

Sustainable Housing Solutions: The Future of Mass Timber Construction



COLLABORATIONS IN MASS TIMBER

Collaborating with various cities, groups, stakeholders, and clients, the GCWood funding for WoodIn Mass Timber Office Prototype gave rise to the use and adoption of locally manufactured engineered wood systems and innovations.



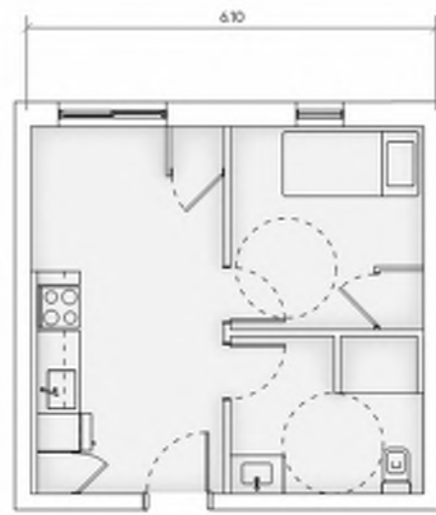
Construction proposing the use of wood-engineered glulam beams and columns with long span hollow massive timber panels (HMT) for the floor and roof system.



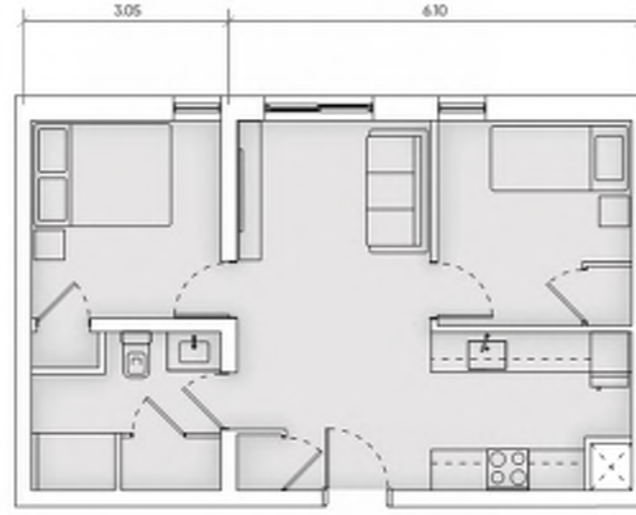
STUDIO



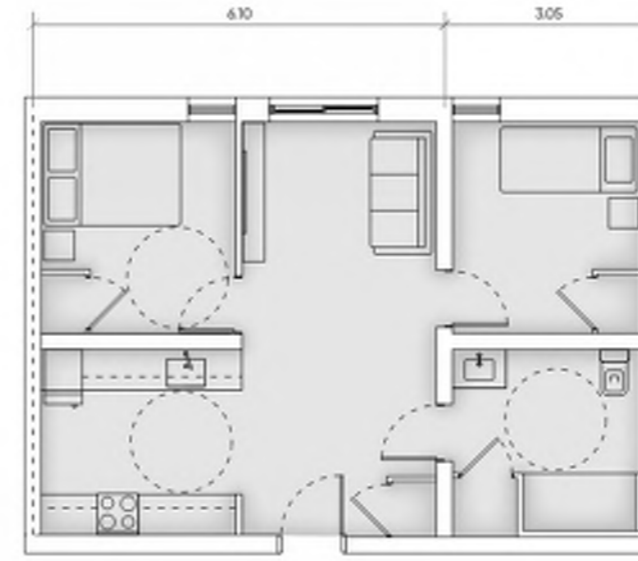
1-BED



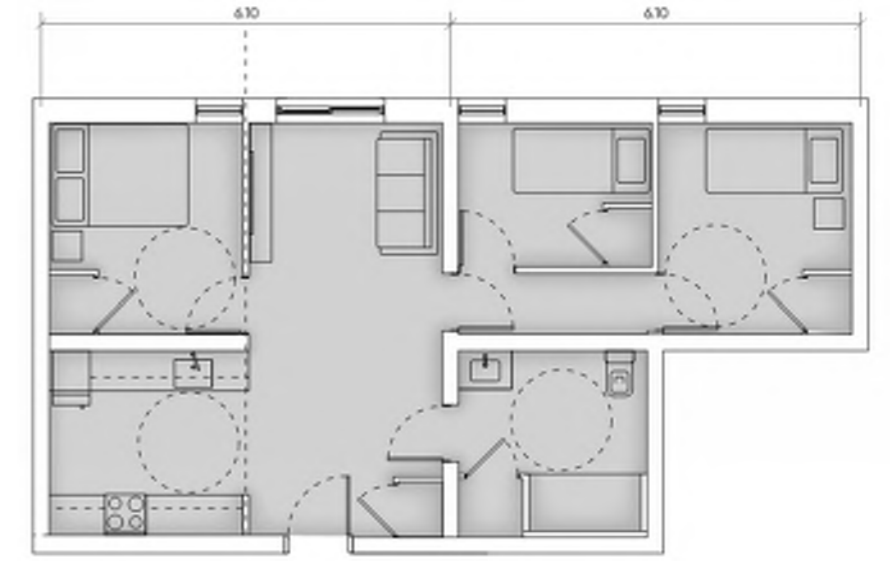
1-BED
BARRIER FREE



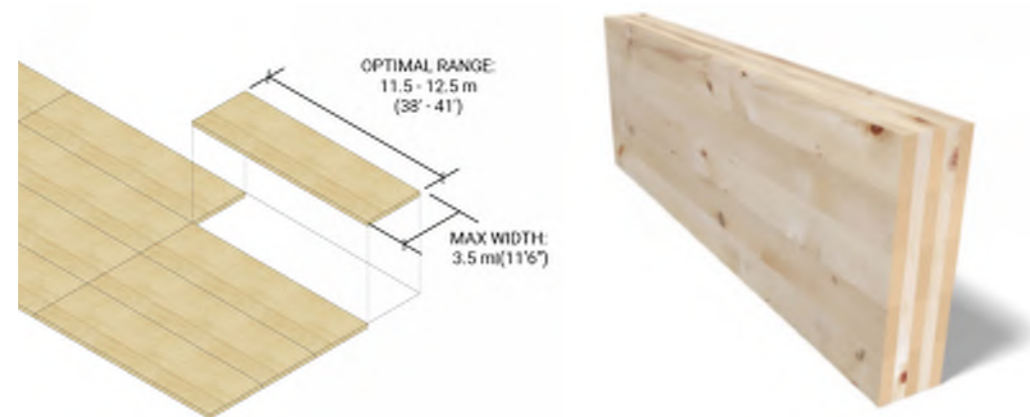
2-BED



2-BED
BARRIER FREE



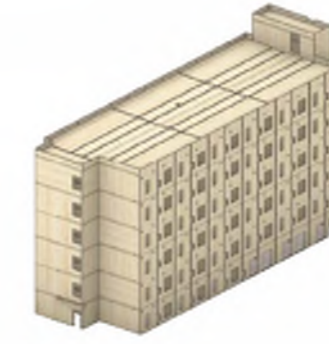
3-BED
BARRIER FREE



ADAPTABLE BUILDING STRUCTURE WITH FLEXIBLE UNIT LAYOUTS

This evolution results in a Six-Storey Mass-Timber Passive House that underscores the importance of collaboration and communication; and in demonstrating the construction efficiencies of mass timber prefabrication with a high-performance building envelope. *(left)* Optional Range of 5-Ply Cross Laminated Timber (CLT) floor and roof panels.

Innovating through prototype/ iterative design and changing one variable at a time with rapid, affordable housing at the forefront.



RAPID HOUSING

Funded by Rapid Housing Initiative, the turnkey RFP submission required 1-year of contract award. From award of project through to occupancy in one calendar year. *(above)* YWKW Phase 1.



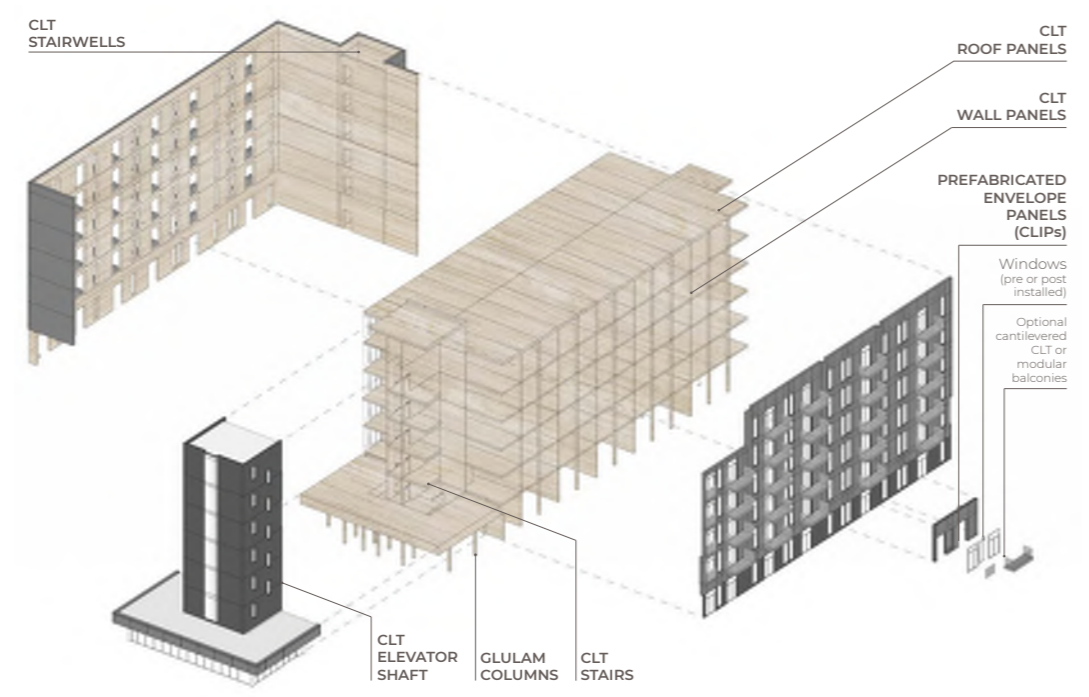
MASS TIMBER

Modified design of YW Phase 1 within the same Round 1 RHI funding window. *(above)* East Gwillimbury Transitional Housing



PASSIVE HOUSE DESIGN

1620 Main St E Affordable Housing demonstrates the adaptability for prefabrication to enhance construction efficiency with Passive House Design principles.



PREFABRICATION & CONSTRUCTION EFFICIENCIES

Solution Components include CLT Elevator & Stair Shaft Walls; CLT Roof, Floor and Wall Panels; and Glulam Columns (*above*). YWKW Phase 1, a 4-storey, 41 unit, 27,000 s.f. multi-unit residential building was assembled in 20 working days. (*right*)





PROJECT DELIVERY CHALLENGES & SOLUTIONS

Our aims for continued collaboration with industry partners, and iterative design-build construction to accelerate the delivery of Affordable Housing through Mass Timber Passive House Design.



8/31/22, 10:14 AM 17,000 new homes to be built as part of \$2B plan to ease housing crunch, Trudeau says | CBC News


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Kitchener-Waterloo

17,000 new homes to be built as part of \$2B plan to ease housing crunch, Trudeau says

PM, housing minister were in Kitchener, Ont., on Tuesday to detail spending committed in recent budgets

CBC News · Posted: Aug 30, 2022 10:39 AM ET | Last Updated: August 30



Prime Minister Justin Trudeau was in Kitchener, Ont., on Tuesday to reveal the government's plan to add a total of 17,000 new housing units across Canada. (James Chaarani/CBC)

comments

About 17,000 new housing units will be built across Canada as part of a \$2-billion federal plan to address living affordability, Prime Minister Justin Trudeau said in Kitchener, Ont., on Tuesday.

RAPID HOUSING INITIATIVE

Partnering with the same design-build team from previous projects, McCallum Sather has evolved their design of Mass Timber Affordable Housing to incorporate Passive House performance through the partnership with RDH, who are providing Passive House and Building Enclosure consulting services for the project.

'A place to call home': Justin Trudeau announces \$2 billion to build 17,000 homes across WCanada, participating in a round-table discussion on housing afford-ability at YWKW 1470 Blockline Rd. (below)





CITY HOUSING HAMILTON

CHH's mission is to create accessible, safe, and inclusive housing solutions. As the largest social housing provider in the city, CHH provide homes that are safe, well-maintained and affordable. 500 MacNab St N., the world's largest EnerPHit multi-res building.

8 Roxanne Dr.'s innovative construction with a panelized modular system. Pre-cast panels with integrated insulation contribute and factory-installed windows.





Once built, this landmark project is in the race to be one of the first mass-timber passive house multi-residential buildings in North America. Modest in form, 1620 Main St E redefines the possibilities for Affordable Housing in terms of delivery and quality of living for its inhabitants.

CASE STUDY: 1620 Main St E Affordable Housing





HOUSING STRATEGY

Our process thus far has been building a team of experts shared goals and aligned objectives. And our focus, on providing non-stigmatized housing for the Waterloo Region.



The release of the Rapid Housing Initiative funding called for the use of innovative construction methods, such as mass timber.

CMHC
RHI CITIES
STREAM

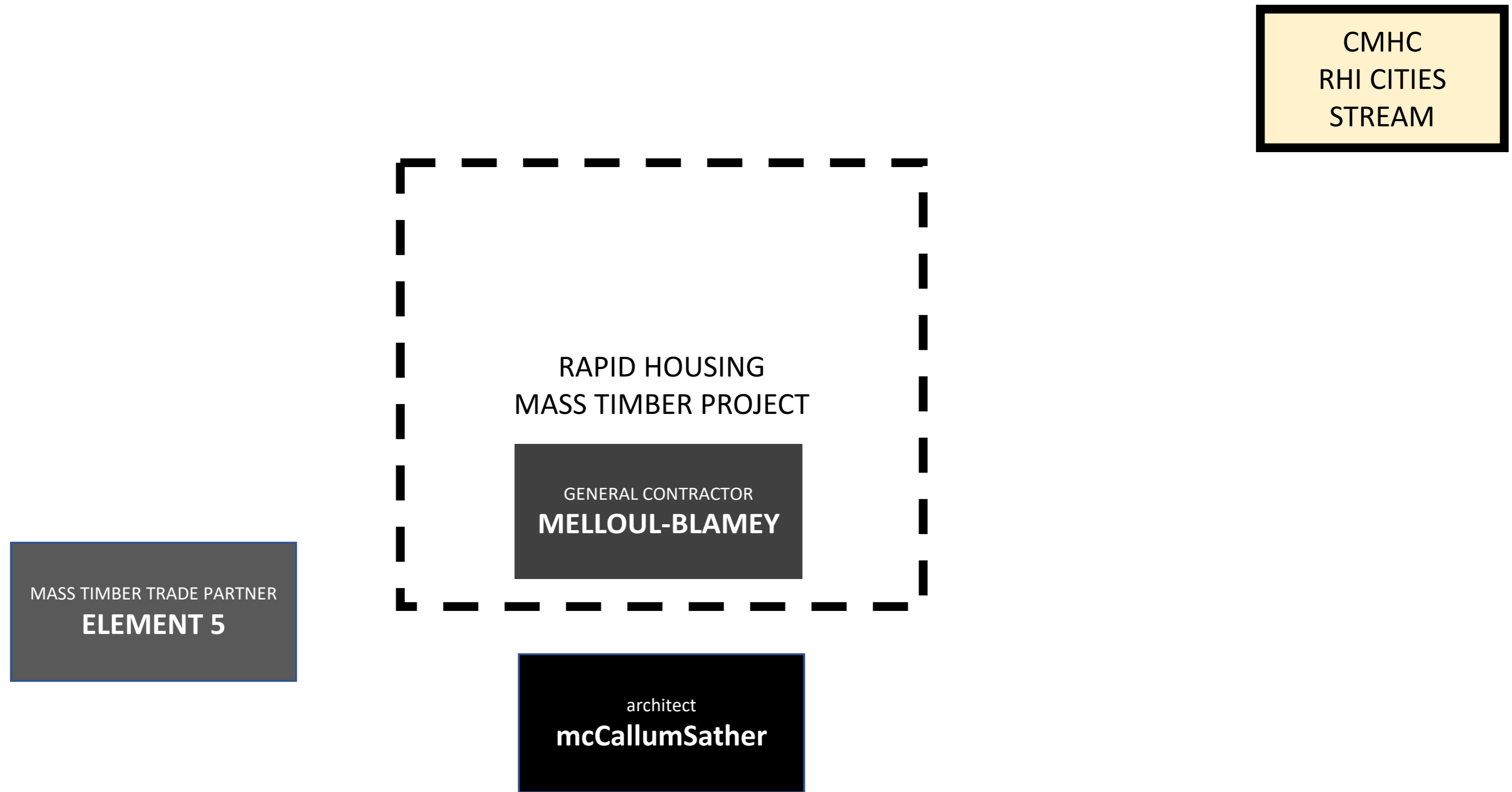


MASS TIMBER TRADE PARTNER
ELEMENT 5

architect
mcCallumSather

ARCHITECT LED DESIGN-BUILD STRUCTURE

This leads to preparing a bid, winning the job, flushing out the design and building the project. From there, we assess the project as a whole and collectively reviewing the wins and losses. And in doing so, reviewing goals and objectives and continuing to ensure the team is aligned.



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THE HOUSING CONTINUUM

We have found mass timber to be a universal in application along the Housing Continuum. Adaptable unit and building plans are driven by mass-timber panel spans and sizing. For Affordable Housing, units requested be under 400sf; with OBC accessibility; and separate bedroom from living space providing residents comfort and security.

An effective diagram in communicating the dynamic
the nature of housing needs.





LOCATION/CLIENT

544 BRIDGEPORT

CONSTRUCTION DATES

AUG 2020 - NOV 2021

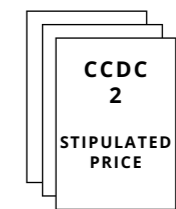
FUNDING STREAMS

CMHC CO-INVESTMENT

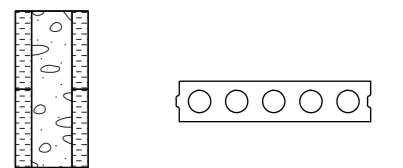
DESCRIPTION

**AFFORDABLE HOUSING
5 STORY
40 ONE-BEDROOM UNITS
8 TWO-BEDROOM UNITS**

CONTRACT TYPE



CONSTRUCTION TYPE



SUSTAINABILITY OBJECTIVES





LOCATION/CLIENT

**1470 BLOCK LINE RD
YW KW**

CONSTRUCTION DATES

AUG 2020 - MARCH 2021

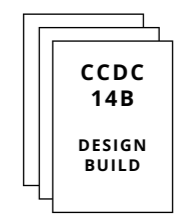
FUNDING STREAMS

**CMHC RAPID HOUSING
INITIATIVE - ROUND 1**

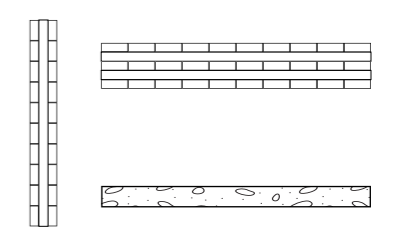
DESCRIPTION

**TRANSITIONAL HOUSING
4 STORY
41 ONE-BEDROOM UNITS**

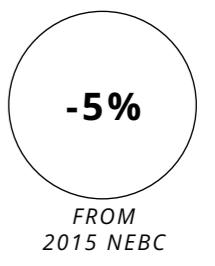
CONTRACT TYPE



CONSTRUCTION TYPE



SUSTAINABILITY OBJECTIVES





LOCATION/CLIENT

YORK REGION AFFORDABLE HOUSING

CONSTRUCTION DATES

DECEMBER 2021 - JULY 2022

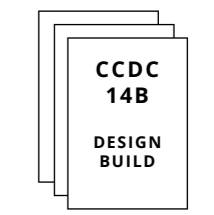
FUNDING STREAMS

CMHC RAPID HOUSING INITIATIVE - ROUND 1

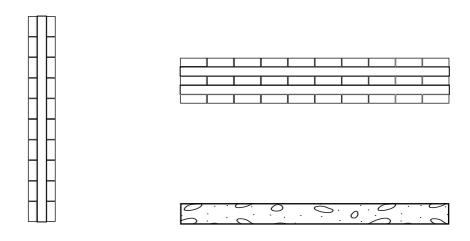
DESCRIPTION

**TRANSITIONAL HOUSING
2 STORY
18 ONE-BEDROOM UNITS**

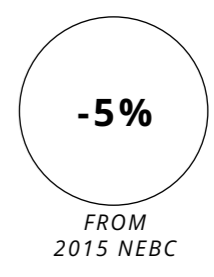
CONTRACT TYPE



CONSTRUCTION TYPE



SUSTAINABILITY OBJECTIVES





LOCATION/CLIENT

**1480 BLOCK LINE RD
YW KW**

CONSTRUCTION DATES

JULY 2021 - MARCH 2022

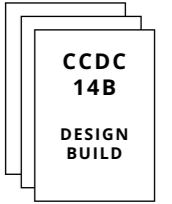
FUNDING STREAMS

**CMHC RAPID HOUSING
INITIATIVE - ROUND 2**

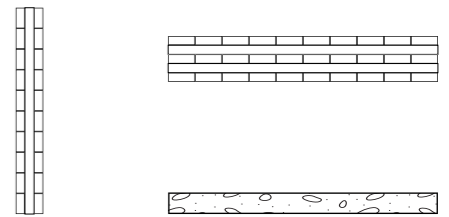
DESCRIPTION

**SUPPORTIVE HOUSING
4 STORY
14 TWO-BEDROOM UNITS**

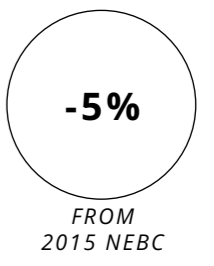
CONTRACT TYPE



CONSTRUCTION TYPE



SUSTAINABILITY OBJECTIVES





LOCATION/CLIENT

**1620 MAIN ST E
CITYHOUSING HAMILTON**

CONSTRUCTION DATES

MARCH 2024 - ONGOING

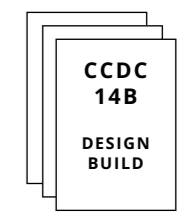
FUNDING STREAMS

**CMHC RAPID HOUSING
INITIATIVE - ROUND 3**

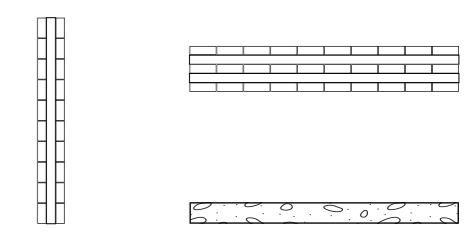
DESCRIPTION

**COMMUNITY HOUSING
6 STORY
4 TWO-BEDROOM UNITS
38 ONE-BEDROOM UNITS**

CONTRACT TYPE



CONSTRUCTION TYPE

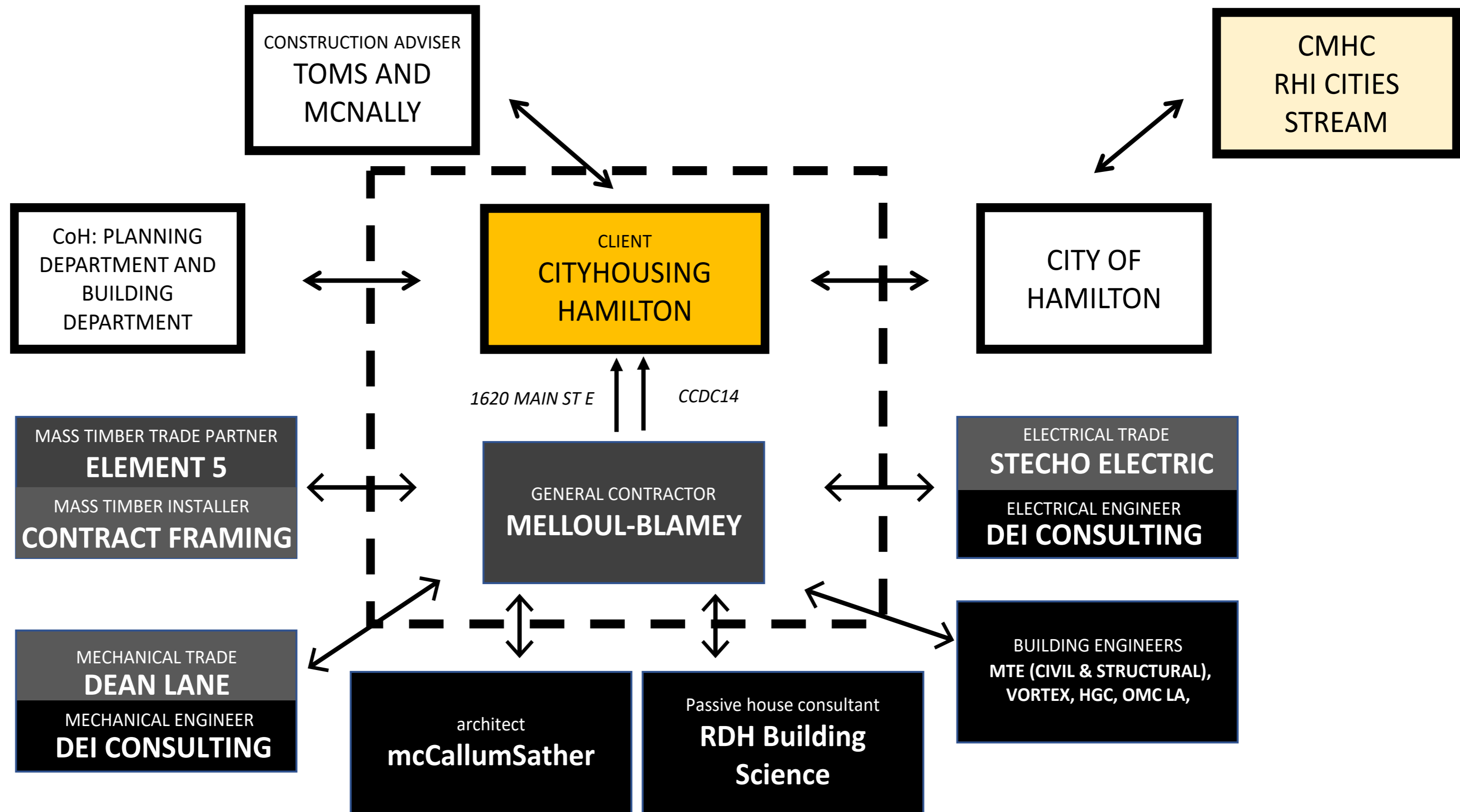


SUSTAINABILITY OBJECTIVES



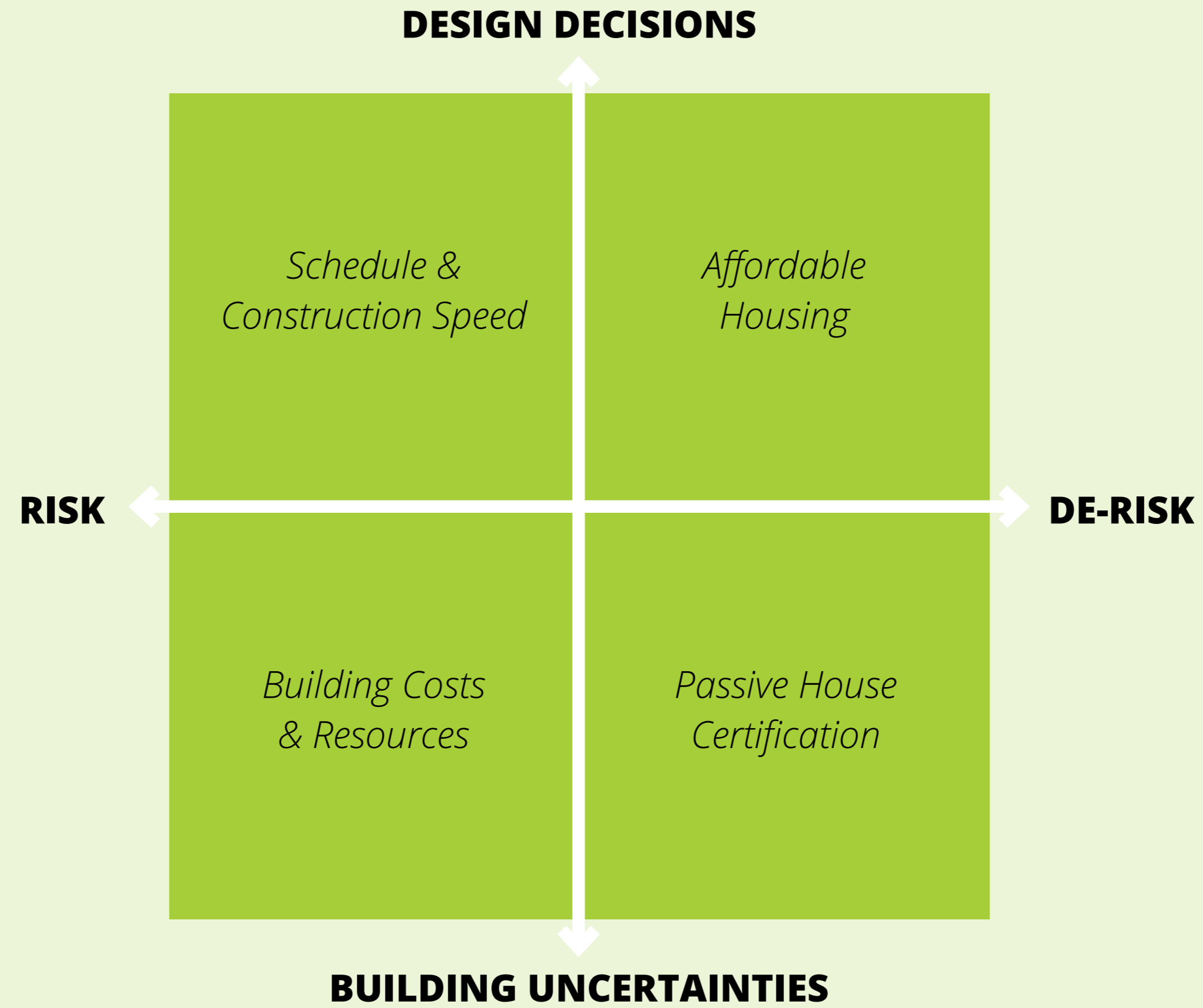


Aerial view of Phase 1 55 Queenston Road+ Phase 2 1620 Main St E
Affordable Housing in the foreground.



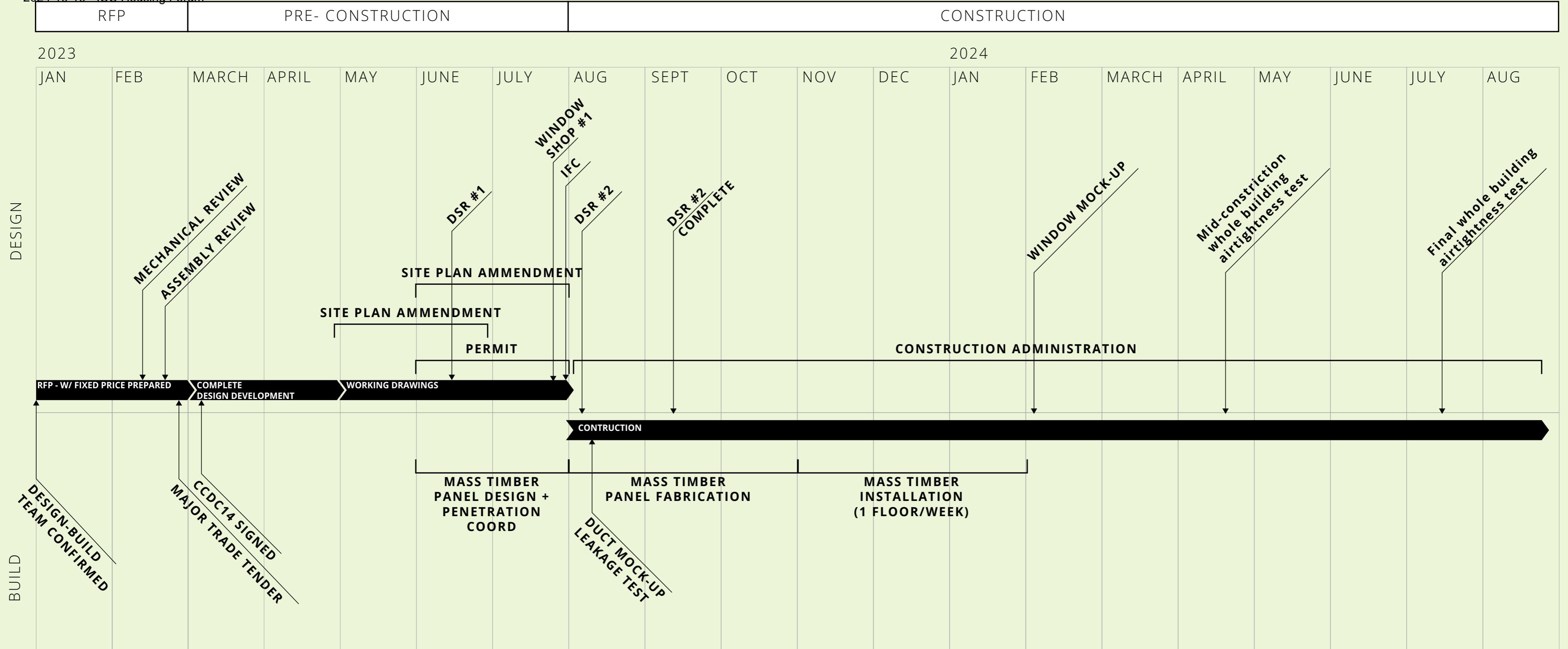
ARCHITECT LED DESIGN-BUILD CONTRACTUAL CONNECTIONS

Our organizational structure. Although complex, the clear understanding of the project goals, responsibilities and continued collaborative efforts of everyone in this stakeholder structure was essential in completing the project successfully.



DESIGN-BUILD PAYOFF

The Delivery of Affordable Housing is at the forefront of this Design-Build Pay-off diagram and depicts collaborative design decisions early on to de-risk building performance uncertainties. The impact of this decision making methodology reduces variables for costly changes on-site labour & accelerates the speed of construction.



The initial timeline during the RFP process for rapid housing initiative accelerated schedule with prefabrication.



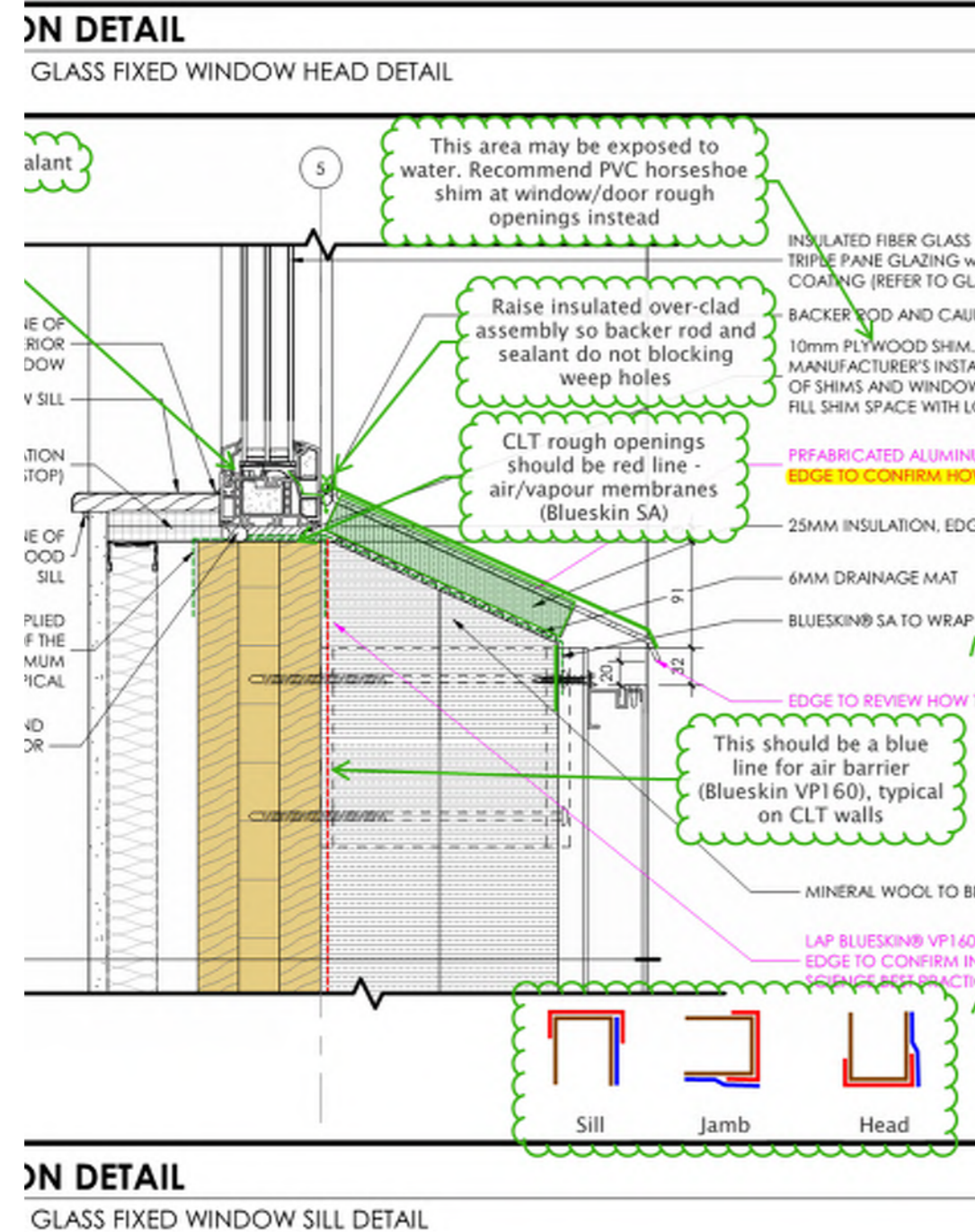
Enclosure Quality Assurance Process on-site conference June 13th hosted by contractor with input from consultants; mechanical, electrical, cladding and roofing trades; supplier; passive house consultants.



MASS TIMBER FABRICATION

Speed of construction with factory tolerances.



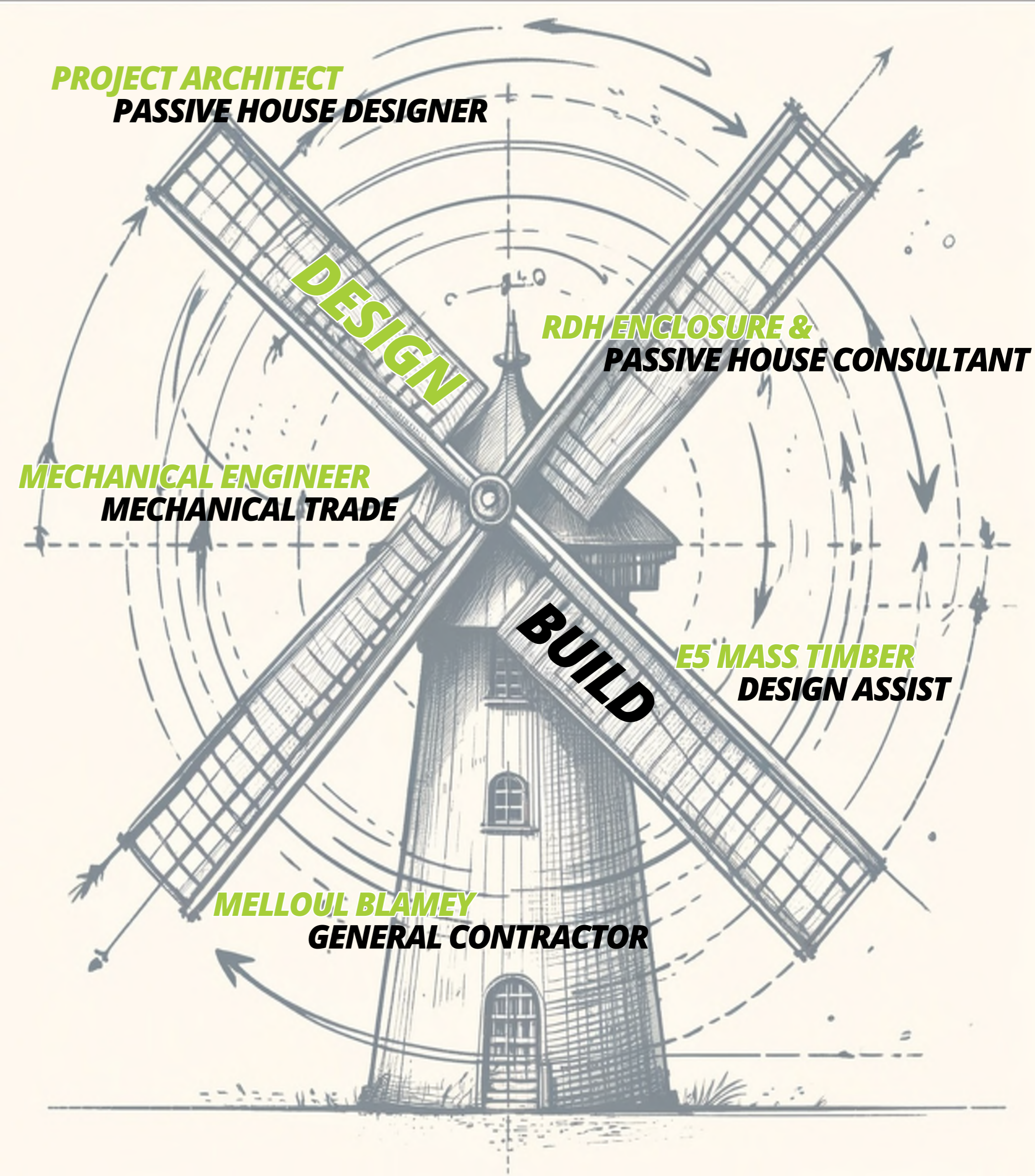


DESIGN-BUILD DELIVERY FOR MASS TIMBER

Architect led project delivery for Mass timber construction through the design synchronization and building integration via Design- Build Delivery for Mass-Timber Construction.

e.g. Project Architect & CPHD / Bridge for CA Process;

e.g. Building Enclosure Consultant + Passive House Consultant





MOISTURE MANAGEMENT PLAN

At time of delivery, the contractor is testing for a 10-12% moisture content. Once installed, splines are being tested to confirm a moisture content of no more than 16% before applying the protective membrane.





MAY 2ND 2024
Form-work for Foundations.



MAY 16TH 2024
Basement CLT Panels and Ground Floor CLT Panel installation.



JUNE 13TH 2024
Superstructure installation up to Second Floor; 3rd week of June anticipated install up to Third Floor with 3-story exterior Wall Panels.



The evolution to Mass-Timber Passive House underscores the importance of collaboration and integration. Our solutions thus far have been to communicate early on and often; and to de-risk building performance uncertainties through early design decisions. At each iteration, we incorporate lessons learned and pull new levers to evolve the next prototype.



KW Habilitation

