ARCHITECTURE STUDENT CONTEST

ARCHITECTURE STUDENT CONTEST

21st INTERNATIONAL EDITION, BELGRADE 2026

Team 11 | *United Kingdom of Great Britain & Northern Ireland*

The SOILution: Floating Ecologies

The University of Nottingham

Team 11 | **United Kingdom of Great Britain & Northern Ireland**

Teacher: Tim Collett

Elizabeth Ferguson

Environmental Engineering
Student

Alex Cook

RIBA ARB Part 2
Masters of Architecture
Student

Jack Garrett - Herd

Environmental Engineering
Student

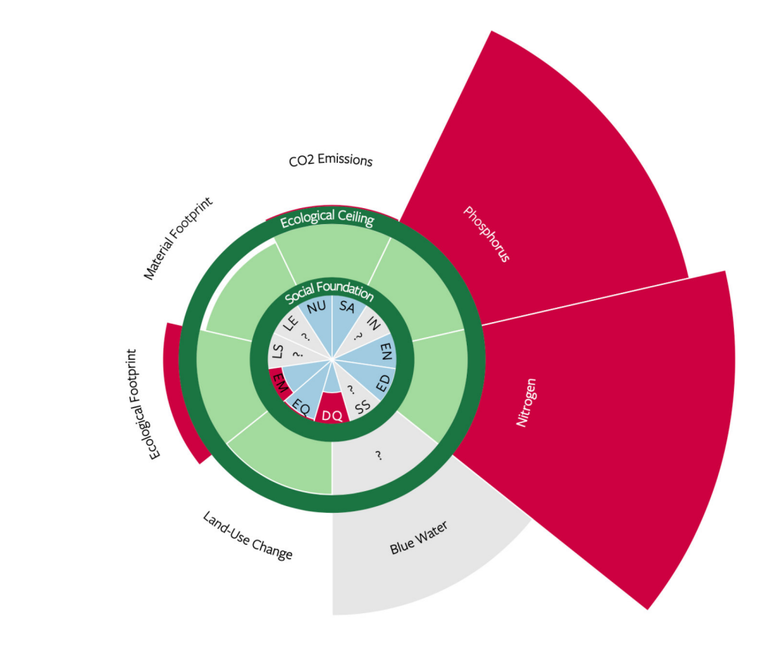
‘Healing Land to synthesise the city & nature’

The Belgrade site is a industrial cement factory defined by hard edges in a prominent part of the city. As the city of Belgrade and its socio-economic stucture evolve into a post industrial future, the question of land and soil becomes prominent.

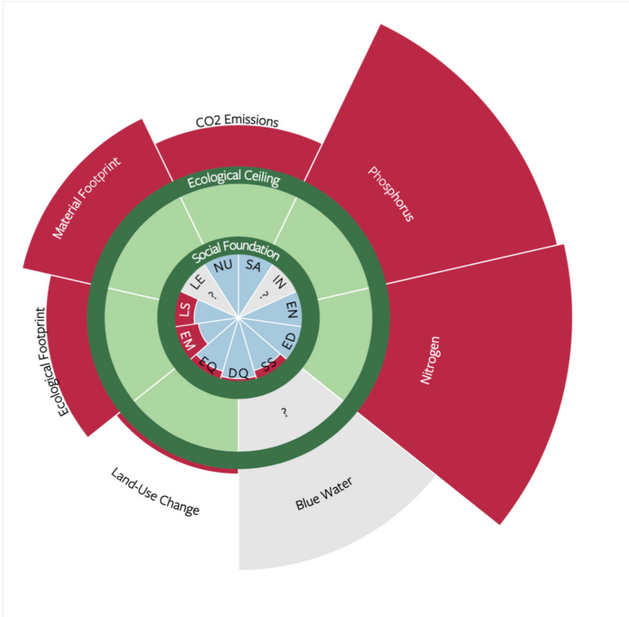
Soil that has become contaminated and polluted through decades of heavy industy. We cannot pass the buck and we cannot incinerate the finite resource that is the earth. Our project seeks to address how we deal with these places, how we can heal land, land that has great value and return into a state where nature and man can coexist and develop.

Our project will initate a phased approach where we restructure a landscape, to let nature reinhabit and reinstate itself within the ecology of Belgrade and allow the land to become rejuvenated without heavy carbon emissions. A floating athletes village on the river Sava will provide the nature the time and space to do its work, whilst creating a network of strong communities that are good places to live. Through this place we invite the city of Belgrade to invest, in this place, in their community and in themselves.

This project seeks to do justice to the land, to the people who will inhabit it, to the fauna and flora and to the city of Belgrade



Yugoslavia - 1992



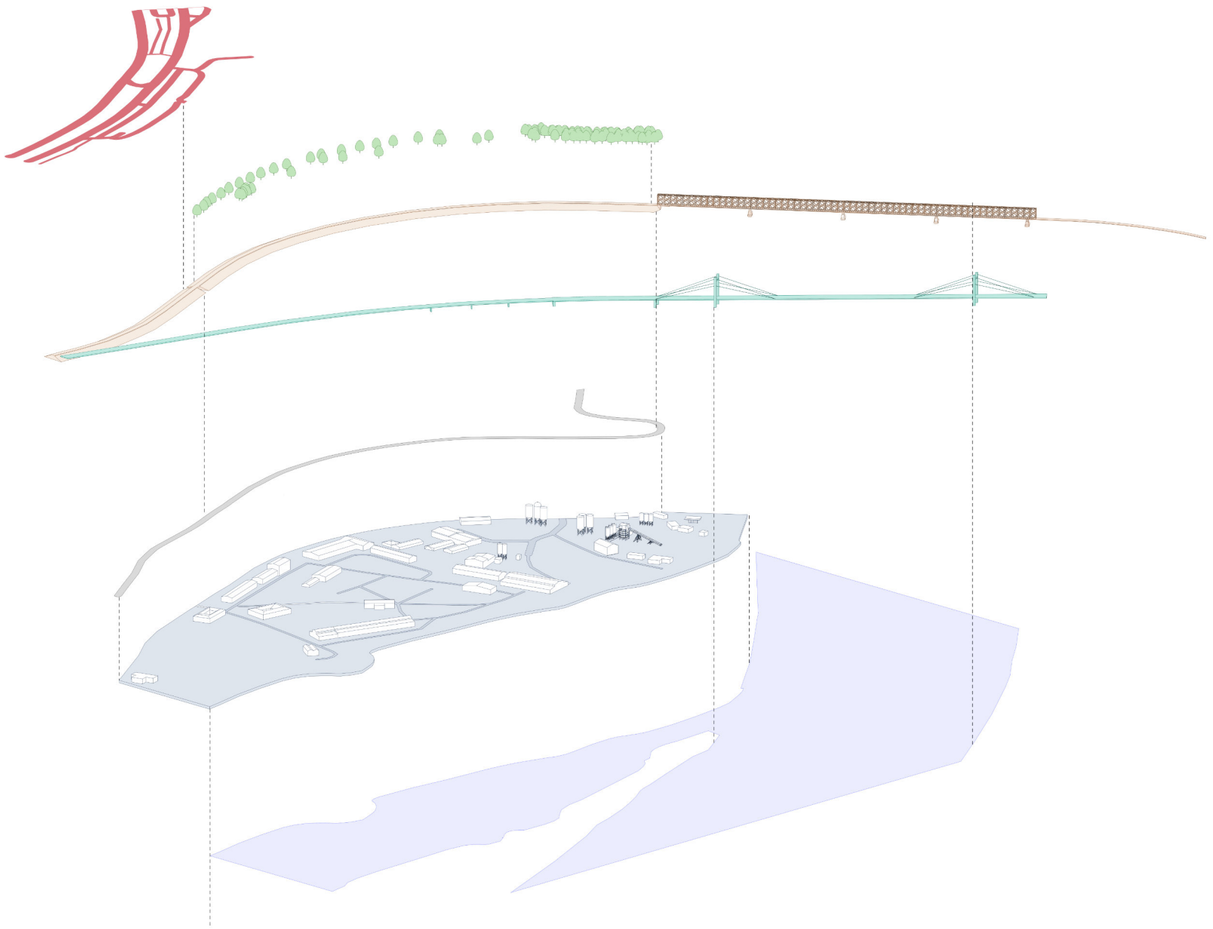
Serbia - 2015

LS - Life Satisfaction
IN - Income Poverty
DQ - Democratic Quality
LE - Life Expectancy
EN - Access to Energy
EQ - Equality
NU - Nutrition
ED - Education
EM - Employment
SA - Sanitation
SS - Social Support

- *Ecological/Social Shortfall*
- *Ecological Ceiling / Social Foundation*
- *Meeting basic social*
- *Resource use = biophysical accessibility*
- *No Data*

Donut economics measures a countries ecological and social limits and how a country balances these attributes. In the post Yugoslavic period the socio-ecological conditions of Serbia have worsened with declining support from the state and growth in its emmisions.

https://goodlife.leeds.ac.uk/national-trends/country-trends/#SRB



Highway
Old railway bridge
New Railway Bridge
Access road
Concrete Island
Sava

The site is defined by the hard edges of the railway lines and highways creating an industrial island within the city that lacks connection with wider Belgrade.

The Problem

Typical emission factor for soil remedition :

Incineration 0.7 t CO2 - eq/m³

Dig & Dump 0.114 t CO2 - eq/m³

Typical depth of soil needed to be dug to remove contaimation:

4.5 - 6 metres *Site = 12,000m²*

Approximate amount of treated soil = 54,000m³ - 72,000m³

Dig & Dump

0.114 t CO2 - eq/m³ x amount of soil

= 5,928t CO2 e - 8,208t CO2 e

Incineration

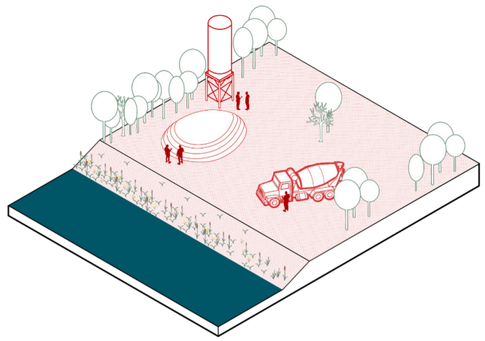
0.7 t CO2 - eq/m³ x amount of soil

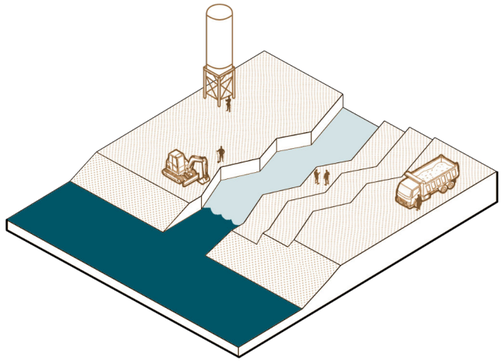
= 34,000t CO2 e - 50,400t CO2 e

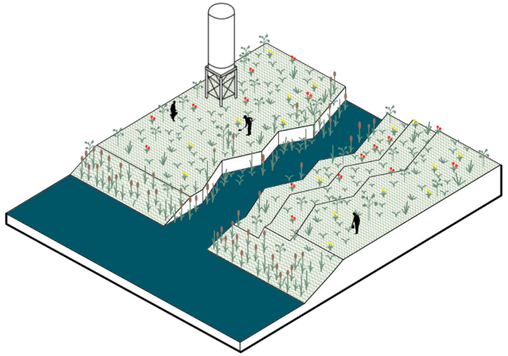
Post industrial sites like the one we are dealing with in Belgrade almost certanly have become polluted over years of heavy industry. Heavy metals and other toxic materials make the land unfit for humans and animals alike. The typical process to resolve theses issues is to burn it or move it hundered of kilometres to somewhere else. This creates thousands of tonnes of CO2, which we cannot afford.

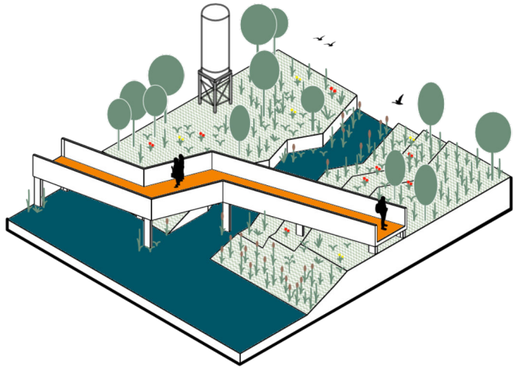
The SOILution

Phytoremediation, a process of growing species specific plants that are both vernacular to Serbia and are able to absorb pollutants. This will work to reinstate nature and the former marsh that once covered the site and supporting both current and new ecosystems.









Phase 1

0-2 Years

Taking the existing site and the piles of material from the concrete making facilities, the topology of the site will be adjusted to create terraced platforms and deltas bringing the river into the site when the river level is high.

Phase 2

3-10 Years

As time passes the water entering the site will re-instate the former marshes that covered the area prior to 1950. Planted terraces with phytoremediatation species will form a range of microclimates for a diverse range of species that will bring life to the site and clean the soil of heavy metals.

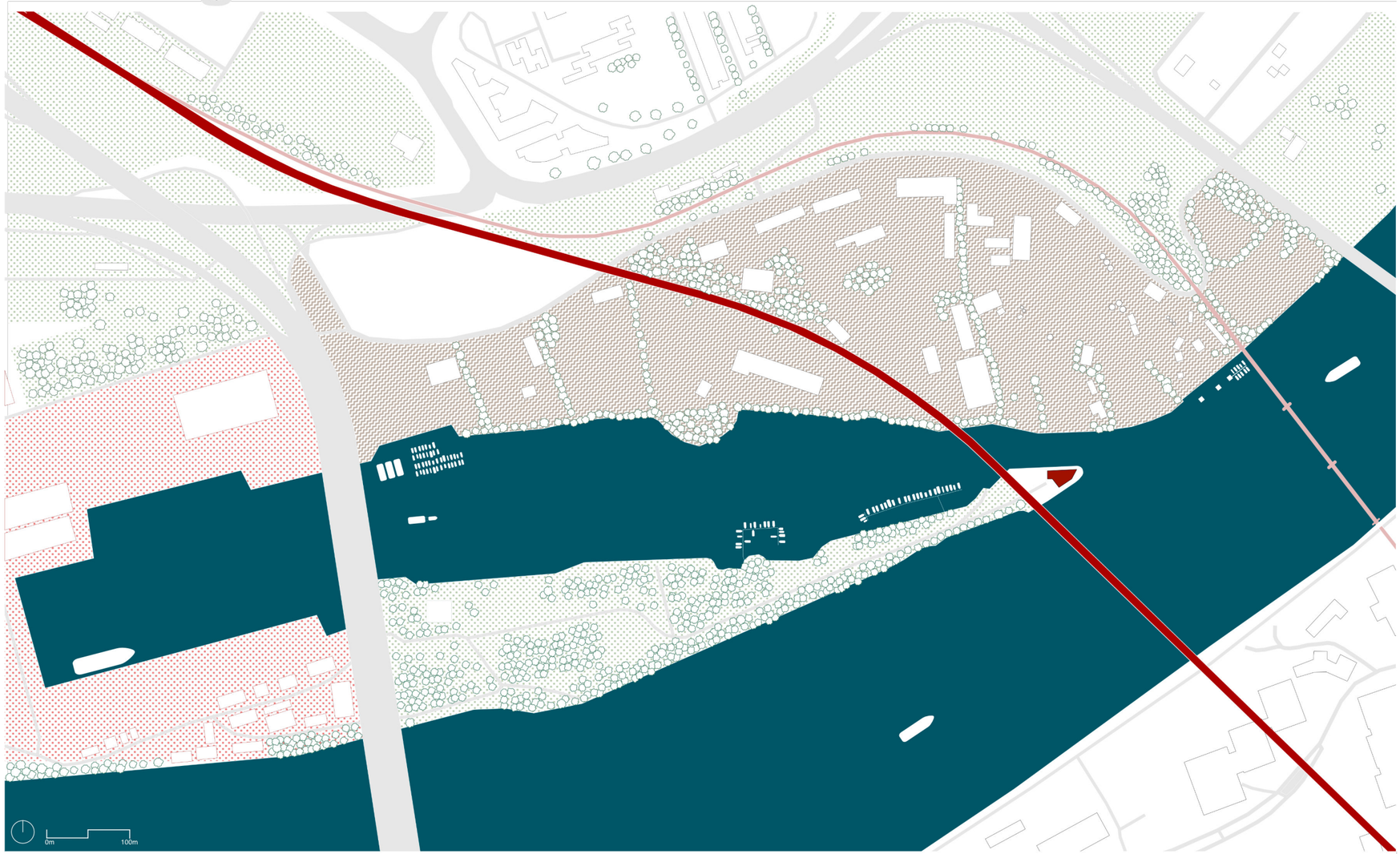
Phase 3

10-12+ Years

Crops will be harvested regularly for bio-fuel over the remediation process. Once the soil is clean, the development will expand onto land, raised on stilts to un-impede the domain of nature, allowing for humans and nature to co-exist in harmony.

Phytoremediation can take upto 10 years and beyond to heal the land of heavy metals and contaminents. Therfore a phased approach will be initated for the project, allowing the land to heal whilst the renovation of the Academic Sailing club and development of the Athletes village moves forward.

Existing


0m
100m
LEGAS Shipyard
Green spaces
Concrete Making
Tree
Sailing Club
2026

Phase I

Remove, Reuse, Regenerate

Contaminated plants will be removed and the existing buildings will be disassemble and taken to material banks. The marsh nursery will be established on the footprint of the rebar works and the sailing club will be refurbished.

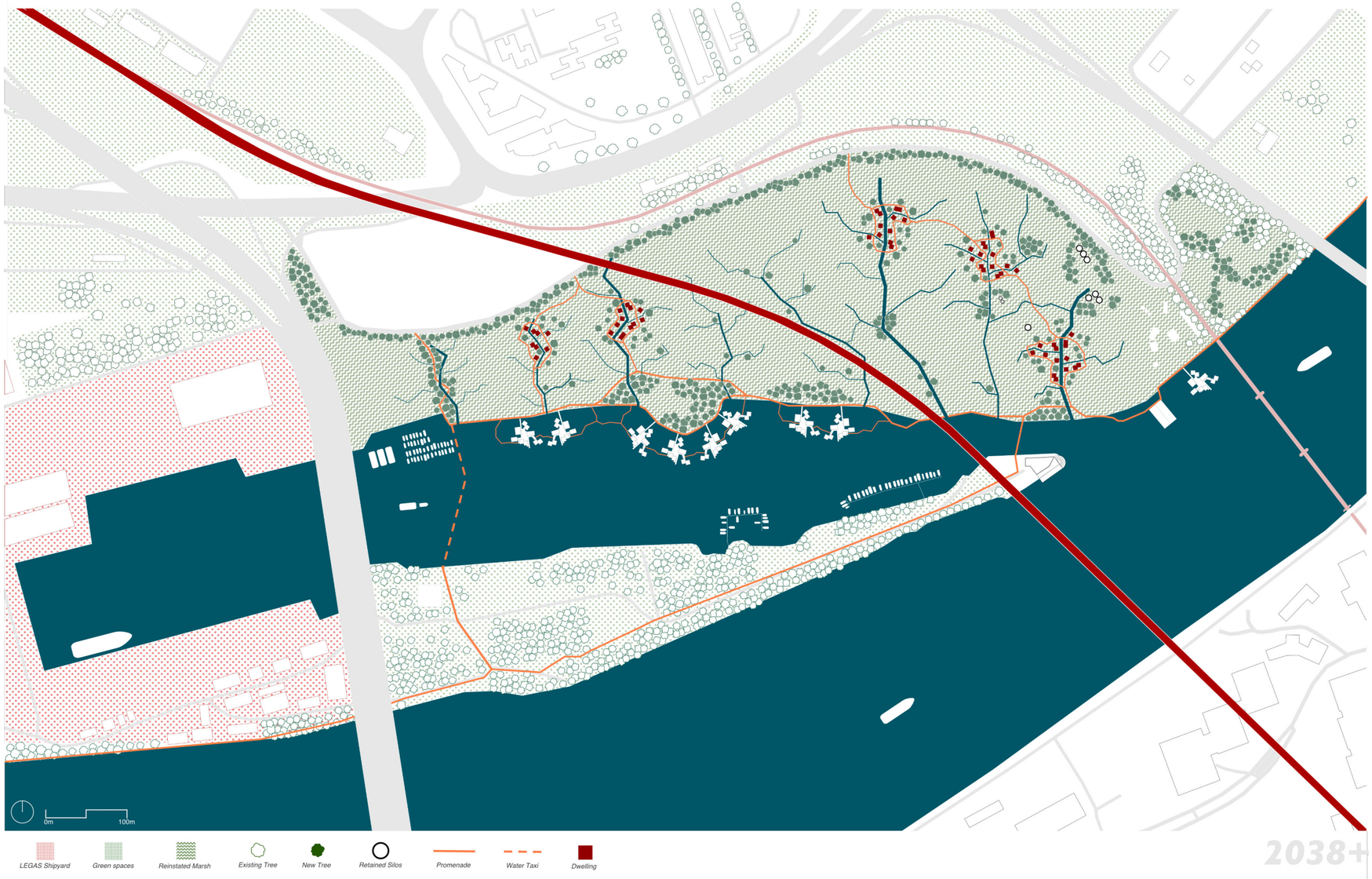
Phase 2

On the waters edge

Hemp crops will have been planted and nature will have reclaimed the land to clean the soil. Away from the land the villages and sports centre will be established along the estuary.

Phase 3

Land Healed

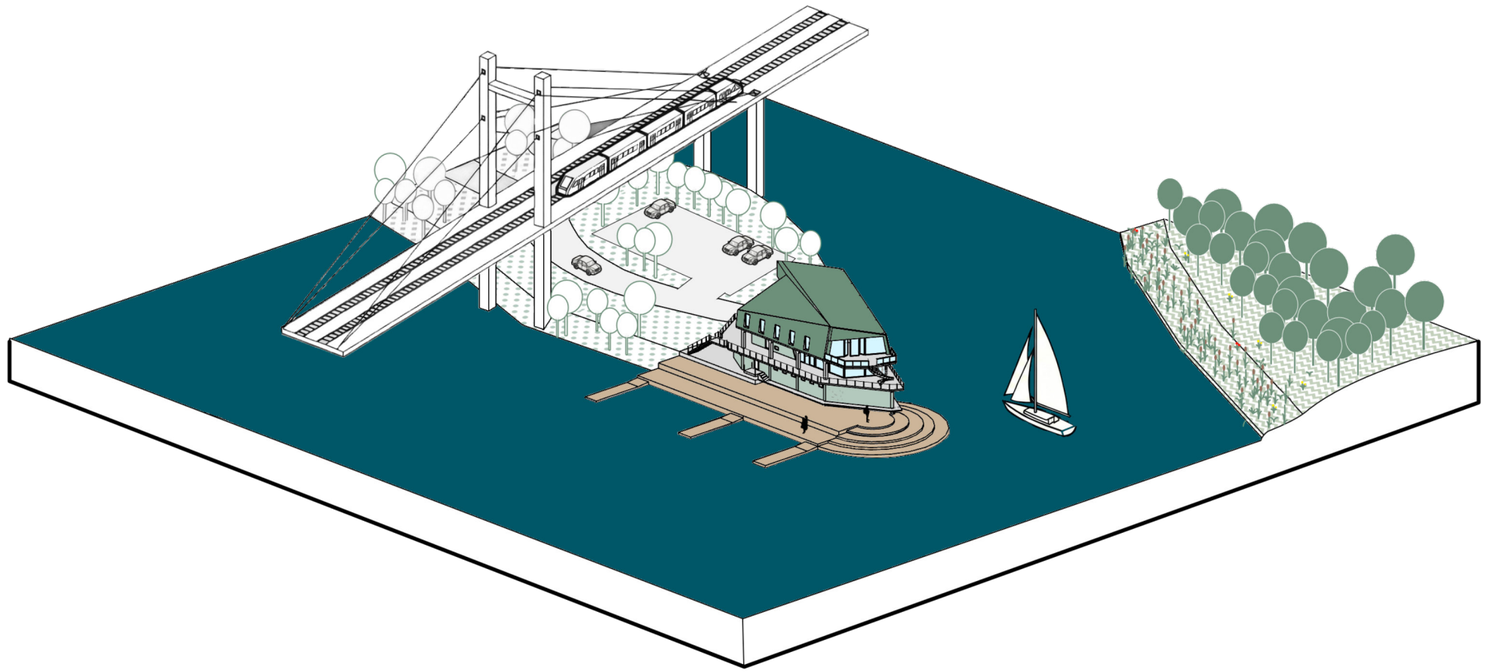


The phytoremediation process will be over allowing for the development to expand and inhabit the landscape

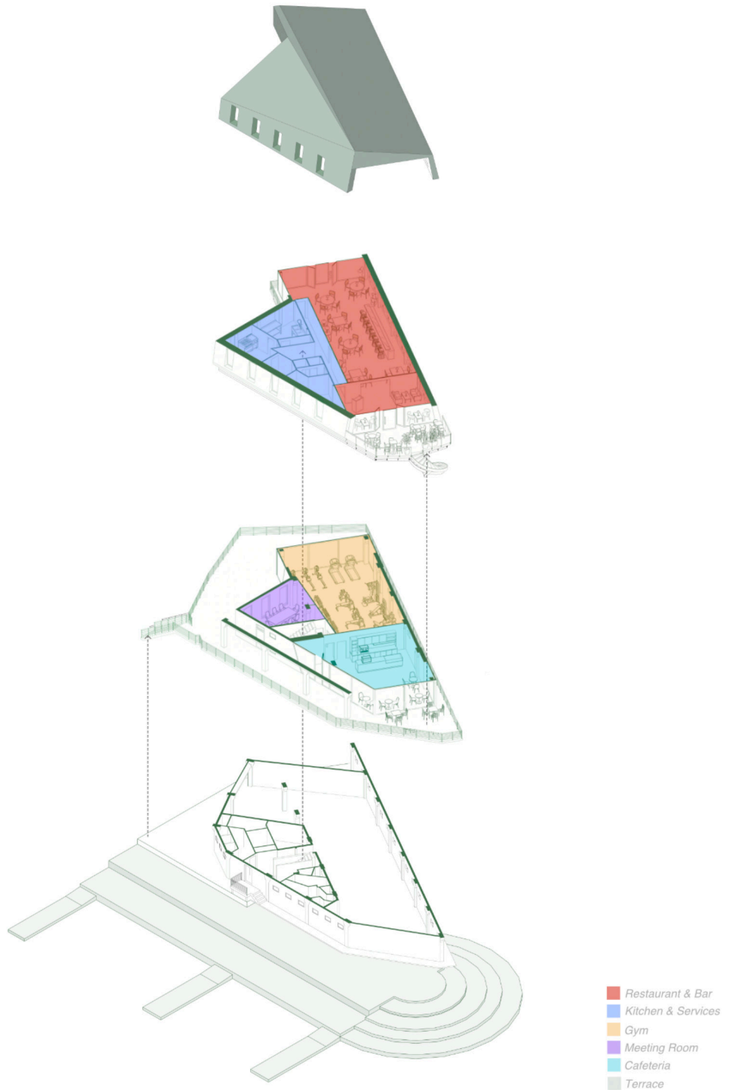
Phase I

2026

Redefining the site and its topography,
establishing the Marsh nursery &
Refurbishing the Academic Sailing Club



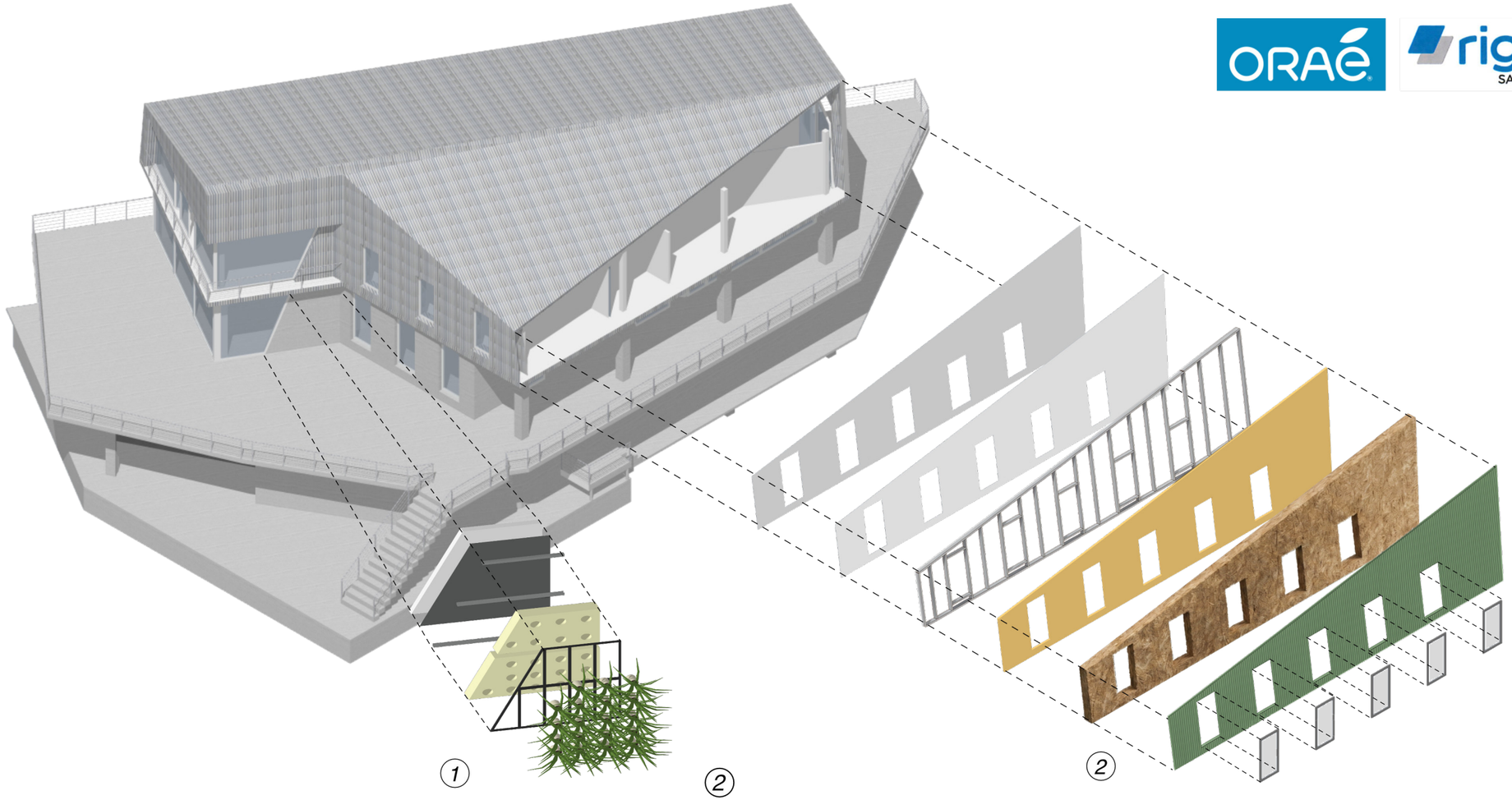
A light touch approach will be given to the renovation of the academic sailing club. The internal environment will be reworked to meet the programatic needs of the club whilst attracting and supporting the wider community and bringing the rest of the city to the site.



At Ground floor level the internal renovations will modernise the changing rooms and facilities of the club without effecting the programme of the space which currently functions well. Externally a brand new deck will create a deeper connection with the waters edge allowing spectators to sit and watch club events on the river, as well as invite new traffic to the site.

At first floor level a state of the art gym and brand new meeting room will be added to support the clubs activites. Further to this a cafe will be added that will bring increased footfall.

Replacing the current bar and restaurant that adjoins the site on the river, a new bar and restaurant will be programmed into the top floor acting as a social hub for the community and an economic driver.



1

2

(1)

- 200mm Existing Concrete wall

-50mm woodfibre insulation

-12mm water resistant board with geotextile drainage layer

-Aluminium Rail

-Irrigation pipe and covers

-Isover Flora Hydroaccumilation Panel

-Recycled Polypropylene irrigation cover

-Planting

(2)

-Added12.5mm Duraline Blue DB Plasterboard

-12.5 Existing Plaster Board

-80mm Existing Steel frame

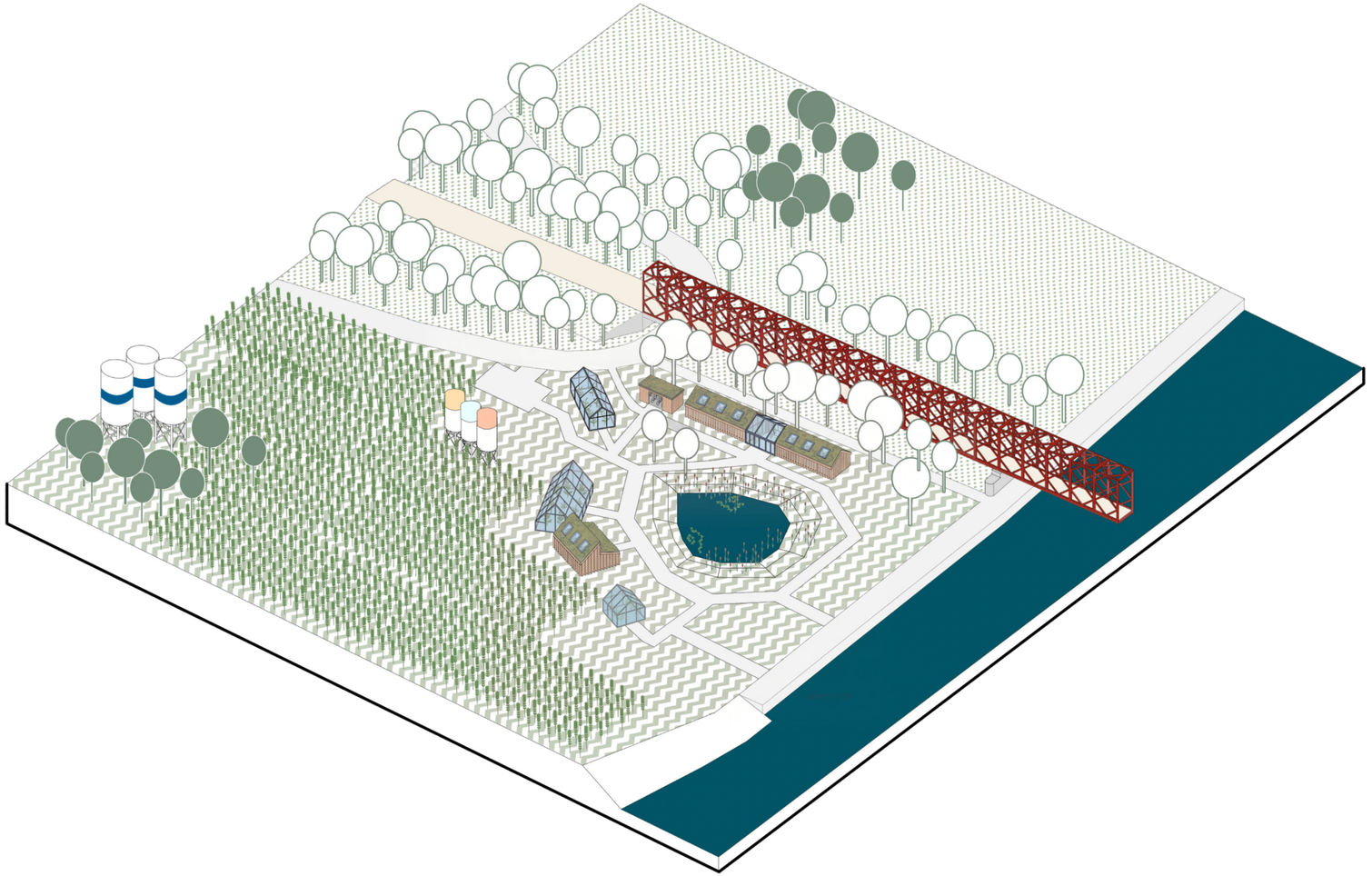
-80mm Existing EPS insulation Between studs

-Added 100mm Wood Fibre Board insulation

-Re-used 2mm Trapezoidal Steel Sheeting painted Matt Sage Green

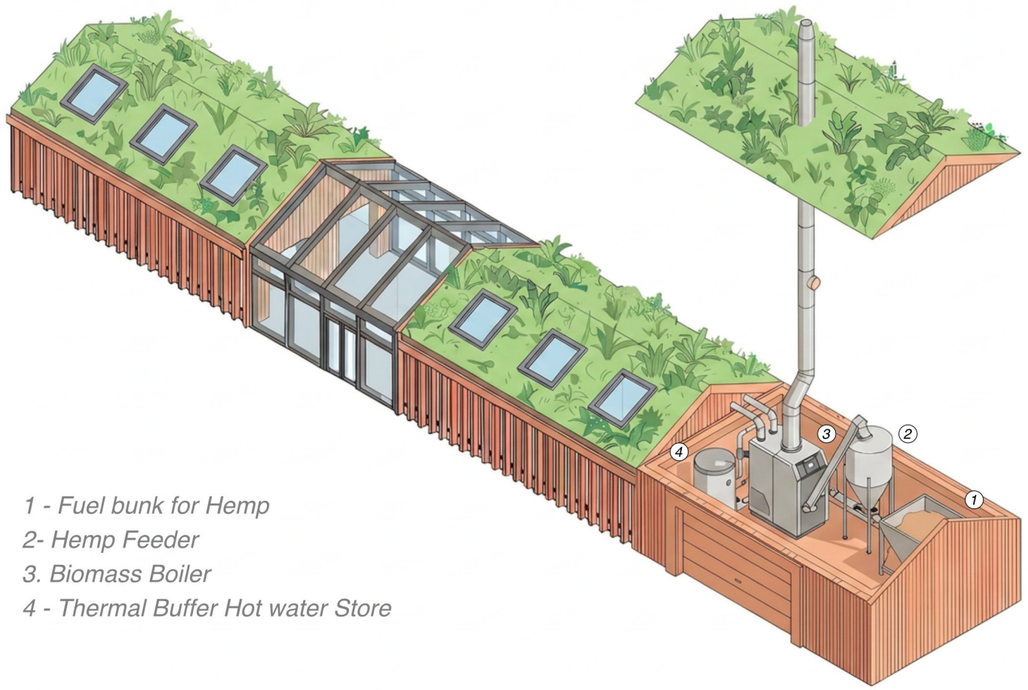
-Orae Coated Planiclear Triple Glazed Unit

Planted walls will be added to the existing exposed concrete walls to insulate and bring pollonators to the site, which inturn will support the remediation processes. Additional insulation and brand new high-performance windows will be added on the second floor to increase the performance of the envelope and improve internal comfort levels



The Marsh Nursery will serve as a community hub enacting the phytoremediation strategies by growing the species and managing the land.

The Marsh Nursery will act as a hub for the local economy and community, generating entrepreneurship, up-skilling and allowing for increased social interaction.



1 - Fuel bunk for Hemp
2- Hemp Feeder
3. Biomass Boiler
4 - Thermal Buffer Hot water Store

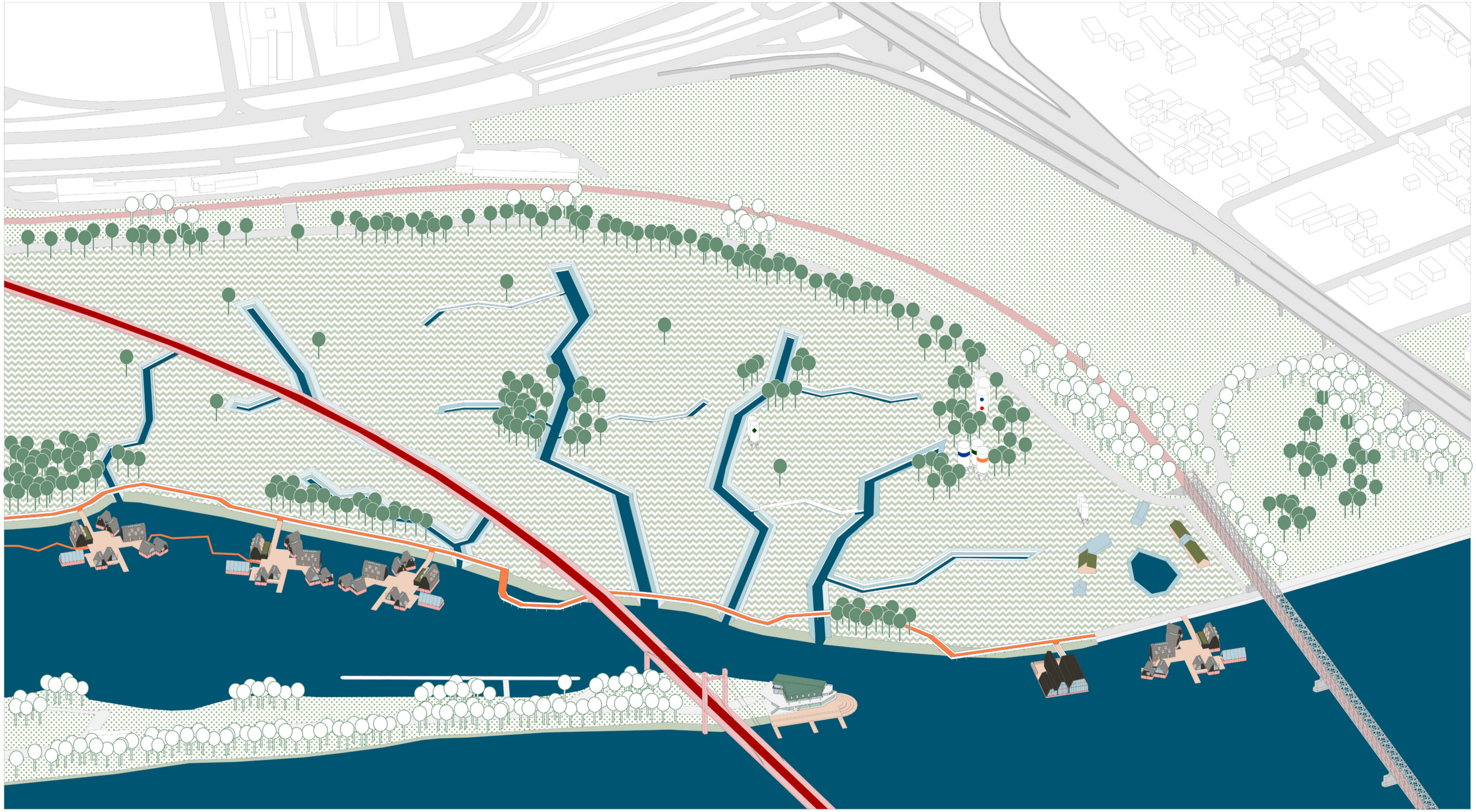
System	Annual heat share	Annual heat supplied	Proposed capacity	Approx. physical size
Biomass Boiler	30%	552 MWh/year	300 kWth	boiler approx. 1.16 m × 2.02 m × 2.29 m, plus fuel store and buffer tank

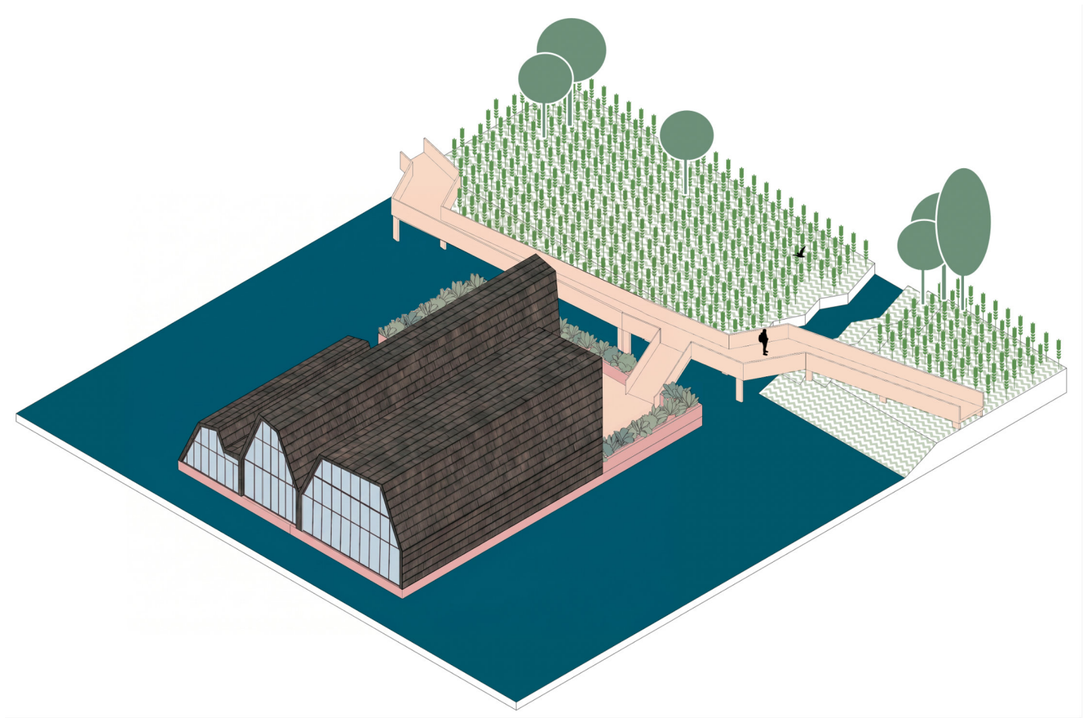
https://www.hempflax.com/en/applications/construction/iso-hemp-blocks/

Phase 2

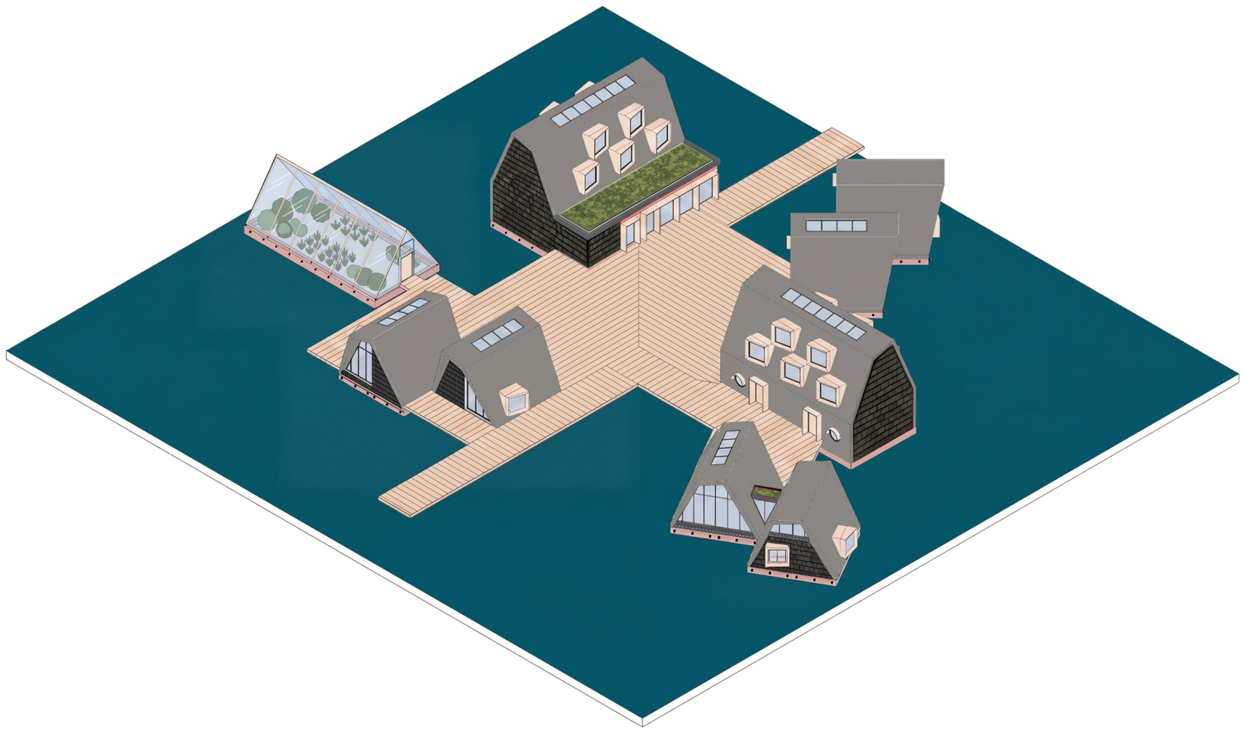
2028

Establishing the floating athletes village son water whilst nature begins to heal the land.

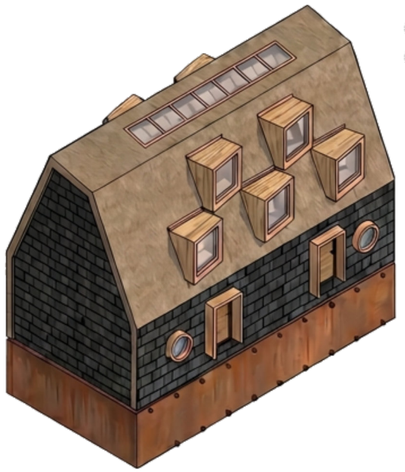




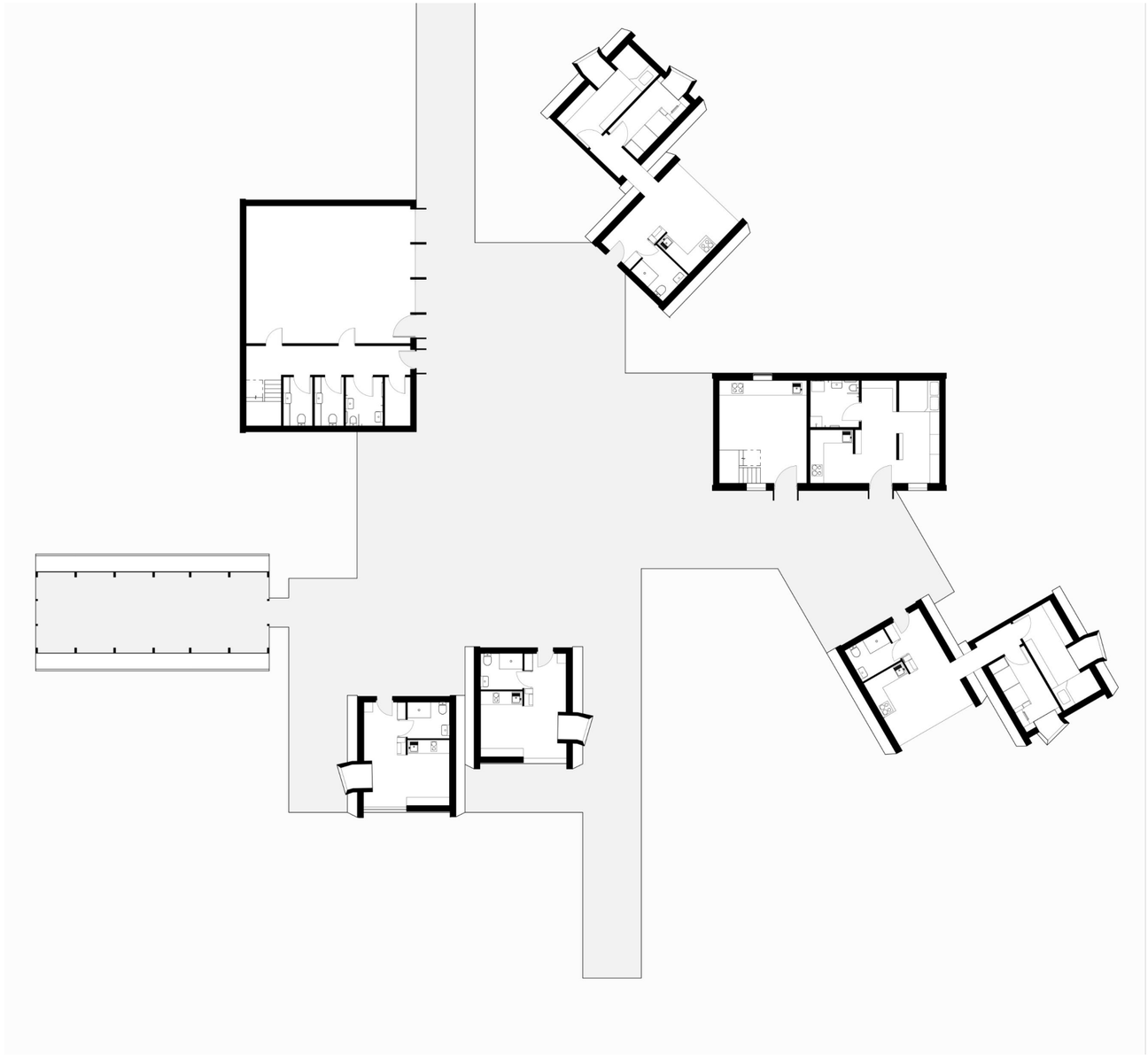
Using existing barges located on site a sports hall, cafeteria and gymnasium with state of the art facilities will be created to support the athletes needs.



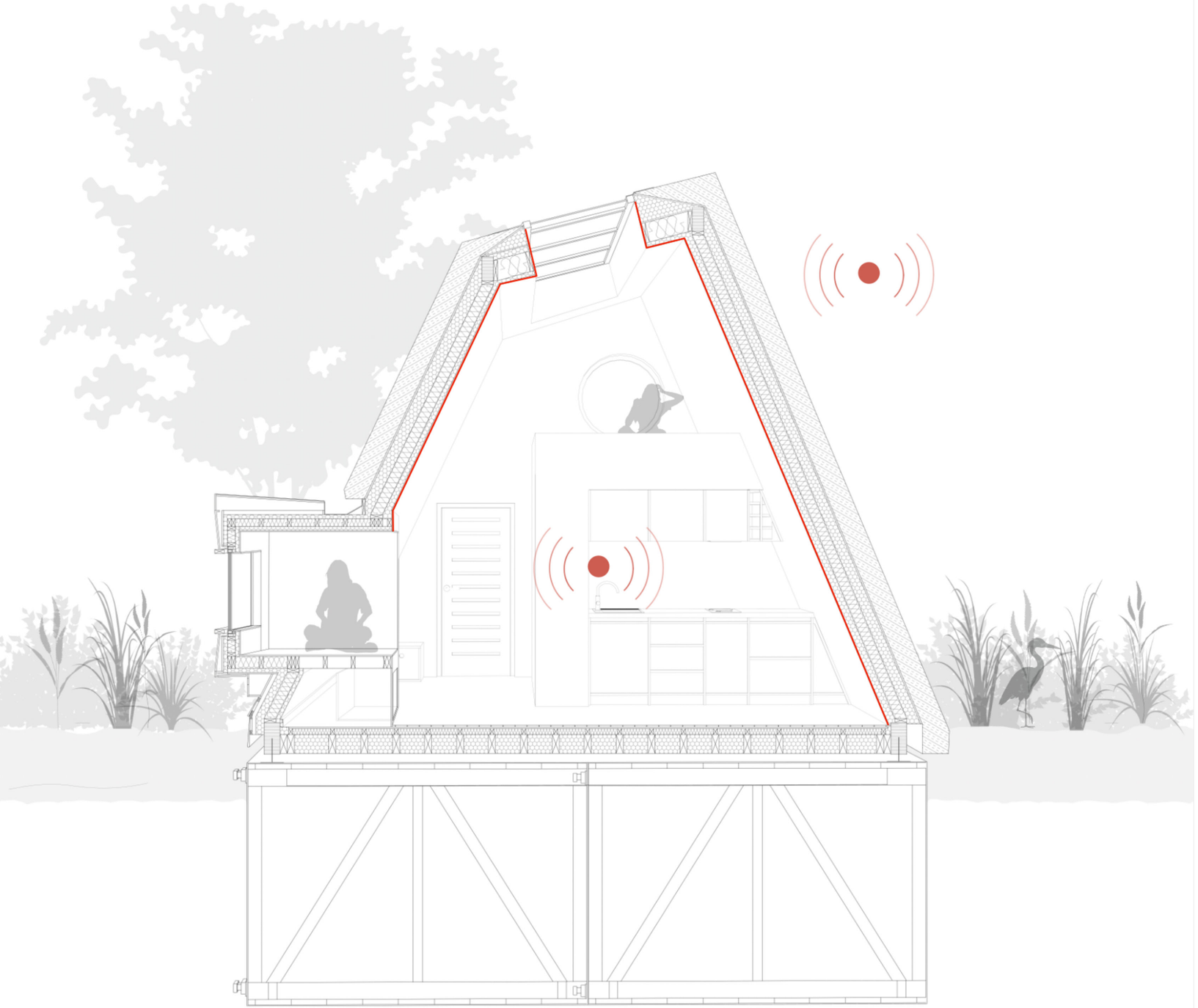
Floating villages will grow organically within the estuary of the Sava. They will be constructed at the Legas shipyard before being floated into place to form the community.

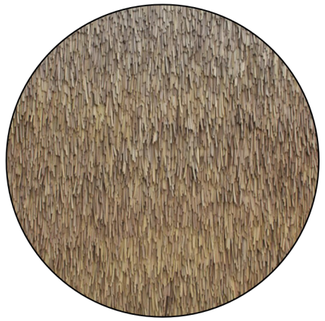


Varying typologies will support a range of athletes including those who have disabilities to create a thriving and diverse community.



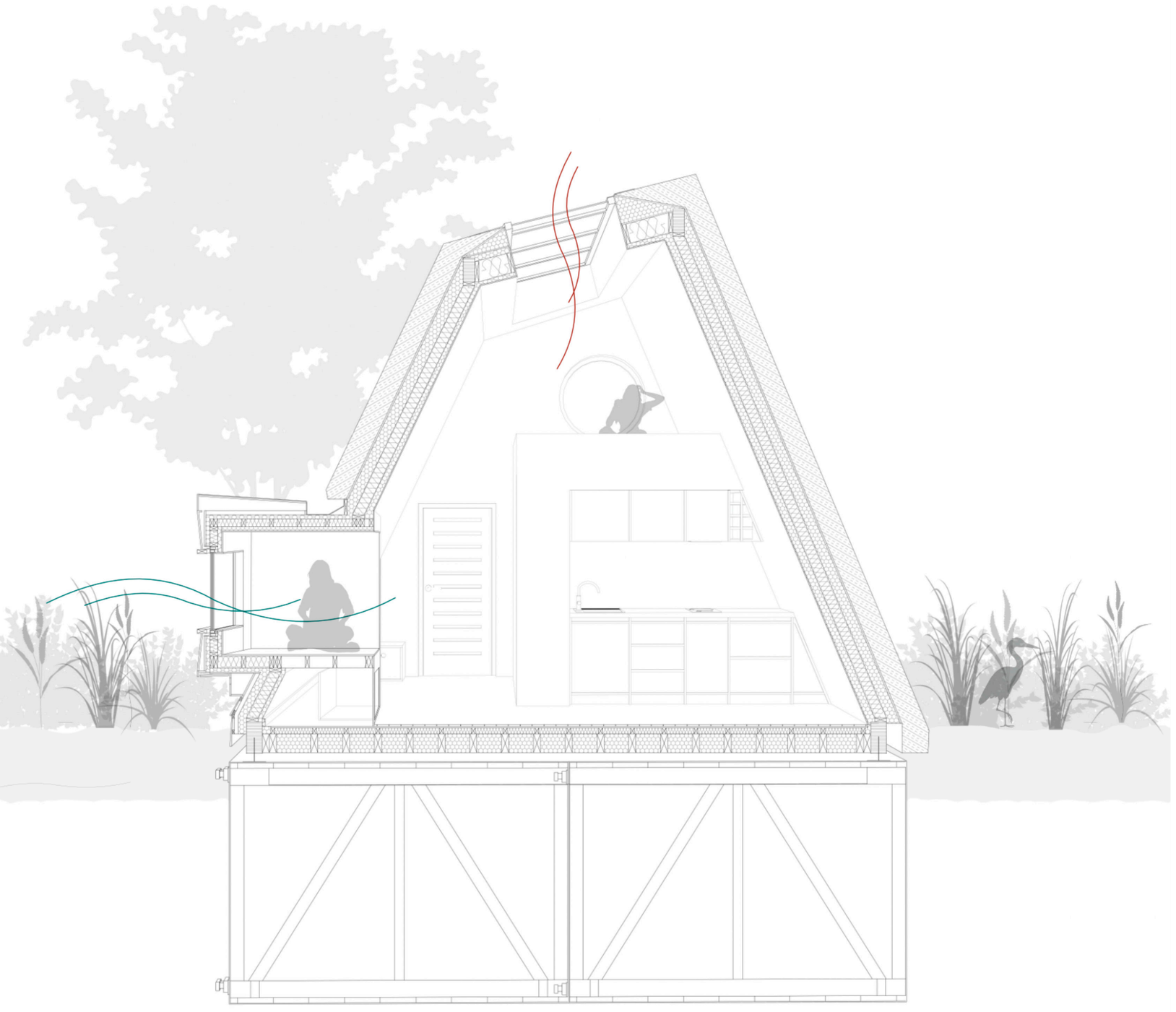
Dwellings are connected by a large decked space for the residents to inhabit and imagine in their own ways creating a deeper sense of place for residents and community between the people living there

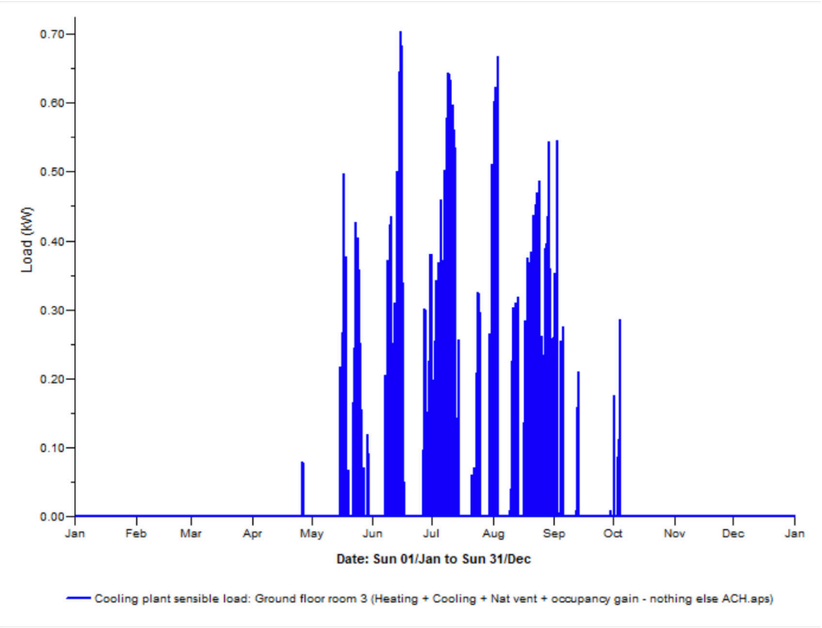




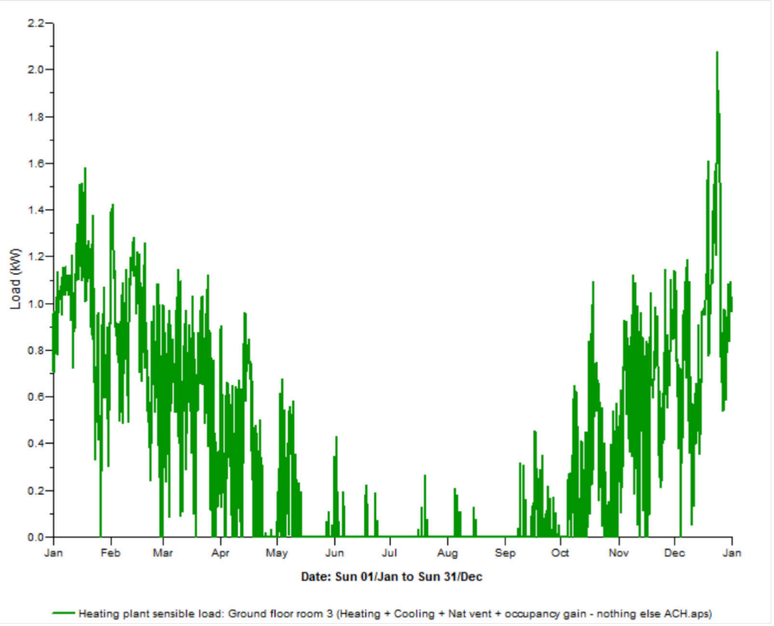
Responding to Serbian vernacular and the sites proximity to major highways and rail links, thatch has been selected as the facade material. Its dense layers allow for sound muffling that will keep internal conditions quite and comfortable for occupants.

An added layer to this system will be Duralin Blue DPI system that further contributes to the acoustic performance whilst responding to the humidity levels of the river.

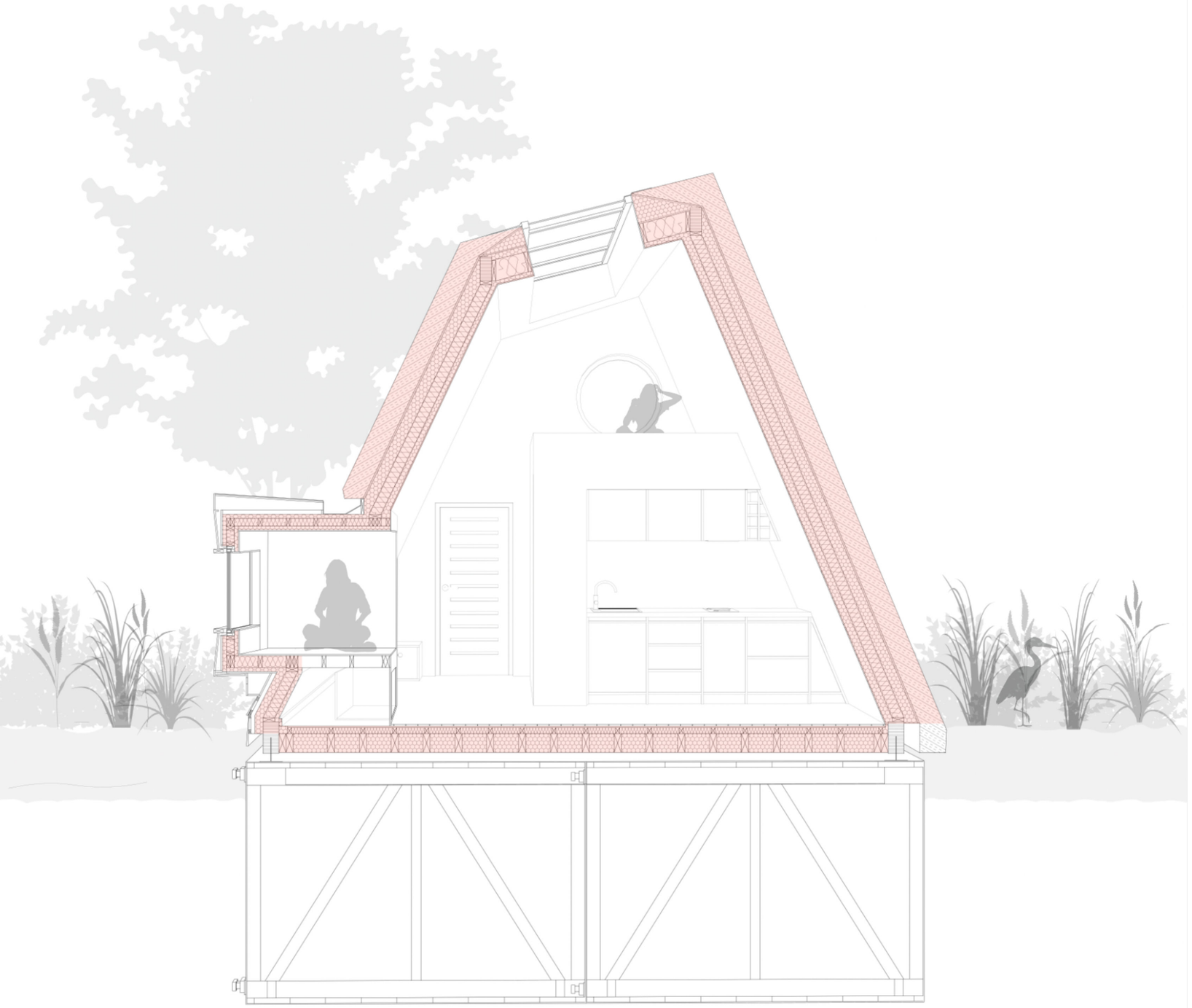




As part of a passive ventilation strategy the development will harness the river and make use of evaporative cooling. Through windows and skylights a stack effect will be created drawing cool air up through the spaces reducing the need for mechanical ventilation

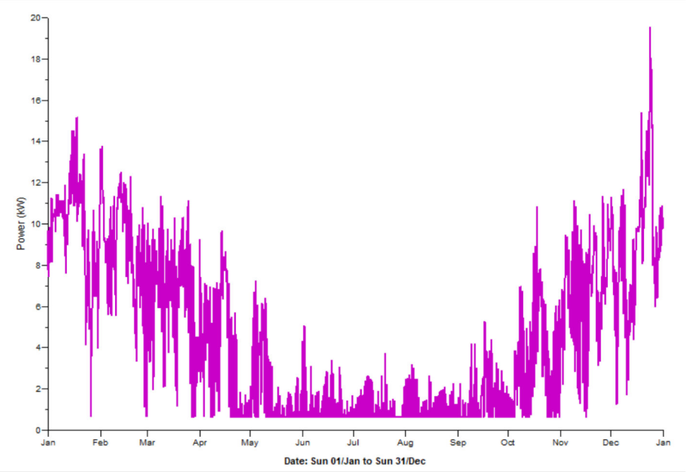


Using Orae low carbon high-performance glass openings will be created to maximise natural daylighting and create a connection between the dwellings and the growing landscape and river around them.

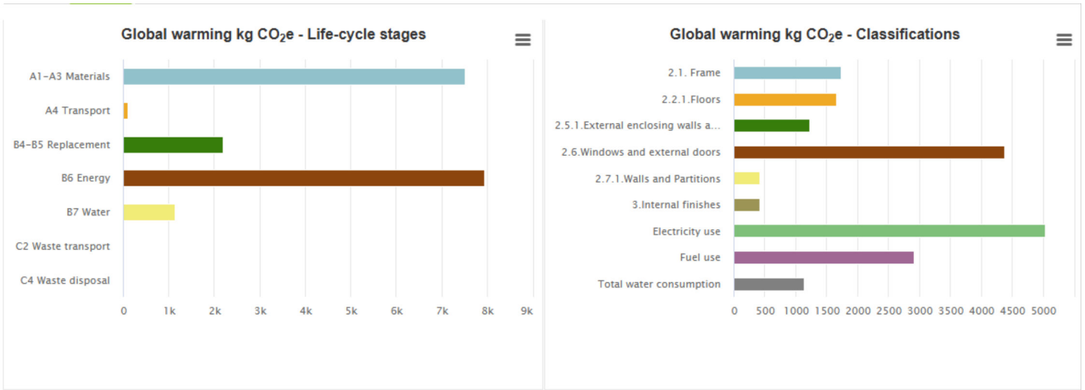


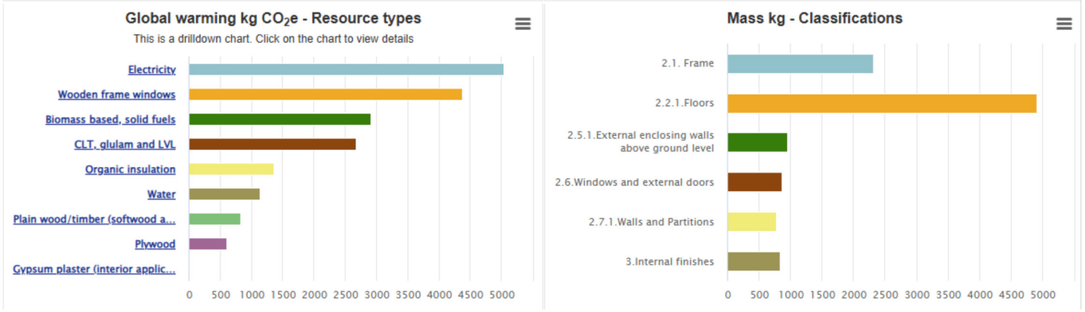
Material	Depth (m)	Conductivity (W/mK)	Resistivity (MK/W)	Resistance (M^2W/K)
Internal Surface Rsi				0.1300
Duraline Blue DB Acoustic Plasterboard	0.0125	0.25	4	0.0513
Isonat Wood Fibre board	0.06	0.038	26.3157	1.3158
Isover Timber Frame Batt @ 400	0.14	0.032	31.25	3.5000
Isonat Wood Fibre Board	0.1	0.038	26.3157	2.6316
Marine Grade Plywood	0.025	0.13	7.6923	0.0288
Thatch	0.28	0.09	11.1111	3.1111
External Surface Rse				0.04
				10.8086

U - Value = 0.098 W/m²K



A highly efficient and thermal envelope will greatly reduce heating and cooling demands for the building, ensuring occupant comfort and reducing operational carbon.





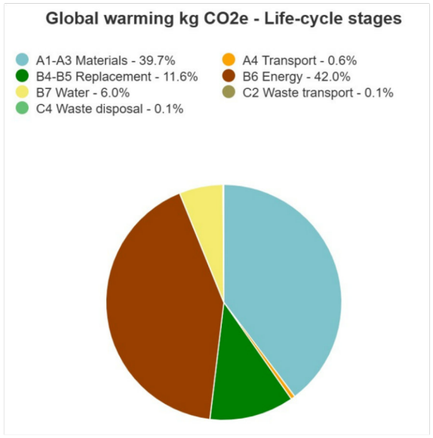
Saint-Gobain AE6 Belgrade Project Concept Material LCA - LCA for BREEAM UK BREEAM UK Project basic information

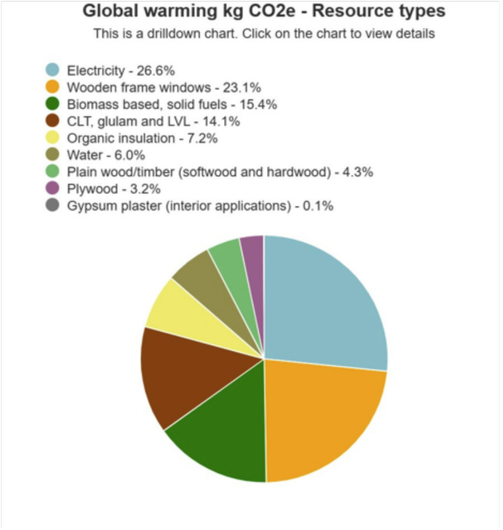
Commercial usage is forbidden. For UK: Trial for BREEAM UK 2018 (14 days), TRIAL, Jack Garratt-Herd 07.05.2026 15:42

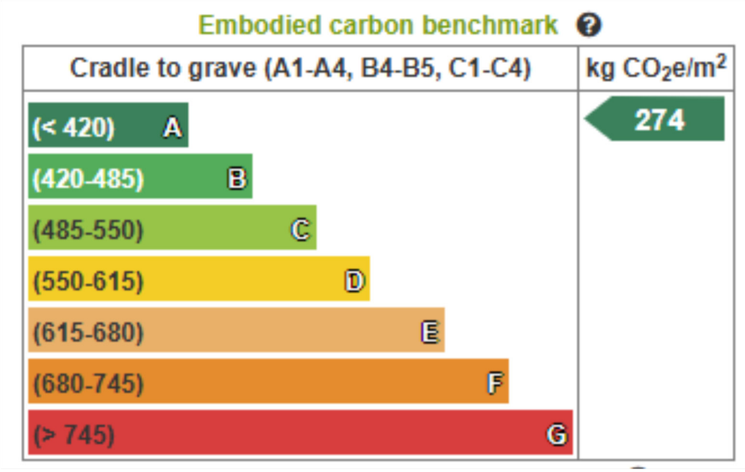
19 Tonnes CO_2e | 8.76 kg CO_2e / m^2 / year | 946 € Social cost of carbon

Life-cycle assessment results for BREEAM UK according to EN 15978 Download Results Summary

	Result category	Global warming kg CO2e	Acidification kg SO2e	Eutrophication kg PO4e	Ozone Depletion kg CFC11e	Formation of ozone of lower atmosphere kg Ethenee	Non hazardous waste disposed kg	Biogenic carbon storage kg CO2e bio	
A1-A3	Construction Materials	7.52E+03	5.17E+01	-2.94E+01	TRIAL	TRIAL	6.29E+03	1.60E+04	Details
A4	Transport to the building site	1.07E+02	4.93E-01	1.07E-01	TRIAL	TRIAL	3.26E-01		Details
A5	Construction/installation process				TRIAL	TRIAL			Hide empty
B1	Use phase				TRIAL	TRIAL			Hide empty
B4-B5	Material replacement and refurbishment	2.19E+03	1.14E+01	1.20E+00	TRIAL	TRIAL	4.47E+03		Details
B6	Energy consumption	7.95E+03	2.35E+01	3.49E+01	TRIAL	TRIAL	5.91E+01		Details
B7	Water use	1.14E+03	7.78E+00	1.81E+00	TRIAL	TRIAL	2.00E+03		Details
C1-C4	End of life	2.16E+01	1.27E-01	2.73E-02	TRIAL	TRIAL	3.91E+03		Details
D	External impacts (not included in totals)				TRIAL	TRIAL			Hide empty
	Total	**1.89E+04**	**9.50E+01**	**8.63E+00**	**TRIAL**	**TRIAL**	**1.67E+04**	**1.60E+04**	
	Results per denominator								
	Gross Internal Floor Area (IPMS/RICS) 36.0 m^2	5.26E+02	2.64E+00	2.40E-01			4.65E+02	4.45E+02	



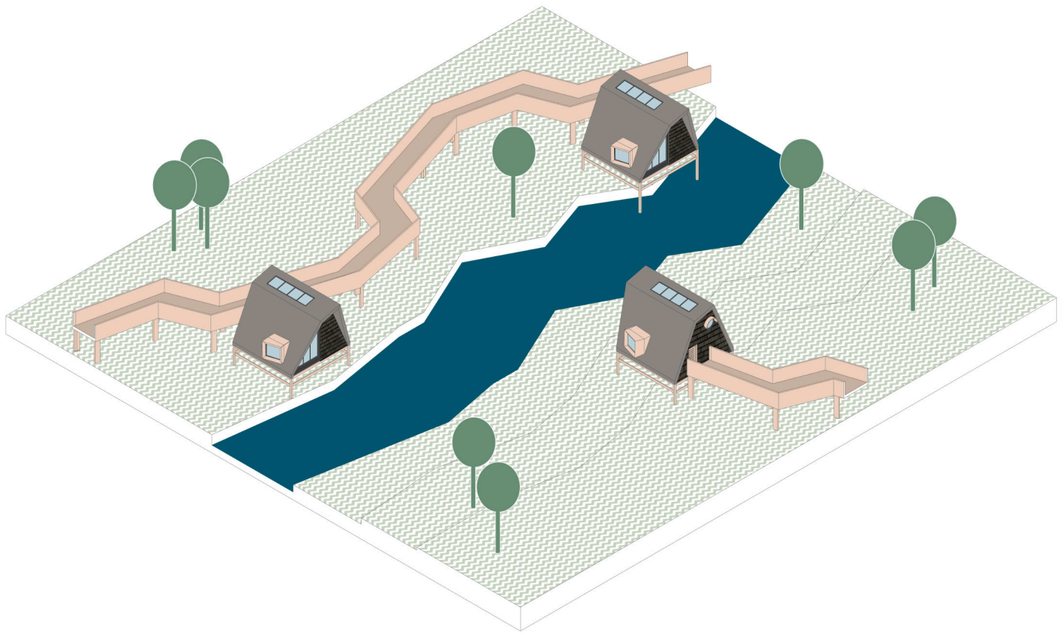




Phase 3

2038

The land is healed, an ecology of both human and animal habitats form in synthesis.



Nature and man will co-develop and exist with wildlife occupying the ground level and humans situated above on stilted dwellings with connected walkways to give a sense of connection with the landscape whilst giving priority to both animal and human habitats

The SOILution: Floating Ecologies

Team 11 | United Kingdom of Great Britain & Northern Ireland

Special Thanks to : Tim Collett, Guillermo Guzman Dumont & Robin Wilson