



REPLY TO  
ATTENTION OF

**DEPARTMENT OF THE ARMY**  
**OFFICE OF THE ASSISTANT SECRETARY OF THE ARMY**  
**INSTALLATIONS AND ENVIRONMENT**  
**110 ARMY PENTAGON**  
**WASHINGTON DC 20310-0110**

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Managing Stormwater with Low Impact Development

1. References.

a. Title 42, USC, Chapter 52, Section 17094, Section 438 Energy Independence and Security Act, December 2007.

b. Memorandum, Deputy Under Secretary of Defense (Installations and Environment), 19 Jan 10, subject: DoD Implementation of Storm Water Requirements under Section 438 of the Energy Independence and Security Act (EISA).

c. Memorandum, Deputy Assistant Secretary of the Army (Installations and Housing), 14 June 10, subject: Sustainable Design and Development Policy Update (Environmental and Energy Performance)

2. Requirement. Federal legislation (reference a) and DoD policy (reference b) direct the Army to manage storm water differently than we have in the past. This memo establishes new Army policy for the full implementation of low impact development (LID) techniques to restore predevelopment hydrology to the maximum extent technically feasible. This policy applies to both new and renovation construction projects regardless of size. The attached Appendix titled "Managing Stormwater with Low Impact Development" identifies LID policy requirements.

3. Applicability. To accomplish the requirements of this policy, all new construction and renovation projects that have not completed concept design prior to the issuance of this policy memorandum shall be planned and designed to incorporate LID techniques. Full compliance with LID requirements is mandatory in FY11 for all sustainment, restoration and modernization (SRM) funded projects and FY13 for all other Army construction. All Army components are directed to immediately plan, program and budget to meet the requirements of this policy.

Encl  
As

Ms. Katherine Hammock  
Assistant Secretary of the Army  
(Installations and Environment)

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## APPENDIX

### Managing Stormwater with Low Impact Development

Implementation of low impact development (LID) is the preferred methodology to meet Section 438 of the Energy Independence and Security Act (EISA), and Department of Defense (DoD) policy regarding stormwater management. Investing in and properly implementing LID techniques will provide the Army with increased sustainable solutions and help us achieve Leadership in Energy and Environmental Design (LEED) excellence.

Installation and activity commanders and their installation managers, master planners, design engineers, land users, the privatization community, tenants and construction execution team are integral to the successful implementation of LID within the Army's construction program. Effective master planning and site planning along with the use of an "integrated design" approach to project development are critical aspects of implementing this policy across Army installations. If Army installations are truly to be sustainable, we must systematically change the way we manage stormwater which requires commitment to LID principles in the installation-wide visioning and planning processes as well as implementing these principles through area development and specific site planning actions.

1. Philosophy. A primary goal of this policy is to replace typical construction practices used to manage stormwater (curb and gutter, drop inlets, storm drain pipe and retentions/detention ponds) with the use of LID techniques to include but not limited to: cisterns/rain barrels, rain gardens, bio-retention cells, soil amendments, reforestation, permeable pavement (asphalt, concrete, pavers or blocks), grass and bio-swales, green roofs and other techniques. This suite of approaches when properly implemented will maintain and/or restore pre-development hydrology and remove pollutants such as nutrients, oil and grease, and sediments from stormwater.

2. Applicability. This policy applies to all new construction and renovation projects by and for: Army Commands, Army Service Component Commands, Direct Reporting Units; Army and Air Force Exchange Service (AAFES); Defense Commissary Agency (DECA) and non-appropriated activities; Army privatization initiatives programs, e.g., utilities privatization and the residential communities initiative; and all tenant activities. At Joint Installations, the owning Service guides all construction policy. If the Navy or Air Force builds on Army installations, they will comply with this policy. Overseas Commands, installations and activities (will strive to achieve LID approaches consistent

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with applicable host nation requirements and in accordance with applicable international agreements, e.g., Status of Force Agreements).

3. Guidance. All requirements of this policy will be met using: Army implementing guidance, Low Impact Development Unified Facilities Criteria (UFC) 3-210-10N, and Environmental Protection Agency (EPA) Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act. Other professionally recognized industry standards including guidance developed by the service components should be considered if it is not available from the Army, Department of Defense (DoD) or EPA.

4. Planning. A focus on area development planning provides an opportunity to consider how we incorporate building, road and other infrastructure requirements with the need to manage stormwater.

a. Master Planning. The use of LID techniques in the management of stormwater warrants a broad holistic approach that addresses the development of watershed areas across our installations and activities. The installation master planner shall include LID considerations throughout the planning process. This includes the entire planning process from initial visioning through, definition of Installation Design Guide principles, area development planning and ultimately down to the site planning level. The Future Development Plan of the Real Property Master Plan (RPMP) identifies the siting of all development on an installation/activity. An approved site meets all comprehensive planning criteria to include the principles of sustainable design and development, including building alignment/orientation and incorporation of LID techniques. Orientation will provide for maximum energy efficiency taking into account heating ventilation and air conditioning requirements as well as water conservation including mechanical equipment condensate and stormwater harvesting in order to maintain predevelopment hydrology.

b. Site planning will be conducted by the installation master planner. Site planning includes management and execution of the planning and design charrette events and incorporates the best stormwater management practices to enhance: the preservation of natural vegetation; the disconnecting and minimizing of impervious areas; reducing longitudinal slopes of swales and ditches; use of alternative roadway layouts that minimize imperviousness; reduced road widths and drive aisles where safety considerations allow; the limitation of sidewalks to one side of roads; reduced on-street parking; the use of permeable paving materials where permitted and does not reduce the functionality; roof drains and direct drainage to vegetated areas; site development to encourage sheet flow through vegetated areas.

c. During planning and design charrette events, the installation planning team (master

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planner, design engineer, architect and environmental staff) will present the approved site from which the project will be developed. Further, the planning team will provide the LID techniques chosen to meet the planning principles the RPMP requires for consideration for all construction.

## 5. Implementation.

a. Funding. All FY11 and FY12 (non SRM funded) projects must incorporate LID techniques to the maximum extent within the programmed amount (PA). All project requests for proposals (RFP) are required to include LID techniques as bid options. All FY13 projects, and beyond, are to be scoped and priced to fully incorporate LID techniques.

b. Requirements. All construction projects will be planned, programmed, designed and constructed in accordance with local, state and Federal requirements. Low impact development techniques will be incorporated into all projects with a stormwater management requirement, be designed and constructed to meet these requirements and will be performed by professionals trained in LID implementation.

c. Studies, Initiatives and Project Documents. All installation/activity level planning studies as well as studies for new and renovation projects shall incorporate LID techniques. All LID implementation will be recorded as separate line items on DD Form 1391, Military Construction Project Data for MCA projects and on DA Form 4283 for SRM projects. Documentation will include: installation name, name of master planner, LID technique design engineer(s), project type, location address, watershed name (per state/EPA) and cost to construct. Documentation will begin at the time a LID technique is planned.

d. Site Management. Site clearing and soil grubbing will not extend more than 15 feet beyond the five (5) foot line for each respective project. Native vegetation will be maintained and replaced as necessary to ensure an appropriate vegetative cover is provided. These limits [15 feet beyond the five (5) foot line] are not to impede contractor requirements for storage, parking, delivery, and other specific project requirements e.g. developing clear zones for airfield construction. Projects must take into account the location of protected species, sensitive areas/habitats, and protected cultural resources sites, avoiding these areas whenever possible.

e. Renovations. All renovation projects that include an element of stormwater management is required to incorporate LID techniques as a means to manage the volume of precipitation from the installations/activities 95th percentile storm event. Incorporating LID techniques may require drain disconnects or storm sewer system reconfiguration. In some instances overflows from LID techniques may tie to existing drop inlets/storm drain pipes.

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f. Stormwater Harvesting. Stormwater harvesting will be incorporated into all planning, budgeting and design activities to support irrigation requirements and provide source water to flush water closets/toilets. Additional consideration may be given to water storage for emergency fire fighting water. Projects in geographical regions susceptible to extensive drought and where riparian water right restrictions are in place will be given special consideration when evaluating the requirement of stormwater harvesting. A cost benefit analysis is required for each project to demonstrate a favorable return on investment (ROI) over a 30-year period. The ROI calculations and supporting analysis must include annual rainfall data.

g. Retention/Detention Ponds. The Army strongly discourages the use of ponds as a means to manage the flow of stormwater. Planners and designers are to develop alternative solutions in place of pond systems that use considerable buildable real estate. Storage may be supported using cisterns and large pipe networks buried under parking lots and other non buildable areas. Site conditions of these storage areas including elevations and soil conditions may dictate pumping and other maintenance cost burdens to be included in garrison O&M requirements. Underground storage in parking and drive areas accessible to tactical vehicles i.e. Striker, MRAP and tanks, etc. must be given special consideration during scoping, budgeting and project design. Retention ponds may be considered where they are designed for and made accessible to soldiers for recreational use such as fishing and managed by the installation/activity MWR and DPW.

h. Stormwater Modeling.

(1) Practical Application. In all instances LID techniques are to meet local, state and federal requirements and will be incorporated into projects in an attempt to restore the site to predevelopment hydrological conditions. As a general rule EISA compliance may be determined by calculating the quantity of stormwater from the 95th percentile rain event, followed by an analysis of runoff based on the runoff coefficients for the different type of site surfaces. The total runoff amount is calculated and used as a base line quantity which is to be managed onsite. Each planned LID technique is modeled to determine its ability to manage an amount of runoff. The effect each LID technique has on the runoff quantity is cumulative in its ability to infiltrate/evapo-transpire/capture, etc.

(2) Watershed Approach. The modeling of LID techniques will be required during and in support of planning and design charrette events. Modeling will be used to determine the impact of the planned project construction and results will be incorporated into the designated development area as cited in the installation master plan. To restore a site to predevelopment hydrological conditions an installation/activity may need to consider a broad area/community or development approach. Project success may involve the cumulative effect of techniques/initiatives, as single techniques by

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themselves may not be capable of restoring the site to predevelopment hydrologic conditions.

i. Exemptions. Planners and designers will engineer stormwater solutions into parts of projects that have a potential to contribute to environmental contamination if using typical LID techniques. As an example, LID techniques will not be implemented in areas where end user activities would include: POL offloading and fueling, hazmat/waste loading/unloading, tactical vehicle/equipment parking, etc. Instead stormwater will be managed or diverted in such a way that any spills will not adversely impact on the environment. In order to ensure integrity of the environment an exemption to incorporating LID will apply to these specialized areas.

j. Waivers. Maintaining or restoring pre-development hydrology using LID may not be feasible for certain projects. Waivers from the requirement to implement LID, including construction of ponds, shall be obtained from each respective command. For the Installation Management Command the Region Director maintains waiver authority. Waiver approval authority for the US Army Reserves and Army National Guard remains at the headquarters level. The waiver is used to demonstrate LID is not practical and is required to be supported by the following documentation: Installation/activity name, name of master planner, LID design engineer(s), type of project considered, site location and watershed name (per state/EPA), engineering calculations, geologic reports, hydrologic analyses and site maps. All data will be developed and maintained for review.

k. Annual Reporting. Annually, installations and activities will report through their chain of command to OACSIM the following data related to LID project work implemented or waived: installation/activity name, name of master planner, LID design engineer(s), project type, location, watershed name (per state/EPA) and cost to complete. Installations and activities with DECA, AFFES and tenant organization projects on their grounds during the fiscal year or report will include the requested information for these projects in their respective reports. Reports will include the data elements in a spreadsheet to be provided by OACSIM in November of each year.

l. Mitigation. The construction of LID techniques may provide mitigation credits or offsets for use in meeting local, state or federal requirements related to installation/activity discharges. These LID projects may be located in previously developed or disturbed areas. As a general rule increased support is given to projects located within the same watershed.