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ENVIRONMENTAL

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CIVIL /
LAND
DEVELOPMENT

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WATER
RESOURCES

Low Impact Development and Water Quality Improvement

Presented by:

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Ken Watson, Ph.D, C.P.H.

July 8, 2015

- **Definition of Low Impact Development (LID)**
- **LID BMPs**
- **Case Study: Rogers Park LID Project**
- **Expedited Permitting**

What Is LID?

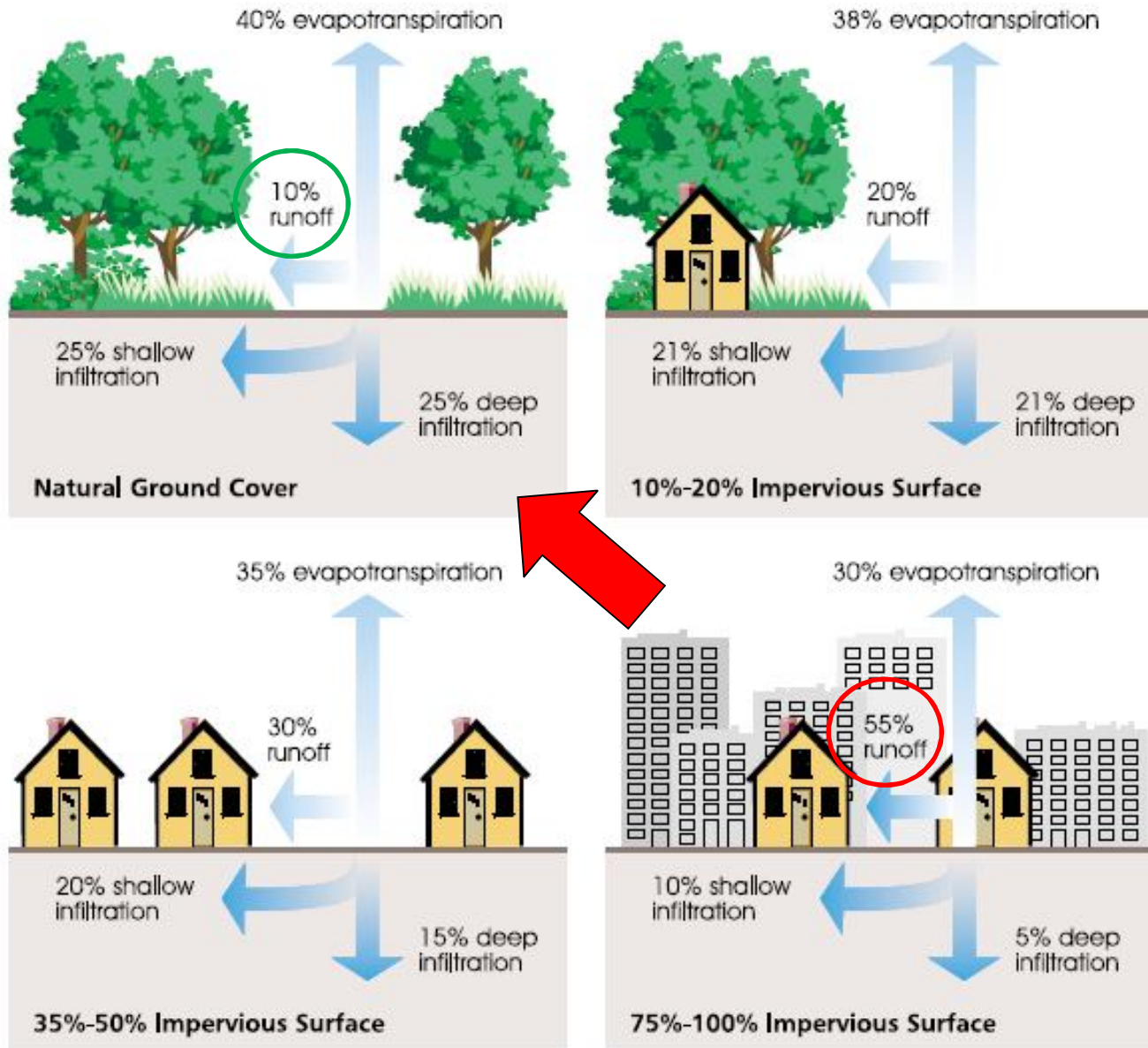
- LID is the practice of **minimizing** environmental **impact** and creating a stormwater plan that **mimics pre-development** hydrology.
- Stormwater Management Best Management Practices (BMPs):
 - Non-Structural
 - Structural

What Is LID?

**STORMWATER MANAGEMENT
BEST MANAGEMENT PRACTICES
MINIMIZING ENVIRONMENTAL IMPACT**
(also known as)
**Conservation Site Design
Sustainable Site Development
Sustainable Urban Drainage Systems (SUDS)
Green Infrastructure**

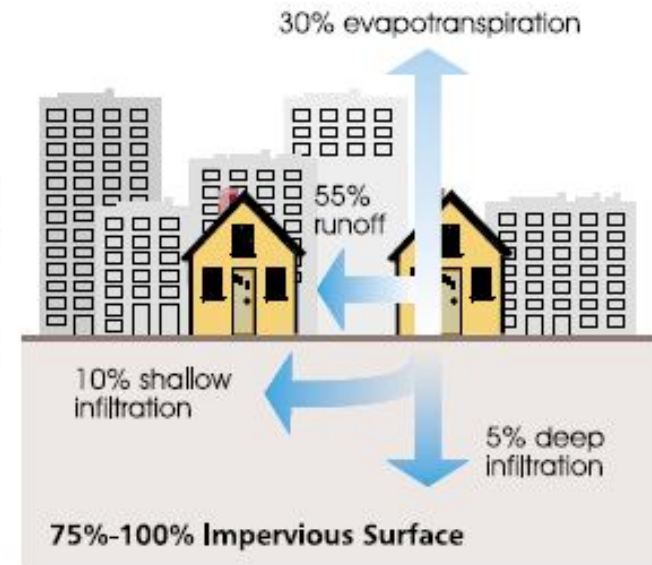
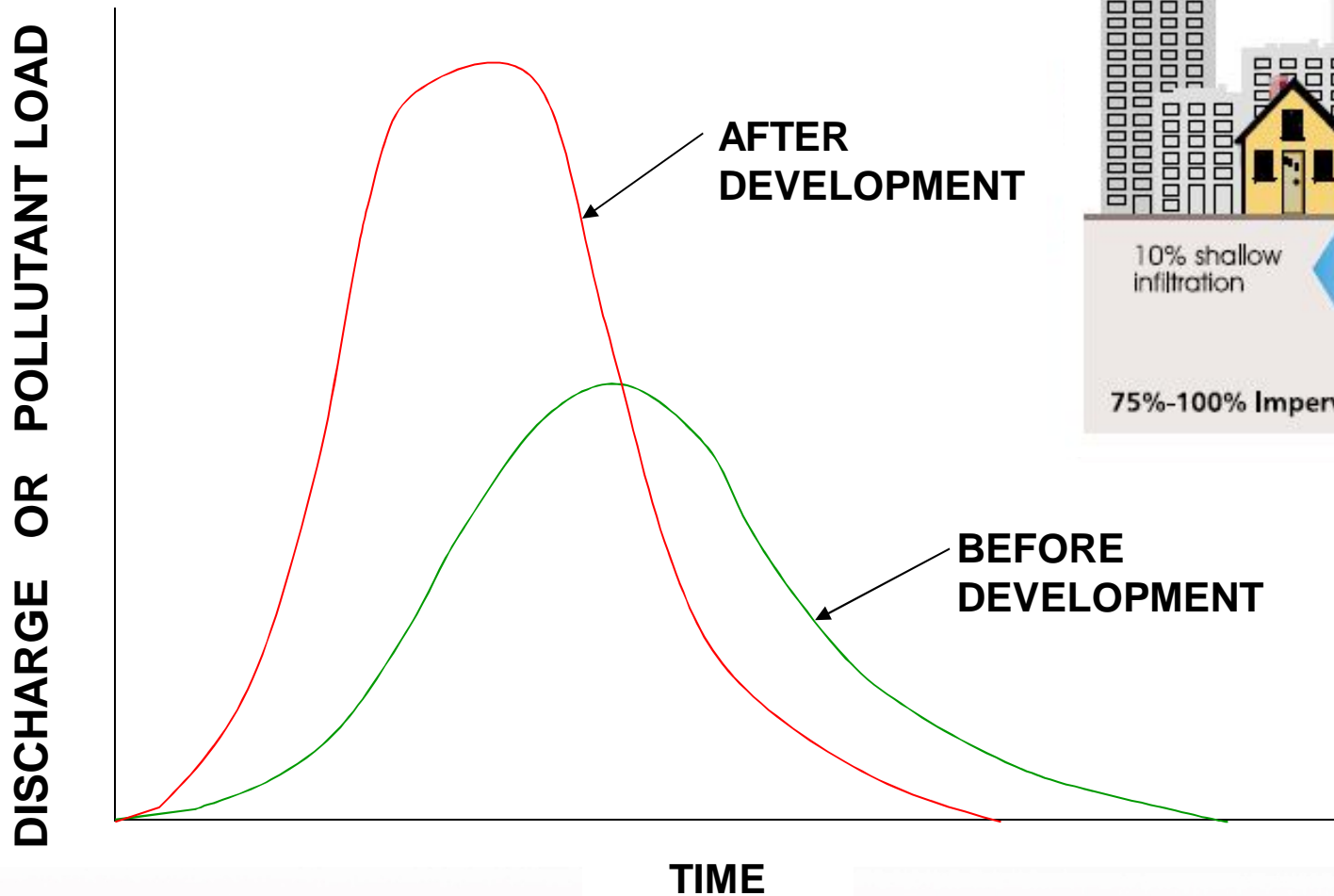


Low Impact Development Goal



Development Impacts

Industrial Development – 10x's More!



LID BMPs – Non-Structural BMPs



- Protect Sensitive Areas
- Cluster Development
- Reduce Imperviousness
- Stormwater Disconnection
- Minimize Disturbance and Compaction
- Protect Flow Pathways

LID BMPs – Structural BMPs

- Bioretention/Bioinfiltration Cells (Rain Gardens)
- Planter Boxes
- Vegetated Swales and Bioswales
- Detention Basins, Enhanced/Naturalized Stormwater Ponds, and Wetlands
- Native Landscaping
- Exfiltration and Infiltration
- Permeable Pavement and Green Streets
- Vegetated Roofs and Walls
- Cisterns, Water Harvesting and Reuse

Case Study - Rogers Park



Rogers Park Setting



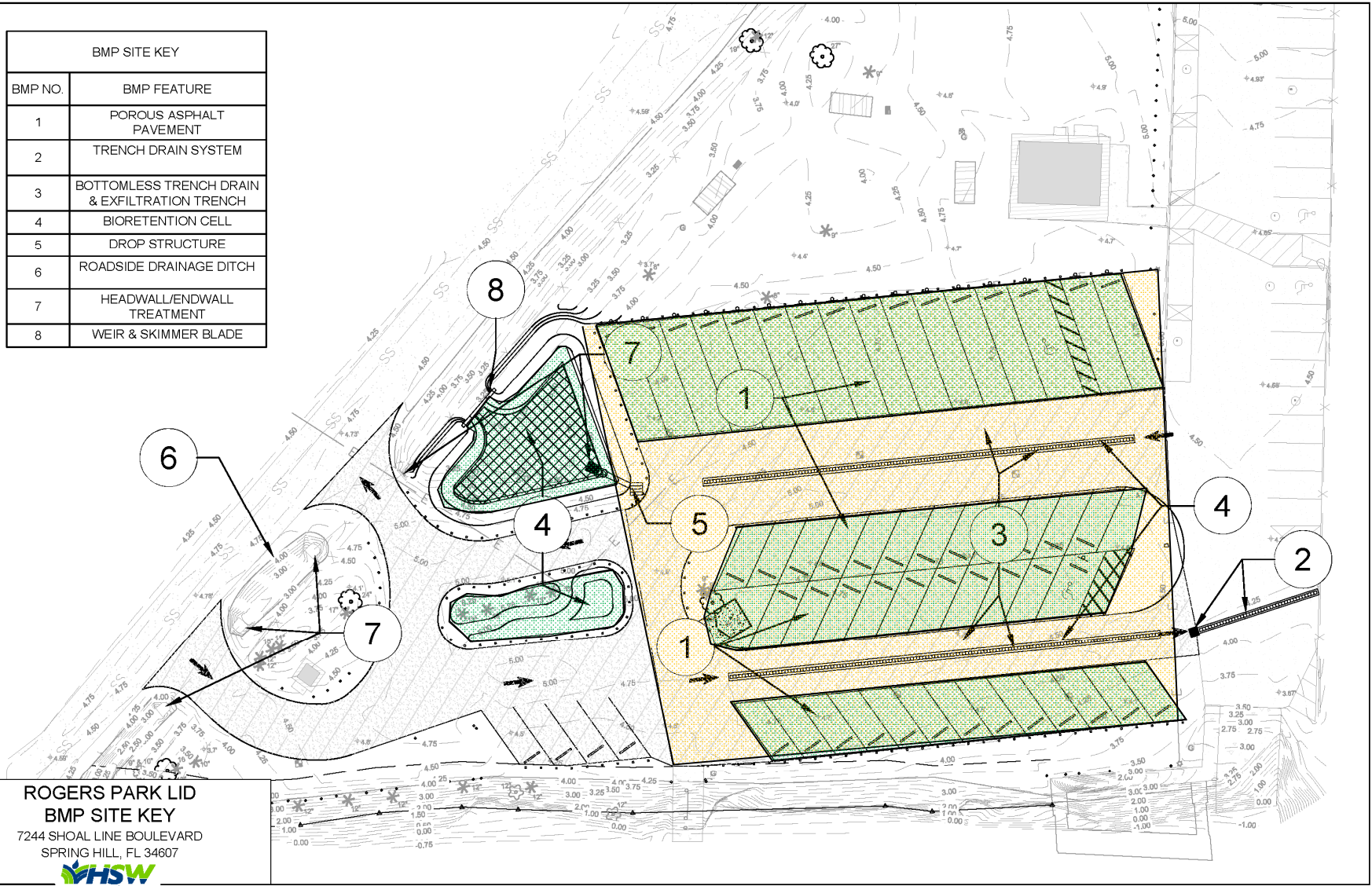
Rogers Park Site Photos



Rogers Park LID PROJECT



BMP SITE KEY	
BMP NO.	BMP FEATURE
1	POROUS ASPHALT PAVEMENT
2	TRENCH DRAIN SYSTEM
3	BOTTOMLESS TRENCH DRAIN & EXFILTRATION TRENCH
4	BIORETENTION CELL
5	DROP STRUCTURE
6	ROADSIDE DRAINAGE DITCH
7	HEADWALL/ENDWALL TREATMENT
8	WEIR & SKIMMER BLADE



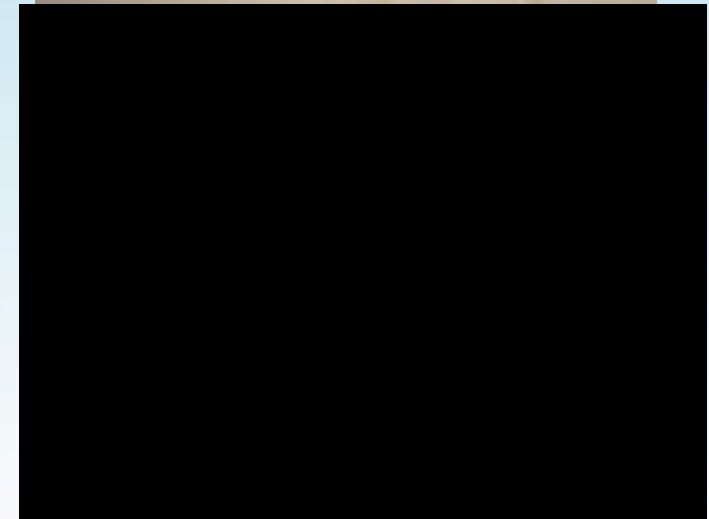
ROGERS PARK LID
 BMP SITE KEY
 7244 SHOAL LINE BOULEVARD
 SPRING HILL, FL 34607



Parking Area – Source Removal

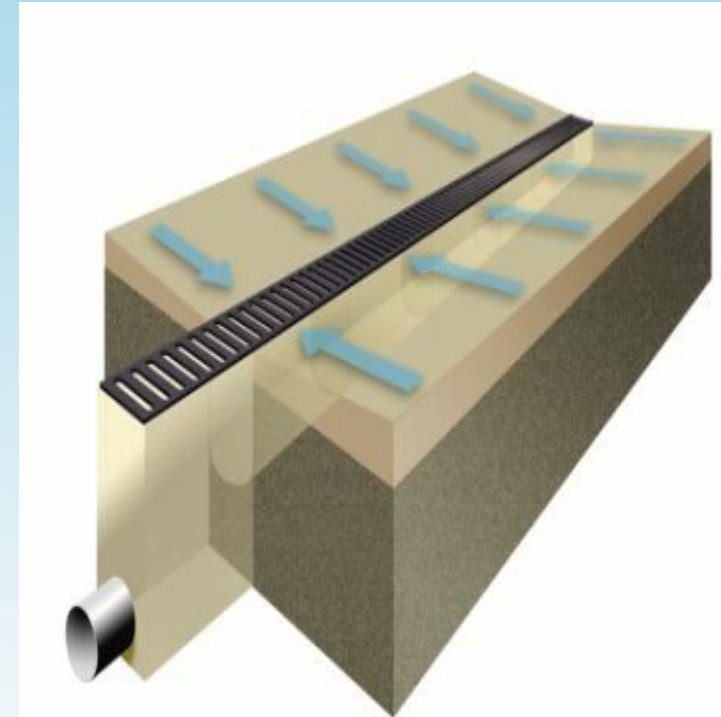


**DIRECTLY CONNECTED
IMPERVIOUS AREA**

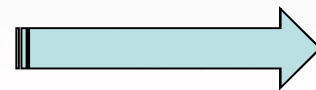


**MULTI-COMPONENT
EXFILTRATION SYSTEM**

Parking Area – Enhanced Infiltration

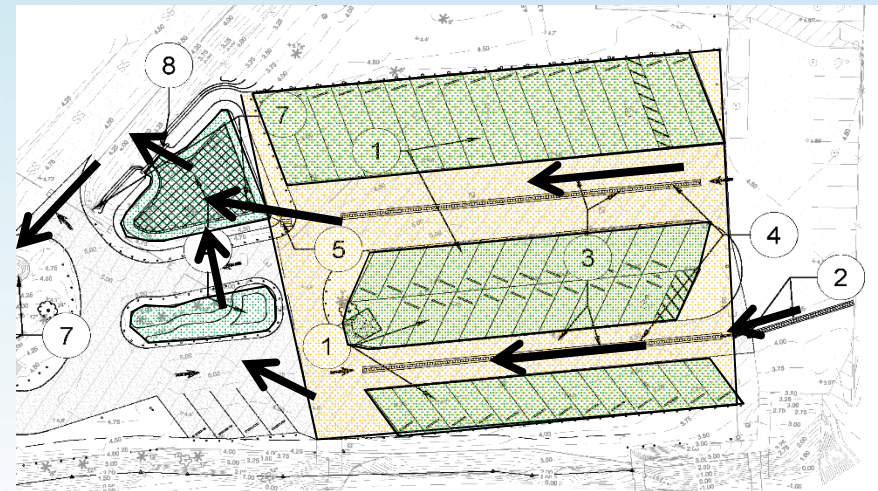
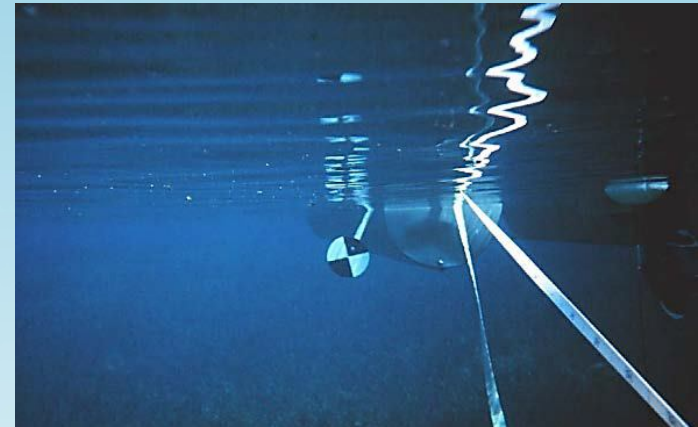
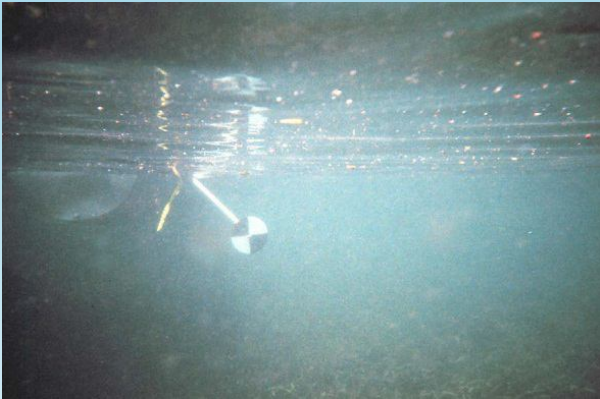


**DIRECTLY CONNECTED
IMPERVIOUS AREA**

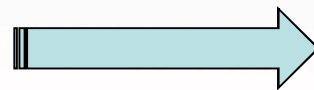


**MULTI-COMPONENT
EXFILTRATION SYSTEM** 14

Protect Sensitive Areas – WWR (OFW)



**DIRECTLY CONNECTED
IMPERVIOUS AREA**



**MULTI-COMPONENT
EXFILTRATION SYSTEM**

Bio Cell

**DIRECTLY CONNECTED
IMPERVIOUS AREA**



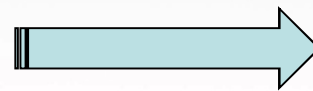
**MULTI-COMPONENT
EXFILTRATION SYSTEM**



Boat Ramp

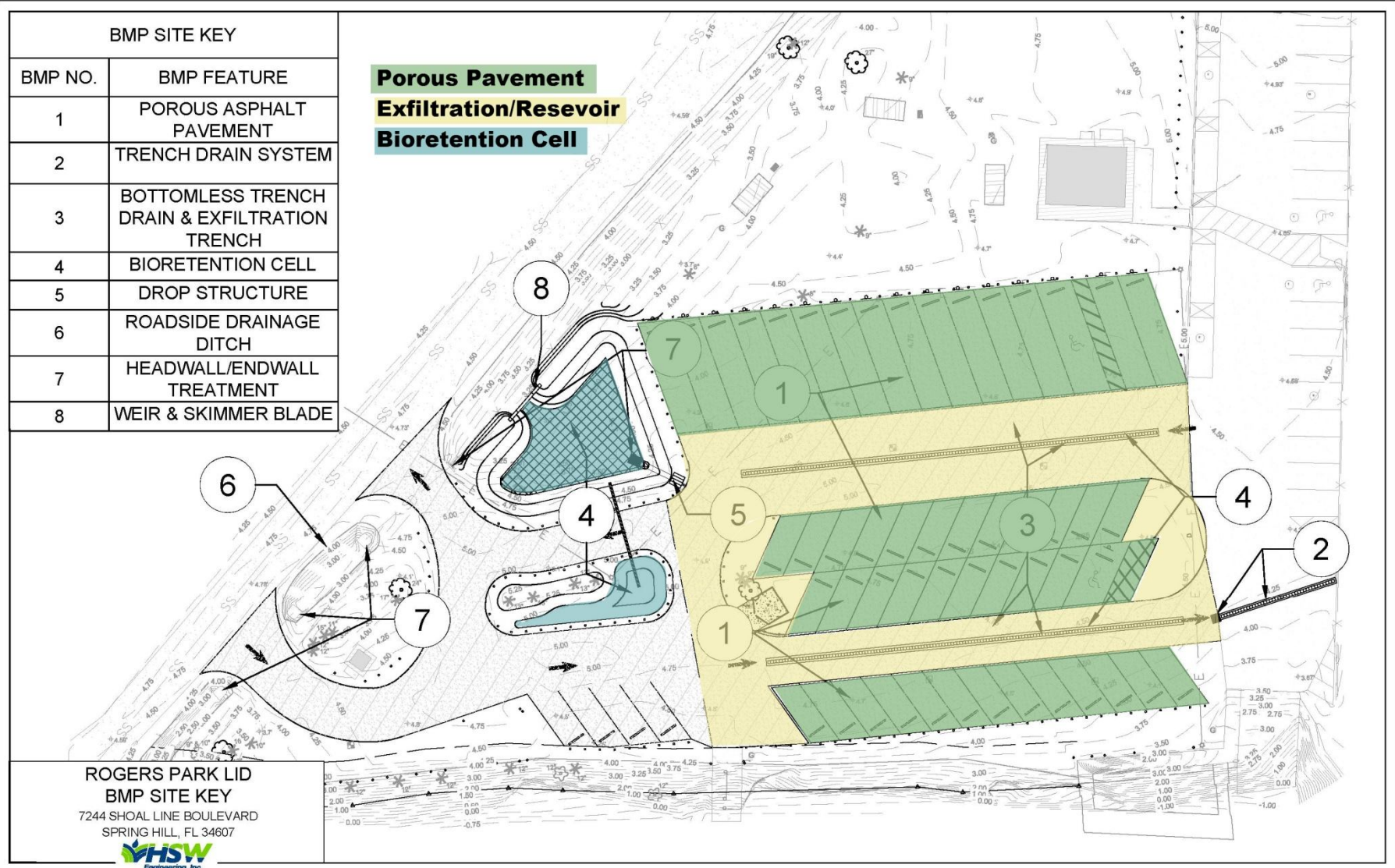


**DIRECTLY CONNECTED
IMPERVIOUS AREA**

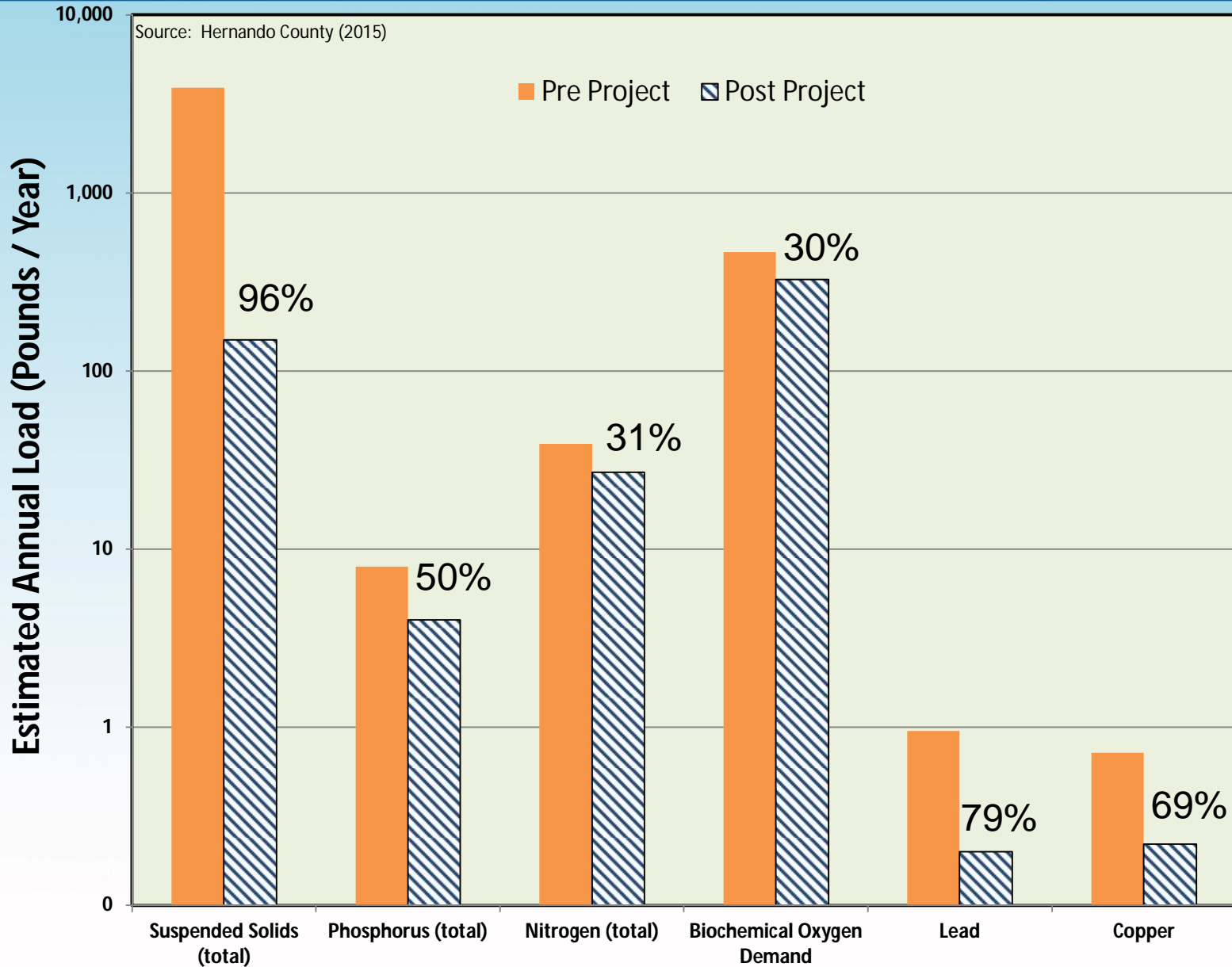


**MULTI-COMPONENT
EXFILTRATION SYSTEM** 17

Rogers Park LID PROJECT



Load Reduction





- **Individual ERP – slow process**
- **Expedited by a “10/2” Permit**
- **General Permit -- granted by Florida Statute 403-814(12)**
- **For construction of stormwater management systems that meet certain criteria**

What Qualifies for a 10-2 permit?



**CONVEYANCES
< 24" dia.**



**NO WETLAND OR SURFACE
WATER IMPACT**

10/2 Permit Saves You Time

**SELF
CERTIFICATION**

**PROJECT
COMPLIANCE
INSPECTION**

**US ARMY
CORPS
PERMIT**

**APPLICATION
FEE**

**AGENCY
STAFF
REVIEW**

National LID Websites

- **LID Center**

<http://www.lowimpactdevelopment.org/>

- **LID Center Urban Design Tools**

<http://www.lid-stormwater.net/index.html>

- **US Environmental Protection Agency**

<http://water.epa.gov/polwaste/green/index.cfm>

- **Stormwater BMP Database**

<http://www.bmpdatabase.org/index.htm>

- **Center for Watershed Protection – Stormwater**

<http://www.cwp.org/2013-04-05-16-15-03/stormwater-management>

- **Stormwater Center**

<http://www.stormwatercenter.net/>

National LID Websites Cont.'d



- **Stormwater Management Life-Cycle Costs**

(capital and maintenance)

<http://www.werf.org/bmpcost>

- **Stormwater Management Life-Cycle Costs**

(land, capital, engineering, administration, maintenance, and replacement)

http://www.udfcd.org/downloads/software/BMP-REALCOST_v1.0.zip

- **Green Values Calculator**

(compare LID to conventional costs)

<http://greenvalues.cnt.org/national/calculator.php>

Florida LID Websites



- **IFAS Florida Low Impact Development**

<http://fyn.ifas.ufl.edu/lowimpactdev.htm>

- **Sarasota County Low Impact Development**

<https://www.scgov.net/WaterServices/Pages/LowImpactDevelopment.aspx>

- **Martin County Stormwater Design Toolkit**

http://www.martin.fl.us/web_docs/cdd/web/xx_Stormwater_Report.pdf

Questions?

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