Green Roof Designed to Reduce Stormwater Runoff into the Mississippi Sets Sustainable Design Example

Project in progress, before green roof installation.

The five-story Central Public Library of Minneapolis, Minnesota, completed in the spring of 2006, is an architectural benchmark for Midwestern urban landscapes and sets an example for sustainable building design. The new library features an energy-efficient design complete with three green roofs and is being billed by the city as an architectural jewel that will support a vibrant downtown culture.

The landscaping architectural company, Kestrel Design Group, was faced with the challenges of 1) creating an extensive green roof that would retain stormwater runoff while supporting the high-tech needs of a modern information hub and 2) preserving the library's fragile historical collections. For help on the project's green roof, The Kestrel Design Group selected Henry Company, based on its track record with green roofing systems.

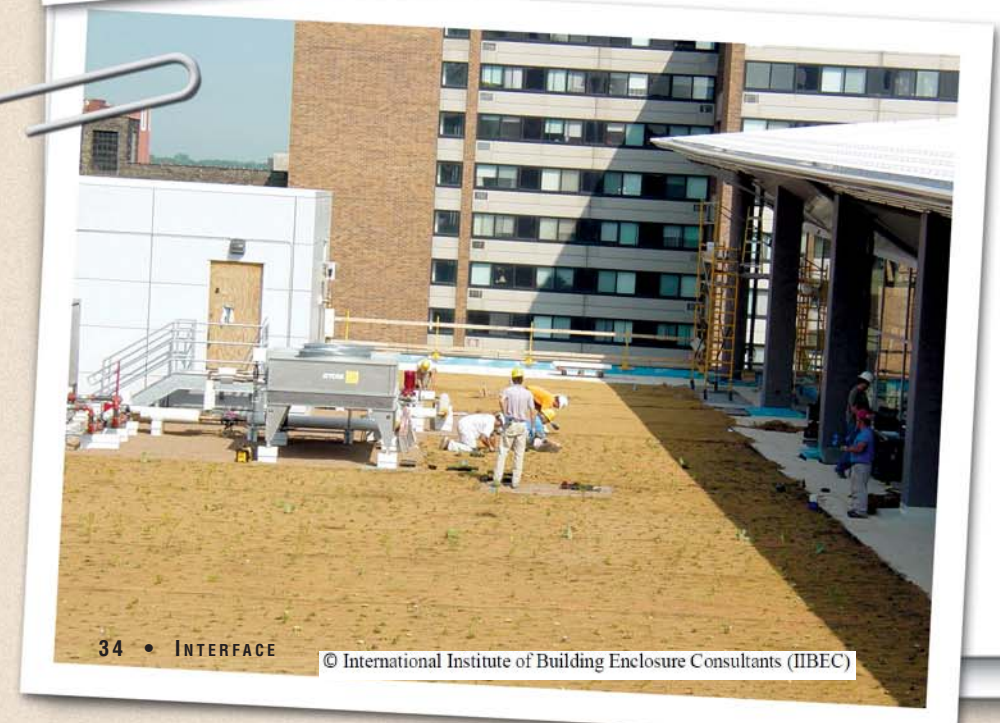
The green roof infrastructure meets both the Environmental Protection Agency (EPA) and the Mississippi Watershed Management Organization's stormwater mandates. The importance of managing stormwater runoff into the Mississippi River from the downtown Minneapolis development was a critical design component in the specification of the green roof for the new building.

Left: The secondary drip watering system is integrated into the waterproof membrane, over the green roof underlayment.

The Central Public Library's green roof system employs two water management systems working together to retain the stormwater that reaches the property for capture and reuse. First, directly beneath the vegetation across the entire growing platform, the green roof uses a Henry® DBR Rootbloc System. This water management system captures a portion of stormwater in small plastic cups, which then re-hydrates the green roof by evaporating upward through the soil. Water in excess of what the subterranean plastic cups can hold is channeled into a secondary water management system.

This secondary water system collects excess stormwater in below-grade water storage tanks. The water collected in these tanks is then pumped back onto the roof, where the rooftop gardens and streetscape are automatically watered with a slow-drip watering system.

The Central Public Library's three green roof systems cover more than 18,560 square feet, with an extensive vegetation design that includes prairie plants and hardy indigenous vegetation that thrives in Minnesota's harsh climate. The green roof landscaping grows in a specially designed "light" growing medium, and with two water management systems, very little mainte-



Green roof planting in progress.

Left to right: waterproofing, dirt, and soil.

nance is required. The landscape design is intended to connect the culture of the community with nature. A variety of plant species (totaling more than 19,000 individual plants) was chosen to form a changing wave of colors across the roof during different seasons, thus reflecting the Mississippi River's strong influence on Minneapolis street grid and building design.

On a 90-degree day in July, Central Library officials measured noontime temperatures on the building's roof. The black asphalt portion was 170 degrees, while the green roof was 92 degrees. A few days before the library opened, building officials tested the AC equipment. The intake air readings on the green roof were so much cooler than what they were used to that "they thought their equipment was broken," noted Peter MacDonagh, founder of The Kestrel Design Group.

Not Just a Reduced Watershed Project

The benefits anticipated for the green roofs on the new library go beyond stormwater management and include:

- Reduced building energy consumption.
- New green space in downtown Minneapolis.
- Reduction of urban heat island signature.
- Improved internal air quality.
- Increased longevity of the library's roof system.
- A model for clean and sustainable building design in Minneapolis.

The waterproofing product used was Henry® 790-11, a hot-applied, rubberized asphalt waterproofing membrane that currently protects more than 1 million square feet of green roofs, plazas, foundation walls, and parking garages throughout North America and Europe. The system is backed by ISO registration, UL Class A fire rating, CCMC approval, and LARR listing. The Henry® 790-11 system is applied by a network of Henry-trained and certified contractors to ensure proper installation and peace of mind for building owners.

A rendering of the green roof design.

Green Roofing Contractor

Rosenquist Construction Inc.
Greg Reiser, PM
Minneapolis, MN

Green Roof Design

The Kestrel Design Group
Edina, MN

Green Roof Waterproofing Manufacturer

Henry® Company
El Segundo, CA

Minneapolis Central Public Library

Minneapolis, MN

Above left: The green roof basin is flooded to test the waterproof seal.

Installation of a coconut windscreen over the growing medium.