



NATURAL INTERIOR DAYLIGHT

A REPORT TO ADVOCATE FOR SOCIALLY RESPONSIBLE SUSTAINABLE DEVELOPMENT

ARCHITECTS CHOOSE MODULAR GLASS SKYLIGHTS FOR CORNELL UNIVERSITY

ENEREF INSTITUTE EXAMINES HOW NEW MODULAR SKYLIGHTS MODERNIZE SPACE AT CORNELL DEPARTMENT OF ARCHITECTURE.

As one of the most iconic college structures in the United States, the 19th-century Sibley Hall dome has been a visual reference point on the Cornell University campus for 122 years.

East Sibley Hall is home to Cornell University's College of Architecture, Art, and Planning (Cornell AAP), whose Department of Architecture is one of the world's most prestigious architecture programs. Originally constructed in the late 1800s, by the early 2000s Sibley

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STELLA BETTS | *Partner of Leven Betts*

Hall had undergone numerous transformations. The third floor, having served as an engineering lab, design studio, and home to the university Fine Arts Library, was in great need of attention.

On the roof of Sibley Hall were two skylights that were decades old and had frosted over and faded with time—the amount of natural daylight coming through the skylights had been reduced significantly. The exterior steel frame of the building was in extremely poor condition and leaked; and, after many years of housing the weight of the Fine Arts Library, the top of the building had begun to spread apart and the exterior walls were cracking.

“The existing space was in pretty bad shape,” said Feuerstein, Architect with Leven Betts Studio.

The challenge was how to modernize East Sibley Hall’s third floor in line with the college’s goals of colocating faculty offices adjacent to student’s studios and creating a collaborative, multiuse space; maintain the integrity of the designated historic building; and satisfy the discriminating needs of the Cornell AAP architecture faculty. The renovation

also needed to satisfy deferred maintenance issues, including structural repairs, window replacements, and a new roof.

MAXIMIZING NATURAL LIGHT

A significant design element to modernizing the repurposed third floor space was the intelligent use of natural interior daylight.

After conducting extensive research, LEVENBETTS chose the VELUX Modular Skylight system to replace the existing skylights.

VELUX supplied a custom-designed, pre-engineered, all-in-one modular skylight system that simply snapped together, like Legos, in six module sizes and configurations. All six module designs were made with LowE3 tempered glass. VELUX Modular Skylights were designed in partnership with the London-based architectural

firm, Foster + Partners. To reduce thermal transfer between outdoor and indoor environments, the skylights use a proprietary pultruded fiberglass polyurethane frame.

“We wanted to have as much daylight and visibility as made sense,” said Feuerstein. “We were looking for the best-looking, high-performance, most minimal skylight.”

Betts concurred, “We thought the modular skylight design was beautiful.”

East Sibley Hall is the first U.S. building to install the recently introduced modular system. What makes these skylights different is that, like traditional windows, a single module panel can be easily replaced, if necessary, by simply sliding in a new skylight panel module.

“There were many ways in which the modular system was advantageous,” said architect Stella Betts., Partner of Leven Betts “That we could actually pop out one of the modules was really appealing to everybody. And it also made for a much easier installation.”

AS PART OF OUR NATURAL INTERIOR DAYLIGHT INITIATIVE, *Eneref Institute examined the lighting installed in East Sibley Hall at Cornell University. Eneref interviewed key participants for this advocacy report including: Project Manager Art Stern and Construction Manager Chris Davenport from Cornell University; Adam Yarinsky, Principal of Architecture Research Office (ARO), the firm hired to develop the site plan; Norman Rockefeller, from Pike Company Construction, the general contractor; Stella Betts and Andrew Feuerstein from LEVENBETTS, the lead architects; and Mitul Parekh from Kugler Tillotson Associates, a lighting firm hired by LEVENBETTS to integrate supplemental electric lighting.*



MODULAR SKYLIGHT PANELS

A single module panel can be easily replaced, if necessary, by simply sliding in a new skylight panel module.

“It’s a really well built, well detailed, high thermal performance skylight,” said Feuerstein. “And it’s quite affordable because it’s modular.”

Today, the first view when entering the long rectangular room is the natural light from the two new skylights, each of which runs a length of 50 feet, by a width of five feet, with 25 panel modules.

“There’s a beautiful, even light,” said Betts.

Kugler Tillotson Associates was hired by LEVENBETTS to properly integrate supplemental electric lighting with the daylighting when there was little or no contribution of light from the skylights.

“We were strongly cognizant of the fact that it needs to work well when there’s no daylight,”

said Parekh, who worked on the project.

Tillotson was also responsible for calculating the foot-candles and the watts per square foot. Their specifications called for electric lighting fixtures from BartCo, Lightlab and Gammalux. A Lutron system controlled the electric lighting zones, which was integrated with the HVAC control system.

THE SKYLIGHTS OPENED MANUALLY OR AUTOMATICALLY

Four of the skylight modules, above the offices, open to allow airflow for natural ventilation.

These venting modules have rain sensors to monitor and control the skylights during inclement weather. And because wind gusts are a precursor to storms, sensors also detect high wind changes and close automatically. The skylights

are set to close during winds in excess of 20 miles per hour, or at the first drop of rain, whichever comes first. They can also be opened and closed manually.

PRESERVING THE HISTORIC ENVELOPE

The completely redesigned space includes faculty offices, a studio pin-up area, and an open studio space for students. Glass doors and walls between the faculty offices and studios create transparency and a sense of activity on either side, and also bring borrowed light from the office windows into the student space.

The entire project was driven by Kent Kleinman, Gale and Ira Drukier Deans of Architecture, Art, and Planning, with a mandate to maintain the historic character of the building.

THE MODULAR SKYLIGHTS WERE DEVELOPED BY VELUX WITH FOSTER + PARTNERS ARCHITECTS.

The design meets all international standards and requirements for commercial buildings and offers an array of solutions with one module design.

“Adaptive reuse is a large part of our urban future and what we teach at AAP,” says Kleinman. “With this project, we took the time to consider preservation versus reconstruction versus new construction and whether architectural authenticity resides in the material itself or in the design and specifications.”

Because of the age of the building, adding skylights to the roof required special vigilance for thermal tightness and water tightness, according to those involved in the project. The skylight manufacturer was closely involved in every step, from planning to installation.

“Once we started working with VELUX everything went incredibly smoothly,” said Feuerstein.

Walter B. Melvin was hired as the consultant by LEVENBETTS to advise how to gain approval from the historical review board to make the changes to East Sibley Hall. The space plan was created by ARO with a focus on preserving the existing historic envelope of the building. Cornell

hired ARO to perform a conceptual pre-design study and framework for the space that LEVENBETTS ultimately created. The ARO plan included distributed daylight into the space.

“We tried to be as flexible as possible in the planning of the space so that the design studio could be configured differently in the future,” said Adam Yarinsky, FAIA LEED AP, a principal with ARO.

The plan, spearheaded by Yarinsky, looked at how to accommodate the program, and organize the offices, studio space, and support space with a basic organization of the floor plan. Yarinsky used daylight to open up the space as much as possible.

Although Cornell did not pursue LEED certification, Cornell’s design contract with LEVENBETTS stipulated they must deliver a LEED Silver equivalent.

“We tracked our progress against a minimum target of LEED Silver,” explained Cornell’s Art Stern, Project Manager. “In fact, during

our LEED charrette, the project was the equivalent of LEED Gold.”

Asked if having a client whose occupants included 150 outstanding architects made the project more challenging, Betts said, “I do think we had a very clear directive from the client.”

PROJECT FUNDING FROM MULTIPLE SOURCES

From pre-plan to completion was five years. The skylight modules were installed in under two weeks, including the demolition of the older skylights. Because the skylight system was prebuilt in the factory, VELUX was able to provide an accurate estimate of man-hours for the installation labor.

Funding for the project came from Cornell AAP with additional funds from the university’s maintenance department because the renovations addressed necessary maintenance issues.

Cornell University issued an RFP for the project. There was a matrix of criteria for invited consultants who responded with a proposal. Cost was one of the factors, but not the dominant factor. Included in the review process was demonstration of past performance of similar style and nature, ability to meet target schedule, proposed staff on the project, and other successfully completed projects. LEVENBETTS emerged



NATURAL VENTILATION

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from that process as the selected consultant.

The Cornell selection committee included Dean Kleinman, the University Architect's office, and facility managers.

PARTICIPANTS REPORT SUCCESS

Stern said the university was exceptionally satisfied with their choice of LEVENBETTS.

"They delivered great value and were very responsive," said Stern.

ARO's research-based methodology-grounded in understanding the client's mission-determined how Sibley Hall could accommodate the students and programs.

Everyone interviewed for this report credited the successful installation of the skylights to

the support and detailed shop drawings provided by the skylight manufacturer.

"I can attribute the easy installation to Velux," said Davenport, Cornell University FS Engineering & Project Administration.

Cornell's Art Stern agreed. "They were with us throughout the entire process, from schematic design all the way through the construction administration."

And Betts said, "Velux and their representatives were incredibly hands on."

To set the module panels into place the general contractor for the project installed the skylights with two workers on the roof and two inside.

"Our workers had no prior experience with this type of skylight and they went in without issues," said Norman Rockefeller of The Pike Company, the GC.

Davenport agreed. "Actually, it was seamless... a very easy installation," he said. "If you had asked me before the project, I would have said my biggest fear was installing these new skylights in a 122-year-old building. Honestly, it was one of the easiest parts of the project."

COVER PHOTO CREDIT

Sabin Design Lab at Cornell AAP, funded by National Science Foundation.

Research and reporting compiled and provided by Eneref Institute. Additional information generously provided by Cornell University, ARO, VELUX, Kugler Tillotson, Leven Betts and The Pike Company.



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