

Naval Facilities Engineering Command

Low Impact Development- Future Design and Construction Requirements

Mr. Leonard Harrell, PE
Civil Engineer, NAVFAC Atlantic

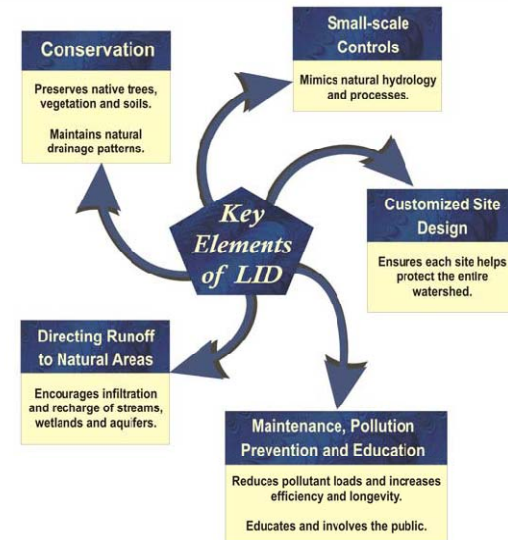
FEB 3, 2009

WHAT IS LID?



Low Impact Development (LID)

- A set of approaches and practices that are designed to retain or reduce runoff of storm water and pollutants from developed sites through infiltration, evapotranspiration, and reuse of rainwater.
- Rather than collecting runoff in piped or channelized networks and controlling the flow downstream in a larger storm water management facility, LID incorporates a set of overall site design strategies as well as highly localized, small scale, decentralized source control techniques known as Integrated Management Practices (IMPs) including:
 - Bioretention/Biofilters
 - Dry Wells
 - Filter Strips
 - Grassed Swales
 - Infiltration Trenches
 - Inlet Pollution Removal Devices
 - Permeable Pavement
 - Permeable Pavers
 - Rain Barrels and Cisterns
 - Soil Amendments
 - Tree Box Filters
 - Vegetated Buffers
 - Vegetated Roofs



WHY ARE WE DOING THIS?

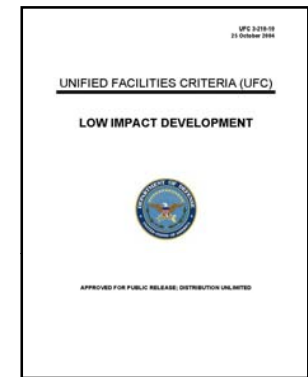


- **Pioneered in 1990's by Prince George's County w/EPA Support**
 - EPA essentially adopted requirements

- **Several pilot projects at Washington Navy Yard, Norfolk Naval Shipyard, and Naval Station Norfolk**

- **Navy developed UFC 3-210-10 “Low Impact Development” Oct 2004**
 - expands on the earlier Prince County and EPA guidance by giving additional examples and details
 - guidance document (i.e. not true criteria)

- **PENN Memo - Nov 16, 2007:**
 - **Directs that the Navy and Marine Corps:**
 - Establish a goal of no net increase in storm water volume and sediment or nutrient loading
 - Consider LID in the design all projects that have a storm water management element
 - Implement LID on FY 11 projects, make efforts to incorporate on FY 08 – FY 10 projects
 - Establish a waiver process for those situations where LID is not appropriate
 - Submit annual report summarizing how LID was implemented or waived on all projects



OTHER POLICIES RELATED TO LID



Energy Policy Act (EPAct) Public Law 109-58 (dated 2005):

500 pages+ mostly dealing with energy savings requirements

Federal Leadership in High Perf and Sustainable Bldgs MOU (dated Jan 2006):

Signed by Navy and other Federal Agencies: “Outdoor water: Employ design and construction strategies that reduce storm water runoff and polluted water runoff”

Asst Sec of the Navy (Installations and Env) (ASN I&E) memo (dated Aug 2006):

Requires Navy and Marine Corps to meet EPAct Aug 2005 and supports achieving at least LEED Silver

Energy Independence and Security Act (dated 2007)

Broad reaching policy on energy and related issues. Federal projects exceeding 5,000 sq ft to maintain to the maximum extent technically feasible the predevelopment hydrology with regard to temperature, rate, volume, and duration of flow

State and Local

Storm water management and permitting policies/regulations vary state-state and county-county

NAVFAC Engineering & Construction Bulletin (dated 12 Dec 2007)

EPAct & LEED Requirements integrated into facility design – FY09 Projects



NAVFAC Engineering & Construction Bulletin (12 Dec 2007) provides strategies for obtaining LEED Silver (to meet ASN I&E Memo of Aug 2006) and identifies required 20 – 22 credit points, including these two credit points related to LID:

- **SS Credit 6.1 Stormwater QUANTITY Control: Requires post discharge to be proportionally less than pre developed levels.**
- **SS Credit 6.2 Stormwater Design QUALITY Control: Limit disruption and pollution of natural water flows by managing stormwater runoff quality**

Relationship between LID and LEED

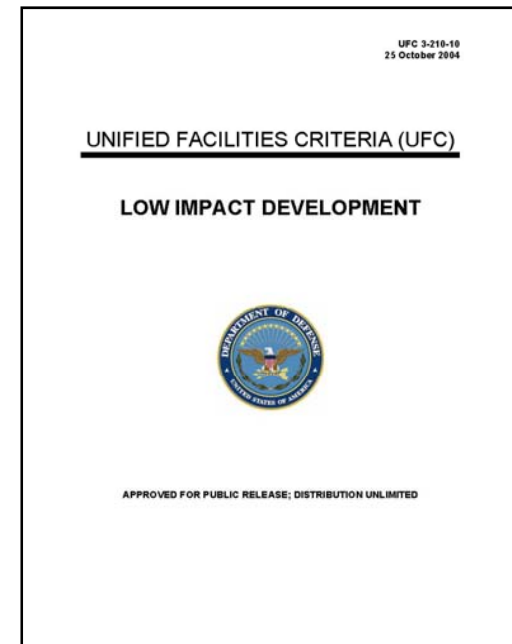
- **LID features can be used achieve to these credits, but they are not required – other methods and techniques can be used**
- **Conversely, LID can be incorporated and not meet LEED Sustainable Site requirements (SS 6.1 and SS 6.2)**

What is a UFC?



Unified Facilities Criteria - UFC

- Criteria that is uniformly applicable to the NAVY or DOD .
- It does not repeat criteria available in Commercial Standards and references commercial standards where applicable.
- A UFC is not a design manual.
- Based on accepted Tri-Service format.



LID IMPLEMENTATION IS COMPLEX



- **Competing Design Interests:** LID, LEED, ATFP requirements, and federal, state, and local jurisdictional permitting requirements have a dynamic and complex interrelationship
- **LID feature choices are site specific:** Topography, land use, soil characteristics, and weather conditions have significant impact on implementation.
- **LID and LEED goals will be separate in the design analysis, but interrelated.**
- **Commercial Standards:** The Navy must evaluate and determine to what extent Navy/DOD policy will use or exceed existing regulatory and permitting policies.
- **Navy-wide/Local requirements:** In addition to overarching guidelines, the Navy will need regional, local and/or installation requirements and practices that are acceptable to permitting agencies, cost effective, and can be successfully monitored by PWD's
- **LID is not an "All or Nothing" Strategy**
 - Storm water management for quality and quantity have been part of NAVFAC MCON designs for years, including various site features (grass swales, filter strips, vegetated buffers)
 - Result will most likely remain a mix of LID and traditional features. Some degree of success will be possible on most projects

NAVFAC BUSINESS LINE IMPACT



•ASSET MANAGEMENT

- Project development and costs
- MTP3 / 1391 preparation
- Increase land use for storm water management



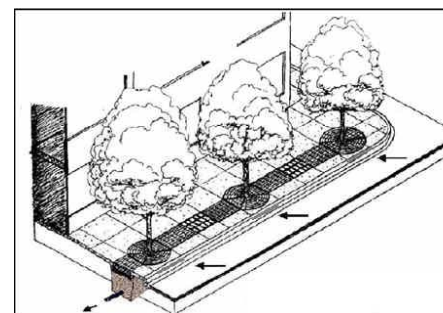
•ENVIRONMENTAL

- Permitting/Compliance
- Long term monitoring
- Waiver evaluation



•CAPITOL IMPROVEMENTS

- MTP3 / 1391 preparation
- Design features
- Waiver evaluation
- Construction surveillance



•PUBLIC WORKS

- Long term maintenance



LID COST IMPACTS



- **Capital Costs**

- Most cost effective in the suburban environment where large undeveloped sites with dedicated land and green spaces are made available as part of the development.

- Urban environment implementation has potentially greater initial and life cycle costs due to more highly engineered features, although limitations on achieved results may be incurred.

- **Long Term Maintenance**

- If not maintained, LID features, just as all storm water BMPs, will fail to provide intended quality and quantity controls, and can also lead to other problems such as flooding, creating breeding ground for mosquitoes and other pests, unsightly debris/trash collection, etc.

- Requires a commitment to resolute maintenance over the life of the facility to insure its viability and effectiveness.

- Maintenance costs are directly related to the complexity of features required and constructed.

- Not much data on long term cost in urban settings

Target Milestones



- **Develop LID program requirements, policy direction, and criteria to effect the FY11 program.**

- **Phased Approach**

- Winter 08
 - Communicate the Plan and general requirements
 - » Awareness
 - Update LEED training (on-line training) to expand on LID and future program requirements
 - Determine Regional requirements
 - » LANT/PAC/FECs
 - » Cross Business Lines (AM, EV, CI, PW)
 - Integrate Regional requirements, UFC, EPA, Penn Memo into Interim Guidance
 - **Goal: Issue interim guidance to assist with FY11 project 1391 development (early 09)**
- Summer 09
 - Update UFC incorporating Regional requirements, EPA, and Penn Memo/Policy requirements
 - » Navy/Marine Corps only
 - Publish Policy and Criteria
 - » ECB and draft UFC
 - **Goal: Issue Policy and Criteria for FY11 project design (Summer 09)**
- Fall 09
 - Update BMS, Design Build Master (DBM) templates, Performance Technical Specifications (PTS), etc.

- **Follow-on requirements**

- Tri-Service unification of criteria

Potential Problems



- **Inappropriate Use of IMP or LID feature**

- Fail to consider soil or site conditions
- Fail to adequately design and specify the IMP

- **Fail to Consider Maintenance Requirements**

- IMPs, such as permeable pavement, have specific maintenance requirements not typically found in PW inventory
- Provide maintenance schedule



Questions?