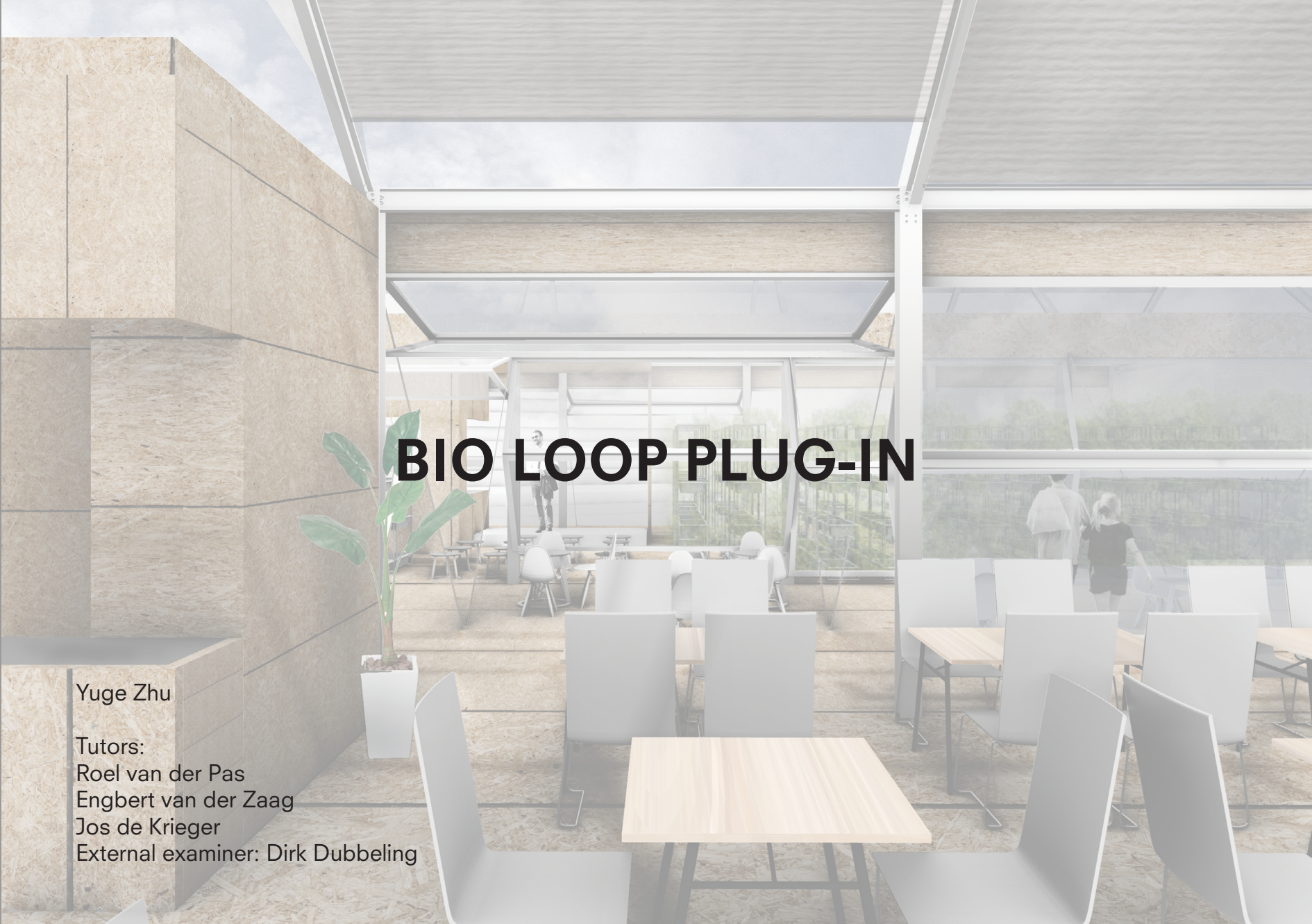
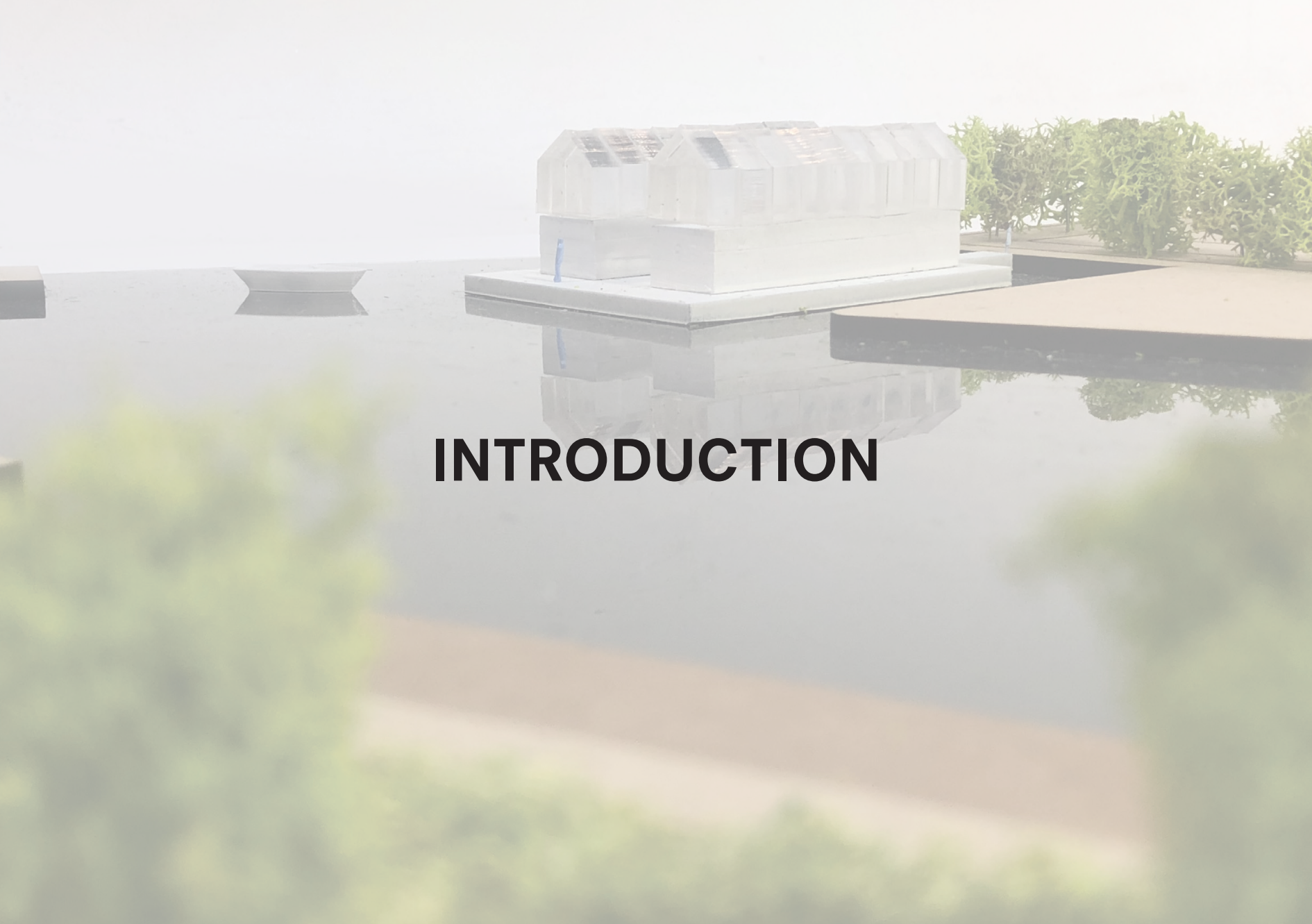


BIO LOOP PLUG-IN

Yuge Zhu

Tutors:
Roel van der Pas
Engbert van der Zaag
Jos de Krieger
External examiner: Dirk Dubbeling



INTRODUCTION

Location:
Marineterrin, Amsterdam

Research topic:
Flow of Food Waste,
Technical Approaches

FOOD WASTE

How much food do we waste?

1/3 OF THE FOOD PRODUCED IS WASTED WORLDWIDE!

worldwide:
1.3 billion tonnes /yr

Netherlands:
700 million kg /yr

FOOD CRISIS

MONEY LOSS

equivalent money loss /yr

ENERGY LOSS

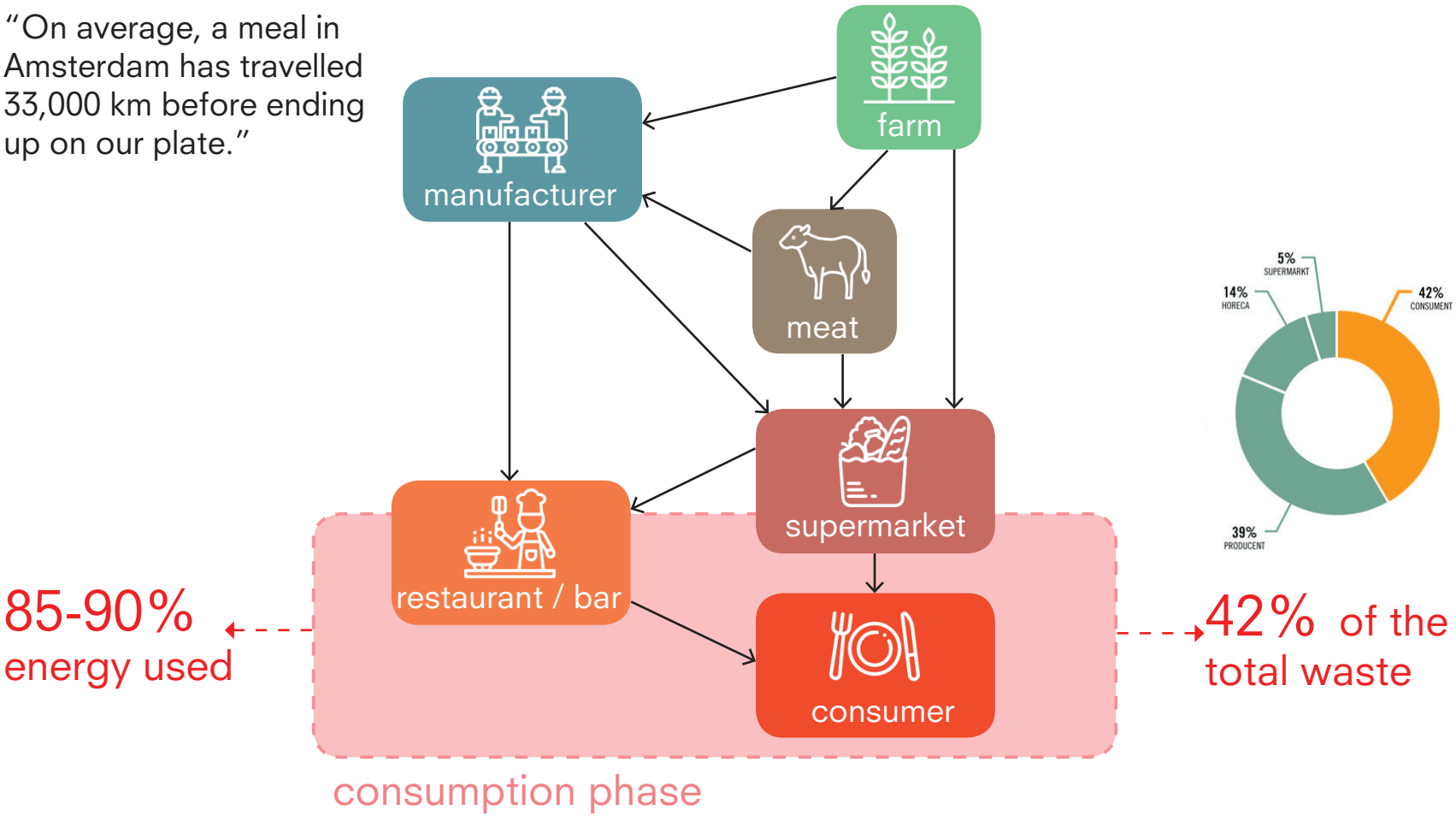
=

CO_2 ←

"Throwing away every kilo of food is actually throwing away 1.3 litres of petrol."

COMSUPTION PHASE - THE LAST AND THE MOST

"On average, a meal in Amsterdam has travelled 33,000 km before ending up on our plate."



ARE WE WASTE-CONSCIOUS?

consumer culture,
tourism,
commercialism,
catering industry

→

food waste

ARE WE WASTE-CONSCIOUS?

21 kg/capita/yr from self-assessment

ARE WE WASTE-CONSCIOUS?

21 kg/capita/yr from self-assessment

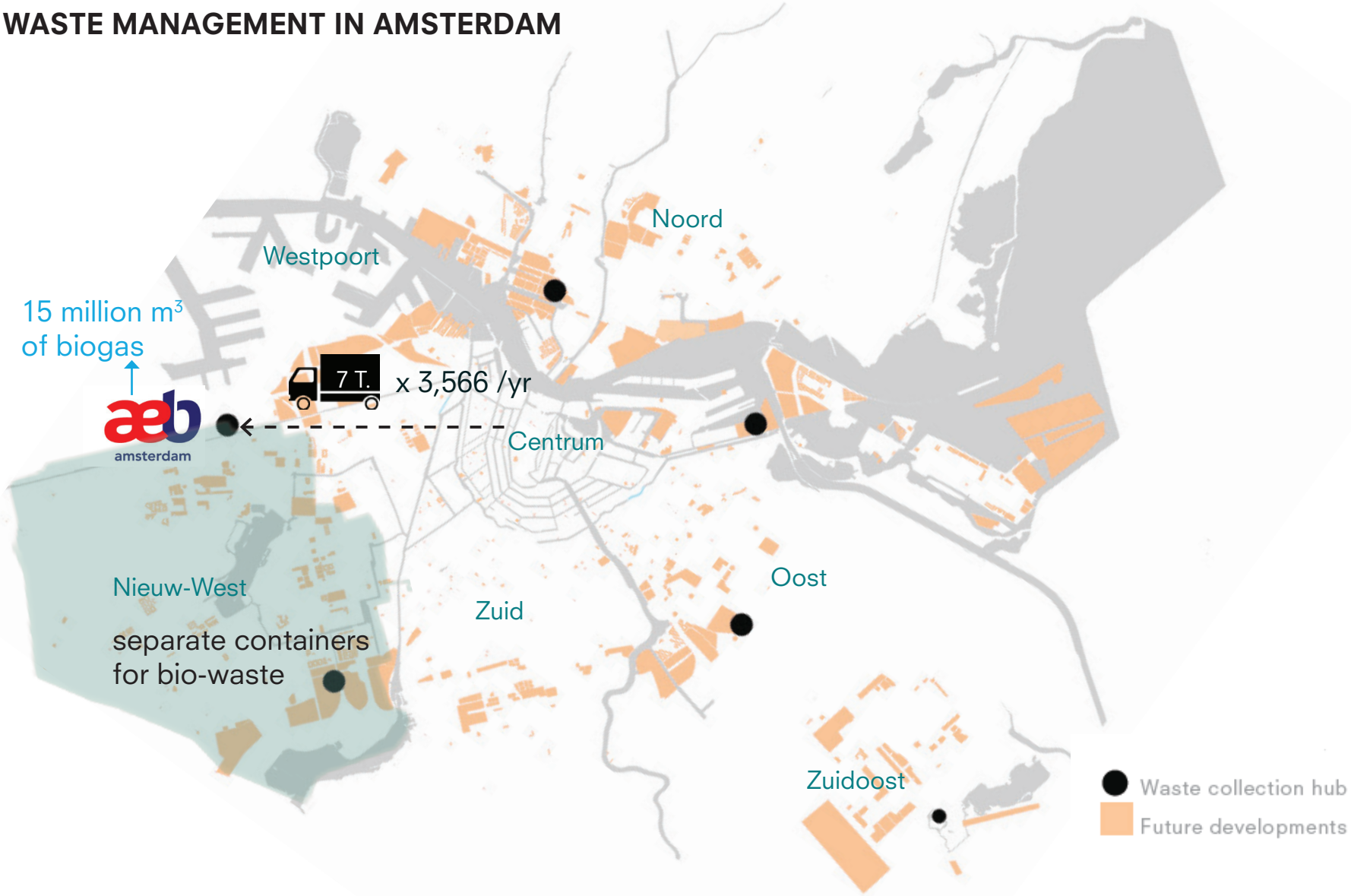
41.2 kg/capita/yr in reality

WASTE MANAGEMENT IN AMSTERDAM

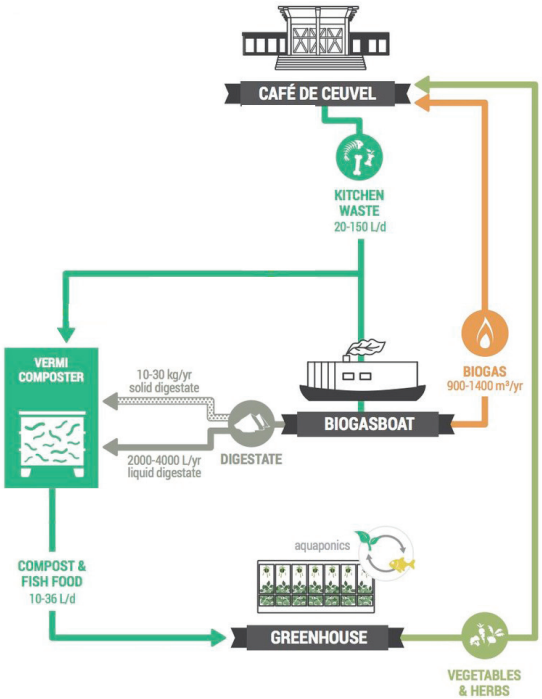
plastic & drink packaging | paper & carboards | textiles | glass | general residue

Separately collected:
44 % paper and cardboard
35 % glass
2 % plastic
0 % metal
1 % bio-waste
18 % other fractions collected separately (e.g. WEEE, hazardous household waste etc.)

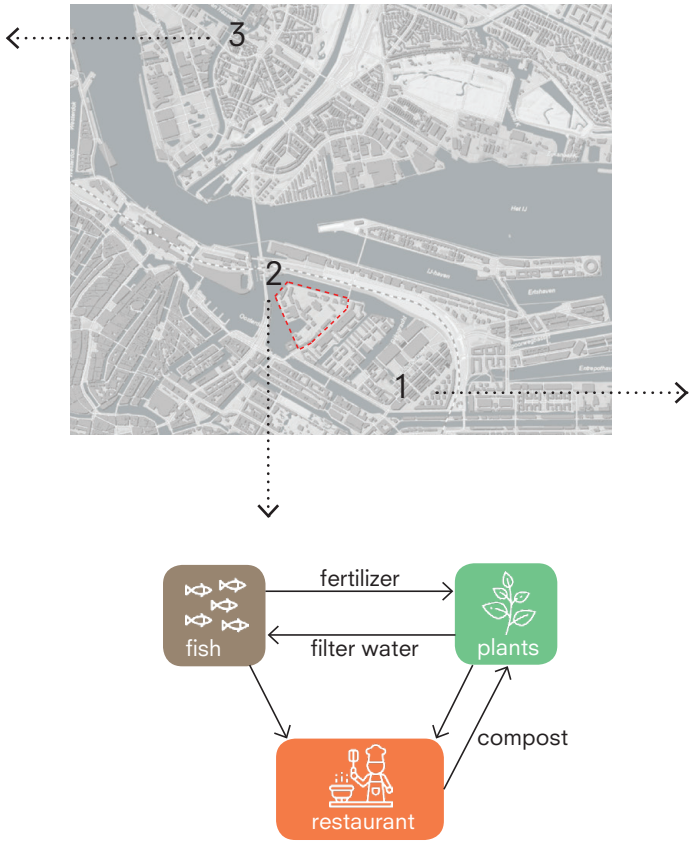
WASTE MANAGEMENT IN AMSTERDAM



NEIGHBORHOOD-SCALE PROJECTS



Biogas Boat



Mediamatic

Instock

CASE STUDIES

Instock

Mediamatic

Biogas Boat

TECHNIQUES

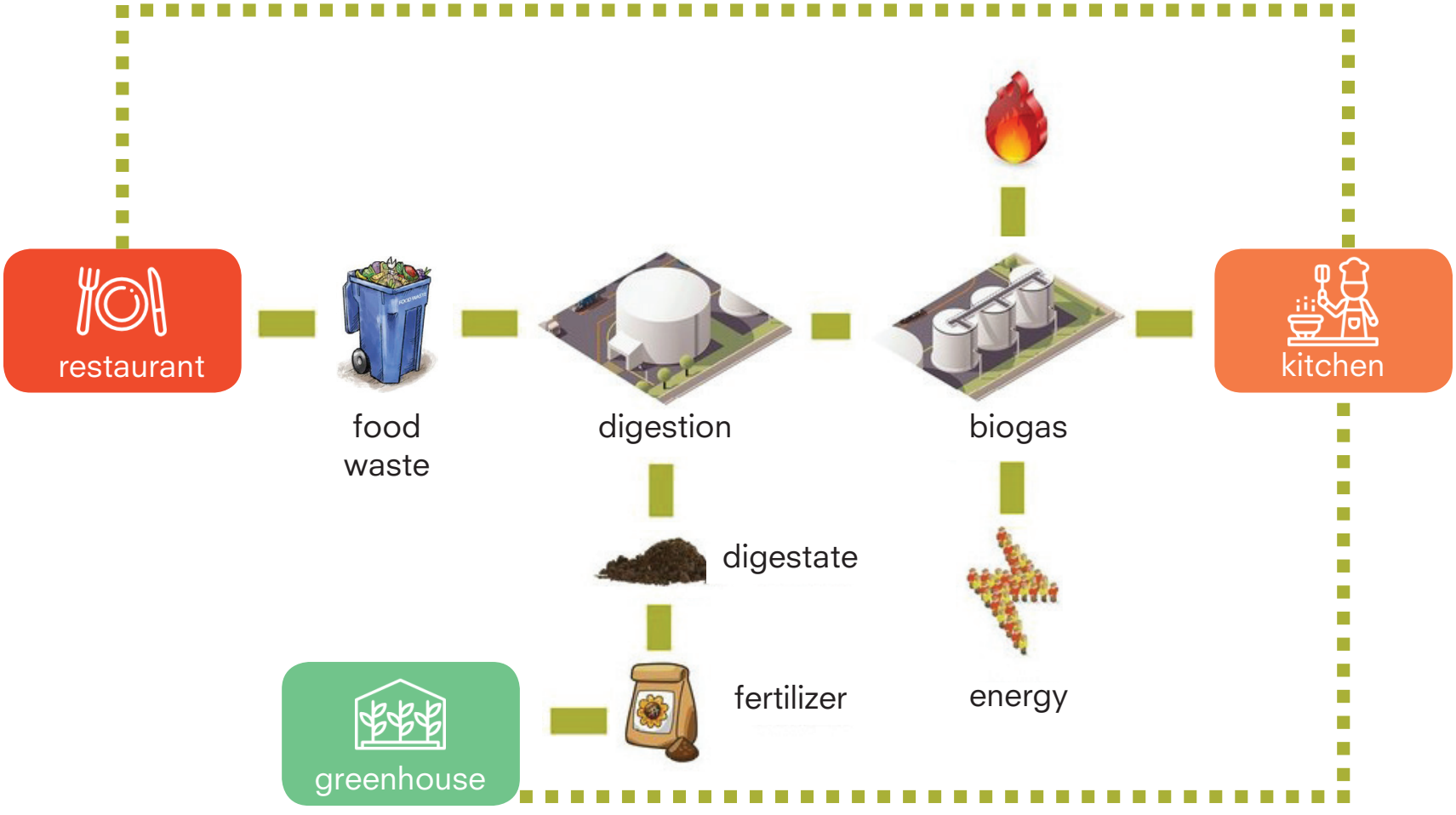
Circular food:
To collect and process the surplus food so as to feed other people or animals.

Composting:
To biodegrade the organic waste and turn into fertilizer to grow fruits, vegetables, herbs etc..

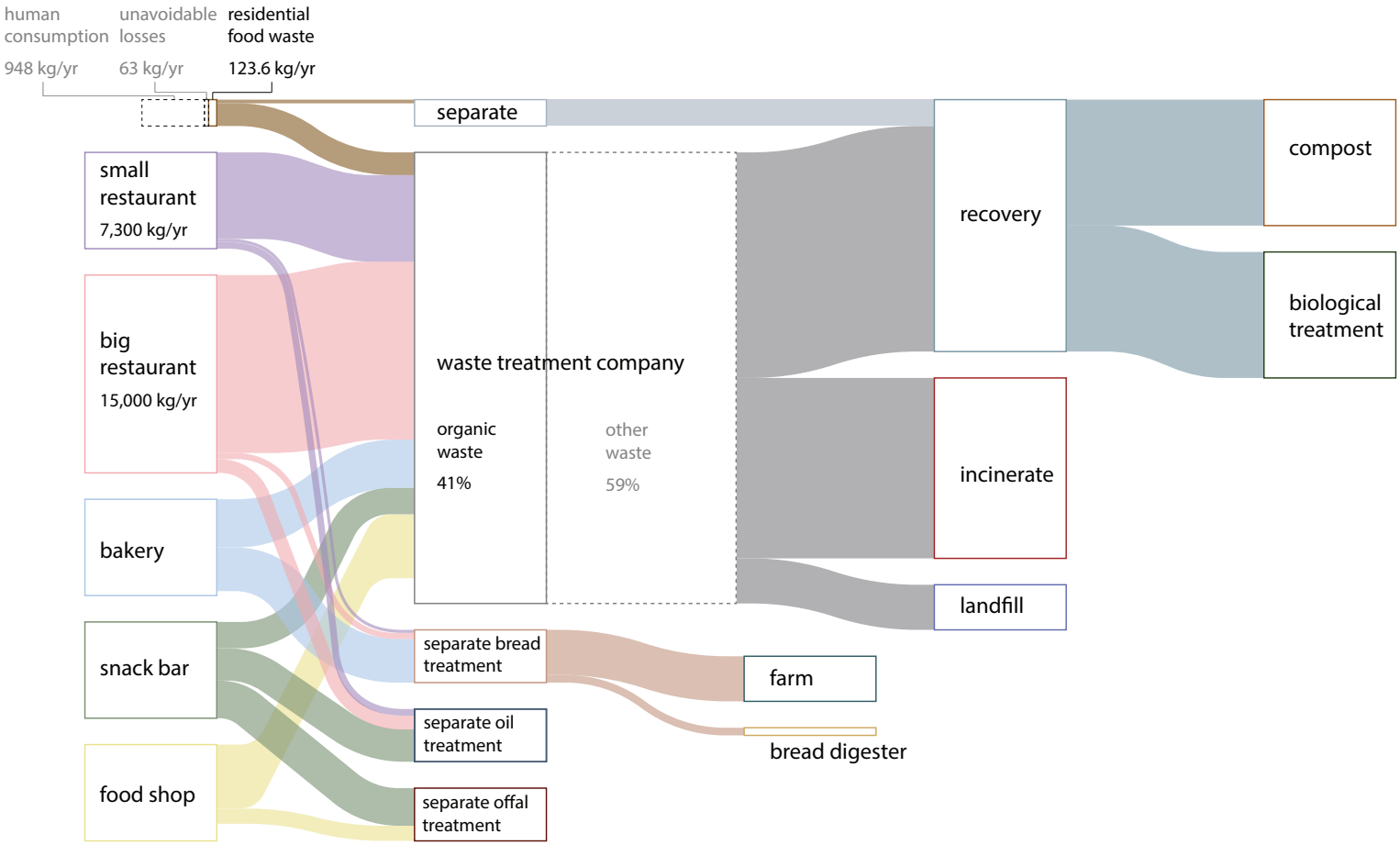
Anaerobic digestion:
To provide biogas by breaking down the food waste into a mixture of CH4 and CO2.

Biofuel:
To purify and recycle the second-used cooking oils into biofuel or biodiesel for vehicles.

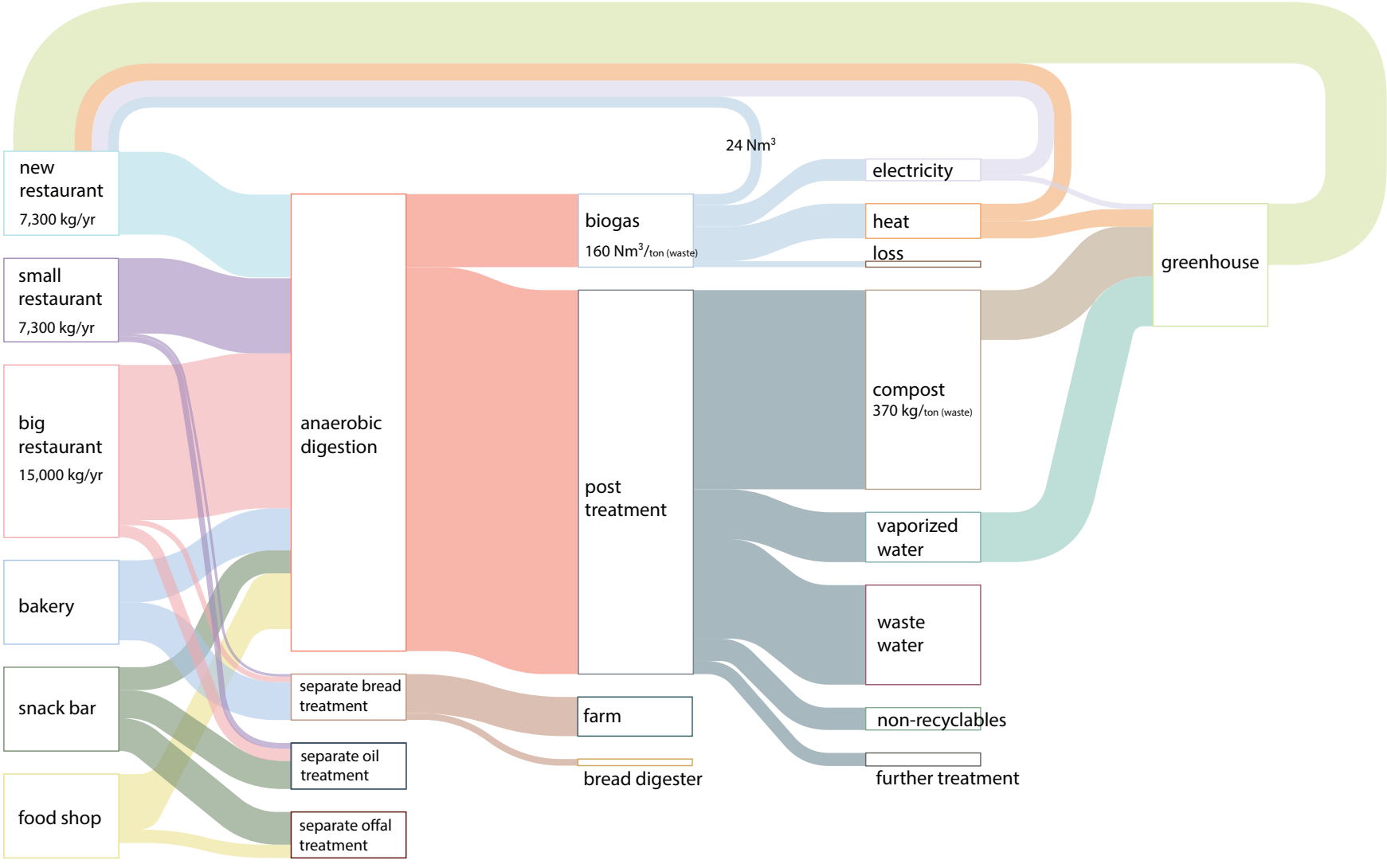
PRELIMINARY PROGRAMS



SUMMARY



Existing flow of food waste in Amsterdam



With plug-in of the proposed programs

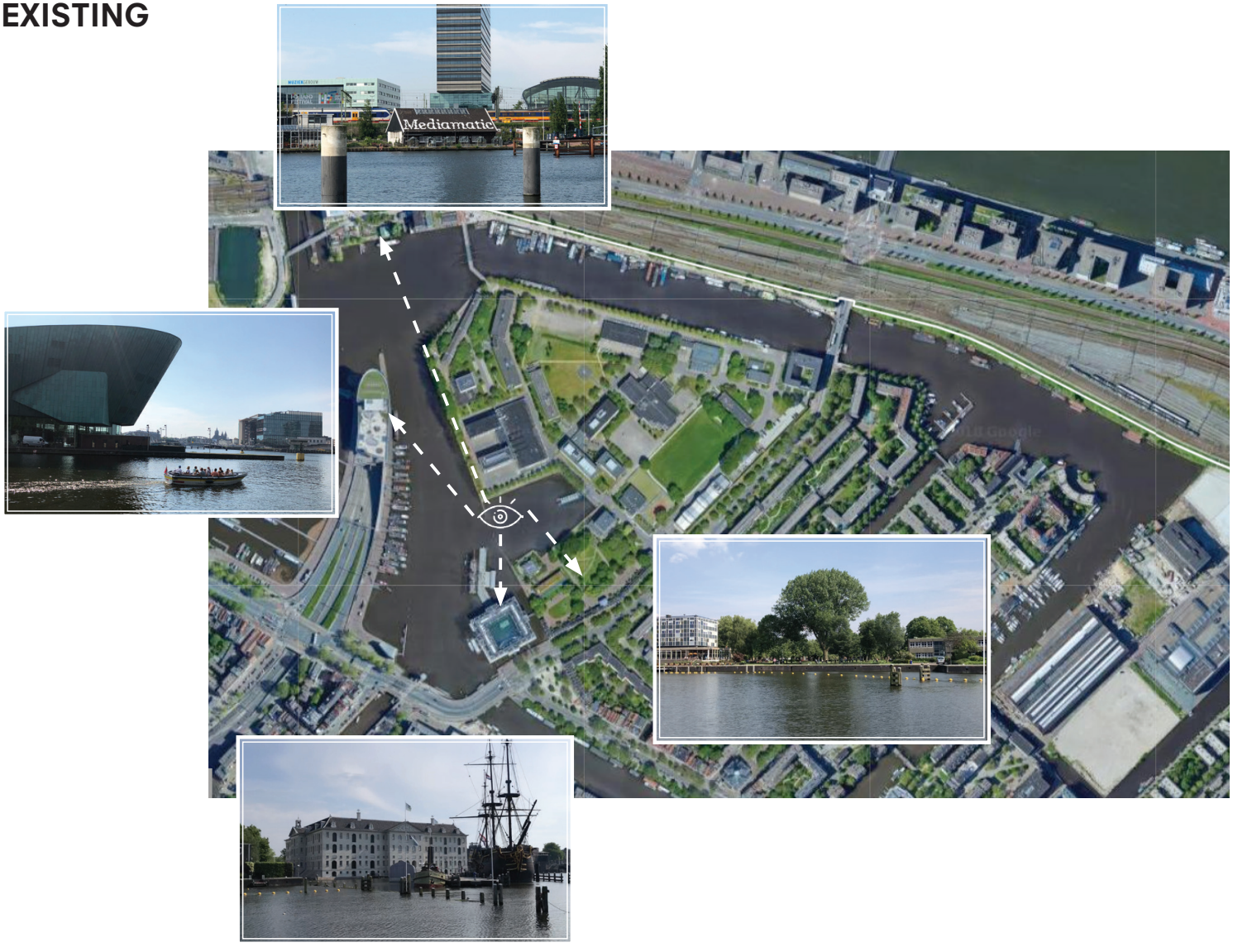
SITE INVESTIGATION
MARINETERREIN AMSTERDAM

- [x] **Hotels, restaurants, bars**
  - [ ] Hotel - Lodging
  - [x] Restaurant
  - [x] Café - Diner pub
  - [x] Snack bar - Ice cream - Fish stall - Food-to-go
  - [x] Lunchroom - Coffee-wifi (non-alcohol)
  - [x] Cafehouse - Teahouse

Restaurants

EXISTING

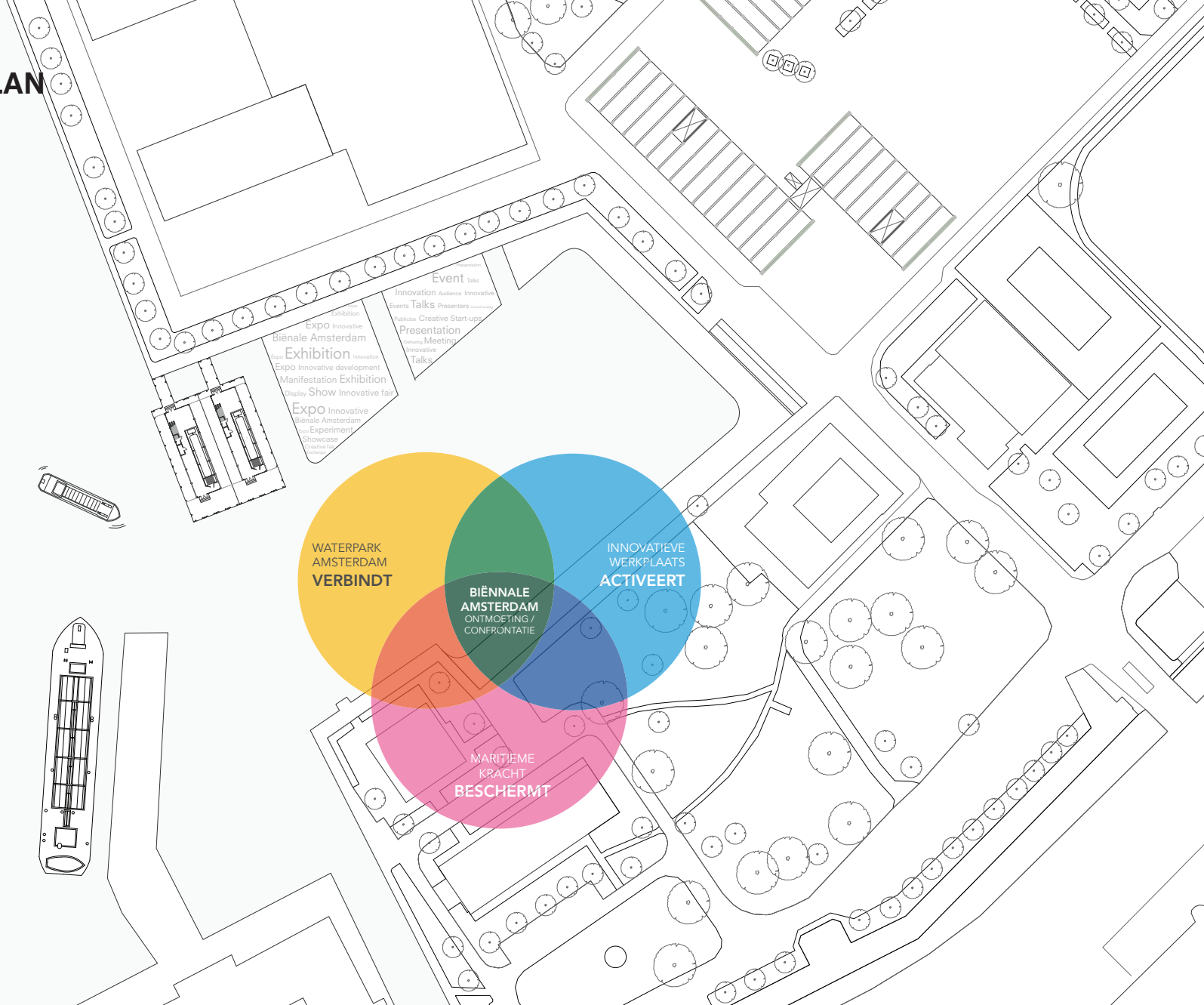
EXISTING



FUTURE PLAN

Potential connection to Nemo

FUTURE PLAN


Presentation
Event Talks
Innovation Audience Innovative
Events Talks Presenters Crowd-funding
Publicize Creative Start-ups
Presentation
Gathering Meeting
Innovative
Talks
Exhibition
Expo Innovative
Biënale Amsterdam
Expo Exhibition Innovation
Expo Innovative development
Manifestation Exhibition
Display Show Innovative fair
Expo Innovative
Biënale Amsterdam
Expo Experiment
Showcase
Creative Start
Exchange
WATERPARK
AMSTERDAM
VERBINDT
INNOVATIEVE
WERKPLAATS
ACTIVEERT
BIËNNALE
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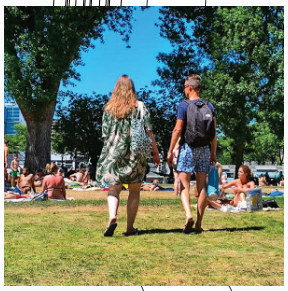
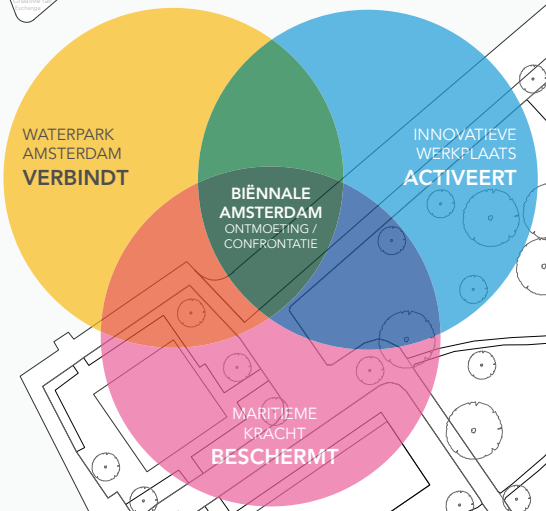
ONTMOETING /
CONFRONTATIE
MARITIEME
KRACHT
BESCHERMT

FUTURE PLAN

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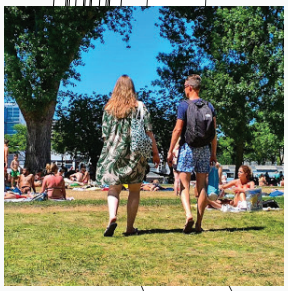

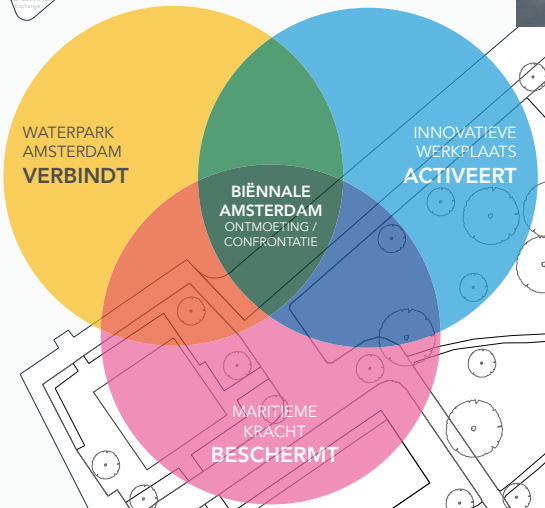
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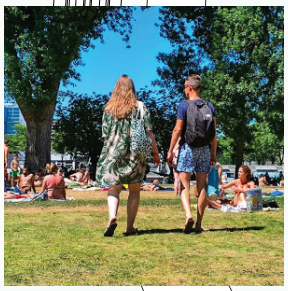

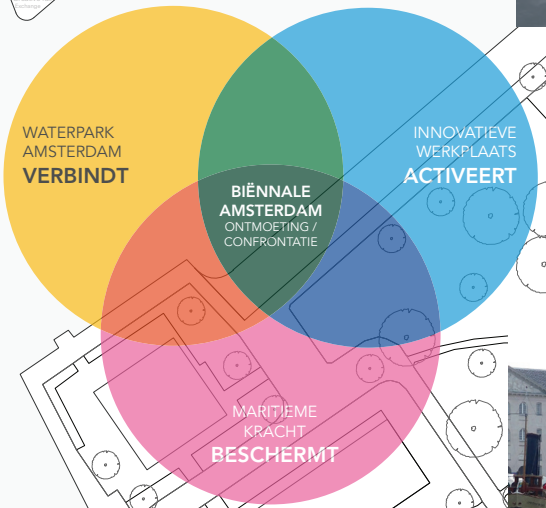
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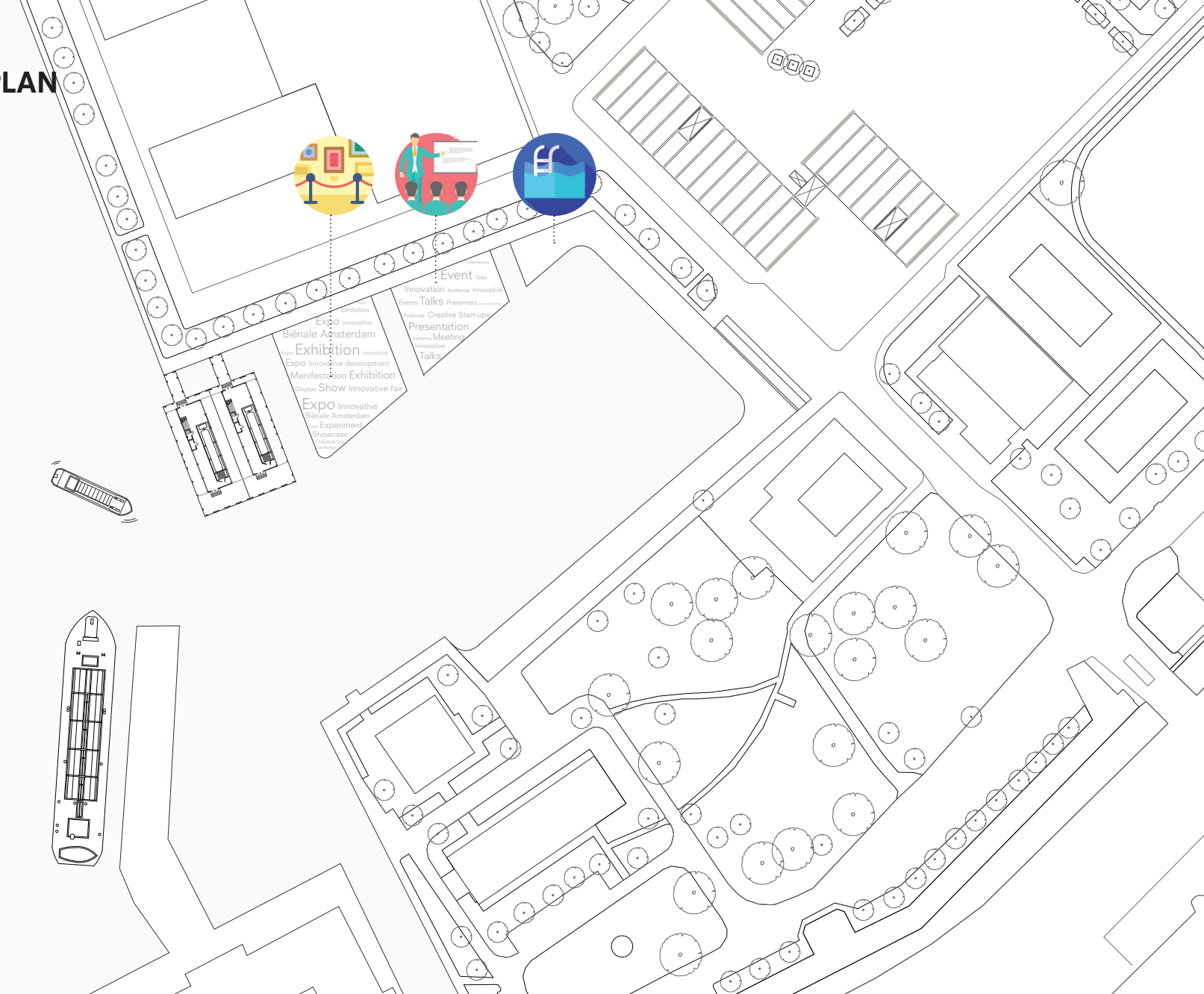
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Expo Exhibition Innovation
Expo Innovative development
Manifestation Exhibition
Display Show Innovative fair
Expo Innovative
Biënale Amsterdam
Expo Experiment
Showcase
Creative Start
Exchange

DESIGN PROPOSAL
PROGRAM AND OBJECTIVES

GOALS

existing restaurants

Nemo

CALCULATION FOR PROGRAMS

1000 kg Food Waste
= 160 Nm3 Biogas + 370 kg Compost

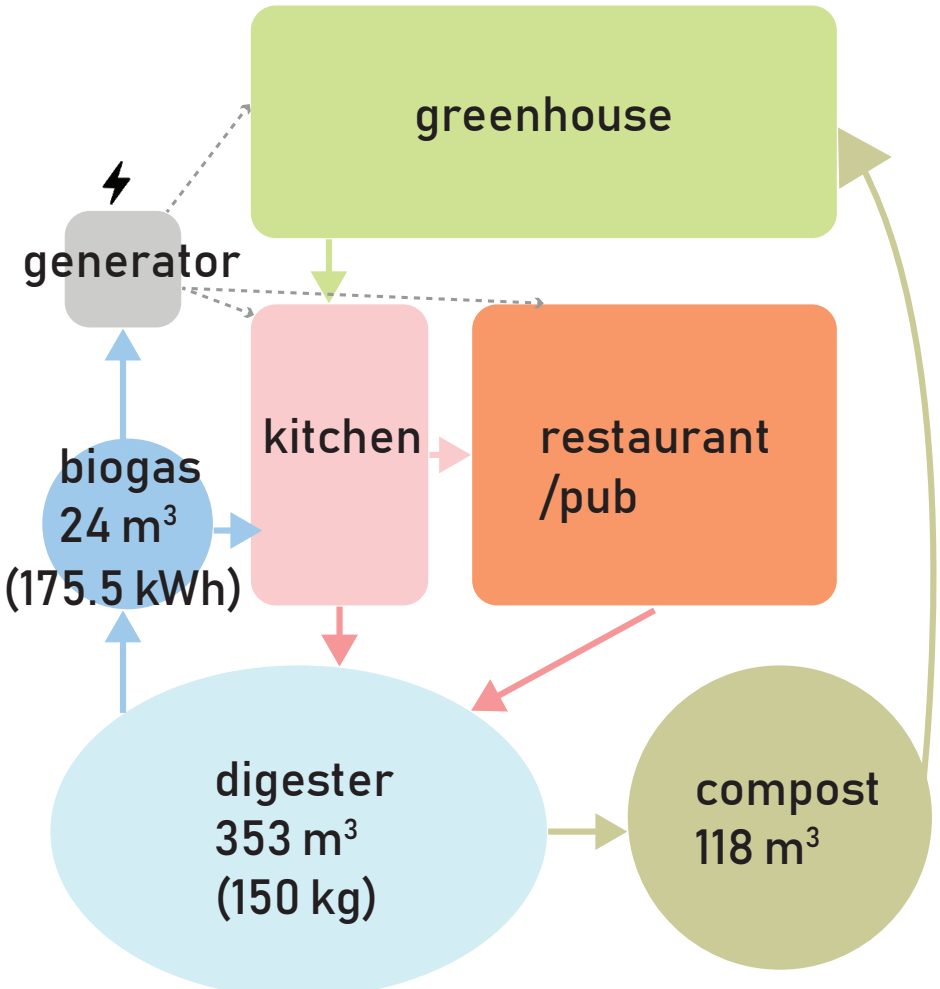
Food Waste:

small restaurant	20 kg/day
medium restaurant	41 kg/day

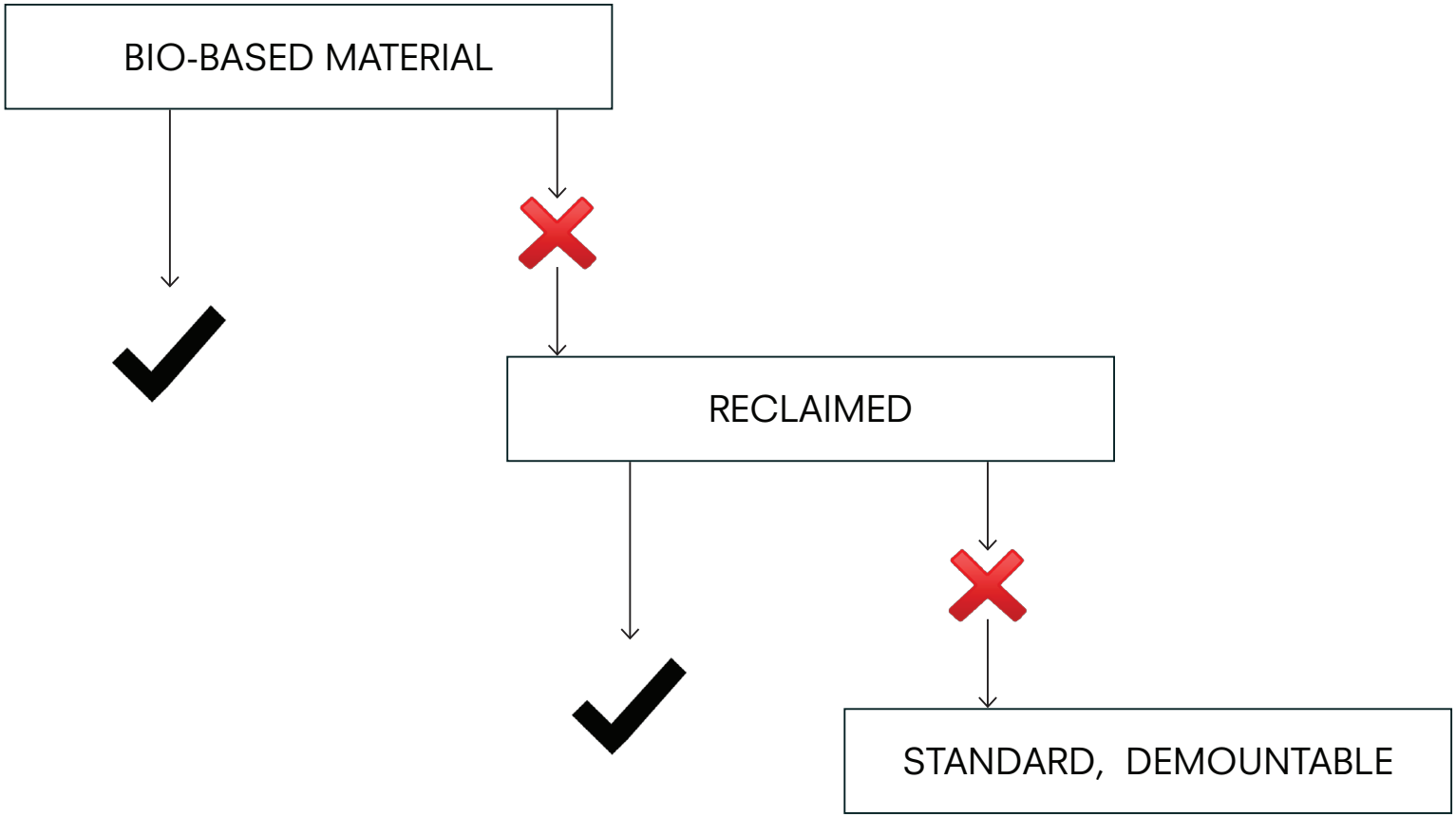
Gas:

small restaurant	22.5 kWh/day
medium restaurant	44.6kWh/day

Marineterrein:

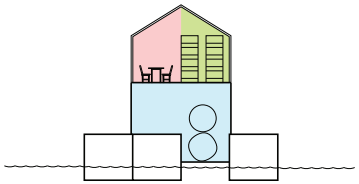


CIRCULARITY AGENDA

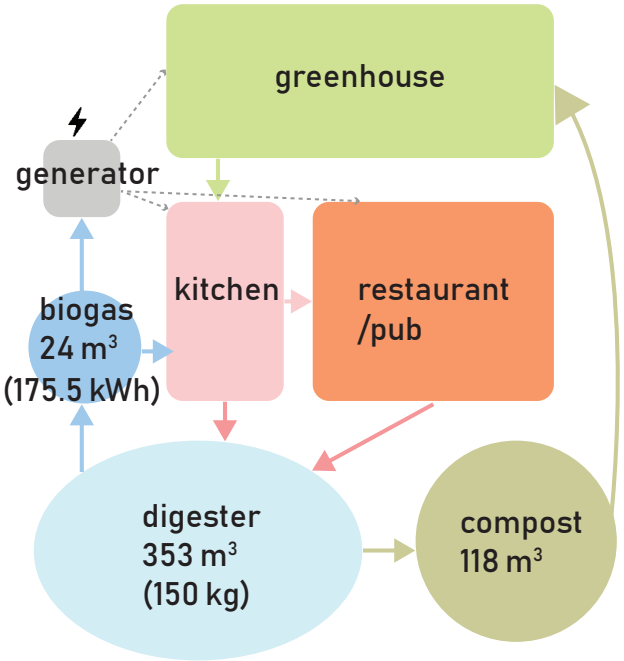


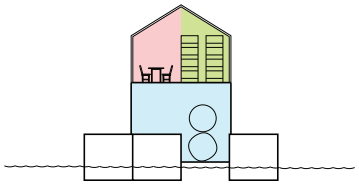
BIO LOOP PLUG-IN

THE PROPOTYPE



4 existing restaurants,
approx.150kg of food waste





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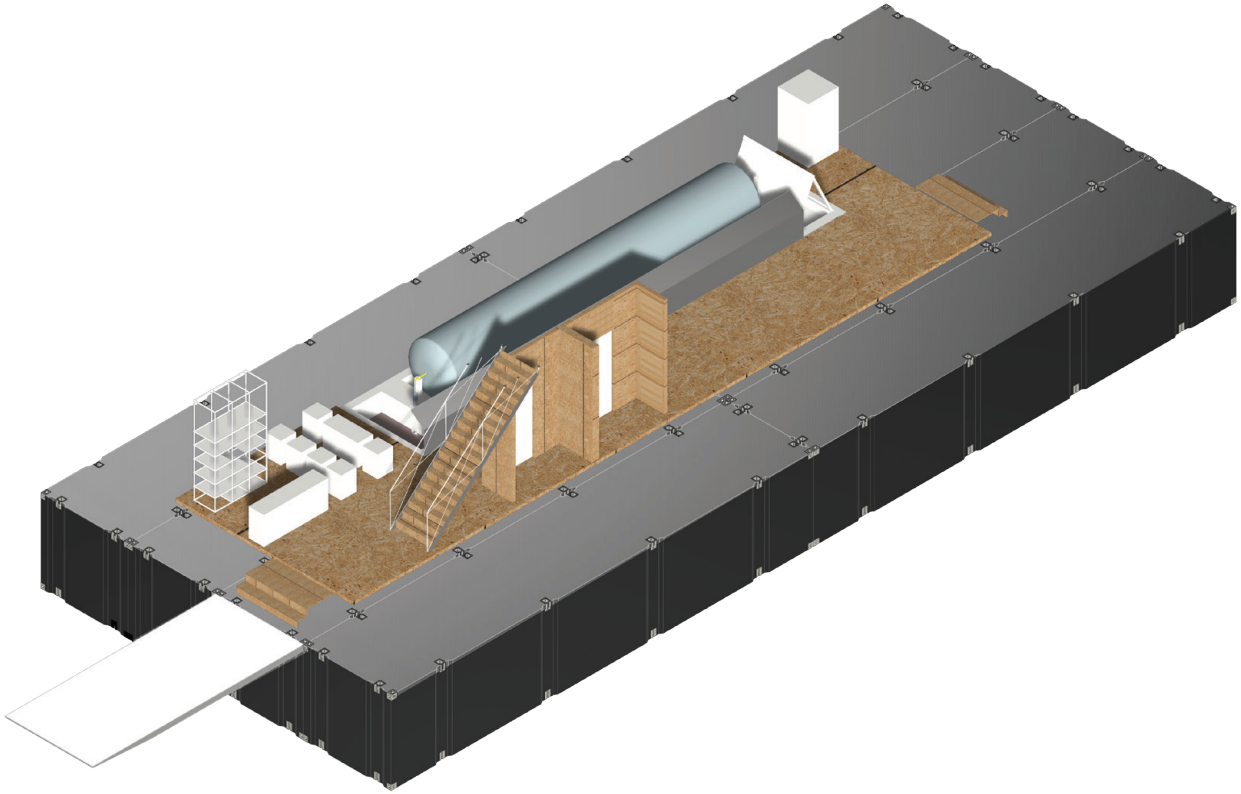
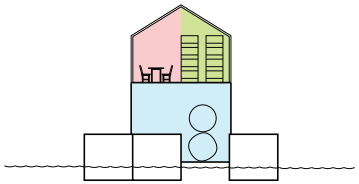
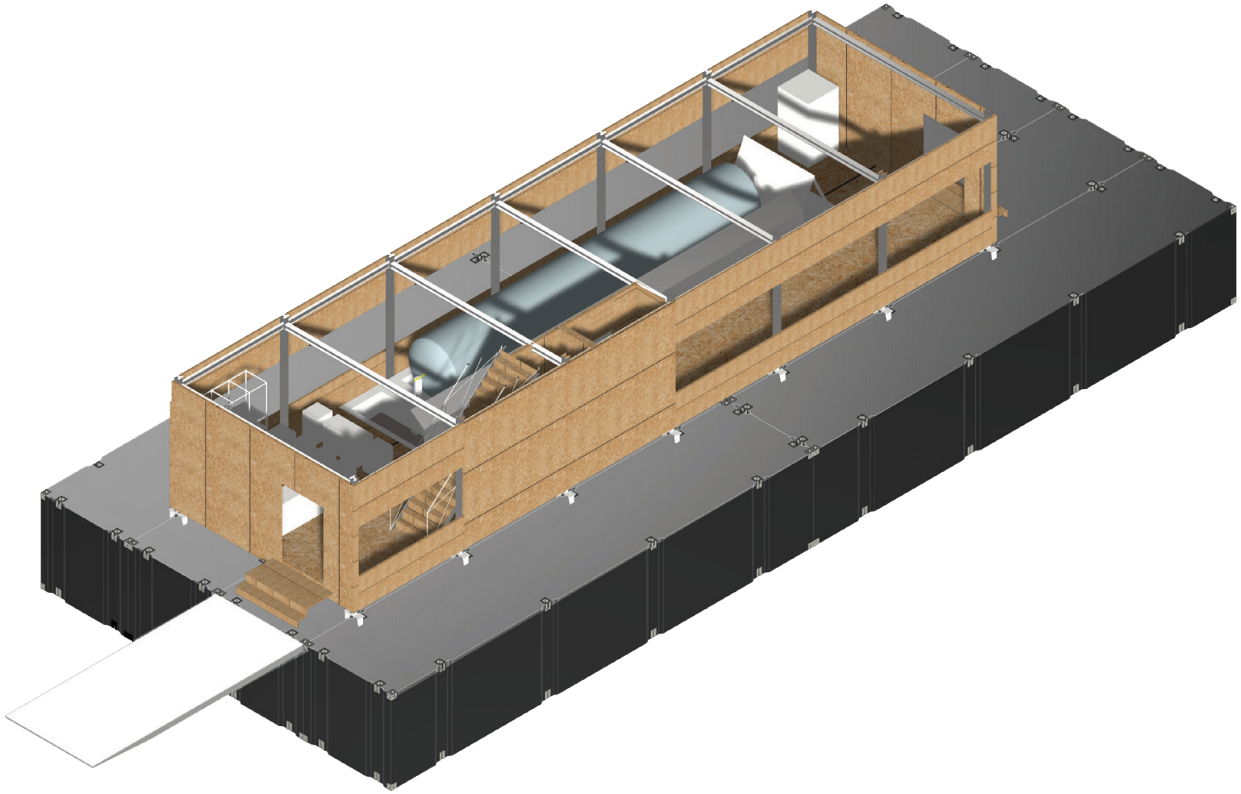
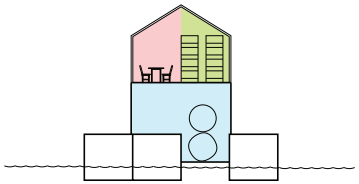
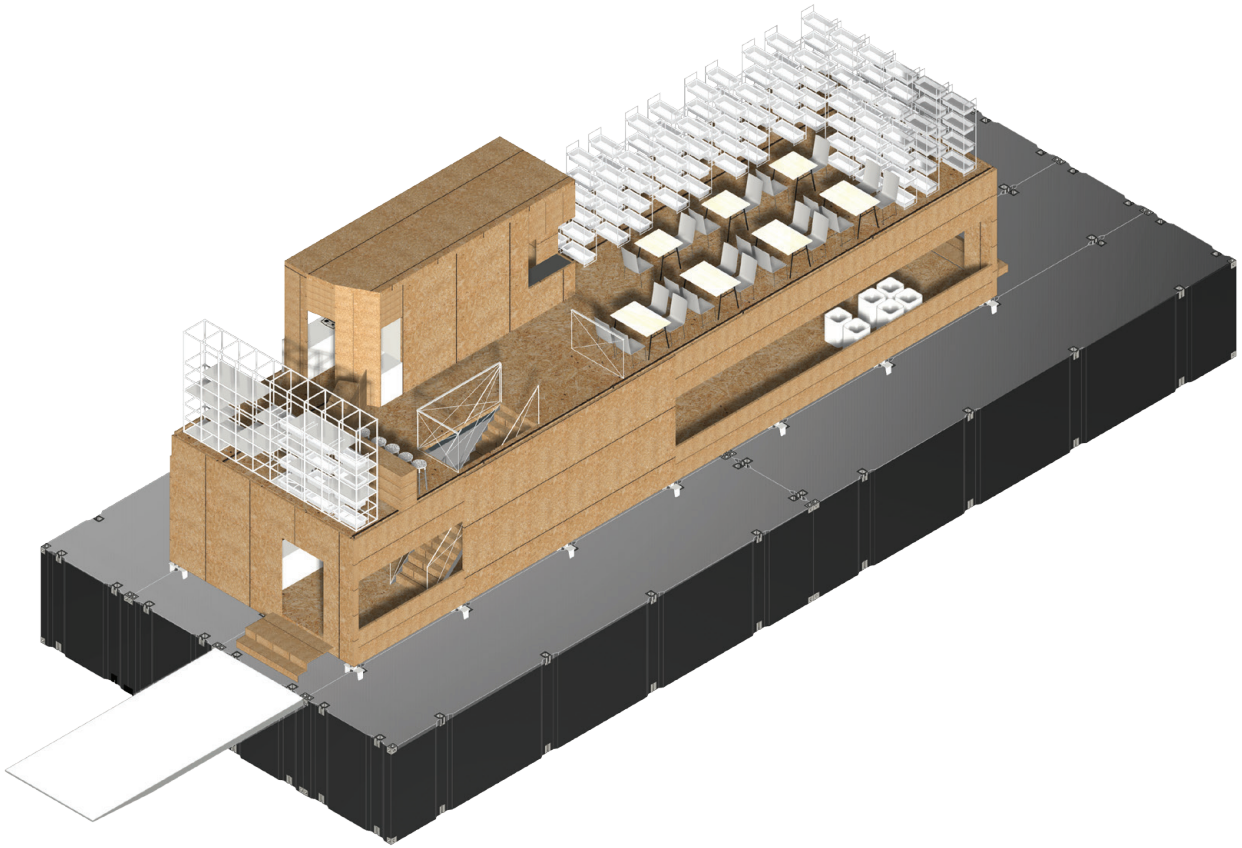
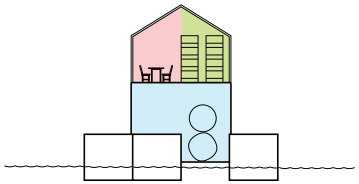


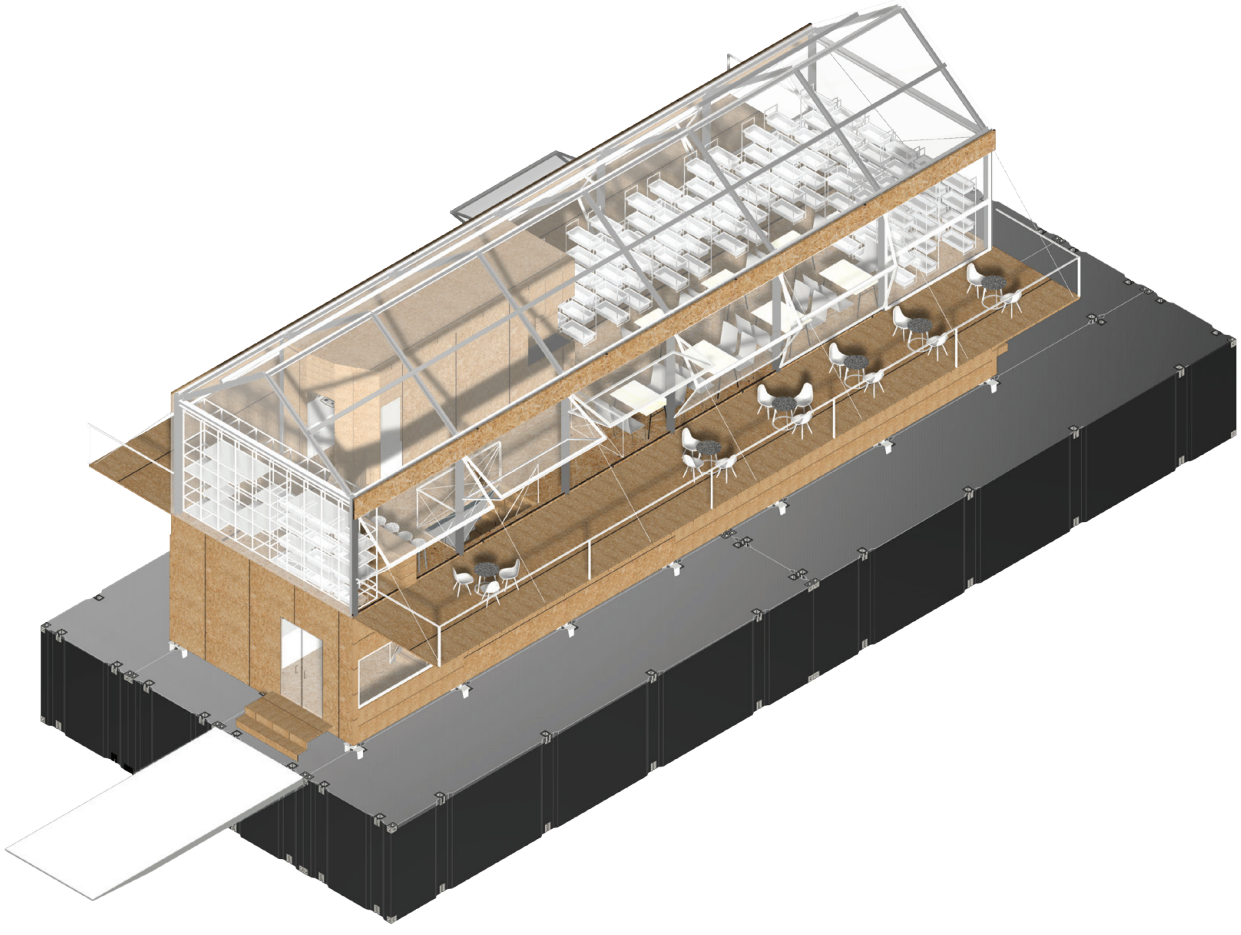




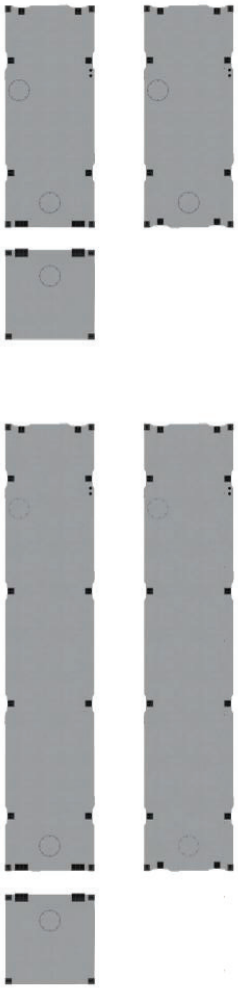


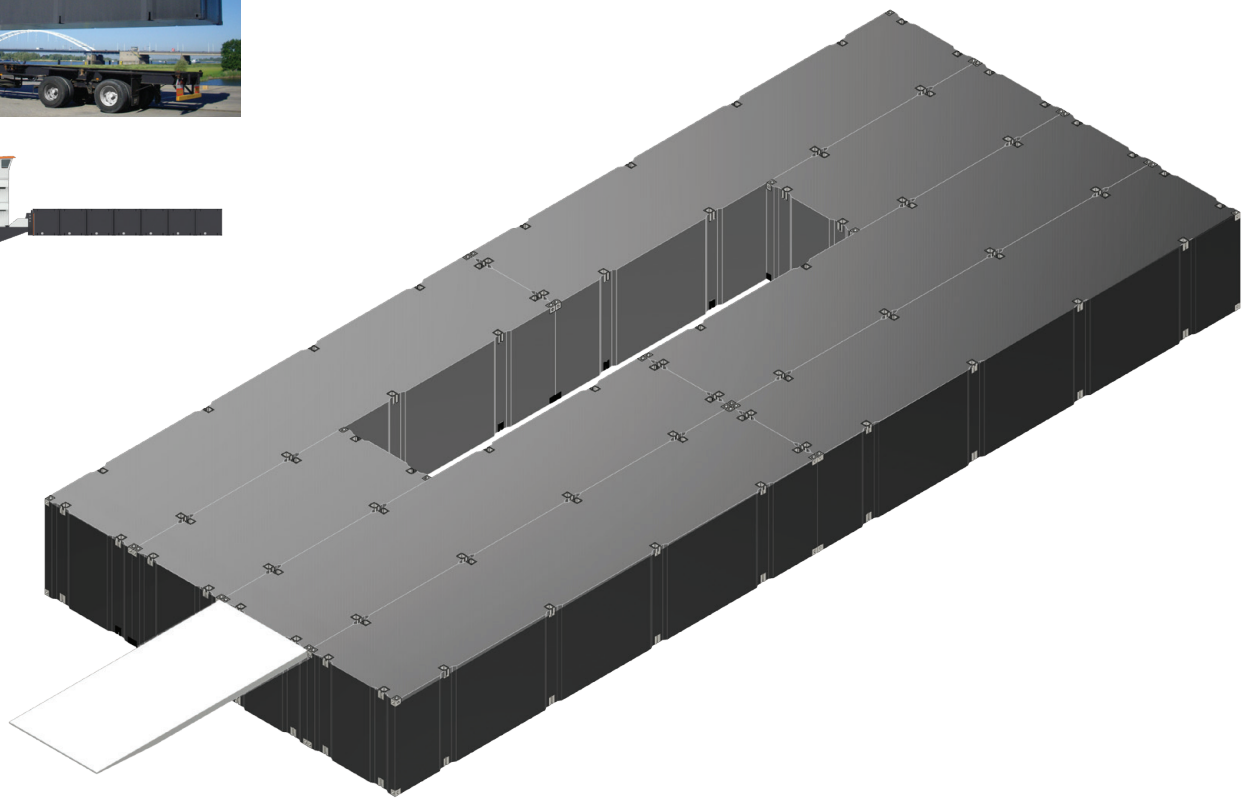




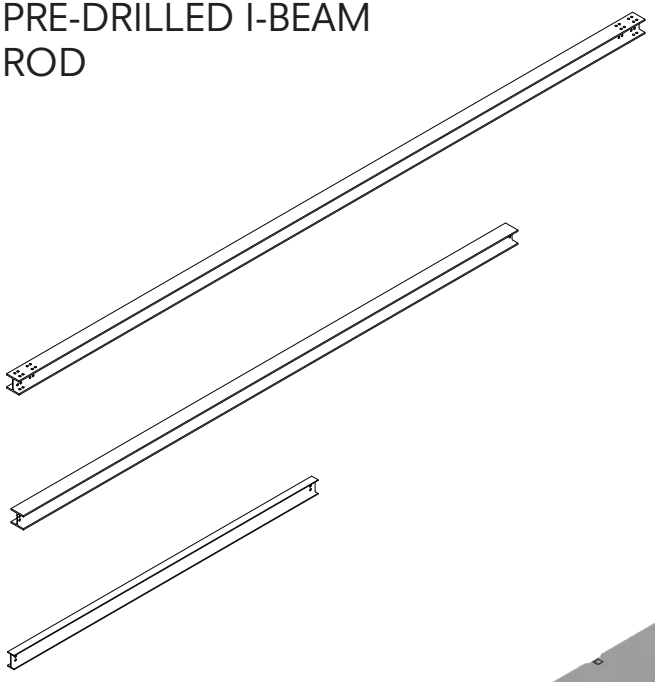


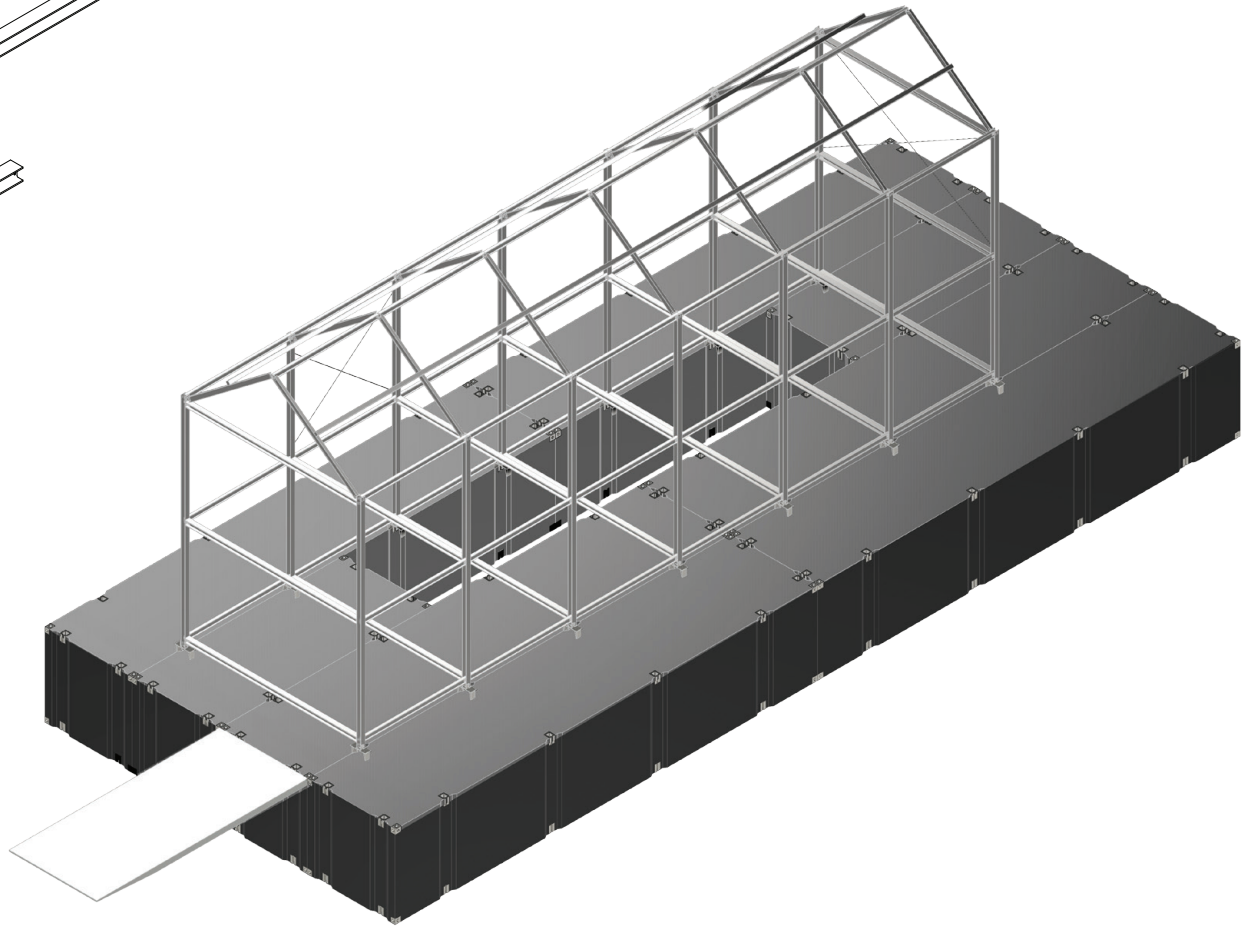
STRUCTURAL ELEMENTS:
MODULAR BARGE





STRUCTURAL ELEMENTS:
PRE-DRILLED I-BEAM
ROD





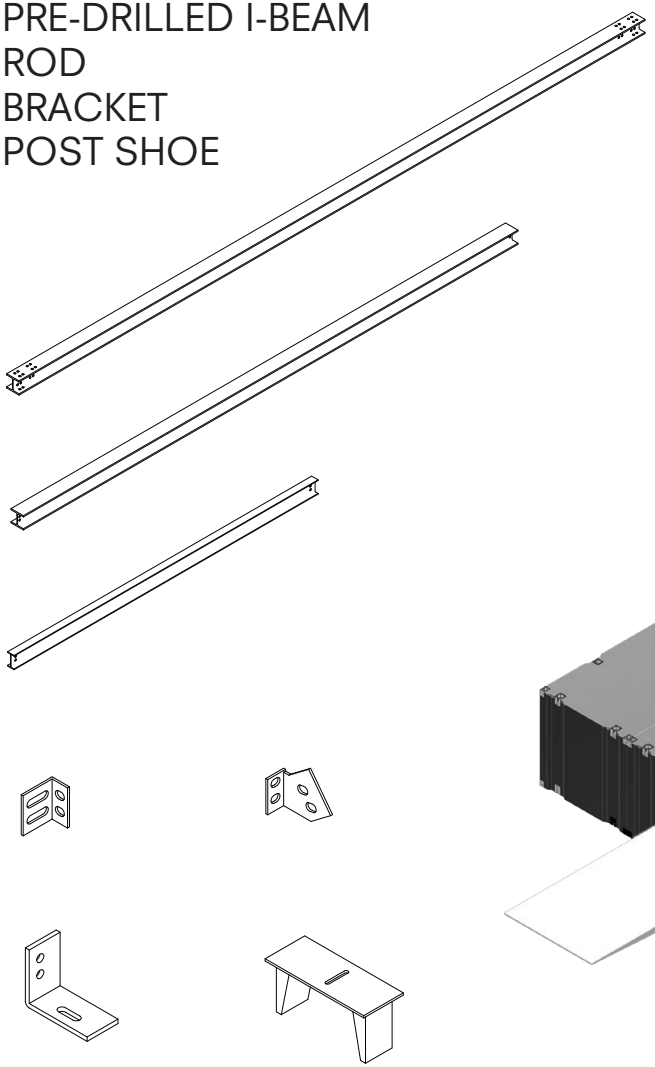
STRUCTURAL ELEMENTS:

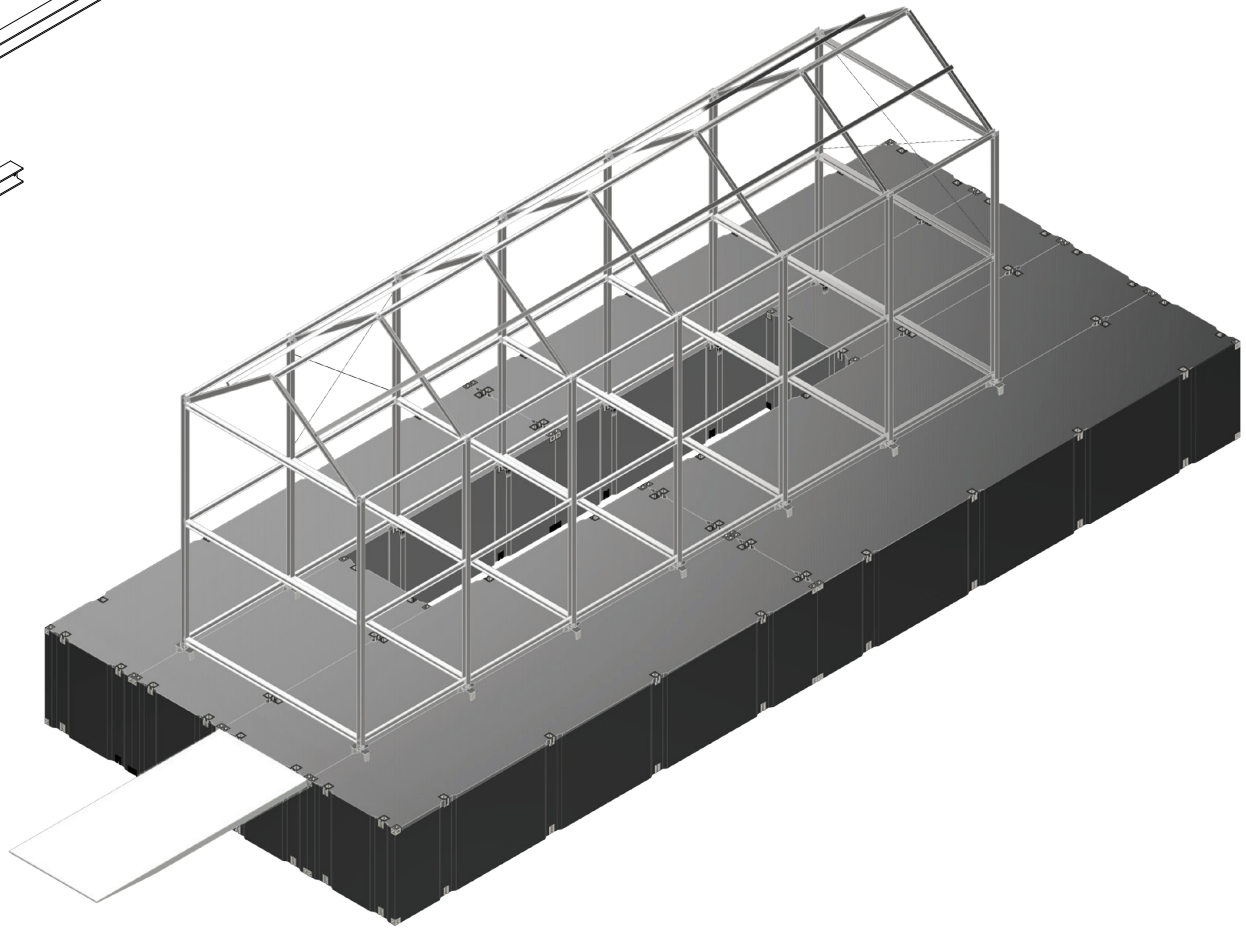
PRE-DRILLED I-BEAM

ROD

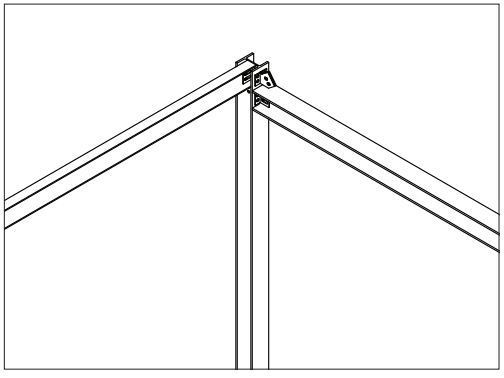
BRACKET

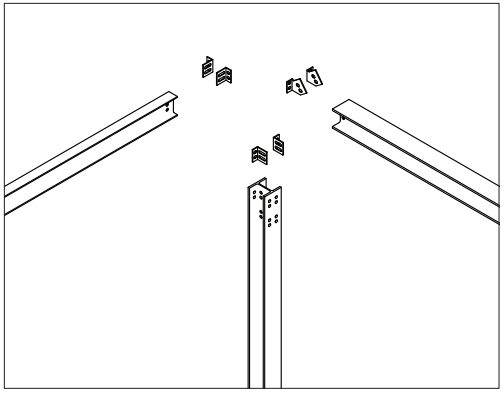
POST SHOE

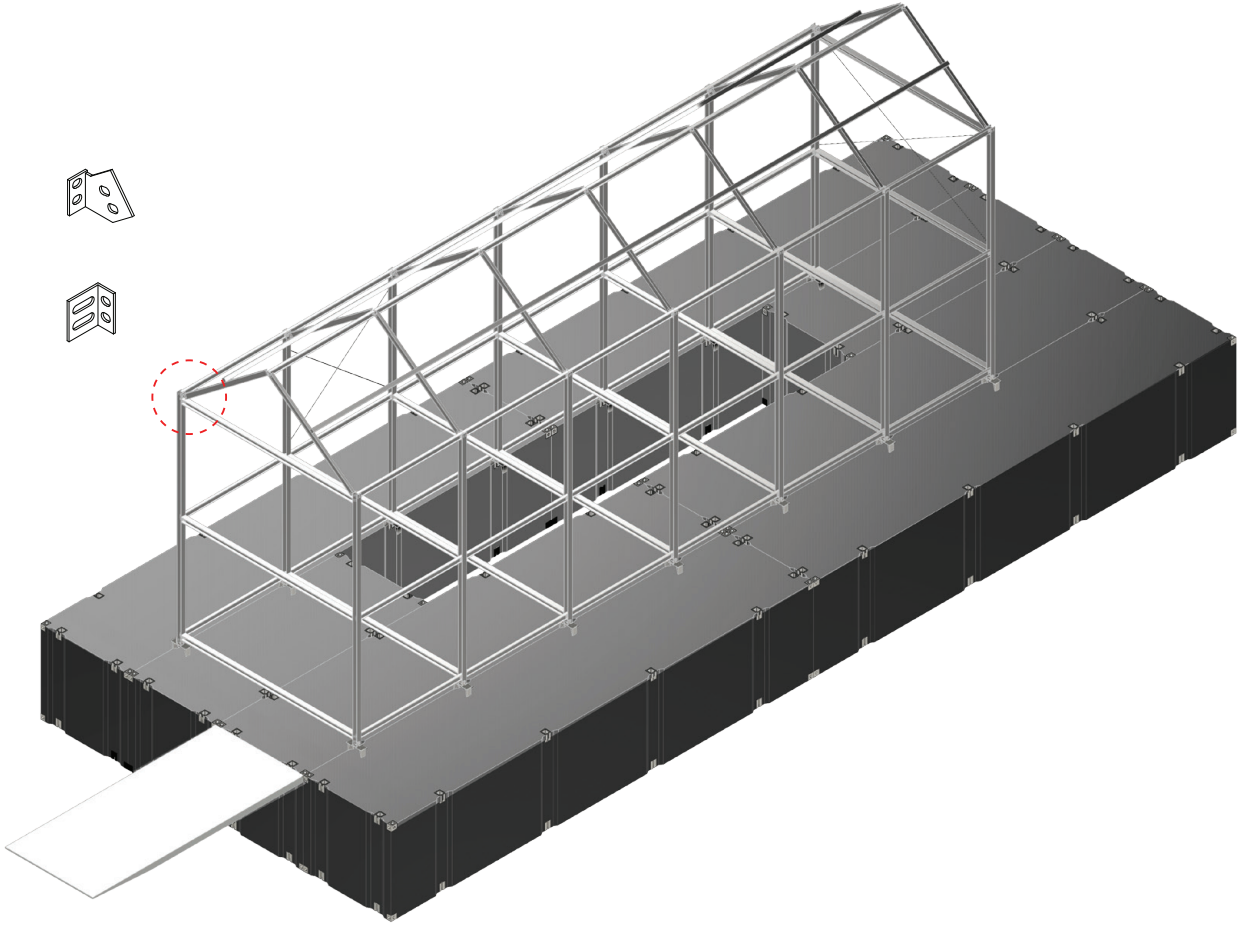




STRUCTURAL ELEMENTS:
PRE-DRILLED I-BEAM
ROD
BRACKET
POST SHOE







STRUCTURAL ELEMENTS:

PRE-DRILLED I-BEAM

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BRACKET

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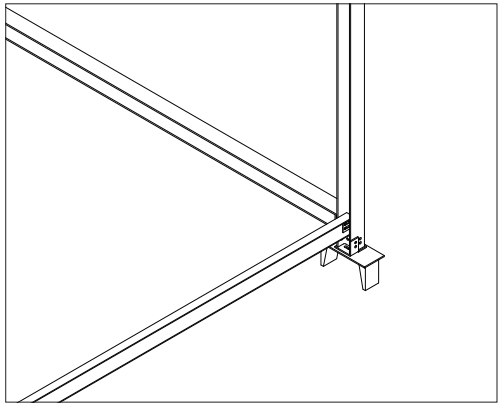

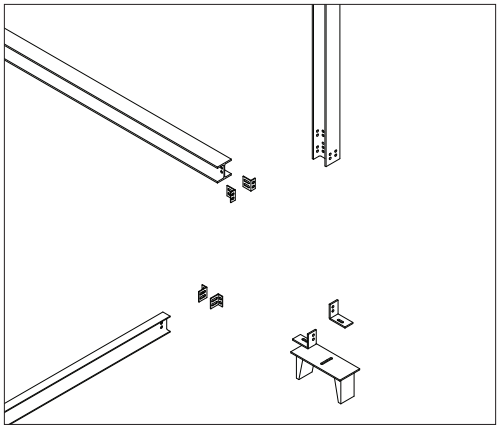

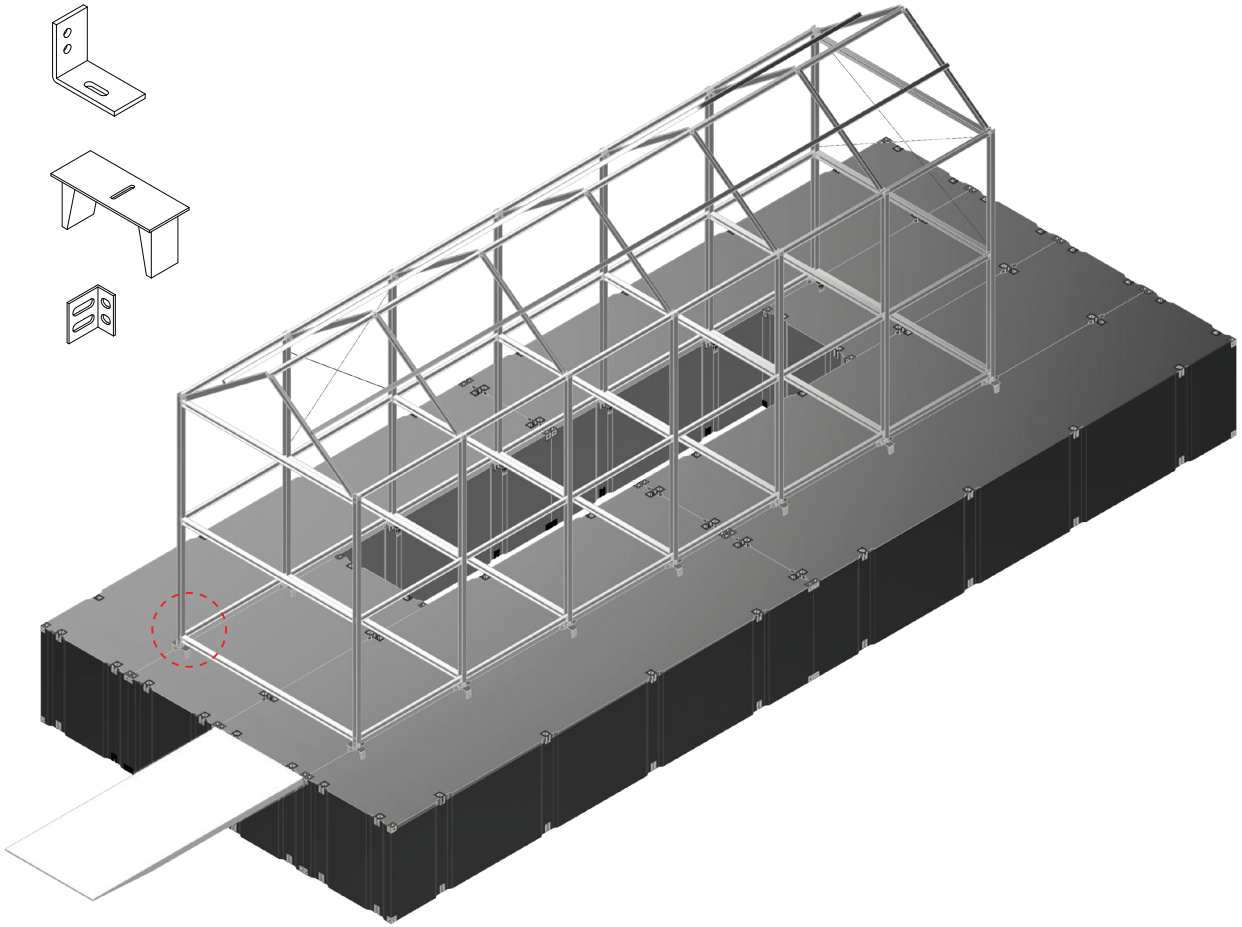

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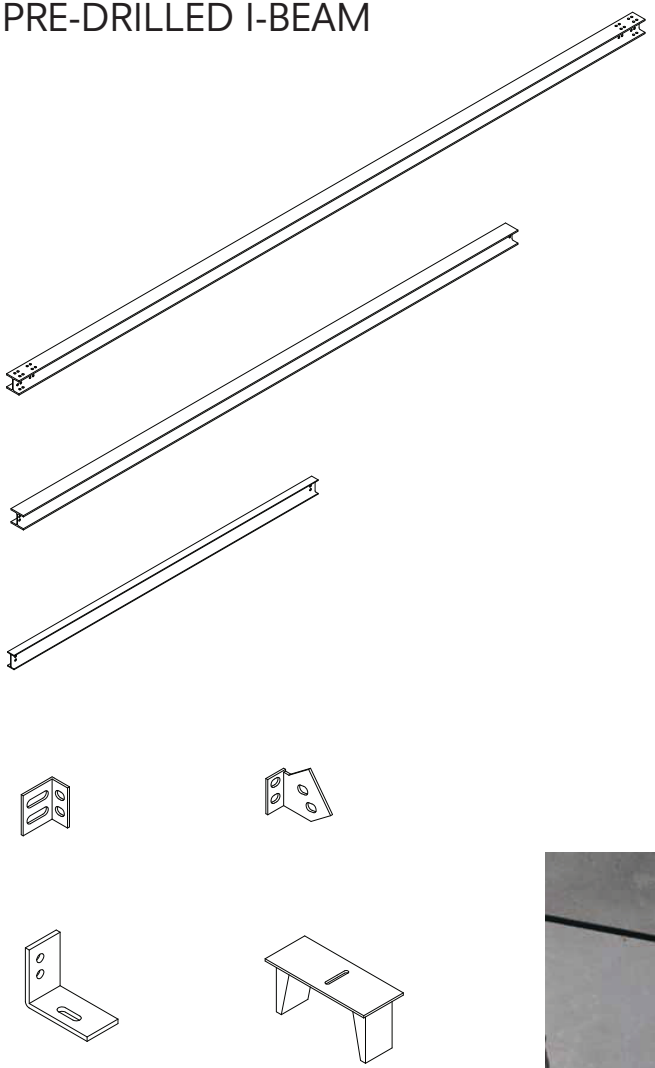
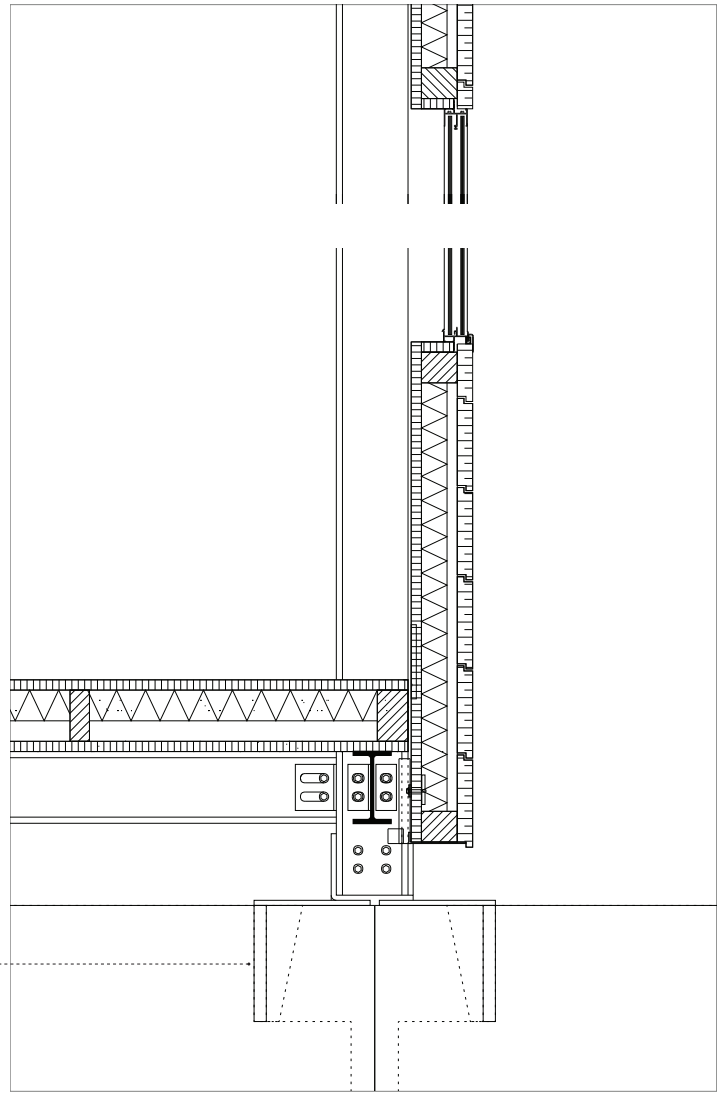
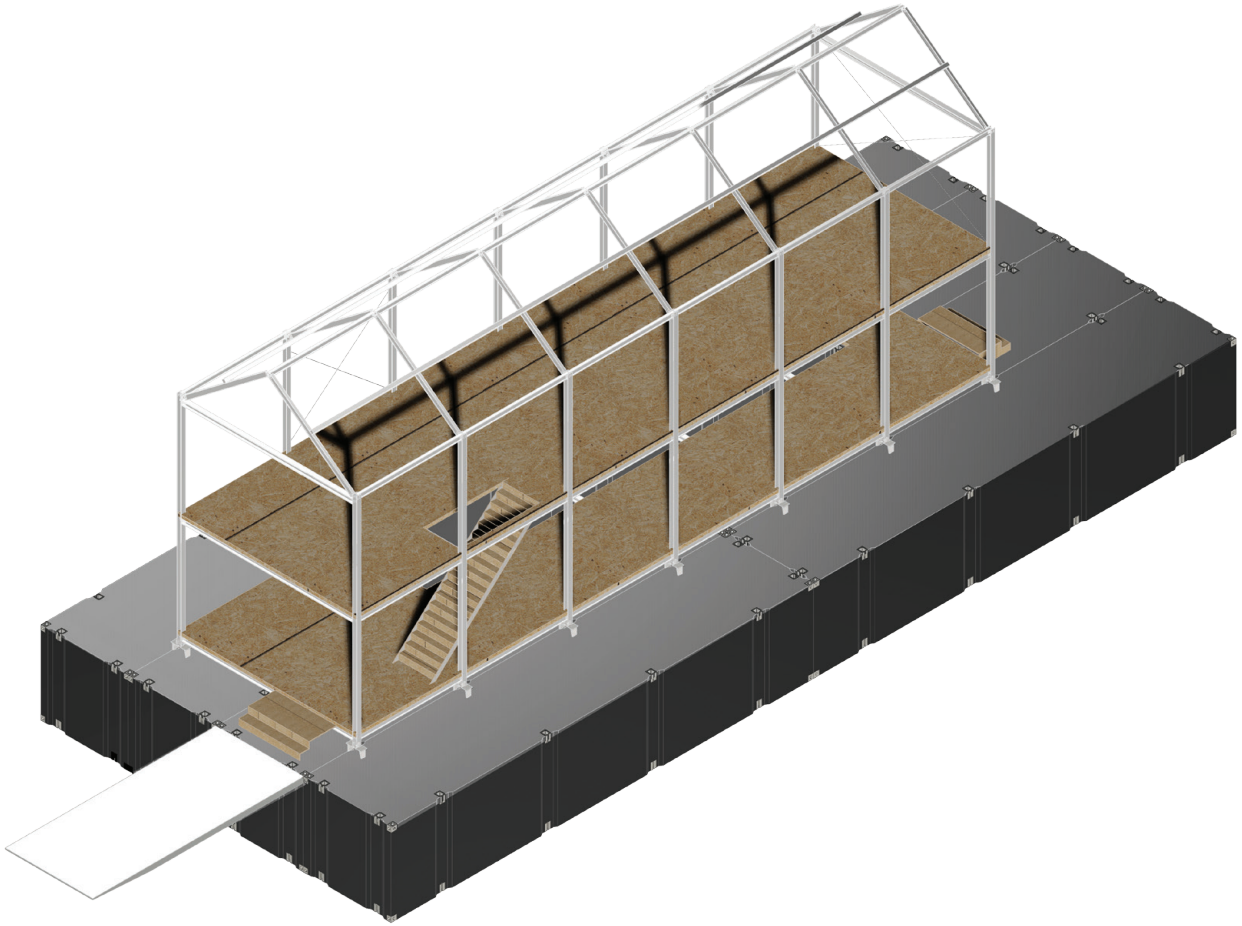
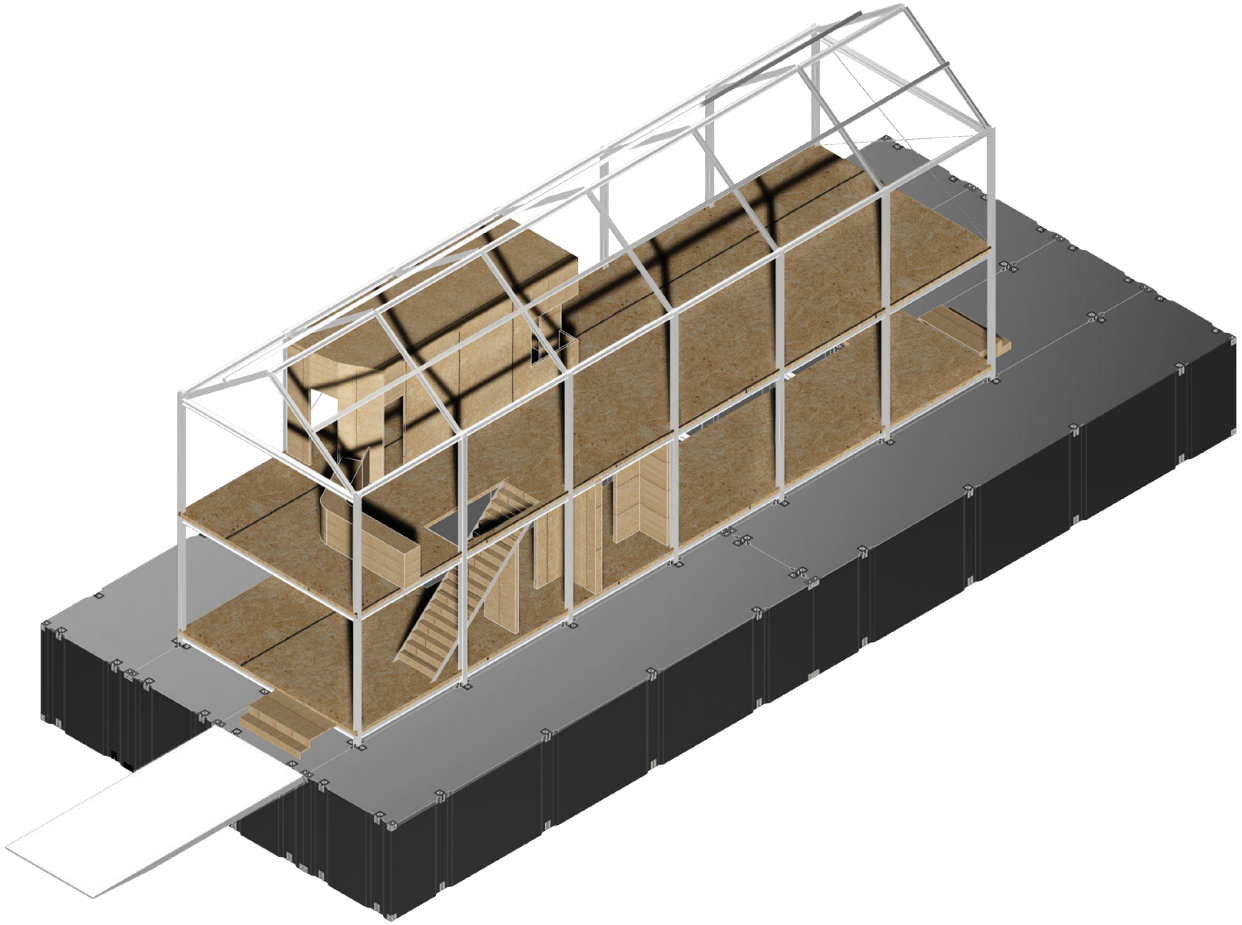




BUILDING ELEMENTS:
FLOOR



BUILDING ELEMENTS:
PATITION



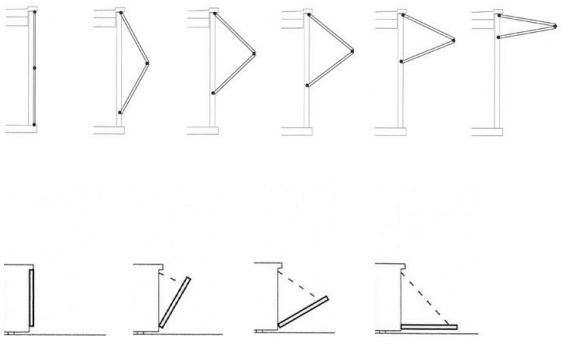
BUILDING ELEMENTS:
BIO MATERIALS

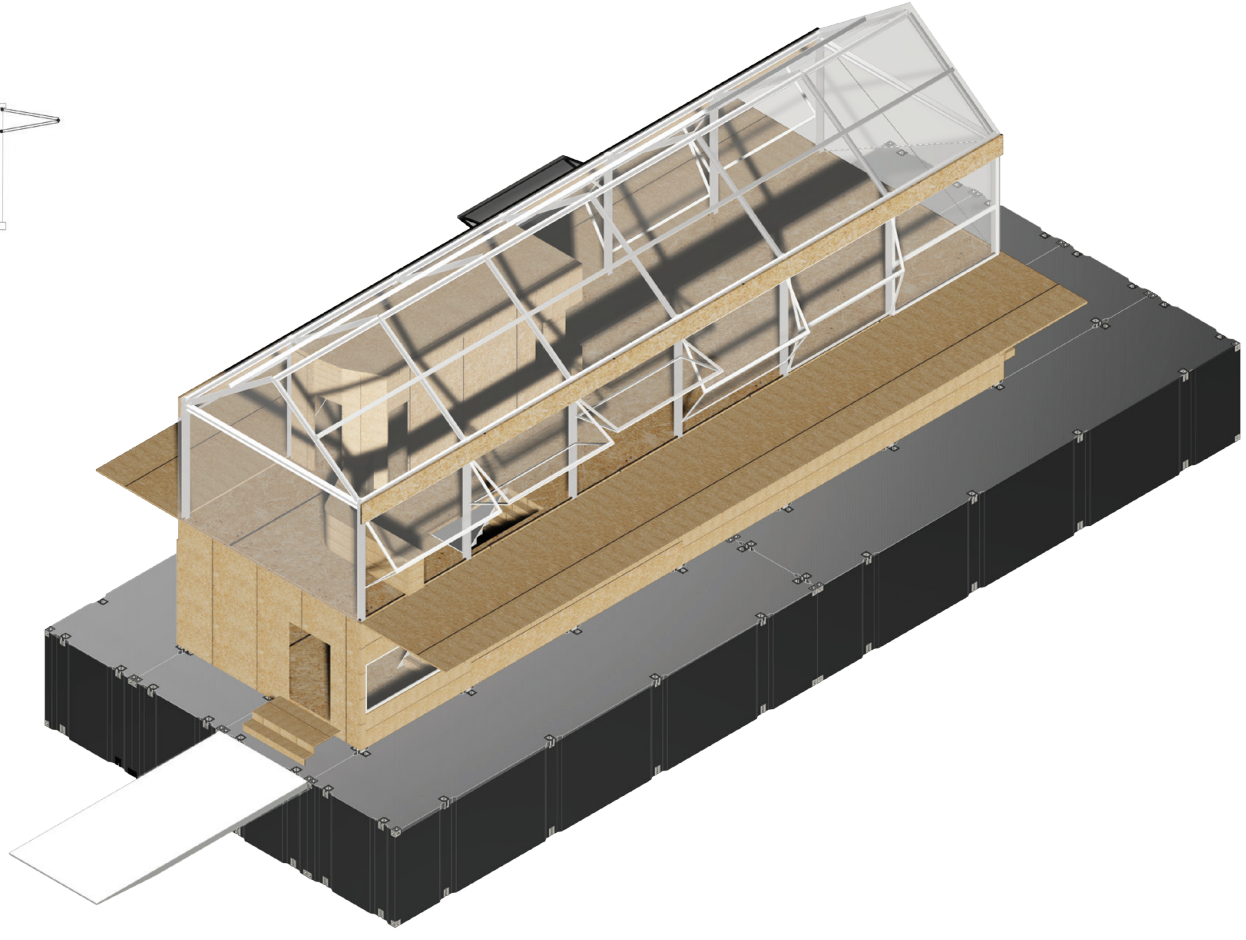
"Over 40 million tonnes of dried organic waste was produced in Europe (2014)."

Value from 1 kg of bio waste = incinerated: 0.85 Euros
or = cladding: 6 Euros

Fabric Wall Insulation Floor Furniture Acoustic panel

BUILDING ELEMENTS:
FACADE





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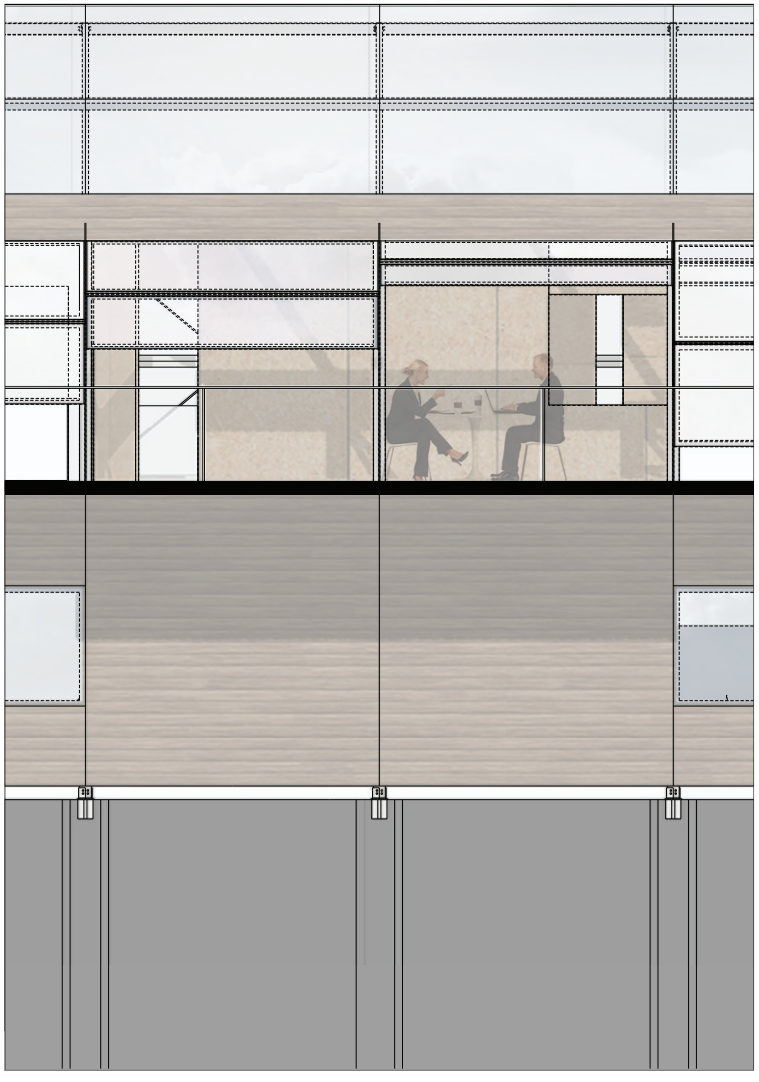
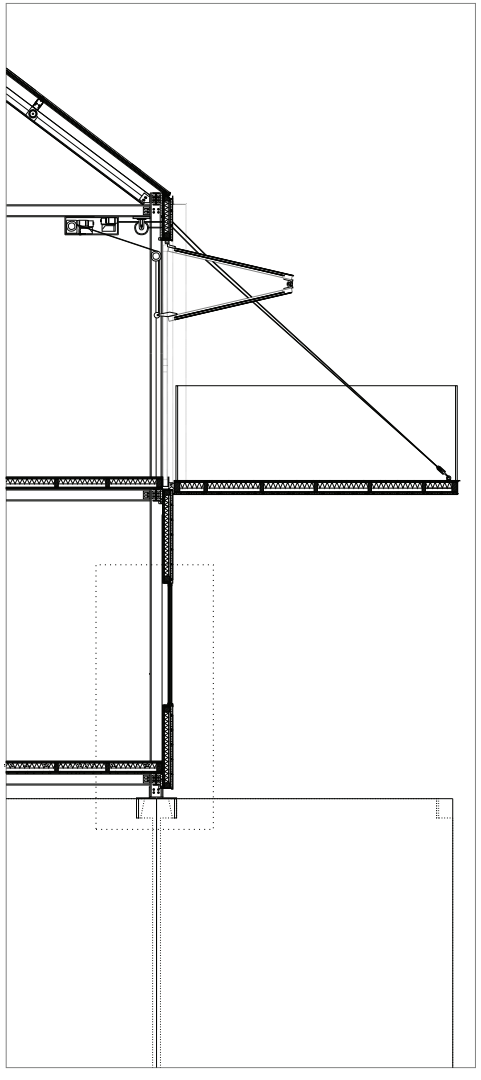
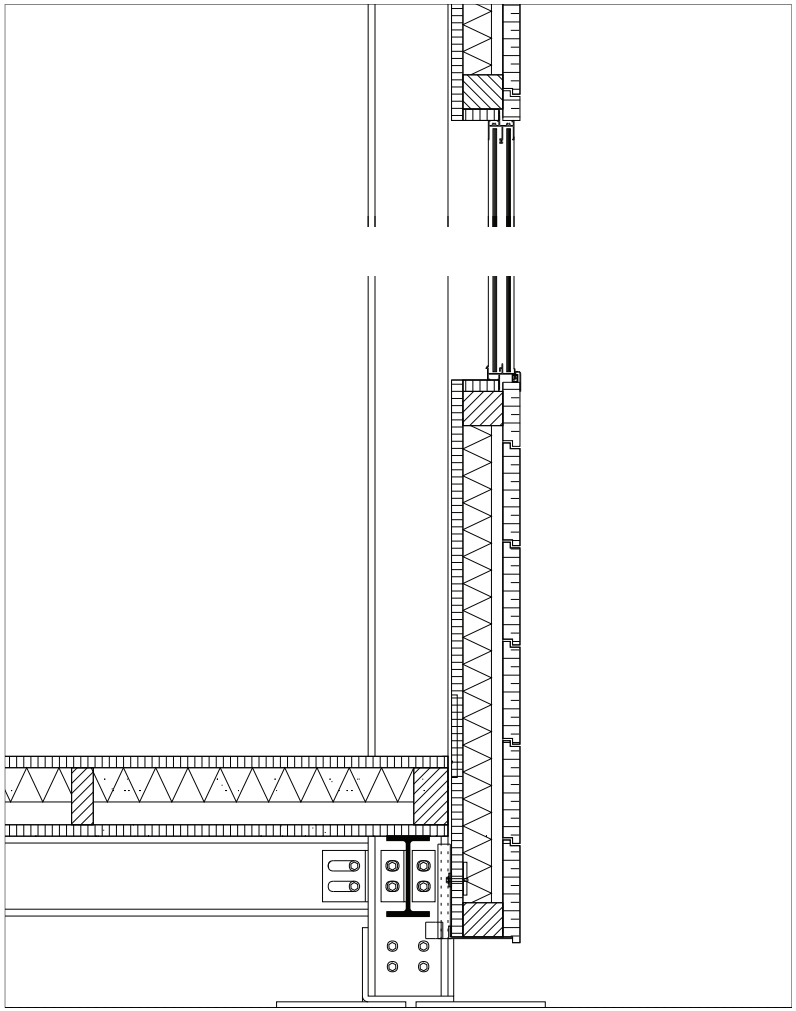
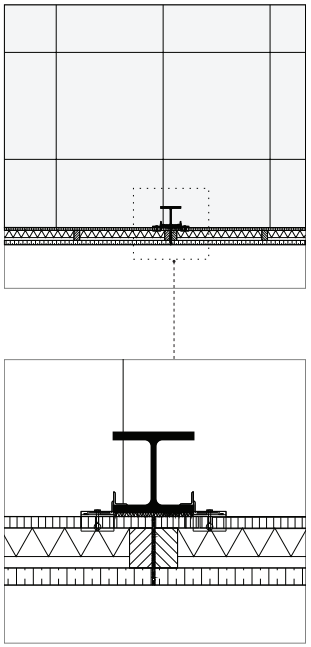
FACADE

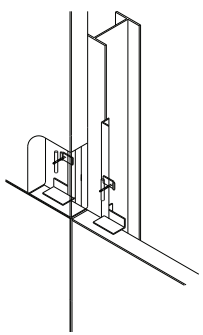




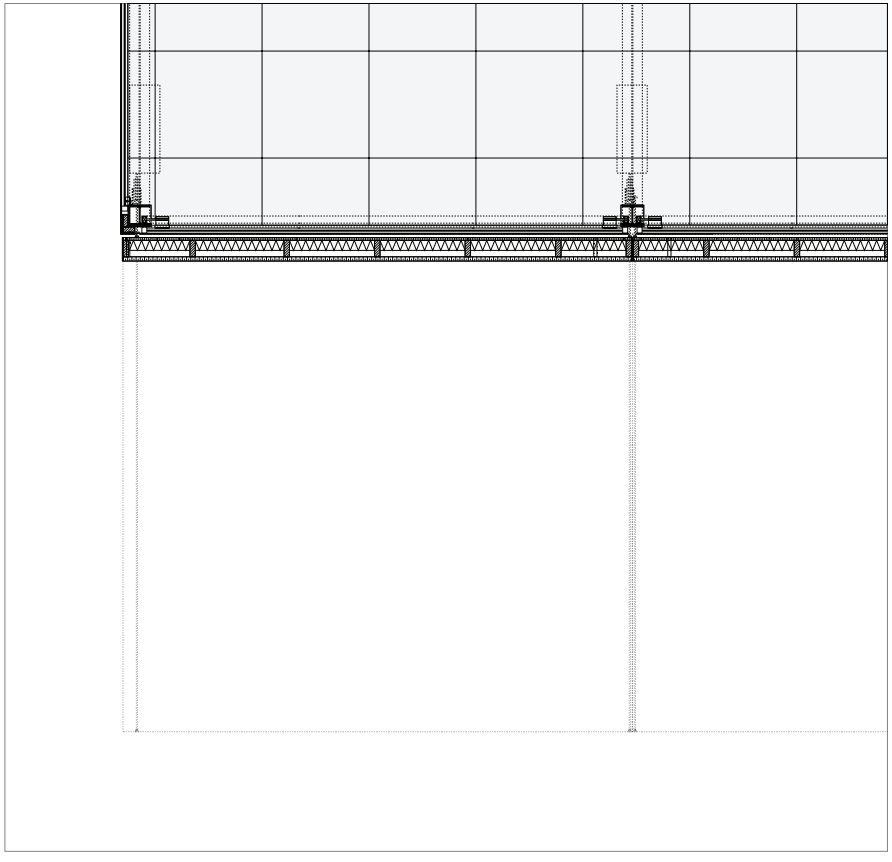
BUILDING ELEMENTS:
FACADE GF





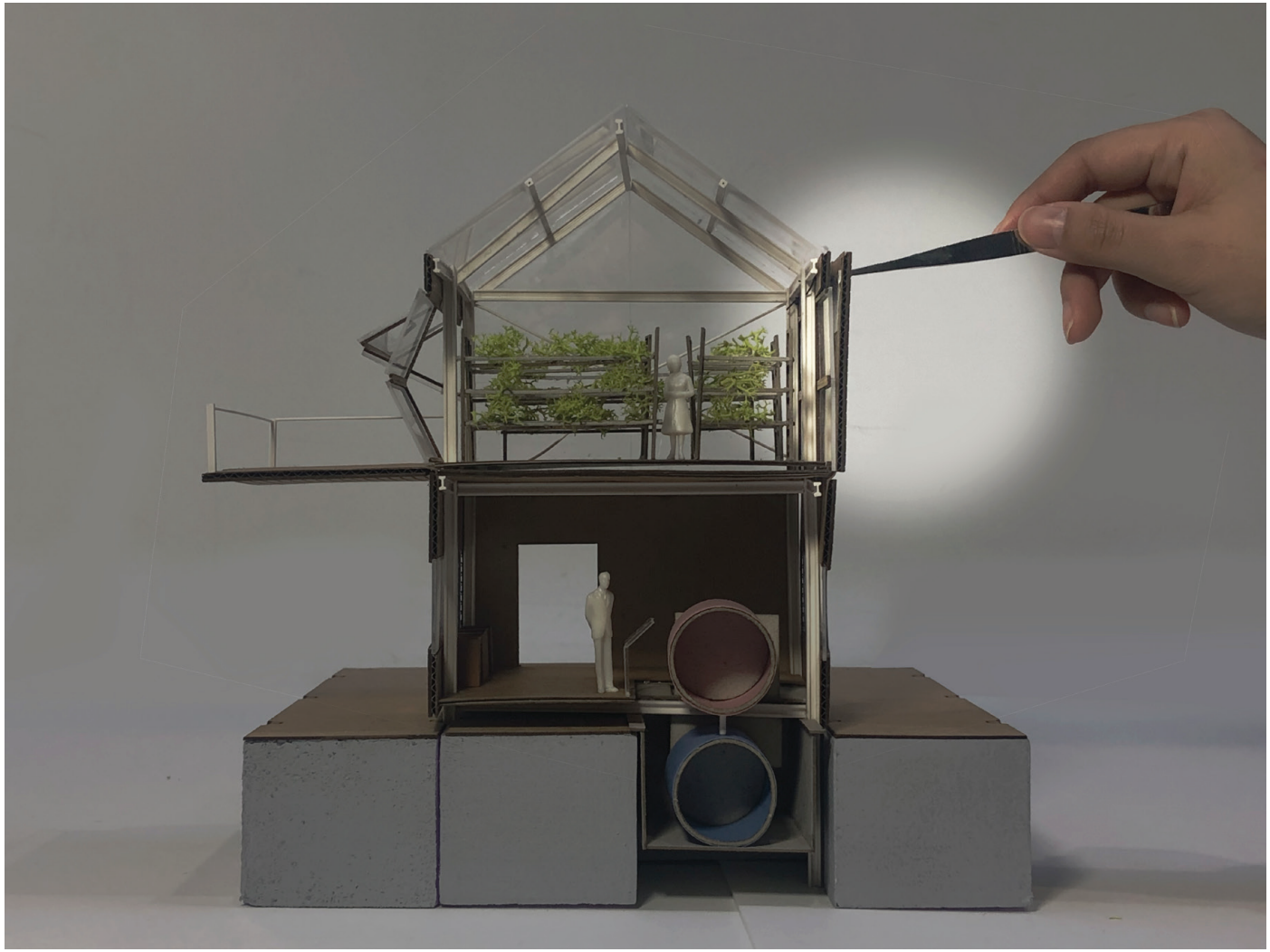


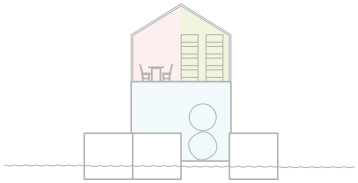
BUILDING ELEMENTS:
FACADE 1/F



BUILDING ELEMENTS:
FACADE 1/F

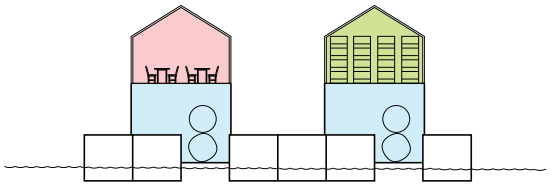
BUILDING ELEMENTS:
FACADE 1/F





SCENARIO 1:

8 existing restaurants,
approx. 300kg of food waste



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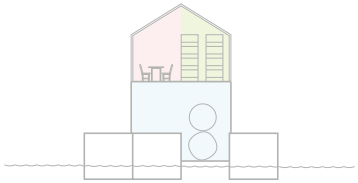

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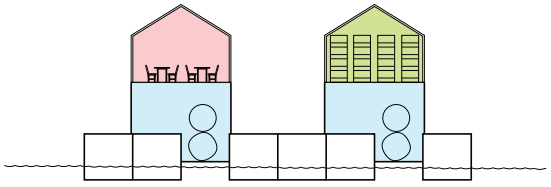
approx. 300kg of food waste



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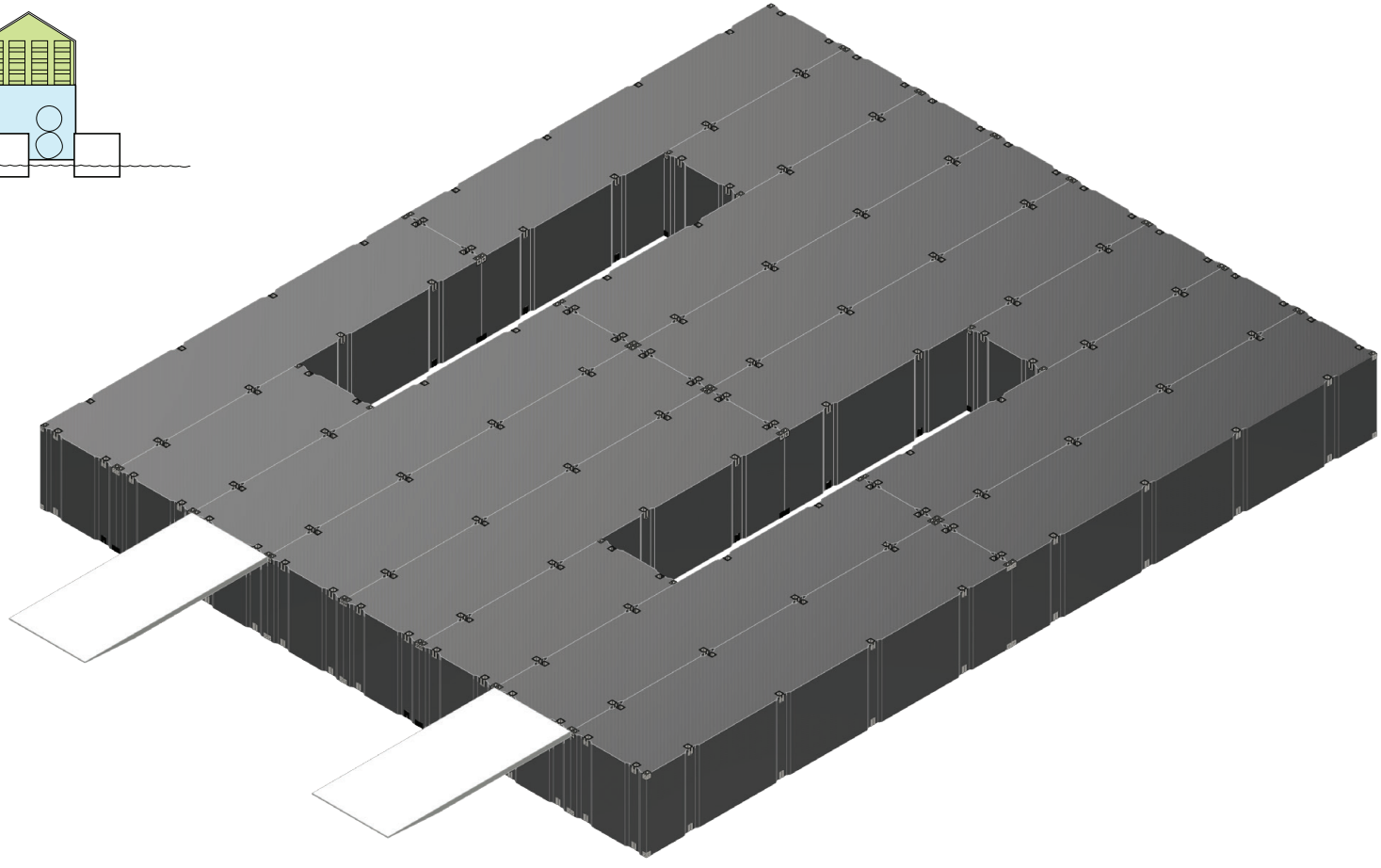

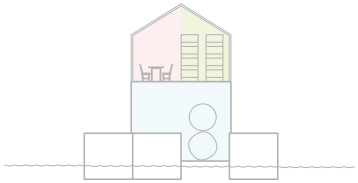

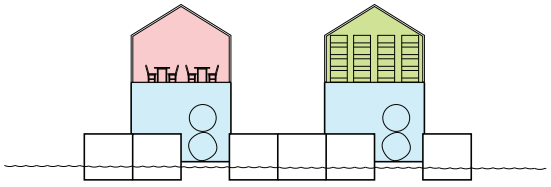

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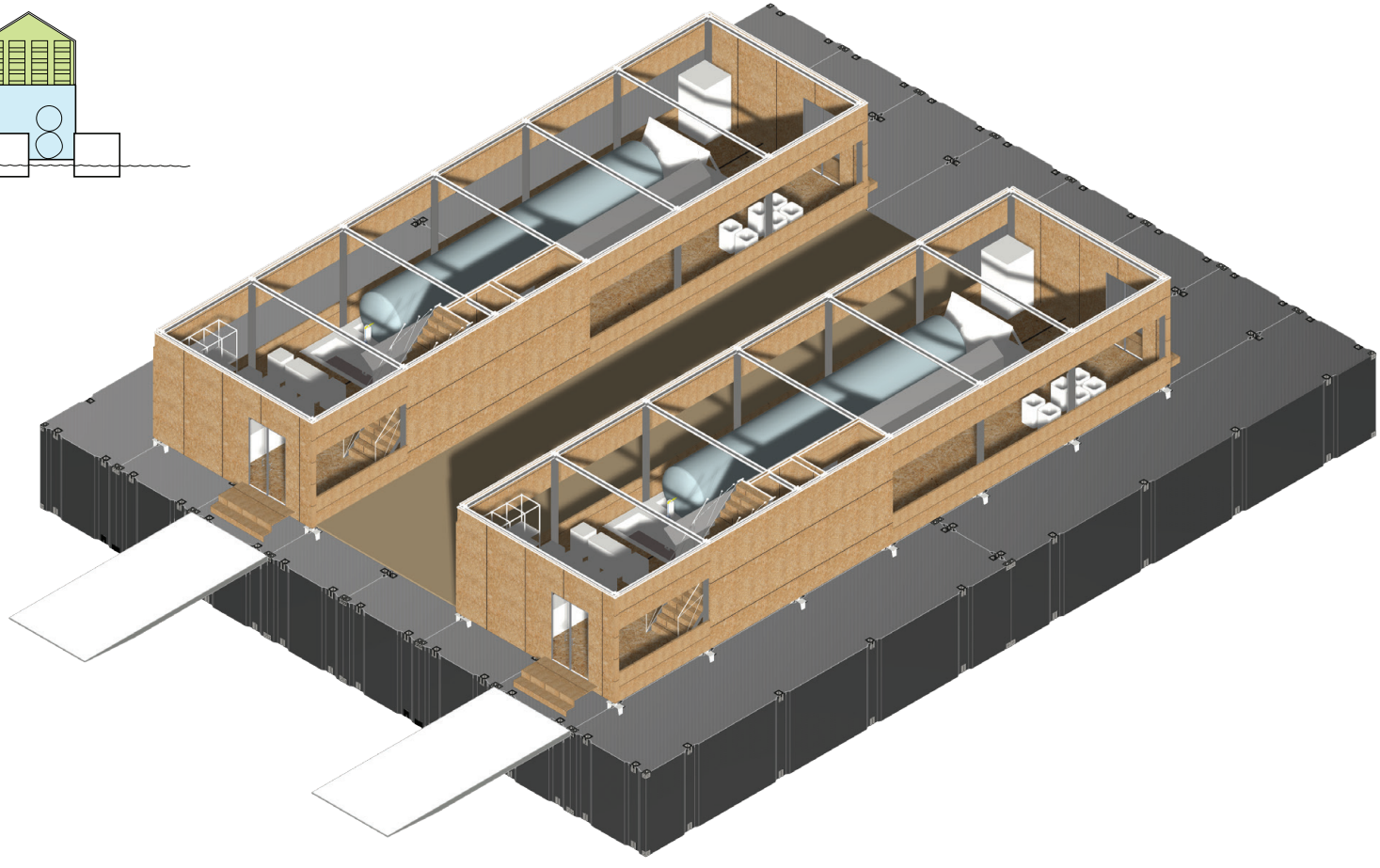

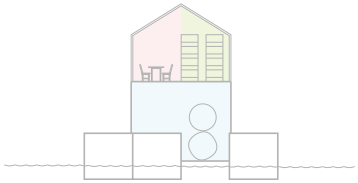

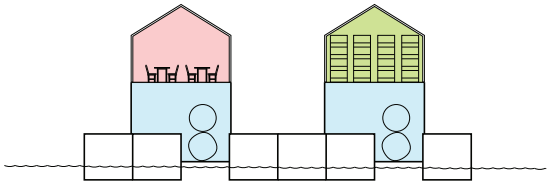

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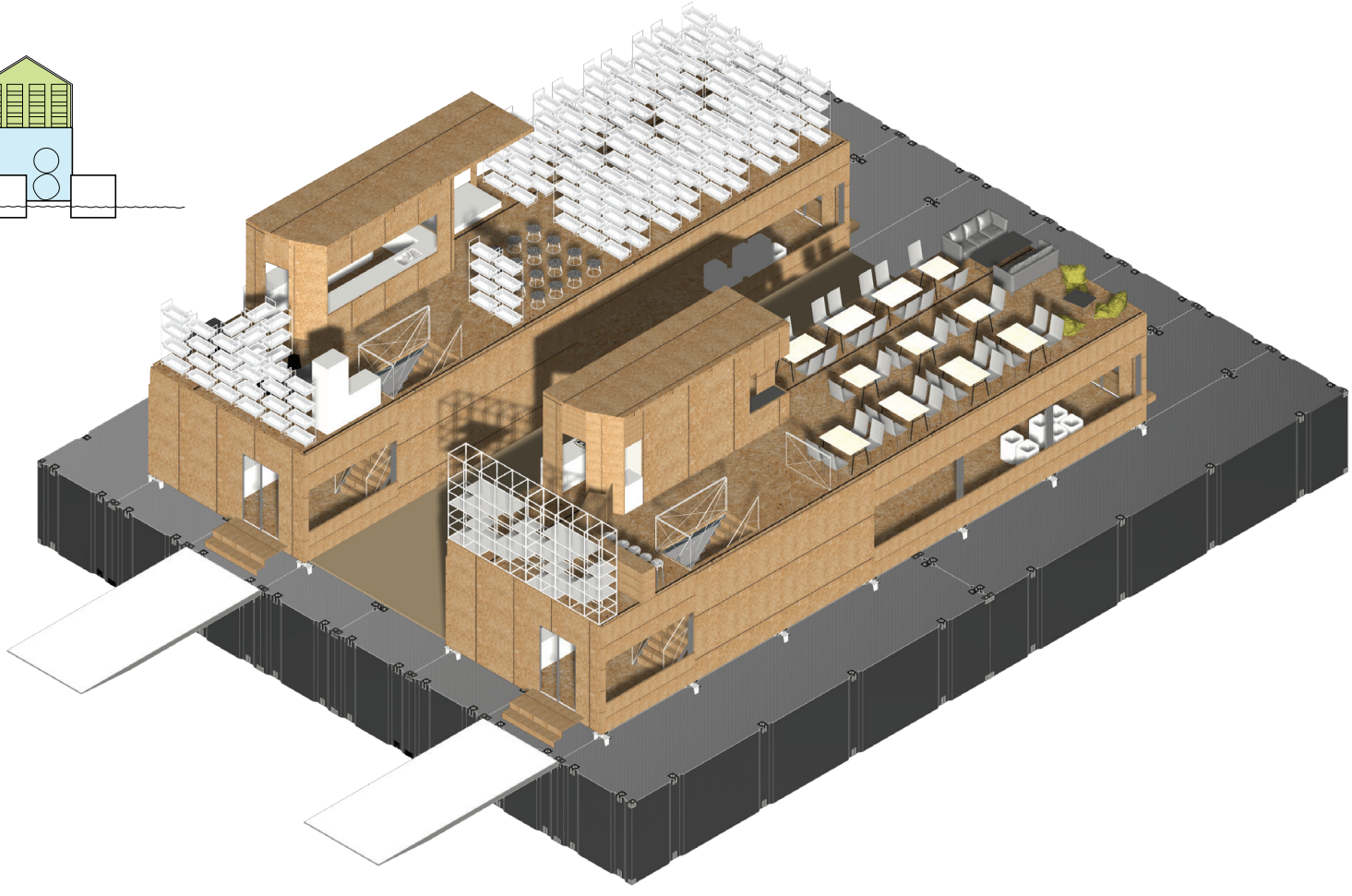

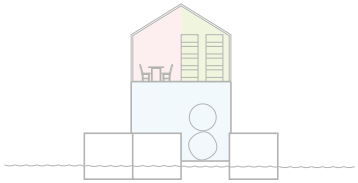

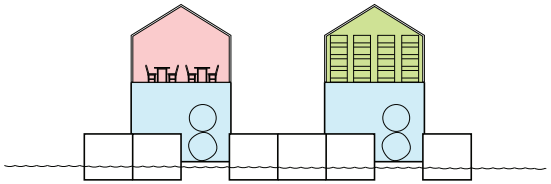

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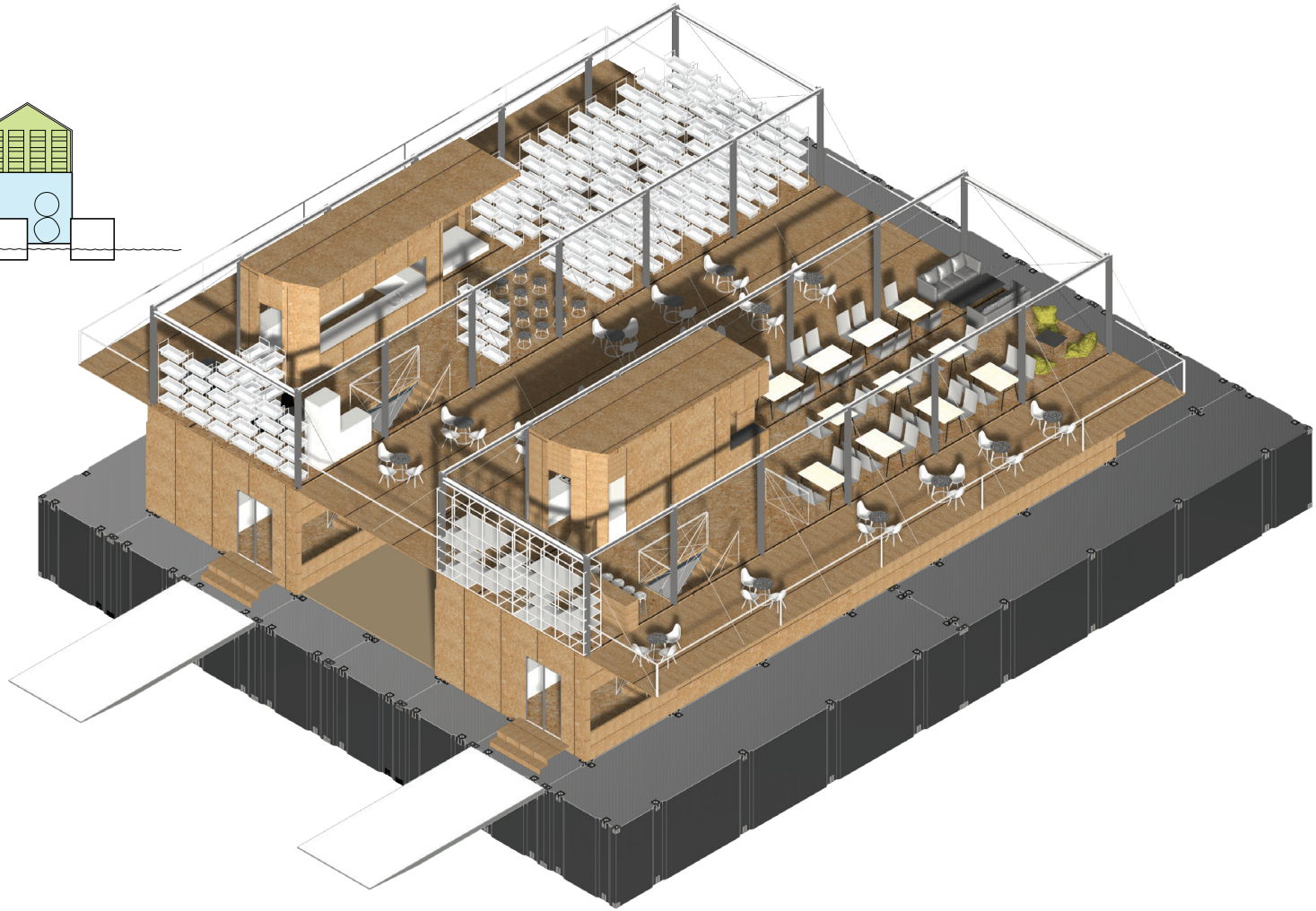

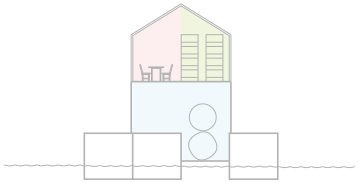

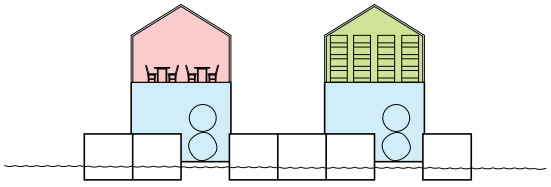

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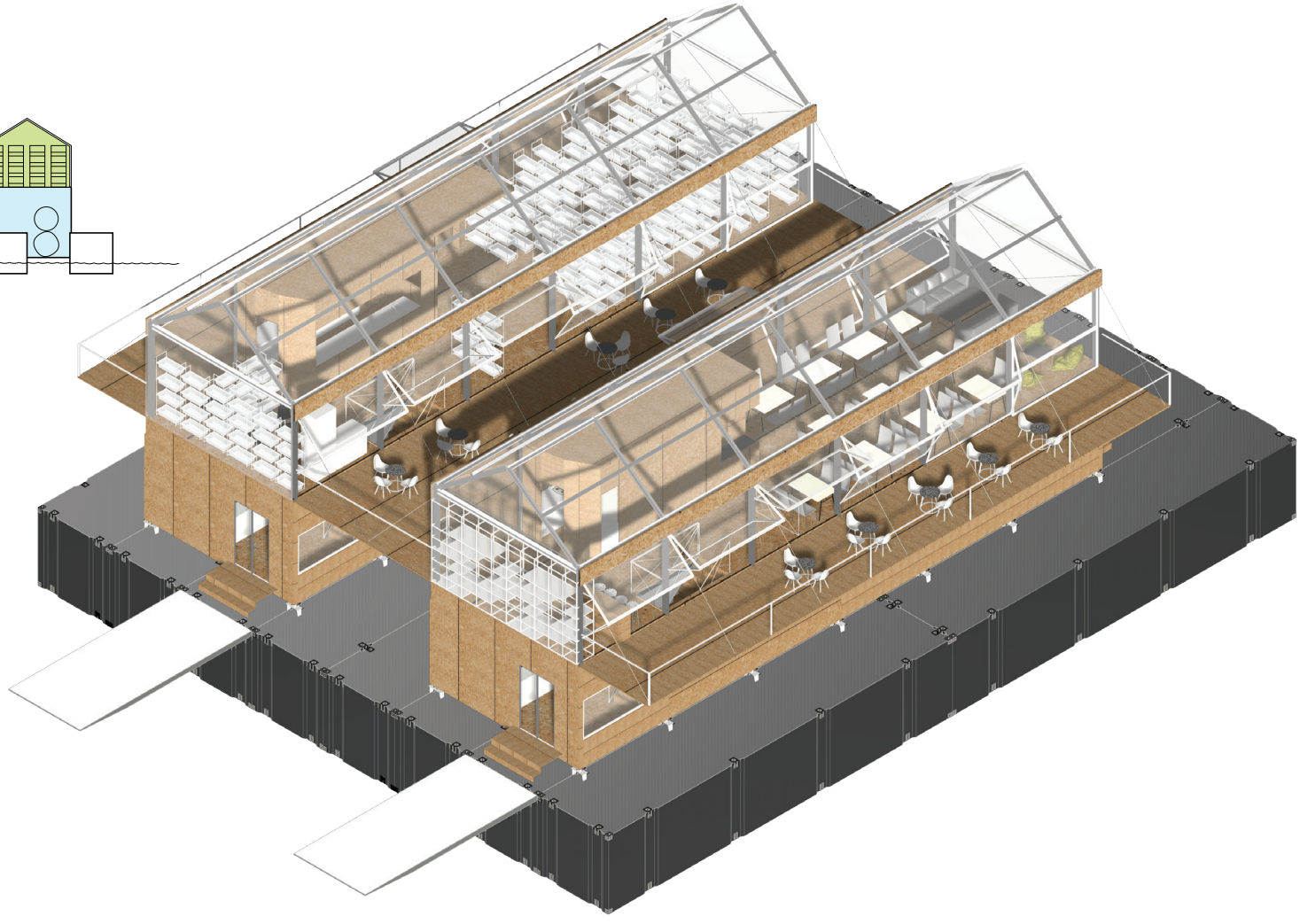
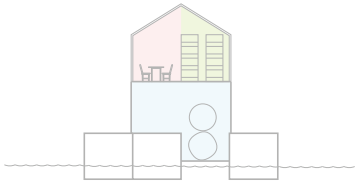
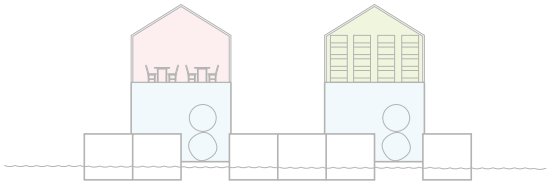
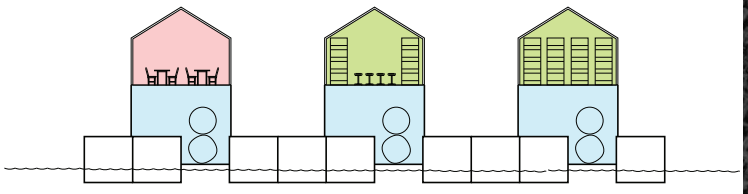


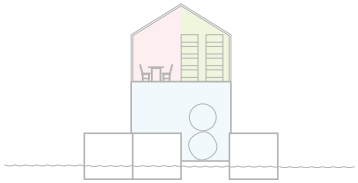


12 existing restaurants,
approx.450kg of food waste

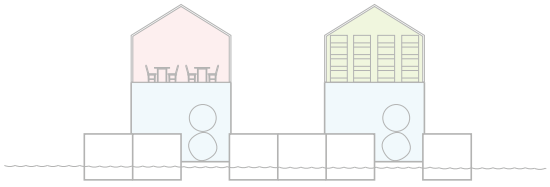


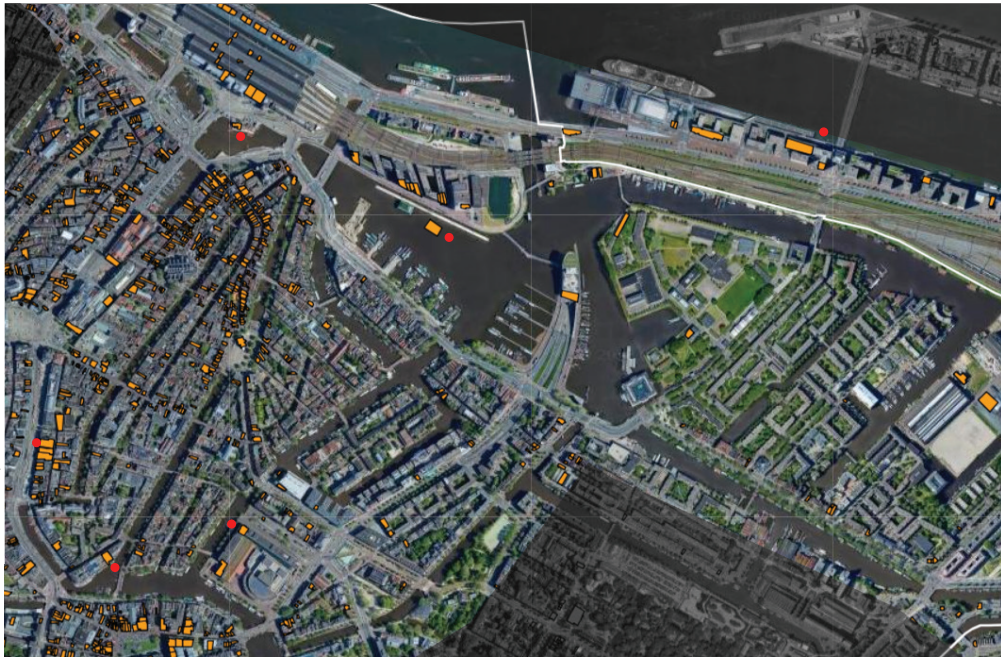


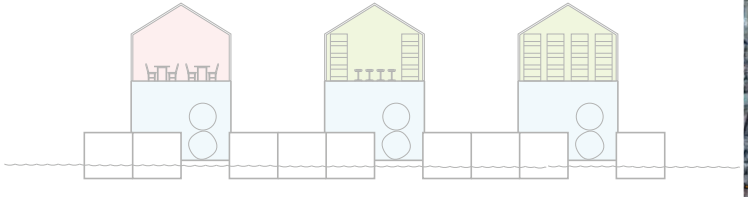
SCENARIO 3:

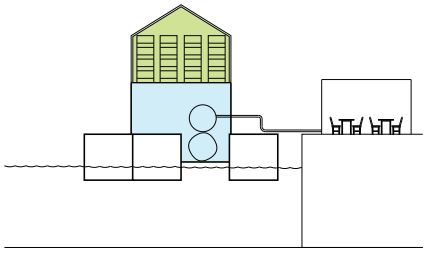


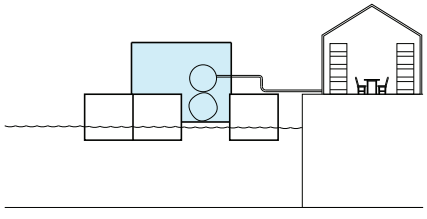
44 existing restaurants,
approx.1650kg of food waste



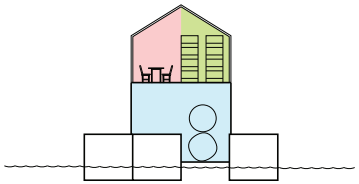




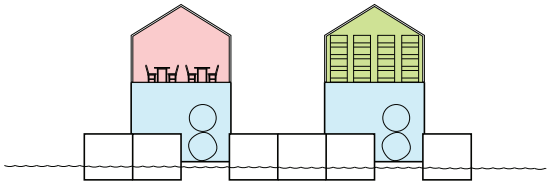




SCENARIO X



SCENARIO 1:



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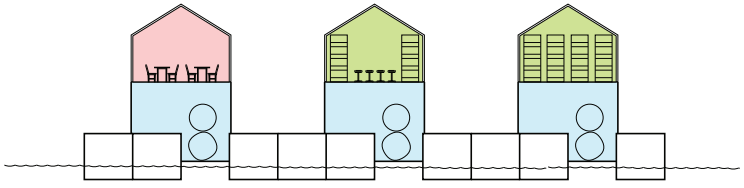

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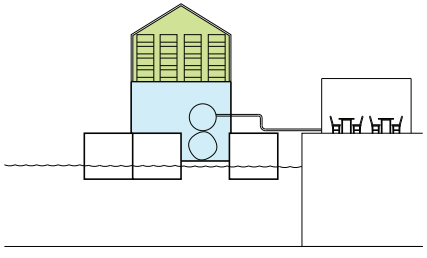
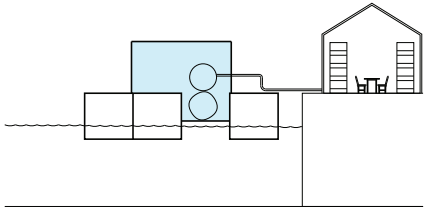
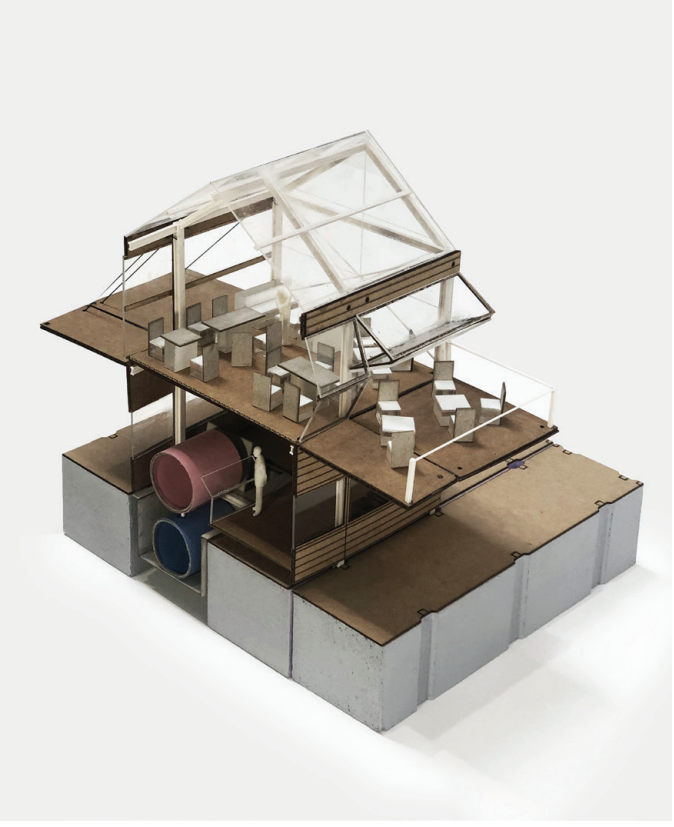
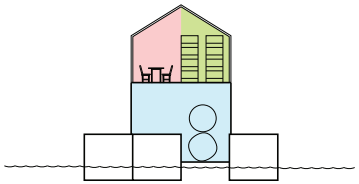


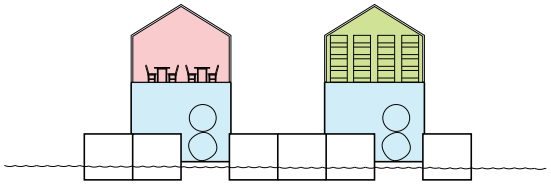


SCENARIO X





SCENARIO 1:



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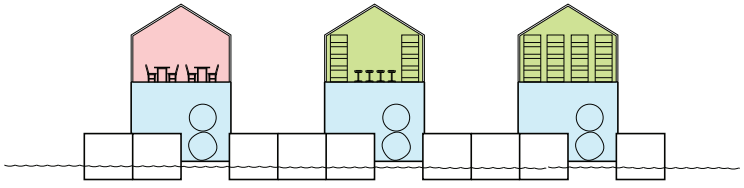

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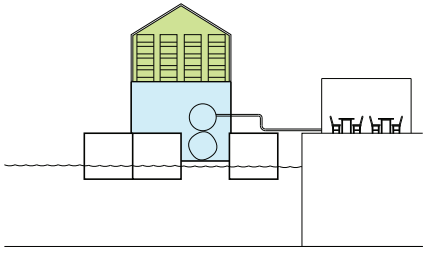
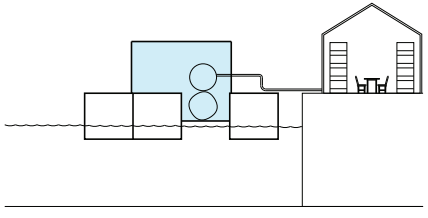
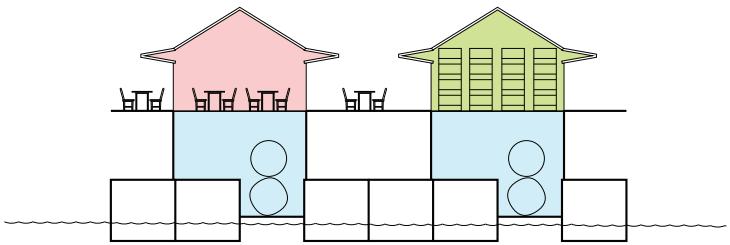
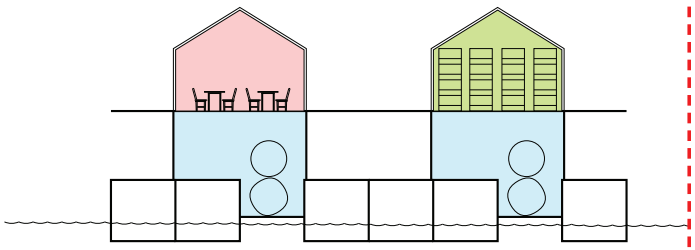
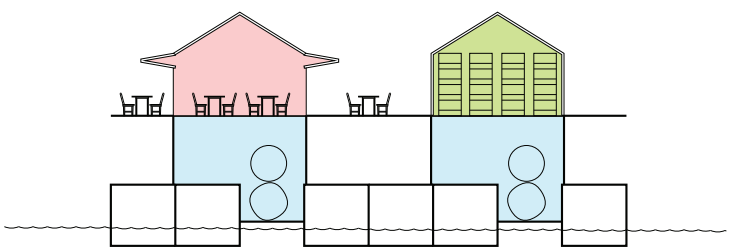
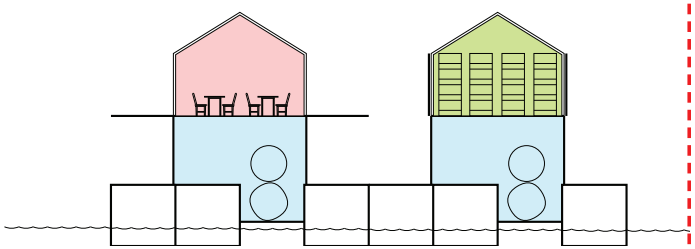
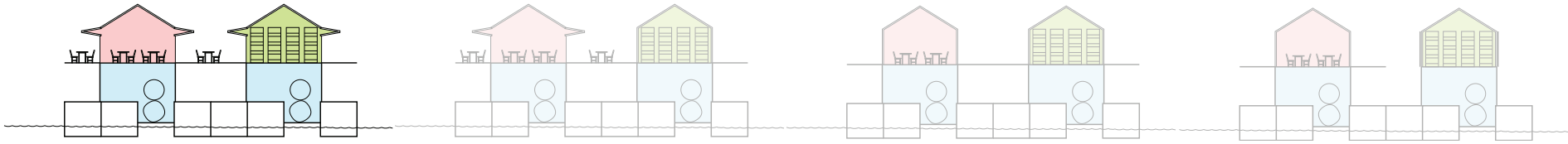




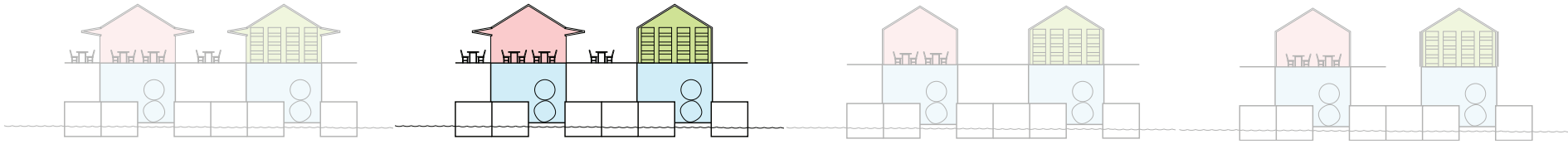
SCENARIO X

CLIMATE SCENARIOS

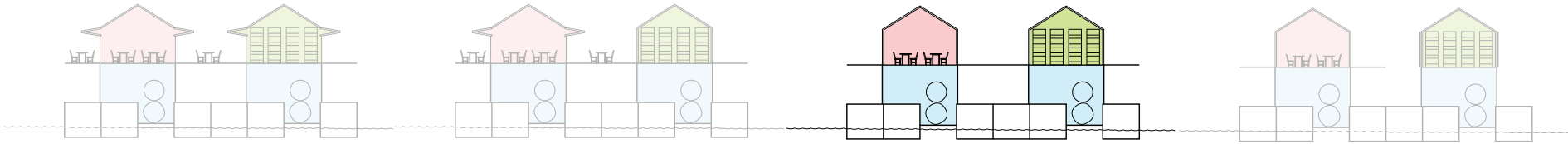
	Summer	Winter
Day		
Night		



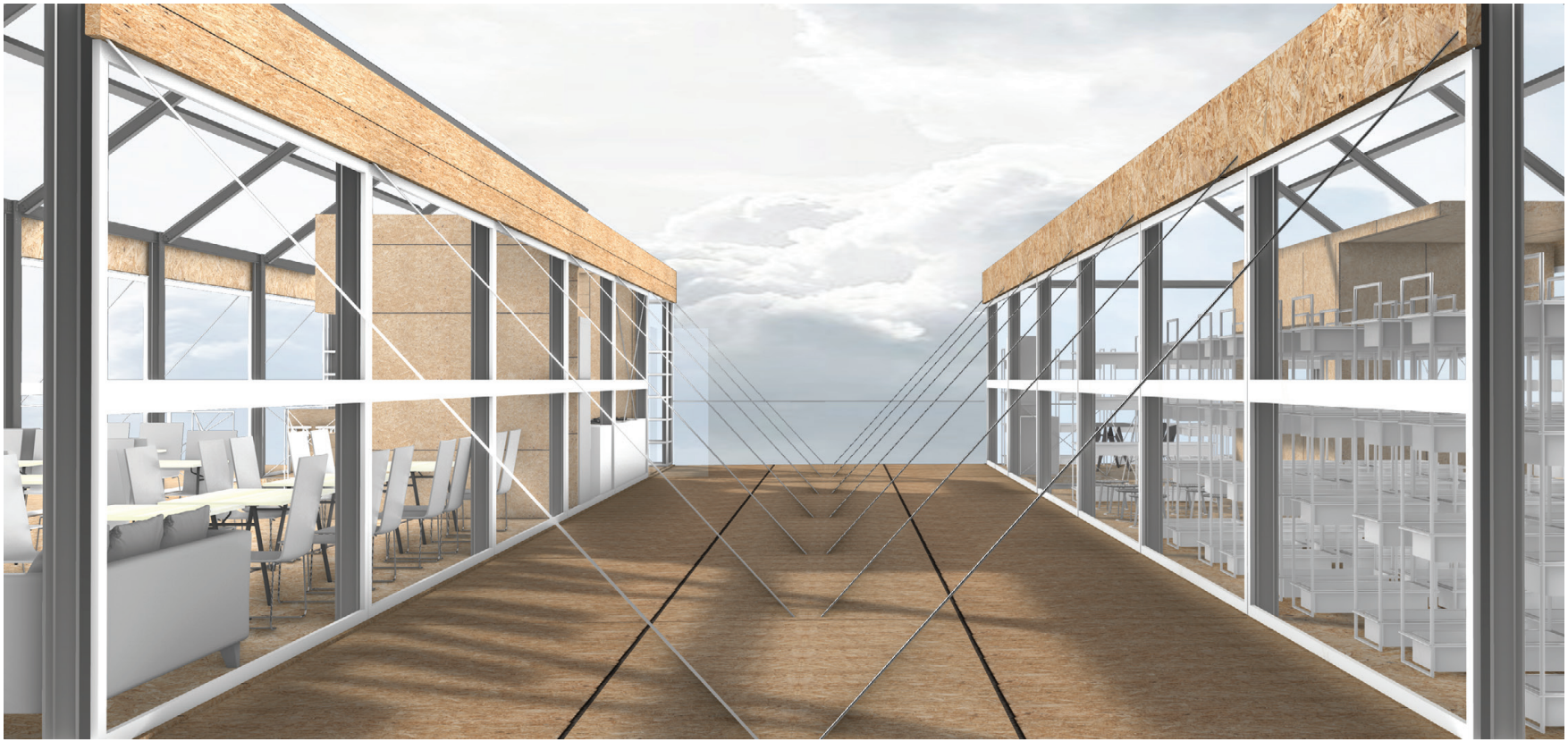
Summer Day

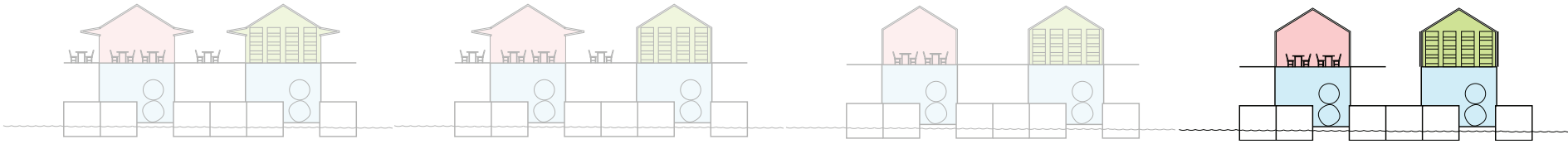


Summer Night

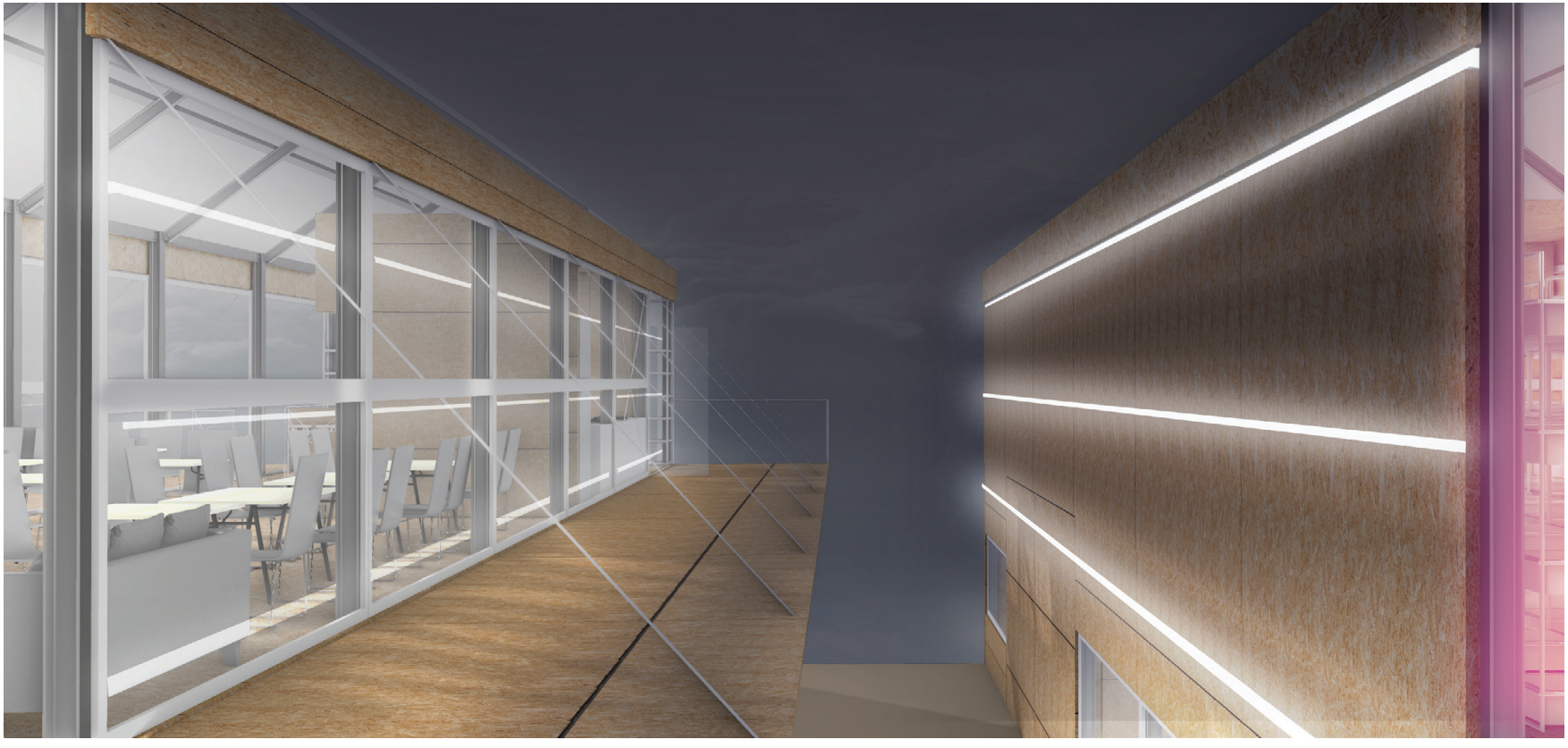


Winter Day

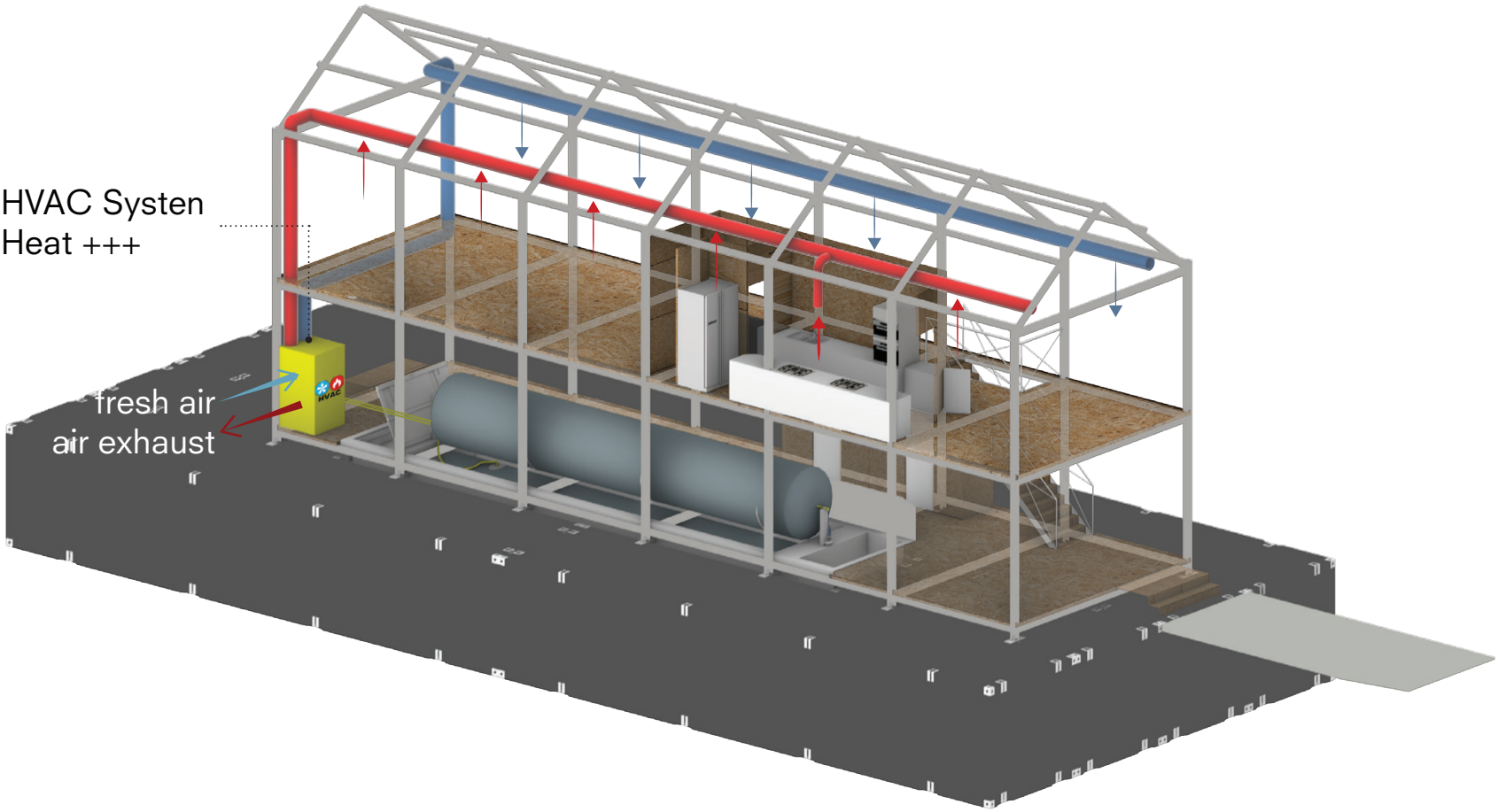




Winter Night



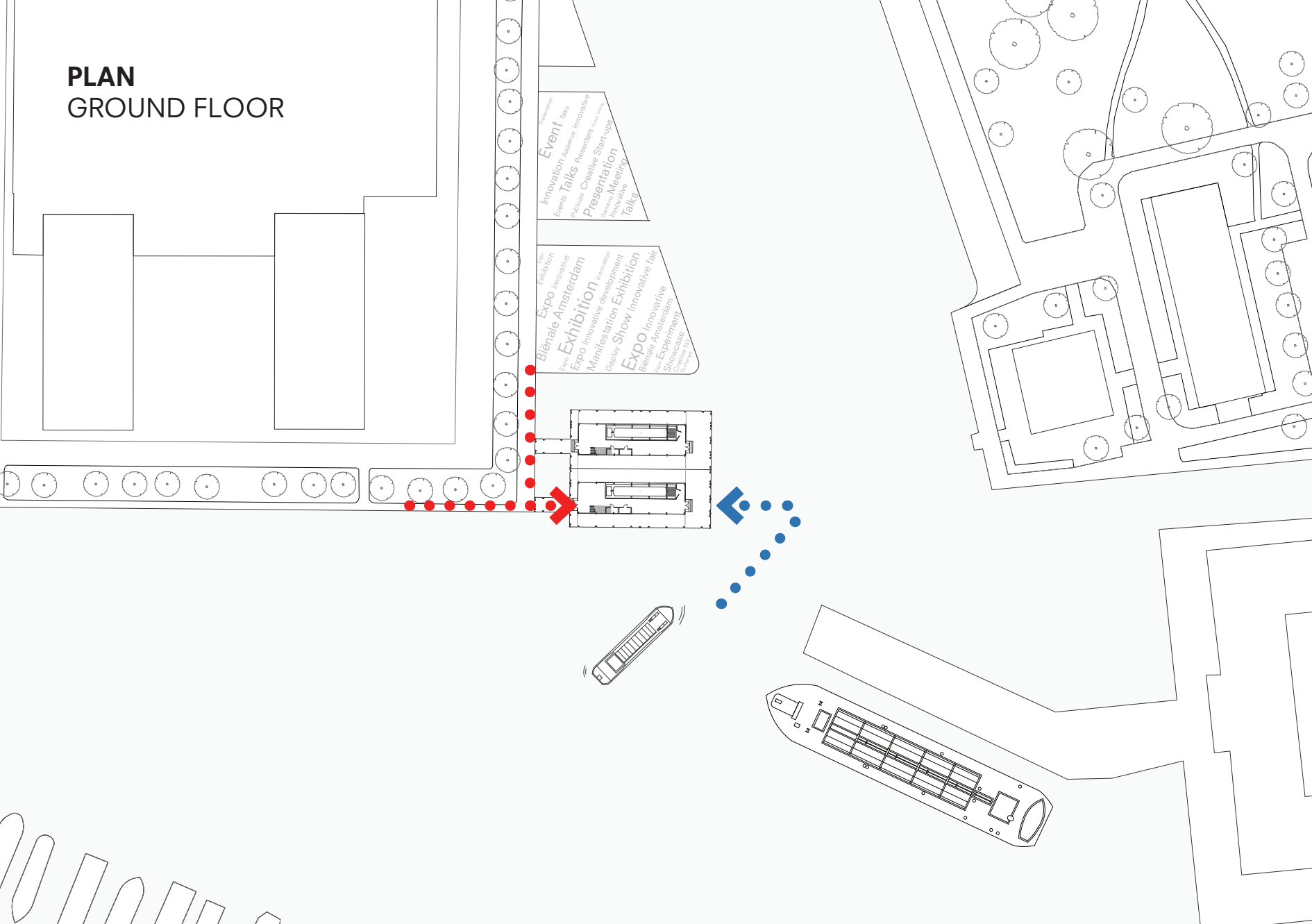
CLIMATE INTEGRATION
MECHANICAL VENTILATION



BIO LOOP PLUG-IN

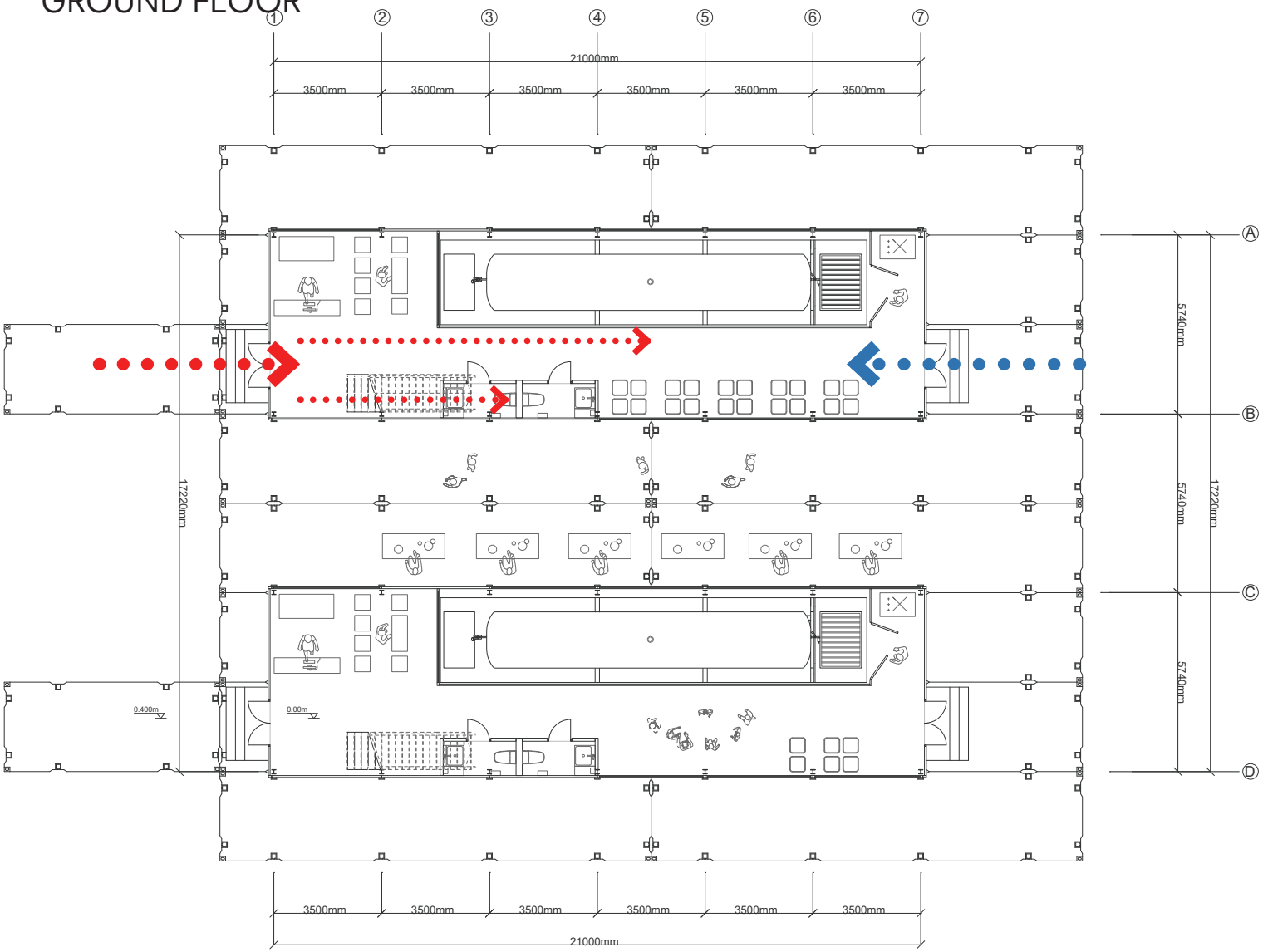
THE SPACIAL EXPERIENCE

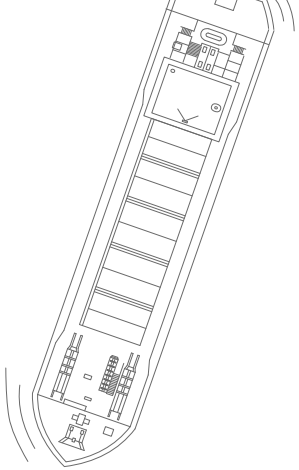
PLAN
GROUND FLOOR



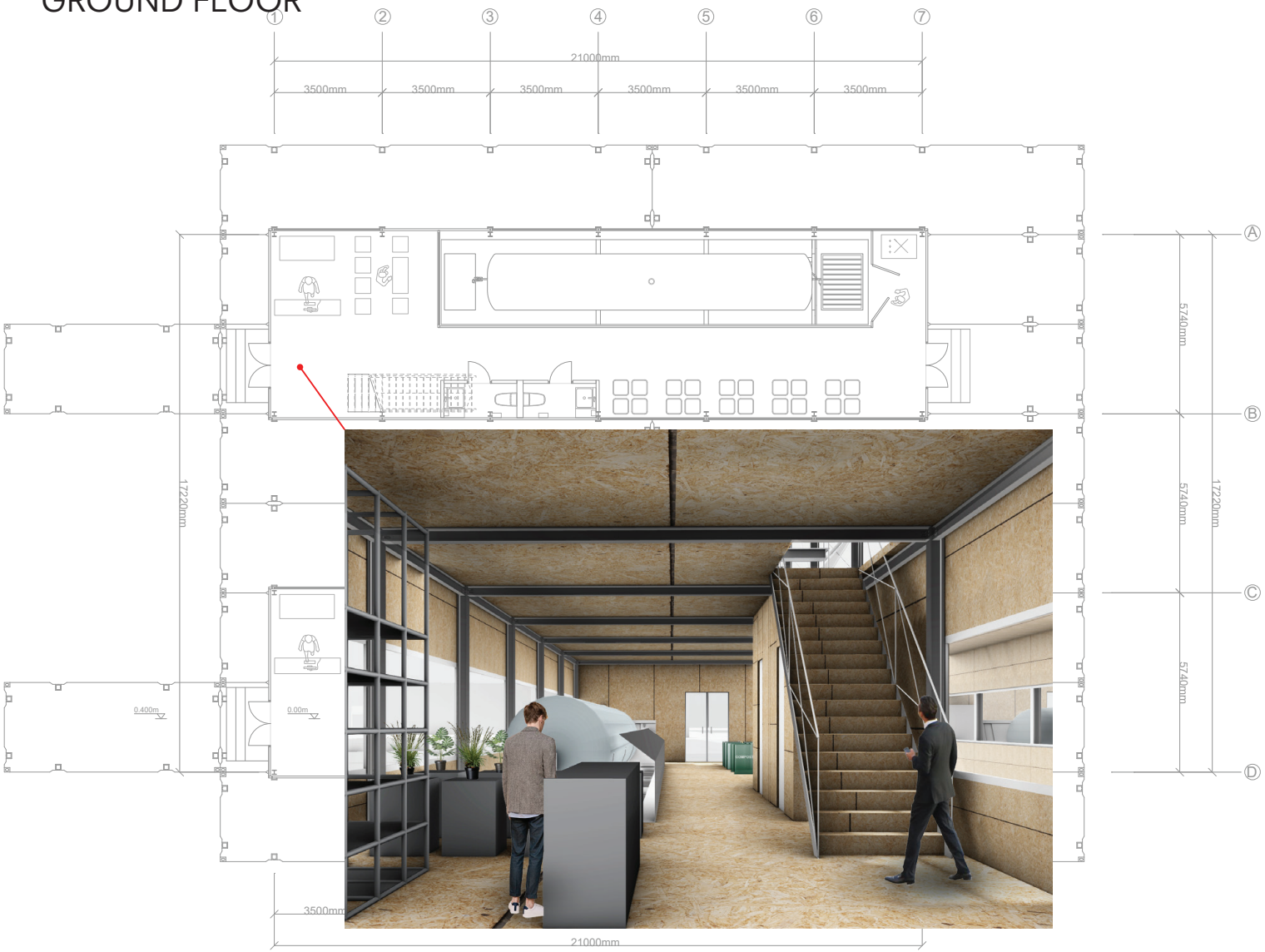
PLAN
GROUND FLOOR

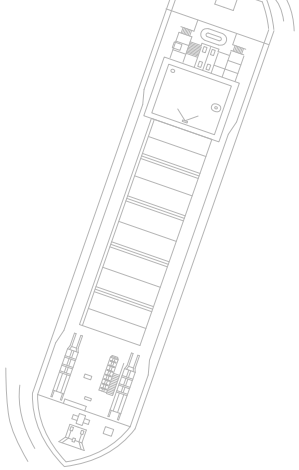
PLAN
GROUND FLOOR

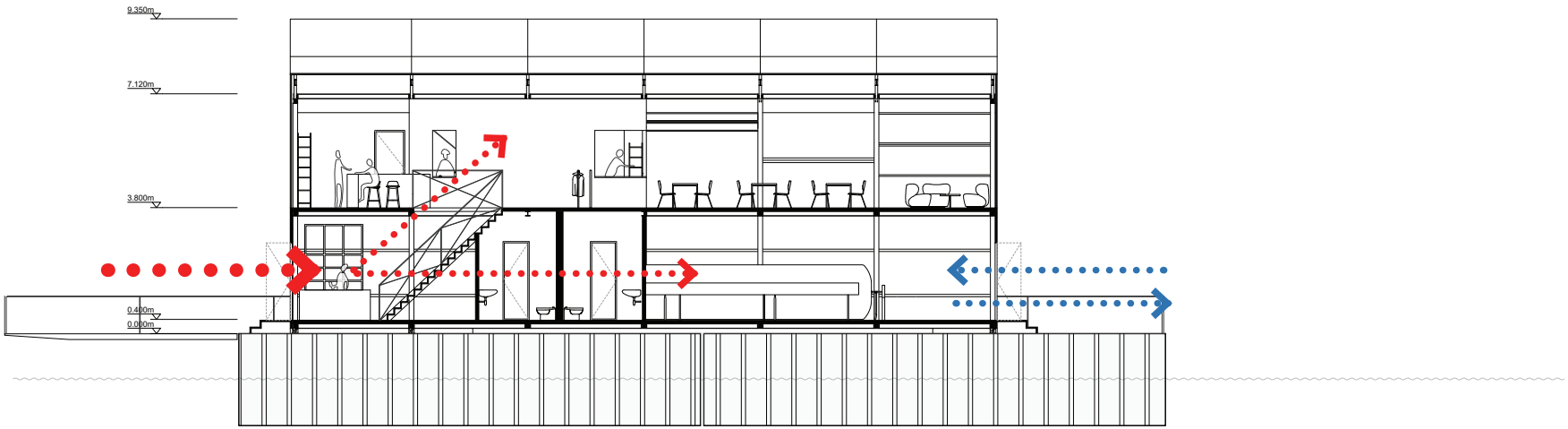




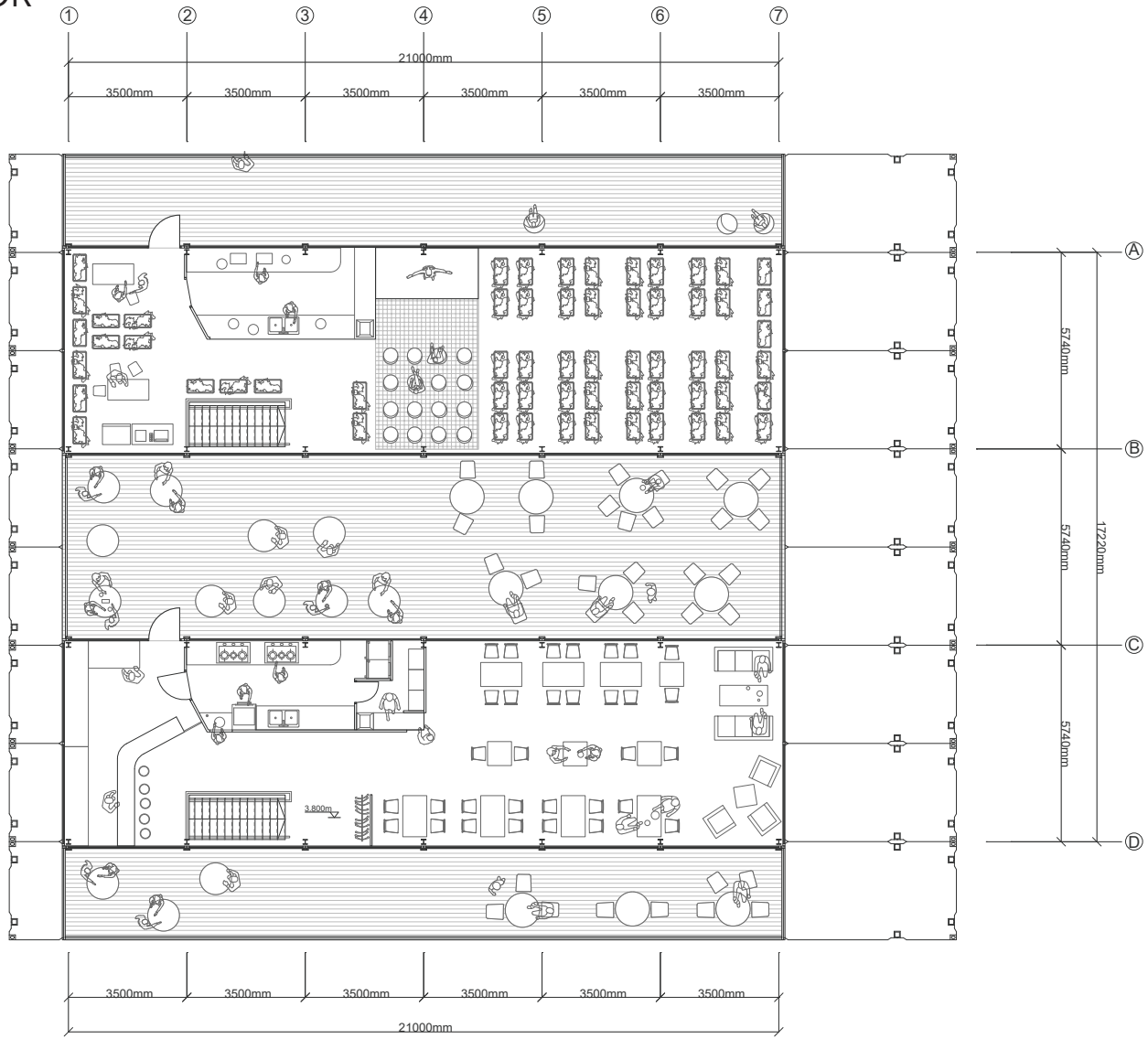
PLAN
GROUND FLOOR



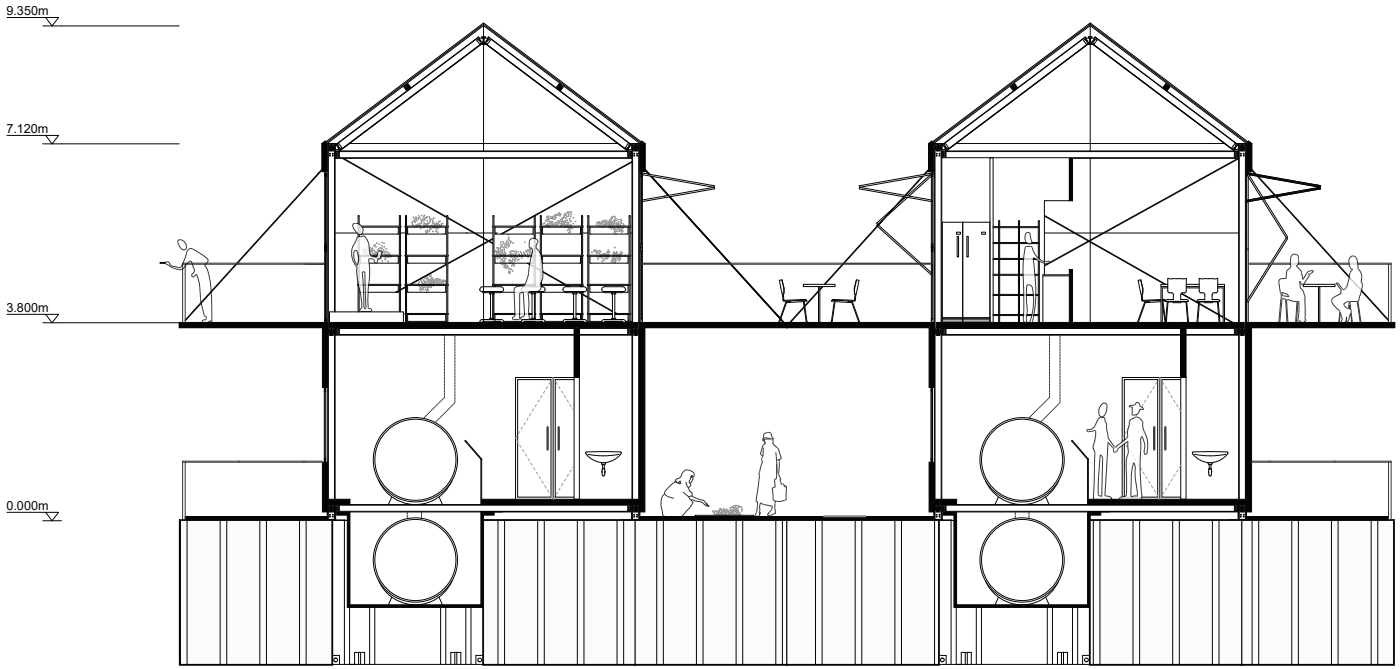



9.350m
7.120m
3.800m
0.400m
0.000m

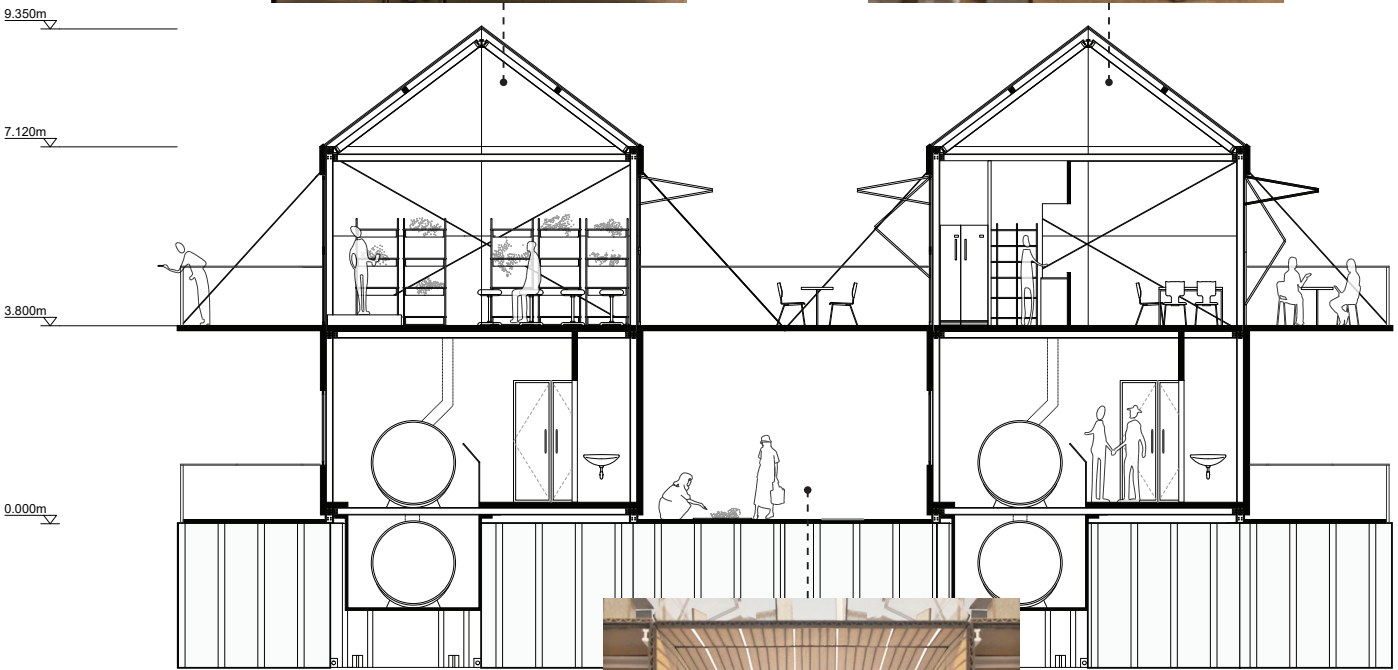
PLAN
FIRST FLOOR

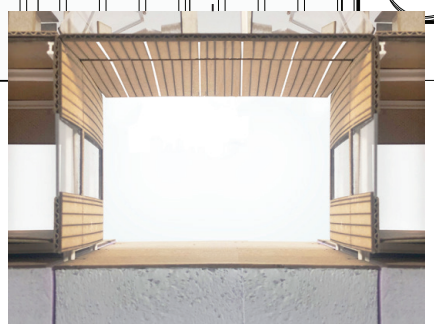


SECTION

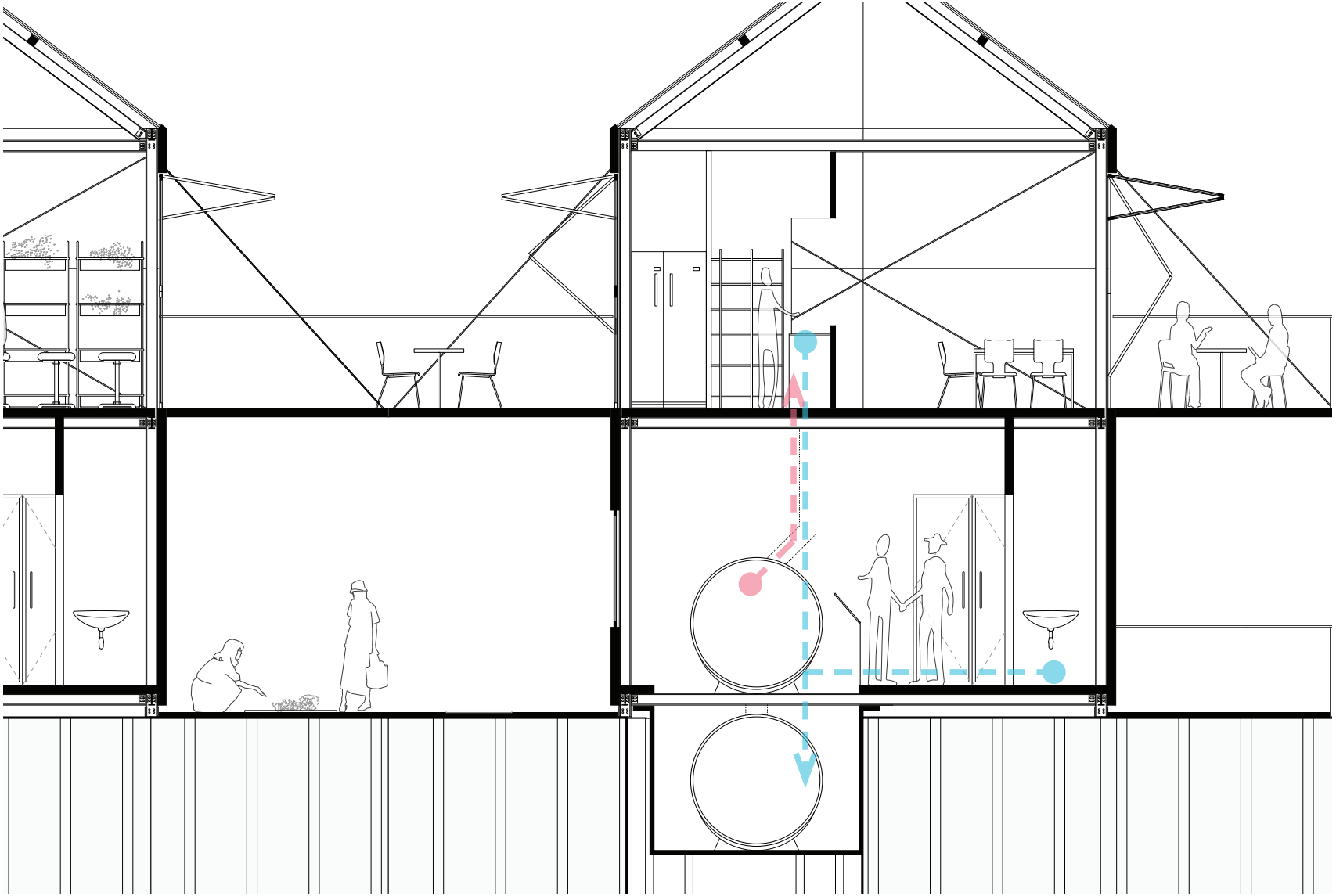


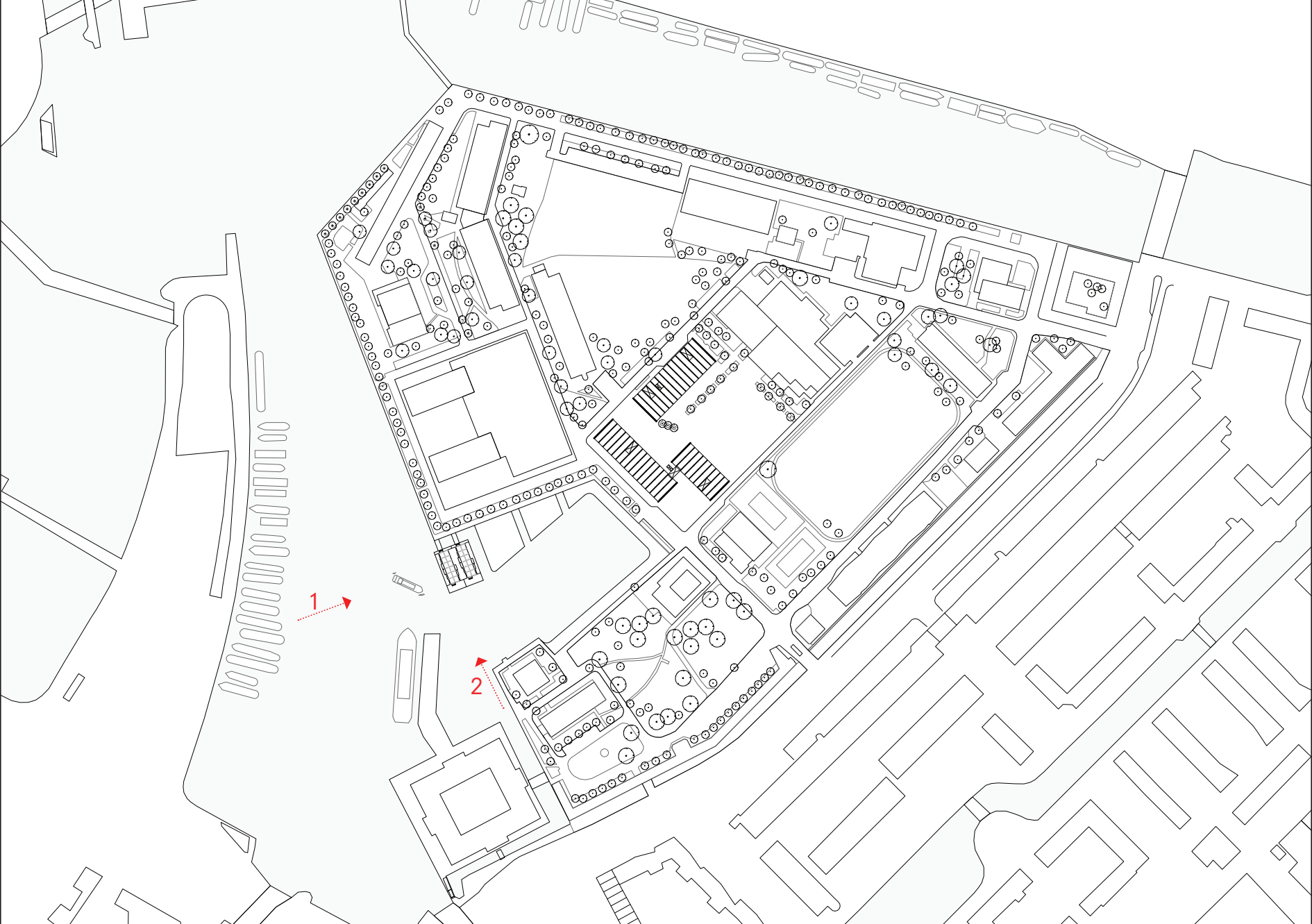
SECTION



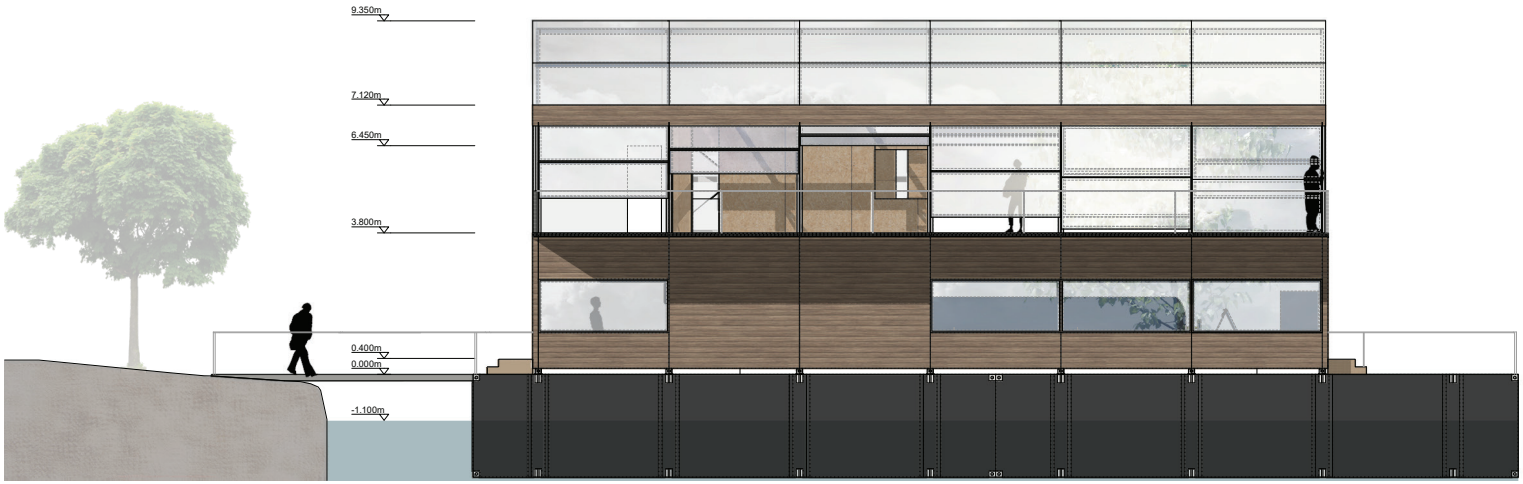



9.350m

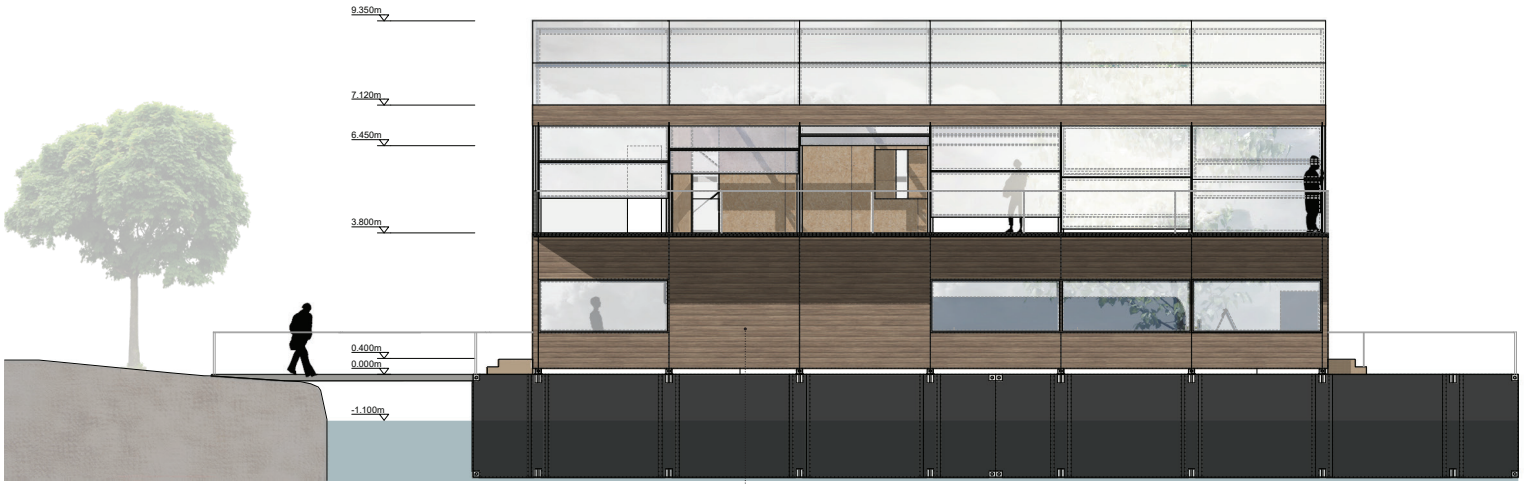



1
2

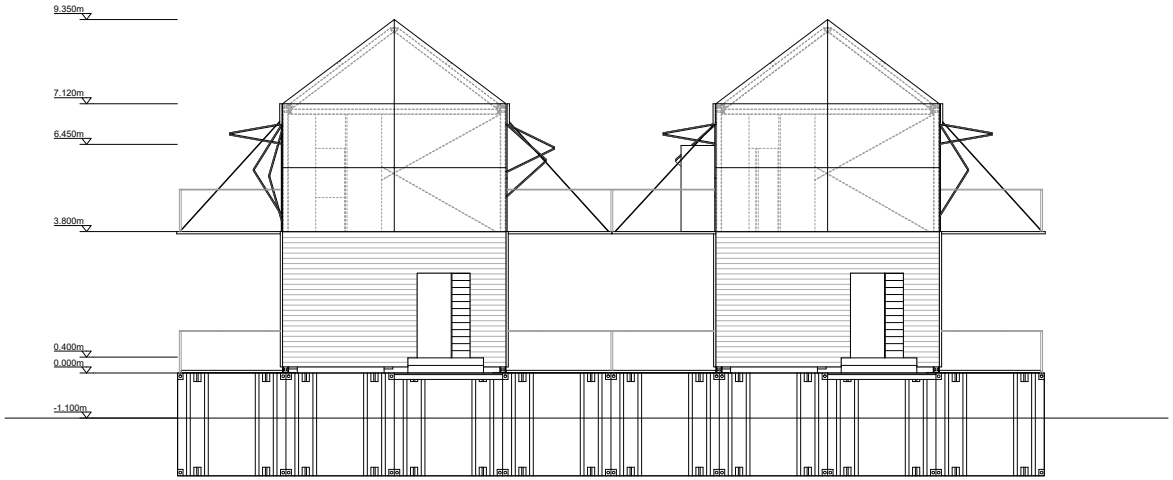
ELEVATION 1



ELEVATION 1

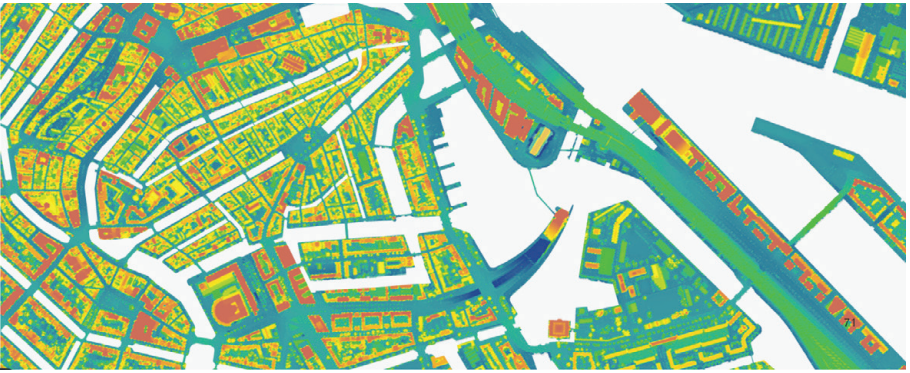


ELEVATION 2



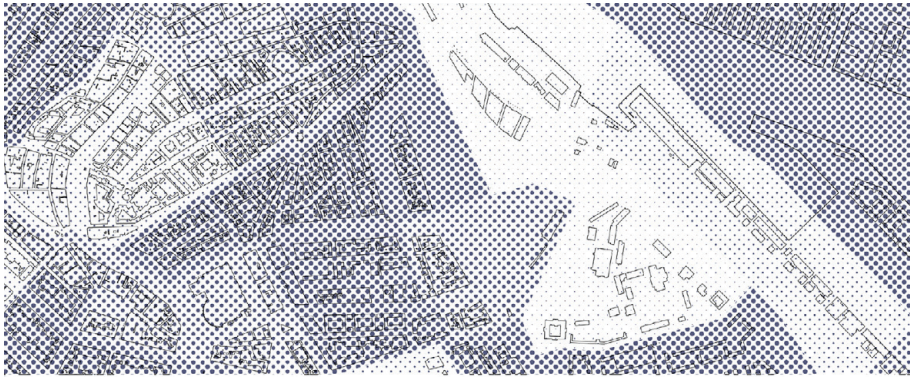
THANK YOU!

APPENDIX



heights

low high



Population per km²

1 - 3,750

3,751 - 7,500

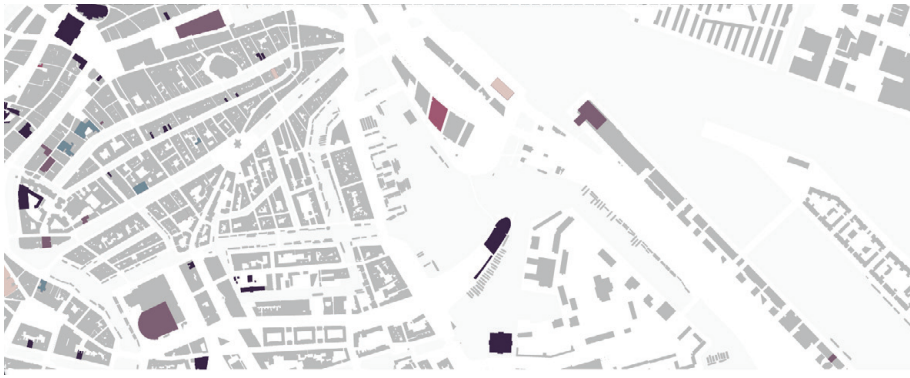
7,501 - 11,250

11,251 - 15,000

Main Roads

Secodary Roads

Civic



Museums

Music Venues

Theatre Venues

Cinemas

Libraries

PROGRAMS

1000 kg Food Waste
= 160 Nm3 Biogas + 370 kg Compost

Food Waste:

small restaurant	20 kg/day
medium restaurant	41 kg/day

Gas:

small restaurant	22.5 kWh/day
medium restaurant	44.6kWh/day