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Langara College Science and Technology Building

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On October 12, 2016, Vancouver's Langara College proudly opened its new Science and Technology Building. A true representation of state-of-the-art architectural design and ground-breaking systems, the five-storey facility features a threestorey, cantilevered structure that extends 56 feet from the core of the building, creating a bold, welcoming entrance to the campus.

"We are very proud of it as you can imagine," says Ian Humphreys, provost and VP, academic and students. "Our previous science building was built in 1970 and given the advances in technology that happened in the last 40 years, it was time for a new facility." He says the science programs operating there include chemistry, biology, physics, kinesiology, astronomy, nursing and computer sciences. "Primarily it is for any class program that requires benchtop laboratory facilities and ventilation systems," he explains.

"We've also built some high-tech simulation rooms. This comes from an evolution of nursing practice and education. Because you can't rely on practicum placement in hospitals, we're doing additional education using simulation with high fidelity mannequins that we program to simulate different conditions. From our simulation centre, we can film students and observe them while they do the procedures, then have debriefing sessions to talk about what they did and give feedback."

Built to LEED Gold standards, the Science and Technology Building has incorporated several green building features. Reflective and green roofs, low-flow fume hoods with adjustable sashes and an energy-efficient cladding system are just some of the high-tech options in the complex.

Dwayne Doornbosch, project manager with Bird Construction Company says the oculus is another significant wow factor for the project. "Because it goes through the centre of the cantilever, when you drive under the building you can look up through it and see the open sky above. The oculus draws light into the circular lounge space around it so when you're sitting in the area, it's almost like a vertical skylight. It's multifaceted and was extremely complicated to build because not only are there no flat sides to it, but it dips in and out."

The other side of the building features a grand atrium that brings extensive light into the building. “This is a lightwell that extends up to the sixth floor,” says Doornbosch. “Structurally, that side of the building is cantilevered as well but it has been enclosed for extra floor space.”

Typically atriums are a challenge to heat and cool, however Harold Stewart, principal at AME Consulting Group Ltd. found a way around that. “The atrium runs the whole length of the side of the building and with the height could contribute to heat loss, or be exceptionally warm,” he says. “To counter that, we installed radiant heating in the floor and spot cooling in various areas to keep the collaborative spaces for students at a comfortable temperature.” Stewart says the extra layer of envelope around the building provides shading to reduce air conditioning loads.

Unlike many construction projects, where buildings are erected floor by floor, with concrete being poured as the levels are built, the opposite was true for the Science and Technology Building. “With the cantilevers on both sides, the concrete had to be poured in a certain pattern in order to load up the structure in sequence,” says Greg Smith, principal, Weiler Smith Bowers Consulting Structural Engineers.

“Another component that was different than a normal build was carrying the steel structure right down to the foundation and encasing it in concrete at the core,” he says. “Normally you can start with a concrete base and steel from there, but the overturning forces were so high with this building there was no way that we could anchor that at ground level.”

Although the construction team was working with a tight budget throughout the build, the state-of-theart energy system was so efficient they ended up with an extra five LEED credits. “A lab building is a huge energy consumer and after the electricity does what it does it becomes heat, which is vented through the exhaust,” says Jeff Weston, principal, TC Thermenex Inc. “There are two ways to reclaim that energy. We actively remove the thermal energy from the exhaust and put it into our Thermal Gradient Header. The result of the process is over 10 times more energy reclaimed than passive energy recovery. We reuse that energy for heating domestic hot water, space heating loads within the building, and more.”

The other innovation Weston installed for the building is Thermenexin- a-Box (TIAB). “This is a prefabricated mechanical room that we put on the roof prior to the building being finished,” he says. “It saved capital cost by reducing building area, and construction time by removing the main HVAC plant fabrication from the critical path of construction.”

A lot of thought for the future went into the design of the building, including a redundant electrical system. “We are anticipating it may become a research building,” says Amir Tavakoli, principal, AES Engineering. “The benefit of having a redundant electrical distribution system is it gives a better opportunity to keep the power to the building uninterrupted.”

Tavakoli says his team spent significant time co-ordinating with the architects and working on concepts to reach specific illumination requirements. “The controls of ASHRAE 2010 were deployed for this project almost a year and a half before it became a requirement.”

Landscaping added another element of esthetics, merging with practicality and function. “The building feels nestled in the surrounding landscape through the preservation of existing mature trees on site,” says Chris Phillips, principal at PFS Studio. “In keeping with this greenery, we featured a large, planted installation that runs the full length of the site. This bold, oversized gesture resonates with the scale and unique pedestal and cantilever expression of the building. The linear planting bed doubles as an ornamental plant feature and as a vegetated bioswale to collect and filter rainwater.”

LOCATION: 160 West 49th Avenue, Vancouver, B.C.
OWNER/DEVELOPER: Langara College
ARCHITECTS: Teeple Architects / Proscenium Architecture + Interiors Inc.
GENERAL CONTRACTOR: Bird Construction
STRUCTURAL CONSULTANT: Weiler Smith Bowers Consulting Structural Engineers
MECHANICAL CONSULTANT: AME Consulting Group Ltd.
MECHANICAL SPECIALTY CONSULTANT: TC Thermenex Inc.
ELECTRICAL CONSULTANT: AES Engineering Ltd.
CIVIL CONSULTANT: Aplin & Martin Consultants Inc.
BUILDING ENVELOPE CONSULTANT: Read Jones Christoffersen Ltd.
LANDSCAPE ARCHITECT: PFS Studio
TOTAL SIZE: 132,000 square feet
TOTAL COST: $44 million
