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LEED Rating System Primer

Northland Newton Development, Newton, MA
May 2019

The LEED Rating System

LEED, which stands for Leadership in Energy and Environmental Design, is the most widely used green building rating system in the world. It was developed by the U.S. Green Building Council (USGBC), a national nonprofit organization, and since the first version of LEED was launched in 2000, it has seen many updates and iterations and is now available for virtually all building, community and home project types. LEED provides a framework to create healthy, highly efficient and cost-saving green buildings. LEED certification is a globally recognized symbol of sustainability achievement now being used in 165 countries. As of May 2019, there are 33,988 LEED Certified buildings in the United States (usgbc.org).

LEED is designed to address environmental challenges while responding to the needs of a competitive market. The LEED rating systems aim to promote a transformation of the construction industry through wholistic strategies designed to achieve seven goals:

- To reverse contribution to global **climate change**
- To enhance individual **human health** and well-being
- To protect and restore **water resources**
- To protect, enhance, and restore **biodiversity** and ecosystem services
- To promote sustainable and regenerative **material resources** cycles
- To build a **greener economy**
- To enhance social equity, environmental justice, **community** health, and quality of life

These goals are the basis for LEED's prerequisites and credits. To earn LEED certification, project teams must earn points outlined in the rating system chosen by adhering to both prerequisites and credits across all categories.

Across all of the rating systems, LEED has four levels of certification, depending on the point thresholds achieved:

- Certified, 40–49 points
- Silver, 50–59 points
- Gold, 60–79 points
- Platinum, 80 points and above

The Northland Newton Development includes several goals for attaining Certification with the USGBC's LEED Green Building Rating Systems. The entire 22-acre development is registered and will pursue LEED for Neighborhood Development (ND) v3 Certification at the Silver level. In addition, the historic Saco-Pettee mill building will be fully renovated into high quality office space with the goal of achieving LEED Core and Shell (CS) v3 Certification at the Silver level. And finally, all new buildings within the Northland Newton Development will be designed to be LEED 'Certifiable.'

LEED for Neighborhood Development

LEED for Neighborhood Development (LEED ND) was engineered to inspire and help create better, more sustainable, well-connected neighborhoods. It looks beyond the scale of buildings to consider entire communities. LEED ND is intended for use by new land development projects or redevelopment projects containing residential uses, nonresidential uses, or a mix (LEED ND website).

Rapid urbanization requires community planning processes that are ideal for green intervention and transformation. LEED for Neighborhood Development strategies such as affordable housing, climate protection, and improved public health can be a part of the larger solution to building sustainable and equitable communities (LEED ND Reference Guide, 2014).

LEED ND includes prerequisites and credits in all of the following categories:

- Smart Location and Linkage
- Neighborhood Pattern and Design
- Green Infrastructure and Buildings

The text below is excerpted and summarized from the LEED ND Reference Guide, 2014 and describes the goals and strategies for neighborhood design that the credits in LEED ND strive to achieve.

Smart Location and Linkage (SLL)

Smart Location and Linkage focuses on selection of sites that minimize the adverse environmental effects of new development and avoid contributing to sprawl and its consequences. Typical sprawl development—low-density, segregated housing and commercial uses located in automobile-dependent outlying areas—can harm the natural environment. Increased automobile travel is one of the most damaging consequences of sprawl. Vehicle emissions contribute to climate change, smog, and particulate pollution, which all are harmful to human health and natural ecosystems.

Research has shown that living in a mixed-use environment within walking distance of shops and services encourages walking and bicycling, which improve cardiovascular and respiratory health and reduce the risk of hypertension and obesity. An additional benefit of locations that require less driving is that households may be able to own fewer automobiles and cut transportation expenses.

Many potential building sites in urban locations have been abandoned because of real or potential contamination from previous activities. Remediation and reclamation of these sites makes them safer for the community and can also contribute to social and economic revitalization. Development of these sites also spares greenfields and makes use of existing infrastructure.

Neighborhood Pattern and Design (NPD)

Neighborhood Pattern and Design emphasizes the creation of compact, walkable, mixed-use neighborhoods with good connections to nearby communities. These vibrant neighborhoods provide many important benefits to residents, employees, and visitors and to the environment. Compact development facilitates access to public transportation because transit becomes more economically viable when supported by higher concentrations of population.

Features such as sidewalks and trails, street trees, inviting building façades, small setbacks, minimal parking lot area, and measures to slow automobiles also increase pedestrian activity. Public spaces, such as parks, plazas, and playing fields, can encourage social interaction and active recreation while helping control rainwater runoff and reducing urban heat island effects.

Communities with diverse housing types that accommodate a range of incomes, ages, and physical abilities
permit residents to live closer to their workplaces, help the community retain residents, and allow families to remain in the neighborhood as their circumstances change over time.

Green Infrastructure and Buildings (GIB)

Green Infrastructure and Buildings focuses on measures that can reduce the environmental consequences of the construction and operation of buildings and neighborhood infrastructure. Sustainable building technologies reduce waste and use energy, water, and materials more efficiently than conventional building practices.

Energy efficiency is an essential strategy for reducing pollution and greenhouse gas emissions, which are possibly the most negative environmental consequences of building and infrastructure operation. Production of electricity from fossil fuels is responsible for air pollution, water pollution, and more than one-third of U.S. greenhouse gas emissions. Building systems—electrical, lighting, heating, ventilation, air-conditioning, and
others—can be designed to significantly reduce energy consumption compared with conventional designs and
practices. The same gains are possible with neighborhood-scale infrastructure components like street lights, traffic signals, and water and wastewater pumps.

The environmental consequences of building construction can be lessened through the reuse of existing buildings. Reuse avoids the environmental effects associated with the extraction, manufacture, and transportation of raw materials, and it reduces the volume of construction and demolition waste, lowering disposal costs and extending landfill life.

Conventional building practices typically alter watershed hydrology and impair local water resources and
ecosystems. New developments can be designed to minimize changes to natural hydrology and stream health by reducing the velocity, volume, temperature, and pollutant content of rainwater runoff.

Urban heat islands are another consequence of standard development patterns and practices. The use of dark, nonreflective materials for parking, roofs, walkways, and other surfaces raises ambient temperatures when radiation from the sun is absorbed and transferred through convection and conduction back to surrounding areas. This increases cooling loads in summer, requiring larger HVAC equipment and consuming additional electricity. Planting of vegetation can reduce rainwater runoff, mitigate the urban heat island effect, and reduce the energy needed for heating and cooling. Trees also reduce air pollution, provide wildlife habitat, and make outdoor areas more pleasant for walking and recreation.

LEED for Core and Shell

LEED for Core and Shell (LEED CS) is intended for buildings that are new construction or major renovation for the exterior shell and core mechanical, electrical, and plumbing units, but not a complete interior fit-out.

LEED CS includes prerequisites and credits in all of the following categories:

- Sustainable Sites

- Water Efficiency
- Energy and Atmosphere
- Materials and Resources
- Indoor Environmental Quality.

These are the same credit categories as in the LEED Building Design and Construction (BD+C) Rating System which would be used as the guideline for the LEED 'Certifiable' standard for all of the new buildings.

The text below is excerpted and summarized from the LEED BD+C v2009 Reference Guide and describes the goals and strategies for core and shell projects that the credits strive to achieve.

Sustainable Sites (SS)
The Sustainable Sites credit section addresses environmental concerns related to the building landscape, hardscape and exterior building issues. These credits promote responsible, innovative, and practical site design strategies that are sensitive to plants, wildlife, and water and air quality. SS credits include the following measures:

- Selecting and developing the site wisely
- Reducing emissions associated with transportation
- Planting sustainable landscapes
- Protecting surrounding habitats
- Managing stormwater runoff
- Reducing the heat island effect
- Eliminating light pollution

Water Efficiency (WE)
The Water Efficiency prerequisites and credits encourage the use of strategies and technologies that reduce the amount of potable (drinking) water consumed in buildings. Buildings that use water efficiently can reduce costs, produce less sewage volume, and reduce energy and chemical use in water systems. The Water Efficiency category addresses environmental concerns relating to both building water use and disposal through the following measures:

- Monitoring water consumption performance
- Reducing indoor water consumption
- Reducing water consumption to save energy
- Practicing water efficient landscaping

Energy and Atmosphere (EA)
Buildings consume approximately 39% of the energy and 74% of the electricity produced annually in the United States, according to the U.S. Department of Energy. Electricity is most often generated by burning fossil fuels, whose combustion releases carbon dioxide and other greenhouse gases that contribute to climate change. Other forms of energy such as natural gas, nuclear power and hydroelectric all have adverse environmental consequences as well. As a result, globally, buildings generate nearly 40% of annual greenhouse gas emissions.

LEED buildings strive to address these issues in two ways. First, they reduce the amount of energy required for building operations, and second, they use more benign forms of energy. To that end, the Energy and Atmosphere prerequisites and credits address all of the following:

- Energy performance
- Tracking building energy performance through design, commissioning and monitoring

- Managing refrigerants to eliminate CFCs (chlorofluorocarbons that contribute to the ozone hole)
- Using renewable energy (on-site or off-site)

Materials and Resources (MR)

Meeting the Materials and Resources credits can reduce the quantity of waste while improving the building environment through responsible waste management and materials selection. The credits in this section focus on two main issues: the environmental impact of materials brought into the project building, and the minimization of landfill and incinerator disposal of materials that leave the project site. This category includes the following measures:

- Selecting sustainable materials
- Practicing waste reduction
- Reducing waste at its source
- Reusing and recycling

Indoor Environmental Quality (IEQ)

Americans spend an average of 90% of their time indoors, so the quality of the indoor environment has a significant influence on our well-being, productivity and quality of life. Recent reports by the Environmental Protection Agency (EPA) have designated indoor air pollution as a top environmental risk to public health. Indoor air pollutants cause health-related problems such as "sick building syndrome" and are linked to triggers for asthma and other respiratory illnesses. This credit category addresses concerns relating to a range of indoor air quality issues including occupants' health, safety and comfort, energy consumption, air change effectiveness and air contaminant improvement. The following strategies are included in the IEQ credits:

- Improving ventilation
- Managing air contaminants
- Specifying less harmful materials
- Allowing occupants to control desired settings
- Providing daylight and views

LEED 'Certifiable'

The term LEED 'Certifiable' does not have a definitive definition and what it entails varies according to the entity or municipality undertaking it. For example, the City of Boston, through its Article 37 Zoning Requirements, mandates that all buildings that meet the compliance requirements submit documentation demonstrating LEED Certifiability but not that they pursue official LEED Certification through the USGBC and GBCI (Green Business Certification Inc.).

The intent of this project is that the documentation prepared for LEED 'Certifiability' would be of a high level and complete enough to confirm intent and general compliance with prerequisites and credits, but will not be submitted in pursuit of official LEED Certification due to the time and resources required in producing and reviewing paperwork.