Draft

Impervious Cover Reduction Action Plan for Jamesburg Borough, Middlesex County New Jersey

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

September 23, 2015

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a. Overview Map of the Project

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Introduction

Located in Middlesex County in central New Jersey, Jamesburg Borough covers approximately 0.89 square miles. Figures 1 and 2 illustrate that Jamesburg Borough is dominated by urban land uses. A total of 41.6% of the municipality's land use is classified as urban. Of the urban land in Jamesburg Borough, medium density residential 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 Jamesburg 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 Jamesburg Borough. Based upon the 2007 NJDEP land use/land cover data, approximately 38.4% of Jamesburg Borough has impervious cover. This level of impervious cover suggests that the streams in Jamesburg Borough are likely non-supporting streams.[1]

Methodology

Jamesburg Borough contains portions of one subwatershed (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

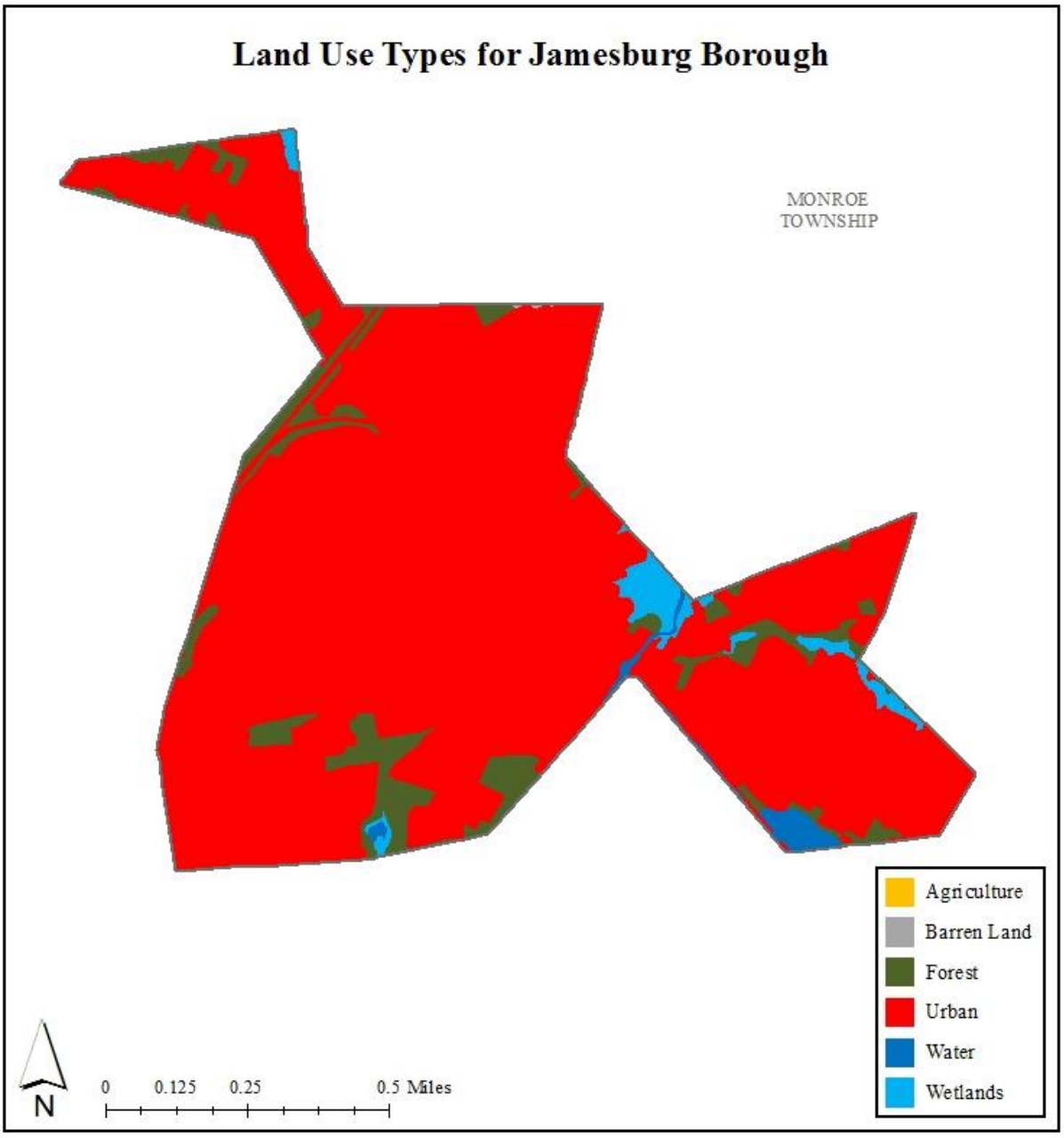


Figure 1: Map illustrating the land use in Jamesburg Borough

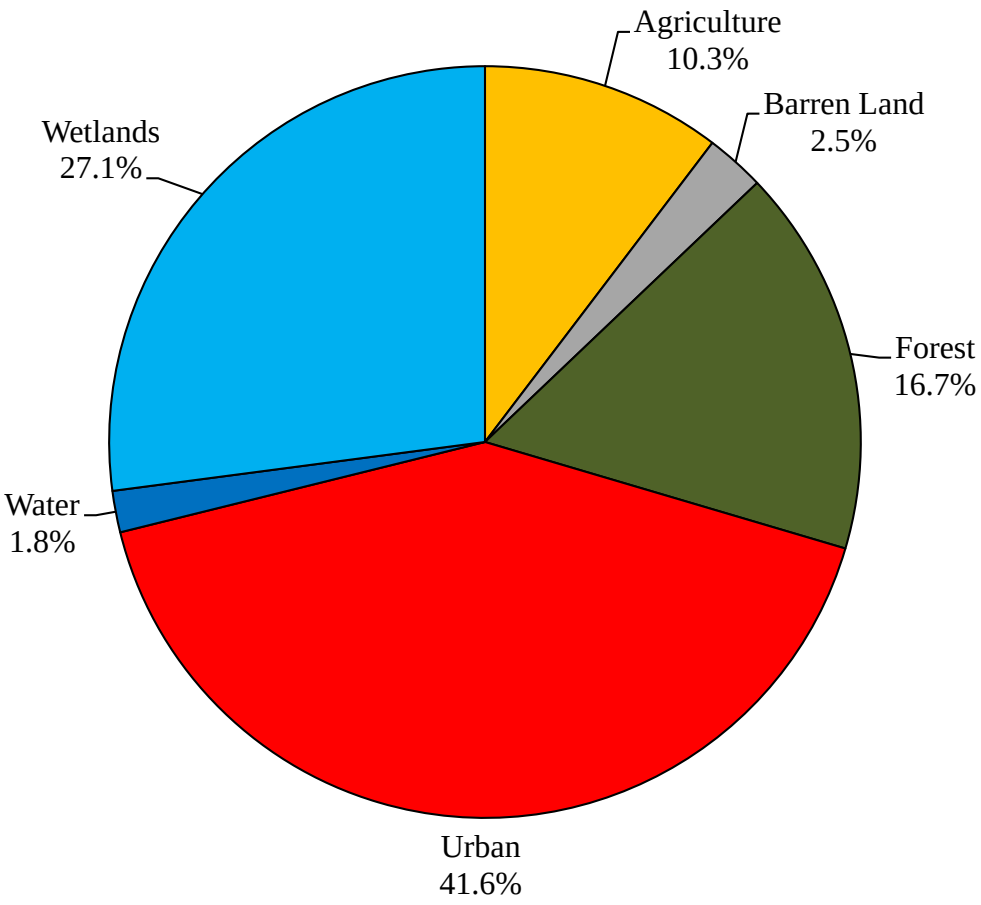


Figure 2: Pie chart illustrating the land use in Jamesburg Borough

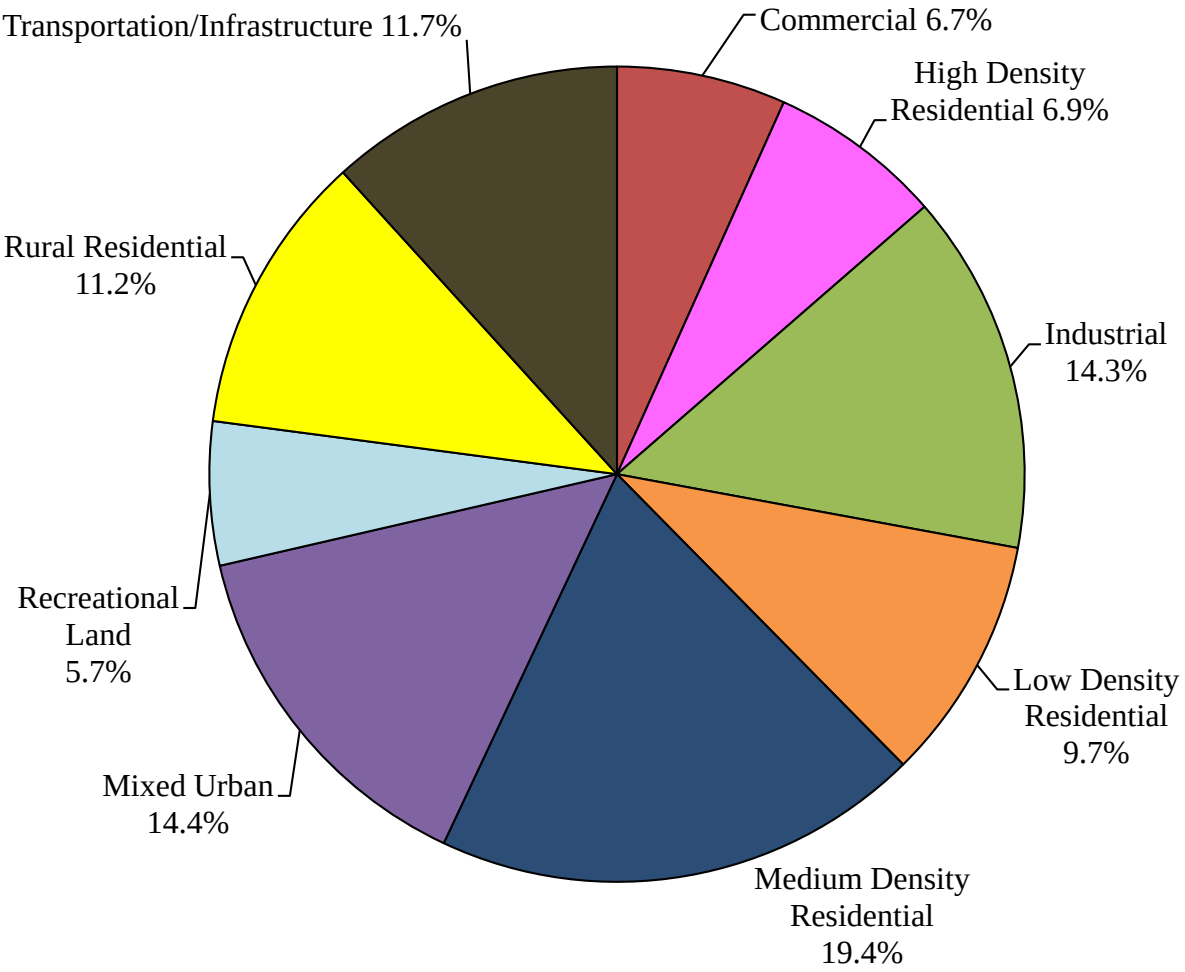


Figure 3: Pie chart illustrating the various types of urban land use in Jamesburg Borough

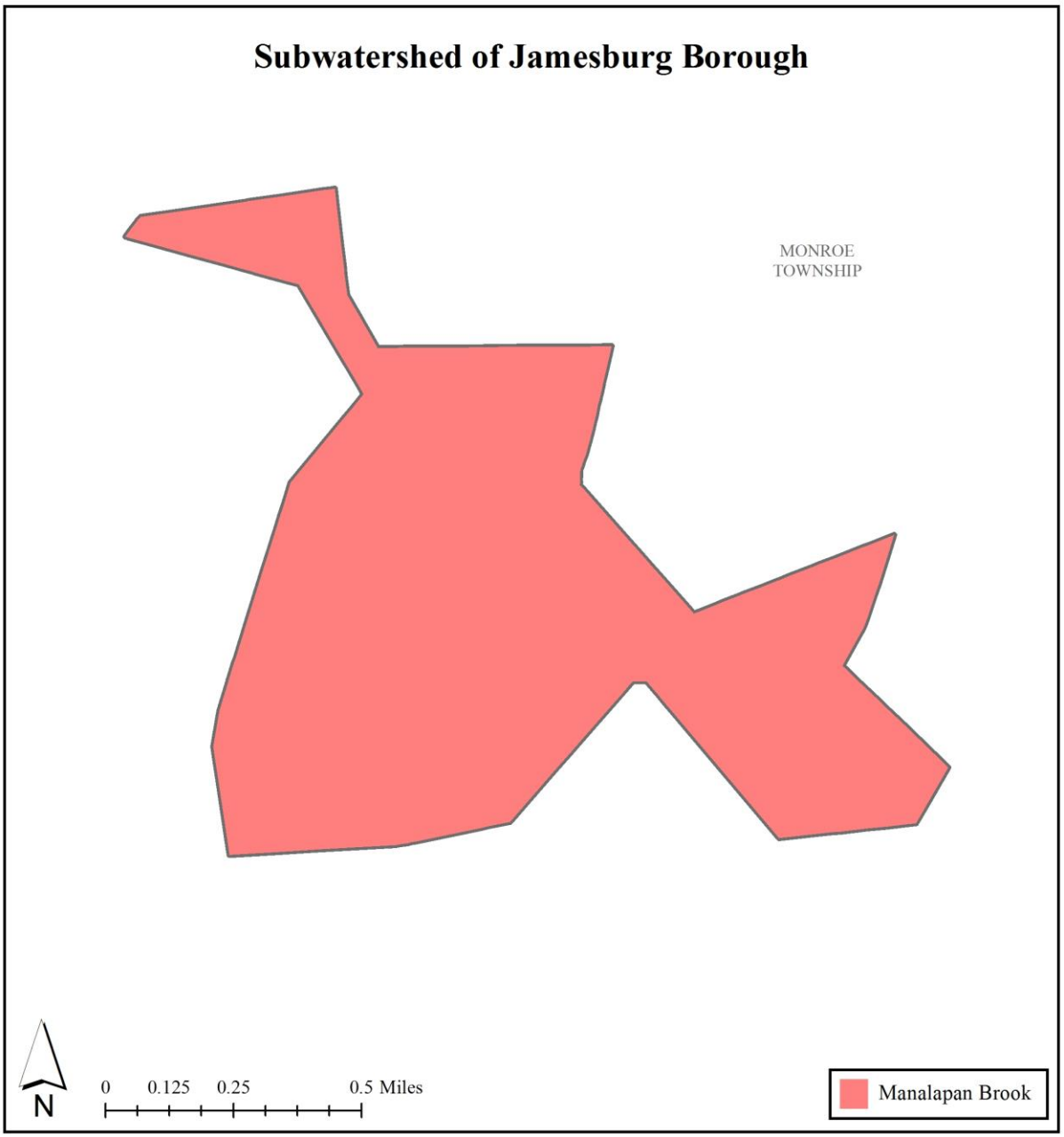


Figure 4: Map of the subwatersheds in Jamesburg Borough

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 Jamesburg 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 Jamesburg Borough. 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

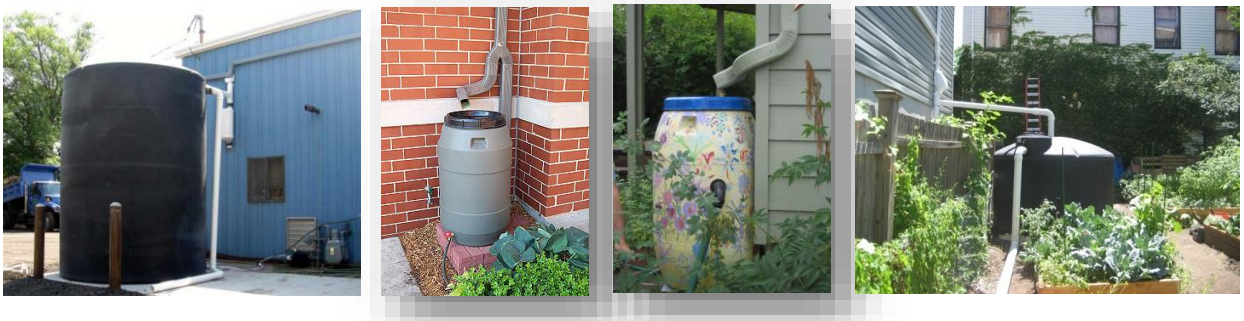
These are landscaped features that are designed to capture, treat, and infiltrate stormwater runoff. These systems can easily be incorporated into existing landscapes, improving aesthetics and creating a wildlife habitat while managing stormwater runoff. Bioretention systems also can be used in soils 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.

ATTACHMENT: CLIMATE RESILIENT GREEN INFRASTRUCTURE

Contents:

a. Overview Map of the Project

JAMESBURG: CLIMATE RESILIENT GREEN INFRASTRUCTURE FOR THE RARITAN BASIN

b. Green Infrastructure Sites

JAMESBURG: GREEN INFRASTRUCTURE SITES

SITES WITHIN THE MANALAPAN BROOK SUBWATERSHED:

1. Calvary Chapel Crossfields
2. Faith Community Church
3. Grace M. Breckwedel School
4. Jamesburg Fire Department
5. Jamesburg Historical Association
6. Jamesburg Municipal Court
7. Jamesburg Public Library
8. John F. Kennedy Elementary School
9. Monroe Community Church
10. Presbyterian Church of Jamesburg
11. Saint James Roman Catholic Church
12. Saint John's Baptist Church
13. US Post Office

c. Proposed Green Infrastructure Concepts

CALVARY CHAPEL CROSSFIELDS

Subwatershed: **Manalapan Brook**

Site Area: **158,677 sq. ft.**

Address: **15 Jamesburg Half Acre Road**
Jamesburg, NJ 08831

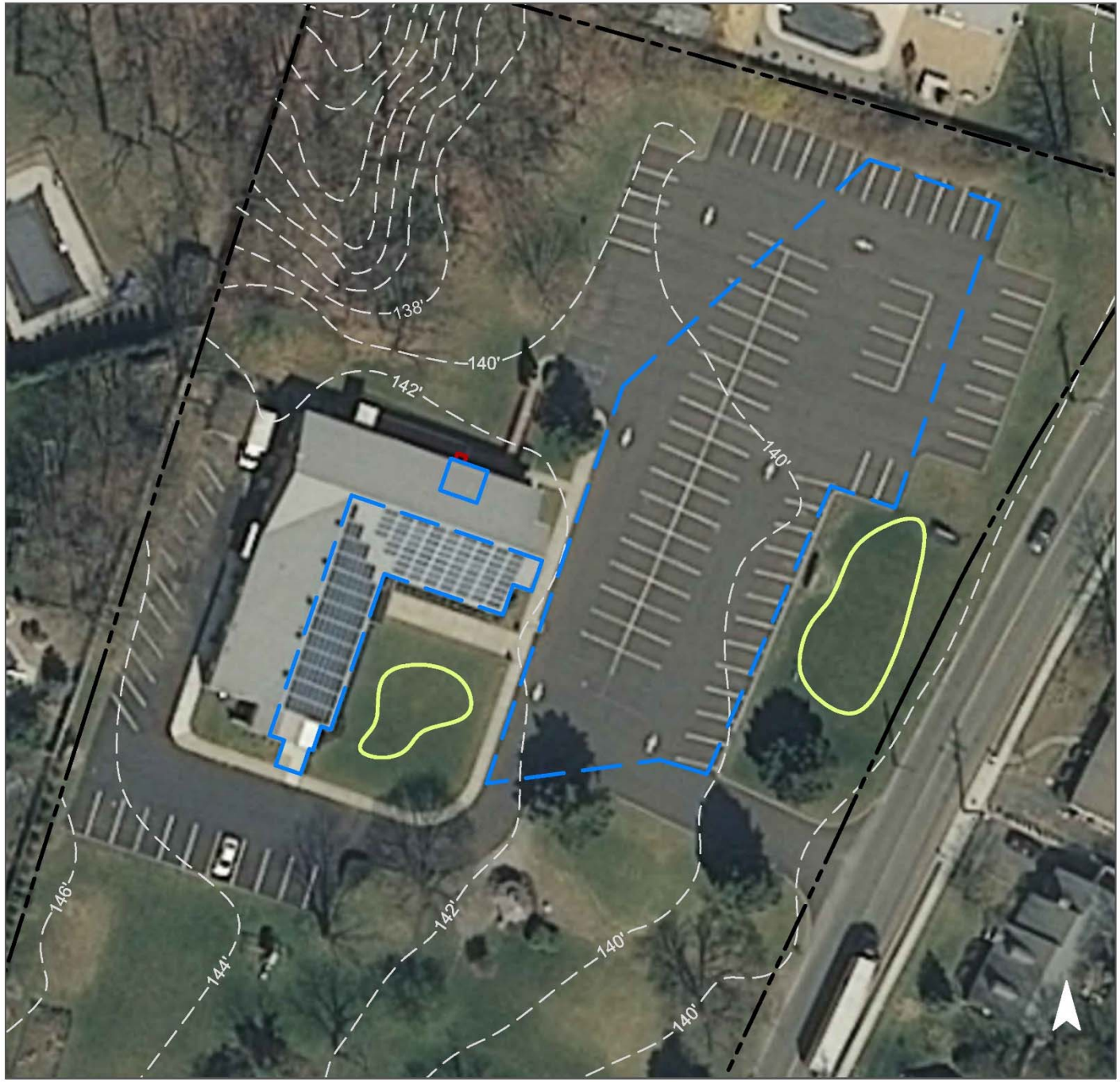
Block and Lot: **Block 73, Lot 2.01**

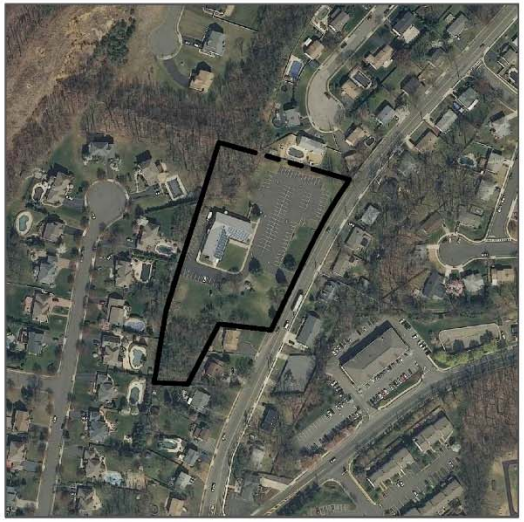
Two bioretention systems can be installed to capture, treat, and infiltrate rooftop and parking lot runoff. In addition, a downspout planter box can be installed to reuse rooftop runoff. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

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"
49	77,013	3.7	38.9	353.6	0.06	2.11

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	0.657	110	48,148	1.81	3,240	$16,200
Downspout planter boxes	0.006	1	n/a	n/a	12	$1,000

GREEN INFRASTRUCTURE RECOMMENDATIONS





Calvary Chapel Crossfields

- bioretention / rain gardens
- downspout planter boxes
- drainage areas
- property line
- 2012 Aerial: NJOIT, OGIS

0 30' 60'

FAITH COMMUNITY CHURCH

Subwatershed: Manalapan Brook

Site Area: 8,712 sq. ft.

Address: 24 Lincoln Avenue
Jamesburg, NJ 08831

Block and Lot: Block 57, Lot 12

A bioretention system can be installed on the eastern side of the site to capture, treat and infiltrate runoff from three downspouts. In the back, a bioretention system can also be built to manage rooftop runoff from five downspouts. 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	3,049	0.1	1.5	14.0	0.002	0.08

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	0.029	5	2,139	0.08	301	$1,505
Bioswales	0.018	3	1,354	0.05	254	$1,270

GREEN INFRASTRUCTURE RECOMMENDATIONS

Faith Community Church

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

0 10' 20'

GRACE M. BRECKWEDEL SCHOOL

Subwatershed: Manalapan Brook

Site Area: 82,424 sq. ft.

Address: 13 Augusta Street
Jamesburg, NJ 08831

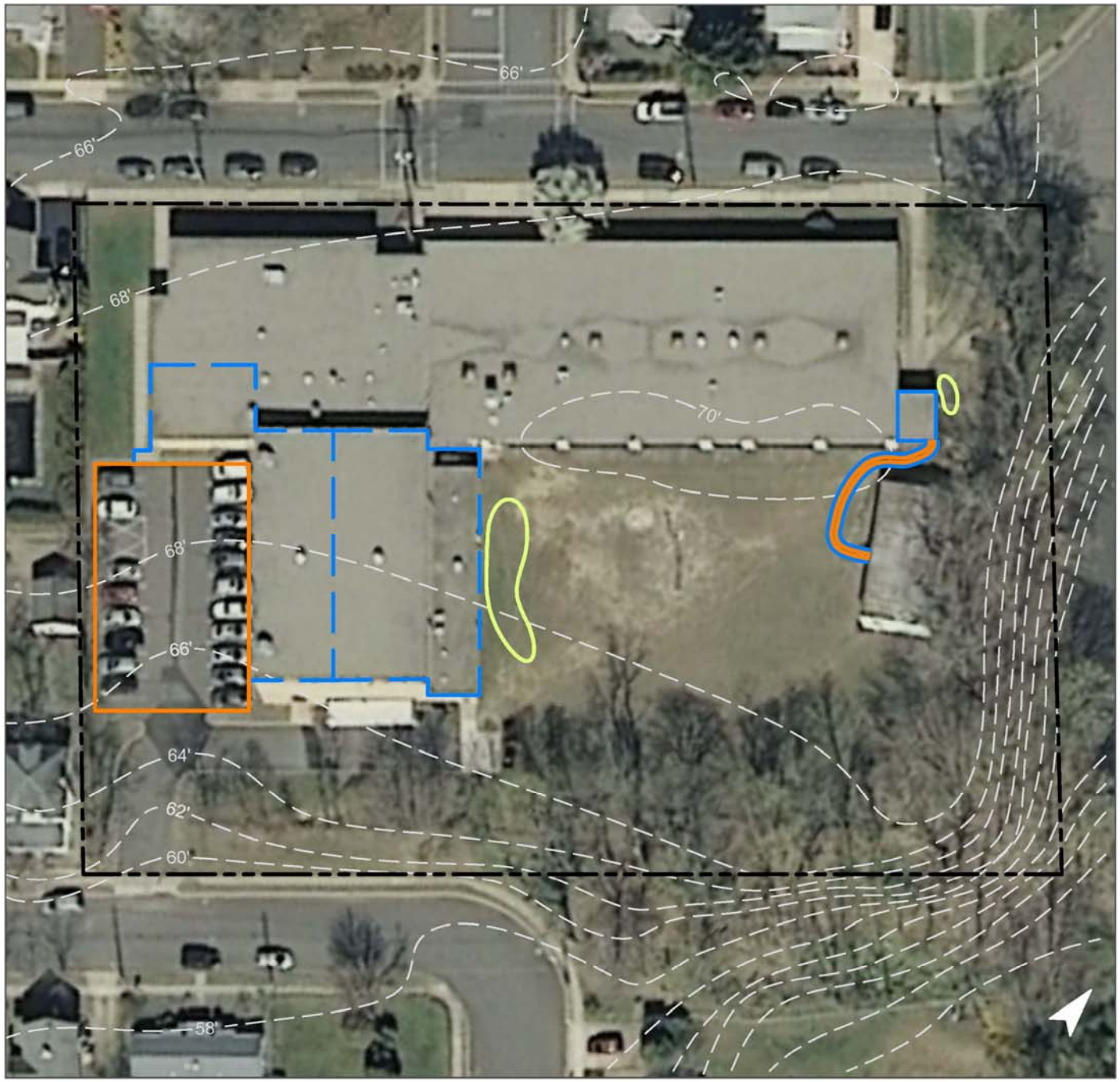
Block and Lot: Block 32, Lot 1

Parking spaces can be replaced with pervious pavement to capture, and infiltrate stormwater. To the east, a bioretention system can be installed to manage rooftop runoff. A walkway on the eastern side of the building is currently in poor condition, and can be replaced with pervious concrete to provide water an opportunity to infiltrate. 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"
49	40,320	1.9	20.4	185.1	0.03	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	0.154	26	11,295	0.42	865	$4,325
Pervious pavements	0.290	49	21,243	0.80	6,014	$150,350

GREEN INFRASTRUCTURE RECOMMENDATIONS



Grace M Breckwedel School

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

0 30' 60'

JAMESBURG FIRE DEPARTMENT

Subwatershed: Manalapan Brook

Site Area: 33,999 sq. ft.

Address: 82 West Railroad Avenue
Jamesburg, NJ 08831

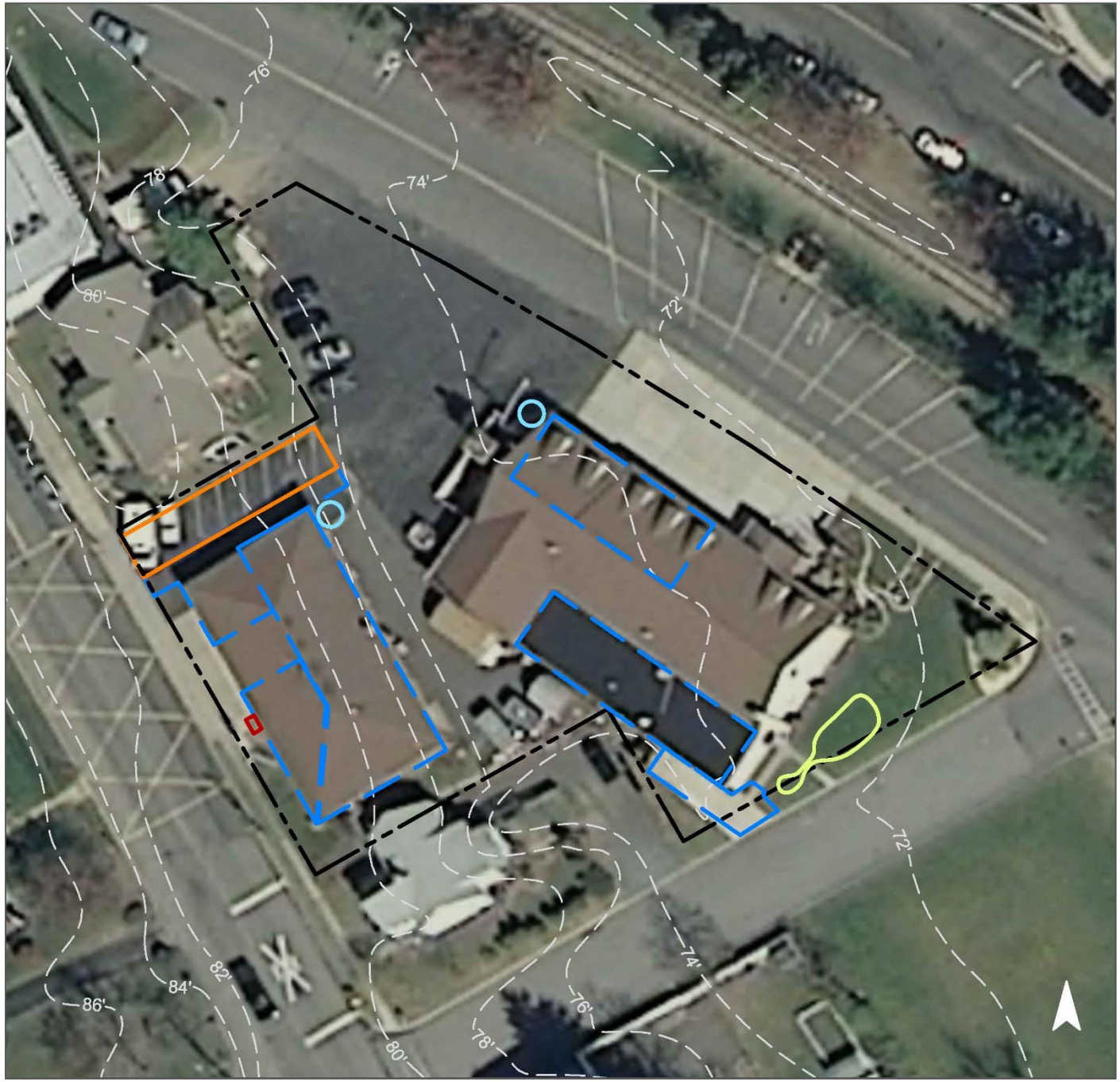
Block and Lot: Block 48, Lot 1

Rooftop runoff from the buildings can be redirected into a rainwater harvesting system that would provide the department with water to wash firetrucks or other equipment. Additional rooftop runoff can be reused by setting up a planter box. Porous asphalt can be installed in several parking spaces to infiltrate rooftop and parking lot runoff. A bioretention system can be built to capture, treat, and infiltrate rooftop runoff from the southern corner of the building. 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	32,217	1.6	16.3	147.9	0.025	0.88

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.056	9	4,129	0.16	320	$1,600
Downspout planter boxes	0.006	1	n/a	n/a	12	$1,000
Pervious pavements	0.056	9	4,092	0.15	1,110	$27,750
Rainwater harvesting systems	0.124	21	4,432	0.34	4,432 (gal)	$8,864

GREEN INFRASTRUCTURE RECOMMENDATIONS



Jamesburg Fire Department

- pervious pavements
- bioretention / rain gardens
- downspout planter boxes
- rainwater harvesting
- drainage areas
- property line
- 2012 Aerial: NJOIT, OGIS

0 25' 50'

JAMESBURG HISTORICAL ASSOCIATION

Subwatershed: Manalapan Brook

Site Area: 61,213 sq. ft.

Address: 203 Buckelew Avenue
Jamesburg, NJ 08831

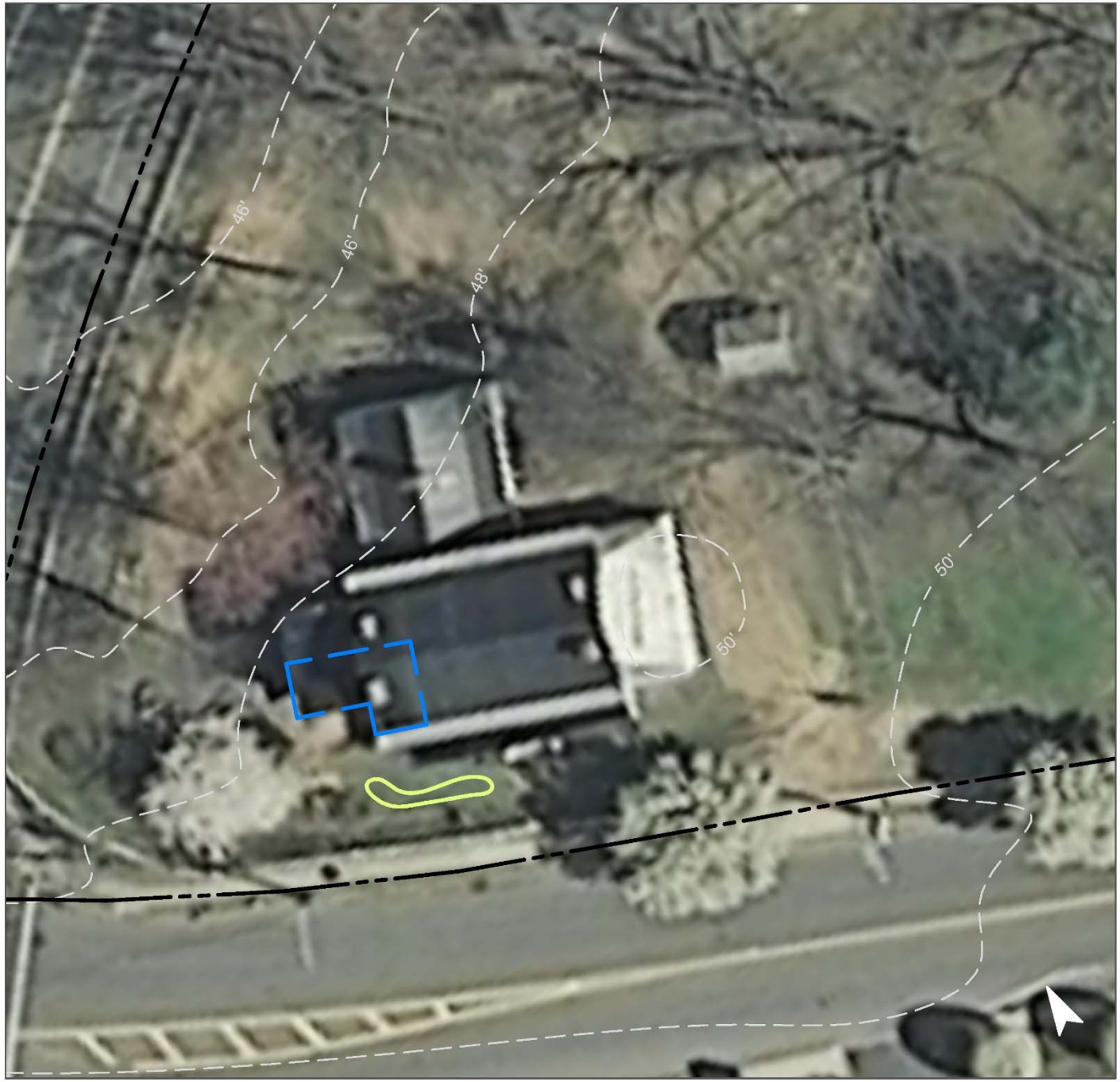
Block and Lot: Block 15, Lot 2

Existing landscaping and a gravel entranceway currently manage a portion of the site's rooftop runoff. A bioretention system can be installed along the front of the building to capture, treat, and infiltrate rooftop runoff from three downspouts. 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"
10	6,264	0.3	3.2	28.8	0.005	0.17

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
Bioretention systems	0.009	1	628	0.02	80	$400

GREEN INFRASTRUCTURE RECOMMENDATIONS



Jamesburg Historical Association

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

0 15' 30'

JAMESBURG MUNICIPAL COURT

Subwatershed: **Manalapan Brook**

Site Area: **331,326 sq. ft.**

Address: **131 Perrineville Road**
Jamesburg, NJ 08831

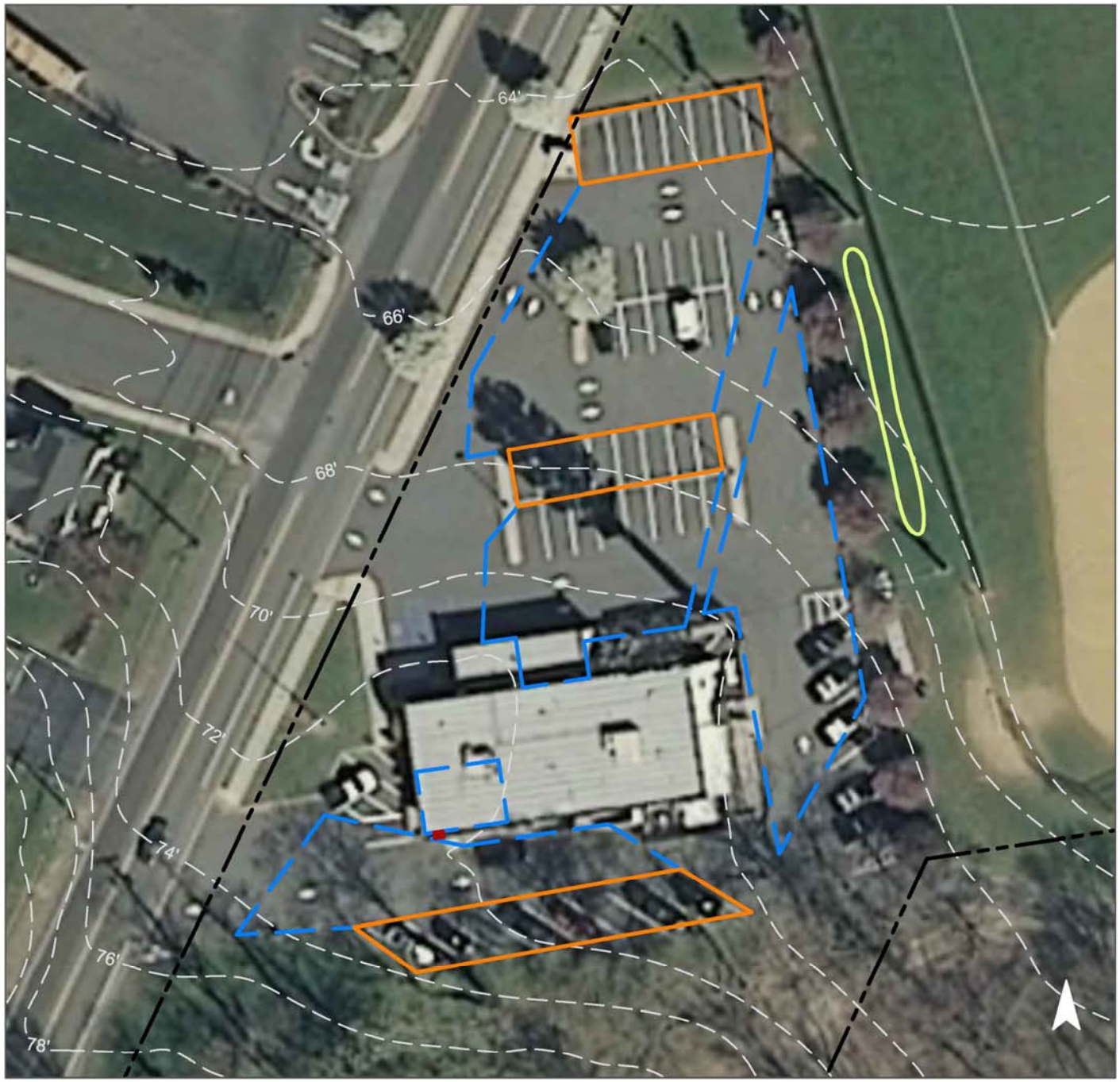
Block and Lot: **Block 82, Lot 1**

Porous asphalt can be installed in three strips of parking spaces to capture runoff from the parking lot and building. A bioretention system can be built along the eastern side of the parking lot to capture, treat, and infiltrate runoff from the parking lot. A downspout planter can be installed to reuse rooftop runoff from the southwestern side of the building. 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"
13	41,939	2.0	21.2	192.6	0.033	1.15

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.118	20	8,654	0.33	640	$3,200
Downspout planter boxes	0.006	1	n/a	n/a	12	$1,000
Pervious pavements	0.476	80	34,924	1.31	4,662	$116,550

GREEN INFRASTRUCTURE RECOMMENDATIONS



Jamesburg Municipal Court

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

0 25' 50'

JAMESBURG PUBLIC LIBRARY

Subwatershed: **Manalapan Brook**

Site Area: **5,250 sq. ft.**

Address: **229 Gatzmer Avenue**
Jamesburg, NJ 08831

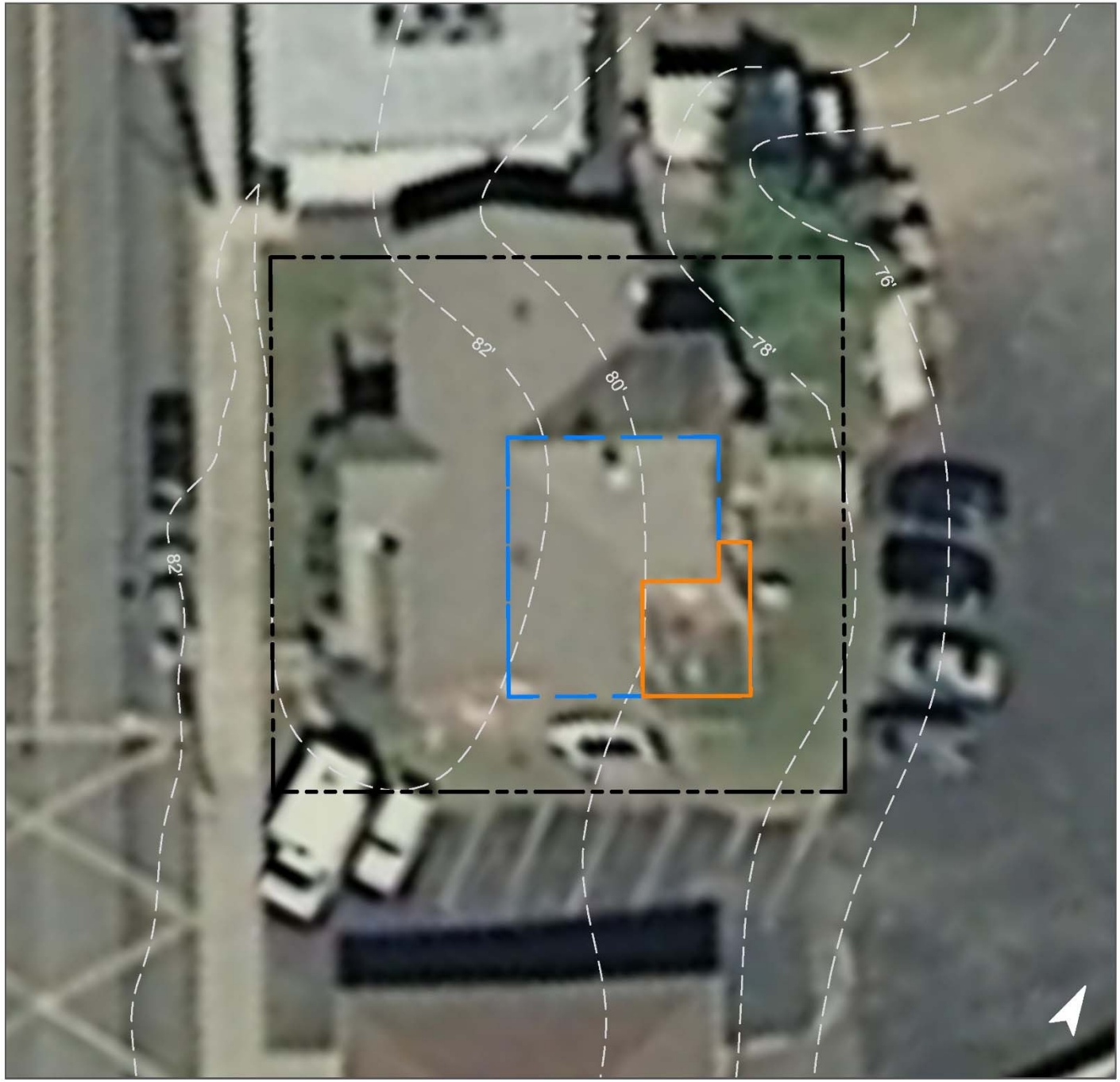
Block and Lot: **Block 48, Lot 1.01**

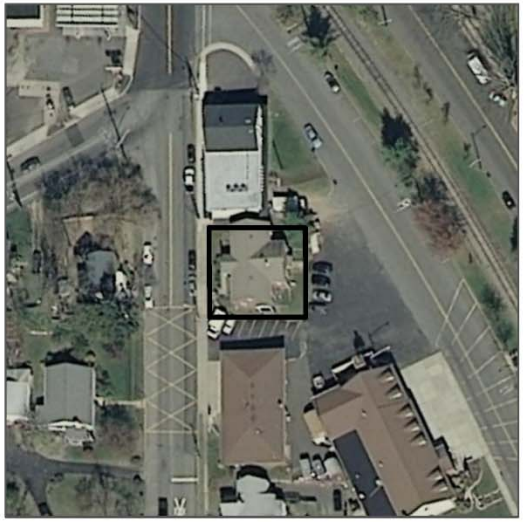
Installation of pervious pavement began six months ago, and is awaiting completion. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

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	4,988	0.2	2.5	22.9	0.004	0.14

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	0.026	4	1,892	0.07	230	$5,750

GREEN INFRASTRUCTURE RECOMMENDATIONS





Jamesburg Public Library

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

0 10' 20'

JOHN F. KENNEDY ELEMENTARY SCHOOL

Subwatershed: Manalapan Brook

Site Area: 313,411 sq. ft.

Address: 25 Front Street
Jamesburg, NJ 08831

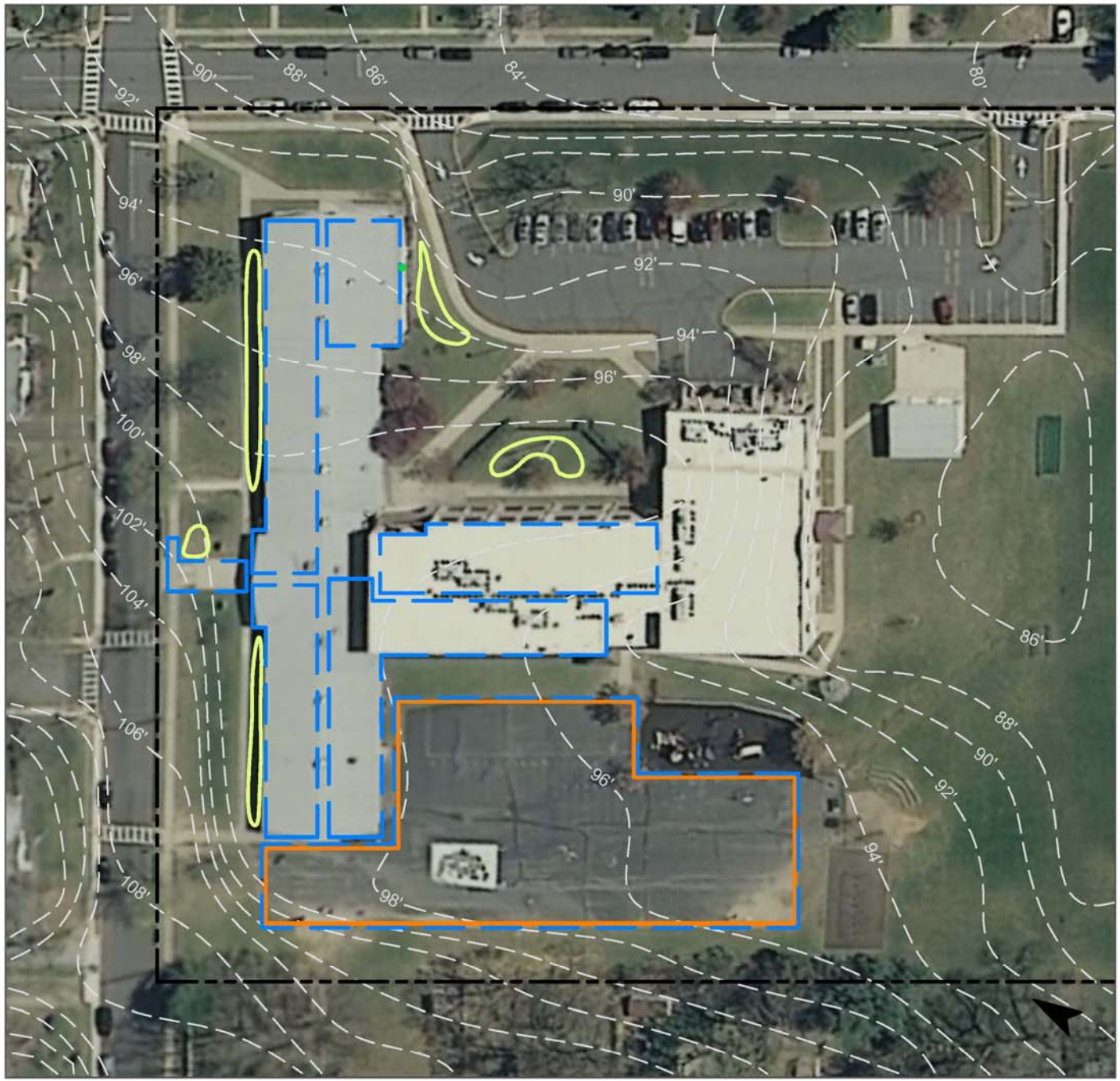
Block and Lot: Block 46, Lot 1.02

The playground on the western side of the building can be replaced with porous asphalt to infiltrate stormwater runoff. Around the perimeter of the main building and within the courtyard bioretention systems can be installed to capture, treat, and infiltrate rooftop runoff by disconnecting and redirecting nearby downspouts. 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"
44	137,472	6.6	69.4	631.2	0.107	3.77

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	0.494	83	36,203	1.36	2,876	$14,380
Pervious pavements	0.801	134	58,770	2.21	23,630	$590,750

GREEN INFRASTRUCTURE RECOMMENDATIONS



John F. Kennedy Elementary School

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

0 40' 80'

MONROE COMMUNITY CHURCH

Subwatershed: Manalapan Brook

Site Area: 15,372 sq. ft.

Address: 139 Stevens Avenue
Jamesburg, NJ 08831

Block and Lot: Block 50, Lot 2.01

Concrete pavement at the entrance of the building can be replaced with pervious pavement to reduce runoff. Parking spots can be replaced with porous asphalt to capture runoff from the parking lot. A bioretention system can be installed to collect, treat, and infiltrate rooftop runoff from two downspouts on the side of the building. 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"
76	11,630	0.6	5.9	53.4	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 systems	0.016	3	1,145	0.04	145	$725
Pervious pavements	0.255	43	18,707	0.70	2,555	$63,875

GREEN INFRASTRUCTURE RECOMMENDATIONS

Monroe Community Church

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

0 15' 30'

PRESBYTERIAN CHURCH OF JAMESBURG

Subwatershed: Manalapan Brook

Site Area: 102,413 sq. ft.

Address: 17 Gatzmer Avenue
Jamesburg, NJ 08831

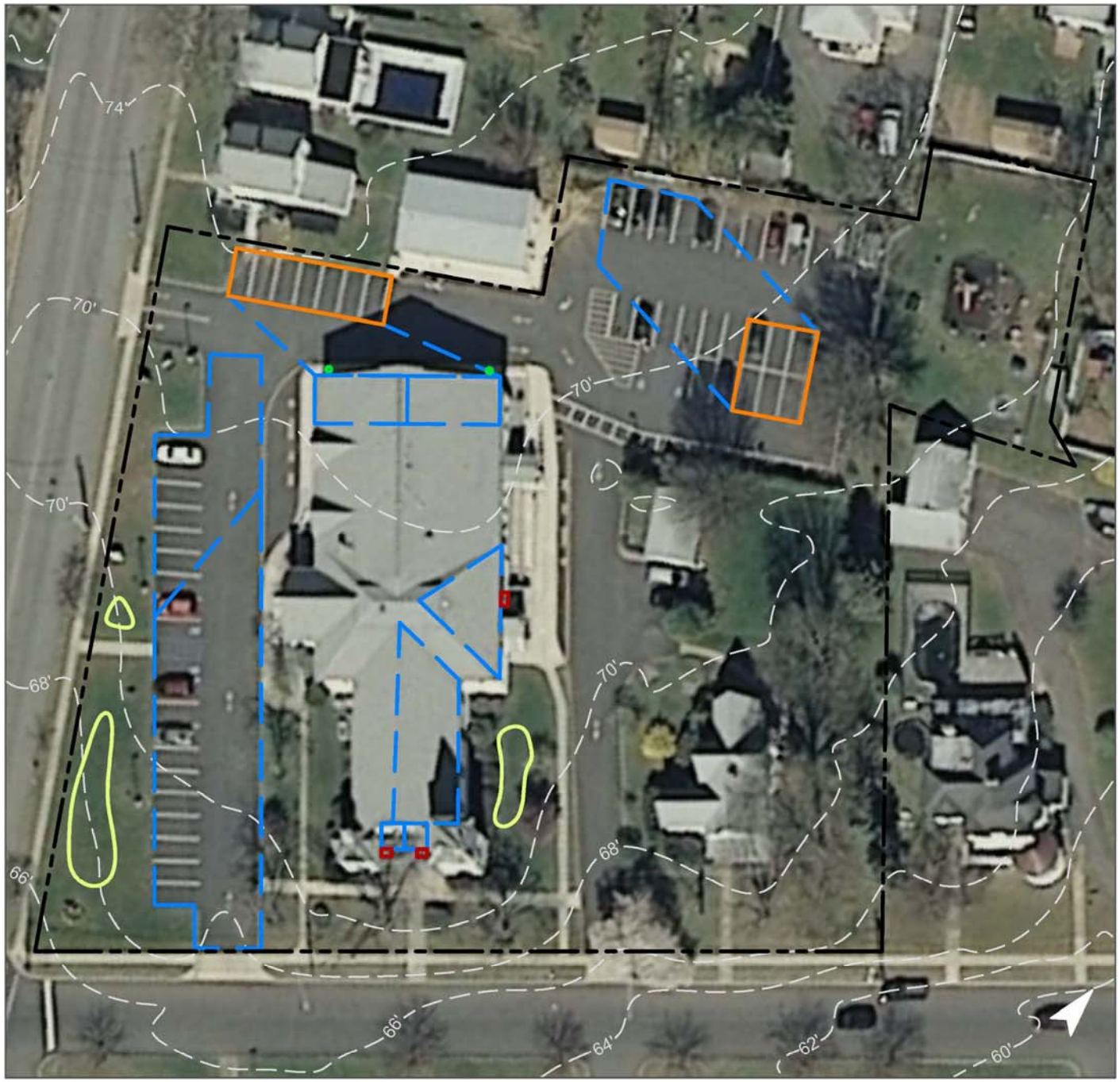
Block and Lot: Block 41, Lot 1

Bioretention systems can be installed to capture, treat, and infiltrate both parking lot and rooftop runoff. Porous asphalt can replace several parking spots to allow runoff from two downspouts that can be disconnected, and a portion of the northern parking lot to infiltrate. Downspout planter boxes can set up on either side of the entrance stairs, and in one location to the side to reuse 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"
64	65,789	3.2	33.2	302.1	0.051	1.80

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	0.274	46	20,121	0.76	1,350	$6,750
Downspout planter boxes	0.017	3	n/a	n/a	36	$3,000
Pervious pavements	0.223	37	16,359	0.62	2,200	$55,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Presbyterian Church of Jamesburg

- bioretention / rain gardens
- downspout planter boxes
- drainage areas
- property line
- 2012 Aerial: NJOIT, OGIS

0 30' 60'

SAINT JAMES ROMAN CATHOLIC CHURCH

Subwatershed: Manalapan Brook

Site Area: 84,666 sq. ft.

Address: 36 Lincoln Avenue
Jamesburg, NJ 08831

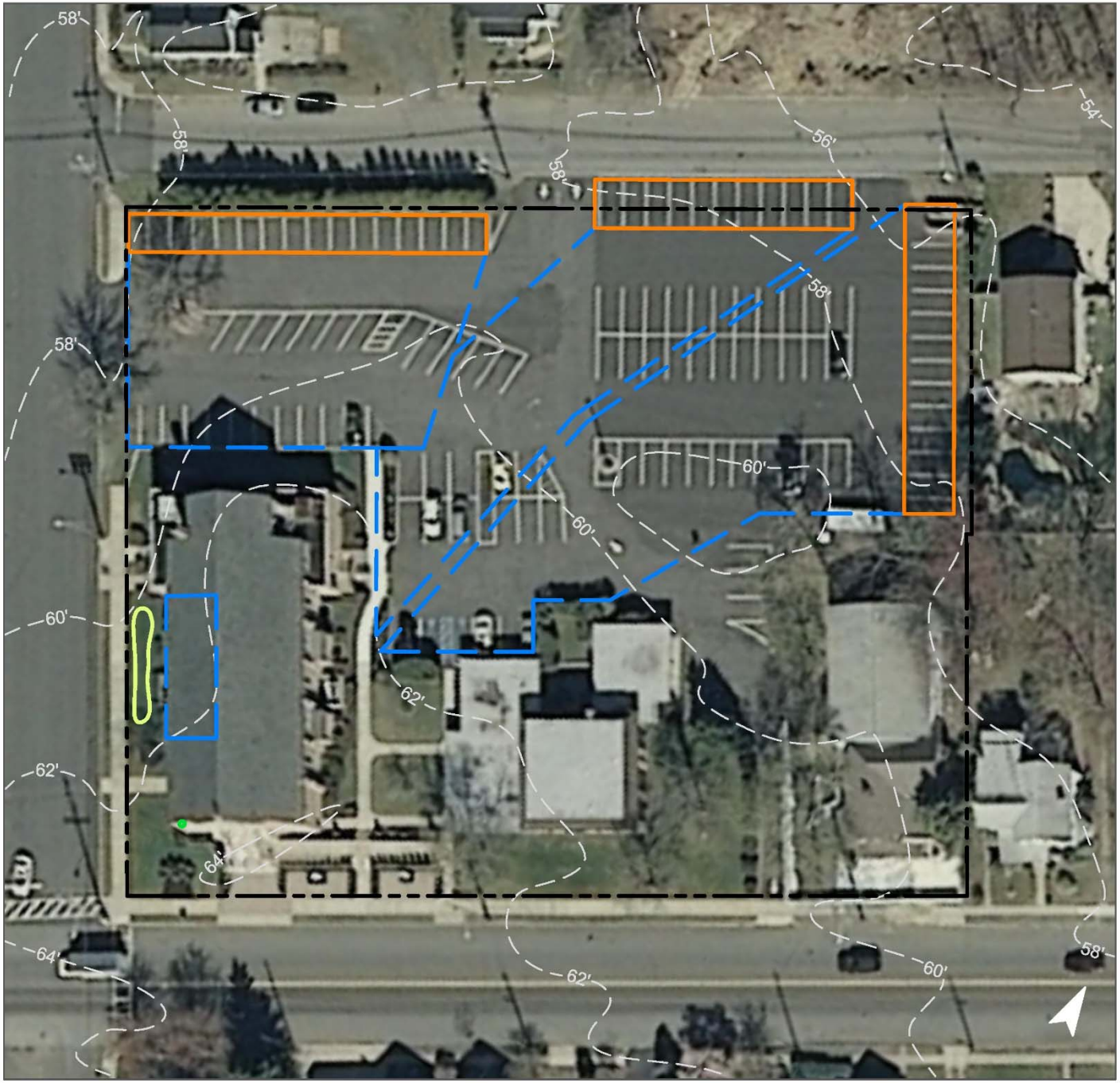
Block and Lot: Block 58, Lot 1

Parking spots along the northern and eastern edges of the parking lot can be converted into porous asphalt in order to provide runoff an opportunity to infiltrate. A bioretention system can be built to capture, treat, and infiltrate rooftop runoff from four downspouts. 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"
65	55,033	2.7	27.8	252.7	0.043	1.51

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 systems	0.029	5	2,109	0.08	250	$1,250
Pervious pavements	1.040	174	76,236	2.87	6,410	$160,250

GREEN INFRASTRUCTURE RECOMMENDATIONS



St. James Roman Catholic Church

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

0 30' 60'

SAINT JOHN'S BAPTIST CHURCH

Subwatershed: Manalapan Brook

Site Area: 22,500 sq. ft.

Address: 24 Lake Street
Jamesburg, NJ 08831

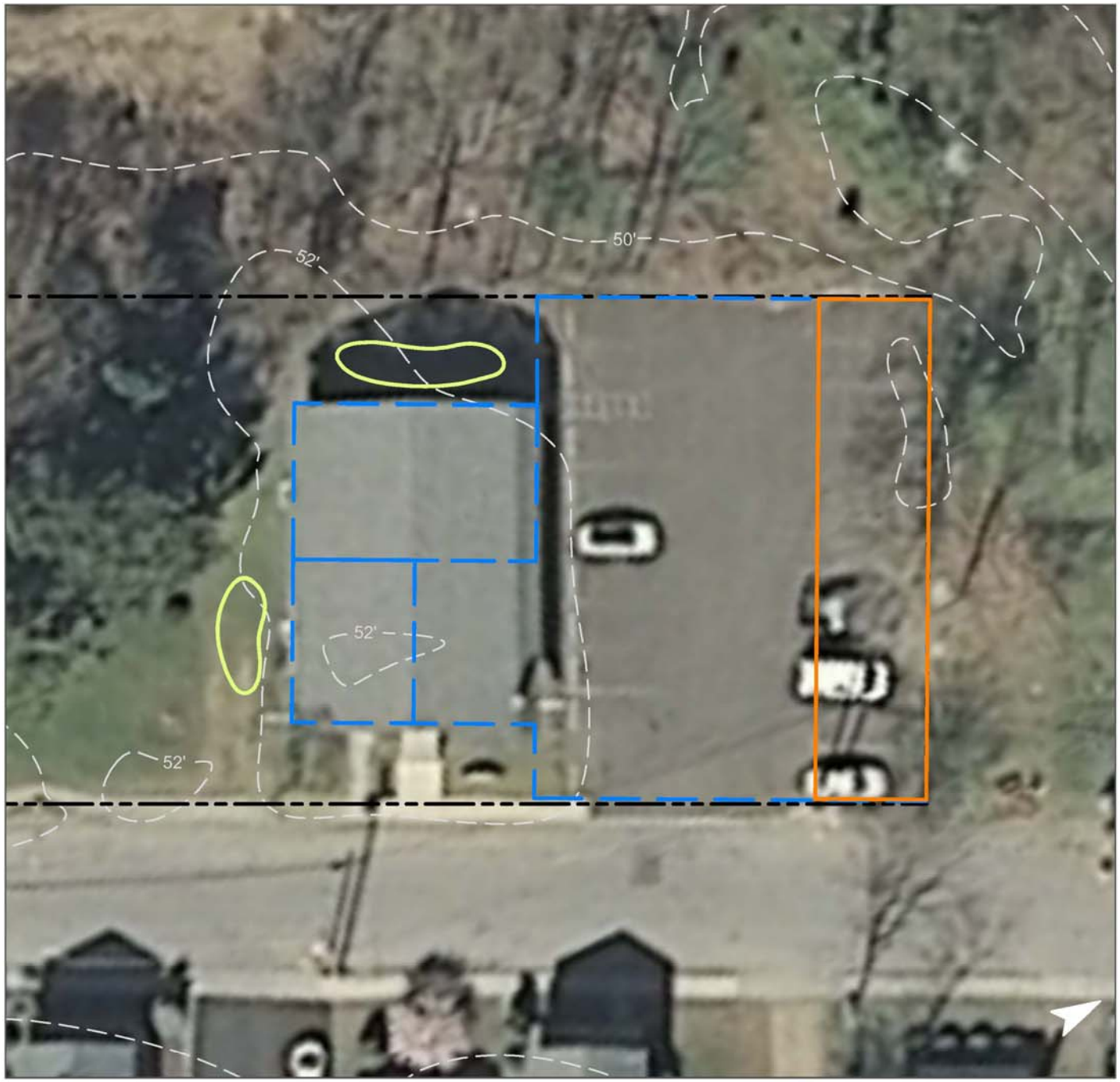
Block and Lot: Block 17, Lot 1

Bioretention systems can be installed along the side, and back of the building to capture, treat, and infiltrate rooftop runoff by redirecting downspouts. Parking spots can be converted into porous asphalt to manage runoff from 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"
70	15,666	0.8	7.9	71.9	0.012	0.43

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 systems	0.058	10	4,279	0.16	390	$1,950
Pervious pavements	0.219	37	16,030	0.60	2,150	$53,750

GREEN INFRASTRUCTURE RECOMMENDATIONS



Saint John's Baptist Church

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

0 15' 30'

US POST OFFICE

Subwatershed: **Manalapan Brook**

Site Area: **17,100 sq. ft.**

Address: **13 East Railroad Avenue**
Jamesburg, NJ 08831

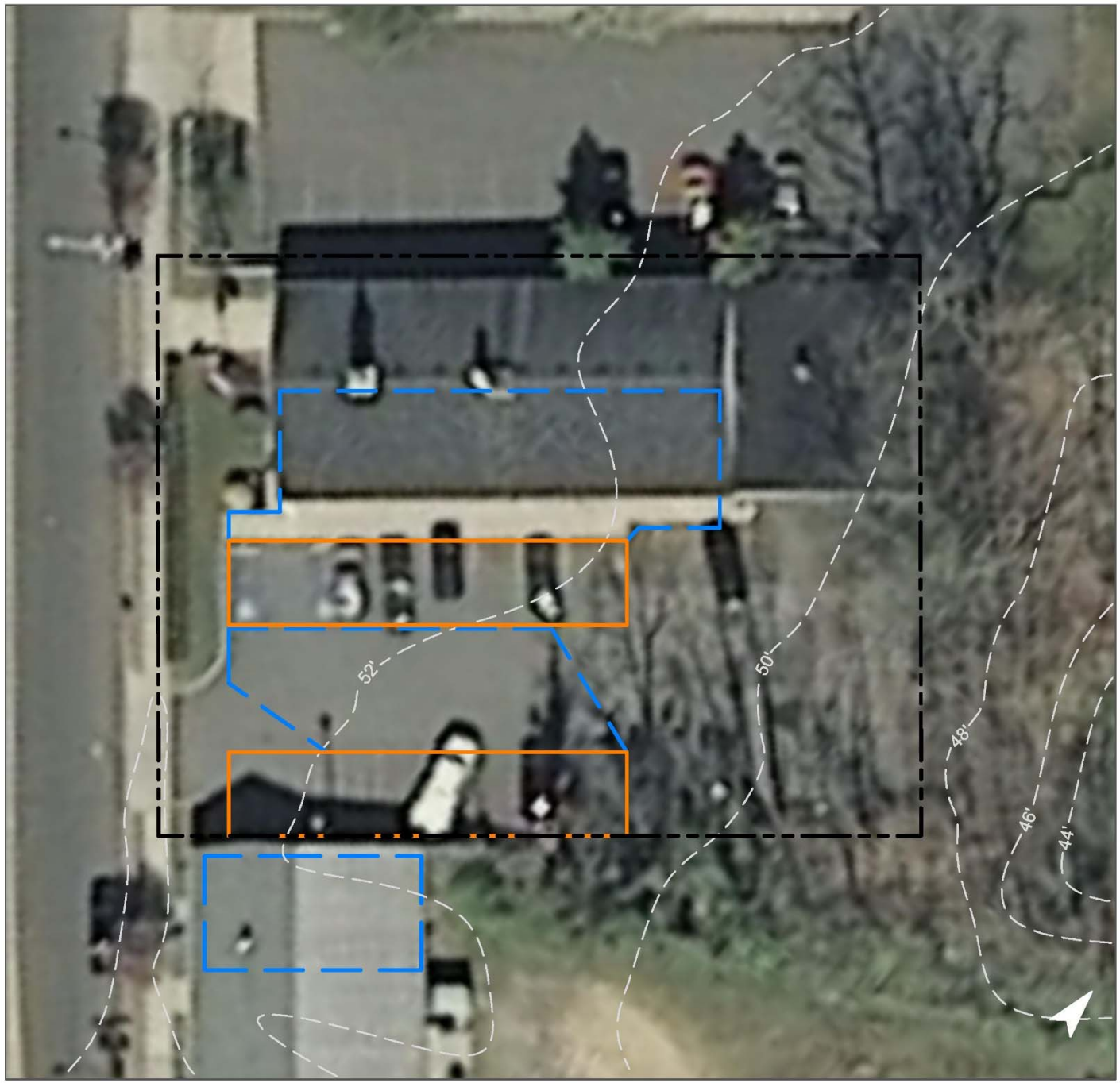
Block and Lot: **Block 28, Lot 2.05**

Both rows of parking can also be replaced with porous asphalt to capture and infiltrate stormwater runoff from surrounding buildings and 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"
85	14,583	0.7	7.4	67.0	0.011	0.40

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	0.200	34	14,690	0.55	2,580	$64,500

GREEN INFRASTRUCTURE RECOMMENDATIONS



US Post Office

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

0 15' 30'

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			I.C. %	I.C. Area (ac)	I.C. Area (SF)	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)
MANALAPAN BROOK SUBWATERSHED	**28.40**	**1,237,063**			**24.4**	**255.5**	**2,323.1**		**11.62**	**505,963**	**0.394**	**13.88**
Calvary Chapel Crossfields												
Total Site Info	3.64	158,677	73	2.01	3.7	38.9	353.6	49	1.77	77,013	0.060	2.11
Faith Community Church												
Total Site Info	0.20	8,712	57	12	0.1	1.5	14.0	35	0.07	3,049	0.002	0.08
Grace M. Breckwedel School												
Total Site Info	1.89	82,424	32	1	1.9	20.4	185.1	49	0.93	40,320	0.031	1.11
Jamesburg Fire Department												
Total Site Info	0.78	33,999	48	1	1.6	16.3	147.9	95	0.74	32,217	0.025	0.88
Jamesburg Historical Association												
Total Site Info	1.41	61,213	15	2	0.3	3.2	28.8	10	0.14	6,264	0.005	0.17
Jamesburg Municipal Court												
Total Site Info	7.61	331,326	82	1	2.0	21.2	192.6	13	0.96	41,939	0.033	1.15
Jamesburg Public Library												
Total Site Info	0.12	5,250	48	1.01	0.2	2.5	22.9	95	0.11	4,988	0.004	0.14
John F. Kennedy Elementary School												
Total Site Info	7.19	313,411	46	1.02	6.6	69.4	631.2	44	3.16	137,472	0.107	3.77
Monroe Community Church												
Total Site Info	0.35	15,372	50	2.01	0.6	5.9	53.4	76	0.27	11,630	0.009	0.32
Presbyterian Church of Jamesburg												
Total Site Info	2.35	102,413	41	1	3.2	33.2	302.1	64	1.51	65,789	0.051	1.80
Saint James Roman Catholic Church												
Total Site Info	1.94	84,666	58	1	2.7	27.8	252.7	65	1.26	55,033	0.043	1.51

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)
Saint John's Baptist Church												
Total Site Info	0.52	22,500	17	1	0.8	7.9	71.9	70	0.36	15,666	0.012	0.43
US Post Office												
Total Site Info	0.39	17,100	28	2.05	0.7	7.4	67.0	85	0.33	14,583	0.011	0.40

e. Summary of Proposed Green Infrastructure Practices

Summary of Proposed Green Infrastructure Practices

	Subwatershed/Site Name/Total Site Info/GI Practice	Potential Management Area Area (SF)	Potential Management Area Area (ac)	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Max Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cfs)	Size of BMP (SF)	Unit Cost ($)	Unit	Total Cost ($)	I.C. Treated %
	MANALAPAN BROOK SUBWATERSHED	**217,035**	**4.98**	**5.656**	**947**	**407,579**	**15.49**	**66,756**			**$1,356,944**	**42.90%**
1	**Calvary Chapel Crossfields**											
	Bioretention systems/ rain gardens	25,200	0.58	0.657	110	48,148	1.81	3,240	5	SF	$16,200	32.72%
	Downspout planter boxes	215	0.00	0.006	1	n/a	n/a	12	1,000	SF	$1,000	0.28%
	Total Site Info	**25,415**	**0.58**	**0.662**	**111**	**48,148**	**1.81**	**3,252**			**$17,200**	**33.00%**
2	**Faith Community Church**											
	Bioretention systems/ rain gardens	1,120	0.03	0.029	5	2,139	0.08	301	5	SF	$1,505	36.73%
	Bioswales	710	0.02	0.018	3	1,354	0.05	254	5	SF	$1,270	23.29%
	Total Site Info	**1,830**	**0.04**	**0.048**	**8**	**3,493**	**0.13**	**555**			**$2,775**	**60.02%**
3	**Grace M. Breckwedel School**											
	Bioretention systems/ rain gardens	5,910	0.14	0.154	26	11,295	0.42	865	5	SF	$4,325	14.66%
	Pervious pavements	11,120	0.26	0.290	49	21,243	0.80	6,014	25	SF	$150,350	27.58%
	Total Site Info	**17,030**	**0.39**	**0.444**	**74**	**32,538**	**1.22**	**6,879**			**$154,675**	**42.24%**
4	**Jamesburg Fire Department**											
	Bioretention systems/ rain gardens	2,160	0.05	0.056	9	4,129	0.16	320	5	SF	$1,600	6.70%
	Downspout planter boxes	215	0.00	0.006	1	n/a	n/a	12	1,000	SF	$1,000	0.67%
	Pervious pavements	2,140	0.05	0.056	9	4,092	0.15	1,110	25	SF	$27,750	6.64%
	Rainwater harvesting systems	4,740	0.11	0.124	21	4,432	0.34	4,432	2	gal	$8,864	14.71%
	Total Site Info	**9,255**	**0.21**	**0.241**	**40**	**12,653**	**0.65**	**5,874**			**$39,214**	**28.73%**
5	**Jamesburg Historical Association**											
	Bioretention systems/ rain gardens	330	0.01	0.009	1	628	0.02	80	5	SF	$400	5.27%
	Total Site Info	**330**	**0.01**	**0.009**	**1**	**628**	**0.02**	**80**			**$400**	**5.27%**
6	**Jamesburg Municipal Court**											
	Bioretention systems/ rain gardens	4,530	0.10	0.118	20	8,654	0.33	640	5	SF	$3,200	10.80%
	Downspout planter boxes	215	0.00	0.006	1	n/a	n/a	12	1,000	SF	$1,000	0.51%
	Pervious pavements	18,280	0.42	0.476	80	34,924	1.31	4,662	25	SF	$116,550	43.59%
	Total Site Info	**23,025**	**0.53**	**0.600**	**100**	**43,578**	**1.64**	**5,314**			**$120,750**	**54.90%**

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 %
7	**Jamesburg Public Library**											
	Pervious pavements	990	0.02	0.026	4	1,892	0.07	230	25	SF	$5,750	19.85%
	Total Site Info	**990**	**0.02**	**0.026**	**4**	**1,892**	**0.07**	**230**			**$5,750**	**19.85%**
8	**John F. Kennedy Elementary School**											
	Bioretention systems/ rain gardens	18,950	0.44	0.494	83	36,203	1.36	2,876	5	SF	$14,380	13.78%
	Pervious pavements	30,760	0.71	0.801	134	58,770	2.21	23,630	25	SF	$590,750	22.38%
	Total Site Info	**49,710**	**1.14**	**1.295**	**217**	**94,973**	**3.57**	**26,506**			**$605,130**	**36.16%**
9	**Monroe Community Church**											
	Bioretention systems/ rain gardens	600	0.01	0.016	3	1,145	0.04	145	5	SF	$725	5.16%
	Pervious pavements	9,790	0.22	0.255	43	18,707	0.70	2,555	25	SF	$63,875	84.18%
	Total Site Info	**10,390**	**0.24**	**0.271**	**45**	**19,852**	**0.74**	**2,700**			**$64,600**	**89.34%**
10	**Presbyterian Church of Jamesburg**											
	Bioretention systems/ rain gardens	10,530	0.24	0.274	46	20,121	0.76	1,350	5	SF	$6,750	16.01%
	Downspout planter boxes	645	0.01	0.017	3	n/a	n/a	36	1,000	SF	$3,000	0.98%
	Pervious pavements	8,560	0.20	0.223	37	16,359	0.62	2,200	25	SF	$55,000	13.01%
	Total Site Info	**19,735**	**0.45**	**0.514**	**86**	**36,480**	**1.38**	**3,586**			**$64,750**	**30.00%**
11	**Saint James Roman Catholic Church**											
	Bioretention systems/ rain gardens	1,105	0.03	0.029	5	2,109	0.08	250	5	SF	$1,250	2.01%
	Pervious pavements	39,900	0.92	1.040	174	76,236	2.87	6,410	25	SF	$160,250	72.50%
	Total Site Info	**41,005**	**0.94**	**1.069**	**179**	**78,345**	**2.95**	**6,660**			**$161,500**	**74.51%**
12	**Saint John's Baptist Church**											
	Bioretention systems/ rain gardens	2,240	0.05	0.058	10	4,279	0.16	390	5	SF	$1,950	14.30%
	Pervious pavements	8,390	0.19	0.219	37	16,030	0.60	2,150	25	SF	$53,750	53.56%
	Total Site Info	**10,630**	**0.24**	**0.277**	**46**	**20,309**	**0.76**	**2,540**			**$55,700**	**67.85%**
13	**US Post Office**											
	Pervious pavements	7,690	0.18	0.200	34	14,690	0.55	2,580	25	SF	$64,500	52.73%
	Total Site Info	**7,690**	**0.18**	**0.200**	**34**	**14,690**	**0.55**	**2,580**			**$64,500**	**52.73%**