WEEK 2

1:1 Interactive Architecture Prototype

Urban Furniture

MSc Arch Elective Seminar (AR0122), 2021, Tutor: Henriette Bier, Max Latour, Vera Laszlo

Group 1

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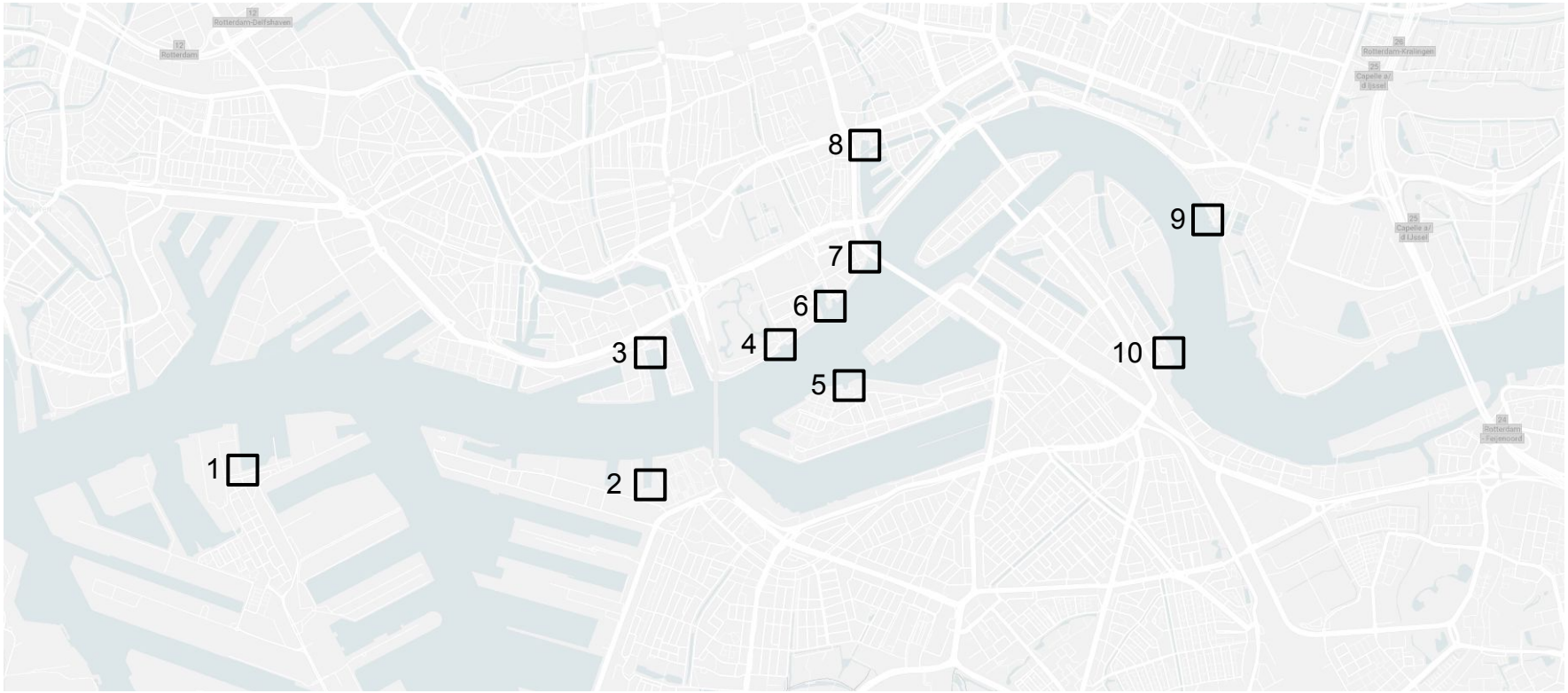
Site

Ferry Terminals, Nieuwe Maas, Rotterdam



Ferry Terminals, Nieuwe Maas, Rotterdam

1. RDM

2. St. Janshaven

3. St.Jobshaven

4. Veerhaven

5. Katendrecht

6. Erasmusbrug

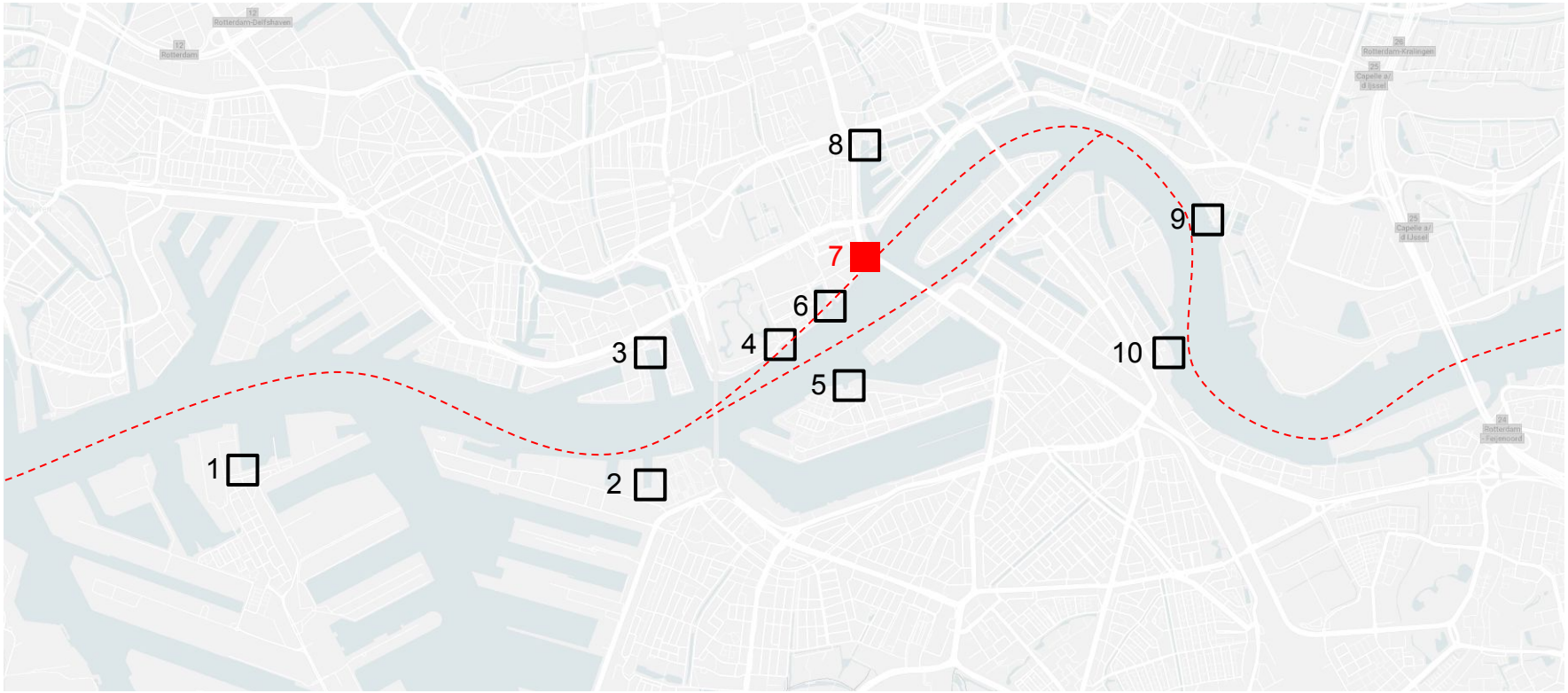
7. Willemsplein

8. Leuvehaven

9. Plantagelaan

10. Piekstraat

7. Willemsplein, Nieuwe Maas, Rotterdam



7. Willemsplein, Nieuwe Maas, Rotterdam

Willemsplein Activities Mapping

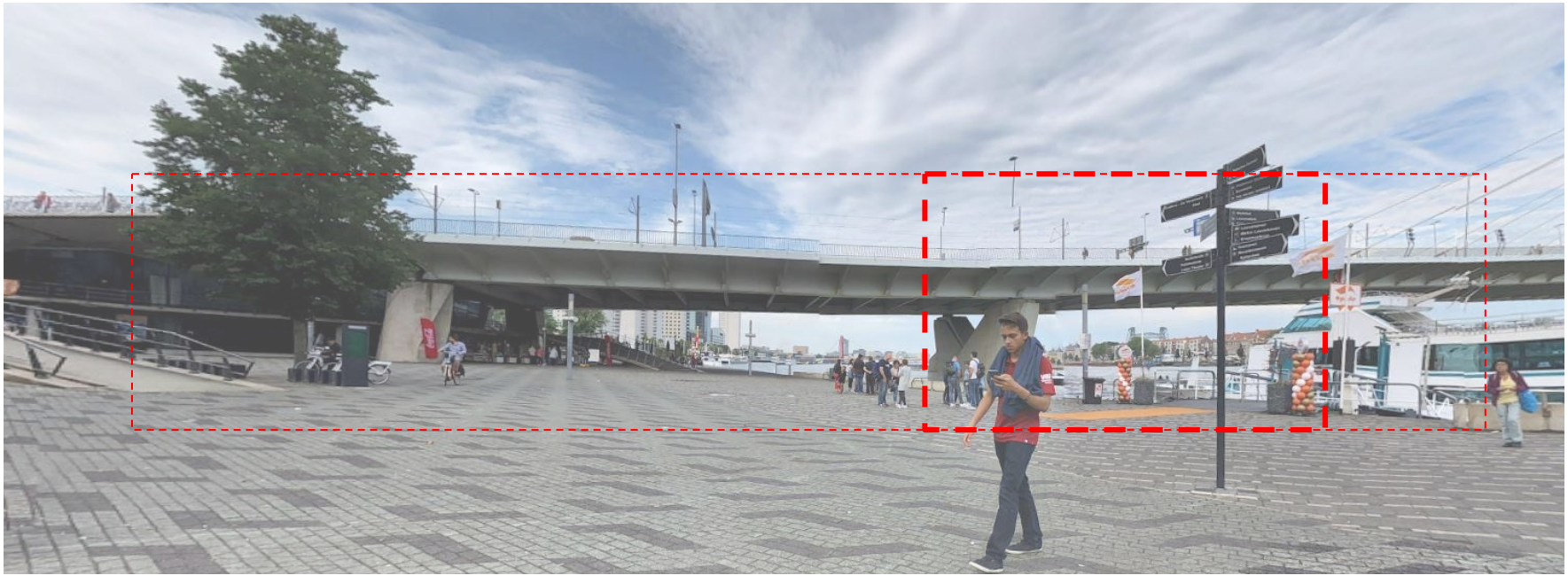
Current activities (action and interaction) :

- walk (pass-by)
- cycle
- wait
- skate

Possible activities :

- interact / engage (stop)
- exercise
- exercise
- shelter

7. Willemsplein, Nieuwe Maas, Rotterdam



Waterbus

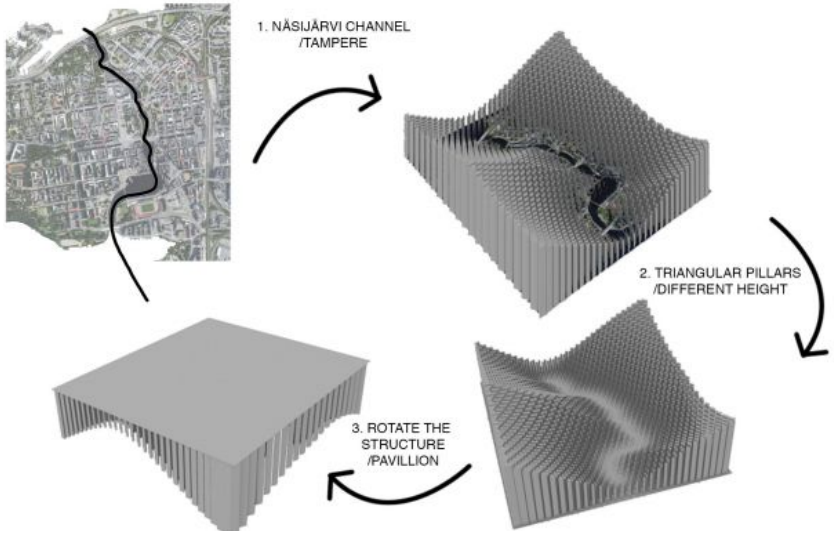
- battery-operated passenger ferry since 2018
- to operate for sixteen hours per day and be charged two times an hour
- high-end lithium battery with a long lifespan
- do we want to power HVAC capacity from the batteries? Or do we want to include another power source
- -> dedicated seat heating and cooling,

= decreased operational costs and zero carbon emissions

Precedents

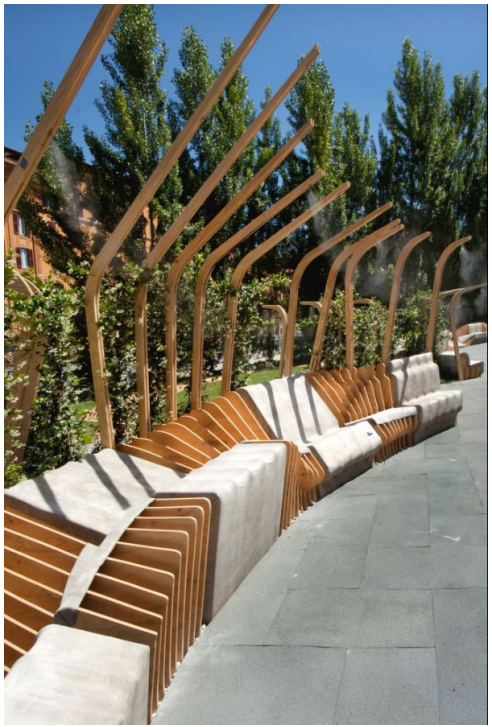
Form: River Inspired

The design of this pavilion, located in Keskustori, comes as a result by combining architecture and landscape: the starting point of the project is the coast line of Nasijarvi channel in Tampere city center, which is used as an attractor to build a complex canopy.
The structure, together with the ceiling, is composed of triangular pillars, while the outer roof is flat, made with a rhinoceros function.



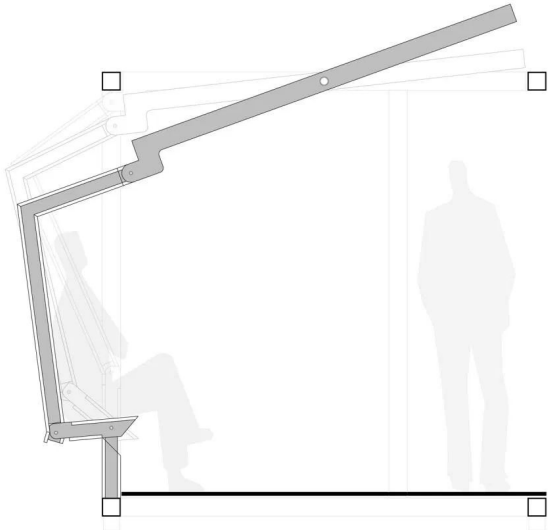
Form to Challenge Interaction

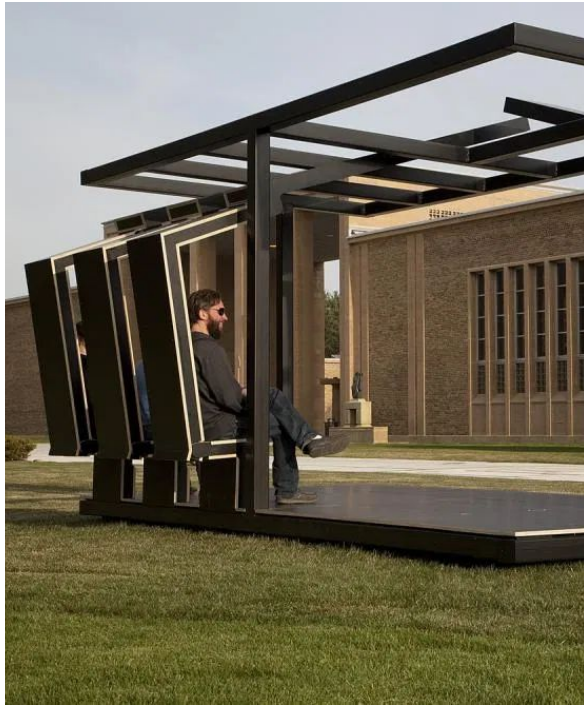
- Body challenging



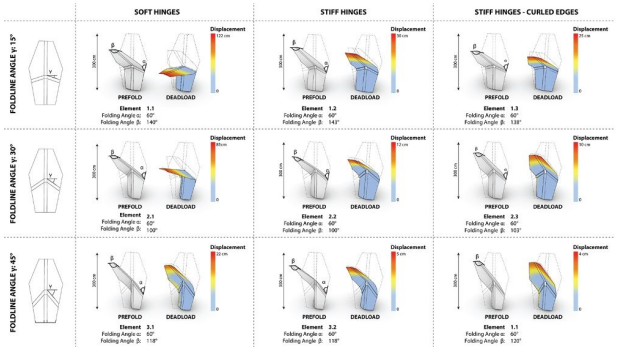
Kinetic: Adaptive Seating for Interaction

- body activated / body responsive





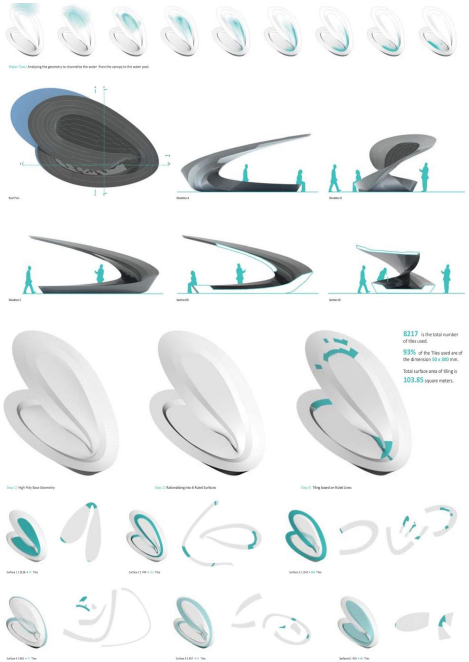
Reference 2: Kinetic Urban Furniture



- showcasing the potential of computational design, simulation and fabrication processes in bio-inspired architecture
- inspired by the folding mechanisms of the Coleoptera coccinellidae (Ladybug) wings.
- composed of two adaptive folding elements made of carbon and glass fibre-reinforced plastic.
- create a shelter and seat for the users

ITECH Research Demonstrator 2018-19
https://vimeo.com/350144840

Urban Furniture - Idea 2



Urban Furniture as fountain, bench, shelter imbedded all in one body

Modularity

Infinity system:

- 4 elements: flat; medium-low, medium-high-high
- 2 different degrees of curvature
- → circular, semi-circular, linear

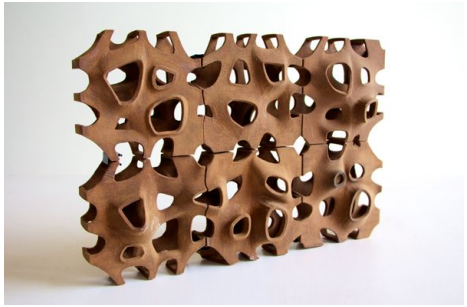
Materialisation

Materials

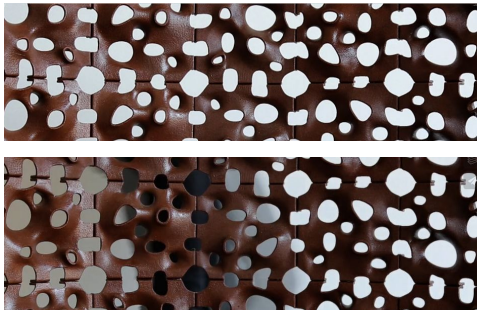
EXPANDS
concrete / rubber polymer

COMPRESS / STRETCH
Thermoplastic elastomer

LIFTS / FALL
Plywood, Elastic bands



3D Printed Wood Bio-polymers



Energy: solar-powered electricity for sound and lighting

Solar powered bench for

- device charging
- sound/music production
- lighting on other hand to project shadow on semi-transparent structure
- cells above seat open/ close according to lighting condition

- related to energy efficiency of waterbus (ferry)

Concept

Idea 1: Infinity System + Hacking Urban Furniture

- Network of urban furniture placed along the river at each Waterbus terminal.

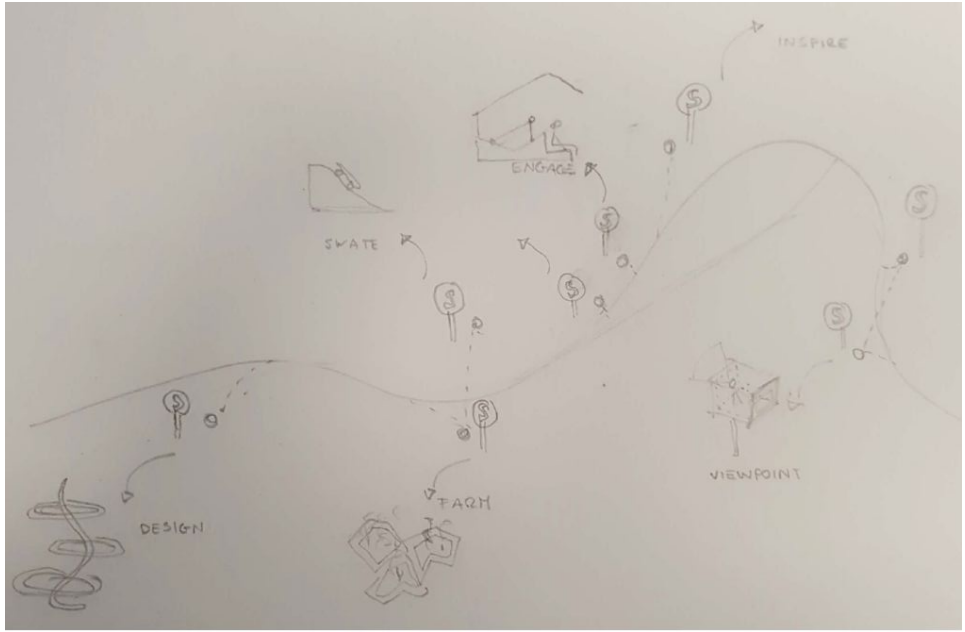
- Design detailed for Willemsplein Terminal for its key location: historic - new; multi-modal intersection; proximity to big park; number of users.

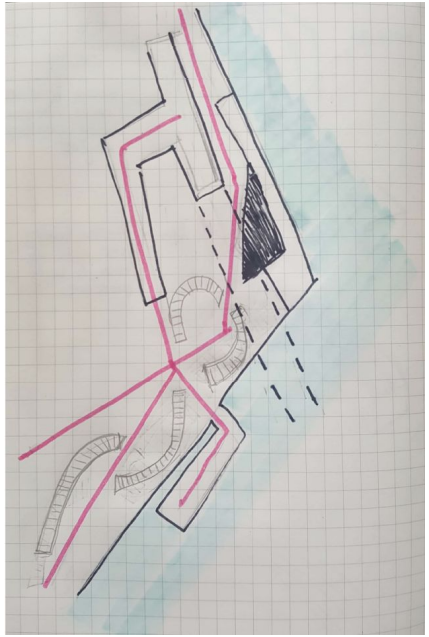
- To provide better shelter and (un?)comfortable seating with element of playfulness to revive a gray & static zone and to change the sedentary lifestyles promoted by the built environment.

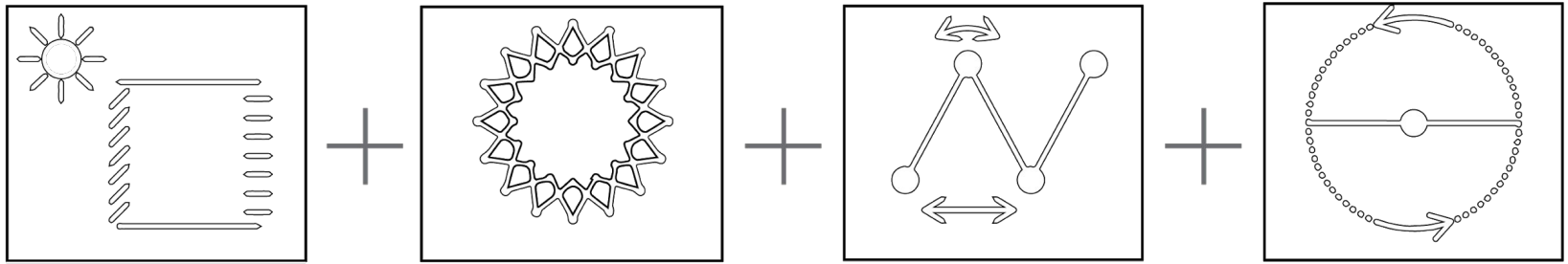
- To allow stations to inform each other about the number of users at each station + Sensor Unit will allow Urban Furniture Network owner to get feedback from each installation.

Idea 1: Sketches

- Modular system according to seating required /terminal
- Adaptive use according to specificity of /terminal
- Lightens up through light sensor
- Shape inspired by the river



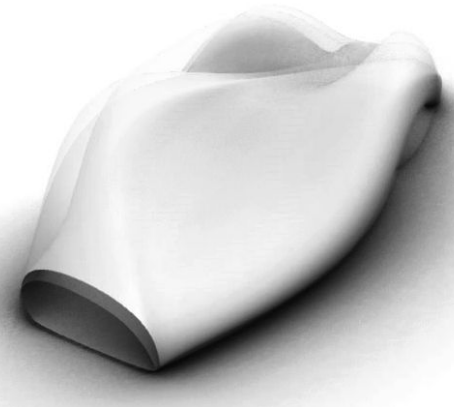



Responsive
Kinetic
Foldable
Transformable

Urban Furniture Idea

Idea 1: Sketches

A modular furniture system inspired by the motion of the river that promotes the freedom of movement of our bodies. The furniture system challenges the user to find new ways of seating and expressing the body. The furniture also undulates like waves, and has a kinetic shading system to provide shade when needed.



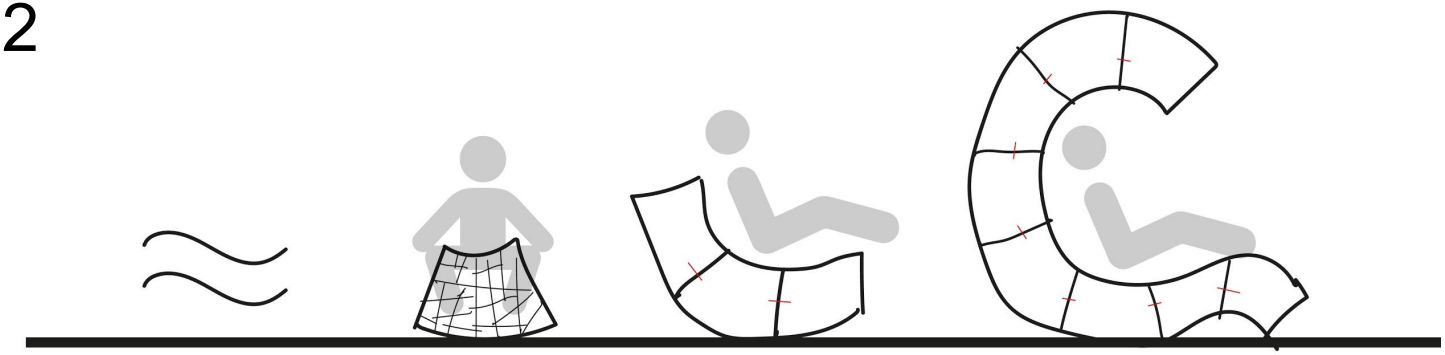
Concept Design

Idea 1: Sketches

- provides seating for ferry terminal
- seating for adjacent office areas
- shelter for people waiting for the ferry
- art piece / beautification of the local area

Concept Design

Idea 2

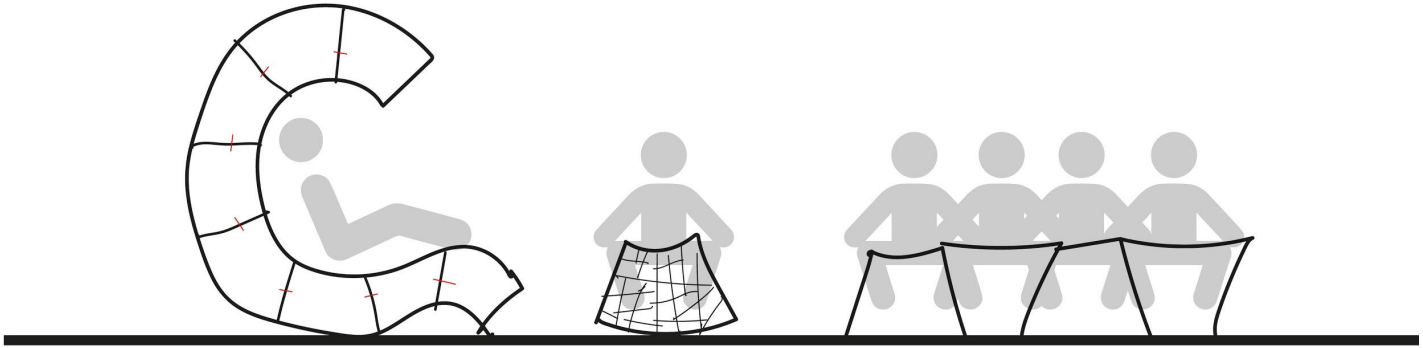


wave concept

a voronoi module

The modules combined manually and built up kinetically to provide more comfortable seating

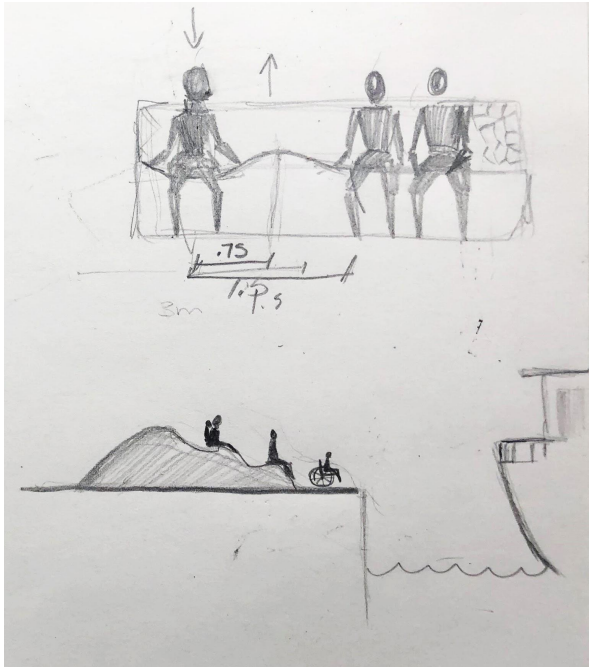
Sitting with shelter



The outcome

Further Ideas / Questions

Urban Furniture - Idea 4



Social distance Seating:

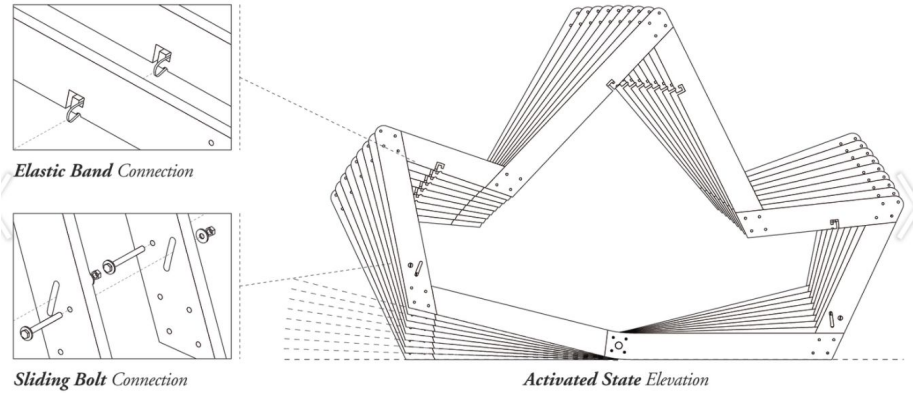
- Seating for ferry terminal
- pressure from one point pushes mesh down and lifts corresponding part up 750mm (highest point) away
- enforces social distancing measures for pandemic / post-pandemic society - or just enforces strangers away because no one likes sitting next to strangers
- useful as people in small groups can sit with each other and 750mm barrier moves relative to seating / pressure
- Inspired by Variable Stiffness

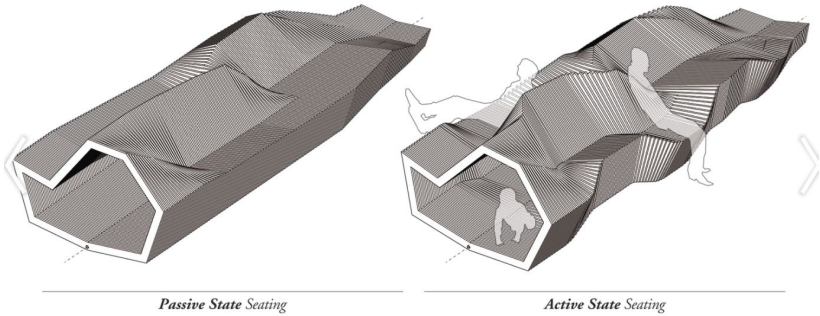
Interactive element: Recognises how many people are sitting on the bench and informs other terminals

To be developed:
How long will this bench be?
Multiple levels? Amphitheatre seating?

Q: Does the furniture have to be printed as one element? Flexibility and range of the elements?

Urban Furniture Idea 4: Precedent





Urban Furniture Idea 4: Materiality

EXPANDS

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