RUTGERS
New Jersey Agricultural
Experiment Station

Green Infrastructure Action Plan and Strategic Plan for Hillsborough Township, Somerset County, New Jersey

Prepared for Hillsborough Township by the Rutgers Cooperative Extension Water Resources Program

September 5, 2019

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Introduction

Located in Somerset County in central New Jersey, Hillsborough Township is approximately 55 square miles in size. Figures 1 and 2 illustrate that Hillsborough Township is dominated by urban land use. A total of 34.5% of the municipality's land use is classified as urban. Of the urban land use in Hillsborough Township, rural residential is the dominant land use (Figure 3).

The New Jersey Department of Environmental Protection (NJDEP) 2007 land use/land cover geographical information system (GIS) data layer categorizes Hillsborough 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 Hillsborough Township. Based upon the NJDEP 2007 land use/land cover data, approximately 8.0% of Hillsborough Township has impervious cover. This level of impervious cover suggests that the streams in Hillsborough Township are likely sensitive streams.[1]

Methodology

Hillsborough Township contains portions of eight subwatersheds (Figure 4). For this Green Infrastructure Action Plan and Strategic 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

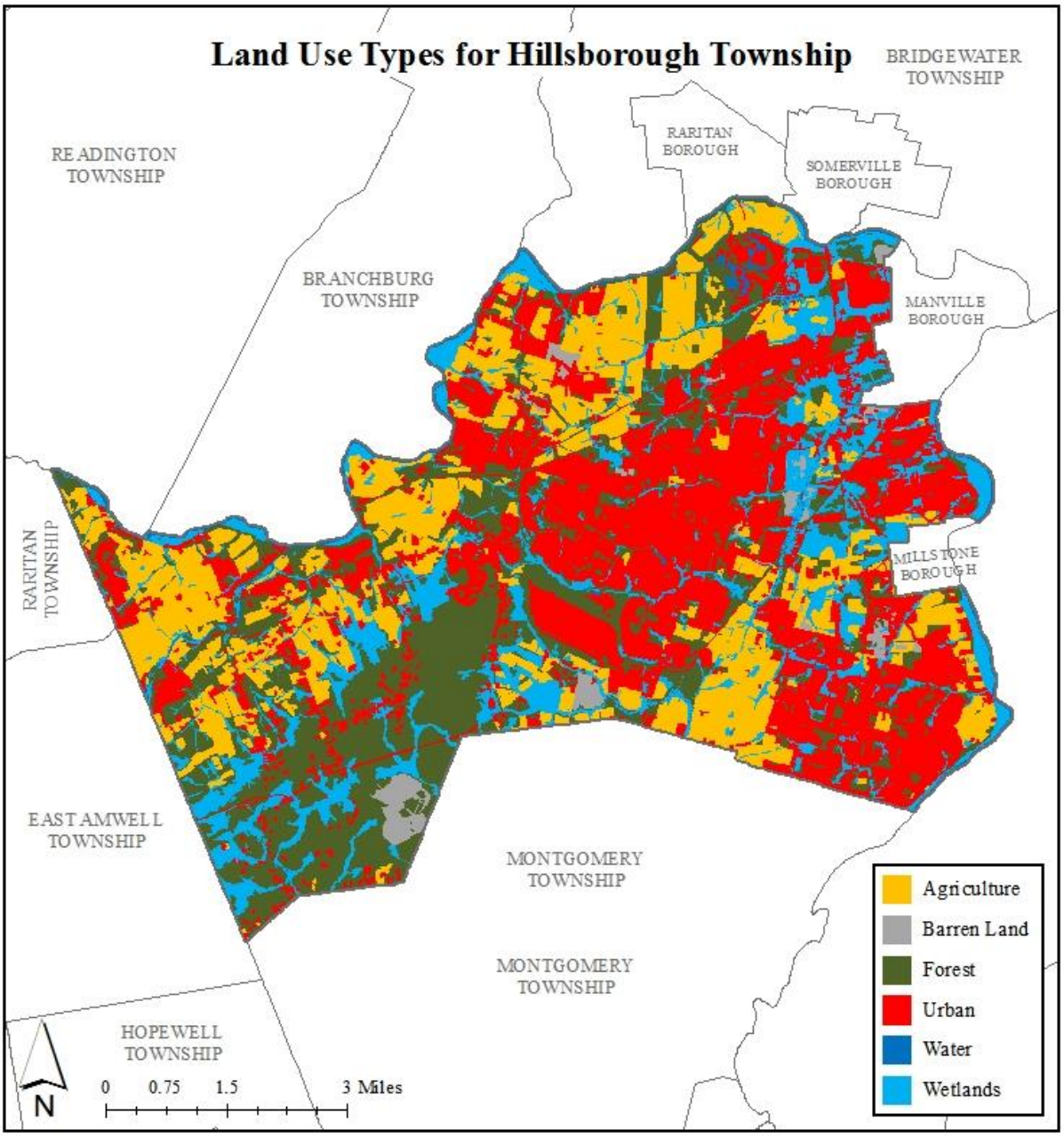


Figure 1: Map illustrating the land use in Hillsborough Township

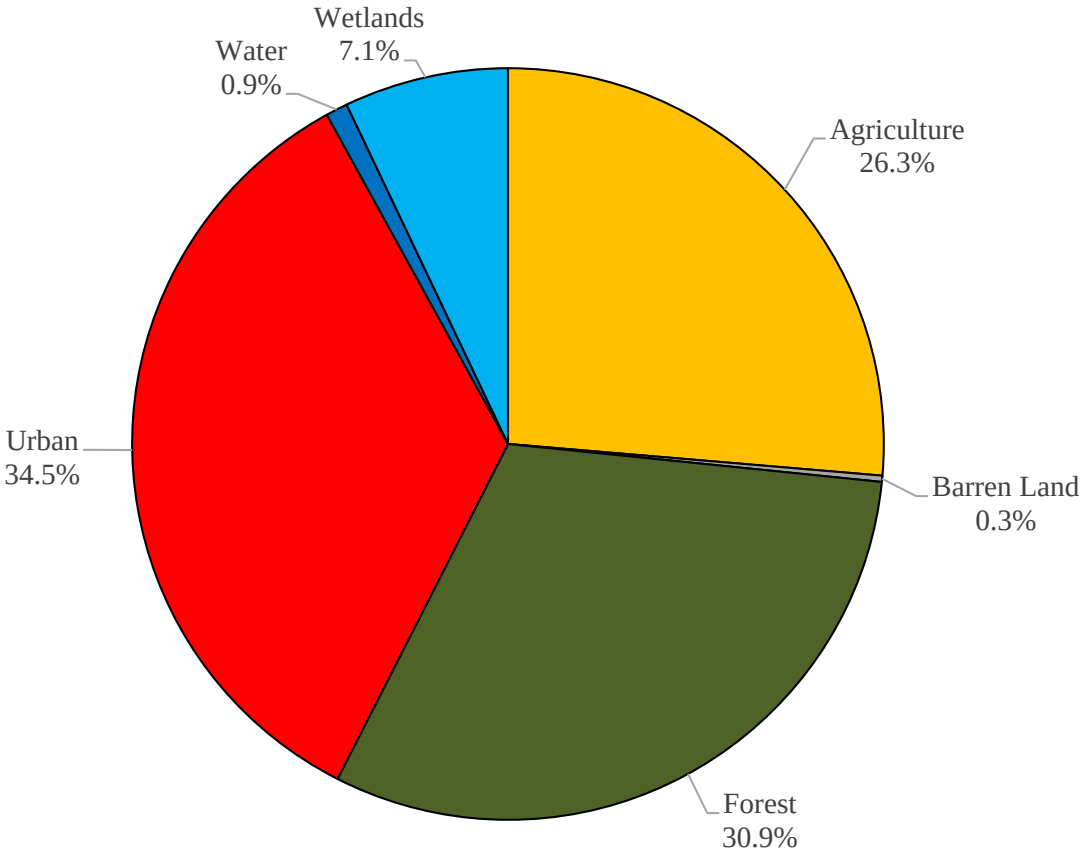


Figure 2: Pie chart illustrating the land use in Hillsborough Township

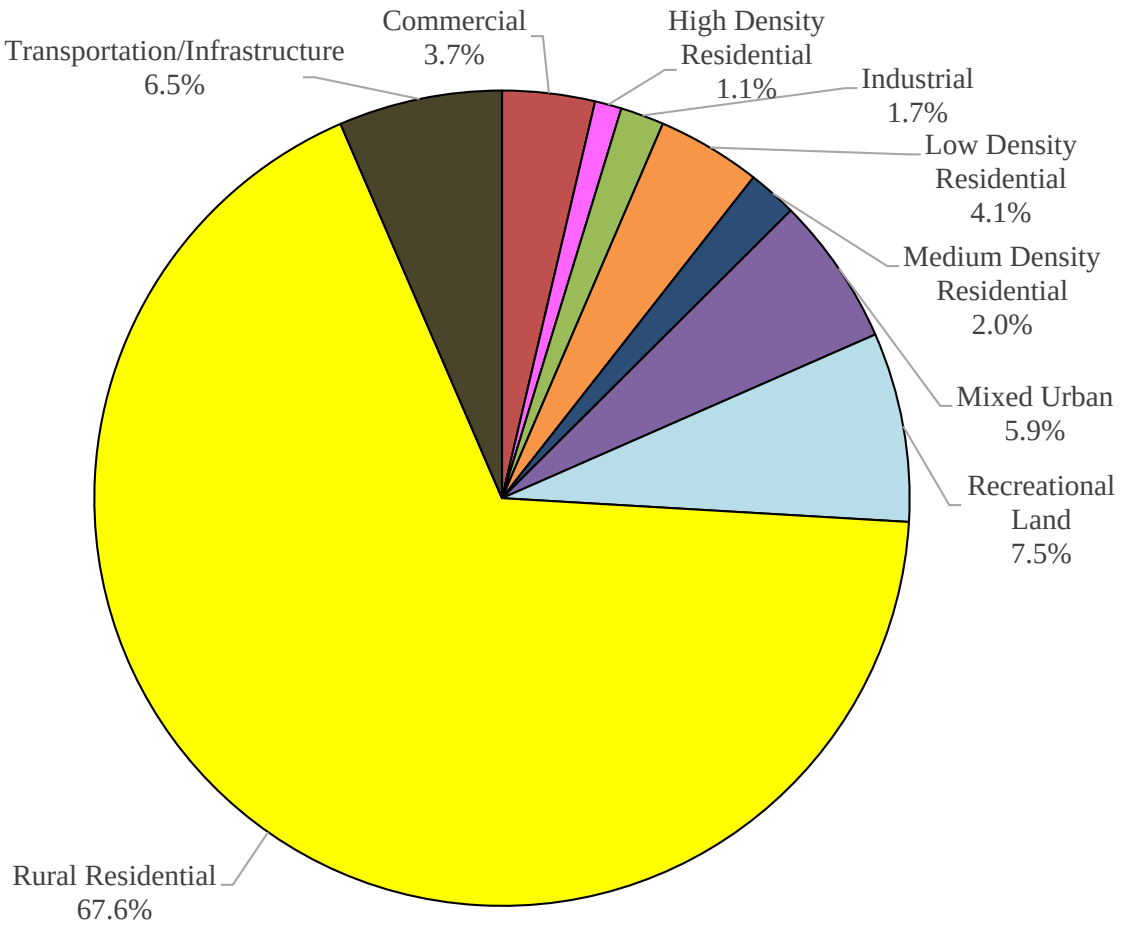


Figure 3: Pie chart illustrating the various types of urban land use in Hillsborough Township

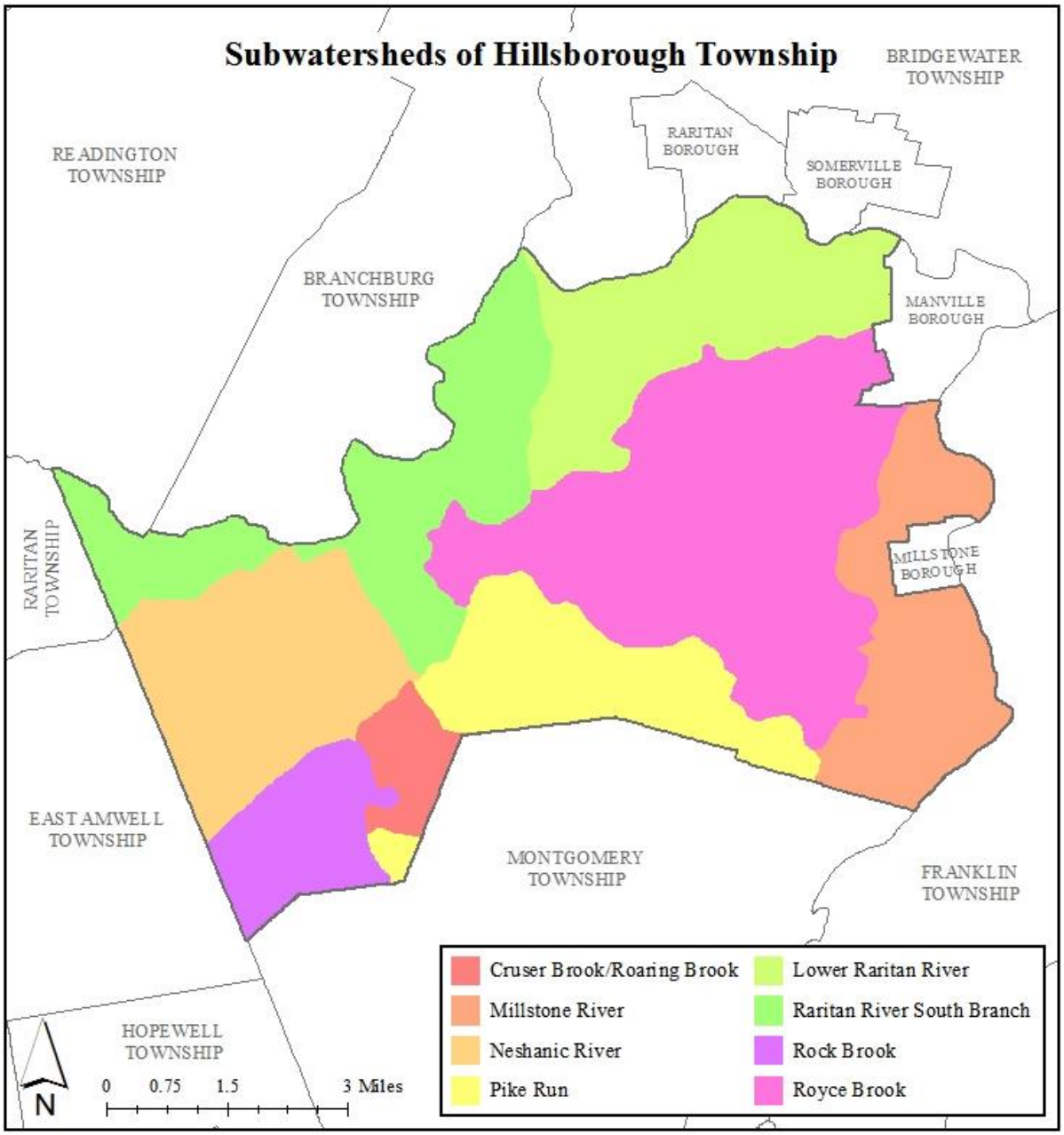


Figure 4: Map of the subwatersheds in Hillsborough Township

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 Hillsborough 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 Hillsborough Township. Each practice is discussed below.

Disconnected downspouts

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

Pervious pavements

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




[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

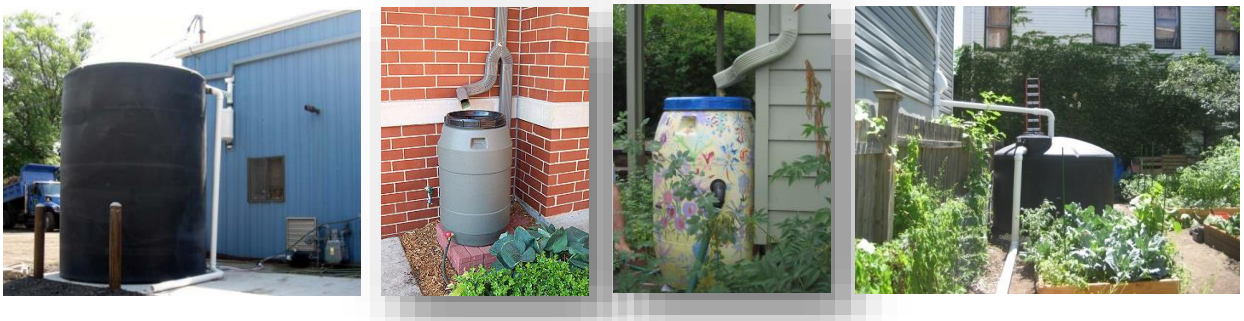
These are landscaped features that are designed to capture, treat, and infiltrate stormwater runoff. These systems can easily be incorporated into existing landscapes, improving aesthetics and creating a wildlife habitat while managing stormwater runoff. Bioretention systems also can be used in soils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

Policy Recommendations

Once NJDEP's newly proposed stormwater management rules are adopted by the State, the Township will update its stormwater management plan and stormwater control ordinance to incorporate green infrastructure requirements for new development. The municipal master plan will also be updated to incorporate green infrastructure recommendations. The initial review of Hillsborough's zoning ordinance indicated that it does not contain barriers for green infrastructure. If barriers are uncovered in the future, they will immediately be addressed to encourage the use of green infrastructure when appropriate.

Funding Strategy, Implementation Agenda, and Community Engagement

The Township will create a green infrastructure subcommittee of the green team that meets monthly to discuss opportunities for projects and coordinate implementation of projects. While much of the implementation thus far has been a function of the availability of the Department of Public Works. The goal is to install five to ten projects per year and possibly increase this number as funding becomes available. While projects can be designed throughout the year, many are installed in the spring, summer, and fall. These are exciting times for the Township who is hoping to be on the forefront of the green infrastructure movement.

Funding Sources

The first source of funding will be provided by the Township from the capital improvement fund and tree fund. The Township is committed to implementing green infrastructure throughout the municipality. The Township is currently partnering with the Rutgers Cooperative Extension (RCE) Water Resources Program on a township-wide green infrastructure initiative. The RCE Water Resources Program is designing green infrastructure projects and overseeing their implementation. Additionally, the RCE Water Resources Program has trained the Department of Public Works to install and maintain rain gardens. They have already installed rain gardens at the municipal building.

The second source of funding will be provided by volunteers as part of their effort to participate in the Township's green infrastructure initiative. For example, in the past a Boy Scout helped with a rain garden at the High School as part of his Eagle Scout project, and a Girl Scout installed one at the intermediate school as part of her Gold Award project. These scouts organized groups of volunteers (mostly other scouts and their parents) to help construct the rain gardens. The scouts

also conducted fund raising to purchase plants for each rain garden. There are other community groups that are interested in participating in the green infrastructure initiative that can provide labor and funding for supplies.

The third source of funding would be through local, state and federal grant programs. The New Jersey Department of Environmental Protection provides some grant funding for stormwater management projects. Other groups like the National Fish and Wildlife Foundation, US Environmental Protection Agency, Sustainable Jersey, and ANJEC (Association of New Jersey Environmental Commissions) have also provided grant funding for stormwater management projects in the past. Private foundations could be another source of funding for designing and building green infrastructure projects.

The final possible source of funding is the New Jersey Water Bank (formerly known as the Environmental Infrastructure Trust) Financing Program. This program provides low interest loans for water projects. The Township could seek funding from the New Jersey Water Bank for green infrastructure projects.

Incentive Programs

Although the Township has been focusing on implementing green infrastructure projects on municipally owned property, a rain garden rebate program was conducted in the municipality, and several rain gardens were installed. This program was funded by a NJDEP 319(h) grant. As the green infrastructure initiative moves forward, there will be opportunities to provide additional incentive programs for homeowners and businesses to participate in the effort.

As stormwater utilities become a reality in New Jersey, there may also be opportunities to offer incentives to homeowners and businesses to install green infrastructure. A stormwater utility can provide a reduced utility fee to property owners that have installed green infrastructure. A stormwater utility programs can also provide direct funding to property owners to install green infrastructure.

Maintenance and Monitoring

So far, all the projects have been installed on public property, and the Department of Public Works has been trained to maintain these systems. As time goes on and more private property owners install green infrastructure systems, these property owners will be held responsible for maintaining

their systems. The Township will provide training sessions for these individuals, and each project will have a maintenance plan.

An annual inspection will be conducted of each green infrastructure project to ensure it is functioning as designed and is maintained on a regular basis. NJDEP provides guidance on maintenance and monitoring of green infrastructure practices. Go to: https://www.njstormwater.org/maintenance_guidance.htm

Responsible Parties

Thus far, the municipality has been solely responsible for installing and maintaining green infrastructure practices. For each project that is built on non-public property, a memorandum of understanding (MOU) will be established to ensure that each participant understands their role in the implementation. This will include disposal of soil and maintenance of the system.

As the municipal green infrastructure initiative continues to move forward, community engagement will play an important role. Several members of the municipality have attended Rutgers workshops and become Green Infrastructure Champions. These Champions will work with the municipality to engage the community to implement green infrastructure practices. Additionally, the green team is reaching out to the schools within the municipality to discuss rain garden programs for the students. Finally, the rain garden rebate program was very successful, and efforts will be made to continue this program, which will hopefully engage a large portion of the community.

Timeframe

The timeframe for installation of green infrastructure depends on available resources (labor and funding). The town has committed to installing four to six projects per year, but this could increase dramatically if an influx of funding becomes available. The policy recommendations will be implemented after NJDEP's passage of the new stormwater management regulations.

Short-term and Long-term Goals

The short-term goal of Hillsborough's Green Infrastructure Initiative is to manage 10 acres of impervious surfaces within the next five years. The long-term goal is to manage 25 acres of

impervious surfaces within 20-years. These goals are highly dependent on secure adequate funding for implementation of green infrastructure projects.

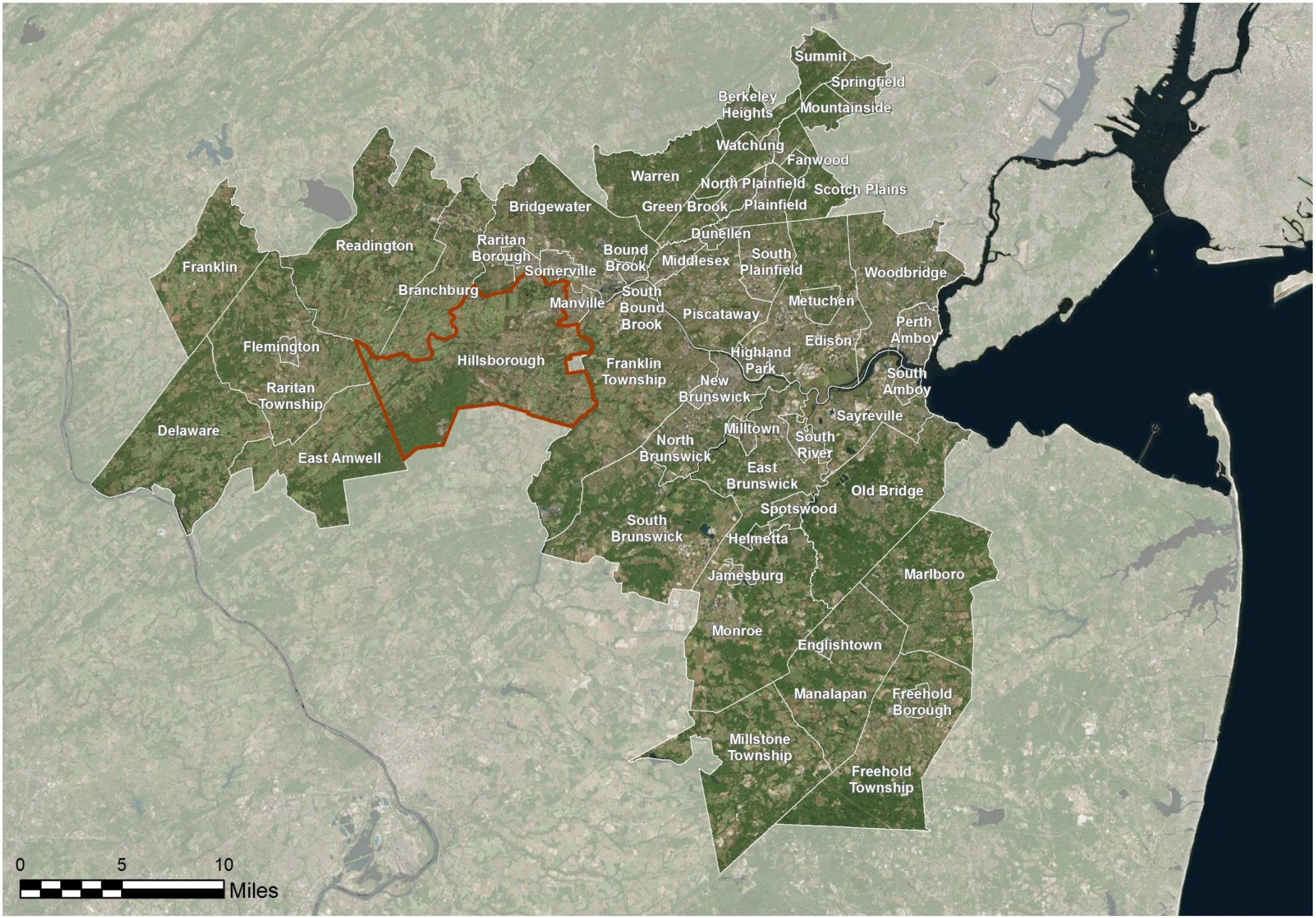
Conclusion

This green infrastructure action plan and strategic 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.

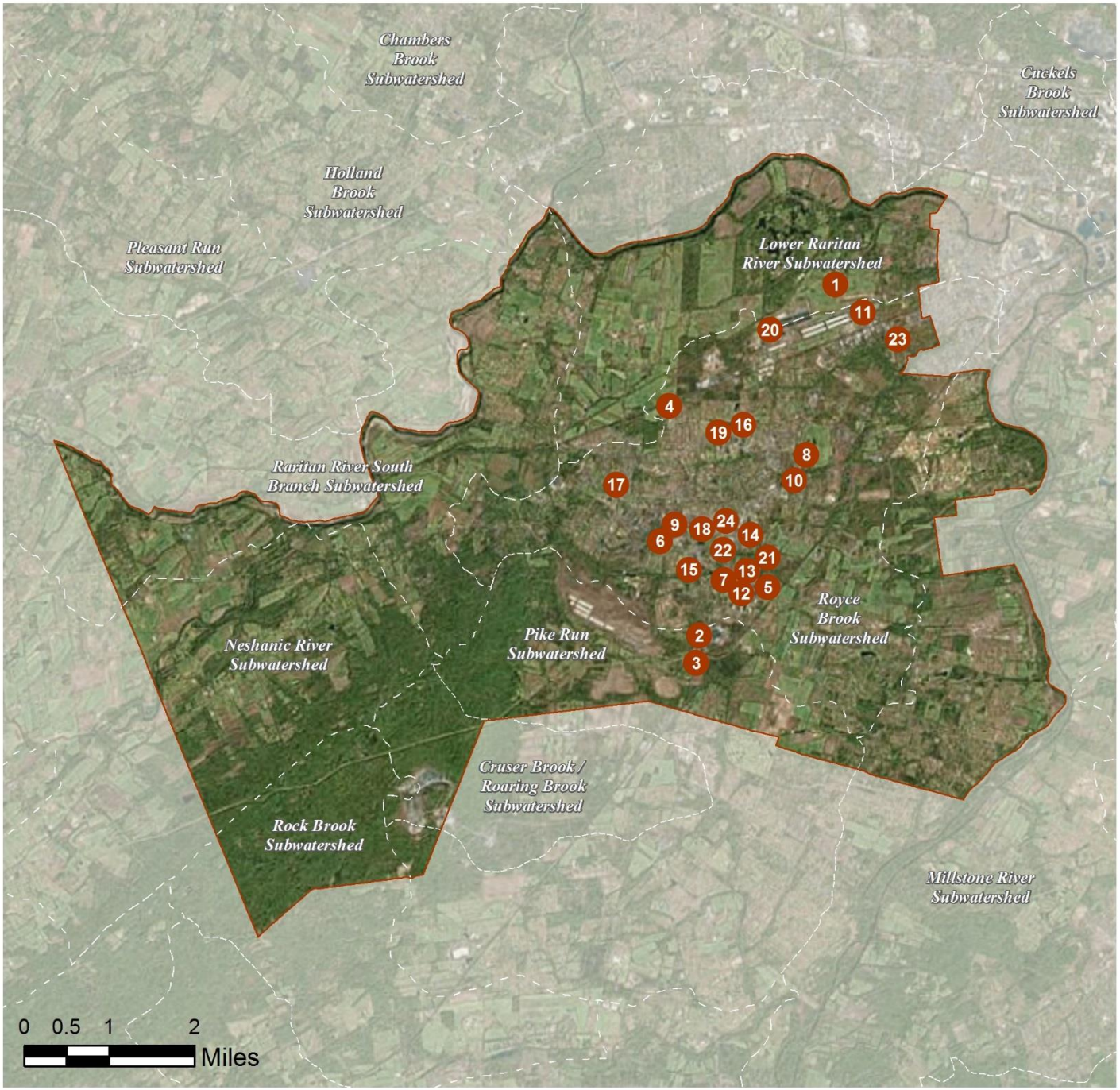
a. Overview Map of the Project

HILLSBOROUGH TOWNSHIP: CLIMATE RESILIENT GREEN INFRASTRUCTURE FOR THE RARITAN BASIN



b. Green Infrastructure Sites

HILLSBOROUGH: GREEN INFRASTRUCTURE SITES



SITES WITHIN THE LOWER RARITAN RIVER SUBWATERSHED:

1. Duke Farms: Cottages

SITES WITHIN THE PIKE RUN SUBWATERSHED:

2. Hillsborough Star Diner
3. Mountain View Plaza

SITES WITHIN THE ROYCE BROOK SUBWATERSHED:

4. Auten Road School
5. Boro Kid Zone
6. Claremont Towers
7. Corporate Building
8. Doctors Way Offices
9. Eves Drive
10. Fire Department and Radiology
11. Harold Docherty Memorial Park
12. Hillsborough Business Center: Building 29
13. Hillsborough Business Center: Building 30
14. Hillsborough Center
15. Hillsborough High School
16. Hillsborough Middle School and Triangle Elementary School
17. Hillsborough Municipal Building and Library
18. JK Design
19. Mary Mother of God Church
20. Paramount Gymnastics
21. R C Fine Foods Inc.
22. Shopping Complex of Amwell
23. Sunnymead Elementary
24. US Post Office

c. Proposed Green Infrastructure Concepts

DUKE FARMS: COTTAGES

Subwatershed: Royce Brook

Site Area: 12,771,159 sq. ft.

Address: 1112 Dukes Parkway West
Hillsborough, NJ 08844

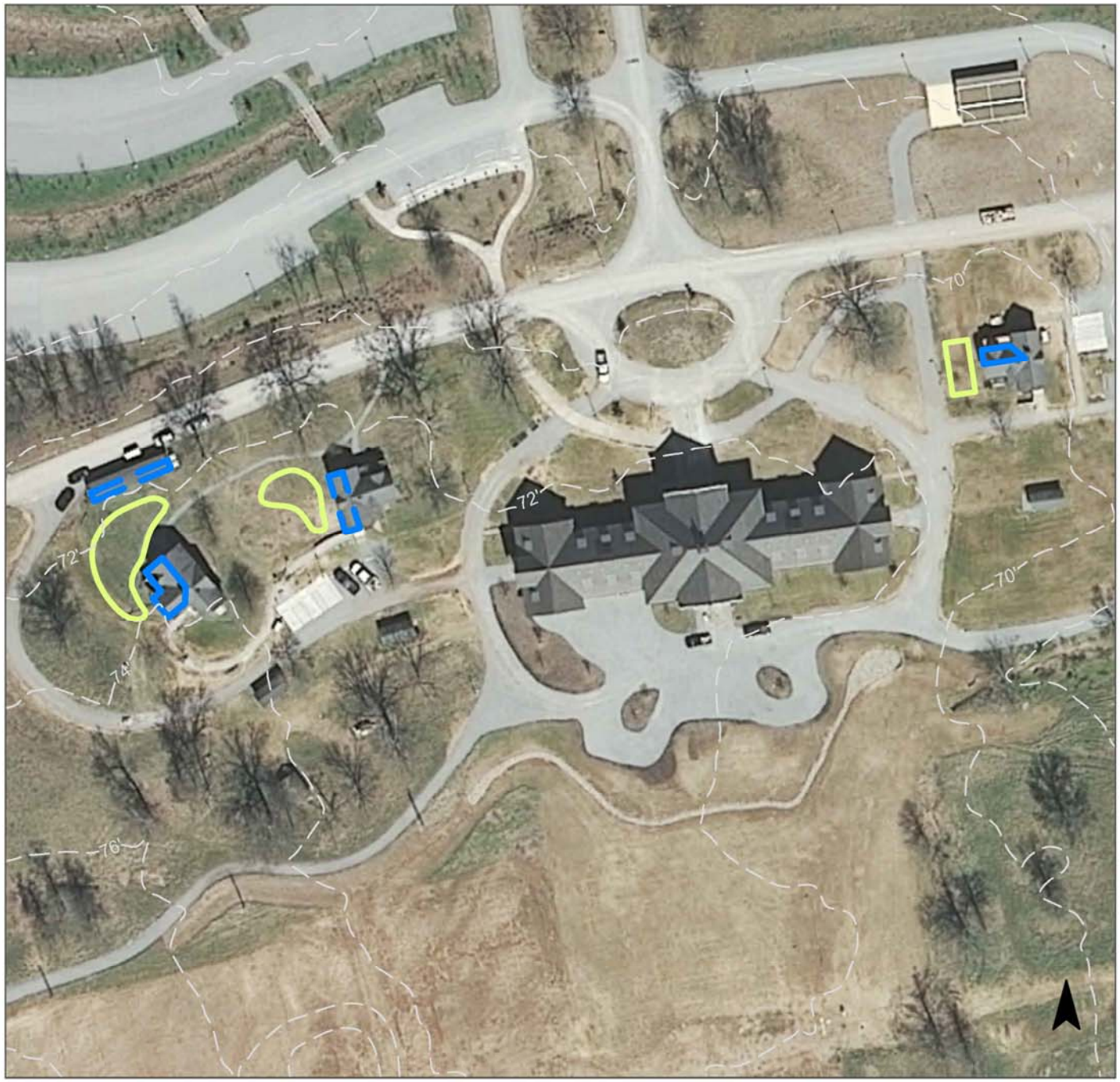
Block and Lot: Block 142, Lot 9

Rain gardens around the cottages can capture, treat, and infiltrate roof runoff. A preliminary soil assessment suggests that the soils have suitable 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"
1	133,809	6.5	67.6	614.4	0.104	3.67

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	0.038	6	2,805	0.11	3,500	$17,500

GREEN INFRASTRUCTURE RECOMMENDATIONS



Duke Farms: Cottages

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

0 50' 100'

HILLSBOROUGH STAR DINER

Subwatershed: **Pike Run**

Site Area: **64,863 sq. ft.**

Address: **842 US Highway 206**
Hillsborough, NJ 08844

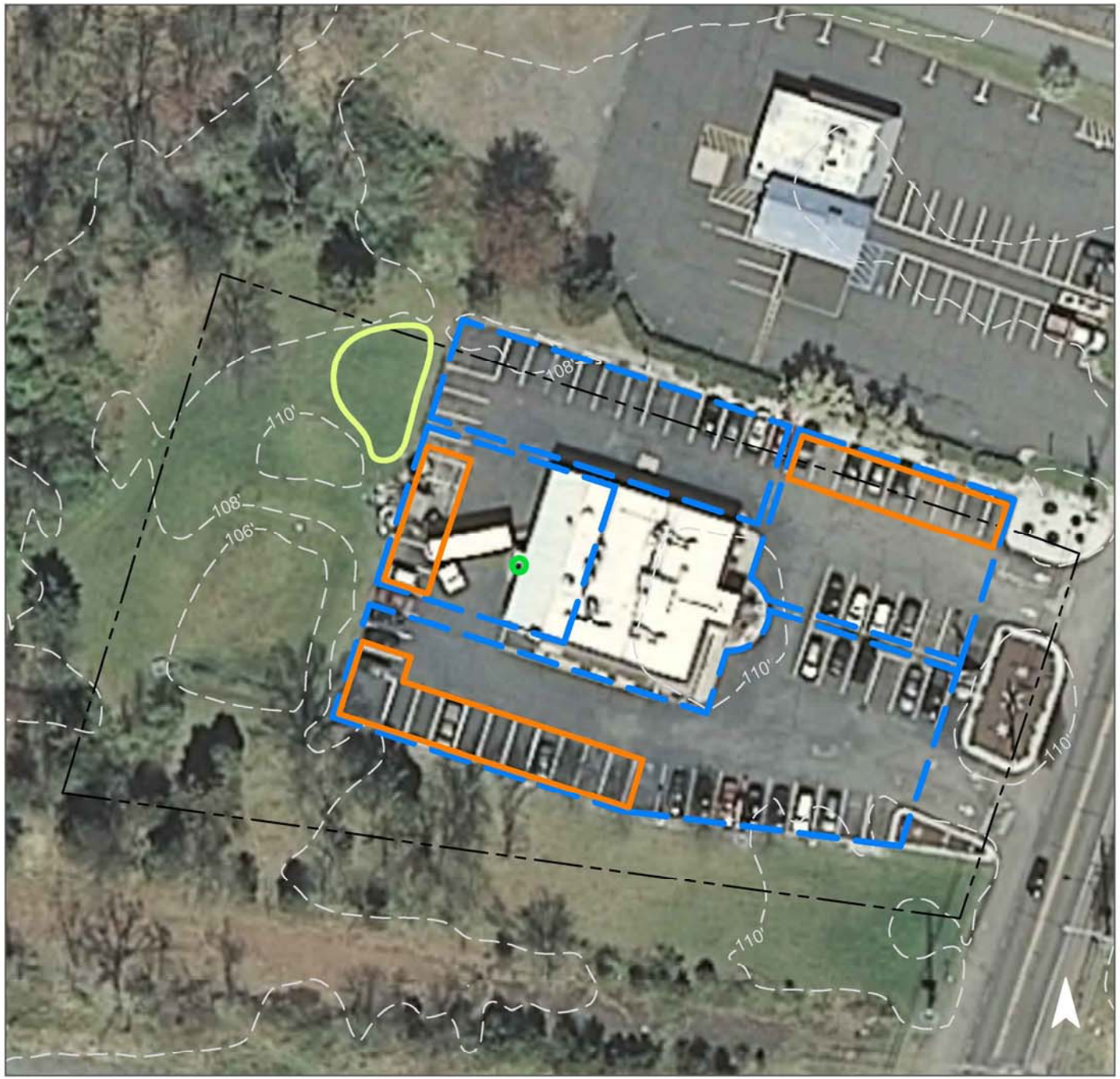
Block and Lot: **Block 177, Lot 22.01**

A rain garden behind the diner can capture, treat, and infiltrate runoff from the parking lot. Parking spaces can be converted into pervious pavement to infiltrate additional stormwater. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
55	35,811	1.7	18.1	164.4	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	0.143	24	10,547	0.40	1,420	$7,100
Pervious pavements	0.640	107	47,386	1.78	5,115	$127,875

GREEN INFRASTRUCTURE RECOMMENDATIONS



Hillsborough Star Diner

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

0 20' 40'

MOUNTAIN VIEW PLAZA

Subwatershed: Pike Run

Site Area: 503,957 sq. ft.

Address: 856 US Highway 206
Hillsborough, NJ 08844

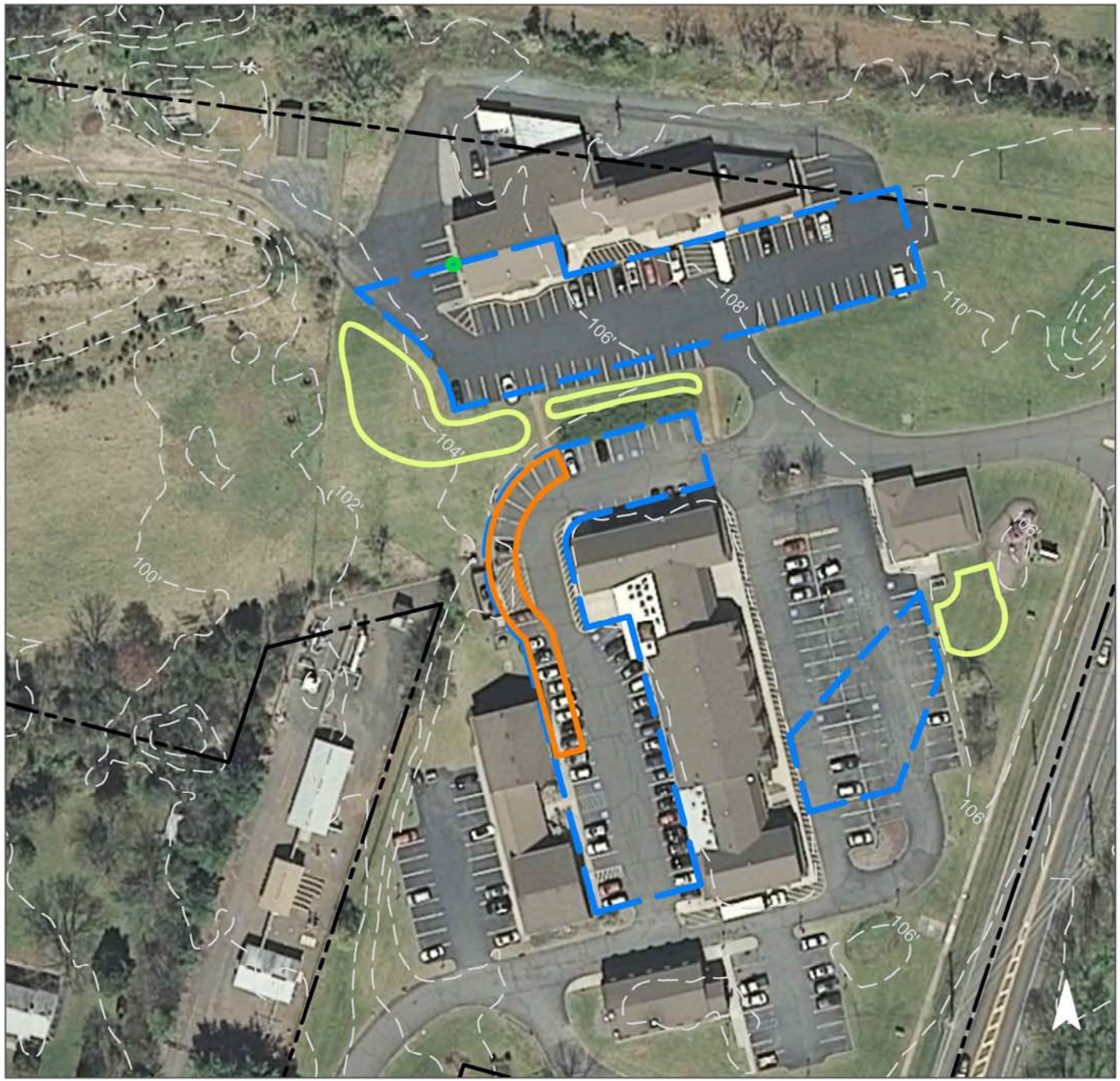
Block and Lot: Block 177, Lot 24.02

Several rain gardens can capture, treat, and infiltrate stormwater. Pervious pavement can infiltrate additional 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"
38	190,333	9.2	96.1	873.9	0.148	5.22

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 systems	0.845	141	62,570	2.35	8,065	$40,325
Pervious pavements	0.605	101	44,805	1.68	3,860	$96,500

GREEN INFRASTRUCTURE RECOMMENDATIONS



Mountain View Plaza

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

0 50' 100'

AUTEN ROAD SCHOOL

Subwatershed: Royce Brook

Site Area: 2,128,895 sq. ft.

Address: 281 Auten Road
Hillsborough, NJ 08844

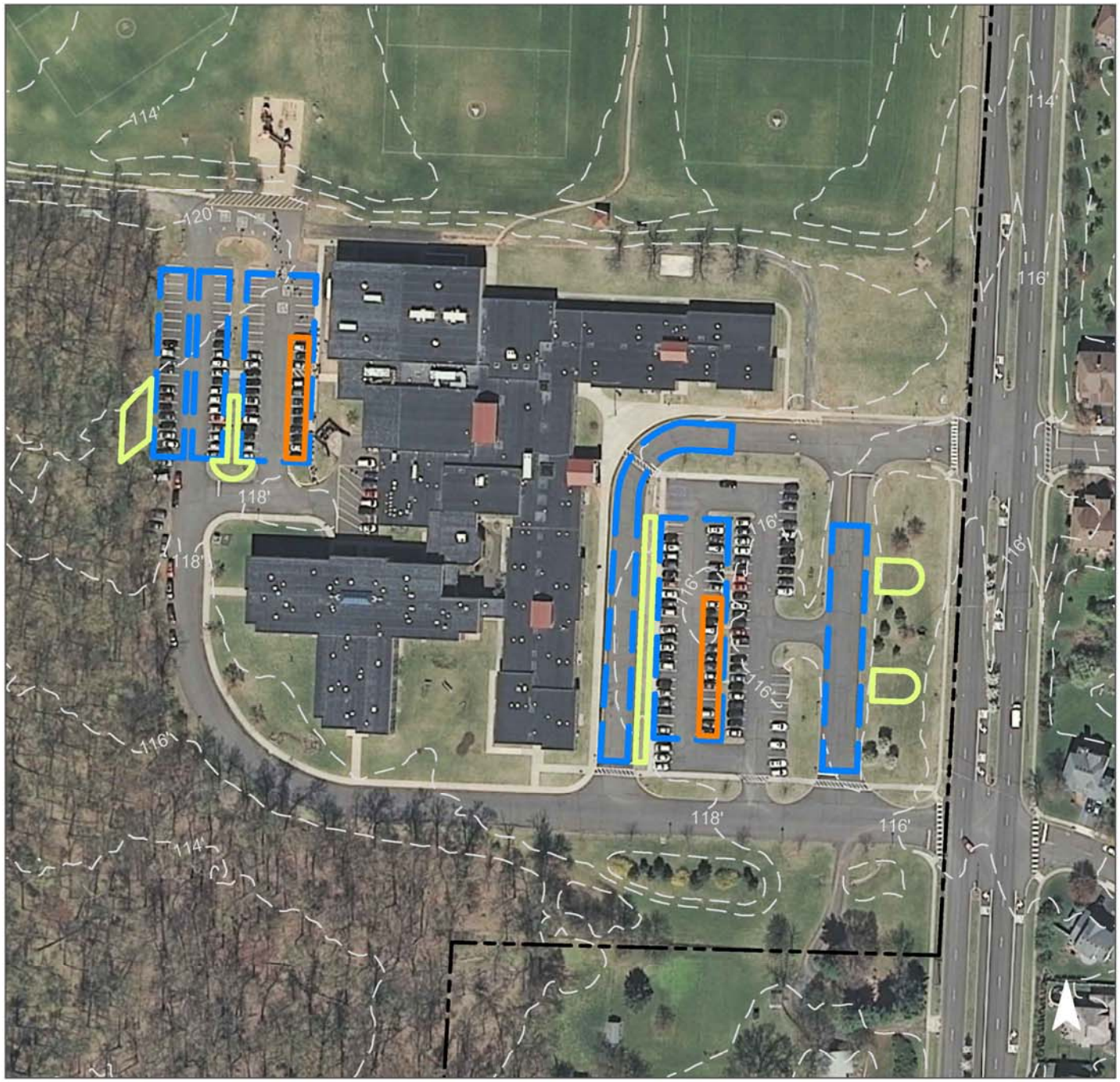
Block and Lot: Block 150, Lot 10

Runoff from the parking lot can be managed with several rain gardens. Additional stormwater can be infiltrated with pervious pavement. A preliminary soil assessment suggests that the soils have suitable 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"
14	295,524	14.2	149.3	1,356.9	0.230	8.11

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.751	126	55,576	2.09	7,500	$37,500
Pervious pavements	0.701	117	51,911	1.95	4,615	$115,375

GREEN INFRASTRUCTURE RECOMMENDATIONS



Auten Road School

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

0 75' 150'

BORO KID ZONE

Subwatershed: **Royce Brook**

Site Area: **88,617 sq. ft.**

Address: **126Stryker Lane**
Hillsborough, NJ 08844

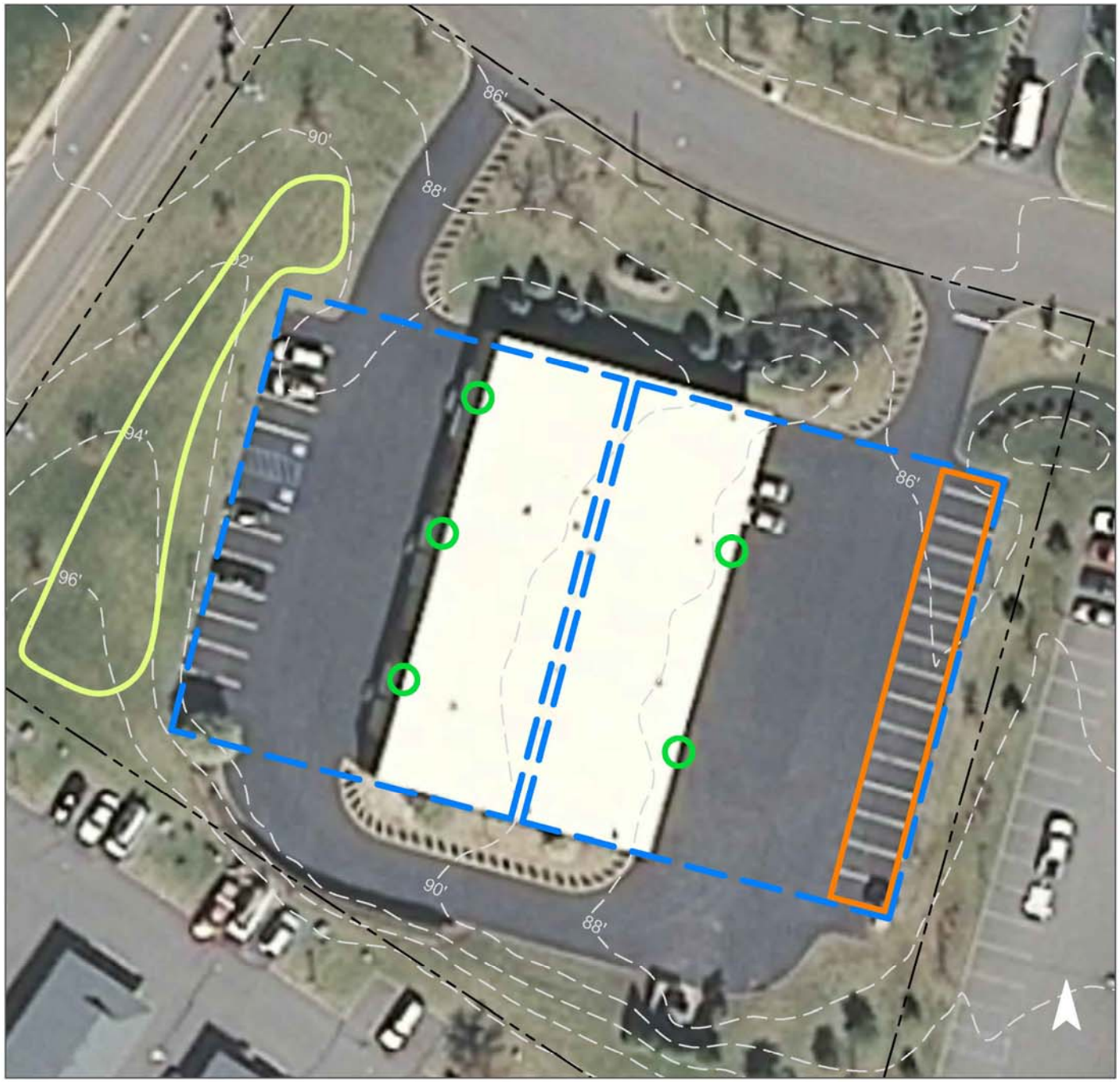
Block and Lot: **Block 200.05, Lot 6**

A rain garden and row of pervious pavement could infiltrate roof and parking lot runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
64	56,801	2.7	28.7	260.8	0.044	1.56

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
Biorentention systems	0.447	75	33,062	1.24	4,600	$23,000
Pervious pavements	0.483	81	35,754	1.34	2,680	$67,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Boro Kid Zone

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

0 25' 50'

CLAREMONT TOWERS

Subwatershed: Royce Brook

Site Area: 206,854 sq. ft.

Address: 779 Eves Drive
Hillsborough, NJ 08844

Block and Lot: Block 163.05, Lot 1.02

Parking spaces can be replaced with pervious pavement to capture and infiltrate stormwater. Installing a rain garden at the north entrance can capture, treat, and infiltrate stormwater. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
75	154,795	7.5	78.2	710.7	0.121	4.25

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	0.037	6	2,768	0.10	350	$1,750
Pervious pavements	1.108	185	82,018	3.08	6,700	$167,500

GREEN INFRASTRUCTURE RECOMMENDATIONS

Claremont Towers

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

0 50' 100'

CORPORATE BUILDING

Subwatershed: Royce Brook

Site Area: 439,945 sq. ft.

Address: Raider Boulevard
Hillsborough, NJ 08844

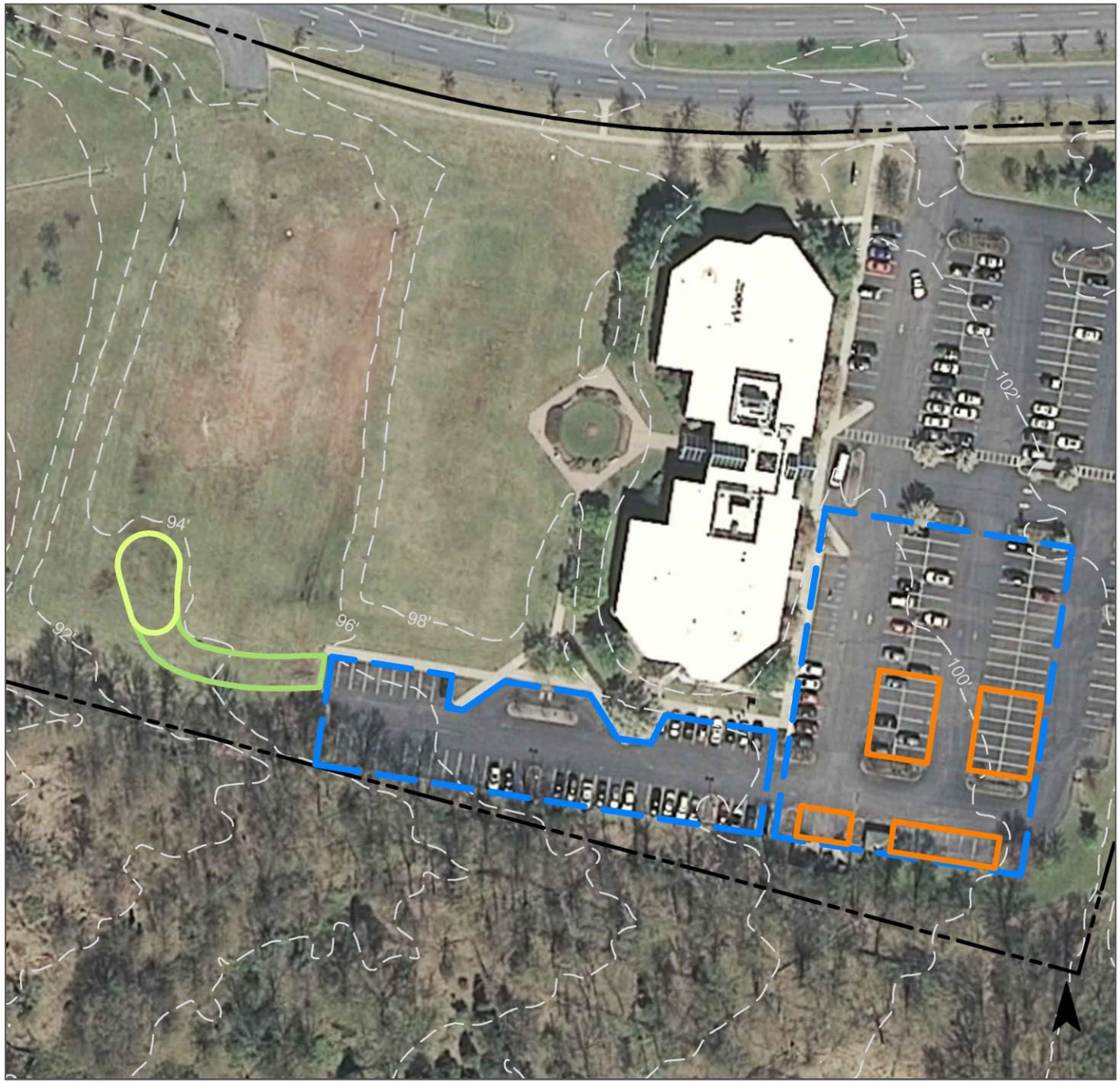
Block and Lot: Block 200.02, Lot 1

A bioswale and rain garden can capture, treat, and infiltrate parking lot runoff. Parking spaces can be replaced with pervious pavement to capture and infiltrate additional stormwater. A preliminary soil assessment suggests that the soils have suitable 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	168,631	8.1	85.2	774.2	0.131	4.62

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	0.234	39	17,324	0.65	2,090	$10,450
Bioswales	0.275	46	20,338	0.76	2,510	$12,550
Pervious pavements	0.926	155	68,592	2.58	6,475	$161,875

GREEN INFRASTRUCTURE RECOMMENDATIONS



Corporate Building

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

0 50' 100'

DOCTORS WAY OFFICE

Subwatershed: Royce Brook

Site Area: 86,343 sq. ft.

Address: 349 US Highway 206
Hillsborough, NJ 08844

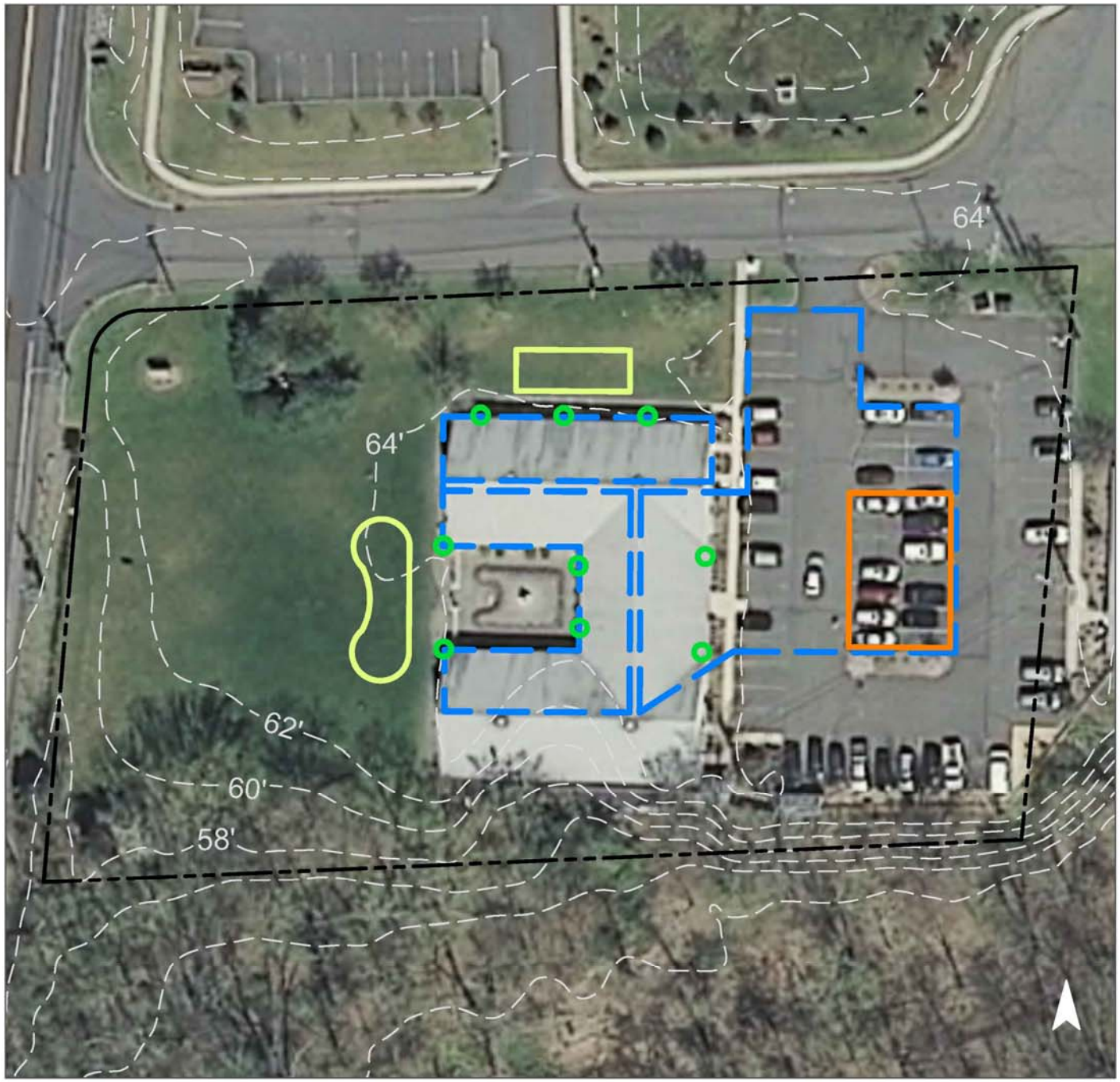
Block and Lot: Block 182, Lot 38.01

Runoff from the roof can be managed by disconnecting several downspouts and directing stormwater into rain gardens. Additional runoff could be infiltrated by replacing existing parking spaces with pervious pavement. 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	40,617	2.0	20.5	186.5	0.032	1.11

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.179	30	13,240	0.50	1,890	$9,450
Pervious pavements	0.331	55	24,497	0.92	2,430	$60,750

GREEN INFRASTRUCTURE RECOMMENDATIONS



Doctors Way Offices

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

0 30' 60'

EVES DRIVE

Subwatershed: **Royce Brook**

Site Area: **819,986 sq. ft.**

Address: **Hillsborough, NJ 08844**

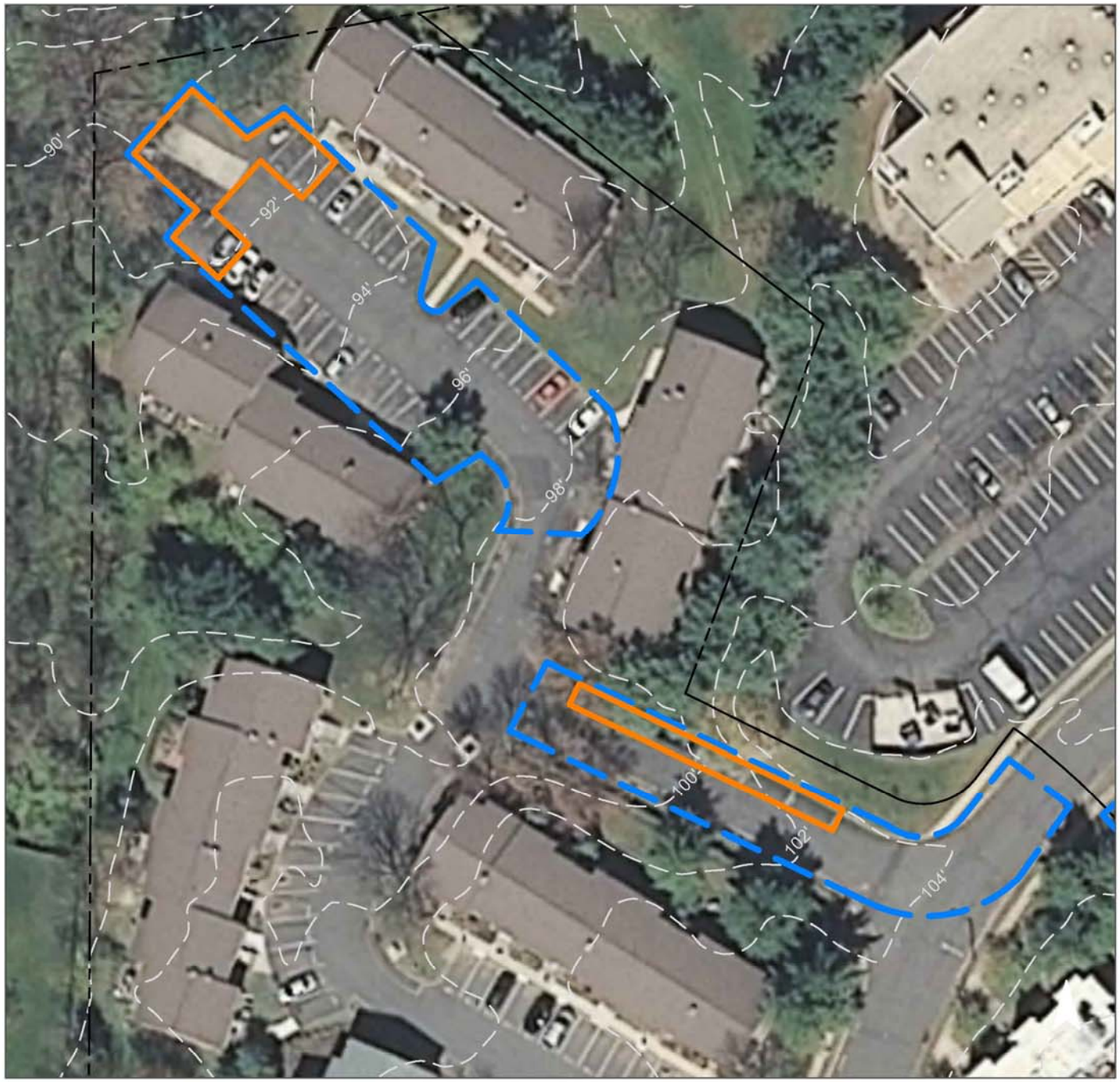
Block and Lot: **Block 163.05, Lot 1.01**

Rows of parking spaces could be replaced with porous asphalt to capture and infiltrate runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
58	477,575	23.0	241.2	2,192.7	0.372	13.10

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	0.542	91	40,168	1.51	3,330	$83,250

GREEN INFRASTRUCTURE RECOMMENDATIONS



Eves Drive

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

0 30' 60'

FIRE DEPARTMENT AND RADIOLOGY OFFICE

Subwatershed: Royce Brook

Site Area: 426,889 sq. ft.

Address: 381 US Highway 206
Hillsborough, NJ 08844

Block and Lot: Block 181, Lot 3

A bioswale could capture, treat, and infiltrate runoff from the east parking lot. Pervious pavement could infiltrate additional stormwater by using it to replace existing parking spaces. A cistern adjacent to the fire station could harvest stormwater from the roof and be used to wash service vehicles. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
28	118,740	5.7	60.0	545.2	0.093	3.26

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
Bioswales	0.365	61	27,040	1.02	3,950	$19,750
Pervious pavements	0.979	164	72,519	2.73	7,275	$181,875
Rainwater harvesting systems	0.088	15	4,000	0.24	4,000 (gal)	$8,000

GREEN INFRASTRUCTURE RECOMMENDATIONS

Fire Department and Radiology Office

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

0 50' 100'

HAROLD DOCHERTY MEMORIAL PARK

Subwatershed: Royce Brook

Site Area: 674,117 sq. ft.

Address: 158 US Highway 206
Hillsborough, NJ 08844

Block and Lot: Block 142, Lot 23.03

Stormwater from the pavilion roof could be managed by a rain garden. Pervious pavement could also infiltrate parking lot runoff. A preliminary soil assessment suggests that the soils have suitable 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"
10	65,983	3.2	33.3	303.0	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	0.014	2	1,047	0.04	130	$650
Pervious pavements	0.444	74	32,875	1.24	2,915	$72,875

GREEN INFRASTRUCTURE RECOMMENDATIONS

Harold Docherty Memorial Park

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

0 40' 80'

HILLSBOROUGH BUSINESS CENTER: BUILDING 29

Subwatershed: Royce Brook

Site Area: 99,120 sq. ft.

Address: 125 Stryker Lane
Hillsborough, NJ 08844

Block and Lot: Block 200.02, Lot 5

Pervious pavement could infiltrate runoff from the roof and parking lots. A preliminary soil assessment suggests that more soil testing would be required before determining the soils 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"
84	83,001	4.0	41.9	381.1	0.065	2.28

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	1.250	209	63,131	2.37	8,780	$219,500

GREEN INFRASTRUCTURE RECOMMENDATIONS

Hillsborough Business Center: Building 29

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

0 30' 60'

HILLSBOROUGH BUSINESS CENTER: BUILDING 30

Subwatershed: Royce Brook

Site Area: 74,485 sq. ft.

Address: 121Stryker Lane
Hillsborough, NJ 08844

Block and Lot: Block 200.02, Lot 6

Pervious pavement could infiltrate runoff from the roof and parking lots. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
70	52,191	2.5	26.4	239.6	0.041	1.43

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Pervious pavements	0.853	143	63,131	2.37	5,655	$141,375

GREEN INFRASTRUCTURE RECOMMENDATIONS

Hillsborough Business Center: Building 30

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

0 30' 60'

HILLSBOROUGH CENTER

Subwatershed: Royce Brook

Site Area: 753,916 sq. ft.

Address: 649 US Highway 206
Hillsborough, NJ 08844

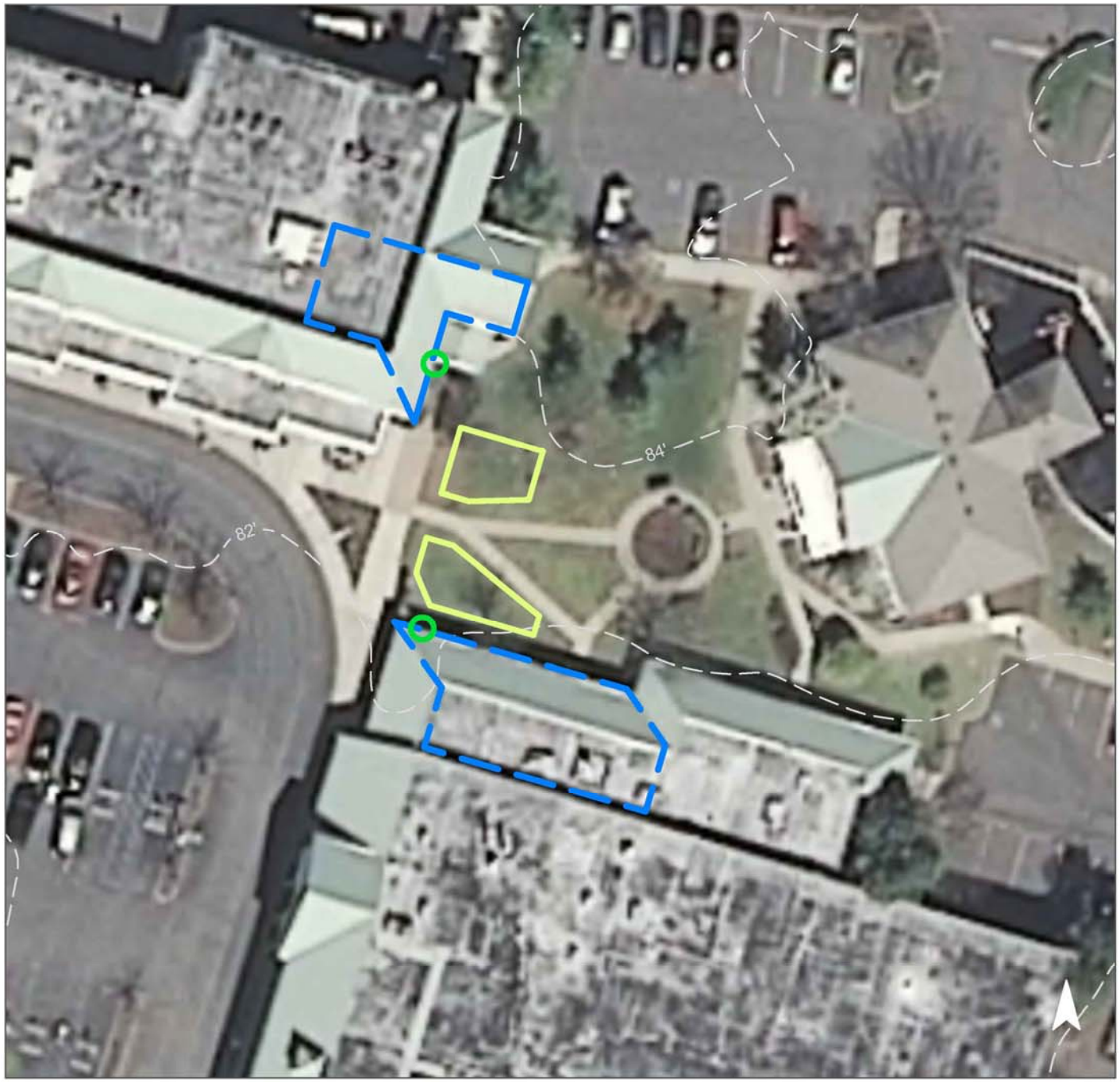
Block and Lot: Block 200.10, Lot 5.02

Rain gardens in the courtyard could capture, treat, and infiltrate roof 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"
50	379,304	18.3	191.6	1,741.5	0.296	10.40

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	0.081	14	6,021	0.23	765	$3,825

GREEN INFRASTRUCTURE RECOMMENDATIONS



Hillsborough Center

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

0 40' 80'

HILLSBOROUGH HIGH SCHOOL

Subwatershed: Royce Brook

Site Area: 2,034,108 sq. ft.

Address: 466 Raider Boulevard
Hillsborough, NJ 08844

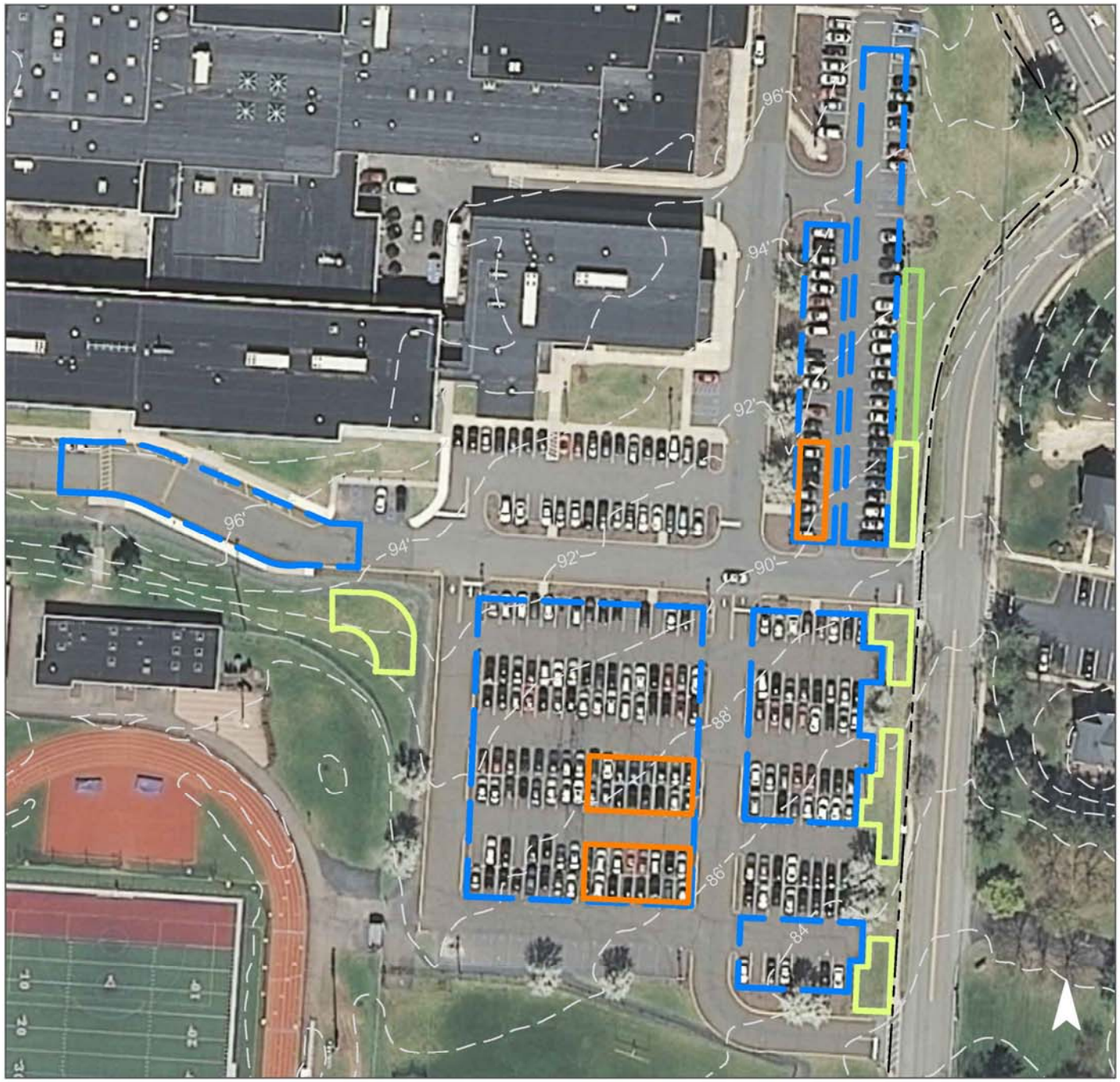
Block and Lot: Block 177.02, Lot 1.01

Several rain gardens and a bioswale could capture, treat, and infiltrate stormwater. Pervious pavement could also infiltrate additional 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"
40	815,061	39.3	411.6	3,742.2	0.635	22.35

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	0.674	113	49,929	1.88	5,925	$29,625
Bioswales	0.119	20	8,864	0.33	1,210	$6,050
Pervious pavements	0.900	151	66,647	2.51	6,100	$152,500

GREEN INFRASTRUCTURE RECOMMENDATIONS



Hillsborough High School

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

0 75' 150'

HILLSBOROUGH MIDDLE SCHOOL

Subwatershed: Royce Brook

Site Area: 1,758,653 sq. ft.

Address: 260 Triangle Road
Hillsborough, NJ 08844

Block and Lot: Block 155, Lot 42,43,44

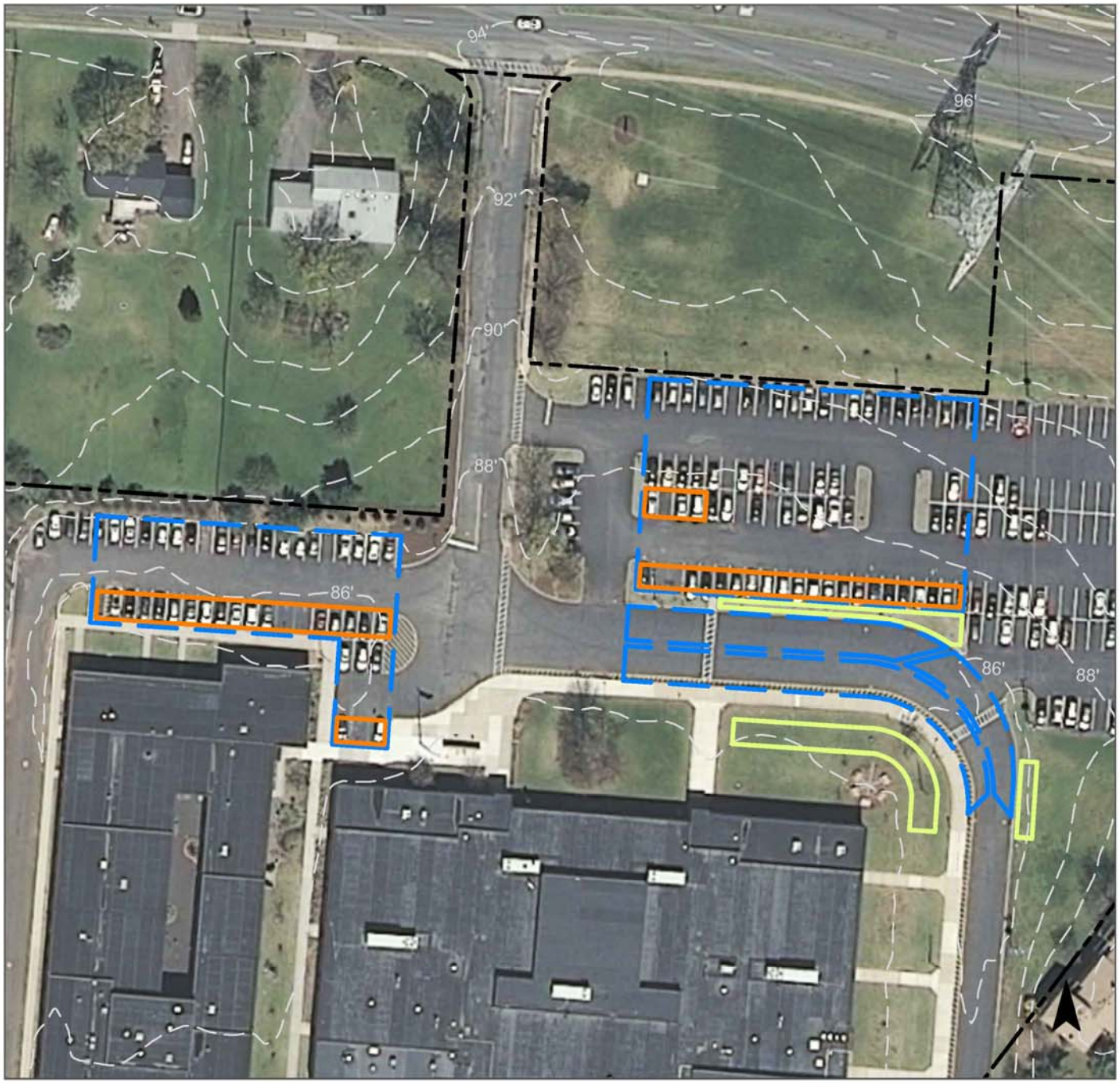
Parking spaces could be converted into pervious pavement to infiltrate runoff. Rain gardens could capture, infiltrate, and treat additional runoff. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

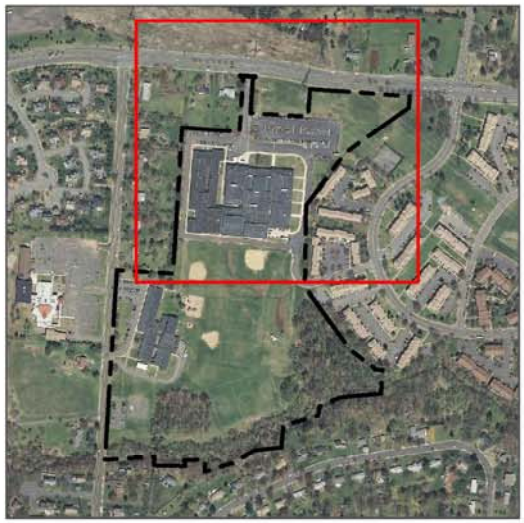
Existing conditions are for both the Hillsborough Middle School and the Triangle Elementary School due to shared parcels.

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"
29	503,027	24.3	254.1	2,309.6	0.392	13.80

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.319	53	23,637	0.89	4,410	$22,050
Pervious pavements	1.196	200	88,563	3.33	7,100	$177,500

GREEN INFRASTRUCTURE RECOMMENDATIONS





Hillsborough Middle School

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

0 75' 150'

TRIANGLE ELEMENTARY SCHOOL

Subwatershed: **Royce Brook**

Site Area: **1,758,653 sq. ft.**

Address: **156 S. Triangle Road**
Hillsborough, NJ 08844

Block and Lot: **Block 155, Lot 42,43,44**

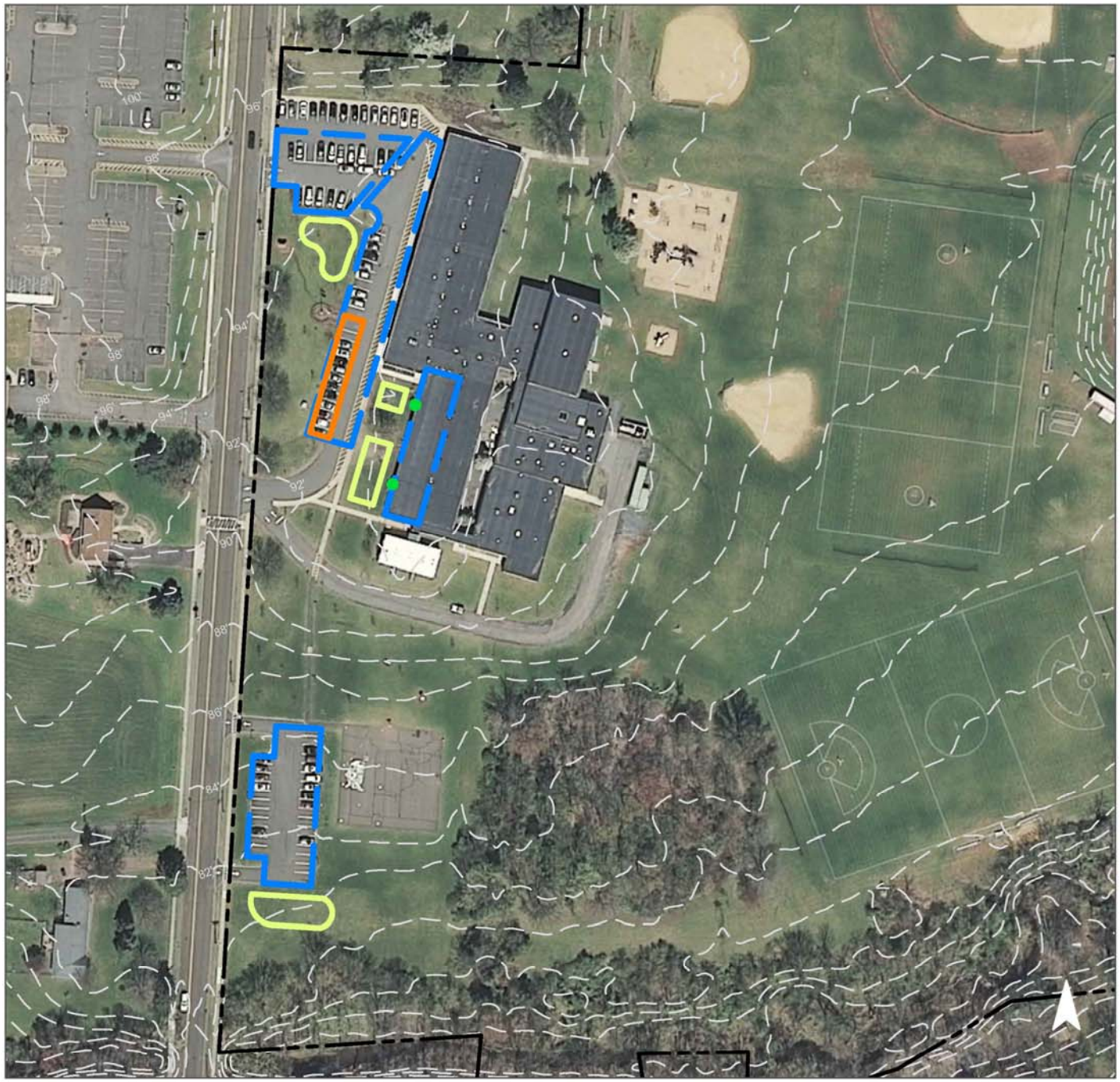
Several rain gardens could capture, treat, and infiltrate runoff from the roof and parking lots. Parking spaces can be converted into pervious pavement to infiltrate additional runoff. A preliminary soil assessment suggests that the soils have suitable characteristics for green infrastructure.

Existing conditions are for both the Hillsborough Middle School and the Triangle Elementary School.

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"
29	503,027	24.3	254.1	2,309.6	0.392	13.80

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.561	94	41,551	1.56	6,050	$30,250
Pervious pavements	0.345	58	25,544	0.96	2,400	$60,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Triangle Elementary School

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

0 75' 150'

HILLSBOROUGH MUNICIPAL BUILDING AND LIBRARY

Subwatershed: Royce Brook

Site Area: 1,397,452 sq. ft.

Address: 379 South Branch Road
Hillsborough, NJ 08844

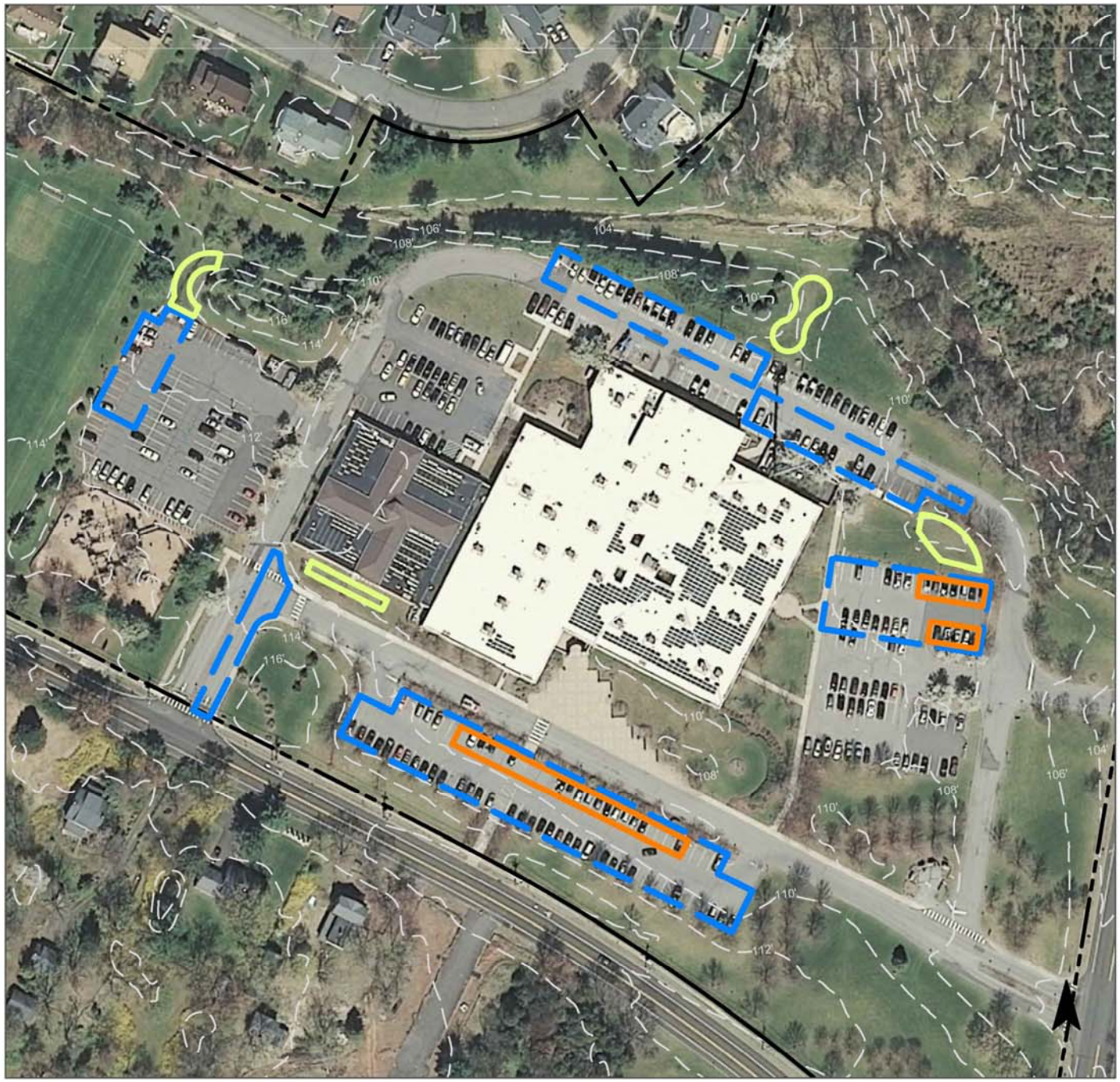
Block and Lot: Block 149, Lot 1.02

Rain gardens can capture, treat, and infiltrate runoff from the parking lots. Additional stormwater can be infiltrated with pervious pavement. 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"
22	304,677	14.7	153.9	1,398.9	0.237	8.36

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.610	102	45,217	1.70	5,920	$29,600
Pervious pavements	0.998	167	73,902	2.78	6,950	$173,750

GREEN INFRASTRUCTURE RECOMMENDATIONS



Hillsborough Municipal Building and Library

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

0 75' 150'

JK DESIGN

Subwatershed: Royce Brook

Site Area: 104,713 sq. ft.

Address: 465 Amwell Road
Hillsborough, NJ 08844

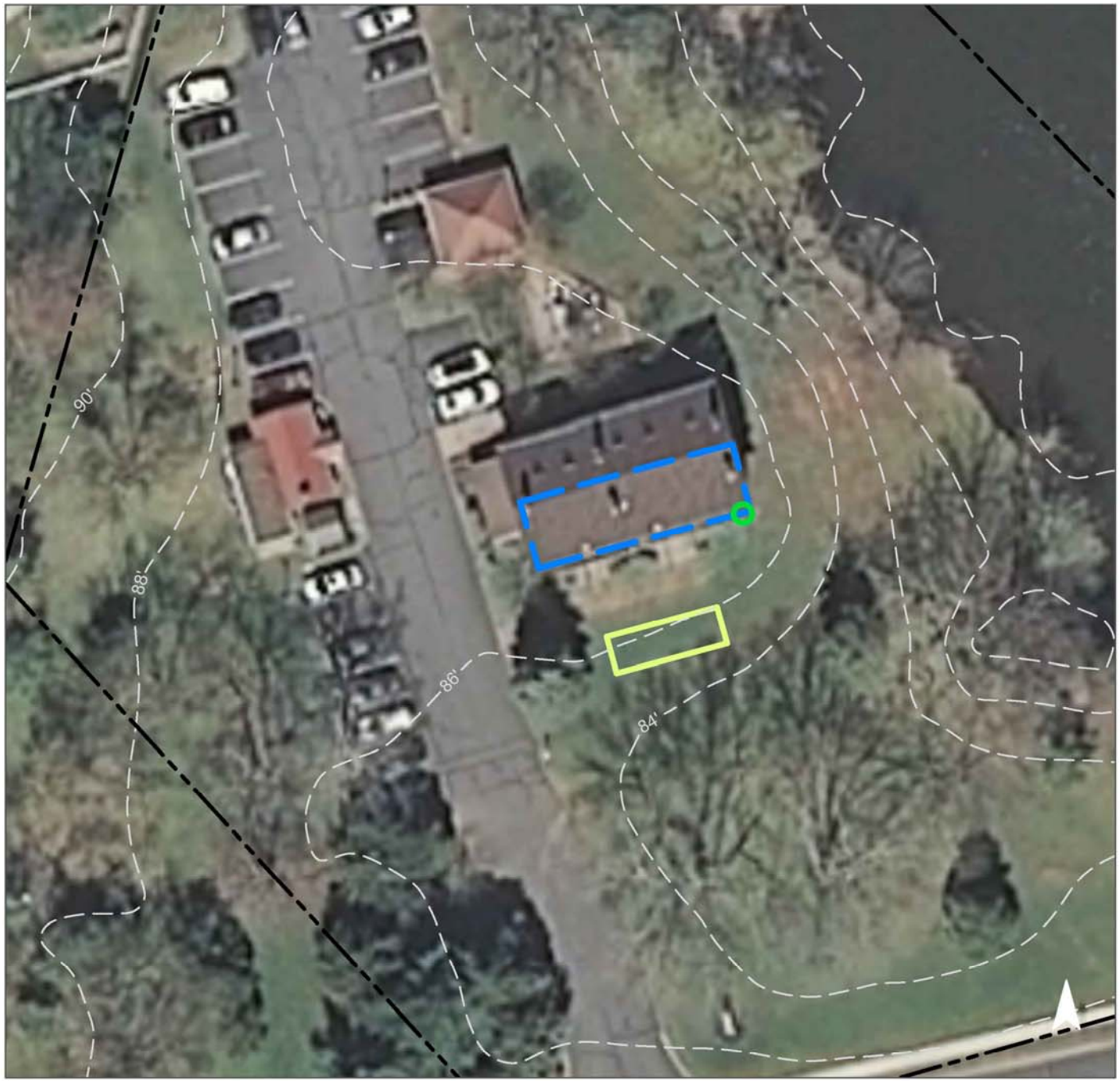
Block and Lot: Block 163.22, Lot 41

Solar panels and a new green roof have already been installed on site. Downspouts can also be disconnected and redirected into a rain garden to capture, treat and infiltrate roof runoff. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
23	24,350	1.2	12.3	111.8	0.019	0.67

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	5	2,020	0.09	300	$1,500

GREEN INFRASTRUCTURE RECOMMENDATIONS



JK Design

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

0 20' 40'

MARY MOTHER OF GOD CHURCH

Subwatershed: Royce Brook

Site Area: 413,984 sq. ft.

Address: 157 South Triangle
Hillsborough, NJ 08844

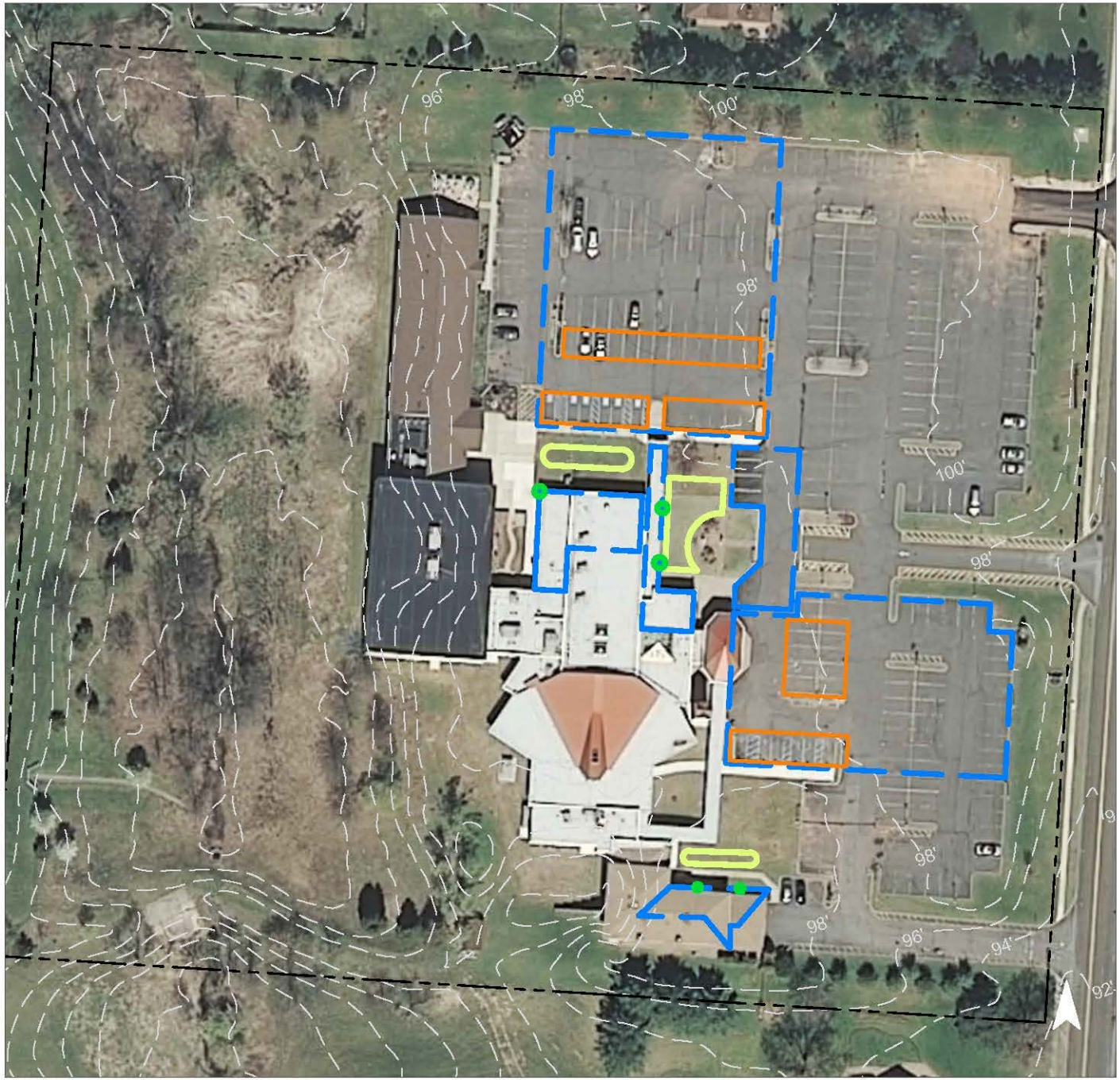
Block and Lot: Block 151, Lot 12.01

The installation of several rain gardens can capture, treat, and infiltrate roof runoff. Parking spaces can be replaced with pervious pavement to capture and infiltrate stormwater. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
46	191,884	9.3	96.9	881.0	0.150	5.26

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	0.252	42	18,700	0.82	2,550	$12,750
Pervious pavements	1.279	214	94,772	4.17	8,580	$214,500

GREEN INFRASTRUCTURE RECOMMENDATIONS



Mary Mother of God Church

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

0 50' 100'

PARAMOUNT GYMNASTICS

Subwatershed: Royce Brook

Site Area: 109,039 sq. ft.

Address: 330 Roycefield Road
Hillsborough, NJ 08844

Block and Lot: Block 142, Lot 23.2

Runoff from the roof and the parking lot could be infiltrated with pervious pavement. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
28	30,538	1.5	15.4	140.2	0.024	0.84

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	0.506	85	37,475	1.41	2,180	$54,500

GREEN INFRASTRUCTURE RECOMMENDATIONS

Paramount Gymnastics

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

0 25' 50

RC FINE FOODS INC.

Subwatershed: Royce Brook

Site Area: 262,729 sq. ft.

Address: 139 Stryker Lane
Hillsborough, NJ 08844

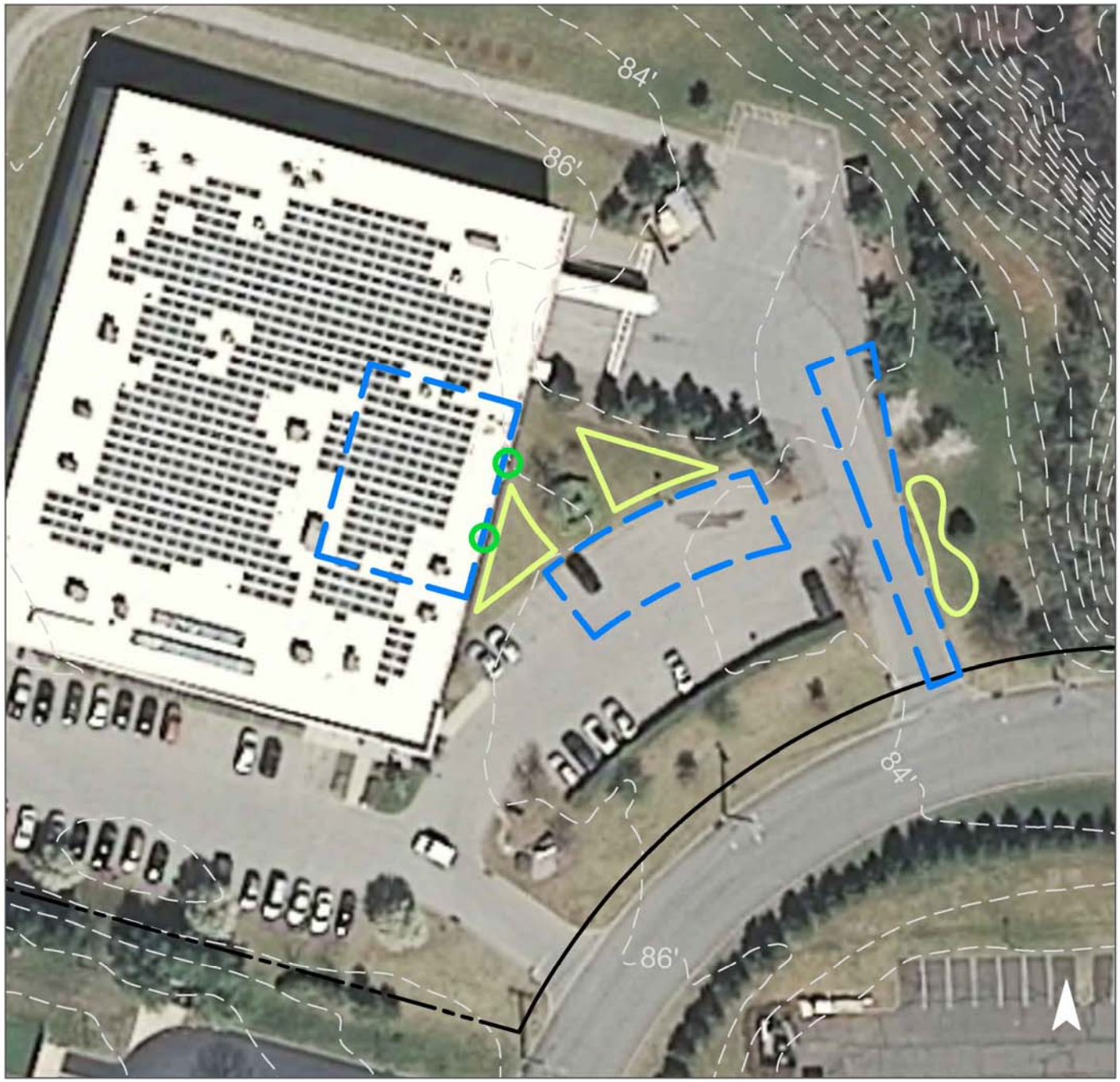
Block and Lot: Block 200.06, Lot 17

Several rain gardens could capture, treat, and infiltrate runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
44	116,673	5.6	58.9	535.7	0.091	3.20

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	0.254	43	18,850	0.71	1,870	$9,350

GREEN INFRASTRUCTURE RECOMMENDATIONS



RC Fine Foods Inc.

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

0 30' 60'

SHOPPING COMPLEX OF AMWELL

Subwatershed: Royce Brook

Site Area: 183,956 sq. ft.

Address: 450 Amwell Road
Hillsborough, NJ 08844

Block and Lot: Block 178, Lot 12.01

Pervious pavement could infiltrate stormwater runoff from the parking lots. 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"
69	126,308	6.1	63.8	579.9	0.098	3.46

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	1.315	220	97,390	3.66	8,050	$201,250

GREEN INFRASTRUCTURE RECOMMENDATIONS

Shopping Complex of Amwell

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

0 50' 100'

SUNNYMEAD ELEMENTARY SCHOOL

Subwatershed: Royce Brook

Site Area: 1,383,391 sq. ft.

Address: 55 Sunnymeade Road
Hillsborough, NJ 08844

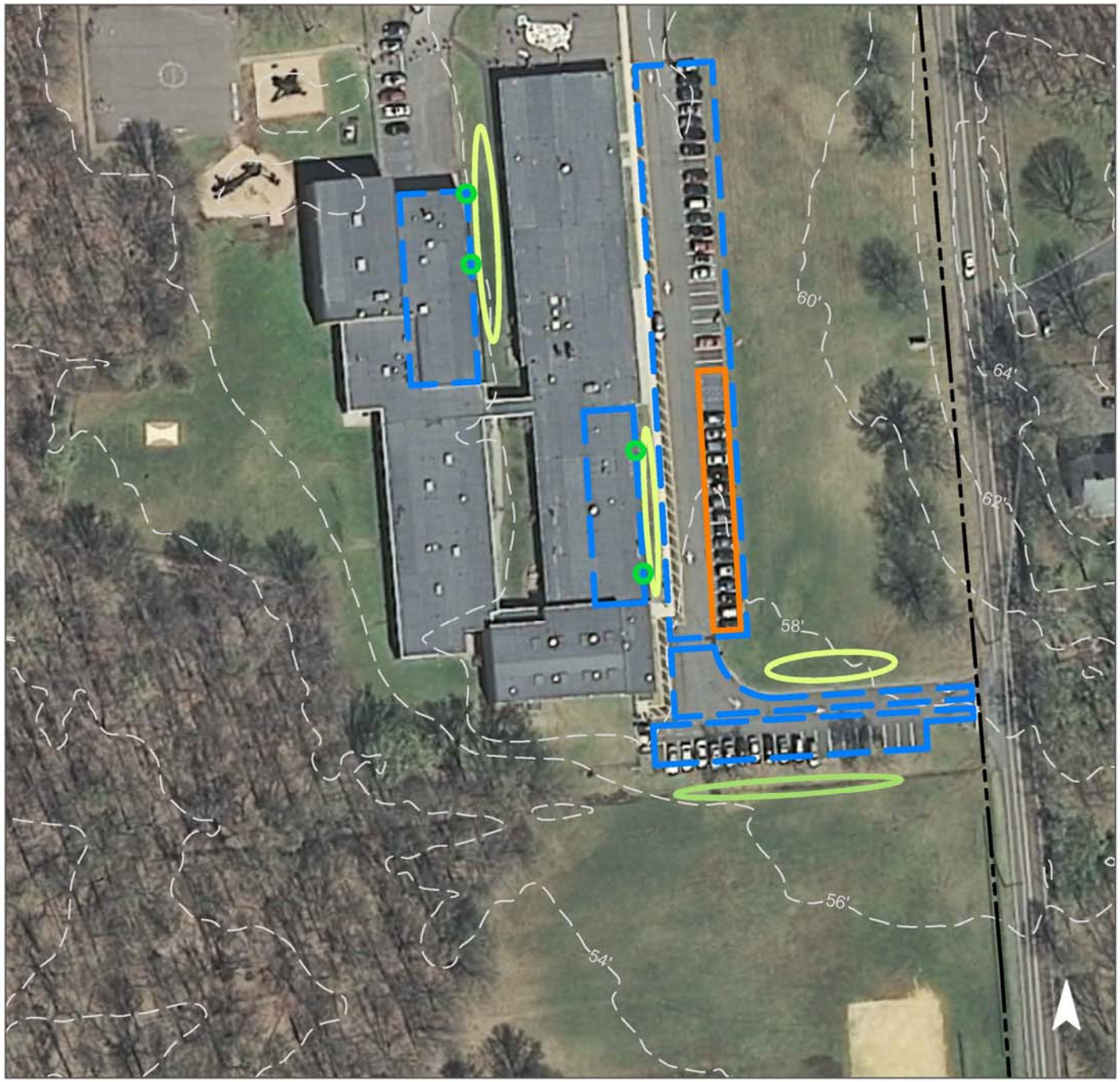
Block and Lot: Block 129, Lot 1.01

The installation of rain gardens and a bioswale can capture, treat, and infiltrate stormwater. Parking spaces can be replaced with pervious pavement to capture and infiltrate stormwater. A preliminary soil assessment suggests that the soils have suitable 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"
9	121,741	5.9	61.5	559.0	0.095	3.34

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 systems	0.332	56	24,609	0.92	3,250	$16,250
Bioswales	0.122	20	9,051	0.34	1,240	$6,200
Pervious pavements	0.498	83	36,839	1.39	3,070	$76,750

GREEN INFRASTRUCTURE RECOMMENDATIONS



Sunnymead Elementary School

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

0 50' 100'

US POST OFFICE

Subwatershed: Royce Brook

Site Area: 182,827 sq. ft.

Address: 437 Amwell Road
Hillsborough, NJ 08844

Block and Lot: Block 163.22, Lot 39

Pervious pavement could infiltrate runoff from the parking lots. A rain garden could 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"
71	130,614	6.3	66.0	599.7	0.102	3.58

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	0.097	16	7,218	0.27	840	$4,200
Pervious pavements	1.446	242	107,076	4.03	9,850	$246,250

GREEN INFRASTRUCTURE RECOMMENDATIONS

US Post Office

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

0 40' 80'

d. Summary of Existing Conditions

Summary of Existing Site Conditions

Subwatershed/Site Name/Total Site Info/GI Practice	Area (ac)	Area (SF)	Block	Lot	Existing Annual Loads			I.C. %	I.C. Area (ac)	I.C. Area (SF)	Runoff Volumes from I.C.	
					TP (lb/yr)	TN (lb/yr)	TSS (lb/yr)				Water Quality Storm (1.25" over 2-hours) (Mgal)	Annual (Mgal)
LOWER RARITAN RIVER SUBWATERSHED	**293.19**	**12,771,159**			**6.5**	**67.6**	**614.4**		**3.07**	**133,809**	**0.104**	**3.67**
Duke Farms: Cottages												
Total Site Info	293.19	12,771,159			6.5	67.6	614.4	1	3.07	133,809	0.104	3.67
PIKE RUN SUBWATERSHED	**13.06**	**568,820**			**10.9**	**114.2**	**1,038.3**		**5.19**	**226,144**	**0.176**	**6.20**
Hillsborough Star Diner												
Total Site Info	1.49	64,863	177.00	22.01	1.7	18.1	164.4	55	0.82	35,811	0.028	0.98
Mountain View Plaza												
Total Site Info	11.57	503,957	177.00	24.02	9.2	96.1	873.9	38	4.37	190,333	0.148	5.22
ROYCE BROOK SUBWATERSHED	**312.90**	**13,630,019**			**205.3**	**2,150.5**	**19,550.2**		**97.75**	**4,258,035**	**3.318**	**116.78**
Auten Road School												
Total Site Info	48.87	2,128,895	150.00	10.00	14.2	149.3	1,356.9	14	6.78	295,524	0.230	8.11
Boro Kid Zone												
Total Site Info	2.03	88,617	200.05	6.00	2.7	28.7	260.8	64	1.30	56,801	0.044	1.56
Claremont Towers												
Total Site Info	4.75	206,854	163.05	1.02	7.5	78.2	710.7	75	3.55	154,795	0.121	4.25
Corporate Building												
Total Site Info	10.10	439,945	200.02	1.00	8.1	85.2	774.2	38	3.87	168,631	0.131	4.62
Doctors Way Offices												
Total Site Info	1.98	86,343	182.00	38.01	2.0	20.5	186.5	47	0.93	40,617	0.032	1.11
Eves Drive												
Total Site Info	18.82	819,986	163.05	1.01	23.0	241.2	2,192.7	58	10.96	477,575	0.372	13.10
Fire Department and Radiology Office												
Total Site Info	9.80	426,889	181.00	3.00	5.7	60.0	545.2	28	2.73	118,740	0.093	3.26

Summary of Existing Site Conditions

Subwatershed/Site Name/Total Site Info/GI Practice	Area (ac)	Area (SF)	Block	Lot	Existing Annual Loads			I.C. %	I.C. Area (ac)	I.C. Area (SF)	Runoff Volumes from I.C.	
					TP (lb/yr)	TN (lb/yr)	TSS (lb/yr)				Water Quality Storm (1.25" over 2-hours) (Mgal)	Annual (Mgal)
Harold Docherty Memorial Park												
Total Site Info	15.48	674,117	142.00	23.03	3.2	33.3	303.0	10	1.51	65,983	0.051	1.81
Hillsborough Business Center: Building 29												
Total Site Info	2.28	99,120	200.02	5.00	4.0	41.9	381.1	84	1.91	83,001	0.065	2.28
Hillsborough Business Center: Building 30												
Total Site Info	1.71	74,485	200.02	6.00	2.5	26.4	239.6	70	1.20	52,191	0.041	1.43
Hillsborough Center												
Total Site Info	17.31	753,916	200.10	5.02	18.3	191.6	1,741.5	50	8.71	379,304	0.296	10.40
Hillsborough High School												
Total Site Info	46.70	2,034,108	177.02	1.01	39.3	411.6	3,742.2	40	18.71	815,061	0.635	22.35
Hillsborough Middle School & Triangle Elementary												
Total Site Info	40.37	1,758,653	155.00	42.00	24.3	254.1	2,309.6	29	11.55	503,027	0.392	13.80
Hillsborough Municipal Building and Library												
Total Site Info	32.08	1,397,452	149.01	1.02	14.7	153.9	1,398.9	22	6.99	304,677	0.237	8.36
JK Design												
Total Site Info	2.40	104,713	163.22	41.00	1.2	12.3	111.8	23	0.56	24,350	0.019	0.67
Mary Mother of God Church												
Total Site Info	9.50	413,984	151.00	12.01	9.3	96.9	881.0	46	4.41	191,884	0.150	5.26
Paramount Gymnastics												
Total Site Info	2.50	109,039	142.00	23.20	1.5	15.4	140.2	28	0.70	30,538	0.024	0.84
RC Fine Foods Inc.												
Total Site Info	6.03	262,729	200.06	17.00	5.6	58.9	535.7	44	2.68	116,673	0.091	3.20
Shopping Complex of Amwell												
Total Site Info	4.22	183,956	178.00	12.01	6.1	63.8	579.9	69	2.90	126,308	0.098	3.46

Summary of Existing Site Conditions

Subwatershed/Site Name/Total Site Info/GI Practice	Area (ac)	Area (SF)	Lot	Block	Existing Annual Loads			I.C. %	I.C. Area (ac)	I.C. Area (SF)	Runoff Volumes from I.C.	
					TP (lb/yr)	TN (lb/yr)	TSS (lb/yr)				Water Quality Storm (1.25" over 2-hours) (Mgal)	Annual (Mgal)
Sunnymead Elementary School												
Total Site Info	31.76	1,383,391	1.01	129.00	5.9	61.5	559.0	9	2.79	121,741	0.095	3.34
US Post Office												
Total Site Info	4.20	182,827	39.00	163.22	6.3	66.0	599.7	71	3.00	130,614	0.102	3.58

e. Summary of Proposed Green Infrastructure Practices

Summary of Proposed Green Infrastructure Practices

	Subwatershed/Site Name/Total Site Info/GI Practice	Potential Management Area Area (SF)	Potential Management Area Area (ac)	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Max Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cfs)	Size of BMP (SF)	Unit Cost ($)	Unit	Total Cost ($)	I.C. Treated %
	LOWER RARITAN RIVER SUBWATERSHED	**1,455**	**0.03**	**0.038**	**6**	**2,805**	**0.11**	**3,500**			**$17,500**	**1.1%**
1	**Duke Farms: Cottages**											
	Bioretention systems/rain gardens	1,455	0.03	0.038	6	2,805	0.11	3,500	5	SF	$17,500	1.1%
	Total Site Info	**1,455**	**0.03**	**0.038**	**6**	**2,805**	**0.11**	**3,500**			**$17,500**	**1.1%**
	PIKE RUN SUBWATERSHED	**85,675**	**1.97**	**2.232**	**374**	**165,308**	**6.21**	**18,460**			**$271,800**	**37.9%**
2	**Hillsborough Star Diner**											
	Bioretention systems/rain gardens	5,475	0.13	0.143	24	10,547	0.40	1,420	5	SF	$7,100	15.3%
	Pervious pavements	24,555	0.56	0.640	107	47,386	1.78	5,115	25	SF	$127,875	68.6%
	Total Site Info	**30,030**	**0.69**	**0.782**	**131**	**57,933**	**2.18**	**6,535**			**$134,975**	**83.9%**
3	**Mountain View Plaza**											
	Bioretention systems/rain gardens	32,430	0.74	0.845	141	62,570	2.35	8,065	5	SF	$40,325	17.0%
	Pervious pavements	23,215	0.53	0.605	101	44,805	1.68	3,860	25	SF	$96,500	12.2%
	Total Site Info	**55,645**	**1.28**	**1.450**	**243**	**107,375**	**4.03**	**11,925**			**$136,825**	**29.2%**
	ROYCE BROOK SUBWATERSHED	**842,040**	**19.33**	**21.940**	**3,673**	**1,592,864**	**60.71**	**166,485**			**$2,923,125**	**19.8%**
4	**Auten Road School**											
	Bioretention systems/rain gardens	28,815	0.66	0.751	126	55,576	2.09	7,500	5	SF	$37,500	9.8%
	Pervious pavements	26,895	0.62	0.701	117	51,911	1.95	4,615	25	SF	$115,375	9.1%
	Total Site Info	**55,710**	**1.28**	**1.452**	**243**	**107,488**	**4.04**	**12,115**			**$152,875**	**18.9%**
5	**Boro Kid Zone**											
	Bioretention systems/rain gardens	17,140	0.39	0.447	75	33,062	1.24	4,600	5	SF	$23,000	30.2%
	Pervious pavements	18,520	0.43	0.483	81	35,754	1.34	2,680	25	SF	$67,000	32.6%
	Total Site Info	**35,660**	**0.82**	**0.929**	**156**	**68,816**	**2.58**	**7,280**			**$90,000**	**62.8%**
6	**Claremont Towers**											
	Bioretention systems/rain gardens	1,425	0.03	0.037	6	2,768	0.10	350	5	SF	$1,750	0.9%
	Pervious pavements	42,510	0.98	1.108	185	82,018	3.08	6,700	25	SF	$167,500	27.5%
	Total Site Info	**43,935**	**1.01**	**1.145**	**192**	**84,786**	**3.18**	**7,050**			**$169,250**	**28.4%**

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)									
7	**Corporate Building**											
	Bioretention systems/rain gardens	8,980	0.21	0.234	39	17,324	0.65	2,090	5	SF	$10,450	5.3%
	Bioswales	10,540	0.24	0.275	46	20,338	0.76	2,510	5	SF	$12,550	6.3%
	Pervious pavements	35,550	0.82	0.926	155	68,592	2.58	6,475	25	SF	$161,875	21.1%
	Total Site Info	**55,070**	**1.26**	**1.435**	**240**	**106,254**	**3.99**	**11,075**			**$184,875**	**32.7%**
8	**Doctors Way Offices**											
	Bioretention systems/rain gardens	6,870	0.16	0.179	30	13,240	0.50	1,890	5	SF	$9,450	16.9%
	Pervious pavements	12,700	0.29	0.331	55	24,497	0.92	2,430	25	SF	$60,750	31.3%
	Total Site Info	**19,570**	**0.45**	**0.510**	**85**	**37,737**	**1.42**	**4,320**			**$70,200**	**48.2%**
9	**Eves Drive**											
	Pervious pavements	20,820	0.48	0.542	91	40,168	1.51	3,330	25	SF	$83,250	4.4%
	Total Site Info	**20,820**	**0.48**	**0.542**	**91**	**40,168**	**1.51**	**3,330**			**$83,250**	**4.4%**
10	**Fire Department and Radiology Office**											
	Bioswales	14,010	0.32	0.365	61	27,040	1.02	3,950	5	SF	$19,750	11.8%
	Pervious pavements	37,590	0.86	0.979	164	72,519	2.73	7,275	25	SF	$181,875	31.7%
	Rainwater harvesting systems	3,360	0.08	0.088	15	4,000	0.24	4,000	2	gal	$8,000	2.8%
	Total Site Info	**54,960**	**1.26**	**1.432**	**240**	**103,559**	**3.99**	**15,225**			**$209,625**	**46.3%**
11	**Harold Docherty Memorial Park**											
	Bioretention systems/rain gardens	550	0.01	0.014	2	1,047	0.04	130	5	SF	$650	0.8%
	Pervious pavements	17,040	0.39	0.444	74	32,875	1.24	2,915	25	SF	$72,875	25.8%
	Total Site Info	**17,590**	**0.40**	**0.458**	**77**	**33,922**	**1.28**	**3,045**			**$73,525**	**26.7%**
12	**Hillsborough Business Center: Building 29**											
	Pervious pavements	47,980	1.10	1.250	209	63,131	2.37	8,780	25	SF	$219,500	57.8%
	Total Site Info	**47,980**	**1.10**	**1.250**	**209**	**63,131**	**2.37**	**8,780**			**$219,500**	**57.8%**
13	**Hillsborough Business Center: Building 30**											
	Pervious pavements	32,720	0.75	0.853	143	63,131	2.37	5,655	25	SF	$141,375	62.7%
	Total Site Info	**32,720**	**0.75**	**0.853**	**143**	**63,131**	**2.37**	**5,655**			**$141,375**	**62.7%**
14	**Hillsborough Center**											
	Bioretention systems/rain gardens	3,120	0.07	0.081	14	6,021	0.23	765	5	SF	$3,825	0.8%
	Total Site Info	**3,120**	**0.07**	**0.081**	**14**	**6,021**	**0.23**	**765**			**$3,825**	**0.8%**

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)									
15	**Hillsborough High School**											
	Bioretention systems/rain gardens	25,875	0.59	0.674	113	49,929	1.88	5,925	5	SF	$29,625	3.2%
	Bioswales	4,585	0.11	0.119	20	8,864	0.33	1,210	5	SF	$6,050	0.6%
	Pervious pavements	34,550	0.79	0.900	151	66,647	2.51	6,100	25	SF	$152,500	4.2%
	Total Site Info	**65,010**	**1.49**	**1.694**	**284**	**125,440**	**4.72**	**13,235**			**$188,175**	**8.0%**
16	**Hillsborough Middle School**											
	Bioretention systems/rain gardens	12,240	0.28	0.319	53	23,637	0.89	4,410	5	SF	$22,050	2.4%
	Pervious pavements	45,910	1.05	1.196	200	88,563	3.33	7,100	25	SF	$177,500	9.1%
	Total Site Info	**58,150**	**1.33**	**1.515**	**254**	**112,200**	**4.22**	**11,510**			**$199,550**	**11.6%**
17	**Triangle Elementary School**											
	Bioretention systems/rain gardens	21,530	0.49	0.561	94	41,551	1.56	6,050	5	SF	$30,250	4.3%
	Pervious pavements	13,240	0.30	0.345	58	25,544	0.96	2,400	25	SF	$60,000	2.6%
	Total Site Info	**34,770**	**0.80**	**0.906**	**152**	**67,096**	**2.52**	**8,450**			**$90,250**	**6.9%**
18	**Hillsborough Municipal Building and Library**											
	Bioretention systems/rain gardens	23,430	0.54	0.610	102	45,217	1.70	5,920	5	SF	$29,600	7.7%
	Pervious pavements	38,300	0.88	0.998	167	73,902	2.78	6,950	25	SF	$173,750	12.6%
	Total Site Info	**61,730**	**1.42**	**1.608**	**269**	**119,119**	**4.48**	**12,870**			**$203,350**	**20.3%**
19	**JK Design**											
	Bioretention systems/rain gardens	1,050	0.02	0.027	5	2,020	0.09	300	5	SF	$1,500	4.3%
	Total Site Info	**1,050**	**0.02**	**0.027**	**5**	**2,020**	**0.09**	**300**			**$1,500**	**4.3%**
20	**Mary Mother of God Church**											
	Bioretention systems/rain gardens	9,690	0.22	0.252	42	18,700	0.82	2,550	5	SF	$12,750	5.0%
	Pervious pavements	49,095	1.13	1.279	214	94,772	4.17	8,580	25	SF	$214,500	25.6%
	Total Site Info	**58,785**	**1.35**	**1.532**	**256**	**113,472**	**4.99**	**11,130**			**$227,250**	**30.6%**
21	**Paramount Gymnastics**											
	Pervious pavements	19,410	0.45	0.506	85	37,475	1.41	2,180	25	SF	$54,500	63.6%
	Total Site Info	**19,410**	**0.45**	**0.506**	**85**	**37,475**	**1.41**	**2,180**			**$54,500**	**63.6%**
22	**RC Fine Foods Inc.**											
	Bioretention systems/rain gardens	9,765	0.22	0.254	43	18,850	0.71	1,870	5	SF	$9,350	8.4%
	Total Site Info	**9,765**	**0.22**	**0.254**	**43**	**18,850**	**0.71**	**1,870**			**$9,350**	**8.4%**

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)									
23	**Shopping Complex of Amwell**											
	Pervious pavements	50,475	1.16	1.315	220	97,390	3.66	8,050	25	SF	$201,250	40.0%
	Total Site Info	**50,475**	**1.16**	**1.315**	**220**	**97,390**	**3.66**	**8,050**			**$201,250**	**40.0%**
24	**Sunnymead Elementary School**											
	Bioretention systems/rain gardens	12,745	0.29	0.332	56	24,609	0.92	3,250	5	SF	$16,250	10.5%
	Bioswales	4,685	0.11	0.122	20	9,051	0.34	1,240	5	SF	$6,200	3.8%
	Pervious pavements	19,100	0.44	0.498	83	36,839	1.39	3,070	25	SF	$76,750	15.7%
	Total Site Info	**36,530**	**0.84**	**0.952**	**159**	**70,499**	**2.65**	**7,560**			**$99,200**	**30.0%**
25	**US Post Office**											
	Bioretention systems/rain gardens	3,740	0.09	0.097	16	7,218	0.27	840	5	SF	$4,200	2.9%
	Pervious pavements	55,490	1.27	1.446	242	107,076	4.03	9,850	25	SF	$246,250	42.5%
	Total Site Info	**59,230**	**1.36**	**1.543**	**258**	**114,294**	**4.30**	**10,690**			**$250,450**	**45.3%**