

Queens College StRIPES Initiative

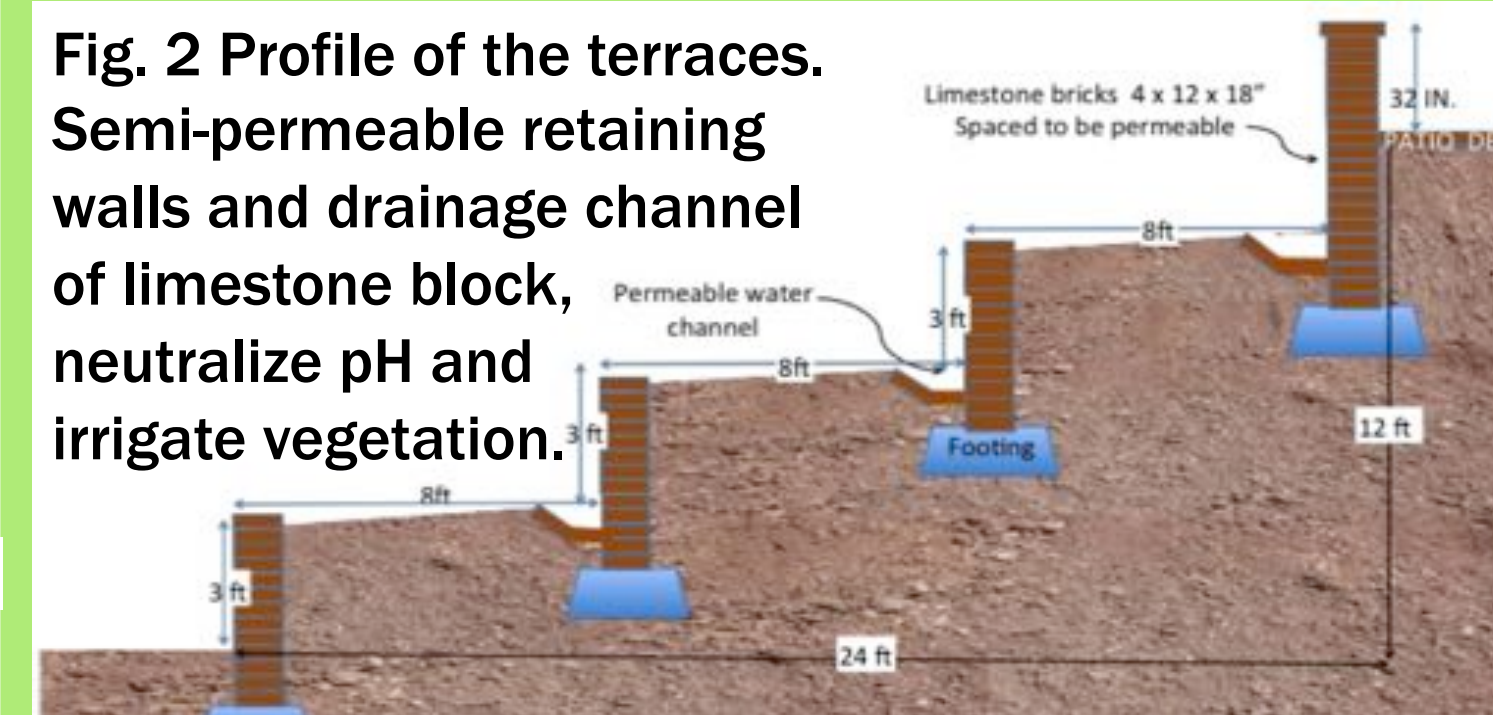
Stormwater Reduction Integrated with a Photovoltaic Energy System



Fig. 1 Pond within the bioswale infiltration area. Solar-powered fountain aerates the pond. Plantings from the pond through the terraces simulate a forest-edge ecotone. Upper patio is a performance space for up to 200 people. Instructional signs explain the functions and value of the retention system and the ecological concepts

Terraces

- Vegetated 3-tiered terrace area bridges a current 12-ft depth drop in the middle of the StRIPES project site.
- Terraces feature retaining walls made of limestone bricks and limestone-lined channels to irrigate terrace vegetation and carry collected runoff to the infiltration area
- Blueberry bushes planted along the sides of the stream create a fence-like hedge.
- Plantings from cattails at the pond through the terraces simulate a forest edge ecotone.
- Lower terrace: upland vegetation, with violets, black eyed susans, grasses, and shrubs simulate dry edge of a pond.
- Middle terrace: additional upland vegetation layer, with elderberry and viburnum shrubs.
- Upper terrace: vegetation similar to a forest edge, with rhododendrons and river birch.
- Planted area of the terraces: 4,696 ft²
- Staircase in the center of the terraces allows access to the path between the north and west sides of campus, and for maintenance of the area



Maintenance Plan

- Regular maintenance involves keeping drainage pipes and channels clean.
- Straw is placed along terraces to maintain moisture for new plants and prevent erosion until plants are well established.
- Routine gardening, e.g., weed and invasive species (i.e. phragmites) removal, ensure continued health of the revegetated area.
- Periodic cleaning of pond to remove excessive sediment and organic debris ensures continued health of the StRIPES aquatic ecosystem.

Bioswale and Retention Pond

- Infiltration area is separated into a large, vegetated bioswale area and a small permanent pond.
- Bioswale area receives water quickly during storms and gradually drains by infiltration into the ground and evapotranspiration from the vegetation planted within it.
- Bioswale slopes gradually to 5 feet depth and retains 42,200 ft³ of water.
- Permanent pond holds 10,600 ft³ of water, the bottom is sealed with bentonite to prevent water.
- The pond accommodates a permanent populations of fish and other aquatic life and will include a fountain, powered by solar energy, to keep water aerated
- Dimension of the entire infiltration area is 90 ft by 150 ft, for a surface area of 13,500 ft²

Bioswale vegetation

Broadleaf cattail
Common arrowhead
Quill-leaf
Rice cutgrass
Hop sedge
Bulrush

Retention pond biota

Muskgrass
White water lily
Canadian waterweed
Fibrous bladderwort
Northern cricket frog
Eastern (red-spotted) newt
Eastern tiger salamander
Chittenango ovate amber snail
Mosquito fish
Common carp



Fig.3. Site plan for the QC Campus.

Educational Collaboration

- K-12 focused Global Learning and Observation to Benefit the Environment (GLOBE) program will use the StRIPES site for citizen science-style projects.
- The site is an outdoor classroom and field research resource for QC
- StRIPES terrace area, with a seating capacity of 200, serves as an outdoor performance space and eco-art park.
- Educational signage with QR codes throughout the project area inform visitors about StRIPES' sustainability efforts, and connects them to a project website.
- StRIPES website will direct visitors towards further educational materials and information about campus-wide sustainability efforts.

Our Impact

- The StRIPES water harvesting system with over 530,000-gallon collection capacity retains 10-year rainstorm volume.
- 3.75 million gal/yr reduced runoff diverted from city sewer system, reduces flooding and repurposed for groundwater recharge and gray-water irrigation of sports fields.
- StRIPES is an outdoor laboratory for education of environmental science class and the Queens community, about the importance of green infrastructure in preserving natural and built environments.