RUTGERS
New Jersey Agricultural
Experiment Station

Impervious Cover Reduction Action Plan
for
Mine Hill Township, Morris County, New Jersey

Prepared for Mine Hill Township by the
Rutgers Cooperative Extension Water Resources Program

October 8, 2020

Highlands Council
New Jersey

ACKNOWLEDGEMENTS:

This document has been prepared by the Rutgers Cooperative Extension Water Resources Program, with funding and direction from the New Jersey Highlands Water Protection and Planning Council and the New Jersey Agricultural Experiment Station, to highlight green infrastructure opportunities within Mine Hill Township. We would like to thank the New Jersey Highlands Water Protection and Planning Council, the New Jersey Agricultural Experiment Station, and Mine Hill Township for their input and support in creating this document.

RUTGERS
New Jersey Agricultural Experiment Station

Highlands Council
New Jersey

Table of Contents

Introduction …… 1

Methodology ……..... 1

Green Infrastructure Practices …… 8

Potential Project Sites …… 10

Conclusion ……..... 11

Appendix A: Climate Resilient Green Infrastructure

a. Green Infrastructure Sites

b. Proposed Green Infrastructure Concepts

c. Summary of Existing Conditions

d. Summary of Proposed Green Infrastructure Practices

Introduction

Located in Morris County, New Jersey, Mine Hill Township covers approximately 3.03 square miles. Figures 1 and 2 illustrate that Mine Hill Township is dominated by urban land use. A total of 43.3% of the municipality's land use is classified as urban. Of the urban land in Mine Hill Township, medium density 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 Mine Hill 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 Mine Hill Township. Based upon the 2015 NJDEP land use/land cover data, approximately 12.0% of Mine Hill Township has impervious cover. This level of impervious cover suggests that the streams in Mine Hill Township are likely impacted streams. [1]

Methodology

Mine Hill Township contains portions of two subwatersheds (Figure 4). For this impervious cover reduction action plan, projects have been identified in both 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.

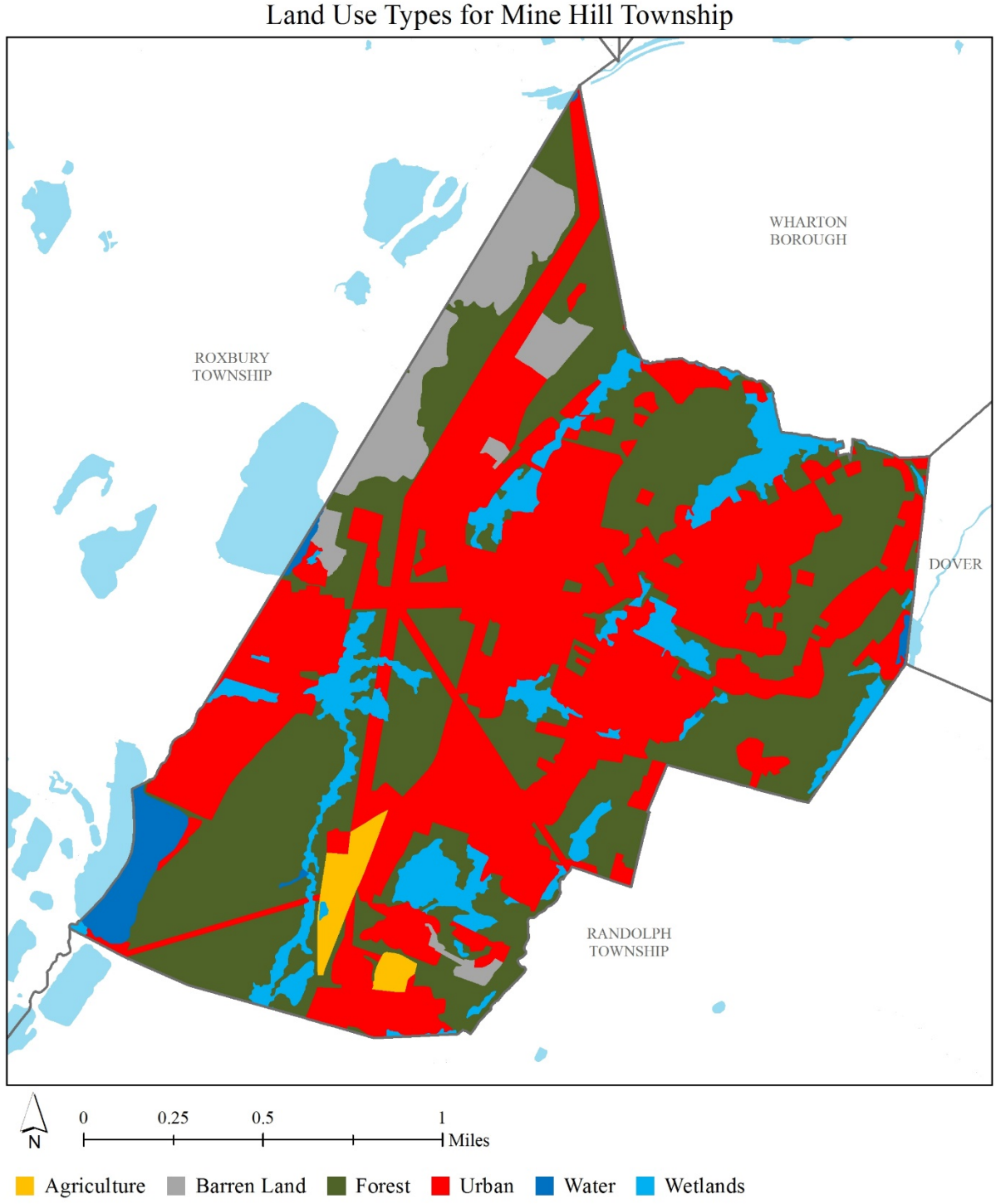


Figure 1: Map illustrating the land use in Mine Hill Township

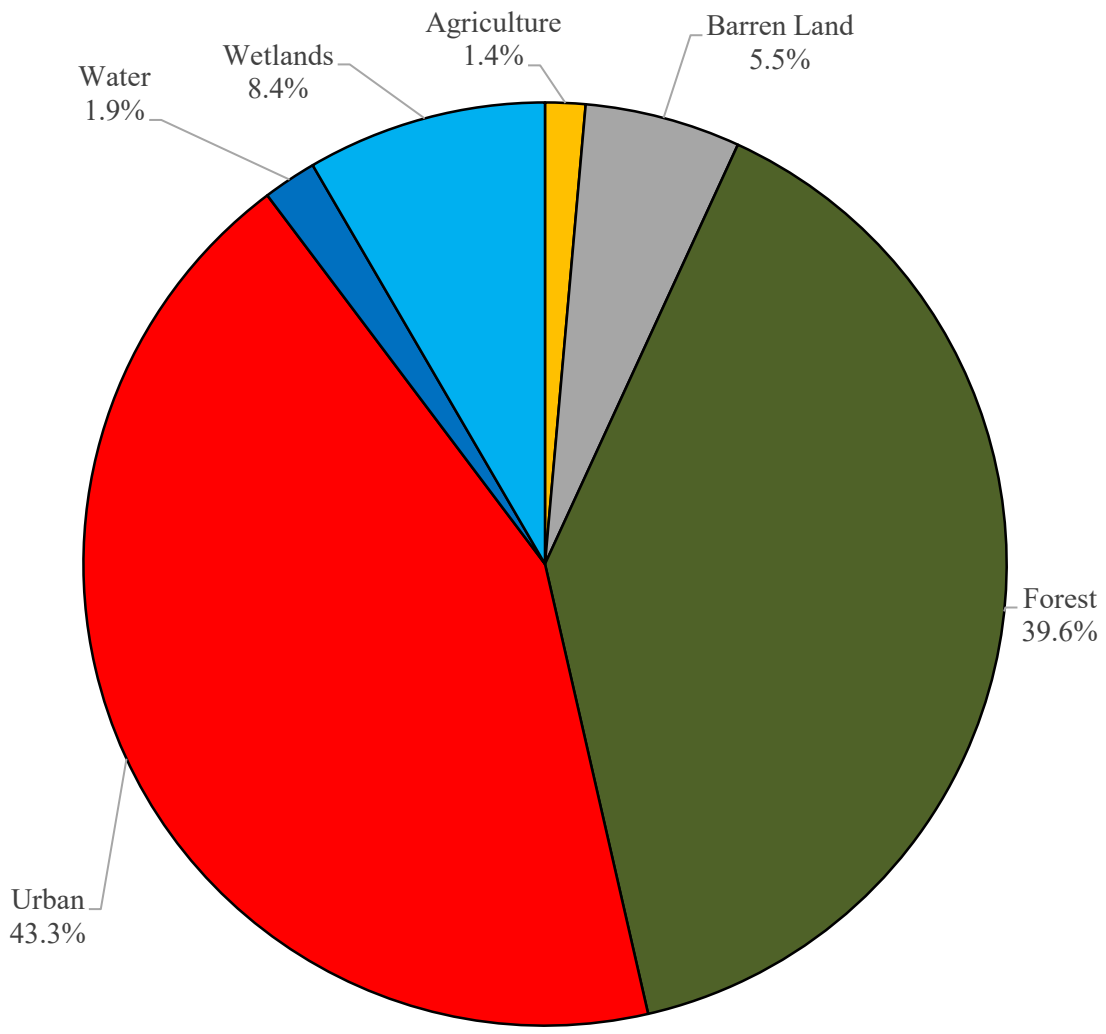


Figure 2: Pie chart illustrating the land use in Mine Hill Township

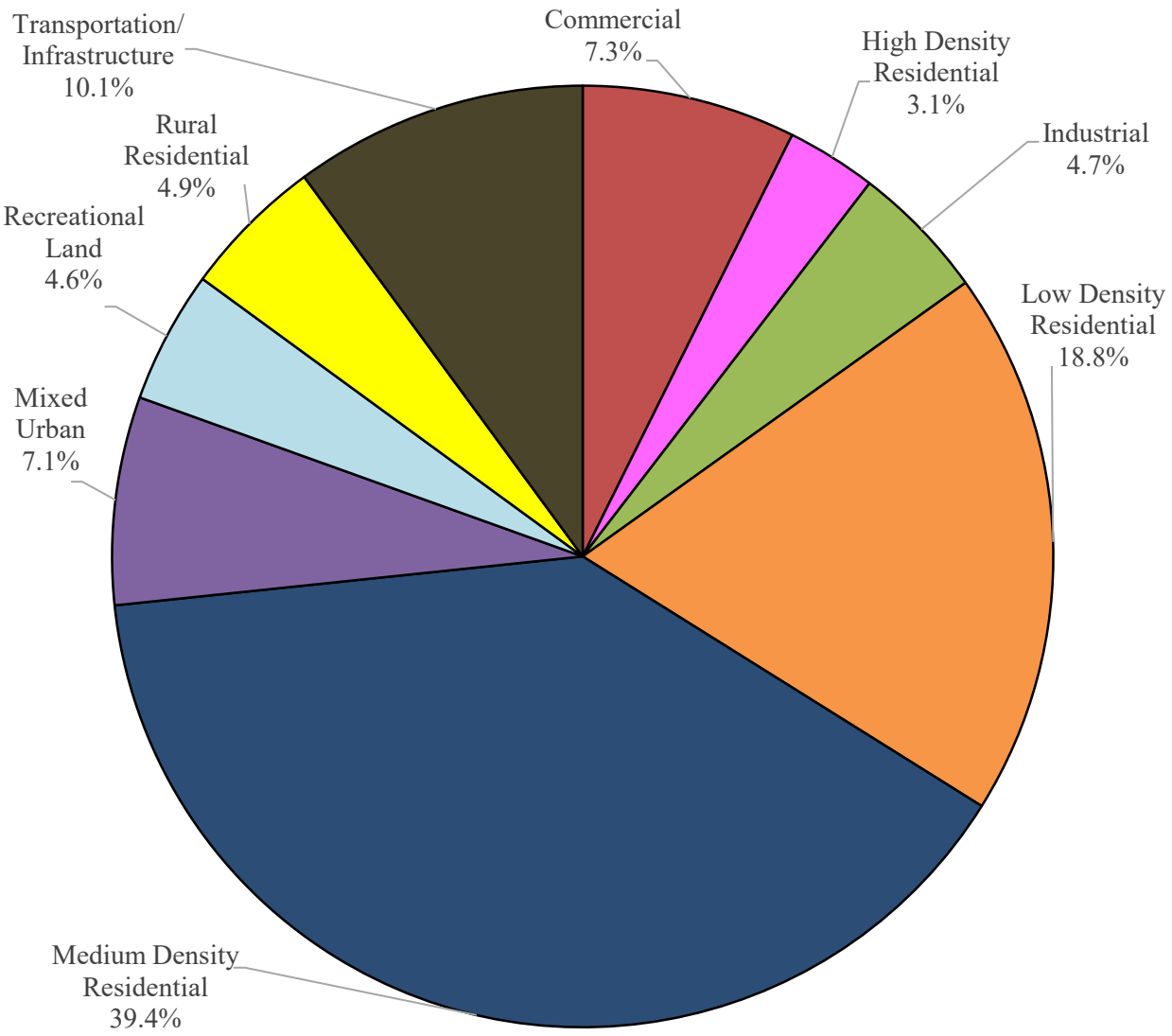


Figure 3: Pie chart illustrating the various types of urban land use in Mine Hill Township

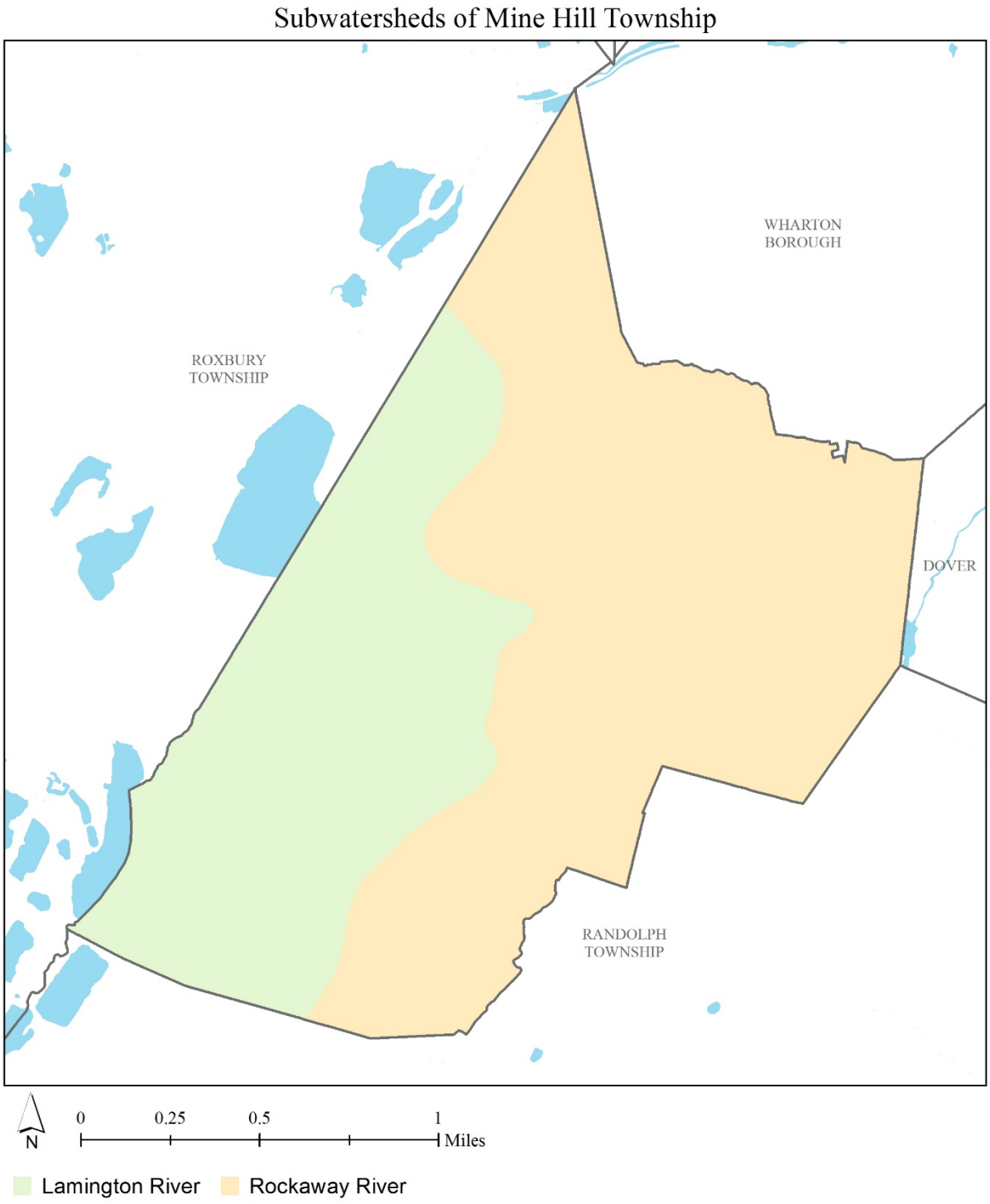


Figure 4: Map of the subwatersheds in Mine Hill Township

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 Mine Hill 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 Mine Hill 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.

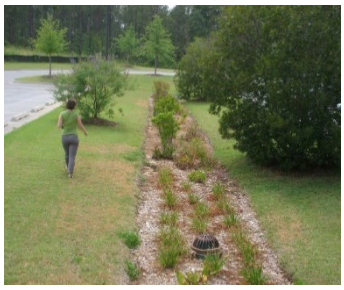
Downspout planter boxes

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

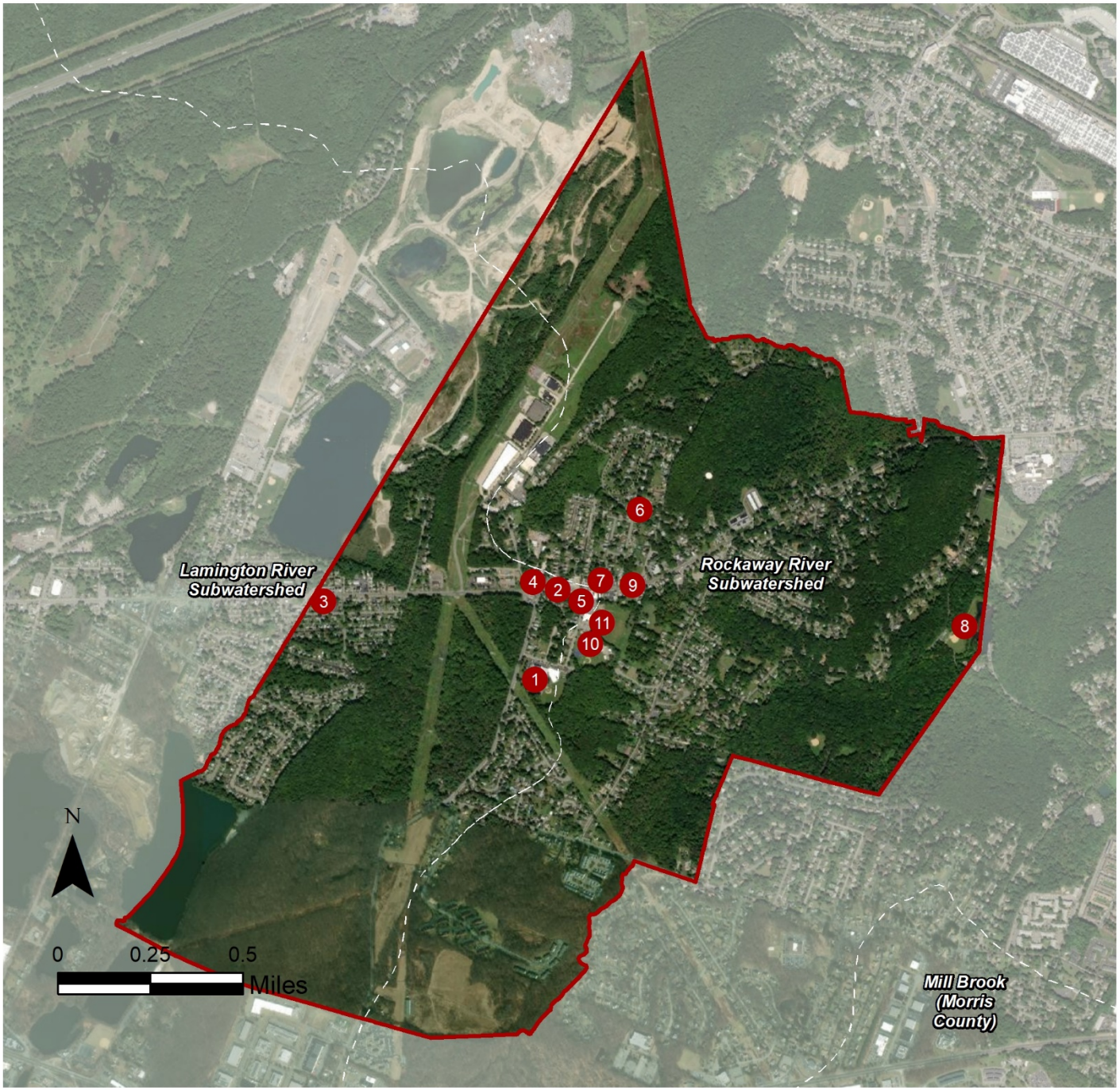
This impervious cover reduction action plan is meant to provide the municipality with a blueprint for implementing green infrastructure practices that will reduce the impact of stormwater runoff from impervious surfaces. These projects can be implemented by a wide variety of people such as boy scouts,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

MINE HILL: GREEN INFRASTRUCTURE SITES



SITES WITHIN THE LAMINGTON RIVER SUBWATERSHED

1. Canfield Avenue Elementary School
2. Coco's Chateau
3. Country Lakes Animal Clinic
4. Hodes Veterinary Group
5. Mine Hill Fire Department

SITES WITHIN THE ROCKAWAY RIVER SUBWATERSHED

6. American Legion
7. Bender's Bagels On The Hill
8. Hedden Park
9. Mine Hill Presbyterian Church
10. Mine Hill Recreation Center
11. Mine Hill Town Hall

b. Proposed Green Infrastructure Concepts

CANFIELD AVENUE ELEMENTARY SCHOOL

Subwatershed: Lamington River

Site Area: 633,014 sq. ft.

Address: 42 Canfield Avenue
Mine Hill, NJ 07803

Block and Lot: Block 1401, Lot 1

A rain garden can be installed near the disconnected downspouts to capture, treat, and infiltrate rooftop 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"
25	155,613	7.5	78.6	714.5	0.121	4.27

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	0.347	58	25,480	0.96	3,330	$16,650

GREEN INFRASTRUCTURE RECOMMENDATIONS

Canfield Avenue Elementary School

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

0 25' 50'

COCO'S CHATEAU

Subwatershed: Lamington River

Site Area: 35,723 sq. ft.

Address: 247 US-46
Mine Hill, NJ 07803

Block and Lot: Block 805, Lot 1

Pervious pavement can be installed on a parking strip south of the building to capture and infiltrate stormwater. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
60	21,483	1.0	10.8	98.6	0.017	0.59

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	0.103	17	7,570	0.28	1,000	$25,000

GREEN INFRASTRUCTURE RECOMMENDATIONS

Coco's Chateau

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

0 25' 50'

COUNTRY LAKES ANIMAL CLINIC

Subwatershed: Lamington River

Site Area: 33,664 sq. ft.

Address: 378 US-46
Mine Hill, NJ 07803

Block and Lot: Block 404, Lot 3-4,8

Parking spaces south of the building can be replaced with pervious pavement to capture and infiltrate stormwater. 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"
82	27,664	1.3	14.0	127.0	0.022	0.76

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	0.169	28	12,420	0.47	1,770	$44,250

GREEN INFRASTRUCTURE RECOMMENDATIONS

Country Lakes Animal Clinic

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

0 25' 50'

HODES VETERINARY GROUP

Subwatershed: Lamington River

Site Area: 23,156 sq. ft.

Address: 265 US-46
Mine Hill, NJ 07803

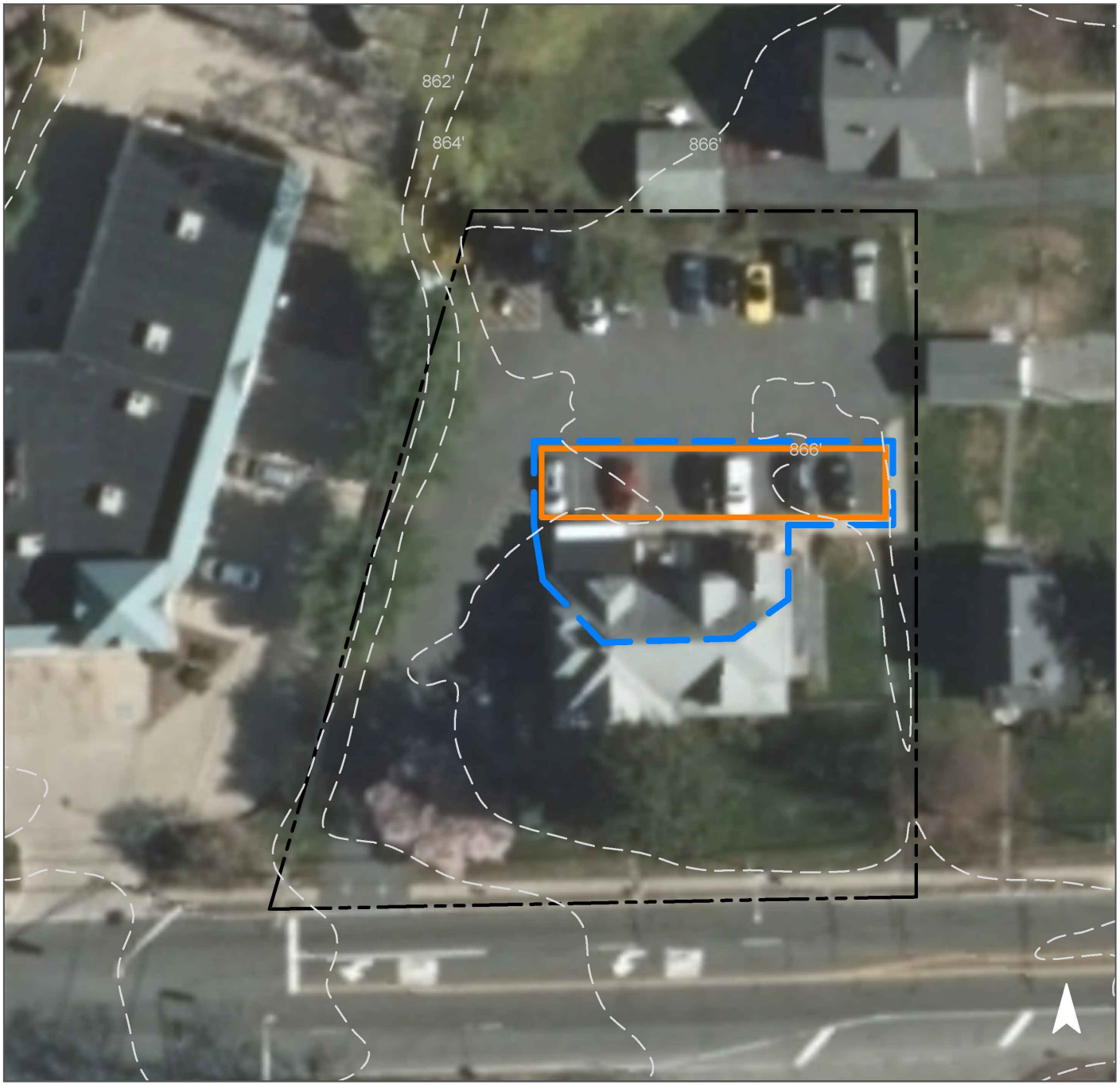
Block and Lot: Block 806, Lot 1

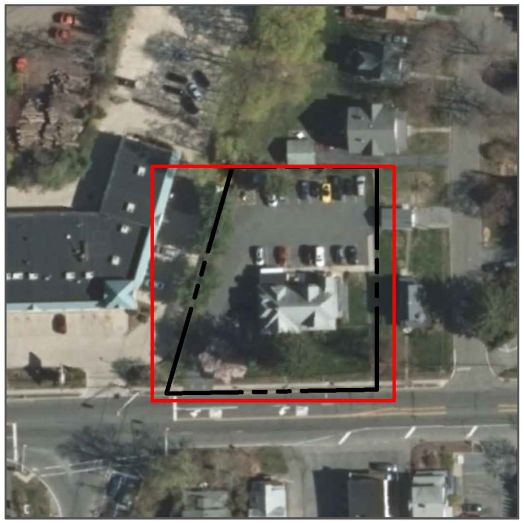
Pervious pavement can be installed on the north side of the building to capture and infiltrate stormwater. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
60	13,897	0.7	7.0	63.8	0.011	0.38

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	0.100	17	7,300	0.27	1,620	$40,500

GREEN INFRASTRUCTURE RECOMMENDATIONS





Hodes Veterinary Group

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

0 20' 40'

MINE HILL FIRE DEPARTMENT

Subwatershed: Lamington River

Site Area: 410,173 sq. ft.

Address: 230 US-46
Mine Hill, NJ 07803

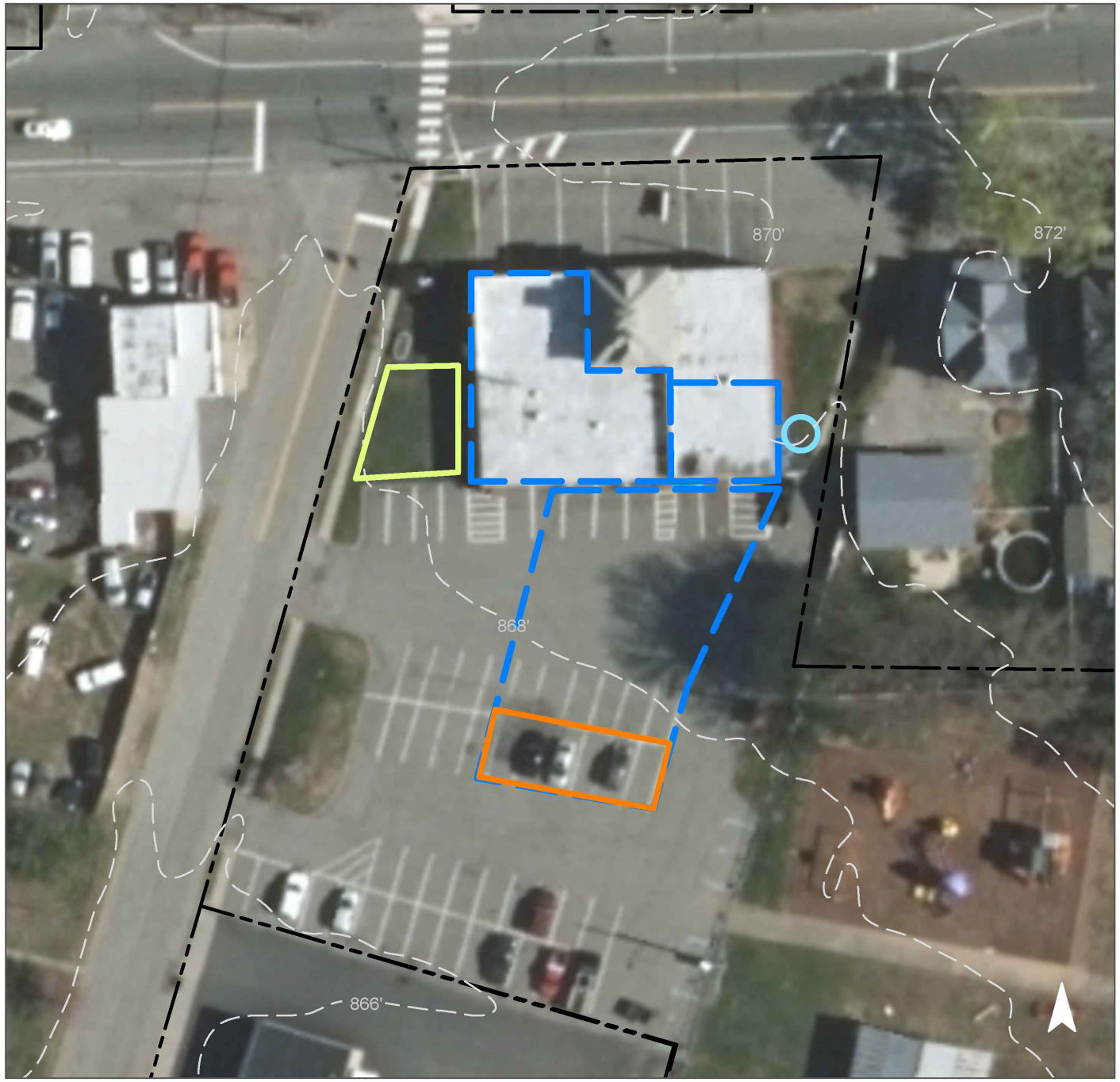
Block and Lot: Block 1304, Lot 17

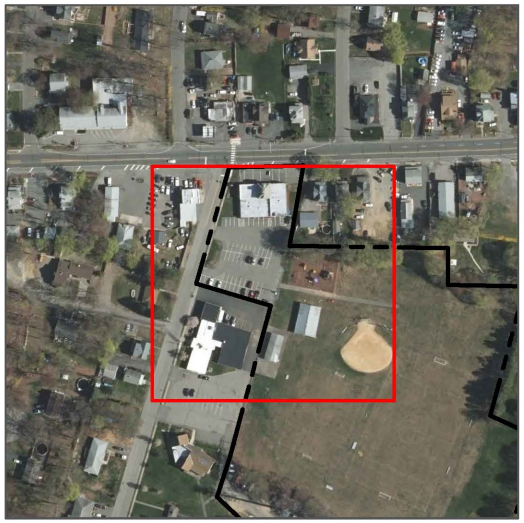
A rain garden can be installed on the west side of the building to capture, treat, and infiltrate rooftop runoff. Pervious pavement can be installed on the south parking strip to store stormwater runoff and allow it to slowly infiltrate into the ground. A cistern can be installed on the east side of the building near a disconnected downspout so the water can be used for watering gardens, washing vehicles, or for other non-potable uses. 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"
13	52,163	2.5	26.3	239.5	0.041	1.43

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	0.094	16	6,880	0.26	900	$4,500
Pervious pavement	0.190	32	13,920	0.52	1,300	$32,500
Rainwater harvesting	0.030	5	900	0.03	900 (gal)	$1,800

GREEN INFRASTRUCTURE RECOMMENDATIONS





Mine Hill Fire Department

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

0 25' 50'

American Legion

Subwatershed: Rockaway River

Site Area: 41,017 sq. ft.

Address: 391 Maple Avenue
Mine Hill, NJ 07803

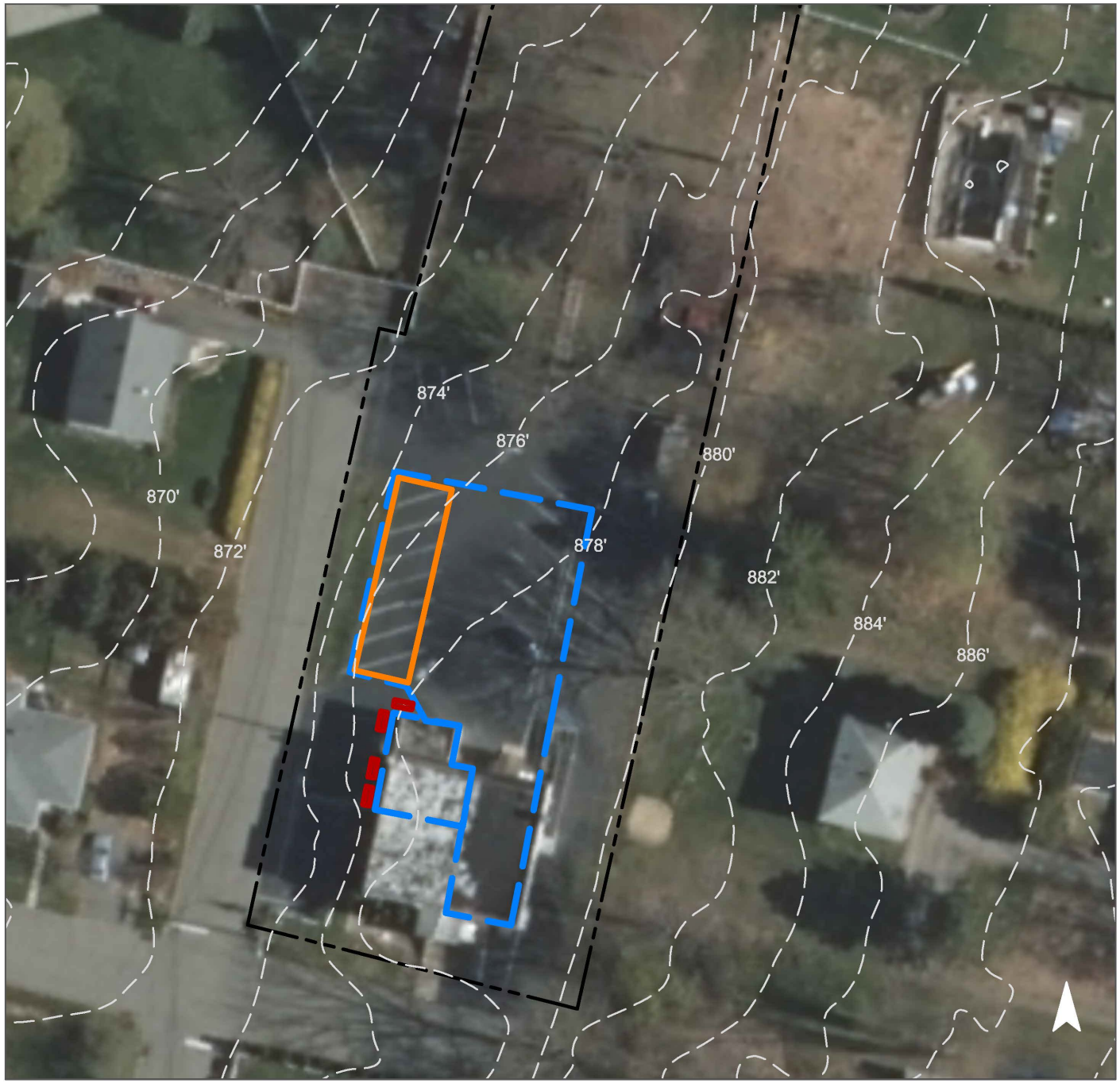
Block and Lot: Block 802, Lot 1

Half of the building's rooftop runoff and part of the parking lot runoff, can be treated with pervious pavement in the east strip 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"
55	22,421	1.1	11.3	102.9	0.017	0.61

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
Planter boxes	0.022	4	n/a	n/a	4 (boxes)	$4,000
Pervious pavement	0.170	28	12,480	0.47	1,165	$29,125

GREEN INFRASTRUCTURE RECOMMENDATIONS



American Legion

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

0 25' 50'

BENDER'S BAGELS ON THE HILL

Subwatershed: Rockaway River

Site Area: 20,596 sq. ft.

Address: 231 US-46
Mine Hill, NJ 07803

Block and Lot: Block 804, Lot 23

Pervious pavement can be installed south of the building 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"
64	13,238	0.6	6.7	60.8	0.010	0.36

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	0.062	10	4,550	0.17	630	$15,750

GREEN INFRASTRUCTURE RECOMMENDATIONS

Bender's Bagels On The Hill

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

0 20' 40'

HEDDEN PARK

Subwatershed: Rockaway River

Site Area: 4,453,779 sq. ft.

Address: 18 Ford Street
Mine Hill, NJ 07803

Block and Lot: Block 2101, Lot 1

A rain garden can be installed in the turfgrass area on the north side of the park to capture, treat, and infiltrate stormwater runoff from the parking/roadway 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"
2	88,704	4.3	44.8	407.3	0.069	2.43

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	0.057	10	4,200	0.16	550	$2,750

GREEN INFRASTRUCTURE RECOMMENDATIONS

Hedden Park

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

0 25' 50'

MINE HILL PRESBYTERIAN CHURCH

Subwatershed: Rockaway River

Site Area: 65,848 sq. ft.

Address: 213 Route 46
Mine Hill, NJ 07803

Block and Lot: Block 8002, Lot 17-18

Rain gardens can be installed on the north, southeast, and south sides of the building near disconnected downspouts to 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"
41	26,839	1.3	13.6	123.2	0.021	0.74

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	0.073	12	5,330	0.20	700	$3,500

GREEN INFRASTRUCTURE RECOMMENDATIONS

Mine Hill Presbyterian Church

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

0 25' 50'

MINE HILL RECREATION CENTER

Subwatershed: Rockaway River

Site Area: 285,271 sq. ft.

Address: 19 Baker Street
Mine Hill, NJ 07803

Block and Lot: Block 1304, Lot 13-14

A rain garden can be installed south of the gazebo to capture, treat, and infiltrate rooftop runoff. Pervious pavement can be installed on the basketball court to store stormwater runoff and allow it to slowly 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"
28	79,516	3.8	40.2	365.1	0.062	2.18

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	0.013	2	970	0.04	125	$625
Pervious pavement	0.358	60	26,280	0.99	13,750	$343,750

GREEN INFRASTRUCTURE RECOMMENDATIONS

Mine Hill Recreation Center

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

0 25' 50'

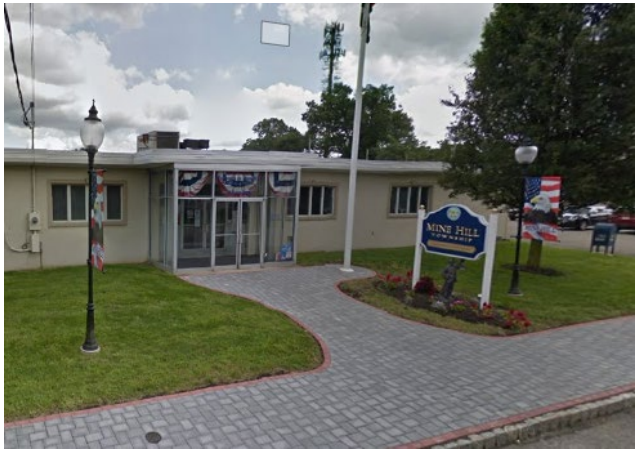
MINE HILL TOWN HALL

Subwatershed: Rockaway River

Site Area: 29,100 sq. ft.

Address: 10 Baker Street
Mine Hill, NJ 07803

Block and Lot: Block 1304, Lot 16



A rain garden can be installed in the turfgrass area near the building to capture, treat, and infiltrate rooftop 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"
64	18,491	0.9	9.3	84.9	0.014	0.51

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	0.123	21	9,010	0.34	376	$1,880

GREEN INFRASTRUCTURE RECOMMENDATIONS

Mine Hill Town Hall

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

0 25' 50'

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 (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)
	LAMINGTON RIVER SITES	**26.07**	**1,135,730**				**270,819**	**13.1**	**136.8**	**1,243.4**	**0.211**	**7.43**
1	**Canfield Avenue Elementary School**											
	Total Site Info	14.53	633,014	1401	1	25	155,613	7.5	78.6	714.5	0.121	4.27
2	**Coco's Chateau**											
	Total Site Info	0.82	35,723	805	1	60	21,483	1.0	10.8	98.6	0.017	0.59
3	**Country Lakes Animal Clinic**											
	Total Site Info	0.77	33,664	404	3-4;8	82	27,664	1.3	14.0	127.0	0.022	0.76
4	**Hodes Veterinary Group**											
	Total Site Info	0.53	23,156	806	1	60	13,897	0.7	7.0	63.8	0.011	0.38
5	**Mine Hill Fire Department**											
	Total Site Info	9.42	410,173	1304	17	13	52,163	2.5	26.3	239.5	0.041	1.43
	ROCKAWAY RIVER SITES	**111.52**	**4,857,595**				**249,209**	**12.0**	**125.9**	**1,144.2**	**0.194**	**6.83**
6	**American Legion**											
	Total Site Info	0.94	41,017	802	15	55	22,421	1.1	11.3	102.9	0.017	0.61
7	**Bender's Bagels On The Hill**											
	Total Site Info	0.47	20,596	804	23	64	13,238	0.6	6.7	60.8	0.010	0.36
8	**Hedden Park**											
	Total Site Info	102.24	4,453,779	2101	1	2	88,704	4.3	44.8	407.3	0.069	2.43
9	**Mine Hill Presbyterian Church**											
	Total Site Info	1.51	65,848	802	17-18	41	26,839	1.3	13.6	123.2	0.021	0.74
10	**Mine Hill Recreation Center**											
	Total Site Info	6.62	288,271	1304	13-14	28	79,516	3.8	40.2	365.1	0.062	2.18
11	**Mine Hill Town Hall**											
	Total Site Info	0.67	29,100	1304	16	64	18,491	0.9	9.3	84.9	0.014	0.51

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	Total Cost	I.C. Treated
		Area (SF)	Area (ac)	(Mgal/yr)	(lbs/yr)	(gal/storm)	(cfs)		($)	%
	LAMINGTON RIVER SITES	**39,625**	**0.91**	**1.032**	**173**	**74,470**	**2.79**		**$165,200**	**14.6%**
1	**Canfield Avenue Elementary School**									
	Bioretention system	13,325	0.31	0.347	58	25,480	0.96	3,330	$16,650	8.6%
	Total Site Info	**13,325**	**0.31**	**0.347**	**58**	**25,480**	**0.96**		**$16,650**	**8.6%**
2	**Coco's Chateau**									
	Pervious pavement	3,960	0.09	0.103	17	7,570	0.28	1,000	$25,000	18.4%
	Total Site Info	**3,960**	**0.09**	**0.103**	**17**	**7,570**	**0.28**		**$25,000**	**18.4%**
3	**Country Lakes Animal Clinic**									
	Pervious pavement	6,500	0.15	0.169	28	12,420	0.47	1,770	$44,250	23.5%
	Total Site Info	**6,500**	**0.15**	**0.169**	**28**	**12,420**	**0.47**		**$44,250**	**23.5%**
4	**Hodes Veterinary Group**									
	Pervious pavement	3,820	0.09	0.100	17	7,300	0.27	1,620	$40,500	27.5%
	Total Site Info	**3,820**	**0.09**	**0.100**	**17**	**7,300**	**0.27**		**$40,500**	**27.5%**
5	**Mine Hill Fire Department**									
	Bioretention system	3,600	0.08	0.094	16	6,880	0.26	900	$4,500	6.9%
	Pervious pavement	7,280	0.17	0.190	32	13,920	0.52	1,300	$32,500	14.0%
	Rainwater harvesting	1,140	0.03	0.030	5	900	0.03	900	$1,800	2.2%
	Total Site Info	**12,020**	**0.28**	**0.313**	**52**	**21,700**	**0.81**		**$38,800**	**23.0%**
	ROCKAWAY RIVER SITES	**33,719**	**0.77**	**0.879**	**87**	**62,820**	**2.37**		**$374,585**	**13.5%**
6	**American Legion**									
	Planter boxes	860	0.02	0.022	4	n/a	n/a	4	$4,000	3.8%
	Pervious pavement	6,525	0.15	0.170	28	12,480	0.47	1,165	$29,125	29.1%
	Total Site Info	**7,385**	**0.17**	**0.192**	**32**	**12,480**	**0.47**		**$6,330**	**32.9%**
7	**Bender's Bagels On The Hill**									
	Pervious pavement	2,380	0.05	0.062	10	4,550	0.17	630	$15,750	18.0%
	Total Site Info	**2,380**	**0.05**	**0.062**	**10**	**4,550**	**0.17**		**$15,750**	**18.0%**

Summary of Proposed Green Infrastructure Practices

	Subwatershed/Site Name/Total Site Info/GI Practice	Potential Management Area		Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Max Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cfs)	Size of BMP	Total Cost ($)	I.C. Treated %
		Area (SF)	Area (ac)							
8	**Hedden Park**									
	Bioretention system	2,200	0.05	0.057	10	4,200	0.16	550	$2,750	2.5%
	Total Site Info	**2,200**	**0.05**	**0.057**	**10**	**4,200**	**0.16**		**$2,750**	**2.5%**
9	**Mine Hill Presbyterian Church**									
	Bioretention systems	2,785	0.06	0.073	12	5,330	0.20	700	$3,500	10.4%
	Total Site Info	**2,785**	**0.06**	**0.073**	**12**	**5,330**	**0.20**		**$3,500**	**10.4%**
10	**Mine Hill Recreation Center**									
	Bioretention system	510	0.01	0.013	2	970	0.04	125	$625	0.6%
	Pervious pavement	13,750	0.32	0.358	60	26,280	0.99	13,750	$343,750	17.3%
	Total Site Info	**14,260**	**0.33**	**0.372**	**2**	**27,250**	**1.03**		**$344,375**	**17.9%**
11	**Mine Hill Town Hall**									
	Bioretention system	4,709	0.11	0.123	21	9,010	0.34	376	$1,880	25.5%
									$1,880	**25.5%**