# The Knowledge Factory

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# Incubator - Symbiotic target groups

## Entrepreneurs / startups

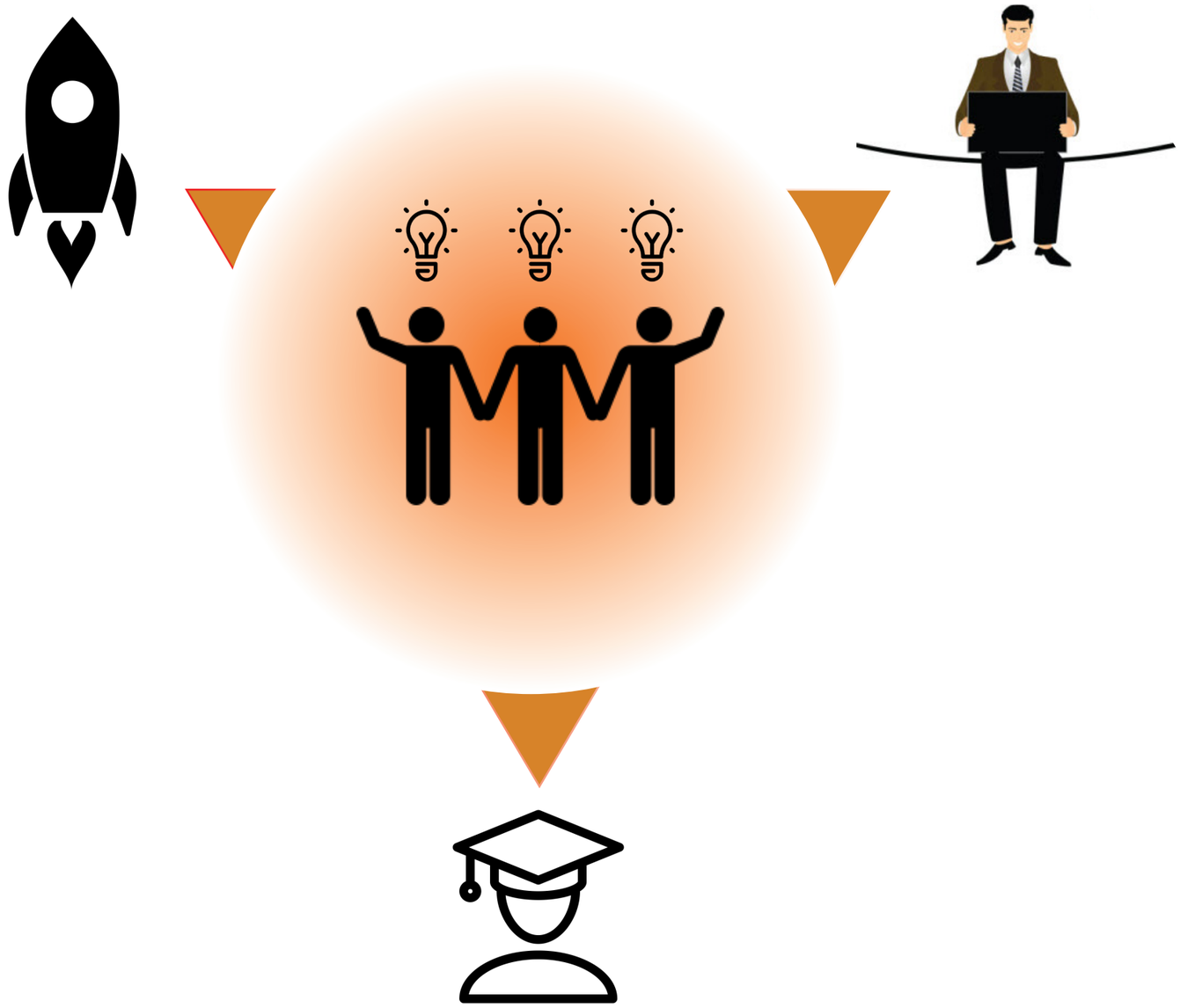
- Between 1 - 25 employees.
- No fixed income
- Rapid growth or decline
- No hierarchy
- Not all startups require their own office
- Require collaboration for them to thrive

## Freelancers

- Looking for places to network
- Important assets for startups
- Flexible hours

## Students

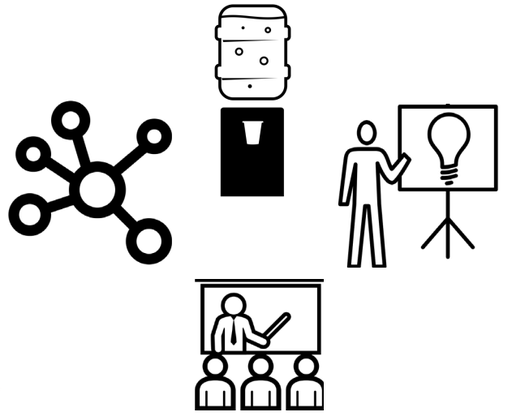
- Cheap assets for startups
- Require a space to study



# How to positively influence sharing?

**Increase sharing**

**Program**



**Physical**

**Mental**

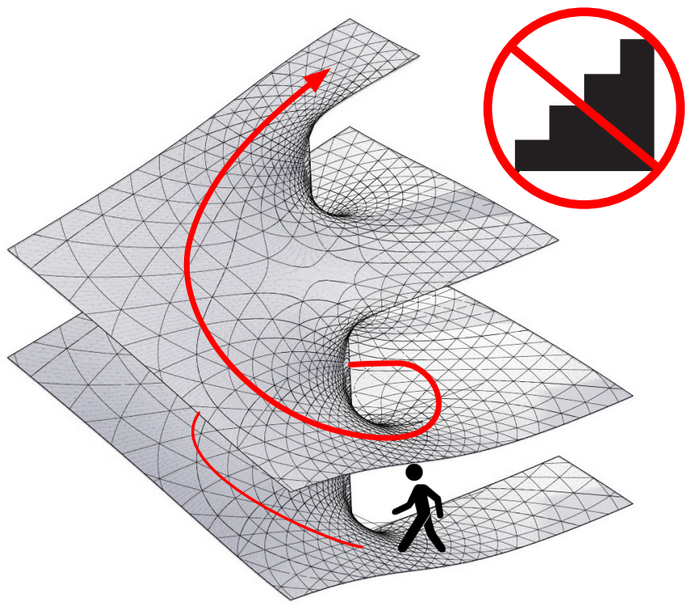
**Balance**

**Cognitive Architecture**

# Cognitive design rules

## People are inherently lazy

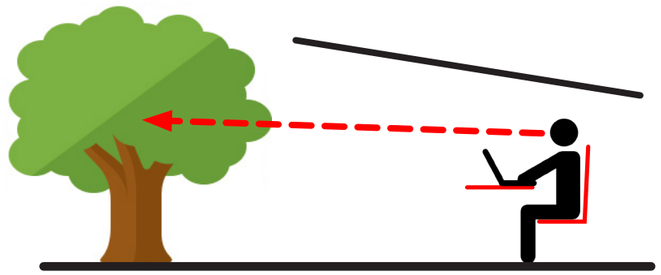
Continuous Workspace



- More incidental meetings
- Walking more often
- Enhanced way finding

## Nature Heals

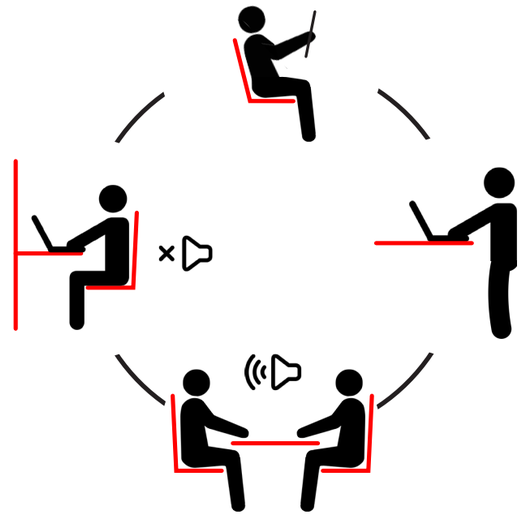
Biophilic attraction



- Reduces stress
- Point of interest
- Natural daylight has the same effect

## Out of sight, Out of mind

Activity based workspaces



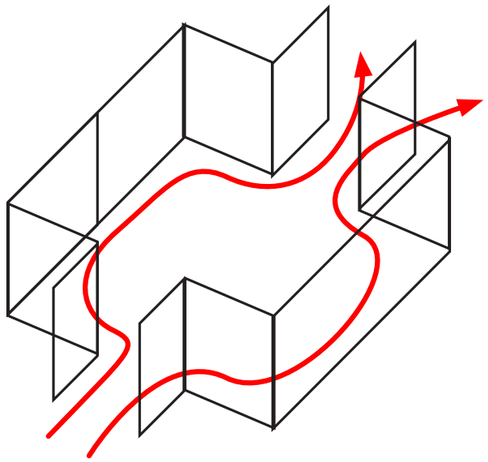
- More incidental meetings
- Reduces stress
- Less privacy issues
- Promote physical activity

**Environmental Psychology 2nd edition: People and their physical settings - Proshanksky, Ittelson, Rivlin (1980)*
**Environmental Psychology - Bell, Greene, Fisher, Baum (2001)*

# Cognitive design rules

## Wall-hugging creatures

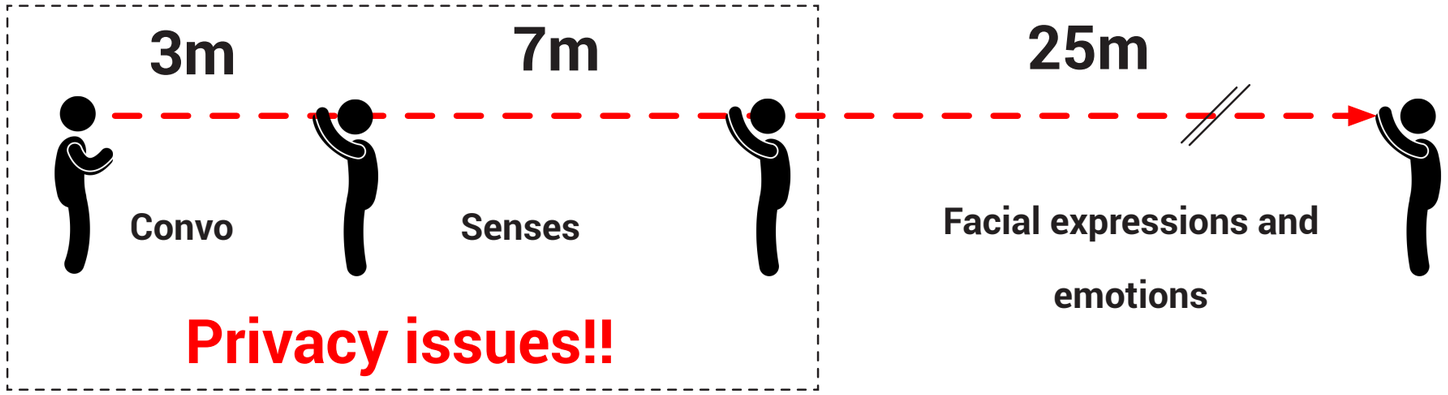
Only walls that are required



- Prevent unnecessary social separation
- Increased way-finding

## Social field of vision

Privacy optimization

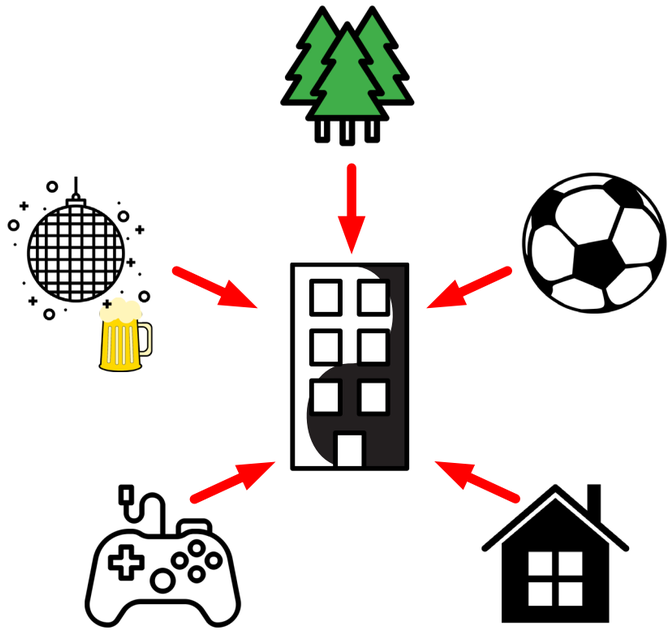



- Interior density and partition location

**Environmental Psychology 2nd edition: People and their physical settings - Proshanksky, Ittelson, Rivlin (1980)*
**Environmental Psychology - Bell, Greene, Fisher, Baum (2001)*

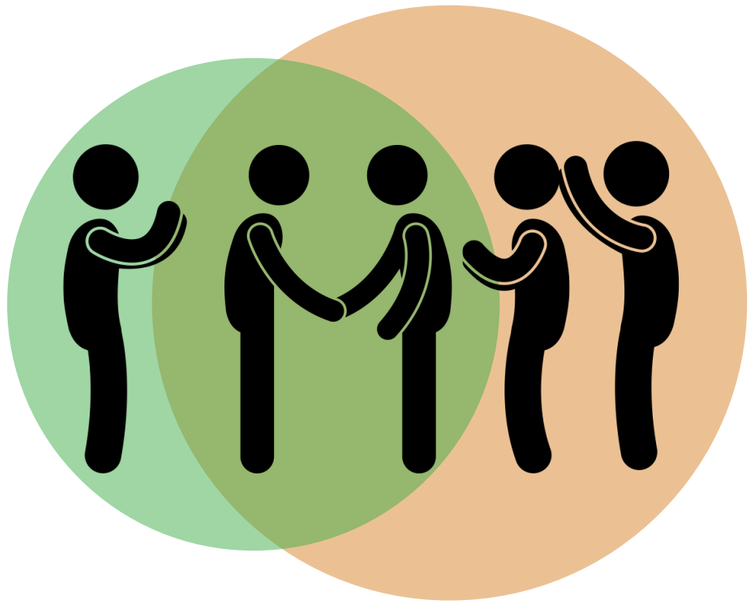
# Programmatic design rules

## Balanced program



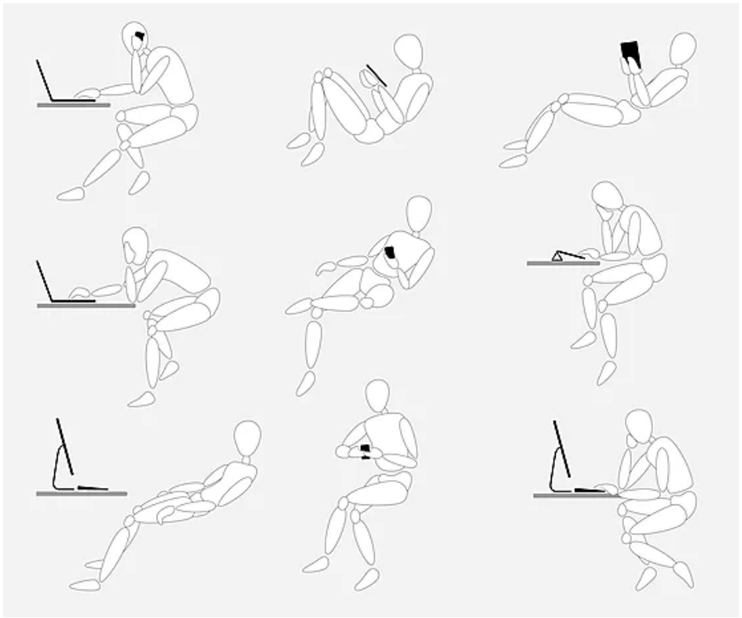
- Provides informal opportunities to network

## Share space



- Allow startups to grow inside the building - physically
- Clustering of startups can result in innovation

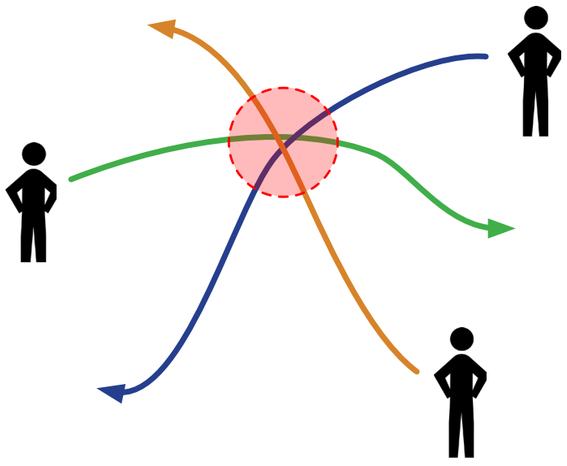
## Everybody is different



- Different ways of working require different body positions
- Everyone is unique, new body positions emerge constantly

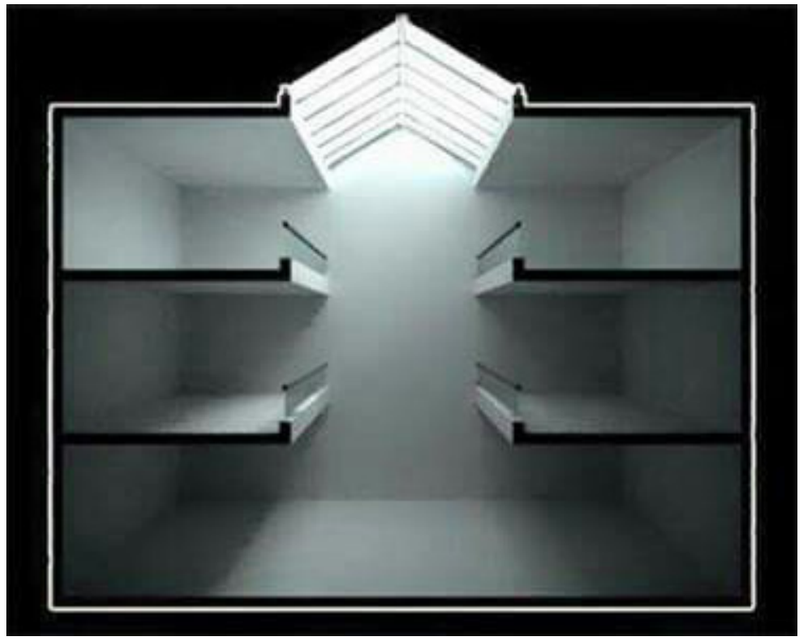
# Optimization design rules

## Circulation



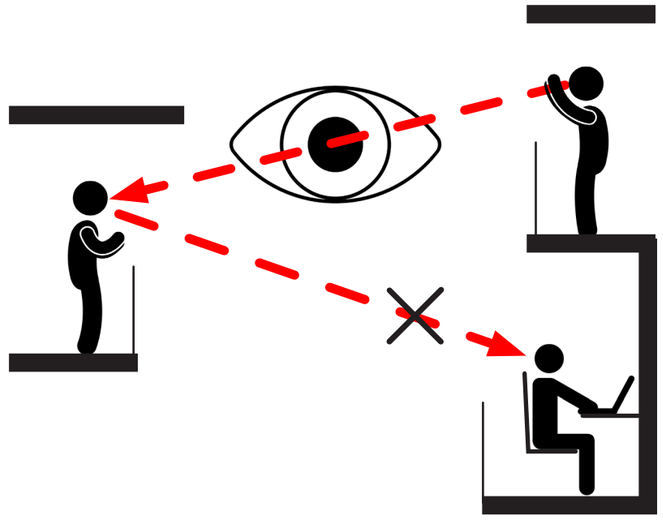
- Can result in incidental meetings - stimulates cross-fertilization
- Determines level of privacy in space
- Way finding is increased by identity

## Daylight



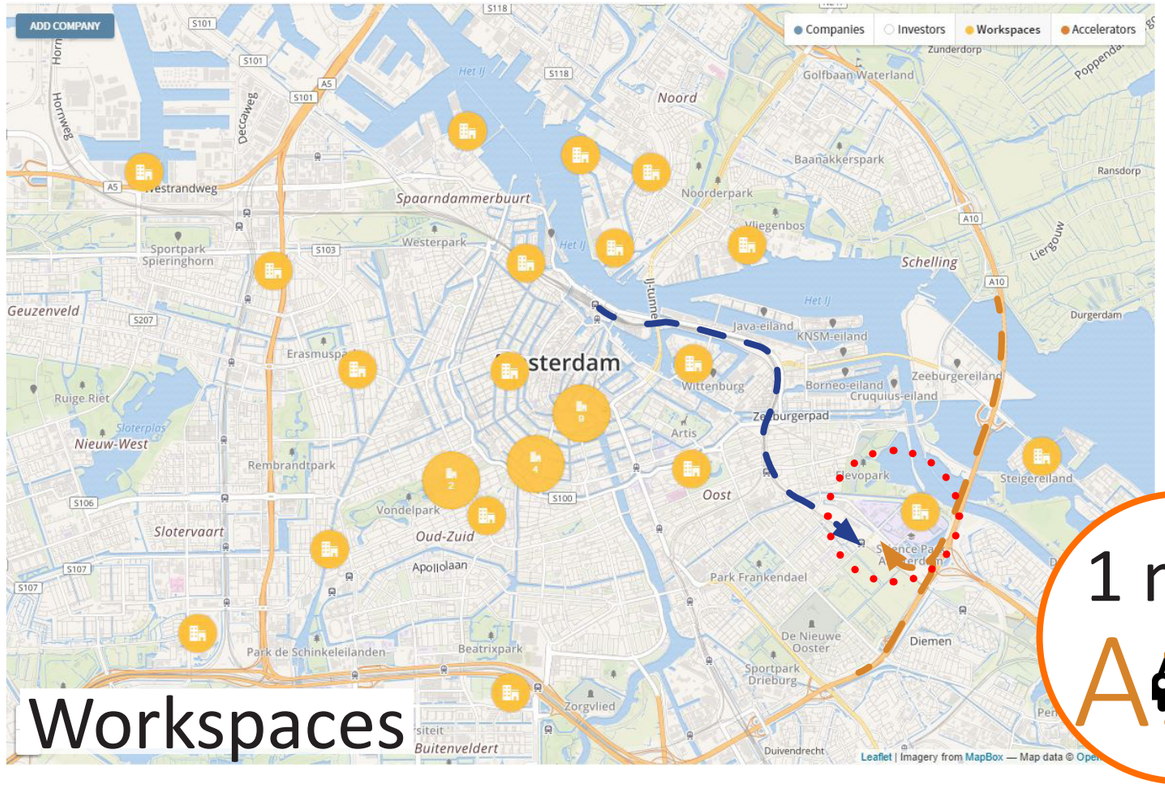
- Directly related to wellbeing
- Reduces need for artificial lightning

## Visual interaction



- Transparent acoustic barrier can induce interaction and reduce distraction
- Determines the likelihood of meeting
- Determines publicness of a space

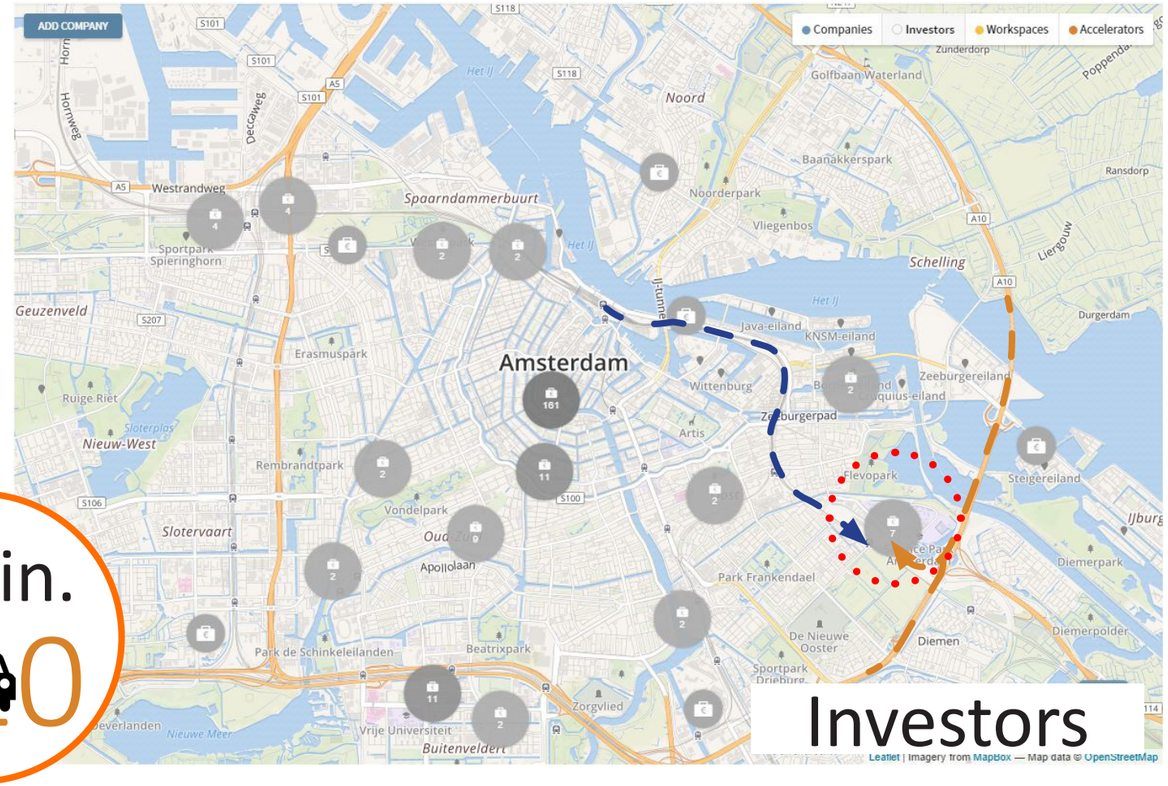
# Connectivity Amsterdam




Workspaces

1 min.

A10

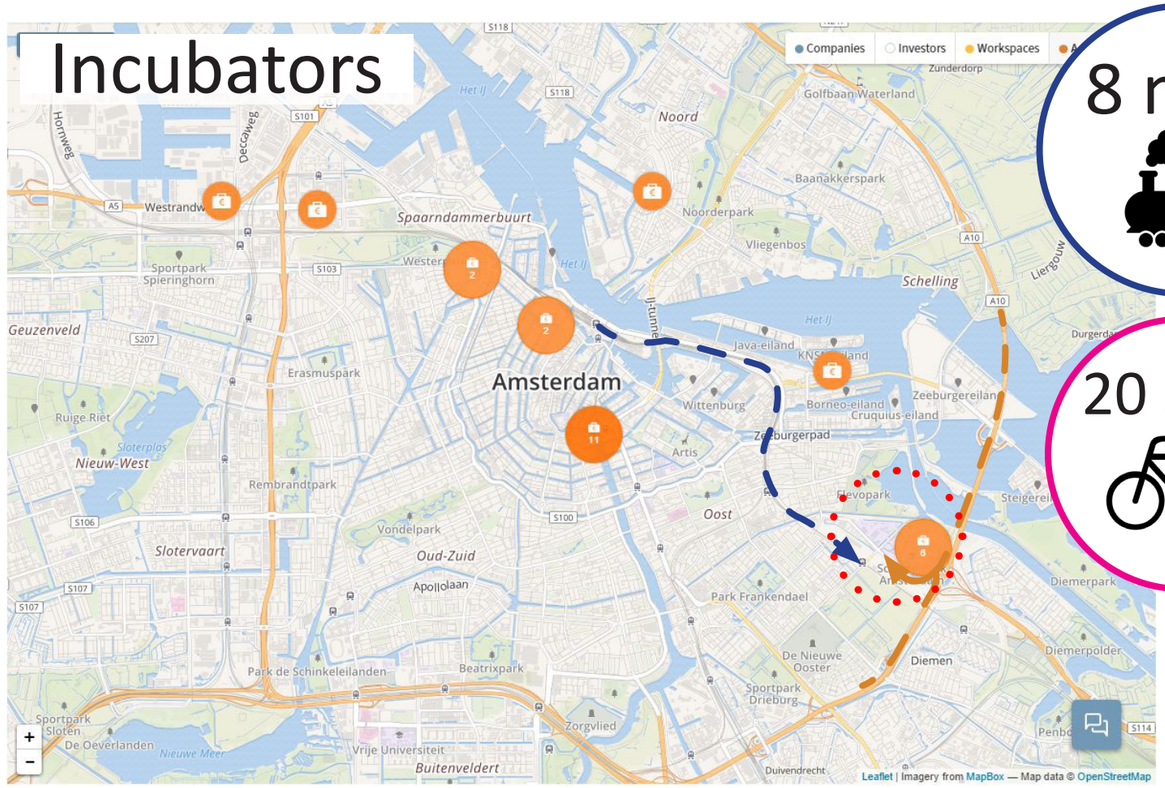



Investors

Incubators

8 min.

20 min.

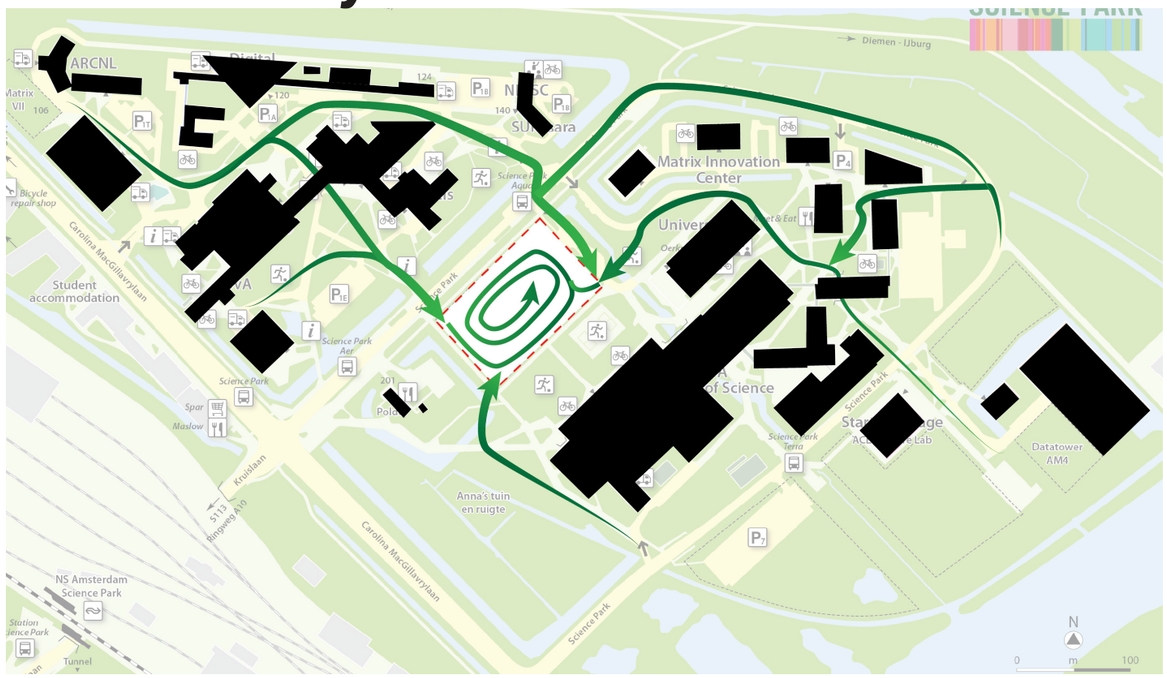



Companies

# Amsterdam Science Park

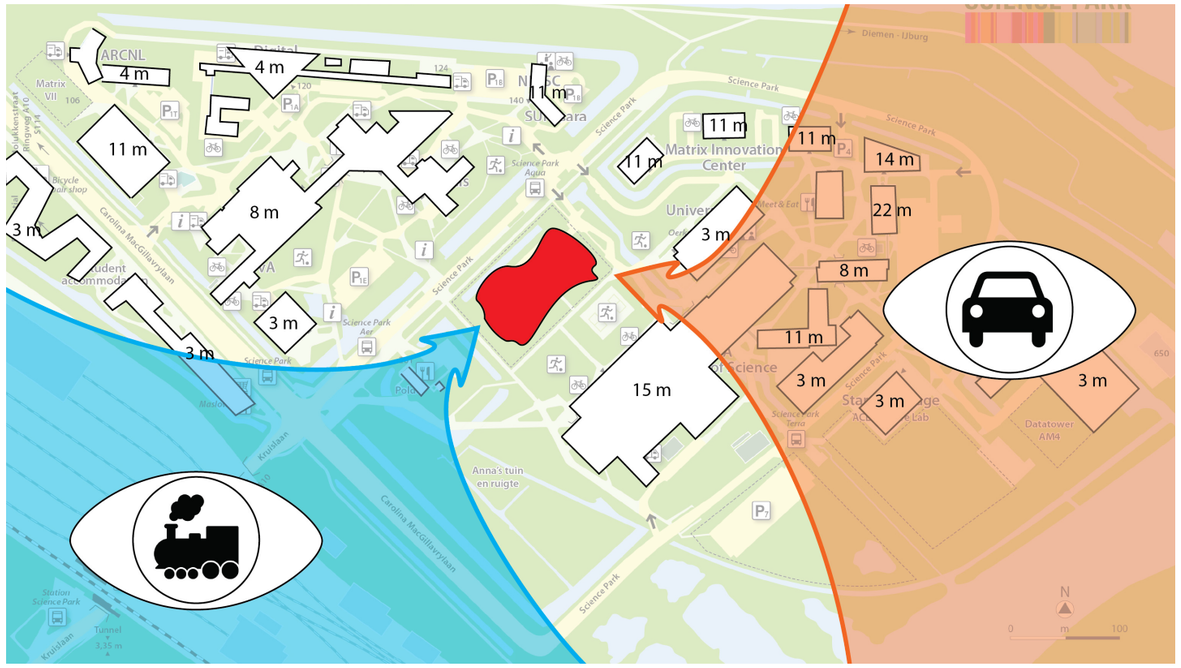
# Urban Strategy

## Connectivity



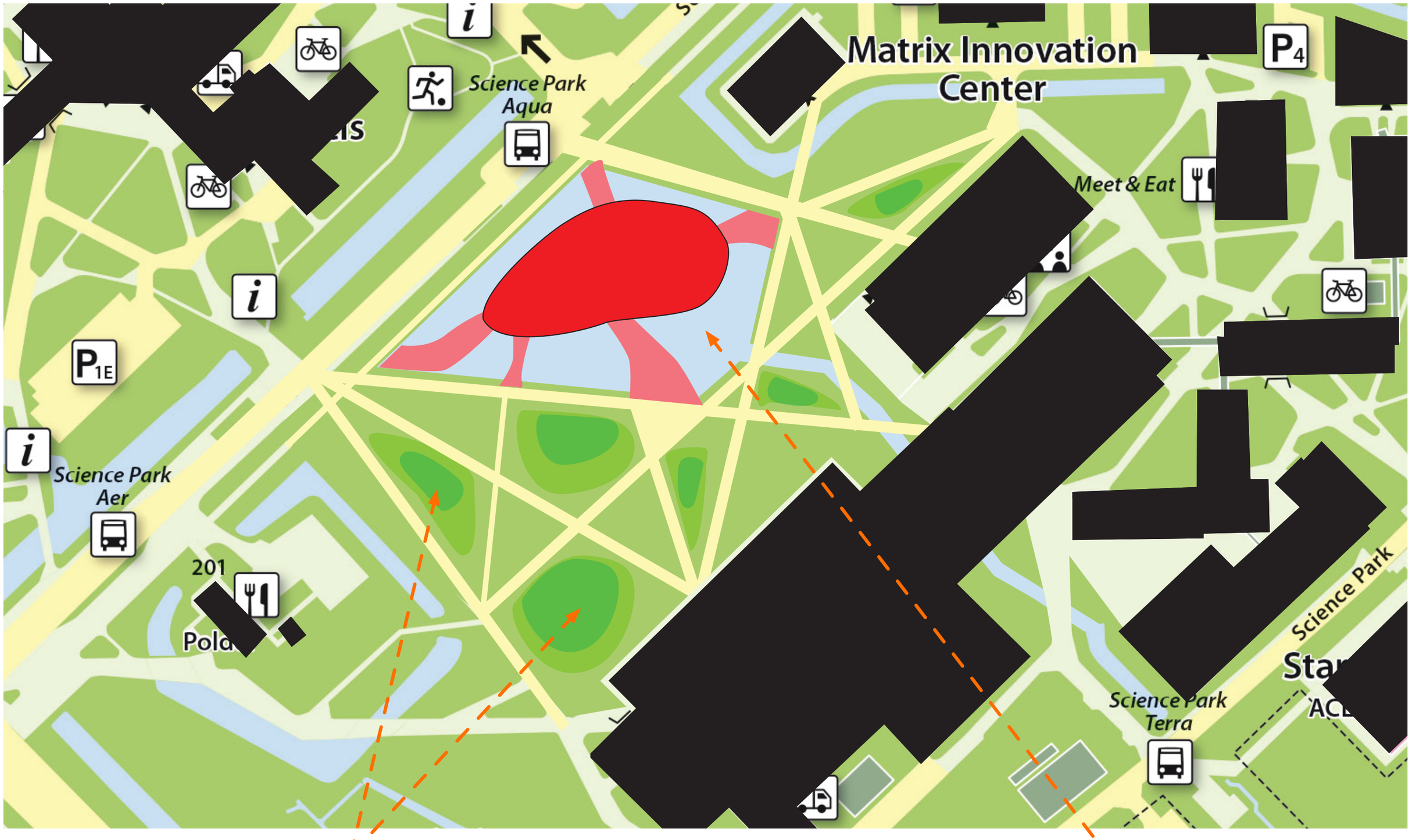

- Become the center of Amsterdam Science Park
- Use public space for informal meetings
- Connect to existing park structure

## Landmark status




- Rise above existing buildings (15m)
- Deviate from existing architecture
- No shadows from neighboring buildings
- Reflective pool to enhance daylight

# Urban design




**Raised park for informal meetings**

**Reflective pool**

# Work environment references (meso)

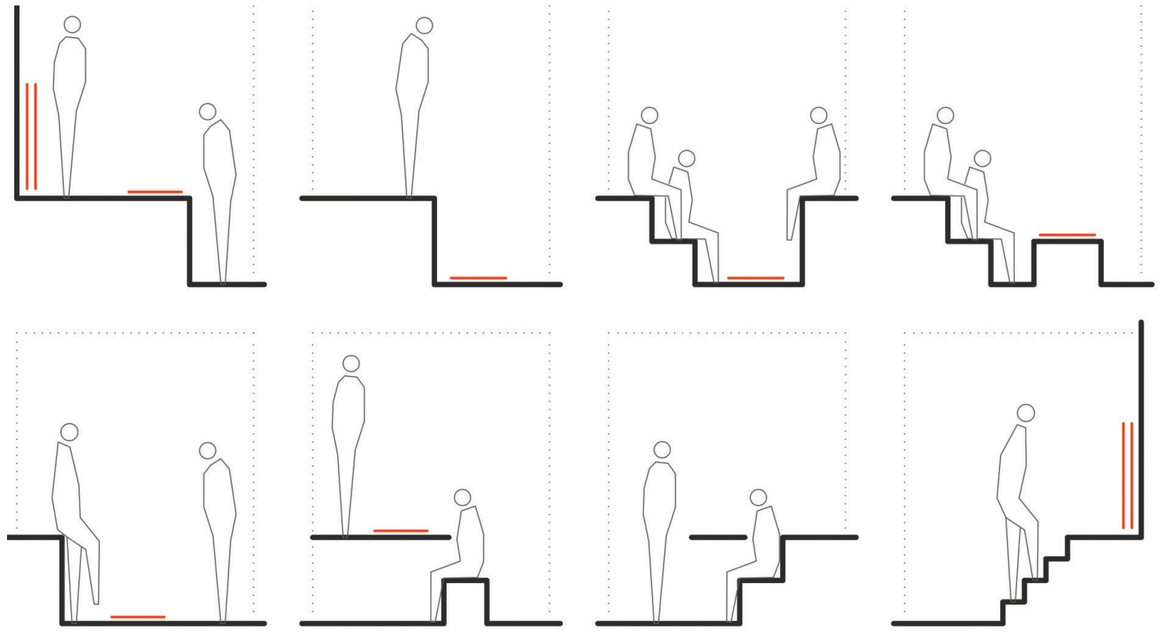
## The End of Sitting

RAAAF, 2014

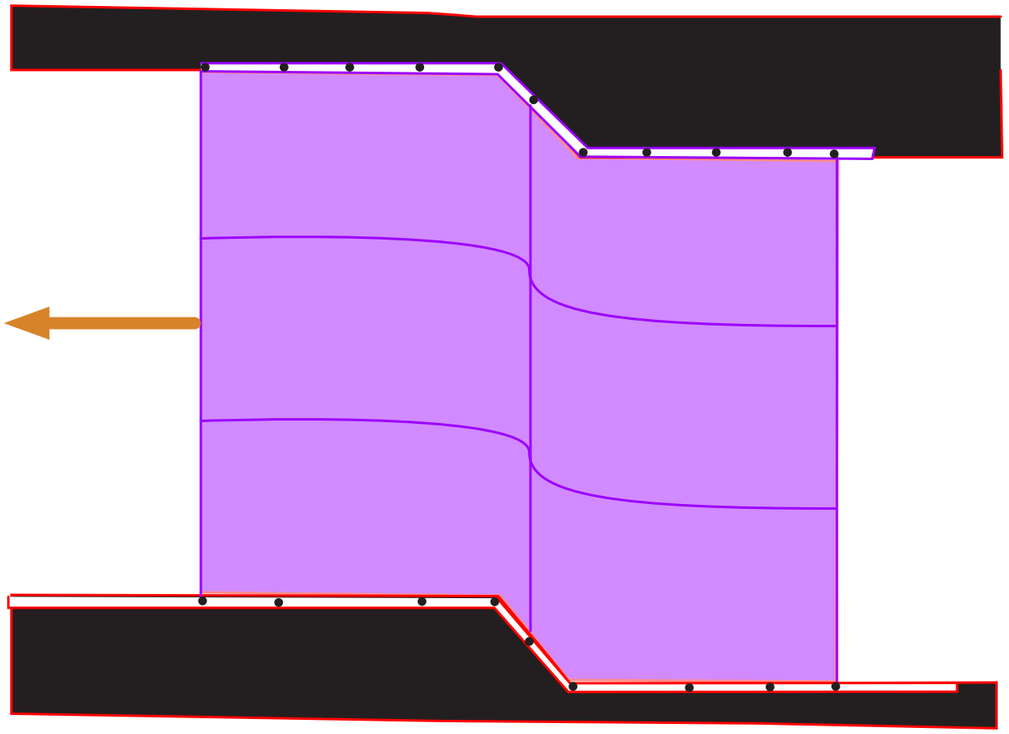
- Open floor plan stimulates interaction
- Landscape furniture result in visual and acoustic privacy
- Active working posture results in more interaction
- Variety of supported working positions and body proportions
- Integrated additional functionalities (Storage, etc.)

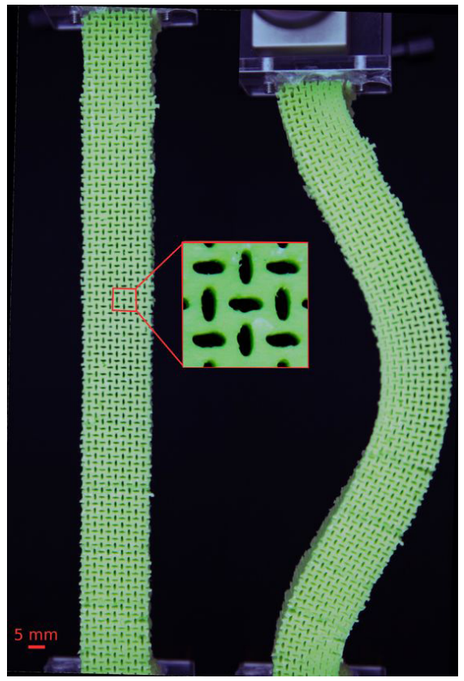
## Vigoss R&D

Zemberek Design office



# Partition wall references

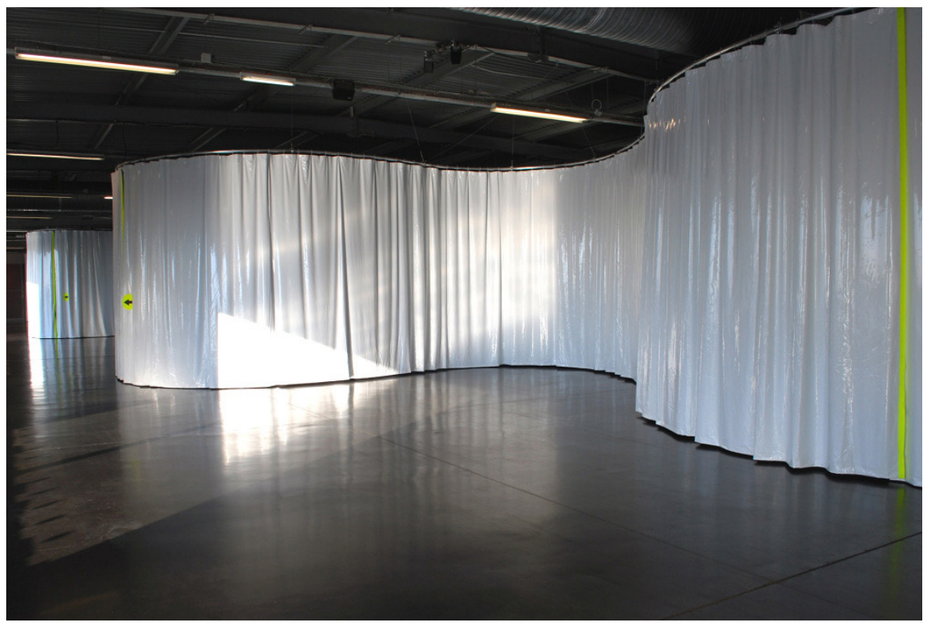





**Multi-materiality**

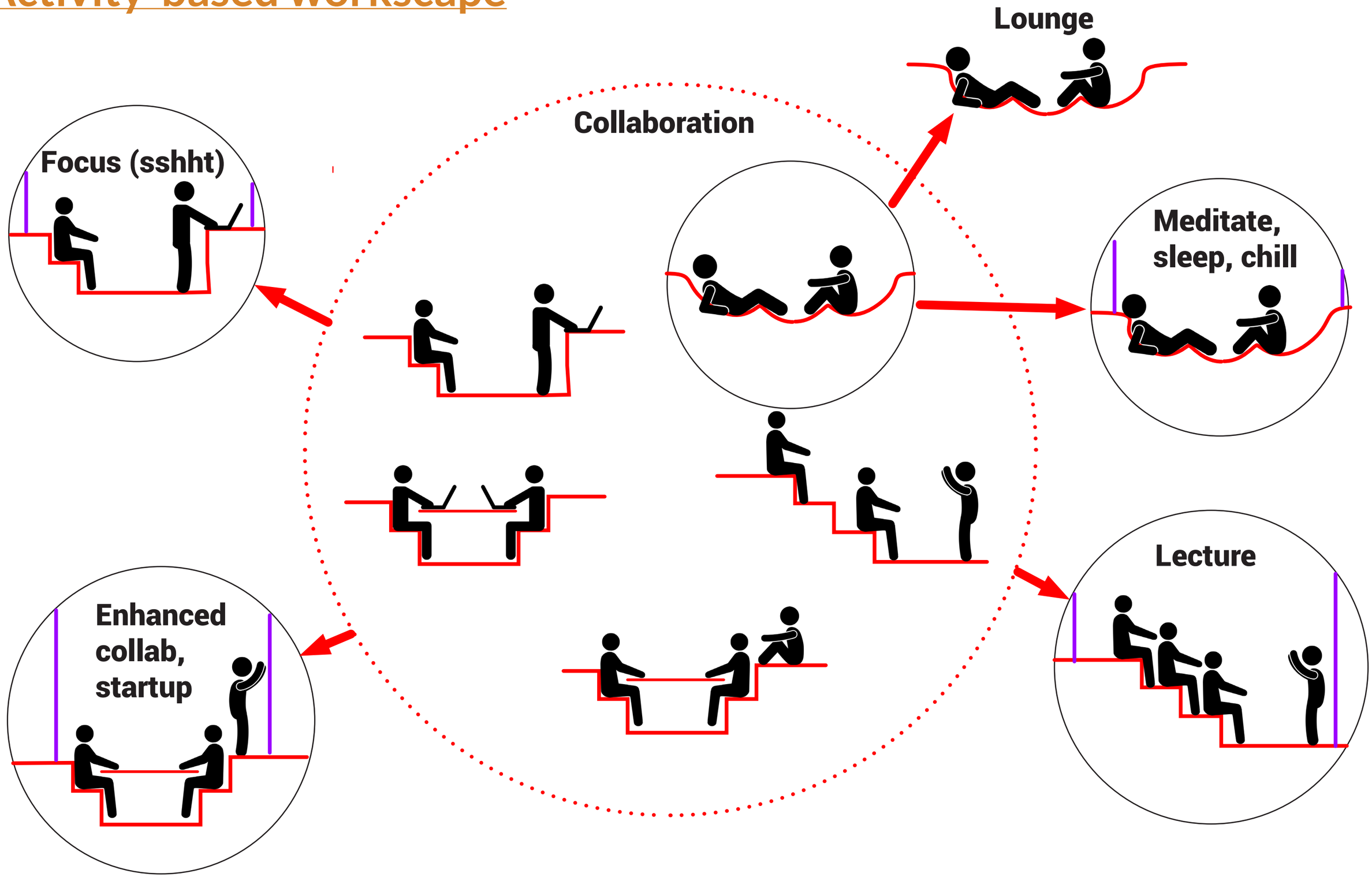
**Easily reconfigurable**

**Acoustic partition**

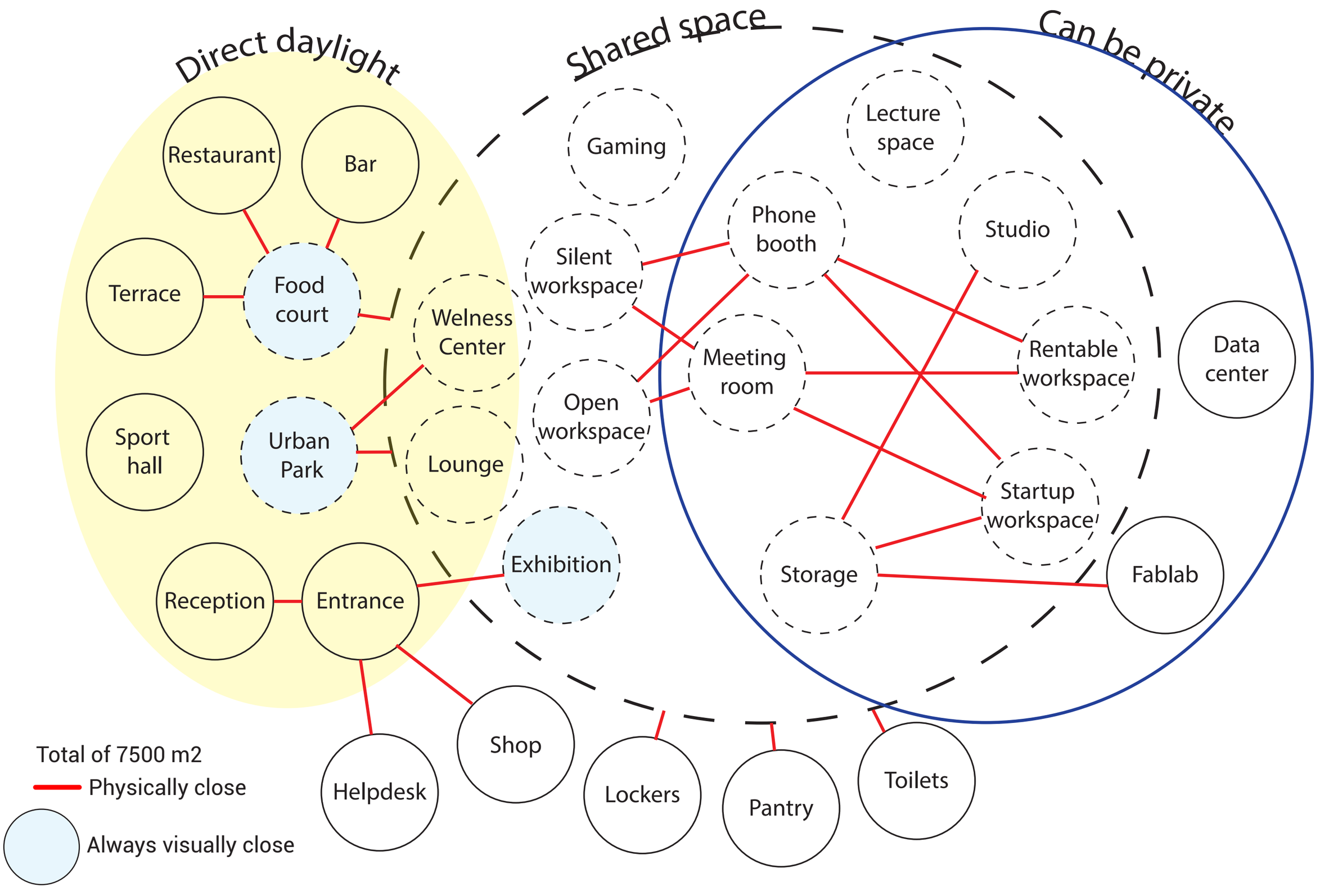


**(semi)-transparant**

# Activity-based workscape

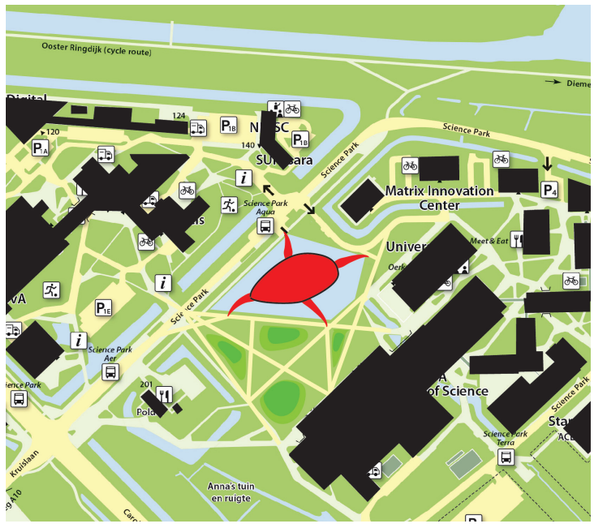


# Program connectivity



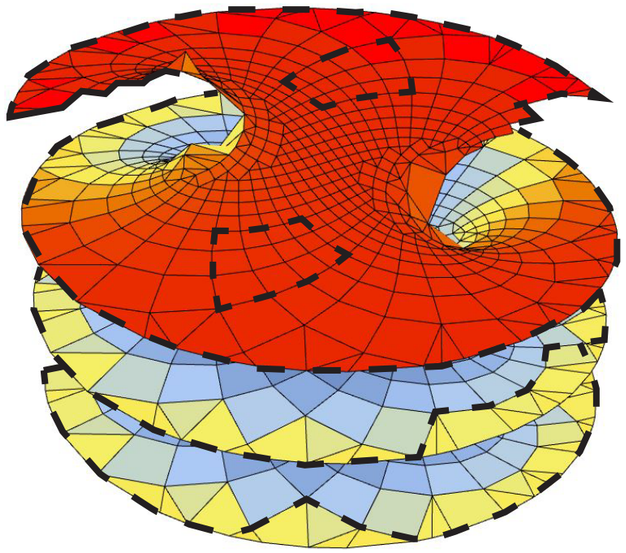
# Computational Strategy - Rheotomic Surfaces

## Urban & Program



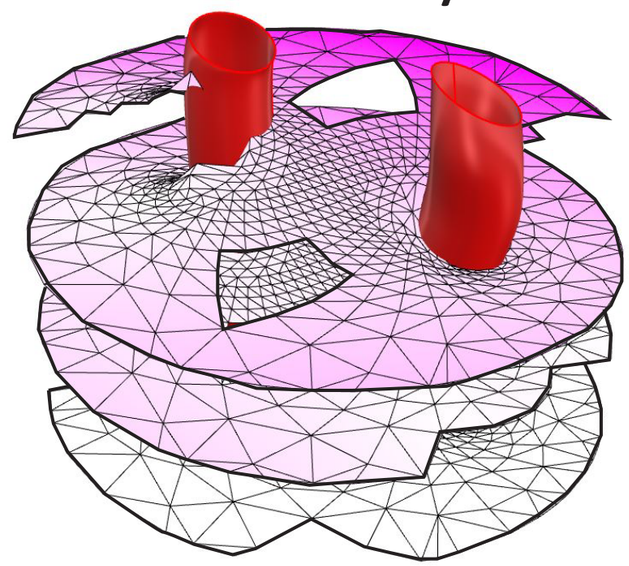

Provide shape

## Daylight analysis

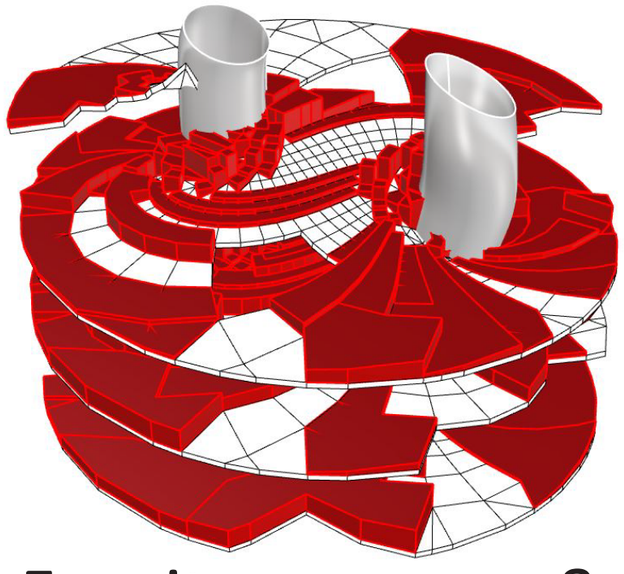


Optimize outer shape
Visual & daylight optimizing atria
Outside spaces

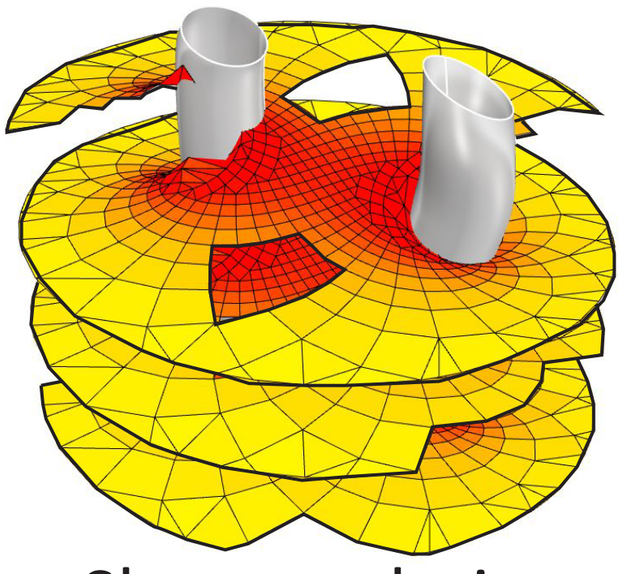
## Stress analysis



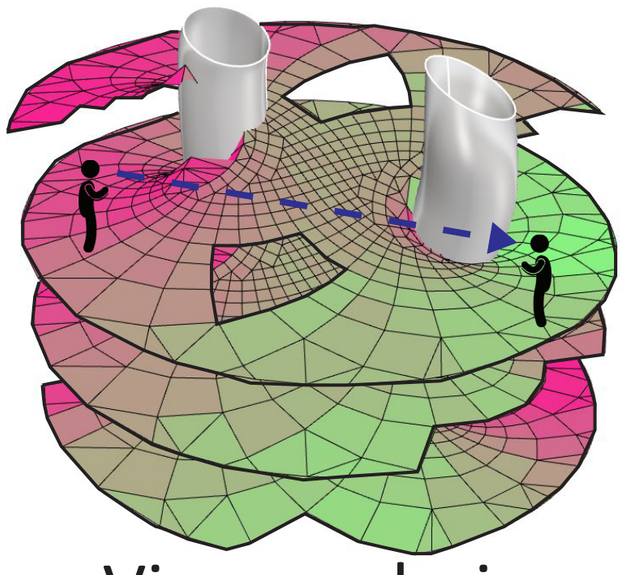
Optimized columns
Realistic cantilevers
Optimized visuals



## Furniture spawn & Partitioning



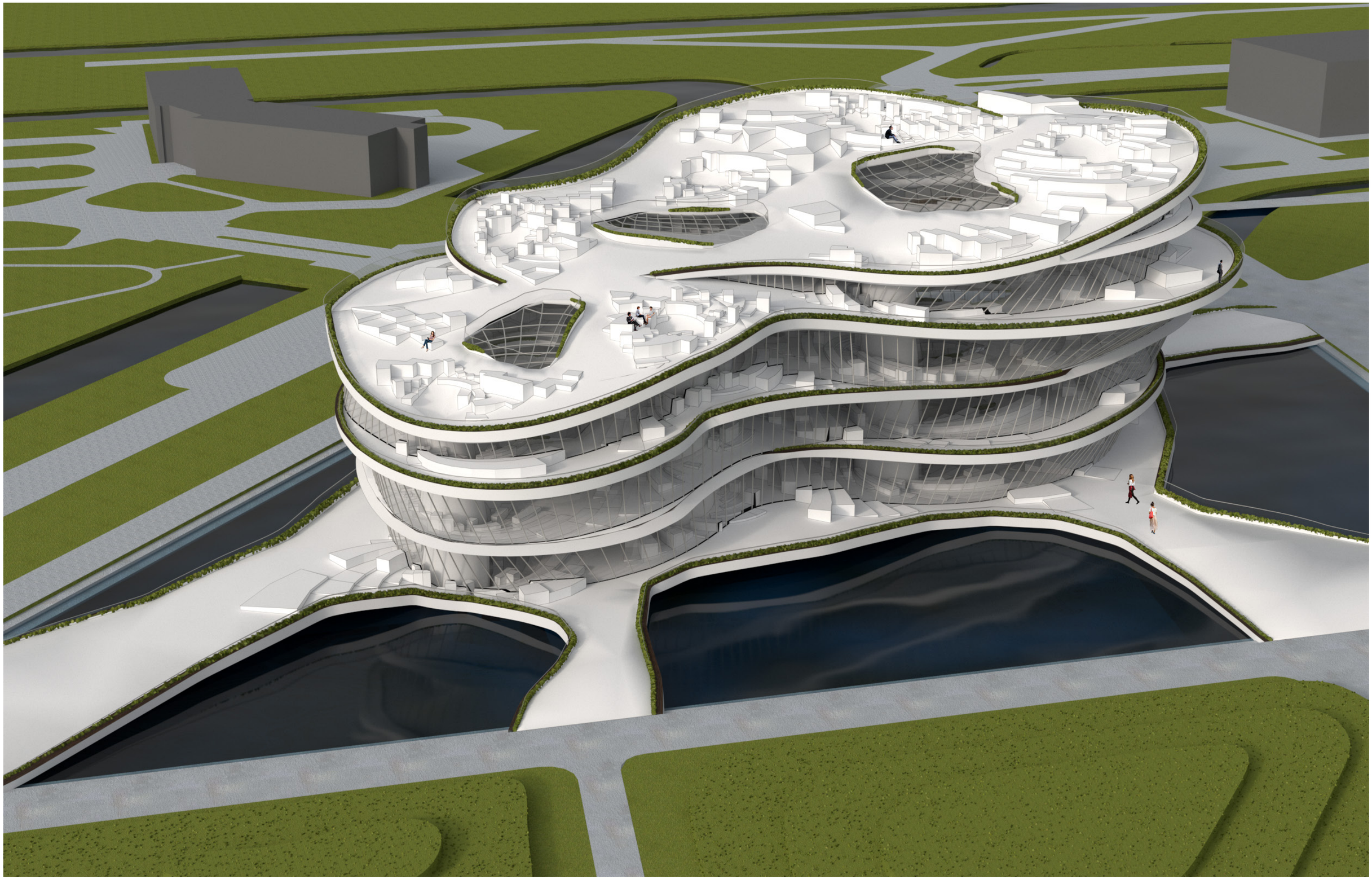
## Slope analysis



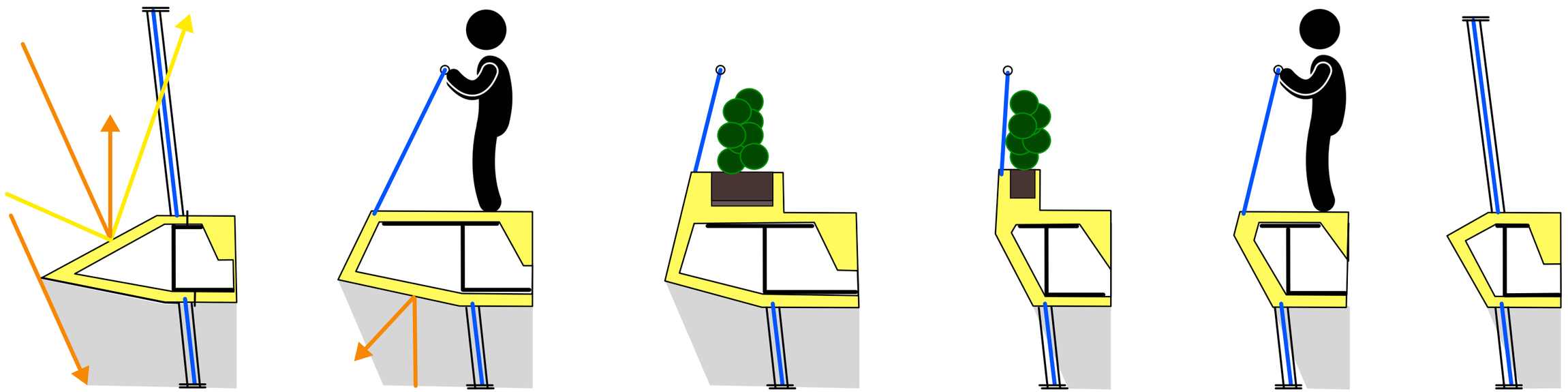
## View analysis

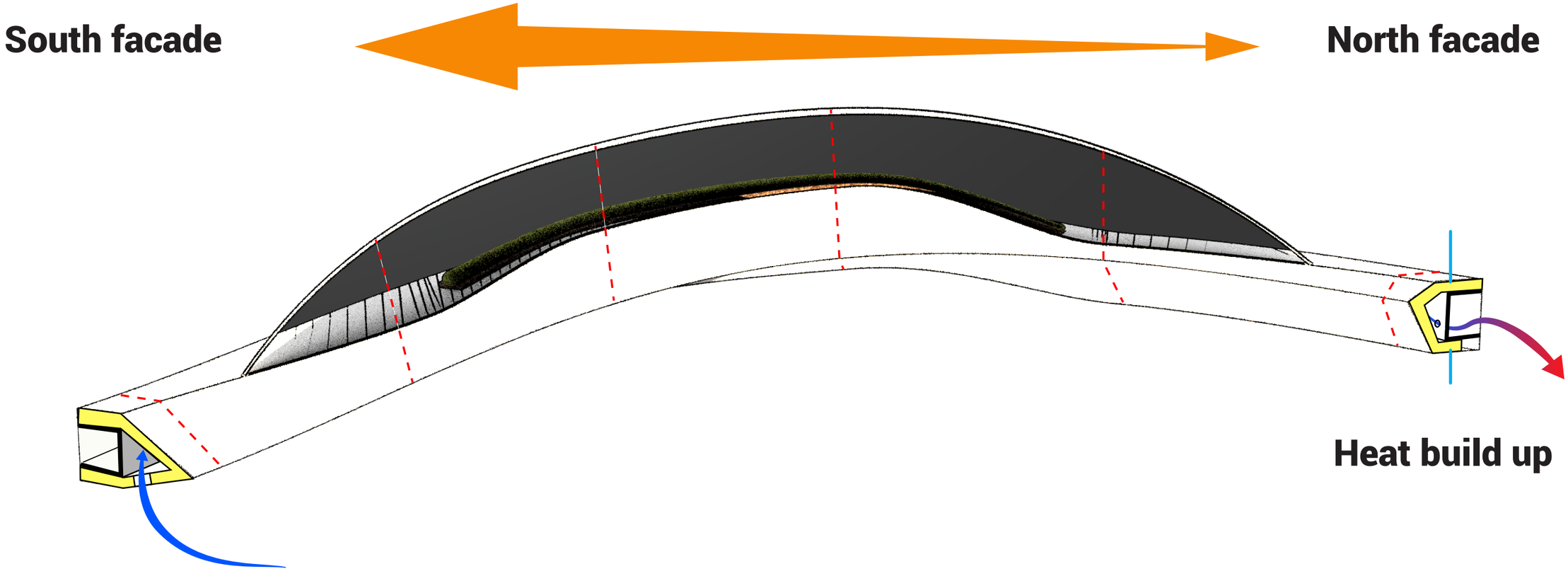
**Rheothomic surfaces - Daniel Piker*

# Impression



# Railing / reflector / ventilation / shader

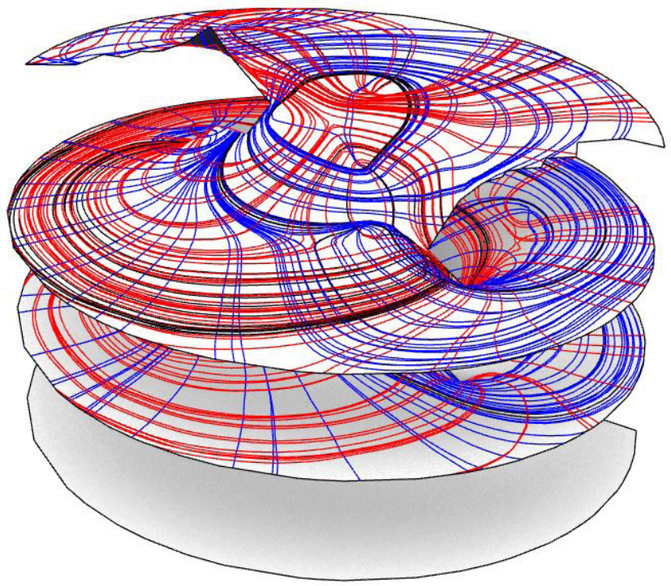




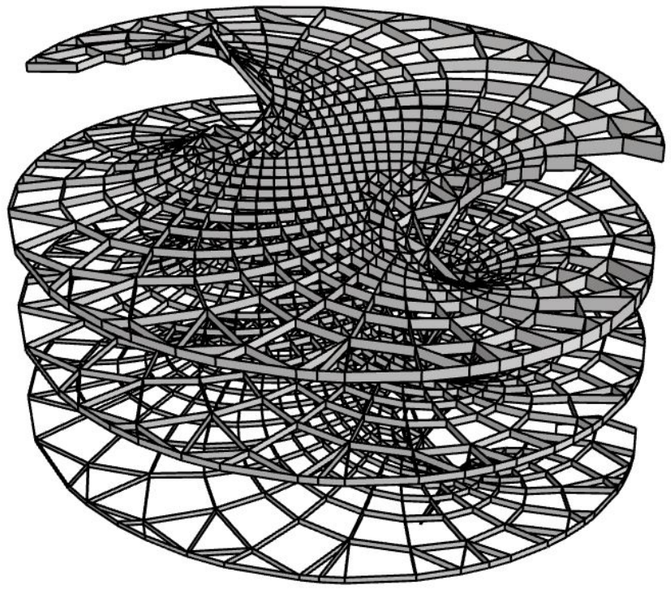
# Flow

# Construction principles

**Rheotomic Surfaces - Daniel Piker**
Continuous self supporting floors

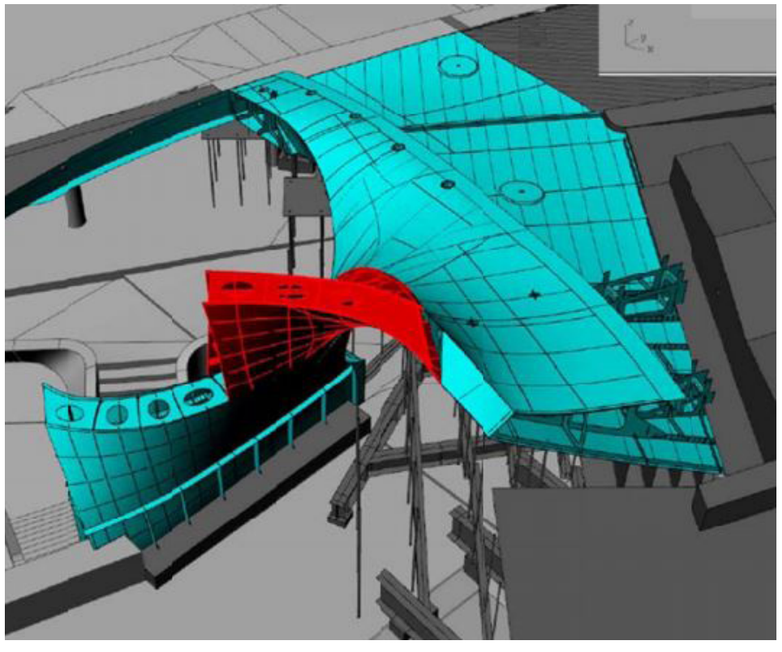


**Optimized beam height**

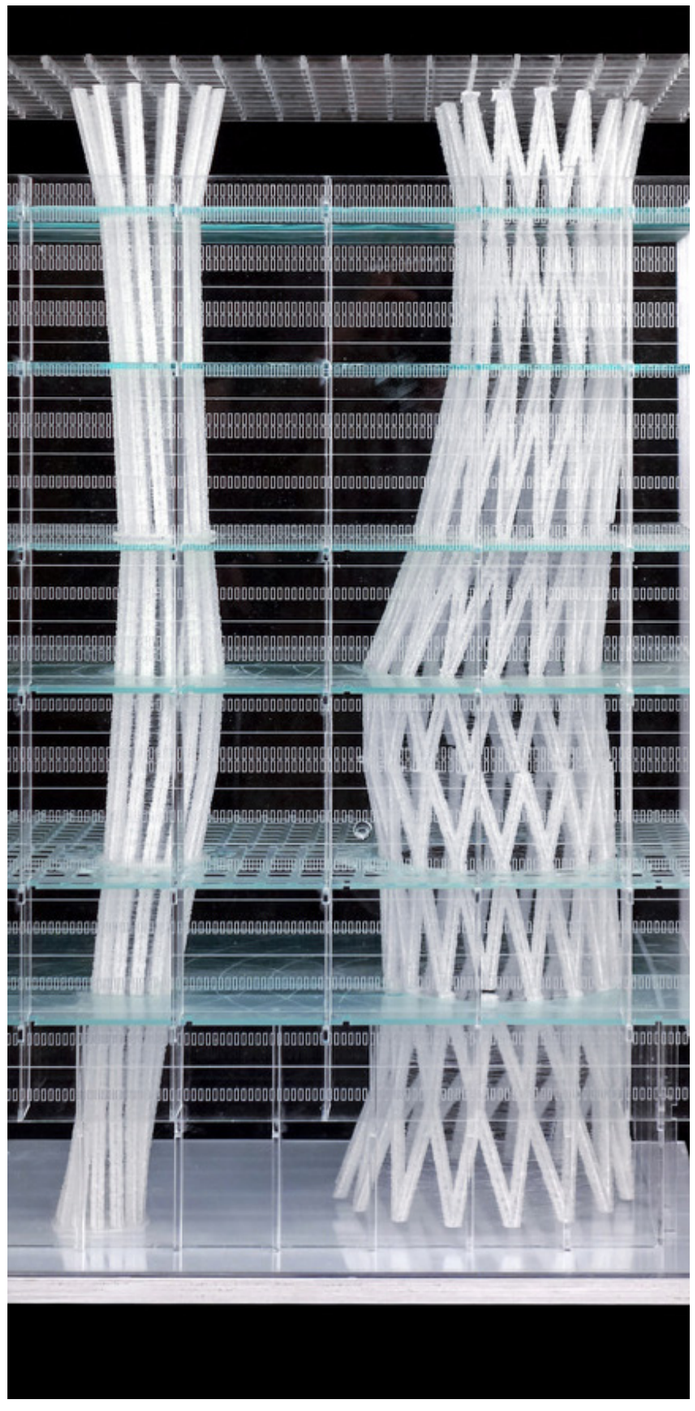


**Arnhem Central - UNstudio**
Reversed boat construction

**Components**



**Sendai Mediatheque - Toyo Ito**
Structurally Optimized columns

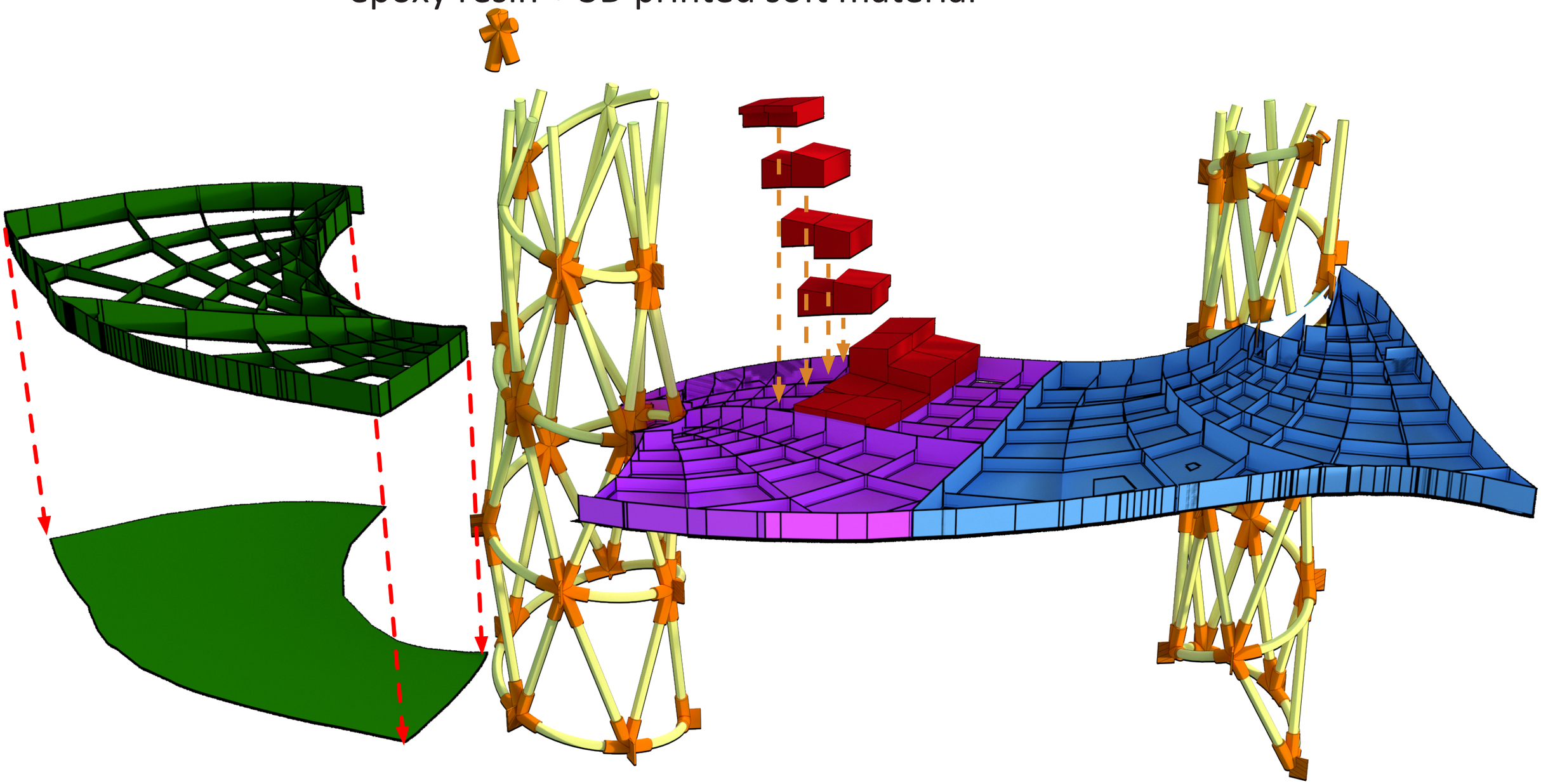


# Main construction

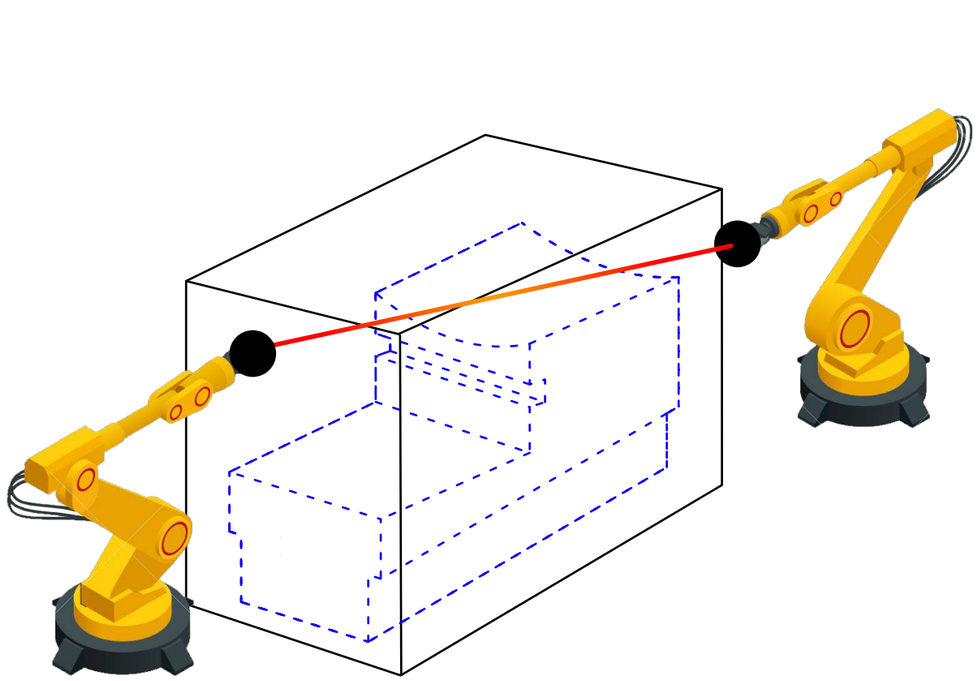
**Floor component:** Pre-bended metal plate welded together with reinforced optimized profiles based on theRheotomic principle

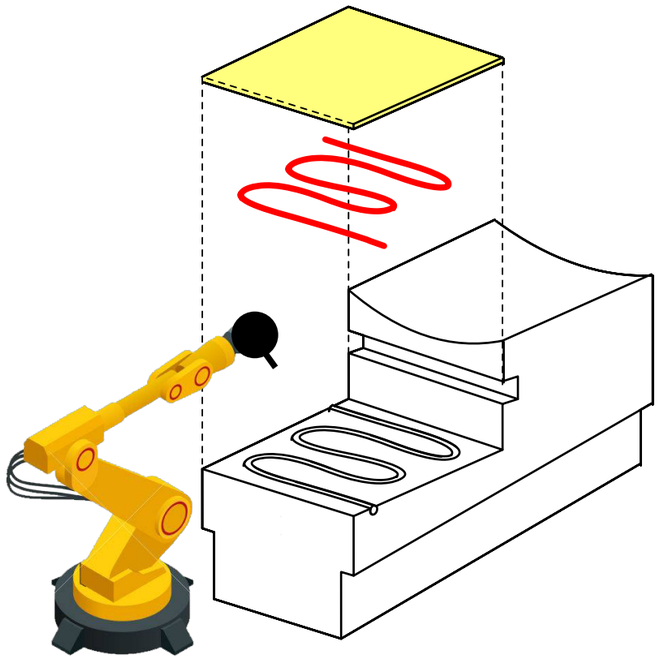
**Column:** Unique steel joints with linear pipe elements

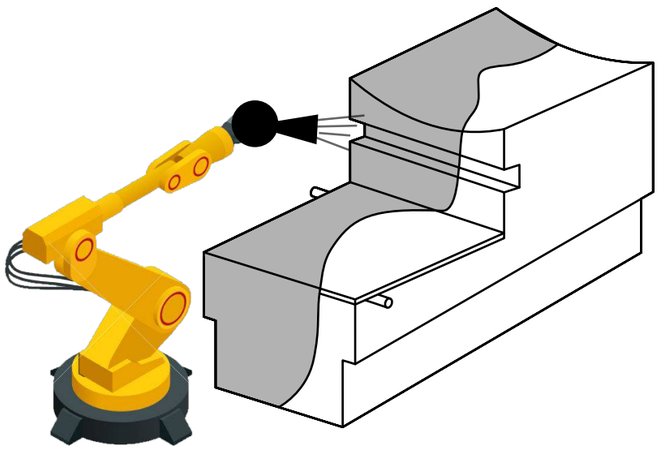
**Floor finish:** Robotically hot-wire cut EPS elements reinforced with glass-fiber epoxy resin + 3D printed soft material



# Fabrication process - Floor component

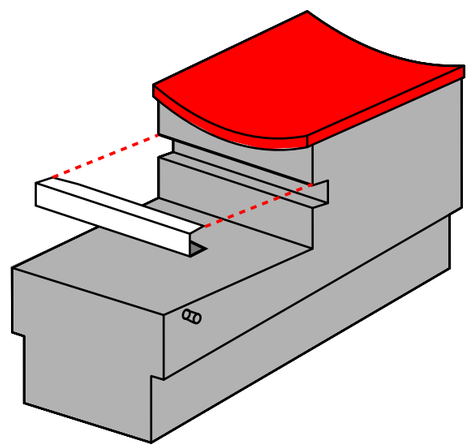


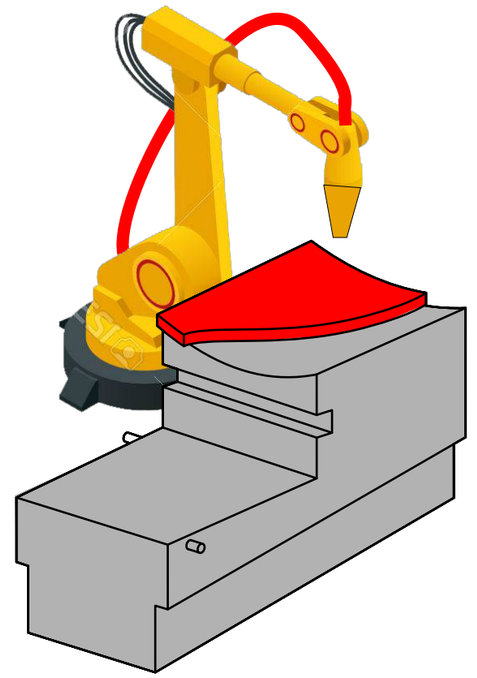




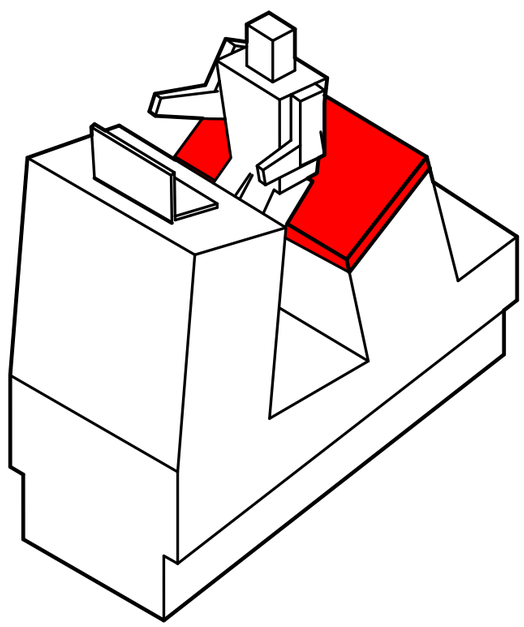
1 → 2 → 3 → 4 → 5

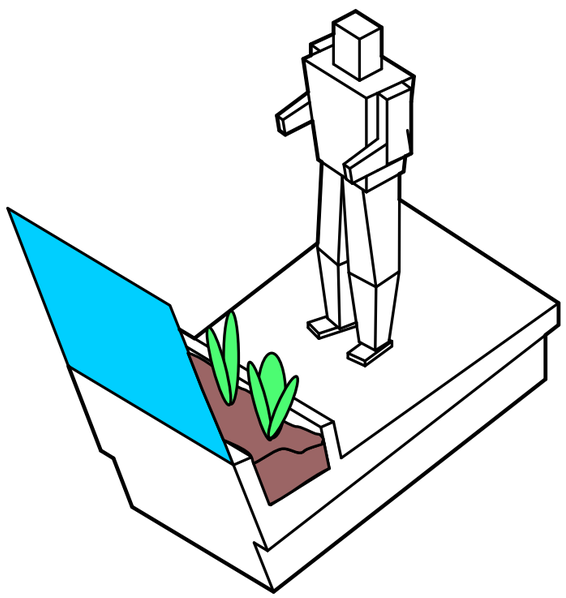
1. Hot-wire cut EPS component
2. Mill additional holes if needed
3. Add additional functionalities
   -Assembly reinforcement plates
   -Floor heating
3. Spray with glass fiber epoxy resin
4. 3D print silicone sitting material
5. Add flexible elements
   -Cable gutter, etc.

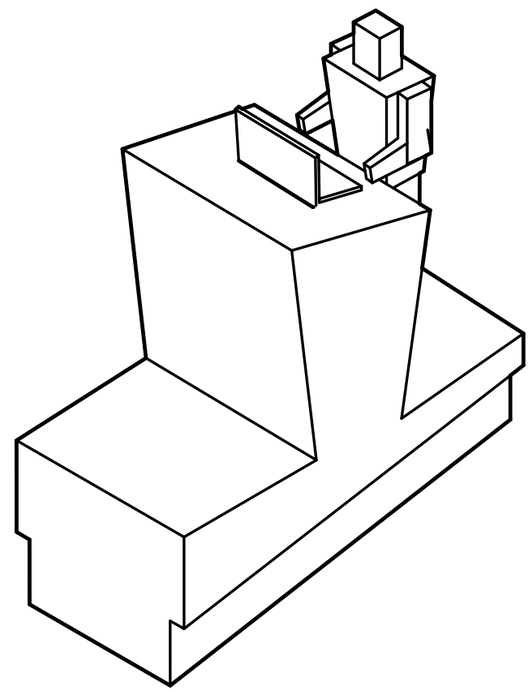


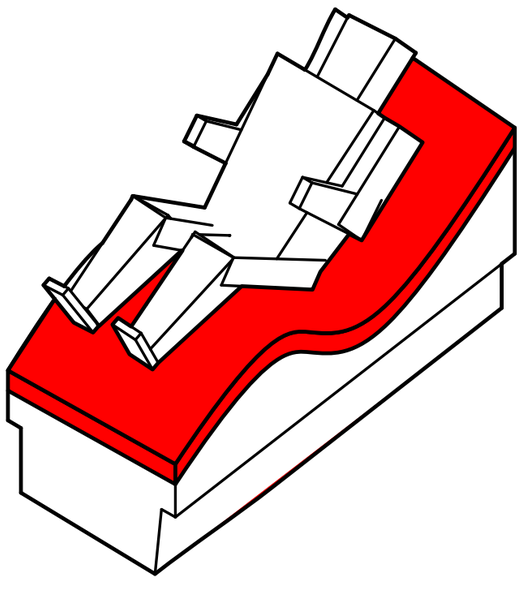


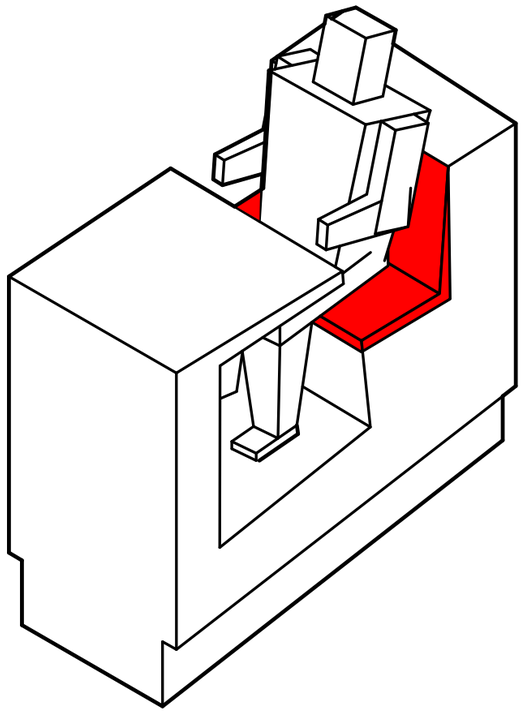
# All-in-one floor system

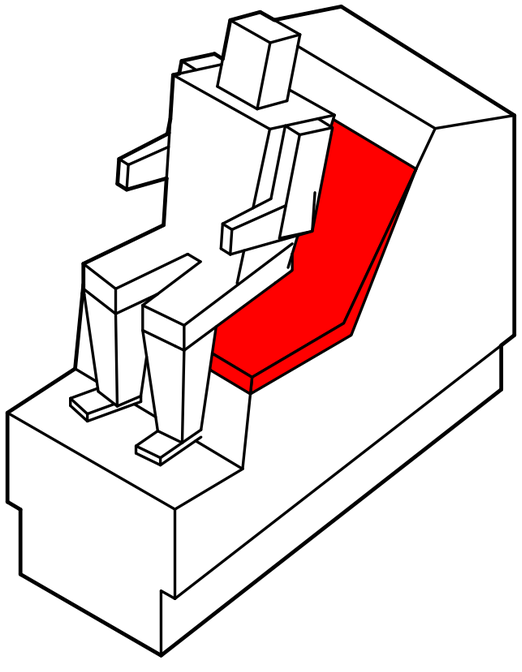




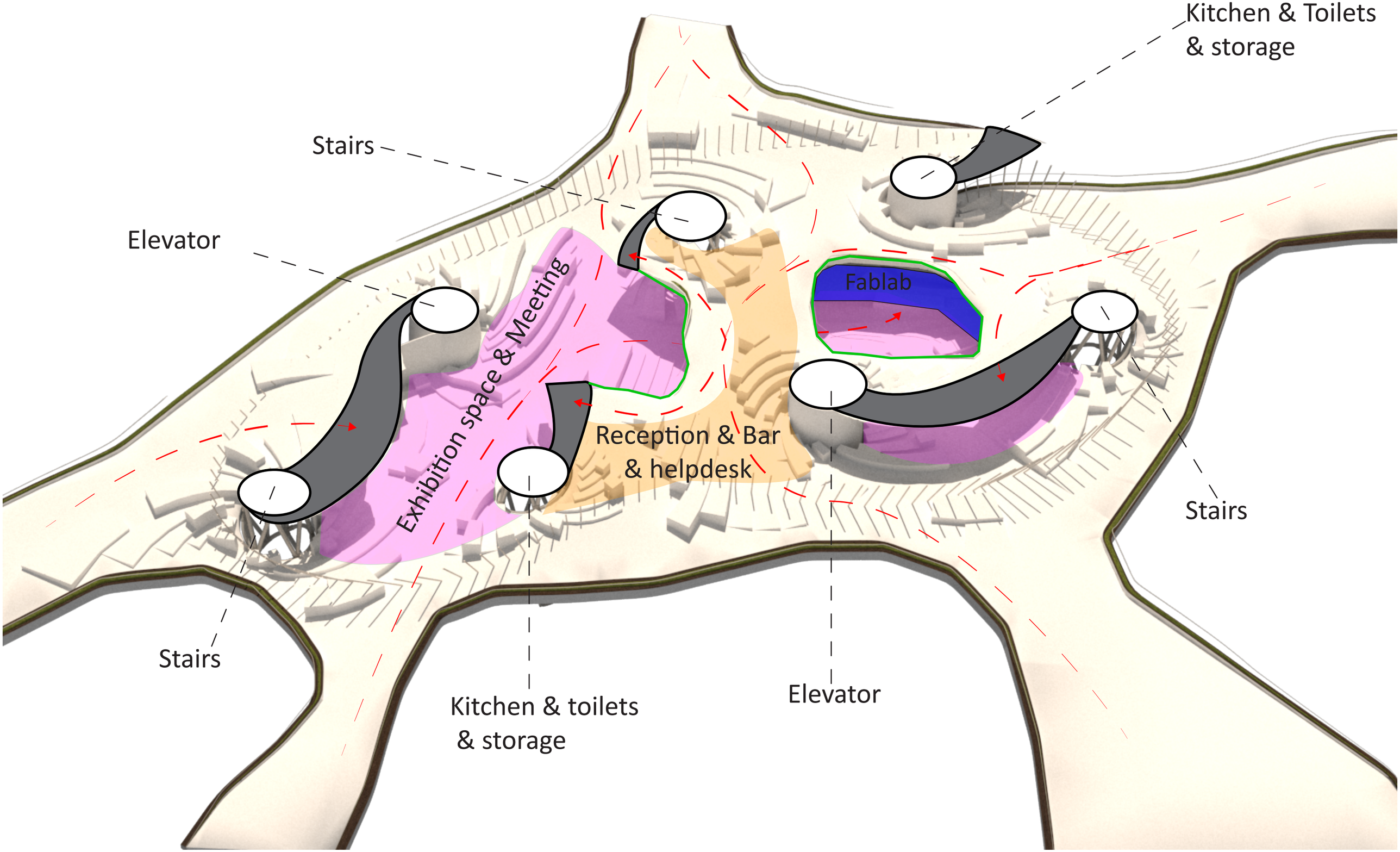




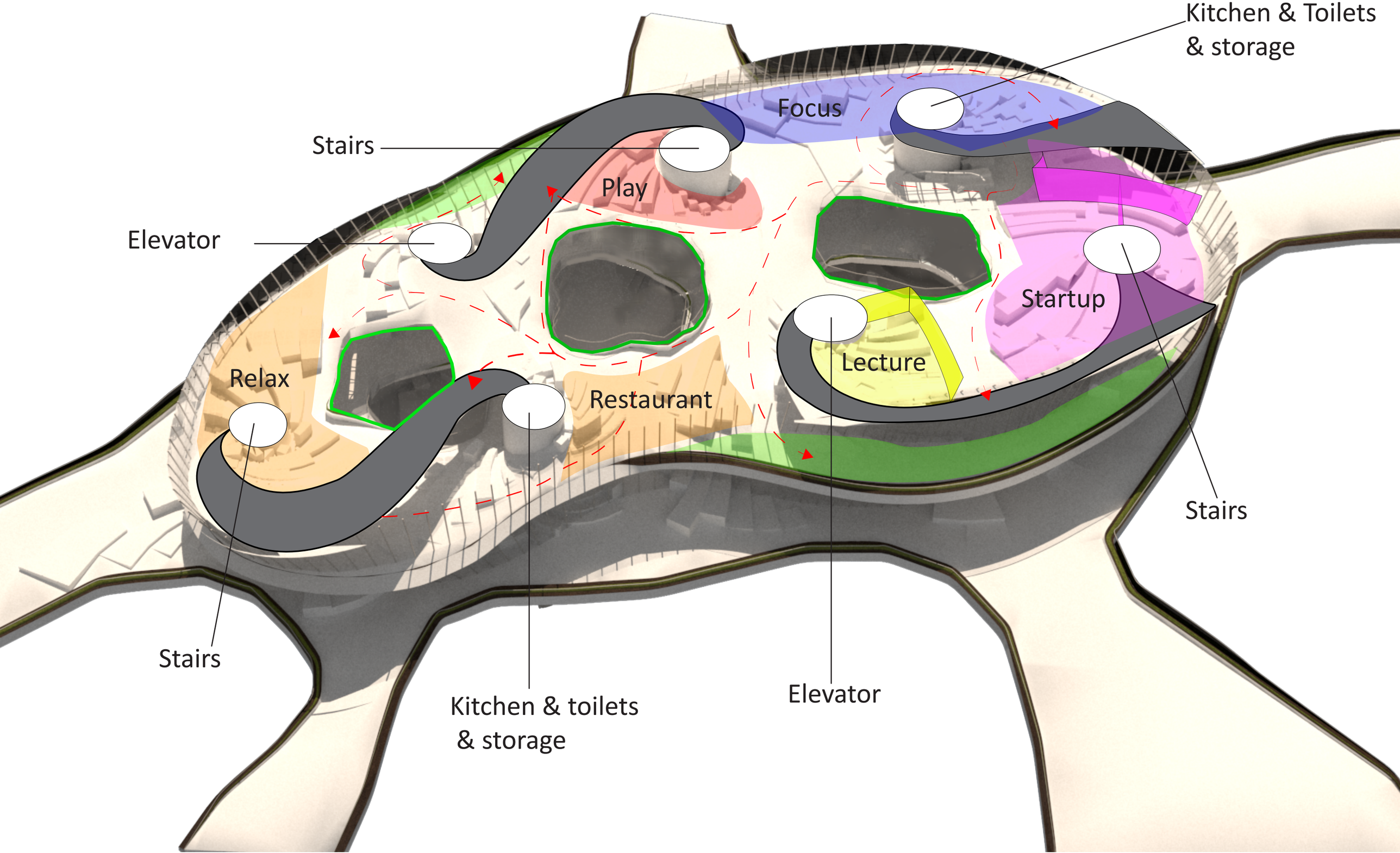




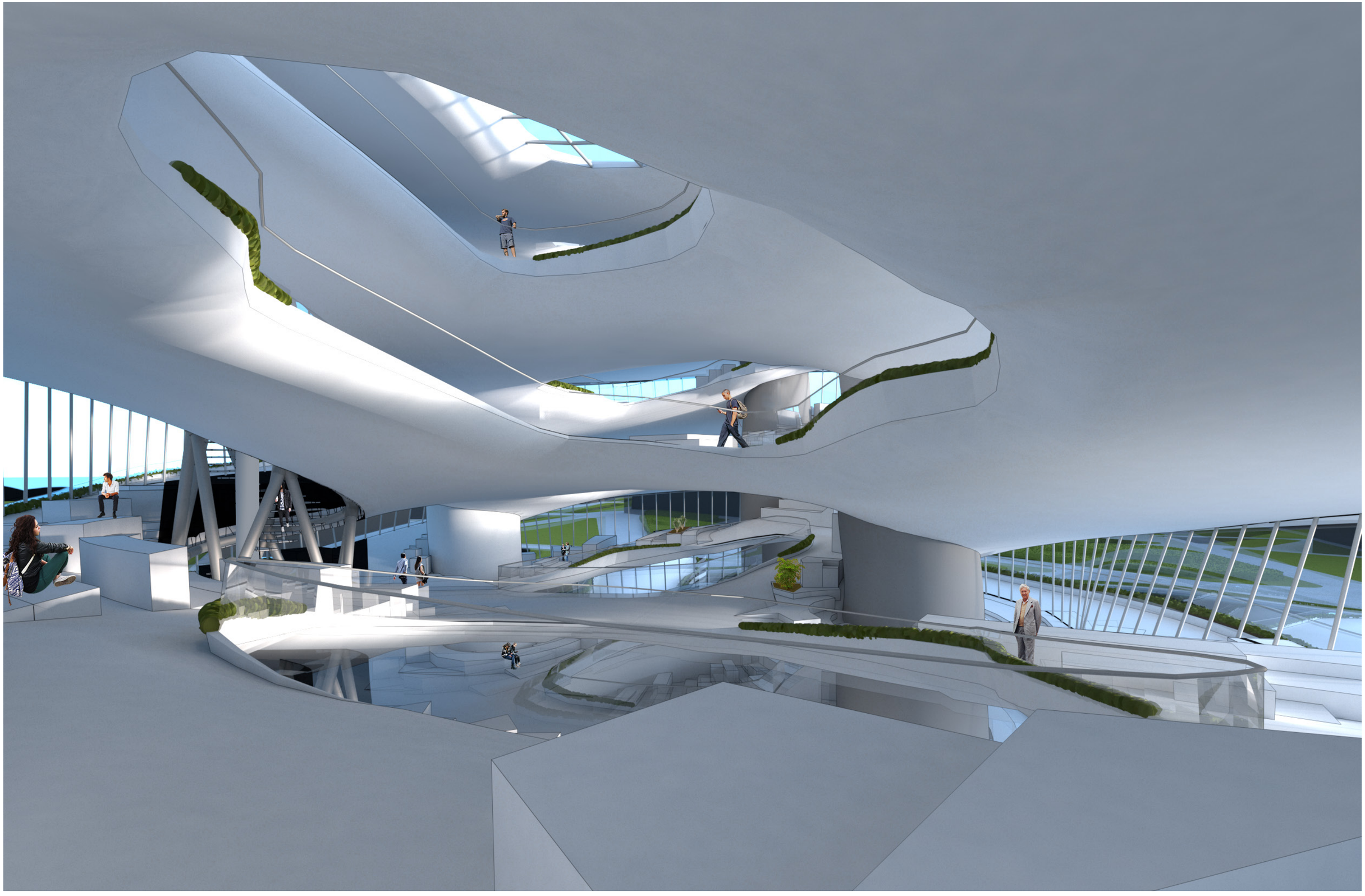
# Ground floor



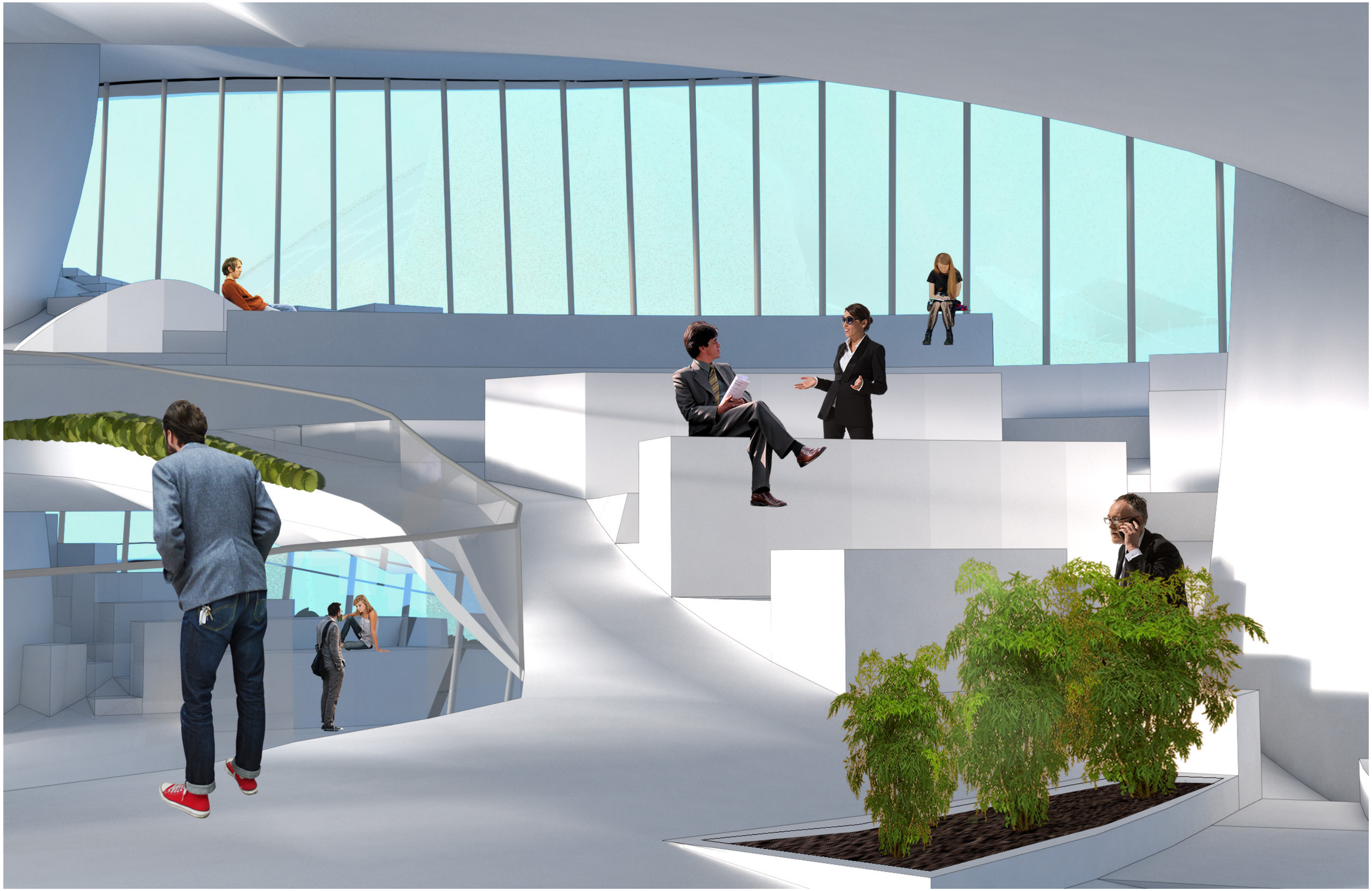
# 2nd - 3th floorplan



# Interior impression



# Interior impression



# Section - Winter

Rain collector connected to grey water system

Active reflectors

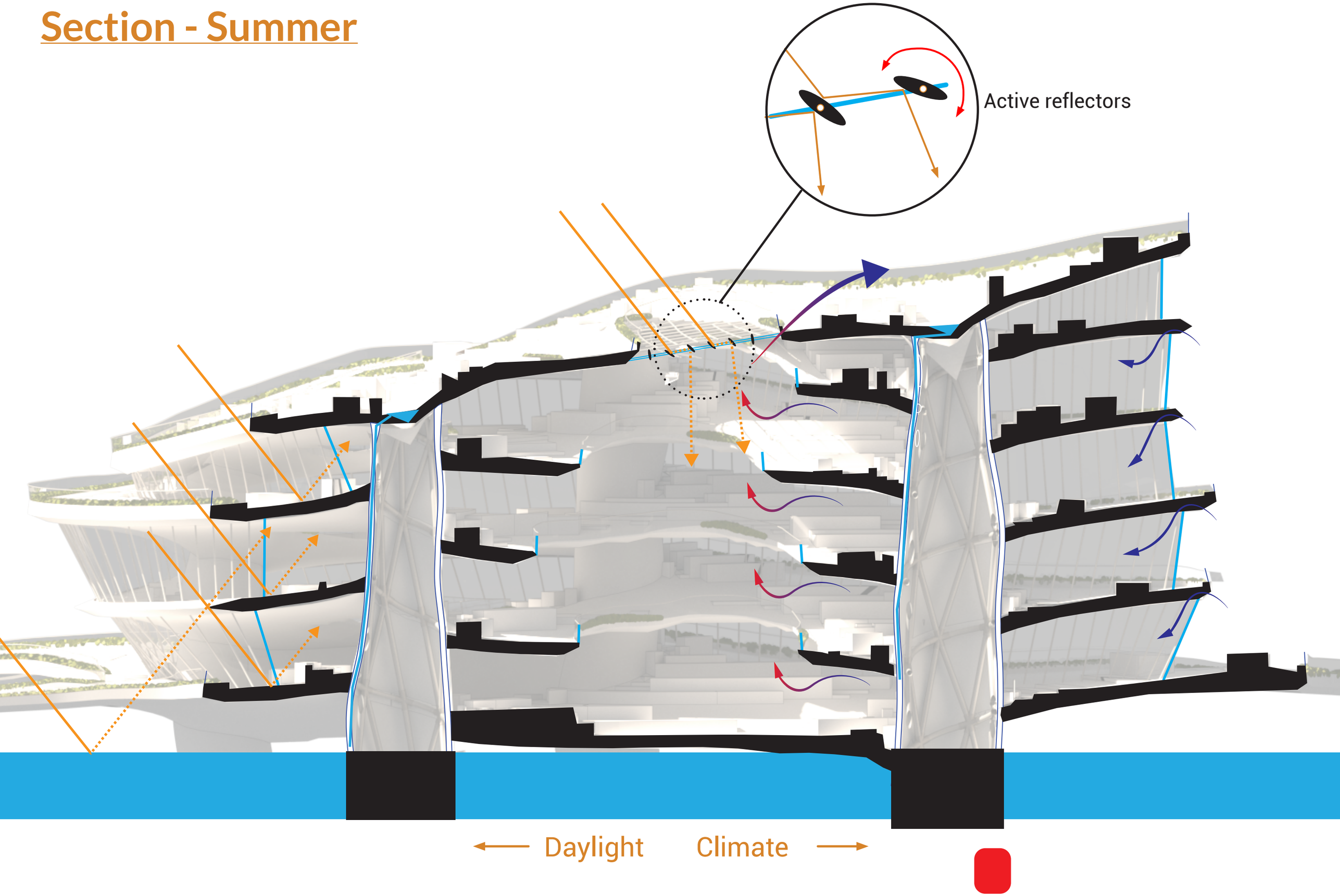
Natural ventilation with stacking effect including mechanical ventilation and heat exchanger

Daylight

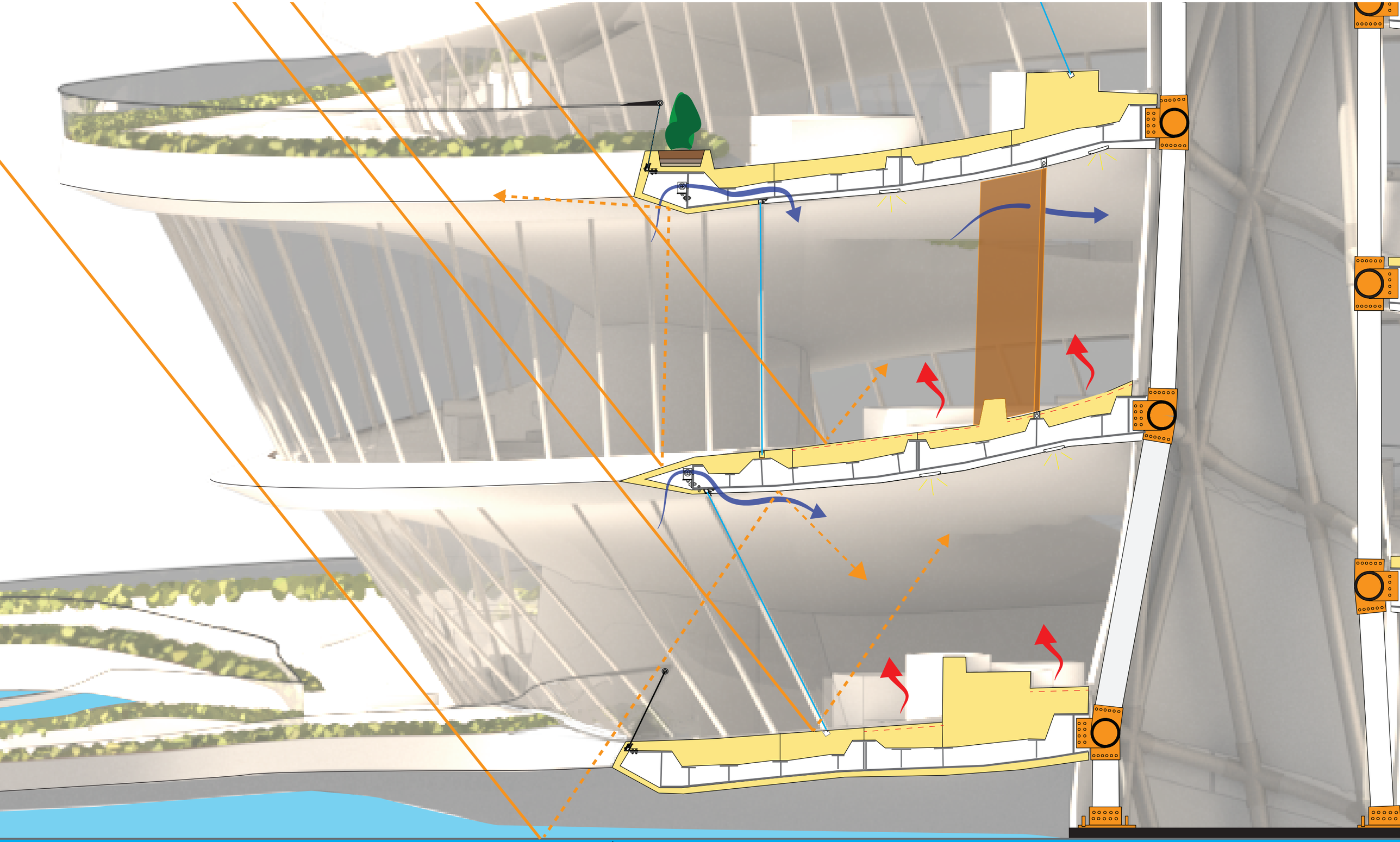
Climate

Seasonal heat storage connected to floor heating

# Section - Summer



# Fragment 2.5 D



# Floor - detail

Glass fiber epoxy resin

Dry screed layer EPS

Floor heating tubes

EPS component

Welded steel floor beams on top of stabilizing metal sheet

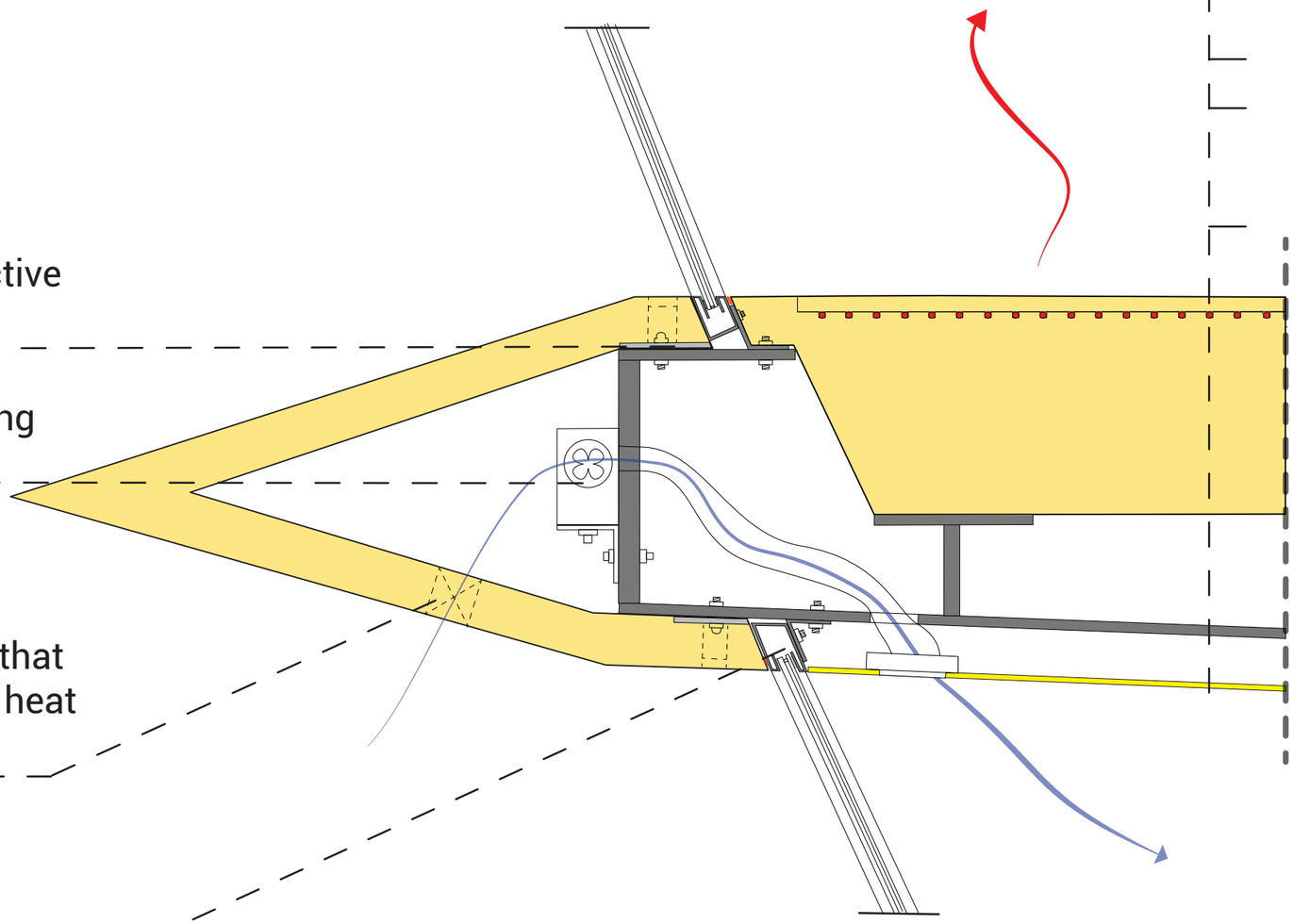
Lowered reflective ceiling with integrated lights and partition profiles

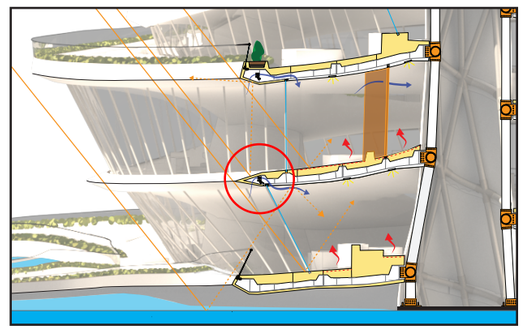
Glass fiber reinforced EPS reflector with embedded assembly method and reflective finish

Heat exchanger for preheating ventilation air in the winter

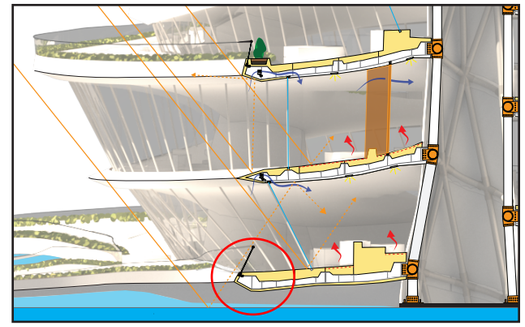
Mechanical ventilation inlet that closes in the winter to allow heat to build up in the cavity

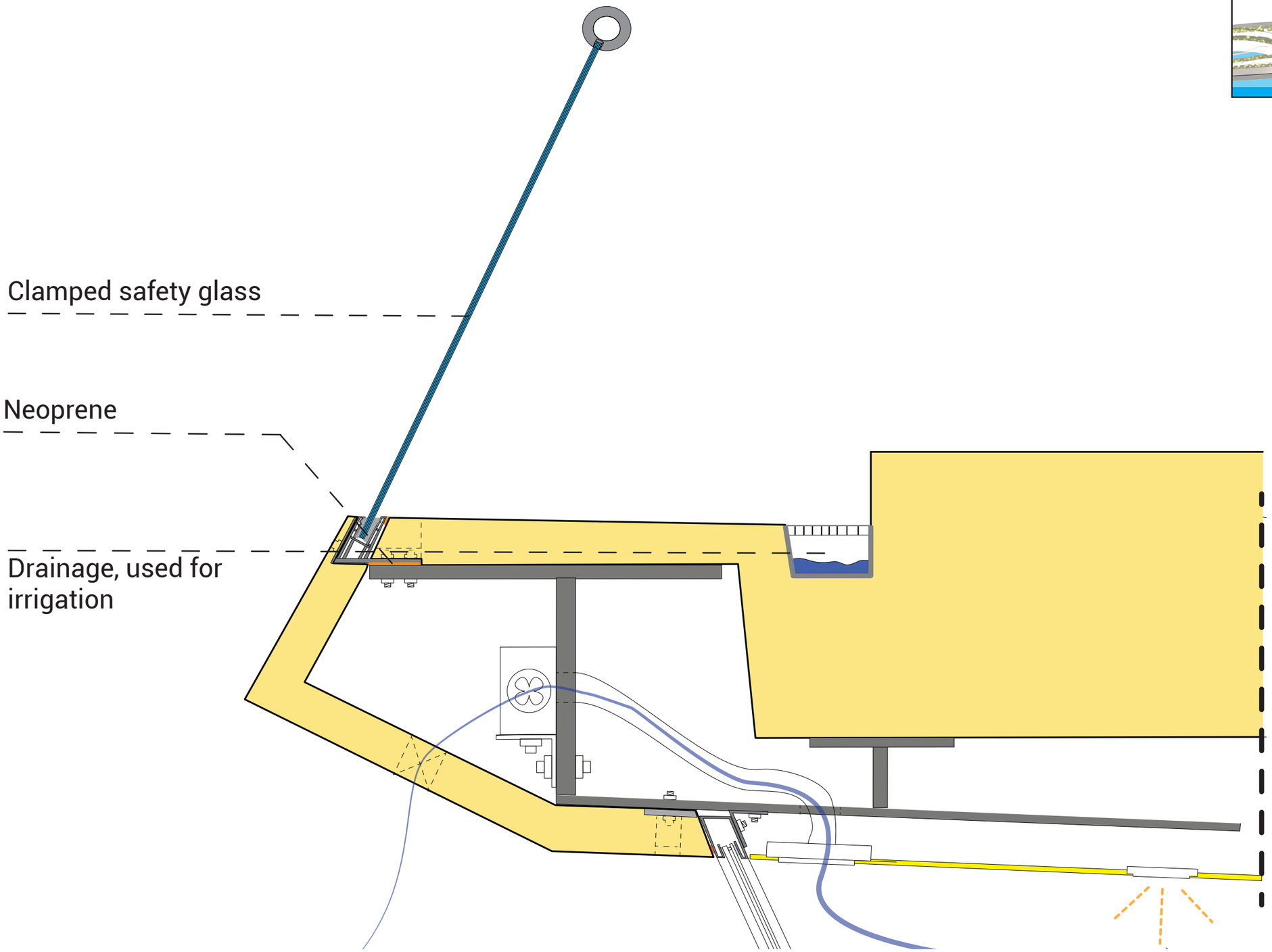
Aluminum profile with





# Detail - Balcony





# Thank you