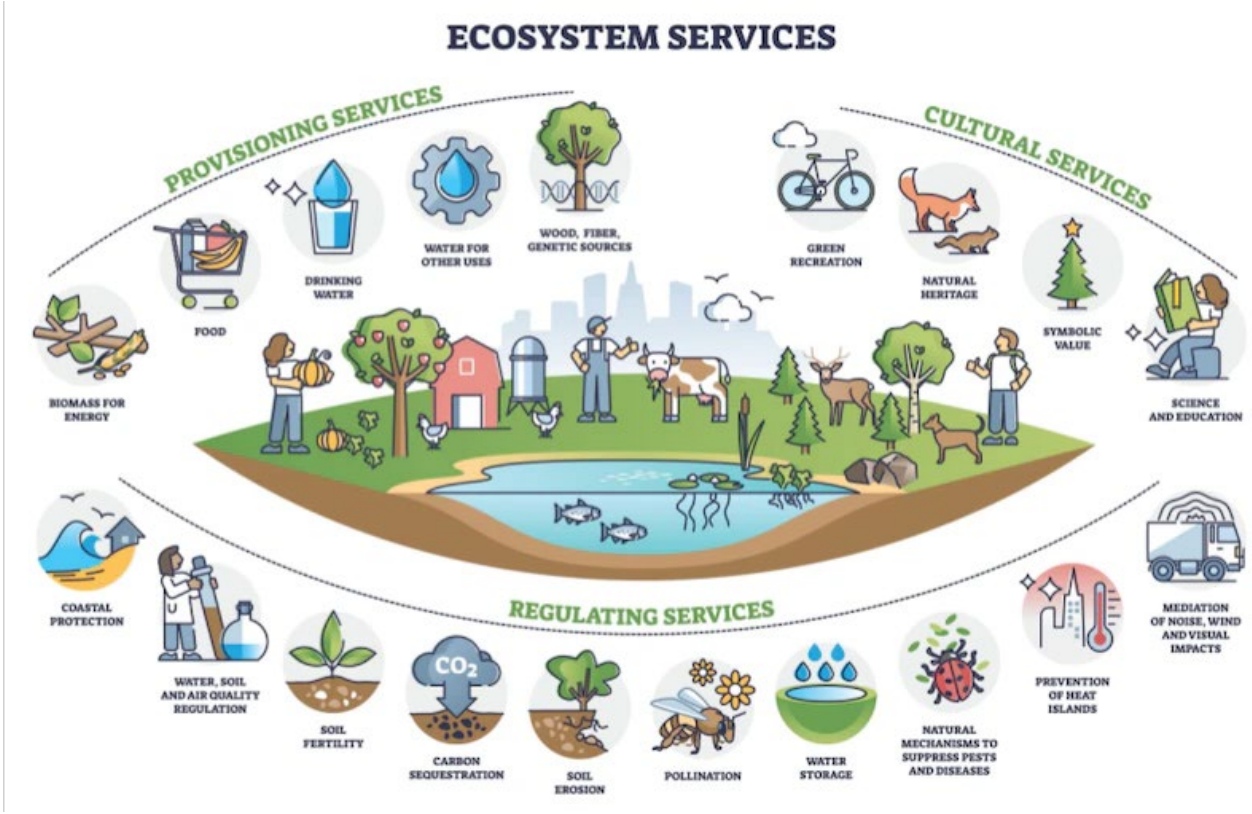
Sustainable Sites (SS)

GA02 Excerpt SS Overview. LEED BD+C RG v4 - Pgs. 137-138

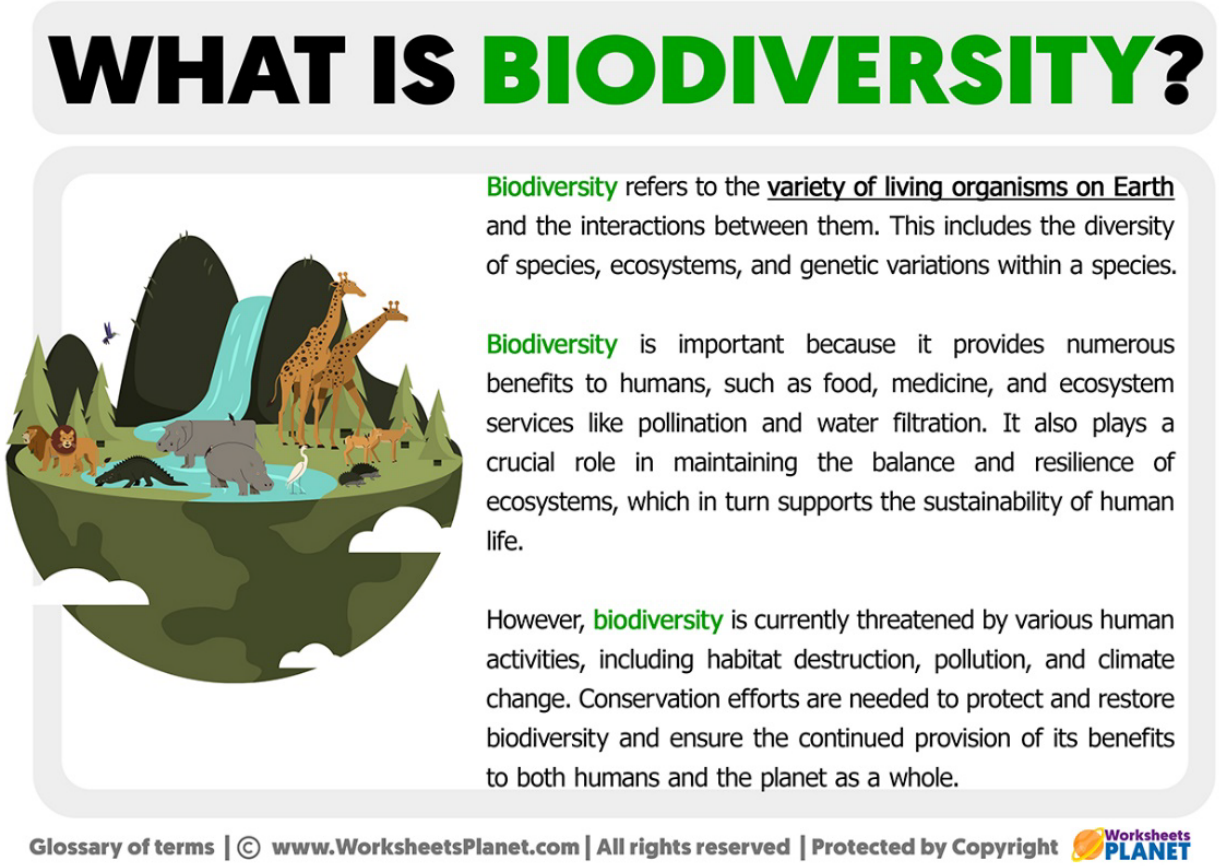
The Sustainable Sites (SS) category rewards decisions about the environment surrounding the building, with credits that emphasize the vital relationships among buildings, ecosystems, and ecosystem services.



Sustainable Sites (SS)

GA02 Excerpt SS Overview. LEED BD+C RG v4 - Pgs. 137-138

It focuses on restoring project site elements, integrating the site with local and regional ecosystems, and preserving the biodiversity that natural systems rely on.



Sustainable Sites (SS)

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U.S. GREEN BUILDING COUNCIL LEED USGBC

Green Buildings

-Use Less Energy
-Use Less Water
-Use Less Resources
-People, Profit, Planet

INTERNATIONAL WELL BUILDING INSTITUTE™

Healthy Buildings

-Use Better Air
-Use Better Water
-Use Better Light
-WELL is for People

THE Sustainable SITES Initiative®

Green Developments

-Water Runoff
-Proper Soil & Vegetation
-Outdoor Spaces for People
-Promote Local Ecosystems

Sustainable Sites (SS)

GA02 Excerpt SS Overview. LEED BD+C RG v4 - Pgs. 137-138

Recent trends like exurban development and **sprawl** encroach on the remaining natural landscapes and farmlands, fragmenting and replacing them with dispersed hardscapes surrounded by nonnative vegetation.

What is Urban Sprawl?

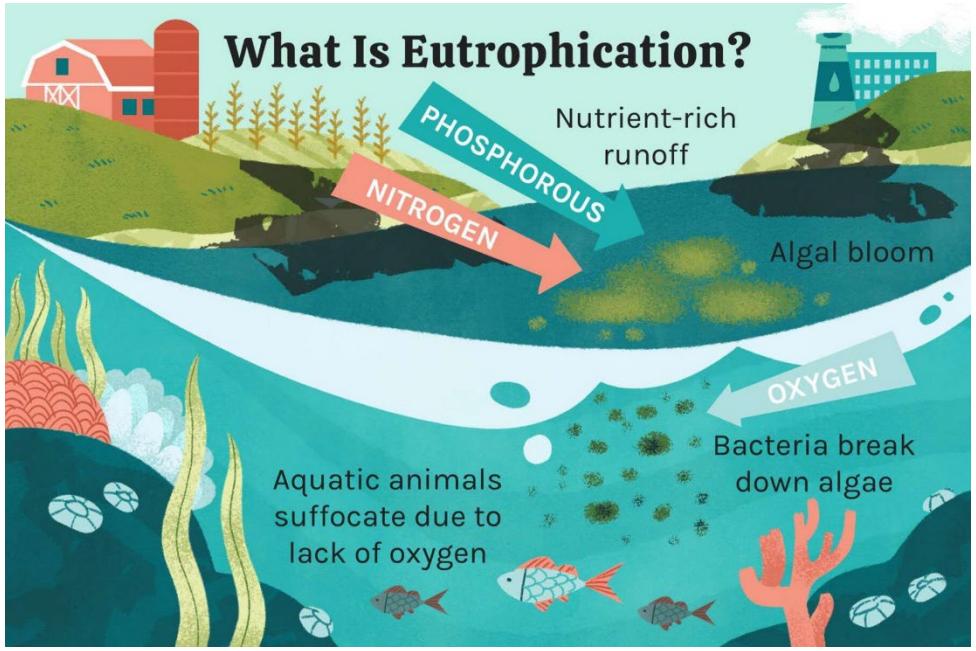
Urban Planning Explained

Sustainable Sites (SS)

GA02 Excerpt SS Overview. LEED BD+C RG v4 - Pgs. 137-138

Rainwater runoff carries such pollutants as oil, sediment, chemicals, and lawn fertilizers directly to streams and rivers, where they contribute to eutrophication and harm aquatic ecosystems and species.

SS credits are designed for projects to avoid harming habitat, open space, and water bodies.

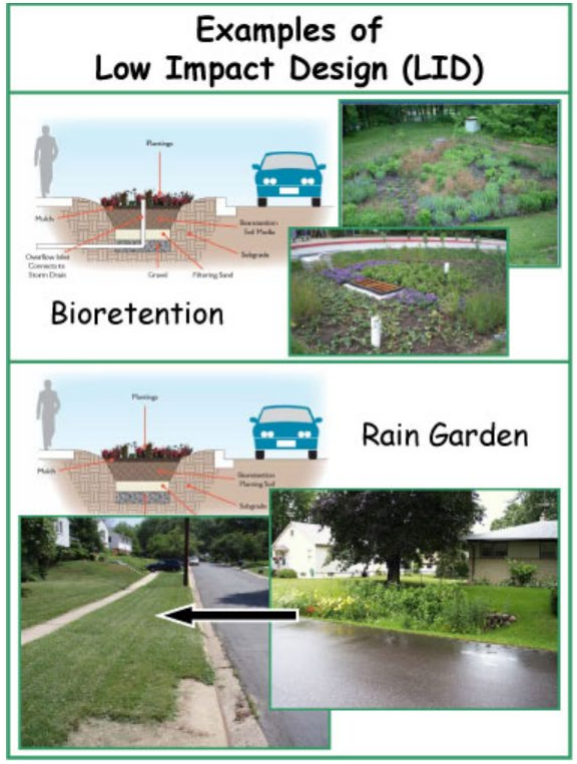


Sustainable Sites (SS)

GA02 Excerpt SS Overview. LEED BD+C RG v4 - Pgs. 137-138

Low Impact Development (LID)

- Minimize construction pollution.
- Reduce heat island effects and light pollution.
- Mimic natural water flow patterns to manage rainwater runoff.



Sustainable Sites (SS)

GA02 Excerpt SS Overview. LEED BD+C RG v4 - Pgs. 137-138

Light Pollution Reduction credit	backlight-uplight-glare (BUG) method
Site Development—Protect or Restore Habitat credit	working with conservation organizations to target financial support for off-site habitat protection
Rainwater Management credit	replicating natural site hydrology
Heat Island Reduction credit	using three-year aged SRI values for roofs and SR values for nonroof hardscape

SUSTAINABLE SITES

LEED RATING SYSTEMS ADDRESS PROJECT SITE DESIGN AND MAINTENANCE THROUGH MANY TOPICS, INCLUDING THE FOLLOWING:

- Site design and management
- Rainwater management
- Heat island effect

STRATEGIES FOR DEVELOPING A SUSTAINABLE SITE DESIGN:

- **MINIMIZE HARDSCAPE.** Substitute pervious surfaces for traditional paving.
- **USE NATIVE LANDSCAPING.** Select plants that are native to the area both to reduce water use and to provide habitat for local birds and other species. Incorporate mulch into the landscape to build the soil and naturally suppress weeds.
- **PREVENT LIGHT POLLUTION.** Avoid up-lighting, glare, and trespass by using shielded fixtures and strategic lighting design.
- **PRESERVE OPEN SPACE AND SENSITIVE AREAS.** Consolidate the development footprint and protect and restore natural vegetation, wetland areas, and bodies of water.
- **PROTECT AND RESTORE HABITAT.** Designate areas as protected habitat and open space for the life of the project. Develop a conservation management program to make sure that the natural environment is protected. Consider putting protected areas into a land trust.

STRATEGIES FOR SUSTAINABLE SITE OPERATIONS AND MAINTENANCE:

- **DEVELOP A SUSTAINABLE SITE MANAGEMENT PLAN.** The plan should address the application of chemicals and the cleaning of hardscape and building exterior, and it should include an integrated pest management program.
- **IMPLEMENT CONSERVATION PROGRAMS.** Work with ecologists and nonprofit organizations to implement conservation programs that protect species and habitat.
- **MAINTAIN SITE LIGHTING TO PREVENT LIGHT POLLUTION.** Ensure that fixtures are replaced according to the original design. If higher light levels are needed, include timers that shut them off automatically after hours.

Sustainable Sites (SS)

Rainwater Management

STRATEGIES FOR RAINWATER MANAGEMENT THROUGH DESIGN:

- **MINIMIZE IMPERVIOUS AREAS.** Increase the area of permeable surfaces, such as vegetated roofs, porous pavement, and landscaped areas.
- **CONTROL RAINWATER.** Install dry ponds, rain gardens, bioswales, and similar landscape features designed to hold water and slow the rate of runoff.
- **INCORPORATE RAINWATER MANAGEMENT INTO SITE DESIGN.** Use features that serve multiple functions, such as planters that collect rainwater, streets that include bioswales to capture and hold rainwater, and mulch that both builds soil and holds moisture.

STRATEGIES FOR RAINWATER MANAGEMENT IN OPERATIONS AND MAINTENANCE:

- **REDIRECT RAINWATER.** Direct runoff into rain gardens, bioswales, and other landscape features that retain water.
- **HARVEST RAINWATER.** In many jurisdictions, collected water can be used as process water, to flush toilets, or to provide irrigation.

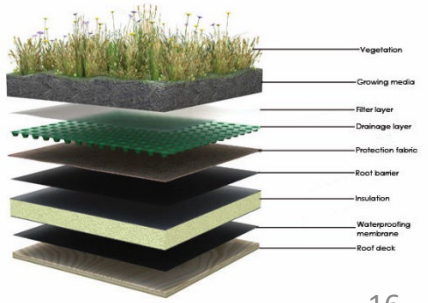
Sustainable Sites (SS)

Rainwater Management

Increase infiltration of rainfall into the ground, capture and reuse it, and use natural processes to treat the remaining water that runs off the property.

STRATEGIES FOR REDUCING THE HEAT ISLAND EFFECT:

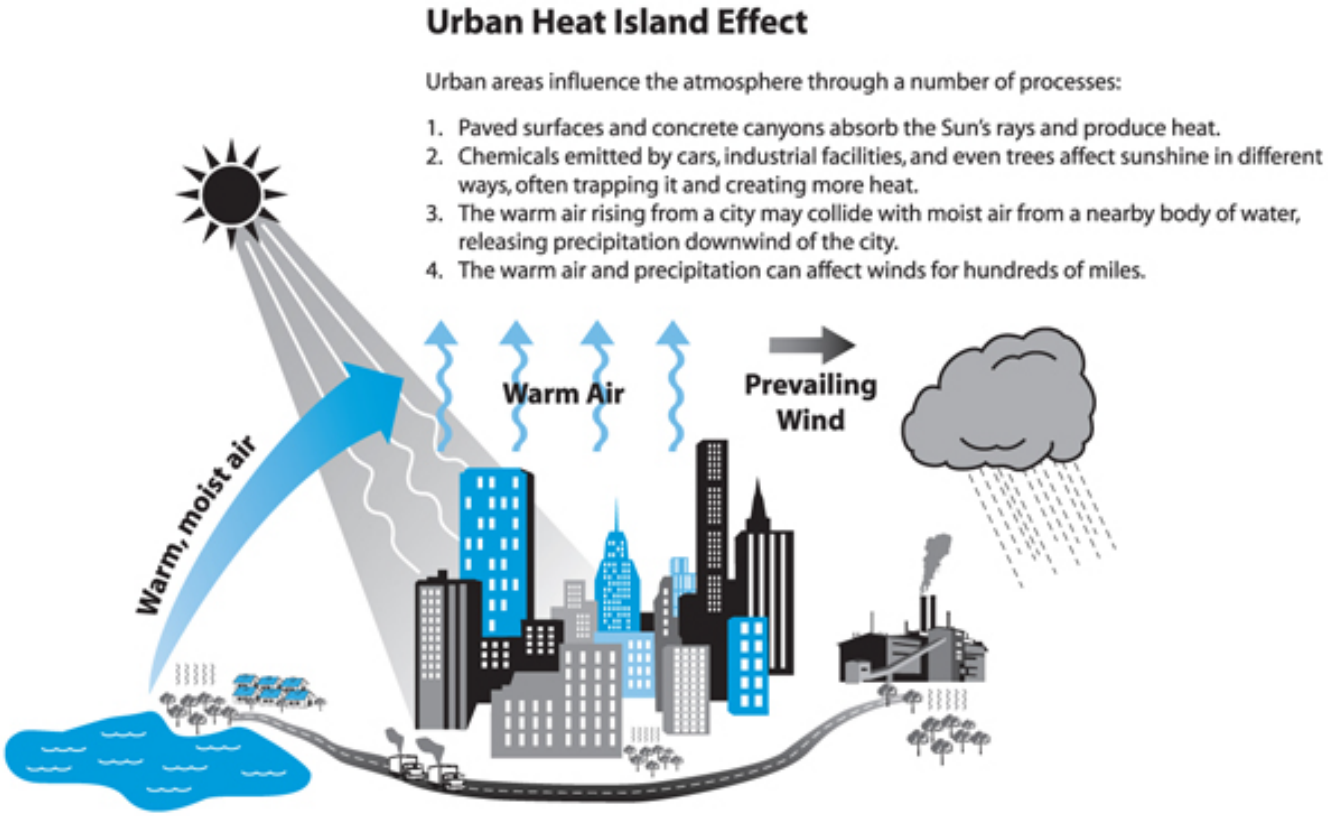
- **INSTALL REFLECTIVE ROOF SURFACES.** Light-colored roofs absorb less heat.
- **REDUCE THE AREA OF PAVED SURFACES EXPOSED TO SUNLIGHT.** Limit the amount of hardscape, design narrow roads, use light-colored paving, shade hardscape with greenery, and locate parking underground.
- **PLANT AN URBAN FOREST OR A GREEN ROOF.** Use street trees, shrubs, and landscaping to reduce heat island effects through evapotranspiration and provide shade.



Sustainable Sites (SS)

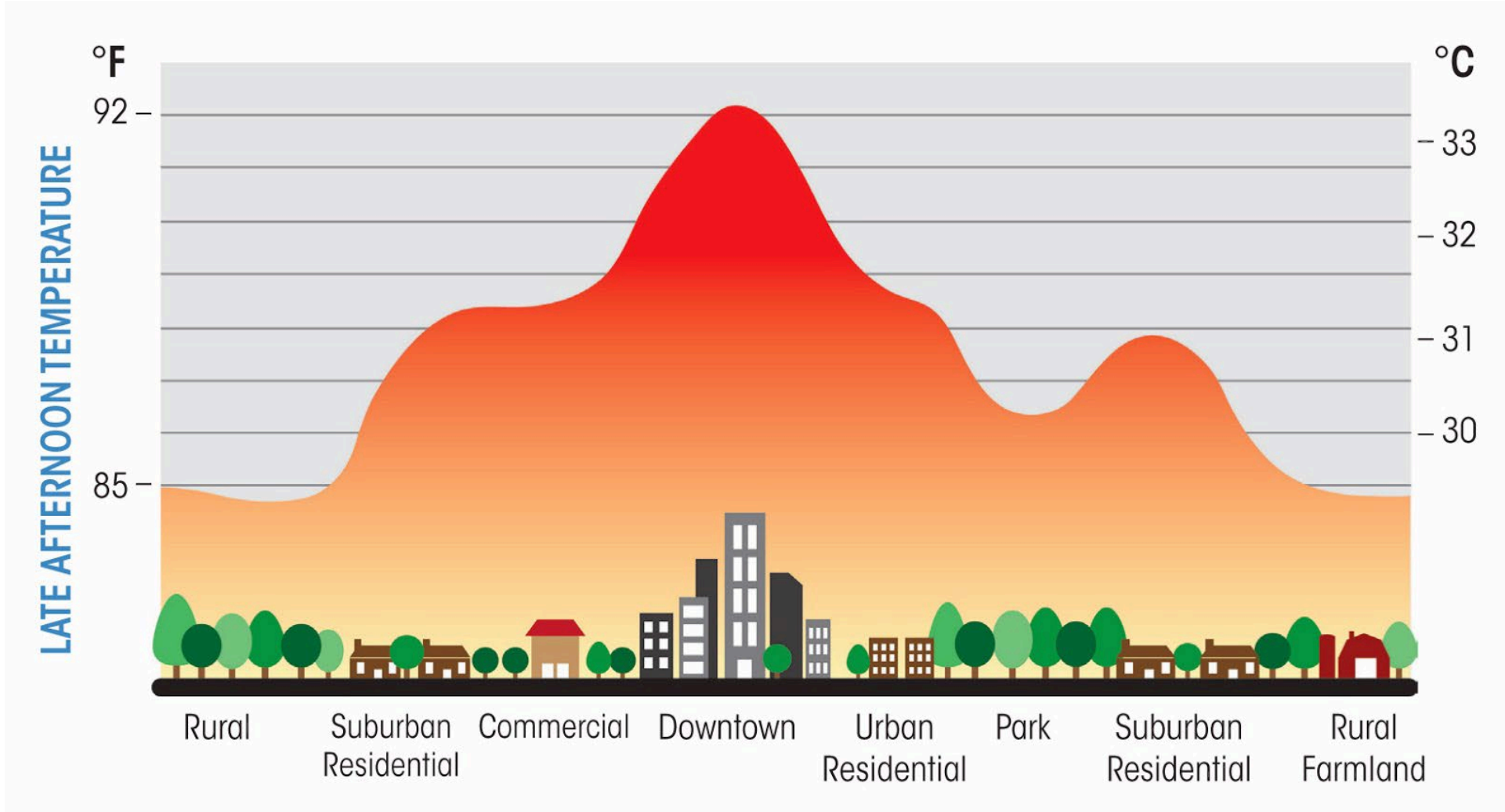
Heat Island Effect

heat island effect the thermal absorption by hardscape, such as dark, nonreflective pavement and buildings, and its subsequent radiation to surrounding areas. Other contributing factors may include vehicle exhaust, air conditioners, and street equipment. Tall buildings and narrow streets reduce airflow and exacerbate the effect.



Sustainable Sites (SS)

Heat Island Effect



infrared (thermal) emittance a value between 0 and 1 (or 0% and 100%) that indicates the ability of a material to shed infrared radiation (heat). A cool roof should have a high thermal emittance. The wavelength range for radiant energy is roughly 5 to 40 micrometers.

Most building materials (including glass) are opaque in this part of the spectrum and have an emittance of roughly 0.9, or 90%. Clean, bare metals, such as untarnished galvanized steel, have a low emittance and are the most important exceptions to the 0.9 rule. In contrast, aluminum roof coatings have intermediate emittance levels. (Adapted from Lawrence Berkeley National Laboratory)

solar reflectance (SR) the fraction of solar energy that is reflected by a surface on a scale of 0 to 1.

Black paint has a solar reflectance of 0; white paint (titanium dioxide) has a solar reflectance of 1.

Sustainable Sites (SS)

Heat Island Effect

solar reflectance index (SRI) a measure of the constructed surface's ability to stay cool in the sun by reflecting solar radiation and emitting thermal radiation.

It is defined such that a standard black surface (initial solar reflectance 0.05, initial thermal emittance 0.90) has an initial SRI of 0, and a standard white surface (initial solar reflectance 0.80, initial thermal emittance 0.90) has an initial SRI of 100.

CRRC
COOL ROOF
RATING COUNCIL

three-year aged SR or SRI value a solar reflectance or solar reflectance index rating that is measured after three years of weather exposure

thermal emittance the ratio of the radiant heat flux emitted by a specimen to that emitted by a blackbody radiator at the same temperature (adapted from Cool Roof Rating Council)

SUSTAINABLE SITES

Sustainable Sites (SS)

Adaptation	NC	CS	S	R	DC	WDC	HOS	HC
Total	10	11	12	12	11	11	10	9
Construction Activity Pollution Prevention	req	req	req	req	req	req	req	req
Environmental Site Assessment	--	--	req	--	--	--	--	req
Site Assessment	1	1	1	1	1	1	1	1
Protect or Restore Habitat*	2	2	2	2	2	2	2	1
Open Space	1	1	1	1	1	1	1	1
Rainwater Management*	3	3	3	3	3	3	3	2
Heat Island Reduction*	2	2	2	2	2	2	2	1
Light Pollution Reduction	1	1	1	1	1	1	1	1
Site Master Plan	--	--	1	--	--	--	--	--
Tenant Design and Construction Guidelines	--	1	--	--	--	--		
Places of Respite*	--	--	--	--	--	--	--	1
Direct Exterior Access	--	--	--	--	--	--	--	1
Joint Use of Facilities	--	--	1	--	--	--	--	--