



Green Infrastructure & Stormwater Management CASE STUDY

College of Marin Botanical Arboretum

Location: College of Marin, CA

Client: Professor Fernando Agudelo - Silva

Design Firm(s): MarinElement Landscape Design

Landscape architect/Project contact: Marty
Camarillo, Student Affiliate

Email: MarinElement@yahoo.com

ASLA Chapter: Northern California



Project Specifications

Project Description: The College of Marin Botanical Arboretum promotes the educational applications of sustainability through cultural applications, LEED principals, and community involvement. Located on campus near a community walking path, the site is a prime location for the promotion of sustainability.

Diversity with plant selection incorporates the cultural usage of plants for dye applications, Mediterranean climate, and educational principals such as succession and biodiversity.

Project Type:

Institutional/education

Part of a new development

Design features: Bioretention facility, rain garden, bioswale, green roof, rain barrels, porous pavers, and curb cuts.

This project was designed to meet the following specific requirements or mandates:

Local ordinance, to meet funding criteria, developer/client preference, applicable statutes and ordinances will be used

Impervious area managed: less than 5,000 sq/ft

Amount of existing green space/open space conserved or preserved for managing stormwater on site: less than 5,000 sq/ft – the project is in beginning stage with site analysis, concepts, and direction for application process.

The regulatory environment and regulator was supportive of the project.

Did the client request that other factors be considered, such as energy savings, usable green space, or property value enhancements? Client asked and was concerned about keeping in mind that "the design is around the concept of regions of California and or plant communities; Coastal Ranges, transverse ranges etc.. Demonstration areas; " Mediterranean Garden" for water use, an "Edible water efficient Garden"; "Natural dye plants". Using existing contours for the site to promote LID, sustainability, water conservation and applications.

Cost & Jobs Analysis

Estimated Cost of Stormwater Project: <\$10,000 (Public funding: Regional, local)

Related Information: Labor - Expenses covered by educational budget allowances, student participation and volunteering collaboration. Materials - Covered by educational budget allowances, on site propagation, donations. Equipment - Supplied by contracting through college administration, local contractors, and community participation.

Was a green vs. grey cost analysis performed? Yes, analyzing the projects impacts on the surrounding environmental concerns for low impact development (LID), biodiversity, and water conservation / utilization. Local materials will be used promoting green economic benefits for the local economy as well as decreasing the usage of non renewable energy sources such as petroleum products and water.

Cost impact of conserving green/open space to the overall costs of the site

design/development project: I believe our project will both preserve and conserve the important elements necessary for a sustainable design providing a long lasting benefit for the local community with less cost incorporated; following LEED principals of resource conservation and site stewardship.

With less resources needed for project completion, it is projected the project will be less costly compared to designs with more demanding time and equipment. The site will contain educational tools for the promotion of sustainability in every aspect including cost analysis and development.

Cost impact of conserving green/open space for stormwater management over traditional site design/site development approaches (grey infrastructure)? Significantly reduced costs (10% or greater savings). Projecting the project will have beneficial cost savings for the College of Marin incorporating the stormwater management principals including rain

water catchment and plant selection. Returning the rainwater collected on site through permeable surfaces and a bioretention area will significantly improve the quality of runoff; providing long term water quality benefits.

Number of jobs created: 3

Job hours devoted to project:

Planning and Design: 40

Construction: 120 estimate to date

Annual Maintenance: To be determined

Performance Measures

Stormwater reduction performance analysis:

Kentfield Average Annual Rainfall: 46.96 Kentfield Standard Deviation: 16.30 Kentfield Coefficient of Variation on this data: $16.30 / 46.96 = .35$ Stormwater reduction projected analysis can be completed after the initial design concepts are agreed upon. It is my focus as a student in Water Technology to analyze the potential water quality data once the project enters a different phase in design.

Community & economic benefits that have resulted from the project: The community and economic benefits for the site located along a walking/ bicycling path in Marin county serves as a prime example of sustainable site stewardship. Community circulation along with the educational benefits providing students it will provide is a primary focus of the project. ASLA guidelines, LEED principals and Water quality management tools serve as the projects directional values. The College of Marin is currently undergoing redevelopment both in infrastructure and presence in the community. The College of Marin Botanical Arboretum has many long term potential benefits for community leadership by creating an exciting project for generations of students, professionals and community members.

Additional Information

Links to images: <http://www.marinelement.com/>

I'm honored to have been asked by Professor Fernando Agudelo - Silva to help design and participate in the construction of the project for the College of Marin. Professor Silva has shown leadership qualities in spearheading the project. As a former student, his principles of sustainability have inspired me to do much research in the many facets of landscaping including water management and other natural resource applications such as solar, wind and geothermal. Geothermal energy is located on campus as well as solar applications for the new Arts building.

Sustainable landscaping has also been used on campus for the new Physical Education center. I'm looking forward to the project evolving into a lasting signature of smart stewardship.