RUTGERS
New Jersey Agricultural
Experiment Station

Draft

Impervious Cover Reduction Action Plan for Westfield, Union County, New Jersey

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

March 19, 2020

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Introduction

Located in Union County, New Jersey, Westfield covers approximately 6.79 square miles. Figures 1 and 2 illustrate that Westfield is dominated by urban land use. A total of 91.9% of the municipality's land use is classified as urban. Of the urban land in Westfield, medium density residential is the dominant land use (Figure 3).

The New Jersey Department of Environmental Protection's (NJDEP) 2015 land use/land cover geographical information system (GIS) data layer categorizes Westfield 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 Westfield. Based upon the 2015 NJDEP land use/land cover data, approximately 37.6% of Westfield has impervious cover. This level of impervious cover suggests that the streams in Westfield are likely non-supporting streams. [1]

Methodology

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

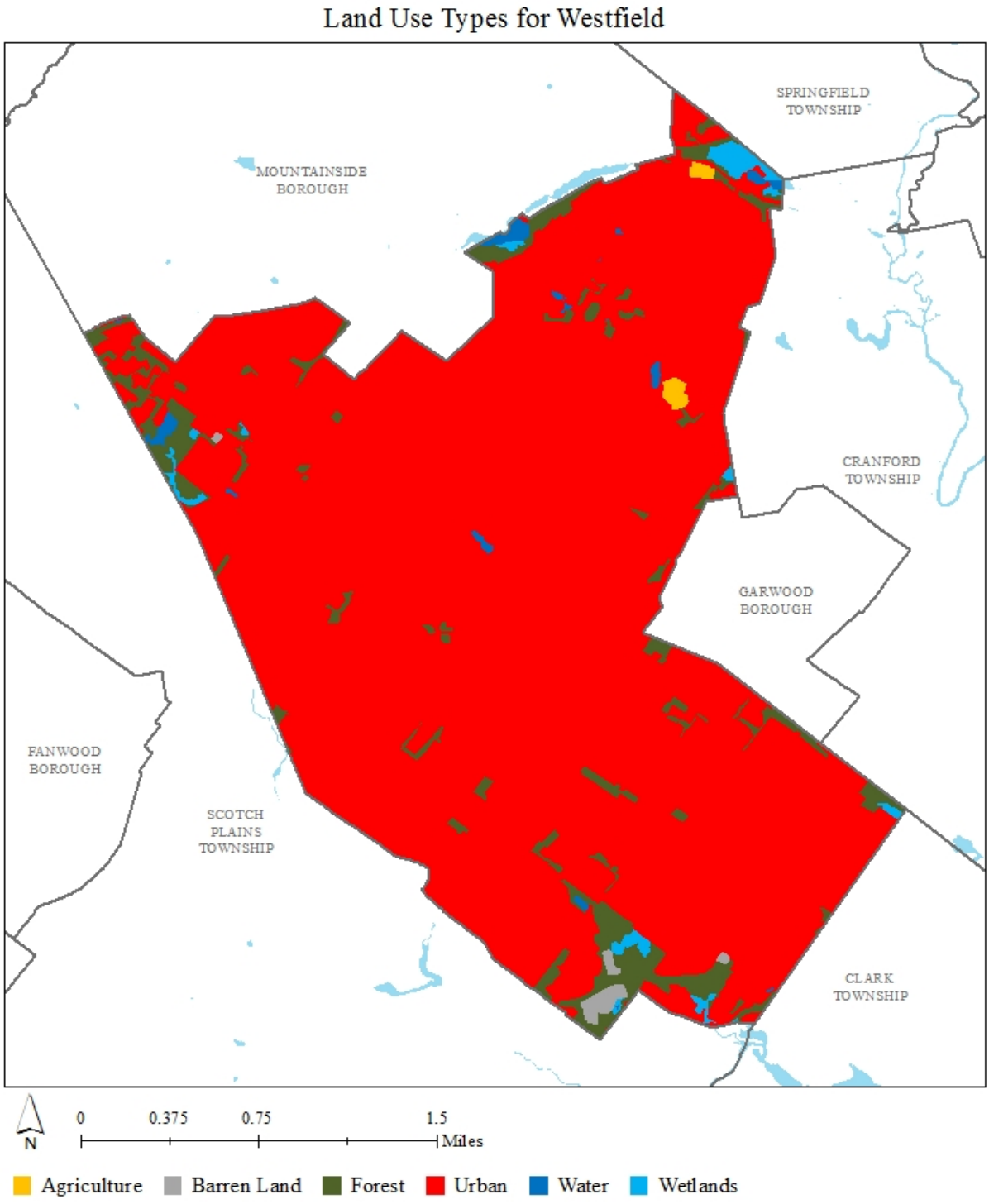


Figure 1: Map illustrating the land use in Westfield

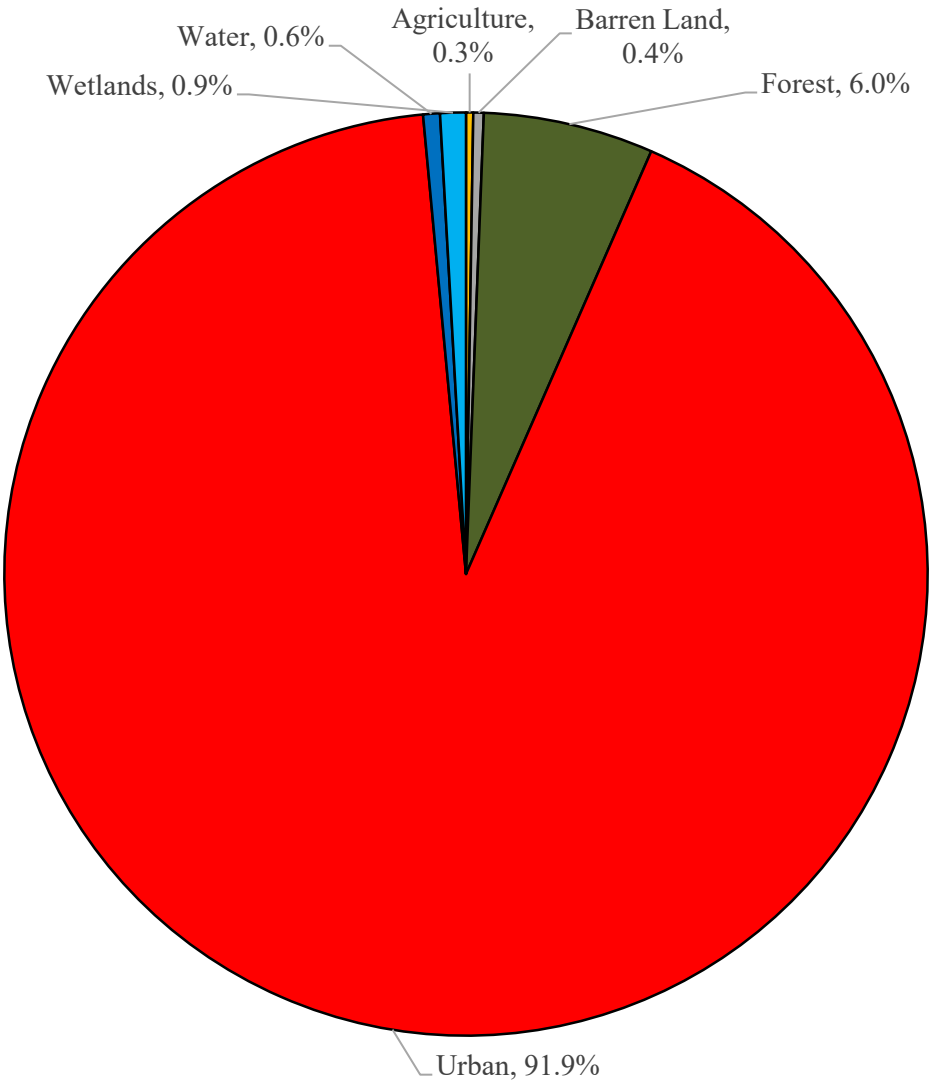


Figure 2: Pie chart illustrating the land use in Westfield

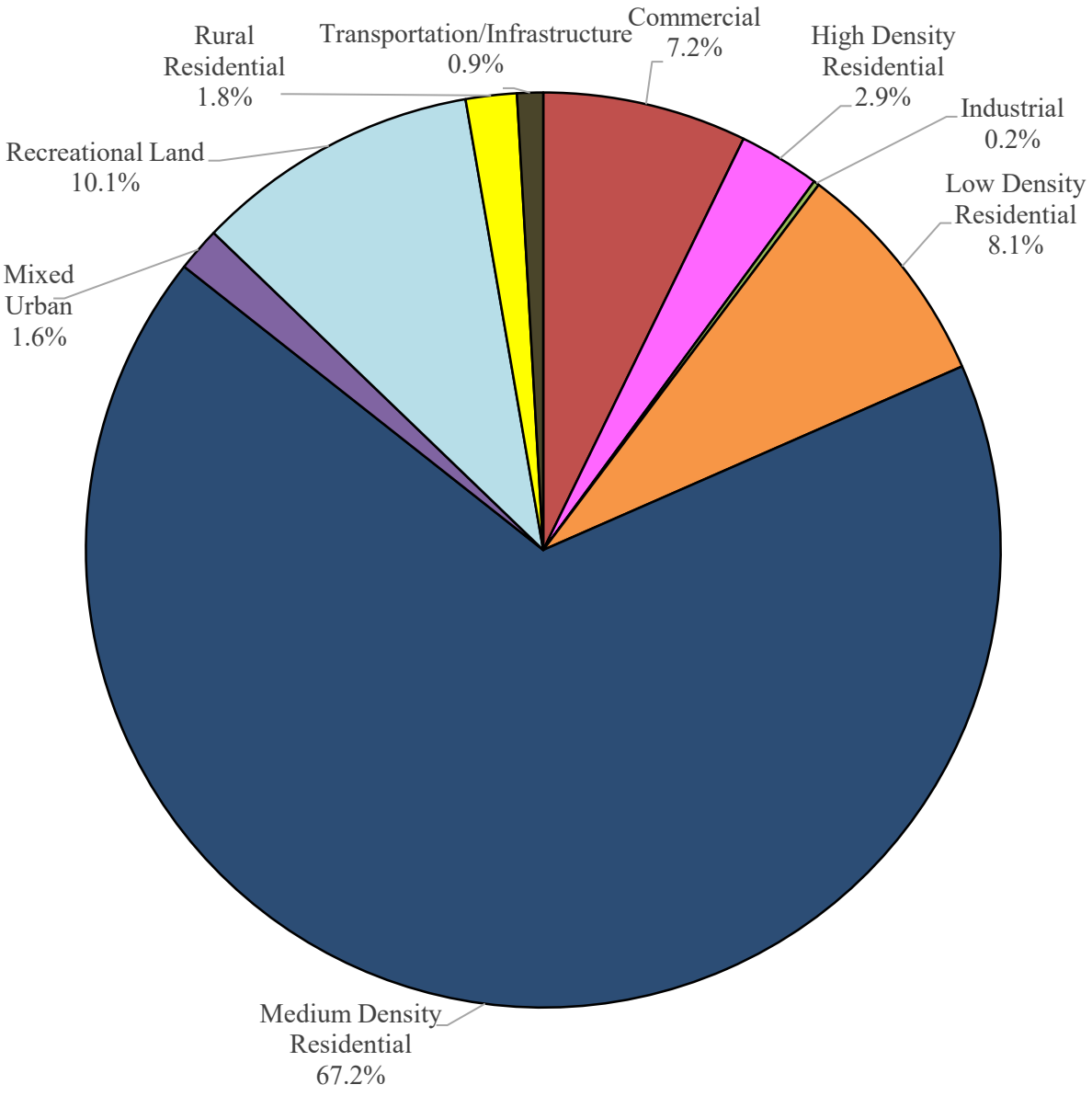


Figure 3: Pie chart illustrating the various types of urban land use in Westfield

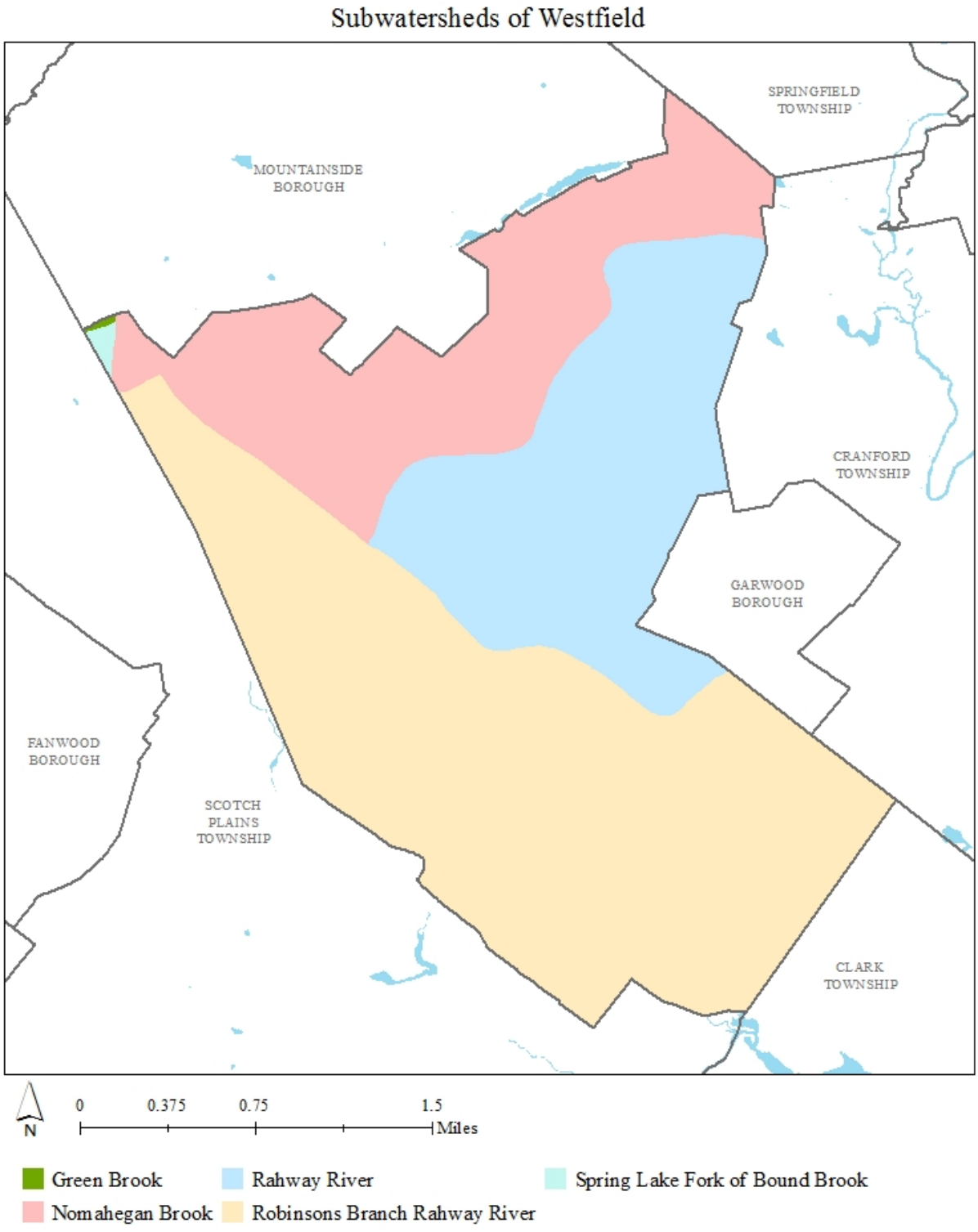


Figure 4: Map of the subwatersheds in Westfield

For each potential project site, specific aerial loading coefficients for commercial land use were used to determine the annual runoff loads for total phosphorus (TP), total nitrogen (TN), and total suspended solids (TSS) from impervious surfaces (Table 1). These are the same aerial loading coefficients that NJDEP uses in developing total maximum daily loads (TMDLs) for impaired waterways of the state. The percentage of impervious cover for each site was extracted from the 2015 NJDEP land use/land cover database. For impervious areas, runoff volumes were determined for the water quality design storm (1.25 inches of rain over two-hours) and for the annual rainfall total of 44 inches.

Preliminary soil assessments were conducted for each potential project site identified in Westfield 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 Bernardsville. 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 wildlife habitat while managing stormwater runoff. Bioretention systems also can be used in soils that do not quickly infiltrate by incorporating an underdrain into the system.

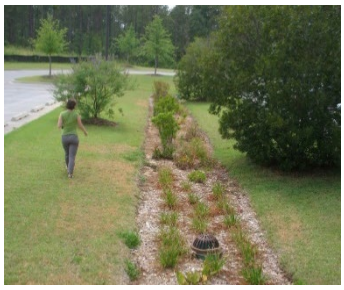
Downspout planter boxes

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

Rainwater harvesting systems (cistern or rain barrel)

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

Bioswale



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

Stormwater planters

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

Tree filter boxes

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

Potential Project Sites

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

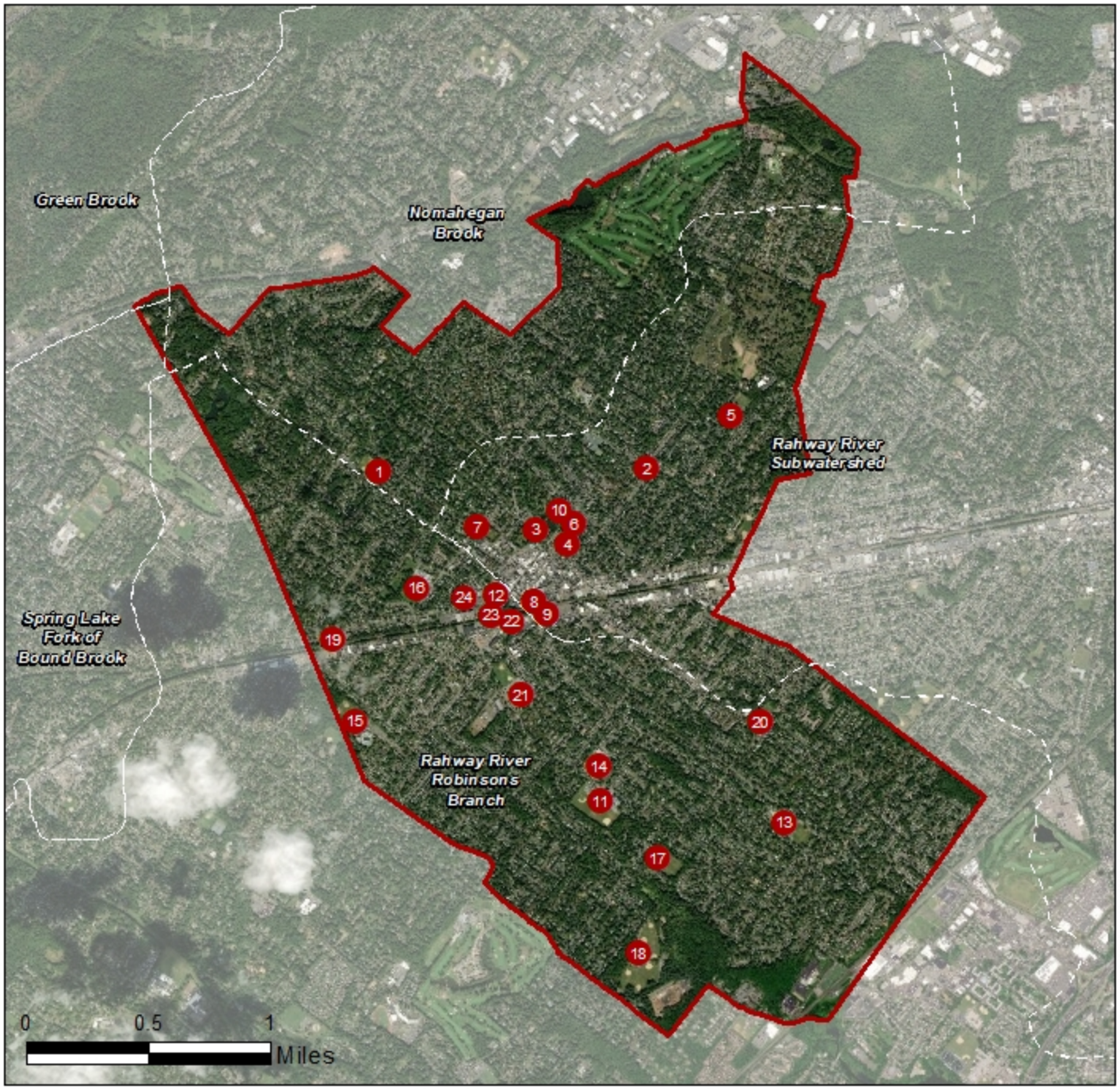
This impervious cover reduction action plan is meant to provide the municipality with a blueprint for implementing green infrastructure practices that will reduce the impact of stormwater runoff from impervious surfaces. These projects can be implemented by a wide variety of people such as boy scouts,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

Appendix A: Climate Resilient Green Infrastructure

a. Green Infrastructure Sites

WESTFIELD: GREEN INFRASTRUCTURE SITES



SITE WITHIN THE NOMAHEGAN BROOK SUBWATERSHED

1. Franklin Elementary School

SITES WITHIN THE RAHWAY RIVER SUBWATERSHED

2. 202 Benson Place
3. Presbyterian Church in Westfield
4. Saint Paul's Episcopal Church
5. Washington Elementary School
6. Westfield Area YMCA
7. Westfield Board of Education
8. Westfield Public Parking Lot #2 & #8
9. Westfield Public Parking Lot #3
10. Westfield Town Hall

SITES WITHIN THE ROBINSONS BRANCH RAHWAY RIVER SUBWATERSHED

11. Edison Intermediate School
12. First United Methodist Church Westfield
13. Jefferson Elementary School
14. Lincoln School
15. Memorial Park and Pool
16. Roosevelt Elementary School
17. Tamaques Elementary School
18. Tamaques Park
19. Westfield Department of Public Works
20. Westfield Fire Station 2
21. Westfield High School
22. Westfield South Avenue Plaza
23. Westfield WWI Memorial
24. YMCA of Westfield Parking Lot

b. Proposed Green Infrastructure Concepts

FRANKLIN ELEMENTARY SCHOOL

Subwatershed: Nomahegan Brook

Site Area: 213,060 sq. ft.

Address: 700 Prospect Street
Westfield, NJ 07090

Block and Lot: Block 603, Lot 38

Two rain gardens can be installed to capture stormwater from the rooftop of the building, and one can be installed near the existing vegetable garden to capture runoff from the driveway. A section of blacktop on the playground area can be converted to porous pavement to capture runoff from the blacktop. 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	94,107	4.5	47.5	432.1	0.073	2.58

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	0.333	56	24,430	0.92	3,200	$16,000
Pervious pavement	0.172	29	12,620	0.47	1,100	$27,500

GREEN INFRASTRUCTURE RECOMMENDATIONS

Franklin Elementary School

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

0 50' 100'

202 BENSON PLACE

Subwatershed: Rahway River

Site Area: 6,481 sq. ft.

Address: 202 Benson Place
Westfield, NJ 07090

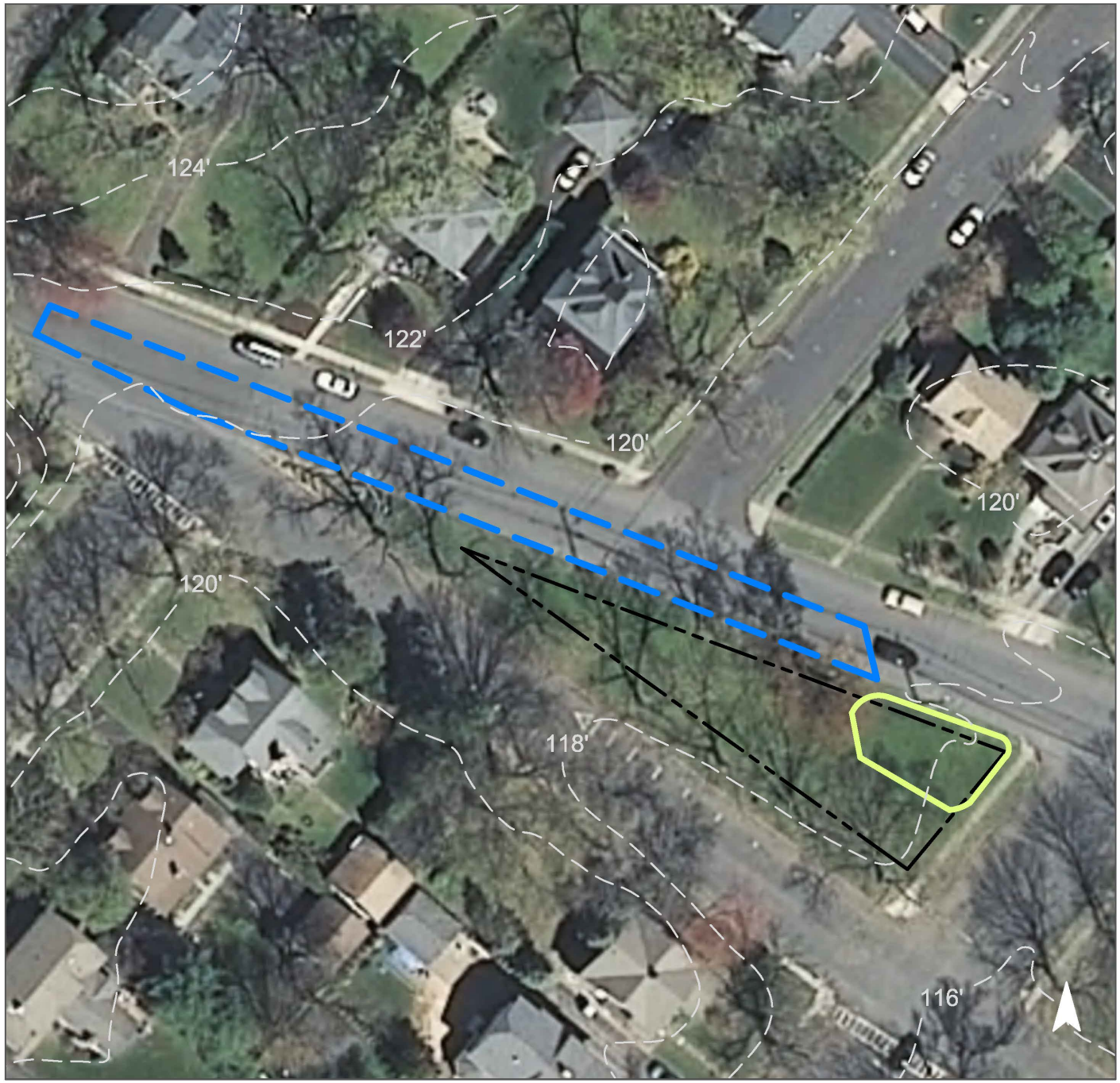
Block and Lot: Block 3509, Lot 1

A rain garden can be installed to capture stormwater from the roadway. 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"
42	2,747	0.1	1.4	12.6	0.002	0.08

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention system	0.172	29	12,620	0.47	1,650	$8,250

GREEN INFRASTRUCTURE RECOMMENDATIONS



202 Benson Place

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

0 30' 60'

PRESBYTERIAN CHURCH IN WESTFIELD

Subwatershed: Rahway River

Site Area: 195,731 sq. ft.

Address: 140 Mountain Avenue
Westfield, NJ 07090

Block and Lot: Block 2403, Lot 30

Two rain gardens can be installed in the front lawn of the building to capture stormwater from the rooftop of the building, and another can be installed to capture runoff at the main entrance. Additionally, pervious pavement can be installed in the parking spaces to capture runoff flowing down the pitched driveway area. 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	118,601	5.7	59.9	544.5	0.092	3.25

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	0.168	28	12,350	0.46	1,615	$8,075
Pervious pavement	0.401	67	29,440	1.11	2,750	$68,750

GREEN INFRASTRUCTURE RECOMMENDATIONS

Presbyterian Church in Westfield

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

0 50' 100'

SAINT PAUL'S EPISCOPAL CHURCH

Subwatershed: Rahway River

Site Area: 118,035 sq. ft.

Address: 414 East Broad Street
Westfield, NJ 07090

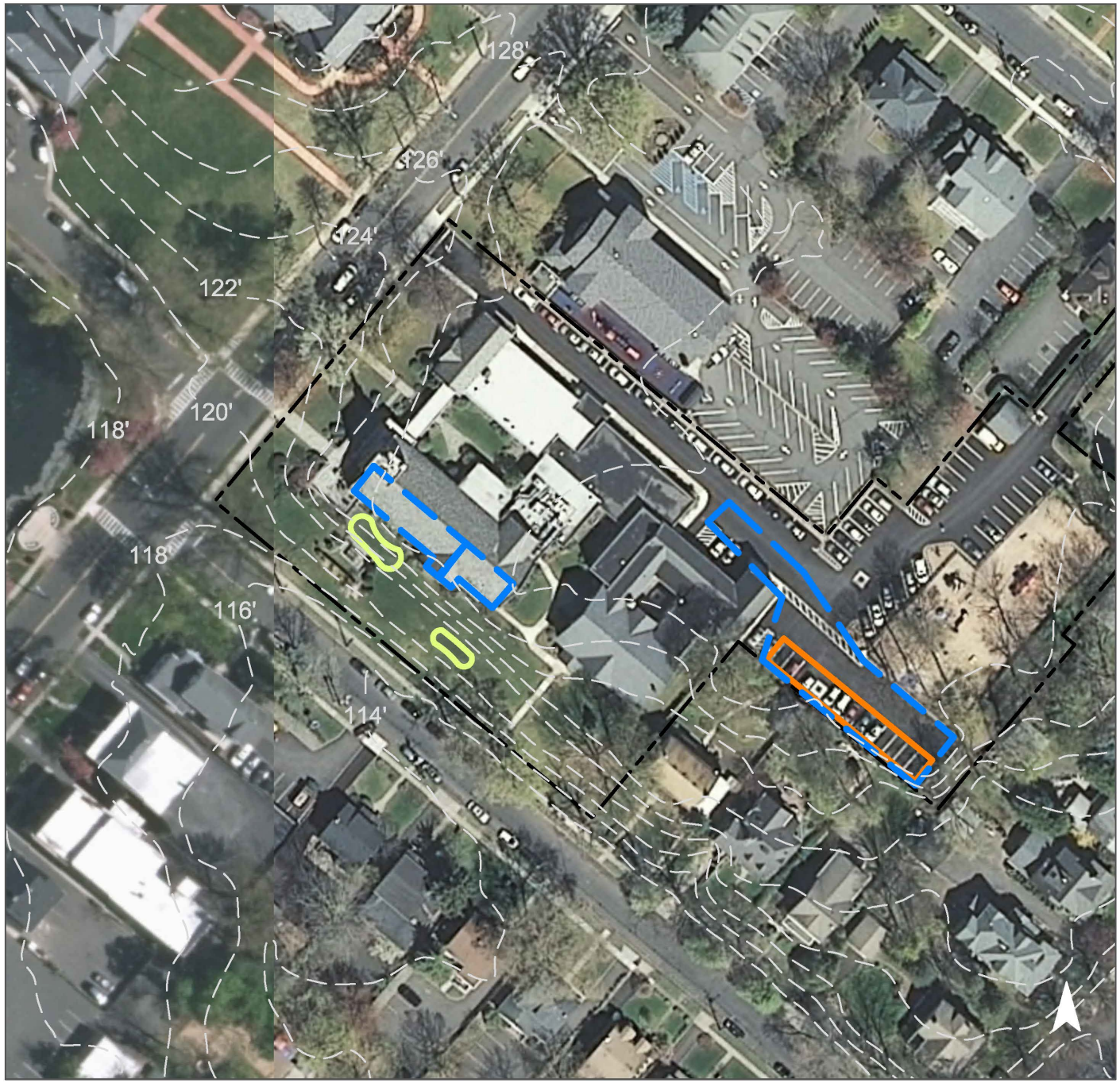
Block and Lot: Block 3109, Lot 1

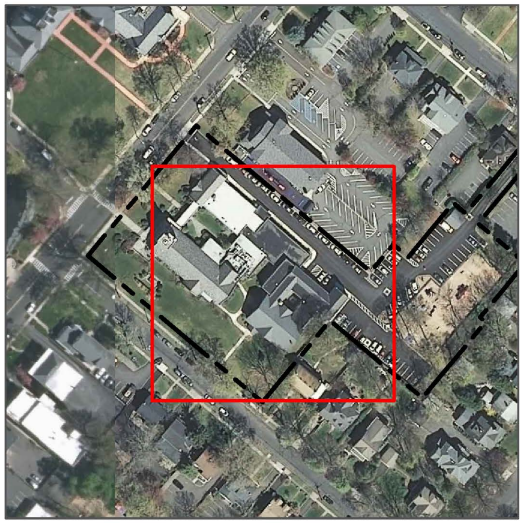
Two rain gardens can be installed in the front lawn of the building to capture stormwater from the rooftop of the building. Additionally, pervious pavement can be installed in the parking spaces to capture runoff flowing down the pitched driveway area. A preliminary soil assessment suggests that more 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	81,399	3.9	41.1	373.7	0.063	2.23

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.068	11	4,970	0.19	665	$3,325
Pervious pavement	0.331	55	24,300	0.91	2,720	$68,000

GREEN INFRASTRUCTURE RECOMMENDATIONS





Saint Paul's Episcopal Church

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

0 25' 50'

WASHINGTON ELEMENTARY SCHOOL

Subwatershed: Rahway River

Site Area: 310,021 sq. ft.

Address: 900 Saint Mark's Avenue
Westfield, NJ 07090

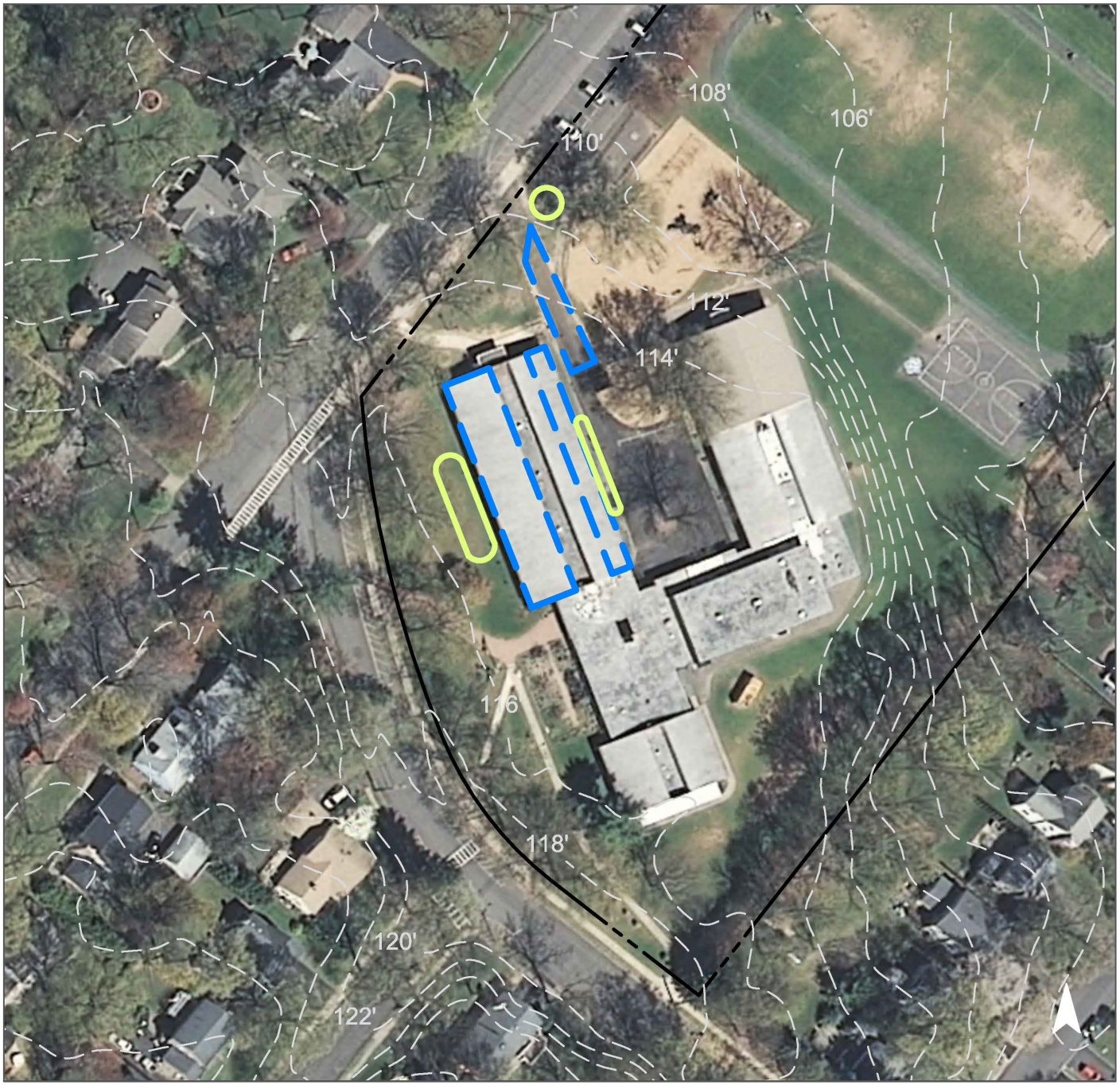
Block and Lot: Block 3601, Lot 54

Three rain garden locations have been identified for capturing stormwater runoff from the building's rooftop as well as from the impervious asphalt surfaces. 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"
25	76,159	3.7	38.5	349.7	0.059	2.09

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	0.208	35	15,300	0.57	2,000	$10,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Washington Elementary School

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

0 50' 100'

WESTFIELD AREA YMCA

Subwatershed: Rahway River

Site Area: 43,656 sq. ft.

Address: 422 East Broad Street
Westfield, NJ 07090

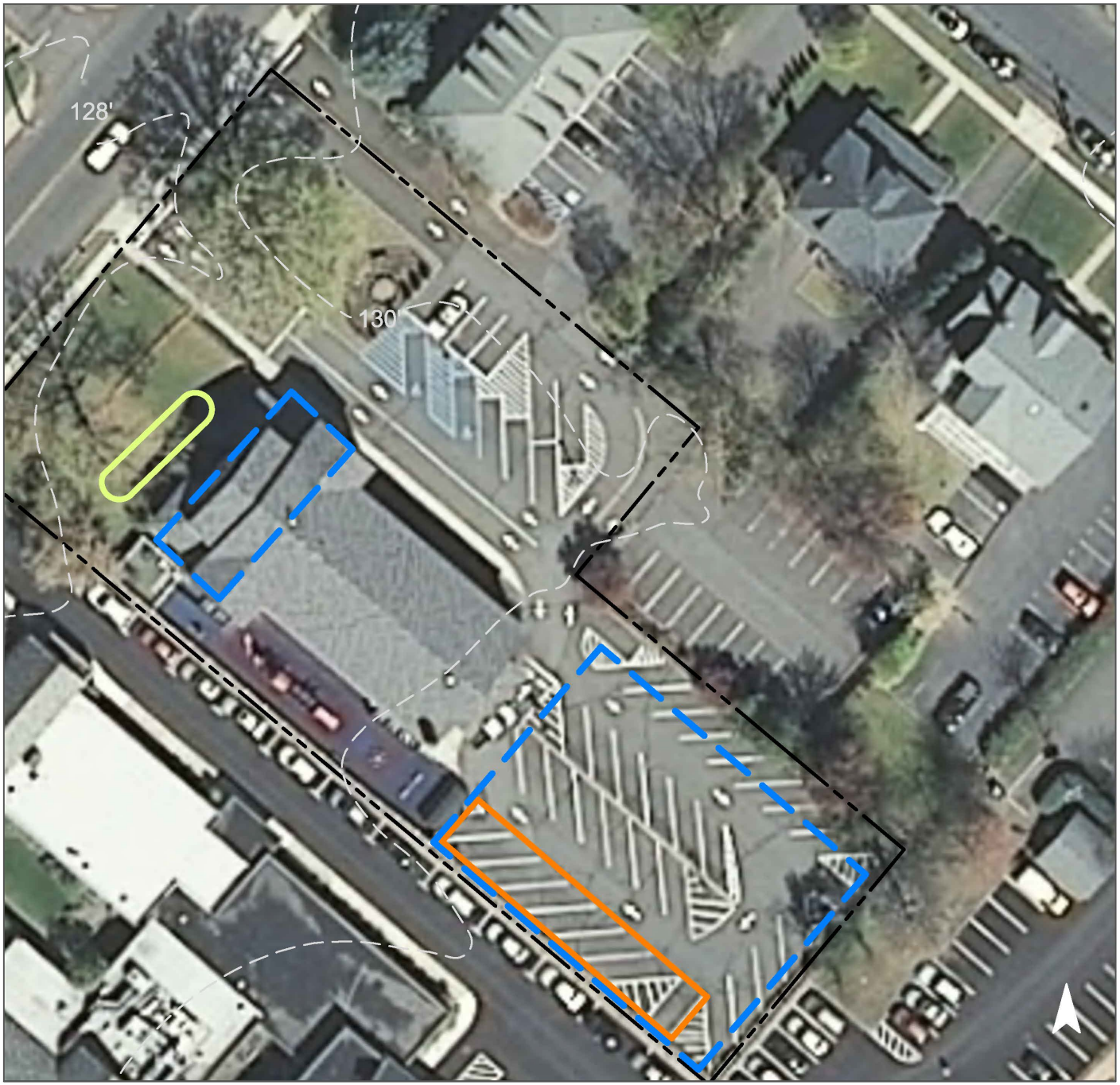
Block and Lot: Block 3109, Lot 2

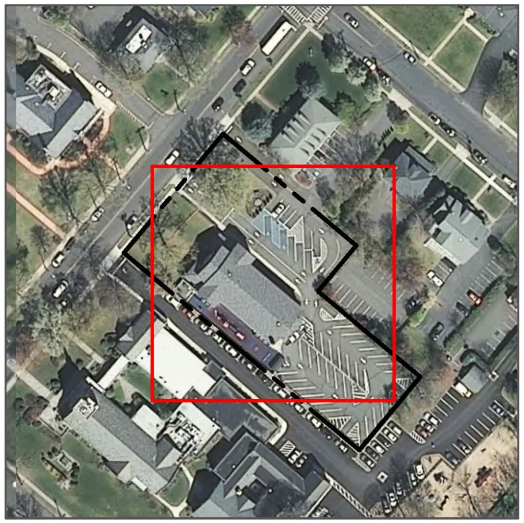
One rain garden can be installed in the front lawn of the building to capture stormwater from the rooftop of the building. Additionally, pervious pavement can be installed in the parking spaces to capture runoff flowing down the pitched driveway area. A preliminary soil assessment suggests that more 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	30,421	1.5	15.4	139.7	0.024	0.83

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	0.047	8	3,480	0.13	455	$2,275
Pervious pavement	0.260	43	19,060	0.72	1,780	$44,500

GREEN INFRASTRUCTURE RECOMMENDATIONS





Westfield Area YMCA

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

0 25' 50'

WESTFIELD BOARD OF EDUCATION

Subwatershed: Rahway River

Site Area: 52,236 sq. ft.

Address: 302 Elm Street
Westfield, NJ 07090

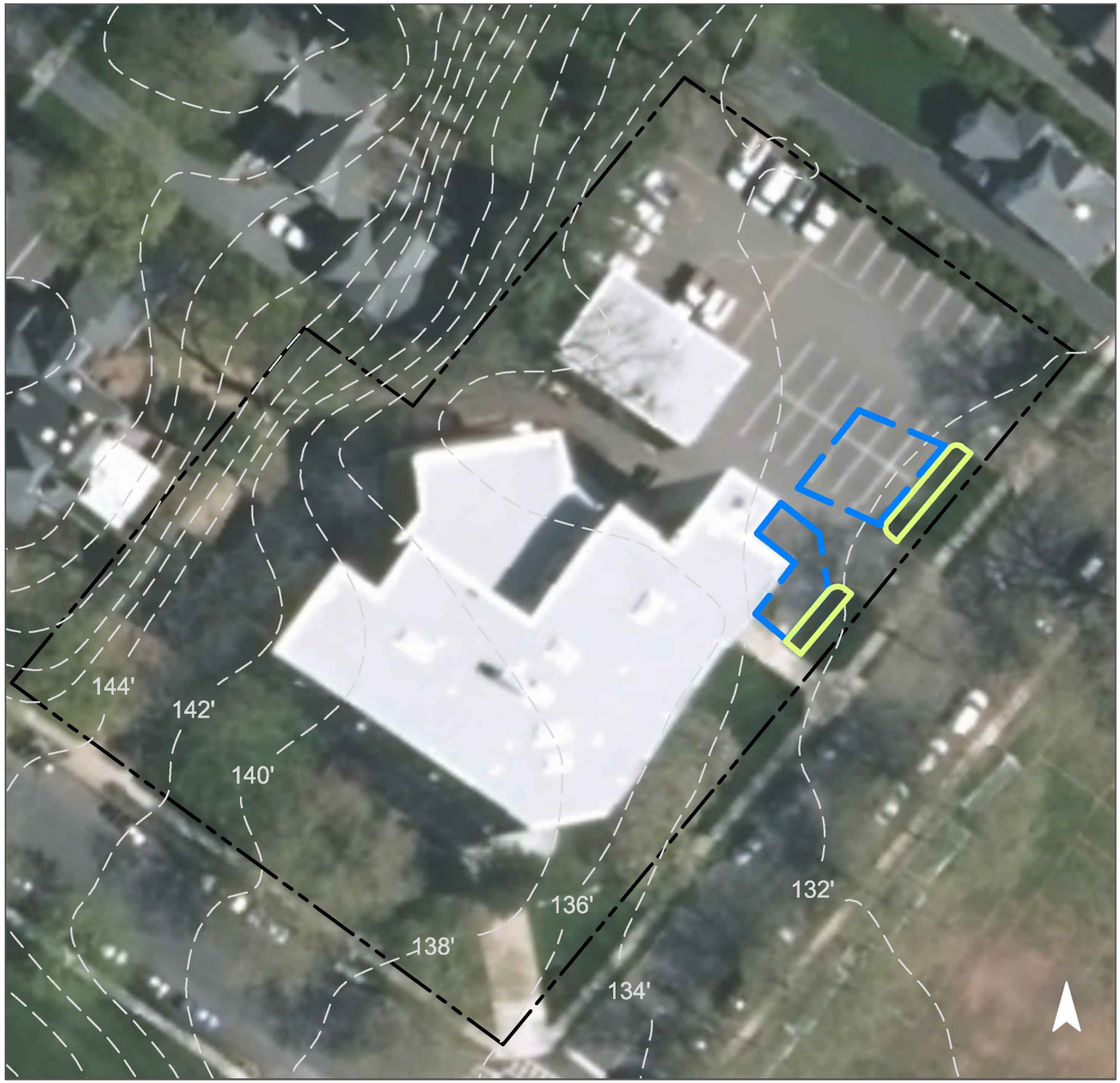
Block and Lot: Block 2401, Lot 18

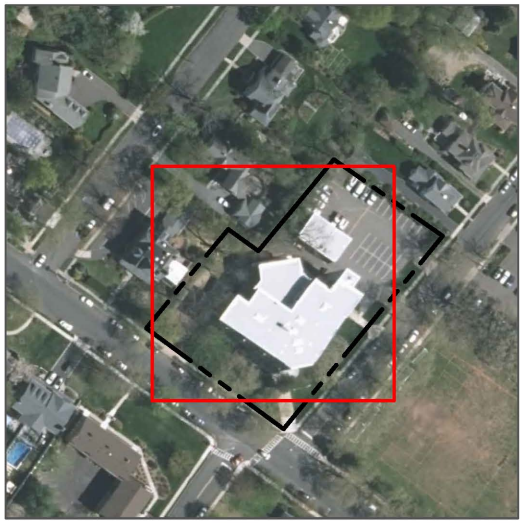
Two rain gardens can be installed in the front lawn of the building to capture stormwater from the parking lot. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

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"
74	38,479	1.9	19.4	176.7	0.030	1.06

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	0.040	7	2,910	0.11	380	$1,900

GREEN INFRASTRUCTURE RECOMMENDATIONS





Westfield Board of Education

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

0 25' 50'

WESTFIELD PUBLIC LOT #2 & #8

Subwatershed: Rahway River

Site Area: 125,935 sq. ft.

Address: 300 North Avenue West
Westfield, NJ 07090

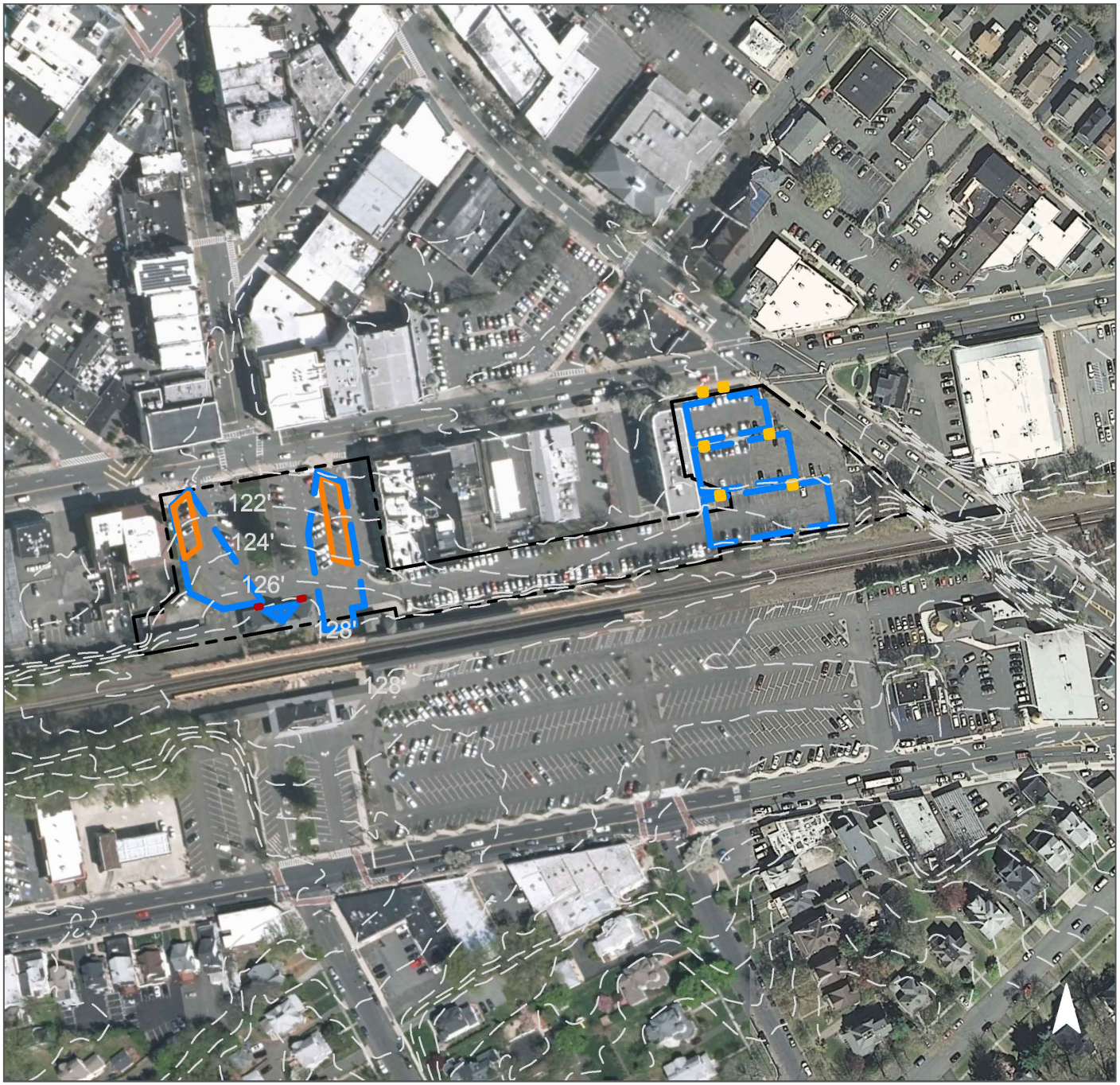
Block and Lot: Block 313, Lot 7

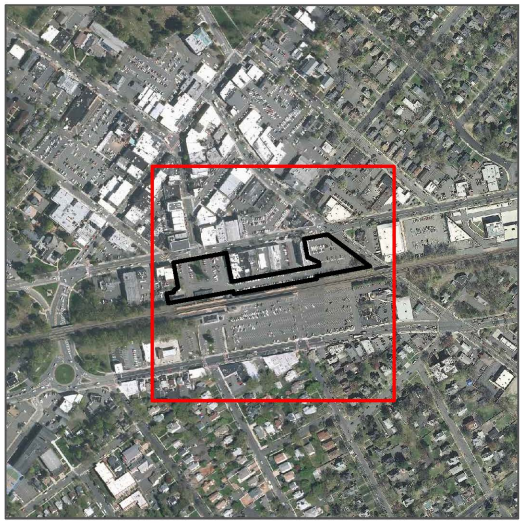
Downspout planter boxes can be installed at the station building to capture and store stormwater runoff from the roof. Additionally, lot #2 can be outfitted with pervious pavement to aid in the infiltration and capture of stormwater runoff. Tree filter boxes can be installed in the islands of lot #8 to capture runoff from the 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"
90	113,407	5.5	57.3	520.7	0.088	3.11

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
Planter boxes	n/a	9	n/a	n/a	2 (boxes)	$12,000
Pervious pavement	0.598	100	43,890	1.65	4,100	$102,500
Tree filter boxes	n/a	85	n/a	n/a	6 (boxes)	$60,000

GREEN INFRASTRUCTURE RECOMMENDATIONS





Westfield Public Parking Lot #2 & #8

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

0 100' 200'

WESTFIELD PUBLIC LOT #3

Subwatershed: Rahway River

Site Area: 185,547 sq. ft.

Address: 327 South Avenue West
Westfield, NJ 07090

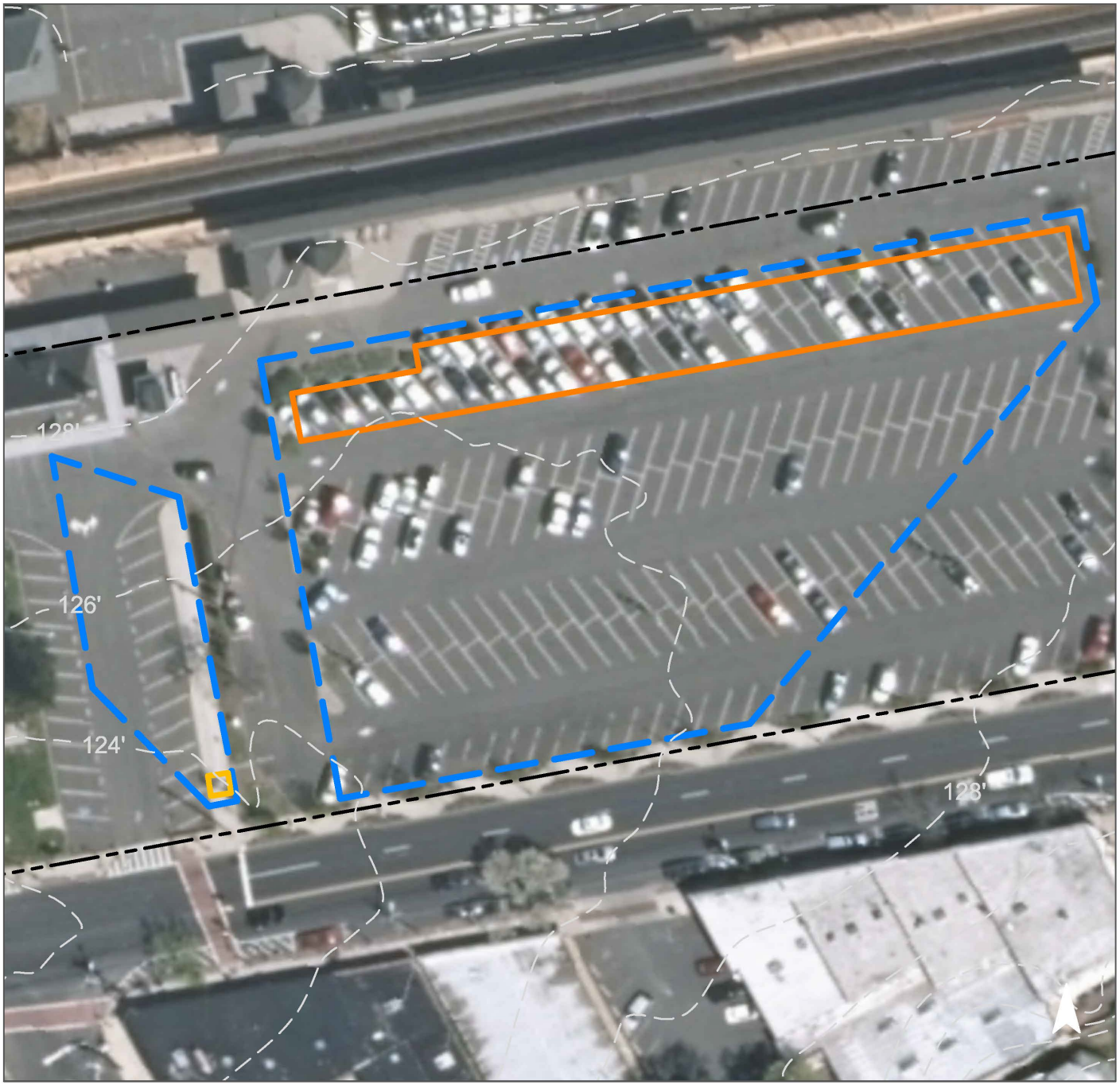
Block and Lot: Block 3101, Lot 5

The lot can be outfitted with pervious pavement to aid in the infiltration and capture of stormwater runoff. A tree filter box can be installed on a parking lot island to capture runoff from 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"
88	162,633	7.8	82.1	746.7	0.127	4.46

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 pavement	1.195	200	87,660	3.29	8,460	$211,500
Tree filter box	n/a	21	n/a	n/a	1 (box)	$10,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Westfield Public Parking Lot #3

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

0 30' 60'

WESTFIELD TOWN HALL

Subwatershed: Rahway River

Site Area: 104,178 sq. ft.

Address: 425 East Broad Street
Westfield, NJ 07090

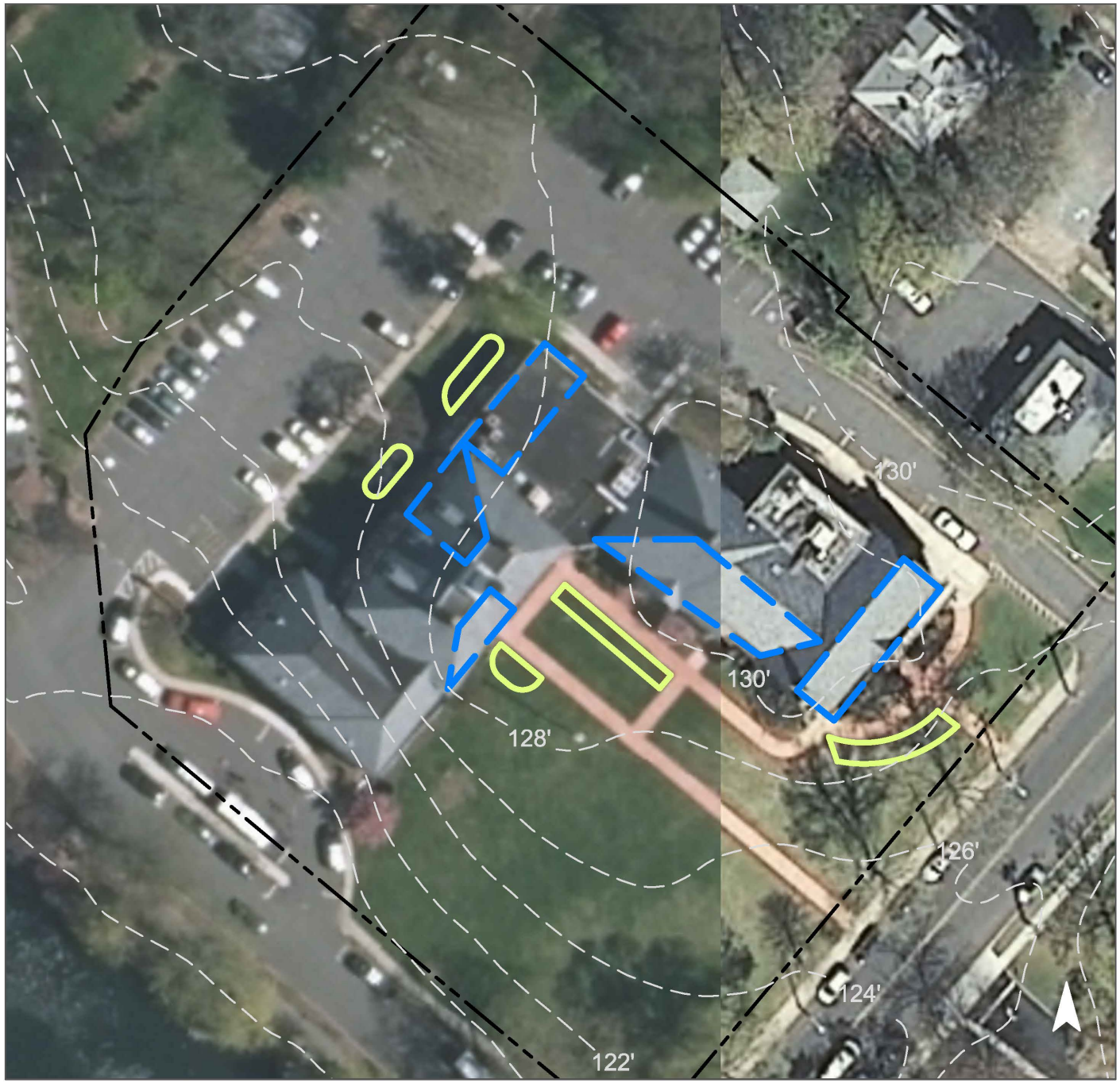
Block and Lot: Block 2403, Lot 29

Five rain gardens can be installed in the turfgrass areas around the building to capture, treat, and infiltrate stormwater runoff from the roof of the building. 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"
63	65,551	3.2	33.1	301.0	0.051	1.80

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	0.150	25	11,010	0.41	1,440	$7,200

GREEN INFRASTRUCTURE RECOMMENDATIONS



Westfield Town Hall

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

0 30' 60'

EDISON INTERMEDIATE SCHOOL

Subwatershed: Robinsons Branch
Rahway River

Site Area: 789,427 sq. ft.

Address: 800 Rahway Avenue
Westfield, NJ 07090

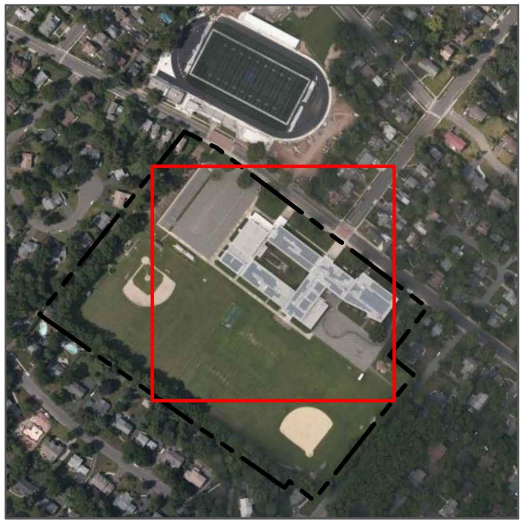
Block and Lot: Block 4301, Lot 31

Rain gardens can be installed adjacent to both the parking lot and building to capture stormwater runoff from those two locations, respectively. Pervious pavement can be installed in the new parking section as outlined in the recommendations in order to capture 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	361,266	17.4	182.5	1,658.7	0.281	9.91

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	0.338	57	24,820	0.93	3,245	$16,225
Pervious pavement	0.380	64	27,880	1.05	2,750	$68,750

GREEN INFRASTRUCTURE RECOMMENDATIONS



Edison Intermediate School

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

0 100' 200'

FIRST UNITED METHODIST CHURCH WESTFIELD

Subwatershed: Robinsons Branch
Rahway River

Site Area: 95,111 sq. ft.

Address: 1 East Broad Street
Westfield, NJ 07090

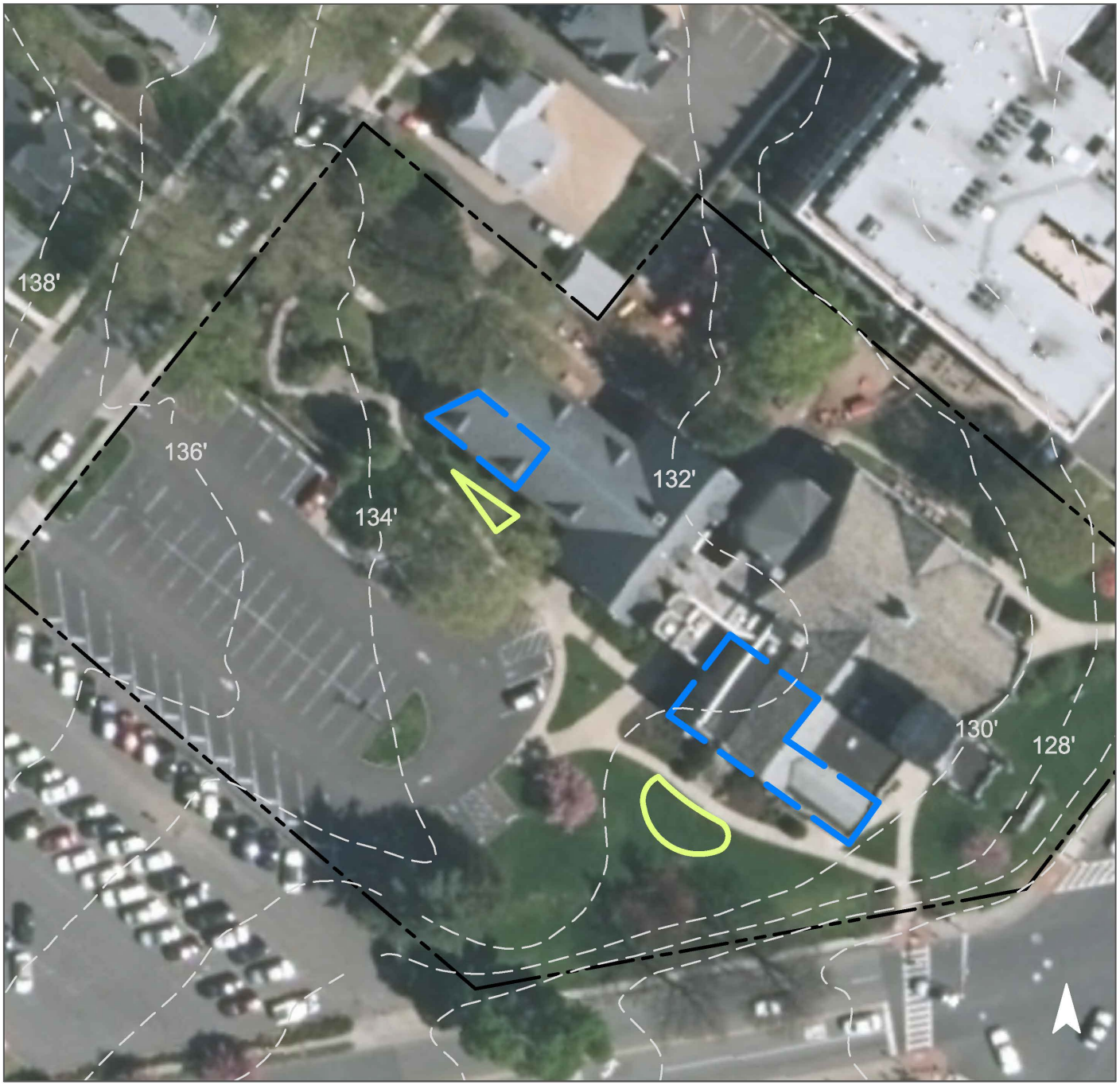
Block and Lot: Block 2506, Lot 2

Rain gardens can be installed adjacent to the building to capture stormwater runoff from rooftop. 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"
90	85,831	4.1	43.3	394.1	0.067	2.35

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	0.087	15	6,390	0.24	835	$4,175

GREEN INFRASTRUCTURE RECOMMENDATIONS



First United Methodist Church Westfield

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

0 30' 60'

JEFFERSON ELEMENTARY SCHOOL

Subwatershed: Robinsons Branch
Rahway River

Site Area: 340,465 sq. ft.

Address: 1200 Boulevard
Westfield, NJ 07090

Block and Lot: Block 5014, Lot 1

Three rain garden locations have been identified which can allow for the capture and infiltration of stormwater runoff from the rooftop of the school building. Additionally, a cistern can be installed to capture and repurpose water from the rooftop for use in the school's garden. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
37	126,127	6.1	63.7	579.1	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
Bioretention systems	0.138	23	10,140	0.38	1,325	$6,625
Rainwater harvesting	0.017	3	500	0.02	500 (gal)	$1,000

GREEN INFRASTRUCTURE RECOMMENDATIONS

Jefferson Elementary School

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

0 50' 100'

LINCOLN SCHOOL

Subwatershed: Robinsons Branch Rahway River

Site Area: 340,466 sq. ft.

Address: 728 Westfield Avenue Westfield, NJ 07090

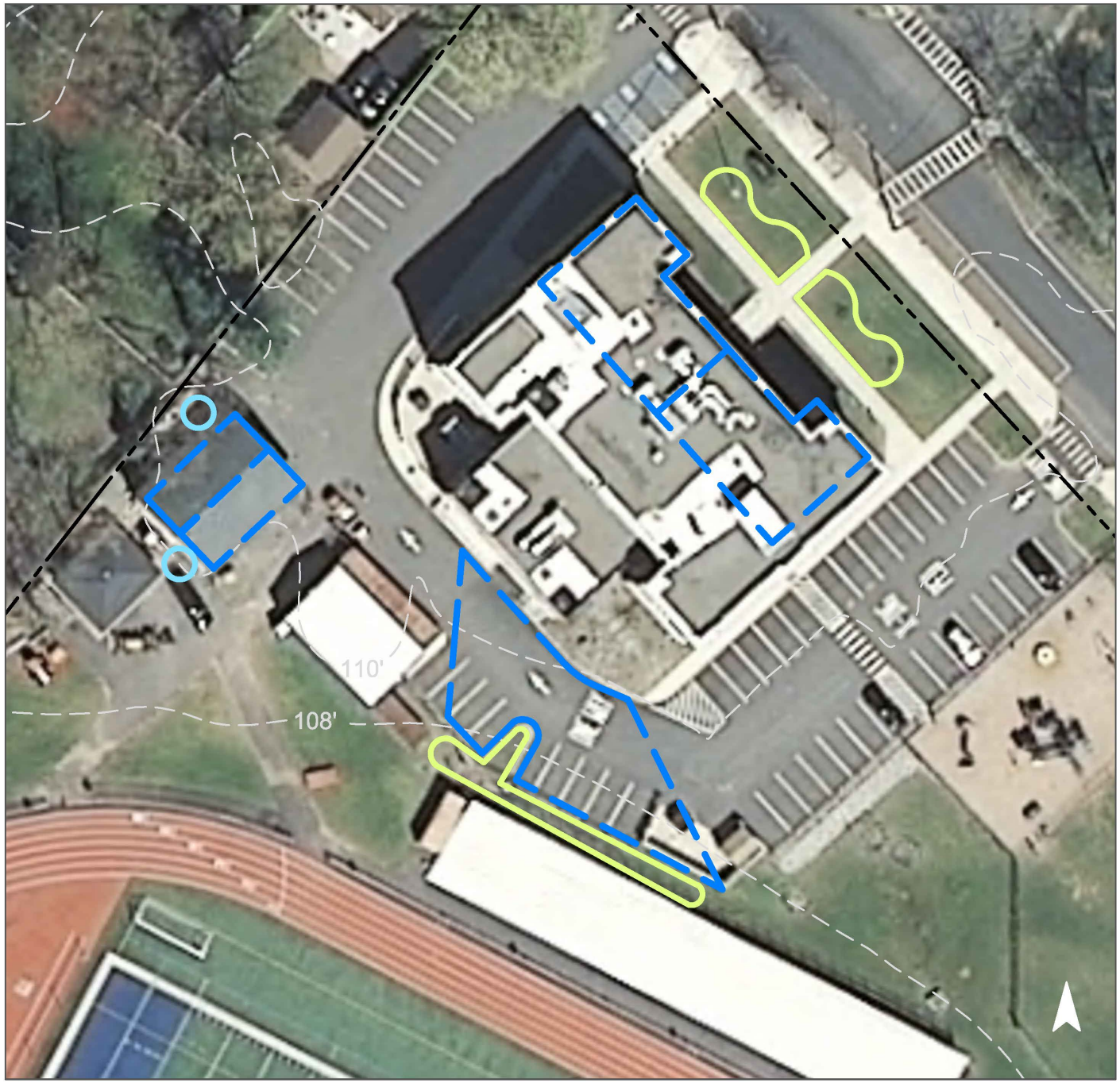
Block and Lot: Block 4205, Lot 5

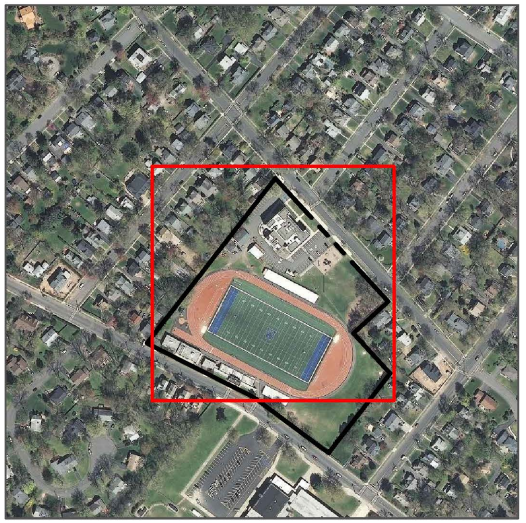
Two rain gardens can be installed at the entrance of the building to capture, treat, and infiltrate stormwater runoff from the rooftop. Another rain garden can be installed adjacent to parking spaces to capture runoff from the parking lot. Two cisterns can be installed on the facilities building to capture stormwater runoff from the roof, which can then be reused for non-potable purposes. 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	255,553	12.3	129.1	1,173	0.199	7.01

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.188	31	13,760	0.52	1,800	$9,000
Rainwater harvesting	0.033	6	1,000	0.04	1,000 (gal)	$2,000

GREEN INFRASTRUCTURE RECOMMENDATIONS





Lincoln School

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

0 25' 50'

MEMORIAL PARK AND POOL

Subwatershed: Robinsons Branch Rahway River

Site Area: 859,891 sq. ft.

Address: 713 Cumberland Street Westfield, NJ 07090

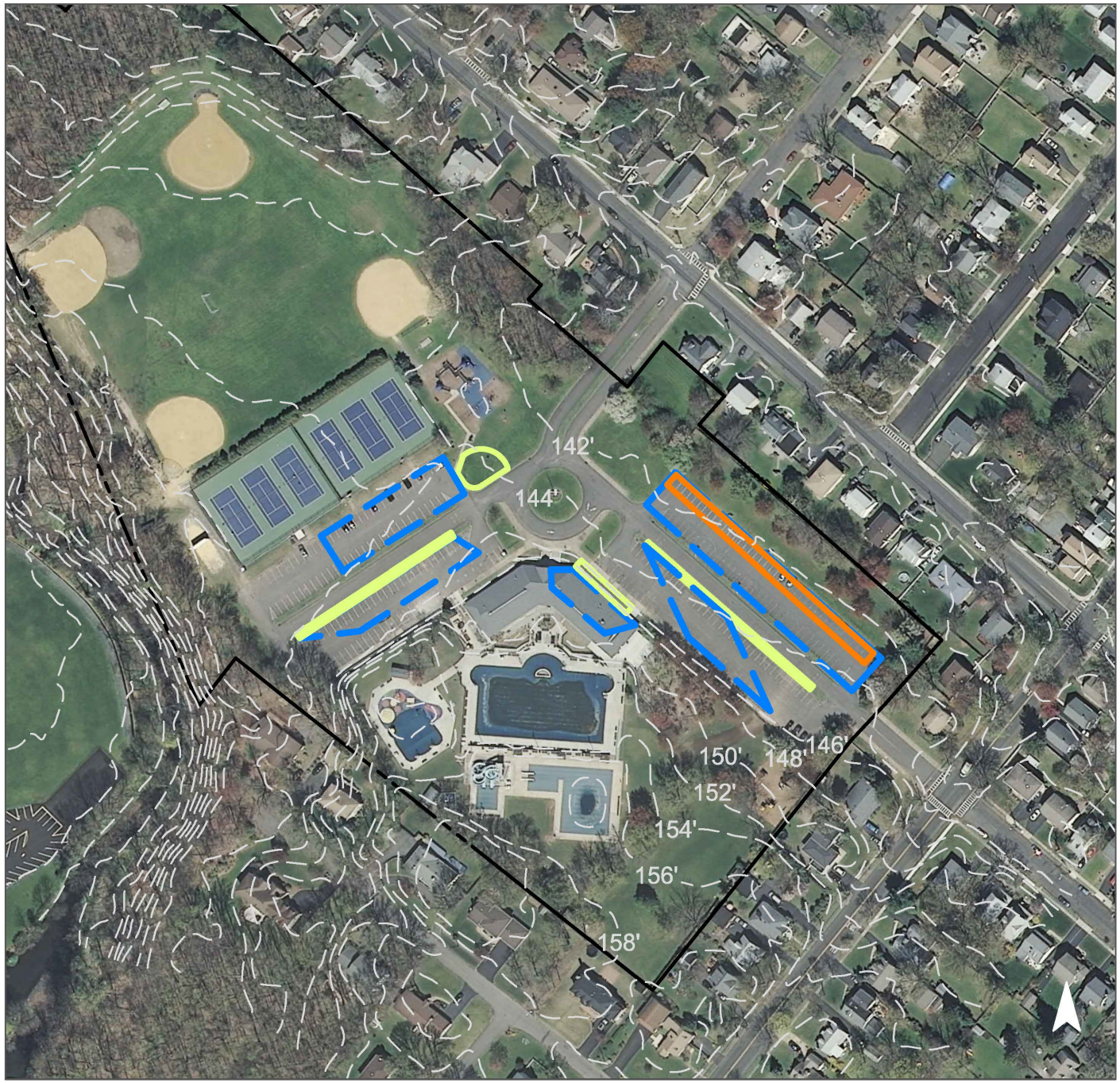
Block and Lot: Block 2020, Lot 1.01

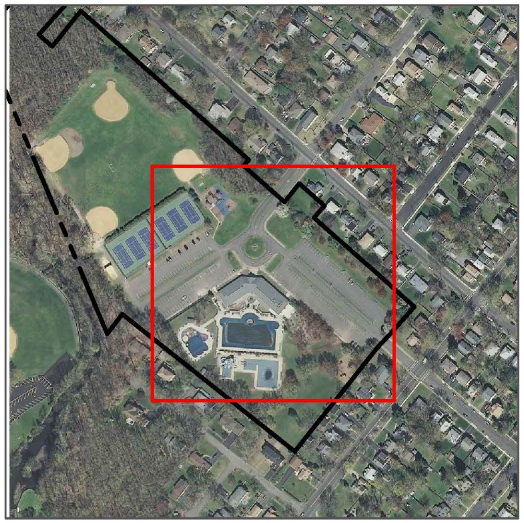
Large rain gardens can be installed in the turfgrass island dividers of the parking lots. A smaller rain garden can be installed adjacent to the building to manage stormwater runoff from the rooftop. Additionally, pervious pavement can be installed in a section of parking spaces to capture the remaining stormwater runoff from the surrounding asphalt. 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"
32	279,284	13.5	141.1	1,282.3	0.218	7.66

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	0.711	119	52,160	1.96	6,820	$34,100
Pervious pavement	0.542	91	39,760	1.49	6,270	$156,750

GREEN INFRASTRUCTURE RECOMMENDATIONS





Memorial Park and Pool

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

0 100' 200'

ROOSEVELT INTERMEDIATE SCHOOL

Subwatershed: Robinsons Branch
Rahway River

Site Area: 407,201 sq. ft.

Address: 301 Clark Street
Westfield, NJ 07090

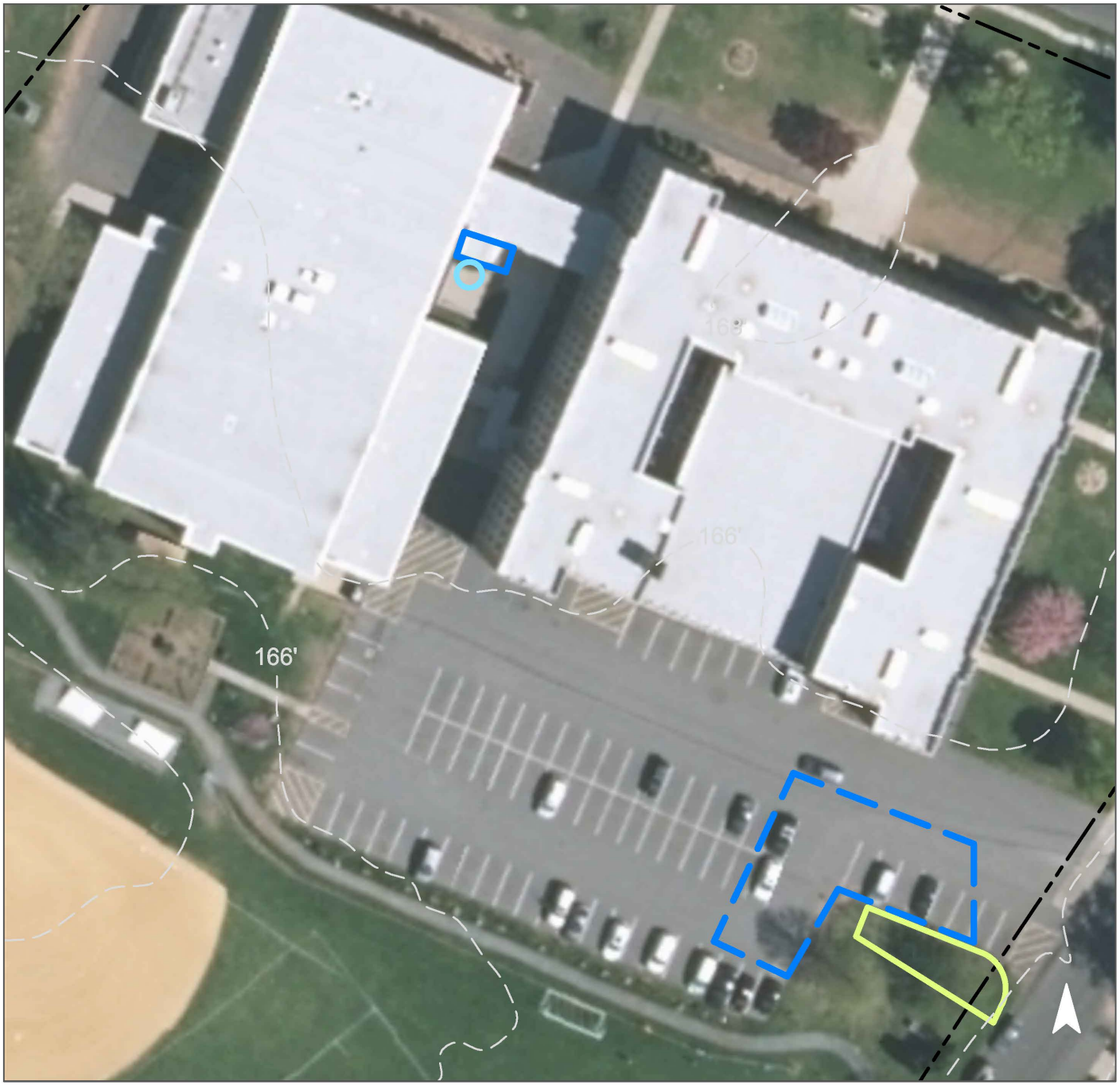
Block and Lot: Block 904, Lot 2

A rain garden can be installed at the southern end of the parking lot to capture, treat, and infiltrate stormwater runoff from the parking lot. A rain barrel can be installed at the central entrance to the building to capture and reuse stormwater runoff from the roof. They will accumulate stormwater from the parking lot and building downspouts, respectively. 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	154,312	7.4	77.9	708.5	0.120	4.23

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention system	0.113	19	8,260	0.31	1,080	$5,400
Rainwater harvesting	0.005	1	100	0.00	100 (gal)	$200

GREEN INFRASTRUCTURE RECOMMENDATIONS



Roosevelt Intermediate School

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

0 30' 60'

TAMAQUES ELEMENTARY SCHOOL

Subwatershed: Robinsons Branch Rahway River

Site Area: 383,168 sq. ft.

Address: 641 Willow Grove Road Westfield, NJ 07090

Block and Lot: Block 4603, Lot 11

Two rain gardens can be installed southeast and southwest of the building to capture stormwater runoff from the back parking lots adjacent to the building. A section of parking spaces can be converted to porous pavement to capture runoff from the front 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"
23	89,029	4.3	45.0	408.8	0.069	2.44

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	0.164	27	12,040	0.45	1,575	$7,875
Pervious pavement	0.086	14	6,310	0.24	1,100	$27,500

GREEN INFRASTRUCTURE RECOMMENDATIONS

Tamaques Elementary School

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

0 50' 100'

TAMAQUES PARK

Subwatershed: Robinsons Branch
Rahway River

Site Area: 2,404,248 sq. ft.

Address: 1101 Lamberts Mill Road
Westfield NJ 07090

Block and Lot: Block 5302, Lot 3

A system of connected rain gardens can be installed to capture stormwater runoff from east of the parking lot and to provide visual interest along the walkway. Downspout planter boxes can be installed along the building to capture and reuse rooftop 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"
13	304,595	14.7	153.8	1,398.5	0.237	8.35

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.133	22	9,790	0.37	1,280	$6,400
Planter boxes	n/a	9	n/a	n/a	2 (boxes)	$12,000

GREEN INFRASTRUCTURE RECOMMENDATIONS

Tamaques Park

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

0 50' 100'

WESTFIELD DEPARTMENT OF PUBLIC WORKS

Subwatershed: Robinsons Branch
Rahway River

Site Area: 115,710 sq. ft.

Address: 959 North Avenue West
Westfield, NJ 07090

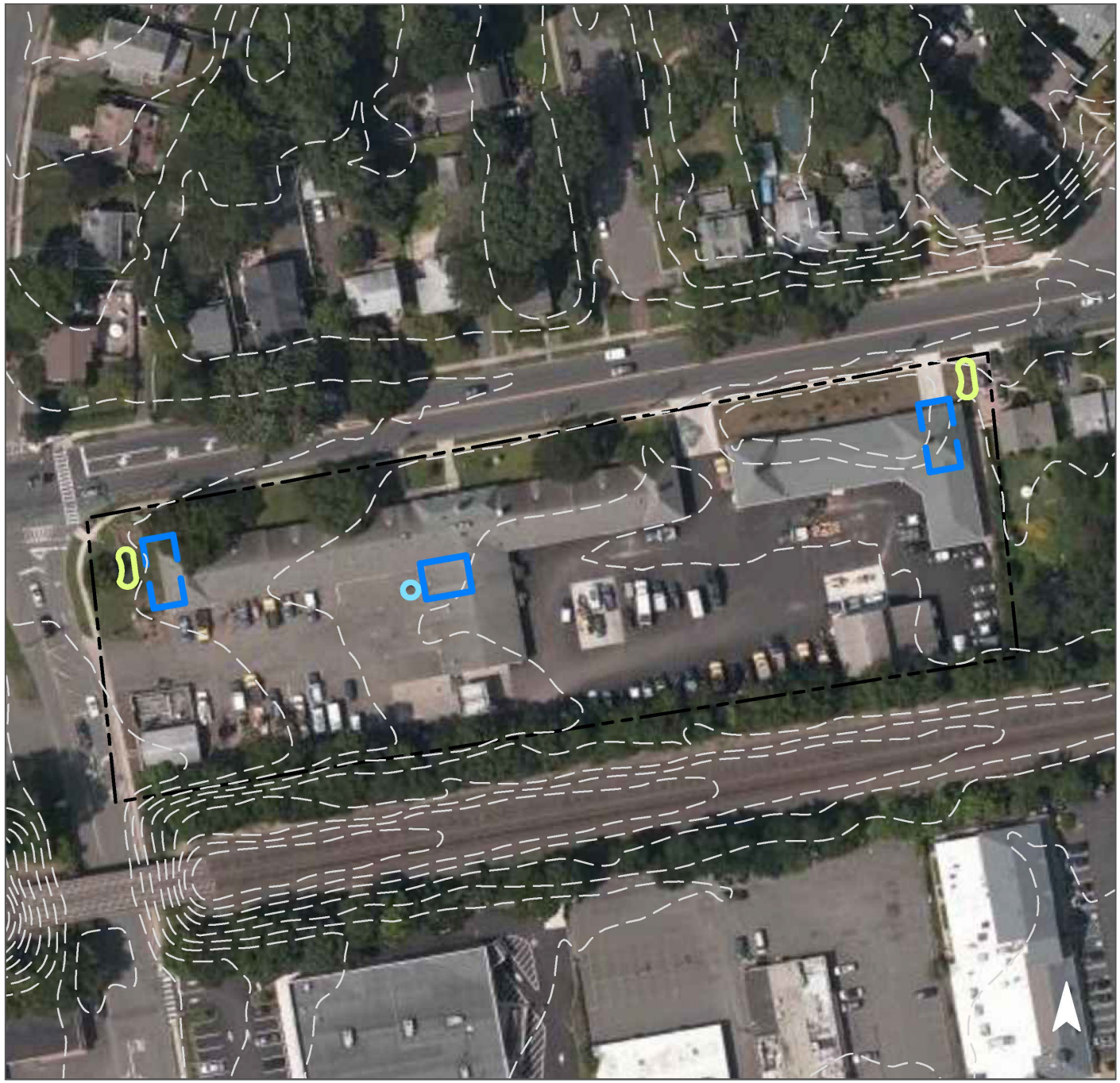
Block and Lot: Block 2604, Lot 1

Rain gardens can be installed at each end of the building to capture stormwater runoff from the rooftop. A cistern can be installed in the back to capture and reuse rooftop runoff for non-potable purposes, such as washing 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"
70	80,603	3.9	40.7	370.1	0.063	2.21

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.047	8	3,440	0.13	450	$2,250
Rainwater harvesting	0.019	3	560	0.02	560 (gal)	$1,120

GREEN INFRASTRUCTURE RECOMMENDATIONS



Westfield Department of Public Works

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

0 30' 60'

WESTFIELD FIRE STATION 2

Subwatershed: Robinsons Branch Rahway River

Site Area: 130,962 sq. ft.

Address: 1029 Central Avenue Westfield, NJ 07090

Block and Lot: Block 4815, Lot 10

A rain garden can be installed along the building to capture stormwater runoff from the building's rooftop. Additionally pervious pavement can be installed in the parking lot to aid in stormwater capture and infiltration from the adjacent 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"
23	30,425	1.5	15.4	139.7	0.024	0.83

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	0.020	3	1,440	0.05	190	$950
Pervious pavement	0.116	19	8,530	0.32	800	$20,000

GREEN INFRASTRUCTURE RECOMMENDATIONS

Westfield Fire Station 2

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

0 25' 50'

WESTFIELD HIGH SCHOOL

Subwatershed: Robinsons Branch Rahway River

Site Area: 544,336 sq. ft.

Address: 550 Dorian Road Westfield, NJ 07090

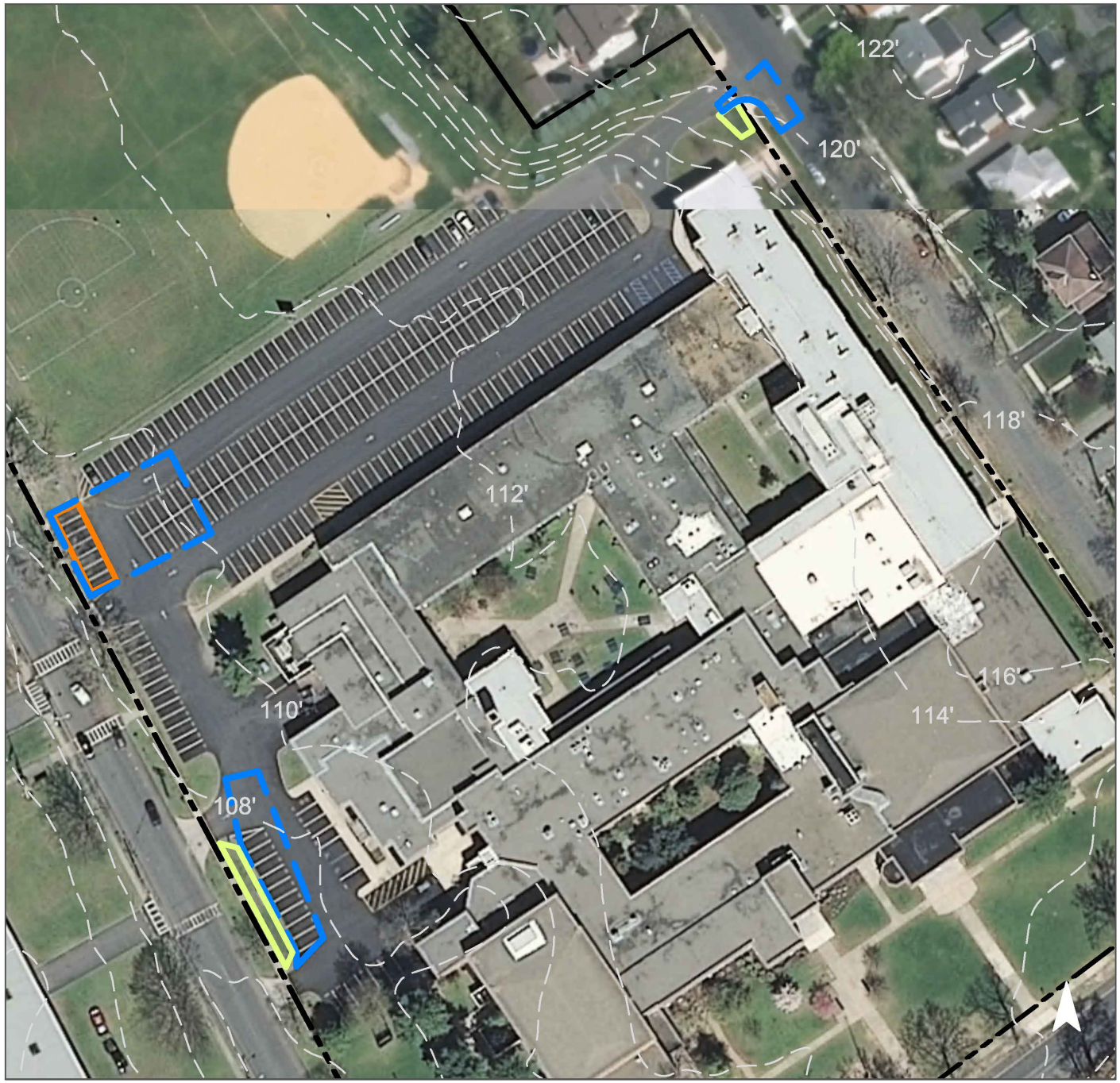
Block and Lot: Block 3011, Lot 20

A rain garden can be installed on the island adjacent to the south of the parking lot to capture, treat, and infiltrate stormwater runoff from the lot. Additionally, pervious pavement can be installed in parking spaces to capture and infiltrate parking lot runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
55	297,650	14.3	150.3	1,366.6	0.232	8.16

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention system	0.100	17	7,300	0.27	955	$4,775
Pervious pavement	0.146	24	10,700	0.40	1,000	$25,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Westfield High School

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

0 50' 100'

WESTFIELD SOUTH AVENUE PLAZA

Subwatershed: Robinsons Branch Rahway River

Site Area: 10,352 sq. ft.

Address: 517 South Avenue Westfield, NJ 07090

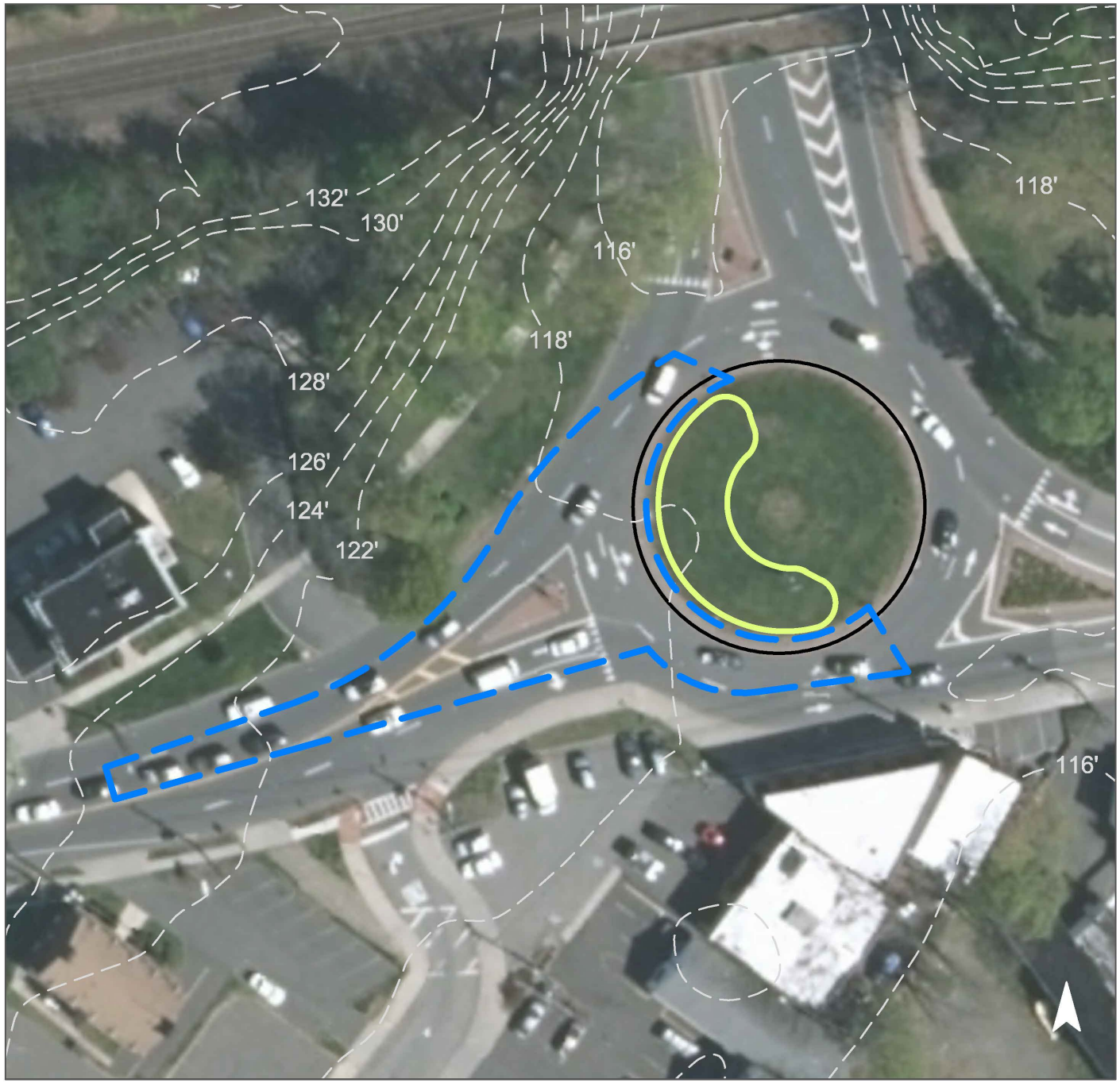
Block and Lot: Block 2511, Lot 1

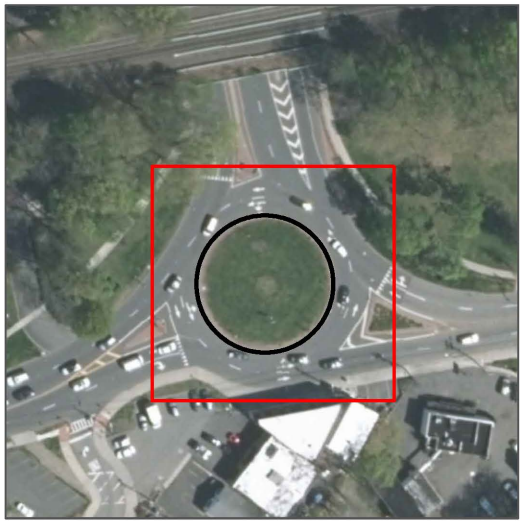
A rain garden can be installed in the center of the plaza to capture stormwater runoff from the streets. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

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"
87	8,968	0.4	4.5	41.2	0.007	0.25

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 system	0.316	53	23,170	0.87	3,030	$15,150

GREEN INFRASTRUCTURE RECOMMENDATIONS





Westfield South Avenue Plaza

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

0 30' 60'

WESTFIELD WWI MEMORIAL

Subwatershed: Robinsons Branch Rahway River

Site Area: 6,941 sq. ft.

Address: 501 North Avenue West Westfield, NJ 07090

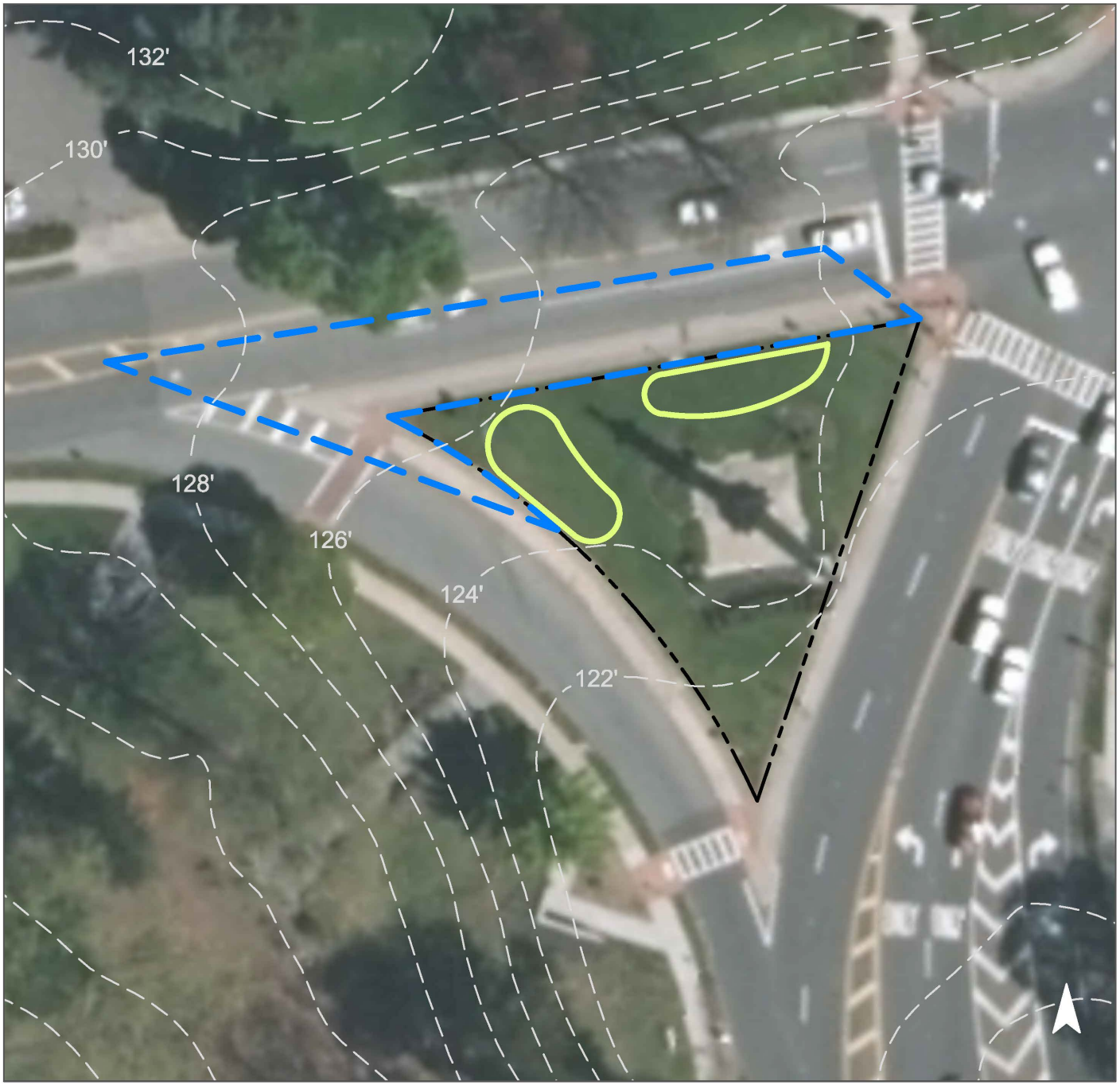
Block and Lot: Block 2507, Lot 1

Two rain gardens can be installed on the island to capture stormwater runoff from the street. 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"
91	6,306	0.3	3.2	29.0	0.005	0.17

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.124	21	9,100	0.34	1,190	$5,950

GREEN INFRASTRUCTURE RECOMMENDATIONS



Westfield WWI Memorial

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

0 20' 40'

YMCA OF WESTFIELD PARKING LOT

Subwatershed: Robinsons Branch Rahway River

Site Area: 31,856 sq. ft.

Address: 231 Clark Street Westfield, NJ 07090

Block and Lot: Block 2502, Lot 11

A section of pervious pavement can be installed in the parking lot to capture and infiltrate stormwater 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"
91	28,937	1.4	14.6	132.9	0.023	0.79

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	0.464	78	34,050	1.28	3,180	$79,500

GREEN INFRASTRUCTURE RECOMMENDATIONS

YMCA of Westfield Parking Lot

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

0 25' 50'

c. Summary of Existing Conditions

Summary of Existing Conditions

	Subwatershed/Site Name/Total Site Info/GI Practice	Area (ac)	Area (SF)	Block	Lot	I.C. %	I.C. Area (ac)	I.C. Area (SF)	Existing Annual Loads (Commercial)			Runoff Volumes from I.C.		Runoff Volumes from I.C.	
									TP (lb/yr)	TN (lb/yr)	TSS (lb/yr)	Water Quality Storm (1.25" over 2-hours) (cu.ft.)	Annual (cu.ft.)	Water Quality Storm (1.25" over 2-hours) (Mgal)	Annual (Mgal)
	NOMAHEGAN BROOK SITES	**4.89**	**213,060**				**2.16**	**94,107**	**4.5**	**47.5**	**432.1**	**9,803**	**345,060**	**0.073**	**2.58**
1	**Franklin Elementary School**														
	Total Site Info	4.89	213,060	603	38	44	2.16	94,107	4.5	47.5	432.1	9,803	345,060	0.073	2.58
	RAHWAY RIVER SITES	**26.21**	**1,141,820**				**15.83**	**689,397**	**33.2**	**348.2**	**3,165.3**	**71,812**	**2,527,790**	**0.537**	**18.91**
2	**202 Benson Place**														
	Total Site Info	0.15	6,481	3509	1	42	0.06	2,747	0.1	1.4	12.6	286	10,072	0.002	0.08
3	**Presbyterian Church in Westfield**														
	Total Site Info	4.49	195,731	2403	30	61	2.72	118,601	5.7	59.9	544.5	12,354	434,872	0.092	3.25
4	**Saint Paul's Episcopal Church**														
	Total Site Info	2.71	118,035	3109	1	69	1.87	81,399	3.9	41.1	373.7	8,479	298,461	0.063	2.23
5	**Washington Elementary School**														
	Total Site Info	7.12	310,021	3601	54	25	1.75	76,159	3.7	38.5	349.7	7,933	279,250	0.059	2.09
6	**Westfield Area YMCA**														
	Total Site Info	1.00	43,656	3109	2	70	0.70	30,421	1.5	15.4	139.7	3,169	111,544	0.024	0.83
7	**Westfield Board of Education**														
	Total Site Info	1.20	52,236	2401	18	74	0.88	38,479	1.9	19.4	176.7	4,008	141,091	0.030	1.06
8	**Westfield Public Parking Lot #2 & #8**														
	Total Site Info	2.89	125,935	313	7	90	2.60	113,407	5.5	57.3	520.7	11,813	415,825	0.088	3.11
9	**Westfield Public Parking Lot #3**														
	Total Site Info	4.26	185,547	3101	5	88	3.73	162,633	7.8	82.1	746.7	16,941	596,321	0.127	4.46
10	**Westfield Town Hall**														
	Total Site Info	2.39	104,178	2403	29	63	1.50	65,551	3.2	33.1	301.0	6,828	240,353	0.051	1.80
	ROBINSONS BRANCH RAHWAY RIVER SITES	**148.54**	**6,470,188**				**45.67**	**1,989,428**	**95.9**	**1004.8**	**9,134.2**	**207,232**	**7,294,568**	**1.550**	**54.56**
11	**Edison Intermediate School**														
	Total Site Info	18.12	789,427	4301	31	46	8.29	361,266	17.4	182.5	1,658.7	37,632	1,324,641	0.281	9.91
12	**First United Methodist Church Westfield**														
	Total Site Info	2.18	95,111	2506	2	90	1.97	85,831	4.1	43.3	394.1	8,941	314,715	0.067	2.35
13	**Jefferson Elementary School**														
	Total Site Info	7.82	340,466	5014	1	37	2.90	126,127	6.1	63.7	579.1	13,138	462,464	0.098	3.46
14	**Lincoln School**														
	Total Site Info	8.05	350,520	4205	5	39	3.12	136,095	6.6	68.7	624.9	14,177	499,014	0.106	3.73
15	**Memorial Park and Pool**														
	Total Site Info	19.74	859,891	2020	1.01	32	6.41	279,284	13.5	141.1	1,282.3	29,092	1,024,040	0.218	7.66
16	**Roosevelt Intermediate School**														
	Total Site Info	9.35	407,201	904	2	38	3.54	154,312	7.4	77.9	708.5	16,074	565,812	0.120	4.23
17	**Tamaques Elementary School**														
	Total Site Info	8.80	383,168	4603	11	23	2.04	89,029	4.3	45.0	408.8	9,274	326,439	0.069	2.44

Summary of Existing Conditions

	Subwatershed/Site Name/Total Site Info/GI Practice	Area (ac)	Area (SF)	Block	Lot	I.C. %	I.C. Area (ac)	I.C. Area (SF)	Existing Annual Loads (Commercial) TP (lb/yr)	TN (lb/yr)	TSS (lb/yr)	Runoff Volumes from I.C. Water Quality Storm (1.25" over 2-hours) (cu.ft.)	Annual (cu.ft.)	Runoff Volumes from I.C. Water Quality Storm (1.25" over 2-hours) (Mgal)	Annual (Mgal)
18	**Tamaques Park**														
	Total Site Info	55.19	2,404,248	5302	3	13	6.99	304,595	14.7	153.8	1,398.5	31,729	1,116,848	0.237	8.35
19	**Westfield Department of Public Works**														
	Total Site Info	2.66	115,710	2604	1	70	1.85	80,603	3.9	40.7	370.1	8,396	295,546	0.063	2.21
20	**Westfield Fire Station 2**														
	Total Site Info	3.01	130,962	4815	10	23	0.70	30,425	1.5	15.4	139.7	3,169	111,560	0.024	0.83
21	**Westfield High School**														
	Total Site Info	12.50	544,336	3011	20	55	6.83	297,650	14.3	150.3	1,366.6	31,005	1,091,382	0.232	8.16
22	**Westfield South Avenue Plaza**														
	Total Site Info	0.24	10,352	2511	1	87	0.21	8,968	0.4	4.5	41.2	934	32,883	0.007	0.25
23	**Westfield WWI Memorial**														
	Total Site Info	0.16	6,941	2507	1	91	0.14	6,306	0.3	3.2	29.0	657	23,124	0.005	0.17
24	**YMCA of Westfield Parking Lot**														
	Total Site Info	0.73	31,856	2502	11	91	0.66	28,937	1.4	14.6	132.9	3,014	106,101	0.023	0.79

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	Total Cost ($)	I.C. Treated %
	NOMAHEGAN BROOK SITES	**12,780**	**0.29**	**0.333**	**56**	**24,430**	**0.92**	**4,775**	**$16,000**	**13.6%**
1	**Franklin Elementary School**									
	Bioretention systems	12,780	0.29	0.333	56	24,430	0.92	3,200	$16,000	26.4%
	Pervious pavement	6,600	0.15	0.172	29	12,620	0.47	1,100	$27,500	7.0%
	Total Site Info	**12,780**	**0.29**	**0.333**	**56**	**24,430**	**0.92**	**4,775**	**$16,000**	**33.4%**
	RAHWAY RIVER SITES	**121,350**	**2.83**	**2.444**	**524**	**179,330**	**6.73**	**28,022**	**$406,775**	**17.6%**
2	**202 Benson Place**									
	Bioretention system	6,600	0.15	0.172	29	12,620	0.47	1,650	$8,250	240.3%
	Total Site Info	**6,600**	**0.15**	**0.172**	**29**	**12,620**	**0.47**	**1,650**	**$8,250**	**240.3%**
3	**Presbyterian Church in Westfield**									
	Bioretention systems	6,460	0.15	0.168	28	12,350	0.46	1,615	$8,075	5.4%
	Pervious pavement	15,400	0.35	0.401	67	29,440	1.11	2,750	$68,750	13.0%
	Total Site Info	**21,860**	**0.50**	**0.570**	**95**	**41,790**	**1.57**	**4,365**	**$76,825**	**18.4%**
4	**Saint Paul's Episcopal Church**									
	Bioretention systems	2,600	0.06	0.068	11	4,970	0.19	665	$3,325	3.2%
	Pervious pavement	12,710	0.29	0.331	55	24,300	0.91	2,720	$68,000	15.6%
	Total Site Info	**15,310**	**0.35**	**0.399**	**67**	**29,270**	**1.10**	**3,385**	**$71,325**	**18.8%**
5	**Washington Elementary School**									
	Bioretention systems	8,000	0.18	0.208	35	15,300	0.57	2,000	$10,000	10.5%
	Total Site Info	**8,000**	**0.18**	**0.208**	**35**	**15,300**	**0.57**	**2,000**	**$10,000**	**10.5%**
6	**Westfield Area YMCA**									
	Bioretention system	1,820	0.04	0.047	8	3,480	0.13	455	$2,275	6.0%
	Pervious pavement	9,970	0.23	0.260	43	19,060	0.72	1,780	$44,500	32.8%
	Total Site Info	**11,790**	**0.27**	**0.307**	**51**	**22,540**	**0.85**	**2,235**	**$46,775**	**38.8%**
7	**Westfield Board of Education**									
	Bioretention systems	1,520	0.03	0.040	7	2,910	0.11	380	$1,900	4.0%
	Total Site Info	**1,520**	**0.03**	**0.040**	**7**	**2,910**	**0.11**	**380**	**$1,900**	**4.0%**

Summary of Proposed Green Infrastructure Practices

	Subwatershed/Site Name/Total Site Info/GI Practice	Potential Management Area Area (SF)	Potential Management Area Area (ac)	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Max Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cfs)	Size of BMP	Total Cost ($)	I.C. Treated %
8	**Westfield Public Parking Lot #2 & #8**									
	Planter boxes	430	0.05	n/a	9	n/a	n/a	2	$12,000	0.4%
	Pervious pavement	22,960	0.53	0.598	100	43,890	1.65	4,100	$102,500	20.2%
	Tree filter boxes	21,820	0.50	n/a	85	n/a	n/a	6	$60,000	19.2%
	Total Site Info	**45,210**	**1.08**	**0.598**	**194**	**43,890**	**1.65**	**4,106**	**$174,500**	**39.9%**
9	**Westfield Public Parking Lot #3**									
	Pervious pavement	45,850	1.05	1.195	200	87,660	3.29	8,460	$211,500	28.2%
	Tree filter box	5,300	0.12	n/a	21	n/a	n/a	1	$10,000	3.3%
	Total Site Info	**5,300**	**0.12**	**0.000**	**21**	**0**	**0.00**	**8,461**	**$10,000**	**31.5%**
10	**Westfield Town Hall**									
	Bioretention systems	5,760	0.13	0.150	25	11,010	0.41	1,440	$7,200	8.8%
	Total Site Info	**5,760**	**0.13**	**0.150**	**25**	**11,010**	**0.41**	**1,440**	**$7,200**	**8.8%**
	ROBINSON BRANCH RAHWAY RIVER SITES	**160,130**	**3.72**	**4.161**	**705**	**303,790**	**11.40**	**38,837**	**$482,995**	**8.0%**
11	**Edison Intermediate School**									
	Bioretention systems	12,980	0.30	0.338	57	24,820	0.93	3,245	$16,225	3.6%
	Pervious pavement	14,580	0.33	0.380	64	27,880	1.05	2,750	$68,750	4.0%
	Total Site Info	**27,560**	**0.63**	**0.718**	**120**	**52,700**	**1.98**	**5,995**	**$84,975**	**7.6%**
12	**First United Methodist Church Westfield**									
	Bioretention systems	3,340	0.08	0.087	15	6,390	0.24	835	$4,175	3.9%
	Total Site Info	**3,340**	**0.08**	**0.087**	**15**	**6,390**	**0.24**	**835**	**$4,175**	**3.9%**
13	**Jefferson Elementary School**									
	Bioretention systems	5,300	0.12	0.138	23	10,140	0.38	1,325	$6,625	4.2%
	Rainwater harvesting	640	0.01	0.017	3	500	0.02	500	$1,000	0.5%
	Total Site Info	**5,940**	**0.14**	**0.155**	**26**	**10,640**	**0.40**	**1,825**	**$7,625**	**4.7%**
14	**Lincoln School**									
	Bioretention systems	7,200	0.17	0.188	31	13,760	0.52	1,800	$9,000	5.3%
	Rainwater harvesting	1,280	0.03	0.033	6	1,000	0.04	1,000	$2,000	0.9%
	Total Site Info	**7,200**	**0.17**	**0.188**	**31**	**13,760**	**0.52**	**1,800**	**$9,000**	**5.3%**

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	Total Cost ($)	I.C. Treated %
15	**Memorial Park and Pool**									
	Bioretention systems	27,280	0.63	0.711	119	52,160	1.96	6,820	$34,100	9.8%
	Pervious pavement	20,800	0.48	0.542	91	39,760	1.49	6,270	$156,750	7.4%
	Total Site Info	**48,080**	**1.10**	**1.253**	**210**	**91,920**	**3.45**	**13,090**	**$190,850**	**17.2%**
16	**Roosevelt Intermediate School**									
	Bioretention system	4,320	0.10	0.113	19	8,260	0.31	1,080	$5,400	2.8%
	Rainwater harvesting	200	0.00	0.005	1	100	0.00	100	$200	0.1%
	Total Site Info	**4,320**	**0.10**	**0.113**	**19**	**8,260**	**0.31**	**1,080**	**$5,400**	**2.9%**
17	**Tamaques Elementary School**									
	Bioretention systems	6,300	0.14	0.164	27	12,040	0.45	1,575	$7,875	7.1%
	Pervious pavement	3,300	0.08	0.086	14	6,310	0.24	1,100	$27,500	3.7%
	Total Site Info	**6,300**	**0.14**	**0.164**	**27**	**12,040**	**0.45**	**1,575**	**$7,875**	**10.8%**
18	**Tamaques Park**									
	Bioretention systems	5,120	0.12	0.133	22	9,790	0.37	1,280	$6,400	1.7%
	Planter boxes	430	0.05	n/a	9	n/a	n/a	2	$12,000	0.1%
	Total Site Info	**5,550**	**0.17**	**0.133**	**31**	**9,790**	**0.37**	**1,282**	**$18,400**	**1.8%**
19	**Westfield Department of Public Works**									
	Bioretention systems	1,800	0.04	0.047	8	3,440	0.13	450	$2,250	2.2%
	Rainwater harvesting	720	0.02	0.019	3	560	0.02	560	$1,120	0.9%
	Total Site Info	**2,520**	**0.06**	**0.066**	**11**	**4,000**	**0.15**	**1,010**	**$3,370**	**3.1%**
20	**Westfield Fire Station 2**									
	Bioretention system	750	0.02	0.020	3	1,440	0.05	190	$950	2.5%
	Pervious pavement	4,460	0.10	0.116	19	8,530	0.32	800	$20,000	14.7%
	Total Site Info	**5,210**	**0.12**	**0.136**	**23**	**9,970**	**0.37**	**990**	**$20,950**	**17.1%**
21	**Westfield High School**									
	Bioretention system	3,820	0.09	0.100	17	7,300	0.27	955	$4,775	1.3%
	Pervious pavement	5,600	0.13	0.146	24	10,700	0.40	1,000	$25,000	1.9%
	Total Site Info	**9,420**	**0.22**	**0.245**	**41**	**18,000**	**0.67**	**1,955**	**$29,775**	**3.2%**

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	Total Cost ($)	I.C. Treated %
22	**Westfield South Avenue Plaza**									
	Bioretention system	12,120	0.28	0.316	53	23,170	0.87	3,030	$15,150	135.1%
	Total Site Info	**12,120**	**0.28**	**0.316**	**53**	**23,170**	**0.87**	**3,030**	**$15,150**	**135.1%**
23	**Westfield WWI Memorial**									
	Bioretention systems	4,760	0.11	0.124	21	9,100	0.34	1,190	$5,950	75.5%
	Total Site Info	**4,760**	**0.11**	**0.124**	**21**	**9,100**	**0.34**	**1,190**	**$5,950**	**75.5%**
24	**YMCA of Westfield Parking Lot**									
	Pervious pavement	17,810	0.41	0.464	78	34,050	1.28	3,180	$79,500	61.5%
	Total Site Info	**17,810**	**0.41**	**0.464**	**78**	**34,050**	**1.28**	**3,180**	**$79,500**	**61.5%**