

Green Street Plan

New Jersey Avenue

Wildwood, NJ 08620

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GI Solutions, LLC.

Who are we?

- Small company with 30 years of experience in Green Infrastructure.
- Team of engineers, scientists, urban planners, etc.
- Invested in providing green infrastructure solutions to grey infrastructure problems.



Outline

- Why Green Infrastructure/ LIDs?
- Problem Statement
- Green Street Plan
 - Design of GI
 - Method of GI
- How much will this cost?
- How long will this take?
- What are the benefits?

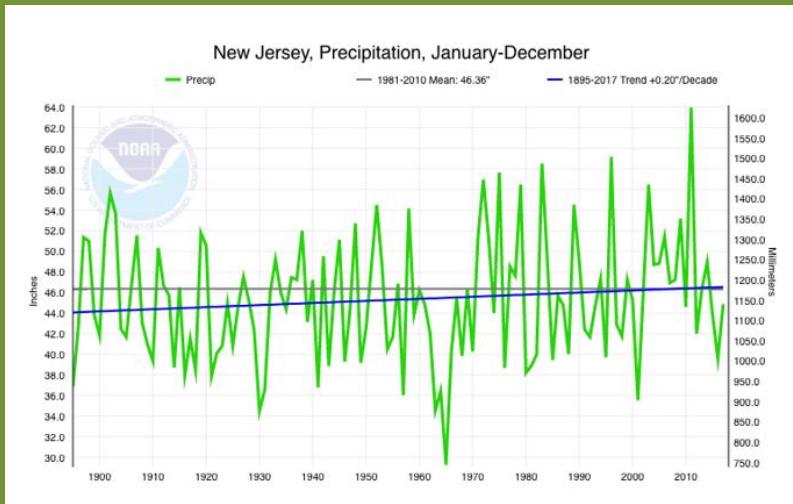


Green Infrastructure (GI)/ LIDs

- Stormwater management that utilizes the natural environment and engineered systems to mimic the natural water cycle.
- Can be designed to:
 - Reduce runoff volume
 - Reduce peak flow rates
 - Improve water quality
- LIDs are a subset of GI practices



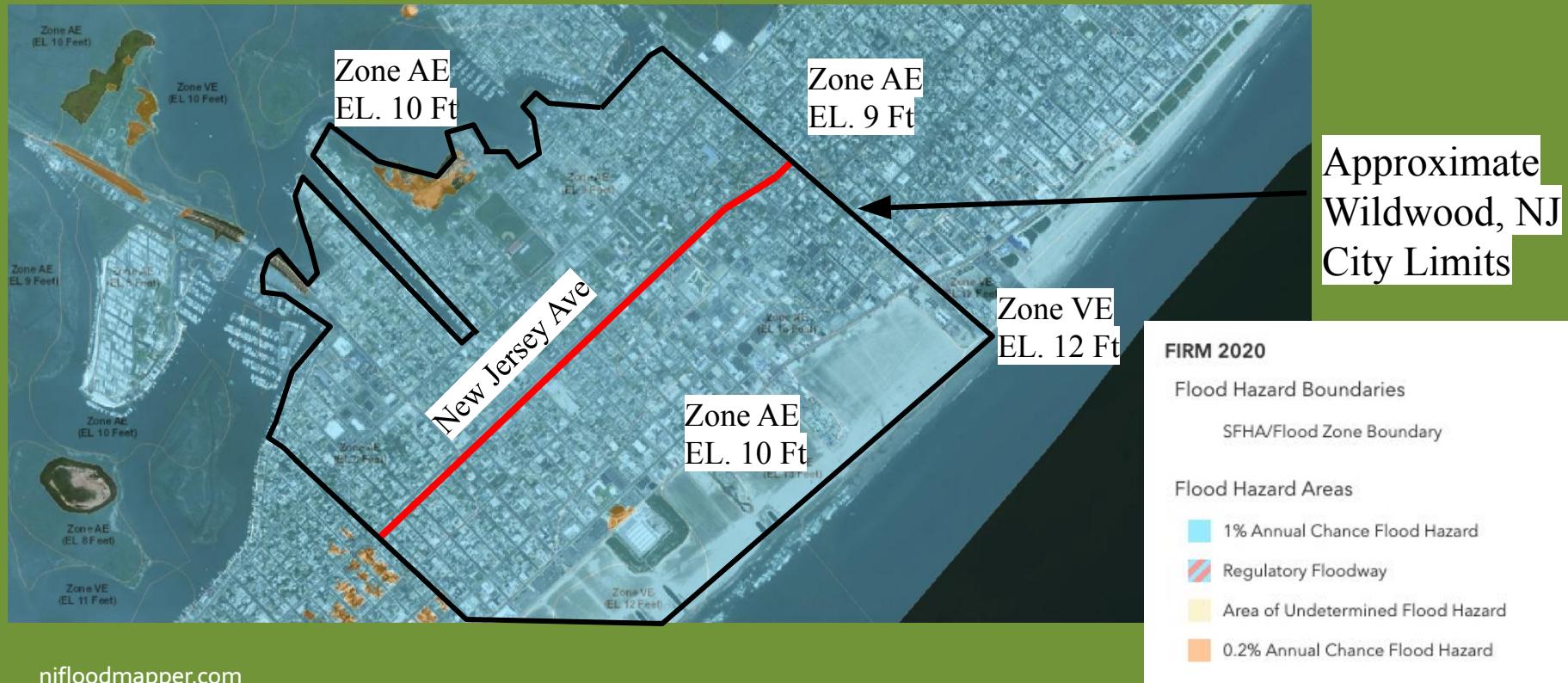
Precipitation Increase/ Hurricane Sandy



- NOAA reported that 2019 was the wettest year on record for the third consecutive year.
- Heavy rainfall continues to increase specifically on the East Coast.



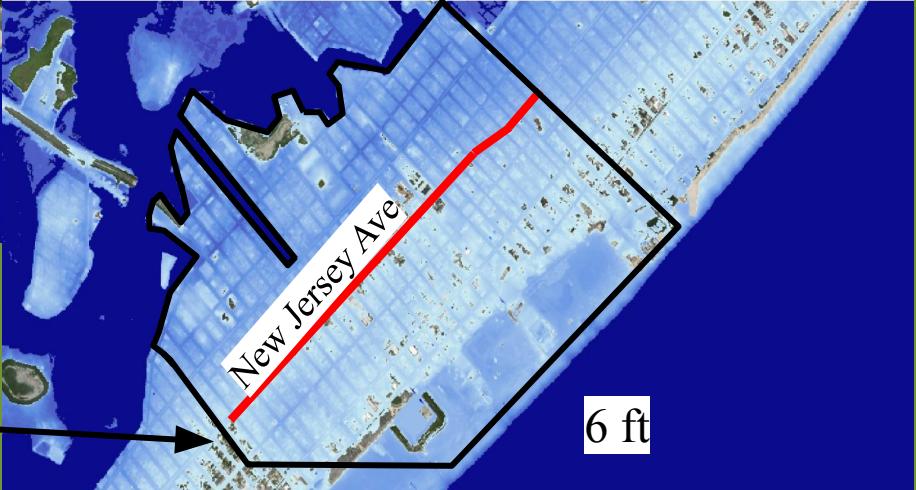
FEMA Flood Zones



Sea Level Rise (SLR)

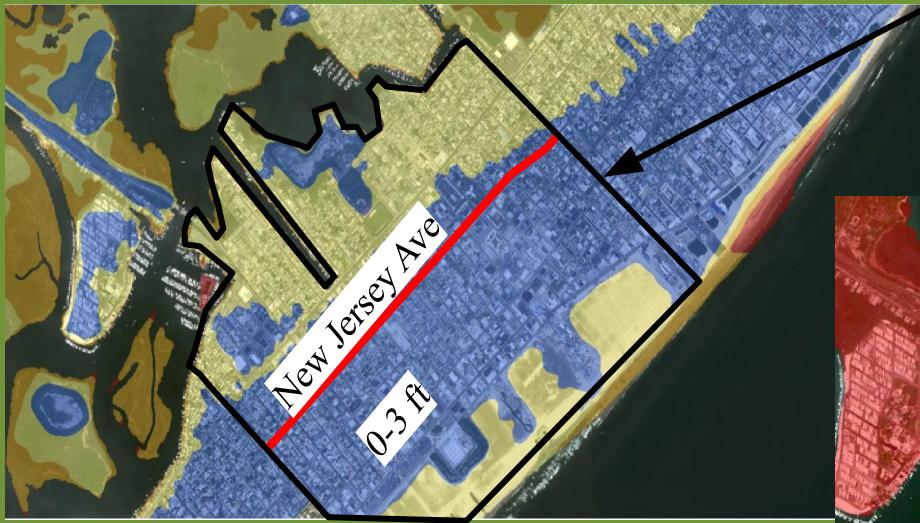


Approximate
Wildwood, NJ
City Limits



Approximate
Wildwood, NJ
City Limits

Storm Surge



Category 1

Approximate
Wildwood, NJ
City Limits



Category 3

New Jersey Avenue, Wildwood

Why did we choose it?

- Heavily trafficked
- Excessive flooding
- Impervious surfaces + wide road*
- Social vulnerability
 - Socioeconomic status
 - Household composition
 - Minority status + language
 - Housing + transportation
- **Lots of potential and room for improvement!**



*We will confirm the width when we do a site visit

Stormwater pumping station

- \$13.7 Million Cape May County-led Grand Gateway project
 - \$12.32 million for stormwater improvement projects
 - Five beach outfalls along Pacific Avenue to be redirected to one outfall 300' from the shoreline
 - A pump station will be built on Leaming Avenue near the boardwalk that will discharge stormwater from the five outfalls over the seawall.





Green Street Plan



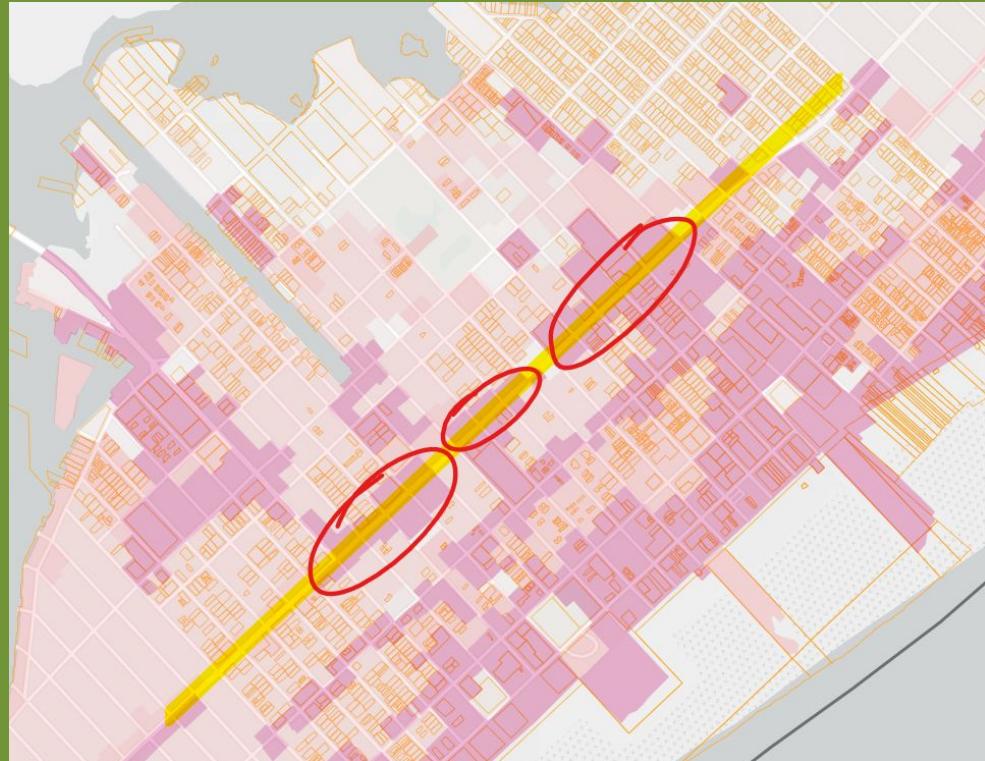
Design for Green Street Plan

- Using LID practices with high volume flow controls to minimize flooding on New Jersey Ave, Wildwood
- Addresses data from NJ FloodMapper and NJ-GeoWeb



Impervious Surface %

- Used impervious surface map from 2012 (NJ-GeoWeb) to determine high-flooding areas on NJ Avenue
- Focused GI implementation on these three circled areas to optimize our Green Street Plan
- Focused about 4500 ft between cross streets Schellenger and Hand ave



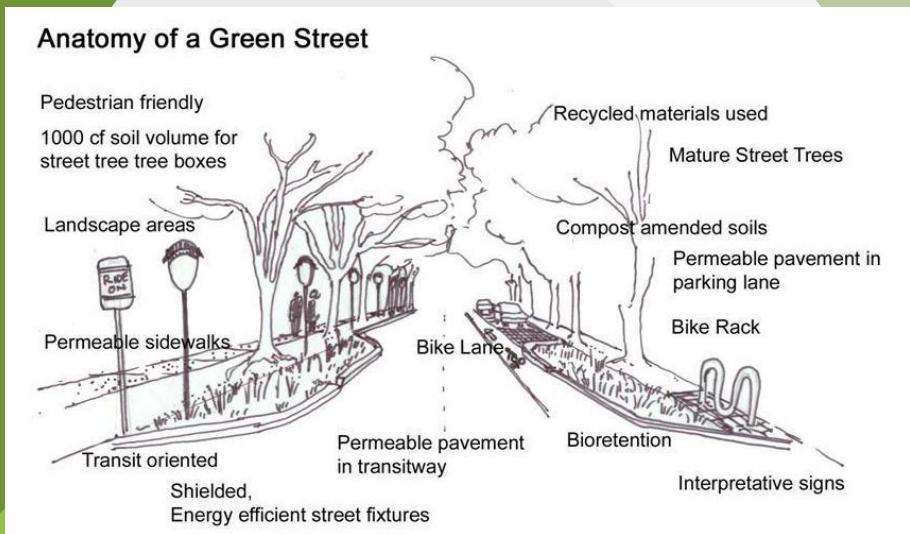
Elevation



Note: Not to scale. Image was to scale (1"=500') for a 24"x36" drawing to find areas. This is a screenshot.

Design Practices

- Bioretention Systems
- Porous Asphalt
- Green Roofs



Bioretention Systems

- Landscaped systems that store and infiltrate the subsoil and capture stormwater runoff at the source
 - Source = rooftops + streets
 - Retain water up to 72 hours
- Eases the rate of stormwater runoff being sent through the sewer systems
- Impervious surfaces + low elevation

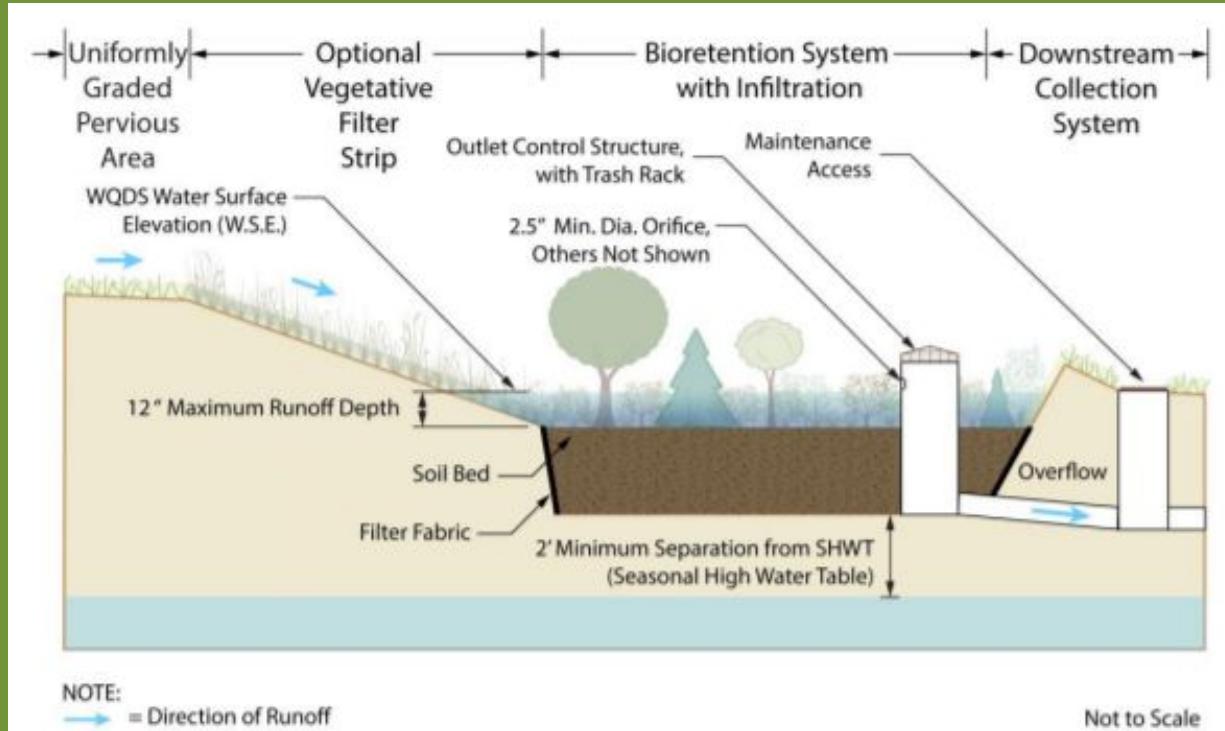


Rain Garden

Bioswale

Tree Boxes

Bioretention System Design



Based on sizing recommendations from NJDEP and Wildwood's Stormwater Management Plan



BioSwale/ Stormwater Planters

- Filters polluted water and either sends it out directly to surface waters, the groundwater or the sewer system once it could handle more water flow
- Moves water through vegetative channel



Ideal Bioswale Locations

- Long areas along the street prone to flooding
- High amounts of impervious surfaces
- Wide Sidewalks



3810 New Jersey Ave -2065 sq ft



3344 New Jersey Ave -1095 sq ft



5100 New Jersey Ave -1895 sq ft



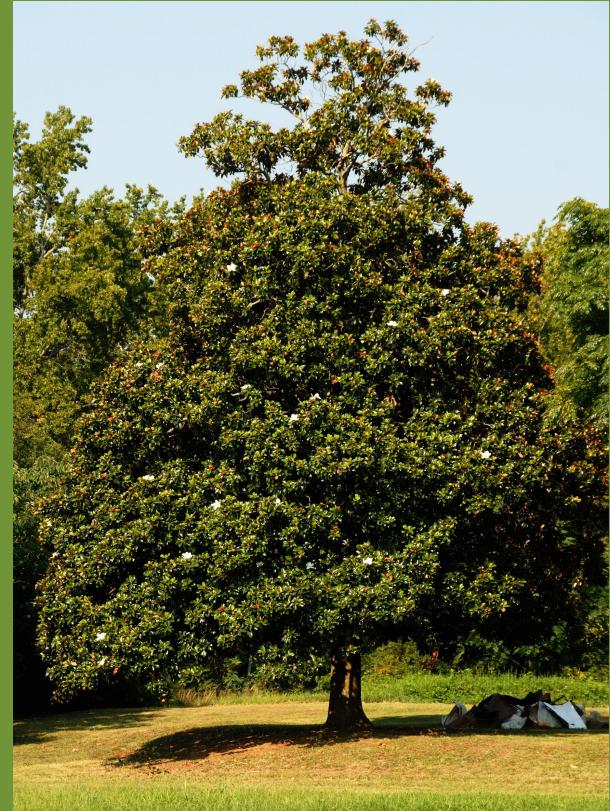
GI Solutions, LLC.

Tree Boxes

- Natural stormwater management
- Soil volume and mixture
- Must consider variety of tree types
 - Deciduous - captures ~700 gal/yr
 - Evergreen - captures ~4,000 gal/yr



Silva Cell Structure



Southern Magnolia Tree

Tree Box locations



3700 New Jersey Ave



3200 New Jersey Ave

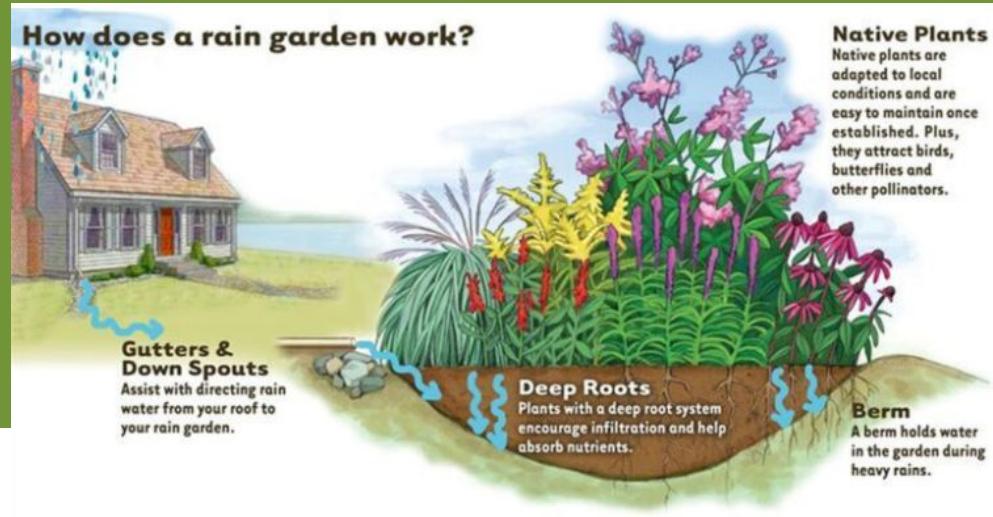
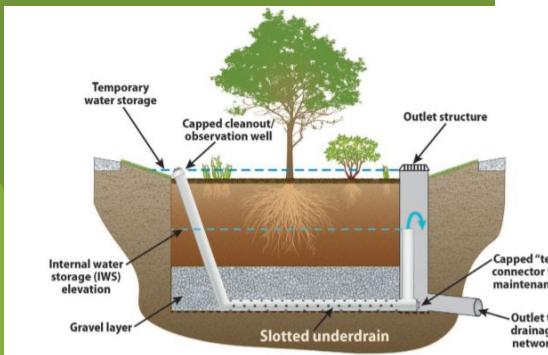
- 10 boxes needed, only 3 new trees
- Dimensions 6ft x 6ft, or 36 sq ft



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Rain Garden

- Capture, filter, and infiltrate stormwater
- 30% more groundwater recharging than traditional infrastructure
- Underdrains added as needed



Rain Garden Location

- In front of the Lions Center
 - Low elevation (6 ft)
 - 1095 sq ft area
 - Heavily trafficked street locations
- Along various other impervious surfaces that have low elevation

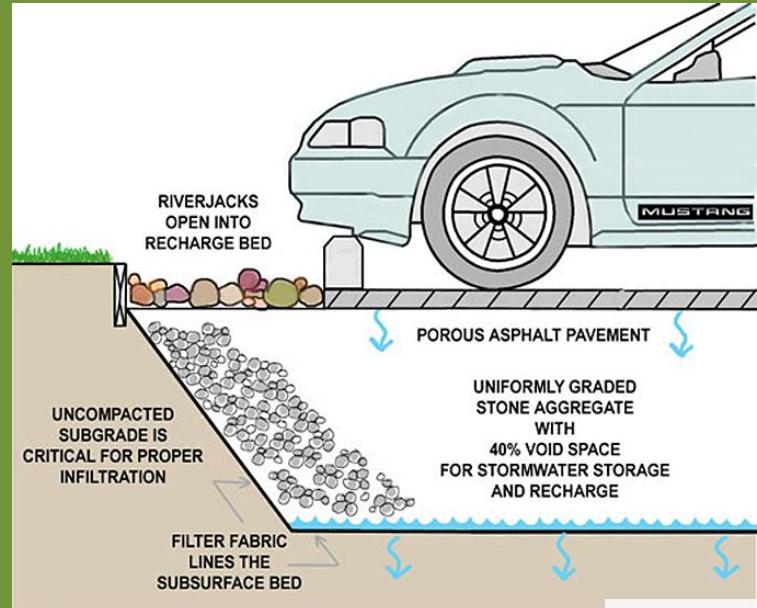


Lions Center -1095 sq ft

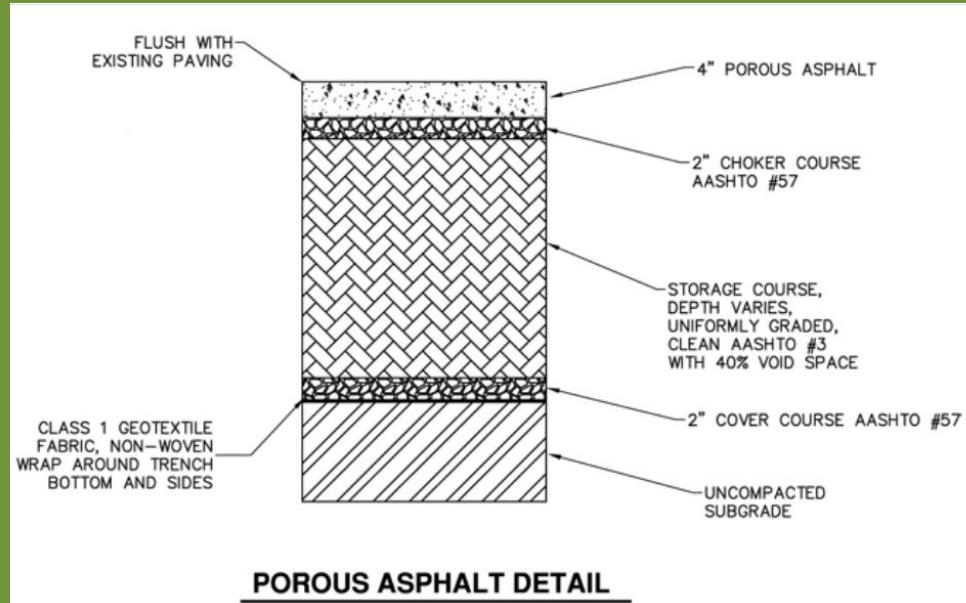
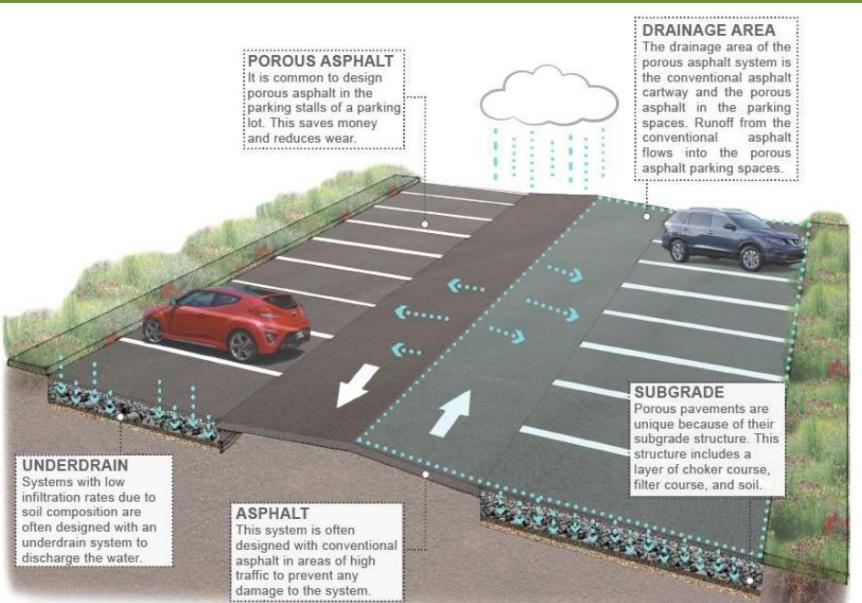


Porous Asphalt

- Reduces impervious surface coverage
- Allows water to pass through, filters out contaminants and recharges groundwater
- 20 year life span



Structure of Porous Asphalt



- Designed for 2 year storm of 3.25" per 24 hours specific for Wildwood NJ

Porous Asphalt Locations Locations



Porous Asphalt Locations

Locations

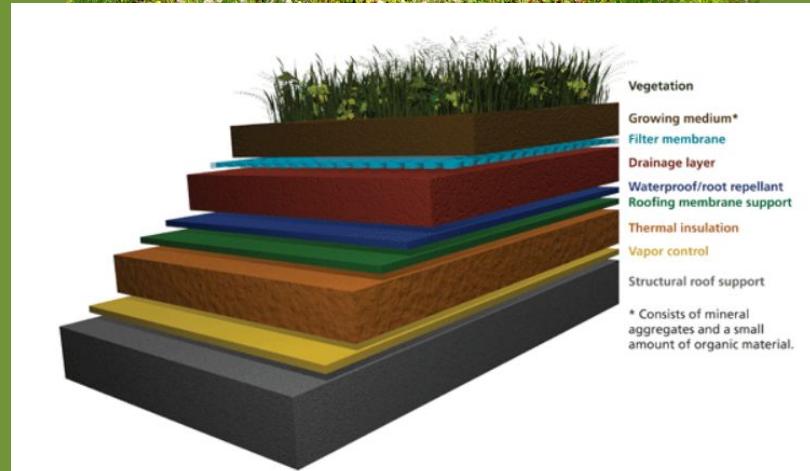


- 4701 NJ Ave
- Side street parking
- 4000 sq ft



Green Roof

- “Living architecture” which uses vegetation atop a waterproofing system to collect and filter stormwater
- Reduces the volume of water that is released at one time
 - ~ 40-80% water retained
- Intensive vs. Extensive



Green Roof Location

- Wildwood City Hall rooftop
 - 12,300 sq ft
 - Central location
- Other flat or slightly-sloped roofs
 - Mainly for industrial and public buildings
- Will be added on case-by-case basis



**4400 NJ Ave -
12,300 sq ft**



Complete Green Infrastructure Proposal



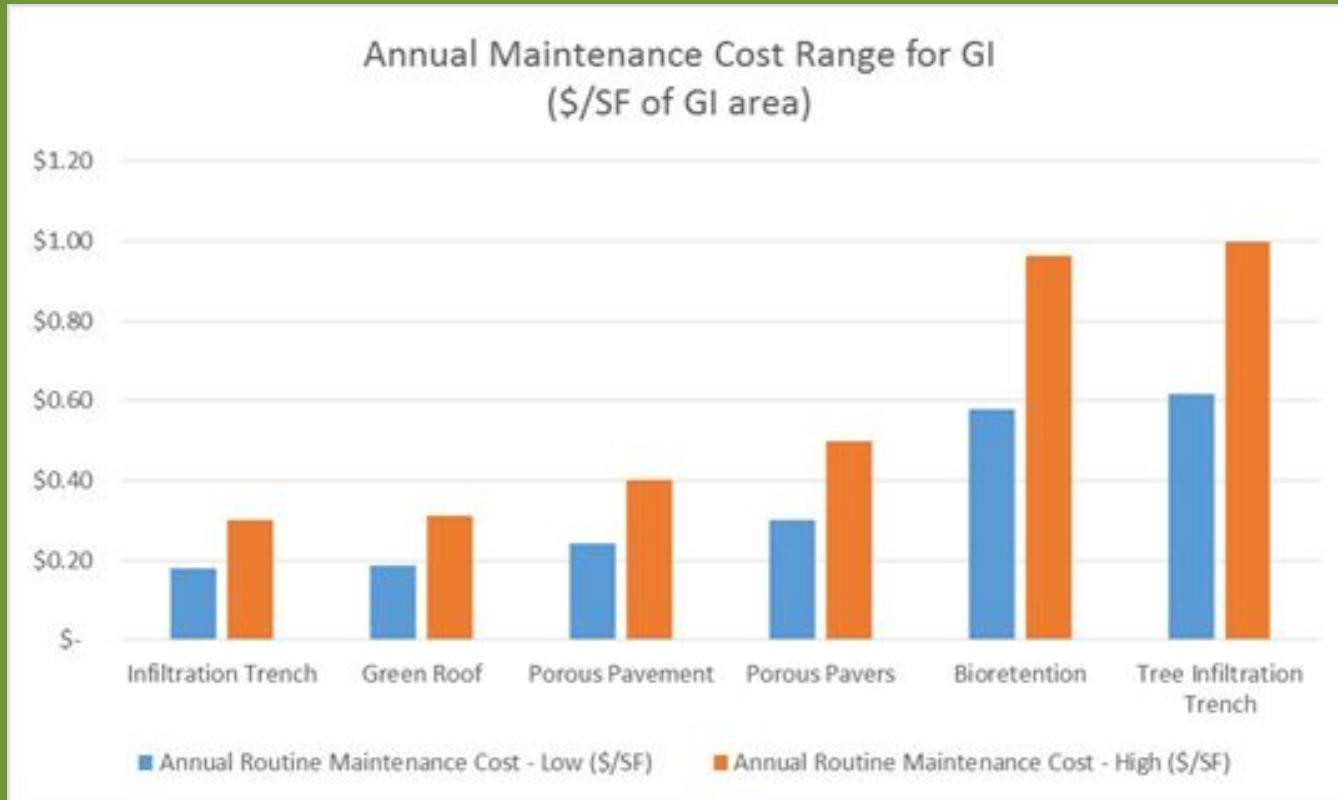
Project Budget



Cost of Implementation - Budget

GI	Avg construction cost	Total cost ((avg cost per sq ft * area sq ft)
Rain Garden/ Bioretention	\$5 - \$7 per square foot	\$15,800 - \$22,120
Porous Asphalt	\$5.50 - \$6.50/sq. Ft.	\$382,525 - \$452,075
Green Roofs	\$8.75 - \$15.75 per square foot	\$107,625 - \$193,725
Bioswale	\$5 - \$15 per square foot	\$25,275 - \$75,825
Tree Box	\$69.44 per square foot	\$25,598.40
	Total	\$556,823.40 - \$769,343.40

Annual Maintenance Cost Range for GI



Grants/ Outside funding

1. **Environmental Protection Agency (EPA) Clean Water State Revolving Fund (CWSRF)** - Provides financing for a wide range of water quality infrastructure projects, including stormwater and green infrastructure
2. **EPA Superfund Redevelopment Initiative** - Finances green infrastructure projects help prevent flooding and erosion as well as water-borne transport of contaminants
3. **US Army Corps of Engineers (USACE)** - Finances to projects on the inland waterways and to operate hurricane barrier projects to support recreational activities and flood control
4. **Department of Energy (DOE) Weatherization and Intergovernmental Program** - Provides grants to encourage installation of green infrastructure - such as green roofs- as part of the weatherization process
5. **FEMA's Hazard Mitigation Assistance** - Provides funding to states to mitigate the risk of future disasters and flood mitigation projects, including green infrastructure, natural infrastructure, or engineering with nature

Anticipated Timeline

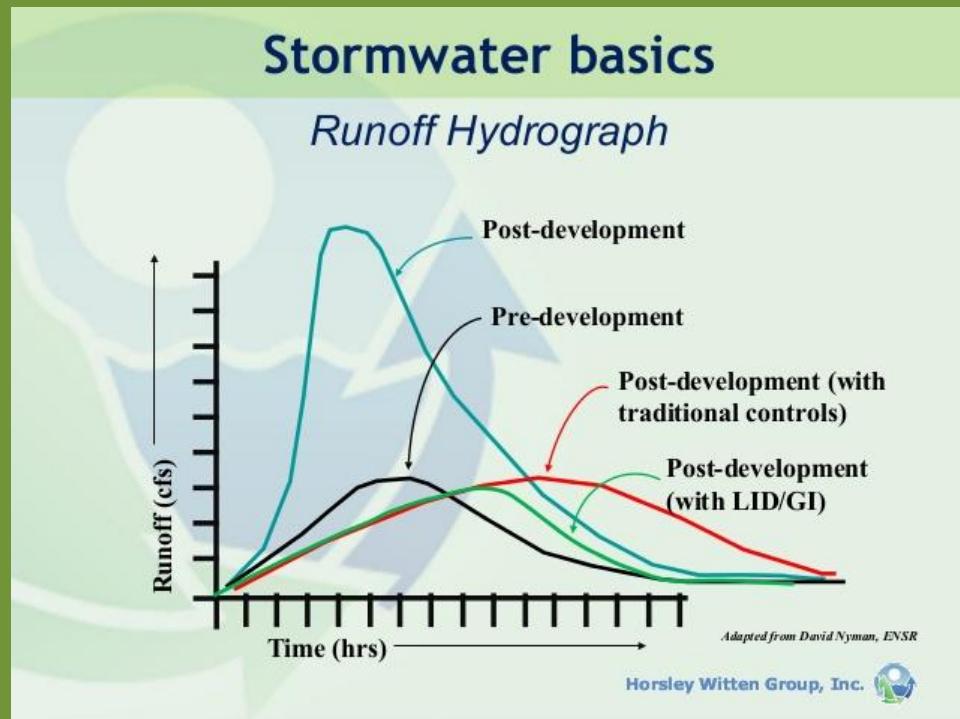




Anticipated Outcomes

Stormwater Management

- Climate Change Resilience
 - Storage (ft^3) for storm surges and rising sea levels
 - Reduced strain on existing grey drainage system on Pacific Avenue.
- Water quality improvements
 - TSS removal efficiencies



Aesthetic



Enhanced walkability, ability to incorporate native plants and introduce new plants and wildlife.

Community Involvement



Education opportunities +
Provide construction and
maintenance jobs



Sustainable communities
“Ecologically informed public”



Economic

- Maintaining/restoring stormwater treatment structures is costly
- Individual GI cost benefits:
 - **Bioretention Systems** – increases town property values
 - **Tree Boxes** - customers spend 12% more in stores with trees outside
 - **Porous Asphalt**- can last twice as long as traditional asphalt, effectively saving money over time
 - Does require more maintenance and upkeep
 - **Green Roofs** - reduce energy costs by up to 15%



Questions?



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