

# Regulations and Incentives: Barriers to LID in the Lowcountry



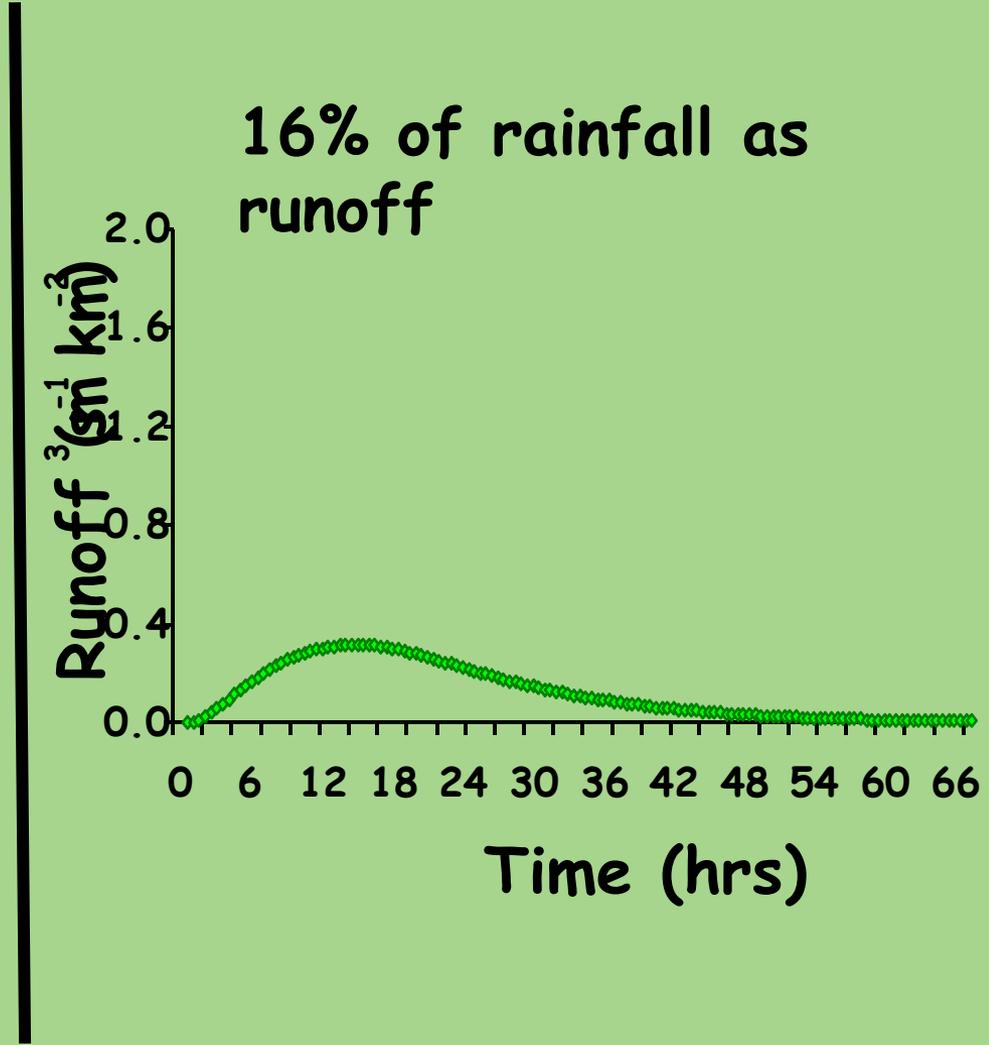
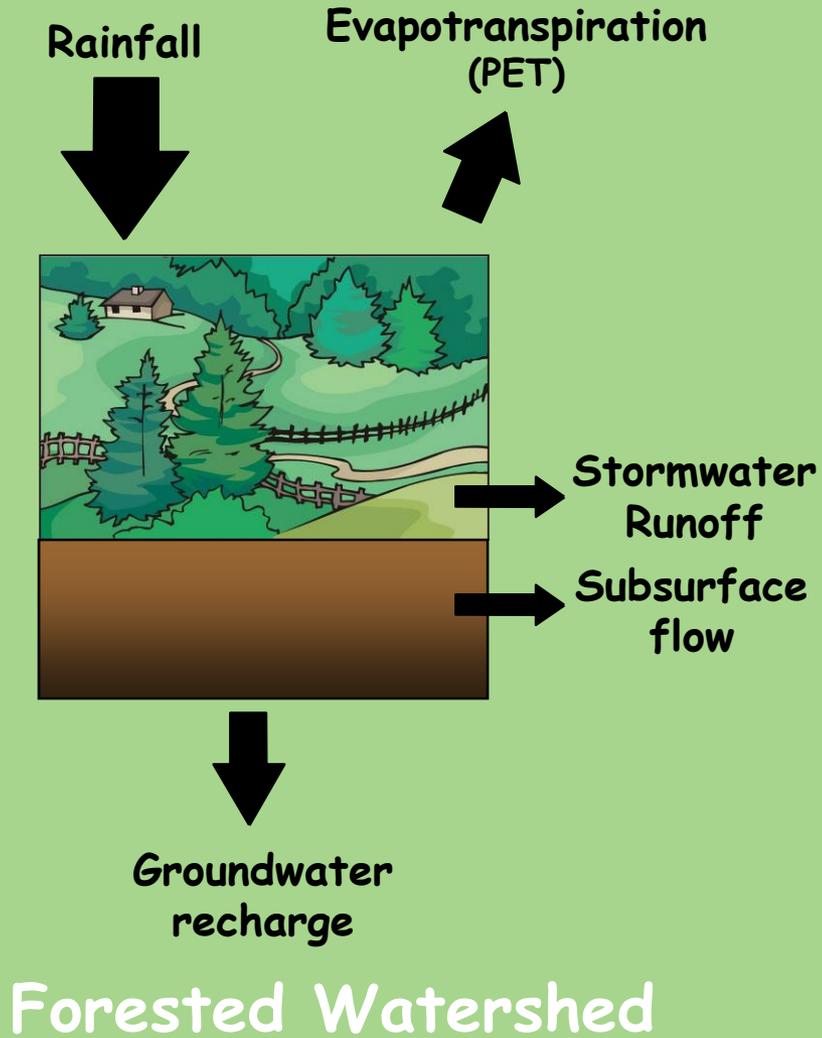
Lisa Vandiver<sup>1</sup>, Dwayne Porter<sup>1</sup>, and Debra Hernandez<sup>2</sup>

<sup>1</sup>USC Department of Environmental Health Sciences

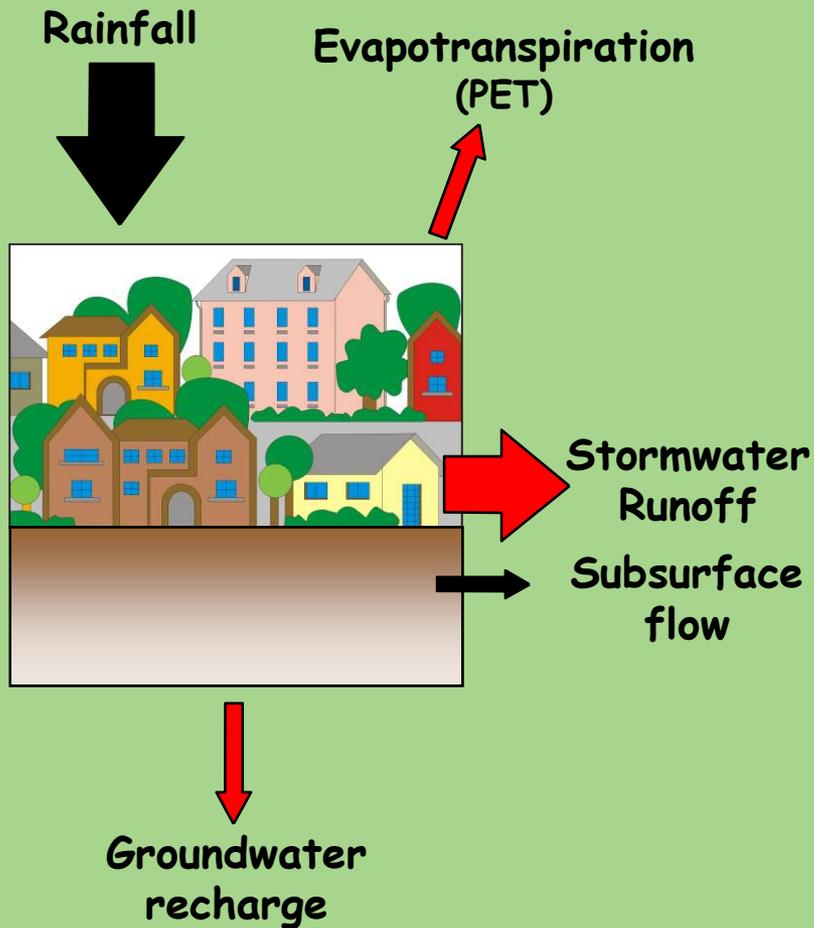
<sup>2</sup>Hernandez and Company



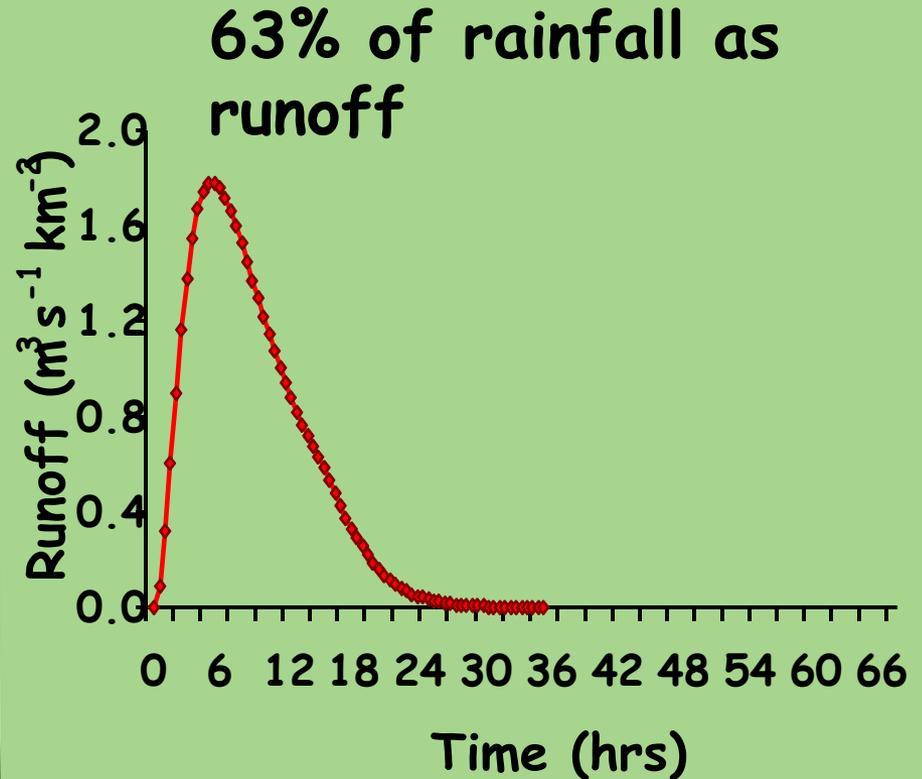
# Water Budgets: Forested Watershed



# Water Budgets: Developed Watershed



Developed Watershed



# Stormwater Ponds

- **PROS:**
  - Water storage
  - Fill material
  - Easy to design, permit, and construct
  - Amenity
- **CONS:**
  - Water volume impacts
  - Collect/concentrate pollutants
  - Fecal Coliform Bacteria
  - Maintenance



# Low Impact Development (LID) Practices



Property of the City of North Charleston

- **DEFINITION:** A stormwater management approach that integrates the use of a network of Best Management Practices (BMPs) to disperse stormwater throughout the site.
- **PURPOSE:** Promote infiltration, recharge groundwater sources, and mimic pre-development hydrologic conditions

# Examples of LID Practices



Bioretention swale,  
Oak Terrace Preserve



Green roof,  
Bowens Island



Pervious pavers,  
Oak Terrace Preserve



Pervious walkway,  
Riverfront Park North Charleston



Rain barrel,  
Oak Terrace Preserve



Green roof, Circular  
Congregational Church

# LID Efficiencies

Stormwater Treatment System	Reference	Stormwater	TSS	Phosphorus	Nitrogen
Retention Pond	UNH Stormwater Ctr, 2007	81% (peak flow)	72%	16% (Total)	54% (DIN)
Single Detention Pond	Messersmith, 2007	7.5% (volume)	19%	-6% (Total)	-2.5% (Total)
Series of Detention Ponds	Messersmith, 2007	-9% (volume)	88%	71% (Total)	39% (Total)
Bioretention Swale	UNH Stormwater Ctr, 2007	82-85% (peak flow)	97-99%	5% (Total)	29-44% (DIN)
	Davis et al., 2007	49-58% (peak flow)	47%	76% (Total)	83% (Nitrate)
Porous Pavement	UNH Stormwater Ctr, 2007	68% (peak flow)	99%	38% (Total)	n/a
Cumulative use of LIDs	EPA, 2000	n/a	91%	3% (Total)	42% (Total)

# Process Map

Federal and State legislation



Local Comprehensive Plan



Zoning Ordinance



Parcel Identified for Development



Land Plan



Local Zoning/  
Land Use Approvals



Wetland Permits



Stormwater  
Management  
System Designed



Stormwater Management System Permitted



Stormwater Management System Constructed



Inspections, Approvals, Enforcement



Maintenance Agreement



Long-term Inspections and Enforcement

# Interview Questions

- Have all the critical steps in the process been identified?
- Who are the key decision-makers in each step?
- What does the term Low Impact Development (LID) practices mean to you?
- Are there stormwater practices that you would consider lower impact (than stormwater ponds) and if so what are some examples?
- How would you describe the advantages of LID in terms of managing stormwater?
- How would you describe the disadvantages of LID in terms of managing stormwater?
- How prevalent are LIDs in the SC coastal region?
- From your perspective, where in the process do road blocks or constraints to utilizing LID exist?
- What do you think needs to be done to increase the number of LIDs that are constructed in the coastal region?
- What stakeholder in the process would have the greatest influence on the number of LIDs installed in the area?

# Workshop

## Stormwater Management in Coastal SC: A Focused Seminar on Ponds and Low Impact Development Practices

*A Short Seminar and Discussion for Developers, Engineers, Contractors,  
Planners, Researchers, Regulatory Staff, Municipal Officials, and Public  
Works Staff Interested in Low Impact Development*

January 22<sup>nd</sup>, 2009  
10:00-3:00  
Charleston, SC



Recreational beach, Myrtle Beach  
Photo courtesy of Lisa Vaidner



Restoration ponds, Oak Terrace Preserve  
Photo courtesy of Lisa Deeb



Retention ponds, Charleston  
Photo courtesy of George Steale

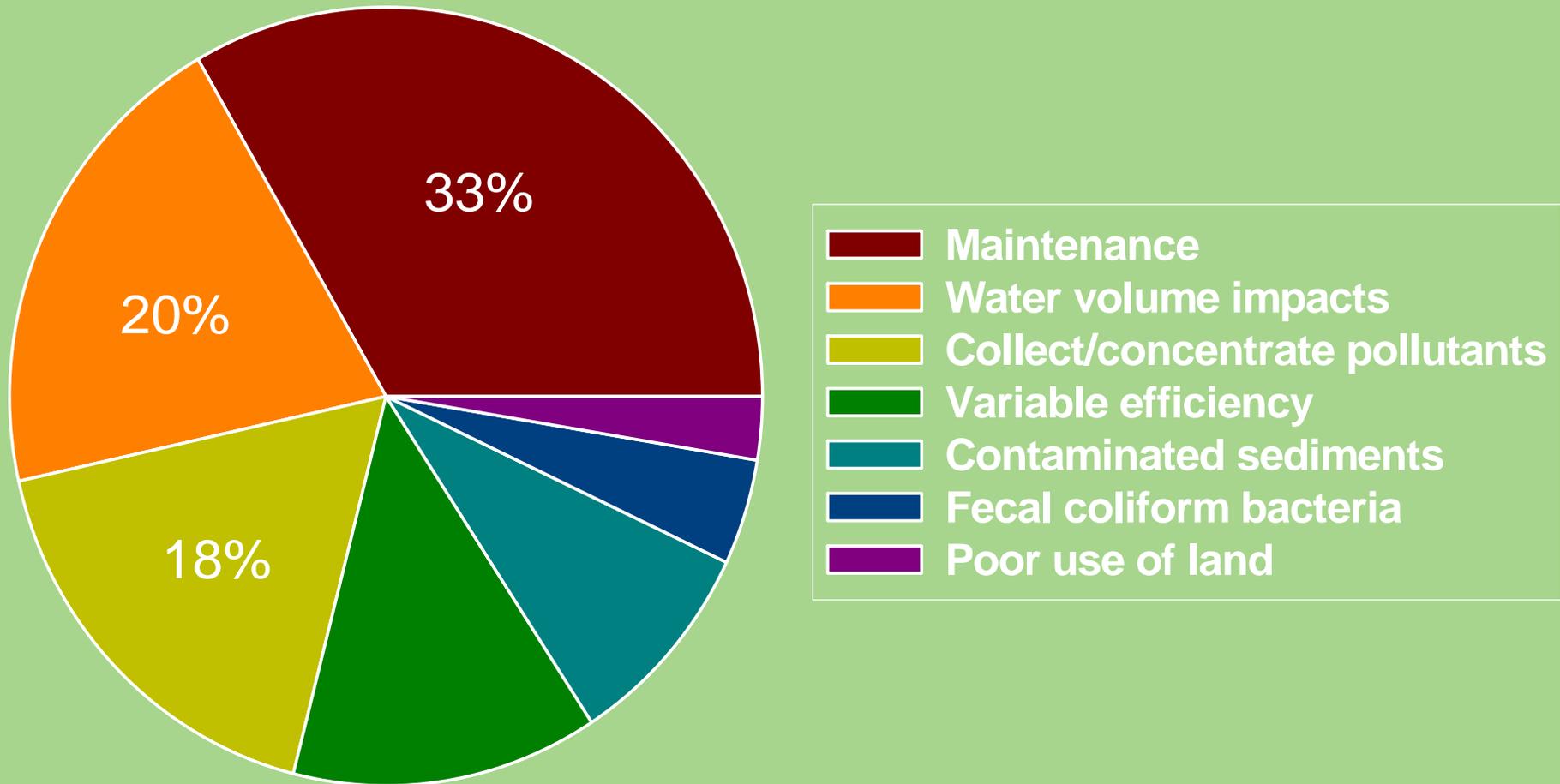
This event is designed to provide developers, engineers, contractors, planners, researchers, regulatory staff, municipal officials, and public works staff an opportunity to discuss the stormwater management options for coastal South Carolina. The session will focus on the strengths and weaknesses of traditional and alternative stormwater management strategies (e.g., ponds and Low Impact Development practices). Strengths and weaknesses of traditional stormwater practices as well as obstacles and opportunities to implementing Low Impact Development practices will be explored via small group discussions to address future needs of coastal communities. Discussions from the event will be summarized and provided as an assessment report to be distributed to interested stakeholders and will include recommendations addressing options for incentives regulatory obstacles and opportunities, and educational and research needs. Your input is critical to assuring that the needs of affected communities and stakeholders are addressed. This event is free of charge and lunch will be provided. CEU and PDH credits are available.



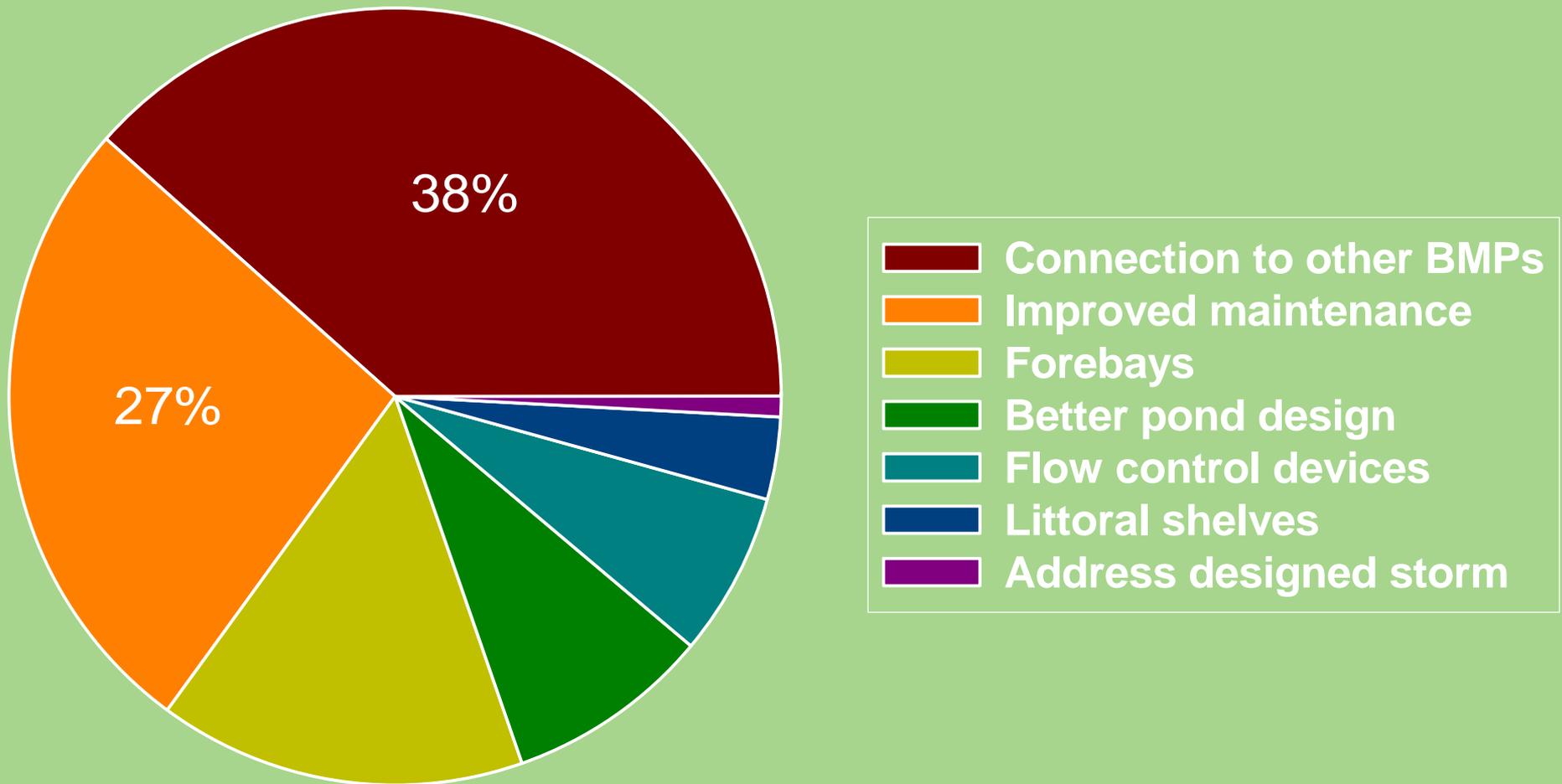
Registration information will be available in January at  
[www.dnr.sc.gov/marine/NERREventsnot.html](http://www.dnr.sc.gov/marine/NERREventsnot.html) Certificates of completion will be  
available at the end of the day for CEU and PDH credits. Please contact Rebekah  
Szivak ([SzivakR@dnr.sc.gov](mailto:SzivakR@dnr.sc.gov) or 843-953-9024) for questions.



# Limitations of Stormwater Ponds

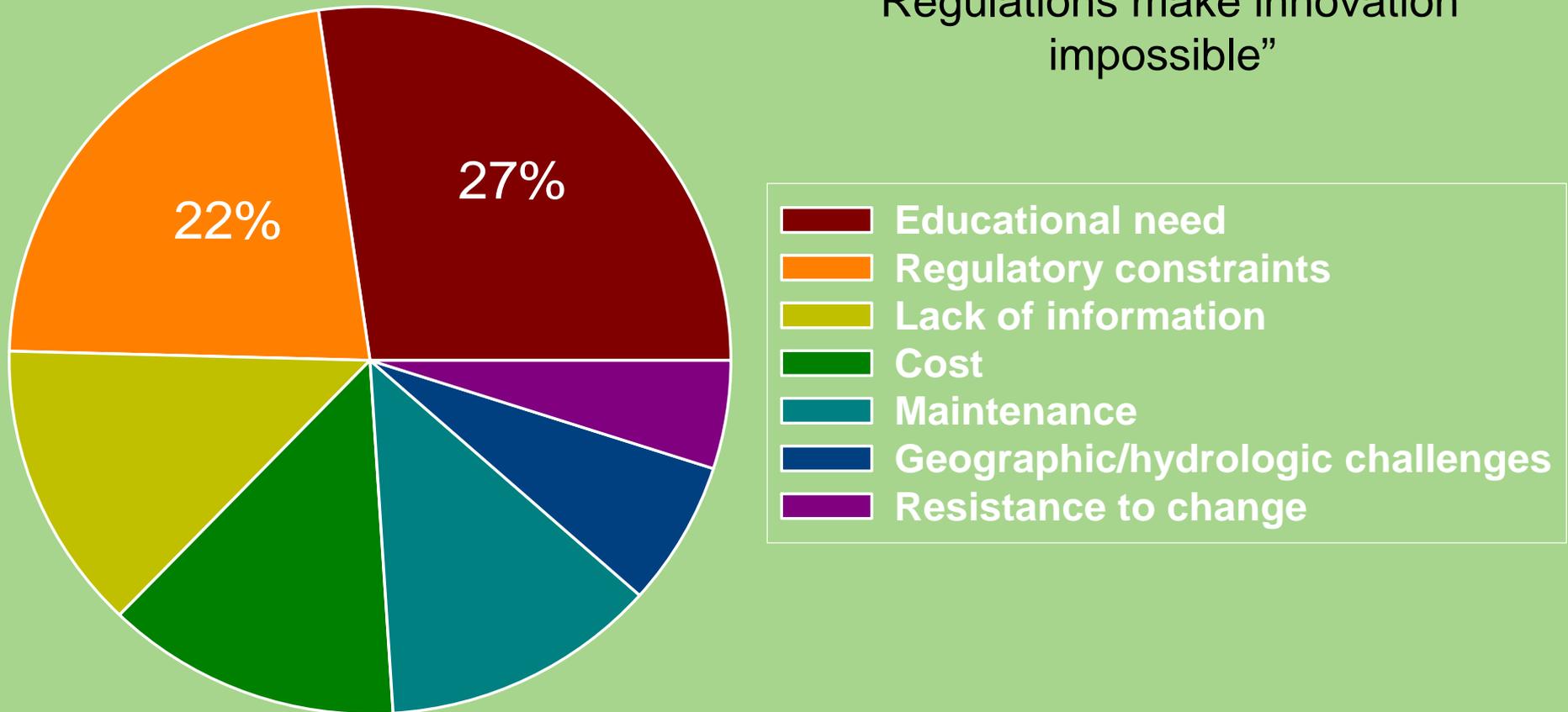


# Options to address limitations of Stormwater Ponds



# Obstacles to utilizing LID

“Regulations make innovation impossible”

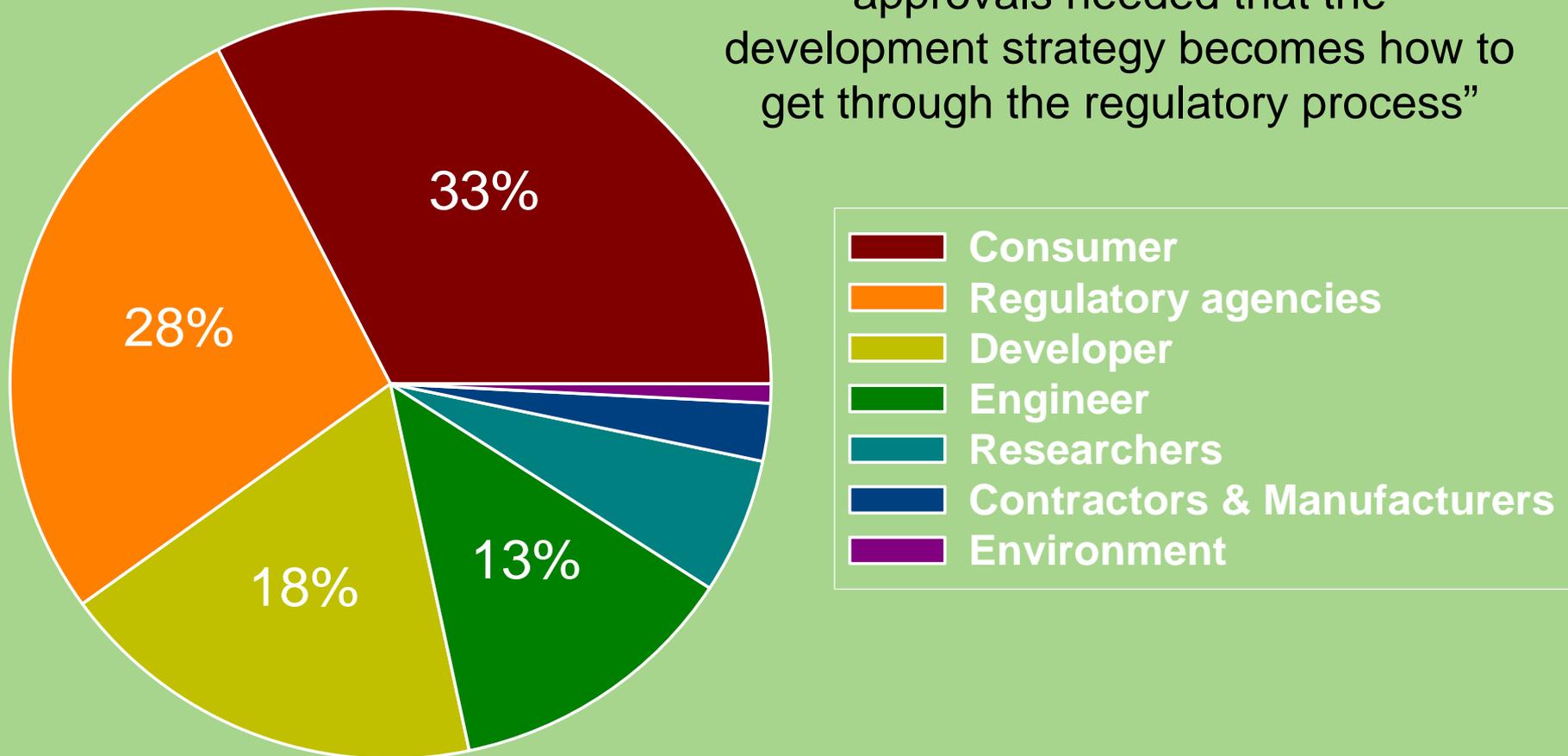


# It's a learning process!

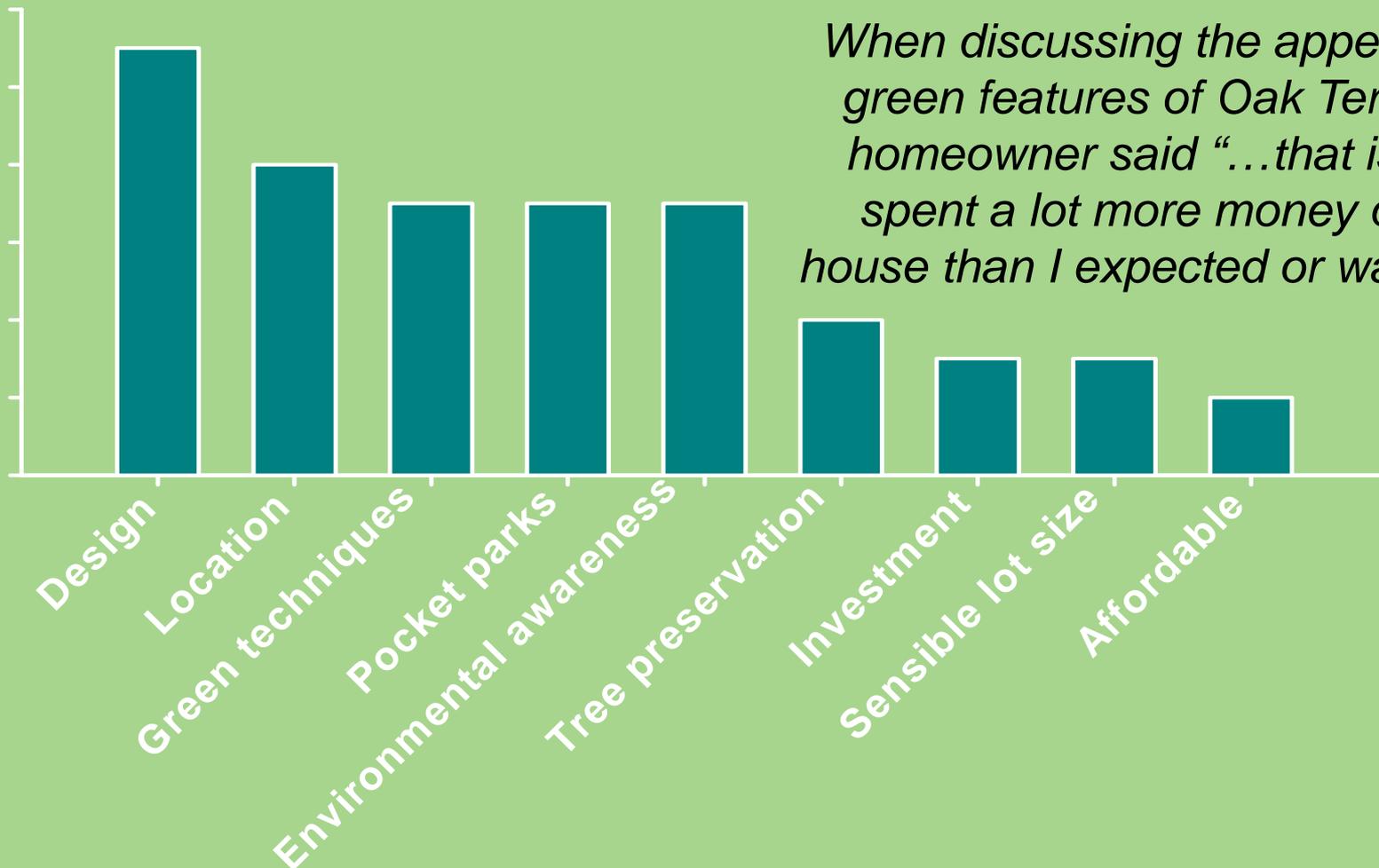


# Stakeholders that have the biggest influence

“There are so many regulations and approvals needed that the development strategy becomes how to get through the regulatory process”



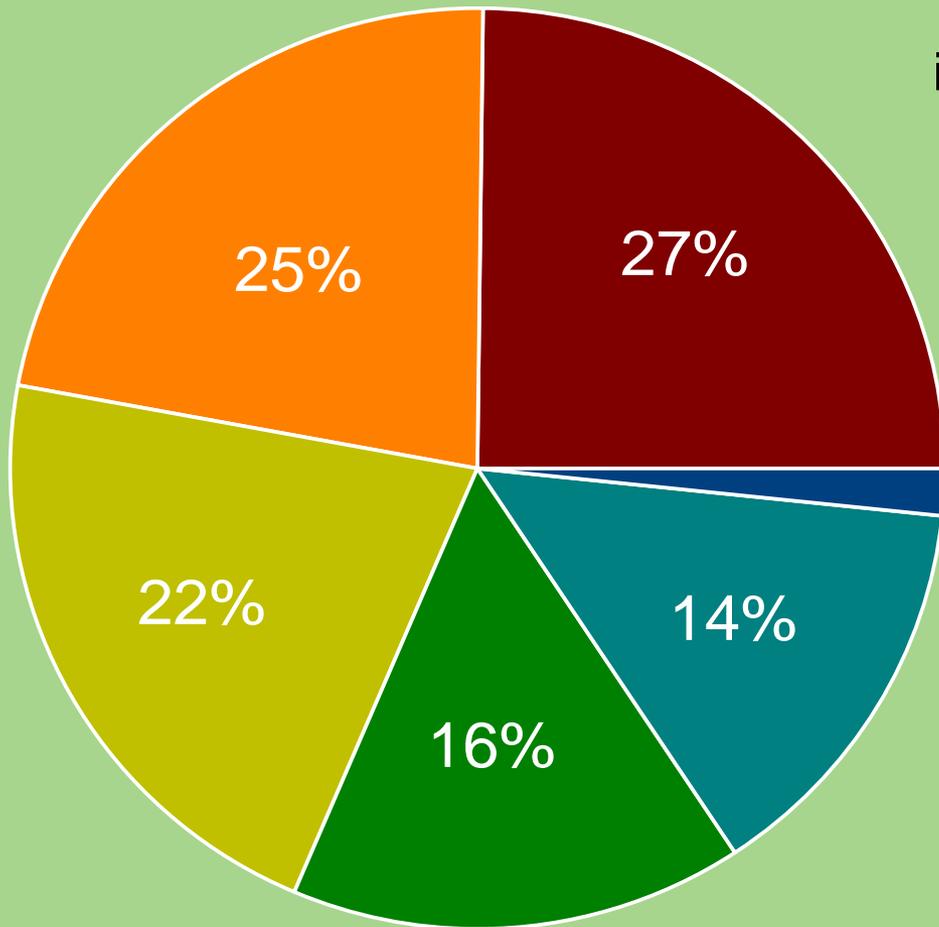
# Attributes used to describe Oak Terrace Preserve



*When discussing the appeal of the green features of Oak Terrace, a homeowner said "...that is why I spent a lot more money on this house than I expected or wanted to."*

# Options for increasing LID use

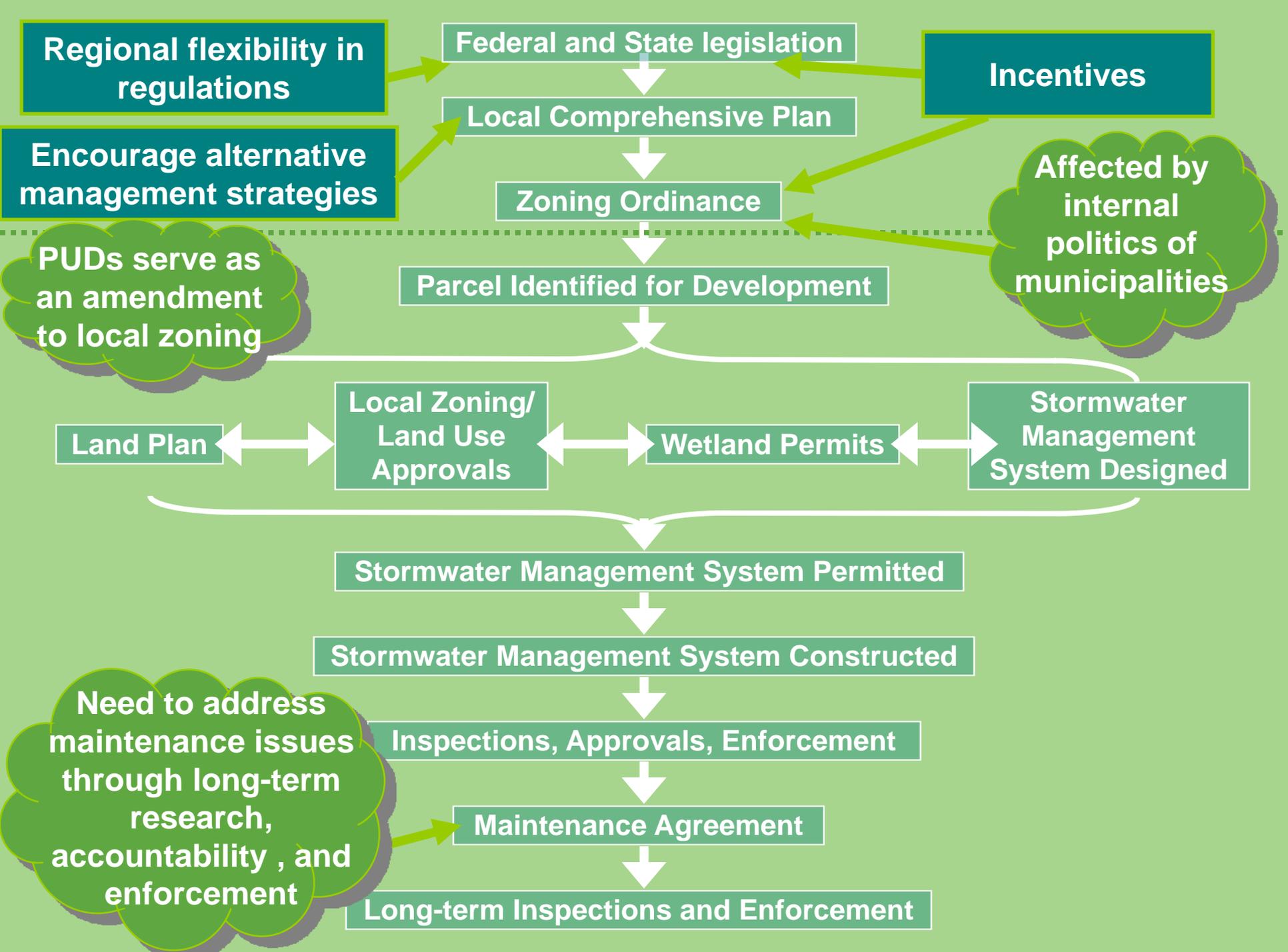
“When developing the mindset is:  
1) easier is better and 2) what  
incentives are there to develop one  
way versus another”



# LEED certification as a marketing tool for LID practices

- “People want green to say they are saving the world, but they don’t understand what it really is”
- “LEED is a branding, the stormwater portion is not”
- “Buyers are interested in the visible, tangible things associated with LID, they don’t notice the advantages of stormwater LID practices”





**Regional flexibility in regulations**

**Federal and State legislation**

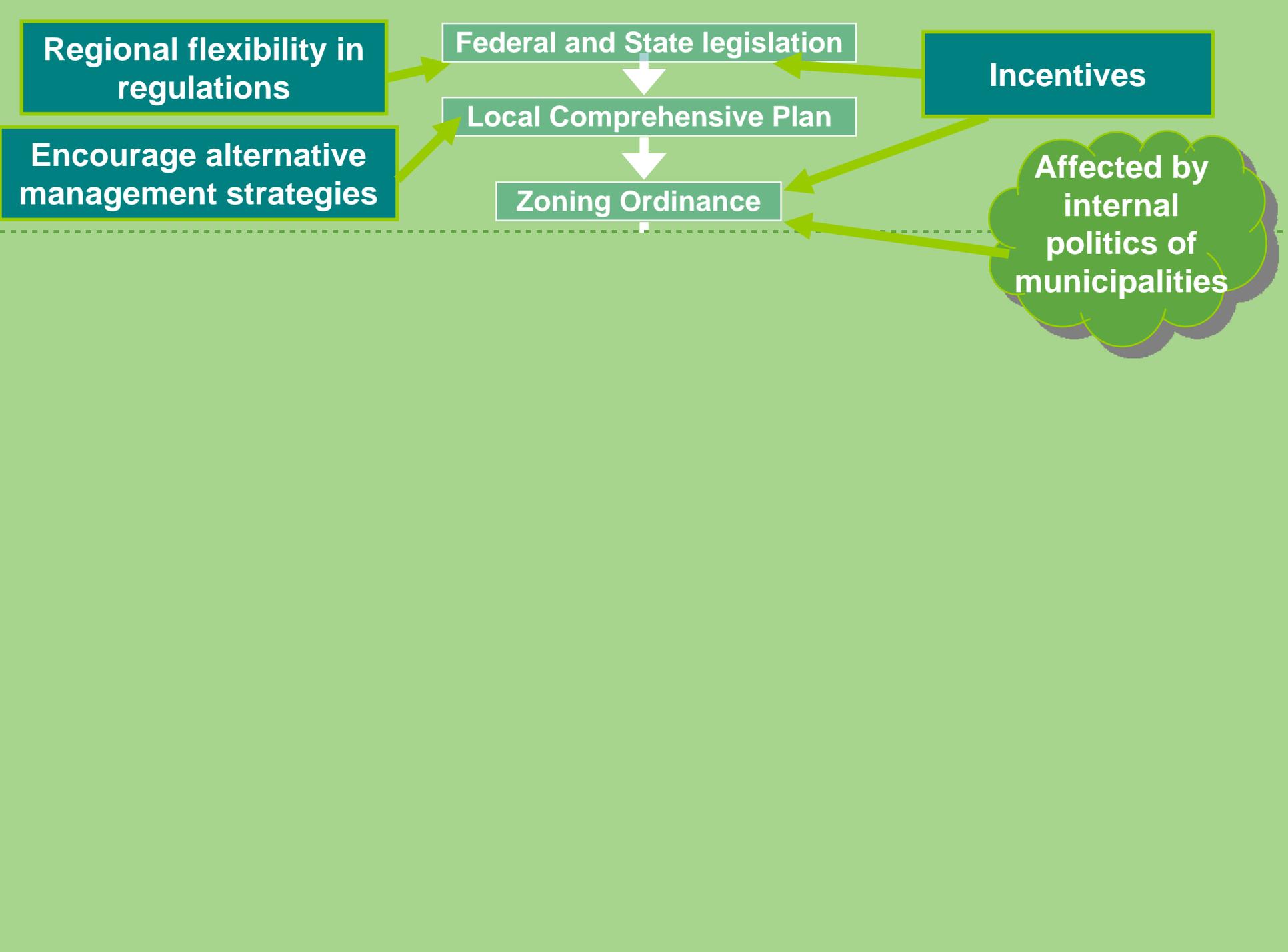
**Incentives**

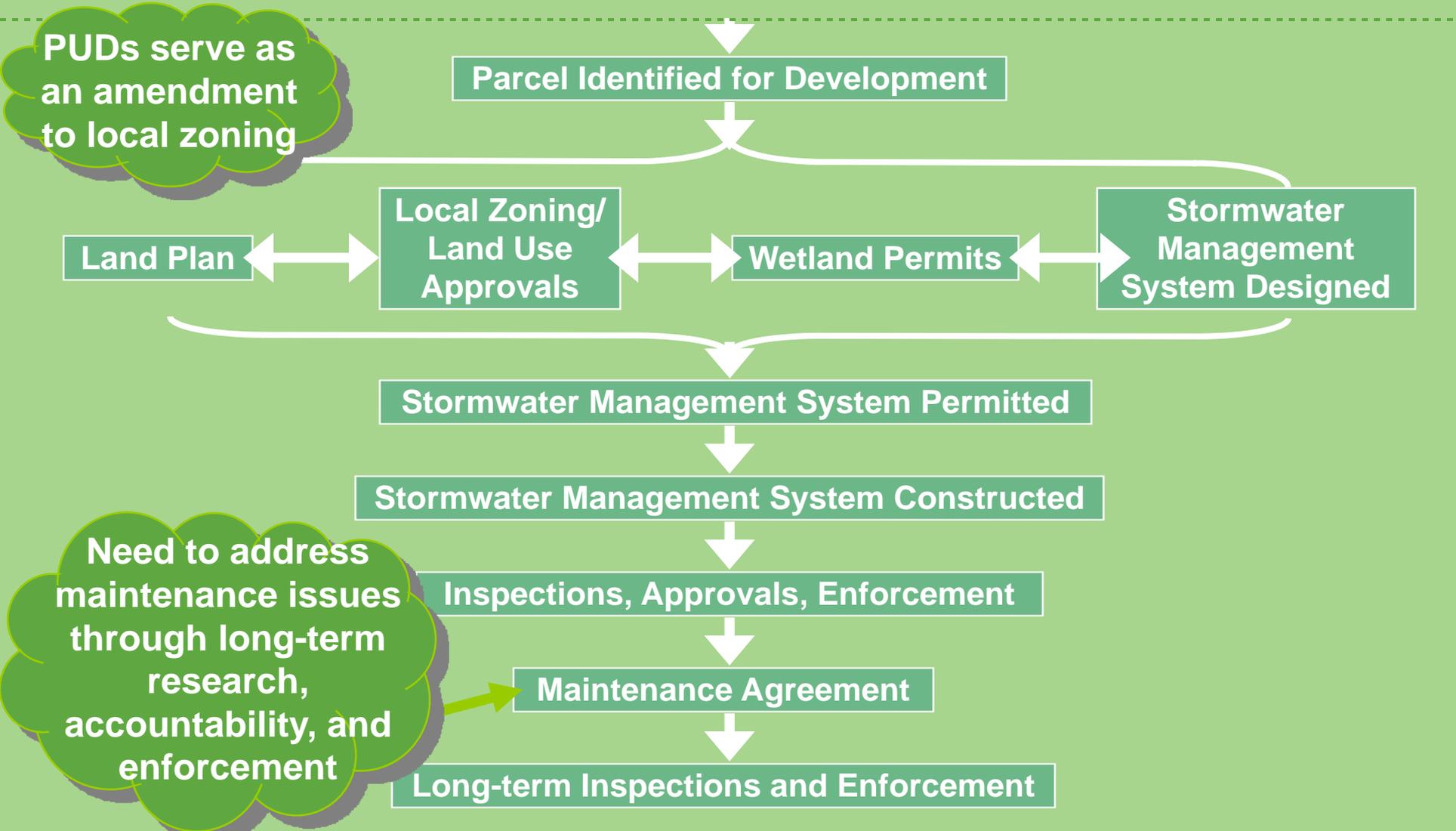
**Encourage alternative management strategies**

**Local Comprehensive Plan**

**Zoning Ordinance**

**Affected by internal politics of municipalities**





# Overcoming the obstacles

- **REGULATORY SUGGESTIONS**

- Incentives for LID (e.g., tax incentive, reduced impact fees, bonus density, expedited review, consumer incentives-lower stormwater utility bill)
- Flexibility in Federal and State regulations
- Include LID in local comprehensive plans
- Guidelines for LID design, permitting, construction phasing, maintenance, & enforcement

- **REGIONAL RESEARCH NEEDS**

- Long-term performance and efficiency
- Development of models and standards
- Identification of long-term maintenance standards
- Success stories

# Overcoming the obstacles

- **EDUCATIONAL NEEDS**

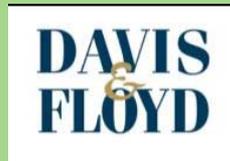
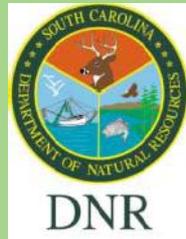
- Regulators, Municipal officials, Contractors, Engineers, Developers, Consumers/Homeowners
- Forums: ULI, ASCE, ASLA, APA, Sustainability Institute, Carolina Clear, Lowcountry Earth Force
- College level education (engineers)
- Homeowner education (maintenance) & marketing

- **ADDITIONAL COMMENTS**

- Refine definition of LID
- Consumer market has to support LID practices
- There is no “one-size fits all” solution to stormwater management

# Acknowledgements

Debra Hernandez, Hernandez and Company; Angela Halfacre, Furman University; Sadie Drescher, SCDHEC-OCRM; April Turner, SC Sea Grant Extension; Becky Szivak, ACE Basin National Estuarine Research Reserve (NERR); Nicole Saladin, North Inlet-Winyah Bay NERR; Anne Rone, SCDHEC – Bureau of Water; Anna Martin, ACE Basin NERR; Katie Giacalone, Carolina Clear; Bob Bacon, SC Sea Grant Consortium; Elias Deeb, Noisette Company; Mike Horton, Davis & Floyd; Anthony Doyle, SCDHEC





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