



ARCHITECTURE
STUDENT
CONTEST

ECO-HABITAT
greenhouse dorms and urban micro-climate



REEM LICHAA EL KHOURY – RALPH SAYAH – MOHAMAD FAOUR



SITE: VIKKI

HELSINKI, FINLAND



URBAN CONTEXT

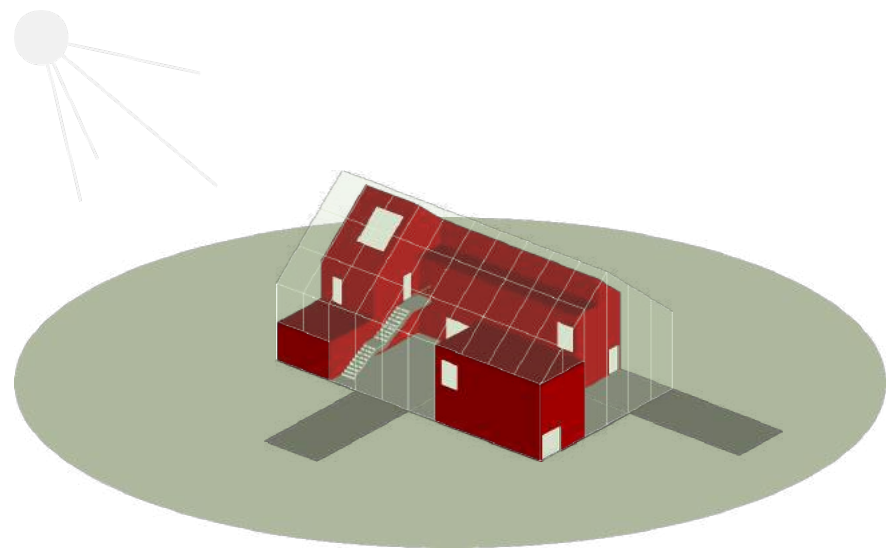


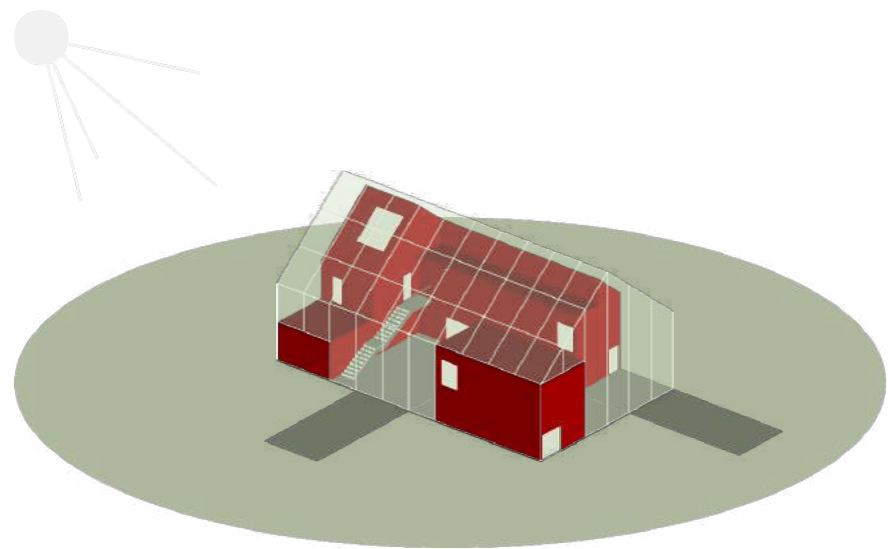
URBAN CONTEXT

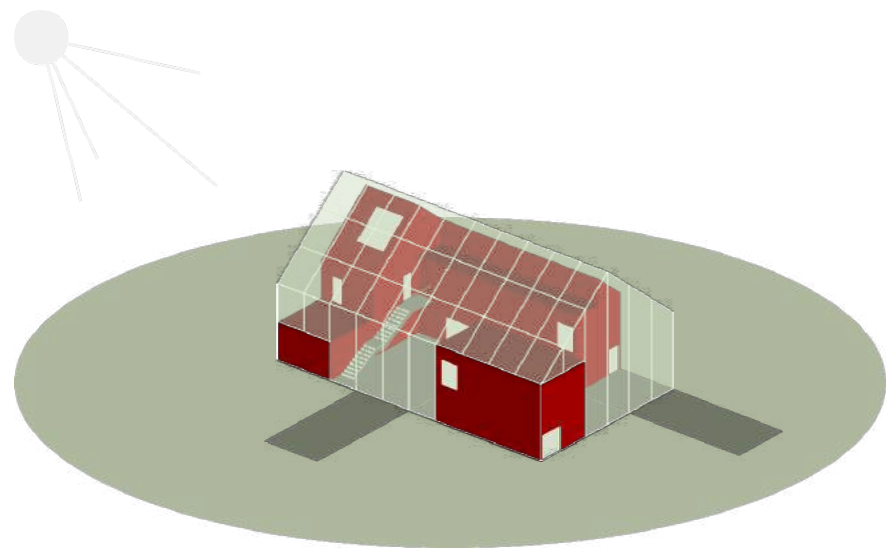


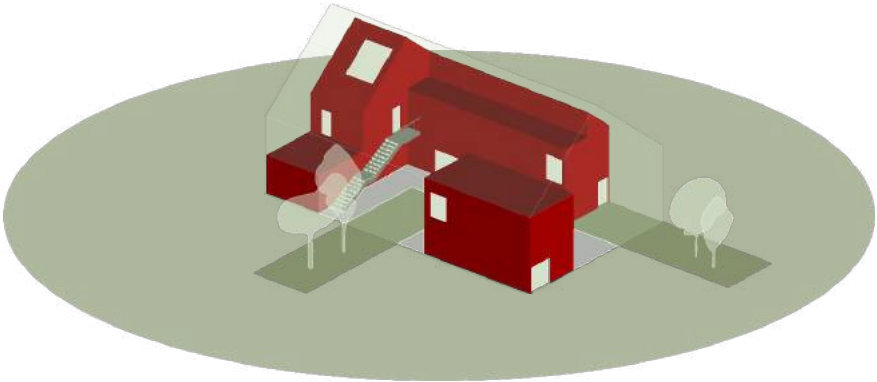
CONCEPT

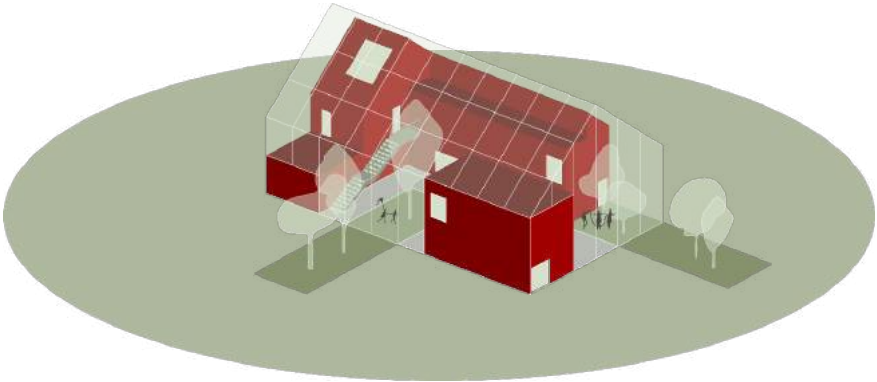


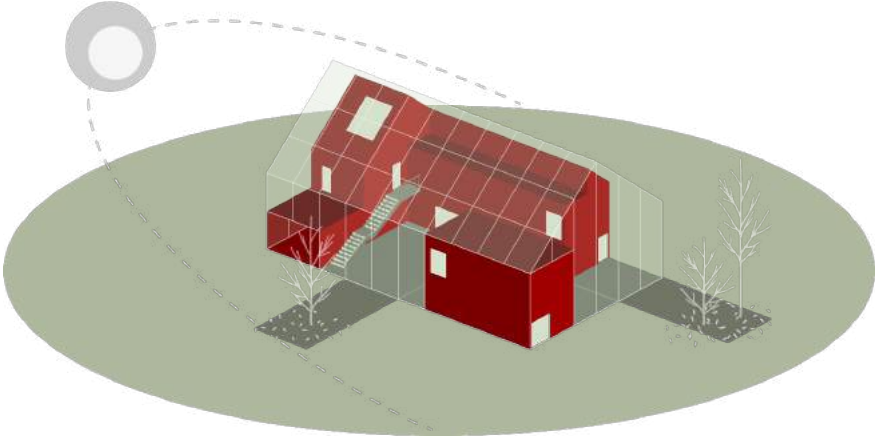


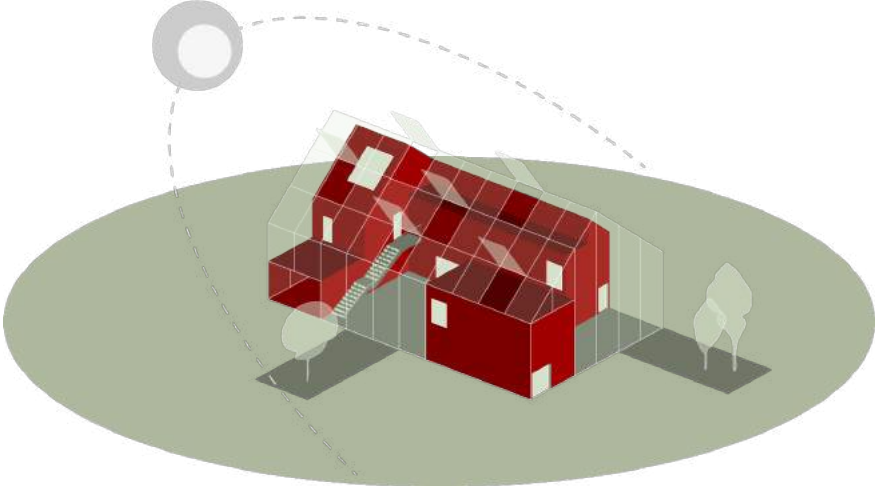




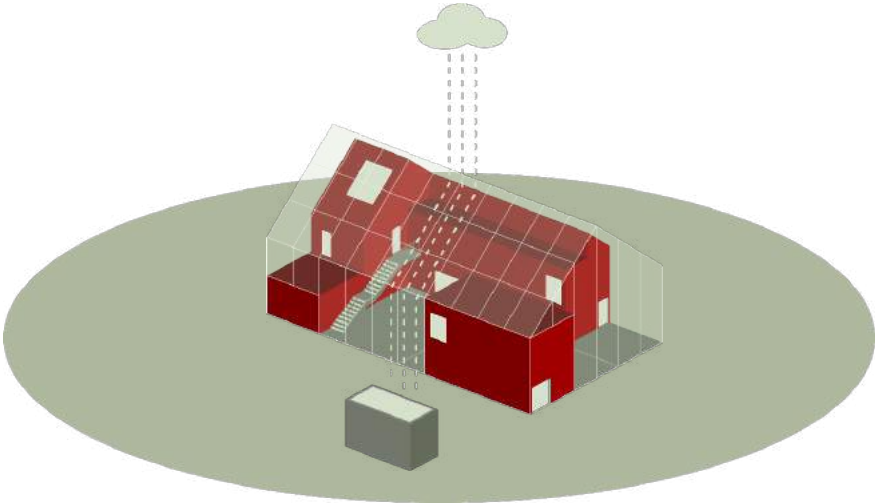






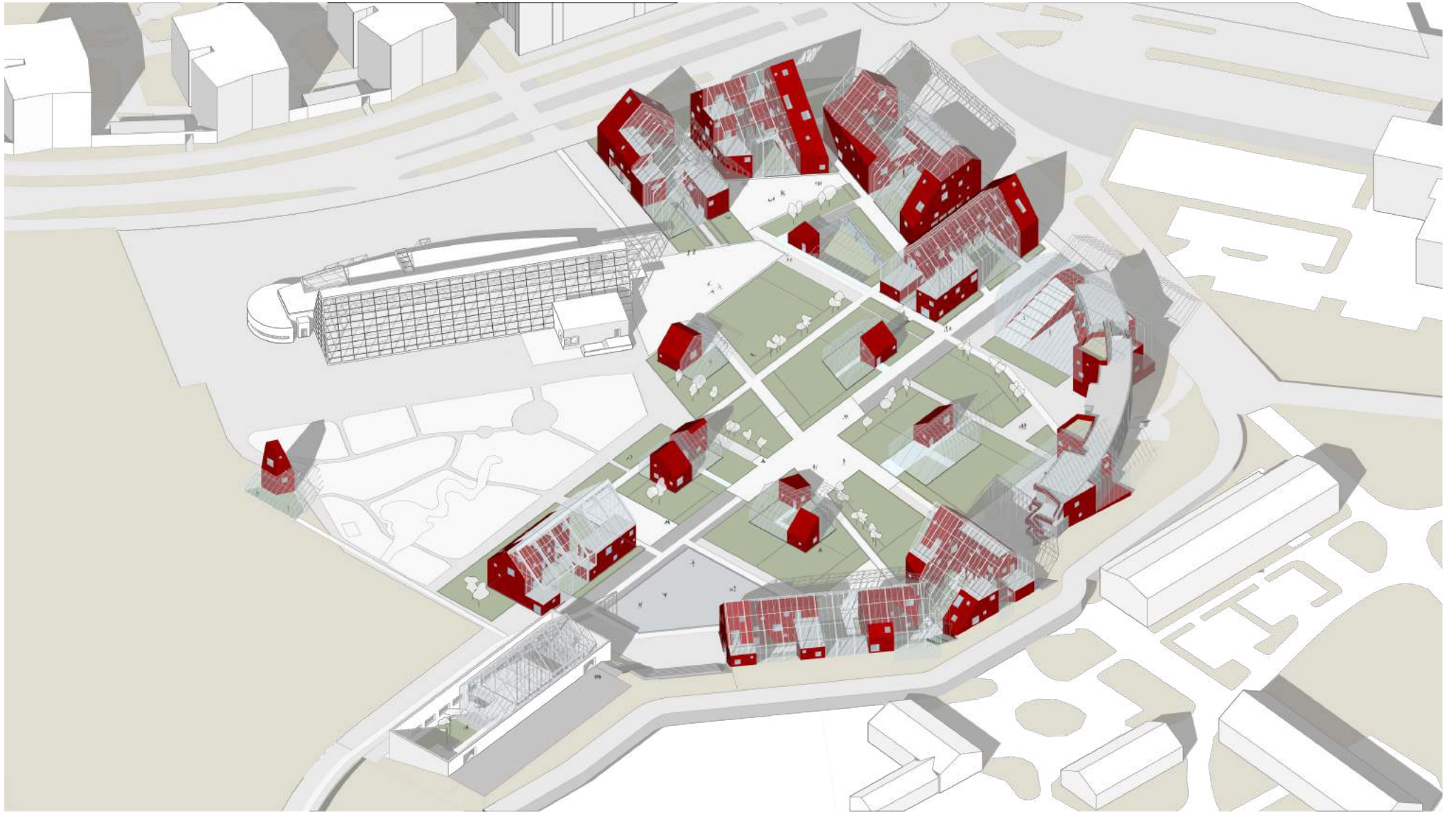




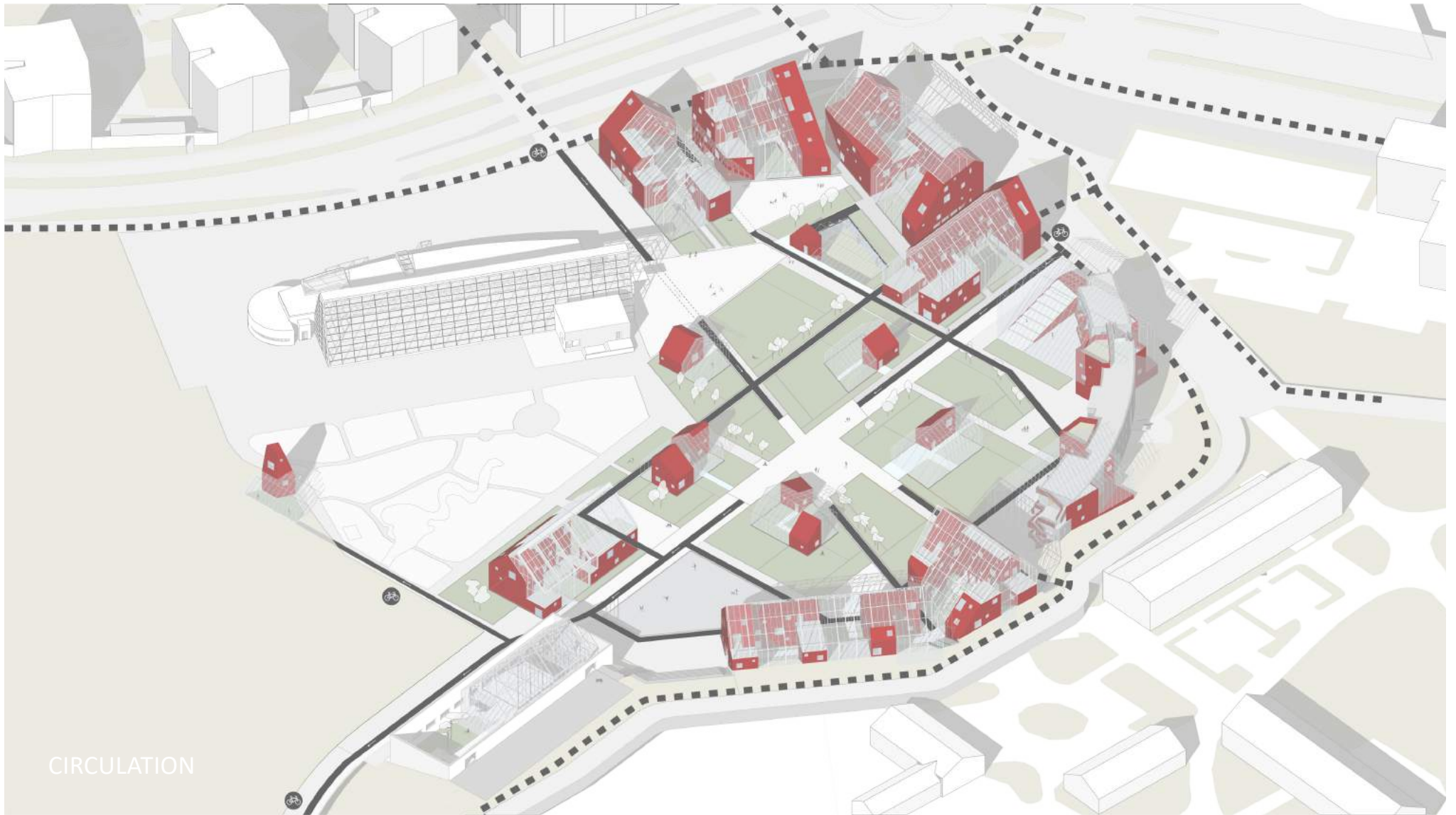




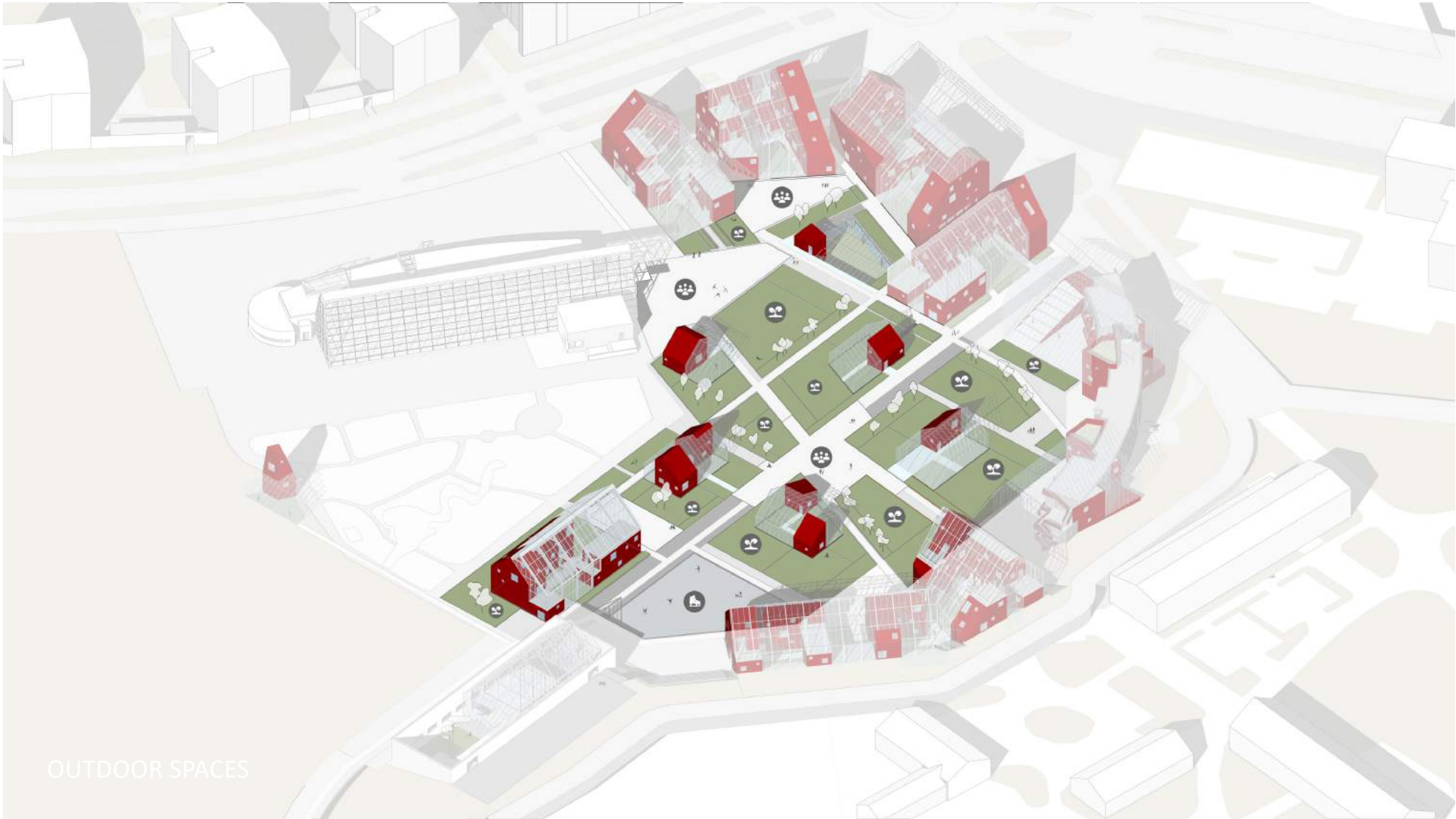
MASS PLAN



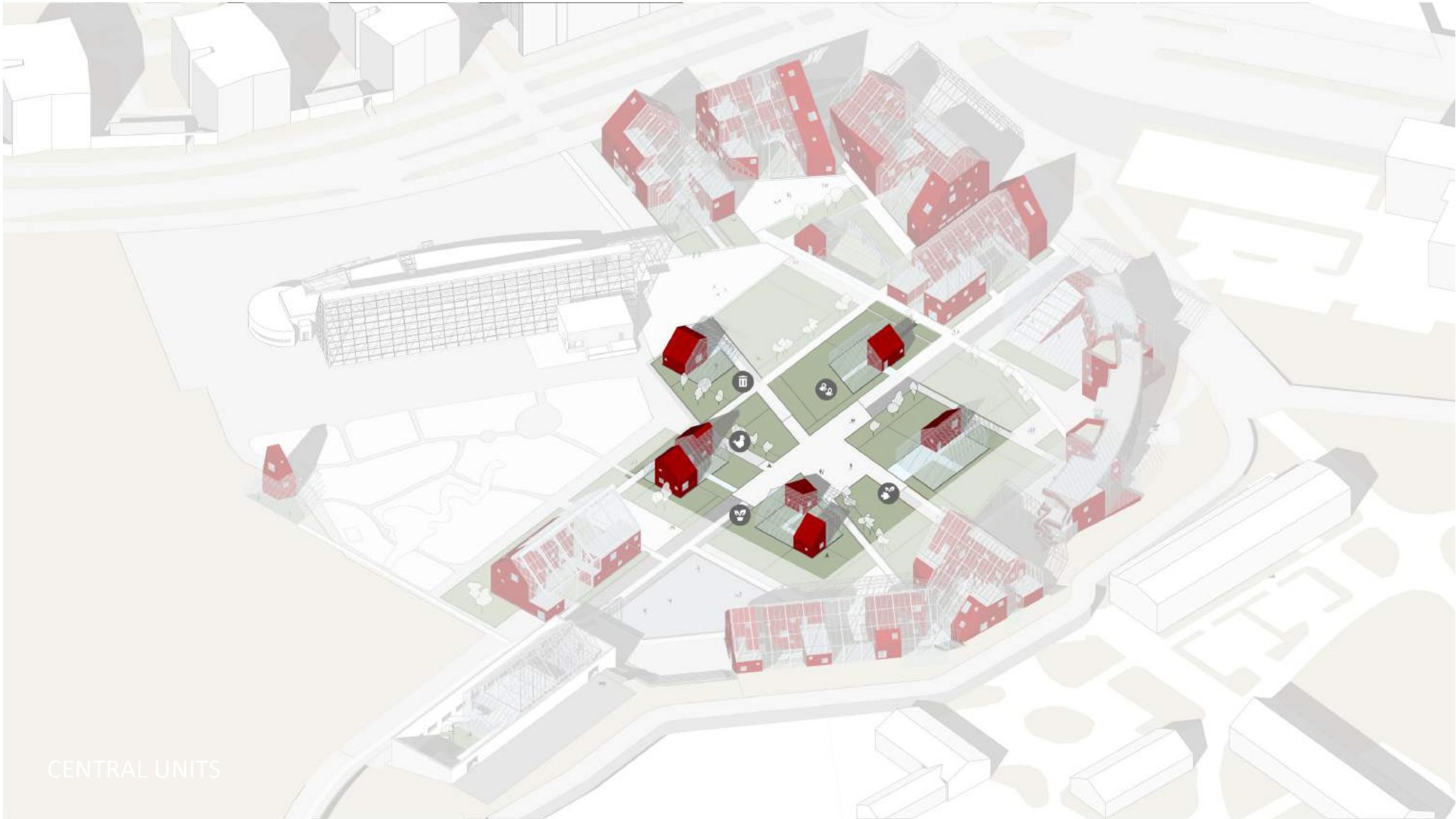




CIRCULATION

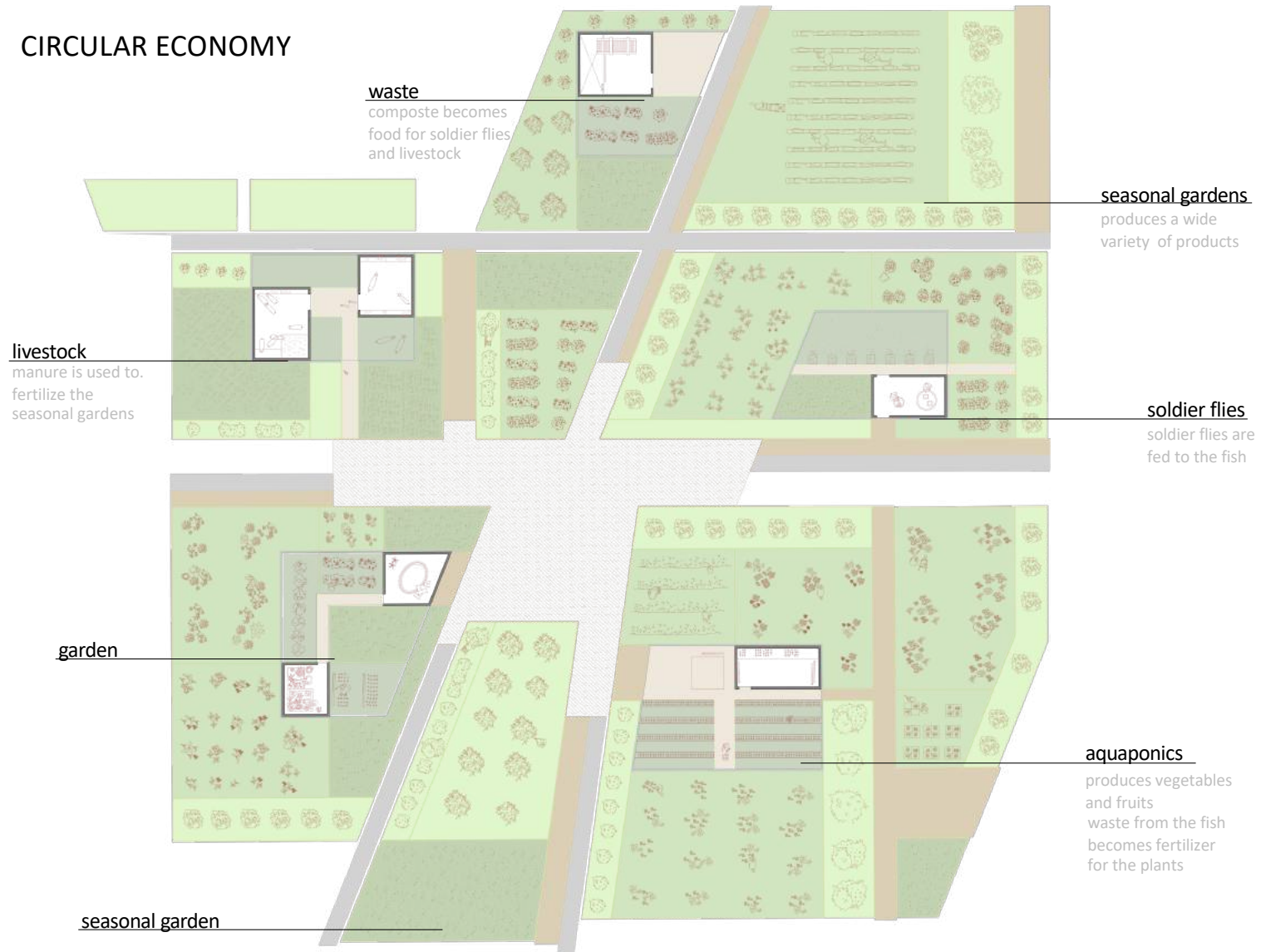


OUTDOOR SPACES

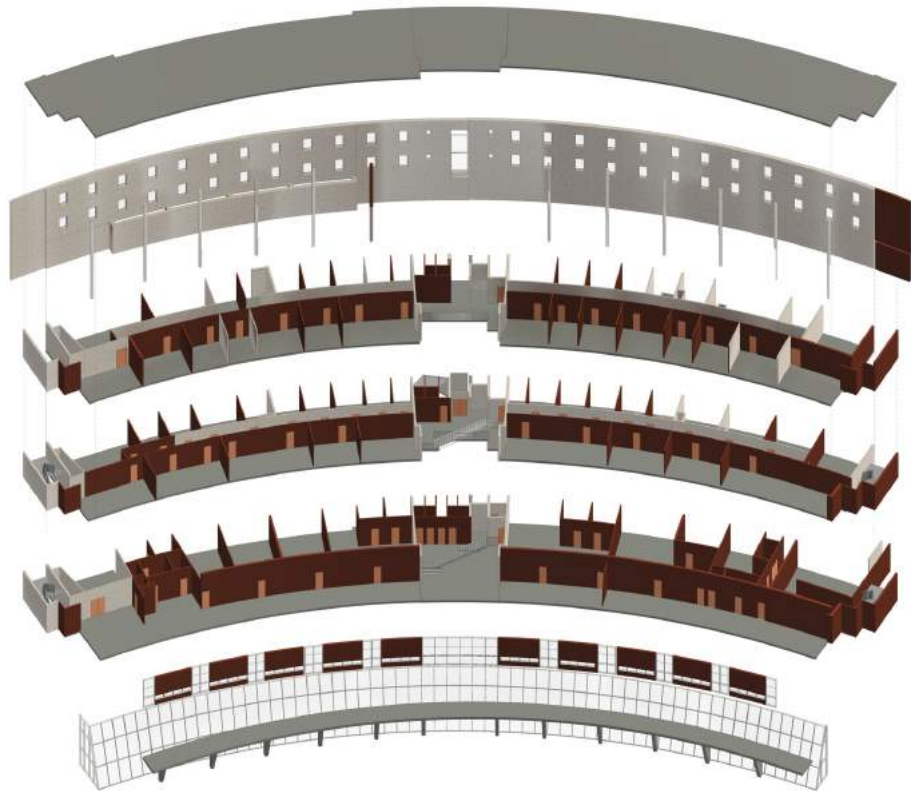


CENTRAL UNITS

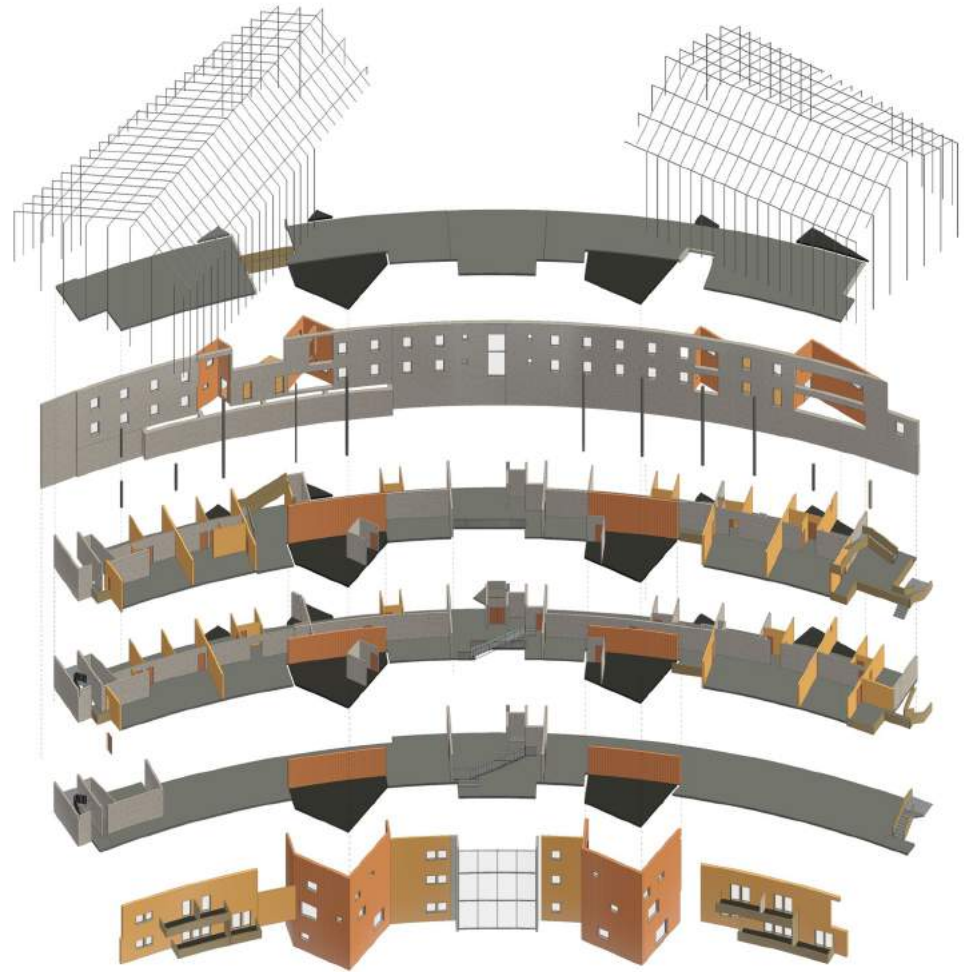
CIRCULAR ECONOMY



REUSE STRATEGY



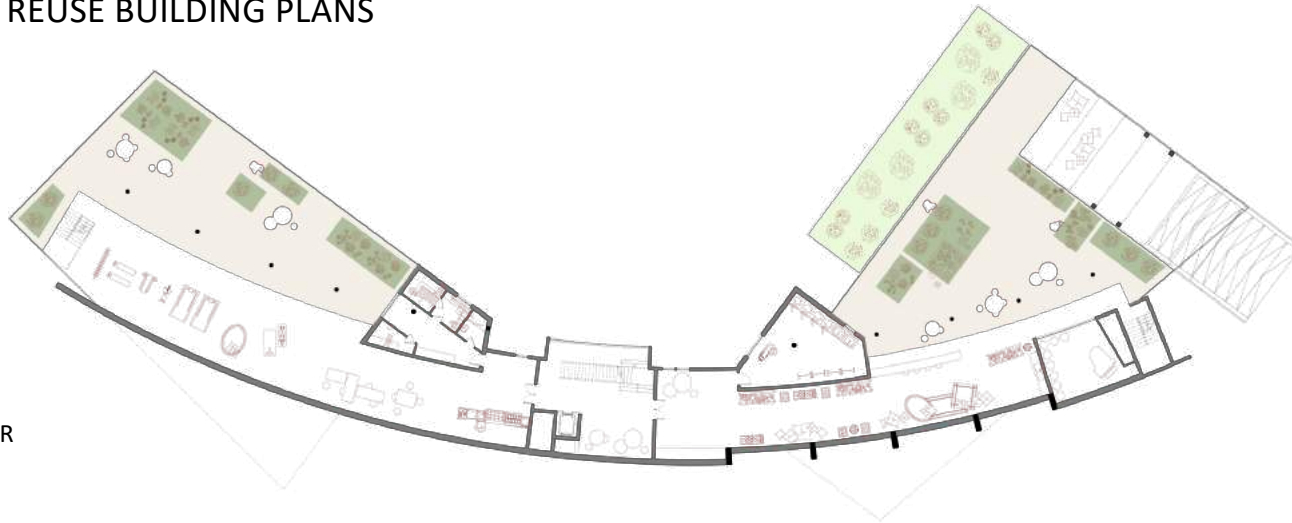
● DEMOLISHED



● NEW

ADAPTIVE REUSE BUILDING PLANS

GROUND FLOOR



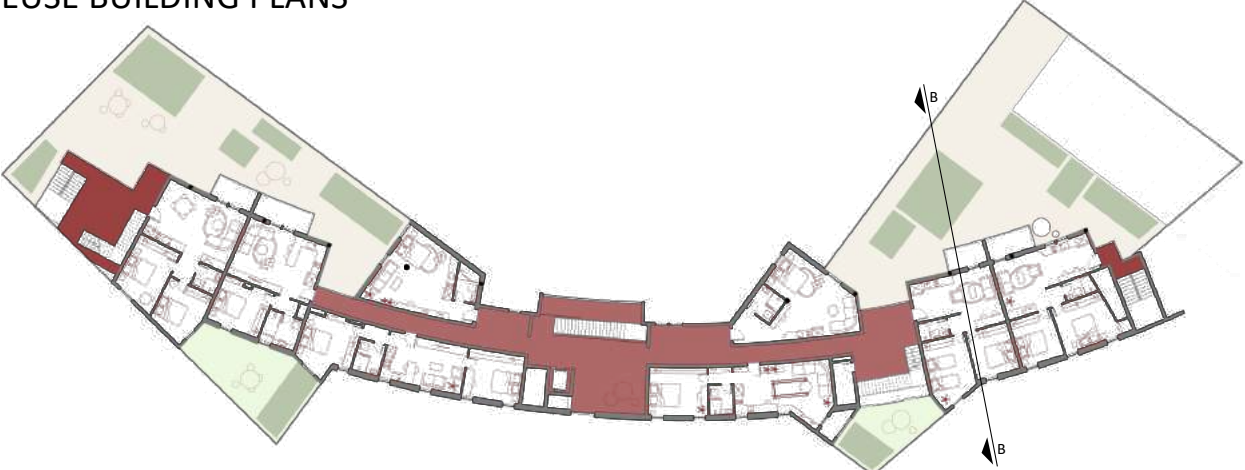
FIRST FLOOR





ADAPTIVE REUSE BUILDING PLANS

SECOND FLOOR



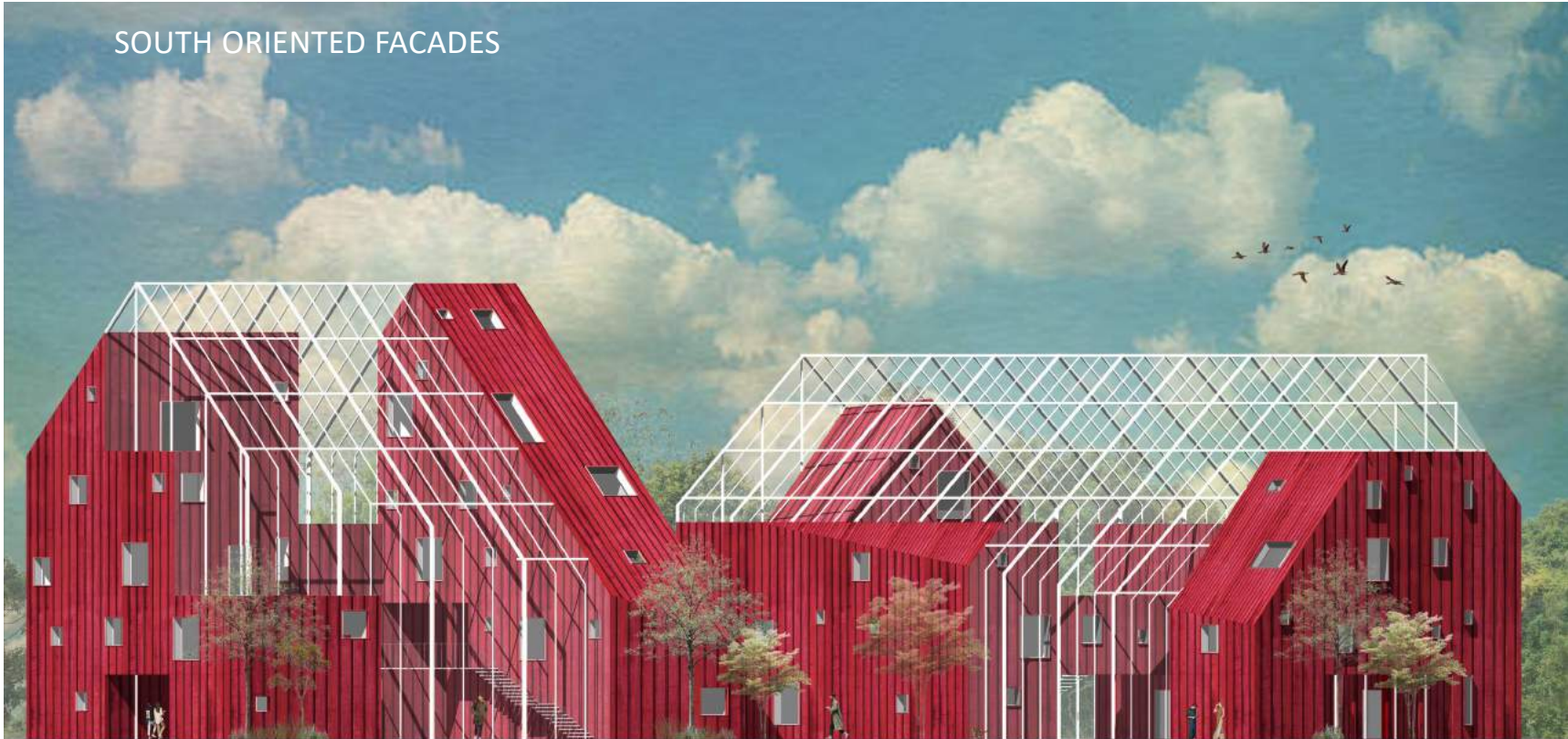
ROOF GARDEN



SECTION BB



SOUTH ORIENTED FACADES



NORTH ORIENTED FACADES



GF MASTER PLAN



CONTINUOUS GREENERY



UNINTERRUPTED FLOW





BLDG 1-2 PLANS



GROUND FLOOR



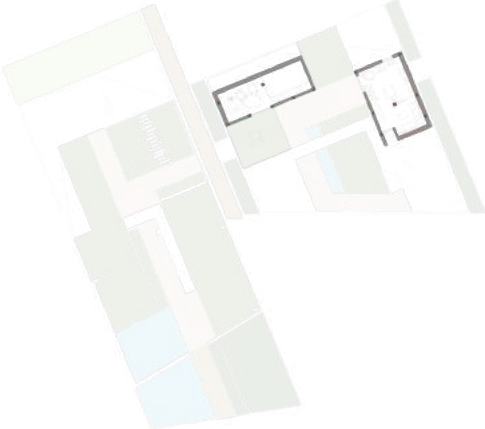
FIRST FLOOR



SECOND FLOOR



THIRD FLOOR



FOURTH FLOOR

BLDG 3-4 PLANS



GROUND FLOOR



FIRST FLOOR



SECOND FLOOR



THIRD FLOOR

SECTION CC



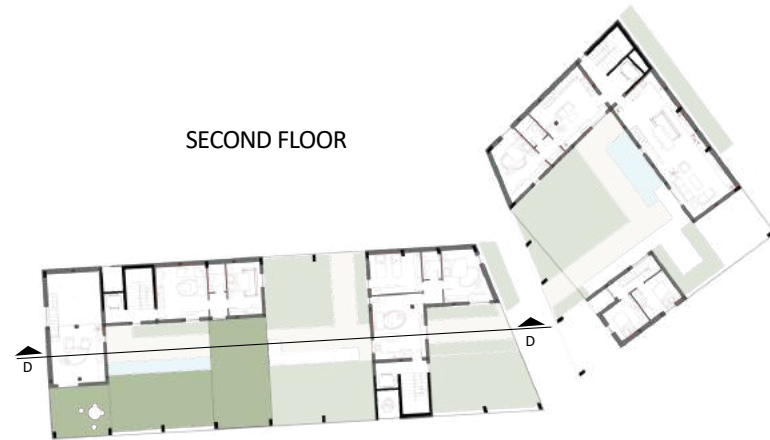
BLDG 5-6 PLANS



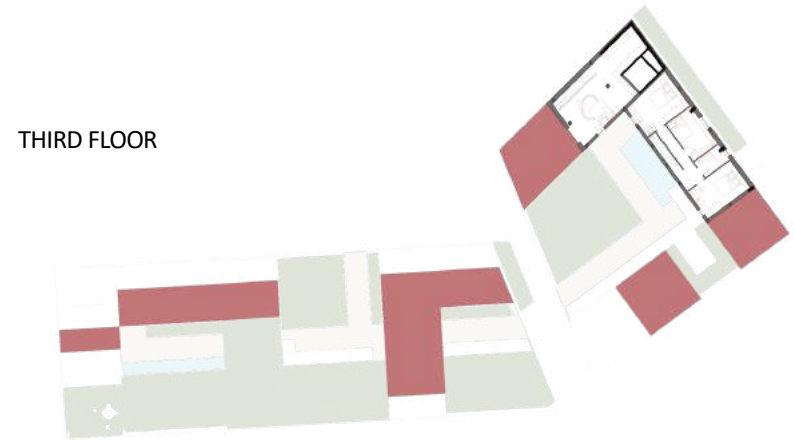
GROUND FLOOR



FIRST FLOOR

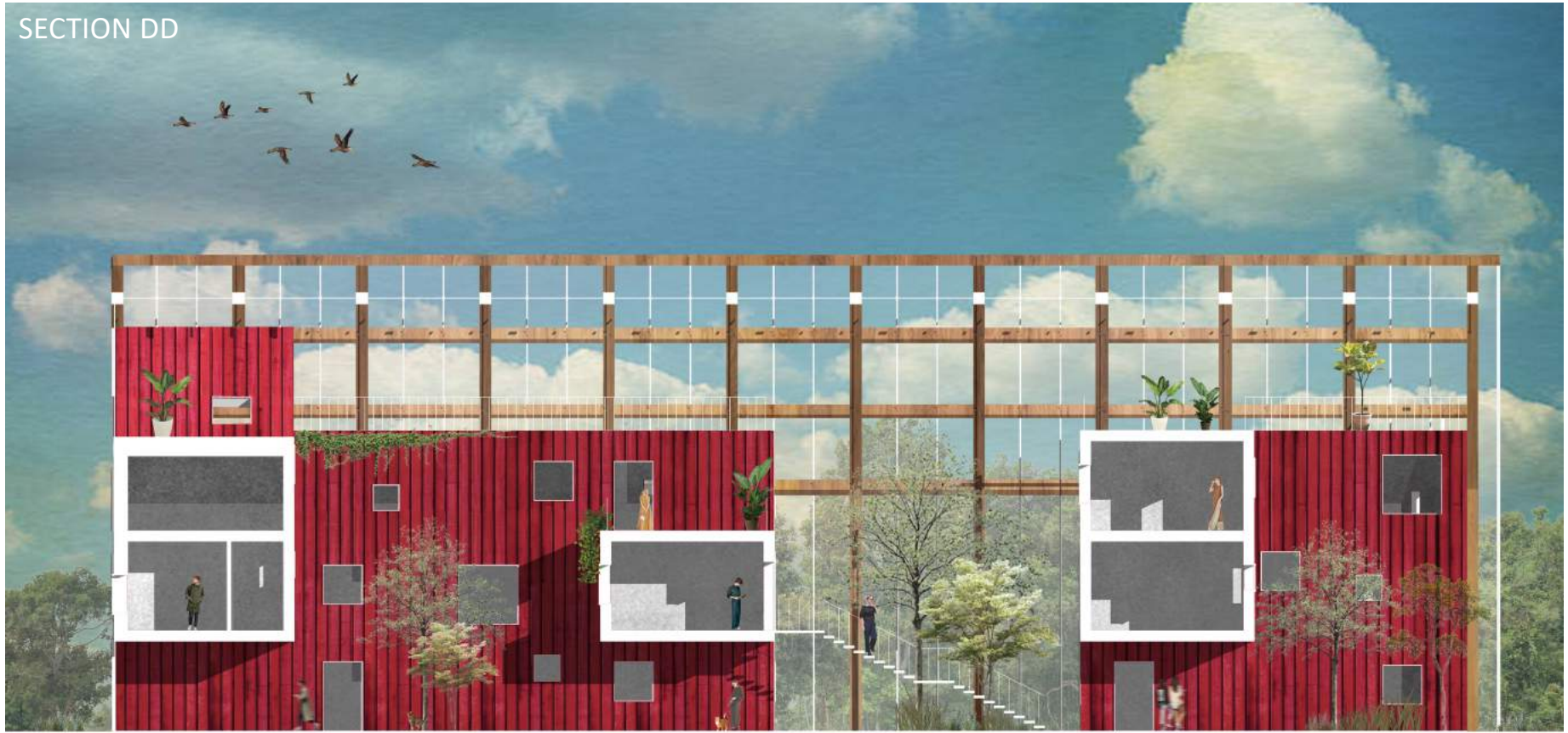


SECOND FLOOR



THIRD FLOOR

SECTION DD



SECTION EE



BLDG 7 PLANS



GROUND FLOOR

F



FIRST FLOOR

F

G



SECOND FLOOR

G

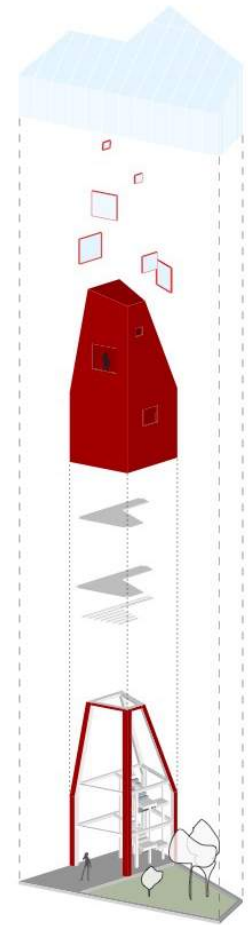
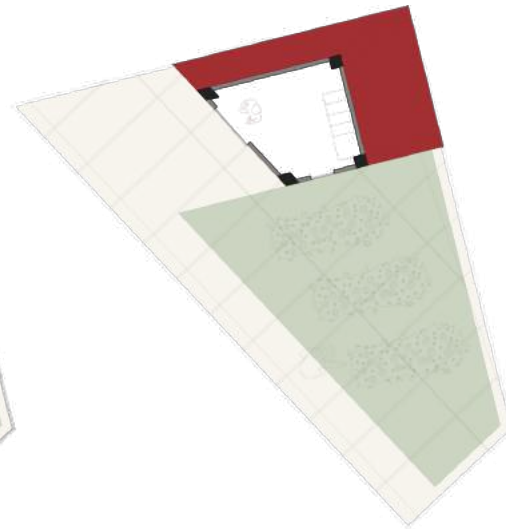
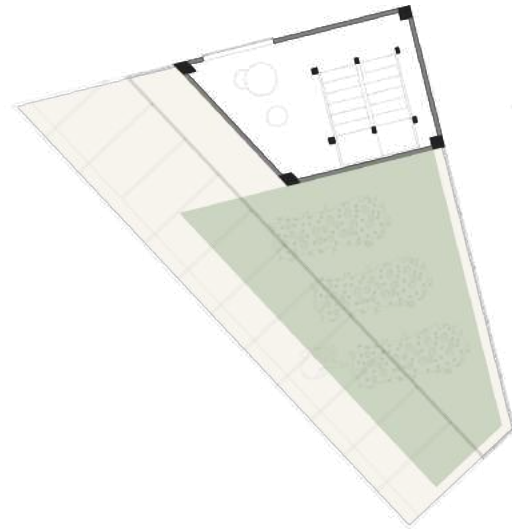
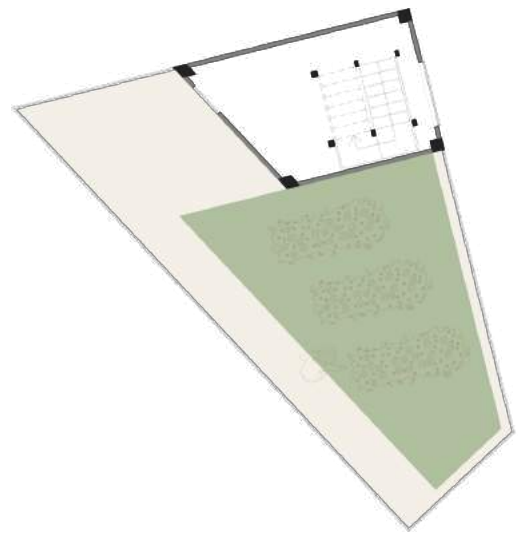
SECTION FF



SECTION GG



BIRDWATCH TOWER



MUSEUM TOWER PLANS



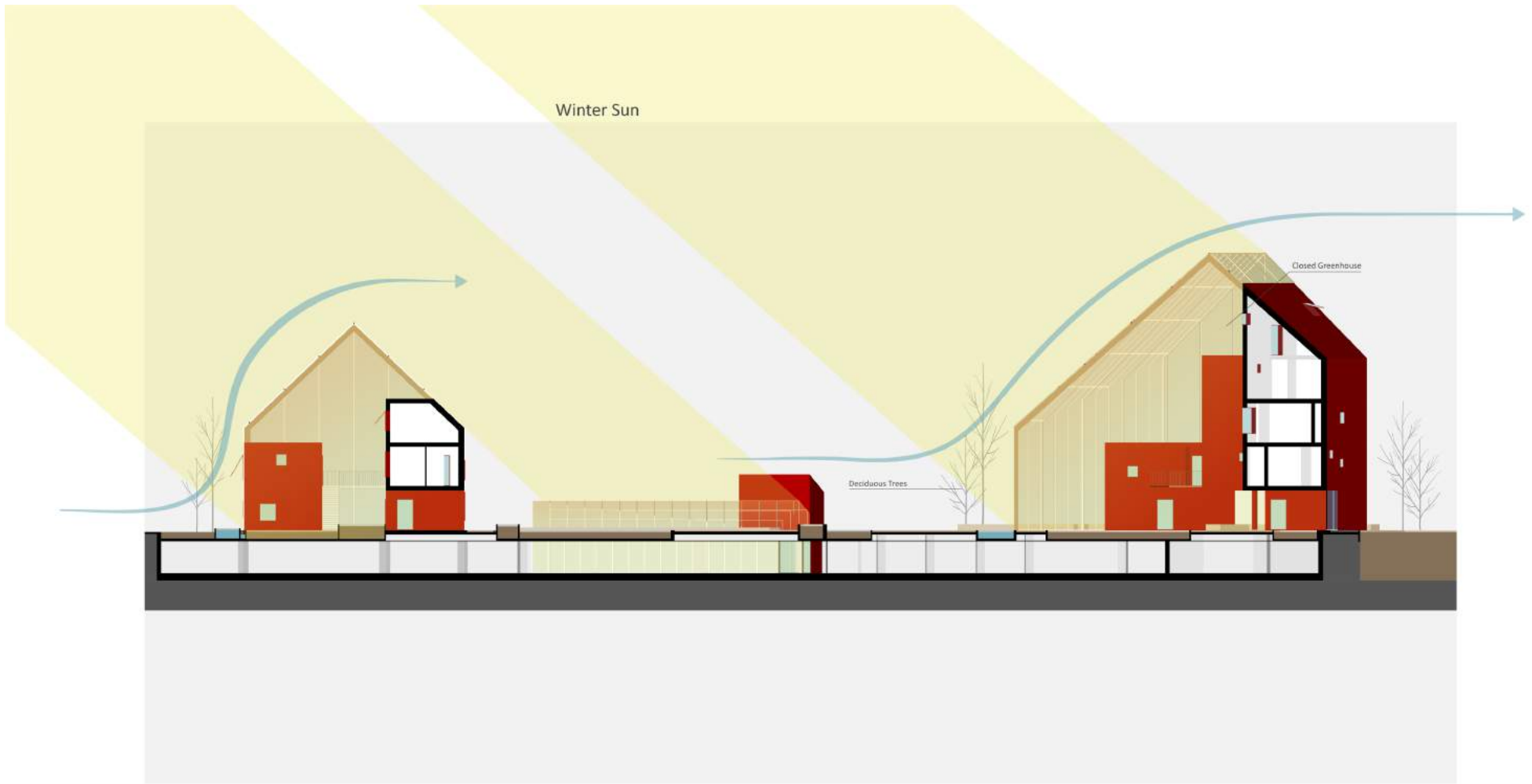
GROUND FLOOR

FIRST FLOOR



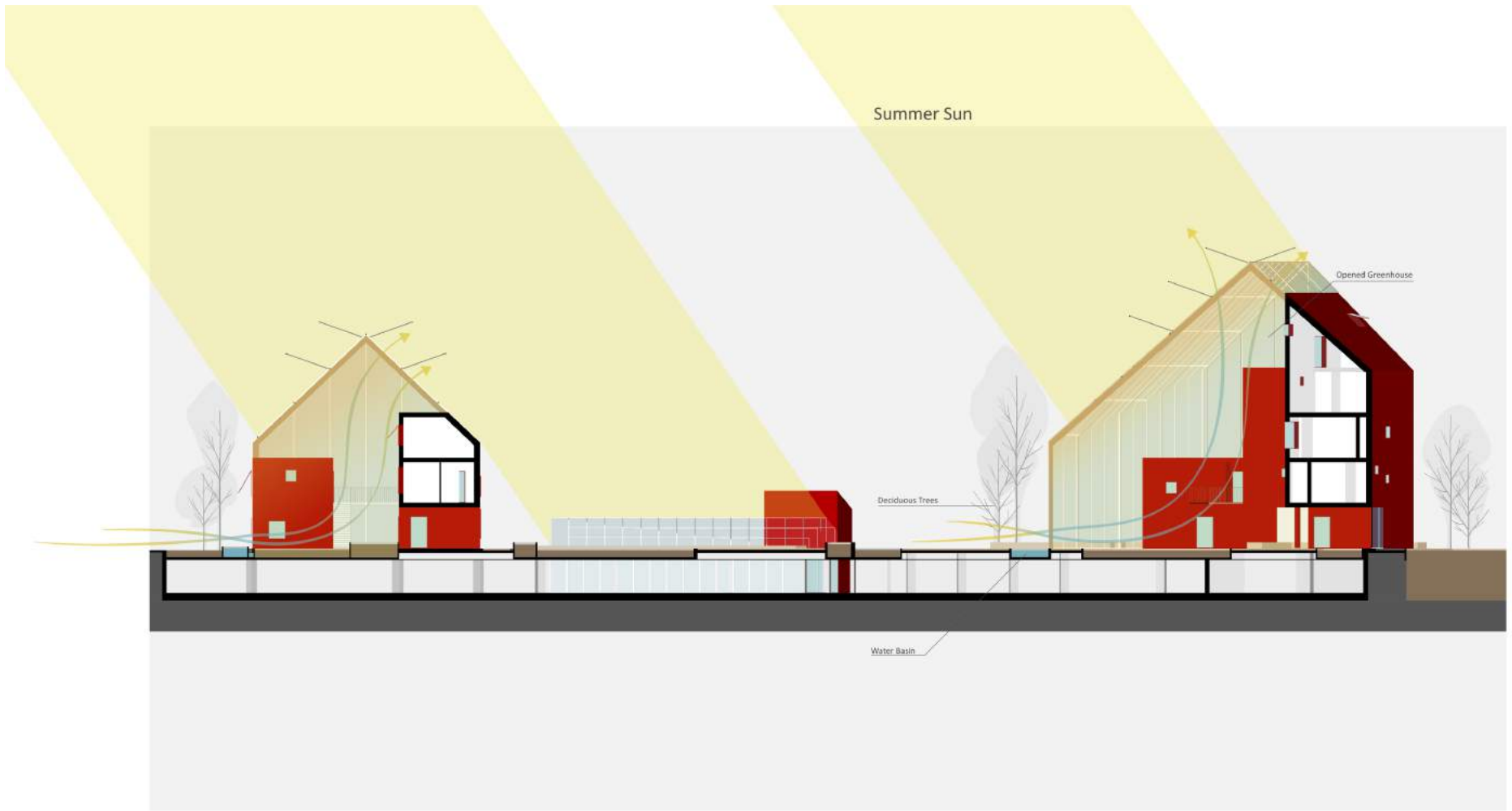
PARKING PLAN



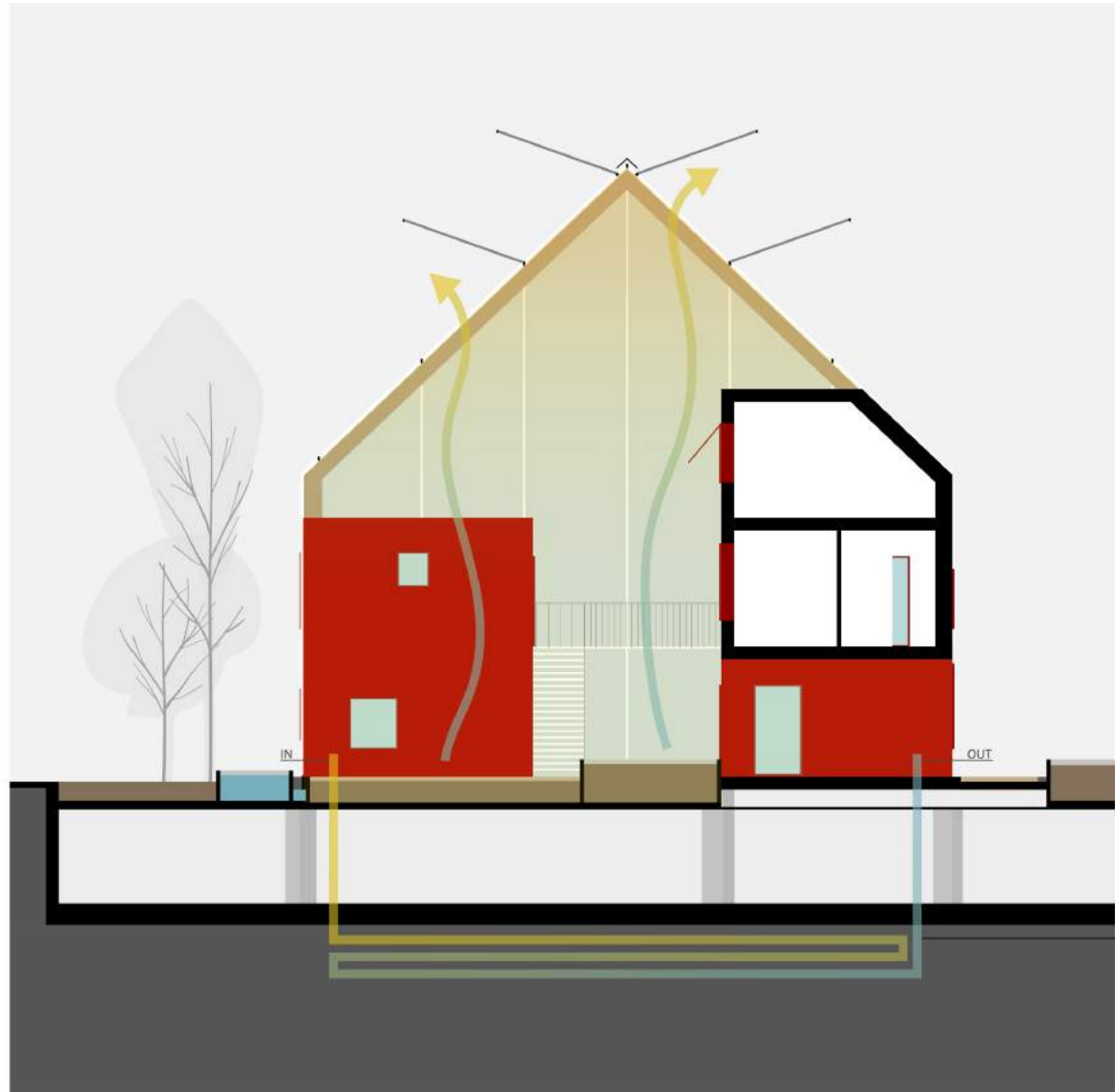


PASSIVE HEATING

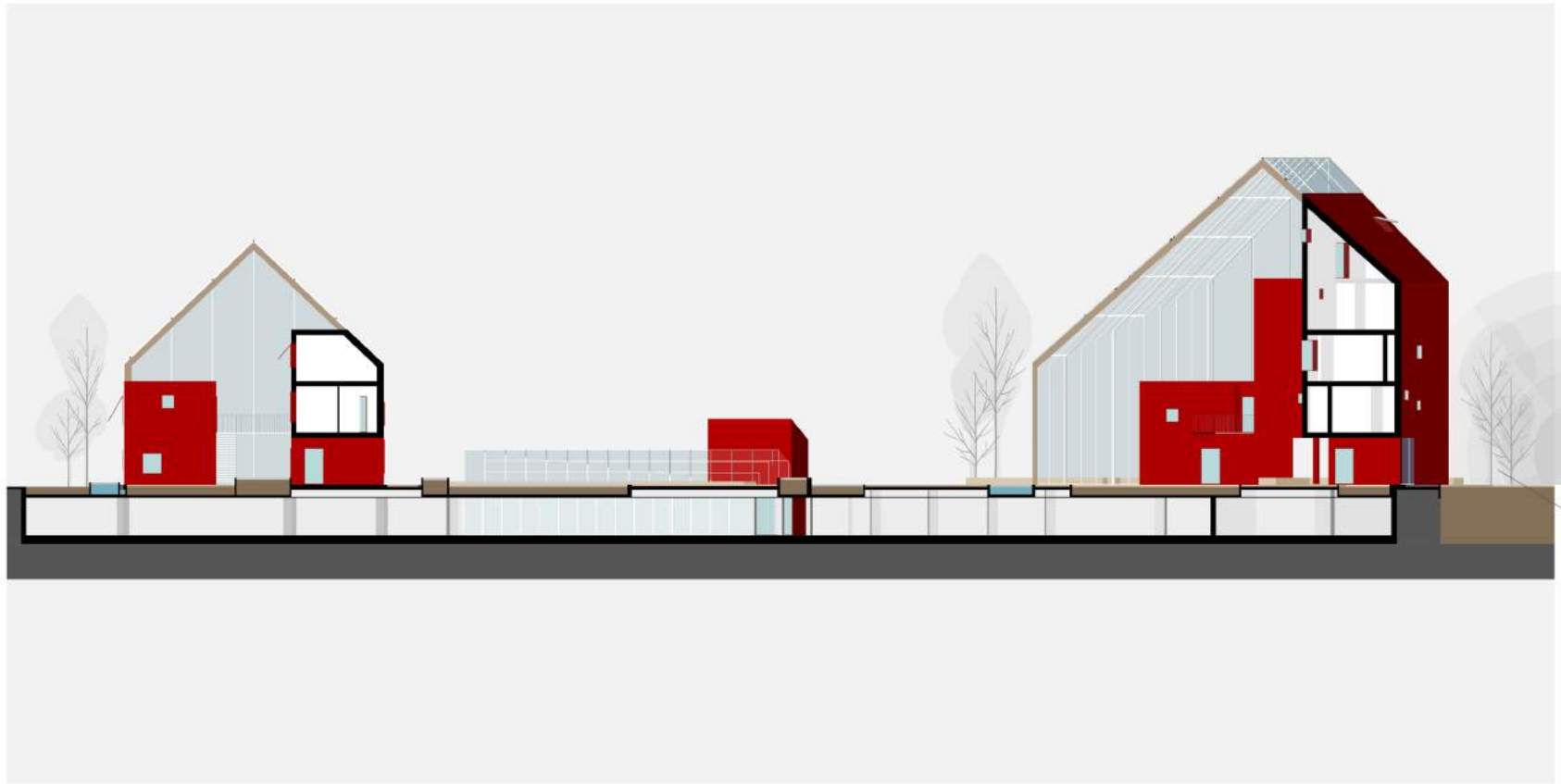




PASSIVE COOLING



Geothermal System

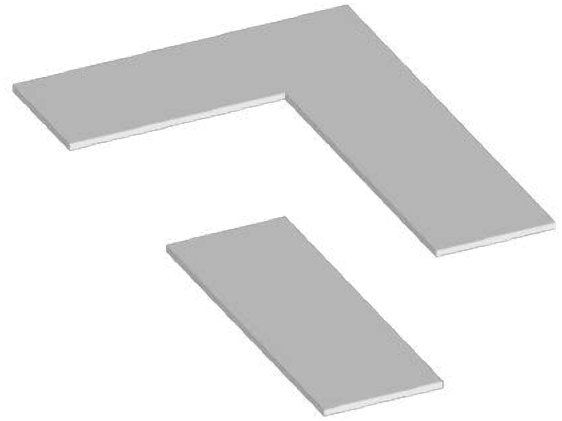


Traffic Sound
Buffer Zone

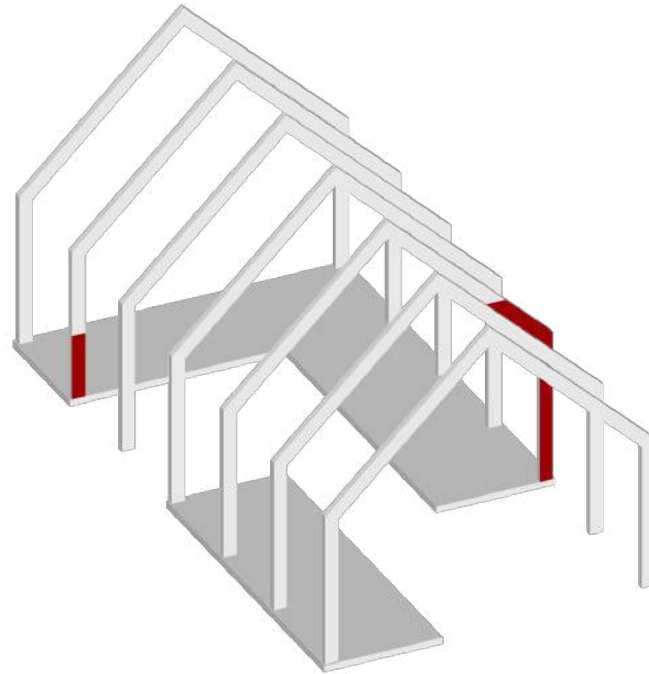




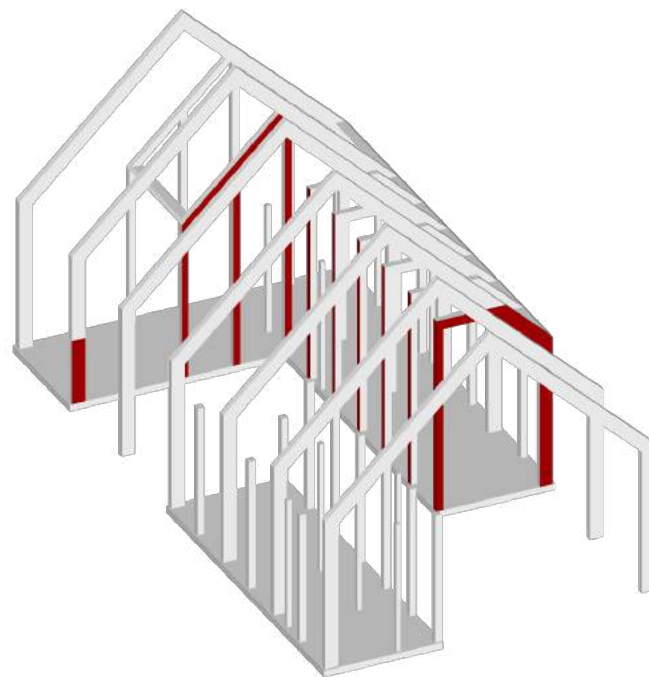
WOODEN CONSTRUCTION PROCESS



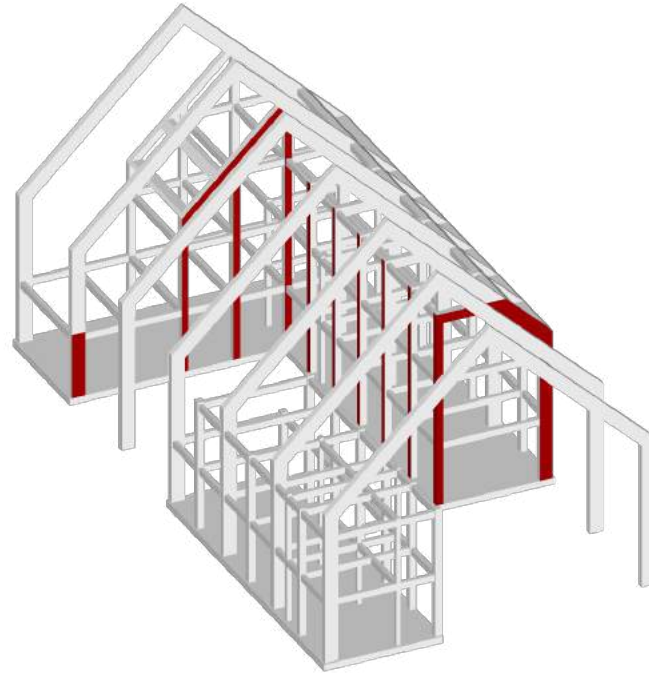
WOODEN CONSTRUCTION PROCESS



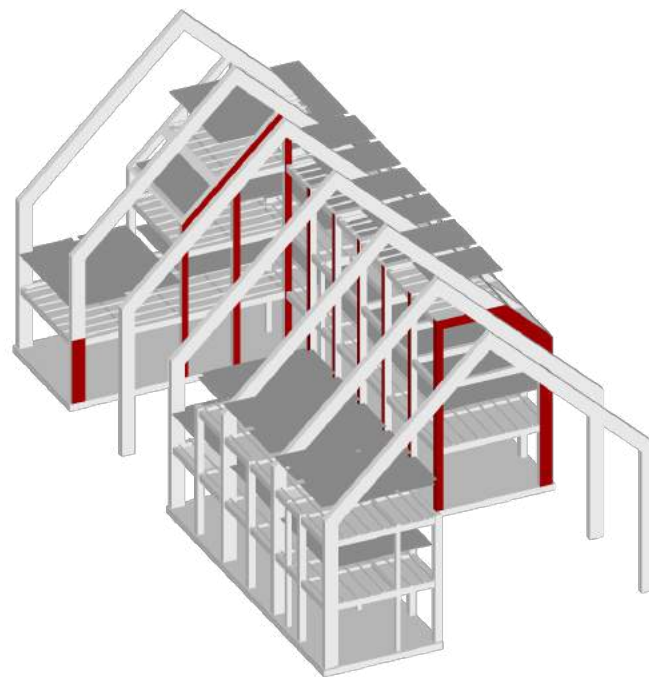
WOODEN CONSTRUCTION PROCESS



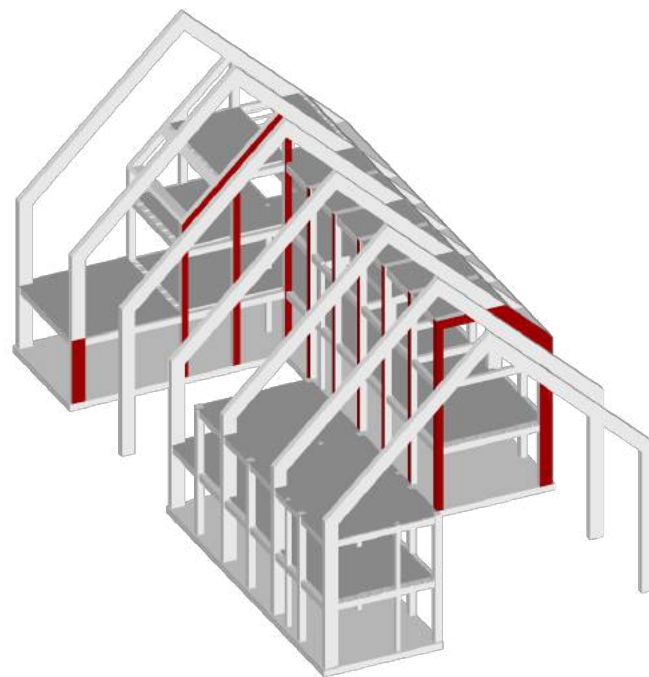
WOODEN CONSTRUCTION PROCESS



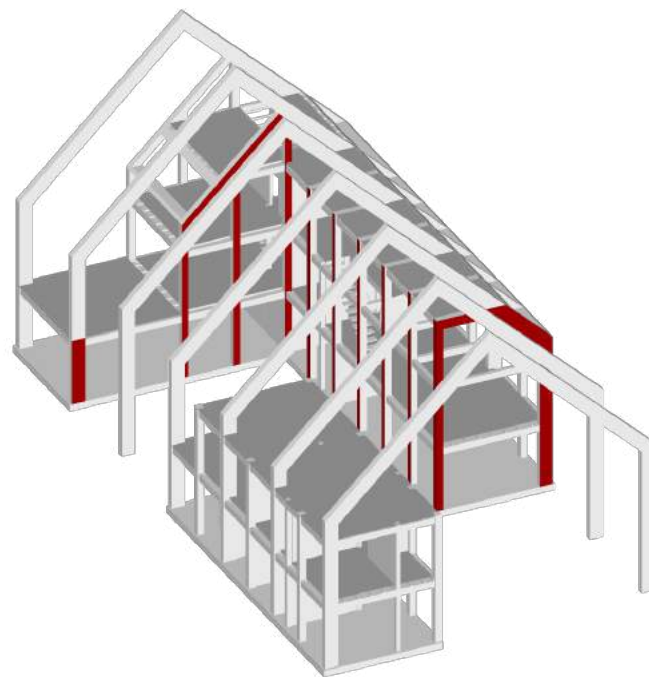
WOODEN CONSTRUCTION PROCESS



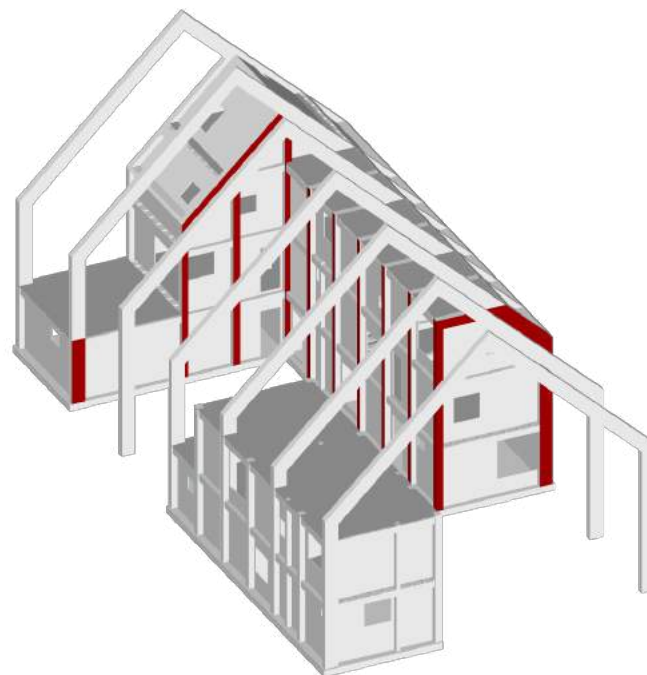
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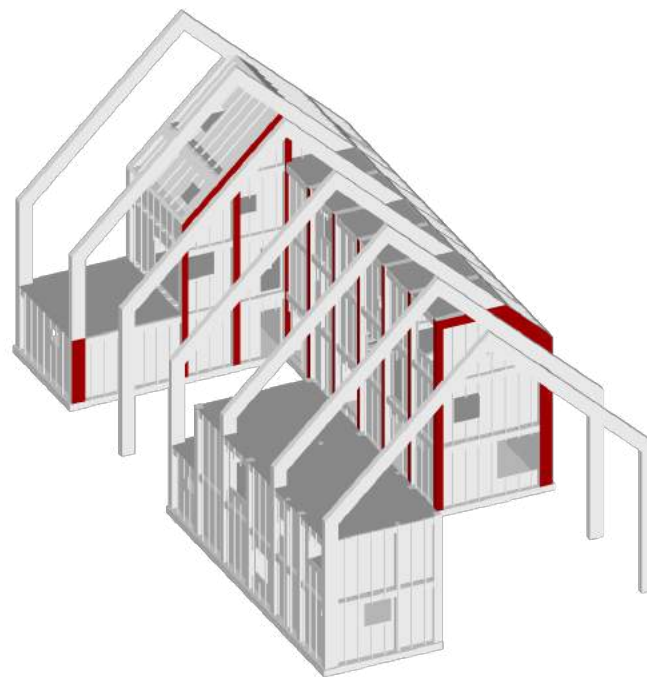
WOODEN CONSTRUCTION PROCESS



WOODEN CONSTRUCTION PROCESS



WOODEN CONSTRUCTION PROCESS



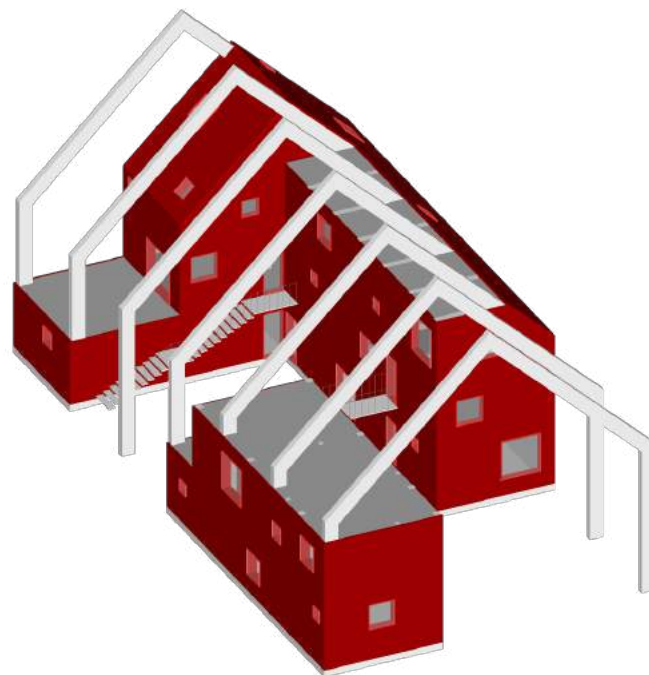
WOODEN CONSTRUCTION PROCESS



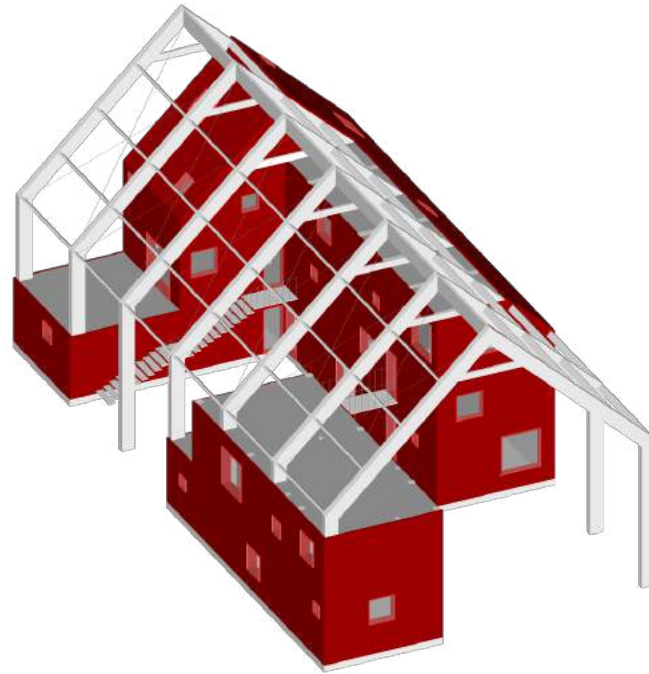
WOODEN CONSTRUCTION PROCESS



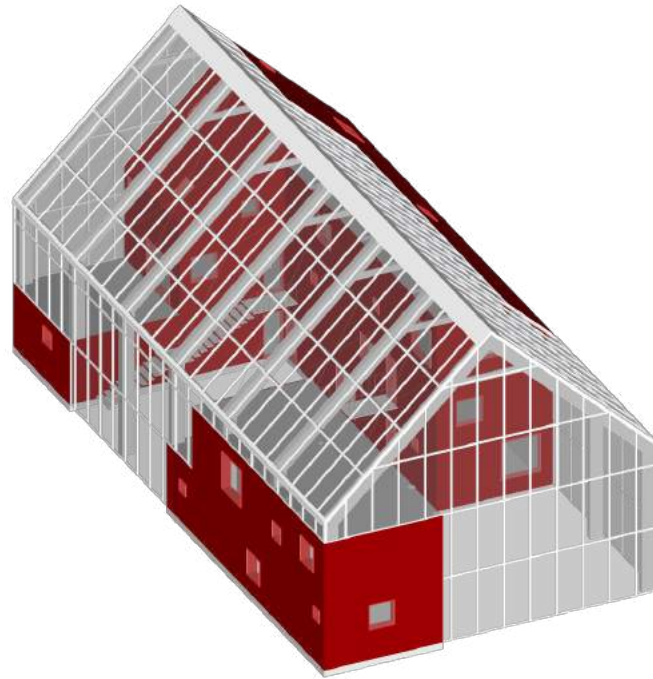
WOODEN CONSTRUCTION PROCESS



WOODEN CONSTRUCTION PROCESS



WOODEN CONSTRUCTION PROCESS



Foundation



Individual footing
4.7t



Concrete deck
8.2t



Reinforcement steel
5.3t

CO2e

Vertical Structure



Timber wood
4.1t



CLT
4.95t
CO2e

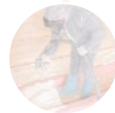
Floor Deck



Wood beam
2.6t



Softwood stud
0.28t



Insulation foam
5.9 kg



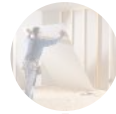
Wooden cladding
0.29t

CO2e

Interior walls



Softwood lath
0.43t



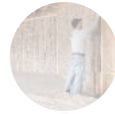
Wooden cladding
3.01t

CO2e

Exterior cladding



Stud lath
2t



Insulation panels
0.22t



CLT board
7.6t



Roof structure
0.97t

CO2e

Windows



Double glazing
1.7t



Red aluminum
0.5t

CO2e

Greenhouse



Double tempered glass
20.8t



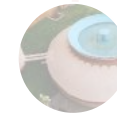
Aluminum
1.6t



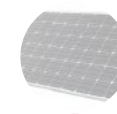
Laminated Wood
5.3t

CO2e

Water Energy



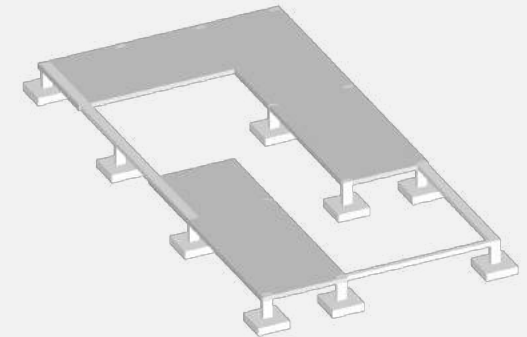
Rainwater harvesting
1.2t



Solar panel
9.8t

CO2e

Selected Build-up: Foundation



Material Usage:

Foundation	62 m3
Vertical structure	73.07 m3
Floor deck	37.16 m3
Interior walls	7.52 m3
Exterior cladding	127.85 m3
Windows	69.29 m2
Greenhouse	901.28 m2

Foundation



Individual footing
4.1t



Concrete deck
8.2t



Reinforcement steel
5.3t

CO2e

Vertical Structure



Timber wood
4.1t



CLT
4.95t
CO2e

Floor Deck



Wood beam
2.6t



Softwood stud
0.28t



Insulation foam
5.9 kg



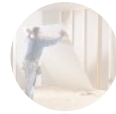
Wooden cladding
0.29t

CO2e

Interior walls



Softwood lath
0.43t



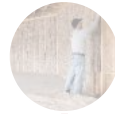
Wooden cladding
3.01t

CO2e

Exterior cladding



Stud lath
2t



Insulation panels
0.22t



CLT board
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Roof structure
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CO2e

Windows



Double glazing
1.7t



Red aluminum
0.5t

CO2e

Greenhouse



Double tempered glass
20.8t



Aluminum
1.6t



Laminated Wood
5.3t

CO2e

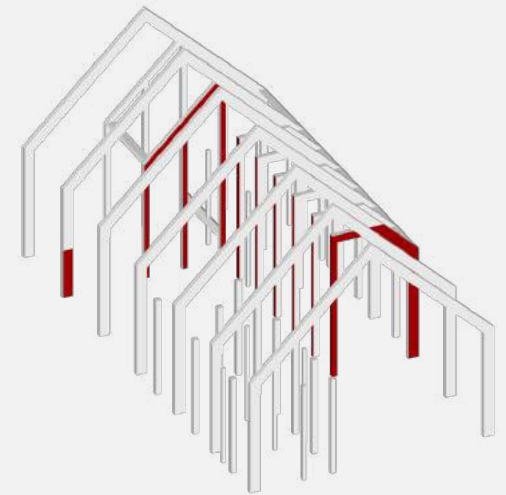
Water Energy

1.2t

9.8t

CO2e

Selected Build-up: Vertical Structure



Material Usage:

Foundation	62 m3
Vertical structure	73.07 m3
Floor deck	37.16 m3
Interior walls	7.52 m3
Exterior cladding	127.85 m3
Windows	69.29 m2
Greenhouse	901.28 m2

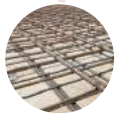
Foundation



Individual footing
4.7t



Concrete deck
8.2t



Reinforcement steel
5.3t

CO2e

Vertical Structure



Timber wood
4.1t



CLT
4.95t
CO2e

Floor Deck



Wood beam
2.6t



Softwood stud
0.28t



Insulation foam
5.9 kg



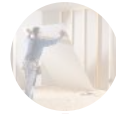
Wooden cladding
0.29t

CO2e

Interior walls



Softwood lath
0.43t



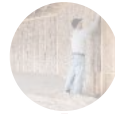
Wooden cladding
3.01t

CO2e

Exterior cladding



Stud lath
2t



Insulation panels
0.22t



CLT board
7.6t



Roof structure
0.97t

CO2e

Windows



Double glazing
1.7t



Red aluminum
0.5t

CO2e

Greenhouse



Double tempered glass
20.8t



Aluminum
1.6t



Laminated Wood
5.3t

CO2e

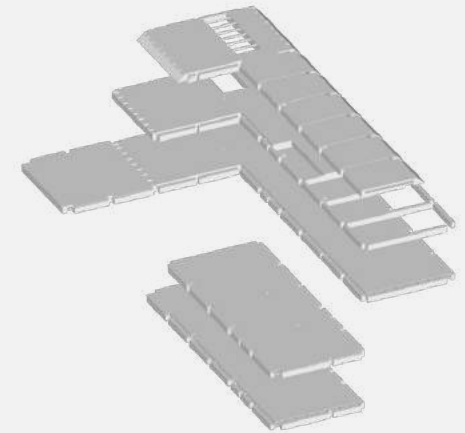
Water Energy

1.2t

9.8t

CO2e

Selected Build-up:
Floor deck



Material Usage:

Foundation	62 m3
Vertical structure	73.07 m3
Floor deck	37.16 m3
Interior walls	7.52 m3
Exterior cladding	127.85 m3
Windows	69.29 m2
Greenhouse	901.28 m2

Foundation



Individual footing
4.7t



Concrete deck
8.2t



Reinforcement steel
5.3t

CO2e

Vertical Structure



Timber wood
4.1t



CLT
4.95t
CO2e

Floor Deck



Wood beam
2.6t



Softwood stud
0.28t



Insulation foam
5.9 kg



Wooden cladding
0.29t

CO2e

Interior walls



Softwood lath
0.43t



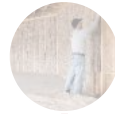
Wooden cladding
3.01t

CO2e

Exterior cladding



Stud lath
2t



Insulation panels
0.22t



CLT board
7.6t



Roof structure
0.97t

CO2e

Windows



Double glazing
1.7t



Red aluminum
0.5t

CO2e

Greenhouse



Double tempered glass
20.8t



Aluminum
1.6t



Laminated Wood
5.3t

CO2e

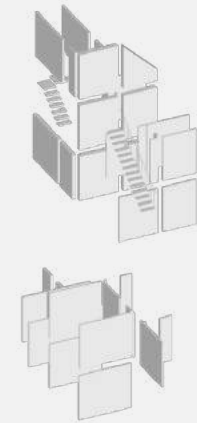
Water Energy

1.2t

9.8t

CO2e

Selected Build-up:
Interior Walls



Material Usage:

Foundation	62 m3
Vertical structure	73.07 m3
Floor deck	37.16 m3
Interior walls	7.52 m3
Exterior cladding	127.85 m3
Windows	69.29 m2
Greenhouse	901.28 m2

Foundation



Individual footing
4.7t



Concrete deck
8.2t



Reinforcement steel
5.3t

CO2e

Vertical Structure



Timber wood
4.1t



CLT
4.95t
CO2e

Floor Deck



Wood beam
2.6t



Softwood stud
0.28t



Insulation foam
5.9 kg



Wooden cladding
0.29t

CO2e

Interior walls



Softwood lath
0.43t



Wooden cladding
3.01t

CO2e

Exterior cladding



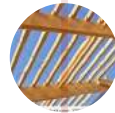
Stud lath
2t



Insulation panels
0.22t



CLT board
7.6t



Roof structure
0.97t

CO2e

Windows



Double glazing
1.7t



Red aluminum
0.5t

CO2e

Greenhouse



Double tempered glass
20.8t



Aluminum
1.6t



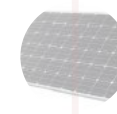
Laminated Wood
5.3t

CO2e

Water Energy



Rainwater harvesting
1.2t



Solar panel
9.8t

CO2e

Selected Build-up: Exterior Cladding



Material Usage:

Foundation	62 m3
Vertical structure	73.07 m3
Floor deck	37.16 m3
Interior walls	7.52 m3
Exterior cladding	127.85 m3
Windows	69.29 m2
Greenhouse	901.28 m2

Foundation



Individual footing
4.7t



Concrete deck
8.2t



Reinforcement steel
5.3t

CO2e

Vertical Structure



Timber wood
4.1t



CLT
4.95t
CO2e

Floor Deck



Wood beam
2.6t



Softwood stud
0.28t



Insulation foam
5.9 kg



Wooden cladding
0.29t

CO2e

Interior walls



Softwood lath
0.43t



Wooden cladding
3.01t

CO2e

Exterior cladding



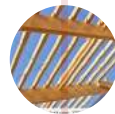
Stud lath
2t



Insulation panels
0.22t



CLT board
7.6t



Roof structure
0.97t

CO2e

Windows



Double glazing
1.7t



Red aluminum
0.5t

CO2e

Greenhouse



Double tempered glass
20.8t



Aluminum
1.6t



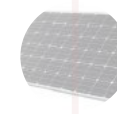
Laminated Wood
5.3t

CO2e

Water Energy



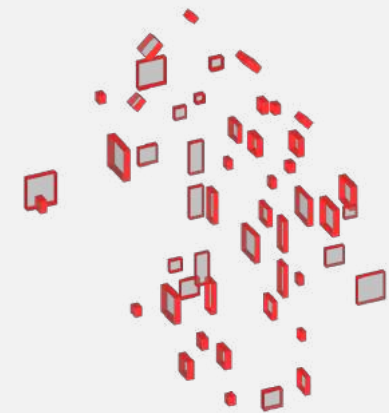
Rainwater harvesting
1.2t



Solar panel
9.8t

CO2e

Selected Build-up: Foundation



Material Usage:

Foundation	62 m3
Vertical structure	73.07 m3
Floor deck	37.16 m3
Interior walls	7.52 m3
Exterior cladding	127.85 m3
Windows	69.29 m2
Greenhouse	901.28 m2

Foundation



Individual footing
4.7t



Concrete deck
8.2t



Reinforcement steel
5.3t

CO2e

Vertical Structure



Timber wood
4.1t



CLT
4.95t
CO2e

Floor Deck



Wood beam
2.6t



Softwood stud
0.28t



Insulation foam
5.9 kg



Wooden cladding
0.29t

CO2e

Interior walls



Softwood lath
0.43t



Wooden cladding
3.01t

CO2e

Exterior cladding



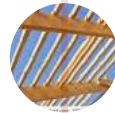
Stud lath
2t



Insulation panels
0.22t



CLT board
7.6t



Roof structure
0.97t

CO2e

Windows



Double glazing
1.7t



Red aluminum
0.5t

CO2e

Greenhouse



Double tempered glass
20.8t



Aluminum
1.6t



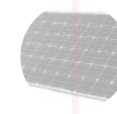
Laminated Wood
5.3t

CO2e

Water Energy



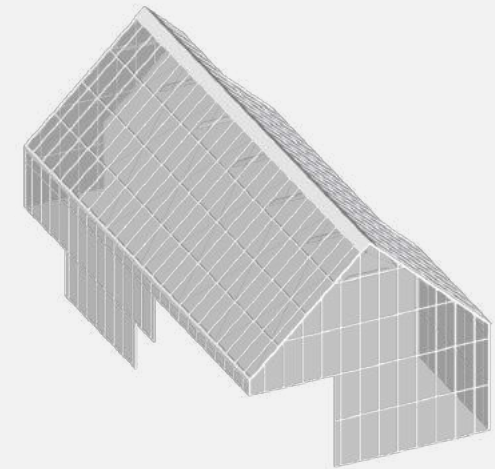
Rainwater harvesting
1.2t



Solar panel
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CO2e

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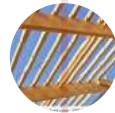
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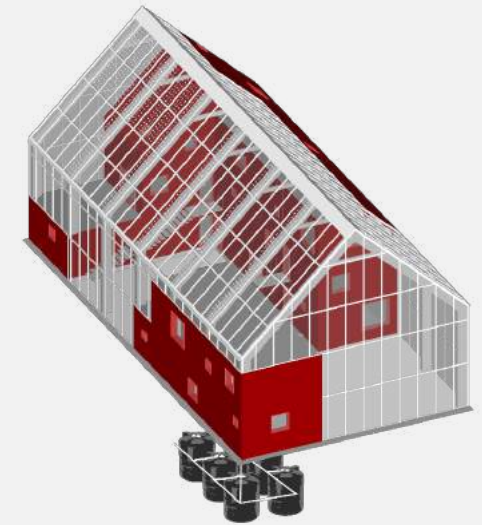


Rainwater harvesting
1.2t

9.8t

CO2e

Selected Build-up:
Water Energy
Consumption



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CO2e

Exterior cladding



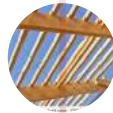
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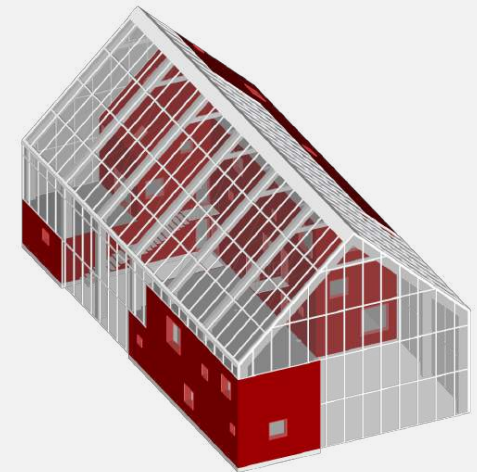
1.2t

9.8t

CO2e

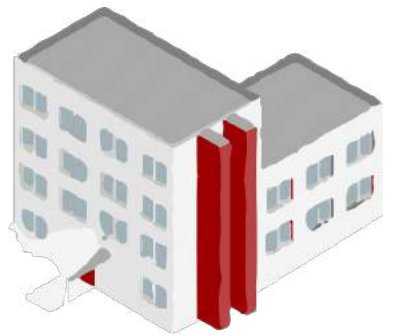
Total LCA

4.04 kg CO2e / m2 / year



Cradle to grave (A1-A4, B4-B5, C1-C4)		kg CO2e/m ²
(< 320) A		193
(320-360) B		
(360-400) C		
(400-440) D		
(440-480) E		
(480-520) F		
(> 520) G		

TOTAL COMPARISON



12.1 kg CO₂e / m² / year

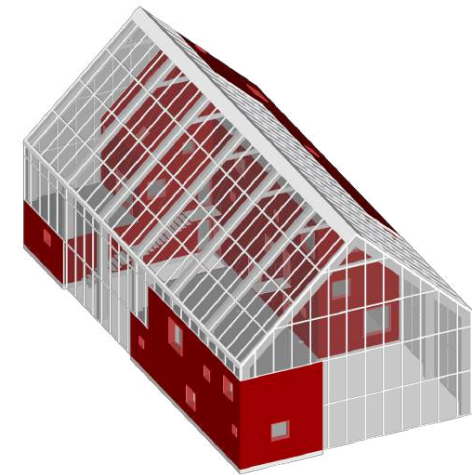


12.1

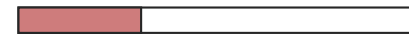
- 65%



4.04



4.04 kg CO₂e / m² / year

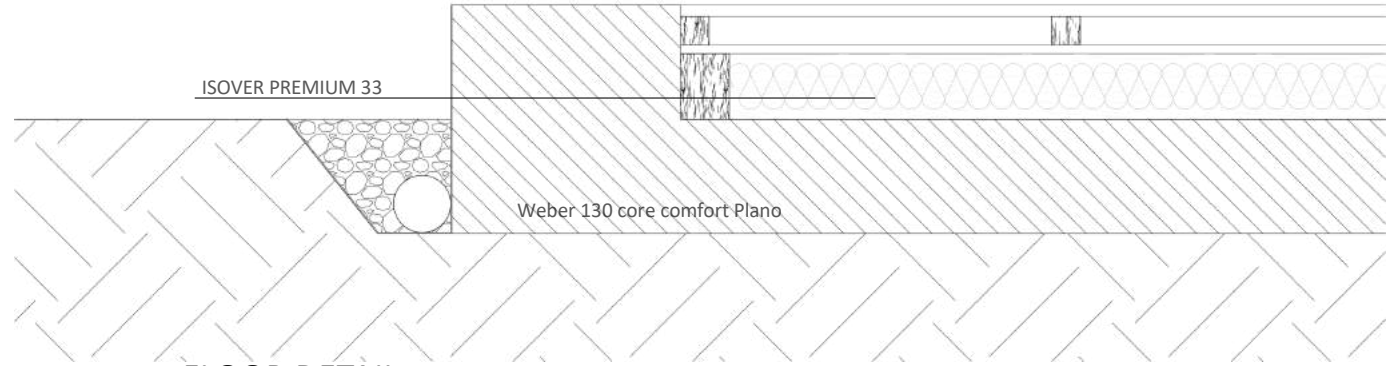
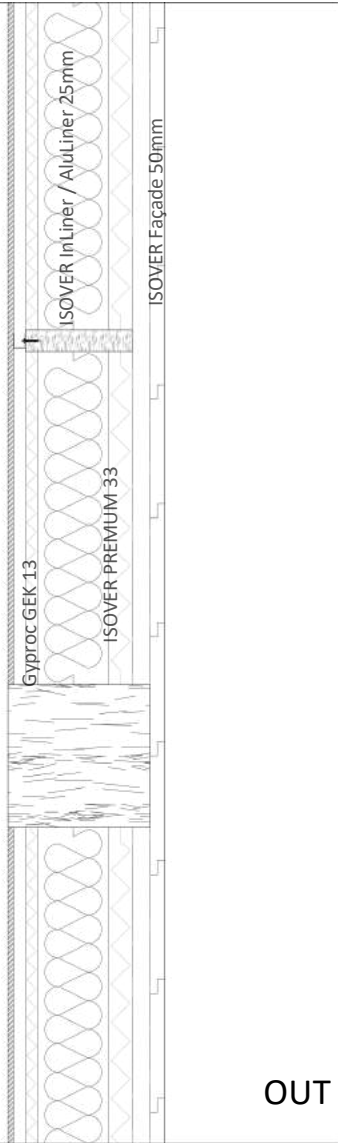


Details:

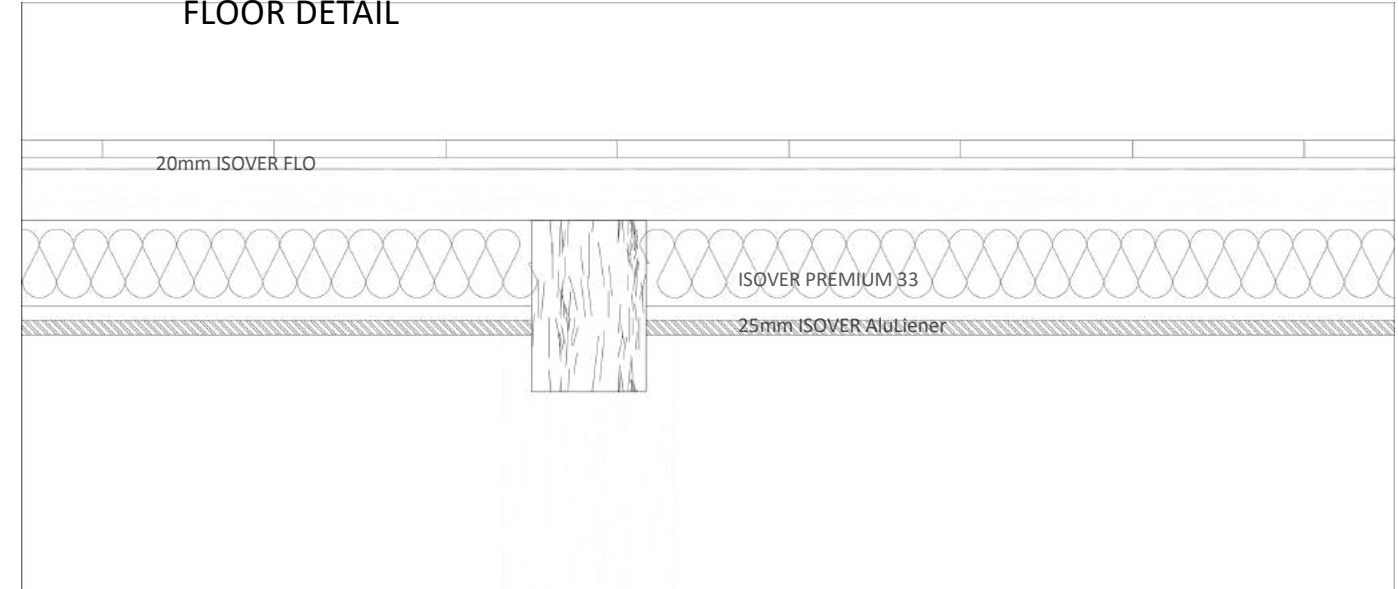
EXTERIOR WALL

IN

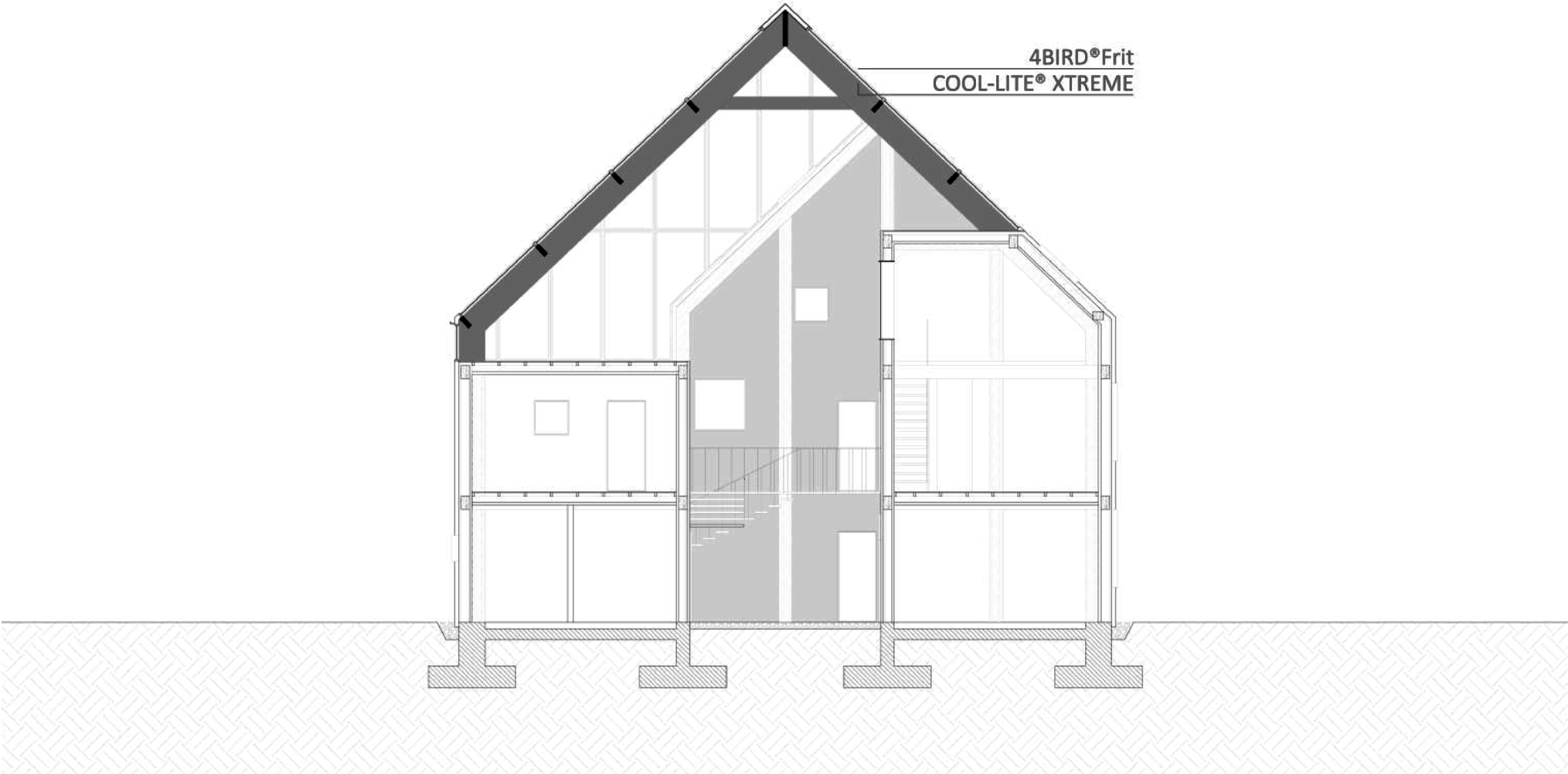
OUT



FLOOR DETAIL



DETAILED SECTION



INTERIOR WALLS DETAILS

