

The Seattle Central Library

Seattle Central Library is a striking example of green building on a massive scale. The 363,000 ft² building is over 75% larger than its predecessor, yet it has created a more inviting and inter-personal experience for its customers. Certified as a LEED Silver building, the Central Library was designed and constructed above and beyond conventional designs, even to surpass minimum LEED requirements. It is one of 11 LEED certified buildings in the city of Seattle, whose present goal is a LEED silver rating for all of its own major construction projects (www.djc.org). Besides being a state-of-the-art facility that serves about 8,000 people per day, the library also has brought new economic activity through tourism to the city. The Central Library stands as a testament to public co-operation, progressive government and innovative design approaches. Before we take a closer look at the simple, smart design concepts that have made this an international award-winning building, it is important to consider the history of the Central Library, and the continued investment the city and its citizens have made towards the library in the past.

The current Central Library building is the third to be built on the Fourth Avenue site. The decision to erect a central library was made in 1901; a decade after the city Department of the Library was created. Steel industry mogul and philanthropist Andrew Carnegie donated \$220,000 towards the building and furnishing of the first Central Library. The city purchased the site for \$100,000 and guaranteed \$50,000 per year in maintenance funds. In 1906, the first Central Library was opened. P.J. Weber of Chicago designed the 55,000 square foot building in the Beaux-Arts style for the cities 144,000 residents (www.spl.org).

In 1946, an 18,000 square foot addition was added to meet user demand of the city population, which had since tripled in size. Only sixteen years later, in 1960, a \$5 Million bond issue passed, and the second Central Library was built to replace the old structure. The \$4.5 Million second Central Library was designed by Bindon & Wright and Decker, Christenson & Kitchin and was one of Seattle's first buildings of modern international design. The library design featured large indoor open spaces, a drive-through service window, escalators, and air conditioning. In 1979, the city used a \$2.3

Million federal grant to update the library with updated furnishings and materials (www.spl.org).

Less than 20 years later, in 1998, Seattle voters approved a \$194 Million bond issue to double the total area of Seattle public libraries and build a new central library building. In 2000, the city of Seattle adopted their Sustainable Building Policy requiring all city-funded projects and renovations with over 5,000 ft² of occupied space to achieve a LEED Silver rating (www.cityofseattle.net). The third central library was designed by renowned OMA Dutch architect Rem Koolhaas in partnership with Seattle-based LMN Architects. The \$169 Million building project was completed in 2004, and certified LEED Silver with 34 of 69 possible points (www.usgbc.org, www.spl.org).

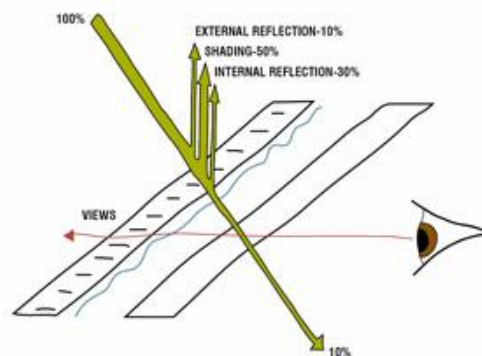
In the Sustainable Site category, the Central Library's construction met the prerequisite erosion and sedimentation control requirements. The library is built on the same urban site that the two previous central libraries have been in the past, not contribute to further sprawling development. The library is situated on bus transit routes, enabling easy public access (though this fact is probably more attributable to the development of public transit around the city center in the past century). The building gets credit for its ample bicycle parking, supporting emission free transportation. The library utilizes landscape and exterior design principles to reduce heat islands both on and off of the roof. On the roof, a light colored Energy Star roof reduces heat by reflecting both heat and light. On the ground, low-maintenance plant life shades the building and exterior spaces. It should be noted that although the Central Library didn't get stormwater management credit, it does have a rainwater collection system that utilizes a 40,000 gallon holding tank which then feeds the landscape through drip irrigation (chapters.usgbc.org, www.spl.org). Here is where the LEED stipulations could be more flexible in relationship to specific locations: the higher average rainfall in the northwest makes it remarkably harder to manage stormwater runoff for a building of that size, in comparison to a building of that magnitude in an arid climate.

As far as gaining additional LEED site credits, the library could have easily reserved 5% of its parking for fuel efficient vehicles or carpools and vanpools and gotten more sustainable site credit. It would have only amounted to a designation of 7 or 14 parking spaces and could have conveyed an important message to the city about lowering fuel emissions. The parking garage does contain two stalls where electric vehicles can be

charged. The building also received credit for reducing light pollution by having all non-emergency indoor lighting controlled by motion sensors in all office spaces and during non-business hours (www.spl.org).

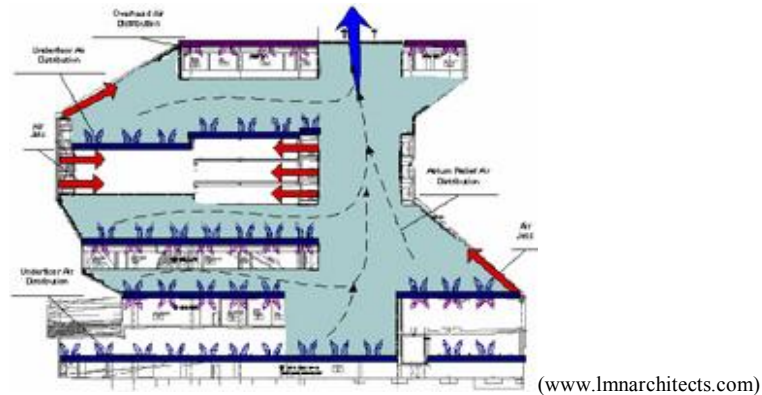
The building received three of five Water Efficiency credits. The Central Library was awarded two for its water efficient landscaping. All of its irrigation comes from non-potable stormwater collection, and at least 25% of the plants were chosen for their low-maintenance and drought tolerance. To my surprise, only two trees were replanted from the old library landscape. Potable water has been reduced by at least 20% in the building: the Central Library is equipped with waterless urinals and spring-loaded sinks (like those we have seen at the PADEP building).

The library received over half of the Energy and Atmosphere credits, meeting all of the prerequisites for systems and energy performance and receiving most credits for optimizing energy performance. The energy efficiency of the building is due largely in part to its light roof and triple glazed glass and aluminum mesh skeleton. These two design attributes drastically reduce the amount of heat absorbed into the building and therefore decrease operations of HVAC&R systems. The Library is entirely covered with a “net” comprised of these 4 by 7 foot glass diamonds, the southern half of which contain a fine aluminum mesh which reflects the sun off the interior layer of the glass, reducing heat build-up. Yet the windows still allow natural light to enter which reduces the need for artificial light. Air between the glass layers provides insulation for the building. The two inner layers of glass also contain krypton, which increases their thermal performance. Furthermore, the glass contains a low-emissivity coating specifically designed by the architect to reflect UV rays and heat, but let in light (www.seattleofseattle.net). The Central Library is the first building in the U.S. to use this innovative glass technology (www.spl.org).



(www.lmnarchitects.com)

The library employs an energy efficient displacement ventilation air distribution system on three of its floors. Ventilation occurs at floor level and improves energy efficiency by utilizing lower fan speeds and providing fresh air only to the space occupied by people. Separate heating and cooling can take place in different regions of the building depending on specific needs.



All controls are monitored by computer to maximize efficiency. From a theoretical standpoint, I think the library could have easily installed some PV cells on the roof, or sides of the building (since it is entirely cloaked in glass) to at least meet at least the 5% renewable energy credit, if not even greater energy renewability.

Personally, I feel the biggest shortcomings of this project are in the Materials and Resource category. Building a third central library on the same site as the previous *two* libraries and not being able to reuse either the shell or interior resources seems wasteful. I understand the architect's vision could not be met using the existing shell, and that certain efficiencies could only result from the construction of a new building. However, I believe at least 5% of previous library materials could have been reused. The desire to re-use materials may have been impeded by the stipulations of the LEED credit, as LEED bases the 5% resource reuse on the total dollar amount of the new project, not 5% of the previous materials. By the third library's price-tag, 5% reuse would equal \$8.5 Million! In lieu of a new building on the same site, a second large public library could have been built in another section of the city to stimulate social economic activity in region that may have needed it more than this established area. The building does store and collect its recyclables and gained two credits for diverting more than 75% of its demolition and construction wastes from landfill (www.paramountlighting.com). It contains over 35%

recycled content, and at least 20 % locally produced materials, half of which are locally harvested (www.usgbc.org).

The indoor environment could also have been improved. While the library made sure to install vibrant paints, floors, and finishes, the interior space only got credit for low-emissions carpeting. For a building project that has unbelievably high daily traffic and occupancy rates, and that seems to have taken great care in its interior design, I would think the materials chosen would be more environmentally sound. Bamboo, Maple and Worthwood composite scrap flooring were used in some of the building, yet polyurethane, aluminum and concrete dominate the floors (www.spl.org). Another design shortcoming in this category seems almost ironic to me: the building is covered entirely in glass, yet daylight is not visible in 75% of the spaces. Alternative interior designs should have been able to achieve this goal. The building does however have 90% views for all spaces, the result of staggering of levels inside gives views of upper and lower floor spaces.

In the last category of Innovation and Design, the Central Library received 4 of 5 possible credits. Their innovation in design credit for sustainability education is justly deserved, as the library has developed an extensive website to explain Seattle's sustainability, the Central Library design process, and provide supplemental information on sustainable design to the public (www.spl.org). The website contains information, videos, virtual tours, and media links to other green sites. The Central Library also received innovation credit because their recycled content exceeded the MRc4 credit by at least 25%; at least 35% of its total materials had recycled content (media.whatcounts.com). The Library got credit for having a LEED accredited professional work on the project. An additional credit was awarded for its water treatment system, utilizing only rainwater to irrigate the entire landscape.

There are additional remarkable design attributes of the Central Library that promote social community and access, increasing sustainability in a different sense, but outside the scope of LEED. The main volumes of the Central Library are displayed on the "books spiral," an open, gradually inclining, five floor system (similar to the layout of the Guggenheim in New York City). The volumes are easily accessible to patrons with various mobility needs. The library features automated check-in and self check-out technology, which enables the librarians to spend more time helping people access

information. Contained in the building are a children's library, teen center, performance auditorium, an art exhibition space, meeting rooms, and a technology center, as well as breathtaking reading rooms, and private staff and administrative offices. For its design ingenuity, both inside and out, the Central Library received many awards including Time Magazine's Building of the Year Award in 2004 (www.hoffmancorp.com). By drawing greater foot traffic downtown, the Central Library has generated \$16 Million in net new economic activity in its first year of operation (Berk and Associates, July 2005).

Equally as important, in speaking with a friend who had visited the Central Library on his last trip to Seattle, he commented that being in the library felt spacious and open, and that he would definitely return to the Library on his next trip. If other visitors share his enthusiasm, hopefully the third Seattle Central Library will become a long-term historical landmark of sustainable building.

References:

Central Library. A case study available at:

<http://chapters.usgbc.org/cascadiagbc/docs/pdf/SeattlePublicLibraryCaseStudy.pdf>

Cover Feature – August 2003: Seattle Central Library. Available at:

http://northwest.construction.com/features/archive/0308_Cover.asp

LEED Checklist for Seattle Central Library. Available at:

<http://www.usgbc.org/ShowFile.aspx?DocumentID=448>

LEED-NC Version 2.2 Rating System. Available at:

<https://www.usgbc.org/ShowFile.aspx?DocumentID=1095>

Seattle LEEDs the Nation in Sustainable Building. July, 2002. Available at:

<http://www.djc.com/news/en/11135658.html>

Seattle's New Central Library: A Lesson in Sustainability. Available at:

http://www.cityofseattle.net/dpd/stellent/groups/pan/@pan/@sustainableblding/document.s/web_informational/dpds_007263.pdf

Seattle's Policy and Progress. Available at:

<http://www.cityofseattle.net/dpd/GreenBuilding/CapitalProjects/SeattlesPolicy/default.asp>

http://media.whatcounts.com/onenw_cgbc/March_2005/SeattlePacificprojectreview.pdf

Seattle Public Library Economic Benefits Assessment. Berk and Associates, July 2005.

available at: http://www.spl.org/pdfs/SPLCentral_Library_Economic_Impacts.pdf

The Seattle Public Library Website. Available at: <http://www.spl.org>

Seattle Central Library. Available at:

<http://www.hoffmancorp.com/SelectedProjects/selected-project.aspx?title=Seattle+Central+Library&cat=Cultural>

Seattle Central Library Lights Up the City. Available at:

http://www.paramountlighting.com/seattlelibrary-appsheet_rev8-04.pdf