G3 GRANT

NORTHUMBERLAND CONCEPTUAL DESIGN

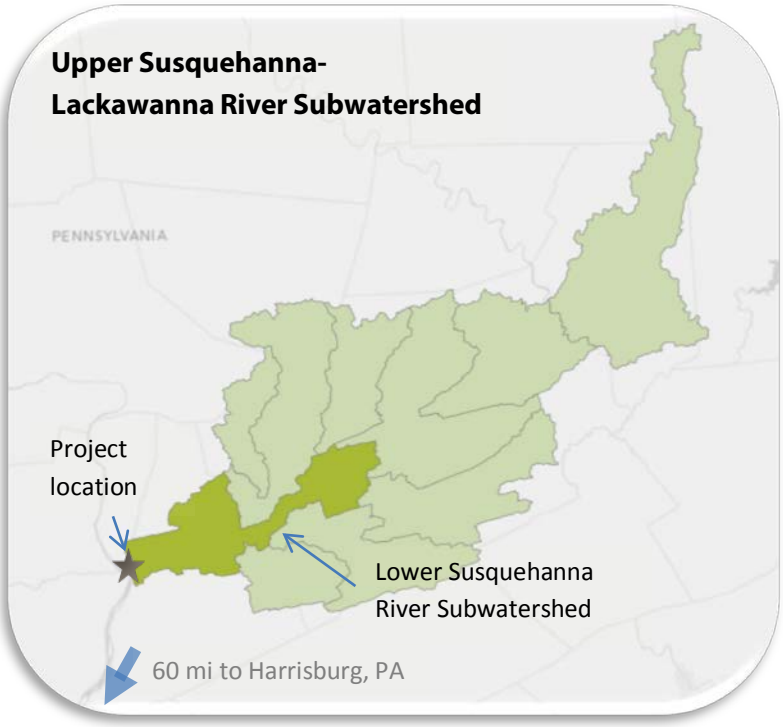
GREEN STREETS ♦ GREEN JOBS ♦ GREEN TOWNS

PROJECT INFORMATION

Location:	Northumberland, PA
Project Type:	Conceptual Design
Restoration Practices:	Bioretention cells, bioretention swales, trees, permeable pavement, rain barrels, green roof
Funding:	Chesapeake Bay Trust and U.S. Environmental Protection Agency
Amount Awarded:	$30,000
Additional Funding Leveraged:	--
Status:	In Process
Key Words:	Green street; urban retrofit; Susquehanna; Chesapeake Bay

PROJECT OVERVIEW

The Borough of Northumberland, PA is a small community about an hour's drive northeast of Harrisburg, PA. In 2013, the Borough requested and was awarded $30,000 from the Green Streets, Green Jobs, and Green Towns (G3) grant. The grant was to identify green infrastructure alternatives to address the recurring flooding of more than 250 residential properties along Liberty Hollow Run, a tributary to the Lower Susquehanna River.



Project Location: Lower Susquehanna River Subwatershed (Upper Susquehanna-Lackawanna River), Borough of Northumberland, Northumberland County, PA

BACKGROUND

The Borough of Northumberland was founded in 1772 on land that was purchased from the Iroquois. It lies at the Susquehanna River's confluence – where two major branches of the Susquehanna River merge into one, before heading south to Harrisburg and eventually into the Chesapeake Bay. Less than 4,000 people live in the 1.6 square mile community. Of these, 40% are over 50 years old, 19% have relatively fixed incomes, and 20% have no measurable income at all.

A small creek known as Liberty Hollow Run flows through the middle of Northumberland. Whenever there's a downpour, the creek can breach its low banks, potentially causing flooding, erosion, stormwater pipe collapse and significant water damage to nearby properties that impact more than 250 homeowners.

The problems have persisted for years. Almost 66% of Liberty Hollow Run's upper drainage area is developed, and a significant percentage of clay and shale soils exist where the hollow begins. This means that when water hits the ground during a storm event, there's not much opportunity to slow it down before it makes its way to the creek.

Flooding in 2011: In spring 2011, Tropical Storm Lee and Hurricane Irene wreaked havoc in the Susquehanna Valley. Nowhere was the flooding worse than Liberty Hollow Run.

Whereas stormwater pipes function to move stormwater away quickly, green infrastructure techniques take a different approach: slow down the runoff, infiltrate it, and treat it where it falls. Keenly aware, in 2013 the Borough turned its focus to utilizing green infrastructure in the hollow's upper reaches, where development is concentrated. The G3 grant helped move the effort along by providing funds to allow the Borough to conduct a green infrastructure study.

LIBERTY HOLLOW STORMWATER IMPROVEMENTS PROJECT

The goal of Northumberland Borough's G3 grant project was to identify green alternatives (rain barrels, rain gardens, tree plantings, etc.) to help alleviate the intense flooding, storm drain collapses, erosion, and other issues that have plagued the Liberty Hollow community for the past decade or more. The project started out in late summer 2013 when the Borough hired an engineering firm to conduct a field survey and preliminary analysis of various green infrastructure options available to the community. This was promptly followed by a public outreach meeting in October 2013 to seek input from affected residents who helped point out issues only evident to those witnessing the flooding events first hand.

With this feedback, the consultant team set out to determine where green infrastructure installations would have the greatest positive impact to the community for the least cost. A conceptual analysis was conducted using topographic and land use maps, aerial photography, locations of existing stormwater management structures, and a hydrologic and hydraulic modeling program. The locations of key stormwater inlets and drainage areas were assessed to determine where stormwater runoff volumes were greatest. The team focused on alternatives that could be built within the existing right-of-way, and thus easiest for the Borough to maintain

over the long-term. Particular practices were categorized as either high, medium, or low based on their overall impact to reducing the amount of water rapidly flowing to the hollow during storm events. Green infrastructure practices assessed included rain gardens; bioswales and planter boxes; green and blue roofs; pervious pavement; infiltration trenches; tree plantings; rain barrels; downspout disconnects; and detention ponds.

The consultant team identified a list of alternatives that, if fully implemented, would reduce peak flows for the 1 inch storm event by a minimum of 20% and total flow by at least 20% at a cost of $470,000.

Proposed Liberty Hollow G3 Study Recommendations:

- Implement all bioretention and pervious pavement practices identified as a high or medium priority.
  Estimated reduction: 20% peak flow and 20% total volume
  Estimated cost: $375,000
- Install a blue roof on a highly visible, municipally owned community building.*
  Estimated cost: $72,000
- Develop community-wide rain barrel, tree planting, and downspout disconnection programs.
  Estimated reduction: Dependent upon implementation success rates
  Estimated cost: $22,000

**Note:* Due to the late addition of this BMP based on community input, peak flow and total runoff reductions were not assessed.

CHALLENGES AND LESSONS LEARNED

From start to finish, the Liberty Hollow stormwater improvements study went smoothly. By the second and final community input meeting in January 2014, interest in the project had increased, and other options to slow down and treat stormwater runoff – such as a blue roof on the Borough's community pool facility – emerged. Continued community involvement, however, will be necessary during the implementation phase for the Borough to reap as much benefit as possible.

LEVERAGING RESOURCES AND ACTIONS

The Liberty Hollow G3 project is relatively young; as such, efforts to obtain implementation funds have just begun. The Borough will soon be posting a permanent sign to educate residents on the problem, potential green infrastructure solutions, and ways to become involved. They've also identified local nonprofits that can help with education, outreach, and implementation efforts. Of greatest importance is that those engaged in the process thus far agree that the issues the Borough faces will not disappear overnight, and that a longer-term,

watershed-wide effort that addresses one “drop” at a time will ultimately get them where they want to be: flood-free.

For more information, visit: http://northumberlandborough.com/

Photo Credits:

P. 1, project location map, canvas/world light gray base layer ©2014 Esri, DeLorme.
P. 2, flooding in 2011, compliments of Railyn Mest.