Storm Water Management Plan
for
The Cocoa Beach Community Redevelopment Area
An Integrated Approach

September 2010
“Water conservation is becoming an important part of Florida's overall water management program. Saltwater intrusion and pollutants threaten Florida's limited water resources, and increasing urbanization and periodic drought are placing greater demands on water supplies.”

Knox, Gary W

http://edis.ifas.ufl.edu/MG027#FOOTNOTE_2
Purpose...

- The City of Cocoa Beach Downtown Community Redevelopment Area (CRA) has been designated in accordance with State Statute Section 163 Part III.

- The finding of necessity for the CRA includes deficiencies in stormwater management systems which have been found to be a condition and symptom of blight. Correcting these deficiencies will serve to promote redevelopment and reverse blighted conditions within the redevelopment area.

- In addition, the City is required by law to reduce the storm water runoff pollution loads in accordance with the Clean Water Act’s total maximum daily load (TMDL) program.

- And finally to be consistent with the CRA vision.
An Integrated Approach....

• In Accordance with the Redevelopment Plan
An Integrated Approach....

Consistent with The Downtown Study....
CRA Storm Water Management Plan

An Integrated Approach....

Consistent with The Master Streetscape Plans
An Integrated Approach....

Meeting the Requirements for 319 Grants
Study Limits

- The Downtown Community Redevelopment Area
  - Approximately 220-acres
  - City of Cocoa Beach Public Property
  - City of Cocoa Beach Private Property
  - FDOT property
**Stormwater Components**

- Stormwater collection and conveyance
- Stormwater flooding issues
- Total Maximum Daily Load (TMDL) Reduction
  - Total Phosphorous
  - Total Nitrogen
  - Total Suspended Solids (Indirectly)

- Goal 1: To address deficiencies with the stormwater collection and conveyance system in order to eliminate blighted conditions
- Goal 2: Develop a plan to meet the TMDL requirements
- Goal 3: To coordinate stormwater management improvements with Urban Design Goals
- Goal 4: To achieve Goal 1 through the use of Low Impact Design (LID) stormwater techniques
### Stormwater Collection, Conveyance & Flooding

- **Collection, conveyance & flooding are all inter-related**

### 2001 Parson’s Stormwater Study Conclusions

<table>
<thead>
<tr>
<th>Problem ID</th>
<th>Problem Location</th>
<th>Problem Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>Intersection of N. Orlando Ave. and 2nd Street N.</td>
<td>Nuisance Flooding, standing water</td>
</tr>
<tr>
<td>F2</td>
<td>A1A and 2nd Street N. and 1st Street N.</td>
<td>Nuisance Flooding, standing water</td>
</tr>
<tr>
<td>F4</td>
<td>Lookout Point Apts. – 1st Street N. and Cedar Ave.</td>
<td>Stormwater from apts. causing flooding at residents to west</td>
</tr>
<tr>
<td>F6</td>
<td>Model Node SF024I – N. Orlando Ave.</td>
<td>Model Indicates possible deficiency</td>
</tr>
<tr>
<td>F7</td>
<td>Model Node SF057I – Woodland, Yard/Open Space</td>
<td>Model Indicates possible deficiency</td>
</tr>
<tr>
<td>F8</td>
<td>Model Node SF050M – N. Brevard, N. 2nd St, Yard/Open Space</td>
<td>Model Indicates possible deficiency</td>
</tr>
<tr>
<td>G1</td>
<td>N. Brevard Ave. and the alley north of Minuteman Causeway</td>
<td>Nuisance Flooding, standing water</td>
</tr>
<tr>
<td>G2</td>
<td>A1A at Minuteman Causeway and 1st Street S.</td>
<td>Nuisance Flooding, standing water</td>
</tr>
<tr>
<td>G3</td>
<td>A1A near 3rd Street S.</td>
<td>Nuisance Flooding, standing water</td>
</tr>
<tr>
<td>G5</td>
<td>4th Street S.- Greenswood Land to Yawl Dr.</td>
<td>Nuisance Flooding, standing water</td>
</tr>
<tr>
<td>G9</td>
<td>Model Node SG077I – N. Brevard, S 2nd Street, Yard/Open Space</td>
<td>Model Indicates possible deficiency</td>
</tr>
<tr>
<td>G10</td>
<td>Model Node SG076M - N. Brevard, S 2nd Street, Yard/Open Space</td>
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TMDL Reduction Analysis

- FDEP IRL & BRL Basin Management Action Plan
  - Mandated a reduction in pollutant loading
  - Requires 33% reduction in 5-years
  - Requires 100% reduction in 15-years
  - Anticipated enactment in summer 2011

- Who accepts the burden?
  - FDOT lands vs City use of FDOT right-of-way
  - Private development: Timeline for implementation

- Decision for City to develop a plan to address the required pollutant loading reduction ... but make it a living plan.
Delineation of Treatment Areas

- Pollutant load reduction assessed as a whole for CRA
- Defined with respect to proposed Districts
- Defined with respect to proposed treatment systems
- Defined with respect to existing & anticipated drainage patterns
TMDL Reduction Methodology

❖ Calculation of Baseline Loading
  - Total P: 10.10 lbs/ac Cocoa & 9.69 lbs/ac FDOT
  - Total N: 2.036 lbs/ac Cocoa & 2.788 lbs/ac FDOT

❖ Calculation of Allowable Loading
  - Total P: 2.323 lbs/ac Cocoa
  - Total N: 0.344 lbs/ac Cocoa
Pollution Reduction Requirements

- Based upon impervious area and amount of directly connected impervious area
- Average treatment requirement of approximately 1.5”
- Total treatment volume ...

- **850,000 CF storage**

- **Or 20 acre-feet**

How do we achieve this Treatment/Pollutant Reduction Requirement?
Traditional Stormwater Management

Collect
Concentrate
Convey
Centralized
Control
The Results

 résultats of Development

- Loss of infiltration
- Increased Runoff Volume
- Shortening of Time of Concentration
- Transportation of pollutants and sediments
- Loss of lands dedicated for stormwater

It's not practical for Cocoa Beach CRA ... 

- Lack of available undeveloped lands
- Not compatible in urban developed setting
- Loss of economic redevelop potential
LID Stormwater Principals

- Reduce impervious areas
- Decrease hydrologic connectivity
- Control stormwater at the source
- Treat stormwater at the source
- Promote off-line treatment
- Promote detention and infiltration opportunities
Bio-retention

- Hydrological benefits of retention and treatment
- Additional benefits of aesthetics, vegetation and habitat
LID Stormwater Techniques

- Pervious Pavements
LID Stormwater Techniques

Underground storage / infiltration
Why is LID Stormwater Appropriate?

- It can be implemented without the need to condemn lands
- It is more efficient at removing pollutants than traditional stormwater systems
- Infiltration aspect takes advantage of Cocoa Beach’s good soils
- By treating water at the source, we enhance the capacity of the storm sewer system
- By treating water at the source, we eliminate downstream flooding
- It can be implemented as part of redevelopment streetscape projects
- It provides aesthetic enhancements to the community thus promoting redevelopment
Typical LID Treatment Solution

- Bio Swales
- Pervious parking
- Infiltration Systems

Typical Streetscape Redevelopment
Summary

- Systems can be implemented in conjunction with already planned streetscape redevelopment
- Enhances the existing storm sewer conveyance systems
- Resolves standing water flooding concerns
- Improves the aesthetic appearance of the CRA promoting redevelopment
- Can be adjusted to accommodate private redevelopment pollution reductions