

THE ROAD TO LID PERMITTING

A CASE STUDY IN COASTAL NORTH CAROLINA

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Background

- Estimated that 8 million acres of coastal wetlands impaired
- 1974 – NC enacts statewide Erosion Control regulations
- 1988 – First version of Coastal Stormwater regulations
- 1997 – Neuse River Basin regulations
 - Tar Pamlico
 - Randleman Lake
 - Jordan Lake
- 2008 – Revised Coastal Regulations

Challenge of Coastal Development

- Growth and influx of new development
 - 127% increase in housing units in 30 years
 - Brunswick County 17th fastest growing county in USA
- Continued Deterioration
 - NCCF estimates 100,000 acres of contaminated shellfish waters

The Road to LID

- Lockwood Folly Roundtable
 - Identified long term deterioration of WQ in watershed
 - Formulated key strategies to address WQ issues
- 2006 – Grant Funding to develop LID ordinances for three jurisdictions
 - Brunswick County
 - New Hanover County
 - City of Wilmington
- 2007 – Formation of Technical Advisory Committees
 - Partnership with Larry Coffman

Task Force Challenges

- Three jurisdictions each have unique goals and visions
- Brunswick County
 - Largely undeveloped
 - Watershed management planning
 - Tailored to new development
- New Hanover County & City of Wilmington
 - Urbanized, and getting denser
 - Focus on retrofit opportunities and redevelopment



Obstacles Identified.....

- Little credit given for some LID practices
 - Rainwater harvesting
 - Soil amendments
- Experience
- Current ordinances and design standards
 - Roadway design standards
 - Fire codes
 - Density limits / bonuses
- Current permitting process
 - What is LID?
 - Paperwork – increasing number of BMPs
 - Calculation methods – quantifying an LID design

... but there is a silver lining

- Current stormwater rules are performance based
- Design standards published in BMP manual
- Community participation
- State agency awareness
 - No major change to implement LID

LID Calculations

- SCS Method
 - Described in TR-55
 - Per NC DWQ, allowable method for LID Projects only
 - Accounts for soil conditions on site
- NC DWQ Involvement
 - No changes required for new Coastal Rules
 - Permitting guidelines in development by DWQ
 - Clarification of policies
 - Disconnected Impervious Area
 - Pervious Pavement
 - First Flush Calculations

Regulatory Cooperation

- Statewide LID manual
- State stormwater staff included in technical discussion
 - Outlining requirements for LID submittals
 - Determining new process
- Collaboration between State agencies and 3 local jurisdictions
- Development of LID Technical Assistance Manuals

LID-EZ

- Development
 - Similar programs in use in Wake County and Manteo.
 - Local and NC Coastal Federation Funding
 - Cooperation with NC DWQ
- Wilmington Version
 - Written to comply with proposed Coastal Rules
 - Quantitative approach to LID developments
 - Based on local ordinances and NC DWQ BMP manual

LID-EZ General Features

- Custom Software tailored to specific needs of stakeholder group
 - Sheet Flow
 - Impervious cover
 - Wetlands / Swamps
 - Residential Info
- Standard submittal and reporting forms
 - Expedited permit review



LID-EZ Interface

- Quick Calculator
 - Planning tool
- Stormwater Calculations
 - Permit submittal preparation
 - Detailed calculations
 - Evaluation of all coastal stormwater regulations
 - State and local



LID-EZ Calculation Features

- Storage devices increase effective soil storage capacity, reducing CN
 - “Effective Volume” varies based on storm event
 - Effective Volume used in Peak Flow calculations
- Disconnected Impervious
- Pervious Pavement
 - Land Use or Storage Area
 - CN and BUA reductions
- Lakes and Wetlands
 - Coastal Wetlands
- Pollutant Removal
 - BMPs in series



Connected / Disconnected Impervious Area

- Connected Impervious Area
 - Directly connected to drainage conveyance
 - Minimal opportunity for volume reduction before reaching analysis point
- Disconnected Impervious Area
 - Runoff has contact with pervious surfaces before reaching analysis point
 - Recommended 50' sheet flow or sheet flow length equal to width of impervious surface
 - Benefit is dependant on soil type
 - Net result is a reduction of CN

Regulatory Compliance

- Numerous meeting with DWQ stormwater staff in Raleigh
 - Discuss SCS CN Method
 - Determine LID Permitting Process
 - Revised supplement Forms
 - Permit submittal requirements
- BMP Design Verification
 - Required Storage Volume
 - Pollutant Removal
 - Total Storage Provided
 - % Impervious Treated

Stormwater Management Plan

Project #: Brunis LID
Date: 09/23/09
Designer: E. Tomczak

PROPOSED STORAGE DEVICES

Enter only runoff volume below that will be infiltrated or drawn down over 2 to 5 days. Additional volume provided in devices should not be entered in this worksheet. Drawdown time requirement applies to all storm events.

#	Name	Location	Type of Device	Storage Volume Provided (ft ³)	Impervious Area (ac)	D.S. BMP #	% of Total Imp. Area	Required Storage (ft ³)	% of Storage Provided
1	Basin A1	Entrance	Retention	1525	0.06		0.09%	190.00	37.2
2	Basin A2	Entrance	Retention	2190	0.06		0.40%	165.00	132.2
3	Basin A3	Cul De Sac	Retention	2030	0.16		1.47%	494.00	57.3
4	Swales 1A	ROW	Vegetated Swale (Storage)	9500	0.11		0.36%	329.00	1526
5	Basin B1	Open Space	Retention	1100	0.29		3.02%	120.00	91.6
6	Basin B2	Open Space	Retention	9345	0.67		8.51%	2066.00	326
7	Basin B3	Open Space	Retention	8955	0.66		8.41%	2033.00	302
8	Swales 1B	ROW	Vegetated Swale (Storage)	8930	2.51		24.50%	4070.00	97
9	Basin 1C1	ROW	Retention	2075	0.16		1.57%	527.00	394
10	Swales 1C	ROW	Vegetated Swale (Storage)	61130	1.34		13.11%	4415.00	1395
11	Basin B5	Open Space	Retention	17000	1.66		16.26%	5143.00	331
12	Swales 1D	ROW	Vegetated Swale (Storage)	15470	1.11		10.86%	3647.00	605
13									
14									
15									
16									
17									
18									
19									
20									

E.R. WO Treatment Volume Provided: 31,786 ft³
 Total Impervious Treated: 89.6 % Treated - 9.16 of 10.22 total impervious acres.

Minimum Required Volume for First Flush:	33,672 ft ³	Net Pollutant Removal (%)	Target %
		TSS	20.0
		TB	85.0
		TP	21.3

Minimum Volume Required to Meet 1.5 or Runoff Volume Requirements: 64,679 ft³

Conclusions

- Stakeholder groups play a key role
- Never lose sight of implementation
- Work with existing rules and policies where possible
- Involve the regulators and reviewers



The Finish Line?

- Wilmington unanimously approved ordinance in September 2008
 - Currently in final phases for Brunswick and New Hanover Counties
- NC DWQ will accept output from LID-EZ for permit submittals
 - Restricted to 3 jurisdictions
- Program will continue to change to meet current policies

- Questions?