KING EDWARD VILLA

LOCATION
Vancouver, British Columbia

SIZE
5,405 m²

COMPLETION
2017

ARCHITECT
GBL Architects

STRUCTURAL ENGINEER
Bryson Markulin Zickmantel

CONSTRUCTION MANAGER
Performance Construction

ENGINEERED WOOD FABRICATOR
Mitsui Homes

PROJECT OWNER
Richard Wong

Project Overview

King Edward Villa is a six-storey, mixed-use building located at the corner of King Edward Avenue and Kingsway. The building is comprised of 77 apartments arranged over five floors of wood-frame construction on top of street level commercial space and a basement parking garage, which are constructed in concrete.

The building extends along the entire Kingsway frontage with no side yard setbacks. The footprint leaves only a narrow rear yard with a single point of access off a lane to the south. These constraints, which are typical of many urban lots now being redeveloped in cities across the country, posed considerable challenges to the contractor both in terms of access for deliveries and staging areas for the erection of a crane and the storage of materials.

While on-site fabrication of walls, floors and other wood-frame components has become common practice for mid-rise buildings, the restricted site would have made this approach difficult. Instead the chosen option was to prefabricate all the wood-frame components at the Mitsui Homes factory in Langley, B.C., taking full advantage of the speed, economy and precision that this approach could offer. This degree of off-site prefabrication is only possible when building with wood, and it successfully addressed the logistical challenges faced by the contractor.

Having deliveries of fully fabricated components coordinated with the progress of work on-site made for more efficient use of expensive crane time minimized the need for storage of materials on site, reducing traffic congestion and the number of lane closures necessary on Kingsway. Estimates done by Performance Construction showed that the choice of an off-site prefabricated wood-frame structure resulted in a 15-20% cost savings relative to concrete. This reduced the construction time from a probable six months for a concrete structure to only two months for wood.

Rendering courtesy of GBL Architects

"The use of prefabricated structural elements enabled us to complete the framing on this building in just two months. The superior grade of the materials used, and the precision of the components meant we got a higher quality building at a competitive cost."

***Richard Wong**, Project Owner*

Wood Use

Above the concrete roof of the ground floor commercial units, the entire structure is wood, including exterior and interior walls, interior floors and exterior balconies, elevator shafts and roof trusses.

Of these elements, the most innovative are the parallel chord floor trusses that enable the main mechanical and electrical services to be run easily within the depth of the floor. In addition, load path analysis demonstrated that these trusses could be hung from their top chords only, making it much easier to run drywall to the underside of the plywood flooring to complete the fire separation required between suites.

On the south side of the building, the floor trusses bear on parallel strand lumber (PSL) beams that extend through the exterior walls, cantilevering five feet to support exterior balconies. Compared to traditional construction, in which header joists would be used for this purpose, the PSL beams reduce the number of penetrations necessary, thus reducing thermal bridging and heat loss.

Mitsui Homes' approach to prefabrication is to create a three-dimensional model in which each prefabricated component is designed in detail then given a unique location within the building. This means that the wall studs on successive floors are precisely aligned, and electrical conduits, plumbing pipes and tie down anchors can be threaded easily through pre-drilled holes, following the construction sequence from the bottom to the top of the building.

The result is faster construction and a cleaner, neater and safer site because the installation of drywall can also proceed from bottom to top, reducing the risk of fire during construction.

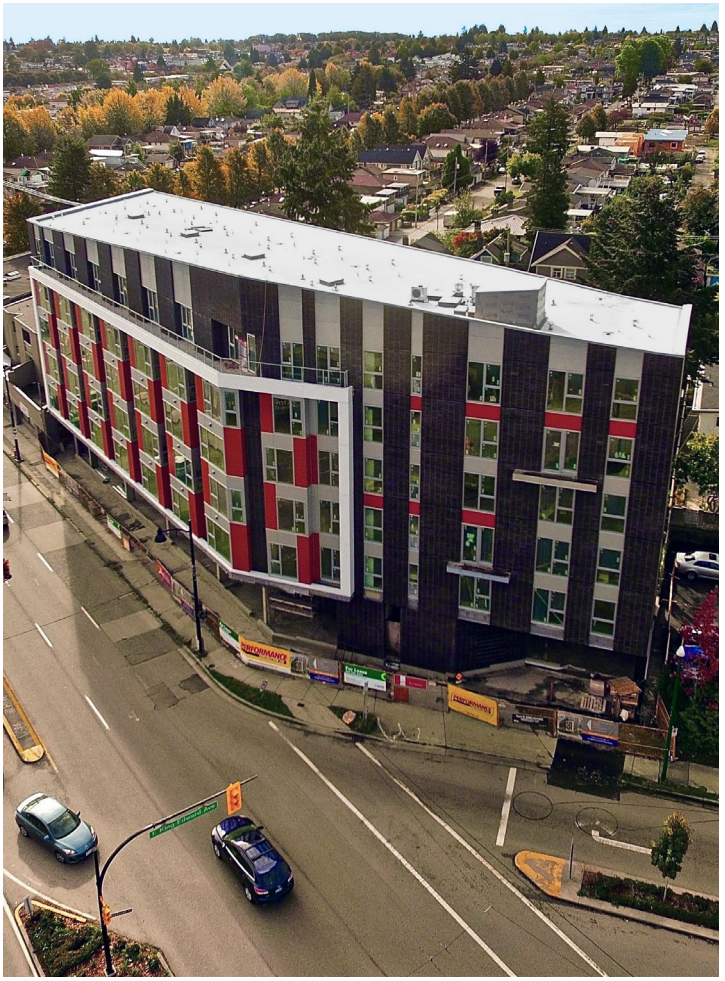

Photo courtesy of GBL Architects

ESTIMATED ENVIRONMENTAL IMPACT OF WOOD USE

- Volume of wood products used: **1,023 cubic meters**
- U.S. and Canadian forests grow this much wood in: **3 minutes**
- Carbon stored in the wood: **871 metric tons of CO_2**
- Avoided greenhouse gas emissions: **1,851 metric tons of CO_2**
- Total potential carbon benefit: **2,721 metric tons of CO_2**

GHG EMISSIONS ARE EQUIVALENT TO:

- **575** cars off the road for a year
- Energy to operate **287** homes for a year

**Estimated by the Wood Carbon Calculator for Buildings, cwc.ca/carboncalculator.*

**CO2 refers to CO2 equivalent.*

FOR MORE INFORMATION

This profile is published by Forestry Innovation Investment, the Government of British Columbia's market development agency for forest products.

For more examples of innovative wood building projects throughout British Columbia, visit:

naturallywood.com

The wood grain featured in this profile is western red cedar.