

MESM 2007 Group Project Proposal  
**Vegetated Surfaces in the Los Angeles Basin:  
The Environmental and Economic Impact on Stormwater Runoff and Management**

*Proposer*  
Earth Pledge

*Faculty Sponsors*  
Christina Tague  
John Melack

*Statement*

Los Angeles faces a suite of extant and emergent environmental and human health challenges, for which stormwater management plays a critical role. Los Angeles has one of most challenging stormwater problems in the nation, violating the Clean Water Act and suffering from flooding, polluted waterways and beach closings. The effect of stormwater overflow creates numerous stresses on the aquatic environment and the cost of clean up, beach closures and human health impacts have implications for the economy of Los Angeles. The need to understand the nature of this challenge, and to evaluate potential mitigation and adaptation strategies, requires innovative scientific research and assessment, coupled with sound policy development, land use planning, technological innovation, and smartgrowth practices. Earth Pledge has a history of integrating innovative building design, specifically vegetative building surfaces, as part of storm water management for cities around the world. This proposal seeks to investigate the potential of using vegetative surfaces as a means of stormwater overflow reduction in Los Angeles. The proposed project will summarize the magnitude of current and potential future stormwater issues in the Los Angeles basin, and estimate the efficacy of implementing vegetated building surfaces (i.e. green roofs and vegetated walls) for stormwater mitigation. Results from this project will set the stage for adapting Earth Pledge design and evaluation tools to the semi-arid environment of Los Angeles and quantify the potential benefit of widespread implementation of vegetative surfaces for new and redevelopment projects in the city.

*Objectives*

The objectives of this study are to evaluate the environmental and economic benefit of incorporating vegetated building surfaces into stormwater management in the Los Angeles basin. The group will:

- Summarize the magnitude and current cost of stormwater overflow issues in the Los Angeles basin from an environmental and economic standpoint
- Identify and evaluate appropriate growing media and vegetation suitable for the Los Angeles region (with particular attention to plant oil content, water use, and potentially hazardous components) in order to highlight locally available materials and reduce the carbon and water footprint
- Apply the existing Smart Stormwater Tool (Earth Pledge Green Roof Stormwater Model Version 2) to estimate stormwater reduction associated with a green roof at the individual household scale. Application of the model will include a sensitivity analysis identifying the key variables to maximize the accuracy and value of the model for the Los Angeles region and will incorporate Los Angeles climate data (both historic and potential future, based on available climate change projections) as well as sewershed and GIS infrastructure and local design storm information)
- Using the Los Angeles Smart Stormwater Tool sensitivity analysis, evaluate the individual building and community wide economic and environmental impact of greening various percentages of total surface coverage of Los Angeles buildings

- Interview key stakeholders including policy makers, building owners, Green Roof Task Force members and vegetated surface industry members to assess their perspective on the potential for implementing vegetative roofing in Los Angeles
- Develop a set of incentives and policy recommendations for vegetated building surface development for the City of Los Angeles

### *Significance*

An analysis of the vegetated building surfaces' economic and environmental impact in the Los Angeles basin, as well as the application of the Los Angeles Smart Stormwater Tool to this region, would:

- Provide analysis needed to develop incentives (environmental and economic) for incorporating green roofing technology into future developments and redevelopments in Los Angeles
- Provide data needed to incorporate green roof approaches into Los Angeles stormwater best management practices guidelines
- Develop rationale for policy encouraging vegetated building surface installations for Los Angeles
- Expand the Los Angeles green roof market and industry through the identification of appropriate growing medium and vegetation and local materials

### *Background*

Earth Pledge's proposal focuses on the Los Angeles basin area because of the substantial stormwater management issues in the city, and its effect on the environment, the community and individuals. As sustainability practices are increasingly incorporated into new and redevelopment projects, vegetated building surfaces present an elegant solution to help mitigate these environmental issues.

Furthermore, as a budding industry, not only is further analysis and research needed to quantify their benefits, but these vegetated building surface applications can present job opportunity, market growth, and sustainable planning options for the City, building owners, and vegetated building surface stakeholders.

Earth Pledge has extensive knowledge within the green roof industry, and has been a front runner of the green roof movement since 2000 after installing the first green roof in New York City atop its Manhattan townhouse. Through its Green Roofs Initiative, Earth Pledge focuses on education, consulting and research of green roofs in order to accelerate their implementation in urban areas nationwide. Having developed the Earth Pledge Green Roof Stormwater Model as a tool to simulate the retention and detention capabilities of a green roof compared to a conventional roof, Earth Pledge has a template from which to develop an enhanced model for Los Angeles. Additionally, Earth Pledge's research stations in Long Island City, NY and Santa Monica, CA provide data for testing and refining the Smart Stormwater Tool.

### *Stakeholders*

- City of Los Angeles
- Environmental Affairs Department
- Los Angeles Green Roof Task Force
- Green Roof material manufacturers (growing medium/vegetation)
- LA Department of Water and Power
- Environmental organizations
- Building owners/developers

### *Possible Approach and Available Data*

#### Approach:

The proposal will examine the stormwater issues and their effect in Los Angeles from an environmental and economic standpoint utilizing modeling, data analysis and field study including interviews with stakeholders such as City officials and the LA Department of Water and Power. Additionally, using the existing Earth Pledge Green Roof Stormwater Model as a template, the Smart Stormwater Tool will incorporate GIS data for LA, as well as local climate data and design variables. An analysis of existing policy incentives for vegetated surface implementation and stormwater best management practice can provide a foundation for Los Angeles policy recommendations.

#### *Deliverables*

- Results from sensitivity analysis using the Los Angeles Smart Stormwater Tool (Earth Pledge Stormwater Model Version 2)
- A final report and presentation will provide an evaluation of the stormwater issues prevalent in Los Angeles and the potential economic and environmental impact of vegetated surfaces on these issues in the Los Angeles basin
- Policy recommendations/suggestions that could provide incentives for vegetated building surfaces

#### *References*

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- Christina Tague publications
- City of Chicago. *A Guide to Stormwater Best Management Practices*.  
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#### **Client**

Earth Pledge  
122 E. 38<sup>th</sup> Street  
New York, NY 10016

Leslie Hoffman, Executive Director  
212-725-6611 ext. 227  
[lhoffman@earthpledge.org](mailto:lhoffman@earthpledge.org)

Greg Loosvelt, Chief Operating Officer  
212-725-6611 ext.240  
[gloosvelt@earthpledge.org](mailto:gloosvelt@earthpledge.org)

#### **Anticipated Financial Needs and Sources of Support**

- Modest supervision of project in coordination with Bren students and faculty
- Possible summer internship for 3 members