
CANADIAN HOME BUILDERS' ASSOCIATION
netzero home
LEADERSHIP SUMMIT
Welcome

MEET OUR 2 DAY CO-HOSTS!

**Lynne J Strickland,
Director, Initiatives, Net
Zero Energy Housing, CHBA**

**Andy Oding,
Vice President, Director of
Building Science, Building
Knowledge Canada Inc.**


Sign in & out
with Vanessa
from CHBA-BC
for your CPDs!
APPROVED
CONTINUING
PROFESSIONAL
DEVELOPMENT
REGISTRAR BC HOUSING










CANADIAN HOME BUILDERS' ASSOCIATION

netzero home

LEADERSHIP SUMMIT

bigBLOCK building communities at full throttle

LANDMARK HOMES it's what's inside

ZIRNHELT TIMBER FRAMES

avalon MASTER BUILDER

SEAN.

Day 2 Agenda

MORNING AGENDA

8:30 Opening Day 2

8:45 Session 5: LEADING THE WAY. Meet 5 Builder Teams achieving Net Zero/Ready in Multi-Family projects.

10:15-10:45 Break upstairs in the HUB

10:45 Session 6: HOW LOW CAN YOU GO. Electrification on 100 amps?

12:00-1:00 LUNCH

Access the full agenda online here:

AFTERNOON AGENDA

1:00 Sponsors

1:15 Session 7: GOTTA KEEP 'EM SEPARATED. Compartmentalization for Multi-Family.

2:30-3:00 Break upstairs in the HUB

3:00 Session 8: ARE YOU READY FOR THIS? What's next for scaling a Net Zero future.

4:15 Closing

Access the speaker info online here:

NET ZERO READY MURBS

Affordable, Replicable and Marketable

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The ultimate in comfort and efficiency

The **OBJECTIVE** of this 5-year+ project was to **validate the use of panelized and modular construction** and **integrated mechanical system** technologies, design and construction practices on

Net Zero or Net Zero Ready MURBs

to optimize energy efficient performance, reduce costs, increase construction productivity and reduce construction schedules.

Project Lead

CHBA's Net Zero Home Labelling Program / Net Zero Housing team

Project Funding

Natural Resources Canada, Office of Energy Research and Development (OERD)

Project Consultants

Andy Oding, Building Knowledge Canada
Derek Satnik & Seungyeon Hong, s2e
Wil Beardmore, Bluewater Energy
Dave Silburn, SHIFT Environmental Design and Consulting

Project Partners

BC Hydro, BC Housing, Enbridge

The expression of interest for this project went out in 2017.

From 2019, and still going, CHBA and our builder teams have persevered.

The **CHALLENGES** were unique.

PART 9 CONSTRAINTS

INDUSTRY CAPACITY

COVID

COVID ECONOMY

“POST” COVID ECONOMY

AFFORDABILITY

REGULATORY

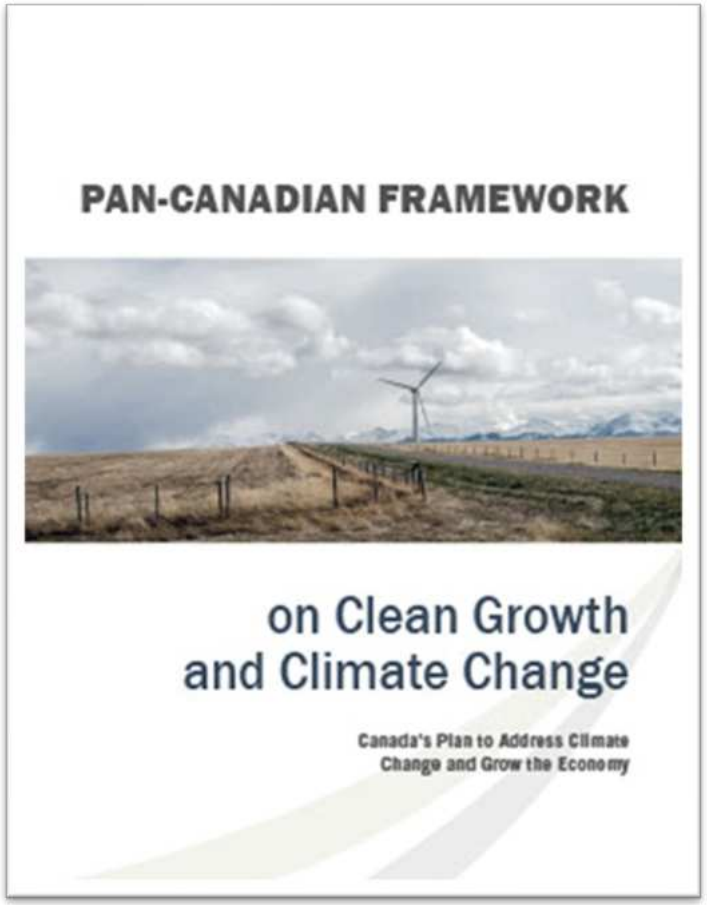
Today we **CELEBRATE** that perseverance and the incredible movement forward that the research, application, and demonstration. The work that was accomplished through this initiative had impacts far beyond the individual participants.

Today we'll see how the willingness of our **NET ZERO BUILDERS**, combined with the dedicated collaboration with our **NET ZERO ENERGY ADVISORS**, consultants and our project partners has resonated for our own CHBA Net Zero Home Labelling Program to informing code for all Canadians.

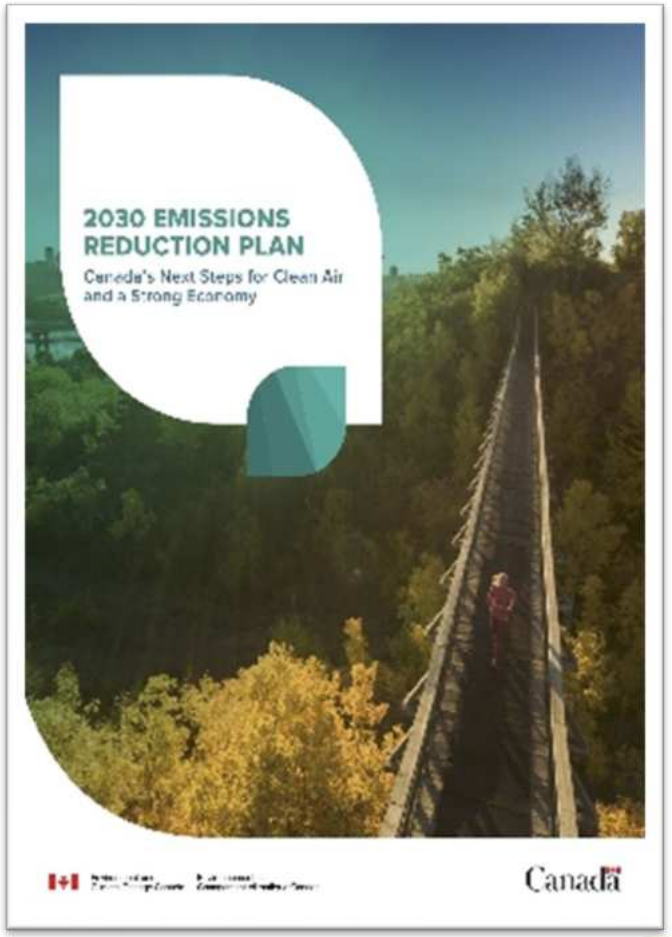
Without the originating forethought of **NATURAL RESOURCES CANADA** to fund initiatives such as these, Canadians would miss out on the significant contributions that projects like these achieve.


Natural Resources Canada
Ressources naturelles Canada
Housing Sector Innovation
NRCan as a partner
Affordable, Replicable, and Marketable Net Zero Ready MURBs – An Energy Efficient Building Funding Program Demonstration Project
CHBA Net Zero Leadership Summit
June 12, 2024
Canada

Federal Mandate & Building Sector



- ***Innovation is necessary for economic and climate objectives in 2030, 2035, and 2050***
- Half to two-thirds of emissions reductions needed to reach net-zero come from technologies that are **not yet ready for deployment**



Energy Efficient Building Funding Program

- **$182 million to increase energy efficiency and address climate change** by improving how our homes and buildings are designed, renovated, and constructed.
- Supporting **research, development and demonstration projects** that:

  - Accelerate the development and adoption of these codes and necessary technologies
  - Provide more cost-effective building solutions and validate their applications locally with real-world demonstrations
  - Build confidence with industry and provinces and territories to accelerate their adoption of revised building codes
  - Promote highly energy-efficient building design and construction practices

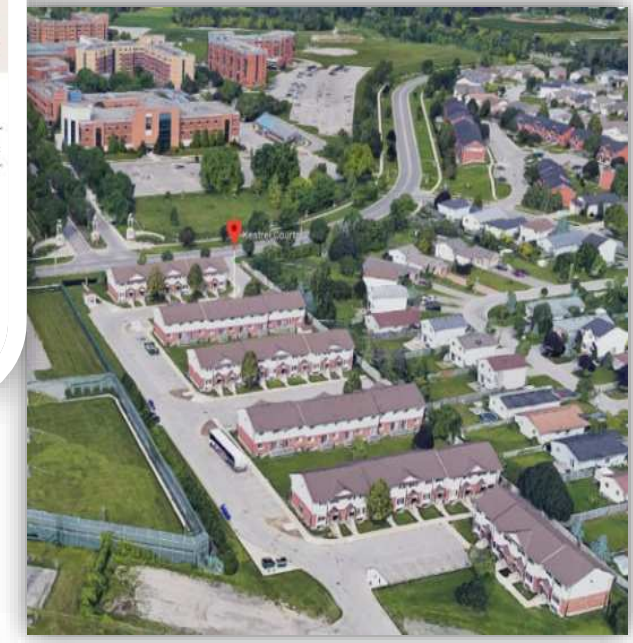
NRCan is a Key Partner in Funding Innovation

- Green Infrastructure Program Energy Efficient Buildings (2018-2026)
- Greener Neighbourhoods Pilot Program (Launched 2023)
- Energy Innovation Program

DEMONSTRATION

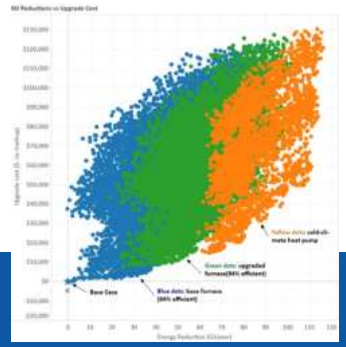
	Project ID	Building type	Highlights
NEW CONSTRUCTION	GIBE-1093	Low-rise MURB	NZER; multi-site; prefabrication
	GIBE-1112	Mid-rise MURB	NZER; hybrid heating system
	GIBE-2204	Mid-rise MURB	NZER; comparative analysis
	GIBE-2215	Commercial/institutional,	NZER; multi-site; provincial program
	GIBE-2156	Low-rise MURB	Passive House; prefabrication
RETROFIT	GIBE-2160	Row houses	NZER; prefabrication;
	GIBE-2176	Mixed-use MURB	DER; student residence
	GIBE-2242	Row houses	NZER; Energiesprong; prefabrication
	GIBE-L001	MURB	DER; student residence

Demonstration of Deep Energy Retrofits



Accelerating Innovation and Technology Up-take

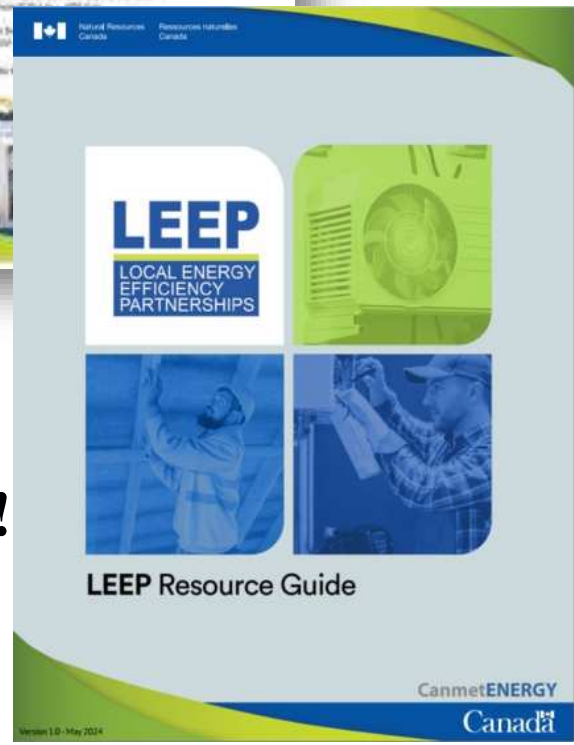
- Local Energy Efficiency Partnerships (LEEP) Initiative for Home Building Innovation
- Federal Tools (e.g. HTAP – CBAT – MC2)
- External Partners Tools
  - Building Envelope Thermal Bridging (BETB) Guide Expansion
  - Net Zero Navigator Platform



LEEP Workshops, Tools and Guides

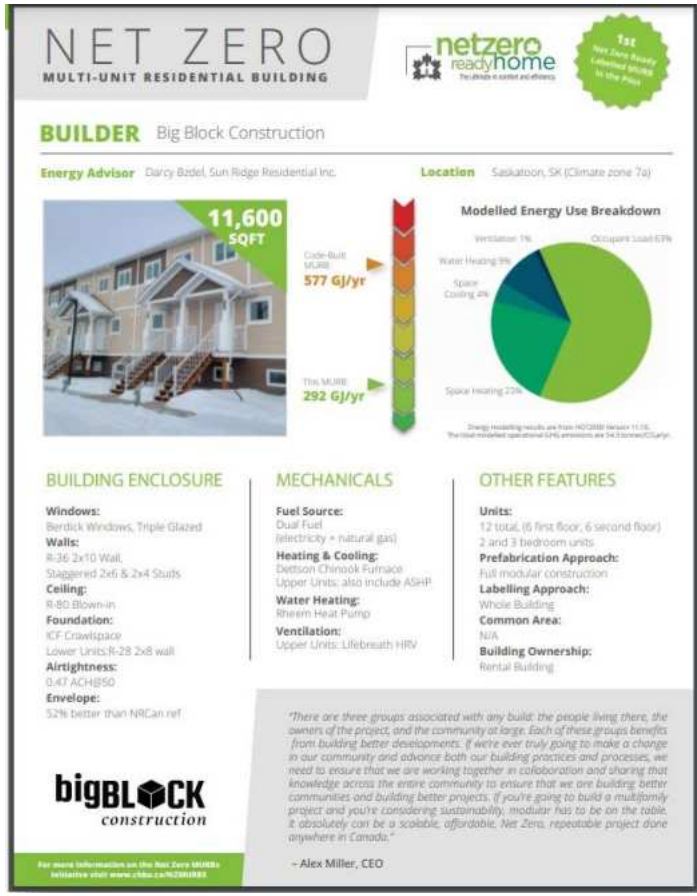
LEEP events, tools, resources and guides provide time saving ways for industry to learn about the information they need so they can move confidently towards building higher performance, resilient homes faster and more affordably.

NEW !



New High-Performance Construction Demos

Breakthrough Energy Solutions Canada



BETTER BUILDINGS BC
THE NET-ZERO ENERGY-READY CHALLENGE

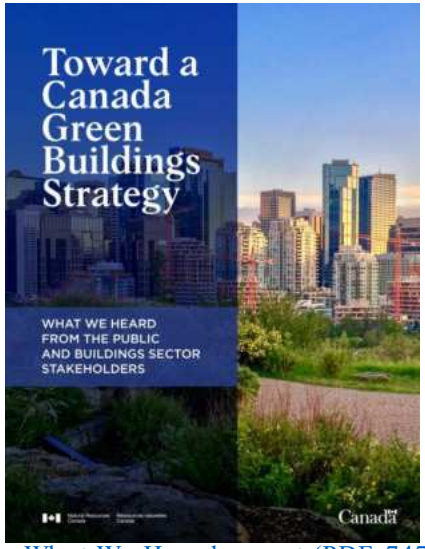
The Canada Green Buildings Strategy

The Canada Green Buildings Strategy - discussion paper (PDF, 2.24 KB)

- The **official Strategy** engagement and development
  - A **discussion paper** was shared
  - 3 Rounds of **formal engagement**
  - **Regional Tables** – with Ministerial participation

10 key takeaways with one on RD&D:

"*RD&D + Scale: Continue development of low carbon technologies and practices + scale technologies as needed*"



What We Heard report (PDF, 747 KB)
Summary of Engagement with Indigenous Partners (PDF, 675 KB)

Latest NRCan Initiatives

Codes Acceleration Fund

Support for PTs and other players to accelerate adoption + compliance with highest tiers of national model energy codes

Deep Retrofit Accelerators initiative

Support for organizations – concierge services, aggregators – that *facilitate* retrofit project pre-development and implementation

Greener Neighbourhoods Pilot Program

Support for organizations that facilitate retrofit project pre-development and implementation AND demonstration projects in clusters of community housing units

Federal Budget 2024

The **Canada Green Buildings Strategy** seeks to address the twin challenges of energy affordability and climate change.

- $800 million to launch a **new Canada Greener Homes Affordability Program**
- $30 million to continue developing a **national approach to home energy labelling**
- $73.5 million to **renew and modernize existing energy efficiency programs**
  - Offer tools to building owners like the ISO 50001 Energy Management Systems Standard and ENERGY STAR® Portfolio Manager.

Thank You

Philippe St-Jean

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NET ZERO READY MURBS

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WE ARE (MULTI) FAMILY
We've got all the BUILDERs and "E"(A's)

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Builders & Energy Advisors Leading the Way: Net Zero Multi-Family Construction

Ben Miller
Big Block Construction

Neil Hawkins
Avalon Master Builder

Haitao Yu
Landmark Group

Sam Zirnhelt
Zirnhelt Timber Frames

Sean Mason
SEAN.ca

Darcy Bzdel
Sun Ridge Residential

Cooper Le
4 Elements

Gilles Lesage
Total Home Solutions

Angela Bustamante
Building Knowledge Canada

bigBLOCK

building communities at full throttle

Ben Miller
Vice President, Operations
Big Block Construction

Darcy Bzdel
CEO, Energy Advisor
Sun Ridge Residential

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PROJECT LOCATION: Saskatoon, SK

NET ZERO ENERGY ADVISOR: Darcy Bzdel, Sunridge Group

 # NET ZERO READY UNITS: 12

CLIMATE ZONE: 7a

STATUS: Occupied 2020

OWNERSHIP TYPE: Rent

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NET ZERO
MULTI-UNIT RESIDENTIAL BUILDING

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1st Net Zero Ready Labelled MURB in the Pilot

PROFILE #1

BUILDER Big Block Construction

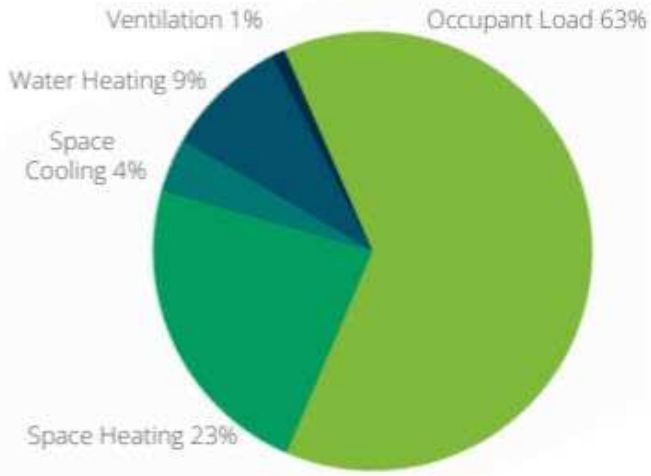
Energy Advisor Darcy Bzdel, Sun Ridge Residential Inc.

Location Saskatoon, SK (Climate zone 7a)

Code-Built MURB:
577 GJ/yr

This MURB:
292 GJ/yr

Modelled Energy Use Breakdown



Energy modelling results are from HOT2000 Version 11.10.
The total modelled operational GHG emissions are 54.3 tonnes/CO_2e/yr.

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www.chba.ca/NZMURB

PROFILE #1

BUILDING ENCLOSURE

Windows:
Berdick Windows, Triple Glazed
Walls:
R-36 2x10 Wall,
Staggered 2x6 & 2x4 Studs
Ceiling:
R-80 Blown-in
Foundation:
ICF Crawlspace
Lower Units:R-28 2x8 wall
Airtightness:
0.47 ACH@50
Envelope:
52% better than NRCan ref

MECHANICALS

Fuel Source:
Dual Fuel
(electricity + natural gas)
Heating & Cooling:
Dettson Chinook Furnace
Upper Units: also include ASHP
Water Heating:
Rheem Heat Pump
Ventilation:
Upper Units: Lifebreath HRV

OTHER FEATURES

Units:
12 total, (6 first floor, 6 second floor)
2 and 3 bedroom units
Prefabrication Approach:
Full modular construction
Labelling Approach:
Whole Building
Common Area:
N/A
Building Ownership:
Rental Building

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For more information on the Net Zero MURBs initiative visit www.chba.ca/NZMURBS

NZE(r) MURBs & Volumetric Modular Construction are a natural fit!*

** if and only if . . .*

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Lesson 1: Modular is Manufacturing

Design, Build, Ship, Crane & Integrate with Modular in Mind

Integrated design involves education & alignment with:

- internal team
- suppliers
- trades
- client
- tenants

about…

- ✓ design
- ✓ purchase
- ✓ install
- ✓ set up
- ✓ interface

Design / Preconstruction (Aug 2019 – April 2020)

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Lesson 2. NZE(r) Homes + Volumetric Modular = Cost Effective

- **Factory / On Site Assembly:** detailed analysis led to minor tweaks to a proven product with big results
- **Minimal Upgrade Cost :** standard spec upgrade to NZR increased build cost by ~3% for this 12-plex






Construction & Commission (May - Dec 2020)

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Takeaways: Lessons Learned

1. Increase Cooling for Upstairs Comfort	2. Improve Insulation for Mechanical Exhaust	3. Increase Feasibility for Solar Install
Insufficient A/C to cool upstairs rooms in multi-level units, esp. south-facing windows with extra solar gain.	Minimal mechanical system run-time leads to exhaust freeze ups in extreme cold or wind.	Rental cases makes this more difficult; unable to do sub-metering for solar generation & separate arrays required for separate panels.
Current solution: *Exterior sun shades install.*	***Current solution:*** *Insulated with Tees & 90s.*	***Current solution:*** *Panels rarely installed.*

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What's Next? Replicating Multi-Family with Modular

Streamline Approvals for Modular MURBs

Municipal policies do not recognize factory certification for volumetric modular MURBS.

Proposed solution:

Municipalities interested in accelerating housing starts can recognize factory certification for modular MURBs.

FOLLOW ALONG:
www.bigblockconstruction.ca

WORK WITH US:
hello@bigblockconstruction.ca

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avalon
MASTER BUILDER

Neil Hawkins
Development Manager,
Avalon Master Builder

Cooper Le
Energy Advisor
4 Elements Integrated Design

2024 Net Zero Leadership Summit

CHBA Net Zero Home MURB Pilot - Avalon

Avalon Master Builder

June 2024

NET ZERO READY MURBS

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MASTER BUILDER

PROJECT LOCATION: Calgary, AB

NET ZERO ENERGY ADVISOR: Cooper Le, 4 Elements

 # NET ZERO UNITS: 8

 # NET ZERO READY UNITS: 8

CLIMATE ZONE: 7a

STATUS: Occupied 2021

OWNERSHIP TYPE: Condo

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PROFILE #2

NET ZERO

MULTI-UNIT RESIDENTIAL BUILDING

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8 units Net Zero &
8 units Net Zero Ready

BUILDER Avalon Master Builder

Energy Advisor Cooper Le, 4 Elements Integrated Design

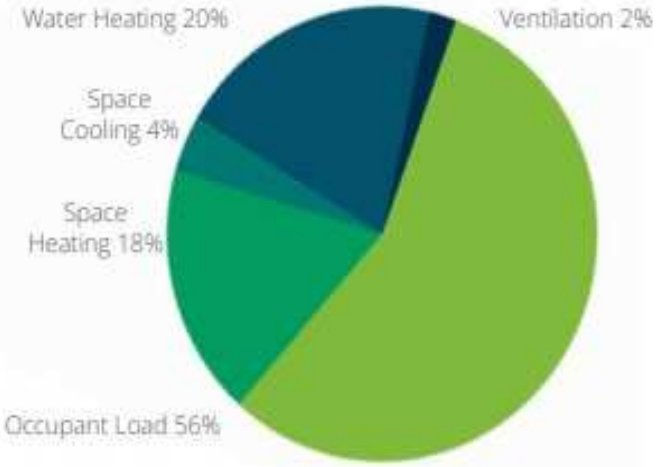
Location Calgary, AB (Climate zone 7a)

Code-Built MURB:
661 GJ/yr

This MURB:
436 GJ/yr

This MURB with installed Renewables:
207 GJ/yr

Modelled Energy Use Breakdown



Energy modelling results are from HOT2000 Version 11.11.
The total modelled operational GHG emissions are 46.4 tonnes/CO_2e/yr.

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PROFILE #2

BUILDING ENCLOSURE

Windows:
Triple glazed, Low e
Walls:
R22 batt + R7.5 rigid foam
Ceiling:
R60 blown-in
Foundation:
R20 batt + R10 rigid foam
R15 foam under slab
Airtightness:
1.4 ACH@50 (on avg.)
Envelope:
64% better than NRCan ref (on avg.)

MECHANICALS

Fuel Source:
All-electric
Heating & Cooling:
NZ Upper units: ccASHP + electric resistance backup
NZr Lower units: Electric baseboards
Water Heating:
NZ Upper units: Heat pump
NZr Lower units: Electric tank
Ventilation:
Lifebreath HRVs

OTHER FEATURES

Units:
16 total
1, 2, and 3 bdrm units
Prefabrication Approach:
Off-site prefab framing
Labelling Approach:
Individual unit
Common Area:
N/A
Building Ownership:
Freehold

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"Avalon's Net Zero homes in Zen Sequel have proven that the cost of financing net zero and the utility savings associated with a net zero home have finally come to intersect. Zen Sequel homeowners live in healthier, more comfortable, and quieter homes for the same monthly cost, averaged over the year, as non net zero homes."

– Chris Williams , Vice President

For more information on the Net Zero MURBs initiative visit www.chba.ca/NZMURBS

CHBA NZE MURB Pilot

Avalon ZEN Sequel

3.6 acre, 8 building, 124 unit stacked townhome community

One building of 16 units is designated as Net Zero

Condominium Units will be for purchase

Upper 3 level, 1380sqft and 1740sqft – Downsizers and Families
Lower 1 level, 520sqft and 670sqft – Singles and Investors

zenbyavalon.com/zen-sequel
338 Seton Close SE
Calgary, Alberta, Canada

Avalon NZE MURB Pilot

Energy Reducing Economics

	GJ Savings	$$ per GJ
Space Heating - Air Source Heat Pump	14.0	$482.86
Heat Pump Hot Water Tank	6.0	$367.35
Drain Water Heat Recovery	1.1	$654.55
Aerobarrier - from 2.5 ACH to 0.7 ACH	4.5	$555.56
Windows – Double to Triple	4.3	$373.61
Solar Panels (PV)	28.2	$404.49

Lessons Learned

Different and Affordable

- Learned to Think/Talk/Do Different – Is it an HRV or **a Fresh Air System**? Is it R-Values, GJs and window panes or **Comfort, Health, and Durability**. Do different is the biggest challenge.

- Learned the **<u>Increase in Mortgage Equalled the Utility Savings</u>** Averaged Over the Year

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avalon | 411

Lessons Learned

Electrification

- What is the real peak load?
  - 4.7 or 8.3 or 12.5 KVA of transformer capacity/unit
- Should Net Zero Envelope Resiliency change load calcs?
- Do utilities know where we are headed as a Building Industry?

Avalon NZE MURB Pilot

Stats…

Unit	Unit Type	Label	Energy Use (GJ/a) Envelope Improvement	Consumption	Generation	Reference	Consumption %LTR	Total %LTR	NBC 2020 (AE) Tier Overall Improvement	Heat Loss Reduction	Carbon Emissions (tCO_2e) Proposed	Reference	Carbon %LTR
20557	Lower	NZE Ready	65.2%	28	0	35	20%	20%	4	5	4.5	5.5	19%
20561	Lower	NZE Ready	82.8%	25	0	28	11%	11%	3	4	4.0	4.4	10%
20563	Lower	NZE Ready	82.8%	25	0	28	11%	11%	3	4	4.0	4.4	10%
20569	Lower	NZE Ready	82.8%	25	0	28	11%	11%	3	4	4.0	4.4	10%
20571	Lower	NZE Ready	82.8%	25	0	28	11%	11%	3	4	4.0	4.4	10%
20577	Lower	NZE Ready	82.8%	25	0	28	11%	11%	3	4	4.0	4.4	10%
20579	Lower	NZE Ready	82.8%	25	0	28	11%	11%	3	4	4.0	4.4	10%
20583	Lower	NZE Ready	57.5%	30	0	35	17%	17%	4	5	4.5	5.5	18%
20555	Upper	NZE	33.2%	35	40	65	46%	108%	4	4	-0.8	10.4	107%
20559	Upper	NZE	55.6%	26	31	49	47%	110%	5	4	-0.7	7.8	112%
20565	Upper	NZE	55.6%	28	31	49	43%	106%	4	4	-0.6	7.8	107%
20567	Upper	NZE	55.6%	26	31	49	47%	110%	5	4	-0.7	7.8	109%
20573	Upper	NZE	55.6%	27	31	49	45%	108%	4	4	-0.6	7.8	108%
20575	Upper	NZE	55.6%	27	31	49	45%	108%	4	4	-0.6	7.8	108%
20581	Upper	NZE	55.6%	27	31	49	45%	108%	4	4	-0.6	7.8	108%
20585	Upper	NZE	36.8%	31	44	64	52%	120%	5	4	-1.9	10.4	118%

- Lower Units Envelope Improvement Ranged from 37% to 83% - Lower Units averaged 77% and Upper 50%
- Only Uppers had dedicated solar, and we totaled 434 GJs of consumption and 270 GJs of Generation (62% of Load Covered)
- 13% better than reference on the lowers (Alternative Path), 46% better on uppers (110% with solar)
- All units met tier 4 performance of the upcoming NBC 2020 code, with a couple units meeting tier 5
- Emissions savings 12% on lowers and 110% on uppers

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Thank you!

Chris Williams
cwilliams@avalonhomes.com

avalonhomes.com

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LANDMARK HOMES

it's what's inside

Haitao Yu
R&D Director
Landmark Group

Cooper Le
Energy Advisor
4 Elements Integrated Design

NET ZERO READY MURBS

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LANDMARK HOMES
it's what's inside

PROJECT LOCATION: Edmonton, AB

NET ZERO ENERGY ADVISOR: Cooper Le, 4 Elements

 # NET ZERO UNITS: 11

CLIMATE ZONE: 7a

STATUS: Occupied 2022

OWNERSHIP TYPE: Rental

LANDMARK HOMES

it's what's inside

PROFILE #3

NET ZERO

MULTI-UNIT RESIDENTIAL BUILDING

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BUILDER Landmark Homes

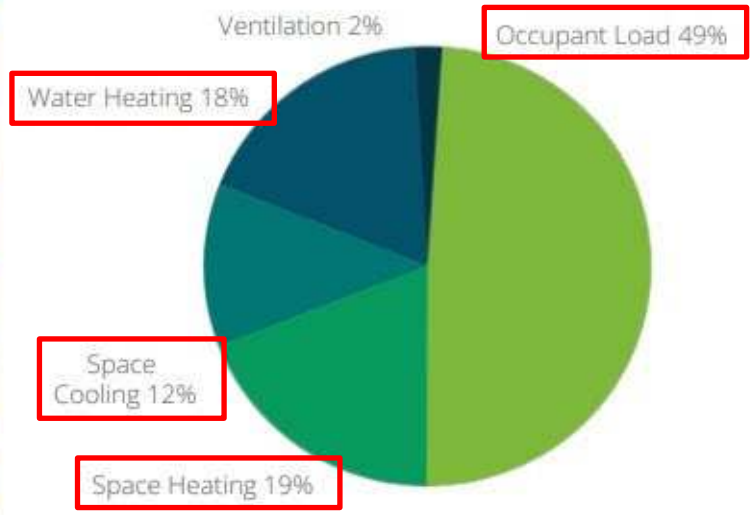
Energy Advisor Cooper Le, 4 Elements Integrated Design

Location Edmonton, AB (Climate Zone, 7a)

Code-Built MURB:
776 GJ/yr

This MURB:
486 GJ/yr

Modelled Energy Use Breakdown



Energy Modelling results are from HOT2000 Version 11.11. The Modelled Energy Use Breakdown above is based on an average of the 11 units.

Percentage Improvement:
Townhomes: 46% | Stack units: 47%

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PROFILE #3

BUILDING ENCLOSURE

Windows:
Triple Glazed, Low-e argon
Walls:
2x6 24"O.C, R22 batt + R5 XPS
Ceiling:
R-60 Blown Cellulose
Foundation:
Slab-on-grade, R-8 under slab
Airtightness:
1.90-2.84 ACH@50
Envelope:
58% better than NRCan ref (avg.)

LANDMARK HOMES
it's what's inside

MECHANICALS

Fuel Source:
Middle units: Dual-fuel
End units: All-electric
Heating & Cooling:
Middle units: Hi-Velocity ASHP + Fan Coil
End units: Tosot Ductless Minisplit + Baseboards
Water Heating:
Middle units: Navien Tankless Water Heater
End units: AO Smith Heat Pump Water Heater
Ventilation:
Fantech HRVs

OTHER FEATURES

Units:
11 total
7 – three storey middle units
4 – stacked end units
Prefabrication Approach:
Off-site panelized
Labelling Approach:
Middle units (7): row homes
Stacked end units (4): single unit MURBs
Common Area:
N/A
Building Ownership:
Rental Units

For more information on the Net Zero MURBs initiative visit www.chba.ca/NZMURBS

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PROFILE #3

BUILDING ENCLOSURE

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Triple Glazed, Low-e argon
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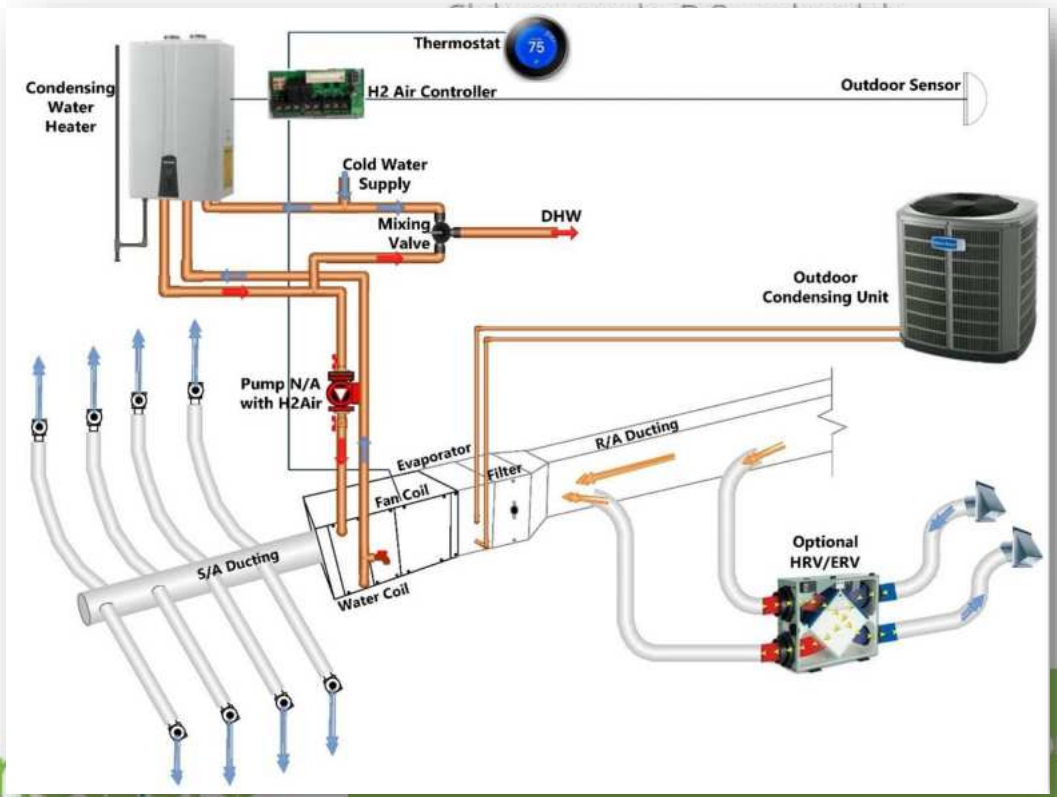
Ceiling:
R-60 Blown Cellulose
Foundation:



MECHANICALS

Fuel Source:
Middle units: Dual-fuel
End units: All-electric
Heating & Cooling:
Middle units: Hi-Velocity ASHP + Fan Coil
End units: Tosot Ductless Minisplit + Baseboards
Water Heating:
Middle units: Navien Tankless Water Heater
End units: AO Smith Heat Pump Water Heater
Ventilation:
Fantech HRVs

OTHER FEATURES

Units:
11 total
7 – three storey middle units
4 – stacked end units
Prefabrication Approach:
Off-site panelized
Labelling Approach:
Middle units (7): row homes
Stacked end units (4): single unit MURBs
Common Area:
N/A
Building Ownership:
Rental Units

Net Zero Ready vs. Net Zero:
- Utility costs of homeowners
- Grid carbon intensity

n the Net Zero MURBs initiative visit www.chba.ca/NZMURBS

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PROFILE #3

BUILDING ENCLOSURE

Windows:
Triple Glazed, Low-e argon
Walls:
2x6 24"O.C, R22 batt + R5 XPS
Ceiling:
R-60 Blown Cellulose
Foundation:
Slab-on-grade, R-8 under slab
Airtightness:
1.90-2.84 ACH@50
Envelope:
58% better than NRCan ref (avg.)

LANDMARK HOMES
it's what's inside

MECHANICALS

Fuel Source:
Middle units: Dual-fuel
End units: All-electric
Heating & Cooling:
Middle units: Hi-Velocity ASHP + Fan Coil
End units: Tosot Ductless Minisplit + Baseboards
Water Heating:
Middle units: Navien Tankless Water Heater
End units: AO Smith Heat Pump Water Heater
Ventilation:
Fantech HRVs

OTHER FEATURES

Units:
11 total
7 – three storey middle units
4 – stacked end units
Prefabrication Approach:
Off-site panelized
Labelling Approach:
Middle units (7): row homes
Stacked end units (4): single unit MURBs
Common Area:
N/A
Building Ownership:
Rental Units

For more information on the Net Zero MURBs initiative visit www.chba.ca/NZMURBS

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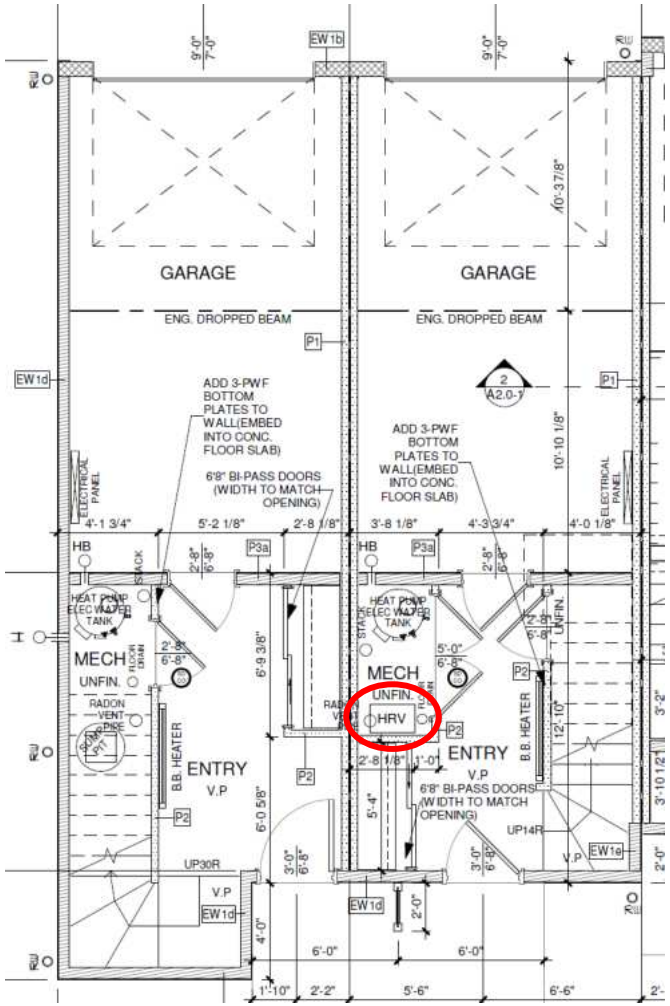
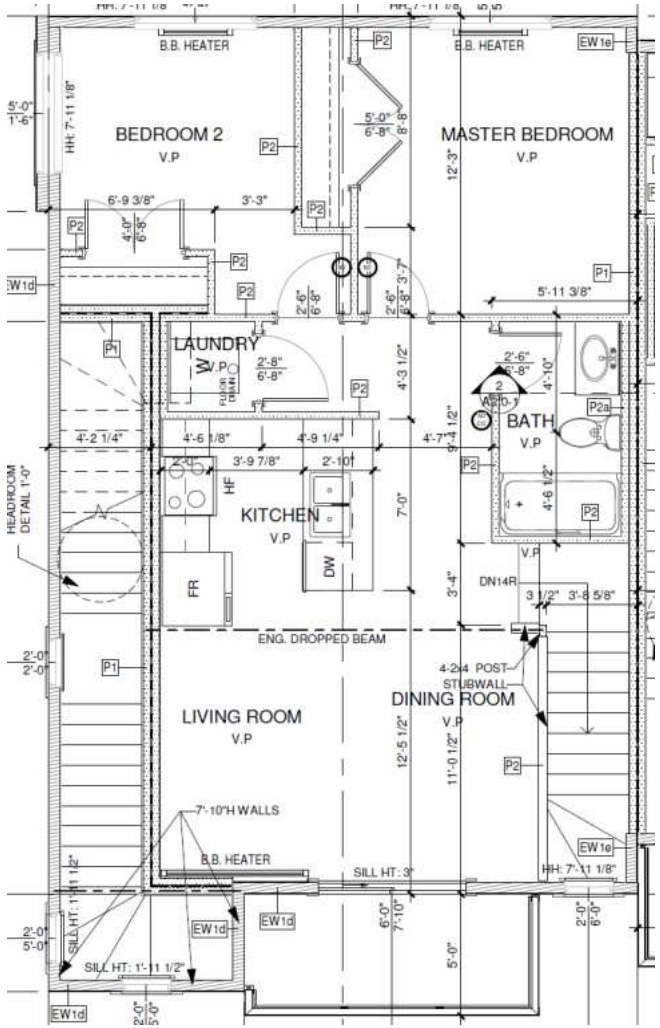
LANDMARK HOMES
it's what's inside

Lessons Learned:
Air-tightness of Lower Stacked Units





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ZIRNHELT
TIMBER FRAMES

Sam Zirnhelt
President
Zirnhelt Timber Frames

Gilles Lesage
Energy Advisor
Total Home Solutions

NET ZERO READY MURBS

Affordable, Replicable and Marketable

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ZIRNHELT TIMBER FRAMES

PROJECT LOCATION: Williams Lake First Nation, BC

NET ZERO ENERGY ADVISOR: Gilles Lesage, Total Home Solutions Inc.

 # NET ZERO UNITS: 2

CLIMATE ZONE: 6

STATUS: Occupied Fall 2022

OWNERSHIP TYPE: Rental

ZIRNHELT
Timber Frames

NET ZERO
MULTI-UNIT RESIDENTIAL BUILDING

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PROFILE #4

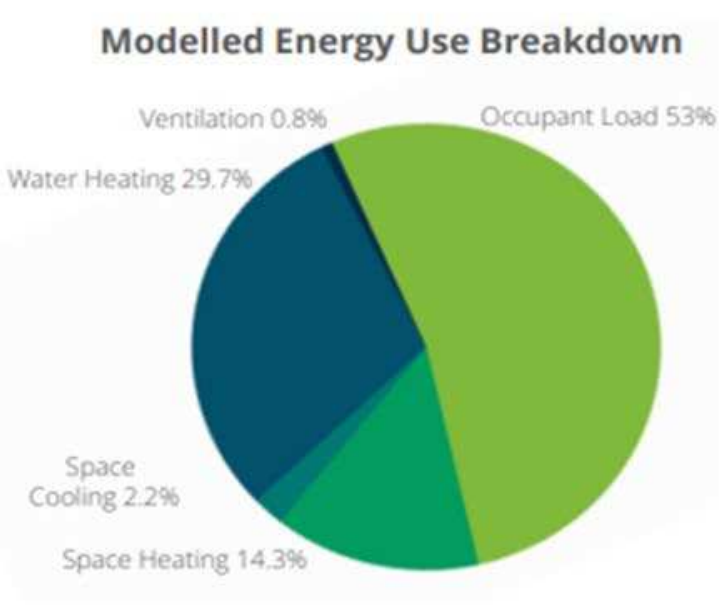
BUILDER Zirnhelt Timber Frames

Energy Advisor Gilles Lesage, Total Home Solutions

Location Williams Lake, BC (climate zone 6)

Code-Built MURB:
79 GJ/yr

This MURB:
57 GJ/yr



Energy modelling results are from HOT2000 Version 11.11.
The total modelled operational GHG emissions are 0.0 tonnes/CO_2e/yr.

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PROFILE #4

BUILDING ENCLOSURE

Windows:
Triple dual, Low e 270
Walls:
2x8" R28 blown in + R8 Roxul exterior insulation
Ceiling:
R46 Expanded Polystyrene (EPS)
Foundation:
R28 ICF
R12.5 foam under slab
Airtightness:
0.57 ACH@50
Envelope:
66% better than NRCan ref

MECHANICALS

Fuel Source:
All-Electric
Heating & Cooling:
Mini-split ASHP,
Electric baseboards
Water Heating:
Electric Tank
Ventilation:
VanEE HRV

OTHER FEATURES

Units:
2 total, (1 bedroom units)
Prefabrication Approach:
Off-site panelized
Labelling Approach:
Whole Building
Common Area:
N/A
Building Ownership:
Rental Building

ZIRNHELT
TIMBER FRAMES

For more information on the Net Zero MURBs initiative visit www.chba.ca/NZMURBS

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DESIGN, IDP & CONSTRUCTION

- Consistency with detailing from design phase
- Integrated Design Process (IDP) is key
- Trade coordination must be planned
- As GC and manufacturer, training, trades education and experience key to making these projects work
- Custom design with MURBs

ZIRNHELT TIMBER FRAMES

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ENERGY ADVISOR & MECHANICAL DESIGN

ZIRNHELT TIMBER FRAMES

- Efficiency achieved comparable to Tier 4/5 of New NBC 2020 9.36
- OPERATIONAL Carbon reduction vs code Annual reduction per unit.
- **Challenge:** Mechanical design capacity for smaller scale solutions
- **Challenge:** Climate proofing from -50 to +50 Celsius
- **Challenge:** Back up heat – overcoming installation assumptions on primary heat versus augmenting & dual source for remote locations (e.g. power outages)
- **Challenge:** Grid tie vs. diesel generated grids & unmonitored grids

CLIENT RELATIONSHIPS & EXPERIENCES

- Future proofing a home requires more thought, material selection, detailing & quality control = some (short to mid-term) cost added
- Educating owners - value proposition
- **Challenge:** For owners and builders alike - inconsistency around incentives - both utilities and governments
- **Challenge:** Messaging from industry, government & utilities needs consistency; dealing with impacts of rumours around the grid capacity with EVs
- **Challenge:** Lack of consistent information with rapid evolution of technologies (e.g. heat pumps, solar, storage, load mgt) and building code changes

NET ZERO PROJECT – WHAT'S NEXT

- Improvements (comfort, durability, energy efficiency/carbon reduction (embodied & operational), beauty/care) in our built environment (building a great home) today requires a team - EA's, designers, PMs, trades, building authorities, engineers & clients
- In our case the best results are always design-build
- We are particularly passionate about increasing the standard of housing in First Nation communities (partnerships, capacity building, education, support incl. warranty & labels

NET ZERO PROJECT – EA's Perspective

ZIRNHELT TIMBER FRAMES

- Extreme temperatures = closer monitoring/house as a system
- Base Loads and their effect on MURB units
- Lack of Reduced Operating Conditions for MURBs
- Variances of Solar modeling:
  - HOT2000 projections
  - Solar design projections
  - Actual real-world generation

SEAN.

Sean Mason
Founder
SEAN.ca

Angela Bustamente
Energy Advisor
Building Knowledge

NET ZERO READY MURBS

Affordable, Replicable and Marketable

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SEAN.

PROJECT LOCATION: Barrie, ON

NET ZERO ENERGY ADVISOR: Angela Bustamante, Building Knowledge Canada

 # NET ZERO READY UNITS: 8+2

CLIMATE ZONE: 6

STATUS: Occupancy 2024

OWNERSHIP TYPE: Condo

SEAN.

NET ZERO

MULTI-UNIT RESIDENTIAL BUILDING

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PROFILE #5

BUILDER SEAN.

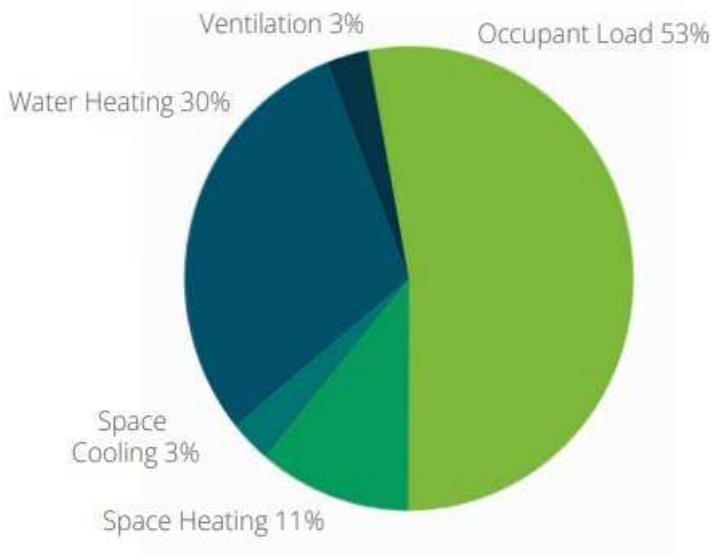
Energy Advisor Angela Bustamante, Building Knowledge Canada

Location Barrie, ON (Climate Zone 6)

Code-Built MURB:
468 GJ/yr

This MURB:
253 GJ/yr

Modelled Energy Use Breakdown



Energy modelling results are from HOT2000 version 11.11. The total modelled operational GHG emissions are 4.06 tonnes/CO2e/yr.

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PROFILE #5

BUILDING ENCLOSURE

Windows:
Inline Fibreglass, U 1.25, SHGC 0.31
Walls:
R22 batt + R5 XPS
(24"O.C on 2nd and 3rd floors)
Ceiling:
R-60 & R-31
Foundation:
Slab on grade, R-10 under slab
Airtightness:
2.0 ACH@50
Envelope:
46% better than NRCan ref (avg.)

MECHANICALS

Fuel Source:
All-Electric
Heating & Cooling:
WaterFurnace Versatec
500 Geothermal
Water Heating:
Electric Tank
Ventilation:
VanEE ERVs, 75% SRE

OTHER FEATURES

Units:
10 units
Prefabrication Approach:
Off-site wall panelization
Labelling Approach:
Single Unit
Common Area:
N/A
Building Ownership:
Condo Ownership

SEAN.

SEAN.

RAIN @ WATER 339 VETERANS

Barrie, ON

- Participated in the Enbridge Savings By Design which conducted a charette that led us through the process to push the boundaries of our conventional design targeting a minimum 20% reduction in energy use vs. OBC.
- The townhomes will be dual labelled Net Zero Ready (Performance Path) and Energy Star for New Homes (Prescriptive Path).
- In partnership with Enbridge Sustain, geothermal bore holes have been dug up to 360 feet deep to supply the towns with HVAC and hot water.
- Exterior insulation R-5, advanced window systems, low-flow water fixtures, smart home technology to control energy usage, 4.5 m concrete roads with 1.5 m of permeable paving on the downstream side, storm water infiltration chambers within the park, and EV chargers, modern xeriscaping, soak away pits and rain gardens
- OVE framing at 24" o.c. on second and third floors as appropriate, panelized off-site in our yard, including Tyvek and outboard insulation installed off-site
- Air tightness best practices to surpass the CHBA NZR target of 2.0ach/0.15 NLR , with the inclusion of Aerobarrier technology.

SEAN.

Lessons Learned:

- Struggles getting to completion
- Municipal regulations – including changes regarding secondary suites, fire separation
- Working with utilities, no gas then all electric and then all geo.
- Scaling
- Geothermal
- Transfer of information from towns to condos
- Transfer of information to next projects in Bracebridge and Brampton

SEAN.

121 WOOD WARD

Lessons Learned at Rainwater became product at 121 Woodward in Bracebridge.

FRONT ELEVATION (GARAGE SIDE)
BLOCK 2

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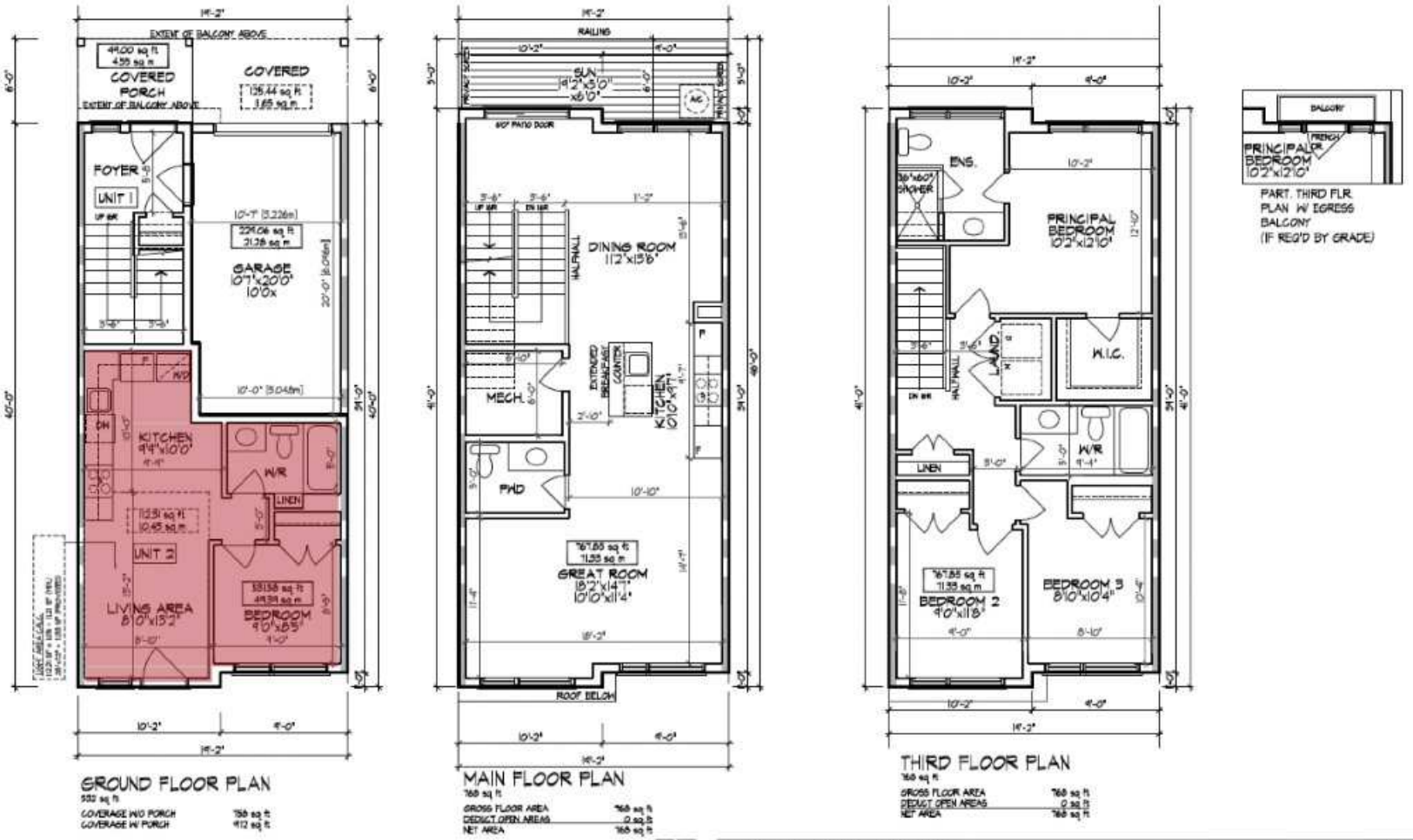
SEAN. 121 WOOD WARD



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HUNT DESIGN ASSOCIATES INC.
www.huntdesign.ca

SEAN HOMES - 222076 — **UNIT A**

BRACEBRIDGE, ONTARIO — AREA - 2005 SF

8966 Woodbine Ave, Markham, ON L3R 0J7 ■ T 905.737.5133 ■ F 905.737.7326 ■ MAR 2024 ■ VG ■ 222076DT_UNIT A

SEAN. 121 WOOD WARD

HUNT DESIGN ASSOCIATES INC.
www.huntdesign.ca

SEAN HOMES - 222076 UNIT C

BRACEBRIDGE, ONTARIO AREA - 2697 SF

8966 Woodbine Ave, Markham, ON L3R 0J7 ■ T 905.737.5133 ■ F 905.737.7326 ■ MAR 2024 ■ V0 ■ 222076DT_UNIT C

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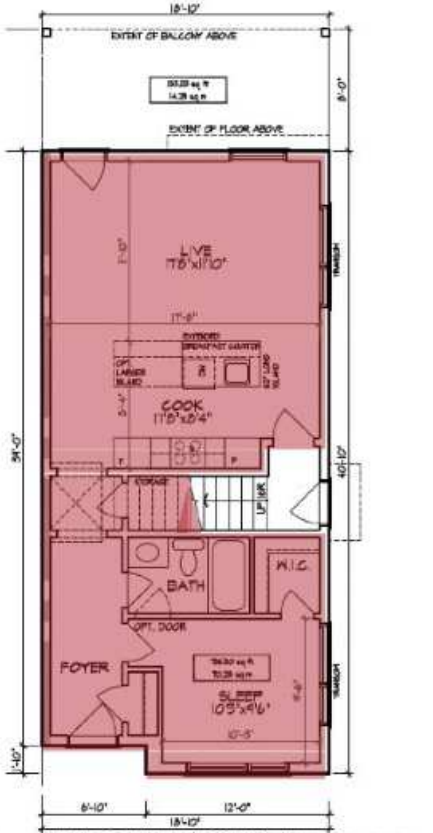
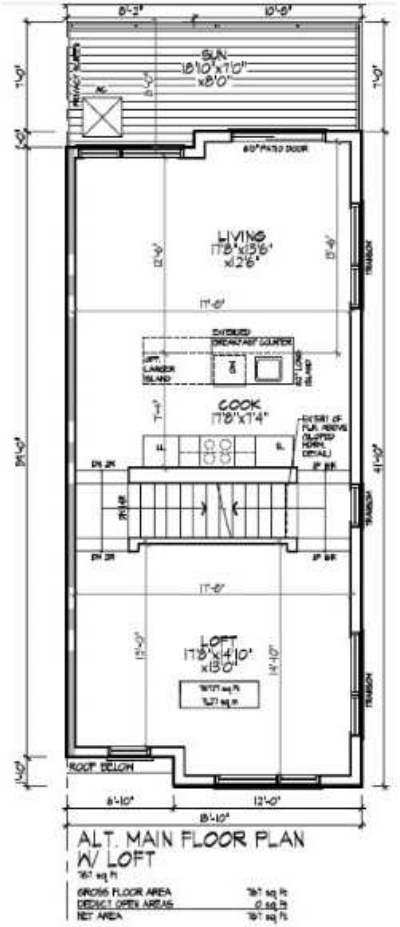
SEAN.

121 WOOD WARD

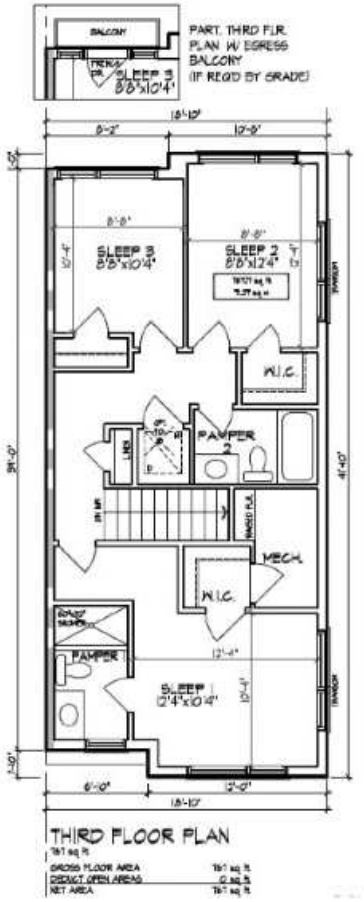


OPT. GROUND FLOOR PLAN (N LIEU OF GARAGE)
W/ SEPERATE SECONDARY SUITE



ALT. MAIN FLOOR PLAN
W/ LOFT

GROSS FLOOR AREA	787 sq ft
DEDUCT OPEN AREAS	0 sq ft
NET AREA	787 sq ft



PART. THIRD FLR.
PLAN W/ EGRESS
BALCONY
(IF REQD BY GRADE)

THIRD FLOOR PLAN
787 sq ft

GROSS FLOOR AREA	787 sq ft
DEDUCT OPEN AREAS	0 sq ft
NET AREA	787 sq ft

SEAN HOMES - 222076
BRACEBRIDGE, ONTARIO

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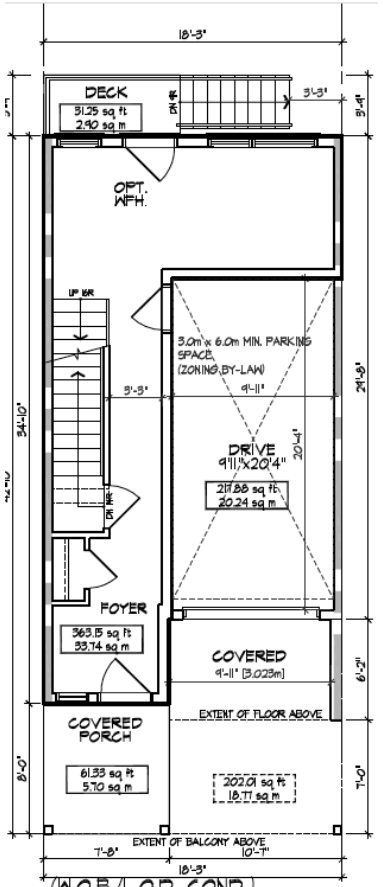
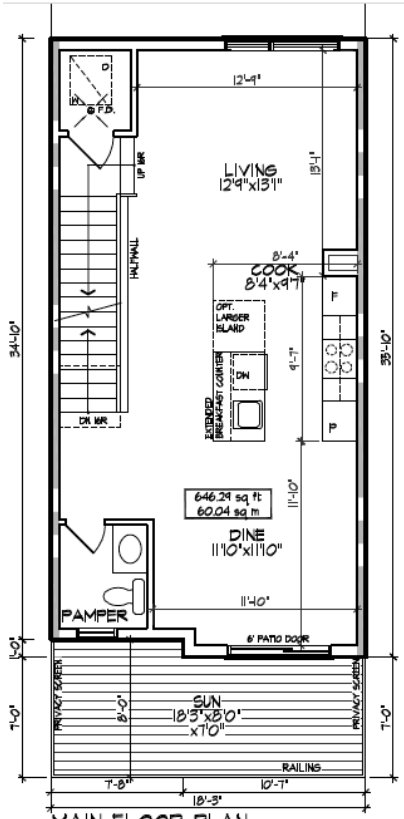
SEAN.

121 WOOD WARD



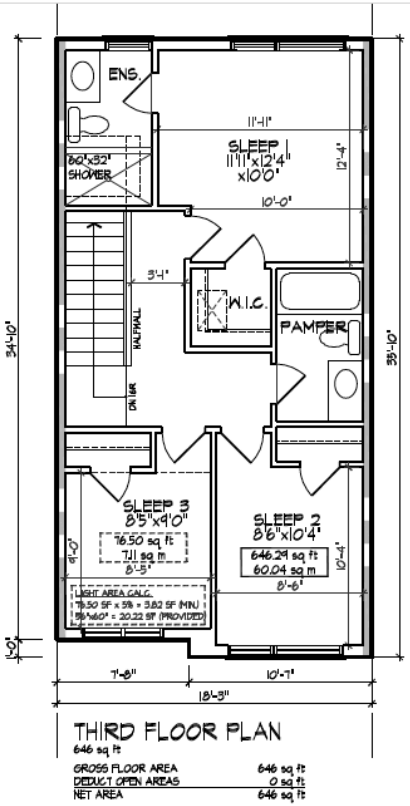
(W.O.B./L.O.D. COND.)
GROUND FLOOR PLAN
363 sq ft

COVERAGE W/O PORCH	581 sq ft
COVERAGE W/ PORCH	813 sq ft



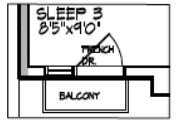
MAIN FLOOR PLAN
W/ OPT. PAMPER
646 sq ft

GROSS FLOOR AREA	646 sq ft
DEDUCT OPEN AREAS	0 sq ft
NET AREA	646 sq ft



THIRD FLOOR PLAN
646 sq ft

GROSS FLOOR AREA	646 sq ft
DEDUCT OPEN AREAS	0 sq ft
NET AREA	646 sq ft



PART. THIRD FLR.
PLAN W/ EGRESS
BALCONY
(IF REQ'D BY GRADE)

HUNT DESIGN ASSOCIATES INC.
www.huntdesign.ca

SEAN HOMES - 222076 — TH-9 (FRONT-LOAD)

BRACEBRIDGE, ONTARIO — 1655 SF

8966 Woodbine Ave, Markham, ON L3R 0J7 ■ T 905.737.5133 ■ ■ MAR 2024 ■ NZ ■ 222076DT1902

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Project Projection:

42% Total Annual Energy Consumption over the Reference House

46% Better than Reference Envelope Improvement

NBC 2020 analysis Hot2000 v11.12:

62% Overall Energy Performance
28% Envelope Performance Improvement
Tiers are not assessed for MURBs ~ estimate Tier 4/5

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SEAN.

SEAN.

RAIN WATER @ 339 VETERANS

Energy Advisor Perspective:

- Continual changes in drawings so Hot2000 needs updating which means targets change. Number of units change.
- Looking at the envelope. Original plan 2x4 struggles with the Truss manufacturer. What can we do or not. Do we hit the target for envelope?
- Geothermal – tends to have another party involved with HVAC that are used to geo modelling or Part 3 outputs in terms of air changes, etc.
- Building Code potential changes through the project that could impact the EEDS/BOPS.
- The impact of the window selection.
- How everything ties in every time there is a change. E.g. windows SHGC could impact geo design.
- In the background always thinking about how the homes will actually be labelled technically as Energy Star, EnerGuide through NRCan's protocols and then CHBA's as well.


CANADIAN HOME BUILDERS' ASSOCIATION
netzero home
LEADERSHIPSUMMIT
Questions?

DOUG TARRY HOMES

Marie Hanchet

bigBLOCK building communities at full throttle

LANDMARK HOMES it's what's inside

ZIRNHELT TIMBER FRAMES

avalon MASTER BUILDER

SEAN.

CANADIAN HOME BUILDERS' ASSOCIATION
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LEADERSHIP SUMMIT

Networking Break

in the Demo Hub. (Whistler Ballroom)
Be back by 10:45 am.