



acquired, allowing the architect to tie the two new structures together above the lane from the second to the ninth floors. A series of double-height lounge spaces are connected by a feature staircase running through the building to the top floor above the laneway, giving all occupants a common social space.

The two facilities have separate lobbies at grade but on upper floors the departments are integrated as much as possible, Keen points out.

The building is clad in a glass curtainwall, unlike the original campus recognized by its “heavy brick” buildings punctuated with small windows. “The knowledge institute utilizes expansive vision glass which allows natural light to penetrate deep into

the building,” says Smith. Horizontal glass fins (solar shades) are applied to the south facade and vertical glass fins to the west side to minimize heat gain in summer months.

Scheduling the construction process was complicated by the congested downtown site, as well as the close proximity to the main campus’s Emergency entrance. The fact that the new building takes up 100 per cent of the site posed a challenge for the general contractor, Eastern Construction Co. Ltd. “There were no real laydown areas so everything (materials and equipment deliveries) had to be on a just-in-time basis,” says Bryan Arnold, vice-president of construction for the general contractor.

**T**he Li Ka Shing Knowledge Institute nearing completion at St. Michael’s Hospital in downtown Toronto represents a new model in health-care design: a combination research/education centre that in part aims to shorten the time it takes research discoveries to make it to bedside applications.

That’s an important objective in the world of medical research where studies indicate that it typically takes 10 to 15 years for important research to find its way to the patient level. In an attempt to speed the process, the new building is designed to promote interaction between researchers, educators and research/education groups, says Michael Keen, project director, St. Michael’s Hospital.

The nine-storey institute is comprised of the Keenan Research Centre and the Li Ka Shing International Healthcare Education Centre. Initially, the hospital planned to install the departments in separate buildings but the architect instead chose to consolidate the two. “We wanted to create synergies between the educators and the researchers,” says Matthew Smith, project architect, Diamond + Schmitt Architects Inc., noting that research staff was spread out at the original hospital campus.

It is important to note that the two centres share information and space; all made possible by the new building. The auditorium and conference facility required for the research centre, for instance, were designed for flexible use as classroom space for the educational centre. “It feeds into the idea of translational research. It’s a huge theme in the research world,” says Smith.

An underused nurses’ residence, a laundry facility and a parking garage were demolished to make way for the new building, which is across the street from the main hospital campus. Air rights (from the City of Toronto) over a laneway dividing the site were

## Li Ka Shing Knowledge Institute – St. Michael’s Hospital

by Don Procter



RENDERINGS COURTESY ST. MICHAEL'S HOSPITAL

An adjacent lane was rented for material laydown. The two tower cranes were installed outside the flight path of helicopters landing on the main hospital campus roof.

The building's foundation consists of shoring and lagging on three sides. A caisson wall was installed on the north side to protect the adjacent building. Underpinning a nearby building's foundation was required during excavation for the new centre. The poured-in-place structure is heavily reinforced to allow for a future four-storey addition.

Arnold says the solar shades on the curtainwall are made of glass, rather than the typical metal shades. Climbers (elevated scaffold platforms) were erected around the building to install the shades, a "very labour-intensive" process.

The interior finishes presented challenges for the building team. Coordinating the design and installation of utilities infrastructure in ceilings was a prime example, says Arnold, noting that the work took more than a year to complete. 3D computer software modelling was used for the design of the complex mechanical room on the ninth floor.

Arnold says walls, ceilings and floors in labs required special finishes, including double-sheet cement board

with lead sheet lining in walls. The cement board is skim coated smooth with a cement-based product and then coated with epoxy paint. A four-step built-up epoxy floor finish took five to six working days to complete.

Unlike office buildings, medical facilities like the Li Ka Shing complex pose atypical structural engineering challenges. The building's mix of uses created a non-uniform layout which complicated the structural engineering process, says Paul Sandford, principal, Carruthers & Wallace, structural and civil engineer.

The elevator cores in both buildings are "eccentric to the centre of the mass" and the auditorium required a wider space than the column grid allowed so pairs of sloping columns were specified, rather than a transfer girder, Sandford points out. In addition, the research department required many shafts and sleeves (openings in the floor). The education centre required some large cantilevers because it is a narrow building. "It's one span plus cantilever – a mix of flat slab and beams."

The two buildings are connected with an expansion joint (a sliding bearing) to allow for building movement.

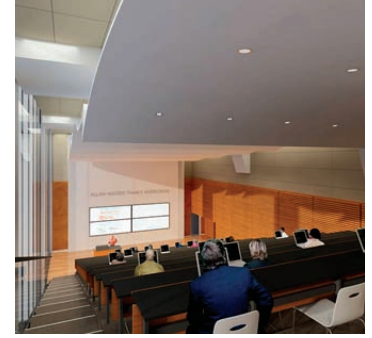
The tight site allowed for minimal landscaping, so landscape architect

Ferris + Associates Inc. installed a buffer from the street comprised of trees and shrubs. The sidewalk was widened to help create a "pleasing gathering space" outside the building but protected from the noise of the busy street traffic.

"The challenge was trying to provide good urban design in a very restricted area," says Paul Ferris, owner, Ferris + Associates Inc., landscape architect for the project.

A third-level pedestrian bridge will connect the new Centre to the main hospital. Keen says the City of Toronto normally rejects such applications so the hospital "decoupled" all bridge permits from the main building approvals process. "We didn't want any holdups of the project because of the city's resistance to the bridge." It took a number of meetings to convince the city to approve the pedestrian link, a striking tubular glass structure framed in steel. The bridge was prefabricated offsite.

The new institute incorporates a number of sustainable features, including a large percentage of recyclable materials, reflective roofing to minimize heat gain, occupancy sensors for lighting control and high efficiency energy recovery systems. The project is on budget and on schedule to open this fall. ■



**LOCATION**  
209 Victoria St./38 Shuter St.  
Toronto, Ontario

**OWNER/DEVELOPER**  
St. Michael's Hospital

**ARCHITECT**  
Diamond + Schmitt Architects Inc.

**GENERAL CONTRACTOR**  
Eastern Construction Co. Ltd.

**STRUCTURAL/CIVIL ENGINEER**  
Carruthers & Wallace

**MECHANICAL/  
ELECTRICAL CONSULTANT**  
H.H. Angus & Associates Ltd.

**COMMISSIONING CONSULTANT**  
Isotherm Engineering Ltd.

**LANDSCAPE CONSULTANT**  
Ferris + Associates Inc.

**TOTAL AREA**  
335,000 square feet  
(two office buildings)

**TOTAL COST**  
\$100 million