Sustainable Landscapes
Sustainability

- Used in many ways to mean many things.
- Sustainable agriculture
- Sustainable architecture
- Sustainable communities
- Sustainable business
- Sustainable table (food)
- Sustainable style (lifestyle, fashion, home)
Sustainable development, according to the Brundtland Report, is development that meets the needs of the present without compromising the ability of future generations to meet their own needs (1987, p. 8).


Photo: images.google.com
kidsdreamgym.com
Sustainable development

- Design and planning
- Product development
- Procedures and maintenance

Photo by Ellen Vincent
Sustainable Landscapes
Certification program for commercial businesses
Developmental stage
Will become the landscape component of the U.S. Green Building Industry’s LEED® (Leadership in Energy and Environmental Design) certification program.
http://www.sustainablesites.org/

Photo: Ellen Vincent
The Sustainable Sites Initiative is a partnership of the

- American Society of Landscape Architects
- Lady Bird Johnson Wildflower Center at the University of Texas at Austin
- United States Botanic Garden
- Diverse group of stakeholder organizations
Mission is to establish and encourage sustainable practices in:

- landscape design
- construction
- operations
- maintenance
Guiding Principles of a Sustainable Site

- Do no harm
- Precautionary principle
- Design with nature and culture
- Use a decision-making hierarchy of preservation, conservation, 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
Foster environmental stewardship
SUSTAINABILITY

SOCIALLY EQUITABLE

ENVIRONMENTALLY SOUND

SUSTAINABILITY

ECONOMICALLY FEASIBLE
Sustainable Sites Initiative™

(1) Site selection
(2) Pre-design assessment and planning
(3) Site design—ecological components
(4) Site design—human health components
(5) Site design materials selection
(6) Construction
(7) Operations and maintenance
### 3. Site Design – Ecological Components

Protect and restore site processes and systems

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>3.1</td>
<td>Control and manage invasive species</td>
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<tr>
<td>3.2</td>
<td>Use appropriate, non-invasive plants</td>
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<tr>
<td>3.3</td>
<td>Preserve special status trees</td>
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<tr>
<td>3.4</td>
<td>Reduce potable water consumption for irrigation</td>
</tr>
</tbody>
</table>

Present day examples (pre certification implementation)

Freshkills, Staten Island, NY
High Line Project, NYC
SC Governor’s mansion
Green roofs

http://www.greenthegrounds.org/south-carolina.html
Lifescape Project at Freshkills Reserve Staten Island, NY

- 2,200 acre former landfill reclamation
- Trash stays
- “Nature sprawl” habitat for plants, animals, people

Source: Field Operations, NYC
High Line Project NYC

- Former railway reclamation
- Integration for business, nature, and recreation

Design by James Corner Field Operations and Diller Scofidio + Renfro. Courtesy the City of New York
Abandoned railway site
reclamation

Design by James Corner Field Operations and Diller Scofidio + Renfro.
Courtesy the City of New York
SC Governor’s Mansion

- Green the Grounds: Bringing nature into the public realm
- SC Governor’s mansion
- White House vegetable garden

http://www.greenthegrounds.org/south-carolina.html
Green roofs

- Reduce summer cooling and winter heating costs.
- Lengthen the life of the roof by 2 to 3 times.
- Reduce noise.
- Reduce stormwater runoff.
- Reduce carbon dioxide impacts.

Source: Penn State Center for Green Roof Research
http://horticulture.psu.edu/cms/greenroofcenter/history.html

Photo: Ellen Vincent
Drought tolerant plants
When soil medium is 1-3 inches low growing plants such as grasses, sedums, cacti are used.
When soil medium is several feet shrubs and small trees are used.
Low pitch and flat roofs can be planted
Niche growers can supply plants for green roofs.

Photo: Ellen Vincent
To demonstrate and promote green roof research, education, and technology transfer in the Northeastern US.

Source: Penn State Center for Green Roof Research
http://horticulture.psu.edu/cms/greenroofcenter/history.html
Sustainable Landscapes
Examples

- Cradle to cradle certification process
- Pots

![Cradle to Cradle Certified Pots](image-url)
Cradle to Cradle Certification

McDonough Braungart Design Chemistry, LLC, Charlottesville, VA

1996, McDonough was given the Presidential Award for Sustainable Development, the nation's highest environmental honor, presented by President Clinton in a White House ceremony.

Michael Braungart
Ph.D. Chemistry
Professor of Process Engineering at the Technical University of Northeast Lower Saxony
1993 earned the Océ-van der Grinten Award for Environment and Sustainability research

William McDonough
Architect & Professor of Architecture for University of VA & Cornell University
http://www.c2ccertified.com/
Integration of nature and human development

- “Industry can be so safe, effective, enriching and intelligent that it need not be fenced off from other human activity.”

  (McDonough and Braungart, 2002, p. 87).

- New product design results in “social goods” such as clean air, clean water, longer product life.

Product development

- Using environmentally safe and healthy materials
- Design for material reutilization, such as recycling or composting
- Energy efficiency and the use of renewable energy
- Efficient use of water, and maximum water quality associated with production
- Instituting strategies for social responsibility
Materials can earn Cradle to Cradle Certified™ status in silver, gold, or platinum categories

http://www.mbdc.com/cert_innovation_credit.htm
Cradle to Cradle Certified™

- Eagle Bay permeable pavers Certified Silver

Expires
7-13-2010

http://www.mbdc.com/c2c/itemDetails.php?item=189

http://www.eaglebayusa.com/products_sfrima.html
Eagle Corporation H.T. Ferron Redi-Rock Retaining Wall System Certified Silver

Expires 07-13-2010

http://www.mbdc.com/c2c/itemDetails.php?item=192

http://www.htferron.com/redi_rock.html
TimberSIL® wood for siding, roofing, structural framing, decking, tongue and groove flooring, windows, shingles, etc.

Wood and glass product is stronger/longer lasting than wood alone (rot resistant)

http://www.mbdc.com/c2c/itemDetails.php?item=79
http://www.timbersilwood.com/
Hycrete® concrete additive prevents rust and corrosion of rebar.

http://www.mbdc.com/c2c/itemDetails.php?item=42

http://www.hycrete.com/
Industrial waste product ingredients replaced a portion of Portland cement.


New product design: Minneapolis bridge concrete
Bamboo pulp, sugar cane, and straw replaces plastic

EnviroArc (Australia)

http://www.enviroarc.net/potsmaterial.php

New product design: Biodegradable pots and trays

http://www.enviroarc.net/potsmaterial.php
Sustainable pots

- Ball: bioplastic ‘Soilwrap’: biodegradable and compostable plant pot (wrap)
- Ball Circle of Life™ pots
- Wal-Mart: Earth Essentials (Ball’s Circle of Life pots)
- Fred Meyer 3rd largest US supercenter: corn based plastic that gets removed and composted before planting
Sustainable Landscapes
EPA’s GreenScapes Program

Reduce

Reuse

Sustainable

Recycle

Rebuy

(www.epa.gov/greenspaces)
GreenScapes 5-step plan

(1) Build and maintain healthy soil

- Compost on site to reduce fuel usage
- Compost reduces need for fertilizers because it produces beneficial microorganisms
- Compost holds water in the soil
- Runoff is minimized

Photo: images.google.com
www.thegreentheory.com
(2) Plant right for your site

- Perform a site analysis for sun exposure and soil texture, and use
- Select right plant for your site and choose plant varieties that are pest-resistant, drought tolerant, and suited to your sun, soil, and water conditions
- Check mature sizes so pruning for size reduction isn’t necessary.
(3) Practice smart watering

- Water deeply but infrequently.
- Water only until plants are established (2-5 years for trees)
- Add compost to the soil
- Select drought tolerant plants
- Use drip system or soaker hoses instead of sprinklers to save water and $.
- Water in early a.m. to reduce evaporation and plant diseases.
- Install permeable pavement to allow water to soak into the ground.

1: www.rittenhouse.ca/asp/Product.asp?PG=1655
2: www.ne-design.net/
(3) Practice smart watering (cont.)

- Connect rain barrels to downspouts

Photo: Ellen Vincent
(4) Adopt a holistic approach to pest management

- Use IPM techniques and start with prevention.
- Prevention involves maintaining healthy soil with compost and mulch, selecting pest resistant plants, and planting them in the sun/shade and soil conditions they are best suited to.

Photo: Ellen Vincent
(4) Adopt a holistic approach to pest management (cont.)

- Prevention involves mowing the grass high, removing diseased plants to prevent the spread of disease, and pulling weeds before they go to seed to prevent their spread.
(4) Adopt a holistic approach to pest management (cont.)

- Prevention involves identifying problems before you “spray, squash, or stomp.”
- Many insects are beneficial and some damage to landscape plants may be needed to encourage natural predators.
- Use traps and barriers and plant replacement before using pesticides.

Photo: images.google.com
www.ent.iastate.edu
(5) Practice natural lawn care

- Mow higher (within appropriate range for turf type)
- Mow regularly
- Leave the clippings
- Use mulching mowers
- Use natural organic and slow release fertilizers to reduce nutrient run-off and leaching.
- Convert lawn, esp. slopes and in shade, and near water bodies to groundcovers or mulch beds
- Water deeply but infrequently
Sustainable misc.

- Reduce gasoline powered equipment use and replace with electric or people-powered.
- Replace pressure treated wood with plastic lumber.
- Replace plastic silt fencing erosion control material with blankets, berms, and filtersocks made of compost.
Sustainable Sites Initiative™

- Categories:
  - (6) Construction
  - (7) Operations and maintenance
6.1 Create a soils management plan

6.2 Restore soils disturbed during construction

(7) Operations & Maintenance
Maintain the site for long-term sustainability

- 7.1 Plan for sustainable landscape maintenance
- 7.2 Minimize exposure to localized air pollutants
- 7.3 Recycle organic matter generated during site operations and maintenance
- 7.4 Provide storage and collection for recyclables
- 7.5 Use renewable sources for site outdoor electricity

Maintenance plan topics to be addressed by the integrated design team including the maintenance contractor or staff.

Photo: Ellen Vincent
## (7) Operations & Maintenance

<table>
<thead>
<tr>
<th>10-year desired outcomes from maintenance practice</th>
<th>Specific maintenance activities</th>
<th>Skill level required to complete the task</th>
<th>Timeline/schedule</th>
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</thead>
<tbody>
<tr>
<td>Plant Stewardship</td>
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<td>Plant maintenance</td>
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<td>Plant health</td>
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<td>Site safety</td>
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<td>Plant procurement</td>
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<tr>
<td>Pest management</td>
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Sustainability is not new

“The Commission has completed its work. We call for a common endeavor and for new norms of behavior at all levels and in the interests of all. The changes in attitudes, in social values, and in aspirations that the report urges will depend on vast campaigns of education, debate, and public participation” (WCED 1987, p. xiv).
Resources

- Sustainable Sites Initiative
  - http://www.sustainablesites.org/
- Penn State Center for Green Roof Technology
  - http://horticulture.psu.edu/cms/greenroofcenter/
- Cradle to Cradle Certification
- EPA GreenScapes program
- Green the Grounds
  - http://www.greenthegrounds.org/
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