Introduction

Carbon Valley

Tech Exhibition and Startup Center

Marineterrein, Amsterdam, Netherlands

This project will unite the tech and startup industries as well as continue the necessary intermingling and discussion between designer and user. The project will bring equity to the city of Amsterdam as well as create a bridge to allow for access to the newly renovated Marineterrein.

Startup Scene

Why Startups?
- Amsterdam is considered the Silicon Valley of Europe.
- Cheaper than London and better quality of life than Berlin.
- Government Supported Startup Visa
- Demand will only increase

Current Startup Spaces:
- Spaces Herengracht
- Rockstart
- The Startup Orgy Munt Square
- Hackers & Founders
- WeWork Metropool
- Spaces Vijzelstraat
- WeWork Weteringschans

Tech Scene

Why the Tech Scene?

-Most of the Tech Companies are located farther south.

- Semi permanent Display of new and innovative technology.

- Gain inspiration and encourage collaboration.

Tech Companies:

- Google
- Microsoft
- Samsung
- Apple

Site Location

Marineterrein
Amsterdam, Netherlands

Site History

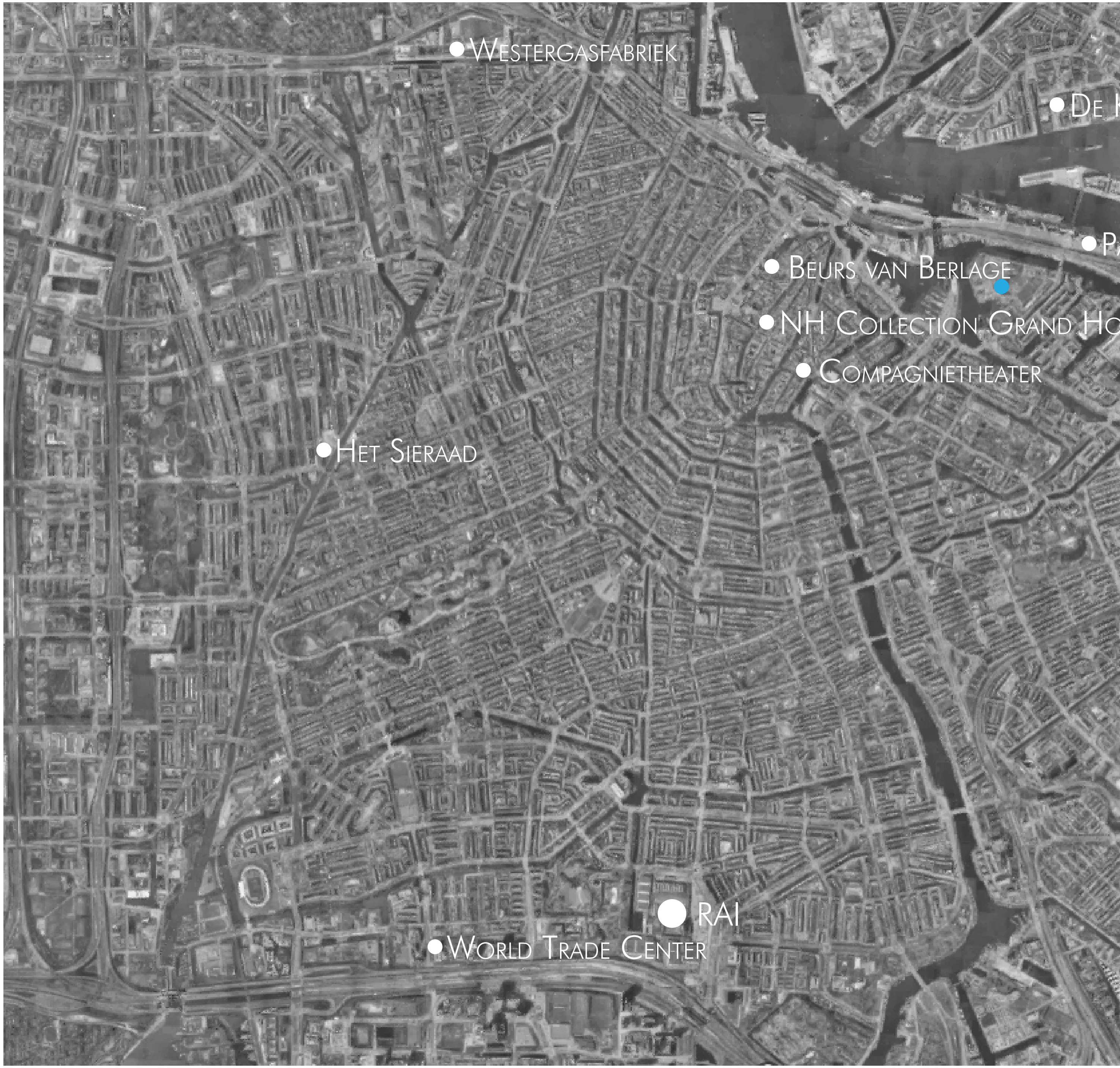
Marineterrein

- Currently occupied by the Navy
- Will be fully transitioned to public in 2018.
- Under new development for next 10 years
- The municipality wants progressive and innovative firms that will help to give back to Amsterdam

Open to the Public

Closed to the Public

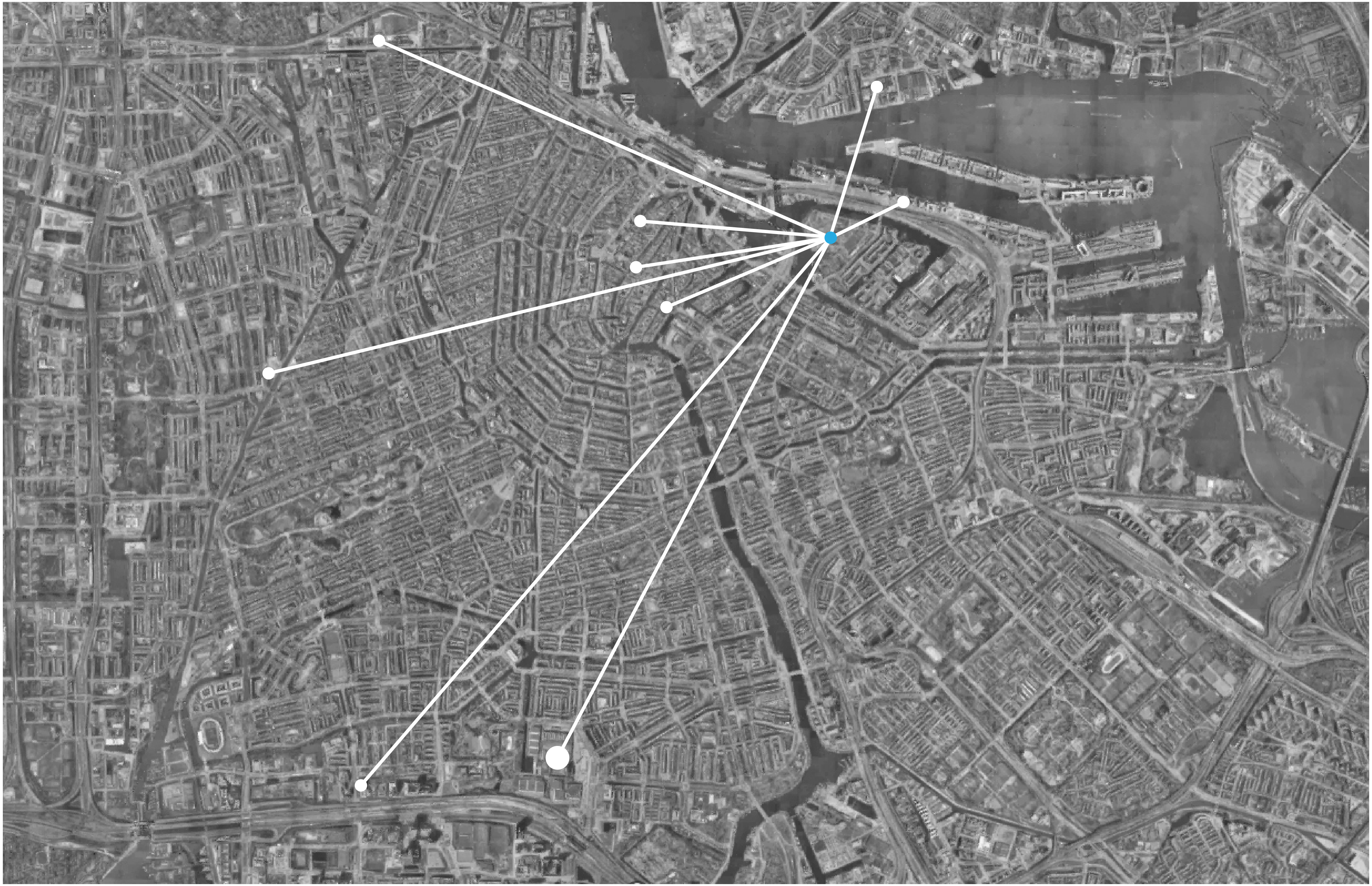
Site Proximity to Exhibition Spaces



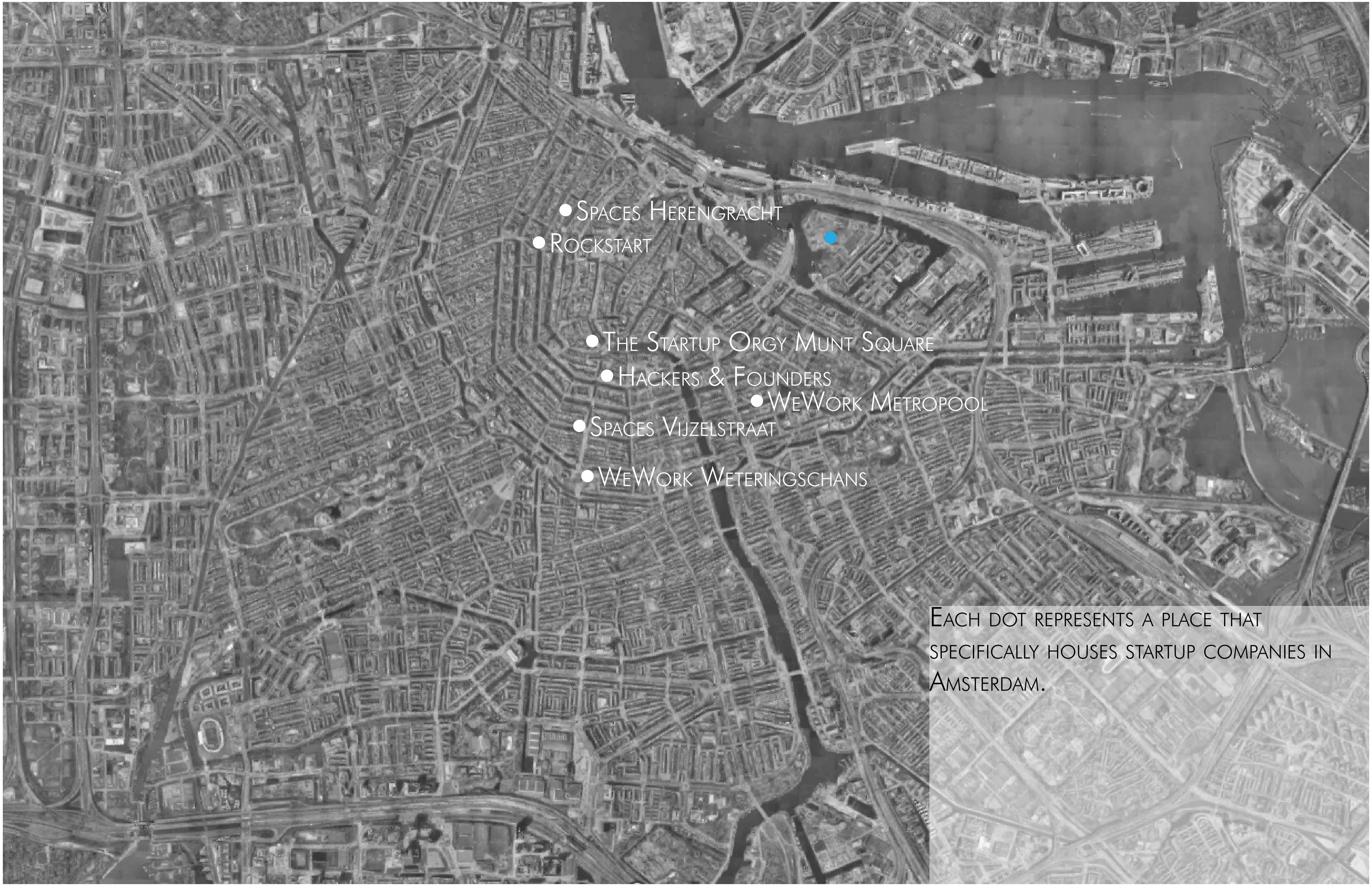
Each dot represents a place that consistently hosts exhibitions in Amsterdam.

The RAI is the main Exhibition center, and is approximately 7 KM from the city center.

Exhibition Spaces Connections

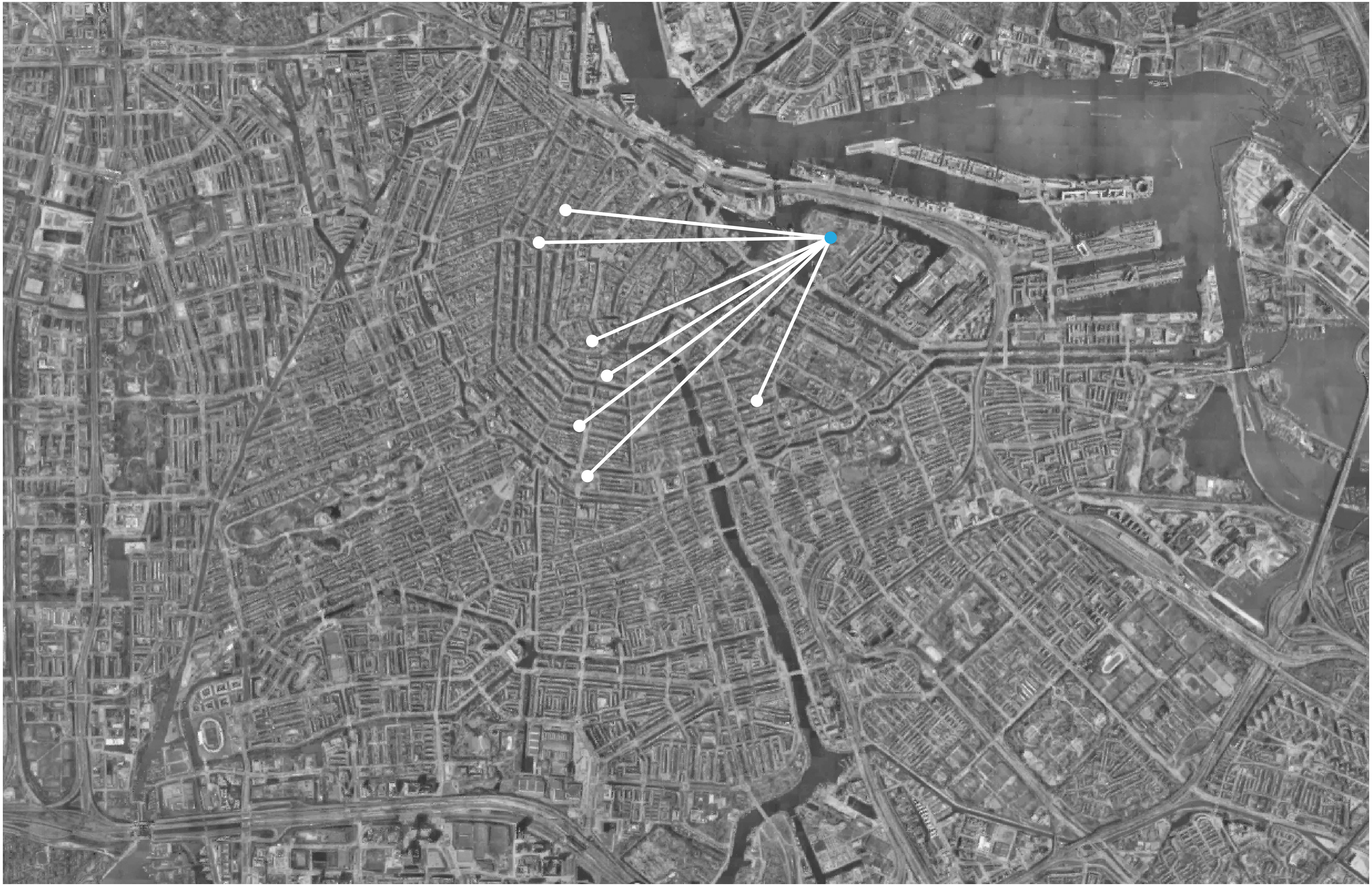


Site Proximity to Startup Specific Spaces

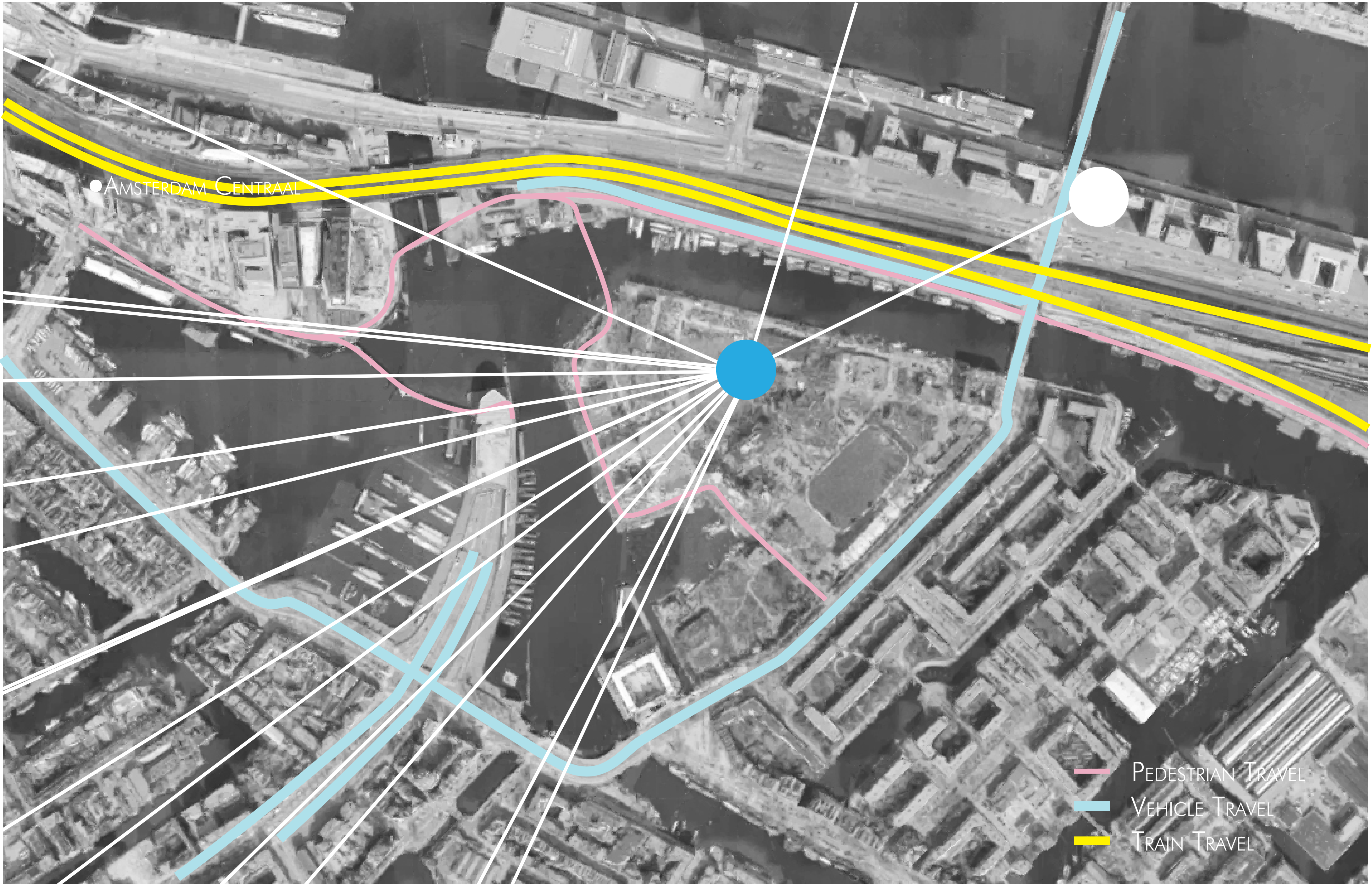


Each dot represents a place that specifically houses startup companies in Amsterdam.

Startup Specific Spaces Connections



Urban Context



Reason for Bridge Connection

Modern Pont De Vecchio

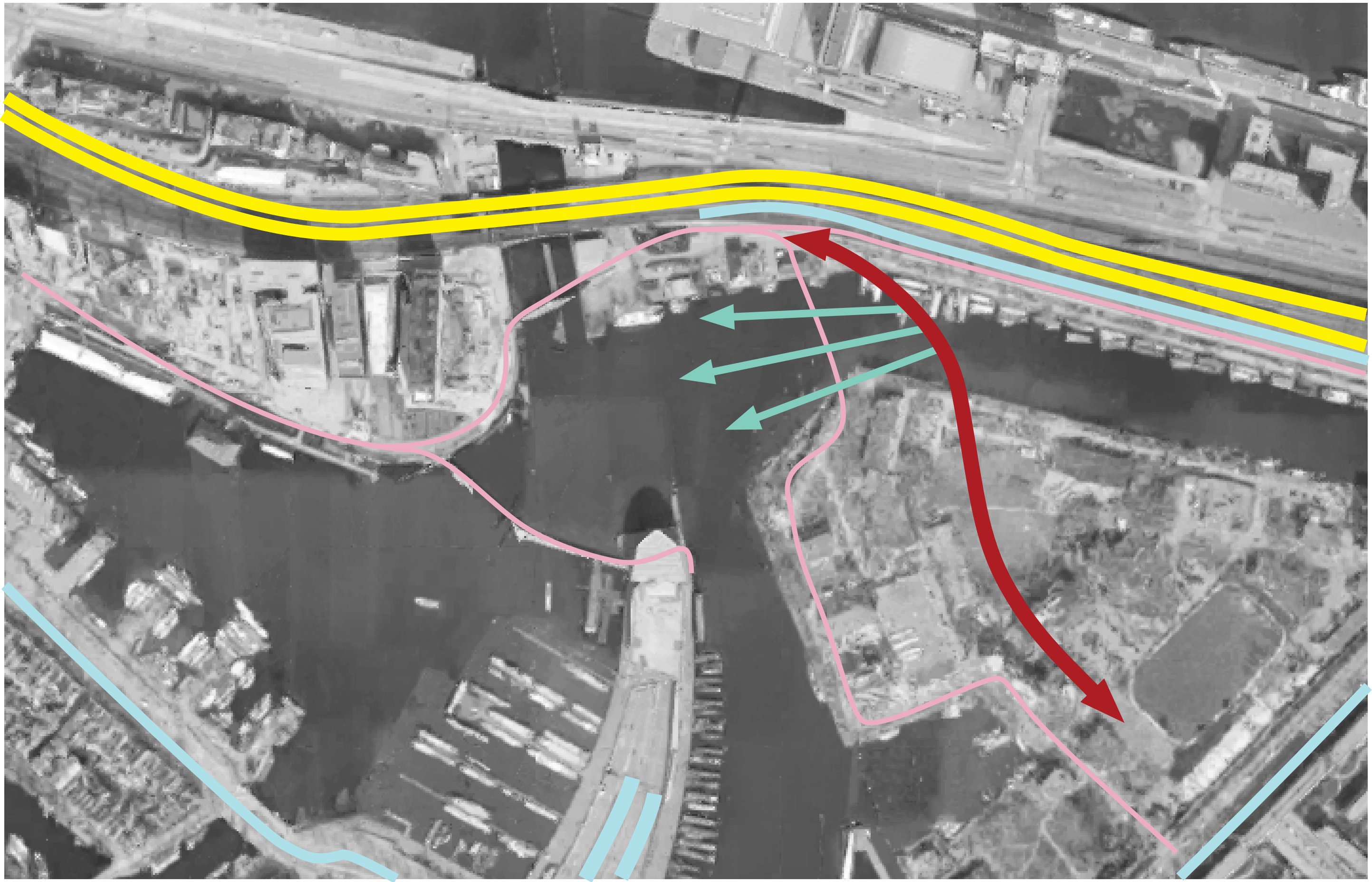
Over the Water

- Offices
- Meeting Spaces
- Walkways

Better Access to the New Site

As the site becomes developed, a better bridge will be necessary.

- More fluid
- Unique
- Views



Computational Design Strategy

Inputs

- Site
- Local Conditions
- People Flow

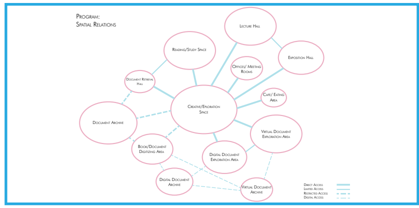
- Climate
- Wind
- Sun

- Visual Connections
- Physical Connections
- Virtual Connections

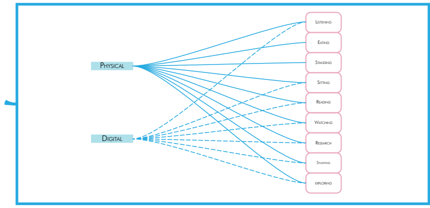
Constraints

Exterior Form/ Boundary

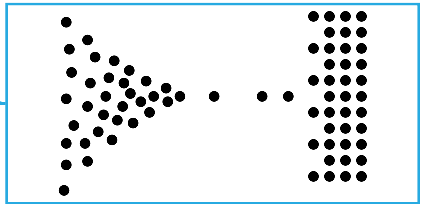
Program Requirements



Human Uses



Informed Inputs



Outputs

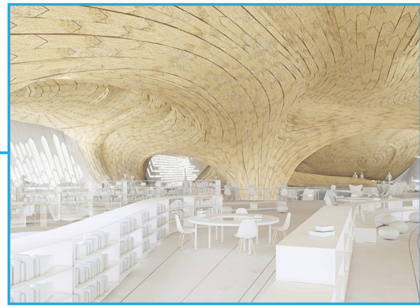
- External Form
- Behavior of Components
  Passive, Static, Active
- Internal Spaces

Biomimicry

Structure

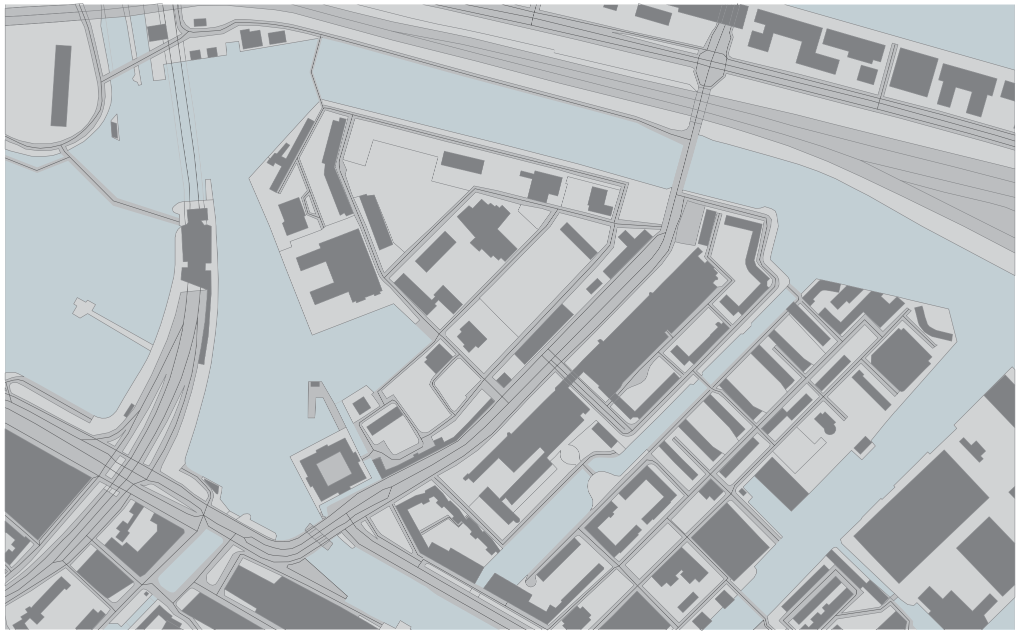
Hierarchy

Scripted

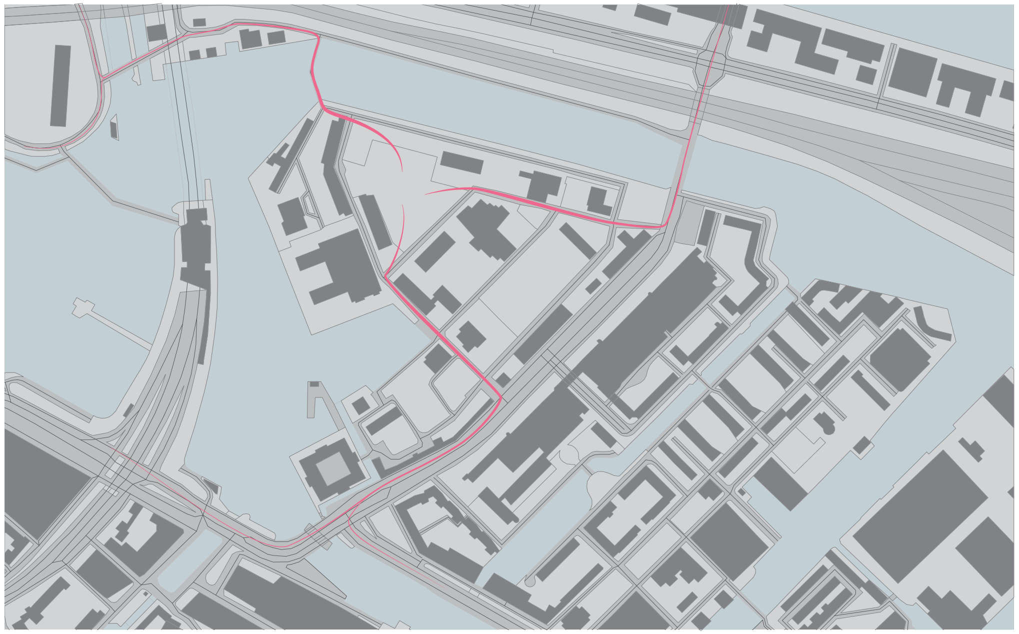


Site Analysis

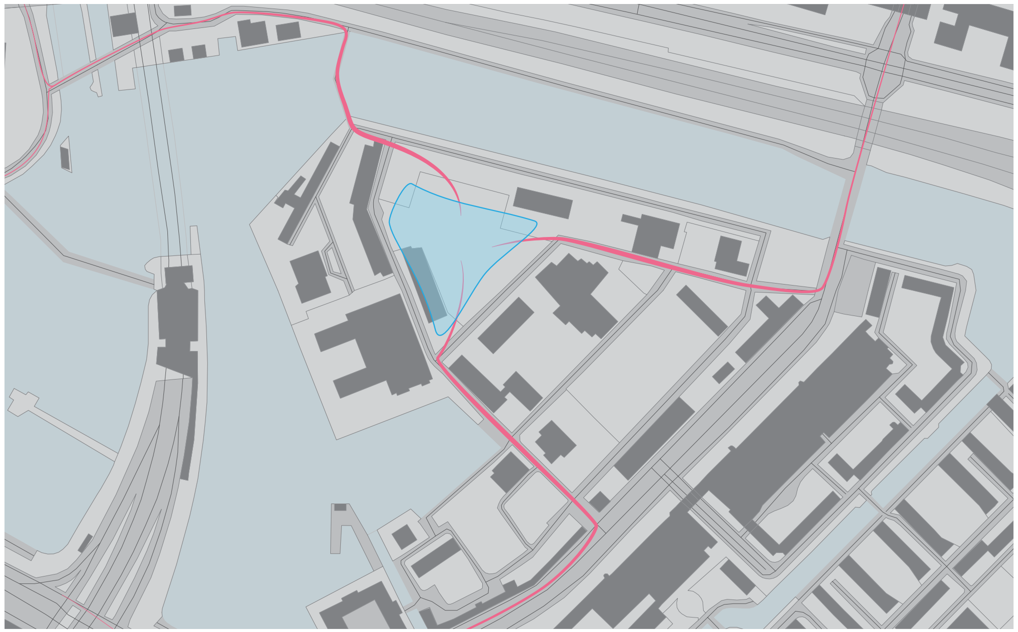
Site Context



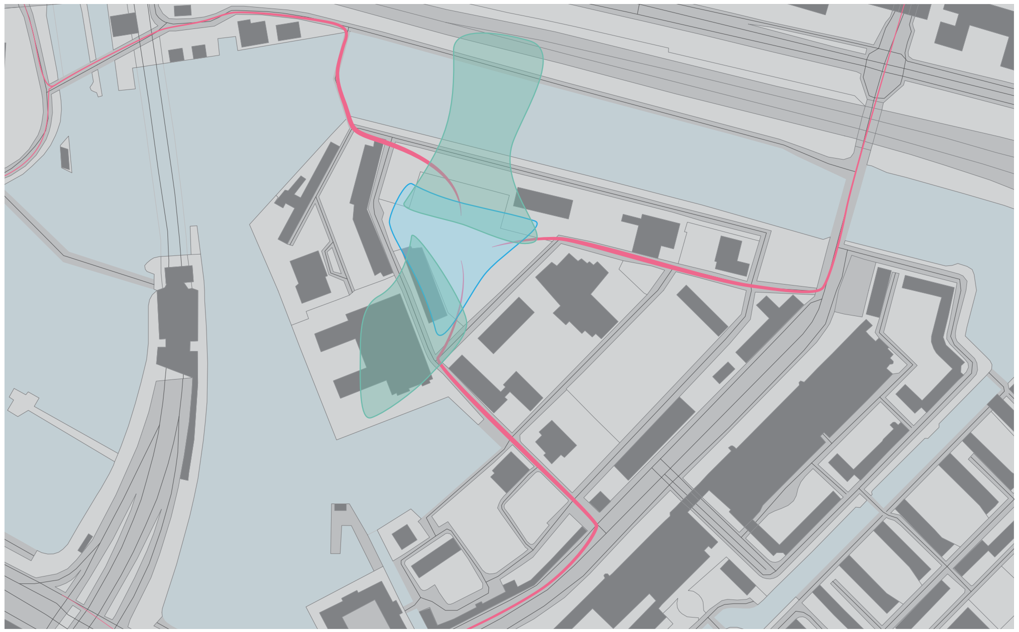
People Flows



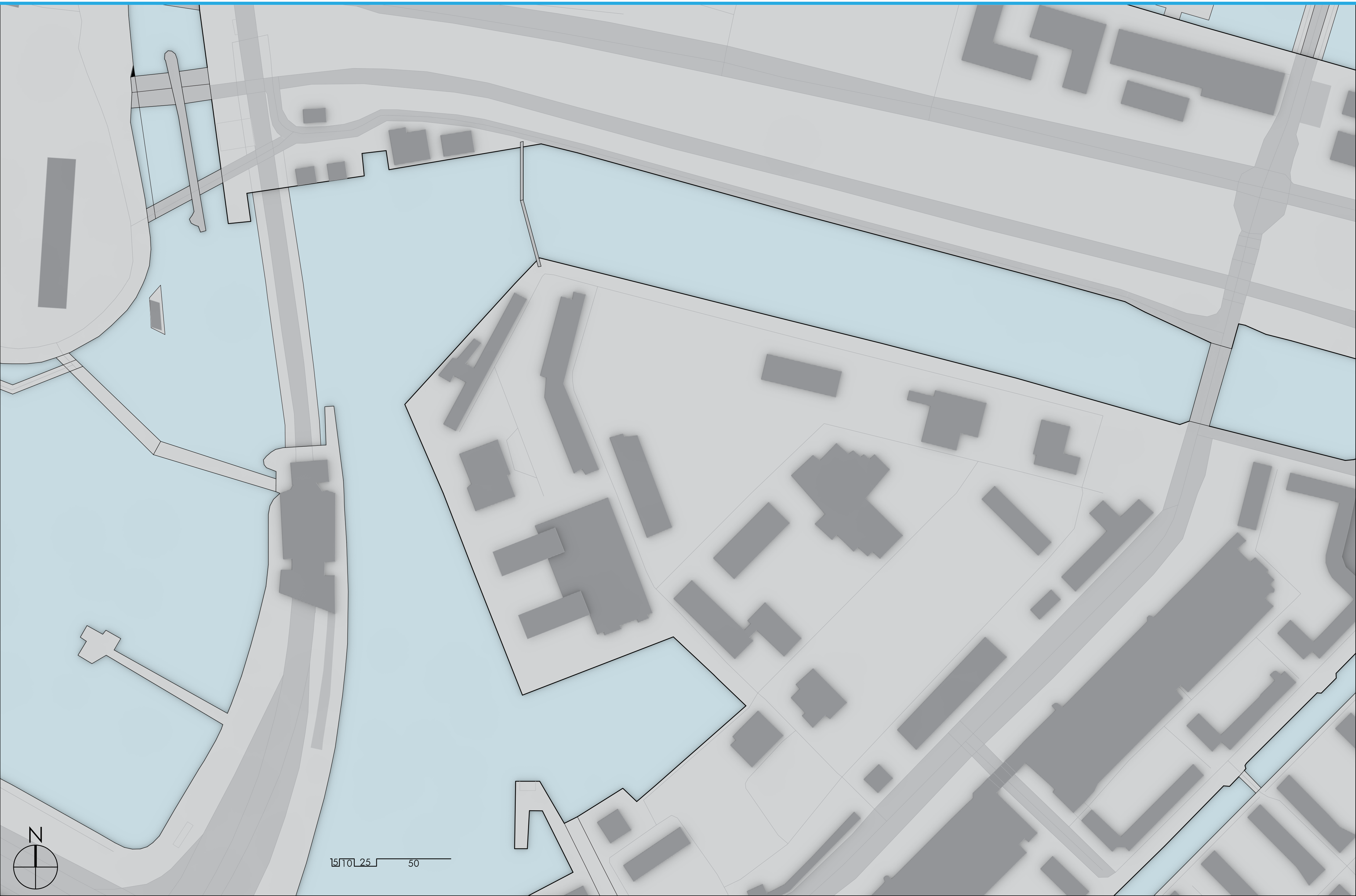
Chosen Site



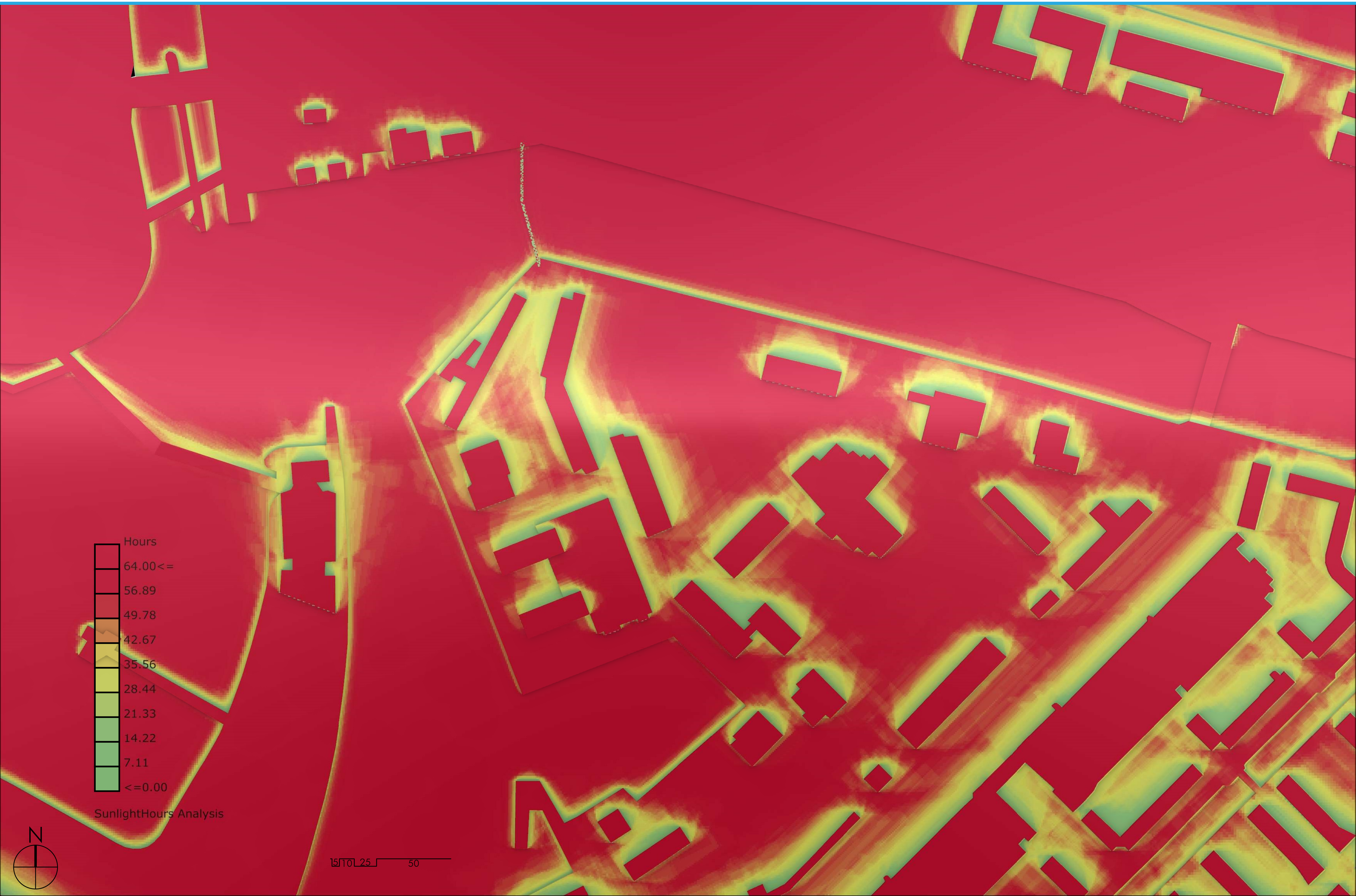
Site Expansion



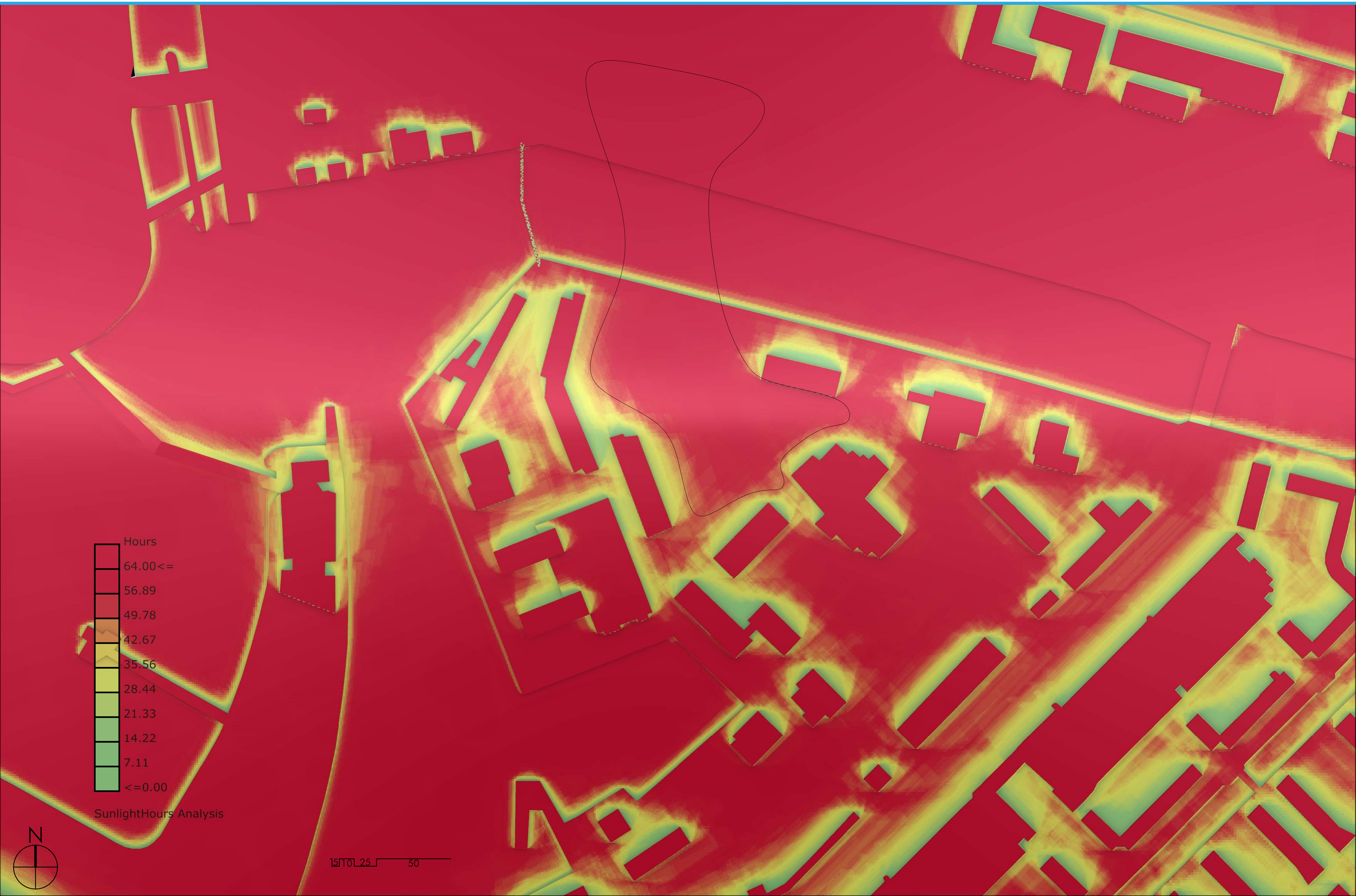
Site Analysis



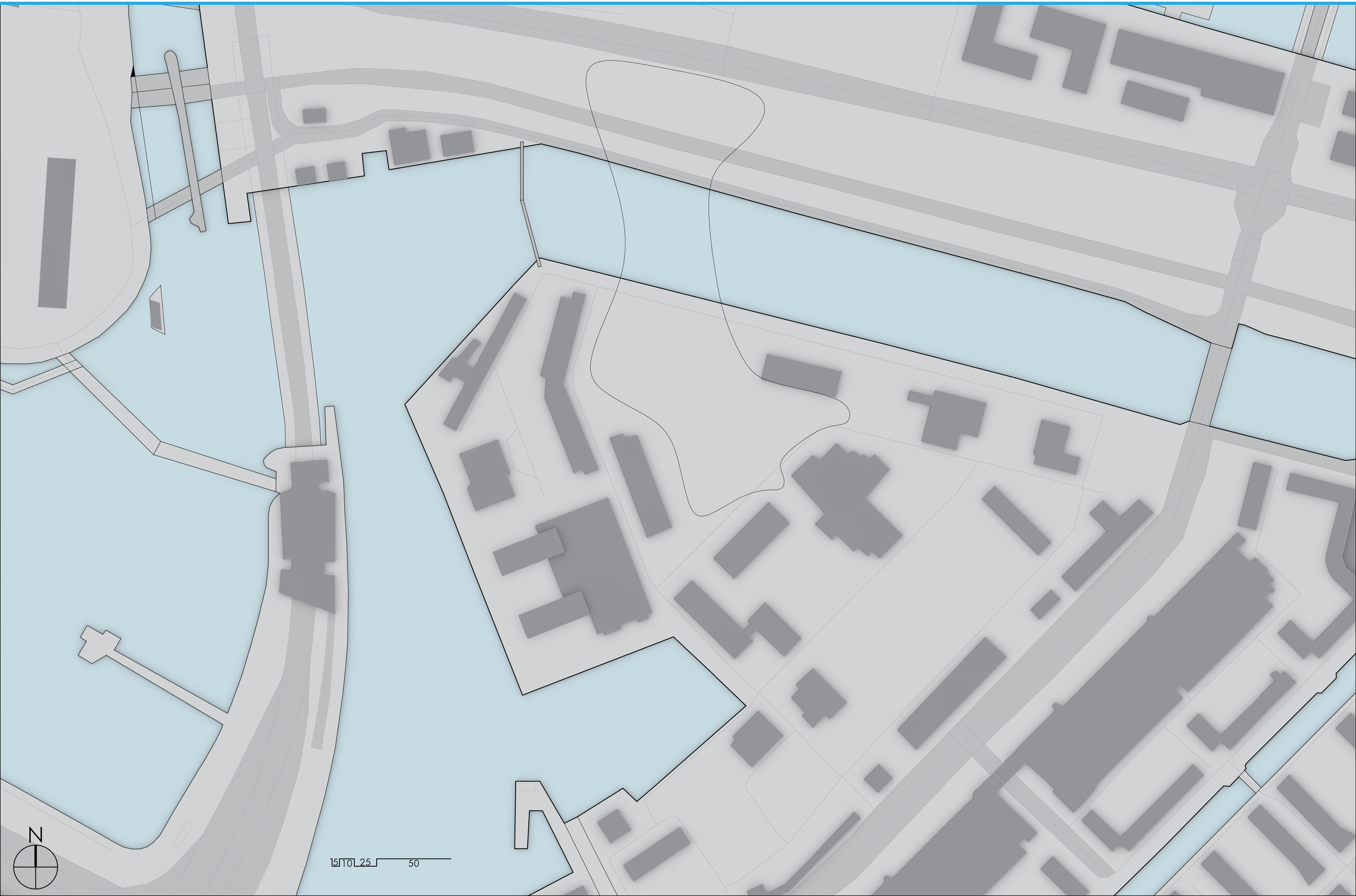
Solar Analysis



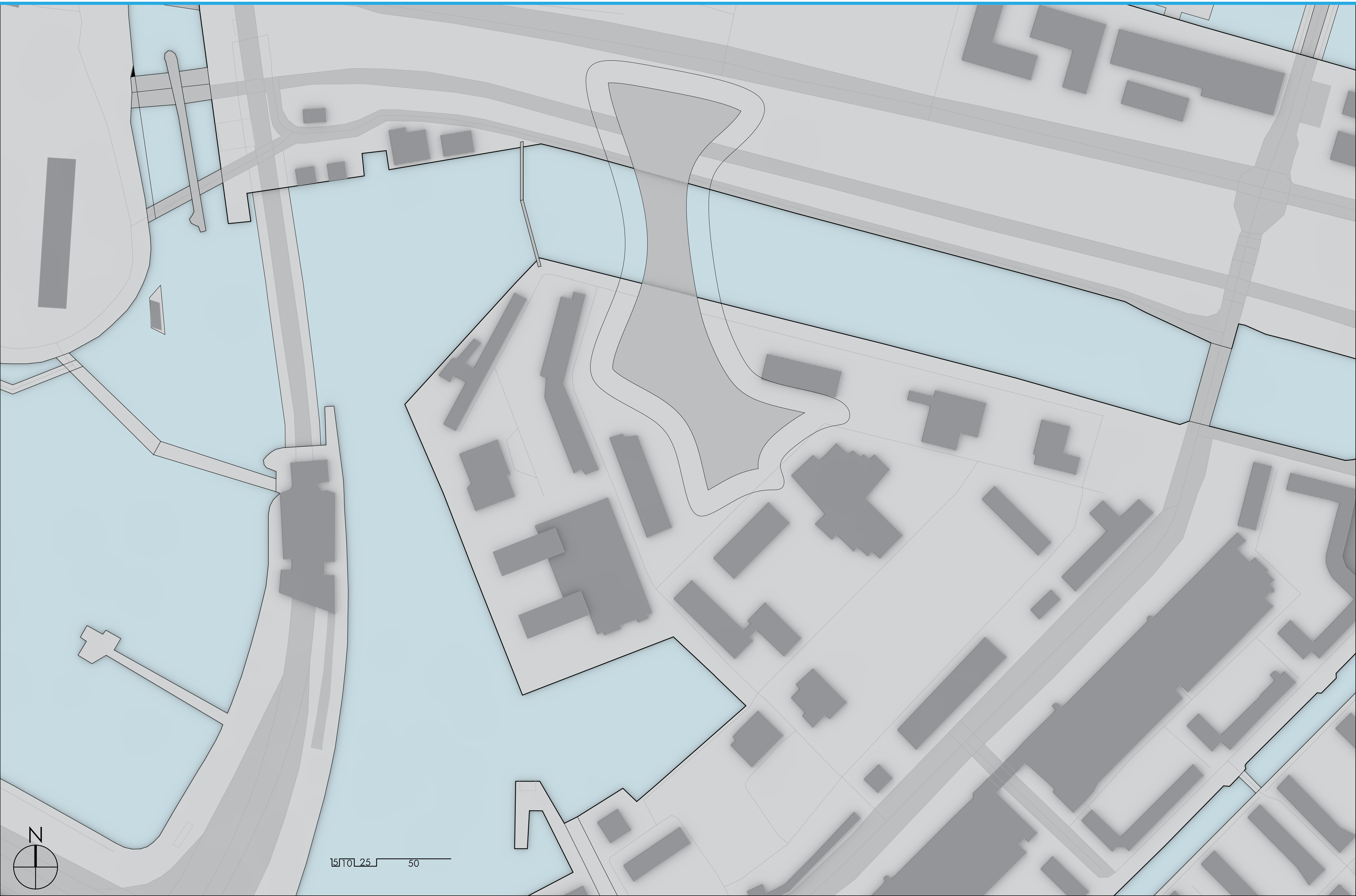
Solar Analysis To Boundary



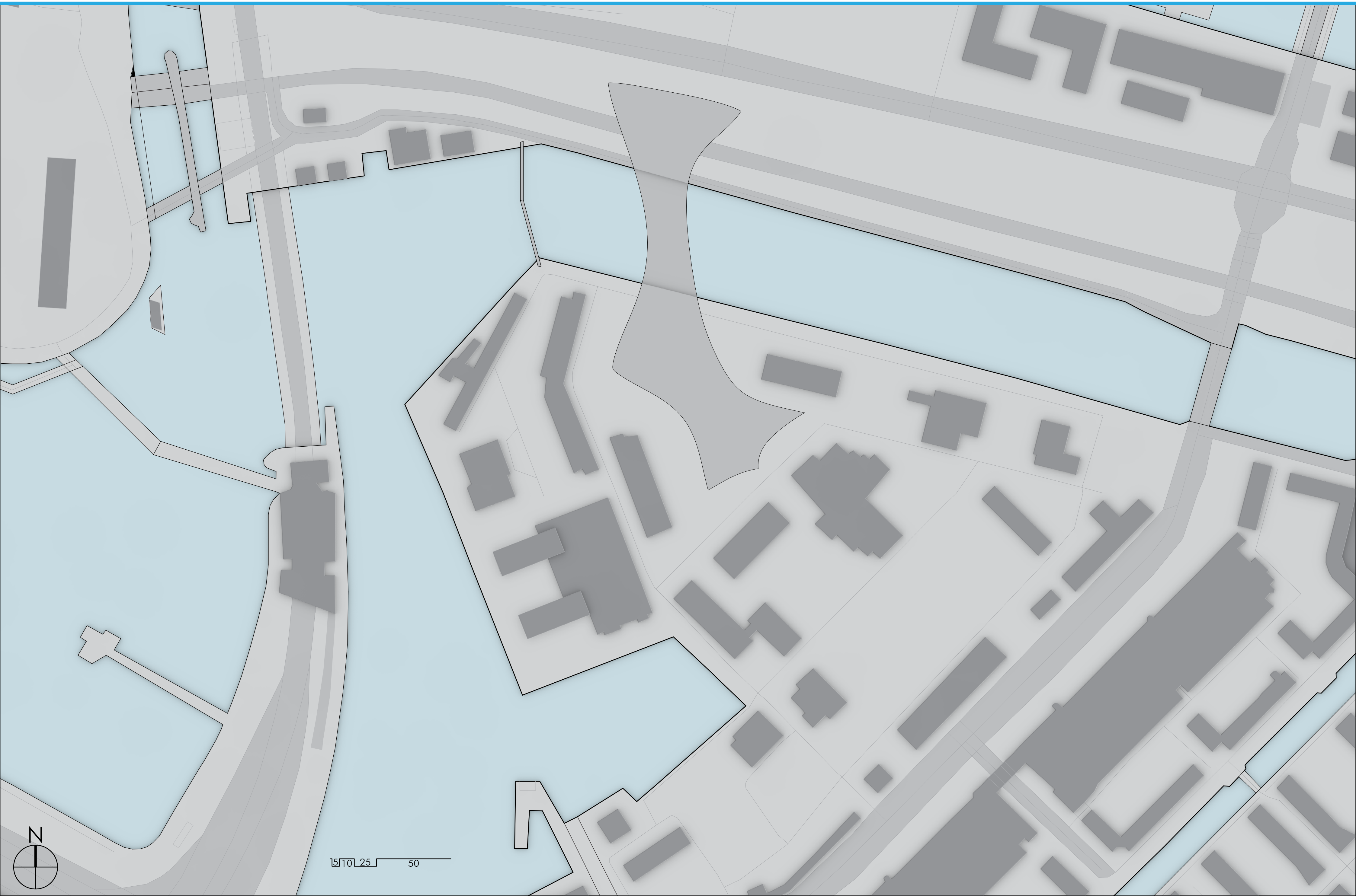
Site Boundary



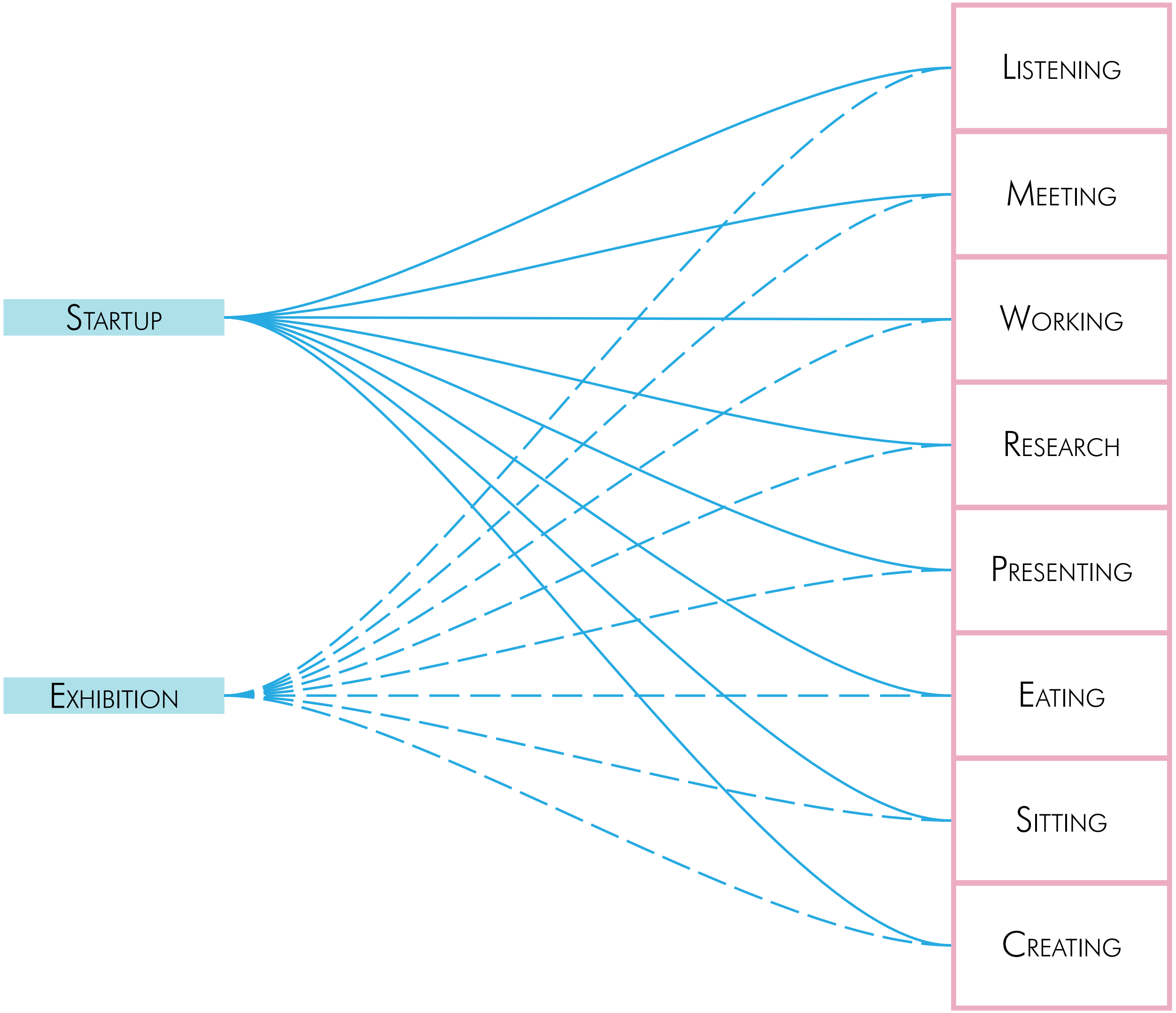
Boundary Offset



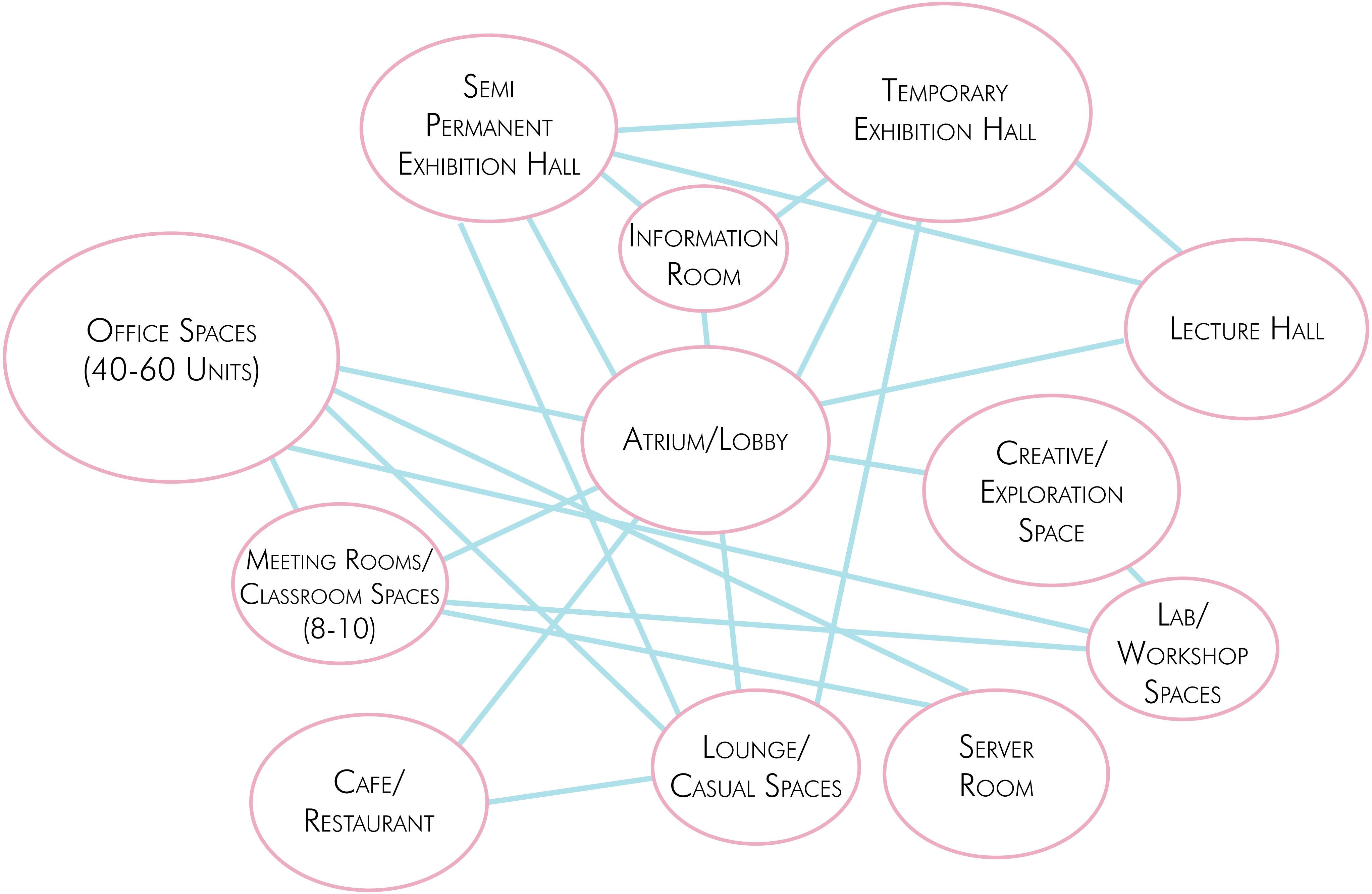
Final Site Boundary



Human Uses


Startup
Exhibition
Listening
Meeting
Working
Research
Presenting
Eating
Sitting
Creating

Program Requirements

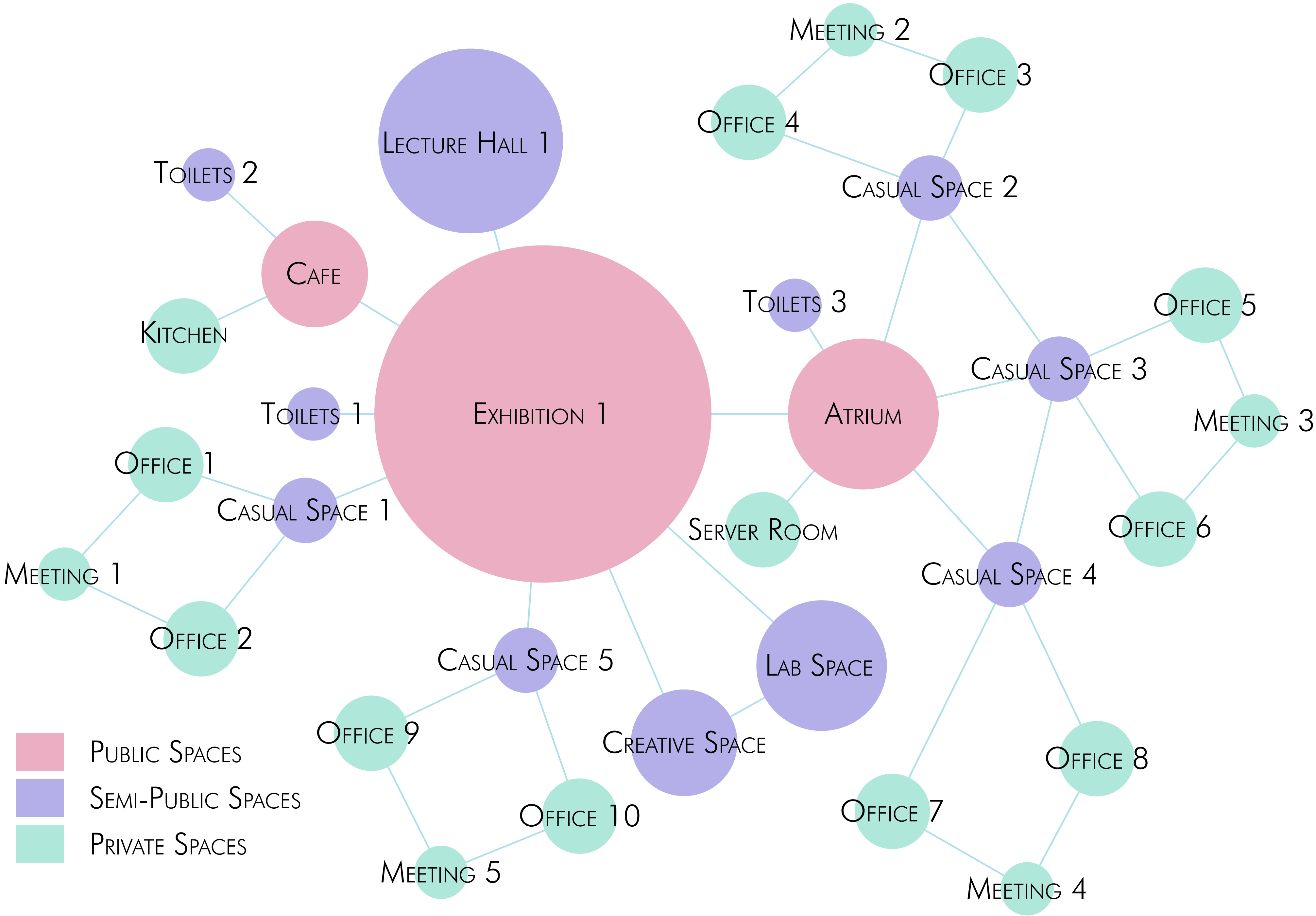


Refined Program Requirements - Space Syntax

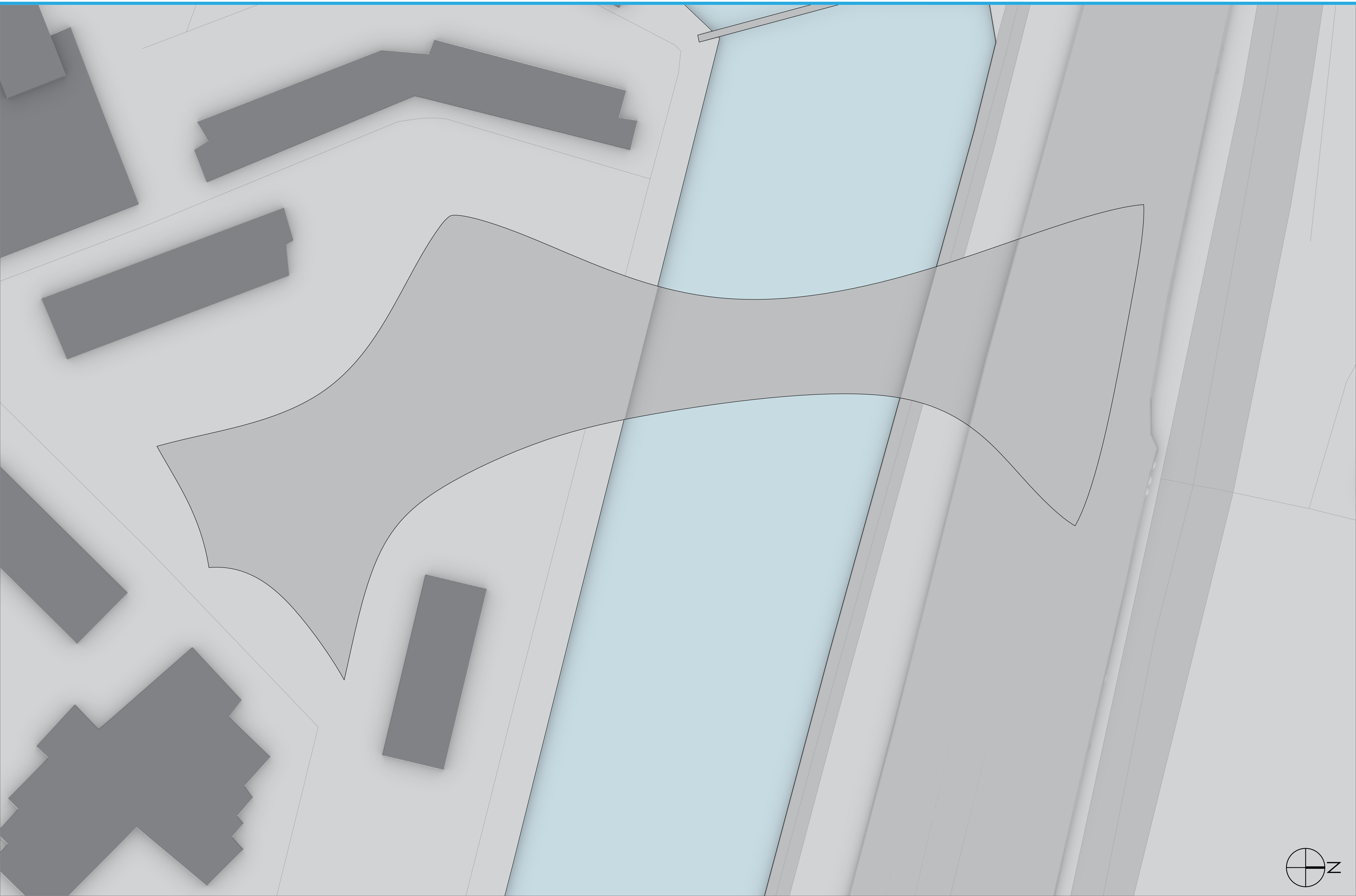
SPACES	SM	CONNECTIONS
0 EXHIBITION 1	2000	1;2;13;14;16;20;27;30
1 LECTURE HALL 1	600	0
2 CREATIVE SPACE	200	0;13
3 OFFICE SPACE 1	100	16;21
4 OFFICE SPACE 2	100	16;21
5 OFFICE SPACE 3	100	17;22
6 OFFICE SPACE 4	100	17;22
7 OFFICE SPACE 5	100	18;23
8 OFFICE SPACE 6	100	18;23
9 OFFICE SPACE 7	100	19;24
10 OFFICE SPACE 8	100	19;24
11 OFFICE SPACE 9	100	20;25
12 OFFICE SPACE 10	100	20;25
13 LAB SPACE	300	0;2
14 CAFÉ	200	0;15;28
15 KITCHEN	100	14

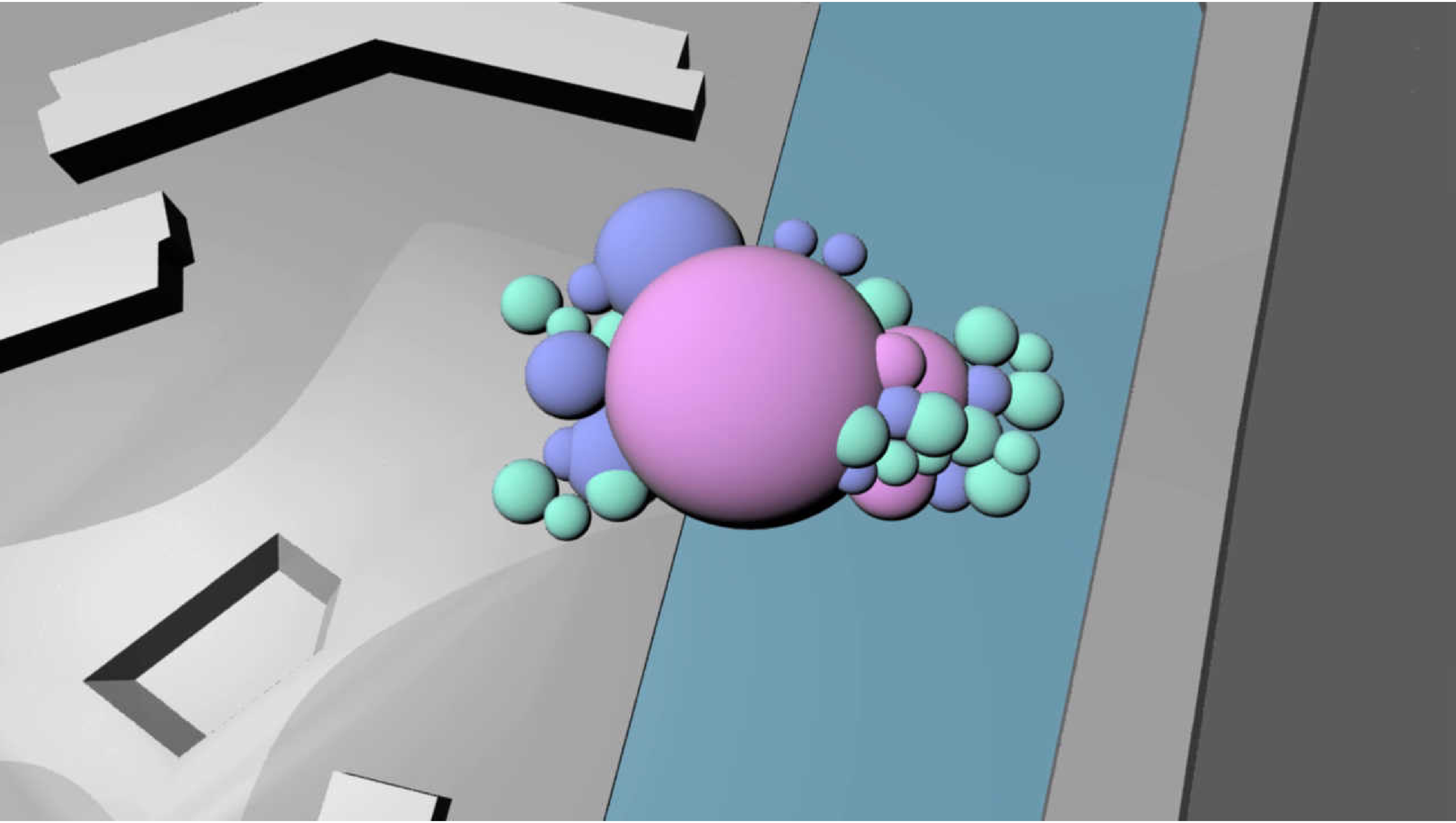
SPACES	SM	CONNECTIONS
16 CASUAL SPACE 1	75	0;3;4
17 CASUAL SPACE 2	75	30;5;6
18 CASUAL SPACE 3	75	30;7;8
19 CASUAL SPACE 4	75	30;9;10
20 CASUAL SPACE 5	75	0;11;12
21 MEETING 1	50	3;4
22 MEETING 2	50	5;6
23 MEETING 3	50	7;8
24 MEETING 4	50	9;10
25 MEETING 5	50	11;12
26 SERVER ROOM	100	30
27 Toilets 1	50	0
28 Toilets 2	50	14
29 Toilets 3	50	30
30 Atrium	400	0;17;18;19;26
Total	5675 SM	

Spatial Analysis and Connections - Space Syntax

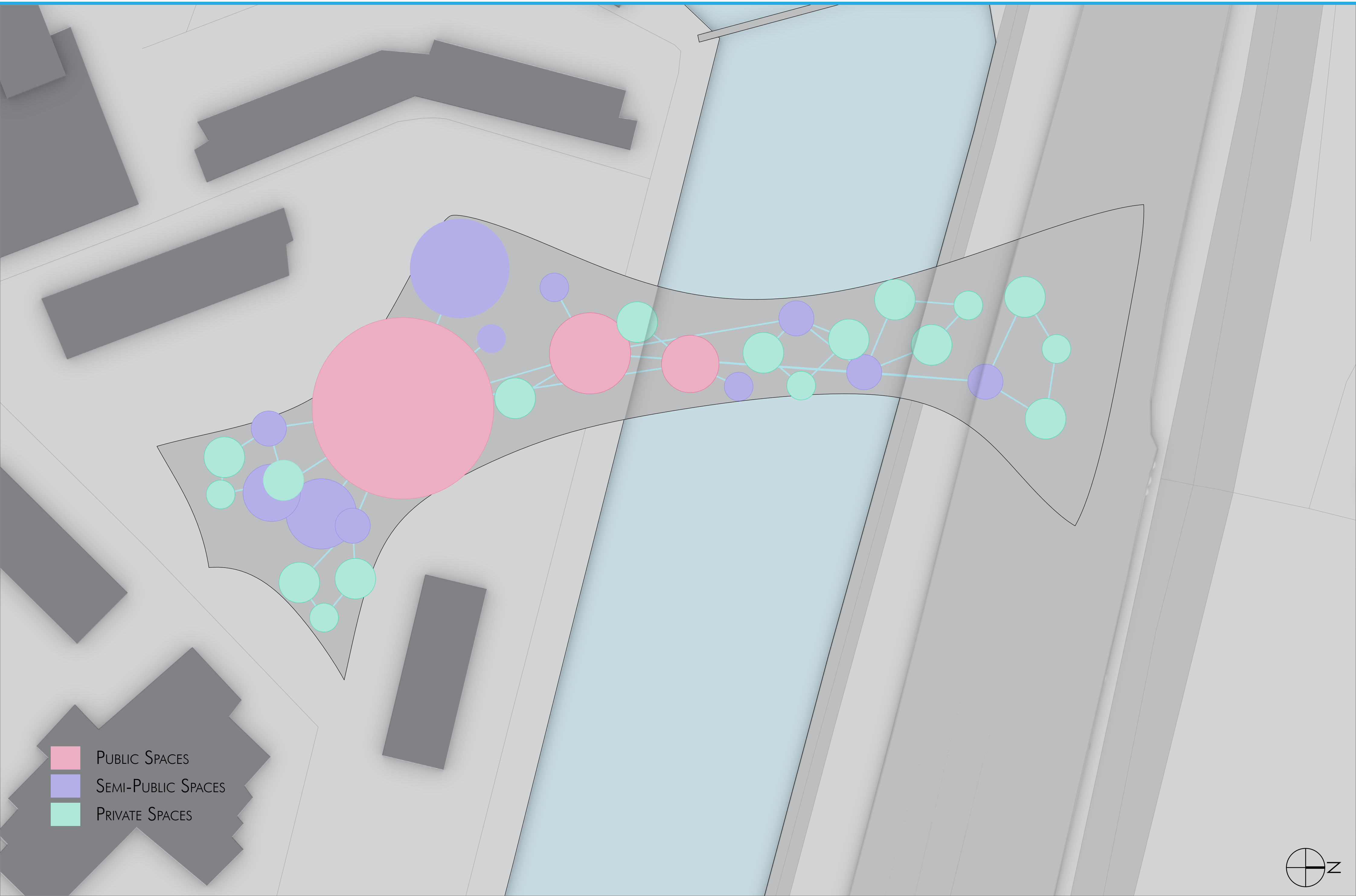


Site Outline

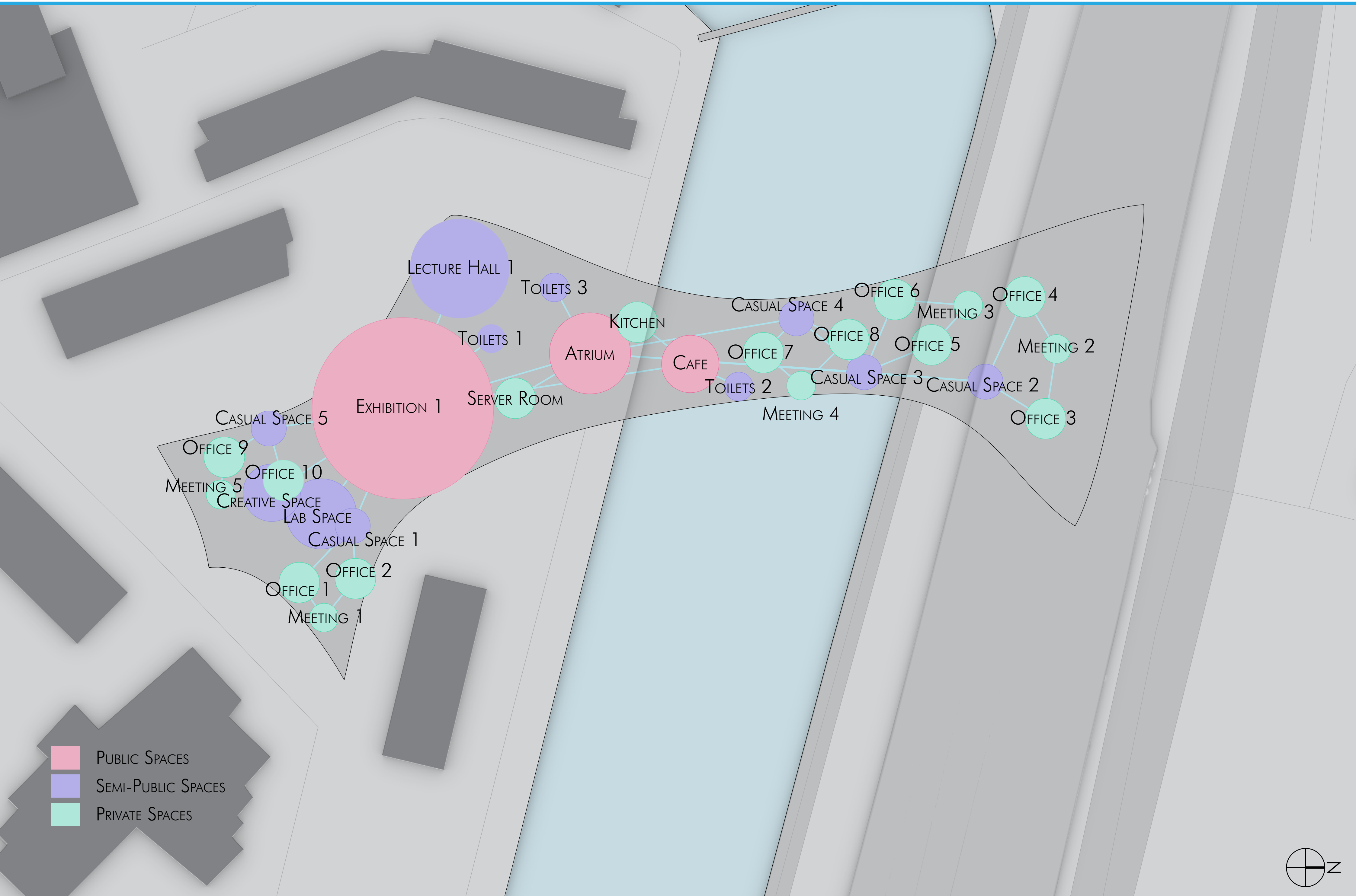




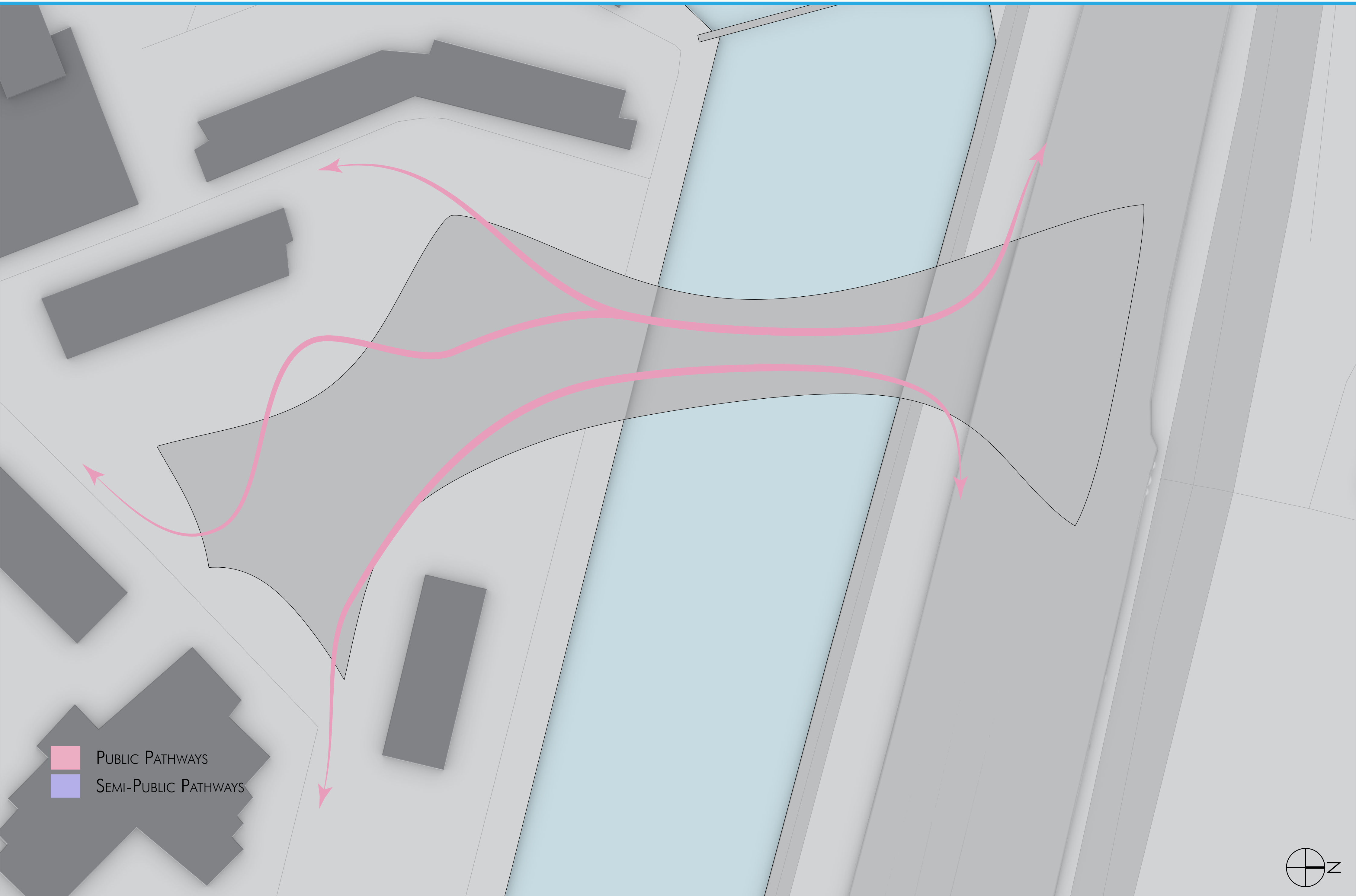
Space Syntax on Site



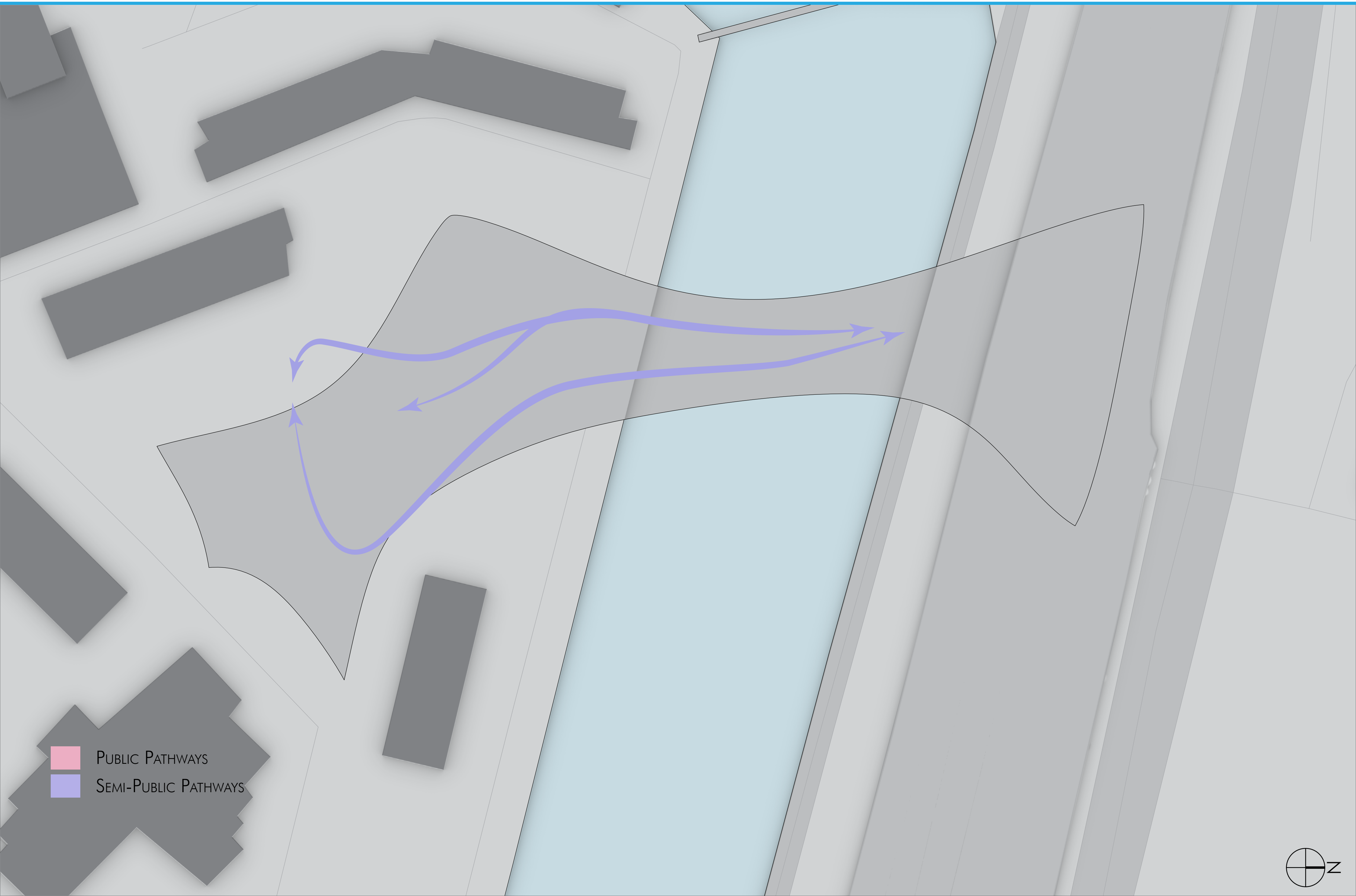
Space Syntax on Site



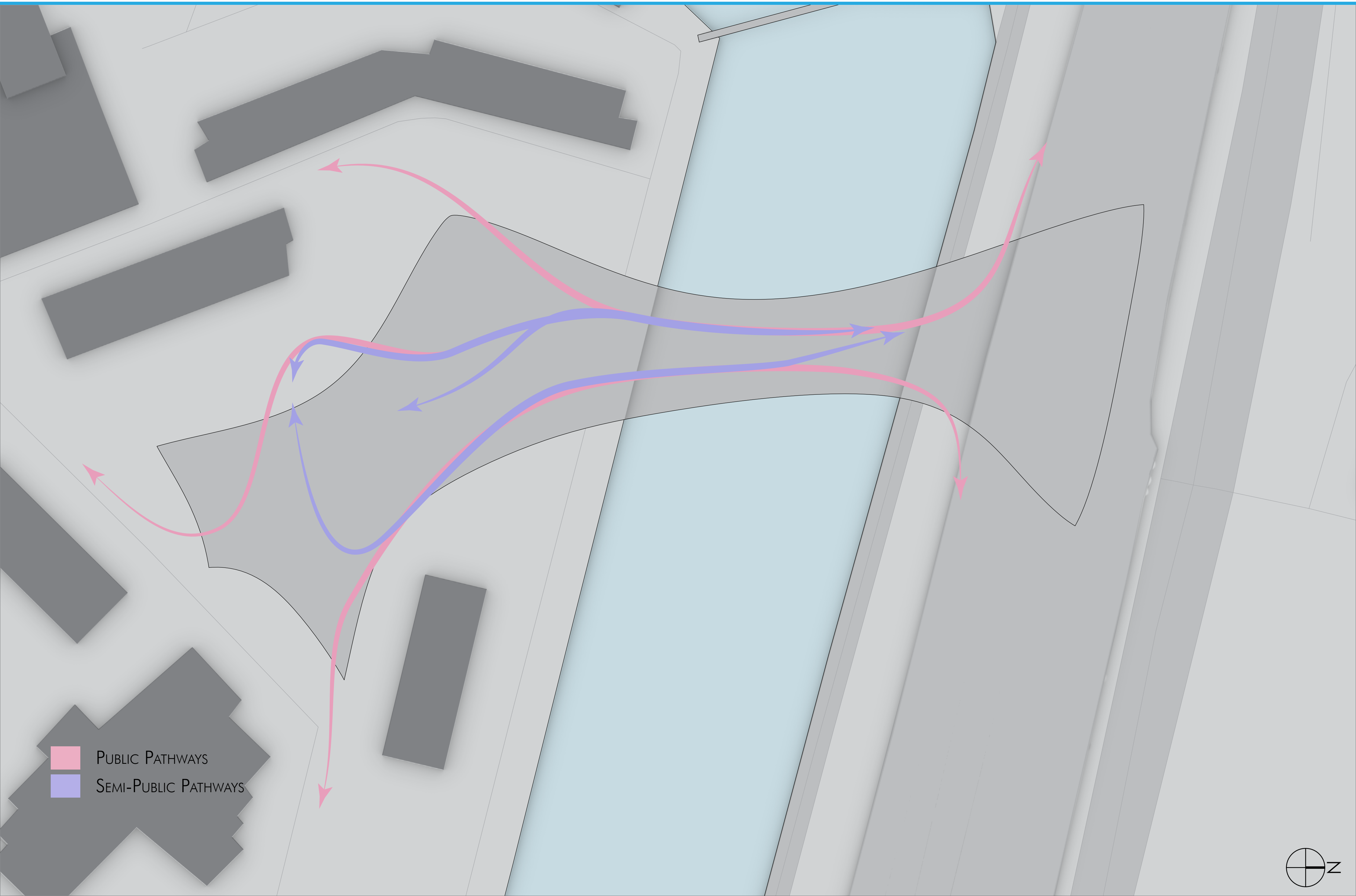
Public Pathways



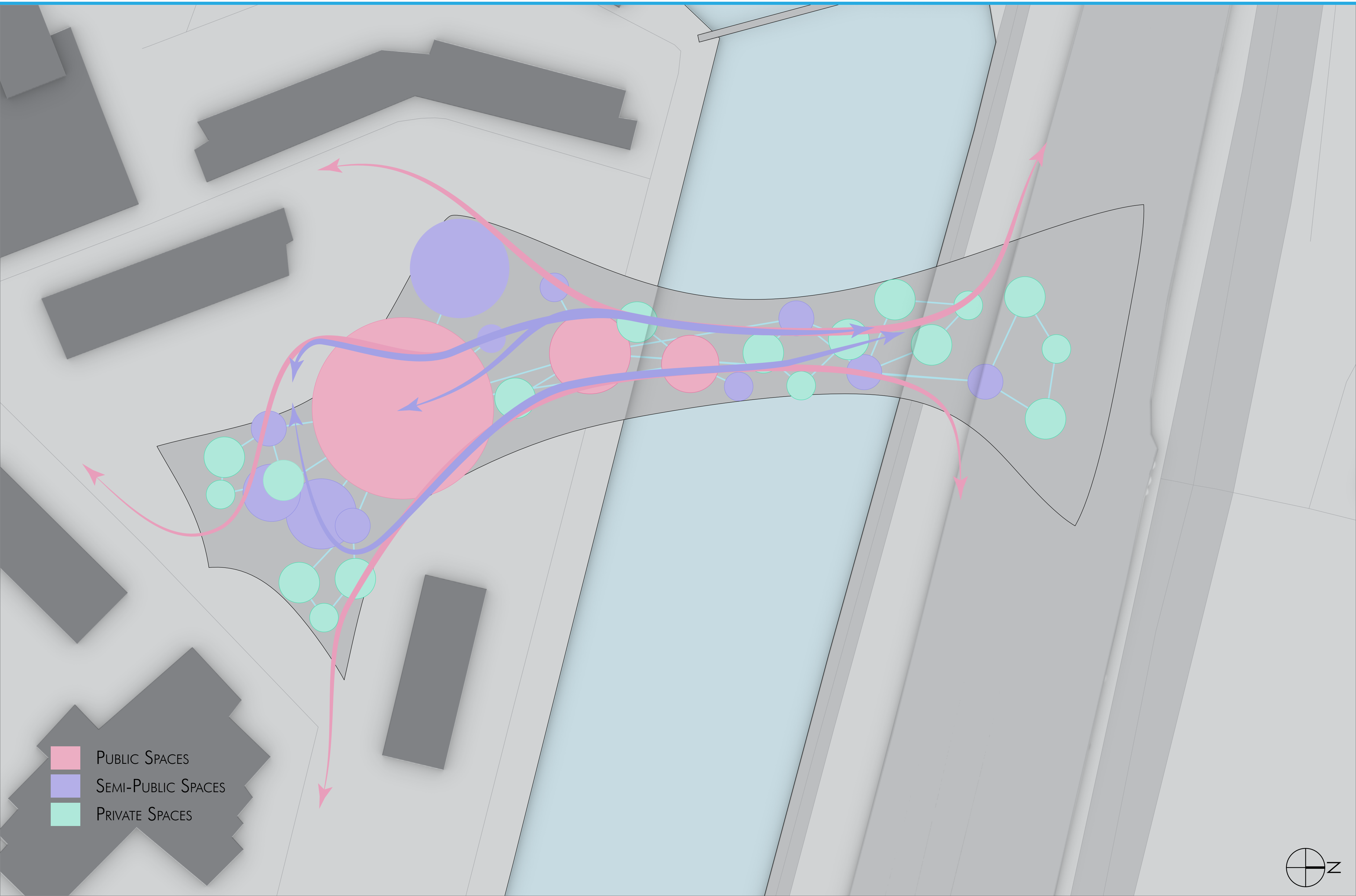
Semi-Public Pathways



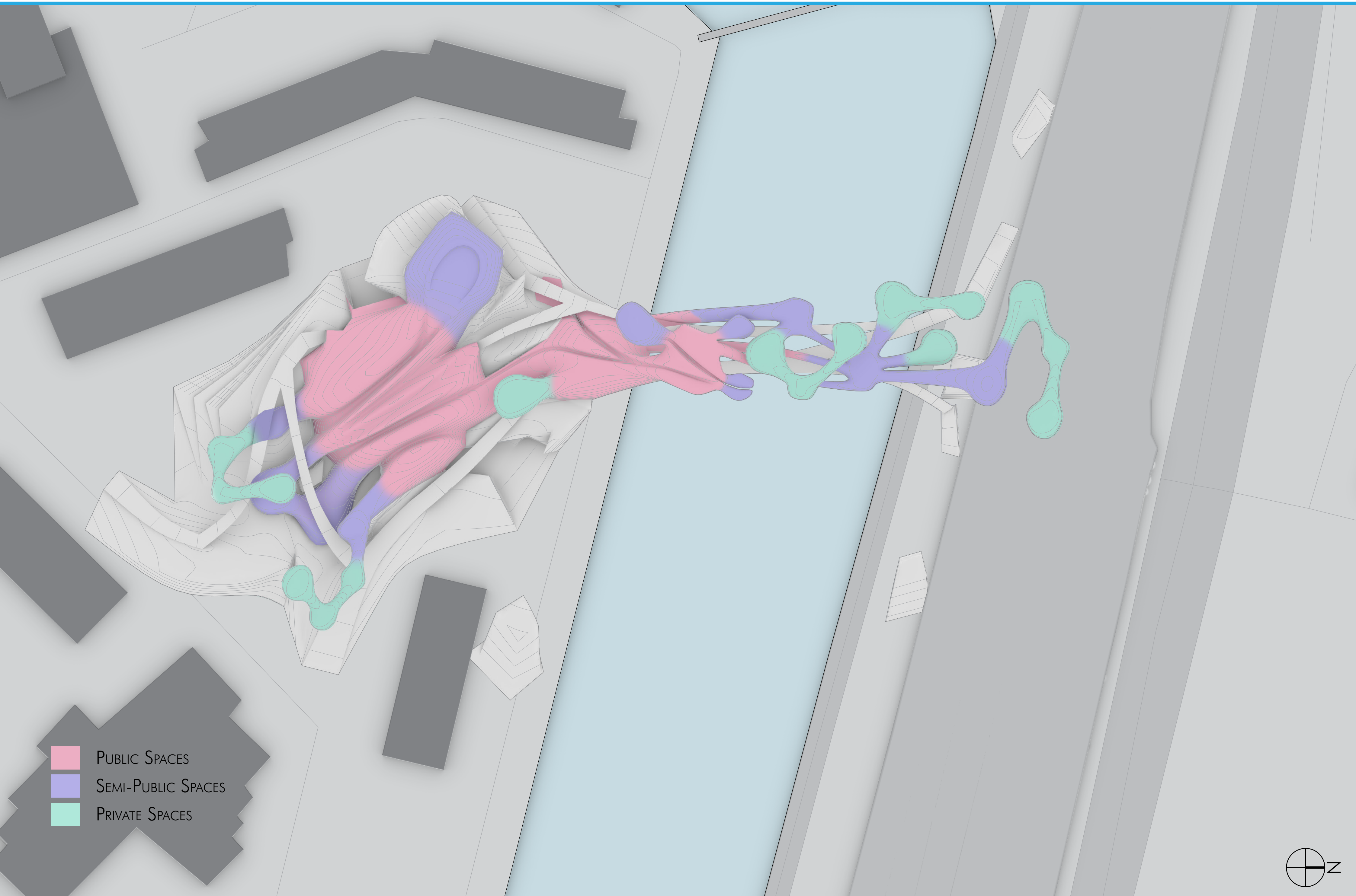
Pathways



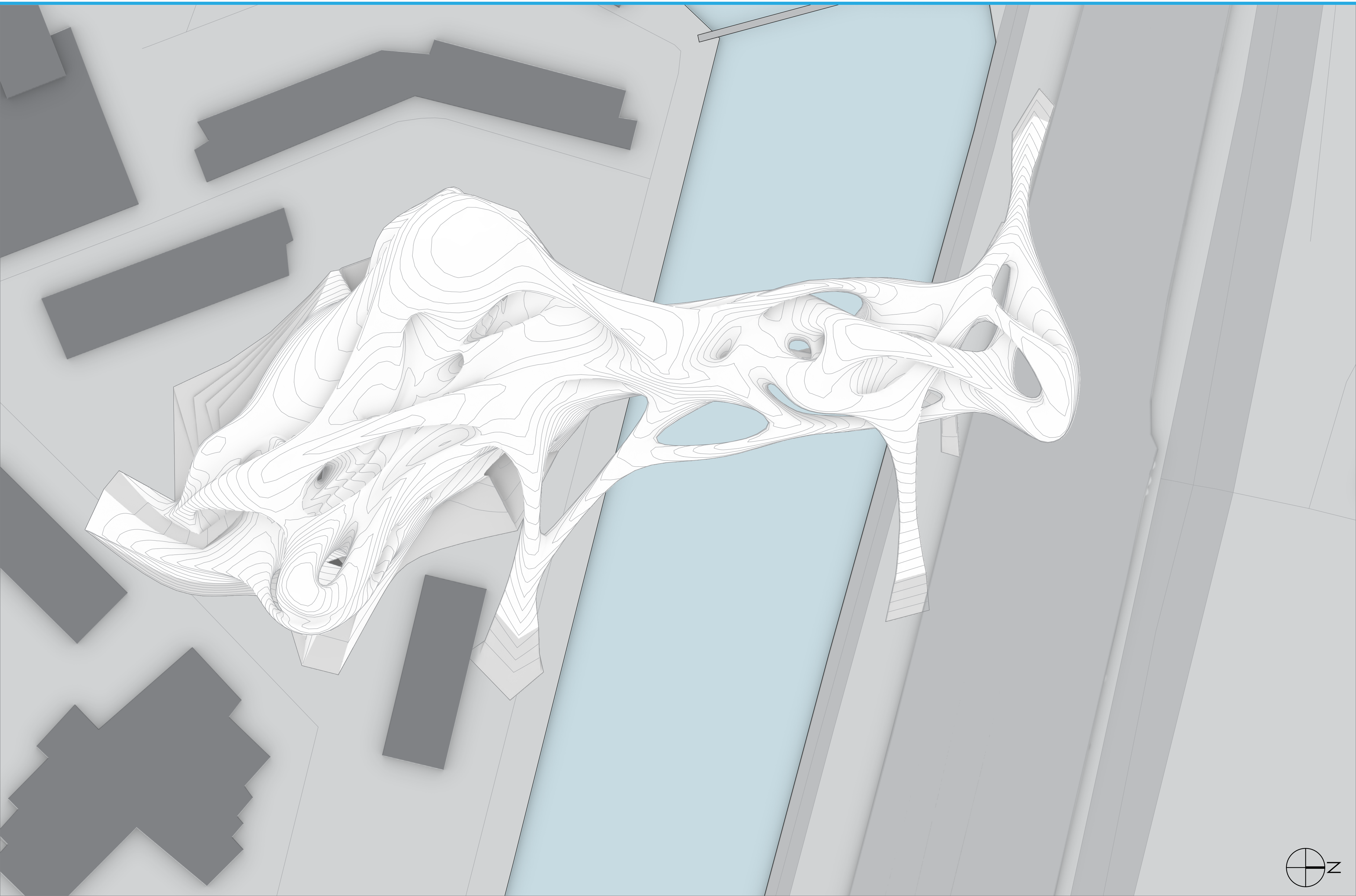
Pathways on Interior Spaces



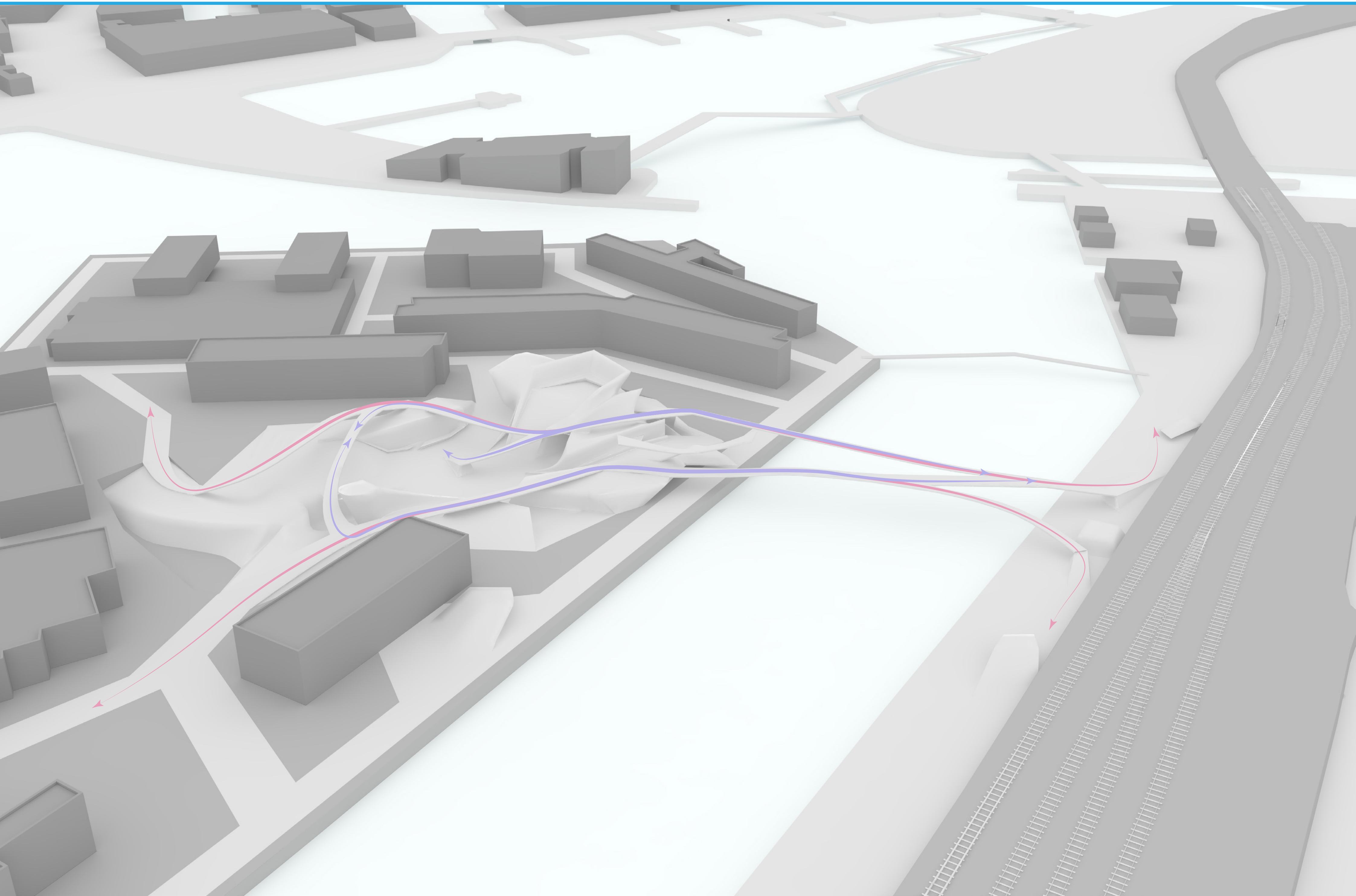
Interior with Pathways



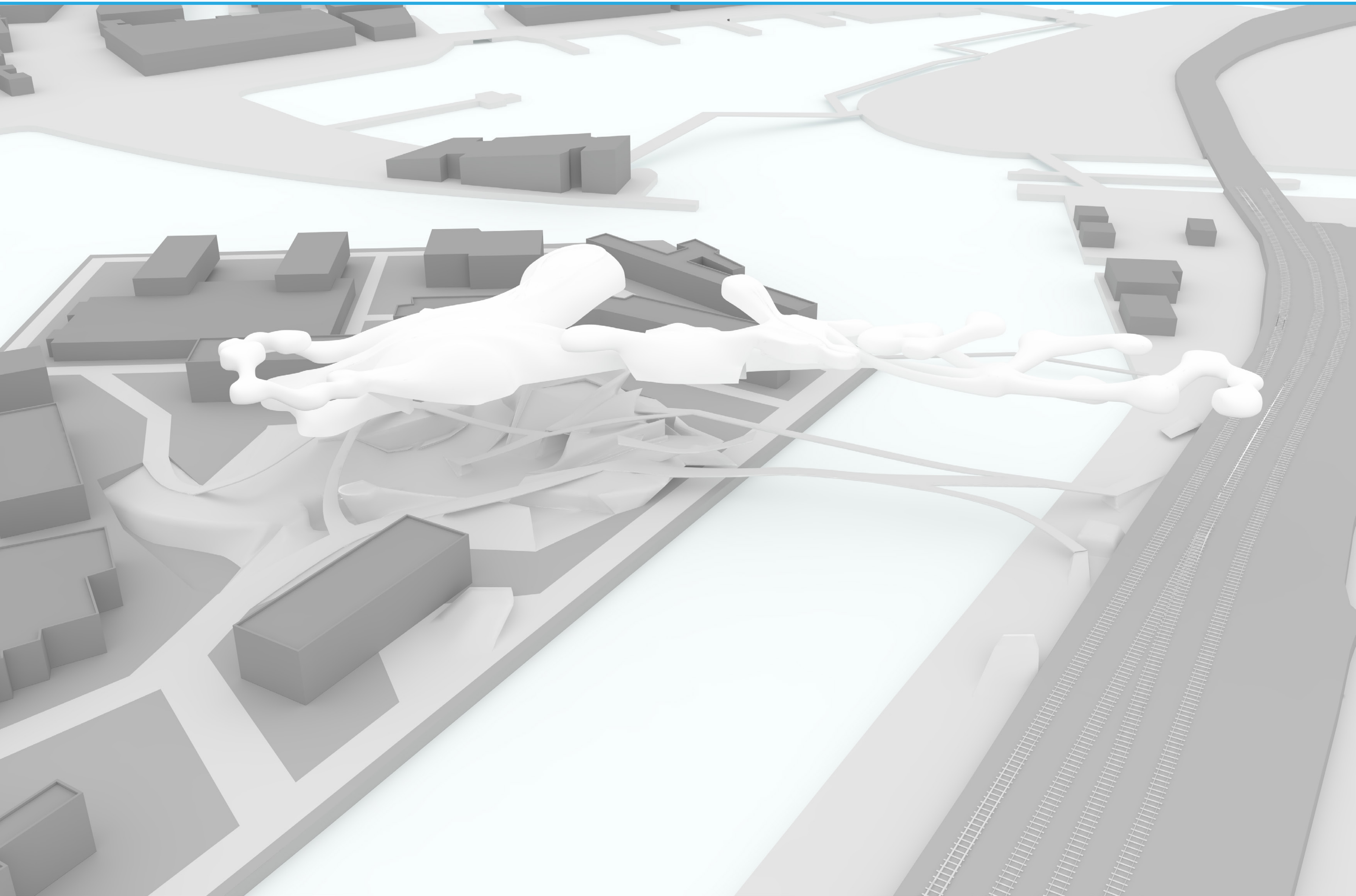
Exterior



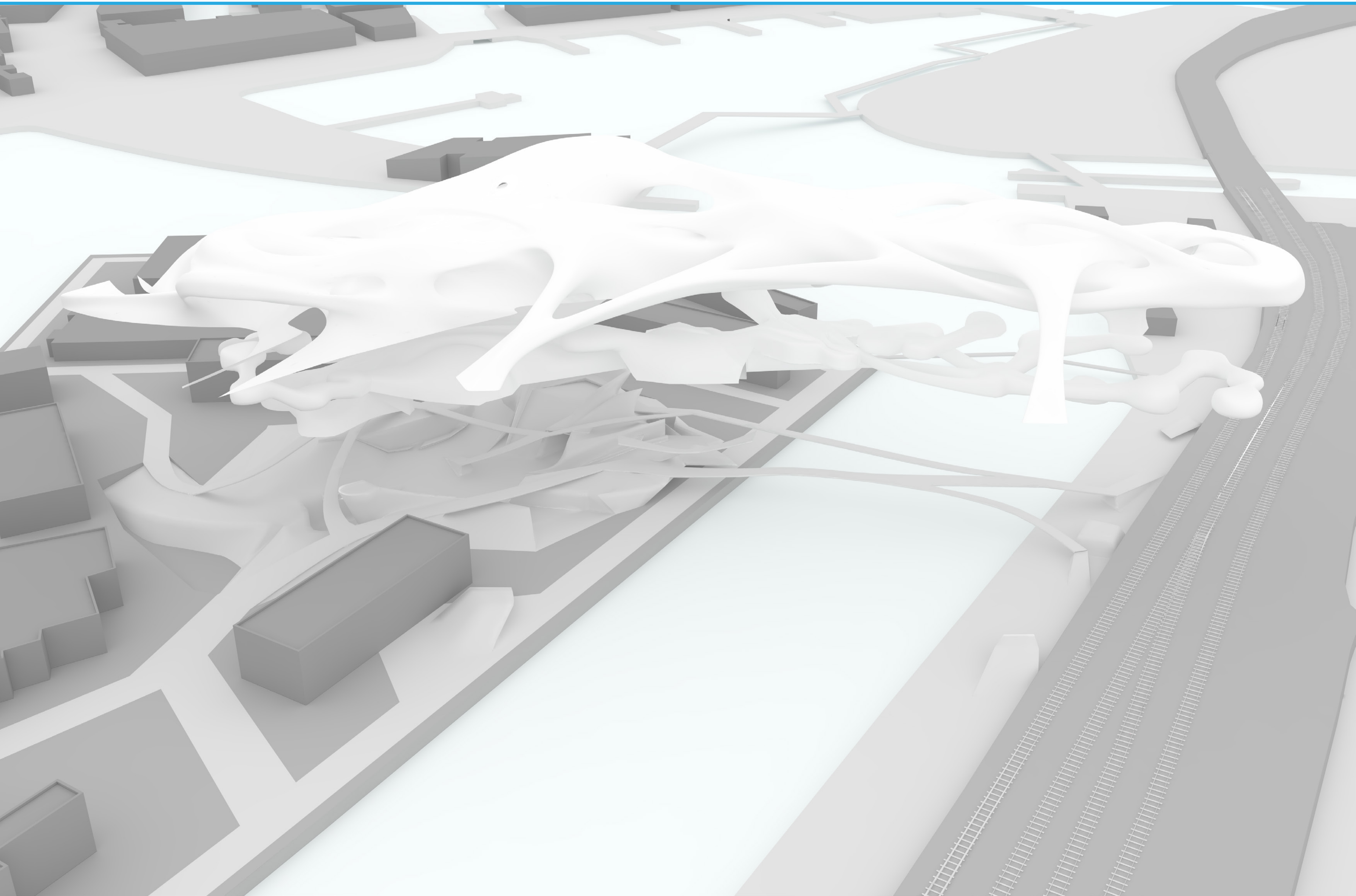
Paths



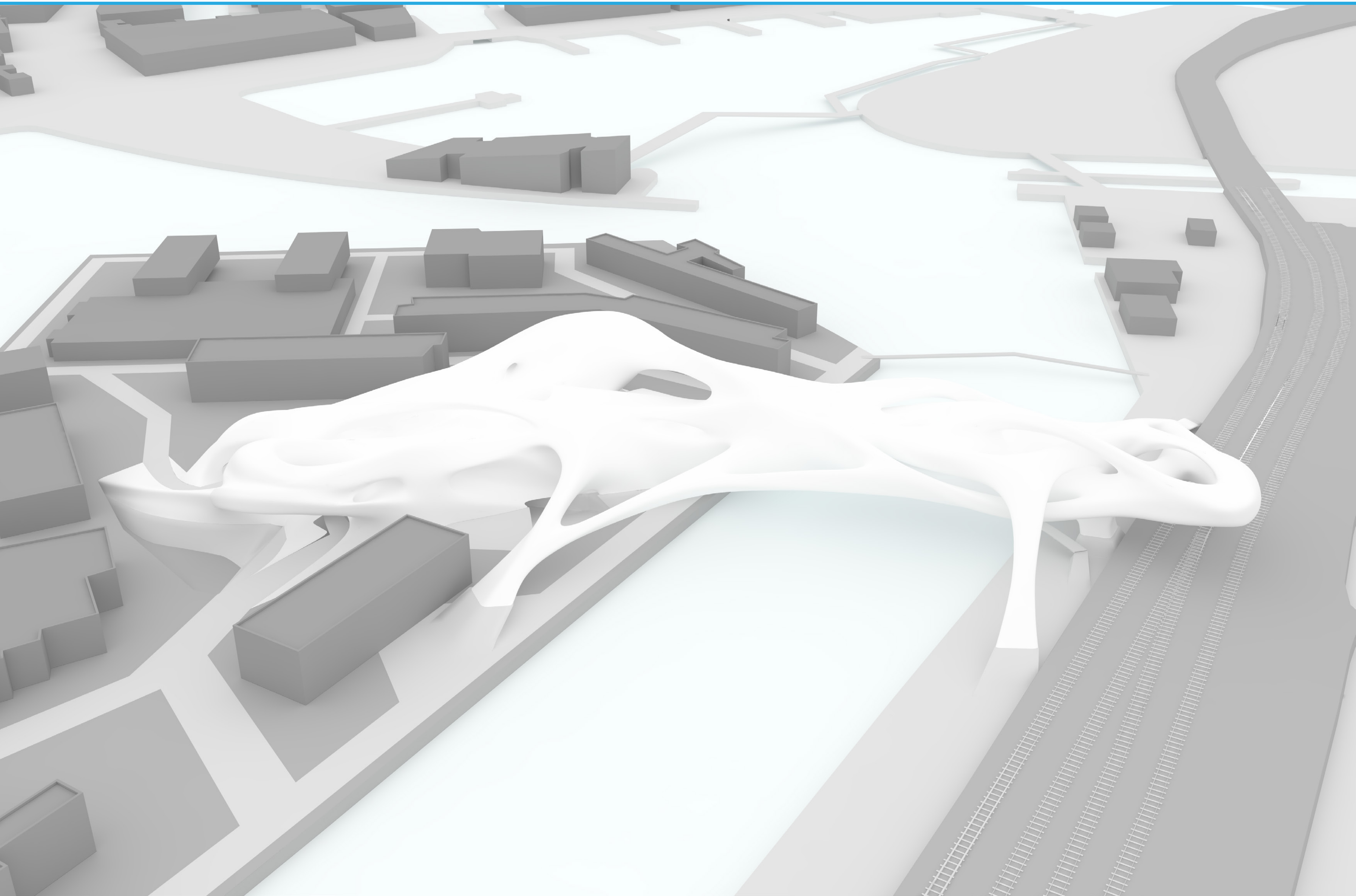
Interior Shell



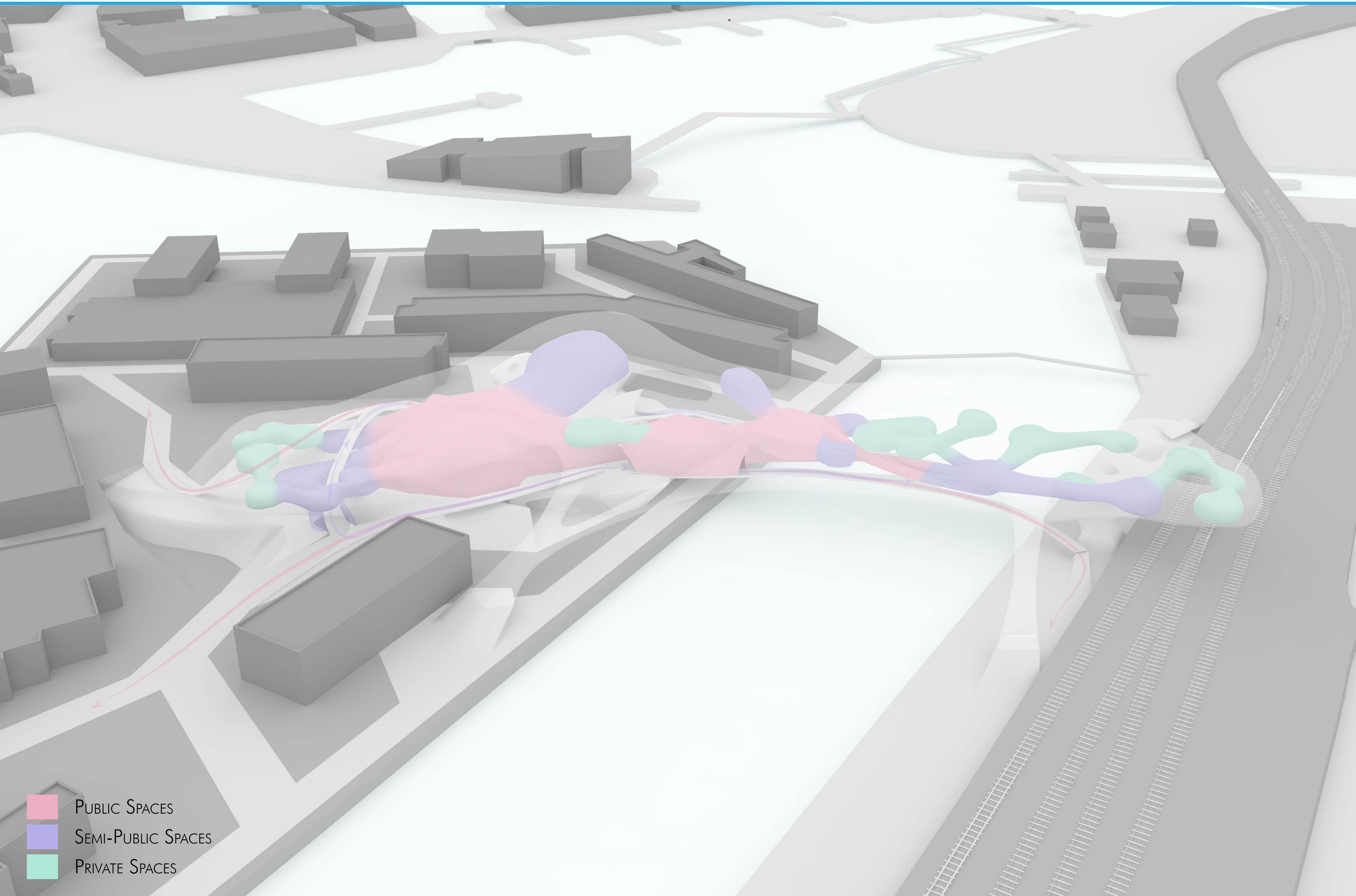
Exploded Axon



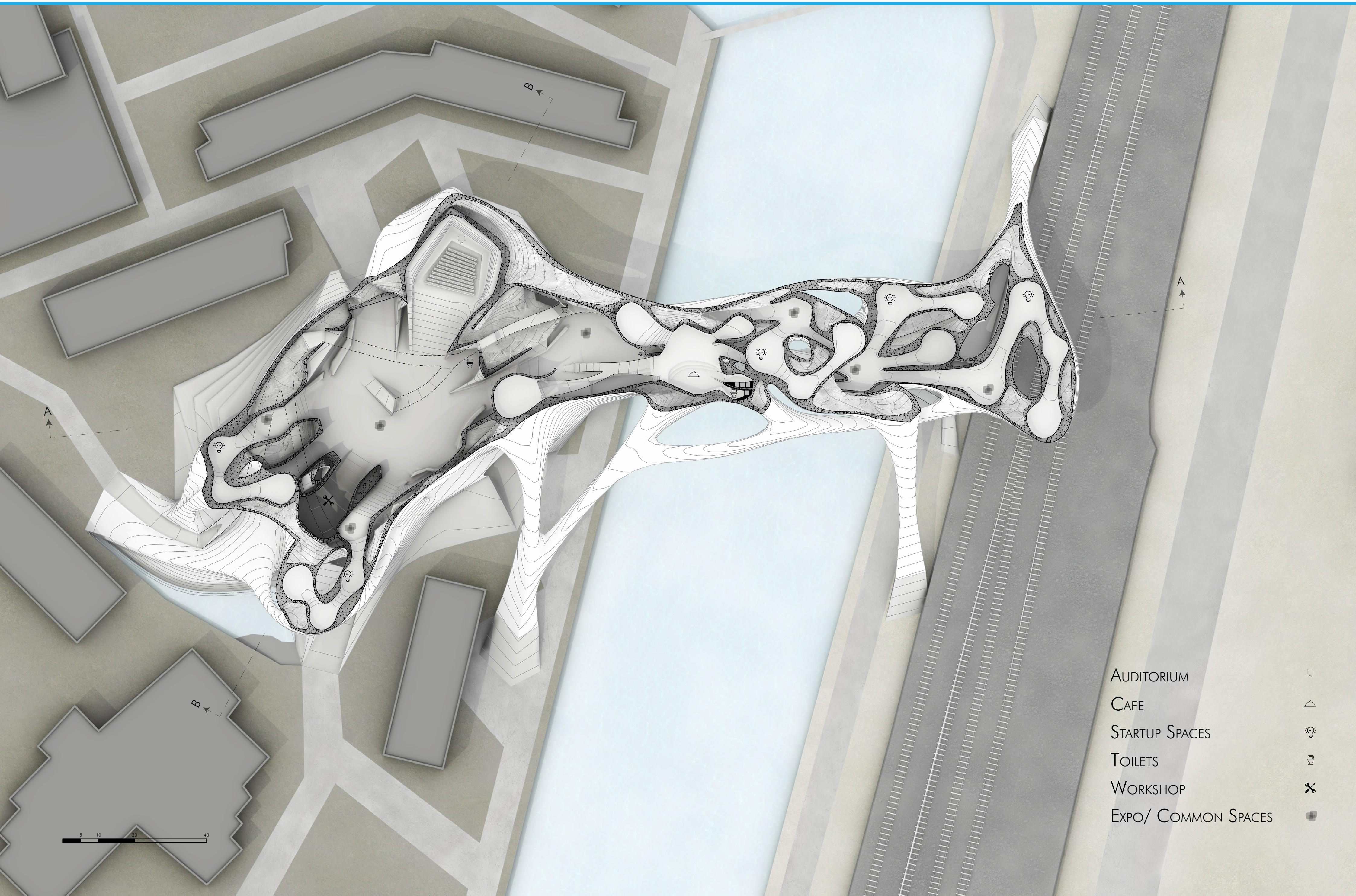
Exterior Shell



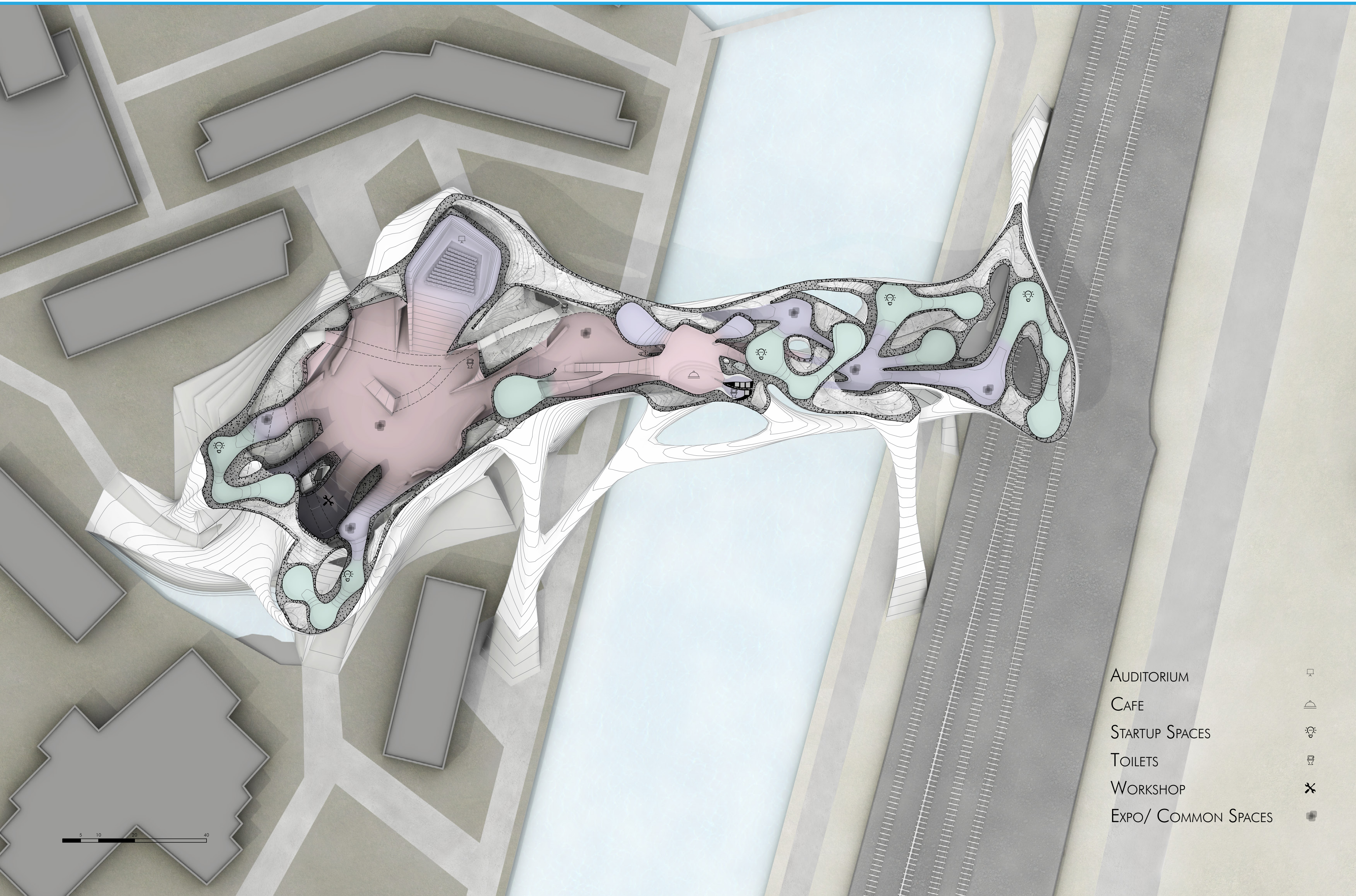
Spaces and Flows



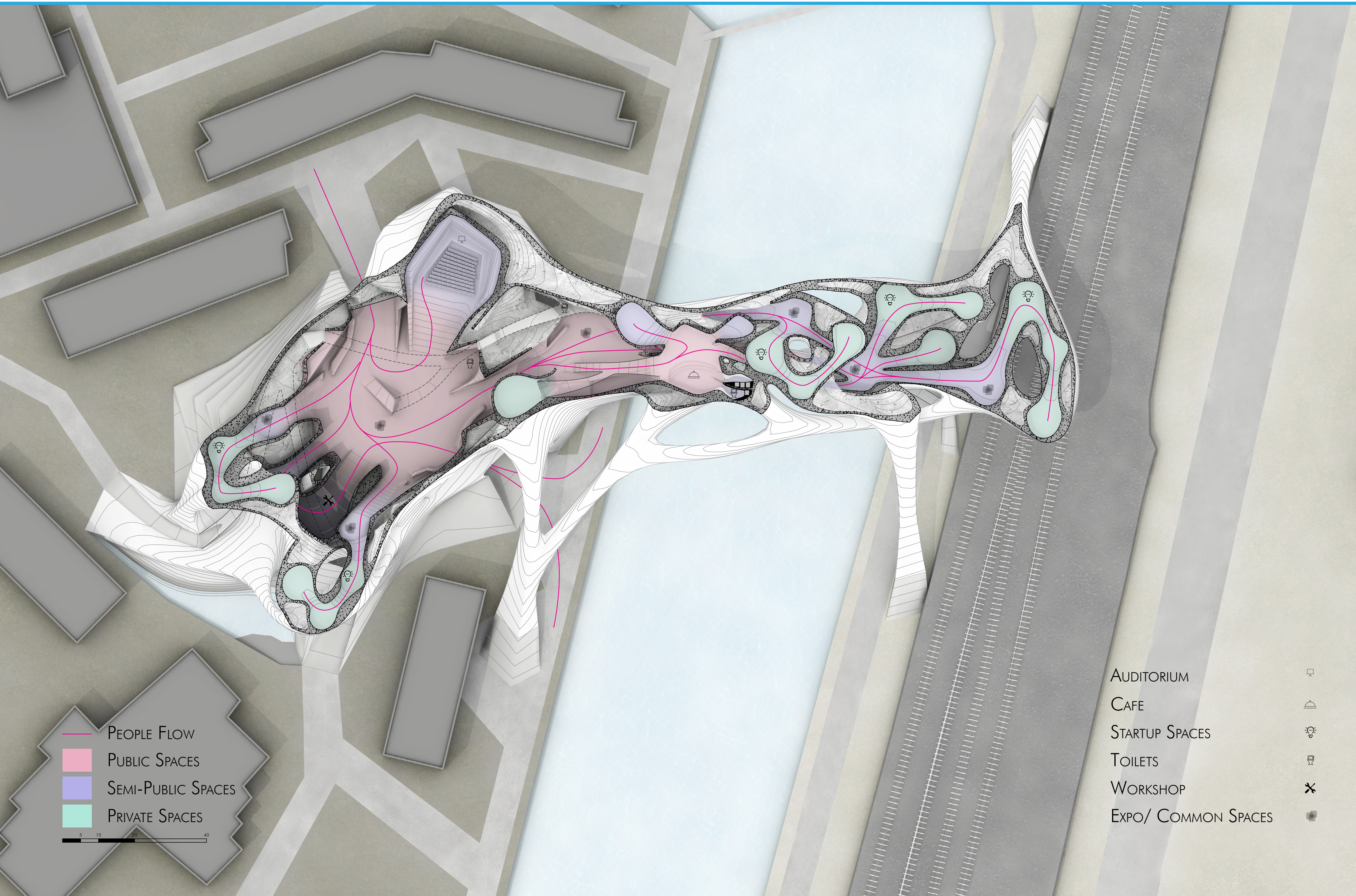
Plan


B
A
A
B
Auditorium
Cafe
Startup Spaces
Toilets
Workshop
Expo/ Common Spaces
5
10
20
40

Plan

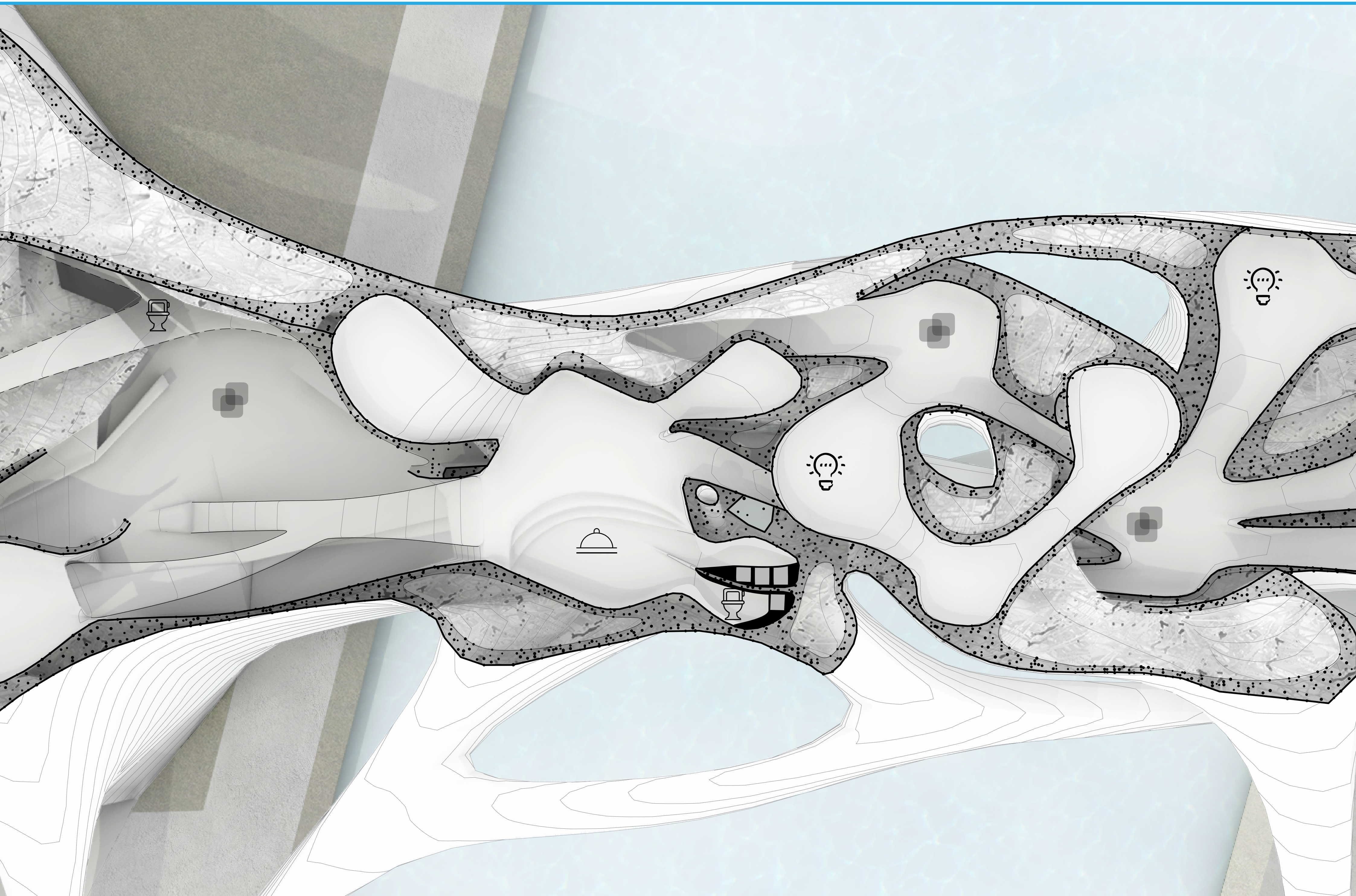

Auditorium
Cafe
Startup Spaces
Toilets
Workshop
Expo/ Common Spaces
5
10
20
40

Plan

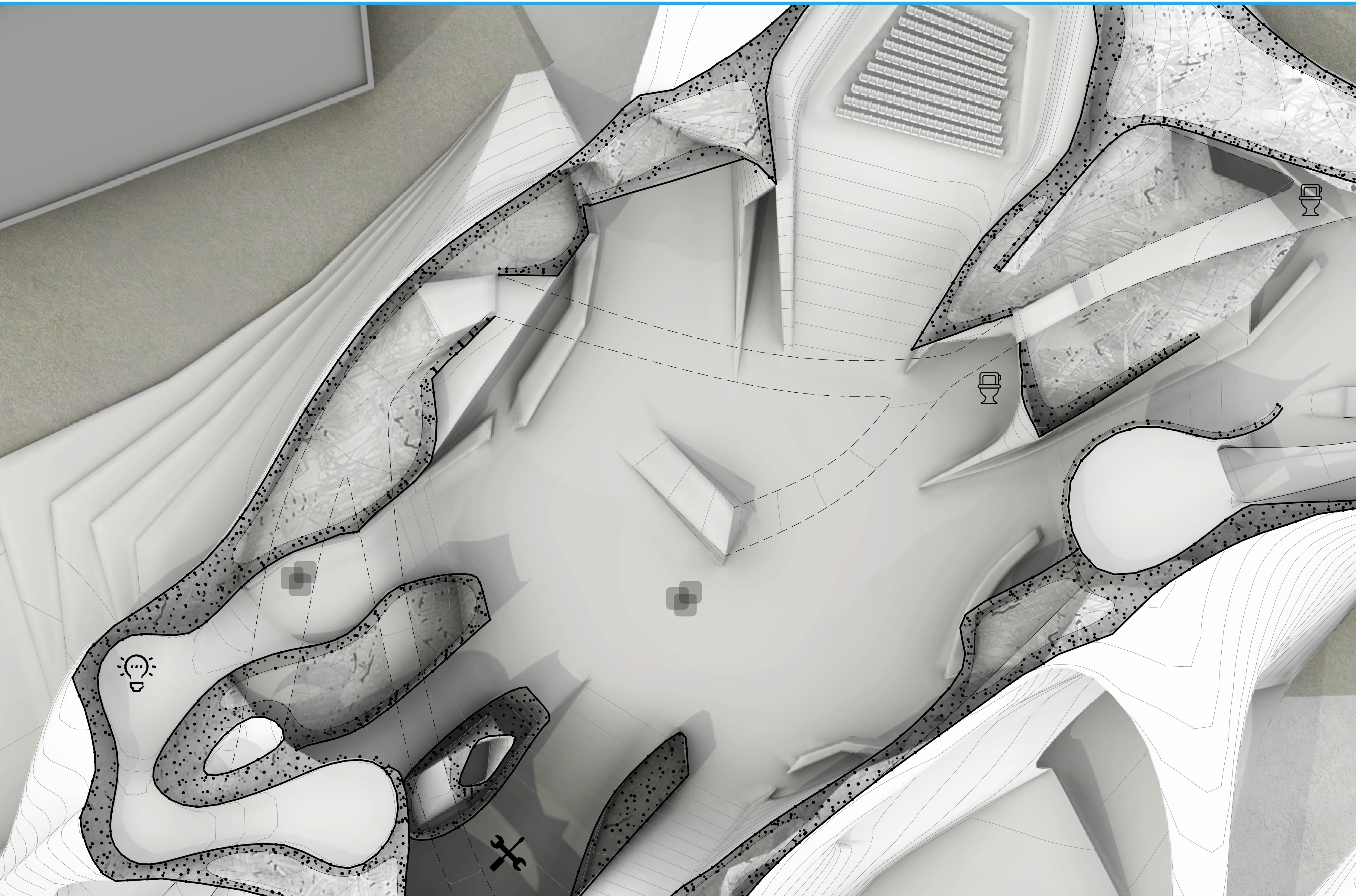


People Flow
Public Spaces
Semi-Public Spaces
Private Spaces
5
10
20
40
Auditorium
Cafe
Startup Spaces
Toilets
Workshop
Expo/ Common Spaces

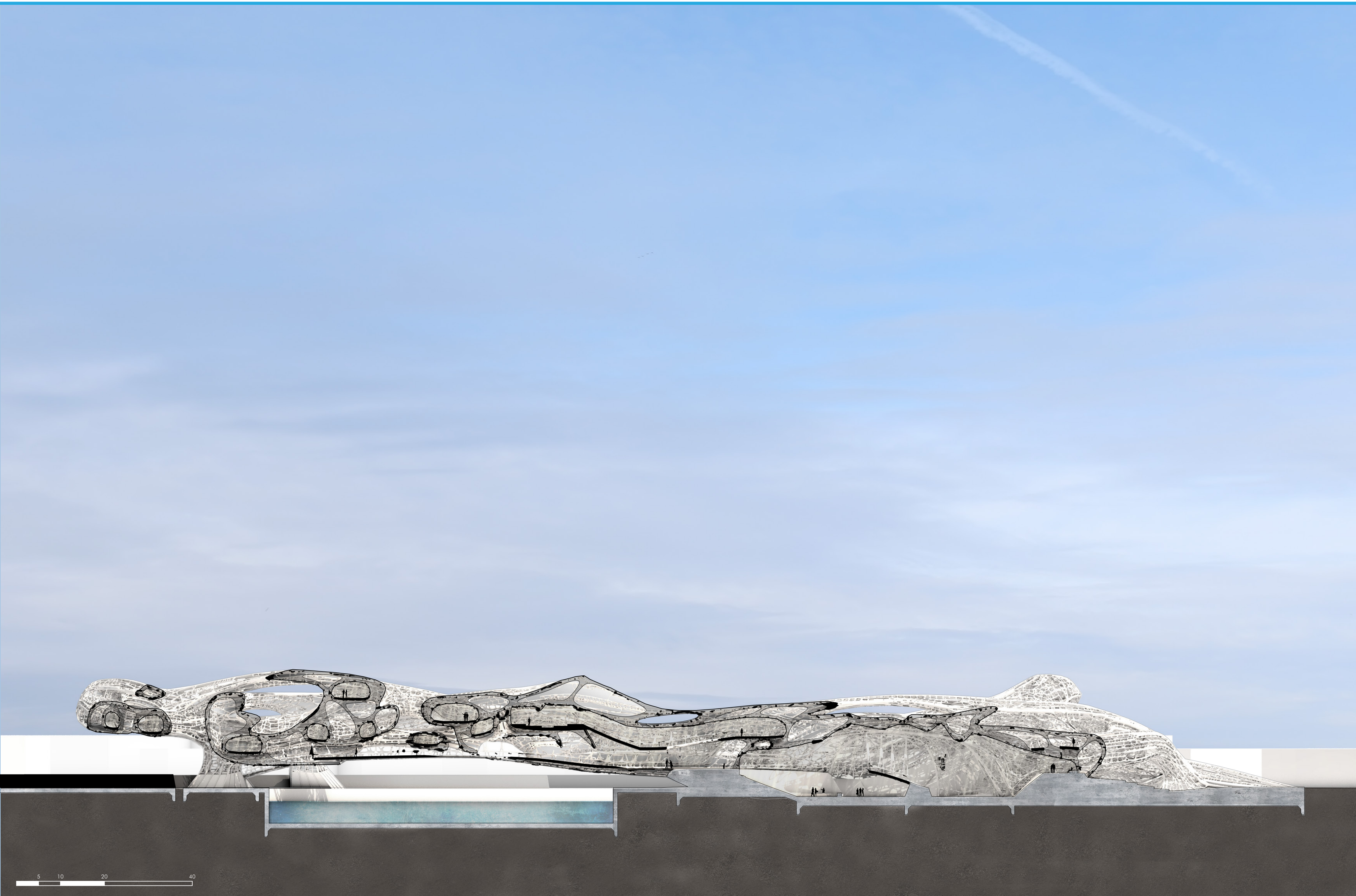
Plan Startup Spaces



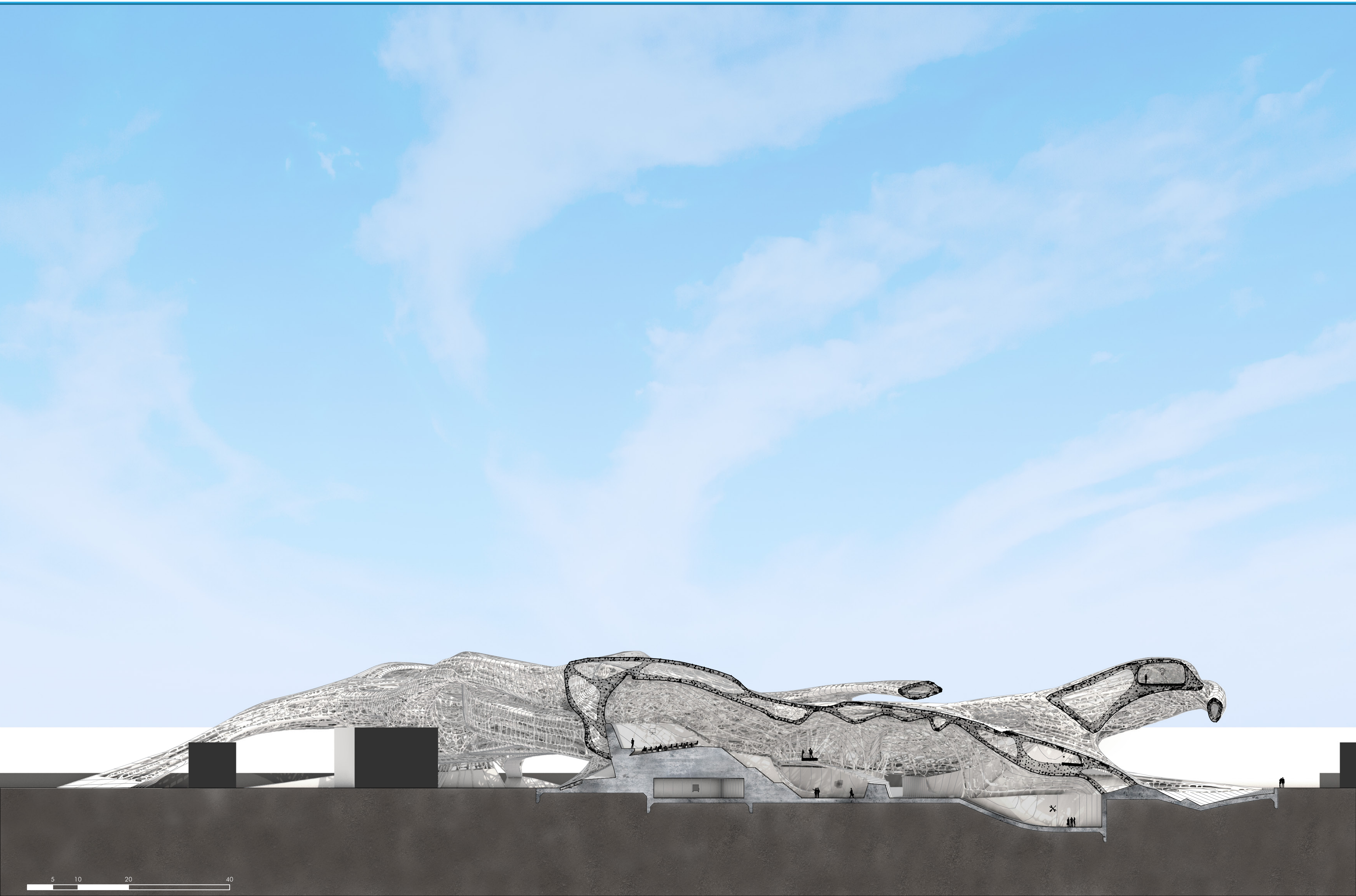
Plan Exhibition Area



Section AA



Section BB



Carbon Fiber

Why Carbon Fiber?

Typically used in High Performance industries, such as Aerospace, Automobile, Nautical and other industries where a high strength to weight ratio is critical.

Standard, Intermediate, High and Ultrahigh Modulus carbon fibers have a tensile modulus of 72.5 - 145.0 milion psi (500 million - 1.0 Billion kPa)

In comparison, steel has a tensile modulus of about 29 million psi (200 million kPa).

Thus, the strongest carbon fibers are ten times stronger than steel and eight times that of aluminum, not to mention much lighter than both materials, 5 and 1.5 times, respectively.

Additionally, their fatigue properties are superior to all known metallic structures, and they are one of the most corrosion-resistant materials available, when coupled with the proper resins.*

* Zoltek

Apple Campus 2 Theatre

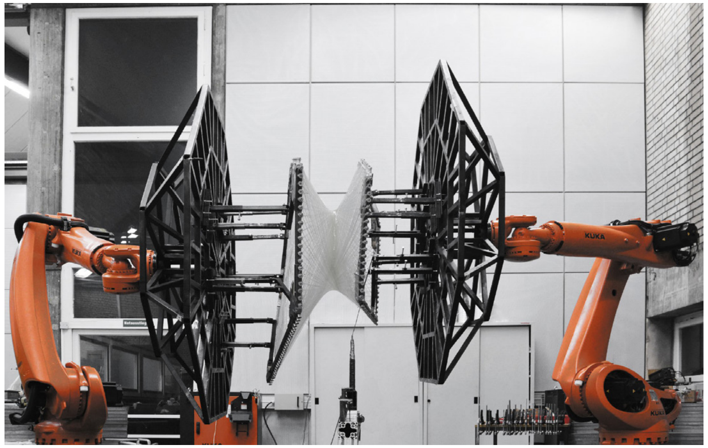
Designed by Foster+Partner in the UK.
120,000 SF (11,148 SM) theatre with a 1000 seat capacity is subterranean.

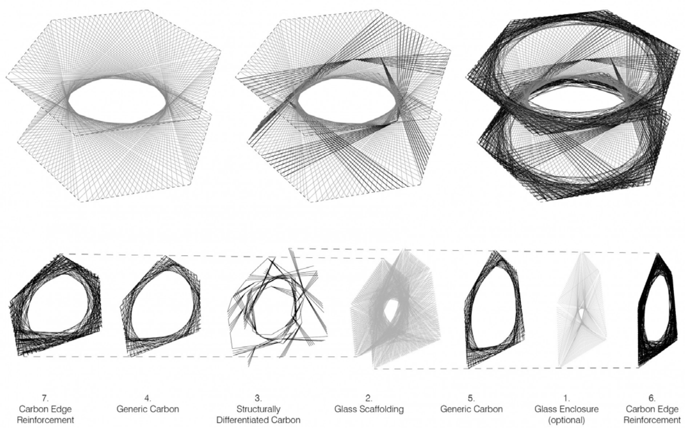
The roof is made of 44 radial panels, each 70 feet long and 11 feet wide.

The fully assembled roof weighs about 80 tons. The equivalent for a concrete roof 6 inches thick would weigh approximately 539 tons, which is about 7 timess as much.

Designed to rest on structural glass panels in order to not have any columns in the interior.

Carbon Fiber Precedents





Research Pavilion 2013-14, Institute for Computational Design, Stuttgart

- Study of how Woven Carbon Fiber could be used as a structural component.

Technique:

- The study of a beatle shell inspired the form and weaving pattern.
- Fiberglass was woven around two jigs on Robots to create parts.
- Carbon Fiber was used to reinforce areas with high stress loads.
- Pieces assembled to create the pavillion.

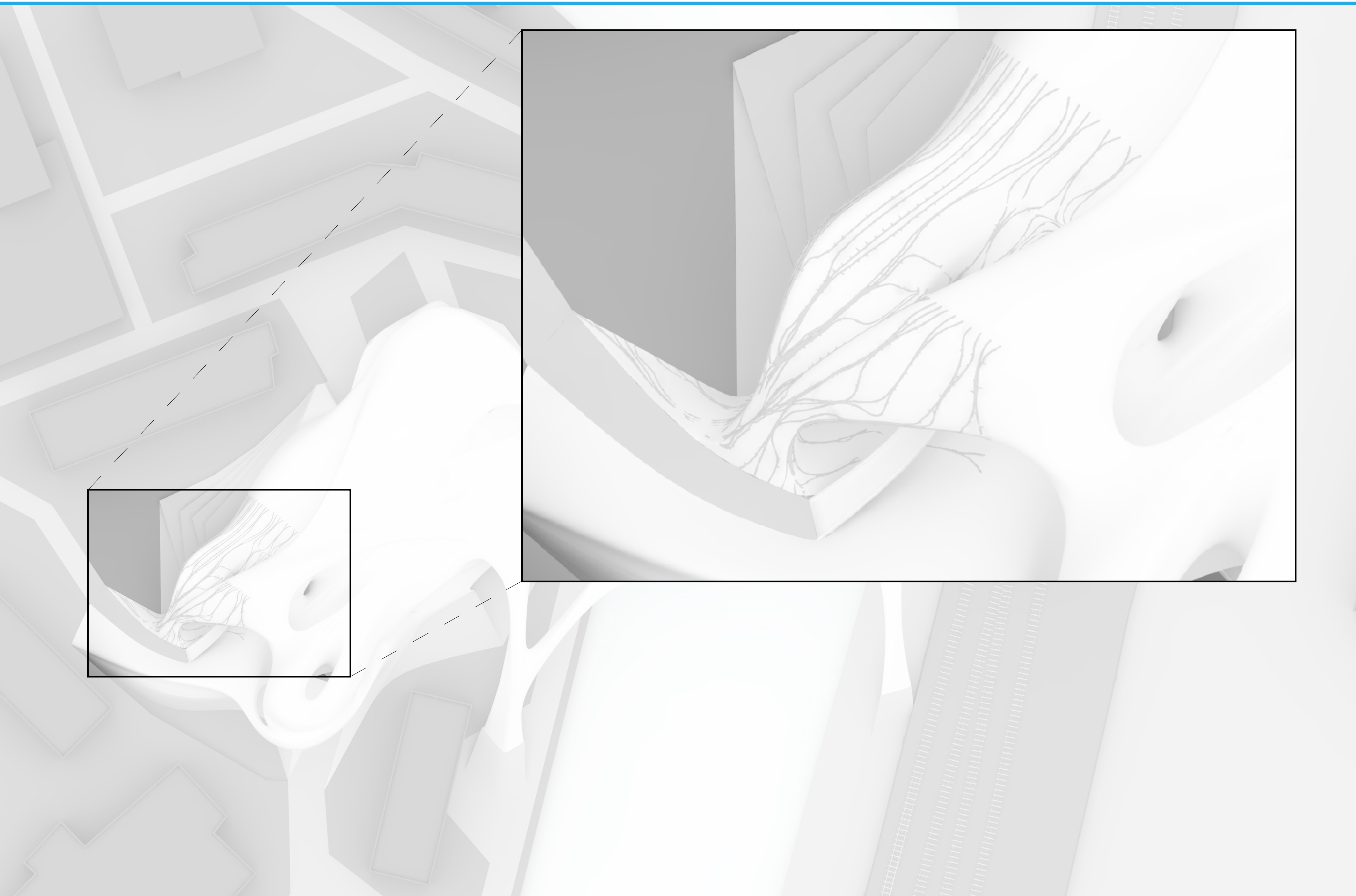
Pros:

- Light weight and strong.
- Components are computationally designed and robotically produced.

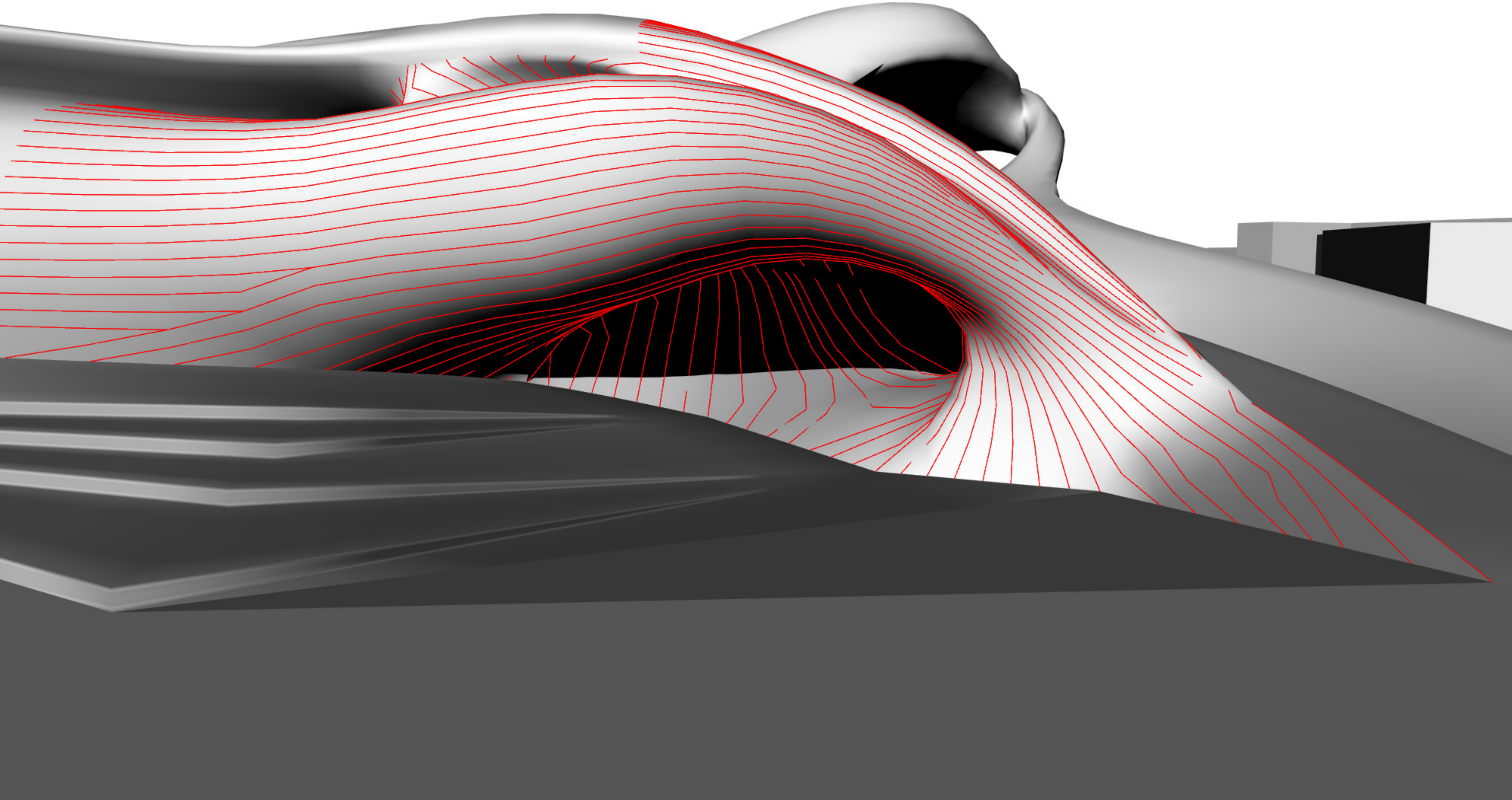
Adaptations:

- Complete Robotic Construction.
- Develop Watertight skin that is integrated in the Woven Fibers.

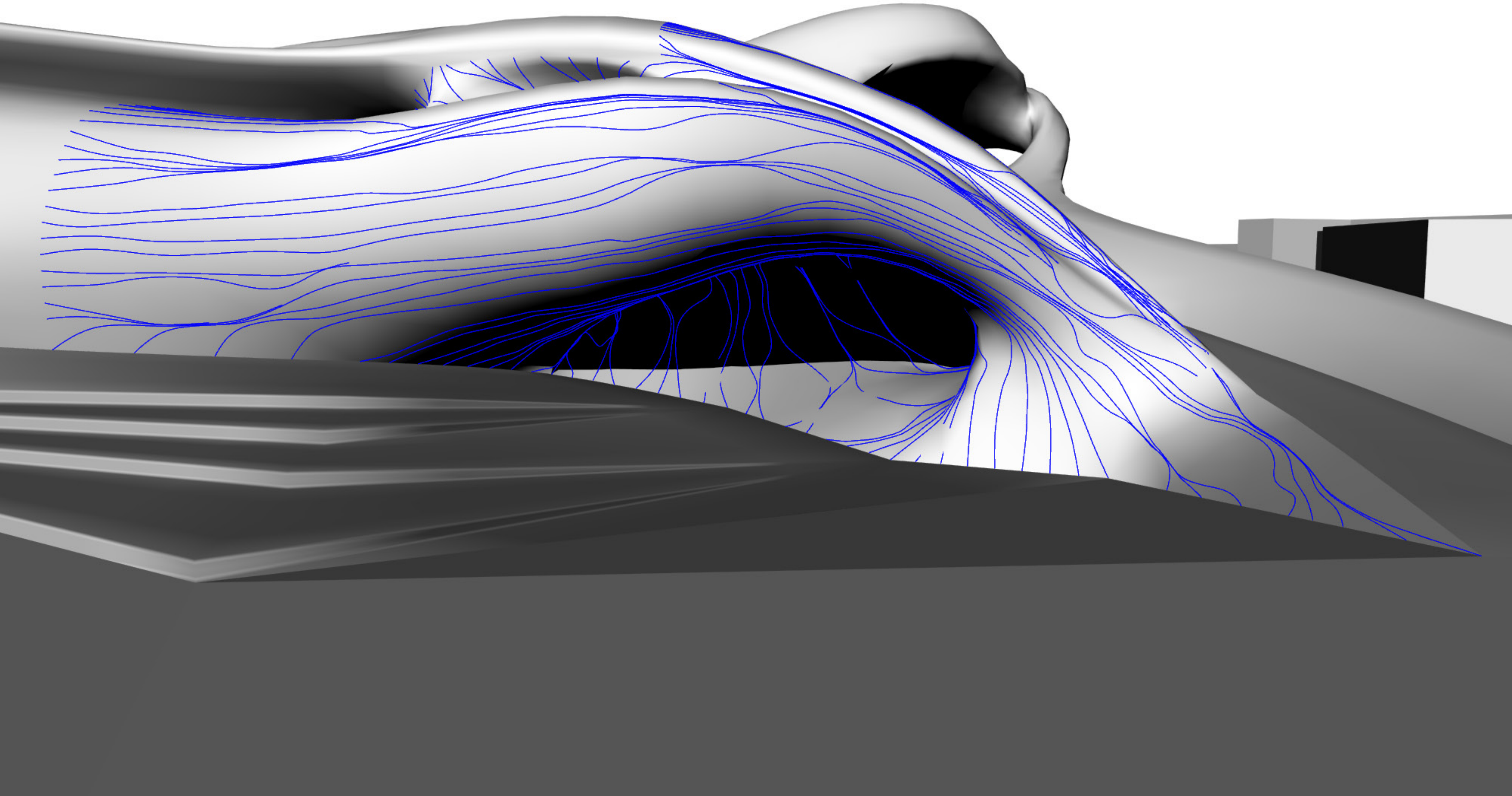
Chunk Piece



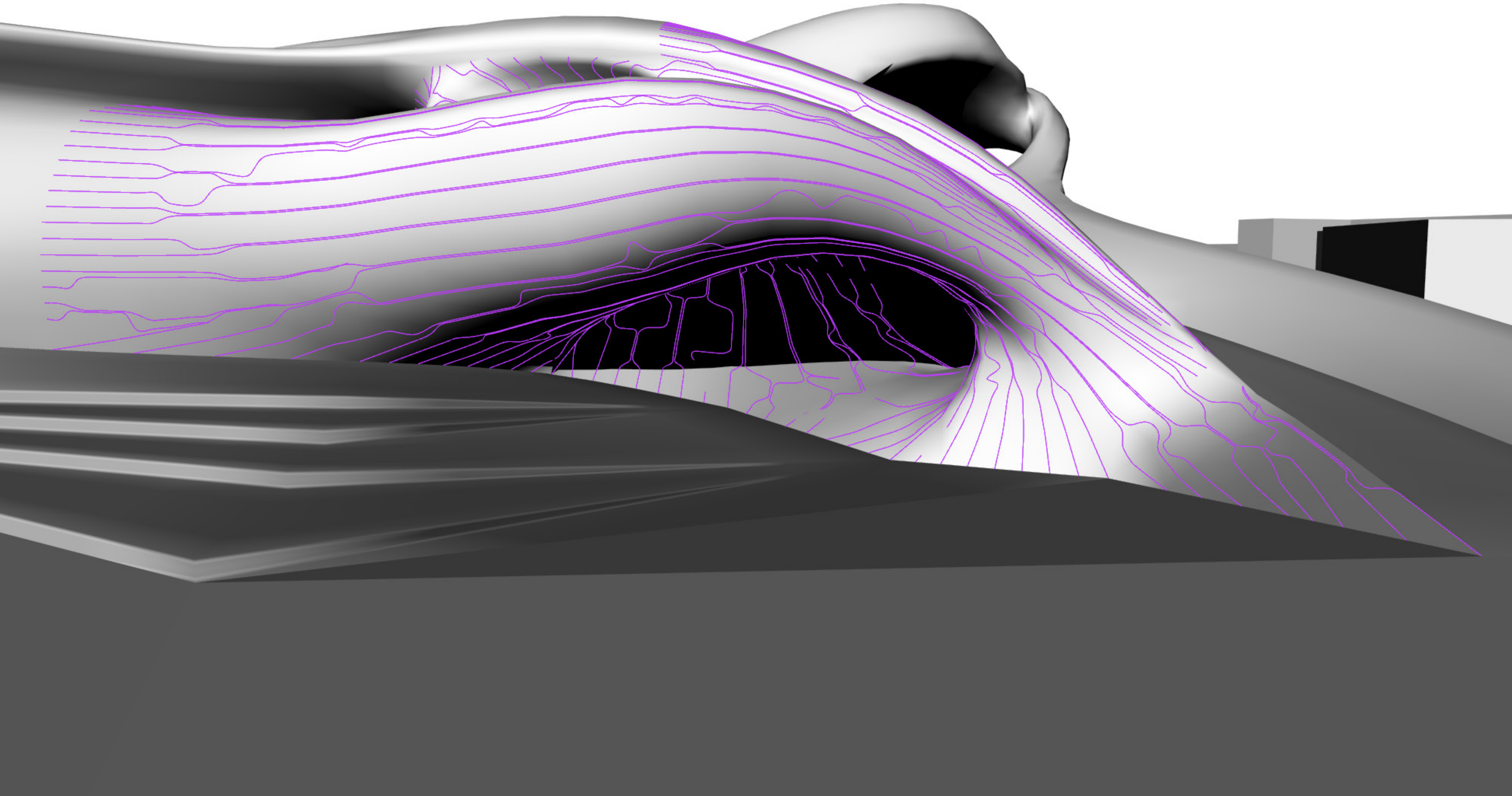
Main Linear Lines



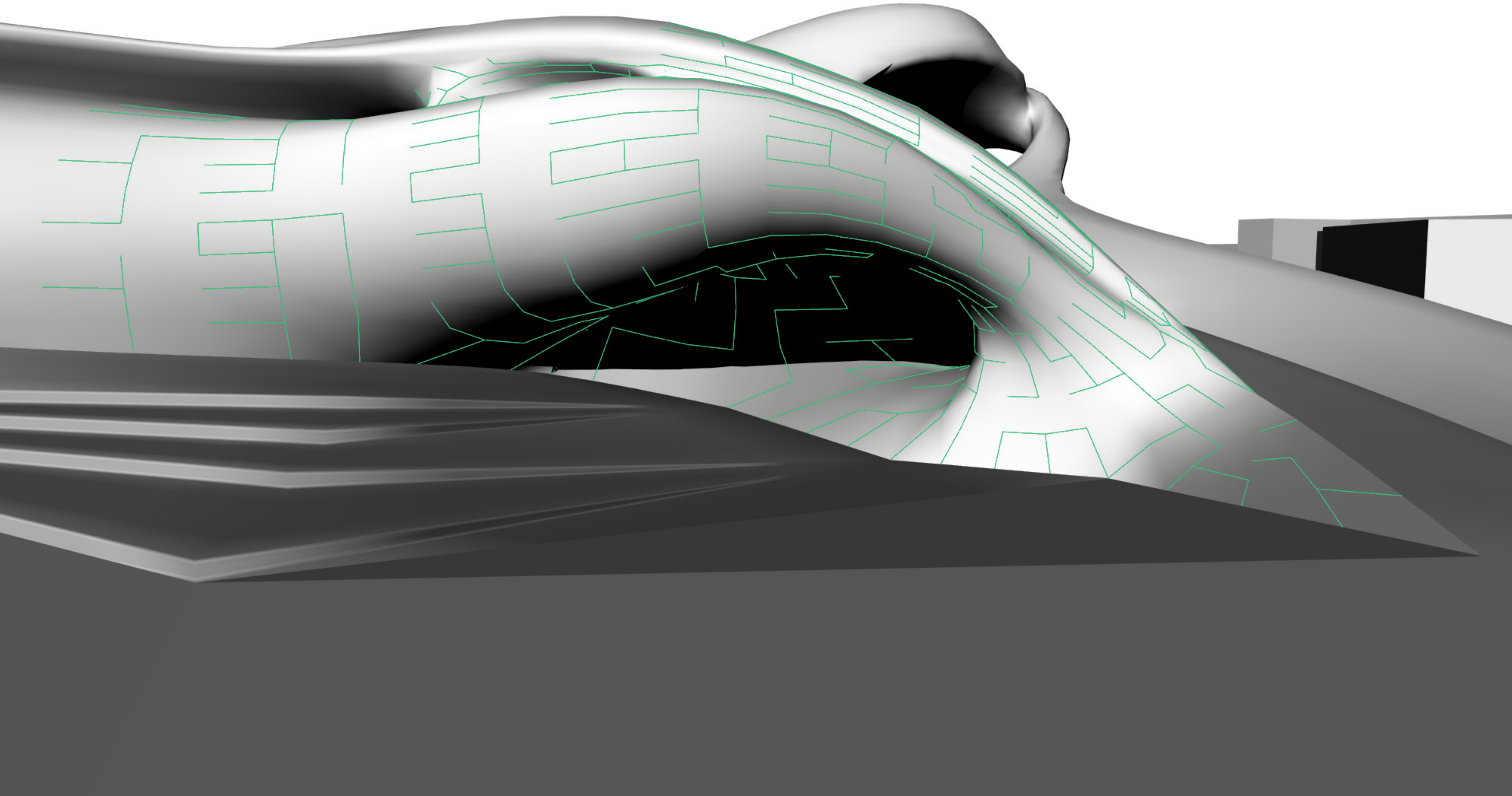
Main Lines Iteration 1



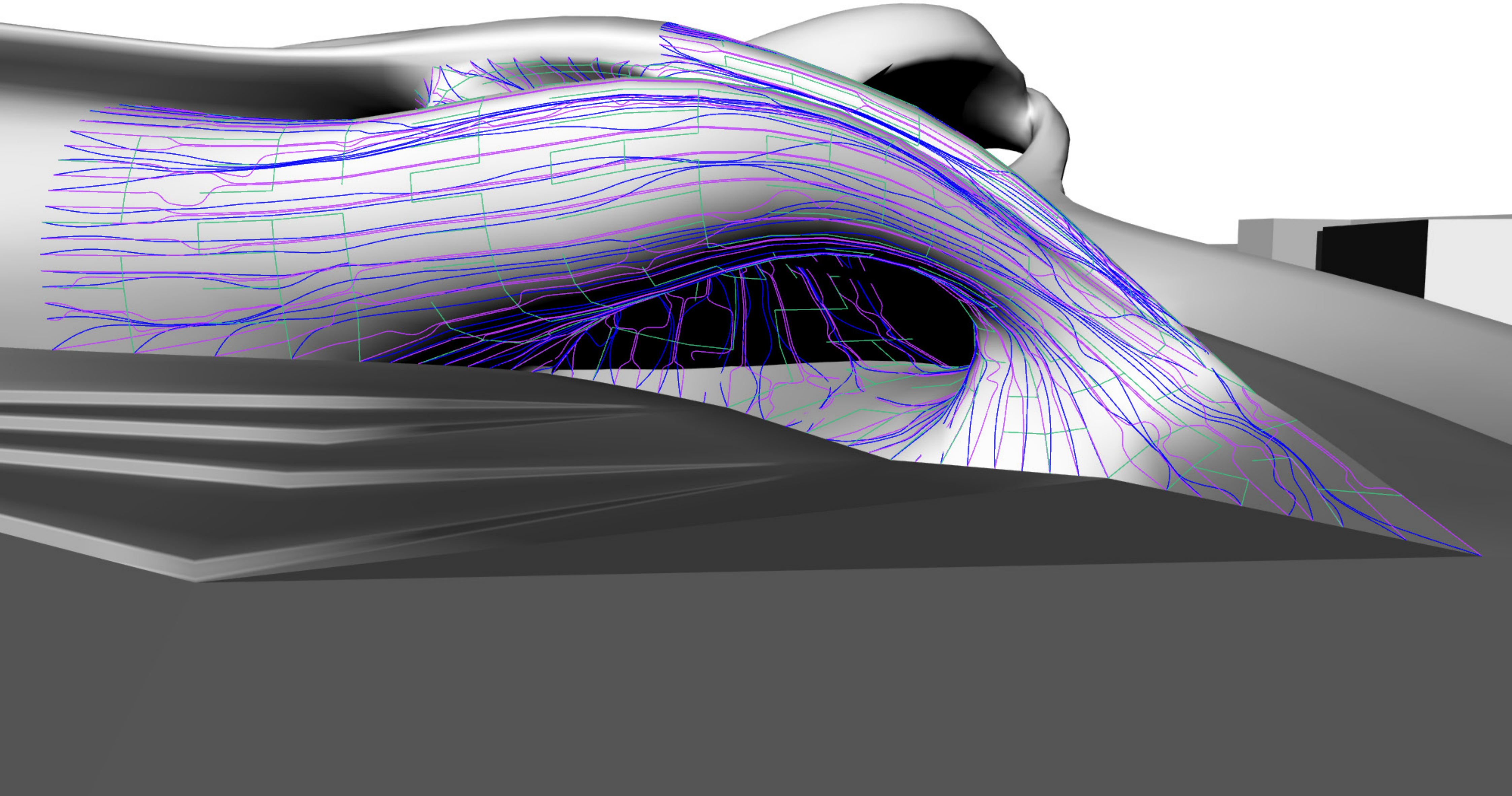
Main Lines Iteration 2



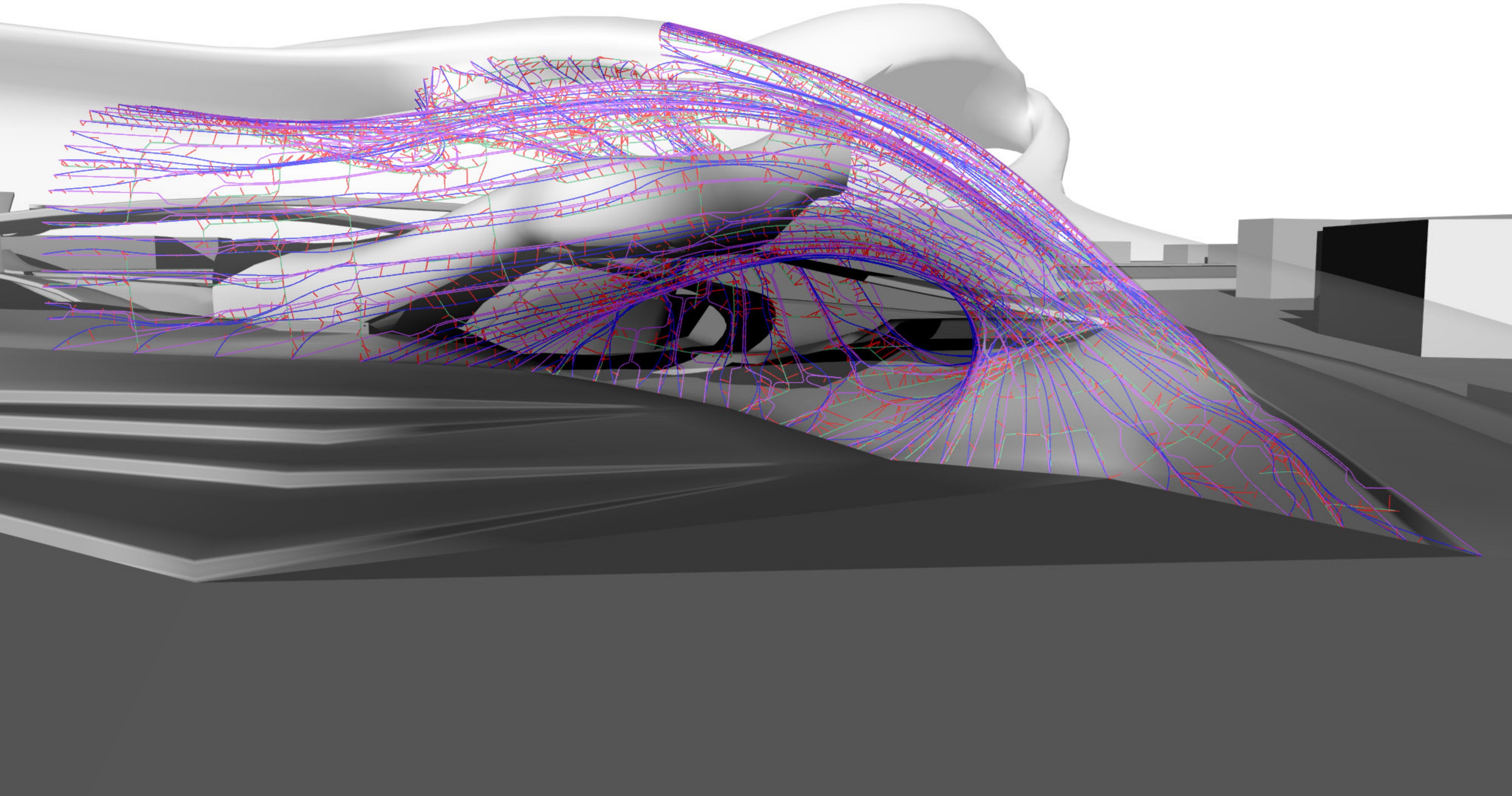
Main Lines Iteration 3



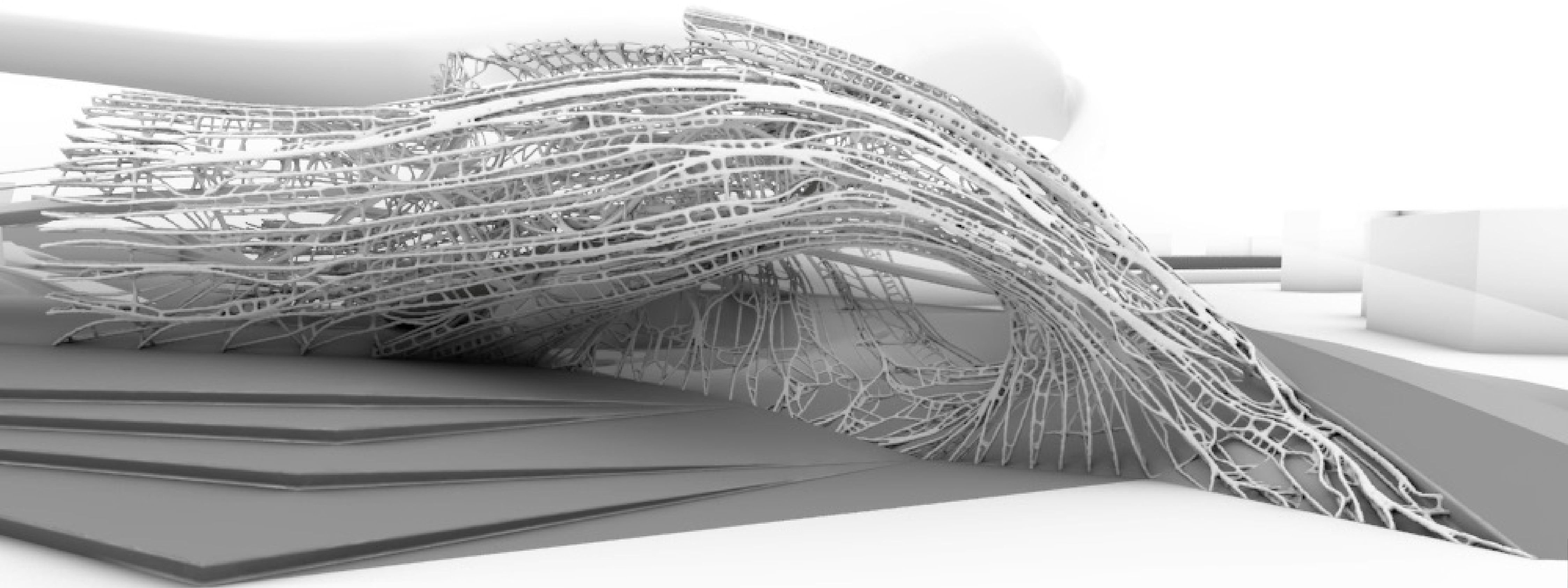
Main Lines Compiled



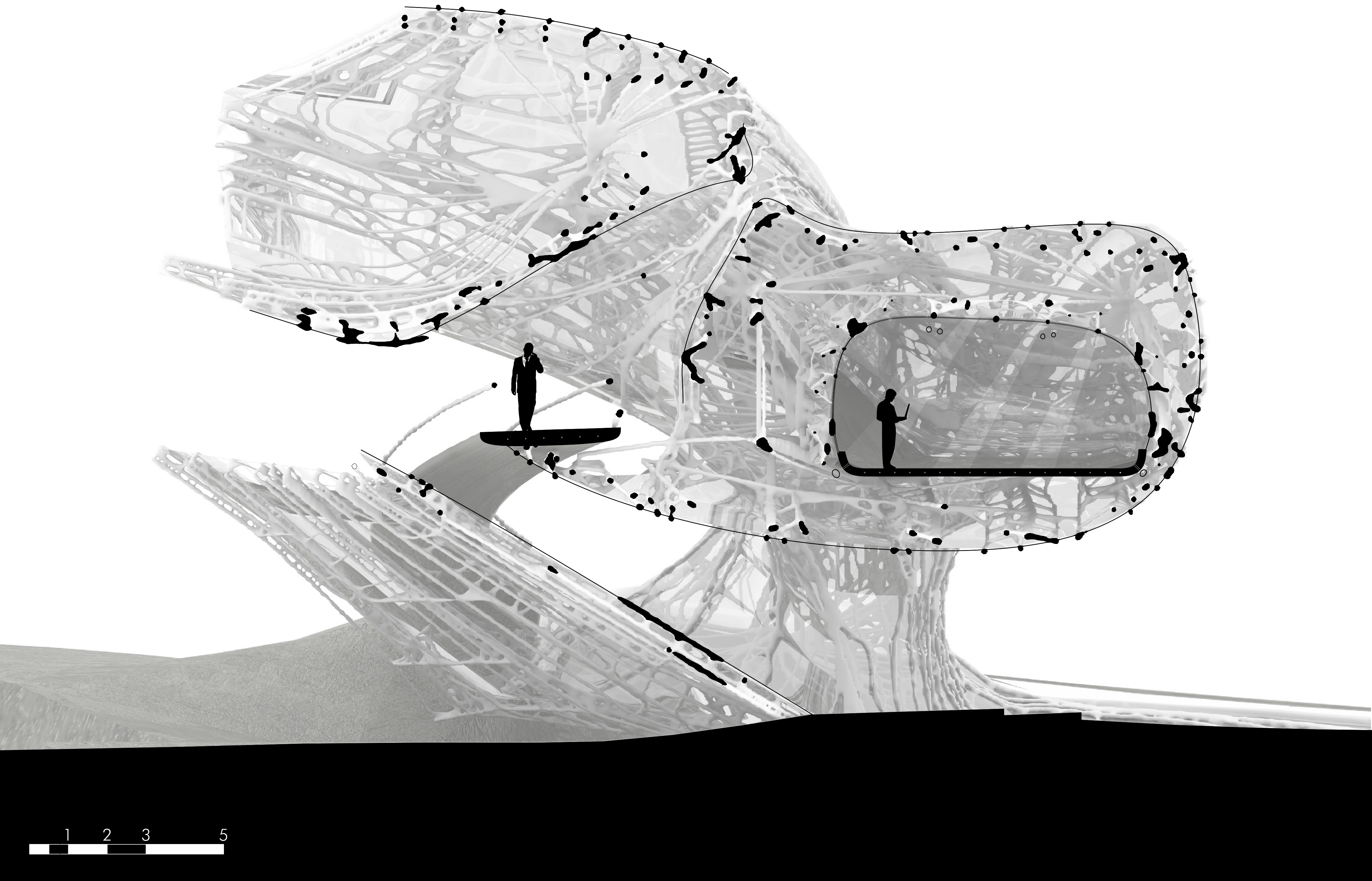
Main Lines Offset and Connected



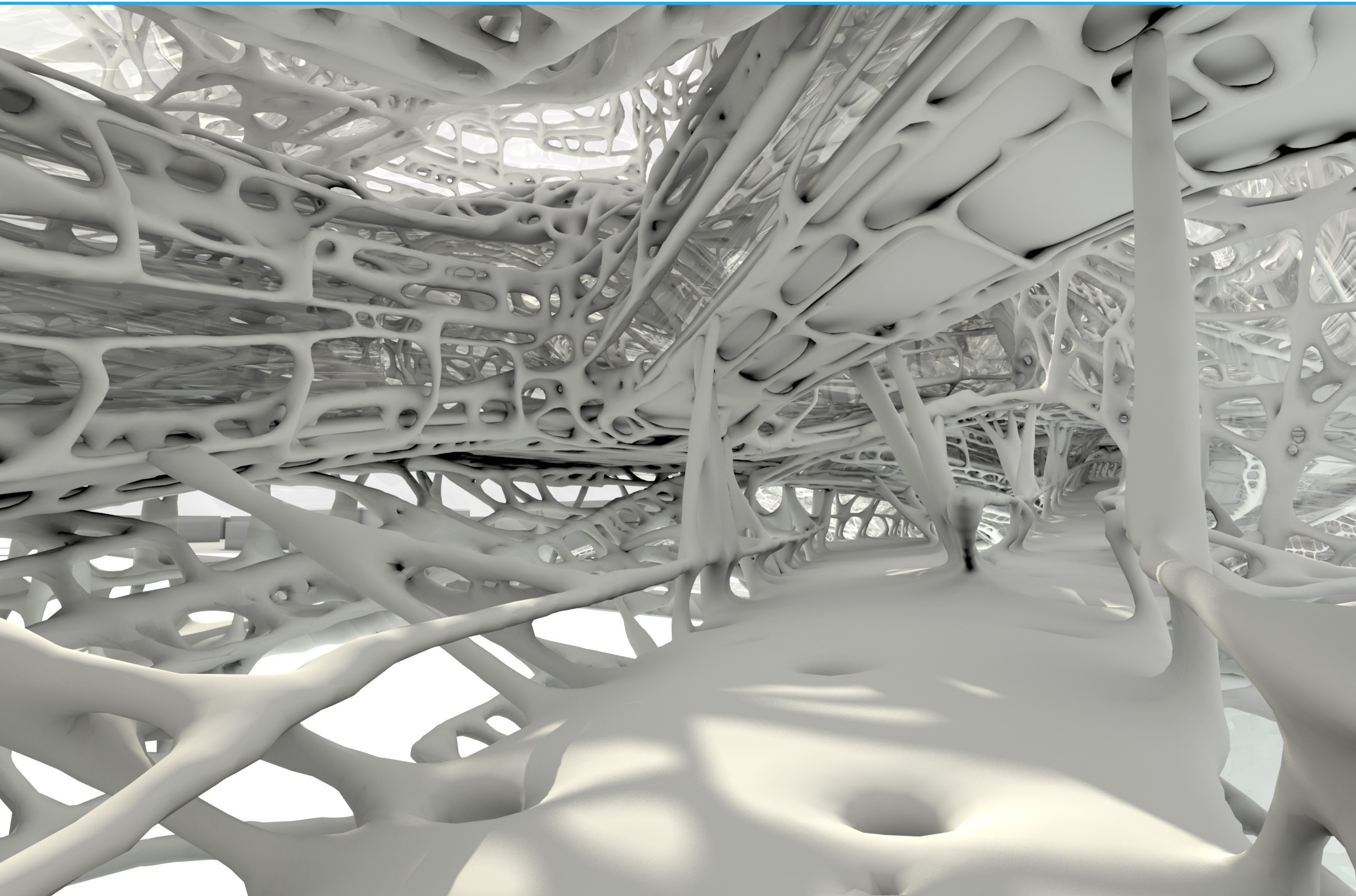
Main Structure



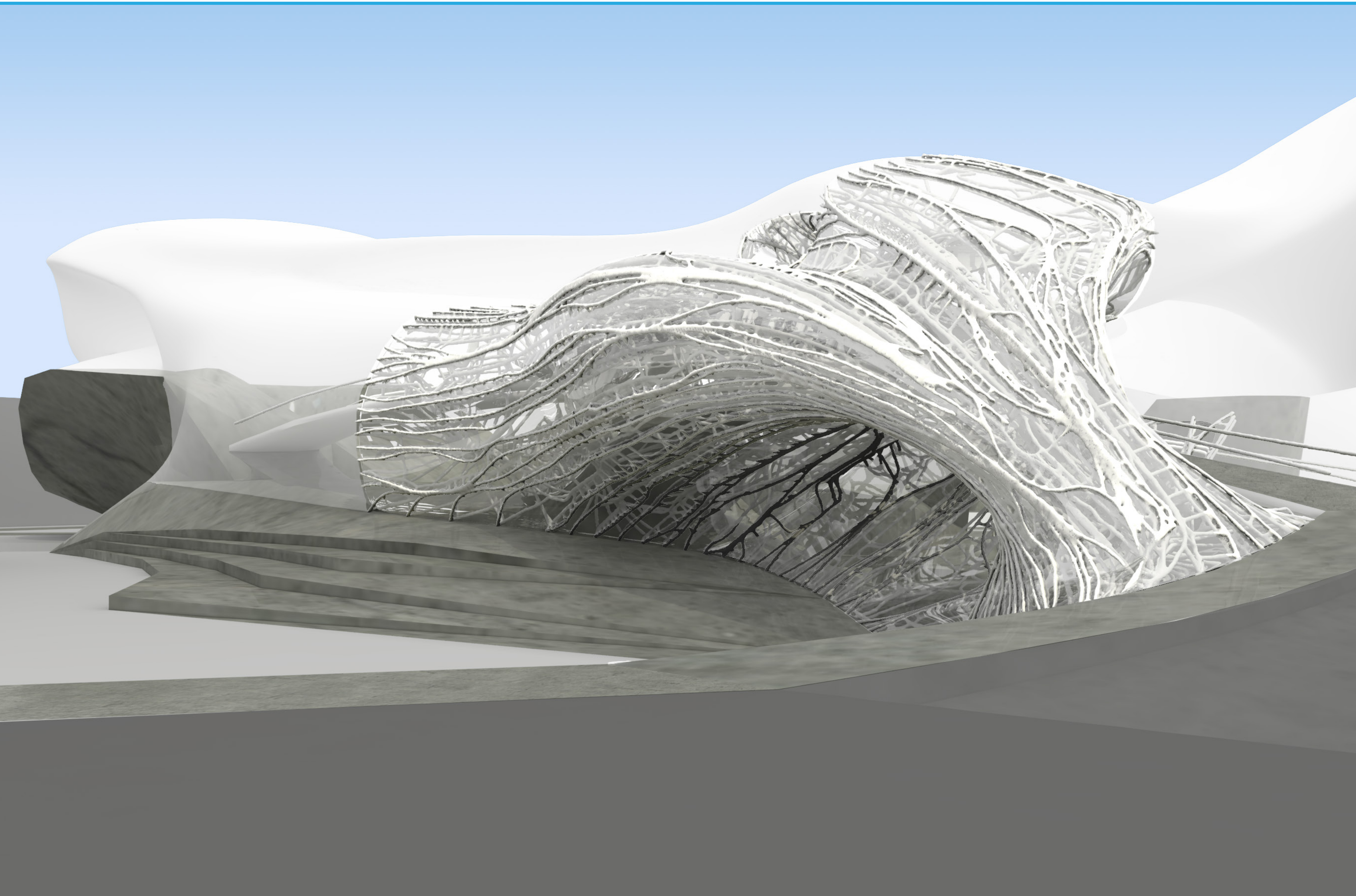
1:20 Section

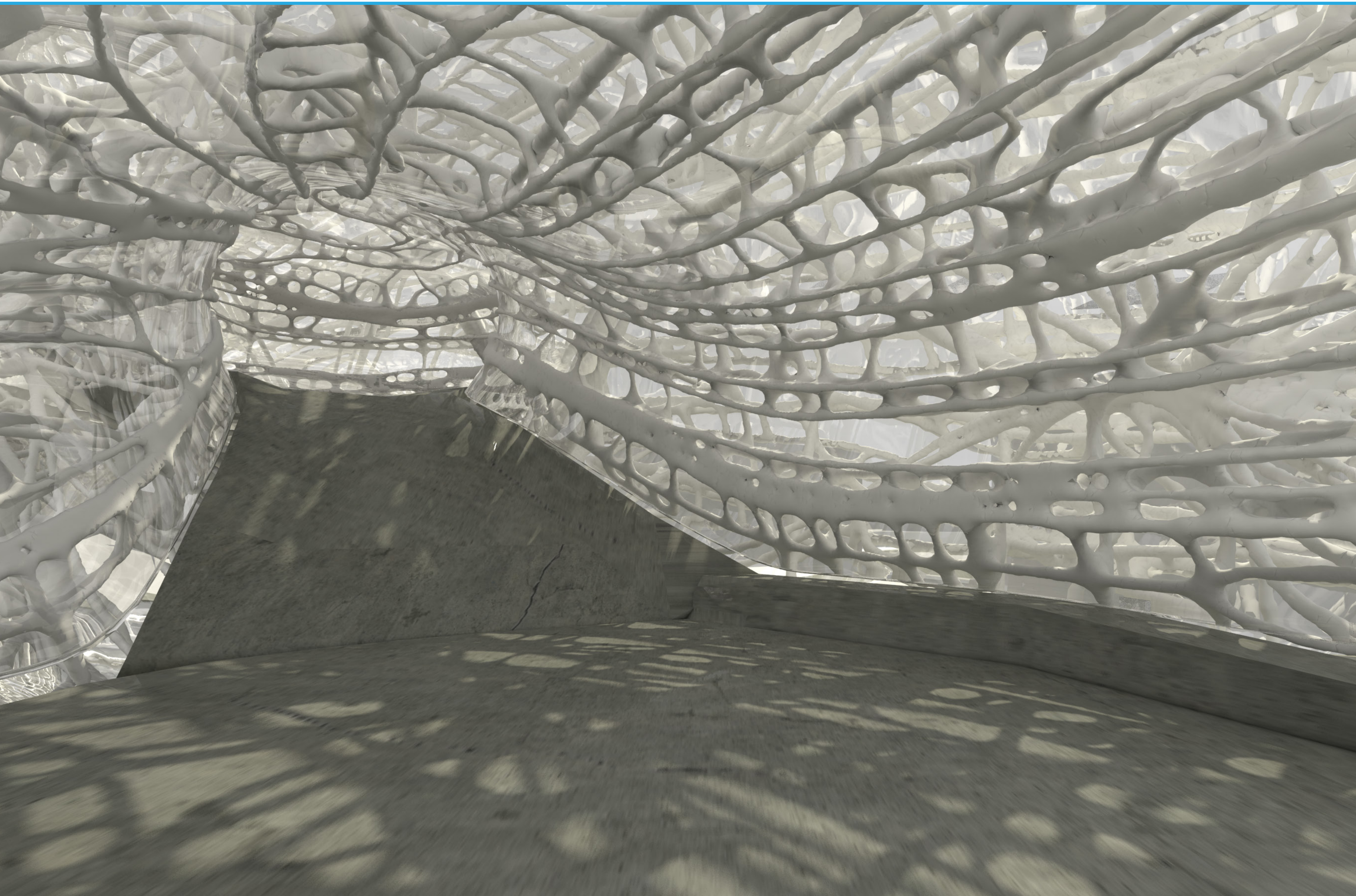


Pathway View

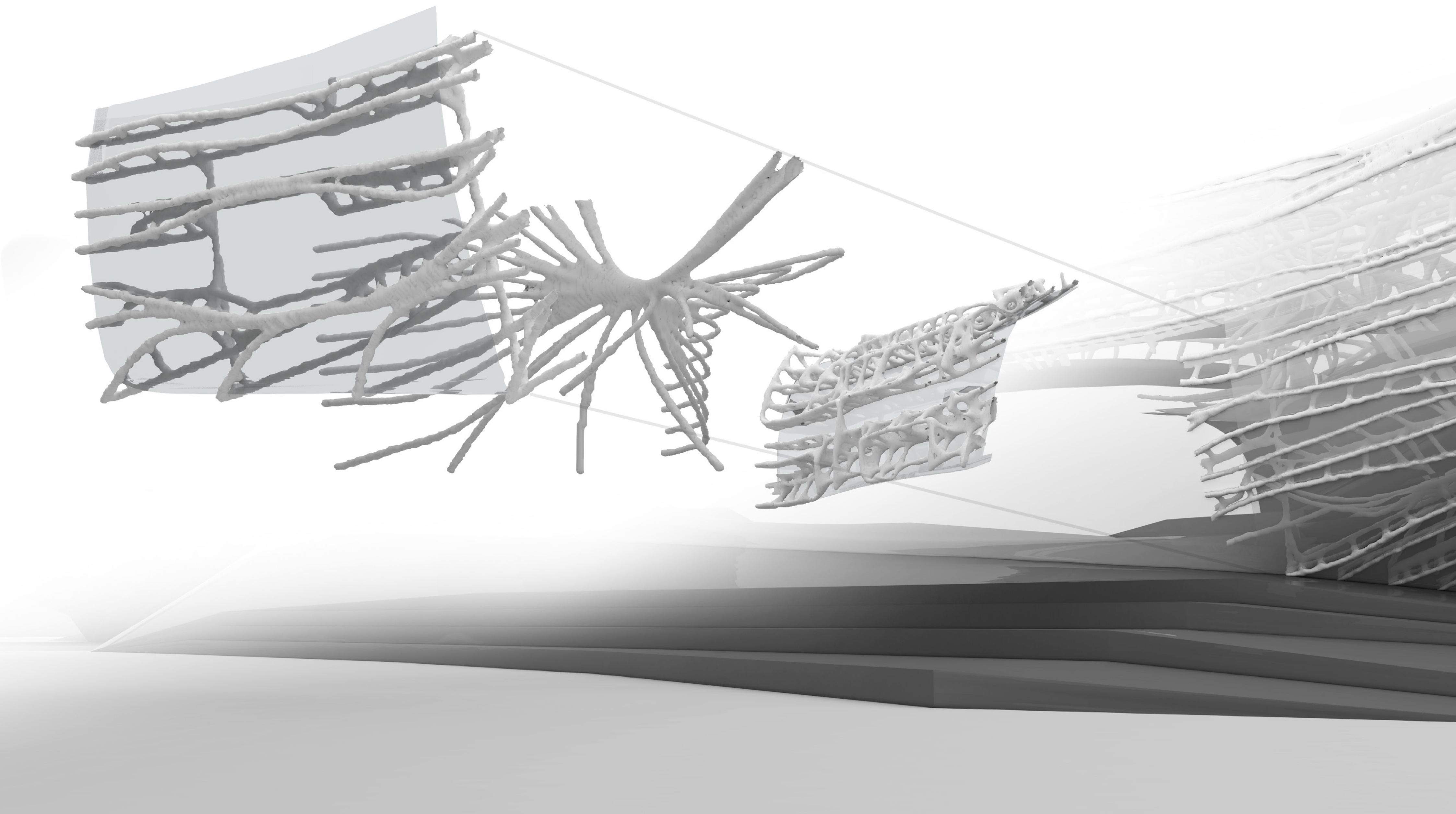


Chunk Piece

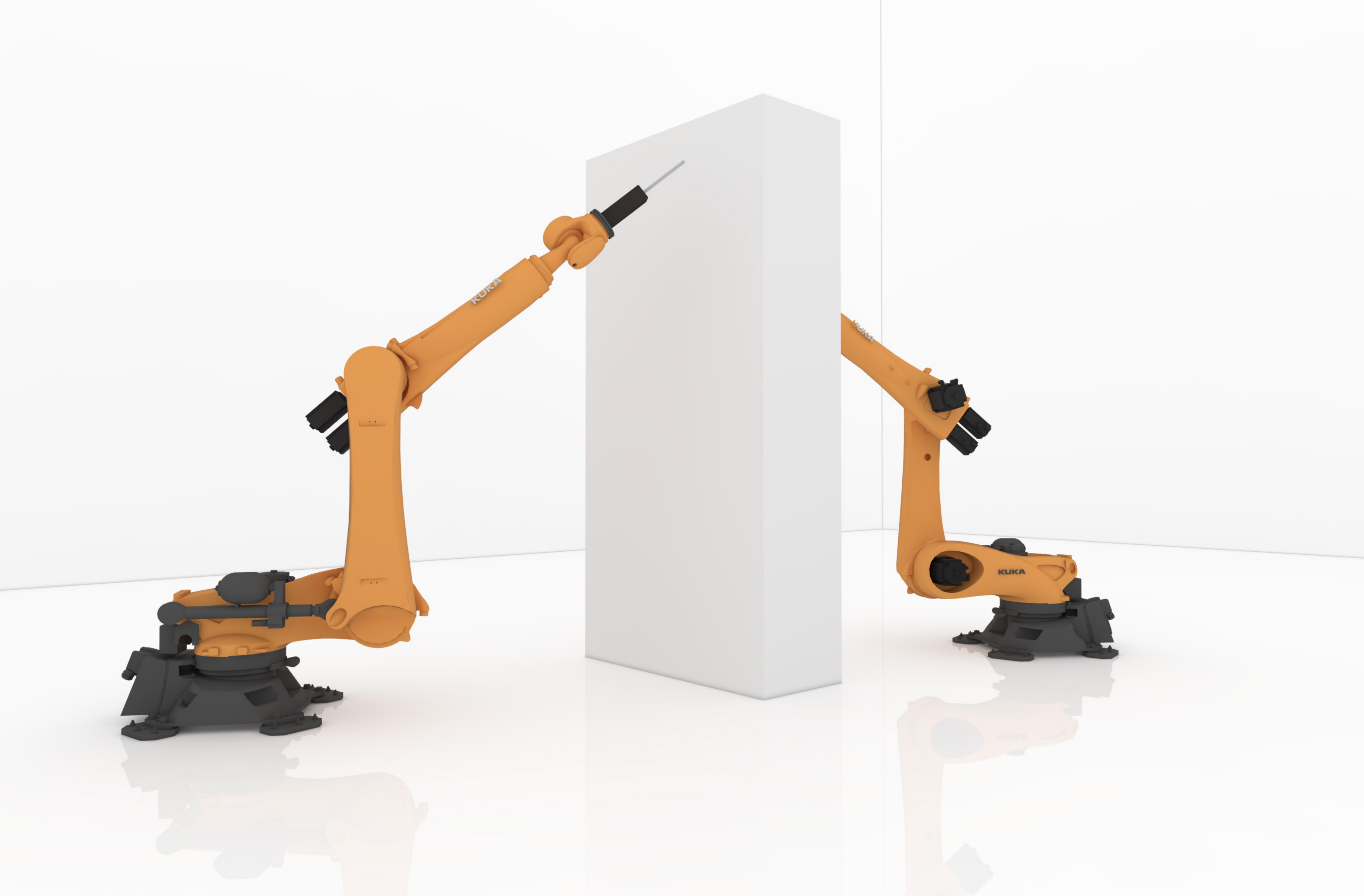




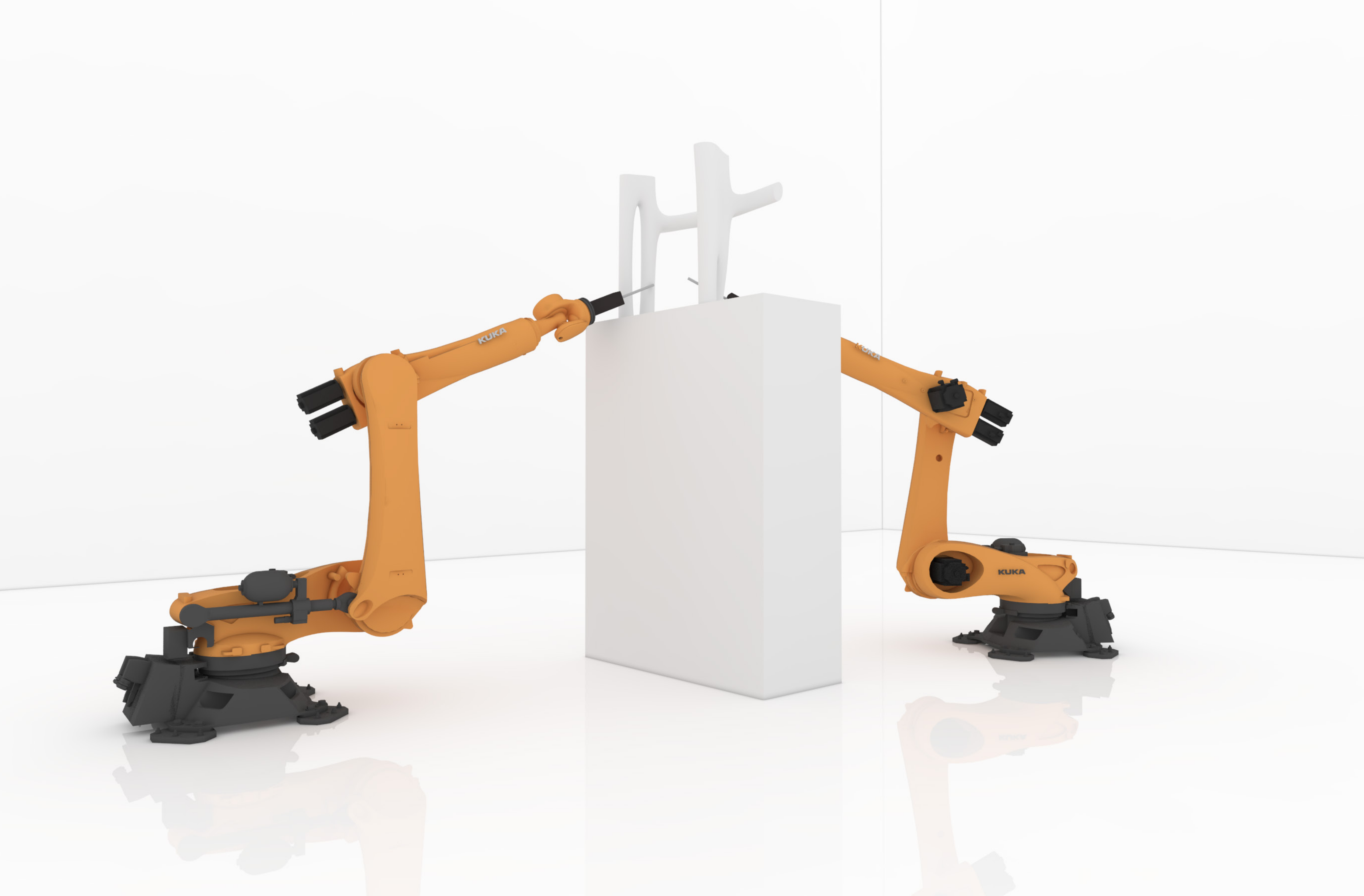
Component Piece Axon



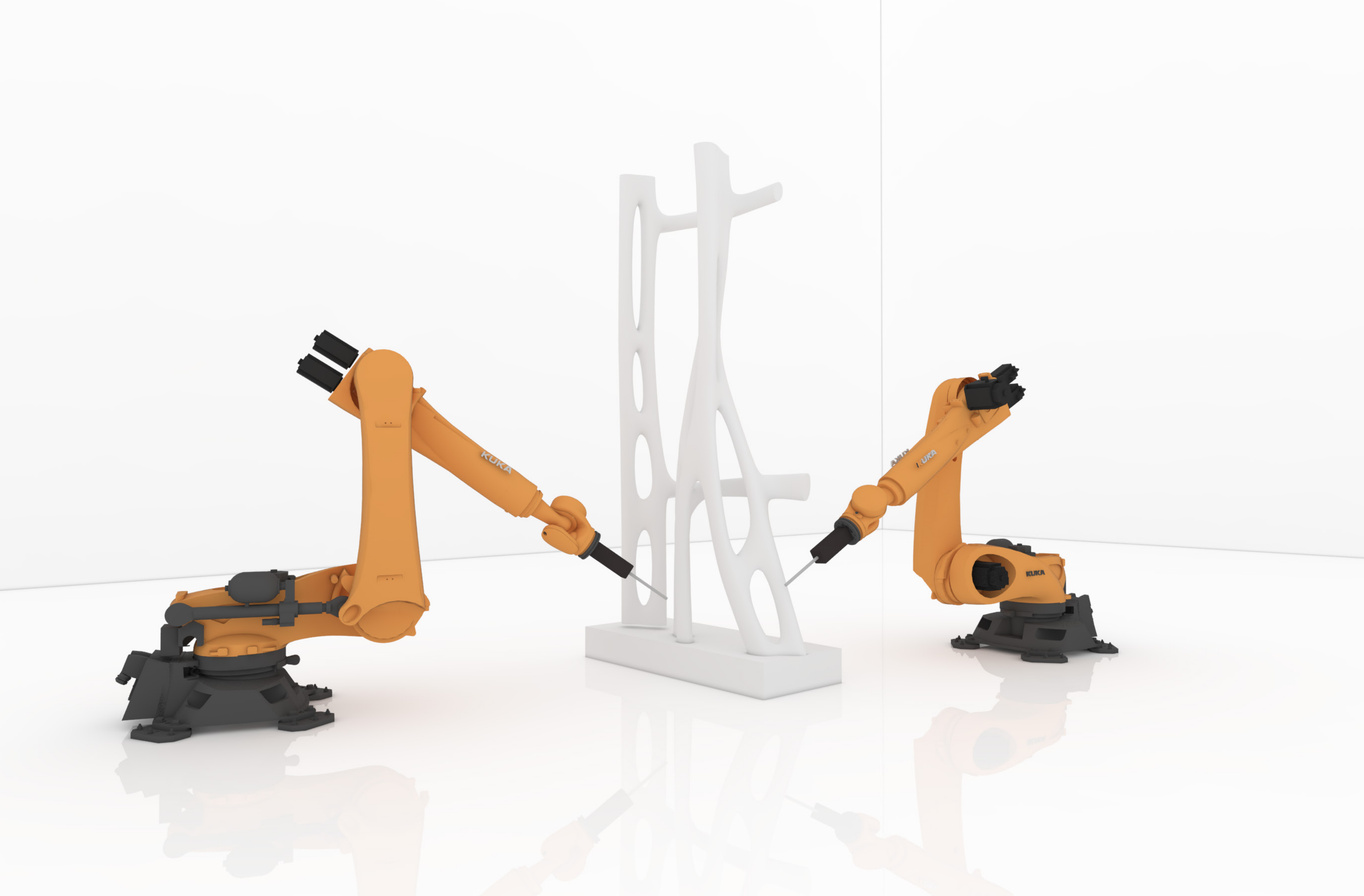
Robotic Production



Robotic Milling



Wax Coating

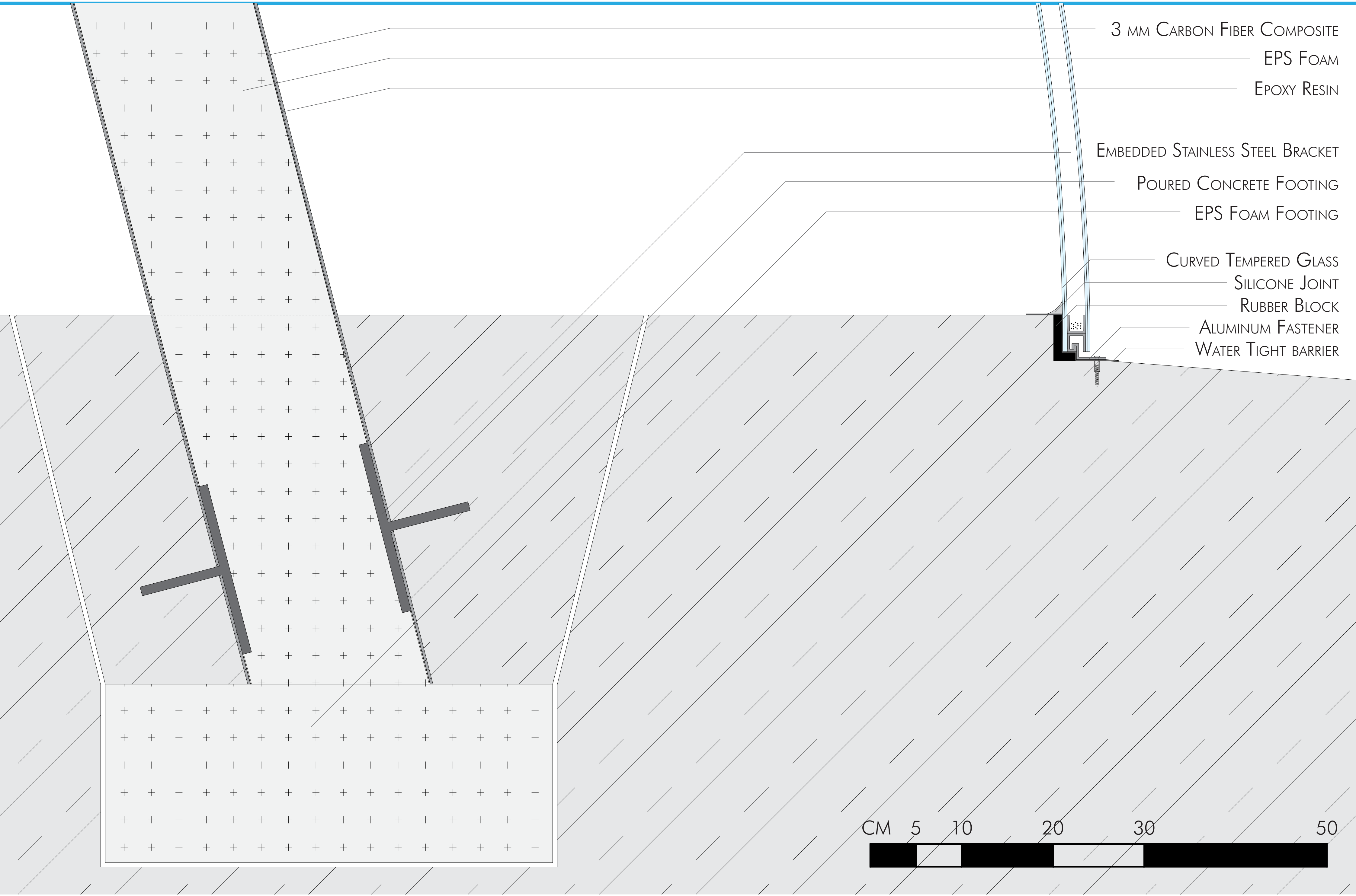


Carbon Fiber and Resin Applied 90, 45, 90

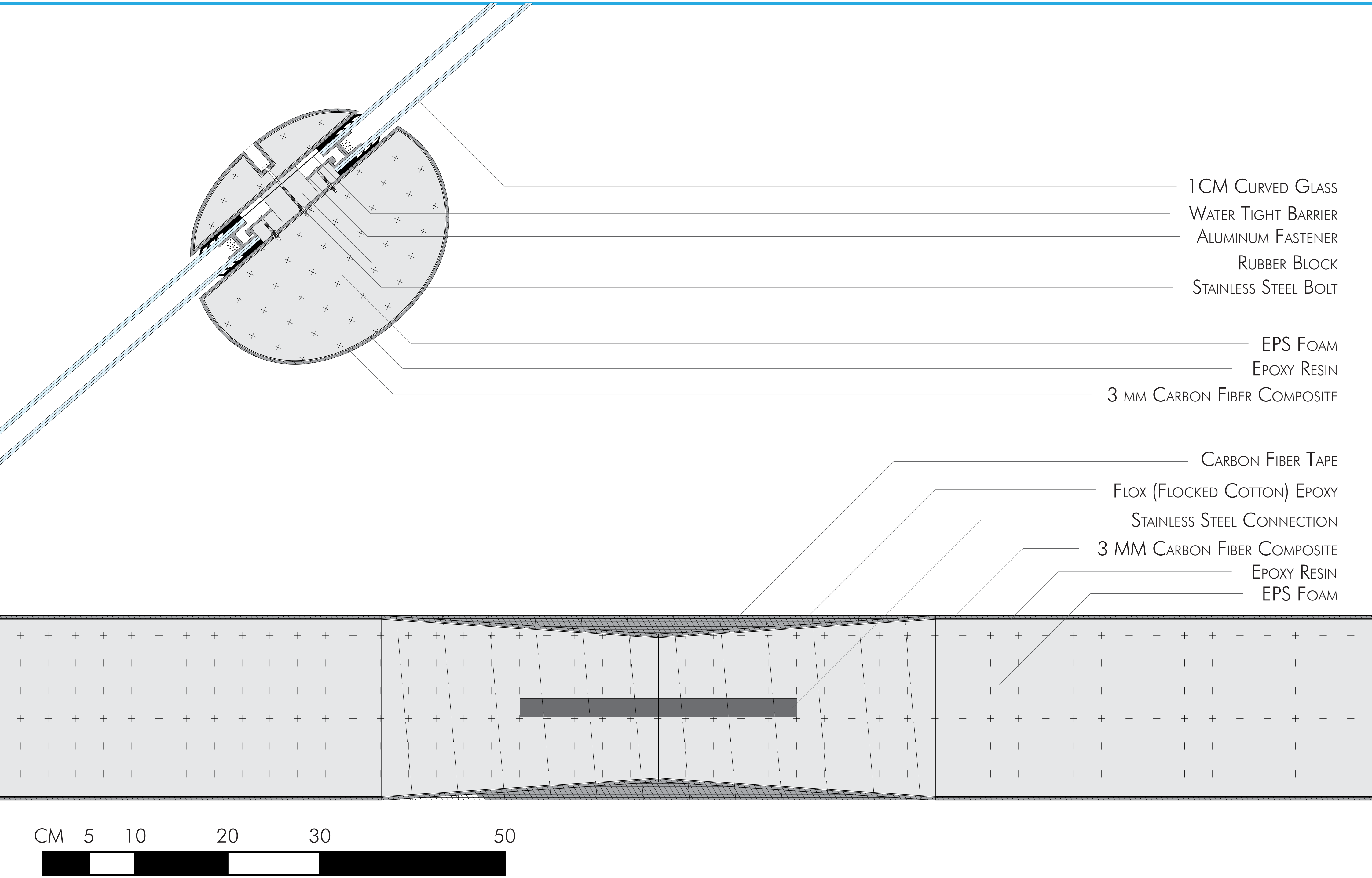
Vacum Bag Curing

Polish

1:5 Detail Carbon Fiber to Concrete



1:5 Detail Carbon Fiber to Glass



Exterior Render

Thank you