

Net Zero Ready OR Passive House - a Builder's Point of View

Spring Training for Advanced Building Science and Practical Application 2019

Arthur Lo
Insightful Healthy Homes Inc.

April 15, 2019



Zen House in North Shore



Two storey, 5378 sq. ft. home with full basement which includes a self-contained secondary suite, and an attached garage, Completed Feb 2018

12 out of 36 (full net zero) PV panels installed and fully pre-wired for future PV upgrade

On site battery storage for resiliency

CHBA Net Zero Ready labelled

EnerGuide rating: 36GJ



Passive Houses at W44



- Two storey 3331 sq.ft.home with full basement, contemporary design, to be completed in May 2019
- Heating demand 7 kWh/(m²yr)
- Heating load 6 W/m²
- Aimed for Passive House certification



Exterior Wall



- 1/2" drywall with VB paint
- 2x6 @24" oc pre-fab stud wall, 3/4" plywood,
- R22 batt,
- fully taped house wrap (Tyvek Commercial) as AB,
- 3" Roxul,
- rain screen, stucco
- R eff. = 28



Material cost only
 VB paint, \$0.1/sq.ft.
 2x6, \$650 Mbf
 Tyvek, \$0.2/sq.ft
 3" Roxul, \$2.66/sq.ft

Sum: \$3.29/sq.ft



Exterior Wall



(pending)

- vapour control layer (SIGA Majrex) (one direction moisture flow), 1/2" drywall,
- 2x8 @ 24" stud wall, R22 batt, 1/2" wall sheathing
- Self adhesive WRB (Delta Vent SA)
- 4" Roxul
- Metal cladding

Material cost only

SIGA Majrex, \$0.6/sq.ft.

2x8, \$650 Mbf

Delta Vent SA, \$1.1/sq.ft

4" Roxul, \$3.54/sq.ft

Sum: \$5.67/sq.ft



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Foundation Wall and Base Slab



Foundation wall

- 3 1/2" thick 8" conc icf wall
- SA waterproofing membrane (taped to footing forming membrane)
- Protection layer



Base Slab

- Strip footing formed by waterproofing membrane
- 4" EPS under slab
- 6 mil poly under slab (taped to footing forming membrane)



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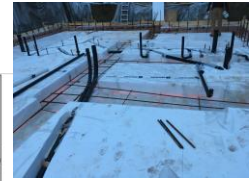
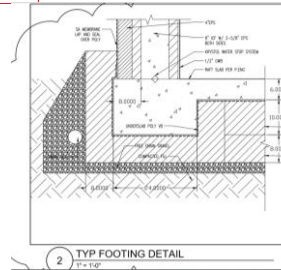
Foundation Wall and Slab



(pending)

Foundation Wall

- 2.25" thick 8" conc icf wall
- Self adhesive waterproofing membrane
- 4" EPS



Base Slab

- Raft slab construction
- 8" HD EPS under footings
- 10" HD EPS under slab
- 15 mil poly under footing and slab



Windows



- Vinyl frame
- Tilt and Turn
- Triple glazed
- Low E
- Argon infill

Manufacturer claimed U value: 1.02

Approx. \$76.7/sq.ft. + GST



Windows



(pending)

- Interior wood in finger jointed pine
- Aluminum clad exterior
- Tilt and Turn
- Enhanced warm edge spacer (Swisspacer)
- Triple glazed
- Low E
- Argon infill



Supplier claimed insulation value:
 $U_w < 0,8 \text{ W/m}^2\text{K}$
 $R \text{ value} = 7.1$

Approx. \$103/sq.ft +GST (shipping NOT included)



Air Seal and Test



Customer:	Arthur Lo c/o Richard Kadulski 204-1037 West Broadway Vancouver, BC V6H 1E3
Building volume:	47,329 cu ft
Building Height (from ground to top):	0
Floor Area:	0
Envelope Area:	9,305 sq ft



Results	
Corrected flow at 50 Pa, [CFM]	528.5
Air changes per hour at 50 Pa [1/h]:	0.67
Corrected flow at 10 Pa, [CFM]	160.5
Equivalent leakage area at 10 Pa [sq in]	46.70
Effective leakage area at 4 Pa [sq in]	22.75
Permeability at 50 Pa, [CFM/sq ft]	0.057
Specific Leakage Rate at 50 Pa, [sq in/sq ft]	0
Normalized Leakage Area [sq in / sq ft]:	0.00500



Air Seal and Test



(pending)

Both de-pressurue and pressure tests are conducted and their average is the final result

Pre drywall test result: 0.39



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Ventilation



- VanEE G3000H ECM
- Supply duct integrated with forced air distribution system
- Push grilles at bathrooms



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Ventilation (pending)

- Zehdner ComfoAir 550 HRV
- 3" flexible duct to all supply and exhaust grilles

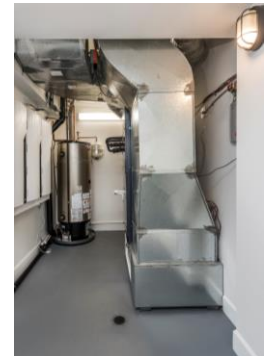


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Heating (Air-conditioning) The ultimate in comfort and efficiency

- Mitsubishi ZUBA heat pump
- Forced air distribution ducting system
- Air-conditioning available in summer



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Heating (Air-conditioning)



(pending)

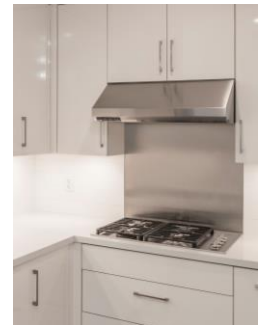
Only electrical base boards in habitat rooms

Rough-in for heat pump for future (if find required)

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Hood Fan



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Hood Fan  (pending)



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Update on the LBC Home in Vancouver



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Thanks

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