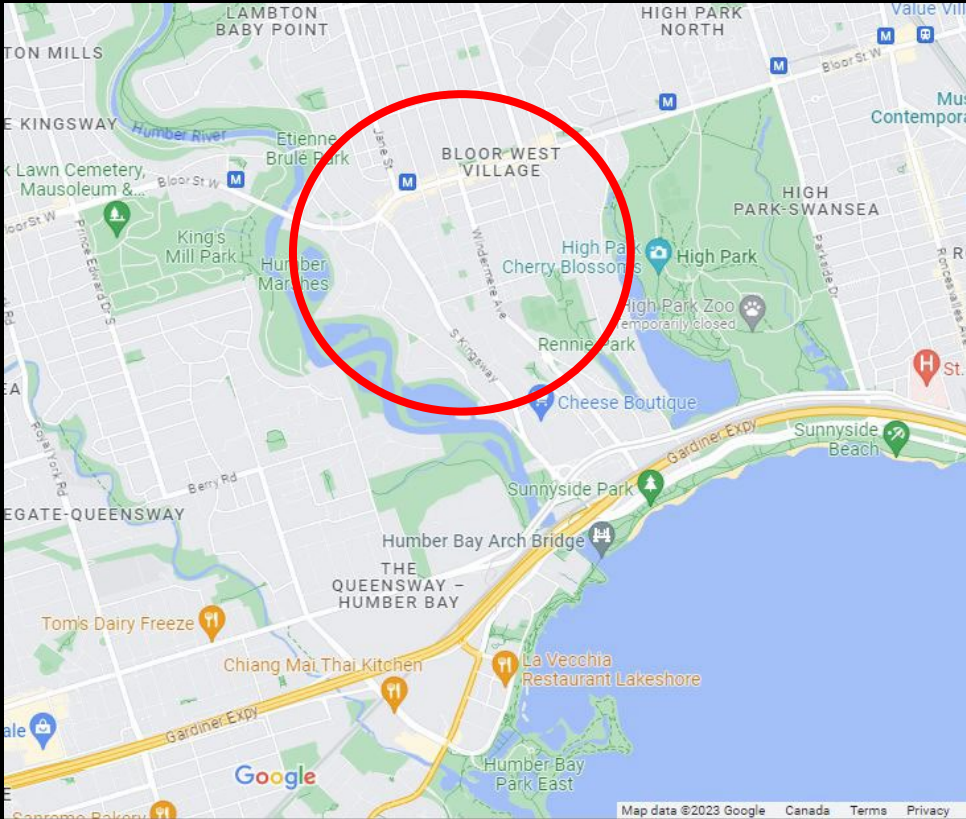


My Decarbonization Journey

Toronto, Ontario

Location



- Climatic Zone 1 (<5000 degree days)
- West of High Park
- Moderated by Lake Ontario

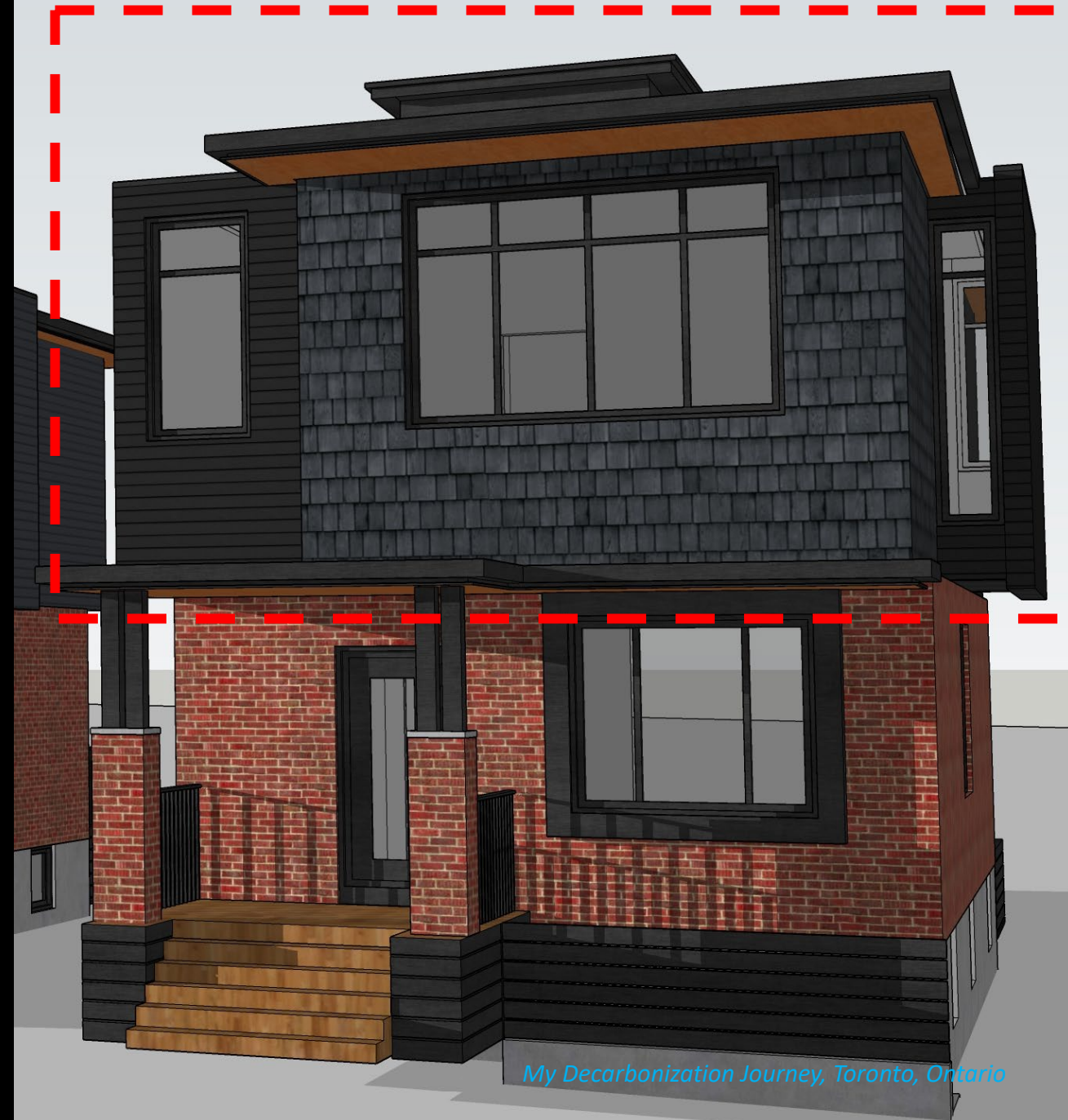
Original Conditions



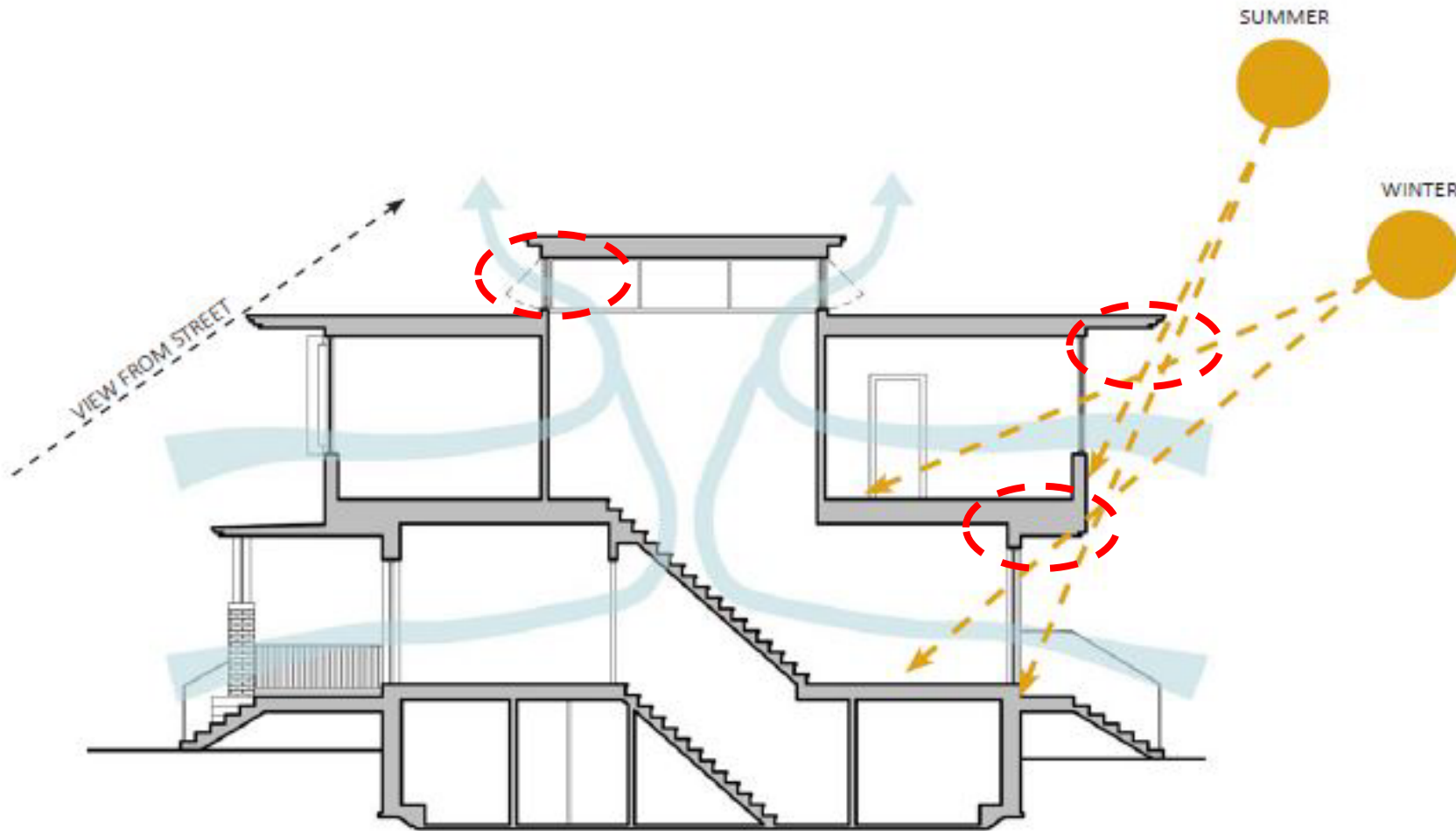
- 1.5 storey circa 1926
- 1018 sqft (excl. bsmt)
- Envelope and Systems:
 - Double Pain, Vinyl Windows 2010
 - Uninsulated double wythe brick with non-expanding cement based fill between strapping
 - Insulated basement R14
 - Attic Insulation R30
 - High Efficiency Gas Furnace
 - Gas Fired Hot Water Tank

Proposed Addition

- 2 storey
- Gross Floor Area: 1,690sqft
(from 1,018sqft)
- Envelope and Systems:
 - Double pain, insulated fiberglass windows
 - Triple glaze windows at roof
 - Fully insulated envelope
 - Air source heat pump with electric auxiliary heat
 - Gas fired on demand water heater
- Complies with OBC SB-12 prescriptive design tables



Passive Strategies



NORTH-SOUTH SECTION

Winter

- Invite the sun in

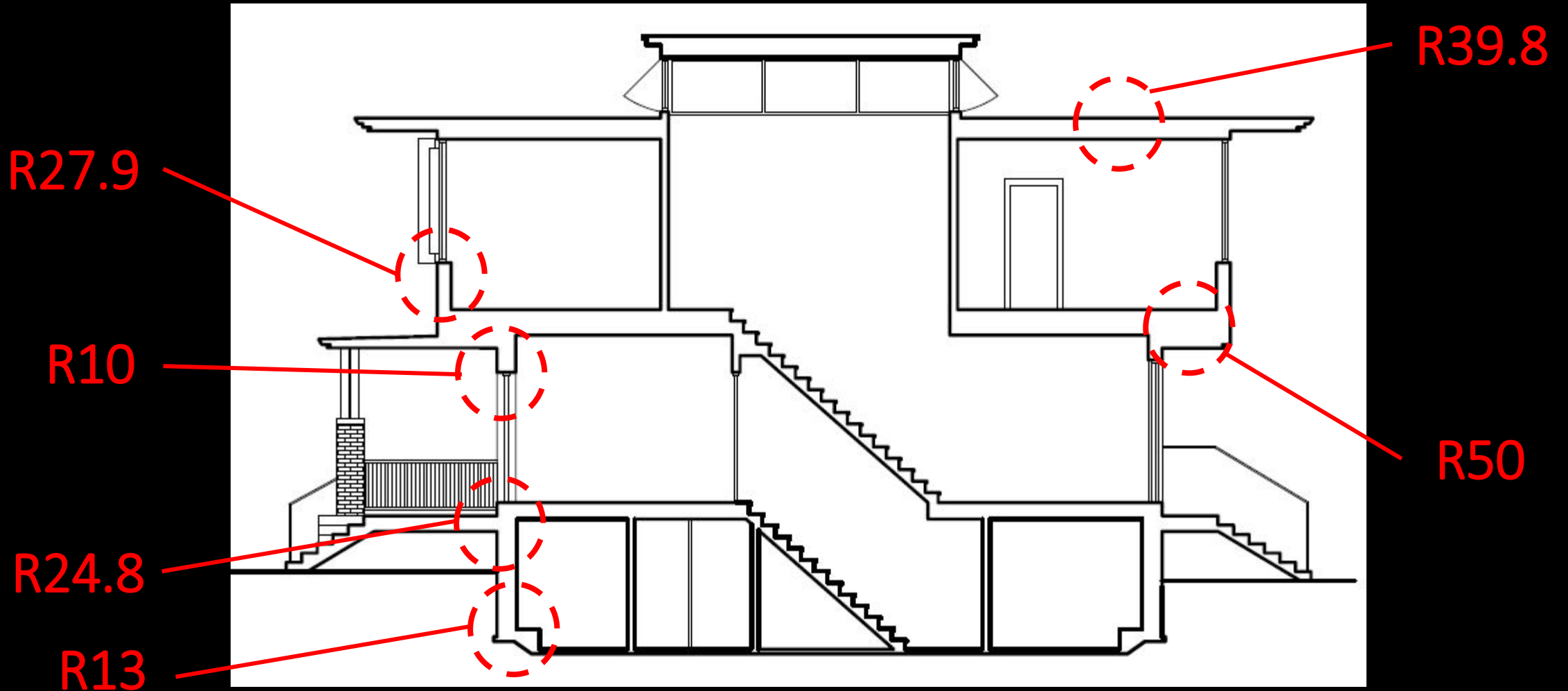
Summer

- Keep the sun out

Stack effect

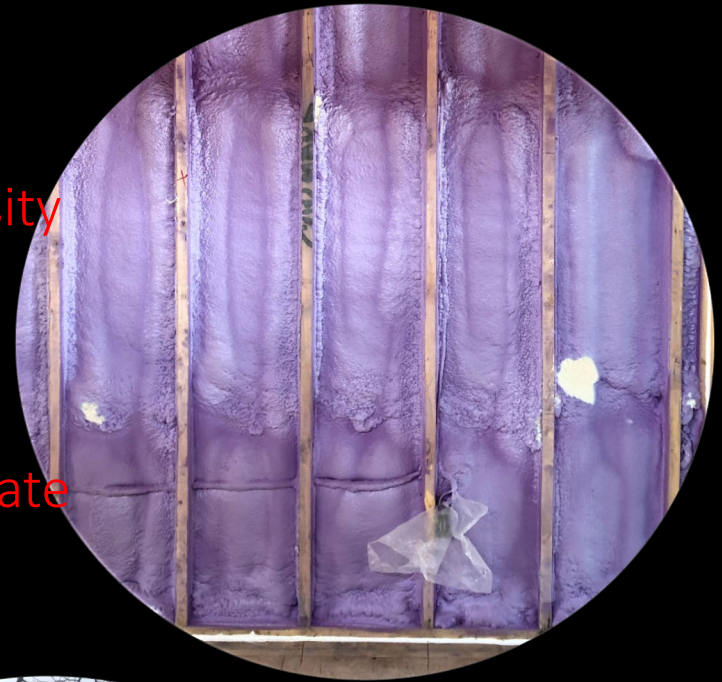
- Move hot air out

Building Envelope



Building Envelope

Roof:
Closed Cell
Medium Density
Polyurethane
Spray Foam
+
Polyisocyanurate



Basement
Walls:
Stone Wool



Exterior:
Extruded
Polystyrene

Mechanical / Electrical

- 2 tonne Air Sourced Heat Pump for central heating and cooling
- 10kW Auxiliary Electric Furnace
- Heat Recovery Ventilator
- Central Humidifier
- On-demand domestic water heater
- Sanitary Heat Recovery
- 200 amp Electric Service
- Energy Star Appliances (Induction Cooktop)



Utility Bills

Electrical	Gas	TOTAL
July 2020 - April 2021 (before) <ul style="list-style-type: none">• \$ 910 (10 months)	July 2020 - April 2021 (before) <ul style="list-style-type: none">• \$ 1014 (10 months)	<ul style="list-style-type: none">• \$ 1924
July 2022 – April 2023 (after) <ul style="list-style-type: none">• \$2400 (10 months)	July 2022 – April 2023 (after) <ul style="list-style-type: none">• \$280 (10 months)	<ul style="list-style-type: none">• \$2680

Solar Ready



5.850

kWdc

System Size

943

kWh/Year/kWdc

System Efficiency

5,519

kWh/Year

Estimated Solar

- Feed in Tariff Program
- Roof joists sized to accommodate panels

Resilience

- Gas fireplace for power outage
- Generlink transfer switch for power outage



Completion



Challenges

- Supply chain
- Poor trades: knowledge gap of systems
- Poor trades: trust and workmanship

2nd Chance?

- Increased insulation
- Smaller windows
- Triple glaze windows
- Different mechanical trade
- Different brand of heat pump? Cold climate heat pump?
- Heat pump for heating domestic hot water