RUTGERS
New Jersey Agricultural
Experiment Station

Draft

Impervious Cover Reduction Action Plan
for
Colts Neck Township, Monmouth County, New Jersey

Prepared for Colts Neck Township by the
Rutgers Cooperative Extension Water Resources Program

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Sea Grant
NJ Sea Grant Consortium

ACKNOWLEDGEMENTS:

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Introduction

Located in Monmouth County, New Jersey, Colts Neck Township covers approximately 31.79 square miles. Figures 1 and 2 illustrate that Colts Neck Township is dominated by urban land use. A total of 38.5% of the municipality's land use is classified as urban. Of the urban land in Colts Neck Township, rural residential is the dominant land use (Figure 3).

The New Jersey Department of Environmental Protection's (NJDEP) 2015 land use/land cover geographical information system (GIS) data layer categorizes Colts Neck 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 Colts Neck Township. Based upon the 2015 NJDEP land use/land cover data, approximately 10.4% of Colts Neck Township has impervious cover. This level of impervious cover suggests that the streams in Colts Neck Township likely range from sensitive to impacted streams. [1]

Methodology

Colts Neck Township contains portions of 10 subwatersheds (Figure 4). For this impervious cover reduction action plan, projects have been identified in three 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] Schuler, T.R., L. Fraley-McNeal, and K. Cappiella. 2009. Is Impervious Cover Still Important? Review of Recent Research. *Journal of Hydrologic Engineering* 14 (4): 309-315.

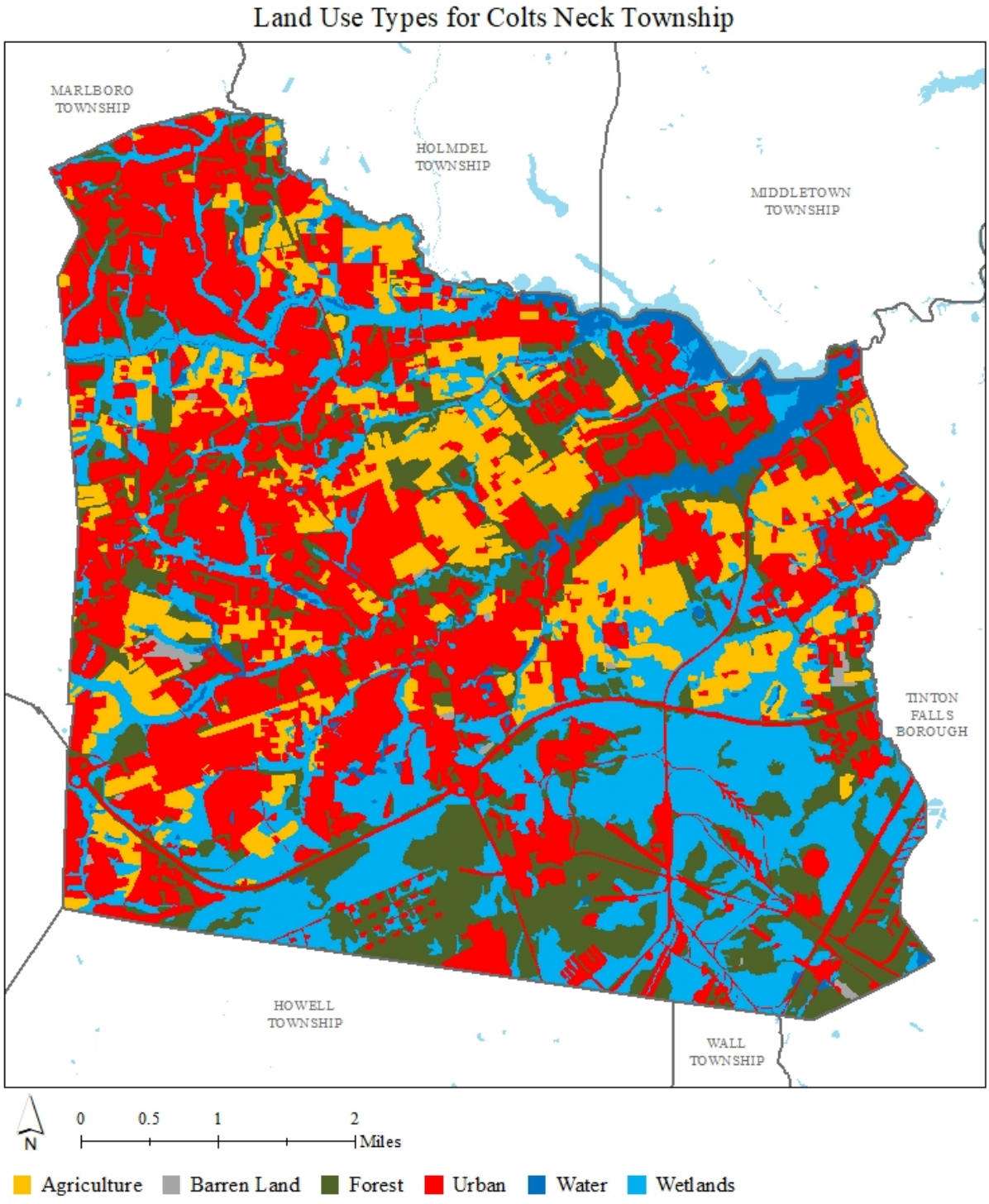


Figure 1: Map illustrating the land use in Colts Neck Township

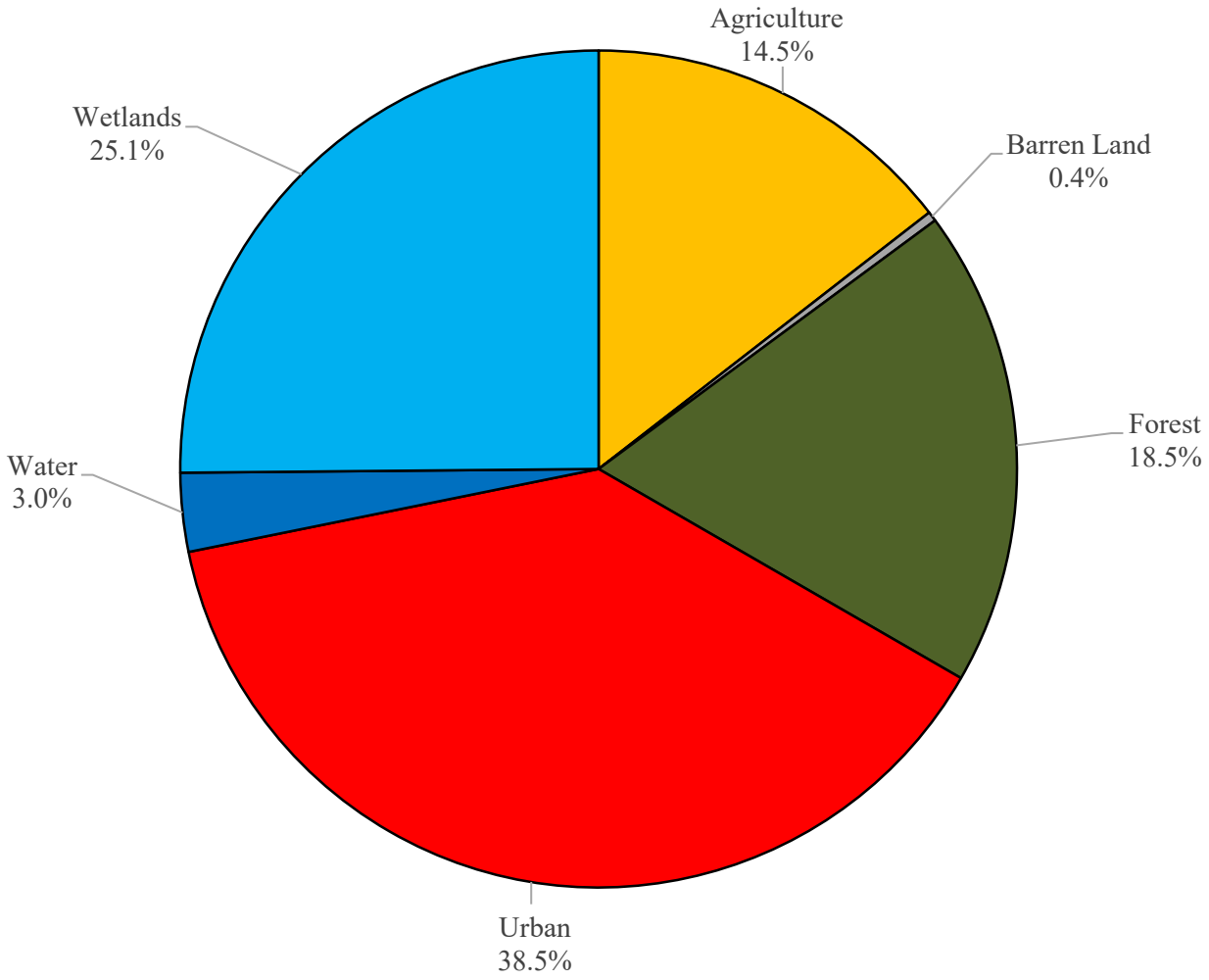


Figure 2: Pie chart illustrating the land use in Colts Neck Township

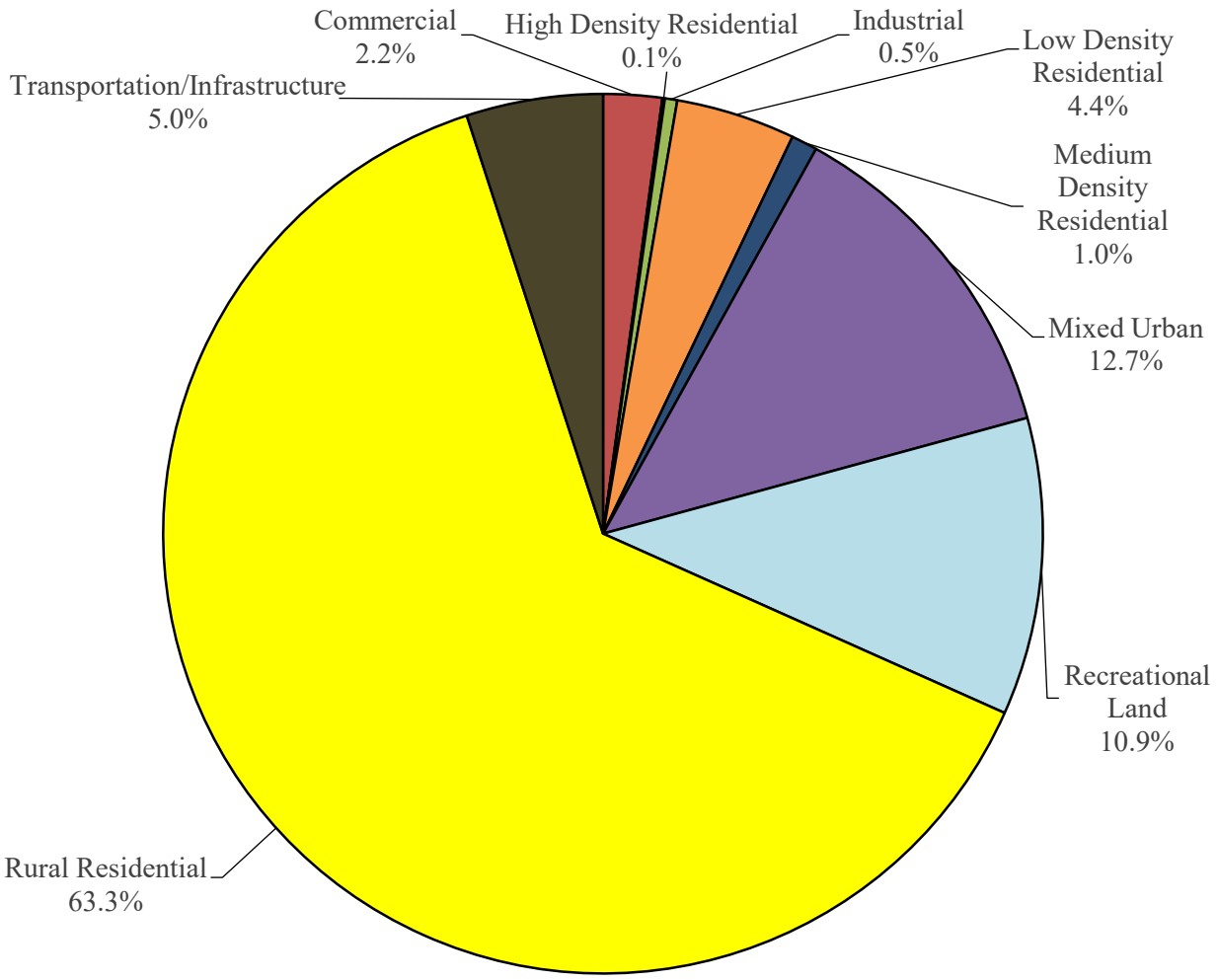


Figure 3: Pie chart illustrating the various types of urban land use in Colts Neck Township

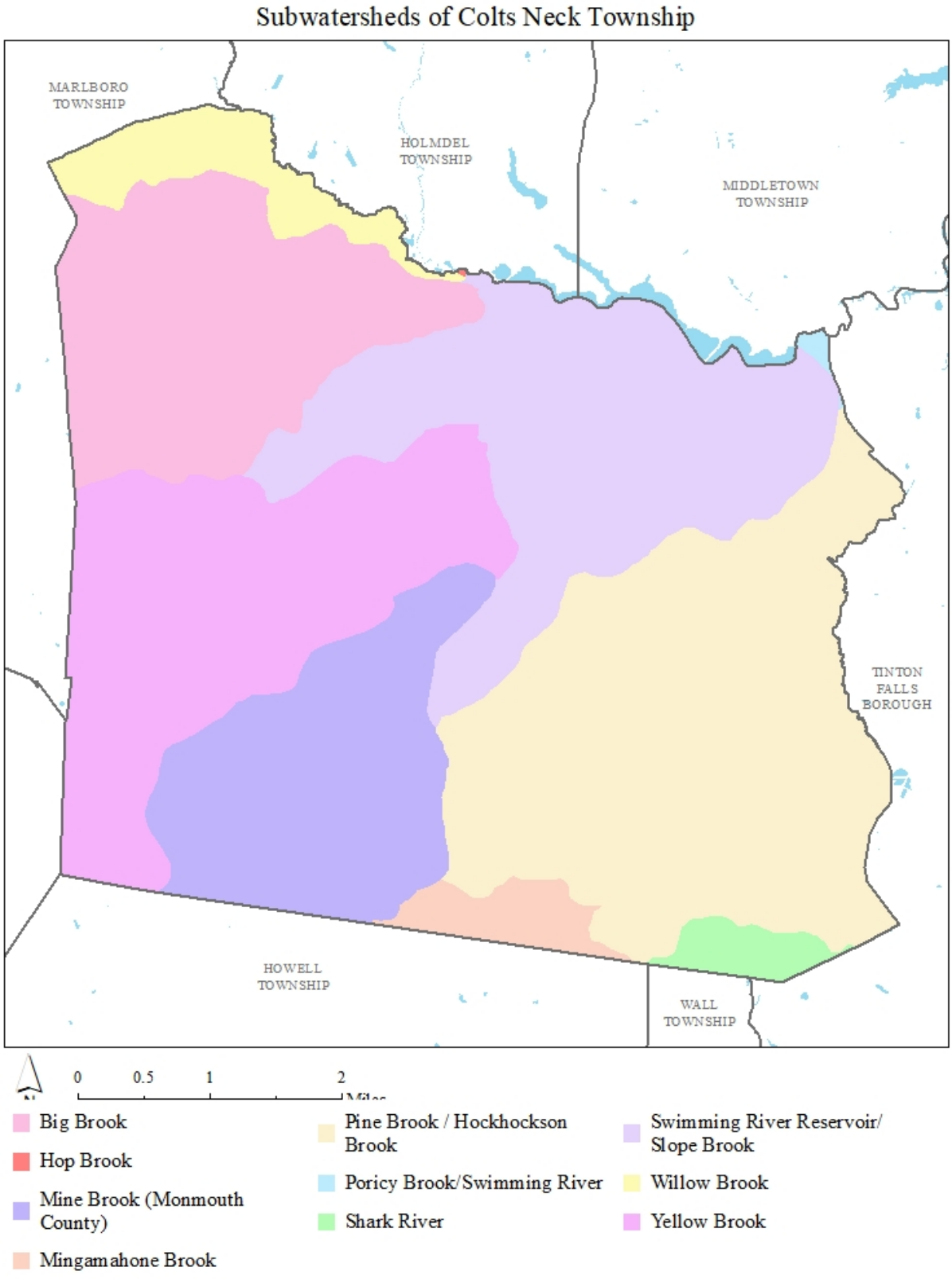


Figure 4: Map of the subwatersheds in Colts Neck Township

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 2015 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 Colts Neck 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 principle, 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 Colts Neck 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.

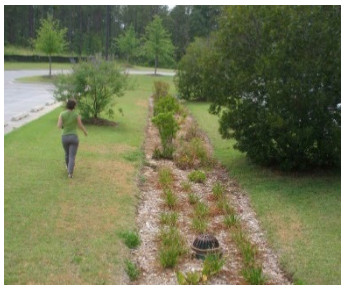
Downspout planter boxes

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

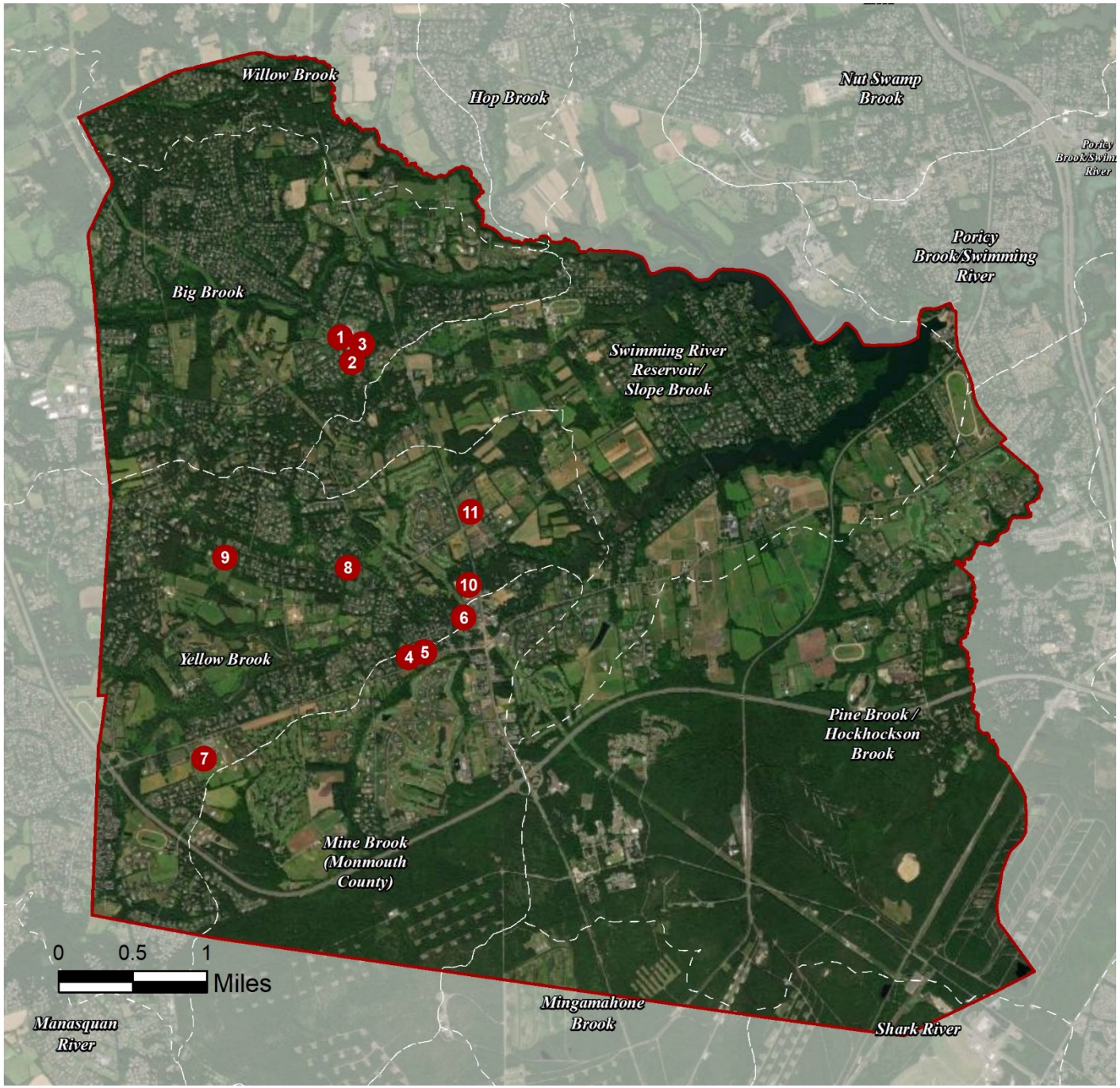
This impervious cover reduction action plan is meant to provide the municipality with a blueprint for implementing green infrastructure practices that will reduce the impact of stormwater runoff from impervious surfaces. These projects can be implemented by a wide variety of people such as boy scouts,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

COLTS NECK: GREEN INFRASTRUCTURE SITES



SITES WITHIN THE BIG BROOK SUBWATERSHED

1. Colts Neck Board of Education & Conover Road Elementary School
2. Colts Neck Fire Company
3. Conover Road Primary School

SITES WITHIN THE MINE BROOK (MONMOUTH COUNTY) SUBWATERSHED

4. Colts Neck Fire Company Number 1
5. Colts Neck Reformed Church

SITES WITHIN THE YELLOW BROOK (ABOVE BUCKS MILL) SUBWATERSHED

6. Colts Neck Community Church
7. Colts Neck High School
8. Colts Neck Municipal Complex
9. Cedar Drive Middle School
10. Colts Neck Shopping Center
11. The Parish of Saint Mary

b. Proposed Green Infrastructure Concepts

COLTS NECK BOARD OF EDUCATION & CONOVER ROAD ELEMENTARY SCHOOL

Subwatershed: Big Brook

Site Area: 1,246,169 sq. ft.

Address: 70 Conover Road
Colts Neck, NJ 07722

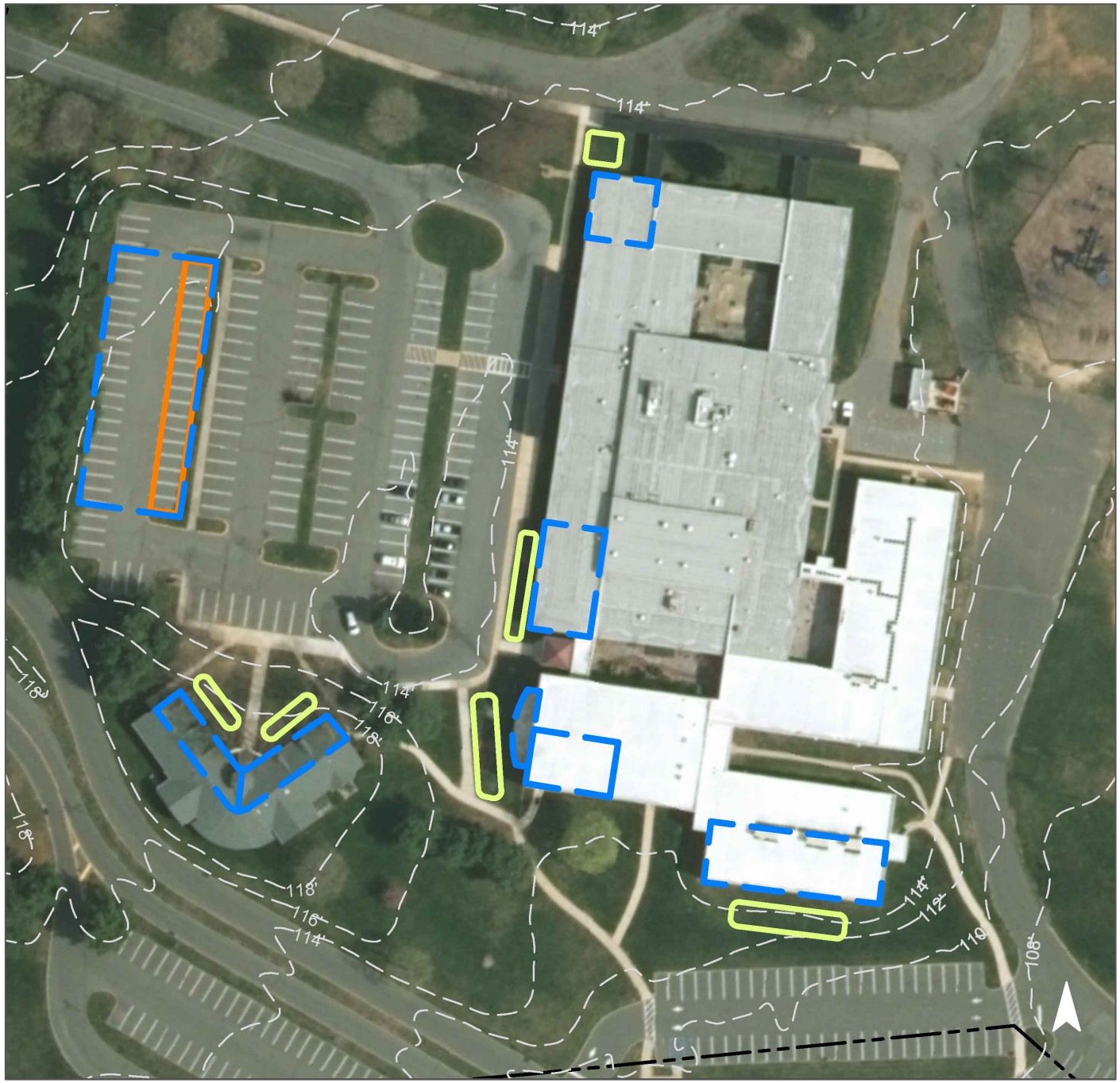
Block and Lot: Block 8, Lot 2.03

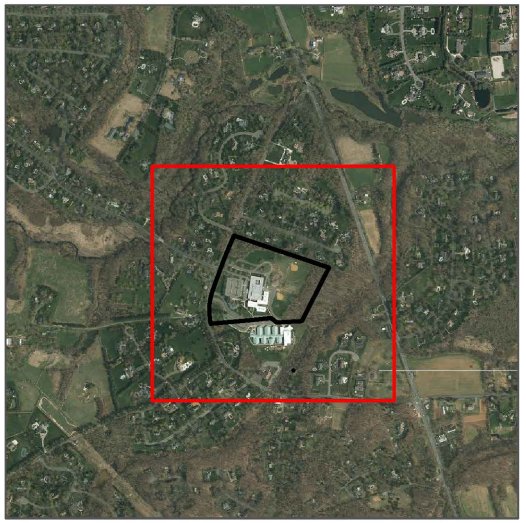
Rain gardens can be installed in the turfgrass areas near rooftops at multiple locations near the buildings to capture, treat, and infiltrate stormwater runoff from the roof. A section of parking spaces can be installed to capture, treat, and infiltrate runoff from the parking lot. A preliminary soil 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"
29	357,057	17.2	180.3	1,639.4	0.278	9.79

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	0.898	150	65,870	2.48	8,615	$43,075
Pervious pavement	0.296	50	21,700	0.82	2,970	$74,250

GREEN INFRASTRUCTURE RECOMMENDATIONS





Colts Neck Board of Education & Conover Road Elementary School

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

0 25' 50'

COLTS NECK FIRE COMPANY

Subwatershed: Big Brook

Site Area: 162,585 sq. ft.

Address: 50 Conover Road
Colts Neck, NJ 07722

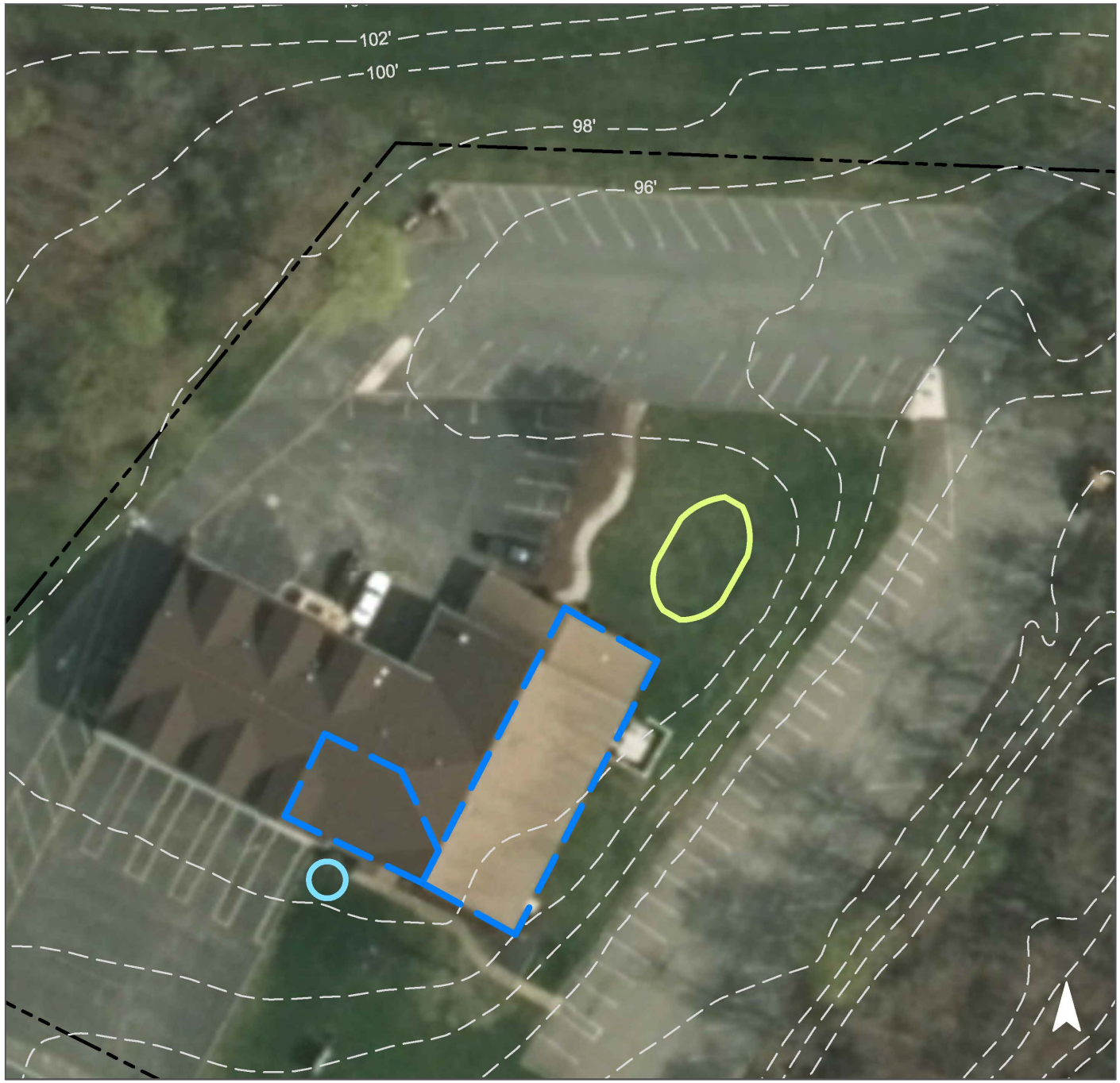
Block and Lot: Block 8, Lot 10

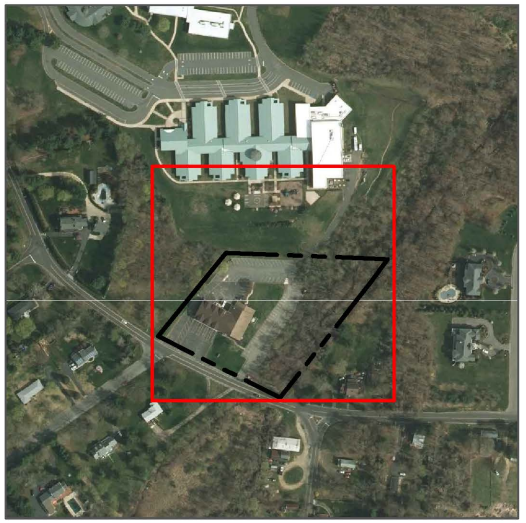
A rain garden can be installed in the turfgrass area near the entrance of the building to capture, treat, and infiltrate stormwater runoff from the roof. A cistern can be installed on the south side of the building to capture rooftop runoff to be reused for washing vehicles, watering plants, or other non-potable purposes. 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	59,235	2.9	29.9	272.0	0.046	1.62

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	0.092	15	6,770	0.25	885	$4,425
Rainwater harvesting	0.033	6	1,000	0.99	1,000 (gal)	$2,000

GREEN INFRASTRUCTURE RECOMMENDATIONS





Colts Neck Fire Company

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

0 50' 100'

CONOVER ROAD PRIMARY SCHOOL

Subwatershed: Big Brook

Site Area: 966,506 sq. ft.

Address: 56 Conover Road
Colts Neck, NJ 07722

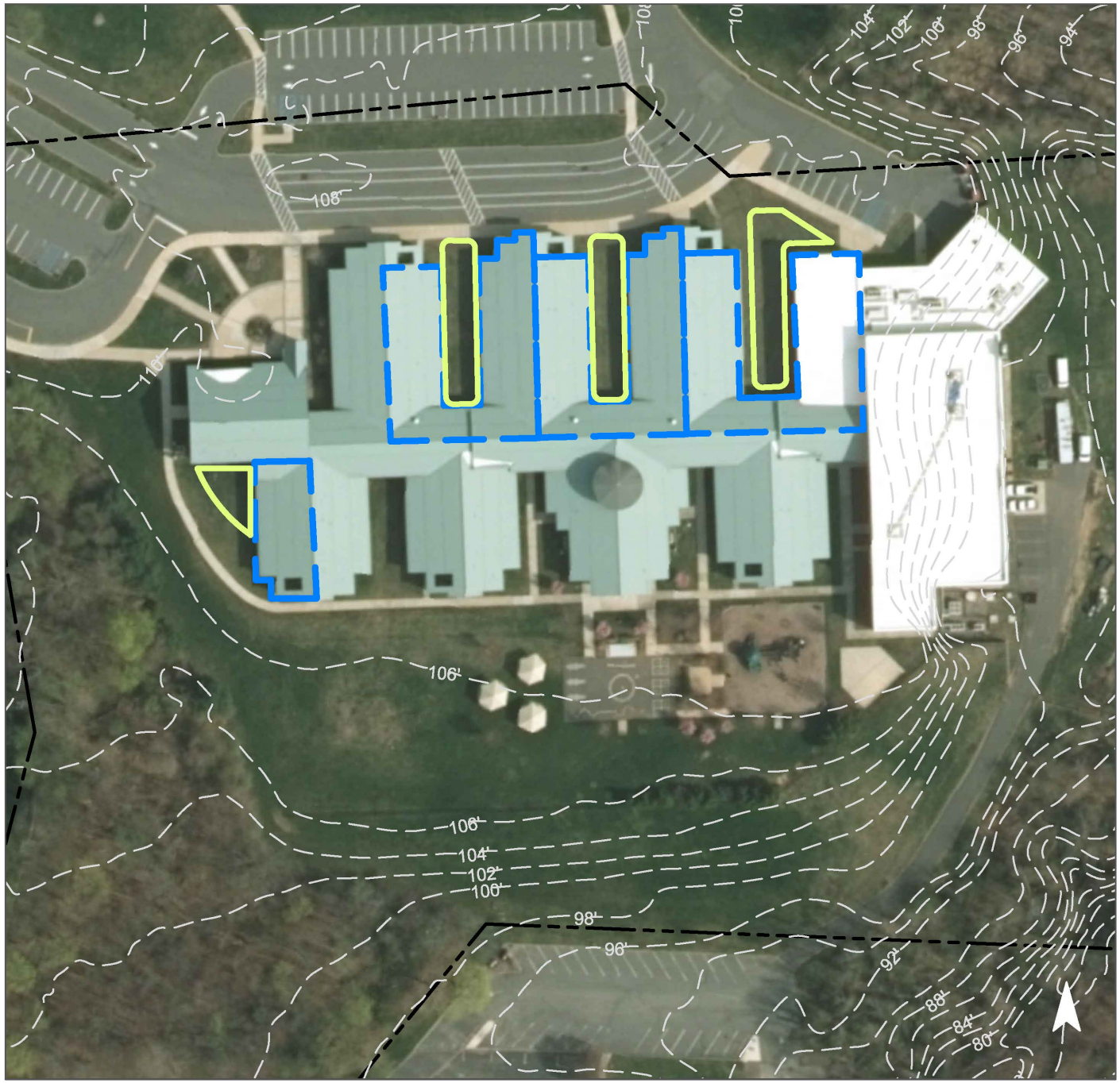
Block and Lot: Block 8, Lot 2.02

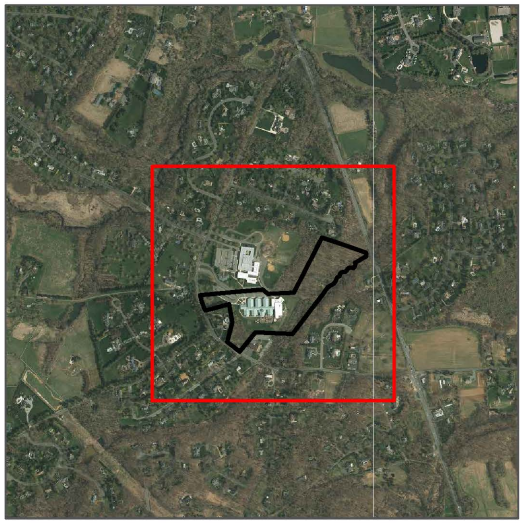
Rain gardens can be installed in the turfgrass areas in between the corridors of the building to capture, treat, and infiltrate stormwater runoff from the roof. Another rain garden can be installed on the west side of the school to collect the runoff from the roof and used as a learning lab on native plant biodiversity. 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"
21	205,420	9.9	103.7	943.2	0.160	5.63

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	0.816	137	59,850	2.25	7,825	$39,125

GREEN INFRASTRUCTURE RECOMMENDATIONS





Conover Road Primary School

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

0 50' 100'

COLTS NECK FIRE COMPANY NUMBER 1

Subwatershed: Mine Brook

Site Area: 495,220 sq. ft.

Address: 123 County Road 537
Colts Neck, NJ 07722

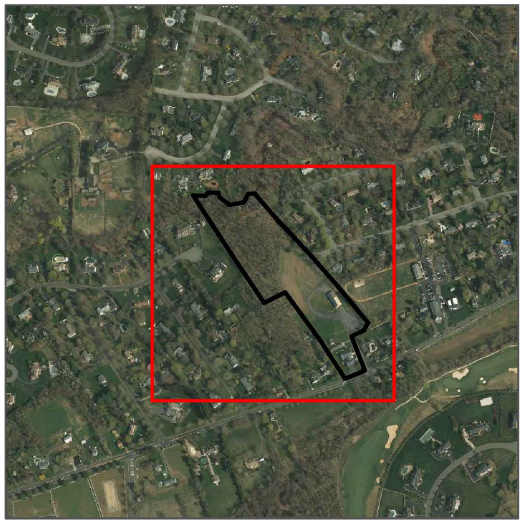
Block and Lot: Block 29.1, Lot 10

Rain gardens can be installed in the turfgrass area near the entrance of the building and near the parking lot to capture, treat, and infiltrate stormwater runoff from the roof and parking lot, respectively. Cisterns can be installed at the garage and main building to collect the runoff from the roof, which can be reused for washing vehicles or watering plants. 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	66,947	3.2	33.8	307.4	0.052	1.84

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	0.092	15	6,770	0.25	885	$4,425
Rainwater harvesting	0.033	6	1,000	0.99	1,000 (gal)	$2,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Colts Neck Fire Company Number 1

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

0 50' 100'

COLTS NECK REFORMED CHURCH

Subwatershed: Mine Brook

Site Area: 226,037 sq. ft.

Address: 139 County Road 537
Colts Neck, NJ 07722

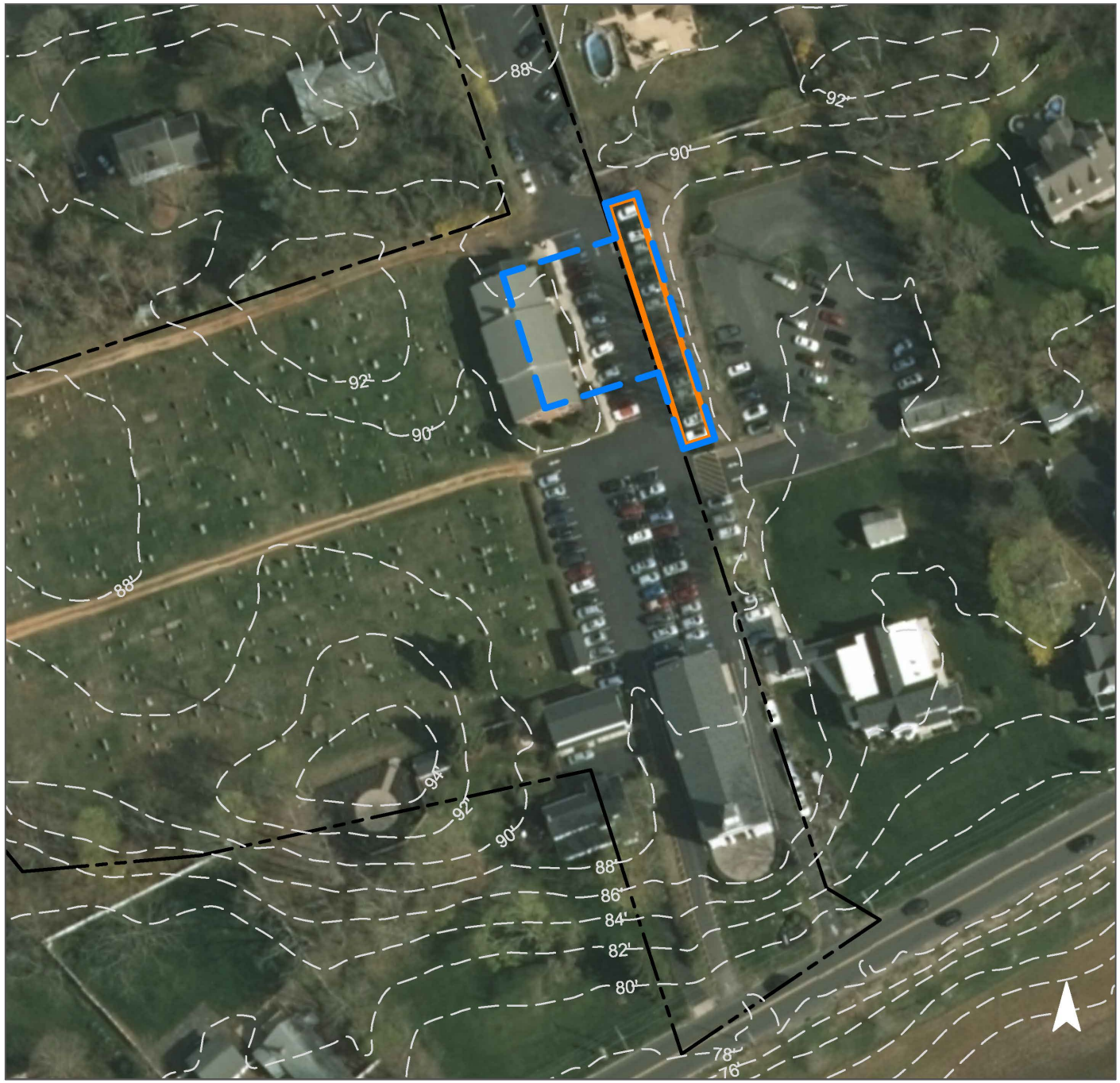
Block and Lot: Block 29.13, Lot 6

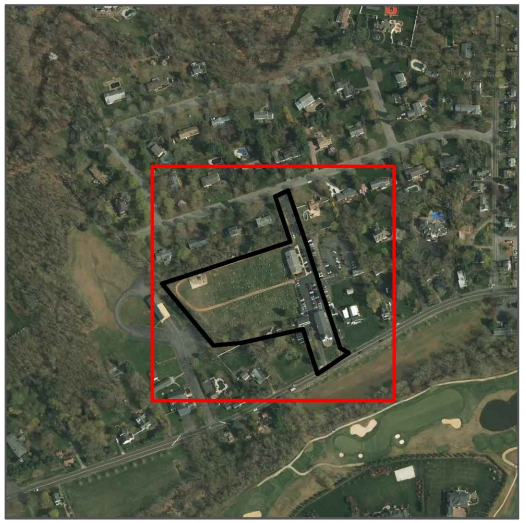
Pervious pavement can be installed to support vehicle traffic and also allow water to infiltrate through the surface in the parking spots located in front of the church. Pervious pavement installations have an underlying stone layer to store stormwater runoff and allow it to slowly infiltrate into the 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"
30	68,591	3.3	34.6	314.9	0.053	1.88

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
Pervious pavement	0.285	48	20,940	0.79	2,970	$74,250

GREEN INFRASTRUCTURE RECOMMENDATIONS





Colts Neck Reformed Church

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

0 50' 100'

COLTS NECK COMMUNITY CHURCH

Subwatershed: Yellow Brook

Site Area: 286,344 sq. ft.

Address: 25 Merchants Way
Colts Neck, NJ 07722

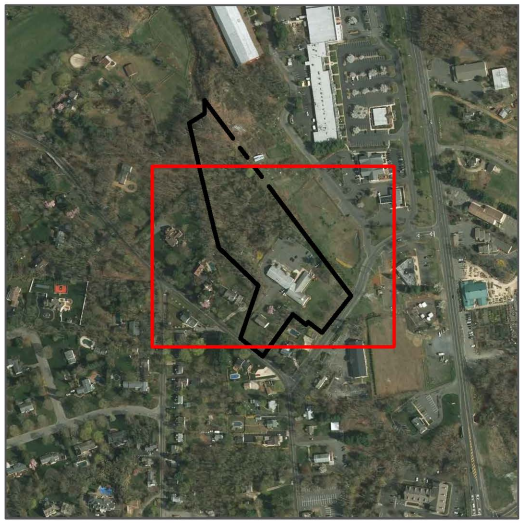
Block and Lot: Block 31, Lot 10.1

A rain garden can be installed in the turfgrass area near the entrance of the building 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"
19	54,367	2.6	27.5	249.6	0.042	1.49

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	0.074	12	5,430	0.20	710	$3,550

GREEN INFRASTRUCTURE RECOMMENDATIONS



Colts Neck Community Church

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

0 50' 100'

COLTS NECK HIGH SCHOOL

Subwatershed: Yellow Brook

Site Area: 3,192,116 sq. ft.

Address: 59 Five Points Road
Colts Neck, NJ 07722

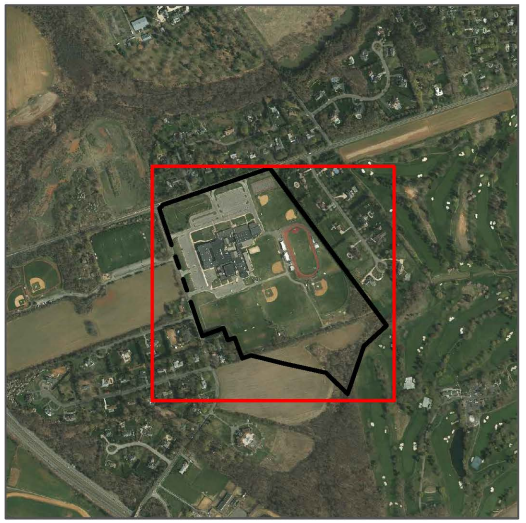
Block and Lot: Block 43, Lot 1

Rain gardens, two on the north side and one on the west side of the school, can be installed to capture, treat, and infiltrate stormwater runoff from the roof. These rain gardens can be educational for the students and can provide an opportunity to learn about native plant systems and stormwater management. A section of parking spaces can be converted to porous pavement to capture and infiltrate parking lot runoff. 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	835,494	40.3	422.0	3,836.1	0.651	22.91

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	0.852	143	62,520	2.35	8,180	$40,900
Pervious pavement	0.473	79	34,690	1.30	3,240	$81,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Colts Neck High School

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

0 100' 200'

COLTS NECK MUNICIPAL COMPLEX

Subwatershed: Yellow Brook

Site Area: 2,321,280 sq. ft.

Address: 124 Cedar Drive
Colts Neck, NJ 07722

Block and Lot: Block 16, Lot 11

Multiple rain gardens can be installed throughout the Municipal Complex. Three rain gardens at the courthouse can capture, treat, and infiltrate runoff from the rooftop and parking lot. Rooftop drainage can be treated with a rain garden at the town hall and with three rain gardens at the library. 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"
11	260,813	12.6	131.7	1,197.5	0.203	7.15

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	0.114	19	8,380	0.31	1,105	$5,525

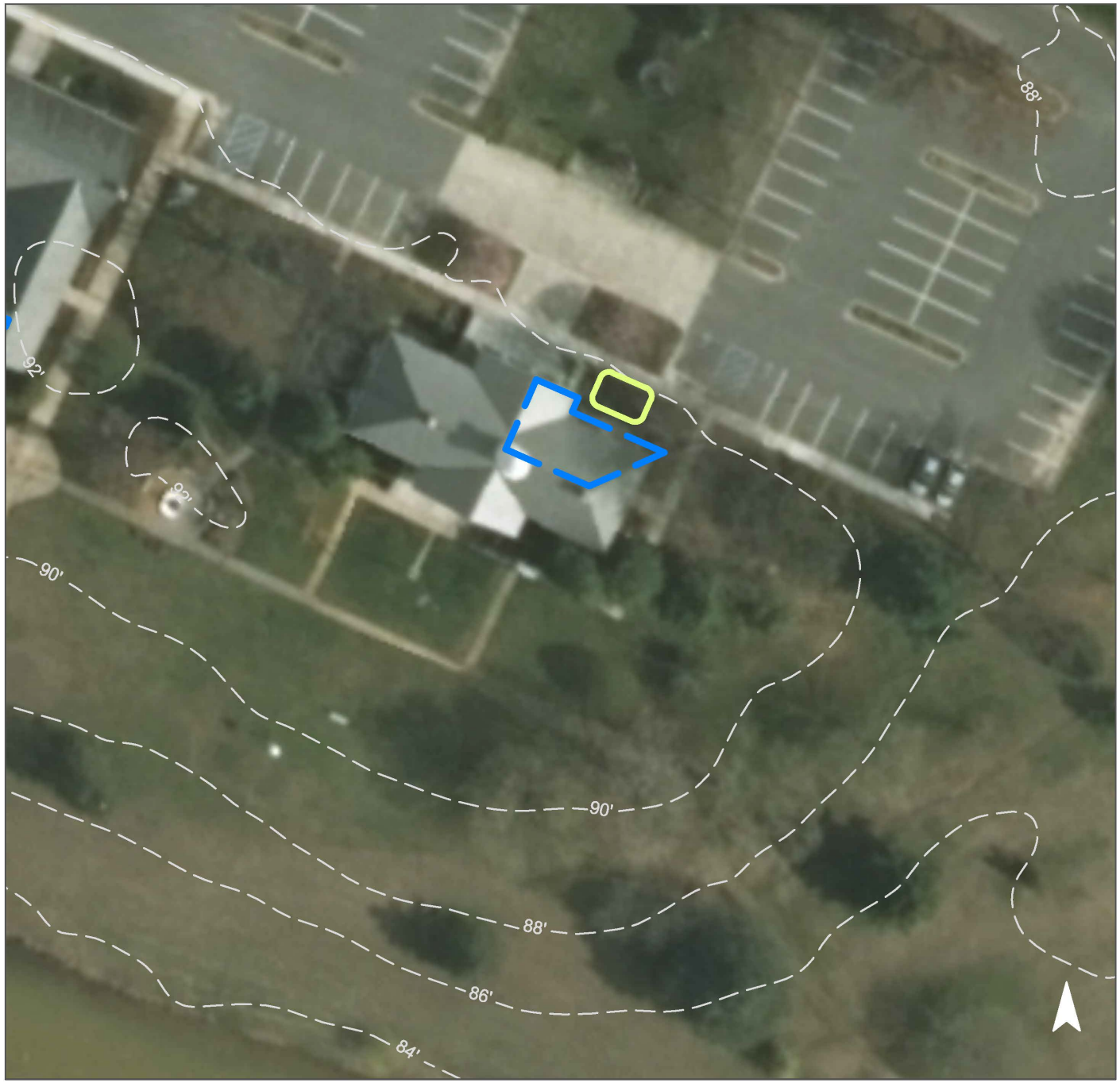
GREEN INFRASTRUCTURE RECOMMENDATIONS

Colts Neck Municipal Court

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

0 25' 50'

GREEN INFRASTRUCTURE RECOMMENDATIONS

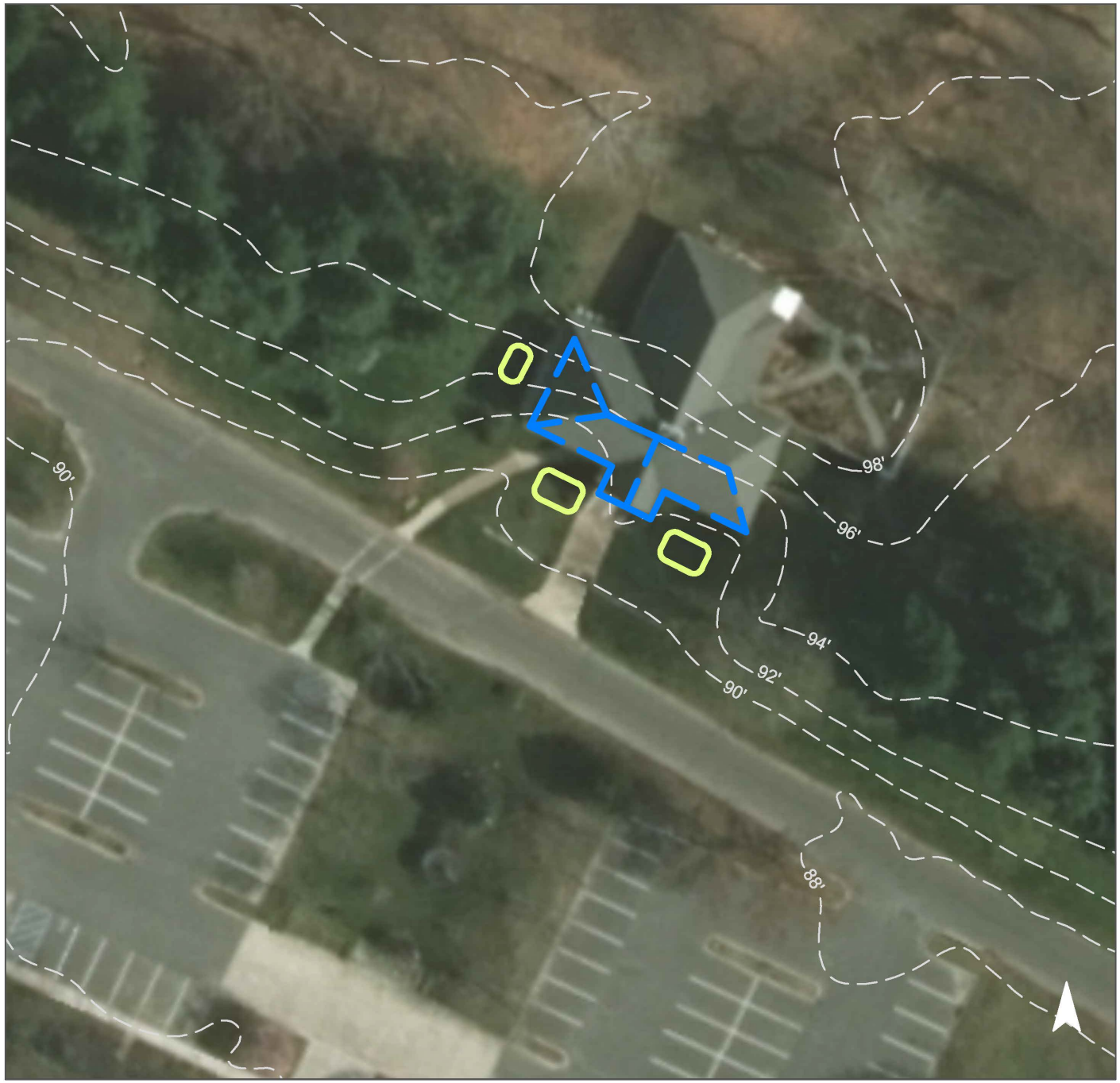


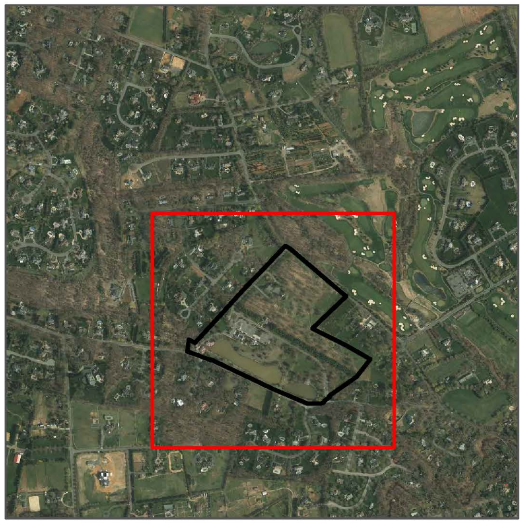
Colts Neck Town Hall

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

0 25' 50'

GREEN INFRASTRUCTURE RECOMMENDATIONS





Colts Neck Library

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

0 25' 50'

CEDAR DRIVE MIDDLE SCHOOL

Subwatershed: Yellow Brook

Site Area: 836,915 sq. ft.

Address: 73 Cedar Drive
Colts Neck, NJ 07722

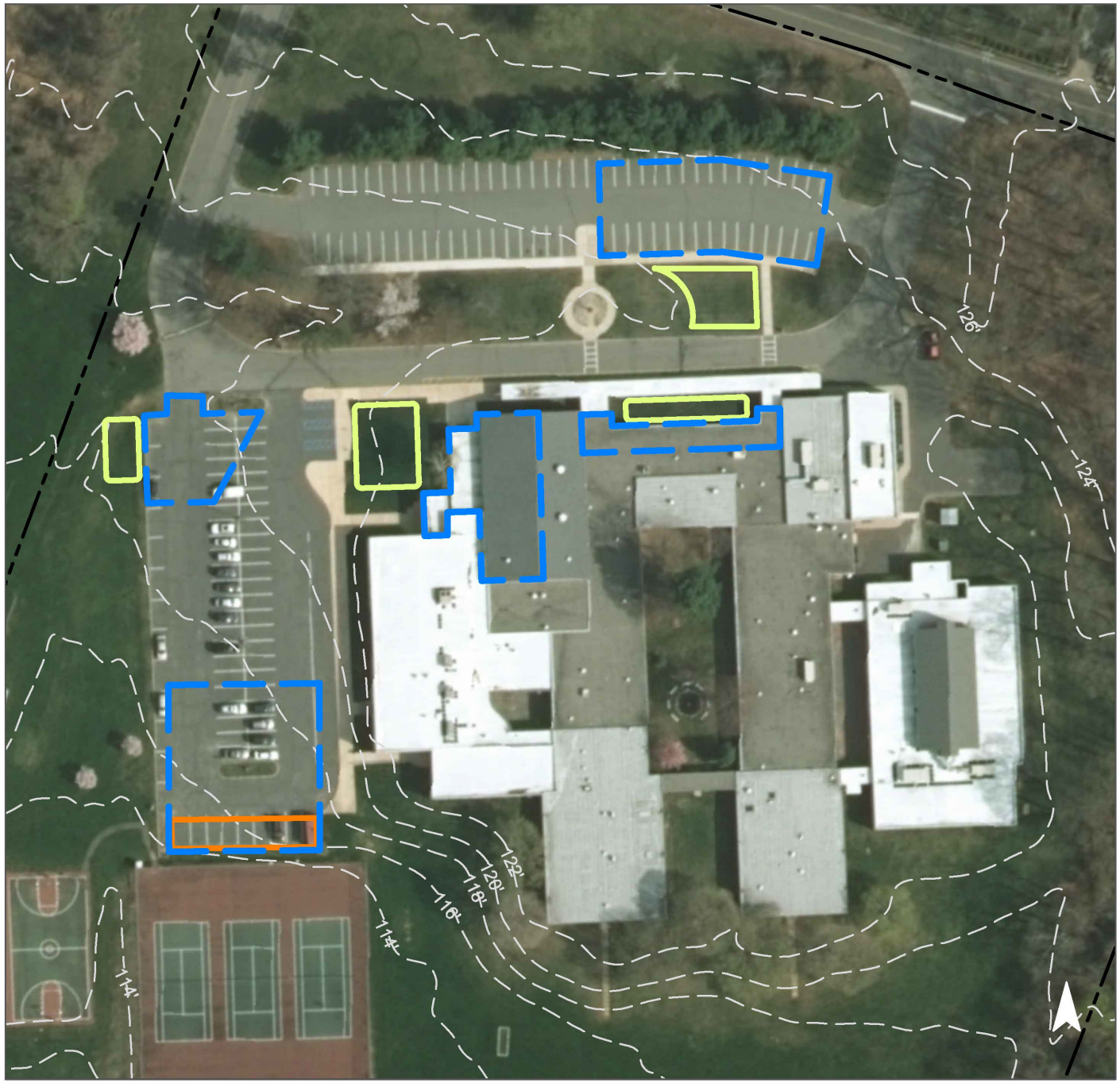
Block and Lot: Block 19, Lot 18

Multiple rain gardens can be installed throughout the school grounds such as in the parking islands to collect stormwater from the parking lot or near the building to capture, treat, and infiltrate runoff from the rooftop. A section of parking spaces can be converted to porous pavement to capture and infiltrate parking lot runoff. 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	230,602	11.1	116.5	1,058.8	0.180	6.32

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	0.502	84	36,800	1.38	4,815	$24,075
Pervious pavement	0.263	44	19,270	0.72	1,800	$45,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Cedar Drive Middle School

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

0 50' 100'

COLTS NECK SHOPPING CENTER

Subwatershed: Yellow Brook

Site Area: 777,880 sq. ft.

Address: 430 NJ-34
Colts Neck, NJ 07722

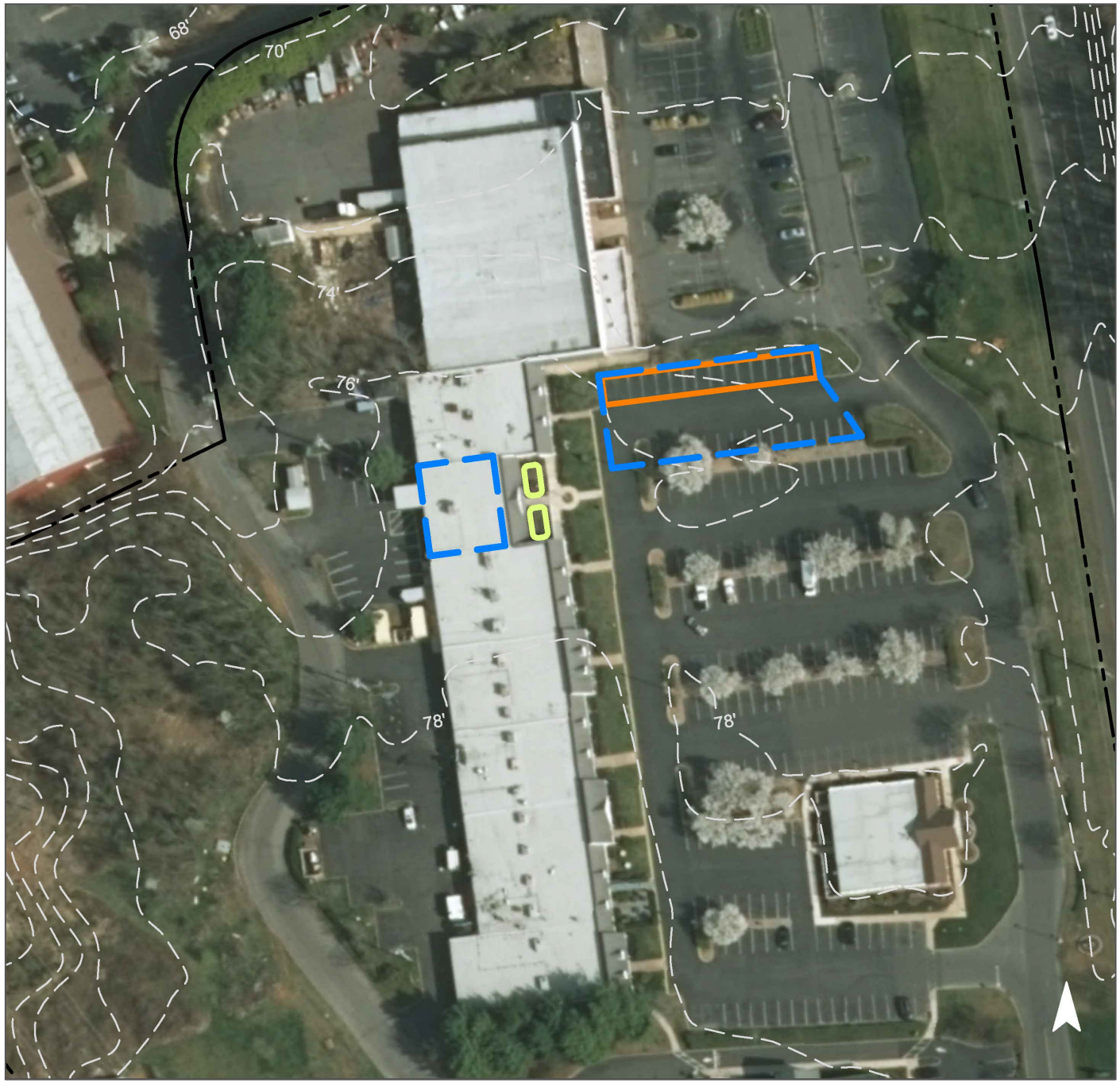
Block and Lot: Block 31, Lot 7

Two rain gardens can be installed in the turfgrass area near the entrance of the building to capture, treat, and infiltrate stormwater runoff from the roof. Parking spaces can be converted to porous pavement to capture and infiltrate runoff from the surrounding parking lot area. 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"
44	339,514	16.4	171.5	1,558.8	0.265	9.31

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	0.078	13	5,740	0.22	750	$3,750
Pervious pavement	0.246	41	18,060	0.68	2,530	$63,250

GREEN INFRASTRUCTURE RECOMMENDATIONS



Colts Neck Shopping Center

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

0 50' 100'

THE PARISH OF SAINT MARY

Subwatershed: Yellow Brook

Site Area: 1,095,021 sq. ft.

Address: 1 Phalanx Road
Colts Neck, NJ 07722

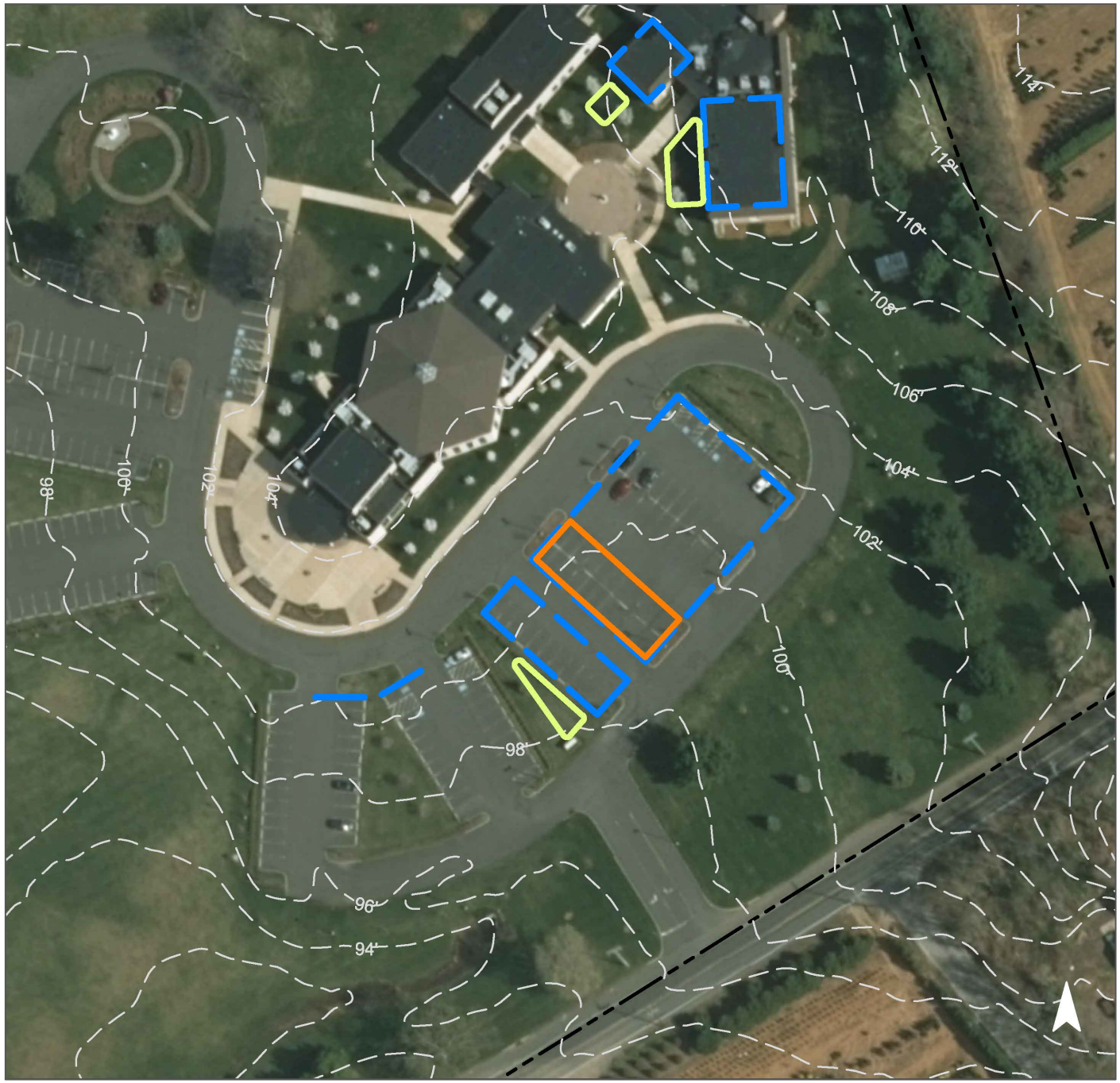
Block and Lot: Block 19, Lot 18

A rain garden can be installed in the turfgrass area near the entrance of the building to capture, treat, and infiltrate stormwater runoff from the roof. Another rain garden location can be the parking islands to collect stormwater from the parking lot. A section of parking spaces can be converted to porous pavement to capture and infiltrate runoff from a large area of the parking lot. 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"
24	265,228	12.8	134.0	1,217.8	0.207	7.27

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
Bioretention system	0.206	34	15,100	0.57	1,975	$9,875
Pervious pavement	0.374	63	27,450	1.03	3,220	$80,500

GREEN INFRASTRUCTURE RECOMMENDATIONS



The Parish of Saint Mary

- bioretention system
- pervious pavement
- 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)
	BIG BROOK SUBWATERSHED	**54.53**	**2,375,259**				**14.27**	**621,712**	**30.0**	**314.0**	**2,854.5**	**64,762**	**2,279,611**	**0.484**	**17.05**
1	**Colts Neck Board of Education & Conover Road Elementary School** **Total Site Info**	28.61	1,246,169	8	10	29	8.20	357,057	17.2	180.3	1,639.4	37,193	1,309,209	0.278	9.79
2	**Colts Neck Fire Company** **Total Site Info**	3.73	162,585	8	10	36	1.36	59,235	2.9	29.9	272.0	6,170	217,196	0.046	1.62
3	**Conover Road Primary School** **Total Site Info**	22.19	966,506	8	2.03	21	4.72	205,420	9.9	103.7	943.2	21,398	753,206	0.160	5.63
	MINE BROOK (MONMOUTH COUNTY) SUBWATERSHED	**16.33**	**711,257**				**3.11**	**135,538**	**6.5**	**68.5**	**622.3**	**14,119**	**496,974**	**0.106**	**3.72**
4	**Colts Neck Fire Company Number 1** **Total Site Info**	11.14	485,220	29.1	10	14	1.54	66,947	3.2	33.8	307.4	6,974	245,474	0.052	1.84
5	**Colts Neck Reformed Church** **Total Site Info**	5.19	226,037	29.13	6	30	1.57	68,591	3.3	34.6	314.9	7,145	251,500	0.053	1.88
	YELLOW BROOK (ABOVE BUCKS MILL) SUBWATERSHED	**195.35**	**8,509,557**				**45.59**	**1,986,019**	**95.7**	**1003.0**	**9,118.5**	**206,877**	**7,282,069**	**1.547**	**54.47**
6	**Colts Neck Community Church** **Total Site Info**	6.57	286,344	31	10.1	19	1.25	54,367	2.6	27.5	249.6	5,663	199,347	0.042	1.49
7	**Colts Neck High School** **Total Site Info**	73.28	3,192,116	43	1	26	19.18	835,494	40.3	422.0	3,836.1	87,031	3,063,478	0.651	22.91
8	**Colts Neck Municipal Complex** **Total Site Info**	53.29	2,321,280	16	11	11	5.99	260,813	12.6	131.7	1,197.5	27,168	956,314	0.203	7.15
9	**Cedar Drive Middle School** **Total Site Info**	19.21	836,915	19	18	28	5.29	230,602	11.1	116.5	1,058.8	24,021	845,540	0.180	6.32
10	**Colts Neck Shopping Center** **Total Site Info**	17.86	777,880	31	7	44	7.79	339,514	16.4	171.5	1,558.8	35,366	1,244,885	0.265	9.31
11	**The Parish of Saint Mary** **Total Site Info**	25.14	1,095,021	19	18	24	6.09	265,228	12.8	134.0	1,217.8	27,628	972,504	0.207	7.27

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 %
	BIG BROOK SUBWATERSHED	**81,935**	**1.88**	**2.135**	**357**	**155,190**	**6.79**				**$162,875**	**13.2%**
1	**Colts Neck Board of Education & Conover Road Elementary School**											
	Bioretention systems	34,455	0.79	0.898	150	65,870	2.48	8,615	$5	SF	$43,075	9.6%
	Pervious pavement	11,350	0.26	0.296	50	21,700	0.82	2,970	$25	SF	$74,250	3.2%
	Total Site Info	**45,805**	**1.05**	**1.193**	**200**	**87,570**	**3.30**				**$117,325**	**12.8%**
2	**Colts Neck Fire Company**											
	Bioretention system	3,540	0.08	0.092	15	6,770	0.25	885	$5	SF	$4,425	6.0%
	Rainwater harvesting	1,285	0.03	0.033	6	1,000	0.99	1,000	$2	gal	$2,000	2.2%
	Total Site Info	**4,825**	**0.11**	**0.126**	**21**	**7,770**	**1.24**				**$6,425**	**8.1%**
3	**Conover Road Primary School**											
	Bioretention systems	31,305	0.72	0.816	137	59,850	2.25	7,825	$5	SF	$39,125	15.2%
	Total Site Info	**31,305**	**0.72**	**0.816**	**137**	**59,850**	**2.25**				**$39,125**	**15.2%**
	MINE BROOK (MONMOUTH COUNTY) SUBWATERSHED	**15,775**	**0.11**	**0.126**	**21**	**7,770**	**1.24**				**$6,425**	**11.6%**
4	**Colts Neck Fire Company Number 1**											
	Bioretention systems	3,540	0.08	0.092	15	6,770	0.25	885	$5	SF	$4,425	5.3%
	Rainwater harvesting	1,285	0.03	0.033	6	1,000	0.99	1,000	$2	gal	$2,000	1.9%
	Total Site Info	**4,825**	**0.11**	**0.126**	**21**	**7,770**	**1.24**				**$6,425**	**7.2%**
5	**Colts Neck Reformed Church**											
	Pervious pavement	10,950	0.25	0.285	48	20,940	0.79	2,970	$25	SF	$74,250	16.0%
	Total Site Info	**10,950**	**0.25**	**0.285**	**48**	**20,940**	**0.79**				**$74,250**	**16.0%**
	YELLOW BROOK (ABOVE BUCKS MILL) SUBWATERSHED	**122,105**	**2.80**	**3.181**	**533**	**233,440**	**8.76**				**$357,425**	**6.1%**

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 %
6	**Colts Neck Community Church**											
	Bioretention system	2,840	0.07	0.074	12	5,430	0.20	710	$5	SF	$3,550	5.2%
	Total Site Info	**2,840**	**0.07**	**0.074**	**12**	**5,430**	**0.20**				**$3,550**	**5.2%**
7	**Colts Neck High School**											
	Bioretention systems	32,700	0.75	0.852	143	62,520	2.35	8,180	$5	SF	$40,900	3.9%
	Pervious pavement	18,145	0.42	0.473	79	34,690	1.30	3,240	$25	SF	$81,000	2.2%
	Total Site Info	**50,845**	**1.17**	**1.325**	**222**	**97,210**	**3.65**				**$121,900**	**6.1%**
8	**Colts Neck Municipal Complex**											
	Bioretention systems	4,380	0.10	0.114	19	8,380	0.31	1,105	$5	SF	$5,525	1.7%
	Total Site Info	**4,380**	**0.10**	**0.114**	**19**	**8,380**	**0.31**				**$5,525**	**1.7%**
9	**Cedar Drive Middle School**											
	Bioretention systems	19,250	0.44	0.502	84	36,800	1.38	4,815	$5	SF	$24,075	8.3%
	Pervious pavement	10,080	0.23	0.263	44	19,270	0.72	1,800	$25	SF	$45,000	4.4%
	Total Site Info	**29,330**	**0.67**	**0.764**	**128**	**56,070**	**2.10**				**$69,075**	**12.7%**
10	**Colts Neck Shopping Center**											
	Bioretention systems	3,000	0.07	0.078	13	5,740	0.22	750	$5	SF	$3,750	0.9%
	Pervious pavement	9,450	0.22	0.246	41	18,060	0.68	2,530	$25	SF	$63,250	2.8%
	Total Site Info	**12,450**	**0.29**	**0.324**	**54**	**23,800**	**0.90**				**$67,000**	**3.7%**
11	**The Parish of Saint Mary**											
	Bioretention systems	7,900	0.18	0.206	34	15,100	0.57	1,975	$5	SF	$9,875	3.0%
	Pervious pavement	14,360	0.33	0.374	63	27,450	1.03	3,220	$25	SF	$80,500	5.4%
	Total Site Info	**22,260**	**0.51**	**0.580**	**97**	**42,550**	**1.60**				**$90,375**	**8.4%**