



# **Sustainable Storm Water Management Policies and Practices at Naval Installations**

**Khoi Nguyen, PhD, PE  
NAVFAC Atlantic Environmental Division**

**Environmental Energy Security & Sustainability  
Symposium & Exhibition**

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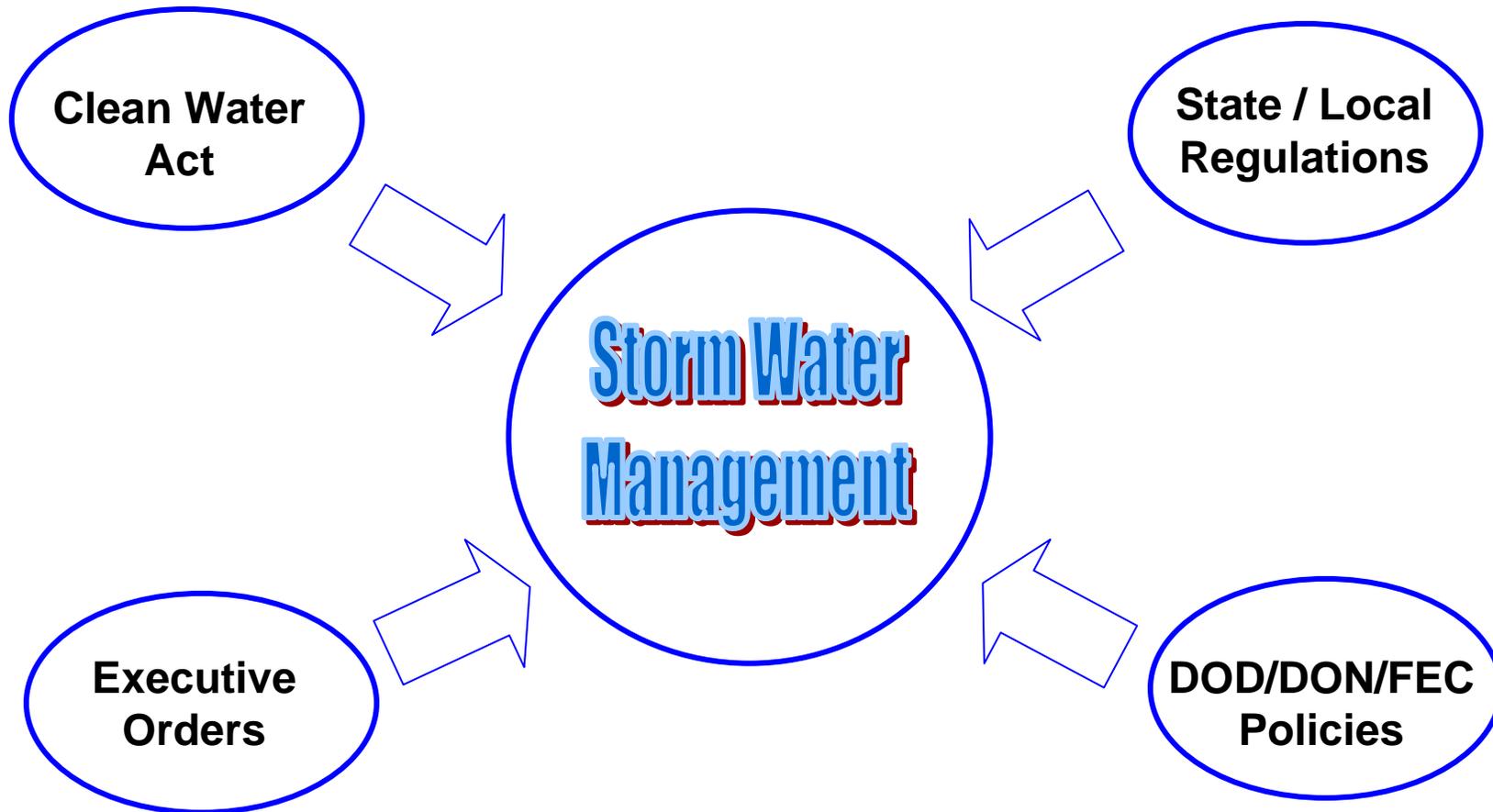
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# Presentation Overview



- Summary of storm water management (SWM) regulations and policies
- Overview of current storm water management practices
- Outlook of LID applications in the future
- Overview of areas for further development

# Storm Water Management Regulations / Policies



# Applicable Storm Water Management Regulations



- **Clean Water Act**
  - Water quality standards
  - TMDL Rule; effluent standards
  - NPDES programs (treatment works direct/indirect discharges; storm water discharges)
  - Enforcement
- **State and Local Storm Water Management Regulations**
  - Equal to or more stringent than Federal standards
  - Permitting and enforcement authority

***Most Naval installations are located in urbanized areas, subject to MS4 permitting***

# EISA of 2007 & Executive Orders



- **Energy Independence and Security Act (EISA) of 2007, Section 438 (Federal law)**
  - Applies to construction project with more than 5,000 square foot-print
  - Restores predevelopment/project hydrologic conditions (flow, volume, rate, and temperature) – mostly through low impact development (LID) technologies
  
- **EO 13423 (2007) Strengthening Federal Environmental, Energy, and Transportation Management**
  - Requires water consumption reduction (among other environmental-related requirements)
  - Implementation period: FY10 - FY15
  
- **EO 13514 (2009) Federal Leadership in Environmental, Energy, Economic Performance**
  - Enhances EO 13423 by extending implementation period (FY15 – FY30)
  - Enhances implementation of EISA Section 438 on storm water management
  
- **EO 13508 (2009) Chesapeake Bay Protection and Restoration**
  - Focuses on storm water management to restore Chesapeake Bay water quality
  - Implementation potentially serves as a model for other regions in the US

# Main Policies Related to Storm Water Management



- **Environmental Readiness Program Manual (5090.1C OPNAVINST, Oct. 2007)**
  - Pollutant reduction or elimination (using low impact development designs)
  - Watershed management
  - Pretreatment program
  
- **Nov. 2007 DON LID Policy for Storm Water Management**
  - FY11 and beyond
  - \$750K new construction; \$5 Million renovation
  - Waiver option
  - Annual reporting
  
- **Jan. 2010 DoD Policy for EISA Section 438 Implementation**
  - Restoration of pre-development (pre-project) hydrologic conditions (temp, rate, volume, duration)
  - Use of TR-55 Method or 95<sup>th</sup> percentile storm data
  - Application of LID to the maximum extent technically feasible
  - Documentation of cost data and post-construction analysis as-built system effectiveness
  
- **LID UFC 3-210-01 (being finalized)**
  
- **LEED Silver Certification**
  - Control of peak storm water discharges and 90% avg annual rainfall
  - Regulation of peak discharge of 1yr/2yr storm events

# A Historical Perspective on SWM Regulations and Policies



**Pre-1990**

**1990**

**2000**

**Late 2000s**

**Beyond 2010**



**FOCUSES**

Point Source Discharge Regulations

Flood, erosion control (70s)

Water quality control (80s)

Phase I MS4 storm water (non-point source) discharge regulations (> 5 ac)

Phase II MS4 storm water discharge regulations (1-5 ac)  
Low impact development approach

Sustainability regulations / policies:  
EISA 2007; OPNAVINST 5090.1C; DON LID Policy; EOs 13423, 13514, 13508;

Sustainability implementation, including DoD Policy for EISA Sec. 438 Implementation

# Traditional vs. New Storm Water Management Approaches



## • TRADITIONAL

- Pipe and pond centralized systems
- Remove storm water off-site
- Flood control, erosion control
- Inadequate water quality control
- Less environmental friendly

## • LOW IMPACT DEVELOPMENT

- Localized systems
- Minimize runoff pollutants by holding, reusing, infiltrating storm water on site
- Expected to improve water quality control
- More environmental friendly

***Existing traditional systems still needed to be maintained. Flood control still required by state and local agencies.***

# FY08-09 LID Applications



<b>LID FEATURES</b>	<b>FY08</b>	<b>FY09</b>
<b>Grassed swales</b>	<b>19</b>	<b>12</b>
<b>Vegetated buffers/filter strips</b>	<b>5</b>	<b>7</b>
<b>Infiltration basins/trenches</b>	<b>2</b>	<b>3</b>
<b>Bioretention</b>	<b>4</b>	
<b>Tree box filters</b>	<b>1</b>	
<b>Soil amendments</b>		<b>3</b>
<b>Permeable pavers</b>	<b>3</b>	<b>2</b>
<b>Inlet poll. removal devices/dry wells</b>	<b>2</b>	<b>2</b>
<b>Vegetated roofs</b>	<b>1</b>	
<b>% of projects with LID features</b>	<b>25%</b>	<b>54%</b>

Ref.: Annual LID Reports from NAVFAC HQ

# LID Project Example - NSN



## Existing Conditions at Site Z-312



## Site Z-312 Completed Construction



After



# LID Projects - NSN



Existing Conditions  
at Site LP-33



**Finished Conditions**

# LID Project Example - NSN



Unknown  
Utility



## Example LID Projects - WNY



# LID Project Example - Annapolis



# LID Project Example - NSN



# LID Project Example - WNY



# Outlook of Storm Water Management Practices



- **Navy LID Policy – LID included in for FY11 major construction/renovation projects**
- **DoD Policy for EISA Section 438 implementation expected in FY12 construction projects**
- **Storm water management part of multi-disciplinary efforts (planning, acquisition, design, construction, O&M, and asset management)**
- **A holistic approach - storm water management part of multi-purpose approached in sustainable development (related to water conservation/reuse/recycle, energy reduction, reduced carbon footprint, LEED certification, EMS, and compliance) while maintaining flood control conditions**

# Areas for Further Development



- **Site Characterization and Planning**

- Characterization of hydrologic conditions of regions and installations (e.g., through additional sampling and mathematical modeling)
- Comprehensive master planning using a holistic approach to achieve goals set by the DoD Policy for EISA Section 438 Implementation
- Development of better cost data

- **Design and Construction**

- Design facilities to meet applicable requirements in Federal, state, and local standards while achieving the goals set by the DoD Policy for EISA Sec. 438 Implementation and LID policies
- Expertise in applications of LID and new storm water treatment technologies in meeting water quality standards and demonstrating sustainability practices
- Improved QA/QC in construction of LID facilities

# Areas for Further Development



- **Operation & Maintenance**

- **Operation and maintenance of LID facilities**
- **System monitoring, inspection, testing, and evaluation**
- **Generation of life-cycle cost data for LID facilities and storm water systems**

# QUESTIONS?

