RUTGERS
New Jersey Agricultural
Experiment Station

Draft

Impervious Cover Reduction Action Plan
for
Stow Creek Township, Cumberland County, New Jersey

Prepared for Stow Creek Township by the
Rutgers Cooperative Extension Water Resources Program

June 11, 2018

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Introduction

Located in Cumberland County in southern New Jersey, Stow Creek Township covers approximately 18.9 square miles. Figures 1 and 2 illustrate that Stow Creek Township is dominated by agricultural land uses. A total of 6.7% of the municipality's land use is classified as urban. Of the urban land in Stow Creek Township, rural residential is the dominant land use (Figure 3).

The New Jersey Department of Environmental Protection's (NJDEP) 2012 land use/land cover geographical information system (GIS) data layer categorizes Stow Creek Township into many unique land use areas, assigning a percent impervious cover for each delineated area. These impervious cover values were used to estimate the impervious coverage for Stow Creek Township. Based upon the 2012 NJDEP land use/land cover data, approximately 1.6% of Stow Creek Township has impervious cover. This level of impervious cover suggests that the streams in Stow Creek Township are sensitive streams. [1]

Methodology

Stow Creek Township contains portions of four subwatersheds (Figure 4). For this impervious cover reduction action plan, projects have been identified in each of these watersheds. Initially, aerial imagery was used to identify potential project sites that contain extensive impervious cover. Field visits were then conducted at each of these potential project sites to determine if a viable option exists to reduce impervious cover or to disconnect impervious surfaces from draining directly to the local waterway or storm sewer system. During the site visit, appropriate green infrastructure practices for the site were determined. Sites that already had stormwater management practices in place were not considered.

[1] Caraco, D., R. Claytor, P. Hinkle, H. Kwon, T. Schueler, C. Swann, S. Vysotsky, and J. Zielinski. 1998. Rapid Watershed Planning Handbook. A Comprehensive Guide for Managing Urbanizing Watersheds. Prepared by Center For Watershed Protection, Ellicott City, MD. Prepared for U.S. Environmental Protection Agency, Office of Wetlands, Oceans and Watersheds and Region V. October 1998.

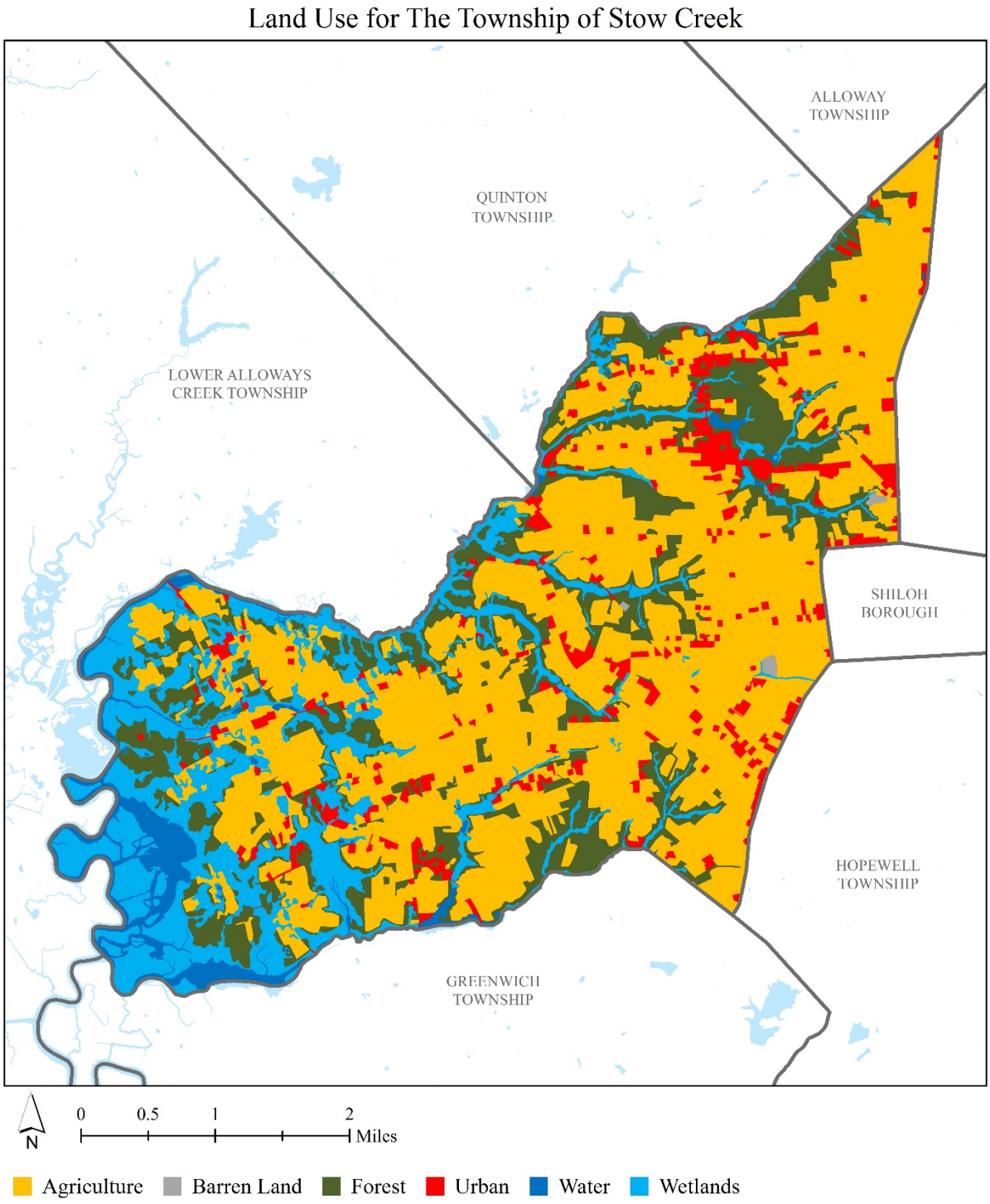


Figure 1: Map illustrating the land use in Stow Creek Township

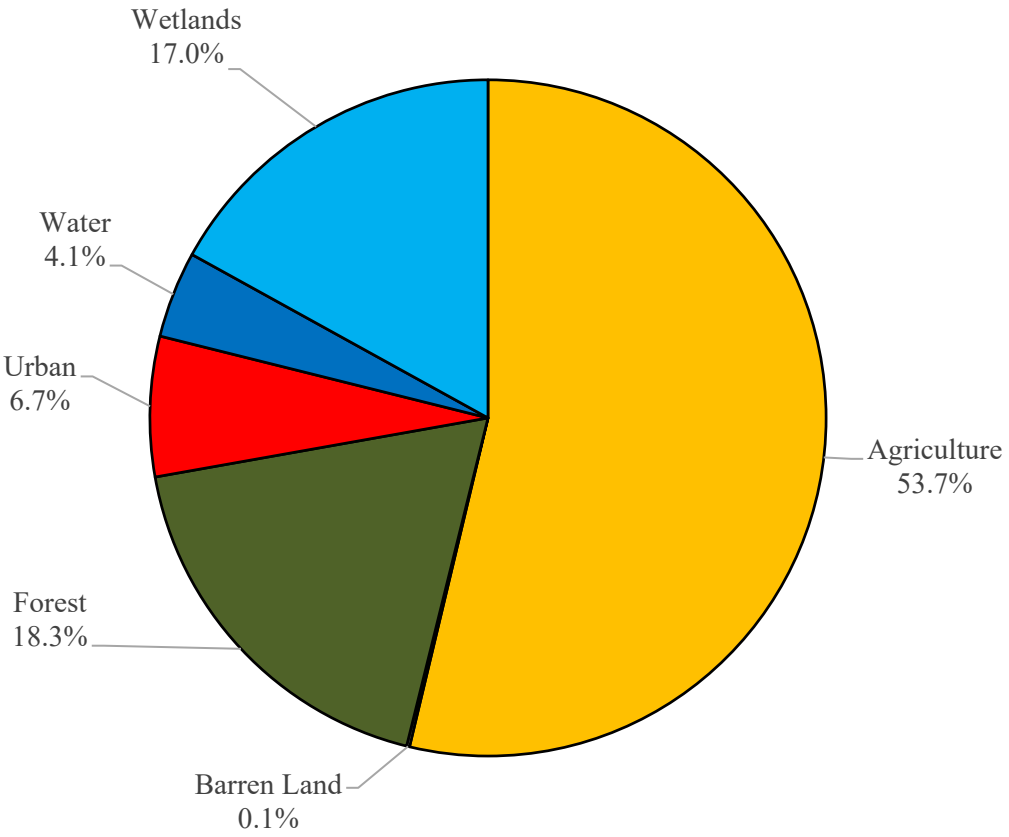


Figure 2: Pie chart illustrating the land use in Stow Creek Township

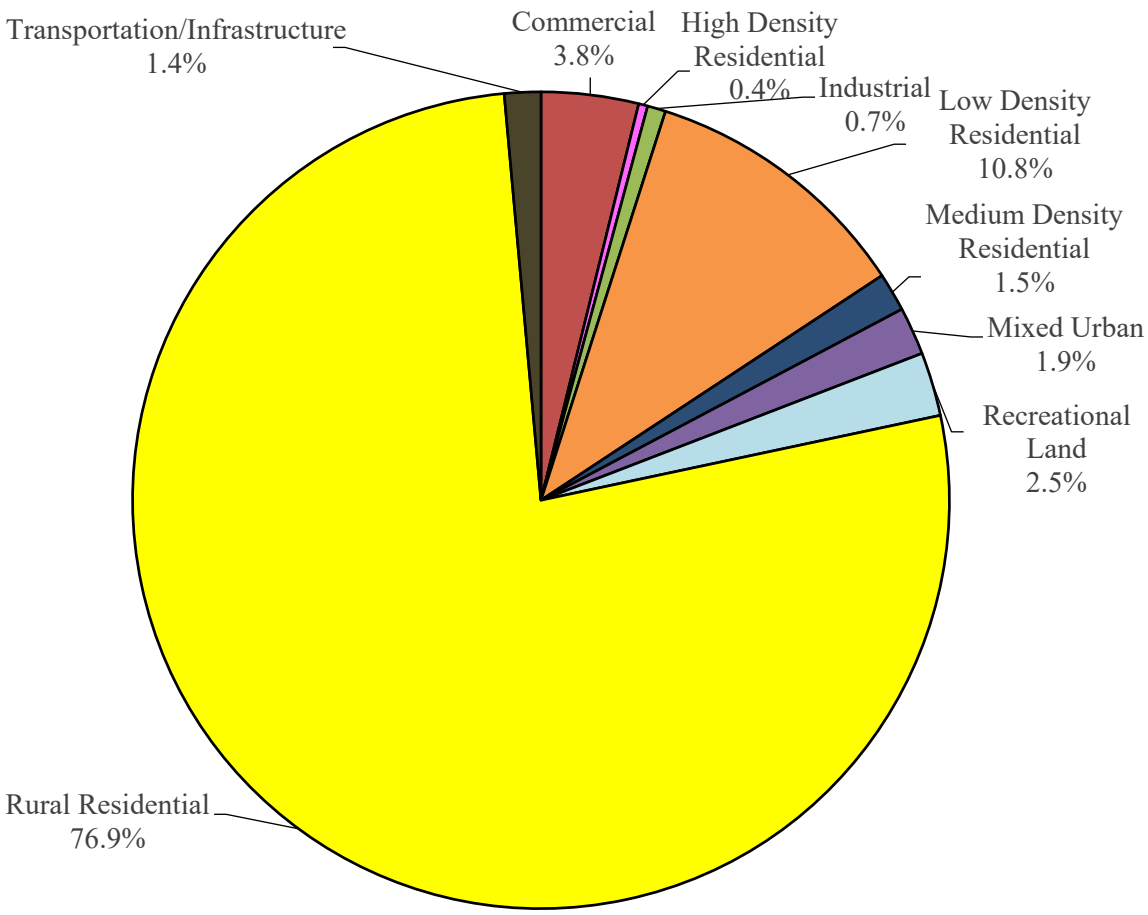


Figure 3: Pie chart illustrating the various types of urban land use in Stow Creek Township

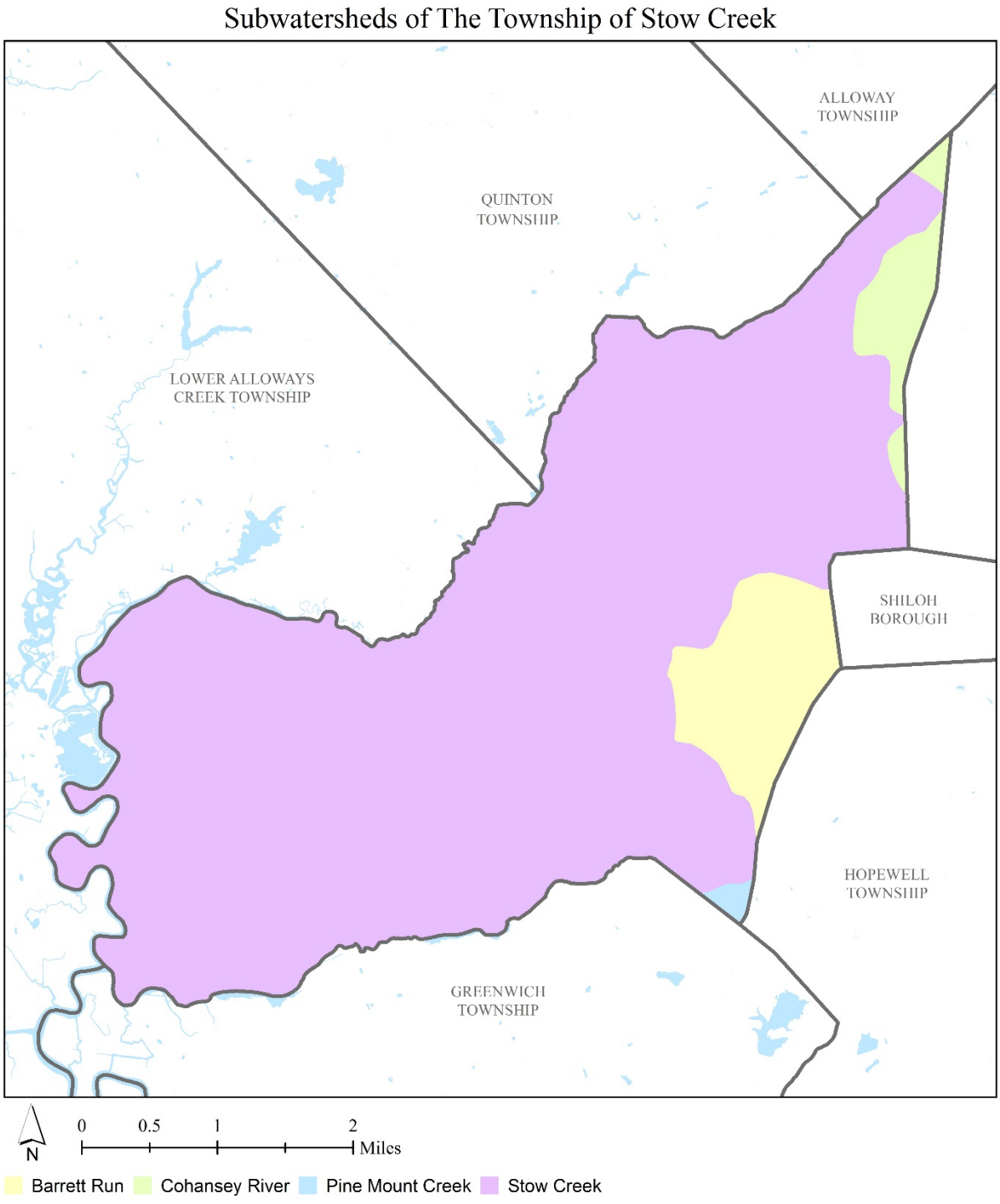


Figure 4: Map of the subwatersheds in Stow Creek Township

For each potential project site, specific aerial loading coefficients for commercial land use were used to determine the annual runoff loads for total phosphorus (TP), total nitrogen (TN), and total suspended solids (TSS) from impervious surfaces (Table 1). These are the same aerial loading coefficients that NJDEP uses in developing total maximum daily loads (TMDLs) for impaired waterways of the state. The percentage of impervious cover for each site was extracted from the 2012 NJDEP land use/land cover database. For impervious areas, runoff volumes were determined for the water quality design storm (1.25 inches of rain over two-hours) and for the annual rainfall total of 44 inches.

Preliminary soil assessments were conducted for each potential project site identified in Stow Creek Township using the United States Department of Agriculture Natural Resources Conservation Service Web Soil Survey, which utilizes regional and statewide soil data to predict soil types in an area. Several key soil parameters were examined (e.g., natural drainage class, saturated hydraulic conductivity of the most limiting soil layer (K_{sat}), depth to water table, and hydrologic soil group) to evaluate the suitability of each site's soil for green infrastructure practices. In cases where multiple soil types were encountered, the key soil parameters were examined for each soil type expected at a site.

For each potential project site, drainage areas were determined for each of the green infrastructure practices proposed at the site. These green infrastructure practices were designed to manage the 2-year design storm, enabling these practices to capture 95% of the annual rainfall. Runoff volumes were calculated for each proposed green infrastructure practice. The reduction in TSS loading was calculated for each drainage area for each proposed green infrastructure practice using the aerial loading coefficients in Table 1. The maximum volume reduction in stormwater runoff for each green infrastructure practice for a storm was determined by calculating the volume of runoff captured from the 2-year design storm. For each green infrastructure practice, peak discharge reduction potential was determined through hydrologic modeling in HydroCAD. For each green infrastructure practice, a cost estimate is provided. These costs are based upon the square footage of the green infrastructure practice and the real cost of green infrastructure practice implementation in New Jersey.

Table 1: Aerial Loading Coefficients[2]

Land Cover	TP load (lbs/acre/yr)	TN load (lbs/acre/yr)	TSS load (lbs/acre/yr)
High, Medium Density Residential	1.4	15	140
Low Density, Rural Residential	0.6	5	100
Commercial	2.1	22	200
Industrial	1.5	16	200
Urban, Mixed Urban, Other Urban	1.0	10	120
Agriculture	1.3	10	300
Forest, Water, Wetlands	0.1	3	40
Barrenland/Transitional Area	0.5	5	60

[2] New Jersey Department of Environmental Protection (NJDEP), Stormwater Best Management Practice Manual, 2004.

Green Infrastructure Practices

Green infrastructure is an approach to stormwater management that is cost-effective, sustainable, and environmentally friendly. Green infrastructure projects capture, filter, absorb, and reuse stormwater to maintain or mimic natural systems and to treat runoff as a resource. As a general principal, green infrastructure practices use soil and vegetation to recycle stormwater runoff through infiltration and evapotranspiration. When used as components of a stormwater management system, green infrastructure practices such as bioretention, green roofs, porous pavement, rain gardens, and vegetated swales can produce a variety of environmental benefits. In addition to effectively retaining and infiltrating rainfall, these practices can simultaneously help filter air pollutants, reduce energy demands, mitigate urban heat islands, and sequester carbon while also providing communities with aesthetic and natural resource benefits[3]. A wide range of green infrastructure practices have been evaluated for the potential project sites in Stow Creek Township. Each practice is discussed below.

Disconnected downspouts

This is often referred to as simple disconnection. A downspout is simply disconnected, prevented from draining directly to the roadway or storm sewer system, and directed to discharge water to a pervious area (i.e., lawn).

Pervious pavements

There are several types of permeable pavement systems including porous asphalt, pervious concrete, permeable pavers, and grass pavers. These surfaces are hard and support vehicle traffic but also allow water to infiltrate through the surface. They have an underlying stone layer to store stormwater runoff and allow it to slowly seep into the ground.

[3] United States Environmental Protection Agency (USEPA), 2013. Watershed Assessment, Tracking, and Environmental Results, New Jersey Water Quality Assessment Report. http://ofmpub.epa.gov/waters10/attains_state.control?p_state=NJ

Bioretention systems/rain gardens

These are landscaped features that are designed to capture, treat, and infiltrate stormwater runoff. These systems can easily be incorporated into existing landscapes, improving aesthetics and creating wildlife habitat while managing stormwater runoff. Bioretention systems also can be used in soils that do not quickly infiltrate by incorporating an underdrain into the system.

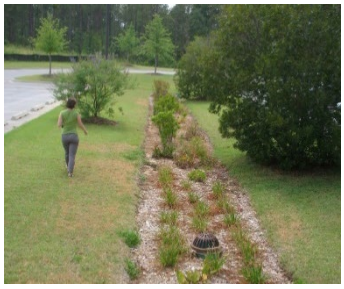
Downspout planter boxes

These are wooden boxes with plants installed at the base of a downspout that provide an opportunity to beneficially reuse rooftop runoff.

Rainwater harvesting systems (cistern or rain barrel)

These systems capture rainwater, mainly from rooftops, in cisterns or rain barrels. The water can then be used for watering gardens, washing vehicles, or for other non-potable uses.

Bioswale



Bioswales are landscape features that convey stormwater from one location to another while removing pollutants and providing water an opportunity to infiltrate.

Stormwater planters

Stormwater planters are vegetated structures that are built into the sidewalk to intercept stormwater runoff from the roadway or sidewalk. Many of these planters are designed to allow the water to infiltrate into the ground while others are designed simply to filter the water and convey it back into the stormwater sewer system.

Tree filter boxes

These are pre-manufactured concrete boxes that contain a special soil mix and are planted with a tree or shrub. They filter stormwater runoff but provide little storage capacity. They are typically designed to quickly filter stormwater and then discharge it to the local sewer system.

Potential Project Sites

Appendix A contains information on potential project sites where green infrastructure practices could be installed as well as information on existing site conditions. The recommended green infrastructure practices and the drainage area that the green infrastructure practices can treat are identified for each potential project site. For each practice, the recharge potential, TSS removal potential, maximum volume reduction potential per storm, the peak reduction potential, and estimated costs are provided. This information is also provided so that proposed development projects that cannot satisfy the New Jersey stormwater management requirements for major development can use one of the identified projects to offset a stormwater management deficit. [4]

[4] New Jersey Administrative Code, N.J.A.C. 7:8, Stormwater Management, Statutory Authority: N.J.S.A. 12:5-3, 13:1D-1 et seq., 13:9A-1 et seq., 13:19-1 et seq., 40:55D-93 to 99, 58:4-1 et seq., 58:10A-1 et seq., 58:11A-1 et seq. and 58:16A-50 et seq., *Date last amended: April 19, 2010*.

Conclusion

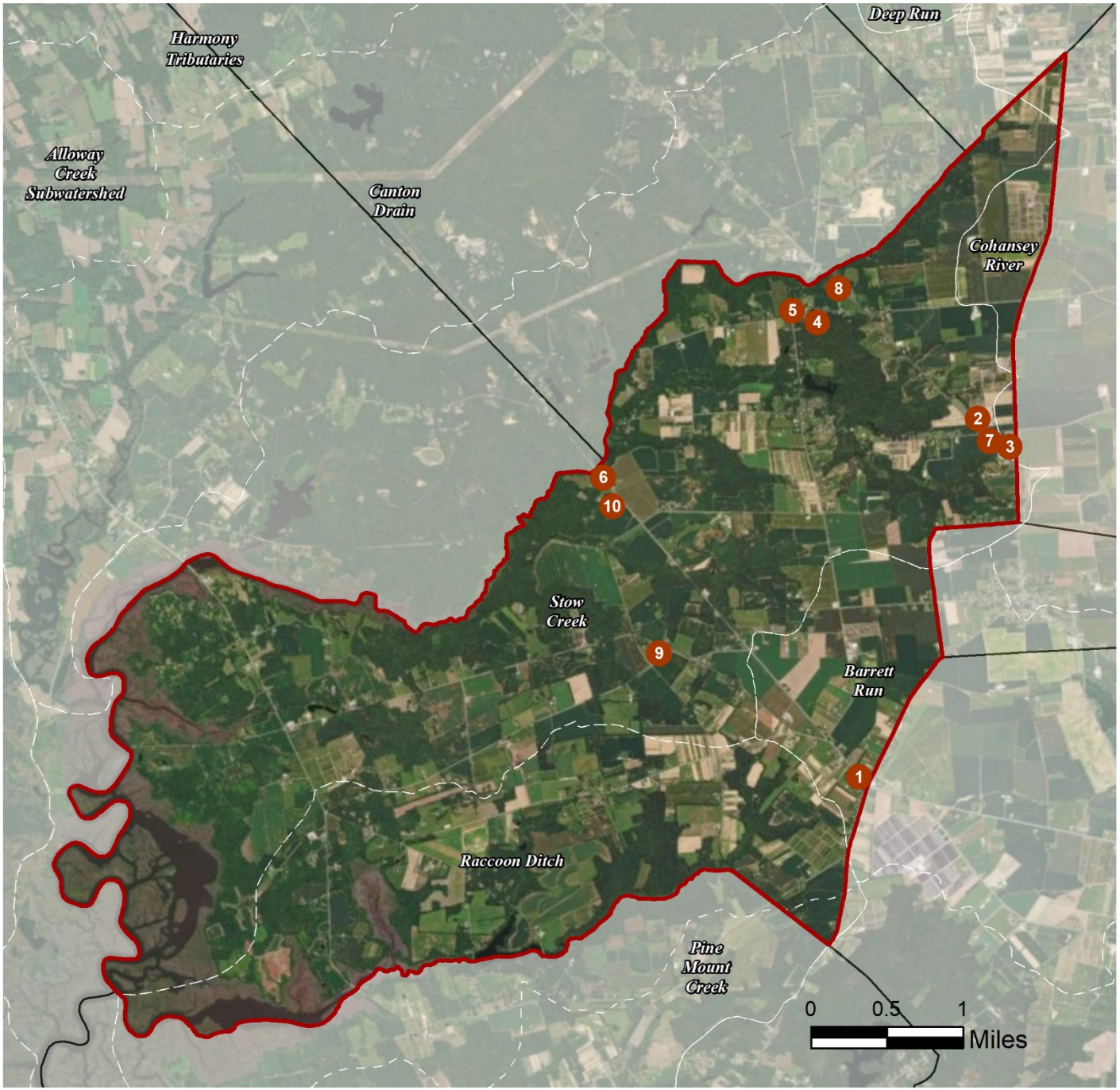
This impervious cover reduction action plan is meant to provide the municipality with a blueprint for implementing green infrastructure practices that will reduce the impact of stormwater runoff from impervious surfaces. These projects can be implemented by a wide variety of people such as boy scouts, girl scouts, school groups, faith-based groups, social groups, watershed groups, and other community groups.

Additionally, development projects that are in need of providing off-site compensation for stormwater impacts can use the projects in this plan as a starting point. The municipality can quickly convert this impervious cover reduction action plan into a stormwater mitigation plan and incorporate it into the municipal stormwater control ordinance.

Appendix A: Climate Resilient Green Infrastructure

a. Green Infrastructure Sites

STOW CREEK TOWNSHIP: GREEN INFRASTRUCTURE SITES



SITES WITHIN THE BARRETT RUN SUBWATERSHED

1. Roadstown Road Right of Way 1

SITES WITHIN THE STOW CREEK SUBWATERSHED

2. Enrico's Italian Cucina & Deli
3. Greenhorn Outdoors
3. Jericho Road Right of Way 1
4. Jericho Road Right of Way 2
5. Roadstown Road Right of Way 2
6. Shiloh Pike Right of Way 1
7. Shiloh Pike Right of Way 2
8. Stow Creek Township School
10. Woodland Country Day School

b. Proposed Green Infrastructure Concepts

Roadstown Road Right of Way 1

Subwatershed: Barrett Run

Site Area: 10,000 sq. ft.

Address: 778 Roadstown Road
Bridgeton, NJ 08032

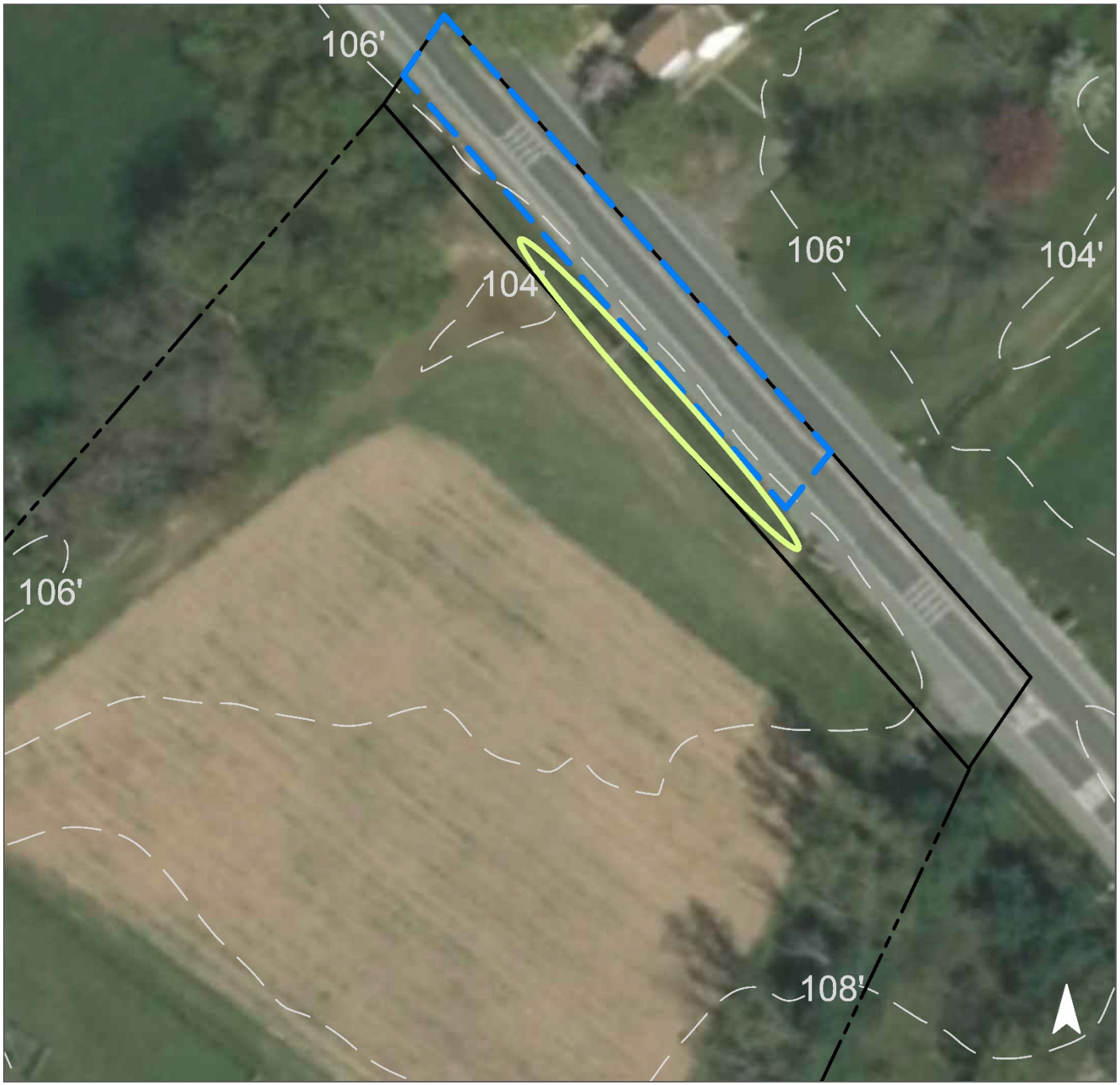
Adjacent Block and Lot: Block 13, Lot 8

A bioretention system can be placed between both catch basins to allow stormwater runoff from the road to infiltrate into the ground. This would improve drainage in the area and create wildlife habitat. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
67	6,720	0.3	3.4	30.9	0.005	0.18

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention system	0.115	19	8,420	0.32	1,100	$5,500

GREEN INFRASTRUCTURE RECOMMENDATIONS



Roadstown Road
Right of Way 1

- bioretention system
- drainage area
- property line
- right of way
- 2015 Aerial: NJOIT, OGIS

0 25' 50'

Enrico's Italian Cucina & Deli

Subwatershed: Stow Creek

Site Area: 24,308 sq. ft.

Address: 1145 Shiloh Pike
Bridgeton, NJ 08302

Block and Lot: Block 6, Lot 1

The parking spaces on the east end of the site can be converted into pervious pavement to reduce flooding and allow stormwater from the surrounding pavement to infiltrate. A bioretention system can be installed in the turfgrass area at the back of the building to capture runoff from the rooftop. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
28	6,781	0.3	3.4	31.1	0.005	0.19

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention system	0.063	10	4,590	0.17	600	$3,000
Pervious pavement	0.075	13	5,490	0.21	1,170	$29,250

GREEN INFRASTRUCTURE RECOMMENDATIONS

Enrico's Italian Cucina & Deli

- bioretention system
- pervious pavement
- drainage area
- property line
- 2015 Aerial: NJOIT, OGIS

0 25' 50'

Greenhorn Outdoors

Subwatershed: Stow Creek

Site Area: 90,563 sq. ft.

Address: 1135 Shiloh Pike
Bridgeton, NJ 08302

Block and Lot: Block 6, Lot 10

A rain garden can be implemented in the turfgrass area south of the parking lot. Stormwater runoff from the parking lot can flow into the garden and infiltrate. Parking spaces can be retrofitted with pervious pavement to capture runoff from the rooftop. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
25	22,641	1.1	11.4	104.0	0.018	0.62

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention system	0.185	31	13,580	0.51	1,775	$8,875
Pervious pavement	0.103	17	7,520	0.28	910	$22,750

GREEN INFRASTRUCTURE RECOMMENDATIONS

Greenhorn Outdoors

- bioretention system
- pervious pavement
- drainage area
- property line
- 2015 Aerial: NJOIT, OGIS

0 25' 50'

Jericho Road Right of Way 1

Subwatershed: Stow Creek

Site Area: 11,700 sq. ft.

Address: 246 Jericho Road
Bridgeton, NJ 08302

Adjacent Block and Lot: Block 5, Lot 5

The road slopes down into the lawn, causing erosion from the flow of stormwater. A bioretention system can be created to capture, treat, and infiltrate the stormwater. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
36	4,250	0.2	2.1	19.5	0.003	0.12

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention system	0.037	6	2,720	0.10	355	$1,775

GREEN INFRASTRUCTURE RECOMMENDATIONS

Jericho Road
Right of Way 1

- bioretention system
- drainage area
- property line
- 2015 Aerial: NJOIT, OGIS

0 25' 50'

Jericho Road Right of Way 2

Subwatershed: Stow Creek

Site Area: 14,760 sq. ft.

Address: 271 Jericho Road
Bridgeton, NJ 08302

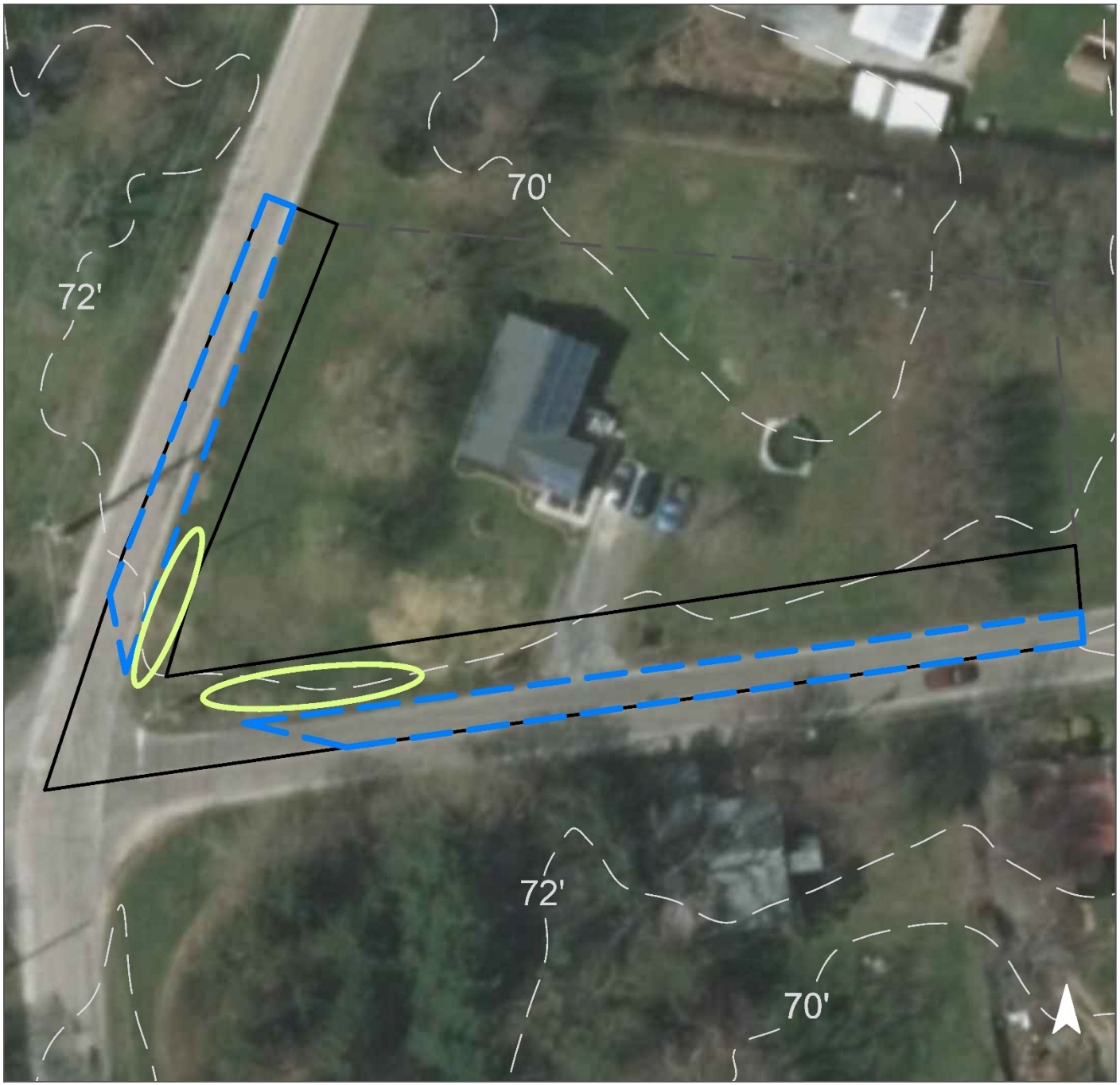
Adjacent Block and Lot: Block 22, Lot 1

There are signs of erosion along the roadside, and a portion of the turfgrass area is lower than the roadways. A bioretention system can be constructed alongside each road to capture stormwater runoff from the pavement. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
44	6,500	0.3	3.3	29.8	0.005	0.18

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.122	20	8,920	0.34	1,165	$5,825

GREEN INFRASTRUCTURE RECOMMENDATIONS



Jericho Road
Right of Way 2

- bioretention system
- drainage area
- property line
- 2015 Aerial: NJOIT, OGIS

0 25' 50'

Roadstown Road Right of Way 2

Subwatershed: Stow Creek

Site Area: 17,300 sq. ft.

Address: 1239 Roadstown Road
Bridgeton, NJ 08302

Adjacent Block and Lot: Block 20, Lot 1

Some signs of erosion are present, and there is an existing depression in the turfgrass area alongside the road. A bioswale can be installed to convey stormwater runoff and provide an opportunity for it to infiltrate into the ground. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
56	9,680	0.5	4.9	44.4	0.008	0.27

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioswale	0.113	19	4,060	0.02	1,085	$5,425

GREEN INFRASTRUCTURE RECOMMENDATIONS

Roadstown Road
Right of Way 2

- bioswale
- drainage area
- property line
- 2015 Aerial: NJOIT, OGIS

0 30' 60'

Shiloh Pike Right of Way 1

Subwatershed: Stow Creek

Site Area: 13,450 sq. ft.

Address: 1135 Shiloh Pike
Bridgeton, NJ 08302

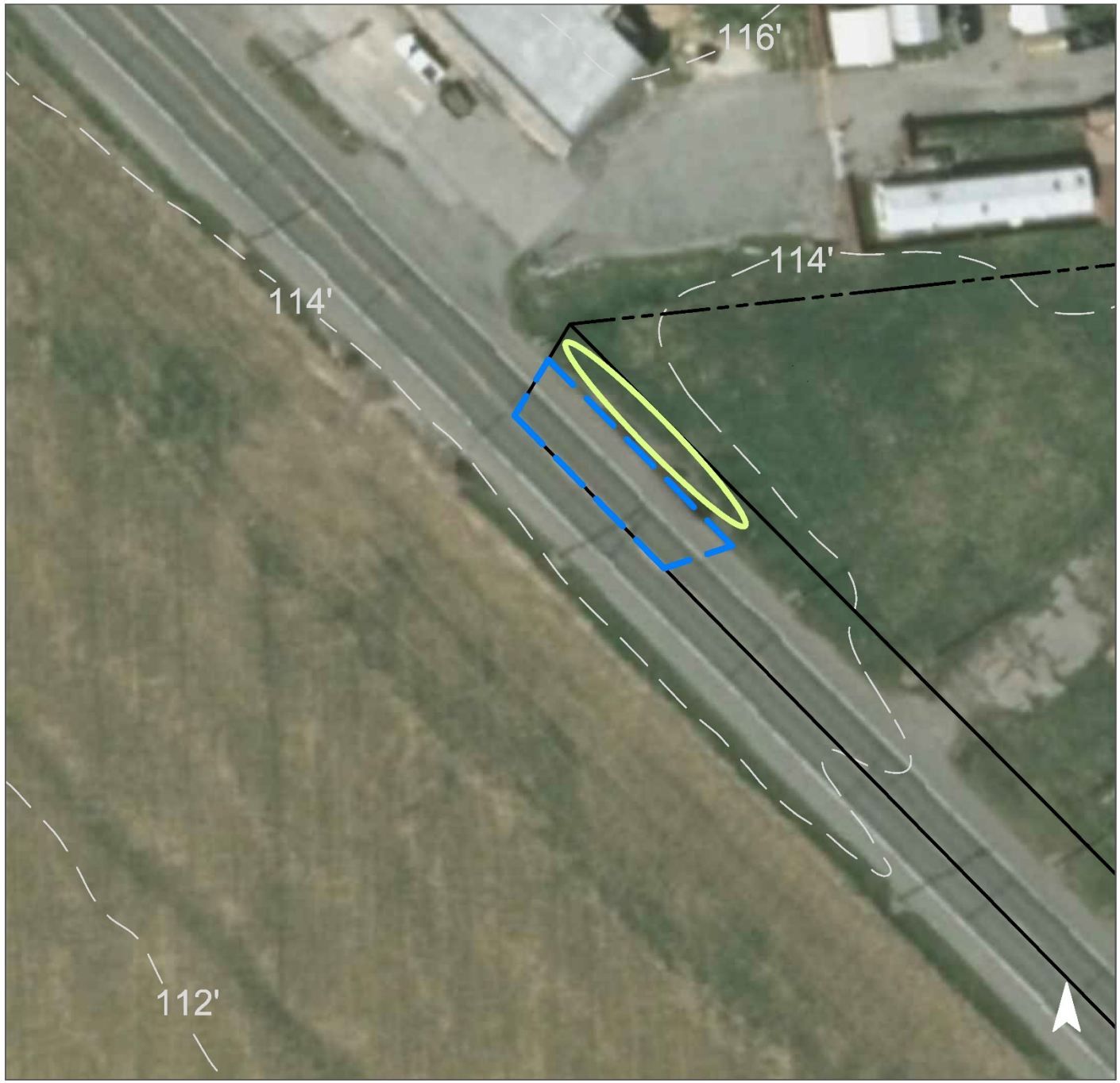
Adjacent Block and Lot: Block 6, Lot 10

There are visible signs of erosion alongside the road and driveway due to stormwater flow. A bioretention system can be installed alongside the road to capture, treat, and infiltrate stormwater runoff from the roadway. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
61	8,210	0.4	4.1	37.7	0.006	0.23

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention system	0.042	7	3,120	0.12	410	$2,050

GREEN INFRASTRUCTURE RECOMMENDATIONS



Shiloh Pike
Right of Way 1

- bioretention system
- drainage area
- property line
- 2015 Aerial: NJOIT, OGIS

0 25' 50'

Shiloh Pike Right of Way 2

Subwatershed: Stow Creek

Site Area: 4,840 sq. ft.

Address: 1391 Shiloh Pike
Bridgeton, NJ 08302

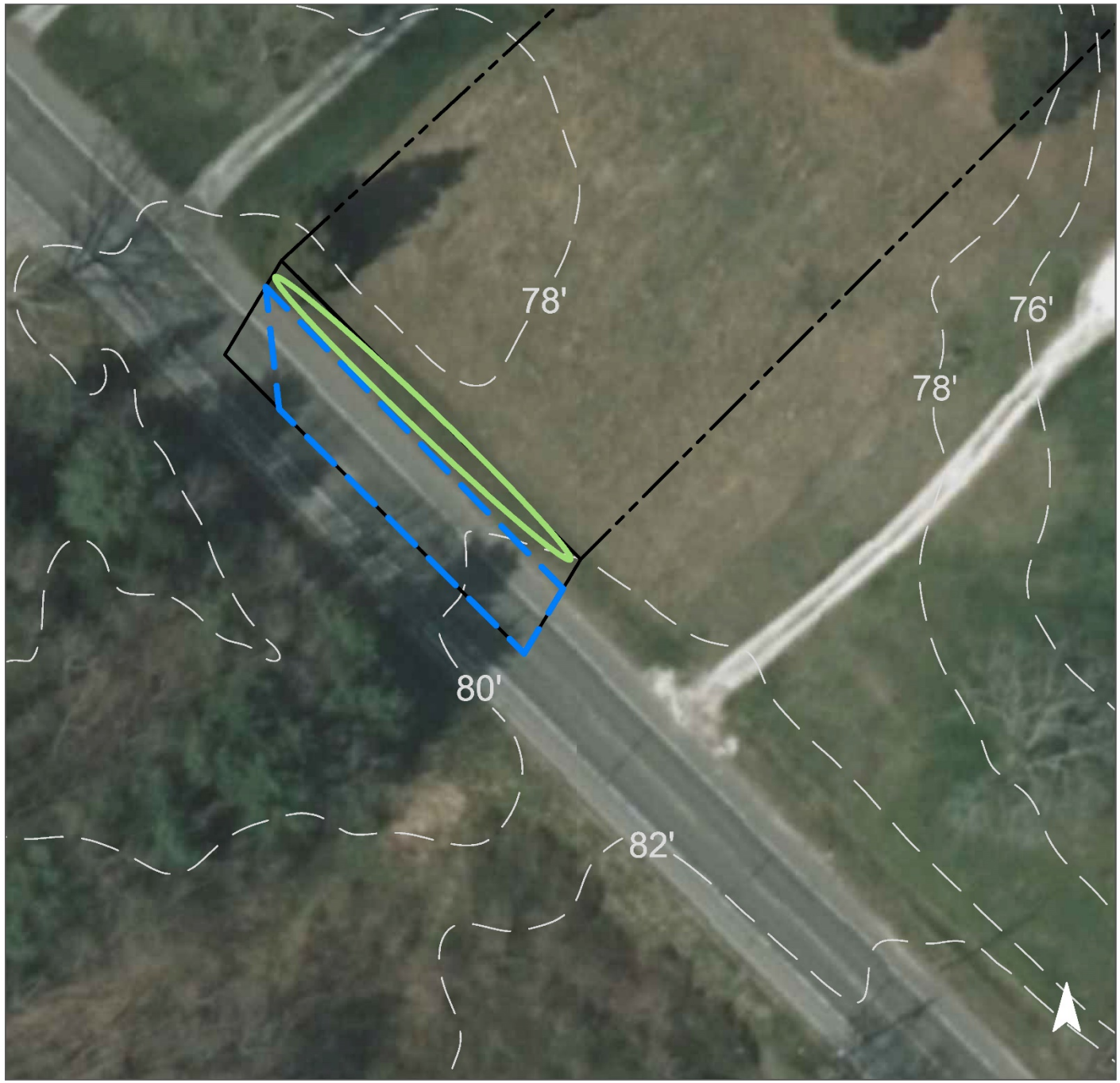
Adjacent Block and Lot: Block 3, Lot 1

Alongside the road, a bioswale can be installed to allow some infiltration of stormwater runoff from the road as well as reduce the levels of pollutants. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
70	3,410	0.2	1.7	15.7	0.003	0.09

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioswale	0.081	14	2,900	0.02	775	$3,875

GREEN INFRASTRUCTURE RECOMMENDATIONS



Shiloh Pike
Right of Way 2

- bioswale
- drainage area
- property line
- 2015 Aerial: NJOIT, OGIS

0 25' 50'

Stow Creek Township School

Subwatershed: Stow Creek

Site Area: 359,255 sq. ft.

Address: 11 Gum Tree Corner Road
Bridgeton, NJ 08302

Block and Lot: Block 17, Lot 2

The parking spaces in the middle parking lot can be converted into pervious pavement to capture, treat, and infiltrate stormwater from the parking lot. A rain garden can be installed in the turfgrass area near the main entrance to capture runoff from the rooftop and surrounding pavement to help alleviate existing erosion issues. Along the north driveway, a second bioretention system could be installed to capture, treat, and infiltrate runoff from the parking lot and rooftop. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
24	85,463	4.1	43.2	392.4	0.067	2.34

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.313	52	22,940	0.86	3,000	$15,000
Pervious pavement	0.284	48	20,840	0.78	1,950	$48,750

GREEN INFRASTRUCTURE RECOMMENDATIONS

Stow Creek Township School

- bioretention system
- pervious pavement
- drainage area
- property line
- 2015 Aerial: NJOIT, OGIS

0 50' 100'

Woodland Country Day School

Subwatershed: Stow Creek

Site Area: 551,730 sq. ft.

Address: 1216 Roadstown Road
Bridgeton, NJ 08302

Block and Lot: Block 24, Lot 2

Two rain gardens can be installed near the buildings by redirecting downspouts into them to capture stormwater runoff from the rooftops. A third rain garden can be installed along the south driveway to capture stormwater runoff from the surrounding pavement. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
31	171,253	8.3	86.5	786.3	0.133	4.70

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.182	31	13,380	0.50	1,250	$6,250

GREEN INFRASTRUCTURE RECOMMENDATIONS

Woodland Country Day School

- bioretention system
- drainage area
- property line
- 2015 Aerial: NJOIT, OGIS

0 50' 100'

c. Summary of Existing Conditions

Summary of Existing Conditions

	Subwatershed/Site Name/Total Site Info/GI Practice	Area (ac)	Area (SF)	Block	Lot	I.C. %	I.C. Area (ac)	I.C. Area (SF)	Existing Annual Loads (Commercial)			Runoff Volumes from I.C.		Runoff Volumes from I.C.	
									TP (lb/yr)	TN (lb/yr)	TSS (lb/yr)	Water Quality Storm (1.25" over 2-hours) (cu.ft.)	Annual (cu.ft.)	Water Quality Storm (1.25" over 2-hours) (Mgal)	Annual (Mgal)
	BARRETT RUN SITES	**0.23**	**10,000**				**0.15**	**6,720**	**0.32**	**3.39**	**30.85**	**700.00**	**24,640**	**0.01**	**0.18**
1	**Roadstown Road Right of Way 1**														
	Total Site Info	0.23	10,000	13	8	67	0.15	6,720	0.3	3.4	30.9	700	24,640	0.005	0.18
	STOW CREEK SITES	**24.97**	**1,087,906**				**7.30**	**318,188**	**15.34**	**160.70**	**1,460.92**	**33,144.61**	**1,166,690**	**0.25**	**8.73**
2	**Enrico's Italian Cucina & Deli**														
	Total Site Info	0.56	24,308	6	1	28	0.16	6,781	0.3	3.4	31.1	706	24,864	0.005	0.19
3	**Greenhorn Outdoors**														
	Total Site Info	2.08	90,563	6	10	25	0.52	22,641	1.1	11.4	104.0	2,358	83,016	0.018	0.62
4	**Jericho Road Right of Way 1**														
	Total Site Info	0.27	11,700	5	5	36	0.10	4,250	0.2	2.1	19.5	443	15,583	0.003	0.12
5	**Jericho Road Right of Way 2**														
	Total Site Info	0.34	14,760	22	1	44	0.15	6,500	0.3	3.3	29.8	677	23,833	0.005	0.18
6	**Roadstown Road Right of Way 2**														
	Total Site Info	0.40	17,300	20	1	56	0.22	9,680	0.5	4.9	44.4	1,008	35,493	0.008	0.27
7	**Shiloh Pike Right of Way 1**														
	Total Site Info	0.31	13,450	6	10	61	0.19	8,210	0.4	4.1	37.7	855	30,103	0.006	0.23
8	**Shiloh Pike Right of Way 2**														
	Total Site Info	0.11	4,840	3	1	70	0.08	3,410	0.2	1.7	15.7	355	12,503	0.003	0.09
9	**Stow Creek Township School**														
	Total Site Info	8.25	359,255	17	2	24	1.96	85,463	4.1	43.2	392.4	8,902	313,365	0.067	2.34
10	**Woodland County Day School**														
	Total Site Info	12.67	551,730	24	2	31	3.93	171,253	8.3	86.5	786.3	17,839	627,929	0.133	4.70

d. Summary of Proposed Green Infrastructure Practices

Summary of Proposed Green Infrastructure Practices

	Subwatershed/Site Name/Total Site Info/GI Practice	Potential Management Area Area (SF)	Potential Management Area Area (ac)	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Max Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cfs)	Size of BMP	Unit Cost ($/unit)	Unit	Total Cost ($)	I.C. Treated %
	BARRETT RUN SITES	**4,400**	**0.10**	**0.11**	**19.19**	**8,420.00**	**0.32**				**$5,500**	**65.48%**
1	**Roadstown Road Right of Way 1**											
	Bioretention system	4,400	0.10	0.115	19	8,420	0.32	1,100	$5	SF	$5,500	65.5%
	Total Site Info	**4,400**	**0.10**	**0.115**	**19**	**8,420**	**0.32**				$5,500	**65.5%**
	STOW CREEK SITES	**61,360**	**1.41**	**1.60**	**267.64**	**110,060**	**3.91**				**$152,825**	**19.28%**
2	**Enrico's Italian Cucina & Deli**											
	Bioretention system	2,400	0.06	0.063	10	4,590	0.17	600	$5	SF	$3,000	35.4%
	Pervious pavement	2,870	0.07	0.075	13	5,490	0.21	1,170	$25	SF	$29,250	42.3%
	Total Site Info	**5,270**	**0.12**	**0.137**	**23**	**10,080**	**0.38**				**$32,250**	**77.7%**
3	**Greenhorn Outdoors**											
	Bioretention system	7,100	0.16	0.185	31	13,580	0.51	1,775	$5	SF	$8,875	31.4%
	Pervious pavement	3,935	0.09	0.103	17	7,520	0.28	910	$25	SF	$22,750	17.4%
	Total Site Info	**11,035**	**0.25**	**0.288**	**48**	**21,100**	**0.79**				**$31,625**	**48.7%**
4	**Jericho Road Right of Way 1**											
	Bioretention systems	1,425	0.03	0.037	6	2,720	0.10	355	$5	SF	$1,775	33.5%
	Total Site Info	**1,425**	**0.03**	**0.037**	**6**	**2,720**	**0.10**				**$1,775**	**33.5%**
5	**Jericho Road Right of Way 2**											
	Bioretention system	4,665	0.11	0.122	20	8,920	0.34	1,165	$5	SF	$5,825	71.8%
	Total Site Info	**4,665**	**0.11**	**0.122**	**20**	**8,920**	**0.34**				**$5,825**	**71.8%**
6	**Roadstown Road Right of Way 2**											
	Bioswale	4,335	0.10	0.113	19	4,060	0.02	1,085	$5	SF	$5,425	44.8%
	Total Site Info	**4,335**	**0.10**	**0.113**	**19**	**4,060**	**0.02**				**$5,425**	**44.8%**
7	**Shiloh Pike Right of Way 1**											
	Bioretention system	1,630	0.04	0.042	7	3,120	0.12	410	$5	SF	$2,050	19.9%
	Total Site Info	**1,630**	**0.04**	**0.042**	**7**	**3,120**	**0.12**				**$2,050**	**19.9%**
8	**Shiloh Pike Right of Way 2**											
	Bioswale	3,100	0.07	0.081	14	2,900	0.02	775	$5	SF	$3,875	90.9%
	Total Site Info	**3,100**	**0.07**	**0.081**	**14**	**2,900**	**0.02**				**$3,875**	**90.9%**
9	**Stow Creek Township School**											
	Bioretention systems	12,000	0.28	0.313	52	22,940	0.86	3,000	$5	SF	$15,000	14.0%
	Pervious pavement	10,900	0.25	0.284	48	20,840	0.78	1,950	$25	SF	$48,750	12.8%

Summary of Proposed Green Infrastructure Practices

	Subwatershed/Site Name/Total Site Info/GI Practice	Potential Management Area Area (SF)	Potential Management Area Area (ac)	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Max Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cfs)	Size of BMP	Unit Cost ($/unit)	Unit	Total Cost ($)	I.C. Treated %
	Total Site Info	**22,900**	**0.53**	**0.597**	**100**	**43,780**	**1.64**				**$63,750**	**26.8%**
10	**Woodland County Day School**											
	Bioretention systems	7,000	0.16	0.182	31	13,380	0.50	1,250	$5	SF	$6,250	4.1%
	Total Site Info	**7,000**	**0.16**	**0.182**	**31**	**13,380**	**0.50**				**$6,250**	**4.1%**