Impervious Cover Assessment, Green Infrastructure Action Plan, and Green Infrastructure Strategic Plan for Caldwell Borough, New Jersey

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Rutgers Cooperative Extension

Rutgers Cooperative Extension (RCE) helps the diverse population of New Jersey adapt to a rapidly changing society and improves their lives through an educational process that uses science-based knowledge.

Water Resources Program

Our Mission is to identify and address community water resources issues using sustainable and practical science-based solutions.

The Impact of Development on Stormwater Runoff

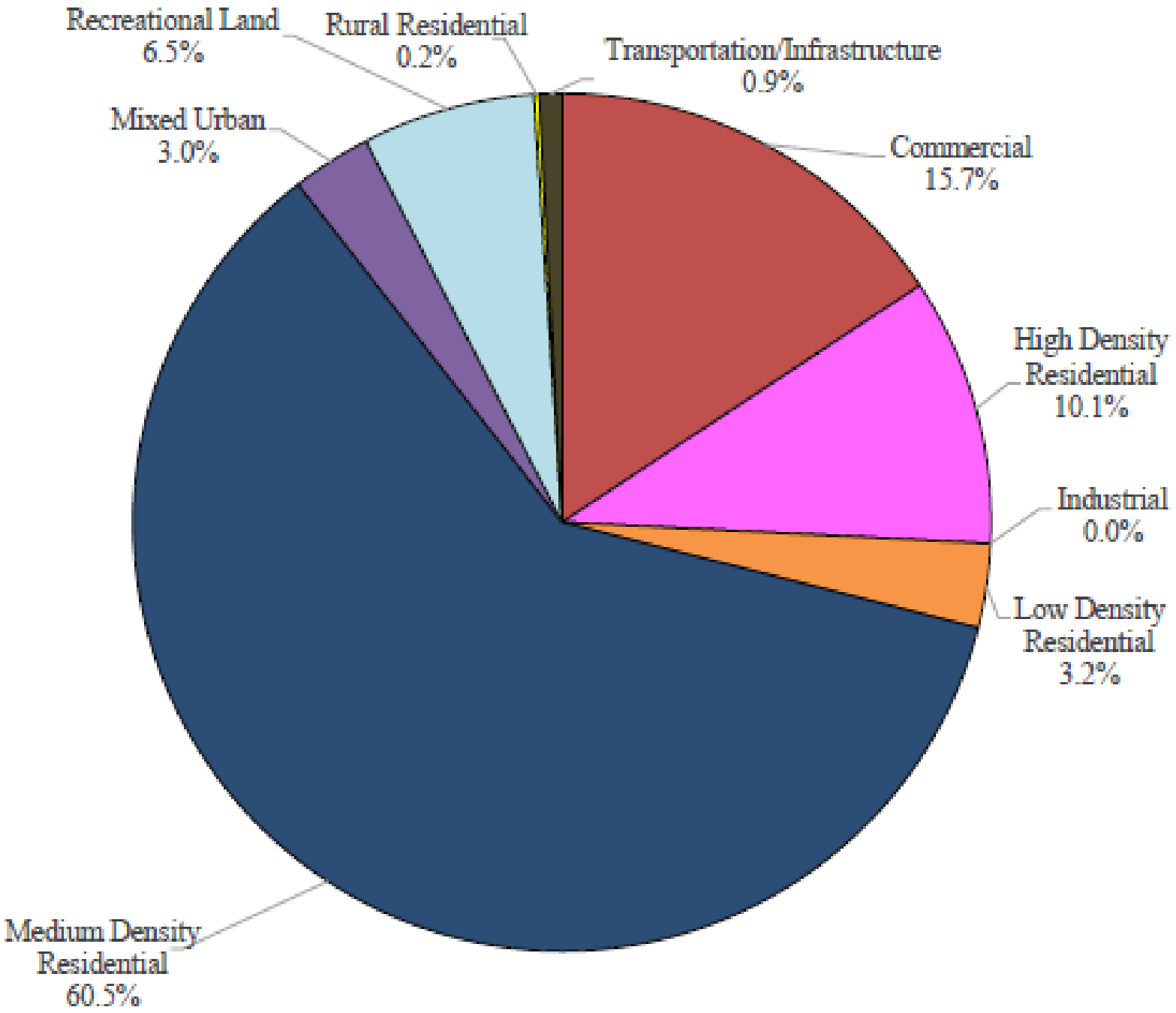
More development → *More impervious surfaces* → *More stormwater runoff*

Impervious Cover Assessment Figures/Charts

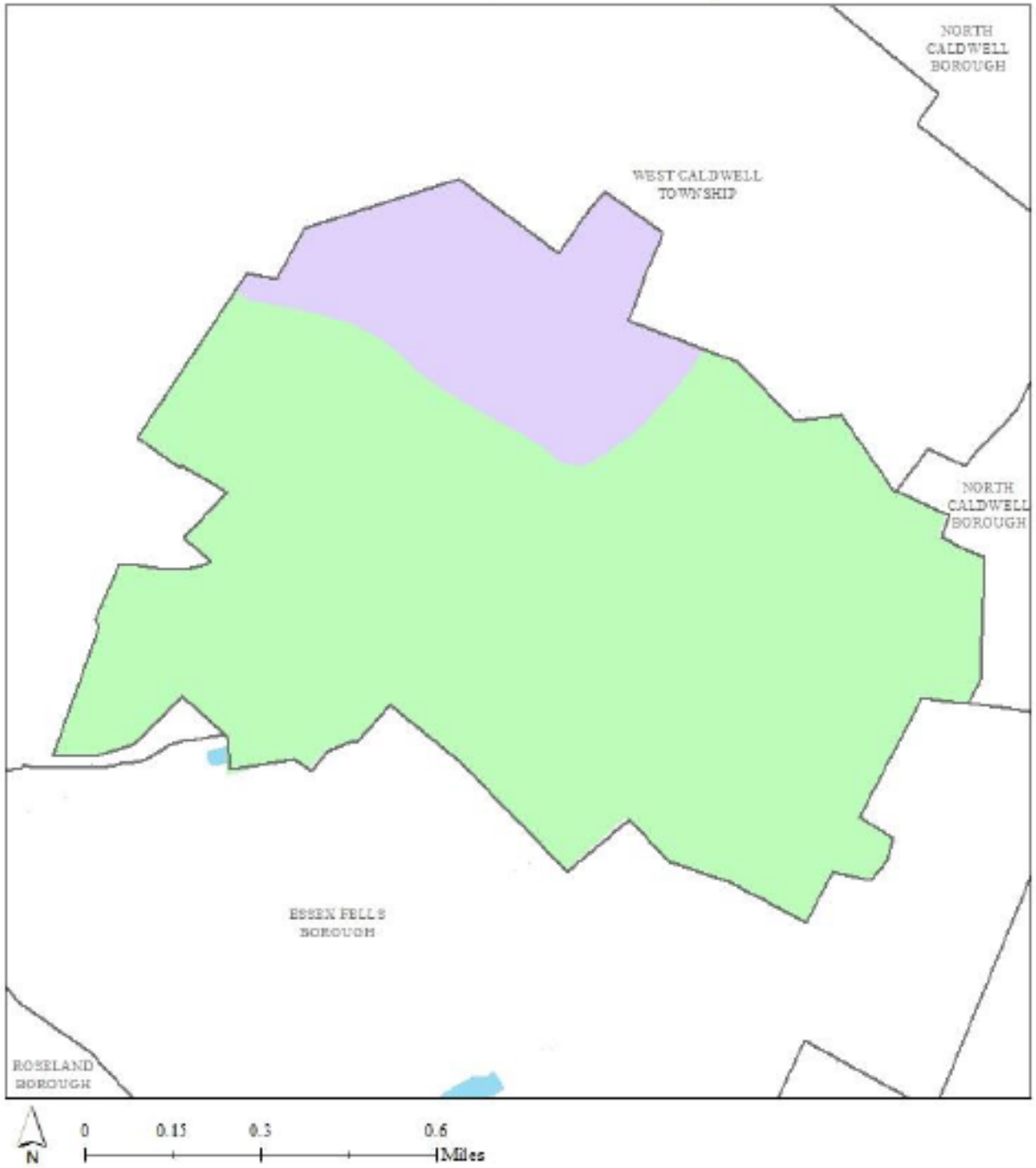
Impervious Cover Assessment

- Analysis completed by watershed and by municipality
- Use 2015 Land Use data to determine impervious cover
- Calculate runoff volumes for water quality, 2, 10 and 100 year design storm and annual rainfall
- Contain three concept designs

Land Use Types for Caldwell Borough


Recreational Land
6.5%
Rural Residential
0.2%
Transportation/Infrastructure
0.9%
Mixed Urban
3.0%
Commercial
15.7%
High Density
Residential
10.1%
Industrial
0.0%
Low Density
Residential
3.2%
Medium Density
Residential
60.5%

Subwatersheds of Caldwell Borough



Subwatershed	Total Area (ac)	Impervious Cover (ac)	Impervious Cover (%)
Deepavaal Brook	129.7	49.4	38.1%
Upper Passaic River	628.2	238.0	37.9%
Total	758.0	287.4	37.9%

Subwatershed	Total Runoff Volume for the 1.25" NJ Water Quality Storm (MGal)	Total Runoff Volume for the NJ Annual Rainfall of 44" (MGal)	Total Runoff Volume for the 2-Year Design Storm (3.4") (MGal)	Total Runoff Volume for the 10-Year Design Storm (5.2") (MGal)	Total Runoff Volume for the 100-Year Design Storm (8.7") (MGal)
Deepavaal Brook	1.7	59.0	4.6	7.0	11.7
Upper Passaic River	8.1	284.3	22.0	33.6	56.2
Total	9.8	343.3	26.5	40.6	67.9

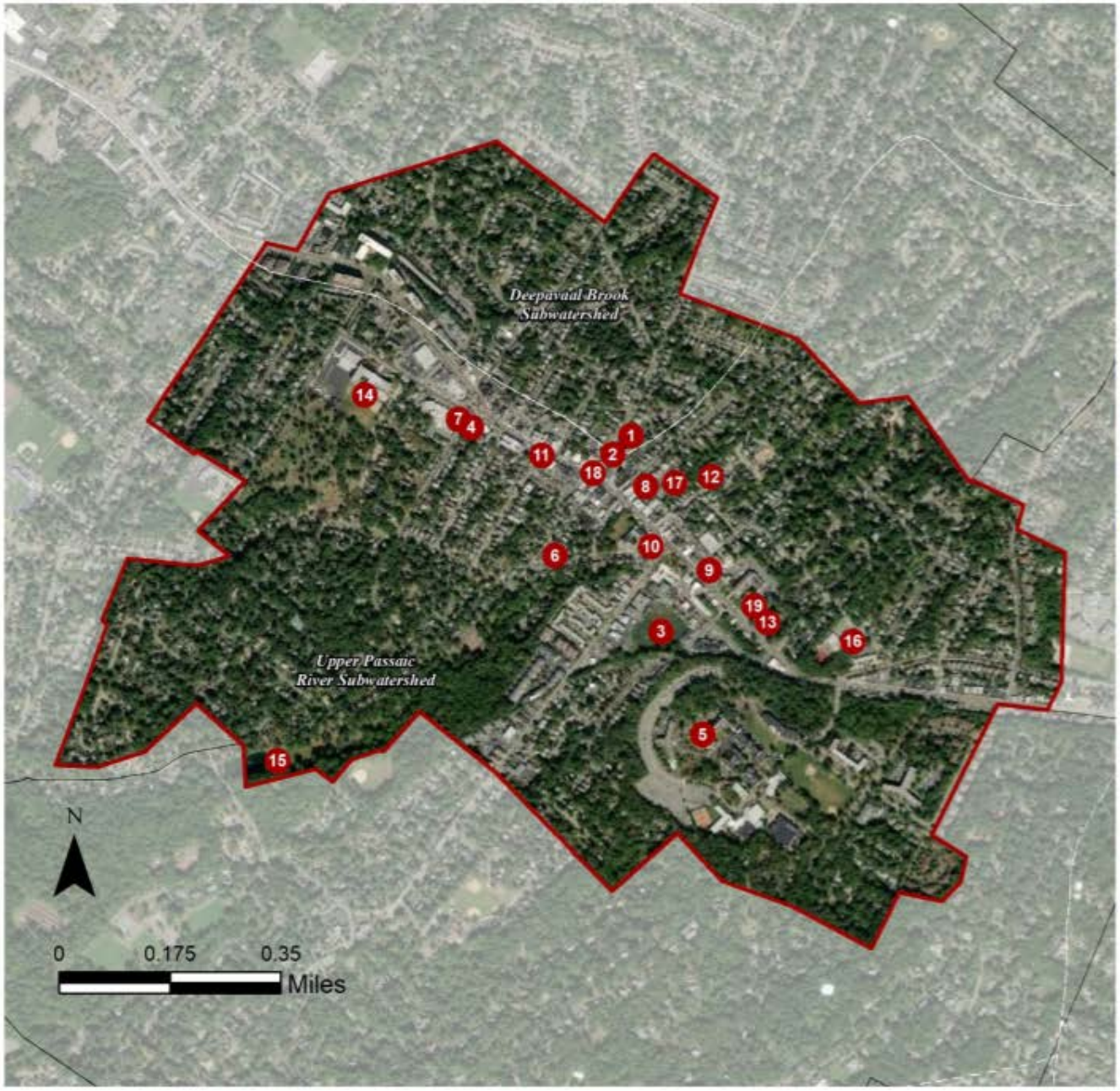
WE LOOK HERE FIRST:

- ✓Schools
- ✓Places of Worship
- ✓Libraries
- ✓Municipal Building
- ✓Public Works
- ✓Firehouses
- ✓Post Offices
- ✓Elks or Moose Lodge
- ✓Parks/ Recreational Fields

- 20 to 40 sites are entered into a PowerPoint
- Site visits are conducted

Green Infrastructure Action Plan and Strategic Plan

CALDWELL BOROUGH: GREEN INFRASTRUCTURE SITES



SITES WITHIN THE DEEPAVAAL BROOK SUBWATERSHED

1. Grover Cleveland Center for Senior Citizens
2. United States Postal Service

SITES WITHIN THE UPPER PASSAIC RIVER SUBWATERSHED

3. Caldwell Municipal Complex
4. Caldwell United Methodist Church
5. Caldwell University
6. Center For Spiritual Living North Jersey
7. Congregation Agudath Israel
8. Essex Lodge No. 7
9. First Baptist Church
10. First Presbyterian Church
11. Gould Place & Bloomfield Avenue Right of Way
12. Green Acres: 27 Personette Street
13. Grover Cleveland Birthplace
14. Grover Cleveland Middle School
15. Grover Cleveland Park
16. Lincoln Elementary School
17. Municipal Parking Lot
18. Park Avenue & Bloomfield Avenue Right of Way
19. Saint Aloysius Roman Catholic Church

CALDWELL MUNICIPAL COMPLEX

Subwatershed: Upper Passaic River

Site Area: 343,616 sq. ft.

Address: 1 Provost Square
Caldwell, NJ 07006

Block and Lot: Block 56, Lot 1, 2, 3, 10.01, 10.02, 0.03, 10.06, 17

Several rain gardens can be installed in the turfgrass area around the municipal complex to capture, treat, and infiltrate stormwater runoff from the field and help reported flooding in the 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"
90	307,669	14.8	155.4	1,412.6	0.240	8.44

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	0.179	30	13,540	0.51	1,715	$8,575

GREEN INFRASTRUCTURE RECOMMENDATIONS

Caldwell Municipal Complex

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

0 75' 150'


RESTROOM


RESTROOM

FIRST PRESBYTERIAN CHURCH

Subwatershed: Upper Passaic River

Site Area: 101,635 sq. ft.

Address: 326 Bloomfield Avenue
Caldwell, NJ 07006

Block and Lot: Block 53, Lot 9

A rain garden can be installed in the turfgrass along the side of the church to capture, treat, and infiltrate stormwater runoff from the roof. An existing asphalt strip adjacent to the sidewalk can be replaced with a series of stormwater planters that could 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"
33	33,845	1.6	17.1	155.4	0.026	0.93

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	0.017	3	1,320	0.05	170	$850
Stormwater planters	0.070	12	5,290	0.20	680	$255,000

GREEN INFRASTRUCTURE RECOMMENDATIONS

First Presbyterian Church

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

0 25' 50'

Caldwell

ALL SITES | DEEPAVAAL BROOK | UPPER PASSAIC RIVER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2 United States Postal Service


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4 Caldwell United Methodist Church


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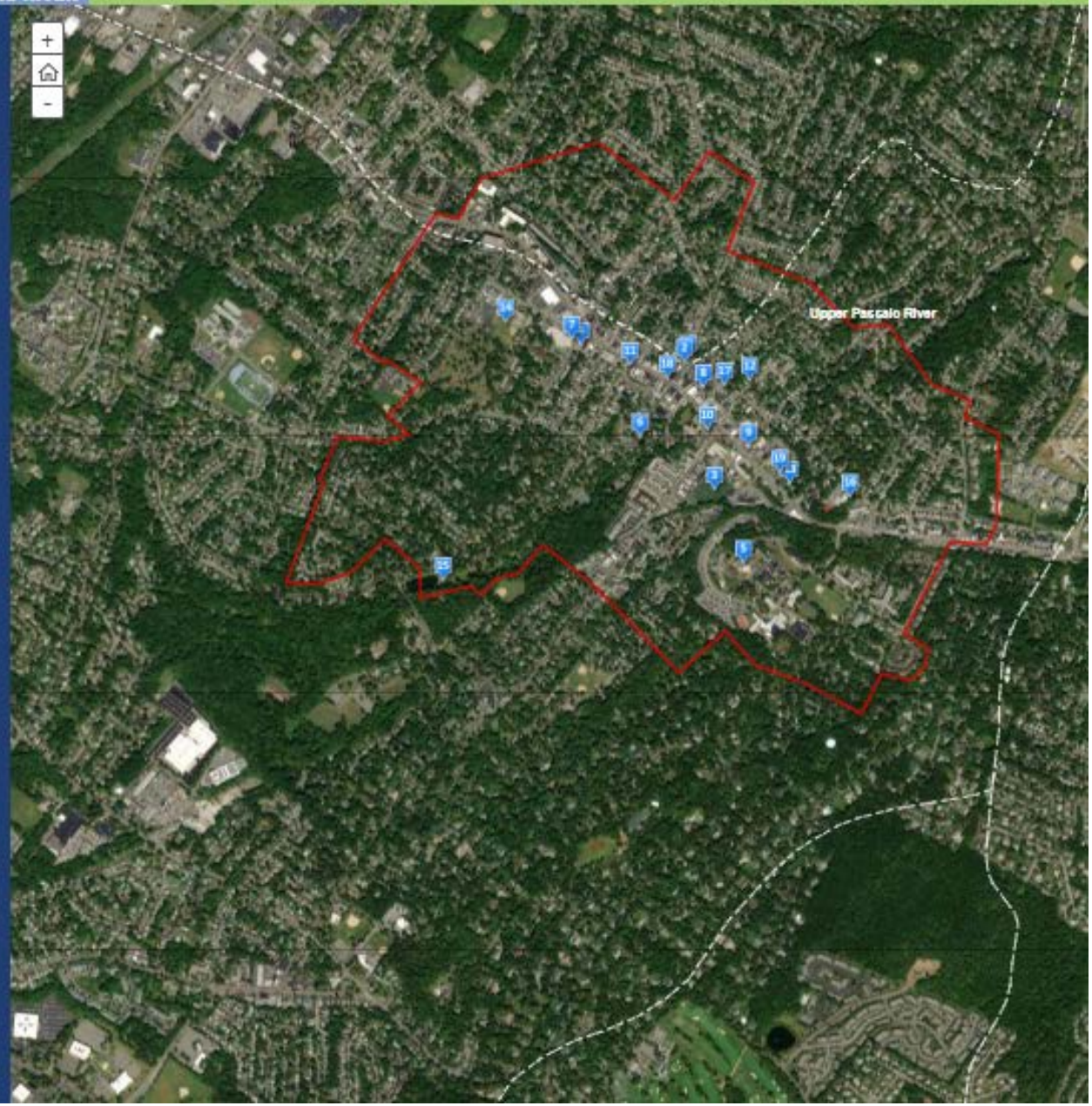

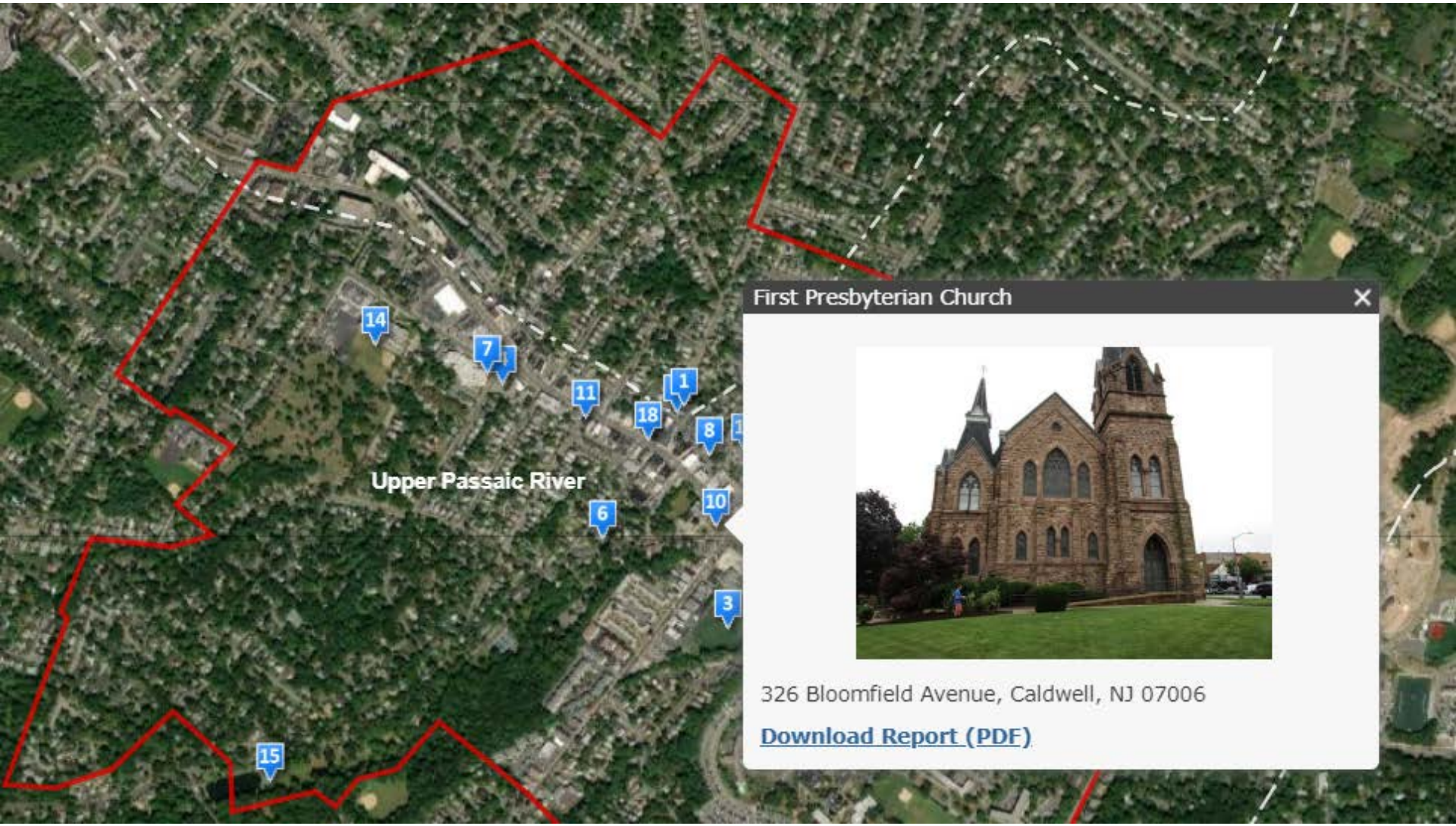
First Presbyterian Church
326 Bloomfield Avenue, Caldwell, NJ 07006
Download Report (PDF)
Upper Passaic River
14
7
11
1
18
8
10
6
3
15

Final Thoughts

- Plans promote action and earn Sustainable Jersey Points
- Plans are a conduit for funding
- Impervious cover reduction action plan provide sites for developers to offset impacts
- Wide range in cost of projects (Eagle Scout projects to economic stimulus money projects)
- Foundation for stormwater utilities, watershed restoration plans, stormwater mitigation plan, and/or integrated water quality plans

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Next Steps and Questions

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