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Experiment Station

**Draft**

# Impervious Cover Reduction Action Plan for Freehold Township, Monmouth County, New Jersey

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

October 12, 2015

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## Introduction

Located in Monmouth County in central New Jersey, Freehold Township covers approximately 38.9 square miles. Figures 1 and 2 illustrate that Freehold Township is dominated by urban land uses. A total of 40.8% of the municipality's land use is classified as urban. Of the urban land in Freehold Township, low 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 Freehold 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 Freehold Township. Based upon the 2007 NJDEP land use/land cover data, approximately 12.1% of Freehold Township has impervious cover. This level of impervious cover suggests that the streams in Freehold Township are likely impacted.[1]

## Methodology

Freehold Township contains portions of eight subwatersheds (Figure 4). For this impervious cover reduction action plan, projects have been identified in each of these watersheds. Initially, aerial imagery was used to identify potential project sites that contain extensive impervious cover. Field visits were then conducted at each of these potential project sites to determine if a viable option exists to reduce impervious cover or to disconnect impervious surfaces from draining directly to the local waterway or storm sewer system. During the site visit, appropriate green infrastructure practices for the site were determined. Sites that already had stormwater management practices in place were not considered.

[1] Caraco, D., R. Claytor, P. Hinkle, H. Kwon, T. Schueler, C. Swann, S. Vysotsky, and J. Zielinski. 1998. Rapid Watershed Planning Handbook. A Comprehensive Guide for Managing Urbanizing Watersheds. Prepared by Center For Watershed Protection, Ellicott City, MD. Prepared for U.S. Environmental Protection Agency, Office of Wetlands, Oceans and Watersheds and Region V. October 1998

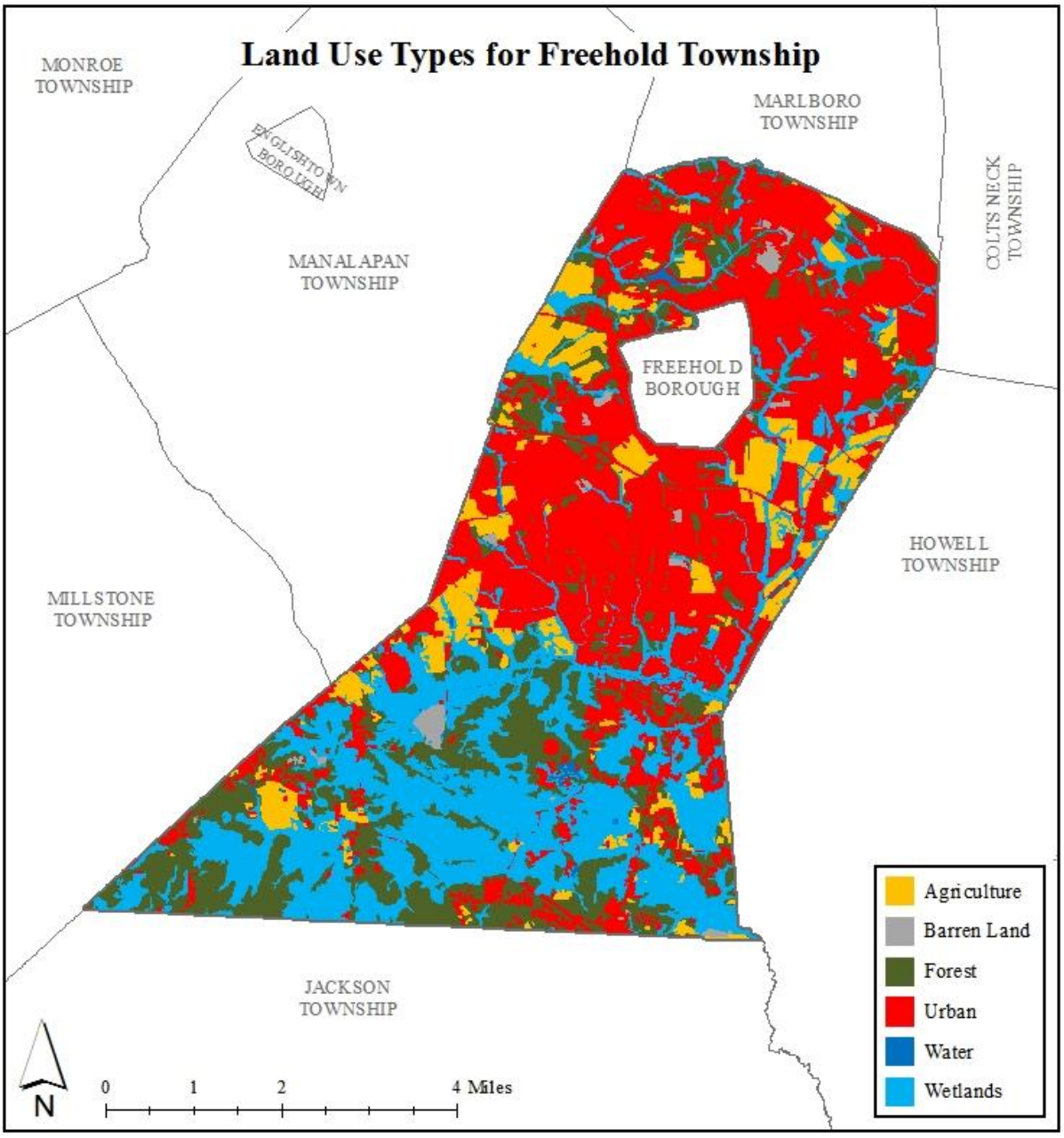



Figure 1: Map illustrating the land use in Freehold Township

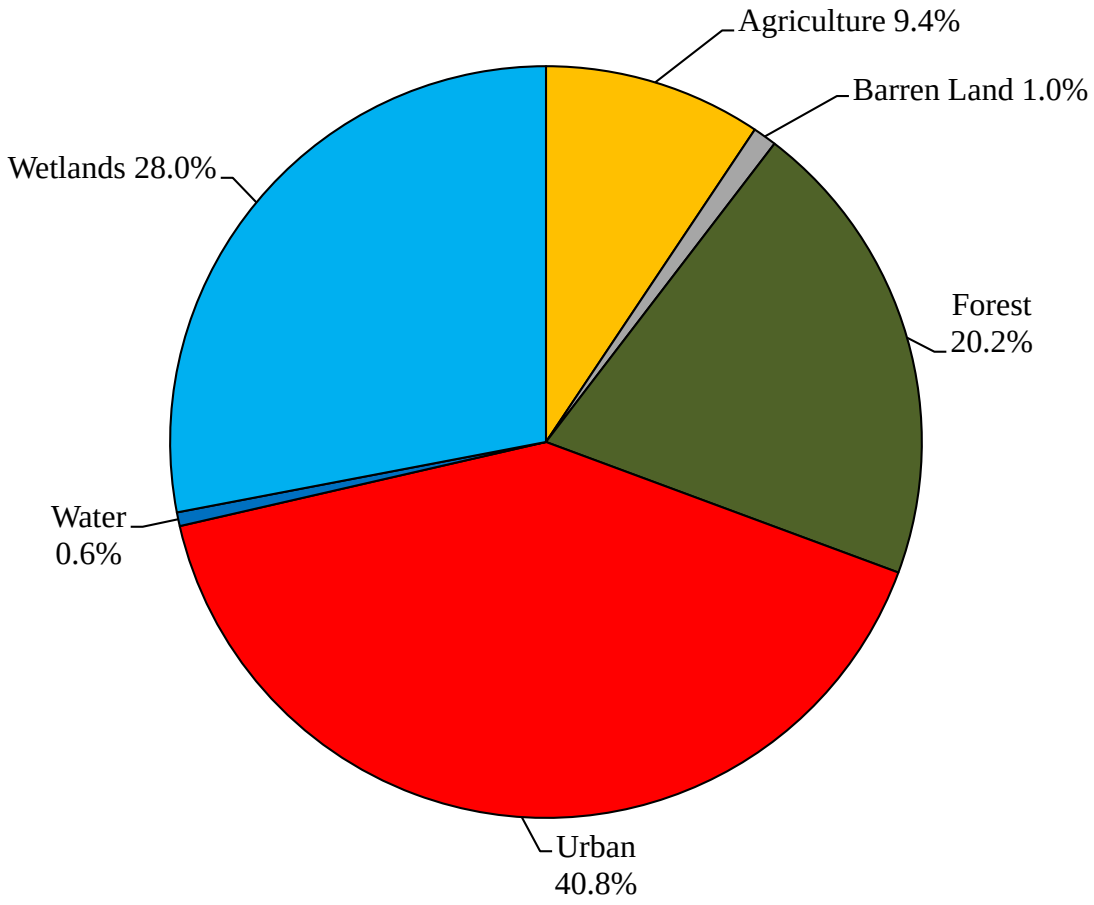



Figure 2: Pie chart illustrating the land use in Freehold Township

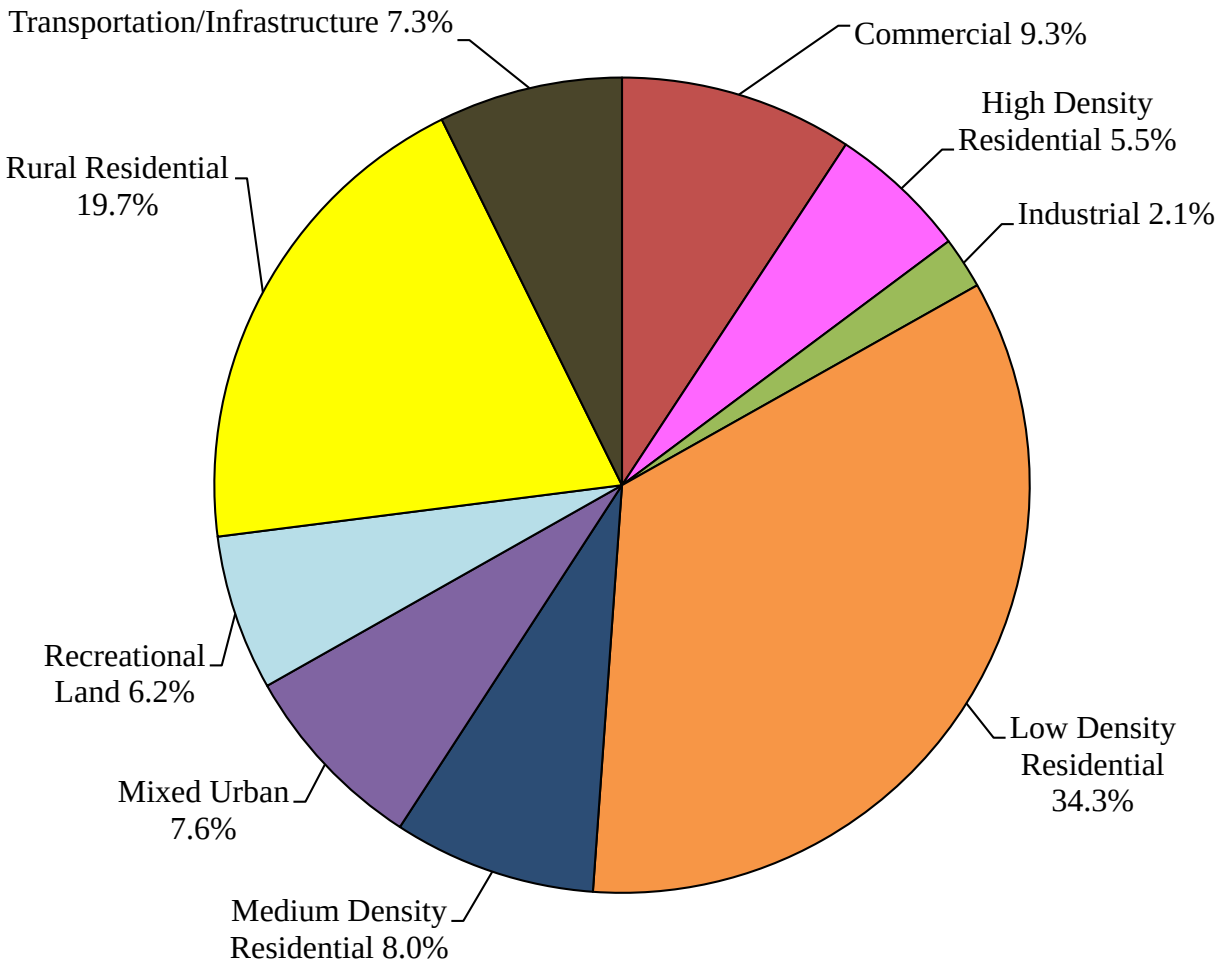



Figure 3: Pie chart illustrating the various types of urban land use in Freehold Township

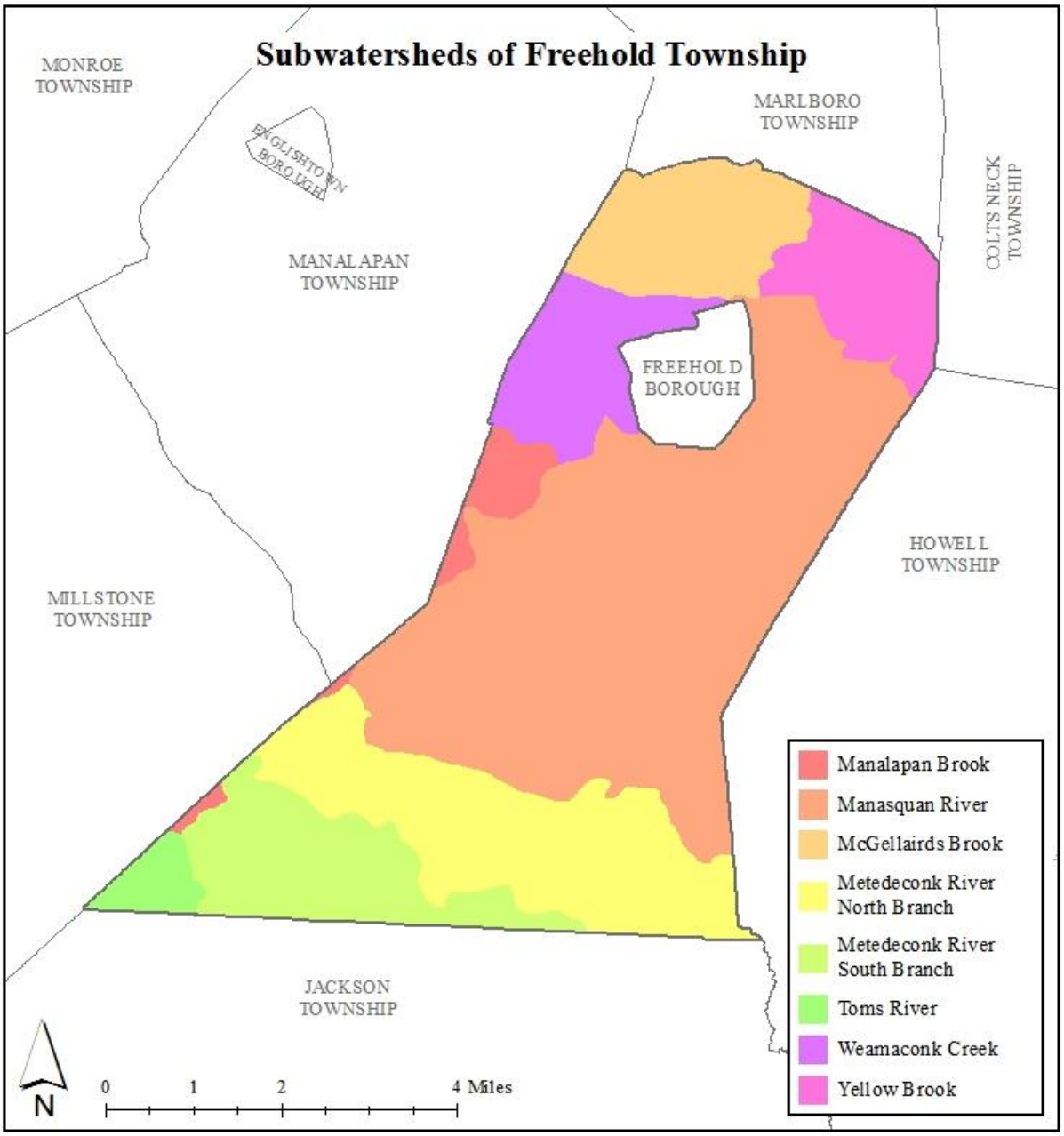



Figure 4: Map of the subwatersheds in Freehold Township

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 Freehold Township using the United States Department of Agriculture Natural Resources Conservation Service Web Soil Survey, which utilizes regional and statewide soil data to predict soil types in an area. Several key soil parameters were examined (e.g., natural drainage class, saturated hydraulic conductivity of the most limiting soil layer ($K_{sat}$), depth to water table, and hydrologic soil group) to evaluate the suitability of each site's soil for green infrastructure practices. In cases where multiple soil types were encountered, the key soil parameters were examined for each soil type expected at a site.

For each potential project site, drainage areas were determined for each of the green infrastructure practices proposed at the site. These green infrastructure practices were designed to manage the 2-year design storm, enabling these practices to capture 95% of the annual rainfall. Runoff volumes were calculated for each proposed green infrastructure practice. The reduction in TSS loading was calculated for each drainage area for each proposed green infrastructure practice using the aerial loading coefficients in Table 1. The maximum volume reduction in stormwater runoff for each green infrastructure practice for a storm was determined by calculating the volume of runoff captured from the 2-year design storm. For each green infrastructure practice, peak discharge reduction potential was determined through hydrologic modeling in HydroCAD. For each green infrastructure practice, a cost estimate is provided. These costs are based upon the square footage of the green infrastructure practice and the real cost of green infrastructure practice implementation in New Jersey.

Table 1: Aerial Loading Coefficients[2]

| Land Cover | TP load (lbs/acre/yr) | TN load (lbs/acre/yr) | TSS load (lbs/acre/yr) |
|---|---|---|---|
| High, Medium Density Residential | 1.4 | 15 | 140 |
| Low Density, Rural Residential | 0.6 | 5 | 100 |
| Commercial | 2.1 | 22 | 200 |
| Industrial | 1.5 | 16 | 200 |
| Urban, Mixed Urban, Other Urban | 1.0 | 10 | 120 |
| Agriculture | 1.3 | 10 | 300 |
| Forest, Water, Wetlands | 0.1 | 3 | 40 |
| Barrenland/Transitional Area | 0.5 | 5 | 60 |

[2] New Jersey Department of Environmental Protection (NJDEP), Stormwater Best Management Practice Manual, 2004.

## Green Infrastructure Practices

Green infrastructure is an approach to stormwater management that is cost-effective, sustainable, and environmentally friendly. Green infrastructure projects capture, filter, absorb, and reuse stormwater to maintain or mimic natural systems and to treat runoff as a resource. As a general 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 Freehold Township. Each practice is discussed below.

### *Disconnected downspouts*

This is often referred to as simple disconnection. A downspout is simply disconnected, and prevented from draining directly to the roadway or storm sewer system, and directed to discharge water to a pervious area (i.e., lawn).

### *Pervious pavements*

There are several types of permeable pavement systems including porous asphalt, pervious concrete, permeable pavers, and grass pavers. These surfaces are hard and support vehicle traffic but also allow water to infiltrate through the surface. They have an underlying stone layer to store stormwater runoff and allow it to slowly seep into the ground.




[3] United States Environmental Protection Agency (USEPA), 2013. Watershed Assessment, Tracking, and Environmental Results, New Jersey Water Quality Assessment Report. http://ofmpub.epa.gov/waters10/attains_state.control?p_state=NJ

***Bioretention systems/rain gardens***

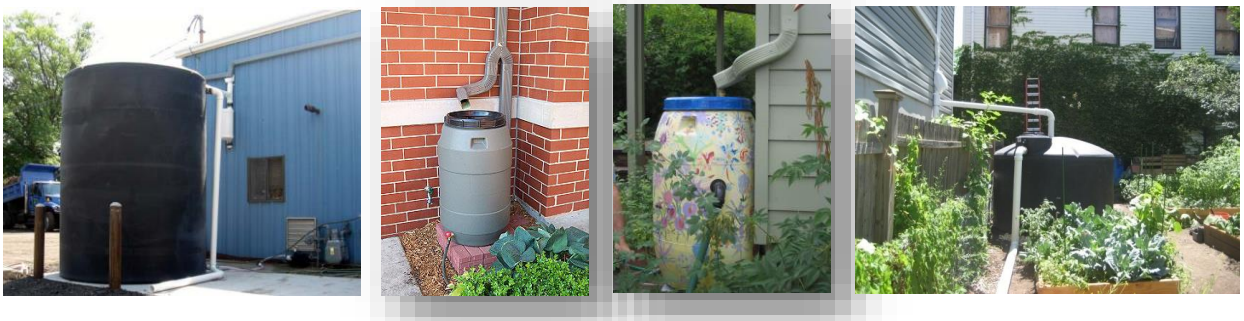
These are landscaped features that are designed to capture, treat, and infiltrate stormwater runoff. These systems can easily be incorporated into existing landscapes, improving aesthetics and creating a wildlife habitat while managing stormwater runoff. Bioretention systems also can be used in soils that do not quickly infiltrate by incorporating an underdrain into the system.

***Downspout planter boxes***

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

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

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



***Bioswale***

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

***Stormwater planters***

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

***Tree filter boxes***

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

## Potential Project Sites

Attachment 1 contains information on potential project sites where green infrastructure practices could be installed. The recommended green infrastructure practice and the drainage area that the green infrastructure practice can treat are identified for each potential project site. For each practice, the recharge potential, TSS removal potential, maximum volume reduction potential per storm, and the peak reduction potential are provided. This information is also provided so that proposed development projects that cannot satisfy the New Jersey stormwater management requirements for major development can use one of the identified projects to offset a stormwater management deficit. [4]

[4] New Jersey Administrative Code, N.J.A.C. 7:8, Stormwater Management, Statutory Authority: N.J.S.A. 12:5-3, 13:1D-1 et seq., 13:9A-1 et seq., 13:19-1 et seq., 40:55D-93 to 99, 58:4-1 et seq., 58:10A-1 et seq., 58:11A-1 et seq. and 58:16A-50 et seq., *Date last amended: April 19, 2010*.

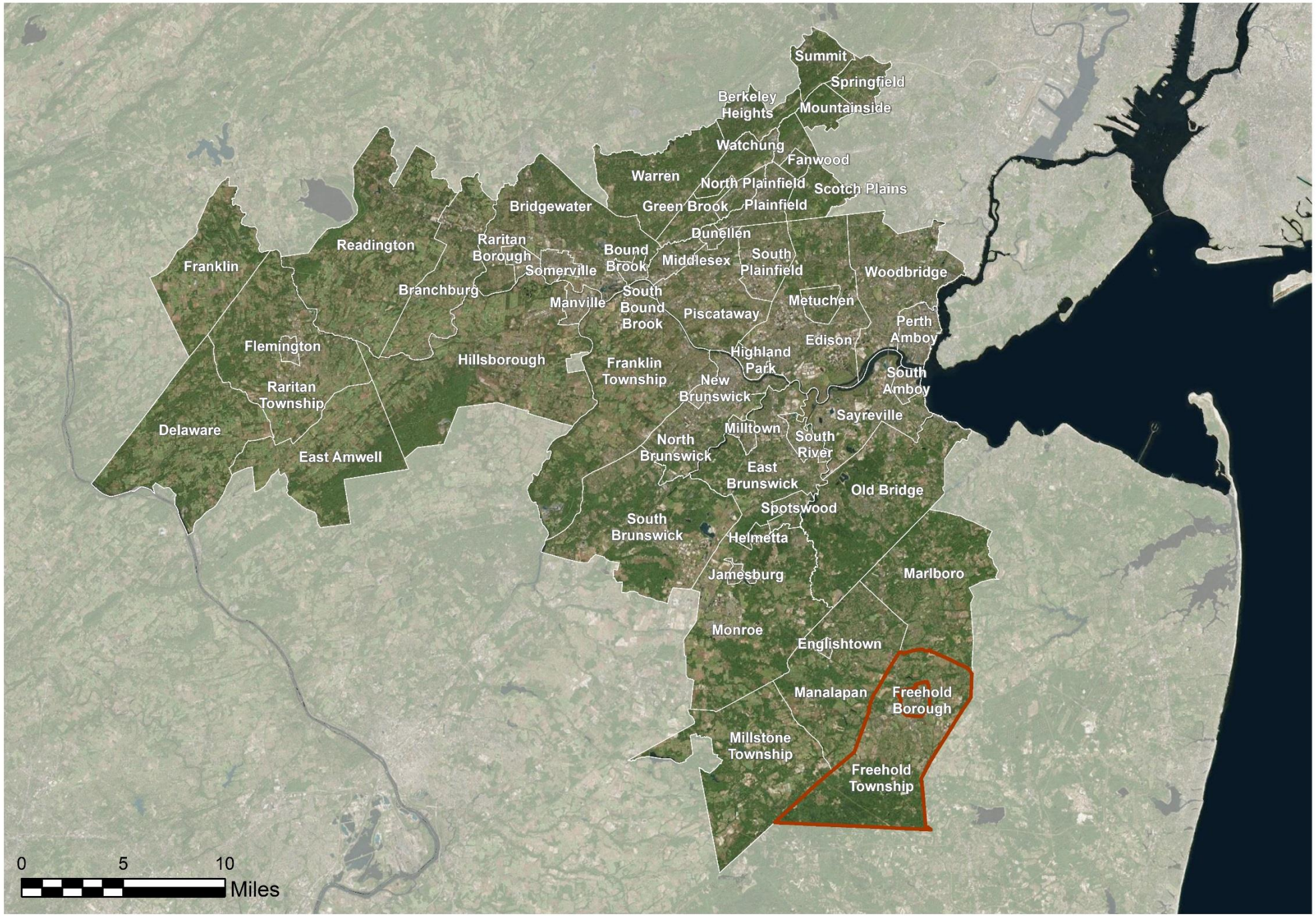
## Conclusion

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

Additionally, development projects that are in need of providing off-site compensation for stormwater impacts can use the projects in this plan as a starting point. The municipality can quickly convert this impervious cover reduction action plan into a stormwater mitigation plan and incorporate it into the municipal stormwater control ordinance.

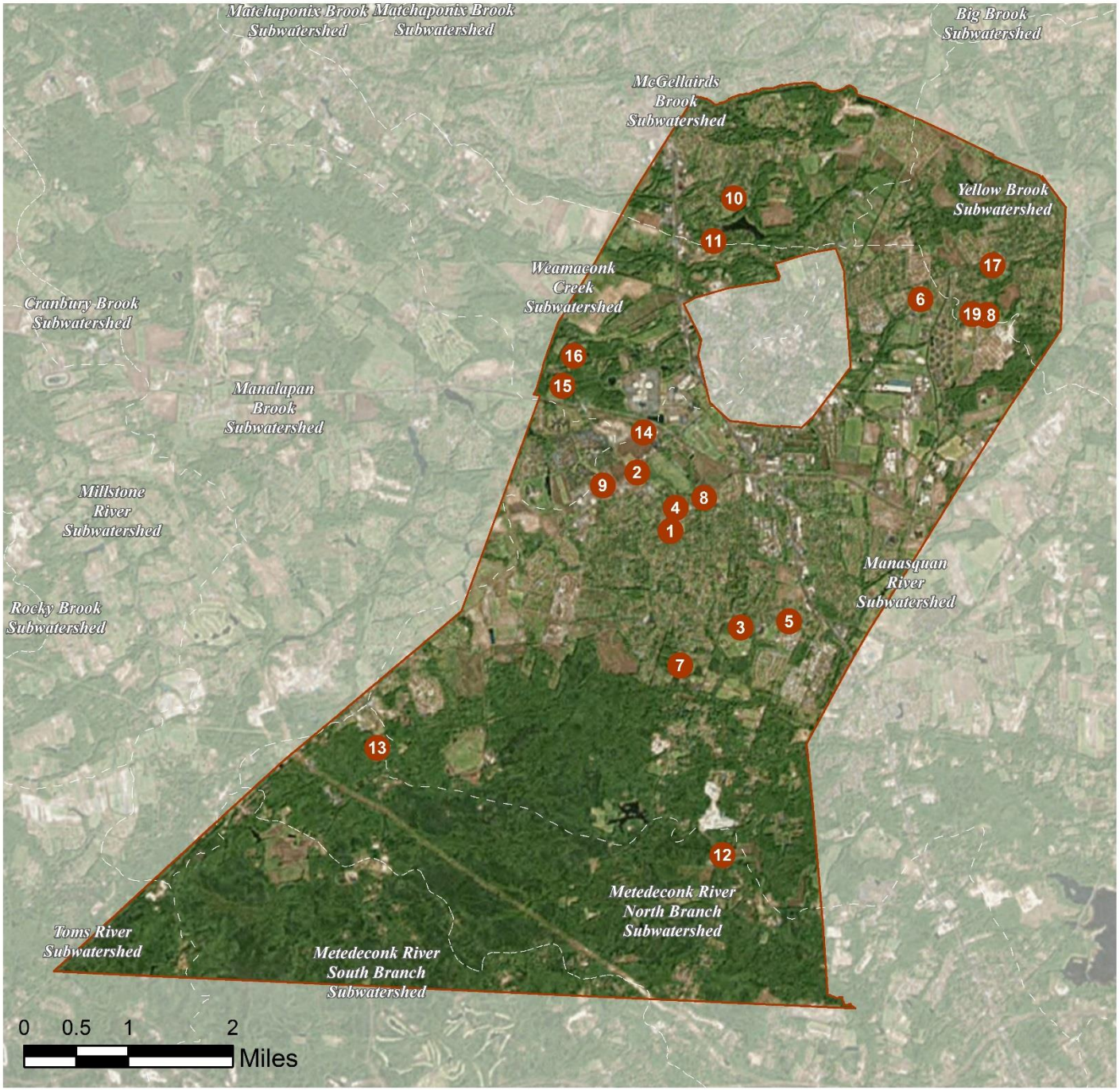
## a. Overview Map of the Project

# FREEHOLD TOWNSHIP: CLIMATE RESILIENT GREEN INFRASTRUCTURE FOR THE RARITAN BASIN



## b. Green Infrastructure Sites

# FREEHOLD TOWNSHIP: GREEN INFRASTRUCTURE SITES




**SITES WITHIN THE MANASQUAN RIVER SUBWATERSHED:**

1. Freehold Independent Fire Company
2. Freehold Township Elementary School District
3. Freehold Township High School
4. Freehold Township Municipal Complex
5. Hope Lutheran Church
6. Monmouth County Vocational Tech District
7. Saint Robert Bellarmine Church & Providence Academy
8. The Goddard School
9. US Post Office

**SITES WITHIN THE MCGELLAIRDS BROOK SUBWATERSHED:**

10. C. Richard Applegate Elementary School
11. Evangelical Baptist Church

**SITES WITHIN THE METEDECONK RIVER NORTH BRANCH SUBWATERSHED:**

12. First Assembly of God
13. Siloam United Methodist Church

**SITES WITHIN THE WEAMACONK CREEK SUBWATERSHED:**

14. Chinese American Bible Church
15. The Church of Jesus Christ of Latter-Day Saints
16. West Monmouth Baptist Church

**SITES WITHIN THE YELLOW BROOK SUBWATERSHED:**

17. Abundant Life Church of God
18. Dwight D. Eisenhower Middle School
19. Joseph J. Catena School

## c. Proposed Green Infrastructure Concepts

# FREEHOLD INDEPENDENT FIRE COMPANY

**Subwatershed:** Manasquan River

**Site Area:** 58,054 sq. ft.

**Address:** 3587 U.S. 9 #302, Freehold Twp., NJ 07728

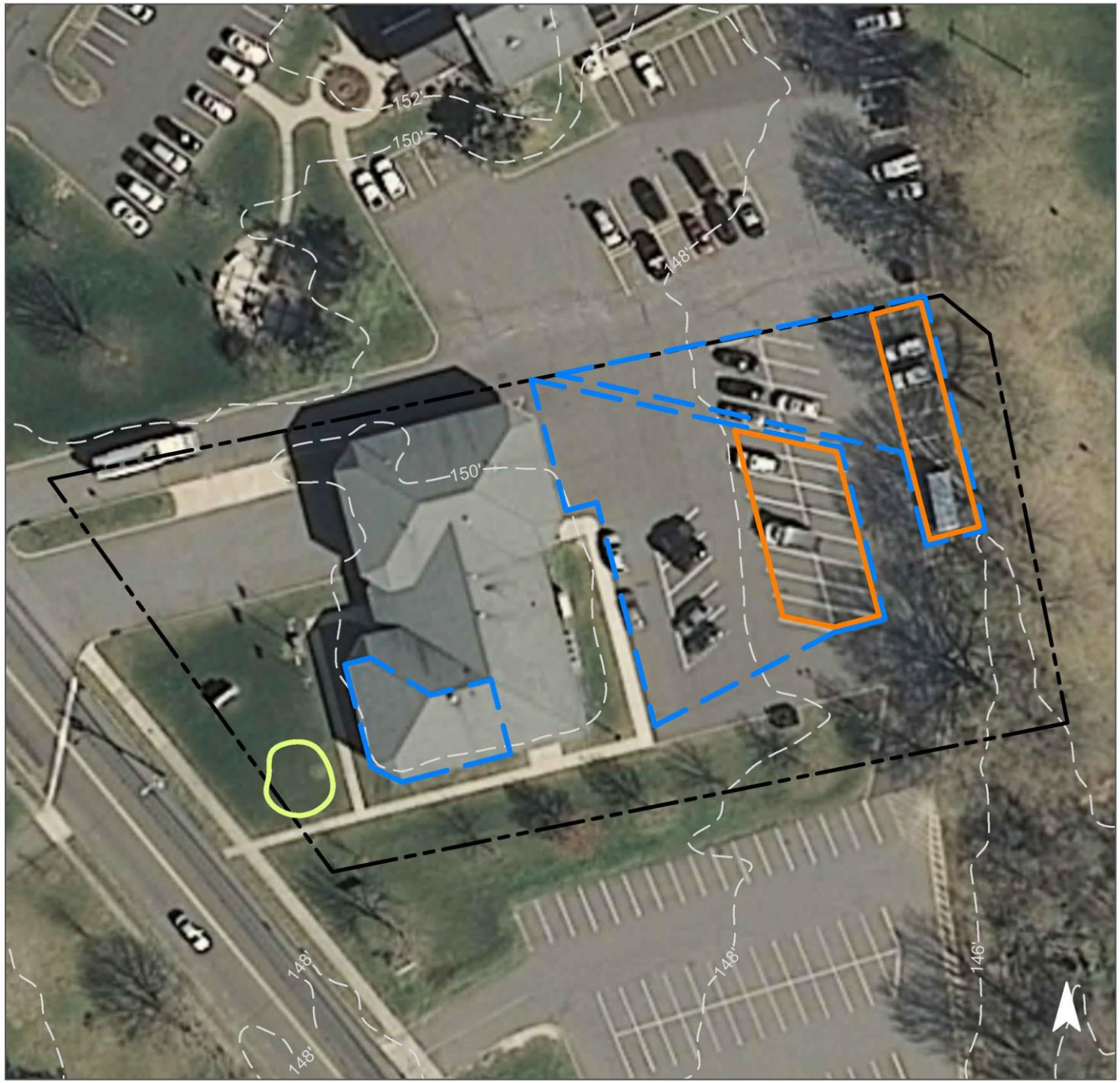
**Block and Lot:** Block 71.27, Lot 11

Parking spaces can be replaced with pervious pavement to capture parking lot runoff. Downspouts on the southwestern corner of the building can be disconnected into a bioretention system to manage 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" |
| 71 | 41,491 | 2.0 | 21.0 | 190.5 | 0.032 | 1.14 |

| 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 |
|---|---|---|---|---|---|---|
| Bioretention systems | 0.052 | 9 | 3,964 | 0.15 | 610 | $3,050 |
| Pervious pavements | 0.430 | 72 | 32,560 | 1.22 | 4,510 | $112,750 |

# GREEN INFRASTRUCTURE RECOMMENDATIONS




## Freehold Independent Fire Company

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

0 30' 60'

# FREEHOLD TOWNSHIP ELEMENTARY SCHOOL DISTRICT

**Subwatershed:** Manasquan River

**Site Area:** 215,920 sq. ft.

**Address:** 384 West Main Street
Freehold Twp., NJ 07728

**Block and Lot:** Block 70, Lot 24

Parking spaces can be replaced with pervious pavement to infiltrate stormwater. A bioretention system can also 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" |
| 51 | 109,660 | 5.3 | 55.4 | 503.5 | 0.085 | 3.01 |

| 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 | 0.088 | 15 | 6,650 | 0.25 | 890 | $4,450 |
| Pervious pavements | 0.163 | 27 | 12,364 | 0.46 | 3,470 | $86,750 |

# GREEN INFRASTRUCTURE RECOMMENDATIONS


**Freehold Township Elementary School District**

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

0 50' 100'

# FREEHOLD TOWNSHIP HIGH SCHOOL

**Subwatershed:** **Manasquan River**

**Site Area:** **3,014,461 sq. ft.**

**Address:** **281 Elton Adelphia Road**
**Freehold Twp., NJ 07728**

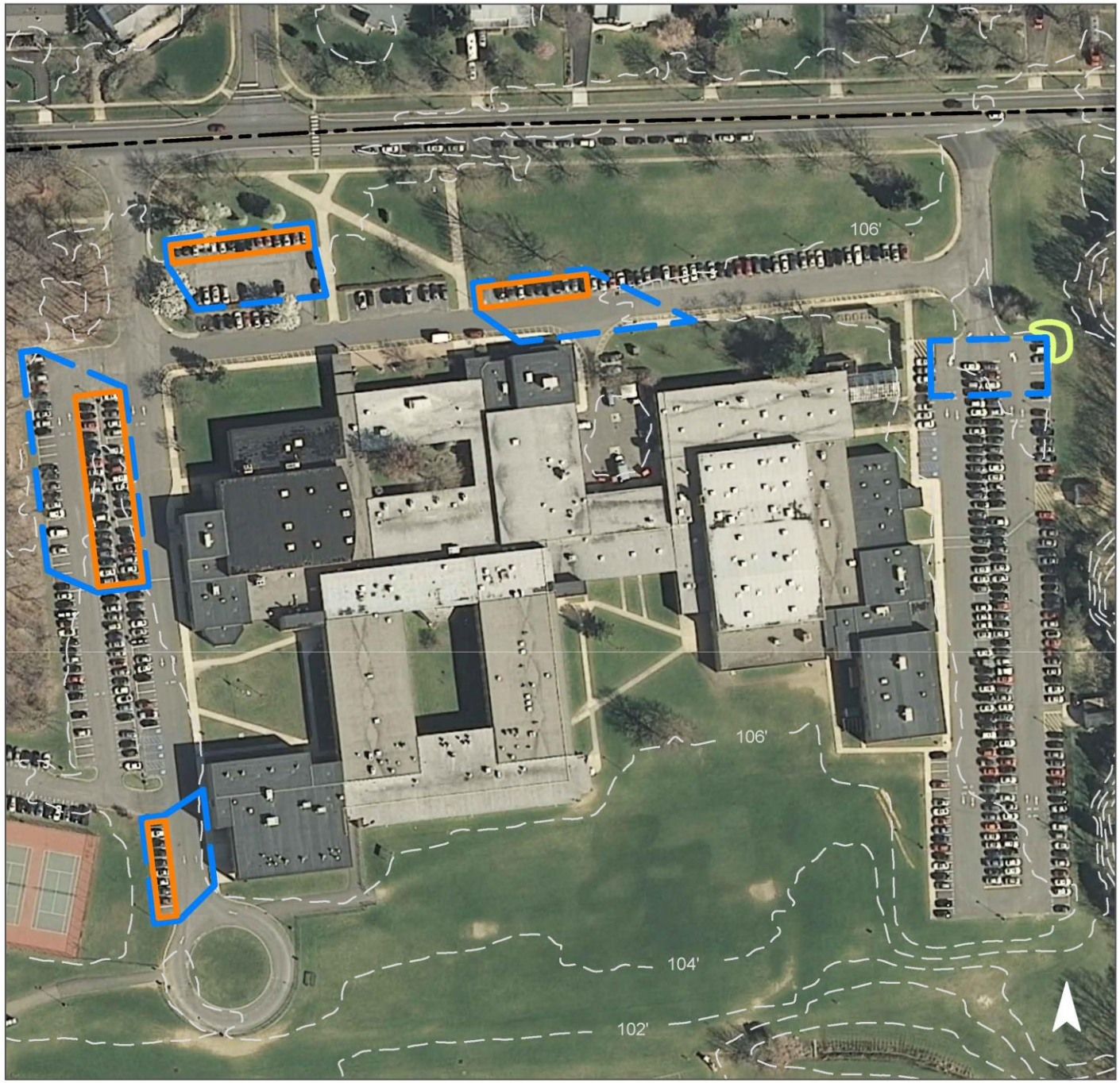
**Block and Lot:** **Block 84, Lot 10**

Parking lot runoff can be captured by installing porous asphalt in four strips of parking spaces to help manage stormwater. A bioretention can be installed in the corner of the eastern parking lot to capture, treat, and infiltrate parking lot runoff. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

| Impervious Cover | | Existing Loads from Impervious Cover (lbs/yr) | | | Runoff Volume from Impervious Cover (Mgal) | |
|---|---|---|---|---|---|---|
| % | sq. ft. | TP | TN | TSS | For the 1.25" Water Quality Storm | For an Annual Rainfall of 44" |
| 21 | 628,345 | 30.3 | 317.3 | 2,885.0 | 0.490 | 17.23 |

| 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 | 0.166 | 28 | 12,544 | 0.47 | 750 | $3,750 |
| Pervious pavements | 1.228 | 206 | 93,014 | 3.49 | 14,685 | $367,125 |

# GREEN INFRASTRUCTURE RECOMMENDATIONS




## Freehold Township High School

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

0 75' 150'

# FREEHOLD TOWNSHIP MUNICIPAL COMPLEX

**Subwatershed:** Manasquan River

**Site Area:** 762,669 sq. ft.

**Address:** 1 Municipal Plaza
Freehold Twp., NJ 07728

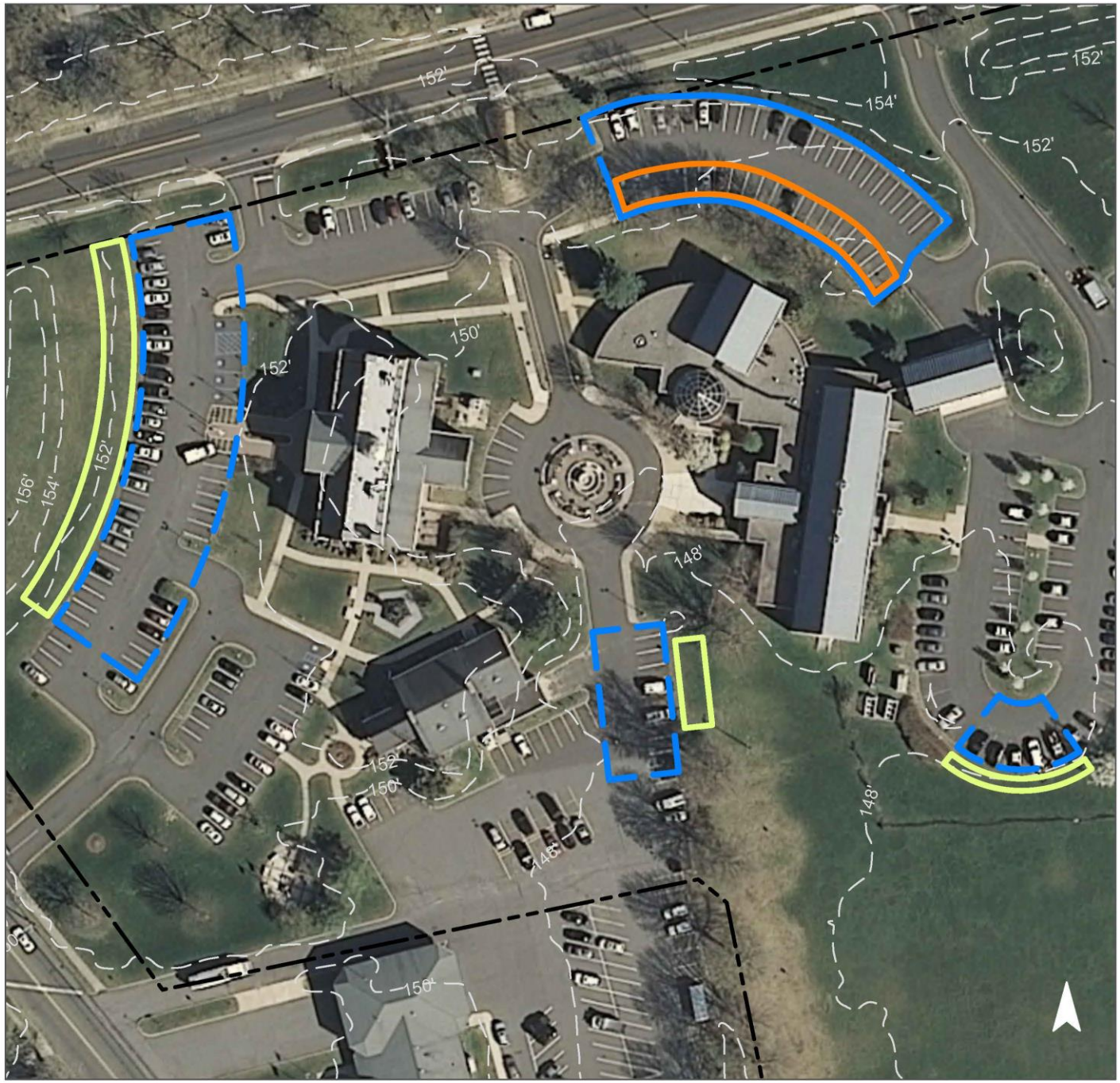
**Block and Lot:** Block 71.27, Lot 10

This site includes a retention basin that collects stormwater runoff from the complex. Bioretention systems can be installed to capture, treat, and infiltrate parking lot runoff. Parking spaces can also be replaced with pervious pavement to infiltrate stormwater. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

| Impervious Cover | | Existing Loads from Impervious Cover (lbs/yr) | | | Runoff Volume from Impervious Cover (Mgal) | |
|---|---|---|---|---|---|---|
| % | sq. ft. | TP | TN | TSS | For the 1.25" Water Quality Storm | For an Annual Rainfall of 44" |
| 40 | 304,576 | 14.7 | 153.8 | 1,398.4 | 0.237 | 8.35 |

| 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 | 0.686 | 115 | 51,993 | 1.95 | 6,835 | $34,175 |
| Pervious pavements | 0.413 | 69 | 31,274 | 1.17 | 3,980 | $99,500 |

# GREEN INFRASTRUCTURE RECOMMENDATIONS




## Freehold Township Municipal Complex

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

0 50' 100'

# HOPE LUTHERAN CHURCH

**Subwatershed:** Manasquan River

**Site Area:** 185,885 sq. ft.

**Address:** 211 Elton Adelphia Road
Freehold Twp., NJ 07728

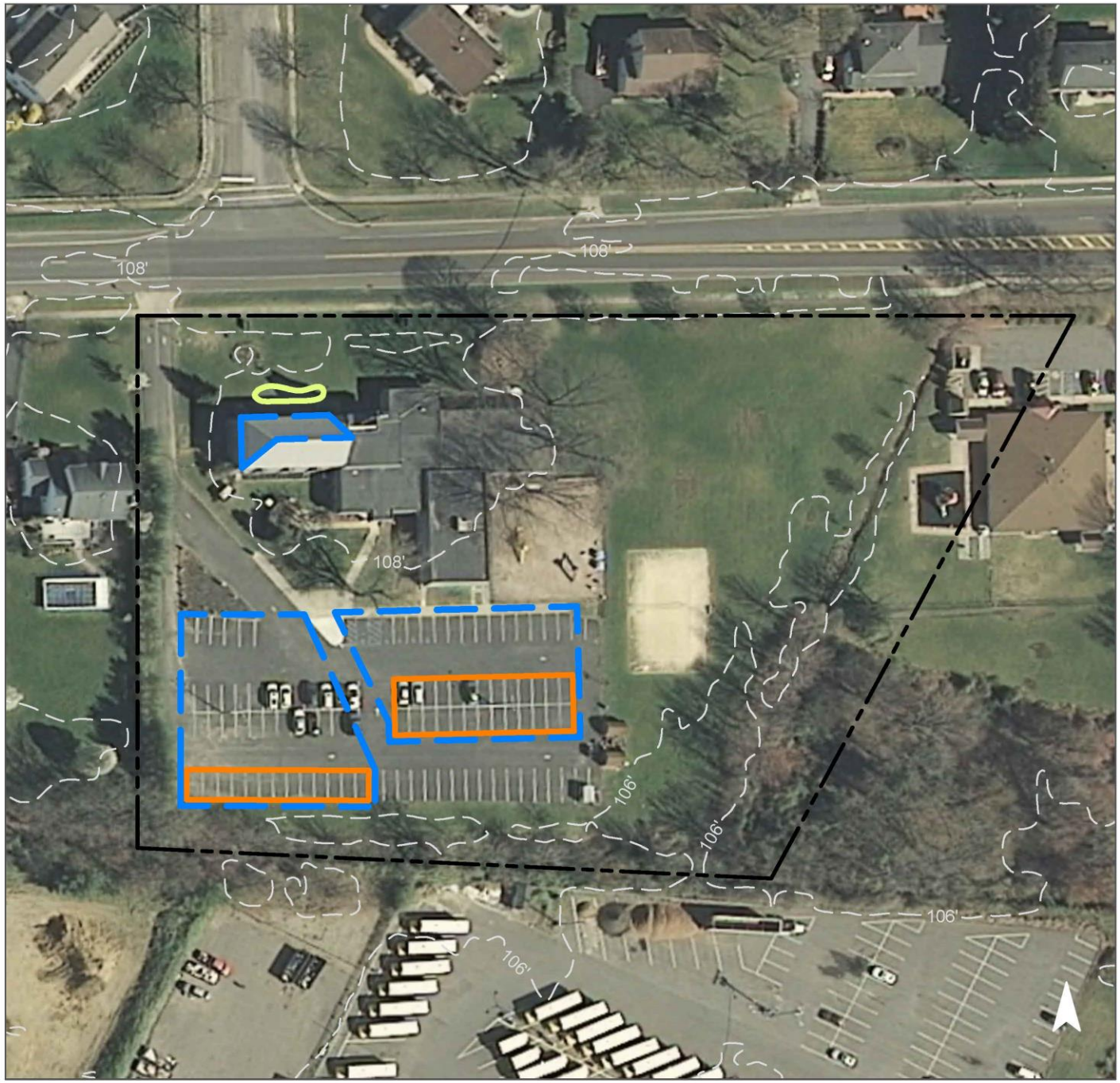
**Block and Lot:** Block 84, Lot 1.01

Porous asphalt can be installed in parking spaces to infiltrate parking lot runoff. A bioretention system can also be installed in the front of the building to capture, treat, and infiltrate rooftop runoff. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

| Impervious Cover | | Existing Loads from Impervious Cover (lbs/yr) | | | Runoff Volume from Impervious Cover (Mgal) | |
|---|---|---|---|---|---|---|
| % | sq. ft. | TP | TN | TSS | For the 1.25" Water Quality Storm | For an Annual Rainfall of 44" |
| 39 | 71,983 | 3.5 | 36.4 | 330.5 | 0.056 | 1.97 |

| 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 | 0.031 | 5 | 2,349 | 0.09 | 355 | $1,775 |
| Pervious pavements | 0.667 | 112 | 50,527 | 1.90 | 6,690 | $167,250 |

# GREEN INFRASTRUCTURE RECOMMENDATIONS




## Hope Lutheran Church

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

0 50' 100'

# MONMOUTH COUNTY VOCATIONAL SCHOOL

**Subwatershed:** Manasquan River

**Site Area:** 1,989,607 sq. ft.

**Address:** 1000-5000 Kozloski Road
Freehold Twp., NJ 07728

**Block and Lot:** Block 41, Lot 11

Detention and retention basins collect runoff from the school. To reduce the volume of runoff entering these systems, pervious pavement can replace several rows of parking spaces throughout the lots to allow runoff 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" |
| 38 | 747,427 | 36.0 | 377.5 | 3,431.7 | 0.582 | 20.50 |

| Recommended Green Infrastructure Practices | Recharge Potential (Mgal/yr) | TSS Removal Potential (lbs/yr) | Maximum Volume Reduction Potential (gal/storm) | Peak Discharge Reduction Potential (cu. ft./second) | Estimated Size (sq. ft.) | Estimated Cost |
|---|---|---|---|---|---|---|
| Pervious pavements | 0.573 | 96 | 230,960 | 8.67 | 21,990 | $549,750 |

# GREEN INFRASTRUCTURE RECOMMENDATIONS


## Monmouth County Vocational School

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

0 150' 300'

# SAINT ROBERT BELLARMINE CHURCH AND PROVIDENCE ACADEMY

**Subwatershed:** Manasquan River

**Site Area:** 800,140 sq. ft.

**Address:** 61 Georgia Road
Freehold Twp., NJ 07728

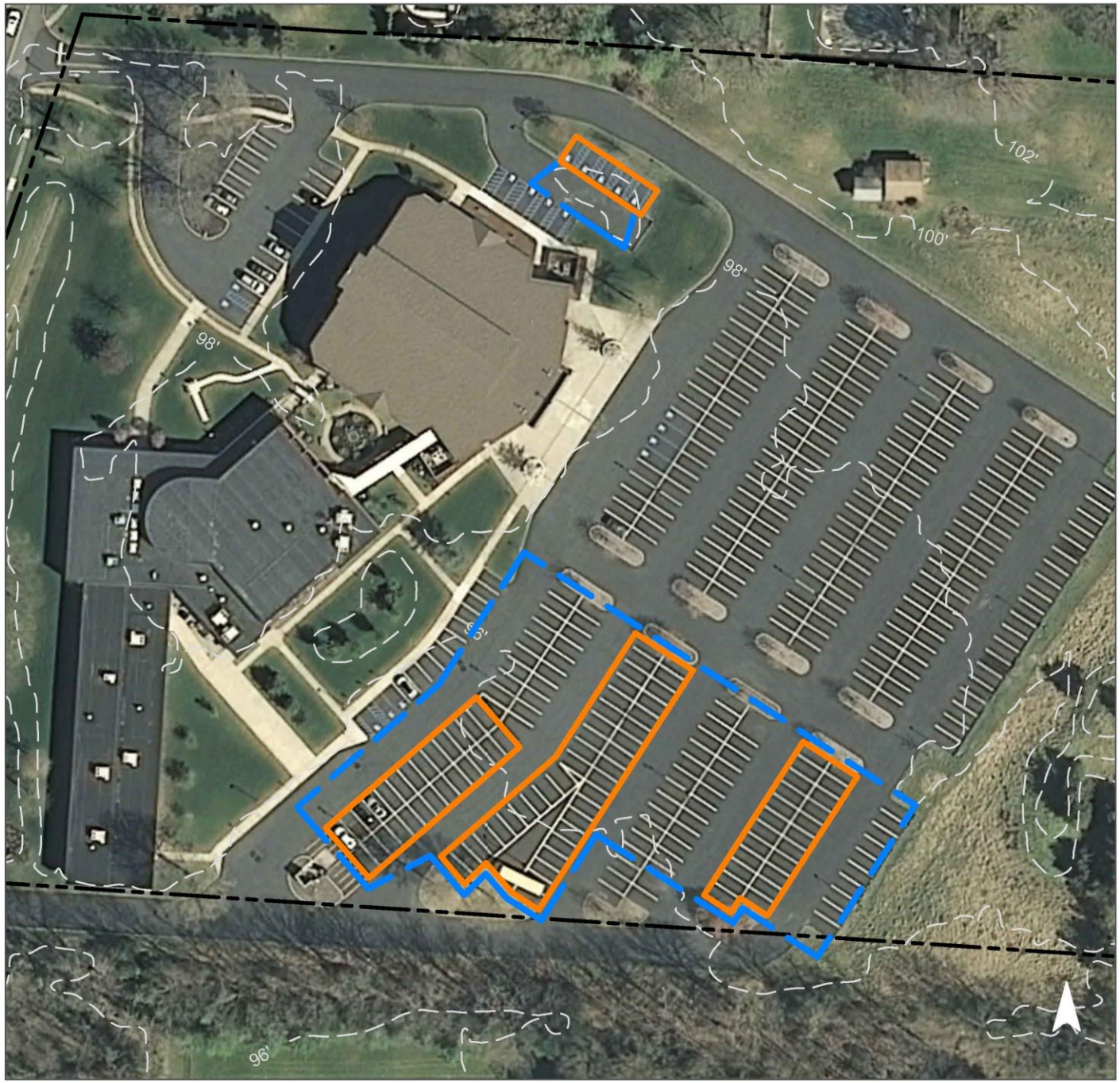
**Block and Lot:** Block 84, Lot 17

Parking spaces can be replaced with pervious pavement to 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" |
| 35 | 277,149 | 13.4 | 140.0 | 1,272.5 | 0.216 | 7.60 |

| 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 | 1.443 | 242 | 109,358 | 4.10 | 21,435 | $535,875 |

# GREEN INFRASTRUCTURE RECOMMENDATIONS




## Saint Robert Bellarmine Church and Providence Academy

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

0 75' 150'

# THE GODDARD SCHOOL

**Subwatershed:** Manasquan River

**Site Area:** 88,464 sq. ft.

**Address:** 230 Schanck Road
Freehold Twp., NJ 07728

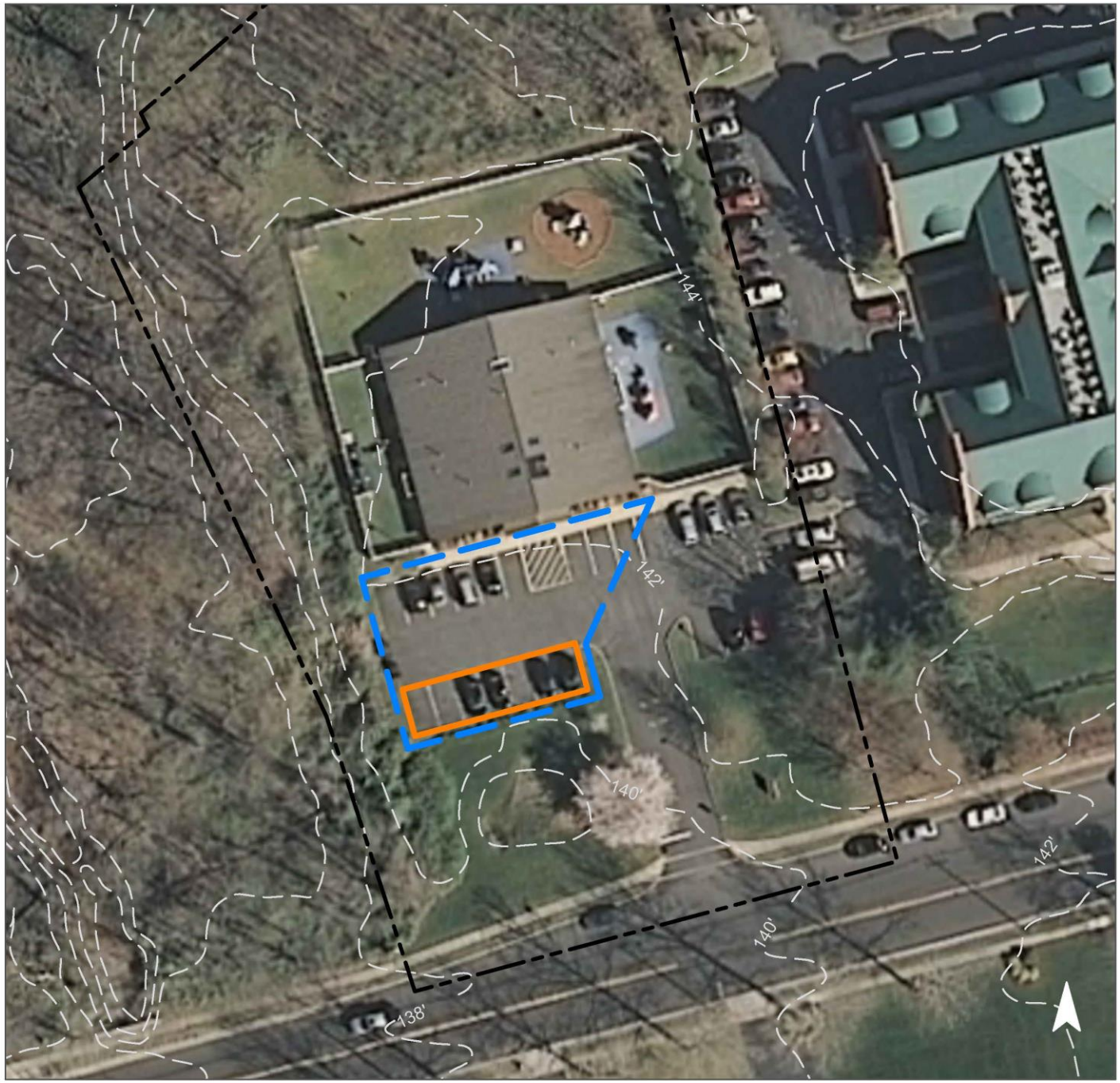
**Block and Lot:** Block 70, Lot 35

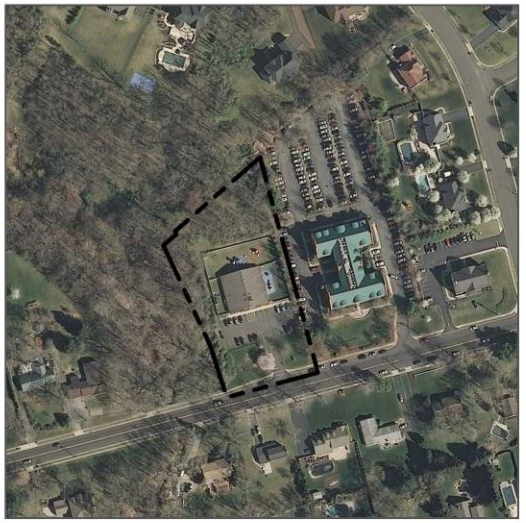

Porous asphalt can replace a row of parking spaces to capture and infiltrate parking lot runoff. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

| Impervious Cover | | Existing Loads from Impervious Cover (lbs/yr) | | | Runoff Volume from Impervious Cover (Mgal) | |
|---|---|---|---|---|---|---|
| % | sq. ft. | TP | TN | TSS | For the 1.25" Water Quality Storm | For an Annual Rainfall of 44" |
| 47 | 41,745 | 2.0 | 21.1 | 191.7 | 0.033 | 1.14 |

| 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 | 0.167 | 28 | 12,664 | 0.48 | 1,335 | $33,375 |

# GREEN INFRASTRUCTURE RECOMMENDATIONS



## The Goddard School

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

0 50' 100'

# US POST OFFICE

**Subwatershed:** Manasquan River

**Site Area:** 1,085,069 sq. ft.

**Address:** 200 Village Center Drive
Freehold Twp., NJ 07728

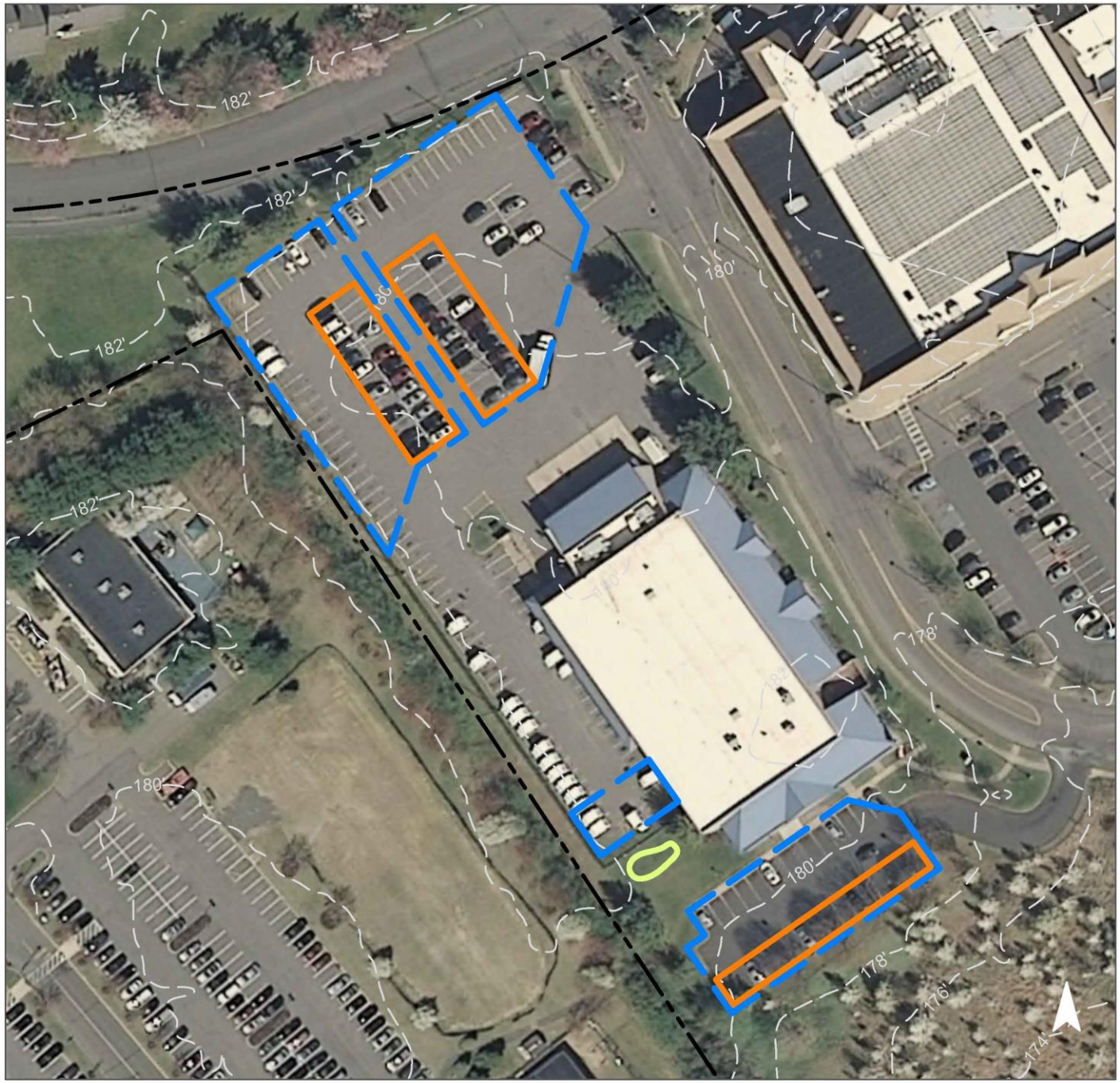
**Block and Lot:** Block 86, Lot 12

Porous asphalt can be installed along three strips of parking spots to capture and infiltrate parking lot runoff. A bioretention system can also be installed off of the southern side of the building to capture, treat, and infiltrate additional 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" |
| 73 | 792,698 | 38.2 | 400.4 | 3,639.6 | 0.618 | 21.74 |

| Recommended Green Infrastructure Practices | Recharge Potential (Mgal/yr) | TSS Removal Potential (lbs/yr) | Maximum Volume Reduction Potential (gal/storm) | Peak Discharge Reduction Potential (cu. ft./second) | Estimated Size (sq. ft.) | Estimated Cost |
|---|---|---|---|---|---|---|
| Bioretention systems | 0.054 | 9 | 4,099 | 0.15 | 415 | $2,075 |
| Pervious pavements | 1.209 | 202 | 91,585 | 3.44 | 12,070 | $301,750 |

# GREEN INFRASTRUCTURE RECOMMENDATIONS




## US Post Office

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

0 50' 100'

# C. RICHARD APPLEGATE ELEMENTARY SCHOOL

**Subwatershed:** McGellairds Brook

**Site Area:** 691,567 sq. ft.

**Address:** 47 Jeanne Brennan Drive
Freehold, NJ 07728

**Block and Lot:** Block 8, Lot 16.01

Parking spaces can be replaced with porous asphalt to allow parking lot runoff and opportunity to be infiltrated. Four locations were identified where bioretention systems can be installed around the perimeter of the school 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" |
| 28 | 196,948 | 9.5 | 99.5 | 904.3 | 0.153 | 5.40 |

| 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 systems | 0.260 | 44 | 19,687 | 0.74 | 2,705 | $13,525 |
| Pervious pavements | 0.646 | 108 | 48,957 | 1.84 | 8,335 | $208,375 |

# GREEN INFRASTRUCTURE RECOMMENDATIONS


## C. Richard Applegate Elementary School

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

0 50' 100'

# EVANGELICAL BAPTIST CHURCH

**Subwatershed:** McGellairds Brook

**Site Area:** 15,028 sq. ft.

**Address:** 108 Waterworks Road
Freehold Twp., NJ 07728

**Block and Lot:** Block 6, Lot 1

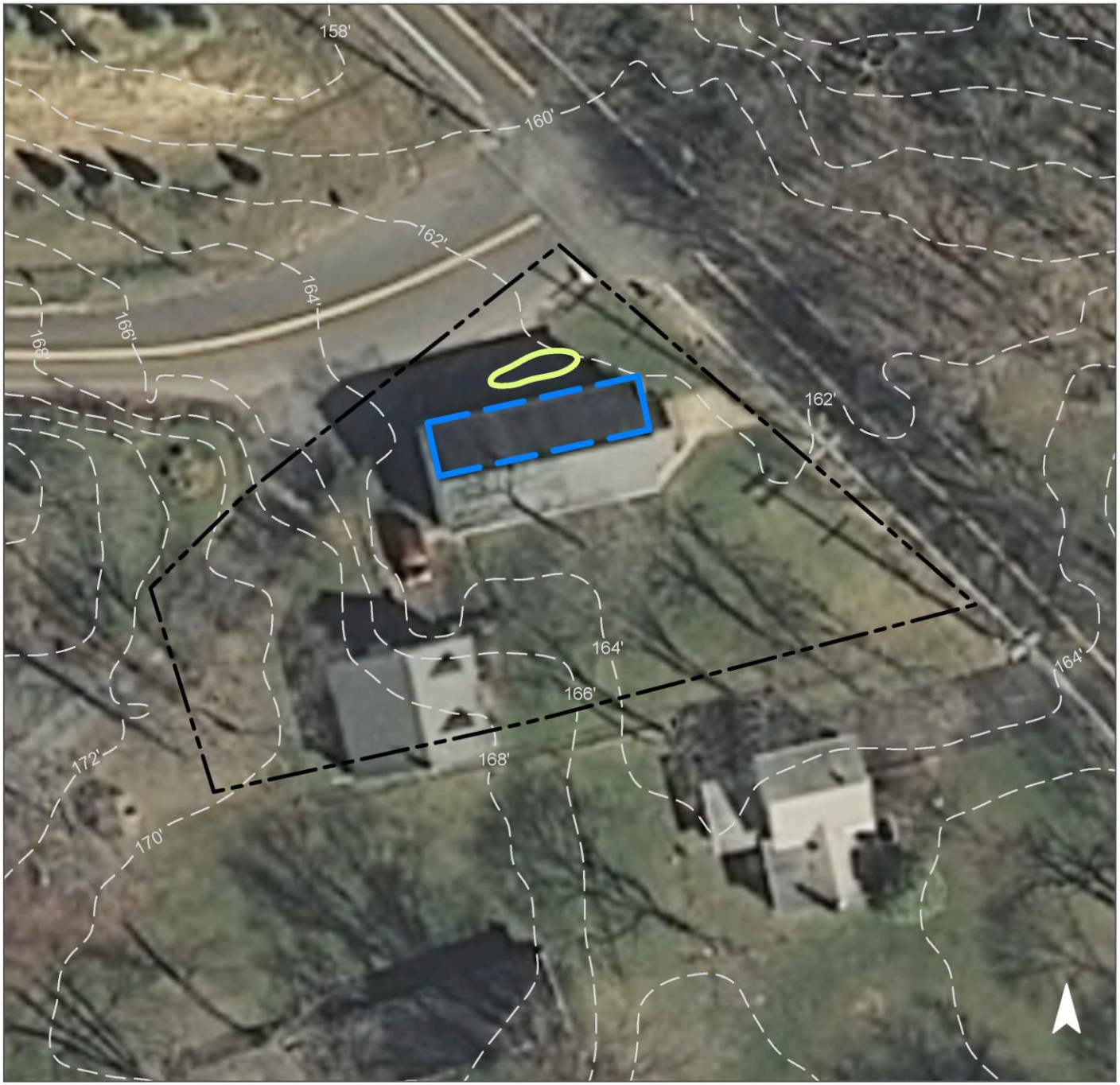


A bioretention can be installed on the northern side of the building to capture, treat, and infiltrate rooftop runoff by redirecting two downspouts. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

| 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" |
| 20 | 3,006 | 0.1 | 1.5 | 13.8 | 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 | 0.021 | 4 | 1,601 | 0.06 | 115 | $575 |

# GREEN INFRASTRUCTURE RECOMMENDATIONS




## Evangelical Baptist Church

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

0 20' 40'

# FIRST ASSEMBLY OF GOD

**Subwatershed:** Metedeconk River North Branch

**Site Area:** 56,530 sq. ft.

**Address:** 272 Jackson Mills Road
Freehold Twp., NJ 07728

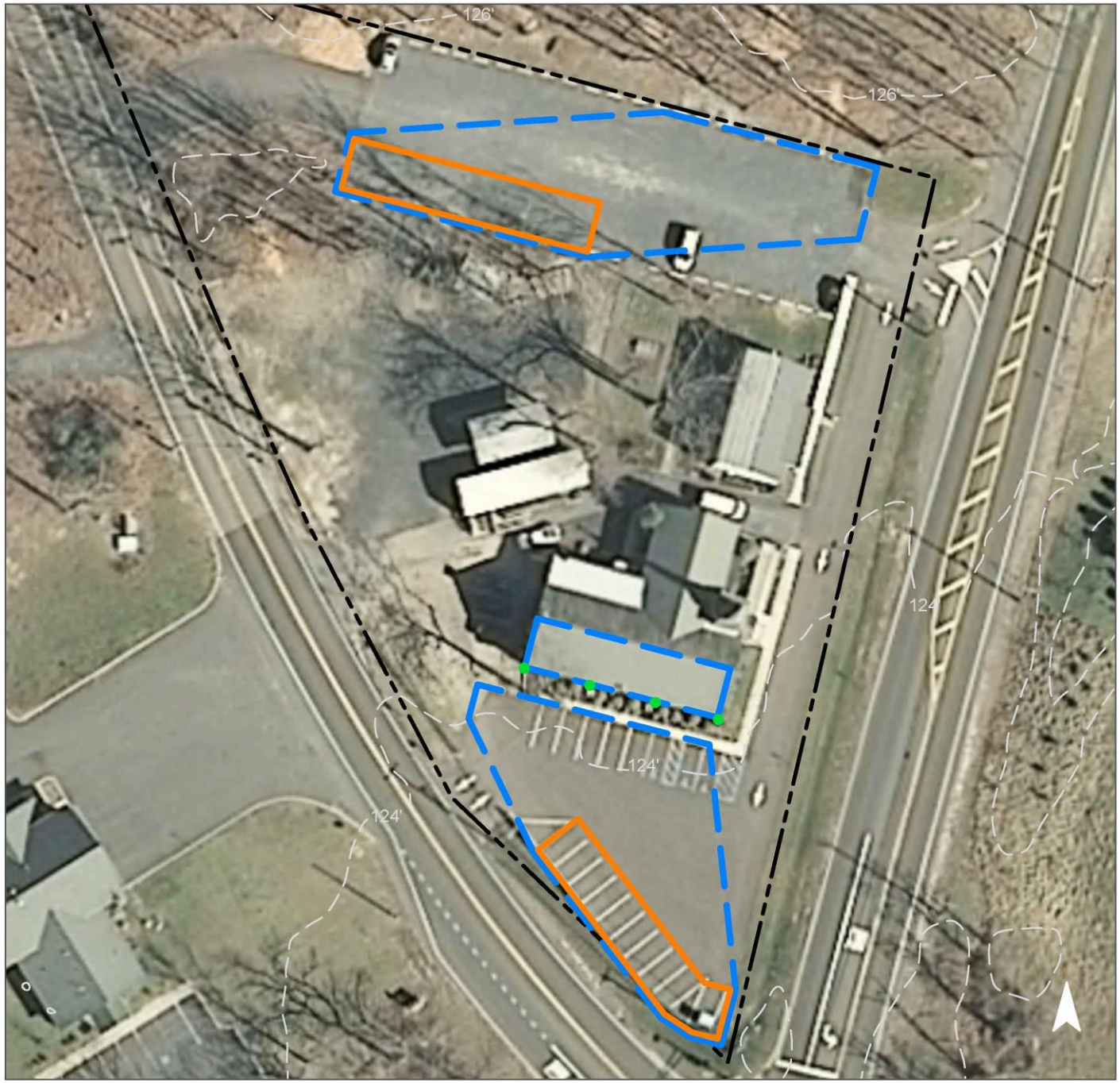
**Block and Lot:** Block 97.09, Lot 52

Porous asphalt can be installed in two rows of parking spaces to capture and infiltrate stormwater runoff. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

| Impervious Cover | | Existing Loads from Impervious Cover (lbs/yr) | | | Runoff Volume from Impervious Cover (Mgal) | |
|---|---|---|---|---|---|---|
| % | sq. ft. | TP | TN | TSS | For the 1.25" Water Quality Storm | For an Annual Rainfall of 44" |
| 67 | 38,057 | 1.8 | 19.2 | 174.7 | 0.030 | 1.04 |

| 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 | 0.482 | 81 | 36,517 | 1.37 | 3,965 | $99,125 |

# GREEN INFRASTRUCTURE RECOMMENDATIONS




## First Assembly of God

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

0 50' 100'

# SILOAM UNITED METHODIST CHURCH

**Subwatershed:** Metedeconk River

**Site Area:** 32,619 sq. ft.

**Address:** 67 Siloam Road
Freehold Twp., NJ 07728

**Block and Lot:** Block 112, Lot 3

Downspouts on the northern side of the building can be disconnected into a bioretention system to capture, treat, and infiltrate rooftop runoff. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

| Impervious Cover | | Existing Loads from Impervious Cover (lbs/yr) | | | Runoff Volume from Impervious Cover (Mgal) | |
|---|---|---|---|---|---|---|
| % | sq. ft. | TP | TN | TSS | For the 1.25" Water Quality Storm | For an Annual Rainfall of 44" |
| 20 | 6,468 | 0.3 | 3.3 | 29.7 | 0.005 | 0.18 |

| Recommended Green Infrastructure Practices | Recharge Potential (Mgal/yr) | TSS Removal Potential (lbs/yr) | Maximum Volume Reduction Potential (gal/storm) | Peak Discharge Reduction Potential (cu. ft./second) | Estimated Size (sq. ft.) | Estimated Cost |
|---|---|---|---|---|---|---|
| Bioretention systems | 0.045 | 8 | 3,418 | 0.13 | 315 | $1,575 |

# GREEN INFRASTRUCTURE RECOMMENDATIONS


**Siloam United Methodist Church**

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

0 20' 40'

# CHINESE AMERICAN BIBLE CHURCH

**Subwatershed:** Weamaconk Creek

**Site Area:** 81,499 sq. ft.

**Address:** 65 Gibson Place
Freehold Twp., NJ 07728

**Block and Lot:** Block 69, Lot 36.08

Parking lot runoff can be captured and infiltrated by installing porous asphalt in parking spaces around the building. A bioretention system can be installed on the eastern side of the site to manage additional parking lot runoff. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

| Impervious Cover | | Existing Loads from Impervious Cover (lbs/yr) | | | Runoff Volume from Impervious Cover (Mgal) | |
|---|---|---|---|---|---|---|
| % | sq. ft. | TP | TN | TSS | For the 1.25" Water Quality Storm | For an Annual Rainfall of 44" |
| 81 | 65,914 | 3.2 | 33.3 | 302.6 | 0.051 | 1.81 |

| 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 | 0.150 | 25 | 11,392 | 0.43 | 1,425 | $7,125 |
| Pervious pavements | 0.946 | 158 | 71,666 | 2.69 | 9,310 | $232,750 |

# GREEN INFRASTRUCTURE RECOMMENDATIONS


## Chinese American Bible Church

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

0 50' 100'

# THE CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS

**Subwatershed:** **Weamaconk Creek**

**Site Area:** **134,641 sq. ft.**

**Address:** **136 Wemrock Road**
**Freehold Twp., NJ 07728**

**Block and Lot:** **Block 68.01, Lot 29.03**

Downspouts on the eastern side of the building can be disconnected into a bioretention system to manage rooftop runoff. Porous asphalt can be used to replace two strips of parking spaces to allow parking lot runoff 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" |
| 41 | 55,210 | 2.7 | 27.9 | 253.5 | 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 | 0.050 | 8 | 3,807 | 0.14 | 445 | $2,225 |
| Pervious pavements | 0.667 | 112 | 50,550 | 1.90 | 6,275 | $156,875 |

# GREEN INFRASTRUCTURE RECOMMENDATIONS


## The Church of Jesus Christ of Latter-Day Saints

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

0 50' 100'

# WEST MONMOUTH BAPTIST CHURCH

**Subwatershed:** **Weamaconk Creek**

**Site Area:** **287,002 sq. ft.**

**Address:** **255 State Route 33**
**Freehold Twp., NJ 07728**

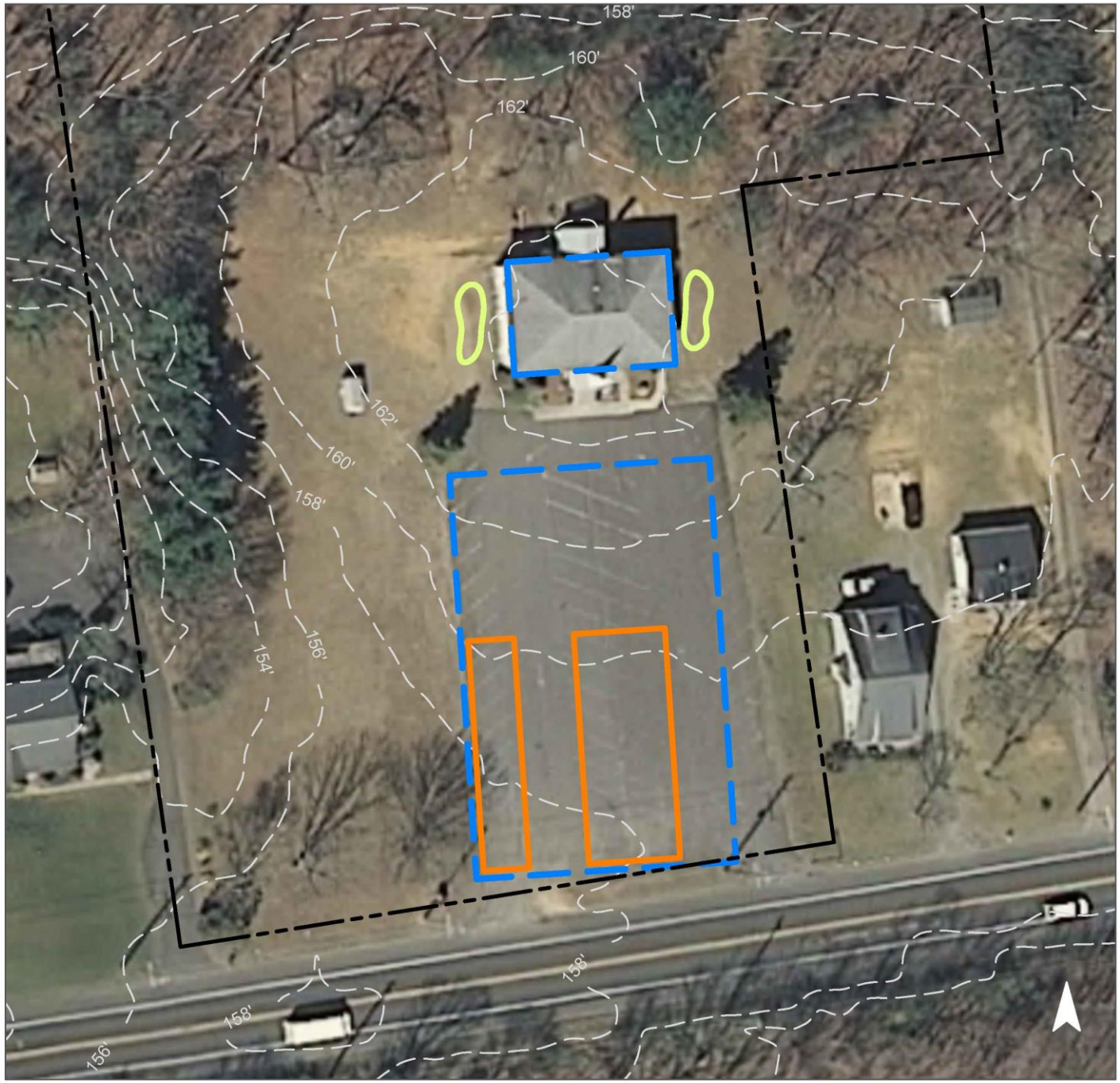
**Block and Lot:** **Block 67, Lot 31**

Downspouts along the eastern and western sides of the building can be disconnected into bioretention systems to capture, treat, and infiltrate rooftop runoff. Porous asphalt can replace existing parking spaces to allow water 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" |
| 12 | 35,867 | 1.7 | 18.1 | 164.7 | 0.028 | 0.98 |

| Recommended Green Infrastructure Practices | Recharge Potential (Mgal/yr) | TSS Removal Potential (lbs/yr) | Maximum Volume Reduction Potential (gal/storm) | Peak Discharge Reduction Potential (cu. ft./second) | Estimated Size (sq. ft.) | Estimated Cost |
|---|---|---|---|---|---|---|
| Bioretention systems | 0.073 | 12 | 5,565 | 0.21 | 485 | $2,425 |
| Pervious pavements | 0.424 | 71 | 32,104 | 1.21 | 4,890 | $122,250 |

# GREEN INFRASTRUCTURE RECOMMENDATIONS




**West Monmouth Baptist Church**

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

0 30' 60'

# ABUNDANT LIFE CHURCH OF GOD

**Subwatershed:** Yellow Brook

**Site Area:** 432,905 sq. ft.

**Address:** 632 Colts Neck Road
Freehold Twp., NJ 07728

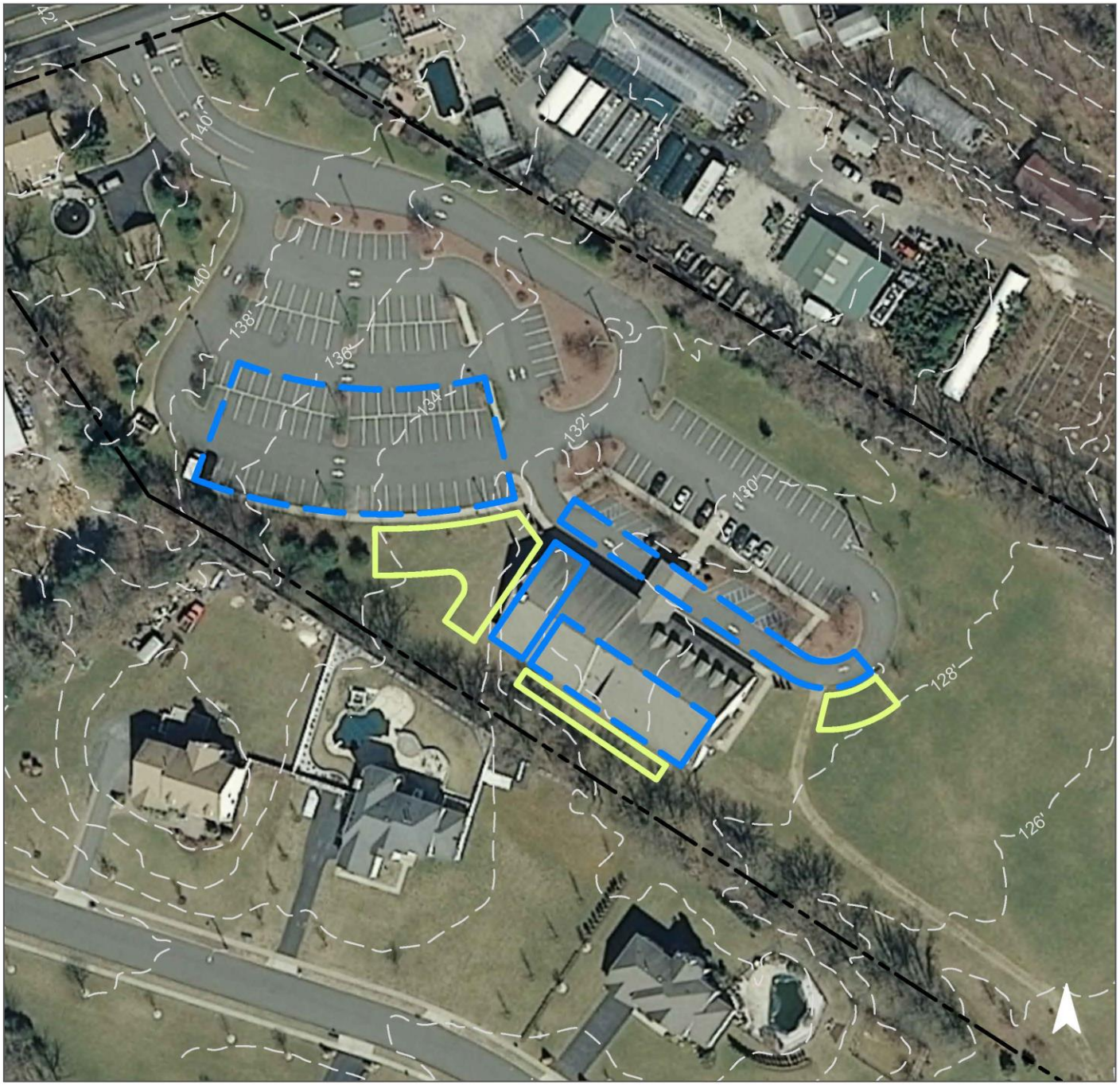
**Block and Lot:** Block 38, Lot 4

A detention basin collects runoff from the site. Several bioretention systems can be installed to capture, treat, and infiltrate parking lot and 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" |
| 25 | 107,973 | 5.2 | 54.5 | 495.7 | 0.084 | 2.96 |

| 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 |
|---|---|---|---|---|---|---|
| Bioretention systems | 0.669 | 112 | 50,684 | 1.90 | 6,705 | $33,525 |

# GREEN INFRASTRUCTURE RECOMMENDATIONS




## Abundant Life Church of God

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

0 50' 100'

# DWIGHT D. EISENHOWER MIDDLE SCHOOL

**Subwatershed:** Yellow Brook

**Site Area:** 758,607 sq. ft.

**Address:** 279 Burlington Road
Freehold Twp., NJ 07728

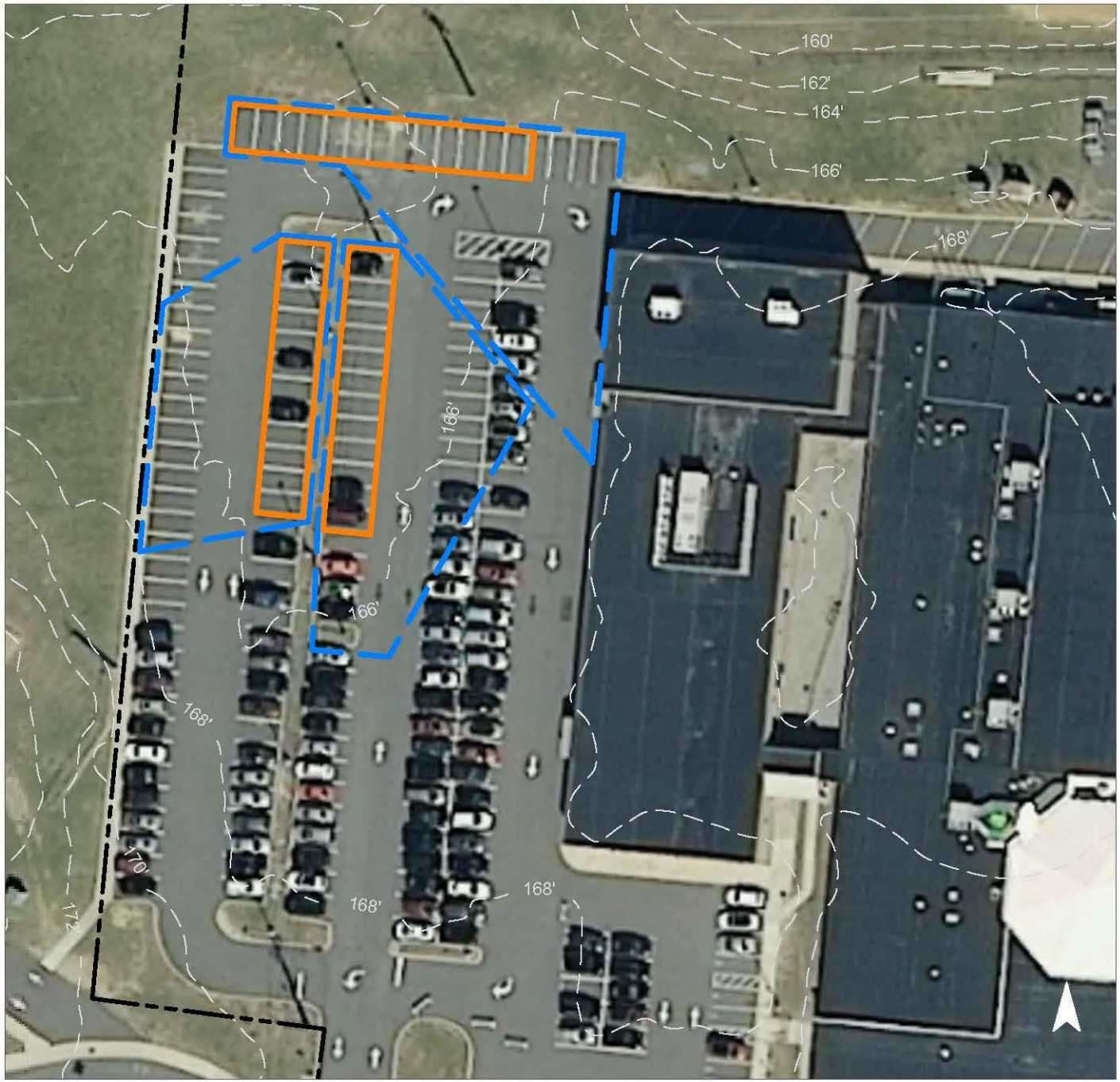
**Block and Lot:** Block 38, Lot 11.03


Porous asphalt can be installed in parking areas to capture 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" |
| 28 | 213,566 | 10.3 | 107.9 | 980.6 | 0.166 | 5.86 |

| 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 pavements | 0.651 | 109 | 49,338 | 1.85 | 6,280 | $157,000 |

# GREEN INFRASTRUCTURE RECOMMENDATIONS




## Dwight D. Eisenhower Middle School

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

0 30' 60'

# JOSEPH J. CATENA SCHOOL

**Subwatershed:** Yellow Brook

**Site Area:** 644,926 sq. ft.

**Address:** 275 Burlington Road
Freehold Twp., NJ 07728

**Block and Lot:** Block 38, Lot 10


The basketball court can be converted into porous asphalt to infiltrate stormwater. Multiple bioretention systems can also be installed to capture, treat, and infiltrate rooftop runoff by disconnecting and redirecting nearby downspouts into them. 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" |
| 34 | 219,536 | 10.6 | 110.9 | 1,008.0 | 0.171 | 6.02 |

| Recommended Green Infrastructure Practices | Recharge Potential (Mgal/yr) | TSS Removal Potential (lbs/yr) | Maximum Volume Reduction Potential (gal/storm) | Peak Discharge Reduction Potential (cu. ft./second) | Estimated Size (sq. ft.) | Estimated Cost |
|---|---|---|---|---|---|---|
| Bioretention systems | 0.527 | 88 | 39,913 | 1.50 | 4,970 | $24,850 |
| Pervious pavements | 0.229 | 38 | 17,316 | 0.65 | 2,655 | $66,375 |

# GREEN INFRASTRUCTURE RECOMMENDATIONS


## Joseph J. Catena School

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

0 50' 100'

## d. Summary of Existing Conditions

## Summary of Existing Site Conditions

| Subwatershed/Site Name/Total Site Info/GI Practice | Area (ac) | Area (SF) | Block | Lot | Existing Annual Loads TP (lb/yr) | Existing Annual Loads TN (lb/yr) | Existing Annual Loads TSS (lb/yr) | I.C. % | I.C. Area (ac) | I.C. Area (SF) | Runoff Volumes from I.C. Water Quality Storm (1.25" over 2-hours) (Mgal) | Runoff Volumes from I.C. Annual (Mgal) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **MANASQUAN RIVER SUBWATERSHED** | **188.25** | **8,200,269** | | | **145.4** | **1,522.8** | **13,843.3** | | **69.22** | **3,015,074** | **2.349** | **82.69** |
| **Freehold Independent Fire Company** | | | | | | | | | | | | |
| **Total Site Info** | 1.33 | 58,054 | 71.27 | 11 | 2.0 | 21.0 | 190.5 | 71 | 0.95 | 41,491 | 0.032 | 1.14 |
| **Freehold Township Elementary School District** | | | | | | | | | | | | |
| **Total Site Info** | 4.96 | 215,920 | 70 | 24 | 5.3 | 55.4 | 503.5 | 51 | 2.52 | 109,660 | 0.085 | 3.01 |
| **Freehold Township High School** | | | | | | | | | | | | |
| **Total Site Info** | 69.20 | 3,014,461 | 84 | 10 | 30.3 | 317.3 | 2,885.0 | 21 | 14.42 | 628,345 | 0.490 | 17.23 |
| **Freehold Township Municipal Complex** | | | | | | | | | | | | |
| **Total Site Info** | 17.51 | 762,669 | 71.27 | 10 | 14.7 | 153.8 | 1,398.4 | 40 | 6.99 | 304,576 | 0.237 | 8.35 |
| **Hope Lutheran Church** | | | | | | | | | | | | |
| **Total Site Info** | 4.27 | 185,885 | 84 | 1.01 | 3.5 | 36.4 | 330.5 | 39 | 1.65 | 71,983 | 0.056 | 1.97 |
| **Monmouth County Vocational Tech District** | | | | | | | | | | | | |
| **Total Site Info** | 45.68 | 1,989,607 | 41 | 11 | 36.0 | 377.5 | 3,431.7 | 38 | 17.16 | 747,427 | 0.582 | 20.50 |
| **St. Robert Bellarmine Church & Providence Academy** | | | | | | | | | | | | |
| **Total Site Info** | 18.37 | 800,140 | 84 | 17 | 13.4 | 140.0 | 1,272.5 | 35 | 6.36 | 277,149 | 0.216 | 7.60 |
| **The Goddard School** | | | | | | | | | | | | |
| **Total Site Info** | 2.03 | 88,464 | 70 | 35 | 2.0 | 21.1 | 191.7 | 47 | 0.96 | 41,745 | 0.033 | 1.14 |
| **US Post Office** | | | | | | | | | | | | |
| **Total Site Info** | 24.91 | 1,085,069 | 86 | 12 | 38.2 | 400.4 | 3,639.6 | 73 | 18.20 | 792,698 | 0.618 | 21.74 |
| **MCGELLAIRDS BROOK SUBWATERSHED** | **16.22** | **706,595** | | | **9.6** | **101.0** | **918.1** | | **4.59** | **199,954** | **0.156** | **5.48** |
| **C. Richard Applegate Elementary School** | | | | | | | | | | | | |
| **Total Site Info** | 15.88 | 691,567 | 8 | 16.01 | 9.5 | 99.5 | 904.3 | 28 | 4.52 | 196,948 | 0.153 | 5.40 |
| **Evangelical Baptist Church** | | | | | | | | | | | | |
| **Total Site Info** | 0.34 | 15,028 | 6 | 1 | 0.1 | 1.5 | 13.8 | 20 | 0.07 | 3,006 | 0.002 | 0.08 |

## 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) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **METEDECONK RIVER NORTH BRANCH SUBWATERSHED** | **2.05** | **89,149** | | | **2.1** | **22.5** | **204.5** | | **1.02** | **44,535** | **0.035** | **1.22** |
| **First Assembly of God** | | | | | | | | | | | | |
| **Total Site Info** | 1.30 | 56,530 | 97.09 | 52 | 1.8 | 19.2 | 174.7 | 67 | 0.87 | 38,057 | 0.030 | 1.04 |
| **Siloam United Methodist Church** | | | | | | | | | | | | |
| **Total Site Info** | 0.75 | 32,619 | 112 | 3 | 0.3 | 3.3 | 29.7 | 20 | 0.15 | 6,478 | 0.005 | 0.18 |
| **WEAMACONK CREEK SUBWATERSHED** | **11.55** | **503,142** | | | **7.6** | **79.3** | **720.8** | | **3.60** | **156,991** | **0.122** | **4.31** |
| **Chinese American Bible Church** | | | | | | | | | | | | |
| **Total Site Info** | 1.87 | 81,499 | 69 | 36.08 | 3.2 | 33.3 | 302.6 | 81 | 1.51 | 65,914 | 0.051 | 1.81 |
| **The Church of Jesus Christ of Latter-day Saints** | | | | | | | | | | | | |
| **Total Site Info** | 3.09 | 134,641 | 68.01 | 29.03 | 2.7 | 27.9 | 253.5 | 41 | 1.27 | 55,210 | 0.043 | 1.51 |
| **West Monmouth Baptist Church** | | | | | | | | | | | | |
| **Total Site Info** | 6.59 | 287,002 | 67 | 31 | 1.7 | 18.1 | 164.7 | 12 | 0.82 | 35,867 | 0.028 | 0.98 |
| **YELLOW BROOK SUBWATERSHED** | **42.16** | **1,836,438** | | | **26.1** | **273.3** | **2,484.3** | | **12.42** | **541,075** | **0.422** | **14.84** |
| **Abundant Life Church of God** | | | | | | | | | | | | |
| **Total Site Info** | 9.94 | 432,905 | 38 | 4 | 5.2 | 54.5 | 495.7 | 25 | 2.48 | 107,973 | 0.084 | 2.96 |
| **Dwight D. Eisenhower Middle School** | | | | | | | | | | | | |
| **Total Site Info** | 17.42 | 758,607 | 38 | 11.03 | 10.3 | 107.9 | 980.6 | 28 | 4.90 | 213,566 | 0.166 | 5.86 |
| **Joseph J. Catena School** | | | | | | | | | | | | |
| **Total Site Info** | 14.81 | 644,926 | 38 | 10 | 10.6 | 110.9 | 1,008.0 | 34 | 5.04 | 219,536 | 0.171 | 6.02 |

# e. Summary of Proposed Green Infrastructure Practices

## Summary of Proposed Green Infrastructure Practices

| | Subwatershed/Site Name/Total Site Info/GI Practice | Potential Management Area | | Recharge Potential (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) | | | | | | | | | |
| | **MANASQUAN RIVER SUBWATERSHED** | **377,871** | **8.67** | **9.846** | **1,648** | **745,905** | **27.99** | **100,020** | | | **$2,303,400** | **12.5%** |
| 1 | **Freehold Independent Fire Company** | | | | | | | | | | | |
| | Bioretention systems/ rain gardens | 2,010 | 0.05 | 0.052 | 9 | 3,964 | 0.15 | 610 | 5 | SF | $3,050 | 4.8% |
| | Pervious pavements | 16,496 | 0.38 | 0.430 | 72 | 32,560 | 1.22 | 4,510 | 25 | SF | $112,750 | 39.8% |
| | **Total Site Info** | **18,506** | **0.42** | **0.482** | **81** | **36,524** | **1.37** | **5,120** | | | **$115,800** | **44.6%** |
| 2 | **Freehold Township Elementary School District** | | | | | | | | | | | |
| | Bioretention systems/ rain gardens | 3,368 | 0.08 | 0.088 | 15 | 6,650 | 0.25 | 890 | 5 | SF | $4,450 | 3.1% |
| | Pervious pavements | 6,262 | 0.14 | 0.163 | 27 | 12,364 | 0.46 | 3,470 | 25 | SF | $86,750 | 5.7% |
| | **Total Site Info** | **9,630** | **0.22** | **0.251** | **42** | **19,014** | **0.71** | **4,360** | | | **$91,200** | **8.8%** |
| 3 | **Freehold Township High School** | | | | | | | | | | | |
| | Bioretention systems/ rain gardens | 6,353 | 0.15 | 0.166 | 28 | 12,544 | 0.47 | 750 | 5 | SF | $3,750 | 0.1% |
| | Pervious pavements | 47,122 | 1.08 | 1.228 | 206 | 93,014 | 3.49 | 14,685 | 25 | SF | $367,125 | 2.3% |
| | **Total Site Info** | **53,475** | **1.23** | **1.393** | **233** | **105,558** | **3.96** | **15,435** | | | **$370,875** | **2.5%** |
| 4 | **Freehold Township Municipal Complex** | | | | | | | | | | | |
| | Bioretention systems/ rain gardens | 26,338 | 0.60 | 0.686 | 115 | 51,993 | 1.95 | 6,835 | 5 | SF | $34,175 | 2.2% |
| | Pervious pavements | 15,845 | 0.36 | 0.413 | 69 | 31,274 | 1.17 | 3,980 | 25 | SF | $99,500 | 1.3% |
| | **Total Site Info** | **42,183** | **0.97** | **1.099** | **184** | **83,267** | **3.12** | **10,815** | | | **$133,675** | **3.6%** |
| 5 | **Hope Lutheran Church** | | | | | | | | | | | |
| | Bioretention systems/ rain gardens | 1,190 | 0.03 | 0.031 | 5 | 2,349 | 0.09 | 355 | 5 | SF | $1,775 | 1.7% |
| | Pervious pavements | 25,595 | 0.59 | 0.667 | 112 | 50,527 | 1.90 | 6,690 | 25 | SF | $167,250 | 35.6% |
| | **Total Site Info** | **26,785** | **0.61** | **0.698** | **117** | **52,876** | **1.99** | **7,045** | | | **$169,025** | **37.2%** |
| 6 | **Monmouth County Vocational School** | | | | | | | | | | | |
| | Pervious pavements | 117,002 | 2.69 | 3.049 | 510 | 230,960 | 8.67 | 21,990 | 25 | SF | $549,750 | 15.7% |
| | **Total Site Info** | **117,002** | **2.69** | **3.049** | **510** | **230,960** | **8.67** | **21,990** | | | **$549,750** | **15.7%** |
| 7 | **Saint Robert Bellarmine Church and Providence Academy** | | | | | | | | | | | |
| | Pervious pavements | 55,399 | 1.27 | 1.443 | 242 | 109,358 | 4.10 | 21,435 | 25 | SF | $535,875 | 20.0% |
| | **Total Site Info** | **55,399** | **1.27** | **1.443** | **242** | **109,358** | **4.10** | **21,435** | | | **$535,875** | **20.0%** |

**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 % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | **The Goddard School** | | | | | | | | | | | |
| | Pervious pavements | 6,417 | 0.15 | 0.167 | 28 | 12,664 | 0.48 | 1,335 | 25 | SF | $33,375 | 15.4% |
| | **Total Site Info** | **6,417** | **0.15** | **0.167** | **28** | **12,664** | **0.48** | **1,335** | | | **$33,375** | **15.4%** |
| 9 | **US Post Office** | | | | | | | | | | | |
| | Bioretention systems/ rain gardens | 2,078 | 0.05 | 0.054 | 9 | 4,099 | 0.15 | 415 | 5 | SF | $2,075 | 0.3% |
| | Pervious pavements | 46,396 | 1.07 | 1.209 | 202 | 91,585 | 3.44 | 12,070 | 25 | SF | $301,750 | 5.9% |
| | **Total Site Info** | **48,474** | **1.11** | **1.263** | **211** | **95,684** | **3.59** | **12,485** | | | **$303,825** | **6.1%** |
| | **MCGELLAIRDS BROOK SUBWATERSHED** | **35,586** | **0.82** | **0.927** | **155** | **70,245** | **2.64** | **11,155** | | | **$222,475** | **17.8%** |
| 10 | **C. Richard Applegate Elementary School** | | | | | | | | | | | |
| | Bioretention systems/ rain gardens | 9,975 | 0.23 | 0.260 | 44 | 19,687 | 0.74 | 2,705 | 5 | SF | $13,525 | 5.1% |
| | Pervious pavements | 24,801 | 0.57 | 0.646 | 108 | 48,957 | 1.84 | 8,335 | 25 | SF | $208,375 | 12.6% |
| | **Total Site Info** | **34,776** | **0.80** | **0.906** | **152** | **68,644** | **2.58** | **11,040** | | | **$221,900** | **17.7%** |
| 11 | **Evangelical Baptist Church** | | | | | | | | | | | |
| | Bioretention systems/ rain gardens | 810 | 0.02 | 0.021 | 4 | 1,601 | 0.06 | 115 | 5 | SF | $575 | 26.9% |
| | **Total Site Info** | **810** | **0.02** | **0.021** | **4** | **1,601** | **0.06** | **115** | | | **$575** | **26.9%** |
| | **METEDECONK RIVER NORTH BRANCH SUBWATERSHED** | **20,231** | **0.46** | **0.527** | **88** | **39,935** | **1.50** | **4,280** | | | **$100,700** | **45.4%** |
| 12 | **First Assembly of God** | | | | | | | | | | | |
| | Pervious pavements | 18,501 | 0.42 | 0.482 | 81 | 36,517 | 1.37 | 3,965 | 25 | SF | $99,125 | 48.6% |
| | **Total Site Info** | **18,501** | **0.42** | **0.482** | **81** | **36,517** | **1.37** | **3,965** | | | **$99,125** | **48.6%** |
| 13 | **Siloam United Methodist Church** | | | | | | | | | | | |
| | Bioretention systems/ rain gardens | 1,730 | 0.04 | 0.045 | 8 | 3,418 | 0.13 | 315 | 5 | SF | $1,575 | 26.7% |
| | **Total Site Info** | **1,730** | **0.04** | **0.045** | **8** | **3,418** | **0.13** | **315** | | | **$1,575** | **26.7%** |

## 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 (SF) | Unit Cost ($) | Unit | Total Cost ($) | I.C. Treated % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Area (SF) | Area (ac) | | | | | | | | | |
| | **WEAMACONK CREEK SUBWATERSHED** | **88,701** | **2.04** | **2.311** | **387** | **175,084** | **6.58** | **22,830** | | | **$523,650** | **56.5%** |
| 14 | **Chinese American Bible Church** | | | | | | | | | | | |
| | Bioretention systems/ rain gardens | 5,770 | 0.13 | 0.150 | 25 | 11,392 | 0.43 | 1,425 | 5 | SF | $7,125 | 8.8% |
| | Pervious pavements | 36,307 | 0.83 | 0.946 | 158 | 71,666 | 2.69 | 9,310 | 25 | SF | $232,750 | 55.1% |
| | **Total Site Info** | **42,077** | **0.97** | **1.096** | **184** | **83,058** | **3.12** | **10,735** | | | **$239,875** | **63.8%** |
| 15 | **The Church of Jesus Christ of Latter-Day Saints** | | | | | | | | | | | |
| | Bioretention systems/ rain gardens | 1,930 | 0.04 | 0.050 | 8 | 3,807 | 0.14 | 445 | 5 | SF | $2,225 | 3.5% |
| | Pervious pavements | 25,610 | 0.59 | 0.667 | 112 | 50,550 | 1.90 | 6,275 | 25 | SF | $156,875 | 46.4% |
| | **Total Site Info** | **27,540** | **0.63** | **0.718** | **120** | **54,357** | **2.04** | **6,720** | | | **$159,100** | **49.9%** |
| 16 | **West Monmouth Baptist Church** | | | | | | | | | | | |
| | Bioretention systems/ rain gardens | 2,820 | 0.06 | 0.073 | 12 | 5,565 | 0.21 | 485 | 5 | SF | $2,425 | 7.9% |
| | Pervious pavements | 16,264 | 0.37 | 0.424 | 71 | 32,104 | 1.21 | 4,890 | 25 | SF | $122,250 | 45.3% |
| | **Total Site Info** | **19,084** | **0.44** | **0.497** | **83** | **37,669** | **1.42** | **5,375** | | | **$124,675** | **53.2%** |
| | **YELLOW BROOK SUBWATERSHED** | **79,662** | **1.83** | **2.076** | **347** | **157,251** | **5.90** | **20,610** | | | **$281,750** | **14.7%** |
| 17 | **Abundant Life Church of God** | | | | | | | | | | | |
| | Bioretention systems/ rain gardens | 25,675 | 0.59 | 0.669 | 112 | 50,684 | 1.90 | 6,705 | 5 | SF | $33,525 | 23.8% |
| | **Total Site Info** | **25,675** | **0.59** | **0.669** | **112** | **50,684** | **1.90** | **6,705** | | | **$33,525** | **23.8%** |
| 18 | **Dwight D. Eisenhower Middle School** | | | | | | | | | | | |
| | Pervious pavements | 24,996 | 0.57 | 0.651 | 109 | 49,338 | 1.85 | 6,280 | 25 | SF | $157,000 | 11.7% |
| | **Total Site Info** | **24,996** | **0.57** | **0.651** | **109** | **49,338** | **1.85** | **6,280** | | | **$157,000** | **11.7%** |
| 19 | **Joseph J. Catena School** | | | | | | | | | | | |
| | Bioretention systems/ rain gardens | 20,220 | 0.46 | 0.527 | 88 | 39,913 | 1.50 | 4,970 | 5 | SF | $24,850 | 9.2% |
| | Pervious pavements | 8,771 | 0.20 | 0.229 | 38 | 17,316 | 0.65 | 2,655 | 25 | SF | $66,375 | 4.0% |
| | **Total Site Info** | **28,991** | **0.67** | **0.755** | **126** | **57,229** | **2.15** | **7,625** | | | **$91,225** | **13.2%** |