



Laneway Living

BY
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Energy Efficient Environmentally Friendly Passive Design

What's in here?

Passive Design Strategies

Maximizing Sun-light Gain	1
Shading Systems	3
Heating / Cooling	5

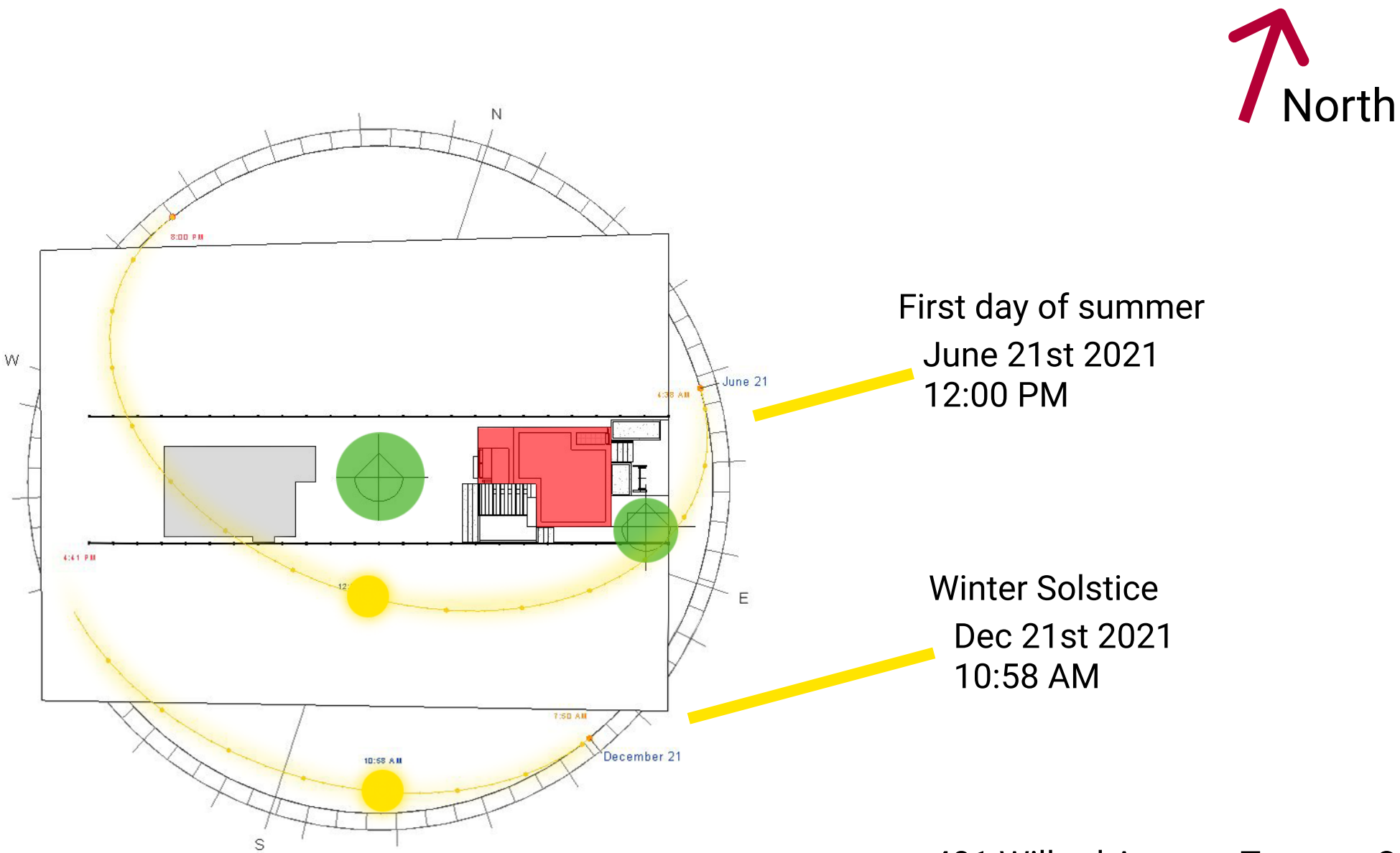
Energy Consideration

Energy Modeling	6
Insulation Technique	7
Solar Energy Usage	7

Other Infomation

Zonning Requirements	8
Cladding Materials	9

Maximizing Sun-Light Gain



LEGEND

- Trees
- Existing Building
- Sun: Path/ Position
- Laneway House

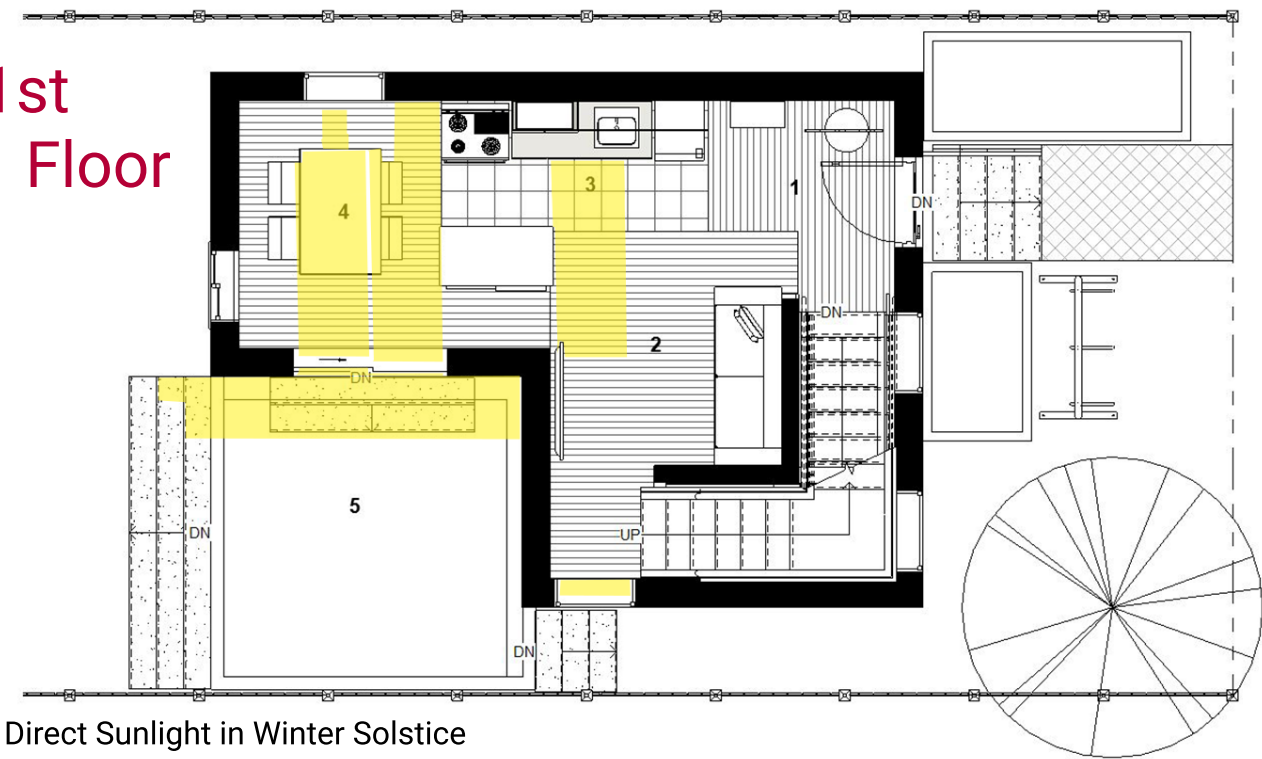
The project is designed with consideration of the sun rotation and position. This allows the building to gain more natural light into rooms and spaces passively through openings. Rooms are layout and oriented to take advantage of the natural light according to the time of day it's used.

481 Willard Avenue, Toronto, ON

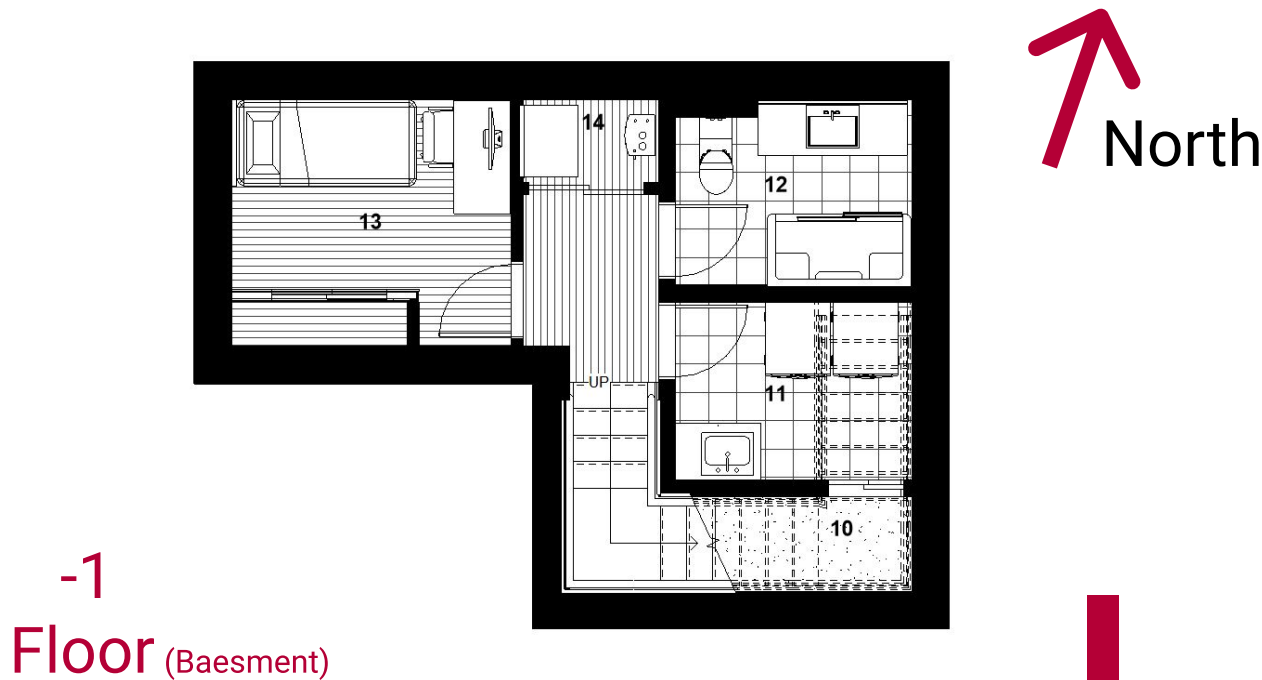
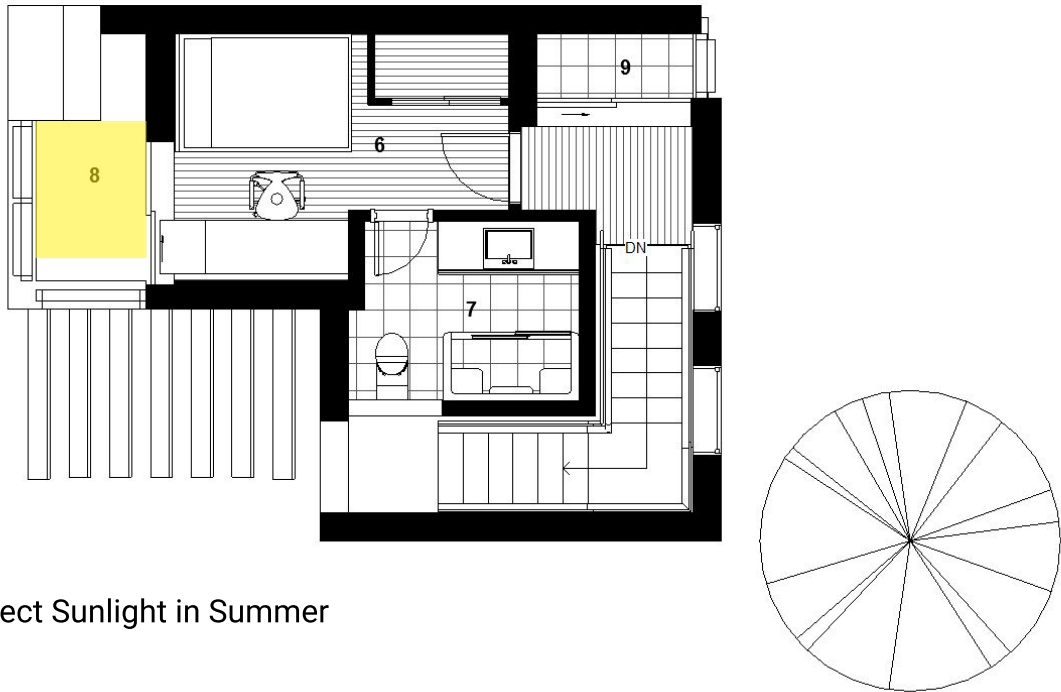
Natural Lighting

In Rooms

1st Floor



2nd Floor

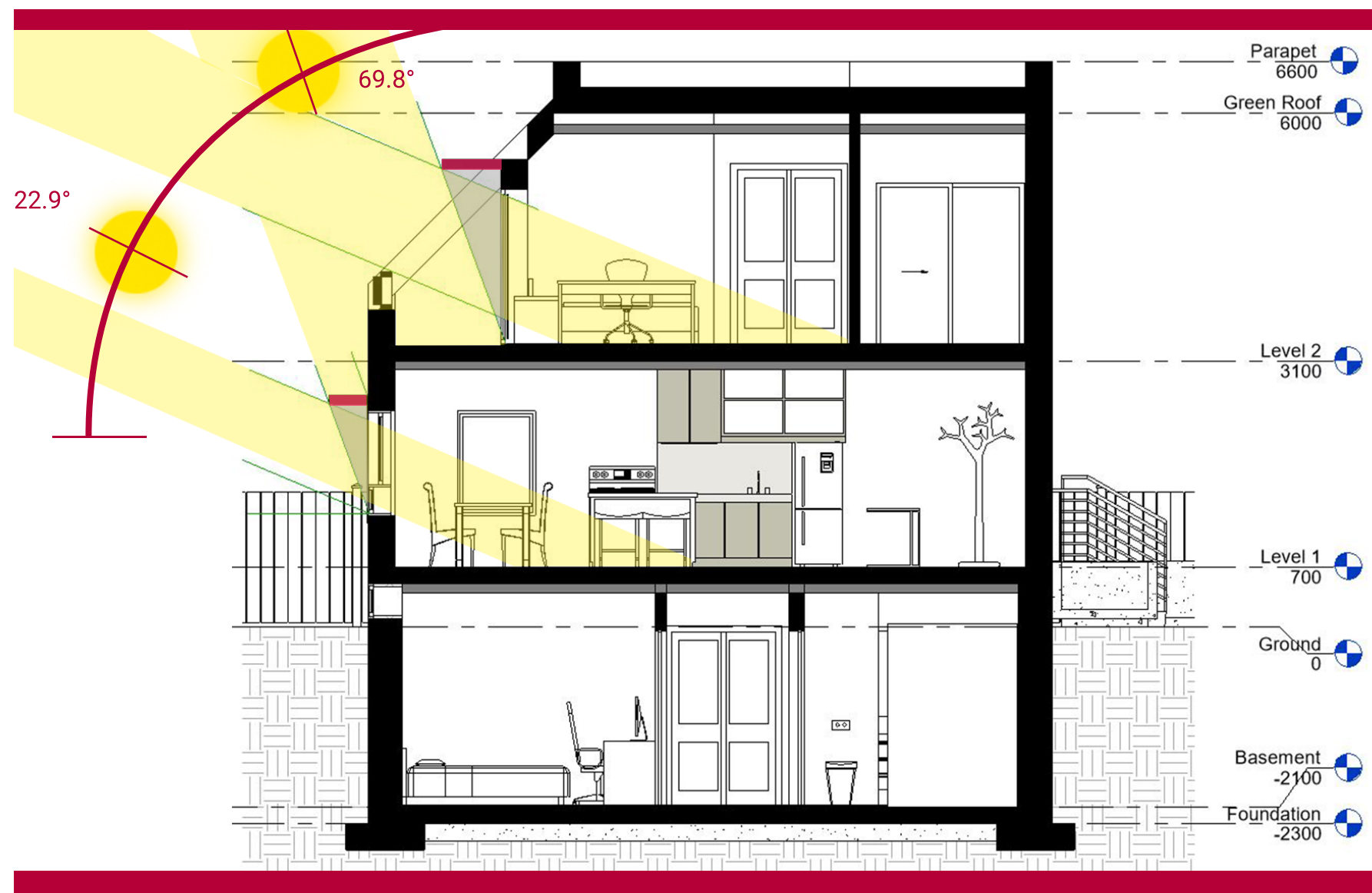


-1 Floor (Basement)

#	Rooms	Size	#	Rooms	Size
1	Entrance	03 m ²	11	Laundry	05 m ²
2	Living Room	06 m ²	12	Washroom	05 m ²
3	Kitchen	04 m ²	13	Bedroom 2	07 m ²
4	Dinning	07 m ²	14	Utility Room	01 m ²
5	Sand Garden	10 m ²			
6	Main Bedroom	09 m ²			
7	Main Washroom	05 m ²			
8	Balcony	03 m ²			
9	Balcony 2	01 m ²			
10	Storage	02 m ²			

Direct Sunlight Areas

Direct Sunlight produces heat in winter and reducing it cool the building passively.



Solar Noon

June 21, 2021
1:19pm (69.8°)

December 21, 2021
12:15am (22.9°)

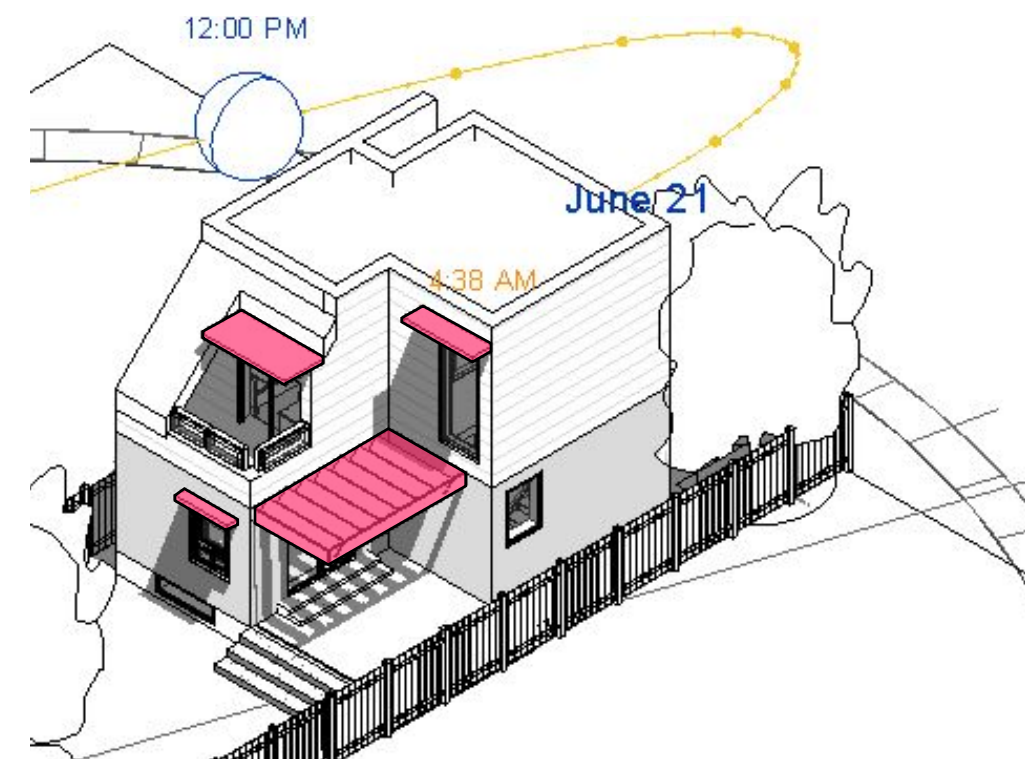
LEGEND

- Summer Shade
- Sunlight
- Shading System

Passive

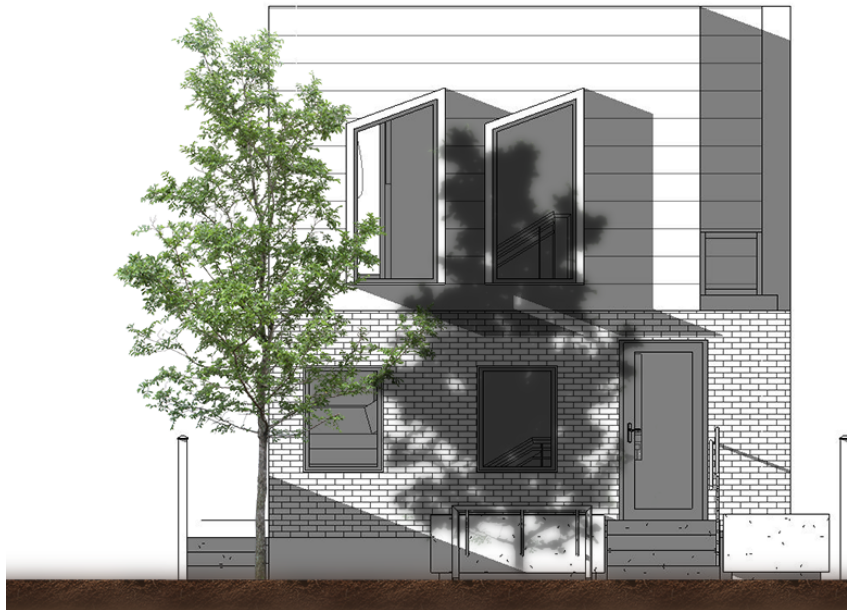
Shading Systems

Horizontal and vertical shading systems are installed around openings to reduce the intensity of direct sunlight in the summer but maximize the amount in winter. Trees on-site are used as passive shading systems as well.



Shading at Summer Solstice

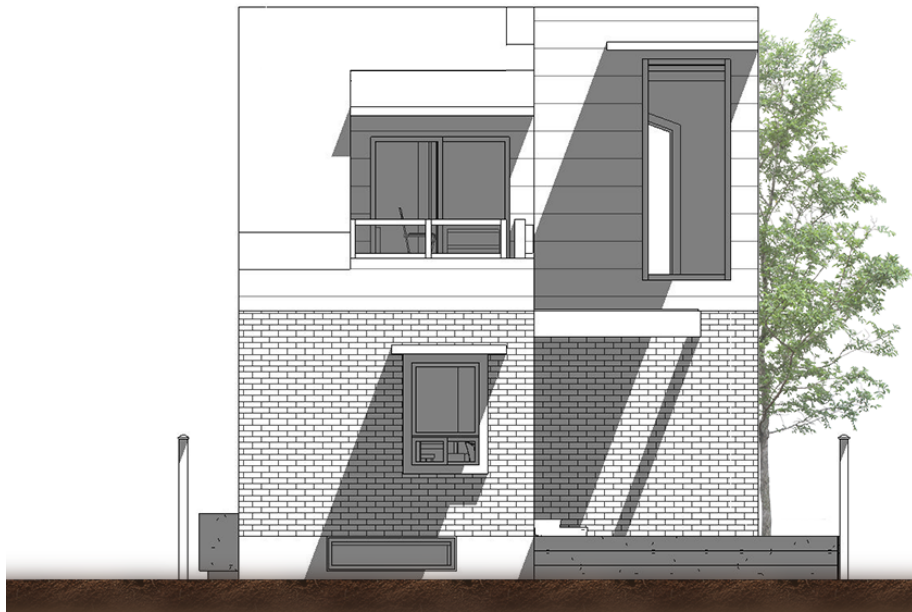
Elevations



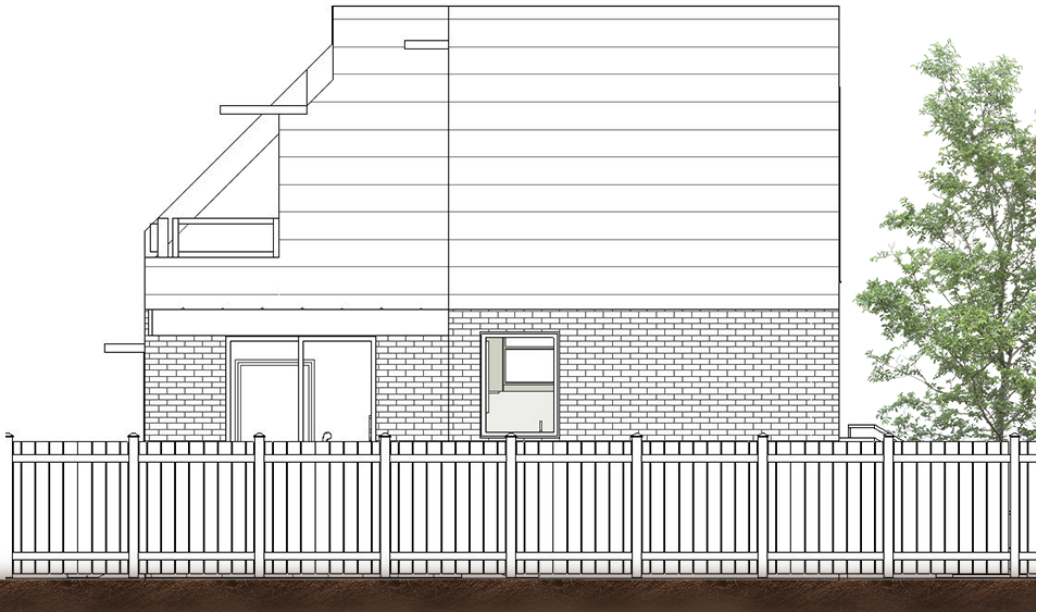
East



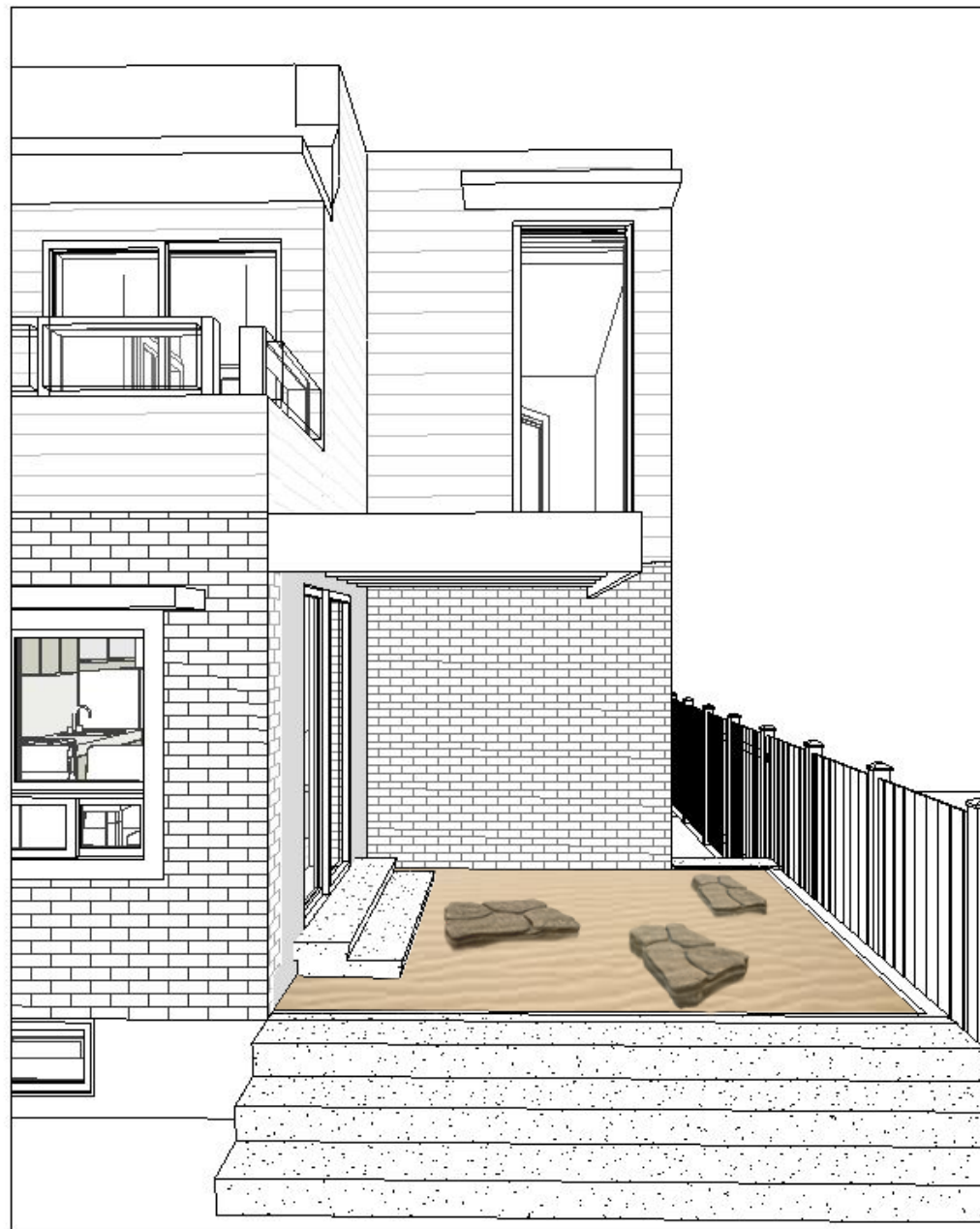
North



West



South



Sand Garden

Heating

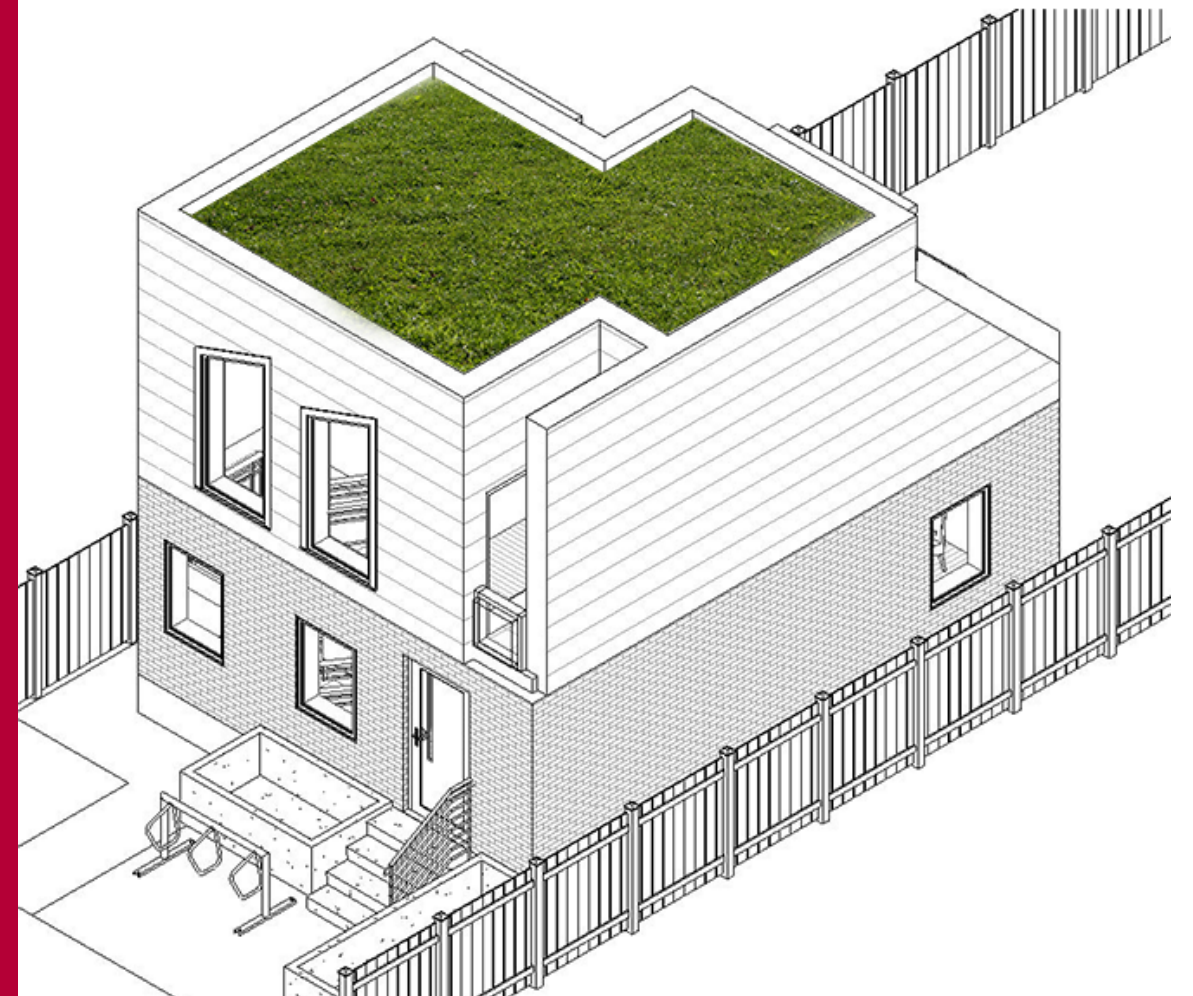
Sand (Zen) Garden in outdoor space and tile flooring in dining and kitchen act as a thermal mass to store heat during day time and discharge it through the night.

Passive

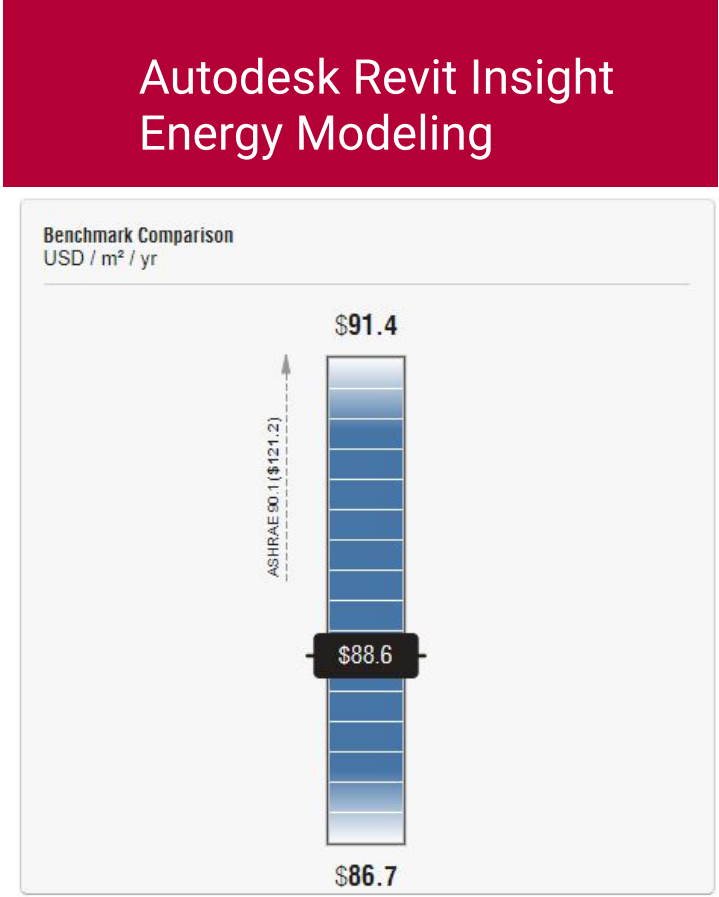
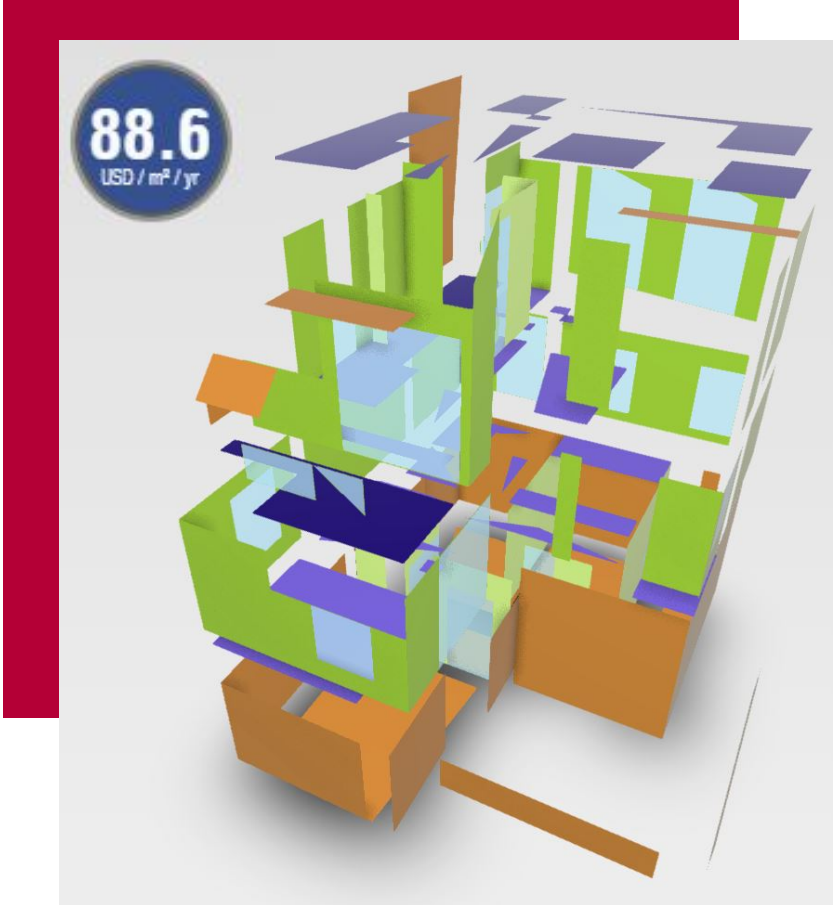
Cooling

While helping the environment and reversing the Urban Heat Island effect, the Green roof moisturizes and cool the surroundings.

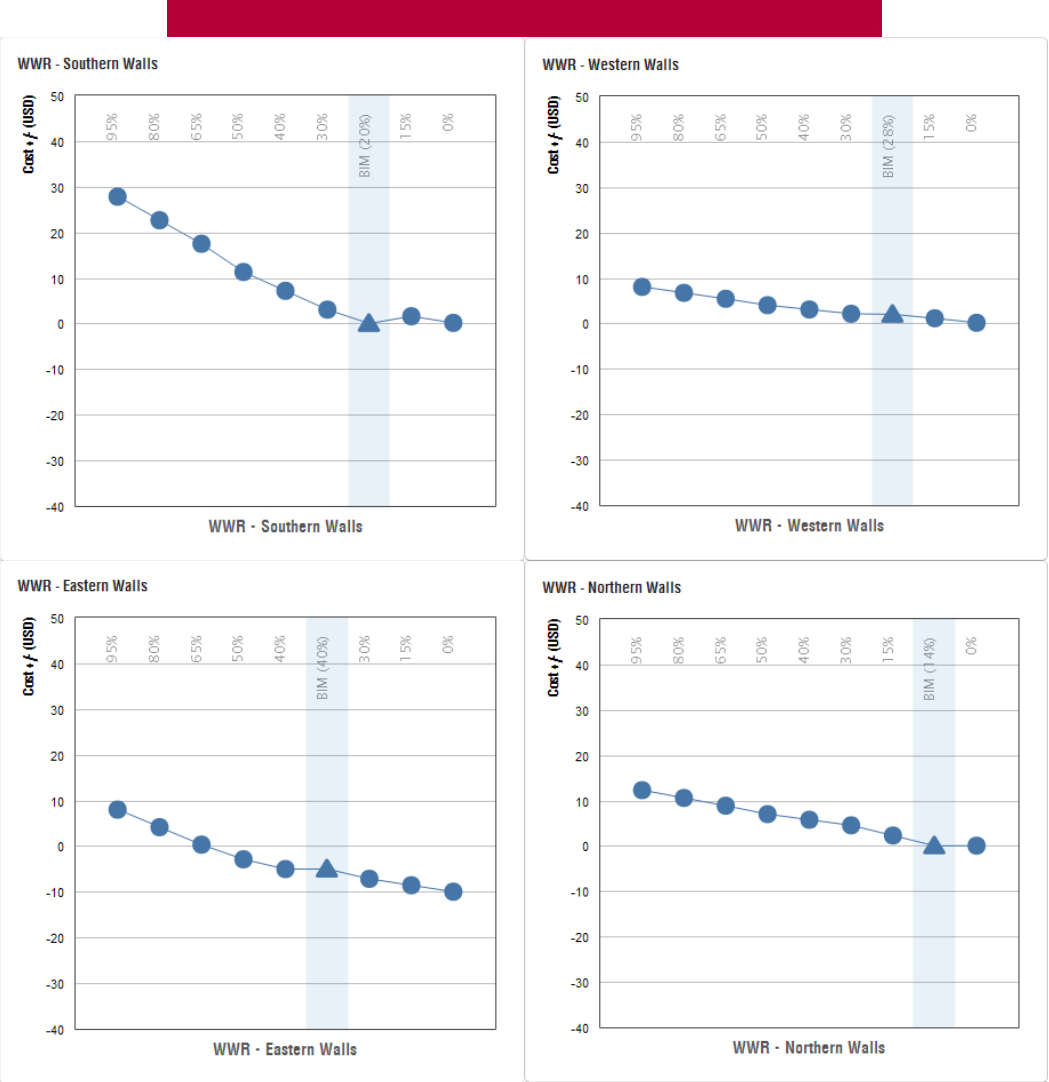
Green Roof



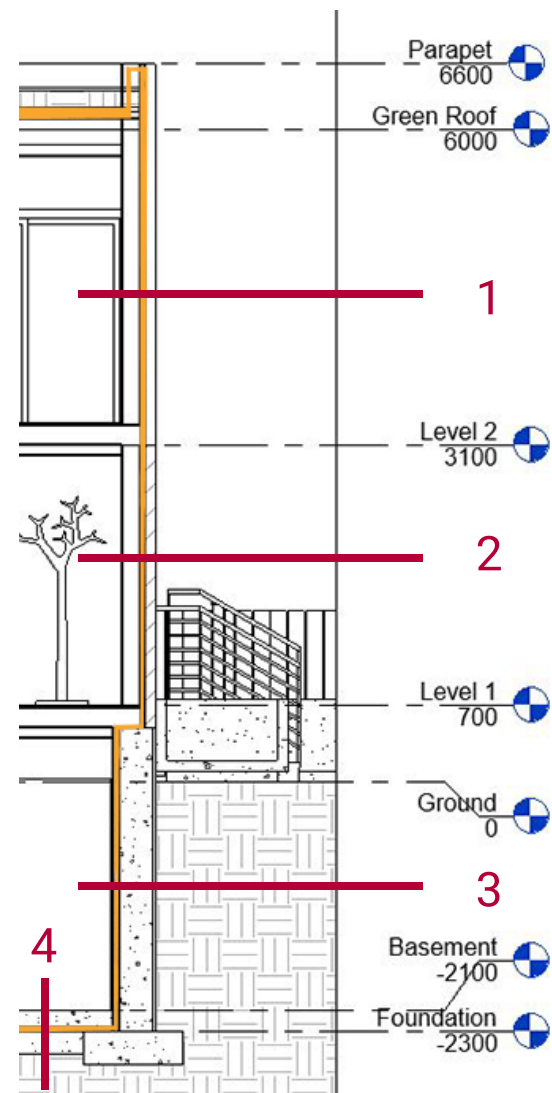
Energy Modeling



Energy modeling tools are used to help calculate the energy consumption of a building in its earlier design stages. This allows for more optimizations choices further to be more energy and cost-efficient.



Note: Due to model complexity and room elements/ volume. This energy modeling may not be 100% accurate.



■ Rigid insulation

1. Wood Siding Ext-Wall
2. Brick Siding Ext-Wall
3. Foundation Wall
4. Basement Floor@ Foundation

1. $R = 29.17$
2. $R = 29.23$
3. $R = 29.23$
4. $R = 37.0$

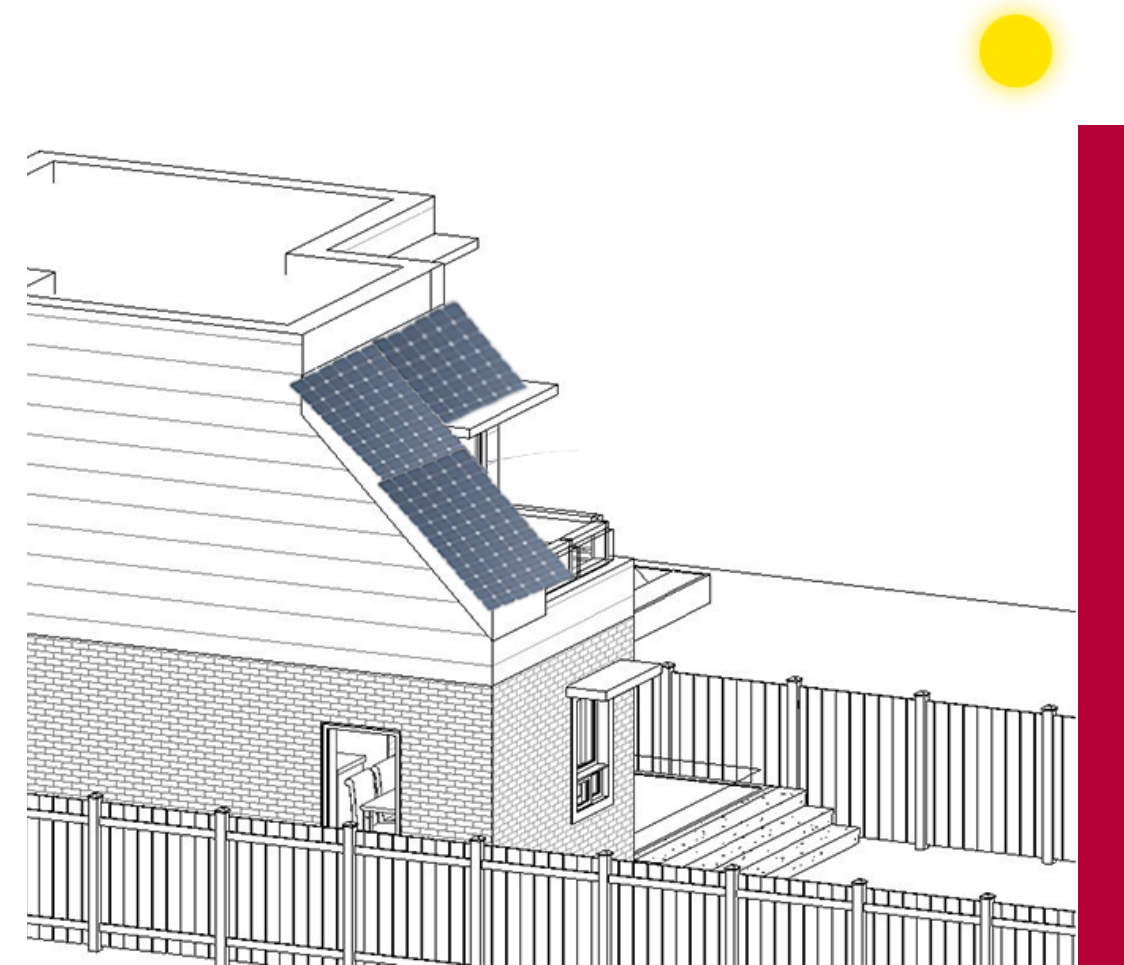
Calculated with
Ekotrope Calculator

Continuous *Insulation*

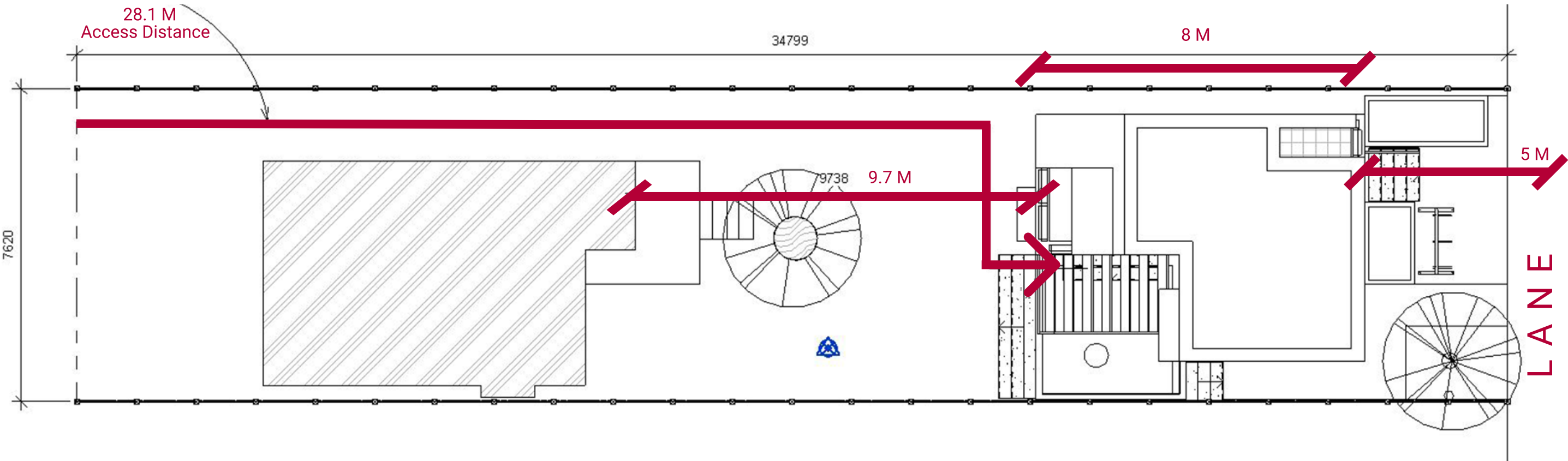
Insulation wraps the building continuously so that thermal bridging doesn't occur. Limiting thermal bridging save energy by lowering the heat loss of the building.

Renewable *Solar Energy*

PV panels are install on the slope roof facing south-west to achieve best possible solar gain. Then power is store in the typical 10kWh solar battery.



Zoning Infomation



Item	Req.	Provided	Item	Req.	Provided
Lane Frontage	3m Min	7.6m	Landscape	30% Min	33%
Access Distance	45m Max	28.1m	Suite Depth	8m Max	8m
Building Height	6m Max	6m	Lane Balcony	Suggested	Yes
Seperation Dist.	7.5m	9.7m	Parking	0	0
Outdoor Space	Yes	Yes	Bike parking	2	3
Angular Plane	45 Deg	45 Deg			
Side-yard Window	30%	14%			
MainFace Window	50%	28%			
LaneFace Window	75%	50%			
Setback	3m	5m			

Changing Lane Principle

Complying with Toronto’s laneway suite requirements and guidelines.



Main Building

Wood
Siding

Brick

Citation

Forest products and applications. (2020, July 16). Government of Canada.
<https://www.nrcan.gc.ca/our-natural-resources/forests-forestry/forest-industry-trade/forest-products-applications/13317>

<https://www.ekotrope.com/r-value-calculator>

<https://goo.gl/maps/TTW1a1dyzsr65pqZ7>

Exterior

Cladding Material

Exterior cladding materials are Brick and wood Siding to mimic the parent (Main) building. Since Canada is one of the largest wood producers in the world, selecting wood material reduces construction and transportation prices.(Forest Products and application)

Used Tools and Resources

Ekotrope Calculator

Autodesk Revit

Autodesk Insight

Adobe Photoshop

For More

Visit: harmonicascension.ca/architecture