

BEYOND

SMART CITIES

SUSTAINABLE SITES - GREEN BUILDING TECHNOLOGY

TRAINING PROGRAM

FOR GREEN BUILDING AND SUSTAINABILITY SPECIALISTS

KRISHNAJI PAWAR, LEED AP BD+C, GSAS CGP, ISO 14001:2015, GCP

GREEN BUILDING SPECIALIST CURRICULUM

GREEN BUILDING SPECIALIST

BEYOND SMART CITIES

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PROTECT OR RESTORE HABITAT - CREDIT

FOR GREEN BUILDING AND SUSTAINABILITY SPECIALIST

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in Progress

LEARNING OBJECTIVES



Intent of Protect or Restore Habitat - Credit

Behind the intent

Step by Step Guidance

Requirements

Required Documentation

Connection to Ongoing Performance

Terms and Definitions

[illegible][illegible]

SS-CR(1-2) - DESIGN

DESIGN

To conserve existing natural areas and restore damaged areas to provide habitat and promote biodiversity.

PROTECT OR RESTORE HABITAT

REQUIREMENTS

Preserve and protect from all development and construction activity 40% of the greenfield area on the site (if such areas exist), AND
Restore a portion of the site (including the building footprint) identified as previously disturbed and follow vegetation and soil requirements below. Vegetated roof surfaces may be included in the habitat area calculations if the plants are native or adapted and provide habitat.

1. Native plant species
2. Native grass seed mixtures
3. Native shrub seed mixtures
4. Native tree seed mixtures
5. Native groundcover seed mixtures

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SS-CR(1-2) - DESIGN

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DESCRIPTION	CERTIFY	SUBMIT	NOTES
Conduct an inventory	X		
Determine percent restoration potential	X		
Develop a riparian corridor plan		X	Review the riparian corridor plan by May 15, 2023
Develop a water management plan		X	Submit water management plan by June 1, 2023
Install a water management system		X	Submit water management system by July 1, 2023
Implement a water management system		X	Submit water management system by August 1, 2023
Implement a water management system		X	Submit water management system by September 1, 2023
Implement a water management system		X	Submit water management system by October 1, 2023
Implement a water management system		X	Submit water management system by November 1, 2023
Implement a water management system		X	Submit water management system by December 1, 2023

- ☑ On greenfield sites, perform a site survey to identify site elements and adopt a master plan for development of the project site.
- ☑ Strategies include stacking the building program, tuck-under parking and sharing facilities with neighbors.
- ☑ Prohibit plant materials listed as invasive or noxious weed species.

PROTECT OR RESTORE HABITAT

REQUIREMENTS

Preserve and protect from all development and construction activity 40% of the greenfield area on the site (if such areas exist). AND
Restore a portion of the site (including the building footprint) identified as previously disturbed by vegetated and soil requirements below. Vegetated roof surfaces may be included in the habitat area calculations if the plants are native or adapted and provide habitat.

IMPLEMENTATION

REQUIRED DOCUMENTATION

DESCRIPTION	EVIDENCE	SUBMIT	NOTED		X
Completed all activities	X				X
Documented ground disturbance activities	X				X
Photos and videotape used to monitor how the 20%					X
Disturbance was managed					X
Vegetation established and/or planted according	X				X
To standards outlined in the approved vegetation plan					X
For erosion control and sediment control and for EIRs					X
(See also 20% of total disturbed area)					X
Documentation of the habitat restoration plan	X				X
Documentation of the habitat restoration plan	X				X

[illegible]

Characteristic	Adaptive	System	Highly		
Adaptive solutions	X			Adaptive can characterize and predict results	X
Decentralized parallel execution (if applicable)				Properly setup, replicated with parallel file size (DFS)	X
Self or explicit expert allocation		X		Over-explicit expert allocation	X
Over-explicit expert allocation, locally located, general pattern use of explicit, parallel allocation, resources, network resources, and explicit allocation, but computing capabilities only, only a small allocation				Agreement without that a computation allocation	
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Over-explicit expert allocation, locally located, general pattern use of explicit, parallel allocation, resources, network resources, and explicit allocation, but computing capabilities only, only a small allocation				Properly setup, a distribution that is not a computation allocation, but a local allocation, a distribution of resources, and a distribution of capabilities	X
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BEHIND THE INTENT

Preservation and conservation of intact or high-quality native ecosystems, including their soils, native vegetation, sensitive species habitat, wildlife corridors, and hydrology, contributes to maintaining overall ecosystem health. Projects should endeavor to situate buildings in ways that protect undeveloped land.

When building on previously disturbed sites or sites with previously disturbed areas, a project team should consider restoring soils, hydrology, and native plants, all of which improve the viability of ecological communities, manage and filter rainwater, and fulfill other ecosystem functions. This credit encourages project teams to first consider on-site restoration.

When site constraints prevent on-site restoration, consider off-site conservation and restoration. An off-site approach may provide greater total ecosystem benefits than could otherwise be achieved on site. For projects that are unable to provide large, contiguous parcels of on-site land for long-term conservation, providing financial support to a recognized land trust or conservation organization can be an effective tool. Funds may be earmarked for activities that protect or restore habitat, such as acquiring crucial riparian parcels, restoring habitat that is essential to certain species, protecting water bodies, and preserving urban green space.

✓ This updated credit is now more achievable for various project types and more directly addresses the intent of the credit as it relates to habitat protection and revitalisation. The restoration requirement was reduced from a minimum of 30% to 5%, and a second threshold was added at 25% for two points to reward projects for increased restoration. Soil requirements have been streamlined and testing requirements have been removed. A vegetation section was added to encourage planting of diverse vegetation and pollinator habitat.

✓ Option 2: Financial Support was removed to encourage focus on local habitat restoration.

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✓ Option 2. Financial Support was removed to encourage focus on local habitat restoration.

STEP-BY-STEP GUIDANCE



STEP 1. IDENTIFY GREENFIELD AREA WITHIN PROJECT

Before staking any buildings, work with a landscape architect, restoration ecologist, or other site professional to identify greenfield within the project boundary.

- Greenfield areas are areas that have not been graded, compacted, cleared, or disturbed and that support (or could support) open space, habitat, or natural hydrology.
- All areas within the project boundary must be categorized as either greenfield or previously disturbed, based on their status at the beginning of the project. If no greenfield areas exist on the site, continue to Step 4.
- Areas that naturally do not contain vegetation can count toward greenfield or restored area. For example, natural rock outcrops, ponds, and natural dewater at quality under this credit.
- Project teams do not need to vegetate areas that are not naturally vegetated but must submit documentation showing that the area contains naturally existing unvegetated land and water bodies.

STEP 2. DETERMINE GREENFIELD AREA TO PRESERVE AND PROTECT

If greenfield area exists on the site, work with site professionals to identify at least 40% of the greenfield area to be preserved and protected from all development and construction activity.

- Ideally, prioritize greenfields that are biodiversity (e.g., a shrub thicket) over monoculture plantings (e.g., turf grass) for preservation and protection.
- Consider the project scope, program, and owner's project goals in determining which areas to preserve and protect.
- Preserve and protect greenfield areas for long-term conservation if possible; this credit does not specify the duration of protection (see *Further Evaluation, Best Practices for Habitat Protection*).
- If the entire project site is greenfield, preserve 40% of the total project area.

STEP 3. DEVELOP CONSTRUCTION ACTIVITY MANAGEMENT PLAN FOR GREENFIELD PROTECTION

If applicable, establish and clearly delineate construction buffer zones with the project contractors early in the process to avoid soil compaction and other construction damage to greenfields.

- Limiting disturbance during construction helps minimize the need for additional soil and habitat restoration.
- Refer to strategies listed in SS Prerequisite Construction Activity Pollution Prevention.



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STEP-BY-STEP GUIDANCE

STEP 4. SELECT OPTION

Select the appropriate option for the project.

- Option 1 may be feasible for projects that have sufficient land to meet the credit requirements for restoration. Project teams must restore both the habitats and soils that will be revegetated. This restoration will likely happen in parallel (see *Further Explanation, Option 1 Timeline*). ➔
- Option 2 is for projects that are 100% greenfield sites, or cannot meet the requirements for on-site restoration, or choose not to conduct restoration. If choosing Option 2, skip to Option 2, Financial Support, below. If unsure, continue with Steps 5 and 6 to gather more information before making a decision.

STEP 5. IDENTIFY ALL PREVIOUSLY DISTURBED SITE AREA

Work with site professionals to determine the total site area that has been graded, compacted, cleared, or disturbed, if any. Include the building footprint if it is located on previously disturbed land.

STEP 6. DETERMINE ANTICIPATED RATIO OF BUILDING FOOTPRINT TO PREVIOUSLY DISTURBED SITE AREA

Determine the density of the project and surrounding areas by estimating the projected size of the building footprint and comparing it with the site area.

- Building vertically can significantly reduce a building footprint while increasing site density.
- If the project meets the floor-area ratio (FAR) density minimum, vegetated roofs may be considered part of the restored area (see *Further Explanation, Vegetated Roofs*). ➔

STEP-BY-STEP GUIDANCE

Option 1. On-Site Restoration

STEP 1. DETERMINE AREAS FOR RESTORATION

Early in the design process, work with site professionals to determine the portions of the site that are the best candidates for restoration. Use Equation 1 to verify that at least 30% of previously disturbed areas will be restored.

- Restoration and enhancement of natural site elements can include existing ponds, riparian buffers, vegetation, and other natural features.
- Consider restoring areas adjacent to greenfield, bordering natural areas, and contiguous parcels to increase the environmental benefits.

EQUATION 1. Percentage of restoration area

$$\text{Percentage of restoration area} = \left(\frac{\text{Restoration area}}{\text{Total previously disturbed site area}} \right) \times 100$$

The total previously disturbed site area includes the building footprint if it is located on previously disturbed land.

- A vegetated roof may be eligible to be included as part of the total restoration area in Equation 1, provided the project density meets the minimum floor-area ratio threshold (see *Further Explanation, Vegetated Roofs*). ➔

STEP 2. DETERMINE RESTORATION STRATEGIES

Develop and prioritize strategies to restore the previously disturbed site areas identified in Step 1. Restoration must use native or adapted vegetation (see *Further Explanation, Best Practices for Habitat Restoration*). ➔

STEP 3. IDENTIFY DISTURBED AREAS TO BE REVEGETATED

Determine which areas have been disturbed or compacted by previous development and will be revegetated.

- Heavy wheeled traffic, previous grading, compacted dirt roads, equipment storage areas, and parking are examples of uses that disturb soils.
- Only soils that will be revegetated need to comply with this requirement.
- Consider the owner's project requirements and work with environmental consultants to help determine which areas to revegetate.

STEP-BY-STEP GUIDANCE

STEP 4. RESEARCH SOIL CONDITIONS AND REFERENCE SOILS

For the areas that will be restored, conduct existing information on both characteristics on comparative soils (e.g., depth, color, soil texture, soil chemistry, soil texture, and soil use).

STEP 5. RESTORE SOILS IN AREAS TO BE REVEGETATED

Develop and implement a plan to meet all levels of credit requirements (see *Further Explanation, Soil Restoration*). ➔

- Conduct tests and tests to demonstrate that the restored soils will meet the criteria specified in the requirements (see *Further Explanation, Soil Testing Guidelines*). ➔

Soil tests should be conducted on the soils to be restored. The results of the tests should be used to determine the appropriate restoration strategy.

STEP 6. RESTORE PREVIOUSLY DISTURBED SITE AREAS

Conduct the restoration strategies identified in Step 5.

- A project that constructs vegetated landscape areas to accommodate whatever vegetation may be available from the vegetation or soil restoration requirements. However, ensure that all such areas are restored according to the requirements (see *Further Explanation, Restoring the Project*). ➔

Use the following information to determine the appropriate restoration strategy.

- Level 1 (or greater) soil is a deeper vegetation only if they are able to survive without receiving fertilization, pesticides, and irrigation.

Option 2. Financial Support

STEP 1. DETERMINE AMOUNT OF FINANCIAL SUPPORT

Using Equation 2, establish the minimum financial support that must be distributed to a qualifying land use or conservation organization.

EQUATION 2. Financial contribution to conservation

$$\text{Minimum financial contribution} = \left(\frac{\text{Total site area}}{\text{Total site area}} \right) \times \$1,000$$

$$\text{Minimum financial contribution} = \left(\frac{\text{Total site area}}{\text{Total site area}} \right) \times \$1,000$$

STEP 2. IDENTIFY QUALIFYING PARTNER ORGANIZATION

Work with an eligible land use or conservation organization to develop a plan for the contribution and establish an agreement with the organization, detailing the use of the funding (see *Further Explanation, Working with Conservation Organizations*). ➔

- The partner organization must provide financial support to a project that meets the previously stated criteria in the credit requirements (see *Further Explanation, Restoring the Project*). ➔

Examples of projects include land acquisition or management for natural resources, native habitat restoration, watershed management, restoration, or protection and public open space restoration or restoration.

REQUIREMENTS

NC, CA, SCHOOLS, RETAIL, DATA CENTERS, WAREHOUSES & DISTRIBUTION CENTERS, HOSPITALS, HEALTHCARE

Preserve and protect from all development and construction activity 40% of the greenfield area on the site (if such areas exist).

AND

Restore a portion of the site (including the building footprint) identified as previously disturbed and follow vegetation and soil requirements below. Vegetated roof surfaces may be included in the habitat area calculations if the plants are native or adapted and provide habitat. Points are awarded according to Table 1.

Table 1. Points for percentage of area restored

Restored Area	Points BD+C (Concept Healthcare)	Points BD+C (Healthcare)
75% of total site area	1	1
25% of total site area	2	-

Soil Restoration

Restore disturbed soils in areas that will later serve as the final habitat area.

- Imported soils may not include the following:
 - soils defined regionally by the Natural Resources Conservation Service web soil survey (or local equivalent for projects outside the U.S.) as prime farmland, unique farmland, or farmland of statewide or local importance;
 - soils from other greenfield sites; or
 - sphagnum peat moss.

REQUIREMENTS +

Vegetation :

Plant a minimum of 6 species of vegetation that are native or adapted to the project's EPA Level III ecoregion (or local equivalent for projects outside of the U.S.). Include a minimum of 2 out of the following plant categories: tree, shrub, and ground cover. Designate a portion of the habitat area for a pollinator garden consisting of native flowering plants and totalling at least 30 square feet (3 square meters).

CONNECTION TO ONGOING PERFORMANCE

LEED O+M credit Site Management: Naturally vegetated areas that meet the requirements of this credit are less likely to require the routine use of maintenance equipment. They could also reduce irrigation, nutrient application, and erosion, thereby helping the project meet the requirements of the related performance-based credit.

LEED O+M SS credit Rainwater Management: Restoring and protecting greenfield areas with native or adapted vegetation will help provide applicable strategies to earn the related performance-based credit.

LEED O+M SS credit Heat Island Reduction : Vegetated roofs can be counted for both credits.

REQUIRED DOCUMENTATION

Documentation	All Projects	Option 1	Option 2
Greenfield area calculations	X		
Description of greenfield area protection (if applicable)	X		
Native or adapted vegetation calculations		X	
Site plan depicting project boundary, building footprint, preserved greenfield areas (if applicable), previously disturbed area, restored area, native and adapted vegetation, plant species, other ecologically appropriate features, and any other relevant site conditions		X	
Description of disturbed or compacted soils to be revegetated		X	
Reference soil characteristics and soil test results		X	
Projects with vegetated roofs provide the floor area ratio (FAR)		X	
Financial support calculations			X
Agreement with land trust or conservation organization			X
U.S. projects: Confirmation that land trust is accredited by Land Trust Alliance			X
Projects outside U.S.: Verification that conservation organization is nationally or locally recognized; description of qualifications and mission of conservation organization			X



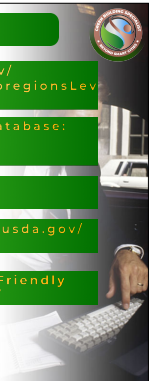
EXEMPLARY PERFORMANCE

Restore a minimum of 35% (including the building footprint) of all previously disturbed area on site using soil and vegetation that meet the credit requirements.



REFERENCED STANDARDS

- ✓ EPA Level III Ecoregion Descriptions: ftp://newftp.epa.gov/EPADataCommons/ORD/Ecoregions/pubs/NA_TerrestrialEcoregionsLevel3_Final-2june11_CEC.pdf
- ✓ USDA Natural Resources Conservation Service, PLANTS Database: <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/plantsanimals/plants/>
- ✓ Invasive Plant Atlas of the United States: <https://www.invasiveplantatlas.org/>
- ✓ U.S. State and Federal Noxious Weed laws: <https://plants.usda.gov/java/noxComposite>
- ✓ Xerces Society for Invertebrate Conservation, Pollinator-Friendly Plant Lists: xerces.org/pollinator-conservation/plant-lists/



TERMS AND DEFINITIONS

Adapted vegetation vegetation that is not native to the particular region it was introduced to, but has evolved or maintained characteristics conducive for healthy growth and requires no additional resources or maintenance, such as water for irrigation, in comparison to similar species native to the area. An adapted species is non-aggressive or disruptive to native plant communities

Invasive vegetation nonnative or exotic vegetation that quickly grows and aggressively reproduces, often disrupting or displacing native plant communities. The plant's vigor combined with a lack of natural enemies leads to outbreak populations.

Previously disturbed areas that have been graded, compacted, cleared, previously developed, or disturbed in any way. These are areas that do not qualify as "greenfield."



BEYOND
SMART CITIES

THANK YOU

**THE WORLD'S 1ST GREEN TECHNOLOGY
MARKETPLACE**