Residential (Small) Award
BSN Architects

PROTOTYPE LANEWAY HOUSING

University of Toronto, ON

Jury Comment

The municipality, the University of Toronto and the design team are all to be commended for attempting this kind of gentle densification in a heritage district. The success of the project enables faculty, staff and other potential residents to benefit from the transportation, commercial and cultural infrastructure already in place in this neighbourhood. The resulting livable lane environment and the remarkable achievement of Passive House performance in such a tight urban context, takes Toronto's laneway housing to the next level.

PROJECT PERFORMANCE

Energy intensity (building and process energy) = 47.3KWhr/m^2/year
Energy intensity reduction relative to reference building under ASHRAE 90.1 = 54%
Water consumption from municipal sources = 44,880 litres/occupant/year
Reduction in water consumption relative to reference building under LEED = 51%
Regional materials (800km radius) by value = 15.25%
Construction waste diverted from landfill = 85%

PROJECT CREDITS

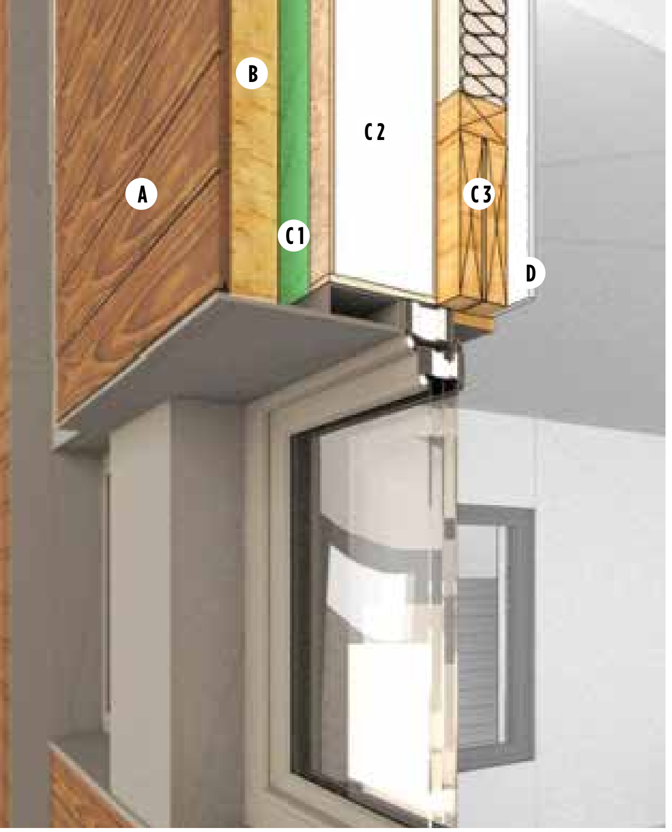
ARCHITECT BSN Architects
OWNER/DEVELOPER University of Toronto
GENERAL CONTRACTOR Index Construction
CIVIL ENGINEER MTE Consultants
ELECTRICAL ENGINEER Runge Engineering
STRUCTURAL AND MECHANICAL ENGINEER Local Impact Design
PHOTOS Tom Arban Photography

These prototypes are the vanguard of 40 laneway and infill homes proposed for the Huron Sussex Neighbourhood, a historic precinct adjacent to the University of Toronto's downtown campus. The project advances urban intensification in a location well served by public transit and existing municipal infrastructure, while revitalizing and helping to sustain its immediate heritage context.

Mandated to deliver affordable, sustainable housing for family living and co-habitation, the project utilizes a prefabrication approach to reduce community impacts during construction and enhance performance outcomes.

The three prototypes include: 3 bedroom + 2 study (2,100 gross sq.ft.), 2 bedroom + study, (1,100 gross sq.ft.), and 1 bedroom + study, (900 gross sq.ft.). Sympathetic to scale, massing, and neighbourhood context, the prototypes provide 'accessibility through proximity' and are clustered to create a shared outdoor courtyard and to initiate a 'Living Laneway' concept with homes accessed from the lane.

1. Of three different sizes, the Passive House prototype laneway houses provide 'accessibility through proximity' and are clustered around a shared outdoor courtyard.
2. Plentiful natural light gives bright interiors. An earth tube system preheats ventilation air in winter and pre-cools and removes humidity from it in summer.

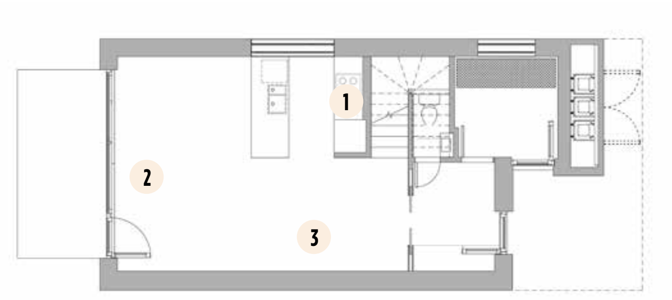


A Thermal treated ash siding
B Ventilated cavity space
C1 Zip wall weather resistive barrier
C2 EPS insulation
C3 Sheathing / VB
C4 2x4 framing with field applied M.F. insulation
D Drywalll

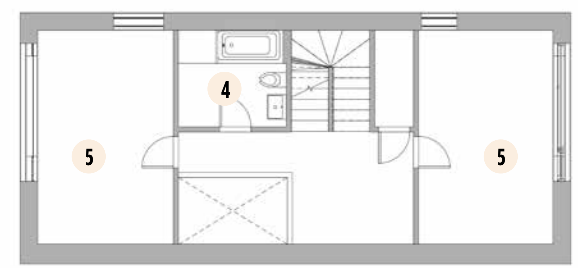
Aerial view
Guelph Solar installed LG 365 Watt solar panels.

Perspective section

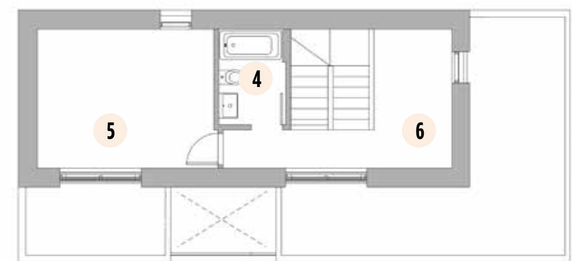
3. Detail of Passive House certified window and thermally-treated ash cladding. Supplied by **CFP Woods**, the ash cladding exhibits numerous grain patterns while displaying the natural beauty of its rich brown colour tones. Left to weather naturally, it will turn a beautiful patina grey.
4. **Legalett** provided three engineered GEO-Passive Slabs with ThermaSill PH thresholds, as well as sub grade preparation supervision for this challenging high density urban fill site with zero clearance lot lines.
5. Installing the earth tubes.



Ground floor



Second floor



Third floor

Three-bedroom unit plans

1. Kitchen
2. Living Room
3. Dining
4. Bathroom
5. Bedroom
6. Study

Designed using Passive House (PH) principles and all-wood construction, the project optimizes prefabrication and on-site assembly methods and utilizes PH-certified wall panels (R-45) with factory- installed windows (R-7), structural insulated panels (R-54) for the roof, and a shallow super-insulated GEO-Passive slab foundation system (R-24) that minimizes site operations.

Designed to achieve net-zero annual energy with no on-site emissions, the prototypes incorporate solar PV panels and earthtubes for pre-conditioning fresh air thus enabling higher levels of ventilation for a healthier indoor environment. Securing community support was essential to the project's success. The community and the University's interests overlapped in key areas, which influenced design. These included:

- Site optimization, which resulted in larger infill laneway homes suitable for family and co-habitation living. This was in contrast to the smaller laneway units currently advocated by the City of Toronto.
- High quality, environmentally sustainable and affordable housing, in which the implementation of Passive House concepts optimizes energy and lifecycle benefits, and an all-electric approach enables Net Zero outcomes, which enhance resilience for both individual households and the community at large.
- A community-based approach to design, applying micro-grid thinking, by which the prototypes share an integrated rooftop PV array, and an earth tube system which preheats ventilation air in winter and pre-cools and removes humidity from it in summer. This eliminates the need for mechanical cooling. This system was realized due to the demolition of a derelict house – its basement provided the opportunity to install the system prior to backfilling and redevelopment of the site as a playground for the neighbouring daycare.
- The use of prefabrication reduced the effects of noise, construction traffic and on-street parking typically associated with conventional site construction. Prefabrication also improved quality, reduced cost and construction time (by two months), and confirmed the replicability of these prototypes. It also contributed to tighter construction, improving air tightness and thermal performance.
- The pre-manufactured, frost-protected slab-on-grade foundation enabled a single concrete pour, rather than the more typical three (i.e. footings, frost wall and slab). This reduced the volume of concrete and associated excavation required. These first-generation prototypes have demonstrated that prefabricated high-performance, low-impact construction can be less complicated and delivered without a cost premium compared to conventional construction, making this type of living accessible to more people.

6. The prototypes are the vanguard of 40 laneway and infill homes proposed for the Huron Sussex Neighbourhood, a historic precinct adjacent to the University of Toronto's downtown campus.