Traffic Growth Prompts Airfield Investments at Billy Bishop Airport

BY JODI RICHARDS

FACTS&FIGURES

Project: Airfield Rehabilitation

Location: Billy Bishop Toronto City Airport

Airport Owner/Operator: PortsToronto

Terminal Owner/Operator: Nieuport Aviation Infrastructure Partners

Airfield Investment: $36 million over 3 years

Planning, Design & Construction Inspection: WSP Canada

General Contractor: Pave-Al Limited

Electrical Contractor: TriStar Electric

Design & Construction of Ground Run-up Enclosure: Blast Deflectors

Equipment & Material Barging: McKeil Marine

Quantity Surveying & Layout: J&R Surveys

Concrete: Belmont Concrete Finishing

Hydroseeding: Dol Hydroseeding

Pavement Markings & Removal: MP Seasonal Services

Quality Assurance Testing: Peto MacCallum Ltd.

Perimeter Intrusion Detection System: Solarbeam Int'l

Last year, Billy Bishop Toronto City Airport (YTZ) served 2.7 million travelers—quite a jump from just 25,000 passengers in 2005. PortsToronto, which owns and operates the Ontario airport, has invested in several upgrades to meet the growing demand. Improvement projects began on the landside and are now migrating to the airfield.

Located on Toronto Island, YTZ is predominately serviced by Porter Airlines and Air Canada. In 2015, the airport debuted an underwater pedestrian tunnel that dramatically improved access to the airport, which had largely relied on ferry service since opening in 1939. (See our Jan/Feb 2016 issue for more details.) In addition, a major enhancement program is underway to increase seating and retail/food service options throughout the terminal, and a U.S. preclearance facility is expected to open in 2018.

Last year, PortsToronto began a $36 million, three-year airfield rehabilitation program to update aging elements such as pavement and lighting. Much of the infrastructure was more than 30 years old, notes Executive Vice President Gene Cabral. "The program pretty well touches almost every piece of apron, taxiways and runways," he reports.

GENE CABRAL

In 2016, YTZ accommodated about 125,000 aircraft movements. About half were from commercial carriers.

Beyond much-needed pavement and lighting enhancements, the current airfield program also includes a ground run-up enclosure—an addition Cabral enthusiastically refers to as a "state-of-the-art noise management tool." PortsToronto invested more than $9 million in the new structure to help reduce the airport's impact on the surrounding community—a prevailing theme for the entire airfield rehabilitation

Being a good neighbor is a major focus for officials, emphasizes Cabral. "One of the key areas for us to make sure that we're successful is not only doing the upgrades in a manner where there's no operational impact, but we also needed to take into consideration—first and foremost—concerns related to the community," he explains.

WSP Canada, lead consultant on the project, devised and executed jobsite strategies to help achieve the overriding goal. "Obviously, the airport is going to need construction work and those things get intrusive, but [PortsToronto] is really putting a lot of attention toward trying to be as unobtrusive as they can and trying to have a good relationship with the public and neighbors," says Bojan Drakul, senior aviation project manager for the company.

BOJAN DRAKUL

Placing construction lights to point away from rather than at nearby residents is just one of the many measures taken. "All of our contractors took to heart the extreme sensitivity that we raised related to managing operational constraints and at the same time, concerns from the community," notes Cabral.

Planning & Scheduling

The airport's 2012 master plan identified the need for various airfield improvements. Planning with WSP began in 2015 and culminated with going out to market in early 2016.

Cabral notes that the three-year airfield program began with infrastructure items that were most critical from an aging standpoint—namely YTZ's main and longest runway, 08-26.

While it received some resurfacing enhancements in 2011, Runway 08-26 required a full-length and full-width rehabilitation. After the new pavement cured, crews added grooves that help accelerate the rate that water runs off the runway to improve aircraft braking performance. During paving operations, the project team had to carefully manage the design mix of the asphalt to ensure it could accommodate the grooves without hampering the overall performance of the pavement, notes Drakul.

Crews also installed new runway centerline lighting and replaced electrical infrastructure such as runway edge lights, approach slope indicators and aircraft guidance signs.

To keep YTZ operational during the runway project, resurfacing work was phased and scheduled over 100 nights. "We don't have the luxury of a secondary runway that can handle the Q400," says Cabral, referring to the Bombardier aircraft that dominates the airport's flight schedules. Carefully crafted nightly schedules developed in conjunction with project contractors and engineers defined specific strips for crews to work on. Following the explicit game plans, crews succeeded in resurfacing the entire 3,988-foot runway during the airport's 11 p.m. to 6:45 a.m. curfew period.

Naturally, attention to detail was critical. "We went through an extensive exercise of looking at what-if scenarios, especially on the overnight activities," recalls Cabral. Project managers focused on having sufficient equipment and personnel on hand for each phase and providing detailed information regarding what workers would find beneath the pavement surface. "When you have a seven-hour window, you don't want to be uncovering an area that you're not able to repair sufficiently and get ready for operations in the morning," he explains.

Crews completed the entire project with only one six-minute delay returning the runway back to service. "And it wasn't even noticed by passengers—quite remarkable," Cabral remarks.

Secondary Runway 06-24, predominately used by general aviation aircraft, had not been resurfaced since 1969. "We had asphalt that was getting to the end of life, and we had electrical systems that were well over 30 years old," Cabral relates.

Improvements on 06-24 included reconstructing the center 30-meter width of the runway. Engineers also reduced its length to improve visibility at the intersection with Runway 08-26. In addition, the secondary runway received new electrical infrastructure, including

runway edge lighting and aircraft guidance signage to allow nighttime operations.

Decommissioning one of YTZ's three runways, Runway 15-33, was another important part of the rehab project. The north-south runway was used less than 1% of the time and would have been costly to reconstruct and maintain, explains Cabral. Runway 15-33 was consequently converted to Taxiway E, providing access to Runway 06-24, the new ground run-up enclosure and the south side of the airfield.

Asphalt from the decommissioned runway was recycled to help construct a perimeter service road that will provide maintenance crews easier access around the airfield. Other elements of this phase included overflow aircraft parking positions and new electrical infrastructure, edge lighting and aircraft guidance signs for the new taxiway.

Looking ahead to the 2018 construction season, PortsToronto plans to expand the airport's main terminal apron southward to provide additional space for aircraft and service vehicle movement behind the terminal gates. Two taxiways will be rehabbed as well.

Noise Management

The project team is going to great lengths to consider all aspects of construction noise—from the loudest equipment roar to the beep-beep-beep of vehicle backup alarms, notes Drakul. Truck routes are carefully planned to minimize the need for backing up because beeper noise can be more intrusive than the steady hum of heavy equipment, he explains.

Grooving the main runway was a particularly noisy project that unfortunately had to be completed at night, Cabral notes. To minimize the impact on the surrounding community, the team scheduled grooving work for early April—right after the spring thaw, but before weather was warm enough to encourage neighbors to open their windows and occupy their balconies.

As an urban airport in the heart of Canada's largest city, noise is a pervasive issue for YTZ. Some residents live just a few hundred meters from the busy airport. "About five years ago, 50% of our noise complaints were associated with aircraft engine run-ups," reports Cabral. "They can be very intrusive, especially if they are done in the early morning or late at night."

Results from noise studies encouraged the airport to consider various mitigation measures, and PortsToronto ultimately invested $9 million to design and build a ground run-up enclosure.

Blast Deflectors constructed the new three-sided structure on the southwest side of the airfield while crews completed other projects elsewhere. YTZ's new ground run-up enclosure is designed to allow users to perform ground run-ups in a safe location without disturbing the local community.

Each ground run-up enclosure that Blast Deflectors builds is unique, notes company president Don Bergin. Designs are based on specific acoustic objectives, aerodynamic requirements and airport budgets.

DON BERGIN

The new enclosure at YTZ includes one wall that is 14 meters tall, another that is 11 meters tall, and a third wall that transitions from 14 meters to 11 meters. "The taller side of the facility is on the city side, and the shorter side of the facility is away from the city where there are fewer noise sensitive receivers," notes Bergin.

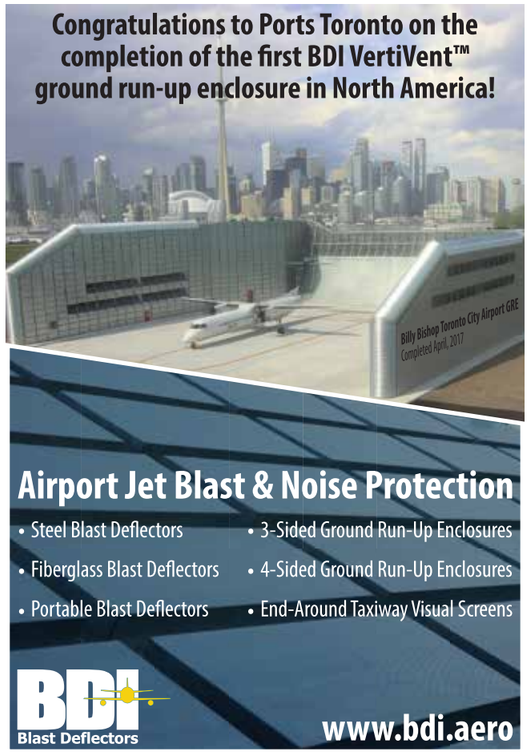
The interior walls of the steel-framed facility are lined with 1,726 of the company's Noiseblotter acoustic panels. "Certain materials effectively block the transmission of sound but may create acoustic reflection that could, potentially, create a new noise problem in a different area," Bergin explains. "We've developed an acoustic panel specifically for the low frequency sound created by aircraft engines that both blocks the transmission of noise and absorbs the sound to reduce reflection."

YTZ's ground run-up enclosure is designed to allow aircraft engines to run at maximum power settings without incurring damage from turbulent or unstable air. This is accomplished through aerodynamic features such as louvered vents on all three sides of the facility. The acoustically treated vents allow air—especially in crosswind and tailwind conditions—to smoothly pass through the walls during run-ups.

The facility was sized to accommodate Bombardier Dash 8 Q400s, a mainstay aircraft at YTZ. The structure is wide enough for mechanics or pilots to taxi aircraft in and out in a U-turn pattern, thus eliminating the need to use tugs.

Aesthetics were also important, notes Bergin. "PortsToronto didn't want a utilitarian looking structure—which a facility like this can oftentimes be," he relates. To avoid detracting from the airport's design and island locale, the company clad the exterior in siding specifically selected to blend with the surroundings.

YTZ is proud of the new ground run-up enclosure, as it is only the second Canadian airport of its kind to add such a facility. "We were looking to achieve considerable noise reduction associated with run-ups, and that's exactly what happened earlier this year when we put it into place," he explains. "I don't want to jinx myself, but the reality is that noise complaints have been dramatically reduced by the ground run-up enclosure."



A new ground run-up enclosure is helping the urban airport mitigate aircraft noise heard by neighbors.

In fact, the airport has received compliments from community members who notice and appreciate the reduction in noise. “A run-up that would have been highly exposed to the surrounding city is now behind an enclosed facility that basically dampens the noise,” Cabral relates.

Ferry-Free Project

Because of its island location, YTZ previously relied on the local ferry to transport supplies and workers for construction projects. For the current airfield improvement program, now in its final year, the project team implemented barge operations to prevent congesting the ferries, particularly with overnight traffic.

The new delivery strategy has been a significant game-changer, reports Cabral.

Because PortsToronto operates the port on Lake Ontario as well as the airport, the project was able to leverage lake access through the harbor. The barging operation allows the construction team to transport materials and employees from a cruise ship terminal in the Port of Toronto to a temporary dock on the east side of the airport. The new transport method greatly reduces the impact of construction traffic for local residents and airport travelers, and has received huge compliments from the community, reports Cabral. “Doing three years of construction in a mixed-use environment—bringing nightly the volumes of trucks we experienced through the community—would have been quite intrusive,” he reflects.

During peak construction in summer 2016, the project required up to 45 loads of asphalt per night. “Those trucks would have been rumbling through the streets and community,” he comments. The contractor further minimized truck movements by staging and stockpiling material at the 210-acre airport.

Bringing equipment and material through the marine terminal has helped tremendously with operational efficiency and eliminating traffic from the surrounding neighborhood, agrees Drakul.

The project contractor also used a water truck to reduce construction dust and created a spray down area on the south side of the airport, where crews hosed down construction equipment before it entered apron or runway areas.

Mid-Project Adjustments

Remaining flexible has also been key to the project, Cabral says. Original plans called for the main runway to be completed in the first year, and work on the secondary runway (06-24) to occur the second year. However, planners determined that closing Runway 06-24 for the summer of 2016 so work could proceed concurrently with the Runway 08-26 rehab would optimize the resources and equipment that contractors already had on site. “That allowed us to advance the schedule so we didn’t have two years in a row with a runway being out of service,” Cabral adds.

Flexibility was also critical when dealing with forces outside the airport’s control—like weather. This spring, Lake Ontario experienced record high water levels, and roughly half of some areas on the island were submerged. Naturally, this prompted

Crews resurfaced the entire runway during the airport's overnight curfew period.

adjustments in the airport's project schedule.

Fortunately, much of the infrastructure at YTZ, including taxiways and runways, is elevated; so the high water levels did not cause too much concern. Some pumping was necessary during heavy rains, and crews working on the overflow parking apron for general aviation aircraft had to wait for water levels to recede.

Workers placing electrical conduit were also affected. "As soon as you get in a half-meter underground, you're already having water," Drakul relates. Because of that, crews spent time pumping water out of the excavations, which impacted the construction schedule.

High water levels also interfered with barging operations. The ramps used to transfer equipment and supplies on and off the barge had to be adjusted to cope with the high water. "It was a pretty difficult situation," he recalls. "If the water level kept rising, we probably would have had to stop some of the work. But luckily, we were able to adjust and keep going."

Community Outreach

Communication has been an important cornerstone throughout the project, notes Cabral. As part of its contract, WSP worked closely with the PortsToronto communications team to create a detailed website for photos, information and progress reports about the project. Now, it posts detailed updates so neighbors know what to expect in the coming week.

Drakul updates the site with new information after weekly construction team meetings.

"A website is an excellent tool to communicate exactly what is going on," he says. "It makes people aware of your plans and then addresses concerns and reassures them that as an airport, you're trying to do the best you can to minimize the impacts on the community."

Community members can also sign up to receive emails about the project.

In addition to the website and email updates, PortsToronto holds outreach events for airport stakeholders and the community. "There are so many small elements," reflects Cabral. "With two years of the program under our belt, we're getting ready for the third year, and we've put ourselves in a great position for this airport to continue to succeed."