BRING NATURE INDOOR

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P5 - 6 july 2018

BRING NATURE INDOOR

by integrating an active living wall system
within a Lung Rehabilitation Center
at the Marine area

1

Problem Statement

1

Problem Statement

2

Objective

1

Problem Statement

2

Objective

3

Research

1

Problem Statement

2

Objective

3

Research

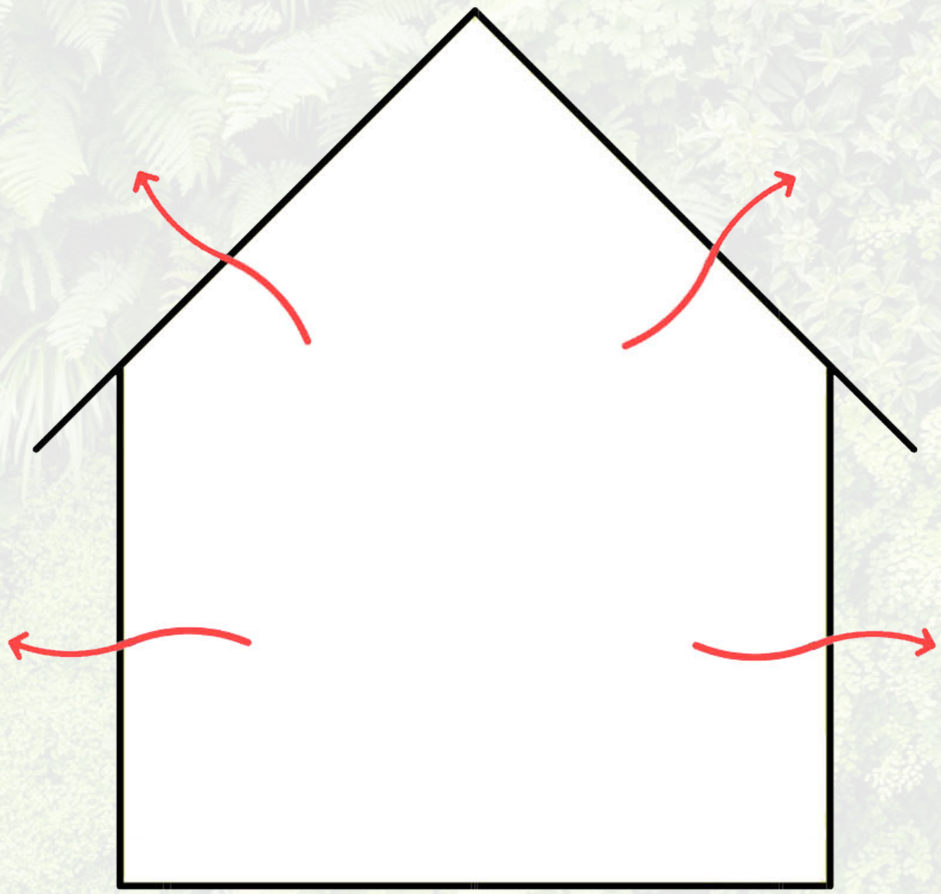
4

Design

PROBLEM STATEMENT

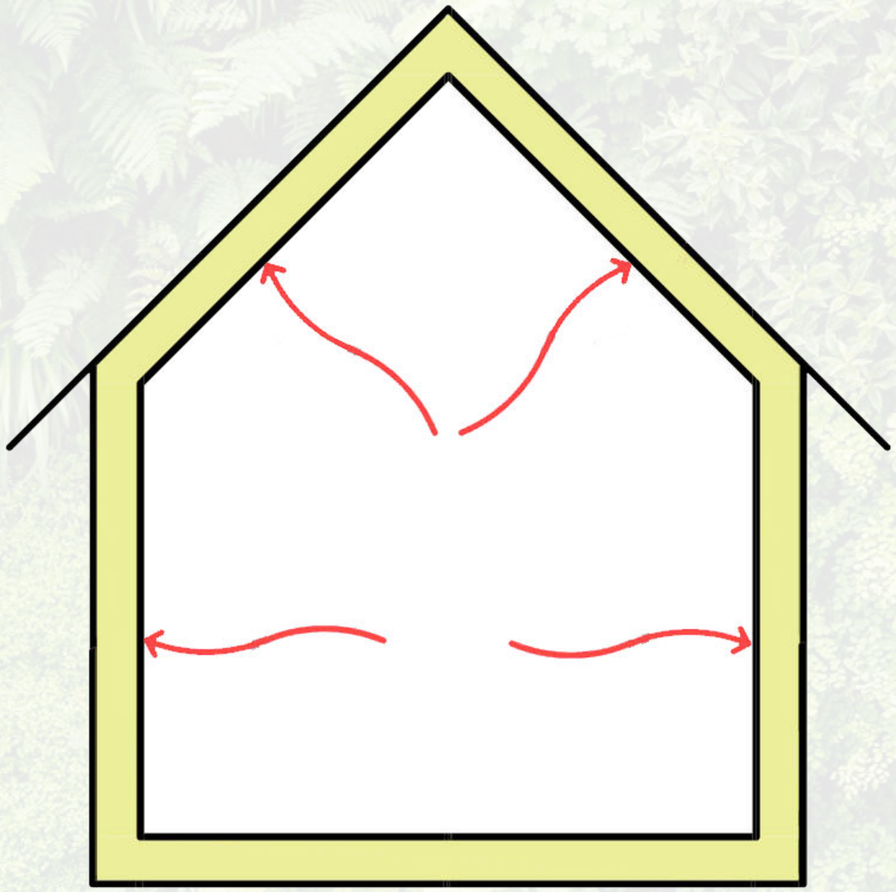
Problem statement

Airtight building



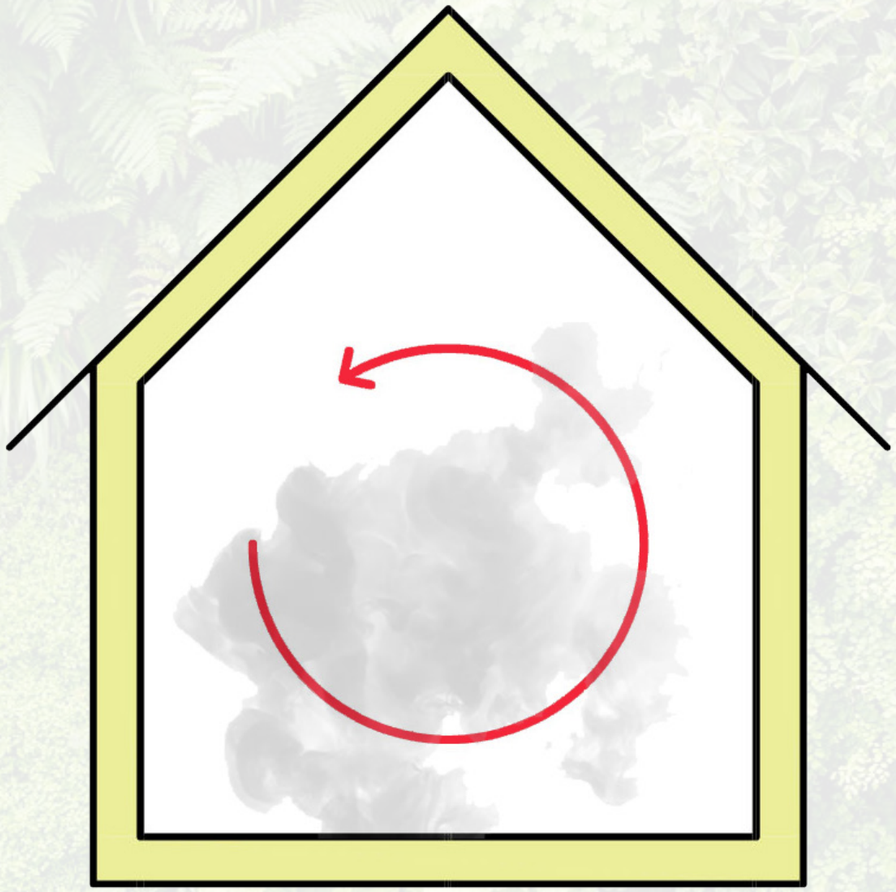
Problem statement

Airtight building



Problem statement

Indoor air pollution



Problem statement

Indoor air pollution

Volatile Organic Compounds

Problem statement

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Volatile Organic Compounds

Problem statement

Indoor air pollution

Volatile Organic Compounds

Carbon Dioxide

Problem statement

Indoor air pollution

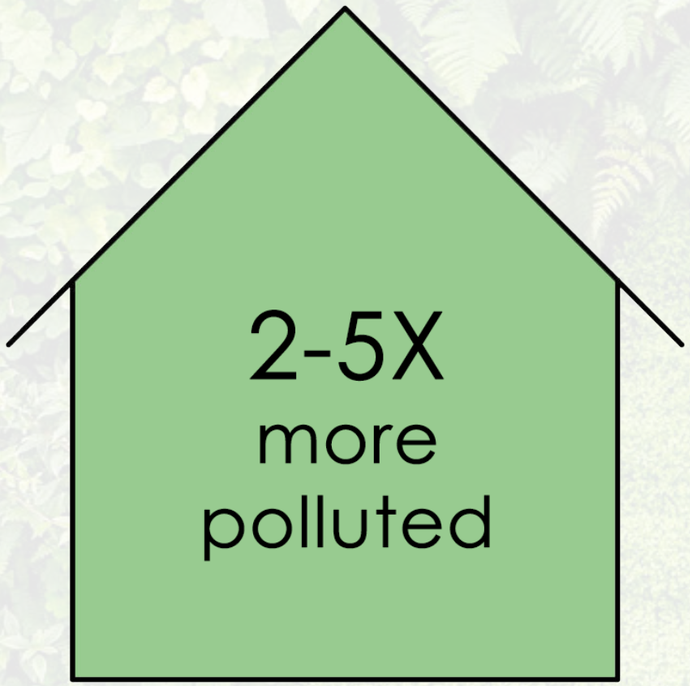
Volatile Organic Compounds

Carbon Dioxide

Dust

Problem statement

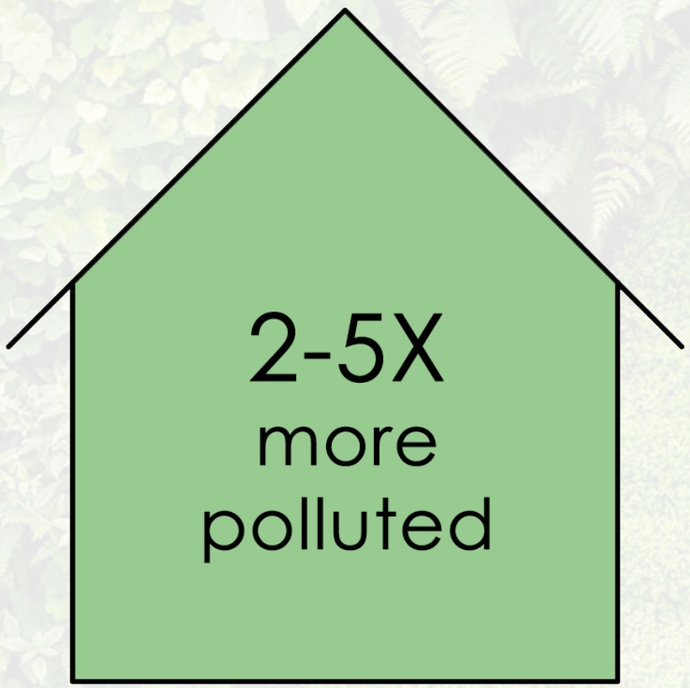
Indoor air pollution



Indoor air more polluted

Problem statement

Indoor air pollution



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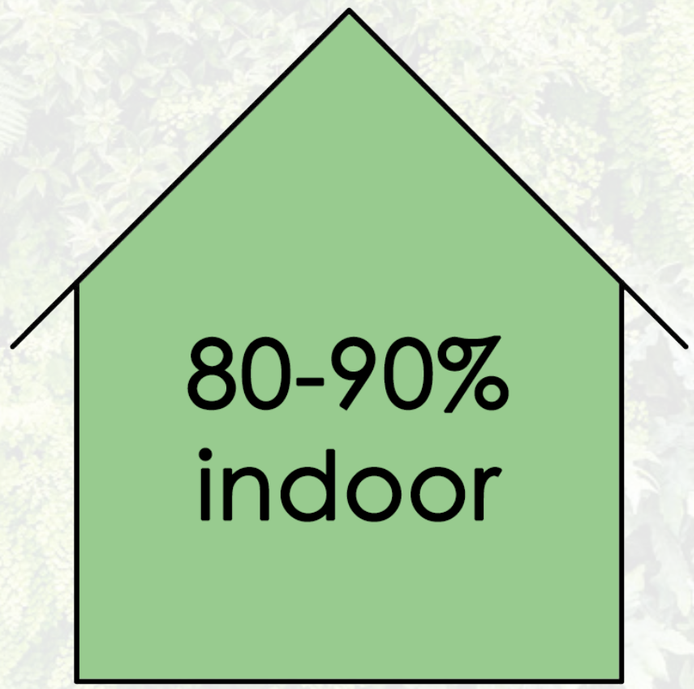


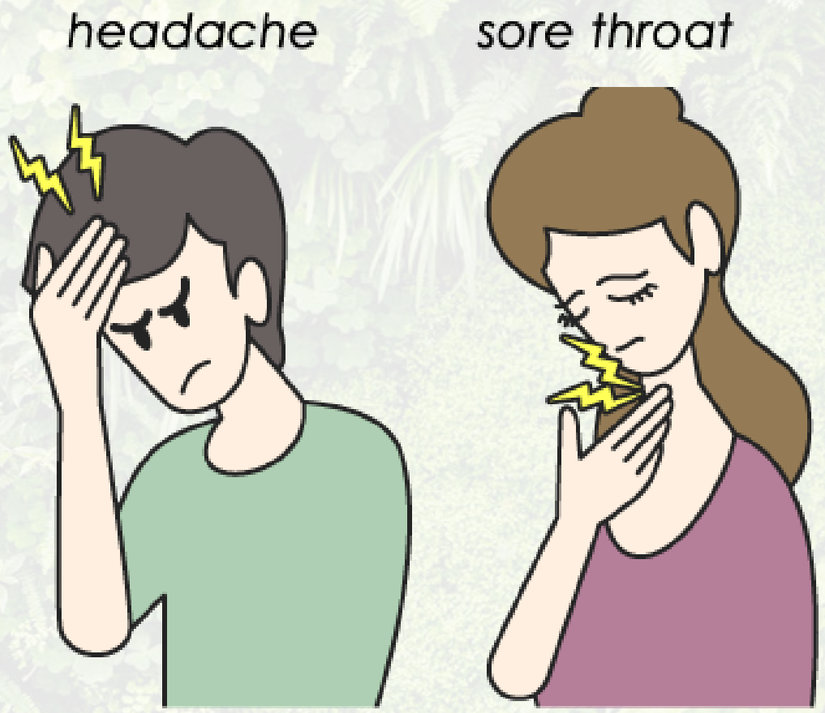
Most time spend indoor

Problem statement

Short term health problems

Problem statement

Short term health problems



Problem statement

Short term health problems

headache

sore throat

Respiration problems

Problem statement

Short term health problems

headache

sore throat

Respiration problems

Stinging eyes

Problem statement

Long term health problems

Respiratory diseases

Problem statement

Long term health problems

Respiratory diseases

Hearth disease

Problem statement

Long term health problems

Respiratory diseases

Hearth disease

Lung cancer

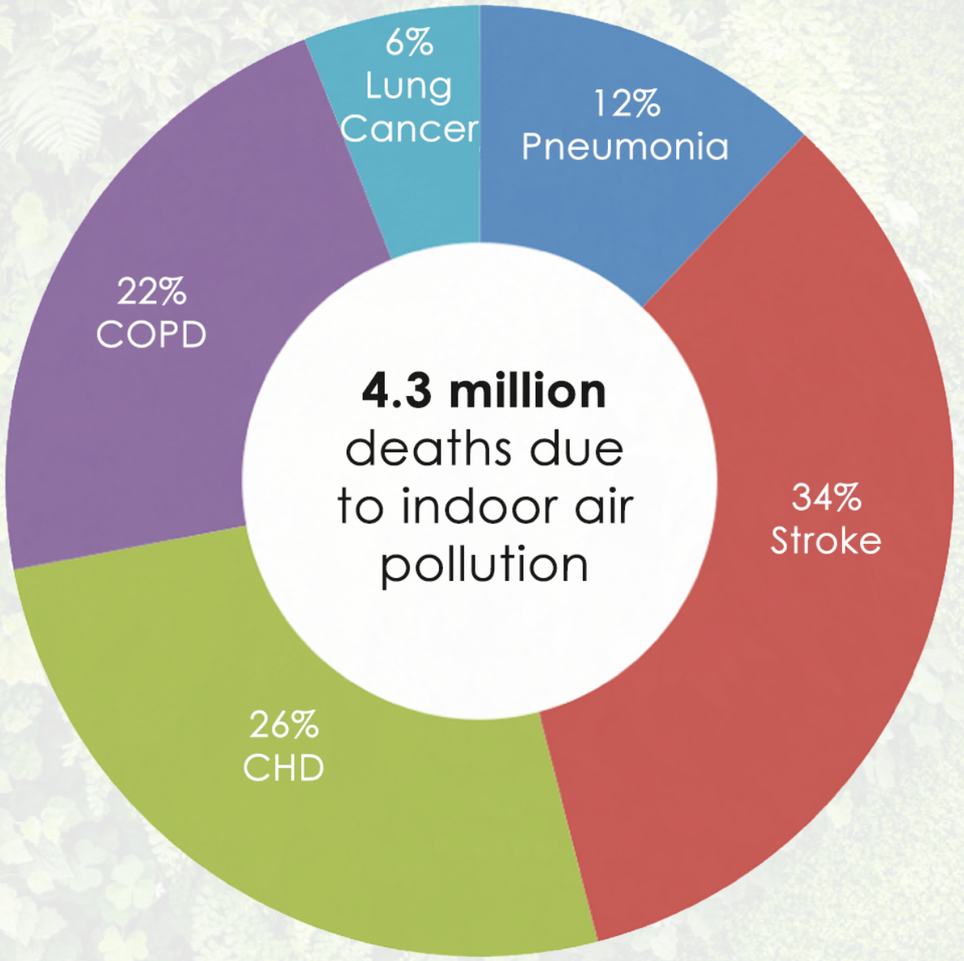
Problem statement

Long term health problems

Respiratory diseases

Hearth disease

Lung cancer



Source: Komalkirti Apte - Household air pollution and its effects on health.

OBJECTIVE

Objective

Create a healthy indoor environment!

Objective

But how?

Objective

Plants as the solution

Objective

Plants as the solution

Dwarf Date Palm

Boston Fern

Kimberley Queen Fern

Spider Plant

Chinese Evergreen

Bamboo Palm

Weeping Fig

Devil's Ivy

Flamingo Lily

Lilyturf

Trichloroethylene

Formaldehyde

Benzene

Xylene

Ammonia

Wolverton, B.C., & Wolverton, D.J. (1993). Plants and soil microorganisms: removal of formaldehyde, xylene, and ammonia from the indoor environment. Journal of Mississippi Academy of Sciences(32). 11-15

Objective

Living wall as the solution

Objective

Living wall as the solution

Objective

Create a healthy indoor environment with the use of an indoor living wall system!

RESEARCH

Research

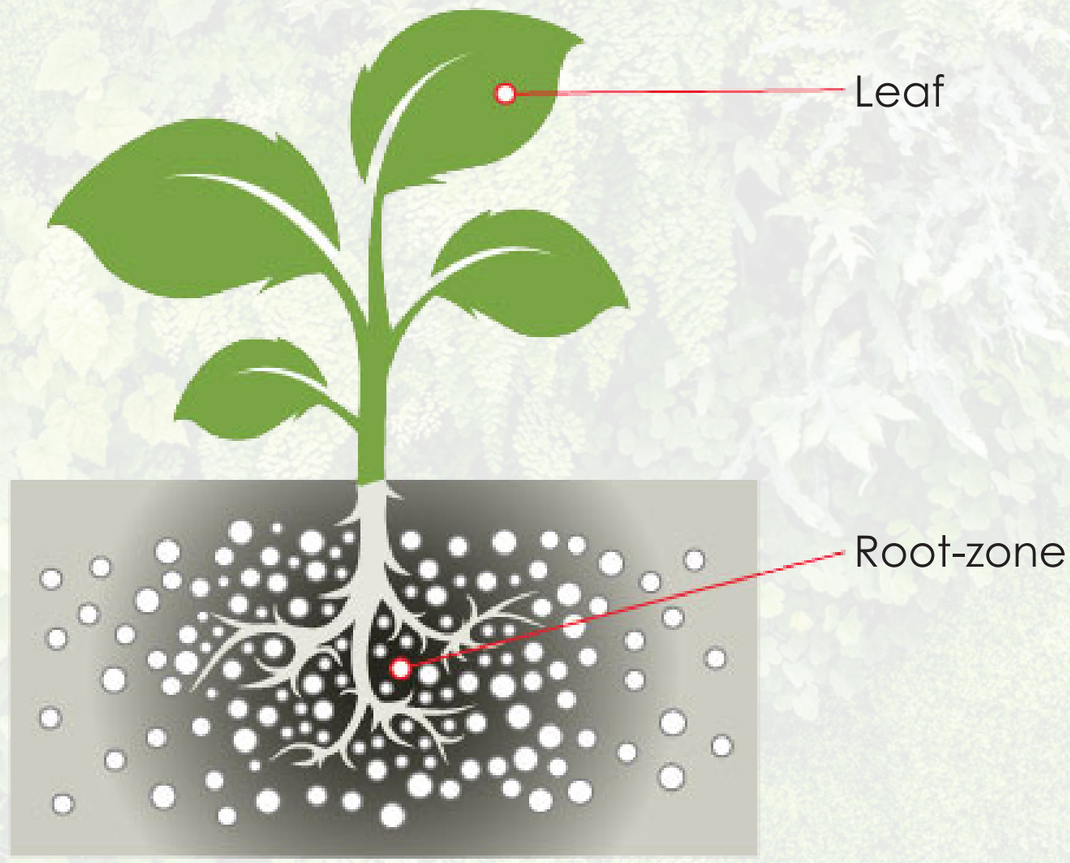
Research question

How could an indoor living wall be integrated within a building to significantly improve the indoor environment?

Research

Air purification

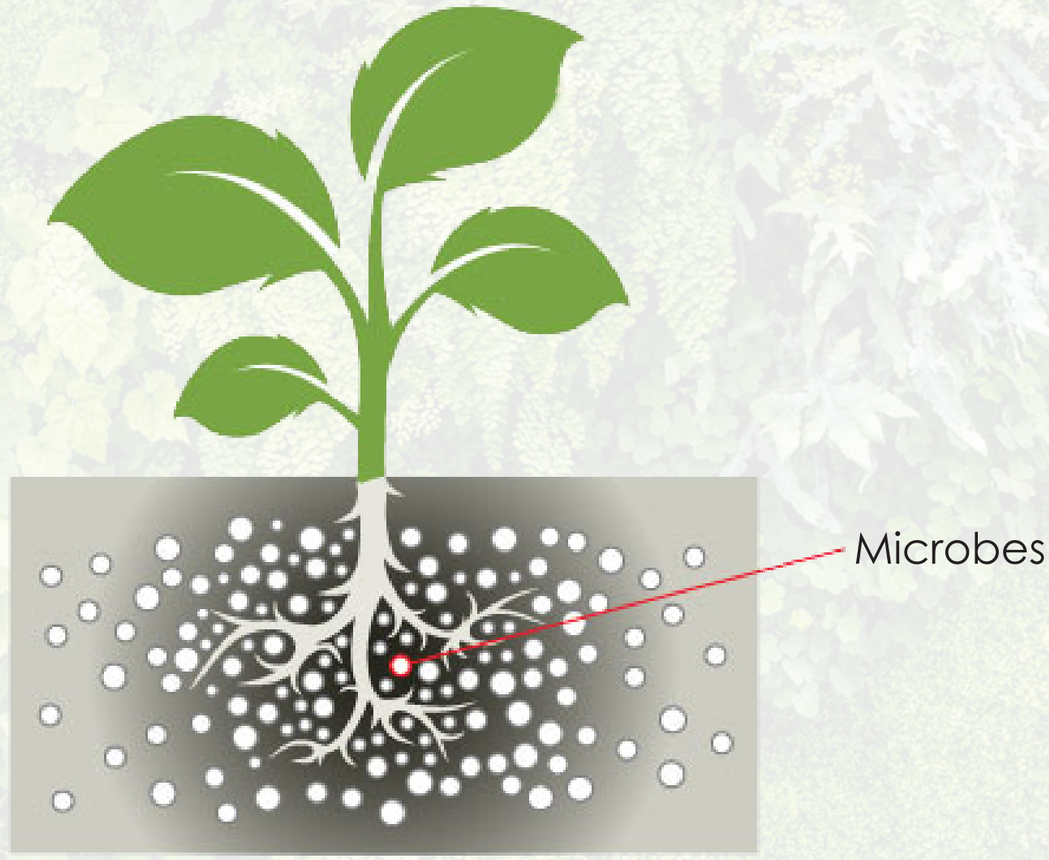
- Root-zone is most important



Research

Air purification

- Root-zone is most important
- Plants create living environment for microbes



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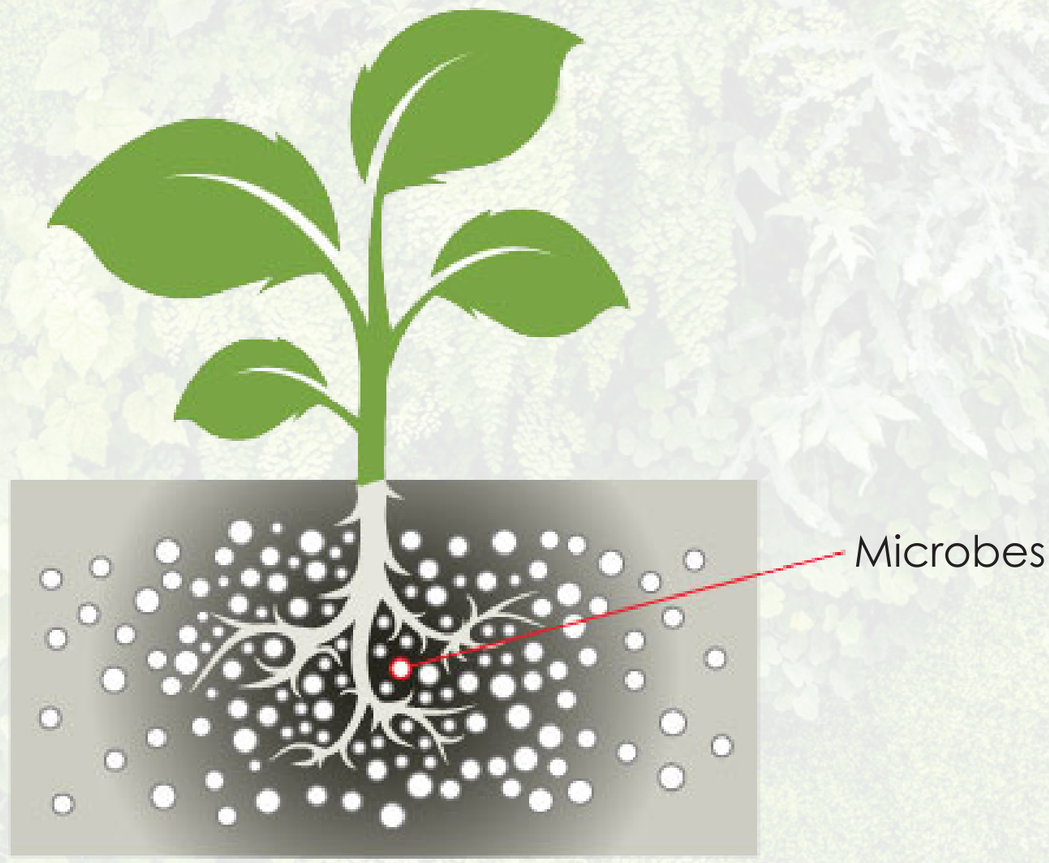
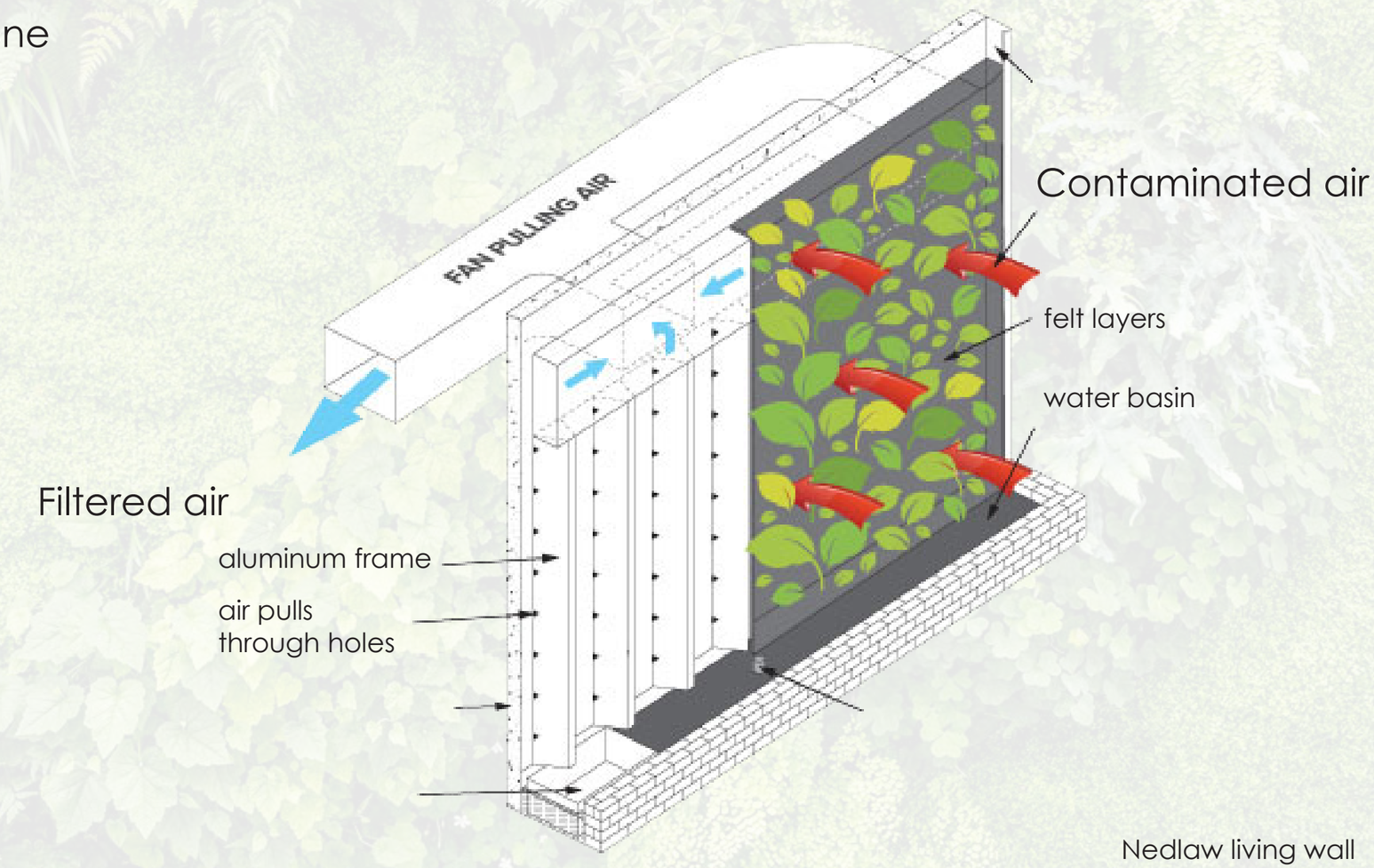


Research

Air purification

- Root-zone is most important
- Plants create living environment for microbes
- Microbes clean the air
- Air-flow through the root-zone

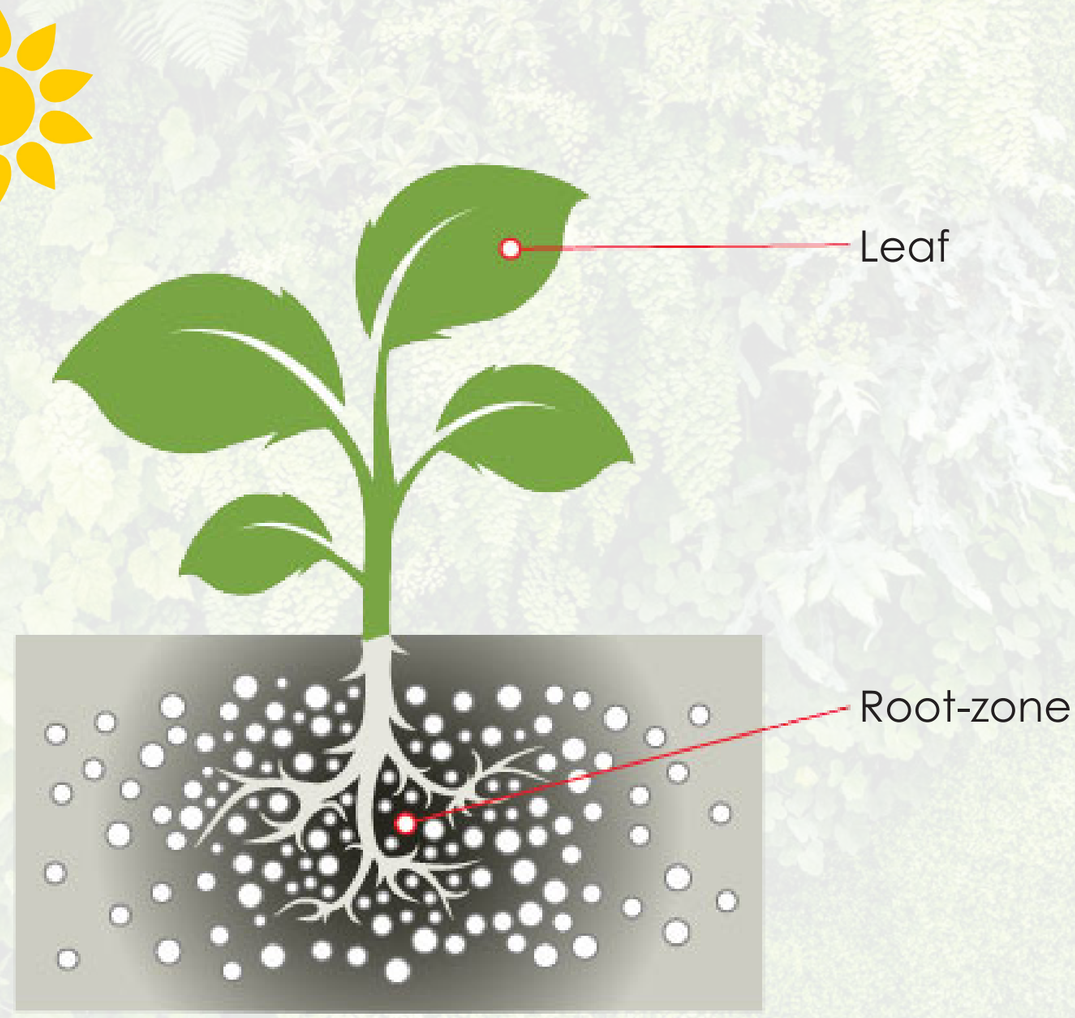


Nedlaw living wall

Research

Air purification

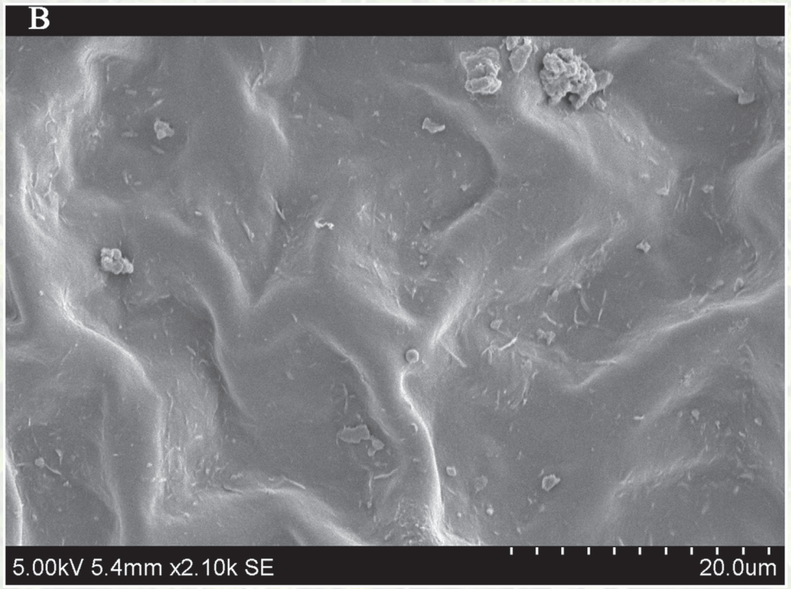
- Root-zone is most important
- Plants create living environment for microbes
- Microbes clean the air
- Air-flow through the root-zone
- CO_2 removal through photosynthesis

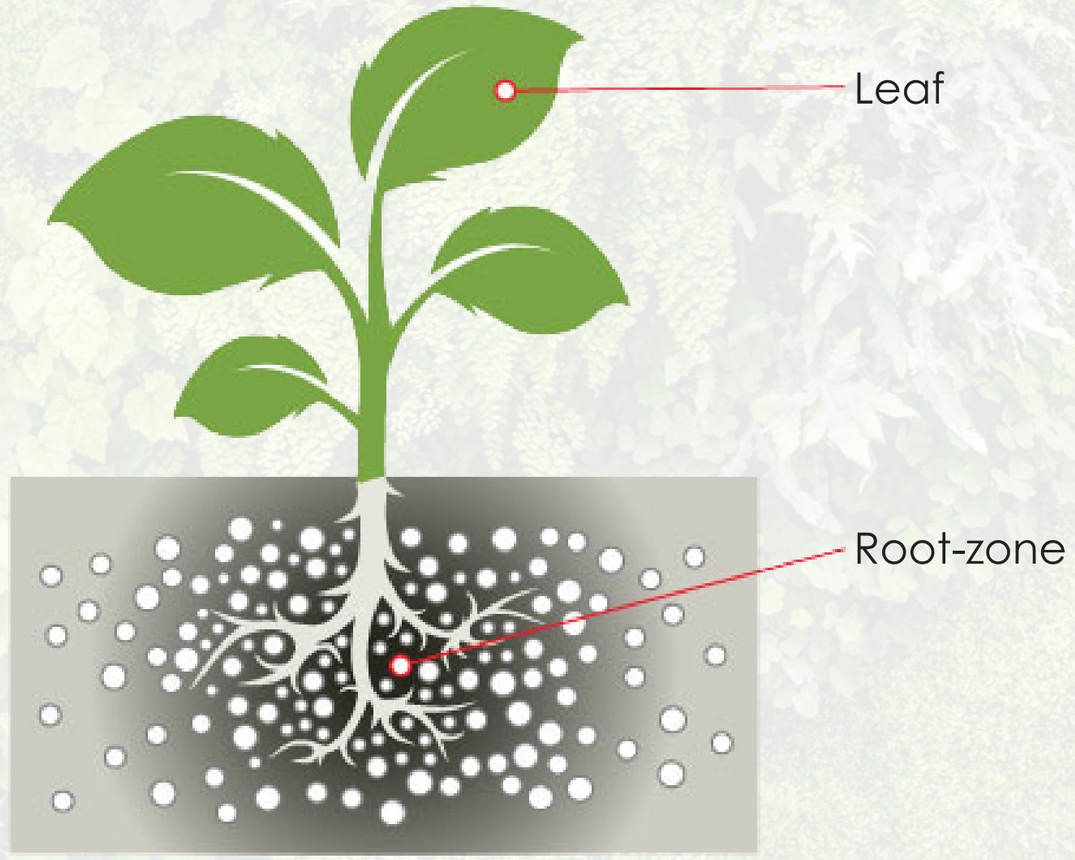


Research

Air purification

- Root-zone is most important
- Plants create living environment for microbes
- Microbes clean the air
- Air-flow through the root-zone
- CO_2 removal through photosynthesis
- Particulate matter



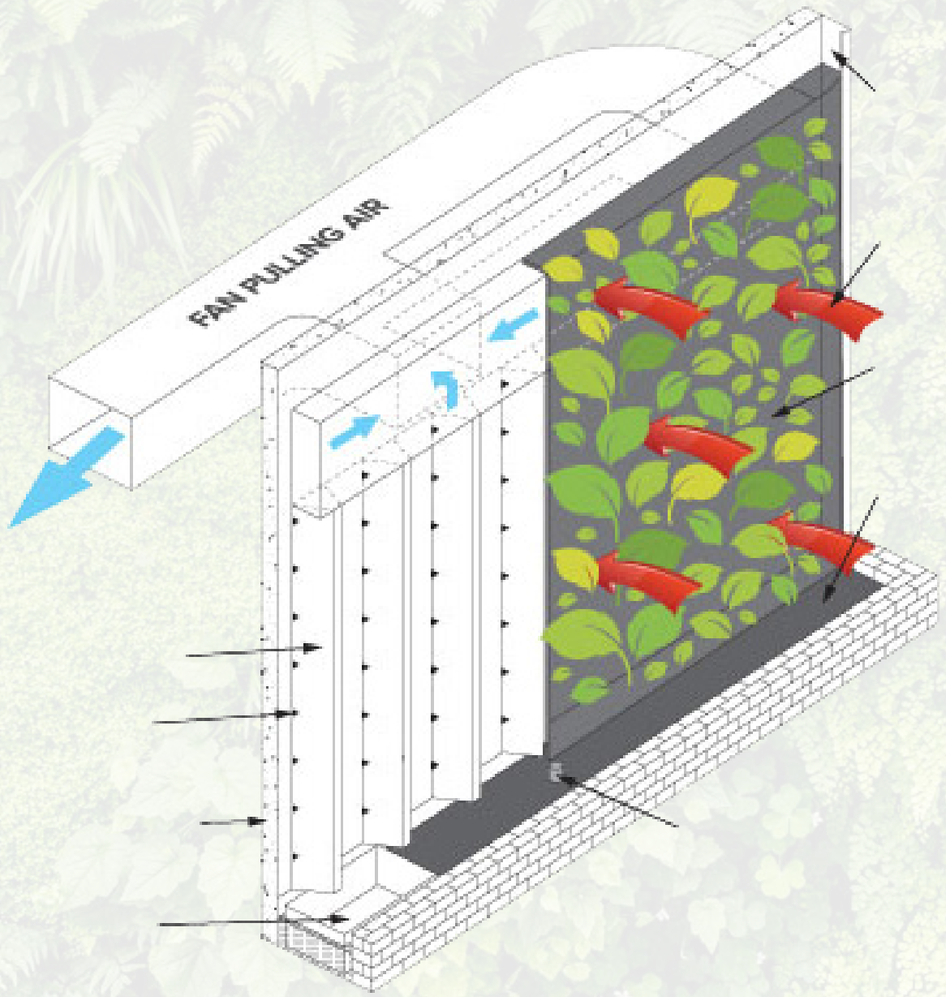


Research

Conclusion

Psysical effects

Air ventilation through the root-zone is required to efficiently let the microbes remove the VOCs.



Research

Positive effects

Psysical effects

Purifies the air

Research

Positive effects

Psysical effects

Purifies the air

Evaporative cooling

Research

Positive effects

Psysical effects

Purifies the air

Evaporative cooling

Reduces noise

Research

Positive effects

Psysical effects

Purifies the air

Evaporative cooling

Reduces noise

Mental effects

Increases the feeling of well-being

Research

Increases the feeling of well-being

- Reduction of stress

Research

Increases the feeling of well-being

- Reduction of stress
- Faster recovery

Research

Conclusion

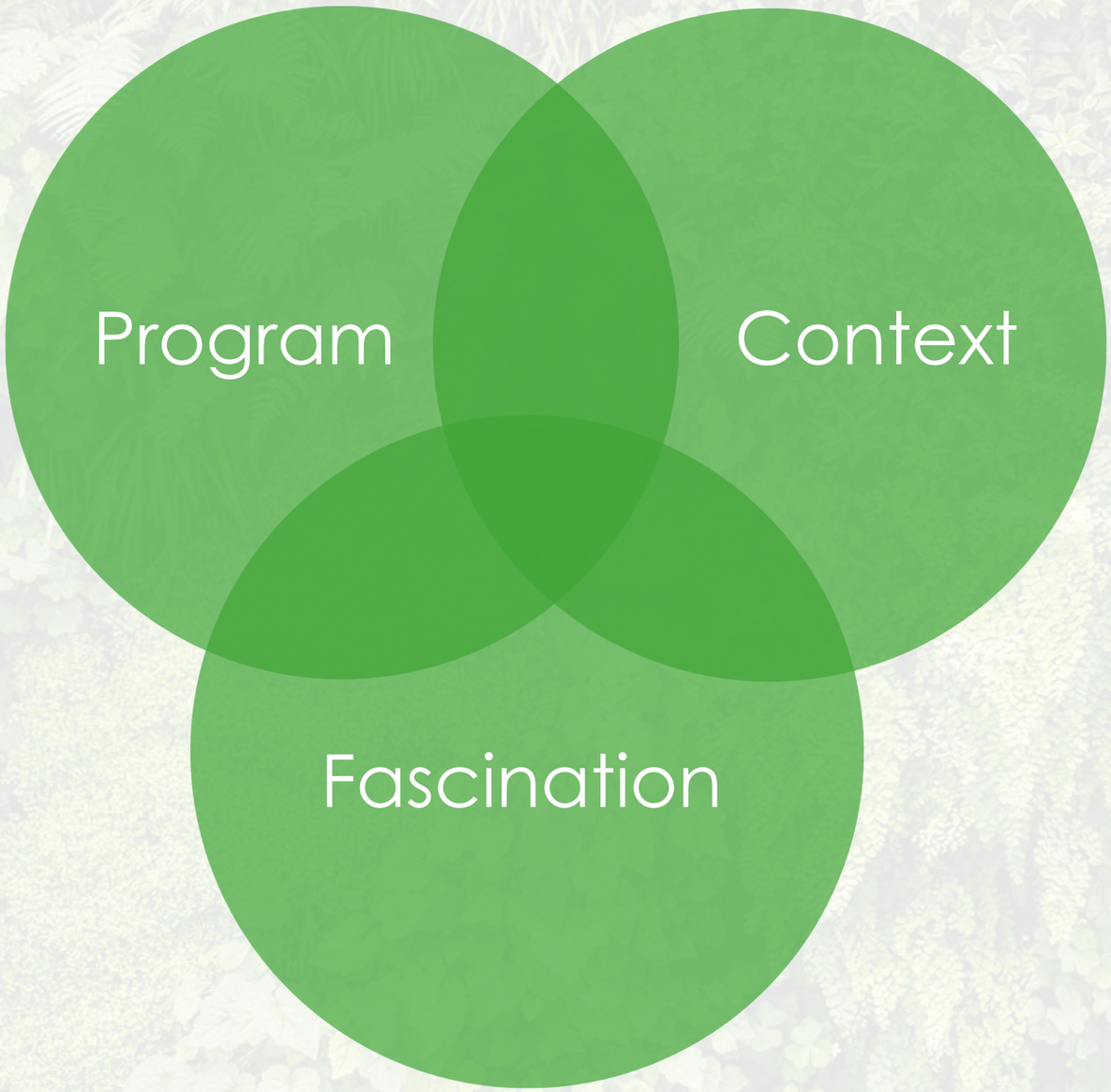
Mental effects

View on the plants is required to have a positive effect on the occupants well-being.

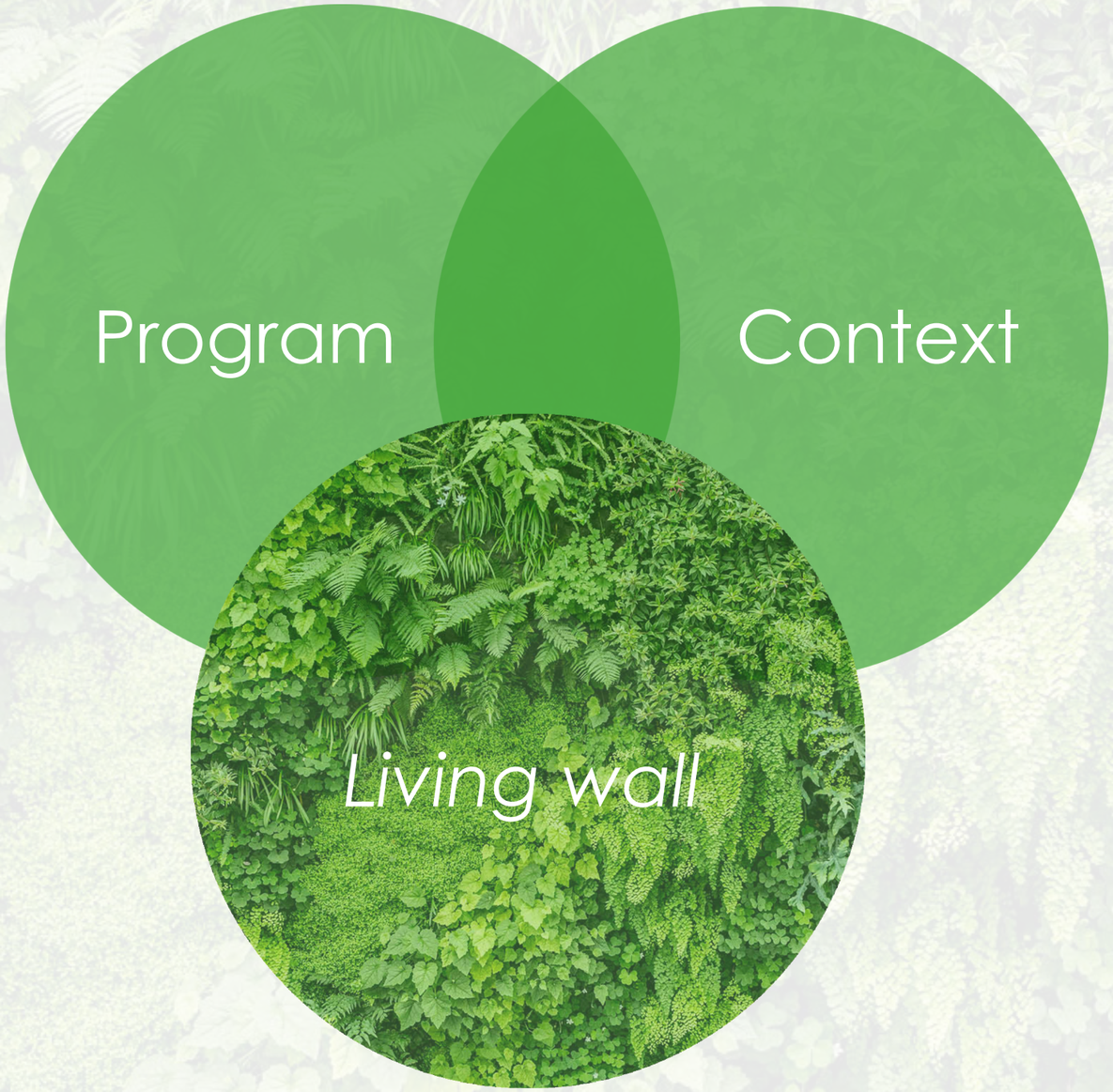
If used correctly, an active living wall system can significantly improve the indoor environment.

DESIGN

Design



Design



Design

Lung Rehabilitation center

Design

Program

- Treatment rooms

Design

Program

- Treatment rooms
- Sports facilities

Design

Program

- Treatment rooms
- Sports facilities
- Restaurant

Design

Program

- Treatment rooms
- Sports facilities
- Restaurant
- Patient room

Design

Lung Rehabilitation center

Design

Lung Rehabilitation center

Marine Area

Living wall

Design

Marine Area

Problem statement - Objective - Research - Design

Design

Marine Area

Design

Marine Area

defensie terrein

defensie gebouwen

depot Scheepvaartmuseum

publiek toegankelijk terrein

publiek toegankelijk water

overgedragen gebouwen

defensiebelang

(M) medegebruik na EU16

afscheiding, gaashek

mil. gecontroleerde toegang

N

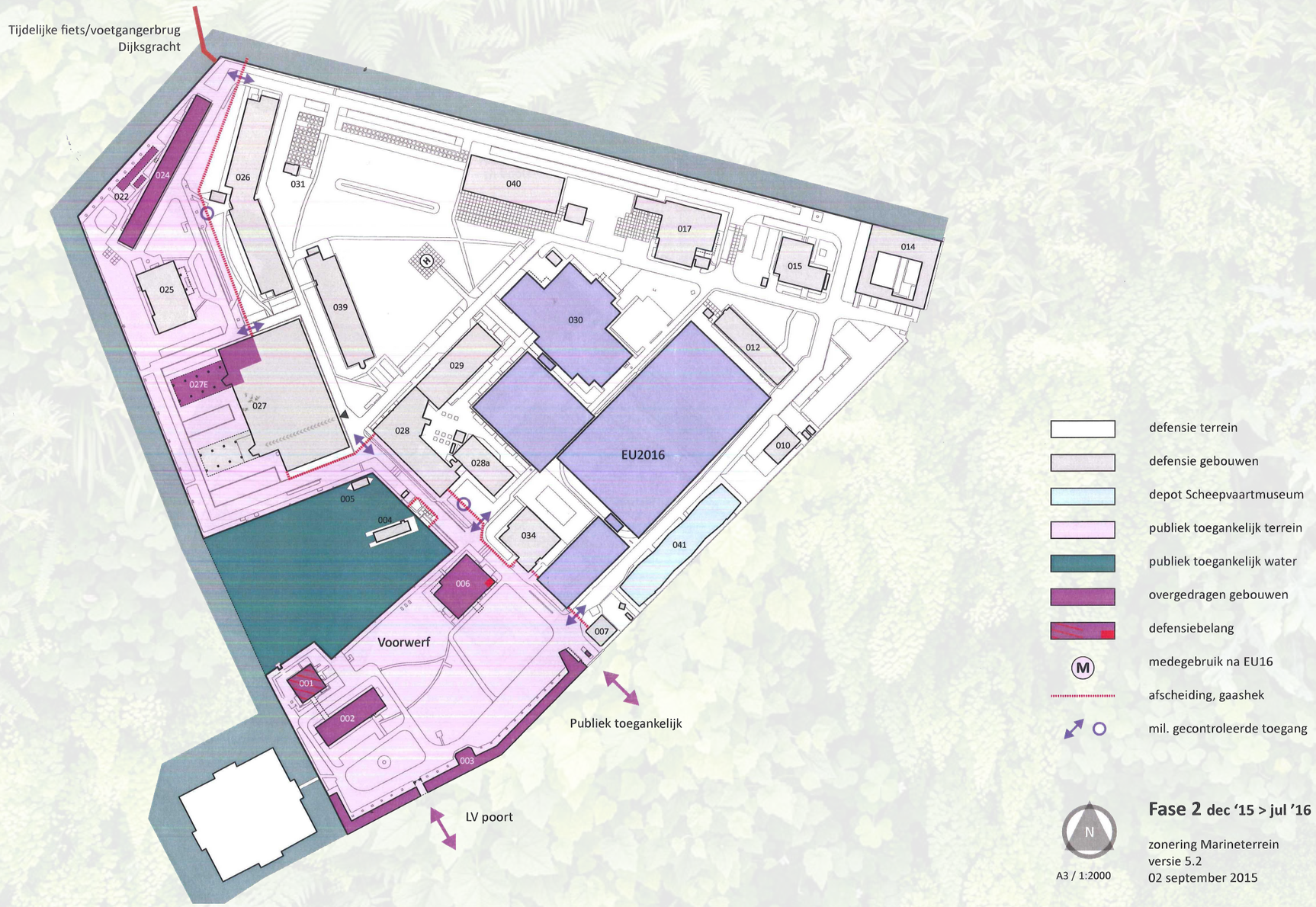
A3 / 1:2000

Fase 1 **jan > nov 2015**

zonering Marineterrein
versie 5.2
02 september 2015

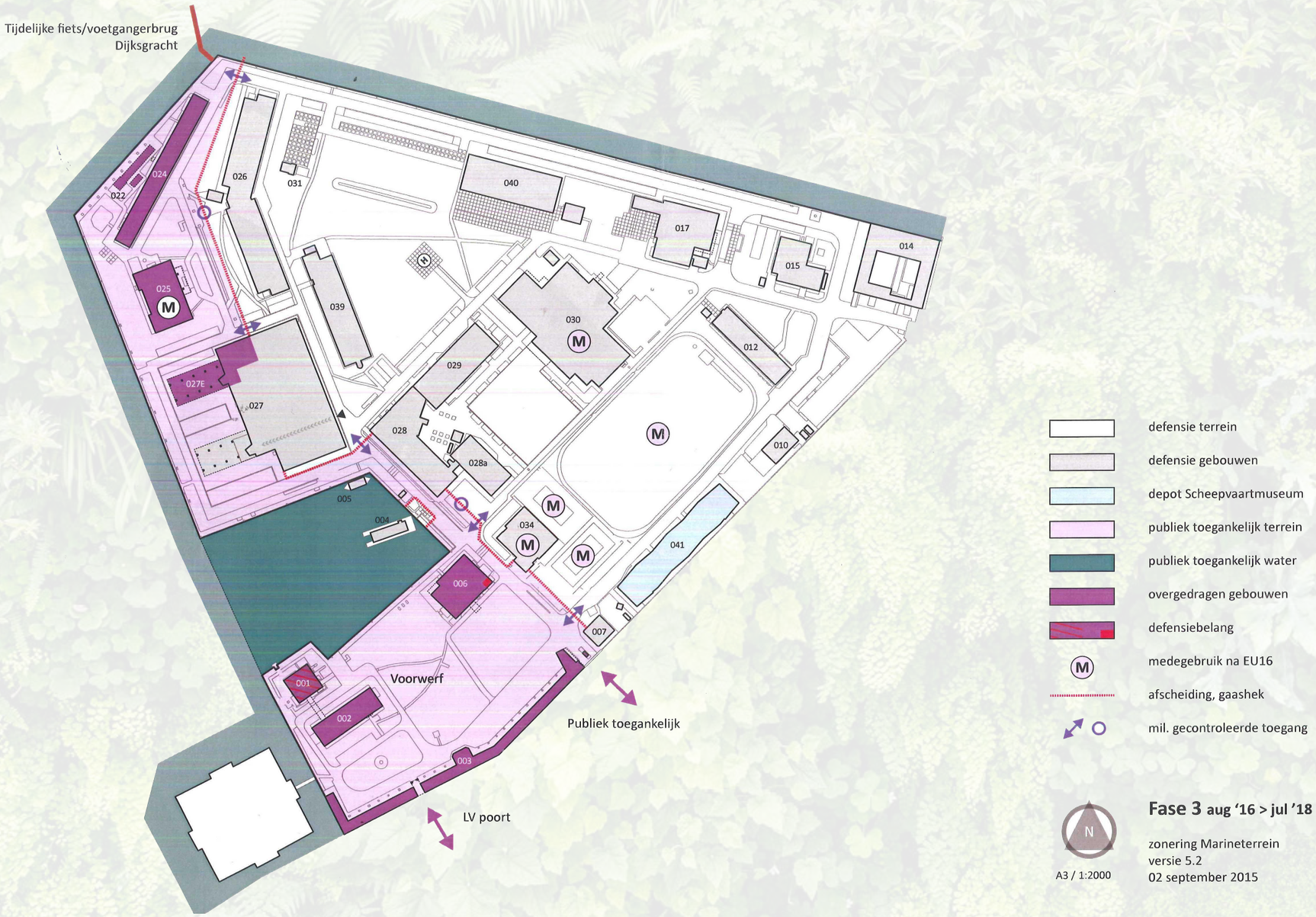
Design

Marine Area



Design

Marine Area



Design

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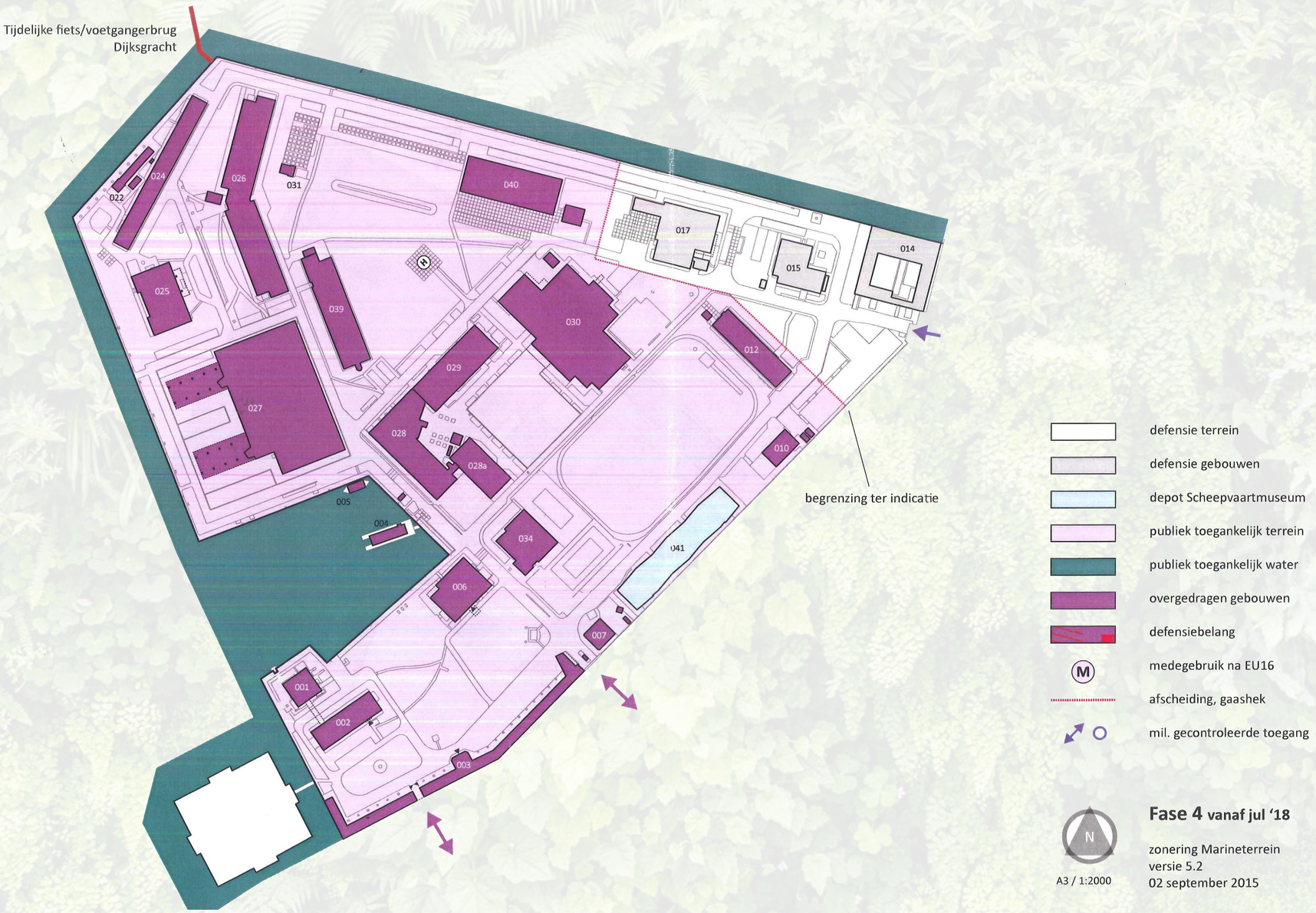


Design

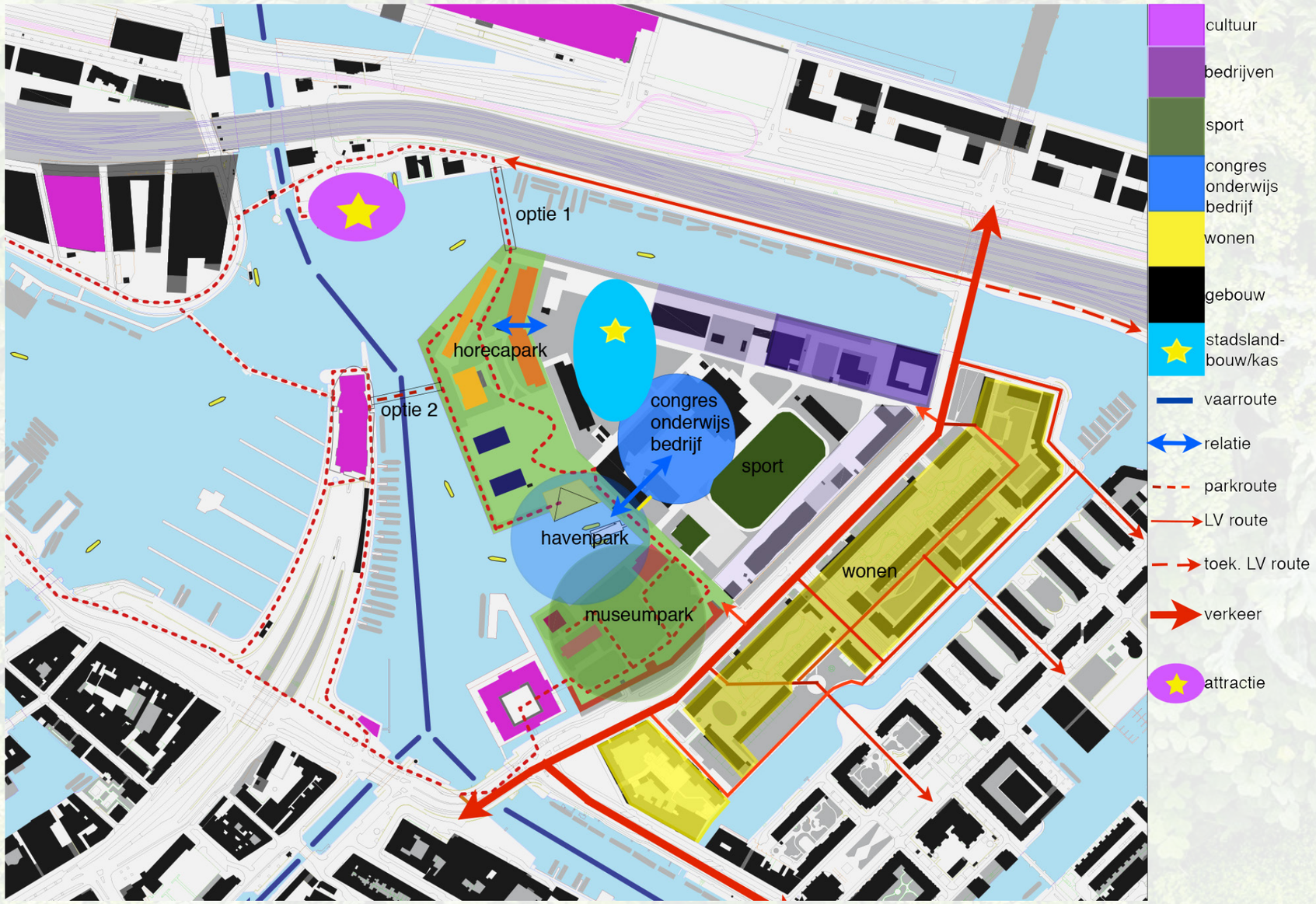
Marine Area

"The Marine area is an environment where innovations arise that contribute to the development of a sustainable city."

Strategienota for the Marine area

Design

Marine Area



Design

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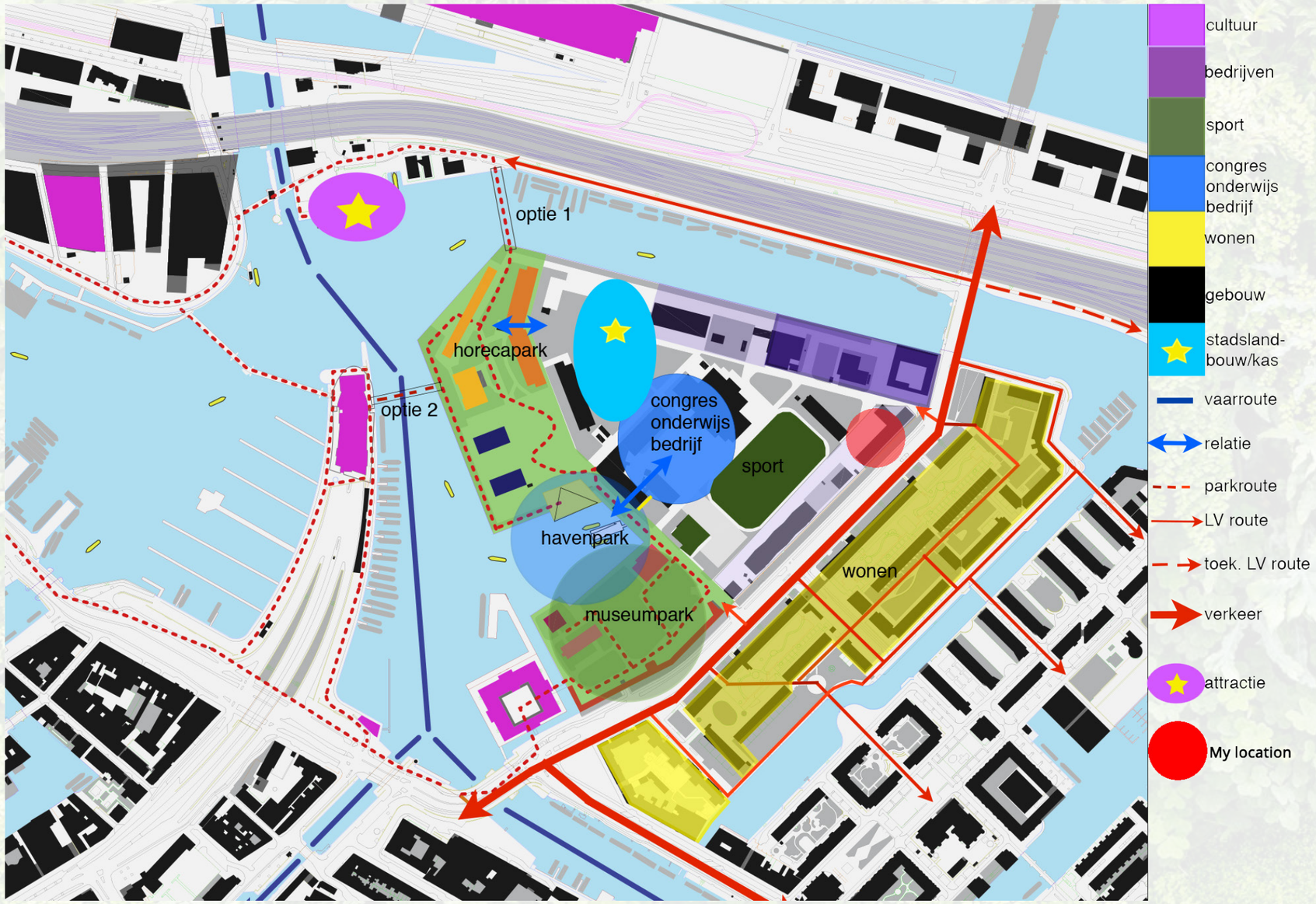


Design

Marine Area

Design

Marine Area

Design

Marine Area

Problem statement - Objective - Research - Design

Design

Marine Area

Design

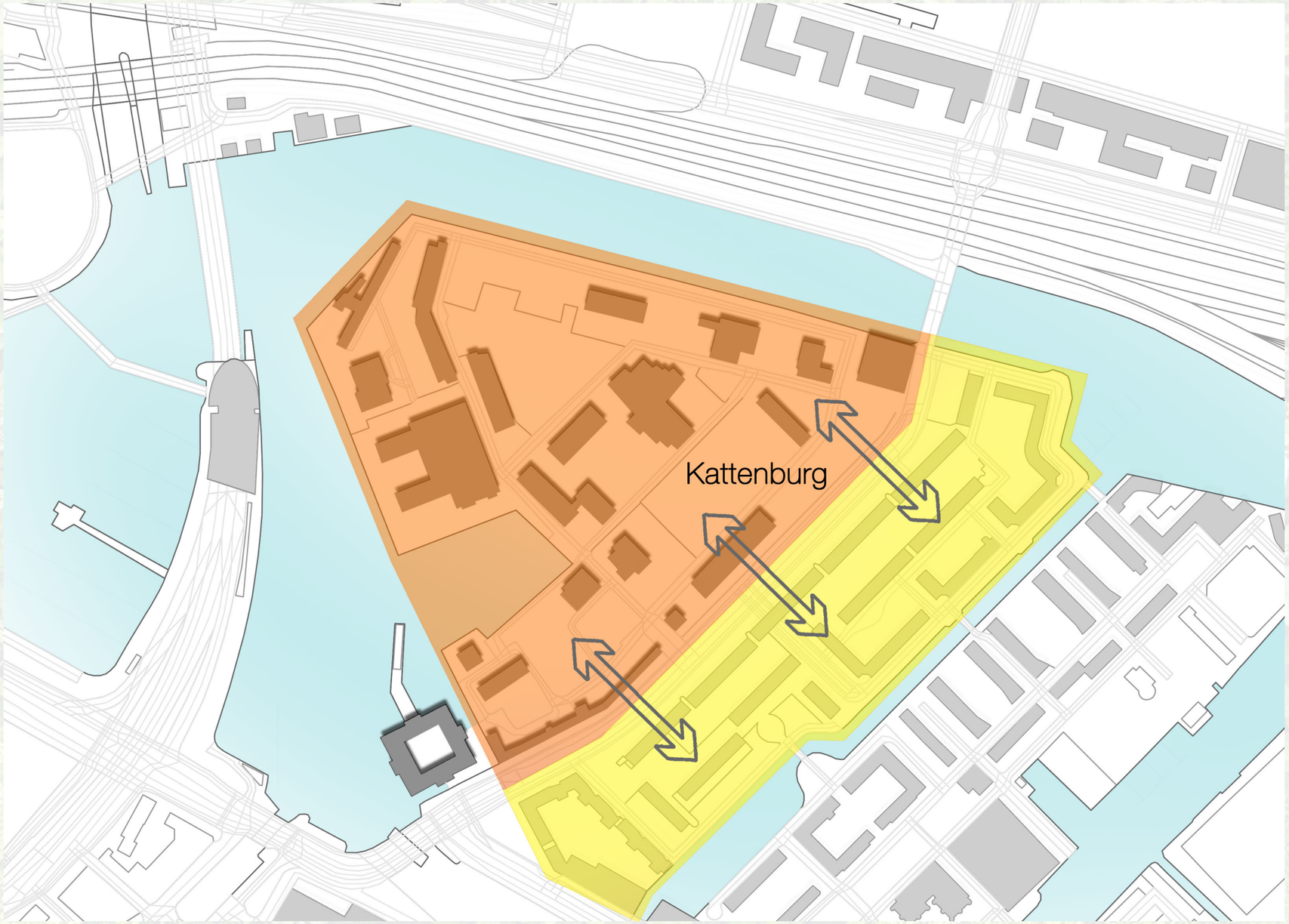
Marine Area

Buurtplatform Kattenburg / Marine area

"We would like the wall no longer to be perceived as a separation, but to be absorbed into the vibrancy of companies and homes on Kattenburg."

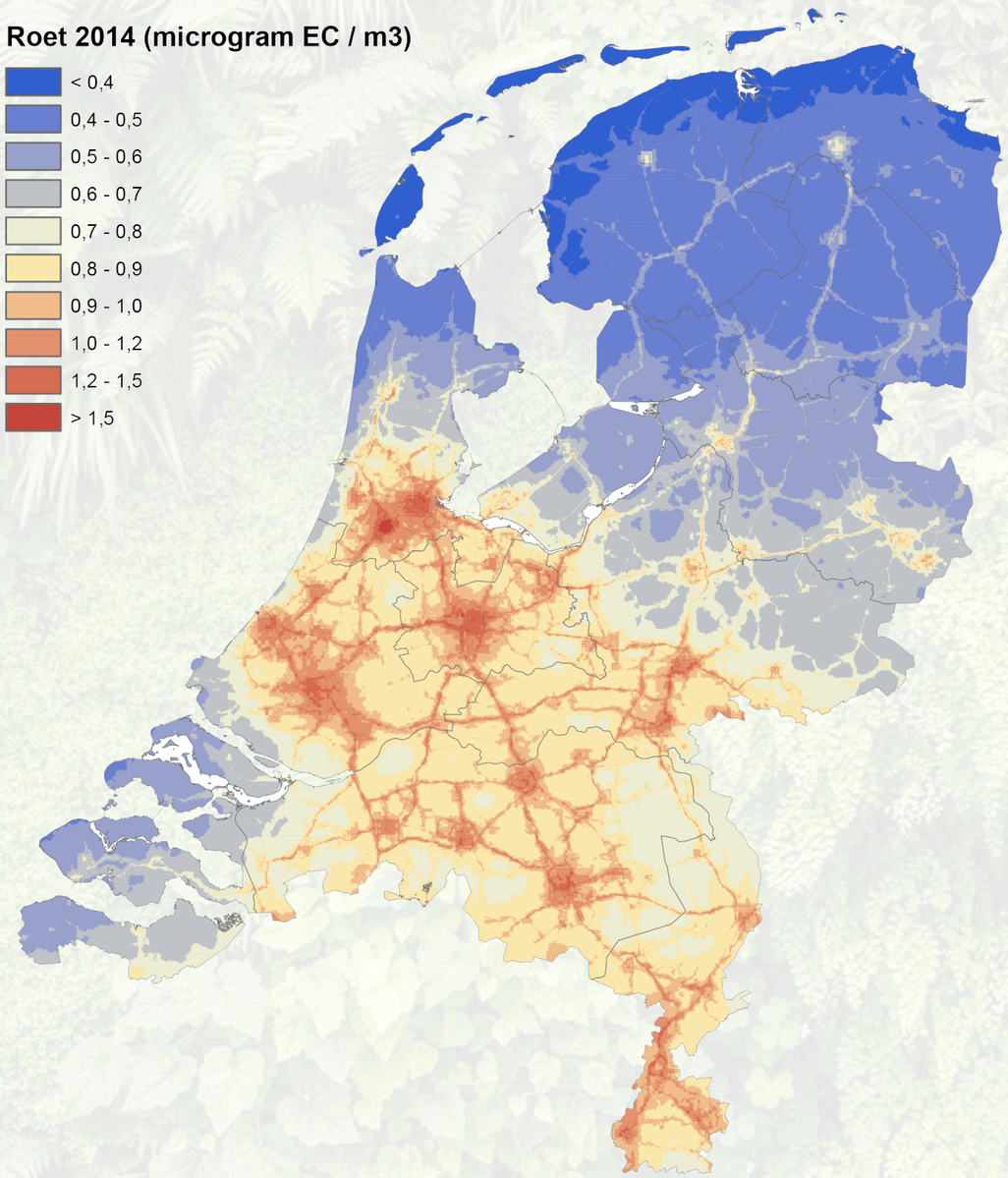
Design

Marine Area



Design

Marine Area



Design

Marine Area

Buurtplatform Kattenburg / Marine area

"We would like the traffic situation on the Kattenburgerstraat to improve with less CO_2 emissions, less noise pollution and less particulate matter."

Buurtplatform Kattenburg / Marine area

Design

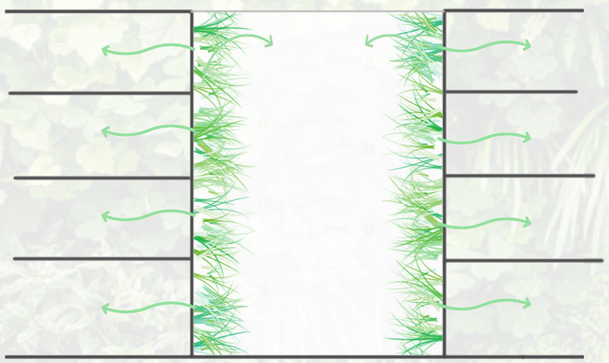
Marine Area

Design

Starting points

Research

Clean the air with an active living wall system in the atrium



Design

Starting points

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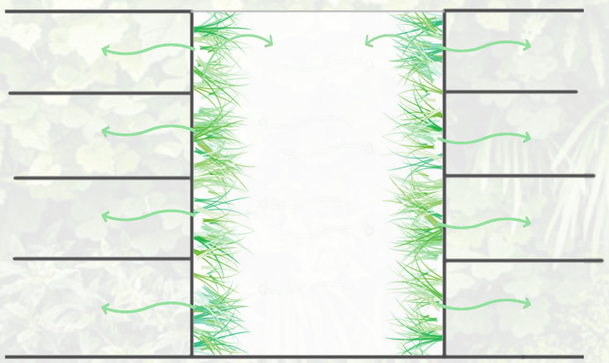
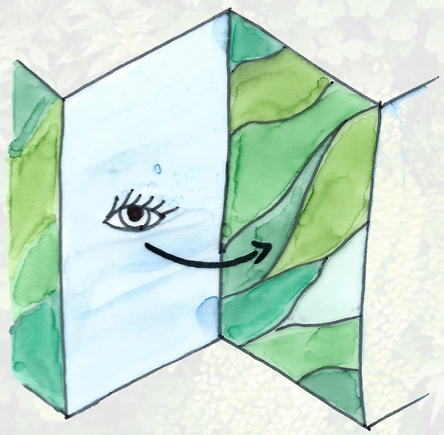


View on green facade from the inside of the building



Design

Starting points

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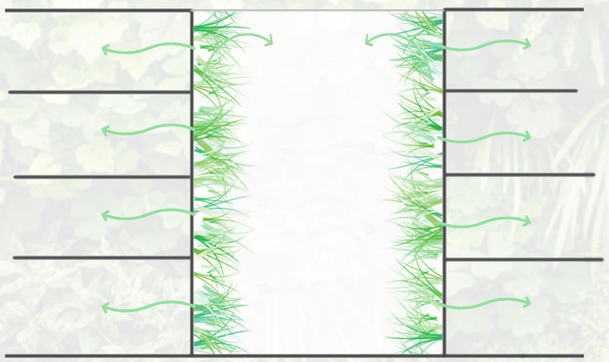
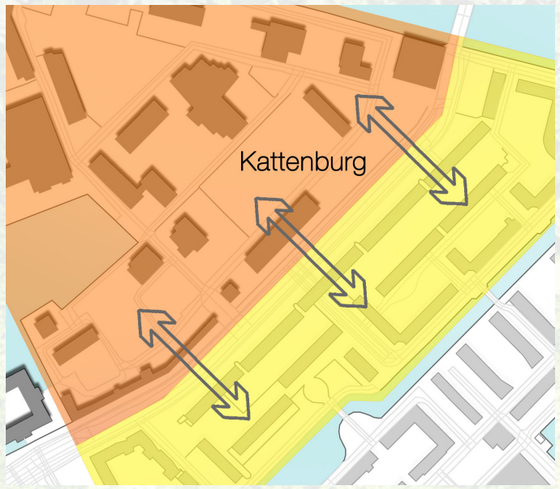


Context

Make a connection over the wall with the residential area



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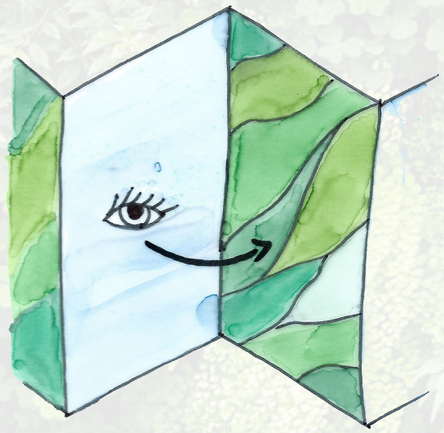

Design

Starting points

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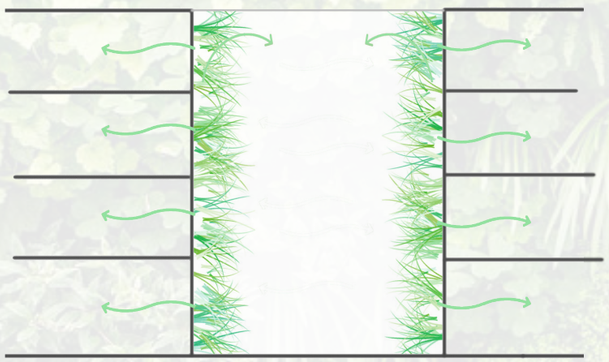

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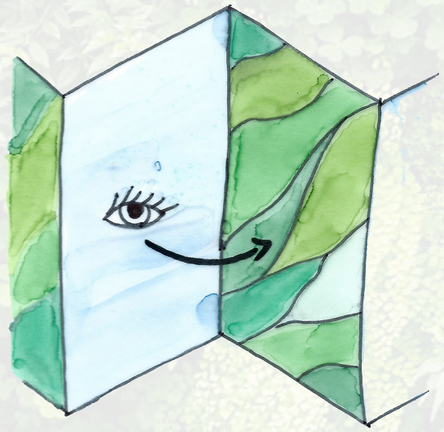

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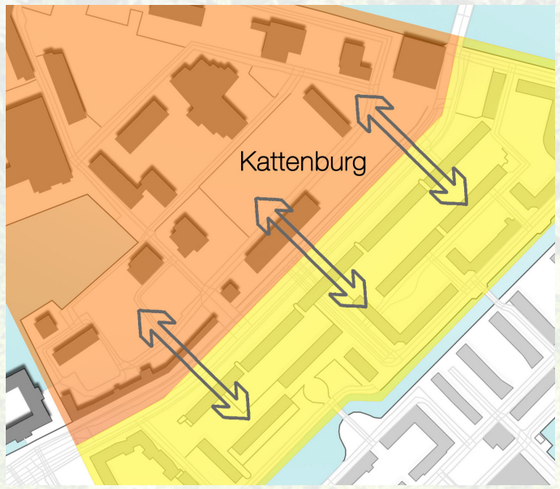
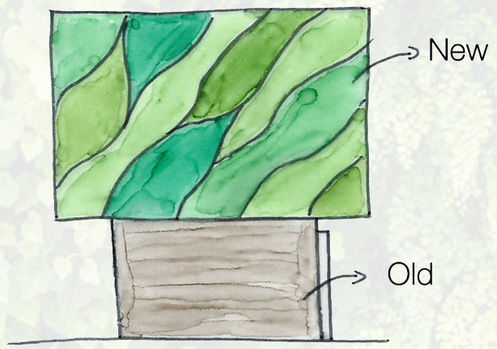
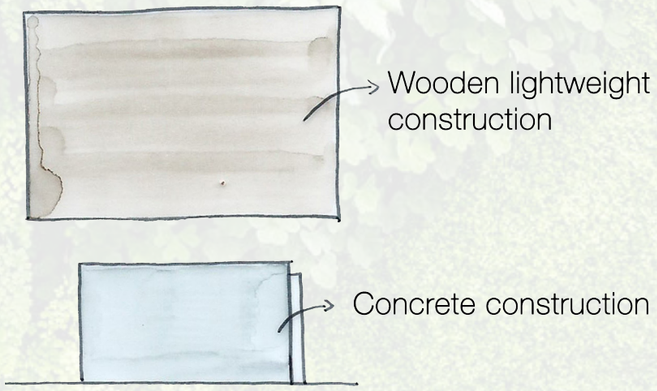


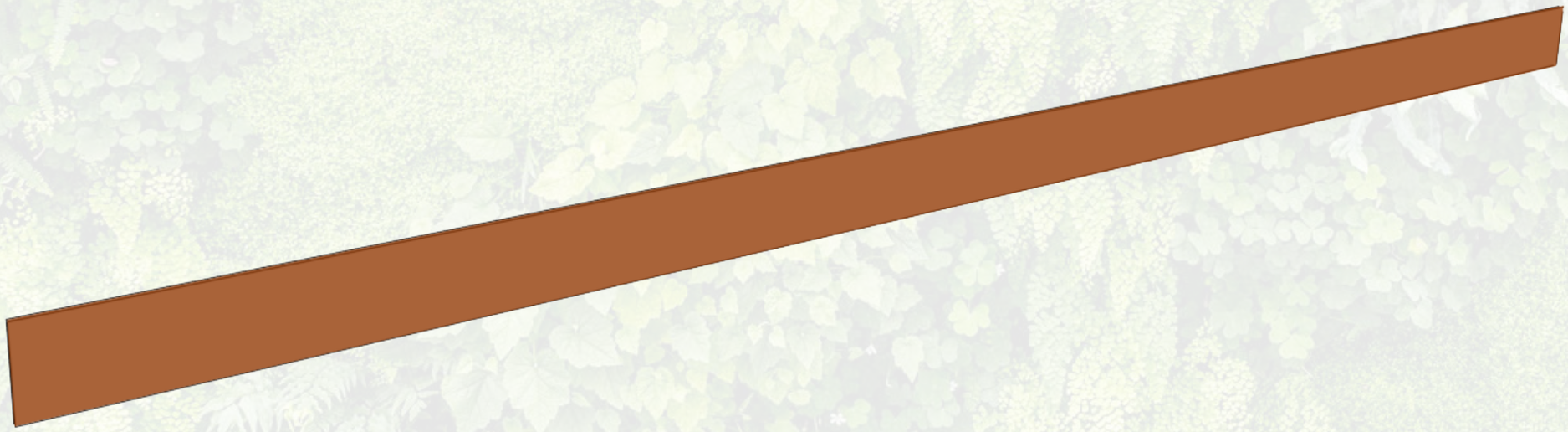
Create a new green building on top of the Marine area foundation





Design

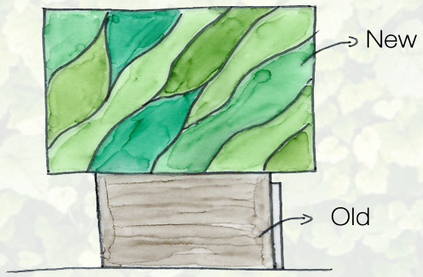
Shape of the building

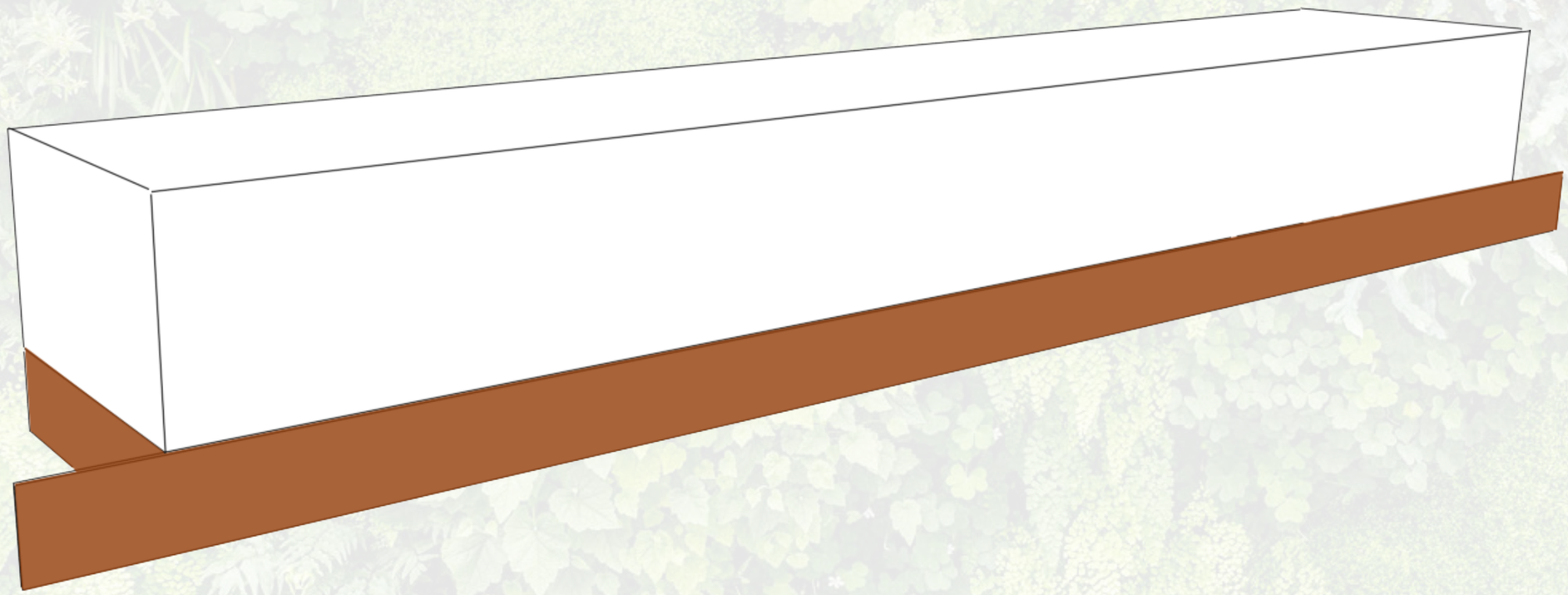


Design

Shape of the building

Create a new green building on top of the Marine area foundation

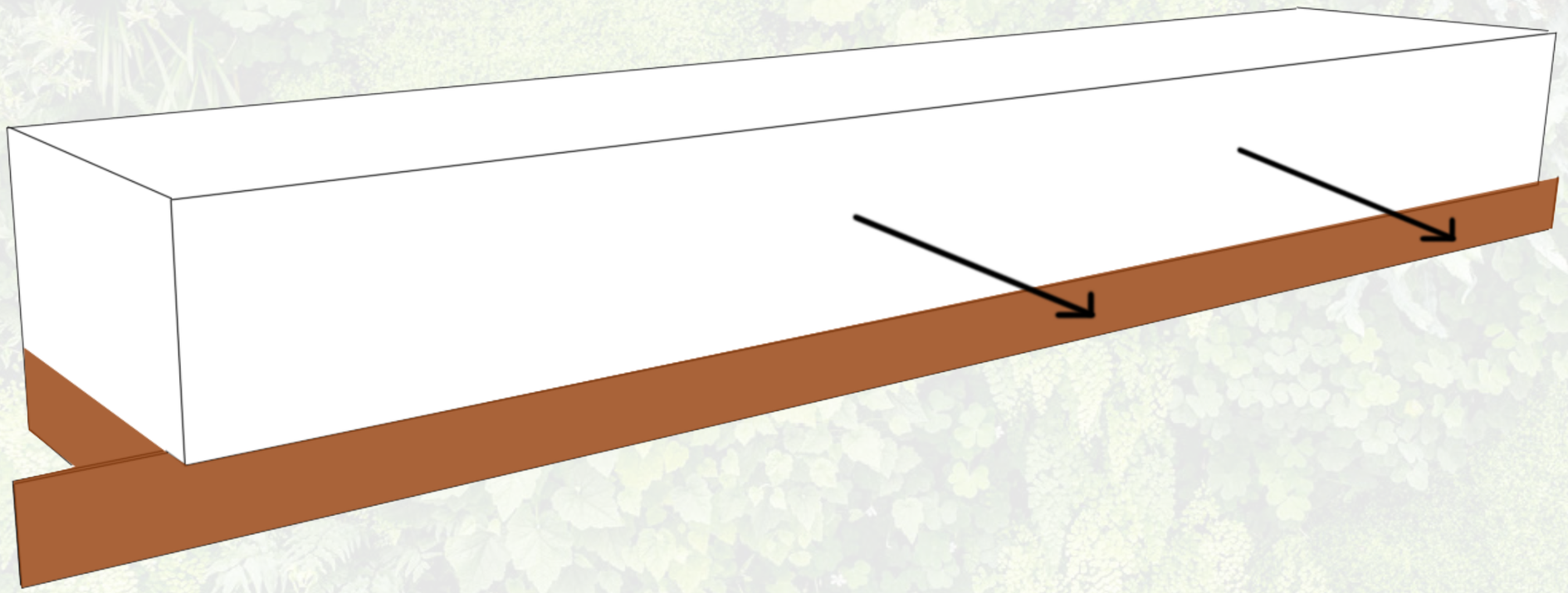




Design

Shape of the building

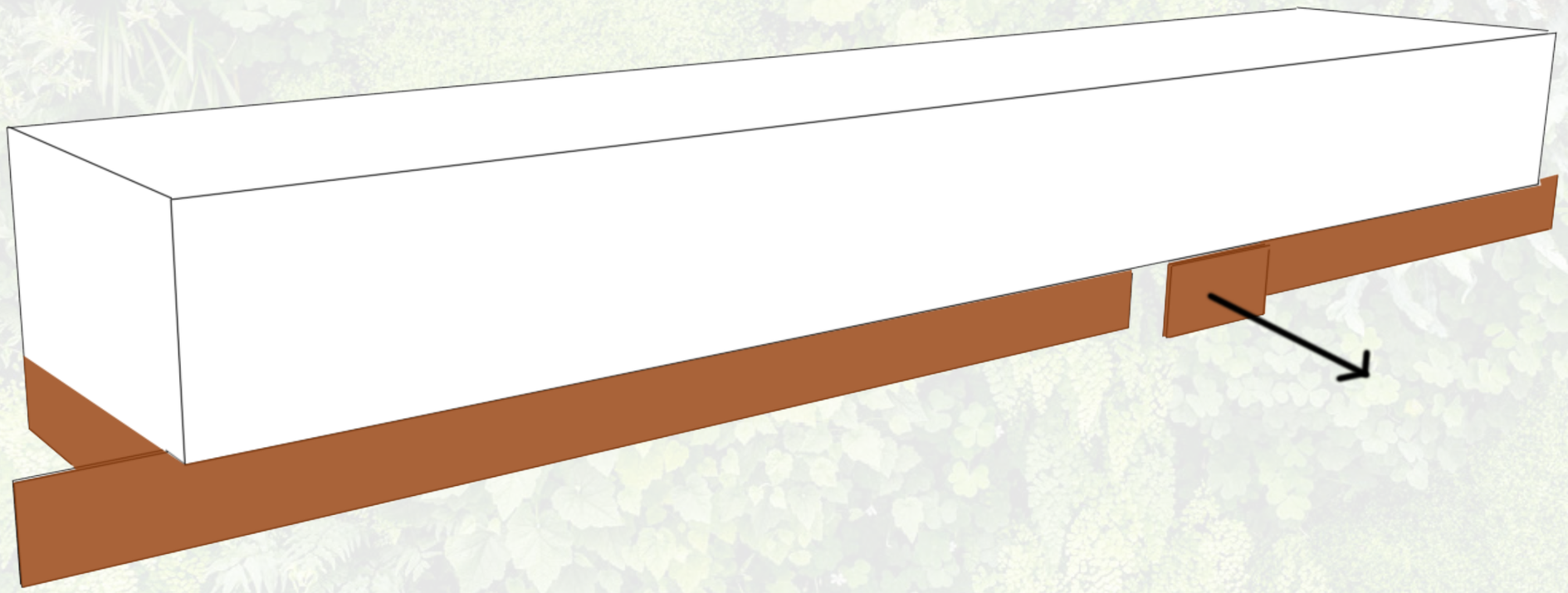
Make a connection over the wall



Design

Shape of the building

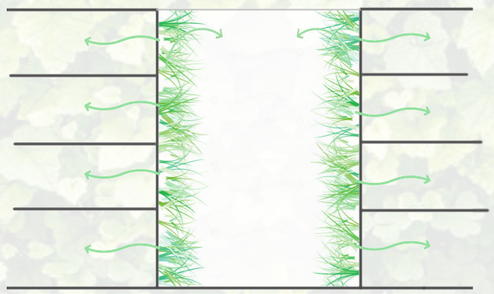
Make a connection through the wall

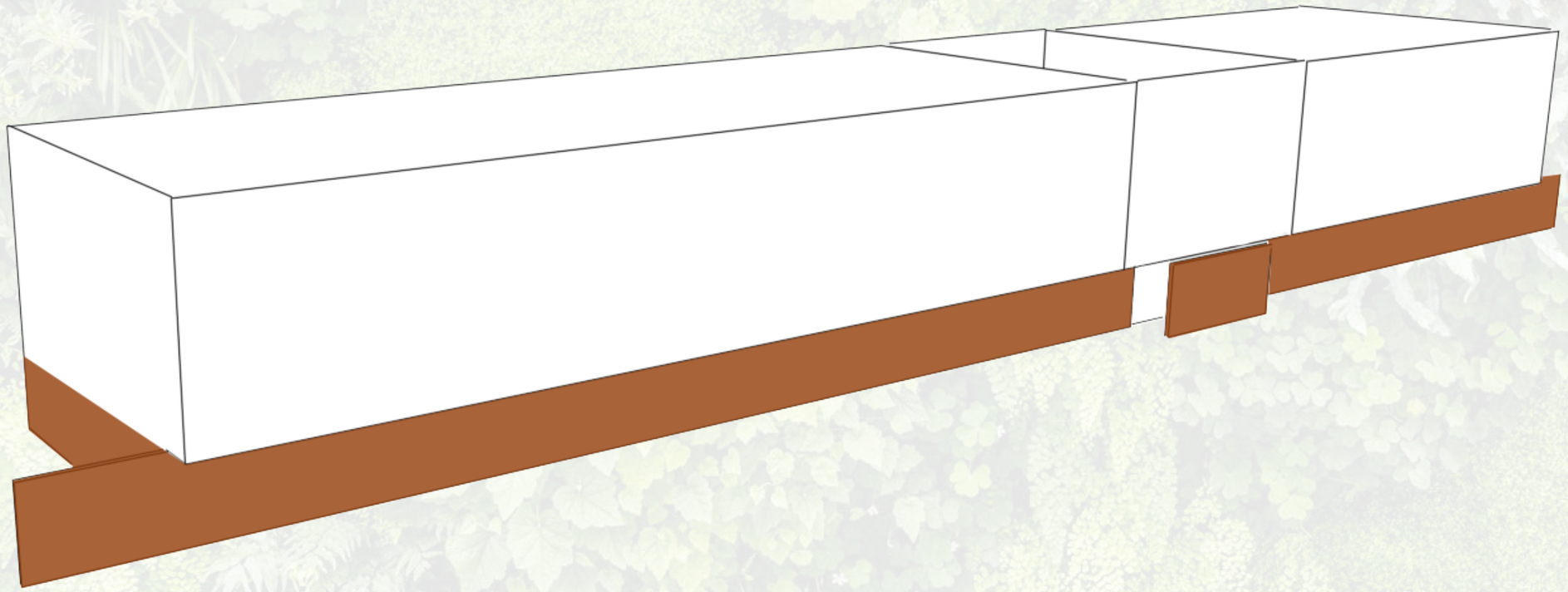


Design

Shape of the building

Clean the air with an active living wall system in the atrium

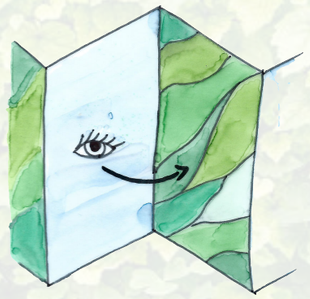




Design

Shape of the building

Create a zigzag shape to have view on the greenery

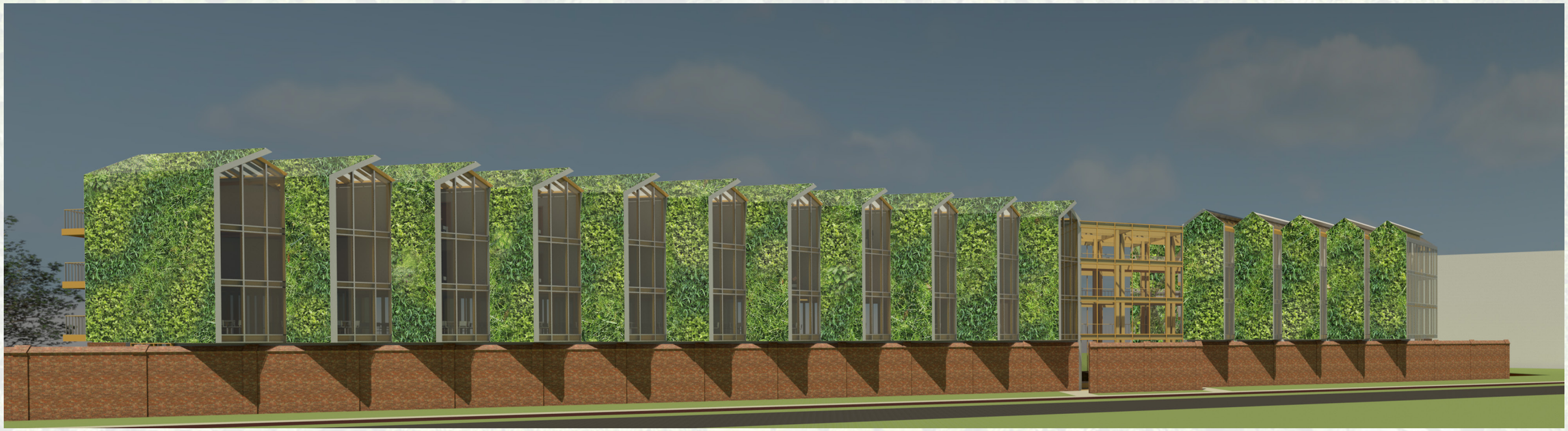


Design

Interaction between green and glass

Design

Interaction between green and glass



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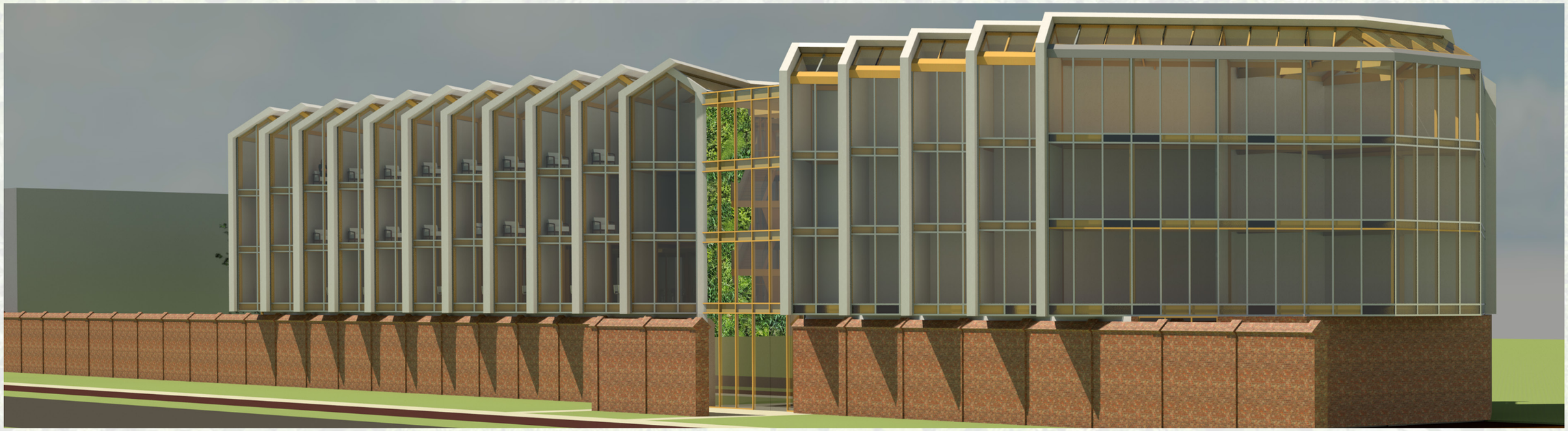
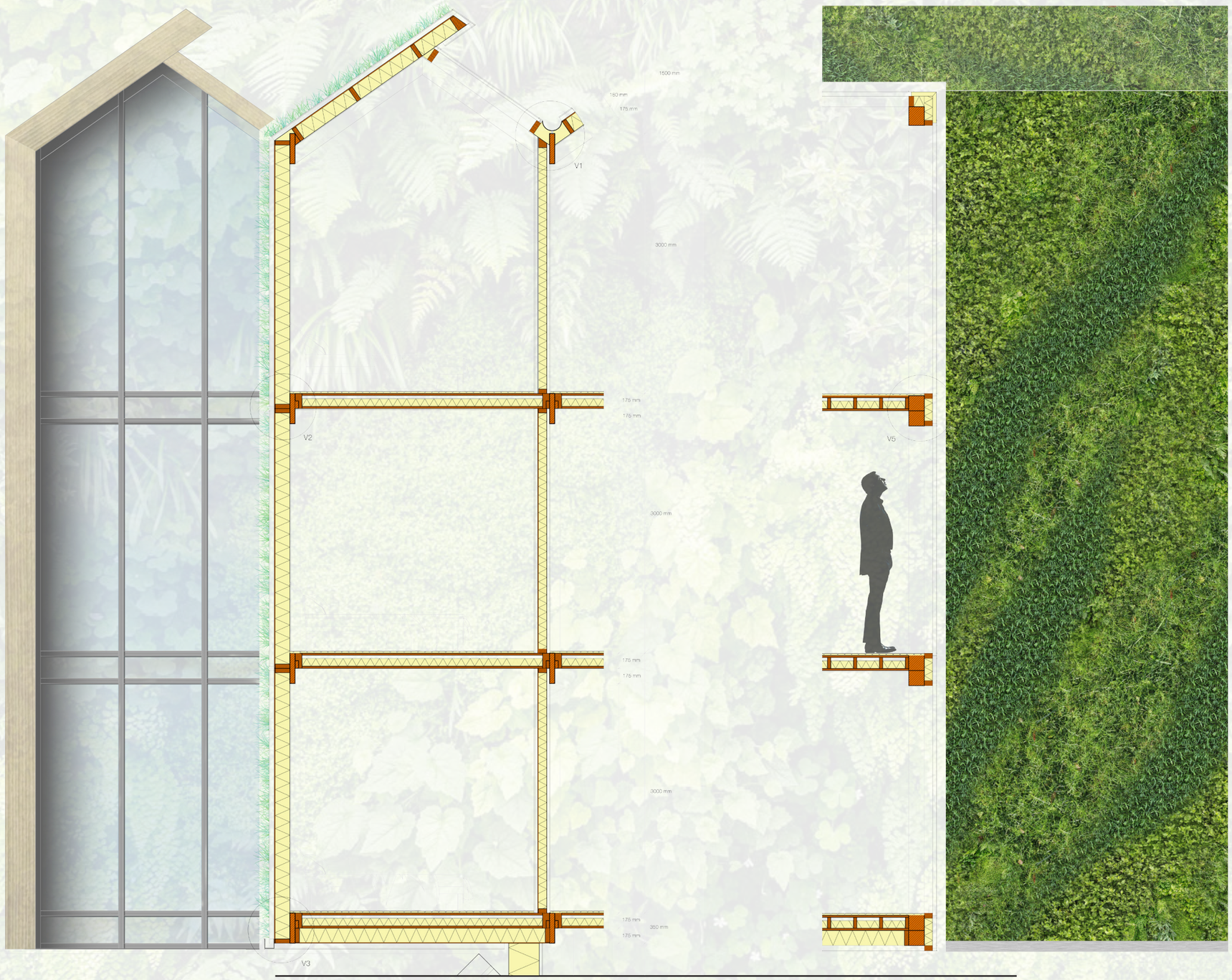


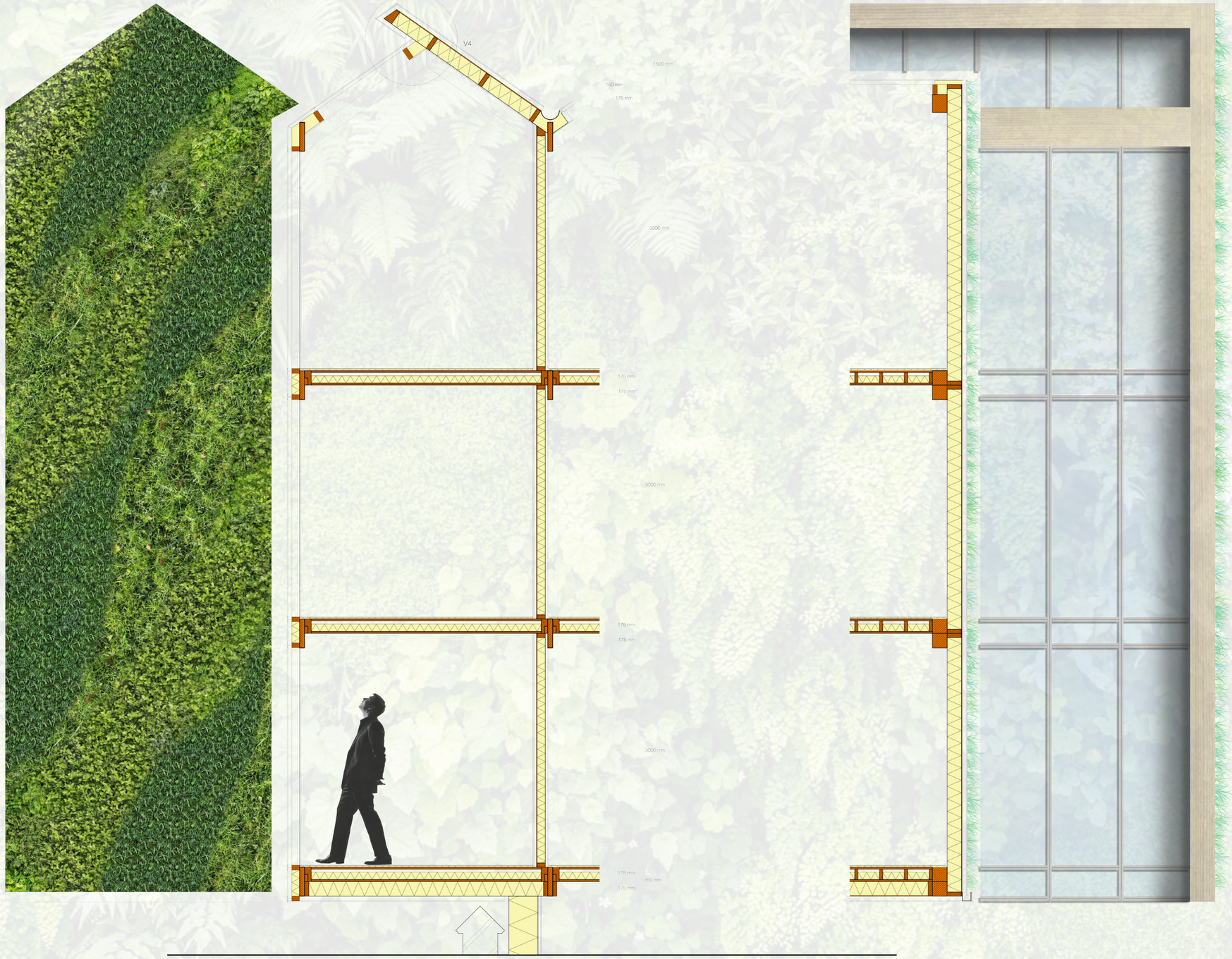
Design

Facade section



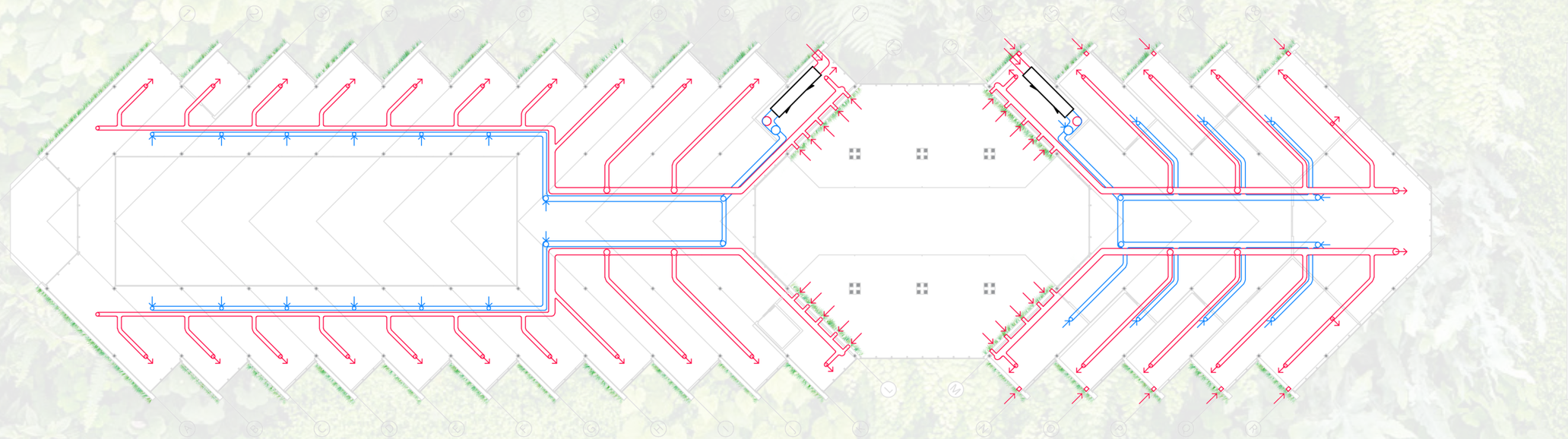
Design

Facade section



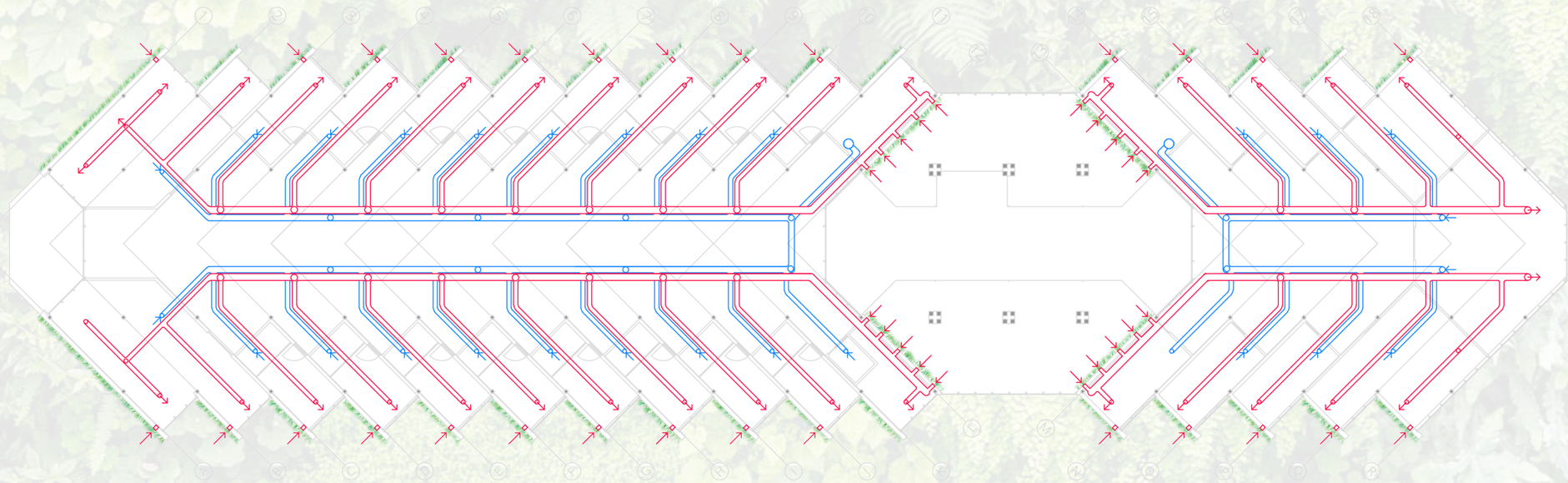
Design

Active living wall system



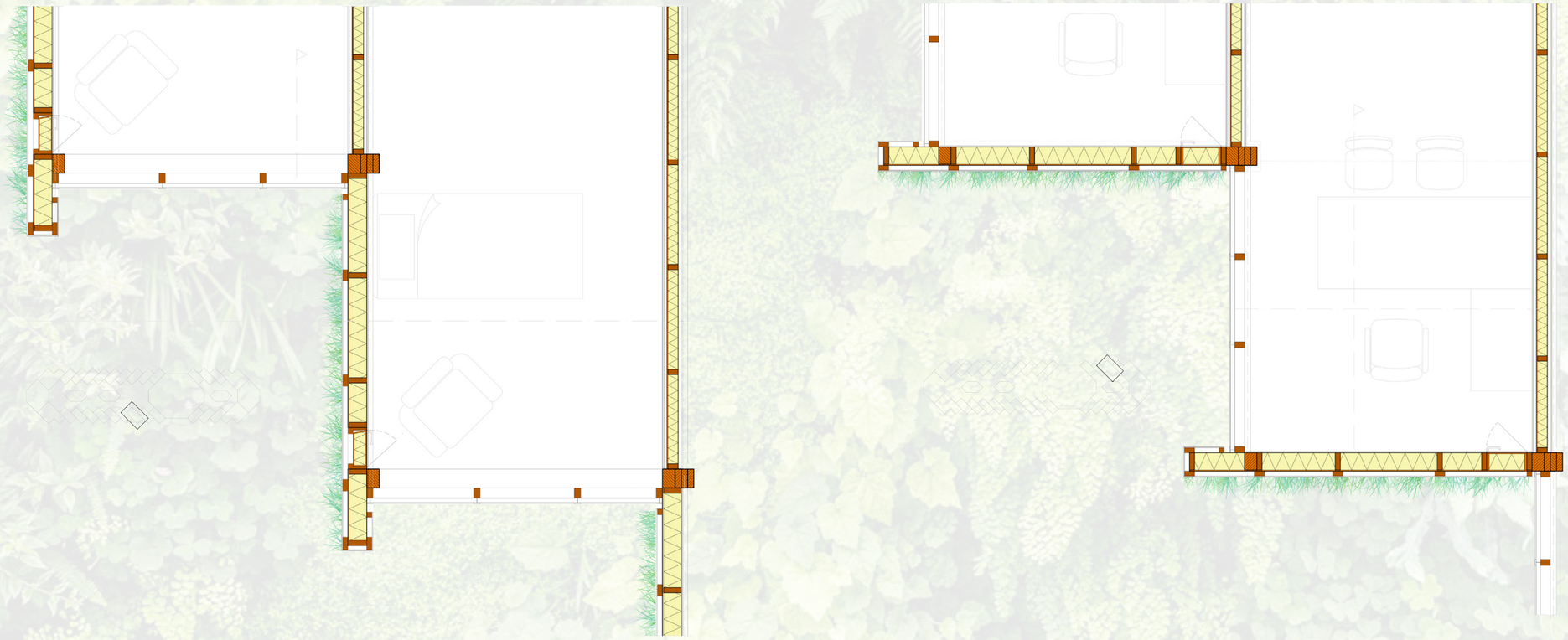
Design

Active living wall system



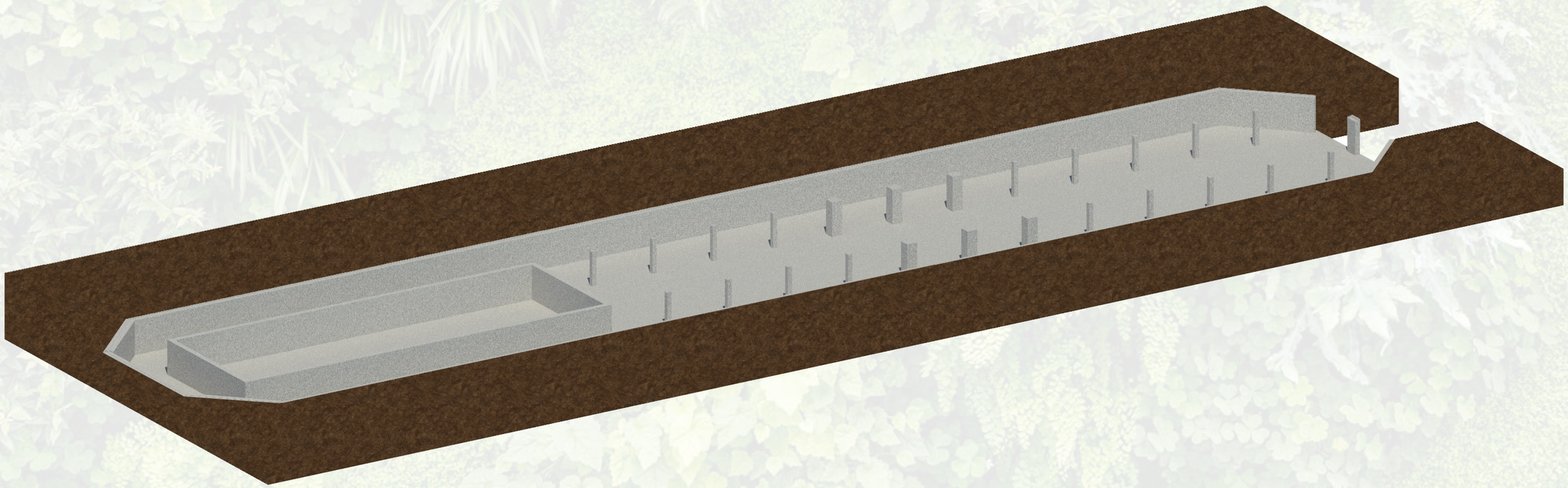
Design

Active living wall system



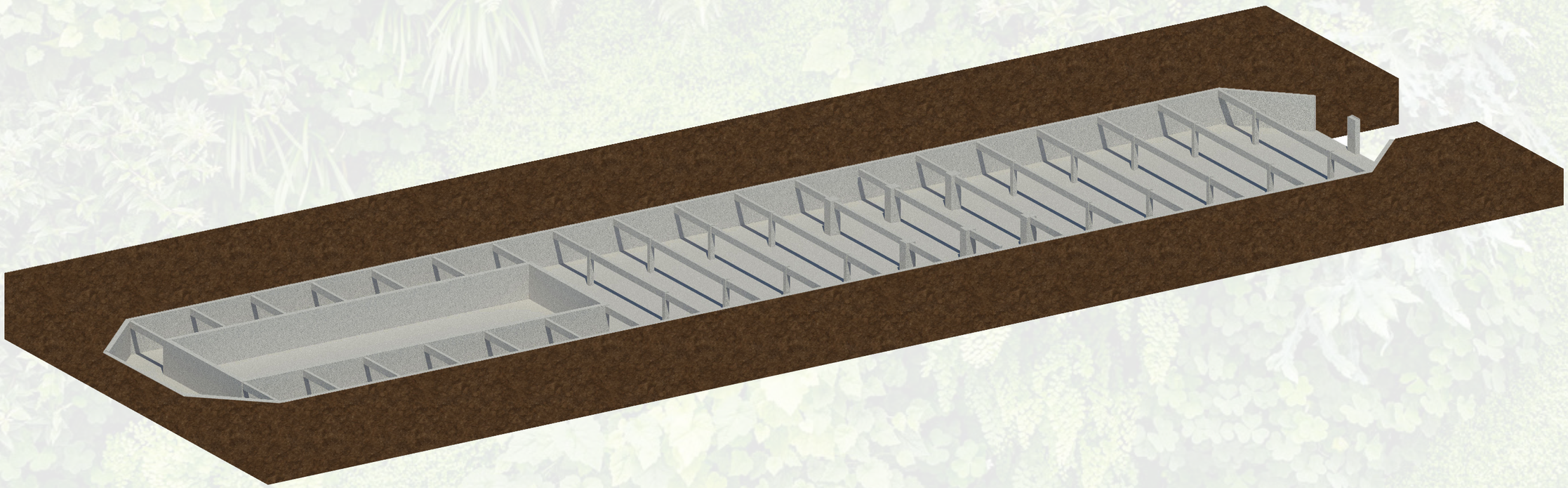
Design

Constuction



Design

Constuction



Design

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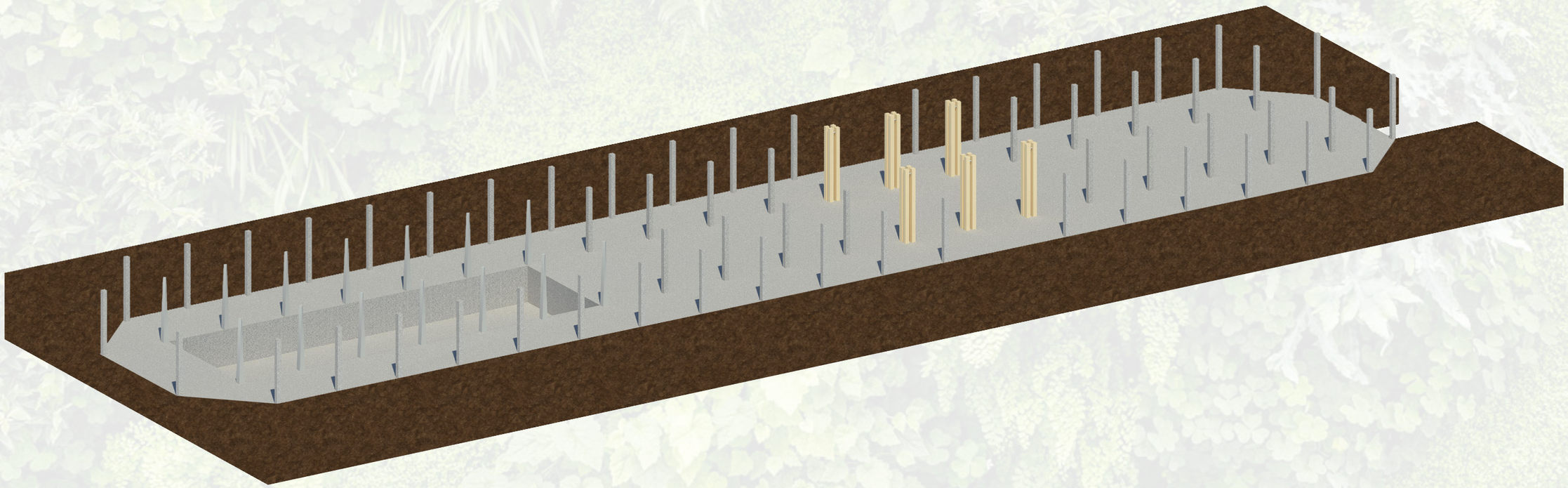

Design

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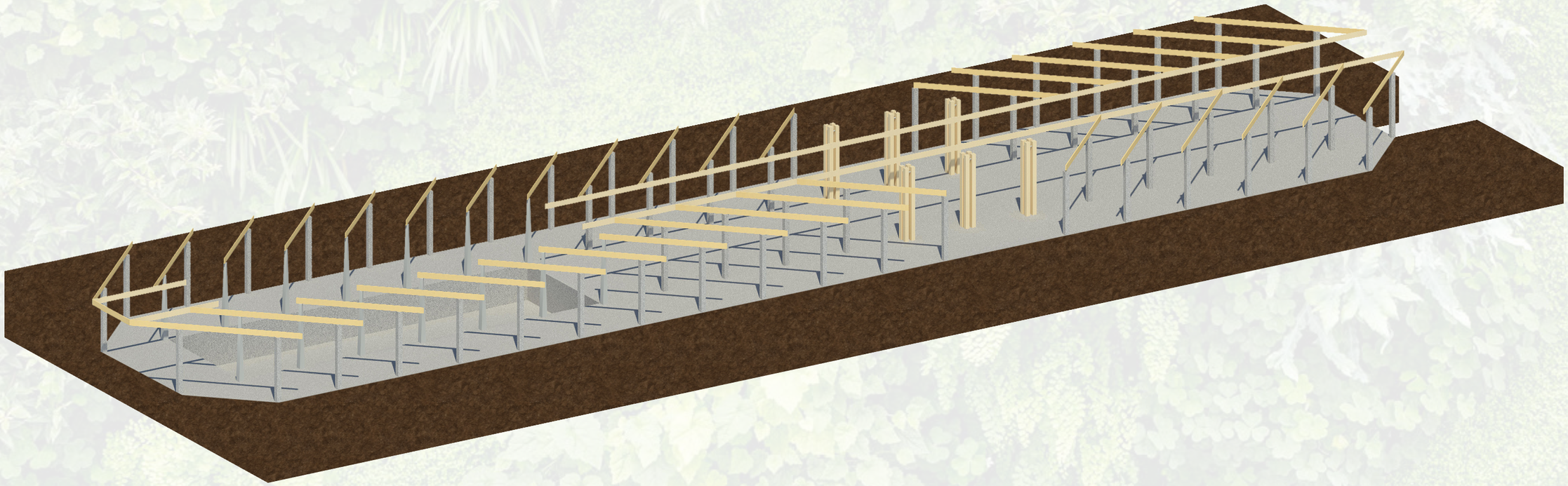

Design

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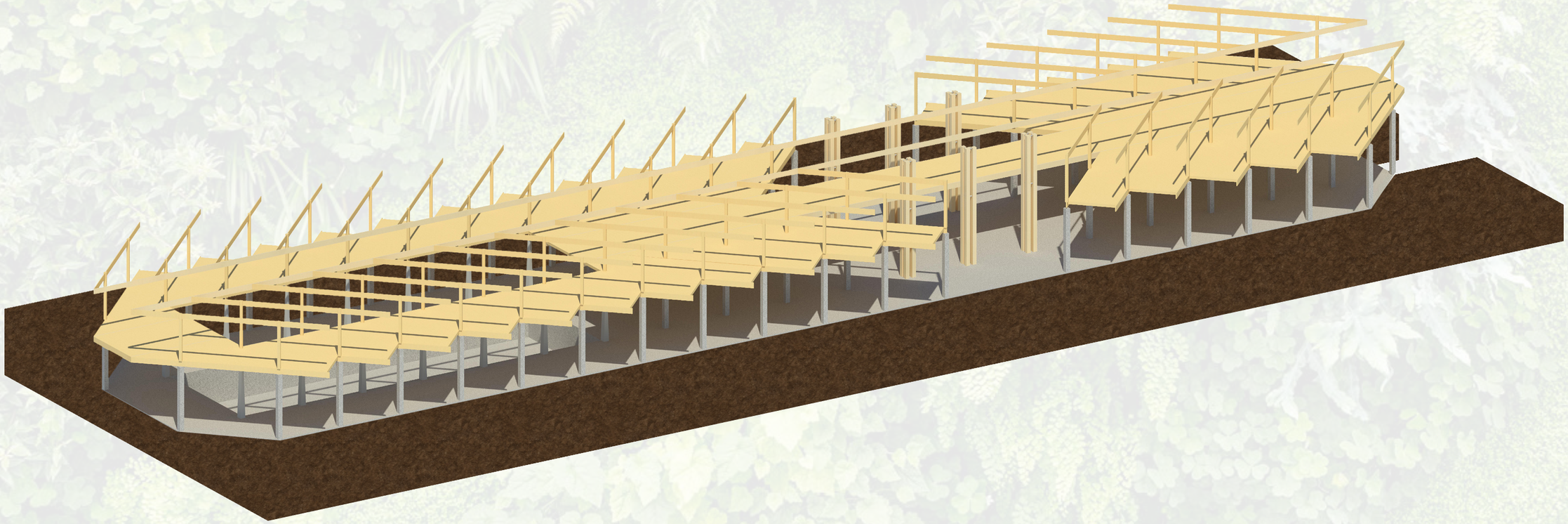

Design

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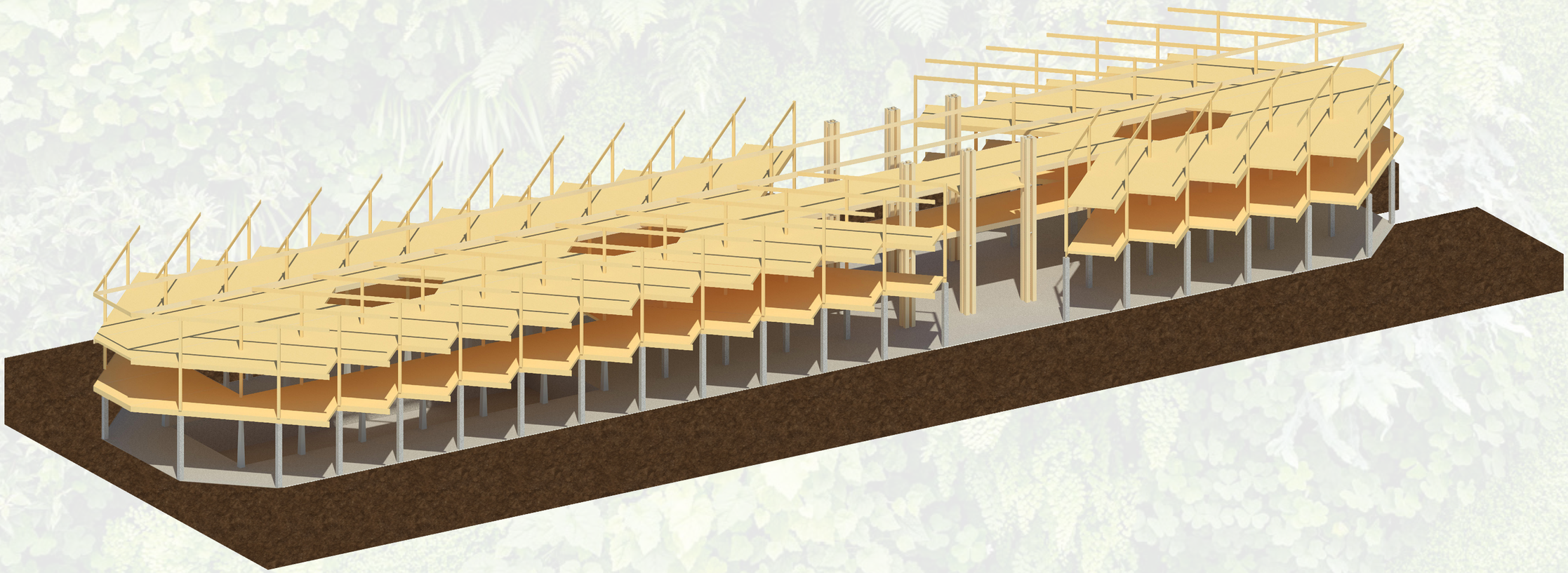

Design

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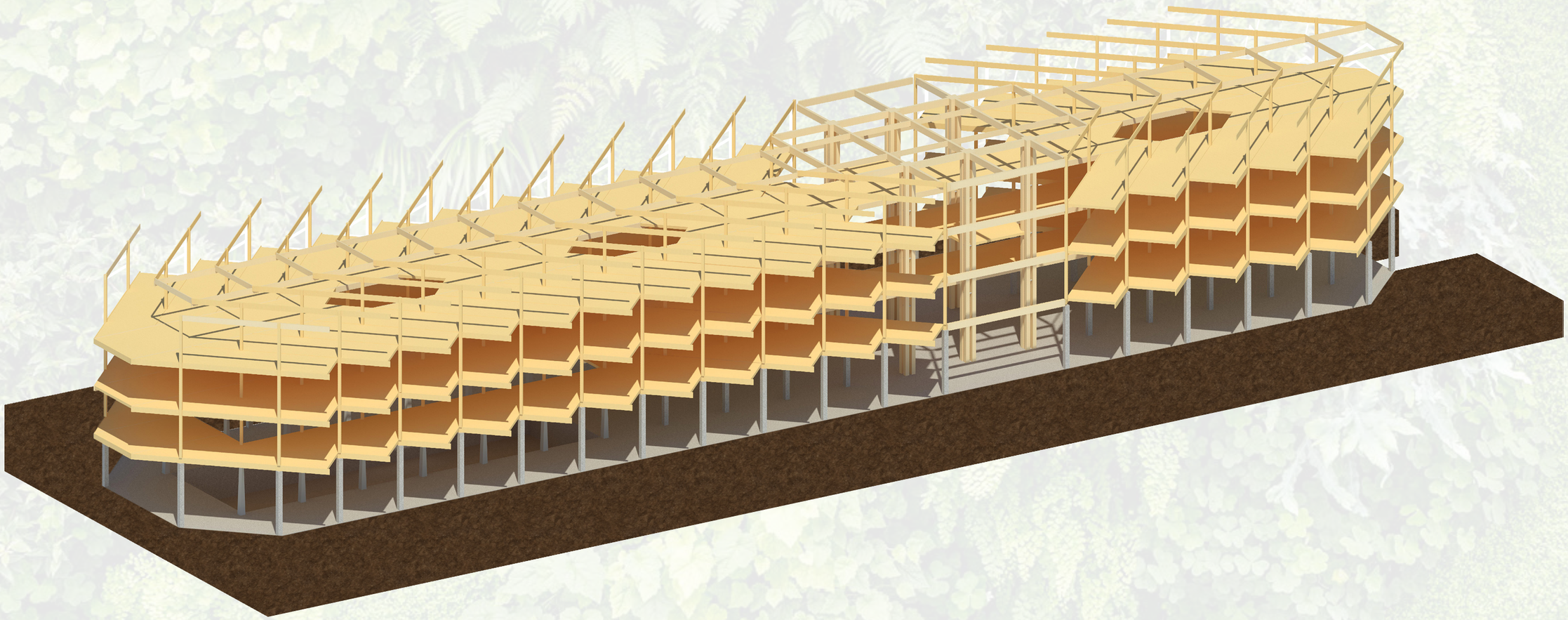

Design

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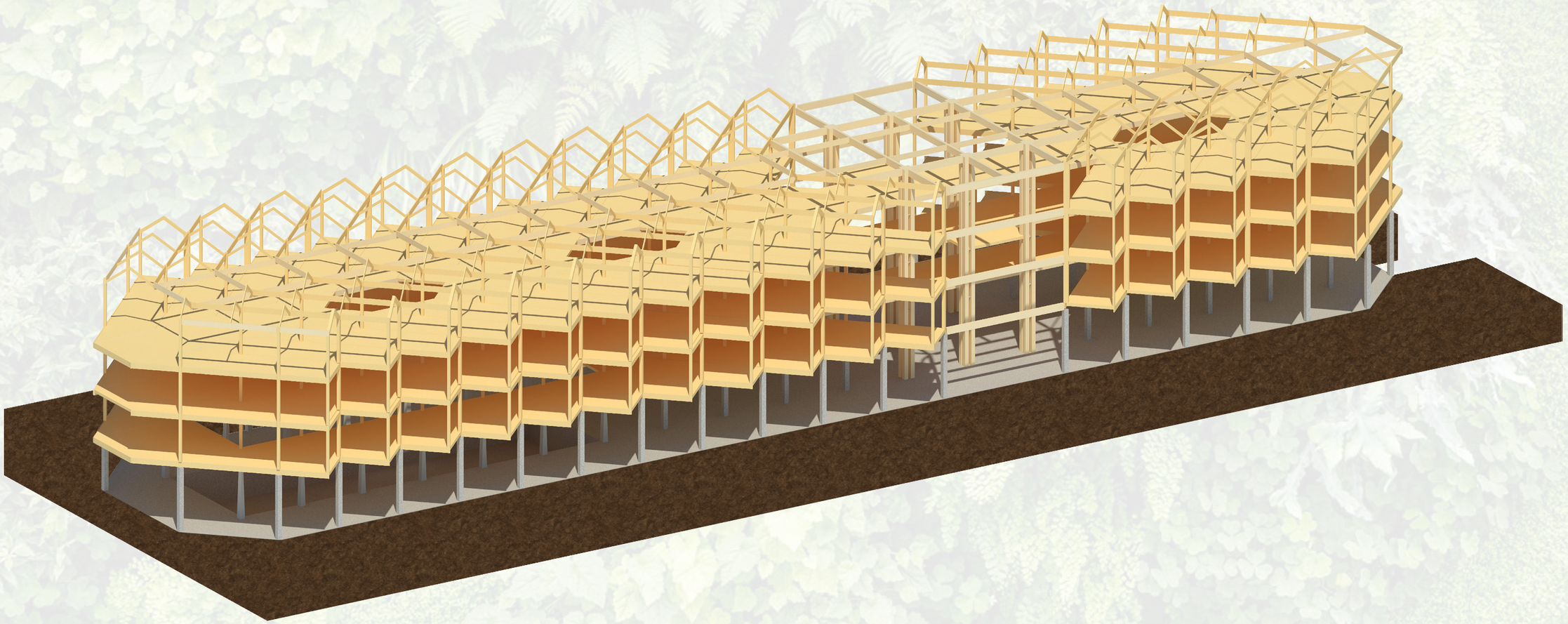
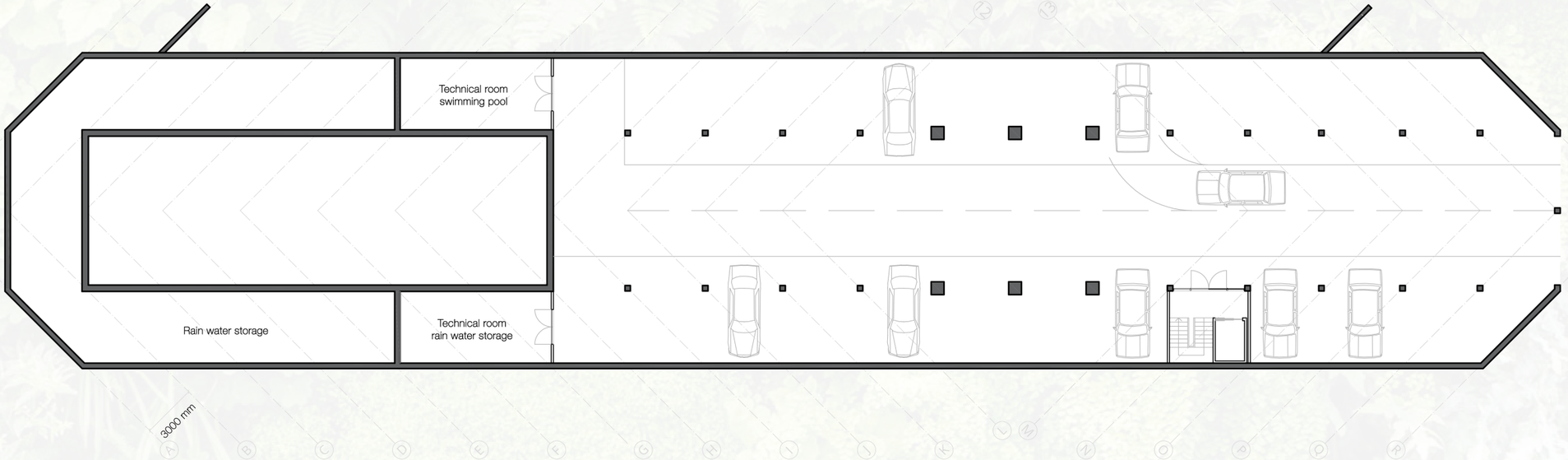


Design

Floorplans

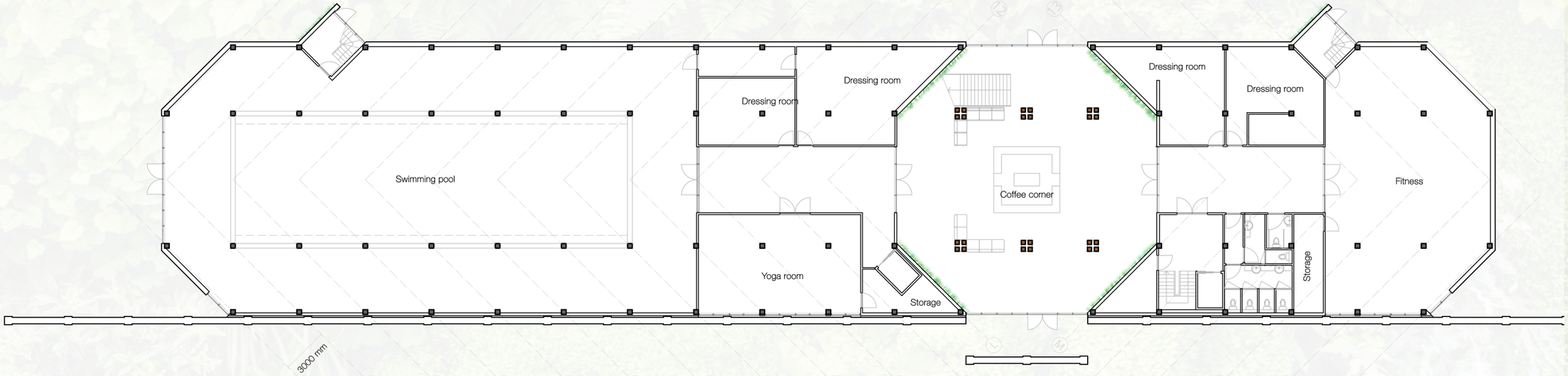
Parking garage



Design

Floorplans

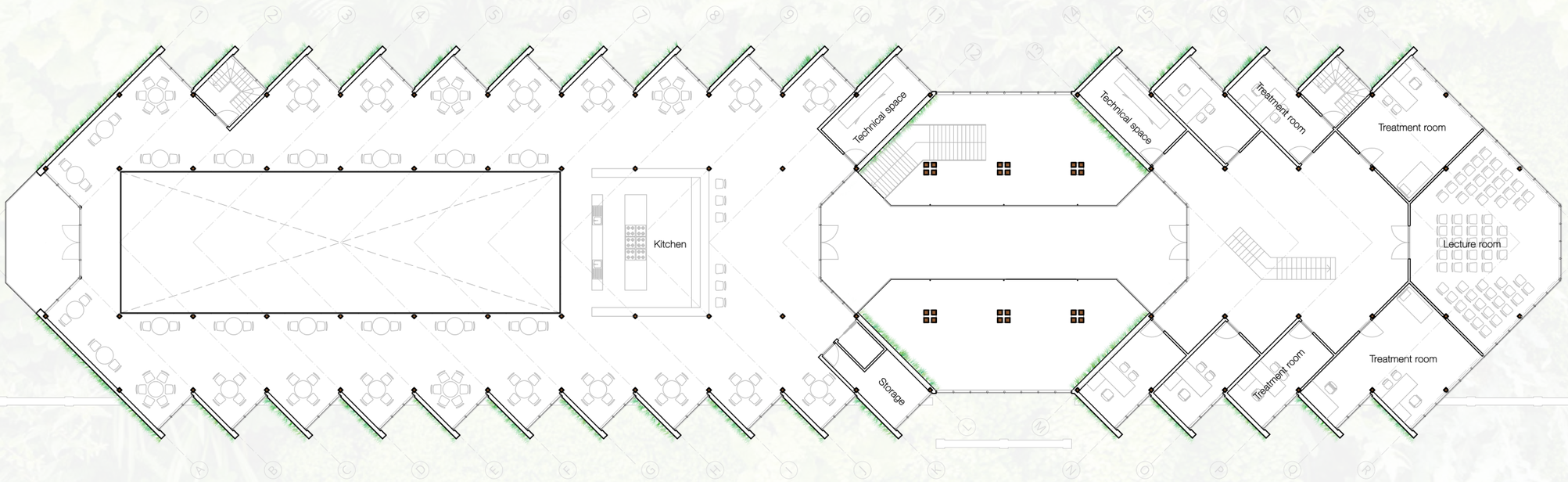
Ground floor



Design

Floorplans

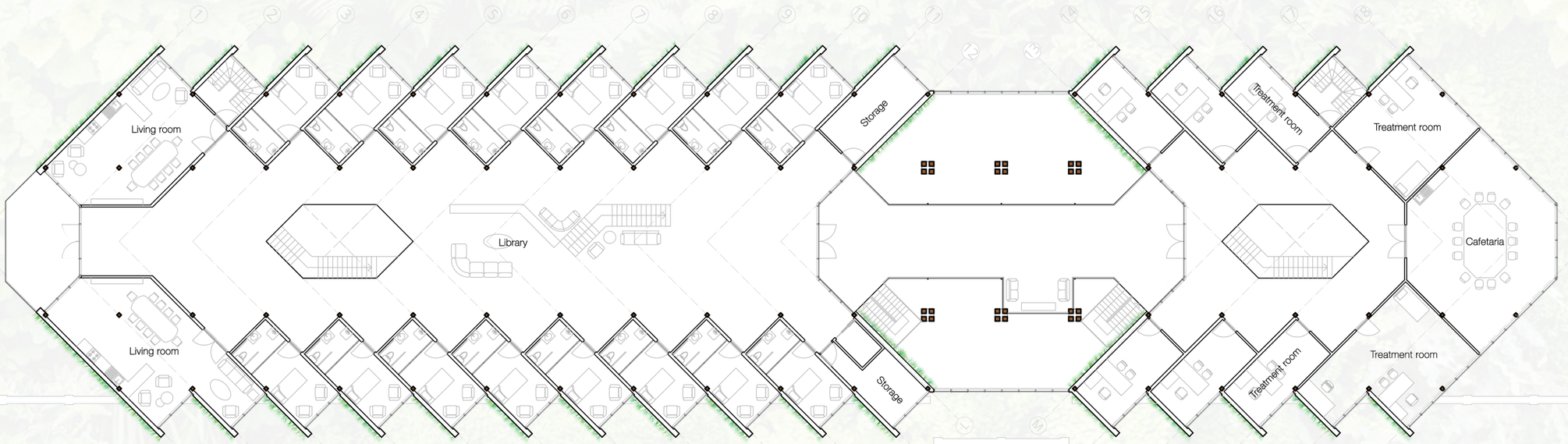
First floor



Design

Floorplans

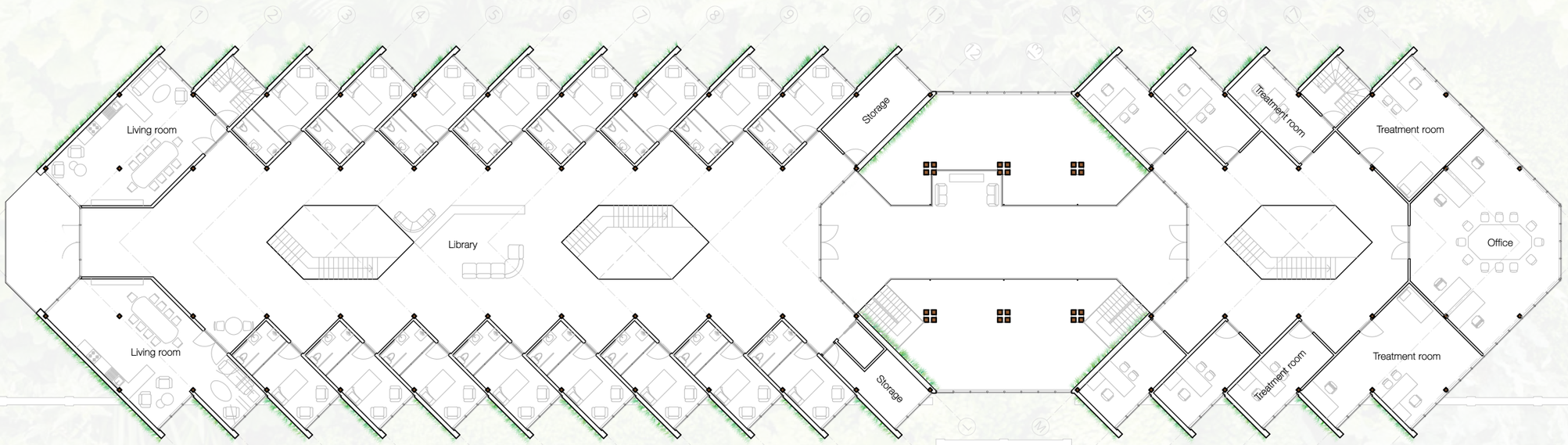
Second floor



Design

Floorplans

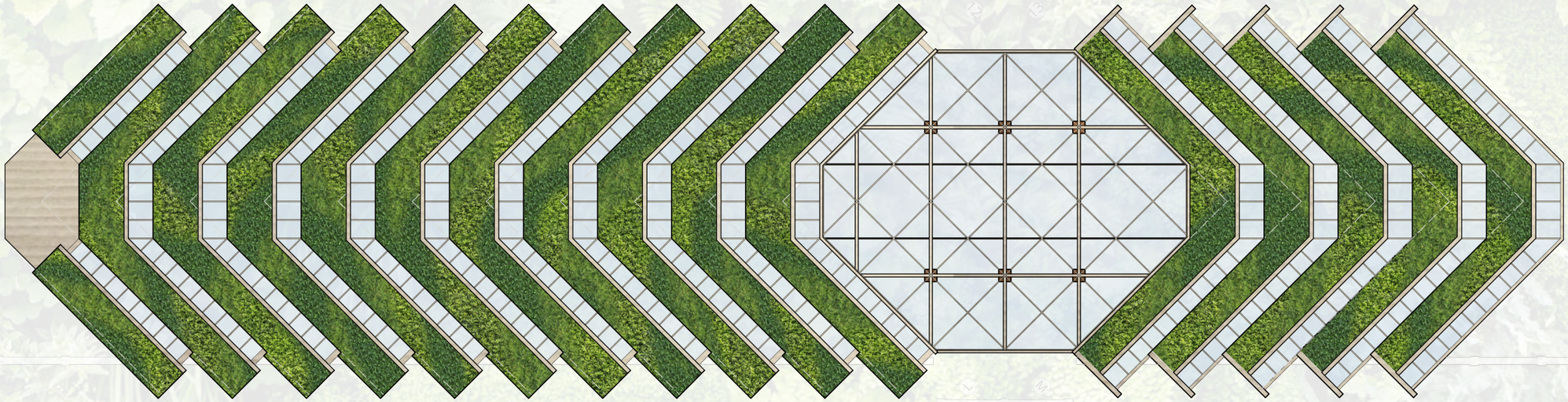
Third floor



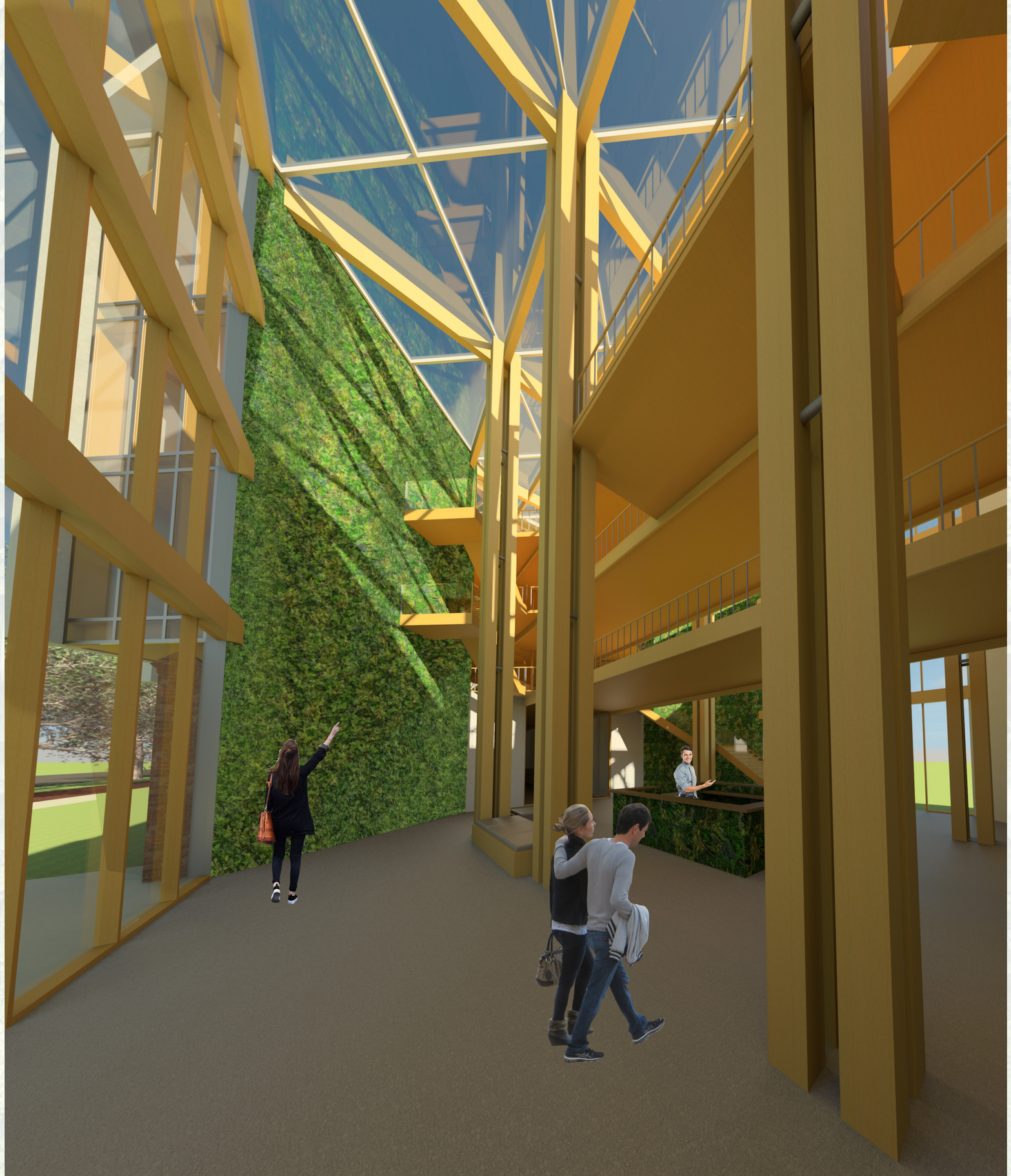
Design

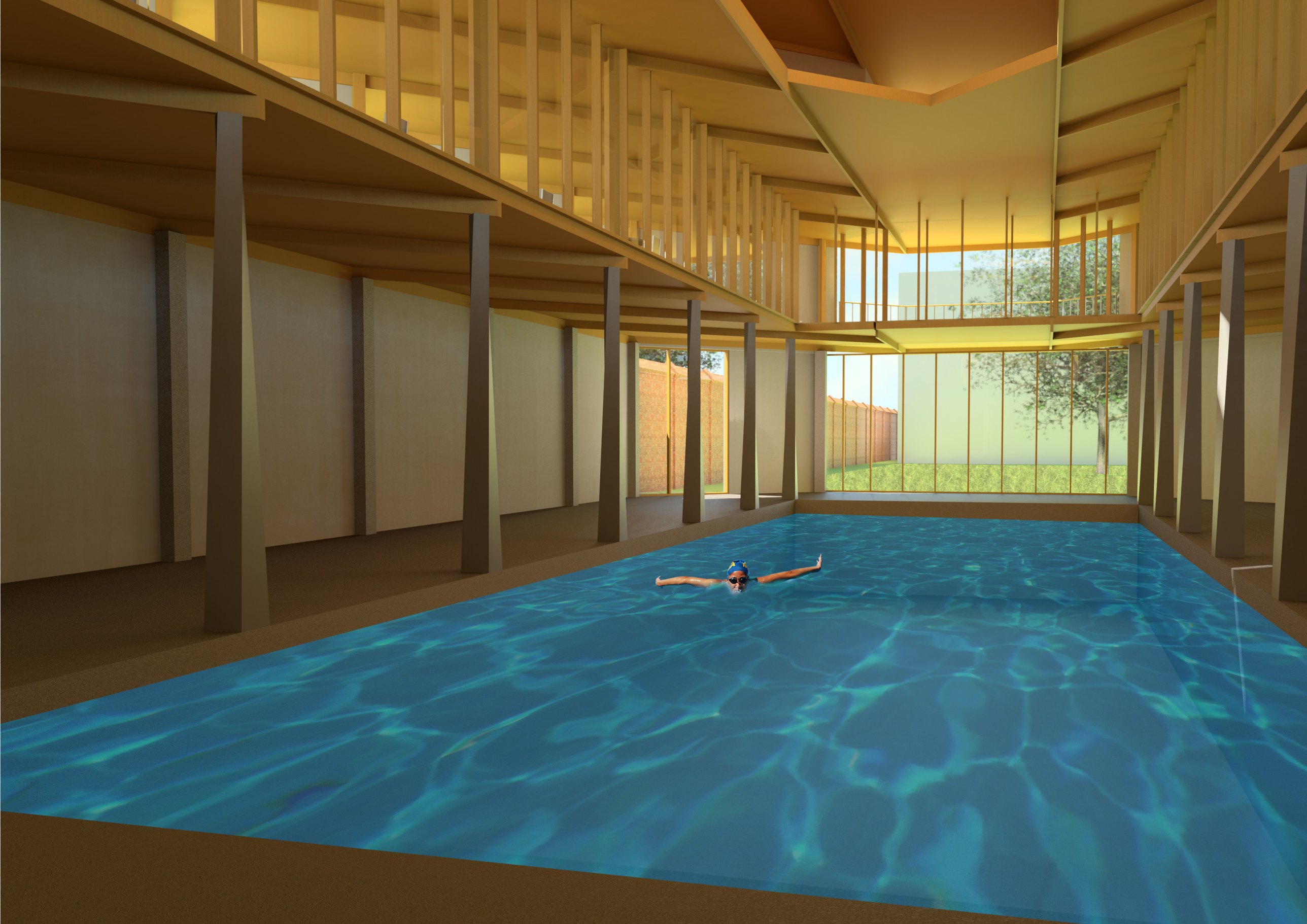
Floorplans

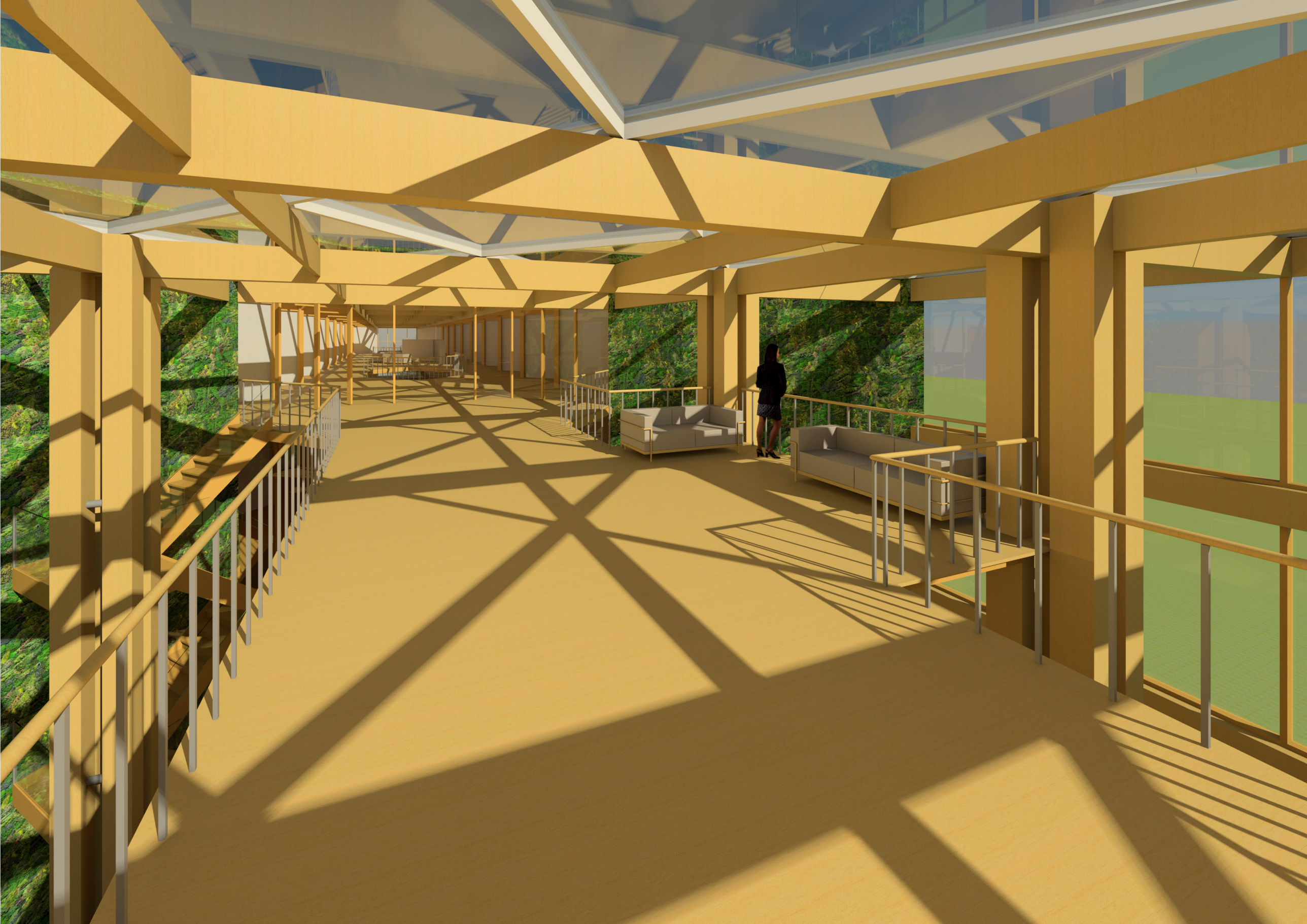
Roof

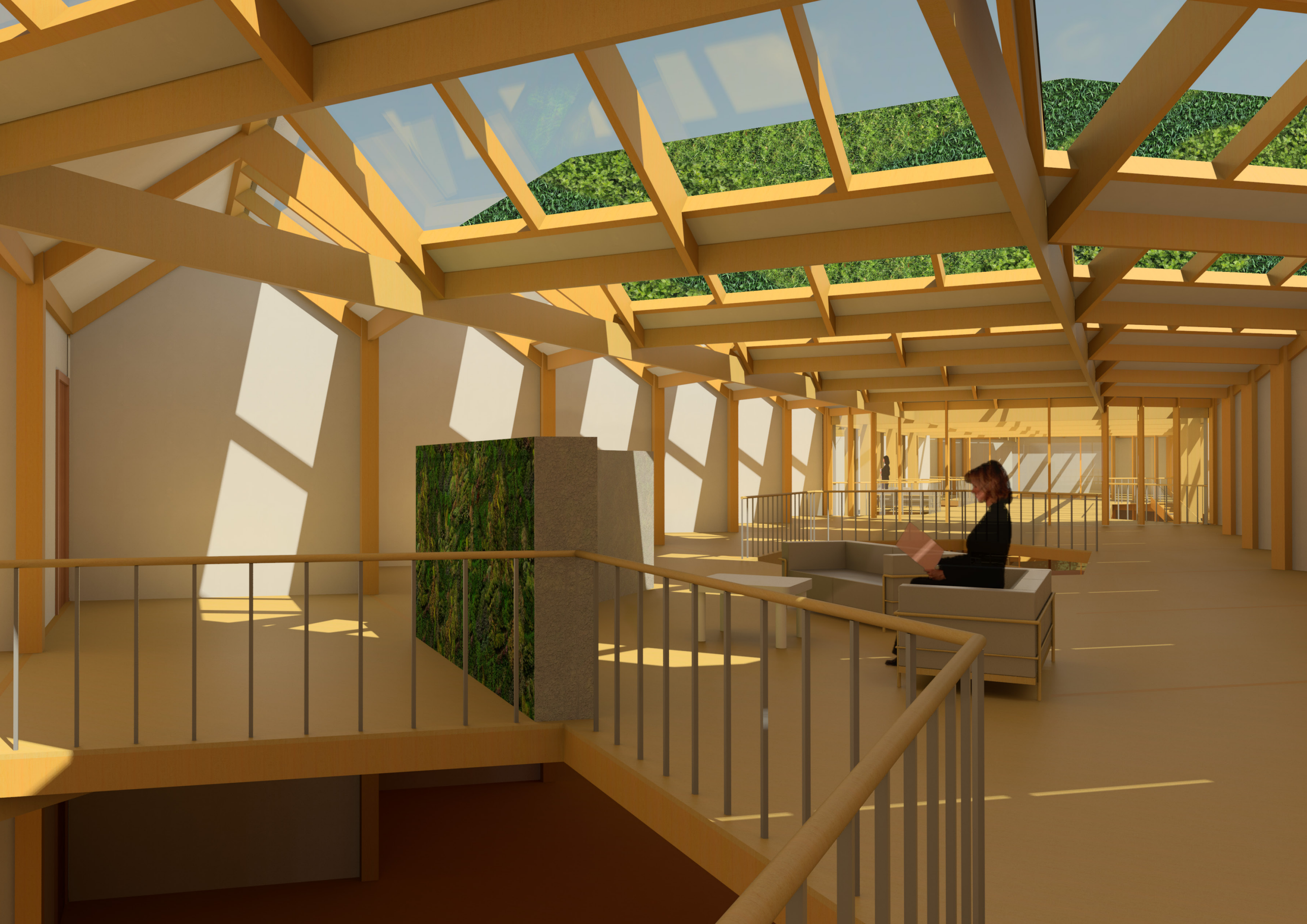


Problem statement - Objective - Research - Design









The ZigZag

Thank you!

Questions?