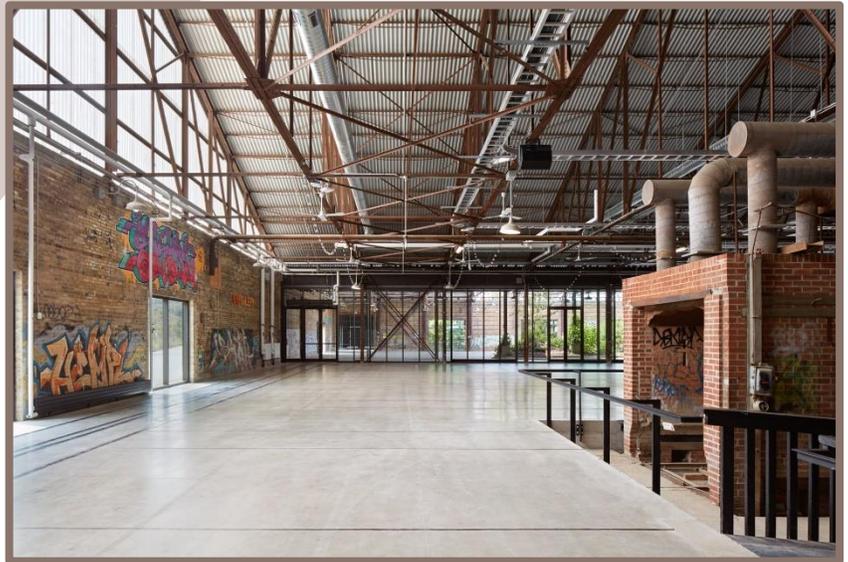


MATERIAL DEVELOPMENT & INNOVATION

KILN BUILDING REDEVELOPMENT EVERGREEN BRICK WORKS



PROJECT CREDITS

OWNER

Evergreen Brick Works

ARCHITECT OF RECORD

LGA Architectural Partners

ENGINEER OF RECORD

Arup Canada

GENERAL CONTRACTOR

EllisDon Corporation

TRADE CONTRACTOR

Belmont Concrete Finishing

MATERIAL SUPPLIER

Dufferin Concrete, A division of CRH Canada Group Inc.

ADDITIONAL PARTICIPANTS

- Ben Rahn / A-Frame
- Brookfield GIS
- Carpenters Union Local 27
- Colin Alston
- Don Shortreed
- ERA Architects
- Euclid Chemical
- SCS Consulting
- Swallow Engineering
- Waverly Projects

PROJECT FACTS

LOCATION Toronto, Ontario

PROJECT TYPE Adaptive Reuse

BUILDING AREA 5,650 m² (60,815 s.f.)

CONSTRUCTION COST Phase 1 - \$10.6 M

DESIGN START July 2016

DESIGN COMPLETION September 1, 2017

CONSTRUCTION START Phase 1 – February 2017

OCCUPANCY Phase 1 May 2018

OFFICIAL OPENING Fall 2018





BACKGROUND AND OVERVIEW

In the 1980s, a century of brick-making came to an end at a major industrial site in Toronto's Don Valley. In 2010, this shuttered factory precinct was reborn as Evergreen Brick Works, Canada's first large-scale community environmental centre. The former quarry had been transformed into a re-naturalized trails network. Over time, several of the site's heritage buildings were repurposed for a host of community uses, and Evergreen's headquarters – a mostly new structure – received LEED Platinum accreditation. Amid all this activity, the Kiln Building remained a particularly daunting Brick Works structure to adapt to new uses – although, as the largest building on the site, it also held great potential. Constructed in the 1950s, the 5,650 m² structure housed the kilns used for drying and firing bricks. In May 2018, with the completion of Phase 1 of its renovation, the Kiln Building reopened as a carbon neutral-targeting event and educational centre. The Kiln Building Redevelopment is much more than an ambitiously sustainable adaptive reuse: it preserves and re-invents a heritage industrial building situated in a flood plain. Without the innovative, varied, and extensive use of concrete, this project would not have been possible.

FLOODING AND HERITAGE REQUIREMENTS: RESOLVING AT-ODDS CHALLENGES

A fundamental challenge was designing for a Don Valley site where flooding occurs frequently – minor flooding is routine,



and the so-called 50-year flood level is reached at much shorter intervals than its name would suggest. Compounding this challenge was a heritage requirement that the existing concrete floor be preserved: carts on rail tracks had been used to move brick into and through the kilns and onto the next phase in the manufacturing process, and municipal and provincial heritage authorities wanted the historic track-laid floor left intact. The design team's solution preserved the factory floor while installing a new one two feet above it.

LAYERING A HIGH-FUNCTIONING NEW CONCRETE FLOOR OVER THE HISTORIC EXISTING KILN BUILDING FLOOR

This was a multi-step process:

1. Cupolex Dome layer: A layer of Cupolex Plastic Dome Concrete Forms, manufactured in Vaughan, ON, by Pontarolo Engineering Inc., was installed on top of the existing floor. The dome footings are the only point of contact touching the original floor, and the new floor layered on top is therefore met heritage requirements by being a reversible intervention. The channeled, raised-cavity floor creates a buffer for nuisance flooding below the upper surface of the new floor. Use of the Cupolex forms on this project also displaced 25,643 cubic feet of concrete in the new floor—thereby significantly reducing CO² emissions as well as material usage.

2. Concrete base pour: A base pour of regular-strength concrete was added on top of the Cupolex forms.

3. Insulating layer of Dufferin Foamcrete: The five-inch insulating layer above the base pour is Dufferin Foamcrete, from CRH Canada. This lightweight concrete product has been extensively used on highway and other infrastructure projects; the Kiln Building Redevelopment marks its first use in Ontario as a flooring substrate. It was selected here partly because it provides 20 times better thermal insulation than conventional options. An additional sustainable benefit is that this lower carbon concrete mix integrates post-industrial recycled material and recycled concrete aggregate.

4. Wire mesh and radiant tubes: A key strategy for achieving carbon neutrality on this project is to supply most of the heating and cooling through a mix of geothermal and solar thermal systems, with the energy

distributed through the in-floor radiant tubes installed on top of the Foamcrete. The use of concrete created a thermal mass that would not have been possible with other materials that enabled the system. The insulating buffer of Foamcrete greatly improves the performance of the entire system because it directs in-floor heating and cooling energy upward into the Kiln Building, rather than allowing it to dissipate into the floor below.

5. A concrete top layer that references the historic Kiln Building floor: Layered over the wire mesh and radiant tubes of the radiant heating and cooling system is three inches of concrete topping from Euclid Chemical, incorporating micro-synthetic fibres that help to control crack management. This top layer in the new floor incorporates a range of finishing treatments to represent and interpret heritage floor features now hidden by the new raised concrete floor: a mix of embedded steel rails and shot-blasted lines mark the routes of the carts' passage through the kilns, and tinted concrete delineates the footprint of former historical features, such as kilns that had been removed in previous renovations. (In one part of the building, a glass panel inset into the new floor provides a view down to an exposed portion of the original kiln floor.) The requirements for control joints had the potential to aesthetically compromise and reduce

the legibility of the new floor's embedded steel rail and shot-blast 'tracery' recreation of the original floor. However, through careful attention to the placement of the control joints, the design team was able to ensure that the pattern of the joints would not visually compete with the recreated rail pattern, but would instead align with many existing elements. For example, control joints align with the centres of historic steel columns and recesses around the existing kilns.

CONCLUSION

The carbon neutral-targeting Kiln Building Redevelopment sustainably preserves and repurposes a unique historical industrial facility on a site that actively floods. Many of the overall systems that contribute to the success of this project would not have been possible without the extensive, innovative, and wide-ranging use of concrete. Concrete is integral to the new raised-cavity floor system, and the use of various aggregates and admixes significantly reduced the project's carbon footprint. And by deploying a wide range of aesthetic concrete treatments, the design team was able to create a unique and meaningful design that enriches the entire project through heritage interpretation.

