



**Draft**

**Impervious Cover Reduction Action Plan  
for  
South Brunswick Township, Middlesex County, New Jersey**

*Prepared for South Brunswick Township by the  
Rutgers Cooperative Extension Water Resources Program*

November 16, 2015



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- b. Green Infrastructure Sites
- c. Proposed Green Infrastructure Concepts
- d. Summary of Existing Conditions
- e. Summary of Proposed Green Infrastructure Practices

## **Introduction**

Located in Middlesex County in central New Jersey, South Brunswick Township covers approximately 41 square miles east of Raritan. Figures 1 and 2 illustrate that South Brunswick Township 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 South Brunswick Township, 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 South Brunswick 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 South Brunswick Township. Based upon the 2007 NJDEP land use/land cover data, approximately 16.1% of South Brunswick Township has impervious cover. This level of impervious cover suggests that the streams in South Brunswick Township are likely impacted.<sup>1</sup>

## **Methodology**

South Brunswick Township contains portions of eleven 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.

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<sup>1</sup> 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

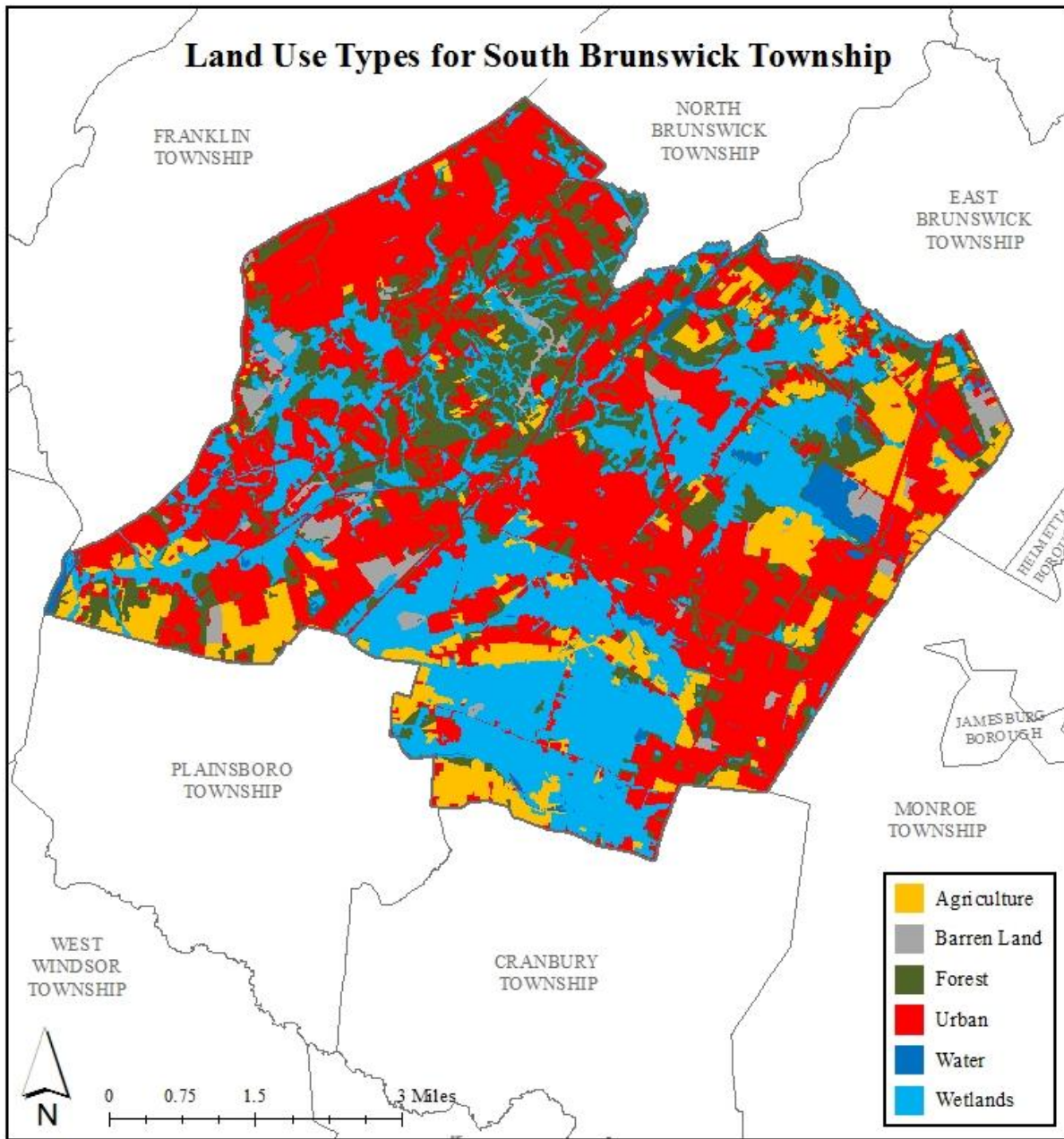


Figure 1: Map illustrating the land use in South Brunswick Township

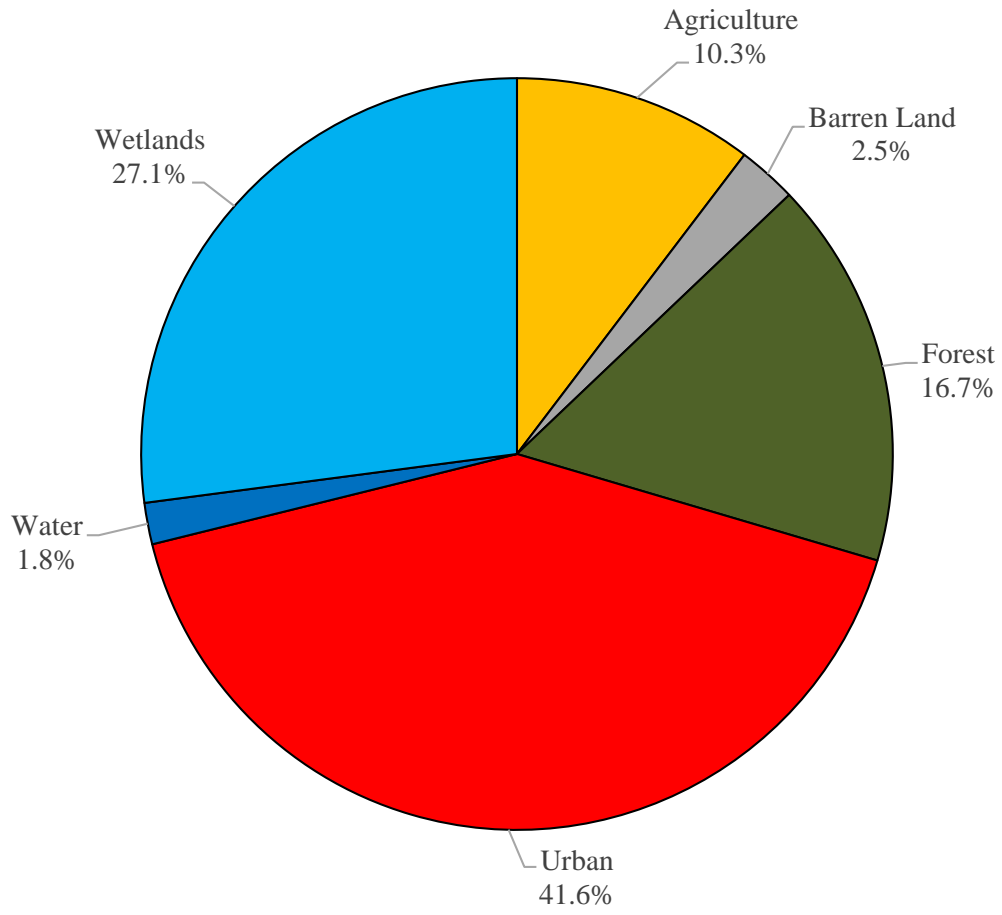


Figure 2: Pie chart illustrating the land use in South Brunswick Township

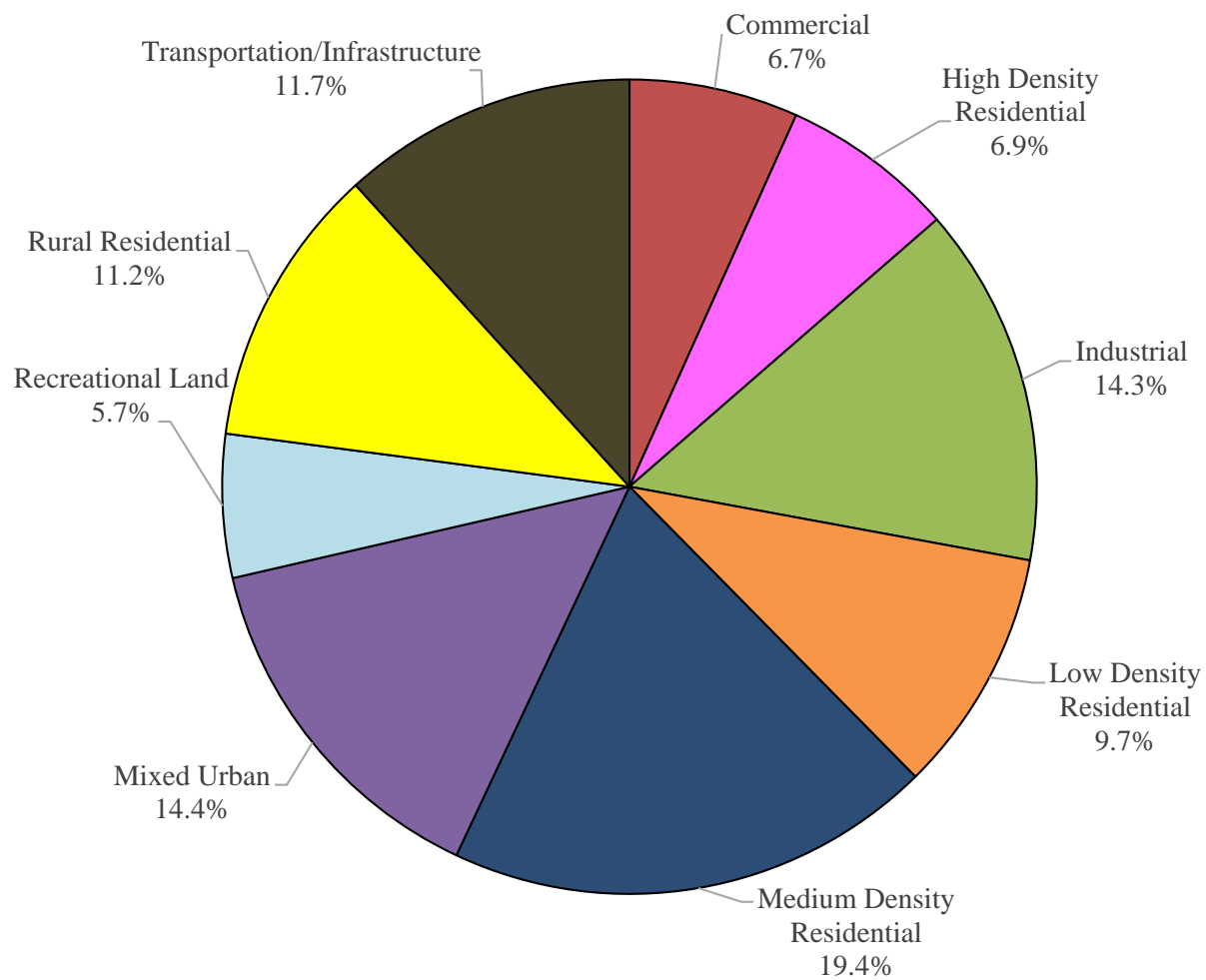


Figure 3: Pie chart illustrating the various types of urban land use in South Brunswick Township

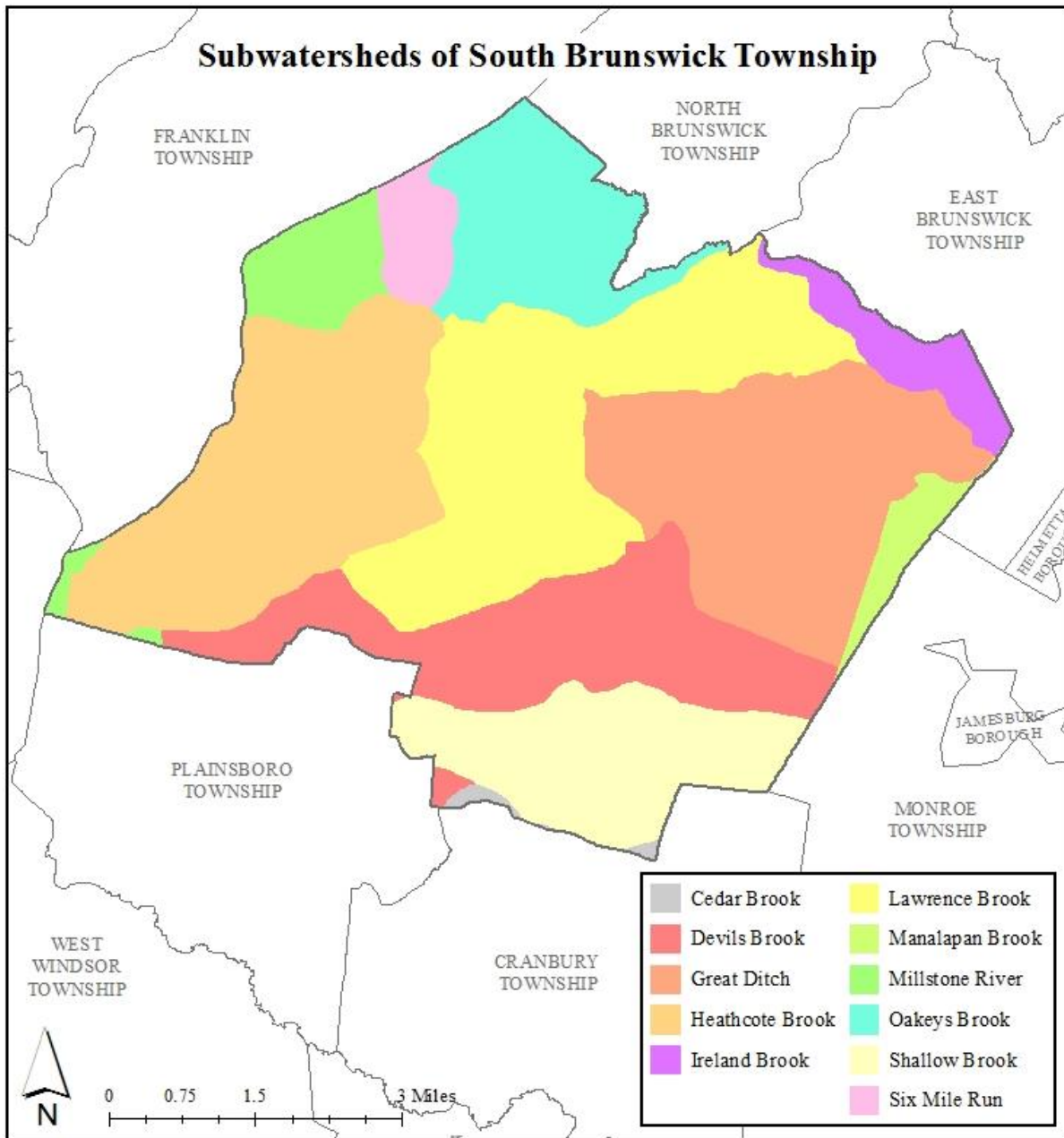


Figure 4: Map of the subwatersheds in South Brunswick Township

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 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 South Brunswick 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<sup>2</sup>

<b>Land Cover</b>	<b>TP load (lbs/acre/yr)</b>	<b>TN load (lbs/acre/yr)</b>	<b>TSS load (lbs/acre/yr)</b>
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

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<sup>2</sup> 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<sup>3</sup>. A wide range of green infrastructure practices have been evaluated for the potential project sites in South Brunswick 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.



<sup>3</sup> 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](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.<sup>4</sup>

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<sup>4</sup> 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.*

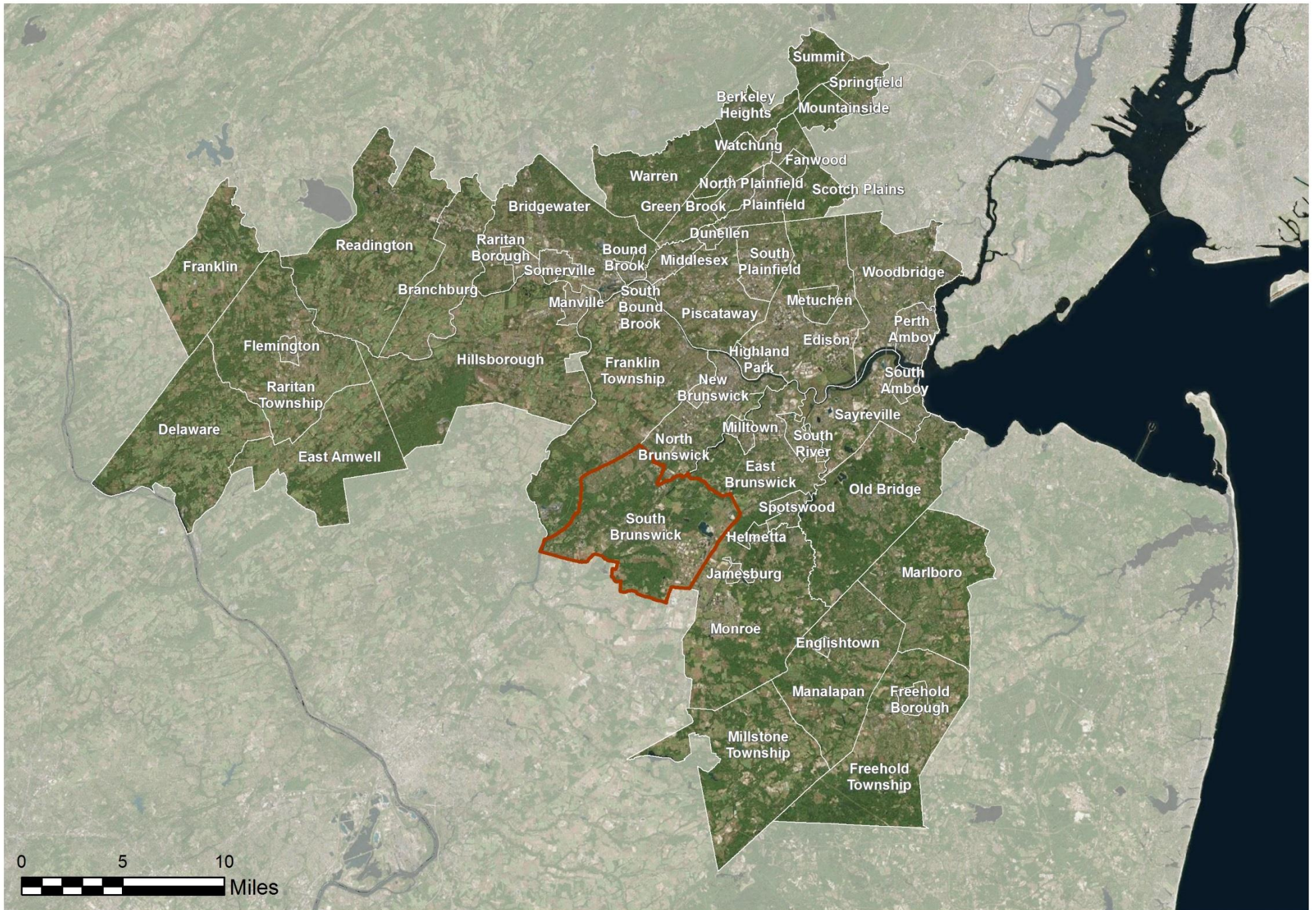
## **Conclusion**

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**

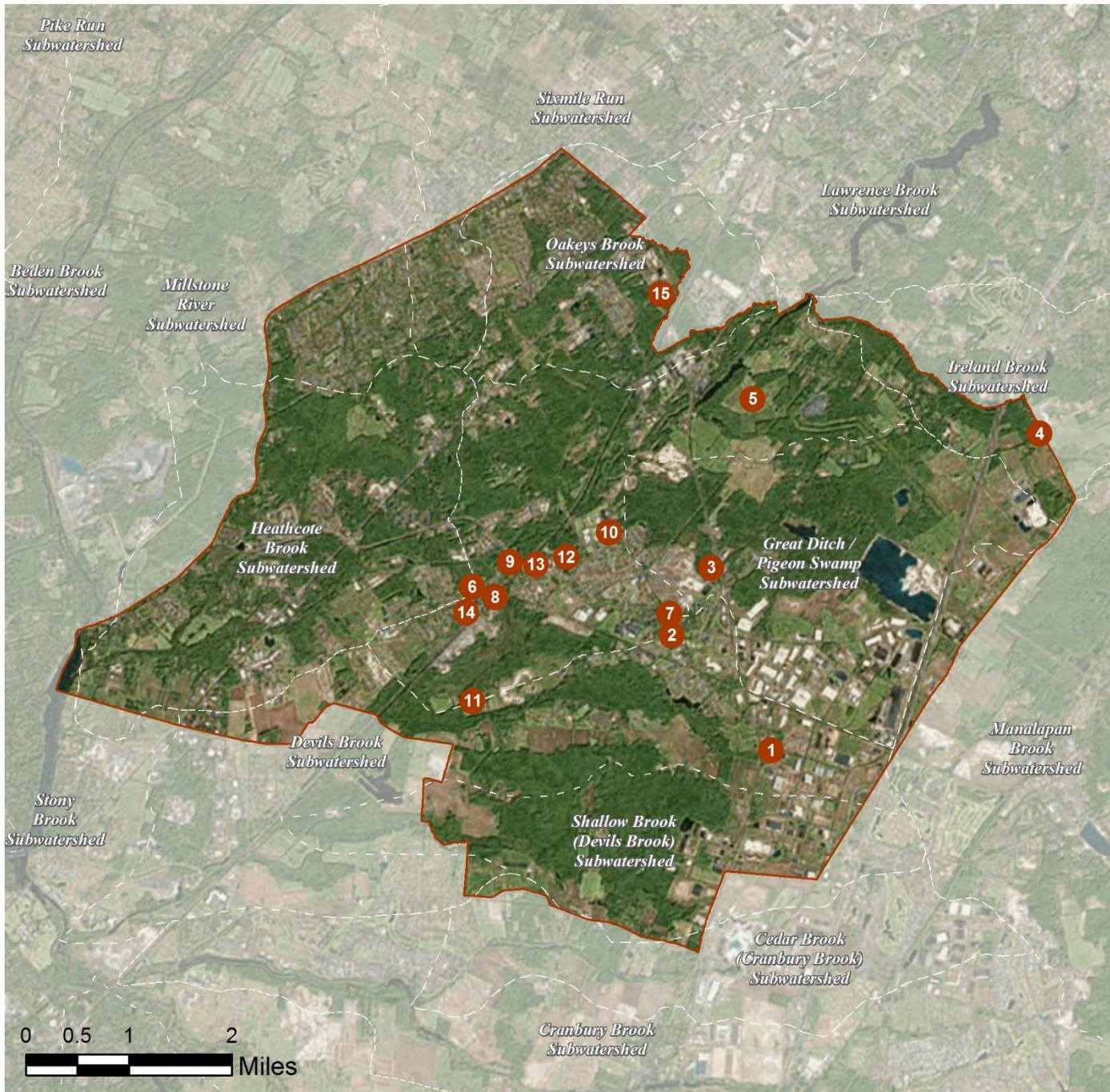
# SOUTH BRUNSWICK: CLIMATE RESILIENT GREEN INFRASTRUCTURE FOR THE RARITAN BASIN



## **b. Green Infrastructure Sites**



# SOUTH BRUNSWICK: GREEN INFRASTRUCTURE SITES



## SITES WITHIN THE DEVILS BROOK SUBWATERSHED:

1. All Nations Mission Church
2. US Post Office: Georges Road

## SITES WITHIN THE GREAT DITCH SUBWATERSHED:

3. Abundant Life Christian Center

## SITES WITHIN THE IRELAND BROOK SUBWATERSHED:

4. Saint Stephen's Mar Thoma Church

## SITES WITHIN THE LAWRENCE BROOK SUBWATERSHED:

5. Davidson Mill Pond County Park / E.A.R.T.H. Center
6. Family Karate Super Center
7. First Presbyterian Church at Dayton
8. Miller Memorial Presbyterian Church
9. Monmouth Junction Fire Department
10. Saint Cecilia's Roman Catholic Church
11. Sondak Park
12. South Brunswick Public Library
13. South Brunswick Township Municipal Center
14. US Post Office: Ridge Road

## SITES WITHIN THE OAKEYS BROOK SUBWATERSHED:

15. South Brunswick Board Of Education

**c. Proposed Green Infrastructure Concepts**

# ALL NATIONS MISSION CHURCH



**Subwatershed:** Devils Brook  
**Site Area:** 542,784 sq. ft.  
**Address:** 2344 U.S. 130  
Dayton, NJ 08810  
**Block and Lot:** Block 10, Lot 13.01



A rain garden south of the parking lot can capture, treat, 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"
41	223,671	10.8	113.0	1,027.0	0.174	6.13

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	0.281	47	20,645	0.78	2,600	\$13,000

# GREEN INFRASTRUCTURE RECOMMENDATIONS



## All Nations Mission Church

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



# U.S. POST OFFICE: GEORGES ROAD



**Subwatershed:** Devils Brook  
**Site Area:** 24,042 sq. ft.  
**Address:** 347 Georges Road  
Dayton, NJ 08810  
**Block and Lot:** Block 32, Lot 2.06

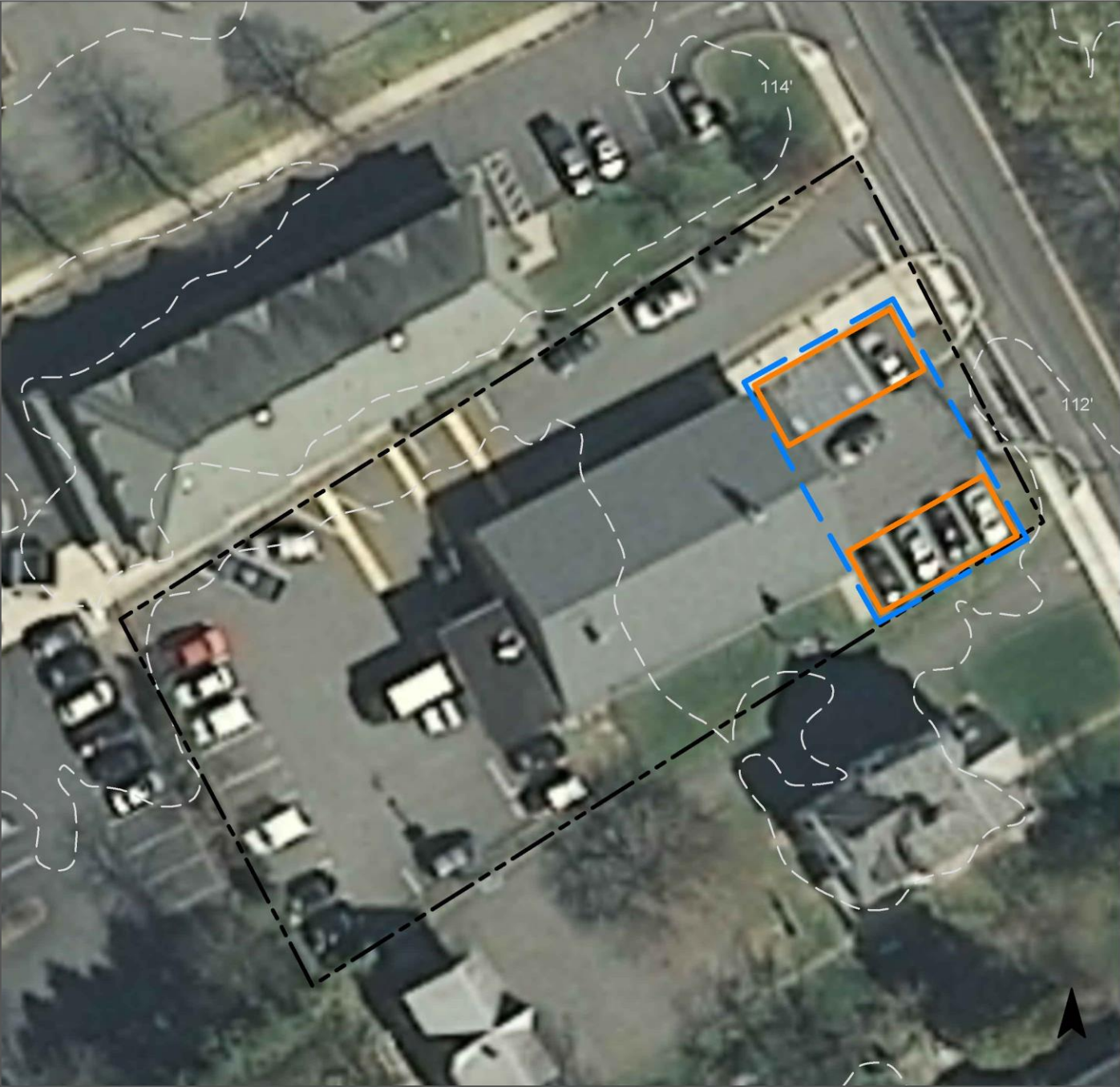


Parking spaces can be replaced with pervious pavement to infiltrate runoff. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.





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"
79	18,894	0.9	9.5	86.8	0.015	0.52

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	0.082	14	6,021	0.23	1,450	\$36,250

# GREEN INFRASTRUCTURE RECOMMENDATIONS



**U.S. Post Office:  
Georges Road**

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



# ABUNDANT LIFE CHRISTIAN CENTER



**Subwatershed:** Great Ditch

**Site Area:** 245,280 sq. ft.

**Address:** 2245 U.S. 130  
Dayton, NJ 08810

**Block and Lot:** Block 31.02, Lot 34.071

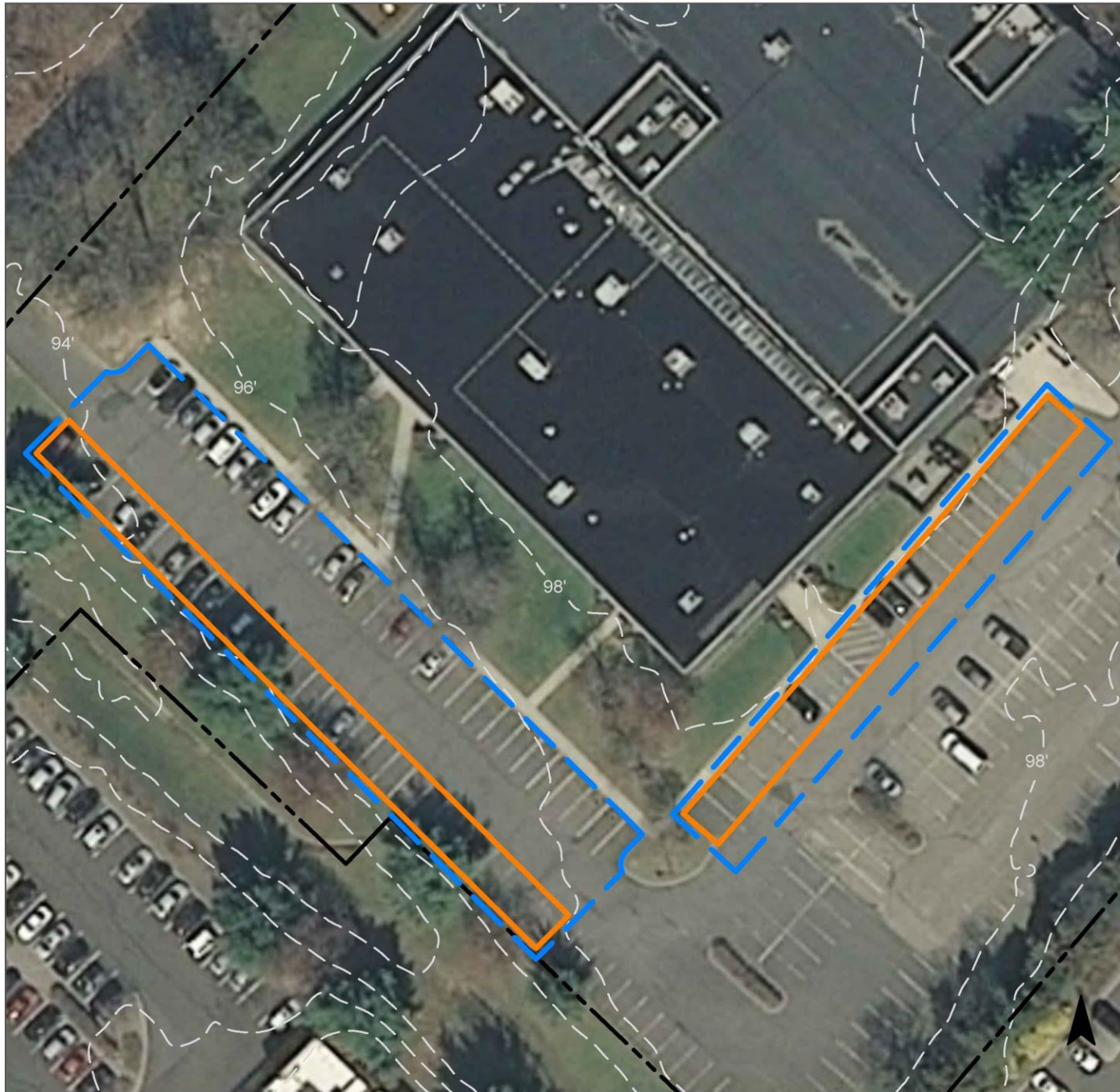


Parking spaces can be replaced with porous asphalt to capture and infiltrate stormwater. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.





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"
76	186,246	9.0	94.1	855.1	0.145	5.11

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
Pervious pavements	0.646	108	47,416	1.78	8,800	\$220,000

# GREEN INFRASTRUCTURE RECOMMENDATIONS



## Abundant Life Christian Center

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





# SAINT STEPHEN'S MAR THOMA CHURCH



**Subwatershed:** Ireland Brook

**Site Area:** 218,155 sq. ft.

**Address:** 423 Dunhams Corner Road  
East Brunswick, NJ 08816

**Block and Lot:** Block 22.01, Lot 2.04



A rain garden can be installed that can capture, treat, and infiltrate parking lot runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.





Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
20	43,967	2.1	22.2	201.9	0.034	1.21

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.261	44	19,119	0.72	2,400	\$12,000

# GREEN INFRASTRUCTURE RECOMMENDATIONS



## Saint Stephen's Mar Thoma Church

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



# DAVIDSON MILL POND COUNTY PARK / E.A.R.T.H. CENTER



**Subwatershed:** Lawrence Brook

**Site Area:** 8,557,232 sq. ft.

**Address:** 42 Riva Avenue  
South Brunswick, NJ 08902

**Block and Lot:** Block 29.03, Lot 29.03



Parking spaces can be replaced with pervious pavement. A rain garden can be installed to capture, treat, and infiltrate stormwater 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"
1	73,014	3.5	36.9	335.2	0.057	2.00

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.042	7	3,059	0.11	400	\$2,000
Pervious pavements	0.216	36	15,865	0.60	3,000	\$75,000

# GREEN INFRASTRUCTURE RECOMMENDATIONS



**Davidson Mill Pond  
County Park /  
E.A.R.T.H. Center**

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



# FAMILY KARATE SUPER CENTER



**Subwatershed:** Lawrence Brook

**Site Area:** 54,878 sq. ft.

**Address:** 621 Ridge Road  
Monmouth Jct., NJ 08852

**Block and Lot:** Block 54.02, Lot 1.12

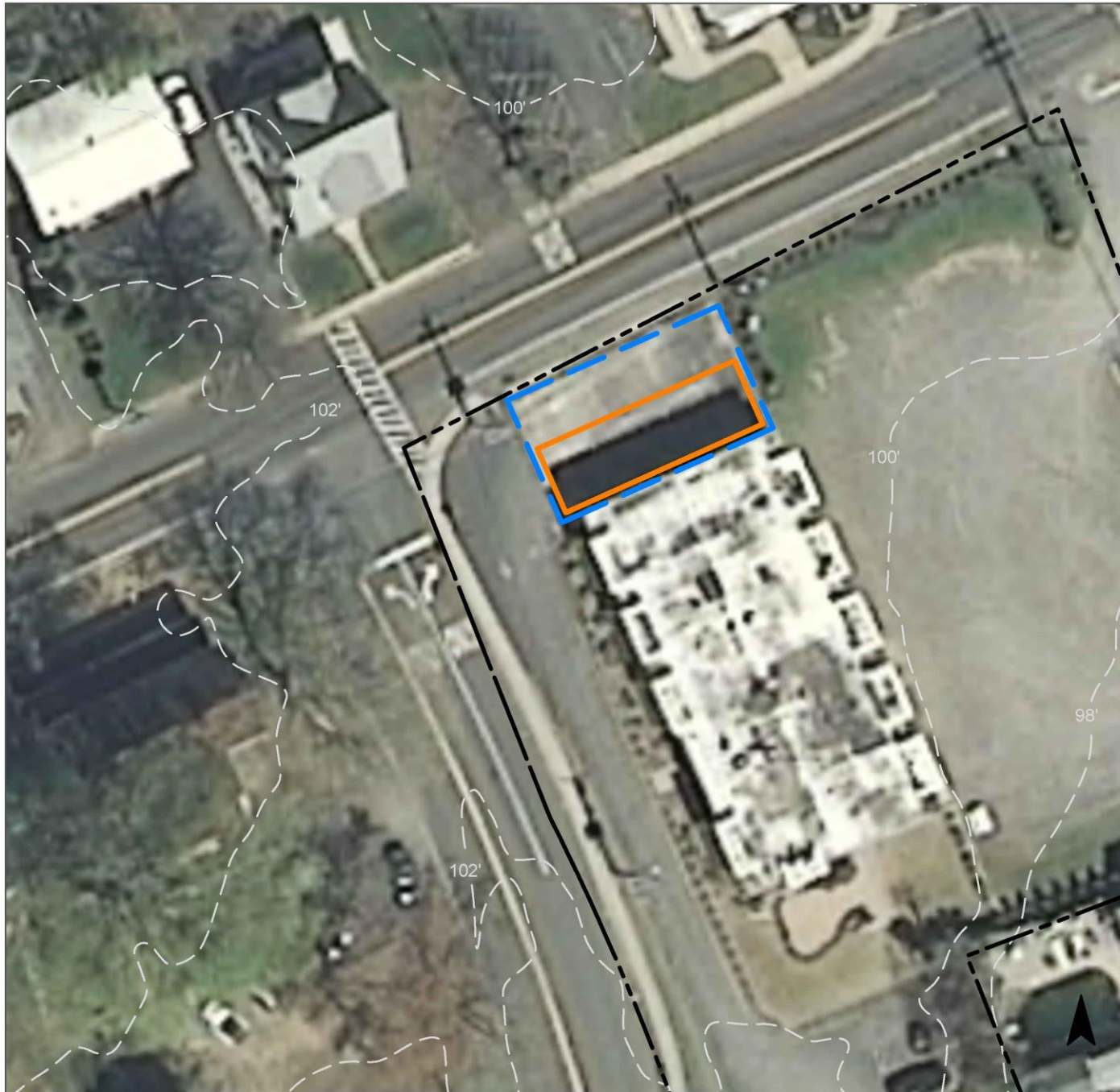


Parking spaces in front of the Center can be replaced with porous asphalt to capture and infiltrate stormwater. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.





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"
64	34,991	1.7	17.7	160.7	0.027	0.96

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	0.052	9	3,822	0.14	1,000	\$25,000

# GREEN INFRASTRUCTURE RECOMMENDATIONS



## Family Karate Super Center

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



# FIRST PRESBYTERIAN CHURCH AT DAYTON



**Subwatershed:** Lawrence Brook

**Site Area:** 99,831 sq. ft.

**Address:** 362 Georges Road  
Dayton, NJ 08810

**Block and Lot:** Block 31, Lot 7



Parking spaces can be replaced with porous asphalt to capture and infiltrate stormwater. A bioretention system adjacent to the building can capture, treat, and infiltrate roof 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"
79	78,826	3.8	39.8	361.9	0.061	2.16

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	0.022	4	1,623	0.06	200	\$1,000
Pervious pavements	0.198	33	14,534	0.55	1,300	\$32,500

# GREEN INFRASTRUCTURE RECOMMENDATIONS



## First Presbyterian Church at Dayton

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





# MILLER MEMORIAL PRESBYTERIAN CHURCH



**Subwatershed:** Lawrence Brook

**Site Area:** 13,651 sq. ft.

**Address:** 617 Ridge Road  
Monmouth Junction, NJ 08852

**Block and Lot:** Block 55, Lot 17.01

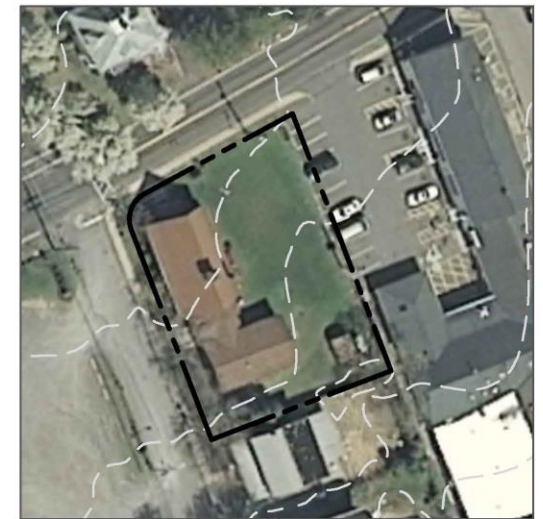
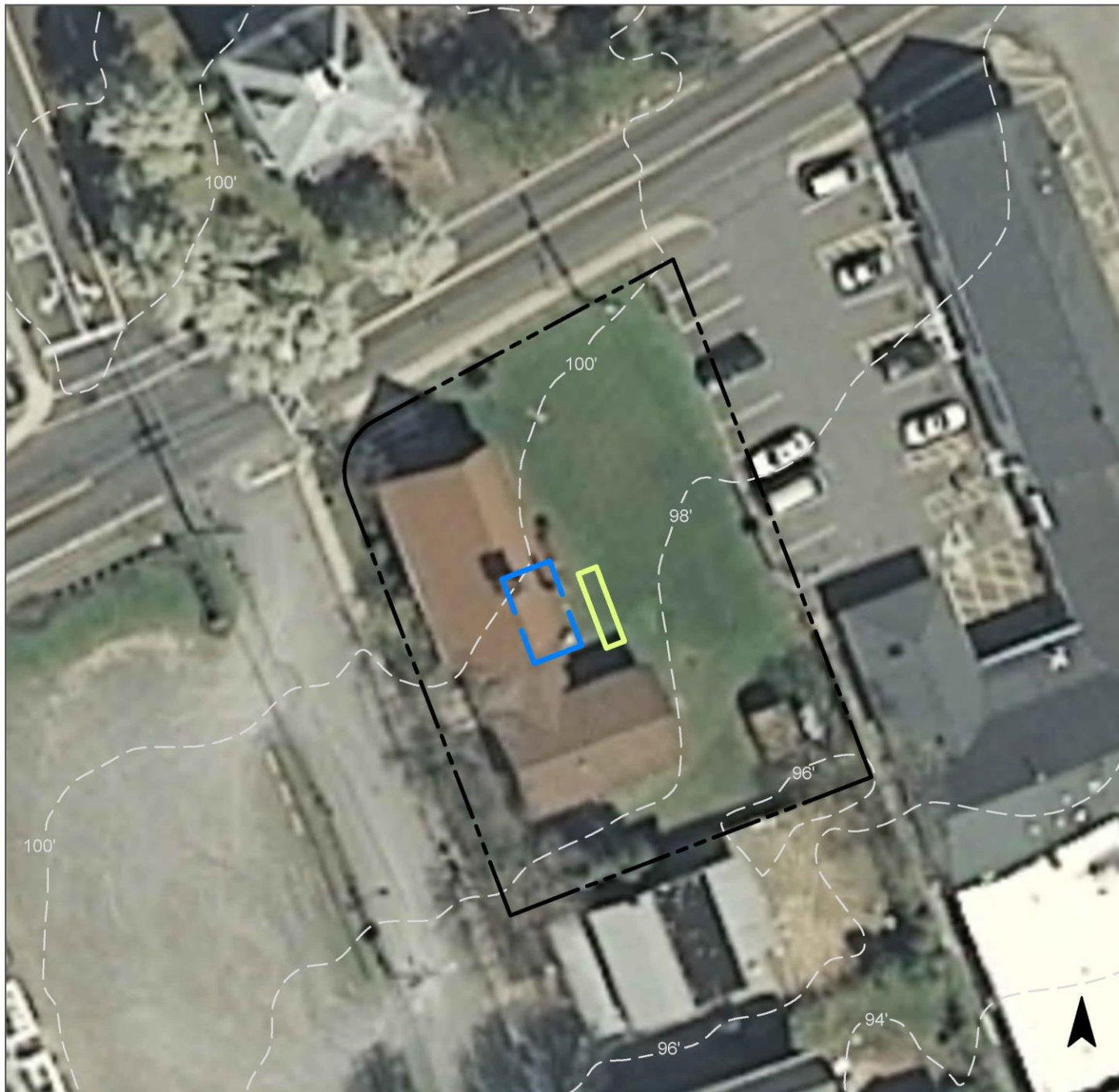


A bioretention system adjacent to the building can capture, treat, and infiltrate roof runoff. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.





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"
45	6,143	0.3	3.1	28.2	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	0.008	1	576	0.02	100	\$500

# GREEN INFRASTRUCTURE RECOMMENDATIONS



## Miller Memorial Presbyterian Church

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



# MONMOUTH JUNCTION FIRE DEPARTMENT



**Subwatershed:** Lawrence Brook  
**Site Area:** 305,653 sq. ft.  
**Address:** 573 Ridge Road  
South Brunswick, NJ 08852  
**Block and Lot:** Block 85.03, Lot 1

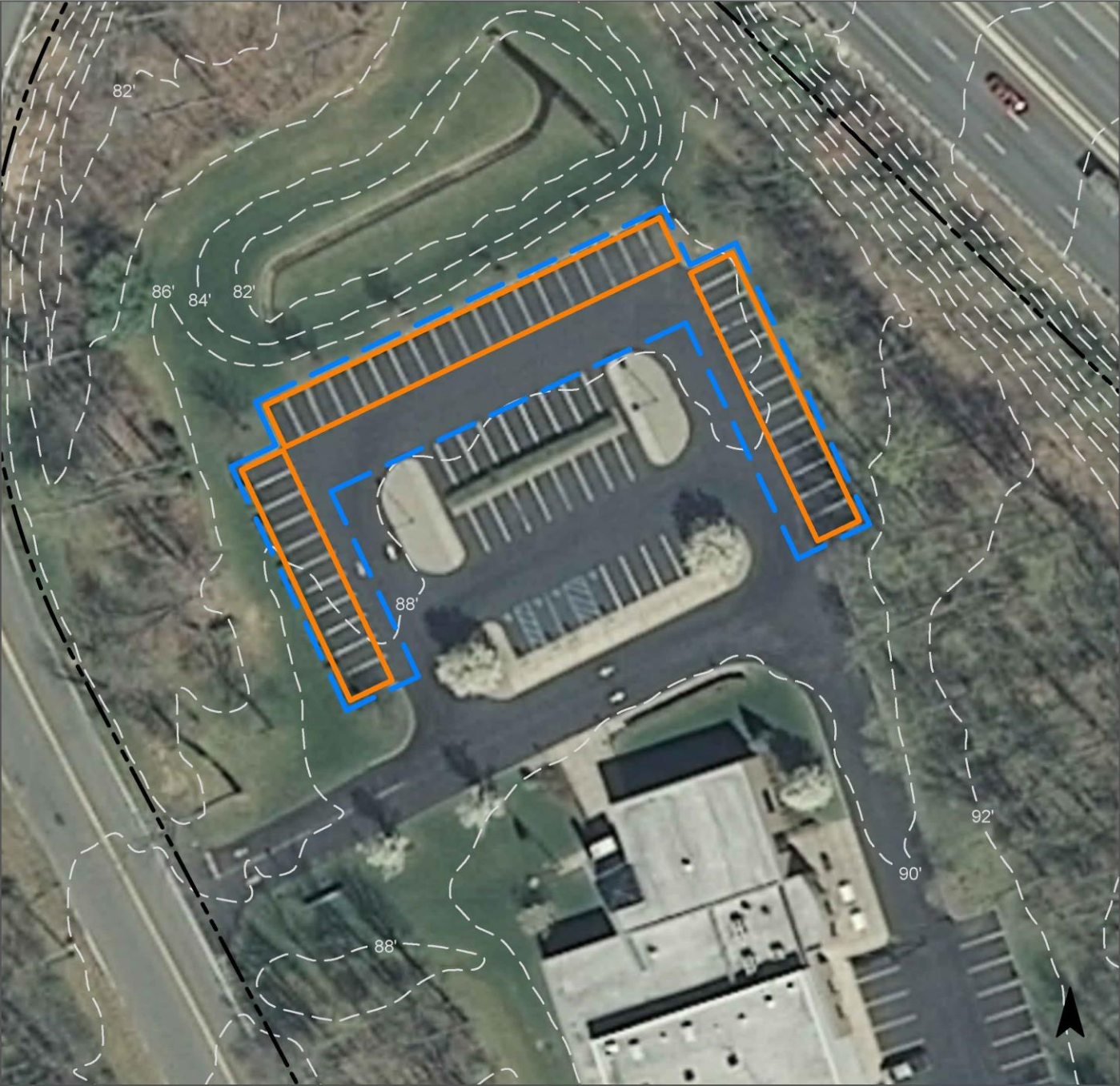


Parking spaces can be replaced with porous asphalt to capture and infiltrate stormwater. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.





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"
35	107,284	5.2	54.2	492.6	0.084	2.94

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	0.373	62	27,339	1.03	6,900	\$172,500

# GREEN INFRASTRUCTURE RECOMMENDATIONS



## Monmouth Junction Fire Department

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



# SAINT CECILIA'S ROMAN CATHOLIC CHURCH



**Subwatershed:** Lawrence Brook

**Site Area:** 319,421 sq. ft.

**Address:** 10 County Road 681  
Monmouth Jct., NJ 08852

**Block and Lot:** Block 87.02, Lot 12.141



Parking spaces can be replaced with porous asphalt to capture and infiltrate stormwater. Rain gardens can also capture, treat and infiltrate roof 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"
42	132,779	6.4	67.1	609.6	0.103	3.64

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	0.156	26	1,144	0.04	1,500	\$7,500
Pervious pavements	0.844	141	61,942	2.33	14,200	\$355,000

# GREEN INFRASTRUCTURE RECOMMENDATIONS



## Saint Cecilia's Roman Catholic Church

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



# SONDEK PARK



**Subwatershed:** Devils Brook / Lawrence Brook

**Site Area:** 4,192,964 sq. ft.

**Address:** 473 New Road  
Monmouth Jct., NJ 08852

**Block and Lot:** Block 52, Lot 23

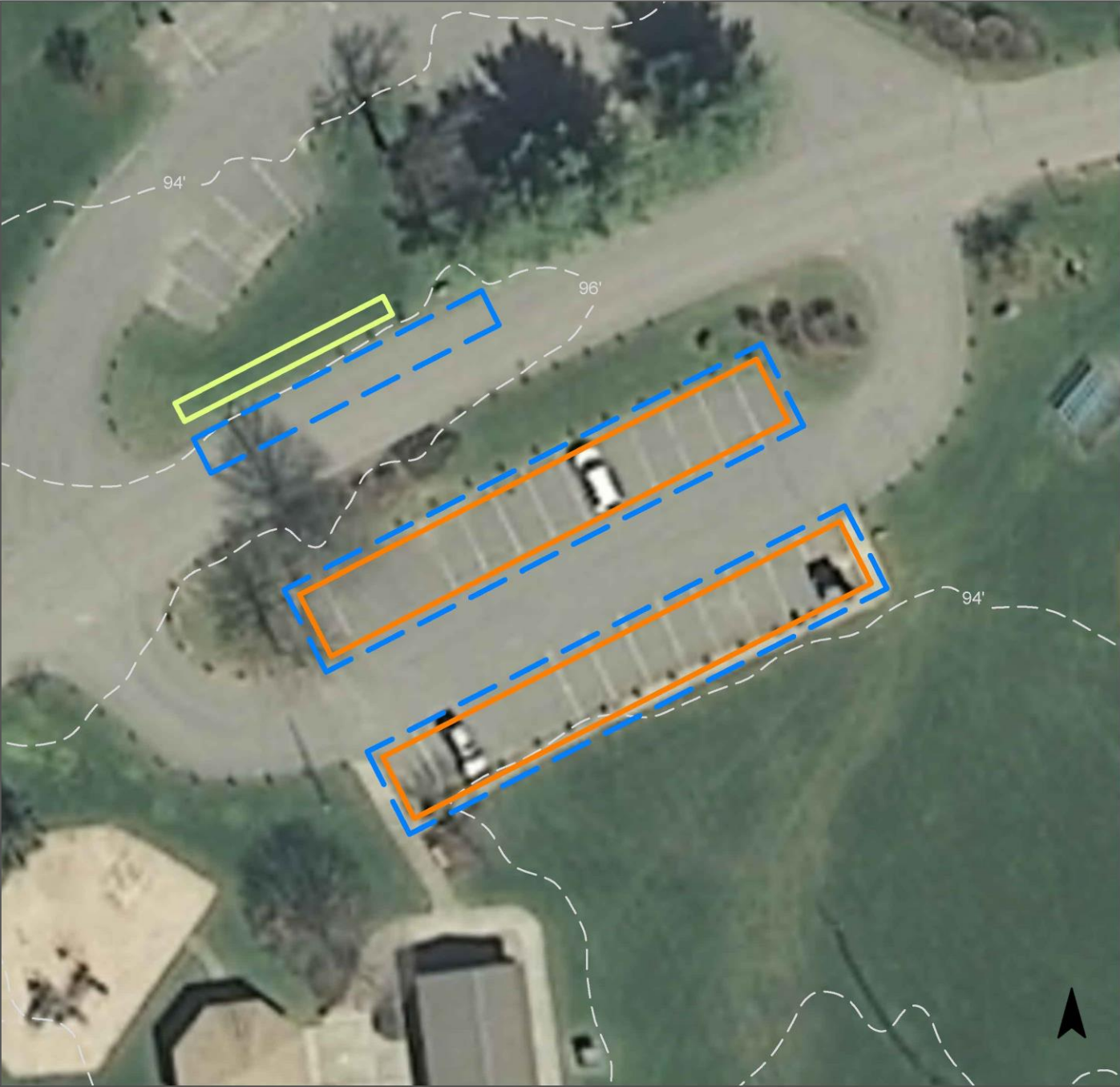


Parking spots by the east entrance to the park can be replaced with porous asphalt to capture and infiltrate stormwater. The installation of a rain garden adjacent to the roadway can capture, treat, and infiltrate runoff. A preliminary soil assessment suggests that more soil testing would be required 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"
3	121,426	5.9	61.3	557.5	0.095	3.33

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	0.022	4	1,623	0.06	300	\$1,500
Pervious pavements	0.125	21	9,178	0.34	4,800	\$120,000

# GREEN INFRASTRUCTURE RECOMMENDATIONS



## Sondek Park

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





# SOUTH BRUNSWICK PUBLIC LIBRARY



**Subwatershed:** Lawrence Brook

**Site Area:** 416,849 sq. ft.

**Address:** 110 Kingston Lane  
Monmouth Jct., NJ 08852

**Block and Lot:** Block 51, Lot 26

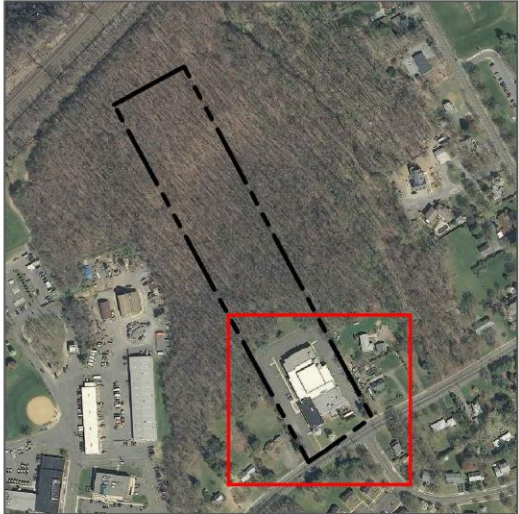
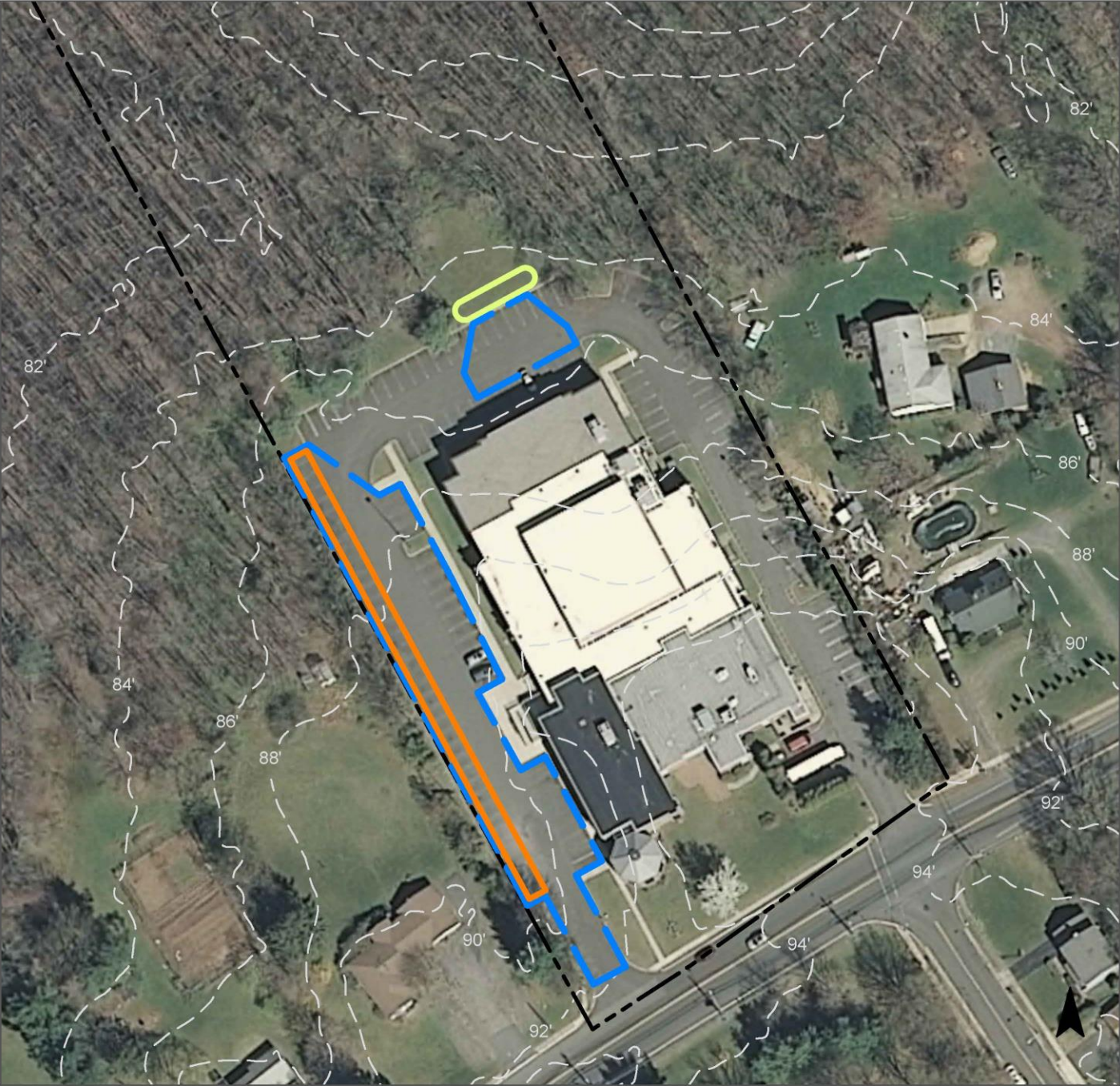


Parking spaces can be replaced with porous asphalt to capture and infiltrate stormwater. A rain garden adjacent to the northern parking lot can capture, treat and infiltrate runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability 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"
28	115,414	5.6	58.3	529.9	0.090	3.17

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	0.072	12	5,258	0.20	700	\$3,500
Pervious pavements	0.469	79	34,415	1.29	3,900	\$97,500

# GREEN INFRASTRUCTURE RECOMMENDATIONS



## South Brunswick Public Library

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



# SOUTH BRUNSWICK TOWNSHIP MUNICIPAL CENTER



**Subwatershed:** Lawrence Brook

**Site Area:** 2,266,722 sq. ft.

**Address:** 540 Ridge Road  
South Brunswick, NJ 08852

**Block and Lot:** Block 44, Lot 3.04



Parking spaces can be replaced with porous asphalt 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"
37	835,155	40.3	421.8	3,834.5	0.651	22.91

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.151	25	11,085	0.42	1,500	\$7,500
Pervious pavements	0.336	56	24,662	0.93	7,000	\$175,000

# GREEN INFRASTRUCTURE RECOMMENDATIONS



## South Brunswick Township Municipal Center

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



# U.S. POST OFFICE: RIDGE ROAD



**Subwatershed:** Lawrence Brook  
**Site Area:** 34,929 sq. ft.  
**Address:** 651 Ridge Road  
Monmouth Jct., NJ 08852  
**Block and Lot:** Block 54.01, Lot 18



Parking spaces can be replaced with porous asphalt to capture and infiltrate stormwater. A rain garden adjacent to the parking lot can capture, treat and infiltrate 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"
84	29,435	1.4	14.9	135.1	0.023	0.81

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	0.060	10	4,398	0.17	600	\$3,000
Pervious pavements	0.091	15	6,695	0.25	800	\$20,000

# GREEN INFRASTRUCTURE RECOMMENDATIONS



**U.S. Post Office: Ridge Road**

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



# SOUTH BRUNSWICK BOARD OF EDUCATION



**Subwatershed:** Oakeys Brook

**Site Area:** 371,360 sq. ft.

**Address:** 231 Black Horse Lane  
Monmouth Jct., NJ 08852

**Block and Lot:** Block 91, Lot 8.01

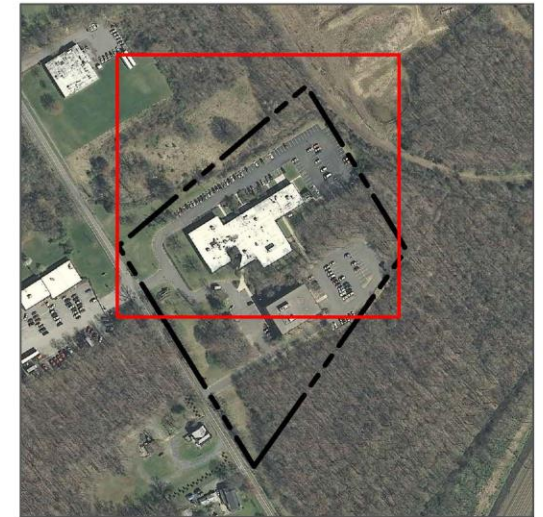
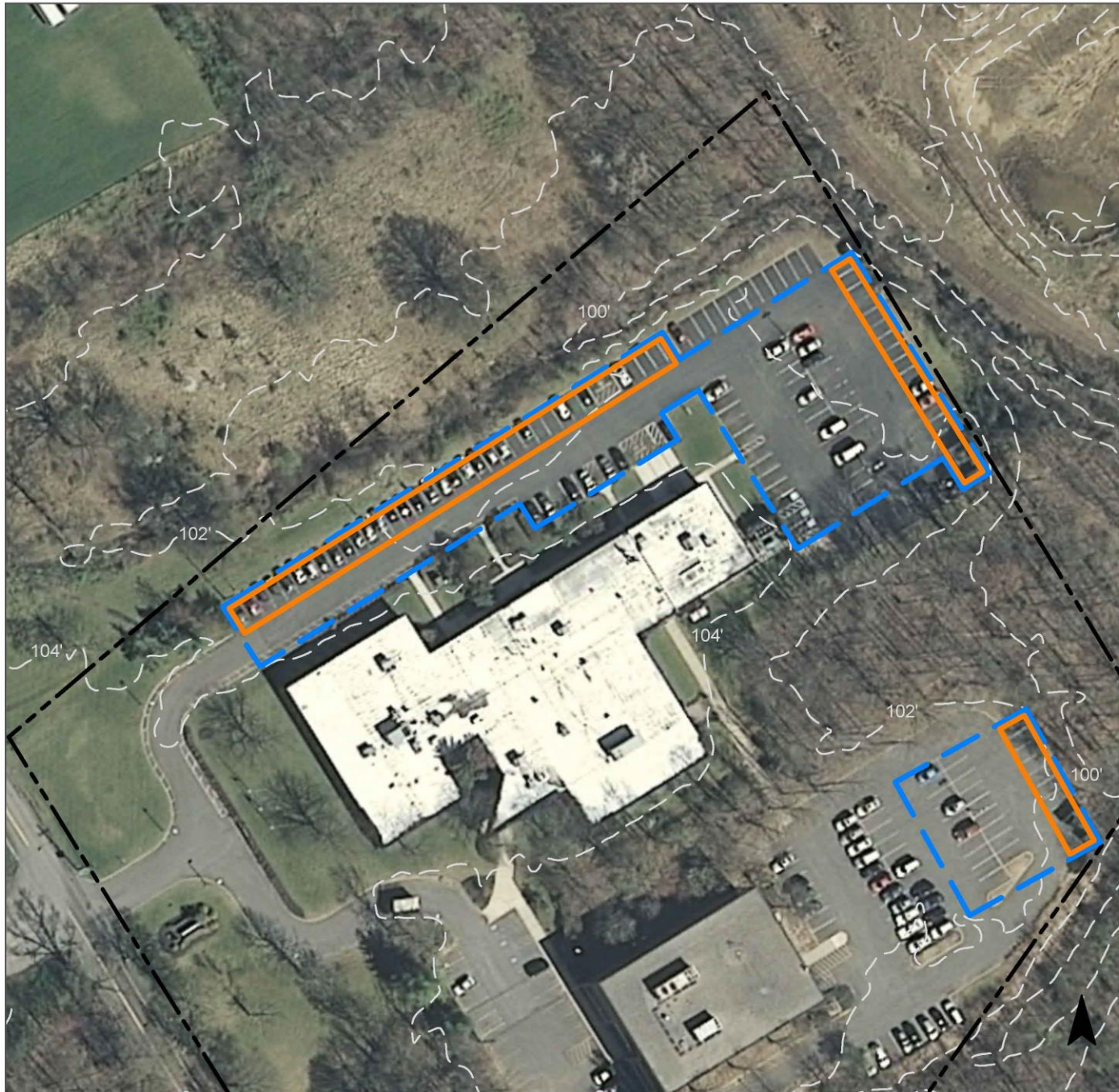


Parking spaces can be replaced with porous asphalt to capture and infiltrate stormwater. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.





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"
52	193,841	9.3	97.9	890.0	0.151	5.32

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
Pervious pavements	1.199	201	87,942	3.31	10,000	\$250,000

# GREEN INFRASTRUCTURE RECOMMENDATIONS



## South Brunswick Board of Education

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





#### **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)
<b>DEVIL'S BROOK SUBWATERSHED</b>	<b>13.01</b>	<b>566,826</b>			<b>11.7</b>	<b>122.5</b>	<b>1,113.7</b>		<b>5.57</b>	<b>242,566</b>	<b>0.189</b>	<b>6.65</b>
<b>All Nations Mission Church Total Site Info</b>	12.46	542,784	10	13.01	10.8	113.0	1,027.0	41	5.13	223,671	0.174	6.13
<b>US Post Office: Georges Road Total Site Info</b>	0.55	24,042	32	2.06	0.9	9.5	86.8	79	0.43	18,894	0.015	0.52
<b>GREAT DITCH SUBWATERSHED</b>	<b>5.63</b>	<b>245,280</b>			<b>9.0</b>	<b>94.1</b>	<b>855.1</b>		<b>4.28</b>	<b>186,246</b>	<b>0.145</b>	<b>5.11</b>
<b>Abundant Life Christian Center Total Site Info</b>	5.63	245,280	31.02	34.071	9.0	94.1	855.1	76	4.28	186,246	0.145	5.11
<b>IRELAND BROOK SUBWATERSHED</b>	<b>5.01</b>	<b>218,155</b>			<b>2.1</b>	<b>22.2</b>	<b>201.9</b>		<b>1.01</b>	<b>209,759</b>	<b>0.034</b>	<b>1.21</b>
<b>Saint Stephen's Mar Thoma Church Total Site Info</b>	5.01	218,155	22.01	2.04	2.1	22.2	201.9	20	1.01	43,967	0.034	1.21
<b>LAWRENCE BROOK SUBWATERSHED</b>	<b>373.33</b>	<b>16,262,130</b>			<b>74.0</b>	<b>775.0</b>	<b>7,045.3</b>		<b>35.23</b>	<b>1,534,466</b>	<b>1.196</b>	<b>42.09</b>
<b>Davidson Mill Pond County Park Total Site Info</b>	196.45	8,557,232	29.03	29.03	3.5	36.9	335.2	1	1.68	73,014	0.057	2.00
<b>Family Karate Super Center Total Site Info</b>	1.26	54,878	54.02	1.12	1.7	17.7	160.7	64	0.80	34,991	0.027	0.96
<b>First Presbyterian Church at Dayton Total Site Info</b>	2.29	99,831	31	7	3.8	39.8	361.9	79	1.81	78,826	0.061	2.16
<b>Miller Memorial Presbyterian Church Total Site Info</b>	0.31	13,651	55	17.01	0.3	3.1	28.2	45	0.14	6,143	0.005	0.17
<b>Monmouth Junction Fire Department Total Site Info</b>	7.02	305,653	85.03	1	5.2	54.2	492.6	35	2.46	107,284	0.084	2.94

**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)
<b>Saint Cecilia's Roman Catholic Total Site Info</b>	7.33	319,421	87.02	12.141	6.4	67.1	609.6	42	3.05	132,779	0.103	3.64
<b>Sondek Park Total Site Info</b>	96.26	4,192,964	52	23	5.9	61.3	557.5	3	2.79	121,426	0.095	3.33
<b>South Brunswick Public Library Total Site Info</b>	9.57	416,849	51	26	5.6	58.3	529.9	28	2.65	115,414	0.090	3.17
<b>South Brunswick Township Municipal Center Total Site Info</b>	52.04	2,266,722	44	3.04	40.3	421.8	3,834.5	37	19.17	835,155	0.651	22.91
<b>US Post Office: Ridge Road Total Site Info</b>	0.80	34,929	54.01	18	1.4	14.9	135.1	84	0.68	29,435	0.023	0.81
<b>OAKEYS BROOK SUBWATERSHED</b>	<b>8.53</b>	<b>371,360</b>			<b>9.3</b>	<b>97.9</b>	<b>890.0</b>		<b>4.45</b>	<b>193,841</b>	<b>0.151</b>	<b>5.32</b>
<b>South Brunswick Board of Education Total Site Info</b>	8.53	371,360	91	8.01	9.3	97.9	890.0	52	4.45	193,841	0.151	5.32

**e. Summary of Proposed Green Infrastructure Practices**

**Summary of Proposed Green Infrastructure Practies**

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 (SF)	Unit Cost (\$)	Unit	Total Cost (\$)	I.C. Treated %
	Area (SF)	Area (ac)									
<b>DEVIL'S BROOK SUBWATERSHED</b>	<b>13,950</b>	<b>0.32</b>	<b>0.363</b>	<b>61</b>	<b>26,666</b>	<b>1.01</b>	<b>4,050</b>			<b>\$49,250</b>	<b>5.8%</b>
1 <b>All Nations Mission Church</b>											
Bioretention systems/rain gardens	10,800	0.25	0.281	47	20,645	0.78	2,600	5	SF	\$13,000	4.8%
<b>Total Site Info</b>	<b>10,800</b>	<b>0.25</b>	<b>0.281</b>	<b>47</b>	<b>20,645</b>	<b>0.78</b>	<b>2,600</b>			<b>\$13,000</b>	<b>4.8%</b>
2 <b>U.S. Post Office: Georges Road</b>											
Pervious pavements	3,150	0.07	0.082	14	6,021	0.23	1,450	25	SF	\$36,250	16.7%
<b>Total Site Info</b>	<b>3,150</b>	<b>0.07</b>	<b>0.082</b>	<b>14</b>	<b>6,021</b>	<b>0.23</b>	<b>1,450</b>			<b>\$36,250</b>	<b>16.7%</b>
<b>GREAT DITCH SUBWATERSHED</b>	<b>24,800</b>	<b>0.57</b>	<b>0.646</b>	<b>108</b>	<b>47,416</b>	<b>1.78</b>	<b>8,800</b>			<b>\$220,000</b>	<b>13.3%</b>
3 <b>Abundant Life Christian Center</b>											
Pervious pavements	24,800	0.57	0.646	108	47,416	1.78	8,800	25	SF	\$220,000	13.3%
<b>Total Site Info</b>	<b>24,800</b>	<b>0.57</b>	<b>0.646</b>	<b>108</b>	<b>47,416</b>	<b>1.78</b>	<b>8,800</b>			<b>\$220,000</b>	<b>13.3%</b>
<b>IRELAND BROOK SUBWATERSHED</b>	<b>10,000</b>	<b>0.23</b>	<b>0.261</b>	<b>44</b>	<b>19,119</b>	<b>0.72</b>	<b>2,400</b>			<b>\$12,000</b>	<b>22.7%</b>
4 <b>Saint Stephen's Mar Thoma Church</b>											
Bioretention systems/rain gardens	10,000	0.23	0.261	44	19,119	0.72	2,400	5	SF	\$12,000	22.7%
<b>Total Site Info</b>	<b>10,000</b>	<b>0.23</b>	<b>0.261</b>	<b>44</b>	<b>19,119</b>	<b>0.72</b>	<b>2,400</b>			<b>\$12,000</b>	<b>22.7%</b>
<b>LAWRENCE BROOK SUBWATERSHED</b>	<b>124,250</b>	<b>2.85</b>	<b>3.237</b>	<b>542</b>	<b>227,220</b>	<b>8.54</b>	<b>48,200</b>			<b>\$1,099,000</b>	<b>8.1%</b>
5 <b>Davidson Mill Pond County Park / E.A.R.T.H. Center</b>											
Bioretention systems/rain gardens	1,600	0.04	0.042	7	3,059	0.11	400	5	SF	\$2,000	2.2%
Pervious pavements	8,300	0.19	0.216	36	15,865	0.60	3,000	25	SF	\$75,000	11.4%
<b>Total Site Info</b>	<b>9,900</b>	<b>0.23</b>	<b>0.258</b>	<b>43</b>	<b>18,924</b>	<b>0.71</b>	<b>3,400</b>			<b>\$77,000</b>	<b>13.6%</b>
6 <b>Family Karate Super Center</b>											
Pervious pavements	2,000	0.05	0.052	9	3,822	0.14	1,000	25	SF	\$25,000	5.7%
<b>Total Site Info</b>	<b>2,000</b>	<b>0.05</b>	<b>0.052</b>	<b>9</b>	<b>3,822</b>	<b>0.14</b>	<b>1,000</b>			<b>\$25,000</b>	<b>5.7%</b>

**Summary of Proposed Green Infrastructure Practicies**

	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 (SF)	Unit Cost (\$)	Unit	Total Cost (\$)	I.C. Treated %	
	Area (SF)	Area (ac)										
<b>7</b>	<b>First Presbyterian Church at Dayton</b>											
	Bioretention systems/rain gardens	850	0.02	0.022	4	1,623	0.06	200	5	SF	\$1,000	1.1%
	Pervious pavements	7,600	0.17	0.198	33	14,534	0.55	1,300	25	SF	\$32,500	9.6%
	<b>Total Site Info</b>	<b>8,450</b>	<b>0.19</b>	<b>0.220</b>	<b>37</b>	<b>16,157</b>	<b>0.61</b>	<b>1,500</b>			<b>\$33,500</b>	<b>10.7%</b>
<b>8</b>	<b>Miller Memorial Presbyterian Church</b>											
	Bioretention systems/rain gardens	300	0.01	0.008	1	576	0.02	100	5	SF	\$500	4.9%
	<b>Total Site Info</b>	<b>300</b>	<b>0.01</b>	<b>0.008</b>	<b>1</b>	<b>576</b>	<b>0.02</b>	<b>100</b>			<b>\$500</b>	<b>4.9%</b>
<b>9</b>	<b>Monmouth Junction Fire Department</b>											
	Pervious pavements	14,300	0.33	0.373	62	27,339	1.03	6,900	25	SF	\$172,500	13.3%
	<b>Total Site Info</b>	<b>14,300</b>	<b>0.33</b>	<b>0.373</b>	<b>62</b>	<b>27,339</b>	<b>1.03</b>	<b>6,900</b>			<b>\$172,500</b>	<b>13.3%</b>
<b>10</b>	<b>Saint Cecilia's Roman Catholic</b>											
	Bioretention systems/rain gardens	6,000	0.14	0.156	26	1,144	0.04	1,500	5	SF	\$7,500	4.5%
	Pervious pavements	32,400	0.74	0.844	141	61,942	2.33	14,200	25	SF	\$355,000	24.4%
	<b>Total Site Info</b>	<b>38,400</b>	<b>0.88</b>	<b>1.001</b>	<b>167</b>	<b>63,086</b>	<b>2.37</b>	<b>15,700</b>			<b>\$362,500</b>	<b>28.9%</b>
<b>11</b>	<b>Sondek Park</b>											
	Bioretention systems/rain gardens	850	0.02	0.022	4	1,623	0.06	300	5	SF	\$1,500	0.7%
	Pervious pavements	4,800	0.11	0.125	21	9,178	0.34	4,800	25	SF	\$120,000	4.0%
	<b>Total Site Info</b>	<b>5,650</b>	<b>0.13</b>	<b>0.147</b>	<b>25</b>	<b>10,801</b>	<b>0.40</b>	<b>5,100</b>			<b>\$121,500</b>	<b>4.7%</b>
<b>12</b>	<b>South Brunswick Public Library</b>											
	Bioretention systems/rain gardens	2,750	0.06	0.072	12	5,258	0.20	700	5	SF	\$3,500	2.4%
	Pervious pavements	18,000	0.41	0.469	79	34,415	1.29	3,900	25	SF	\$97,500	15.6%
	<b>Total Site Info</b>	<b>20,750</b>	<b>0.48</b>	<b>0.541</b>	<b>91</b>	<b>39,674</b>	<b>1.49</b>	<b>4,600</b>			<b>\$101,000</b>	<b>18.0%</b>
<b>13</b>	<b>South Brunswick Township Municipal Center</b>											
	Bioretention systems/rain gardens	5,800	0.13	0.151	25	11,085	0.42	1,500	5	SF	\$7,500	0.7%
	Pervious pavements	12,900	0.30	0.336	56	24,662	0.93	7,000	25	SF	\$175,000	1.5%
	<b>Total Site Info</b>	<b>18,700</b>	<b>0.43</b>	<b>0.487</b>	<b>82</b>	<b>35,747</b>	<b>1.35</b>	<b>8,500</b>			<b>\$182,500</b>	<b>2.2%</b>
<b>14</b>	<b>U.S. Post Office: Ridge Road</b>											
	Bioretention systems/rain gardens	2,300	0.05	0.060	10	4,398	0.17	600	5	SF	\$3,000	7.8%
	Pervious pavements	3,500	0.08	0.091	15	6,695	0.25	800	25	SF	\$20,000	11.9%
	<b>Total Site Info</b>	<b>5,800</b>	<b>0.13</b>	<b>0.151</b>	<b>25</b>	<b>11,093</b>	<b>0.42</b>	<b>1,400</b>			<b>\$23,000</b>	<b>19.7%</b>

**Summary of Proposed Green Infrastructure Practies**

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 (SF)	Unit Cost (\$)	Unit	Total Cost (\$)	I.C. Treated %
	Area (SF)	Area (ac)									
<b>OAKEYS BROOK SUBWATERSHED</b>	<b>46,000</b>	<b>1.06</b>	<b>1.199</b>	<b>201</b>	<b>87,942</b>	<b>3.31</b>	<b>10,000</b>			<b>\$250,000</b>	<b>23.7%</b>
15 <b>South Brunswick Board of Education</b>											
Pervious pavements	46,000	1.06	1.199	201	87,942	3.31	10,000	25	SF	\$250,000	23.7%
<b>Total Site Info</b>	<b>46,000</b>	<b>1.06</b>	<b>1.199</b>	<b>201</b>	<b>87,942</b>	<b>3.31</b>	<b>10,000</b>			<b>\$250,000</b>	<b>23.7%</b>