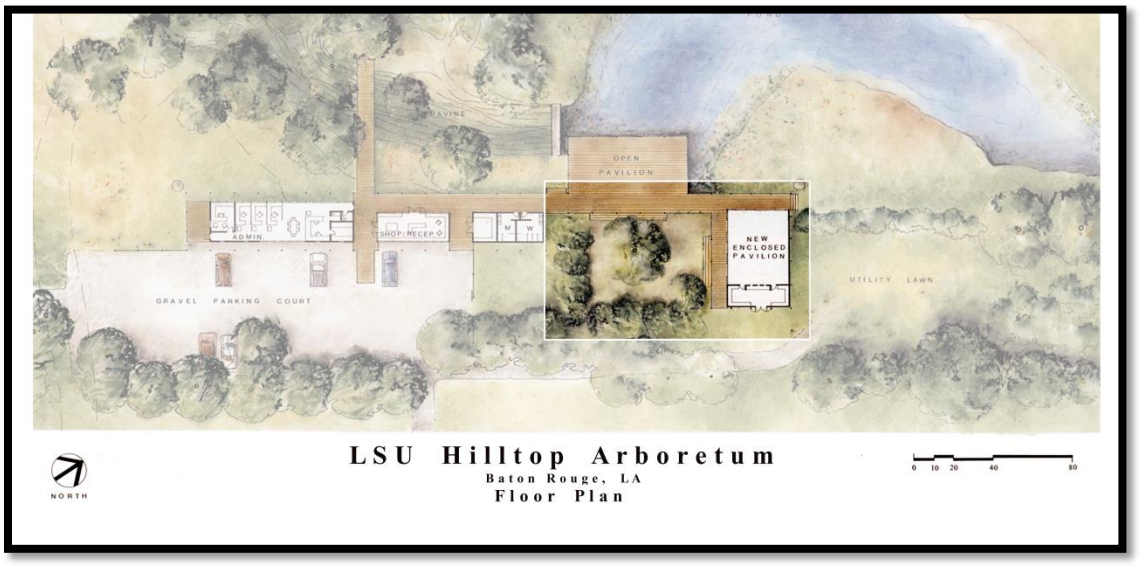
LSU Hilltop Arboretum
Case Study

Project Scope: One Story Building with Educational Courtyard
Location: LSU Hilltop Arboretum, Baton Rouge, Louisiana
Building Type: Educational Facility, Assembly for Higher Education, Hilltop Programs and Community
Exterior Features: Educational Courtyard open to the public
New Construction: Building – 1,868 S.F., Courtyard – 5,966 S. F.
Site: Suburban

LEED v2.2 Checklist: See Page 12

Imogene Newsom Education Facility

The Imogene Newsom Brown Education Facility, which includes the Beverly Brown Coates Auditorium and Bert Turner Courtyard, are on the campus of the LSU Hilltop Arboretum which consists of fourteen acres showcasing an extensive collection of Louisiana native trees and plants. The education facility and courtyard completes a campus construction master plan created and designed in 1998 by Lake Flato Architects of San Antonio, Texas. On November 27, 2007 the board of directors unanimously voted to make this last phase of the plan a LEED certified project with the goal of attaining LEED v2.2 Silver Certification.



The facility will act as an educational tool and serve as an environmental role model for Louisiana State University, organization members, and the community at large. The building itself will be an

interpretive exhibit of human interaction with nature through the use of environmentally conscious building materials and systems which strive for sustainability by minimizing imported energy and water usage.

The architectural design goals for the building include a facility that is open, airy, and inviting, allowing guests to engage with the surrounding grounds. The facility will serve as a multipurpose space, which can be used in conjunction with the courtyard and the existing Margaret Holmes Brown Pavilion. It will support multiple media formats and include a warming kitchen for in-house and contracted catering. All of the building components, including the structural and mechanical systems, will harmonize with this goal. Exterior mechanical components will be hidden from sight or carefully integrated into the structure. The design creates a healthy environment for occupants and allows for uninterrupted connectivity with the outside environment. The building structural system is designed for flexibility of interior space usage and celebration of the surrounding landscape. It will allow an abundance of daylight and fresh air. Its configuration is designed to optimize natural ventilation, with numerous windows to capture the seasonal breezes during the spring and fall seasons, when there are the most visitors to the Arboretum. Deep verandas surround the building on two sides: south and west and minimize solar thermal gain.

The heating and cooling mechanical system are as effective, healthy, and as quiet as possible and will utilize 2 high efficiency, (17.75 EER) electric heat pumps. The system exceeds ASHRAE 90.1 – 2004 Appendix G/LEED v2.2 energy requirements by at least 20%. Occupancy sensors are used to switch lights to prevent energy waste in unoccupied or lightly used spaces. A DDC (direct digital control) automated control system is utilized to control and maximize the efficiency of the building heating and cooling system. The control system is programmed to cycle the building HVAC (heating, ventilating, and air conditioning) system between occupied and unoccupied cycles. Energy is saved during unoccupied cycles by disengaging the fresh air system and offsetting the space thermostat temperature settings. The DDC control system also incorporates and coordinates other energy saving devices such as, motion sensors, occupancy cycling, and discharge temperature resetting. Given the different seating configurations of the space and the different usages envisioned by the organization, occupancy requirements and the number of visitor during events will vary. Seating arrangements will allow for small group presentations or discussions, with a maximum seating of

100 for a lecture or theater-style event. In addition to meeting all code requirements, we have sized the main electrical service components to match the needs of the building's equipment, taking advantage of smaller and more efficient systems.

Electric lighting is designed and controlled to optimize the use of natural day lighting and fixture efficiency in terms of lumens per watt. In candescent light fixtures were held to a minimum and used only where fluorescent lamps or LED fixture will not meet the requirements. Direct/indirect linear fixtures are designed to provide a low ambient light level in conjunction with task and accent lighting. Our goal was to design for a maximum lighting density of 1 watt per square foot connected and operate in the day time at 0.5 W/s.f. or less. Occupancy sensors are used to keep lights and exhaust fans off when the spaces are not occupied. These occupancy sensors have auxiliary contacts for interfacing with the HVAC control system logic to sense occupied and unoccupied modes of operation.

Interior Recycled Content and Low Emitting Products

The furniture and carpeting were specified with the intent of using recycled materials. The tables are comprised of 65% recycled materials with 7% being postconsumer and 60% pre-consumer recycled. They are also up to 29% recyclable at the end of their useful life. The chairs are comprised of 71% recycled materials, 59% postconsumer and 12% pre-consumer and 100% recyclable. The carpet system is made up of 35% pre-consumer/post-industrial and 33% post-consumer materials.

In an effort to insure the quality of the indoor environment the chairs and tables that were specified are GREENGUARD® certified low emitting products that meet current indoor air quality standards, the carpet system and backing meet CRI Green Label plus criteria which insures that the product meets their standards of low emitting contents and assembly and all adhesives, sealants, paint, and coatings are below the required limit or emit zero VOCs in to the indoor environment.

Bert Turner Courtyard

The design for the Hilltop Arboretum Courtyard draws from the regional vernacular of constructed waterways and conveyance systems to evoke a narrative of water and high and low ground that is fundamental to Louisiana culture and identity. The indigenous palette consists of

plants that are well-adapted to the region and thus require minimal irrigation. The design seeks to manage storm water in a sustainable manner while demonstrating environmental dynamics and regional ecology to Arboretum visitors. The courtyard planting is divided into horticultural zones based on the sub-ecologies of the Southern Mixed Hardwood Forest. The central court functions as an open gathering space with a grove of Pond Cypress (*Taxodium ascendens*) that plays off of the building columns and will provide a shaded gathering space for Hilltop visitors and guests of special events. To either side of the main courtyard space are sunken planting beds of mixed perennial and shrub borders. At the entrance to the courtyard from the parking area, planting beds of grasses and perennial wildflowers immerse the visitor in the flora of the native plant community. This native plant association is adapted to wetter ground and will be designed to accommodate the drainage pattern of the courtyard (See Plant List, Attachment A). The hardscape was chosen for maximum water infiltration. The limestone base used in the open gathering space, where pond cypress trees are planted, is held in place with custom stainless steel edging.

A rainwater catchment system provides non-potable water for use in landscape irrigation. Rain water from the roof of the building addition is collected in a storage cistern that becomes the main source for the courtyard's drip irrigation system. Water that falls on the central courtyard will drain to a linear rill that delivers water to a sunken planting bed that functions as a bio-retention swale, recharging the groundwater. Any excess water that is not reabsorbed into the ground is directed through a sub-drainage system into a water retention pond located directly adjacent to the courtyard.

With this focus on horticulture and hydrology, the courtyard teaches environmental dynamics and explores regional ecologies, fostering a sustainable connection between people and the land. The courtyard sustainable components include: The courtyard Sustainability Components include: native plant community, locally grown plants, bio swales, permeable materials, water harvesting and locally manufactured material.

Bert Turner Courtyard
Native Plant Palette

COURTYARD ENTRANCE

Perennial Wildflowers

Rattlesnake Masters, *Eryngium yuccifolium*
Joe Pye Weed, *Eupatorium dubium* "Little Joe"
Blazing Star, *Liatris spicata*
Barbara's Buttons, *Marshallia graminifolia*
Culver's Root, *Veronicastrum virginicum*

Grasses

Switch Grass, *Panicum virgatum* 'Cloud Nine'
Little Blue Stem, *Schizachyrium scoparium*

CENTRAL COURT

Trees

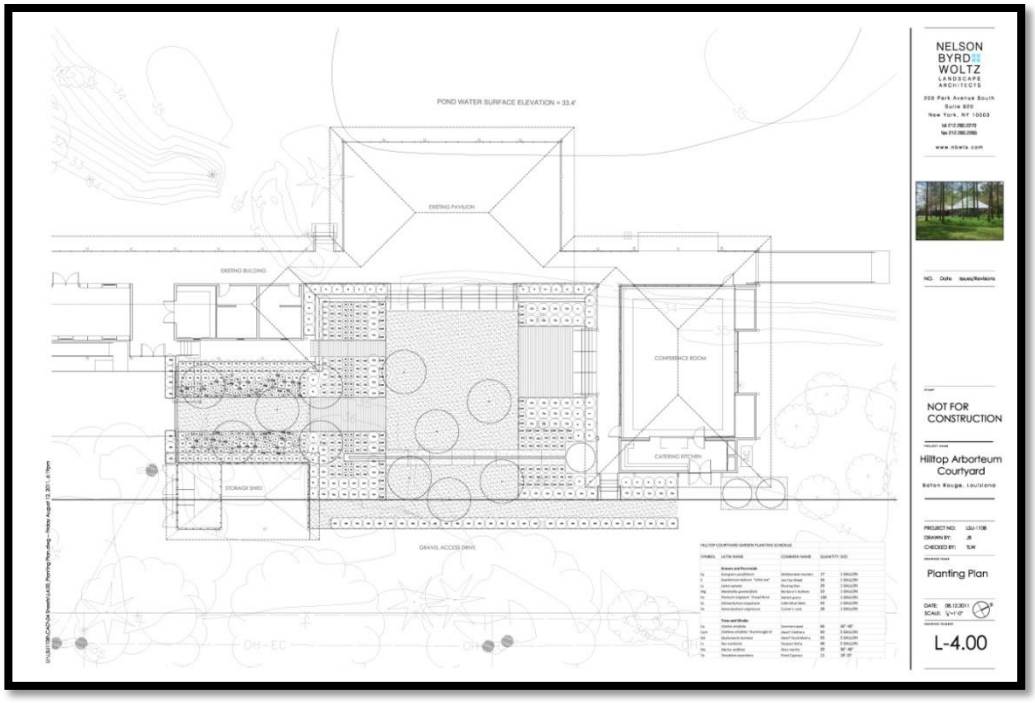
Pond Cypress, *Taxodium ascendens*

BIO SWALES

Shrubs

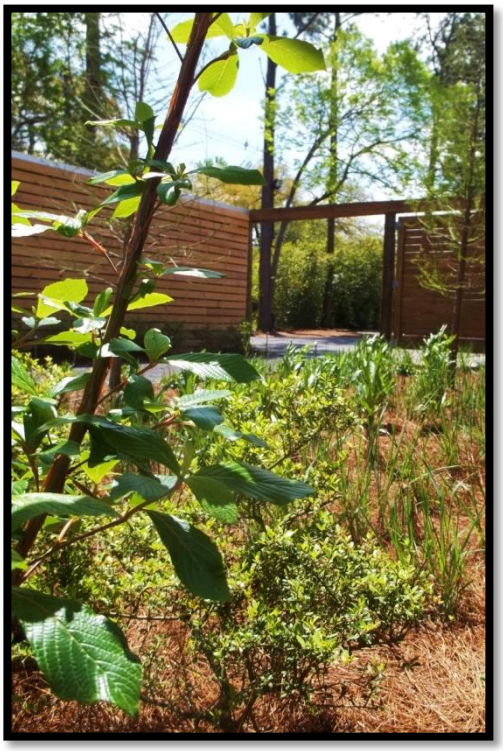
Summersweet, *Clethera alnifolia*
Dwarf Clethera, *Clethra alnifolia* 'Ruby Spice'
Dwarf Blueberry, *Vaccinium darrowii*
Yaupon Holly, *Ilex Vomitoria 'Scarlet's Peek'*
Southern Magnolia, *Magnolia grandiflora* 'Alta'

1. Courtyard Plan by Nelson, Byrd, Woltz

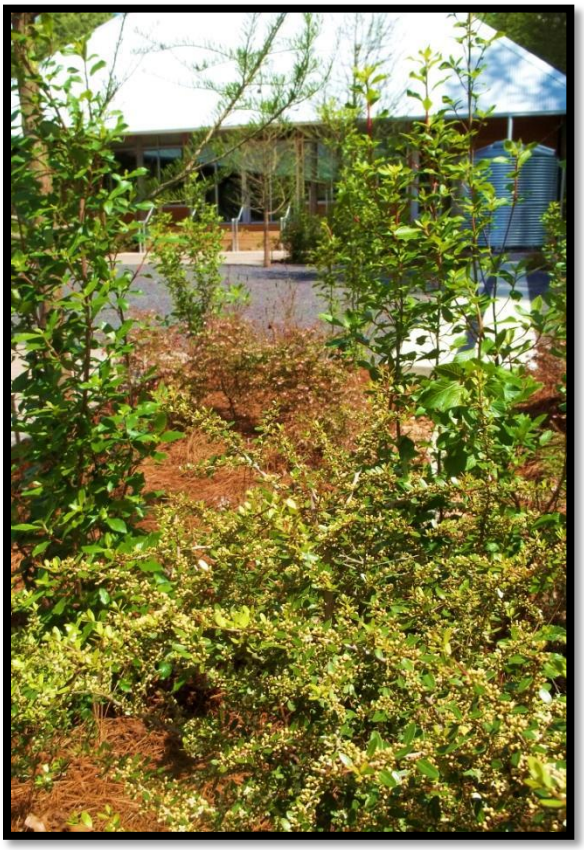


2. Courtyard at Dusk

3. Wildflowers Emerging in Spring



4. Dwarf blueberry (left), yaupon holly (right) and pond cypress (below)



5. Rows of dwarf blueberry and clethera summersweet

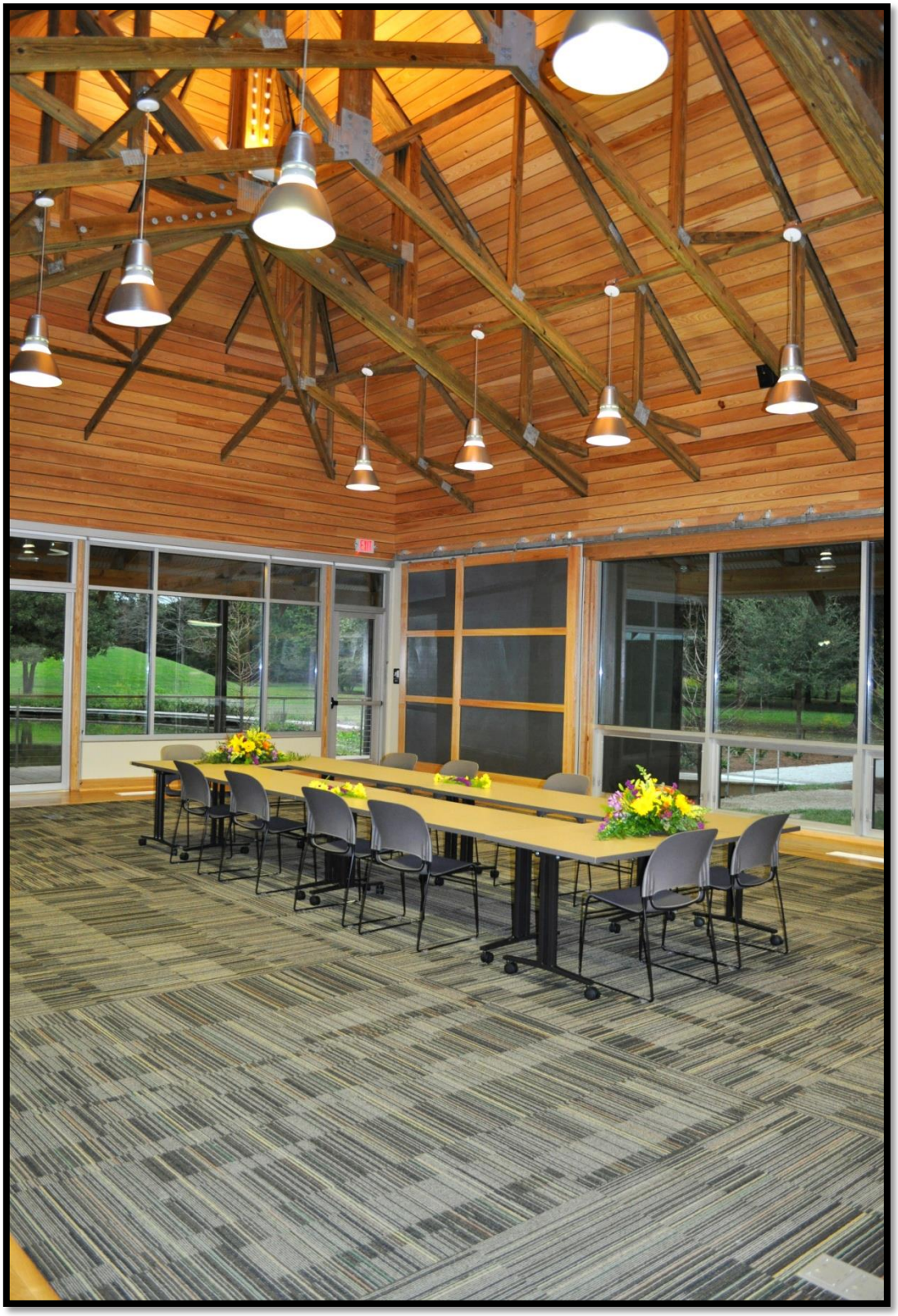
6. Imogene Newsom Brown Education Facility (left)

7. Beverly Brown Coates Auditorium and View of Pond

8. Beverly Brown Coates View of Kitchen and Courtyard

9. Interior Veiws of Nature through Windows and Transparent Blinds

10. Interior Furnishings and Carpet



LSU Hilltop Arboretum Educational Facility

LEED v2.2 Checklist

Categories	Credits	
Sustainable Sites		
Prereq 1	**Construction Activity Pollution Prevention**	-
Credit 1.0	**Site Selection**	1
Credit 4.3	**Alternate Transportation,** Low Emitting and Fuel Efficient Vehicles	1
Credit 4.4	**Alternate Transportation,** Parking Capacity	1
Credit 5.1	**Site Development,** Protect or Restore Habitat	1
Credit 5.2	**Site Development,** Maximize Open Space	1
Credit 7.1	**Heat Island Effect,** Non-Roof	1
Credit 7.2	**Heat Island Effect,** Roof	1
Credit 8.0	**Light Pollution Reduction**	1
Water Efficiency		
Credit 1.1	**Water Efficient Landscaping**, Reduce by 50%	1
Energy & Atmosphere		
Prereq 1	**Fundamental Commissioning of the Building Energy Systems**	-
Prereq 2	**Minimum Energy Performance**	-
Prereq 3	**Fundamental Refrigerant Management**	-
Credit 1.0	**Optimize Energy Performance**	5
Credit 6.0	**Green Power**	1
Materials & Resources		
Prereq 1	**Storage & Collection of Recyclables**	-
Credit 2.1	**Construction Waste Management**, Divert 50% from Disposal	1
Credit 2.2	**Construction Waste Management**, Divert 75% from Disposal	1
Credit 4.1	**Recycled Content**, 10% (post-consumer + ½ pre-consumer)	1
Credit 5.1	**Regional Materials**, 10% Extracted, Processed & Manf. Regionally	1
Credit 5.2	**Regional Materials**, 20% Extracted, Processed & Manf. Regionally	
Indoor Environmental Quality		
Prereq 1	**Minimum IAQ Performance**	-
Prereq 2	**Environmental Tobacco Smoke (ETS) Control**	-
Credit 3.1	**Construction IAQ Management Plan, During Construction**	1
Credit 4.1	**Low-Emitting Materials, Adhesives & Sealants**	1
Credit 4.2	**Low-Emitting Materials, Paints & Coatings**	1
Credit 4.3	**Low-Emitting Materials, Carpet Systems**	1
Credit 6.1	**Controllability of Systems, Lighting**	1
Credit 7.1	**Thermal Comfort, Design**	1
Credit 8.1	**Daylight & Views**, Daylight 75% of Spaces	1
Credit 8.2	**Daylight & Views**, Views for 90% of Spaces	1
Innovation & Design Process		
Credit 1.1	**Innovation in Design: Education**	1
Credit 1.2	**EQ c8.1 Exemplary Performanece Views**	1
Credit 1.3	**EA c6.0 Examplary Performance Green Power**	1
Credit 1.4	**MR c2 Exemplary Performance CWM**	1
Credit 2.0	**LEED® Accredited Professional**	1
Project Totals (precertification estimates)		**32**

Certified: 26-32 points, **Silver:** 33-38 points, **Gold:** 39-51 points, **Platinum:** 52-69 points