Brampton’s Springdale Library strives for LEED Gold

Under construction since 2015 and slated for completion this fall, a new library in Brampton, Ont., is targeted for LEED Gold certification with a comprehensive list of green features.

But it is the somewhat irregular-shape piece of land the Springdale Library and Community Park sits on which defines its presence in an established residential community and sets the design parameters.

Designed by RDH Architects and being built by Brampton-based Aquicon Construction, the 1,850-square-metre (20,000-square-foot) library is triangular in shape.

In explaining the rationale for that configuration, City of Brampton project manager Mike Ferraro says the property comes to a “point” on its west side. It faces Bramalea Road and a major project objective was to provide maximum exposure along that main thoroughfare.

“ Orienting the building so that it was highly visible from Bramalea Road meant that we had to consider a building that triangular in shape to achieve that visibility,” Ferraro says.

The infill property was originally intended to be slated for housing, he says. Other topographic factors also influenced the design of the building and the placement of a community park which will consist of a splash pad, children’s play area and contemplation/reflection garden.

On its north and east sides, the library is flanked by a small ravine which could not be impacted and required extensive measures to protect. At the same time, the design team and the city capitalized on its presence, he says.

“We were able to take advantage of the ravine by locating the park and the garden adjacent to it, giving the library an opportunity to be a continuous larger green space,” explains Ferraro, noting that the library’s children’s section will look on to the ravine.

Given the green areas will align or connect — in a symbolic way — with the library’s green roof, which will be capped with approximately 10 inches of earth and is intended to be clearly visible from the street.

“This area is meant to appear like a natural green berm or hilltop situated on the roof,” adds Ferraro.

The roof area has been designed to be covered in roof’s flat areas, but ultimately the city opted for white reflective roofs because of costs. Rain water collected from the flat section will be collected as grey water for flush toilets and urinals, says Ferraro.

Although green roofs are now common in buildings, the unique geometry of this one makes it unique in Canada, says John Sharp, a principal with RDH Architects.

The only other one he is aware of is a building in San Francisco.

Describing the library as “architecturally ambitious,” the architect cites the use of curved double glazed units with digitally printed solar responsive ceramic frit patterns as an example of the progressive aspects of the design.

“Each vertical bay has a slightly different pattern,” says Sharp. “Instead of using traditional element colors, the window units were manufactured in China by a firm which was the only one the design team could find capable of undertaking an entire assembly, including the printing of the ceramic patterns.

“There was considerable pre-set up work and we to ensure the shop drawings met our design drawings specification. But once production started there were no delays,” explains Sharp.

The utilized curtain wall assembly was undertaken by Mississauga, Ont.-based glazing contractor Noram.

Asked about the potential of glare and heat gain, especially on its western exposure along Bramalea Road, Sharp explains the ceramic frit patterns vary in density, responding to solar orientation.

“The pattern is densest on the south and west facing glass, less dense on the east facades and transparent on the north facing glass,” he adds.

Glare is also controlled through the integration of motorized blinds on the south, west, and east facing glass, he says.

Apart from the green and white roofs and the glazed units, some of the library’s other environmental features include a geothermal heating/cooling system with 38, 121-metre (400 feet)/deep bore holes and eight heat pumps, high-efficient colour changing LED lighting and a system which recycles water from the splash pad to irrigate parkland, says Ferraro.

“We are storing the used water in a cistern which then passes through a filtration system before it is used for irrigating the park,” Ferraro says.

Although a first for Brampton, the concept for recycling the splash pad water was inspired by a similar use in Mississauga, notes Ferraro.

Close proximity to public transit, electric vehicle plug-in stations and a high percentage of construction waste management are other factors aimed at attaining LEED Gold for the facility.

Only a small handful of Brampton-owned facilities have achieved that benchmark, adds Ferraro.
A Winnipeg contractor developed “a revolutionary decorative concrete topping” reminiscent of terrazzo flooring “quite by accident.”

In 2010 Antex Western was remodelling its head office in Winnipeg and hoping to divert 100 per cent of its construction waste from landfill when the commercial contractor’s hard surfaces manager, Sal Maida, suggested processing waste into aggregates, and then mixing it with cement to create the floor topping for the new office.

“At first I thought he (Maida) was crazy, but it turned out stunning,” says president Mike Kolas of the product he calls Reazzo.

“We designed it to be an environmentally positive replacement for terrazzo,” Kolas adds.

Reazzo has gone through a number of modifications since then, gaining credibility in the architectural community along the way and the contractor is about to install its biggest job-ever with Reazzo — 80,000 square feet in the MTS Centre, the home of the National Hockey League’s (NHL) Winnipeg Jets.

Kolas says Antex Western has three weeks to install all of the Reazzo while competing for space with other subtrades at the centre which is undergoing a $12 million facelift. “We designed it to be an environmentally positive replacement for terrazzo,”

Reazzo was created when construction waste was mixed with cement to create the floor topping for the new Antex Western Winnipeg office in 2010.

Reazzo contains a number of green-friendly binding agents — industrial waste products such as flyash and slag — that reduce cement content required in terrazzo by 50 per cent.

The installation process — grinding, polishing and then burnishing — is time consuming but he believes that current research will show how to expedite installation. “If we can do away with it, the product will fit (price wise) squarely into the ceramic and porcelain tile market.”

Kolas says key to the development of Reazzo is Dr. Asia Shvarzman, who heads Antex’s R&D department and sits on the ASTM (American Society for Testing and Materials) board for alternative cementitious materials.

“She not only created it and it is looking at improving Reazzo through the use of geopolymers, but she also does research on other products we source for business. This is unheard of in our trade.”

One of the characteristics of Reazzo that has garnered interest from architects across Canada is its durability/performance — it has strengths of 60 to 100 MPa.

The fact Reazzo has been specified for “such an iconic building” in Winnipeg as the MTS Centre has also raised eyebrows in the design community.

“Reazzo is very local at the moment but we are trying to scale production up fast” to meet growing demand, says Kolas.

It is a challenge not normal to a building contractor’s job description. Production could be handled by a number of different types of producers, he says.

“I see a change coming in the industry and I think Reazzo will be a part of that change.”
The next straw: builder takes straw bale construction to school

How did a Guelph, Ont.-based green builder wind up supplying modular straw bale schoolhouses to the Pineolevo Pomo Nation in northern California? By following their market.

The company was founded in 2001 by Ben Polley as Harvest Homes, employing traditional straw bale and plaster construction techniques as a subcontractor. The system involves stacking straw bales, then placing a cementitious plaster over the interior and exterior to create an ultra-efficient wall. Straw bale construction is rot-resistant, fire-resistant and offers an R40 insulation rating with few thermal bridges.

“Clients asked for traditional, natural or green building services that were not being provided by the market,” says Polley. “We told them that we would understand the research and training required to complete the work at a discount because our first project would not be as efficient as we would wish to be. The market was telling us what it wanted and effectively paying for our training.”

Work ranged from building domestic green roofs to designing and installing artificial wetlands for septic systems, creating adobe structures using clay trees in place of paint and building earthen outdoor bread ovens.

As the company’s expertise grew, two specialty divisions were founded in 2006 by Polley and Chris Vander Hout. Evolve Builders is a full-service general contractor offering green construction for turn-key additions, renovations and new construction. Fermata offers hand-sculpted earthen construction techniques, including natural plastering, adding texture and the use of clay mixtures of clay-rich earth, sand and straw. Today, the combined companies employ 23 workers.

“Clients were looking for something different and we were listening to their needs,” says Polley. “They wanted and effectively paying for our training.”

The company produced six modules, complete with walls insulated with straw; floors; and roofs with structural insulated panels, air source heat pumps and thermoplastic polyolefin reflective roofing membranes. Six flat-roofed mobile buildings delivered to the tribe over a five-day journey. The building was assembled by members of the tribe on piers, and configured into two classrooms, a shared performance space and four small bathrooms.

Polley says that the company invested some time and money in the project that could not be fully recovered out of a sense of social dedication...coupled with a sense of achievement. “We were told that these will be the furthest traveled structures of their kind anywhere in the world,” says Polley. “That gave us a tinge of pride as well.”

The project is a first for CLT in First Nations housing but the manufacturer suggests there are many lessons to think it would work there as well.

The assembly can save money on building costs and provide a durable product that is mould-resistant, says Nancy Devar, vice president, Guardian Structures, the manufacturer awarded the contract to build the houses.

“The bids from conventional school construction that happen to sit on a mobile chassis,” says Polley. “We’re building permanent quality construction that happens to sit on a mobile chassis.”

The California school project began with a call for bids and ended up with a call for a relocatable school structure built with straw.

“None of the portable straw bale or portable constructors in California offered what they wanted,” says Polley. “I was absent the day the call came. If I had, I might have dismissed it as implausible that we could affordably put together something that we could ship to California. I called the tribe management back and it was like the anti-sales call. Every time I described constraints that would be really difficult to overcome, they would call back saying they had solved them.”

The project has structural walls — usually 105 mm thick — that offer an R5 insulation value. And CLT is more sustainable because it is “larger amounts of community naturally.”

That assembly with the insulation and connectors installed on the inside of the house prevents mould from developing, Devar points out.

Because it isn’t a problem in First Nations housing improperly designed with wood frame and drywall.

Devar adds that CLT is more durable than drywall.

Furthermore, because the design is done upfront, on site change orders are less likely. “It means faster installation because of technology in people and equipment such as CNC machines that can cut to tolerances with 0.05 mm.”

Typically,她说, installation is up to 25 per cent faster than traditional materials. CLT’s structural walls — usually 105 mm thick — offer an R5 insulation value. “And CLT uses less wood and more insulation,” she says. “It makes sense that we would be building them faster.”

Devar says Guardian’s CLT product has a number of advantages over stick-built construction that the company’s mobile (Mobile Economy ENClosure), division, created in 2014. “Our products are depreciating assets the moment they’re set into place,” says Polley. “We’re building permanent quality construction that happens to sit on a mobile chassis.”

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Don Proctor Construction

A cross-laminated timber (CLT) manufacturer based in St. Mary’s, Ont., will build 30 houses for the First Nations in Grand Rapids, Man.

The project is a first for CLT in First Nations housing but the manufacturer suggests there are many lessons to think it would work there as well.

The assembly can save money on building costs and provide a durable product that is mould-resistant, says Nancy Devar, vice president, Guardian Structures, the manufacturer awarded the contract to build the houses.

The design consists of horizontal cross-laminated slab/wall roof panels assembled in a plant with insulation, doors, windows, siding, plumbing, electrical and other building materials, says Dewar.

Construction is expected to start mid-June. Dewar says last year Guardian was approached by the project’s developer and architect Douglas Cardinal, who couldn’t design the project’s exterior with conventional CLT.

“Douglas expressed interest in Guardian’s history of using mass timber wrapped with fibreglass composite,” says Dewar. “It’s a challenge to deliver on the exterior CLT panels encapsulate the building seamlessly, greatly reducing thermal loss.”

Some say CLT is the solution to the challenge of rising energy costs than stick frame “which has greater thermal loss every 16 inches.”

“The biggest difference from dimensional lumber in Guardian’s opinion is that the CLT is the only material to our knowledge that sequesters large amounts of carbon dioxide, she explains. “The time has arrived for companies to verify their worth to society, with greater emphasis being placed on embodied carbon that is carbon that has been used to increase the carbon costs, sustainable, environmental, societal impact, rather than strict economics.”