Evaluating LID for a Development in the Lockwood Folly Watershed

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Main Goals of Project

- Find Proposed/Existing Development in Brunswick County and Develop an Alternative Low Impact Development (LID) Plan.
- Develop Additional Revenues and Costs for LID Development and Compare to those of Conventional Development.
- Determine which type of development is financially more attractive to a developer.

Proposed Development in Brunswick County

Tract of Land – Pre-Development

Excellent Surface Infiltration = Ability to Store H2O
Conventional Development

- Watershed Area ~ 4 acres.
- Approximate Lot size = 0.3 acre per home
- Each house “assigned” a roof surface area of 2300 sf
- Average driveway size ~ 400 sf
- 10 ft drivable with expansion to 20 ft at driveway end.
- All pavement is Impermeable
- Pond Surface Area ≈ 8500 sf

This developer incorporates “part way” LID

- What has the developer already done?
  - Limited road width (22’)
  - Eliminated curb & gutter
  - All swales no culverts/concrete pipe
- Estimate “already” cost savings
  - $14,500 saved: no curb & gutter
  - Elimination of 6’ asphalt from road: $7,000
  - Elimination of 3 drop inlets: $4,500
  - Reduction of 750’ of 18” Diam. Pipe: $21,400

Permeable Pavement on lightly traveled street

- Somerset Street, Ocean City, MD

How Permeable Pavement Works
Using Permeable Pavement reduces size of pond from 8500 sf to 7900 sf

Incorporating Bioretention in Hamlet

Building “Hamlet” Rain Garden reduces size of pond from 7900 sf to 5900 sf

Potential to Store Water in Swales

Swales – not ditches

Constructing/Converting Wet Swales reduces size of pond from 5900 sf to 5150 sf
So, new pond surface area is reduced allowing for...

A new 2300 sf home on an 11,000 sf lot

Costs – Small Pond Still Exists

<table>
<thead>
<tr>
<th>Item</th>
<th>SF / cost per sf</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driveways</td>
<td>3,515 / $4.0</td>
<td>$14,100</td>
</tr>
<tr>
<td>Roads</td>
<td>4,604 / $2.5</td>
<td>$11,500</td>
</tr>
<tr>
<td>Community Rain Gardens</td>
<td>3,500 / $4.0</td>
<td>$14,000</td>
</tr>
<tr>
<td>Swales</td>
<td>6,367 / $1.0</td>
<td>$6,400</td>
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Savings – Small Pond Still Exists

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<thead>
<tr>
<th>Item</th>
<th>Notes</th>
<th>Savings</th>
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<tr>
<td>Pond Eliminated</td>
<td>3350 sf / $7.0</td>
<td>$23,450</td>
</tr>
<tr>
<td>Profit from Home &amp; Lot</td>
<td>$400,000 Sale (per recent sales)</td>
<td></td>
</tr>
</tbody>
</table>

Balance – Is LID worth it?

- If 15% Profit, total savings is $37,500
- If 30% Profit, total savings is $97,500

- Total Costs - $45,900 EXTRA
- Total Savings – From $83,400 to $143,400

From Construction Cost Perspective... YES
Could more be done?

LID Site
Create a Hydrologically Functional Lot

LID Site
Create a Hydrologically Functional Lot

LID: Small-scale Controls

Rain Garden Installation: Brunswick County

Rain Gardens/ Bioretention can be grassed, too.

Medium-Scale Water Harvesting
Pond would be “shrunk” further and replaced by a community rain garden

Costs – Small Pond now R.G.

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<td>Community Rain Gardens</td>
<td>3,500 / $4.0</td>
<td>$14,000</td>
</tr>
<tr>
<td>Individual R.G.</td>
<td>10,653 / $3.0</td>
<td>$32,000</td>
</tr>
<tr>
<td>Swales</td>
<td>6,367 / $1.0</td>
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Savings – Small Pond now R.G.

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<tr>
<td>Pond Eliminated</td>
<td>3350 sf / $7.0</td>
<td>$23,400</td>
</tr>
<tr>
<td>Pond Replaced by Rain Garden</td>
<td>5150 sf / $3.0</td>
<td>$15,400</td>
</tr>
<tr>
<td>Profit from Home &amp; Lot</td>
<td>$380,000 Sale (per recent sales) <strong>RiverSea Village</strong></td>
<td>$15,400</td>
</tr>
</tbody>
</table>

Balance – Is LID worth it? Take 2

- If 15% Profit, total savings is $18,000
- If 30% Profit, total savings is $75,000
- Total Costs - $77,900 EXTRA
- Total Savings – From $95,900 to $152,900 IN ADDITION

Yes. However, the savings is slightly less than the Community LID-only option.

Conventional Development

Pervious Concrete: according to NC DENR
Add in Rain Gardens

Examining Runoff Volumes

Summary

- A subset of a Brunswick Co. development was “converted” from Conventional to Low Impact Development (LID)
- Two Options Developed... (1) “Community LID” and (2) “Community + Individual LID”
  - (1) Pond reduced from over 8500 sf to 5100 sf
  - (2) Pond replaced by same size rain garden
- Both Options: land savings allows another property to be constructed in the development

- Both Options Saved Money for the Developer
- Amount of Savings based on Profit for House.
  - Range from $20,000 to $100,000 in SAVINGS
- More LID not necessarily better, w.r.t. savings

Other Important Points

- Environmental Benefits Examined
  - 1/3 to nearly 100% of pollutant load reduction
- Home Value will be re-evaluated
  - Is home near stormwater pond worth less than one near rain garden (due to liability)
  - It appears not enough data available.
  - Thank you to the Coastal Federation & Brunswick County.

Questions?