

Date: July 8, 2013

To: Tim Narvell, Vice President of Maintenance, Roseland Management Services
Juan Lent, Regional Director of Operations, Roseland Management Services
Dana Sente, Director of Operations, Highlands at Hilltop

From: Theresa Trapp, Treasurer, Hilltop Conservancy

Re: Naturalizing the Highlands Detention Basin

The Hilltop Conservancy is a non-profit group of local volunteers who assist Essex County with caring for the Hilltop Reservation, the nature preserve that surrounds the Highlands apartment complex. Our primary mission is to preserve wildlife habitat in and around the Hilltop, including restoring balanced eco-systems to previously-disturbed areas.

We would like to discuss ways to both improve wildlife habitat and reduce maintenance requirements for the detention basin located northwest of the Highlands complex. The basin abuts a corner of the route that provides public access from the western side of the Reservation, and we will be implementing a Green Acres grant to upgrade that same route and restore the surrounding wetlands beginning next year / 2014.

As you know, the Highlands basin was constructed in 2008 to manage storm water and sediment from the developed areas upslope. Unfortunately the basin is not draining as intended – we are aware that there are ongoing discussions with the original builder, but in the meantime the basin is almost constantly filled with stagnant water and thick mats of algae that regularly clog the outlets. See sample pictures on page 3 – this situation has unfortunately created an eyesore as well as a breeding ground for mosquitos.

From the Conservancy's discussions and site visits with wildlife biologists and other subject matter experts, an easy, low-cost way to enhance the function and the appearance of the basin would be to "naturalize" it. This would involve designating a "no-mow" buffer zone on the interior banks of the basin, and then planting those banks with native wetland species. Three major benefits to creating vegetative buffers are:

1. They provide necessary habitat for wildlife like insects, amphibians, birds and small mammals, including mosquito predators
2. They filter the water as it enters the basin, removing nutrients such as nitrogen and phosphorus, which in turn helps reduce algae growth
3. They lower basin maintenance costs via less frequent mowing

Photos of sample restored basins are featured on page 4 – the results are aesthetically pleasing, functional and relatively low-cost to obtain. Per our experience, the Highlands basin can be naturalized for as little as 10 cents per square foot using seed mixes, or \$1 per square foot using plant plugs (if faster results are desired).

Highlands Detention Basin

Estimated costs and projected savings for naturalizing the basin are shown on page 5 – with a one-time \$3,000 investment Roseland Management Services can simultaneously improve the basin’s appearance and reduce annual mowing costs by \$2,400 (for a payback period of 1.25 years). This will also reduce the number of times staff are required to manually unclog the basin outlets (currently estimated at 4-5 times per year).

Planting materials are readily available from commercial sources like Pinelands Nursery and Ernst Conservation Seeds. The Hilltop Conservancy can advise on plant species to use (including those unpalatable to deer), as well as provide volunteers to assist with the initial planting effort.

We believe the Highlands basin can easily be transformed into a natural eco-system that supports wildlife, improves water quality and has aesthetic value – and one that also happens to reduce maintenance requirements. There is potential public relations value in such a restoration project, and Roseland Management Services could use best practices from its implementation to improve storm water basins on other properties.

If you are interested in naturalizing the Highlands basin, we would like to meet with you to discuss the proposal and potential approaches in more detail – our contact information is below. Thank you for your time, and we look forward to hearing from you.

Sincerely,

Theresa Trapp, Treasurer
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Highlands Detention Basin

Highlands at Hilltop Detention Basin – Current Status

Significant long-term algae infestation; basin banks mown frequently and closely



Source: Hilltop Conservancy

Clogged basin outlets must be manually cleared multiple times per year



Source: Hilltop Conservancy

Highlands Detention Basin

Naturalized Detention Basins – Sample Photos

Naturalizing a detention basin enhances wildlife habitat and aesthetics



Source: Mike Fiely, Ernst Conservation Seeds

Replacing turf grass with native species reduces nutrient and sediment run-off



Source: www.FXBrowne.com

Highlands Detention Basin

Estimated Costs and Projected Savings

Naturalizing the Highlands basin can reduce maintenance costs (primarily mowing) by 50%. Payback period on the initial investment is estimated at 1.25 years.

Current Maintenance Costs *

Total mowing area	20,000	sq ft
Cost to mow / trim per visit	400	8-10 man-hours
Mowing frequency	<u>12</u>	per yr
Annual mowing cost	\$4,800	

Naturalization Costs

Site marking	0	Conservancy (via spot herbicide)
Planting materials	2,000	Native grass & wildflower plugs, seed, bagged soil, mulch
Site digging, planting	1,000	Landscaper (3 guys, 1 full day)
Site monitoring	<u>0</u>	Conservancy (for foreign invasives during 1st season)
One-time naturalization costs	\$3,000	

Future Maintenance Costs

Total mowing area	10,000	sq ft (top of basin and access ramp)
Cost to mow / trim per visit	200	50% reduction
Mowing frequency	<u>12</u>	per yr
Annual mowing cost	\$2,400	

Naturalization Savings

Reduced mowing costs	<u>\$2,400</u>	per yr
Payback period	<u>1.25</u>	yrs

* Rutgers University has detailed basin maintenance, retro-fitting and other information available, including presentations like this:
<http://www.water.rutgers.edu/Projects/Sussex/Detention%20Basin%20Retrofits%20and%20Maintenance.pdf>

Highlands Detention Basin

Subject Matter Expert Recommendations (per site visits)

Eric Schrading, Private Lands Biologist – U.S. Fish & Wildlife Service

“Currently the Highlands detention basin provides limited wildlife habitat and is negatively impacted by high nutrient content (probably from upstream lawn areas), high summer water temperature (due to lack of shade), and regular mowing of the banks. To improve the area for wildlife and reduce maintenance costs without impacting the function of the detention basin we recommend the following: 1. Limit mowing to just those areas required to provide access (ramp and top of basin walls). 2. Plant as much of the basin banks as possible with native grasses and forbs – generally this should be from the water’s edge to 20-30 feet up the bank (more is better). 3. Create small pools up to 2’ deep (currently the basin is at a uniform depth) to increase diversity within the pond. Excavating multiple pools will not adversely affect the function or value of the detention basin, and will provide refuge for predators that consume mosquito larvae (e.g., frogs, tadpoles, water beetles and other invertebrates).”

Dr. Michael Van Clef, Ecologist – Ecological Solutions, LLC (also Science Director for the New Jersey Invasive Species Strike Team)

“Storm water management basins, while typically ecologically sterile, have great potential for providing habitat for attractive and beneficial native plants. Species such as rose mallow, blue flag iris and Joe-Pye weed – just to name a few – can thrive in such conditions. These species produce flowers that are attractive to butterflies and other wildlife (and people too!). Re-vegetating with native species would create excellent wildlife habitat that complements the basic utility of the Highlands basin.”

Dr. Richard Pardi – specialist in aquatic and isotopic geochemistry, retired chair of the Department of Environmental Science at William Paterson University, current technical advisor for NJ Watershed Management Area #4 (Lower Passaic and Saddle Rivers)

*“While the Highlands property owner and the original basin builder are working out their disagreement over the basin’s performance, they could use integrated pest management strategies to better control mosquito breeding in the basin. Planting native species to provide shade and then stocking *Gambusia affinis* (mosquitofish) in the spring to prey on mosquito larvae can be effective short-term solutions. Enzyme treatments are available, but depend on a minimum level of oxygen in the water – given the basin’s shallow depth, lack of shade, and algal blooms observed, the current oxygen levels are likely quite low. Longer-term, the owner will probably need to retro-fit the basin in order to fulfill the goals of removing silt and providing ecological support.”*

Highlands Detention Basin



Hilltop Conservancy, Inc.

The Hilltop Conservancy is a non-profit organization of local volunteers dedicated to preserving wildlife habitat in the Hilltop Reservation, a 280+-acre nature preserve in Essex County straddling the borders of Verona, Cedar Grove and the Caldwells. We are an official partner of Essex County, and assist the County with caring for the Reservation and helping provide neighbors and park visitors with a site for respite, enjoyment and nature-based learning activities.

In addition to annual park clean-ups, the Conservancy organizes hikes, bike rides and wildlife observation events. We also implement major habitat restoration projects, including:

- 10-acre upland grassland (completed – see photo below)
- 3-acre native meadow (in progress)
- 7-acre forest regeneration (in progress)
- 6-acre wetland restoration (beginning spring 2014, via western route grant)

