# Impervious Cover Reduction Action Plan
# for
# The Town of Hammonton, Atlantic County, New Jersey

*Prepared for the Town of Hammonton by the*
*Rutgers Cooperative Extension Water Resources Program*

December 9, 2016

*Funding provided by: New Jersey Future, Geraldine R. Dodge Foundation and New Jersey Agricultural Experiment Station

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## Introduction

Located in Atlantic County in southern New Jersey, the Town of Hammonton covers approximately 41.3 square miles northeast of Vineland City. Figures 1 and 2 illustrate that the Town of Hammonton is dominated by wetland land uses. A total of 19.1% of the municipality's land use is classified as urban. Of the urban land in the Town of Hammonton, rural residential is the dominant urban 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 the Town of Hammonton 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 the Town of Hammonton. Based upon the 2007 NJDEP land use/land cover data, approximately 5.2% of the Town of Hammonton has impervious cover. This level of impervious cover suggests that the streams in the Town of Hammonton are likely sensitive streams.[1]

## Methodology

The Town of Hammonton contains portions of six 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

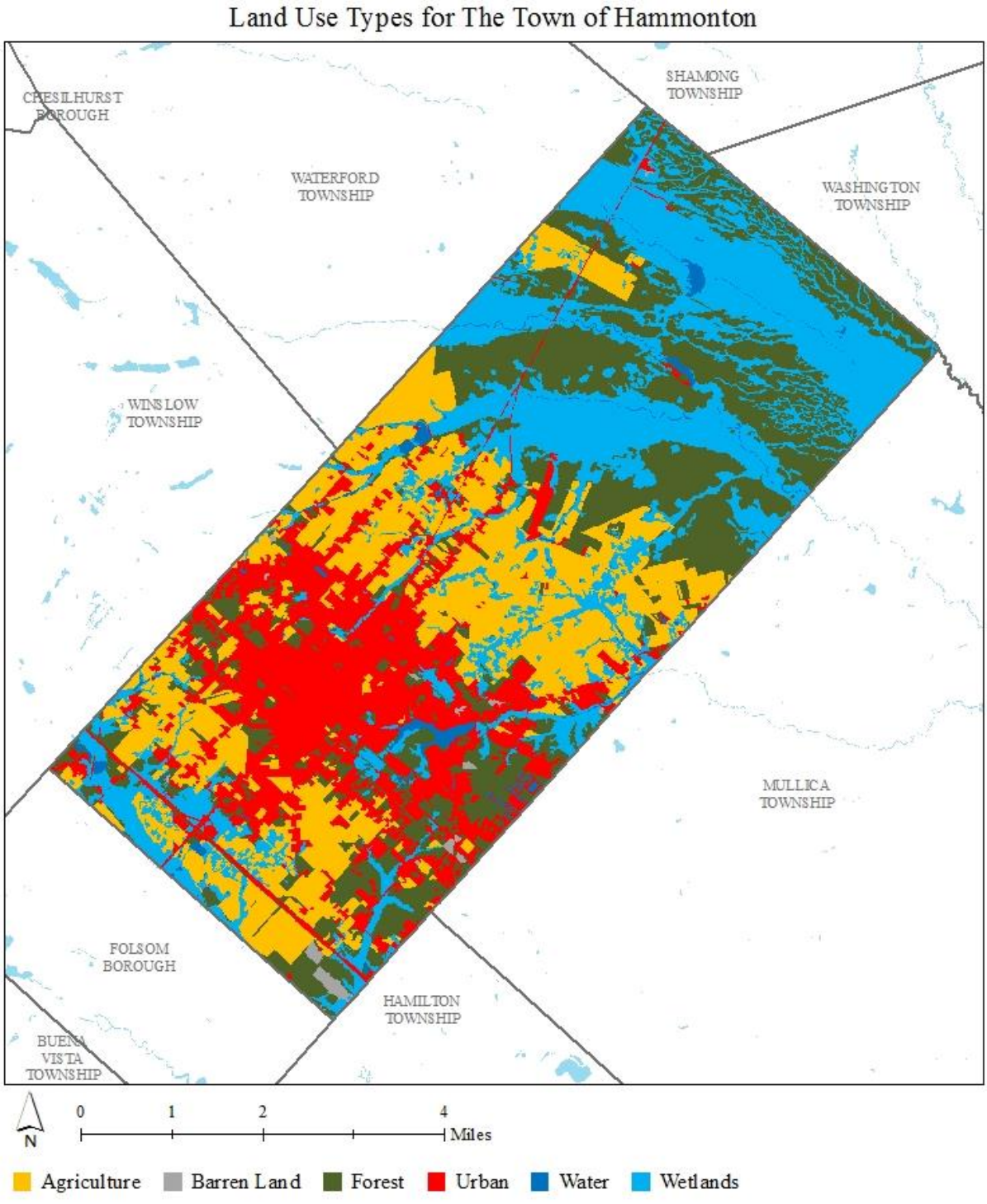



Figure 4: Map illustrating the land use in the Town of Hammonton

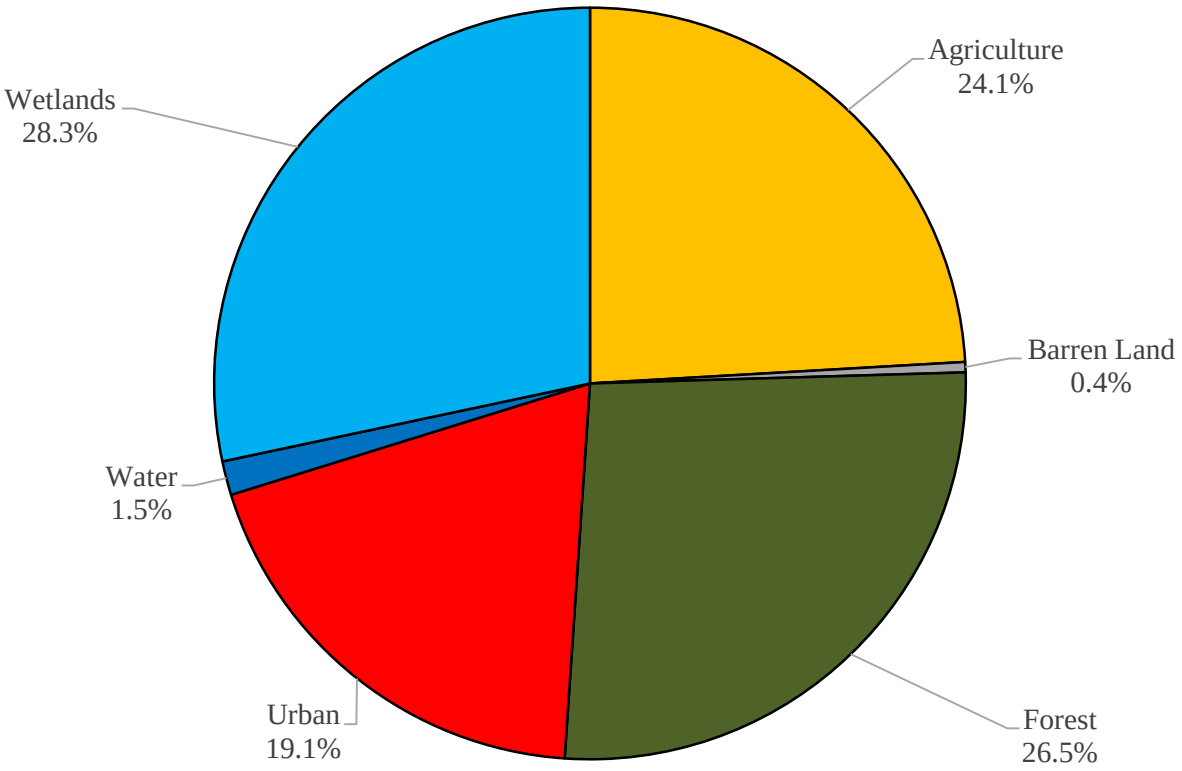



Figure 3: Pie chart illustrating the land use in the Town of Hammonton

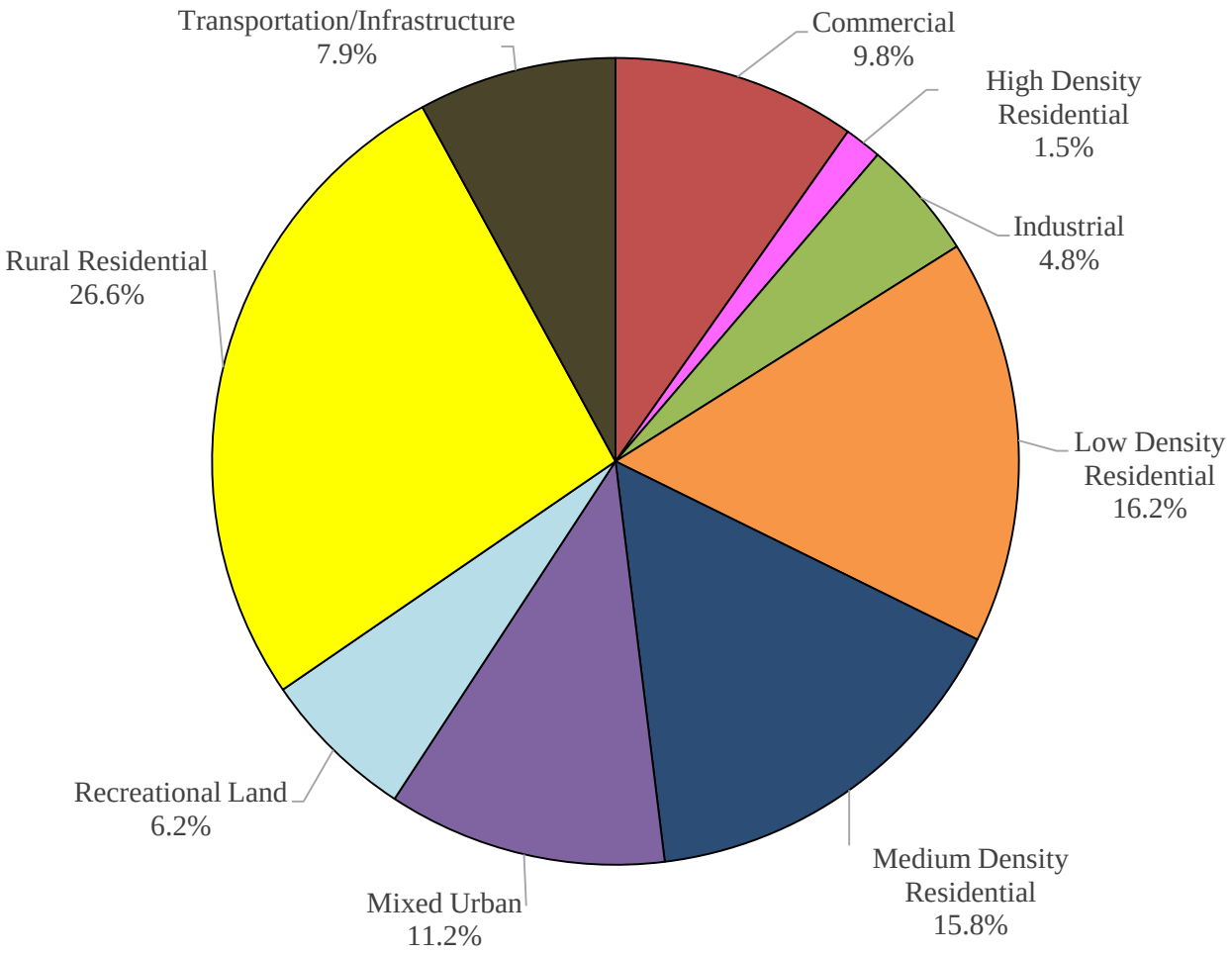



Figure 5: Pie chart illustrating the various types of urban land use in the Town of Hammonton

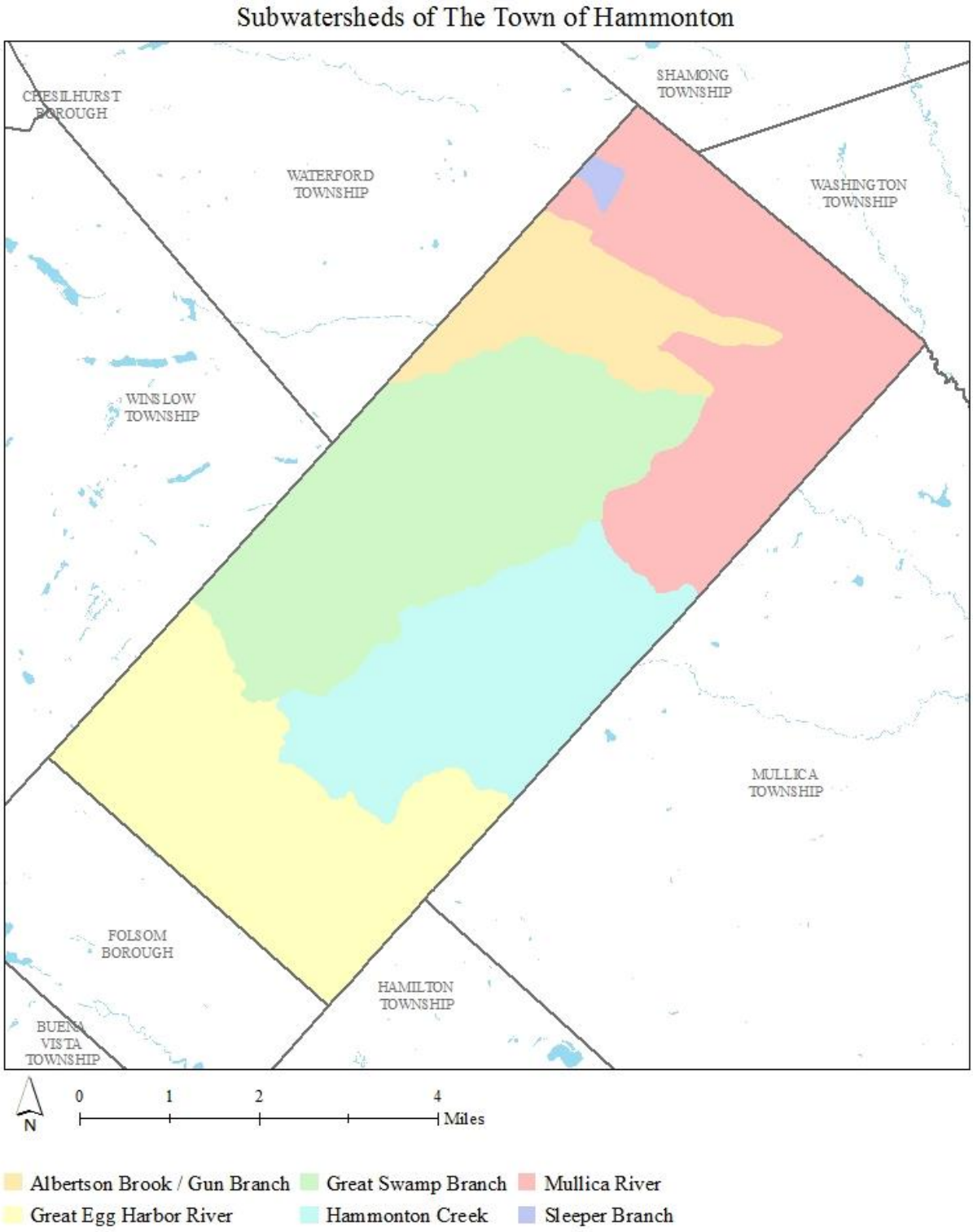



Figure 6: Map of the subwatersheds in the Town of Hammonton

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 Hammonton 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 Hammonton. Each practice is discussed below.

### *Disconnected downspouts*

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

### *Pervious pavements*

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




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

***Bioretention systems/rain gardens***

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

***Downspout planter boxes***

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

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

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

***Bioswale***

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

***Stormwater planters***

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

***Tree filter boxes***

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

**Potential Project Sites**

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

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

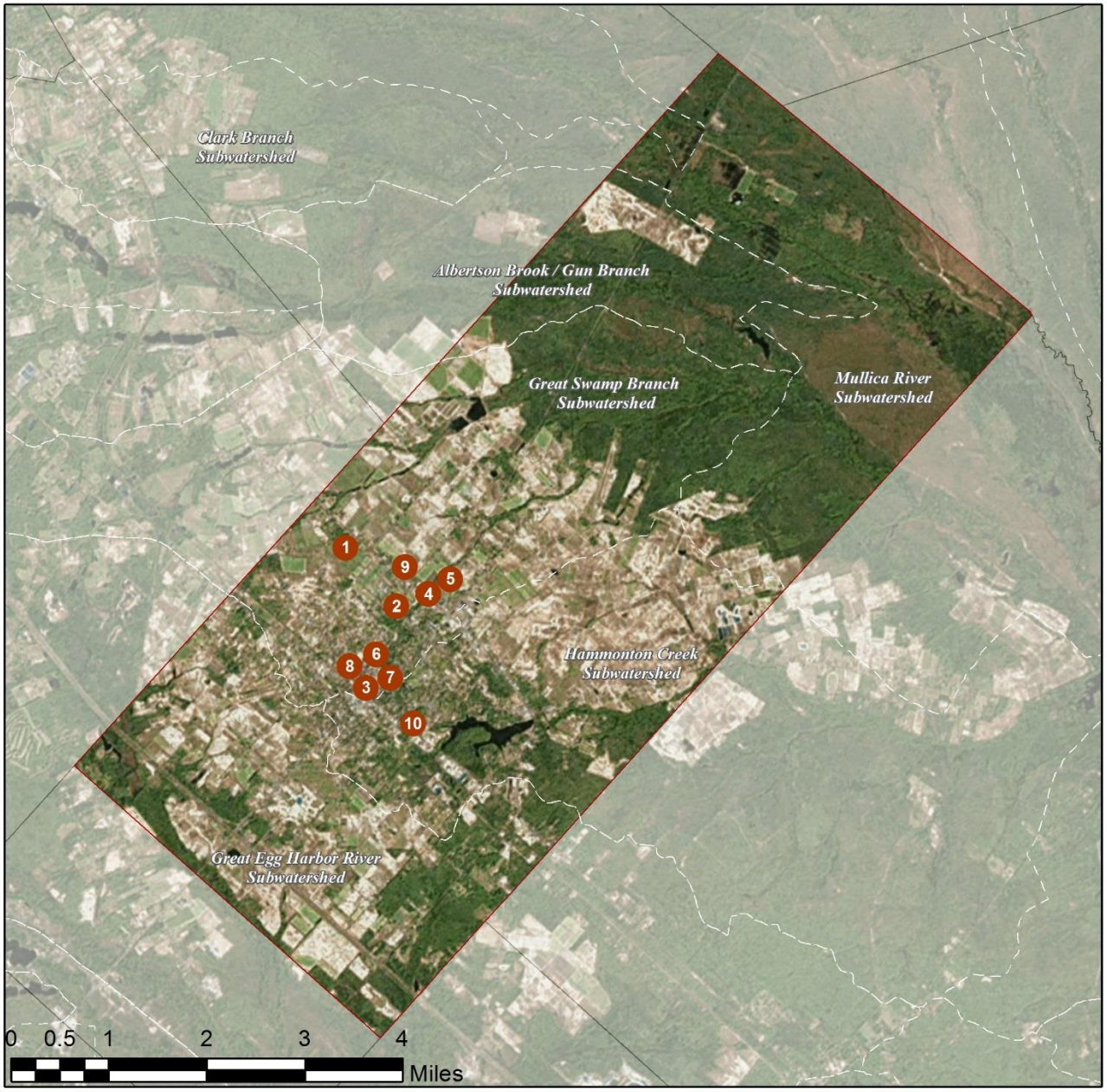
## Conclusion

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

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

## a. Green Infrastructure Sites

# HAMMONTON: GREEN INFRASTRUCTURE SITES




**SITES WITHIN THE GREAT SWAMP BRANCH SUBWATERSHED:**

1. Hammonton High School
2. Hammonton Middle School
3. Hammonton Post Office
4. Hammonton Volunteer Fire Company No. 2
5. Heritage Assisted Living
6. Presbyterian Church USA
7. St. Joseph Catholic School
8. St. Joseph Regional Elementary and Preschool
9. Tomasello Winery and Banquet Hall

**SITES WITHIN THE HAMMONTON CREEK SUBWATERSHED:**

10. Atlantic County Library of West Hammonton

# b. Proposed Green Infrastructure Concepts

# HAMMONTON HIGH SCHOOL

**Subwatershed:** Great Swamp Branch

**Site Area:** 5,050,221 sq. ft.

**Address:** 566 Old Forks Road
Hammonton, NJ 08037

**Block and Lot:** Block 2301, Lot 43,45,46

Downspouts around the building can be disconnected and redirected to rain gardens to capture, treat, and infiltrate roof runoff. Sections of parking spaces in the two parking lots can be converted to porous asphalt to capture and infiltrate 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" |
| 12 | 606,360 | 29.2 | 306.2 | 2,784.0 | 0.472 | 16.63 |

| 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 | 0.627 | 105 | 45,912 | 4.02 | 7,365 | $30,090 |
| Pervious pavement | 1.075 | 180 | 148,269 | 1.25 | 6,018 | $184,125 |

# GREEN INFRASTRUCTURE RECOMMENDATIONS


## Hammonton High School

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

0 100' 200'

# HAMMONTON MIDDLE SCHOOL

**Subwatershed:** Great Swamp Branch

**Site Area:** 1,930,653 sq. ft.

**Address:** 75 North Liberty Street
Hammonton, NJ 08037

**Block and Lot:** Block 3505, Lot 8,9

A rain garden can be installed into the south perimeter of the building to capture, treat, and infiltrate runoff from three downspouts to be disconnected. Two sections of parking spaces can be converted to porous asphalt to capture and infiltrate 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" |
| 22 | 428,437 | 20.7 | 216.4 | 1,967.1 | 0.334 | 11.75 |

| 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 | 0.096 | 16 | 7,031 | 0.26 | 920 | $4,600 |
| Pervious pavement | 1.610 | 270 | 118,072 | 4.44 | 11,035 | $275,875 |

# GREEN INFRASTRUCTURE RECOMMENDATIONS


## Hammonton Middle School

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

0 100' 200'

# HAMMONTON POST OFFICE

**Subwatershed:** Great Swamp Branch

**Site Area:** 35,077 sq. ft.

**Address:** 114 South 3rd Street
Hammonton, NJ 08037

**Block and Lot:** Block 2811, Lot 8

Three downspouts can be disconnected and redirected to two separate rain gardens. The rain gardens can be installed on the lawn surrounding the building. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

| Impervious Cover | | Existing Loads from Impervious Cover (lbs/yr) | | | Runoff Volume from Impervious Cover (Mgal) | |
|---|---|---|---|---|---|---|
| % | sq. ft. | TP | TN | TSS | For the 1.25" Water Quality Storm | For an Annual Rainfall of 44" |
| 95 | 33,324 | 1.6 | 16.8 | 153.0 | 0.026 | 0.91 |

| Recommended Green Infrastructure Practices | Recharge Potential (Mgal/yr) | TSS Removal Potential (lbs/yr) | Maximum Volume Reduction Potential (gal/storm) | Peak Discharge Reduction Potential (cu. ft./second) | Estimated Size (sq. ft.) | Estimated Cost |
|---|---|---|---|---|---|---|
| Bioretention systems | 0.027 | 4 | 1,952 | 0.07 | 210 | $1,050 |

# GREEN INFRASTRUCTURE RECOMMENDATIONS


**Hammonton Post Office**

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

0 20' 40'

# HAMMONTON VOLUNTEER FIRE COMPANY NO. 2

**Subwatershed:** Great Swamp Branch

**Site Area:** 90,612 sq. ft.

**Address:** 52 North White Horse Pike
Hammonton, NJ 08037

**Block and Lot:** Block 4601, Lot 27


Stormwater currently runs off the site into a stream along the north edge of the property. Installing a cistern to catch runoff from the south end of the roof will help to reduce pollution in the stream and can be used to wash the fire trucks. Porous asphalt can be installed to capture and infiltrate runoff from the parking lot. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

| Impervious Cover | | Existing Loads from Impervious Cover (lbs/yr) | | | Runoff Volume from Impervious Cover (Mgal) | |
|---|---|---|---|---|---|---|
| % | sq. ft. | TP | TN | TSS | For the 1.25" Water Quality Storm | For an Annual Rainfall of 44" |
| 61 | 55,154 | 2.7 | 27.9 | 253.2 | 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 |
|---|---|---|---|---|---|---|
| Pervious pavement | 0.332 | 56 | 8,213 | 0.85 | 2,275 | $56,875 |
| Rainwater harvesting | 0.117 | 20 | 2,902 | 0.30 | 3,000 (gal) | $6,000 |

# GREEN INFRASTRUCTURE RECOMMENDATIONS


## Hammonton Volunteer Fire Company No. 2

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

0 50' 100'

# HERITAGE ASSISTED LIVING

**Subwatershed:** Great Swamp Branch

**Site Area:** 201,299 sq. ft.

**Address:** 45 US 206
Hammonton, NJ 08037

**Block and Lot:** Block 4601, Lot 26.01

Connected downspouts around the building can be disconnected and redirected to rain gardens which will capture, treat, and infiltrate runoff from the roof. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

| Impervious Cover | | Existing Loads from Impervious Cover (lbs/yr) | | | Runoff Volume from Impervious Cover (Mgal) | |
|---|---|---|---|---|---|---|
| % | sq. ft. | TP | TN | TSS | For the 1.25" Water Quality Storm | For an Annual Rainfall of 44" |
| 49 | 99,473 | 4.8 | 50.2 | 456.7 | 0.078 | 2.73 |

| 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 | 0.323 | 54 | 7,989 | 0.82 | 3,100 | $15,500 |

# GREEN INFRASTRUCTURE RECOMMENDATIONS


## Heritage Assisted Living

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

0 50' 100'

# PRESBYTERIAN CHURCH USA

**Subwatershed:** Great Swamp Branch

**Site Area:** 27,087 sq. ft.

**Address:** 326 Bellevue Avenue
Hammonton, NJ 08037

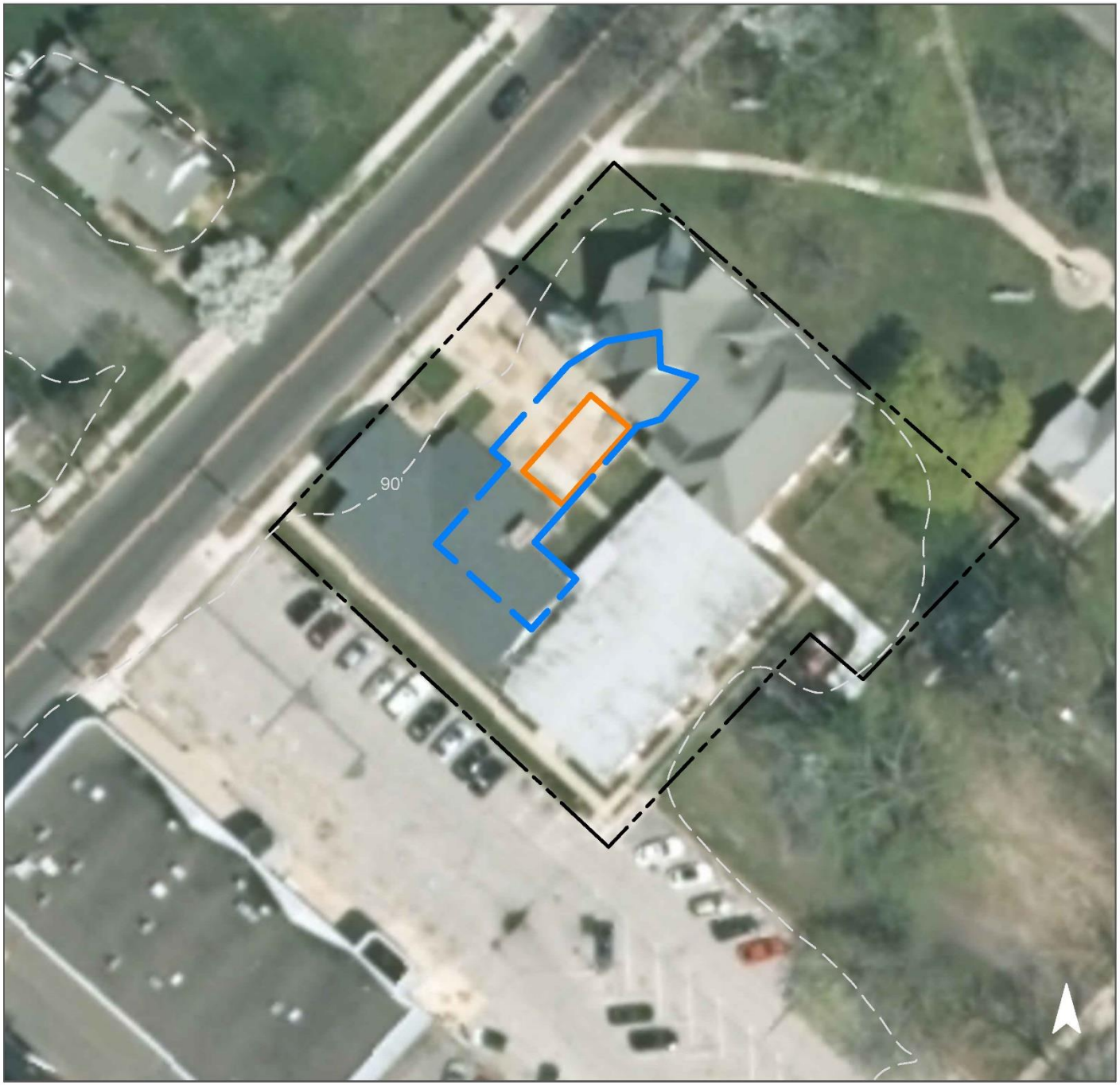
**Block and Lot:** Block 3201, Lot 3

The concrete in the central area of the property can be converted to grass pavers to capture, treat, and infiltrate runoff from the roof. 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" |
| 82 | 22,219 | 1.1 | 11.2 | 102.0 | 0.017 | 0.61 |

| 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 | 0.080 | 13 | 1,967 | 0.20 | 550 | $13,750 |

# GREEN INFRASTRUCTURE RECOMMENDATIONS




**Prebysterian Church USA**

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

0 25' 50'

# ST. JOSEPH'S CATHOLIC SCHOOL

**Subwatershed:** Great Swamp Branch

**Site Area:** 327,615 sq. ft.

**Address:** 328 Vine Street
Hammonton, NJ 08037

**Block and Lot:** Block 34, Lot 19


A section of sidewalk can be converted to grass pavers to infiltrate runoff from the roof. A rain garden can be installed at the south corner of the property to capture, treat, and infiltrate runoff from the roof. Two sections of porous asphalt can be installed in the parking lot 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" |
| 47 | 153,907 | 7.4 | 77.7 | 706.6 | 0.120 | 4.22 |

| 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 |
|---|---|---|---|---|---|---|
| Bioretention system | 0.066 | 11 | 4,855 | 0.18 | 635 | $3,175 |
| Pervious pavement | 1.070 | 179 | 78,413 | 2.48 | 7,335 | $183,375 |

# GREEN INFRASTRUCTURE RECOMMENDATIONS


## St. Joseph's Catholic School

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

0 50' 100'

# ST. JOSEPH REGIONAL ELEMENTARY AND PRESCHOOL

**Subwatershed:** Great Swamp Branch

**Site Area:** 75,907 sq. ft.

**Address:** 133 North 3rd Street
Hammonton, NJ 08037

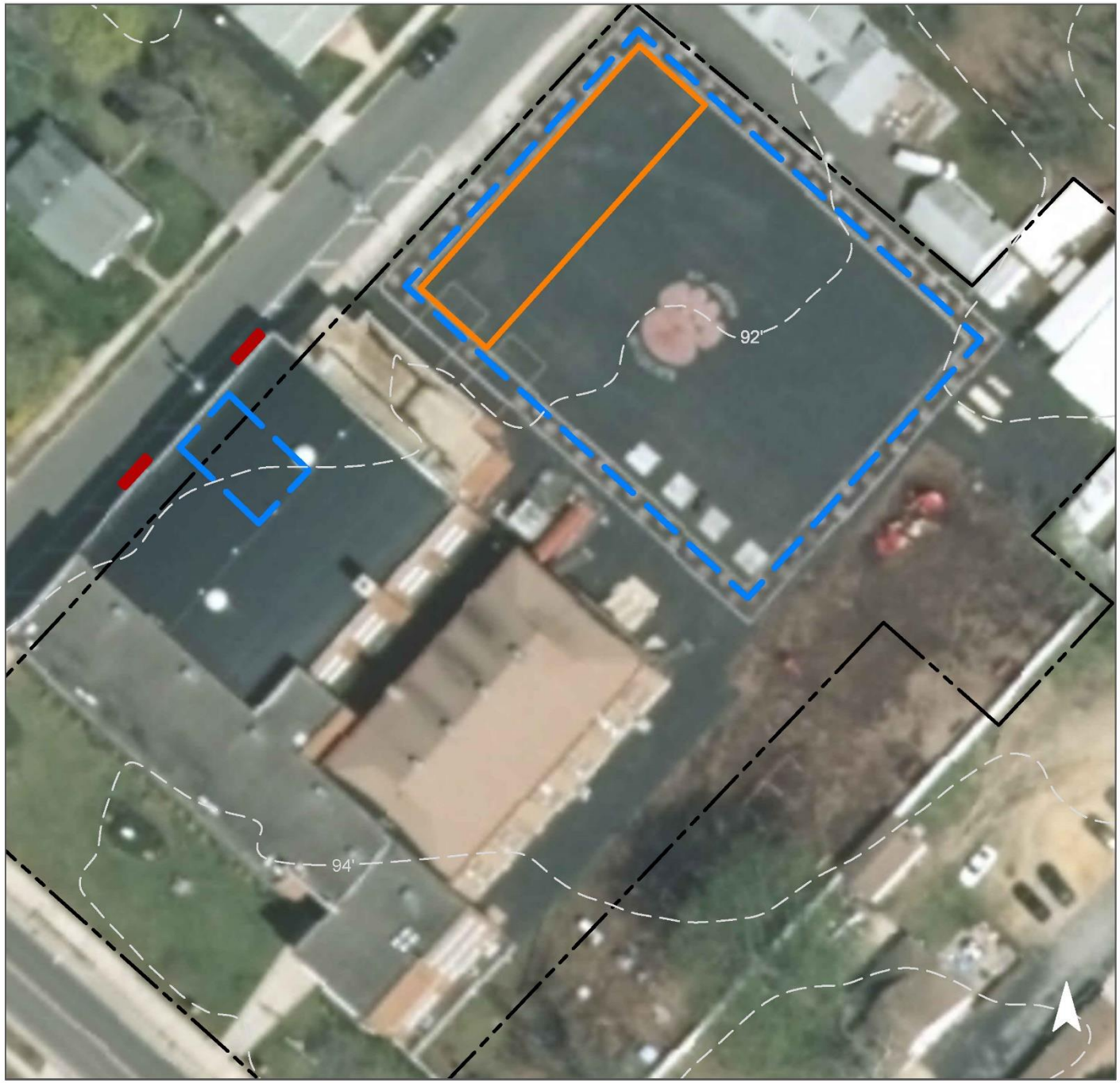
**Block and Lot:** Block 2816, Lot 1

Four downspout planter boxes can be installed at two downspouts at the entrance of the building to capture and treat runoff from the roof. The blacktop on the north end of the building can be replaced with porous asphalt to capture and treat 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" |
| 73 | 55,583 | 2.7 | 28.1 | 255.2 | 0.043 | 1.52 |

| Recommended Green Infrastructure Practices | Recharge Potential (Mgal/yr) | TSS Removal Potential (lbs/yr) | Maximum Volume Reduction Potential (gal/storm) | Peak Discharge Reduction Potential (cu. ft./second) | Estimated Size (sq. ft.) | Estimated Cost |
|---|---|---|---|---|---|---|
| Pervious pavement | 0.449 | 75 | 11,100 | 1.14 | 3,075 | $76,875 |
| Planter boxes | 0.022 | 4 | n/a | n/a | 48 | $4,000 |

# GREEN INFRASTRUCTURE RECOMMENDATIONS




## St. Joseph Regional Elementary and Preschool

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

0 25' 50'

# TOMASELLO WINERY AND BANQUET HALL

**Subwatershed:** Great Swamp Branch

**Site Area:** 318,200 sq. ft.

**Address:** 225 North White Horse Pike
Hammonton, NJ 08037

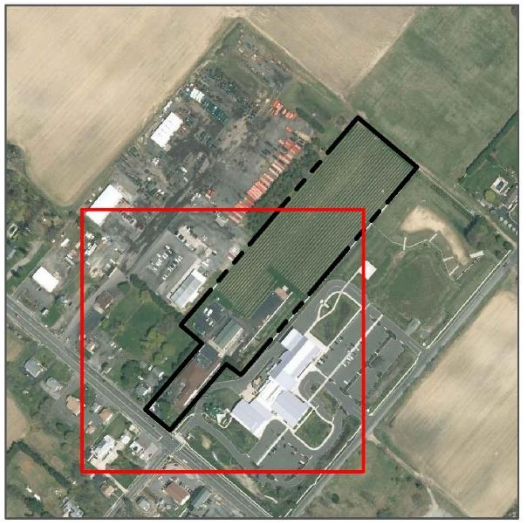
**Block and Lot:** Block 4501, Lot 37

A rain garden can be installed in the lawn in the front of the building to capture, treat, and infiltrate stormwater runoff from the roof. A section of parking spaces can be installed in the north end of the parking lot to capture and infiltrate stormwater from the roof and 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" |
| 15 | 48,883 | 2.4 | 24.7 | 224.4 | 0.038 | 1.34 |

| 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 | 0.032 | 5 | 793 | 0.08 | 310 | $1,550 |
| Pervious pavement | 0.132 | 22 | 3,269 | 0.34 | 1,780 | $44,500 |

# GREEN INFRASTRUCTURE RECOMMENDATIONS

**Tomasello Winery and Banquet Hall**

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

0 50' 100'

# ATLANTIC COUNTY LIBRARY OF WEST HAMMONTON

**Subwatershed:** Hammonton Creek

**Site Area:** 93,896 sq. ft.

**Address:** 451 South Egg Harbor Road
Hammonton, NJ 08037

**Block and Lot:** Block 3001, Lot 41.10

A rain garden can be installed in the front lawn to capture, treat, and infiltrate runoff from the roof of the building. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

| Impervious Cover | | Existing Loads from Impervious Cover (lbs/yr) | | | Runoff Volume from Impervious Cover (Mgal) | |
|---|---|---|---|---|---|---|
| % | sq. ft. | TP | TN | TSS | For the 1.25" Water Quality Storm | For an Annual Rainfall of 44" |
| 54 | 50,457 | 2.4 | 25.5 | 231.7 | 0.039 | 1.38 |

| Recommended Green Infrastructure Practices | Recharge Potential (Mgal/yr) | TSS Removal Potential (lbs/yr) | Maximum Volume Reduction Potential (gal/storm) | Peak Discharge Reduction Potential (cu. ft./second) | Estimated Size (sq. ft.) | Estimated Cost |
|---|---|---|---|---|---|---|
| Bioretention system | 0.050 | 8 | 1,242 | 0.13 | 485 | $2,425 |

# GREEN INFRASTRUCTURE RECOMMENDATIONS


**Atlantic County Library of West Hammonton**

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

0 25' 50'

# c. 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) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **GREAT SWAMP BRANCH SUBWATERSHED** | **184.96** | **8,056,671** | | | **72.5** | **759.3** | **6,902.4** | | **34.51** | **1,503,340** | **1.171** | **41.23** |
| **Hammonton High School** | | | | | | | | | | | | |
| **Total Site Info** | 115.94 | 5,050,221 | 2301 | 43,45,46 | 29.2 | 306.2 | 2,784.0 | 12 | 13.92 | 606,360 | 0.472 | 16.63 |
| **Hammonton Middle School** | | | | | | | | | | | | |
| **Total Site Info** | 44.32 | 1,930,653 | 3505 | 8,9 | 20.7 | 216.4 | 1,967.1 | 22 | 9.84 | 428,437 | 0.334 | 11.75 |
| **Hammonton Post Office** | | | | | | | | | | | | |
| **Total Site Info** | 0.81 | 35,077 | 2811 | 8 | 1.6 | 16.8 | 153.0 | 95 | 0.77 | 33,324 | 0.026 | 0.91 |
| **Hammonton Volunteer Fire Company No. 2** | | | | | | | | | | | | |
| **Total Site Info** | 2.08 | 90,612 | 4601 | 27 | 2.7 | 27.9 | 253.2 | 61 | 1.27 | 55,154 | 0.043 | 1.51 |
| **Heritage Assisted Living** | | | | | | | | | | | | |
| **Total Site Info** | 4.62 | 201,299 | 4601 | 26.01 | 4.8 | 50.2 | 456.7 | 49 | 2.28 | 99,473 | 0.078 | 2.73 |
| **Presbyterian Church USA** | | | | | | | | | | | | |
| **Total Site Info** | 0.62 | 27,087 | 3201 | 3 | 1.1 | 11.2 | 102.0 | 82 | 0.51 | 22,219 | 0.017 | 0.61 |
| **St. Joseph Catholic School** | | | | | | | | | | | | |
| **Total Site Info** | 7.52 | 327,615 | 34 | 19 | 7.4 | 77.7 | 706.6 | 47 | 3.53 | 153,907 | 0.120 | 4.22 |
| **St. Joseph Regional Elementary and Preschool** | | | | | | | | | | | | |
| **Total Site Info** | 1.74 | 75,907 | 2816 | 1 | 2.7 | 28.1 | 255.2 | 73 | 1.28 | 55,583 | 0.043 | 1.52 |
| **Tomasello Winery and Banquet Hall** | | | | | | | | | | | | |
| **Total Site Info** | 7.30 | 318,200 | 4501 | 37 | 2.4 | 24.7 | 224.4 | 15 | 1.12 | 48,883 | 0.038 | 1.34 |
| **HAMMONTON CREEK SUBWATERSHED** | **2.16** | **93,896** | | | **2.4** | **25.5** | **231.7** | | **1.16** | **50,457** | **0.039** | **1.38** |
| **Atlantic County Library of West Hammonton** | | | | | | | | | | | | |
| **Total Site Info** | 2.16 | 93,896 | 3001 | 41.01 | 2.4 | 25.5 | 231.7 | 54 | 1.16 | 50,457 | 0.039 | 1.38 |

# d. Summary of Proposed Green Infrastructure Practices

**Summary of Proposed Green Infrastructure Practices**

| Subwatershed/Site Name/Total Site Info/GI Practice | Potential Management Area Area (SF) | Potential Management Area Area (ac) | Recharge Potential (Mgal/yr) | TSS Removal Potential (lbs/yr) | Max Volume Reduction Potential (gal/storm) | Peak Discharge Reduction Potential (cfs) | Size of BMP (SF) | Unit Cost ($) | Unit | Total Cost ($) | I.C. Treated % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **GREAT SWAMP BRANCH SUBWATERSHED** | **271,677** | **6.24** | **7.079** | **1,185** | **511,744** | **19.43** | **57,129** | | | **$1,135,625** | **18.1%** |
| 1 **Hammonton High School** | | | | | | | | | | | |
| Bioretention systems | 79,705 | 1.83 | 2.077 | 348 | 152,285 | 5.73 | 16,700 | 25 | SF | $417,500 | 13.1% |
| Pervious pavement | 24,805 | 0.57 | 0.646 | 108 | 47,393 | 1.78 | 6,200 | 5 | SF | $31,000 | 4.1% |
| **Total Site Info** | **104,510** | **2.40** | **2.723** | **456** | **199,679** | **7.51** | **22,900** | | | **$448,500** | **17.2%** |
| 2 **Hammonton Middle School** | | | | | | | | | | | |
| Bioretention system | 3,680 | 0.08 | 0.096 | 16 | 7,031 | 0.26 | 920 | 5 | SF | $4,600 | 0.9% |
| Pervious pavement | 61,797 | 1.42 | 1.610 | 270 | 118,072 | 4.44 | 11,035 | 25 | SF | $275,875 | 14.4% |
| **Total Site Info** | **65,477** | **1.50** | **1.706** | **286** | **125,103** | **4.70** | **11,955** | | | **$280,475** | **15.3%** |
| 3 **Hammonton Post Office** | | | | | | | | | | | |
| Bioretention systems | 1,020 | 0.02 | 0.027 | 4 | 1,952 | 0.07 | 210 | 5 | SF | $1,050 | 3.1% |
| **Total Site Info** | **1,020** | **0.02** | **0.027** | **4** | **1,952** | **0.07** | **210** | | | **$1,050** | **3.1%** |
| 4 **Hammonton Volunteer Fire Company No. 2** | | | | | | | | | | | |
| Pervious pavement | 12,740 | 0.29 | 0.332 | 56 | 24,340 | 0.92 | 2,275 | 25 | SF | $56,875 | 23.1% |
| Rainwater harvesting | 4,500 | 0.10 | 0.117 | 20 | 2,902 | 0.30 | 3,000 | 2 | gal | $6,000 | 8.2% |
| **Total Site Info** | **17,240** | **0.40** | **0.449** | **75** | **27,242** | **1.22** | **5,275** | | | **$62,875** | **31.3%** |
| 5 **Heritage Assisted Living** | | | | | | | | | | | |
| Bioretention systems | 12,385 | 0.28 | 0.323 | 54 | 23,667 | 0.89 | 3,100 | 5 | SF | $15,500 | 12.5% |
| **Total Site Info** | **12,385** | **0.28** | **0.323** | **54** | **23,667** | **0.89** | **3,100** | | | **$15,500** | **12.5%** |
| 6 **Presbyterian Church USA** | | | | | | | | | | | |
| Pervious pavement | 3,055 | 0.07 | 0.080 | 13 | 5,834 | 0.22 | 550 | 25 | SF | $13,750 | 13.7% |
| **Total Site Info** | **3,055** | **0.07** | **0.080** | **13** | **5,834** | **0.22** | **550** | | | **$13,750** | **13.7%** |
| 7 **St. Joseph Catholic School** | | | | | | | | | | | |
| Bioretention system | 2,540 | 0.06 | 0.066 | 11 | 4,855 | 0.18 | 635 | 5 | SF | $3,175 | 1.7% |
| Pervious pavement | 41,075 | 0.94 | 1.070 | 179 | 78,488 | 2.95 | 7,335 | 25 | SF | $183,375 | 26.7% |
| **Total Site Info** | **43,615** | **1.00** | **1.136** | **190** | **83,342** | **3.13** | **7,970** | | | **$186,550** | **28.3%** |

**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 | **St. Joseph Regional Elementary and Preschool** | 17,215 | 0.40 | 0.449 | 75 | 32,890 | 1.24 | 3,075 | 25 | SF | $76,875 | 31.0% |
| | Pervious pavement | 860 | 0.02 | 0.022 | 4 | n/a | n/a | 4 | 1,000 | box | $4,000 | 1.5% |
| | Planter boxes | **18,075** | **0.41** | **0.471** | **79** | **32,890** | **1.24** | **3,079** | | | **$80,875** | **32.5%** |
| | **Total Site Info** | | | | | | | | | | | |
| 9 | **Tomasello Winery and Banquet Hall** | 1,230 | 0.03 | 0.032 | 5 | 2,349 | 0.09 | 310 | 5 | SF | $1,550 | 2.5% |
| | Bioretention system | 5,070 | 0.12 | 0.132 | 22 | 9,687 | 0.36 | 1,780 | 25 | SF | $44,500 | 10.4% |
| | Pervious pavement | **6,300** | **0.14** | **0.164** | **27** | **12,035** | **0.45** | **2,090** | | | **$46,050** | **12.9%** |
| | **Total Site Info** | | | | | | | | | | | |
| | **HAMMONTON CREEK SUBWATERSHED** | **1,930** | **0.04** | **0.050** | **8** | **3,688** | **0.14** | **485** | | | **$2,425** | **3.8%** |
| 10 | **Atlantic County Library of West Hammonton** | | | | | | | | | | | |
| | Bioretention system | 1,930 | 0.04 | 0.050 | 8 | 3,688 | 0.14 | 485 | 5 | SF | $2,425 | 3.8% |
| | **Total Site Info** | **1,930** | **0.04** | **0.050** | **8** | **3,688** | **0.14** | **485** | | | **$2,425** | **3.8%** |