RUTGERS
New Jersey Agricultural
Experiment Station

Draft

Impervious Cover Reduction Action Plan
for
Lower Alloways Creek Township, Salem County, New Jersey

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

June 11, 2018

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Introduction

Located in Salem County in southern New Jersey, Lower Alloways Creek Township covers approximately 41.0 square miles. Figures 1 and 2 illustrate that Lower Alloways Creek Township is dominated by wetlands. A total of 5.1% of the municipality's land use is classified as urban. Of the urban land in Lower Alloways 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 Lower Alloways 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 Lower Alloways Creek Township. Based upon the 2012 NJDEP land use/land cover data, approximately 1.6% of Lower Alloways Creek Township has impervious cover. This level of impervious cover suggests that the streams in Lower Alloways Creek Township are sensitive streams. [1]

Methodology

Lower Alloways Creek Township contains portions of ten 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.

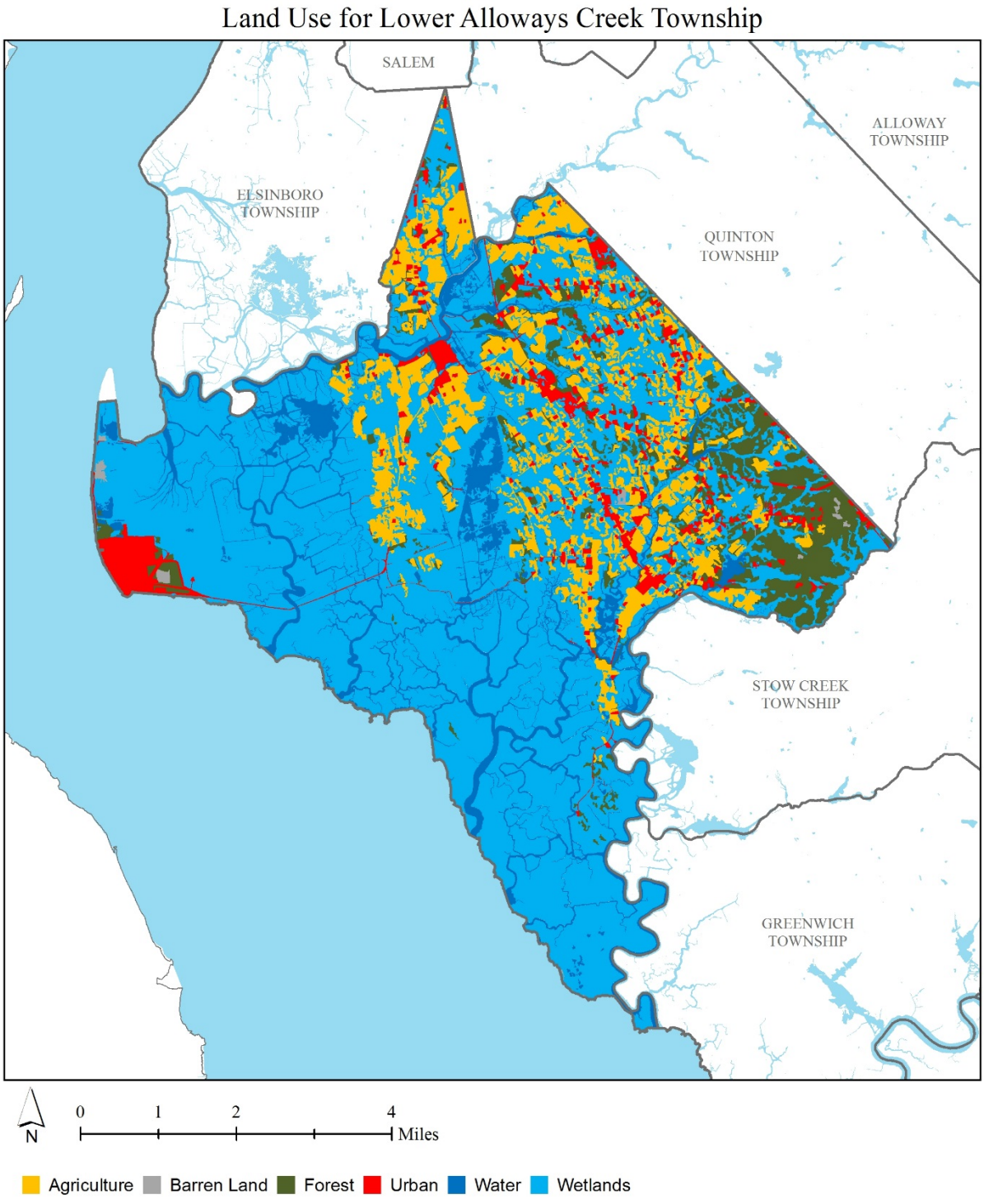


Figure 1: Map illustrating the land use in Lower Alloways Creek Township

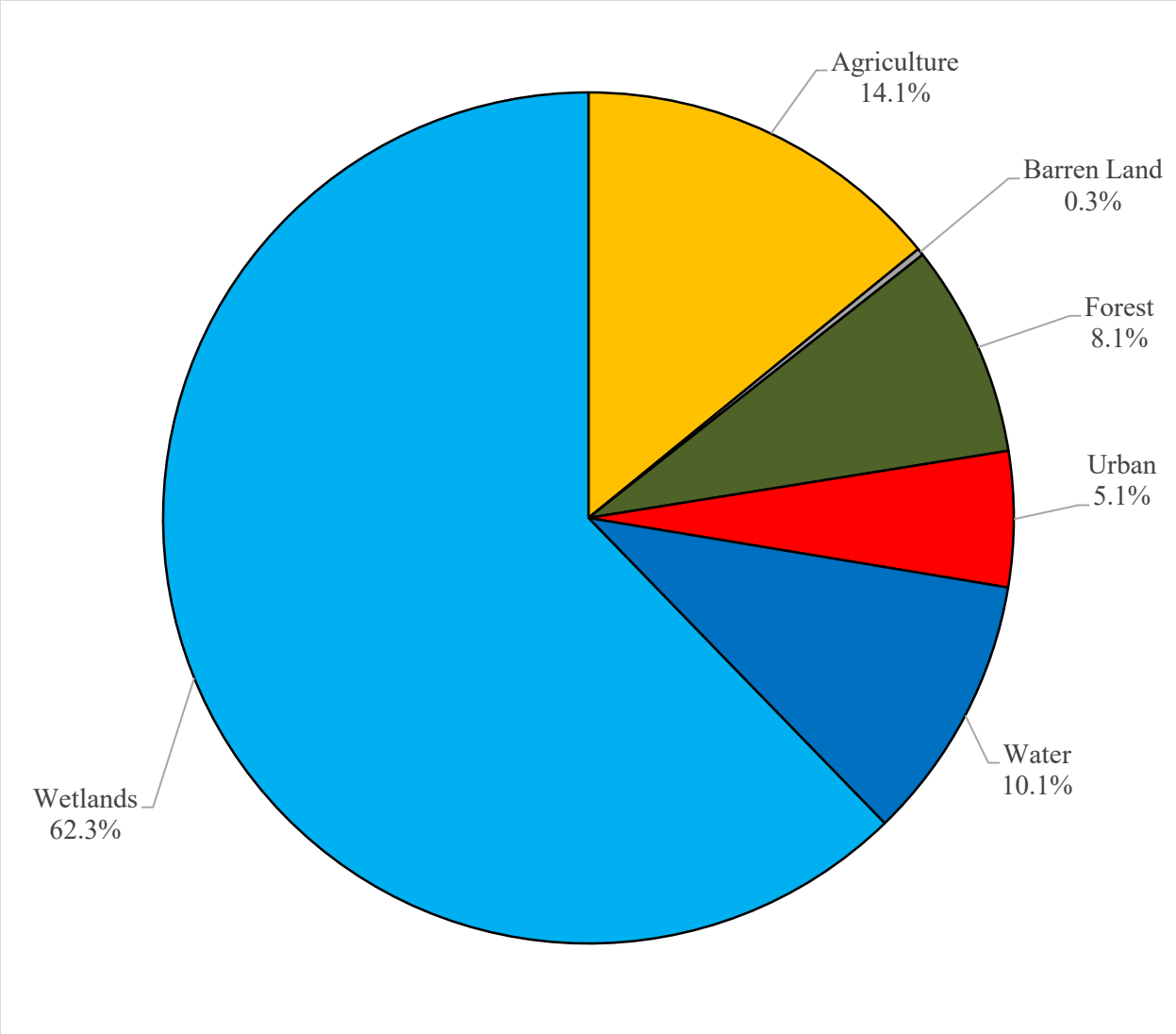


Figure 2: Pie chart illustrating the land use in Lower Alloways Creek Township

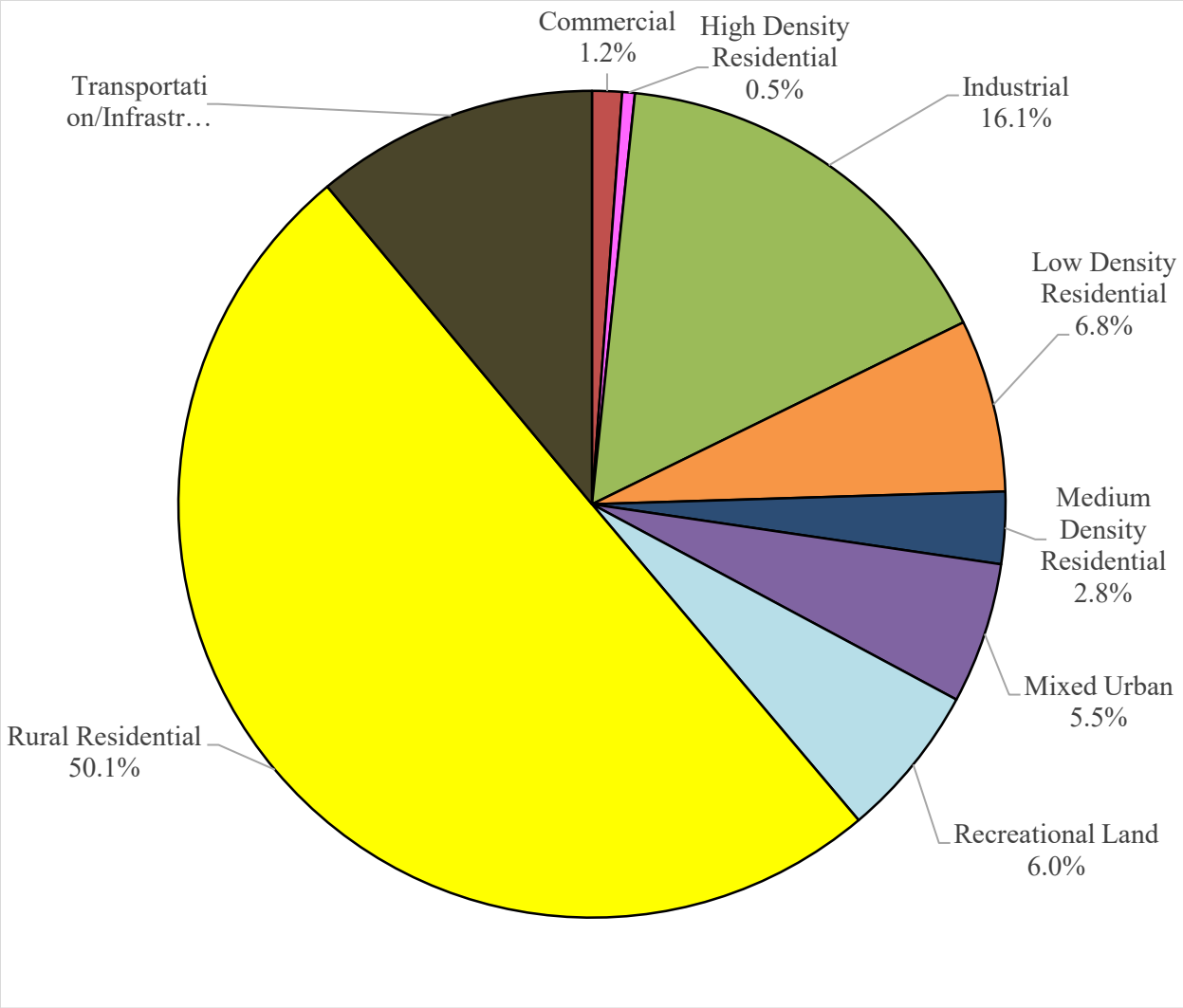


Figure 3: Pie chart illustrating the various types of urban land use in Lower Alloways Creek Township

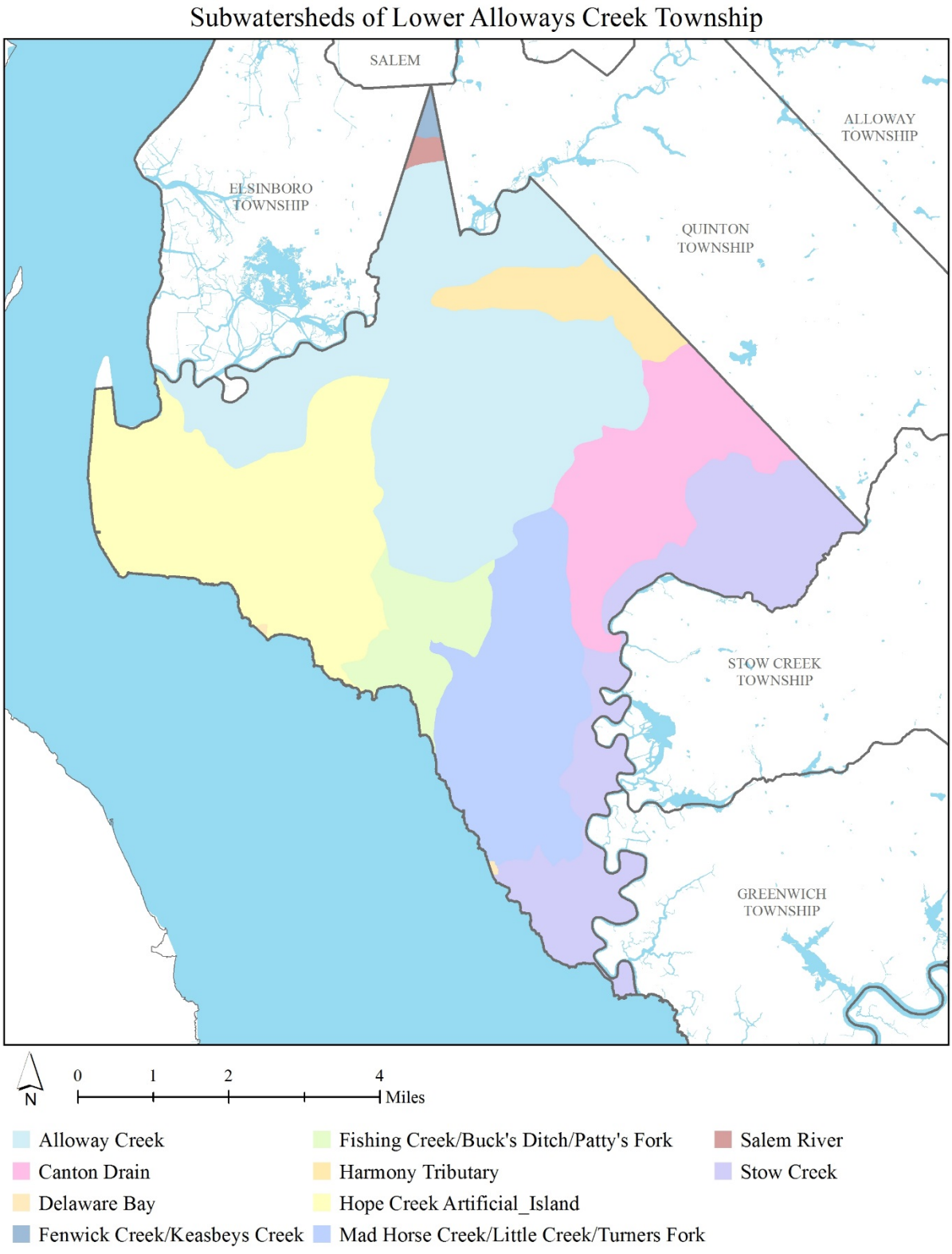


Figure 4: Map of the subwatersheds in Lower Alloways Creek Township

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 Lower Alloways 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 Lower Alloways 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.

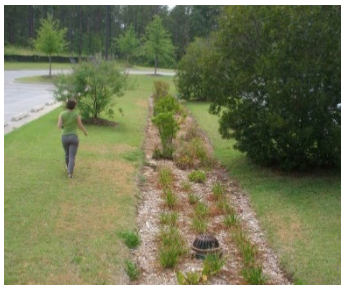
Downspout planter boxes

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

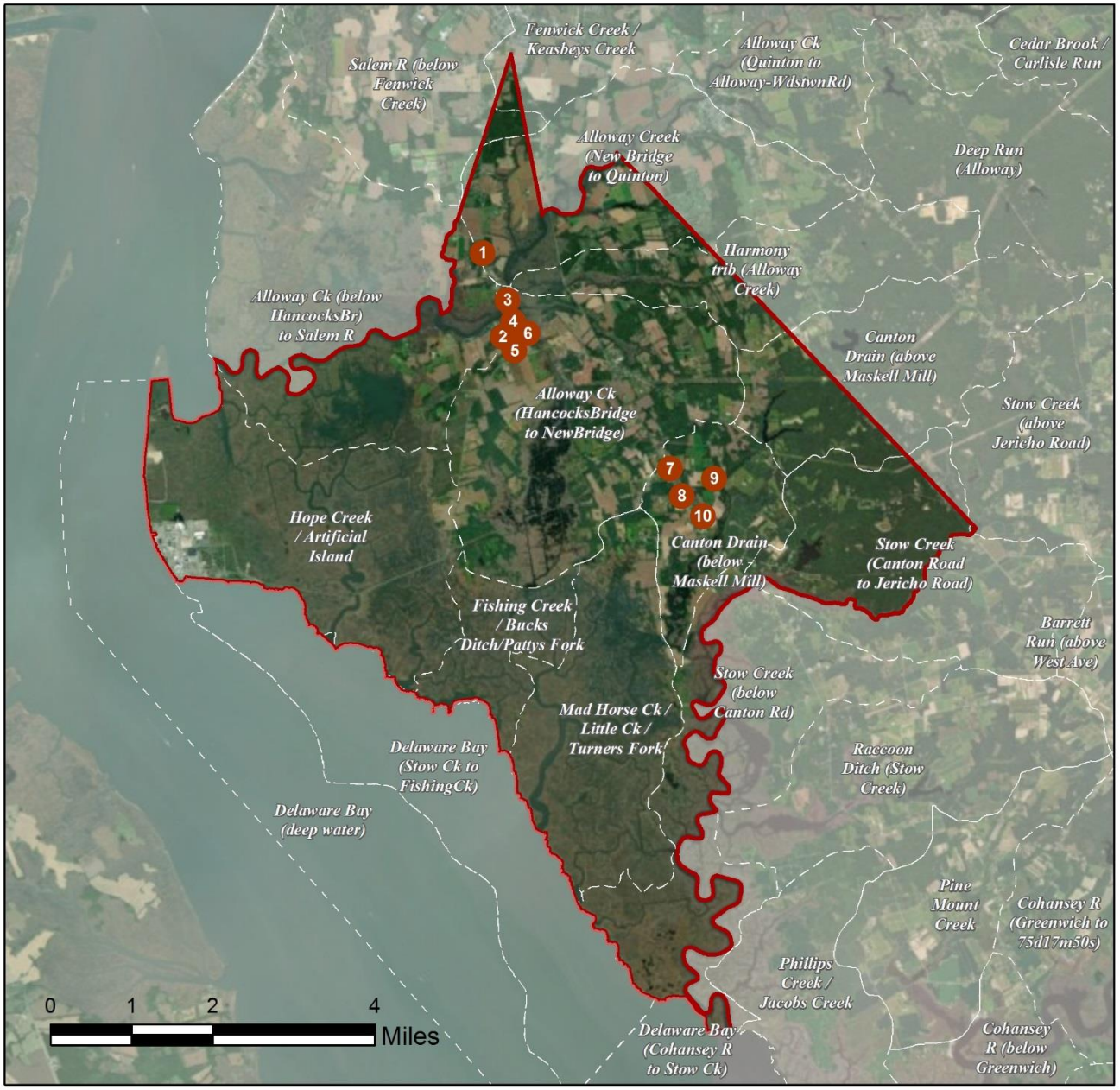
This impervious cover reduction action plan is meant to provide the municipality with a blueprint for implementing green infrastructure practices that will reduce the impact of stormwater runoff from impervious surfaces. These projects can be implemented by a wide variety of people such as boy scouts,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

LOWER ALLOWAYS CREEK: GREEN INFRASTRUCTURE SITES



SITES WITHIN THE ALLOWAY CREEK SUBWATERSHED

1. 427 Salem Hancocks Bridge Road
2. Hancock's Bridge United Methodist Church
3. Hancock House Historic Site
4. Hancock House Office
5. Lower Alloways Creek Municipal Building
6. Lower Alloways Creek Post Office

SITES WITHIN THE CANTON DRAIN SUBWATERSHED

7. 2 Silver Lake Road
8. 848 County Road 623
9. Canton Baptist Church
10. Lower Alloways Creek Rescue

b. Proposed Green Infrastructure Concepts

427 SALEM HANCOCKS BRIDGE ROAD

Subwatershed: Alloway Creek

Site Area: 7,352 sq. ft.

Address: 427 Salem Hancocks Bridge Road
Salem, NJ 08079

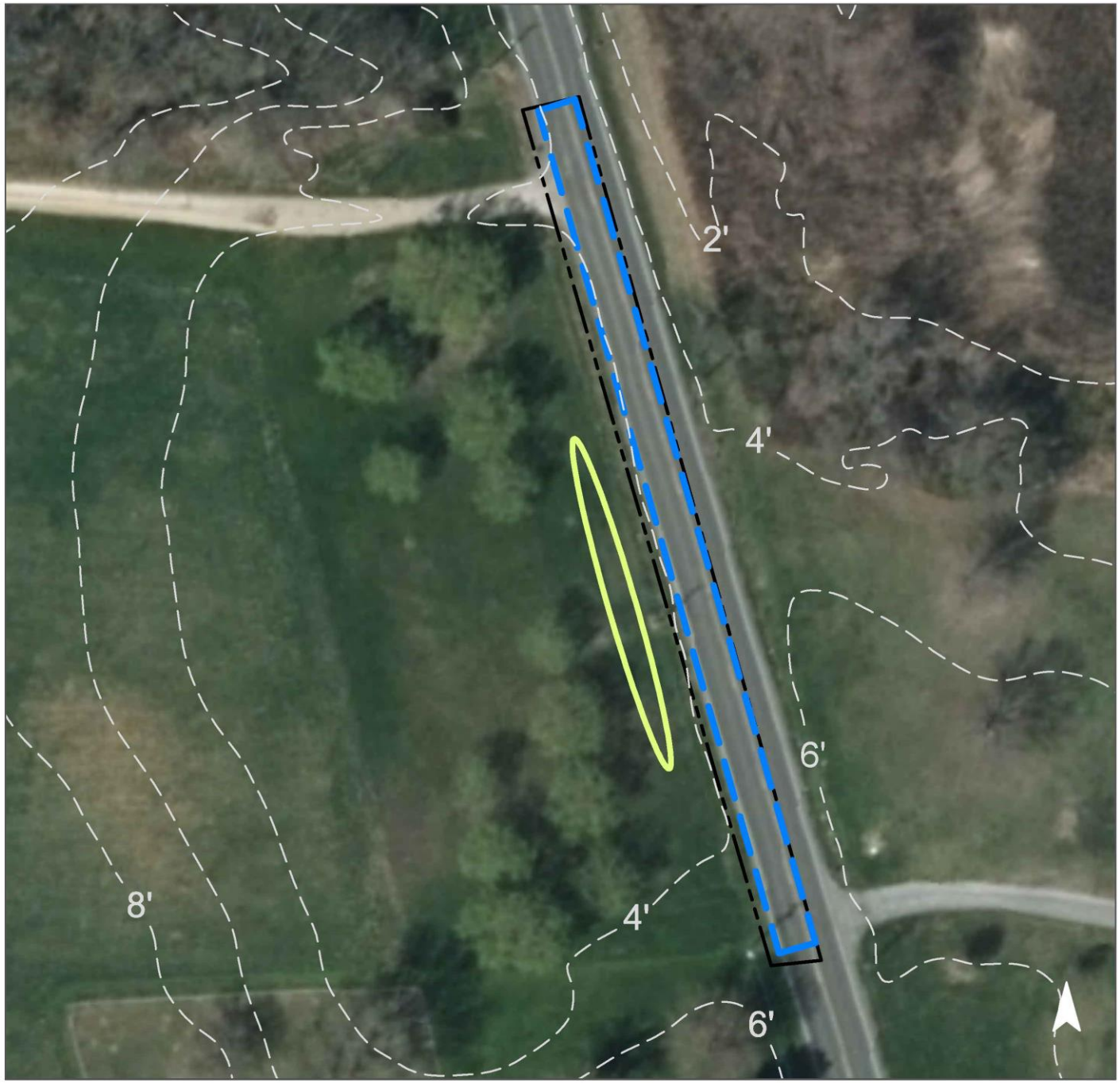
Block and Lot: Block 6, Lots 8, 9.01, 9.03

The trench stretching along the east side of the road can be converted into a rain garden to allow stormwater runoff from the road to infiltrate more efficiently. Creating a rain garden will also benefit wildlife by creating 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"
6	476	0.0	0.2	2.2	0.000	0.01

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	0.135	23	9,940	0.37	1,300	$6,500

GREEN INFRASTRUCTURE RECOMMENDATIONS



427 Salem Hancocks Bridge Road

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

0 30' 60'

HANCOCK'S BRIDGE UNITED METHODIST CHURCH

Subwatershed: **Alloway Creek**

Site Area: **31,697 sq. ft.**

Address: **50 Main Street**
Hancock's Bridge, NJ
08038

Block and Lot: **Block 16, Lot 11**

A bioretention system can be installed in the turfgrass area near the entrance of the building by the sign as well as the turfgrass area at the southeast side of the building to capture, treat, and infiltrate stormwater runoff from the roof. 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"
26	8,091	0.4	4.1	37.1	0.006	0.22

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	0.051	9	494	0.16	414	$2,700

GREEN INFRASTRUCTURE RECOMMENDATIONS

Hancock's Bridge United Methodist Church

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

0 25' 50'

HANCOCK HOUSE HISTORIC SITE

Subwatershed: Alloway Creek

Site Area: 65,244 sq. ft.

Address: 485 Locust Island Road
Hancock's Bridge, NJ
08038

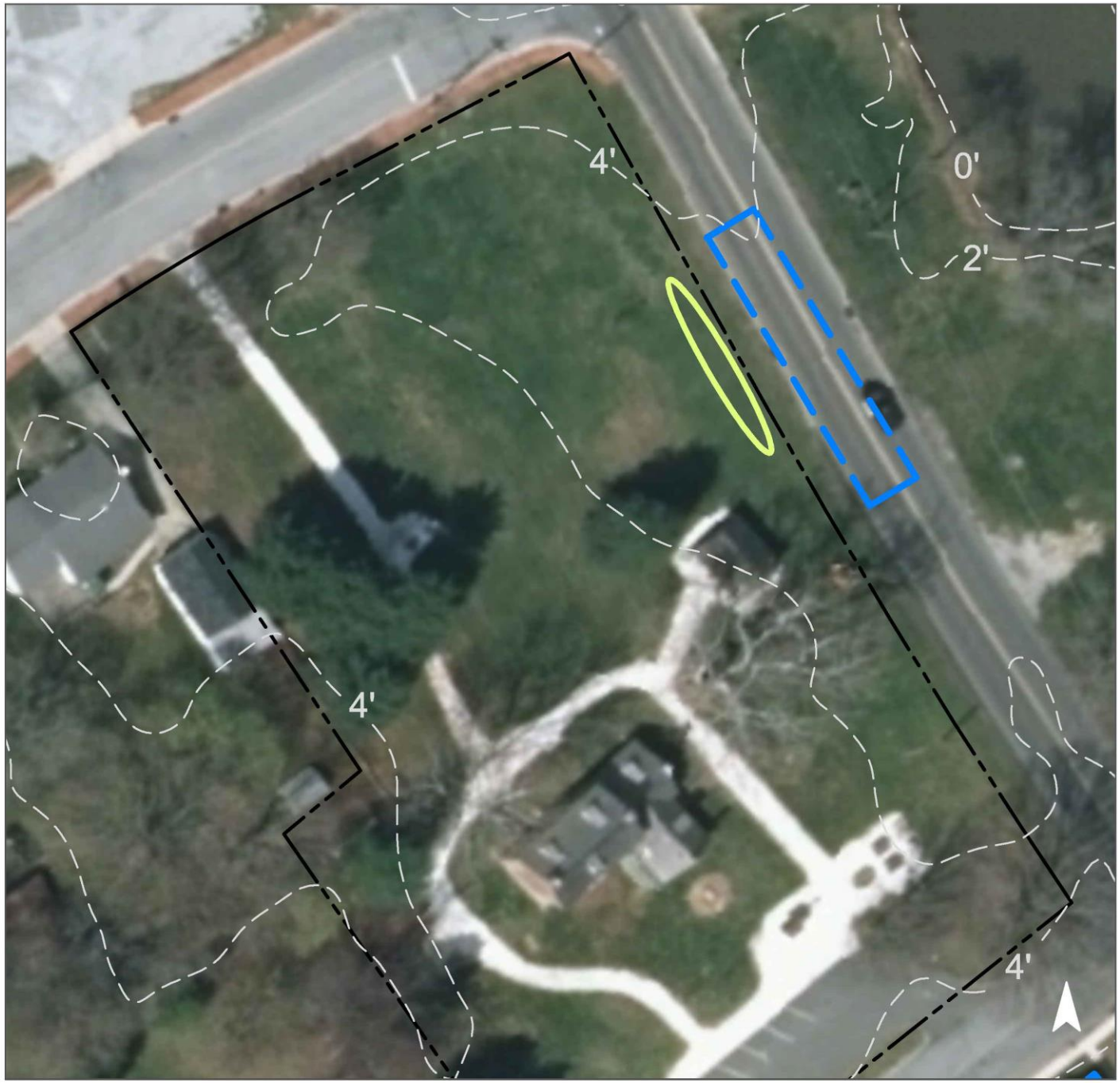
Block and Lot: Block 12, Lot 1

A rain garden can be built on the west side of Locust Island Road to capture, treat, and infiltrate stormwater runoff from the road and to add aesthetic appeal and wildlife habitat to the property. 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"
14	8,817	0.4	4.5	40.5	0.007	0.24

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	0.045	8	3,330	0.13	435	$2,175

GREEN INFRASTRUCTURE RECOMMENDATIONS



Hancock House Historic Site

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

0 25' 50'

HANCOCK HOUSE OFFICE

Subwatershed: **Alloway Creek**

Site Area: **8,997 sq. ft.**

Address: **493 Locust Island Road Hancock's Bridge, NJ 08038**

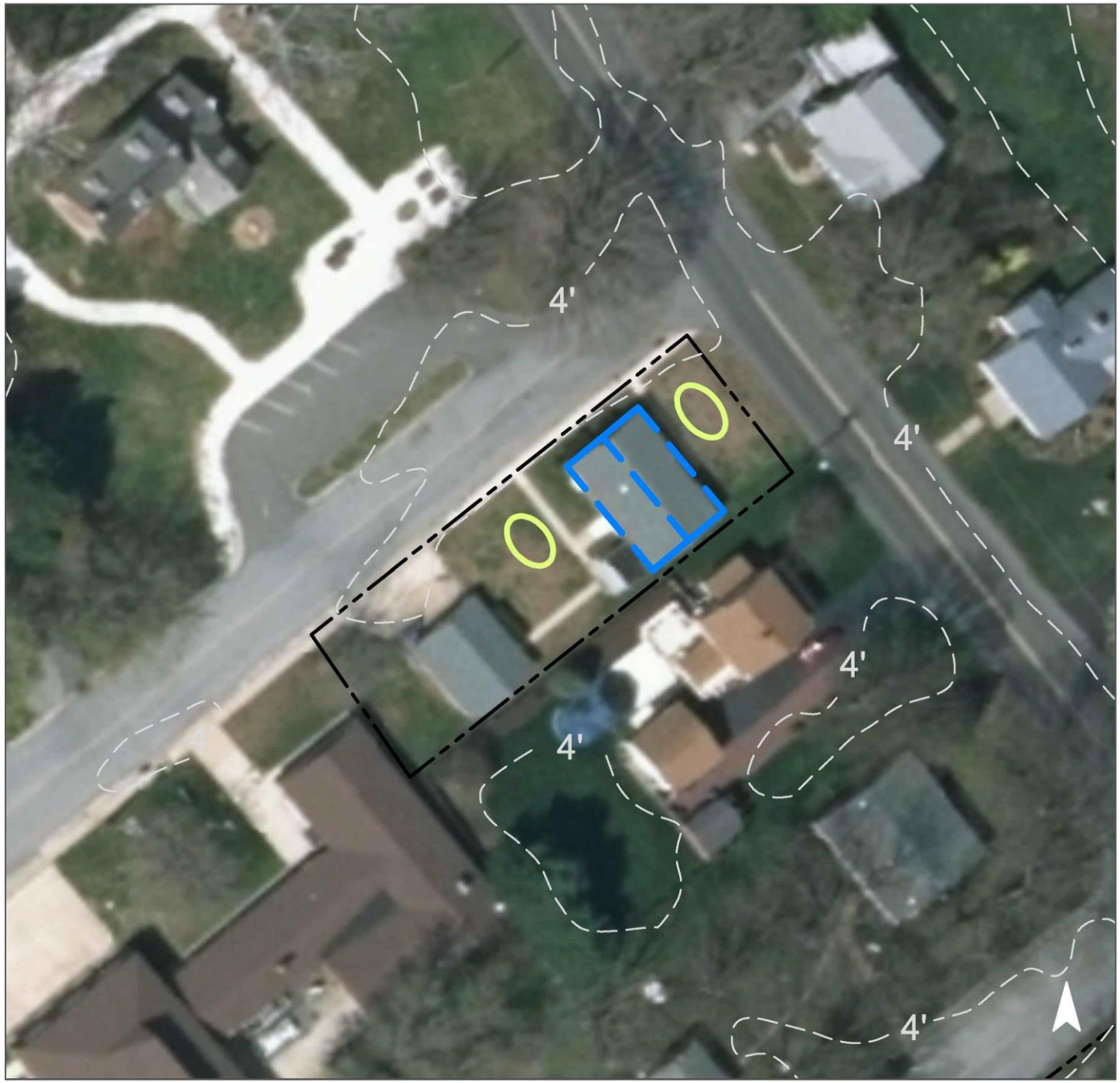
Block and Lot: **Block 13, Lot 1**

Bioretention systems can be installed in the turfgrass on both sides of building to capture, treat, and infiltrate stormwater runoff from the roof. 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"
30	2,699	0.1	1.4	12.4	0.002	0.07

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	0.035	6	2,560	0.10	340	$1,700

GREEN INFRASTRUCTURE RECOMMENDATIONS



Hancock House Office

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

0 25' 50'

LOWER ALLOWAYS CREEK MUNICIPAL BUILDING

Subwatershed: **Alloway Creek**

Site Area: **733,293 sq. ft.**

Address: **501 Locust Island Road Hancock's Bridge, NJ 08038**

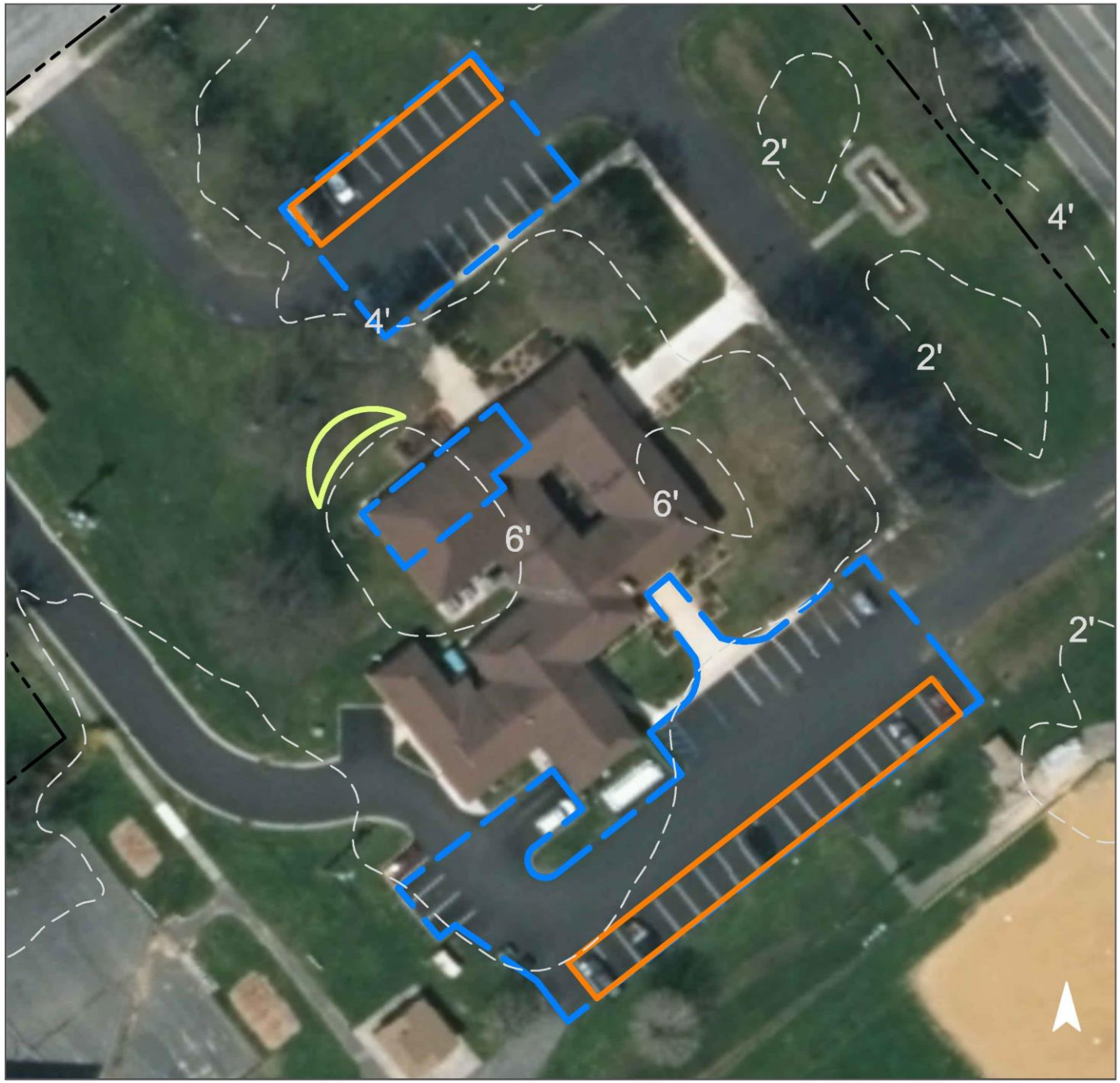
Block and Lot: **Block 16, Lot 1**

A bioretention system can be installed to capture, treat, and infiltrate stormwater runoff from the roof and to add aesthetic appeal to the building. Parking spaces can be converted to porous pavement to allow stormwater runoff from the parking lots to infiltrate into the ground. 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"
20	145,874	7.0	73.7	669.8	0.114	4.00

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	0.045	7	3,280	0.12	430	$2,150
Pervious pavement	0.562	94	41,260	1.55	5,020	$125,500

GREEN INFRASTRUCTURE RECOMMENDATIONS



Lower Alloways Creek Municipal Building

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

0 30' 60'

LOWER ALLOWAYS CREEK POST OFFICE

Subwatershed: Alloway Creek

Site Area: 895,139 sq. ft.

Address: 500 Locust Island Road
Hancock's Bridge, NJ
08038

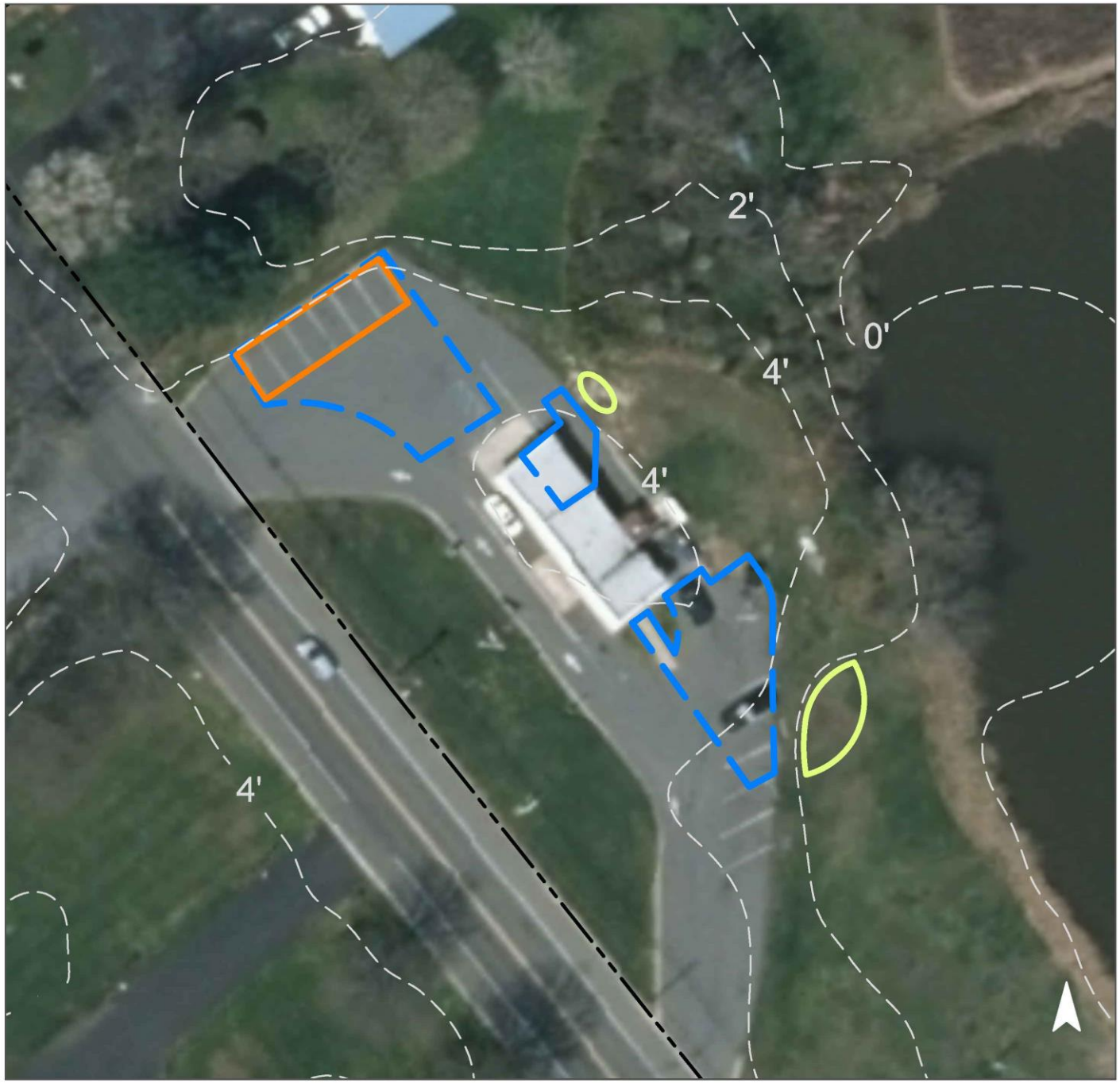
Block and Lot: Block 20, Lots 2 & 2.01

Bioretention systems can be installed in turfgrass at two locations to allow the stomrwater runoff from the pavement to infiltrate. The parking spaces east of the pizzeria can be retrofitted with pervious pavement to allow water to penetrate the surface. 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"
4	32,980	1.6	16.7	151.4	0.026	0.90

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	0.060	10	4,440	0.17	580	$2,900
Pervious pavement	0.076	13	4,440	0.21	980	$24,500

GREEN INFRASTRUCTURE RECOMMENDATIONS



Lower Alloways Creek Post Office

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

0 25' 50'

2 SILVER LAKE ROAD

Subwatershed: Canton Drain

Site Area: 17,521 sq. ft.

Address: 2 Silver Lake Road
Salem, NJ 08079

Block and Lot: Blocks n/a, Lot n/a

The trench alongside the south side of the road next to the “Canton Baptist Church” sign can be transformed into a rain garden to allow stormwater runoff from the road to infiltrate and reduce contaminant levels more efficiently while providing a habitat for wildlife. 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"
7	1,185	0.1	0.6	5.4	0.001	0.03

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	0.091	15	6,650	0.25	870	$4,350

GREEN INFRASTRUCTURE RECOMMENDATIONS

2 Silver Lake Road Road

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

0 50' 100'

848 COUNTY ROAD 623

Subwatershed: Canton Drain

Site Area: 17,897 sq. ft.

Address: 848 County Road 623
Salem, NJ 08079

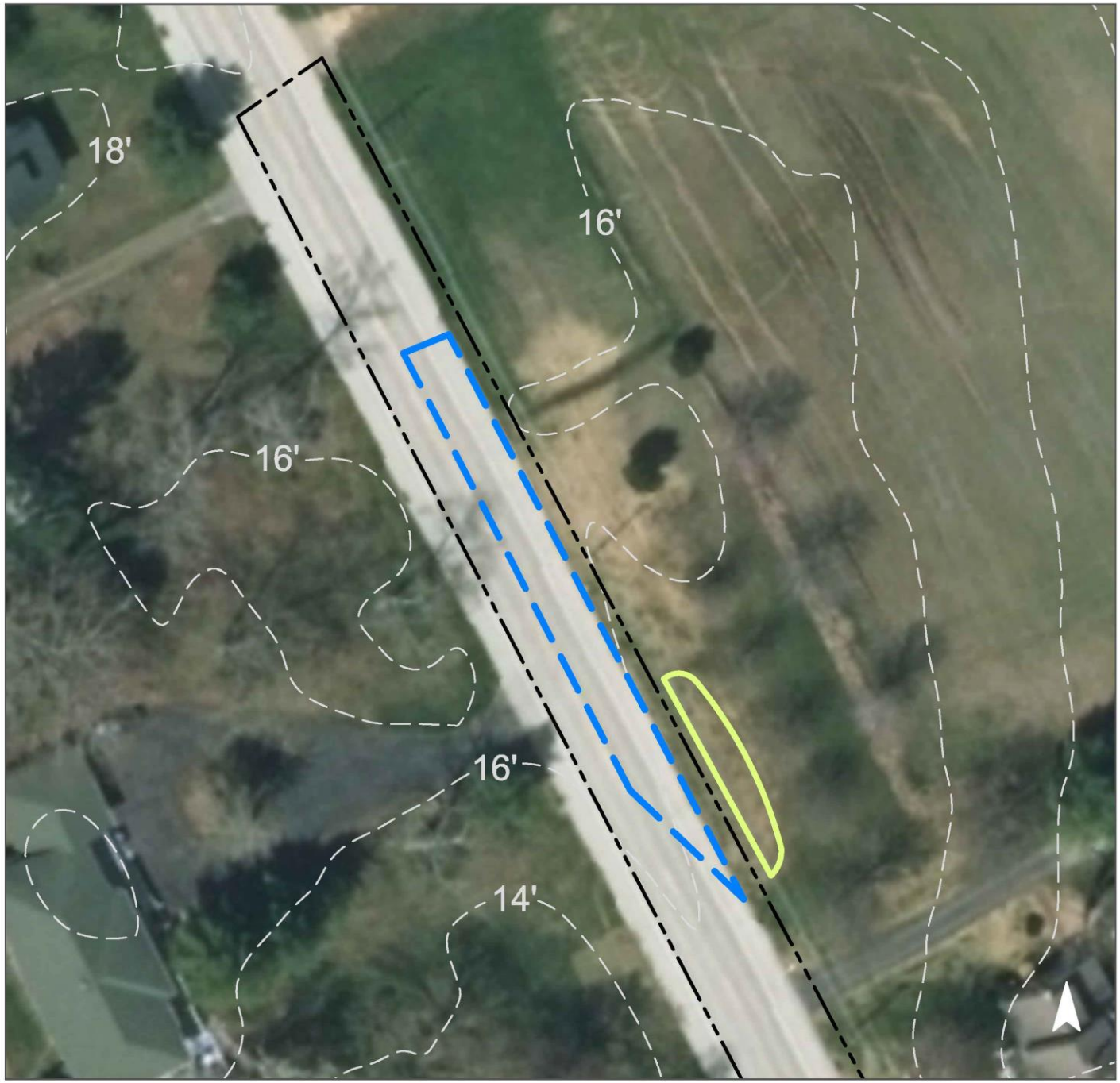
Block and Lot: Block n/a, Lot n/a

On the east side of the road there exists a bioswale filled with grasses. This can be extended perpendicularly to its current position to create a rain garden, travelling alongside the road to allow stormwater runoff to infiltrate into the ground and reduce contaminant levels. 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"
12	2,091	0.1	1.1	9.6	0.002	0.06

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	0.078	13	5,740	0.22	750	$3,750

GREEN INFRASTRUCTURE RECOMMENDATIONS



848 County Road 623 Road

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

0 25' 50'

CANTON BAPTIST CHURCH

Subwatershed: Canton Drain

Site Area: 405,814 sq. ft.

Address: 700 Smick Road
Salem, NJ 08079

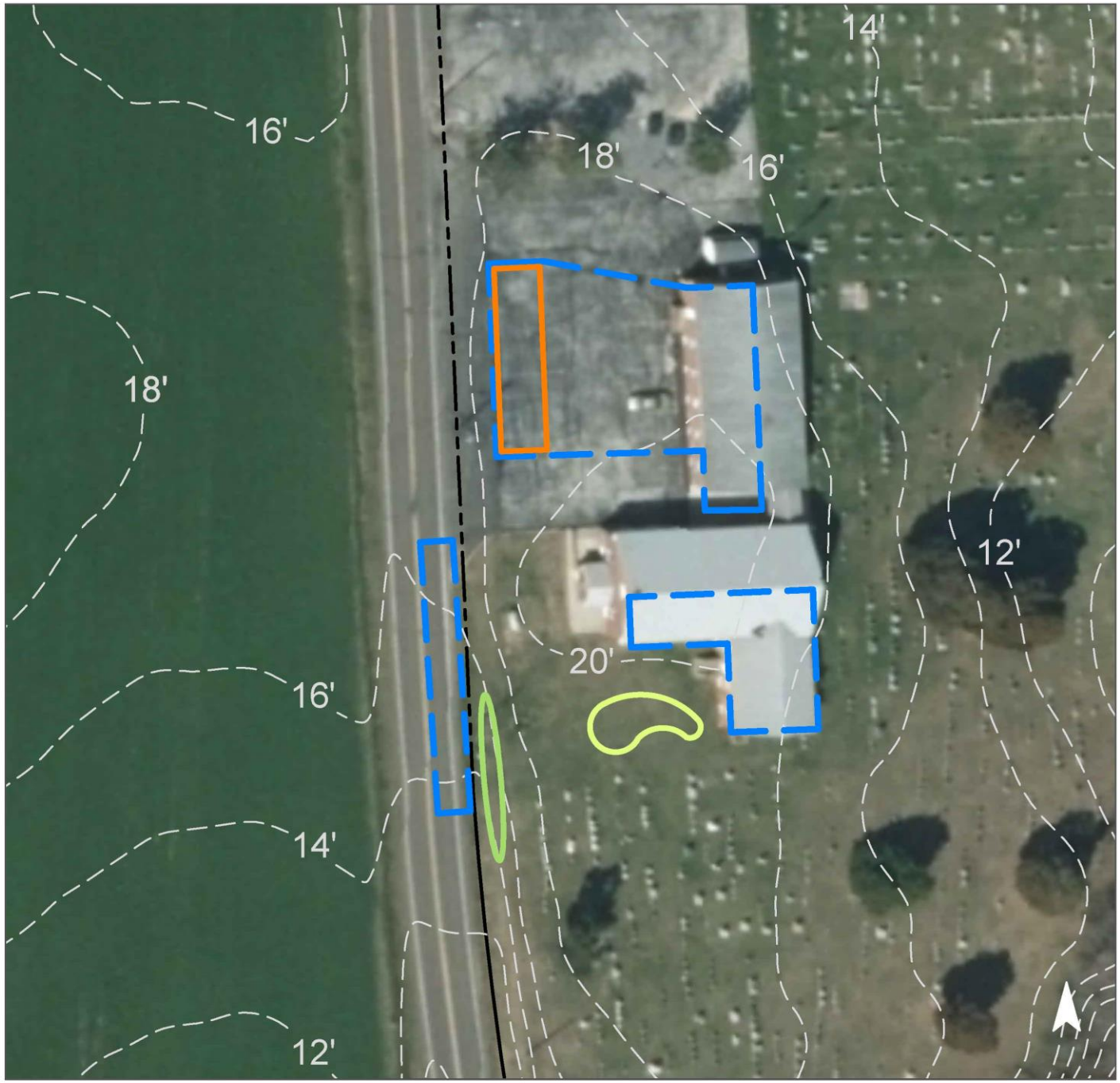
Block and Lot: Block 40, Lot 10

A section of parking spaces can be converted to pervious pavement to allow the stormwater from the roof and other impervious cover to infiltrate into the ground. The strip of turfgrass in the southwest area along Smick Road can be converted into a bioswale to allow stormwater to infiltrate and remove pollutants from the road. A rain garden can be installed to capture, treat, and infiltrate stormwater runoff from the roof. 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"
14	55,395	2.7	28.0	254.3	0.043	1.52

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	0.069	12	5,050	0.19	660	$3,300
Bioswale	0.035	6	345	0.11	340	$1,700
Pervious pavement	0.190	32	13,920	0.52	1,300	$32,500

GREEN INFRASTRUCTURE RECOMMENDATIONS



Canton Baptist Church

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

0 30' 60'

LOWER ALLOWAYS CREEK RESCUE

Subwatershed: Canton Drain

Site Area: 195,454 sq. ft.

Address: 773 Smick Road
Salem, NJ 08079

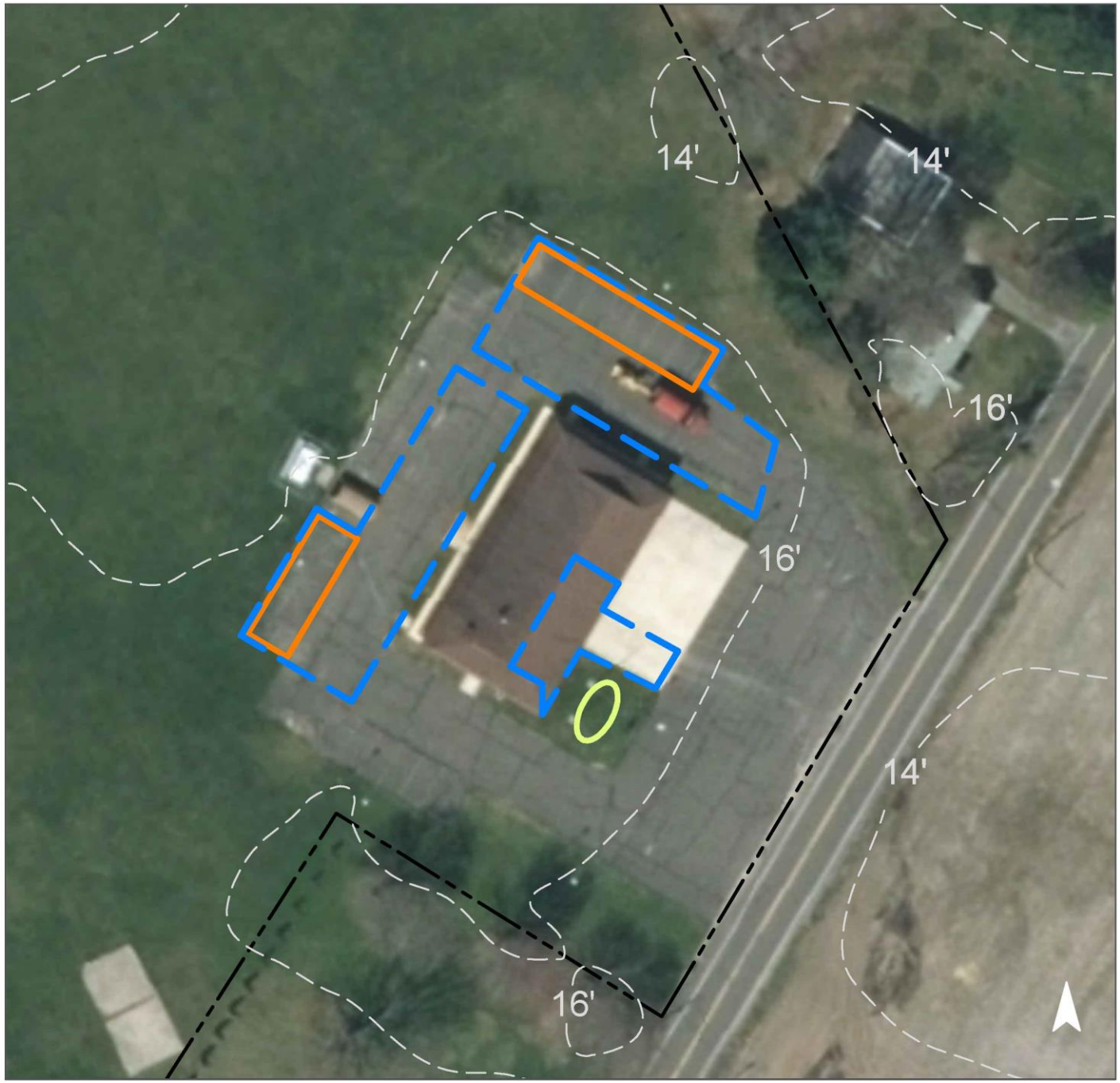
Block and Lot: Block 39, Lot 22.01

A bioretention system can be installed in the turfgrass area behind the sign and in front of the flag poles to allow stormwater runoff from the parking lot to infiltrate through the soil. Sections of the parking spaces can be converted to pervious pavement to allow water from the pavement 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"
22	43,172	2.1	21.8	198.2	0.034	1.18

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	0.042	7	3,120	0.12	410	$2,050
Pervious pavement	0.285	48	20,910	0.79	2,430	$60,750

GREEN INFRASTRUCTURE RECOMMENDATIONS



Lower Alloways Creek Rescue

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

0 30' 60'

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)
	ALLOWAY CREEK SUBWATERSHED	**39.98**	**1,741,722**			**99**	**4.57**	**198,937**	**9.59**	**100**	**913**	**20,722.57**	**729,435**	**0.16**	**5.46**
1	**427 Salem Hancocks Bridge Road**														
	Total Site Info	0.17	7,352	n/a	n/a	6	0.01	476	0.0	0.2	2.2	50	1,747	0.000	0.01
2	**Hancock's Bridge United Methodist Church**														
	Total Site Info	0.73	31,697	16	11	26	0.19	8,091	0.4	4.1	37.1	843	29,665	0.006	0.22
3	**Hancock House Historic Site**														
	Total Site Info	1.50	65,244	12	1	14	0.20	8,817	0.4	4.5	40.5	918	32,330	0.007	0.24
4	**Hancock House Office**														
	Total Site Info	0.21	8,997	13	1	30	0.06	2,699	0.1	1.4	12.4	281	9,897	0.002	0.07
5	**Lower Alloways Creek Municipal Building**														
	Total Site Info	16.83	733,293	16	1	20	3.35	145,874	7.0	73.7	669.8	15,195	534,870	0.114	4.00
6	**Lower Alloways Creek Post Office**														
	Total Site Info	20.55	895,139	20	2 & 2.01	4	0.76	32,980	1.6	16.7	151.4	3,435	120,926	0.026	0.90
	CANTON DRAIN SUBWATERSHED	**14.62**	**636,686**				**2.34**	**101,844**	**4.9**	**51.4**	**467.6**	**10,609**	**373,427**	**0.079**	**2.79**
7	**2 Silver Lake Road**														
	Total Site Info	0.40	17,521	n/a	n/a	7	0.03	1,185	0.1	0.6	5.4	123	4,346	0.001	0.03
8	**848 County Road 623**														
	Total Site Info	0.41	17,897	n/a	n/a	12	0.05	2,091	0.1	1.1	9.6	218	7,668	0.002	0.06
9	**Canton Baptist Church**														
	Total Site Info	9.32	405,814	40	10	14	1.27	55,395	2.7	28.0	254.3	5,770	203,117	0.043	1.52
10	**Lower Alloways Creek Rescue**														
	Total Site Info	4.49	195,454	39	22.01	22	0.99	43,172	2.1	21.8	198.2	4,497	158,296	0.034	1.18

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 %
	ALLOWAY CREEK SUBWATERSHED	**38,965**	**0.89**	**1.02**	**169.96**	**73,360.00**	**2.80**	**0.00**			**$168,125**	**19.59%**
1	**427 Salem Hancocks Bridge Road**											
	Bioretention system	5,200	0.12	0.135	23	9,940	0.37	1,300	$5	SF	$6,500	1091.7%
	Total Site Info	**5,200**	**0.12**	**0.135**	**23**	**9,940**	**0.37**				**$6,500**	**1091.7%**
2	**Hancock's Bridge United Methodist Church**											
	Bioretention system	2,150	0.05	0.056	9	4,110	0.15	540	$5	SF	$2,700	26.6%
	Total Site Info	**2,150**	**0.05**	**0.056**	**9**	**4,110**	**0.15**				**$2,700**	**26.6%**
3	**Hancock House Historic Site**											
	Bioretention system	1,740	0.04	0.045	8	3,330	0.13	435	$5	SF	$2,175	19.7%
	Total Site Info	**1,740**	**0.04**	**0.045**	**8**	**3,330**	**0.13**				**$2,175**	**19.7%**
4	**Hancock House Office**											
	Bioretention systems	1,340	0.03	0.035	6	2,560	0.10	340	$5	SF	$1,700	49.6%
	Total Site Info	**1,340**	**0.03**	**0.035**	**6**	**2,560**	**0.10**				**$1,700**	**49.6%**
5	**Lower Alloways Creek Municipal Building**											
	Bioretention system	1,715	0.04	0.045	7	3,280	0.12	430	$5	SF	$2,150	1.2%
	Pervious pavement	21,580	0.50	0.562	94	41,260	1.55	5,020	$25	SF	$125,500	14.8%
	Total Site Info	**23,295**	**0.53**	**0.607**	**102**	**44,540**	**1.67**				**$127,650**	**16.0%**
6	**Lower Alloways Creek Post Office**											
	Bioretention systems	2,320	0.05	0.060	10	4,440	0.17	580	$5	SF	$2,900	7.0%
	Pervious pavement	2,920	0.07	0.076	13	4,440	0.21	980	$25	SF	$24,500	8.9%
	Total Site Info	**5,240**	**0.12**	**0.137**	**23**	**8,880**	**0.38**				**$27,400**	**15.9%**
	CANTON DRAIN SUBWATERSHED	**30,330**	**0.70**	**0.790**	**132**	**55,735**	**2.20**	**0**			**$108,400**	**29.78%**
7	**2 Silver Lake Road**											
	Bioretention system	3,480	0.08	0.091	15	6,650	0.25	870	$5	SF	$4,350	293.6%
	Total Site Info	**3,480**	**0.08**	**0.091**	**15**	**6,650**	**0.25**				**$4,350**	**293.6%**
8	**848 County Road 623**											
	Bioretention system	3,000	0.07	0.078	13	5,740	0.22	750	$5	SF	$3,750	143.4%
	Total Site Info	**3,000**	**0.07**	**0.078**	**13**	**5,740**	**0.22**				**$3,750**	**143.4%**

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 %
9	**Canton Baptist Church**											
	Bioretention system	2,640	0.06	0.069	12	5,050	0.19	660	$5	SF	$3,300	4.8%
	Bioswale	1,360	0.03	0.035	6	345	0.11	340	$5	SF	$1,700	2.5%
	Pervious pavement	7,280	0.17	0.190	32	13,920	0.52	1,300	$25	SF	$32,500	13.1%
	Total Site Info	**11,280**	**0.26**	**0.294**	**49**	**19,315**	**0.82**				**$37,500**	**20.4%**
10	**Lower Alloways Creek Rescue**											
	Bioretention system	1,630	0.04	0.042	7	3,120	0.12	410	$5	SF	$2,050	3.8%
	Pervious pavement	10,940	0.25	0.285	48	20,910	0.79	2,430	$25	SF	$60,750	25.3%
	Total Site Info	**12,570**	**0.29**	**0.328**	**55**	**24,030**	**0.91**				**$62,800**	**29.1%**