Sustainability & Green Infrastructure / Low Impact Development (LID)

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What *is* Green Infrastructure

*"Green Infrastructure is a cost-effective, resilient approach to managing WET WEATHER IMPACTS that provides many community benefits… Green Infrastructure **reduces** and **treats stormwater** at its source while delivering ENVIRONMENTAL, SOCIAL, AND ECONOMIC BENEFITS* (USEPA)."

*"Green Infrastructure is an approach to **water management** that **protects, restores, or mimics** the natural water cycle* (American Rivers)."

"…an interconnected network of undisturbed natural areas and open space that helps preserve the ecological function of our watersheds (Benedict and McMahon, 2006)."

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Evolution of Stormwater Management

1st Try…

2nd Try…

3rd Try…

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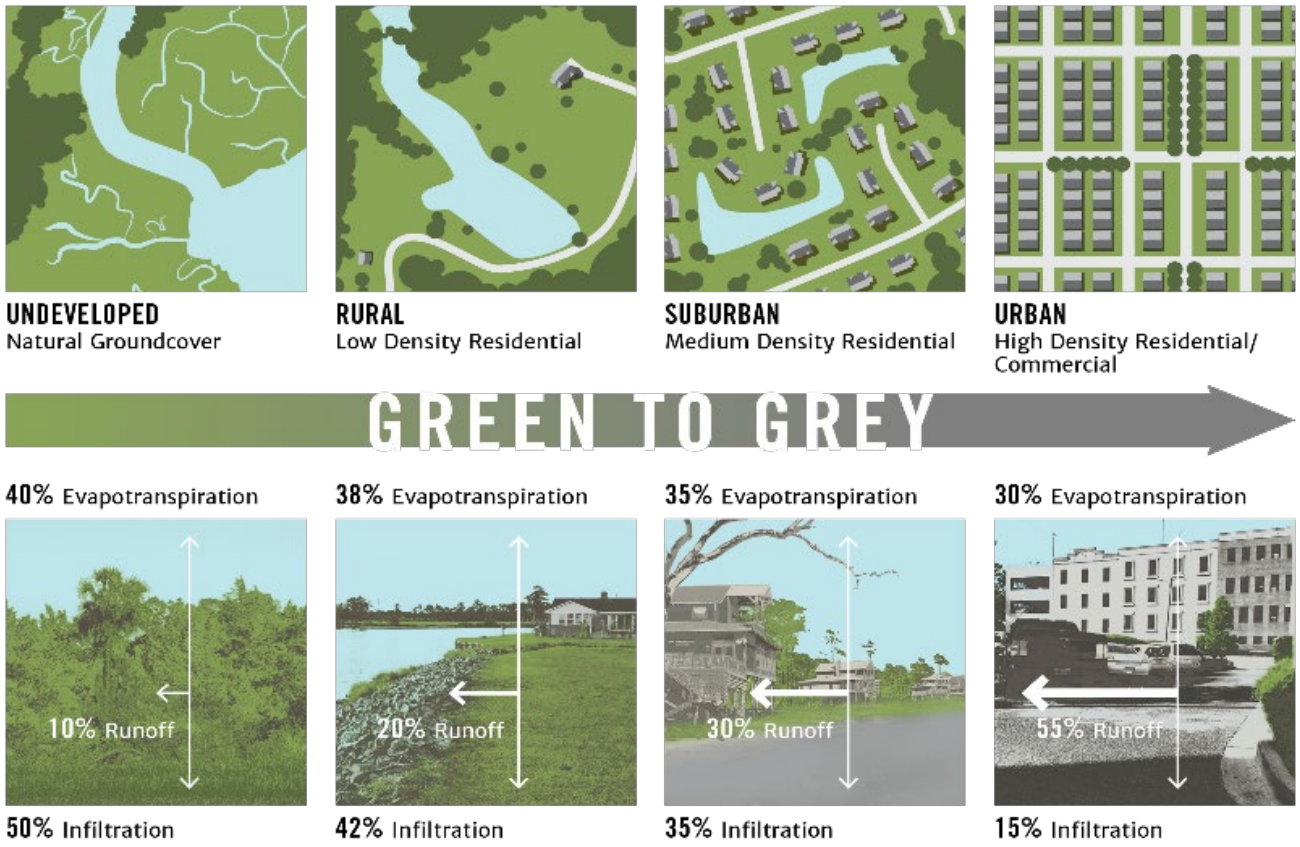
Water Balance with Development



Graphic Source:

Marine Extension and Georgia Sea Grant
UNIVERSITY OF GEORGIA
Sea Grant

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Examples of Green Infrastructure








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Resiliency

- "The ability to **bounce back** after hazardous events such as hurricanes, coastal storms, and flooding – rather than simply reacting to impacts" (NOAA).
- Sea level rise (SLR) has been a persistent trend observed globally for over a century
  - "*Slow-moving coastal hazard event*"
- Consideration of SLR has been part of on-going discussions of Aloe Bay.
- As the project transitions from conceptual planning toward implementation, decisions on specific sea level rise considerations will be made based on consultation with the Town

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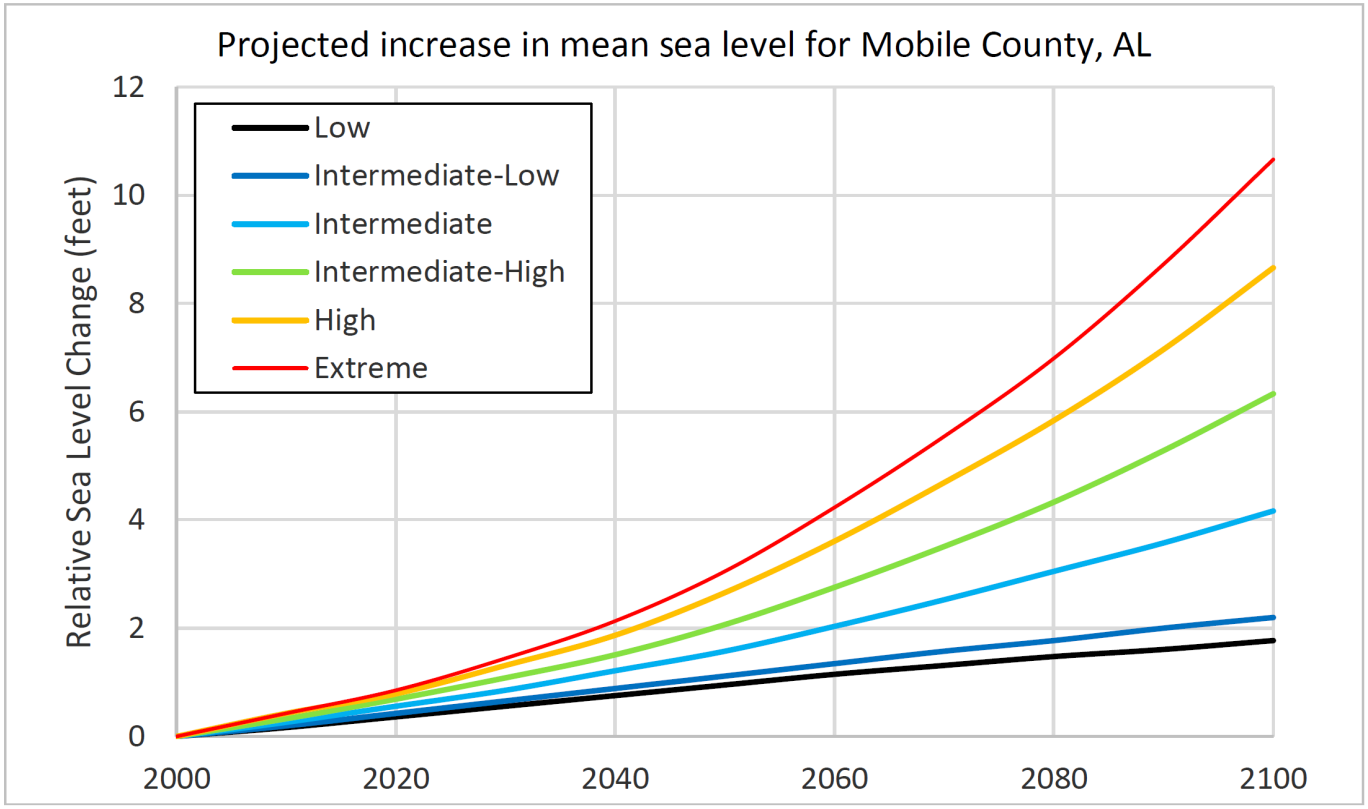
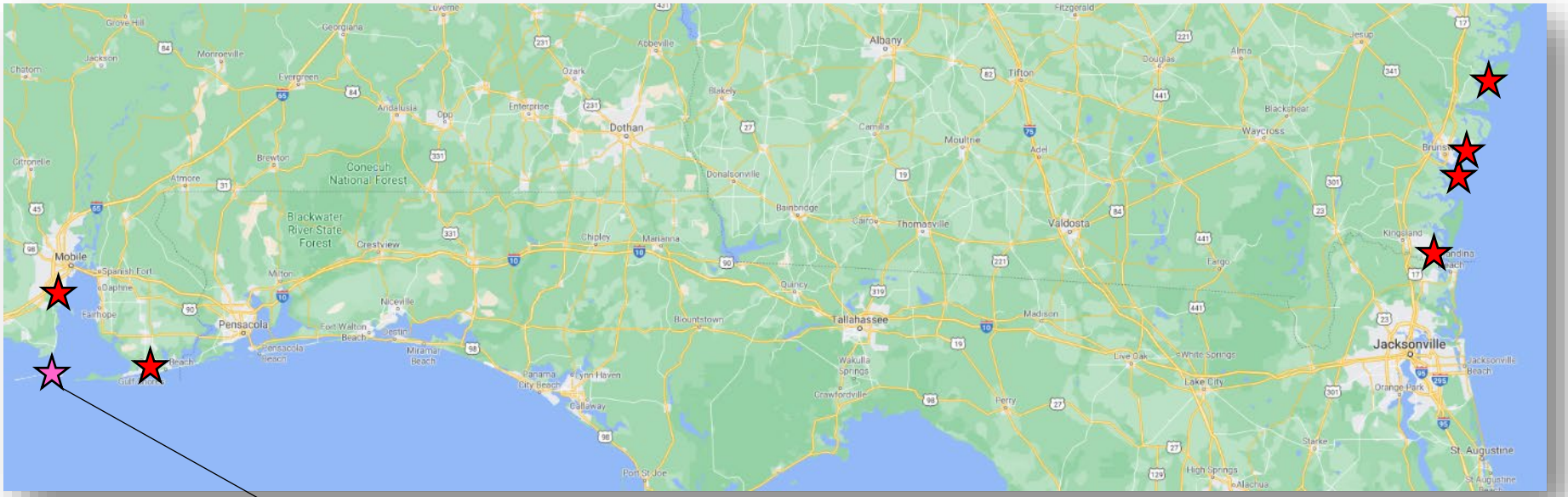
SLR Scenarios

Global Sea Level Rise Scenario	RCP2.6 dramatic reduction of carbon emissions	RCP4.5 modest reduction in carbon emissions	RCP8.5 no change in carbon emissions
Low	94%	98%	100%
Intermediate-low	49%	73%	96%
Intermediate	2%	3%	17%
Intermediate-high	0.4%	0.5%	1.3%
High	0.1%	0.1%	0.3%
Extreme	0.05%	0.05%	0.1%



Data source: *NOAA Technical Report NOS CO-OPS 083*; Site: 1005952715

LID Examples in Coastal Settings



Parking Lot at “The Estuarium”

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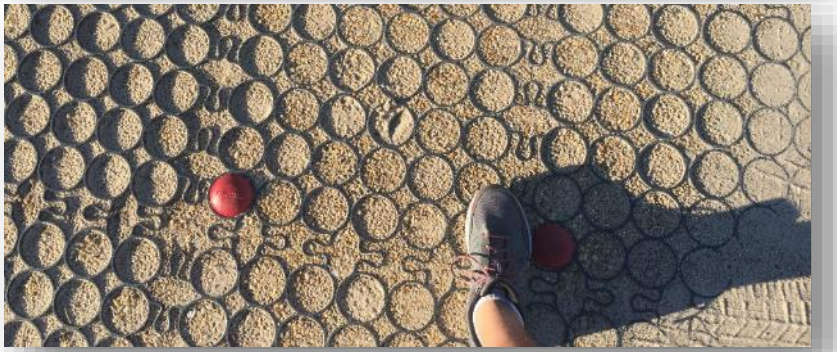
Arlington Park – Mobile (Pervious Concrete)

The Lodge at Gulf State Park – Gulf Shores (Multiple)



Downtown St. Marys, GA (Permeable Pavers & Bioswales)

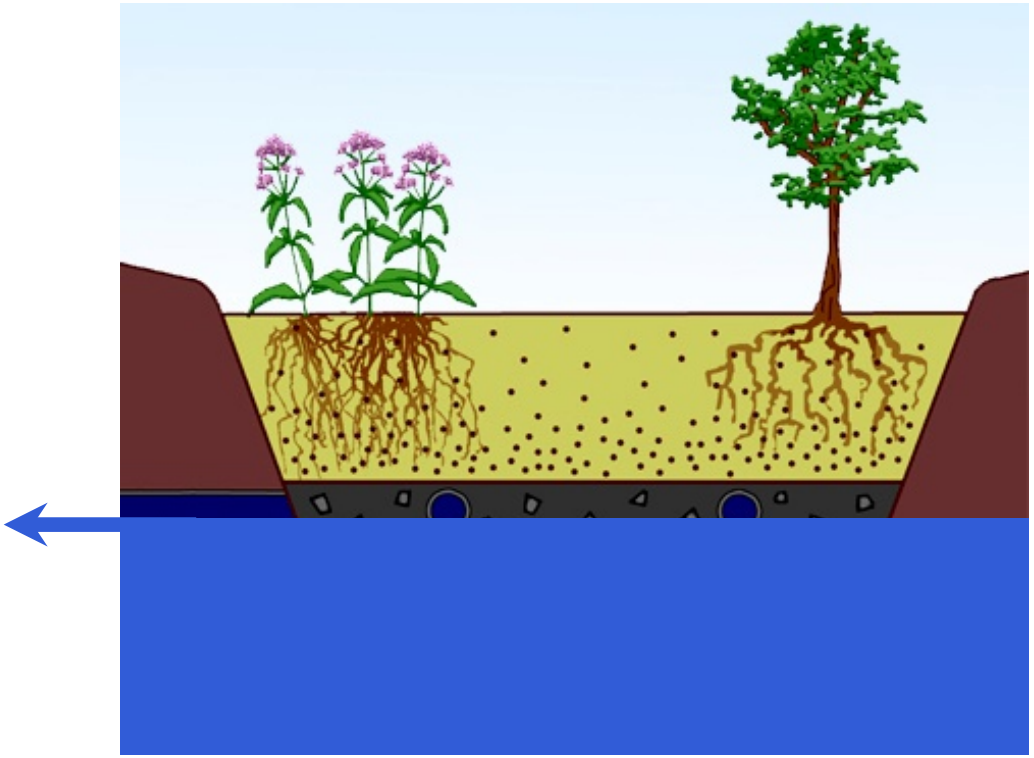
Jekyll Island, GA
(Bioretention & Pervious Concrete)

St. Simons Island, GA (Permeable Pavers)

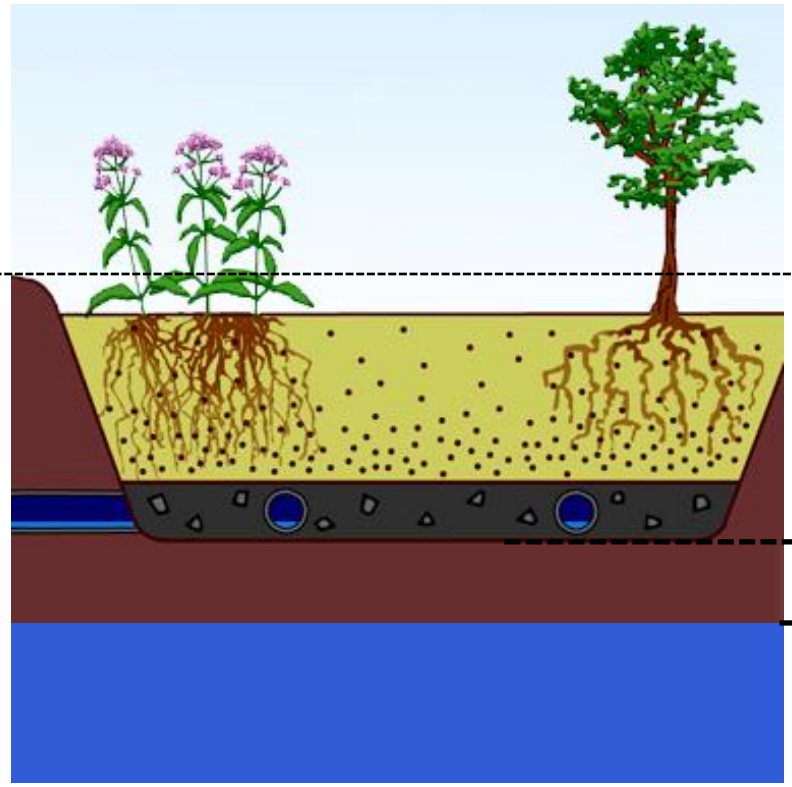
Others in Jekyll & St. Simons

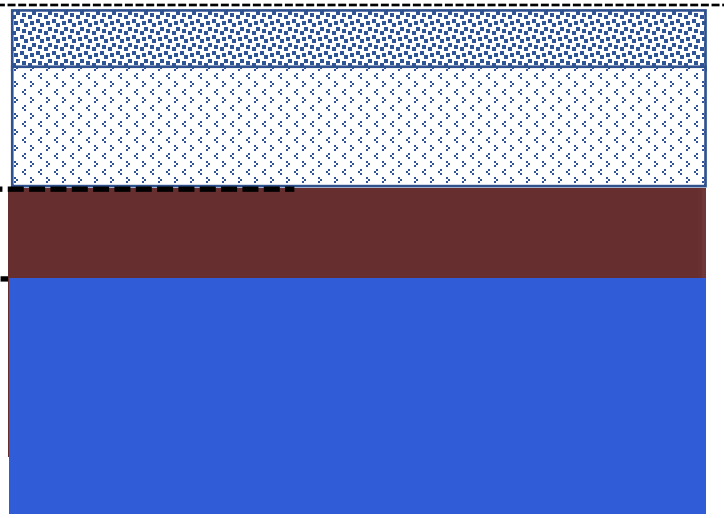
Cisterns for Vehicle/Boat Washing (Sapelo Island & Brunswick, GA)

Primary Coastal Constraint



Minimum Requirements





<u>Note</u>: NC DEQ allows 1-foot if hydrogeologic eval. from licensed prof. is provided

Ponding: 1 ft
Media: 2 ft (min.)
Gravel: 0.5 ft
Min Water Table Depth = 5.5 feet

Surface Layer: ~0.5 ft
Gravel Subbase: 1 ft (min.)
Min Water Table Depth = 3.5 feet

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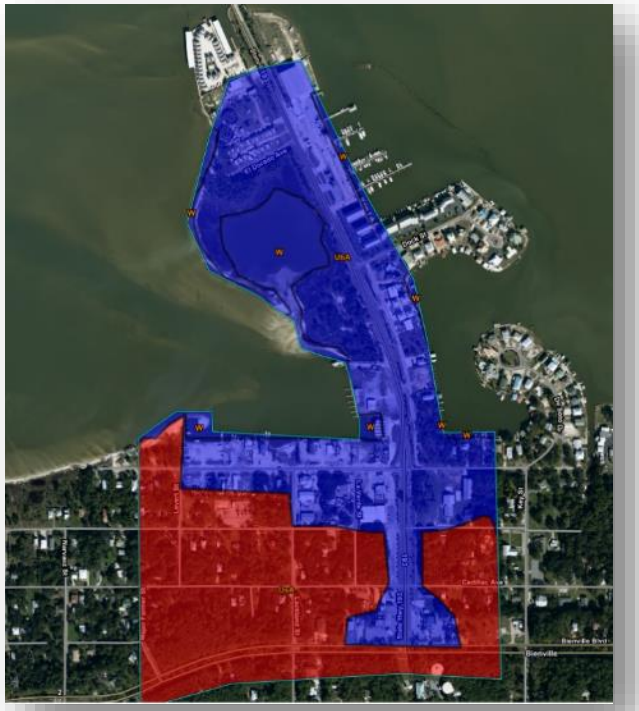
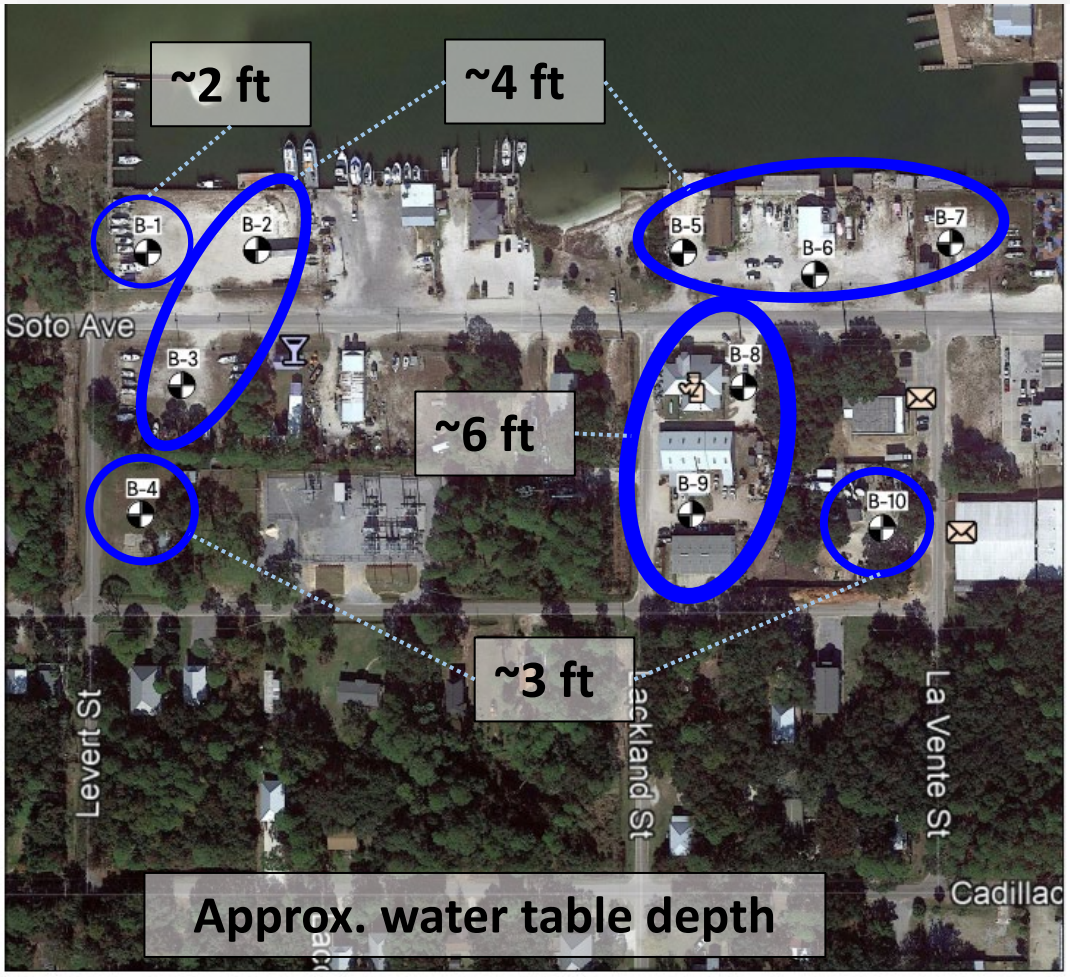
General Soil Conditions

- NRCS Web Soil Survey Results
  - Blue – Urban land or Water
    - No information
  - Red – Osier loamy sand
    - Profile
      - Loamy sand – 0 to 43 inches
      - Fine sand – 43 to 80 inches
    - Hydrologic Soil Group – A/D
    - Depth to Water Table
      - 0 to 12 inches

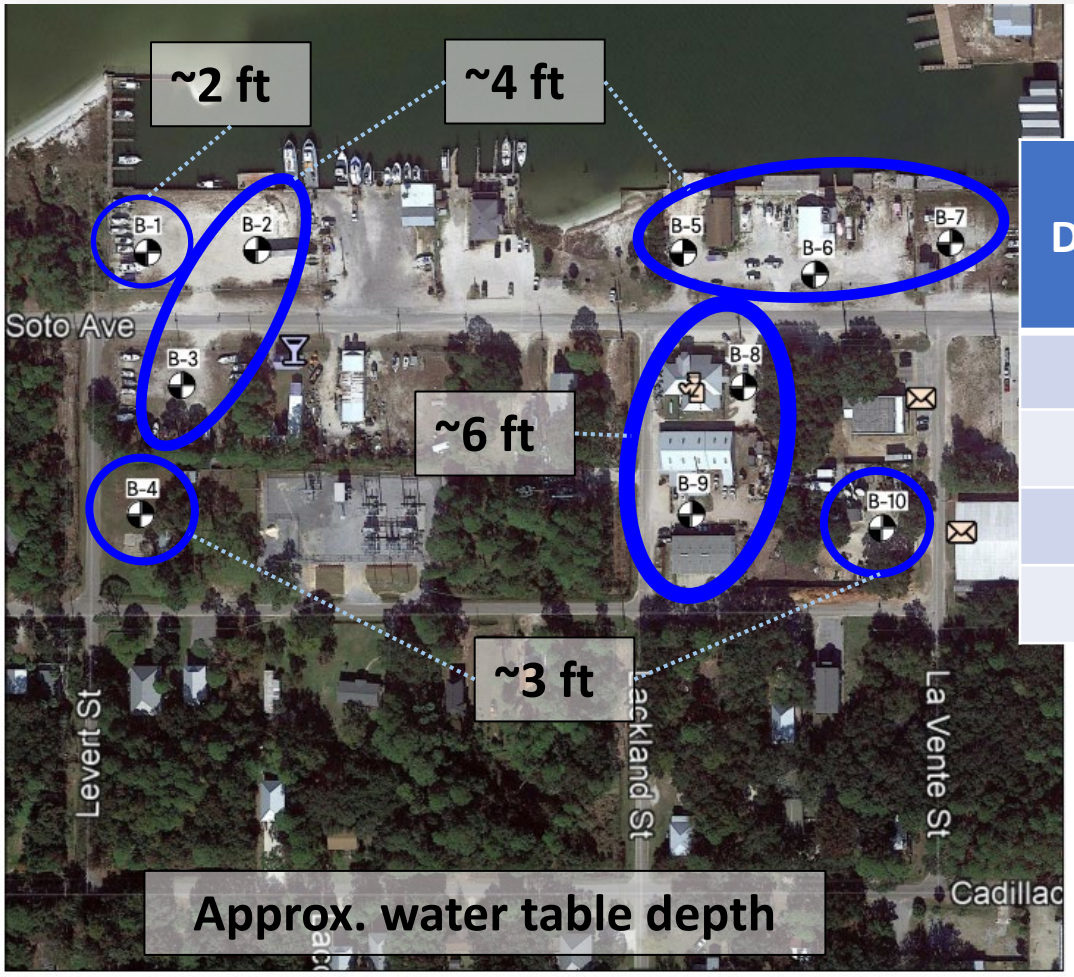


Geotechnical Exploration



- 10 borings
- Groundwater depth was approx. 2 to 6 ft
- Most were “sand” & “sand to silty sand”
  - Good for infiltration

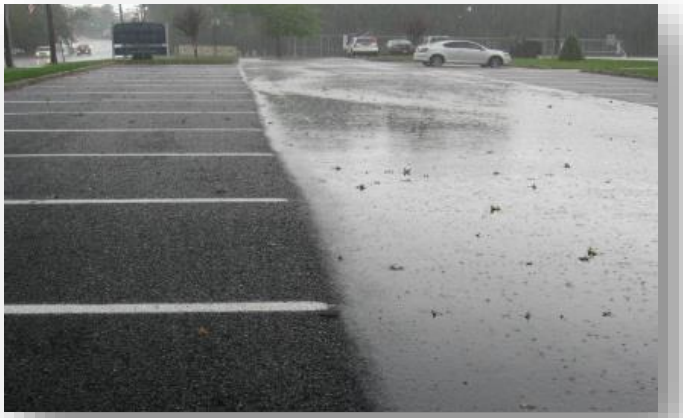
GI/LID Suitability



GW Depth (ft)	Bioretention	Permeable Pavement
2	None	None
3	None	Potential
4	Potential	Suitable
6	Suitable	Suitable

Permeable Interlocking Concrete Pavement (PICP) Types

Pervious Concrete / Porous Asphalt



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Other Types

» GrassPave / GravelPave (invisible structures)




» Concrete Grid Pavers (with sand or aggregate)

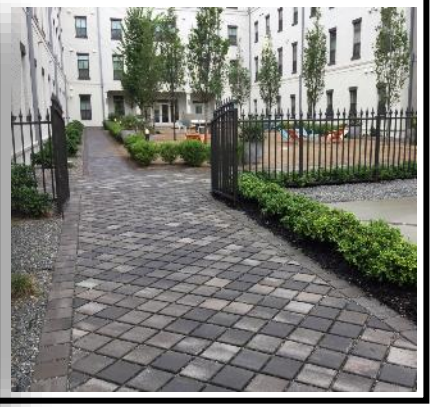


Permeable Pavement Applications

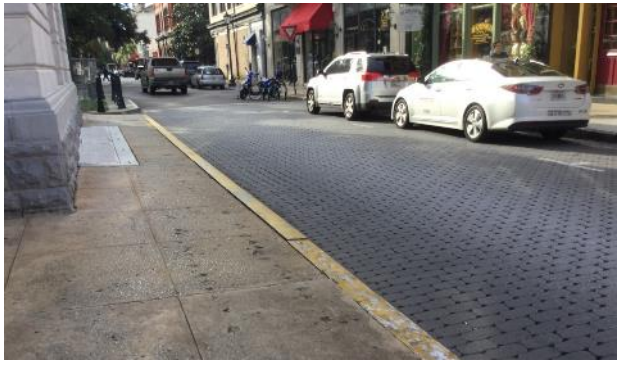
Parking Stalls Only

Entire Parking Lot

Sidewalks / Walkways



Roadways



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Options for Aloe Bay

- Groundwater Constraints
  - Permeable pavements are more favorable for implementation
  - Bioretention/Bioswales will work in select areas

- Is there interest in rainwater capture and reuse for irrigation or vehicle/boat washing?

- **What do you like?**
  - Permeable Pavement Types
  - Permeable Pavement Applications

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