Ana da Fonseca

The *Port* and the Automaton

Tutors:
Stefano Milani
Nicola Marzot

Sjap Holst

North Sea: Landscapes of Coexistence
Transitional Territories Studio 2018-2019

MSc3 Architecture Report

Index

Proposal/ The Action

5. The Project

5.2. Objectives

1.

To introduce a new industry to the port of grimsby as a modes to regenerate the economy of the port city but also to regenerate the estuary in itself. Replacing the fishery and automotive industry with an industry that provides future prospects and growth potential, but also introduces the new sustainable energy future that is present at a territorial level. The port can start of by catering to the National offshore energy farms, but go on to cater for the future North sea energy ring.

2.

The Factory should allow for human engagement, visibility in order to raise awareness but also provide a spectacle to this "ghost town" the city has become. Although automation might see production jobs decrease, knowledge of the production system must be taught, in order to provide people with the knowledge to adapt to the future jobs that may come from automation (Analysis, energy research, logistical research... etc.)

3.

At an architectural scale, the project must look at the expansion of these logistical units and its impact on the landscape and built environment. If it were to be replicated how can an architecture of quality be intregated with the demands of the logistics industry? What role does the human play in the future of this port, and where is his place within the built environment?

Relevance

The transitional territories studio, under the chair of public building is an inter-disciplinary studio with designers, urban planners and water managers/engineers. This graduation project has its inception in a theoretical framework based on the notion of space as a territory put forth by Claude Raffestin in which he argues that space is not a given construct but socially appropriated and "territorialised" by humans as the object of social practice and knowledge. He argues that territorial space has a certain territoriality (behaviour), consisting of relations between social groups on different social, spatial and temporal scales. The nature of the territory as a temporal and multi-scalar space requires a multi-methodological approach to research. My thesis research will look at the implementation of different methodologies at certain scales of the design project, with an emphasis on scenario based design and mapping as a means to connect the scales to the temporal quality of the research.

The choice of the port as a project which allows for exploration in the role of architecture and the architect in the design of logistical networks. This is relevant as the world we see today according to graham, is governed by these networks that are connected on a global scale but splinter the urban and local scale they are placed upon. Advances in technology and capitalism have seen the ports become a place of great wealth but simultaneously one of great social disadvantage and deprivation. How to make the project of a port a public one also?

What my research already suggests is that socio-economic shifts (such as Brexit and new Trading routes) in an era of globalisation and hyper mobility can have catastrophic results on the British port context. Expansion must be strategic, to avoid de creation of a string of low quality logistical architectural artefacts devoid of any aesthetical and societal purpose. It is no longer enough for a project to design a solution to current problems, it must also question the role it will play if the context were to change.

Image: Port separation

Source: Self made

Image: Port Island

Source: Self made

Image: Shoreline

Source: Self made

Architectural Research

53. Architectual Project

a. Configuration and Composition

The configuration and composition of the project is based primarily on the technical and function requirements of the logistics industry combined with aspect related to automation. The order in which these elements is placed is based on a sequence from production, to storage, to loading and exporting. In reverse, offshore turbines can also arrive at the quay, unload, be repaired and reshipped all on the island. Avoiding further transport onto shore, and keeping the global scale of the industry separate from the coastline. The project aims at unraveling this chain in such a way that allows for expansion into other offshore energy industries (reparation), without consuming the local shoreline. The rearrangement also considers where the human presence ends and where automation will take control. The project aims to contain the automation within one single architectural object, and seeks to determine the relationship between form and automation

b. Performance

The project must first meet the technical needs of the industry, both in terms of logistics (quay length, infrastructure, storage), and in terms of manufacturing (factory building standards, machinery space, movement space). The goal is how to arrange these to integrate, form flow and funtion into one automated architectural object. The aim is to create a cycle of flows through the building but also in how it is materialised.

c. Function and Program

The functional aspect of the project is split into the functions of an offshore wind terminal (production, maintanance and repair, temporary storage.) And will investigate the impact of automation on the human in relation to the port. Where will the human end up? and how can they be a part of this global network of flows.

d. Theoretical Approach and Framework

The Architectural research considers the productive infrastructure as what Martin Pawley suggests as "Terminal Architecture". As the built form surrenders to the will of global automated networks, it becomes a terminal no longer a building. How to design with the notion that "The real barometer of the value of buildings today is not their aesthetic pedigree, but their usefullness as terminals in the maze of networks that sustain modern life" (Pawley). Designing buildings as instruments and not monuments.

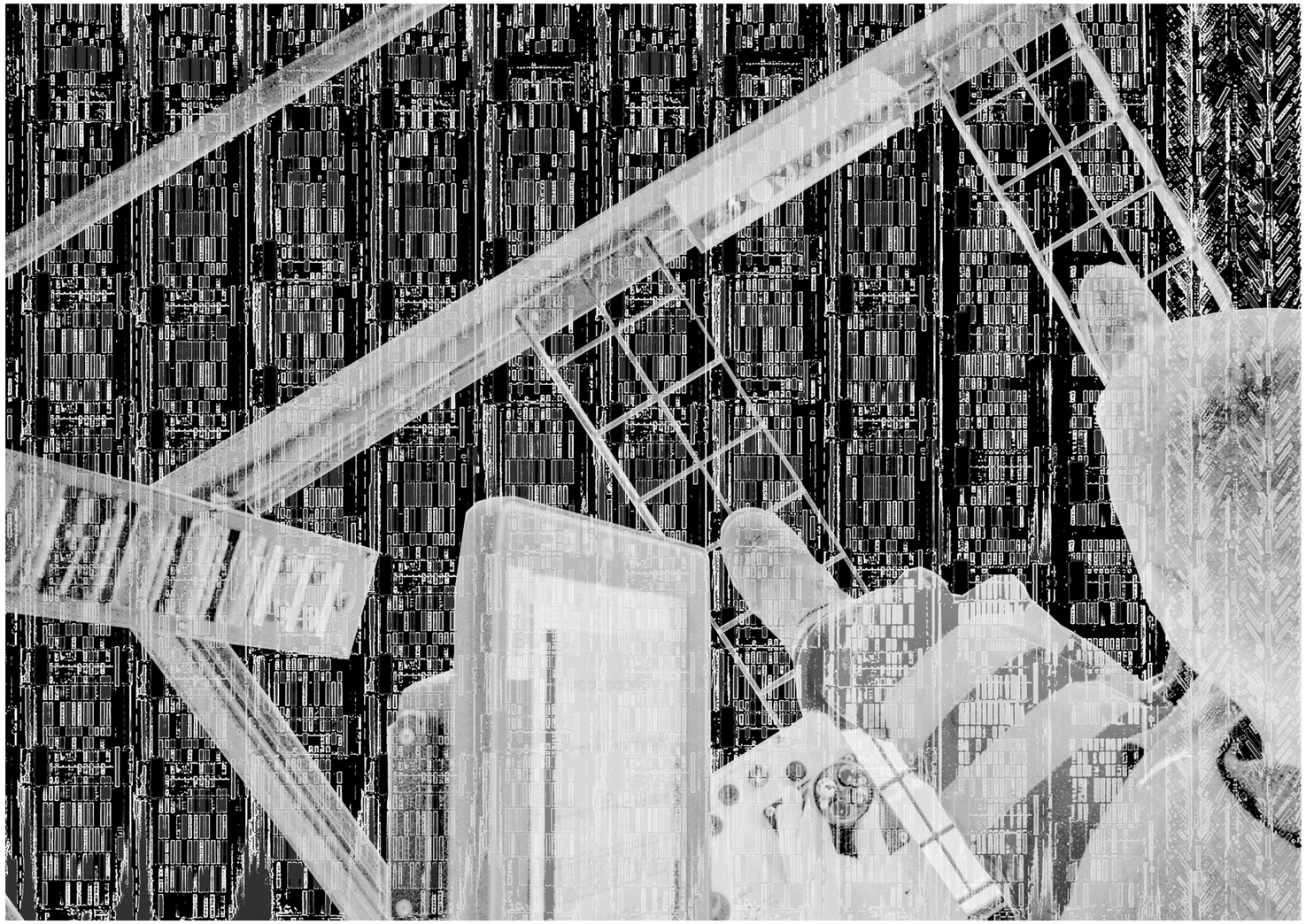
Looking at the building as an automaton. A machine that moves by itself or that has in itself the principles of its movements. But is it perhaps something that moves at the will of another? is this productive infrastructure the frontline between these global networks in which humans now look upon from above, from the control room somewhere else, or from the computer screen kilometers away?

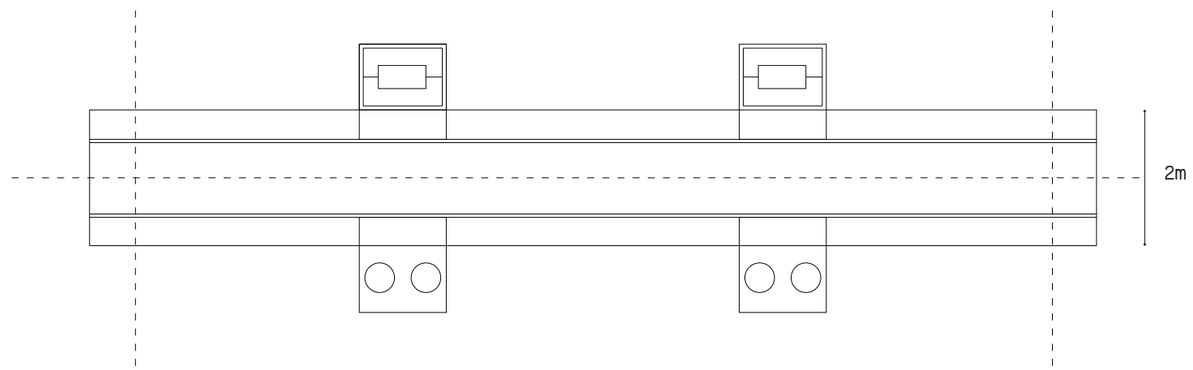
Research Questions

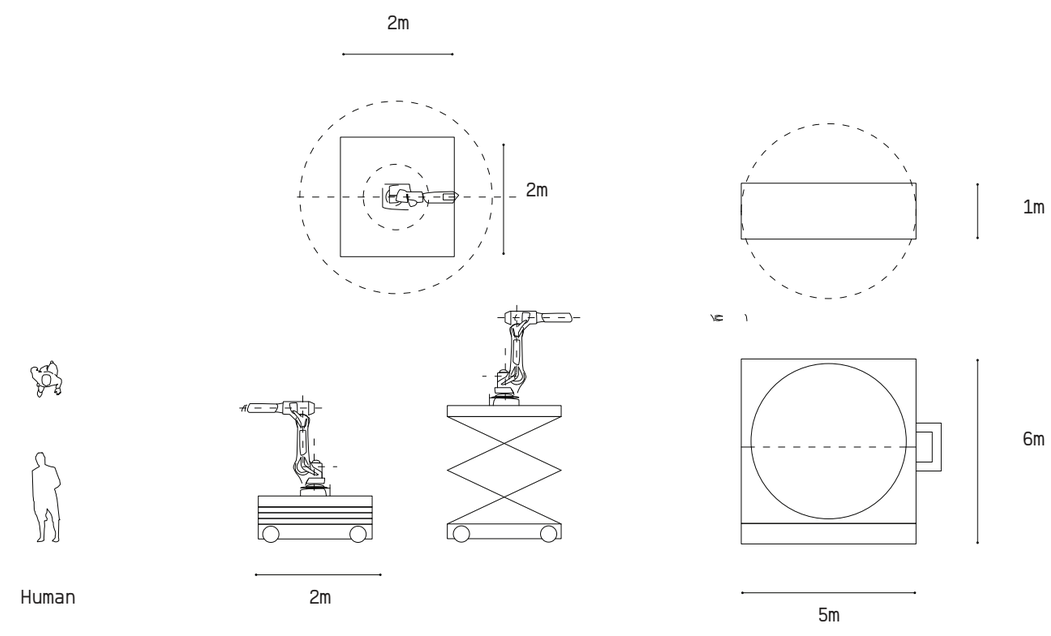
1. INVESTIGATING THE RELATIONSHIP BETWEEN INFRASTUCTURAL FORM, FUNCTION AND AUTOMATION

2. WHAT ARE THE EFFECTS OF THE INTRODUCTION OF THE AUTOMATED INFRASTRUCTURE INTO PORT LANDSCAPES?

3. HOW CAN STRUCTURE, STORAGE AND FAÇADE BE COMBINED INTO ONE MODULAR ELEMENT THAT DEPICTS THE PROCESS WITHIN?







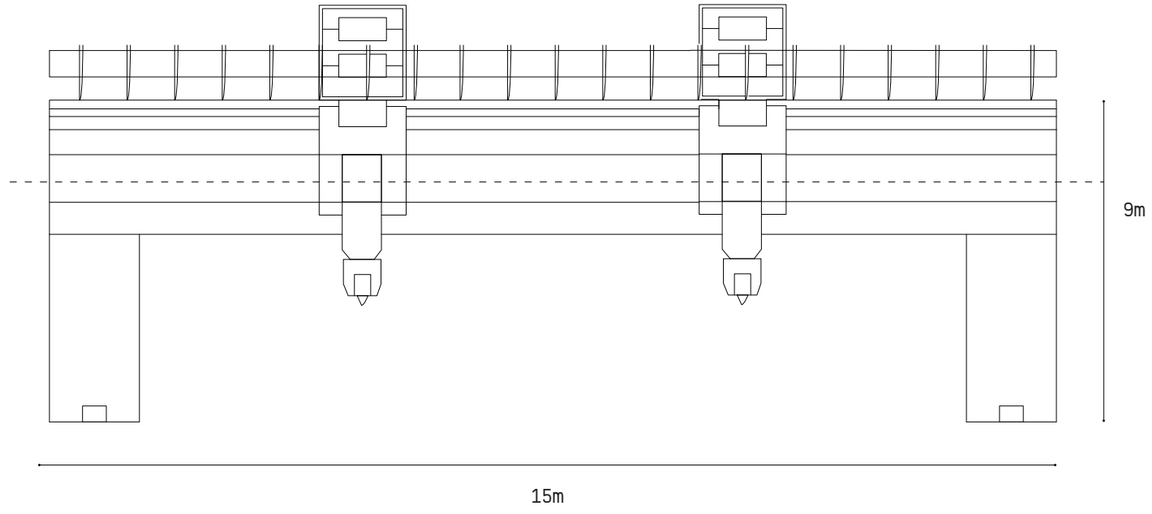
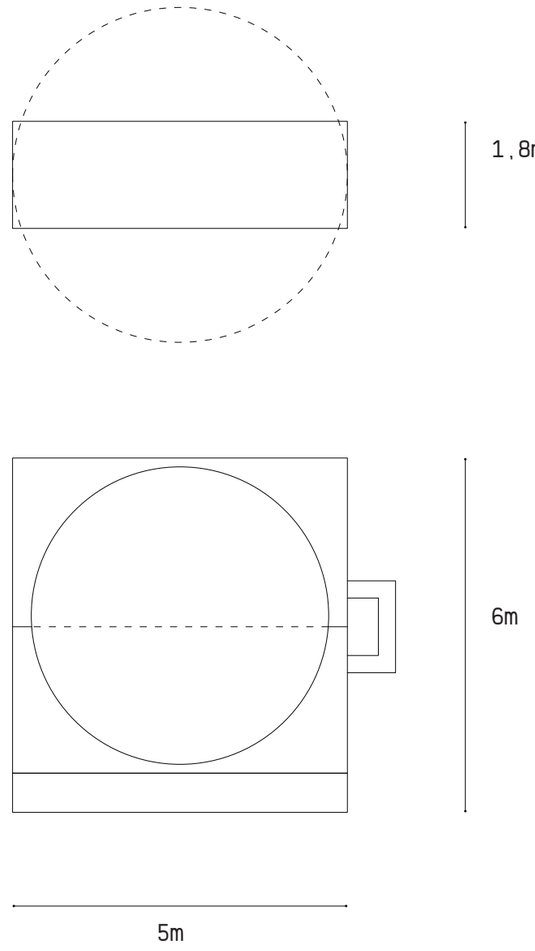
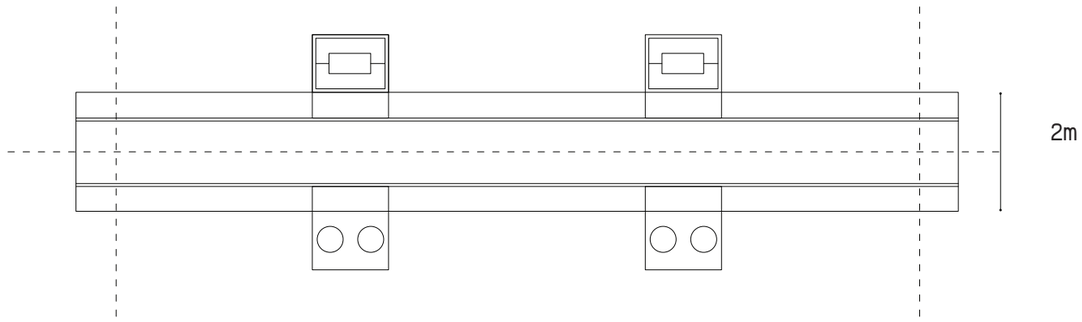
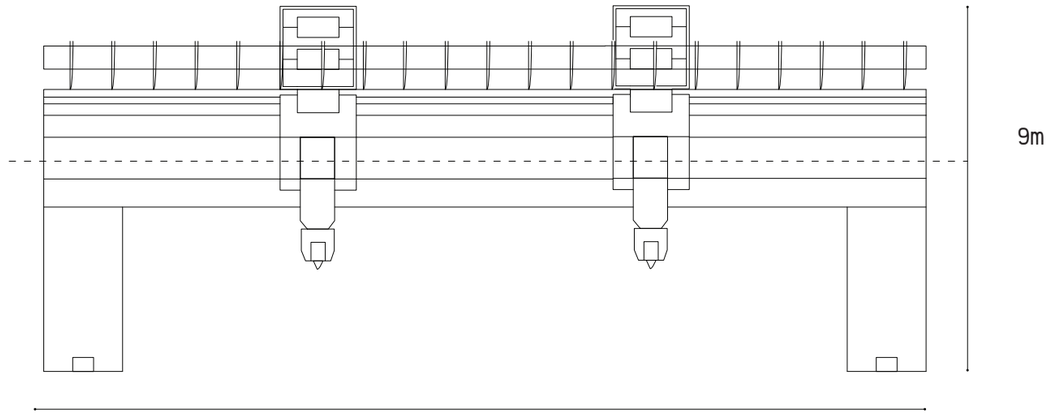


Image: Human to Machine Scale Comparison

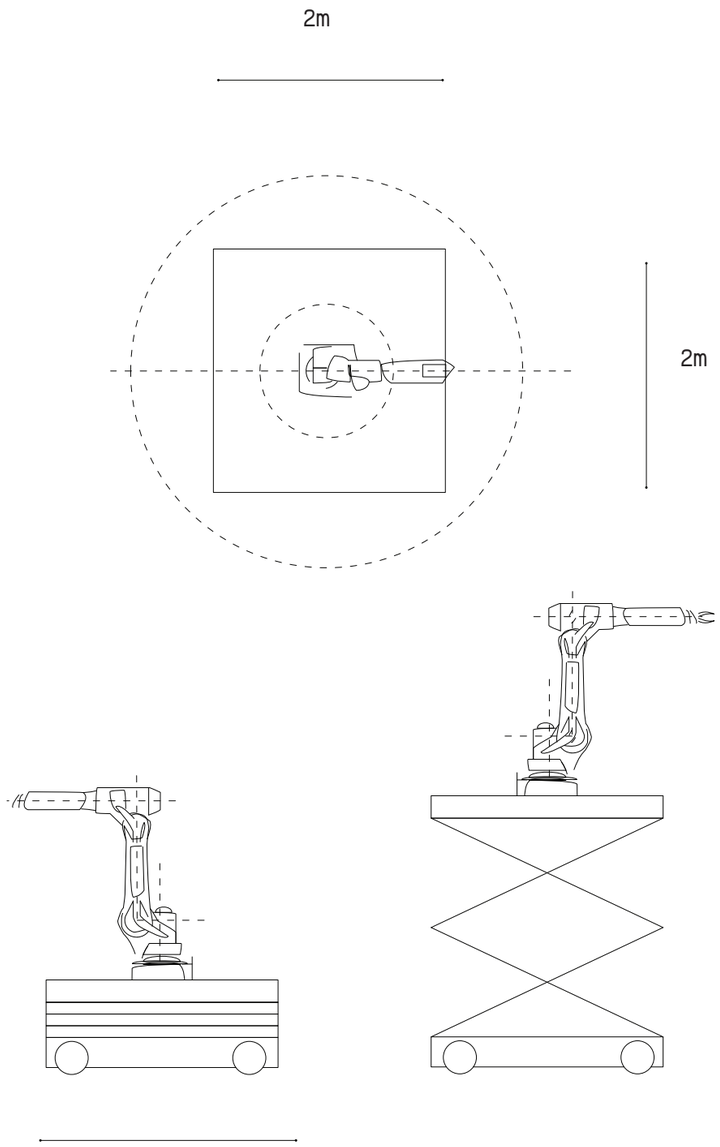


The Machines (Blade Holder)





Mastermill Prototype



Kuka omnimove and robotic Arm

4.4. Spatial Concept

a. Configuration and Composition

The configuration and composition of the project is based primarily on the technical and function requirements of the logistics industry. The order in which these elements is placed is based on a sequence from production, to storage, to loading and exporting. In reverse, offshore turbines can also arrive at the quay, unload, be repaired and reshipped all on the island. Avoiding further transport onto shore, and keeping the global scale of the industry separate from the coastline. The project aims at unraveling this chain in such a way that allows for expansion into other offshore energy industries (reparation), without consuming the local shoreline. The rearrangement also considers where the human presence ends and where automation will take control. The project aims to contain the automation within one single architectural object, and seeks to determine the relationship between form and automation

b. Performance

The project must first meet the technical needs of the industry, both in terms of logistics (quay length, infrastructure, storage), and in terms of manufacturing (factory building standards, machinery space, movement space). The goal is how to arrange these to integrate, form flow and funtion into one automated architectural object. The aim is to create a cycle of flows through the building but also in how it is materialised.

c. Function and Program

The functional aspect of the project is split into the functions of an offshore wind terminal (production, maintanance and repair, temporary storage.) And will investigate the impact of automation on the human in relation to the port. Where will the human end up? and how can they be a part of this global network of flows.

d. Framework

The object is characterised by the automated container, (light weight adaptable and durable), and the base, 5m elevation from groundconditions due to flood prone areas. The coastline then reflects the process, by being shaped in order to properly experience the building itself, the processes, both automated and natural.

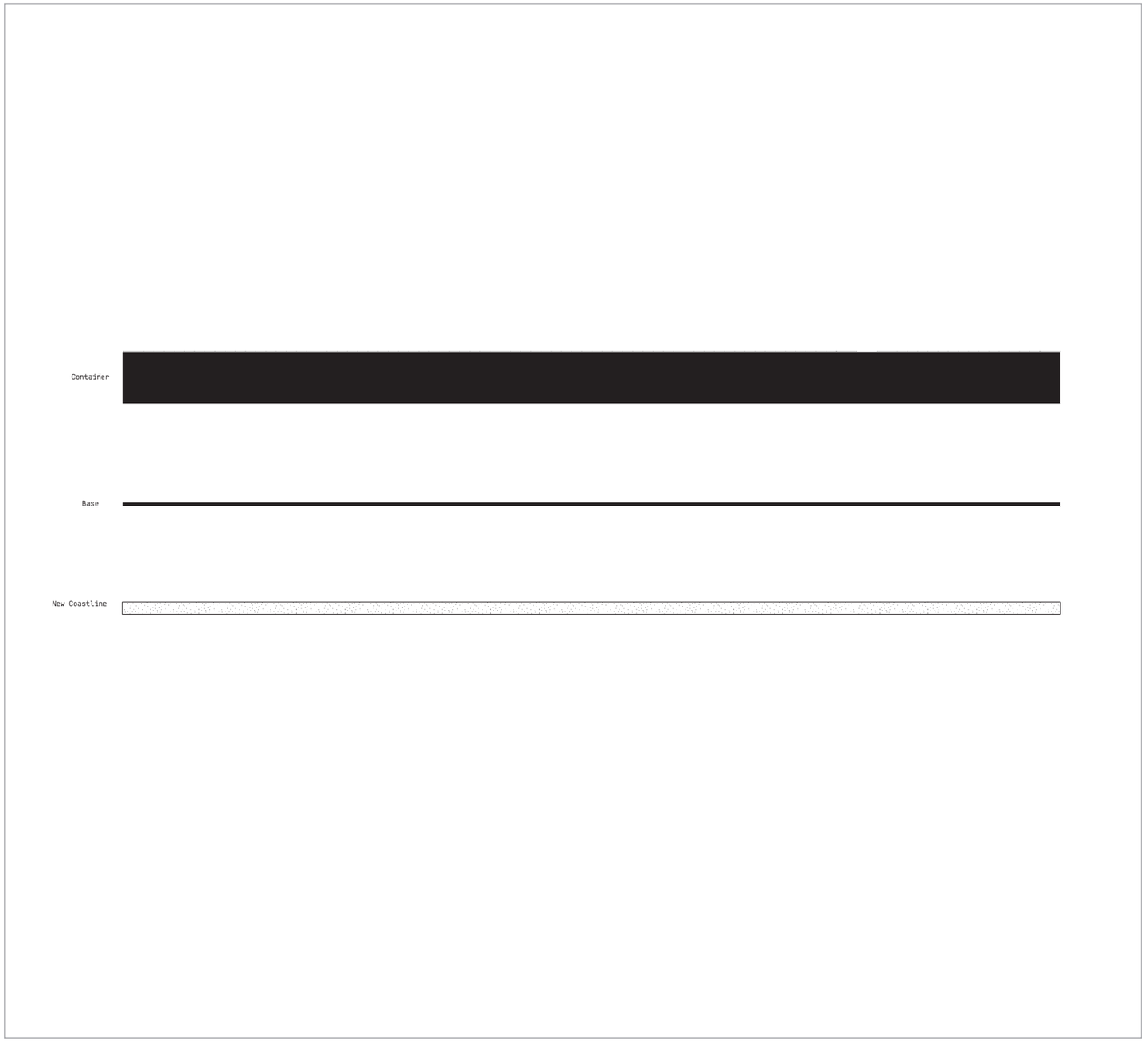
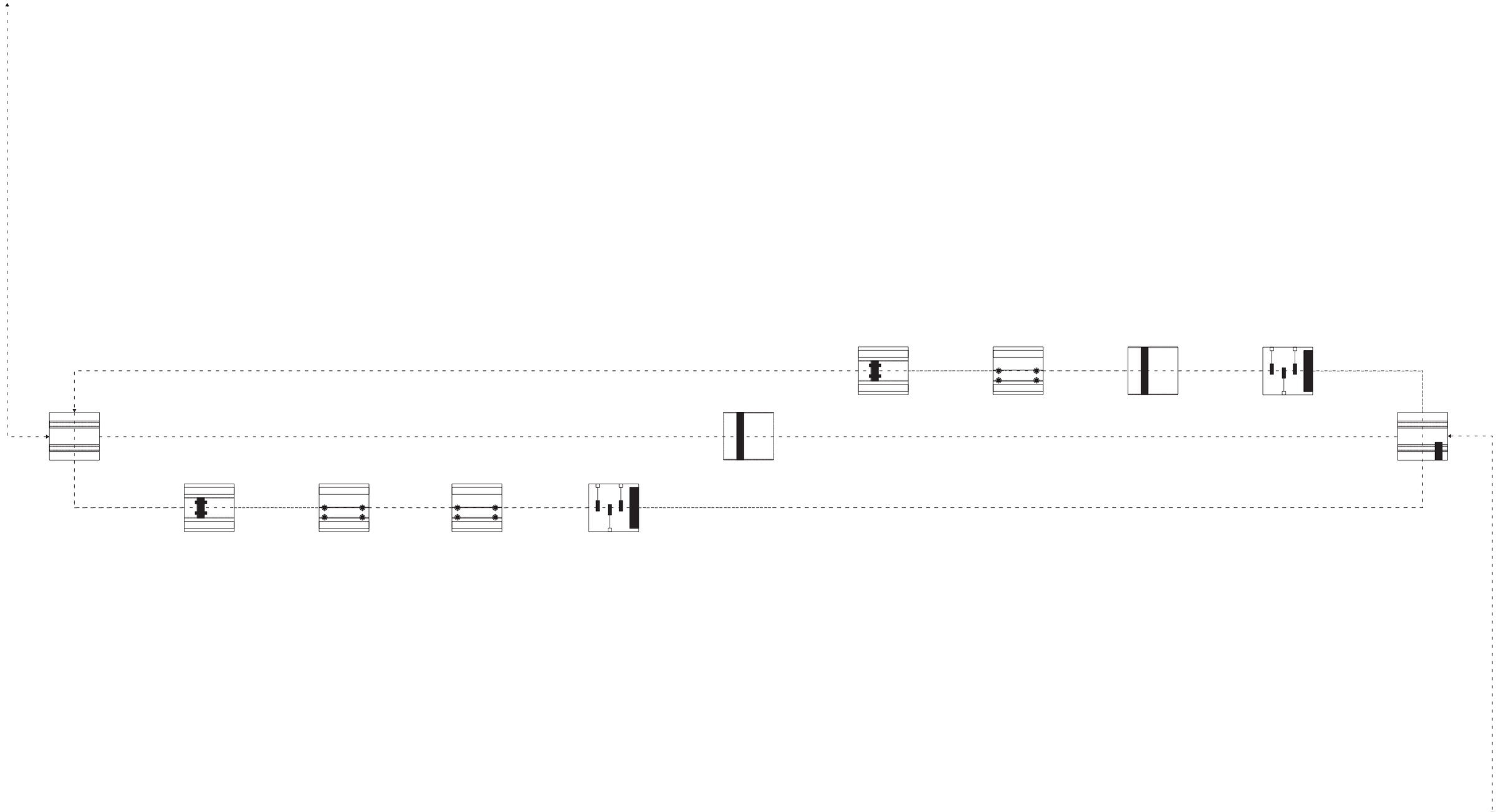


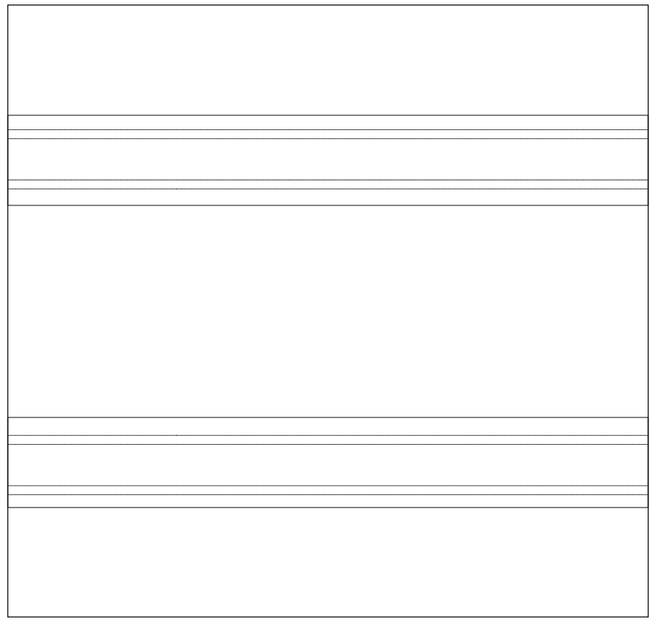
Image: Introduction Casco

Action/ Space/ Machine Sequence

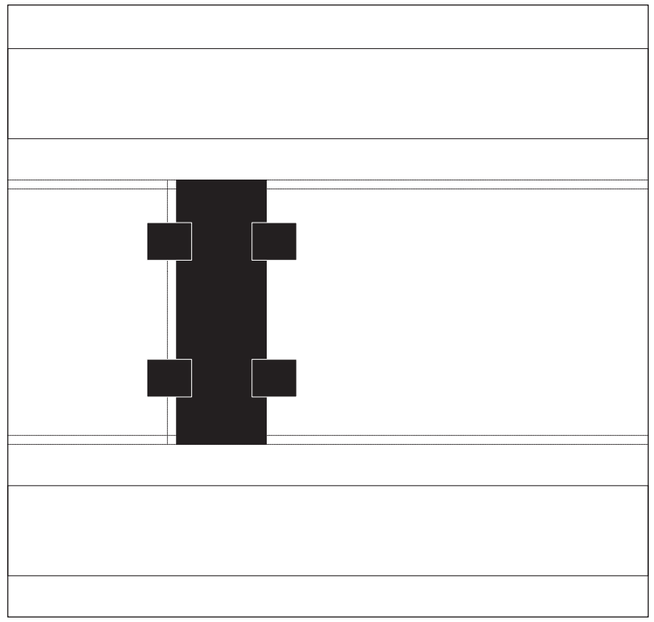
The research began with the investigation of movement between process and the machine that governs it. by creating this sequence an order is created that can be translated into the routing of the building.
This is the abstraction of the process



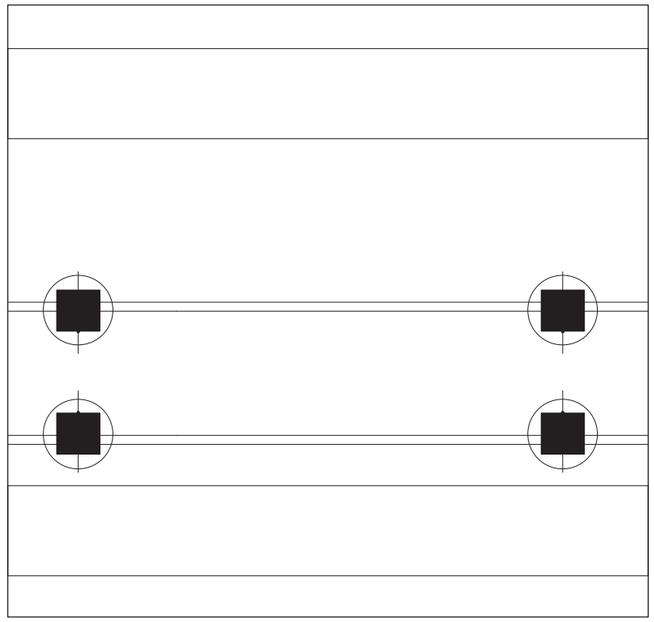
Sequence of Actions and Spaces: From production to maintance to destruction

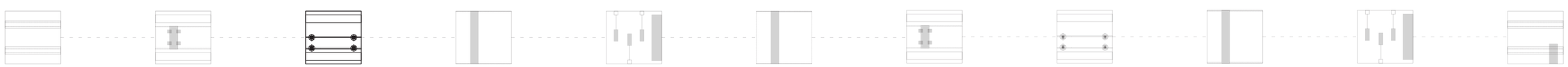


Material Input: Train Rail

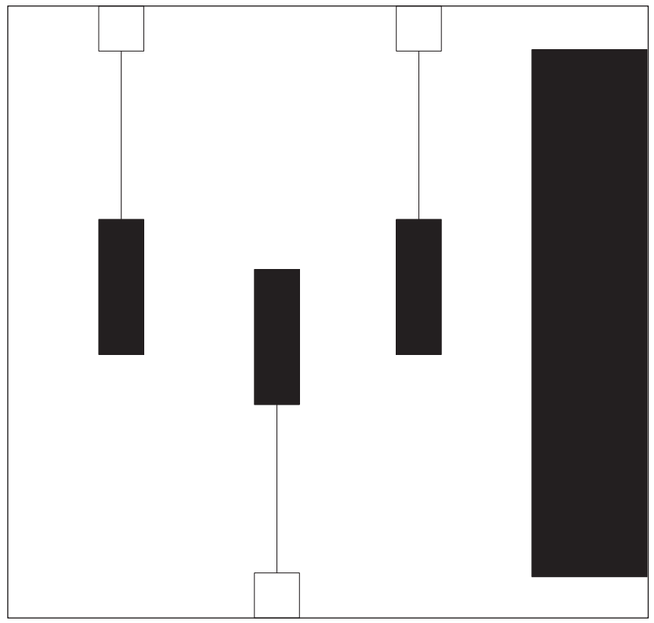


Molding : Mastermill





Epoxy Curing and Painting : robotic arms

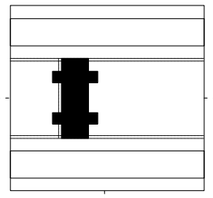


Testing and Pack-
ing

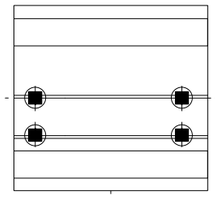
Floorplan Translation

The action sequence was then translated into floorplans by adding the dimensions to the automaton and the dimension of the blade. 75m determined the minimum length of one process. In order to account for additional movement around the machines and the blade the overall process becomes 80m long with a buffer zone of 10m on each end.

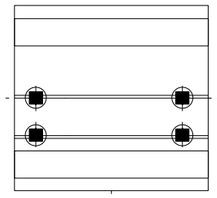
Molding



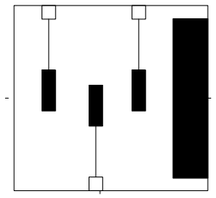
Curing



Sanding and Painting

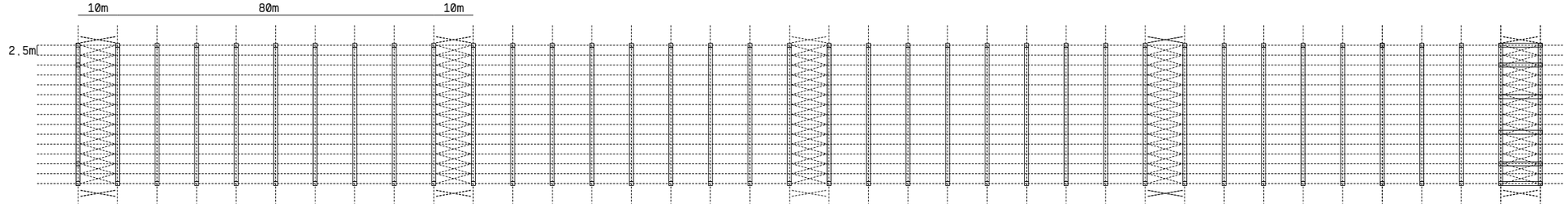


Testing

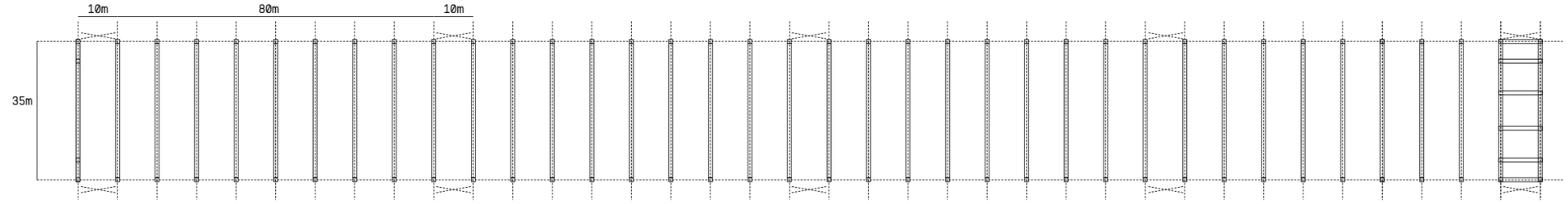


From Action to Containment

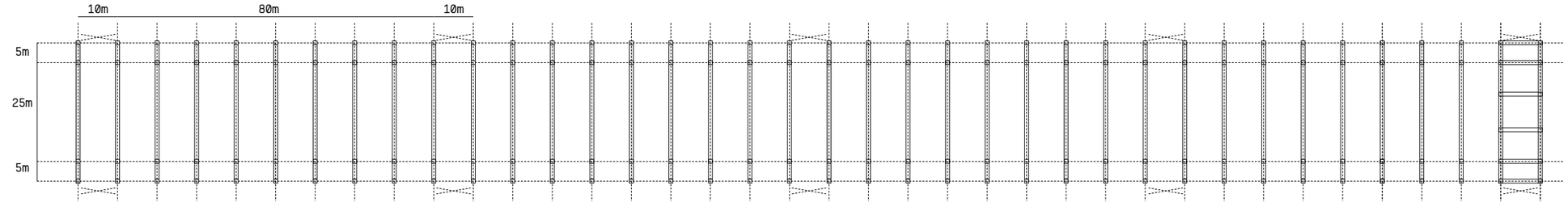
Option 1
Roof



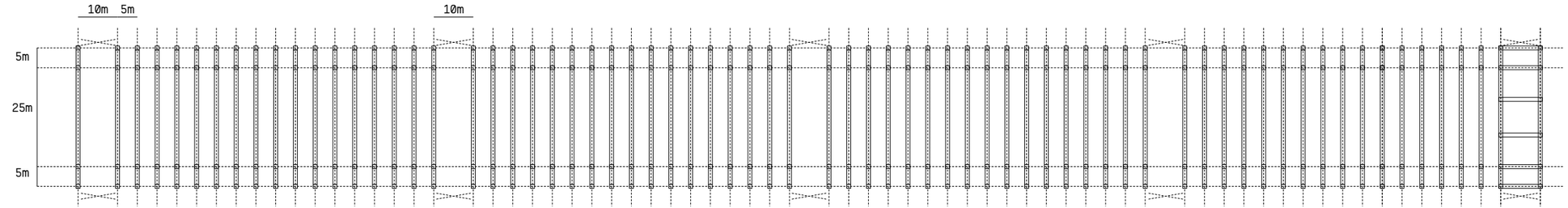
Option 1
10M Spacing



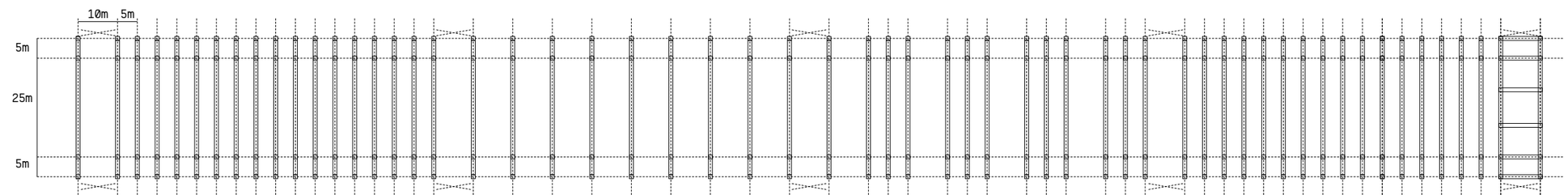
Option 2
10M Spacing
Double
Corridor

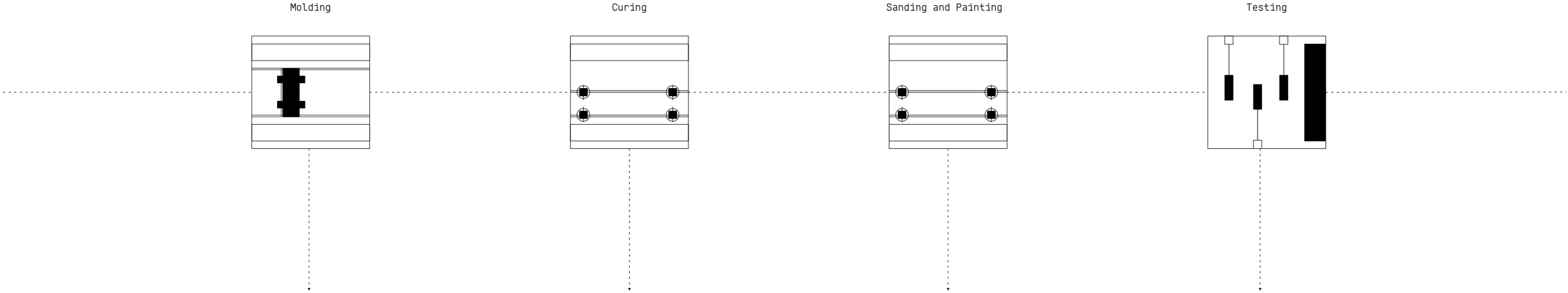


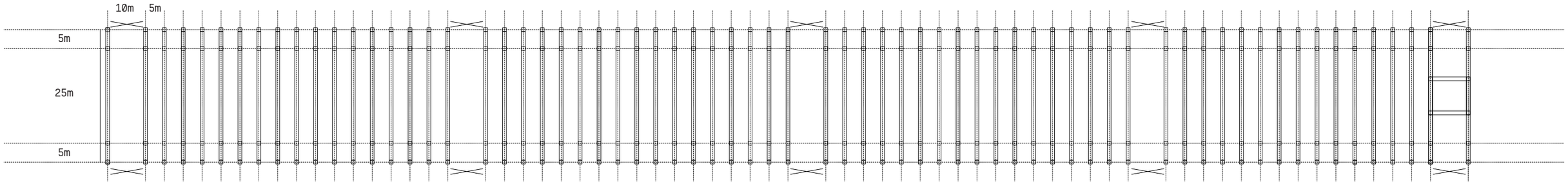
Option 3
5M Spacing
Double
Corridor



Option 4
5M Spacing
& 10M
Spacing
Double





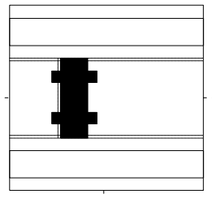


Grid Composition vs Action

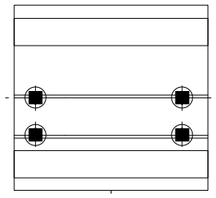
Elevation Scoring

The Elevation is then Scored in Accordance to the objects involved in each process. Leading to a facade that becomes an exhibition of the elements used within the interior automated space.

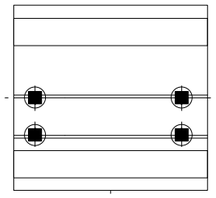
Molding



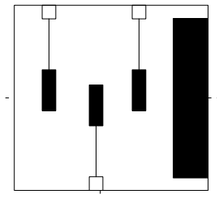
Curing

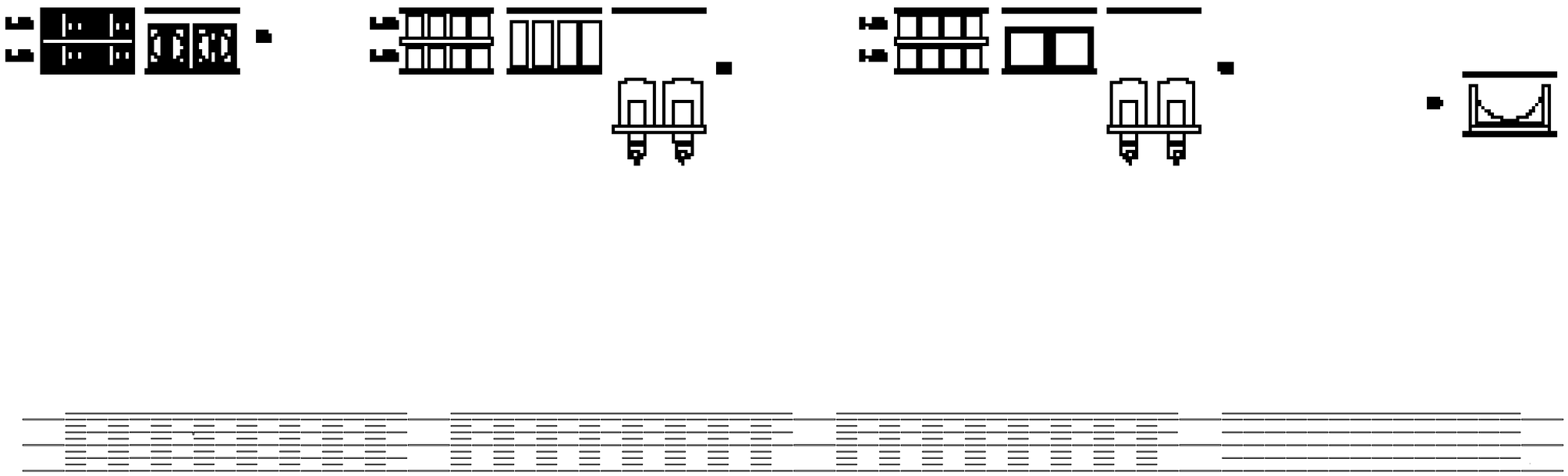


Sanding and Painting

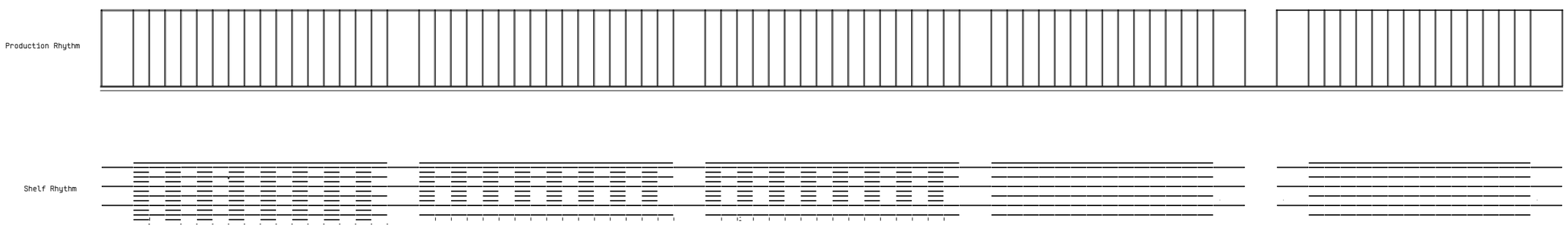


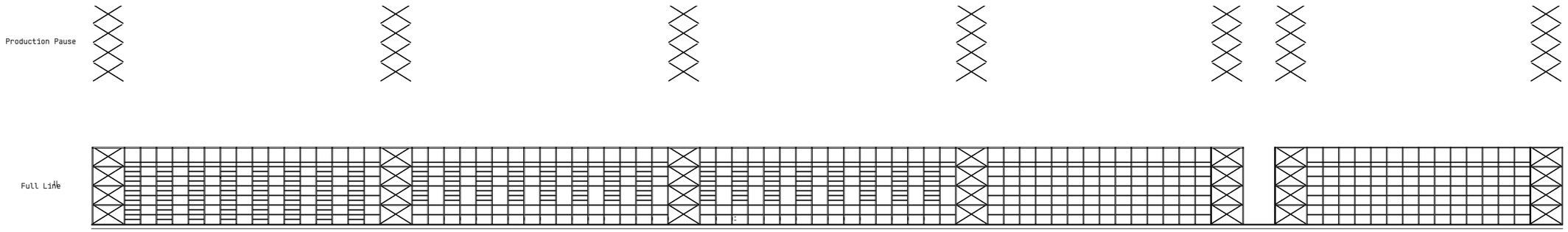
Testing



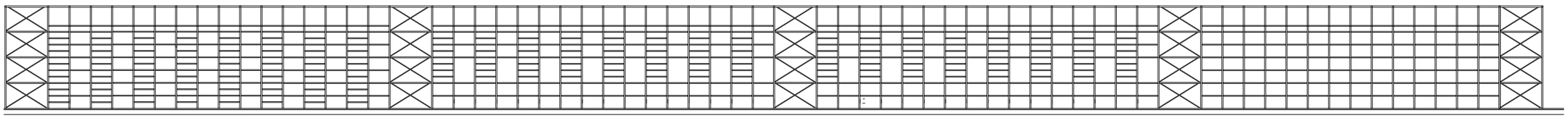


Objects involved in process

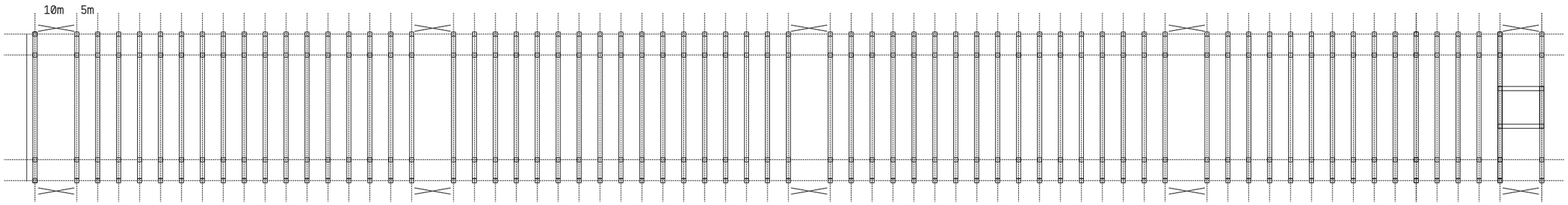




Elevation Scoring



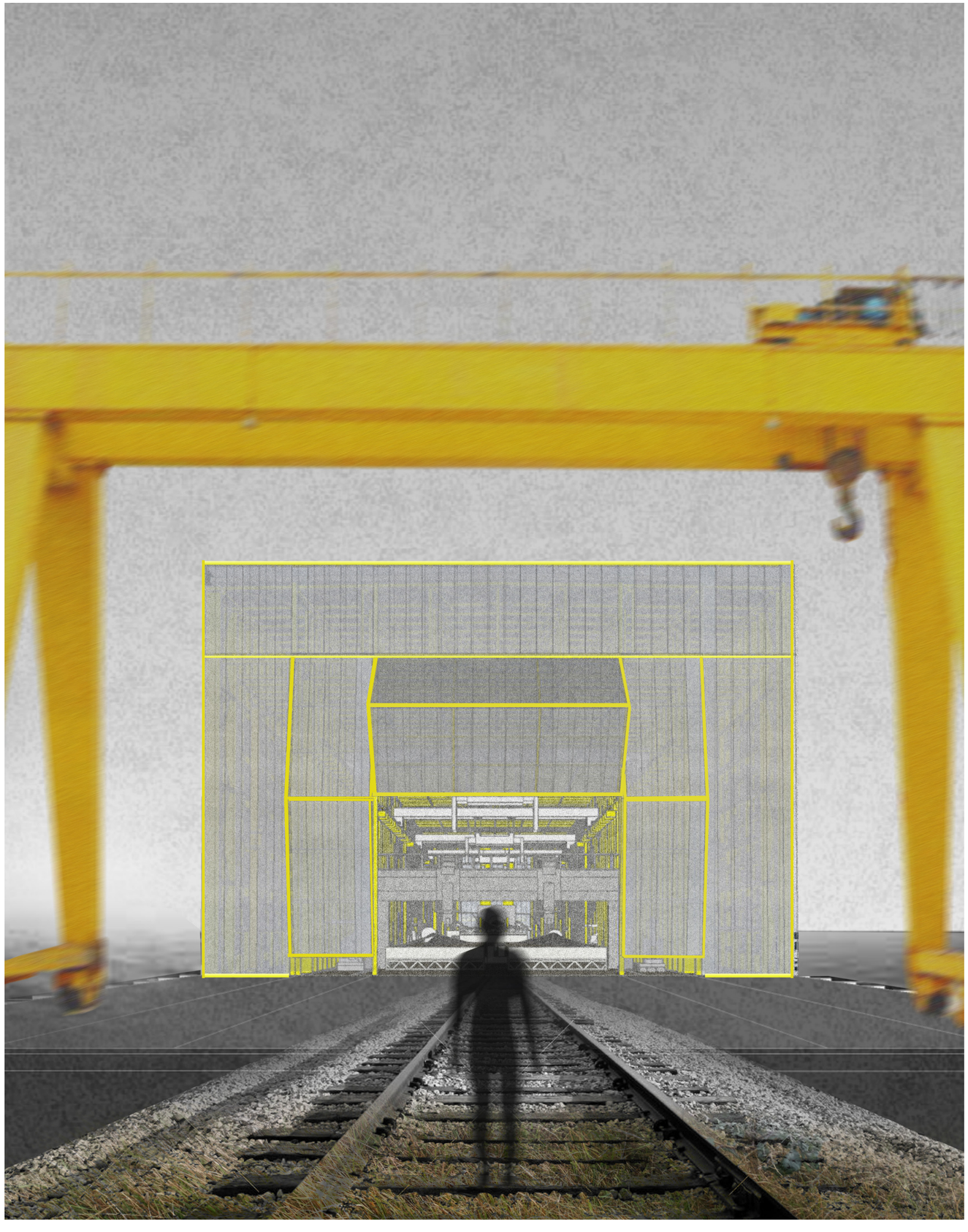
Elevation Scoring

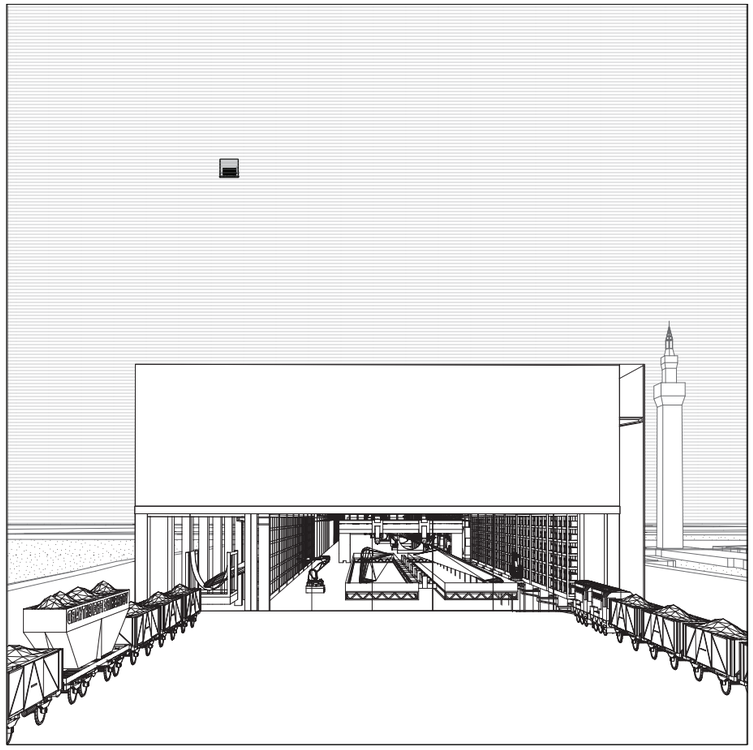


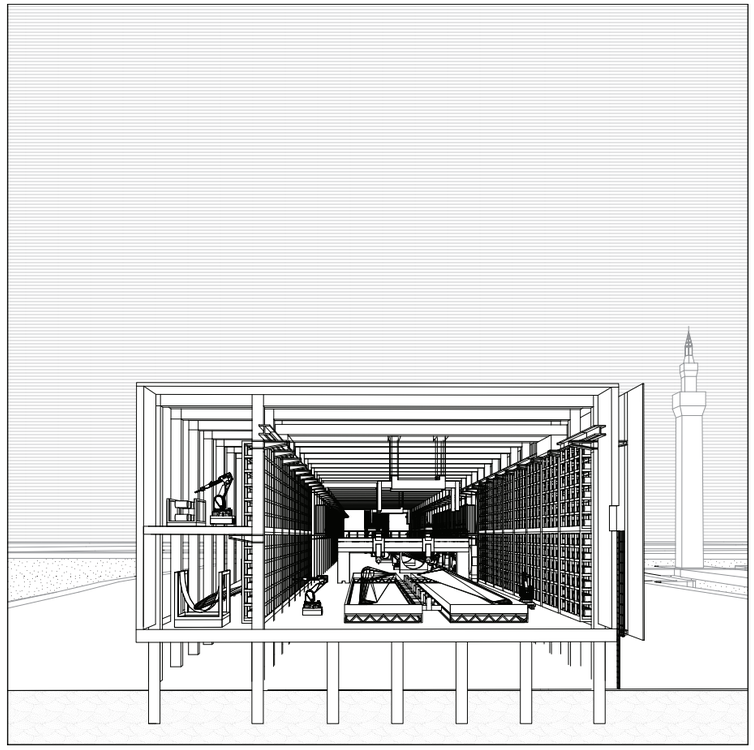
Floorplan Scoring

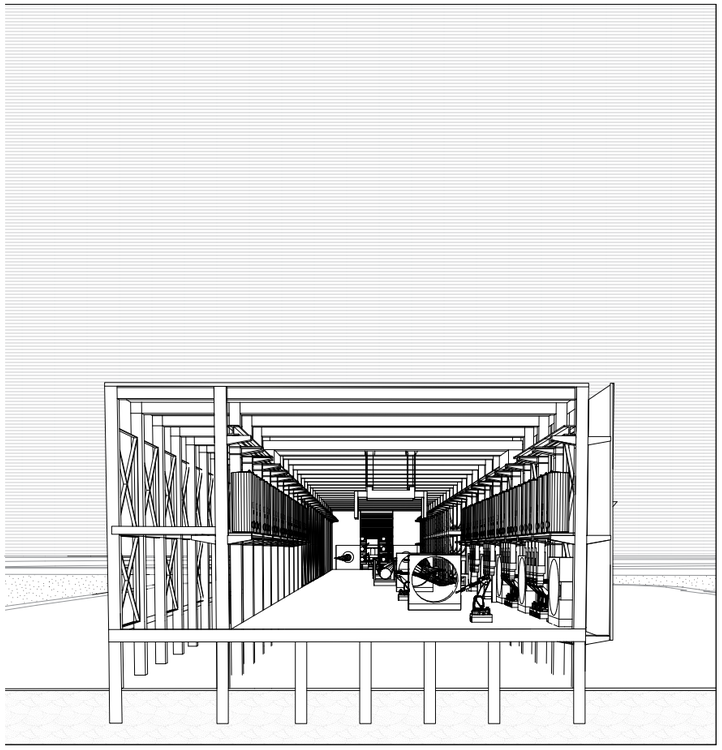
Introduction of the Machine

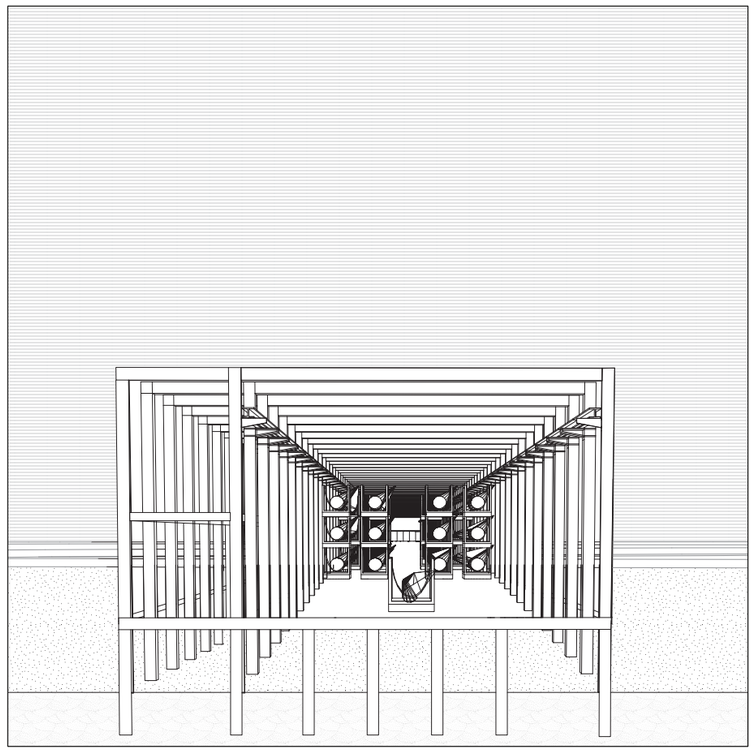
The Container is given Life. The scoring is converted into a functional grid. The line is split in three bands. A central band where the production takes place, and two bands that follow it on either end where the storage occurs. A series of elevation tests show the need the three bands to be translated into section as well, to allow for machines on all levels to flow freely.

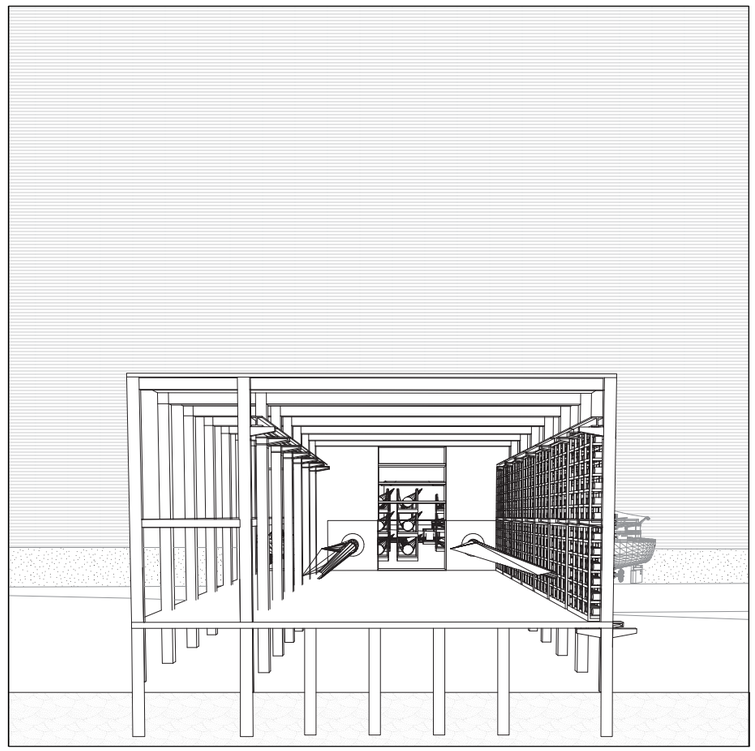


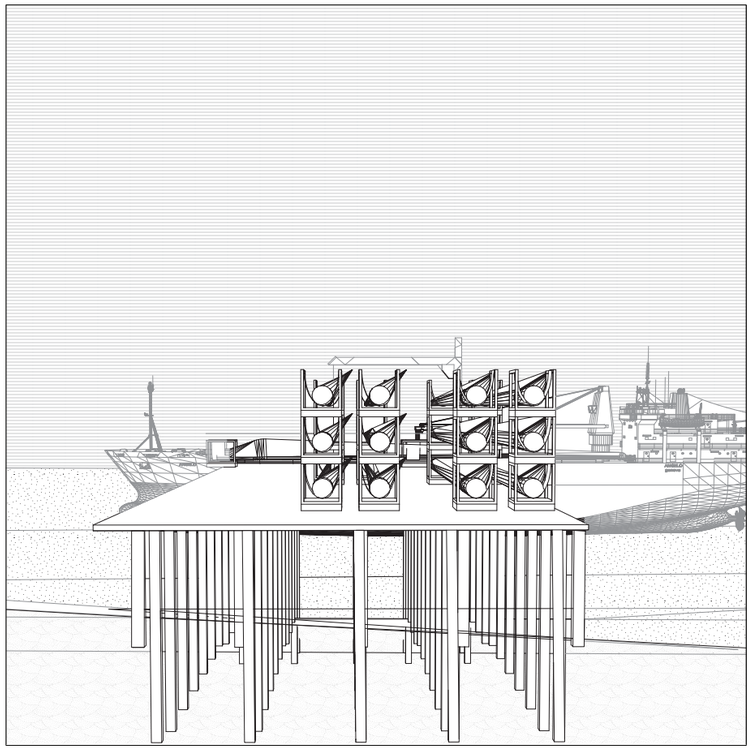


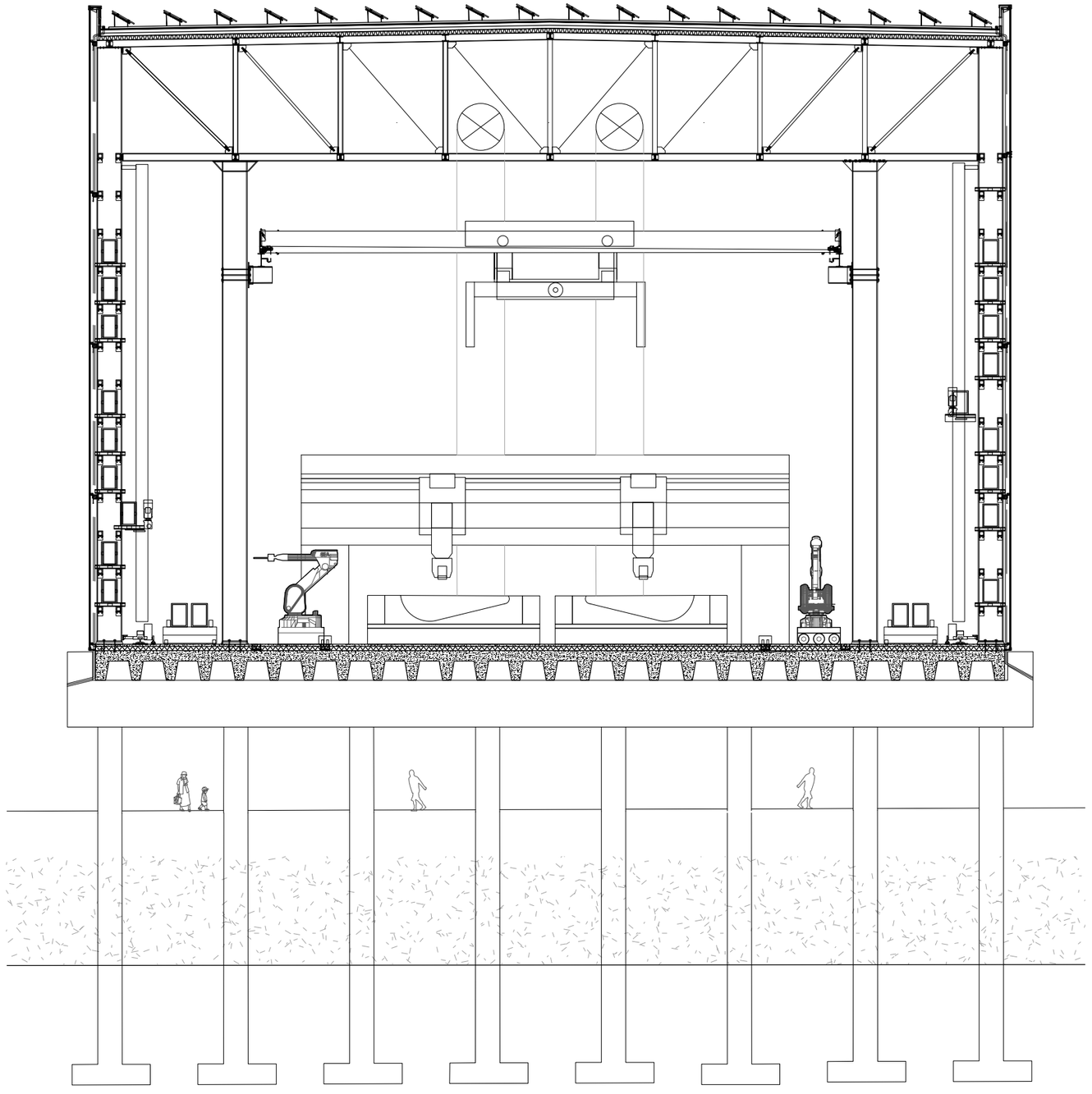




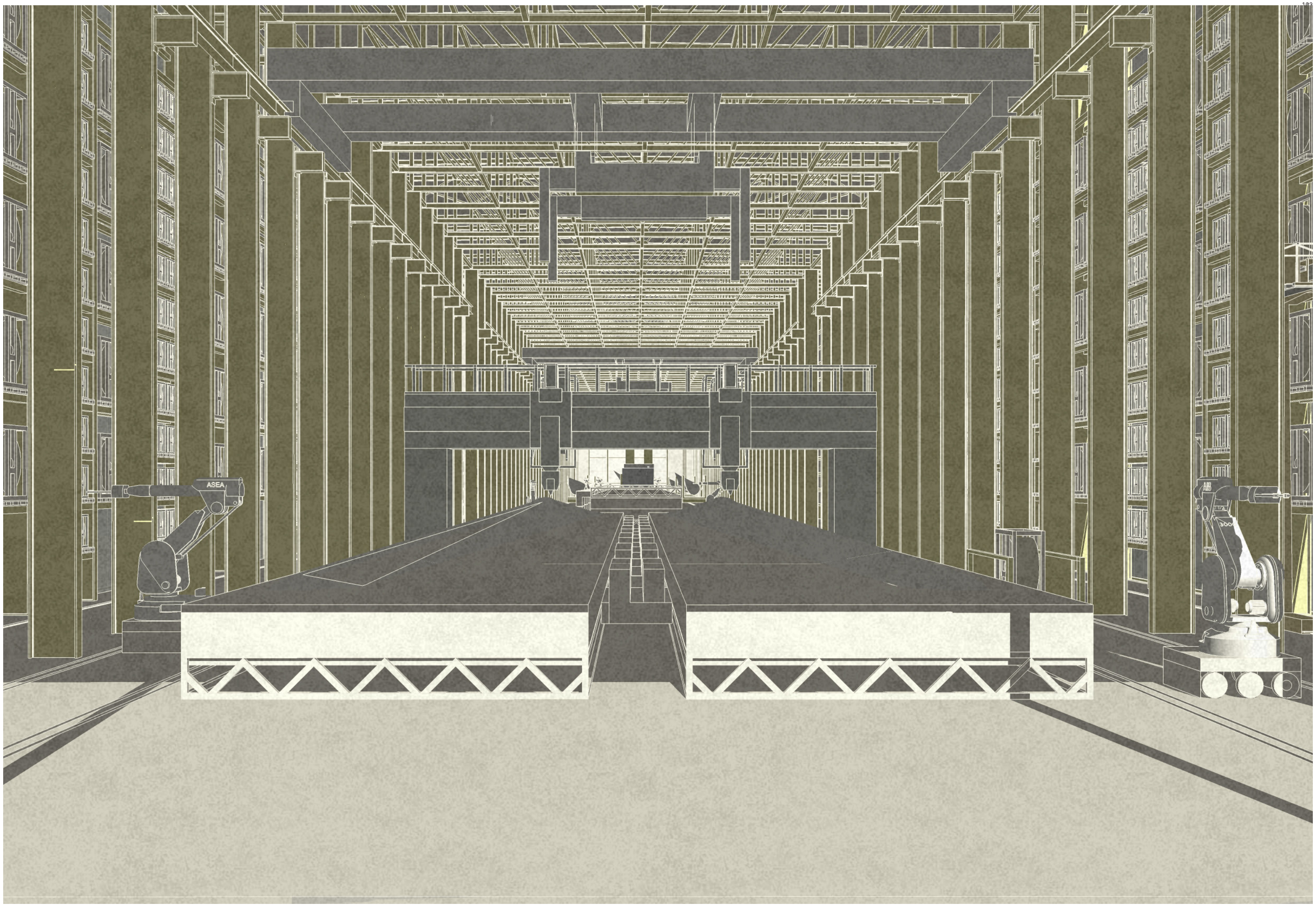


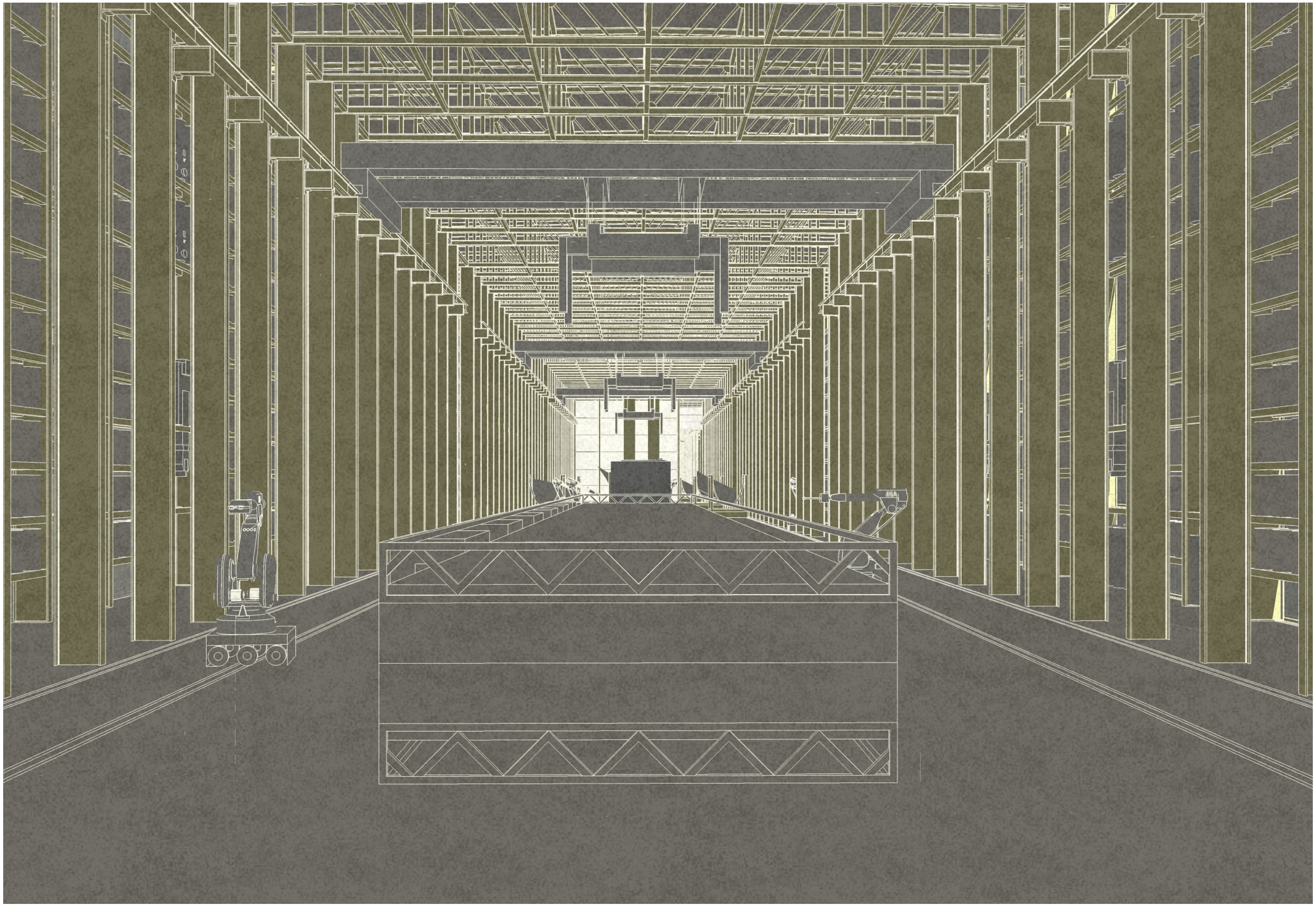


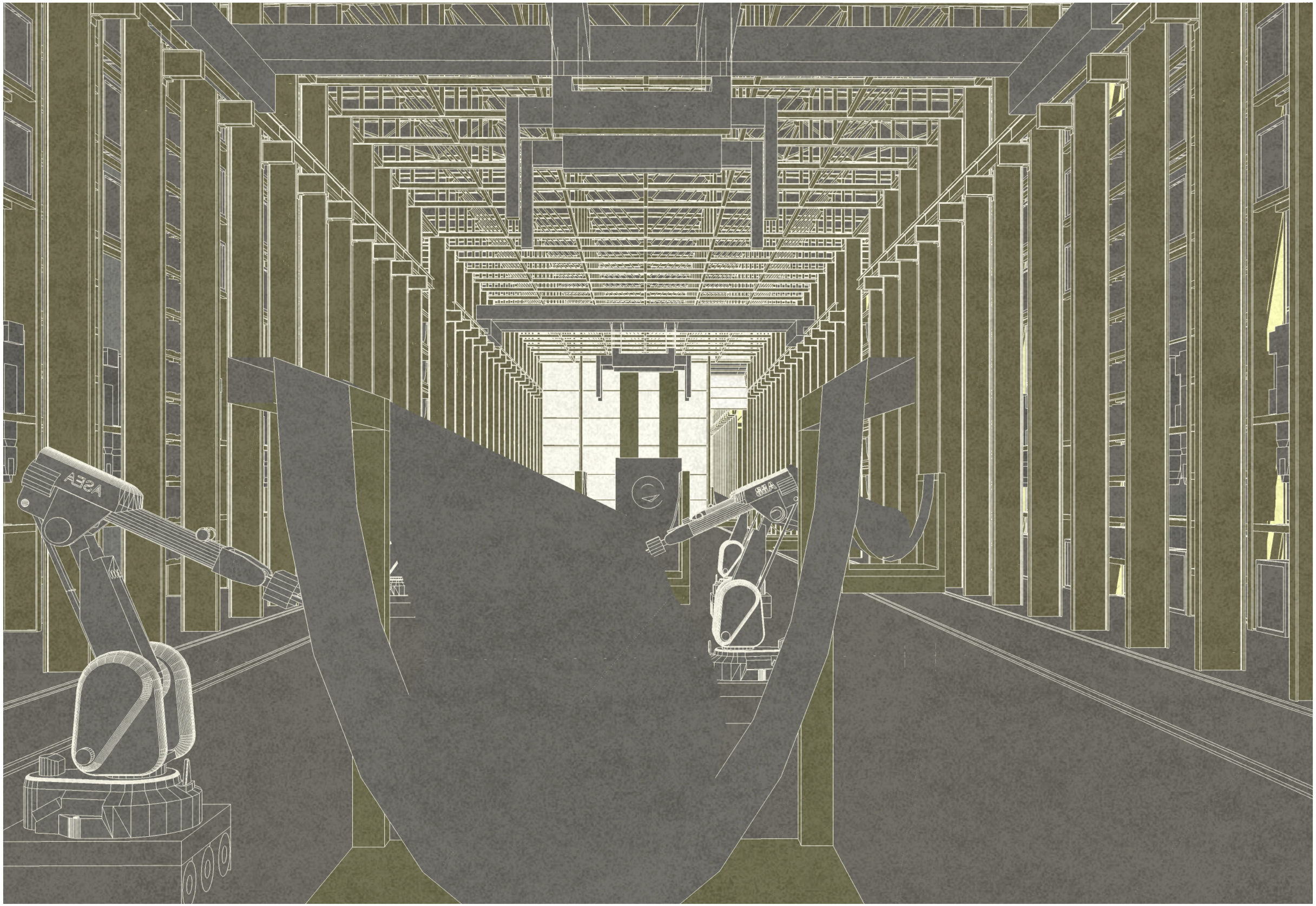


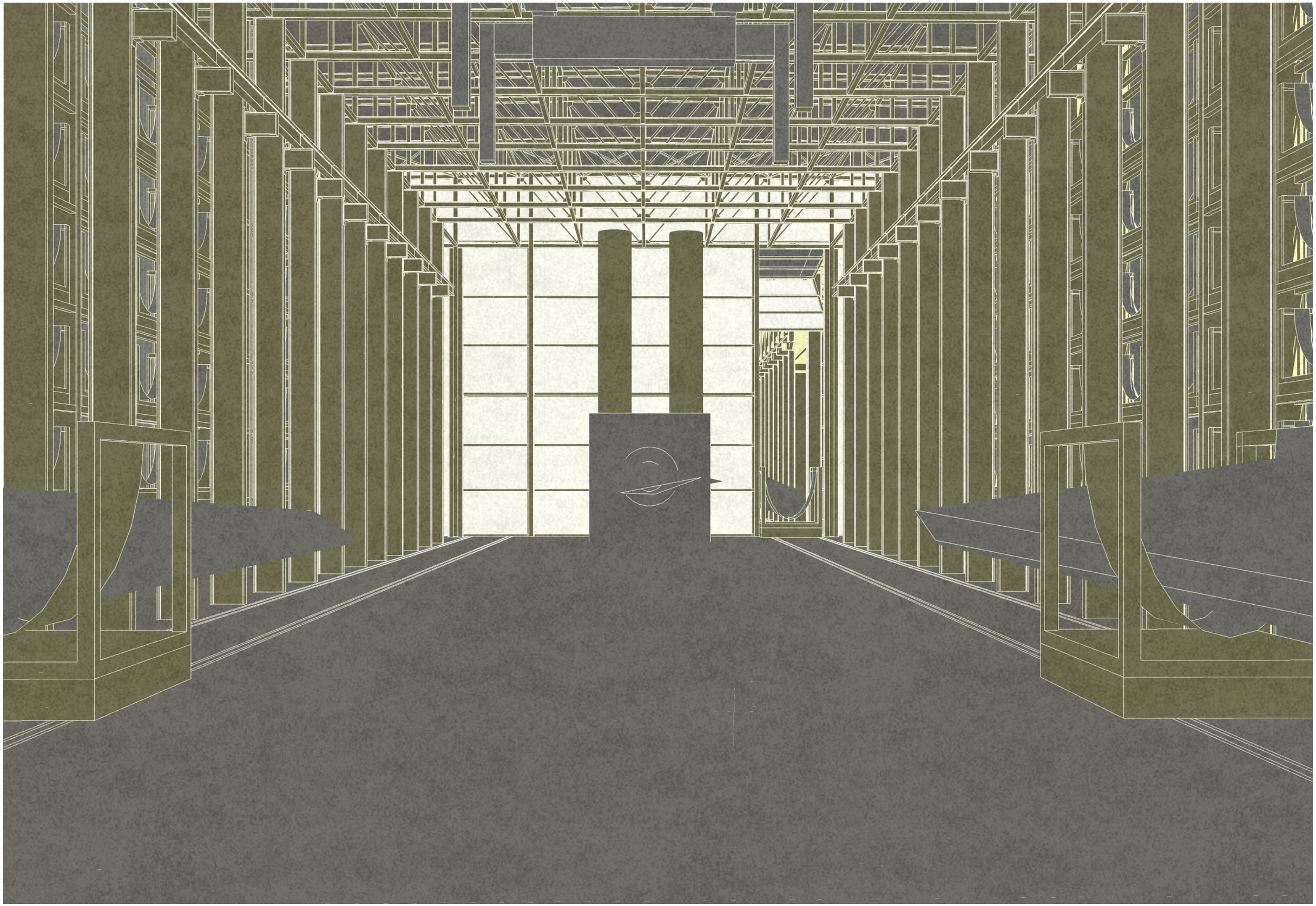


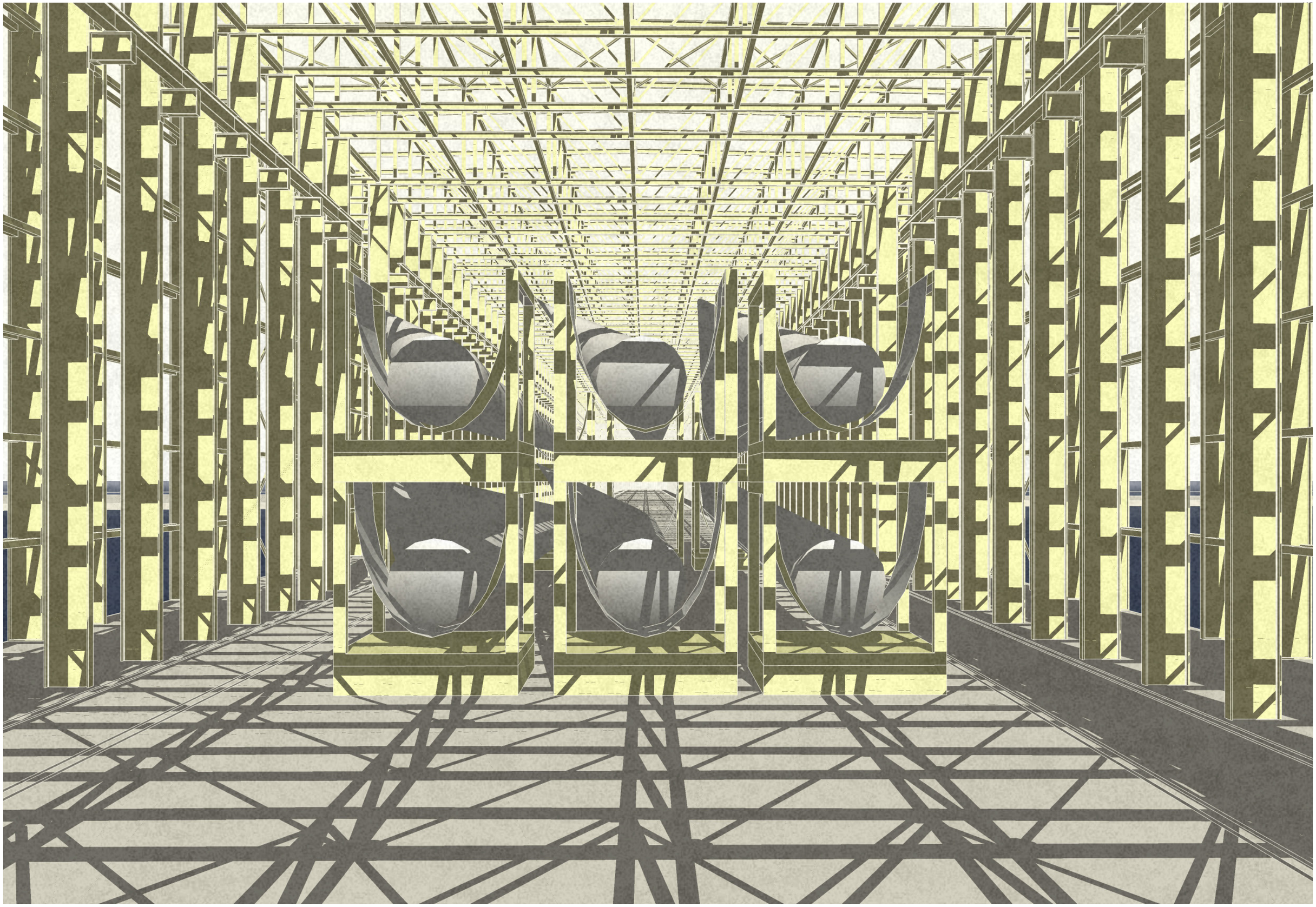
Short Cross Section
1:200

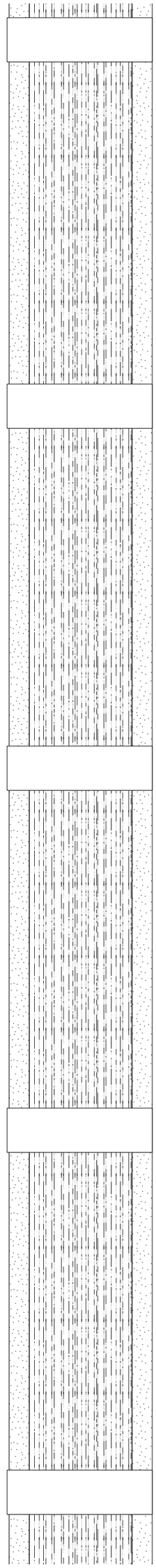

ASEA

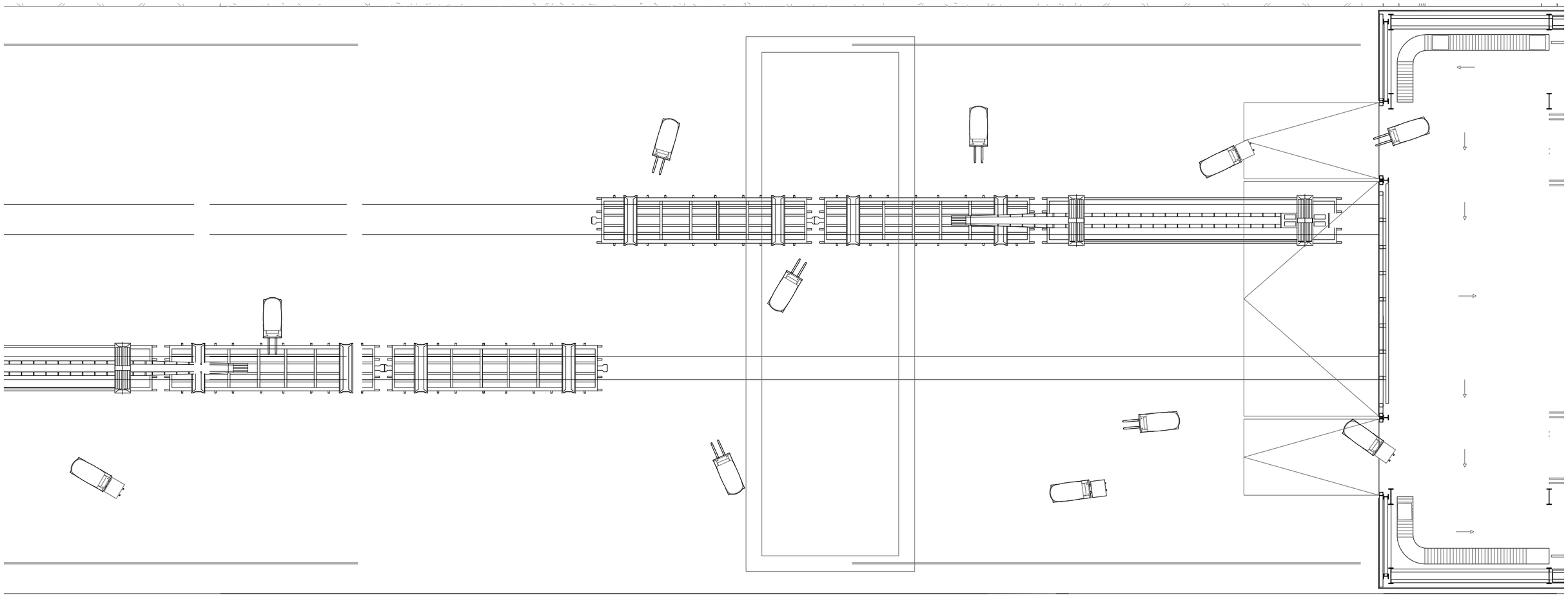



ASEA

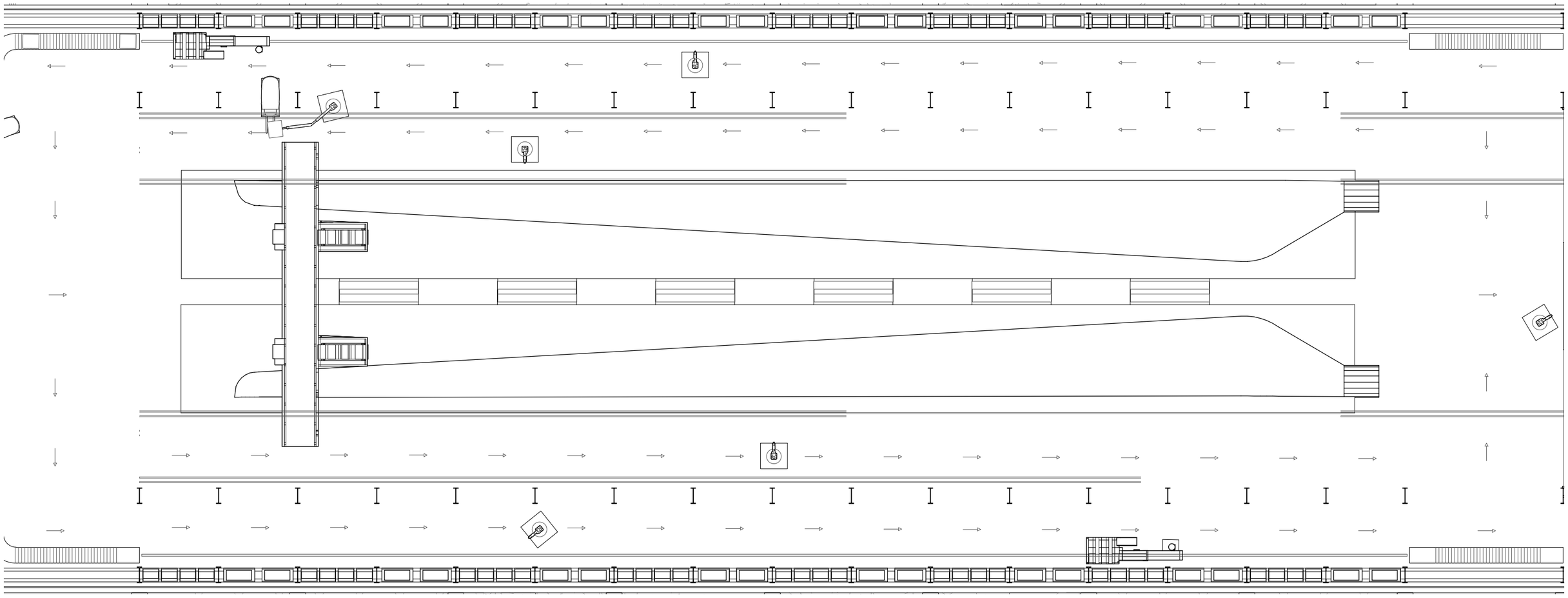




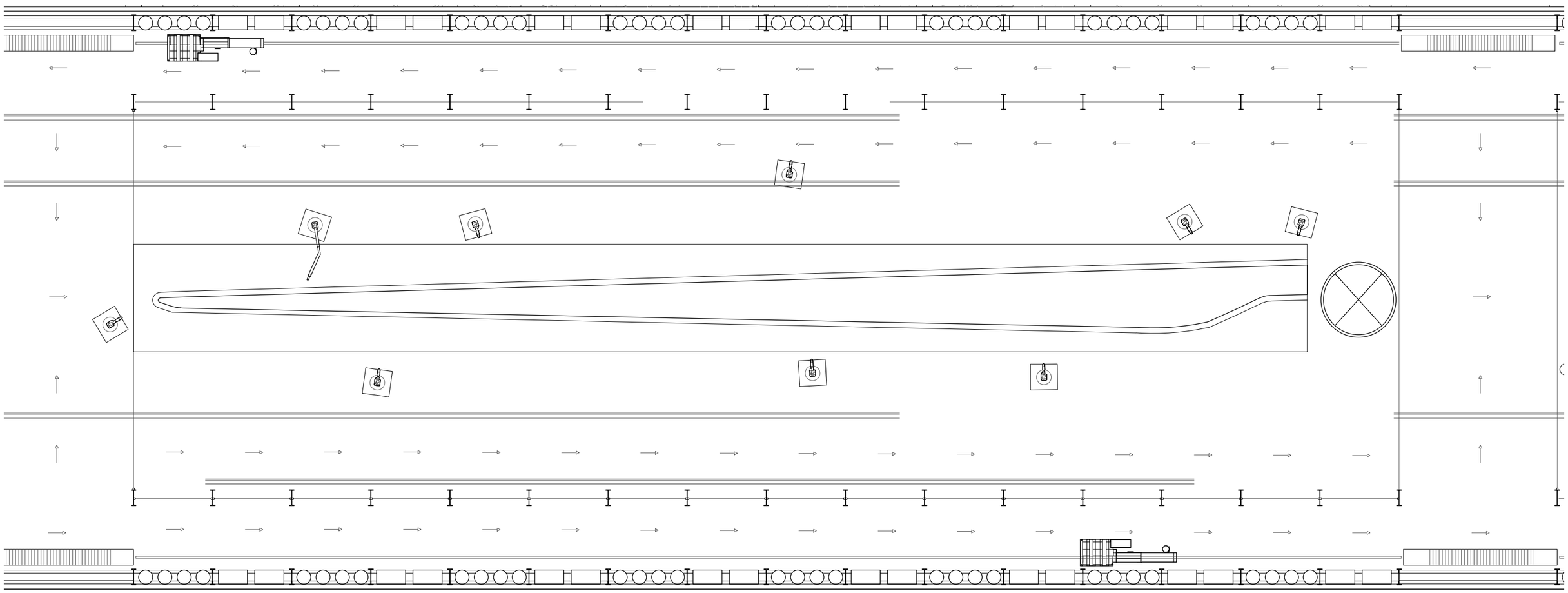




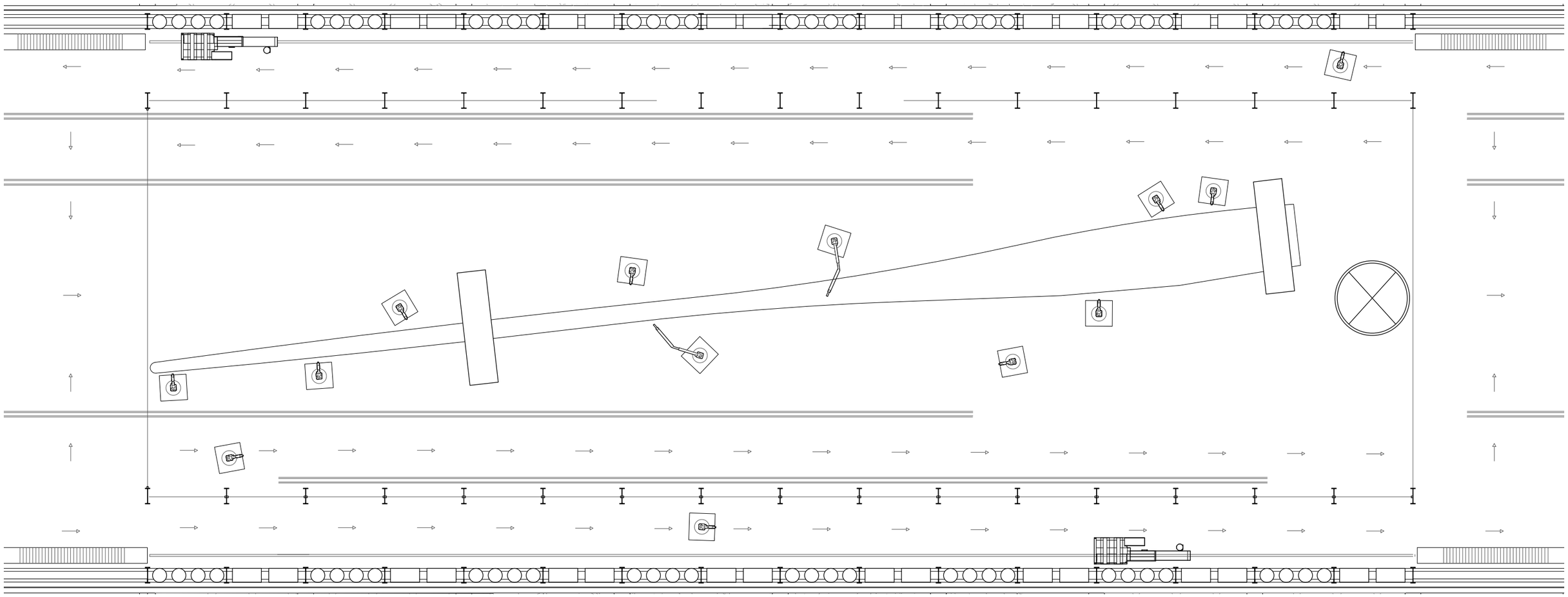
Floorplan Entrance
1:250



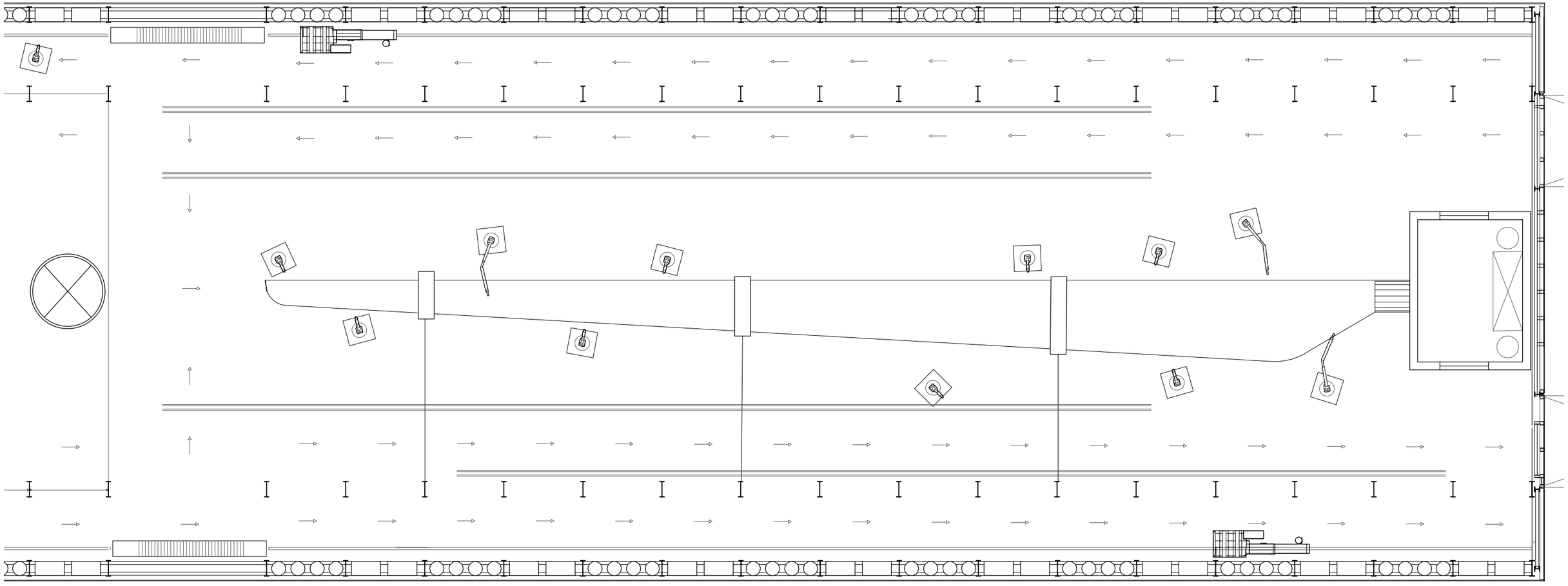
Floorplan Molding
1:250



Floorplan Curing
1:250



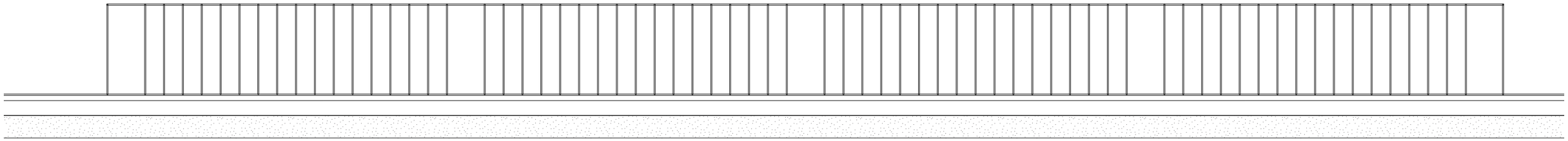
Floorplan Painting
1:250



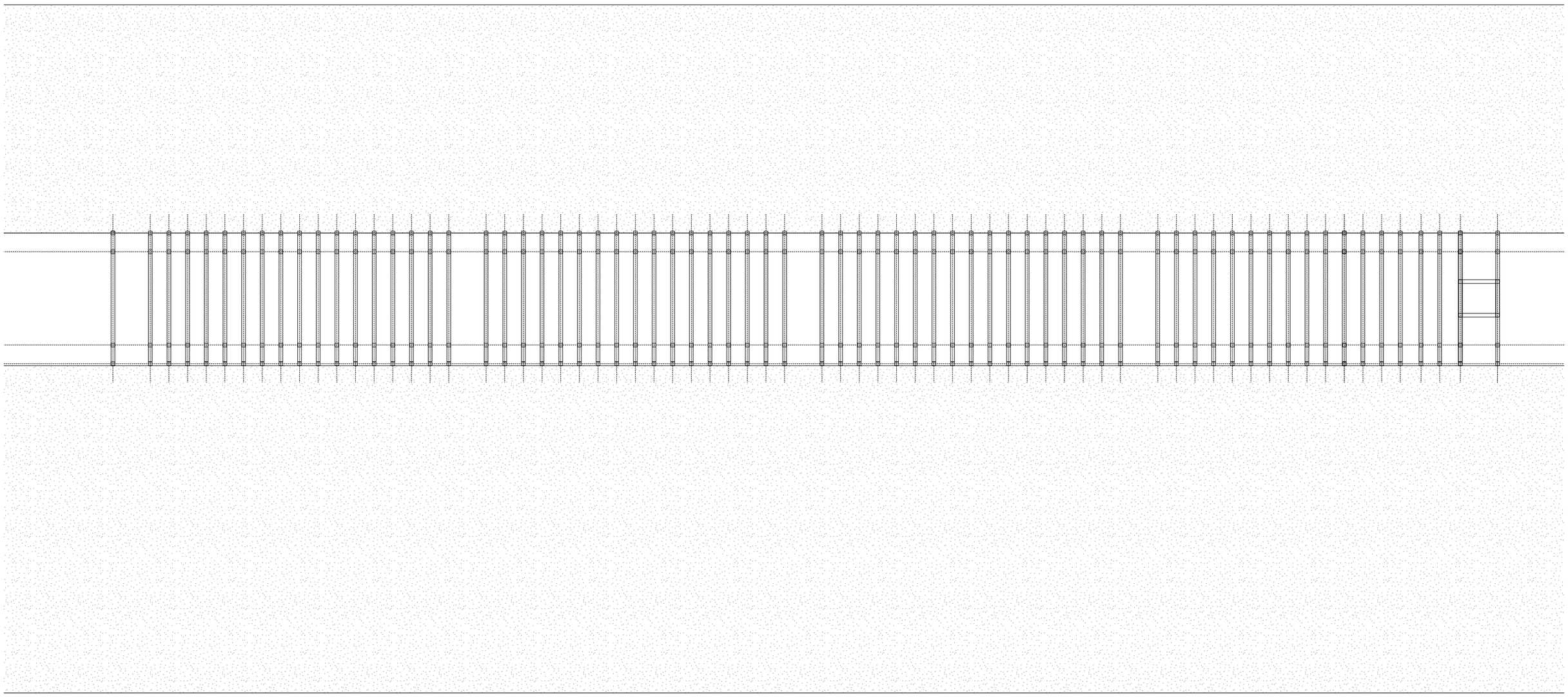
Floorplan Testing
1:250

Grounding

The Container is then placed 5m above ground, and the new coastline is formed through the formation of tidal basins that function both as flood defence and as a place for seating on the coast. The human is now the audience of the automated spectacle. Moments of pause in the production line reflect on the extension of the coastline out and under the building, a connection between land and sea is then further implied.

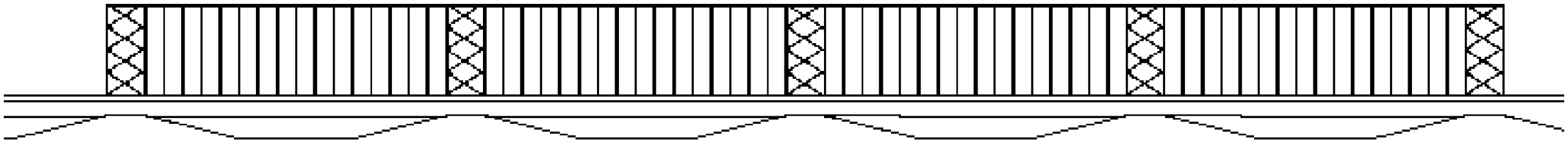


Section Elevation

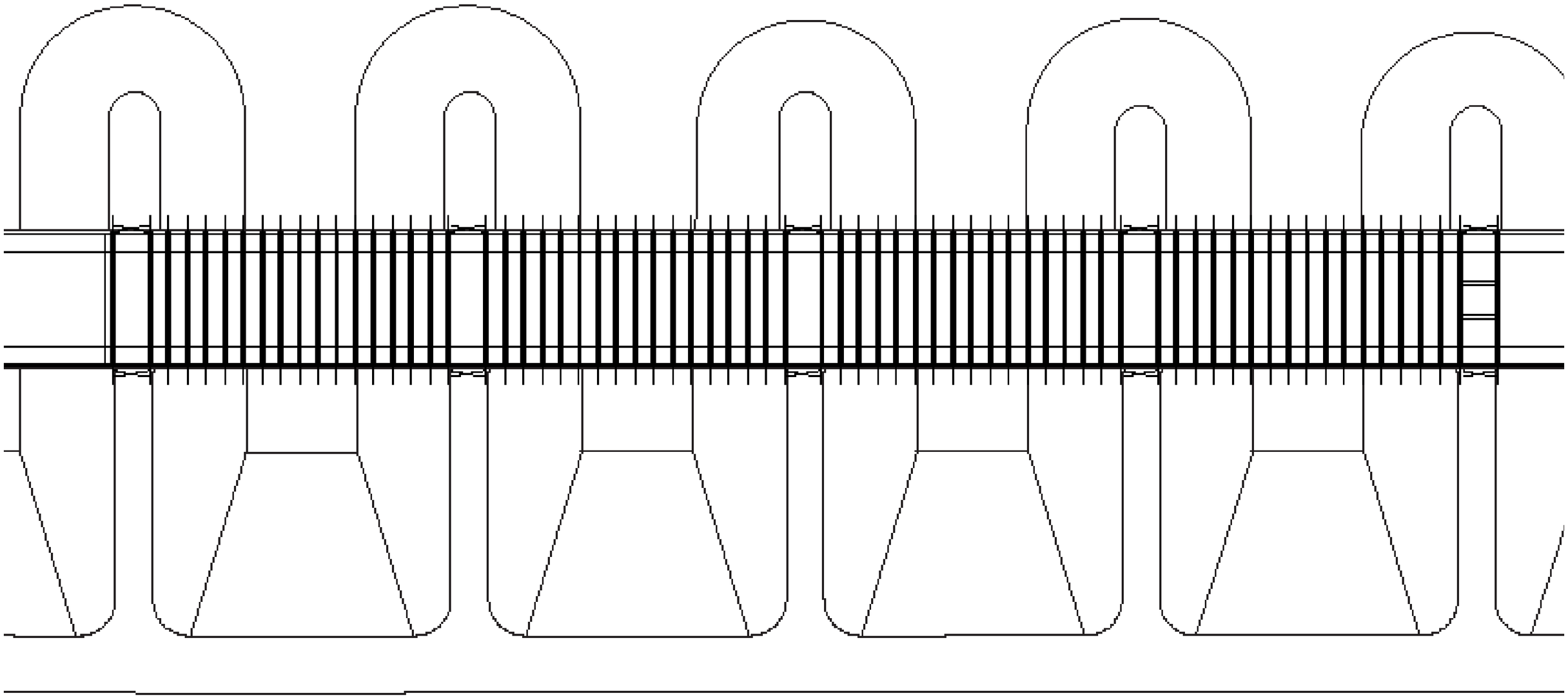


Floorplan

Original Ground
Condition

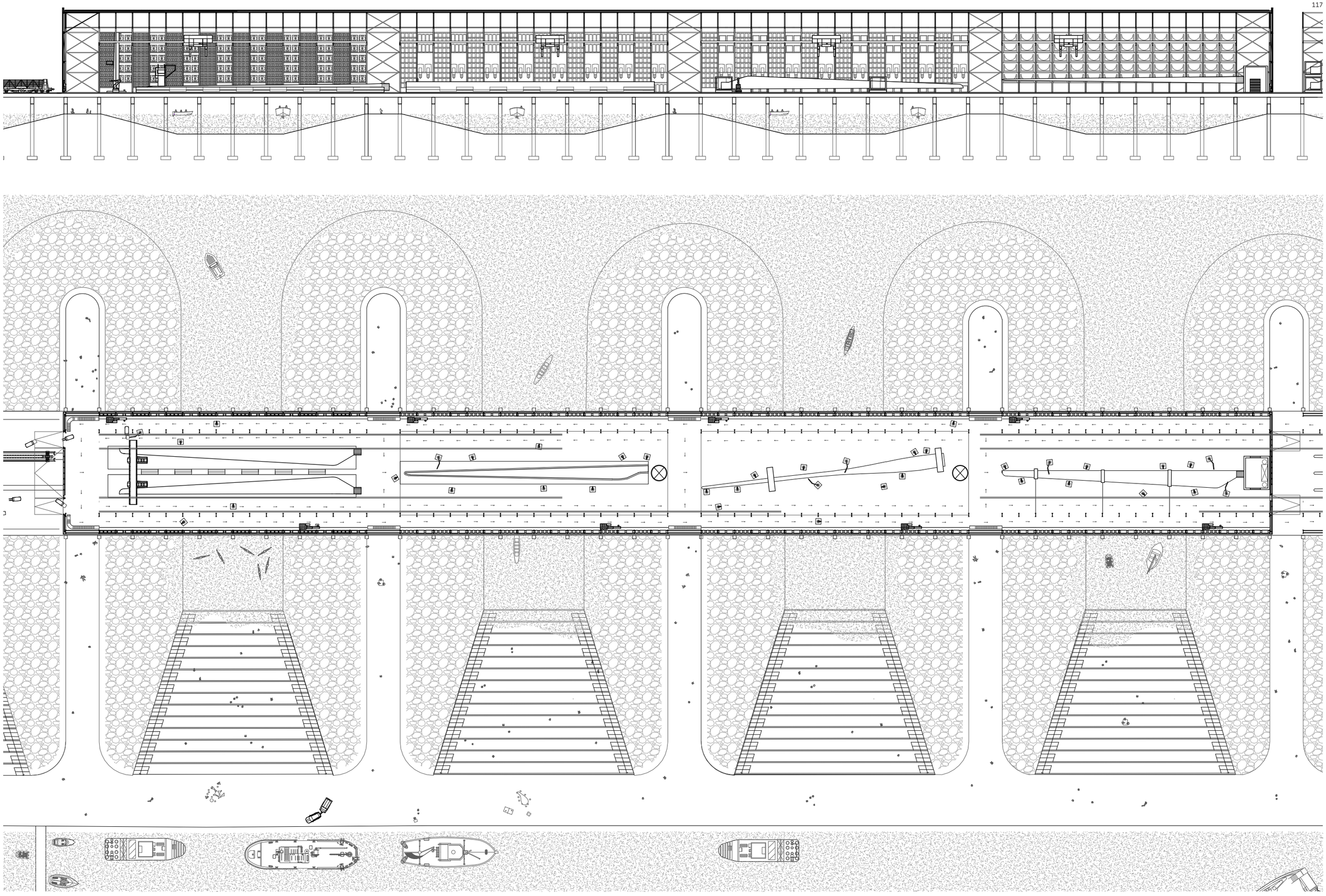


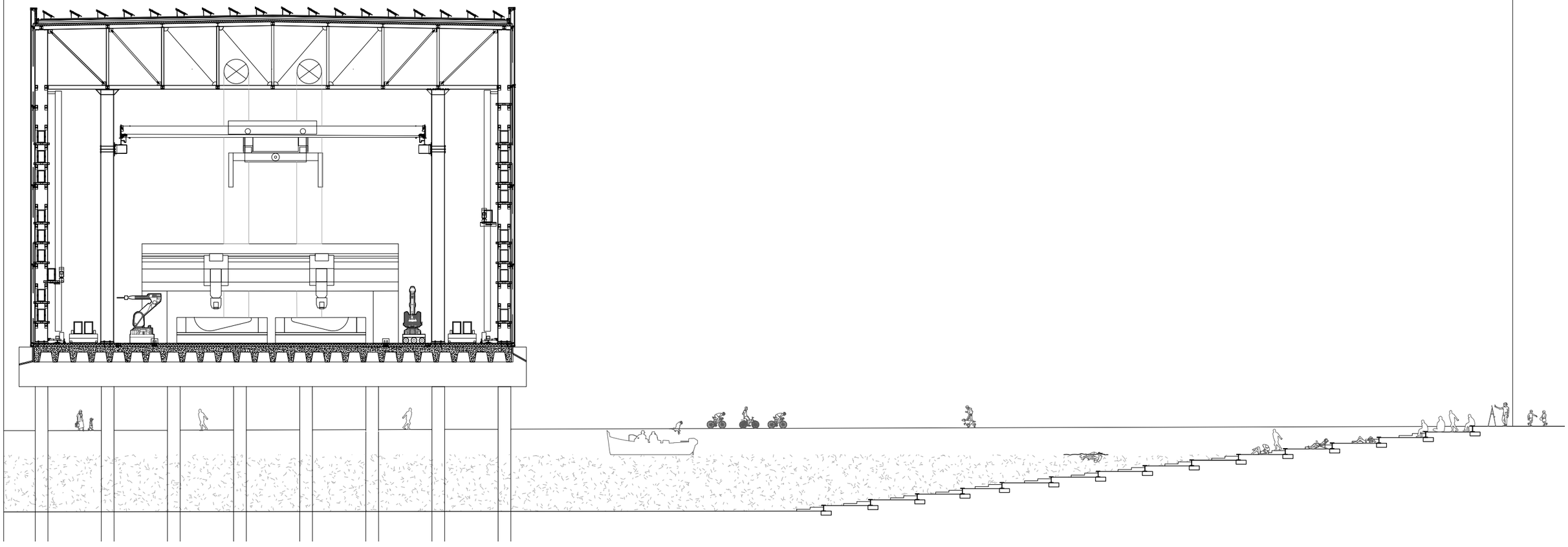
Section Elevation



Floorplan

Carved Ground Condition

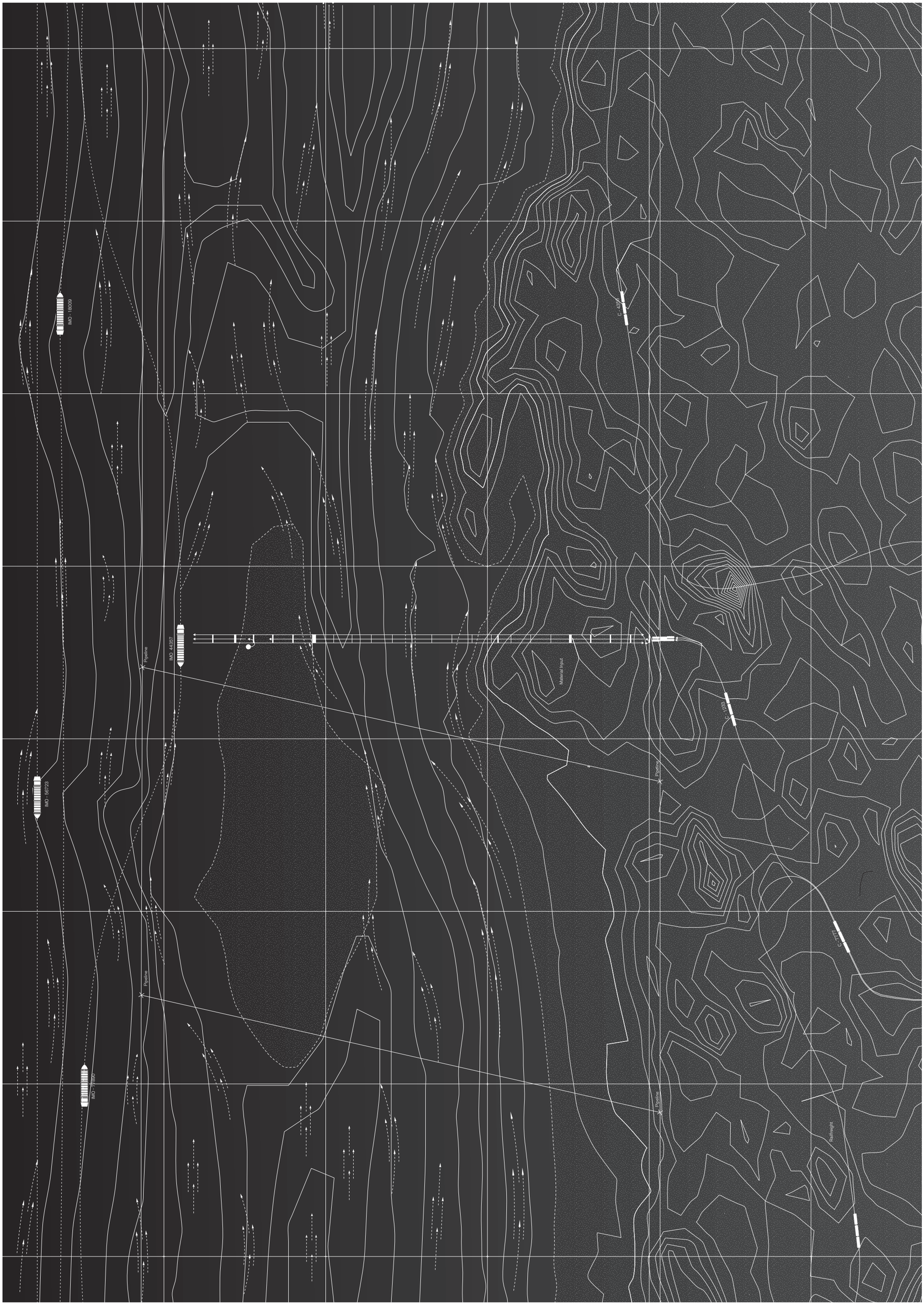


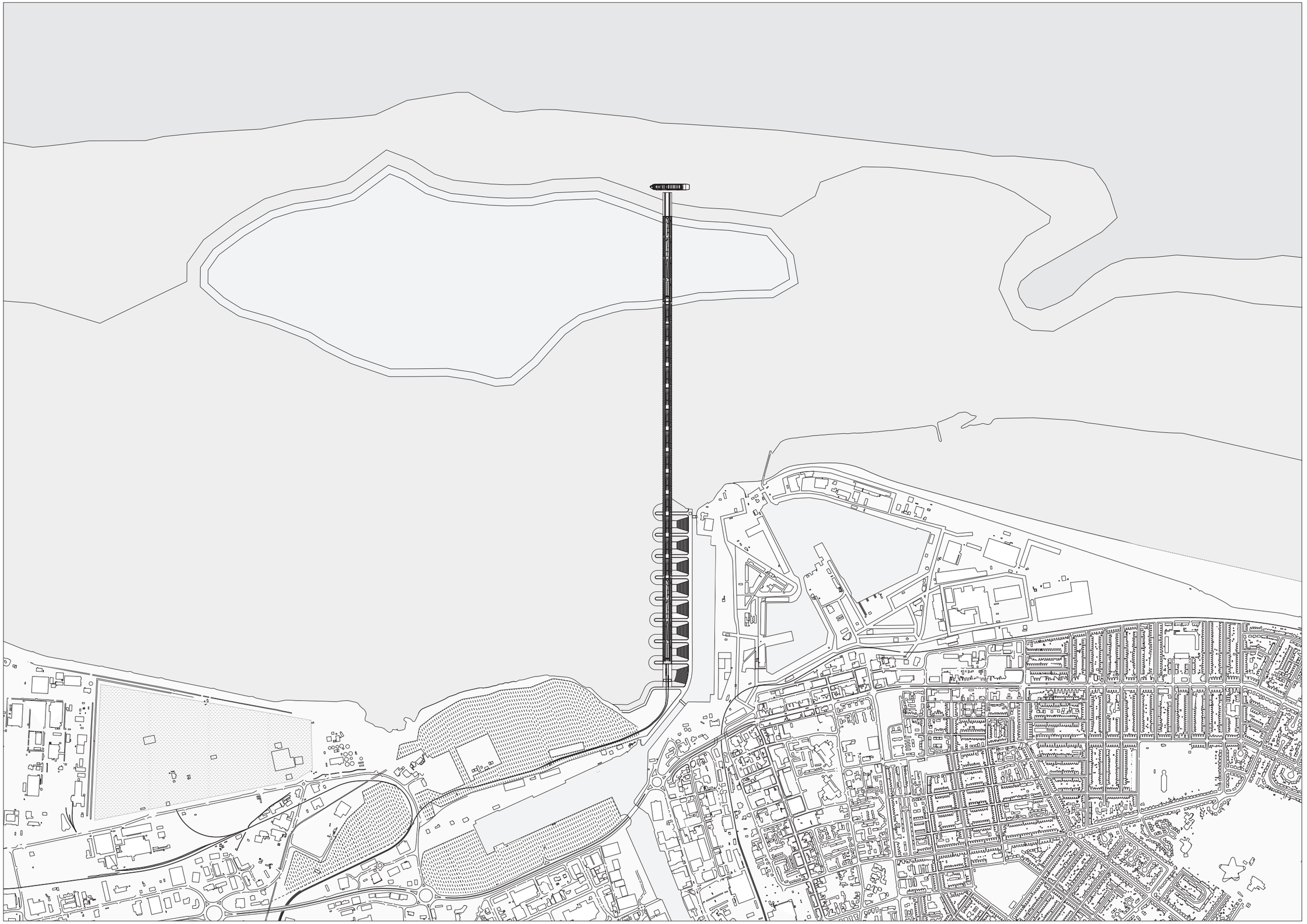


Short Cross Section
1:200

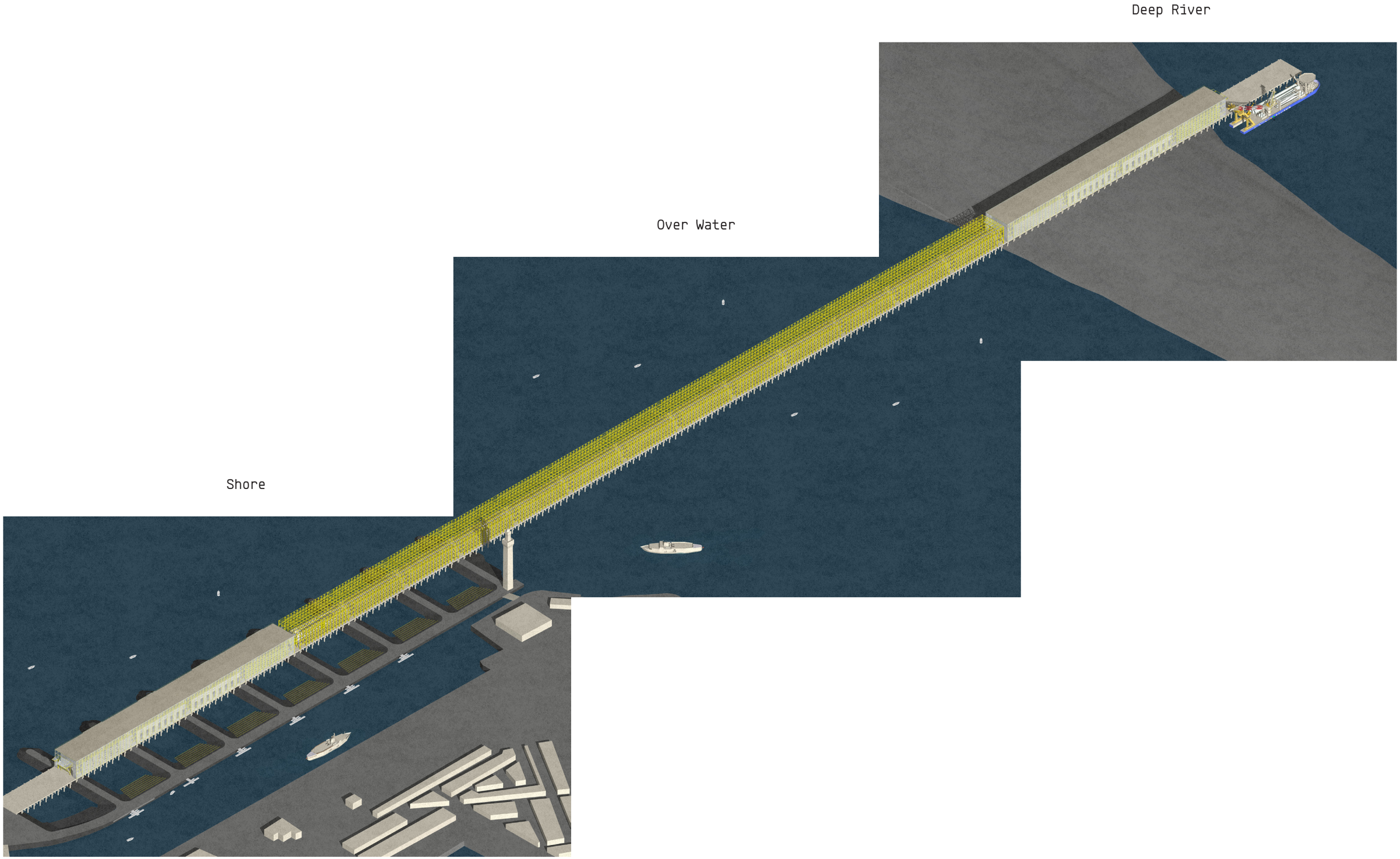
The Automated Pier

The Spaces are then arranged in linear order, and what becomes clear is that the manufacturing process of the blade is linear like an assembly line. In combination with the natural flow of import and export, and the need to reduce dredging and seek deeper water, the linear process is combined with the linear flow into a pier, that extends to the deeper end of the river (15m). The part over the water is opened, to expose the skeleton of the building, an area of storage and possible expansion.

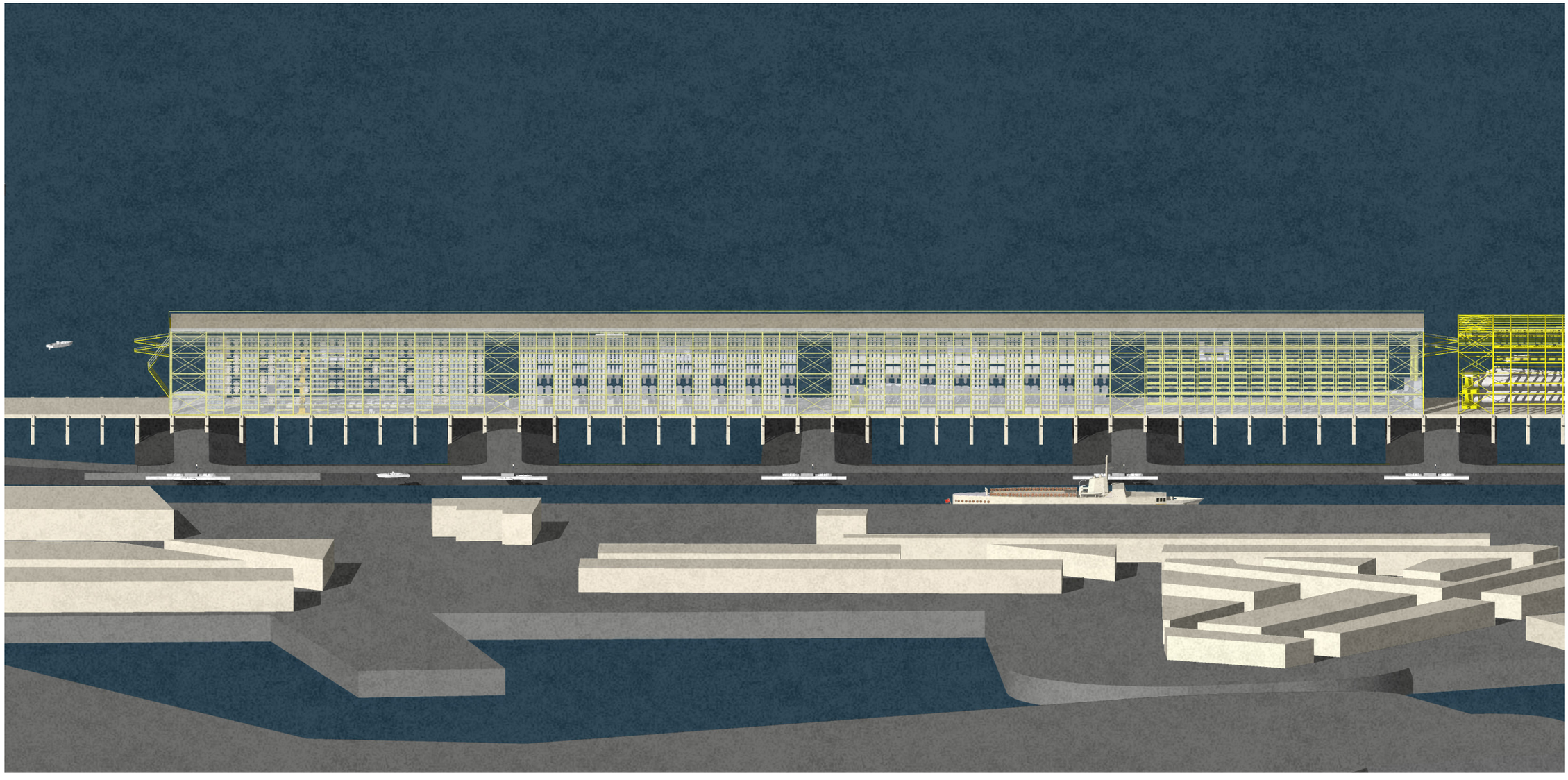

IMO - 18009
IMO - 44357
Pipeline
IMO - 56723
Pipeline
IMO - 77820
Pipeline
Material Input
C - 4577
C - 11253
Pipeline
C - 11774
Railweight



Grimsby Port Urban Intervention
Scale 1:5000



The Pier: From Shore to Sea



The New Coastline

The Spectacle

The Final Output is a transulucent polycarbonate facade with Glass fiber profiles. The creation of a "Wunderkamer" with the outside reflecting the processes inside, a vague manifestation of the process on the facade of the building.

The placement of the object and the formation of the new coastline allows for an experience of both automated and natural processes. Both cycles , both automated and natural create a spectacle. A space for distraction, contemplation, and mostly for reflection, on the processes that are in transtion. The unseen becomes seen, in this one object of containment. An attempt at making the automated process graspable for humans.

The Spectacle

The building is experience throught different times of day and seasons. From the shore, one can experience both tidal and process changes.