

PROJECT PROFILE

University of Chicago Center for Biomedical Discovery

Forward-Thinking City Gets Green Rooftop

The University of Chicago is remarkable for many reasons: its reputation for academic excellence is reflected in its affiliation with 49 Rhodes Scholars and 85 Nobel laureates. Its commitment to scholarship can best be seen in its extensive library system which hosts the largest collection of print volumes in the nation. Of particular note is its dedication to scientific research, accomplished through its 12 research institutes and more than 100 research centers – which have produced such leaps in knowledge as the first manmade nuclear reaction and the development of radiocarbon dating. This final focus of the university expanded with the recent addition of the Jules and Gwen Knapp Center for Biomedical Discovery, a 330,000-square-foot, 10-story medical research facility.

When the facility was conceived, it was done so with the express purpose of innovation and interaction. As the first facility of its kind in the United States, it is devoted to improving health through research on the influence of genetic factors on disease, especially pediatric disease. Moreover, the building itself was designed to encourage a culture of teamwork with an innovative, state-of-the-art structure containing modern appointments such as double-height spaces and offices that offer views into labs and support spaces. One of these appointments was a vegetative roof system of approximately 30,000 feet that tops the facility's mechanical penthouse. A contractor involved with the project made the decision to use products manufactured by Carlisle Coatings and Waterproofing Incorporated (CCW), a leading provider of waterproofing and deck coating technologies. CCW's green roof products, designs and solutions would make the Center for Biomedical Discovery the latest Chicago facility to join the growing eco-friendly movement.

Chicago is one of the most forward-thinking cities in the nation when it comes to green building, and rooftops are an important part of the process. The city installed one of its first public roof gardens on its city hall a decade ago, and the trend has only grown since then. Today reflective rooftops are required on public buildings, and new commercial structures larger than 50,000 square feet are required to include a minimum vegetative roof portion. The Center for Biomedical Discovery was designed with a green roof for the purpose of allaying problems associated with heavy rains. "The primary reason for the green roof application was water retention," said Carlisle Representative John Dashner. "It was important that the building help to mitigate rainwater runoff to prevent localized flooding."

The roof garden installation began with the application of CCW-500R to the concrete roof decks. CCW-500 is a single-component, hot-applied waterproofing membrane that cures to form a flexible but durable monolithic waterproofing membrane. It also contains a special blend of renewable content, including 26% pre-consumer material, which can help contribute toward LEED® credits in new building applications. The double-layer reinforced CCW-500R system adheres tenaciously to ensure that water will not migrate beneath the membrane. After priming the surface, crews pretreated all joints, cracks and penetrations with the hot-applied membrane and reinforcing fabric to ensure durability.

University of Chicago Center for Biomedical Discovery at a glance

Location:
Chicago, IL

Carlisle Coatings & Waterproofing Contractor:
John Dashner

Carlisle Coatings & Waterproofing Products:

- CCW-500R
- Protection Board-HS
- RMB 400 15-mil Root Barrier
- MiraDRAIN® 9800
- MiraDRAIN GR9400
- Growth Media
- Sedum Cuttings



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While applications of the system typically warrant only 125 mils of reinforced waterproofing, this system called for a 215-mil layer of hot rubber due to water retention requirements of the system, which would include CCW growth media. However, the added thickness ended up benefiting the project in a different way: the waterproofing membrane provided optimal protection from the harsh Chicago elements on this particular job as the roof's only layer of protection for several months following installation. "After the application of the CCW-500, the contractor applied a protection course," said Dashner. "The roof was left exposed for months prior to the installation of the growth media and plants!"

When roofers finally returned, their work was cut out for them: not only was it a challenge moving the materials from the ground to the rooftop and combating Chicago's signature high winds, the crew had to contend with a new addition to the project. "A massive chiller unit was installed on the penthouse," said Dashner. "Much of the chiller unit was installed after the waterproofing membrane, so repairs and a water test were needed prior to the installation of the rest of the green roof system." Once the issue was addressed and tests determined the watertightness of the membrane, crews were prepared to begin installation of the remainder of the system.

A green roof system depends on the precise arrangement and number of variables, for practical as well as aesthetic reasons. CCW's green roof creations are designed to the needs of each specific building; often, they are custom-made with the help of landscape designers to ensure the highest quality. The typical green roof system includes the CCW-500R waterproofing layer followed by CCW Protection Board-HS, is a heavy-duty modified bitumen protection board consisting of a fiberglass mat with rubber and asphalt blend for elasticity and flexibility. Its dimensional stability and strength can handle the weight of the vegetation installed over it, even when the soil is saturated with heavy rainfall. One of the gravest concerns in a vegetative roofing system is that roots will migrate down to the waterproofing layer and work their way through to the roof, causing massive damage. To prevent this from occurring, crews laid CCW's patented RMB 400 15-mil root barrier, a polyethylene-reinforced multifilament grid designed to prevent root migration into the waterproofing system.

Chicago's heavy rains can flow off of buildings and flood surrounding streets which is why the water retention properties of CCW's green roof system were such a crucial component. However well such a system retains water, managing and filtering water drainage remains a concern in any roof garden application. CCW's MiraDRAIN layer provides additional water retention properties while filtering water and directing drainage. The system's insulation was sandwiched between MiraDRAIN 9800 drainage composite on the bottom and CCW's MiraDRAIN GR9400 on top. MiraDRAIN 9800 is a high-strength drainage composite consisting of a high-impact polystyrene core and a nonwoven filter fabric, while MiraDRAIN 9400 contains a polystyrene core with drainage holes, a moisture retention fabric and a woven filter fabric.

Finally, the growth media – a type of soil engineered specifically for high water retention and ability to sustain the system's plants – was installed. Four inches of growth media would sustain the variety of vegetation selected for this particular project. "They installed sedum as cuttings," said Dashner. "The planting media was topped with a variety of eight different sedums. Wind was a bit of a challenge with the cuttings, but a biodegradable netting system was utilized to keep them in place."

Today, the facility is in full swing, introducing to the world innovations and technologies that will change lives for the better – a charge for which the university has long been lauded. Researchers are working together on tailor-made cancer treatments and improving children's health through research on the influence of genes in pediatric diseases, to name only a notable couple of their endeavors. Just as millions benefit from the long hours of dedicated study and experimentation completed within the walls of the Knapp Center, so are millions of Chicagoans benefiting from the ambitious construction projects of the environmentally conscious university. The CCW roof garden assembly is only the city's most recent contribution to a healthier, more beautiful world.

