A MID-CENTURY GEM GOES NET POSITIVE

Loom House

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Image Source: Redfin

Image Source: Redfin

Image Source: Redfin

Image Source: Redfin

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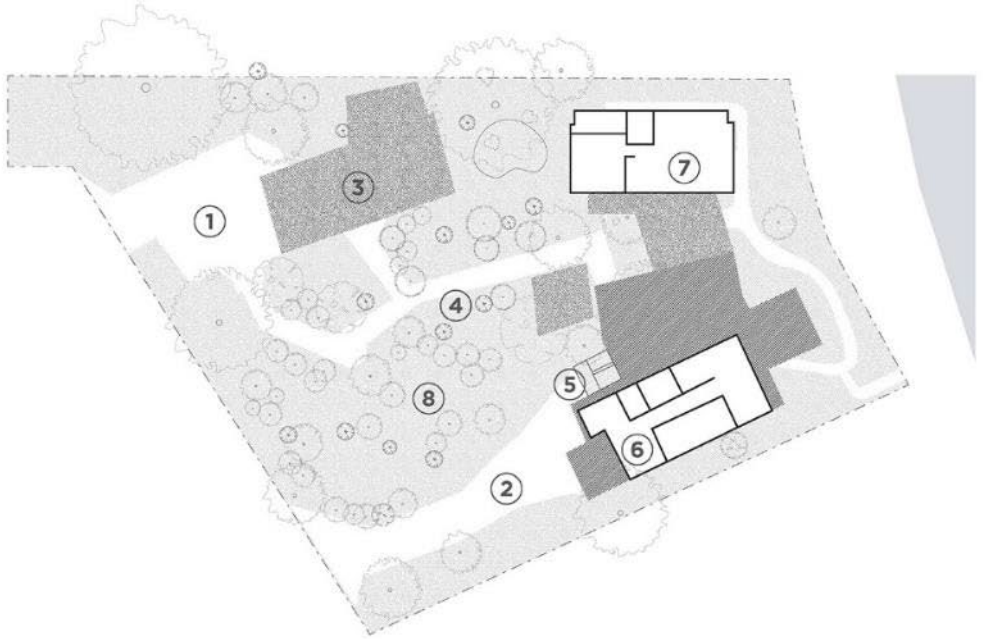
1968 / BEFORE

The existing site consisted of an ornamental garden, 100+ year old mature fir trees, and two existing dwellings designed by a renowned Pacific Northwest Architect, Hal Moldstad.

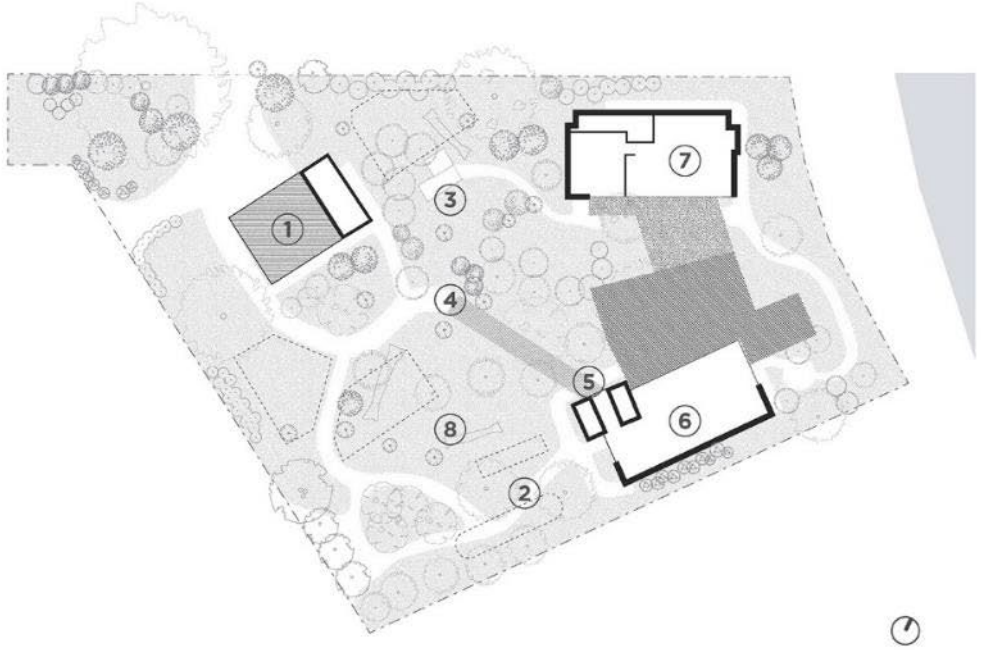
1. GRAVEL PARKING PAD
2. GRAVEL DRIVEWAY
3. ASPHALT SPORT COURT
4. UNDEFINED ENTRANCE
5. EXTERIOR STAIR
6. ISOLATED ROOMS
7. BILLIARDS ROOM
8. ORNAMENTAL GARDEN



CURRENT / AFTER

The new site plan incorporates several sustainability strategies within the existing landscape. The renovation of the existing dwellings improved the interior spaces while maintaining the original spirit of the architecture.

1. CARPORT / BIKE STORAGE
2. BELOW GRADE CISTERN
3. RESTORED GARDEN / ON SITE WATER TREATMENT
4. GATEWAY TREES FOR ENTRY BRIDGE
5. ENTRY BOX
6. MAIN HOUSE OPEN FLOOR PLAN
7. HOME OFFICE
8. MYCOLOGICAL FORAGING FOREST



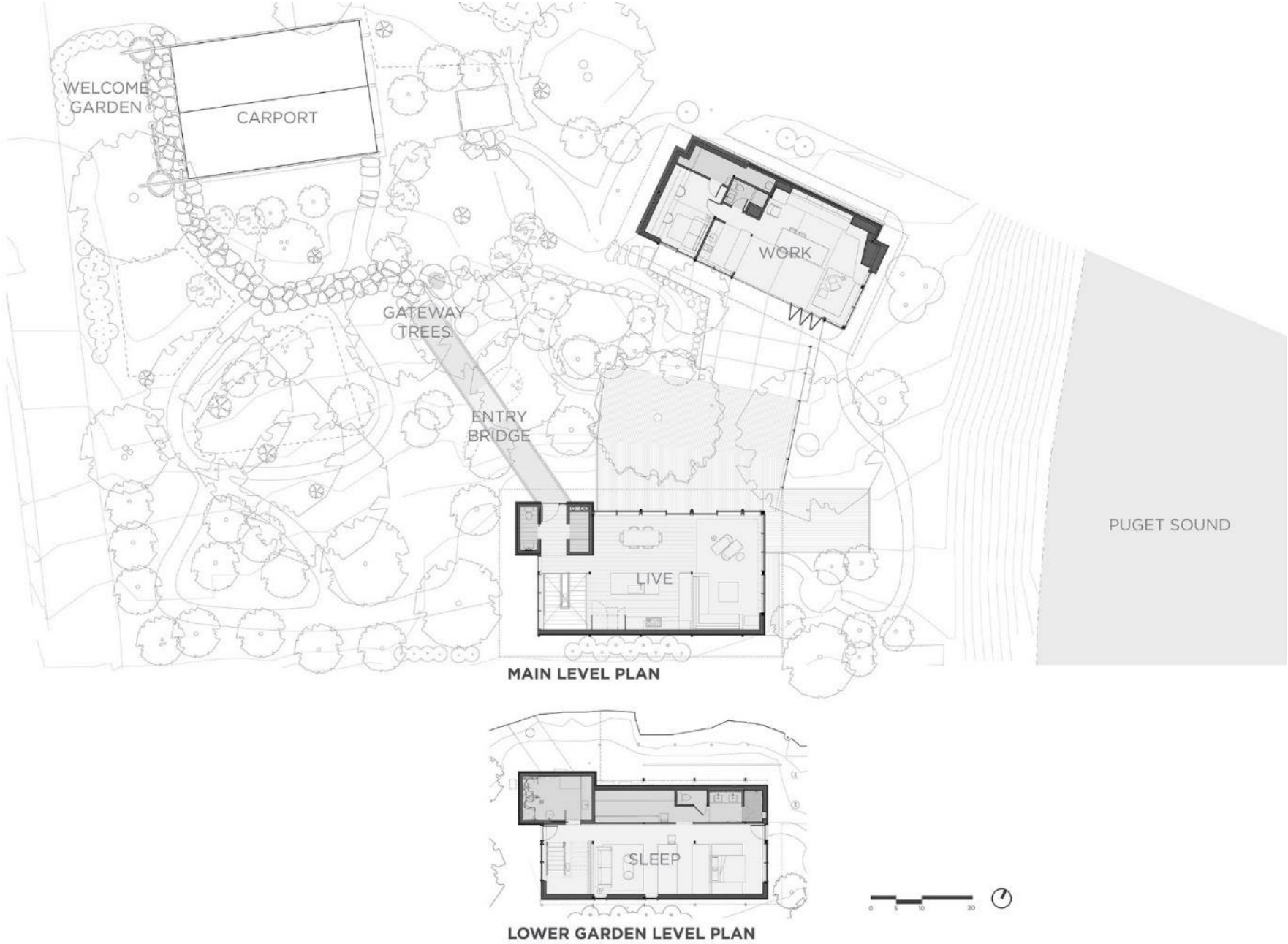

WELCOME GARDEN
CARPORT
WORK
GATEWAY TREES
ENTRY BRIDGE
LIVE
PUGET SOUND
MAIN LEVEL PLAN
SLEEP
LOWER GARDEN LEVEL PLAN

Image Source: Ben Schauland

STRATEGY

LIVING BUILDING CHALLENGE

SHARE WITH OTHERS

THE METAPHOR OF THE FLOWER

ROOTED IN PLACE AND YET:

Harvests all energy + water

Is adapted to climate and site

Operates pollution free

Is comprised of integrated systems

Is beautiful

LIVING BUILDING CHALLENGE℠

WHY LBC?

1. **Holistic:** The Challenge includes areas of equity, beauty and health in addition to traditional sustainability criteria such as energy, water and materials

2. **Measured by Outcomes**: The outcomes are more important than a prescriptive checklist.

3. **Validated by Performance:** The team must provide the project performance over a one-year period.

4. **Guide Collective Advocacy:** The challenge is designed to shift the market, to spur change within its time frame, and to create a path for future change.

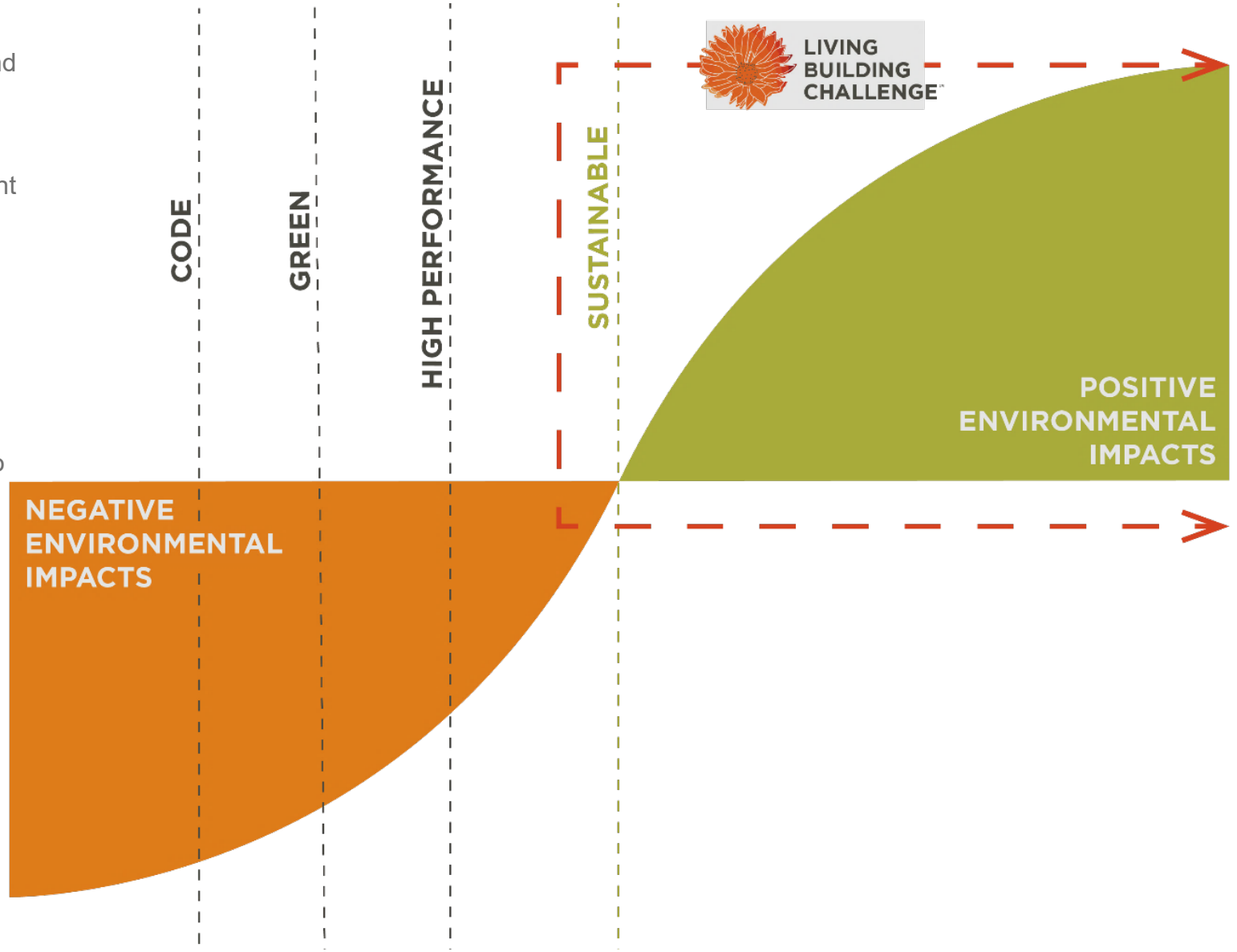
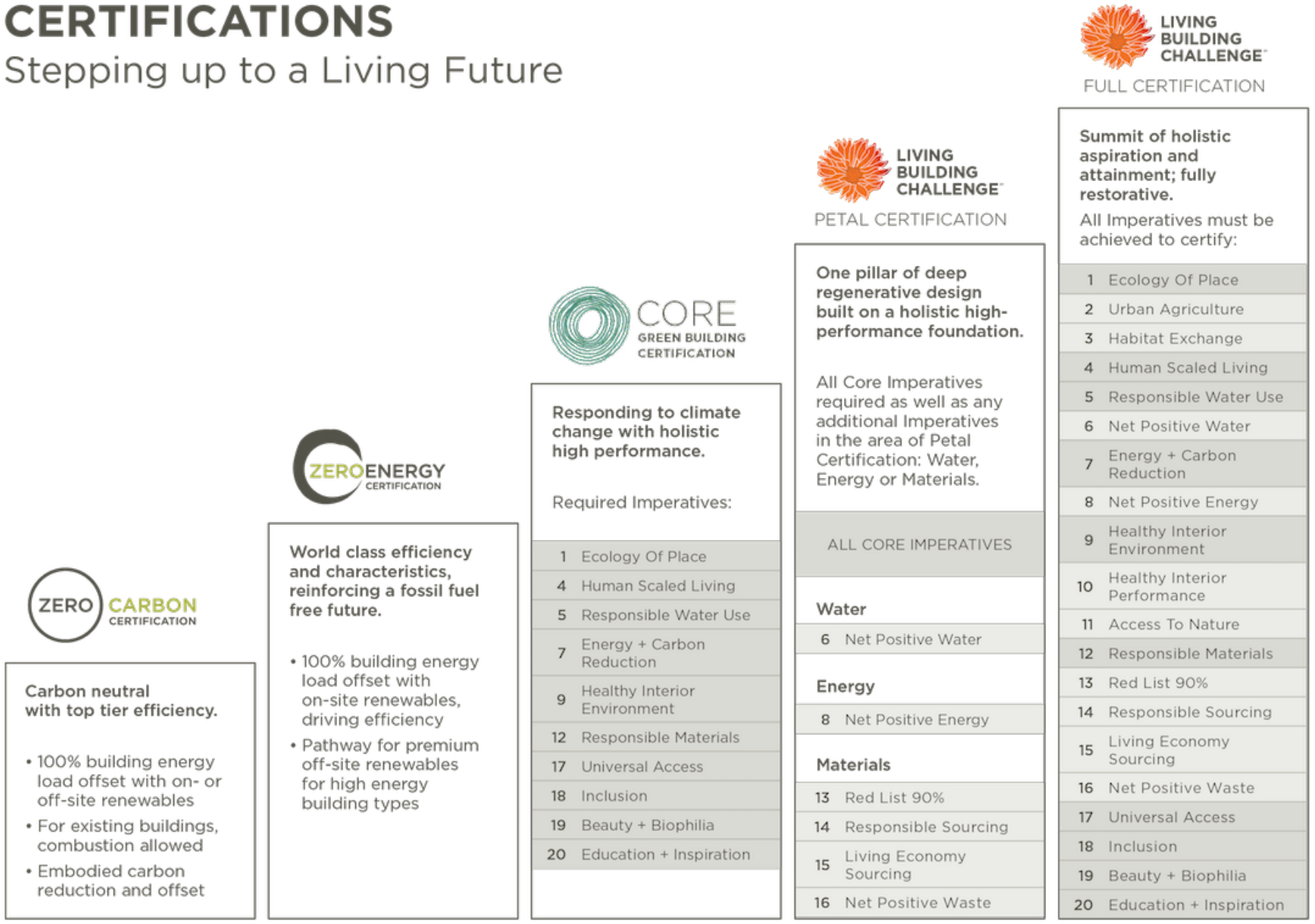


Image Source: International Living Future Institute, LBC v4.0

CERTIFICATIONS

Stepping up to a Living Future



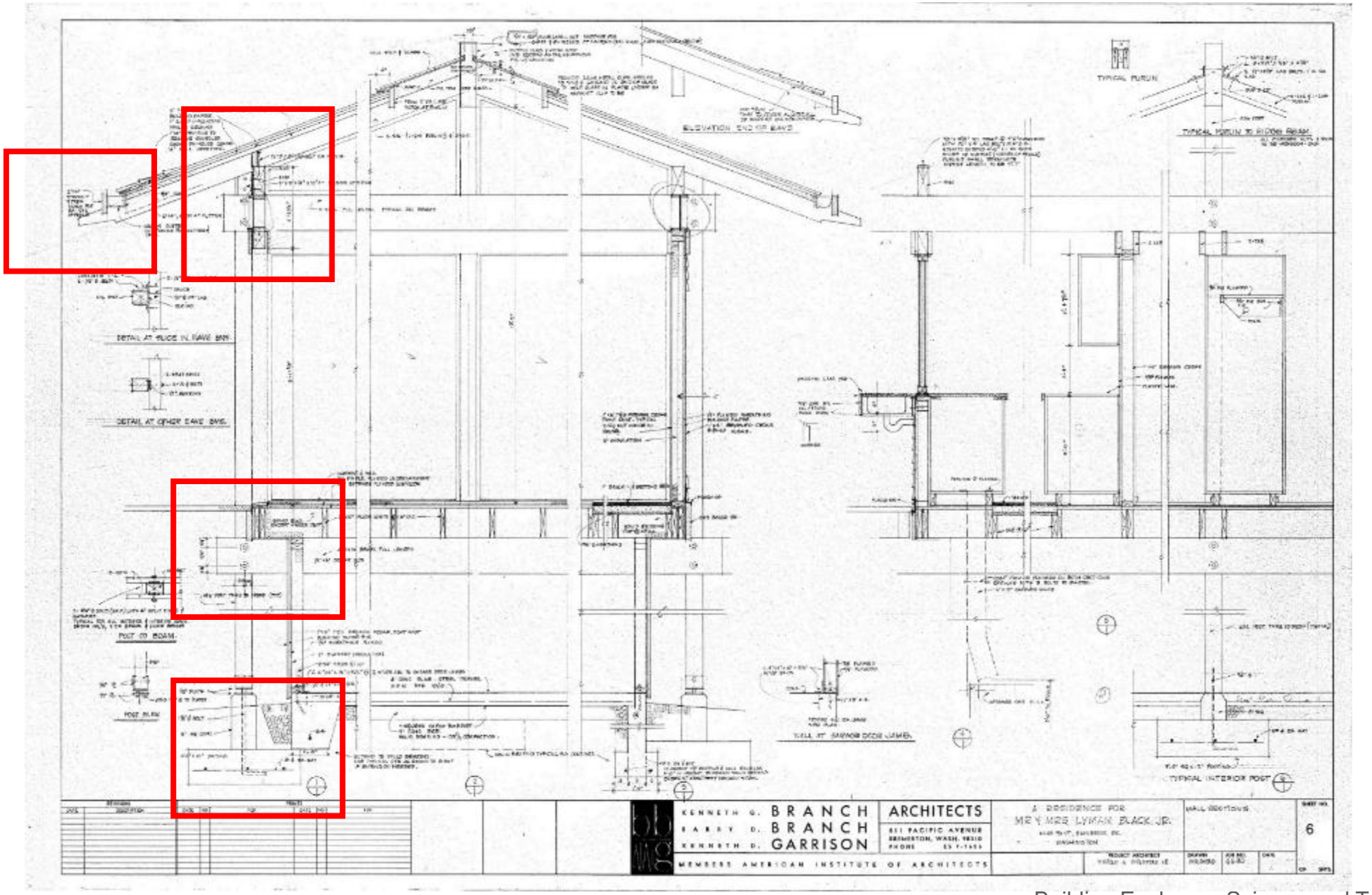
TYPICAL RESIDENTIAL MODEL

Existing house | Demolish | New construction

LOOM HOUSE MODEL

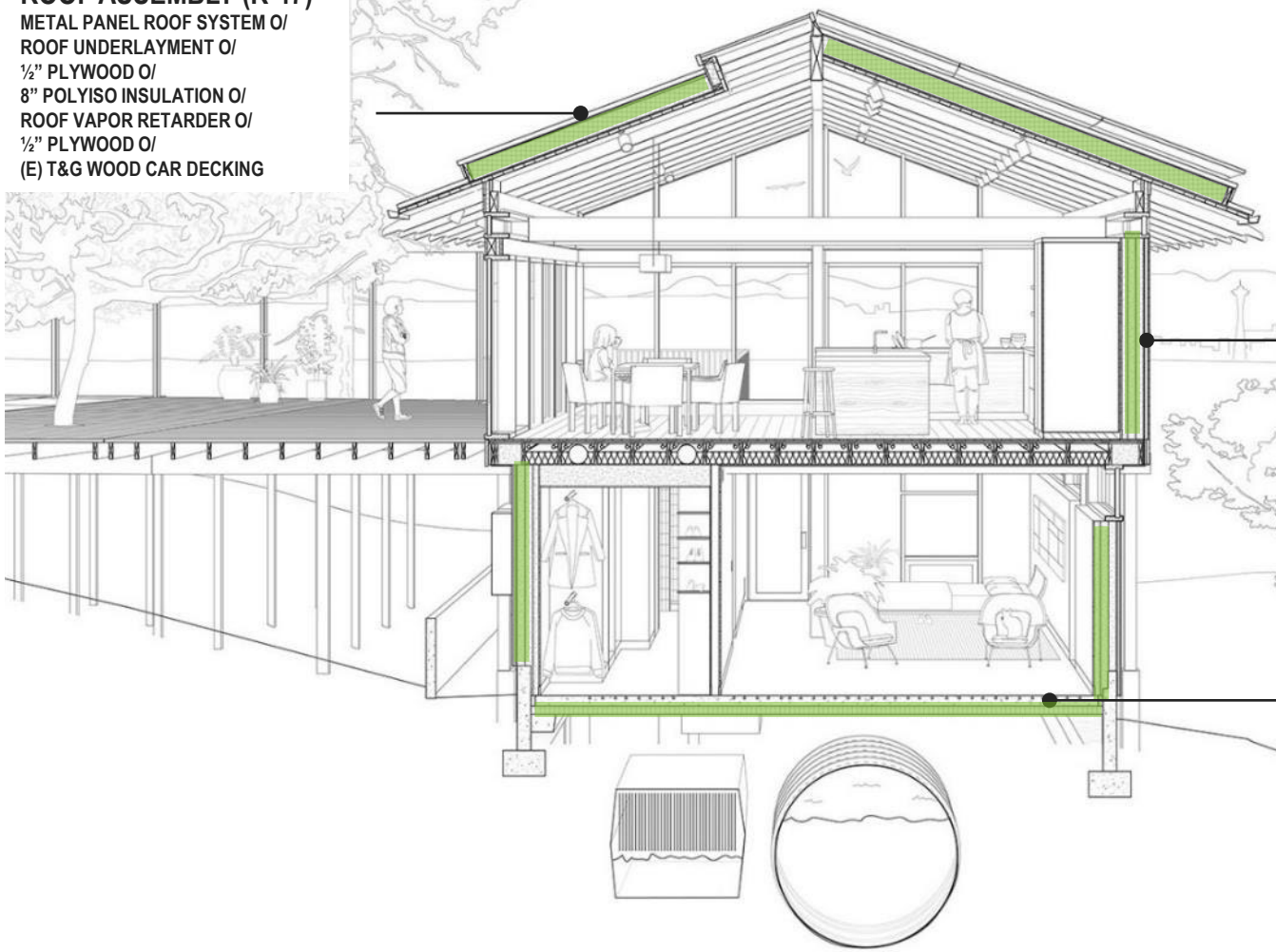
Existing house | Upgrade envelope | Energy efficient systems

ENVELOPE - UPGRADES



ENVELOPE - UPGRADES

ROOF ASSEMBLY (R-47)
METAL PANEL ROOF SYSTEM O/
ROOF UNDERLAYMENT O/
½" PLYWOOD O/
8" POLYISO INSULATION O/
ROOF VAPOR RETARDER O/
½" PLYWOOD O/
(E) T&G WOOD CAR DECKING

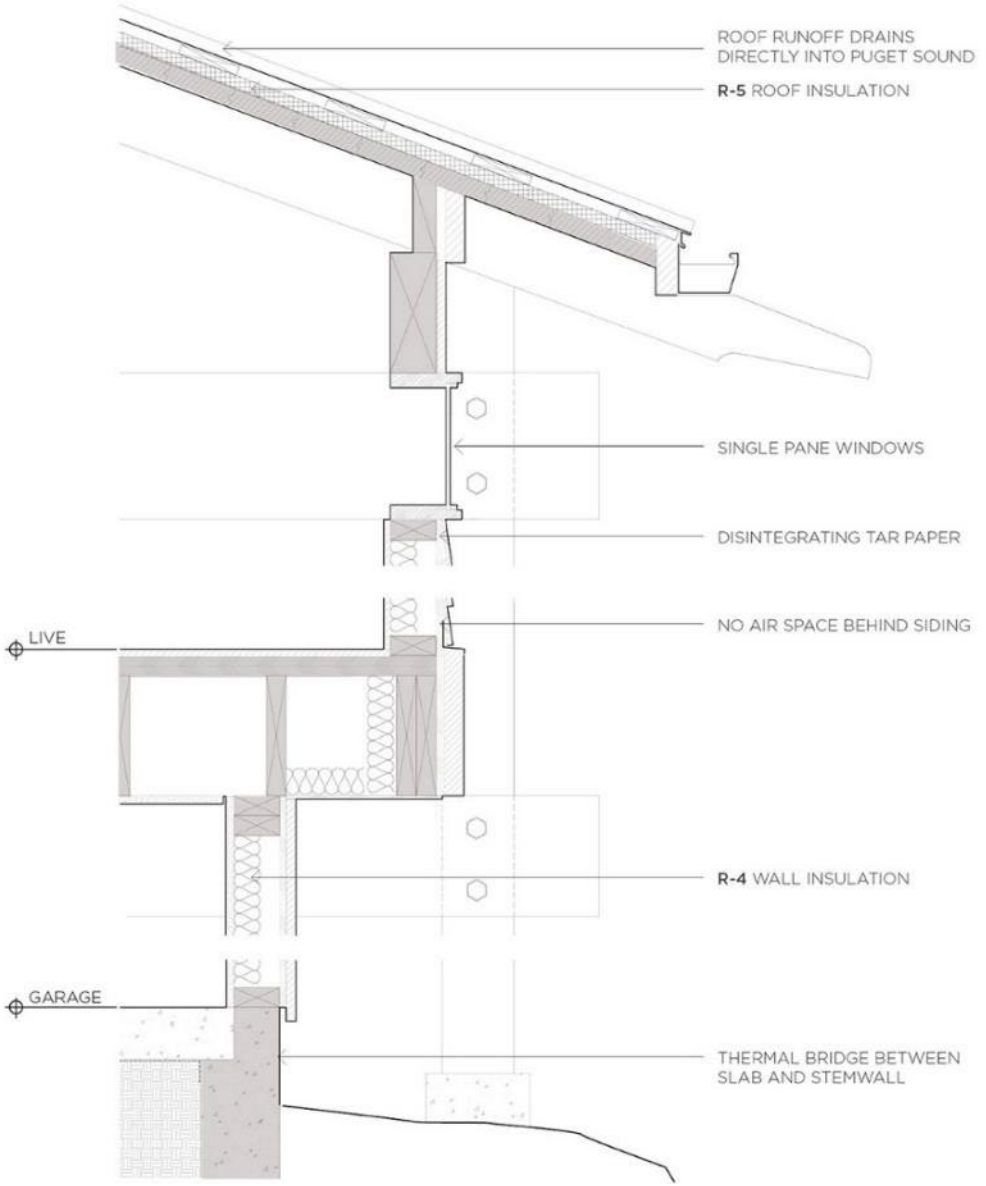


WALL ASSEMBLY (R-33)
(E) EXTERIOR SIDING O/
FLUID APPLIED WRB O/
(E) PLYWOOD SHEATHING O/
(E) 2X4 WOOD STUDS W/
9.5 BLOWN-IN INSULATION O/
VAPOR RETARDER
INTERIOR FINISH

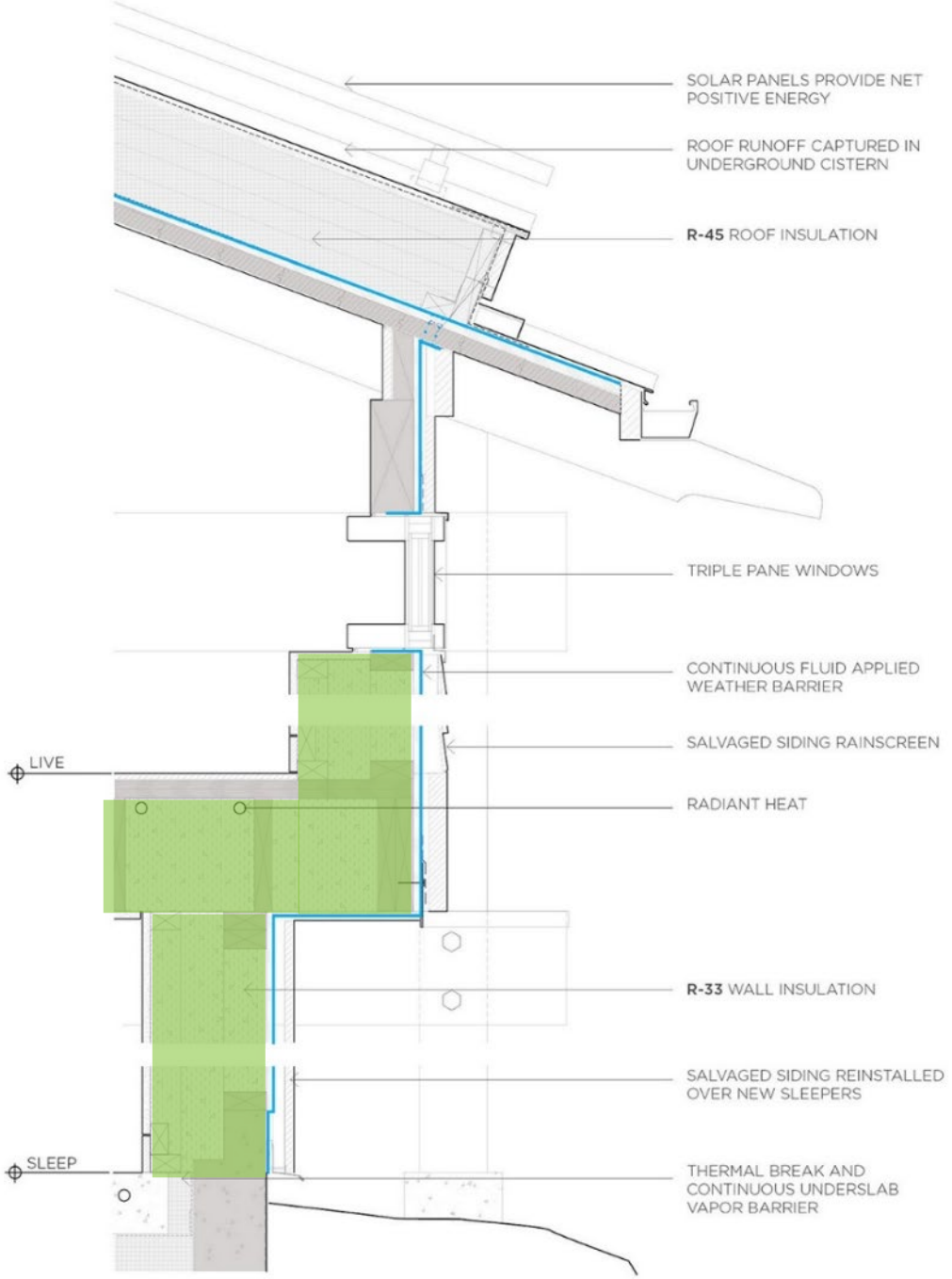
CONCRETE SLAB ON GRADE
POLISHED CONCRETE SOG W/
RADIANT PEX TUBING O/
SLAB VAPOR BARRIER O/
3" XPS RIGID INSULATION

ENVELOPE – UPGRADES - BEFORE

ENVELOPE - UPGRADES - BEFORE



ENVELOPE – UPGRADES - AFTER



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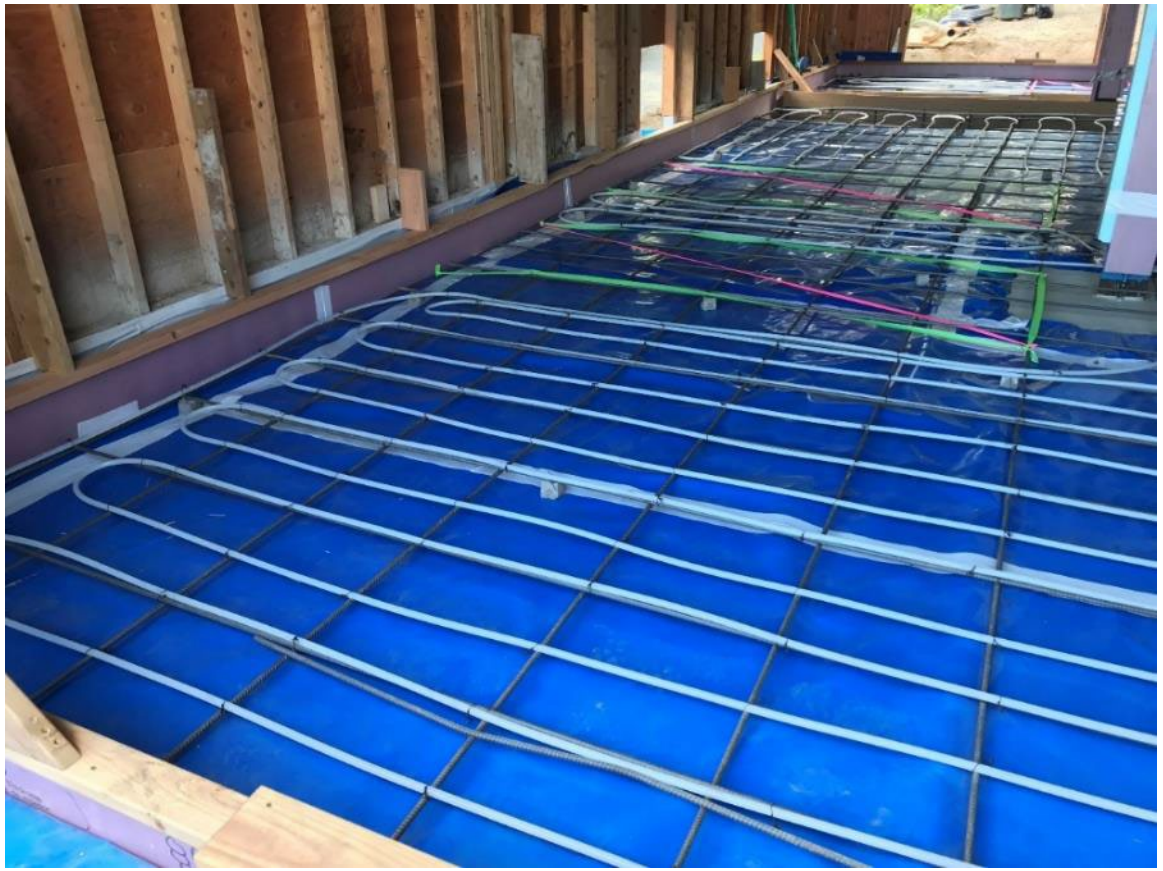

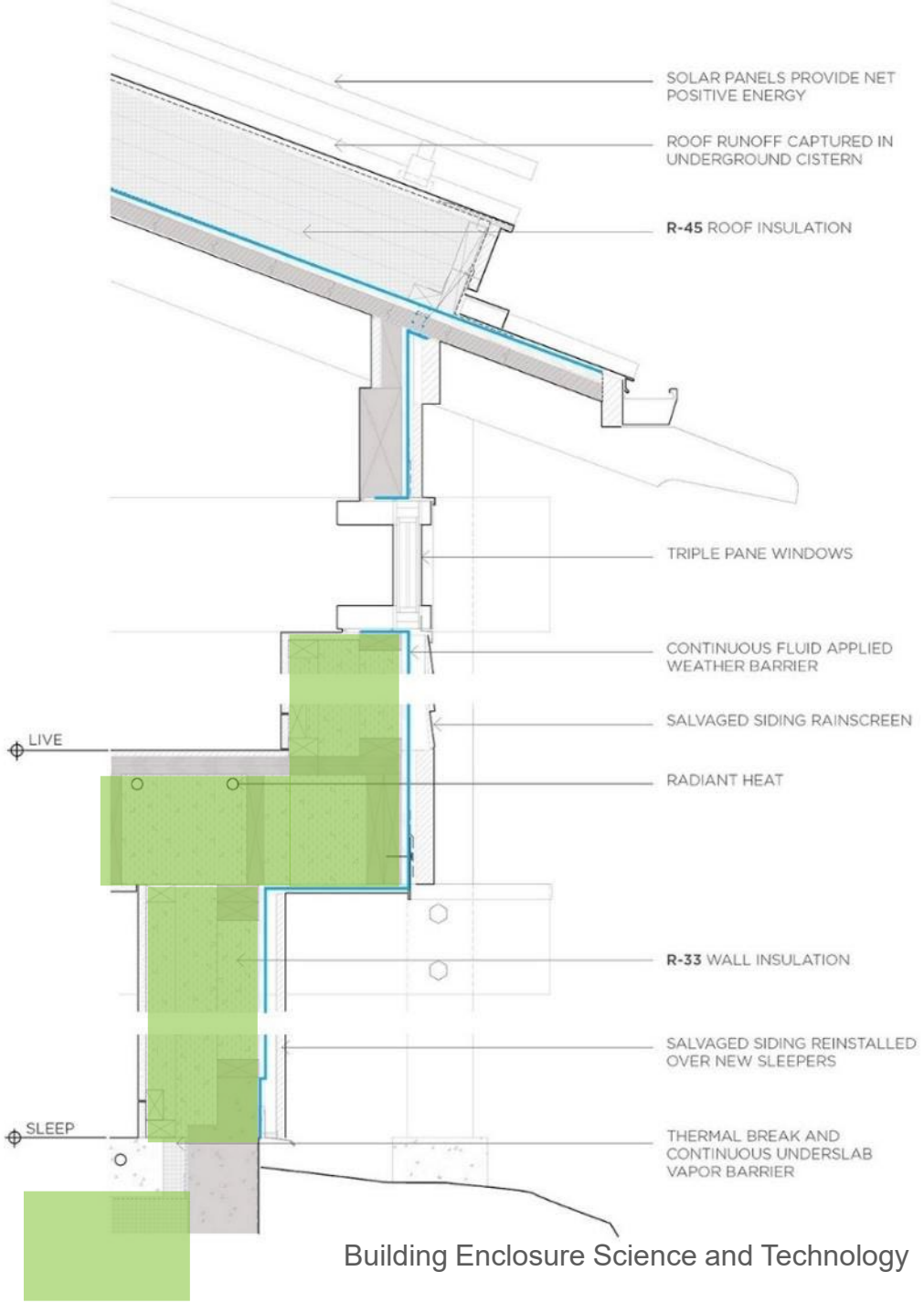

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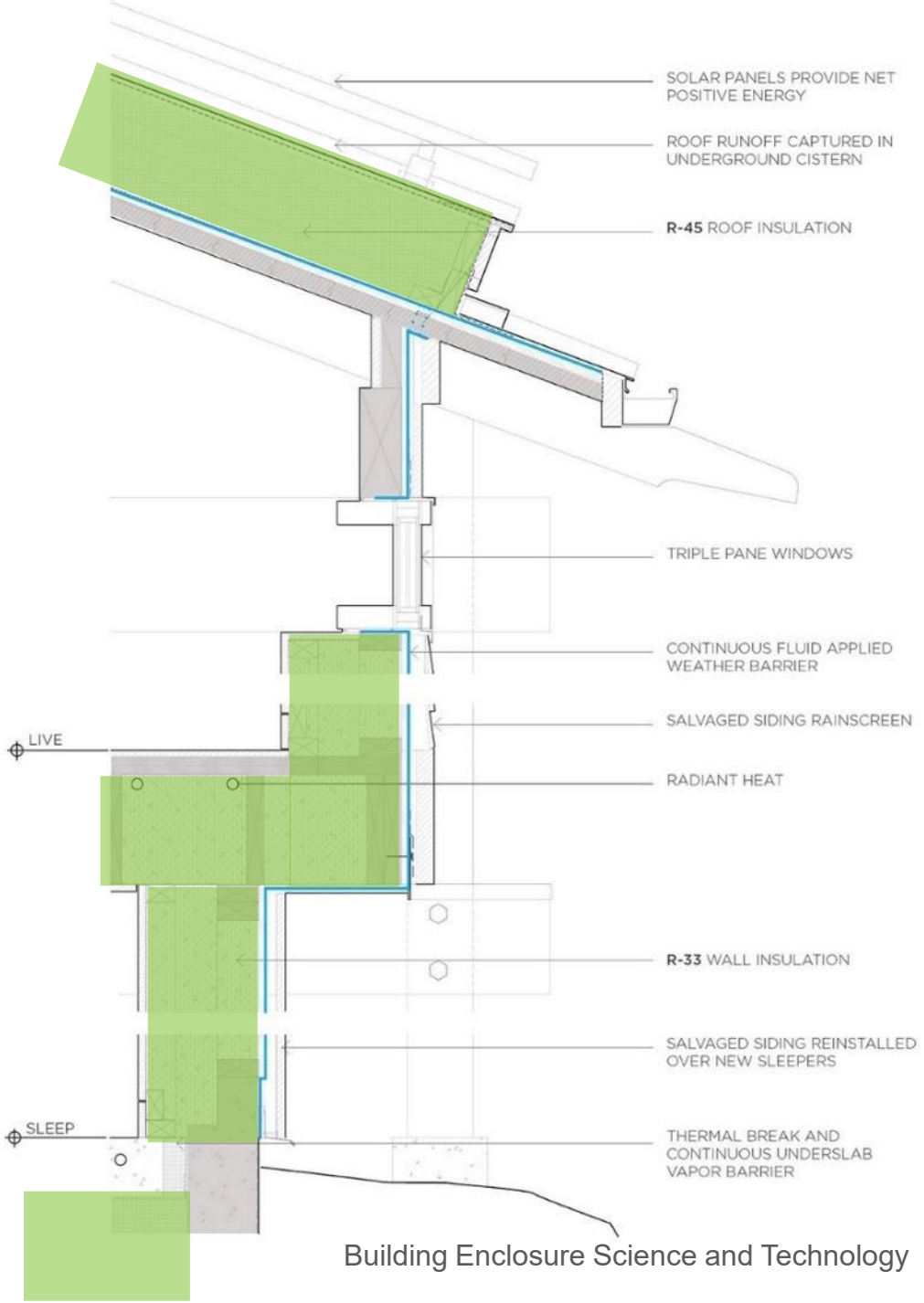

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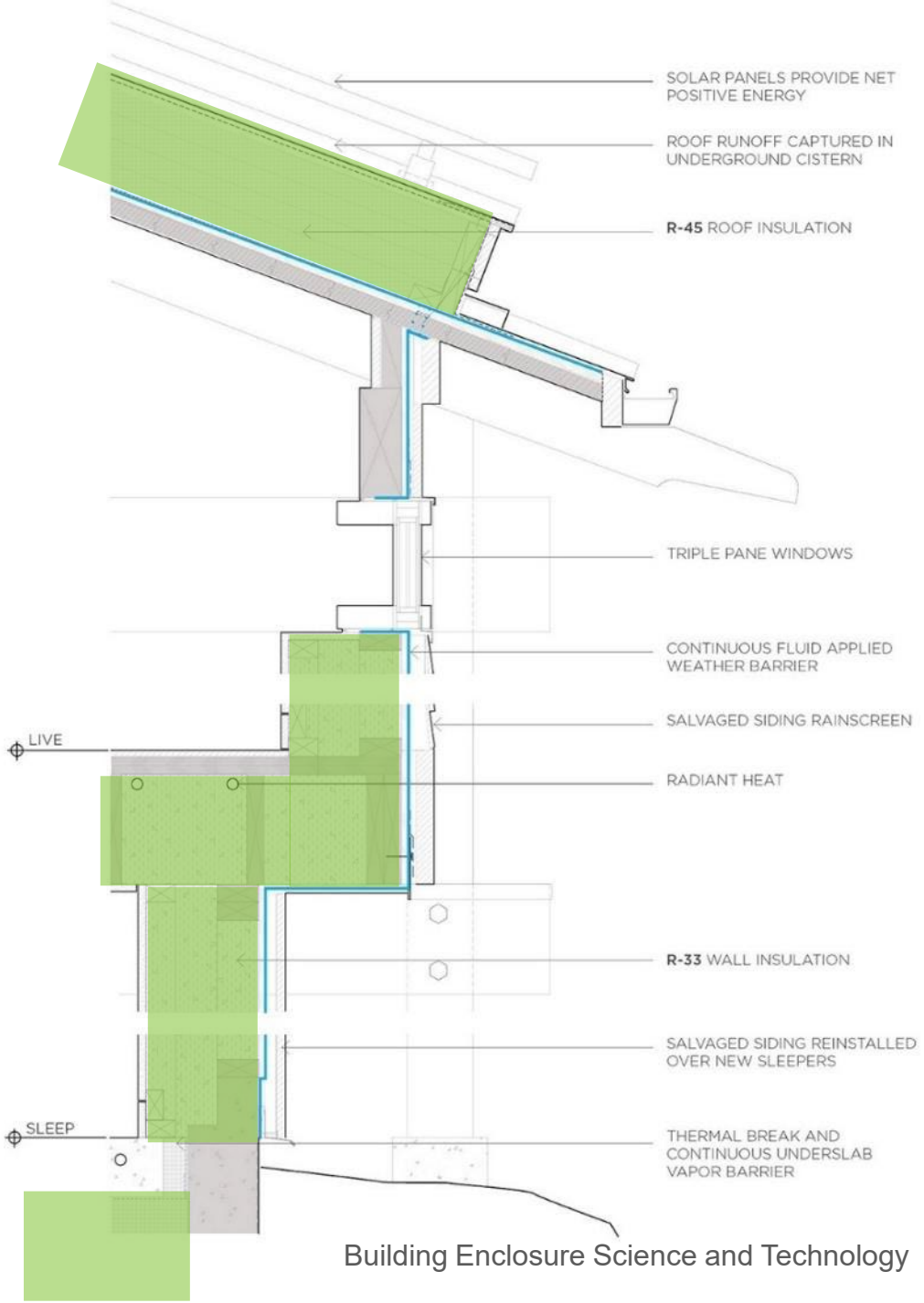

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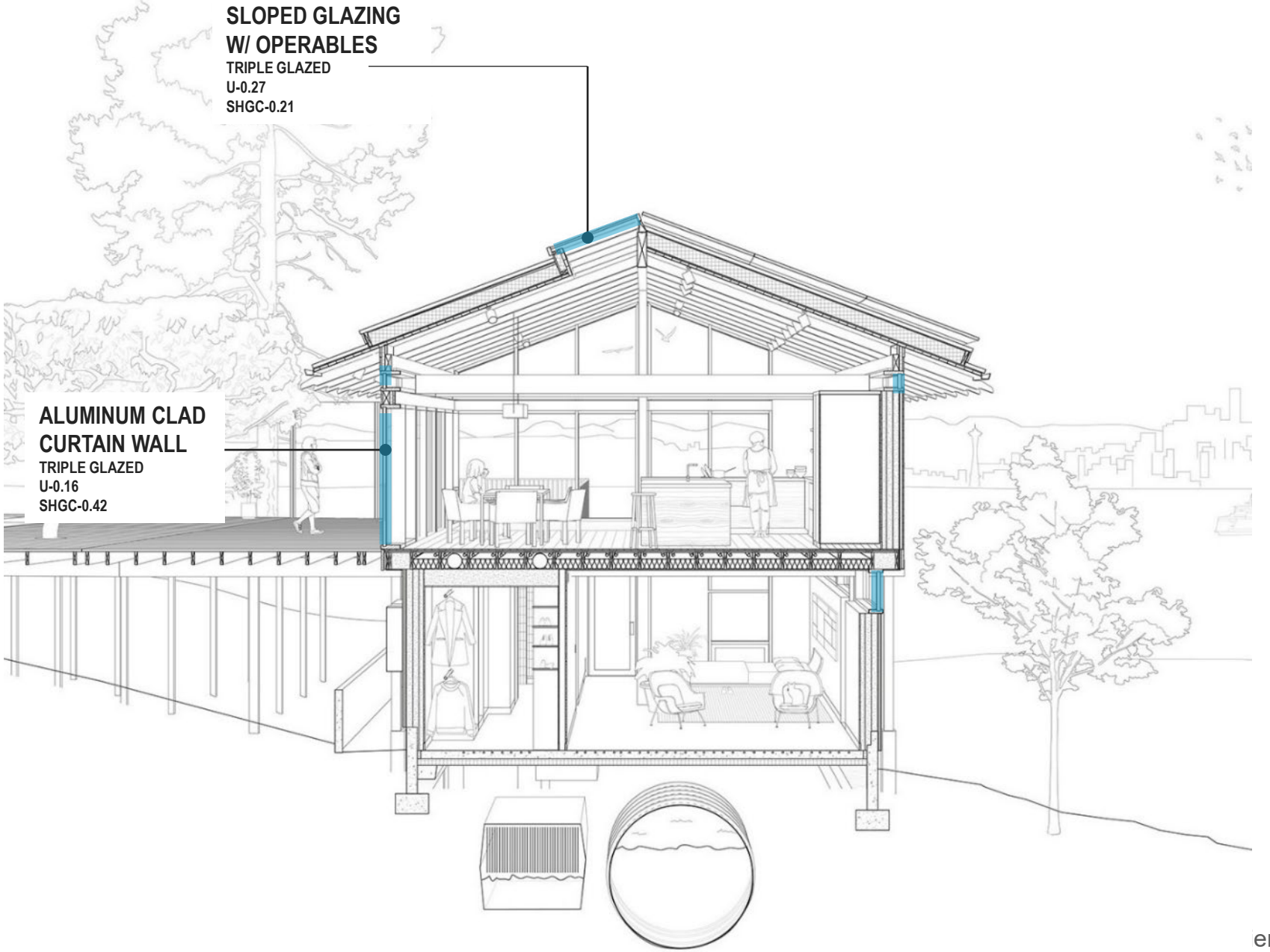

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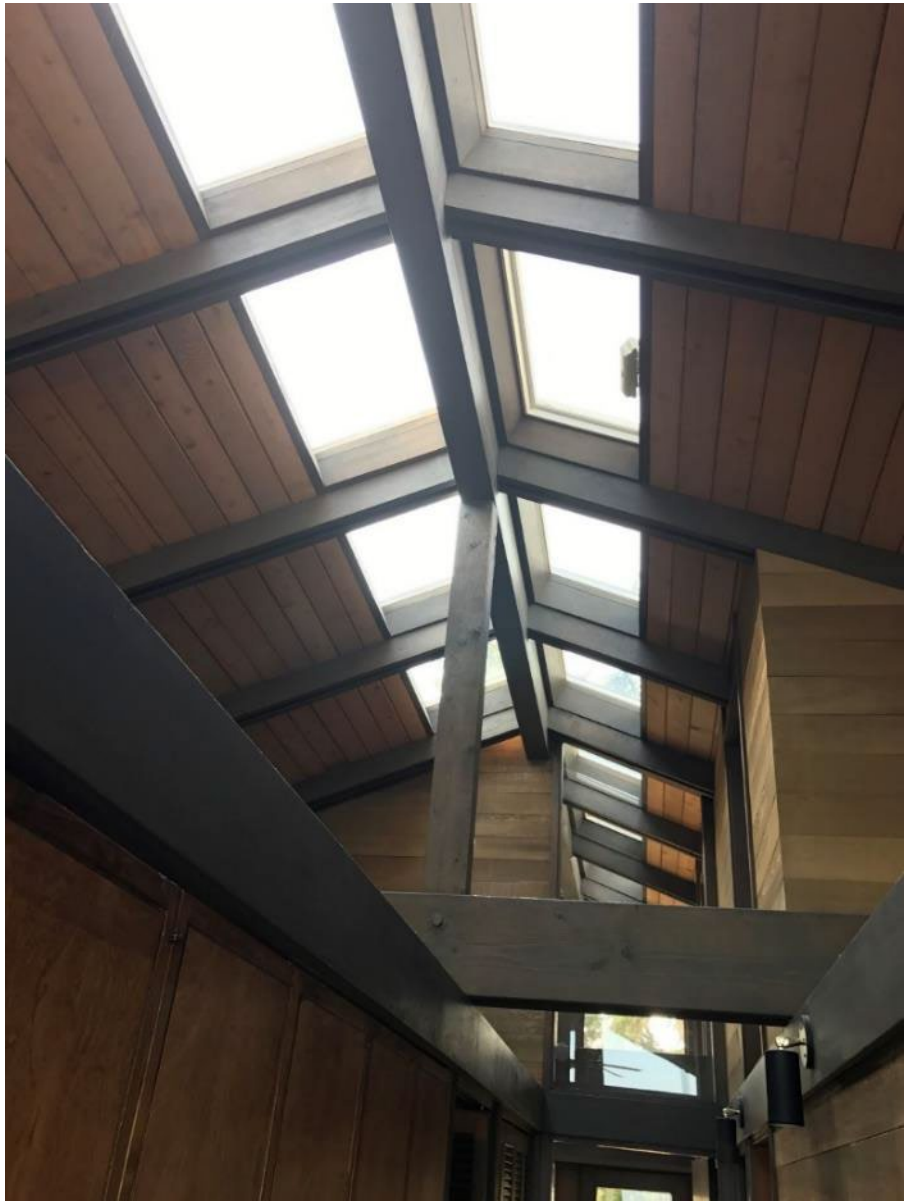

Image Source: Kevin Scott

ENVELOPE – UPGRADES

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ENVELOPE – UPGRADES


Image Source: Redfin

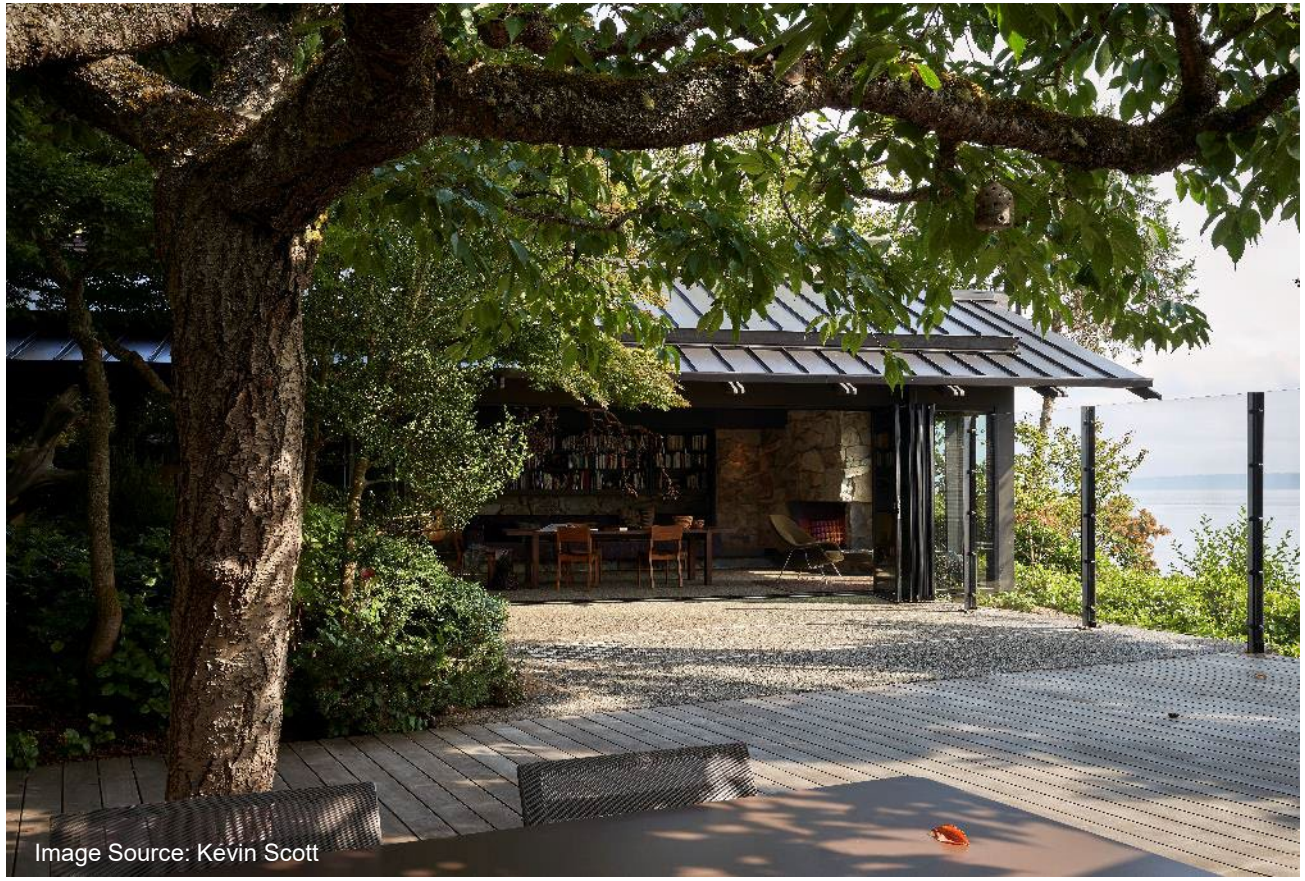
Image Source: Kevin Scott

ENVELOPE - INFILTRATION

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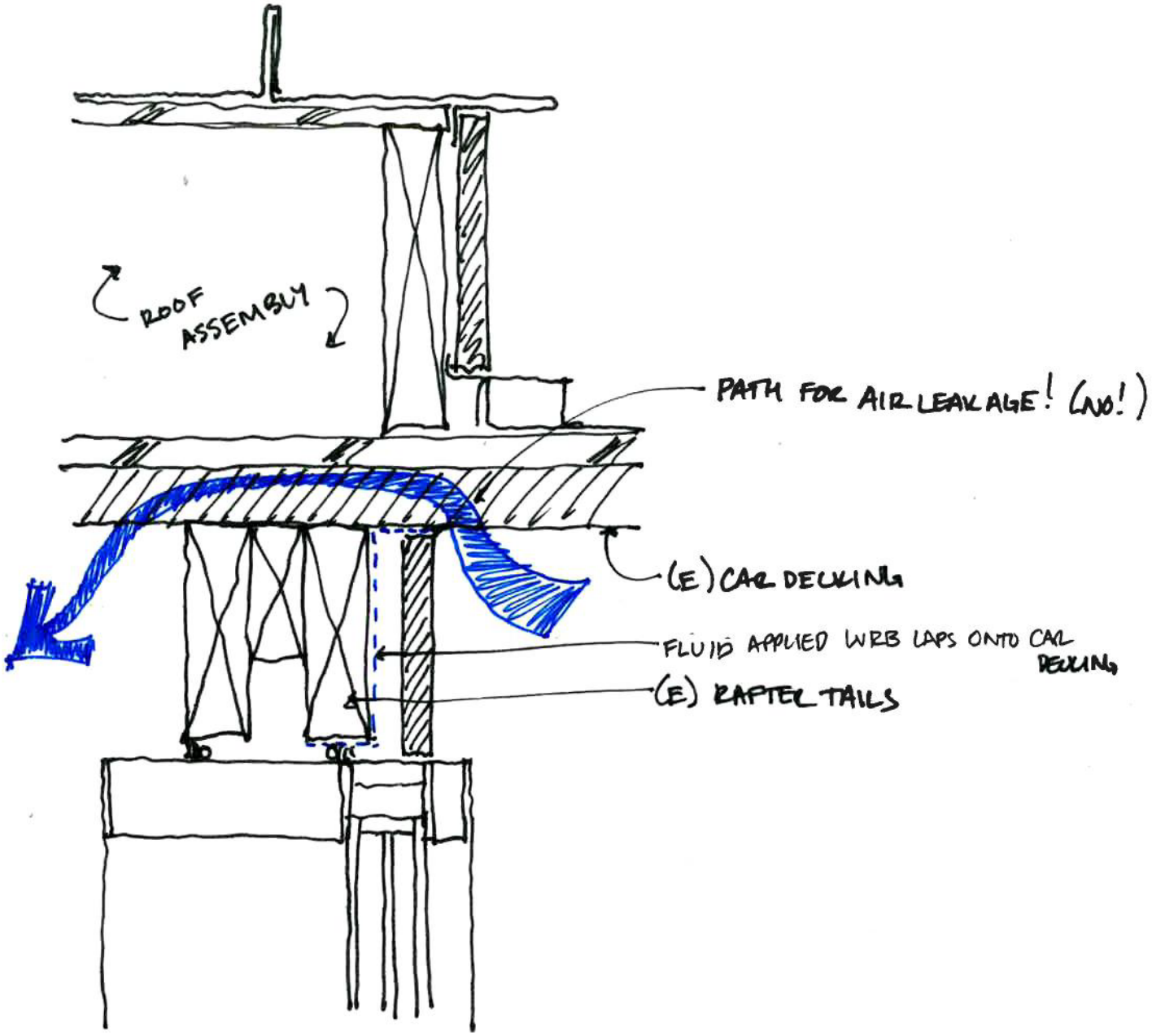

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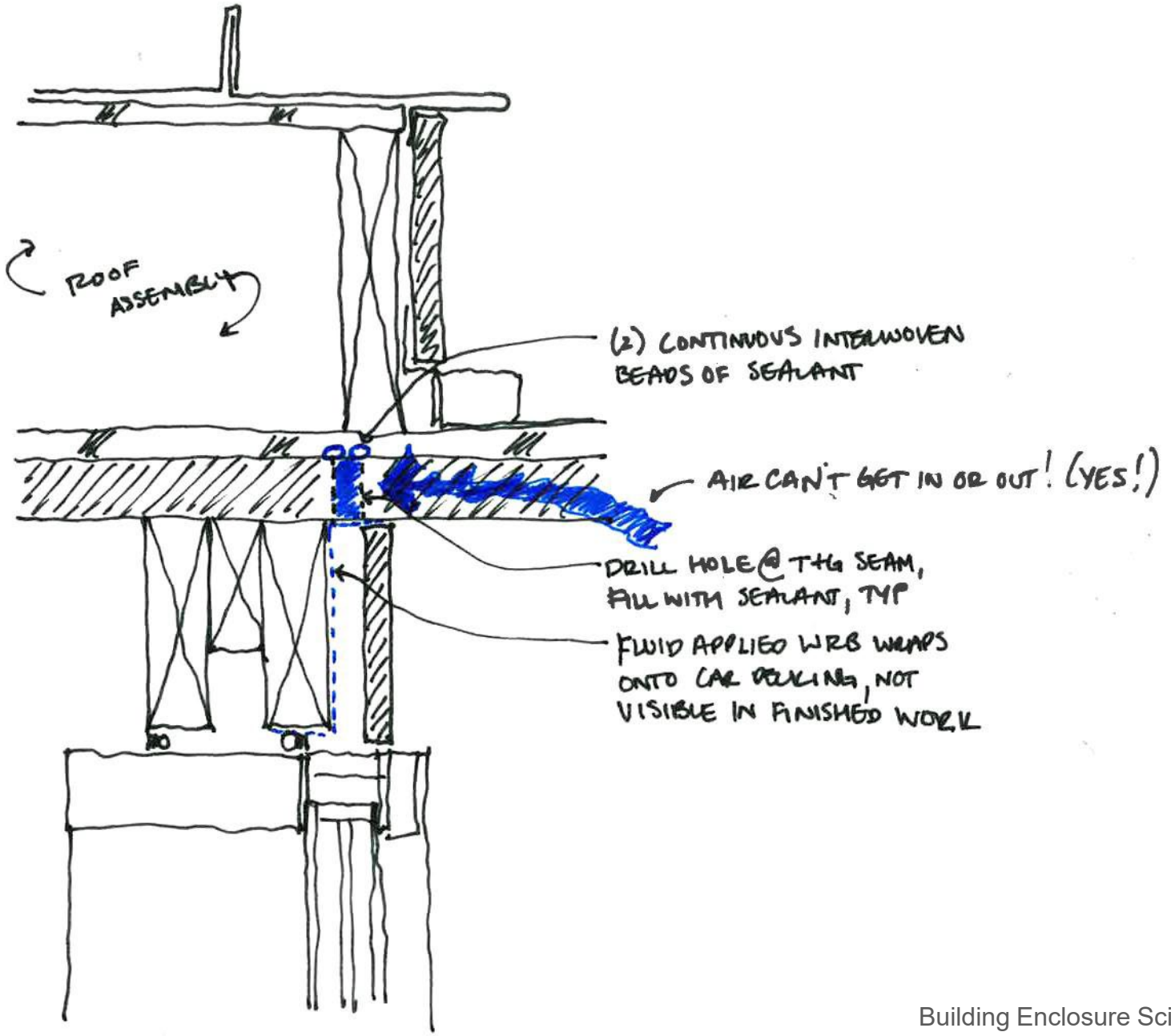
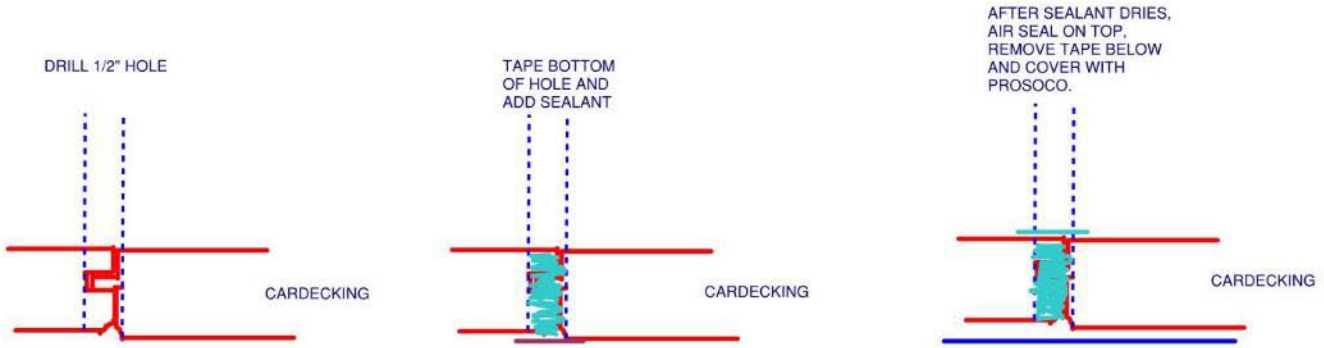


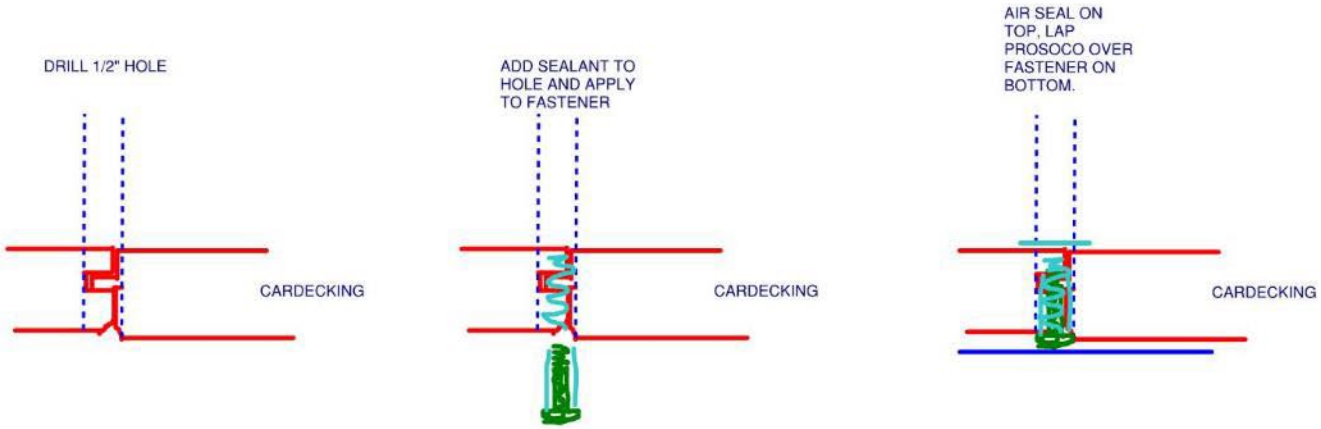
ENVELOPE - INFILTRATION

CONTRACTOR OPTIONS:

OPTION 1: TAPE AND SEALANT



OPTION 2: FASTENER OPTION



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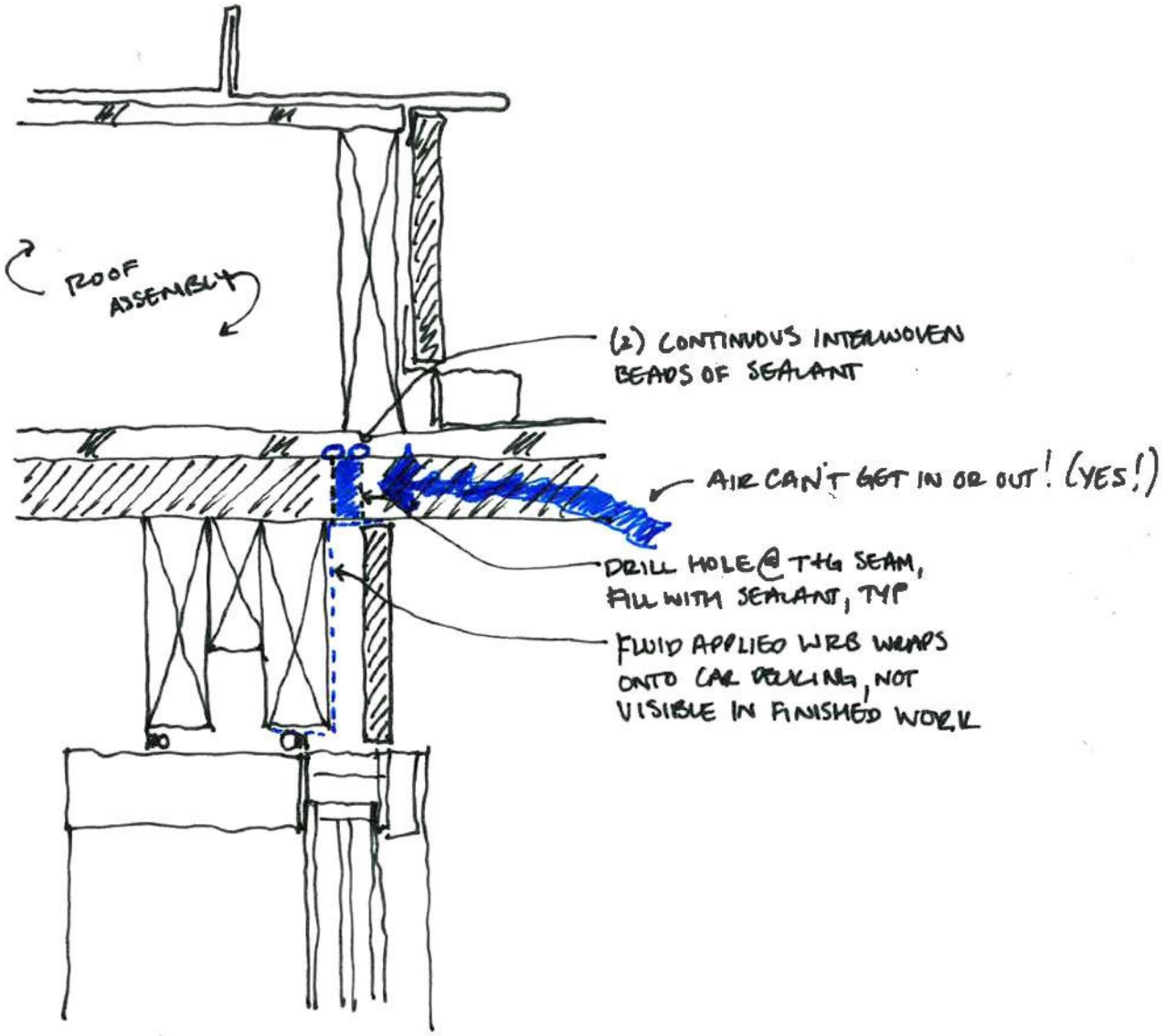

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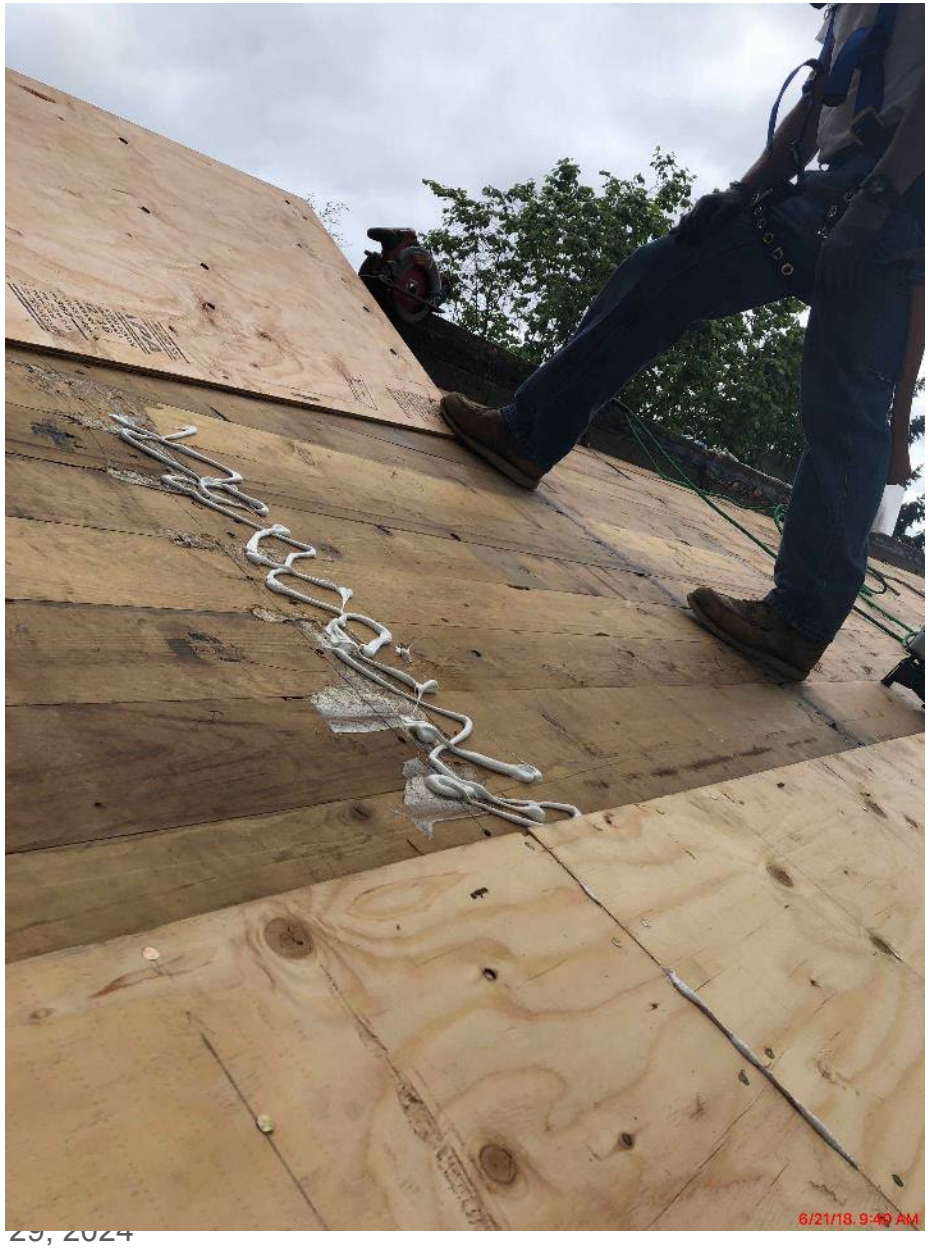

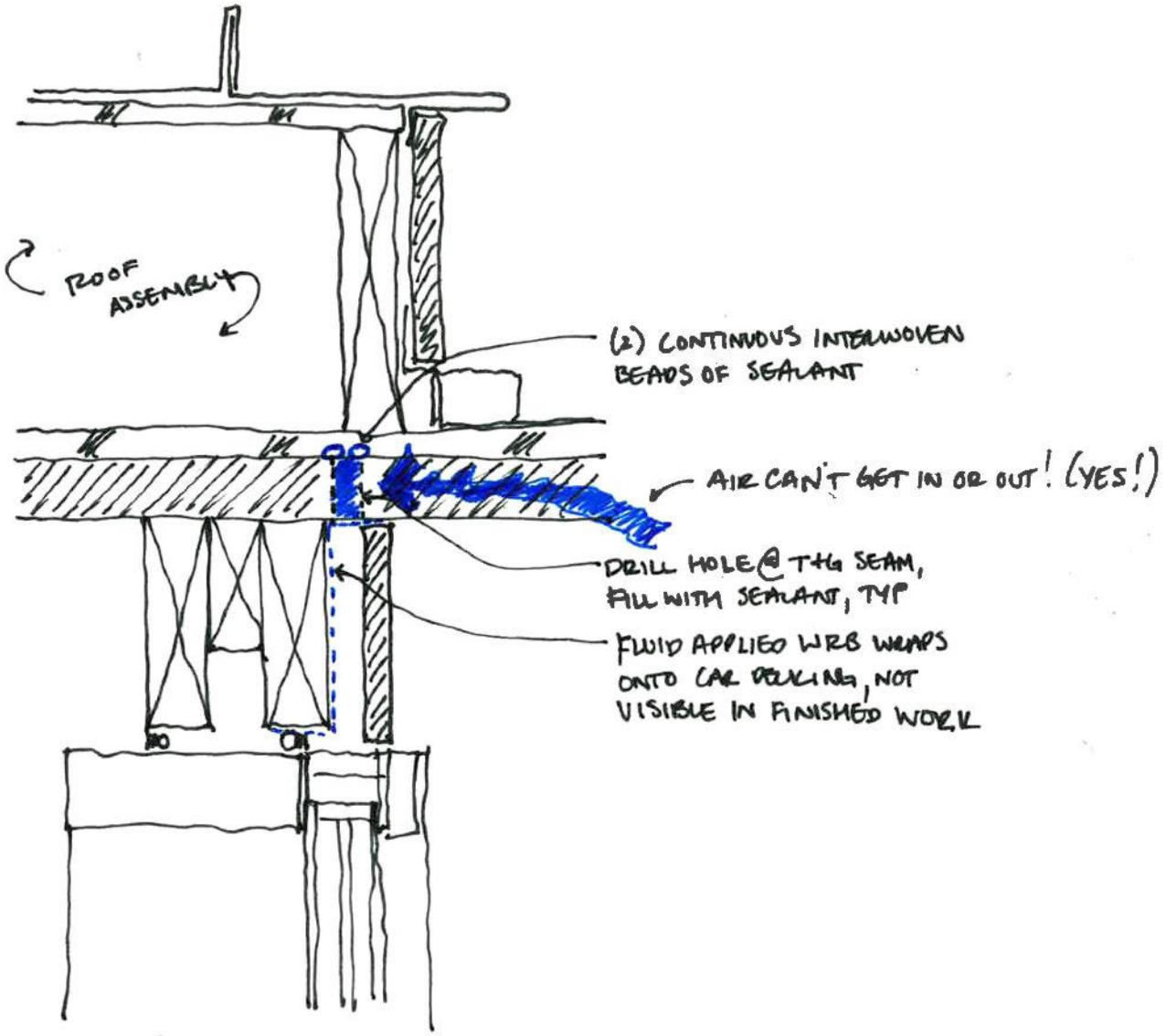

ENVELOPE - INFILTRATION

SOUTH HOUSE

First Blower Door: 0.6 ACH50

Tested after all windows, skylights and fluid applied WRB were installed.
Mechanical exhaust and supply penetrations were not yet completed.

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Final: 1.3 ACH50

ENVELOPE - INFILTRATION

NORTH HOUSE

First Blower Door: 2.25 ACH50

Tested after all windows, skylights and fluid applied WRB were installed.
Mechanical exhaust and supply penetrations were not yet completed.

ENVELOPE - INFILTRATION

NORTH HOUSE

First Blower Door: 2.25 ACH50

Tested after all windows, skylights and fluid applied WRB were installed.
Mechanical exhaust and supply penetrations were not yet completed.

Second Blower Door: 2.2 ACH50

Tested again after several gaps at the fireplace and through-wall framing were filled and sealed.

ENVELOPE - INFILTRATION

NORTH HOUSE

First Blower Door: 2.25 ACH50

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Tested again after several gaps at the fireplace and through-wall framing were filled and sealed.

ENVELOPE - INFILTRATION

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Aerobarrier Install: .8 ACH50 (Openings and fireplace was still masked off)

ENVELOPE - INFILTRATION

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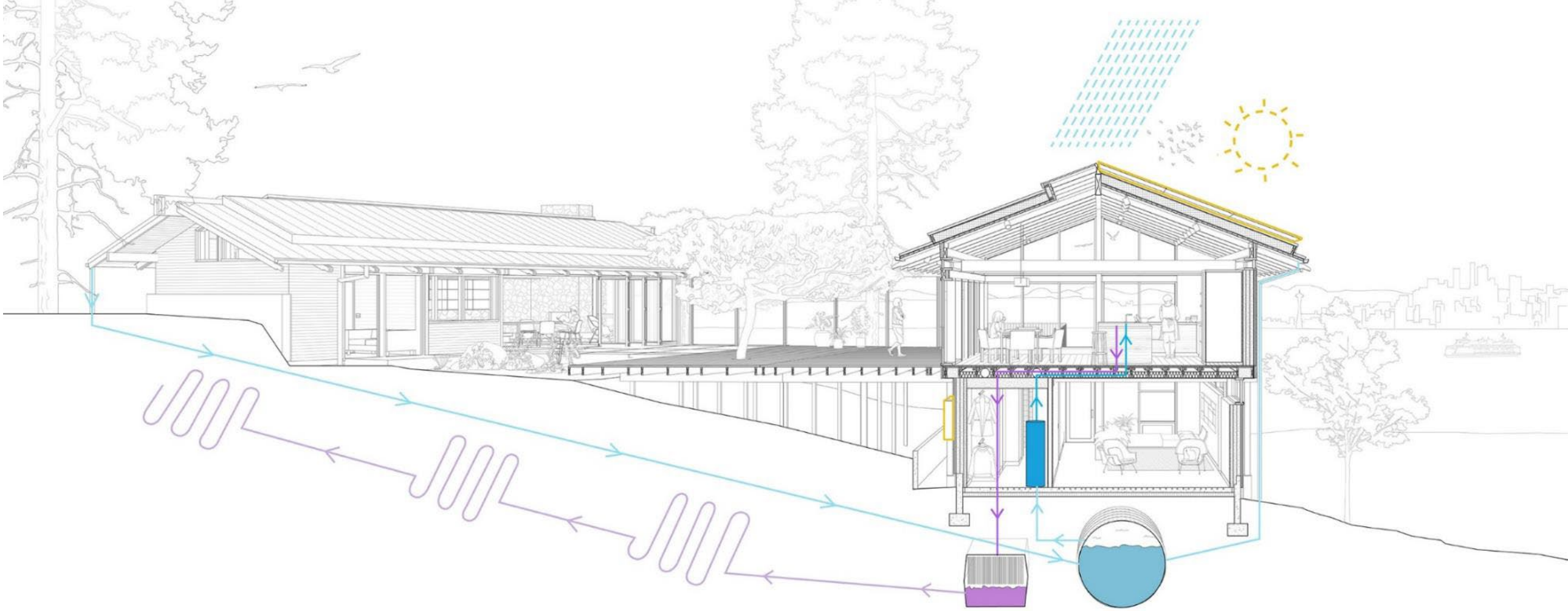
Final Blower Door: 1.8 ACH50



NET-POSITIVE WATER

Potable water demand is met through rooftop collection and storage within a 10,000-gallon below-grade cistern. Rainwater is treated in the mechanical room and then distributed to both the Main House and Office.

ON-SITE WATER TREATMENT

All grey and black water is treated on site and reused to meet non-potable demands, including irrigation via a septic tank and textile filter.

NET-POSITIVE ENERGY

Power needs are met by the on-site 16 kW photovoltaic array on the Main House. The array provides 105% of the power usage on site. A backup battery system provides resilience in the event of a power failure.

RED LIST

To meet the requirements of the Materials Petal of the Living Building Challenge, all construction material, landscape material, and even interior furniture and furnishings are Red List free.

ENERGY – NET POSITIVE ENERGY

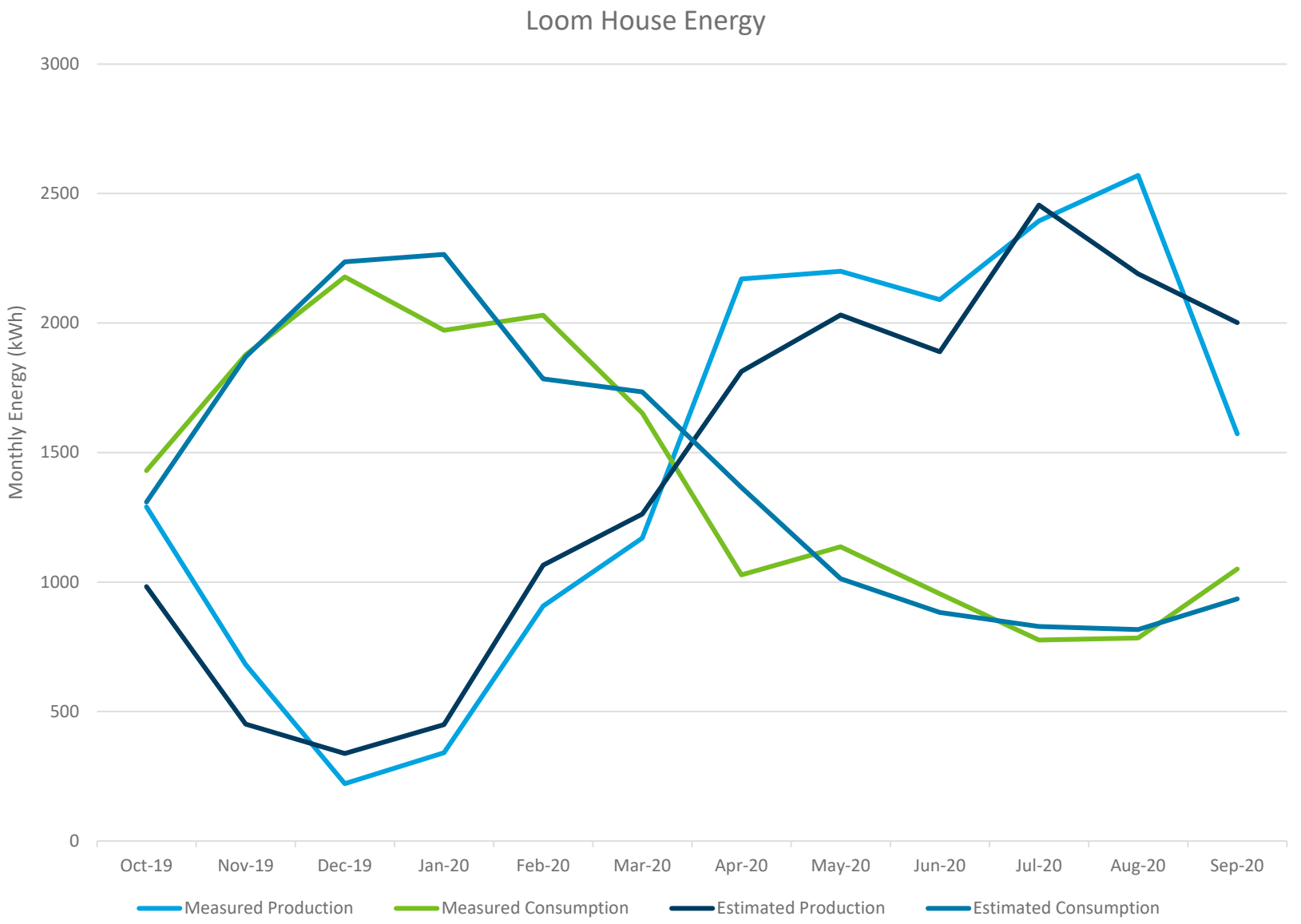
Image Source: Ben Schauland

ENERGY – RESILIENCY

Equipment Selections

PV MODULES: (42) Qty. LG 350W NeON R, 14.7kW DC total
PV OPTIMIZER: (42) Qty. SolarEdge P370
INVERTER: (2) Qty. SolarEdge SE7600A-USS
BATTERY: (2) Qty. LG CHEM ESS RESU 10H 9.8kWh

ENERGY – MEASURED



LOOM HOUSE

TOTAL GWP: **43.63 tCO2e** *(9.4 passenger vehicles driving for a year*)*
GWP / AREA: **119 kgCO2e/m2**

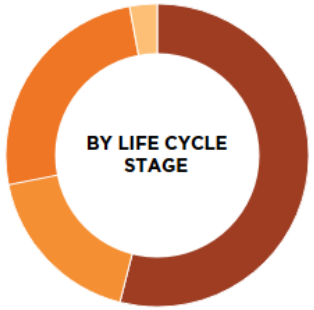
Study date:	April 27, 2020
Tally modeler:	Brie McCarthy
Tally version:	2019.12.21.01
Project area:	3,944 sf
Reference lifespan:	60 years
Design phase:	Post-occupancy
Notes:	Null

TOP MATERIALS BY GWP *(45 materials defined, total)*

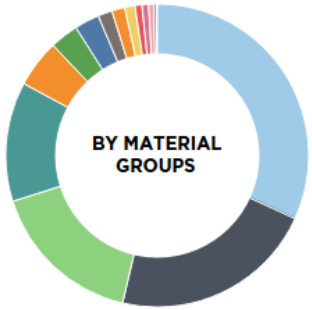
			GWP (kgCO2eq)	Mass Total (kg)
1	Cast-in-place concrete, structural concrete, 2501-3000 psi	60	17,237	80,733 *47.2% of total*
2	Glazing, triple pane IGU	40	10,295	7,775 *4.5% of total*
3	Steel, plate	45	4,883	2,854 *1.7% of total*
4	Wall board, gypsum	28	4,092	9,653 *5.6% of total*
5	Polyisocyanurate (PIR), board	60	3,926	1,496 *0.9% of total*
6	Metal roofing panels, formed	59	3,676	2,577 *1.5% of total*
7	Steel, W section (wide flange shape)	60	2,749	2,566 *1.5% of total*
8	Extruded polystyrene (XPS), board	50	2,138	788 *0.5% of total*
9	Wood mullion	49	1,634	3,986 *2.3% of total*
10	Steel, C channel	60	1,453	1,357 *0.8% of total*

-10K -5K 0K 5K 10K 15K 20K 0K 20K 40K 60K 80K 100K

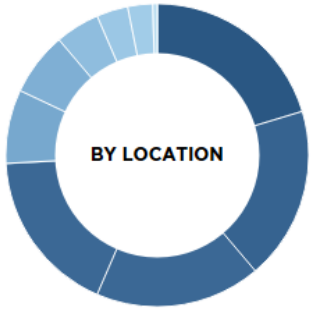
GWP (kgCO2eq) Mass Total (kg)



[A1-A3] Product	54%
[A4] Transportation	0%
[B2-B5] Maintenance and Replacement	18%
[C2-C4] End of Life	25%
[D] Module D	3%



Metal	48%
Concrete	33%
Glazing	25%
Insulation	19%
Plaster	8%
Coating	5%
Vapor barrier	4%
Door frame	2%
Window frame	2%
Adhesive / Sealant	2%
Door	1%
Metal Coating	1%
Opening hardware	1%
Flooring & Tile	0%
Wall coverings	0%



Structure	20%
Walls	19%
Roofs	18%
Floors	18%
Curtainwall Panels	8%
Curtainwall Mullions	7%
Doors	5%
Windows	3%
Ceilings	3%
Stairs and Railings	0%

COMPARING BUILDINGS

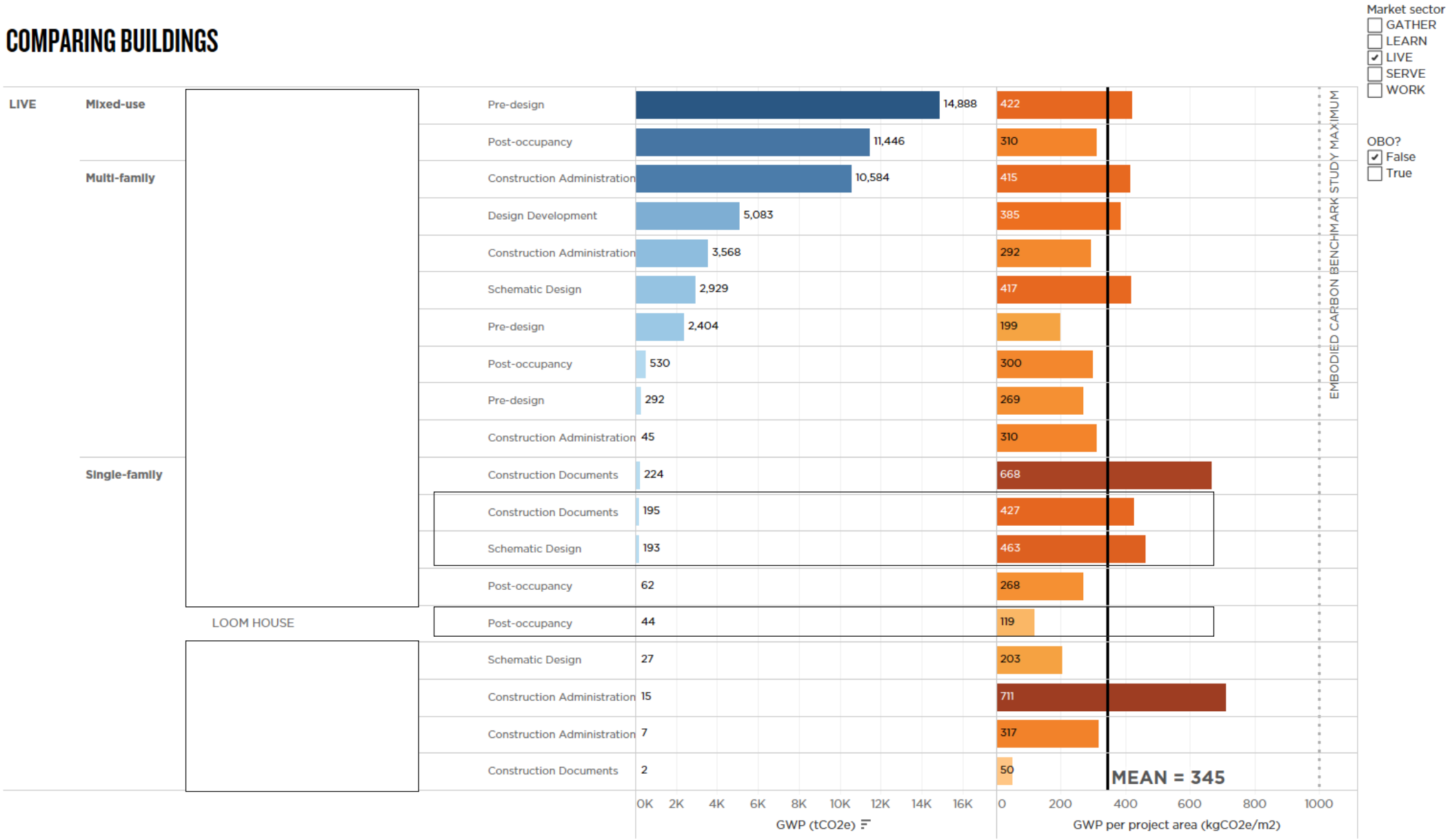


Image Source: Ben Schauland

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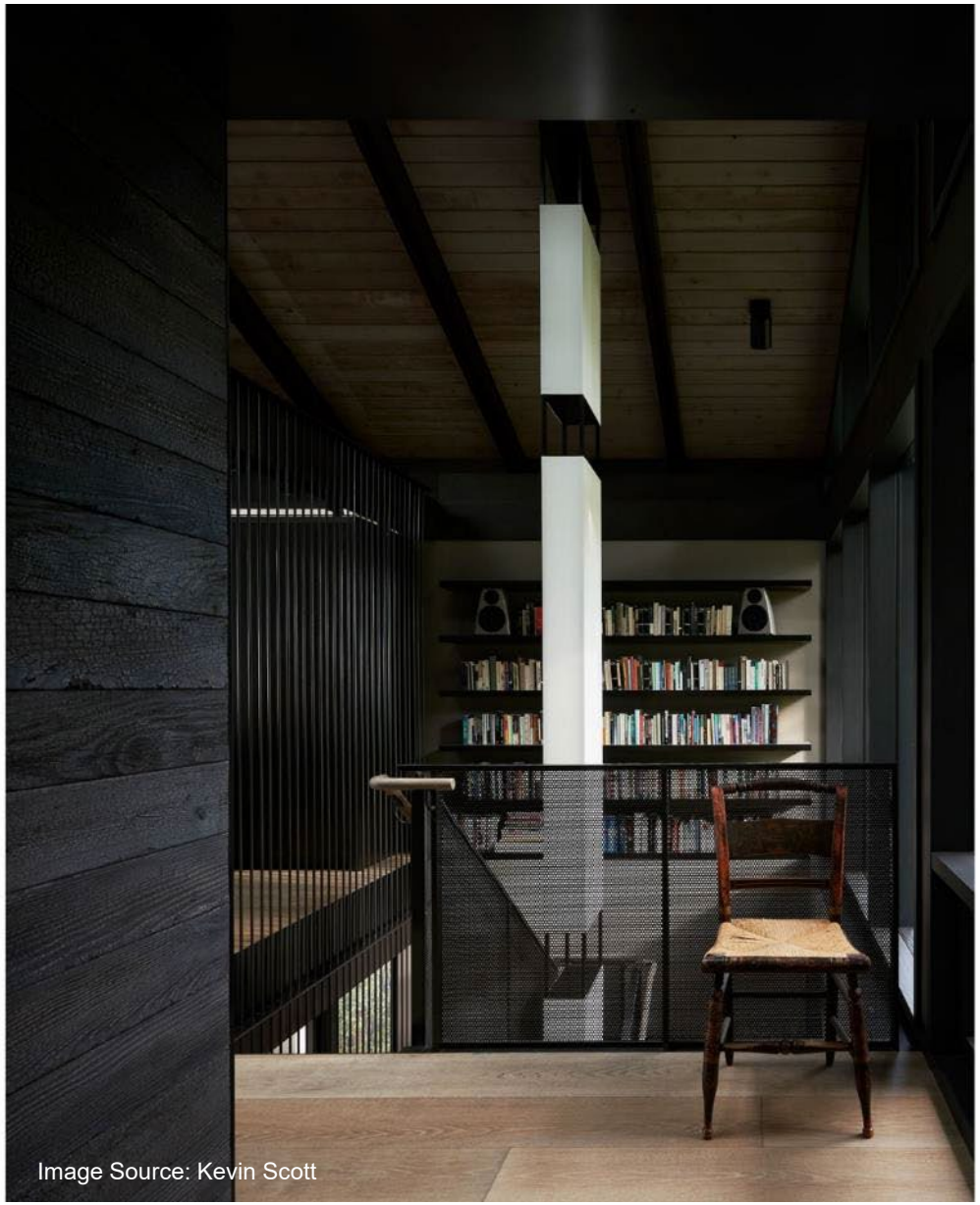
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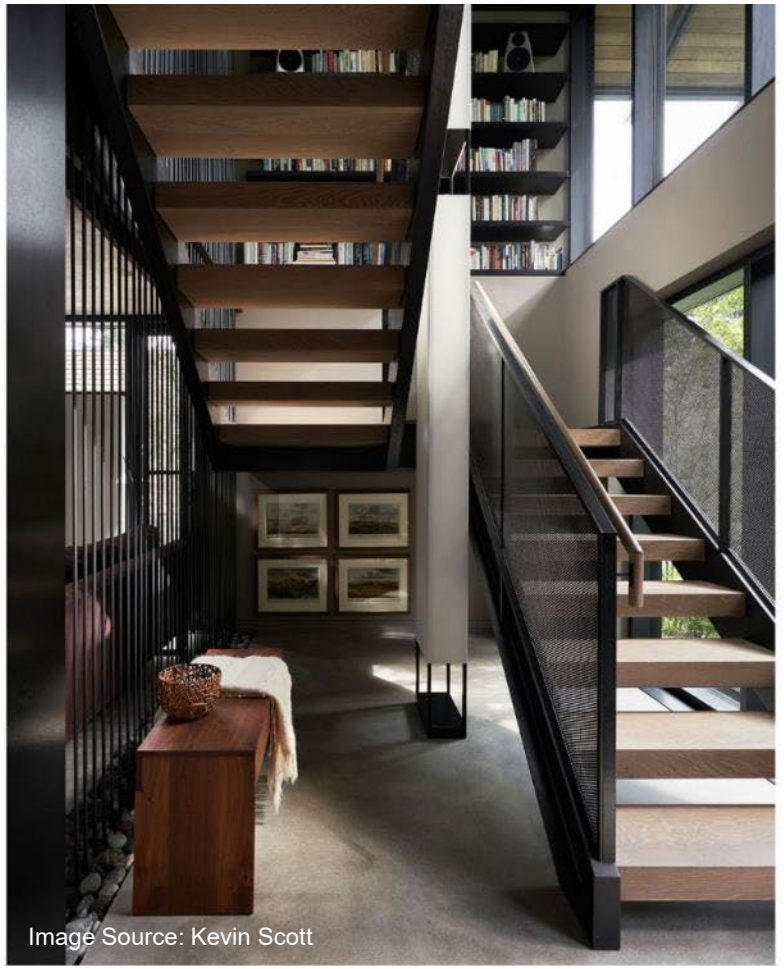
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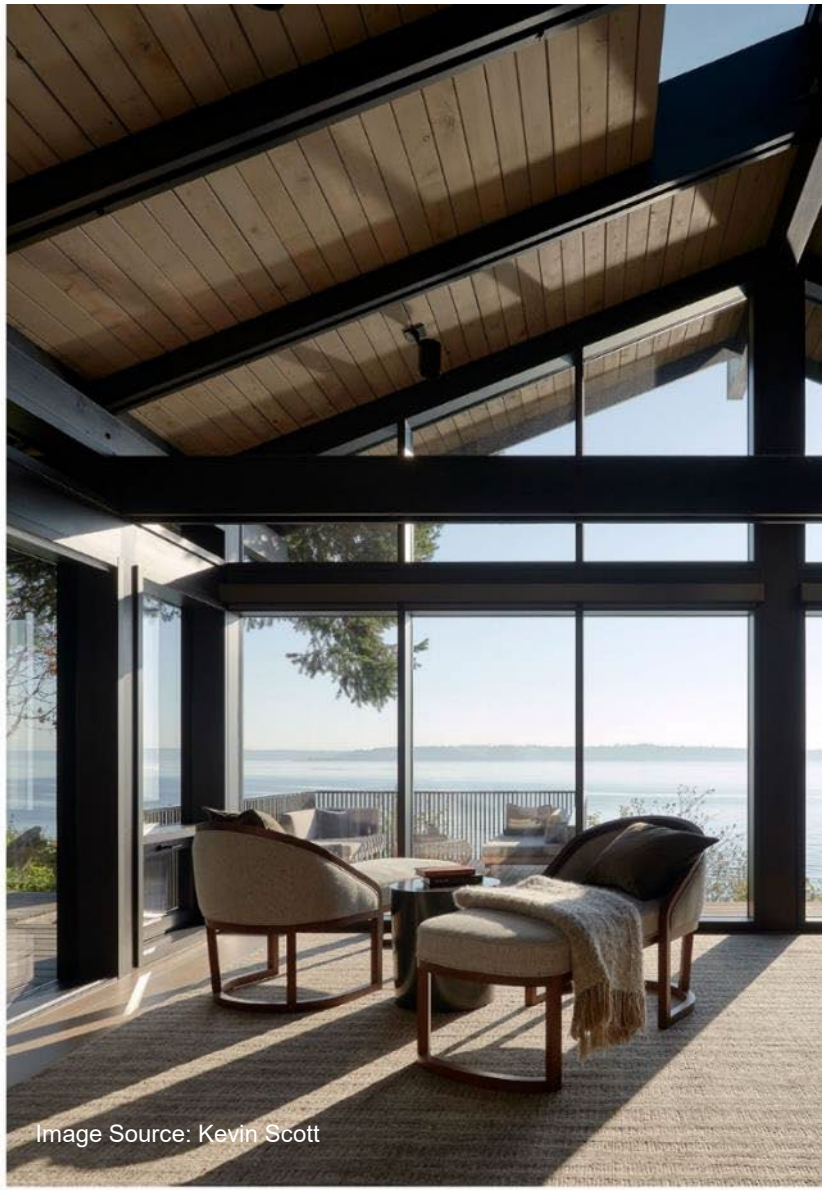

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MILLER HULL


CLARK
CONSTRUCTION


CHARLIE HELLSTERN
INTERIOR DESIGN


ANNE JAMES
LANDSCAPE ARCHITECTURE LLC


QUANTUM
CONSULTING ENGINEERS


Aspect
CONSULTING


SEABOLD
ENGINEERING LLC


LD
LIGHTING DESIGNS, INC.


Biohabitats


wsp


4EA

Thank You