

GO trains per day: 180. GO buses per day: 400. VIA trains per day: 35. Current passengers per year: 50 million. Expected in two decades: 80 million. These numbers help describe the busiest travel hub in all of Canada: Toronto's Union Station.

With funding from all three levels of government, GO has begun to revamp Union Station, which it co-owns with the City of Toronto, to handle these passenger loads. David Hopper, the deputy program manager for the Union Station Rail Corridor Infrastructure

architect and heritage planner for GO Transit's Program Management group. "We worked with the conservation architects and engineers with Public Works and Government Services Canada (PWGSC) and Parks Canada, responsible for approving all alterations to this federally designated heritage building, to create a balance between the glass atrium and the restoration of the 1929 steel and wood train shed."

Builders will tear a north-south strip 46 metres wide and 107 metres long from the middle of the seven-metre-

doesn't require mechanical ventilation. "As the trains pull in, the exhaust is pulled out of the area," D Lullo says. New concrete smoke ducts will replace the original pre-cast ducts, long corroded by train exhaust and waterfront weather, and the roof will continue to do without mechanical ventilation.

That goes for the atrium as well, so Guelph-based consultants RWDI tested models of the building in wind tunnels to find designs that would promote ventilation while protecting travellers from the elements. "The atrium overhangs the opening in the bush roof by about eight metres on all sides," says Vetere. "In the middle of that eight metres we hung cables and light trusses that support clear glass louvres."

GO measures each project timeline

OWNER/DEVELOPER
GO Transit

PROGRAM MANAGERS
HDI Joint Venture: Hatch Mott MacDonald, Delcan Corporation and IBI Group

PROJECT LEAD DESIGNER/STRUCTURAL ENGINEERS
Halcrow Yolles

ARCHITECT
Zeidler Partnership Architects

MECHANICAL / ELECTRICAL ENGINEERS
Smith and Anderson

TRAIN SHED PROJECT

LEAD DESIGNER/STRUCTURAL ENGINEER
Halcrow Yolles

ARCHITECT
Zeidler Partnership Architects

MECHANICAL/ELECTRICAL ENGINEERS
smith and anderson

PLATFORM 13/14 (NEW SOUTH PLATFORM)

DESIGN/BUILD PROJECT LEAD / GENERAL CONTRACTOR
EllisDon

LEAD DESIGN / STRUCTURAL ENGINEER
MMM Group

ARCHITECT
Moffat & Duncan

MECHANICAL / ELECTRICAL CONSULTANT
Black & McDonald

GEOTECHNICAL CONSULTANT
Shaheen & Peaker

TOTAL AREA
350,000 square feet

TOTAL CONSTRUCTION COST (ENTIRE PROGRAM INCLUDING THE TRACK AND SIGNAL WORK)
\$600 million

Union Station Platform

by Luigi Benetton



RENDERINGS COURTESY ZEIDLER PARTNERSHIP ARCHITECTS

Improvement Program, calls the current projects "enabling works." For instance, the 1920s-era signal control and switching system will be replaced by a modern system that can suggest alternate routing to keep trains moving when Union experiences high train volumes, delays, bad weather, et cetera.

GO will reconfigure several spaces to more than triple the size of the 69,940-square-foot concourse to 239,948 square feet. "The western end of the building, formerly used by VIA, will open up as a concourse the same size as the east one," says Hopper.

A pedestrian link will run south from Union Station to a vestibule shared by the Air Canada Centre, Union Plaza and an enclosed colonnade leading from the Telus Building, which is currently under construction. Teamways immediately east and west of the station will lead directly to platforms. "These measures disperse pedestrian activity over a larger portion of the platform," says Hopper. 55 new stairwells and ten new elevators will improve access.

"The Bush train shed, which covers all passenger platforms, may be the most challenging aspect of the rehabilitation project," says Don Loucks,

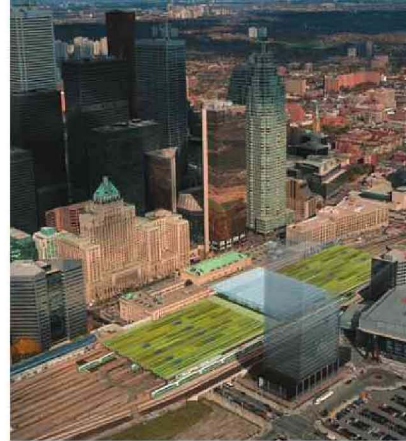
high roof and replace it with a glass-covered atrium that will tower 18 metres above the platform.

Architects forewent a traditional arch design in favour of a hovering "glass box." "It doesn't point either east-west or north-south," says Don Vetere of Zeidler Partnership Architects, who designed the atrium. "It doesn't suggest a direction." LED lighting will illuminate the "box" each night.

Peter D Lullo, project manager, Train Shed Rehabilitation for Halcrow Yolles, figures travellers might, at first glance, believe the atrium "floats" above the platform. "It will be supported by structural steel columns that are not perpendicular to the platform," he says.

D Lullo quotes shading studies that concluded the strip of roof to the north that covers Tracks One and Two receive plenty of sunlight year-round, so they will accommodate 914 photovoltaic panels. The assembly will feed an estimated 148,000 kWh per year (enough to power the atrium's lighting) into Toronto's power grid. All numbers will set Canadian records.

The remainder of the train shed roof will become one of the largest green roofs in Canada. The Bush roof design



in years, since Union Station serves travellers even as the station is serviced. Planning and staging exercises concluded that work can proceed during the day, as well as evenings and weekends. Another insight gleaned was the feasibility of closing two tracks at a time, so GO will renovate the roof in strips 13 metres wide and 366 metres long. As GO is sensitive to schedule disruption, D Lullo notes that, "once the contractor leaves two tracks and hands them back to GO, he can't come back to them."

Prior to the roof renovation (slated to start in 2009), EllisDon will complete a new platform for tracks 13 and 14 at the south end of the station to enable the aforementioned track closures.

"This new platform is outside the existing train shed," says Antonio Cofni, EllisDon's project manager, Union Station Platforms. "We're building a structural steel canopy for the whole length of it, along with glass-enclosed stairs."

The concourse does not extend all the way to the new platform, so builders will take support columns right down to bedrock. "It makes the first piece of the atrium stable enough to take all the eventual wind load required on the roof," says Vetere. "That helps to reduce the wind load on the parts of the structure that rest on the existing building."

GO isn't the only operation undertaking renovations. The City of Toronto is upgrading Union's concourse. The Toronto Transit Commission is upgrading the platform at its Union Station subway stop and improving access to the PATH pedestrian system. Take into account the Telus tower development that forms part of the common south vestibule and the need for co-ordination is obvious. To help projects run smoothly, managers from respective parties hold regular meetings.

"We're trying to create a piece of art, something that goes well beyond accommodation," says Vetere. "Inside the station, when you look up in places, you will see the trusses of the structure of the roof. In other places you won't."

"It will be mysterious and beautiful and poetic. That's the ultimate goal – to build a beautiful object floating in the air." ■