Green Infrastructure Champions Program

This program is partially funded by the Rutgers New Jersey Agricultural Experiment Station, The Geraldine R. Dodge Foundation, and NJ Sea Grant Consortium and is a collaboration of the Rutgers Cooperative Extension Water Resources Program, the Green Infrastructure Subcommittee of Jersey Water Works, and Duke Farms.

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New Jersey Agricultural Experiment Station

JERSEY WATER WORKS
Smart infrastructure. Strong communities.

Sea Grant
NJ Sea Grant Consortium

The Geraldine R. DODGE FOUNDATION
IMAGINE A BETTER NEW JERSEY

Duke Farms

Chat with "smellor"

Green Infrastructure Champion Training: Part 6

"Green Infrastructure Projects for Schools"

March 27, 2020

~~Duke Farms~~

~~Hillsborough, NJ~~

Start Time: 10 am

Webinar due to COVID-19 Pandemic

Presented by Chris Obropta and Toby Horton

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Water Resources Program

water.rutgers.edu

Green Infrastructure Champion Trai art 6

"Green Infrastructure Proje ools"

M

A Coronavirus Webinar

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water.rutgers.edu

Rutgers Cooperative Extension

Rutgers Cooperative Extension (RCE) helps the diverse population of New Jersey adapt to a rapidly changing society and improves their lives through an educational process that uses science-based knowledge.

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New Jersey Agricultural Experiment Station

Water Resources Program

Water Resources Program

Our mission is to identify and address community water resources issues using sustainable and practical science-based solutions.

Why New Jersey Schools?

- 590 School Districts
- 2,526 Public Schools
  - 2,005 Elementary Schools
  - 511 Secondary Schools
- 88 Charter Schools
- Public School Enrollment = 1.37 million
- Charter School Enrollment = 45,982
- Full-time classroom teachers = 116,351

Need more math teachers at NJ Department of Education

More on "why schools"

- Mostly old buildings and parking lots with little or no stormwater management
- Dedicated source of funding ($8.03 billion in state aid in 2016-2017 + local property taxes)
- Educate the youth and the adults will follow
- Enhance all levels of teaching with outdoor education
- Innovative, interdisciplinary "outdoor classrooms"
- Highly visible sites
- Separate government – school board
- Free labor

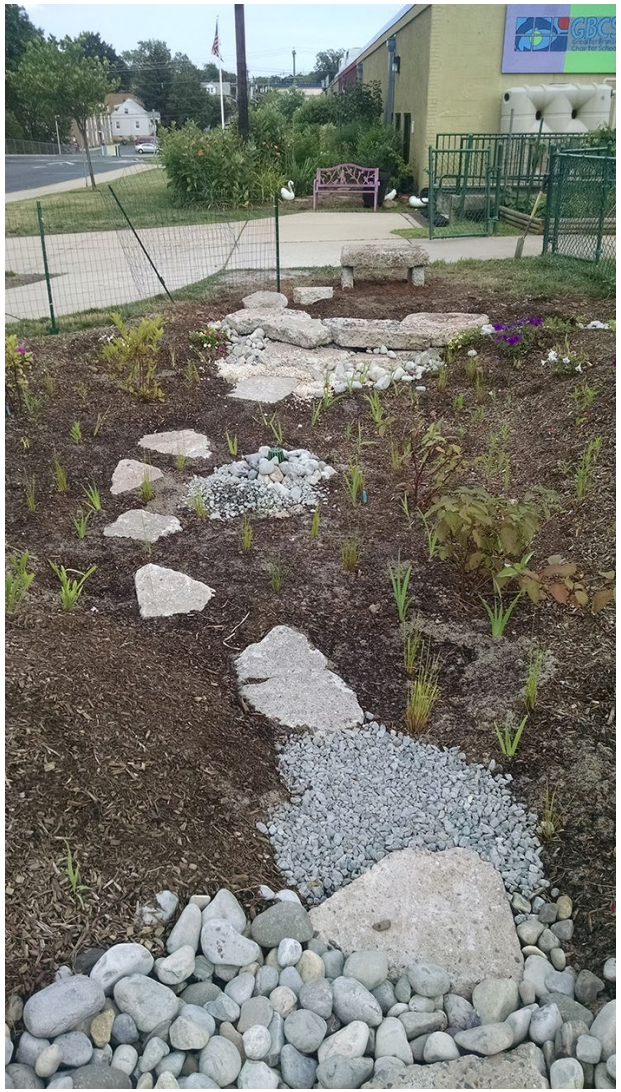
It is all about controlling runoff from impervious surfaces

Step 1: Depave

Make Something with your De-Pavement

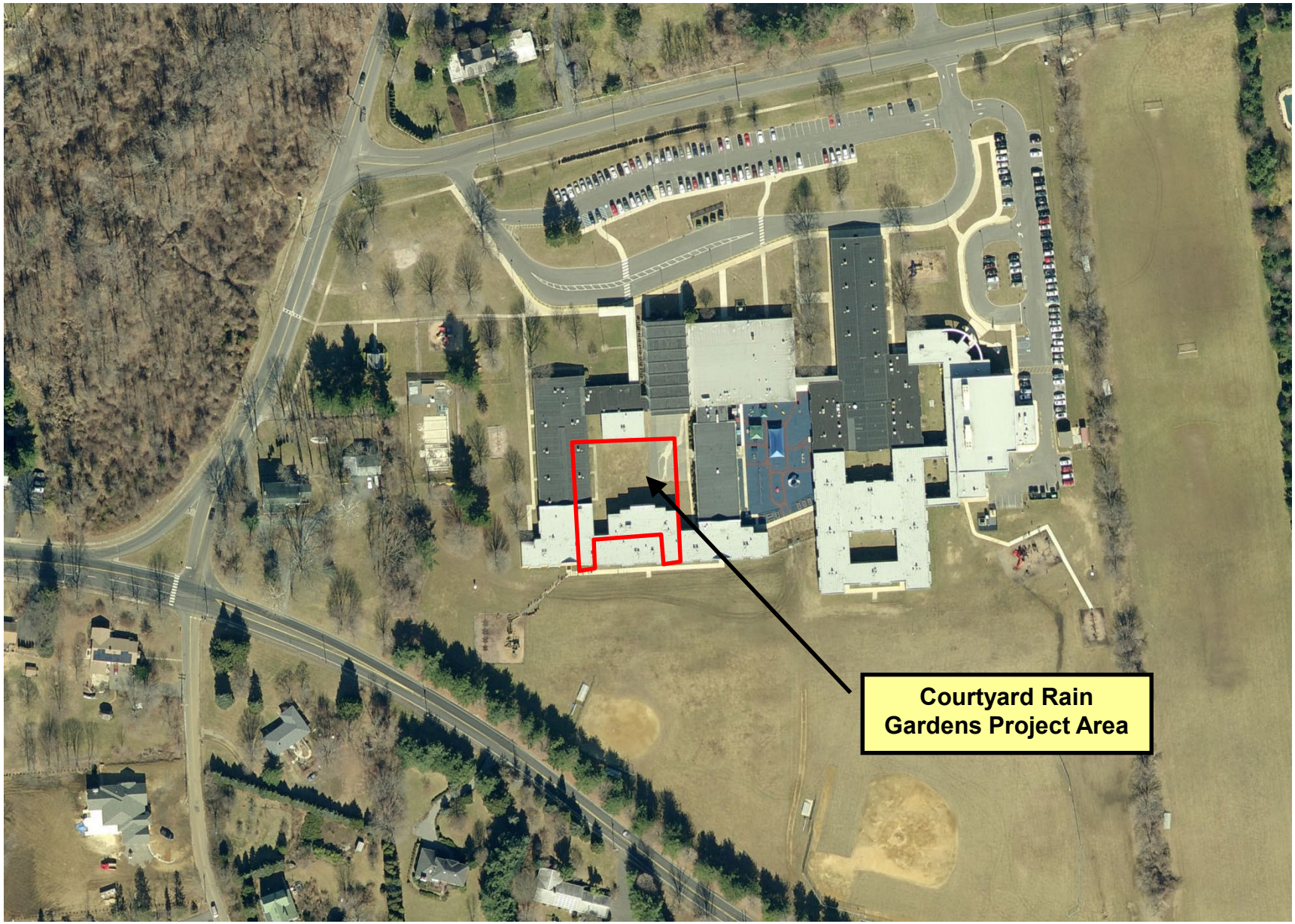
Greater Brunswick Charter School

Make Something with your De-Pavement



Greater Brunswick Charter School

Village Elementary School - Aerial



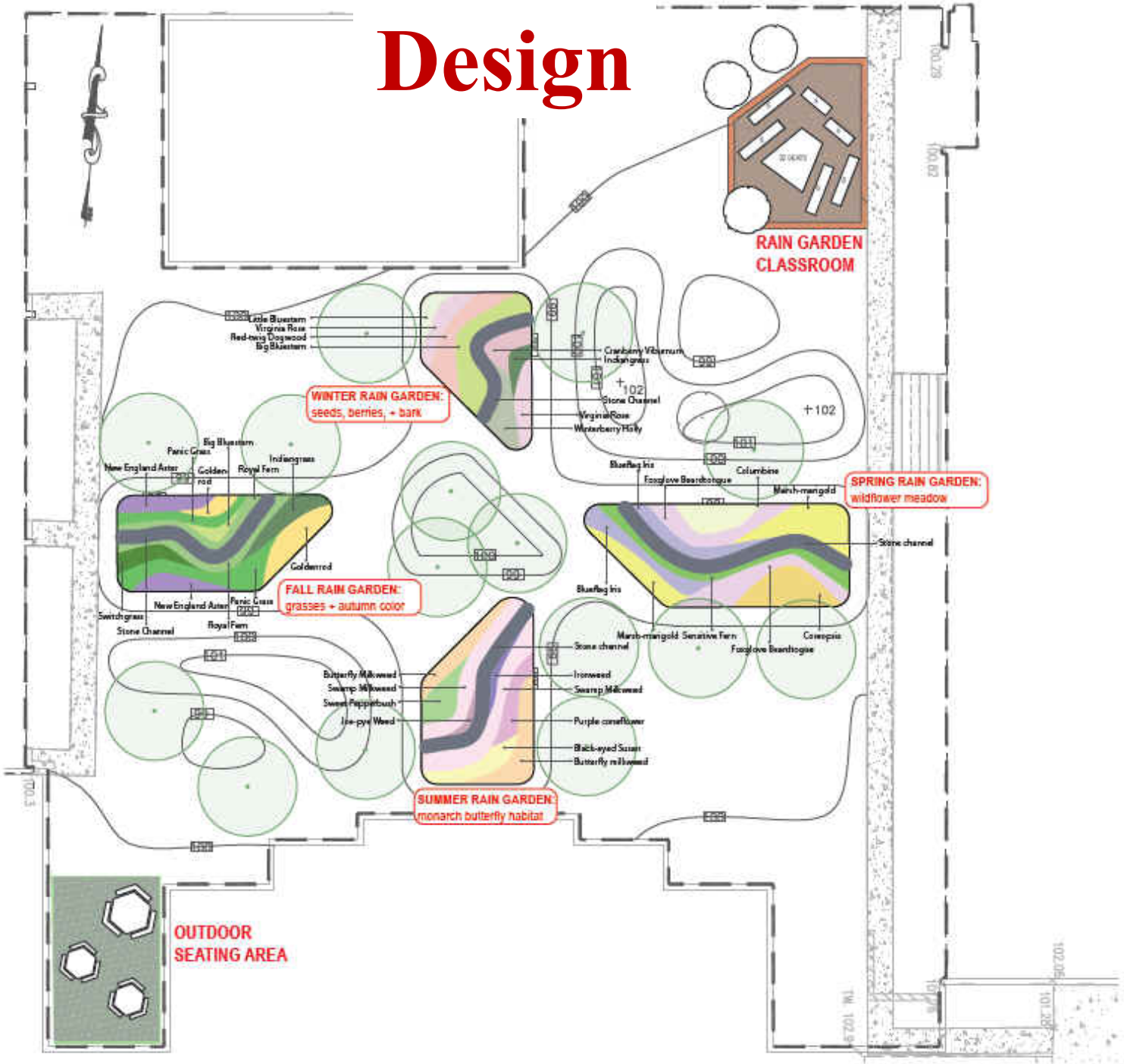
Existing Courtyard

Existing Courtyard

Existing Courtyard

Existing Courtyard

Design


RAIN GARDEN
CLASSROOM
WINTER RAIN GARDEN:
seeds, berries, + bark
Little Bluestem
Virginia Rose
Red-twig Dogwood
Big Bluestem
Cranberry Viburnum
Indiangrass
Stone Channel
Virginia Rose
Winterberry Holly
+102
SPRING RAIN GARDEN:
wildflower meadow
Blueflag Iris
Foxglove Beardtongue
Columbine
Marsh-marigold
Stone channel
FALL RAIN GARDEN:
grasses + autumn color
Big Bluestem
Panic Grass
New England Aster
Golden rod
Royal Fern
Indiangrass
Goldenrod
Switchgrass
Stone Channel
SUMMER RAIN GARDEN:
monarch butterfly habitat
Butterfly Milkweed
Swamp Milkweed
Sweet Pepperbush
Joe-pye Weed
Ironweed
Swamp Milkweed
Purple coneflower
Black-eyed Susan
Butterfly milkweed
Sensitive Fern
Coreopsis
OUTDOOR
SEATING AREA


south garden


BRAVO, Livingstone Mouse!
It's Pumpkin Time!
Very Scary
Move
BIG RED TUB
LIBRARY MOUSE
A Place Called KINDERGARTEN


HOLMDEL
EST 1857

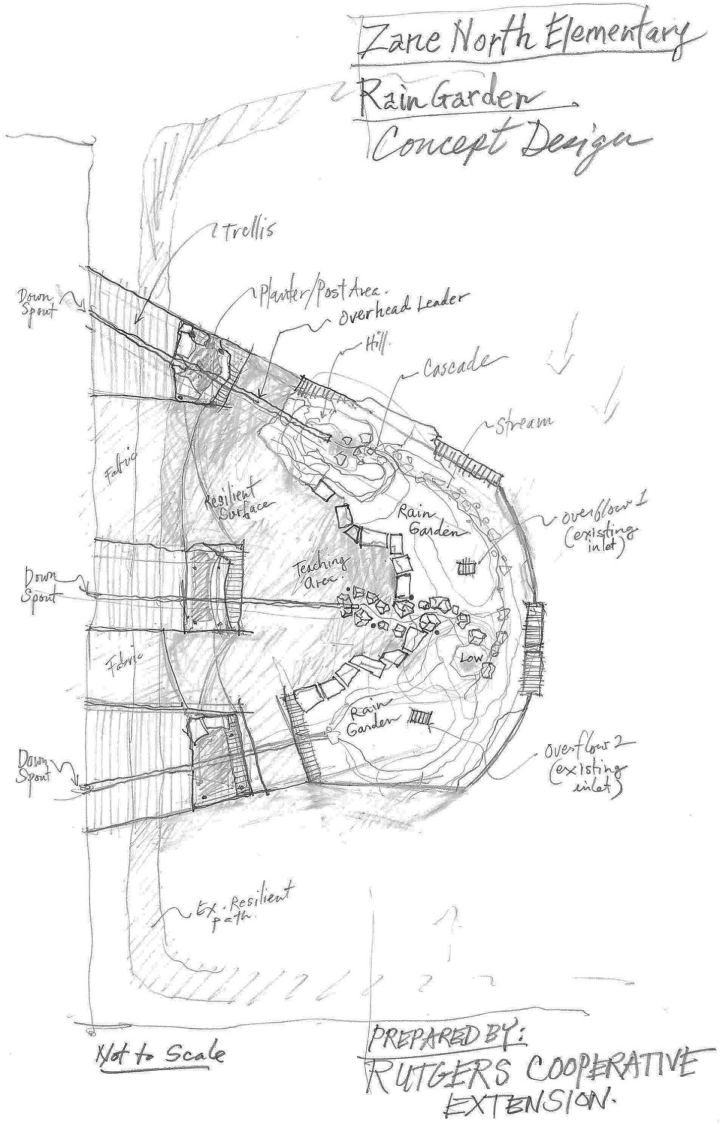

GO FISH
1

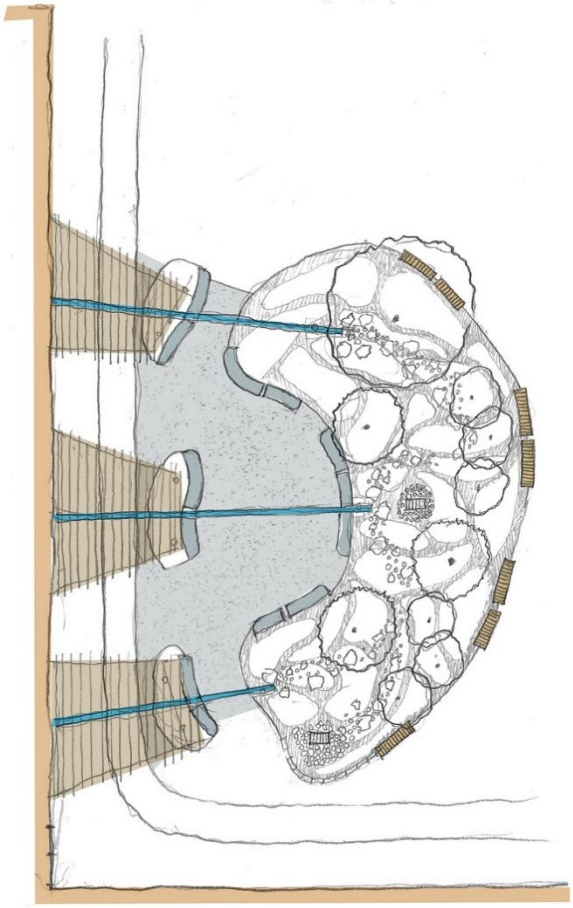

41
HOLMDEL


25

ZANE NORTH ELEMENTARY

ZANE NORTH ELEMENTARY





Site Elements: Infrastructure/Furnishings

Not to Scale
Dimensions to be Verified in the Field

Zane North Elementary School
Rain Garden Project
Rutgers Cooperative Extension
April 20, 2017

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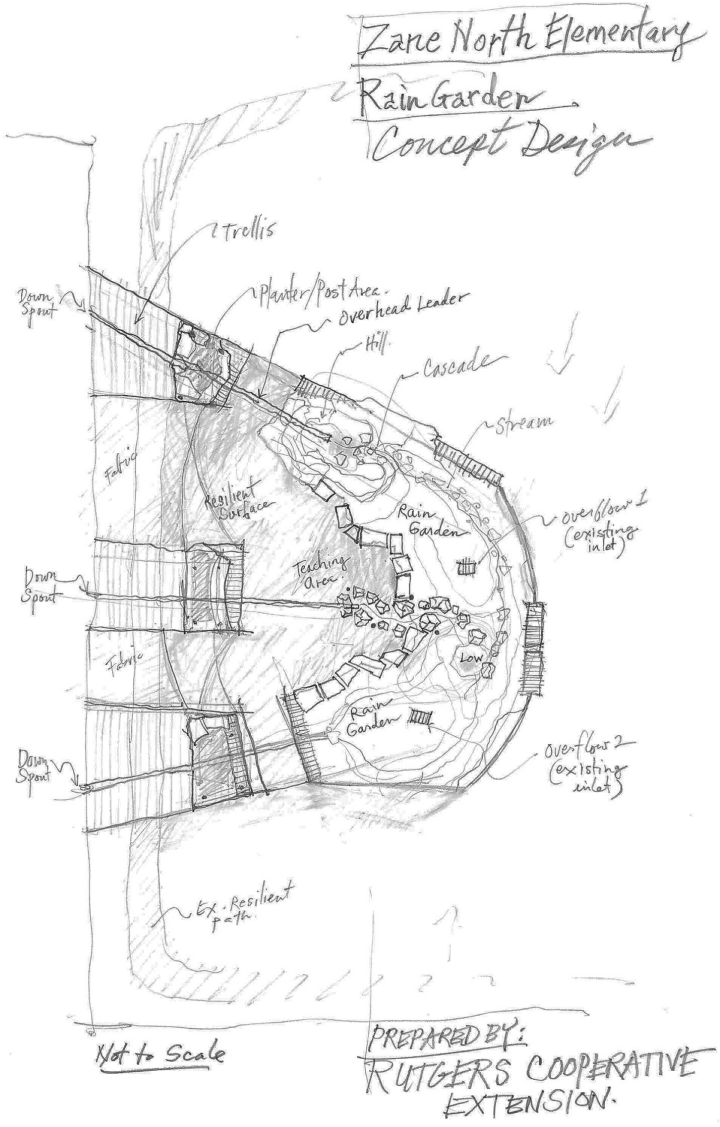
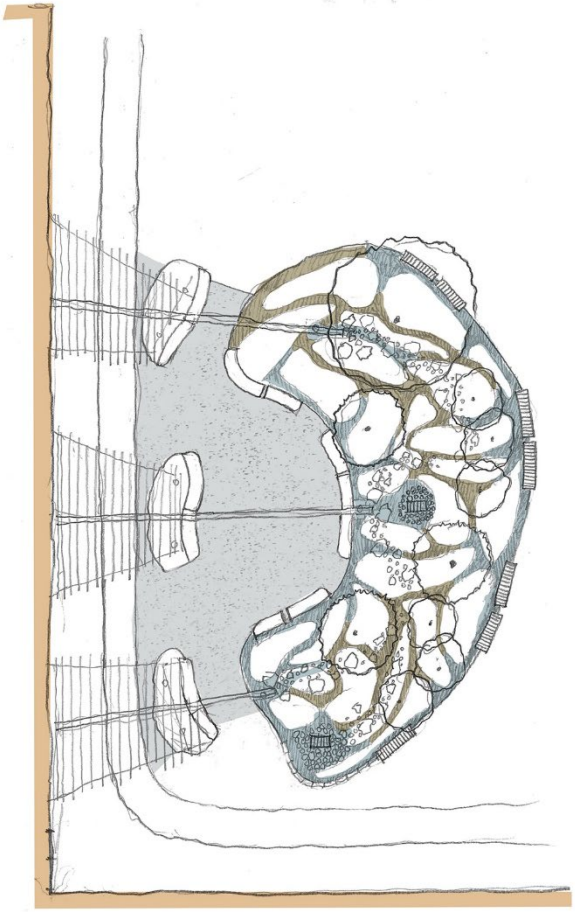
Water Resources Program

ZANE NORTH ELEMENTARY





Narrow Garden Paths: Mulch and Gravel

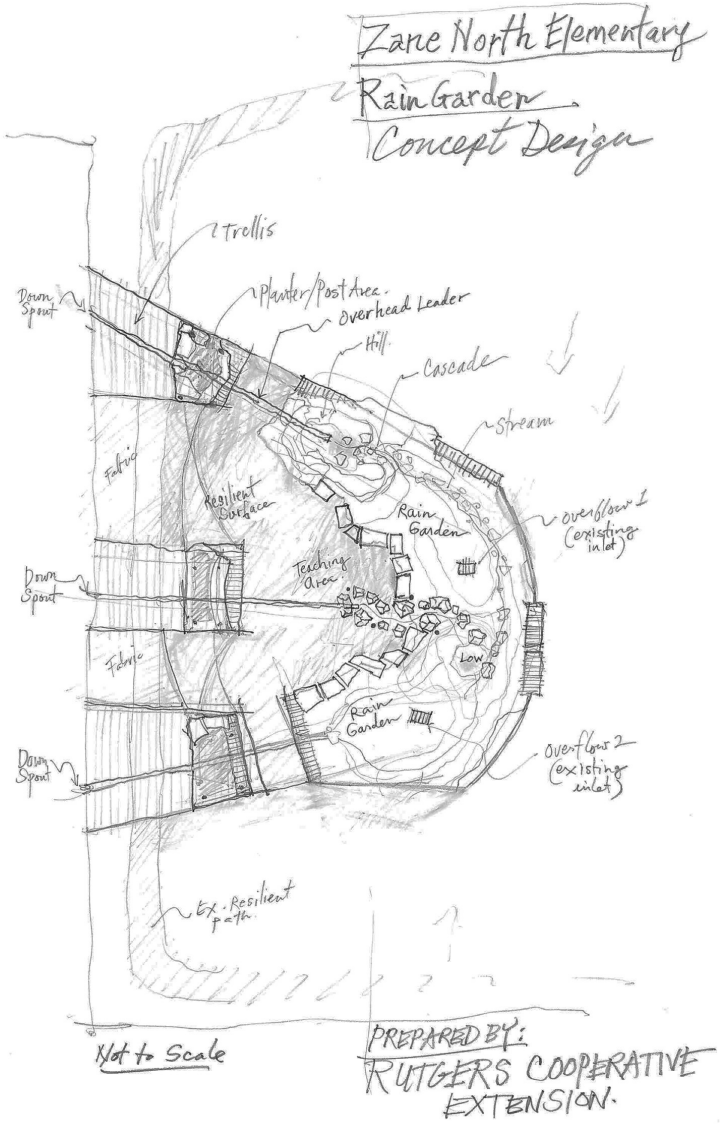
Not to Scale
Dimensions to be
Verified in the Field

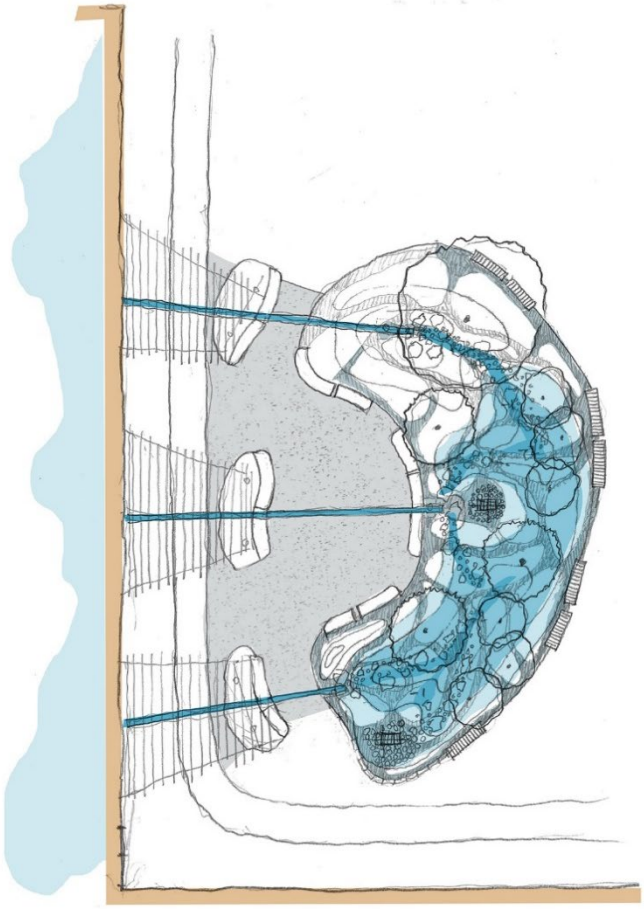
Zane North Elementary School
Rain Garden Project
Rutgers Cooperative Extension
April 20, 2017

RUTGERS
New Jersey Agricultural Experiment Station

Water Resources Program

ZANE NORTH ELEMENTARY





Water Flow and Infiltration Diagram

Not to Scale
Dimensions to be Verified in the Field

Zane North Elementary School
Rain Garden Project
Rutgers Cooperative Extension
April 20, 2017

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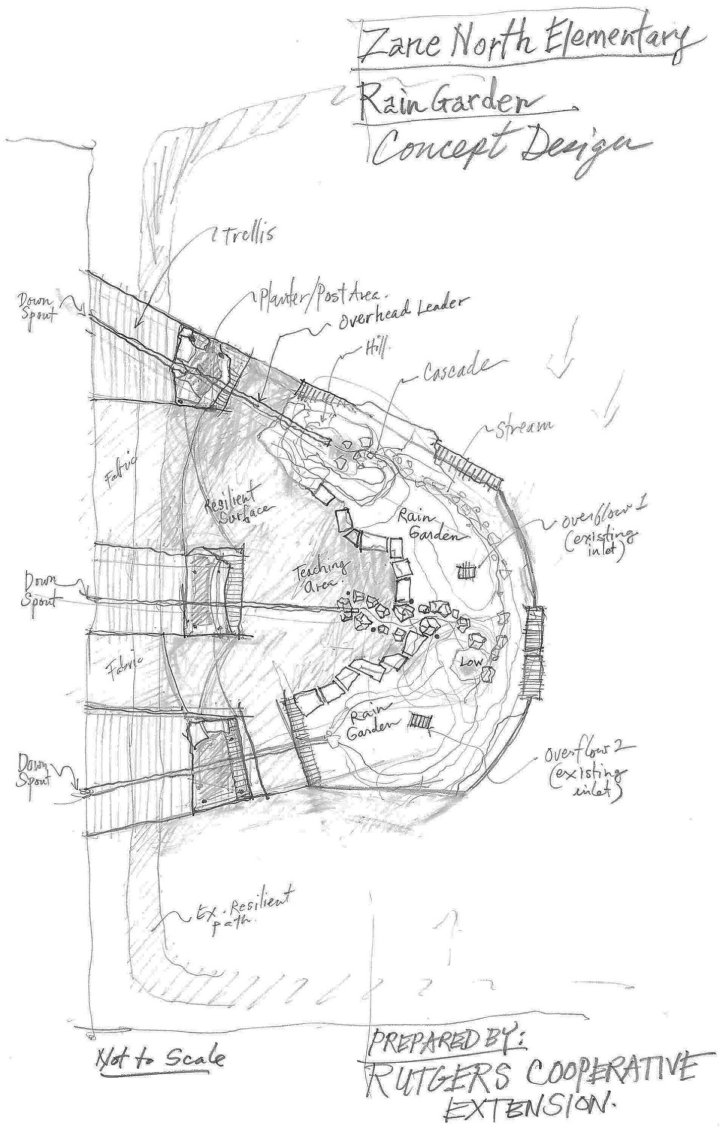
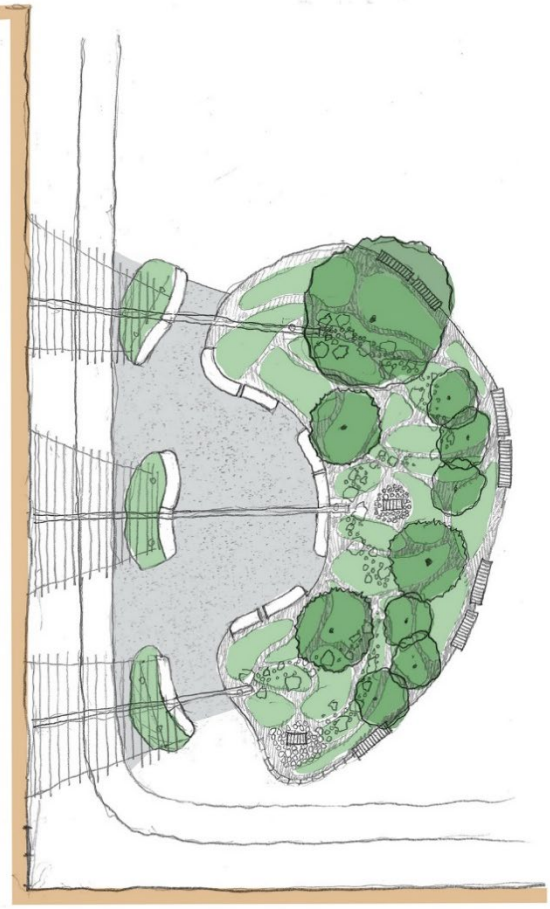
ZANE NORTH ELEMENTARY





Planting

Not to Scale
Dimensions to be Verified in the Field

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Rutgers Cooperative Extension
April 20, 2017

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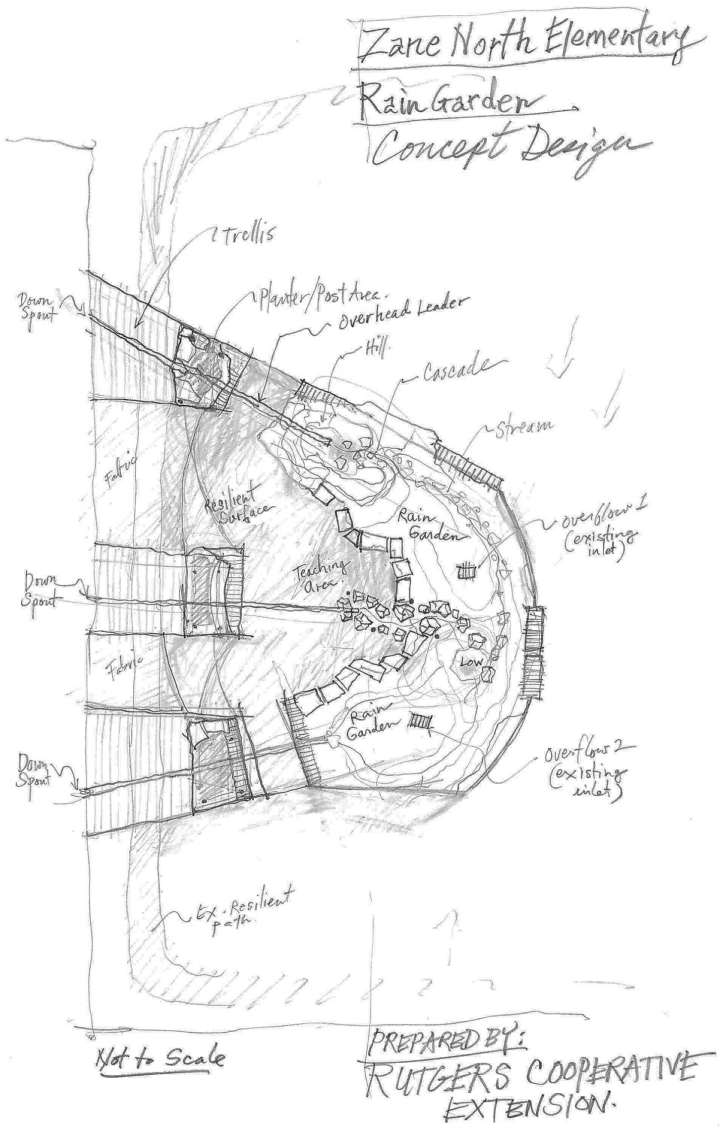

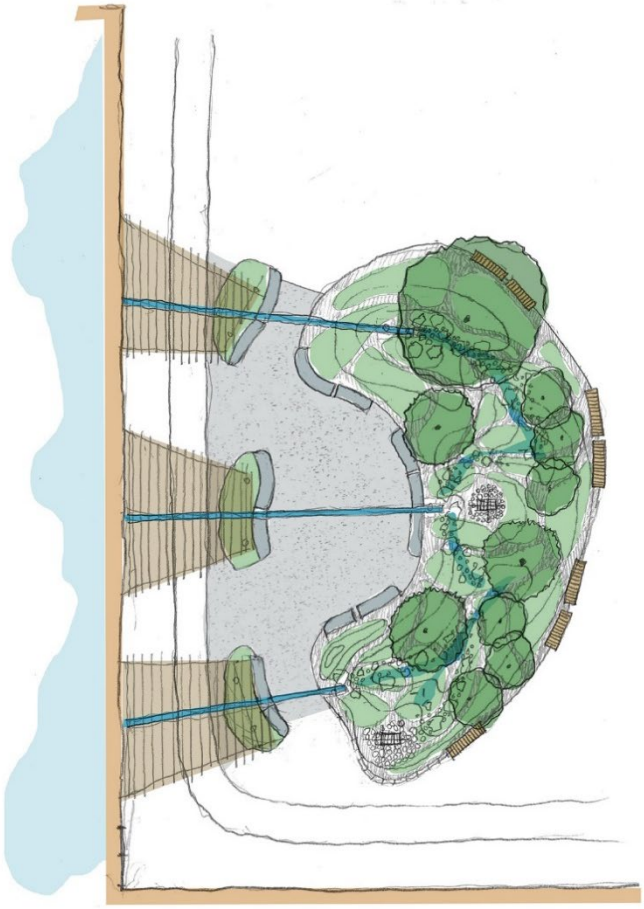

Composite Plan

Not to Scale
Dimensions to be Verified in the Field

Zane North Elementary School
Rain Garden Project
Rutgers Cooperative Extension
April 20, 2017

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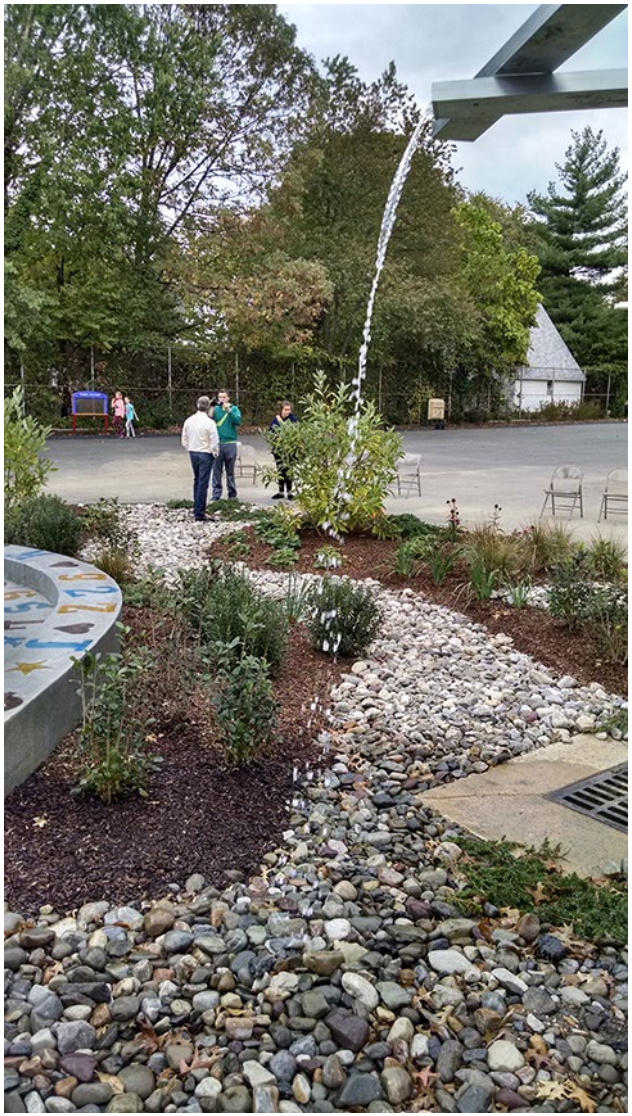
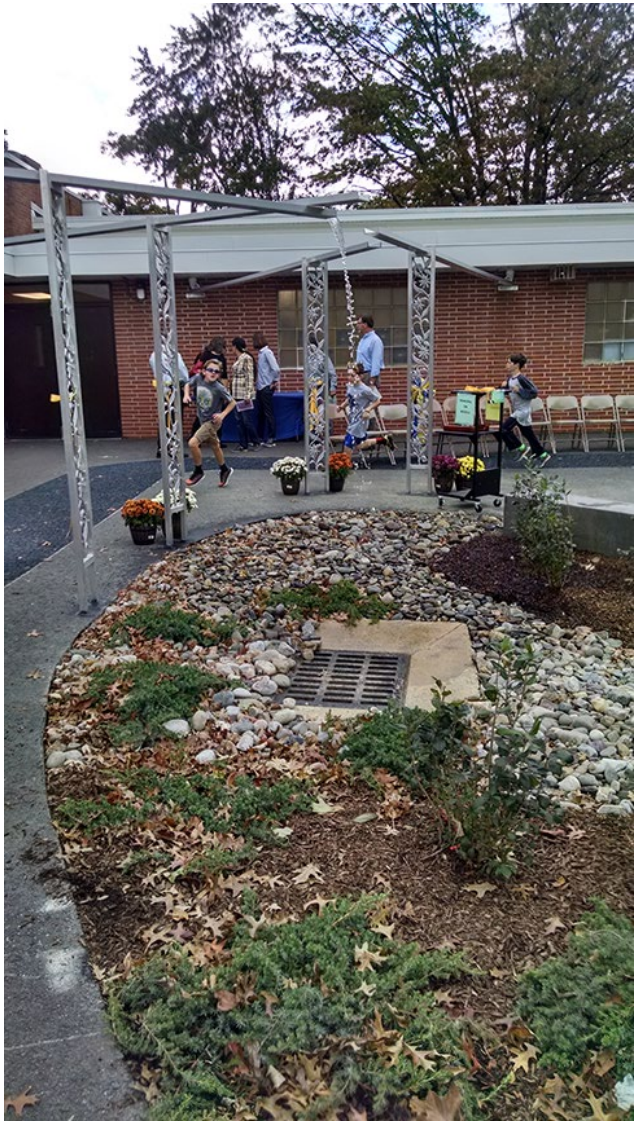
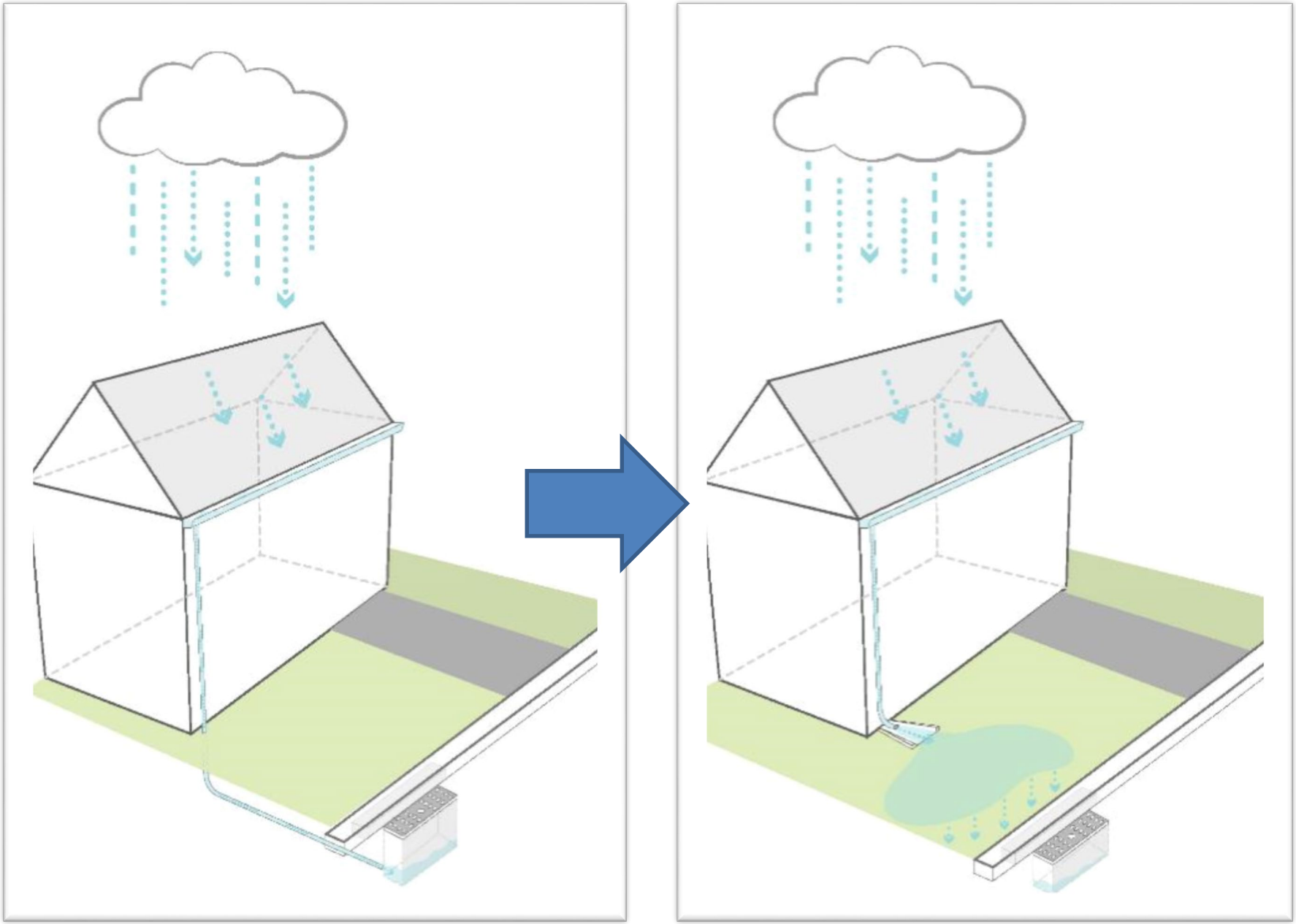
ZANE NORTH ELEMENTARY

ZANE NORTH ELEMENTARY

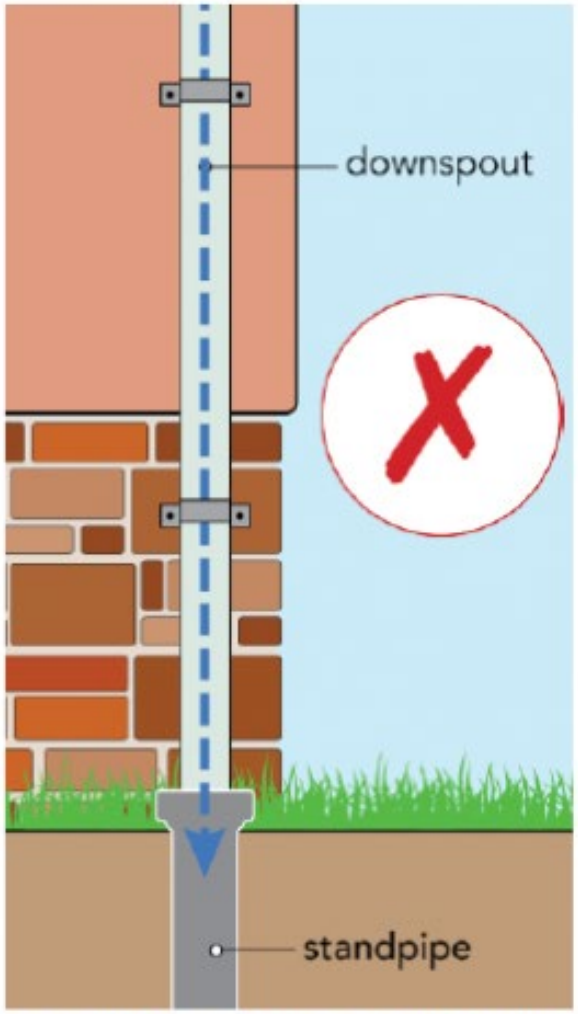




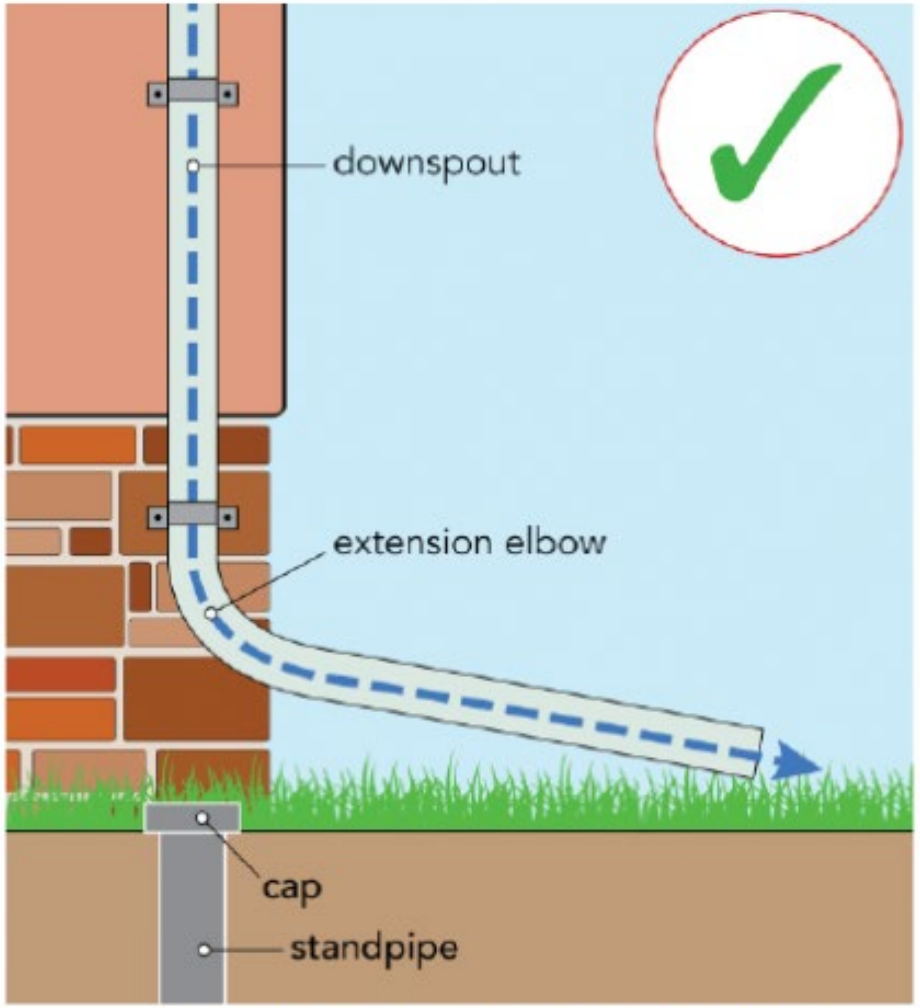
Step 2: Simple Disconnection



Downspout Disconnection

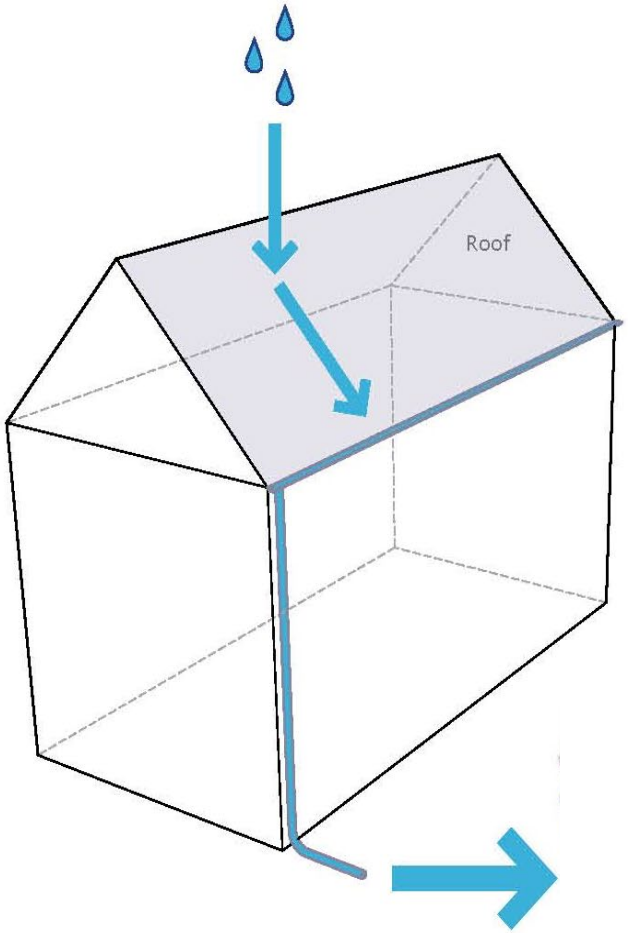


DOWNSPOUT CONNECTED TO SEWER SYSTEM



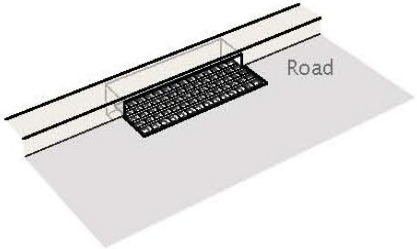
DOWNSPOUT DISCONNECTED FROM SEWER SYSTEM

Useful Water: Disconnect to a Rain Barrel or Cistern



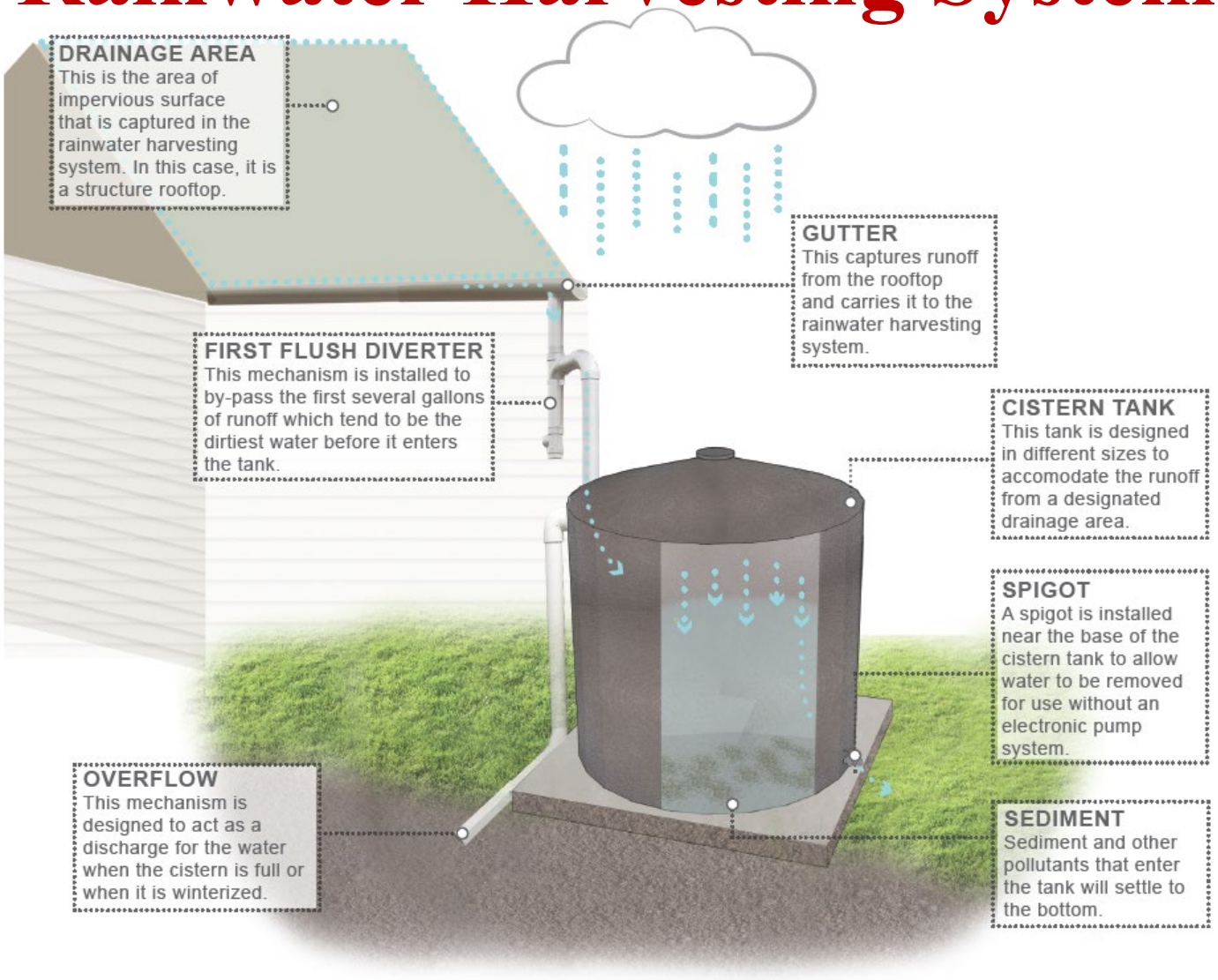
Disconnect your downspout by installing a rain barrel

REDUCE THE AMOUNT OF RUNOFF ENTERING STORM SEWERS



Impervious area is now ***"disconnected"*** from flowing directly into the storm sewer system

Useful Water:
Rainwater Harvesting Systems



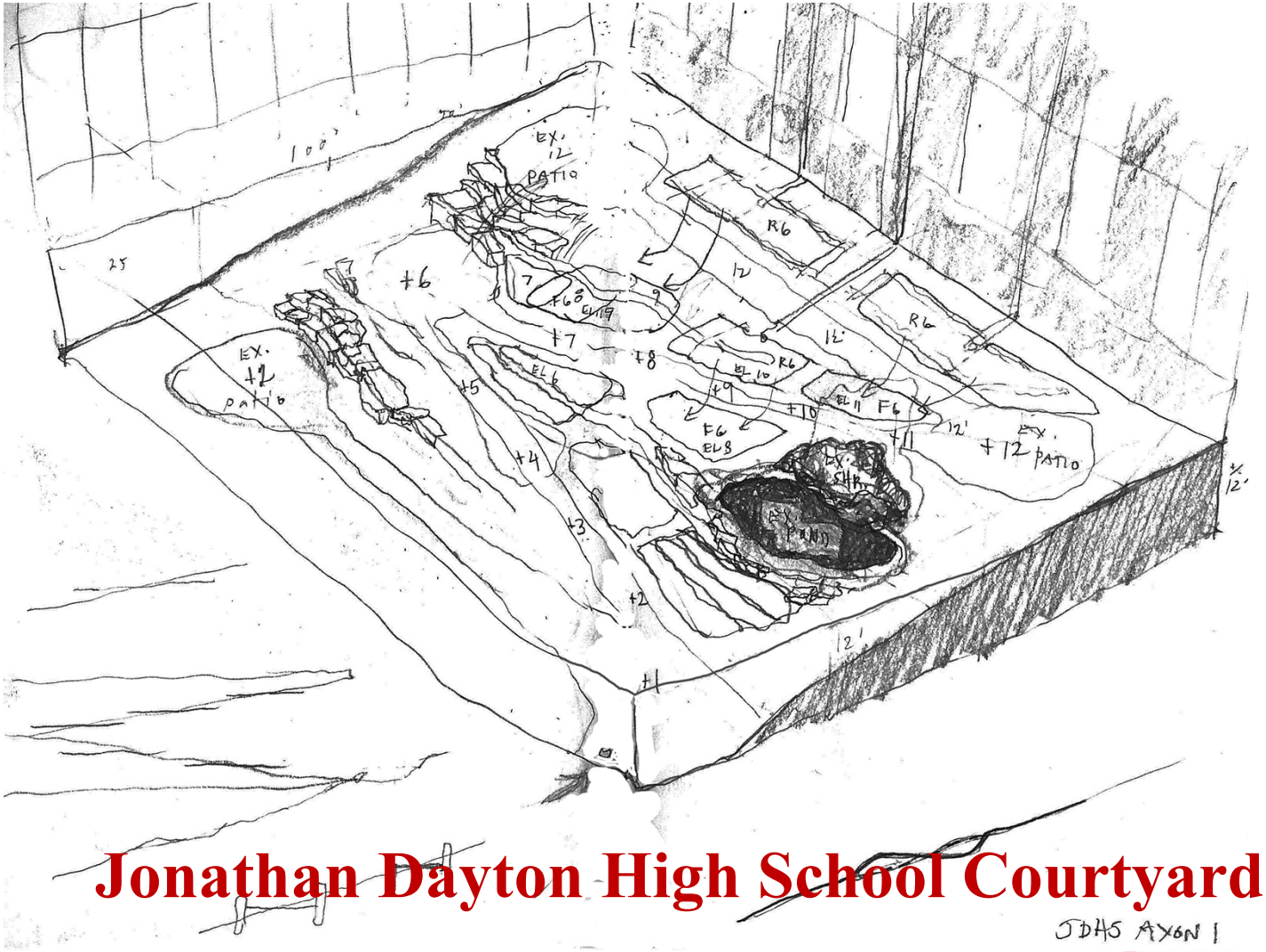
From Problem to Utility


DEERE


Rain Garden
Water Quality and Wildlife Habitat Enhancement Project
This garden is designed to capture, treat, and infiltrate stormwater at the source before it becomes runoff. It helps prevent nonpoint source pollutants from entering nearby waterways. The plants are native to the region and attract wildlife.
Rain gardens are beautiful, low-maintenance, and inexpensive gardens that you can install at home.
www.water.rutgers.edu
RUTGERS


Kirby

Useful Water: Filter Stormwater through rain garden to root-water food beds

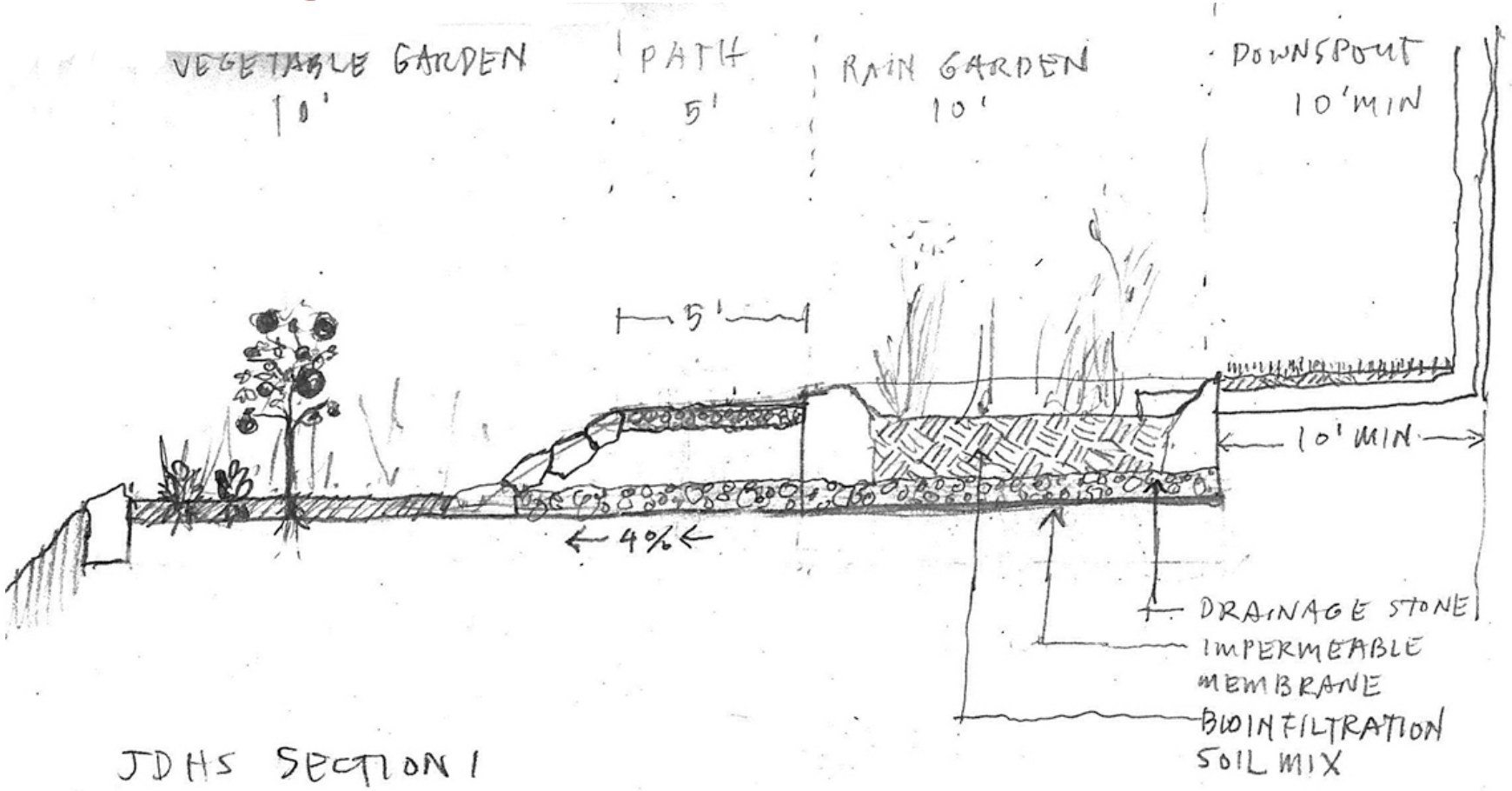


Jonathan Dayton High School Courtyard

RUTGERS New Jersey Agricultural Experiment Station

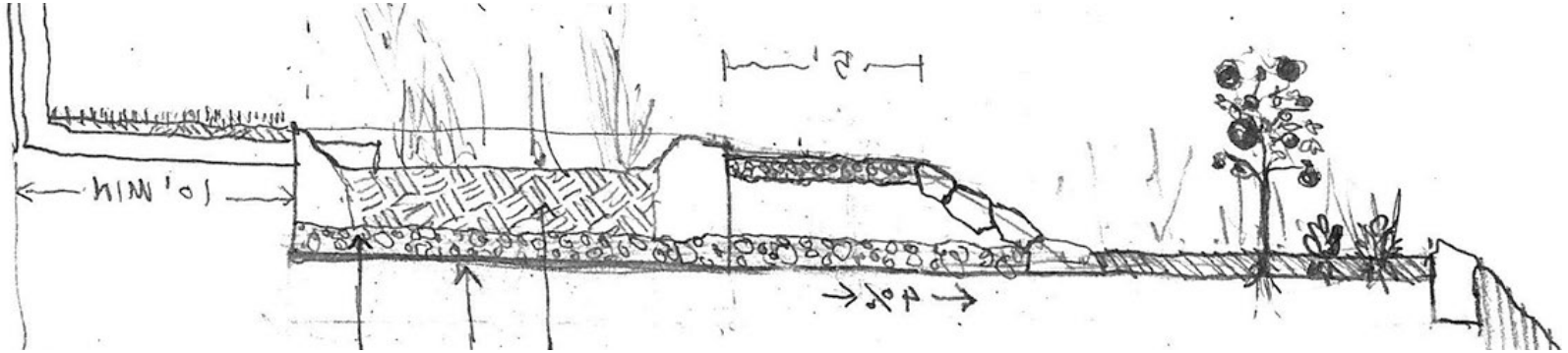
Water Resources Program

Useful Water: Filter Stormwater through rain garden to root-water food beds

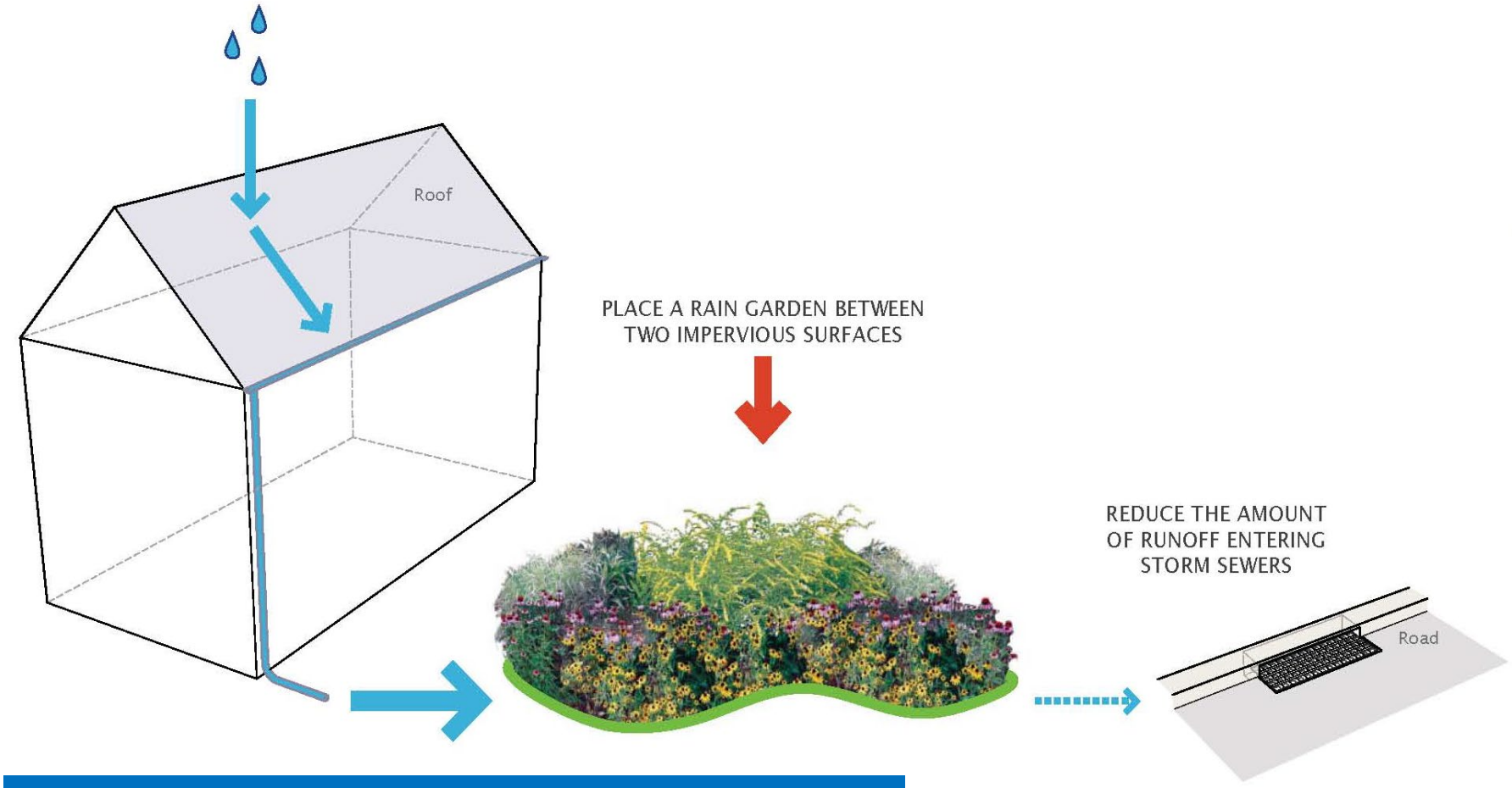


Useful Water: Filter Stormwater through rain garden to root water food beds

Useful Water: Filter Stormwater through rain garden to root water food beds

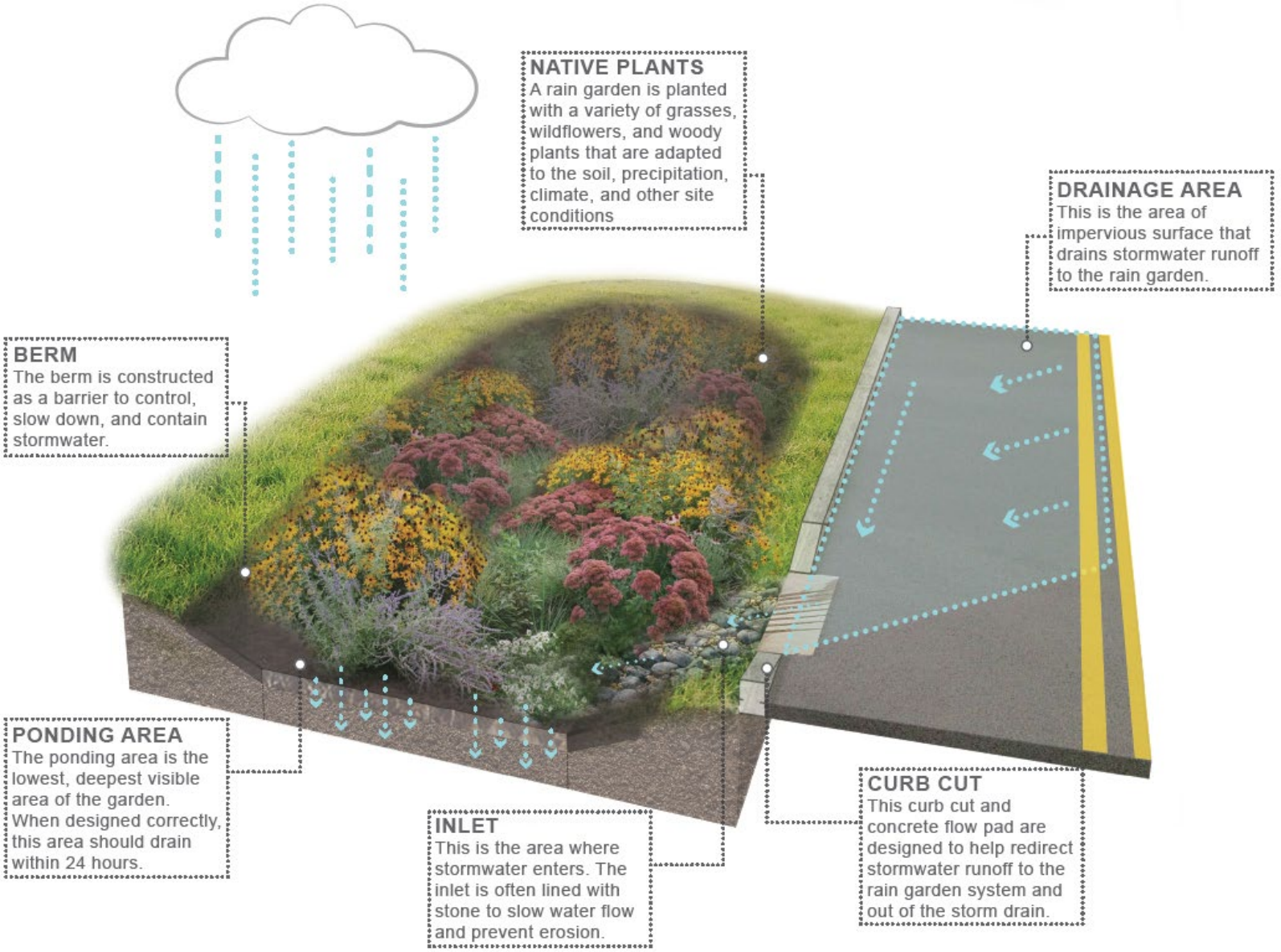


Disconnect to a Rain Garden

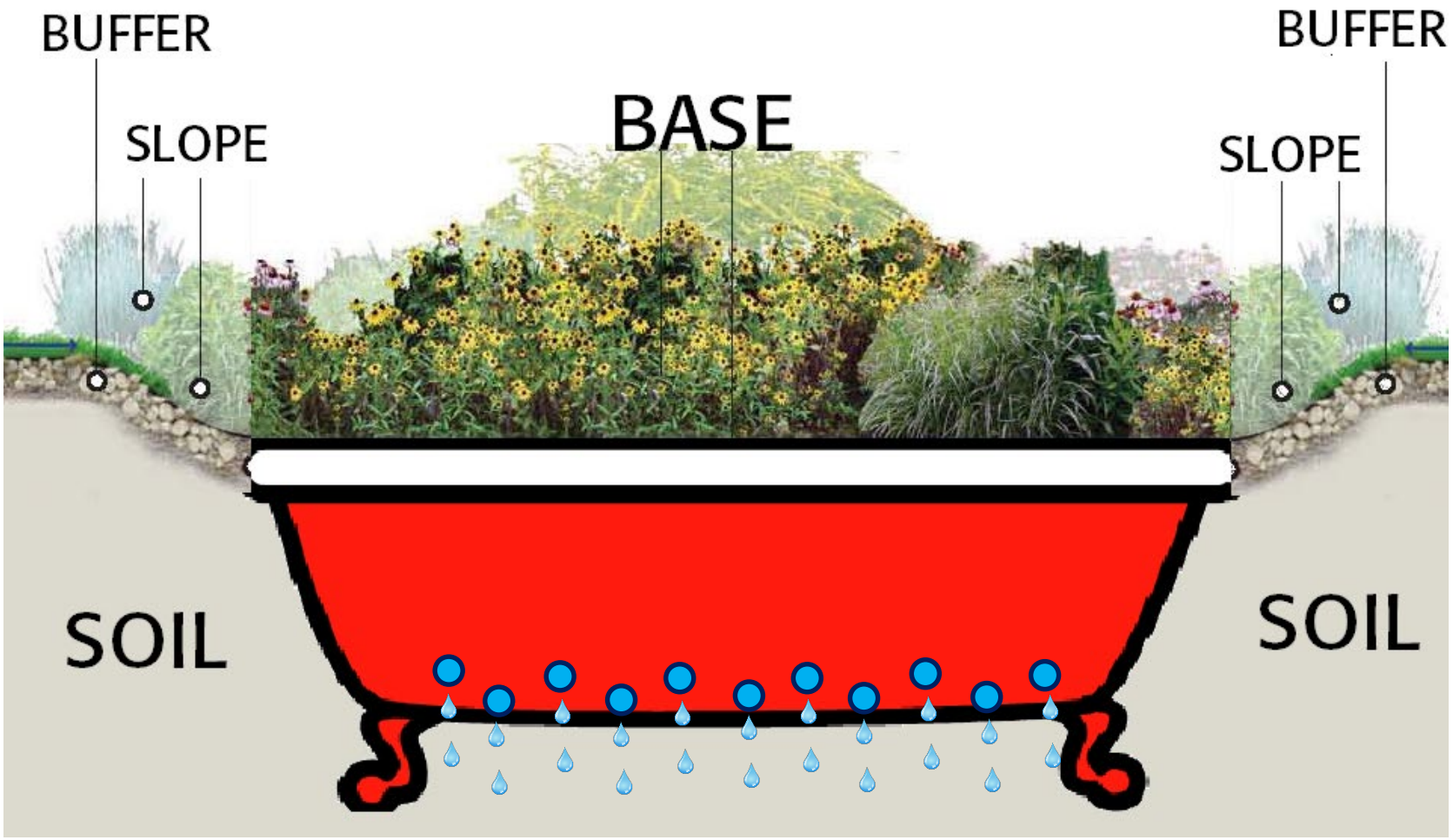


Rooftop runoff is now ***"disconnected"*** from flowing directly into the storm sewer system

Bioretention Systems/Rain Gardens



PARTS OF A RAIN GARDEN



Lots of Rain Gardens

HAMILTON HIGH SCHOOL WEST

Mark out
April 2014

2014
- Installed rain garden with assistance from the DPW
- Educated students about rain gardens and planted with them

2016
- Returned to conduct maintenance

Planting
June 2014

Post Maintenance August 2016

HAMILTON HIGH SCHOOL WEST

October 2018

- Educated the Life Skills students about non point source pollution, rain gardens and how to do maintenance
- Conducted hands on maintenance with the students

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Water Resources Program

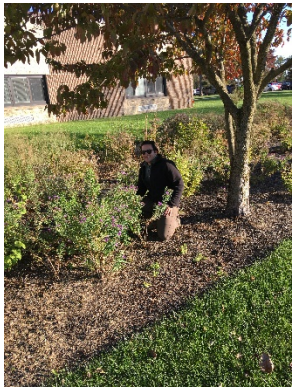
TABERNACLE MIDDLE SCHOOL

January 2018

October 2018

April 2018

October 2018



October 2018

October 2018

WOODS ROAD ELEMENTARY SCHOOL

Site visit March 2011

Post excavation April 2011

Post planting May 2011

Follow up site visit June 2011

WOODS ROAD ELEMENTARY SCHOOL



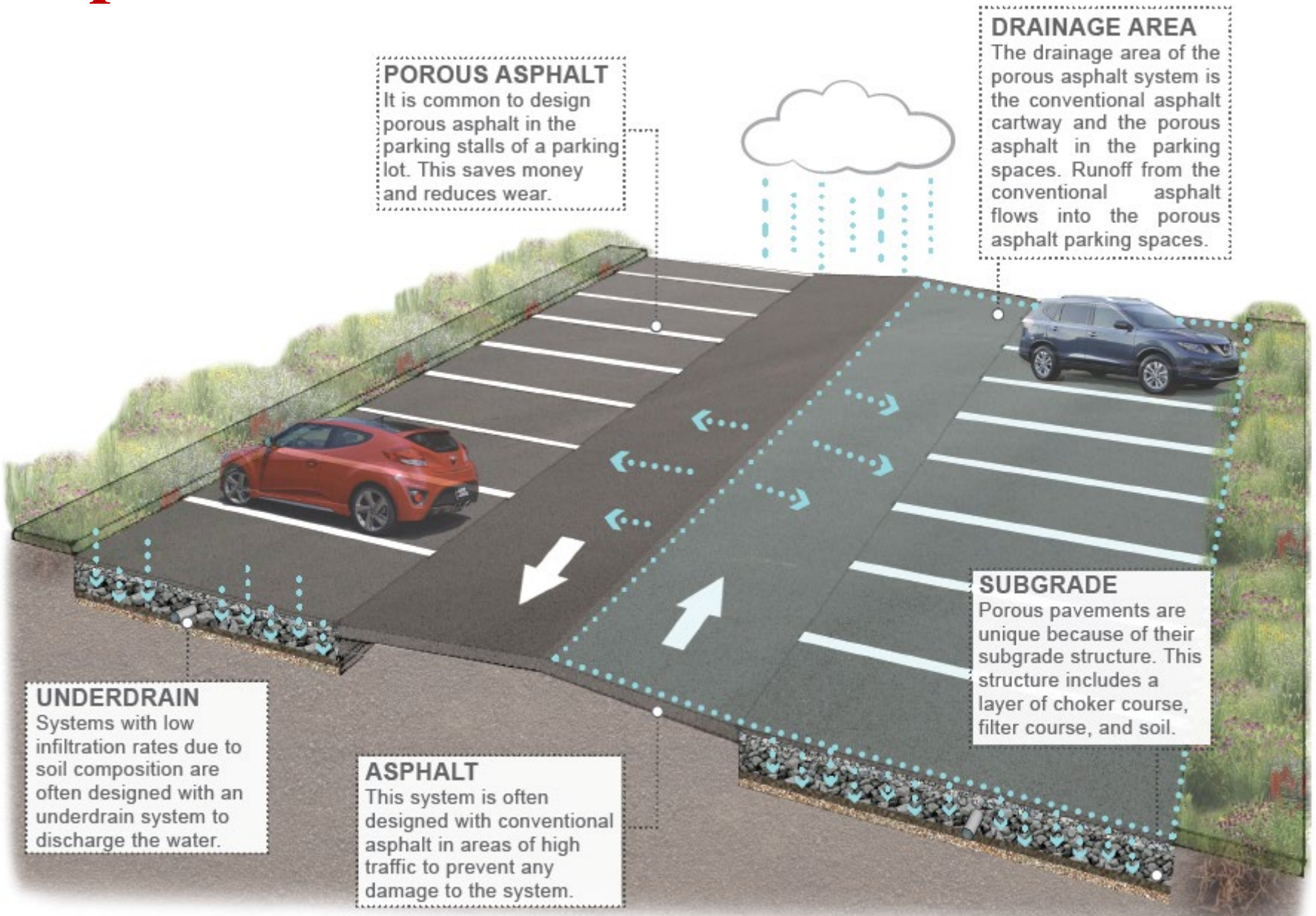
Site inspection August 2017


Maintenance August 2017

ETHEL JACOBSON ELEMENTARY SCHOOL

Rain garden at Catto School in Camden, NJ

Step 3: Convert to Permeable Pavement



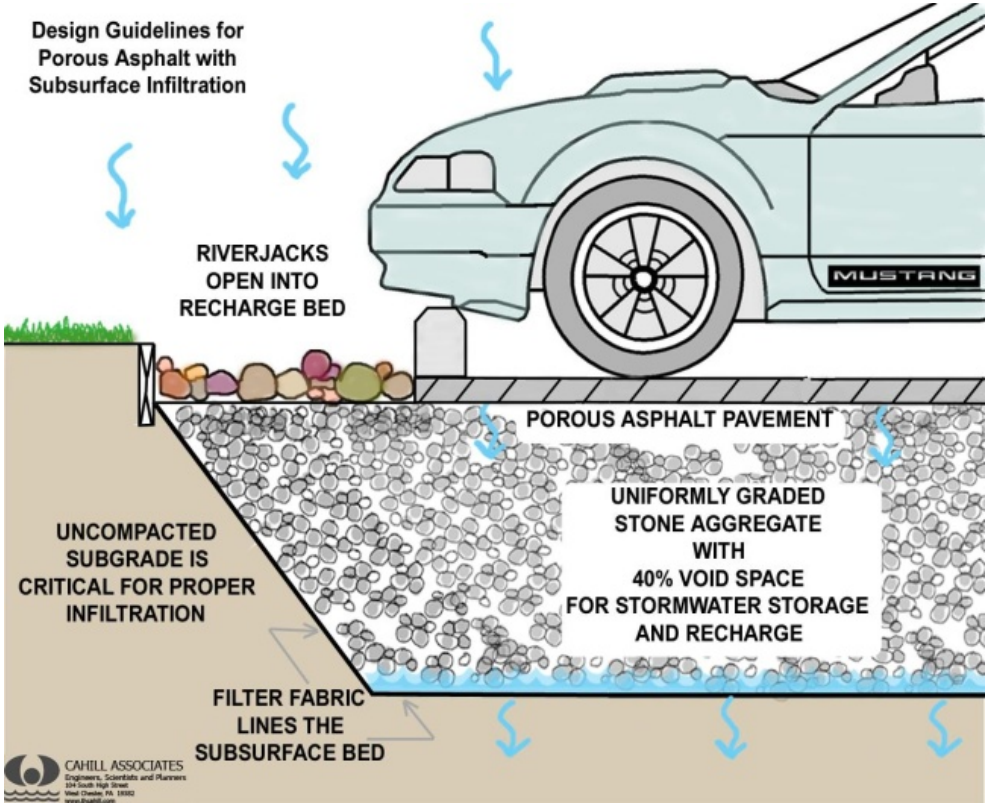
Permeable Pavements

- Underlying stone reservoir
- Porous asphalt and pervious concrete are manufactured without "fine" materials to allow infiltration
- Grass pavers are concrete interlocking blocks with open areas to allow grass to grow
- Ideal application for porous pavement is to treat a low traffic or overflow parking area

ADVANTAGES

- Manage stormwater runoff
- Minimize site disturbance
- Promote groundwater recharge
- Low life cycle costs, alternative to costly traditional stormwater management methods
- Mitigation of urban heat island effect
- Contaminant removal as water moves through layers of system

COMPONENTS




DICAL ARTS HIGH SCHOOL


CAUTION
CAUTION


PAPER
BOTTLES & CANS

How do we get started?

- Be clear about what you have to offer the school and why you want to work with them
- Ensure them that you are not going to make more work for the teachers or administrators
- Do not scare them with a lengthy discussion on maintenance but inform them of the tasks
- Tell them how the work will be funded, don't be afraid to ask for funding but make sure they know you have skin in the game

Educational Programming

- Educational program can vary in length
- Community-Based Project Learning was eight weeks – one day in the classroom per week and then building and planting a rain garden
- You can also educated the students why they plant the garden
- Students can continue these efforts beyond the classroom – Eagle Scout Project, National Honor Society, or simply a college resume builder

Jonathan Dayton High School Springfield

a) NJ Physiography modeled in the garden
b) Interpretive Design
c) Embedded Narrative
d) Local Aesthetics
e) Built with Town DPW and Board of Education Facilities Personnel

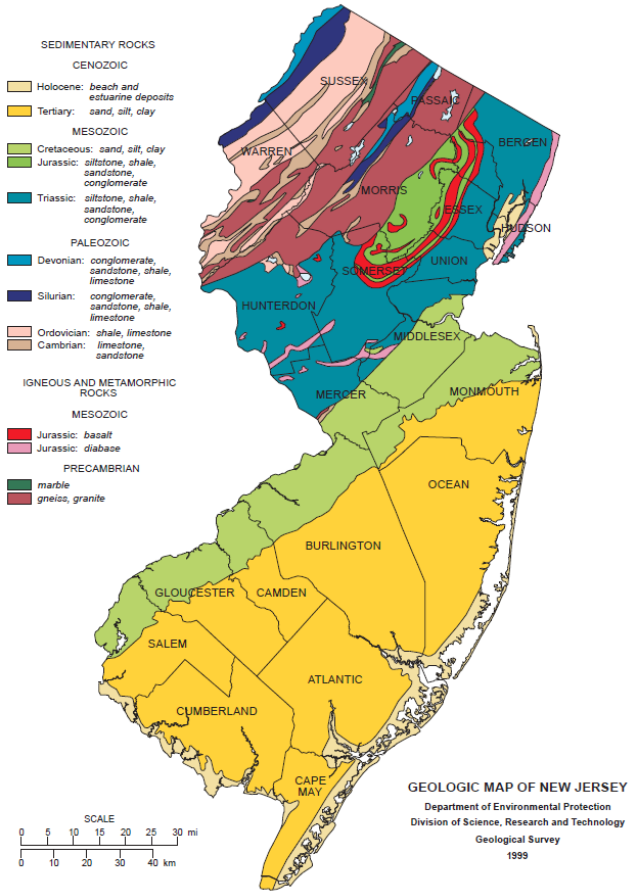
“Physiography/Geology Teaching Garden”

Design Goals:

Demonstrate a rain garden that:

- **Is useful as a teaching tool specific to place**
- **Highlight New Jersey’s geology, and how it is connected to water and plants**
- **Demonstrate the relationship between paving (imperviousness) and unpaved areas**
- **Create interest in “real” landscapes by reference and mimicry in the garden**

Beyond Water Control: Connecting with Geology, Soils and Plant Communities



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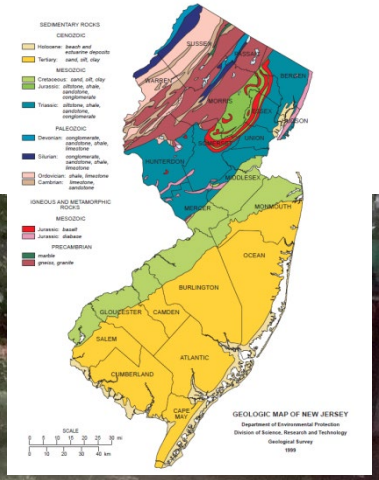
Water Resources Program

Beyond Water Control: Educational Garden



Ridge & Valley

Highlands

Piedmont

Coastal Plain

Limestone

Sand

Granite

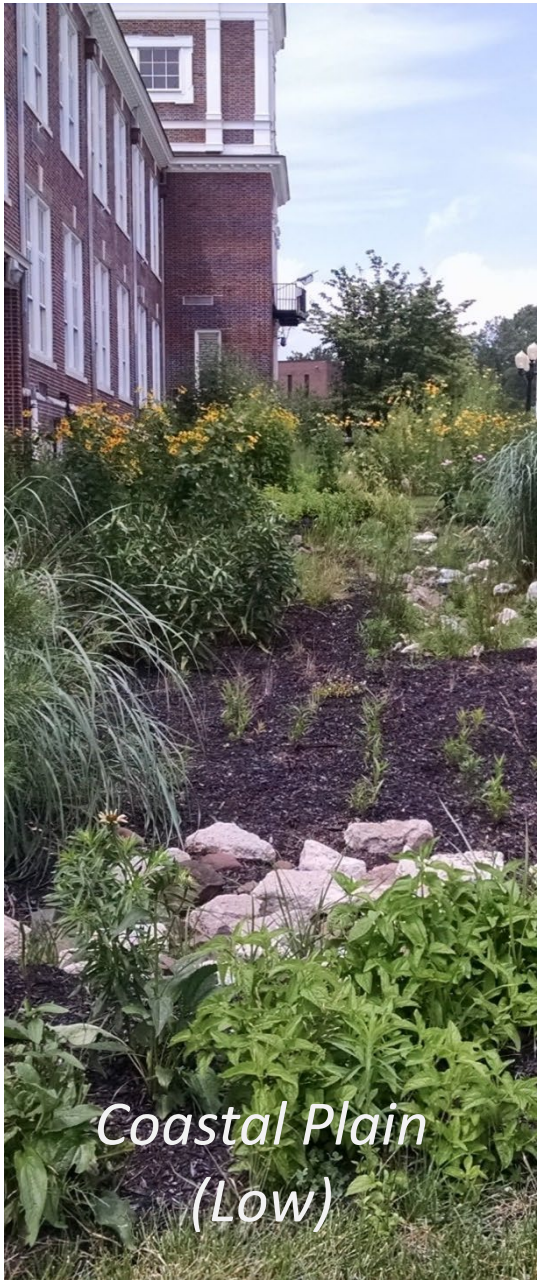
Sandstone

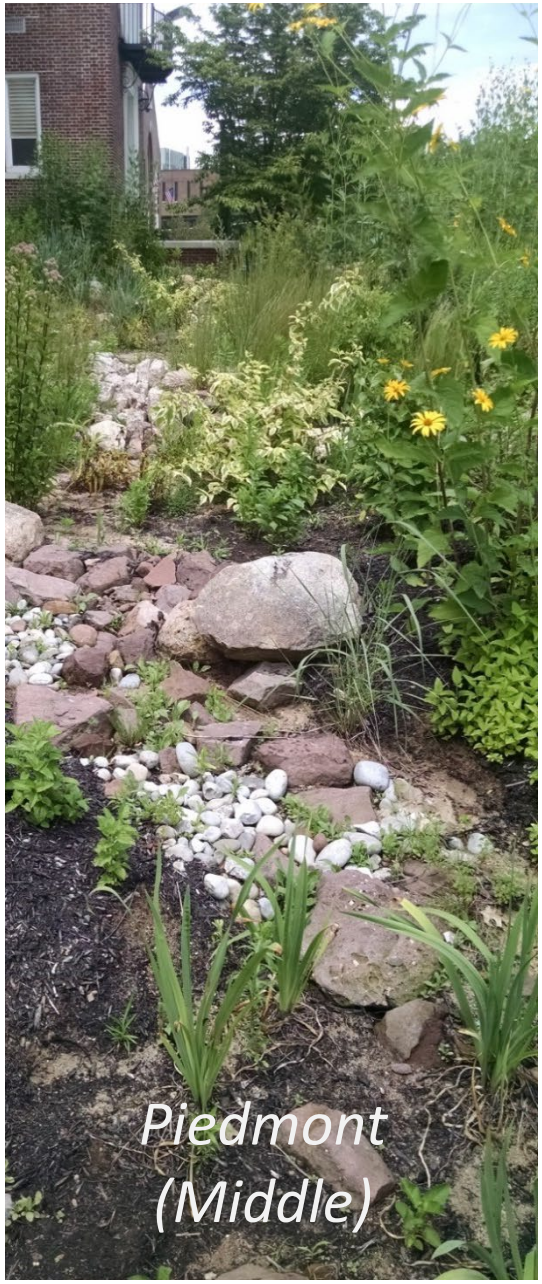
Concrete

Shale

Gneiss

Rutgers Landscape Architecture, NJAES, Springfield Township


Coastal Plain
(Low)


Piedmont
(Middle)


Ridge and Valley
Highlands
(High)


Coastal Plain
(Low)

The Enviroscape Model

- Great for all ages
- Simple to use and conveys all the necessary concepts
- Easy to clean up
- The students can jump right in and make it rain


BRAVO, Livingstone Mouse!
It's Pumpkin Time!
Move
BIG RED TUB
LIBRARY MOUSE
HIS is how WE PLAY FOOTBALL

Stormwater Management in Your Schoolyard Program

http://water.rutgers.edu/Projects/SWMIYSchoolyard/SWMIYSchoolyard.html#K8

Sustainable Jersey for Schools

Two Actions (10 points each):

- **Green Infrastructure Assessment & Plan**
- **Green Infrastructure Installation**

What's next?

- Many of the ICAs, RAPs, and Green Infrastructure Feasibility Studies have identified opportunities at schools
- Check is the school is registered in Sustainable Jersey for Schools: http://www.sustainablejerseyschools.com/actions-certification/participating-districts-and-schools/
- Reach out to the school and see if they are interested in green infrastructure planning or installing a practice

Green Infrastructure Champions Program

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IMAGE A BETTER NEW JERSEY

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