RETAINING RUNOFF AT ITS SOURCE

Atlantic Beach Case Study

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Outline

- Overview of stormwater issues in Atlantic Beach, FL
- City's ordinance limits for urban development
- Test case evaluation to confirm cost effectiveness of current practice

Capital Improvement Projects Completed Since 1999


CORE CITY PROJECT - 2001


SEMINOLE ROAD DITCH OCEAN/14TH STREET 2007

HOPKINS CREEK RSF - 2008

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The City of Atlantic Beach has reduced flooding conditions in the past years

1. Major flooding problem areas were identified in 2002
2. City implemented a series of capital improvement projects
3. City established limits on impervious area on parcels
4. In 2012 the City developed an updated list of capital improvement projects, and reviewed the effectiveness of its stormwater ordinance

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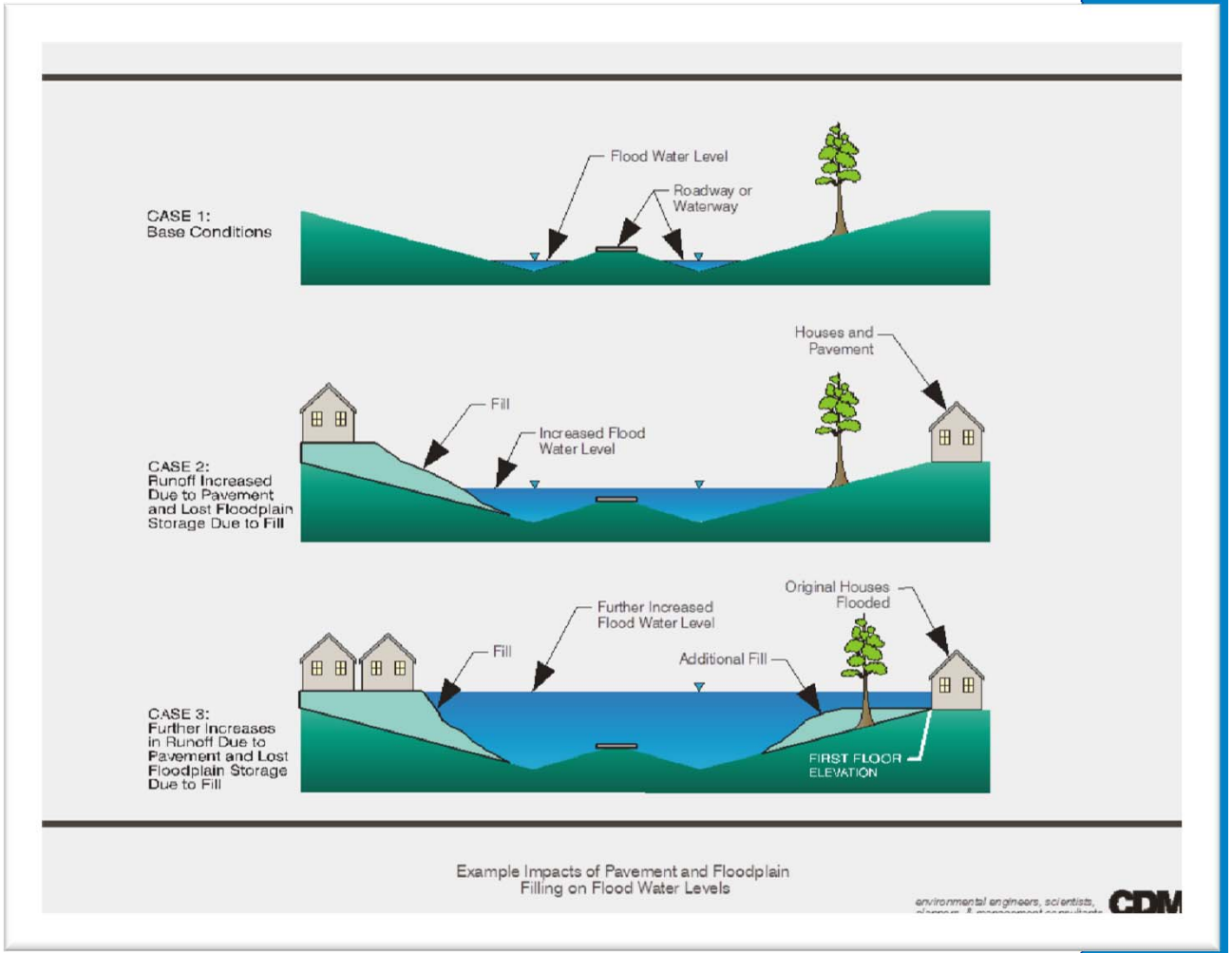
Flooding Will Increase Without Onsite Stormwater Controls

- City Streets
- Adjacent properties
- Downstream systems
- Water quality Impacts
- Reduced recharge



City's ordinance promotes low impact development

- Application of Low Impact Development concepts to redevelopment by more than 10% or 400 sq-ft of impervious area
- No net loss of onsite surface storage (to avoid displacing historic onsite stormwater onto adjacent parcels and to maintain existing aquifer recharge)
- No increase in runoff volume for the 25 year 24 hour design storm (to avoid increases in runoff volume, flooding and pollution to offsite while maintaining aquifer recharge)

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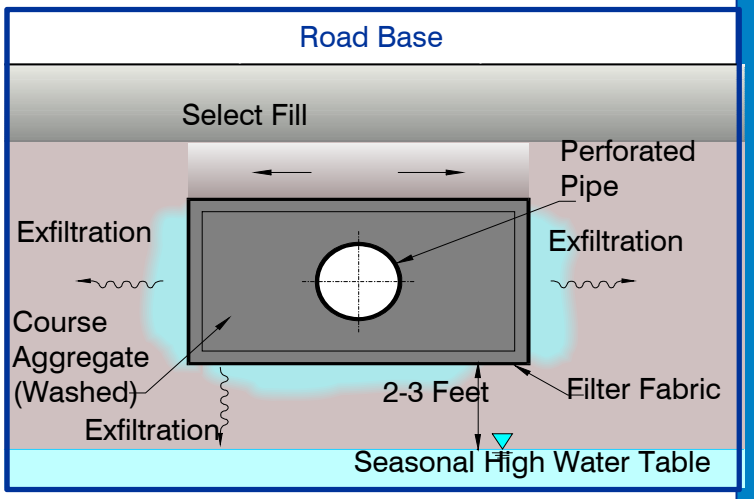
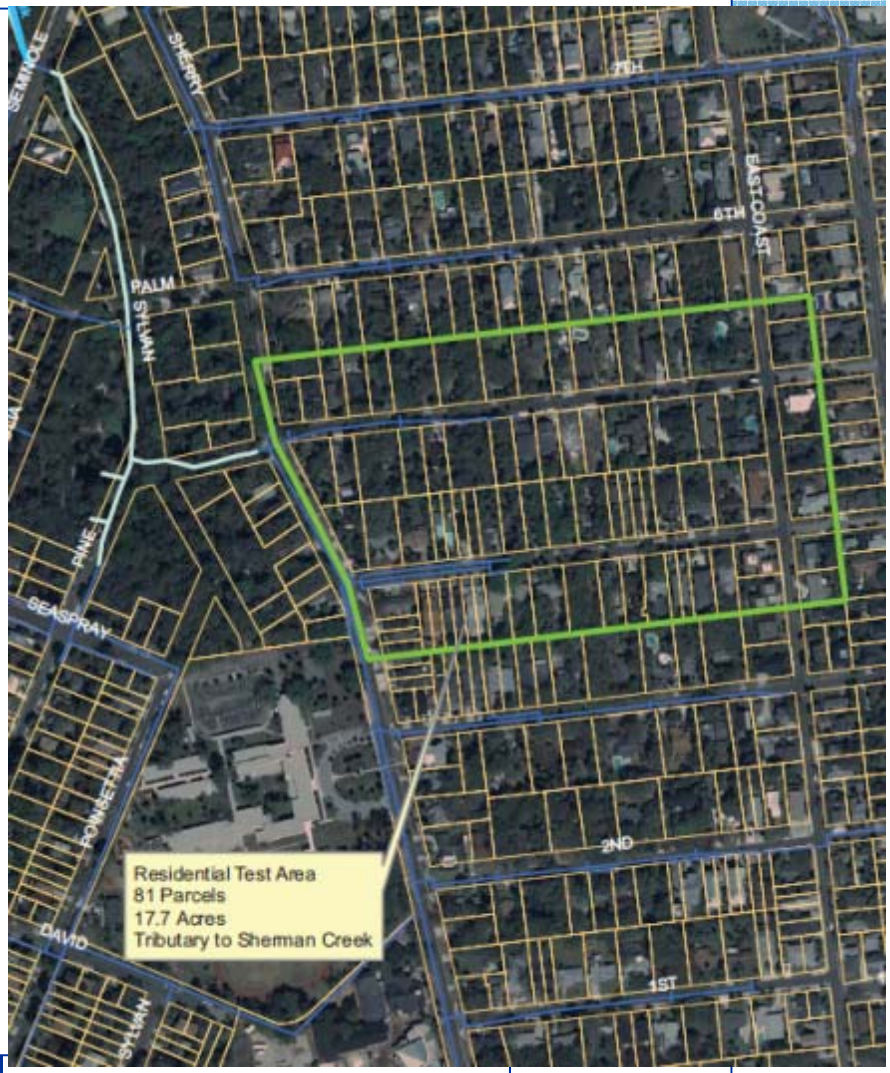
The 2012 master plan update included an evaluation of onsite stormwater control practices

- Test area
- Evaluation for existing and potential redevelopment conditions
  - Impervious area,
  - Groundwater table
- Considered four LID BMPs
  - Swales/retention
  - Rain gardens/bioretention
  - Exfiltration trench
  - Underground storage



Test Area Evaluated

- 81 Parcels
- Total Area: 17.7 Acres
- Existing parcels impervious Range: 0-78%
- Composite : 32% impervious



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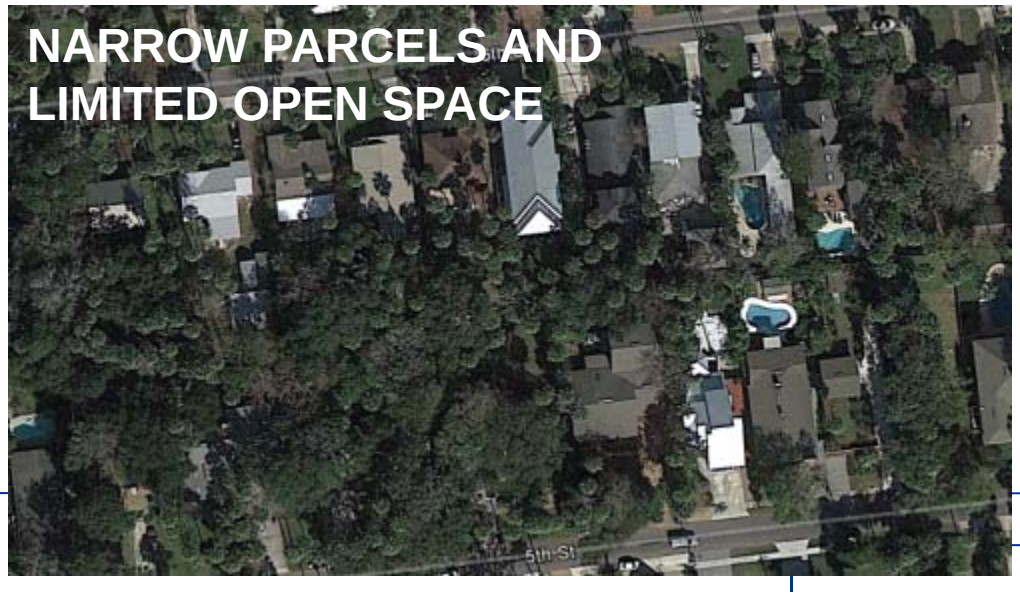
Residents are commonly interested in upgrading existing structures, or developing available parcels



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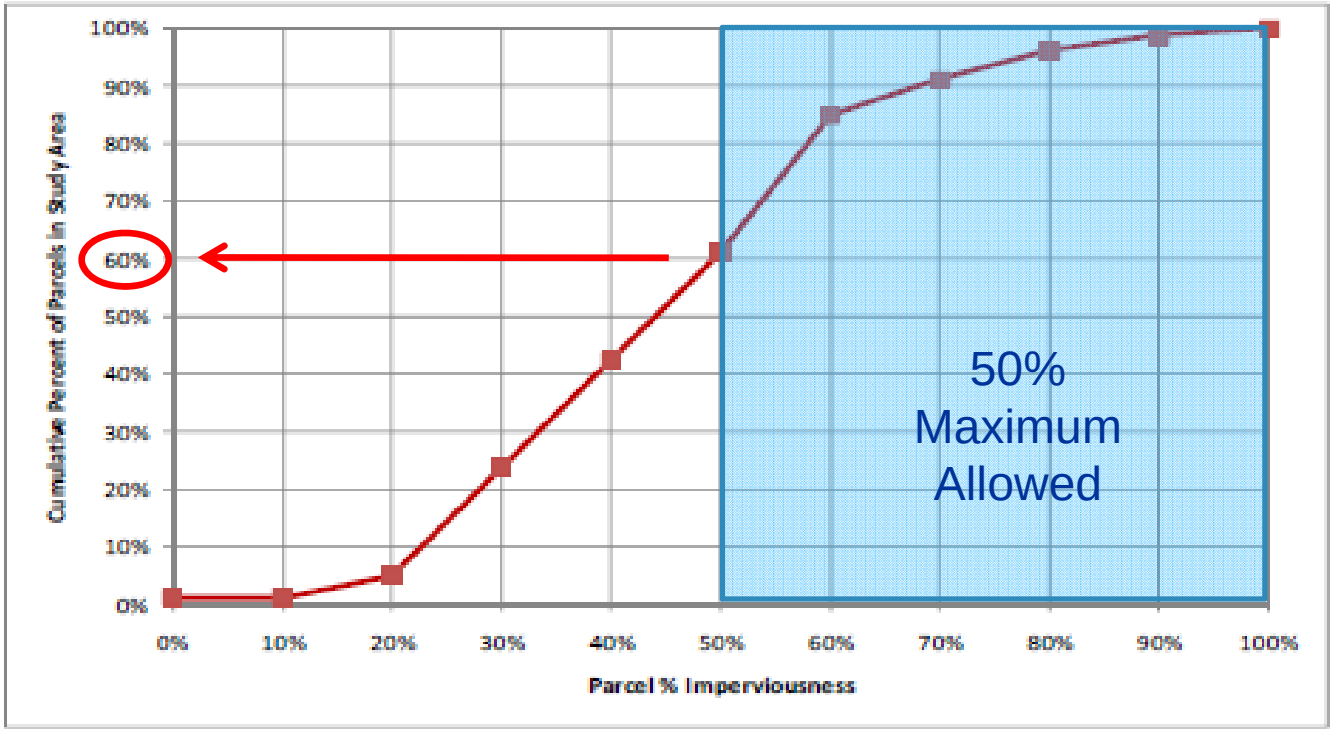
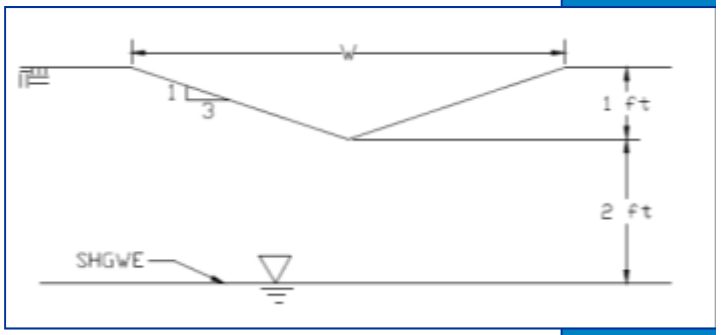
49 parcels could increase their impervious cover in the test area

- 60 % of the parcels can increase their impervious area to the maximum allowed (50%)



Swales and Retention

- Can be a traditional swale
- Can be a shallow retention area for grassed yard areas to allow dual use
- Should not be deeper than 1 ft above seasonal high groundwater table
- Should be maintainable by homeowner



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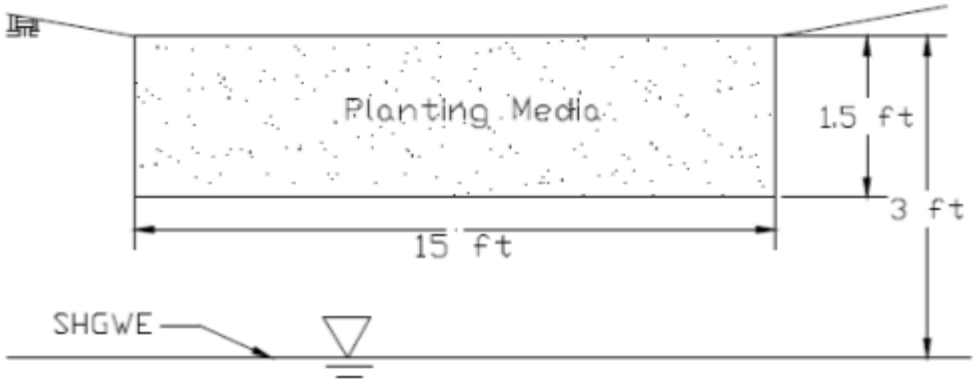
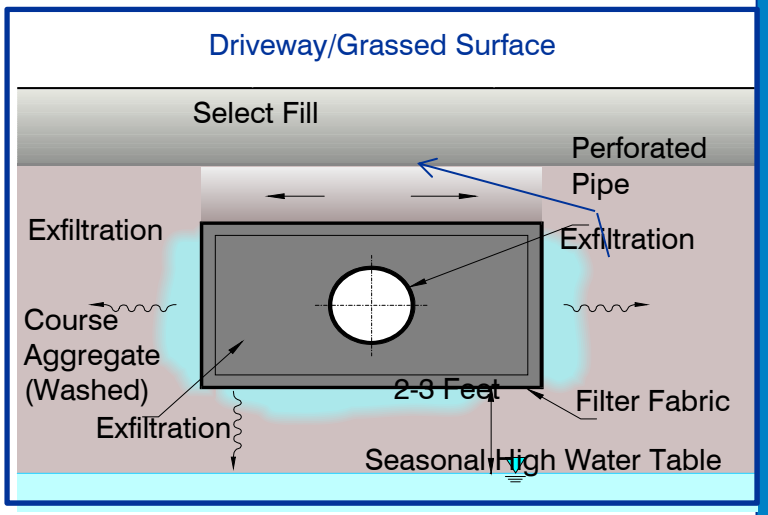
Bioretention (Rain Gardens)

- Special form of a swale or retention
- Added aesthetic factor with plants/flowers
- Must retain the required volume below the overflow elevation.



Exfiltration Trenches

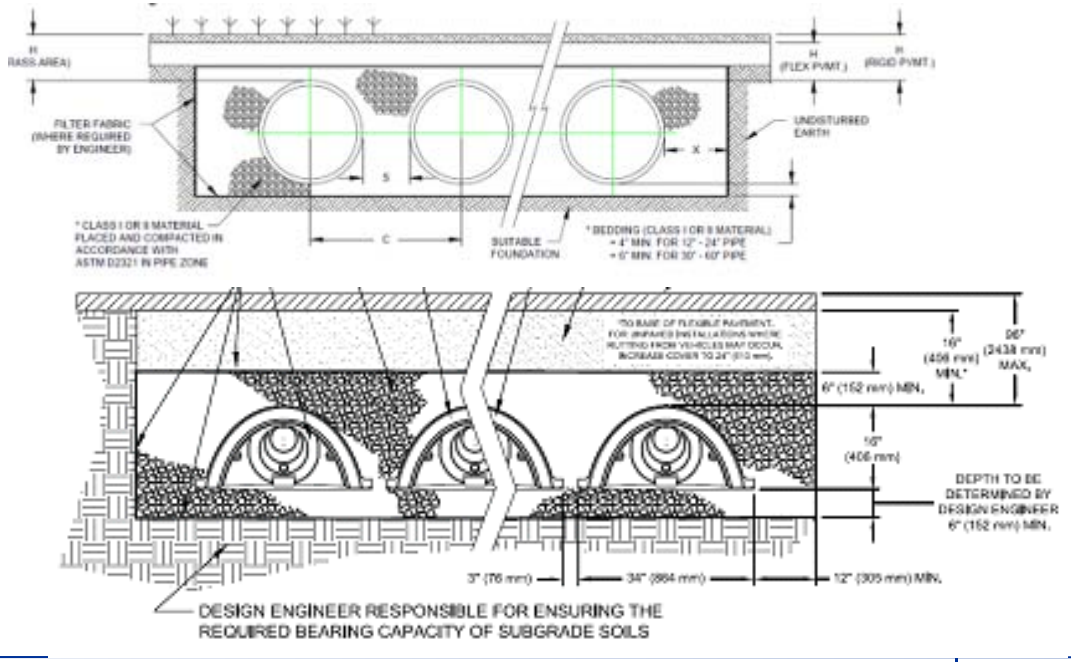
- Underground option
- Can go under pavement or grassed areas
- Filter wrap around perforated pipe and trench



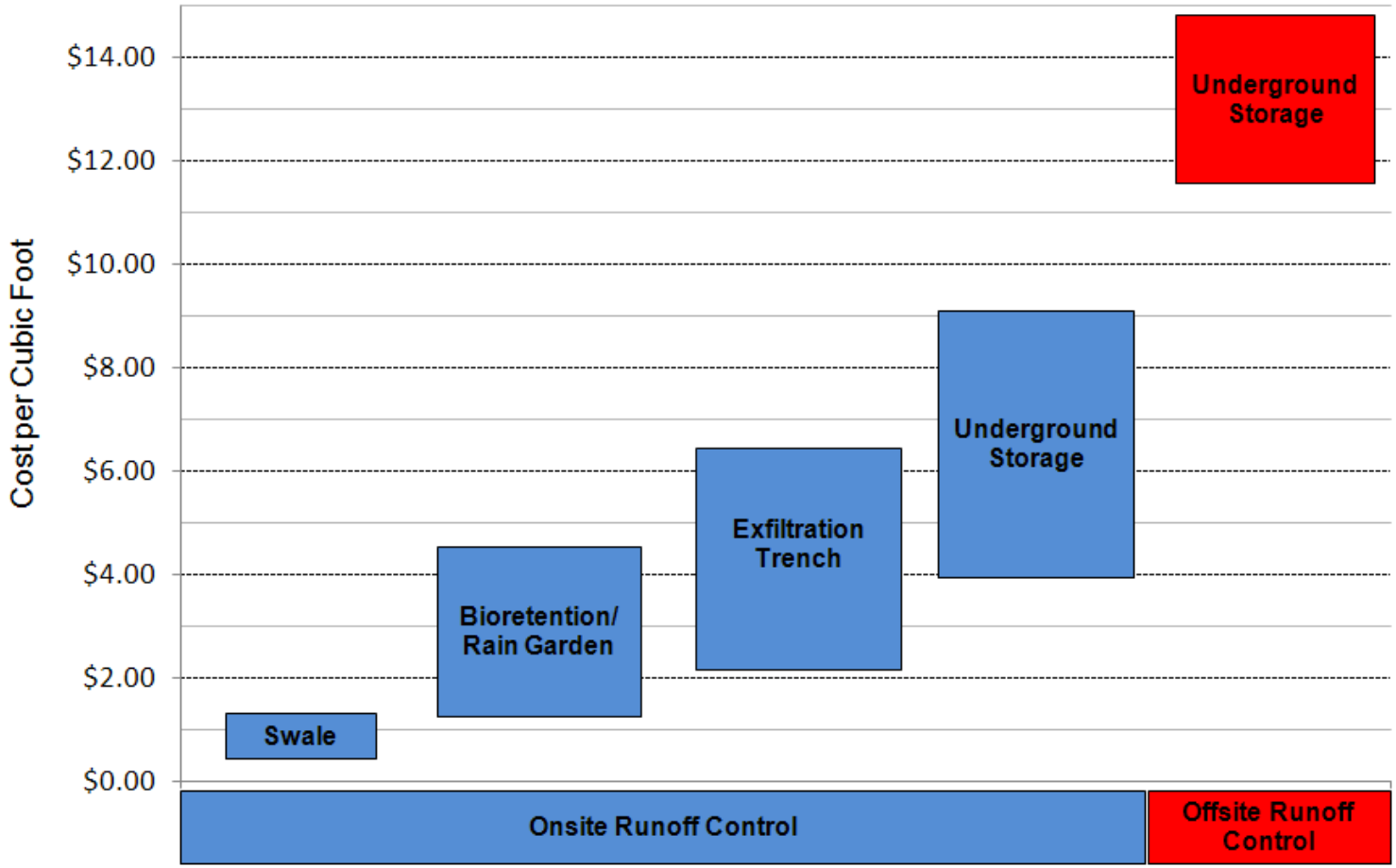
Underground Storage

- An alternative consists in excavating underground vaults/pipes that can provide runoff retention volume.

- Access required for maintenance.



Costs comparison for onsite versus offsite neighborhood-scale stormwater controls



Conceptual Cost to Meet the Current Ordinance

- Swales or yard retention are the most cost-effective controls and allow for dual use
- Based on all parcels applying the same BMP type

	Swale/ Retention	Bioretention	Exfiltration Trench	Underground Vault	Offsite Underground Vault
Test Area Total Cost	$18,300	$144,100	$210,700	$352,500	$673,000
Ratio	36.8	4.7	3.2	1.9	1.0
Cost per Parcel	$200	$2,900	$4,300	$7,200	$13,700
Cost/cu-ft	$0.40	$2.80	$4.10	$6.80	$13.10

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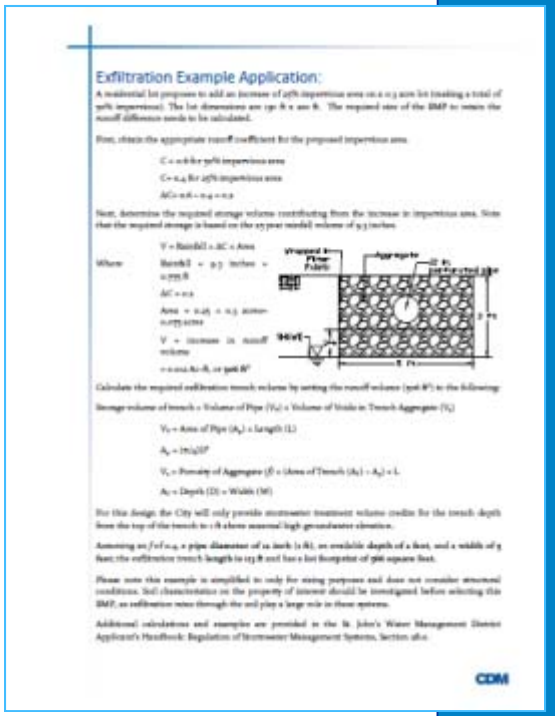
The City has available information for residents to guide their selection of the appropriate BMP

Evaluation of Low Impact Development Best Management Practices (BMPs)



Buffers can also provide privacy and aesthetic value along with their stormwater function

Summary

- Benefits of controlling runoff at its source:
  - Reduction of operation and maintenance, and
  - Reduction of complexity associated with underground storage, control structures, and piping
- CDM Smith evaluated a test area and confirmed that the most cost effective method to control runoff is at its source
- Cities interested in implementing low impact development practices and reducing operation and maintenance should consider onsite runoff retention.