Templar Flats

HAMILTON, ON

Canadian Wood Council
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Cover Photo: Martinus Geleynse

Introduction

Templar Flats in Hamilton, Ontario, has the distinction of being the first occupied, modern wood-frame mid-rise building completed in Ontario. It was constructed under provisions (O. Reg. 191.14) added to the province's Building Code (2012 OBC) that permit wood-frame construction up to 6 storeys, an increase of two storeys over the previous iteration of the code.

The 6-storey, mixed-use project offers 25 modern residential units above three street-level restaurants in the city's downtown core. The City of Hamilton is committed to revitalizing the downtown and developments on King William Street, including Templar Flats, have benefited from infrastructure improvements in the area.

Templar Flats brings together the best of the old and new in an innovative, hybrid solution that puts a modern 6-storey building with glass penthouses between two thoughtfully restored heritage buildings that were adapted into a single, unified development.

Code Changes

On January 1, 2015, amendments to the 2012 Ontario Building Code came into effect that permit combustible wood construction up to 6 storeys in height for Group C and D occupancies (residential, commercial, office). The Code updates balanced the Ontario government's two primary objectives: to help increase opportunities for designers and builders to create innovative, flexible, and affordable new buildings; and to maintain Ontario's high fire safety standards for both the public and fire service personnel.

Strategically, mixed-use mid-rise buildings are considered an important building type expected to help municipalities increase housing density and attract businesses and families to urban centres. Previous code restrictions on combustible construction made non-combustible solutions the only option for mid-rise development and many potential developments were shelved because they were deemed cost-prohibitive. Developers now have a new, cost-effective construction option for mid-rise buildings; an important development considering densification is mandated in most municipal growth plans in the province.

SITE PLAN

Rationale

The historic Templar building on the corner of the site was in a state of considerable disrepair. It was vacant on the main floor, with a few occupied apartments above. The uninhabitable top floor relied on an adjacent building for a fire escape. After an extended period of time on the lease market, the owner found a tenant whose intended use for the property was not considered acceptable by the community.

Learning of the proposed use, and recognizing this use was not in keeping with the revitalization plan for the neighbourhood, the developer, Core Urban, met with the owner and made an offer to purchase the building. After successfully negotiating the purchase, Core Urban subsequently acquired the two adjacent properties: a vacant lot and a three-storey, turn of the century building in need of repair.

The site falls within the centre of Hamilton's 'Downtown and Community Renewal Community Improvement Project Area.' The purpose of the City's plan is to focus and co-ordinate municipal action and investment that promotes and enhances the physical, social and economic environments in Hamilton's commercial business districts, mixed use corridors, and neighbourhoods targeted for community improvement and renewal.

The amendments to the Ontario Building Code increase opportunities for design teams to create versatile and affordable new buildings. The changes recognize the advancements in wood products and systems as well as in fire detection, suppression, and containment systems. There are many benefits to wood construction:

- **Design flexibility and innovation**
- **Public and fire service personnel safety**
- **Urban intensification and main-street redevelopment**
- **More sustainable construction**
- **Housing affordability**
- **Value added wood-based products help support the forest industry**

Photos courtesy of Strik Baldinelli Moniz

"The code change was geared to projects like this."

Michael Baldinelli, Principal, Large Buildings, Strik Baldinelli Moniz Structural Engineers

"There's a point of pride here in what can be done with old buildings. I hate the excuse that it's too old, too far gone, too broken. People want old buildings; tearing them down doesn't make much sense."

Project Developer, Steve Kuwlakowsky, Partner, Core Urban Inc.

To this end, the City upgraded King William Street in 2011, widening the sidewalks so they could accommodate patios in an effort to entice restaurants to the area and support Hamilton's burgeoning food scene. The developer, who works exclusively in the Hamilton area and believes in the city's vision for the neighbourhood, felt a sense of duty to create restaurant spaces at the street level. The revitalized street, with its wide sidewalks and thoughtful redevelopment, is quickly becoming the city's new "restaurant row."

Building Description

Templar Flats is comprised of a new 6-storey wood-hybrid structure flanked by two restored heritage buildings. The new portion is five floors of wood and steel over one floor of concrete. The oldest portion of the project is the Templar building on the corner which was erected in 1867 and lends its name to the development. The other building acquired for redevelopment was also more than 100 years old. The space between the two buildings, and site of the new construction, was a relatively small, irregularly shaped vacant lot.

Combined, the three buildings offer 25, 252 ft^2 (2,346 m^2) of residential and commercial space. Templar Flats is a fully sprinklered, compartmentalized building with no unusual requirements; all aspects of construction fell within the building code. The roof of the tall centre section, which is under 25m in height, has a 1-hour fire rating and there is a 1-hour fire separation between the units.

Two units have a rooftop patio. Other units have balconies constructed of wood joists cantilevered from the wood frame structure. The joists of the balconies project 5 feet (1.5 meters) outside the building envelope and are waterproofed to protect them from the elements. Using wood for the balconies is an effective way to address thermal bridging. The sleek, cedar-clad roof overhang above the top floor balcony was constructed in the same manner.

Adaptive Reuse/ New Construction

Adaptive reuse projects can be very challenging in meeting the intent of the Ontario Building Code. While a straightforward "renovation" can be addressed using Part 11 of the Building Code, often new systems such as elevators and stairs are integrated into the construction. These new systems must comply with current codes. While horizontal additions to existing buildings can be relatively straight forward, additions to the tops of buildings can be quite complex, often requiring seismic upgrading of the entire existing structure.

In the case of Templar Flats, minimal structural changes were made to the two existing structures and the three buildings are designed to act independently during a seismic event. The renovations to the two existing buildings included reinforcing the existing sawn lumber floor joists with LVL joists. This allowed for the addition of a concrete topping on the floor which significantly increased the STC rating, achieving a low sound transfer between the units. This enhancement was not required by the Code but was deemed essential by the developer, whose intention was to create a better-quality living experience for tenants of the building. The concrete topping also contributed to the ULC fire rated assembly.

Individually, the three buildings would have been expensive to repair and build; strategically combining the two renovated buildings with the new construction in the middle made the project more affordable. The infill portion of the development provides the elevator, scissor stairs, and corridor system that tie all three buildings together.

The units in the heritage buildings did not require parking, however the 12 units in the new section would have required parking spaces. Due to the site's limited footprint, creating parking for the units was not possible. The developer sought and obtained a variance from the Committee of Adjustment; the Flats are just steps from city transit, GO Transit, and a future LRT stop, and the development provides a large bike storage room.

Strategic Design

Although the project was conceived before the changes to the Ontario Building Code permitting wood framed construction up to six storeys came into effect, in the minds of the design team, Templar Flats was always going to be a wood building. They believed the code changes were perfectly geared for projects like this.

From the beginning, the team felt a 6-storey infill building was the obvious solution and never considered anything else. This height adds valuable density, but maintains an approachable human scale that interacts with the vibrant, but relatively narrow streetscape.

At the top of the stone cornice on the fourth floor there is a setback that visually disconnects the lower limestone-clad portion of the building from the two upper glass-wrapped levels. This feature makes it appear as though the top two floors were added to an existing building, an illusion

Photo: Martinus Geleynse

that supports the general look and feel of the neighborhood. Externally, the three buildings retain their own character above street level, while at patio level they are unified in colour, though each has unique details.

The carefully considered project enhanced and restored historic features wherever possible; from sandblasting the limestone of the old Templar building and replacing corbels that had been removed, to preserving a light shaft that went from the main floor to the roof. Rather than remove this oddity from the building in the redevelopment, it was re-framed. This decision helped increase the bedroom count by providing natural light; without it, one side of the building wouldn't have had windows. The shaft brings natural light from the roof down past the residential units, all the way to the restaurant, spilling daylight into the modern space in a distinctive way.

Foundation

The site was challenged by poor soil conditions. The developer originally wanted a basement in the new building, but because the two existing buildings flanking the new construction had shallow basements that were not in ideal condition, they would have had to be underpinned by several feet in order to create a new basement in the middle.

This process would have been risky, with the potential to undermine the integrity of the existing basements, and the need to shore both sides of the facing street during construction would have increased the construction timeline, adding considerable cost to the project. The structural engineer recommended against this approach. Large pad footings could not be used because of the limited space, so piers were chosen for the foundation. The new construction is supported by 150 helical piers, each with a 12 inch square cap, and a concrete grade beam. The tops of the piers are encased in the beam.

The use of wood in the structure helped mitigate the cost of the building's foundation, and the lightweight wood-hybrid construction solution for Templar Flats enabled the team to maximize the development potential of the site. Had the team constructed a concrete building, the weight of the building materials would have limited the project to only 3 storeys in height because of the poor soil conditions.

Photo courtesty of Strik Baldinelli Moniz

"Downtown Hamilton is undergoing an edgy kind of renaissance now. The six storey height that the building code now permits for wood frame construction is a perfect scale for infill and repair of our urban fabric."

Project Architect, Rick Lintack, Lintack Architects Inc.

Infill Considerations

The principal challenge for the new construction was to design a building to fit perfectly between the existing heritage buildings, a task that was complicated by the skewed lot and the fact that the existing buildings were not parallel to each other.

There is also no point in the buildings where the floor elevations between buildings are level. Among developers, there is a general belief that if floor levels do not line up you cannot combine buildings, but this is not true. The development team considers it a point of pride that Templar Flats so clearly demonstrates the possibilities of infill development and heritage restoration. The challenges can be overcome and there are big benefits to redeveloping old buildings. In this case, the re-purposed buildings added 16,000 ft.^{2} (1,486 m^2) of space and considerable value to the project.

The impact of the taller building adjacent to the existing buildings had to be taken into account. The snow drift off the new 6-storey building is cast onto the shorter buildings so the existing roofs had to be reinforced to support the additional snow load.

The un reinforced clay brick walls of the adjacent buildings provide no support to the infill construction. The existing walls could not be used to resist lateral loads under the Building Code so the 6-storey building stands alone, structurally independent of the existing structures. The City of Hamilton is subject to seismic loads; therefore, the structural engineer had to determine the amount of deflection that would occur during a seismic event and design the building accordingly. As a result, the buildings are separated 2.5 in. (6.35 cm) to allow for this potential movement and the void between the buildings is filled with foam insulation that permits the buildings to move independently.

A Hybrid Structure

Templar Flats used hybrid construction to maximum advantage and employed a mix of wood, steel, concrete and concrete block systems to realize a structure that makes best use of each material. The vertical structure is either masonry or steel, and the floors are wood. The floor system is comprised of engineered wood I-joists that span between steel or concrete bearing points. Wood was also used for sheathing and interior framing. Construction sequencing and coordinating the presence of multiple trades on-site was complex, but the end result was worth the additional effort.

The commercial first floor is concrete, with a suspended concrete transfer slab above that varies from 16 inches to 24 inches thick. The thick section of the slab was required to support the five-storey stairwell and elevator shaft above. This core and the steel moment frames at the front of the building provide the lateral resistance for the building.

The use of concrete on the ground floor helped meet the restaurant's requirements for an open plan. The concrete was formed with strips of wood to create a textured finish for the interior restaurant walls.

Photo: Martinus Geleynse

The stair shafts and elevator core were built with concrete block to comply with the Ontario Building Code's requirement for the use of non-combustible materials for these areas. If combustible construction had been permitted, as it is in some other jurisdictions, the project team would have considered wood cores for the stair and elevator shafts in order to take advantage of their speed, ease of construction, and reduced weight. Once the concrete slab was complete, construction of the upper five storeys progressed quickly at a pace of 1.5 weeks per floor.

Steel beams and columns provide bearing along the front and back of the structure and the concrete core provides bearing in the centre of the building. Shrinkage in the building was a non-issue; the steel to concrete bearing structure avoided differential deflection and eliminated cumulative shrinkage over the height of the structure. The floor and roof joists are engineered wood I-joists and the walls are dimension lumber.

Photo courtesty of Strik Baldinelli Moniz

"We wanted Templar Flats to be an example of what can be done with infill. We really tried to emphasize that all challenges with heritage buildings can be overcome and, at the same time, emphasize that new buildings don't have to be boring."

Project Developer, Steve Kulakowsky, Partner, Core Urban Inc.

Construction

Construction was complicated by the lack of a staging area; there was no place for a crane, preventing the team from panelizing the project. Another complication was the existing district energy system that had a steam pipe 6 feet under the site which needed to be considered when designing the placement of the foundation piers. The steam pipe provided the opportunity to tie into the district energy service, provided by HCE Energy, to heat the building. Templar Flats is the first private project to tie into the system and this state-of-the-art heating and cooling system is just one of the project's several sustainable features.

Fire safety during construction was a priority managed by the contractors. The site was always well lit with a prominent safety board displayed. Access to the site was strictly controlled; the hoarding was very tall and only 15 feet away from the building so passers-by could neither observe what was happening on site, nor gain unauthorized access to the site.

The developer had no difficulty securing insurance for the project and, despite anticipated challenges from the City of Hamilton because Templar Flats was one of the first wood-framed 6-storey buildings to go to permit in the province, there were few questions or concerns about the building and none of them were significant. Everyone who reviewed the permit application was competent and informed about the new code provisions and there were no structural concerns.

SBM performed a waste calculation for what was diverted from landfill by restoring instead of tearing down the existing buildings:

Wood: 17 000 linear feet of 2x12 (existing joists) saved

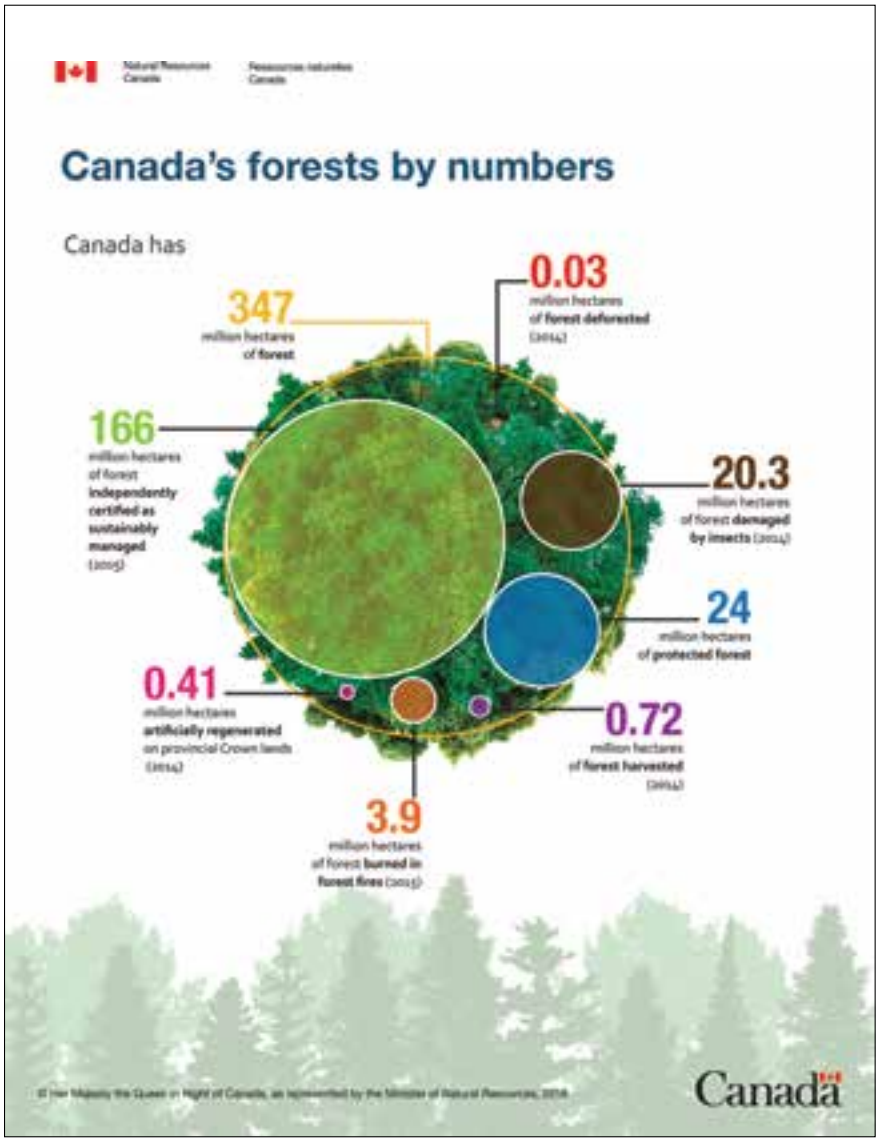
Brick: 40 000 cubic feet of clay brick saved

Why Wood?

The products used to build, renovate, and maintain structures have a significant effect on the environment, so it is important to thoughtfully consider the full impact of each when specifying materials. From extraction, through processing, to finished components, wood products have the smallest environmental footprint of any commonly used building material. Whether in the form of dimensional lumber, engineered wood products, or mass timber, wood is the most sustainable construction material available.

The pursuit of design solutions that incorporate sustainably sourced wood products helps reduce the carbon footprint of our built environment. As we face the reality of climate change and the impact of human development, it is clear that building with wood is not just a more responsible choice, it is a necessary one. Using wood in the new ways made possible through advanced manufacturing, computer-aided design, and progressive, science-based building codes, has ensured that today's wood buildings are not only sustainable, but also smarter, stronger and more versatile.

In Canada, we have a long tradition of building with wood. It is a fundamental part of our architectural heritage, embraced for its warmth, beauty and availability. Yet, as significant as wood is to our past, it is going to play an even more important role in our future. Jurisdictions across Canada are striving for more rigorous environmental standards and seeking solutions for affordable and sustainable densification. As a result, building designers are under significant pressure to balance functionality and cost objectives with reduced environmental impact. Wood construction is a strategic way to meet all of these goals.



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“Templar Flats hits the right buttons. It has received more comments from people than any other project. Hamilton is on the upswing and this is one of the reasons why.”

Project Developer, Steve Kulakowsky, Partner, Core Urban Inc.

Photos: Martinus Geleynse

Conclusion

Templar Flats is a compelling blend of history and modernity. The building’s two most significant dates are commemorated on a tasteful, etched frieze on the facade of the centre section: 1867 for the restored Templar building on the corner, and 2016 for the cutting-edge, new building that has revitalized its old neighbours. By providing high-density housing, contributing to a vibrant streetscape, and saving historic buildings, Templar Flats exemplifies many urban development ideals and demonstrates clear leadership in infill construction.

The project team expressed their belief that the mid-rise wood-frame code changes were geared to projects like this. From the outset, they felt 6-storeys was the obvious solution for the site, and that it was a good height for a tight street like King William. It is clear that they were right. The team took a relatively small, irregularly shaped empty lot and in a short time frame built a beautiful new six-storey hybrid building, with minimal disruption to the surrounding neighbourhood. Through carefully considered design, the team has delivered a vibrant new mixed-use occupancy that enhances and reflects the charming and inviting character of the neighbourhood.

Photo: Martinus Geleynse

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