SITES
Journey Towards Sustainability
Case Study
Margot Taylor RLA, Land Ethics
Edgar David RLA, SED Design
An interdisciplinary effort to create national guidelines and a voluntary rating system for sustainable land design, construction and maintenance.
Guiding Principles

• Do no harm
• Use the precautionary principle
• Design with nature and culture
• Use a decision-making hierarchy of conservation, restoration and regeneration
• Provide regenerative systems as intergenerational equity
• Support a living process
• Use a systems thinking approach
• Use a collaborative and ethical approach
• Maintain integrity in leadership and research
• Instill a sense of stewardship
As of 2010, green building accounted for 25% of all new construction activity.

The green building market size is expected to reach $135 billion by 2015.

The value of green building construction starts was up 50% from 2008 to 2010 (during the recession).

Over 160,000 professionals hold LEED credentials.

“Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

Brundtland Report, Our Common Future (1987)
Benefits provided by natural systems that support our lives and are often considered “free” and not a part of conventional accounting methods.

In 1997, these were estimated to be worth $33 trillion per year (twice the global GNP).

Source: Costanza et al. 1997
Framework: *Ecosystem Services*

- Regulate global and local climate
- Detoxify and cleanse air, soil and water
- Regulate water supply
- Control erosion and retain sediment
- Provide refuge and nursery habitat / pollination services

- Decompose, treat, and re-use waste
- Provide human health and well-being benefits
- Provide food and non-food products
- Provide cultural, educational and aesthetic values
- Mitigate potential hazards

Woodland Garden Aqua-duct by SED Design

Hillside Water Garden Pool by SED Design
IMPROVED AIR + WATER QUALITY
LOWERED URBAN HEAT ISLAND EFFECTS
INCREASED SOIL HEALTH
INCREASED EVAPOTRANSPIRATION
INCREASED VEGETATIVE COVER
REDUCED RUNOFF
INCREASED INFILTRATION
IMPROVED SOIL CONDITIONS

Conservation to Regeneration through High Performance Landscapes

SITES Goals: Shift of Values

REDUCED VEGETATIVE COVER
COMPACTION OF SOIL
REDUCED INFILTRATION
INCREASED RUNOFF
DECREASED SOIL ACTIVITY
DECREASED SOIL ORGANIC MATTER
IMPAIRED WATER + AIR QUALITY

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Schedule

PROJECT TIMELINE:

Guidelines & Performance Benchmarks 2009: Released November 2009
Pilot Program: June 2010 – June 2012
Public Comment Period on Proposed 2013 Credits: Sept. 26 – Nov. 26, 2012
Open Enrollment / Education + Training: Fall 2013
Professional Credentialing Program: Anticipated in 2014
Project Applications

- parks, trails, campgrounds
- industrial & office parks
- government & medical complexes
- botanical gardens
- university campuses
- residential sites
- streetscapes & plazas

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SITES 2009 Rating System

- Measures site sustainability within the context of ecosystem services
- Applies to new construction or major renovations of existing sites
- 250 point scale
- Performance based benchmarks
- 4 levels of certification
  - Prerequisites plus:
    - ★ = 100 points (40%)
    - ★★ = 125 points (50%)
    - ★★★ = 150 points (60%)
    - ★★★★ = 200 points (80%)
- Note, this will be updated and replaced by the forthcoming 2013 Rating System
SITES 2009 Rating System: Categories

Site Selection
Preserve existing resources & repair damaged systems

Pre-Design Assessment and Planning
Plan for sustainability from the onset of the project

Site Design – Water
Protect and restore site processes and systems

Site Design – Soil and Vegetation
Protect and restore site processes and systems

Site Design – Materials Selection
Reuse/recycle & support sustainable production practices

Site Design – Human Health and Well-Being
Build communities and a sense of stewardship

Construction
Minimize effects of construction-related activities

Operations and Maintenance
Maintain the site for long-term sustainability

Monitoring and Innovation
Reward exceptional performance
Each Prerequisite and Credit includes:

- Credit Intent
- Requirements
- Submittal Documentation
- Potential Technologies and Strategies
- Links to Other Credits
- Resources
Select locations to preserve existing resources and repair damaged systems

**Prerequisite 1.1:** Limit development of soils designated as prime farmland, unique farmland, and farmland of statewide importance

**Prerequisite 1.2:** Protect floodplain functions

**Prerequisite 1.3:** Preserve wetlands

**Prerequisite 1.4:** Preserve threatened or endangered species and their habitats

**Credit 1.5:** Select brownfields or greyfields for redevelopment (5-10 points)

**Credit 1.6:** Select sites within existing communities (6 points)

**Credit 1.7:** Select sites that encourage non-motorized transportation and use of public transit (5 points)

21 possible points
Select brownfields or greyfields for redevelopment

- During the site selection process, give preference to previously developed or brownfield sites
- Coordinate site development plans with remediation activity and use of existing infrastructure and materials, as appropriate
- 5 points for selecting greyfield
- 10 points for selecting brownfield
Site Design – Water

Guidelines & Performance Benchmarks 2009

44 possible points

Protect and restore processes and systems associated with a site’s hydrology

Prerequisite 3.1: Reduce potable water use for landscape irrigation by 50 percent from established baseline

Credit 3.2: Reduce potable water use for landscape irrigation by 75 percent or more from established baseline

(2-5 points)

Credit 3.3: Protect and restore riparian, wetland, and shoreline buffers (3-8 points)

Credit 3.4: Rehabilitate lost streams, wetlands, and shorelines (2-5 points)

Credit 3.5: Manage stormwater on site (5-10 points)

Credit 3.6: Protect and enhance on-site water resources and receiving water quality (3-9 points)

Credit 3.7: Design rainwater/stormwater features to provide a landscape amenity (1-3 points)

Credit 3.8: Maintain water features to conserve water and other resources (1-4 points)

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Credit 3.7

Design rainwater / stormwater features to provide a landscape amenity

- Make rainwater / stormwater management features visible, usable, and beautiful
- Document that rainwater falling on site is treated as an amenity through the way it is received, conveyed, and managed on site, and made accessible to site users
- Keep water healthy and clean with natural, chemical-free techniques
Maintain the site for long-term sustainability

Prerequisite 8.1: Plan for sustainable site maintenance

Prerequisite 8.2: Provide for storage and collection of recyclables

Credit 8.3: Recycle organic matter generated during site operations and maintenance (2-6 points)

Credit 8.4: Reduce outdoor energy consumption for all landscape and exterior operations (1-4 points)

Credit 8.5: Use renewable sources for landscape electricity needs (2-3 points)

Credit 8.6: Minimize exposure to environmental tobacco smoke (1-2 points)

Credit 8.7: Minimize generation of greenhouse gases and exposure to localized air pollutants during landscape maintenance activities (1-4 points)

Credit 8.8: Reduce emissions and promote the use of fuel-efficient vehicles (4 points)

23 possible points
### Prerequisite 8.1: Plan for sustainable site maintenance

- Use an integrated design team to plan for ongoing site maintenance
- Include short and long term strategies
- Use SITES worksheet to ensure adequate coverage
SITES Pilot Program: June 2010 – June 2012

- Over 150 Registered Pilot Projects
- Range of project types and sizes, geographic diversity
- Feedback from Pilot Program to inform Reference Guide
SITES Pilot Program – Project Types

- Open Space / Park (25%)
- Institutional (20%)
- Commercial (15%)
- Residential (13%)
- Streetscape / Trans. Corridor (8%)
- Garden / Arboretum (8%)
- Government (6%)
- Mixed Use (4%)
- Industrial (1%)
How it Began

Choosing to participate in SITES Pilot

Major house & site renovations underway

Opportunity to become a demonstration site for sustainable land practices

Professional & career advancement

Mark Gormel
Getting Started

Review standards and identify those project may qualify

• Target point count: 3 Stars / 169 points
• Project budget and time commitment

• House construction had already begun
  • Improvements sited; septic, driveway, garage, house addition.
  • Basement excavation in process, digging 3’ down
Getting Started

**Solicit Design Team & Stakeholder Participation**

**Design Team**
- Margot Taylor, Owner, Landscape Architect, SITES Project Manager
- Edgar David, Landscape Architecture, CAD maps and illustrations
- Russ Losco, Soil Scientist
- Carol Ohm & Steve Williams, Civil Engineering

**Stakeholders**
- Tom Brightman, Land manager, Longwood Gardens
- Dan Barringer, Land manager, Natural Lands Trust
- Maya Baruch, Permaculture
- Claudia West, Native plants, North Creek Nursery
- Janet Ebert, Botanist
- Robert Struble, Water resources, Red Clay Valley Association
- Tara Tracey, Site planning, formerly with Brandywine Conservancy
- Jeff Wallin, Biochar, The Biochar Company
- Kennett Township Manager, Zoning Officer, Planning Commission
- Robert Johnston, Kennett Township Engineer, Gilmore Associates
- John Bare, Neighbor and land restoration advocate
- Mt Cuba Center, reference site
- Bucktoe Creek Preserve, reference site
- Meadow at Longwood Gardens, reference site
Getting Started Project Goal

Property shall become a landmark demonstration site and educational resource for sustainable practices for water, soil, and vegetation conservation, land management, human health and well-being.
Getting Started Project Objectives

- Efficient management of water resources
- Restoration of native plant communities
- Protect, build and restore top soil resources and health
- Use regionally sourced materials and products
- Design smart to minimize long-term management needs
- Preserve and enhance *Cultural and Significant Visual Resources* within Kennett Townships
- Create outdoor living spaces that bring pleasure, engagement and spiritually rejuvenate to all users
Getting Started

- Establish Point-of-Beginning for documentation as September 2009
- Complete compulsory charts and worksheets
- Assign tasks to team members
- Plan Design and Land Management Charrette dates
- Formulate project goals
• Adjacent property served in 1700’s as a Inn & Tavern, resources harvested?
• Mid 1800’s-1950’s, dairy farm operation, barn & pastures
• 1933 tenant farmer home built, principal dwelling
• 1950-1993 rental property
• From 1993-2013 Taylor’s ownership
Getting Started

• Qualify as a “Greyfield for redevelopment”
  • Expanded acreage to include maintained road ROW 1.5-1.69 acres
  • Farmers timely gift of historic barn photo
Site Design - selection/inventory

Select locations to preserve existing resources & repair damaged systems

Greyfields
Sites that encourage non-motorized transportation
Site Design - Assessment & Planning

Plan for sustainability from onset of the project.
Site assessment and integrated site development process.
• Stormwater management system created across site.

Site Design - Water
Protect and restore processes and systems associated with a site’s hydrology
Soil tests: highly erodible and compacted, need to balance soil biology, fungal vs. bacterial dominance.

Vegetation communities destroyed for farming practices.

**Site Design - Soil & Vegetation**

Protect and restore processes and systems associated with a site’s soil and vegetation
- Shared driveway separated
- Excavated soil & stone from basement in reuse garden.
- Basement concrete under new driveway
- New septic system & holding tanks
- Tree logs form retention wall
- Plant rescue on & off-site
- Plant producers

Site Design - Materials Selection

Reuse/ recycle existing materials and support sustainable production practices
Considerations: seating areas, social interaction, reduced light pollution, educational elements, physical activity, cultural places, and spiritual rejuvenation.

Site Design – Human Health & Well-Being

Build strong communities and a sense of stewardship.
Construction

Minimize effects of construction-related activities

Contractors agreement, SVPZ, special vegetation, equitable income, local owned and operated businesses
Operations & Maintenance

Maintain the site for long-term sustainability
Monitoring and Innovation

Reward exceptional performance and improve the body of knowledge on long-term sustainability
Monitoring Protocols

Soil Health, Vegetative Community Quality, Water Management, Summary report on findings per above.

- Maintenance Log
- Annual soil tests in spring
- Annual review of vegetation in September with reference site stakeholders
- Photo recordation of plant communities development and invasive plant removal.
- Annual inspection of stormwater system/devices in spring with engineers.
- Monthly photo recordation of projects stormwater management system.
- Publish summary report end of 2-year monitoring period, June 2014, highlighting soils, vegetation, and stormwater management performance.
Innovation

Internship credit – drafted credit 9.2 and demonstrated how to complete it.
Coming Improvements 2013

- Front Entry Hardscape, retaining walls, walkways, patios, pond, rain garden, and fencing
Notable Sustainable site features

Drip irrigation septic system: Sensitive wastewater disposal while preserving hillside woodland vegetation.
Notable Sustainable site features

Green Roofs: Absorb rainwater and reduce storm water surge, and regulate seasonal temperatures in structure.
Rescue Garden: Excavation and construction materials on this property were creatively reused rather than being sent to a landfill.

Twenty-five tons of stone found new life as steps, terraces, roadways, and retaining walls, and excavated soils were used to create ramps and planting beds.

The porch’s timbers were adapted to construct a one-of-a-kind potting shed.
Notable Sustainable site features

- Stormwater system conveyances and BMP’s that model nature: Direct and control storm water flow, recharge ground water, reduce peak stormwater surge, create aesthetic landscape features, and lower meadow rain garden habitat.
Challenges

The historic farm use of the site stripped its native vegetative communities and lowland top soils, and left highly eroded and compacted soils. This developed into opportunities to rebuild soil health and native plant communities appropriate for different zones throughout site.
Challenges

When the farming operation ended debris from farm structures was buried on-site.

- Debris was found during driveway reconstruction and contained concrete, ceramic tiles and building grade stone.
- Materials have been repurposed into stone walls, structural road support, drainage ways, creative landscape amenities and follies.
Challenges

The 8-15% grade for the site posed challenges for water management and improvement locations.

Developed into opportunities for creative water management techniques that directed, captured, slowed and played with stormwater runoff.
Challenges

• Property to serve as a demonstration site.
  • Issue: It became important to consider accessibility to garden areas for visitors of limited mobility and groups of varying sizes.

• Solution: A pathway and signage system was designed for multiple ability user access and to serve wayfinding needs, and drawn up on a map.
Challenges Educational Elements

DANCING TREE
Kennett Square, Chester County, PA

Special sustainable landscape features are marked with a and include:
- A rain garden that allows rainwater to infiltrate the soil and reduce runoff
- A green roof that absorbs rainwater into straw bale structure
- Site-sensitive construction for a native plant community that promotes existing trees
- Invasive plant species removal and replacement with native vegetation

Contact: Visit www.dancingtree.com for more information and to schedule a tour.

PATH KEY
- Water Play
- Garden Way
- Walkabout
- Sky Top
- Fox Trot

WAYFINDING KEY
- Welcome signpost
- Major trail marker
- Minor trail marker
- Main path (moderate accessibility)
- Minor path (moderate accessibility)
- Path with stairs or steep terrain
- Path with stairs or steep terrain
- Visitor parking
- Private parking
- Picnic area
- Entrance building
- Future building
- Gathering circle/tour start point
- Property boundaries
Lessons Learned

Integrative Design Team focus on water and soil resource management lead design responses.

A 5" or 100-year rainstorm in December 2012 demonstrated the appropriate and adequate design and placement of all stormwater devices. For the first time since 1993, there were no signs of soil erosion on-site after hurricane Sandy.
Lessons Learned

Analysis life cycle of project during design phase including long-term site management

Land managers contributions to design and site management
Since project commenced before SITES Pilot, some decisions needed to change to align with SITES standards.

Decisions needed quantification or qualification post completion.
Lessons Learned

Project success due to the contractors, suppliers, stakeholders, and Design Team’s flexibility, willingness to change in mid-stream, and timely humor.
Lessons Learned

Project influence on future projects

• Broader perspective through a integrated design team
• The need to plan site management and select site materials and suppliers up front

The continued opportunity to draw inspiration from nature by modeling natural systems and processes
March 5, 2013 Achieved 3 Star Certification

1st certified residence east coast
For more information, please visit: www.sustainablesites.org

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