

# UTILIZING MASS TIMBER

## A Case Study on the Rapid Housing Initiative

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Managing Principal  
Jan. 16, 2024  
[www.mccallumsather.com](http://www.mccallumsather.com)

*Disclaimer: This presentation was developed by a third party and is not funded by WoodWorks or the Softwood Lumber Board.*







# AGENDA

**01**

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Our Pursuit of Mass  
Timber

**02**

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Rapid Housing  
Response

**03**

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1470 Blockline Rd.  
Case Study

**04**

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Next Steps for Mass  
Timber Housing



# OUR PURSUIT OF MASS TIMBER



'Almost' Mass Timber Project No. 1

## **THE WALTER**

*description*

5-STOREY MID-RISE, INFILL  
RESIDENTIAL APARTMENT W/ 38  
DWELLING UNITS

*completed*

2017

*construction type*

HAMBRO

*why not mass timber*

COST & SUPPLY UNCERTAINTY



'Almost' Mass Timber Project No. 2

## **GLOVE BOX**

*description*

ADAPTIVE RE-USE/ADDITION, CLASS A  
OFFICE AS PART OF A DOWNTOWN  
INTENSIFICATION

*completed*

2022

*construction type*

CAST IN PLACE

*why not mass timber*

COMPLEXITY & BUILDING CODE



'Almost' Mass Timber Project No. 3

## **WOODin**

*description*

OFFICE PROTOTYPE W/ RESEARCH  
FUNDING THROUGH NRCAN - GREEN  
CONSTRUCTION THROUGH WOOD.

*completed*

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*construction type*

MASS TIMBER

*why not mass timber*

GLOBAL PANDEMIC

# OUR PURSUIT OF MASS TIMBER



'Almost' Mass Timber Project No. 1  
**THE WALTER**

## CROSS LAMINATED TIMBER (CLT)



### SYSTEM DESCRIPTION:

Cross-laminated timber (CLT) is a wood panel consisting of layers of dimension lumber glued to form structural panels with exceptional strength, dimensional stability, and rigidity. CLT is well suited to floors, walls and roofs used in mid-rise construction. The wall and floor panels may be left exposed in the interior which provides additional aesthetic attributes.

**BUDGET:** See attached.

### SCHEDULE IMPACT:

- Panels are prefabricated with pre-cut openings;
- Components are lifted into place by crane and assembled by carpenters using hand tools;
- Building Permit resubmission is required with an Alternate Solution to expose ceilings.

### SUSTAINABILITY:

- Naturally occurring and renewable;
- Sourced from sustainably managed forests;
- Can contribute to reduced carbon footprint;
- Can contribute to occupant sense of well-being;
- Improved thermal resistance;
- Outperforms steel and concrete in terms of embodied energy, air and water pollution.

### MARKETABILITY:

- Ability to market the project for its sustainable features and distinctive wood interiors.

### BRANDING POTENTIAL:

- Unique amongst competition;
- Distinction associated with being the first project of its kind in the region.

## HAMBRO



### SYSTEM DESCRIPTION:

The Hambro composite floor system combines open web steel joists with steel deck and a transversely reinforced concrete compression slab. The system accommodates spans of up to 43 ft. and large web openings enable passage of various mechanical systems such as HVAC, electrical and plumbing components.

**BUDGET:** See attached.

### SCHEDULE IMPACT:

- System components are site placed/ assembled;
- Forming/ placement of cast-in place concrete loadbearing walls is time-consuming;
- Installation of floor framing is relatively quick;
- Building Permit resubmission is required.

### SUSTAINABILITY:

- No tangible environmental benefits.

### MARKETABILITY:

- Cost savings related to structure could be invested in higher level interior fixtures and finishes.

### BRANDING POTENTIAL:

- No special attributes.



# OUR PURSUIT OF MASS TIMBER



'Almost' Mass Timber Project No. 1  
**THE WALTER**

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# OUR PURSUIT OF MASS TIMBER



'Almost' Mass Timber Project No. 1  
**THE WALTER**

**UNCERTAIN COST, SUPPLY  
AND INSTALL RESOURCES  
COMBINED WITH  
GENERAL CLIENT  
DISCOMFORT**

HAMBRO



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# OUR PURSUIT OF MASS TIMBER

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*'Almost' Mass Timber Project No. 2*

**GLOVE BOX**



# OUR PURSUIT OF MASS TIMBER

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*'Almost' Mass Timber Project No. 2*

**GLOVE BOX**

# OUR PURSUIT OF MASS TIMBER

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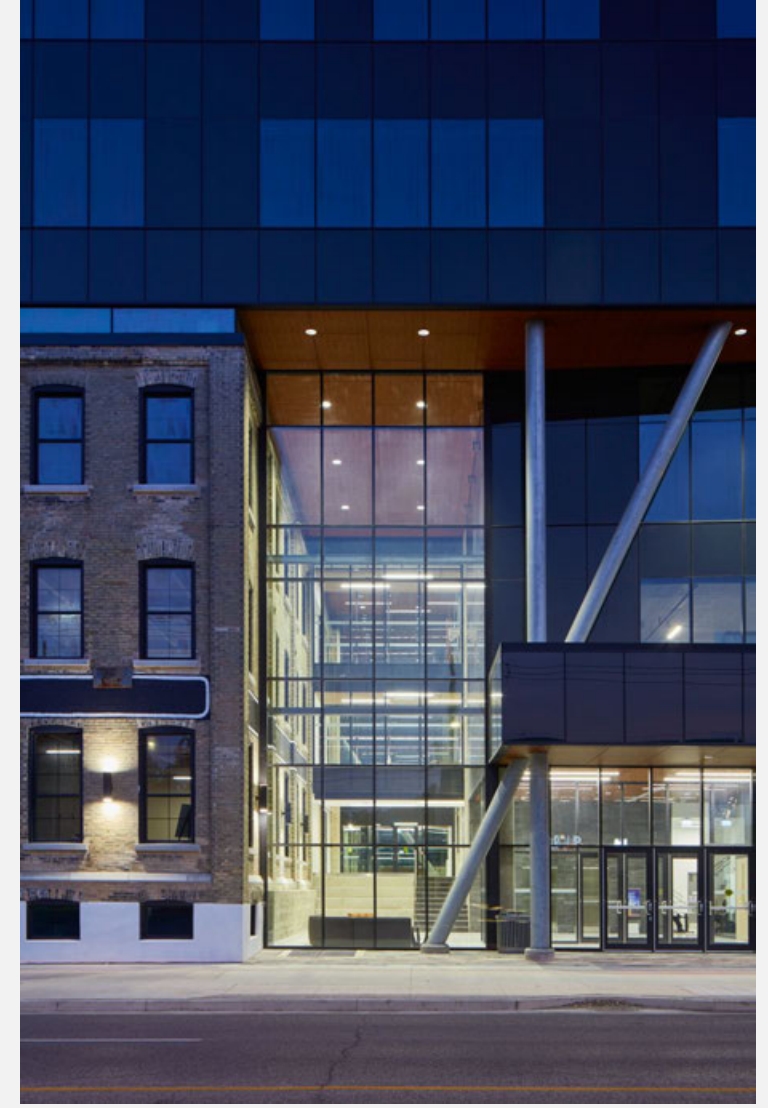
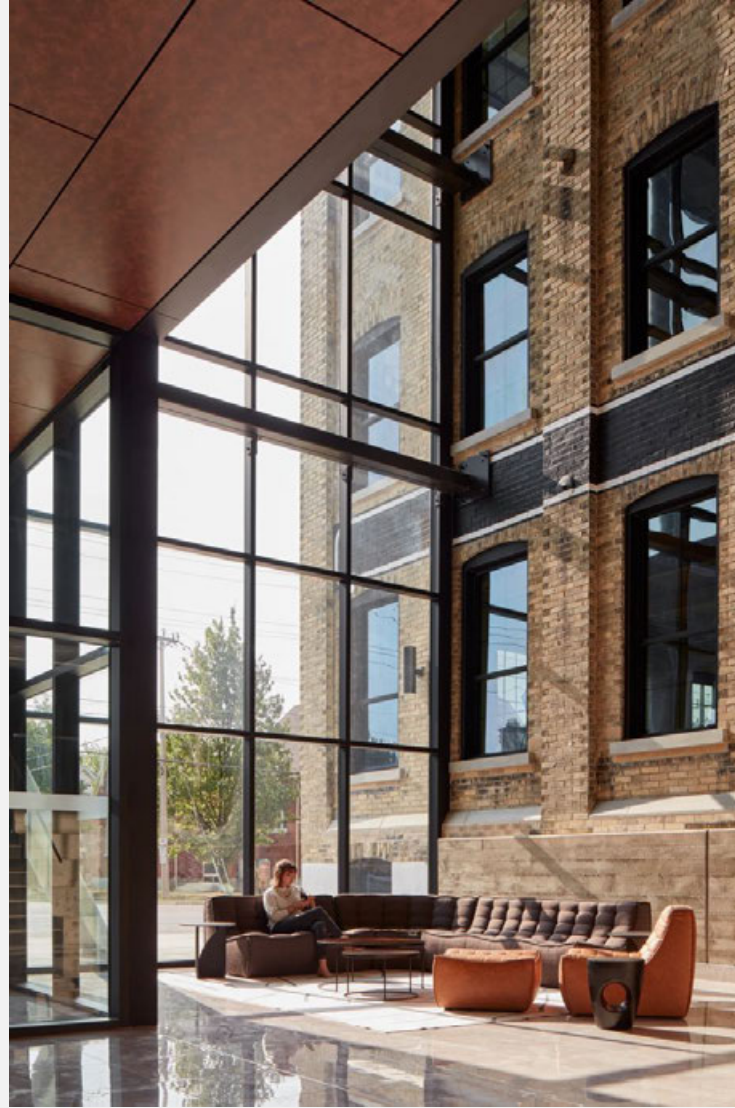
*'Almost' Mass Timber Project No. 2*

**GLOVE BOX**



# OUR PURSUIT OF MASS TIMBER

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*'Almost' Mass Timber Project No. 2*  
**GLOVE BOX**

# OUR PURSUIT OF MASS TIMBER

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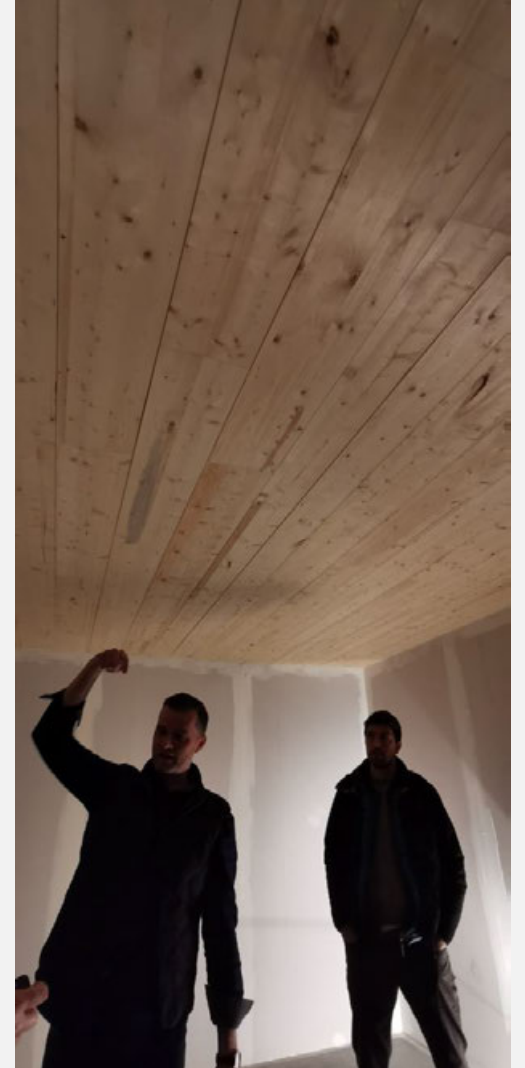
*'Almost' Mass Timber Project No. 3*

**WOODin**



# OUR PURSUIT OF MASS TIMBER

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*'Almost' Mass Timber Project No. 3*

**WOODin**

# OUR PURSUIT OF MASS TIMBER

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*'Almost' Mass Timber Project No. 3*

**WOODin**



## OUR PURSUIT OF MASS TIMBER

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???



# RAPID HOUSING RESPONSE

## **THE RAPID HOUSING INITIATIVE (RHI)**

The RHI is delivered by the Canada Mortgage and Housing Corporation (CMHC), under the National Housing Strategy (NHS).

**The first round was announced in October 2020. Round 2 was announced in June 2021, and Round 3 is currently underway**

In Round 1, \$1 billion in available funding went towards projects that helped those in severe housing need, specifically:

- People at risk of, or experiencing homelessness
- People living in temporary shelters because of the COVID-19 pandemic

## **QUICK FACTS – ROUND 1:**

- **Modular construction was required** and defined as “housing units that are partially or fully built in off-site (e.g., A factory, warehouse, or similar facility) by a qualified manufacturer and delivered to the site in whole or in parts.
- Cities Stream funding provided money directly to municipalities who could then pass along the funding directly to NFP organizations. Project Stream required the NFP’s to apply directly to CMHC. YWKW received their Cities Stream funding from the Region of Waterloo.
- At least 25 per cent of this new funding will go toward **women-focused housing** projects.
- The units will be **built within 12 months** of when funding is provided to program applicants.
- **The RHI takes a human rights-based approach to housing**, serving people experiencing or at risk of homelessness and other vulnerable people under the NHS, including women and children fleeing domestic violence, seniors, young adults, indigenous peoples, people with disabilities, people experiencing mental health and addiction issues, veterans, LGBTQ2 individuals, racialized and Black Canadians, and recent immigrants or refugees.



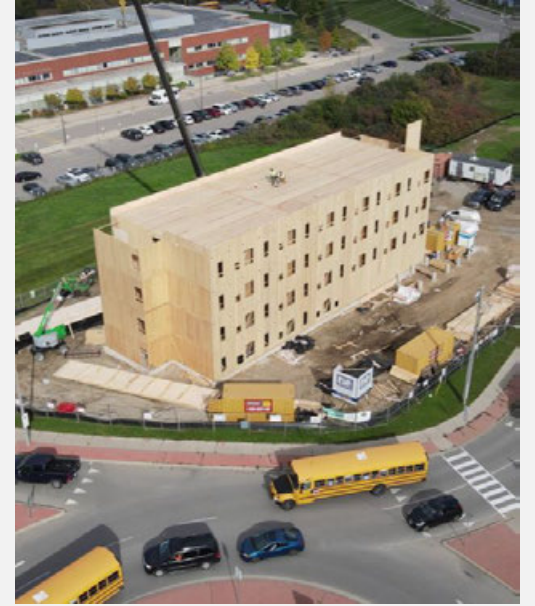
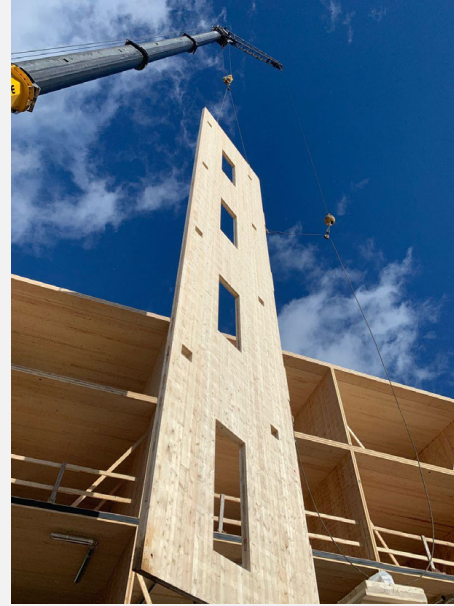
# RAPID HOUSING RESPONSE

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# 1470 BLOCKLINE ROAD CASE STUDY



*Mass Timber Project No. 1*

## **YWKW TRANSITIONAL HOUSING**

EDGE assembled a team that was selected by the YWKW as the successful proponent to deliver 41 compact yet accessible 1-bedroom transitional housing units. Some specific features of the design included:

- Modular construction through mass timber CLT and Glulam pre-fabrication
- Completion of design, approvals AND construction within 1 year of contract award.
- Maximized the material efficiency and minimized the installation time
- Exposure of mass timber surfaces inside the building to impart a sense of warmth and well-being.

*completed*

2022

*construction type*

MASS TIMBER



# 1470 BLOCKLINE ROAD CASE STUDY

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CMHC  
RHI CITIES  
STREAM

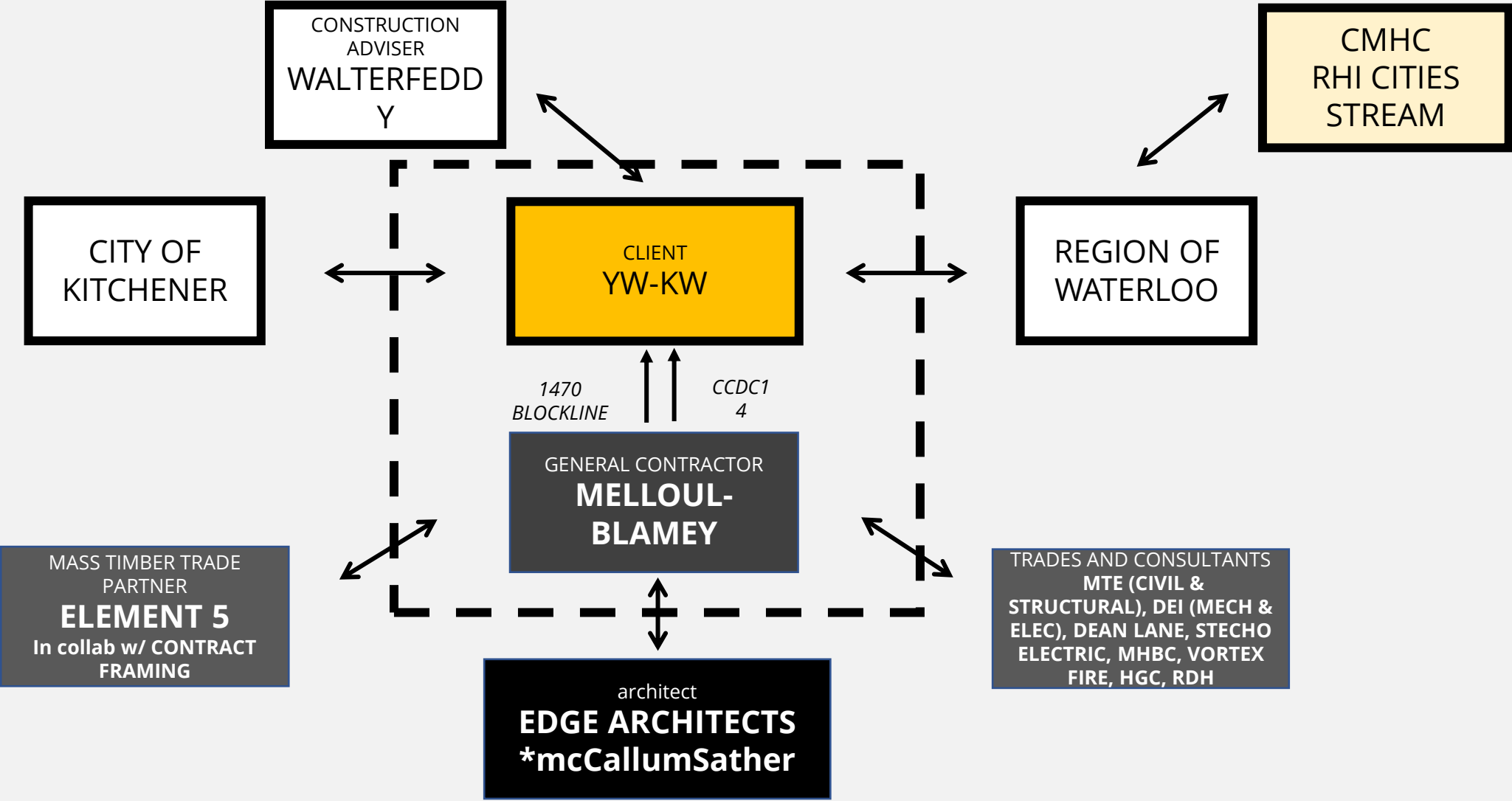
RAPID HOUSING  
MASS TIMBER PROJECT

MASS TIMBER TRADE  
PARTNER  
**ELEMENT 5**

architect  
**EDGE ARCHITECTS**  
**\*mcCallumSather**

ARCHITECT LED DESIGN-BUILD STRUCTURE

# 1470 BLOCKLINE ROAD CASE STUDY



ARCHITECT LED DESIGN-BUILD STRUCTURE  
**CONTRACTUAL CONNECTIONS**

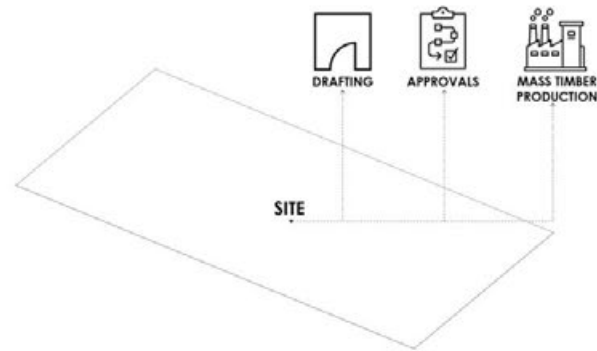


# 1470 BLOCKLINE ROAD CASE STUDY

1

## PROPOSAL RESPONSE + PLANNING AND APPROVALS [+/- 5 MONTHS]

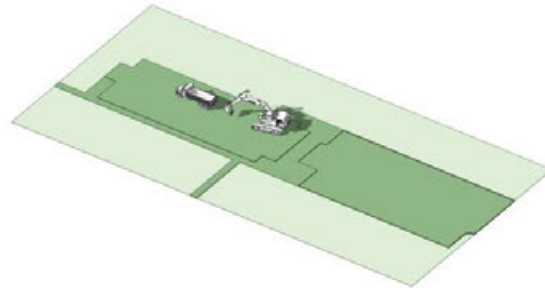
Architectural plans are adapted to the chosen site and submitted for any municipal approvals and permits. Element 5 develops shop drawings and begins manufacturing the structural components in their factory.



2

## SITE WORK BEGINS [+/- 2 MONTHS]

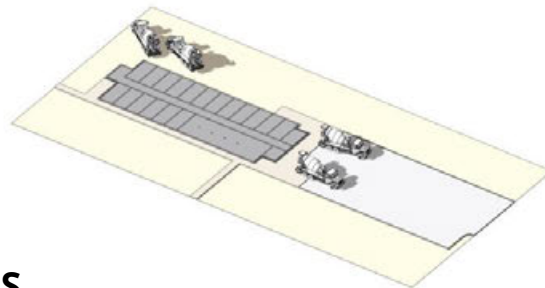
Once plans are approved, any site work and grading can commence. Meanwhile production continues on the structural components off-site at the element 5 factory. Any under slab electrical and mechanical work is completed.



3

## FOUNDATION [+/- 1 MONTHS]

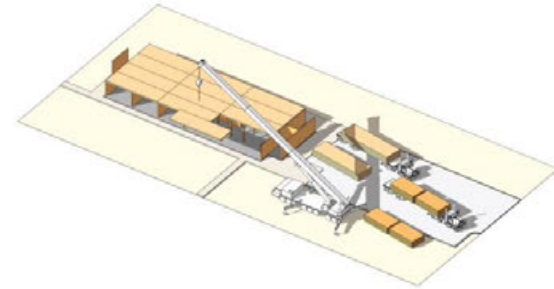
Slab on grade foundation in poured.



4

## SUPER STRUCTURE [+/- 1 MONTH]

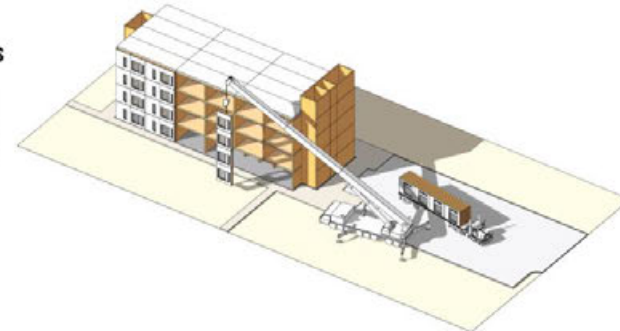
Modular wall and floor panels arrive on site. They are then craned into place to create the superstructure.



5

## ROOF AND WALL PANELS [+/- 1 MONTHS]

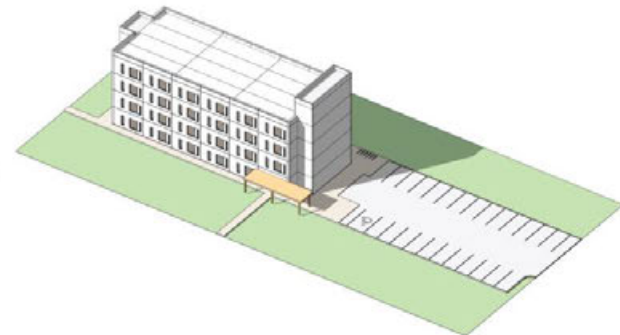
Modular roof and exterior wall panels arrive on site. They are then craned into place.



6

## COMPLETION [+/- 4 MONTHS]

Once the envelope is complete interior finishing can be finished. Final site work and landscaping is completed at this time.



## THE DESIGN - BUILD PROCESS

# 1470 BLOCKLINE ROAD CASE STUDY

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1ST SEPTEMBER 2021

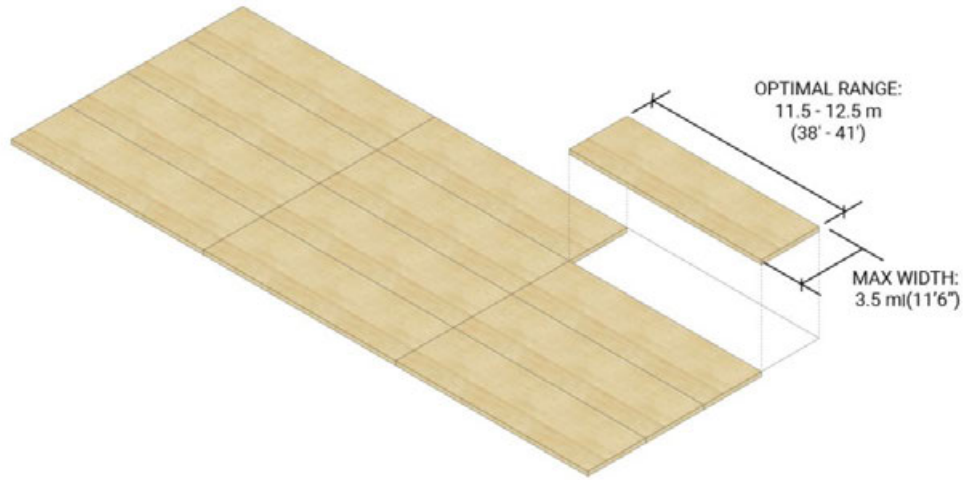
ELEMENTS | YWCA SUPPORTIVE HOUSING





# 1470 BLOCKLINE ROAD CASE STUDY

## ① CLT FLOOR + ROOF PANELS



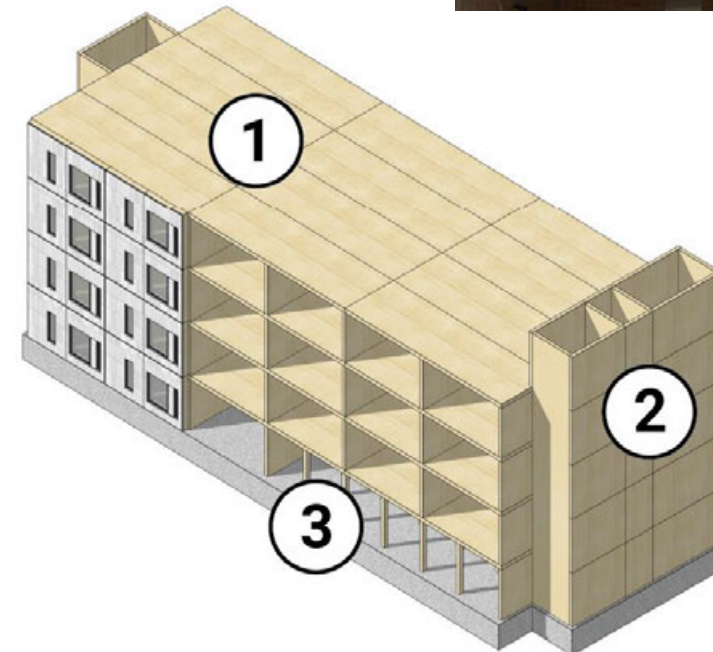
Continuous span across multiple bearing walls for increased stiffness and reduced panel depth.



## ② CLT WALL PANELS

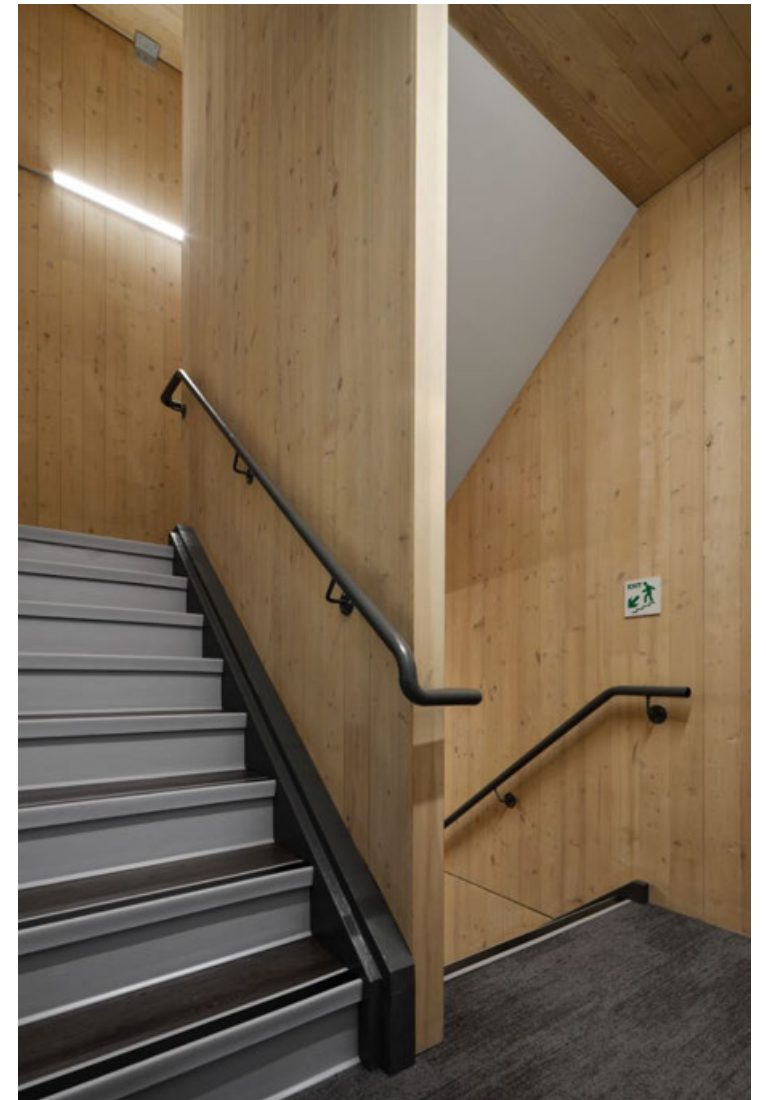
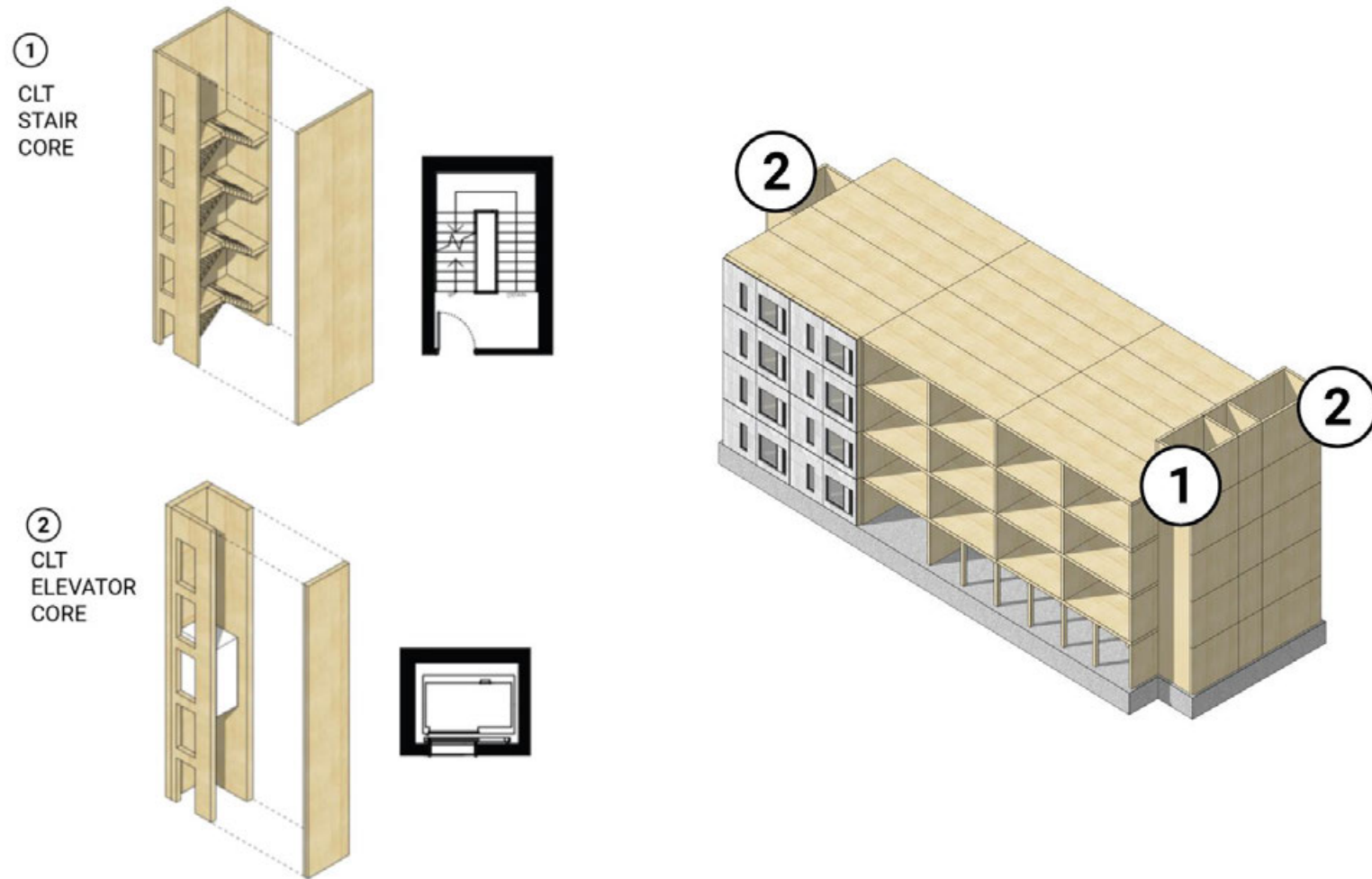


## ③ GLULAM COLUMN



**OPTIMIZED STRUCTURAL LAYOUT**

# 1470 BLOCKLINE ROAD CASE STUDY



VERTICAL CIRCULATION CONSTRUCTION

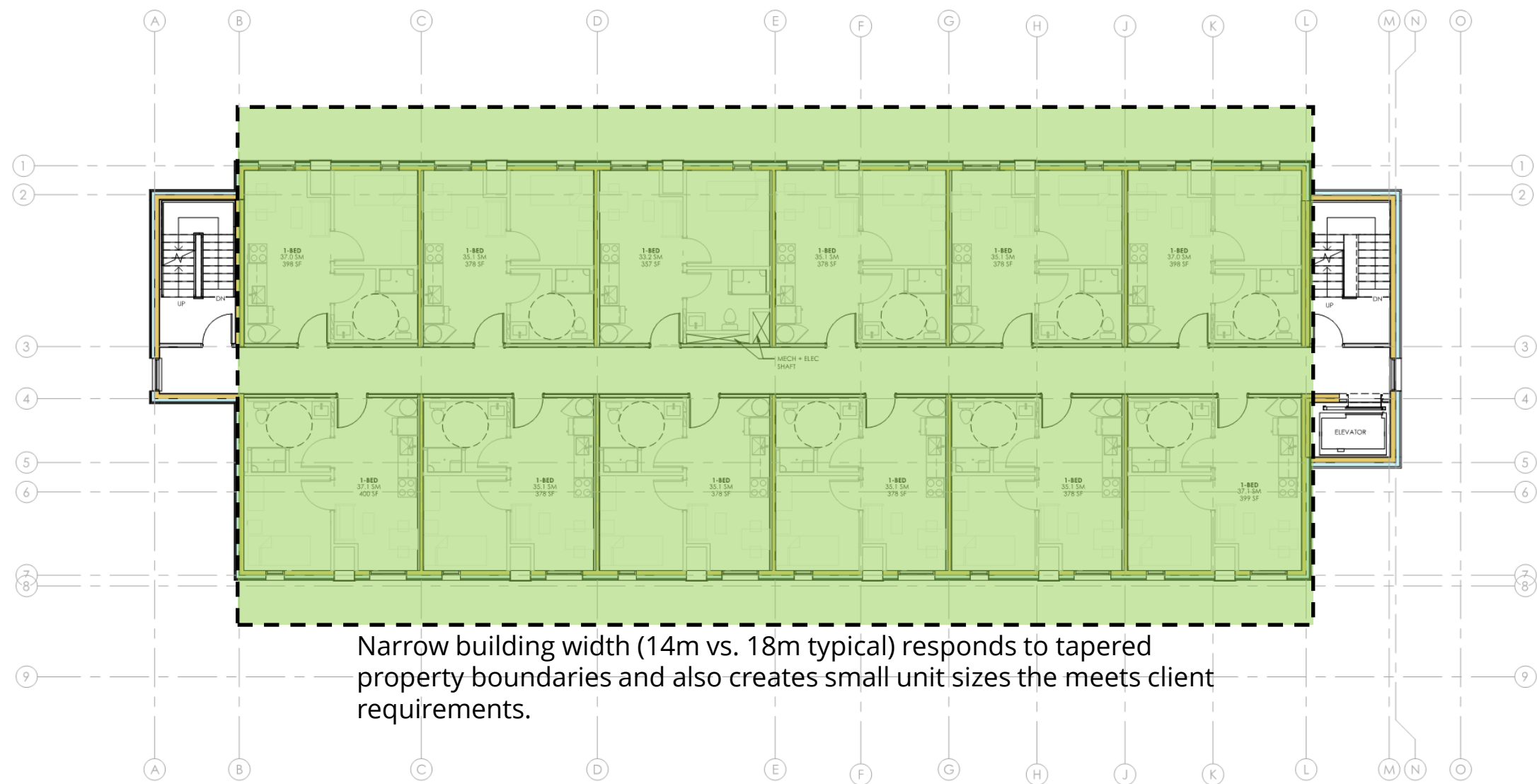


# 1470 BLOCKLINE ROAD CASE STUDY



**ADAPTABLE BUILDING & UNIT LAYOUT**

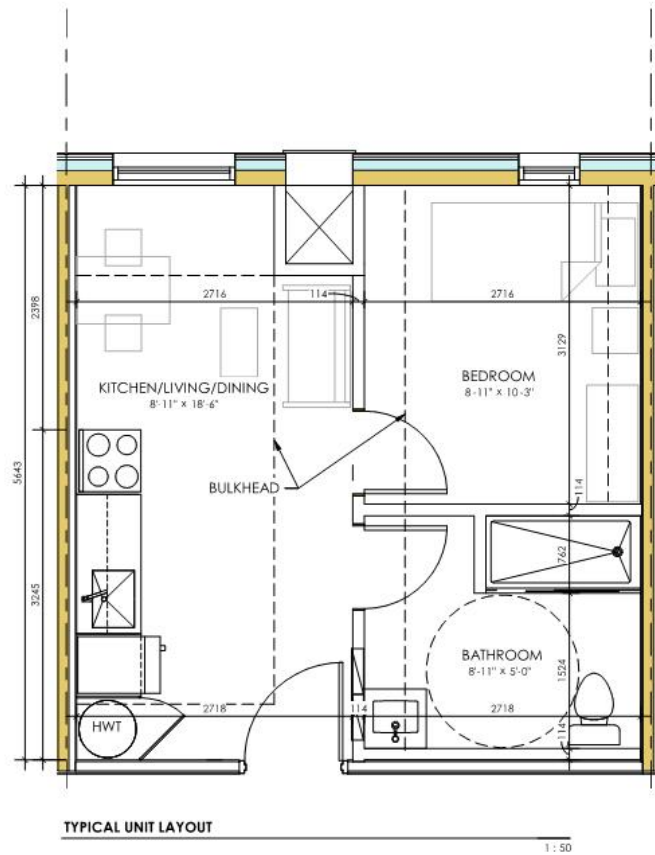
# 1470 BLOCKLINE ROAD CASE STUDY



ADAPTABLE BUILDING & UNIT LAYOUT



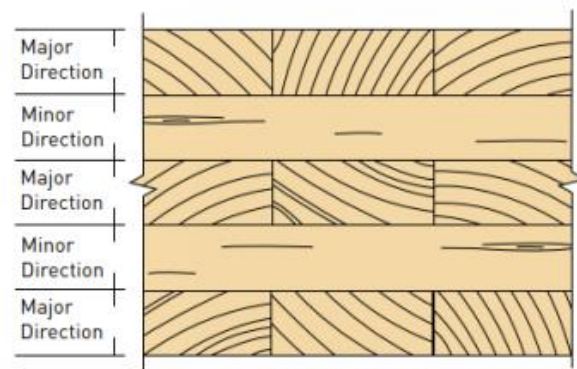
# 1470 BLOCKLINE ROAD CASE STUDY



SUITE RENDERING

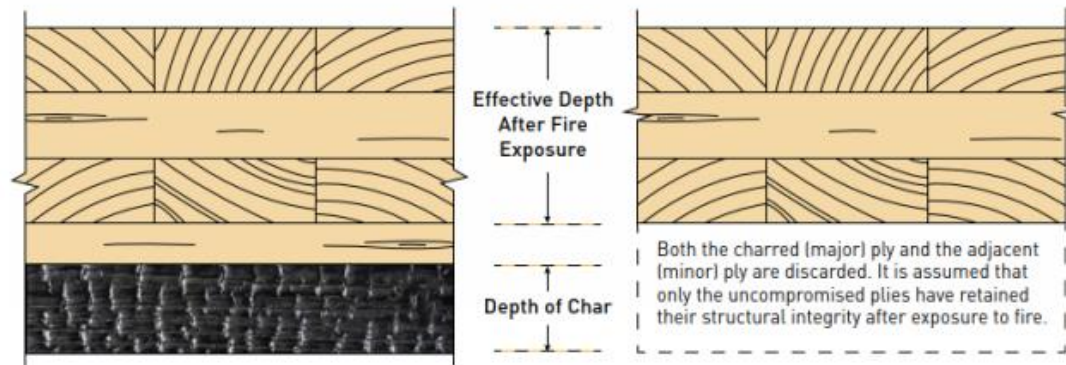
ADAPTABLE BUILDING & UNIT LAYOUT

# 1470 BLOCKLINE ROAD CASE STUDY



5-Ply CLT Panel

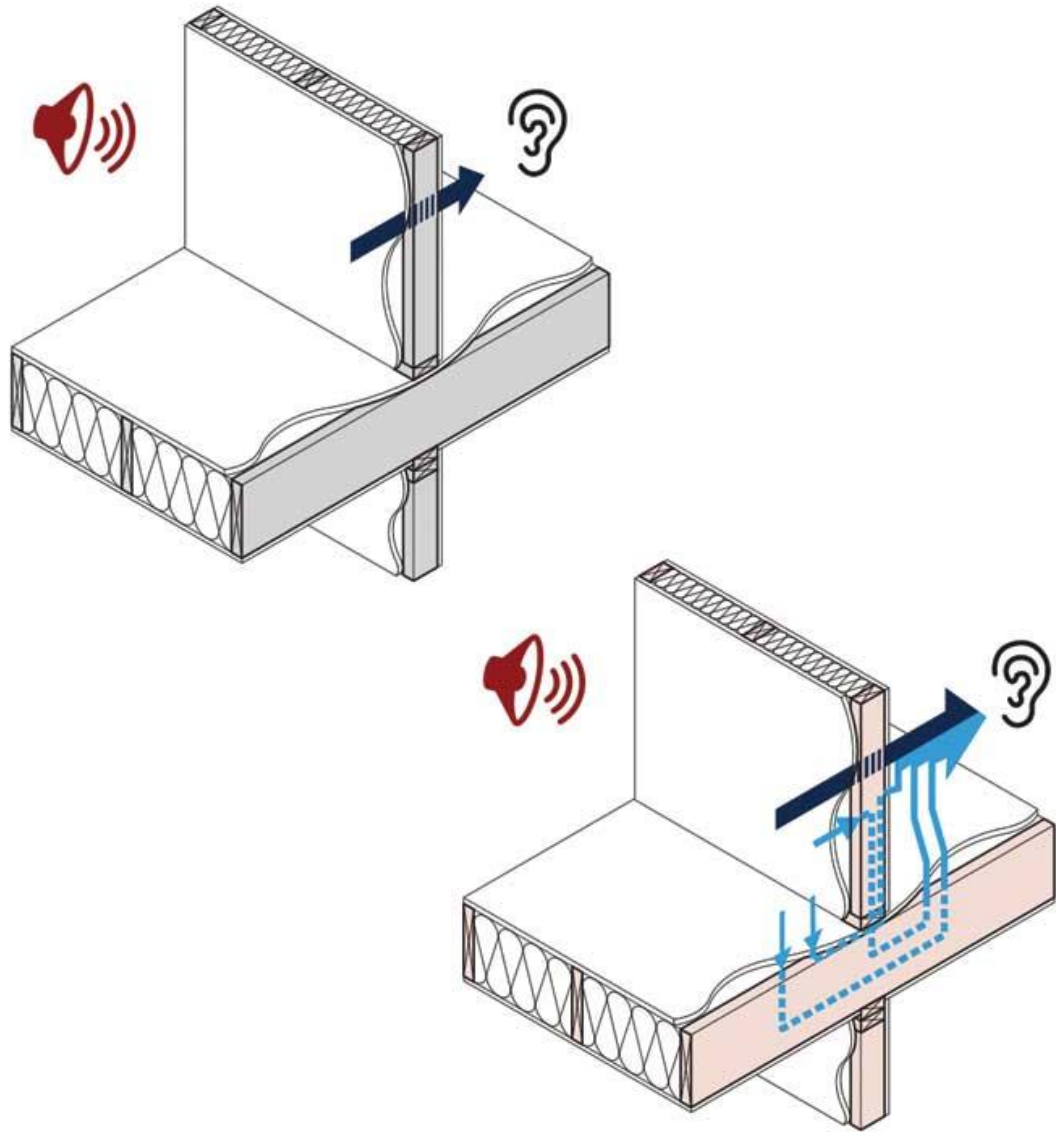
*Effective depth of a CLT panel. After accounting for the depth of char and the effects of heat exposure on the affected lamination, in this hypothetical example the panel's effective depth is reduced from 5 to 3 plies. (CLT Handbook)*



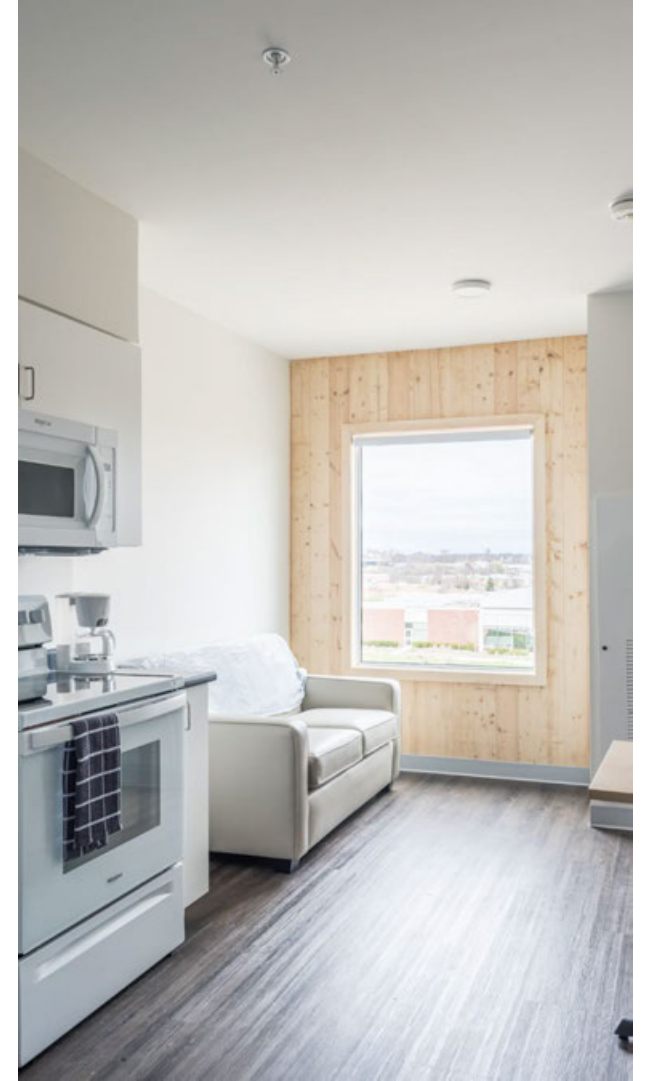
## FIRE RATINGS AND ALTERNATIVE SOLUTIONS



# 1470 BLOCKLINE ROAD CASE STUDY



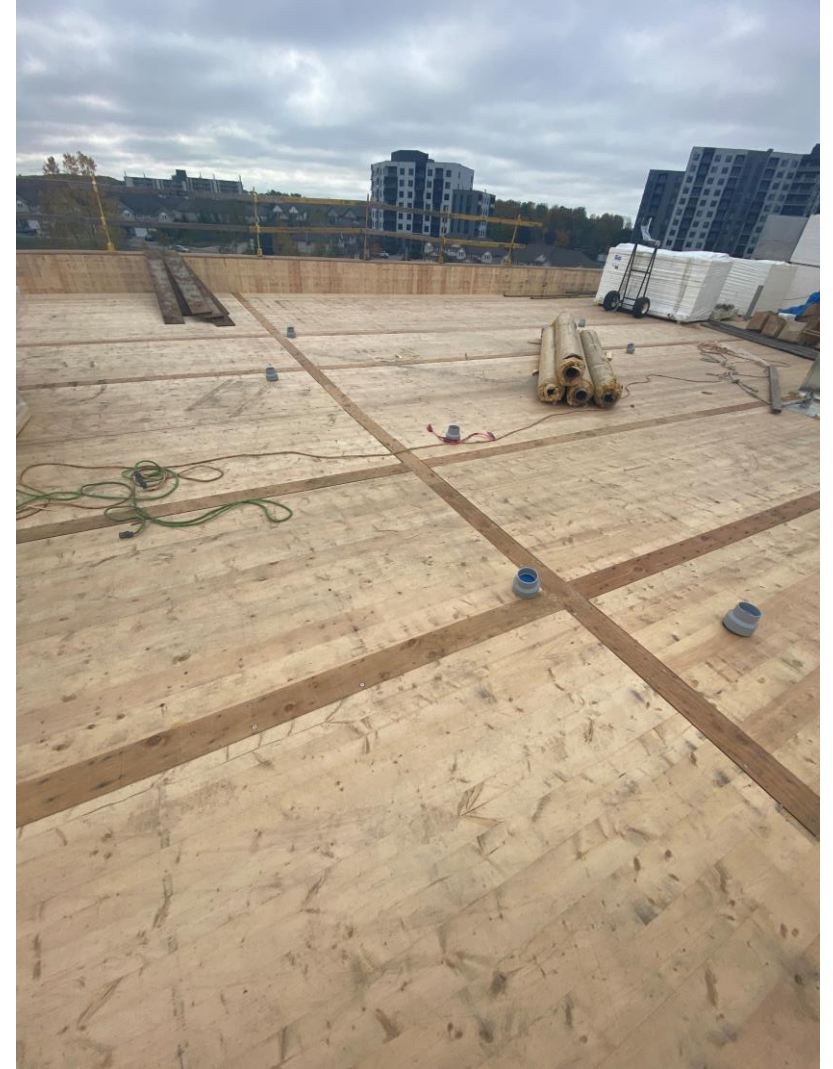
ACOUSTICAL DESIGN



# 1470 BLOCKLINE ROAD CASE STUDY



Photo 2.2c Moisture Content reading in CLT before membrane applied



## MOISTURE CONTROL STRATEGY



# 1470 BLOCKLINE ROAD CASE STUDY

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# 1470 BLOCKLINE ROAD CASE STUDY

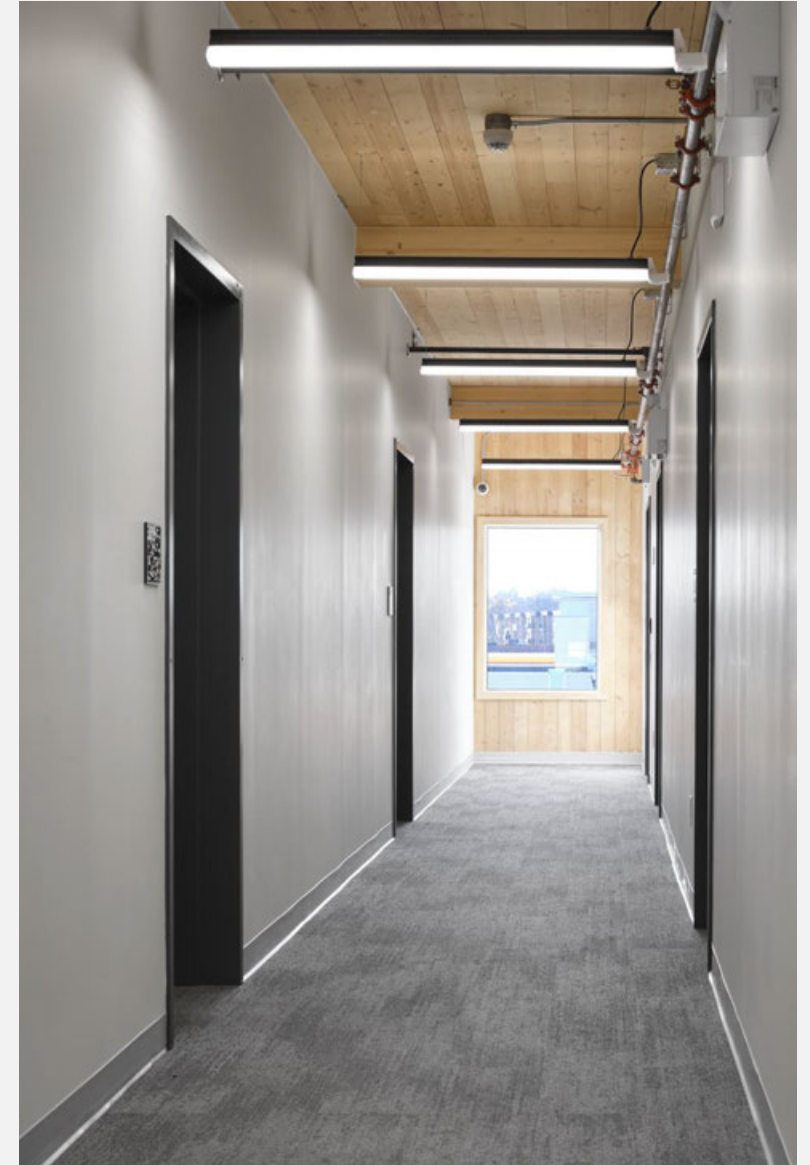
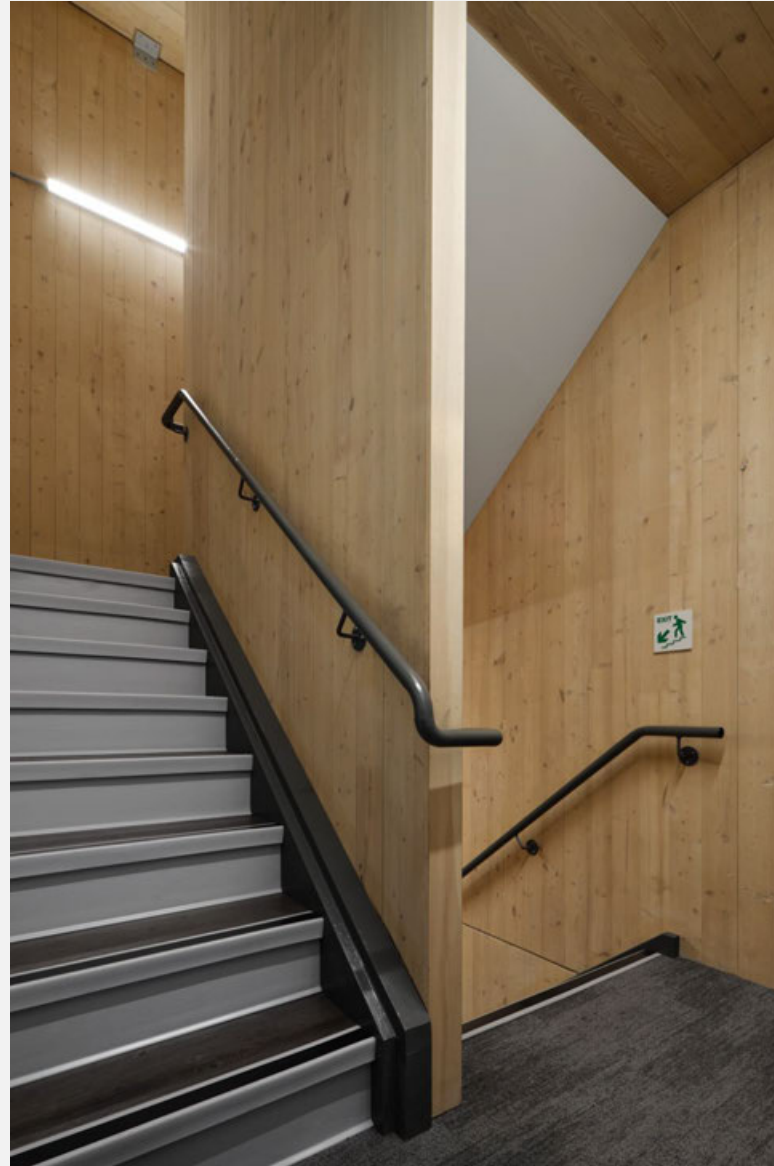
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## 1470 BLOCKLINE ROAD CASE STUDY

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# 1470 BLOCKLINE ROAD CASE STUDY

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## 1470 BLOCKLINE ROAD CASE STUDY

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# NEXT STEPS FOR MASS TIMBER HOUSING

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## THE HOUSING CONTINUUM





# NEXT STEPS FOR MASS TIMBER HOUSING

## THE HOUSING CONTINUUM



# NEXT STEPS FOR MASS TIMBER HOUSING

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**York Region & R-Hauz** (18) 1- Bedroom Units

**PASSAGE HOUSE**  
EAST GWILLIMBURY, ONTARIO



## NEXT STEPS FOR MASS TIMBER HOUSING

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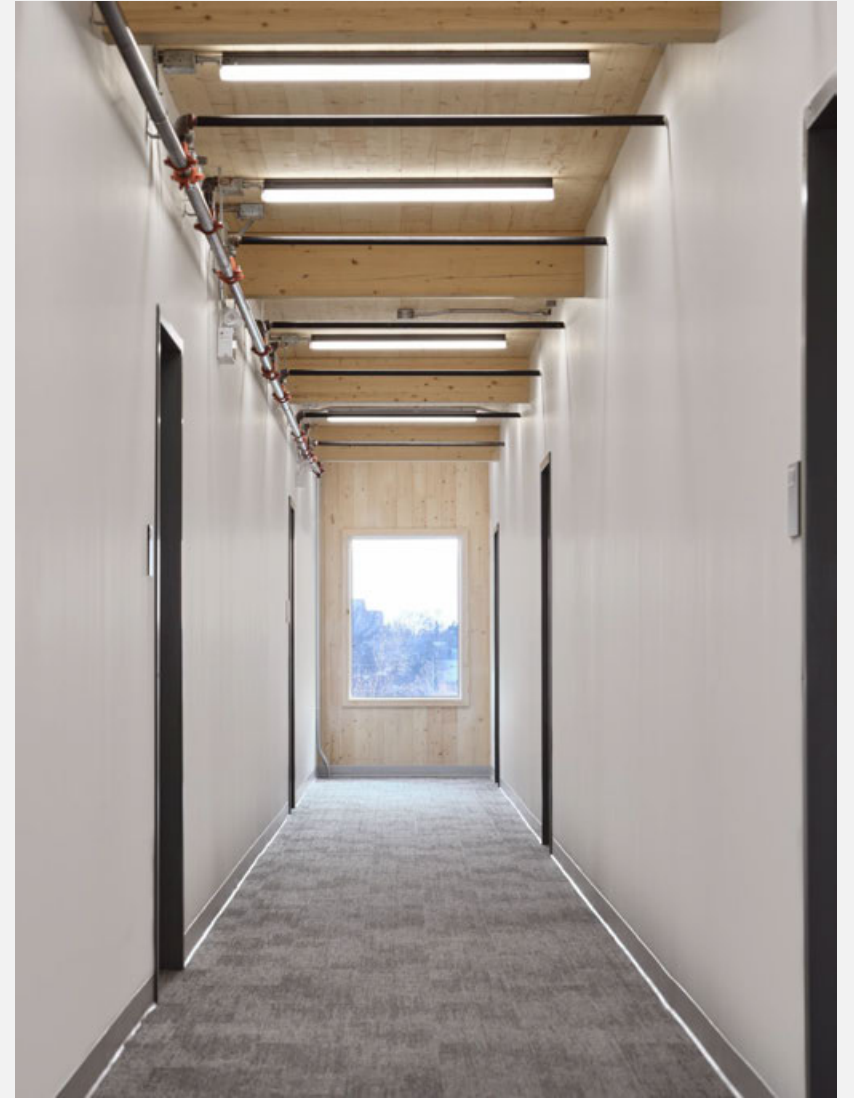
**1470 & 1480 BLOCKLINE RD (YWKW)**  
KITCHENER, ONTARIO

**Phase 1** (41) 1- Bedroom Units (for women)

**Phase 2** (10) 2- Bedroom Units (for women & children)

## NEXT STEPS FOR MASS TIMBER HOUSING

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**1480 BLOCKLINE RD PHASE 2**  
KITCHENER, ONTARIO



## NEXT STEPS FOR MASS TIMBER HOUSING

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**1480 BLOCKLINE RD PHASE 2**  
KITCHENER, ONTARIO

# NEXT STEPS FOR MASS TIMBER HOUSING

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**PASSIVE HOUSE SUPPORTIVE HOUSING PROJECT**  
HAMILTON, ON



## NEXT STEPS FOR MASS TIMBER HOUSING

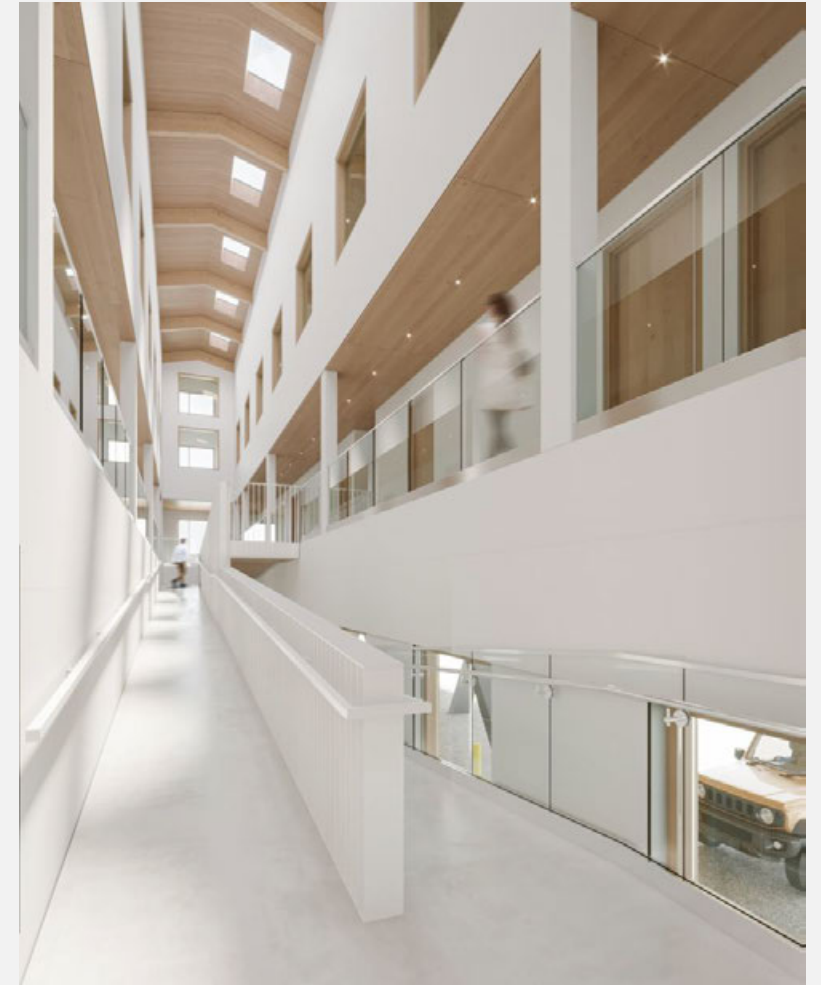
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**HYBRID CLT, 6 Storey Affordable Housing Project**  
KITCHENER, ON

# NEXT STEPS FOR MASS TIMBER HOUSING

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**UQUUTAQ SOCIETY HOUSING**  
IQALUIT, NUNAVUT



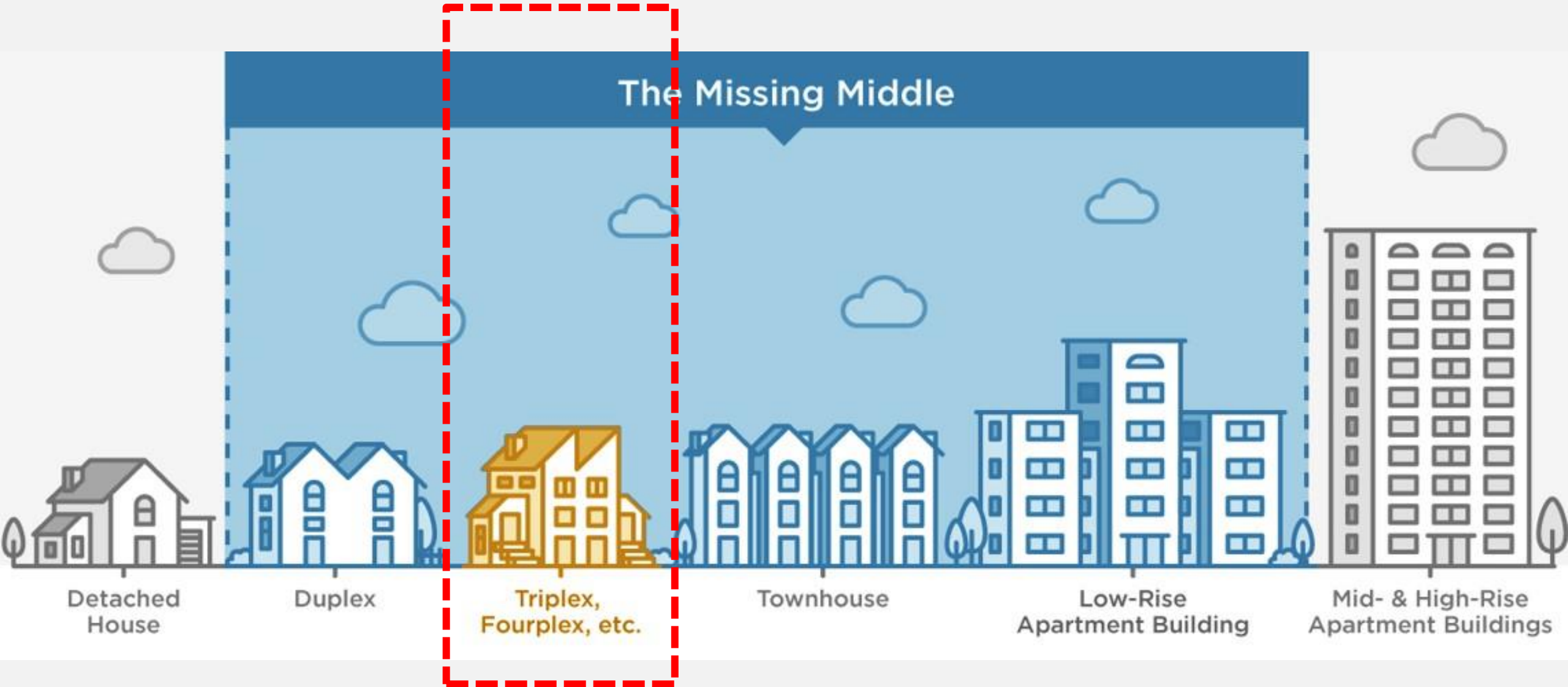
# NEXT STEPS FOR MASS TIMBER HOUSING

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**PINNGUAQ MAKER SPACE & APARTMENTS**  
IQALUIT, NUNAVUT

## NEXT STEPS FOR MASS TIMBER HOUSING





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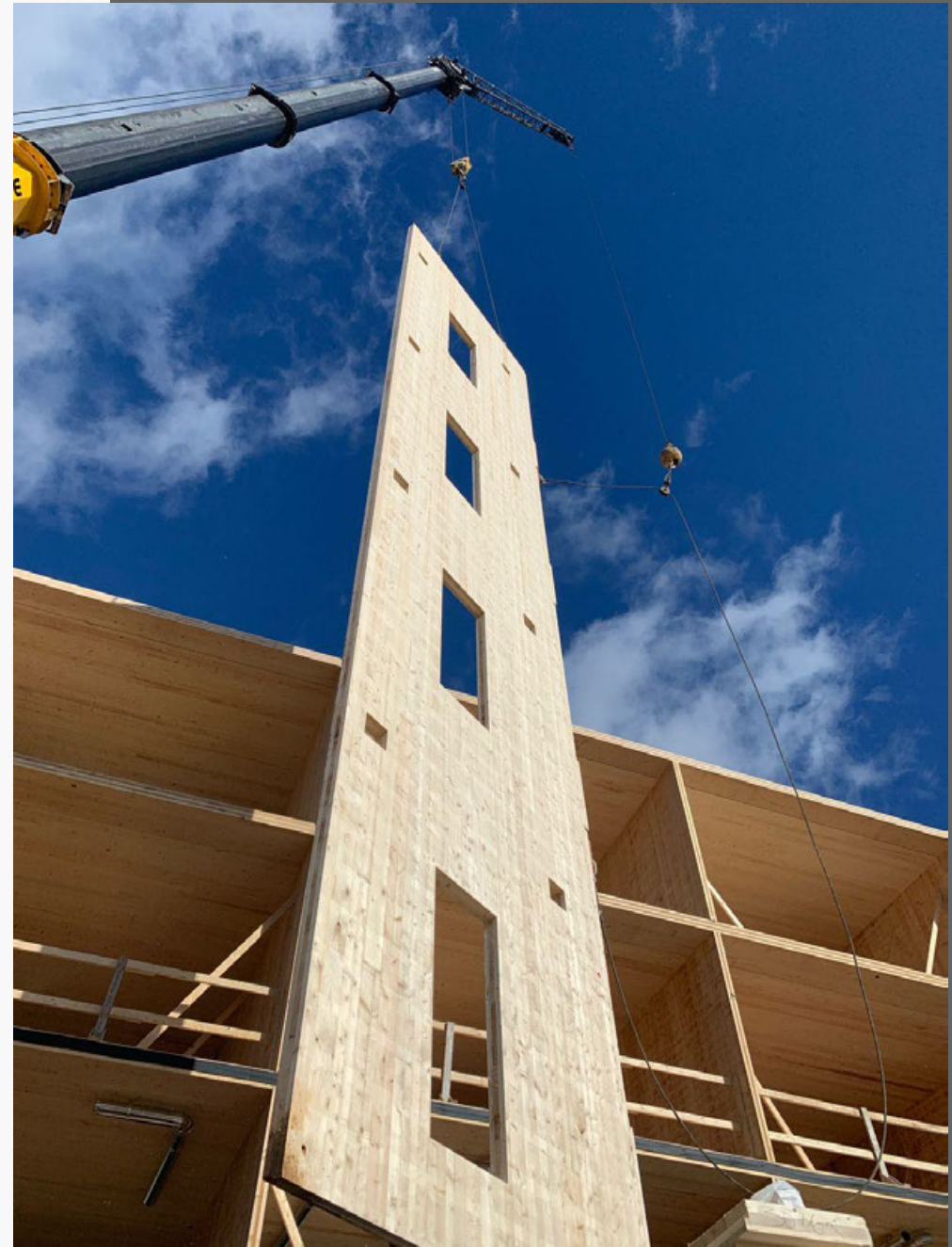


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**Matt Bolen**, BAS, M.Arch, OAA, CPHD  
Managing Principal  
Jan. 16, 2024  
[www.mccallumsather.com](http://www.mccallumsather.com)

*This concludes The American Institute of  
Architects Continuing Education Systems  
Course.*



CLT INSTALL AT YWKW BLDG 01 IN KITCHENER, ON