

# LEED & ACCREDITATION & CERTIFICATION:

## WHERE DOES PARKING FIT?

### LEED and Parking Structures

To date, the United States Green Building Council (USGBC) has not recognized a stand-alone parking structure as suitable for Leadership in Energy and Environmental Design (LEED®) certification. This is not to imply that there cannot be many sustainable design features incorporated into a parking structure to promote environmental sensitivity and reduce energy consumption. If there are retail, office, or other occupied spatial components within the structure, then LEED certification could be achieved. The parking structure can also contribute LEED points to a larger site development project.

### History of LEED

The USGBC originated as a program launched by the Natural Resources Defense Council (NRDC) in 1994. At the time, awareness of the declining state of the environment and the dependence on foreign oil was increasing. The first LEED Standard was introduced in 1998 as a single rating system for all projects. Today, there are nine different certification paths including separate requirements for schools, homes, retail spaces, laboratories, and core and shell construction.

The widespread acceptance of the program has led many design professionals, facility managers, building owners, property managers and others to ask, "Should I become LEED Accredited?" More than 43,000 individuals have taken the steps to attain LEED accreditation since the rating system was introduced. The USGBC describes such individuals as those who "have demonstrated a thorough understanding of green building techniques, the LEED Green Building Rating System, and the certification process."



Above: Photovoltaic panels were incorporated into the design of the Pennington Street garage in Tucson, Arizona. These panels supplement the facility's electrical system by providing 50KW of electricity and are tied directly into the City's power grid on the roof.

Acceptance of the USGBC and the LEED Rating System has spread worldwide. In 2003, a Canadian LEED Standard, LEED Canada NC V1.0 was introduced. Other rating systems have been developed including the Australian Green Star, the Japanese Comprehensive Assessment System for Building Environmental Efficiency (CAS-BEE), the Green Globes system and the United Kingdom's BREEAM. As a result, the World Green Building Council was established with a mission to encourage diverse standards and rating systems rather than adopt or endorse a specific one.

### How Companies Benefit By Encouraging LEED Accreditation

The presence of LEED Accredited Professionals (LEED APs) within a company demonstrates commitment to the principles of the Rating System. Within design organizations, LEED APs serve as knowledgeable resources who can contribute to a sustainable building or project design for a variety of facilities such as parking structures. LEED APs understand that key building design elements include the location and orientation on the site, optimal energy performance, control of lighting and HVAC, and efficient design of water and stormwater systems.

In addition, LEED APs are well-suited to develop sustainable site designs. Important aspects of sustainable site design are the selection of landscaping, rainwater harvesting, greywater systems and reduction of heat island effect, which results in artificial warming of the surrounding environment due to heat reflected off surfaces such as roofs and paving. Another significant design consideration is the reduction of light trespassing onto adjoining property.

For contractors, the presence of LEED APs within a company indicates an understanding of the requirements during construction of a LEED building including material recycling and reuse, construction methods and documentation. A key principle in sustainable design is the reuse of existing building components and building shell, which may be defined in the design documents, but must be supervised by a conscientious, knowledgeable contractor to ensure these elements are preserved during the demolition. Items that are torn down, like bricks and lumber, can be reused in other features of the building, such as around the landscaping site and to manu-



**Above:** The Pennington Street Garage is located in Tucson, Arizona. **Right:** The plaza provides a green roof for the parking structure at the Rams Head Center at the University of North Carolina, Chapel Hill campus, and reduces the heat island effect while recharging the storm water.

facture the interior furniture. Old concrete can be ground up and used as fill under and in the concrete slabs at grade.

A LEED AP will also be better prepared to develop the documentation required during construction. A Construction Activity Pollution Prevention Plan is necessary while an Indoor Air Quality Plan and a Recycling Plan are recommended. Additional documentation is needed to quantify material recycling and reuse.

### LEED-AP Benefits to Building Owners, Property Managers, and Building Operations and Maintenance Staff

As important as the design may be to the sustainable building project, a successful project requires the acceptance by all members of the team including the owner, property manager, and facility staff including parking professionals. These individuals make a commitment during the early stages of design to include sustainable aspects in the building design that lead to certification. As this group becomes more aware of the commissioning, maintenance, and operation of the building, it can provide a significant contribution. The continued "green" aspect of the building or parking structure requires a continuation of the practices of recycling and chemical and material control, as well as maintenance of systems so they will operate efficiently.

As owners, managers and other staff become LEED APs, they will acquire an understanding of the principles in the design and will, in turn, be better prepared



to contribute their knowledge of operations and maintenance during the design and construction processes.

### Design Features to be Considered When Designing an Environmentally Sound Parking Structure

As mentioned previously, stand-alone parking structures have yet to be considered for LEED accreditation; however, there are steps that can be taken to make parking structures more environmentally friendly. Design features to be considered when constructing a parking structure are:

**Recycled Materials:** Sustainable design of parking structures should include materials to extend the expected service life of the structure as well as materials that contain recycled content. Flyash is a material that offers two benefits to concrete – extended life and replacement of cement with a recycled material. Flyash is a by-product from coal fired electric generation plants. Due to the efforts of the power industry and EPA, this material is no longer vented into the atmosphere. The concrete industry has shown an effective use of the flyash by substituting it for some of the binding agents in the concrete mixture. The flyash reduces the

amount of energy intensive Portland cement in the concrete mix and thereby reduces the CO2 emissions per unit of concrete produced. Flyash also reacts with the cement hydration products and enhances the durability or expected life of the concrete.

**Low VOC Materials:** The opportunity exists to wisely select the materials that minimize the VOC Content and other chemicals that are harmful to construction workers, occupants of the building, and the environment. Some examples include the paints and sealants, coatings, adhesives, and other building materials.

**Rainwater Harvesting:** Roof deck runoff is a prime candidate for rainwater harvesting. This water can be used for irrigation, for greywater in toilets and urinals, and as a non-potable water source for washing the floor surfaces. All of which will reduce the stormwater directed into the municipal system.

**Renewable Energy:** There have been many structures designed with Solar Photovoltaic Collectors on the roof. Parking structures typically have a large roof area that will lend itself to this application and the electrical power that is generated can be used to reduce cost from the utilities. Horizontal building-integrated photovoltaic panels can also be used as a replacement for façade treatments.

**Reduced Heat Island Effect:** A vegetated or partially-vegetated roof deck or white concrete roof will serve to reduce the heat island effect. A normal dark colored roof absorbs

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sunlight and becomes hotter than the surrounding area, thus creating a temperature gradient. Parking structures mitigate the heat island effect by reducing the amount of dark asphalt site parking. The LEED credit can be attained by situating a minimum of 50 percent of the parking under the roof and maximizing the reflectance of the roof.

**Lighting Control:** Parking structures can feature several zones of lighting control. The most common is the photocell for the roof-mounted fixtures, which enables them to turn off during the daytime. This same photocell can be used to turn lights off along the perimeter in an open structure during the daylight hours.

**Light Pollution Reduction:** The use of full-cutoff lighting fixtures eliminates light beaming into the atmosphere. Adding shields will reduce the amount of light spillover from the structure to the outside or to adjacent properties. Full-cutoff lighting fixtures should be standard design features in all parking structures.

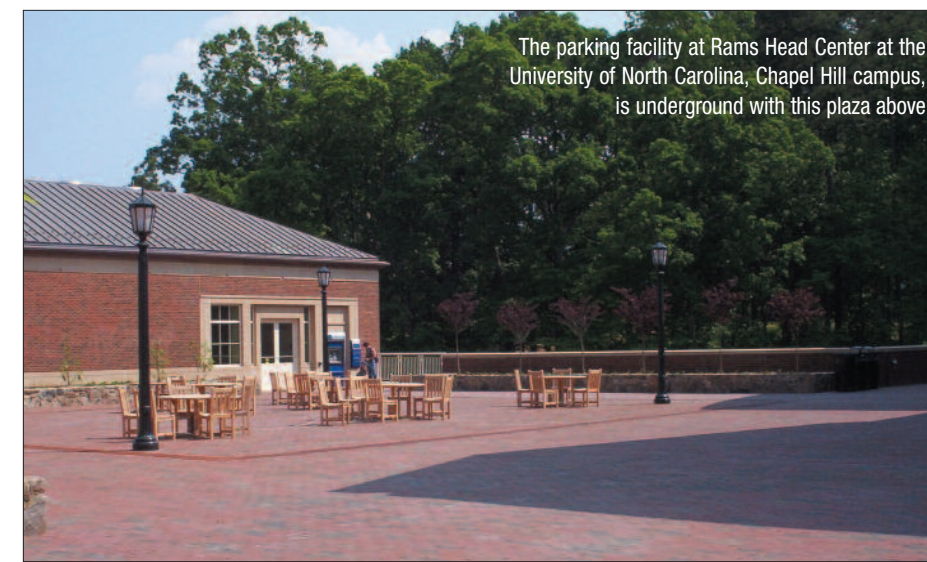
**Bicycle Storage & Changing Rooms:** Racks and changing facilities can be located inside the parking structure to encourage the use of bicycles.

**Low Emitting and Fuel Efficient Vehicles:** As the resurgence of electric automobiles becomes more mainstream, there will be a need for electrical outlets to recharge their batteries. If you decide to designate "Preferred Parking Spaces" for these vehicles, be sure to include outlets for recharging. As other fuel sources are developed, fueling stations can be considered to supply these vehicles. Additionally, preferred ride-share and hybrid vehicle spaces are a viable and inexpensive addition to the facility.

### Conclusion

There are countless measures one may take to conserve energy and benefit the environment when designing a parking structure, and this article touches upon a few of the steps one can take to make a parking structure LEED-friendly. At Walker Parking Consultants, our teams of engineers, consultants and architects work to identify and implement green practices and features in all of our designs, some of which have been addressed in this article as examples. We envision that one day the parking structure will eventually become recognized by the USGBC and further the great strides in making our environment more suitable for all of its inhabitants. ■

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