



**Draft**

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

*Prepared for Califon Borough by the  
Rutgers Cooperative Extension Water Resources Program*

November 10, 2020

## ACKNOWLEDGEMENTS:

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## **Introduction**

Located in Hunterdon County, New Jersey, Califon Borough covers approximately 0.97 square miles. Figures 1 and 2 illustrate that Califon Borough is dominated by urban land use. A total of 52.8% of the municipality's land use is classified as urban. Of the urban land in Califon Borough, low density residential is the dominant land use (Figure 3).

The New Jersey Department of Environmental Protection's (NJDEP) 2015 land use/land cover geographical information system (GIS) data layer categorizes Califon 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 Califon Borough. Based upon the 2015 NJDEP land use/land cover data, approximately 11.6% of Califon Borough has impervious cover. This level of impervious cover suggests that the streams in Califon Borough are likely impacted streams.<sup>1</sup>

## **Methodology**

Califon Borough contains portions of two subwatersheds (Figure 4). For this impervious cover reduction action plan, projects have been identified in one 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> Schuler, T.R., L. Fraley-McNeal, and K. Cappiella. 2009. Is Impervious Cover Still Important? Review of Recent Research. *Journal of Hydrologic Engineering* 14 (4): 309-315.

# Land Use Types for Califon Borough

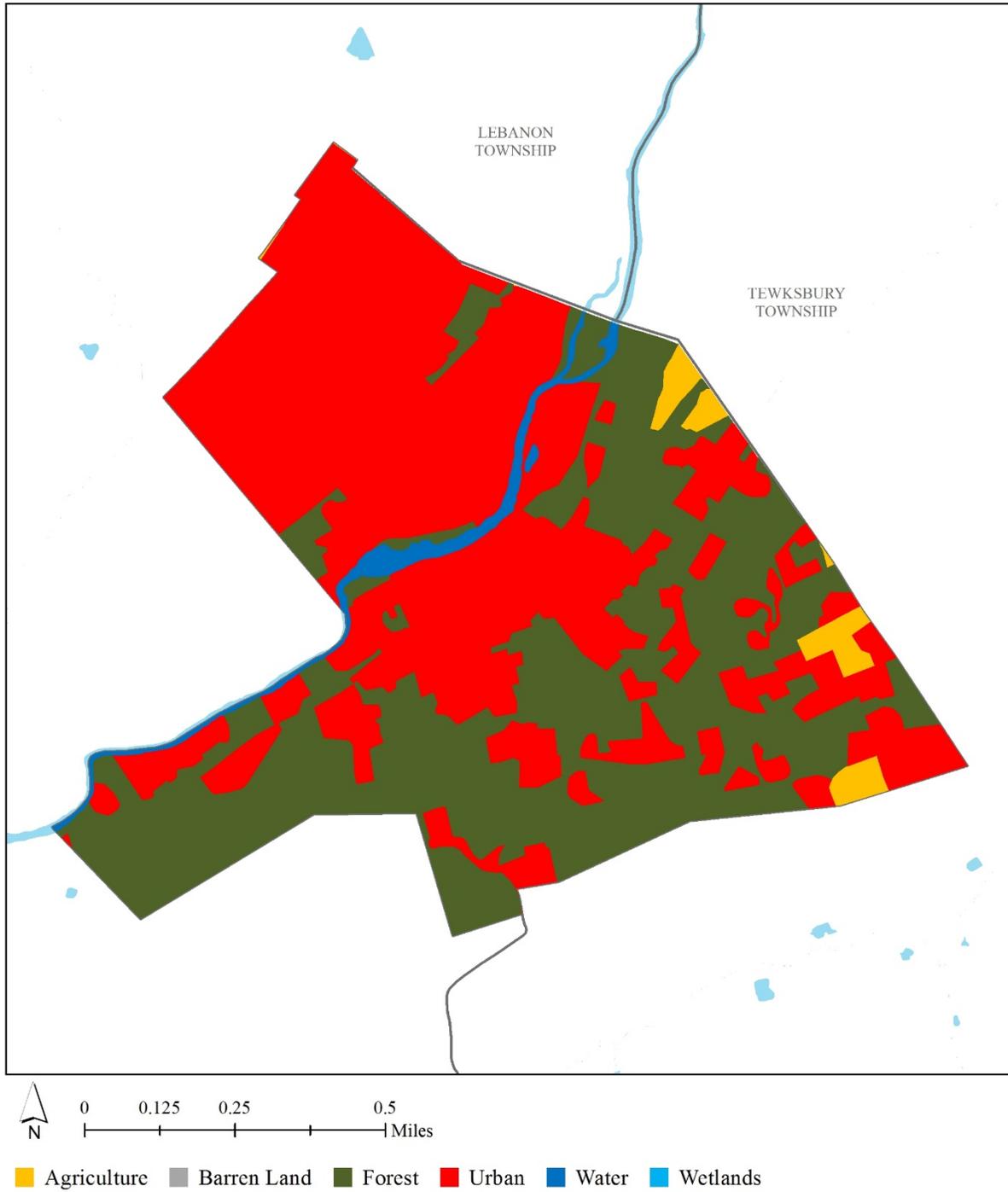


Figure 1: Map illustrating the land use in Califon Borough

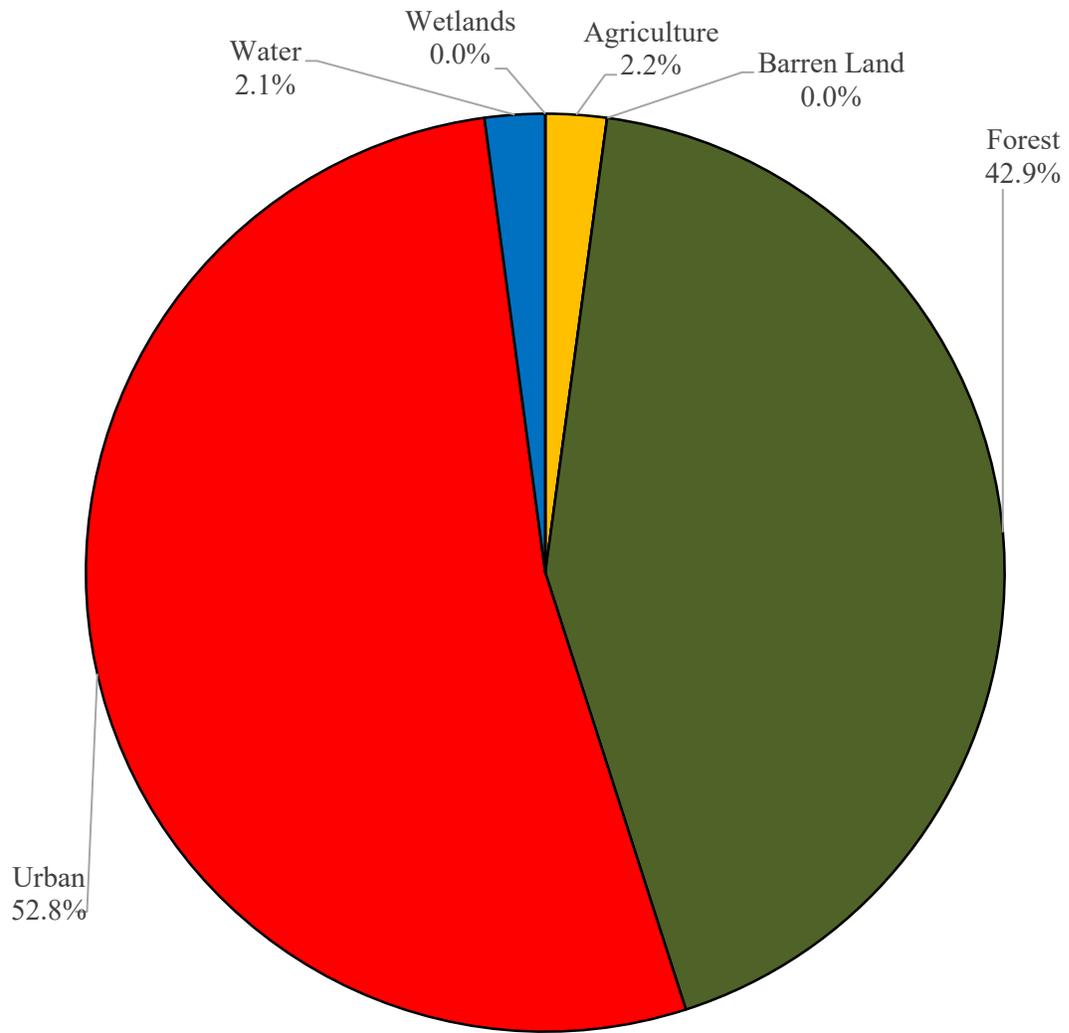


Figure 2: Pie chart illustrating the land use in Califon Borough

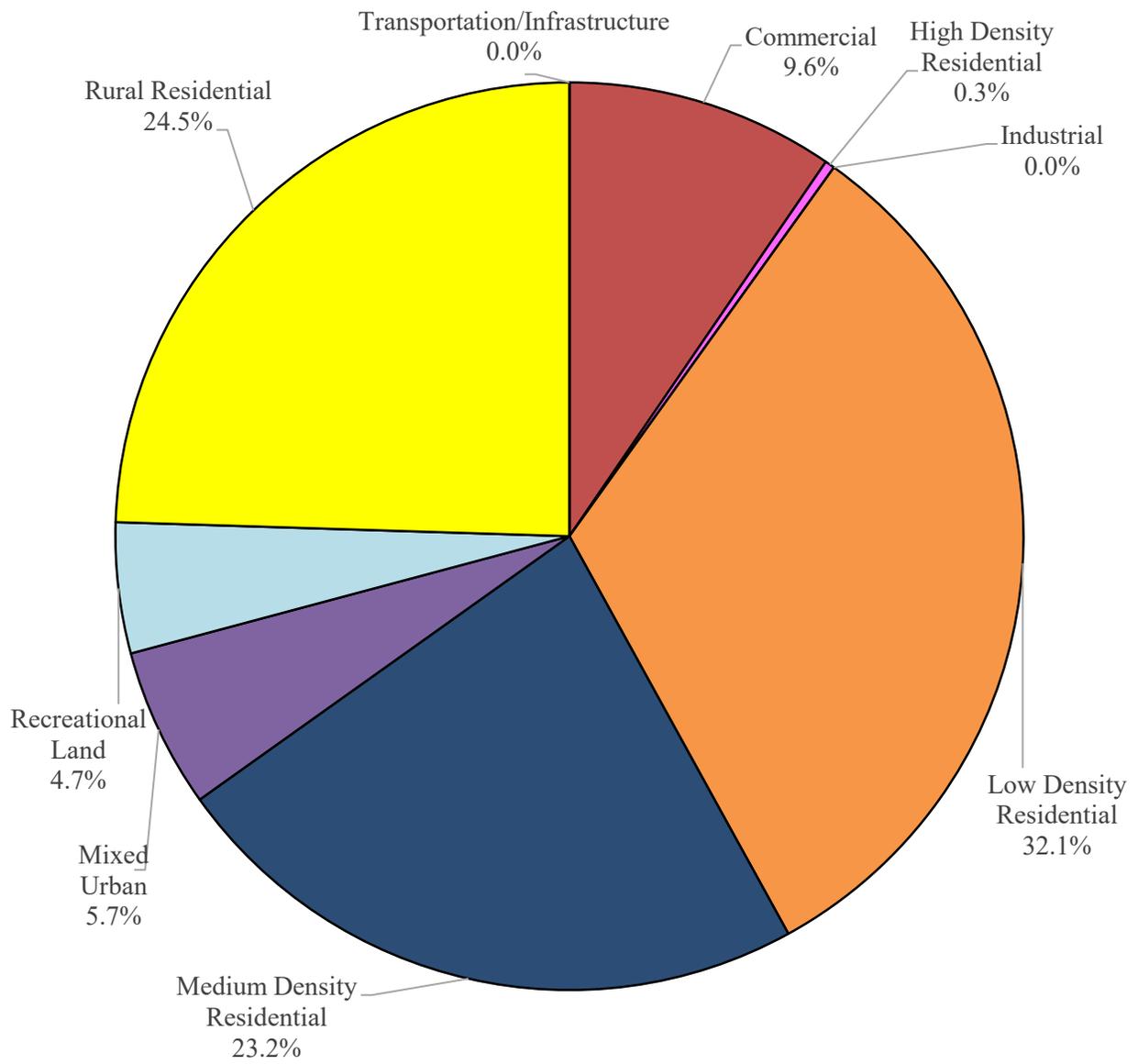


Figure 3: Pie chart illustrating the various types of urban land use in Califon Borough

# Subwatersheds of Califon Borough

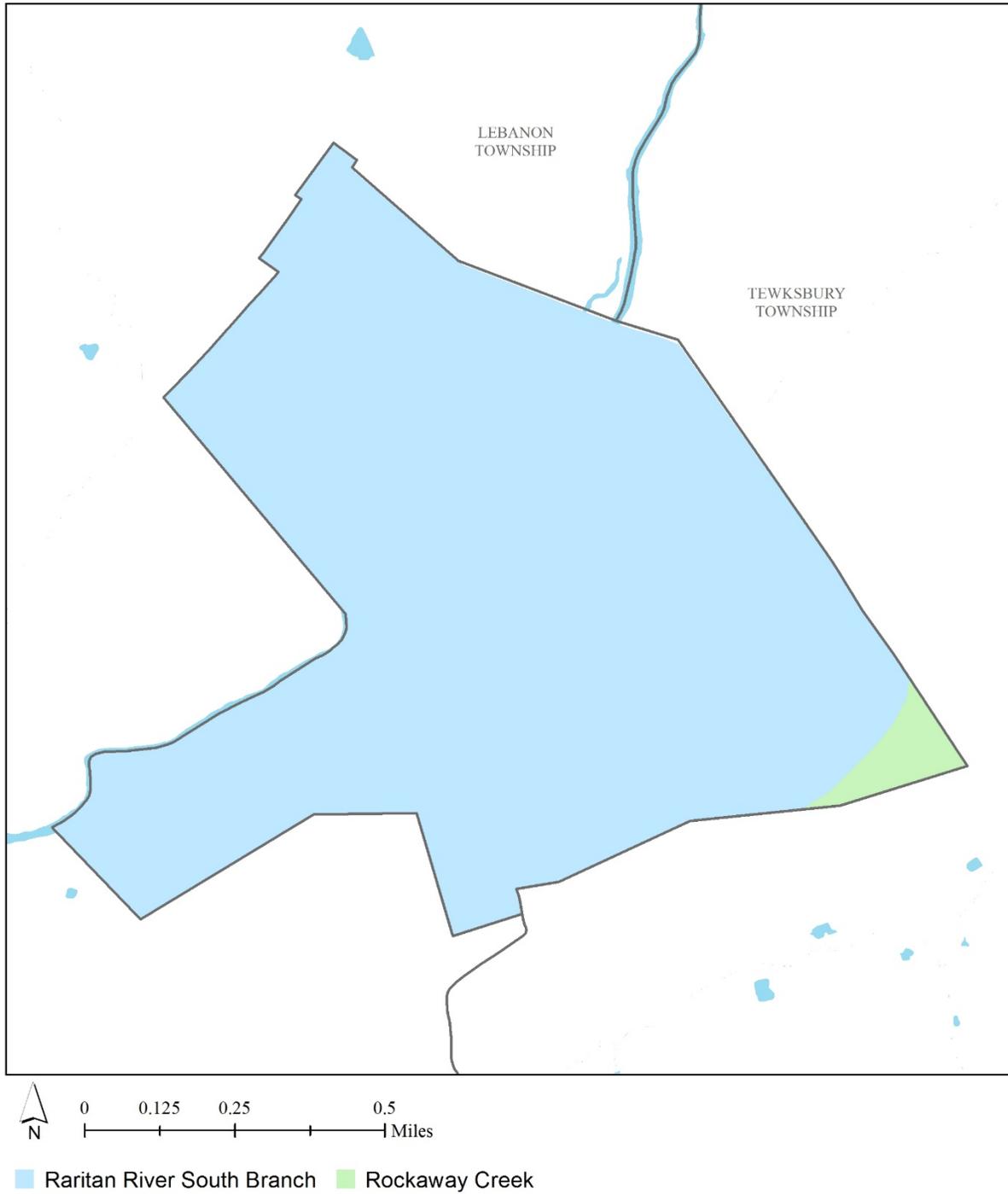


Figure 4: Map of the subwatersheds in Califon Borough

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 2015 NJDEP land use/land cover database. For impervious areas, runoff volumes were determined for the water quality design storm (1.25 inches of rain over two-hours) and for the annual rainfall total of 44 inches.

Preliminary soil assessments were conducted for each potential project site identified in Califon 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<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 principle, green infrastructure practices use soil and vegetation to recycle stormwater runoff through infiltration and evapotranspiration. When used as components of a stormwater management system, green infrastructure practices such as bioretention, green roofs, porous pavement, rain gardens, and vegetated swales can produce a variety of environmental benefits. In addition to effectively retaining and infiltrating rainfall, these practices can simultaneously help filter air pollutants, reduce energy demands, mitigate urban heat islands, and sequester carbon while also providing communities with aesthetic and natural resource benefits<sup>3</sup>. A wide range of green infrastructure practices have been evaluated for the potential project sites in Califon 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.



<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 wildlife habitat while managing stormwater runoff. Bioretention systems also can be used in soils that do not quickly infiltrate by incorporating an underdrain into the system.



### ***Downspout planter boxes***

These are wooden boxes with plants installed at the base of a downspout that provide an opportunity to beneficially reuse rooftop runoff.



### ***Rainwater harvesting systems (cistern or rain barrel)***

These systems capture rainwater, mainly from rooftops, in cisterns or rain barrels. The water can then be used for watering gardens, washing vehicles, or for other non-potable uses.



### ***Bioswale***

Bioswales are landscape features that convey stormwater from one location to another while removing pollutants and providing water an opportunity to infiltrate.



### ***Stormwater planters***

Stormwater planters are vegetated structures that are built into the sidewalk to intercept stormwater runoff from the roadway or sidewalk. Many of these planters are designed to allow the water to infiltrate into the ground while others are designed simply to filter the water and convey it back into the stormwater sewer system.



### ***Tree filter boxes***

These are pre-manufactured concrete boxes that contain a special soil mix and are planted with a tree or shrub. They filter stormwater runoff but provide little storage capacity. They are typically designed to quickly filter stormwater and then discharge it to the local sewer system.



### **Potential Project Sites**

Appendix A contains information on potential project sites where green infrastructure practices could be installed as well as information on existing site conditions. The recommended green infrastructure practices and the drainage area that the green infrastructure practices can treat are identified for each potential project site. For each practice, the recharge potential, TSS removal potential, maximum volume reduction potential per storm, the peak reduction potential, and estimated costs are provided. This information is also provided so that proposed development projects that cannot satisfy the New Jersey stormwater management requirements for major development can use one of the identified projects to offset a stormwater management deficit.<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**

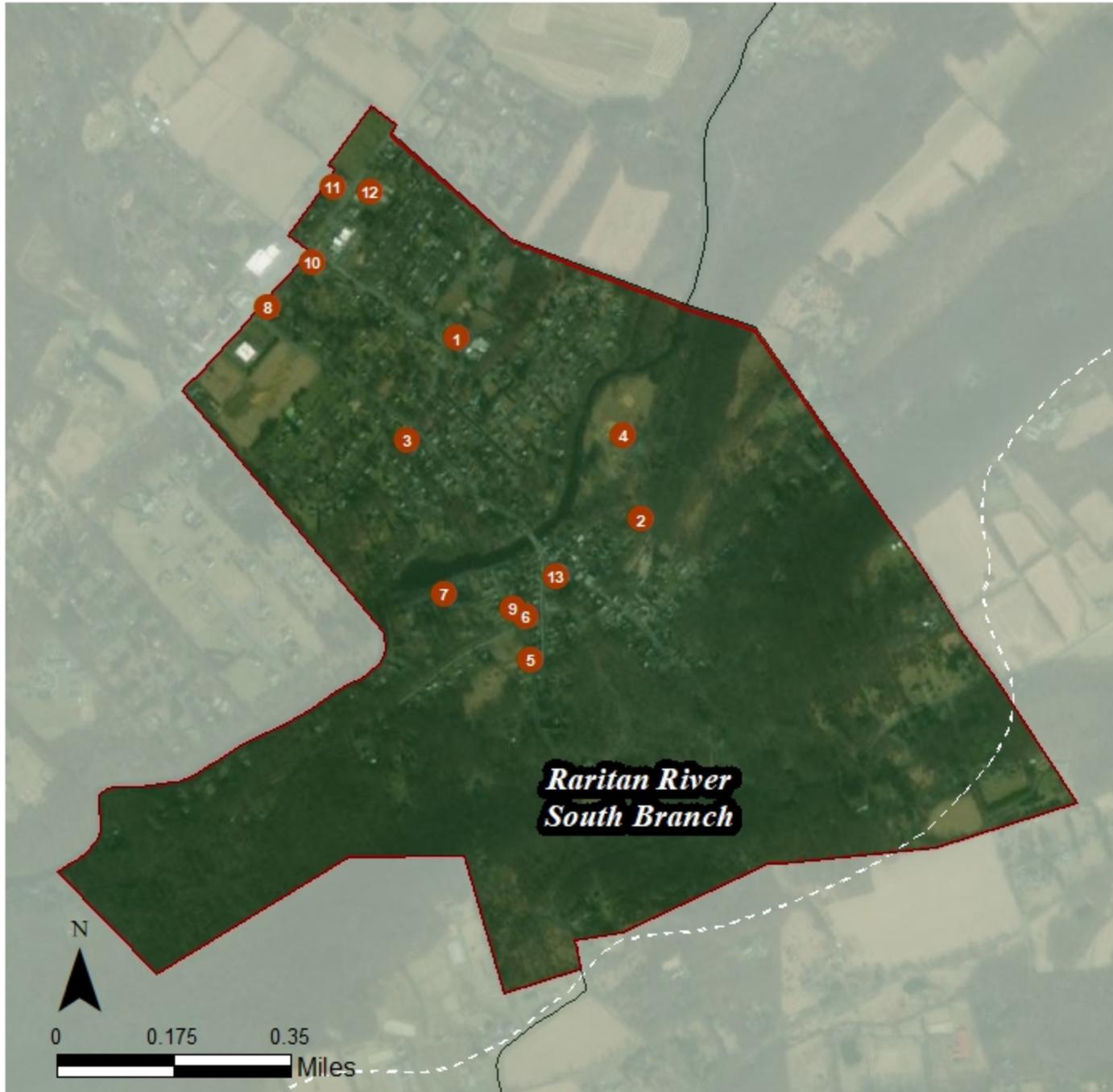
This impervious cover reduction action plan is meant to provide the municipality with a blueprint for implementing green infrastructure practices that will reduce the impact of stormwater runoff from impervious surfaces. These projects can be implemented by a wide variety of people such as boy scouts,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



**Appendix A: Climate Resilient Green Infrastructure**  
**a. Green Infrastructure Sites**

## CALIFON BOROUGH: GREEN INFRASTRUCTURE SITES



### SITES IN THE RARITAN RIVER SOUTH BRANCH WATER SHED

1. Califon Borough Elementary School
2. Califon First Aid Squad
3. Califon General Store
4. Califon Island Park
5. Califon Municipal Office
6. Califon Train Station
7. Califon United Methodist Church
8. Califon Wine and Spirits
9. Coughlin Funeral Home
10. James M Murray CPA
11. Lower Valley Presbyterian Church
12. Staianos Furniture
13. United States Postal Service

## **b. Proposed Green Infrastructure Concepts**

# CALIFON BOROUGH ELEMENTARY SCHOOL



**Subwatershed:** Raritan River South Branch

**Site Area:** 96,268 sq. ft.

**Address:** 6 School Street  
Califon, NJ 07830

**Block and Lot:** Block 8, Lot 3

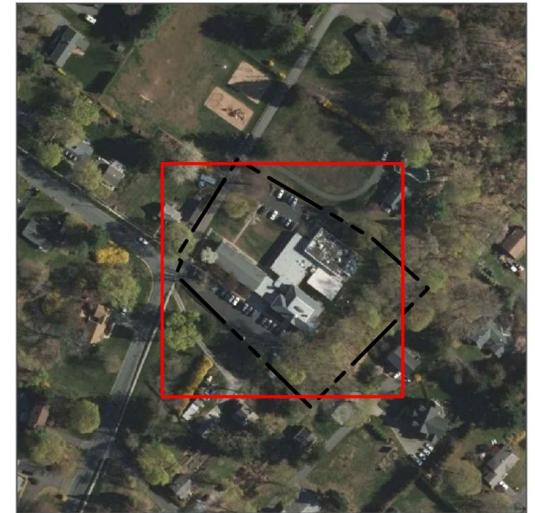
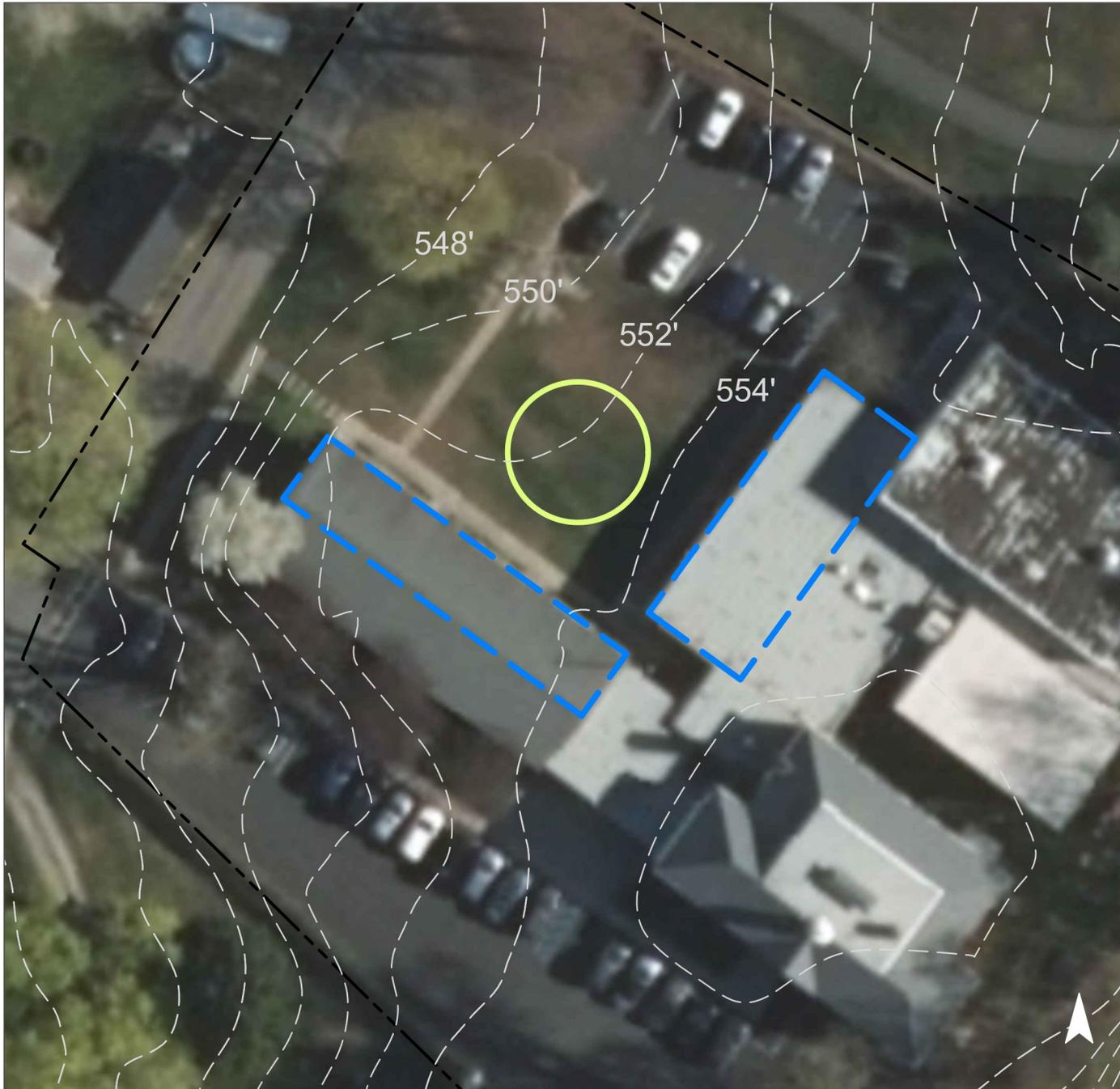


A rain garden centralized in the courtyard could be installed to collect rooftop stormwater. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

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"
52	49,605	2.4	25.1	227.8	0.039	1.36

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention system	0.108	18	8,198	0.31	1,040	\$5,200

# GREEN INFRASTRUCTURE RECOMMENDATIONS



## Califon Borough Elementary School

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



# CALIFON FIRST AID SQUAD



**Subwatershed:** Raritan River South Branch

**Site Area:** 27,012 sq. ft.

**Address:** 107 Bank Street  
Califon, NJ 07830

**Block and Lot:** Block 23, Lot 4



A rain garden can be installed next to the entrance of the parking lot to capture stormwater from the sloped lot. A cistern can be installed to harvest rainwater from the rooftop. Collected rainwater can be used for washing first aid squad vehicles or be used to water landscaping. 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"
54	14,648	0.7	7.4	67.3	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
Bioretention system	0.045	8	3,396	0.13	430	\$2,150
Rainwater harvesting	0.032	5	1,000	0.09	1,000 (gal)	\$2,000

# GREEN INFRASTRUCTURE RECOMMENDATIONS



## Califon First Aid Squad

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



# CALIFON GENERAL STORE



**Subwatershed:** Raritan River South Branch

**Site Area:** 12,272 sq. ft.

**Address:** 75 Main Street  
Califon, NJ 07830

**Block and Lot:** Block 5, Lot 3

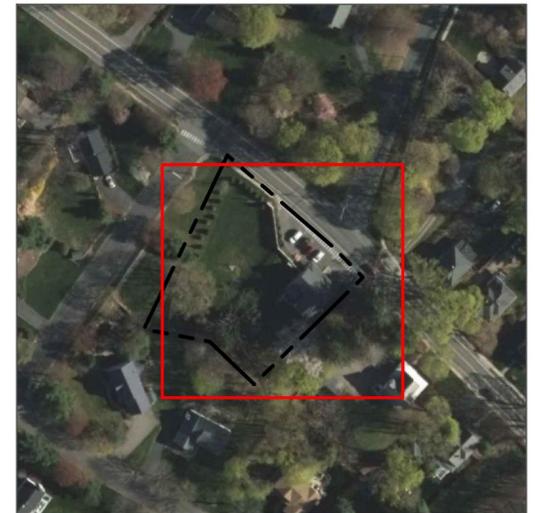


Porous pavement can be installed in the rear parking spaces to aid in infiltration of stormwater. A downspout planter box can be constructed along the building to allow roof runoff to be reused. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

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"
38	4,664	0.2	2.4	21.4	0.004	0.13

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
Pervious pavement	0.117	20	8,841	0.33	800	\$20,000
Planter box	N/A	2	N/A	N/A	1 (box)	\$1,000

# GREEN INFRASTRUCTURE RECOMMENDATIONS



## Califon General Store

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



# CALIFON ISLAND PARK



**Subwatershed:** Raritan River South Branch

**Site Area:** 537,044 sq. ft.

**Address:** 111 Bank Street  
Califon, NJ 07830

**Block and Lot:** Block 21, Lot 4

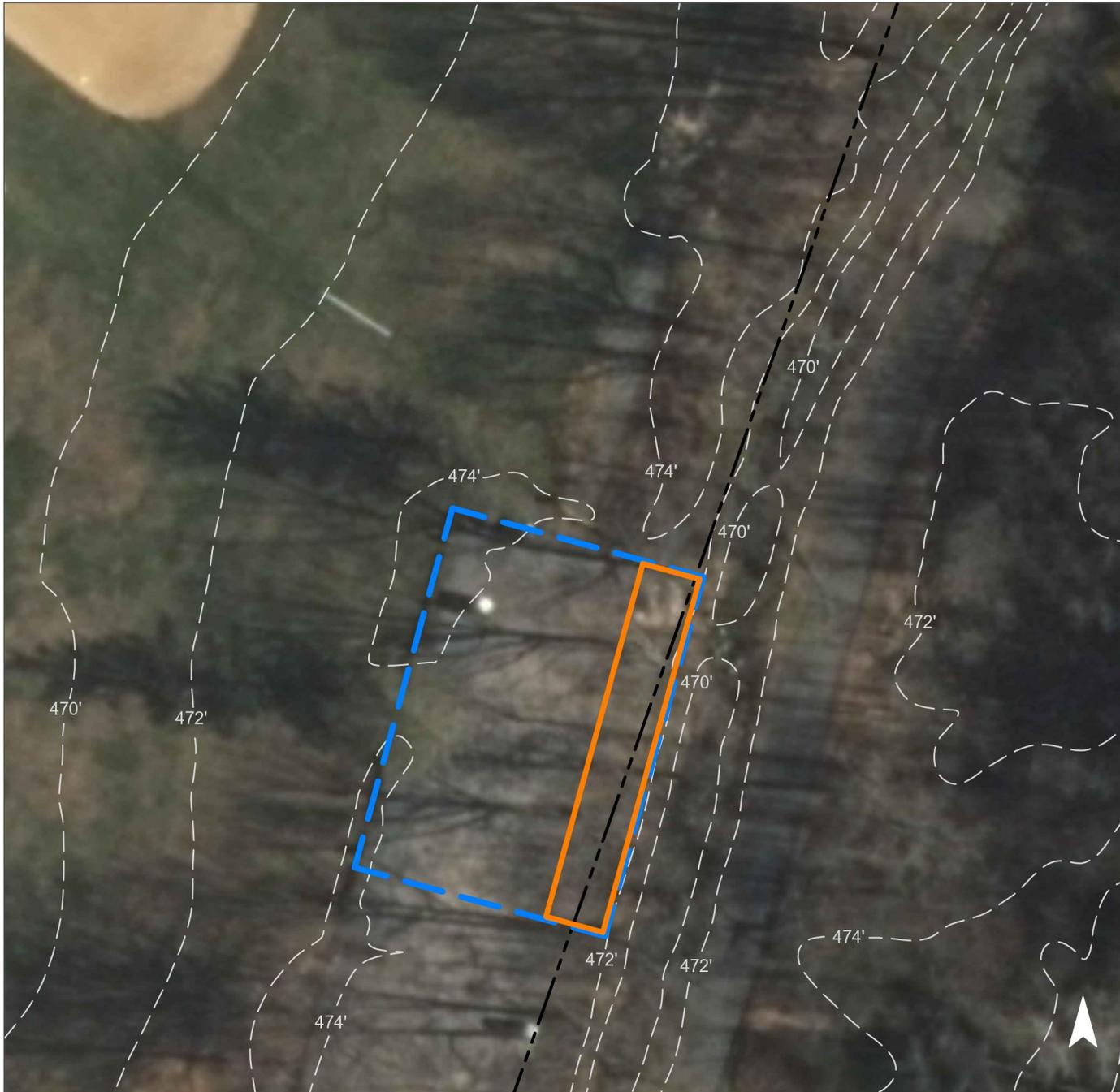


Porous pavement can be installed in the rear parking spaces to aid in infiltration of stormwater. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

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"
6	31,444	1.5	15.9	144.4	0.025	0.86

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Pervious pavement	0.262	44	19,859	0.87	2,400	\$60,000

# GREEN INFRASTRUCTURE RECOMMENDATIONS



## Califon Island Park

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



# CALIFON MUNICIPAL BUILDING



**Subwatershed:** Raritan River South Branch

**Site Area:** 11,422 sq. ft.

**Address:** 39 Academy Street  
Califon, NJ 07830

**Block and Lot:** Block 18, Lot 13.01

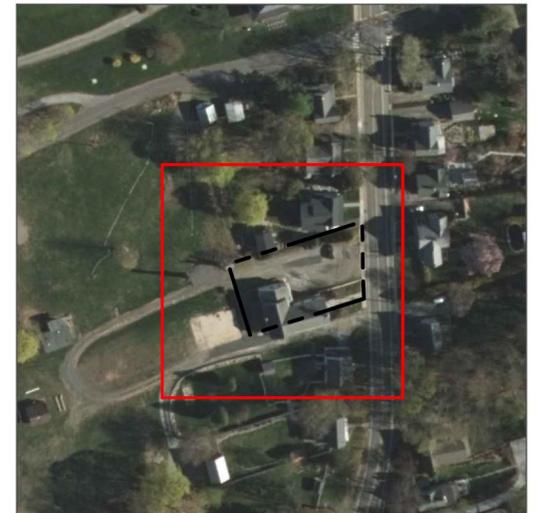
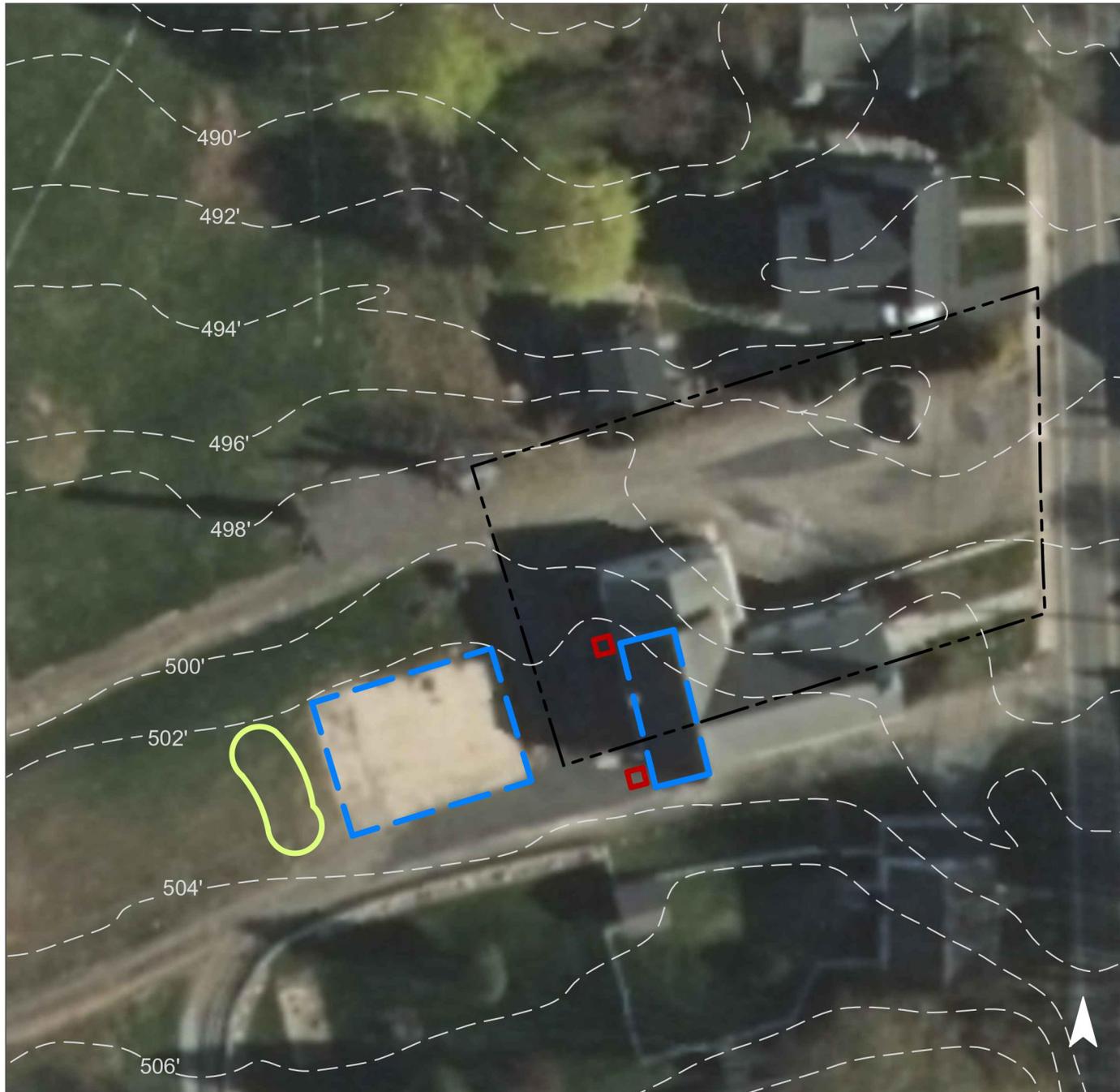


A rain garden can be installed to infiltrate stormwater draining from the parking lot. Downspout planter boxes can be constructed along the building to allow roof runoff to be reused. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

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	4,817	0.2	2.4	22.1	0.004	0.13

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 system	0.045	8	3,418	0.13	440	\$2,200
Planter boxes	N/A	2	N/A	N/A	2 (boxes)	\$2,000

# GREEN INFRASTRUCTURE RECOMMENDATIONS



## Califon Municipal Building

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



# CALIFON TRAIN STATION



**Subwatershed:** Raritan River South Branch

**Site Area:** 41,501 sq. ft.

**Address:** 15 Center Street  
Califon, NJ 07830

**Block and Lot:** Block 6, Lot 41

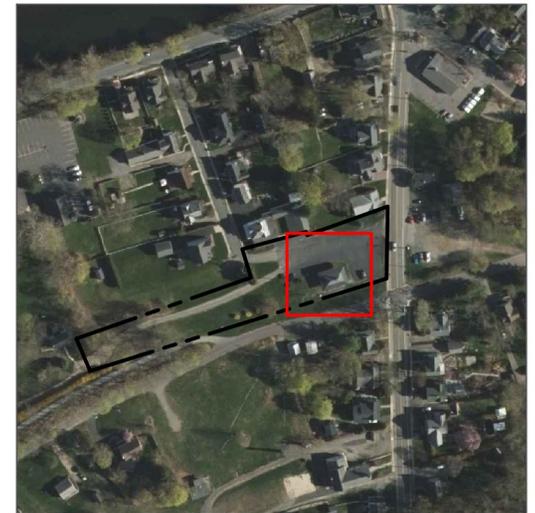
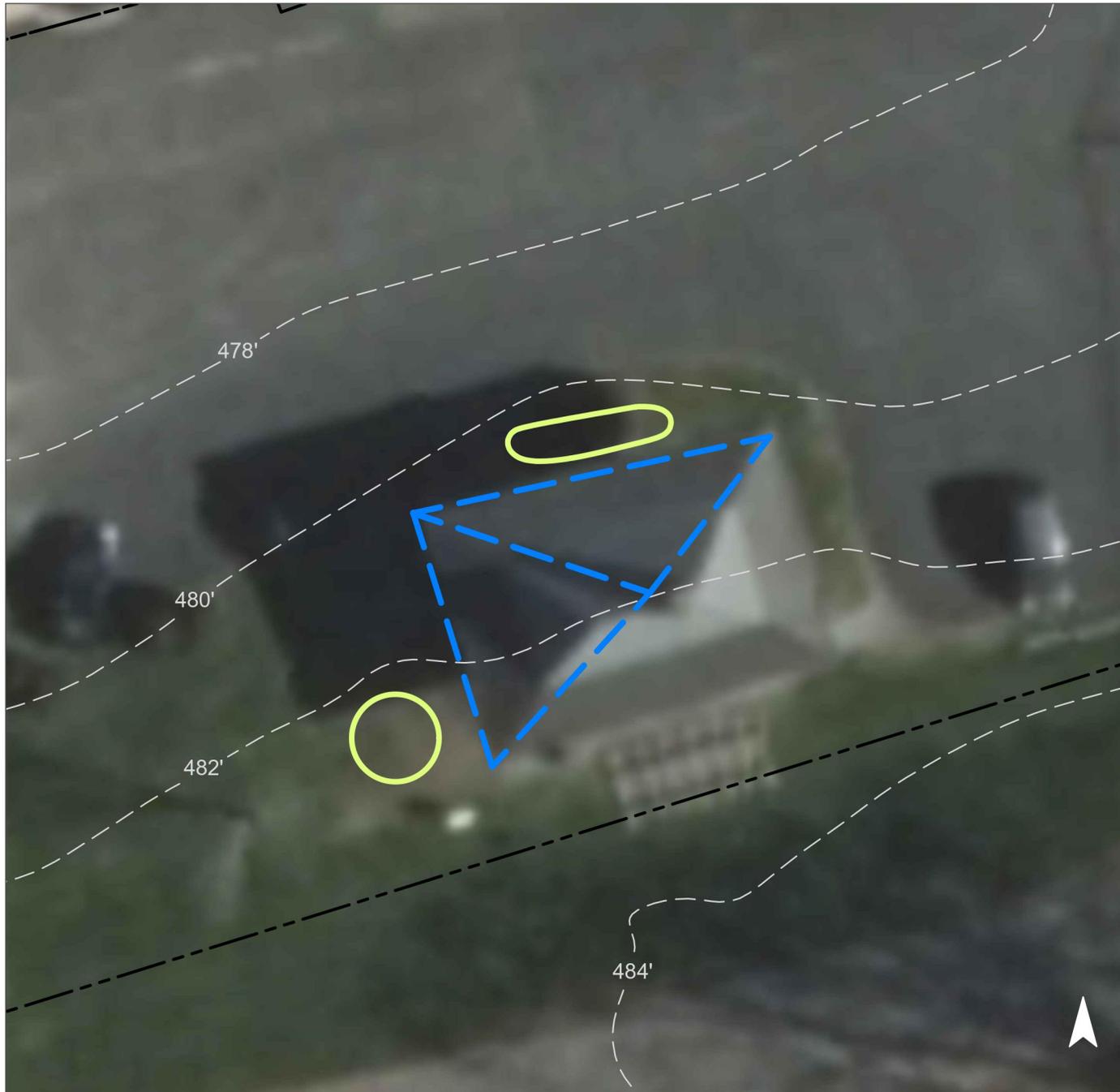


Rain gardens can be installed north of the building and in the turfgrass area east of the building to infiltrate stormwater draining from the parking lot. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

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"
47	19,639	0.9	9.9	90.2	0.015	0.54

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	1,661	0.07	195	\$975

# GREEN INFRASTRUCTURE RECOMMENDATIONS



## Califon Train Station

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



# CALIFON UNITED METHODIST CHURCH



**Subwatershed:** Raritan River South Branch  
**Site Area:** 39,832 sq. ft.  
**Address:** 15 Raritan River Road  
Califon, NJ 07830  
**Block and Lot:** Block 6, Lot 11

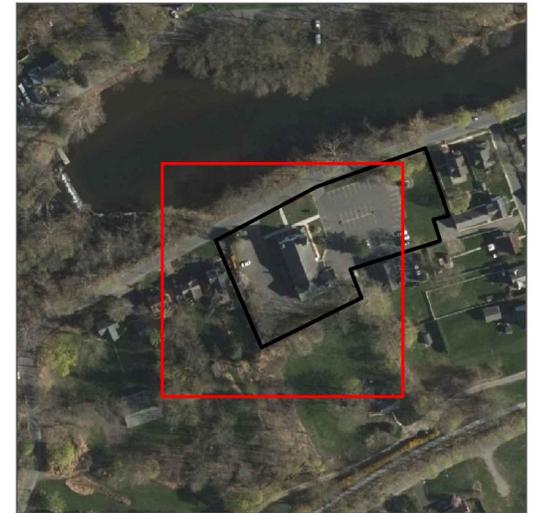


Two rain gardens can be installed to capture, treat, and infiltrate stormwater runoff from the roof. Downspout planter boxes can be constructed along the building to allow roof runoff to be reused. A preliminary soil assessment suggests that more soil testing would be required before determining the 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"
65	25,759	1.2	13.0	118.3	0.020	0.71

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention system	0.067	11	5,109	0.19	645	\$3,225
Planter boxes	N/A	2	N/A	N/A	2 (boxes)	\$2,000

# GREEN INFRASTRUCTURE RECOMMENDATIONS



## Califon United Methodist Church

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



# CALIFON WINE AND SPIRITS



**Subwatershed:** Raritan River South Branch  
**Site Area:** 23,453 sq. ft.  
**Address:** 430 County Road 513  
 Califon, NJ 07830  
**Block and Lot:** Block 3, Lot 1

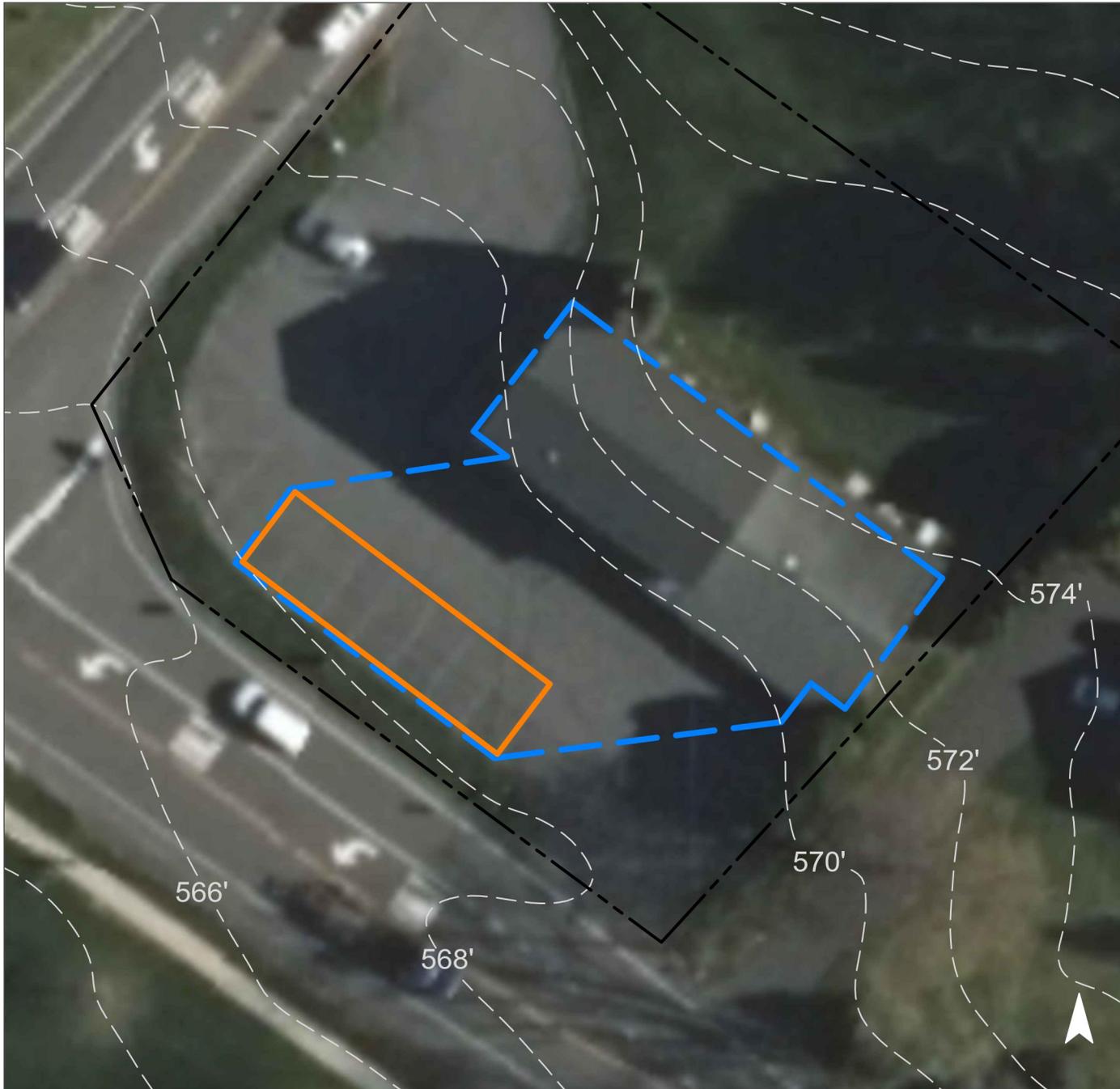


Areas of the parking lot can be retrofitted with porous pavement to capture stormwater runoff from the parking lot. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

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	15,317	0.7	7.7	70.3	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
Pervious pavement	0.172	29	13,030	0.49	1,135	\$28,375

# GREEN INFRASTRUCTURE RECOMMENDATIONS



**Califon Wine and Spirits**

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



# COUGHLIN FUNERAL HOME



**Subwatershed:** Raritan River South Branch

**Site Area:** 7,381 sq. ft.

**Address:** 15 Academy Street  
Califon, NJ 07830

**Block and Lot:** Block 6, Lot 27

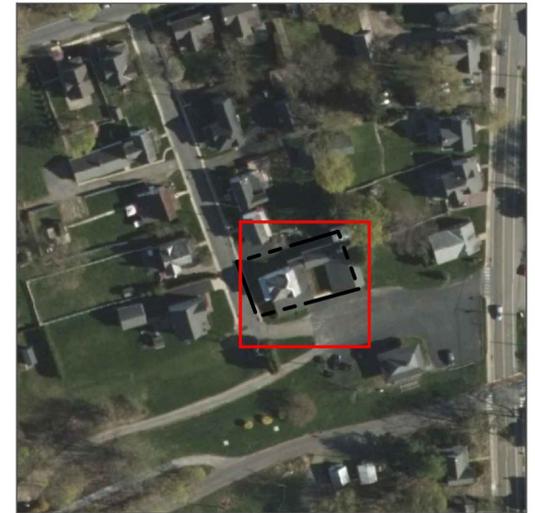
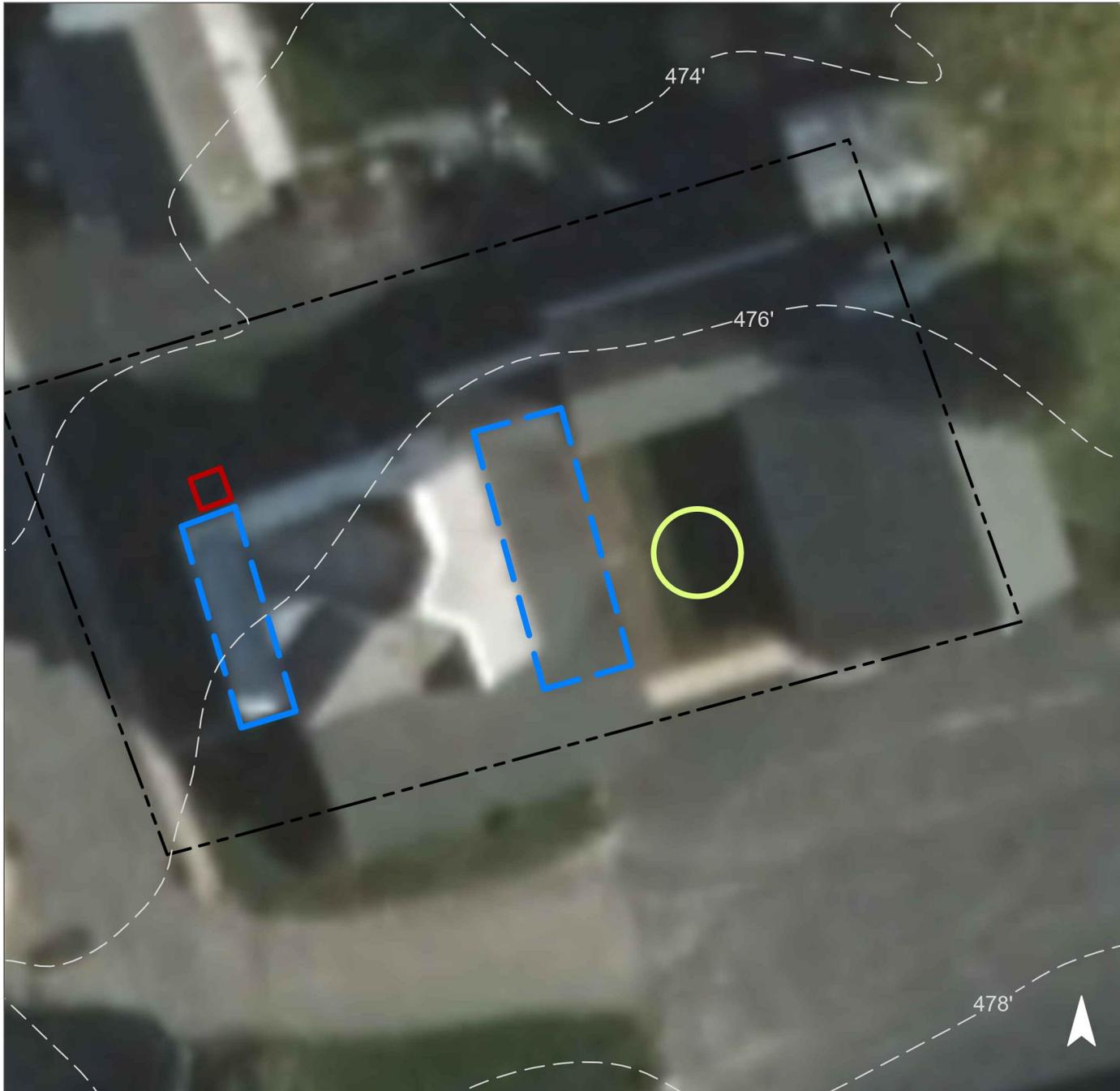


A central rain garden can be installed to capture stormwater runoff from the inward sloping rooftops. A downspout planter box can be constructed along the building to allow roof runoff to be reused. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
55	4,062	0.2	2.1	18.7	0.003	0.11

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 system	0.010	2	793	0.03	100	\$500
Planter box	N/A	1	N/A	N/A	1 (box)	\$1,000

# GREEN INFRASTRUCTURE RECOMMENDATIONS



**Coughlin Funeral Home**

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



# JAMES M MURRAY CPA



**Subwatershed:** Raritan River South Branch

**Site Area:** 44,433 sq. ft.

**Address:** 37 School Street  
Califon, NJ 07830

**Block and Lot:** Block 3, Lot 5,6

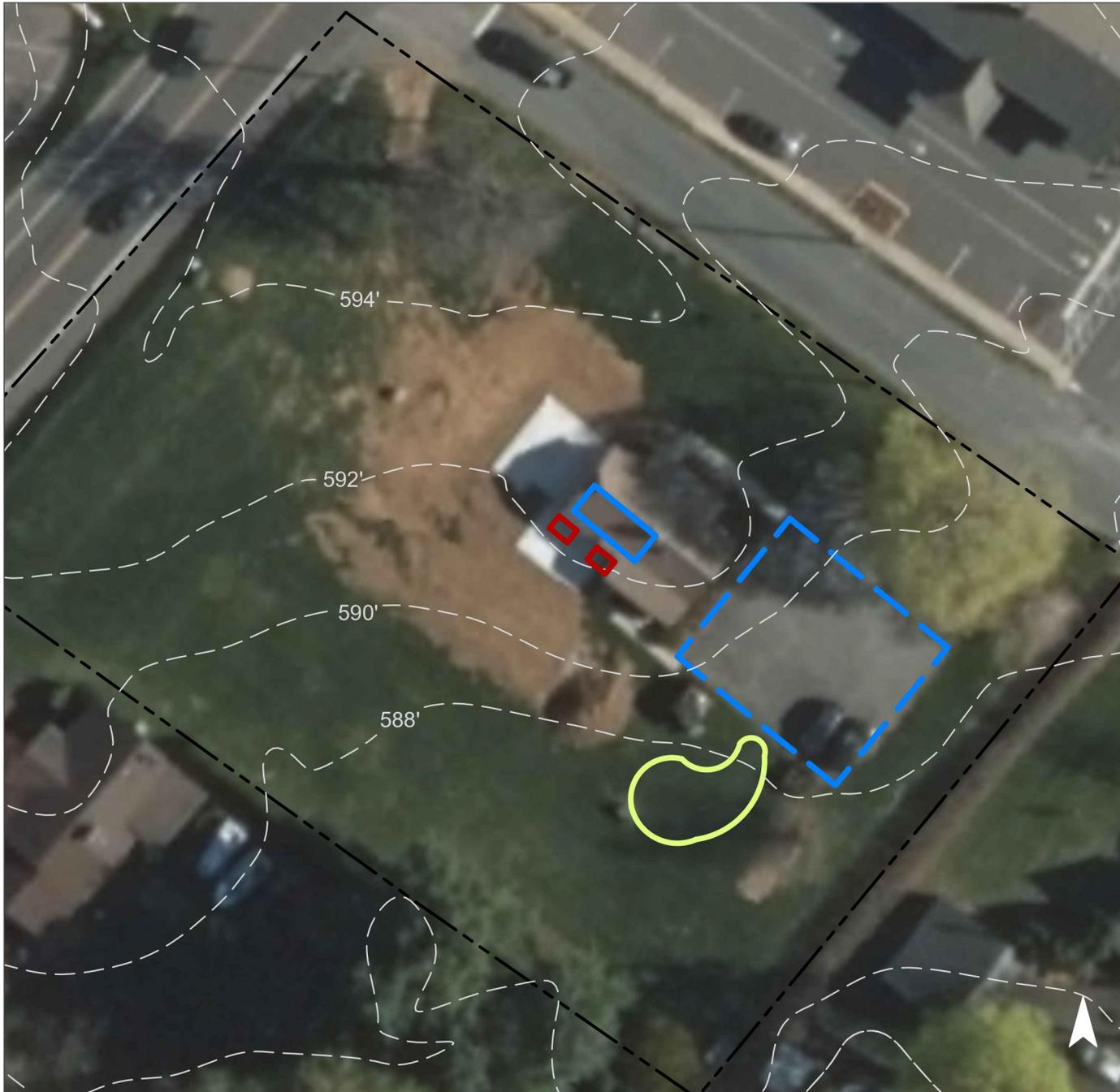


A rain garden can be installed at the end of the parking lot to capture, treat, and infiltrate stormwater runoff from the parking lot . Downspout planter boxes can be constructed along the building to allow roof runoff to be reused. A preliminary soil assessment suggests that the soils have suitable 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"
20	8,775	0.4	4.4	40.3	0.003	0.11

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 system	0.063	11	4,757	0.18	600	\$3,000
Planter boxes	N/A	2	N/A	N/A	2 (boxes)	\$2,000

# GREEN INFRASTRUCTURE RECOMMENDATIONS



## James M Murray CPA

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



# LOWER VALLEY PRESBYTERIAN CHURCH



**Subwatershed:** Raritan River South Branch  
**Site Area:** 101,066 sq. ft.  
**Address:** 445 County Road 513  
 Califon, NJ 07830  
**Block and Lot:** Block 1, Lot 2



A rain garden can be installed to capture, treat, and infiltrate stormwater runoff from the roof. Downspout planter boxes can be constructed along the building to allow roof runoff to be reused. 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"
47	47,178	2.3	23.8	216.6	0.037	1.29

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention system	0.018	3	1,354	0.05	170	\$850
Planter boxes	N/A	3	N/A	N/A	2 (boxes)	\$2,000

# GREEN INFRASTRUCTURE RECOMMENDATIONS



## Lower Valley Presbyterian Church

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



# STAIANOS FURNITURE



**Subwatershed:** Raritan River South Branch  
**Site Area:** 94,240 sq. ft.  
**Address:** 442 County Road 513  
Califon, NJ 07830  
**Block and Lot:** Block 4, Lot 2

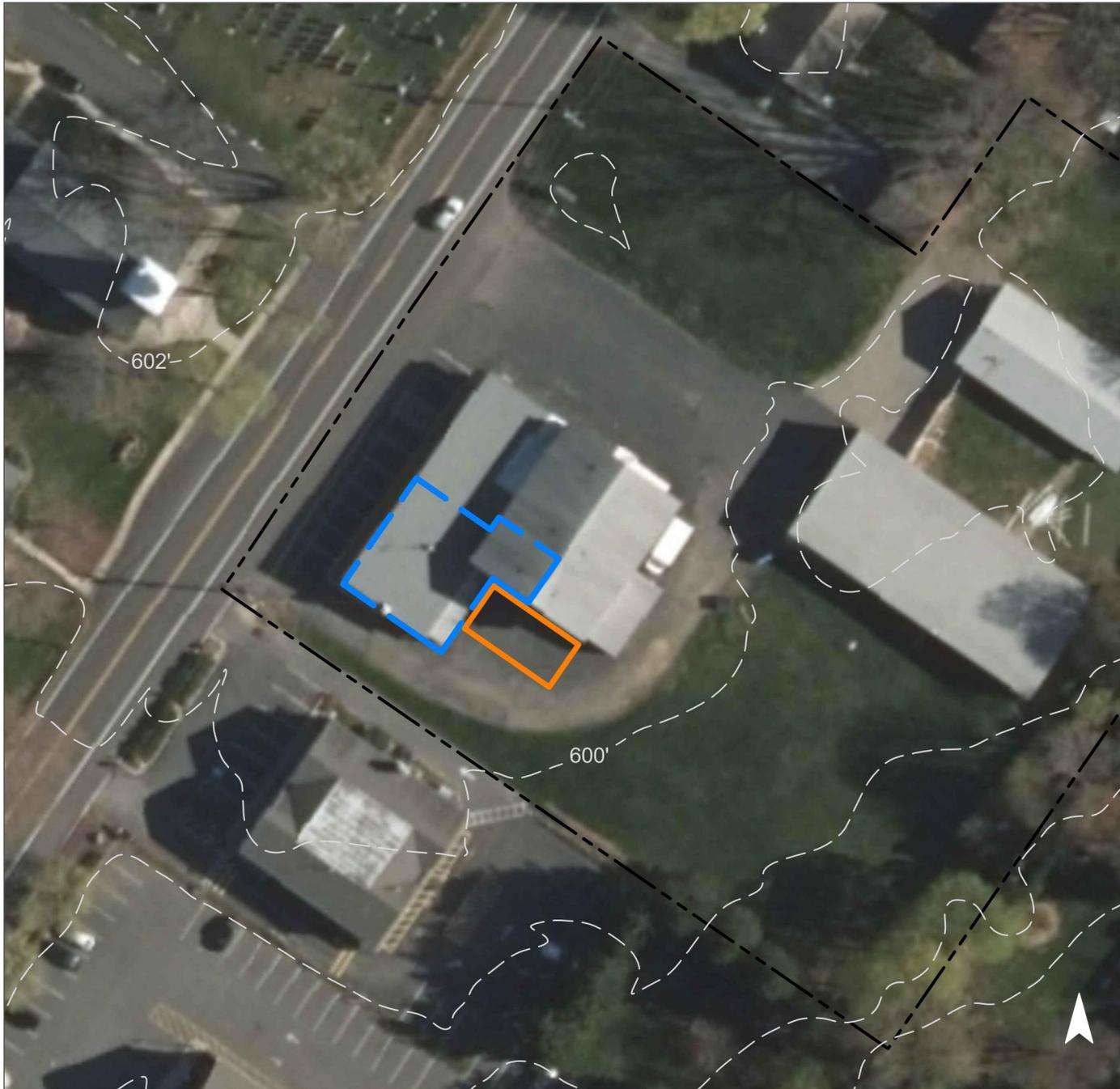


Porous pavement can be installed along the parking spots in the back lot of the building. The downspouts currently empty onto asphalt which is impervious and does not aid in infiltration. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
66	61,927	3.0	31.3	284.3	0.048	1.70

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Pervious pavement	0.071	12	5,401	0.20	800	\$20,000

# GREEN INFRASTRUCTURE RECOMMENDATIONS



## Staianos Furniture

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



# UNITED STATES POSTAL SERVICES



**Subwatershed:** Raritan River South  
Branch

**Site Area:** 10,212 sq. ft.

**Address:** 53 Main Street  
Califon, NJ 07830

**Block and Lot:** Block 19, Lot 5



Porous pavement can be installed to collect stormwater from both the disconnected downspouts as well as from the parking lot surface. 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"
79	8,102	0.4	4.1	37.2	0.006	0.22

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Pervious pavement	0.095	16	7,188	0.27	1,000	\$25,000

# GREEN INFRASTRUCTURE RECOMMENDATIONS



## United States Postal Service

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





**c. Summary of Existing Conditions**



**Summary of Existing Conditions**

Subwatershed/Site Name/Total Site Info/GI Practice	Area (ac)	Area (SF)	Block	Lot	I.C. %	I.C. Area (ac)	I.C. Area (SF)	Existing Annual Loads (Commercial)			Runoff Volumes from I.C.		Runoff Volumes from I.C.	
								TP (lb/yr)	TN (lb/yr)	TSS (lb/yr)	Water Quality Storm (1.25" over 2-hours) (cu.ft.)	Annual (cu.ft.)	Water Quality Storm (1.25" over 2-hours) (Mgal)	Annual (Mgal)
<b>RARITAN RIVER SOUTH BRANCH SITES</b>	<b>24.0</b>	<b>1,046,135</b>				<b>6.79</b>	<b>295,938</b>	<b>14.3</b>	<b>149.5</b>	<b>1,358.8</b>	<b>30,827</b>	<b>1,085,105</b>	<b>0.231</b>	<b>8.12</b>
1 <b>Califon Borough Elementary School</b> <b>Total Site Info</b>	2.21	96,268	8	3	52	1.14	49,605	2.4	25.1	227.8	5,167	181,885	0.039	1.36
2 <b>Califon First Aid Squad</b> <b>Total Site Info</b>	0.62	27,012	23	4	54	0.34	14,648	0.7	7.4	67.3	1,526	53,710	0.011	0.40
3 <b>Califon General Store</b> <b>Total Site Info</b>	0.28	12,272	5	3	38	0.11	4,664	0.2	2.4	21.4	486	17,101	0.004	0.13
4 <b>Califon Island Park</b> <b>Total Site Info</b>	12.33	537,044	21	4	6	0.72	31,444	1.5	15.9	144.4	3,275	115,294	0.025	0.86
5 <b>Califon Municipal Office</b> <b>Total Site Info</b>	0.26	11,422	18	13.01	42	0.11	4,817	0.2	2.4	22.1	502	17,662	0.004	0.13
6 <b>Califon Train Station</b> <b>Total Site Info</b>	0.95	41,501	6	41	47	0.45	19,639	0.9	9.9	90.2	2,046	72,011	0.015	0.54
7 <b>Califon United Methodist Church</b> <b>Total Site Info</b>	0.91	39,832	6	11	65	0.59	25,759	1.2	13.0	118.3	2,683	94,450	0.020	0.71
8 <b>Califon Wine and Spirits</b> <b>Total Site Info</b>	0.54	23,453	3	1	65	0.35	15,317	0.7	7.7	70.3	1,596	56,162	0.012	0.42
9 <b>Coughlin Funeral Home</b> <b>Total Site Info</b>	0.17	7,381	6	27	55	0.09	4,062	0.2	2.1	18.7	423	14,896	0.003	0.11
10 <b>James M Murray CPA</b> <b>Total Site Info</b>	1.02	44,433	3	5,6	20	0.20	8,775	0.4	4.4	40.3	914	32,175	0.007	0.24
11 <b>Lower Valley Presbyterian Church</b> <b>Total Site Info</b>	2.32	101,066	1	2	47	1.08	47,178	2.3	23.8	216.6	4,914	172,985	0.037	1.29
12 <b>Staianos Furniture</b> <b>Total Site Info</b>	2.16	94,240	4	2	66	1.42	61,927	3.0	31.3	284.3	6,451	227,066	0.048	1.70
13 <b>United States Postal Service</b> <b>Total Site Info</b>	0.23	10,212	19	5	79	0.19	8,102	0.4	4.1	37.2	844	29,707	0.006	0.22



#### **d. Summary of Proposed Green Infrastructure Practices**



**Summary of Proposed Green Infrastructure Practices**

Subwatershed/Site Name/Total Site Info/GI Practice	Potential Management Area		Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Max Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cfs)	Size of BMP	Unit Cost (\$/unit)	Unit	Total Cost (\$)	I.C. Treated %
	Area (SF)	Area (ac)									
<b>RARITAN RIVER SOUTH BRANCH SITES</b>	<b>46,035</b>	<b>1.05</b>	<b>1.128</b>	<b>198</b>	<b>84,006</b>	<b>3.34</b>				<b>181,475</b>	<b>15.6%</b>
<b>1 Califon Borough Elementary School</b>											
Bioretention system	4,155	0.10	0.108	18	8,198	0.31	1,040	\$5	SF	\$5,200	8.4%
<b>Total Site Info</b>	<b>4,155</b>	<b>0.10</b>	<b>0.108</b>	<b>18</b>	<b>8,198</b>	<b>0.31</b>				<b>\$5,200</b>	<b>8.4%</b>
<b>2 Califon First Aid Squad</b>											
Bioretention system	1,720	0.04	0.045	8	3,396	0.13	430	\$5	SF	\$2,150	11.7%
Rainwater harvesting	1,240	0.03	0.032	5	1,000	0.09	1,000	\$2	gal	\$2,000	8.5%
<b>Total Site Info</b>	<b>2,960</b>	<b>0.07</b>	<b>0.077</b>	<b>13</b>	<b>4,396</b>	<b>0.22</b>				<b>\$4,150</b>	<b>20.2%</b>
<b>3 Califon General Store</b>											
Pervious pavement	4,480	0.10	0.117	20	8,841	0.33	800	\$25	SF	\$20,000	96.1%
Planter box	550	0.01	n/a	2	n/a	n/a	1	\$1,000	box	\$1,000	11.8%
<b>Total Site Info</b>	<b>5,030</b>	<b>0.12</b>	<b>0.117</b>	<b>22</b>	<b>8,841</b>	<b>0.33</b>				<b>\$21,000</b>	<b>107.8%</b>
<b>4 Califon Island Park</b>											
Pervious pavement	10,060	0.23	0.262	44	19,859	0.87	2,400	\$25	SF	\$60,000	32.0%
<b>Total Site Info</b>	<b>10,060</b>	<b>0.23</b>	<b>0.262</b>	<b>44</b>	<b>19,859</b>	<b>0.87</b>				<b>\$60,000</b>	<b>32.0%</b>
<b>5 Califon Municipal Office</b>											
Bioretention system	1,730	0.04	0.045	8	3,418	0.13	440	\$5	SF	\$2,200	35.9%
Planter boxes	545	0.01	n/a	2	n/a	n/a	2	\$1,000	box	\$2,000	11.3%
<b>Total Site Info</b>	<b>2,275</b>	<b>0.05</b>	<b>0.045</b>	<b>10</b>	<b>3,418</b>	<b>0.13</b>				<b>\$4,200</b>	<b>47.2%</b>
<b>6 Califon Train Station</b>											
Bioretention systems	840	0.02	0.022	4	1,661	0.07	195	\$5	SF	\$975	4.3%
<b>Total Site Info</b>	<b>840</b>	<b>0.02</b>	<b>0.022</b>	<b>4</b>	<b>1,661</b>	<b>0.07</b>				<b>\$975</b>	<b>4.3%</b>
<b>7 Califon United Methodist Church</b>											
Bioretention systems	2,590	0.06	0.067	11	5,109	0.19	645	\$5	SF	\$3,225	10.1%
Planter boxes	560	0.01	n/a	2	n/a	n/a	2	\$1,000	box	\$2,000	2.2%
<b>Total Site Info</b>	<b>3,150</b>	<b>0.07</b>	<b>0.067</b>	<b>13</b>	<b>5,109</b>	<b>0.19</b>				<b>\$5,225</b>	<b>12.2%</b>
<b>8 Califon Wine and Spirits</b>											
Pervious pavement	6,600	0.15	0.172	29	13,030	0.49	1,135	\$25	SF	\$28,375	43.1%
<b>Total Site Info</b>	<b>6,600</b>	<b>0.15</b>	<b>0.172</b>	<b>29</b>	<b>13,030</b>	<b>0.49</b>				<b>\$28,375</b>	<b>43.1%</b>

**Summary of Proposed Green Infrastructure Practices**

Subwatershed/Site Name/Total Site Info/GI Practice	Potential Management Area		Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Max Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cfs)	Size of BMP	Unit Cost (\$/unit)	Unit	Total Cost (\$)	I.C. Treated %
	Area (SF)	Area (ac)									
<b>9 Coughlin Funeral Home</b>											
Bioretention system	400	0.01	0.010	2	793	0.03	100	\$5	SF	\$500	9.8%
Planter box	200	0.00	n/a	1	n/a	n/a	1	\$1,000	box	\$1,000	4.9%
<b>Total Site Info</b>	<b>600</b>	<b>0.01</b>	<b>0.010</b>	<b>2</b>	<b>793</b>	<b>0.03</b>				<b>\$1,500</b>	<b>14.8%</b>
<b>10 James M Murray CPA</b>											
Bioretention system	2,410	0.06	0.063	11	4,757	0.18	600	\$5	SF	\$3,000	27.5%
Planter boxes	170	0.00	n/a	1	n/a	n/a	2	\$1,000	box	\$2,000	1.9%
<b>Total Site Info</b>	<b>2,580</b>	<b>0.06</b>	<b>0.063</b>	<b>11</b>	<b>4,757</b>	<b>0.18</b>				<b>\$3,000</b>	<b>27.5%</b>
<b>11 Lower Valley Presbyterian Church</b>											
Bioretention system	685	0.02	0.018	3	1,354	0.05	170	\$5	SF	\$850	1.5%
Planter boxes	725	0.02	n/a	3	n/a	n/a	2	\$1,000	box	\$2,000	1.5%
<b>Total Site Info</b>	<b>1,410</b>	<b>0.03</b>	<b>0.018</b>	<b>6</b>	<b>1,354</b>	<b>0.05</b>				<b>\$2,850</b>	<b>3.0%</b>
<b>12 Staianos Furniture</b>											
Pervious pavement	2,735	0.06	0.071	12	5,401	0.20	800	\$25	SF	\$20,000	4.4%
<b>Total Site Info</b>	<b>2,735</b>	<b>0.06</b>	<b>0.071</b>	<b>12</b>	<b>5,401</b>	<b>0.20</b>				<b>\$20,000</b>	<b>4.4%</b>
<b>13 United States Postal Service</b>											
Pervious pavement	3,640	0.08	0.095	16	7,188	0.27	1,000	\$25	SF	\$25,000	44.9%
<b>Total Site Info</b>	<b>3,640</b>	<b>0.08</b>	<b>0.095</b>	<b>16</b>	<b>7,188</b>	<b>0.27</b>				<b>\$25,000</b>	<b>44.9%</b>