Description**

The Rutgers Cooperative Extension (RCE) Water Resources Program completed design plans (PLAN) for a rain garden at the Bridgewater Raritan Middle School (BRMS). This work was completed as a part of an effort by students of teachers Ms. Pat Magee and Mr. Michael Russel to propose an environmental project, fundraise, and install the project on their school grounds. The rain garden was built in June 2018 by students and teachers, volunteers from Raritan Headwaters Association, RCE Water Resources Program, and made possible by plant donations by Coopers Hollow Farm. Students were recognized by the Bridgewater Raritan Board of Education at their June 2018 meeting for their efforts.

The project proposal was drafted by BRMS students in spring 2018. RCE Water Resources Program was contacted to provide technical assistance with the design and engineering of the rain garden. RCE Water Resources Program visited the school on April 13, 2018 to review the site location and project feasibility. The site was confirmed and the PLAN was drafted and incorporated into the student proposal. RCE Water Resources Program provided a cost estimate for construction materials totaling \$1,635.00 (see Quarterly Report 9).

Project construction commenced on June 14, 2018 and completed on June 29, 2018. RCE Water Resources Program staff and interns were present on site and led physical and technical construction efforts, including surveying, hand excavation, transportation of materials, and planting. Students and teachers from the school joined the construction effort after school dismissal and provided labor in hand digging and planting. Materials and supplies were purchased by RCE Water Resources Program, including bioretention blended soil, bagged river stone, mulch, an overflow drain box, and native plants. Additional native plants were donated by Coopers Hollow Farm.

The project supplies and staff hours were funded through a 319(h) grant from the New Jersey Department of Environmental Protection (NJDEP).

The rain garden is 450 square feet in area is designed to pond a maximum of six inches in a rain event. The rain garden is designed to manage runoff from a drainage area totaling 1,800 square feet, including from adjacent impervious surfaces totaling 820 square feet. The rain garden is designed to capture stormwater runoff generated by a rain event of 1.25 inches (NJDEP Water Quality Design Storm). The rain gardens have the potential to capture stormwater runoff generated by 90% of all rainfall events, or 1,402 gallons per individual rain event. The rain gardens have the potential to capture an annual runoff volume of 39,988 gallons per year, assuming an average rainfall total of 44 inches per year in New Jersey.

**Project Proposal**

Rain Garden

The RCE Water Resources Program will design and installed a 450 sq. ft. rain garden surrounding an existing drainage catch basin in a courtyard area of the Bridgewater Raritan Middle School. The area will be excavated to a depth of approximately 21 inches and backfilled with soil, sand, mulch, and stone as per

the PLAN. The existing catch basin will be modified to increase the ponding depth in the rain garden. The rain garden is to be constructed by hand, as per the PLAN.

Planting will be coordinated by RCE and completed by students and school staff.

**Estimated Project Costs**

| ITEM DESCRIPTION                 | ESTIMATED COST    | ACTUAL COST       | FUNDING SOURCE       |
|----------------------------------|-------------------|-------------------|----------------------|
| Rain Garden Materials & Supplies | \$1,635.00        | \$466.19          | RCE/NJDEP 319h Grant |
| Plants                           | (included)        | \$0.00            | Donation             |
| <b>TOTAL</b>                     | <b>\$1,635.00</b> | <b>\$1,635.00</b> |                      |

# **CONSTRUCTION REPORT**

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**DATES:** June 14 – 29, 2018

**PROJECT:** Bridgewater Raritan Middle School (BRMS) Student Rain Garden  
Demonstration Project

**PREPARED BY:** Christopher Perez

**DATES SITE VISITED:**

4/13/2018 (Initial site visit)  
6/14/2018 (Construction begins)  
6/18/2018  
6/21/2018  
6/29/2018 (Construction complete)

**SITE CONTACTS:**

Michael Russell, Bridgewater Raritan Middle School  
Pat Magee, Bridgewater Raritan Middle School

**OVERVIEW:**

Rutgers Cooperative Extension (RCE) Water Resources Program was on-site for a total of five days between April 13, 2018 and June 29, 2018 and completed the project work during that period. RCE staff and interns, students and teachers, and volunteers from Raritan Headwaters Association excavated the site, graded the rain garden, and added landscape material including soil, sand, stone, mulch, fabric, and a drainage fixture, as per the plan.

**SUMMARY:**

Following final approval of the student project proposal, RCE brought hand tools on-site that included wheelbarrows, shovels, rakes, etc. on June 14, 2018. RCE staff marked out the rain garden location and removed sod and 6"-12" of soil from the site. Soil was moved to a stockpile outside of the courtyard. This required several doors in the school to be left open throughout the duration of the project as RCE staff transported wheelbarrows of material to-and-from the site. Bioretention soil (sand, compost blend) was added back to the excavation and blended into the existing grade, to ensure a gradual slope on all sides. Bioretention soil was provided by RCE. Students, teachers, and volunteers aided in the excavation and the rain garden was fully graded by the end of the day on June 14, 2018. Plants were delivered on-site by Peter Birnbaum, of Cooper's Hollow Farm on June 14, 2018.

RCE returned on June 18, 2018 to add stone, landscape fabric, and mulch to the rain garden. These materials were sourced and procured by RCE from Schofield Stone, of Bridgewater, NJ.

Thirty-one, fifty pound bags of 2"-3" sized river stone were placed in a 2' strip, on top of landscape fabric, along two edges of the garden to protect the soil from erosion. An additional area of erosion was identified during a rain event on June 19, 2019 and additional river stone was added to the identified area of erosion. Students from BRMS assisted with planting the native plants in the rain garden. The plant donation was supplemented with additional 50 native plants, in 2" plugs, purchased by RCE for an earlier project from Pinelands Nursery, of Columbus, NJ. Two yards of triple shredded hardwood mulch was placed into the garden in a 3"-thick layer.

The existing catch basin was inspected by RCE on June 14, 2018 for functionality within the design requirements of the rain garden. It was found to be at the incorrect elevation necessary for adequate ponding depth in the rain garden and was excavated and removed from the site by RCE on June 29, 2018. A replacement was sourced and procured by RCE from Kennedy Culvert & Supply Co. of Hillsborough, NJ. The catch basin was installed by RCE staff and interns on June 29, 2018.

The project construction was completed on June 29, 2018.



4/13/2018 - Site location identified with students and teachers during RCE Water Resources Program initial site visit with BRMS





4/13/2018 Site location identified with students and teachers during RCE Water Resources Program initial site visit with



6/14/2018 – The rain garden location is measured and marked-out and sod is removed by RCE Water Resources Program staff and interns.





6/14/2018 RCE Water Resources Program staff and interns remove and stockpile sod and soil outside of the courtyard.



6/14/2018 – All materials were moved to and from the site with wheelbarrows through a short distance in the school building.





6/14/2018 Native plants, including this Purple Coneflower were donated in part by Cooper's Hollow Farm, of Bernardsville, NJ



6/14/2018 – Existing catch basin and piping is uncovered and assessed for reuse.





6/14/2018 RCE Water Resources Program staff determined that the catch basin would need to be retrofitted with new parts to raise the overflow inlet several inches.



6/14/2018 RCE Water Resources Program staff share progress status and lead afternoon excavation with student and teacher volunteers.





6/18/2018 Stone was placed around the perimeter of the garden to protect against erosion, the garden was planted and mulched by students and volunteers.



6/19/2018 Post-installation, additional erosion issues were noted.





6/29/2018 – RCE Water Resources Program staff and interns replaced the existing catch basin with a larger box, increasing the height of the inlet structure.



6/29/2018 Mulch was replaced and stone was placed around the installed catch basin and area of erosion.





6/29/2018 RCE Water Resources Program staff celebrates the completion of the project.



6/29/2018 - Completed rain garden project at Bridgewater Raritan Middle School