RUTGERS
New Jersey Agricultural
Experiment Station

Draft

Impervious Cover Reduction Action Plan for Woodland Township, Burlington County, New Jersey

Prepared for Woodland Township by the
Rutgers Cooperative Extension Water Resources Program

June 11, 2018

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Introduction

Located in Burlington County, New Jersey, Woodland Township covers approximately 94.4 square miles. Figures 1 and 2 illustrate that Woodland Township is dominated by forest land uses. A total of 1.9% of the municipality's land use is classified as urban. Of the urban land in Woodland 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 Woodland 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 Woodland Township. Based upon the 2012 NJDEP land use/land cover data, approximately 0.3% of Woodland Township has impervious cover. This level of impervious cover suggests that the streams in Woodland Township are sensitive streams. [1]

Methodology

Woodland Township contains portions of seventeen 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.

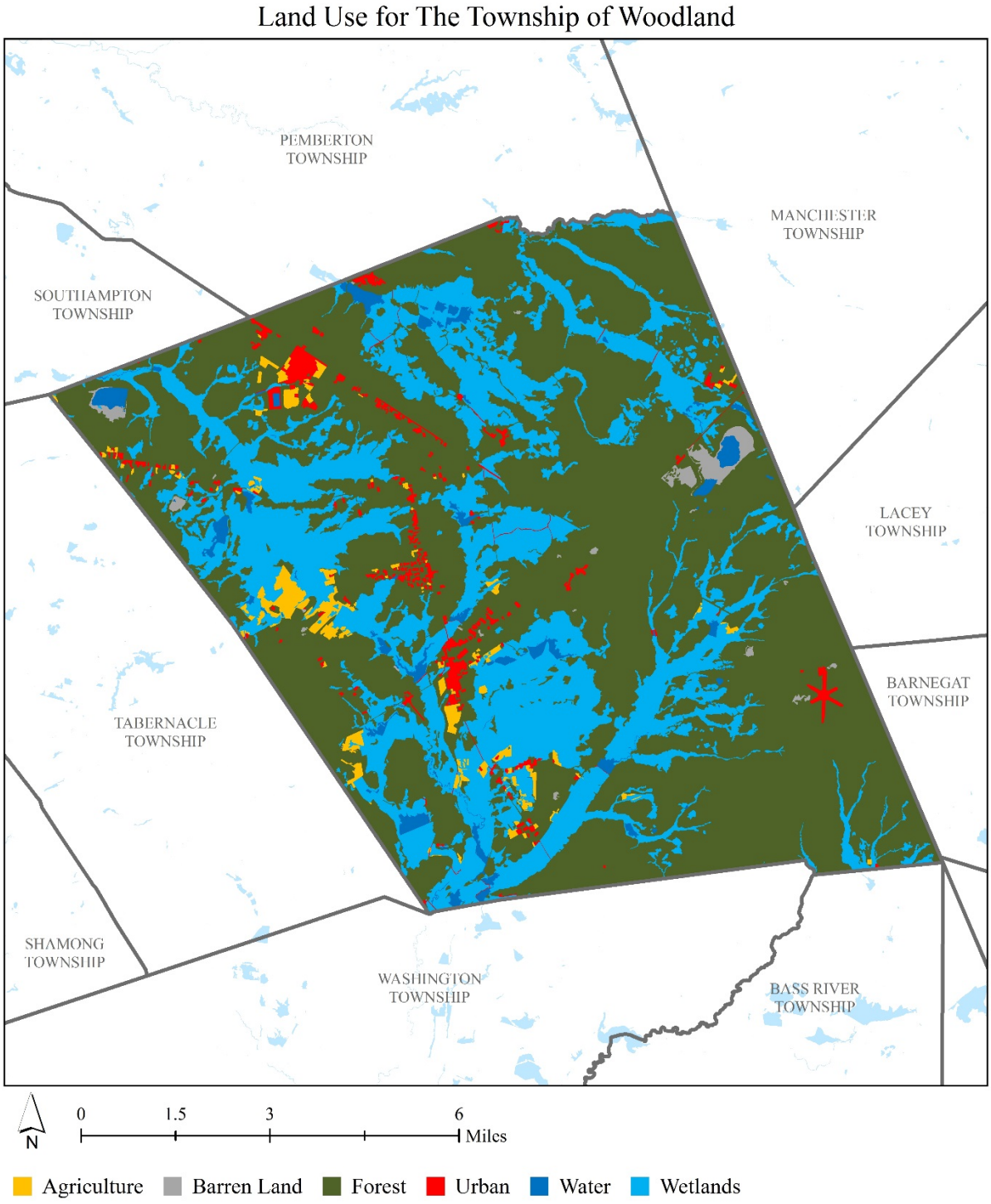


Figure 1: Map illustrating the land use in Woodland Township

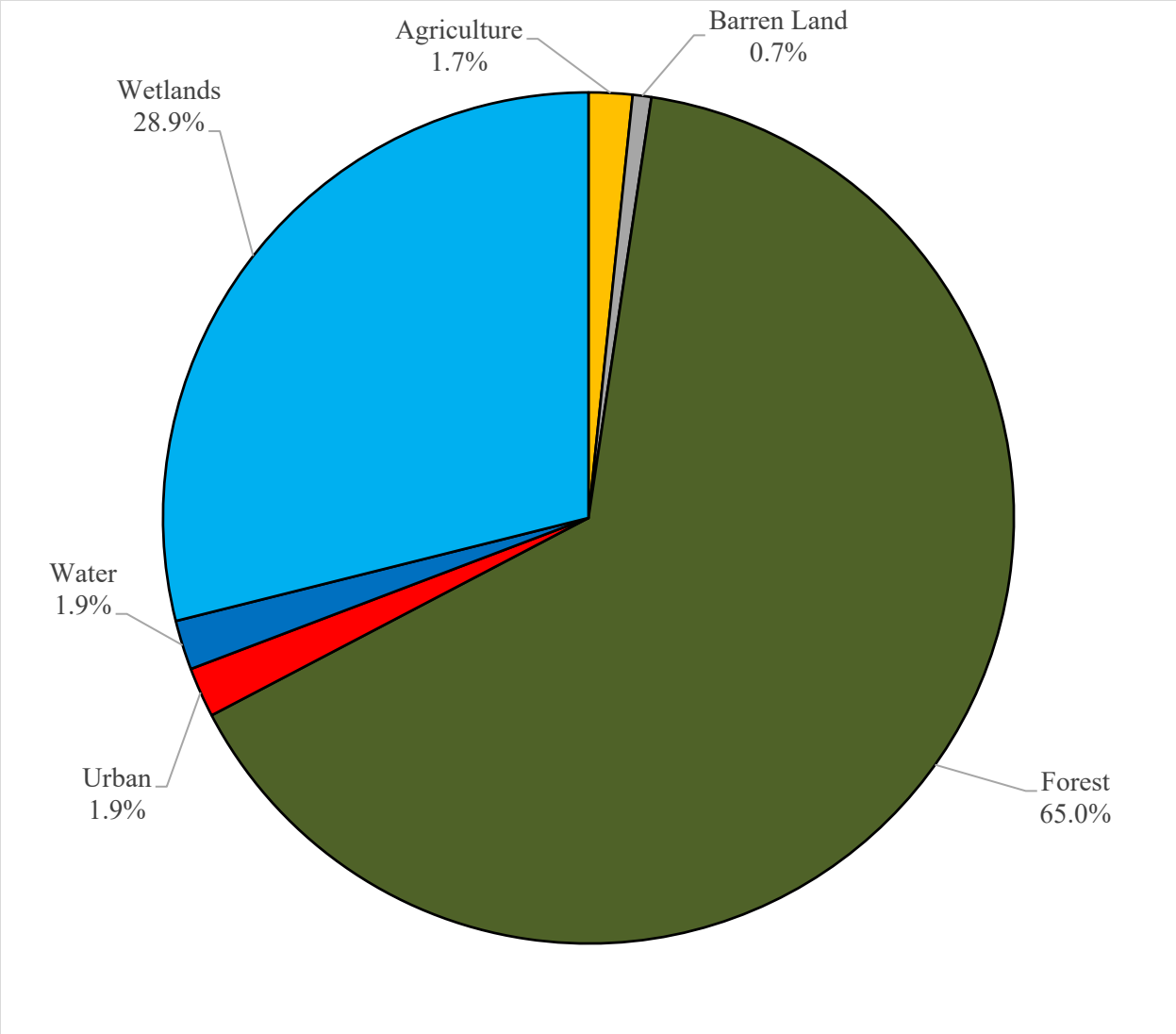


Figure 2: Pie chart illustrating the land use in Woodland Township

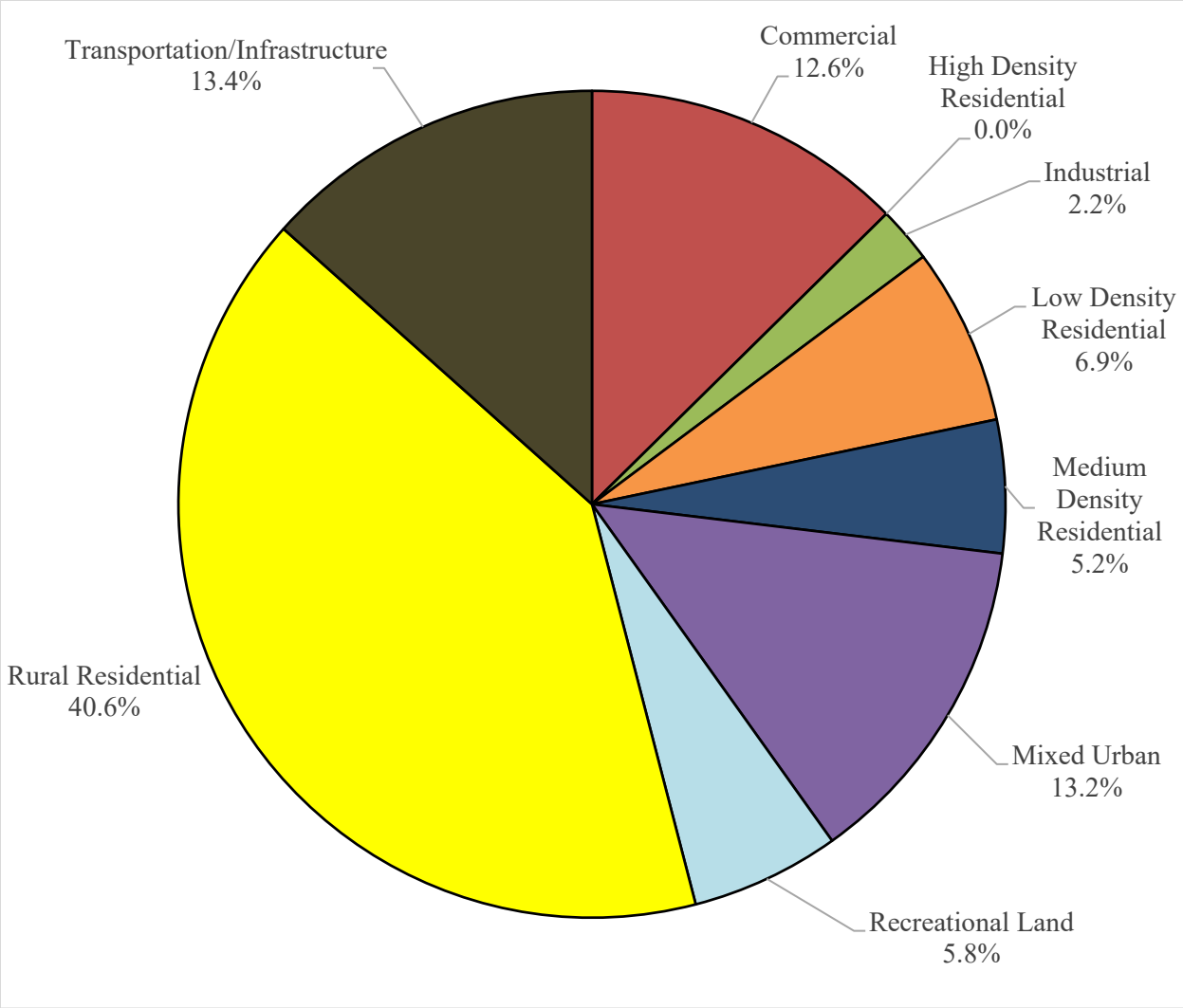


Figure 3: Pie chart illustrating the various types of urban land use in Woodland Township

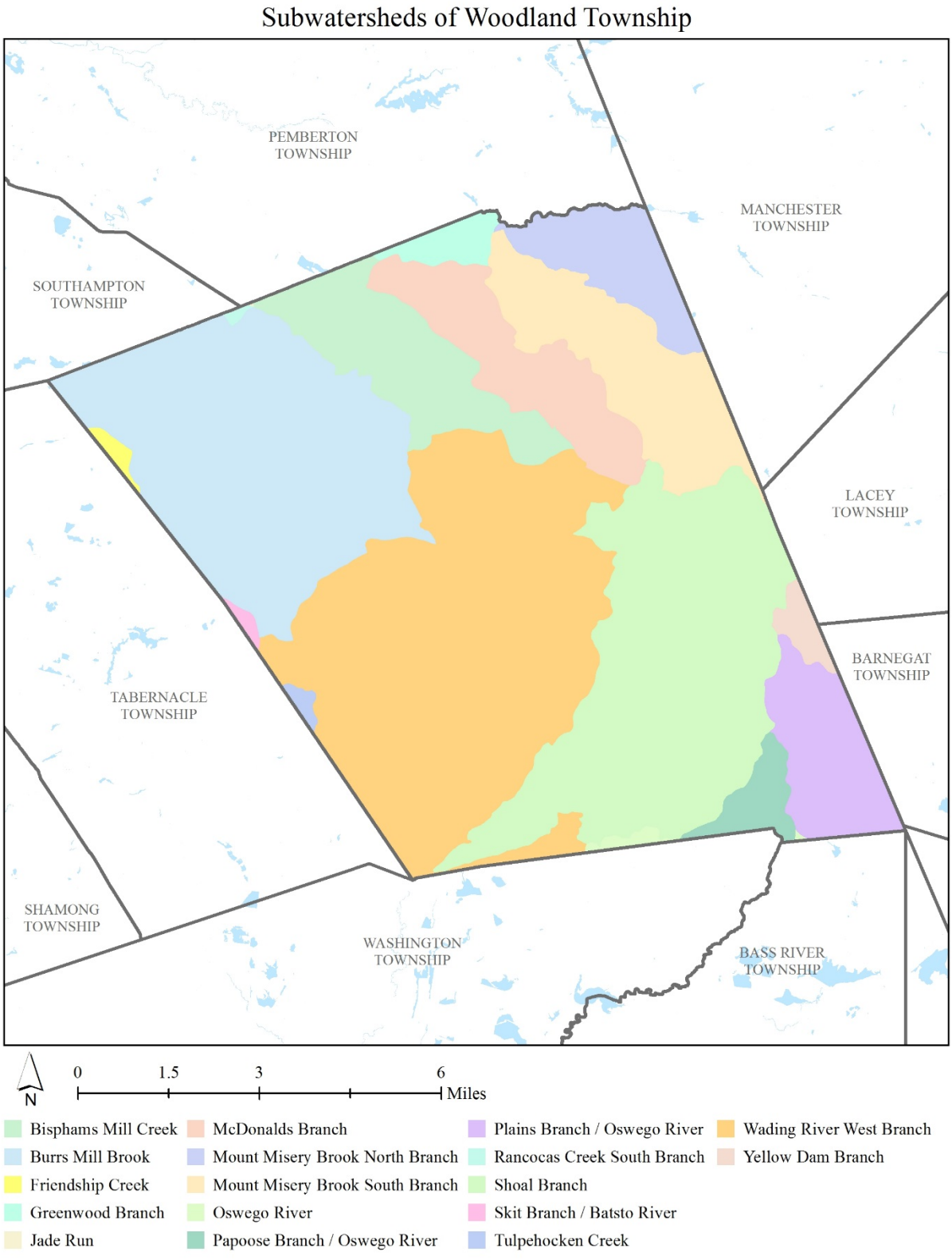


Figure 4: Map of the subwatersheds in Woodland Township

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 Woodland 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 Woodland 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.

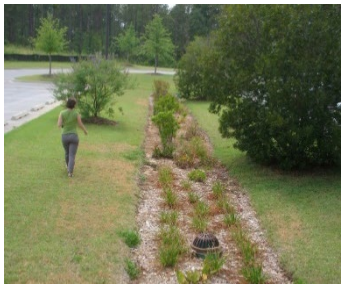
Downspout planter boxes

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

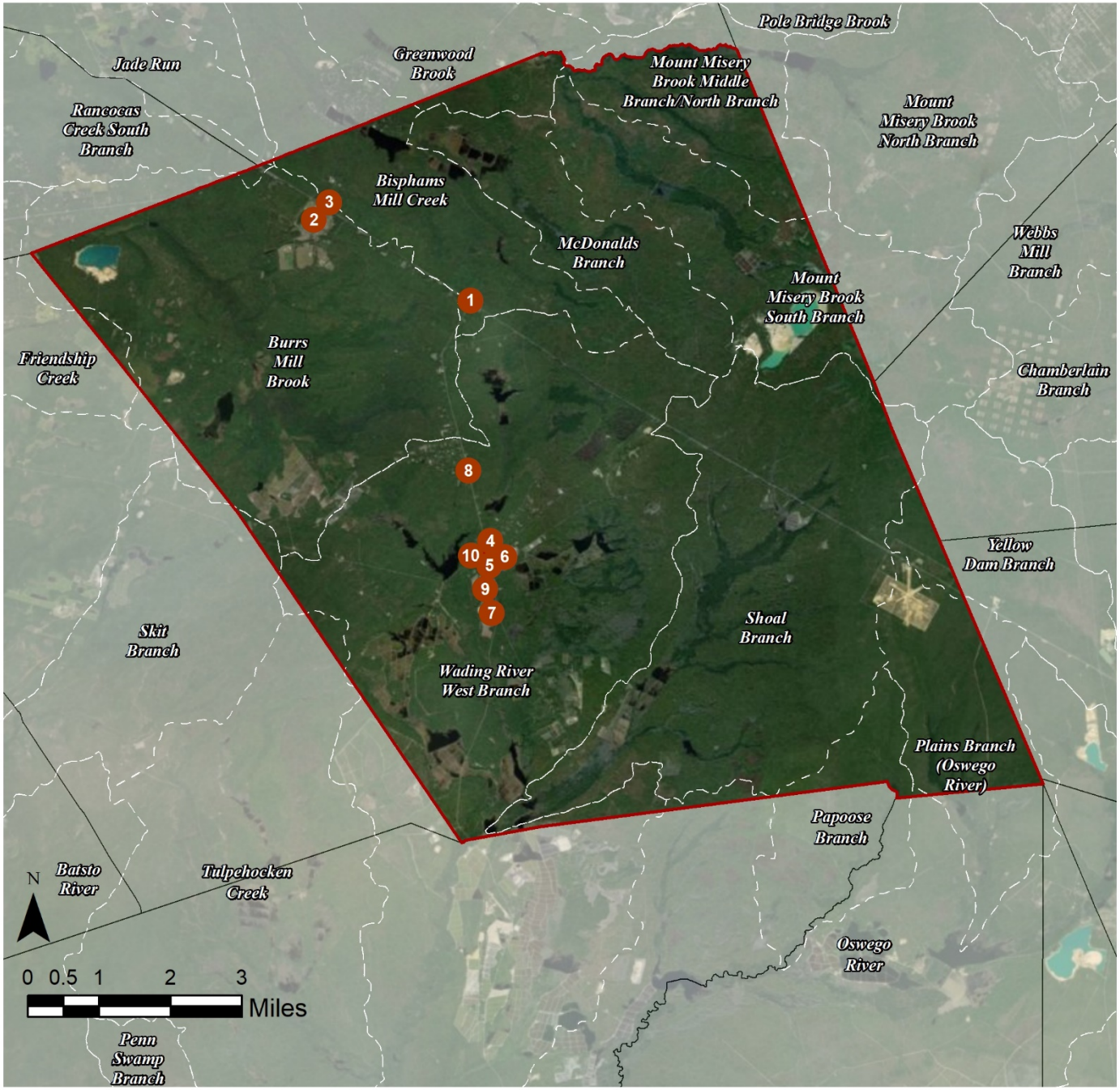
This impervious cover reduction action plan is meant to provide the municipality with a blueprint for implementing green infrastructure practices that will reduce the impact of stormwater runoff from impervious surfaces. These projects can be implemented by a wide variety of people such as boy scouts,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

WOODLAND TOWNSHIP: GREEN INFRASTRUCTURE SITES



SITES WITHIN THE BIPHAMS MILL CREEK SUBWATERSHED

1. NJ-72 and County Road 563 Right of Way

SITES WITHIN THE BURRS MILL BROOK SUBWATERSHED

2. New Lisbon Development Center
3. NJ-72 New Lisbon Right of Way

SITES WITHIN THE WADING RIVER WEST BRANCH SUBWATERSHED

4. 4011 Main Street Right of Way
5. Chatsworth Elementary School
6. Chatsworth United Methodist Church
7. Ocean Spray Chatsworth Receiving Station
8. Panama Road and County Road 563 Right of Way
9. Woodland Township Municipal Building
10. Woodland Volunteer Fire and EMS Station #1

b. Proposed Green Infrastructure Concepts

NJ-72 and County Road 563 Right of Way

Subwatershed: Biphams Mill Creek

Site Area: 14,670 sq. ft.

Address: NJ-72 and County Road 563
Vincentown, NJ 08088

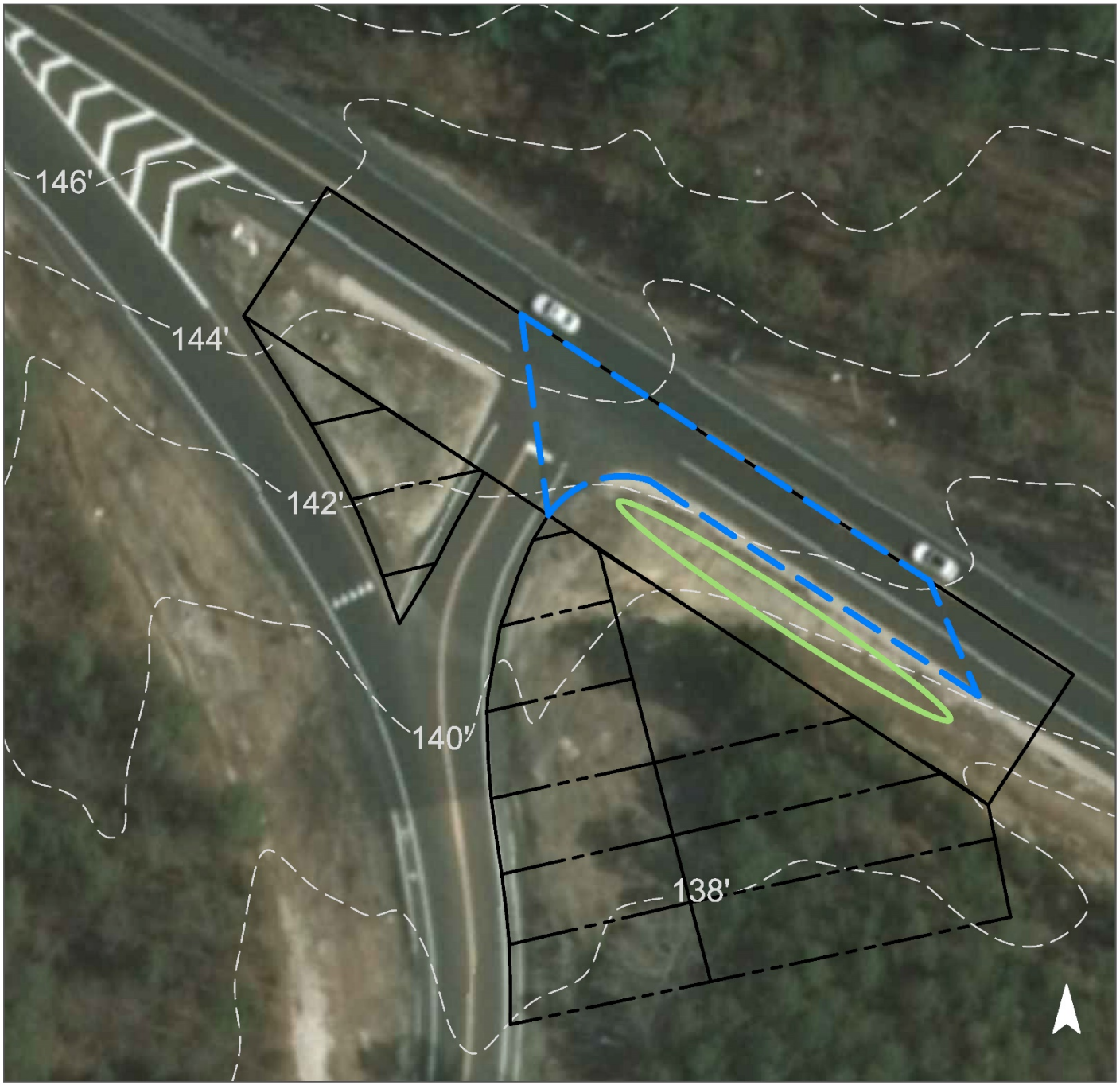
Adjacent Block and Lot: Block 1315, Lot 1-13

A bioswale can be installed along the roadside to capture runoff from the road. Bioswales are landscape features that convey stormwater from one location to another while removing pollutants and allowing infiltration. 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"
52	7,580	0.4	3.8	34.8	0.006	0.21

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	0.111	19	4,040	0.03	1,080	$5,400

GREEN INFRASTRUCTURE RECOMMENDATIONS



NJ-72 and County Road 563 Right of Way

- bioswale
- drainage area
- property line
- right of way region
- 2015 Aerial: NJOIT, OGIS

0 25' 50'

New Lisbon Development Center

Subwatershed: Burrs Mill Brook

Site Area: 32,389,649 sq. ft.

Address: 1 Bennion Avenue
Woodland, NJ 08064

Block and Lot: Block 601, Lot 1-5,9,12

A bioretention system can be installed behind the development center to capture stormwater runoff from the impervious roof by redirecting downspouts into it. There are potentially many more locations on the site to install additional bioretention systems that would capture, treat, and infiltrate stormwater runoff from the buildings. 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"
7	2,281,484	110.0	1152.3	10,475.1	1.778	62.57

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	10,260	0.39	1,300	$6,500

GREEN INFRASTRUCTURE RECOMMENDATIONS

New Lisbon Developmental Center

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

0 25' 50'

NJ-72 New Lisbon Right of Way

Subwatershed: Burrs Mill Brook

Site Area: 84,790 sq. ft.

Address: NJ-72
Woodland, NJ 08064

Adjacent Block and Lot: Block 601, Lot 3,4

A bioswale can be installed in the right of way in the patch of grass between the road and sidewalk. The bioswale will catch runoff from the impervious road before entering a catch basin. This would convey stormwater in a controlled manner while also removing pollutants and allowing infiltration. 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"
50	42,265	2.0	21.3	194.1	0.033	1.16

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	0.184	44	13,180	0.11	3,525	$17,625

GREEN INFRASTRUCTURE RECOMMENDATIONS

NJ-72 New Lisbon Right of Way

- bioswale
- drainage area
- property line
- right of way region
- 2015 Aerial: NJOIT, OGIS

0 30' 60'

4011 Main Street Right of Way

Subwatershed: Wading River West Branch

Site Area: 8,300 sq. ft.

Address: 4011 Main Street
Woodland, NJ 08064

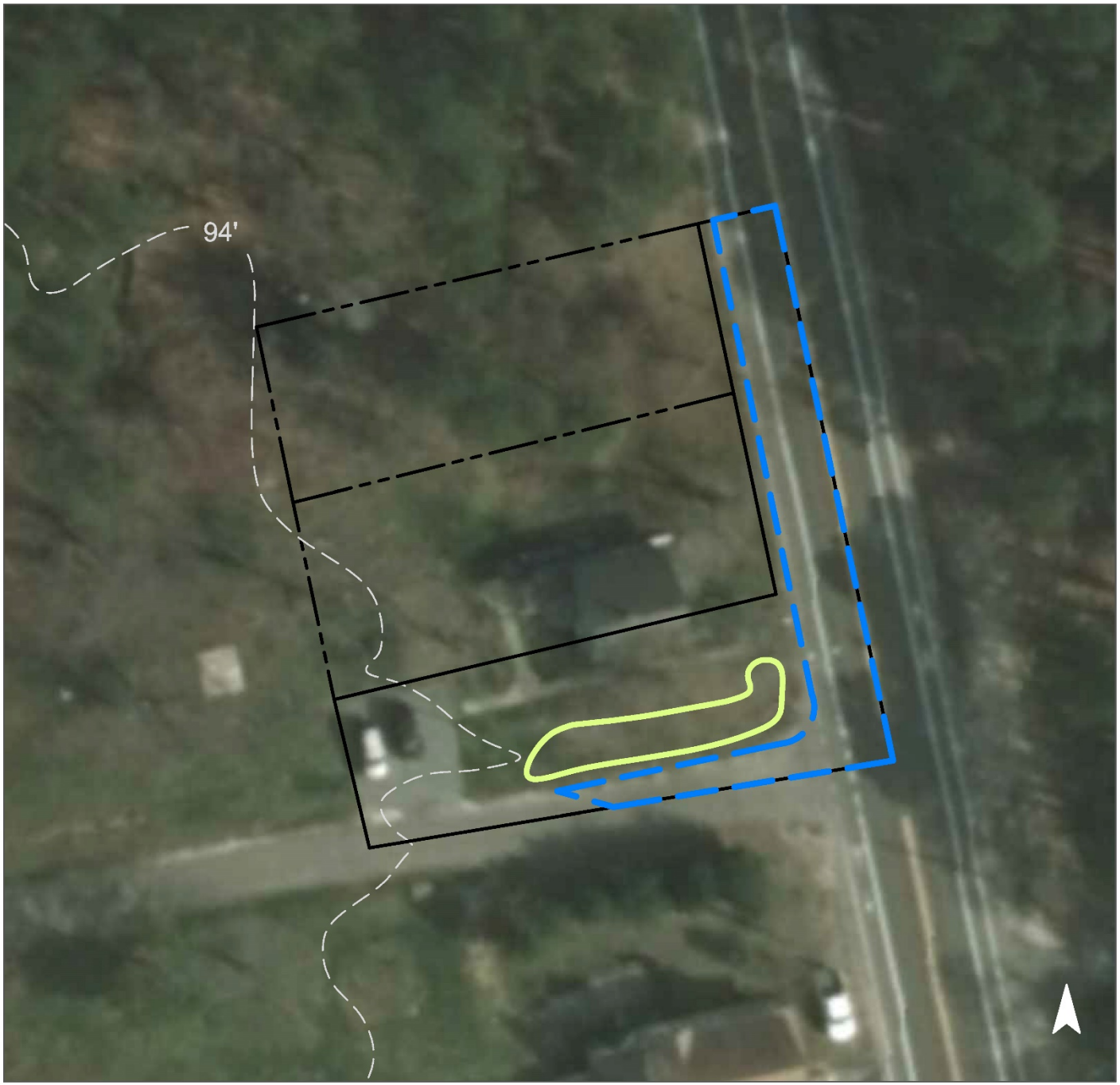
Adjacent Block and Lot: Block 3702, Lot 3,4

A bioretention system can be placed in the turfgrass area between Peacock Road and the house. The bioretention system will be able to capture runoff from the road by bypassing the catch basin. 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"
54	4,450	0.2	2.2	20.4	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	0.040	10	6,020	0.23	860	$4,300

GREEN INFRASTRUCTURE RECOMMENDATIONS



4011 Main Street
Right of Way

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

0 20' 40'

Chatsworth Elementary School

Subwatershed: Wading River West Branch

Site Area: 416,126 sq. ft.

Address: 2 Giles Avenue
Chatsworth, NJ 08019

Block and Lot: Block 4807, Lot 1

Rain gardens can be installed in the turfgrass areas along the front of the school. The rain gardens will be able to capture and treat runoff from the roof of the school building by directing the downspouts into them. Two downspout planters can be placed along the driveway of the school to help capture runoff from the roof from the downspouts as well. 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"
16	66,897	3.2	33.8	307.1	0.052	1.83

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	0.152	25	11,490	0.43	1,460	$7,300
Planter boxes	n/a	2	n/a	n/a	2 (boxes)	$2,000

GREEN INFRASTRUCTURE RECOMMENDATIONS

Chatsworth Elementary School

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

0 30' 60'

Chatsworth United Methodist Church

Subwatershed: Wading River West Branch

Site Area: 44,606 sq. ft.

Address: Main Street & 2nd Street
Chatsworth, NJ 08019

Block and Lot: Block 4913, Lot 10.01

Bioretention systems can be installed next to the church in the turfgrass area on each side of the building. The bioretention systems can capture, treat, and infiltrate rooftop 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"
9	3,820	0.2	1.9	17.5	0.003	0.10

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	0.042	7	3,160	0.12	400	$2,000

GREEN INFRASTRUCTURE RECOMMENDATIONS

Chatsworth United Methodist Church

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

0 15' 30'

Ocean Spray Chatsworth Receiving Station

Subwatershed: Wading River West Branch

Site Area: 5,947,958 sq. ft.

Address: 3917 County Road 563
Chatsworth, NJ 08019

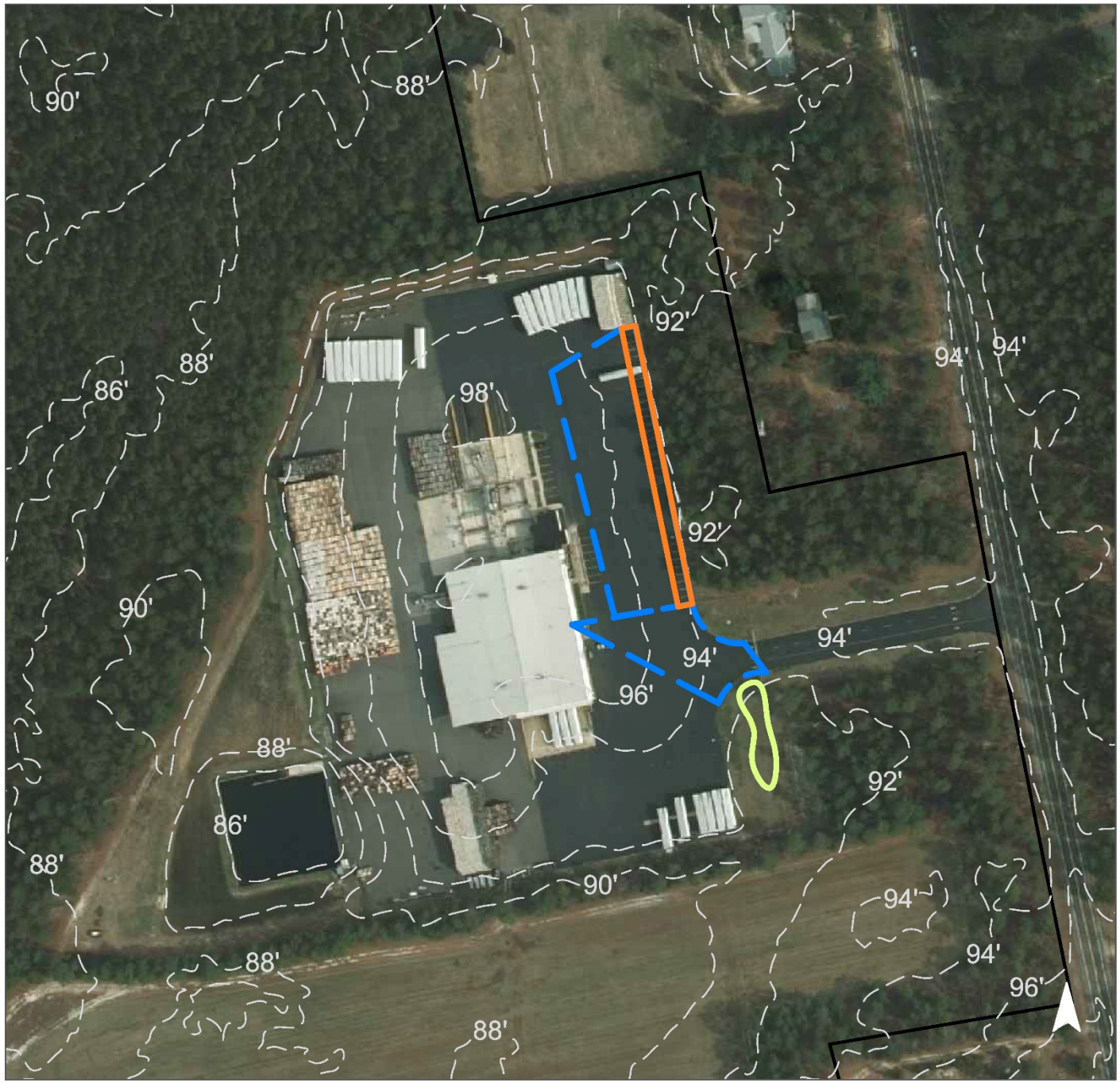
Block and Lot: Block 4601, Lot 2.02, 2.03

Pervious pavement can be installed across from the main building alongside the parking spaces to capture runoff from the impervious parking lot to capture and infiltrate stormwater. A bioretention system can also be installed to the southeast of the building to capture additional runoff from the paved areas. 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"
7	438,179	21.1	221.3	2,011.8	0.341	12.02

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	0.375	63	28,420	1.07	3,600	$18,000
Pervious pavement	1.032	173	78,150	2.94	7,070	$176,750

GREEN INFRASTRUCTURE RECOMMENDATIONS



Ocean Spray Chatsworth Receiving Station

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

0 100' 200'

Panama Road and County Road 563 Right of Way

Subwatershed: Wading River West Branch

Site Area: 19,990 sq. ft.

Address: Panama Road and County Road 563
Chatsworth, NJ 08019

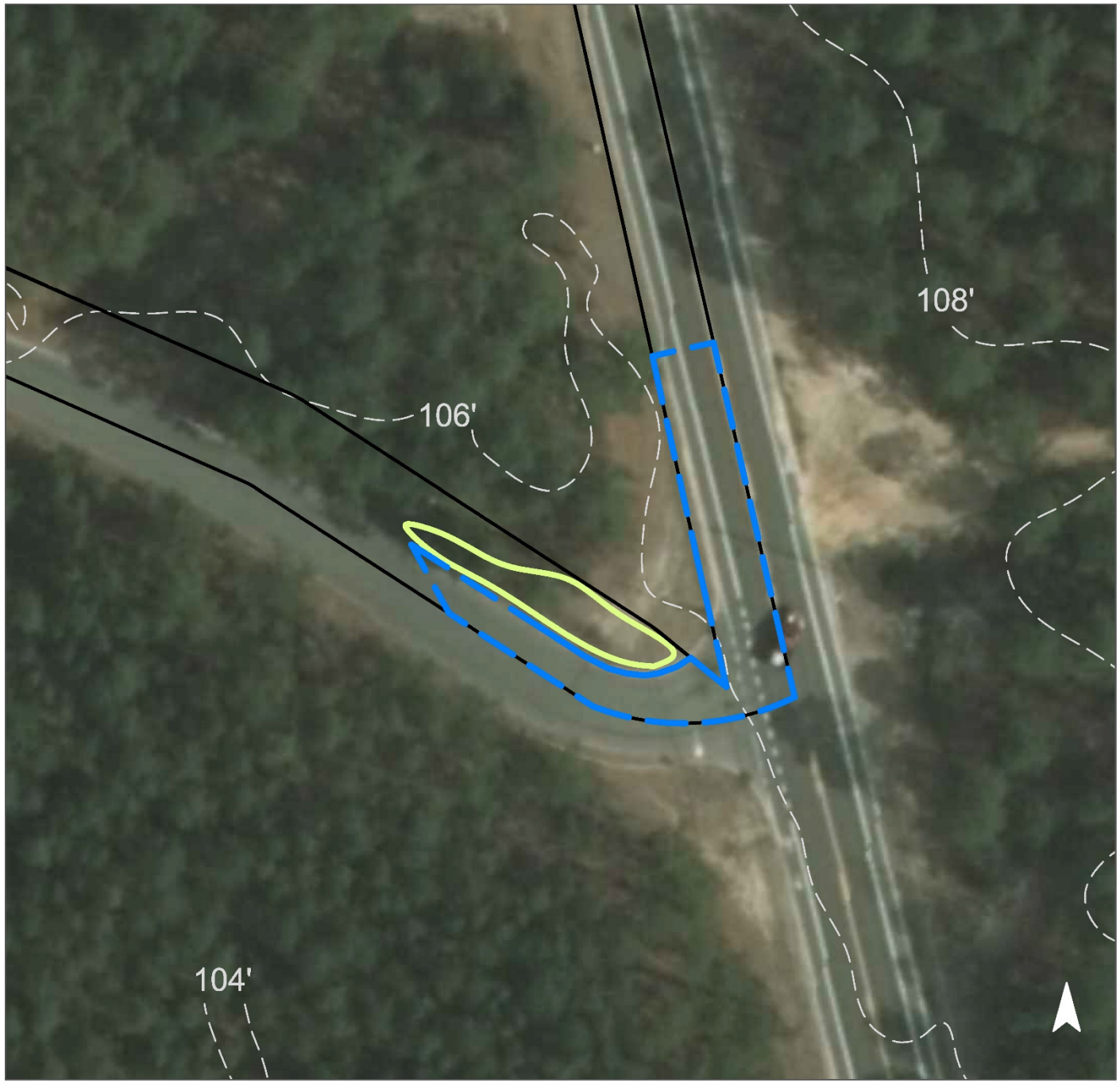
Adjacent Block and Lot: Block 2306, Lot 5

A bioretention system can be installed in the turfgrass area next to the intersection of Panama Road and County Road 563. The bioretention system will capture runoff from the impervious road and will allow infiltration of the runoff instead of runoff directly entering the nearby catch basin. 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"
58	11,600	0.6	5.9	53.3	0.009	0.32

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 system	0.052	12	7,900	0.30	1,000	$5,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Panama Road and County Road 563 Right of Way

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

0 25' 50'

Woodland Township Municipal Building

Subwatershed: Wading River West Branch

Site Area: 73,818 sq. ft.

Address: 3943 Main Street
Chatsworth, NJ 08019

Block and Lot: Block 4803, Lot 2

Bioretention systems can be installed in the turfgrass areas at each corner of the municipal building to capture runoff from the roof of the building as well as provide aesthetic value. Pervious pavement can be installed by replacing a section of the parking spaces near the edge of pavement to capture and infiltrate stormwater 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"
55	40,600	2.0	20.5	186.4	0.032	1.11

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	0.127	21	9,610	0.36	1,220	$6,100
Pervious pavement	0.359	60	27,170	1.02	3,890	$97,250

GREEN INFRASTRUCTURE RECOMMENDATIONS

Woodland Township Municipal Building

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

0 25' 50'

Woodland Volunteer Fire and EMS Station #1

Subwatershed: Wading River West Branch

Site Area: 7,830 sq. ft.

Address: 3991 County Road 563
Chatsworth, NJ 08019

Block and Lot: Block 3704, Lot 1

A cistern can be installed, and downspouts from the fire station's roof can be redirected into the cistern. The captured water can be used to wash fire trucks or for other non-potable uses. 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"
91	7,130	0.3	3.6	32.7	0.006	0.20

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
Rainwater harvesting	0.025	4	750	0.03	750 (gal)	$1,500

GREEN INFRASTRUCTURE RECOMMENDATIONS

Woodland Volunteer Fire and EMS Station #1

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

0 20' 40'

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.	
									TP (lb/yr)	TN (lb/yr)	TSS (lb/yr)	Water Quality Storm (1.25" over 2-hours) (Mgal)	Annual (Mgal)
	BIPHAMS MILL CREEK SITES	**0.34**	**14,670**				**0.17**	**7,580**	**0.4**	**3.8**	**34.8**	**0.006**	**0.21**
1	**NJ-72 and County Road 563 Right of Way**			Adjacent									
	Total Site Info	0.34	14,670	1315	1-13	52	0.17	7,580	0.4	3.8	34.8	0.006	0.21
	BURRS MILL BROOK SITES	**745.51**	**32,474,439**				**53.35**	**2,323,749**	**112.0**	**1173.6**	**10,669.2**	**1.811**	**63.73**
2	**New Lisbon Development Center**												
	Total Site Info	743.56	32,389,649	601	1-5,9,12	7	52.38	2,281,484	110.0	1152.3	10,475.1	1.778	62.57
3	**NJ-72 New Lisbon Right of Way**			Adjacent									
	Total Site Info	1.95	84,790	601	3, 4	50	0.97	42,265	2.0	21.3	194.1	0.033	1.16
	WADING RIVER WEST BRANCH SITES	**147.76**	**6,436,510**				**13.15**	**572,676**	**27.6**	**289.2**	**2,629.4**	**0.446**	**15.71**
4	**4011 Main Street Right of Way**			Adjacent									
	Total Site Info	0.19	8,300	3702	3, 4	54	0.10	4,450	0.2	2.2	20.4	0.003	0.12
5	**Chatsworth Elementary School**												
	Total Site Info	9.55	416,126	4807	1	16	1.54	66,897	3.2	33.8	307.1	0.052	1.83
6	**Chatsworth United Methodist Church**												
	Total Site Info	1.02	44,606	4913	10.01	9	0.09	3,820	0.2	1.9	17.5	0.003	0.10
7	**Ocean Spray Chatsworth Receiving Station**												
	Total Site Info	136.55	5,947,958	4601	2.02, 2.03	7	10.06	438,179	21.1	221.3	2,011.8	0.341	12.02
8	**Panama Road and County Road 563 Right of Way**			Adjacent									
	Total Site Info	0.46	19,990	2306	5	58	0.27	11,600	0.6	5.9	53.3	0.009	0.32
9	**Woodland Township Municipal Building**												
	Total Site Info	1.69	73,818	4803	2	55	0.93	40,600	2.0	20.5	186.4	0.032	1.11
10	**Woodland Volunteer Fire and EMS Station #1**												
	Total Site Info	0.18	7,830	3704	1	91	0.16	7,130	0.3	3.6	32.7	0.006	0.20

d. Summary of Proposed Green Infrastructure Practices

Summary of Proposed Green Infrastructure Practices

	Subwatershed/Site Name/Total Site Info/GI Practice	Potential Management Area		Recharge Potential	TSS Removal Potential	Max Volume Reduction Potential	Peak Discharge Reduction Potential	Size of BMP	Unit Cost	Unit	Total Cost	I.C. Treated
		Area (SF)	Area (ac)	(Mgal/yr)	(lbs/yr)	(gal/storm)	(cfs)		($/unit)		($)	%
	BIPHAMS MILL CREEK SITES	**4,265**	**0.10**	**0.111**	**19**	**4,040**	**0.03**				**$5,400**	**56.3%**
1	**NJ-72 and County Road 563 Right of Way**											
	Bioswale	4,265	0.10	0.111	19	4,040	0.03	1,080	$5	SF	$5,400	56.3%
	Total Site Info	**4,265**	**0.10**	**0.111**	**19**	**4,040**	**0.03**				**$5,400**	**56.3%**
	BURRS MILL BROOK SITES	**19,300**	**0.44**	**0.319**	**67**	**23,440**	**0.50**				**$24,125**	**0.8%**
2	**New Lisbon Development Center**											
	Bioretention system	5,200	0.12	0.135	23	10,260	0.39	1,300	$5	SF	$6,500	0.2%
	Total Site Info	**5,200**	**0.12**	**0.135**	**23**	**10,260**	**0.39**				**$6,500**	**0.2%**
3	**NJ-72 New Lisbon Right of Way**											
	Bioswale	14,100	0.32	0.184	44	13,180	0.11	3,525	$5	SF	$17,625	33.4%
	Total Site Info	**14,100**	**0.32**	**0.184**	**44**	**13,180**	**0.11**				**$17,625**	**33.4%**
	WADING RIVER WEST BRANCH SITES	**88,485**	**2.03**	**2.202**	**377**	**172,670**	**6.50**				**$320,200**	**15.5%**
4	**4011 Main Street Right of Way**											
	Bioretention system	3,050	0.07	0.040	10	6,020	0.23	860	$5	SF	$4,300	68.5%
	Total Site Info	**3,050**	**0.07**	**0.040**	**10**	**6,020**	**0.23**				**$4,300**	**68.5%**
5	**Chatsworth Elementary School**											
	Bioretention systems	5,820	0.13	0.152	25	11,490	0.43	1,460	$5	SF	$7,300	8.7%
	Planter boxes	430	0.01	n/a	2	n/a	n/a	2	$1,000	box	$2,000	0.6%
	Total Site Info	**6,250**	**0.14**	**0.152**	**27**	**11,490**	**0.43**				**$9,300**	**9.3%**
6	**Chatsworth United Methodist Church**											
	Bioretention systems	1,600	0.04	0.042	7	3,160	0.12	400	$5	SF	$2,000	41.9%
	Total Site Info	**1,600**	**0.04**	**0.042**	**7**	**3,160**	**0.12**				**$2,000**	**41.9%**
7	**Ocean Spray Chatsworth Receiving Station**											
	Bioretention system	14,400	0.33	0.375	63	28,420	1.07	3,600	$5	SF	$18,000	3.3%
	Pervious pavement	39,590	0.91	1.032	173	78,150	2.94	7,070	$25	SF	$176,750	9.0%
	Total Site Info	**53,990**	**1.24**	**1.407**	**235**	**106,570**	**4.01**				**$194,750**	**12.3%**
8	**Panama Road and County Road 563 Right of Way**											

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 %
	Bioretention system	4,000	0.09	0.052	12	7,900	0.30	1,000	$5	SF	$5,000	34.5%
	Total Site Info	**4,000**	**0.09**	**0.052**	**12**	**7,900**	**0.30**				**$5,000**	**34.5%**
9	**Woodland Township Municipal Building**											
	Bioretention systems	4,870	0.11	0.127	21	9,610	0.36	1,220	$5	SF	$6,100	12.0%
	Pervious pavement	13,765	0.32	0.359	60	27,170	1.02	3,890	$25	SF	$97,250	33.9%
	Total Site Info	**18,635**	**0.43**	**0.486**	**81**	**36,780**	**1.38**				**$103,350**	**45.9%**
10	**Woodland Volunteer Fire and EMS Station #1**											
	Rainwater harvesting	960	0.02	0.025	4	750	0.03	750	$2	gal	$1,500	13.5%
	Total Site Info	**960**	**0.02**	**0.025**	**4**	**750**	**0.03**				**$1,500**	**13.5%**