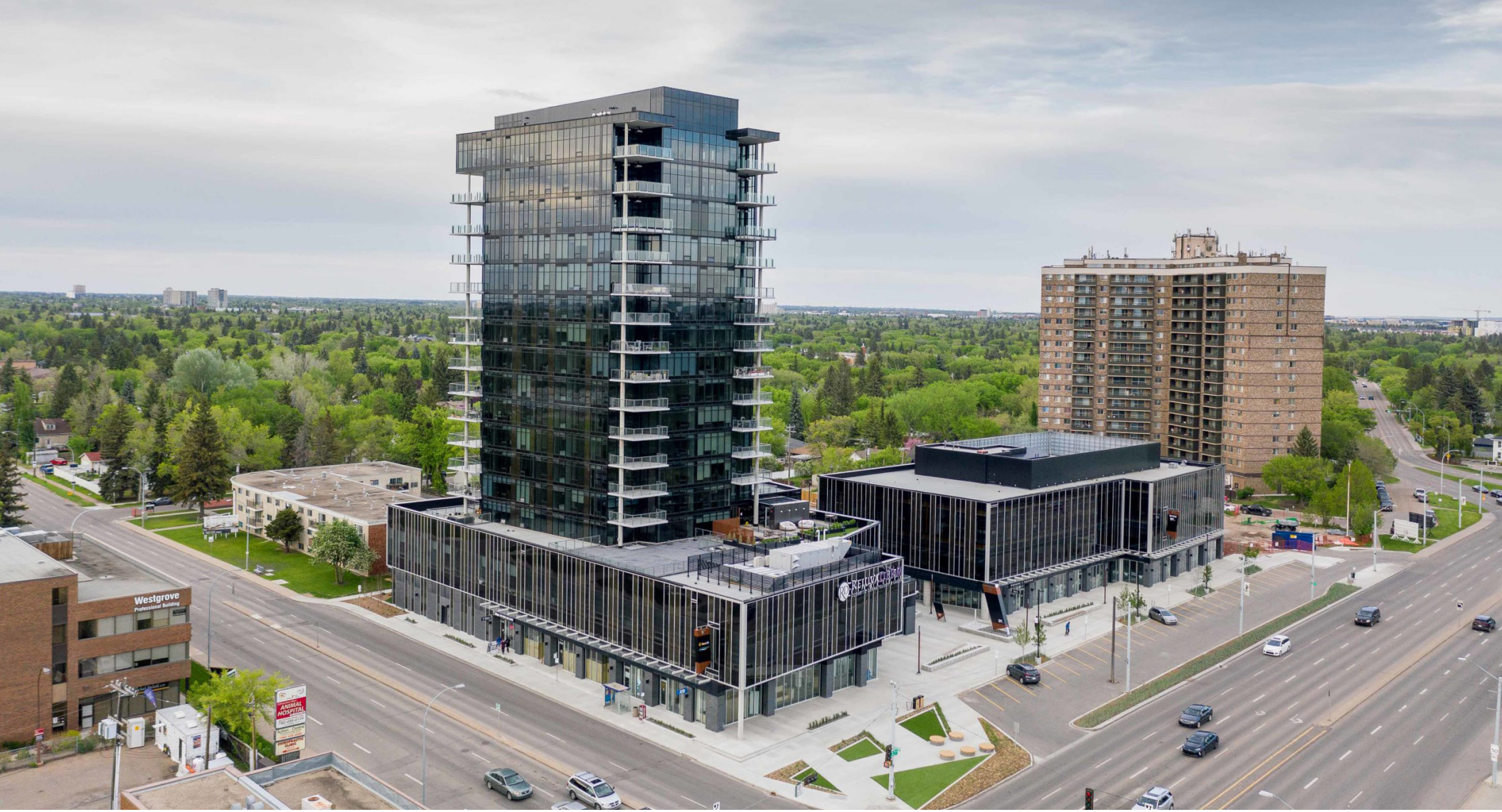
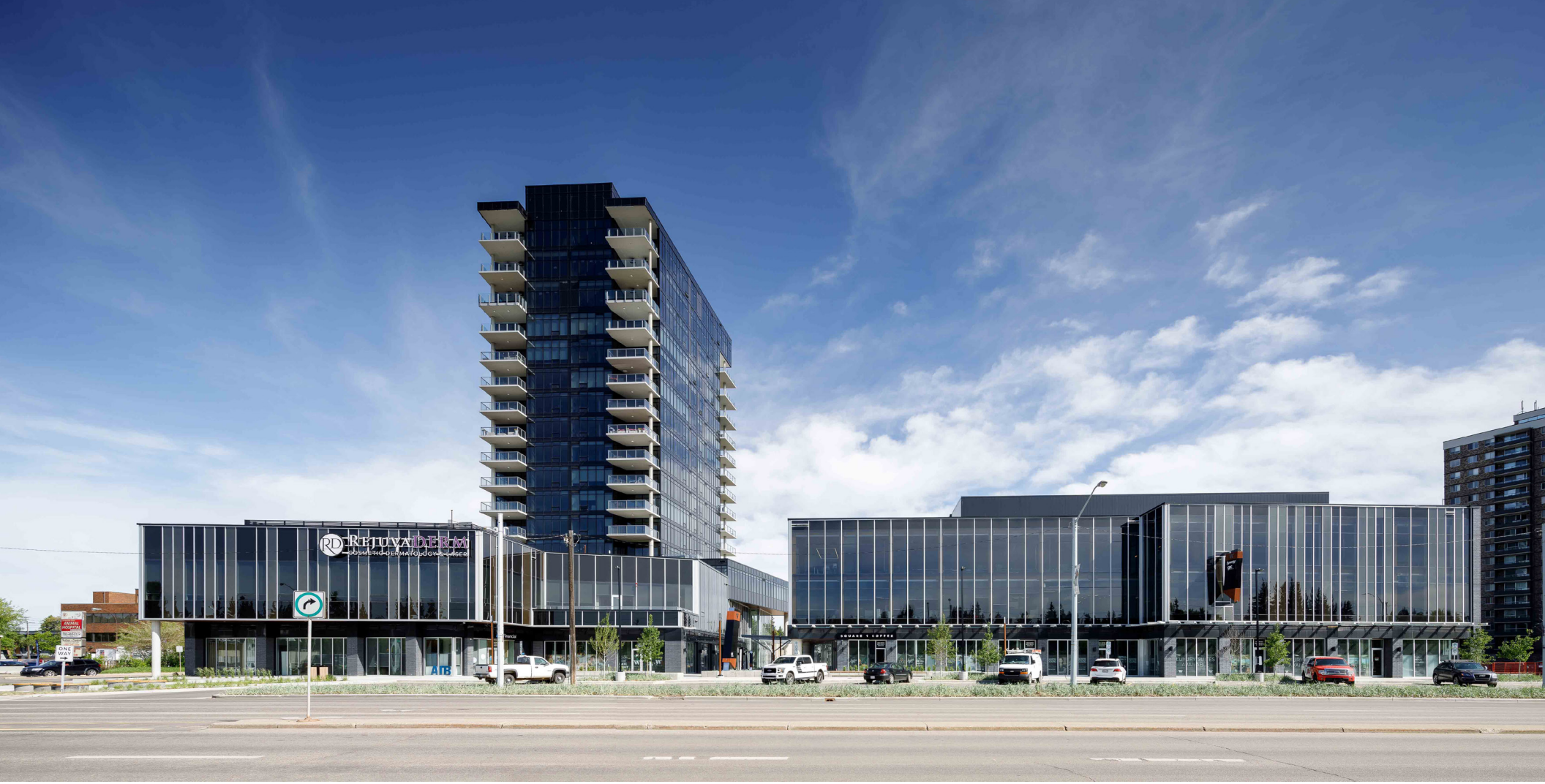


Case Study - Glenora West Block 300

Wood Works | Canadian Wood Council Resource Program



About us

The Canadian Wood Council (CWC) proudly marks its 65th anniversary as a leading force in advancing building codes and standards for wood construction, ensuring market access for Canadian wood products, and accelerating the adoption of sustainable, wood-based construction in the marketplace.

Founded in 1959, the Canadian Wood Council (CWC) is Canada's unifying voice for the wood products industry. As a national federation of associations, our members represent hundreds of manufacturers across the country.

Our mission is to support our members by accelerating market demand for wood products and championing responsible leadership through excellence in codes, standards, and regulations. We also deliver technical support and knowledge transfer for the construction sector through our market leading WoodWorks program.

Introduction

As interest in mass timber construction continues to grow in a more carbon-friendly world, examples of innovative projects using these sustainable materials are popping up all over Canada. One prime example is Glenora West Block 300.

Located in Glenora, one of Edmonton's oldest and most sought-after neighbourhoods, the three-storey, mixed-use building was constructed using glue-laminated timber (GLT).

Completed in 2019, Glenora West Block 300 was the first mass timber office building to be built in Alberta and features 60,000 square feet of office and retail space.

Project Description

Largely comprised of GLT, concrete floors, and a glass envelope, the building's design follows a fairly minimal approach. Richard Blouin, principal at GEC Architects, says that creating this style of design can be a challenge.

"Simple is not always easy. It can actually be more complicated in some ways to pull it off.

I think that's where this design is successful in showcasing the wood structure," Blouin says.

To help express the wood structures, the building envelope is relatively light, comprised mainly of curtain walls. To obtain the necessary fire rating between floors, a solid panel is required at each floor so heat, smoke, and fire do not transfer through the slab. GEC Architecture wanted to keep the beams exposed, so they used a zero spandrel system. To further enhance the visibility of the GLT beams, they designed a one-way system. By having the beams installed in one direction, the installers were able to hide many of the services in between the beams, such as rainwater leaders and sprinkler pipes.

"It helped us because we were trying to keep the ceiling clean. We wanted to really express the wood structure," Blouin says.

Design Phase

One of the design challenges for GEC Architecture was working with mass timber and coordinating with other building elements, such as the concrete grid of the parkade below.

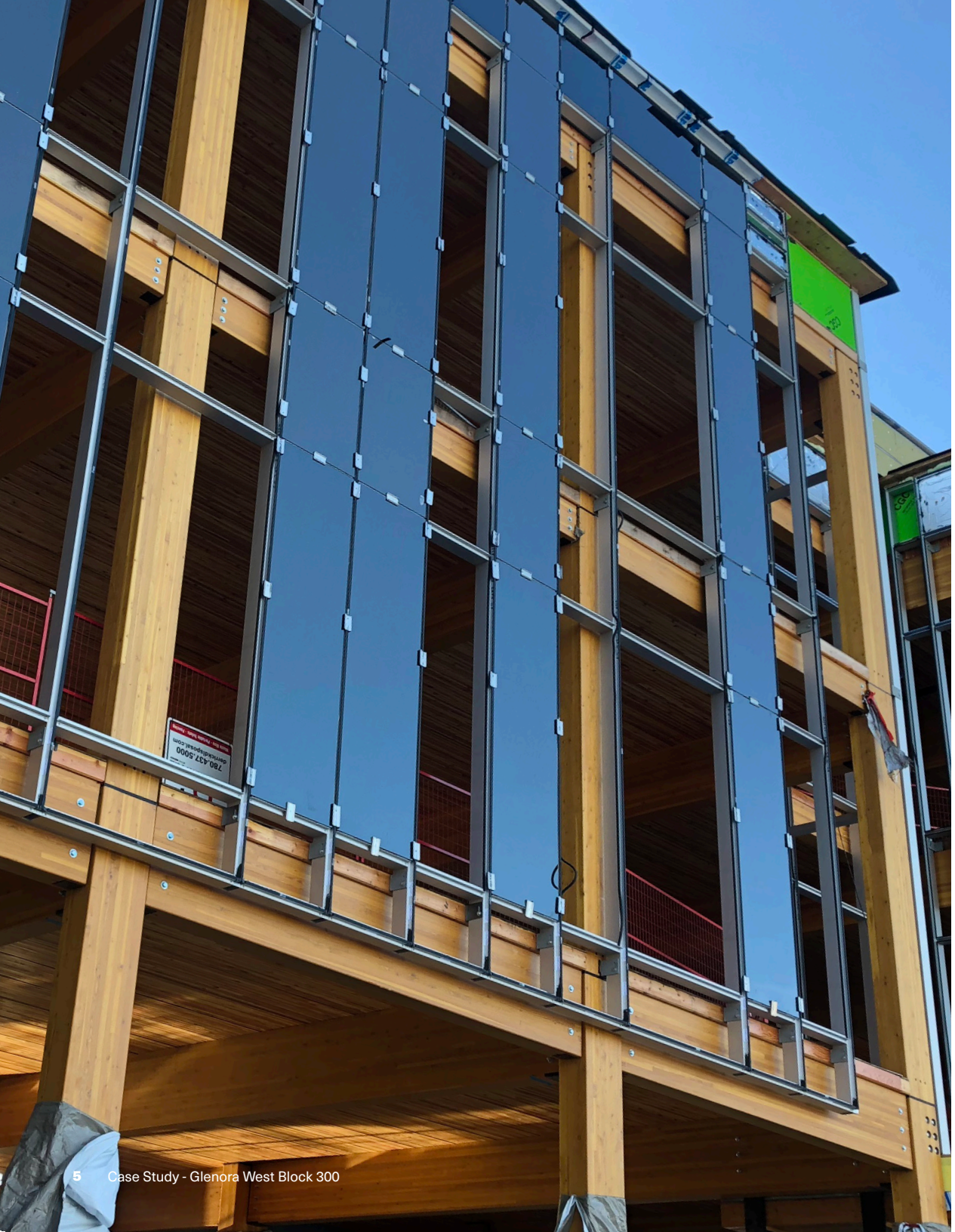
“Figuring out how to attach things like the curtain wall to the frame, signage into the canopy, the canopy connections, those were a little challenging,” Blouin says.

The curtainwall was anchored back to the wood structure with 6-mm steel angle anchors. The anchors were secured to the mass timber structure with timber screws. The curtainwall was then bolted to the metal anchors.

GEC Architects worked with ISL Engineering and Land Services Ltd. (ISL) for the incorporation of the GLT into the design. ISL was the building’s structural engineer of record and specialty engineer for the timber components.

A major hurdle that had to be navigated during the project was a change in the fire rating of the building. The building was originally designed for retail and office spaces. Late in the design stage, the building owner requested space for a daycare and restaurants. This changed the occupancy classification, which required a higher level of fire protection. GEC Architects and ISL worked with the building owner and the City of Edmonton to determine strategies to meet the fire rating requirements for those occupancy types.

“Simple is not always easy. It can actually be more complicated in some ways to pull it off. I think that’s where this design is successful in showcasing the wood structure” - Richard Blouin, Principal at GEC



The GLT installed had a 45-minute fire resistance rating, but this needed to be increased to a 60-minute fire resistance rating. ISL performed a char analysis of the GLT and determined that the glulam structure was able to meet the one-hour fire resistance rating requirement. However, there were concerns over exposed metal connections that needed to be addressed. To resolve these concerns, a combination of wood blockings and special bolt covers were installed.

“They’re caps that go on over the bolts so that if there was a fire, they foam up and create that fire protection,” Blouin explains.

Another concern that had to be addressed was meeting the required fire-resistance rating (FRR) due to a change in occupancy type. To solve this issue, GEC Architecture increased the level of sprinkler protection and ensured that the public corridors met FRR requirements.

CARBON ESTIMATE

- Volume of wood products used: **9,363 ft³/ 265 m³**
- U.S. and Canadian forests grow this much wood in: **1 minute**
- Carbon stored in the wood: **200 metric tons of CO^2**
- Avoided greenhouse gas emissions: **430 metric tons of CO^2**
- Total potential carbon benefit: **630 metric tons of CO^2**

Equivalent to:

- **121 cars off the road for a year**
- **Energy to operate 54 homes for a year**

Building with GLT

The project was originally designed with cross-laminated timber (CLT), but due to budget and supply constraints, glue-laminated timber (GLT) was specified instead. The main difference between the two building materials is that CLT is a two-way system while GLT is a one-way system. In this case, deciding to switch to GLT had no impact on the building's structure.

"The building was set up in a way that moving to a one-way system wasn't going to impact it," explains Kara Lincoln, structural manager for buildings at ISL.

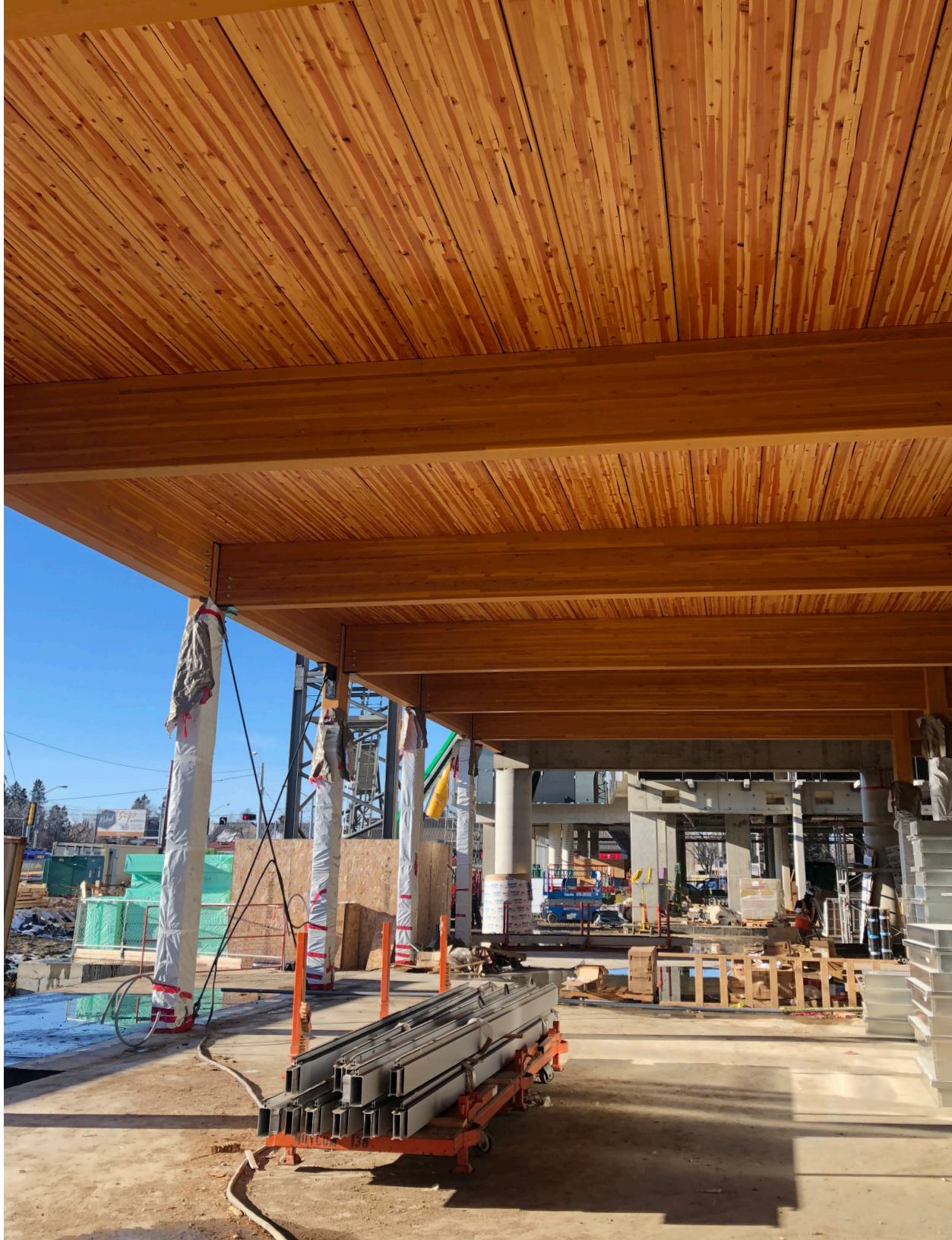
She adds that GLT is more readily available and offers certain aesthetic advantages. "CLT has more of a kind of a ranch-style appearance, whereas GLT comes across as more refined, more finished."

The GLT for the project was supplied by Western Archrib, part of the Northland Group of Companies. To help ensure the project met budget targets, Western Archrib worked with the project team to find the right mass timber product. They ended up supplying Live Edge Westdek GLT.

"They were very open to it because they liked the rustic look, and it has a bit more of a wane allowance," explains Andre Lema, manager of business development for Western Archrib. "It allowed us to lower the cost of the decking material."

Supplying materials for a multi-storey mass timber building was a relatively new type of project for Western Archrib at that time, so there were a few challenges the company needed to overcome. The biggest challenge in supplying this project from a manufacturing perspective was the sequencing.

"For our sequencing, we had to do our planning from the very last beam and column that went out. We had to plan backwards from that, and I think that was a bit of a mind shift for us," Lema says.



To make the installation go as smoothly as possible, Western Archrib worked closely with ISL Engineering and, the GLT installer, Beam Craft.

Contracted by Pagnotta, the project's general contractor, Beam Craft performed the installation of the mass timber structural system for the building including the GLT columns, beams and connections, the GLT panel deck, and the plywood diaphragm. Michael Parkhill, construction manager for Pagnotta, said there were some challenges related to the front-end planning and site planning that needed to be overcome.

"We had to do a lot of planning on how the erection plan would go together and then work through that, essentially, inversely with the production. So that when it came to getting product to site, it came in the right order, and it also wasn't buried by other products," Parkhill explains.

Jason Beamish, partner at Beam Craft, says understanding the tolerances within the hybrid structure was a vital part of the project. While much of the construction was mass timber, the building had concrete cores for the elevator shafts and the stairwell.

"There's an interface between the mass timber structural system and a traditional reinforced concrete system. We definitely had some challenges around the connection points between the two," Beamish says.

He adds that with hybrid mass timber construction, companies are learning that more attention is required in pre-construction with the discussion of tolerances as well as methodology for locating and installing any connection points which bridge the different structural elements. There also needs to be diligent follow through with quality control measures and as built verifications of the actual connection points.

If construction teams do not follow through with the verification steps prior to pre-manufactured components arriving on site, there can be delays, extra costs, and generally unmet expectations for all parties. Detailed surveying layouts and verifications of the interface connection points are becoming essential to successful mass timber installations, Beamish explains.

Sustainable Attraction

One of the advantages of constructing a mass timber building instead of using traditional building materials such as steel and concrete is the reduced carbon footprint. Another advantage is the aesthetic appeal to prospective occupants.

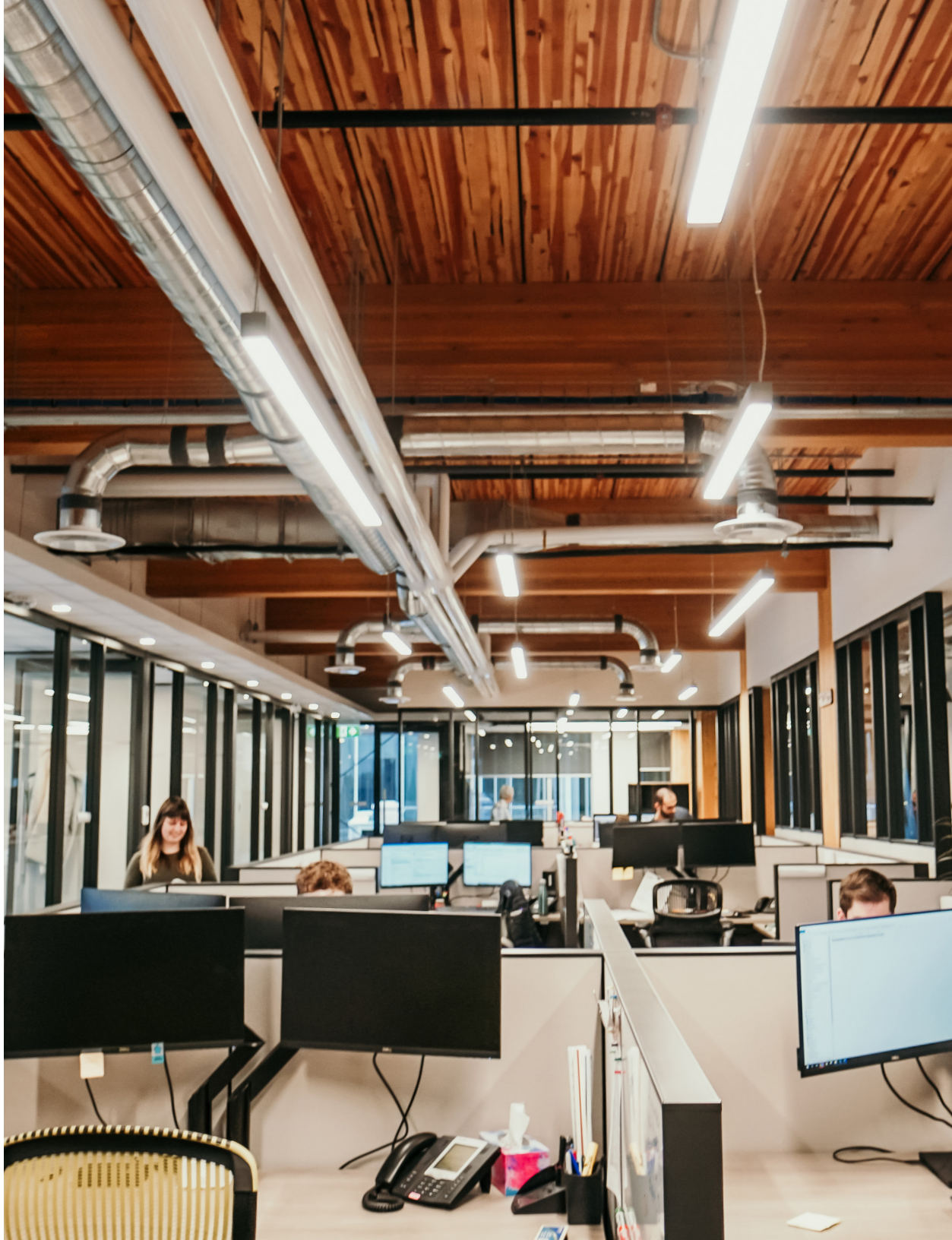
“The owner told us they were quite successful in leasing the building fairly quickly compared to other projects because of the wood structure,” Blouin says. “It has a warmth to it that other building materials don’t have. I think that’s a big advantage.”Beamish adds that one advantage of installing the mass timber is that the final spaces feel warm and inviting for people working and visiting the space and they gravitate to the wood.

“They get drawn to it. It’s a great environment for places where people gather – restaurants, shops, work... it’s a warm and inviting space,” he says.

GEC Architecture was so happy with the final design that they leased office space within the Glenora West Block for their Edmonton operations. Another one of the tenants to lease space was construction firm Synergy Projects Ltd. The company has been renting space in the building since it was constructed in 2019.

“It’s a very nice environment to work in, not just a normal office building made from concrete and steel,” says Mark Moran, construction manager for Synergy Projects, adding that he would like to see more mass timber building being built in the future.

“It has a warmth to it that other building materials don’t have. I think that’s a big advantage.” - Richard Blouin, Principal at GEC



Conclusion

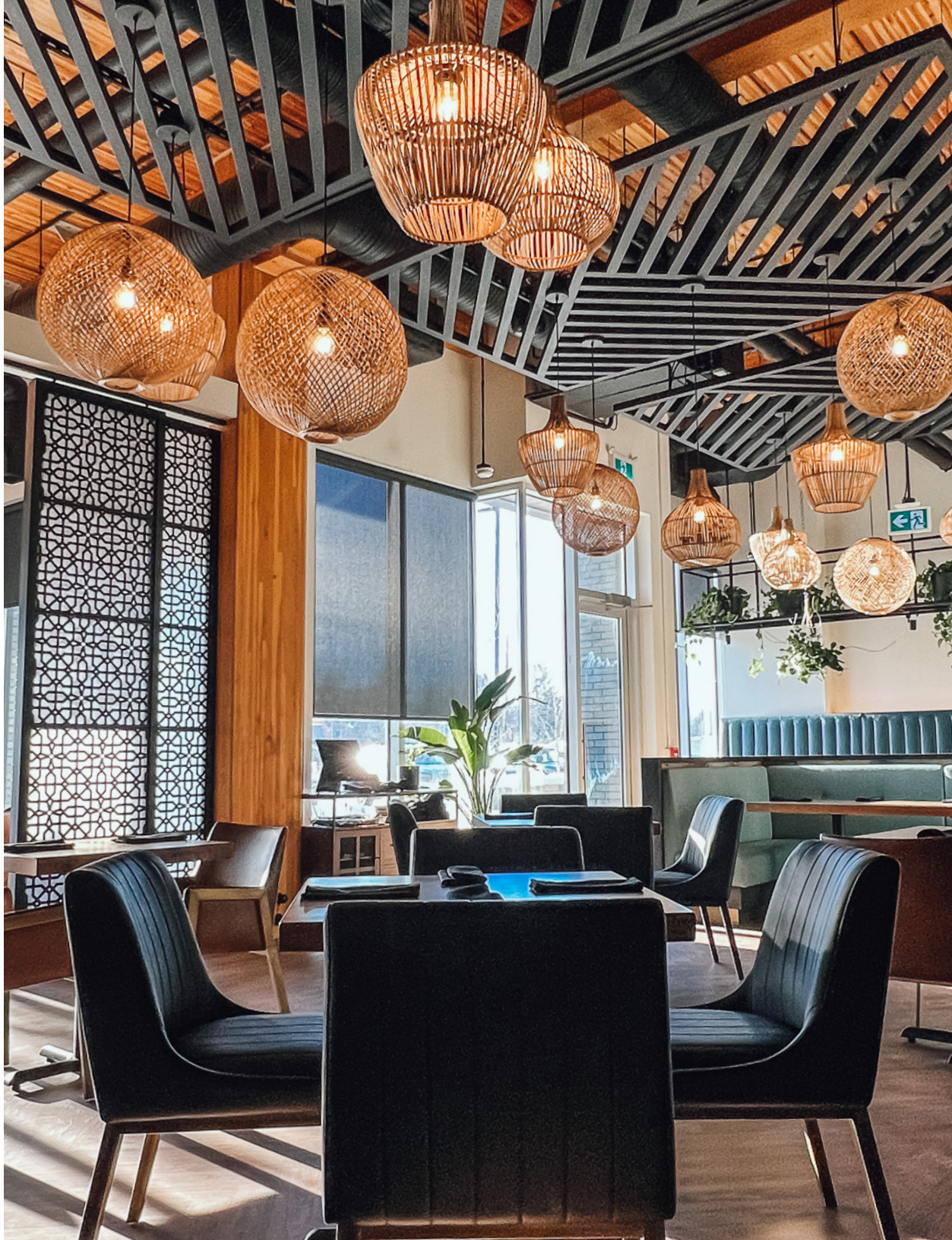
For Alberta to continue to grow its mass timber market, developers need to be made aware that they can access local experts within the province for future projects. They also need to understand that lead times for mass timber products differ from those of other traditional building materials.

“Understanding lead times is fundamental. Any project like this, right now, is 2025 and beyond. They’re planning and then booking CLT or GLT manufacturing because there’s such a high demand,” Beamish says.

The appeal of mass timber structures like Glenora West Block 300 to potential tenants can be seen on the Cantiro Group’s website, which states that all the office space for the building is currently leased. And where there is demand, there is opportunity for growth. As developers become increasingly aware of the appeal of mass timber, we will likely see many more projects like this in the future.

“The owner said that the mass timber structure was a key driver in successfully leasing the building in a timely manner”

- Richard Blouin, Principal at GEC



STRUCTURAL MATERIALS

FRAME

Columns:
310mm x 567mm, 260mm x 415mm

Beams:
- 215mm wide x 340-900mm thick.
- Exposed steel and bolted connections

*Glulam structure total for beams and columns:
252,000 board feet (347 m^3)

Floor assemblies:
- 38-50mm concrete topping
- Isonomat acoustic membrane
- ½" or 12.7mm plywood
- 130mm glulam timber panels

(Westdek: +/- 1786 m^2 per plate)

Roof:
Westdek laminated timber panels
(603mm wide x 130mm/175mm thick), Douglas Fir

Interior partitioning:
Steel stud partitions with painted gypsum wallboard finish.

EXTERIOR MATERIALS

Siding:
Aluminum Curtainwall framing system. Columns were clad with Manganese Ironspot, Norman modular brick.

Roofing:
SBS Roofing system.

PROJECT TEAM

Owner
Cantiro Group LP
17511 108 Ave. NW
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Architect
GEC Architecture
#310, 14055 West Block Drive NW
Edmonton, AB T5N 1L8

Structural Engineer
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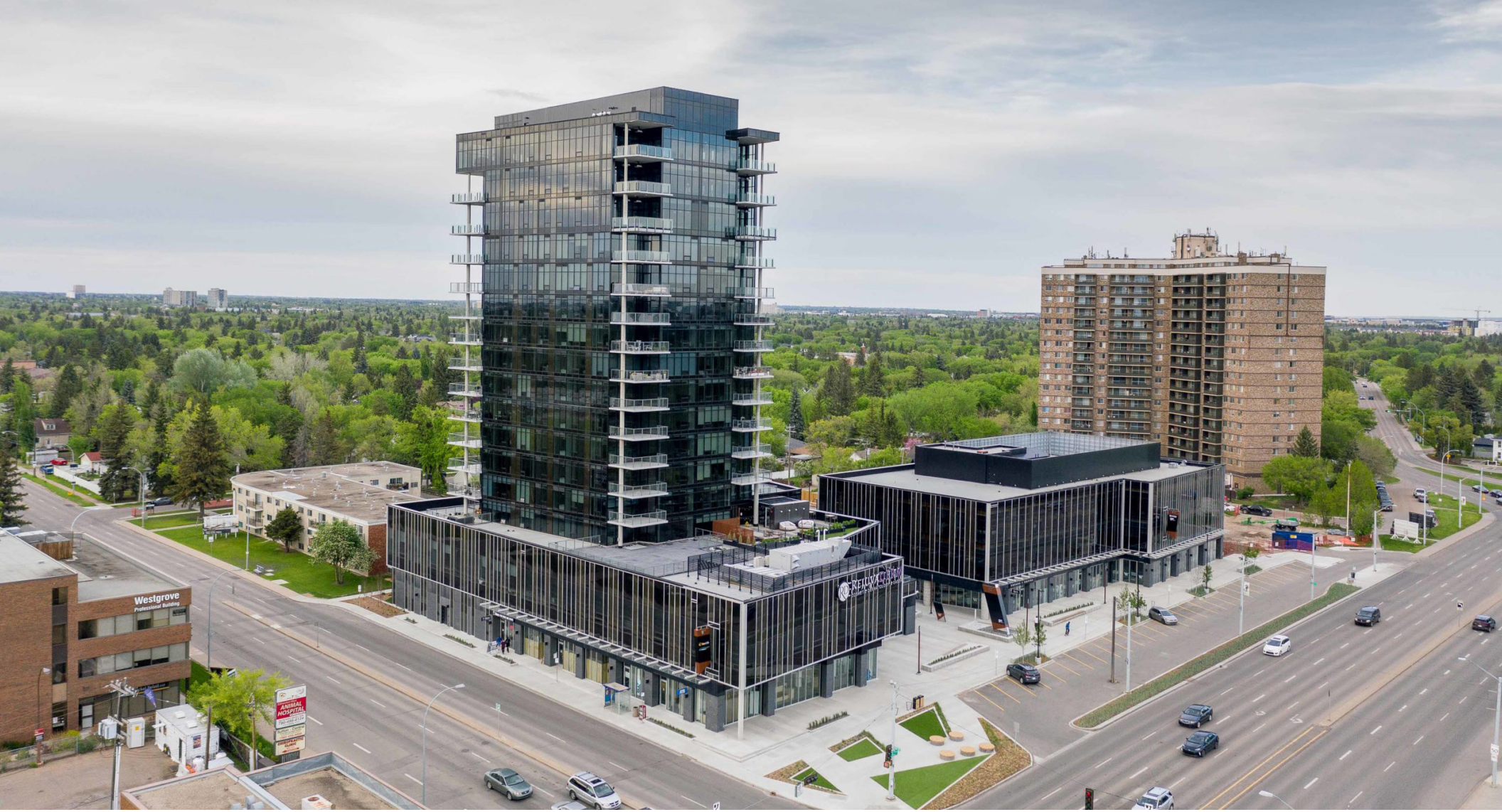
Edmonton, AB T6E 5L9

General Contractor
Pagnotta
#201, 5920 Gateway Blvd.
Edmonton, AB T6H 2H5

Wood Supplier
Western Archrib
4315 92nd Ave.
Edmonton, AB T6B 3M7



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