



BUILT ENVIRONMENT



Photo by Kath Williams

BUILT ENVIRONMENT DESIGN TEAM

Core Team Members

Sue L. Anderson, CTA Architects Engineers, Billings, MT

Garett Chadwick, Plan One Architects, Driggs, ID

Casey Dudley, Steve Dudley Associates, Bozeman, MT

Ron Pecarina, Energy and Sustainable Design Consultants, Inc, Billings, MT

Trey Warren, Whimpy Wolf Builders, Lander, WY

Consulting Members

Mike Keys, Keys Custom Homes, Red Lodge, MT

John McClure, McClure Custom Builders Inc., Cody, WY

Bruce Poe, Cole Poe Architects, Boise, ID

Facilitators

Kath Williams, Kath Williams + Associates, Bozeman, MT

Cheryl O'Brien, Co-Facilitator, INL Applied Mechanics & Sustainable Design, Idaho Falls, ID

Jennifer Henry, Liaison, U.S. Green Building Council, Washington,, DC

INTRODUCTION TO BE CREDITS

The phrase “Built Environment” refers to the man-made surroundings that provide the setting for human activity, ranging from large-scale civic surroundings to small personal places. The impact of the built environment, including design, construction and operation is significant. The built environment imposes on our natural resources, and without proper planning, can destroy the very attributes that inspire us to live in these places. Recently there has also been considerable dialogue and research into the impact of the built environment on human health.



A large percentage of the human environment is manmade, and these artificial surroundings are so extensive and cohesive that they function as organisms in the consumption of our natural resources, disposal of wastes, and facilitation of productive enterprise within its bounds.

“Built Environment” also refers to the places constructed in our natural environment as well as on previously developed sites. The built environment is made up of single buildings and multiple building developments; it includes landscape design, and also refers the bigger picture of urban planning. It refers to places of any scale and form. Many of these places are built without consulting any planning tools, let alone green planning tools or building standards. It is a useful acknowledgment that only a small, but growing percentage, of our built environment constructed every year is designed by professionals such as architects, landscape architects, and planners. In these cases, developers of the built environment encounter issues that cross the traditional professional boundaries between urban planners, traffic engineers, zoning authorities, architects, interior designers, industrial designers, landscape architects, etc. In other cases, such as a public park that may have the look, feel, and nourishing quality of natural surroundings while being completely artificial and “built”, the line between the natural and the built environments can be very difficult to distinguish.

The goals of this credit category are to attempt to recognize and include the values of green building rating systems, including LEED. Meeting the prerequisites of the appropriate green building rating tool is a solid base for all building projects. However, the environmental challenges in this region go beyond those in LEED and are addressed by awarding specific points for positive actions. The practices outlined in this Reference Guide and those in other green building standards, can minimize the impacts and potentially reverse effects of previously poorly developed sites.

The issues addressed in this credit category include:

- Optimization of energy in all building types
- Reduction of waste generation on construction sites
- Recycling on construction sites
- Designing buildings with material sizes in mind to minimize labor and waste
- Reuse of organics
- Development of outdoor spaces to connect man and nature and potentially minimize building size
- “Right sizing” of residential dwellings to fit environment and function

Innovation is encouraged and exemplary performance will be awarded additional points.

BE PREREQUISITE 1: LEED PREREQUISITES REQUIRED

INTENT

To design and construct sustainable buildings and structures

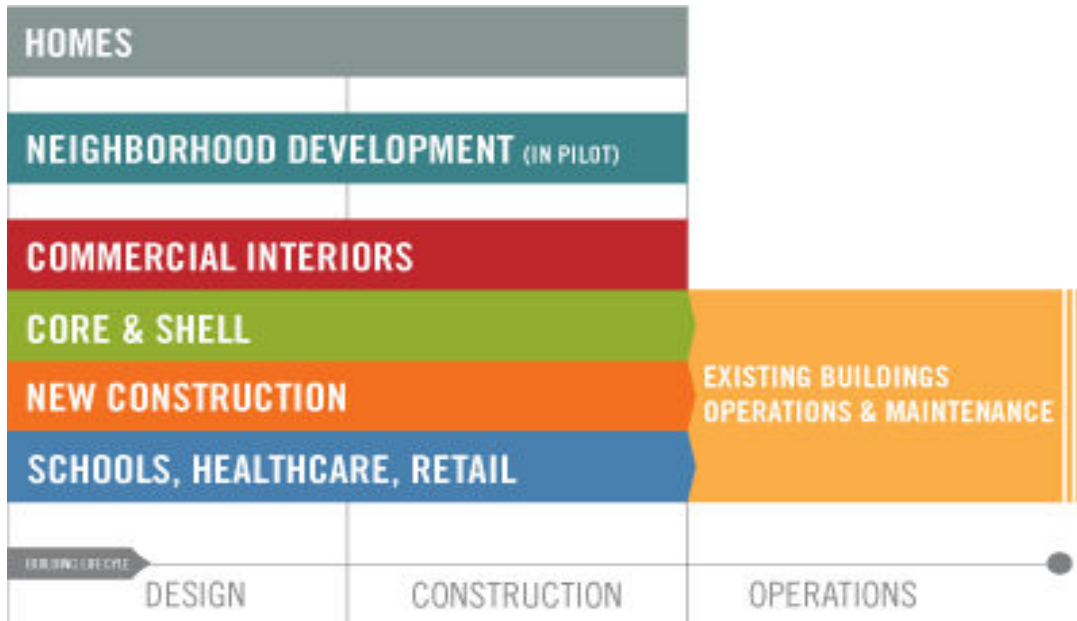
REQUIREMENTS

The national green building leadership standard, LEED, was developed to transform the market of the design and construction industry to sustainability. Use of the LEED family of products forms the basis for a sustainable, habited structure and serves as a measurement tool. LEED Accredited Professionals support the design and construction teams in meeting the requirements, earning points, and documenting the project in this third-party verified system.



Built environments encompass all constructed entities. Habited structures are enclosed, occupied, and conditioned. Non-habited include but are not limited to structures that are not enclosed, occupied or conditioned, such as barns, sheds, gazebos, transit shelters, bridges, retaining walls, landscape features.

The GY-Framework has relied heavily on the lessons learned by the U.S. Green Building Council in the development of LEED. The current LEED rating systems available for use are:



From USGBC Website...www.usgbc.org

All GY-Framework registered projects with habited structures are encouraged to use the appropriate LEED rating system as their guide throughout design and construction. **LEED registration and certification is not required but highly encouraged.** The prerequisites of the appropriate rating system, however, are required of all projects containing habited structures.

BE CREDIT 1: OPTIMIZE ENERGY PERFORMANCE

1 - 3 POINTS

INTENT

Encourage the design and construction of energy efficient buildings to reduce air, water, and land pollution, and environmental impacts from energy production and consumption.

REQUIREMENTS

Design and construct at least 90% of all habited buildings in the project such that they meet one of the following requirements according to the appropriate building type.

Minimally Exceed Performance (1 point):

For non-residential buildings and residential buildings over 3 stories:

Option 1

Whole Building Energy Simulation: Demonstrate a minimum 10% improvement in the proposed building performance rating compared to International Energy Conservation Code (IECC). Perform a whole



building project simulation using the Building Performance Rating Method per Appendix G of ASHRAE/IESNA Standard 90.1-2004. Appendix G requires that this energy analysis include ALL of the energy costs within and associated with the building project. To achieve this point, the proposed design:

Must comply with the mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4 and 10.4) in Standard 90.1-2004 (without addenda) or local code, whichever is more stringent.

AND

Must include all the energy costs within and associated with the building project,

AND

Must be compared against a baseline building that complies with IECC. The default process energy cost is 25% of the total energy cost for the baseline building. For buildings where the process energy cost is less than 25% of the baseline building energy cost, the LEED submittal must include supporting documentation substantiating that process energy inputs are appropriate.

For the purposes of the analysis, process energy is considered to include, but is not limited to:

Office and general miscellaneous equipment: computers, elevators and escalators, kitchen cooking and refrigeration, laundry washing and drying, lighting exempt from the lighting power allowance (e.g. lighting integral to medical equipment) and other (e.g. waterfall pumps).

Regulated (non-process) energy includes: lighting (such as for the interior, parking garage, surface parking, facade, or building grounds, except as noted above), HVAC (such as for space heating, space cooling, fans, pumps, toilet exhaust, parking garage ventilation, kitchen hood exhaust, etc.), and service water heating for domestic or space heating purposes.

For this credit, process loads shall be identical for both the baseline building performance rating and for the proposed building performance rating. However, if process loads are reduced, the Exceptional Calculation Method (ASHRAE 90.1-2004 G2.5) may be used to document such process loads reductions.

Documentation of process load energy savings shall include a list of the assumptions made for both the base and proposed design, and theoretical or empirical information supporting these assumptions.

BE Credit 1: Optimize Energy Performance (continued)

For residential buildings 3 stories or fewer:

Qualify as an ENERGY STAR Home by the prescriptive Builder Option Package (BOP).

Moderately Exceed Performance (2 Points):

For non-residential buildings and residential buildings over 3 stories:

Option 2

Whole Building Energy Simulation: Demonstrate a minimum 20% improvement in the proposed building performance rating compared to the baseline described above in Option 1 for non-residential buildings and residential buildings over 3 stories.

OR

Option 3

Prescriptive Compliance Path: Comply with the prescriptive measures of the ASHRAE Advanced Energy Design Guide for Small Office Buildings or the ASHRAE Advanced Energy Design Guide for Small Retail Buildings, as appropriate to building type. The following restrictions apply:



Buildings must be less than 20,000 square feet.

Buildings must be office or retail occupancy.

Project teams must fully comply with all applicable criteria as established in the Advanced Energy Design Guide for the climate zone in which the building is located.

For residential buildings 3 stories or fewer:

Qualify as an ENERGY STAR Home by achieving a HERS Index rating of 80 or better for IECC Climate Zones 6-8.

Aggressively Exceed Performance (3 Points):

For non-residential buildings and residential buildings over 3 stories:

Option 4

Whole Building Energy Simulation: Demonstrate a minimum 30% improvement in the proposed building performance rating compared to the baseline described above in OPTION 1 of non-residential buildings or residential buildings greater than 3 stories.

OR

Option 5

Prescriptive Compliance Path: Comply with the Basic Criteria and Prescriptive Criteria of the Advanced Buildings Benchmark™ Version 1.1 with the exception of the following sections: 5.7 Monitoring and Trend-logging, 5.11 Indoor Air Quality, and 5.14 Networked Computer Monitor Control.

For residential buildings 3 stories or fewer:

Exceed the ENERGY STAR for Homes requirements by achieving a HERS Index of 70 or better for IECC Climate Zones 6-8.

BE CREDIT 2.1: GREEN BUILDING PROGRAMS: PARTICIPATION AND COMPLIANCE
1 POINT

INTENT

To encourage incorporation of green building standards into built environment* projects.

REQUIREMENTS

Meet the intent and requirements of a local, regional, or national green rating system other than LEED (See [BE2.2](#) to achieve points using LEED). The rating system must include elements of green building in addition to energy efficiency and conservation. (1 point)

BE CREDIT 2.2: GREEN BUILDING PROGRAMS: LEED CERTIFICATION
1 - 5 POINTS

INTENT

To recognize and encourage built environment* projects to meet the highest national standards.

REQUIREMENTS

For habited built structures:



Achieve certification for the applicable LEED product. Use the LEED Version currently available to the public. Note: Projects achieving LEED certification at the Gold or Platinum Level can earn an additional point in [SCO Credit 1](#).

Credit Matrix: Provided LEED products are used, points are allocated accordingly:

LEED Certification		
	Certified	Silver
50% of habited built area	1 point	2 points
At least 80% of habited built area	2 points	3 points

For non-habited built environments: (2 points)

If the project is only a non-habited built environment, or if the project has a non-habited built environment that is not included in the habited building certification, demonstrate that it meets the equivalent of 15 points of the following LEED-NC requirements:

Prerequisite SS1 Erosion and Sedimentation Control

SS1 Site Selection

SS6 Stormwater Management (2)

SS7 Heat Island Effect (2)

SS8 Light Pollution Reduction

WE1 Water Efficient Landscaping (2)

MR2 Construction Waste Management (2)

MR3 Resource Reuse (2)

MR4 Recycled Content (2)

MR5 Regional Materials (2)



BE Credit 2.2:

Green Building Programs: LEED Certification (continued)

MR6 Rapidly Renewable Materials

MR7 Certified Wood

Innovation and Design (2)

BE CREDIT 3.1:

WASTE MANAGEMENT: REDUCE AND RECYCLE

1 - 2 POINTS

INTENT

To reduce the amount of waste hauled to and disposed of in landfills.

REQUIREMENTS

Meet one or both of the following requirements and publicize the availability and benefits of the drop-off points, stations or services:

Include at least one recycling or reuse station as part of the project available to all project occupants dedicated to the separation, collection, and storage of materials for recycling including, at a minimum, paper, corrugated cardboard, plastics and metals; or locate project in a local government jurisdiction that provides recycling services for these materials. If a plan for post-collection disposal or use does not exist, establish one. **(1 point)**

AND/OR

Include at least one appropriately installed compost station as part of the project available to all project occupants dedicated to the collection and composting of food wastes and yard wastes, or locate project in a local government jurisdiction that provides services for composting materials. Locate compost station appropriately to avoid potential animal conflict. If a plan for post-collection use does not exist, establish one. **(1 point)**

BE CREDIT 3.2:

CONSTRUCTION WASTE: MATERIALS EFFICIENCY

1 POINT

INTENT

To reduce amount of building materials needed, construction costs, and project waste.

REQUIREMENTS

Design building components using standard-sized units for masonry, structural and framing lumber, wallboard, plywood, advanced framing and other sheet goods. (i.e. wood components in measures of 2x4, 2x6, 2x8, etc.)

BE CREDIT 3.3:

CONSTRUCTION WASTE: REUSE OF ORGANICS

1 POINT

INTENT

To reduce organic waste from the project.



REQUIREMENTS

Compost, reuse, or share compostable materials generated by the project on-site or within 100 miles of the site. (1 point)

BE CREDIT 4: OUTDOOR SPACES

1 POINT

INTENT

To ensure connection to the natural environment, reduce the need for mechanical systems, and enhance the health and well-being of building occupants.

REQUIREMENTS

Provide accessible outdoor space(s) a minimum of 20' away from building exhaust, designated smoking areas, parking lots, and trash enclosures.

AND

Provide a space, independent of public sidewalks and access easements, greater than or equal to 15 square feet per occupant, for 10% of the building occupants, but not less than 100 square feet.
(1 point)

BE CREDIT 5: SIZE OF RESIDENTIAL DWELLINGS

1 POINT

INTENT

To conserve natural resources over the life of the building.

REQUIREMENTS

Do not exceed 4,000 square feet above grade for single residential units in either single-family or multi-family residences. (1 point)