

Wood in Commercial Buildings

A CASE STUDY



Askew's Uptown Supermarket
Salmon Arm, BC

Whistler Community Services Society Building
Whistler, BC

WOOD IN COMMERCIAL BUILDINGS

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1.0 INTRODUCTION



1.1 Askew's Uptown Supermarket (Martin Knowles, Courtesy Allen+Maurer Architects Ltd.)

In 2009, the British Columbia Building Code (BCBC) was amended to permit residential buildings of up to six storeys to be constructed in wood. Since then, through a five-year code process of consultation and research, the potential for expanding these provisions to other building occupancies has been under consideration at the national code level.

Changes introduced in the 2015 edition of the National Building Code of Canada (NBC) and adopted in British Columbia in 2018, have expanded these provisions to office-type buildings, but also permit mixed-type occupancies on the first two storeys. As a result, wood building types now include office, residential, mercantile, assembly, low hazard or storage/garage uses.

Front and back cover photos: Askew's Uptown Supermarket (Martin Knowles, Courtesy Allen+Maurer Architects Ltd.)
Whistler Community Services Society Building (Andrew Doran Photography, Courtesy AKA architecture + design)



This case study examines two wood buildings, both with primary retail commercial occupancies, but which employ different mass timber products to achieve very different effects. Askew's Uptown Supermarket in Salmon Arm, BC, features an expansive nail-laminated timber (NLT) roof that appears to float above the retail floor (Figure 1.1), while the Whistler Community Services Society Building in Whistler, BC, uses a robust, utilitarian exposed glued-laminated timber (glulam) and cross-laminated timber (CLT) structure as befits the building's industrial setting (Figure 1.2).



1.2 Whistler Community Services Society Building (Andrew Doran Photography, Courtesy AKA architecture + design)

ASKEW'S UPTOWN SUPERMARKET

Salmon Arm is a rapidly-growing city of around 18,000 people located on the shores of Shuswap Lake in the Southern Interior of British Columbia. Lying midway between Calgary and Vancouver, it was established in the 1880s during the construction of the Canadian Pacific Railway. The city has a compact and characterful downtown core, surrounded by the kind of sprawling development typical of most Canadian cities of similar age and size.

The 3,000-square-metre Askew's Uptown Supermarket is the first phase in a planned six-hectare mixed-use development that will include retail, office and residential space. The site is on 11th Avenue, a frontage road that parallels the Trans-Canada Highway, northeast of the city centre. This area has seen significant residential growth in the past two decades.

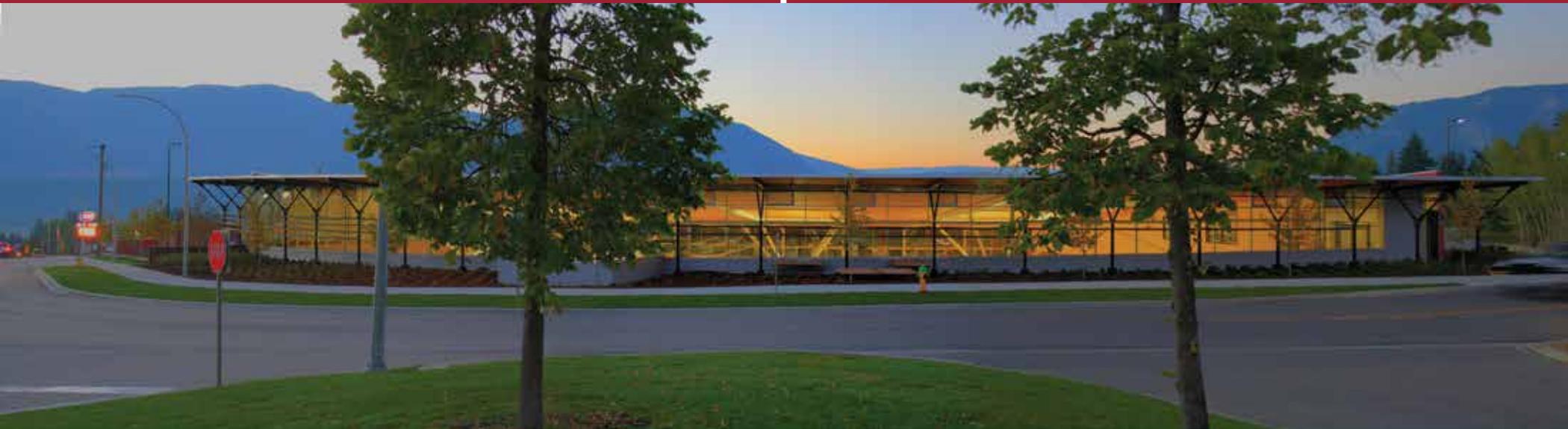
The site slopes down approximately 18 metres from southeast to northwest, presenting challenges in establishing suitable grades for buildings with large floor plates and for engineering conventional approaches to vehicular access. Both these challenges have been embraced as opportunities and have together contributed to a unique design solution.

2.1 Urban Design Response

In a suburban context such as this, the typical urban design response is to create a strip mall; a building complex located at the centre of the site, surrounded by large paved parking areas. However, in their masterplan for this project, the design team took a different approach. As architect Florian Maurer puts it, "The guiding principle is as simple as turning a negative photograph into a positive one: instead of placing buildings in the middle of parking lots, they are used to create streetscapes and squares." (Figure 2.1)



2.1 Masterplan of Askew's development (Allen+Maurer Architects Ltd.)

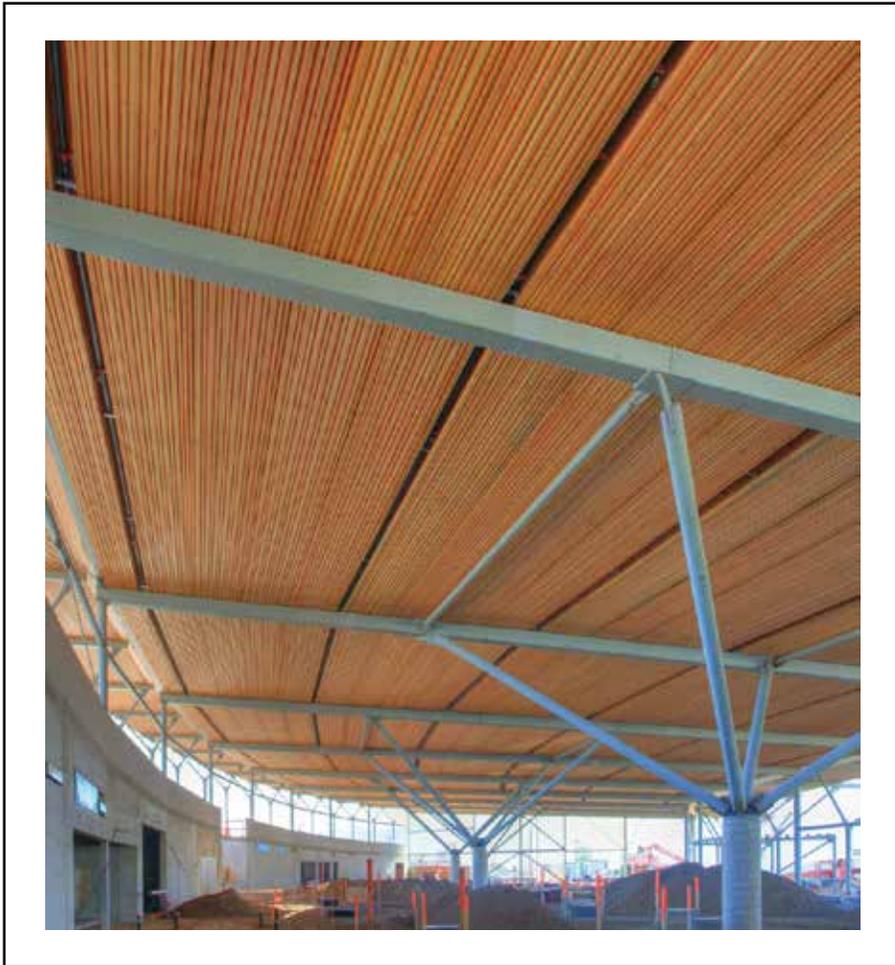


2.2 Askew's upper level from street (Florian Maurer)

The starting point is the creation of a Street Wall, achieved by locating the building adjacent to the sidewalk. Next comes a row of trees, then a walking and cycling path, and finally parallel parking – a strategy to slow down traffic and announce a 'destination' rather than a thoroughfare (Figure 2.2). By following these steps, the Askew's development creates a precedent for Salmon Arm, setting an appropriately progressive tone for the future Uptown commercial centre and encouraging a move away from inefficient and unsustainable single-use zoning.

2.2 Project Goals

In keeping with this strategic approach to sustainability, the design of the Askew's building is informed by the particular outlook and priorities of the client, the needs and aspirations of the community, and the materials and construction expertise available in the region.



2.3 Nail-laminated timber roof (Chris Allen)

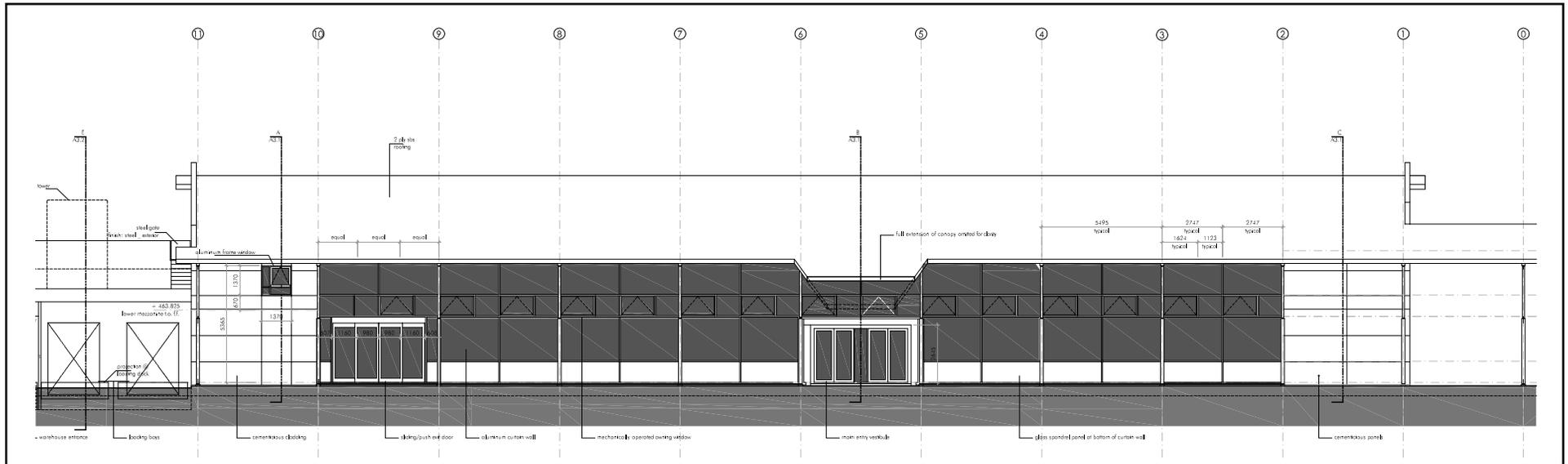
The forest products industry has been a traditional mainstay of the local economy, although it has recently been impacted by a combination of consolidation and globalization. With family roots in the forest industry, architect Chris Allen saw this project as an opportunity to fight back. Similarly, as a service provider to that industry for several generations, Askew's Foods wanted to make its project a statement of community support by maximizing the use of local wood products and labour (Figure 2.3).

With these goals in mind, the construction of the building also turned away from the typological norm of a generic concrete masonry or steel box. With an elegant wood roof and abundant daylight, Askew's Uptown Supermarket is bright and airy, warm and welcoming – as befits its role as a hub for the community of Salmon Arm.



2.4 Floor plan of store showing tapering structural bays (Allen+Maurer Architects Ltd.)

2.3 Architectural Response



2.6 North (entrance) elevation (Allen+Maurer Architects Ltd.)

The site is accessed from the road via a switchback ramp that descends an earthen berm bordering the south property line. Next to the ramp, the back of the supermarket has been tucked into the slope, where a concrete retaining wall holds back the berm.

The south wall, projecting above the top of the berm adjacent to the street, allows for a mezzanine extending along a continuous horizontal clerestory window. The window gives the store a bright and welcoming presence visible from the Trans-Canada Highway (refer back to Figure 2.2). A projecting canopy shades the window from unwanted solar heat gain in summer, while still ensuring that the store below is flooded with natural light.

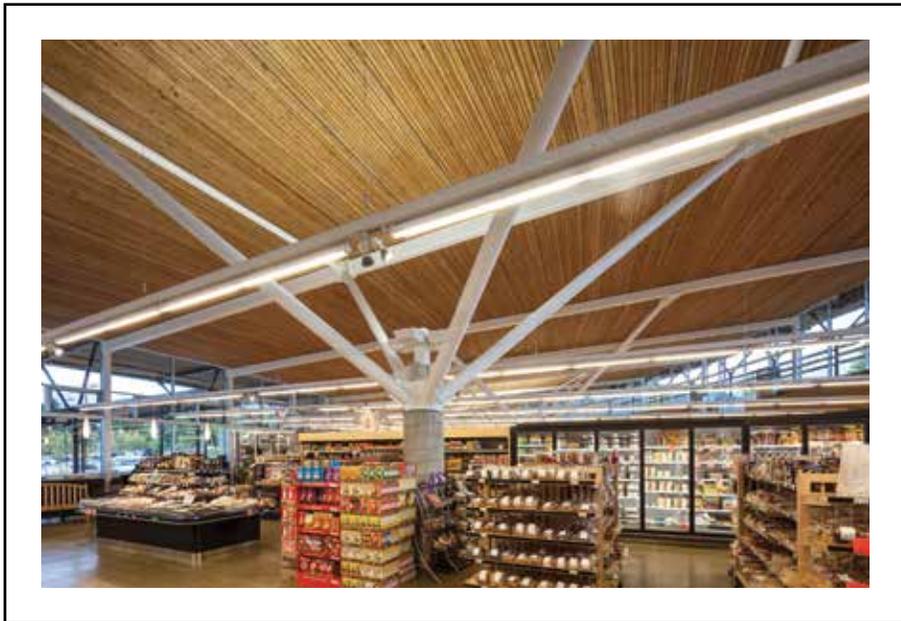
A staircase descends from the road adjacent to the brightly coloured west wall (Figure 2.5) and leads down to courtyard level and the main entrance to the store. The curving north wall, oriented toward the centre of the site, also has extensive floor-to-ceiling glazing (Figure 2.6).

At this southeast corner of the site, the adjacent frontage road follows a gentle arc. The building plan is generated by taking the centre point of this arc and scribing two concentric lines to define a concave front wall and convex rear wall. The planning grid is thus a series of tapered segments that increase from approximately 4.8 metres at the front of the building to approximately 9.6 metres at the rear (Figure 2.4).

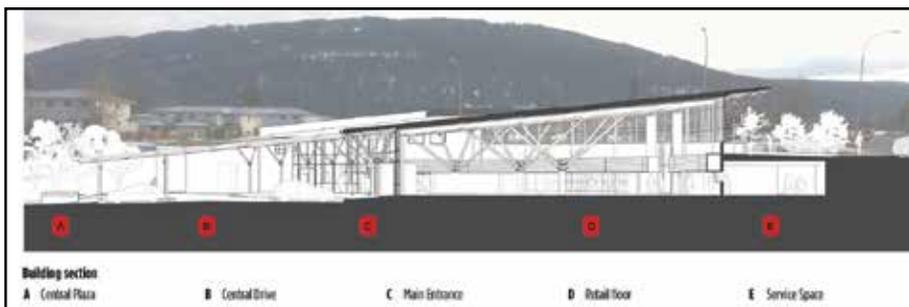


2.5 West elevation, canopy and stairs to street (Florian Maurer)

To ensure maximum flexibility in laying out the store, the structure consists of widely spaced cylindrical concrete columns, with tubular steel branches that support parallel lines of partially concealed steel beams (Figure 2.7). The columns support a large, planar exposed wood roof that slopes gently down from south to north



2.7 View of tubular steel tree column (Derek Lepper Photography, Courtesy Allen+Maurer Architects Ltd.)



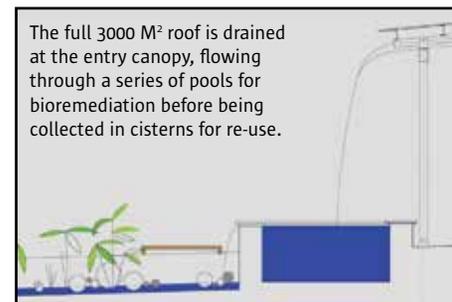
2.8 North-south building section (Allen+Maurer Architects Ltd.)

(Figure 2.8). The branching steel structure means that columns are only required in every alternate structural bay, lightening the vertical structure and reinforcing the illusion of a floating roof.

Extending out from the main entrance, a long, tapering canopy channels the rainwater that falls on the roof, guiding it to a 'waterfall' edge where it cascades into an ornamental pool (Figures 2.9 and 2.10). During the frequent downpours that occur in this valley, the runoff creates an impressive and engaging spectacle – while recharging the underground cistern that is used to irrigate the street trees and landscape.



2.9 Entrance canopy and north elevation at dusk (Derek Lepper Photography, Courtesy Allen+Maurer Architects Ltd.)



The full 3000 M² roof is drained at the entry canopy, flowing through a series of pools for bioremediation before being collected in cisterns for re-use.

2.10 Sketch of waterfall and pond at edge of entrance canopy (Allen+Maurer Architects Ltd.)

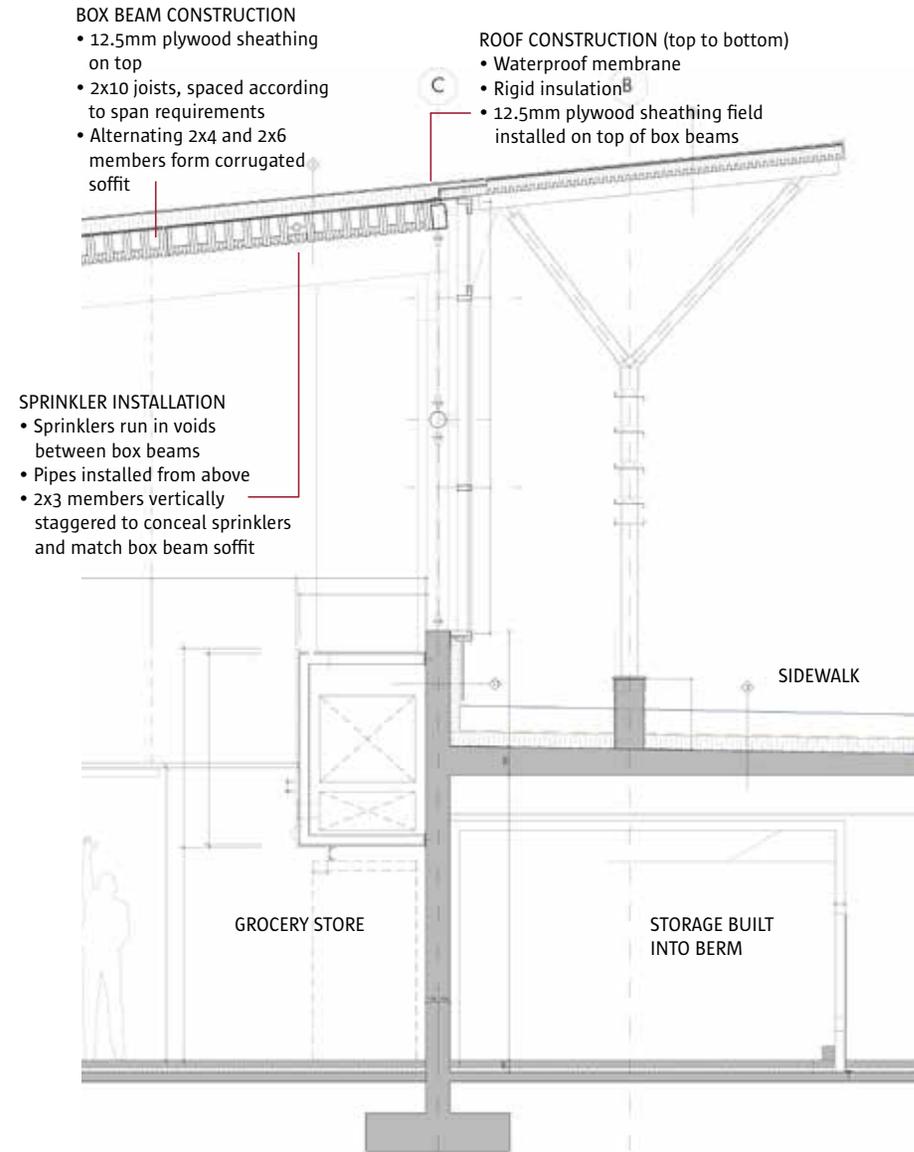
2.4 Structural Design

With a design snow load of 3.5kPa, a traditional wood roof for a building of this scale would have consisted of glulam beams and purlins with heavy timber decking above. Such a roof would have required considerable depth and the lattice of heavy timber members would not have achieved the floating effect desired by the architects. In addition, for consistency of appearance, the tapering structural bays would have required glulam beams of equal depth, despite variations in span from 4.8 metres to 9.6 metres.

Instead, for economy, efficiency and improved aesthetics, structural engineers Fast + Epp designed the 3,000-square-metre roof of the building as a series of 1,200-millimetre-wide nail-laminated timber (NLT) box panels, supported on a primary structure of steel beams. As noted, these beams rest on tubular steel branches that spring diagonally from cylindrical concrete columns. Lateral resistance in the vertical plane is provided by steel cross-bracing along the south wall, long shear walls on the east and west sides, and two short sections of shear wall on the north side of the building.

The NLT panels have a consistent depth and continuous soffit treatment but with variable joist spacing according to the length of span. The joists are regular 2x12 sections, used singly or doubled up for panels spanning up to 7.2-metres – the longest available section. For the 9.6-metre spans, 7.2-metre and 2.4-metre sections were overlapped longitudinally and nailed together face-to-face in pairs to form beams. All the panels were finished with one layer of 12.5-millimetre plywood sheathing on top, while the spaces between the joists were filled with alternating 2x4 and 2x6 members at the bottom, creating a corrugated ceiling.

A 300-millimetre gap was left between panels to conceal sprinkler lines. These gaps are bridged by plywood on top and have corrugated cover panels beneath, made from vertically staggered 2x3 members to match the main panel soffits. The panels use a total of 580 cubic metres of locally harvested dimension lumber and 530.5 cubic metres of plywood (Figure 2.11).



2.11 Architectural section at south wall showing roof construction (Allen+Maurer Architects Ltd.)

2.5 Benefits of Nail-laminated Panel Construction

The lumber was sourced from various regional mills to meet the demands of the schedule and to allow for competitive pricing. Shop prefabrication of the wood components also enabled the work to be carried out over the winter, providing off-season employment for carpentry crews. The simplicity of the design required no special tools or new skills to turn 578 cubic metres (245,000 board feet) of lumber into a roof (Figures 2.12 – 2.16).

The finished panels were hoisted onto the steel beams in summer, with no painting or electrical work required. Sprinkler installers were able to kneel on the roof to drop the pipes in the slots provided, rather than working above their heads from scaffolding in the building. A second layer of 12.5- millimetre plywood was installed in the field to create a roof diaphragm.

The panels contain no insulation; instead, continuous rigid insulation was laid on top of the field-installed plywood sheathing before the roofing membrane was applied. The maximum volume of the voids within the panels is less than the threshold for sprinklering of concealed spaces.



2.12



2.15



2.13



2.16



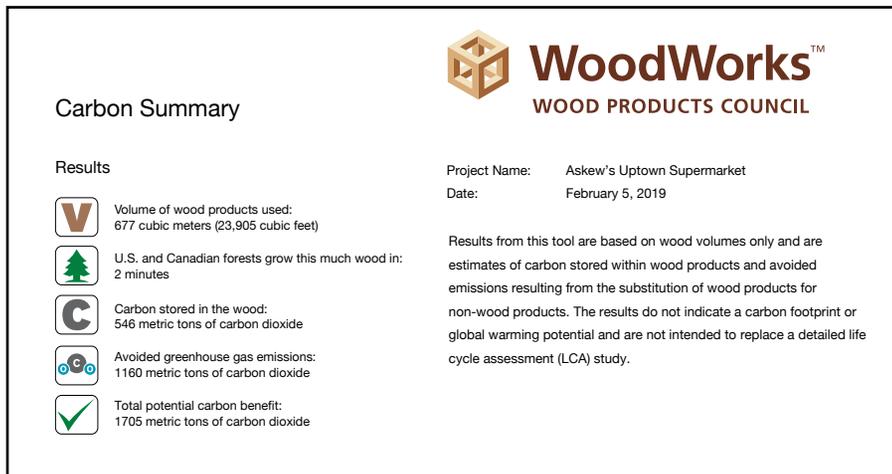
2.14

2.12 – 2.16 Fabrication and installation sequence for NLT panels (Chris Allen)

2.6 Environmental Performance

This project uses solid-sawn lumber, a product that is only one step of refinement up from the log – without glues, treatments or applied finishes. Therefore, the primary processing energy used is limited and the environmental benefits of the carbon stored in the wood are maintained to the greatest possible degree (Figure 2.17).

Turning to the more familiar measurement tools of sustainability, the Askew’s Uptown Supermarket achieves a 43 per cent reduction in energy use compared to a typical grocery store through the re-use of waste refrigeration heat, in-floor heating, natural ventilation, ample glazing for daylighting, light-sensing dimmers, and exterior shading.



2.17 Carbon summary chart

2.7 Conclusion

In addition to the tangible benefits of low carbon construction and local employment, the form, materials and organization of the building express the unique qualities of the site, and enhance the experience of Salmon Arm. Doubling as a retaining wall, the structure reconciles the change in level between the street and the incipient urban square below. The sweeping roof with its exposed Douglas fir soffit, creates a warm ambience, while the expansive windows offer views of the surrounding mountains (Figures 2.18 and 2.19).

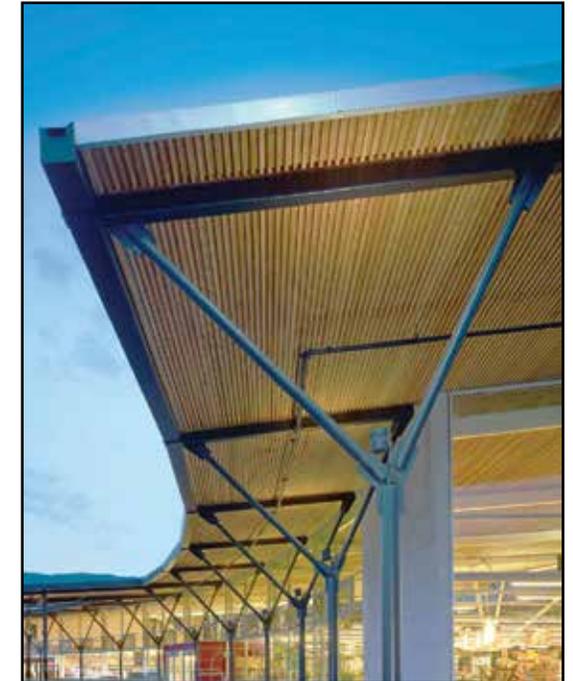
Perhaps appropriately for a grocery store, the design of Askew’s in some respects parallels the ambitions of the Slow Food movement. Just as Slow Food has promoted the local virtues of quality and taste over the agri-business model of uniformity and convenience, the design of Askew’s puts the ecological, economic and cultural sustainability of the community first (Figure 2.20).



2.18 Views from seating area to mountains (Florian Maurer)



2.19 Views from seating area (Florian Maurer)



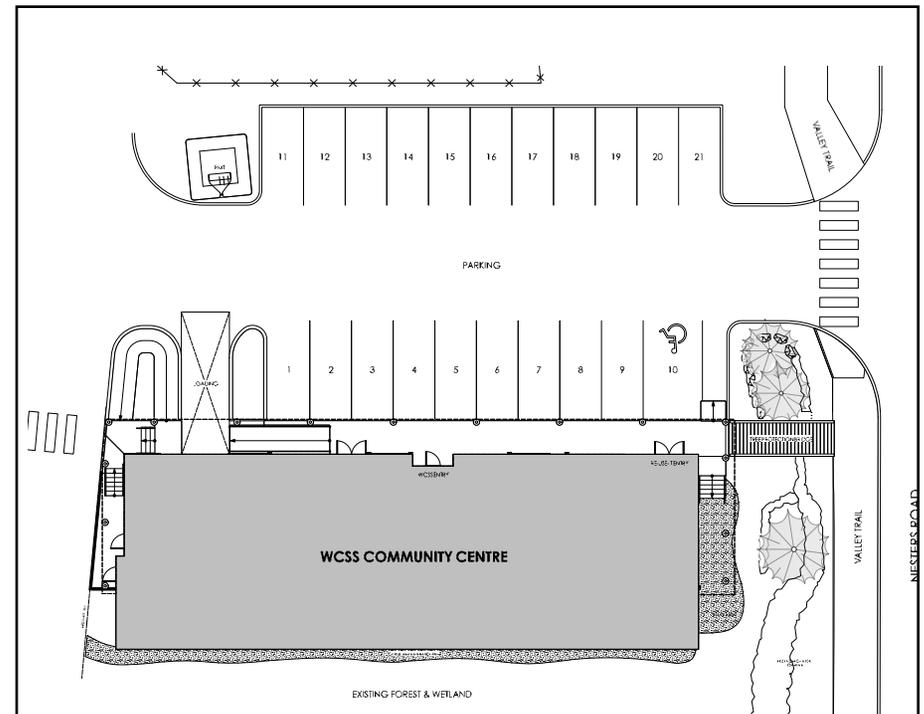
2.20 NLT canopy at north elevation (Martin Knowles Photography, Courtesy Allen+Maurer Architects Ltd.)

WHISTLER COMMUNITY SERVICES SOCIETY BUILDING

The Whistler Community Services Society (WCSS) is a not-for-profit organization that provides a wide variety of social services to the residents of the Resort Municipality of Whistler, located approximately 125 kilometres north of Vancouver, BC.

Incorporated in 1989, WCSS first established its food bank and Christmas hamper programs using grant funding from government. Ten years later, the organization was approached by Whistler Mayor Hugh O'Reilly to develop a thrift store. The concept was to resell used sports equipment and other goods, keeping them from the landfill and using the profits to fund additional social service programming. The Reuse-It Centre was an overnight success. Since then WCSS has expanded its social enterprise to include the Re-Build-It Centre as well as bottle and electronic recycling. Together these businesses provide 85 per cent of funding required to run social service programming including legal advice, counselling services, parenting classes and many others.

With the rapid expansion of its retail operations and community programs, WCSS found itself operating in multiple locations, eventually reaching the point where consolidation became the most expedient next step in the evolution of the organization. With the complexities of a mixed-use program, including high clearance storage areas, retail and office space – together with a desire to be close to the town centre and accessible by transit as well as private vehicles – WCSS concluded that the best option was to construct a new building on a vacant site in the municipal works yard (Figure 3.1).



3.1 WCSS building site plan (AKA architecture + design)

3.1 A Pragmatic Approach to Building

The WCSS formed a building committee which developed the program for the new facility and decided (largely because of the heavily trafficked, industrial nature of the site) that the building should be constructed using the traditional combination of a steel frame primary structure, open-web steel joists, profiled metal deck and concrete topping for the suspended floors and tilt-up concrete (structural insulated) panels for the exterior walls (Figure 3.2). The firm of AKA architecture + design was retained to lead the design team for the project, with Fromme Engineering as structural engineers.

The project went through the schematic design and design development phases, received both development and building permits and was put out to tender as a construction management contract based on this steel and concrete structural system. However, it soon became apparent that the concrete SIP supplier was unable to meet the required construction schedule.



3.2 North elevation: proposed concrete tilt-up building (AKA architecture + design)

3.2 A Change in Direction: Exploring a Wood Alternative

Whistler experiences long, cold winters with significant snowfall, restricting the construction season, for concrete work in particular, to the six months from May to October. Faced with this untenable situation, one WCSS trustee who had experience working with cross-laminated timber (CLT) suggested that the design team explore this alternative.

AKA architecture + design brought in Penticton-based Structurlam, currently British Columbia's only fabricator of CLT, and they in turn retained Vancouver-based structural engineers Fast + Epp to design the wood structure. The first priority was to determine whether a wood alternative could be designed and delivered within the client's time and cost constraints. To further complicate matters, the exterior appearance of the building had to be maintained as this was a condition of the original development permit.

Minor modifications were permitted; for example, windows where the jamb widths required in tilt-up construction are different from those for CLT. Conversely, the pattern of reveals that were to have been cast into the concrete walls had to be replicated in the layout of the metal cladding panels and HardiePlank siding used on the wood solution (Figure 3.3). This enabled municipal staff to sign off on the redesigned building without having to return the proposal to council.

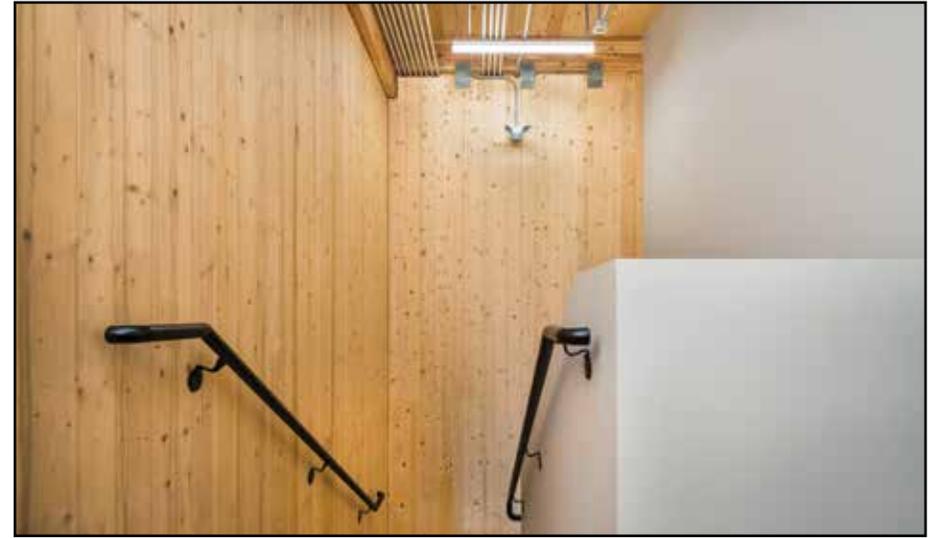


3.3 North elevation: wood building showing pattern of joints in cladding (AKA architecture + design)

From a cost perspective, the design team had a known tender price for the steel and concrete building as a benchmark and believed they could achieve modest cost savings with a simple mass timber alternative. In the end, the two solutions were almost identical in cost: poor soil conditions had led to expensive foundations being designed to support the weight of a concrete structure, and these could be substantially reduced for the lighter wood option. Because the CLT exterior wall panels could be load-bearing, it was possible to eliminate the perimeter columns required in the steel and concrete option. In addition, interior finishes could be eliminated in some places, as the CLT panels could be left exposed (Figure 3.4).

The mass timber structure is as simple as possible, with vertical CLT panels, a glulam post-and-beam interior frame, CLT ground and upper floors, and a glulam and CLT roof. The floor-to-floor heights had to be slightly increased, as services designed to run through open-web steel joists now had to be suspended below the glulam beams. The CLT panels were exposed in the counselling rooms and in the storage areas, where racks could be secured directly to the walls.

For this project, the client was happy to specify an industrial grade of CLT, rather than an architectural ‘appearance’ grade and to leave building services exposed (Figure 3.5). This was in part due to the function and context of the building, but also meant that the money saved could be directed to the organization’s social programs. The building is classified as a retail commercial major occupancy, with an industrial (warehouse) minor occupancy.



3.4 CLT panels left exposed as an interior finish
(Andrew Doran Photography, Courtesy AKA architecture + design)



3.5 Exposed services reflect the industrial context of the building
(Andrew Doran Photography, Courtesy AKA architecture + design)

3.3 Structural Design

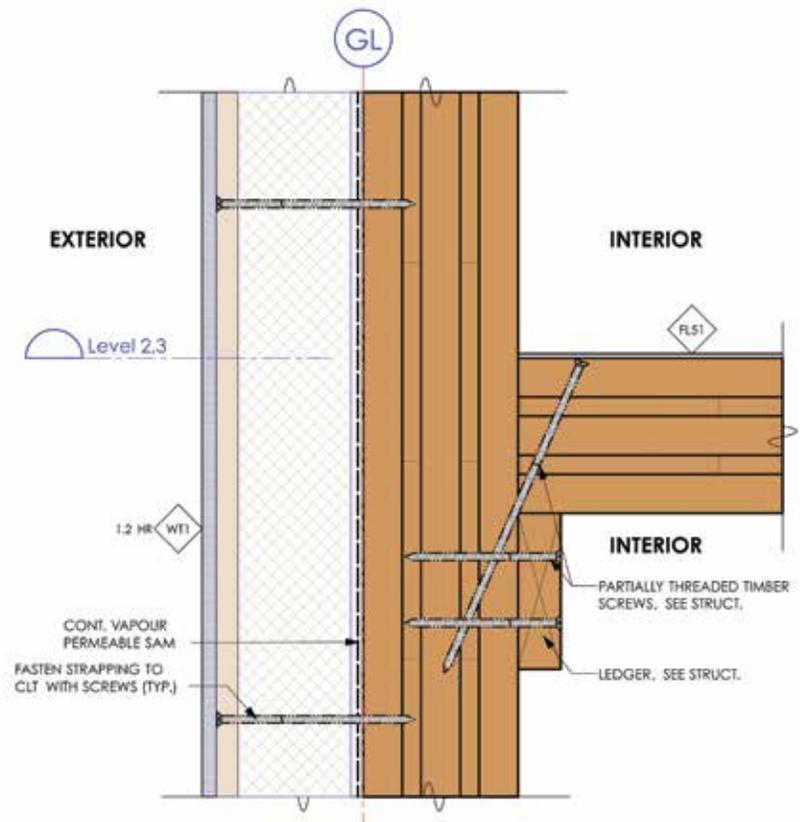
The first step was to do a rough layout to see if the budget and timeline could be met. The schedule required that work start on site less than three months after the contract was awarded. At the same time that Fast + Epp began designing the mass timber structure, Fromme Engineering (still the structural engineer of record) began redesigning the foundations.

According to Carla Dickof, senior technical specialist with Fast + Epp, “The dimensions of the building as originally designed made it perfect for CLT.” Both the height and



3.6 The CLT wall panels, together with the elevator and stair cores, run from grade beam to eaves as in balloon frame construction. The panels were lifted off the truck and lowered directly into place. (Fast + Epp)

the width were just short of 12 metres – the maximum length of a CLT panel. The five-ply CLT wall panels were aligned vertically, running the full height of the building from grade beam to eaves, as in balloon frame construction. The elevator and stair shafts were constructed in the same way (Figure 3.6). This meant the panels could be lifted off the delivery truck and dropped directly into place by Seagate Structures, the mass timber subcontractor. The exterior wall panels had dimension lumber ledgers pre-installed to provide bearing for the five-ply CLT upper floor panels (Figure 3.7).



3.7 Solid sawn lumber ledgers support the CLT floor panels at the exterior walls (AKA architecture + design)

At mid-span, the floor panels bear on a pair of glulam beams that run either side of a central line of glulam columns (Figures 3.8 and 3.9).

The lateral system uses the exterior walls along the 34-metre length of the building, with the panels connected by plywood strips nailed across the joints. For these tall panels to contribute to the lateral system, a creative interpretation of CSA Standard 086 Engineering Design in Wood was required.¹ Across the width of the building, elevator and stair shafts contribute to lateral stability.²

For lateral load distribution, a simple envelope approach was used, considering both rigid and flexible diaphragms. Diaphragm action was achieved by ‘stitching’ the floor and roof panels together using strips of plywood to bridge the seams – the same detail as that used for the exterior walls (Fig. 3.10).



3.8 and 3.9 At mid-span, the CLT floor panels bear on a pair of glulam beams supported by a central line of glulam columns (Fast + Epp – 3.8; Andrew Doran Photography, Courtesy AKA architecture + design – 3.9)

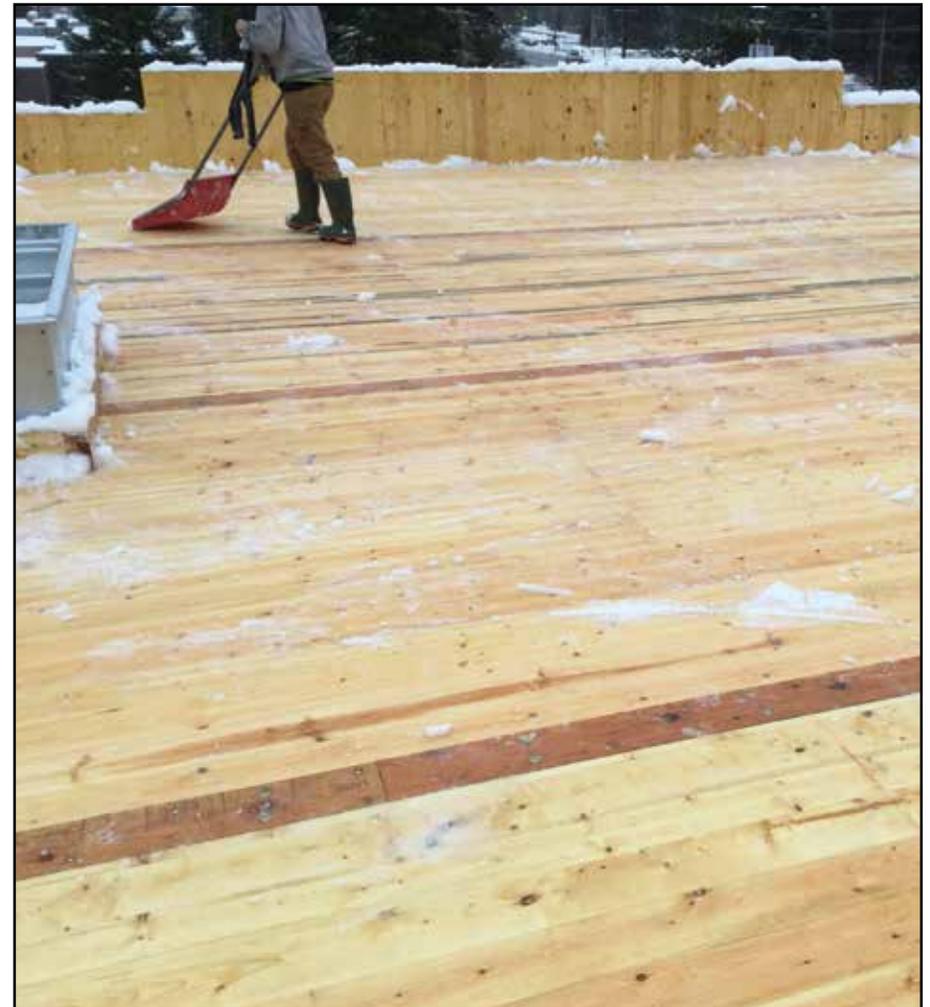
The roof consists of three-ply CLT panels mounted on glulam purlins that run between the central glulam beams and the ledgers mounted on the exterior CLT panels. The purlins and beams are connected using proprietary aluminum 'dovetail' connectors. Drag straps connect the roof diaphragm to the CLT cores.

The revised foundation design is a raft slab, with short perimeter walls to create a crawl space. These concrete walls support both the CLT floors and exterior walls. Cast-in-bolts are used to secure sill plates below both the ground floor and wall plates to the foundation wall. A moisture barrier ensures there is no direct contact between the wood plates and the concrete wall.

The floor panel is then screwed to the sill plate. The wall panels are nominally connected to the sill plate as well as directly fastened to the concrete foundation wall with plate connectors installed on the exterior face of the CLT wall panels and concrete foundation wall. These plates are screwed or nailed to the face of the CLT panels and anchored to the face of the concrete foundation wall with post-installed anchors.



3.8



3.10 Roof construction: plywood strips installed at CLT panel joints (Fast + Epp)

¹ CSA 086-14 requires the aspect ratio and platform framed approach when using the noted ductility values. However, it does provide an alternative approach with lower ductility if the criteria (such as aspect ratios, sliding of panels governing, etc.) are not met. This is a very conservative approach but does offer a path forward for alternate approaches to CLT structures (such as 'balloon' style construction) within the current code limitations.

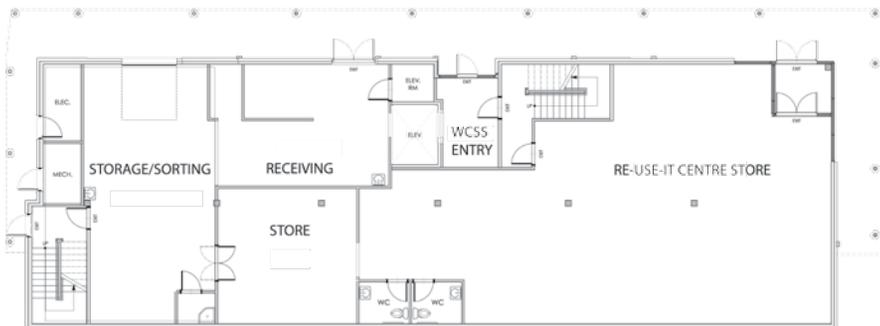
² Only the shaft walls running in the short direction were considered as part of the lateral system, unlike concrete construction where the entire 'core' can be considered.

3.4 Architectural Implications

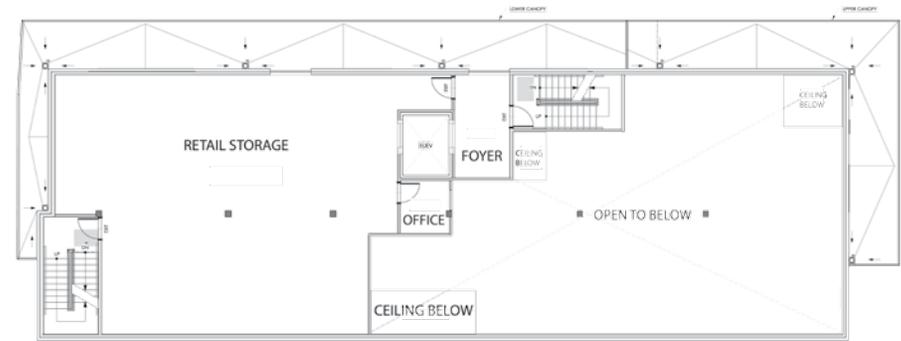
The building program is arranged on three levels: the first (ground) level is largely devoted to the sale of second-hand items, including receiving, storage and sales areas, with seasonal storage located on the second level (mezzanine) above. The food bank, counselling and other community support programs operate out of offices and meeting rooms on the third level (Figures 3.11, 3.12 and 3.13). These programs are accessed by way of a separate entrance to protect the privacy of clients.

Most of the work required to make the change from a concrete and steel structure to mass timber structure went into re-detailing the building. Semi-rigid Rockwool insulation was added on the outside of the CLT panels, with battens and siding secured directly through it. Window openings are detailed to minimize thermal bridging, with exterior wood trims hinting at the presence of the CLT structure within (Figures 3.14, 3.15 and 3.16).

Energy modelling was used to verify the thermal performance of the building envelope. The walls achieved an R-value of 24 and the roof achieved an R-value of 32. Both these values exceed the requirements for a non-residential building in climate Zone 6, which specify a minimum of R23 for walls and R31 for roofs. The relatively low thermal transmittance of CLT was a contributing factor in realizing these higher values.



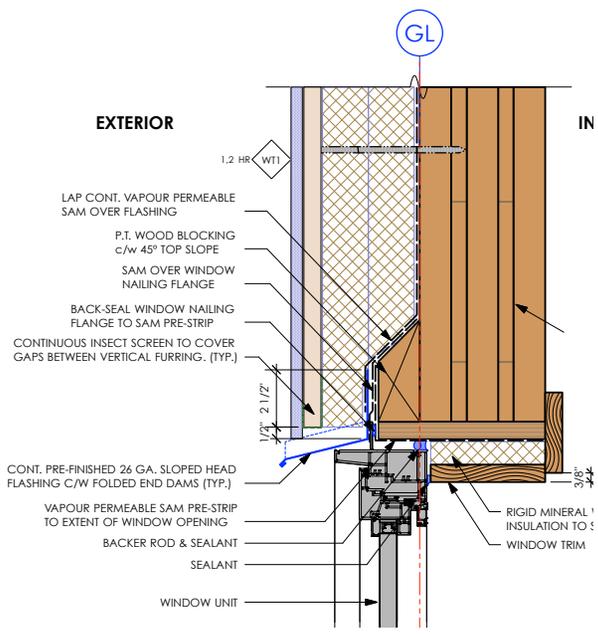
3.11 Level one (AKA architecture + design)



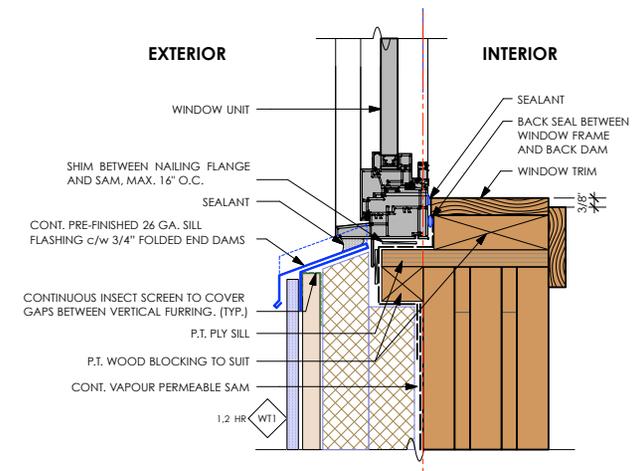
3.12 Level two (AKA architecture + design)



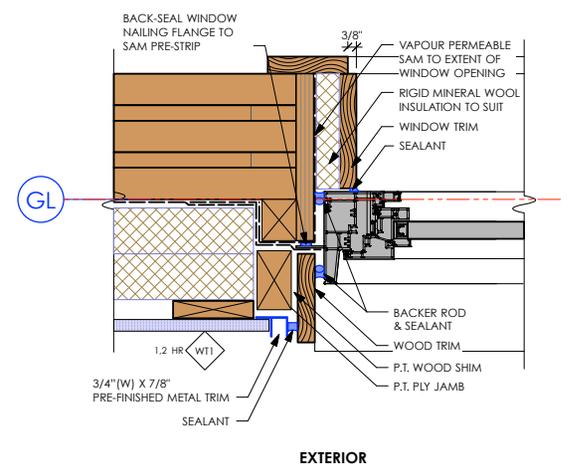
3.13 Level three (AKA architecture + design)



3.14 Section detail at window head (AKA architecture + design)



3.16 Section detail at window sill (AKA architecture + design)



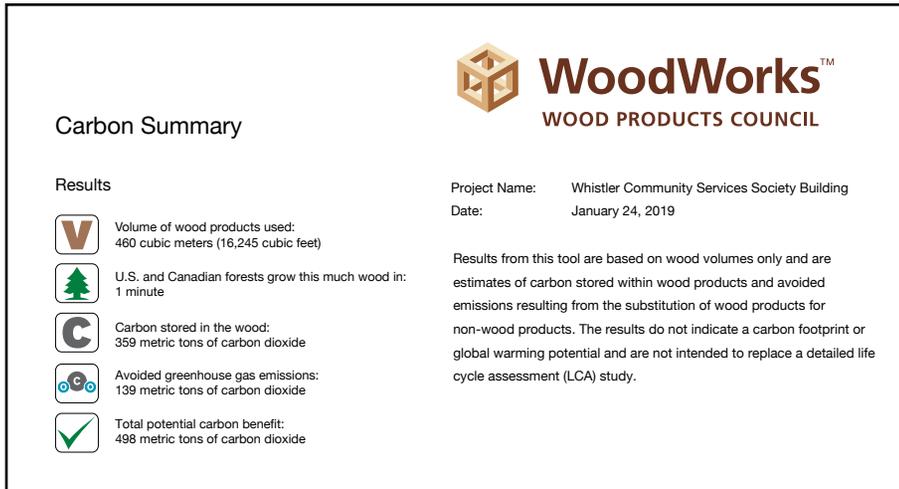
3.15 Plan detail at window jamb (AKA architecture + design)

3.5 Modifying the Prototype

While the building geometry and construction techniques are both simple and straightforward, designing within the constraints of the existing development permit did lead to some inefficiencies.

As built, the CLT panels on the WCSS building vary in width from two to three metres, because that is how the concrete tilt-up panels had been designed. It would have been more economical to use panels of a standard width.

Because the mezzanine occupies more than 40 per cent of the floor area in which it is located, it is not considered a mezzanine as defined in the British Columbia Building Code. As a result, the structure is deemed to be three storeys in height. Had the mezzanine conformed to the BCBC definition, the building would have been subject to less stringent fire performance requirements.



3.18 Carbon summary chart

3.6 Fire Performance: An Alternative Solution

For the three-storey structure, GHL Consultants Ltd. provided an alternative solution to address exterior wall construction, due to the proximity of the building to the property line, which is as little as 1.5 metres in some places.

Given the higher fire load for the retail occupancy and the size of the fire compartment in this location, BCBC 2012 prescribes that no more than 10 per cent of the wall adjacent to the property line be unrated window openings and/or wall area. The remaining (minimum 90 per cent) of the wall assembly must have a two-hour fire-resistance rating and be of non-combustible construction.

The functional objective of this requirement is to limit the risk that a fire in the WCSS building would spread to the neighbouring property before emergency responders could perform their duties (e.g. fire suppression and wetting of neighbouring buildings). This could be due to either the fire spreading to the adjacent property through a window opening or unrated wall assembly, or through ignition of the wall itself.

The alternative solution permitted the use of CLT within the exterior wall assembly in the locations where a two-hour non-combustible wall assembly was prescribed by the building code. The alternative solution demonstrated that a non-load-bearing CLT wall could achieve the required level of performance. This was achieved using a char analysis³ and specifying mineral fibre insulation and a non-combustible cladding on the exterior side of the CLT. Similar measures could be used on future projects to address the same situation, if reorganizing the program or increasing the distance from the property line were not viable options.

³ Because mass timber burns at a predictable rate, it is possible to accurately calculate how long an element can be exposed to fire before losing its structural integrity.

3.7 Conclusion

This is the first retail building of its type in Canada and demonstrates the potential of mass timber construction to compete in this market sector, with comparable costs and enhanced environmental performance relative to ‘traditional’ steel and concrete construction. The wood solution is cost competitive and highly repeatable (Figure 3.17).

The enhanced environmental performance of mass timber, including lower GHG emissions from resource extraction through fabrication to installation of the building components, together with the carbon already sequestered in the material, fits well with the ecological values of both the architect and municipality (Figure 3.18). Exposing wood inside the building also creates a warm and welcoming atmosphere for employees and visitors (Figure 3.19).



3.17 The building is simple, cost effective and highly repeatable (Andrew Dalton Photography, Courtesy AKA architecture + design)



3.19 Interior of finished building showing exposed CLT panels (Andrew Dalton Photography, Courtesy AKA architecture + design)

4.0 CHANGES TO THE NATIONAL BUILDING CODE OF CANADA

Requirements for the specification of structural wood products and wood building systems are set out in the model National Building Code of Canada (NBC), which is concerned with health, safety, accessibility and the protection of buildings from fire or structural damage. Since its inception in 1941, the NBC has been subject to regular reviews and updates approximately every five years. In the 2015 edition of the NBC, changes were made to increase the permitted height limit for wood construction for some buildings. These changes were incorporated into the British Columbia Building Code (BCBC) in 2018.

The recommendation to move from permitting a maximum of four storeys up to a maximum of six storeys of wood construction is the result of a rigorous, broad-based engineering and scientific review by expert committees of the Canadian Commission on Building and Fire Codes. These independent technical committees are made up of professionals from all aspects of the construction industry, including developers, designers, builders, construction material manufacturers, the regulatory community (e.g. building officials and fire service personnel) and general interest groups.

The new five- and six-storey mid-rise wood construction option provides builders with code compliant alternatives that fully meet the safety, health and accessibility, as well as fire and structural protection, objectives of the NBC. Whether built with light wood framing materials or engineered mass timber products, the added height and area of these buildings will give designers new options for an expanded range of occupancy types.

The BCBC mid-rise changes are applicable to residential and office-type buildings, but also allow mixed-type occupancies on the first two storeys. As a result, buildings may have office, residential, mercantile, assembly, low hazard or storage/garage-type tenants (Figure 4.1).



4.1 Virtuoso was the first six-storey residential building in British Columbia to combine light wood frame (for the walls) and mass timber (for the floors) construction. This technique and other all-wood approaches can now be applied to other building types. (Courtesy: Seagate Structures)



Askew's Uptown Supermarket

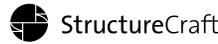
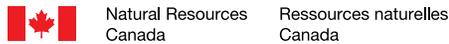
Owner/Developer: David Askew
 Architects: Allen + Maurer Architects
 Structural Engineer: Fast + Epp
 Mechanical/Electrical Engineer: Integral Group
 Civil Engineer: Gentech Engineering Inc.
 Construction Manager: Exel Construction
 Landscape: Eric Reynard Landscape Architect



Whistler Community Services Society Building

Owner/Developer: Whistler Community Services Society
 Architect: AKA architecture + design
 Structural Engineer of Record: Fromme Engineering
 Wood Engineer: Fast + Epp
 General Contractor: Kenwood Construction
 Wood Installation Subcontractor: Seagate Structures
 Engineered Wood Fabricator: Structurlam Mass Timber Corp.

NATIONAL FUNDER



NATIONAL PARTNERS

PROVINCIAL FUNDER



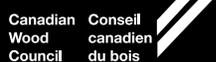
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