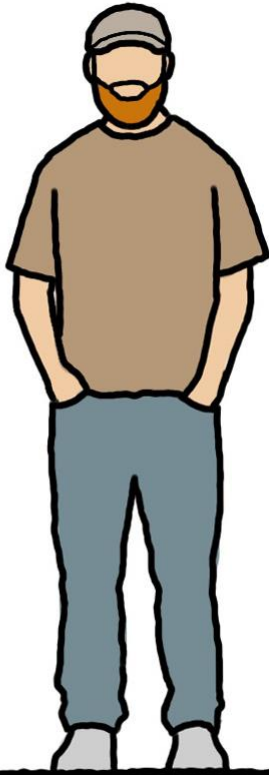


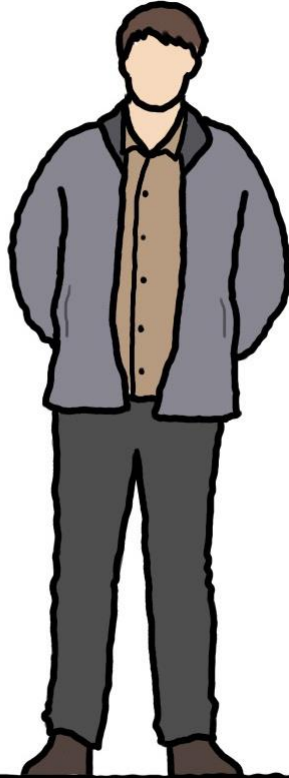
# NEST ZERO

single family - retrofit





Aidan



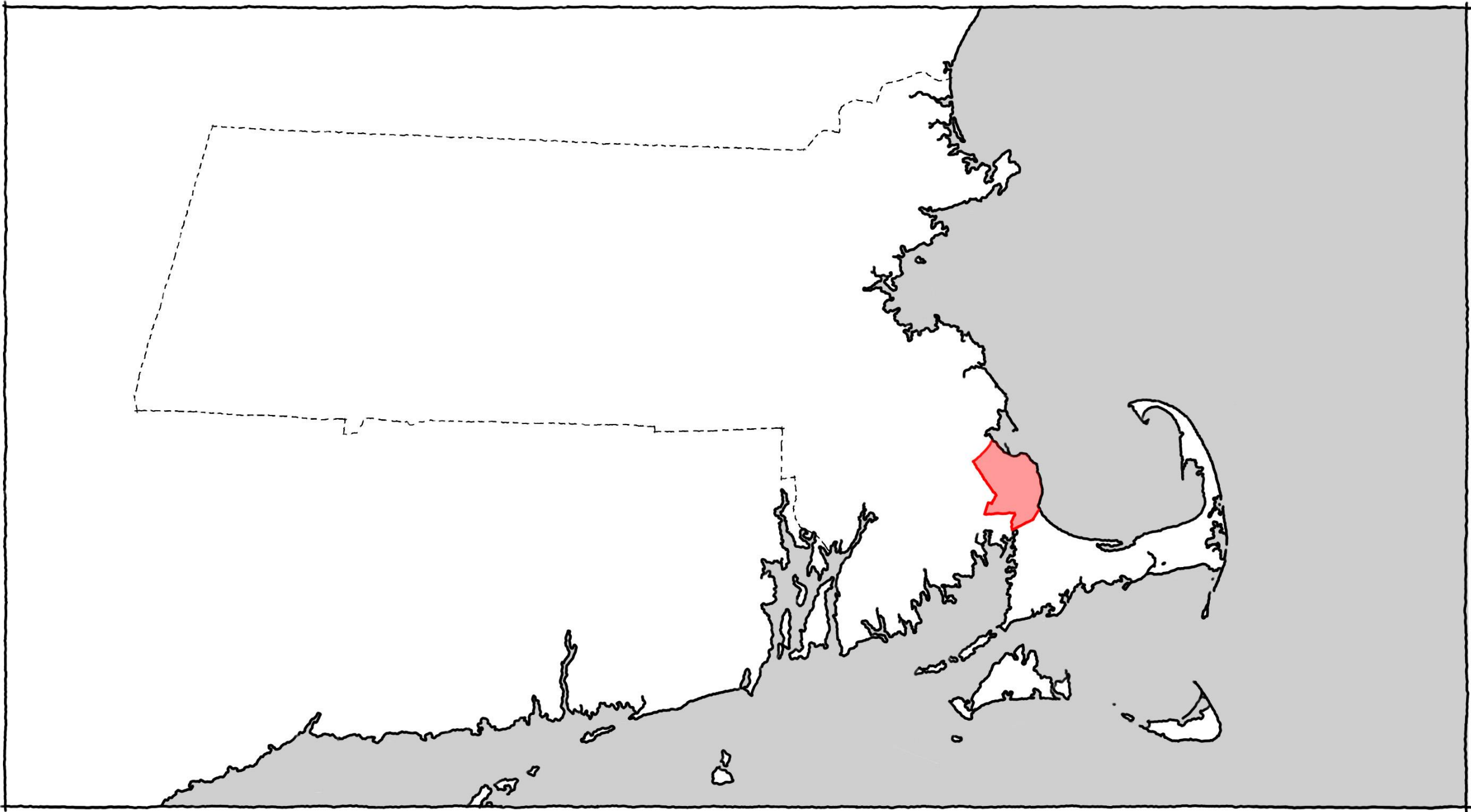
Noah



Milo



Professor Peters





1913



1950



2018



2024



Front



Right



Rear





Front



Right



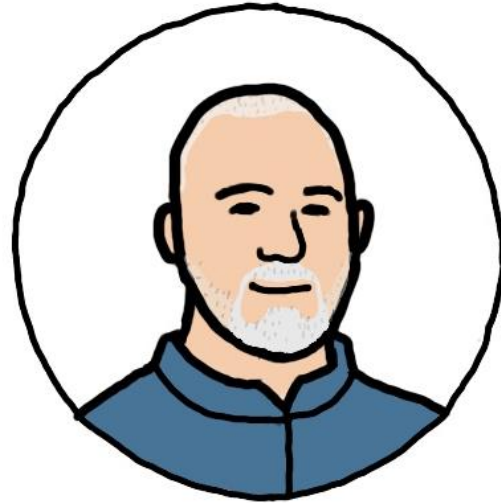
Rear







Librarian  
Plymouth Public Library



Architect  
BF Architects



Chair  
Community Preservation Committee



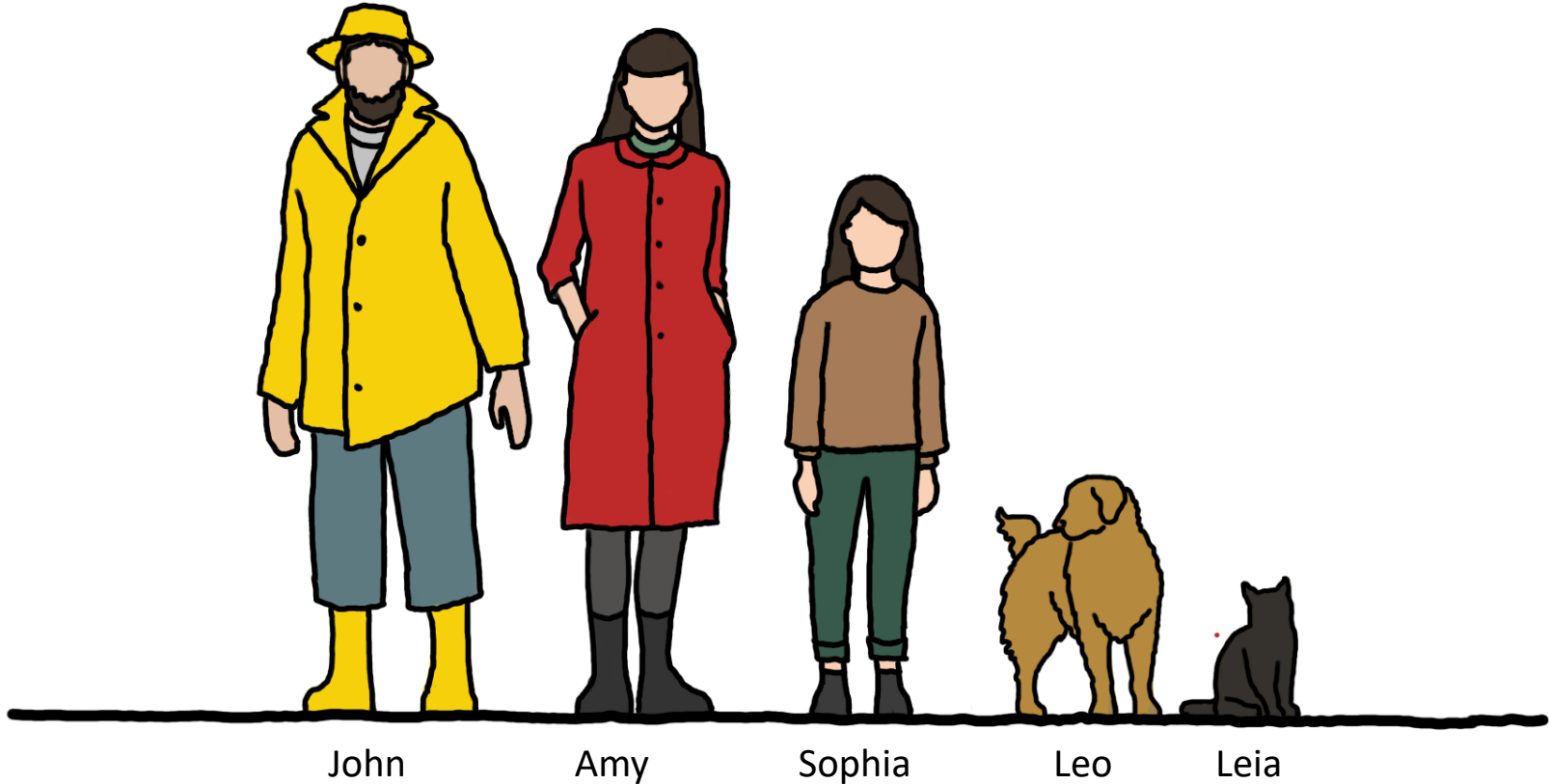
Artist retreat?

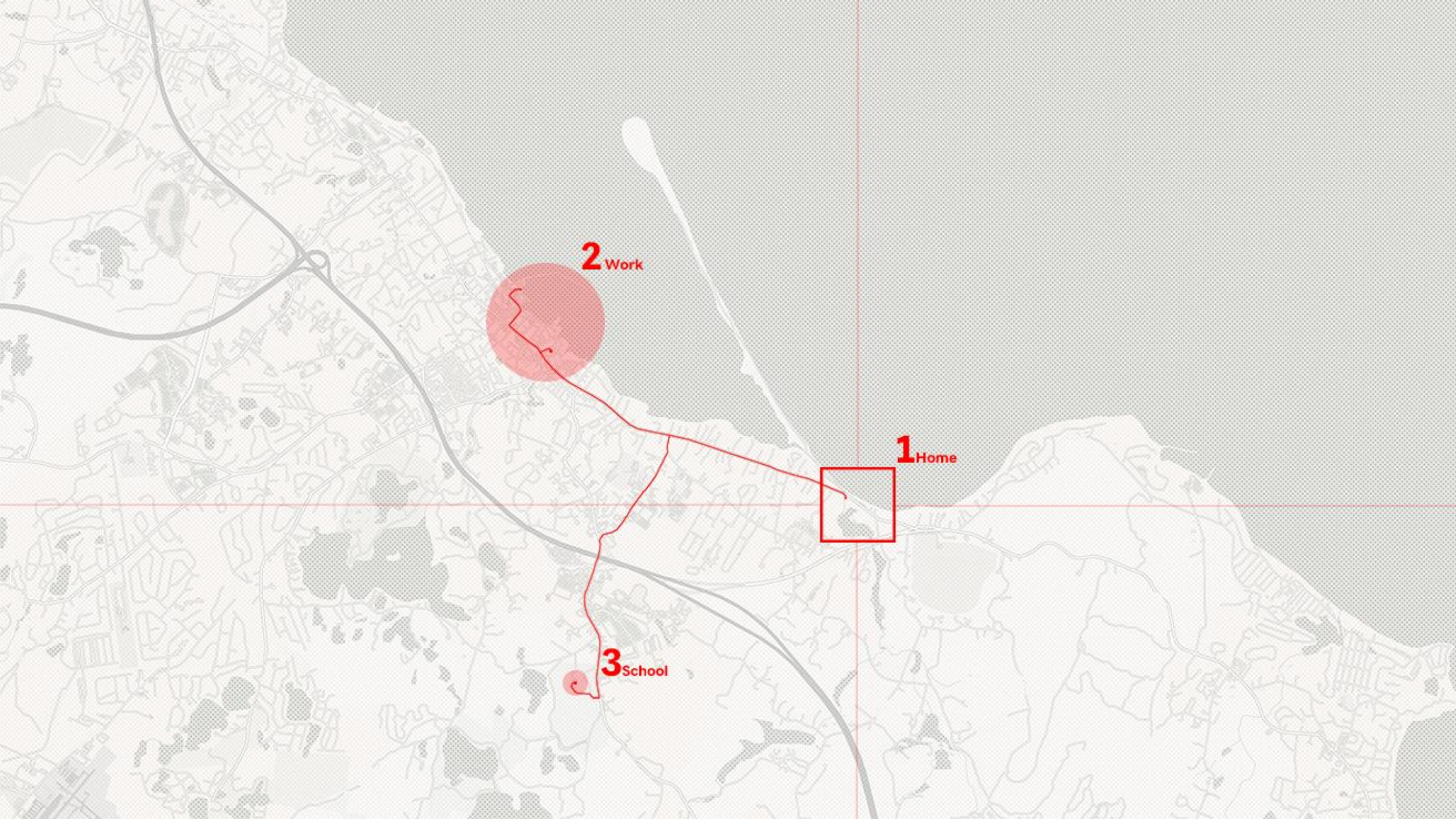


Bird-watching sanctuary?



Shelter for unhoused?

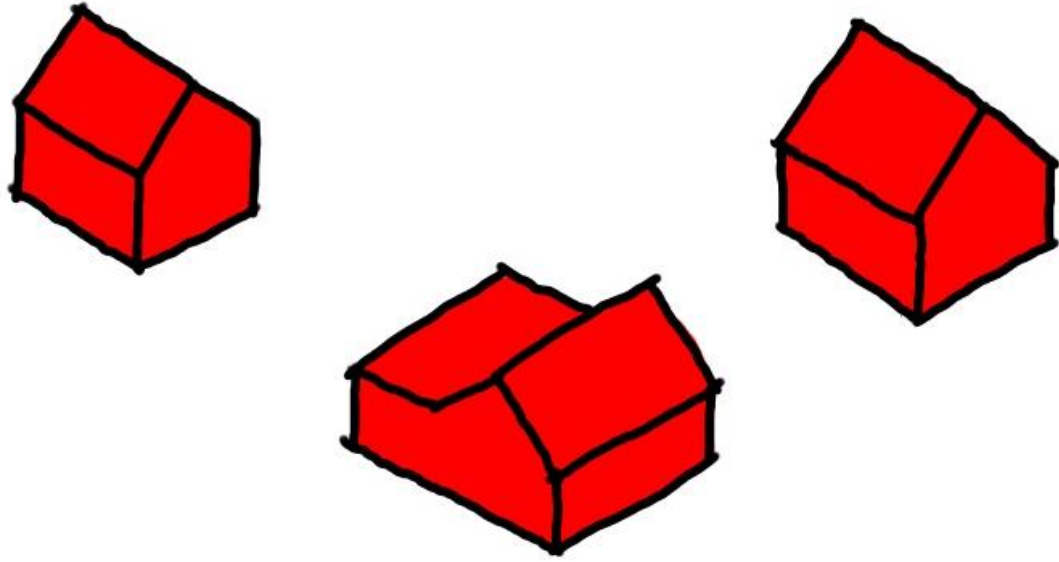




**2** Work

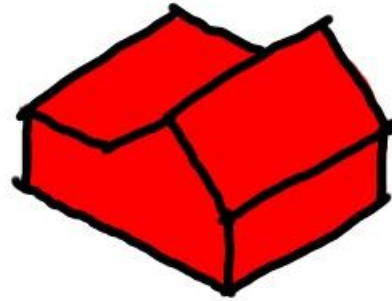
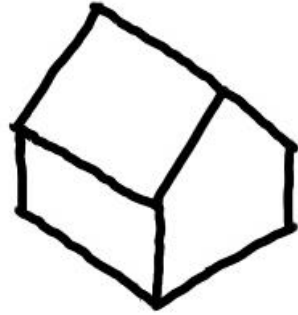
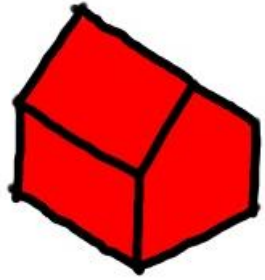
**1** Home

**3** School

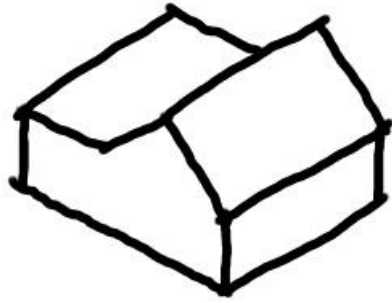
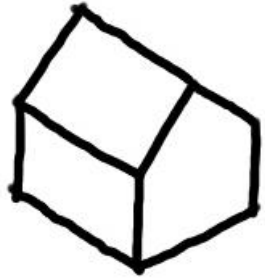


Three fishing shanties

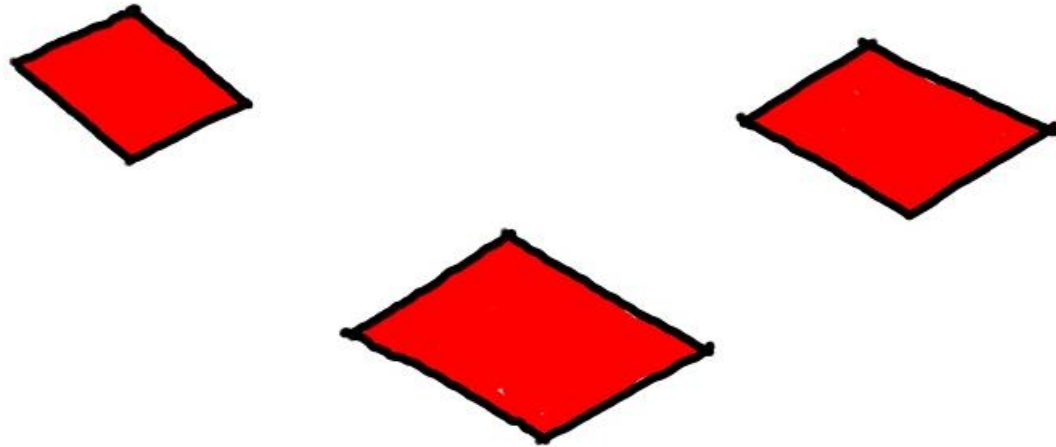




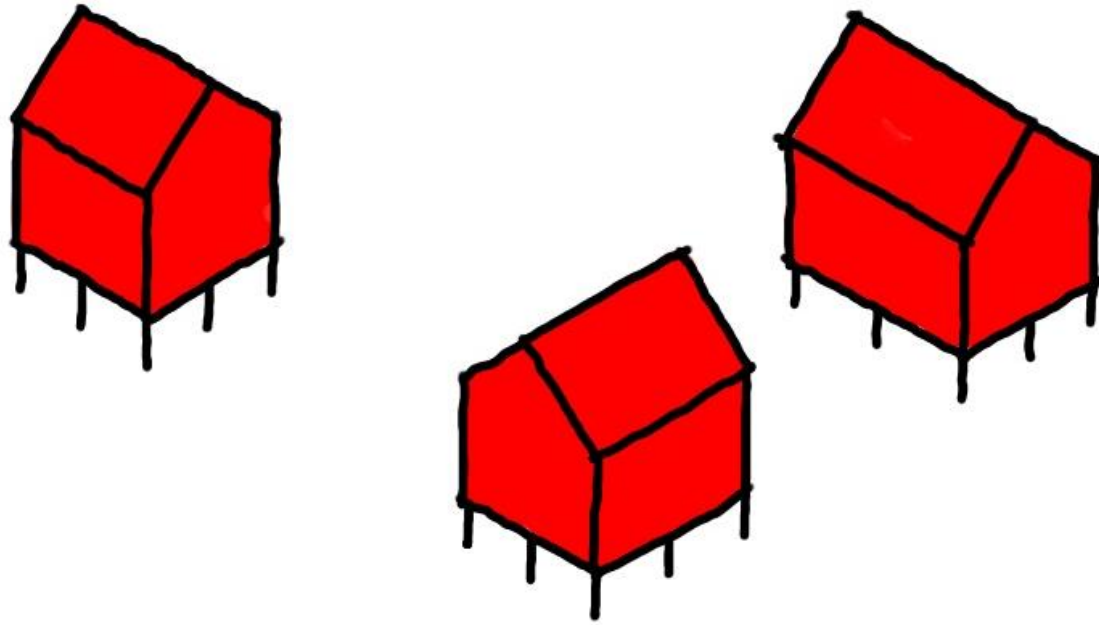
Two run down



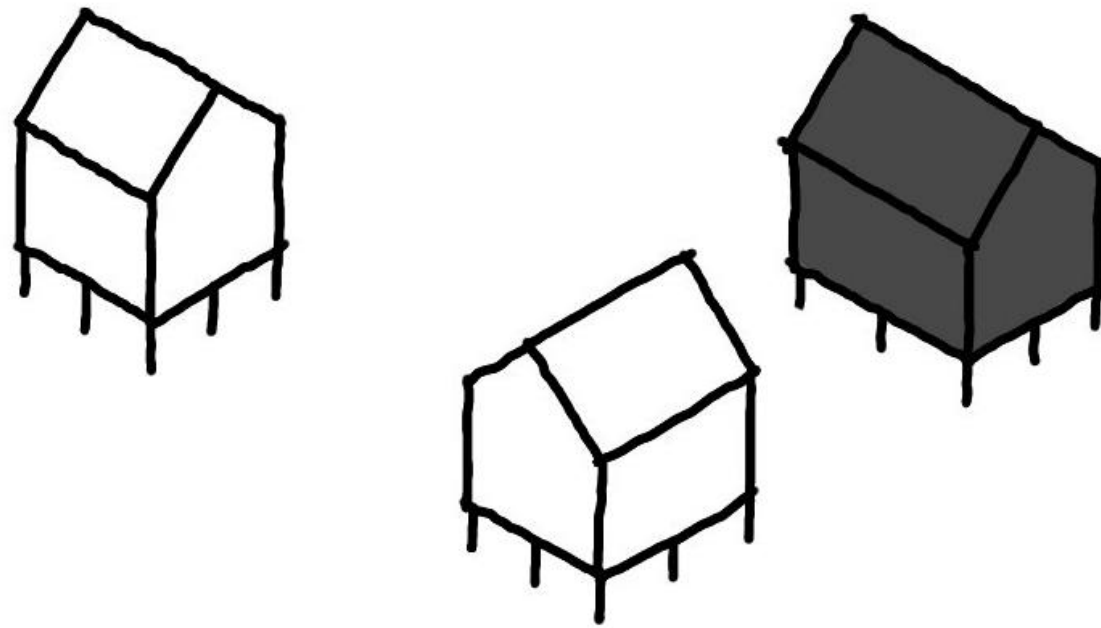
One burnt down



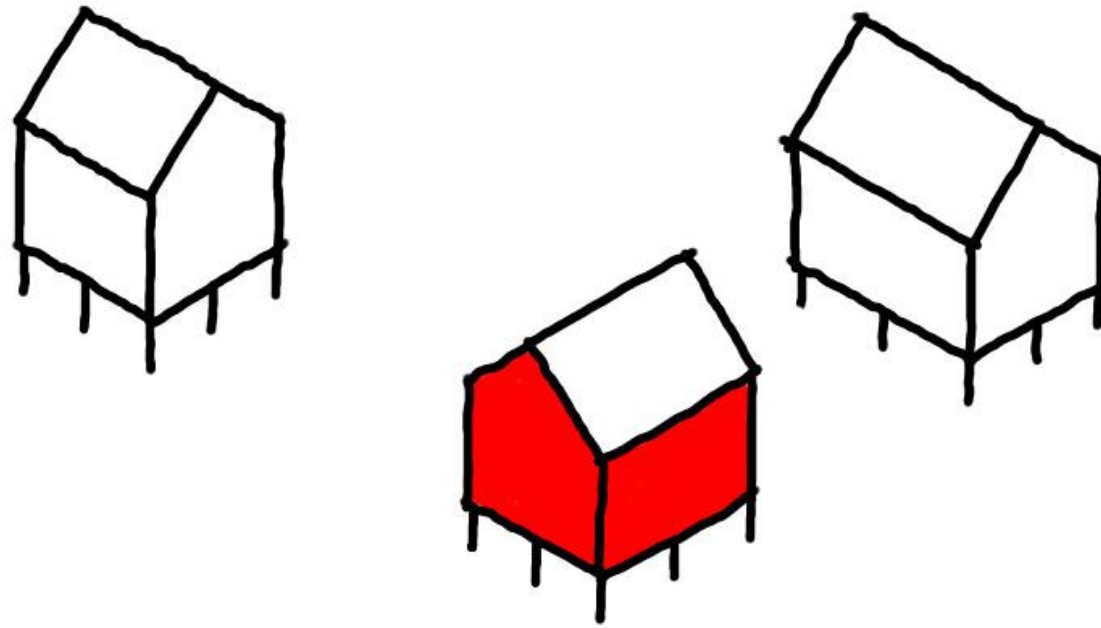
Disassemble buildings



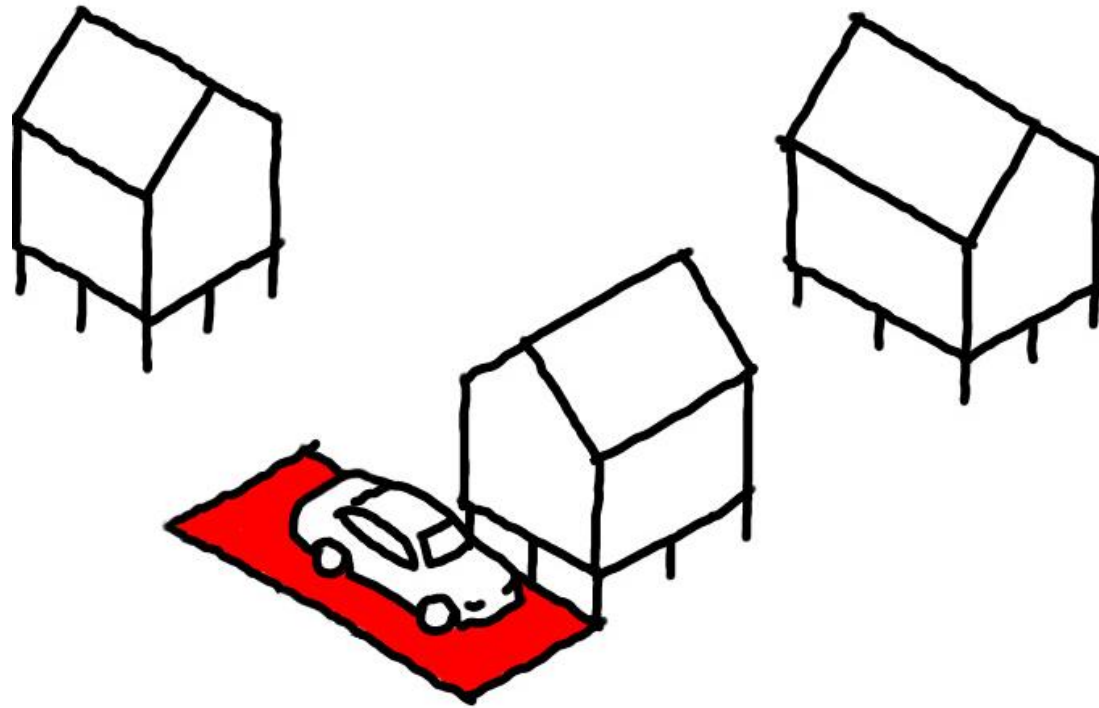
Rebuild on wood piles



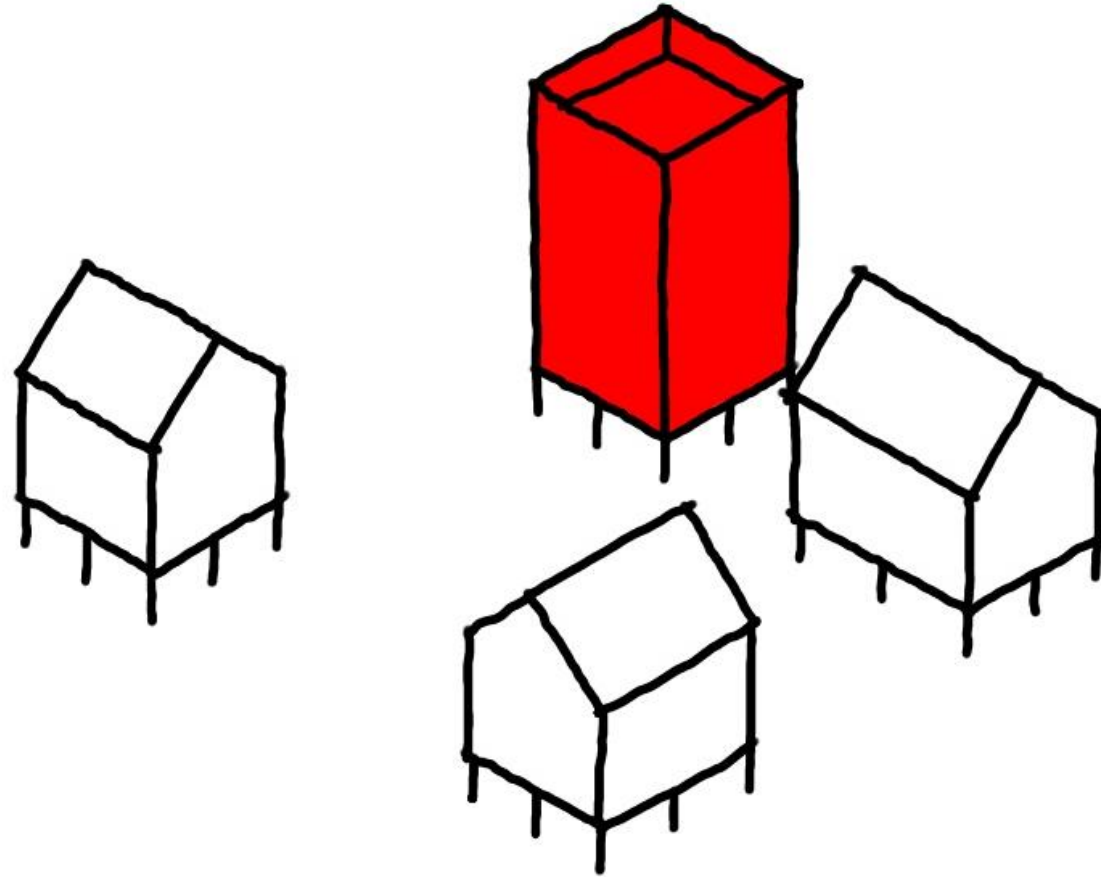
Charred wood cladding



Re-use clapboards

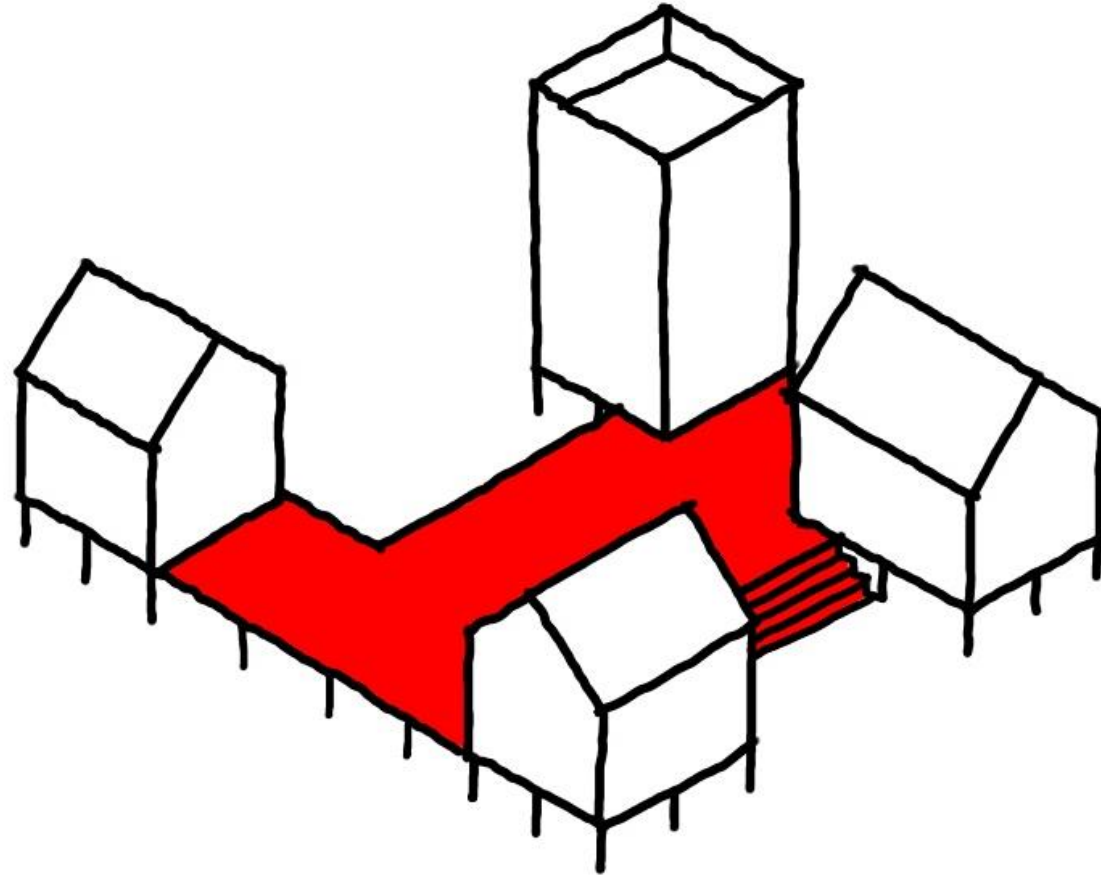


Re-use chimney bricks for patio

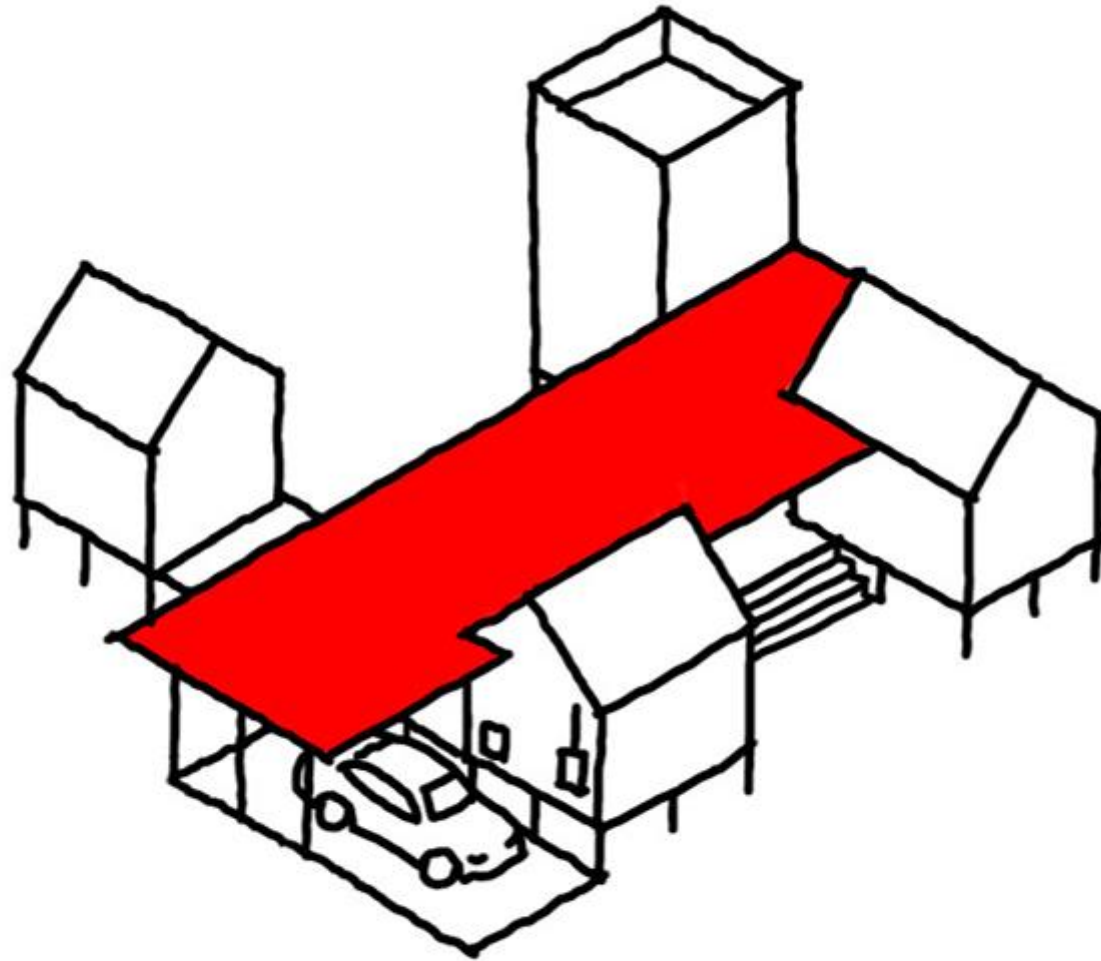


New observation tower

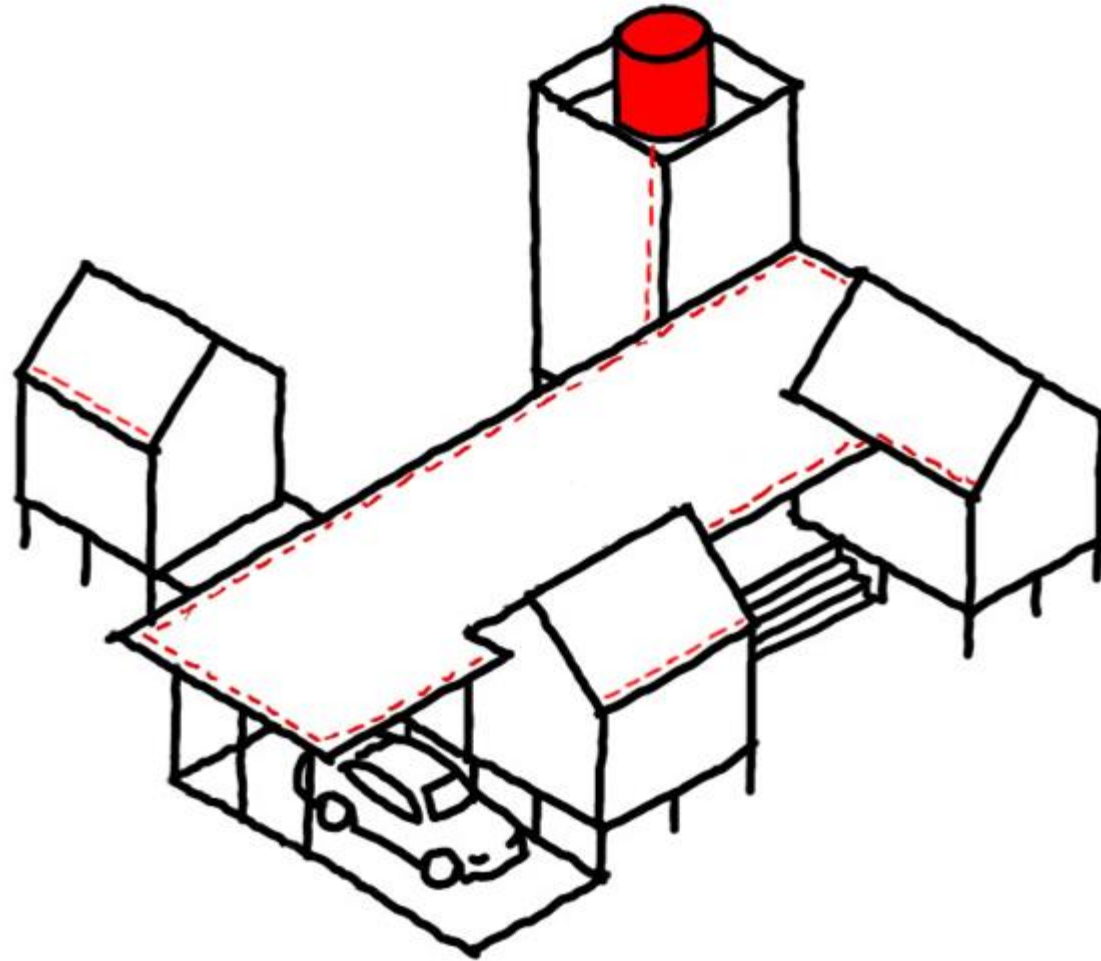




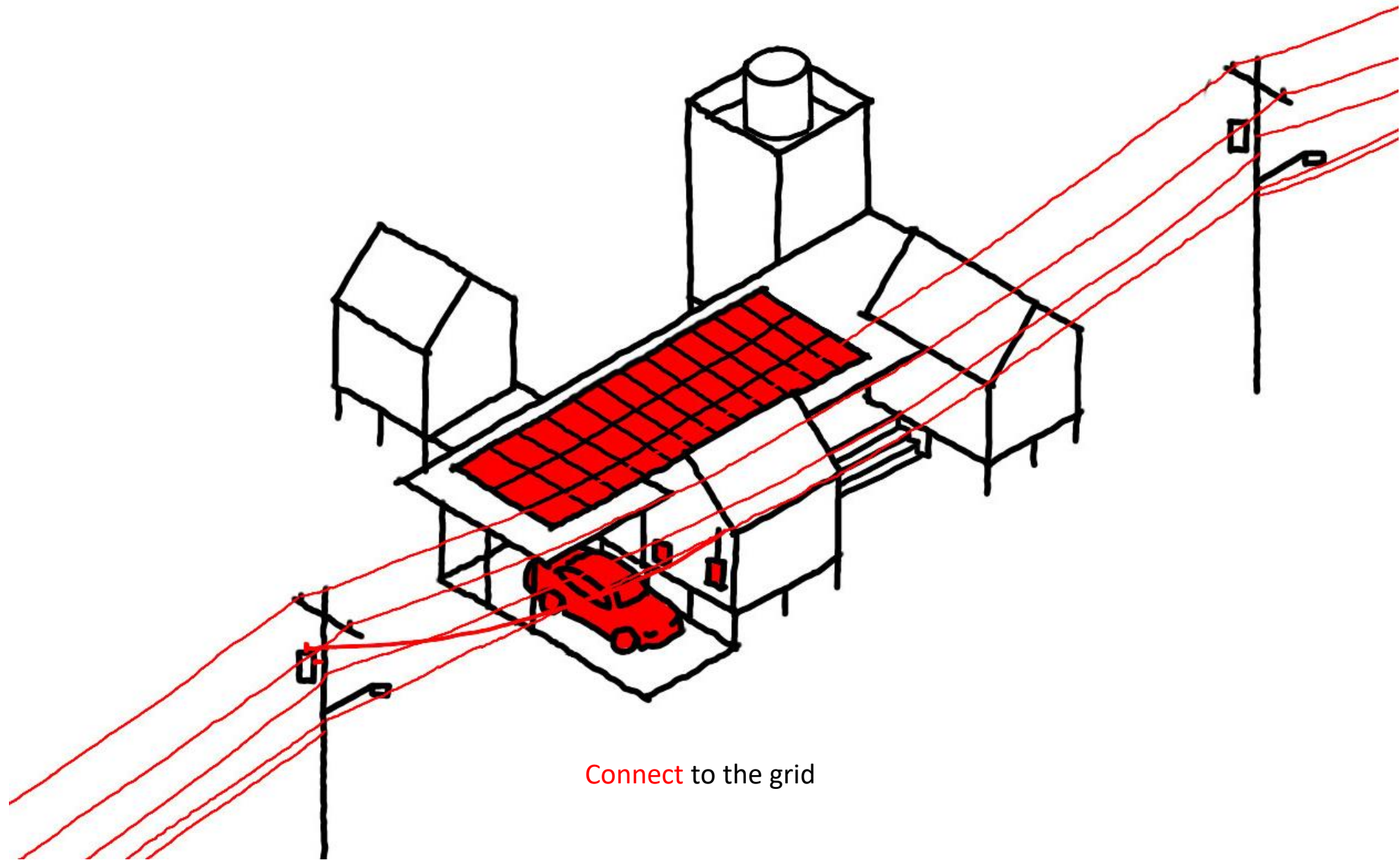
Connect with platform



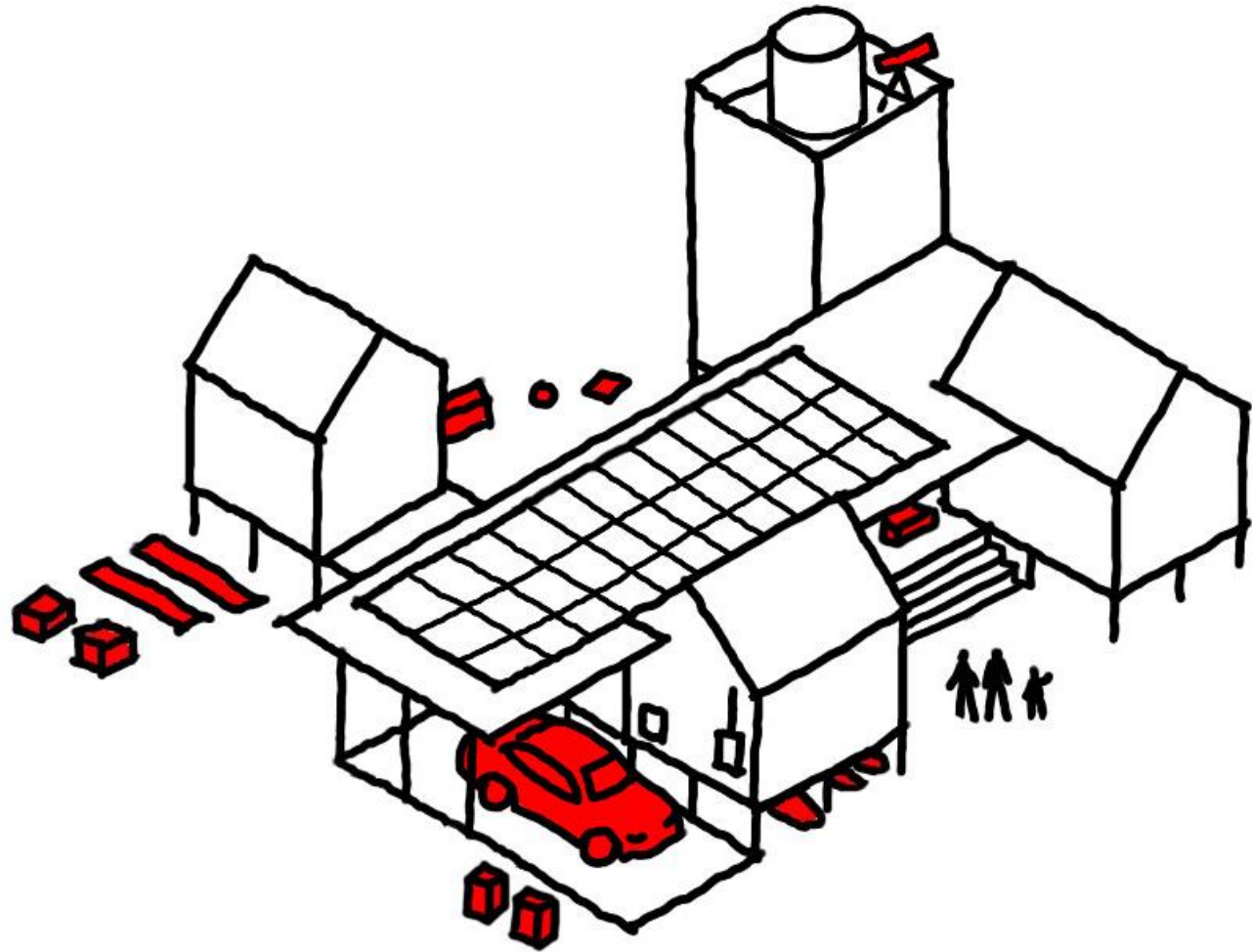
Shelter with roof



Collect rainwater



Connect to the grid

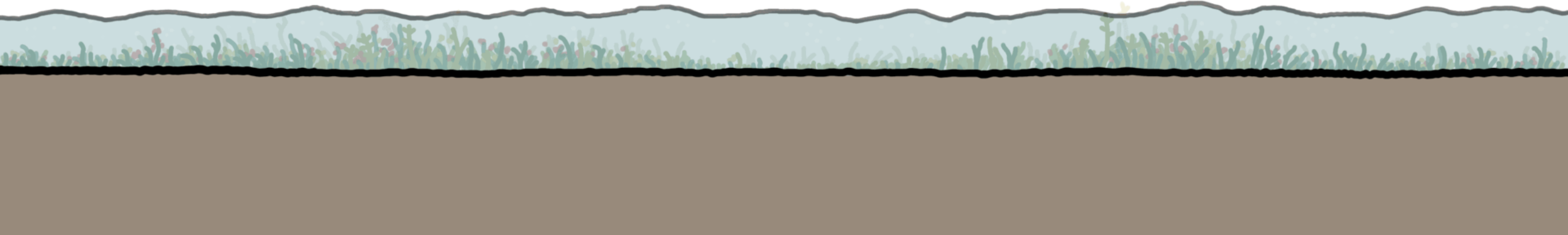


Move in

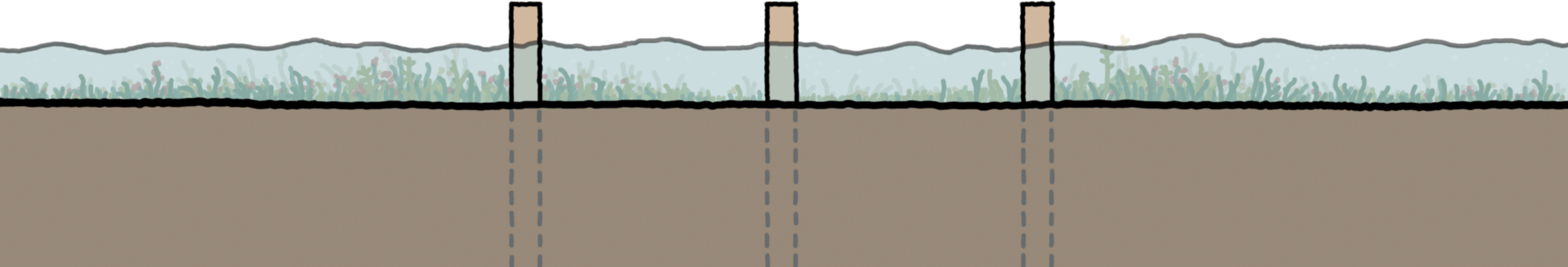


50 Year Flood Risk:  
1% chance

8ft. above sea level

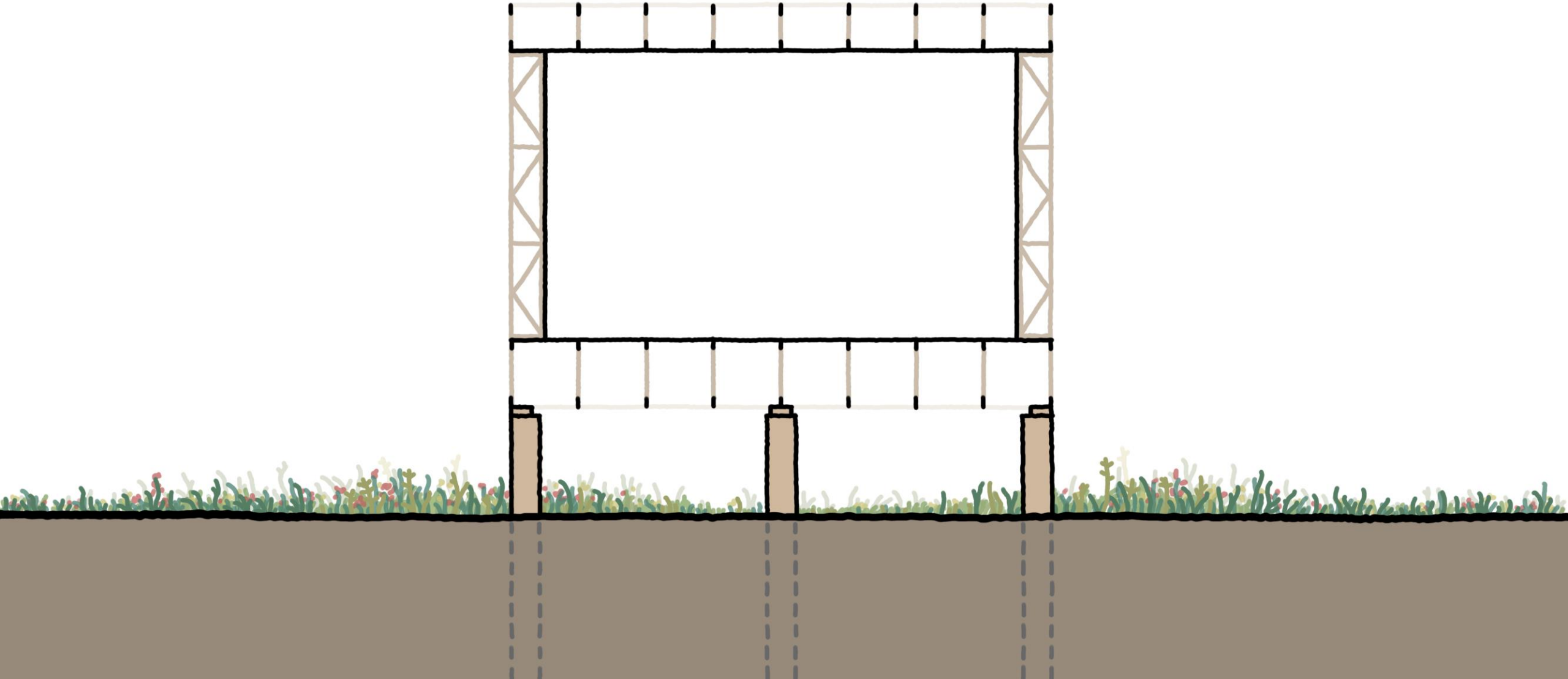


Foundation:  
treated wood piles

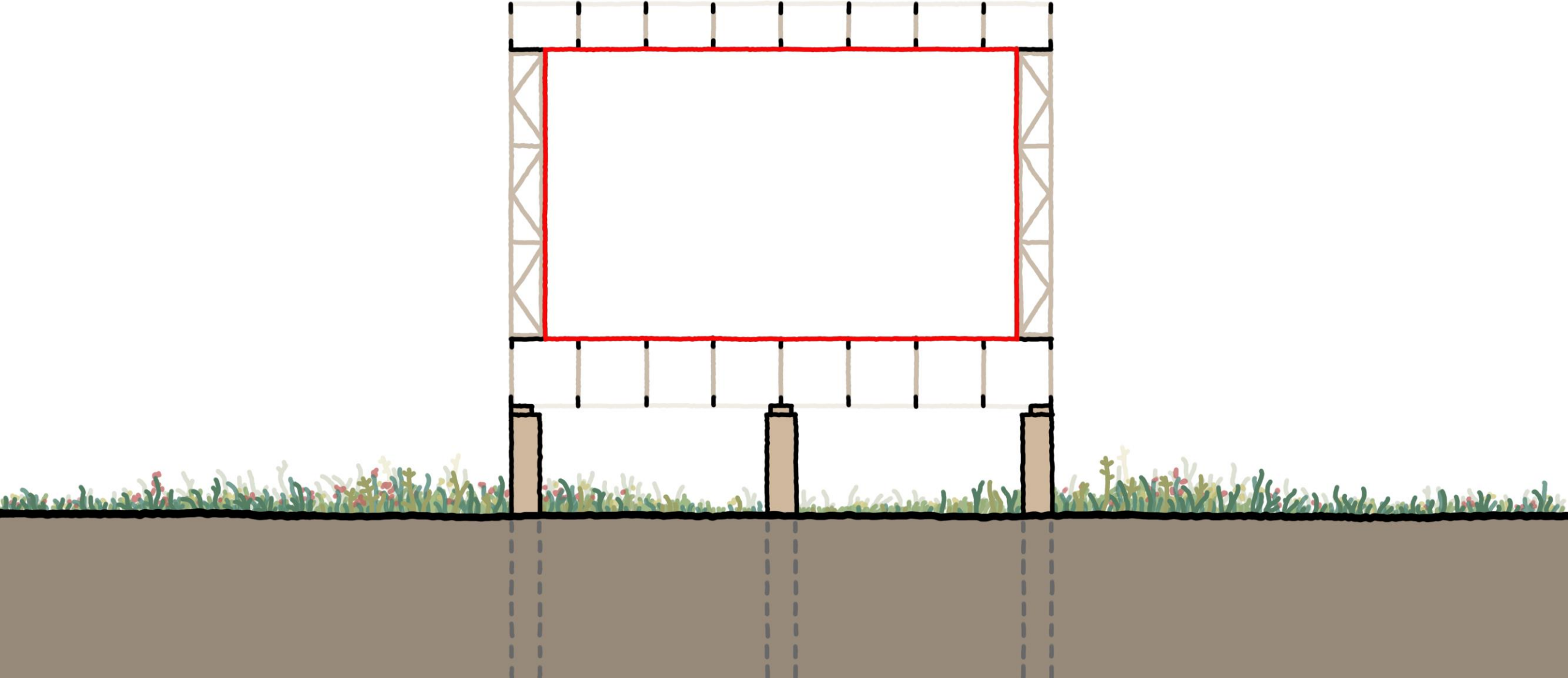




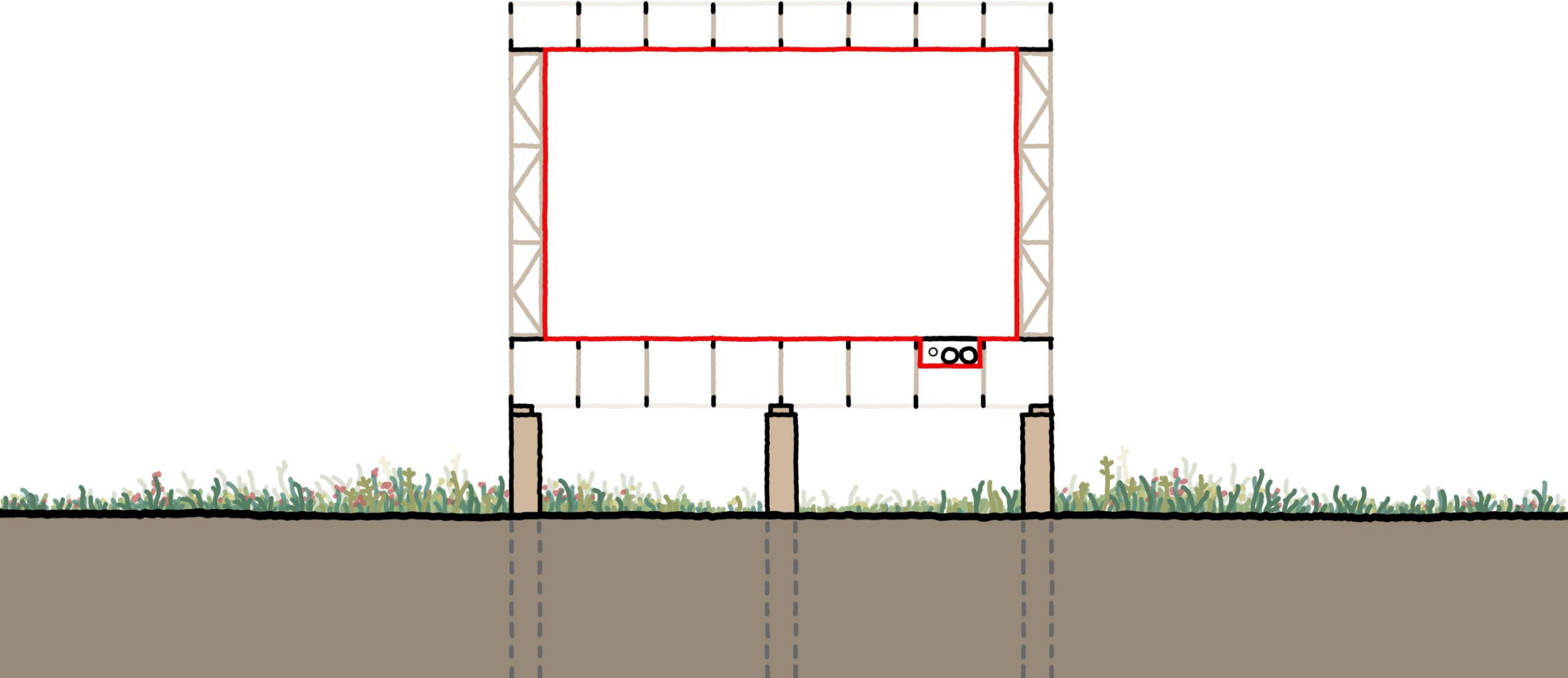
Structure:  
open web trusses  
osb sheathing



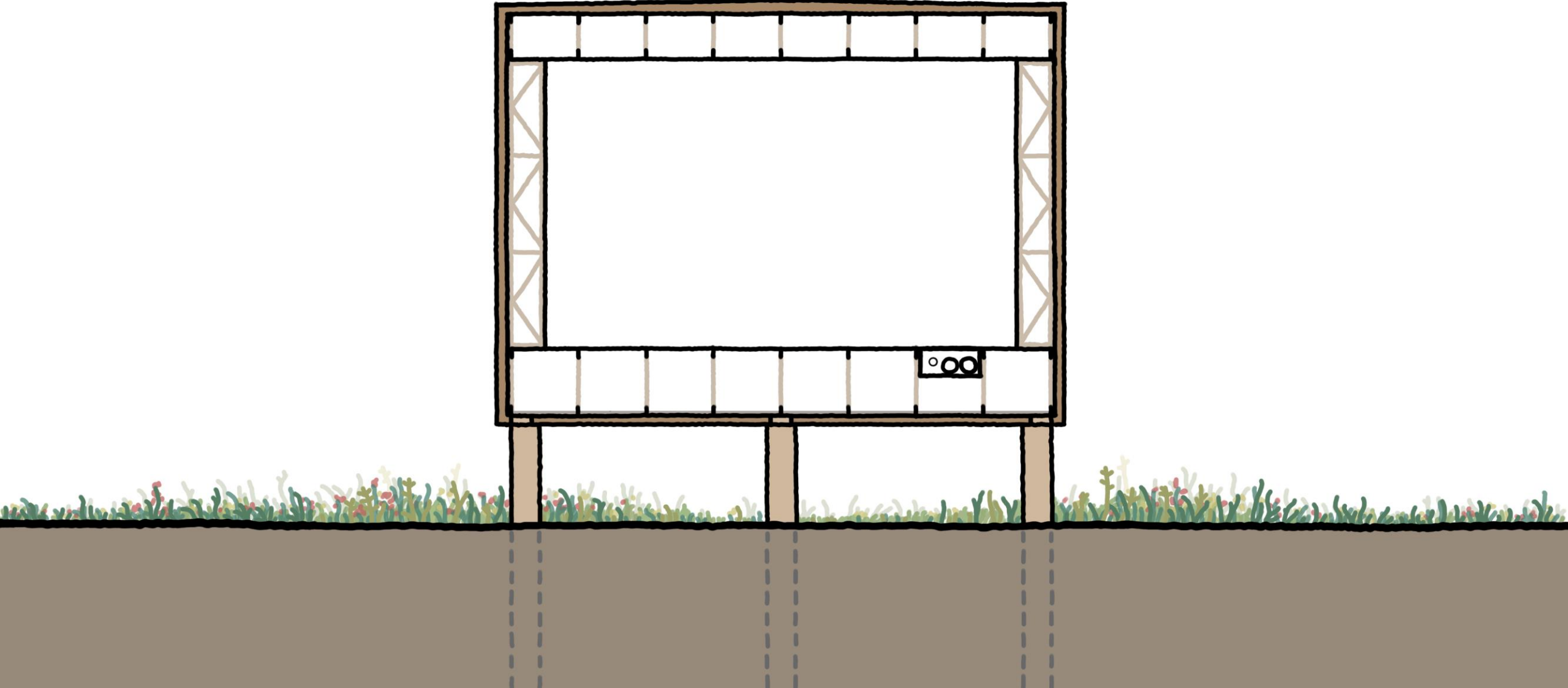
Air + Vapor Control:  
osb sheathing



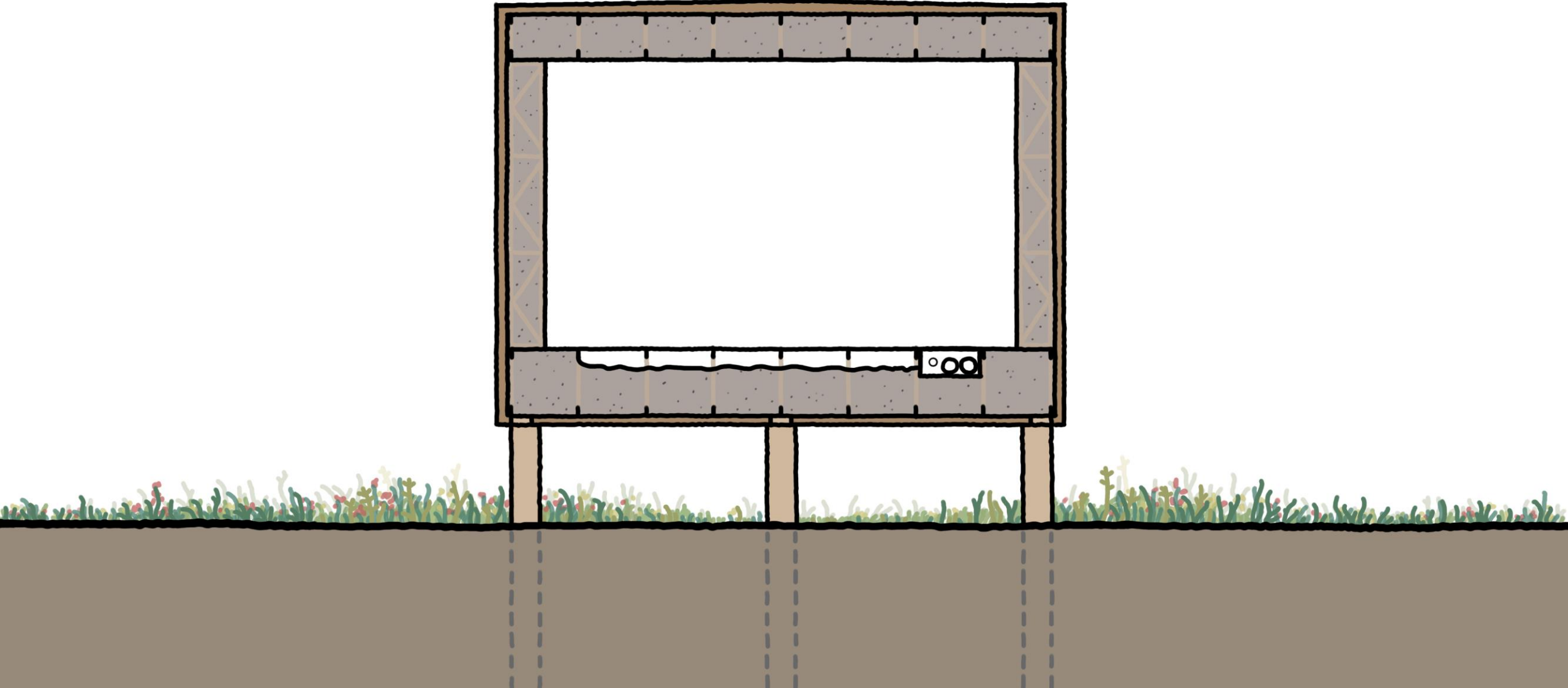
Air + Vapor Control:  
service chase



Thermal Control:  
wood fiber insulation



Thermal Control:  
wood fiber insulation  
blown cellulose



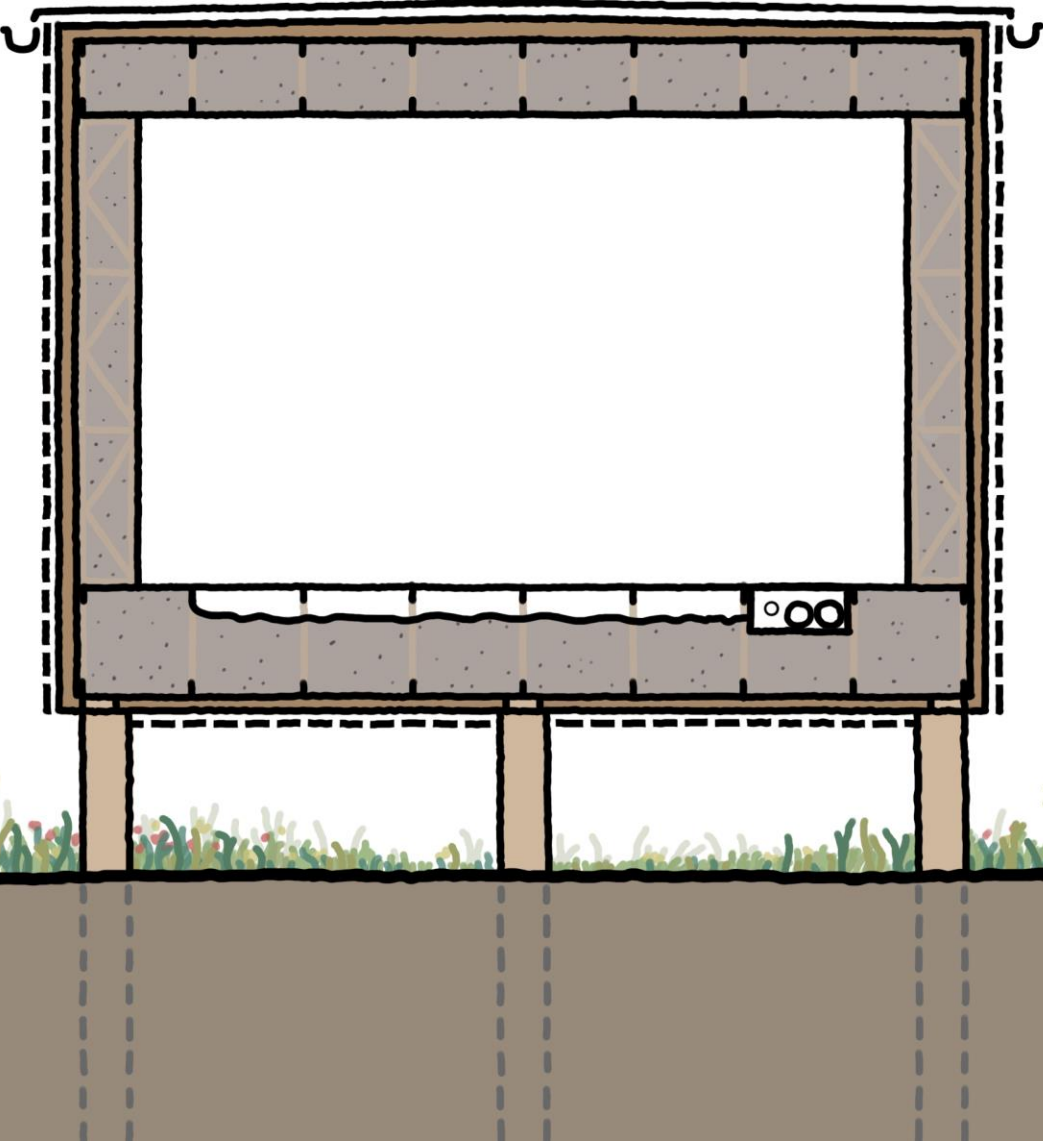
Thermal Simulation:  
temperature

0°F  68°F

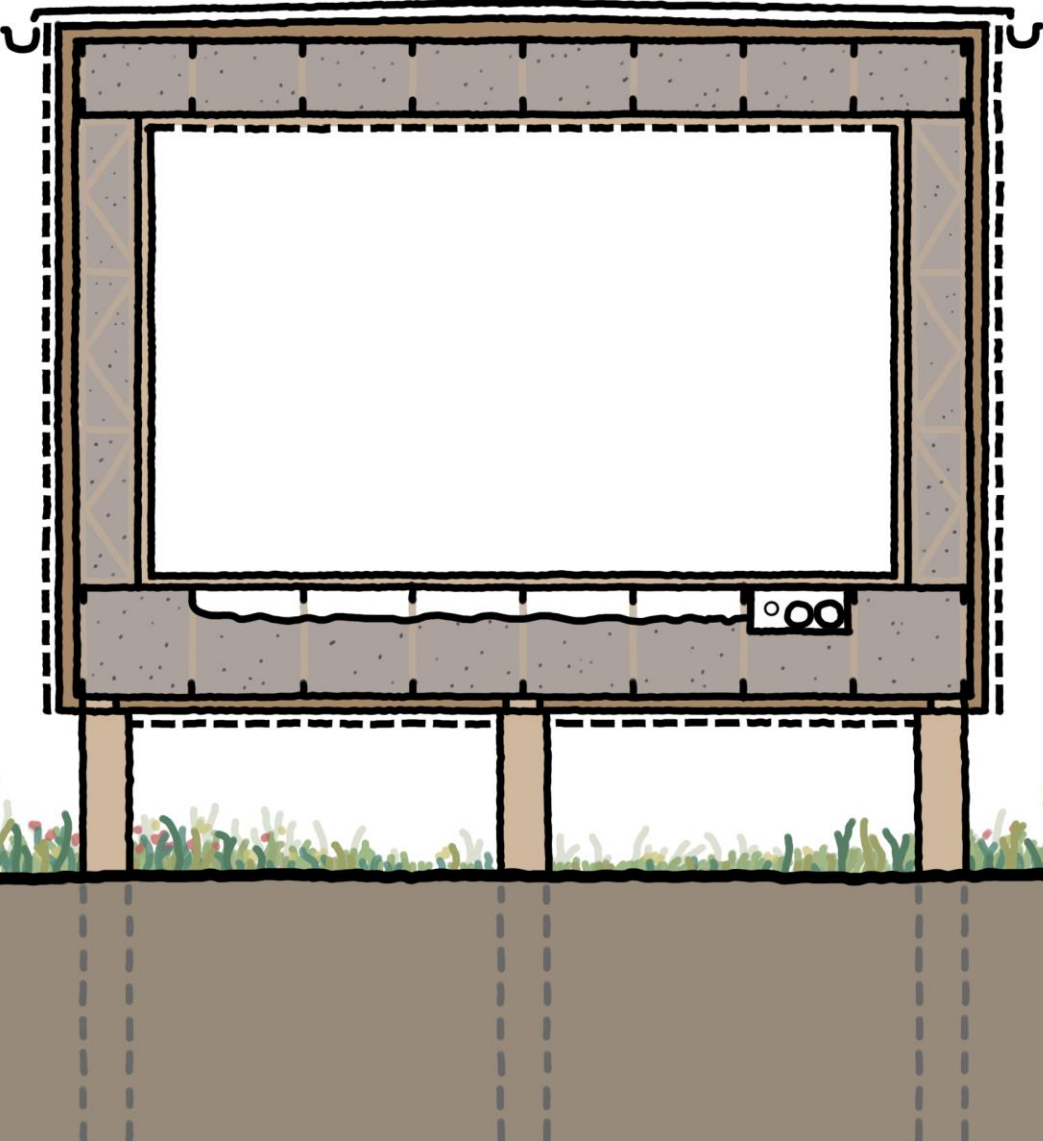


\*generated with THERM 7.8

Water Control:  
cedar rainscreen  
parrafin wax coating  
epdm roof

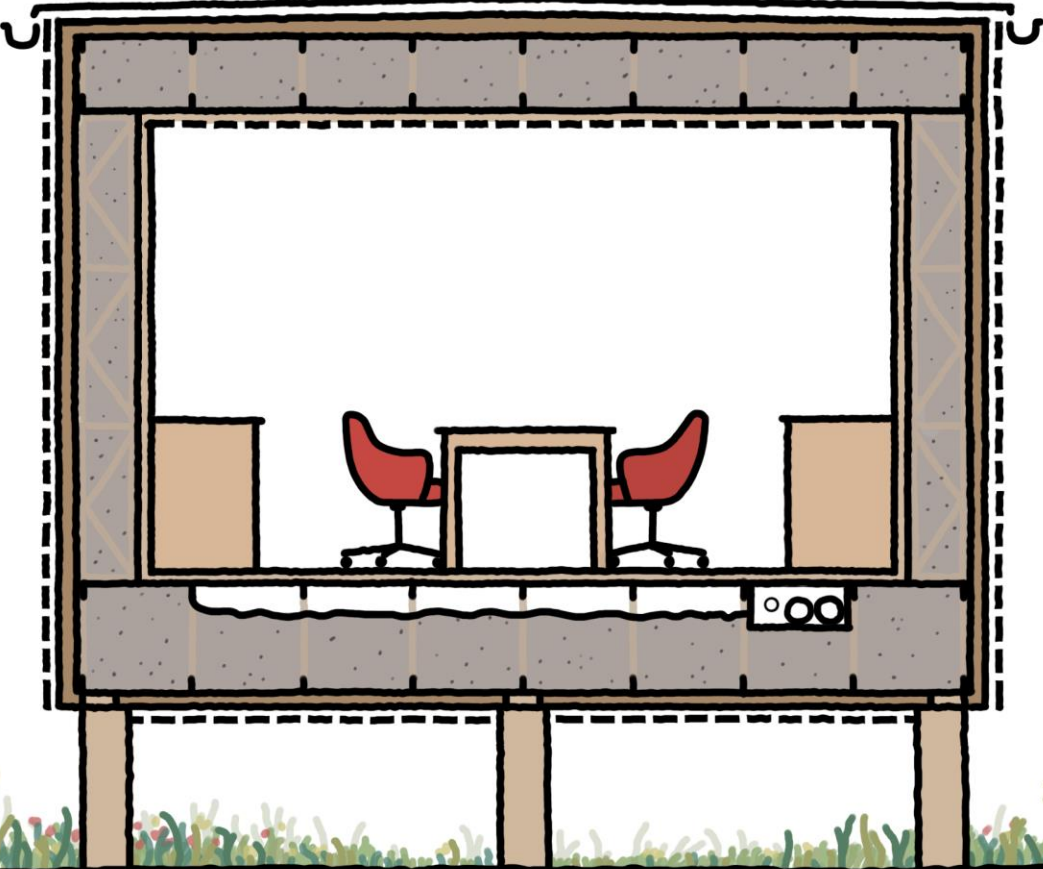


Interior Finishes:  
installed over furring strips

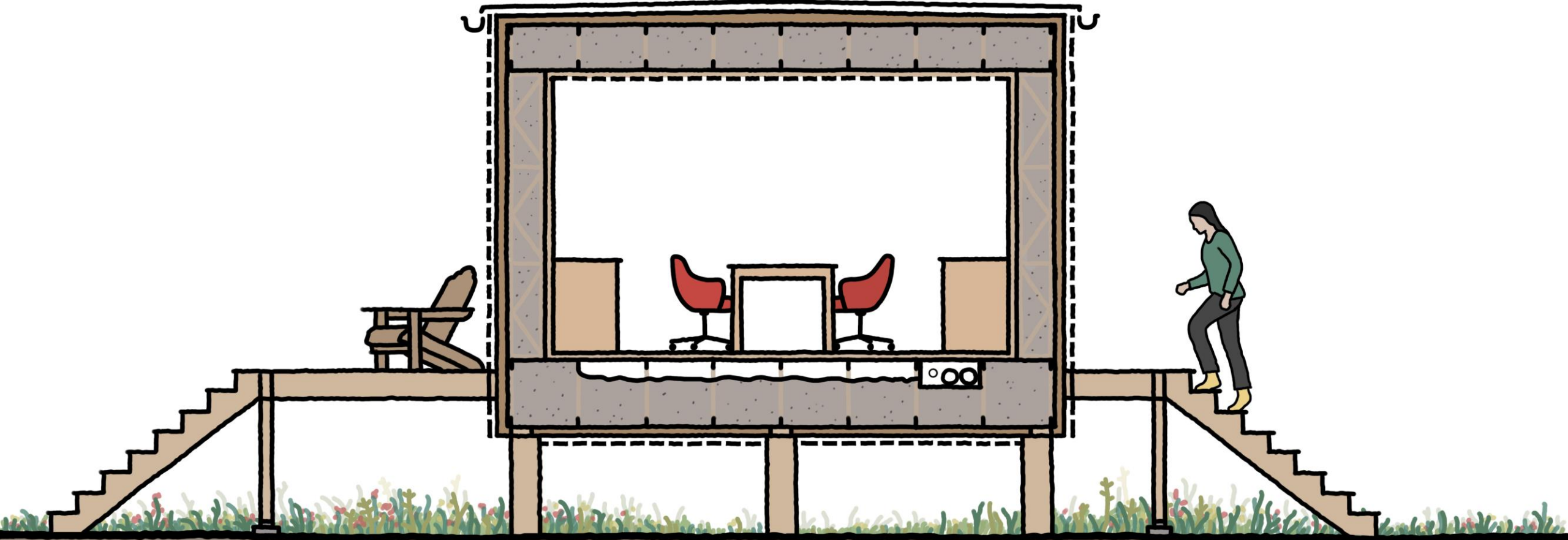




Interior Furniture:  
bamboo plywood  
low voc materials



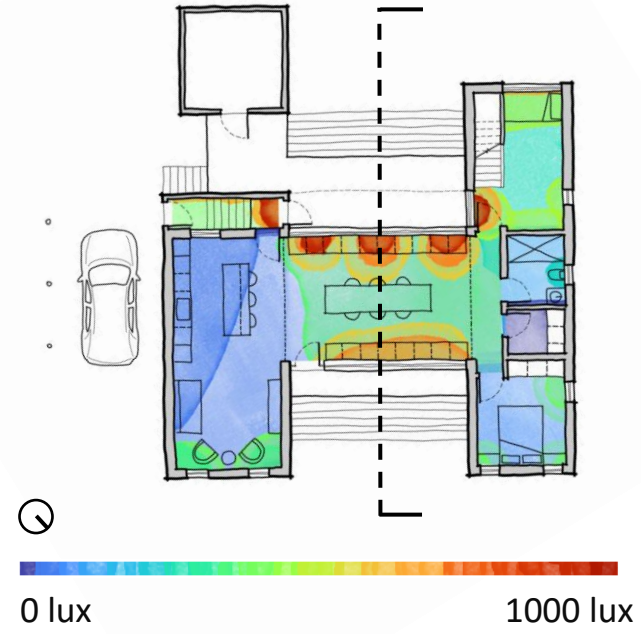
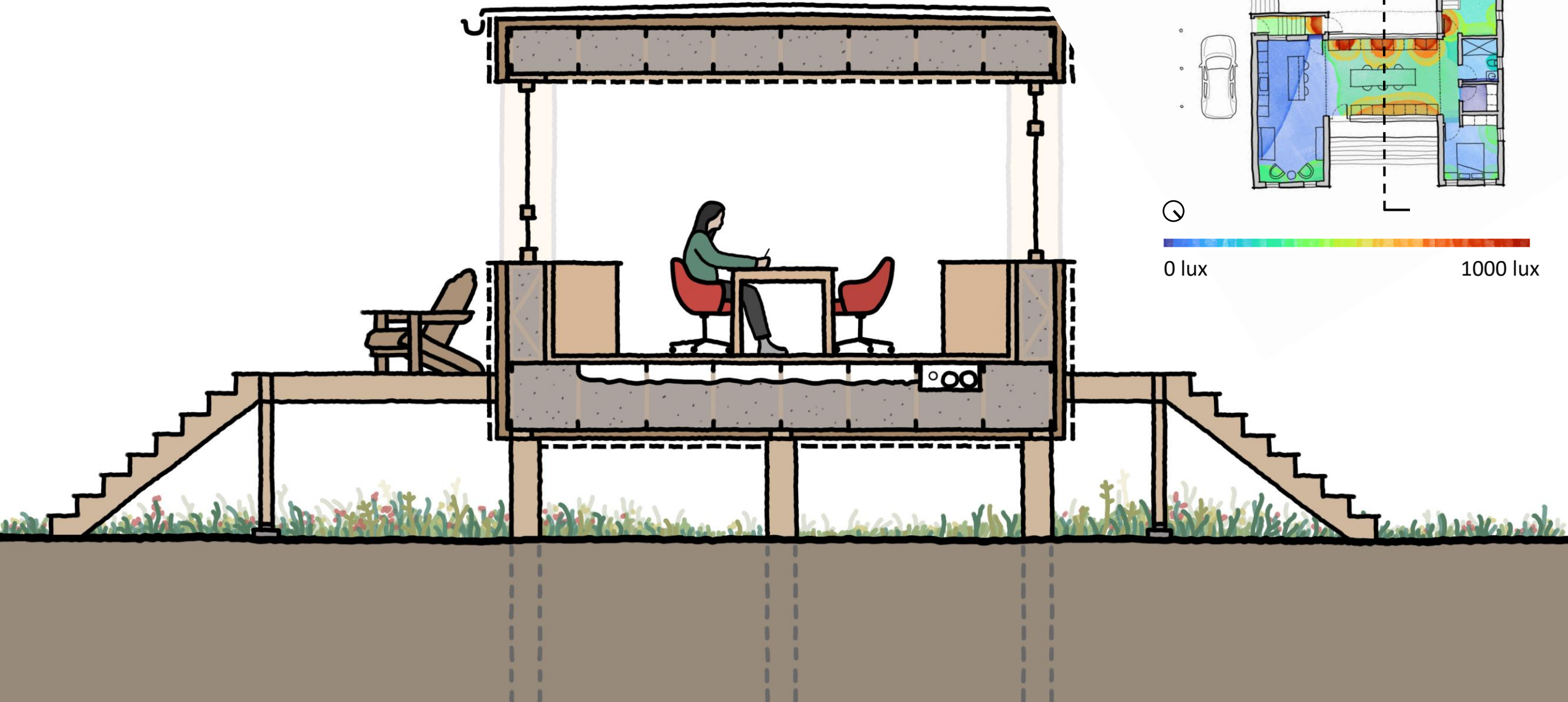
Exterior:  
wood deck



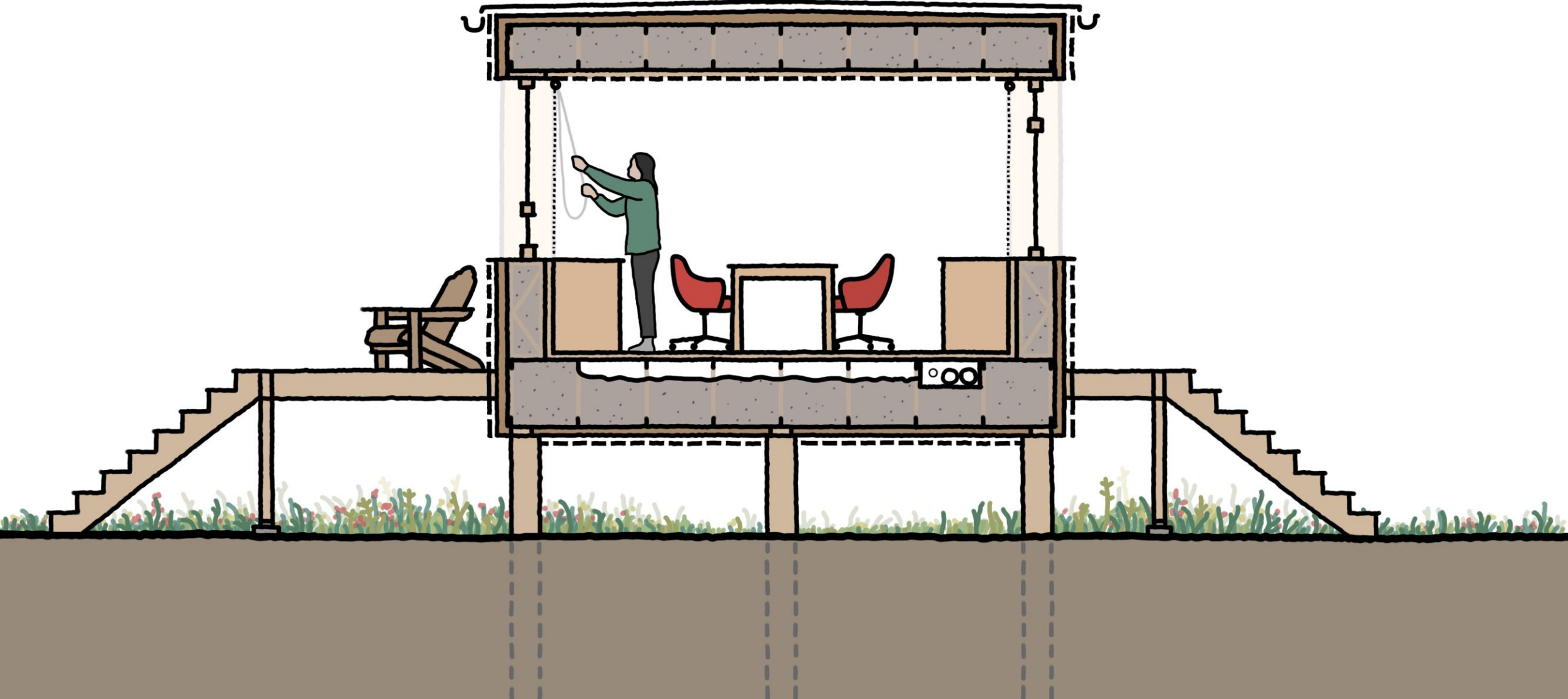
Visual Comfort:  
even daylighting



Visual Comfort:  
even daylighting  
average lux: 300



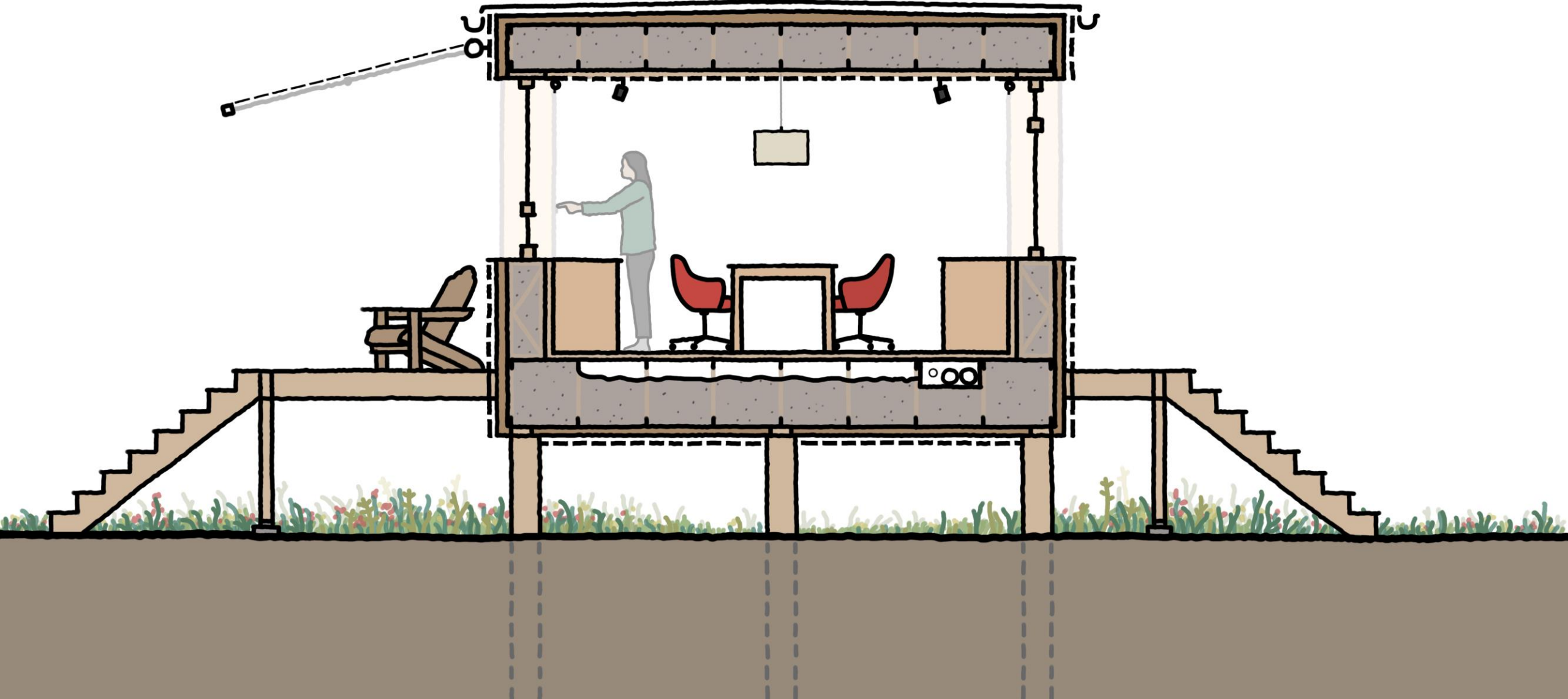
Visual Comfort:  
insulated cellular shades



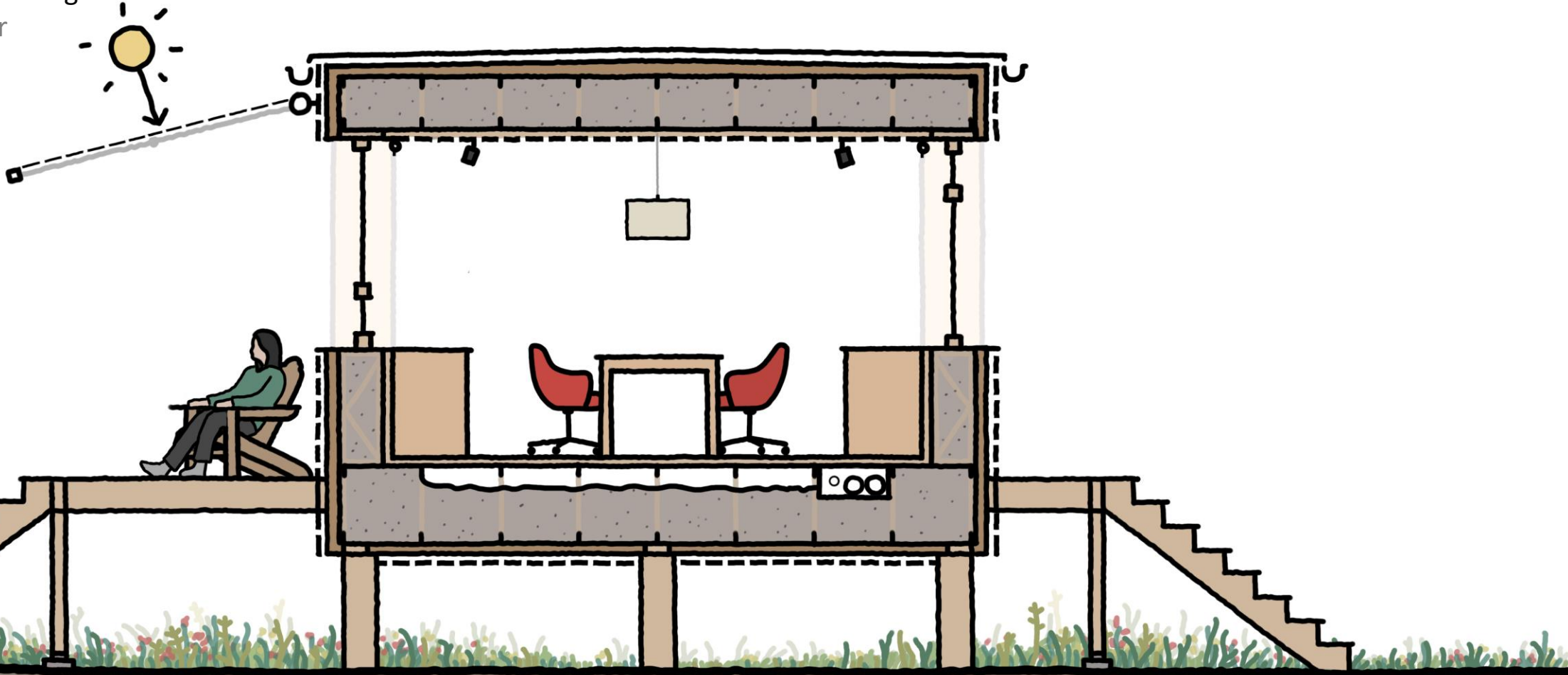
Visual Comfort:  
dimmable electric lighting  
90+ color rendering index



Thermal Comfort:  
motorized awning

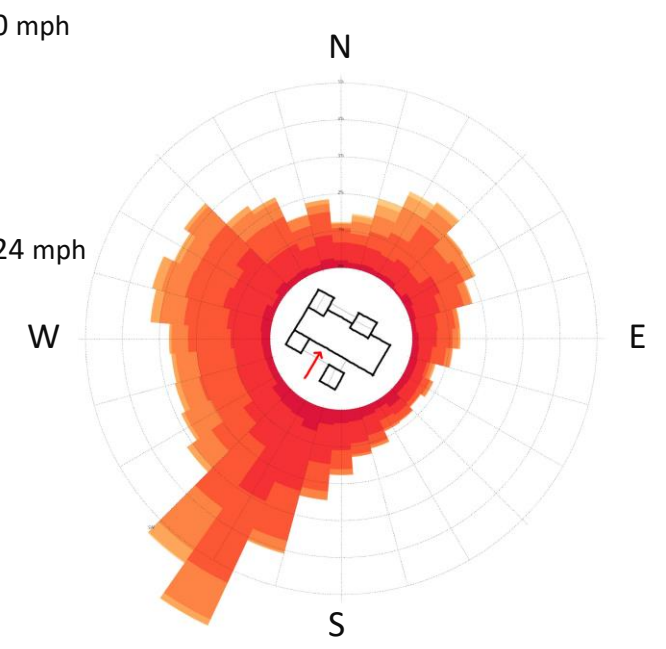
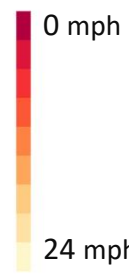
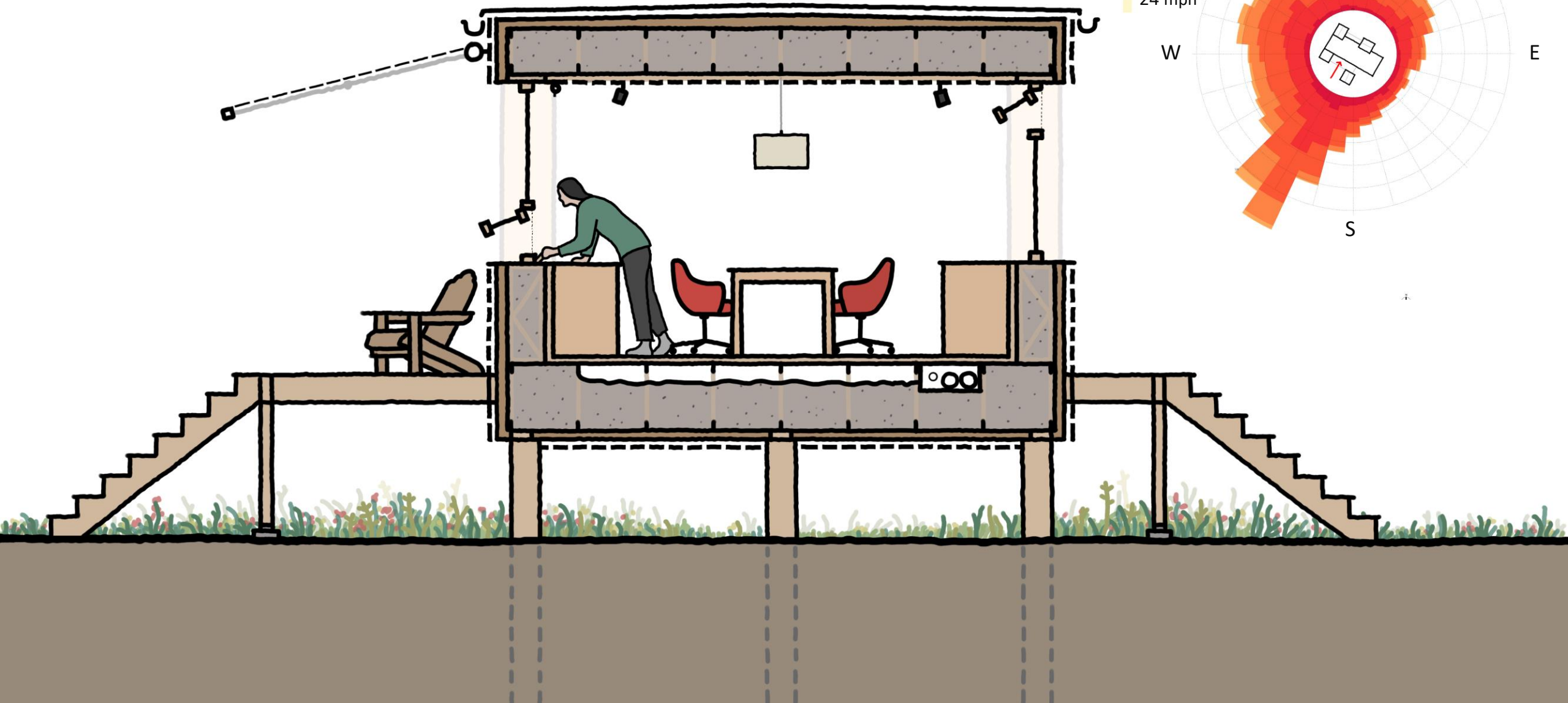


Thermal Comfort:  
motorized awning  
hot weather

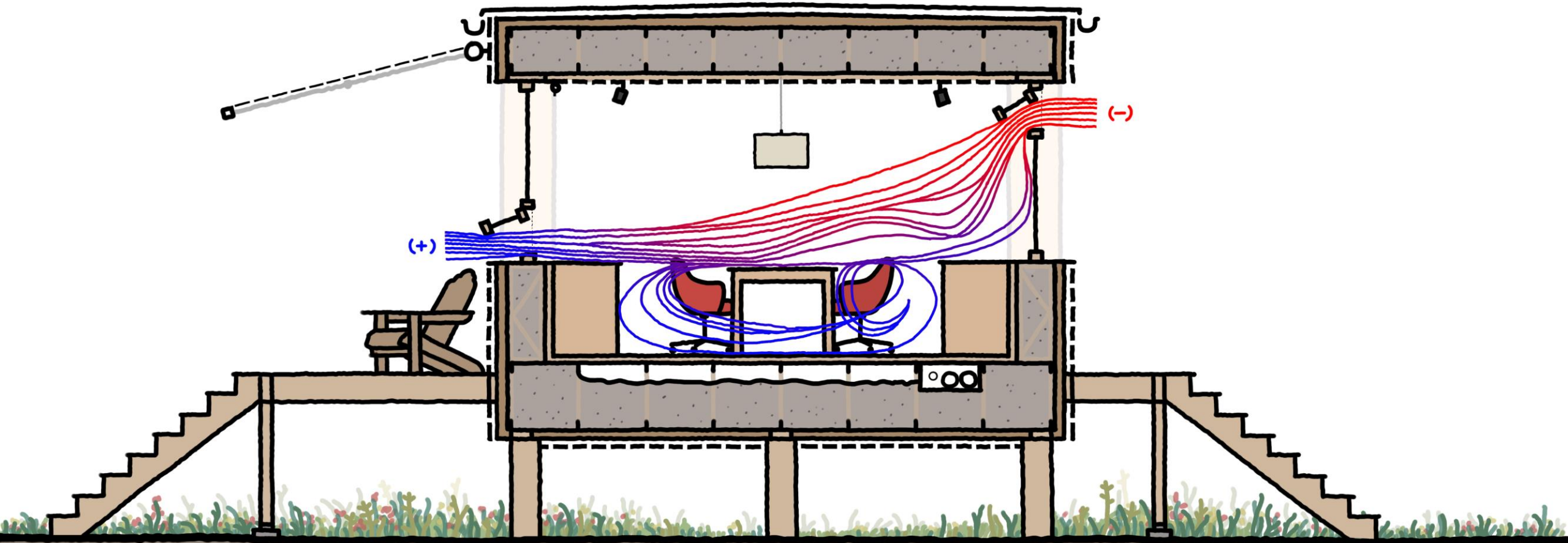




Thermal Comfort:  
passive ventilation  
hot weather

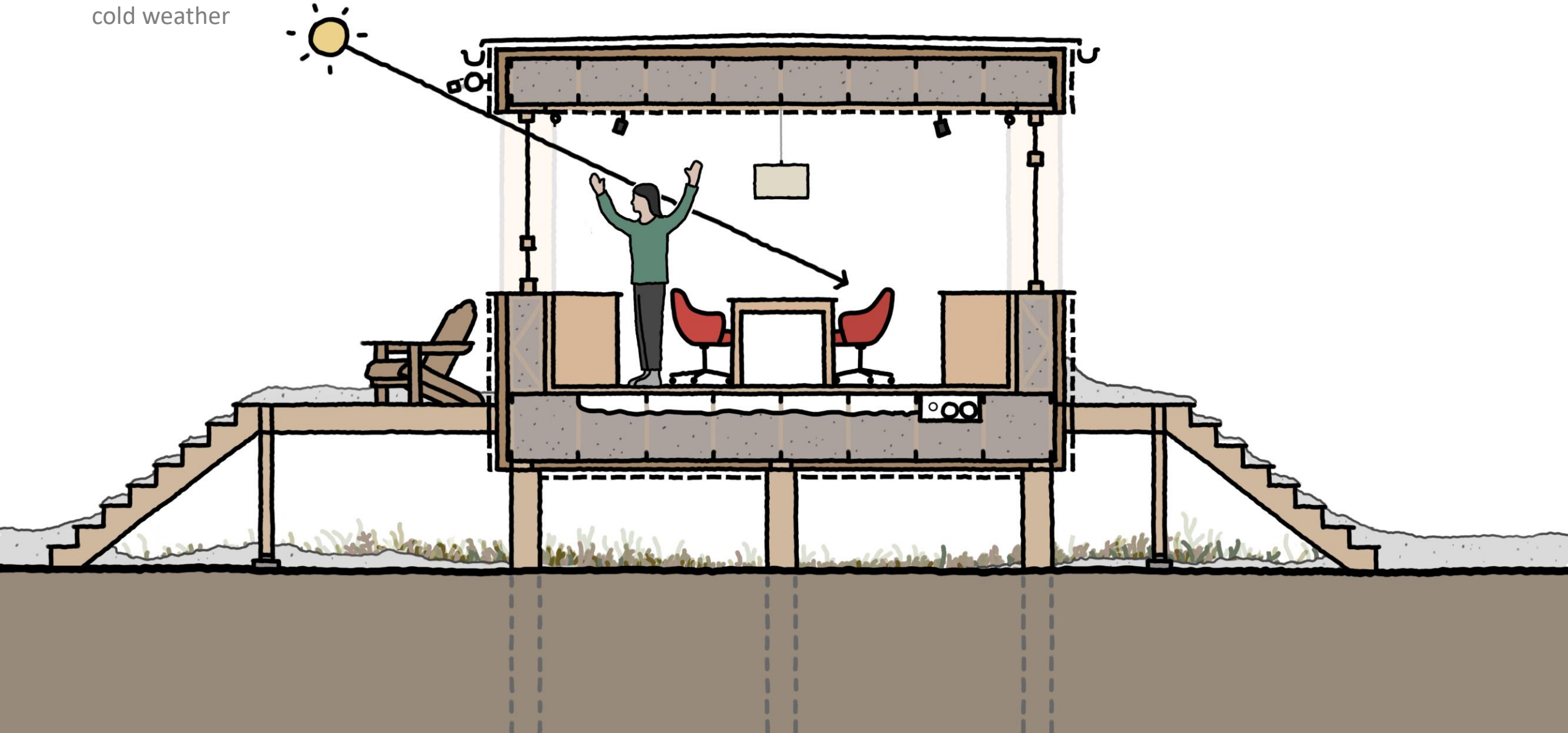


Thermal Comfort:  
awning windows  
passive ventilation

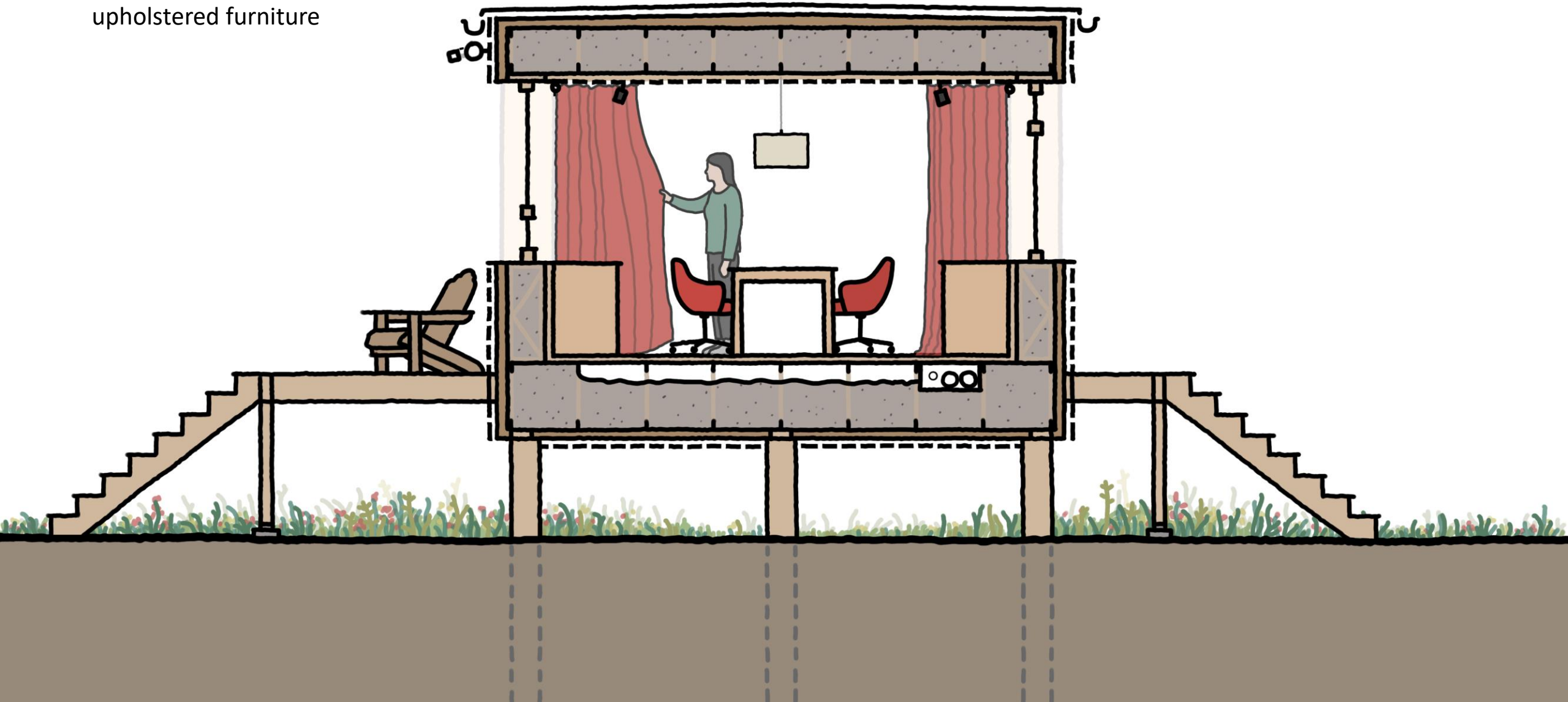


\*based on Grasshopper OpenFoam plugin for Rhino

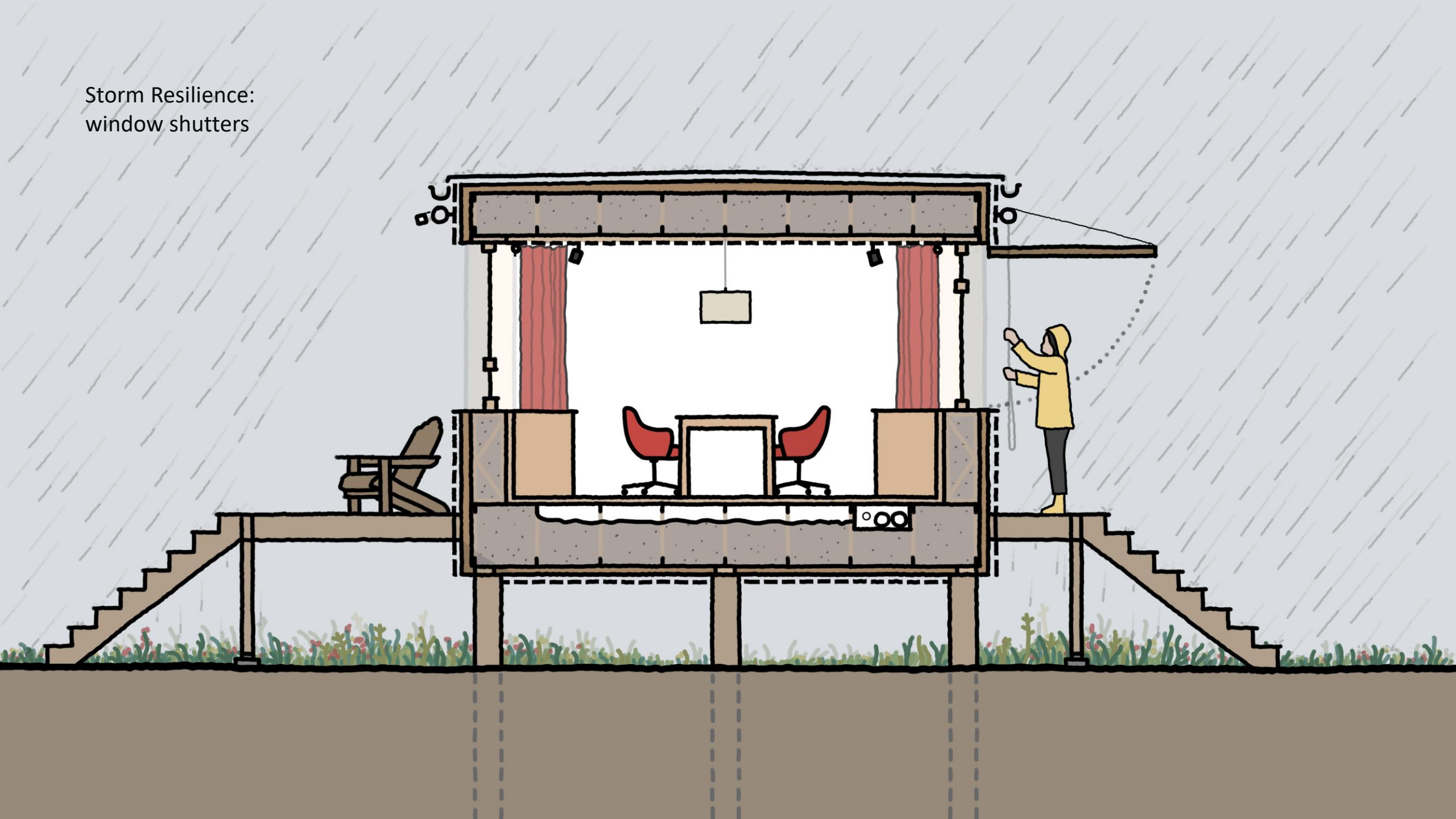
Thermal Comfort:  
motorized awning  
cold weather



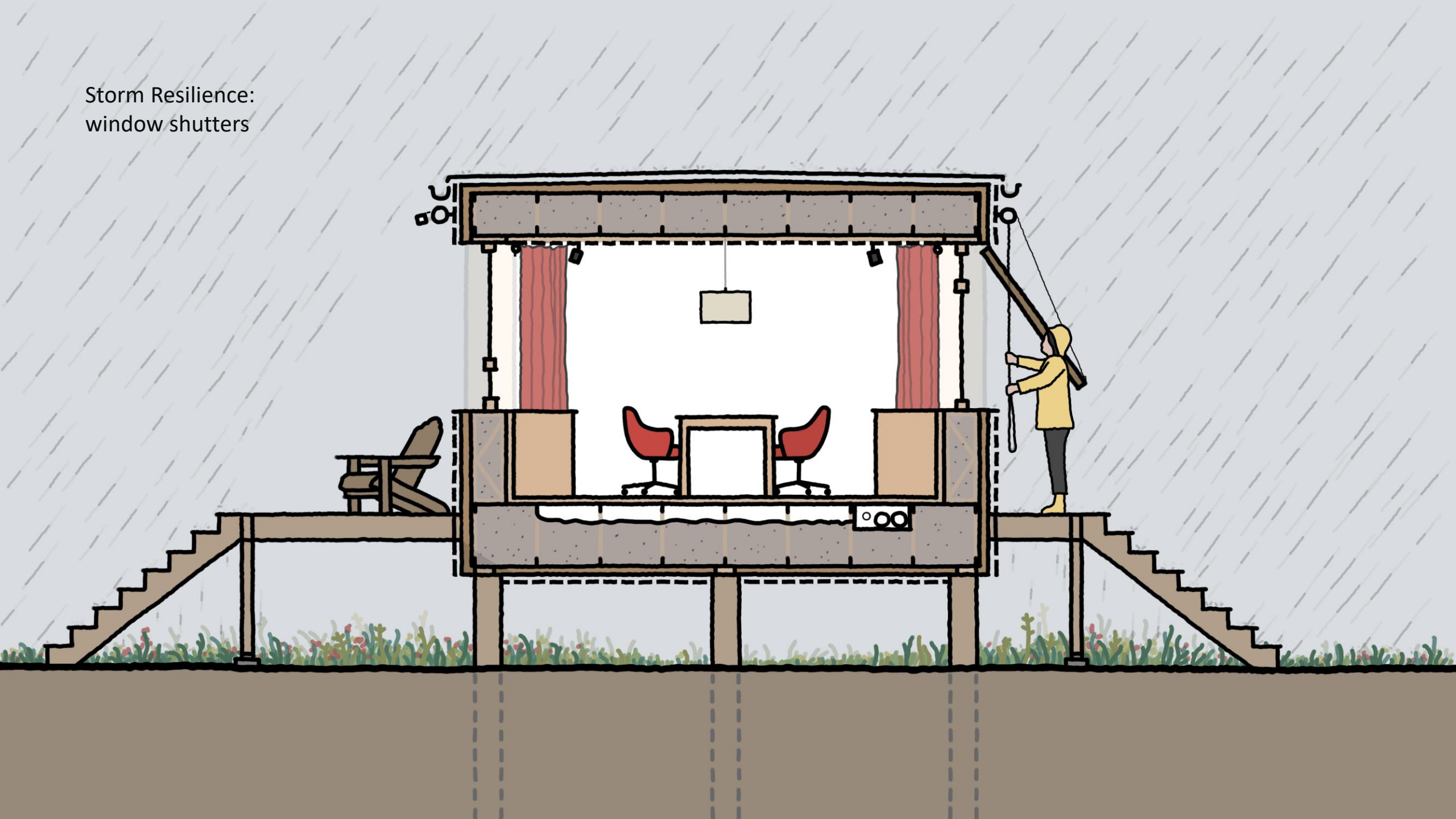
Acoustic Comfort:  
acoustic wood ceiling  
heavy curtains  
upholstered furniture



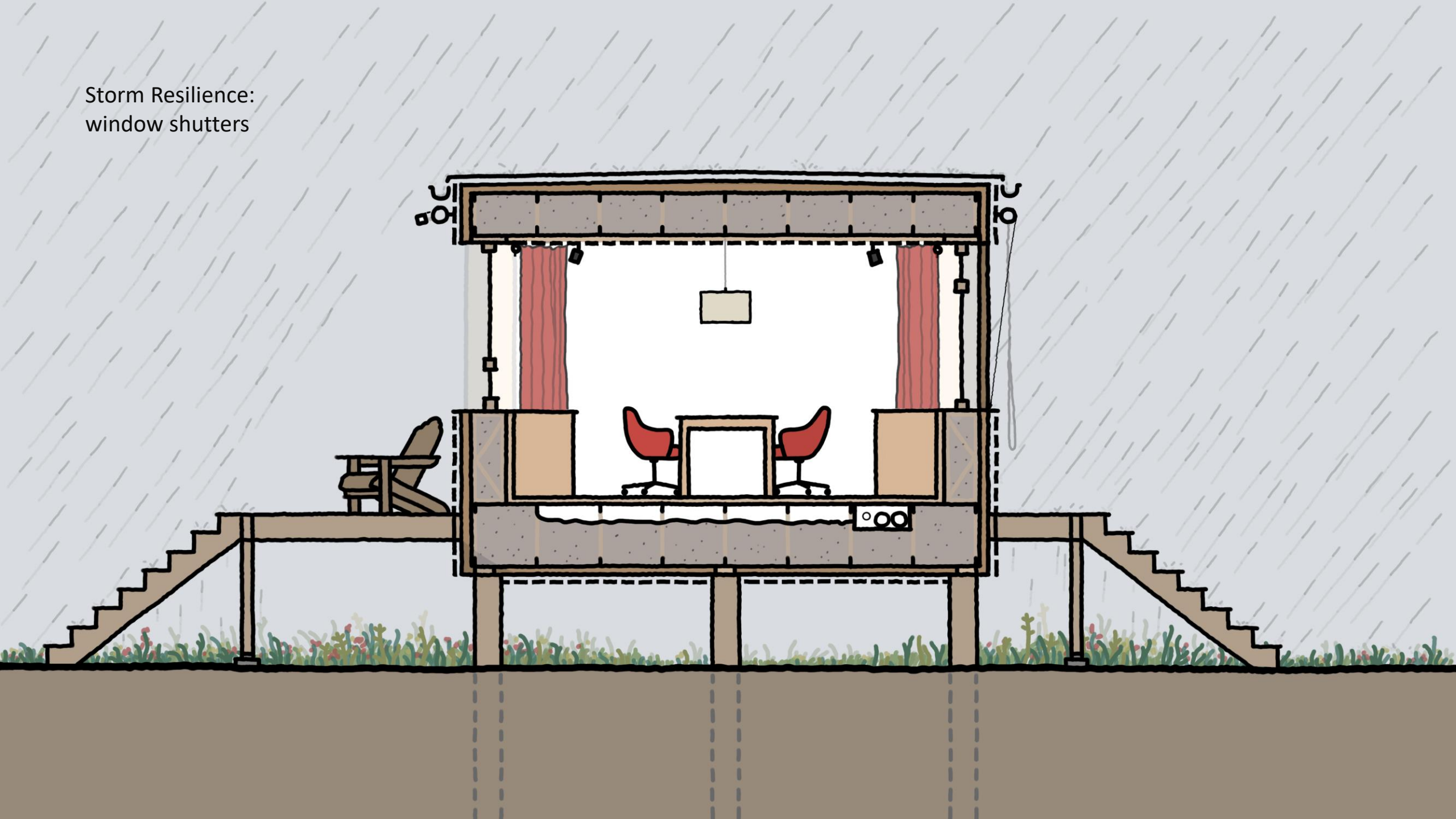
Storm Resilience:  
window shutters



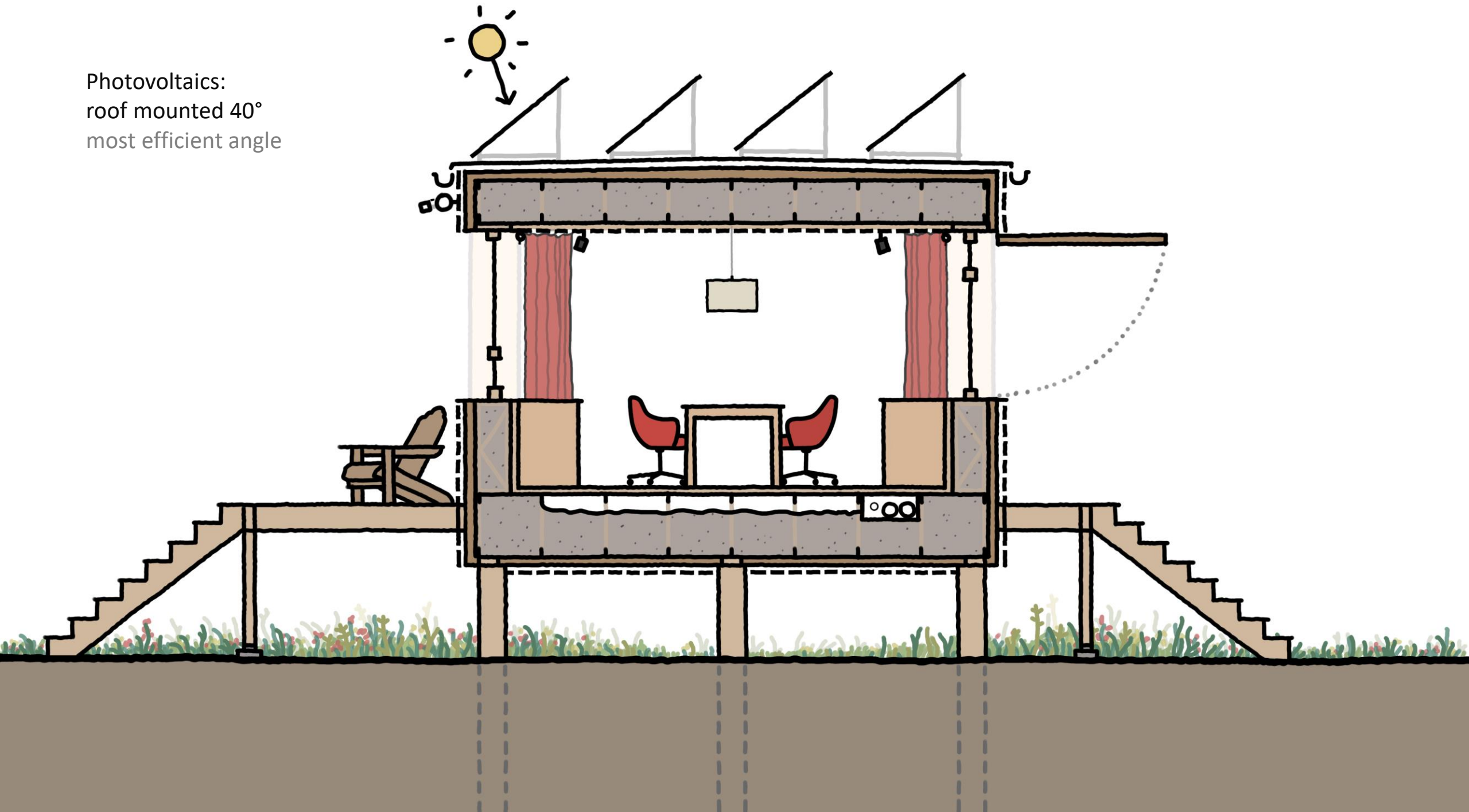
Storm Resilience:  
window shutters



Storm Resilience:  
window shutters

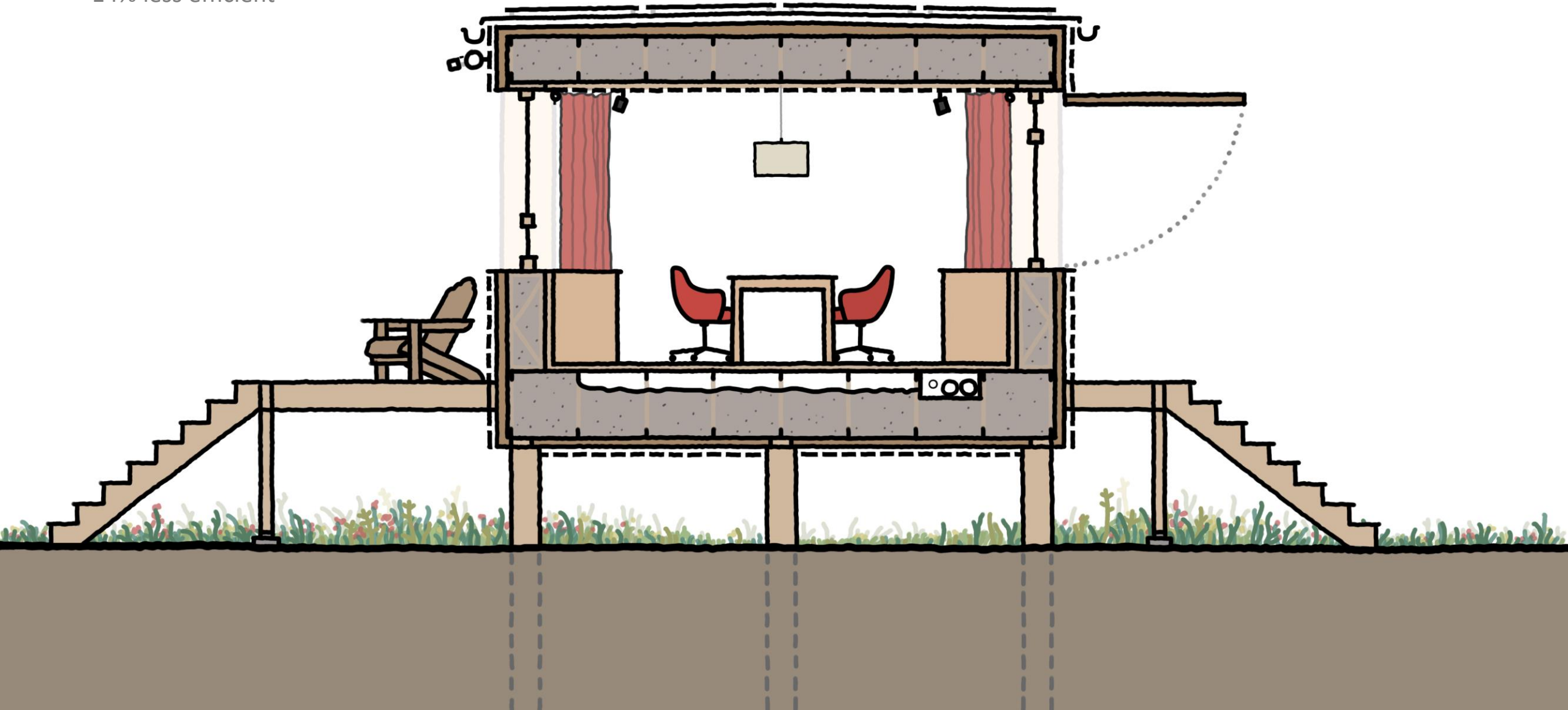


Photovoltaics:  
roof mounted 40°  
most efficient angle

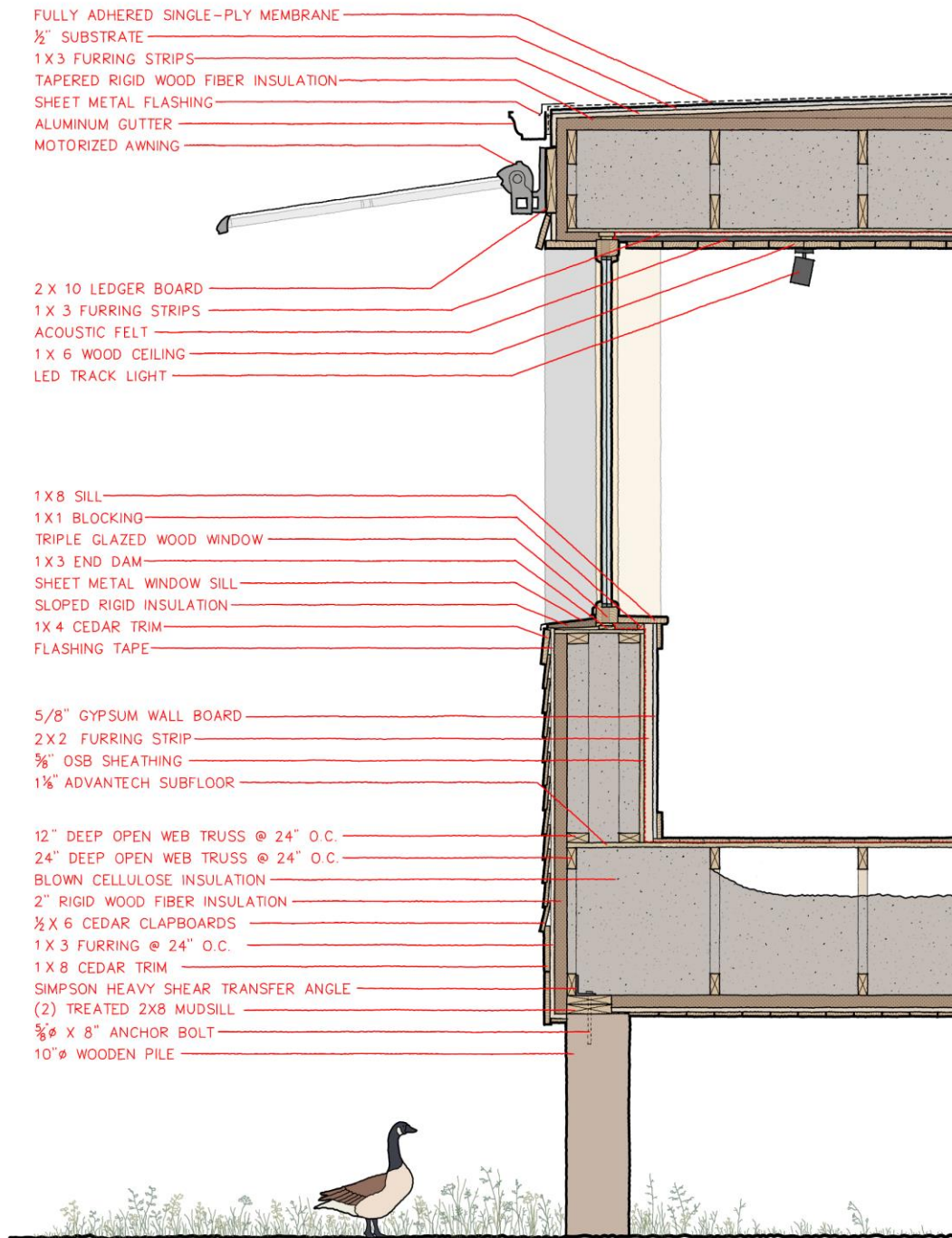


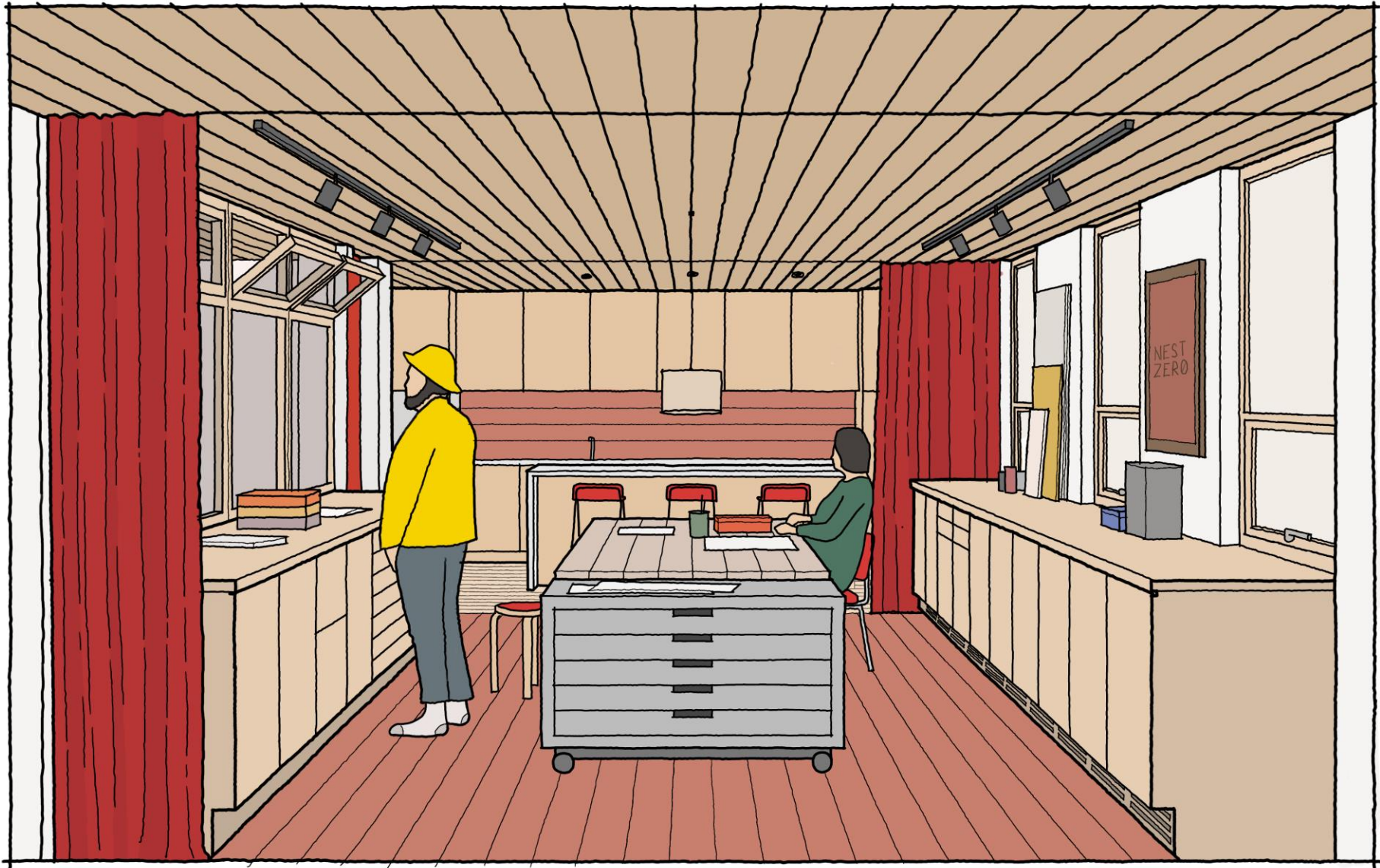


Photovoltaics:  
roof mounted 1°  
14% less efficient

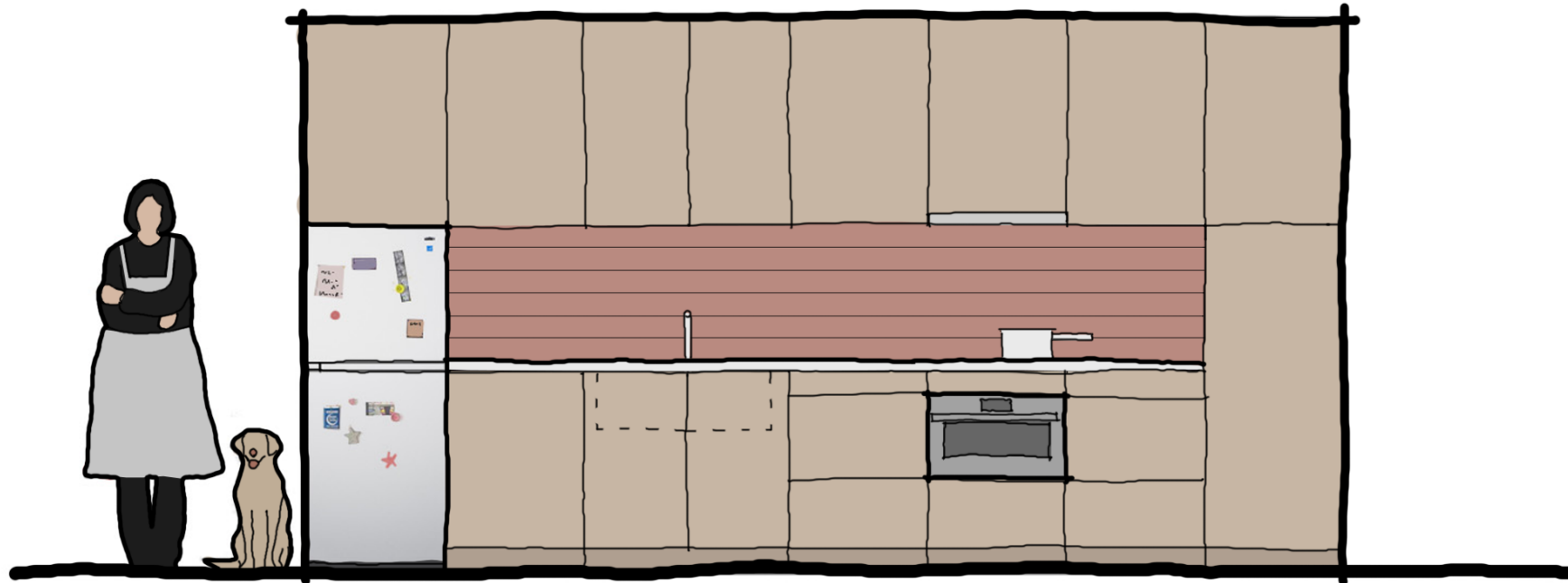


Section Detail:  
dining room / art studio





Dining Room / Art Studio Interior



Kitchen elevation

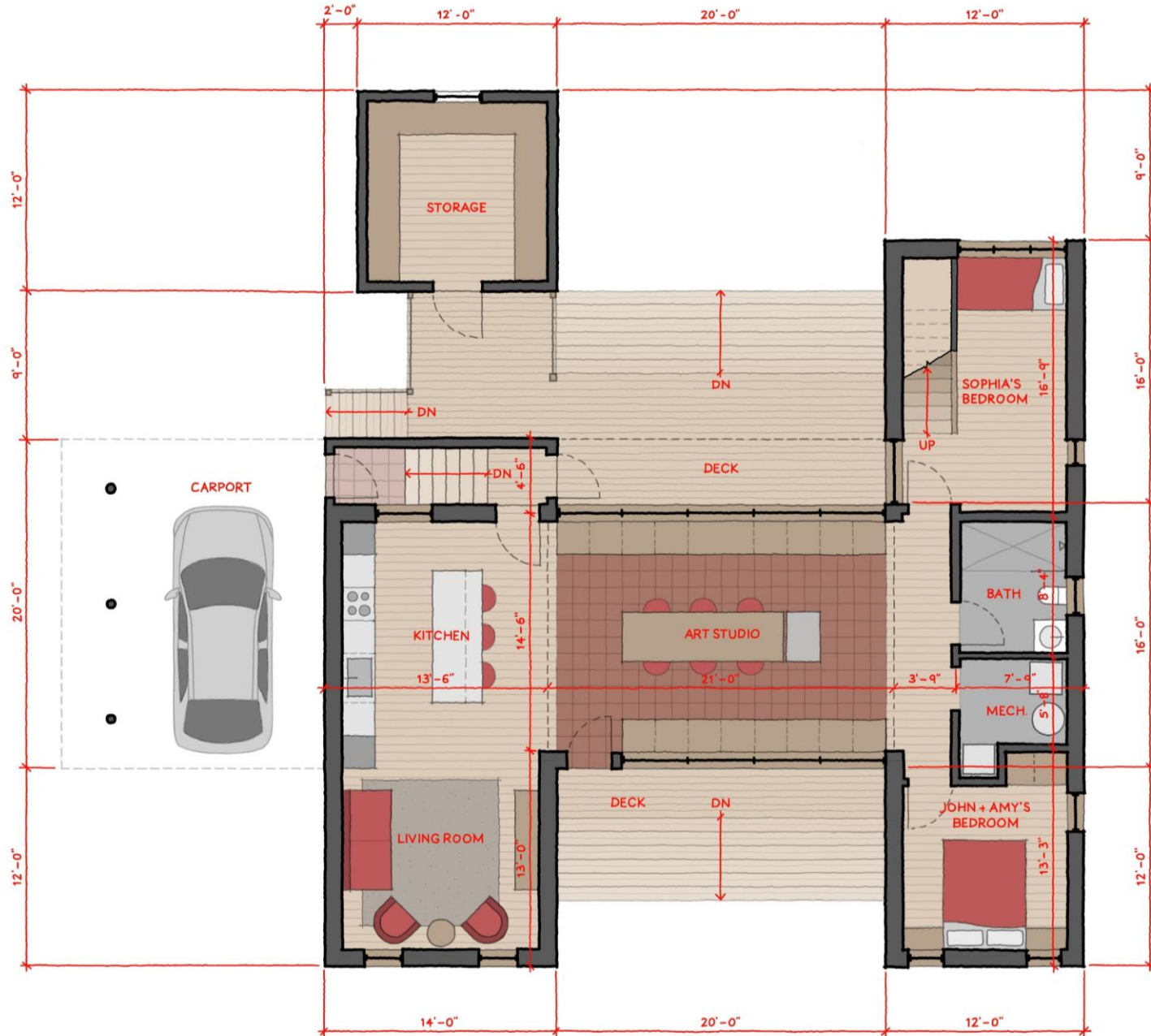


View from street

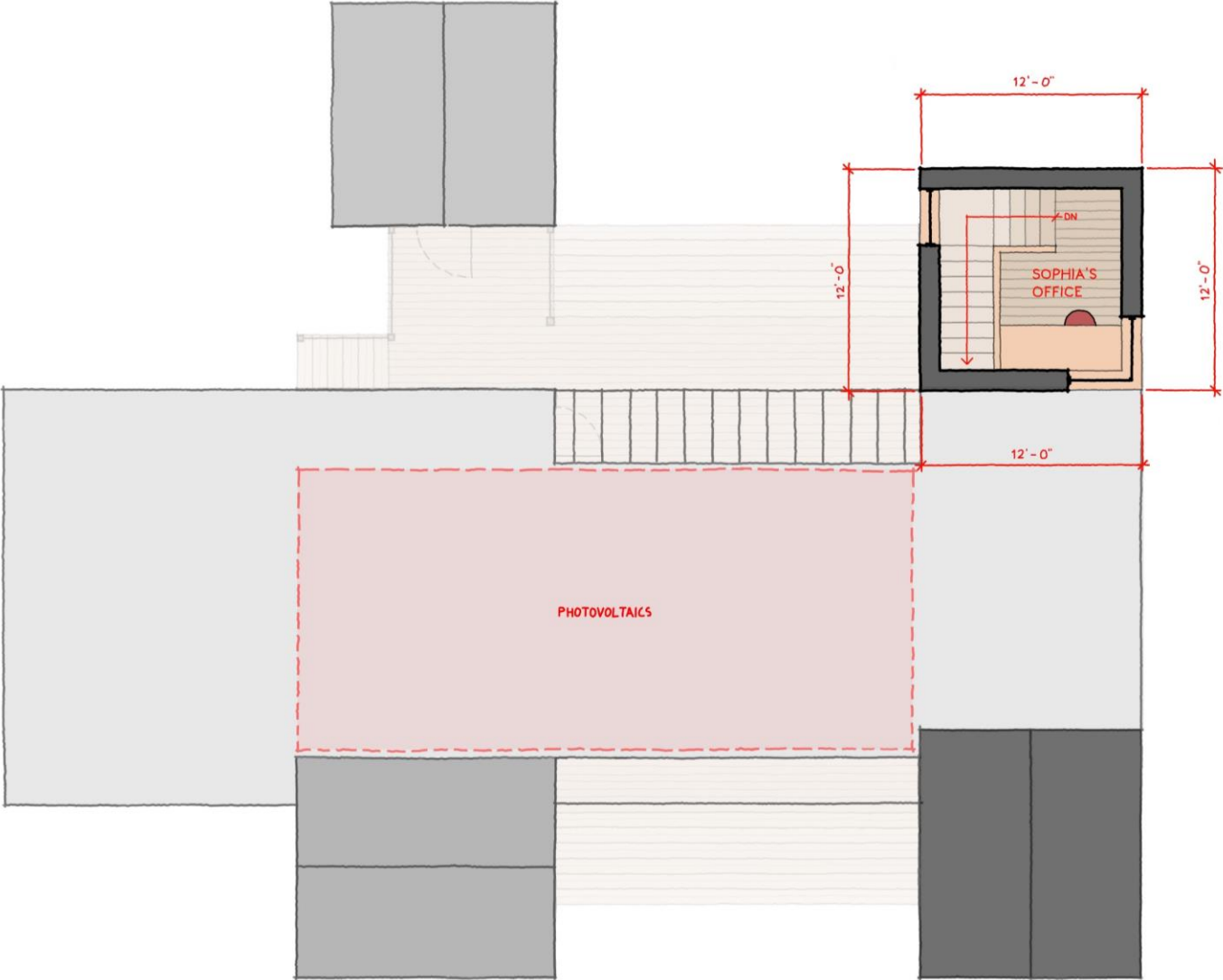


Flooded street

Floor Plan:  
first floor



Floor Plan:  
second floor

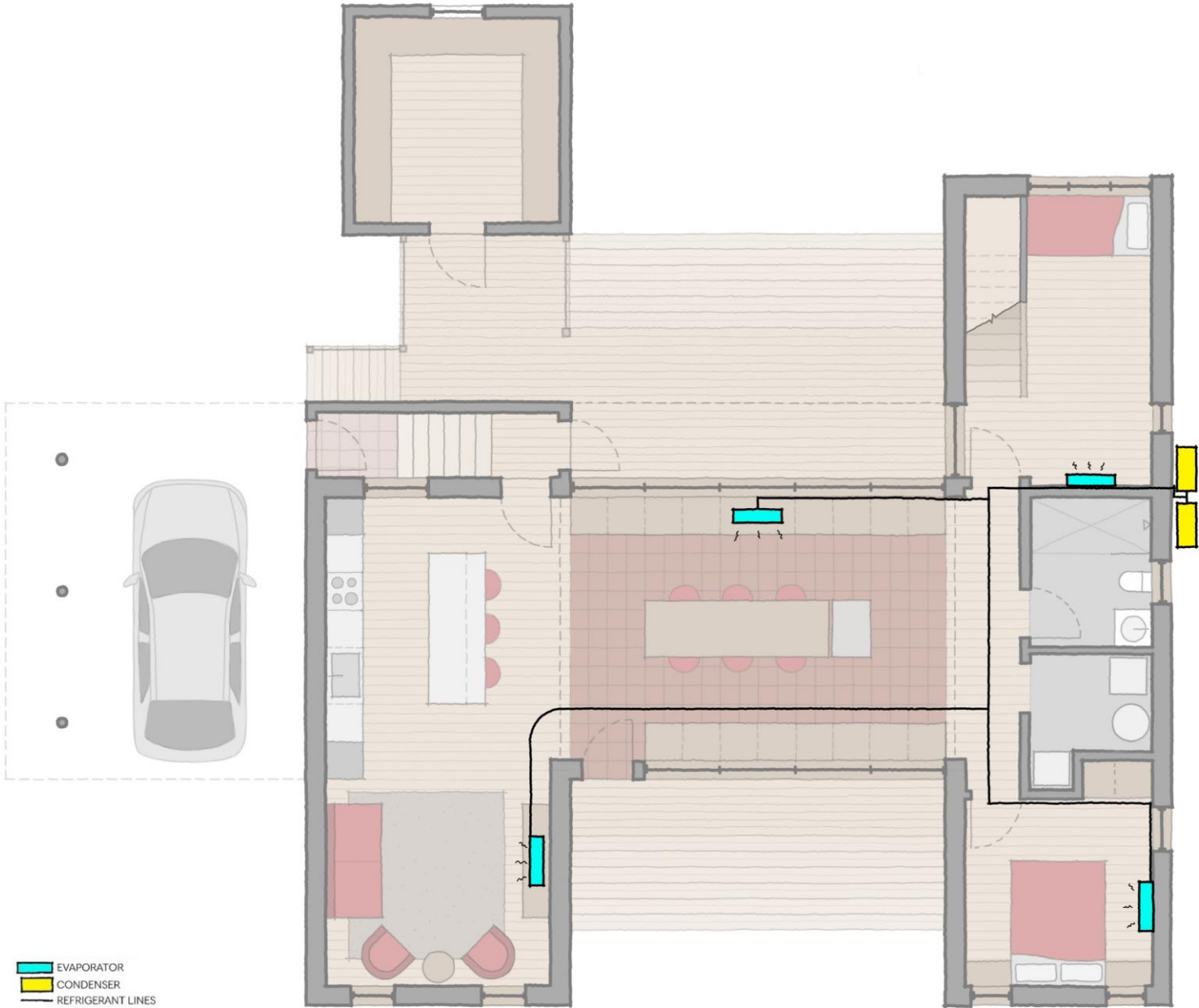




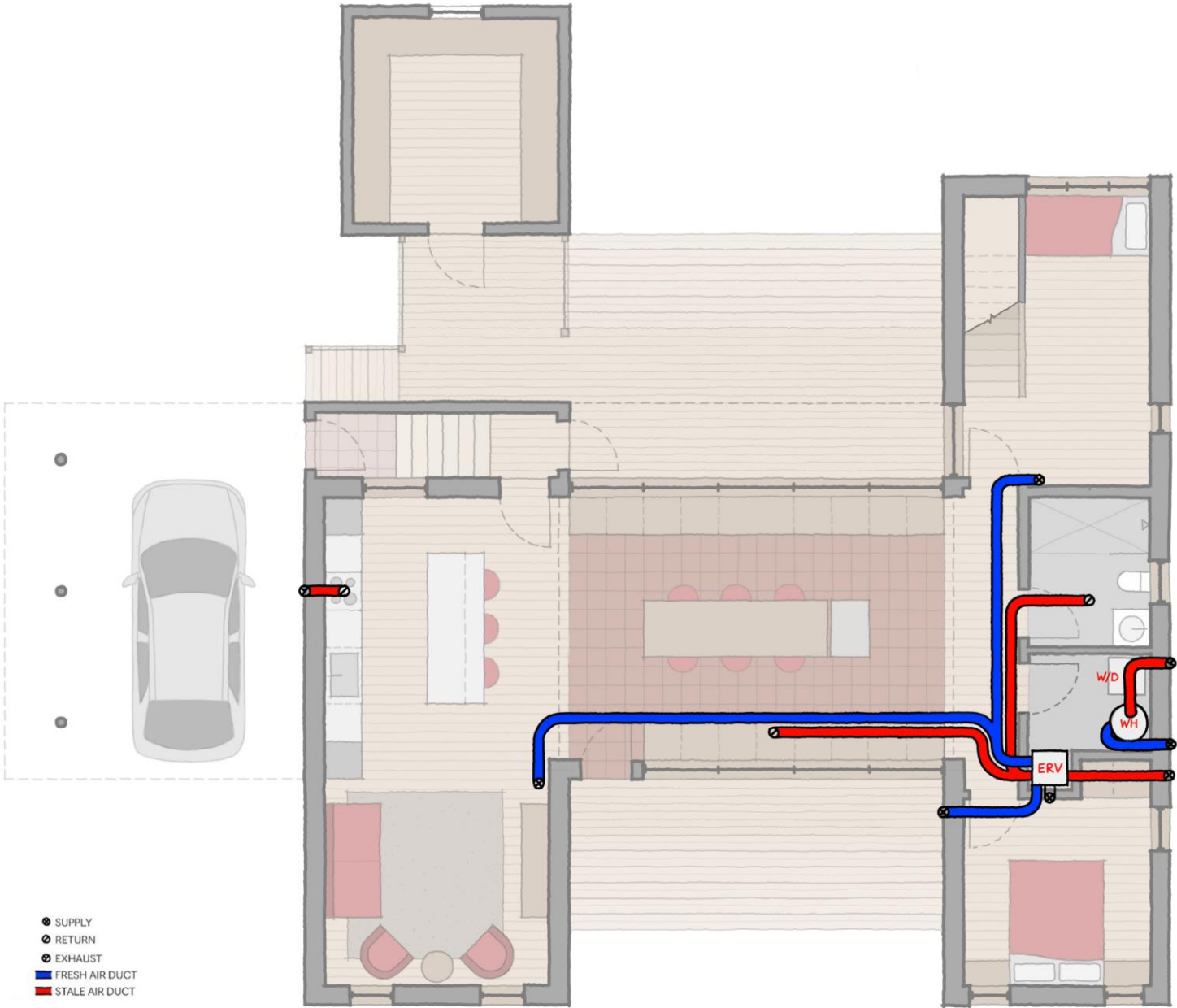
Sophia's watchtower



Floor Plan:  
mini-split system



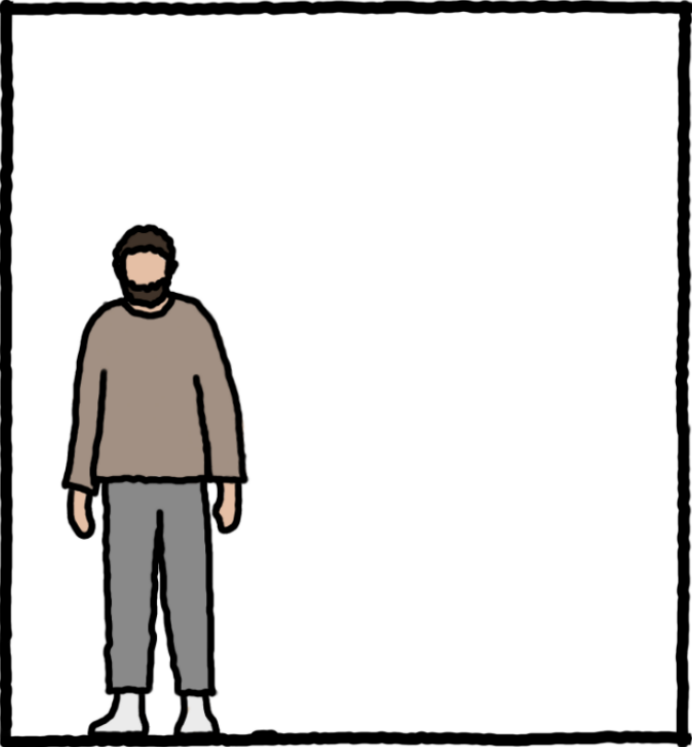
Floor Plan:  
ductwork



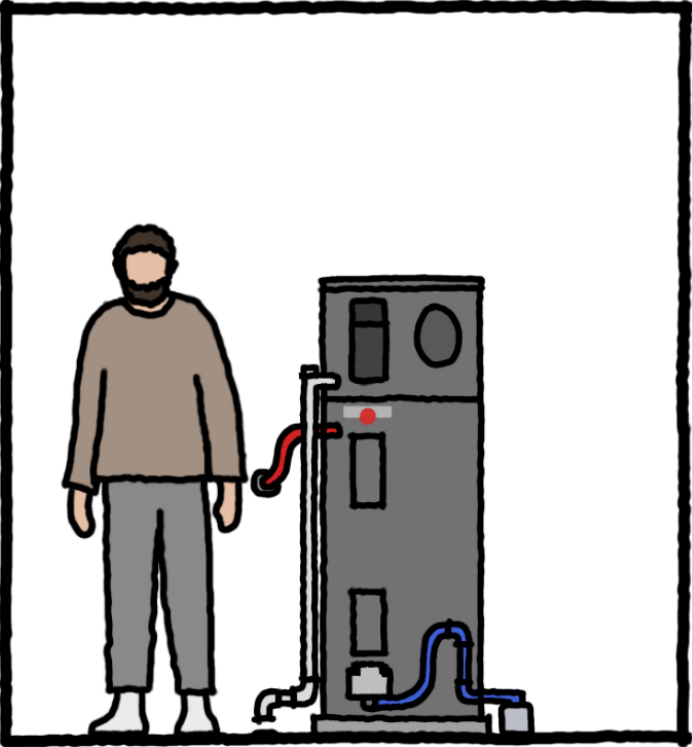
Ductwork Plan



Mechanical Closet  
elevation view

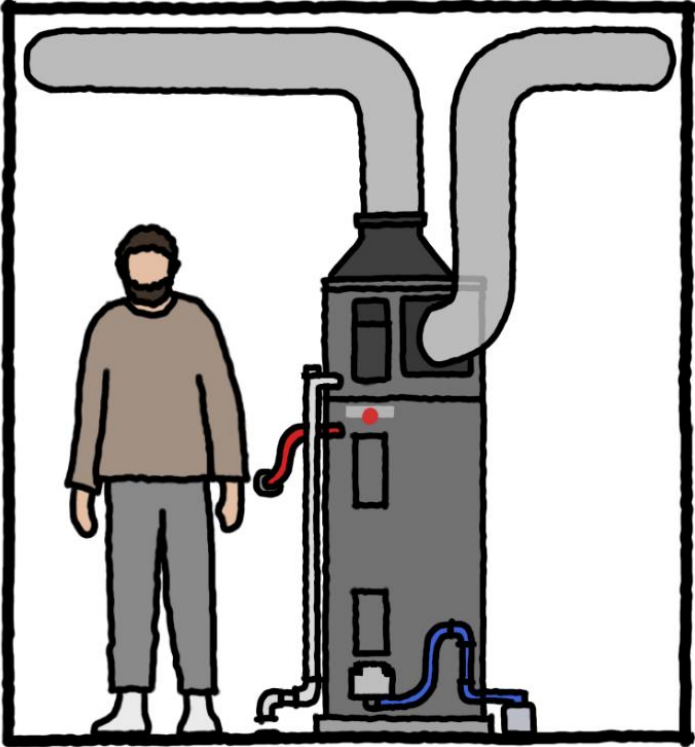


Mechanical Closet  
elevation view



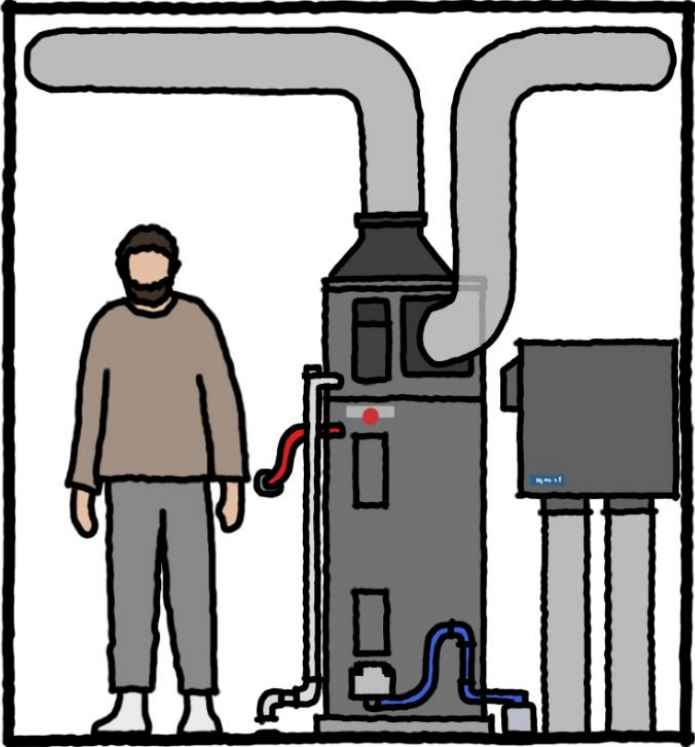
heat pump  
water heater

Mechanical Closet  
elevation view



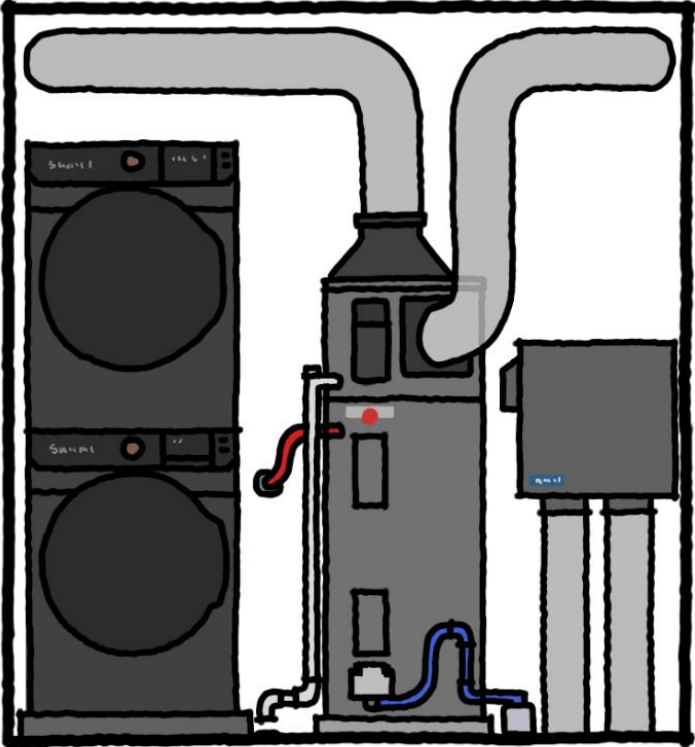
heat pump  
water heater  
(ducted)

Mechanical Closet  
elevation view



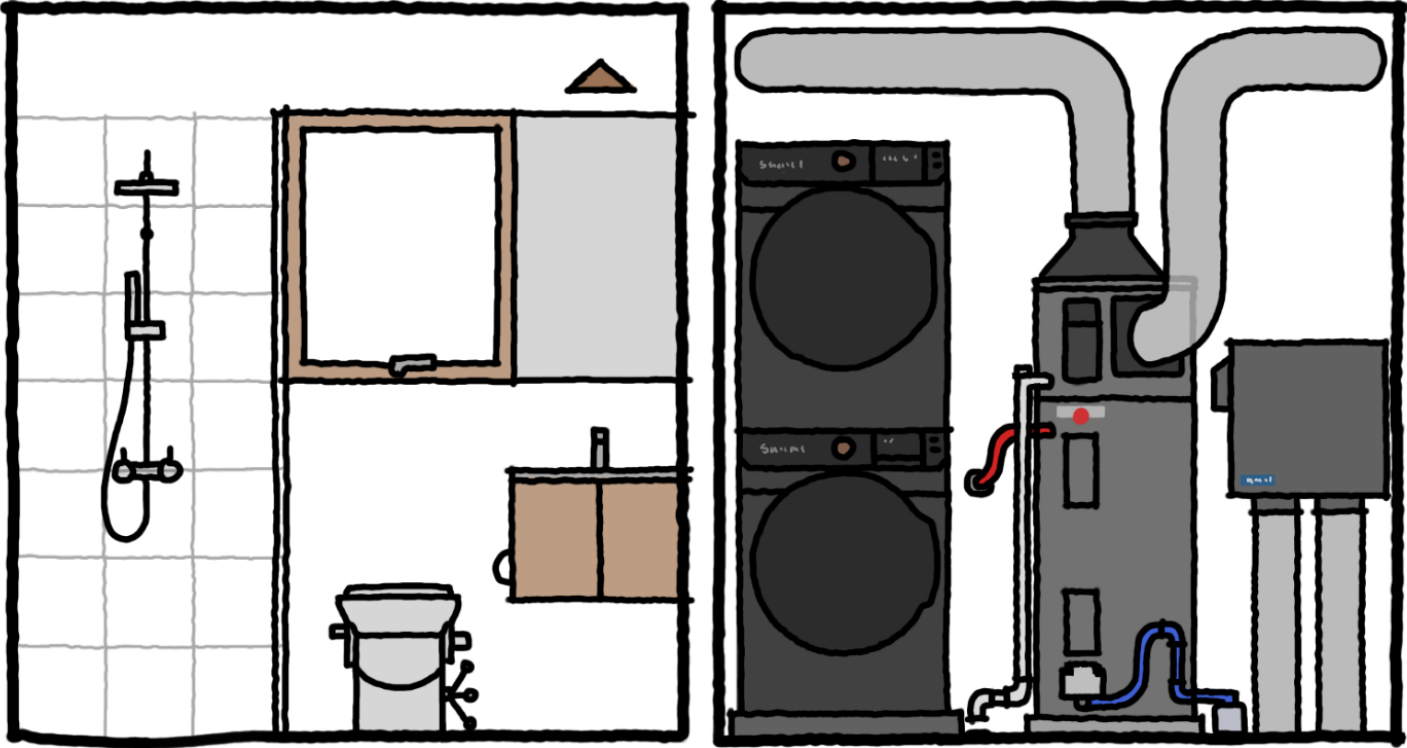
energy recovery  
ventilator

Mechanical Closet  
elevation view



washing machine ventless  
dryer

Mechanical Closet + Bathroom  
elevation view



shower  
low flow

composting  
toilet

sink  
low flow



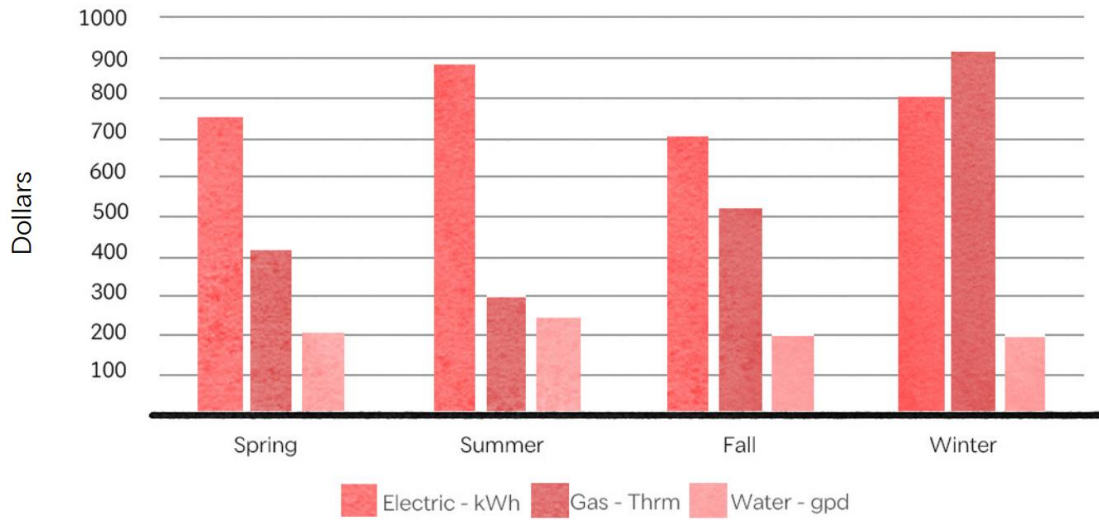


Backyard view from river

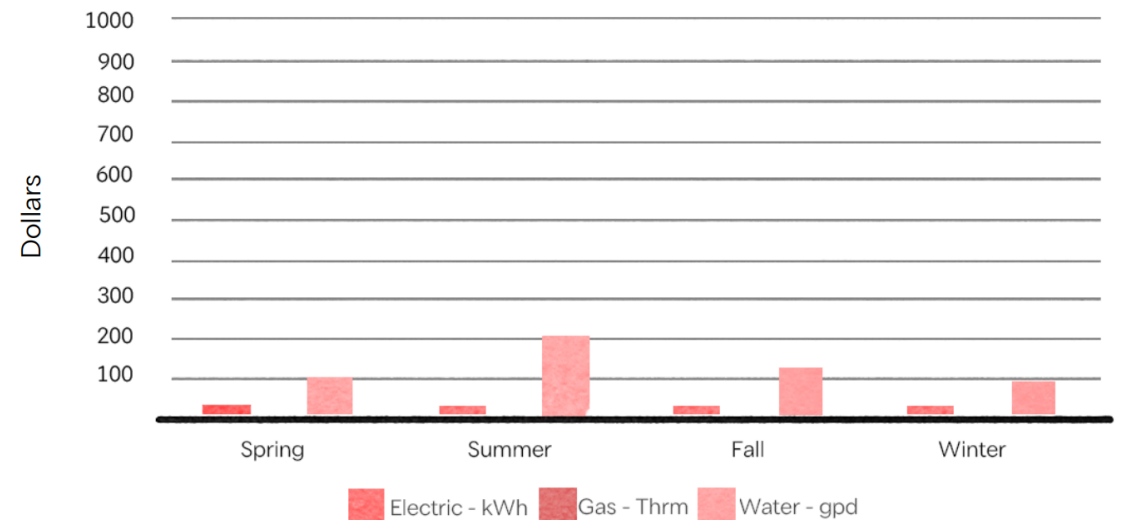
Typical Single Family House  
 Construction cost:  
 \$300 / ft<sup>2</sup>

Nest Zero House  
 Construction cost:  
 \$250 / ft<sup>2</sup>

Utility Costs Per Season

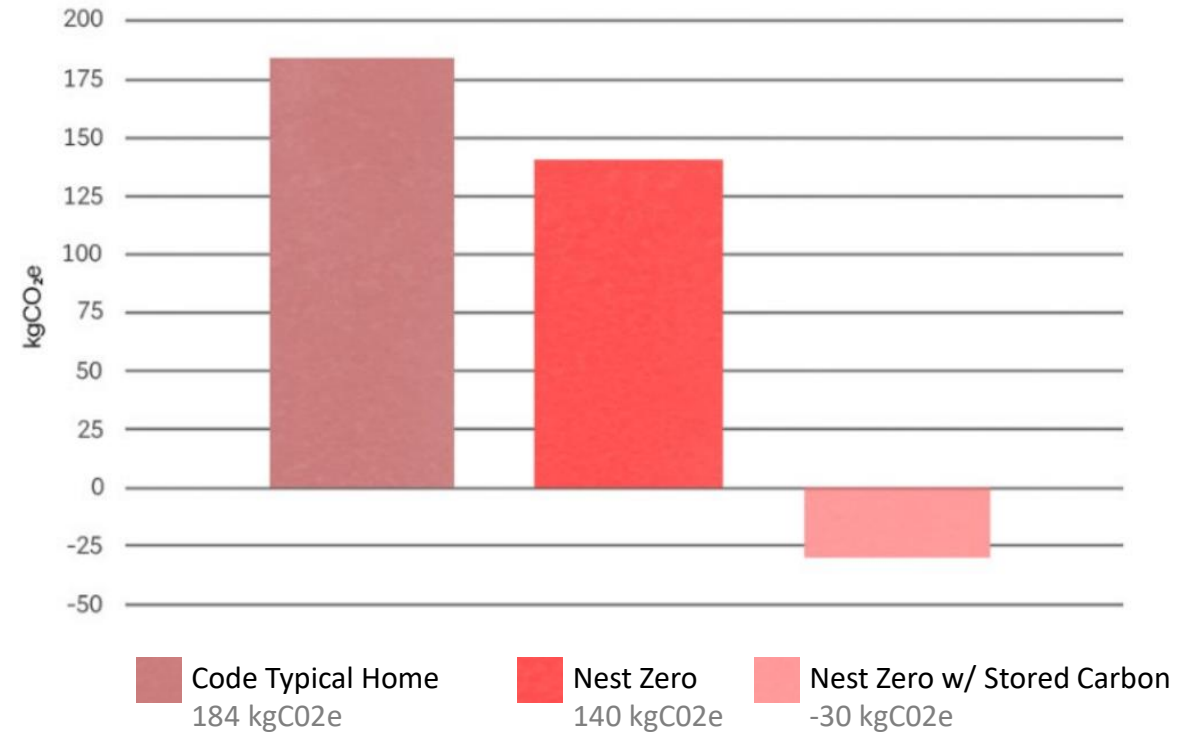


Utility Costs Per Season

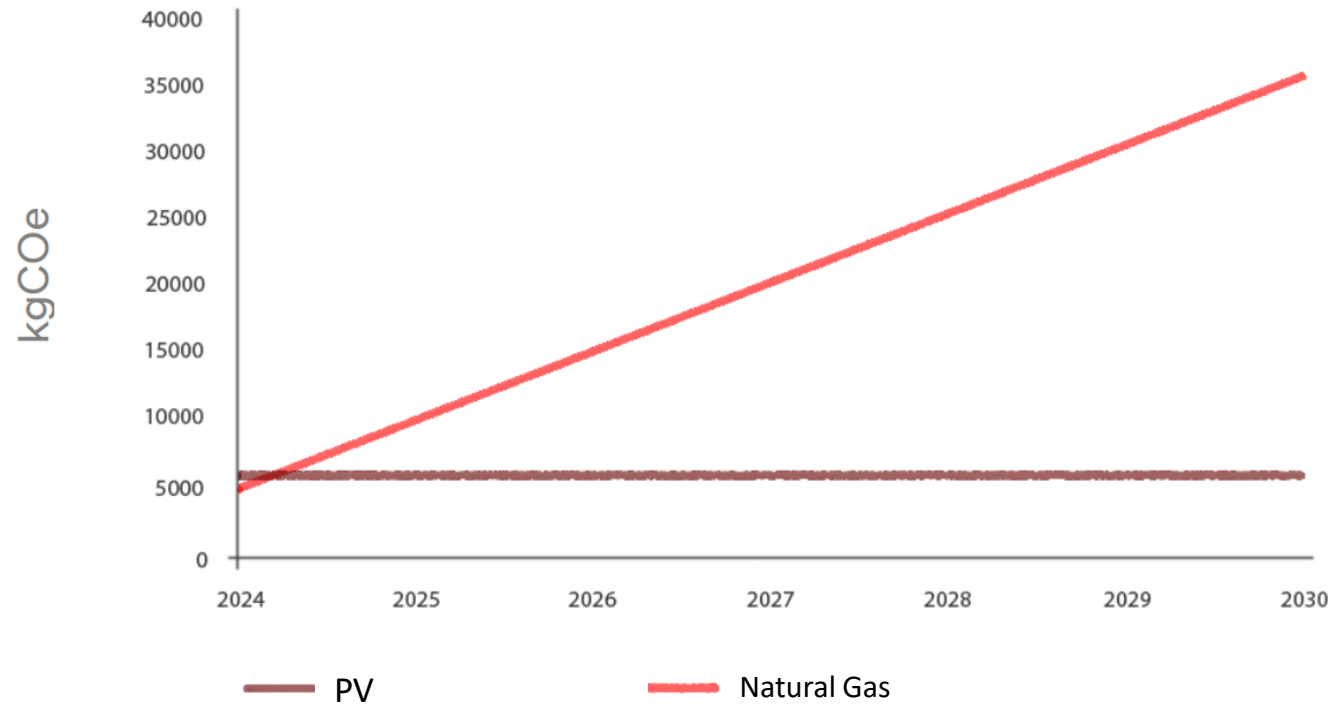


\* Cost estimate based on RSMeans data

## Embodied Carbon & Stored Carbon



# Operational Carbon



Massachusetts Stretch Code:

HERS max score:

55 – January 1, 2023

45 – July 1, 2024

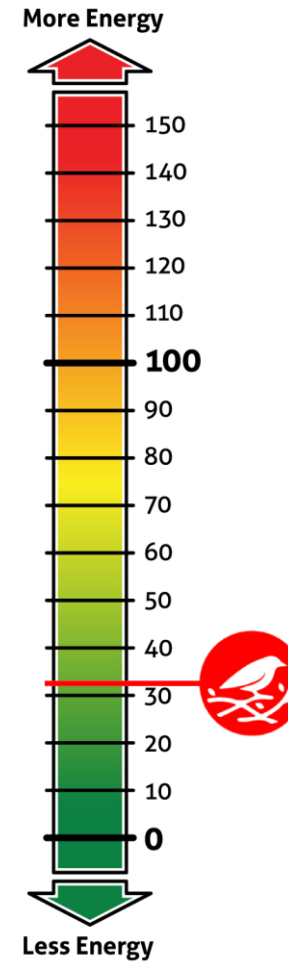
Nest Zero:

HERS score:

32 – without PV

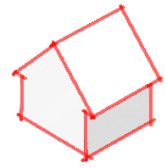
0 – with 320 ft<sup>2</sup> PV

-18 – with 500 ft<sup>2</sup> PV

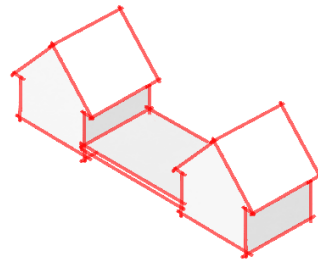


\* HERS score based on REMRate report

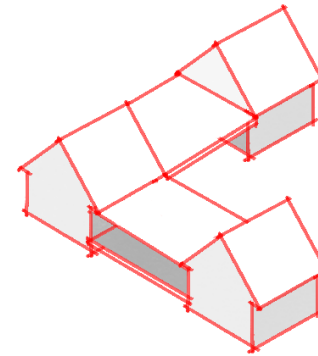
Future Scalability:  
Lease-to-Own Houses



Option A



Option B



Option C

Future Scalability:  
Lease-to-Own Houses



# NEST ZERO

Thank You!

