RUTGERS
New Jersey Agricultural
Experiment Station

Roadway Bioswale Stormwater Reduction Action Plan (RAP) for Bernardsville Borough

Prepared for Bernardsville Borough by the Rutgers Cooperative Extension Water Resources Program

July 15, 2022

Addendum to:
Impervious Cover Reduction Action Plan for
Bernardsville Borough, Somerset County, New Jersey
February 10, 2020

Roadway Bioswale Stormwater Reduction Action Plan (RAP) for Bernardsville Borough

Acknowledgement

This document has been prepared by the Rutgers Cooperative Extension Water Resources Program, with funding and direction from Bernardsville Borough and the New Jersey Agricultural Experiment Station, to highlight opportunities for implementing green infrastructure roadway stormwater management strategies within Bernardsville Borough. We would like to thank the New Jersey Agricultural Experiment Station and Bernardsville Borough for their input and support in creating this document.

This document will serve as an addendum to the February 10, 2020 impervious cover reduction action plan for Bernardsville Borough prepared with funding and direction from the New Jersey Highlands Water Protection and Planning Council.

What is a bioswale?

Bioswales are landscape features that convey stormwater from one location to another while removing pollutants and allowing water to infiltrate. Bioswales are often designed for larger scale sites where water needs time to move and slowly infiltrate into the groundwater.

Much like rain garden systems, bioswales can also be designed with an underdrain pipe that allows excess water to discharge to the nearest catch basin or existing stormwater system.

Bioswales are best applied in areas with good soil for infiltration which is in an existing low lying area directly adjacent to a roadway or parking lot.

The inflow of the stormwater should occur across the entire length of the bioswale. The inflow of water to the base of the bioswale is aided by having a slope (typically 3:1) from native grade to the depressed base of the bioswale. Since the bioswale is focused on stormwater conveyance, the base of the bioswale will have an additional grade to allow the stormwater to travel from one end of the bioswale to the other.

What is a rain garden?

A rain garden is a landscaped, shallow depression that captures, filters, and infiltrates stormwater runoff. The rain garden removes nonpoint source pollutants from stormwater runoff while recharging groundwater. A rain garden serves as a functional system to capture, filter, and infiltrate stormwater runoff at the source, while being aesthetically pleasing. Rain gardens are an important tool for communities and neighborhoods to create diverse, attractive landscapes while protecting the health of the natural environment. Rain gardens can also be installed in areas that do not infiltrate by incorporating an underdrain system.

Rain gardens can be implemented throughout communities to begin the process of re-establishing the natural function of the land. Rain gardens offer one of the quickest and easiest methods to

reduce runoff and help protect our water resources. Beyond the aesthetic and ecological benefits, rain gardens encourage environmental stewardship and community pride.

Rain gardens are best applied in areas with good soil for infiltration which is in an existing low lying area directly adjacent to a roadway or parking lot or from an area in which downspouts can be connected.

When to install a bioswale and/or rain garden

With the focus of a rain garden primarily being infiltration into the ground, a rain garden should only be installed in areas where the soil has good infiltration rates. A high water table, poor soil type, or a restrictive feature in the ground can all limit how much water will infiltrate into the soil. The combination of these factors can decrease the infiltration rate of a site; so to ensure that rain gardens are installed in a proper location, a soil assessment and infiltration test should be conducted.

In cases where the infiltration rate is not ideal, bioswales can be installed to help convey the water into a more suitable location for stormwater treatment. To mitigate stormwater load on the bioswale, a rain garden can be placed prior to or after the bioswale to help detain and infiltrate water in proper locations.

How were sites selected for inclusion in the roadway bioswale stormwater reduction action plan?

Areas of concern were outlined as potential sites for green infrastructure installations. Those sites were examined using the United States Department of Agriculture, Natural Resources Conservation Service (NRCS) Web Soil Survey (WSS). The WSS has general soil data of areas to help guide proper project placement. The WSS has data for the type of soil in the area, the hydrologic soil group, depth to restrictive features, depth to water table, and much more.

Hydrological soil groups A and B are preferred for their favorable conditions for green infrastructure. Projects can be installed in hydrological soil groups C and D but might require adjustments for the less favorable conditions. If the depth to a restrictive feature is shallow, soil permeability could be low for those areas. If the depth to water table is shallow, standing water could be an issue for those areas. The data obtained from WSS is preliminary data and should only be used as a guide. On-site testing could prove different conditions are present compared to what the NRCS estimates are for that area, which could in turn could allow for green infrastructure installation at those sites.

How to verify site conditions are suitable for green infrastructure

1. **Soil testing** can be done while performing a visual inspection of the site, or a sample can be taken to a laboratory for more conclusive results later on. A typical field test that is done to determine soil type is the ribbon test in which a small sample of the soil is collected, it is slightly moistened and formed into a ball removing any large rocks or organic material from the soil as you are forming it, then a ribbon of soil is made by squeezing the soil out between your thumb and pointer finger. The ribbon is then measured and afterwards you wet the soil to determine the texture of the soil.

		Soil Texture		
		Gritty	Smooth	Neither
Ribbon Length	0″	Sand		
	0-1″	Sandy Loam	Silt Loam	Loam
	1-2″	Sandy Clay Loam	Silty Clay Loam	Clay Loam
	>2″			

2. **Infiltration testing** can be conducted on-site when there is ample time available to do so. To get a good data set, at least 2.5 hours should be available for the test, split into a pre-soak time of at least 30 minutes and 2 hours of data collection.
    a. Dig a hole in the ground 1′ diameter to a 1′ depth.
    b. Fill the hole with water up to native grade and allow at least 30 minutes for the water to infiltrate; during this time if the hole goes dry, you can refill it.
    c. Install a reference marker to measure the water level.
    d. During this pre-soak time, record the change of the water level every 5 minutes. If at the end of the 30 minute pre-soak time the change in water level is stabilized, the useable data can be collected. If the rate does not stabilize by the end of the 30 minutes then a longer pre-soak may be needed.
    e. Refill the hole back to the top and take note of the time. Data will be collected at 15 minute intervals for the next 2 hours minimum. If the hole runs dry during this time, the test can be ended early. Do not refill the hole during this data collection phase.
    f. Once all the data has been collected, find both the average infiltration rate and the slowest infiltration rate recorded and make note of each. The green infrastructure can then be installed with the average measured rate after a factor of safety of 2 is applied. For instance if the measured rate was 1 inch per hour, then with the factor of safety of 2, the designed rate would be 0.5 inches per hour.

3. **Visually inspect for utilities** by looking around the area for power lines, underground utility access points like manholes or caps. An estimation of the underground utilities can be made if you find multiple access points. If possible at a later time, plans of the area can be acquired to find the exact location of these utilities. Another method would be to conduct the New Jersey One Call so the location can be marked out to find any conflicts.

4. **Identify potential underdrain locations** in cases of lower infiltration rates. Existing infrastructure such as catch basins or underground stormwater pipes can be tied into the green infrastructure to reduce the retention time of the system. These types of systems need to be downhill from the green infrastructure. If the green infrastructure is on a hill and no existing stormwater infrastructure can be connected, the underdrain pipe can be day-lighted on the lower part of the hill.

Potential project sites

Appendix A contains information on potential project sites where roadway stormwater management strategies could be implemented 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.

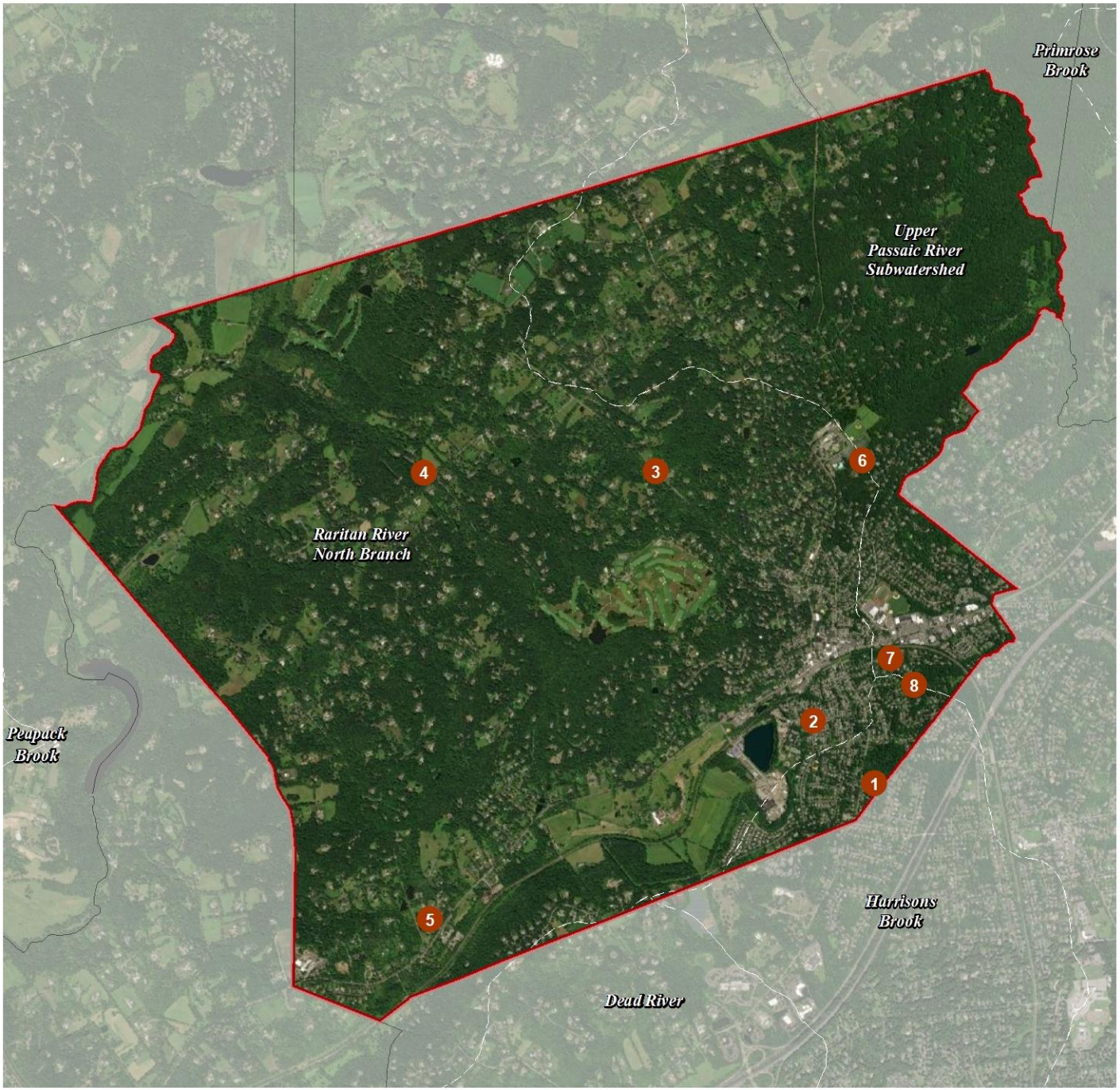
Each site's soil properties are summarized in the table below.

Site Name	Soil Type	Hydrologic Soil Group	Depth to Water Table	Depth to Restrictive Feature
Oakley Street	Silt Loam	B	>80"	48-80" to bedrock
Bernards Avenue & Maple Street	Gravelly Sandy Loam	B	>80"	>80"
Claremont Road	Gravelly Loam	B	>80"	65-67" to bedrock
Mountain Top Road & Overleigh Road	Gravelly Loam & Clay Loam	C	18 – 36"	20 – 32" to fragipan & 39 – 60" to bedrock
South Field Drive	Channery silt loam	C	>80"	20-39" to bedrock
Locust Drive	Sandy Loam	B	>80"	39-60" to bedrock
Prospect Street	Sandy loam & gravelly sandy loam	B	>80"	>80"
Washington Street	Sandy loam & gravelly sandy loam	B	>80"	>80"

Appendix A: Climate Resilient Green Infrastructure

a. Green Infrastructure Sites

BERNARDSVILLE BOROUGH: GREEN INFRASTRUCTURE ROADWAY STORMWATER MANAGEMENT STRATEGIES



SITES WITHIN THE HARRISONS BROOK SUBWATERSHED

1. Oakley Street

SITES WITHIN THE RARITAN RIVER NORTH BRANCH SUBWATERSHED

2. Bernards Avenue & Maple Street
3. Claremont Road
4. Mountain Top Road & Overleigh Road
5. South Field Drive

SITES WITHIN THE UPPER PASSAIC RIVER SUBWATERSHED

6. Locust Drive
7. Prospect Street
8. Washington Avenue

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0 0.5 1 Miles

b. Proposed Green Infrastructure Concepts

Oakley Street

Subwatershed: Harrisons Brook

Address: Oakley Street
Bernardsville, NJ 07924

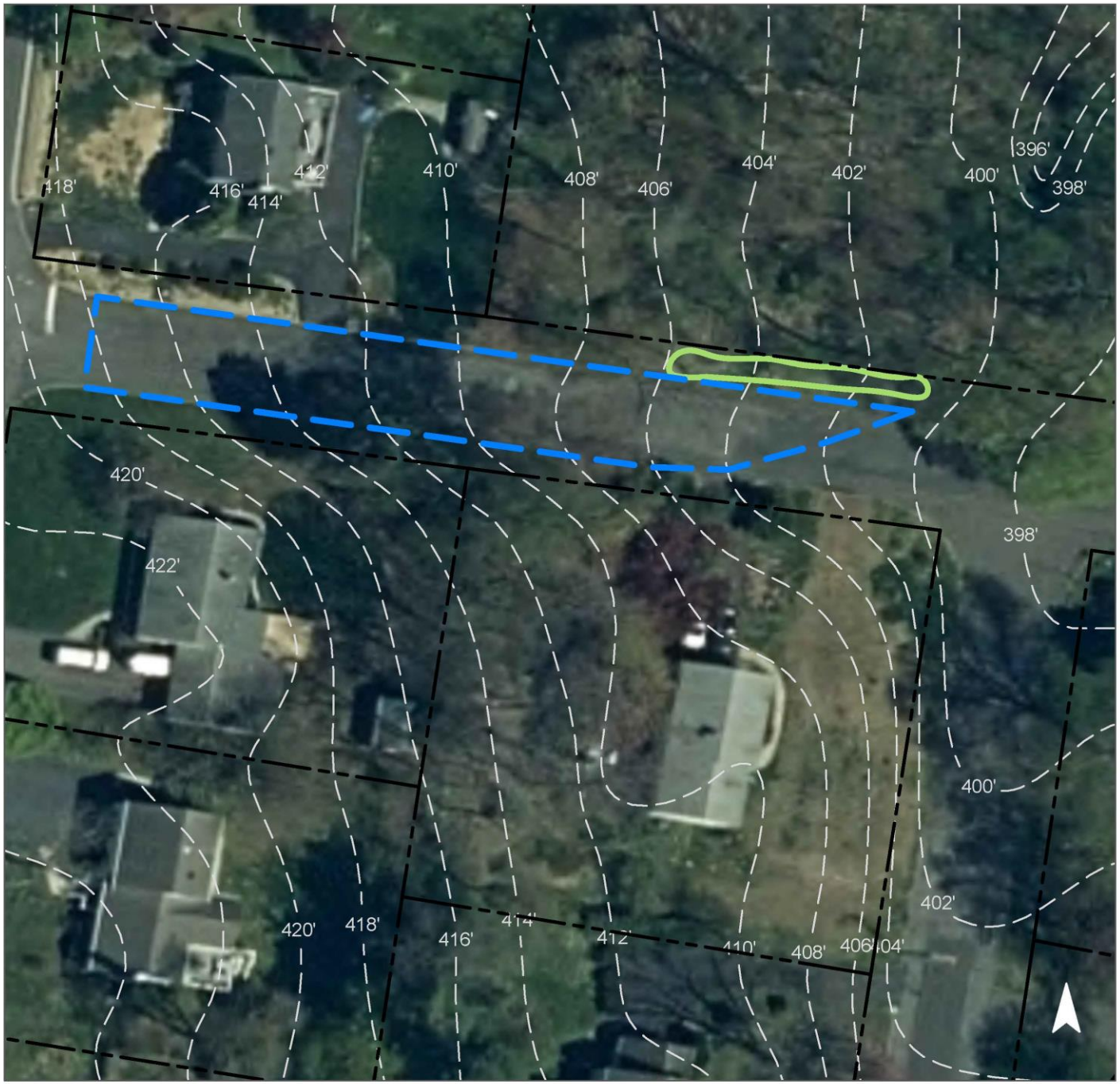
Latitude, Longitude: 40.70910, -74.56597

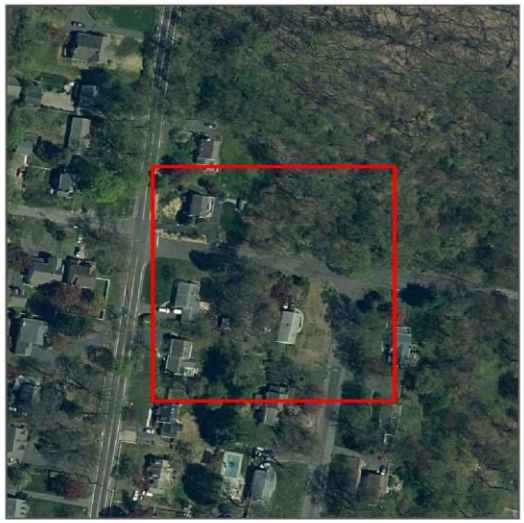
A bioswale can be installed west of the existing catch basin in the grassed area between the tree cover. The catch basin had standing water in it so an investigation to the downhill piping could help with water ponding issues in this area. A preliminary soil assessment suggests that the soils have suitable 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"
7,160	0.3	3.6	32.9	0.006	0.20

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
Bioswale	0.093	22	2,110	0.02	565	$2,825

GREEN INFRASTRUCTURE RECOMMENDATIONS





Oakley Street

- bioswale
- drainage area
- property line
- 2020 Aerial: NJOIT, OGIS

0 20' 40'

Bernards Avenue & Maple Street

Subwatershed: Raritan River North Branch

Site Area: 15,815 sq. ft.

Address: 50 Bernards Avenue
Bernardsville, NJ 07924

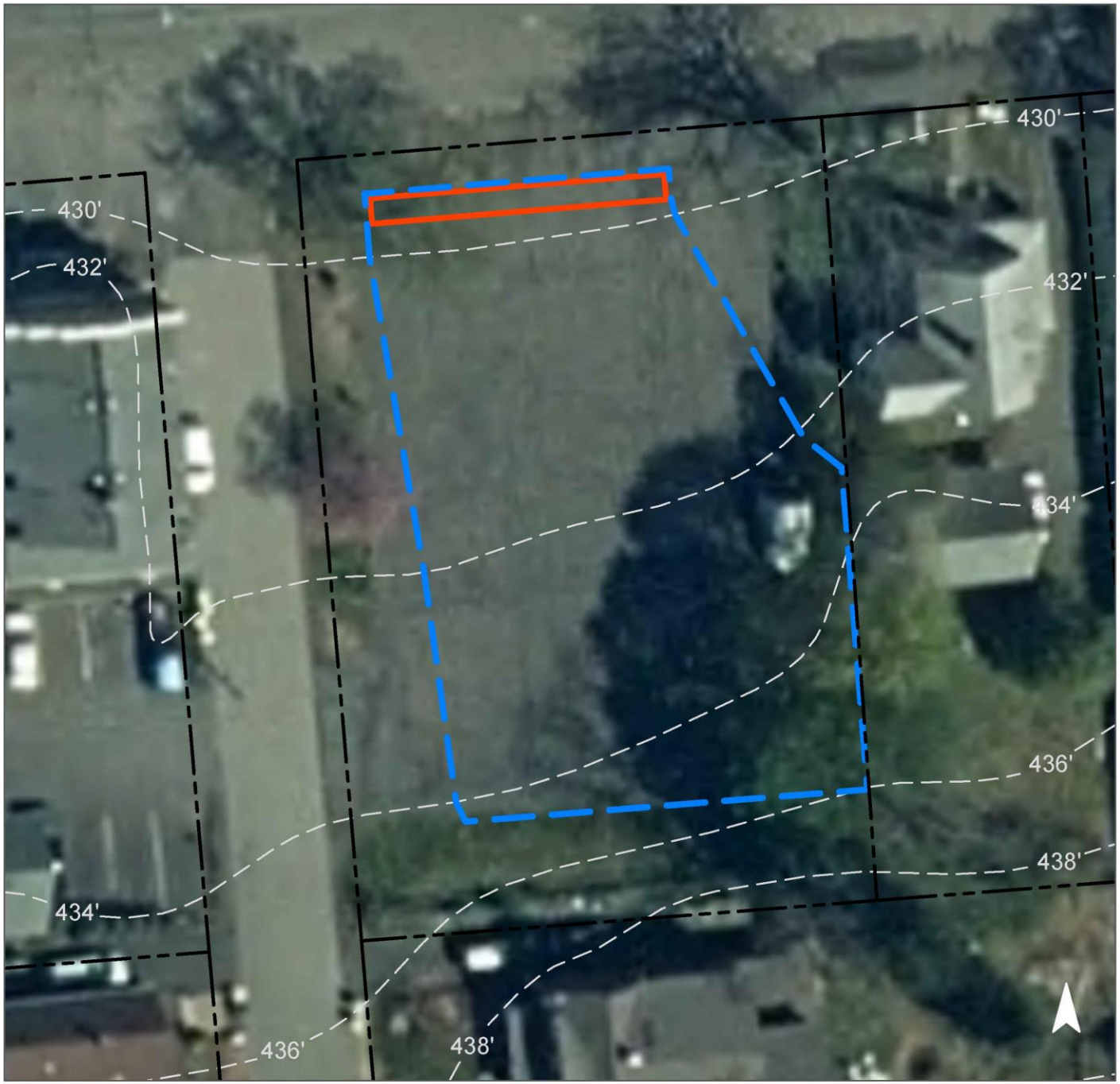
Block and Lot: Block 113, Lot 1

A stormwater planter can be installed uphill of the catch basin to intercept the stormwater prior it entering the basin. A major portion of cost for stormwater planter installation is in the excavation, curbing, and debris removal. The estimated cost is variable and dependent on those factors. 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"
9,475	0.5	4.8	43.5	0.007	0.26

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
Stormwater planter	0.247	41	18,350	0.69	360	$135,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Bernards Avenue & Maple Street

- stormwater planter
- drainage area
- property line
- 2020 Aerial: NJOIT, OGIS

0 15' 30'

Claremont Road

Subwatershed: Raritan River North Branch

Address: Claremont Road
Bernardsville, NJ 07924

Latitude, Longitude: 40.73093, -74.58618

Using an existing curb cut and underground piping system, the daylighted areas can be converted to a bioswale to help promote water infiltration. The outfall pipe on the southern section of the roadway can have the channel cleared of debris, regraded, and planted to be converted to a bioswale. 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"
3,330	0.2	1.7	15.3	0.003	0.09

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
Bioswale	0.043	10	2,360	0.01	630	$3,150

GREEN INFRASTRUCTURE RECOMMENDATIONS

Claremont Road

- bioswale
- drainage area
- property line
- 2020 Aerial: NJOIT, OGIS

0 25' 50'

Mountain Top Road & Overleigh Road

Subwatershed: Raritan River North Branch

Address: Mountain Top Road & Overleigh Road Bernardsville, NJ 07924

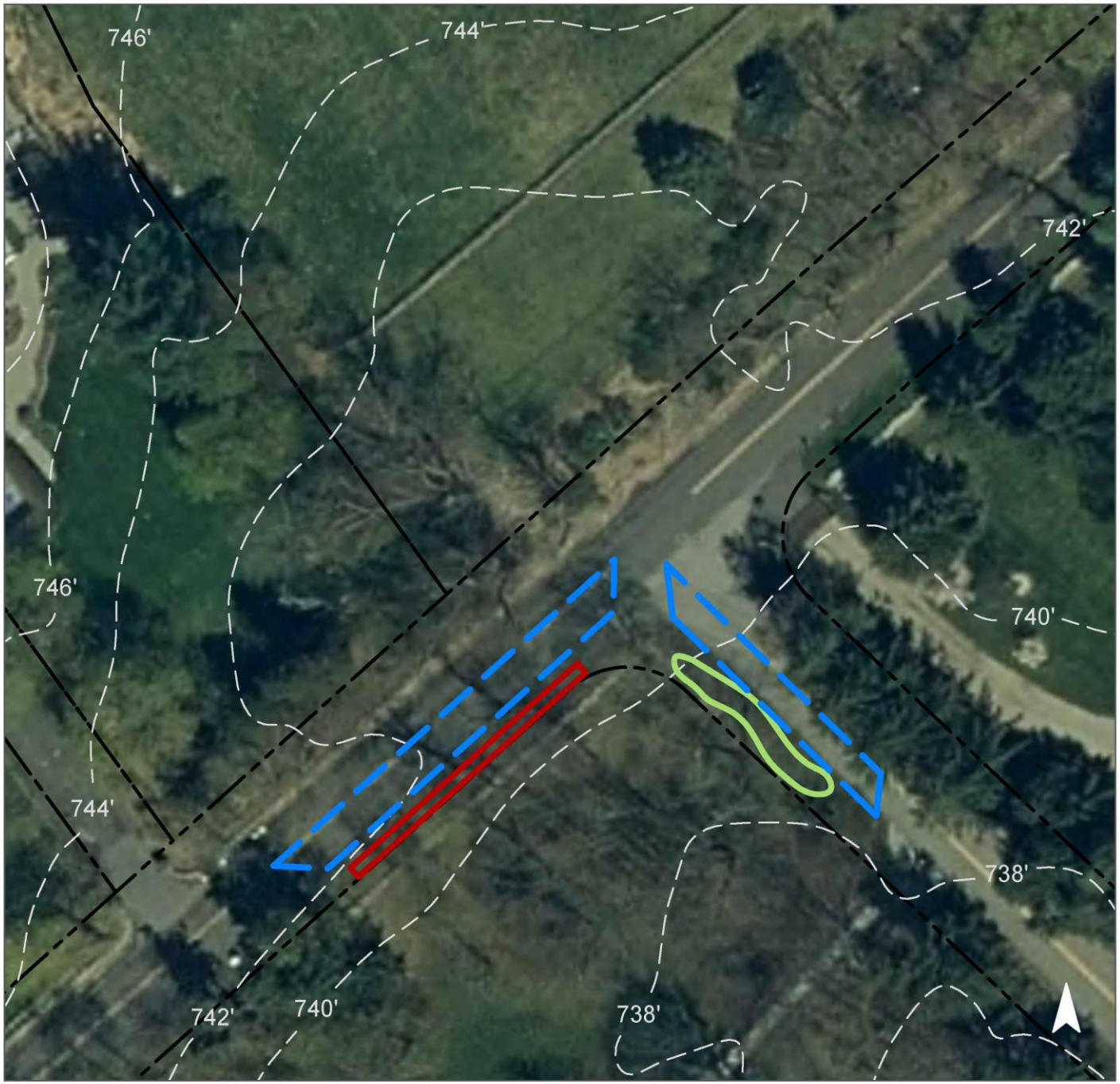
Latitude, Longitude: 40.73026, -74.60582

A stone swale can be installed south of Mountain Top Road to help guide the water flow away from the retaining wall toward the catch basin on the corner of the roadway. The stone swale does not provide any additional benefits for stormwater reduction other than flow redirection. A bioswale can be installed west of Overleigh Road in the existing eroded area to aid in water conveyance to the nearby catch basins. 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"
1,050	0.1	1.3	12.3	0.002	0.07

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
Bioswale	0.014	3	1,870	0.01	500	$2,500
Stone swale	n/a	n/a	n/a	n/a	400	$1,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Mountain Top Road & Overleigh Road

- stone swale
- bioswale
- drainage area
- property line
- 2020 Aerial: NJOIT, OGIS

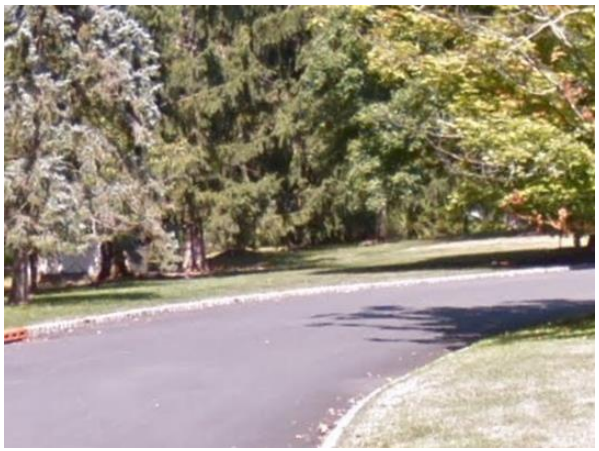
0 25' 50'

South Field Drive

Subwatershed: Raritan River North Branch

Address: South Field Drive
Bernardsville, NJ 07924

Latitude, Longitude: 40.69986, -74.60597

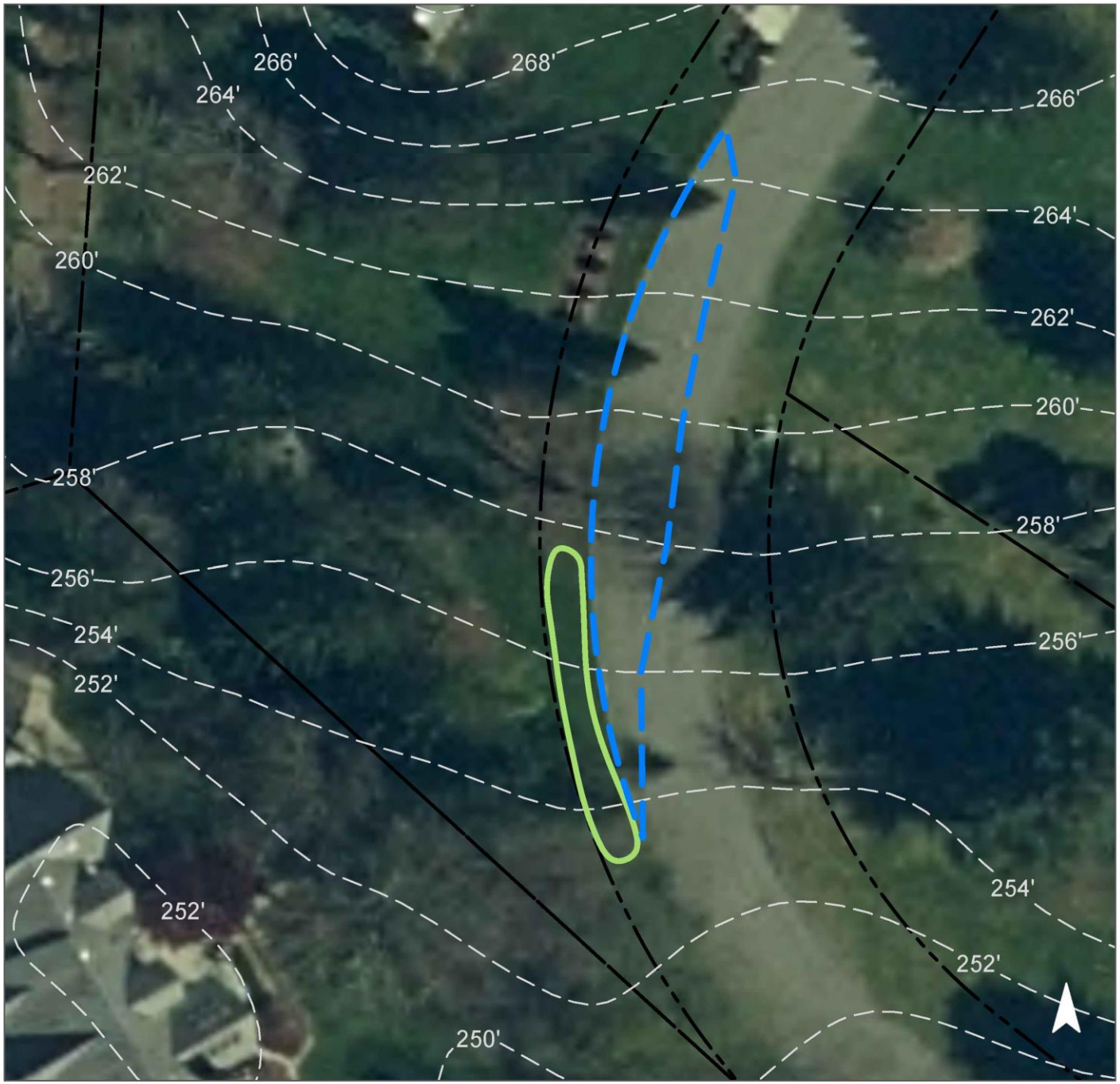


A bioswale can be installed on the corner turn of South Field Drive. This will help with water conveyance down the hill and help prevent erosion alongside the roadway. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

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"
2,670	0.1	1.3	12.3	0.002	0.07

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
Bioswale	0.035	8	2,660	0.1	710	$3,550

GREEN INFRASTRUCTURE RECOMMENDATIONS



Southfield Drive

- bioswale
- drainage area
- property line
- 2020 Aerial: NJOIT, OGIS

0 20' 40'

Locust Drive

Subwatershed: Upper Passaic River

Address: Locust Drive
Bernardsville, NJ 07924

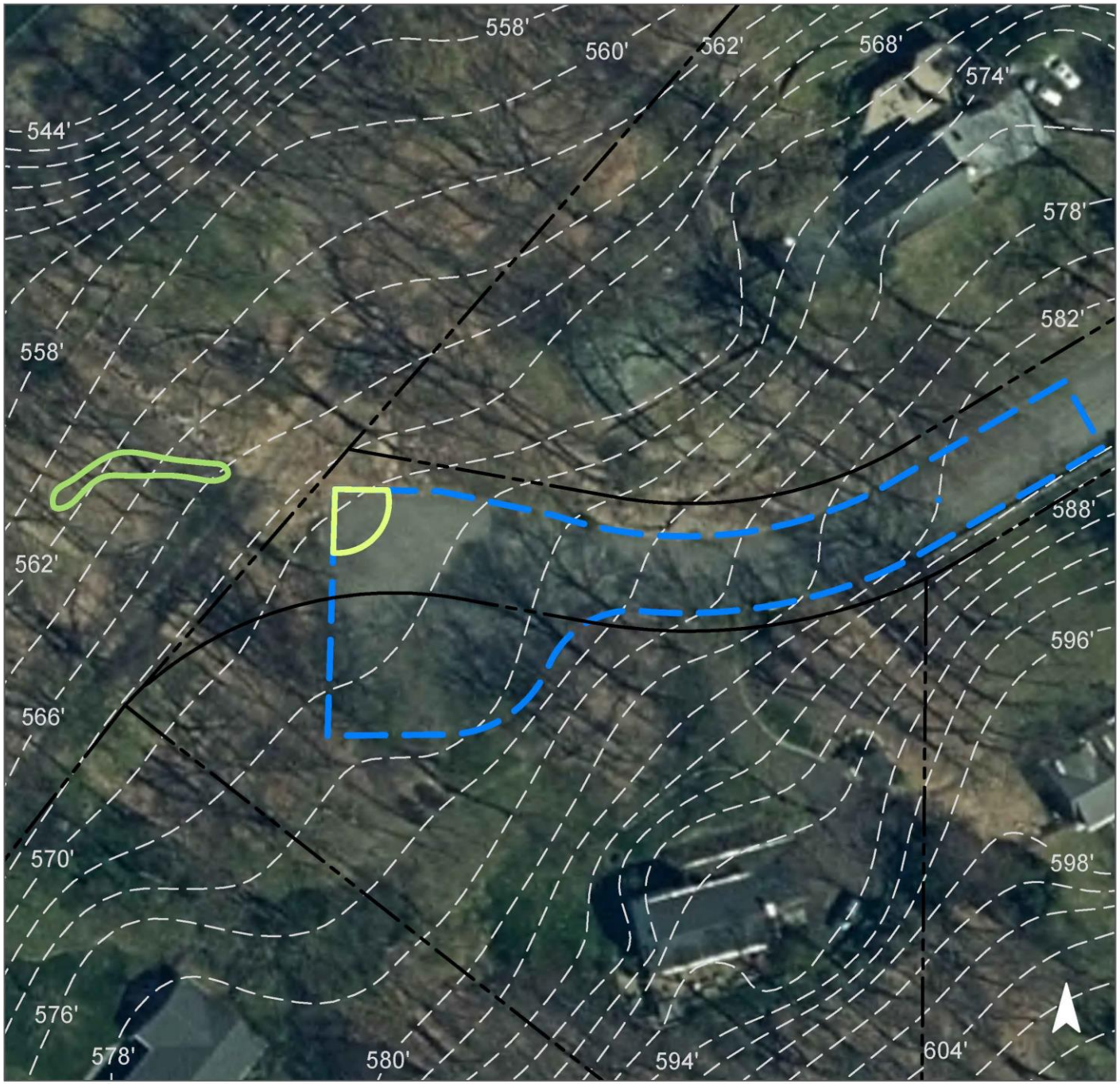
Latitude, Longitude: 40.73136, -74.56676

The northwestern section of the pavement can be replaced with a rain garden to intercept stormwater prior to it entering the catch basin. The outfall pipe of the catch basin can be armored with rock to prevent erosion, and the channel downhill of it can be cleared of debris and converted to a bioswale to help promote water infiltration. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervious Cover	Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
14,755	0.7	7.5	67.7	0.011	0.40

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention system	0.047	8	3,490	0.13	450	$2,250
Bioswale	0.169	40	1,910	0.04	510	$2,550

GREEN INFRASTRUCTURE RECOMMENDATIONS



Locust Drive

- bioretention system
- bioswale
- drainage area
- property line
- 2020 Aerial: NJOIT, OGIS

0 30' 60'

Prospect Street

Subwatershed: **Upper Passaic River**

Address: **Prospect Street**
Bernardsville, NJ 07924

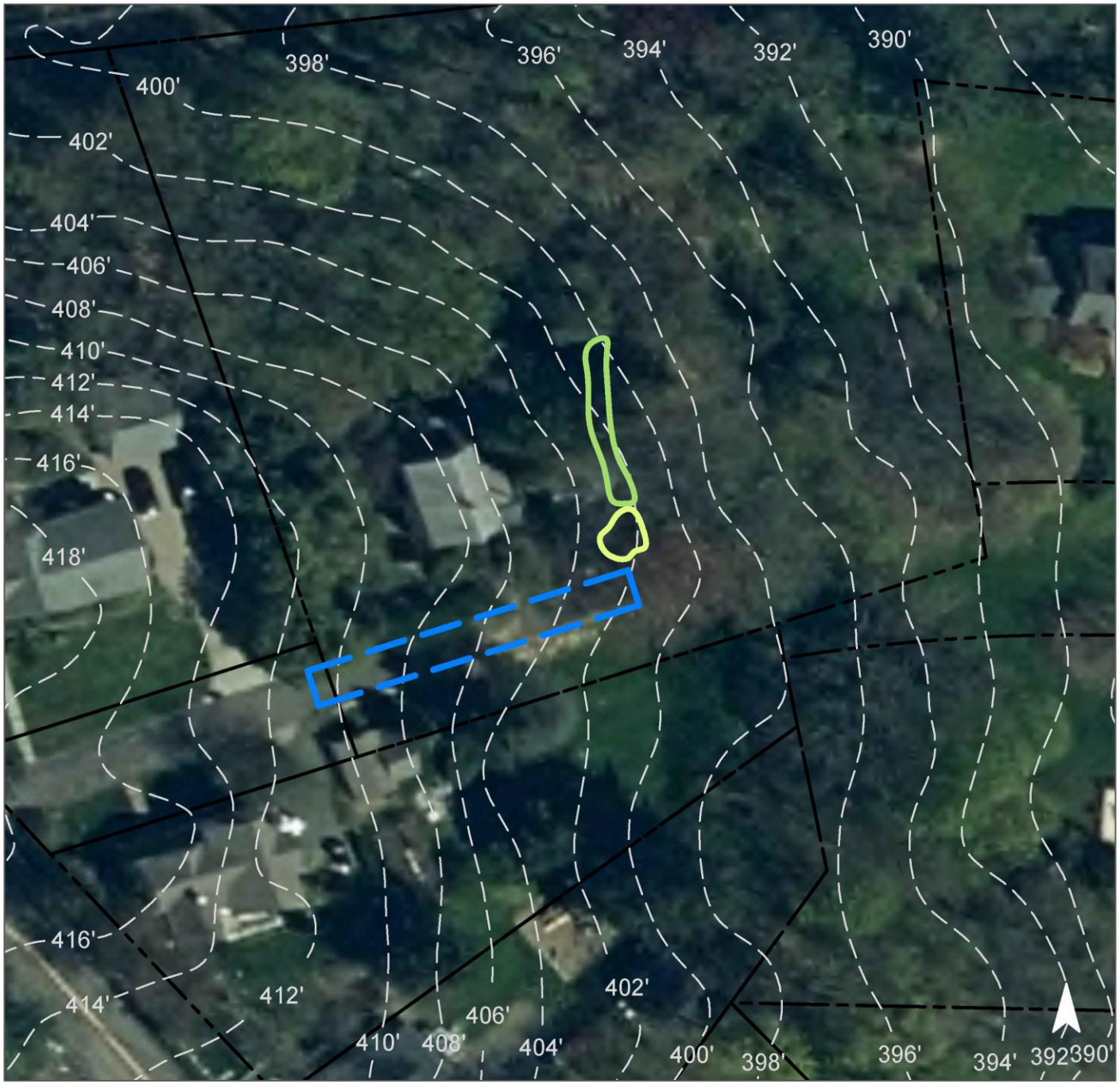
Latitude, Longitude: **40.71790, -74.56339**

A rain garden can be installed at the beginning of the existing drainage channel to promote infiltration. To prevent standing water and further erosion of the drainage channel, the channel can be converted to a bioswale. 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"
1,320	0.1	0.7	6.1	0.001	0.04

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention system	0.034	6	2,560	0.10	170	$850
Bioswale	0.017	4	1,310	0.01	350	$1,750

GREEN INFRASTRUCTURE RECOMMENDATIONS



Prospect Street

- bioretention system
- bioswale
- drainage area
- property line
- 2020 Aerial: NJOIT, OGIS

0 25' 50'

Washington Avenue

Subwatershed: **Upper Passaic River**

Address: **Washington Street**
Bernardsville, NJ 07924

Latitude, Longitude: **40.71687, -74.56314**

Bioswales can be installed alongside the northern edge of Washington Avenue in areas where stormwater creates ruts or dead patches in the turfgrass to help convey the stormwater nondestructively. 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"
2,255	0.1	1.1	10.4	0.002	0.06

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
Bioswale	0.029	7	3,850	0.02	1,030	$5,150

GREEN INFRASTRUCTURE RECOMMENDATIONS

Washington Avenue

- bioswale
- drainage area
- property line
- 2020 Aerial: NJOIT, OGIS

0 50' 100'

c. Summary of Existing Conditions

Summary of Existing Conditions

	Subwatershed/Site Name/Total Site Info/GI Practice	Block	Lot	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)
	Harrisons Brook Sites			**0.16**	**7,160**	**0.3**	**3.6**	**32.9**	**746**	**26,850**	**0.006**	**0.20**
1	**Oakley Street**											
	Total Site Info	**n/a**	**n/a**	**0.16**	**7,160**	**0.3**	**3.6**	**32.9**	**746**	**26,850**	**0.006**	**0.20**
	Raritan River North Branch Sites			**0.22**	**9,700**	**0.5**	**4.9**	**44.5**	**1,010**	**35,567**	**0.008**	**0.27**
2	**Bernards Avenue & Maple Street**											
	Total Site Info	**113**	**1**	**0.08**	**3,700**	**0.2**	**1.9**	**17.0**	**385**	**13,567**	**0.003**	**0.10**
3	**Claremont Road**											
	Total Site Info	**n/a**	**n/a**	**0.08**	**3,330**	**0.2**	**1.7**	**15.3**	**347**	**12,210**	**0.003**	**0.09**
4	**Mountain Top Road & Overleight Road**											
	Total Site Info	**n/a**	**n/a**	**0.02**	**1,050**	**0.1**	**0.5**	**4.8**	**109**	**3,850**	**0.001**	**0.03**
5	**South Field Drive**											
	Total Site Info	**n/a**	**n/a**	**0.06**	**2,670**	**0.1**	**1.3**	**12.3**	**278**	**9,790**	**0.002**	**0.07**
	Upper Passaic River Sites			**0.34**	**14,755**	**0.7**	**7.5**	**67.7**	**1,537**	**54,102**	**0.011**	**0.40**
6	**Locust Drive**											
	Total Site Info	**n/a**	**n/a**	**0.34**	**14,755**	**0.7**	**7.5**	**67.7**	**1,537**	**54,102**	**0.011**	**0.40**
7	**Prospect Street**											
	Total Site Info	**n/a**	**n/a**	**0.03**	**1,320**	**0.1**	**0.7**	**6.1**	**138**	**4,840**	**0.001**	**0.04**
8	**Washington Avenue**											
	Total Site Info	**n/a**	**n/a**	**0.05**	**2,255**	**0.1**	**1.1**	**10.4**	**235**	**8,268**	**0.002**	**0.06**

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	Unit Cost ($/unit)	Unit	Total Cost ($)
	Harrisons Brook Sites	**7,160**	**0.16**	**0.093**	**22**	**2,110**	**0.02**				**$2,825**
1	**Oakley Street**										
	Bioswale	7,160	0.16	0.093	22	2,110	0.02	565	$5	SF	$2,825
	Total Site Info	**7,160**	**0.16**	**0.093**	**22**	**2,110**	**0.02**				**$2,825**
	Raritan River North Branch Sites	**9,700**	**0.22**	**0.175**	**35**	**12,190**	**0.29**				**$141,700**
2	**Bernards Avenue & Maple Street**										
	Stormwater planter	3,700	0.08	0.096	16	7,170	0.27	360	$375	SF	$135,000
	Total Site Info	**3,700**	**0.08**	**0.096**	**16**	**7,170**	**0.27**				**$135,000**
3	**Claremont Road**										
	Bioswale	3,330	0.08	0.043	10	2,360	0.01	630	$5	SF	$3,150
	Total Site Info	**3,330**	**0.08**	**0.043**	**10**	**2,360**	**0.01**				**$3,150**
4	**Mountain Top Road & Overleight Road**										
	Bioswale	1,050	0.02	0.014	3	1,870	0.01	500	$5	SF	$2,500
	Total Site Info	**1,050**	**0.02**	**0.014**	**3**	**1,870**	**0.01**				**$2,500**
5	**South Field Drive**										
	Bioswale	2,670	0.06	0.035	8	2,660	0.01	710	$5	SF	$3,550
	Total Site Info	**2,670**	**0.06**	**0.035**	**8**	**2,660**	**0.01**				**$3,550**

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	Unit Cost ($/unit)	Unit	Total Cost ($)
	Upper Passaic River Sites	**14,755**	**0.34**	**0.216**	**48**	**5,400**	**0.17**				**$4,800**
6	**Locust Drive**										
	Bioretention system	1,800	0.04	0.047	8	3,490	0.13	450	$5	SF	$2,250
	Bioswale	12,955	0.30	0.169	40	1,910	0.04	510	$5	SF	$2,550
	Total Site Info	**14,755**	**0.34**	**0.216**	**48**	**5,400**	**0.17**				**$4,800**
7	**Prospect Street**										
	Bioretention system	1,320	0.03	0.034	6	2,560	0.10	170	$5	SF	$850
	Bioswale	1,320	0.03	0.017	4	1,310	0.01	350	$5	SF	$1,750
	Total Site Info	**2,640**	**0.06**	**0.052**	**10**	**3,870**	**0.11**				**$2,600**
8	**Washington Avenue**										
	Bioswale	2,255	0.05	0.029	7	3,850	0.02	1,030	$5	SF	$5,150
	Total Site Info	**2,255**	**0.05**	**0.029**	**7**	**3,850**	**0.02**				**$5,150**