RUTGERS
New Jersey Agricultural
Experiment Station

Draft

Impervious Cover Reduction Action Plan
for
Flemington Borough, Hunterdon County, New Jersey

Prepared for Flemington Borough by the
Rutgers Cooperative Extension Water Resources Program

November 16, 2015

Table of Contents

Attachment: Climate Resilient Green Infrastructure

a. Overview Map of the Project

b. Green Infrastructure Sites

c. Proposed Green Infrastructure Concepts

d. Summary of Existing Conditions

e. Summary of Proposed Green Infrastructure Practices

Introduction

Located in Hunterdon County in central New Jersey, Flemington Borough covers approximately 1.08 square miles. Figures 1 and 2 illustrate that Flemington Borough is dominated by urban land uses. A total of 93.8% of the municipality's land use is classified as urban. Of the urban land in Flemington Borough, commercial is the dominant land use (Figure 3).

The New Jersey Department of Environmental Protection's (NJDEP) 2007 land use/land cover geographical information system (GIS) data layer categorizes Flemington Borough 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 Flemington Borough. Based upon the 2007 NJDEP land use/land cover data, approximately 47.7% of Flemington Borough has impervious cover. This level of impervious cover suggests that the streams in Flemington Borough are likely non-supporting streams.[1]

Methodology

Flemington Borough contains portions of two 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

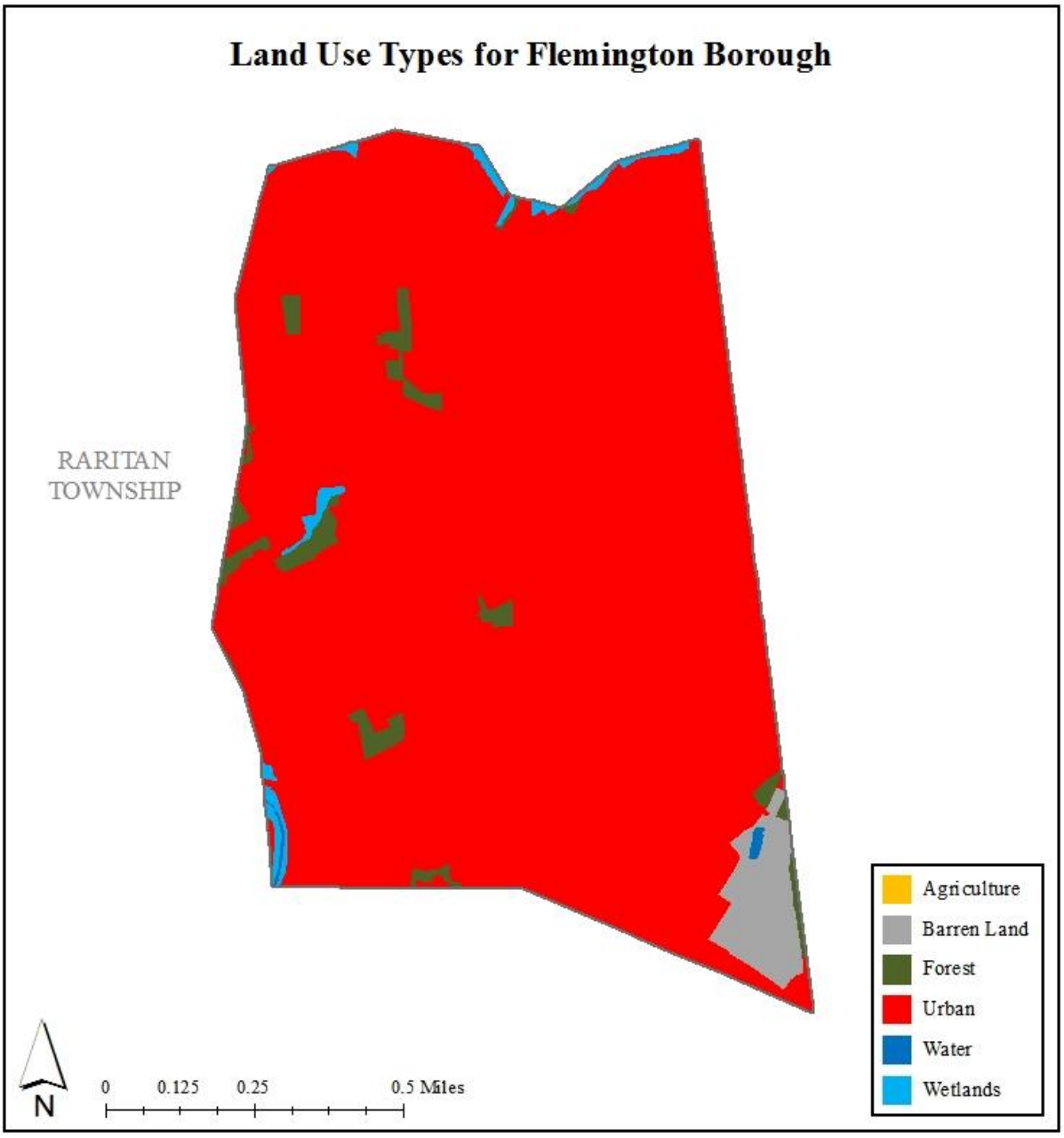


Figure 1: Map illustrating the land use in Flemington Borough

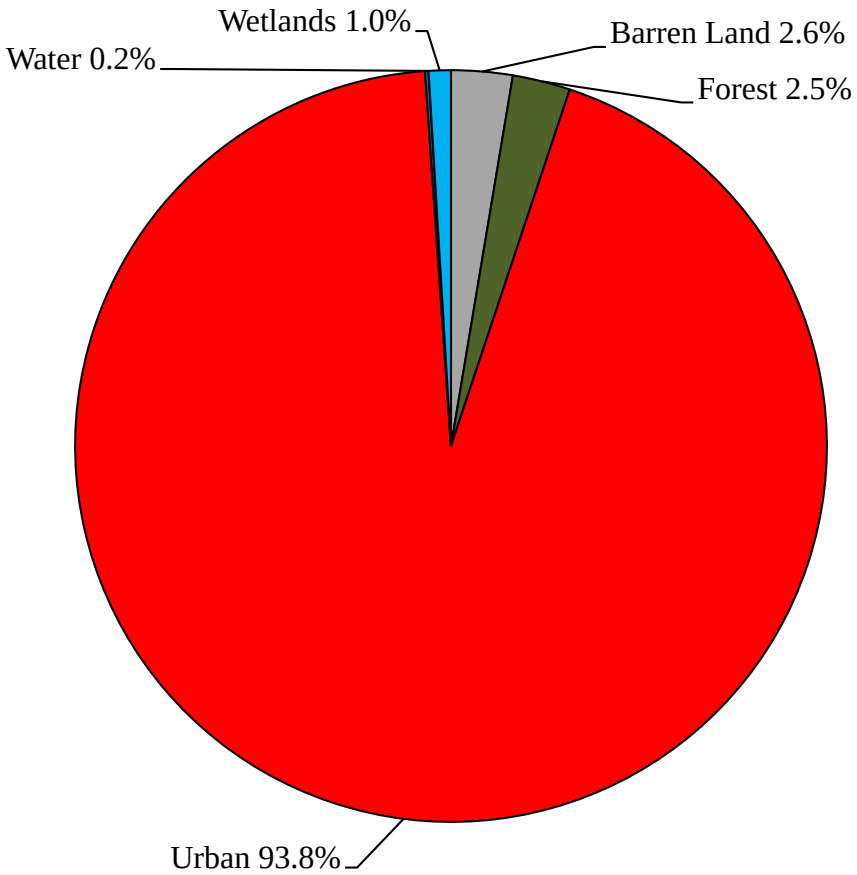


Figure 2: Pie chart illustrating the land use in Flemington Borough

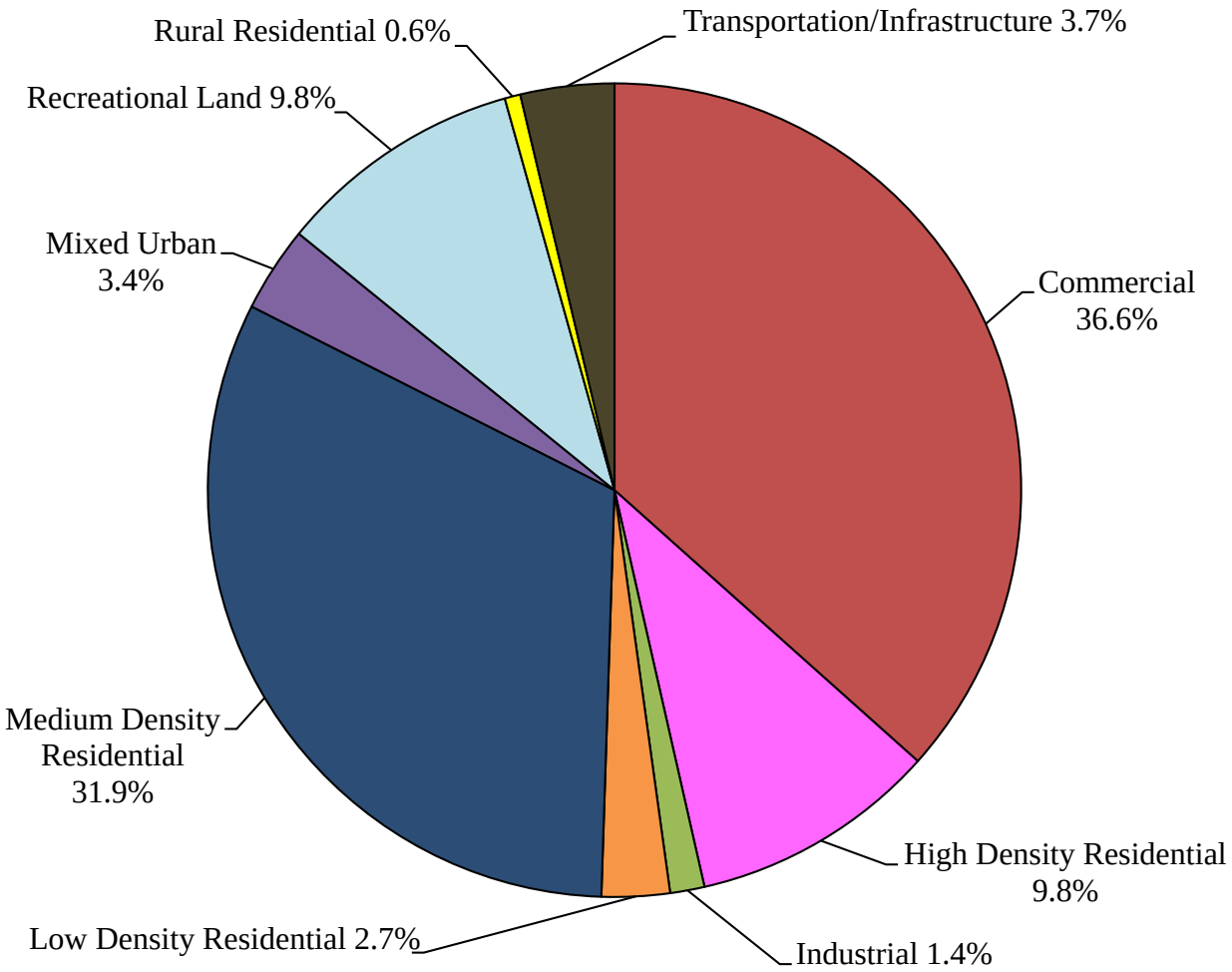


Figure 3: Pie chart illustrating the various types of urban land use in Flemington Borough

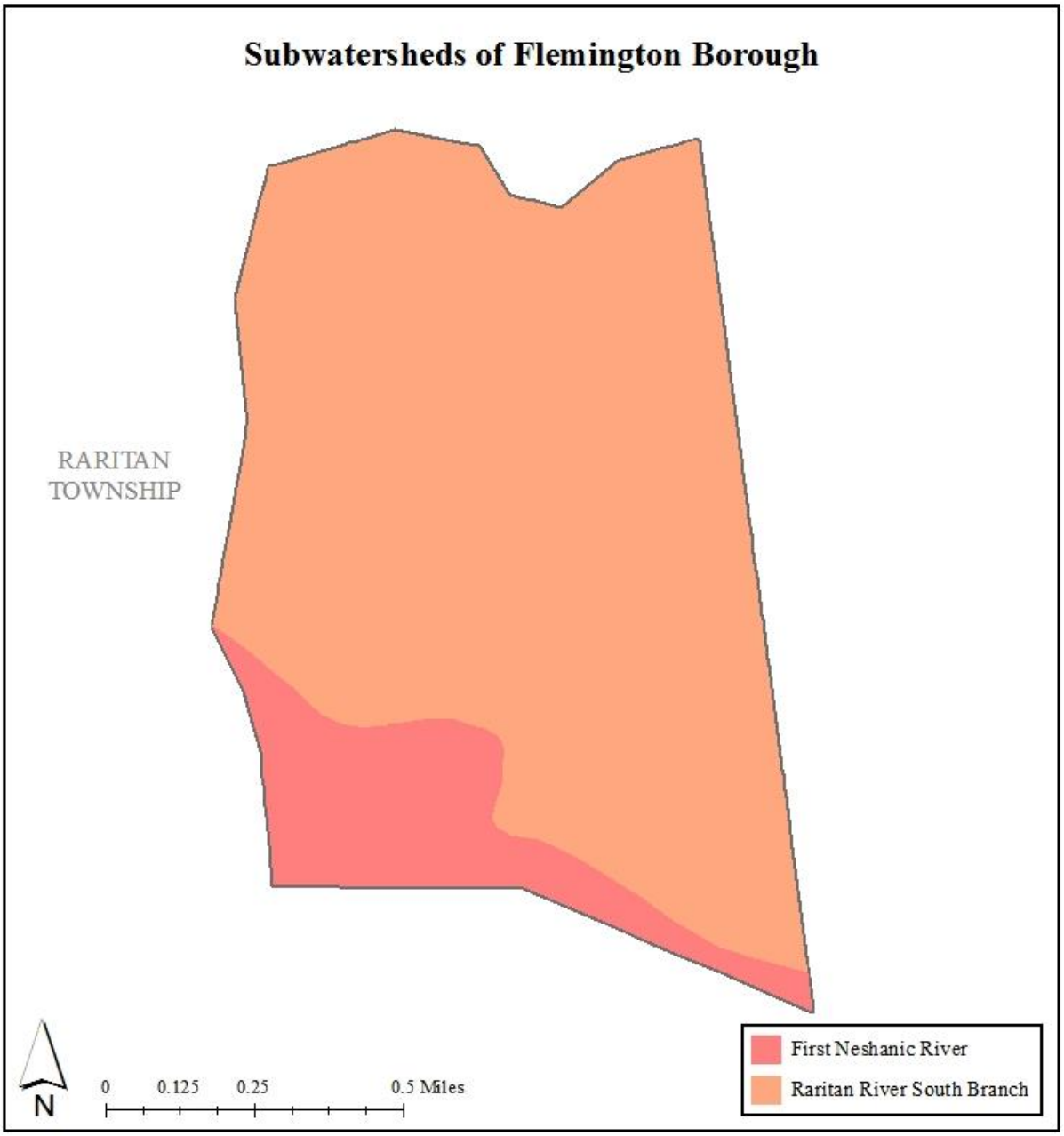


Figure 4: Map of the subwatersheds in Flemington Borough

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 2007 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 Flemington Borough 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 Flemington Borough. Each practice is discussed below.

Disconnected downspouts

This is often referred to as simple disconnection. A downspout is simply disconnected, and 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 a 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

Attachment 1 contains information on potential project sites where green infrastructure practices could be installed. The recommended green infrastructure practice and the drainage area that the green infrastructure practice can treat are identified for each potential project site. For each practice, the recharge potential, TSS removal potential, maximum volume reduction potential per storm, and the peak reduction potential 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.

a. Overview Map of the Project

FLEMINGTON BOROUGH: CLIMATE RESILIENT GREEN INFRASTRUCTURE FOR THE RARITAN BASIN

b. Green Infrastructure Sites

FLEMINGTON BOROUGH: GREEN INFRASTRUCTURE SITES

SITES WITHIN THE FIRST NESHANIC RIVER SUBWATERSHED:

1. Paradise Golf Center

SITES WITHIN THE RARITAN RIVER SOUTH BRANCH SUBWATERSHED:

2. Calvary Episcopal Church
3. Flemington Baptist Church
4. Flemington Borough Fire Department
5. Flemington Borough Police Department
6. Flemington Presbyterian Church
7. Flemington Public Library
8. Holcombe-Fisher Funeral Home
9. Reading-Flemington Intermediate School
10. Saint Magdalen Church

c. Proposed Green Infrastructure Concepts

PARADISE GOLF CENTER

Subwatershed: First Neshanic River

Site Area: 456,819 sq. ft.

Address: 56 Route 12
Flemington, NJ 08822

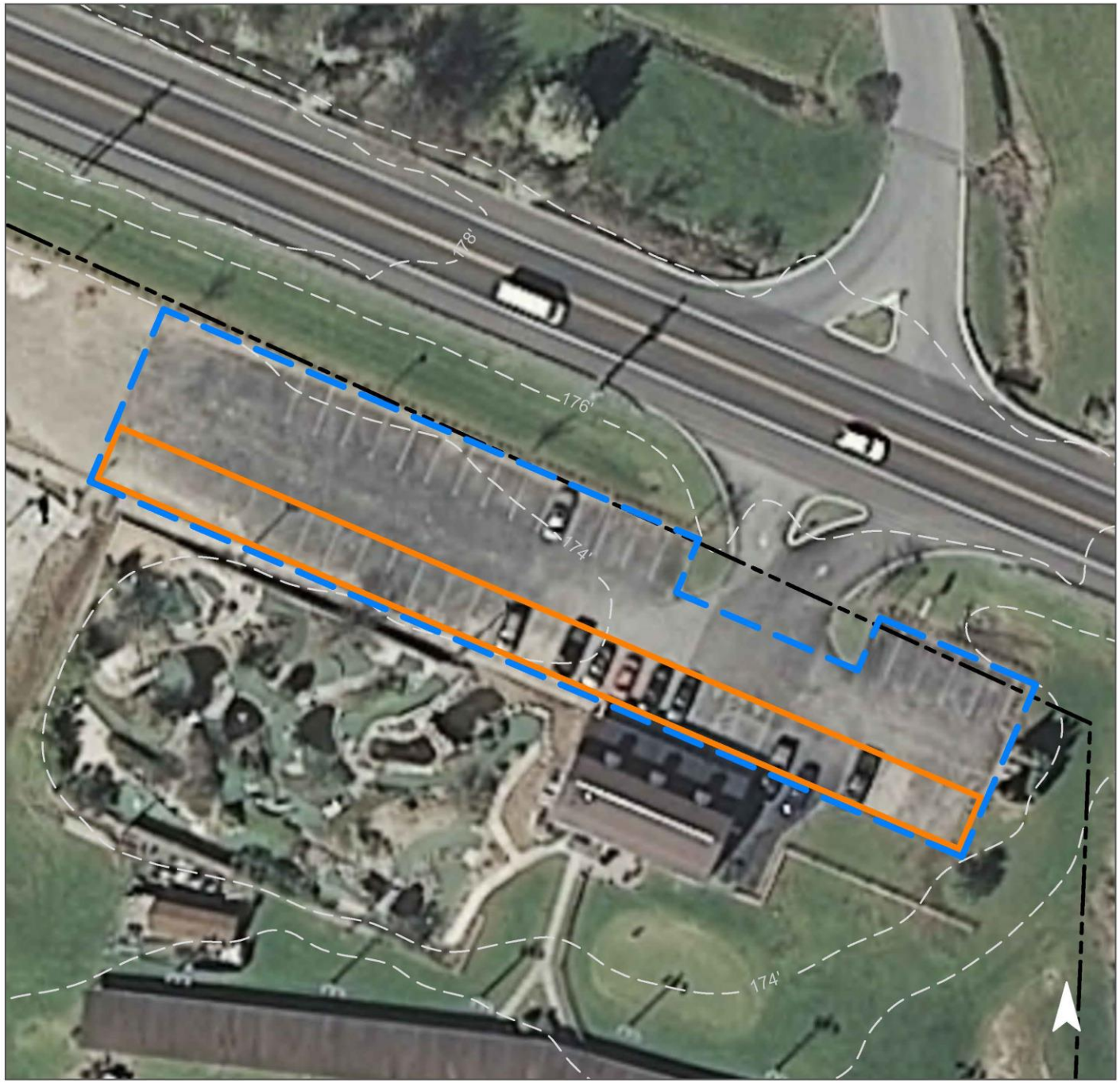
Block and Lot: Block 45, Lot 1

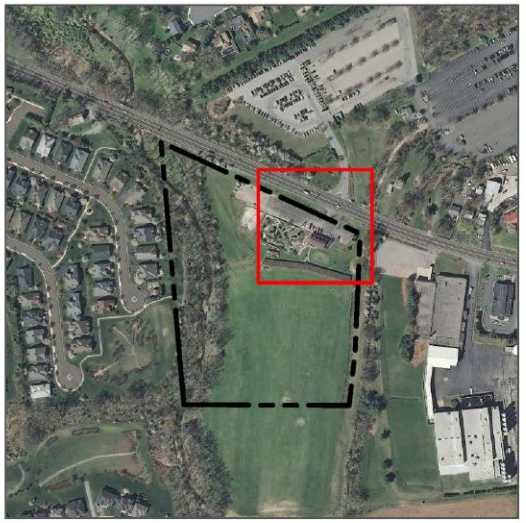
Parking spaces adjacent to the main building can be replaced with pervious pavement to capture and infiltrate stormwater runoff. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

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"
11	50,299	2.4	25.4	230.9	0.039	1.38

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 pavements	0.469	79	35,530	1.33	5,600	$140,000

GREEN INFRASTRUCTURE RECOMMENDATIONS





Paradise Golf Center

- pervious pavements
- drainage areas
- property line
- 2012 Aerial: NJOIT, OGIS

0 25' 50'

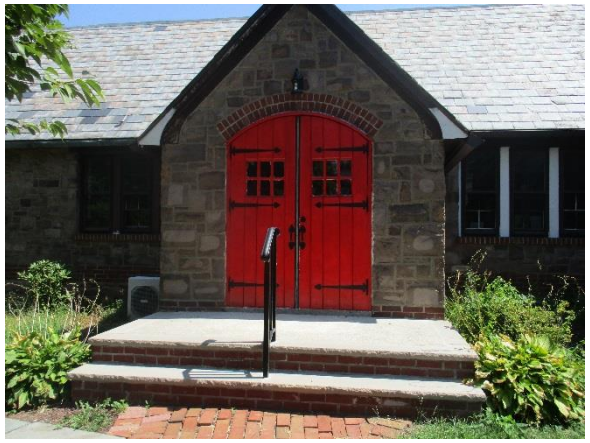
CALVARY EPISCOPAL CHURCH

Subwatershed: Raritan River South Branch

Site Area: 43,815 sq. ft.

Address: 44 Broad Street
Flemington, NJ 08822

Block and Lot: Block 19, Lot 7

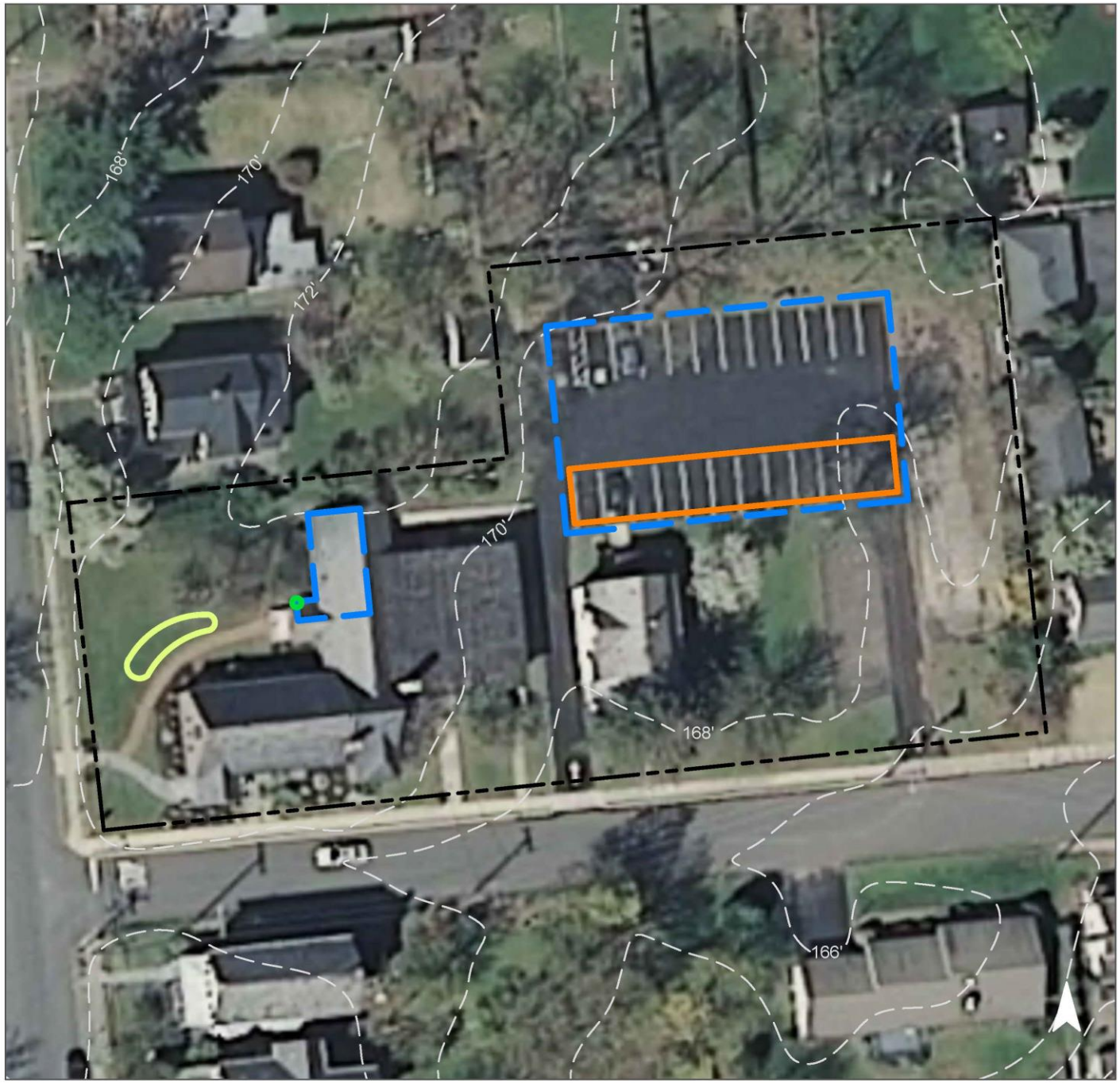


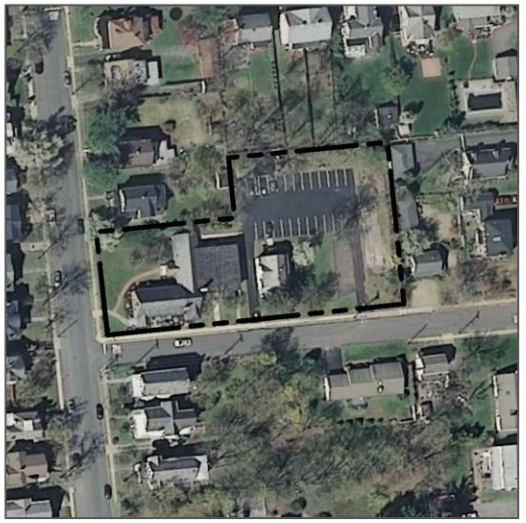
Parking spots can be replaced with pervious pavement to capture and infiltrate runoff. A bioretention system can be installed to capture, treat, and infiltrate roof runoff by disconnecting and redirecting a nearby downspout into it. A preliminary soil assessment suggests that the soils have suitable 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"
35	15,335	0.7	7.7	70.4	0.012	0.42

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	0.016	3	1,182	0.04	200	$1,000
Pervious pavements	0.198	33	15,005	0.56	1,900	$47,500

GREEN INFRASTRUCTURE RECOMMENDATIONS





Calvary Episcopal Church

- disconnected downspouts
- pervious pavements
- bioretention / rain gardens
- drainage areas
- property line
- 2012 Aerial: NJOIT, OGIS

0 25' 50'

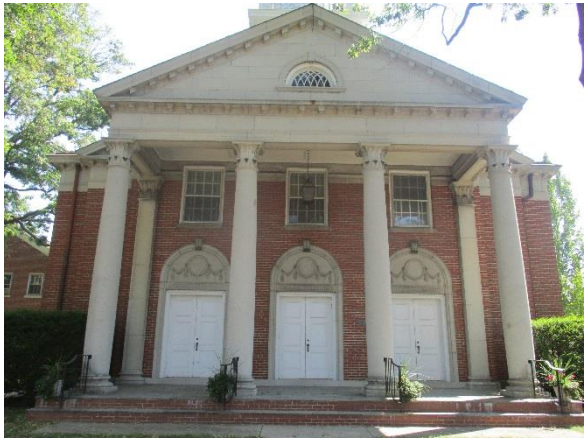
FLEMINGTON BAPTIST CHURCH

Subwatershed: Raritan River South Branch

Site Area: 175,914 sq. ft.

Address: 170 Main Street
Flemington, NJ 08822

Block and Lot: Block 38, Lot 10

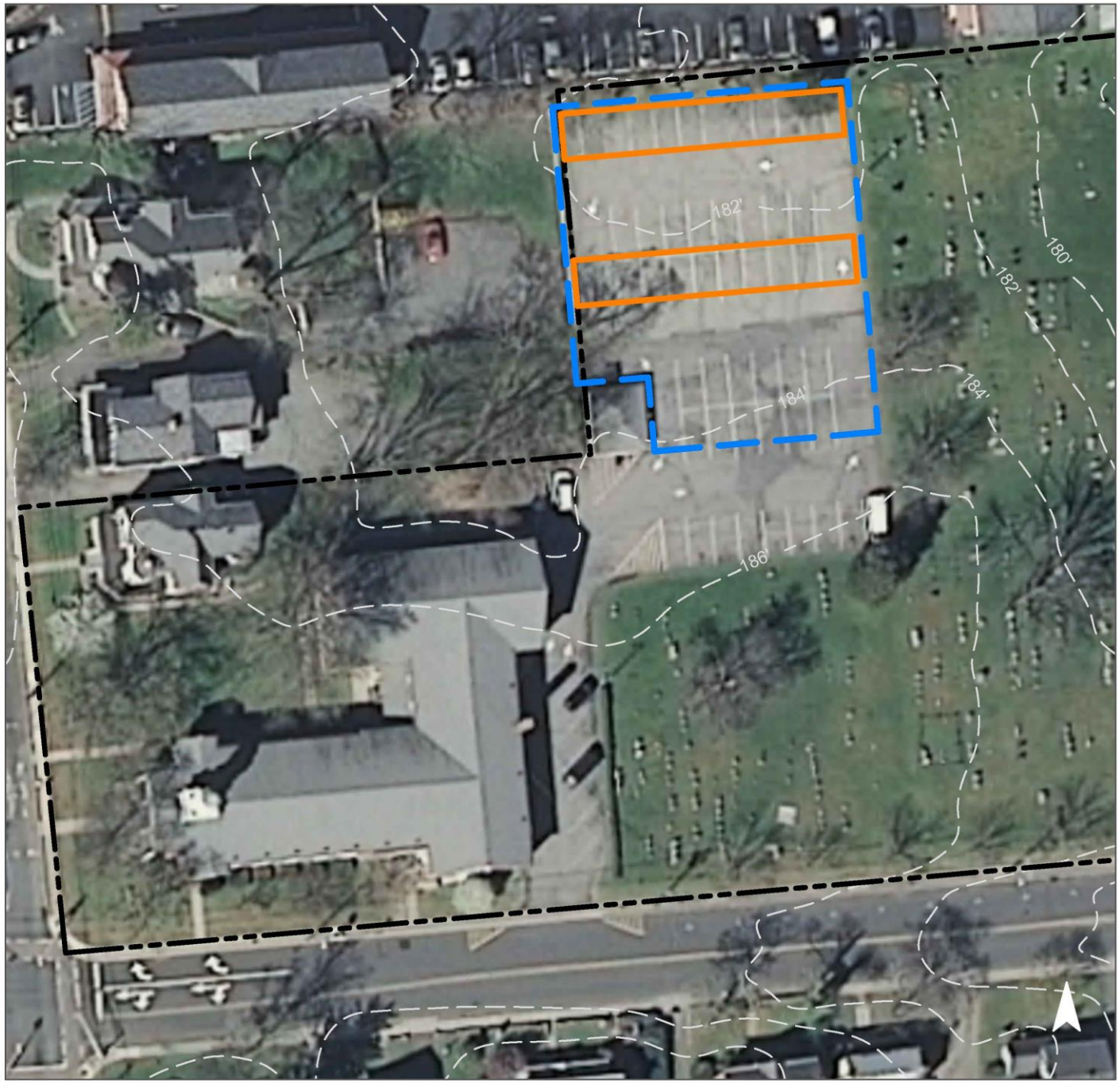


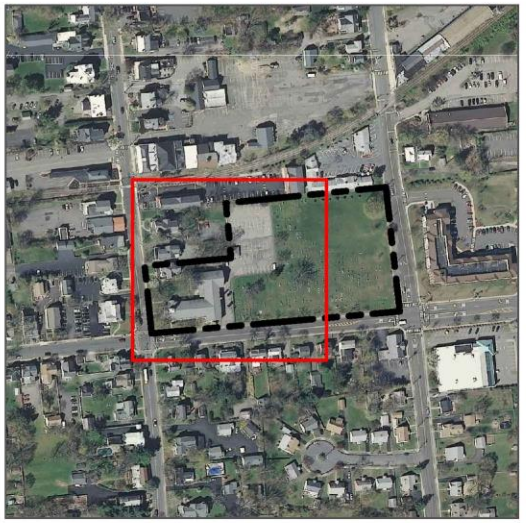
Parking spaces can be replaced with pervious pavement to infiltrate parking lot runoff. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

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"
37	64,320	3.1	32.5	295.3	0.050	1.76

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 pavements	0.391	65	29,606	1.11	4,000	$100,000

GREEN INFRASTRUCTURE RECOMMENDATIONS





Flemington Baptist Church

- pervious pavements
- drainage areas
- property line
- 2012 Aerial: NJOIT, OGIS

0 30' 60'

FLEMINGTON BOROUGH FIRE DEPARTMENT

Subwatershed: Raritan River South Branch

Site Area: 39,247 sq. ft.

Address: 38 Park Avenue
Flemington, NJ 08822

Block and Lot: Block 15, Lot 43

Parking spaces can be replaced with porous asphalt to 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"
91	35,558	1.7	18.0	163.3	0.028	0.98

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 pavements	0.378	63	28,626	1.07	2,800	$70,000

GREEN INFRASTRUCTURE RECOMMENDATIONS

Flemington Borough Fire Department

- pervious pavements
- drainage areas
- property line
- 2012 Aerial: NJOIT, OGIS

0 25' 50'

FLEMINGTON BOROUGH POLICE DEPARTMENT

Subwatershed: Raritan River South Branch

Site Area: 44,760 sq. ft.

Address: 100 Main Street
Flemington, NJ 08822

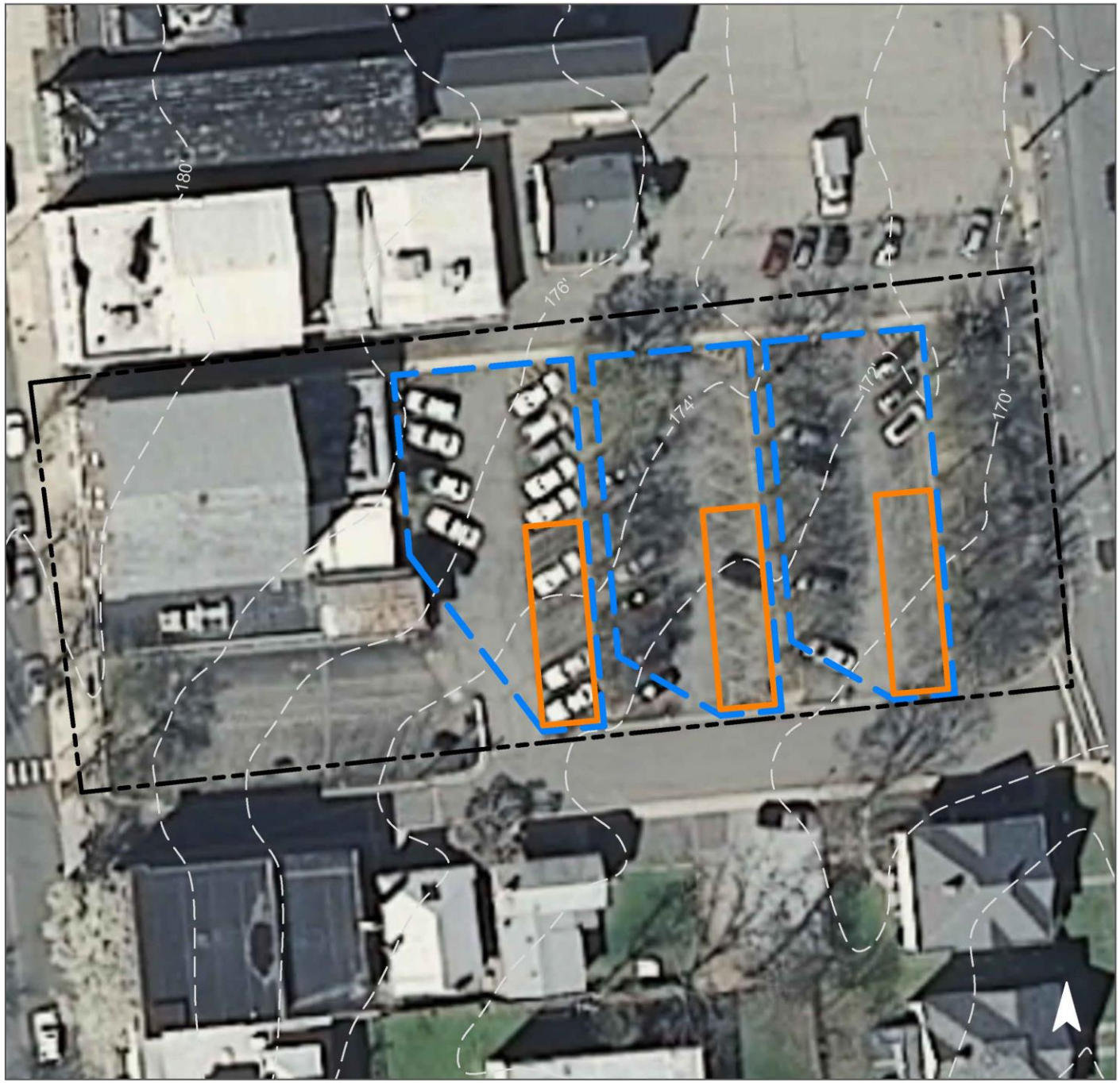
Block and Lot: Block 22, Lot 7

Parking spaces can be replaced with porous asphalt to capture and infiltrate stormwater 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"
95	42,522	2.0	21.5	195.2	0.033	1.17

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 pavements	0.456	76	34,543	1.30	3,500	$87,500

GREEN INFRASTRUCTURE RECOMMENDATIONS



Flemington Borough Police Department

- pervious pavements
- drainage areas
- property line
- 2012 Aerial: NJOIT, OGIS

0 25' 50'

FLEMINGTON PRESBYSTERIAN CHURCH

Subwatershed: Raritan River South Branch

Site Area: 209,590 sq. ft.

Address: 10 East Main Street
Flemington, NJ 08822

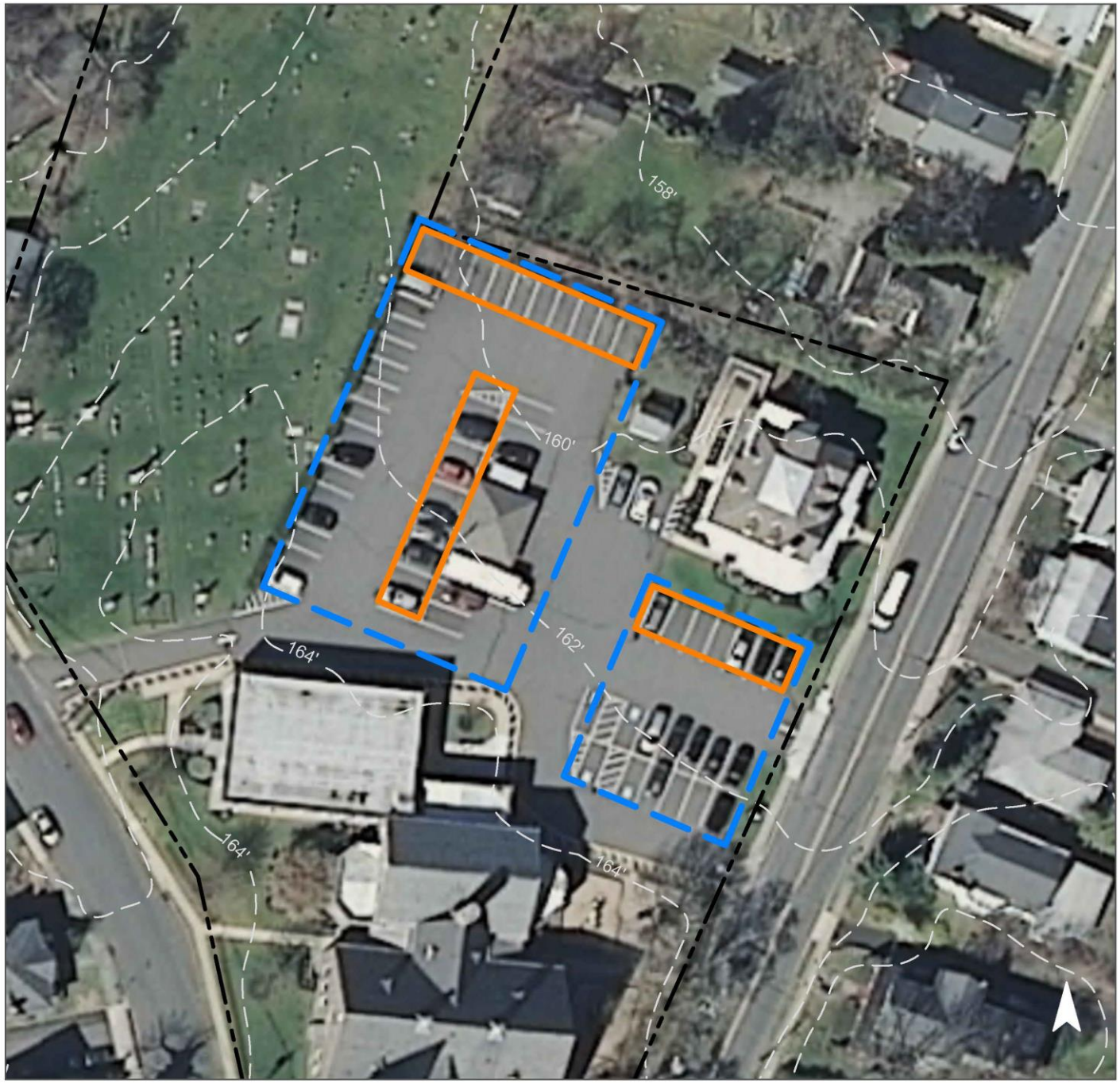
Block and Lot: Block 6, Lot 11

Parking spaces can be replaced with pervious pavement to 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"
35	73,533	3.5	37.1	337.6	0.057	2.02

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
Pervious pavements	0.573	96	43,429	1.63	4,500	$112,500

GREEN INFRASTRUCTURE RECOMMENDATIONS



Flemington Presbyterian Church

- pervious pavements
- drainage areas
- property line
- 2012 Aerial: NJOIT, OGIS

0 30' 60'

FLEMINGTON PUBLIC LIBRARY

Subwatershed: Raritan River South Branch

Site Area: 36,558 sq. ft.

Address: 118 Main Street
Flemington, NJ 08822

Block and Lot: Block 29, Lot 2

Parking spots by the north building can be replaced with porous asphalt to 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"
94	34,340	1.7	17.3	157.7	0.027	0.94

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 pavements	0.253	42	19,149	0.72	2,600	$65,000

GREEN INFRASTRUCTURE RECOMMENDATIONS

Flemington Public Library

- pervious pavements
- drainage areas
- property line
- 2012 Aerial: NJOIT, OGIS

0 25' 50'

HOLCOMBE-FISHER FUNERAL HOME

Subwatershed: Raritan River South Branch

Site Area: 22,353 sq. ft.

Address: 147 Main Street
Flemington, NJ 08822

Block and Lot: Block 36 , Lot 11

Parking spaces can be replaced with pervious pavement to 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"
75	16,760	0.8	8.5	77.0	0.013	0.46

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 pavements	0.125	21	9,477	0.36	2,200	$55,000

GREEN INFRASTRUCTURE RECOMMENDATIONS

Holcombe-Fisher Funeral Home

- pervious pavements
- drainage areas
- property line
- 2012 Aerial: NJOIT, OGIS

0 25' 50'

READING-FLEMINGTON INTERMEDIATE SCHOOL

Subwatershed: Raritan River South Branch

Site Area: 658,353 sq. ft.

Address: 50 Court Street
Flemington, NJ 08822

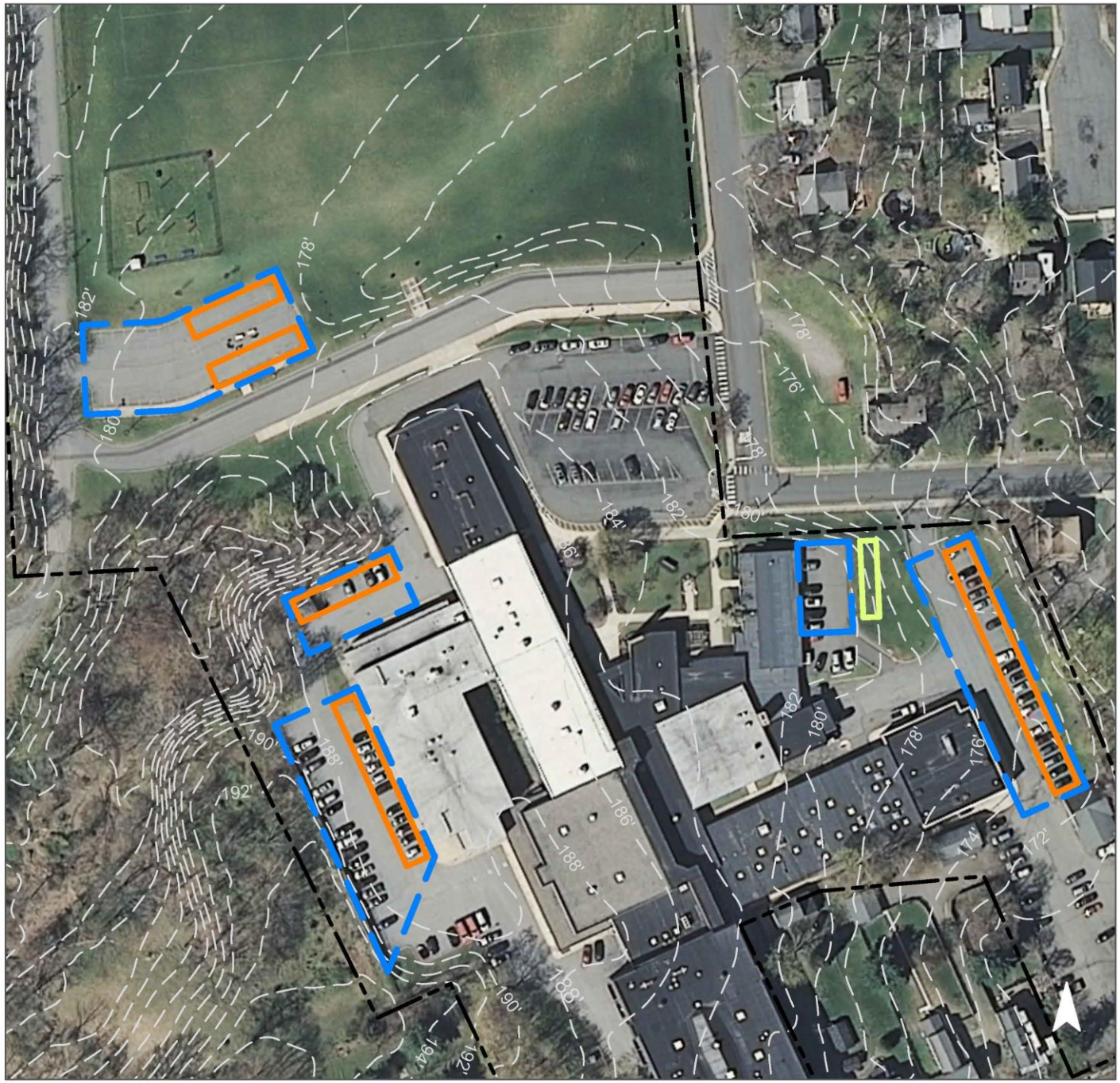
Block and Lot: Block 15, Lot 2

Parking spaces can be replaced with pervious pavement to infiltrate parking lot runoff. A rain garden can also capture, treat and infiltrate runoff. A preliminary soil assessment suggests that 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"
48	314,253	15.1	158.7	1,442.8	0.245	8.62

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 systems	0.073	12	5,528	0.21	700	$3,500
Pervious pavements	1.081	181	81,921	3.08	11,000	$275,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Reading-Flemington Intermediate School

- pervious pavements
- bioretention / rain gardens
- drainage areas
- property line
- 2012 Aerial: NJOIT, OGIS

0 60' 120'

SAINT MAGDALEN CHURCH

Subwatershed: Raritan River South Branch

Site Area: 283,759 sq. ft.

Address: 105 Mine Street
Flemington, NJ 08822

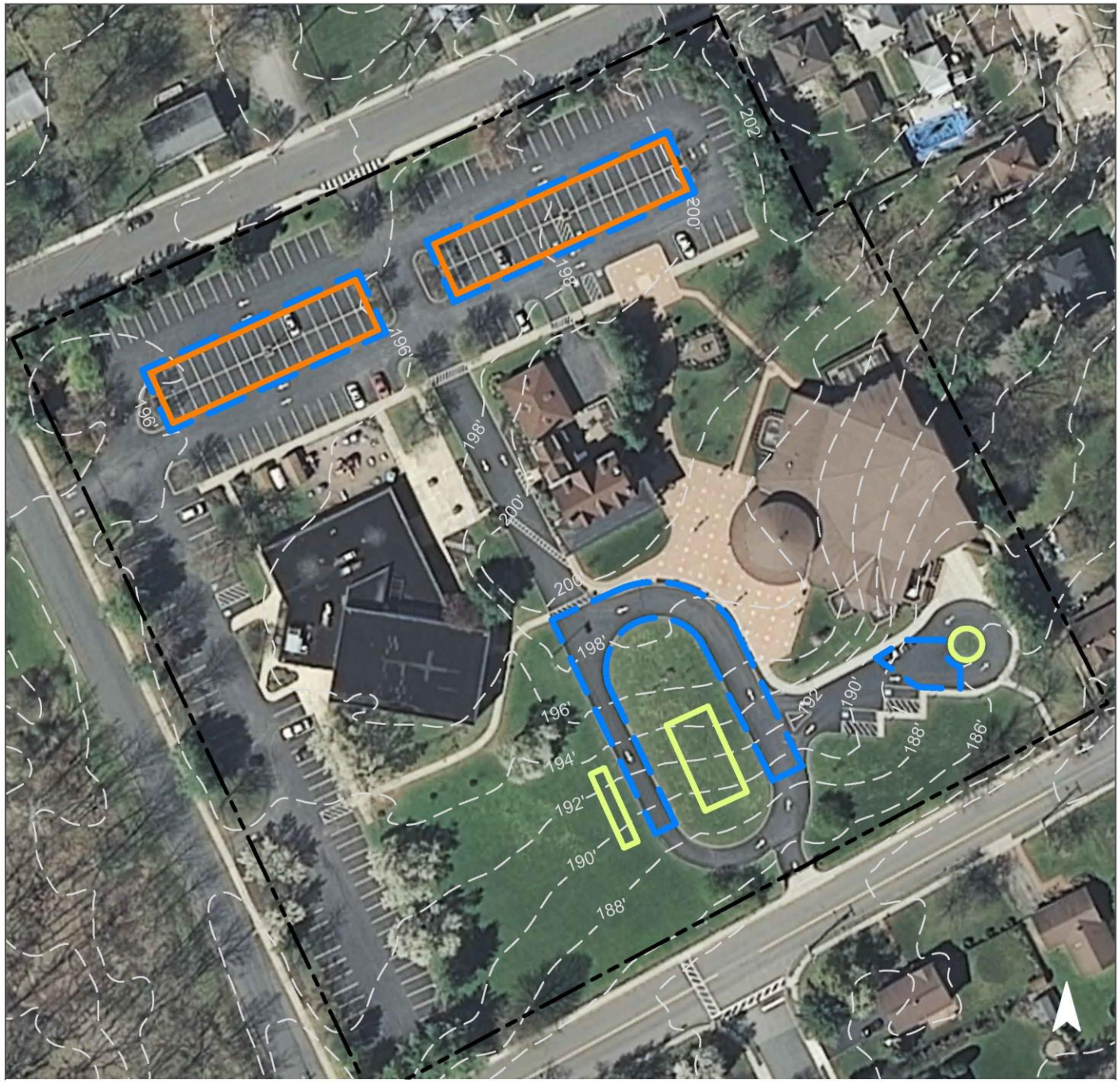
Block and Lot: Block 32, Lot 1

Bioretention systems can be installed to capture, treat, and infiltrate driveway runoff. Parking spaces can also be replaced with pervious pavement to 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"
66	188,053	9.1	95.0	863.4	0.147	5.16

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
Bioretention systems	0.224	38	16,980	0.64	2,700	$13,500
Pervious pavements	0.378	63	28,626	1.07	11,000	$275,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Saint Magdalen Church

- pervious pavements
- bioretention / rain gardens
- drainage areas
- property line
- 2012 Aerial: NJOIT, OGIS

0 50' 100'

d. Summary of Existing Conditions

Summary of Existing Site Conditions

Subwatershed/Site Name/Total Site Info/GI Practice	Area (ac)	Area (SF)	Block	Lot	Existing Annual Loads TP (lb/yr)	Existing Annual Loads TN (lb/yr)	Existing Annual Loads TSS (lb/yr)	I.C. %	I.C. Area (ac)	I.C. Area (SF)	Runoff Volumes from I.C. Water Quality Storm (1.25" over 2-hours) (Mgal)	Runoff Volumes from I.C. Annual (Mgal)
FIRST NESHANIC RIVER SUBWATERSHED	**10.49**	**456,819**			**2.4**	**25.4**	**230.9**		**1.15**	**50,299**	**0.039**	**1.38**
Paradise Golf Center												
Total Site Info	10.49	456,819	45	1	2.4	25.4	230.9	11	1.15	50,299	0.039	1.38
RARITAN RIVER SOUTH BRANCH SUBWATERSHED	**34.76**	**1,514,349**			**37.8**	**396.3**	**3,602.7**		**18.01**	**784,674**	**0.611**	**21.52**
Calvary Episcopal Church												
Total Site Info	1.01	43,815	19	7	0.7	7.7	70.4	35	0.35	15,335	0.012	0.42
Flemington Baptist Church												
Total Site Info	4.04	175,914	38	10	3.1	32.5	295.3	37	1.48	64,320	0.050	1.76
Flemington Borough Fire Department												
Total Site Info	0.90	39,247	15	43	1.7	18.0	163.3	91	0.82	35,558	0.028	0.98
Flemington Borough Police Department												
Total Site Info	1.03	44,760	22	7	2.0	21.5	195.2	95	0.98	42,522	0.033	1.17
Flemington Presbyterian Church												
Total Site Info	4.81	209,590	6	11	3.5	37.1	337.6	35	1.69	73,533	0.057	2.02
Flemington Public Library												
Total Site Info	0.84	36,558	29	2	1.7	17.3	157.7	94	0.79	34,340	0.027	0.94
Holcombe-Fisher Funeral Home												
Total Site Info	0.51	22,353	36	11	0.8	8.5	77.0	75	0.38	16,760	0.013	0.46
Reading-Flemington Intermediate School												
Total Site Info	15.11	658,353	15	2	15.1	158.7	1,442.8	48	7.21	314,253	0.245	8.62
Saint Magdalen Church												
Total Site Info	6.51	283,759	32	1	9.1	95.0	863.4	66	4.32	188,053	0.147	5.16

e. 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)	(SF)	($)		($)	%
	FIRST NESHANIC RIVER SUBWATERSHED	**18,000**	**0.41**	**0.469**	**79**	**35,530**	**1.33**	**5,600**			**$140,000**	**35.8%**
1	**Paradise Golf Center**											
	Pervious pavements	18,000	0.41	0.469	79	35,530	1.33	5,600	25	SF	$140,000	35.8%
	Total Site Info	**18,000**	**0.41**	**0.469**	**79**	**35,530**	**1.33**	**5,600**			**$140,000**	**35.8%**
	RARITAN RIVER SOUTH BRANCH SUBWATERSHED	**159,100**	**3.65**	**4.145**	**694**	**314,072**	**11.79**	**47,100**			**$1,105,500**	**20.3%**
2	**Calvary Episcopal Church**											
	Bioretention systems/rain gardens	600	0.01	0.016	3	1,182	0.04	200	5	SF	$1,000	3.9%
	Pervious pavements	7,600	0.17	0.198	33	15,005	0.56	1,900	25	SF	$47,500	49.6%
	Total Site Info	**8,200**	**0.19**	**0.214**	**36**	**16,187**	**0.60**	**2,100**			**$48,500**	**53.5%**
3	**Flemington Baptist Church**											
	Pervious pavements	15,000	0.34	0.391	65	29,606	1.11	4,000	25	SF	$100,000	23.3%
	Total Site Info	**15,000**	**0.34**	**0.391**	**65**	**29,606**	**1.11**	**4,000**			**$100,000**	**23.3%**
4	**Flemington Borough Fire Department**											
	Pervious pavements	14,500	0.33	0.378	63	28,626	1.07	2,800	25	SF	$70,000	40.8%
	Total Site Info	**14,500**	**0.33**	**0.378**	**63**	**28,626**	**1.07**	**2,800**			**$70,000**	**40.8%**
5	**Flemington Borough Police Department**											
	Pervious pavements	17,500	0.40	0.456	76	34,543	1.30	3,500	25	SF	$87,500	41.2%
	Total Site Info	**17,500**	**0.40**	**0.456**	**76**	**34,543**	**1.30**	**3,500**			**$87,500**	**41.2%**
6	**Flemington Presbyterian Church**											
	Pervious pavements	22,000	0.51	0.573	96	43,429	1.63	4,500	25	SF	$112,500	29.9%
	Total Site Info	**22,000**	**0.51**	**0.573**	**96**	**43,429**	**1.63**	**4,500**			**$112,500**	**29.9%**
7	**Flemington Public Library**											
	Pervious pavements	9,700	0.22	0.253	42	19,149	0.72	2,600	25	SF	$65,000	28.2%
	Total Site Info	**9,700**	**0.22**	**0.253**	**42**	**19,149**	**0.72**	**2,600**			**$65,000**	**28.2%**
8	**Holcombe-Fisher Funeral Home**											
	Pervious pavements	4,800	0.11	0.125	21	9,477	0.36	2,200	25	SF	$55,000	28.6%
	Total Site Info	**4,800**	**0.11**	**0.125**	**21**	**9,477**	**0.36**	**2,200**			**$55,000**	**28.6%**

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 (SF)	Unit Cost ($)	Unit	Total Cost ($)	I.C. Treated %
9	**Reading-Flemington Intermediate School**											
	Bioretention systems/rain gardens	2,800	0.06	0.073	12	5,528	0.21	700	5	SF	$3,500	0.9%
	Pervious pavements	41,500	0.95	1.081	181	81,921	3.08	11,000	25	SF	$275,000	13.2%
	Total Site Info	**44,300**	**1.02**	**1.154**	**193**	**87,449**	**3.29**	**11,700**			**$278,500**	**14.1%**
10	**Saint Magdalen Church**											
	Bioretention systems/rain gardens	8,600	0.20	0.224	38	16,980	0.64	2,700	5	SF	$13,500	4.6%
	Pervious pavements	14,500	0.33	0.378	63	28,626	1.07	11,000	25	SF	$275,000	7.7%
	Total Site Info	**23,100**	**0.53**	**0.602**	**101**	**45,606**	**1.71**	**13,700**			**$288,500**	**12.3%**