REPOSITIONING INDUSTRIAL BROWNFIELD

A post-human-centered transformation of the abandoned flour milling plant in Tbilisi base on rewilding and temporality



A Living Lab of Novel Ecosystem

Shucheng Zhang
B & T Graduation Studio | P5

The transition ...





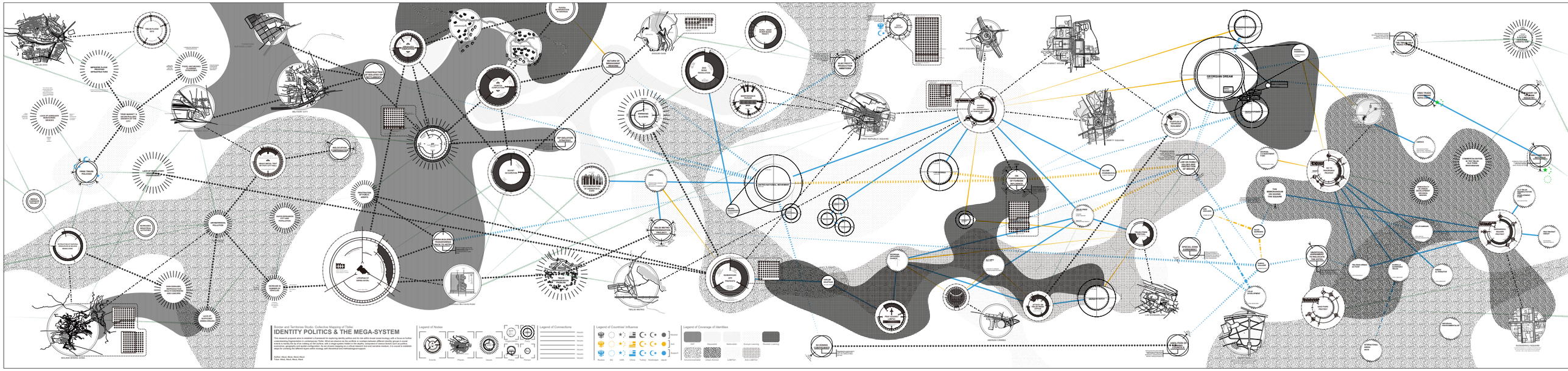
The starting point of the journey ...

TOPIC
SITE IDENTITY

INDUSTRIAL BROWNFIELD - A REWILDED LANDSCAPE FROM SYNERGY

Research (P1-P2)

TOPIC | Collective Research - Mega System


Bontar and Territories Studio, Collective Mapping of Tbilisi
IDENTITY POLITICS & THE MEGA-SYSTEM
This research proposal aims to establish a framework for exploring identity politics and its role within broad social ecology, with a focus on further understanding the complex relationships between the city of Tbilisi and its surrounding territories. Identity politics, as a multifaceted concept, is rooted in every fibr by of an ordering on the surface, with a mega-system of forces on the depths, component of cultural diversity such as a cultural, economical, geographic and spatial configuration. As an inverse mapping as a critical research tool and narrative medium, it is crucial to establish steps for curating the different layers within ecology with theoretical and methodological support.
Author: Aboul, Aboul, Aboul, Aboul
Tutor: Aboul, Aboul, Aboul, Aboul
Legend of Nodes
Legend of Connections
Legend of Countries' Influence
Legend of Coverage of Identities
GEORGIAN DREAM
FREEDOM SQUARE
RUSTAVELI AVENUE
GALAKTION TABIDZE STREET
GEORGIAN PARLIAMENT
GEORGIAN PARLIAMENT
GEORGIAN PARLIAMENT

TOPIC | Collective Research - Soviet Heritages

Heritage

Other cultural influences

Soviet public / monumental heritage

Soviet industry heritage

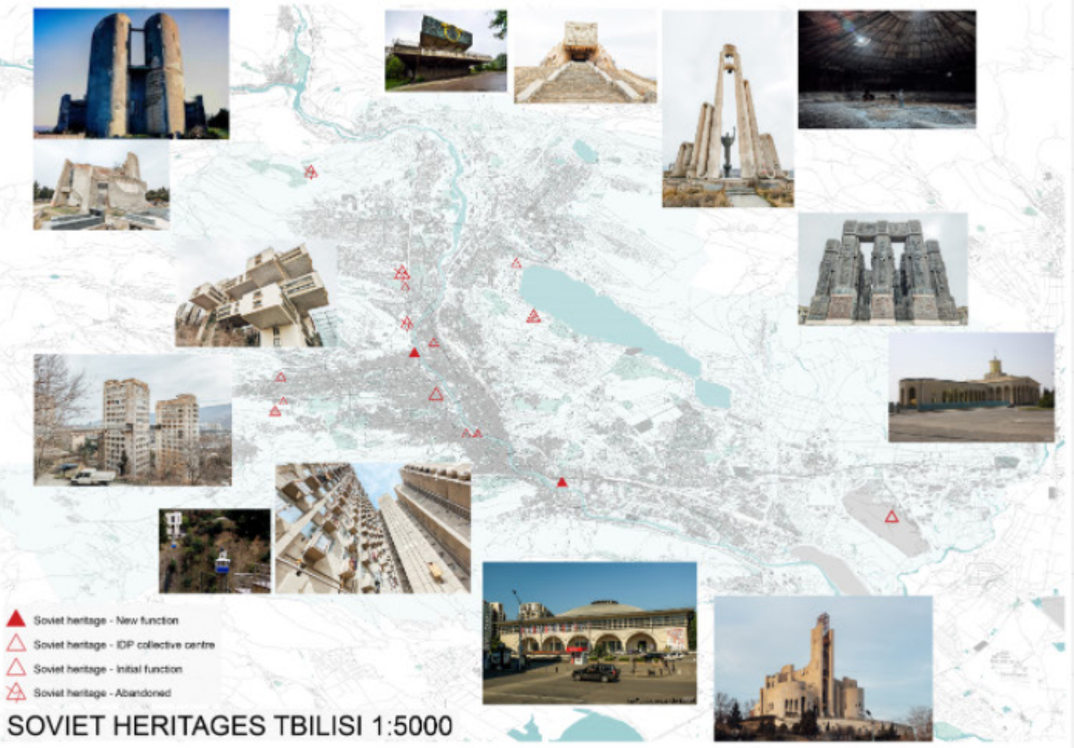
Frame 1

Frame 2



LIFE & DEATH & RELIGION

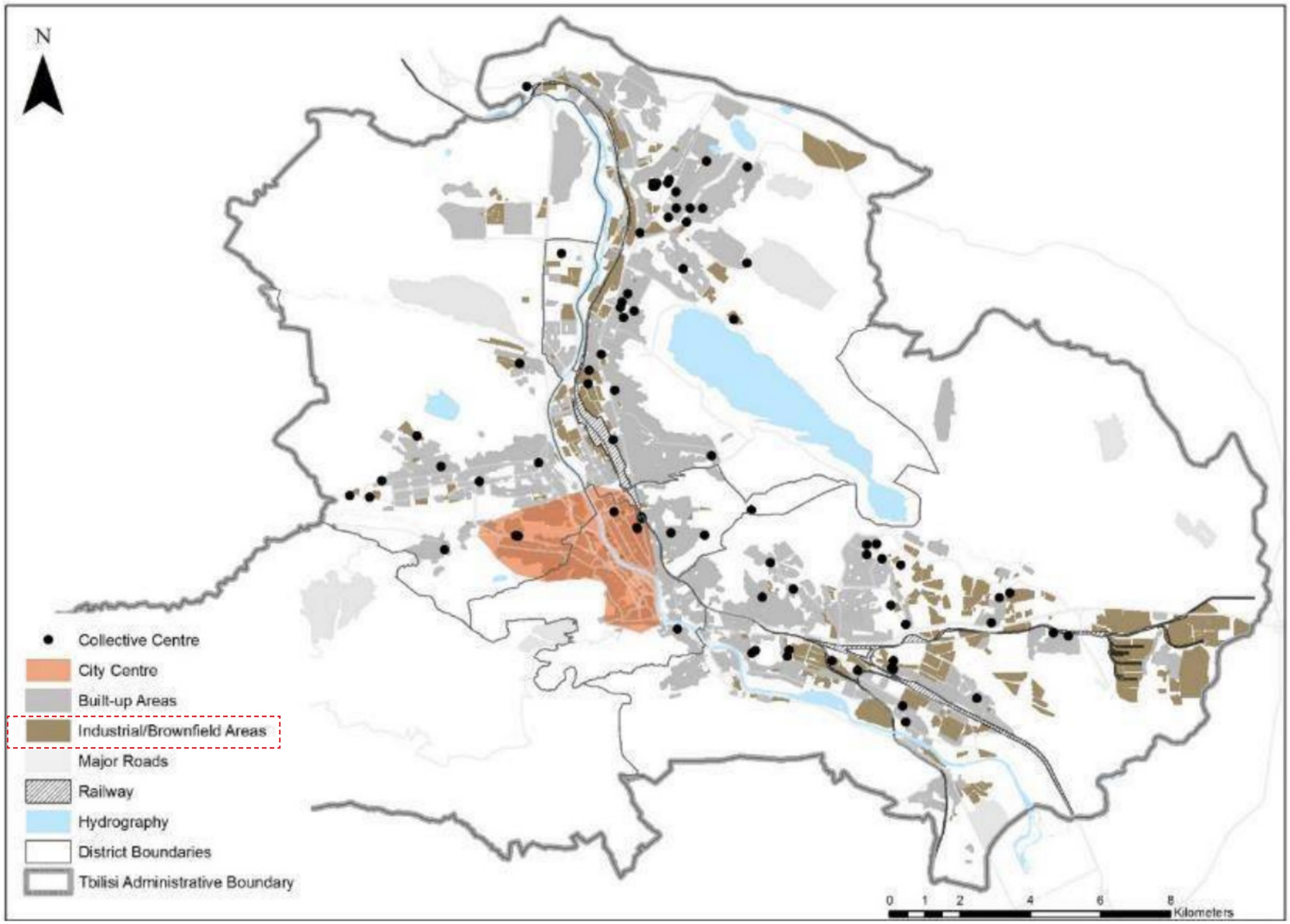




INDUSTRIAL BROWNFIELD

NEGLECTED

TOPIC | Industrial Brownfield - the Neglected Space



TOPIC | Industrial Brownfield

"As a post-soviet city, Tbilisi has a large soviet memory - 17% of the city plot is covered with the former industrial sites and brownfields."

- Research from MUA studio

The Framework and Panel Factory Maghlivmsheni

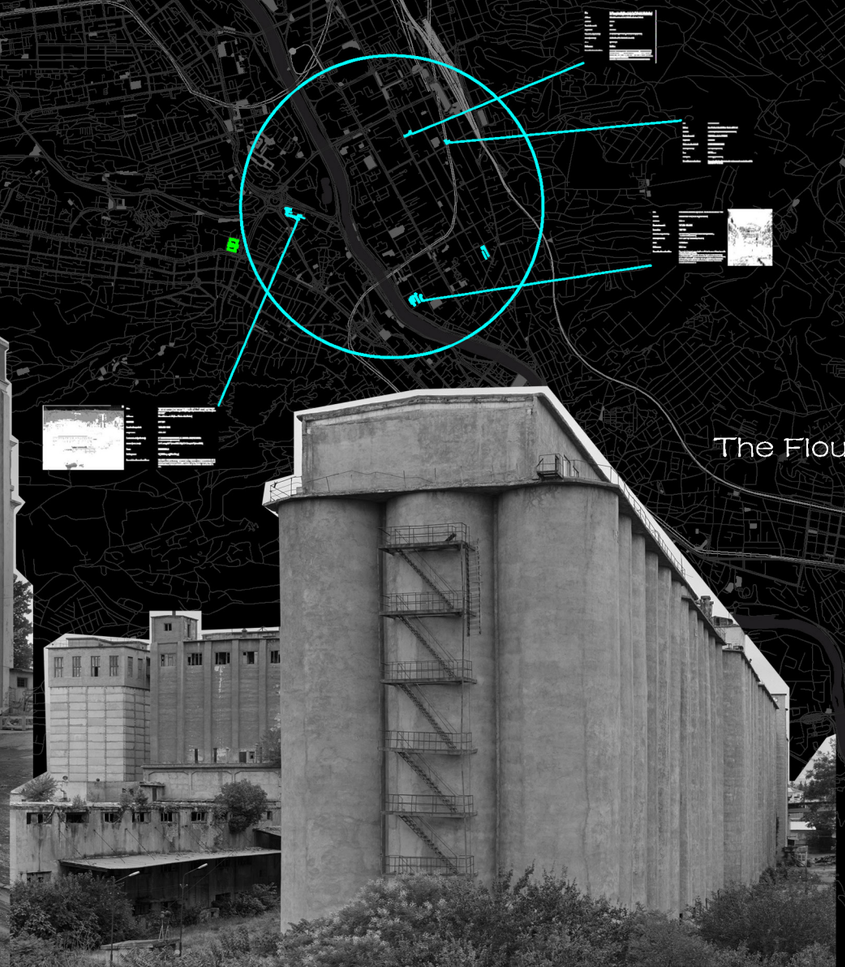


The vinegar factory of Samtresti of Tbilisi



The Tea Weighing Factory of Tbilisi





The Flour Milling Plant of Tbilisi

The vinegar factory of Samtresti



SITE | Previous Flour Milling Plant

SITE | Previous Flour Milling Plant



SITE | Previous Flour Milling Plant







Initial Function:
Flour Milling Plant
Address:
Moscow Ave.15
Constructor:
Khlebostroy Construction Company of Moscow
Construction Period:
1931-1935
In Operation:
1930-2000s
Current Ownership Type:
Private
Area:
56,454.00 sq.m
Future Plan:
Apply for demolishing and redeveloping as residential property

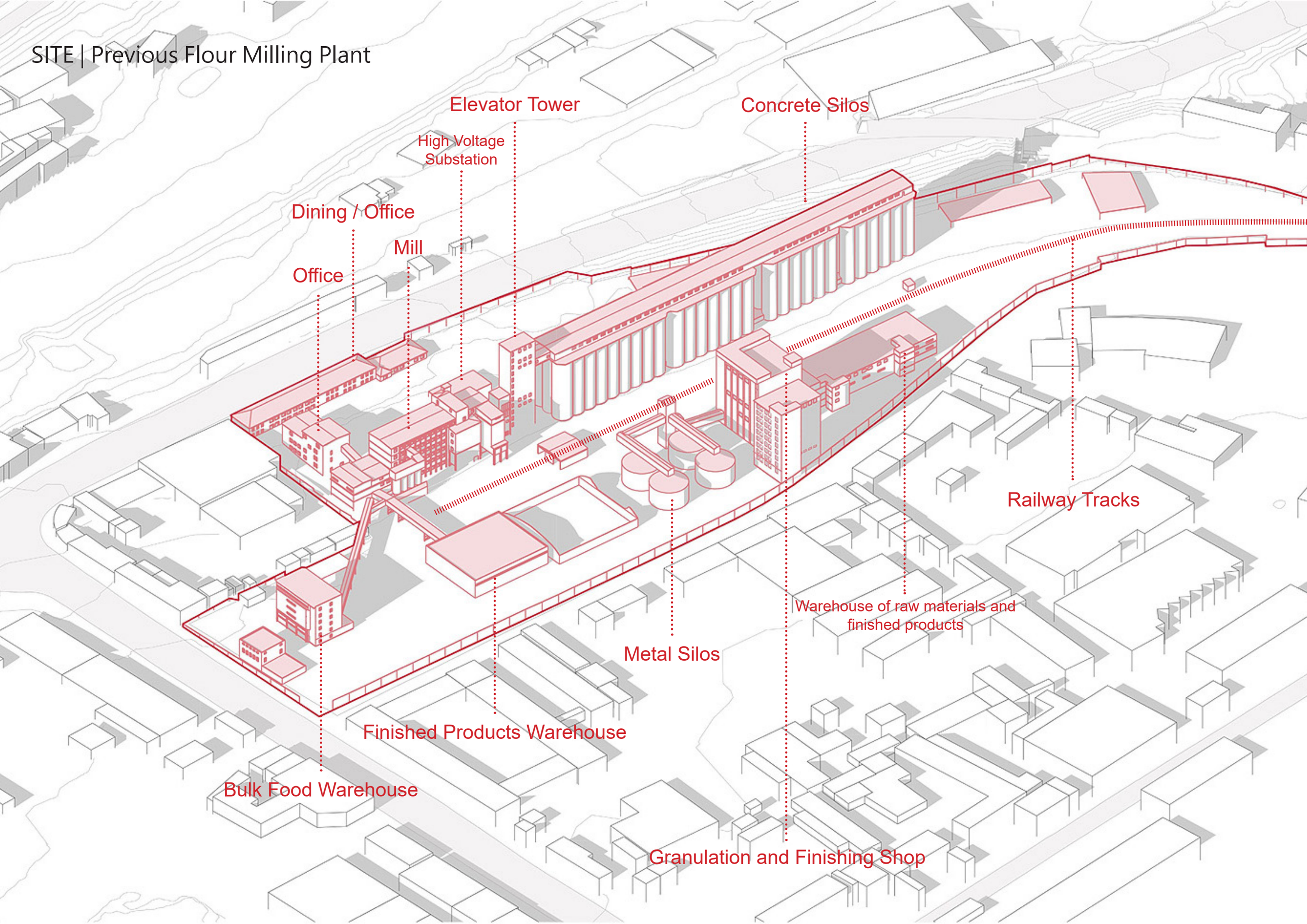
SITE | Current Situation



SITE | Current Situation



SITE | Previous Flour Milling Plant

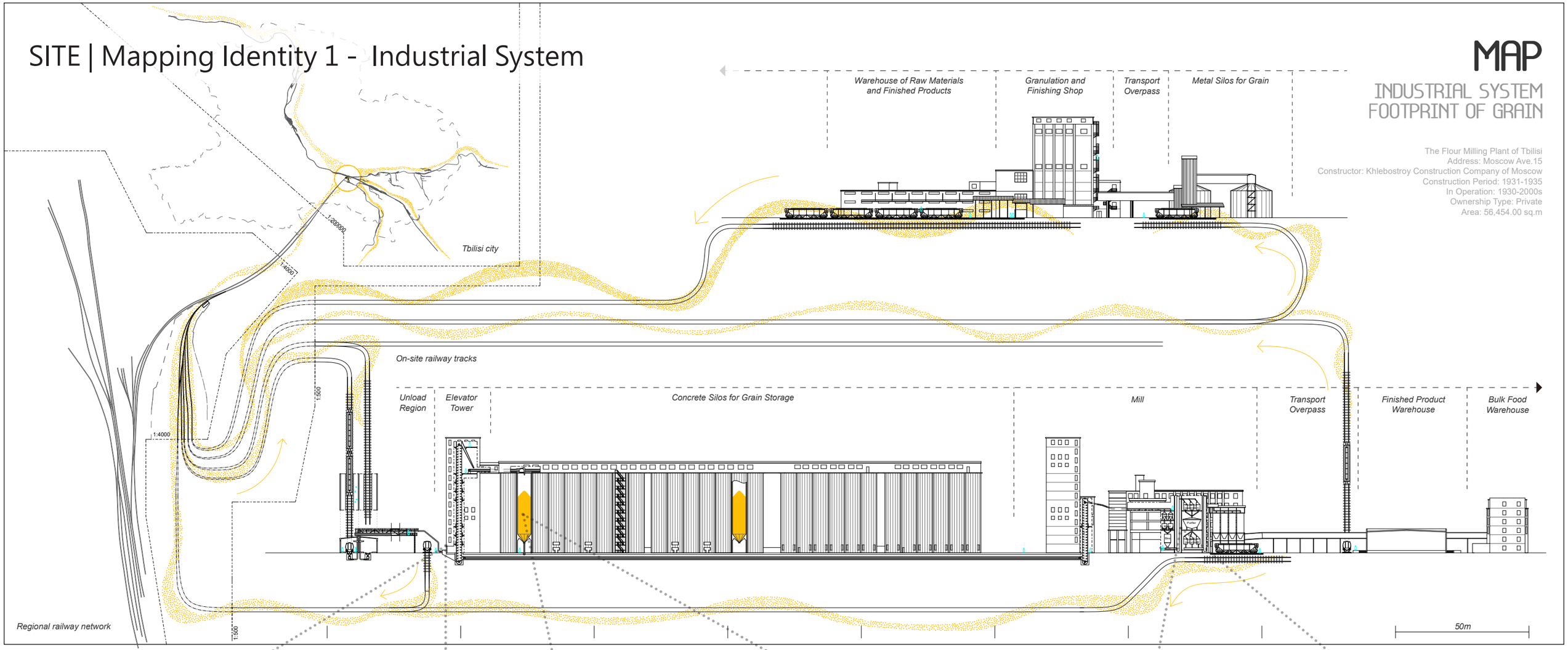


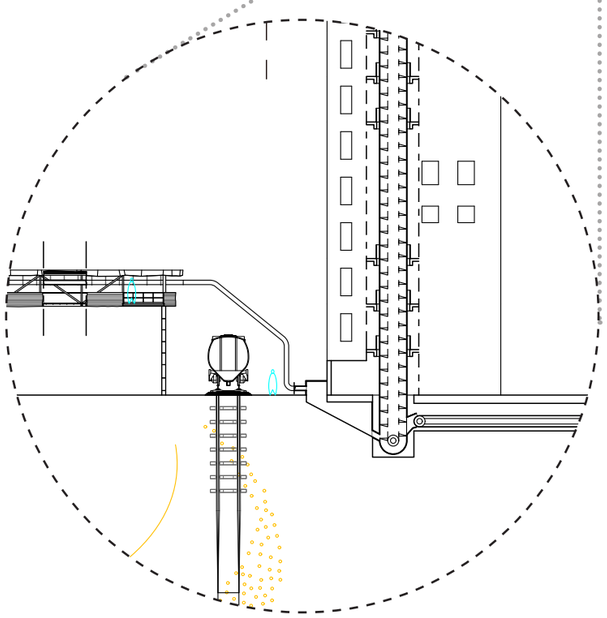
SITE | Mapping Identity 1 - Industrial System

MAP

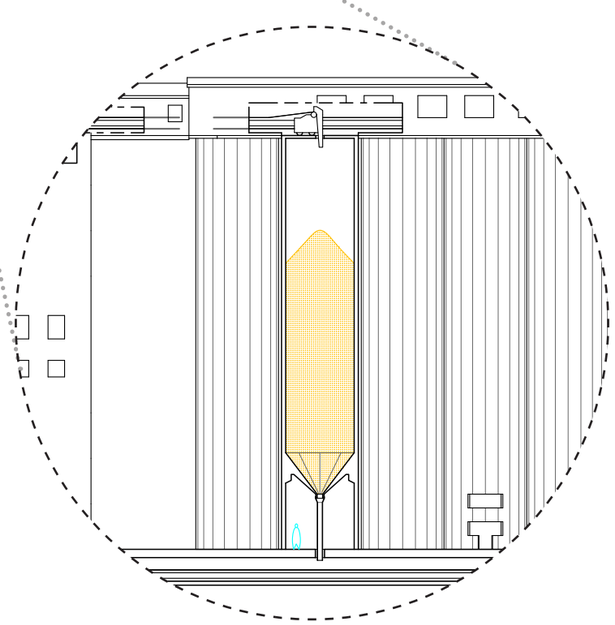
INDUSTRIAL SYSTEM FOOTPRINT OF GRAIN

The Flour Milling Plant of Tbilisi
Address: Moscow Ave.15
Constructor: Khlebostroy Construction Company of Moscow
Construction Period: 1931-1935
In Operation: 1930-2000s
Ownership Type: Private
Area: 56,454.00 sq.m

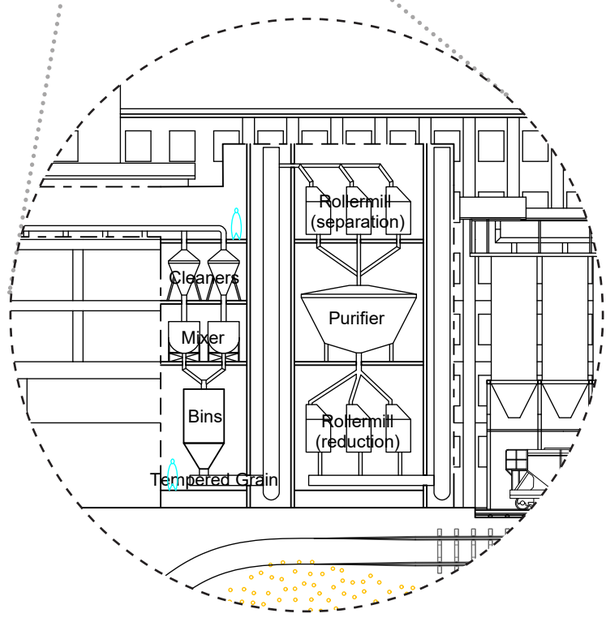




Grain Transportation



Grain Storage



Grain Processing

SITE | Previous Flour Milling Plant





ISOLATED



REWILDED





REWILDING

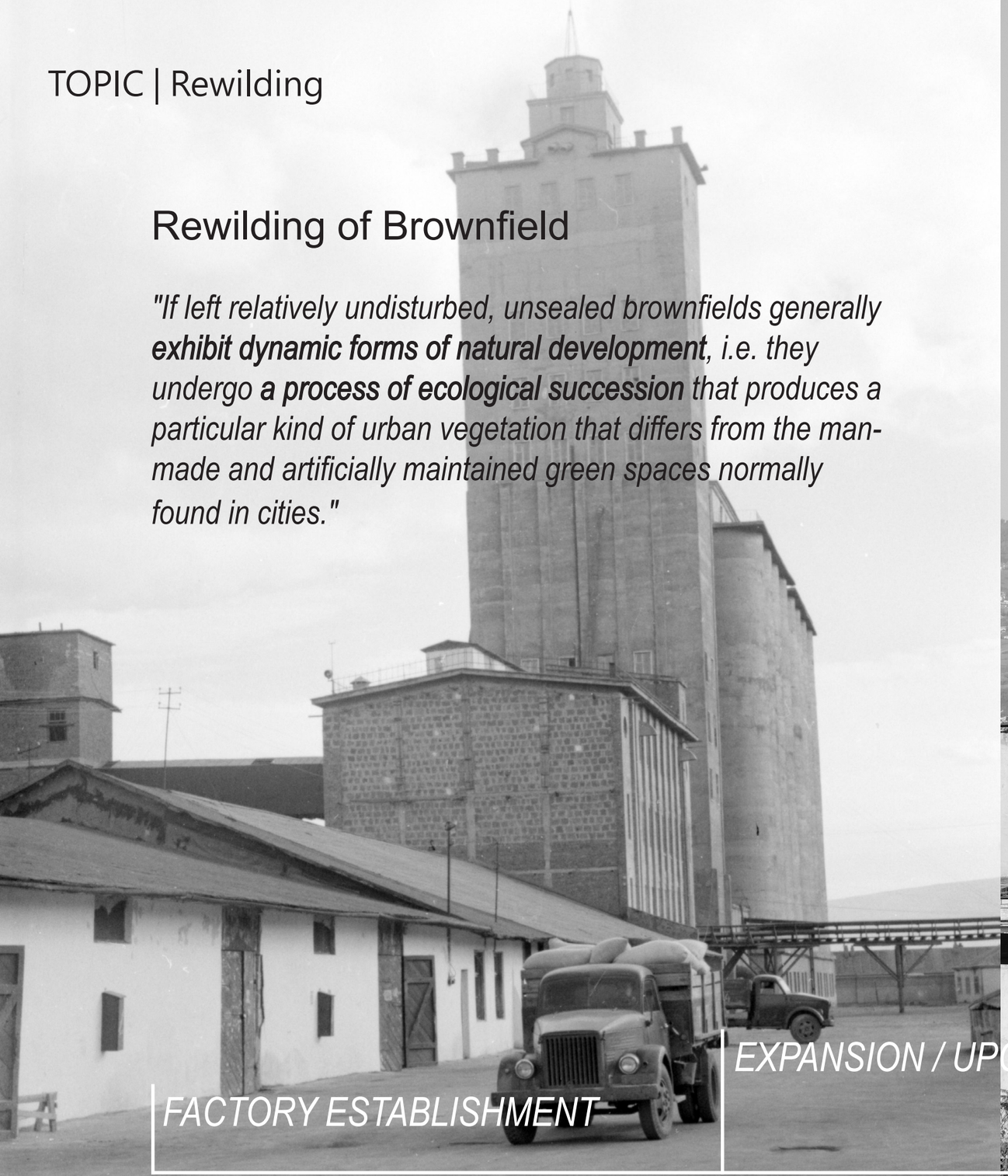
ISOLATED

REWILDED

TOPIC | Rewilding

Rewilding of Brownfield

*"If left relatively undisturbed, unsealed brownfields generally **exhibit dynamic forms of natural development**, i.e. they undergo **a process of ecological succession** that produces a particular kind of urban vegetation that differs from the man-made and artificially maintained green spaces normally found in cities."*



TEMPORALITY OF INDUSTRIAL SITES

Mathey, J., Arndt, T., Banse, J., & Rink, D. (2018). Public perception of spontaneous vegetation on brownfields in urban areas—Results from surveys in Dresden and Leipzig (Germany). Urban Forestry & Urban Greening, 29, 384–392. https://doi.org/10.1016/j.ufug.2016.10.007

 Pioneer Vegetation	 Persistent Ruderal Vegetation	 Tall Herbaceous Vegetation	 Spontaneous Wood
Initial 3-year fallow period: open fragmentary ruderal pioneer populations with short-lived, annual species	Fallow period of 3-10 years: encroaching vegetation, increasing persistent ruderal vegetation, single bushes higher than 5 m	Fallow period of 10-50 years: mainly persistent species, ruderal tall forbs, bushes, single groves higher than 10 m	Fallow period of more than 50 years: dense groves, if not completely covered highly growing herb layer, characteristic wood

Fig. 1. Stages of ecological succession on urban brownfields based on length of fallow period. The characteristic vegetation on the four types of habitat which can develop on urban brownfields during the process of ecological succession are shown and described. (modified after Mathey and Rink, 2010). Photomontages: E.-M. Tittel, M. Wahl; background photo: J. Volz.

4-stages of rewilding provide good opportunities for high urban biodiversity

Müller, N., Werner, P., Kelcey, J. G., & Zoological Society of London. (2010). Urban biodiversity and design. Wiley-Blackwell. https://doi.org/10.1002/9781444318654

SITE | Mapping Identity 2 - Rewilding



INDUSTRIAL STRUCTURES ON SITE

INDUSTRIAL BLOCKS

RESIDENTIAL BLOCKS

BUSINESS BLOCKS

RESIDENTIAL BLOCKS

OPERATING RAILWAY

AVENUE

WILDERNESS STAGE 0

WILDERNESS STAGE 1 / ON ROOF

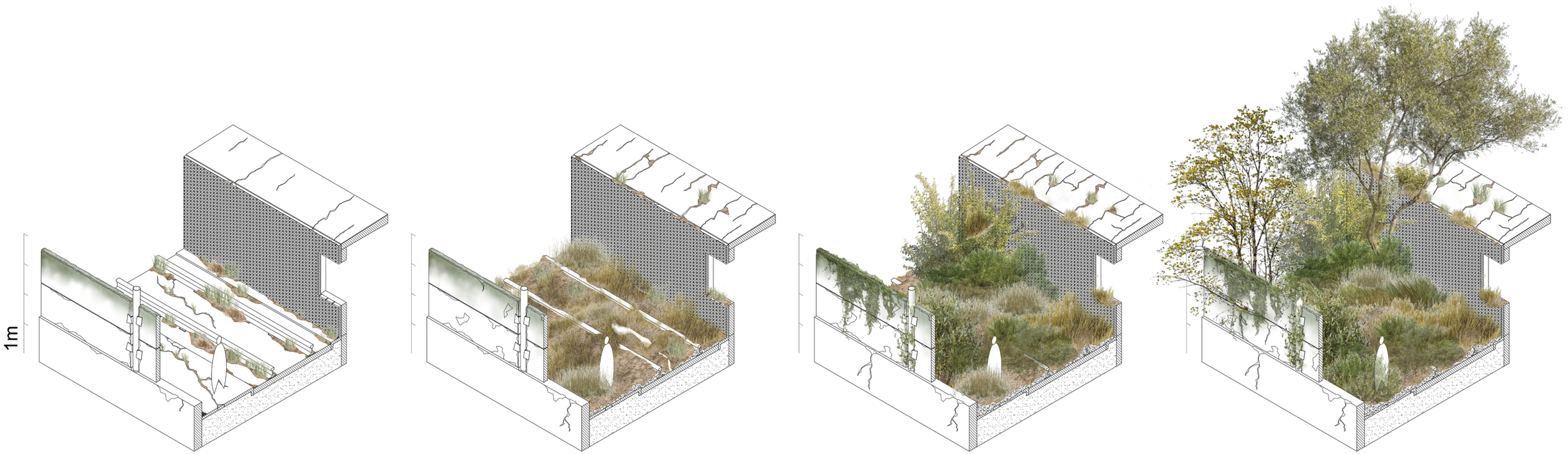
WILDERNESS STAGE 2 / ON ROOF

WILDERNESS STAGE 3 / ON ROOF

WILDERNESS STAGE 4



SITE | Rewilding Stages on Site



WILDERNESS STAGE 1

Young Brownfield with Pioneer Vegetation

WILDERNESS STAGE 2

Older Brownfield with Persistent Ruderal Vegetation

WILDERNESS STAGE 3

Old Brownfield with Ruderal Tall Herbaceous Vegetation

WILDERNESS STAGE 4

Old Brownfield with Spontaneous Woodlands


INDUSTRIAL
INFRASTRUCTURE
+
WILDERNESS

IDENTITY | Synergy

INDUSTRIAL INFRASTRUCTURE

+

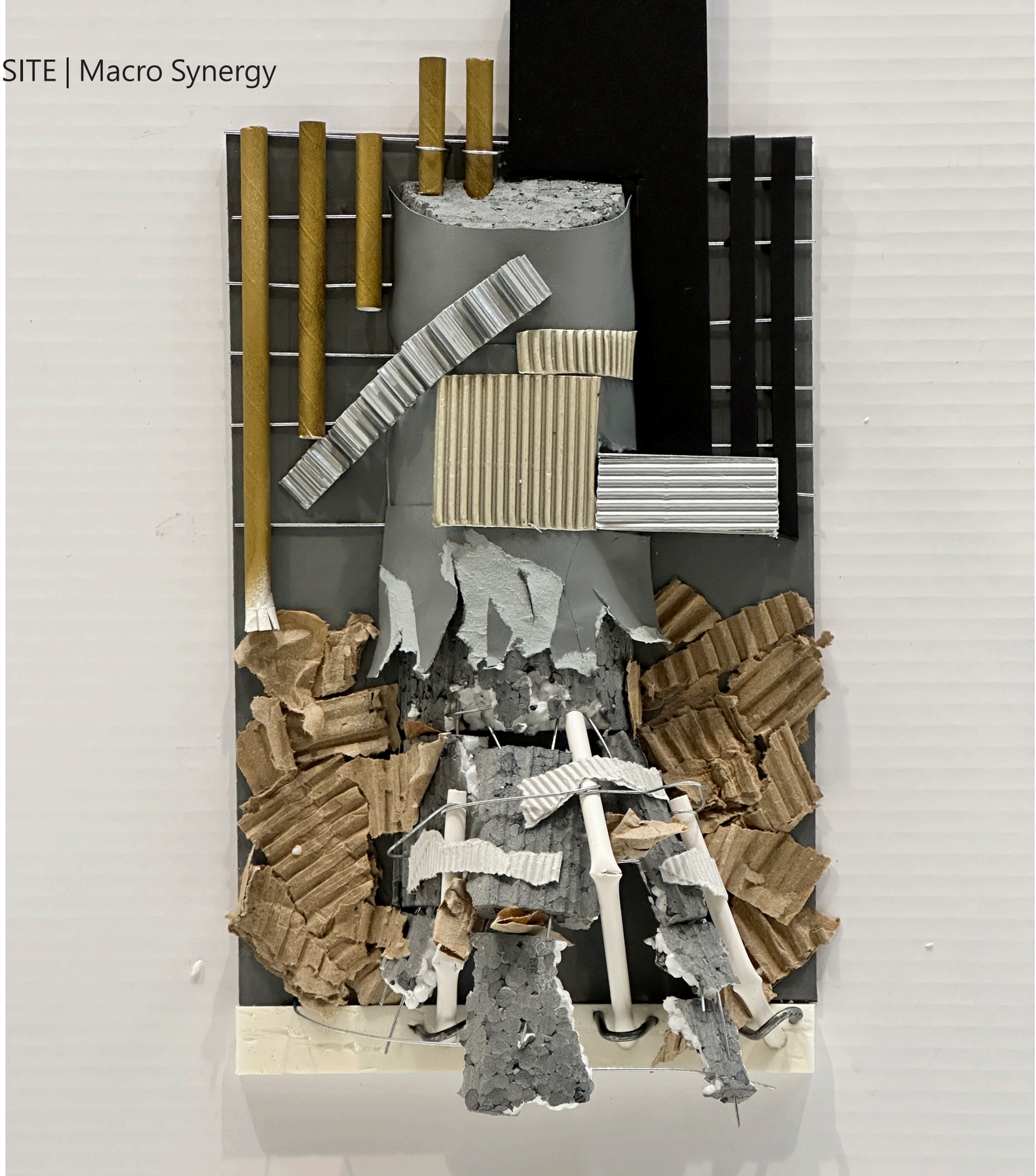
WILDERNESS

Synergy

NOVEL ECOSYSTEM

Novel ecosystems are those that have been altered by human activities and have afterwards experienced abandonment or human disuse, allowing for a new assemblage of species to establish.

IDENTITY | MODI 1-SITE | Macro Synergy



IDENTITY | MODI 2-FORM | Micro Synergy

Current Conflicts and Future Possibilities ...

CONFLICTION STRATEGY PROGRAMMING

BROWNFIELD REWILDING - A LIVING LAB OF NOVEL ECOSYSTEM

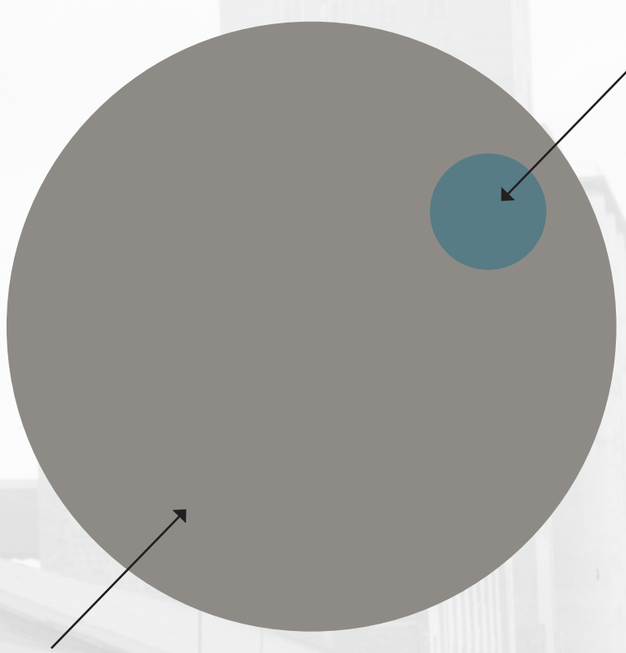
Research & Design (P2-P3)

CONFLIECTION | Shift in Site Dominance

Functional Flour Milling Plant
Before 2000

Industrial Brownfield
2000-2025

CONFLIECTION | Shift in Site Dominance

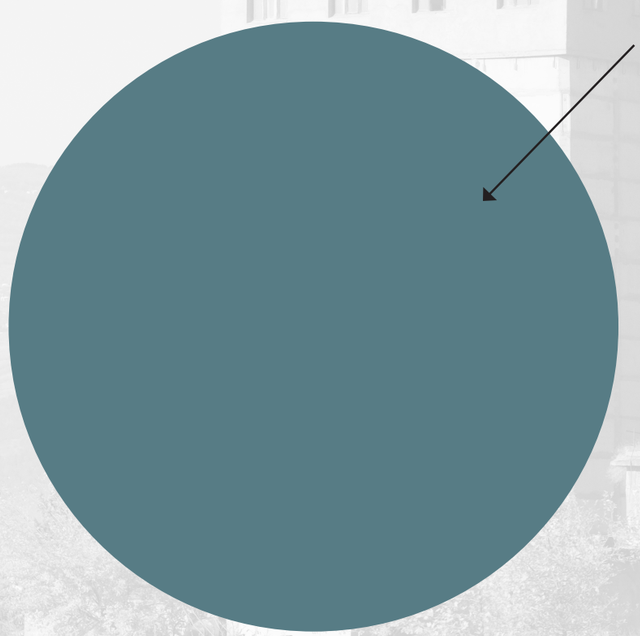


Planted Vegetation

Industrial Production
for
Human Society

Functional Flour Milling Plant
Before 2000

Abandoned



Wilderness
Industrial ruins
Novel Eco

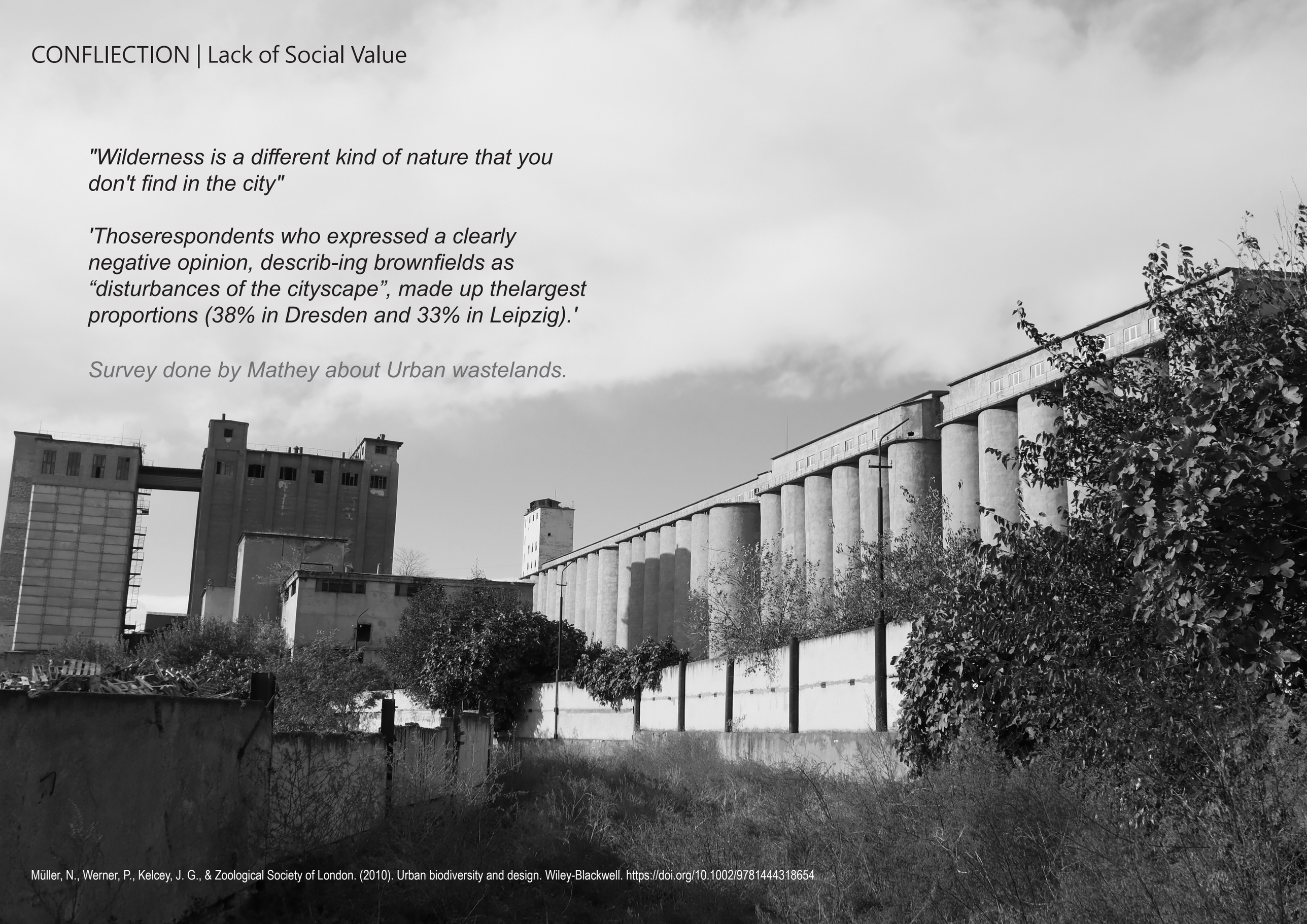
Industrial Brownfield
2000-2025

CONFLIECTION | Lack of Social Value

"Wilderness is a different kind of nature that you don't find in the city"

'Thoserespondents who expressed a clearly negative opinion, describ-ing brownfields as “disturbances of the cityscape”, made up thelargest proportions (38% in Dresden and 33% in Leipzig).'

Survey done by Mathey about Urban wastelands.



Müller, N., Werner, P., Kelcey, J. G., & Zoological Society of London. (2010). Urban biodiversity and design. Wiley-Blackwell. https://doi.org/10.1002/9781444318654

CONFLIECTION | Lack of Social Value

INTERVENTION

NOVEL ECOSYSTEM ***SOCIETY***

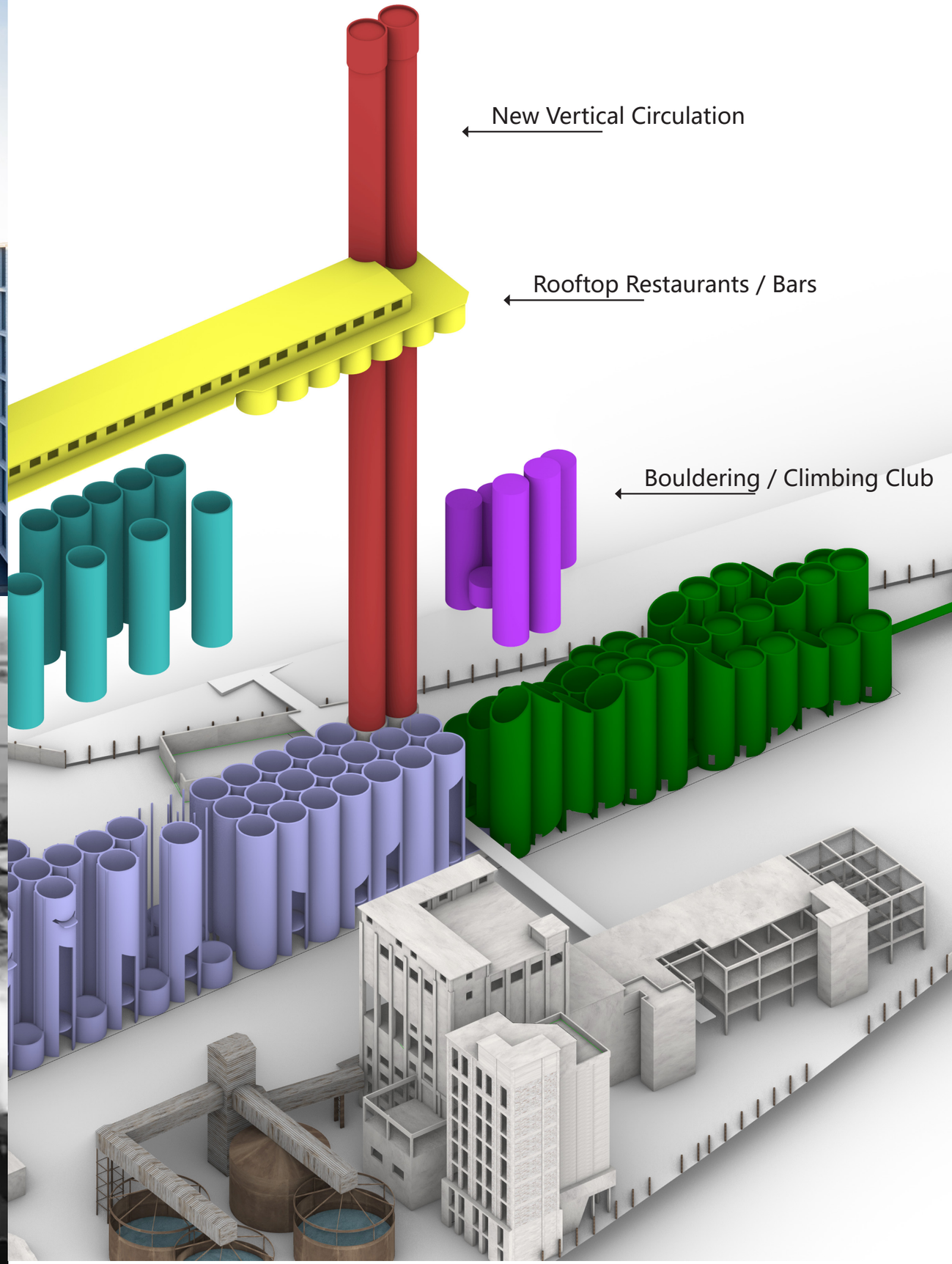
connection

STRATEGY | test

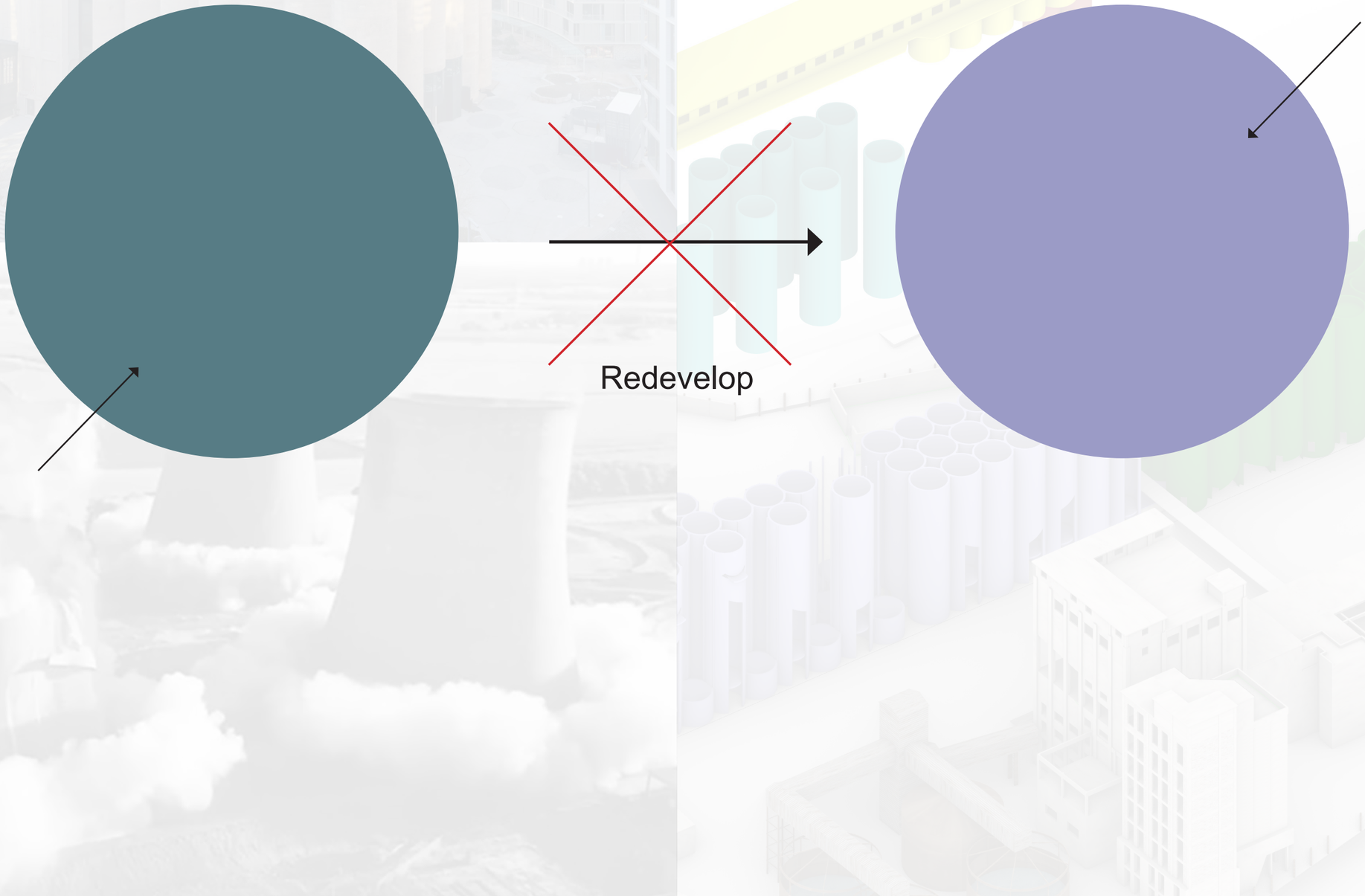


2017, Zeitz Museum of Contemporary Art Africa, Cape Town, Heatherwick Studio



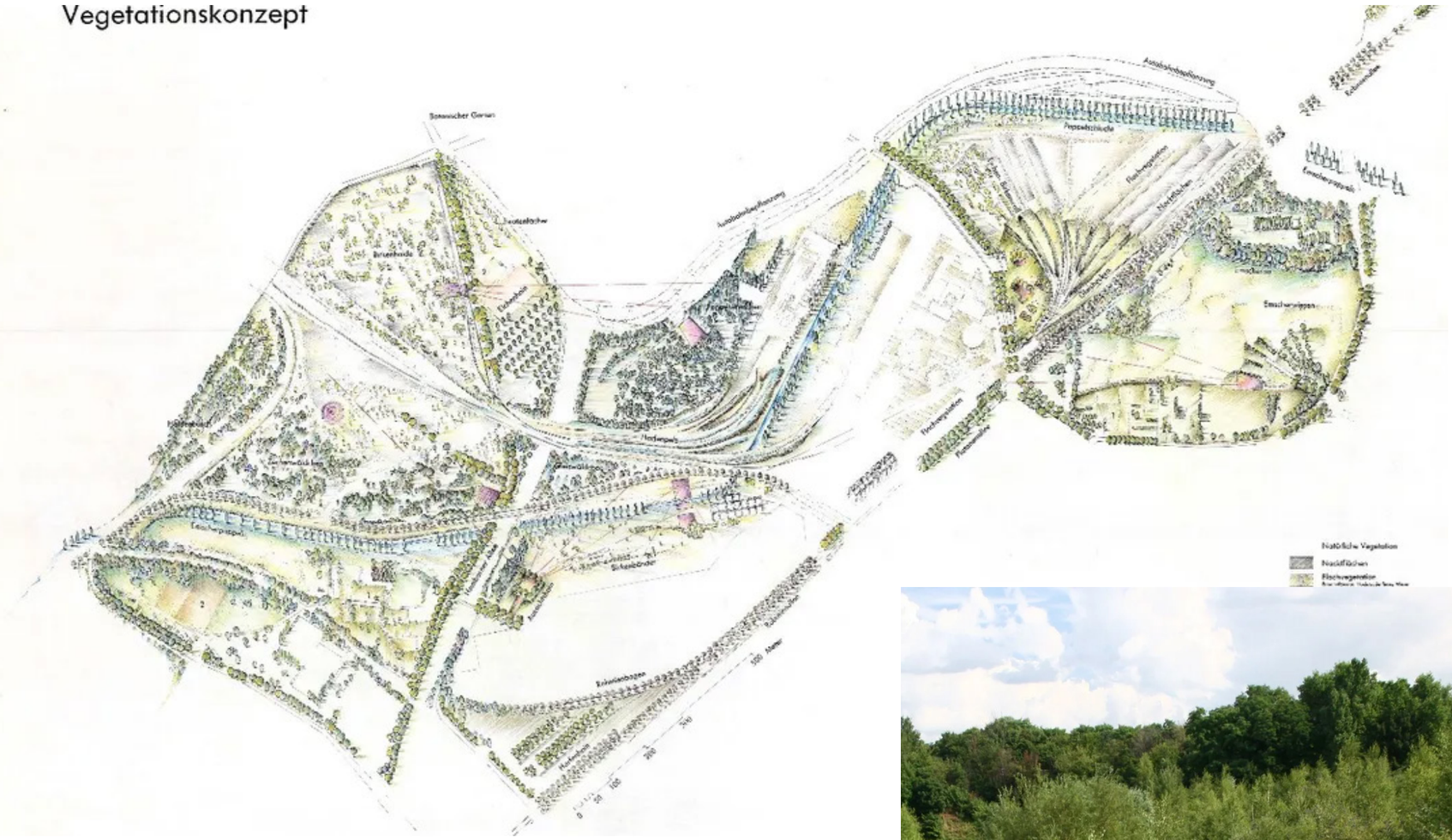


STRATEGY | test



STRATEGY | Happenstance Nature - Landscape park Duisburg-Nord







1990s Landschaftspark Duisburg-Nord - Peter Latz +

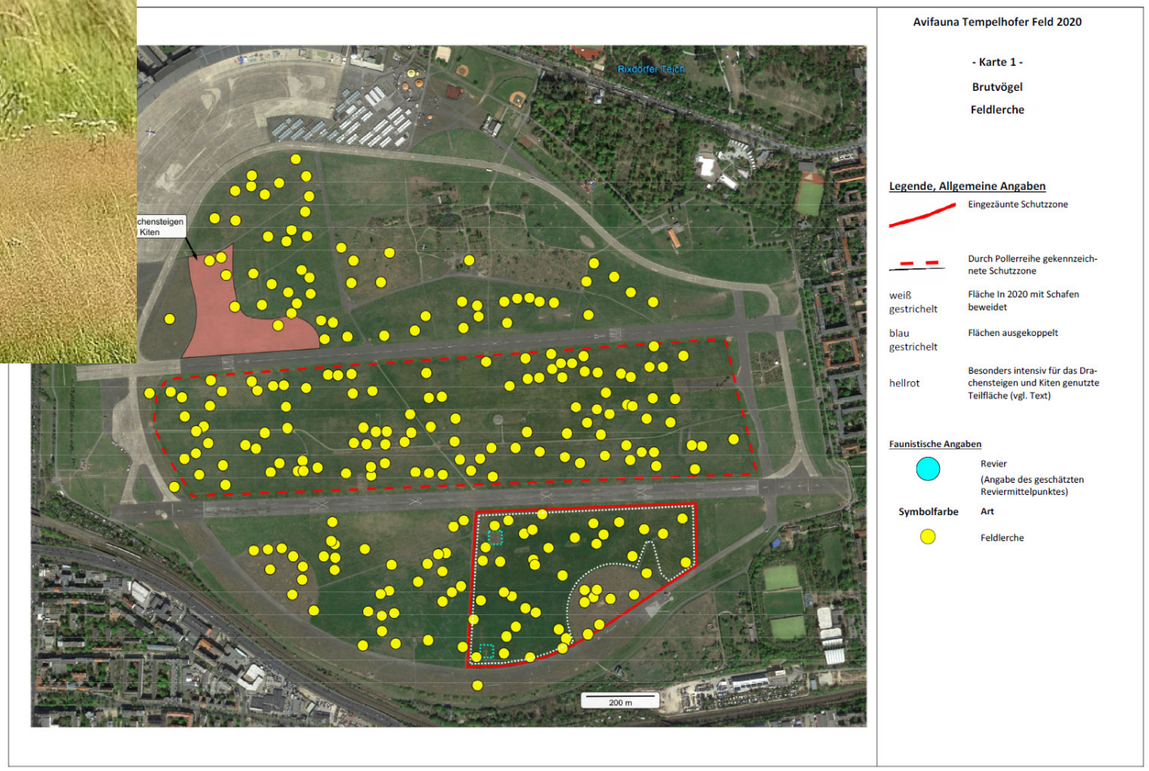


STRATEGY | Bioinclusive Design - Abandoned Tempelhofer Feld Airport | Berlin





Habitate of Skylark
Fenced off during breeding seasons



https://www.tempelhoferfeld.de/en/nature-environment/skylark-protection-zone/

Architects & Scientists

Bio-inclusive intervention



Novel Ecological Reserve |
Staged Comparative Experiment on the Ecological Process of Rewilding in Industrial Brownfield

Urban Post-humanism Landscape |
Education Base of Native Biology |
Interactive green space for community

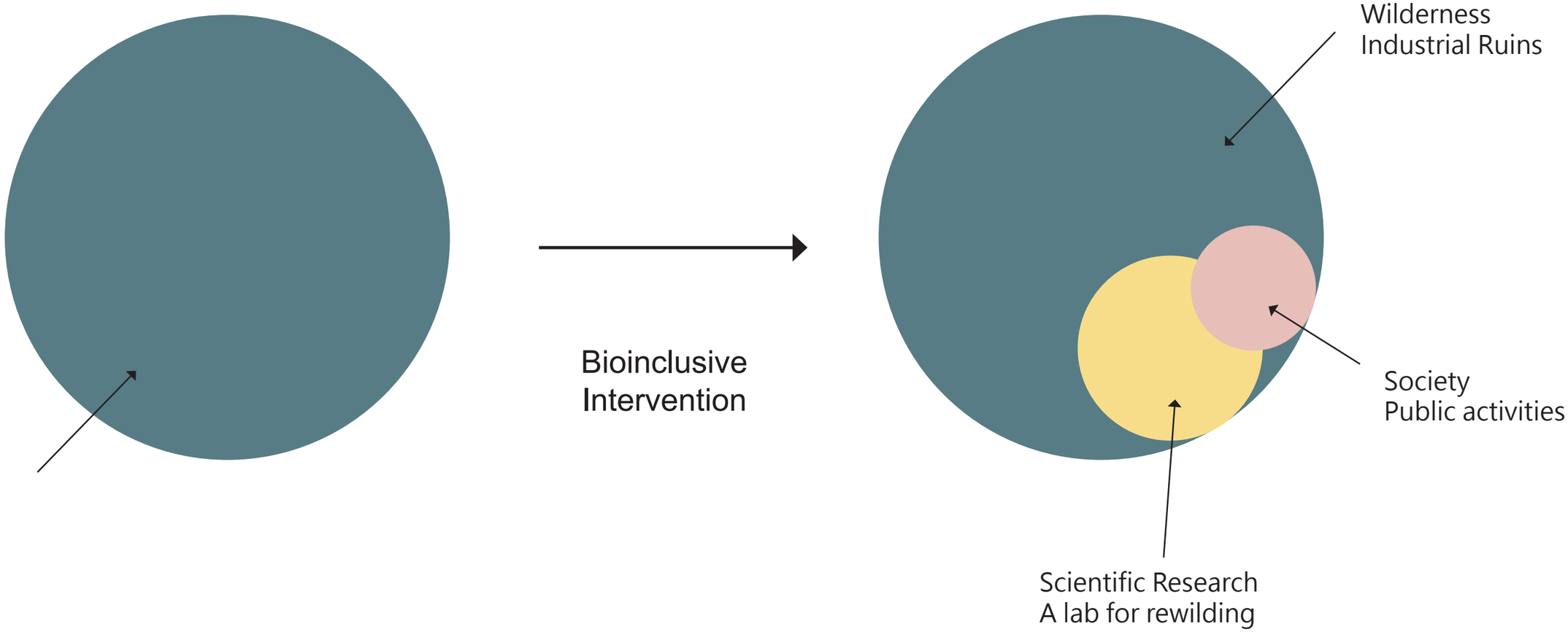
NOVEL ECOSYSTEM

Provide spatical, ecological and aesthstic value

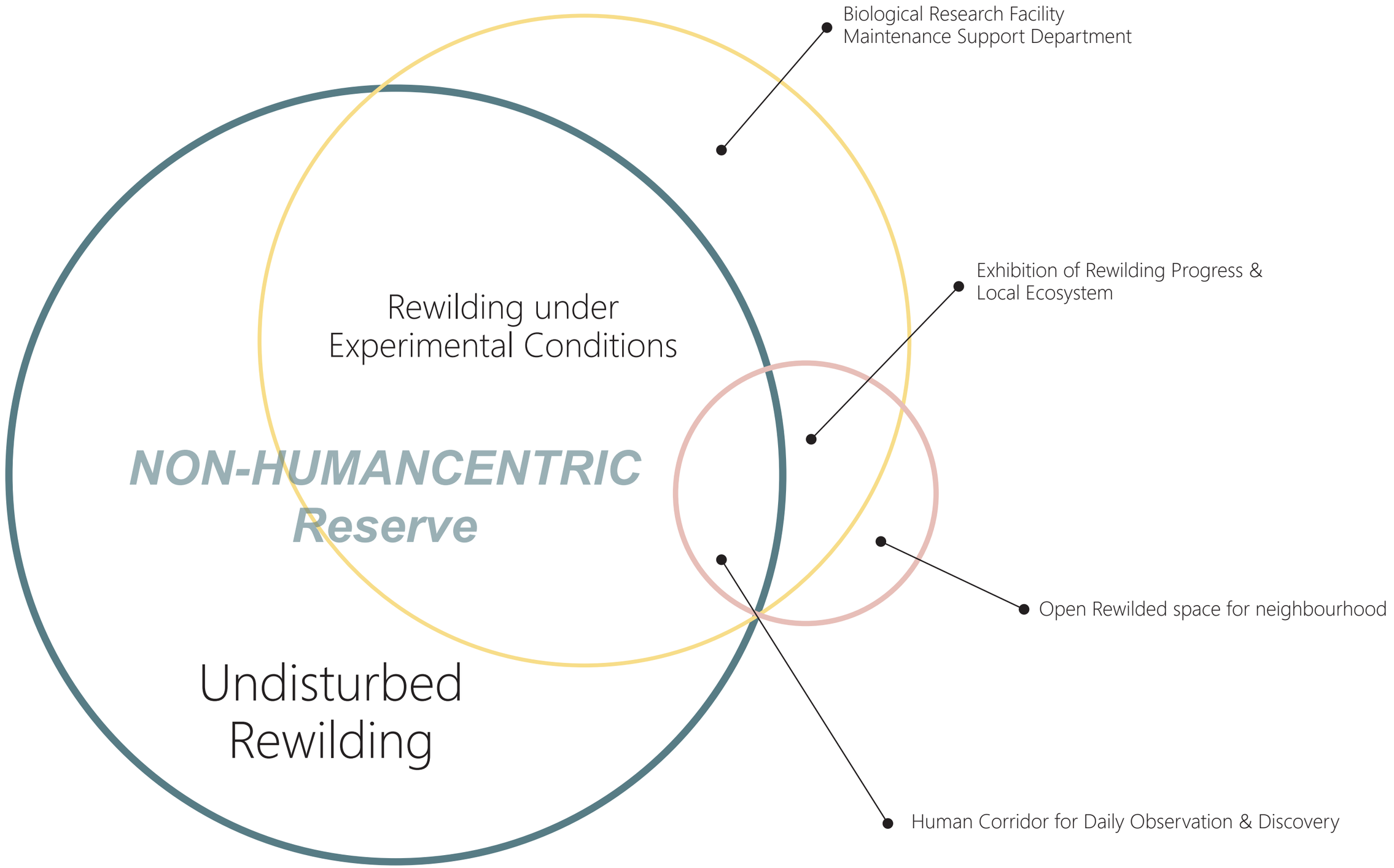
Discovery the value of 'rewilding' as a prototype for future urban regeneration with time

SOCIETY

STRATEGY | A Living Lab of Novel Ecosystem - A post-human-centered transformation



STRATEGY | A Living Lab of Novel Ecosystem - Spatial Relationship



STRATEGY | Site



STRATEGY | Site

Public Business

Residential

Public Business

Industrial land

Public Business

Industrial land

Residential

Residential

Residential

SOCIETY

SCIENCE

NOVEL-ECO

PROGRAMMING | Accessibility for Human

Scientific Institution & Technical Support

Community Park

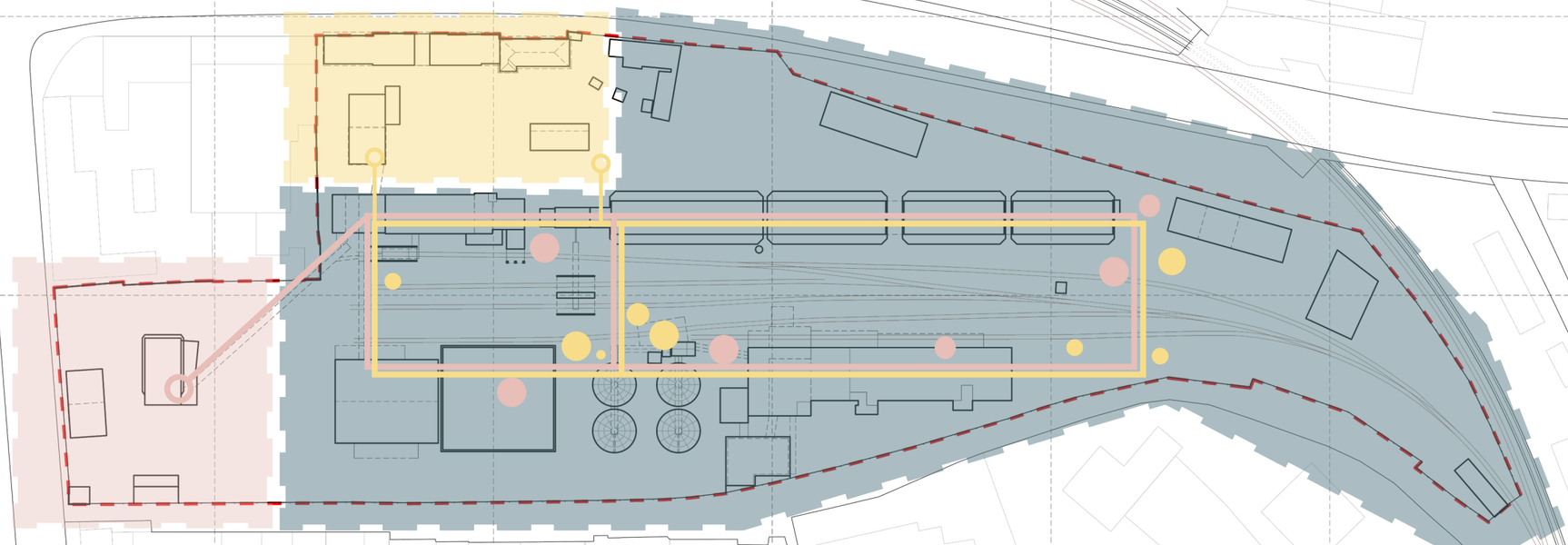
Natrual Reserver for Rewilding

Abandoned Railway Tracks
Operational Railway Tracks
Boundary of the Milling works

SOCIETY SCIENCE NOVEL-ECO

PROGRAMMING | Modular Accessible Points with Multi-functions

Scientific Institution & Technical Support



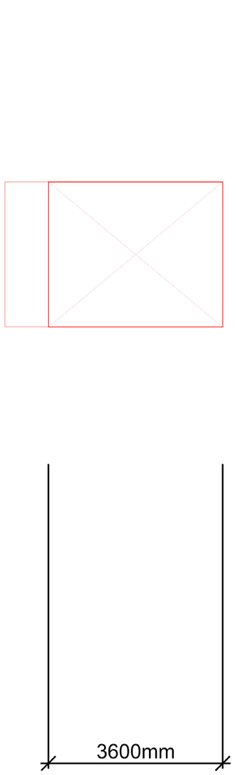
Community Park

Natrual Reserver for Rewilding

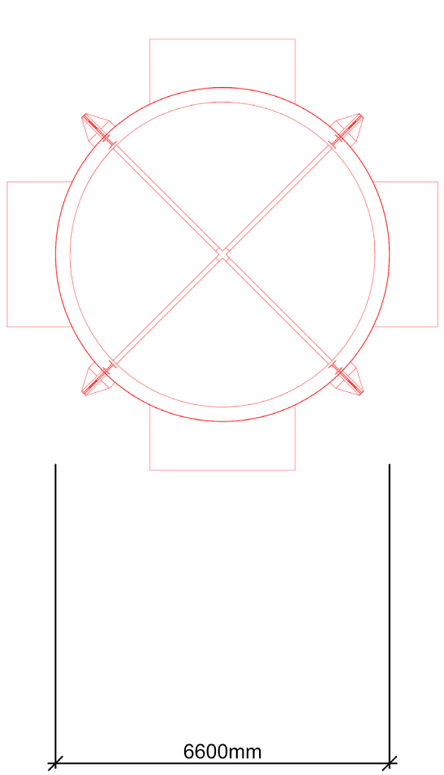
Abandoned Railway Tracks
Operational Railway Tracks
Boundary of the Milling works

SOCIETY **SCIENCE** **NOVEL-ECO**

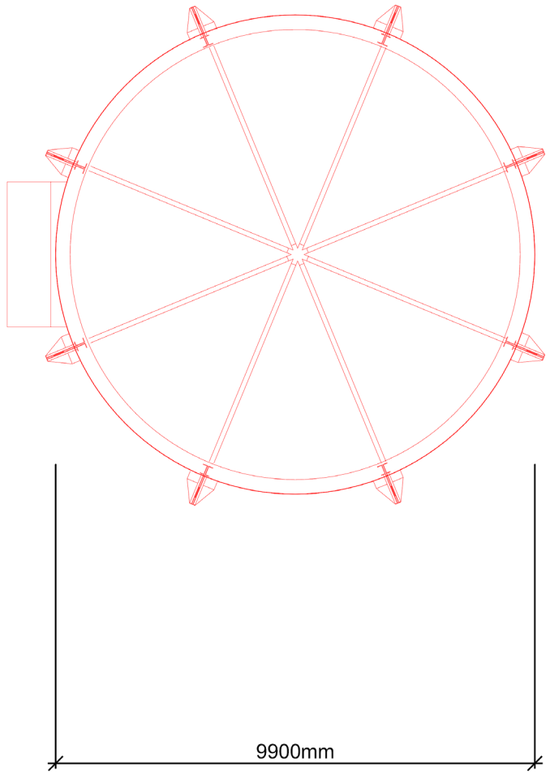
Strategy | Prefabricated Modules



Structure
Corridor



Structure
Circulation
Services
Observatory
Single Camp
...



Structure
Exhibition
Lab
Control Centre
Group Camp
Observatory
Reception
...

PROGRAMMING | Transportation

Small pecies -
Truck transportation

Public Area

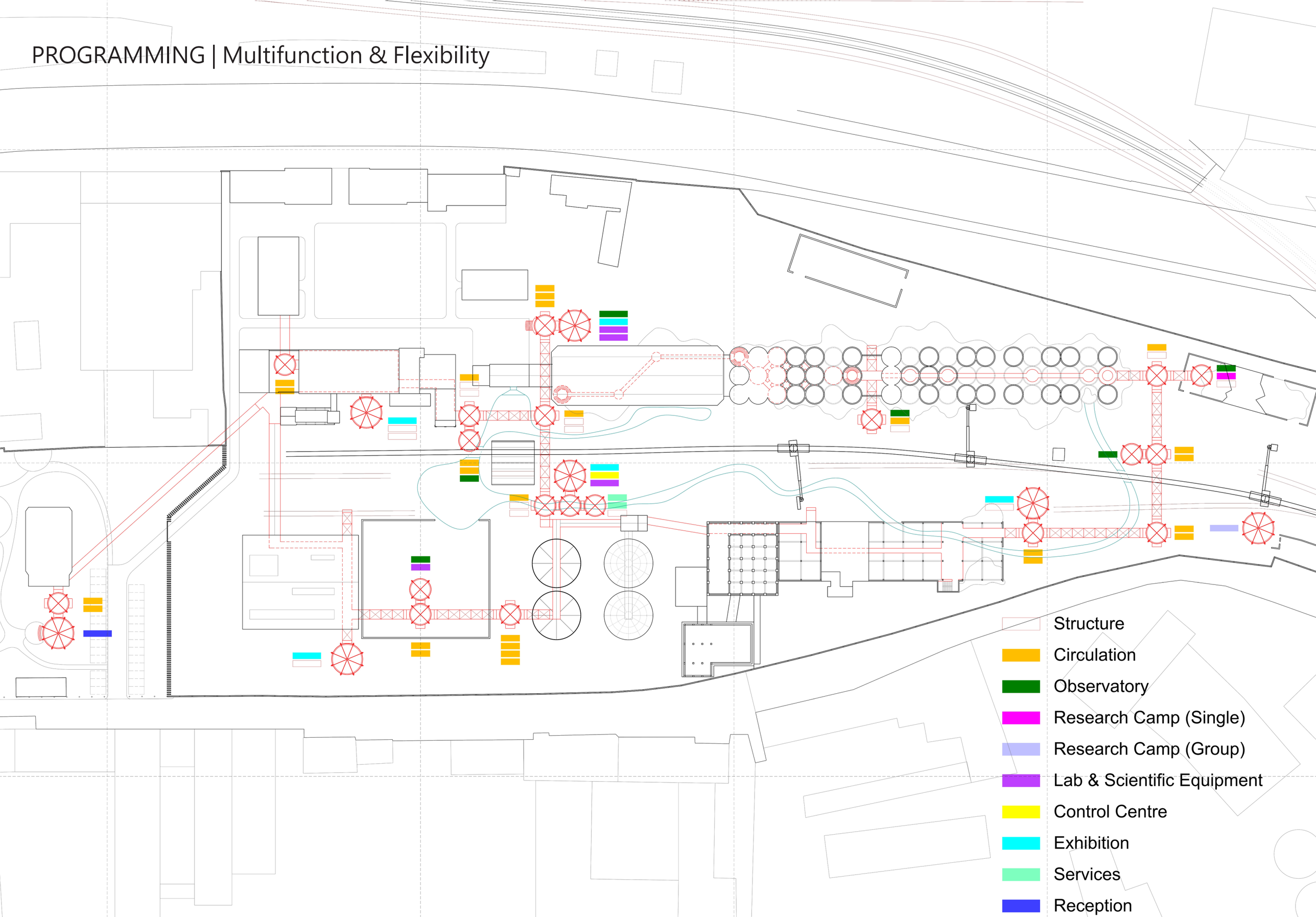
Restriction Area

Unload & Assemble
Area

Large modules -
Railway transportation

Abandoned Railway Tracks
Transportation Railway Tracks
Operational Railway Tracks
Boundary of the Milling works

PROGRAMMING | Multifunction & Flexibility



Different Phases, Different Corner ...

TRANSFORMATION
SYNERGY
SPACE

'SUCCESSIONAL SITE' - A LIVING LAB OF NOVEL ECOSYSTEM

Design Development (P3-P5)

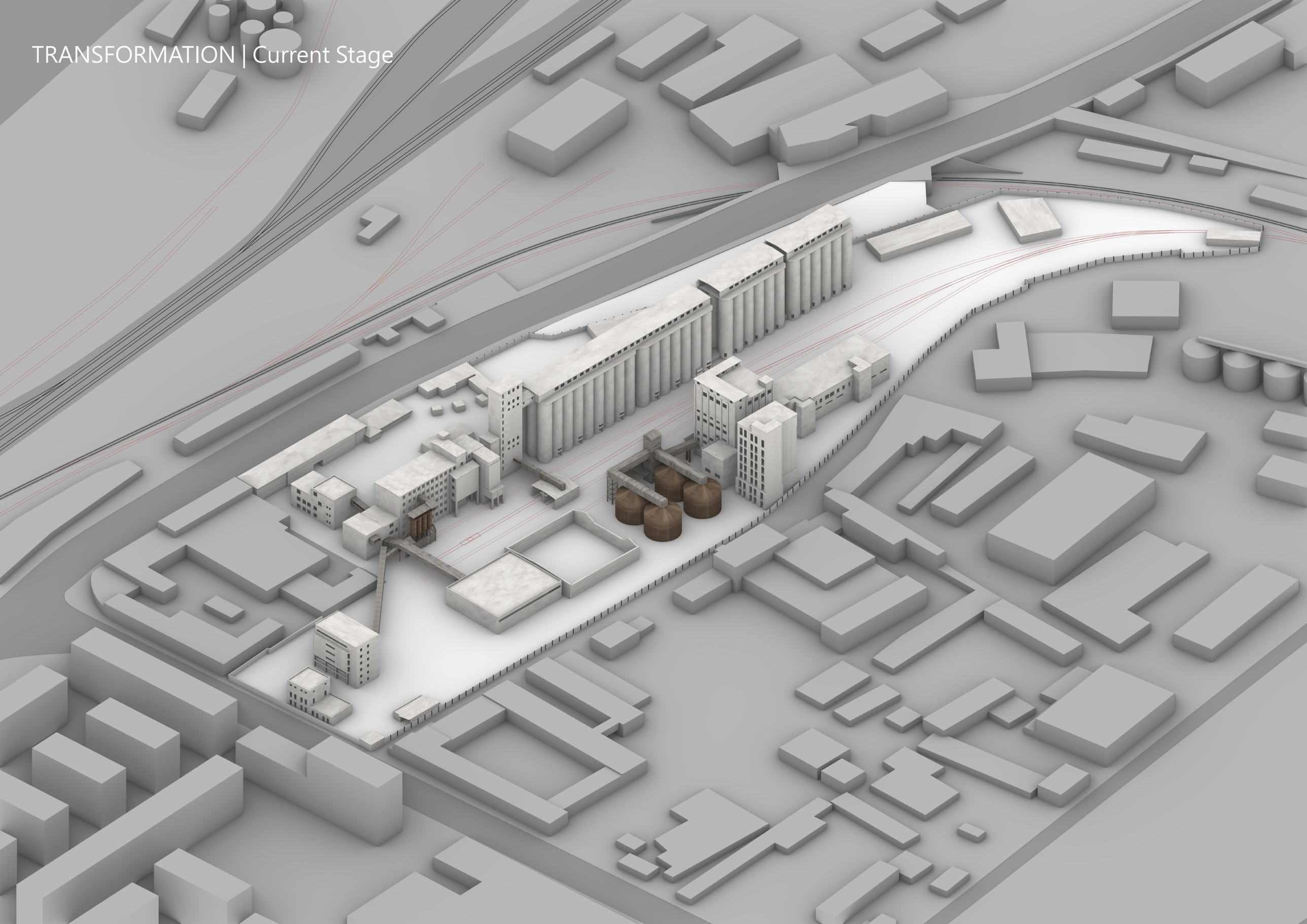
TRANSFORMATION | Sculpting + Modular Add-ons Assembly

Scupting existing structures for diversified rewilding

+

Assembling prefabricated modules for human accessiblity

TRANSFORMATION | Current Stage



TRANSFORMATION | Reused Railway

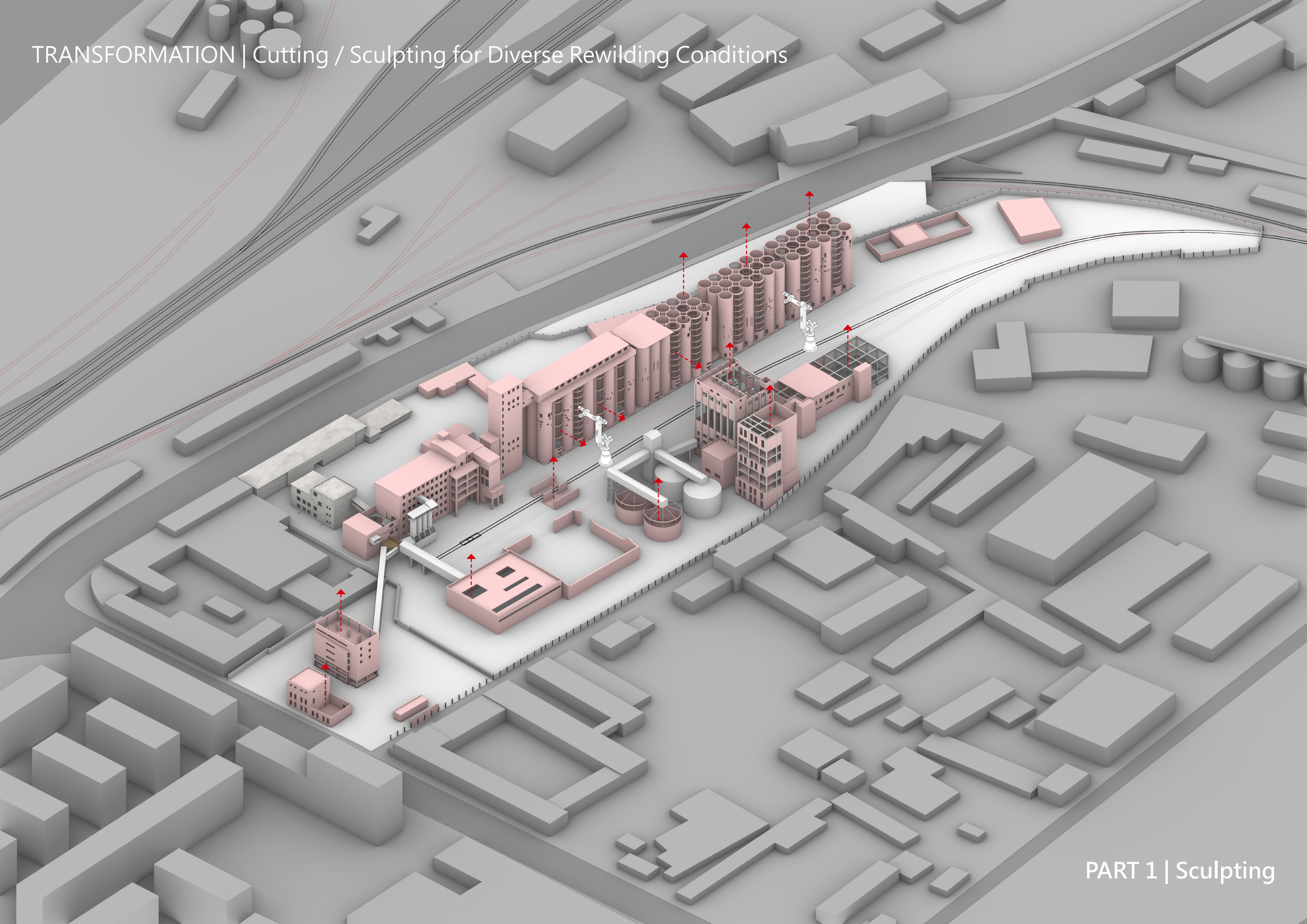
PART 1 | Sculpting

TRANSFORMATION | Relocated Boundary

SOCIETY SCIENCE NOVEL-ECO

PART 1 | Sculpting

TRANSFORMATION | Cutting / Sculpting for Diverse Rewilding Conditions



PART 1 | Sculpting

TRANSFORMATION | Cutting / Sculpting for Diverse Rewilding Conditions

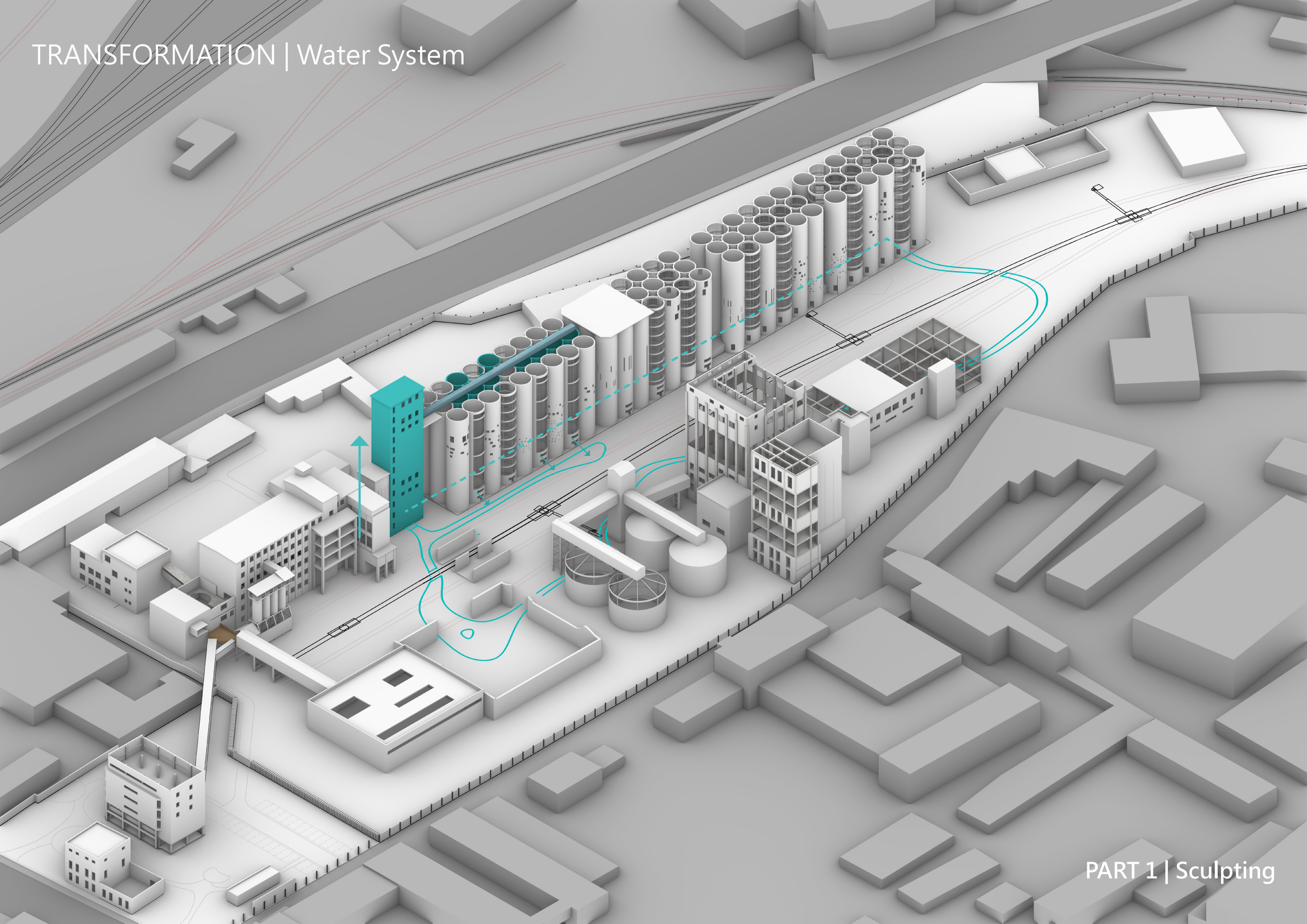




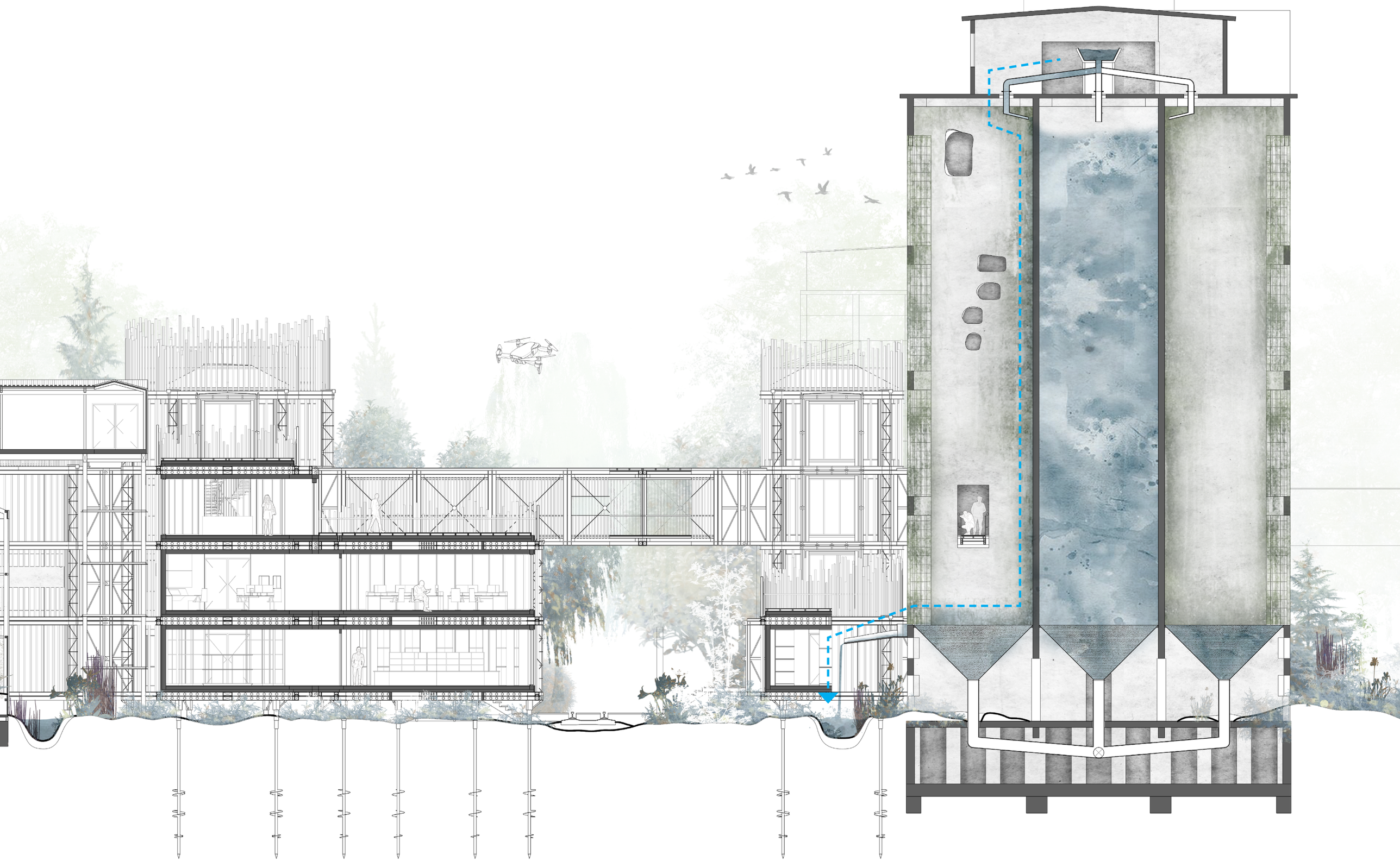


PART 1 | Sculpting

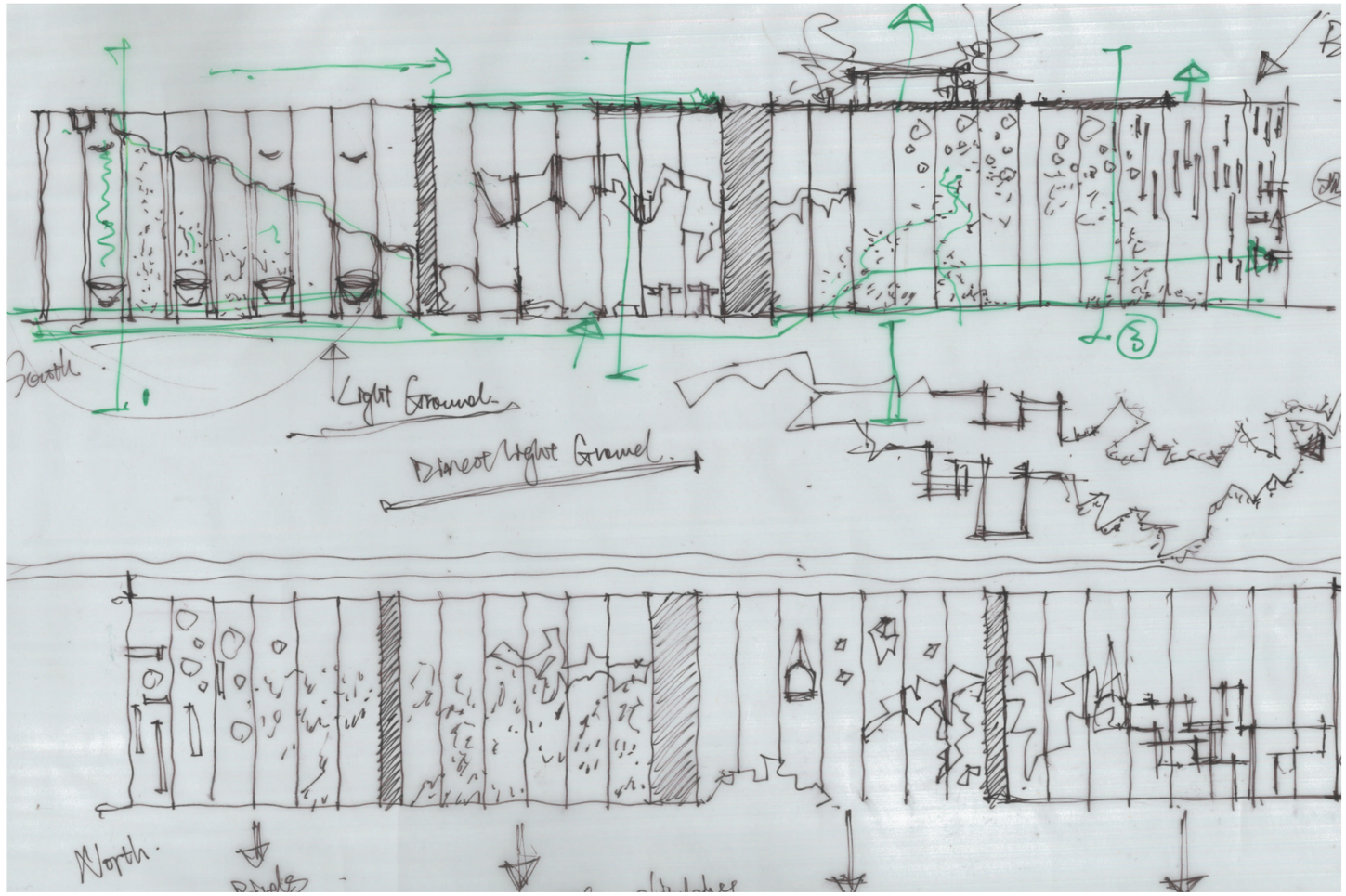
TRANSFORMATION | Water System

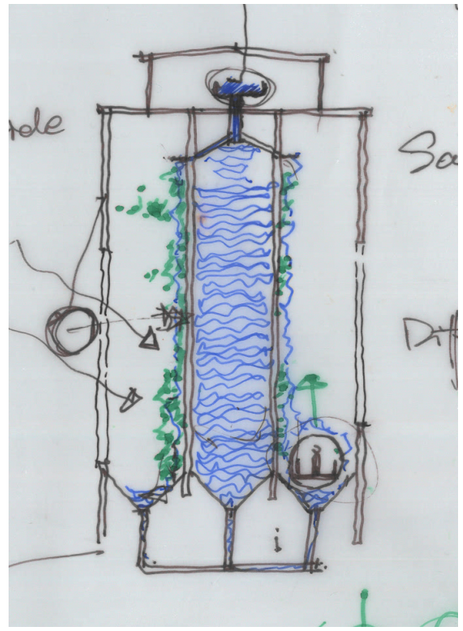


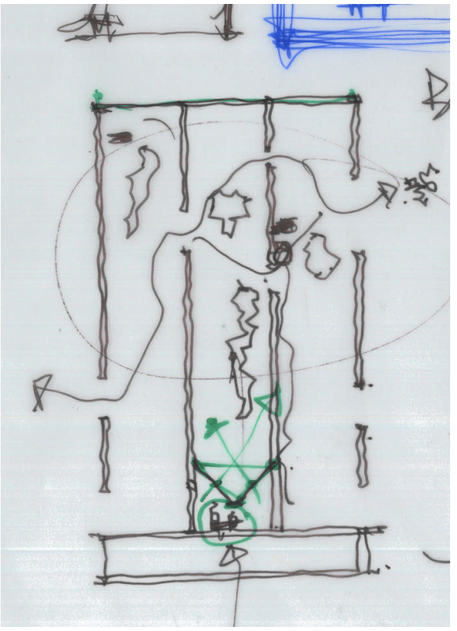
TRANSFORMATION | "Reuse" of Existing Structures

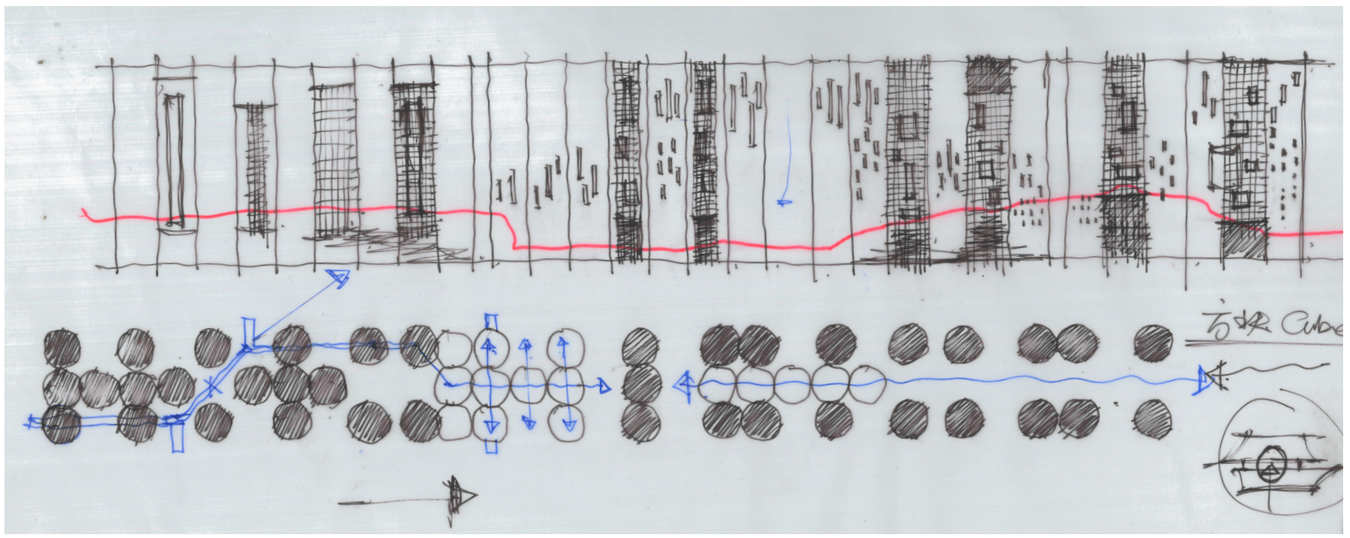


TRANSFORMATION | "Reuse" of Existing Structures

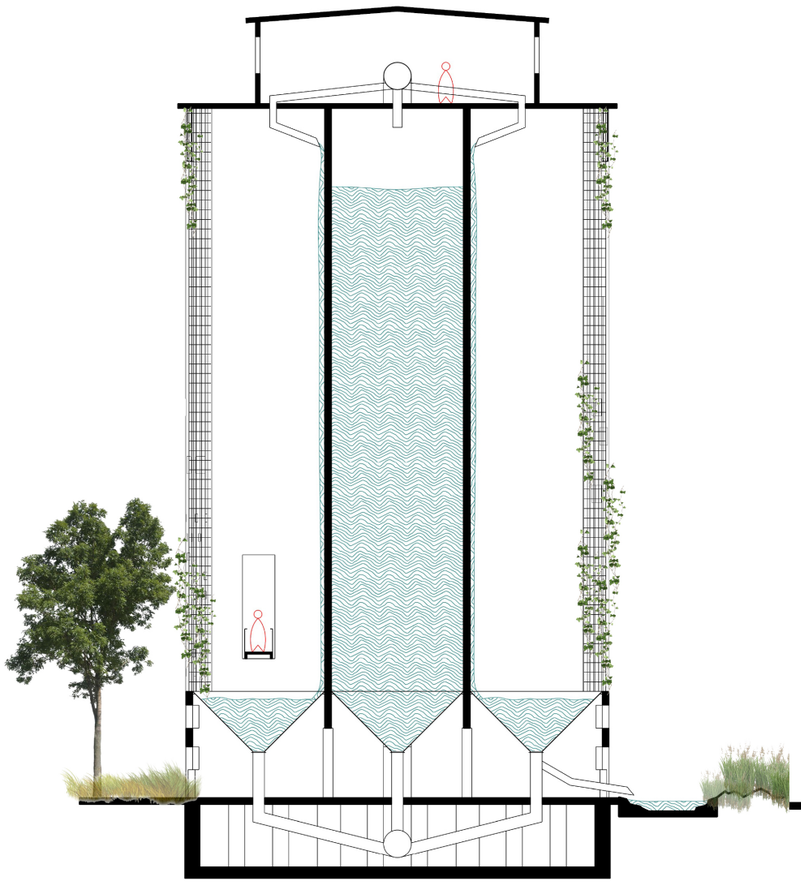




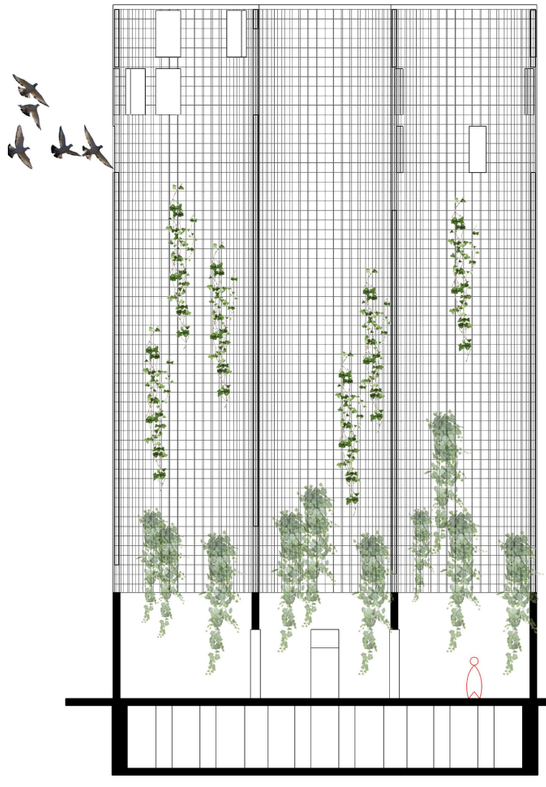


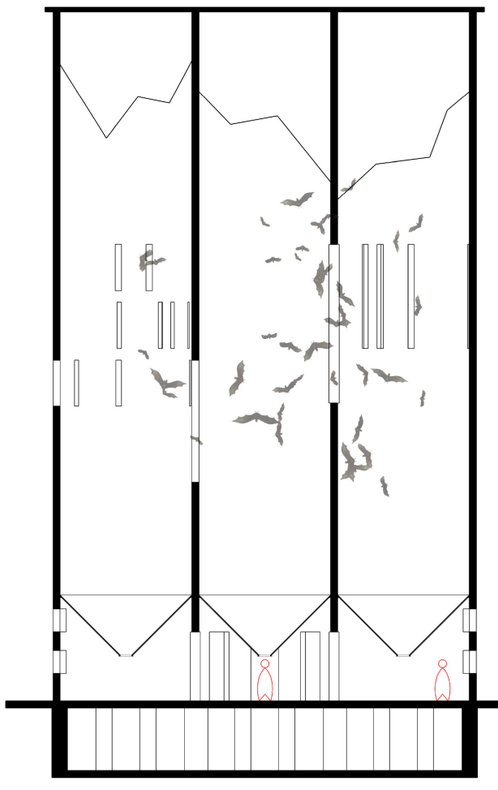


TRANSFORMATION | Varying Levels of Openness

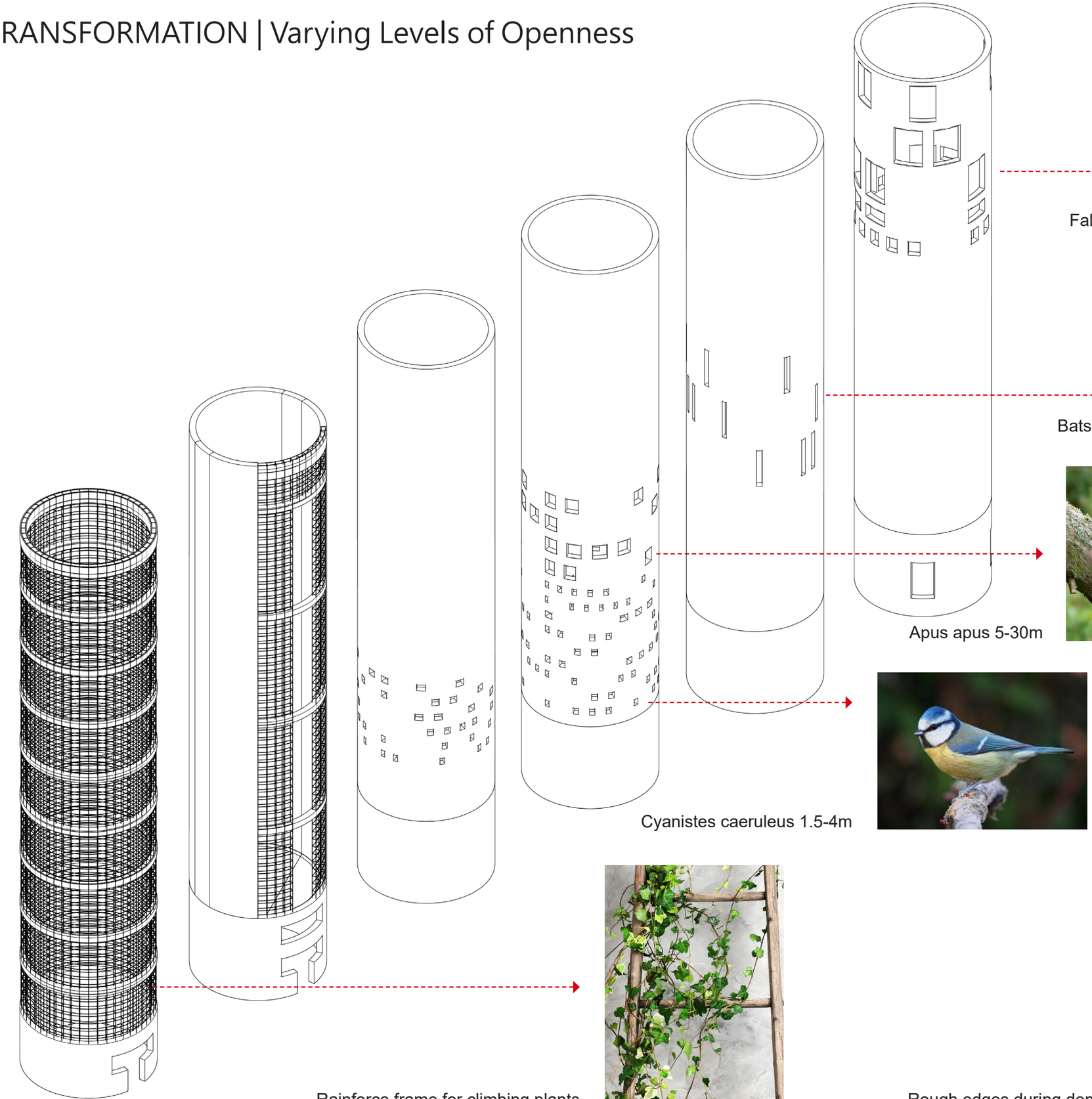








TRANSFORMATION | Varying Levels of Openness





Falco peregrinus 20-100m



Bats 3-15m



Apus apus 5-30m

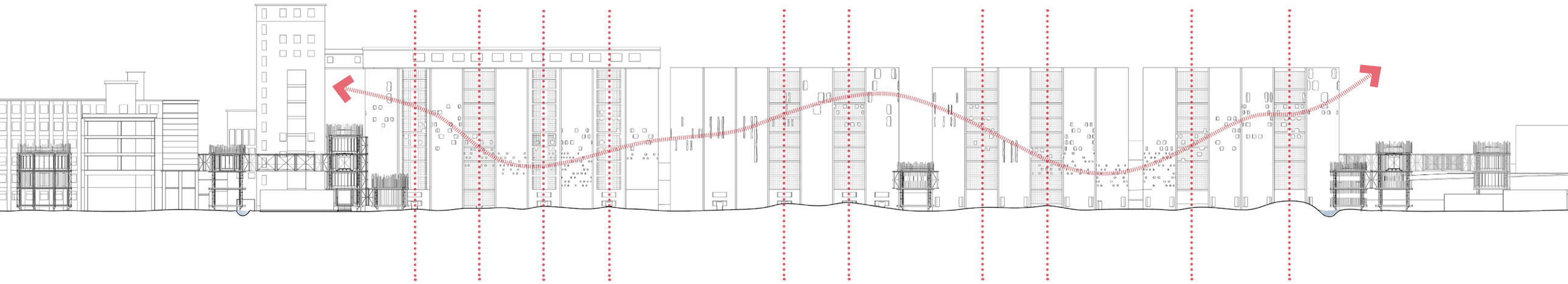
Cyanistes caeruleus 1.5-4m

Rainforce frame for climbing plants

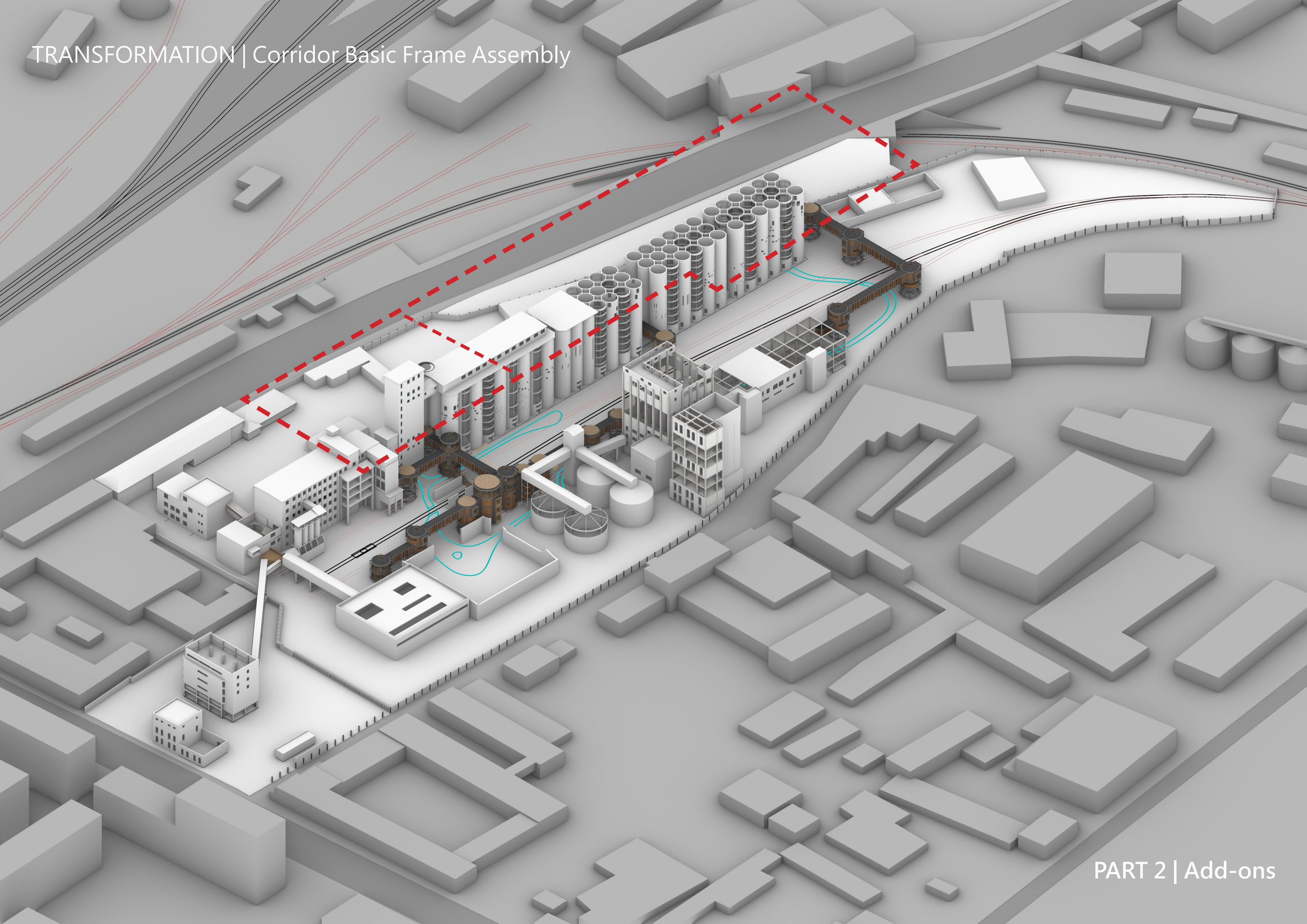


Rough edges during demolition

TRANSFORMATION | Rhythm of Facade Composed by Openings

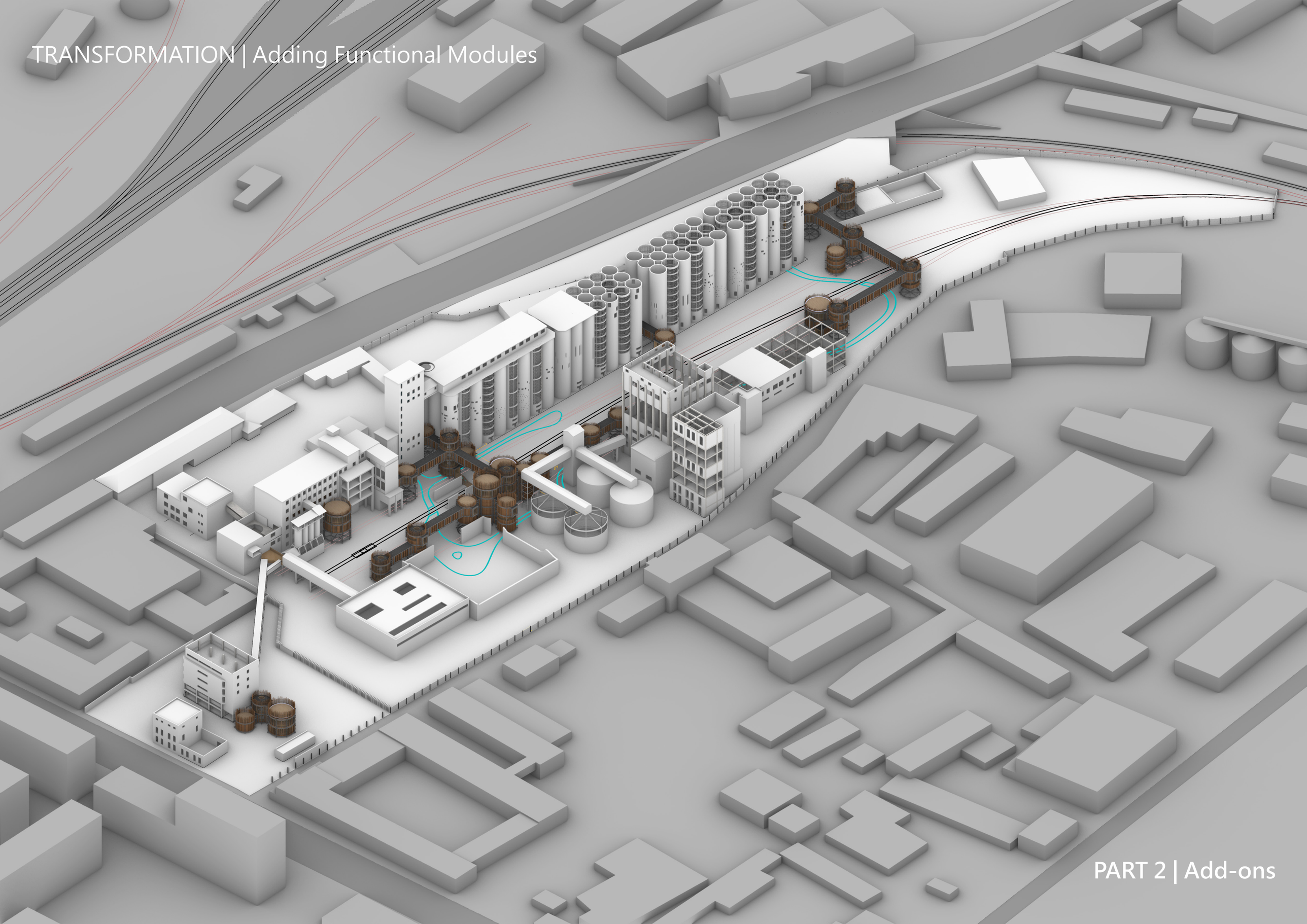


TRANSFORMATION | Corridor Basic Frame Assembly



PART 2 | Add-ons

TRANSFORMATION | Adding Functional Modules



PART 2 | Add-ons

TRANSFORMATION | Master Plan

SITE PLAN 1:500

N

A

B

B

A

1

1

SITE SECTION 1-1 1:500

TRANSFORMATION | Accessibility for Human

SITE PLAN 1:500

N

A

Researchers and Staff

1

B

B

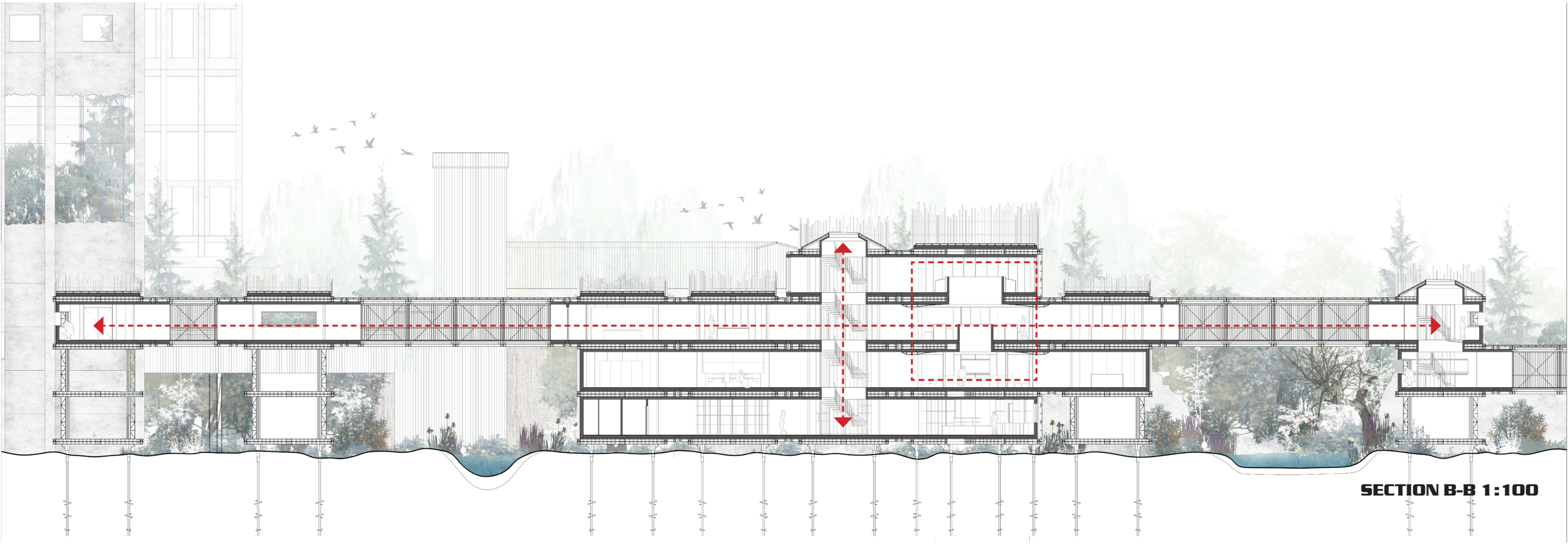
A

1

Public Entrance

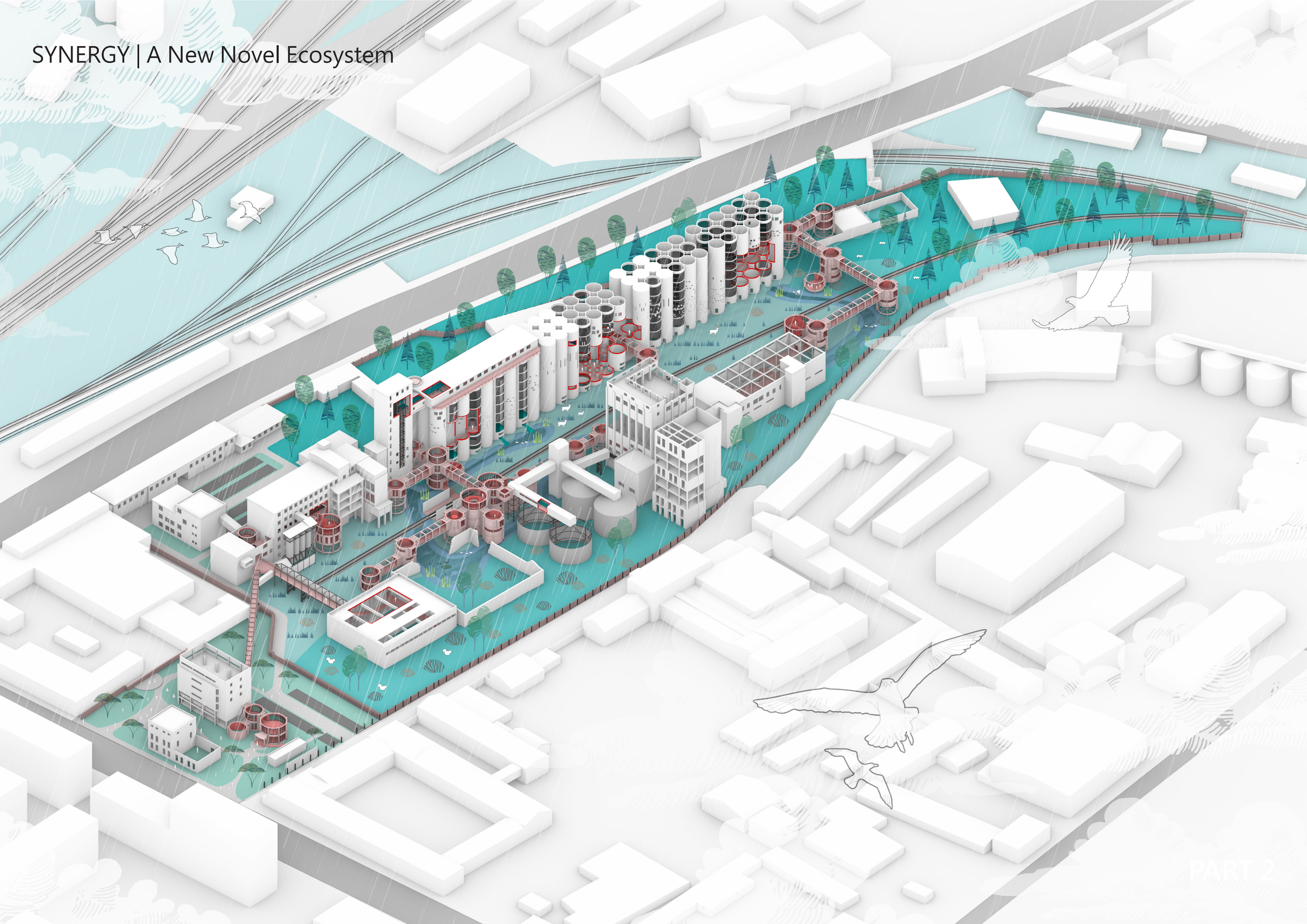
SITE SECTION 1-1 1:500

TRANSFORMATION | Modular Frame & Space



SECTION B-B 1:100

SYNERGY | A New Novel Ecosystem



SYNERGY | Habitats

WILD CORRIDOR

WILDERNESS STAGE 4
Spontaneous Woodlands



WILDERNESS STAGE 2-3
Waterfront Ecology



WILDERNESS STAGE 2
Persistent Ruderal Vegetation



CONTROLED WILDERNESS
Public Greenspace

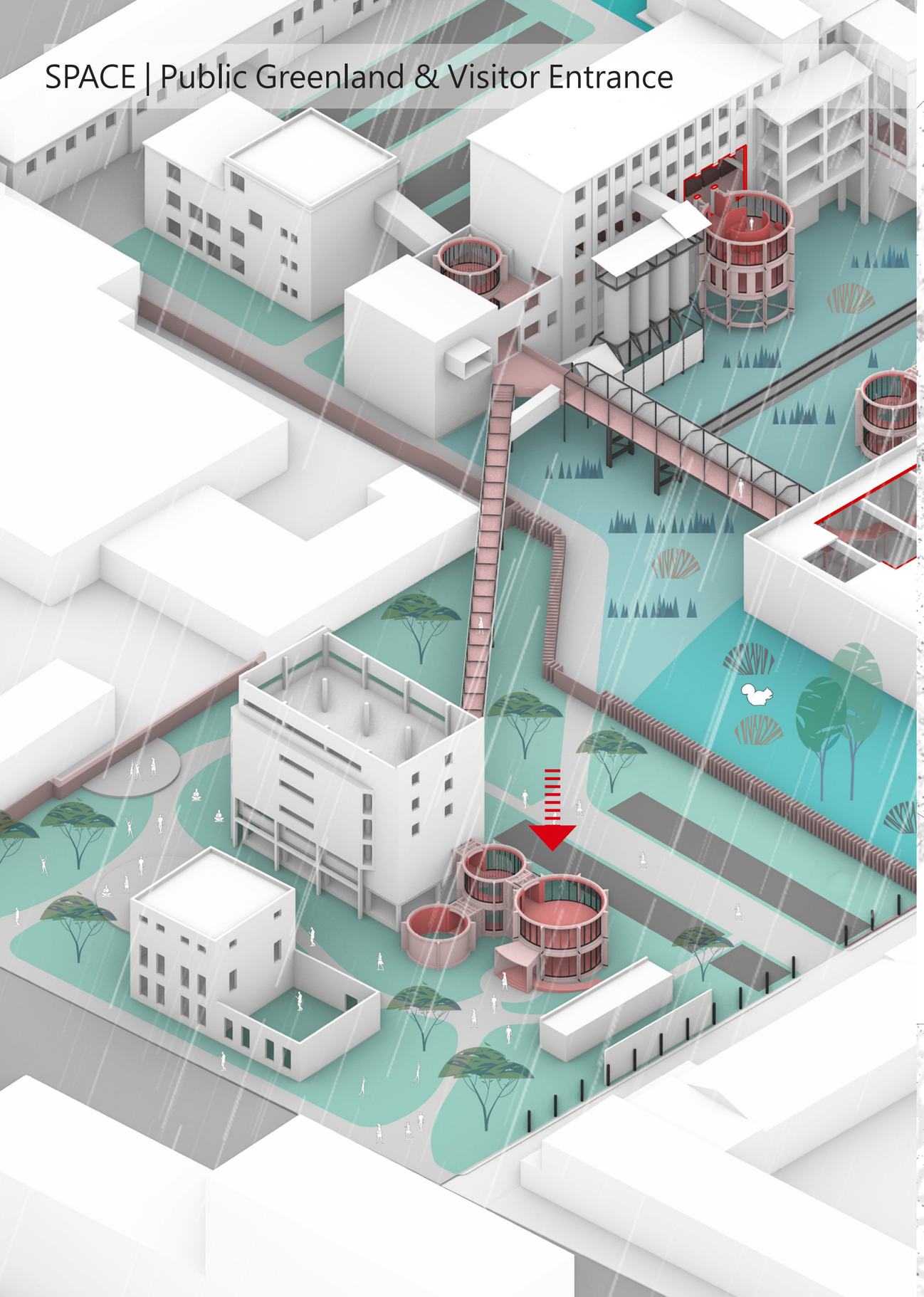


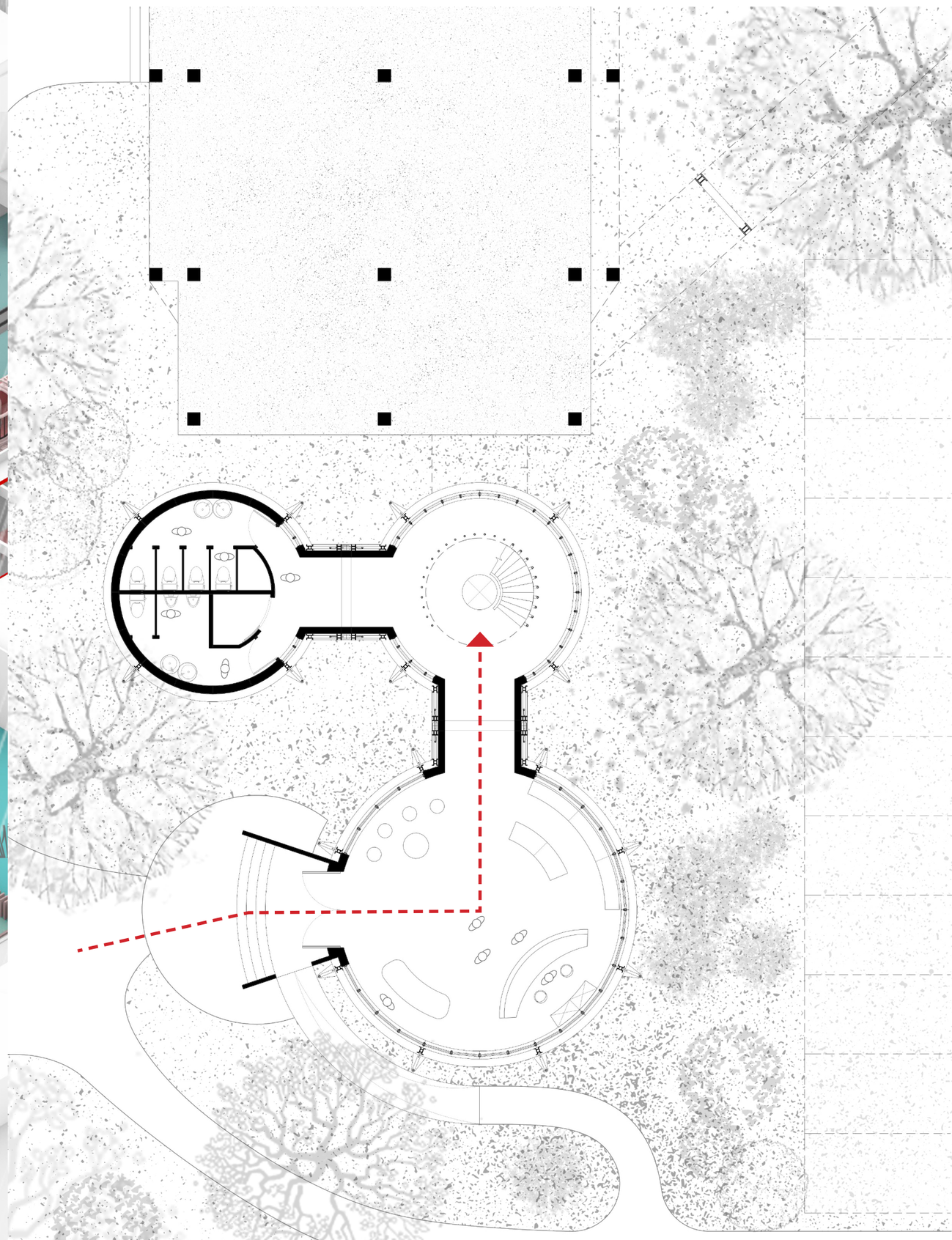
WILDERNESS STAGE 3
Ruderal Tall Herbaceous Vegetation





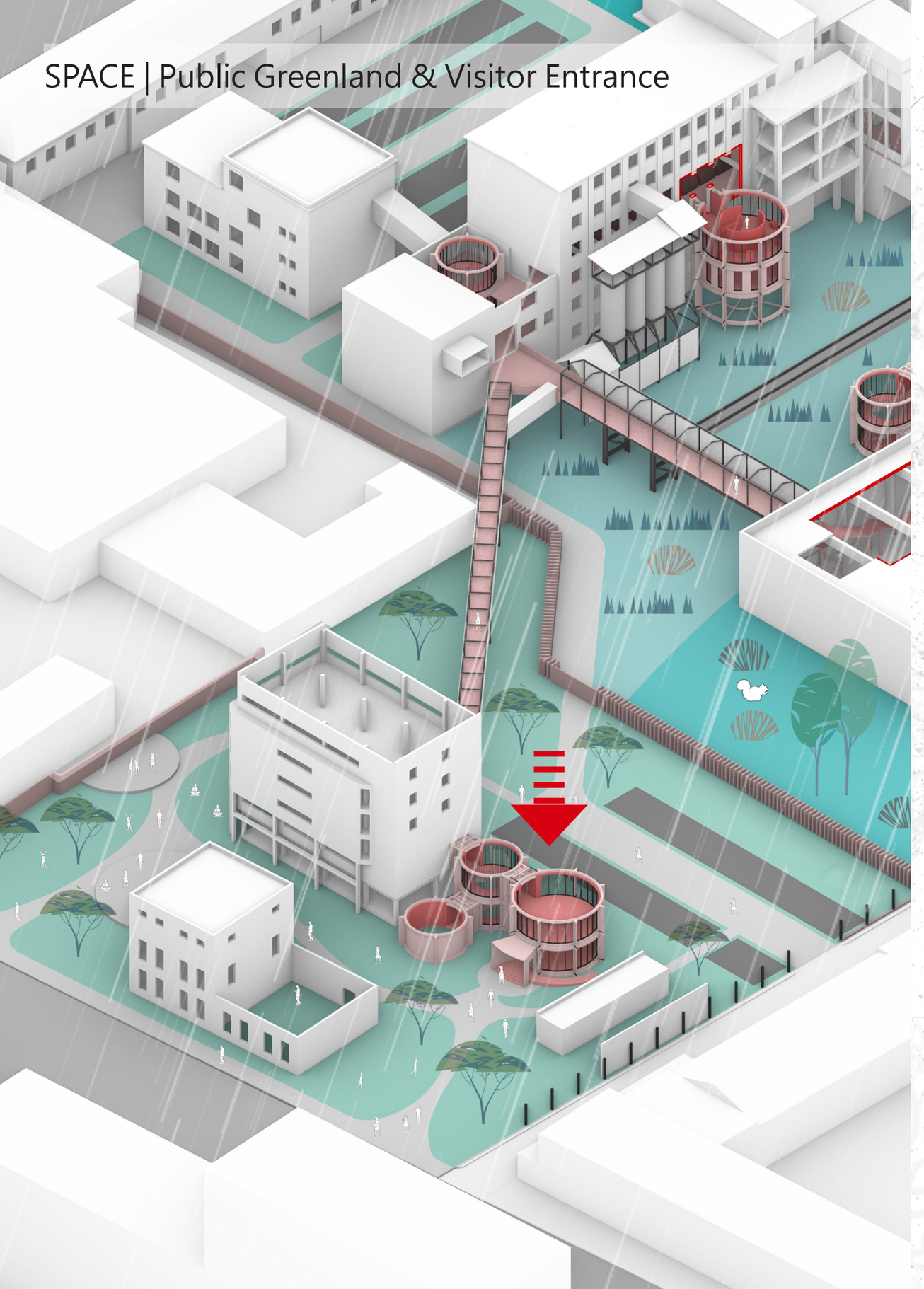
SPACE | Public Greenland & Visitor Entrance

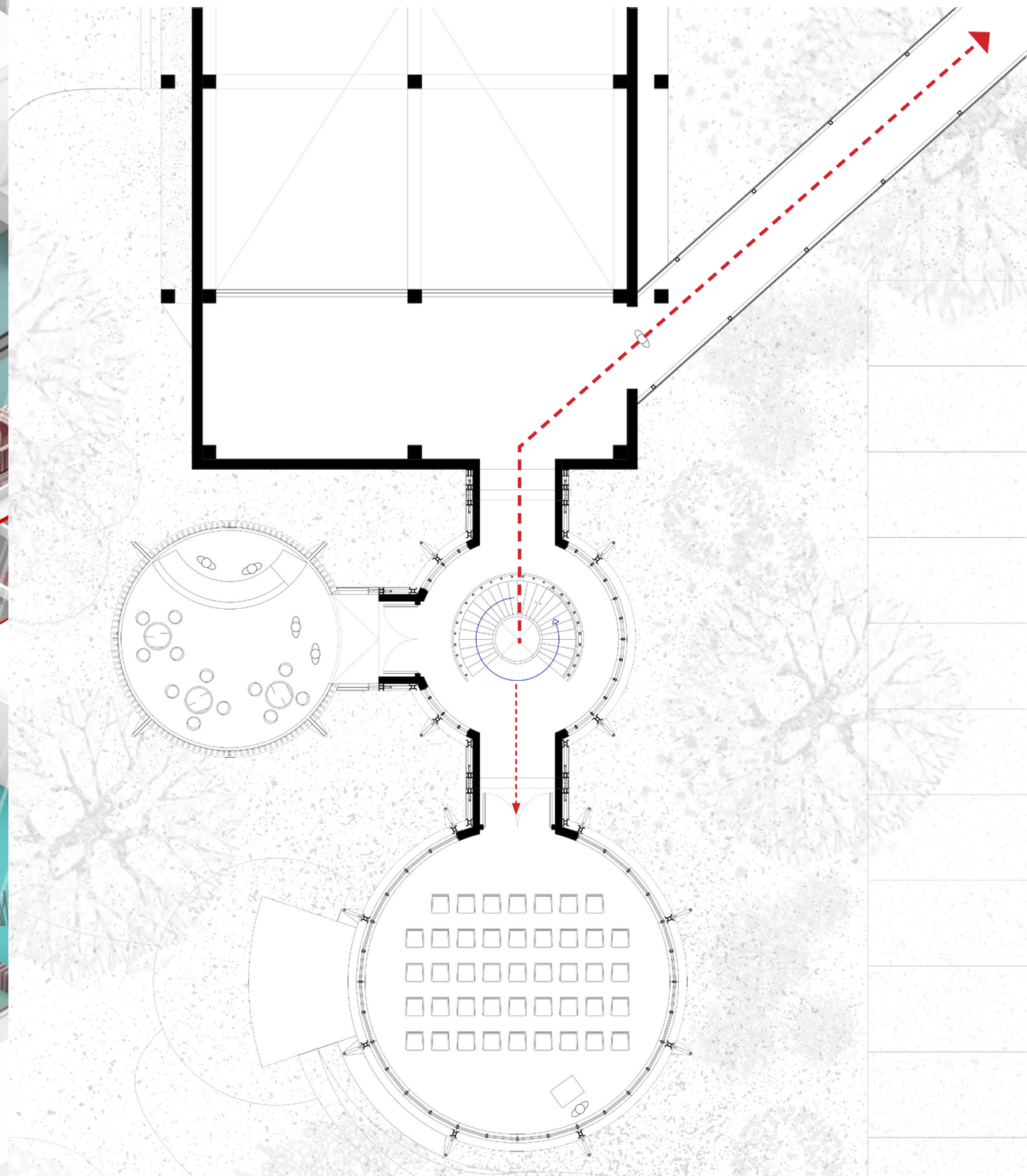




Entrance | Ground Floor

SPACE | Public Greenland & Visitor Entrance





Entrance | 1st Floor

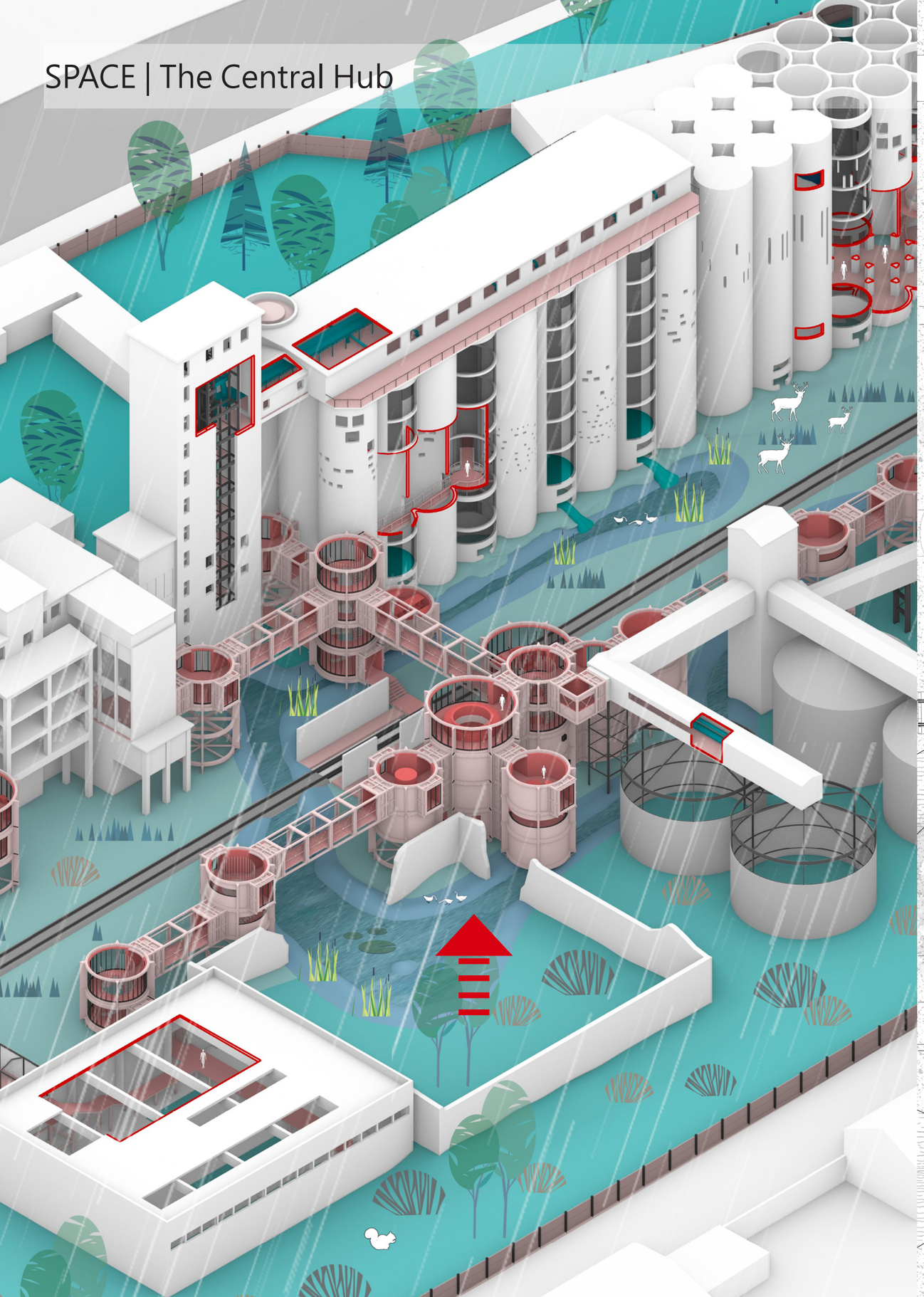


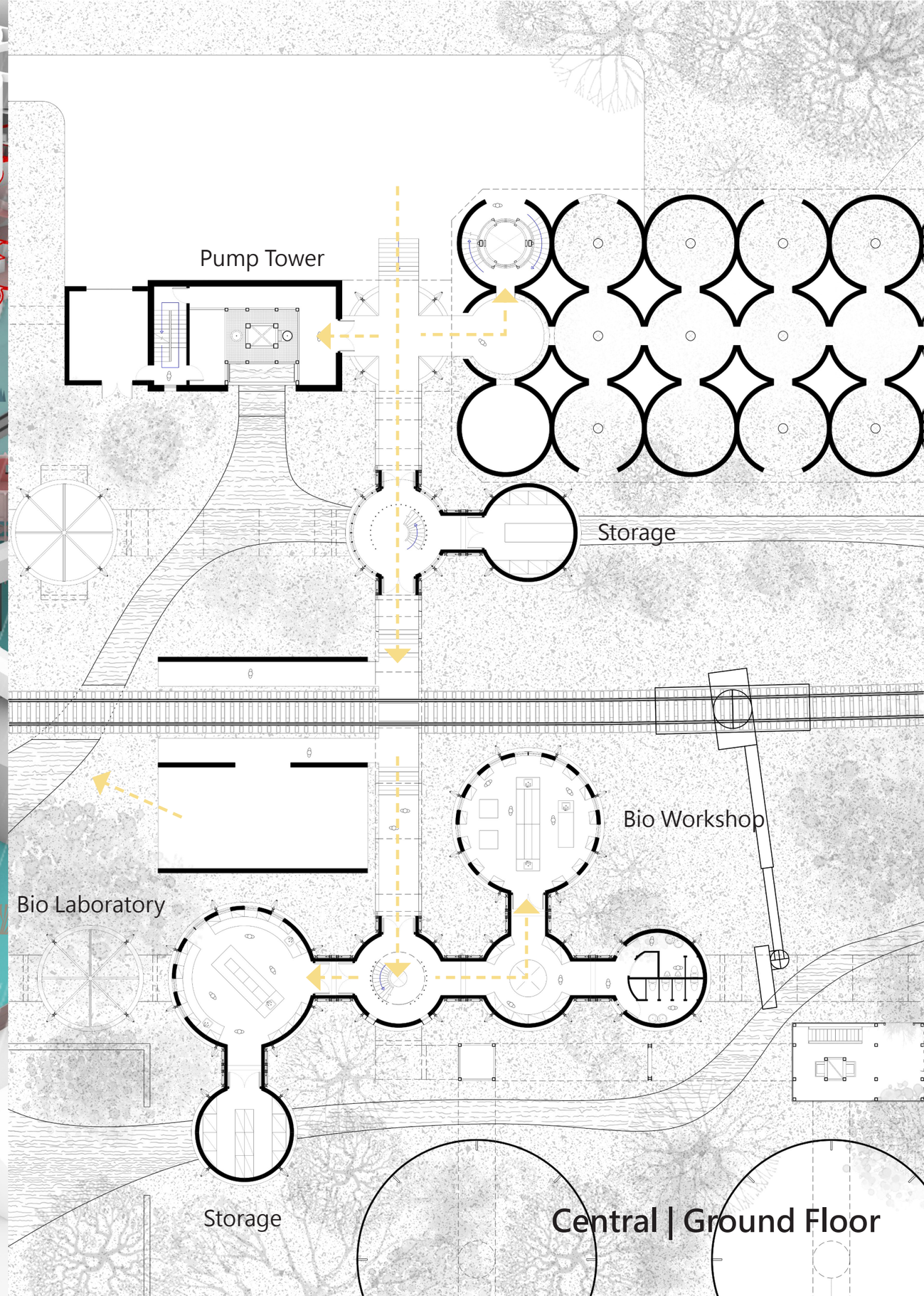
SPACE | Machinery & History





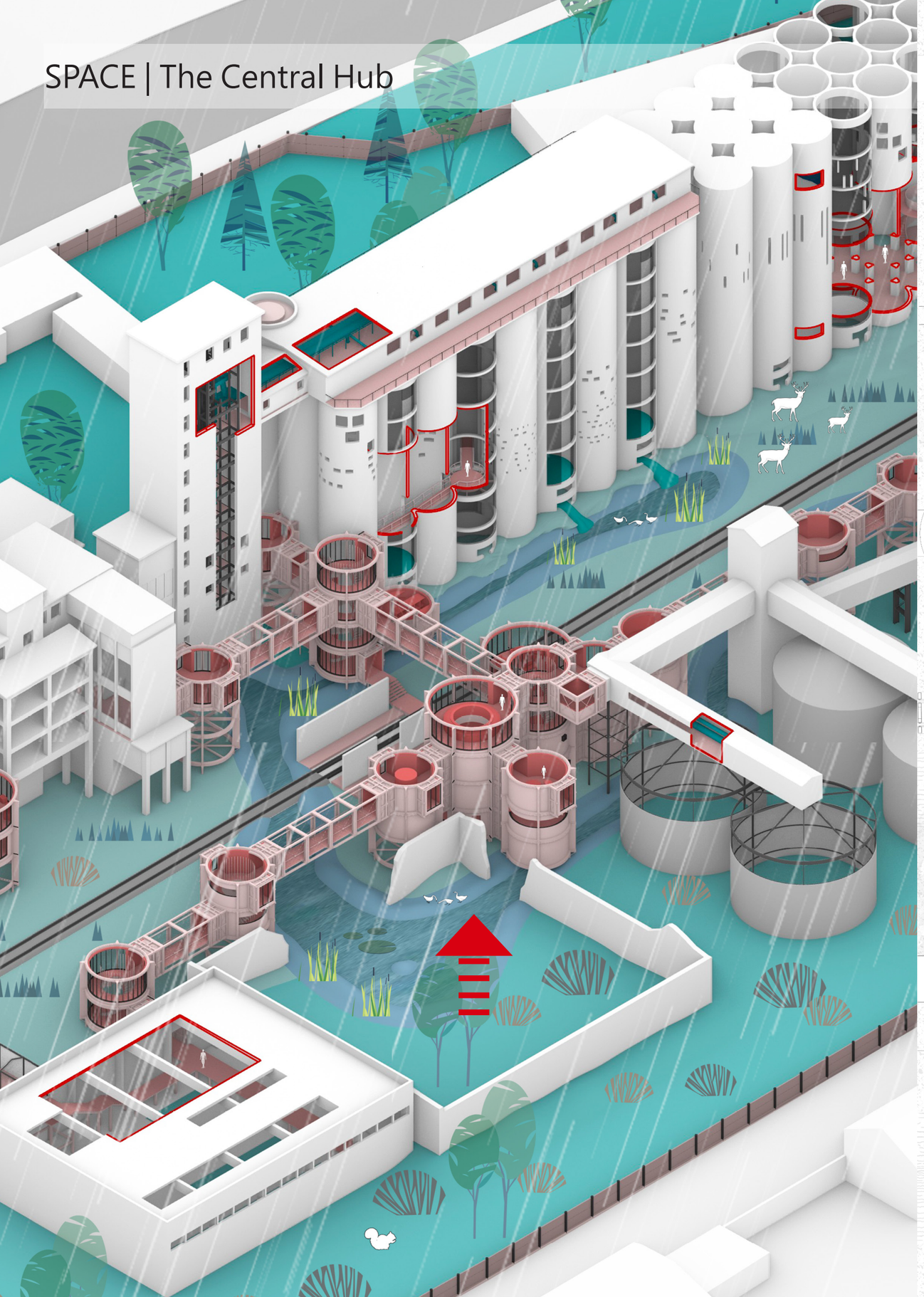
SPACE | The Central Hub

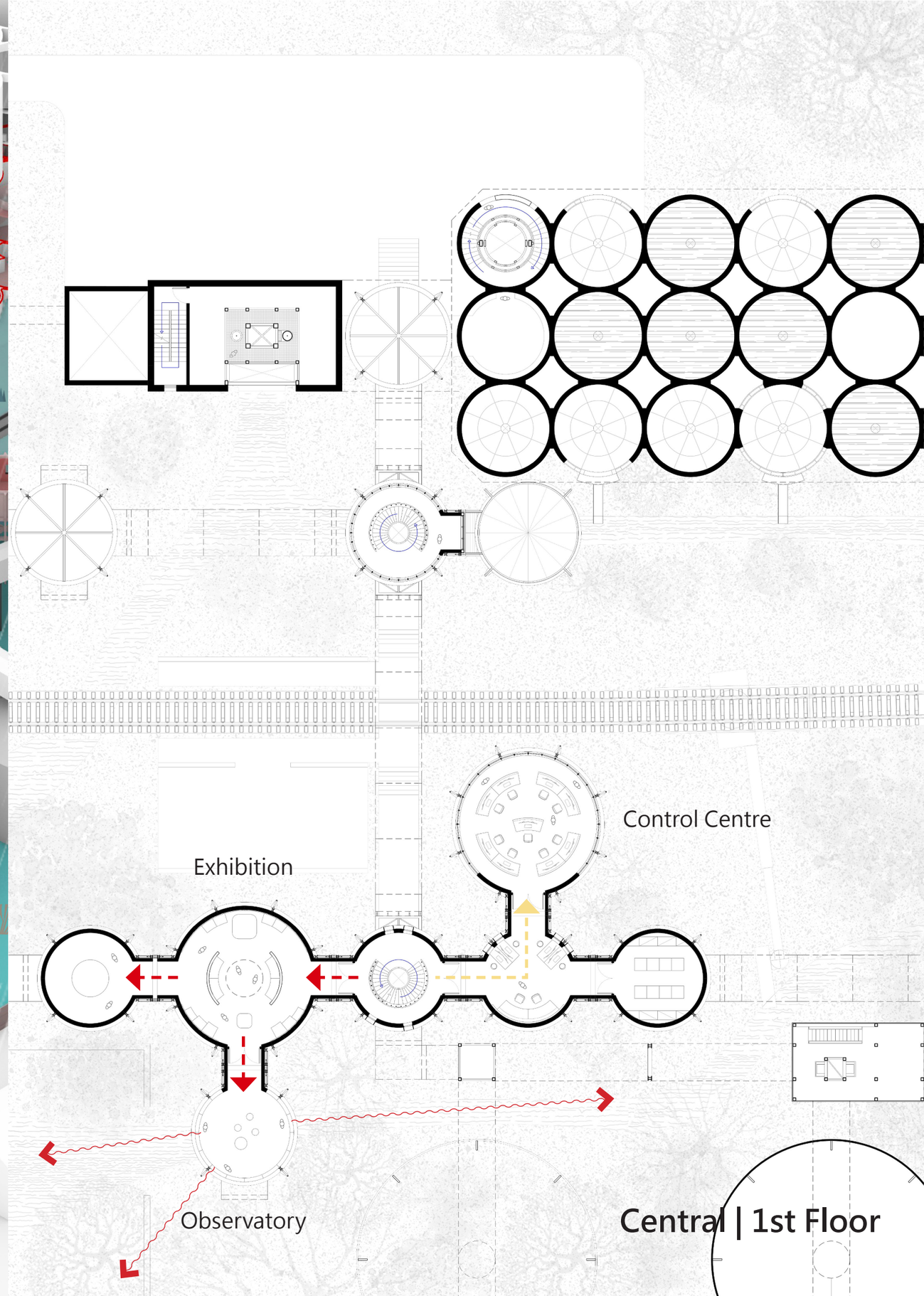




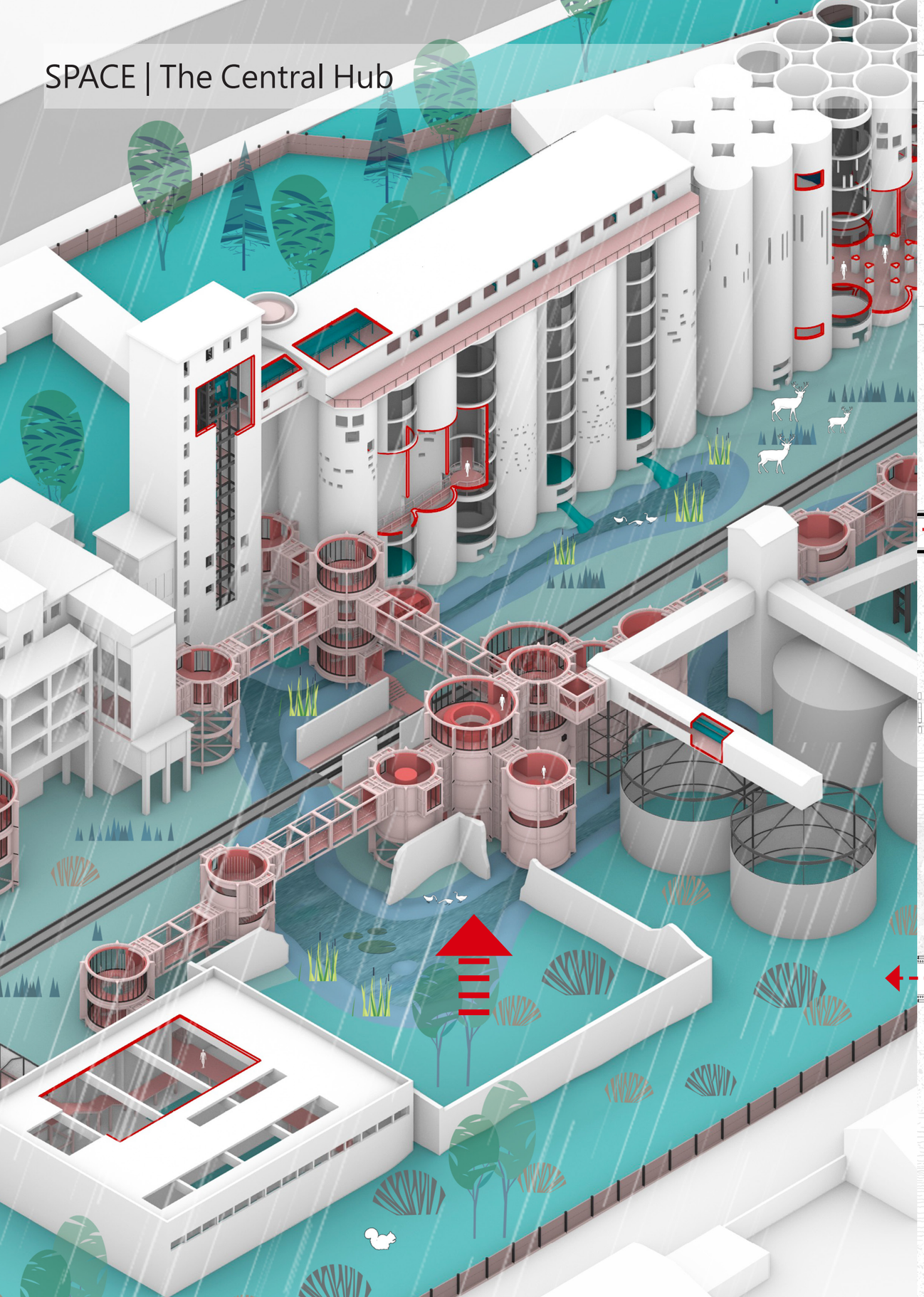
Central | Ground Floor

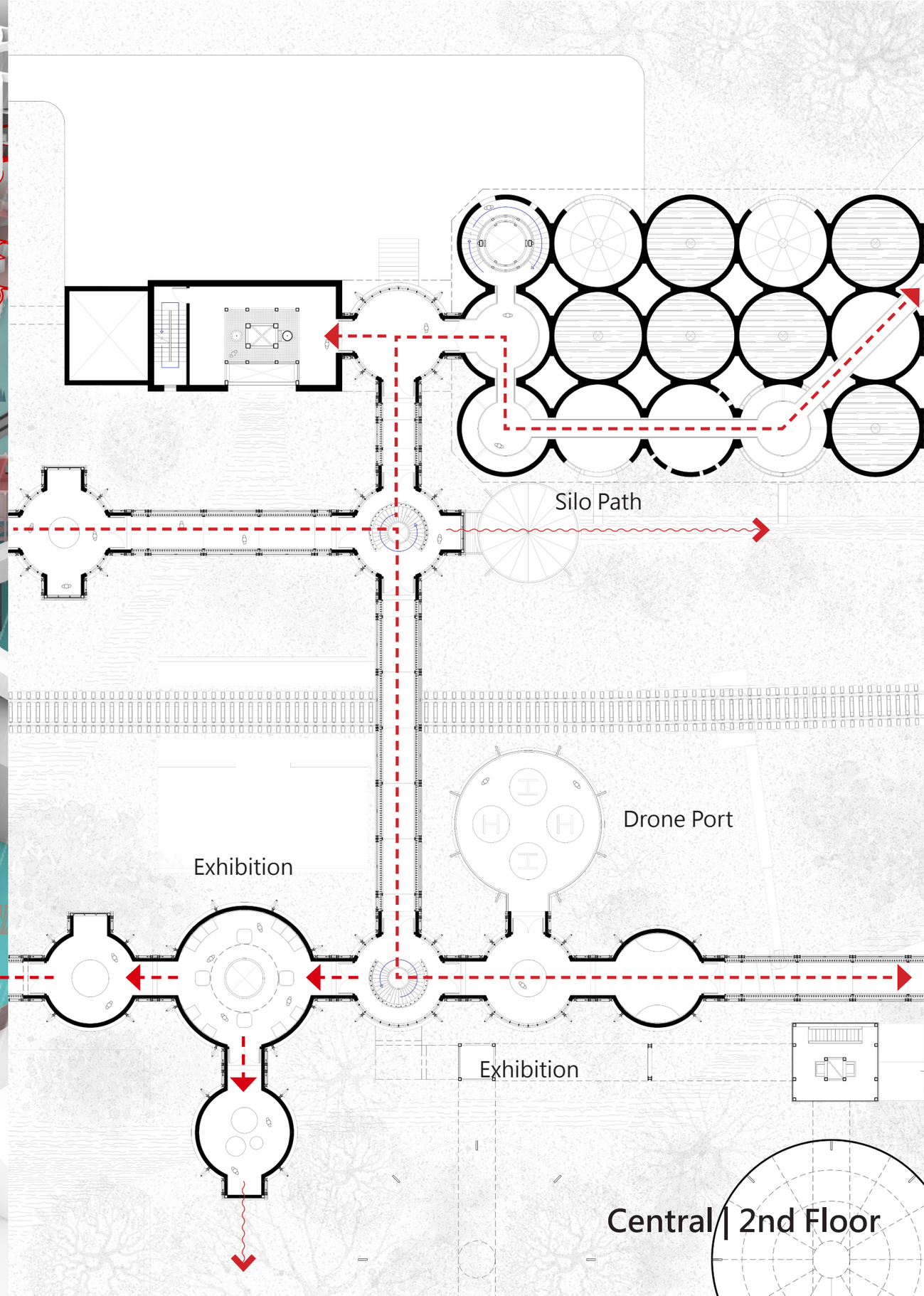
SPACE | The Central Hub



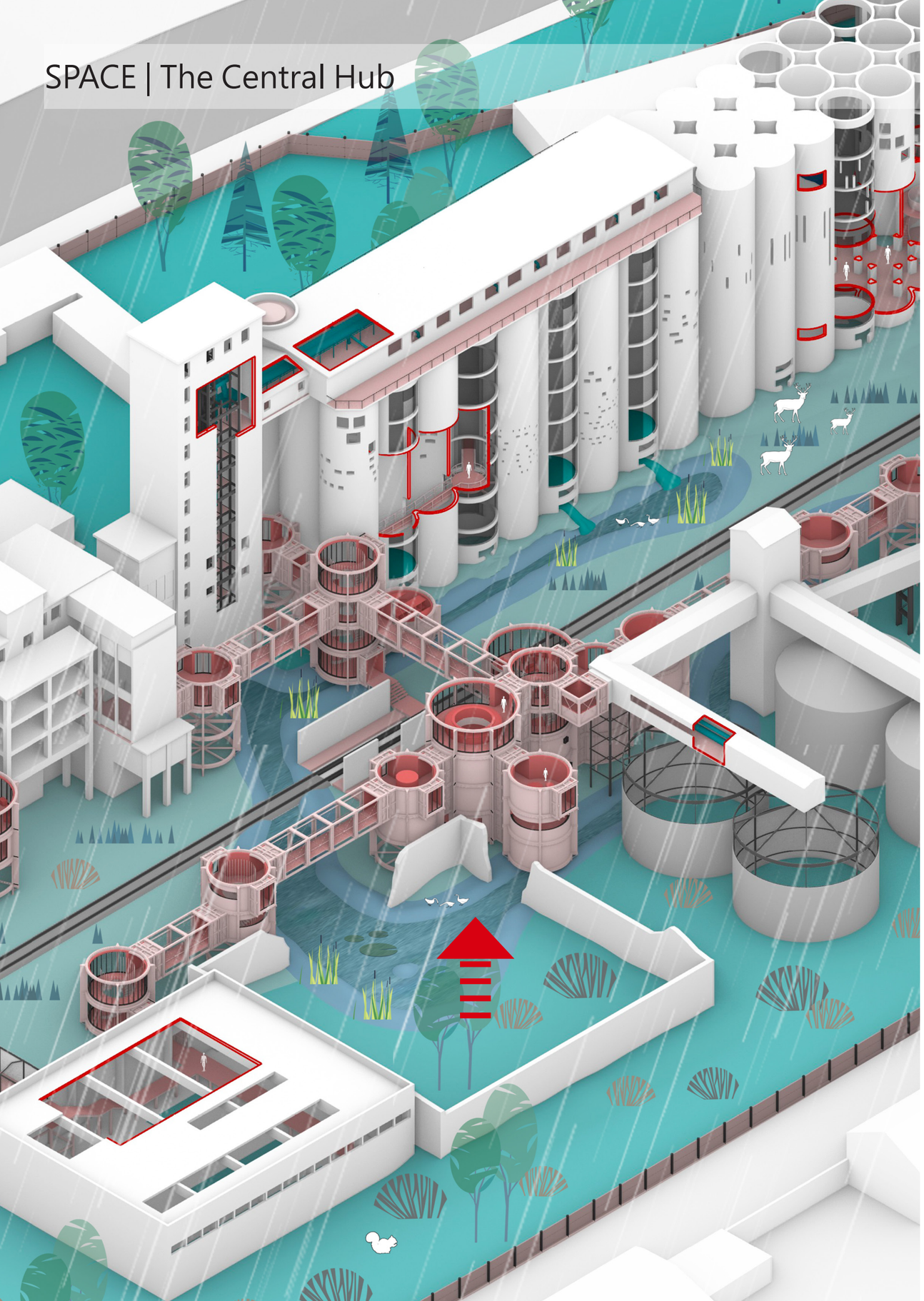


SPACE | The Central Hub





SPACE | The Central Hub

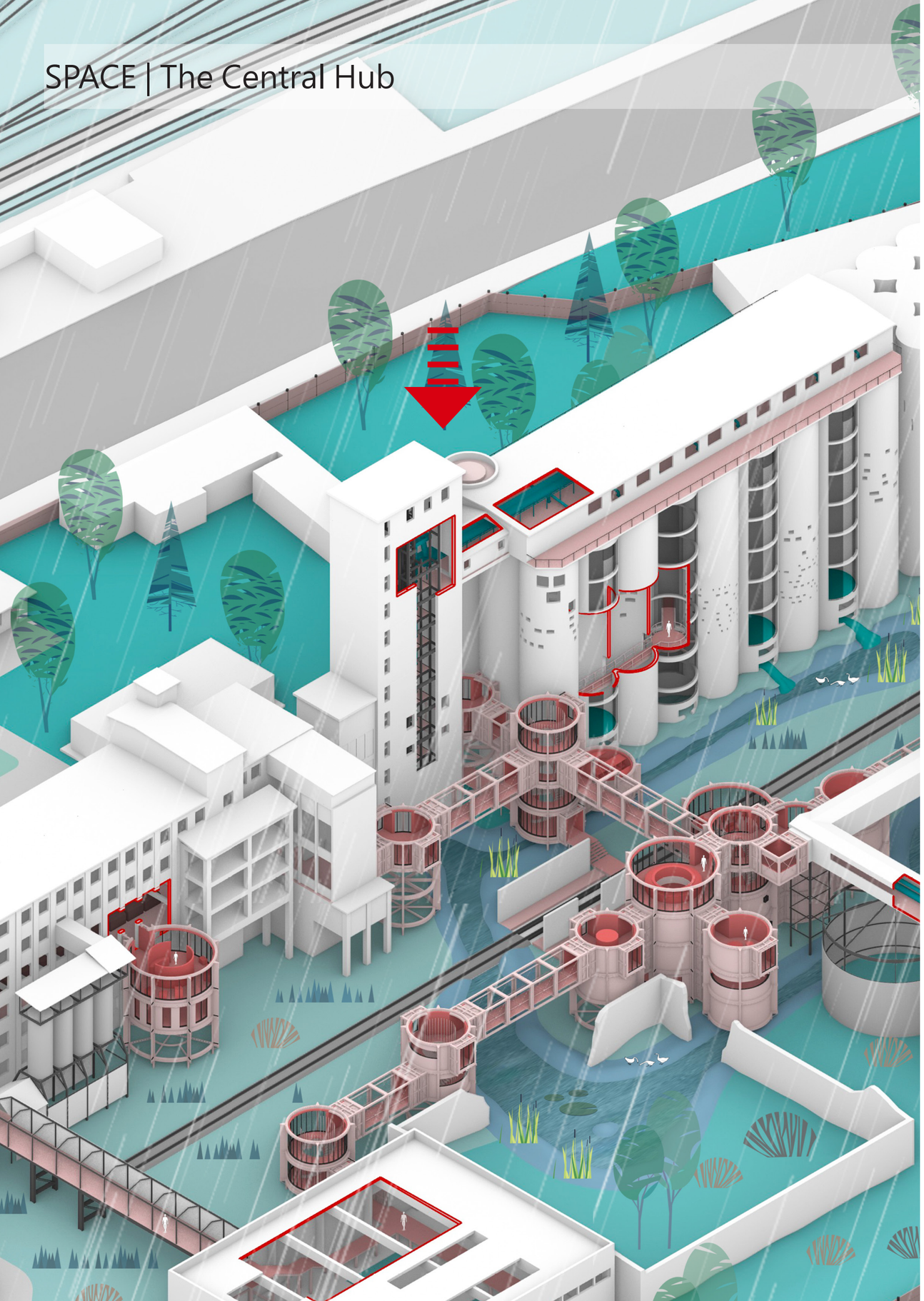






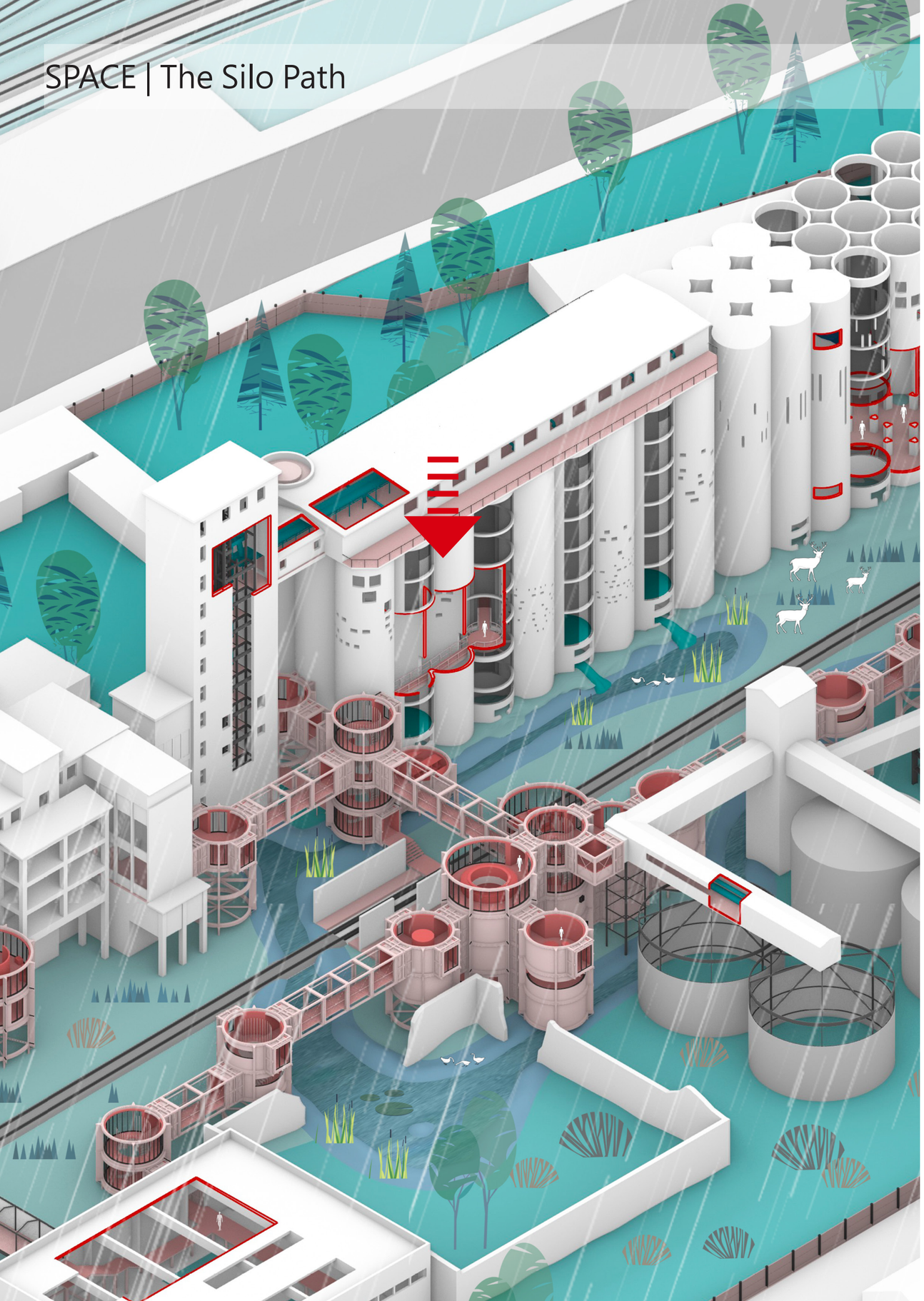
SPACE | Waterside Platform

SPACE | The Central Hub



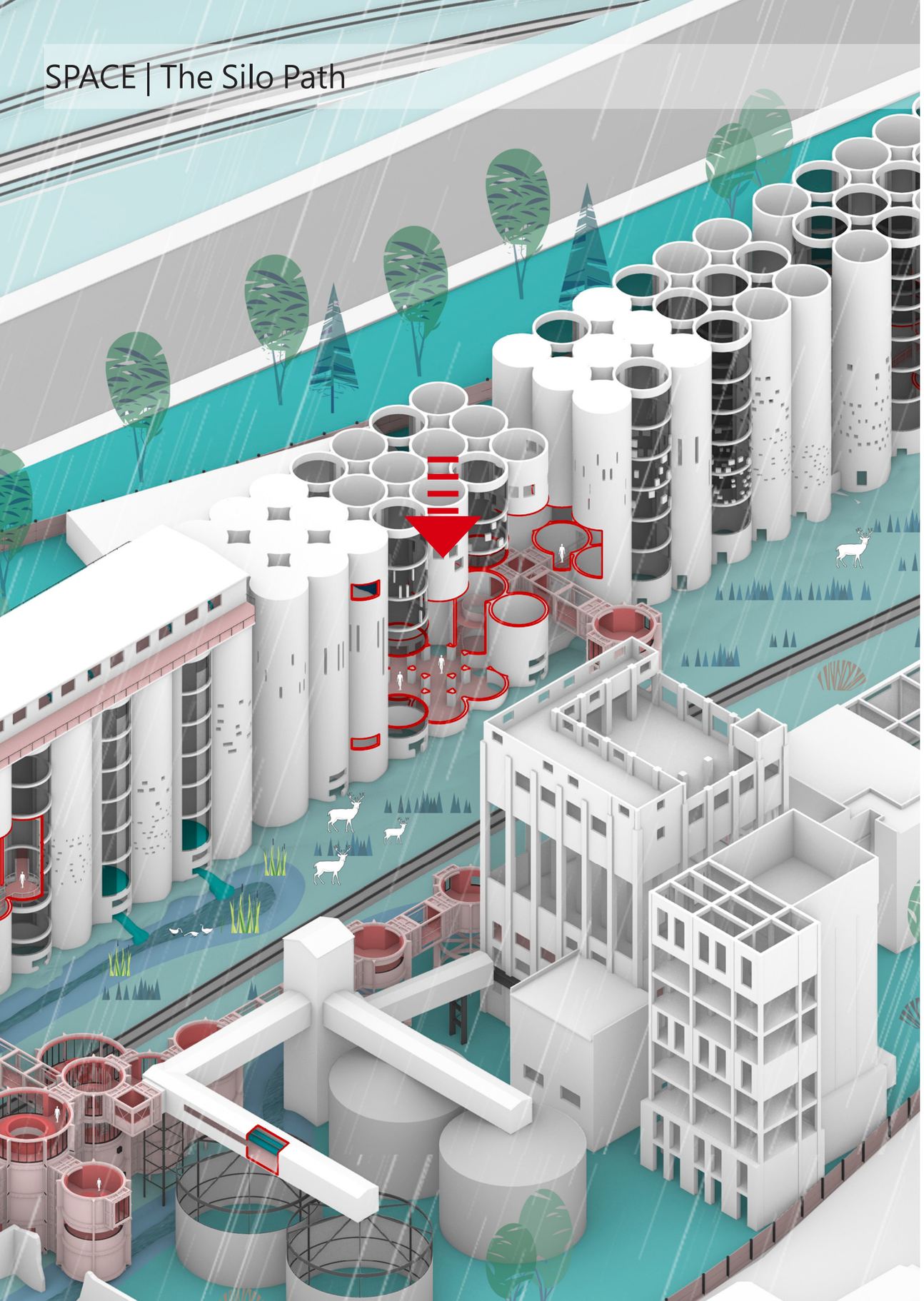


SPACE | The Silo Path



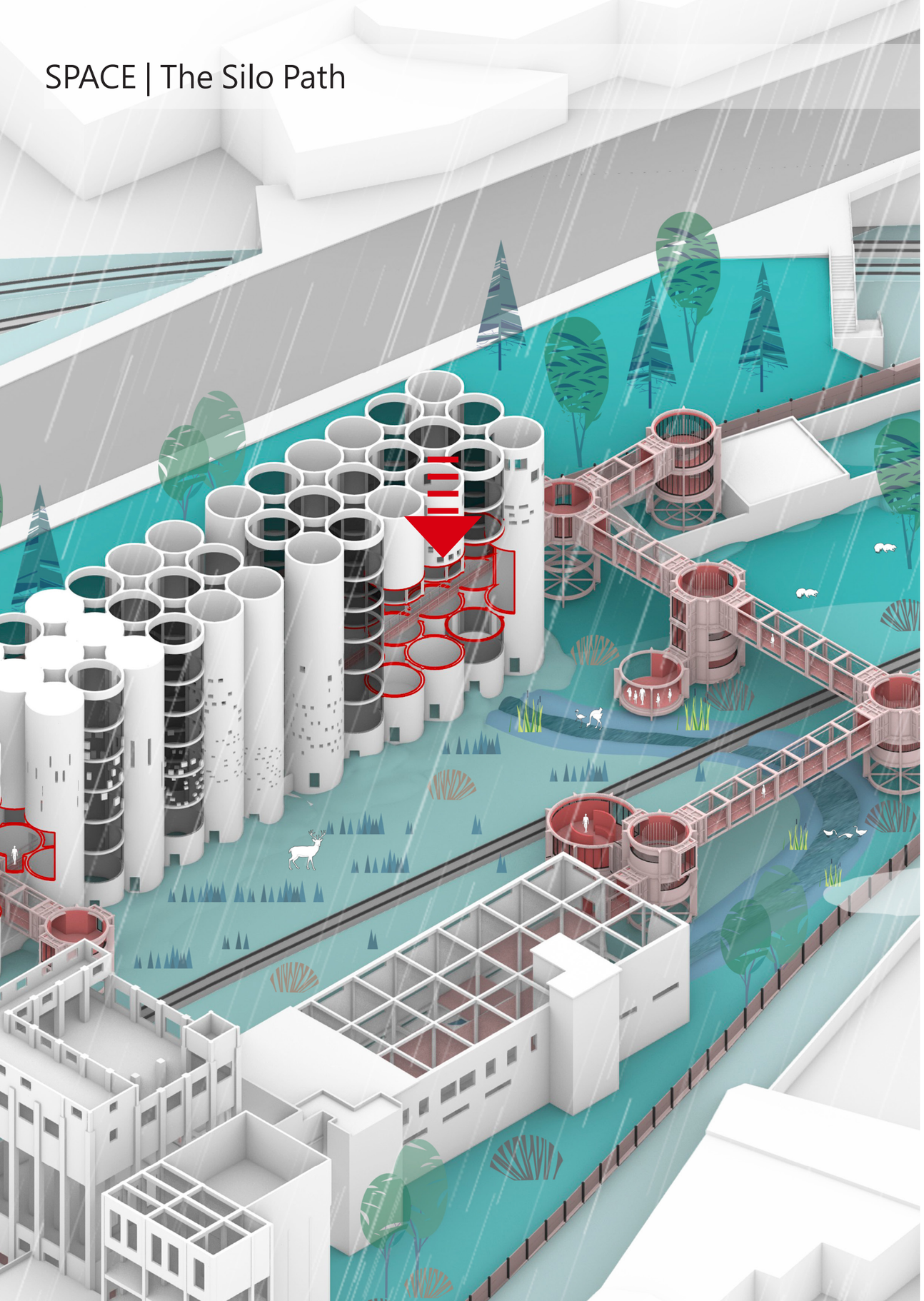


SPACE | The Silo Path





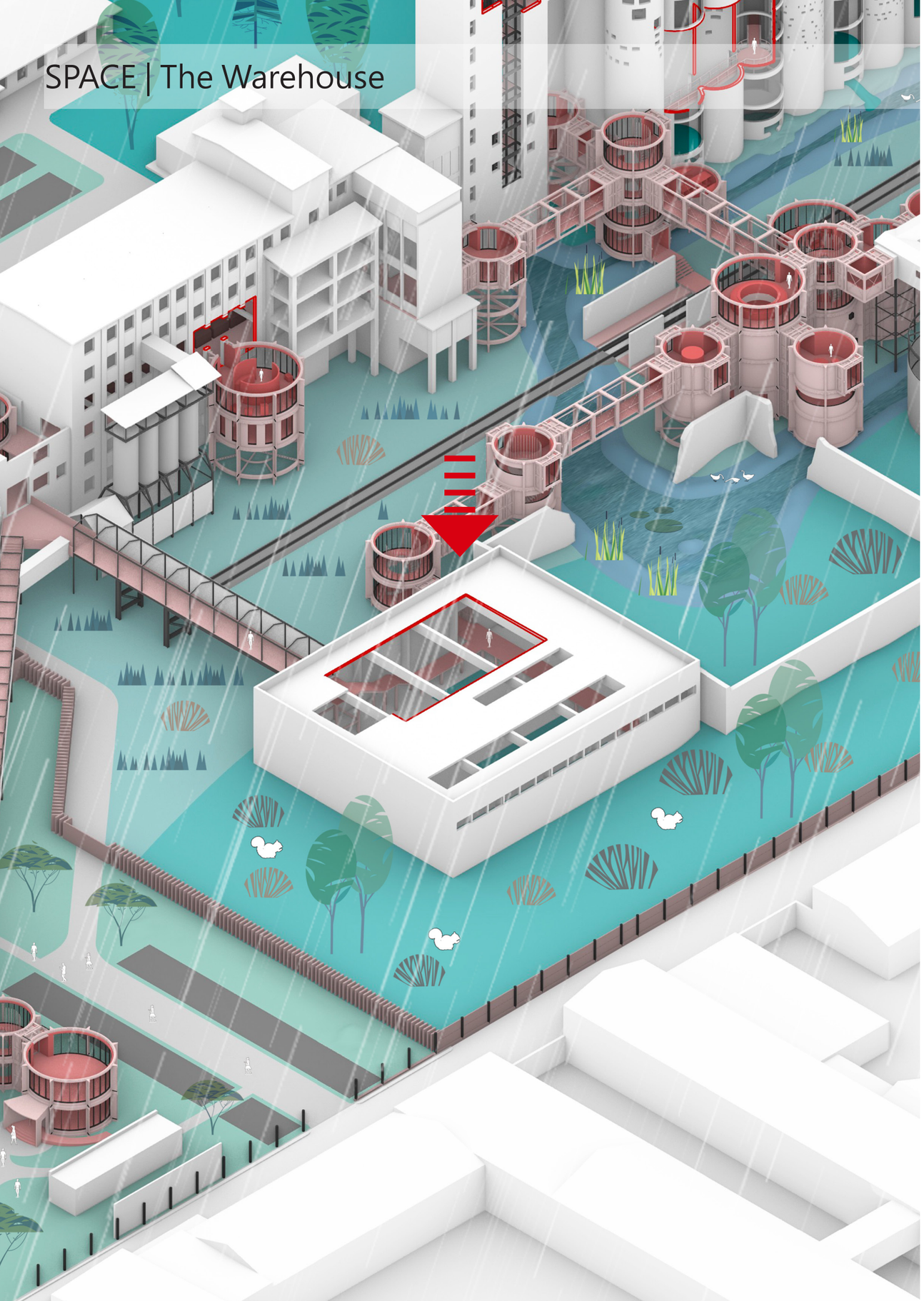
SPACE | The Silo Path





SPACE | Opened Warehouse

SPACE | The Warehouse





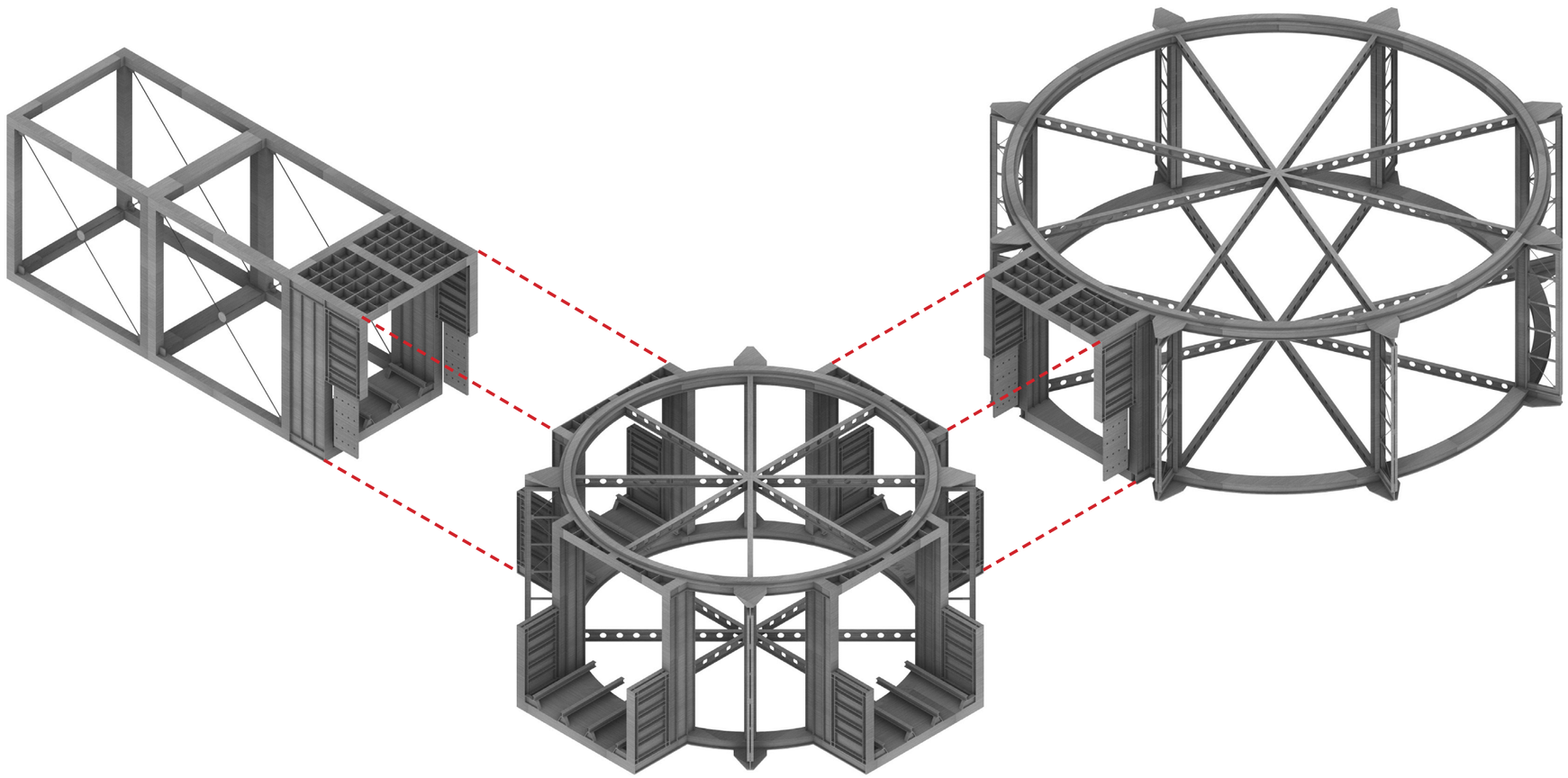
Modular Construction ...

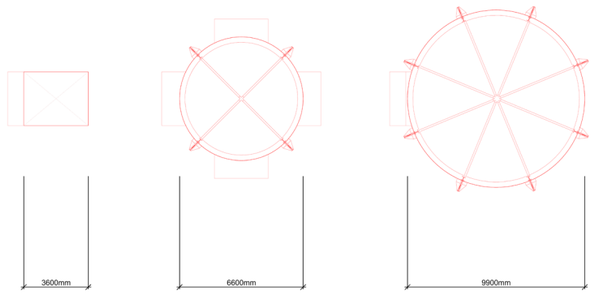
STRUCTURE
CLIMATE

ON-SITE ASSEMBLE, MODULAR THERMAL INSULATION, SYSTEMATIC VENTILATION

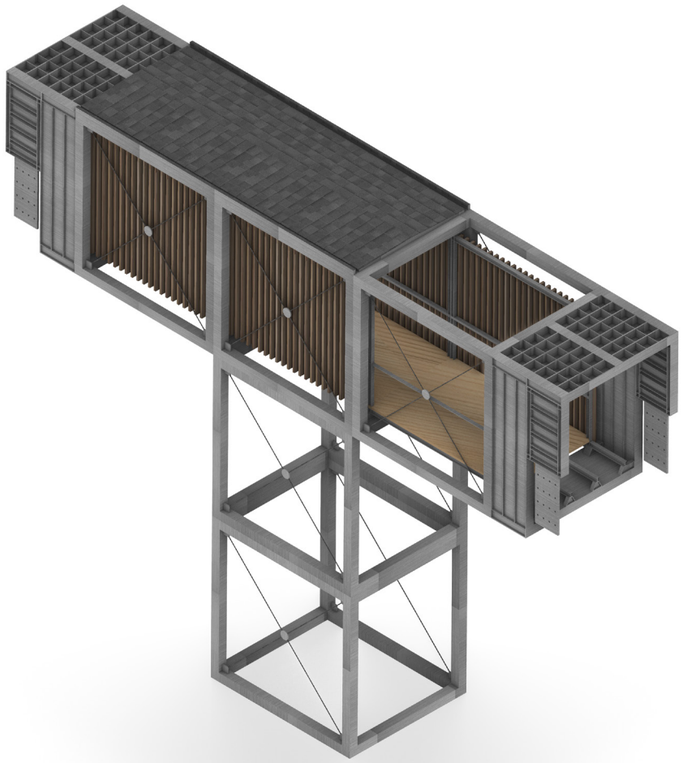
Design Development (P3-P5)

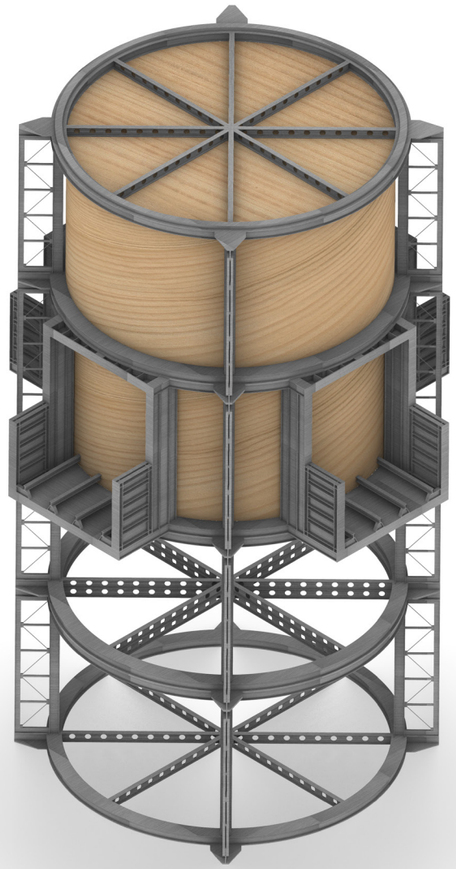
STRUCTURE | Prefabricated Modules Structure 1.0





STRUCTURE | Expendable Structure





STRUCTURE | Corner



STRUCTURE | Helical Piles



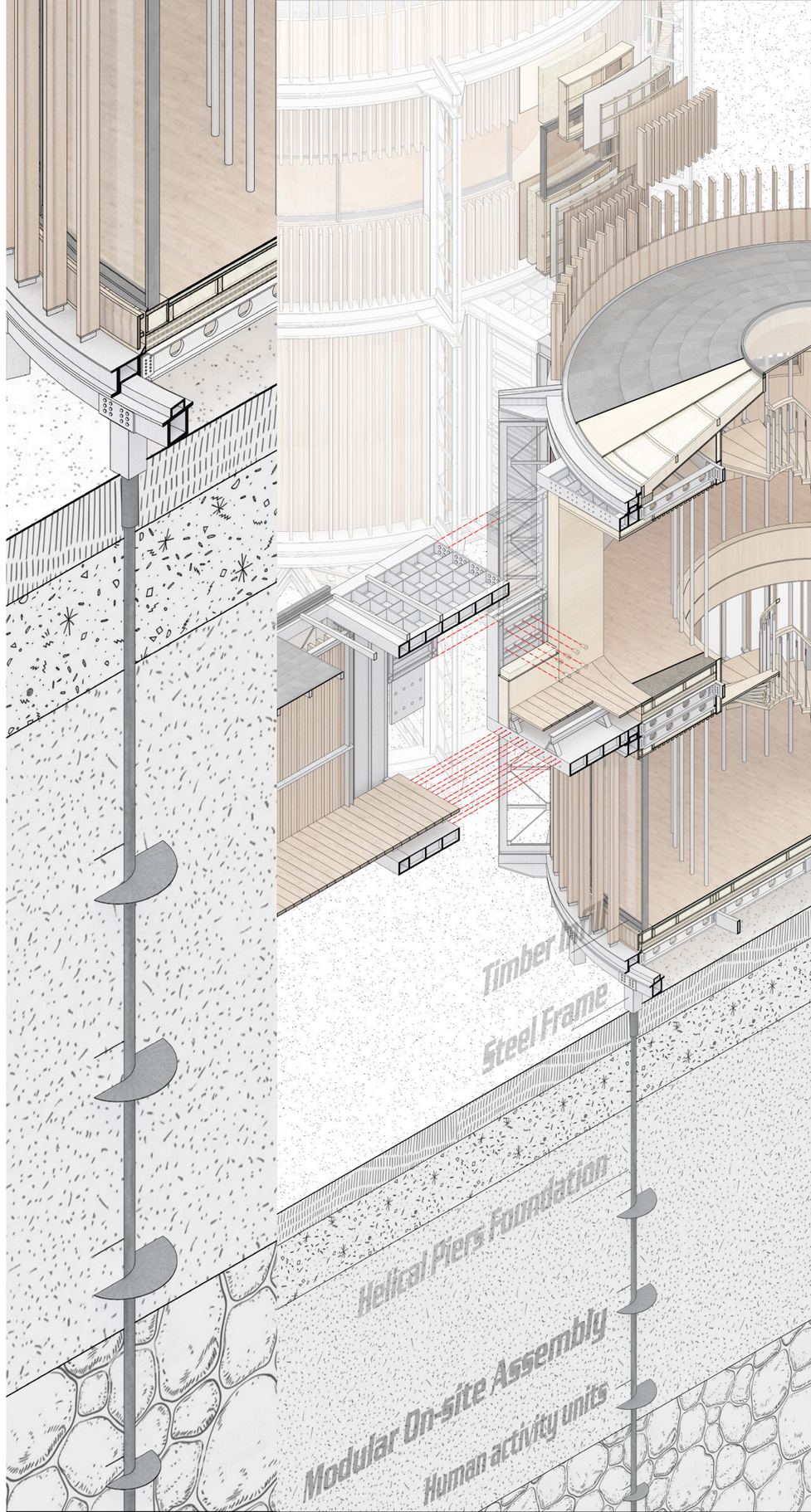
Helical Piles - Minimize environmental impact

Topsoil

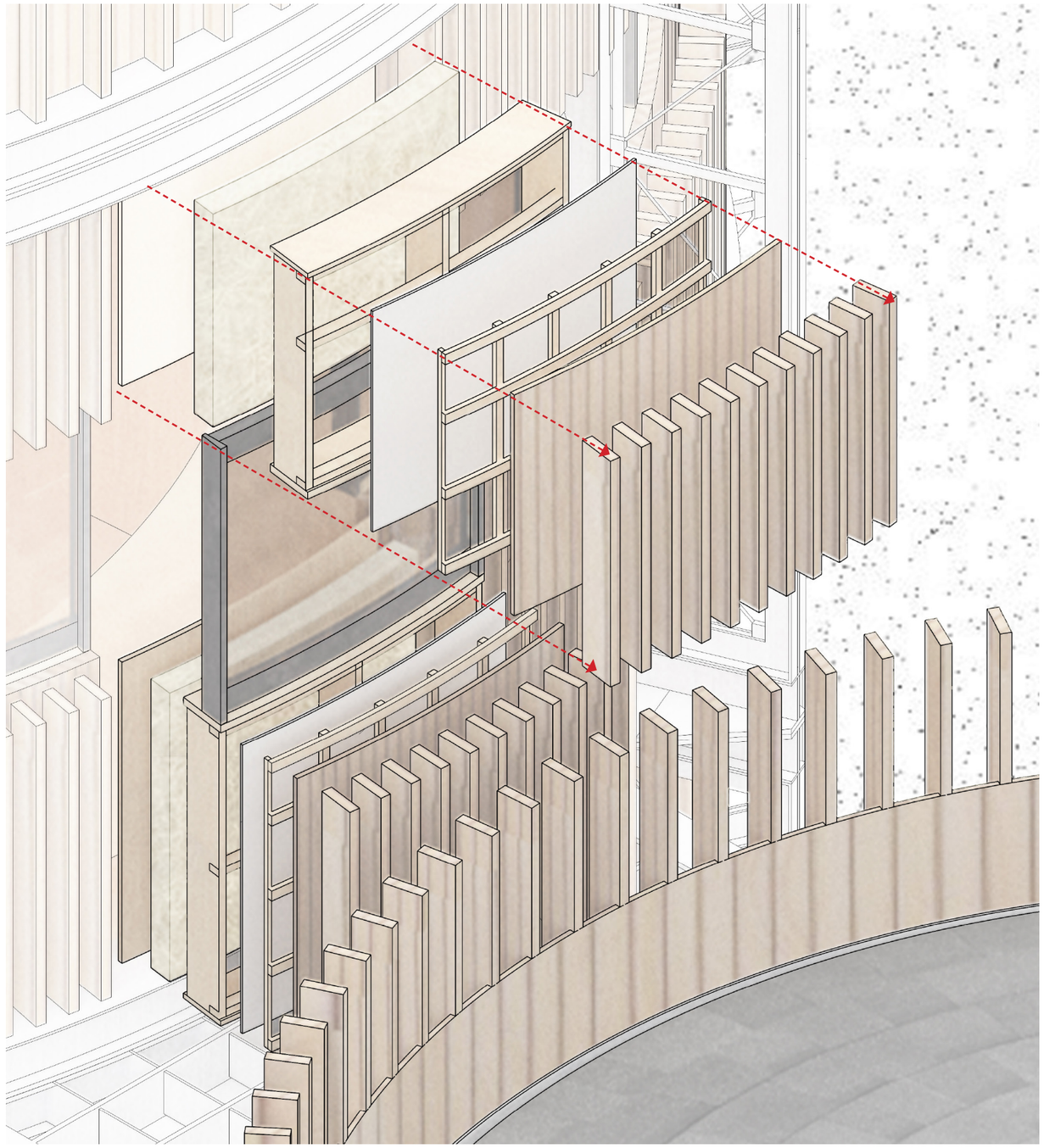
Highly Plastic Clay

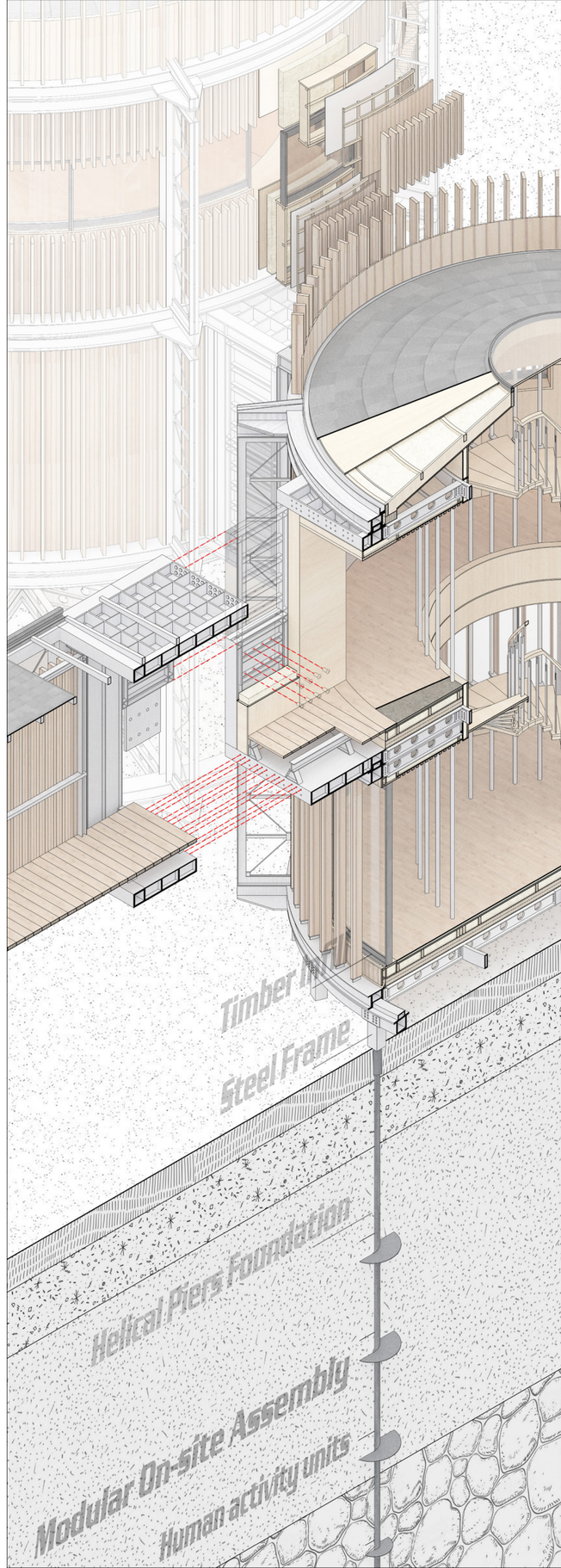
Moderately Plastic Clay

Highly Plastic Clay

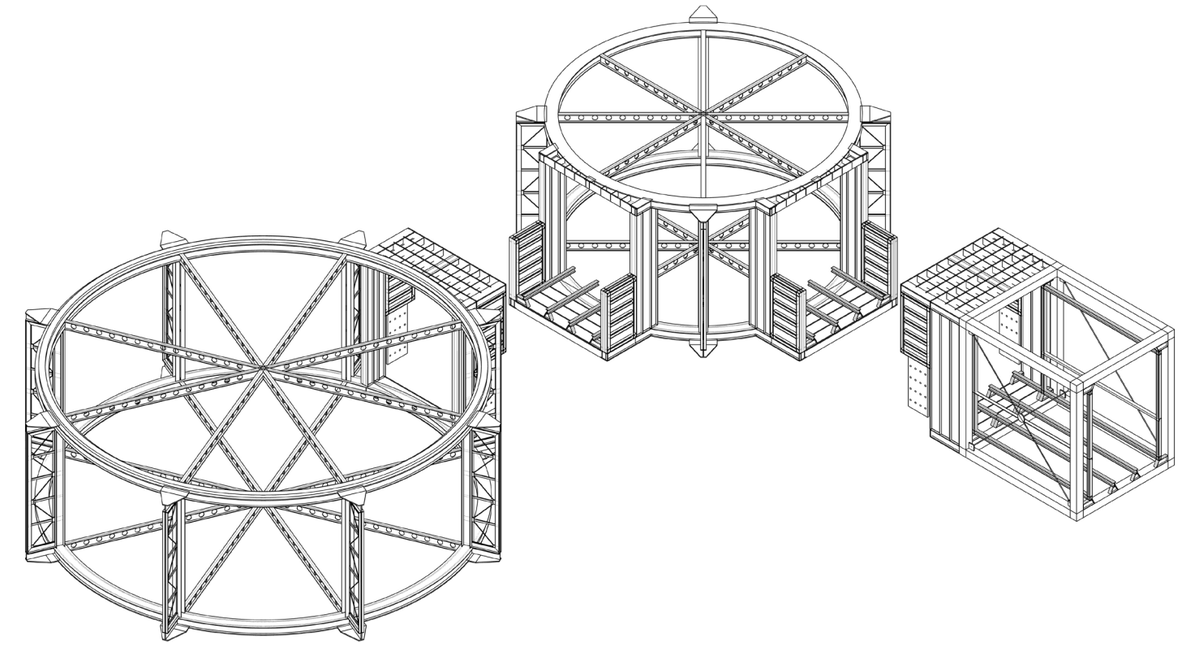


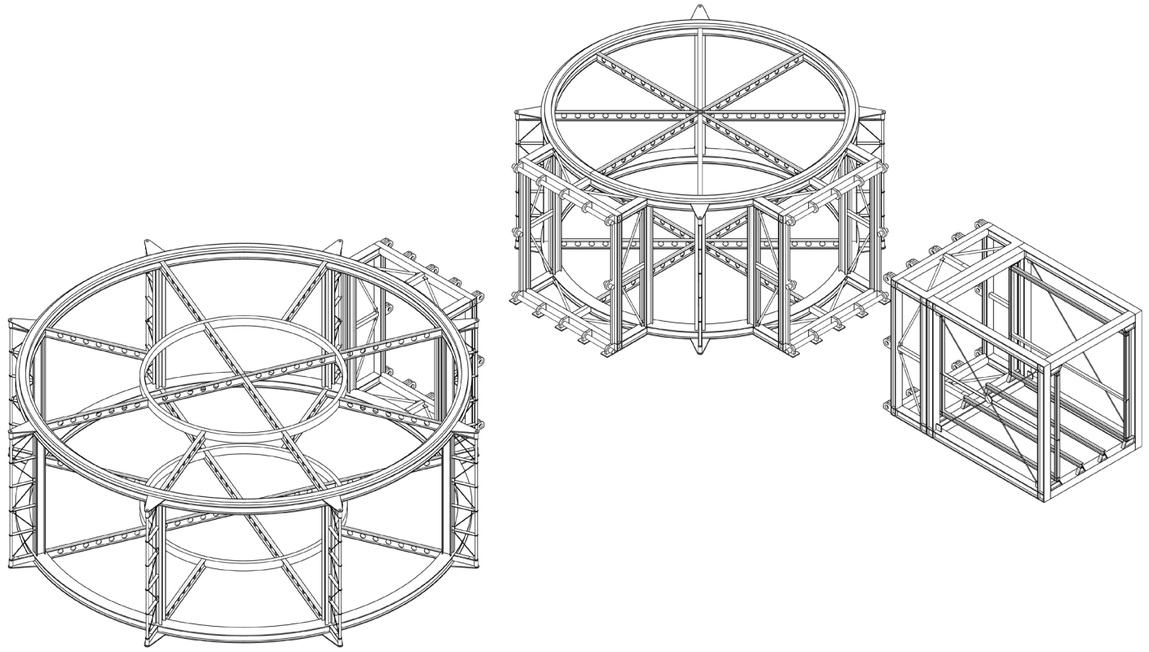
STRUCTURE | Modular Envelop



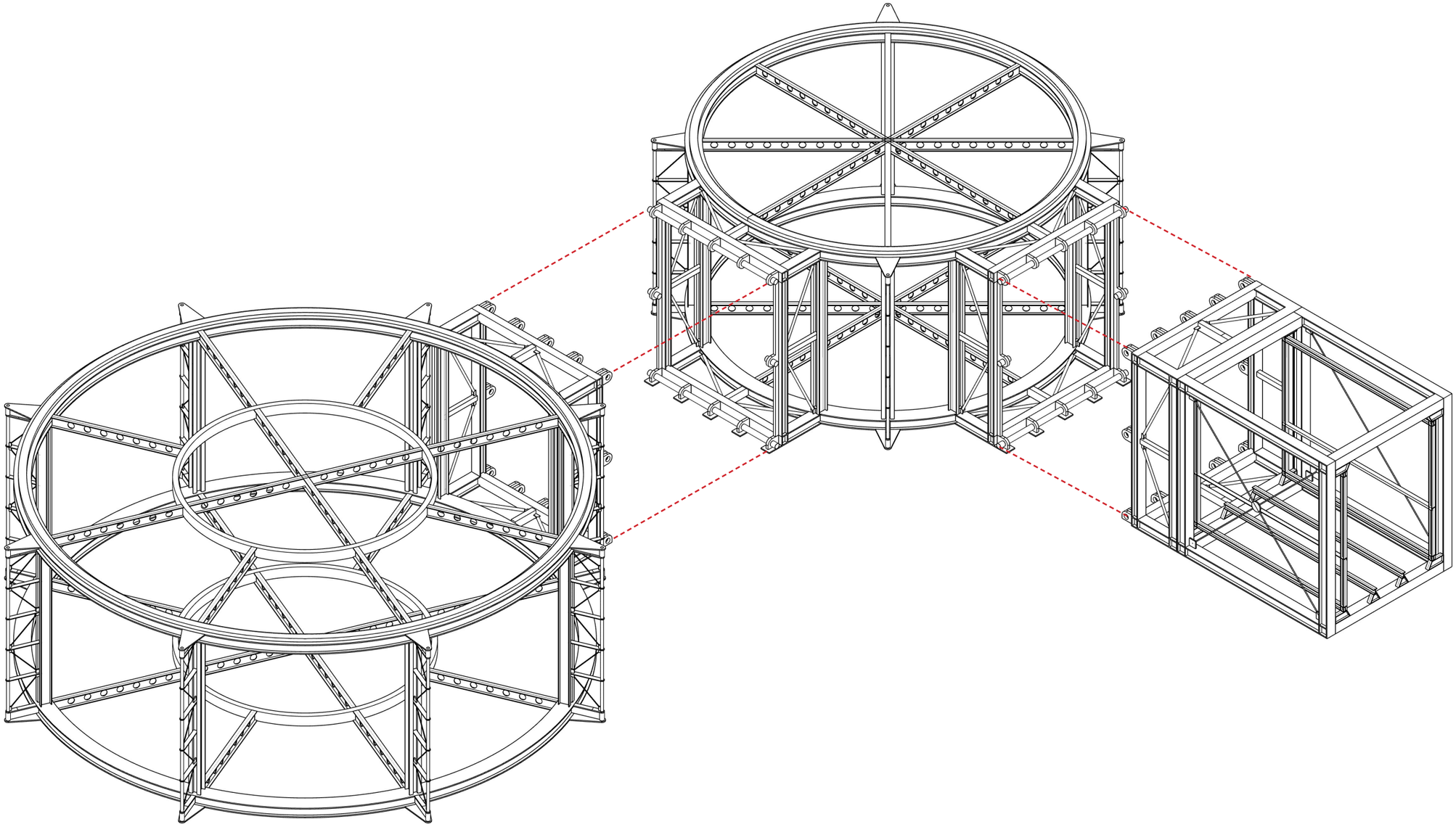


STRUCTURE | Prefabricated Modules Structure 2.0

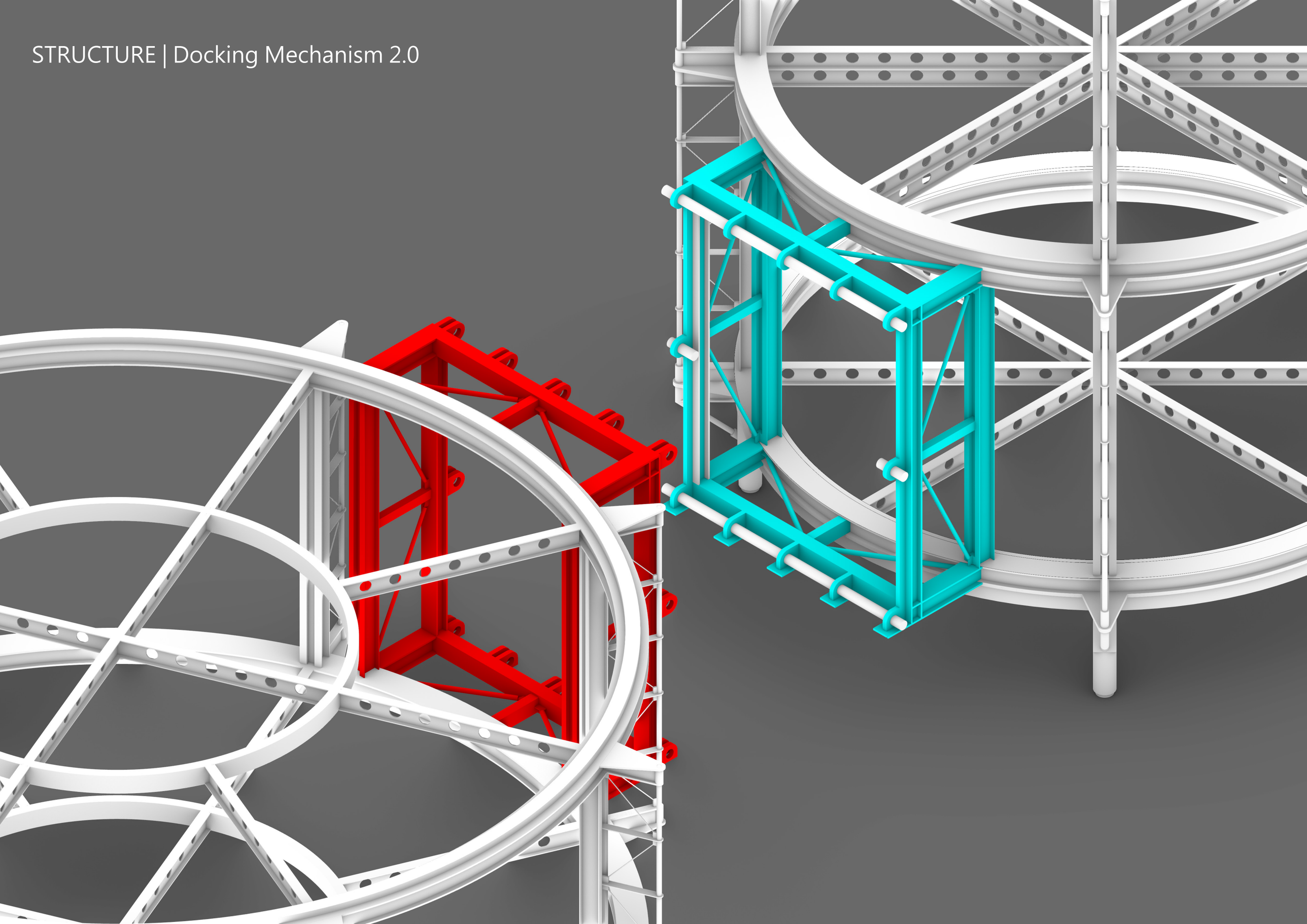




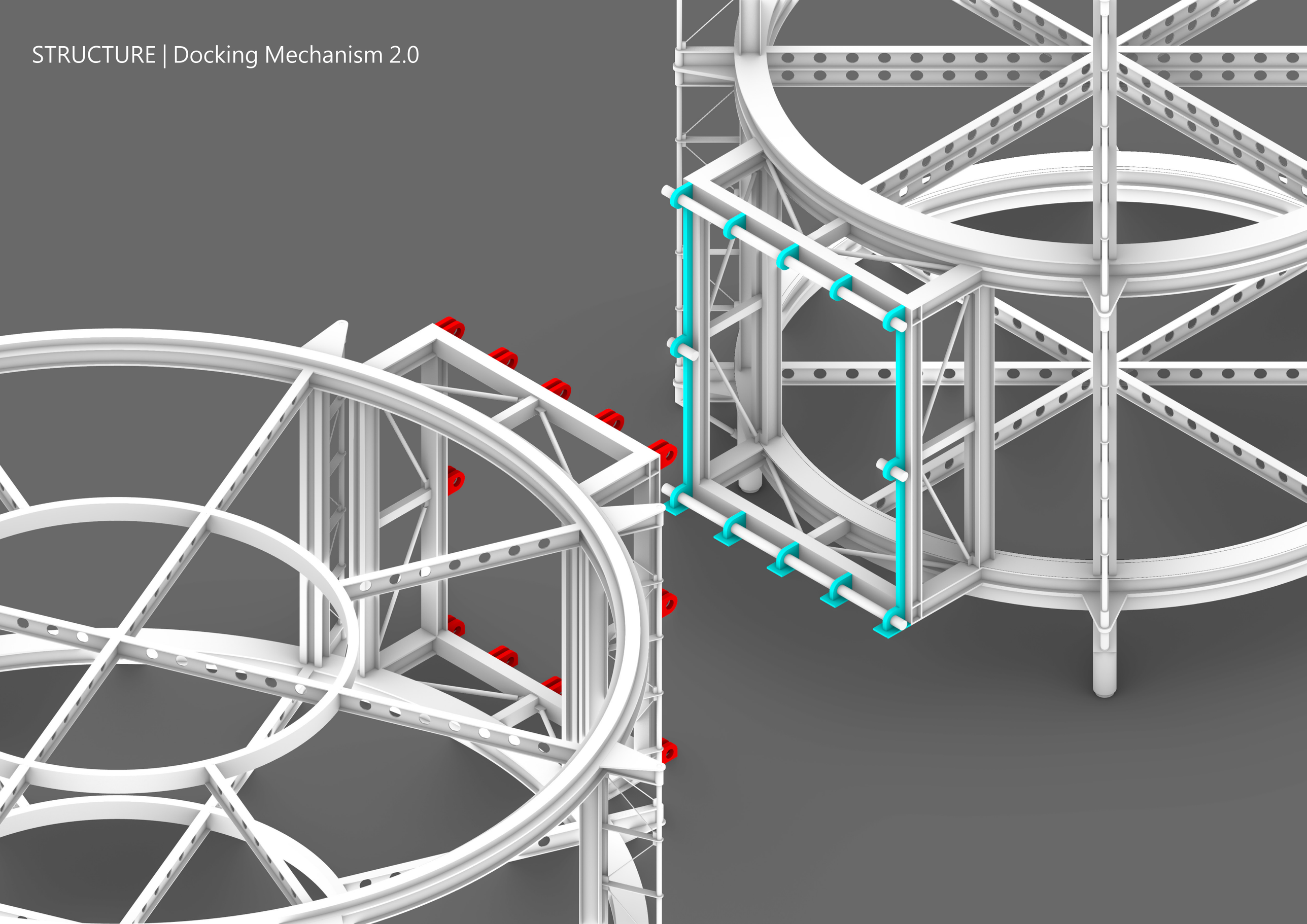
STRUCTURE | Prefabricated Modules Structure 2.0



STRUCTURE | Docking Mechanism 2.0



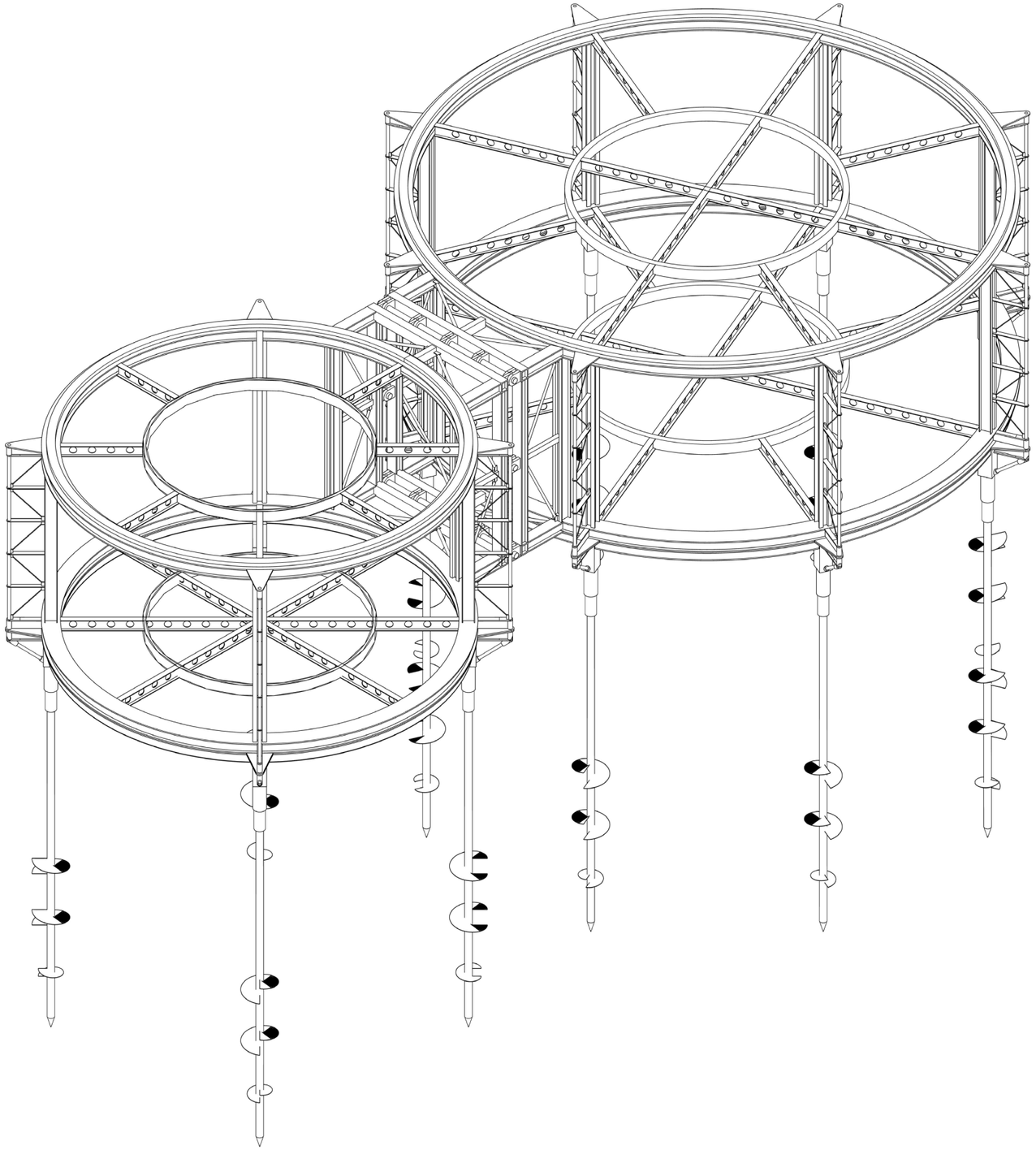
STRUCTURE | Docking Mechanism 2.0



STRUCTURE | Docking Mechanism 2.0

STRUCTURE | Docking Mechanism 2.0

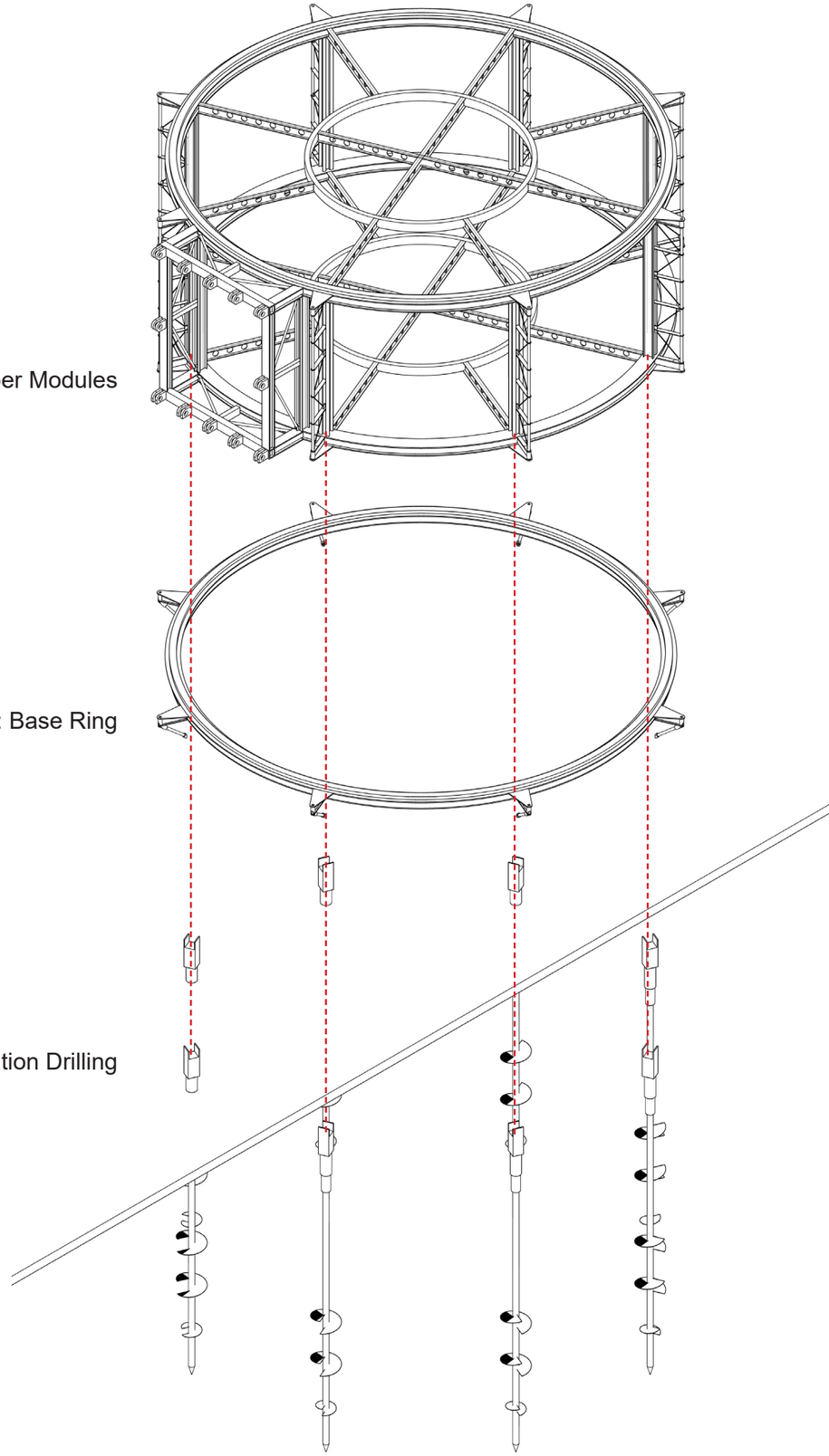
STRUCTURE | Base Ring



STEP 3: Upper Modules

STEP 2: Base Ring

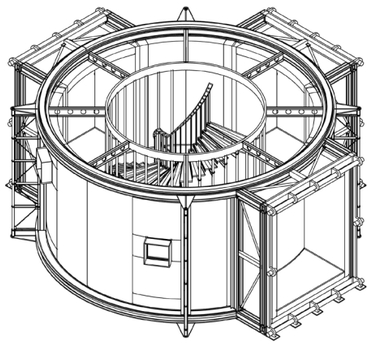
STEP 1: Foundation Drilling

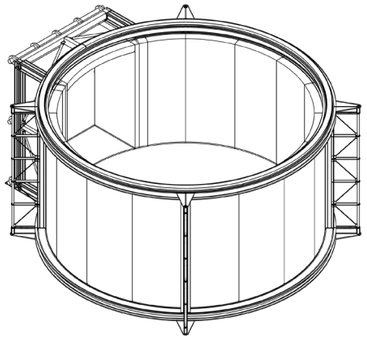


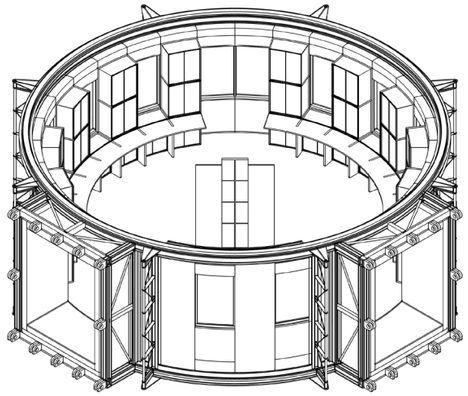
STRUCTURE | Diverse Interior Layouts



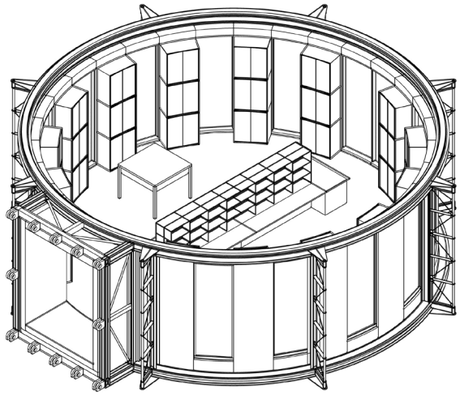
6.6m Module - Staircase



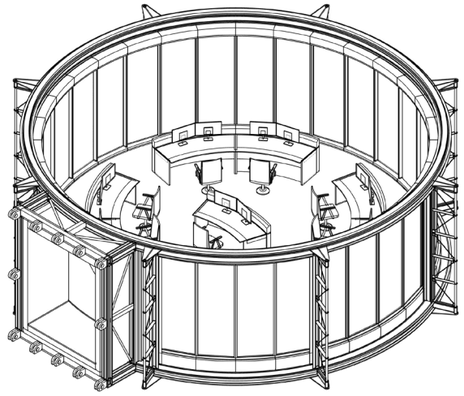


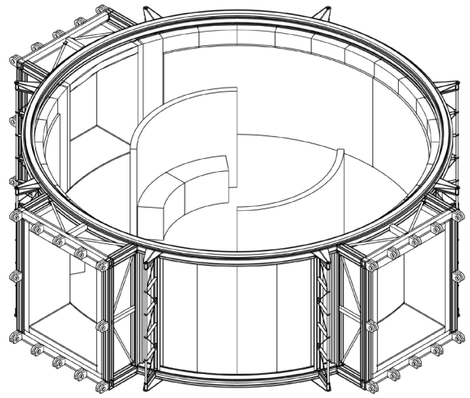


9.9m Module - Bio-Lab



9.9m Module - Contral Centre

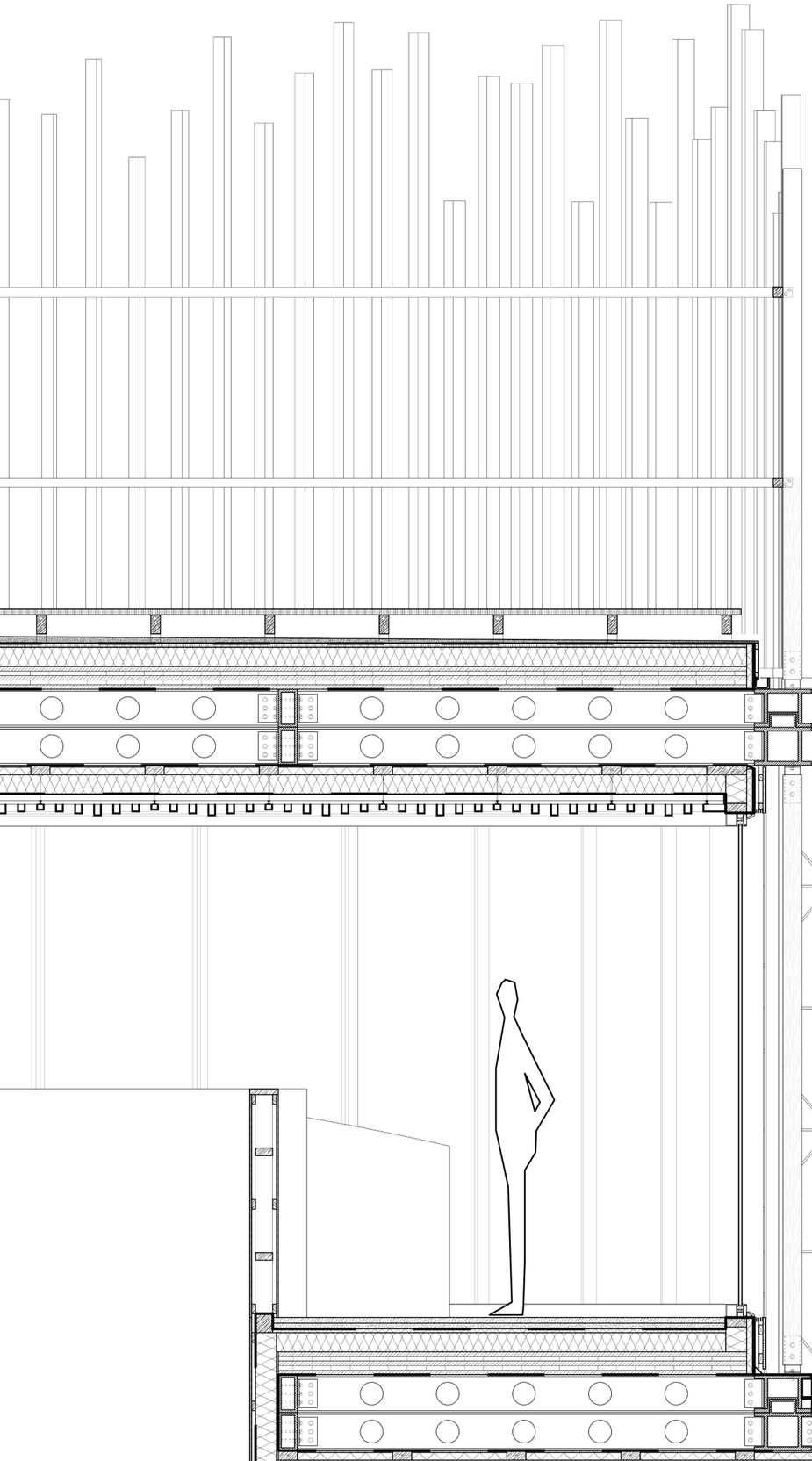


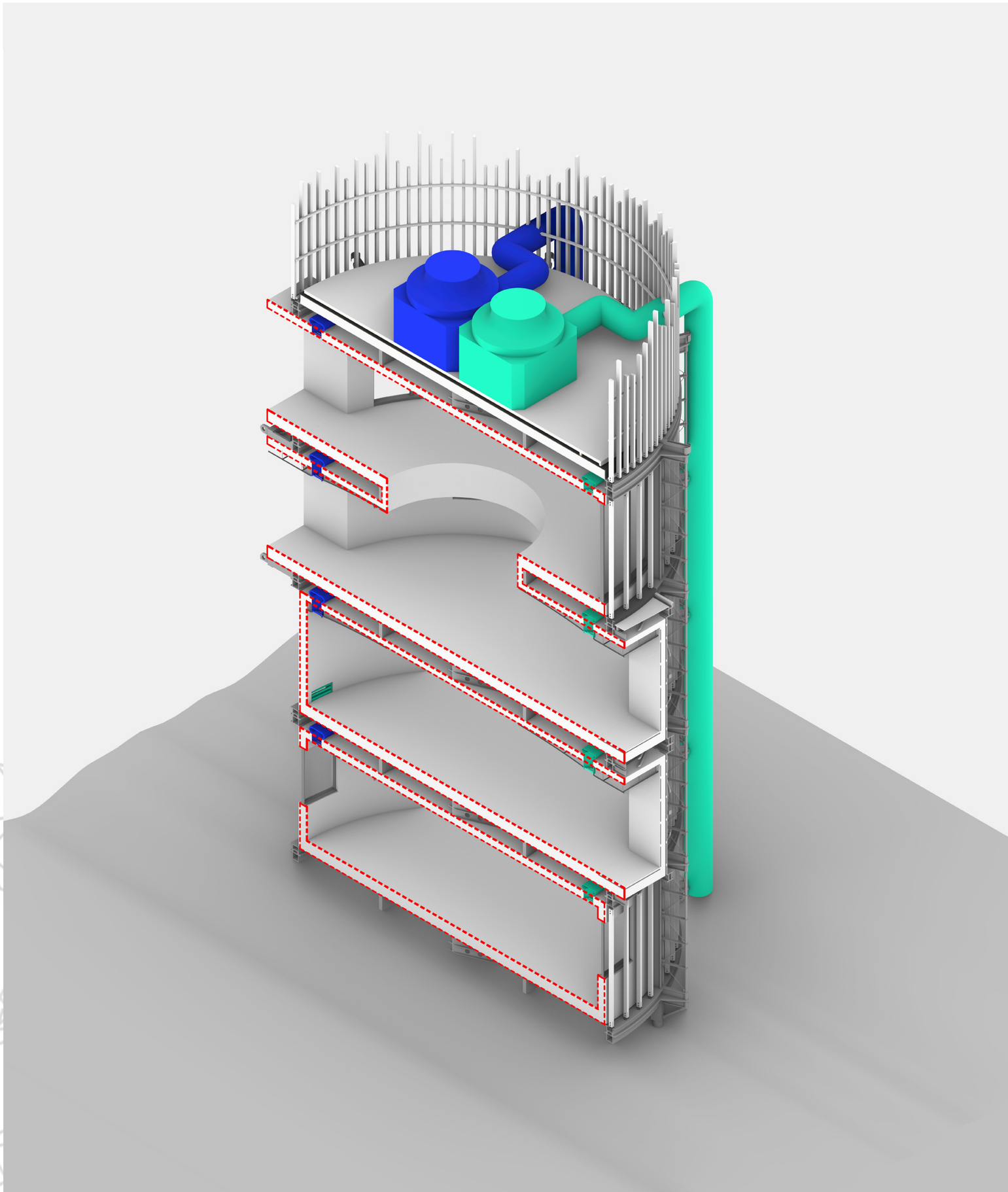


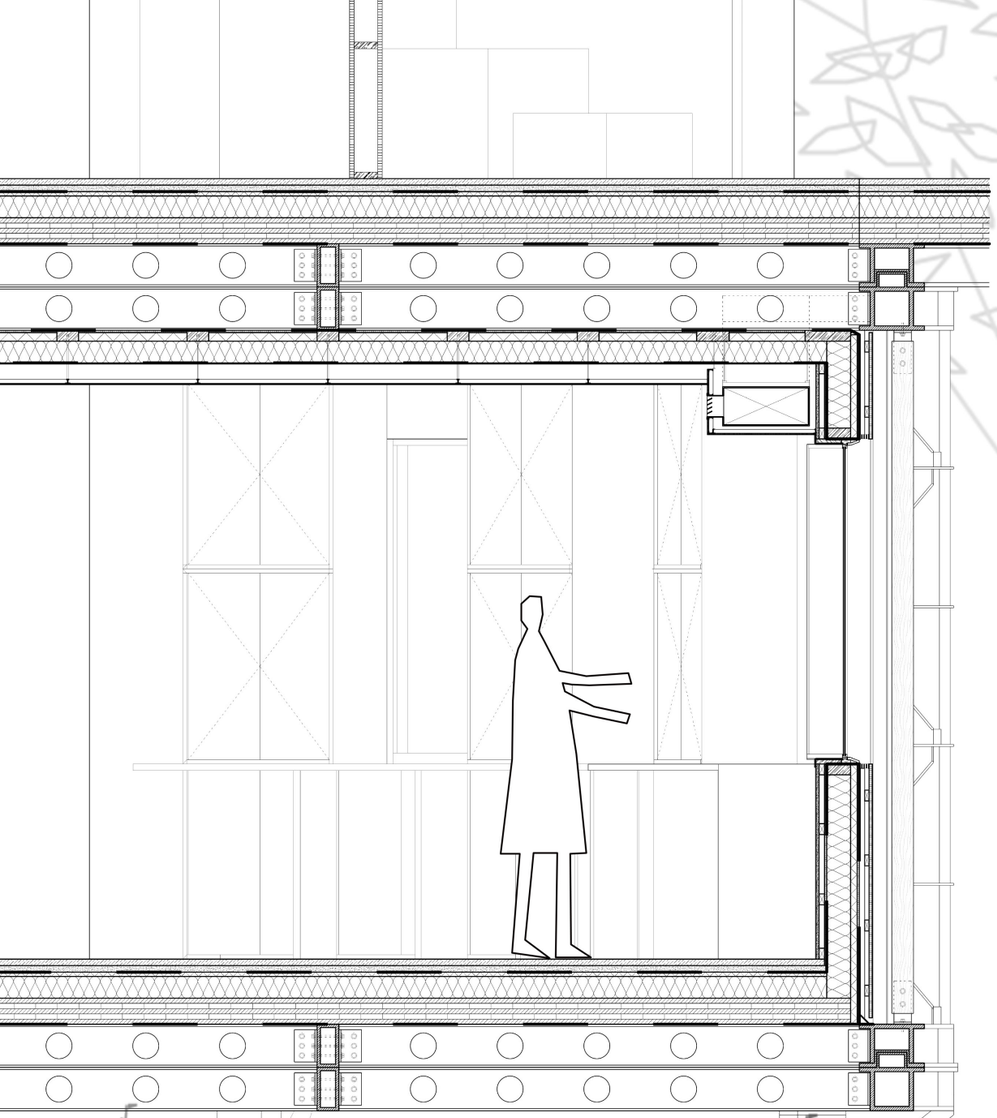
9.9m Module - Exhibition Hall

9.9m Module - Workshop

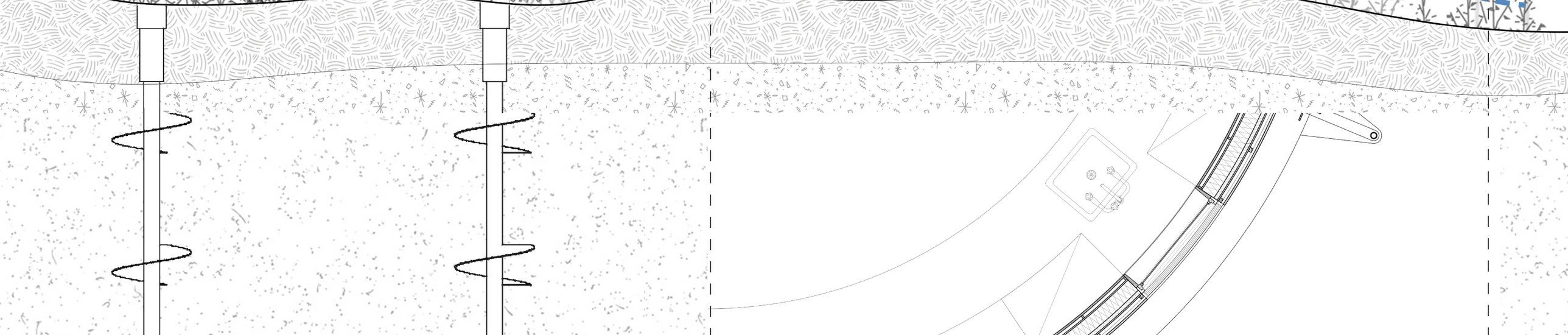
CLIMATE | Thermal Insulation



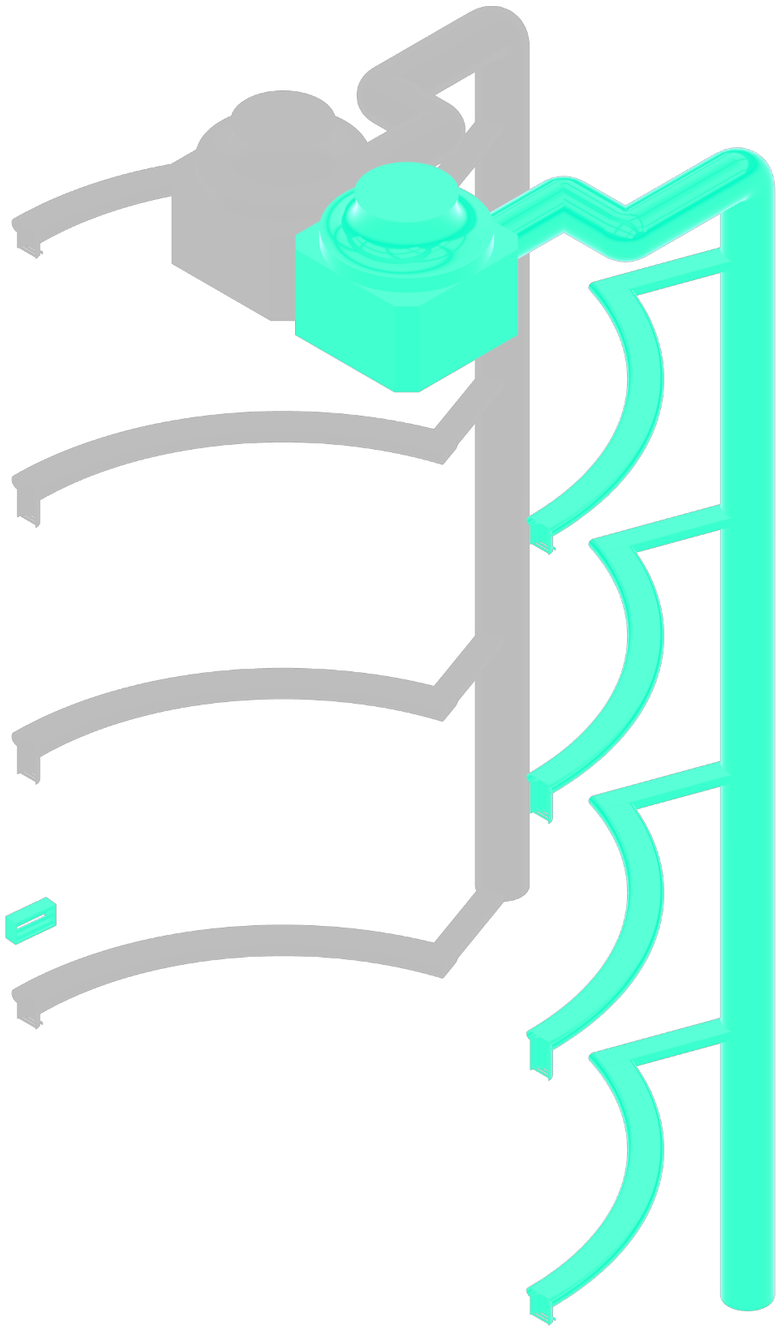


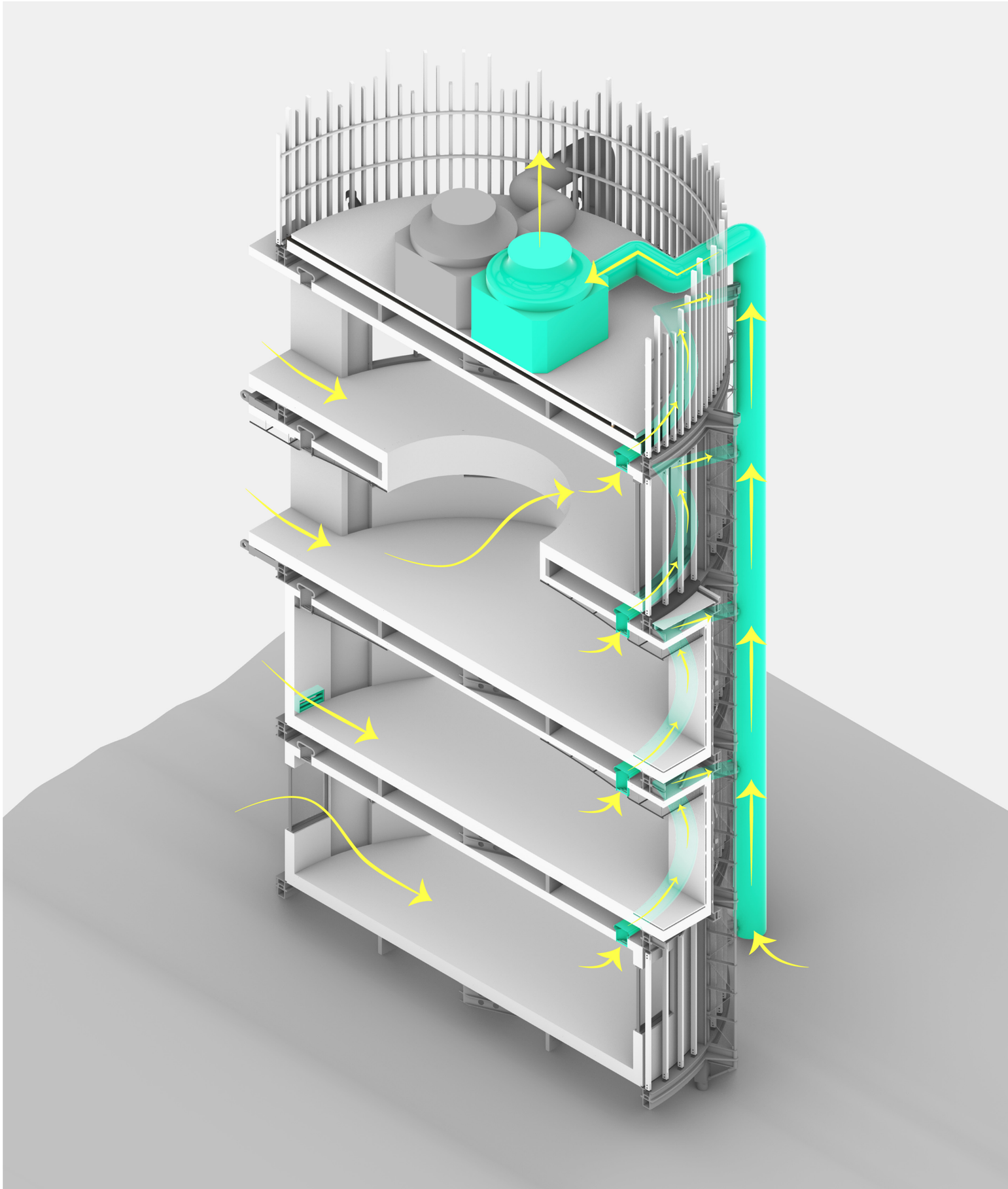




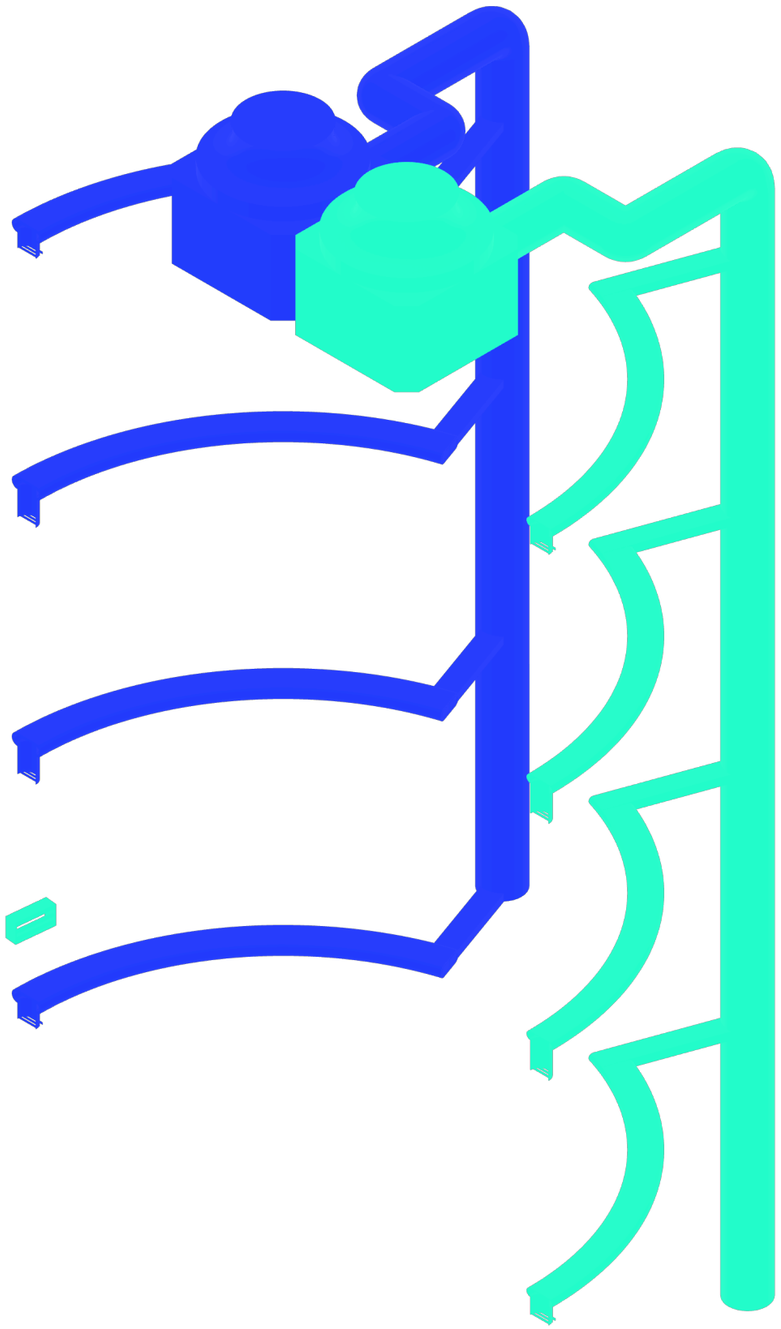


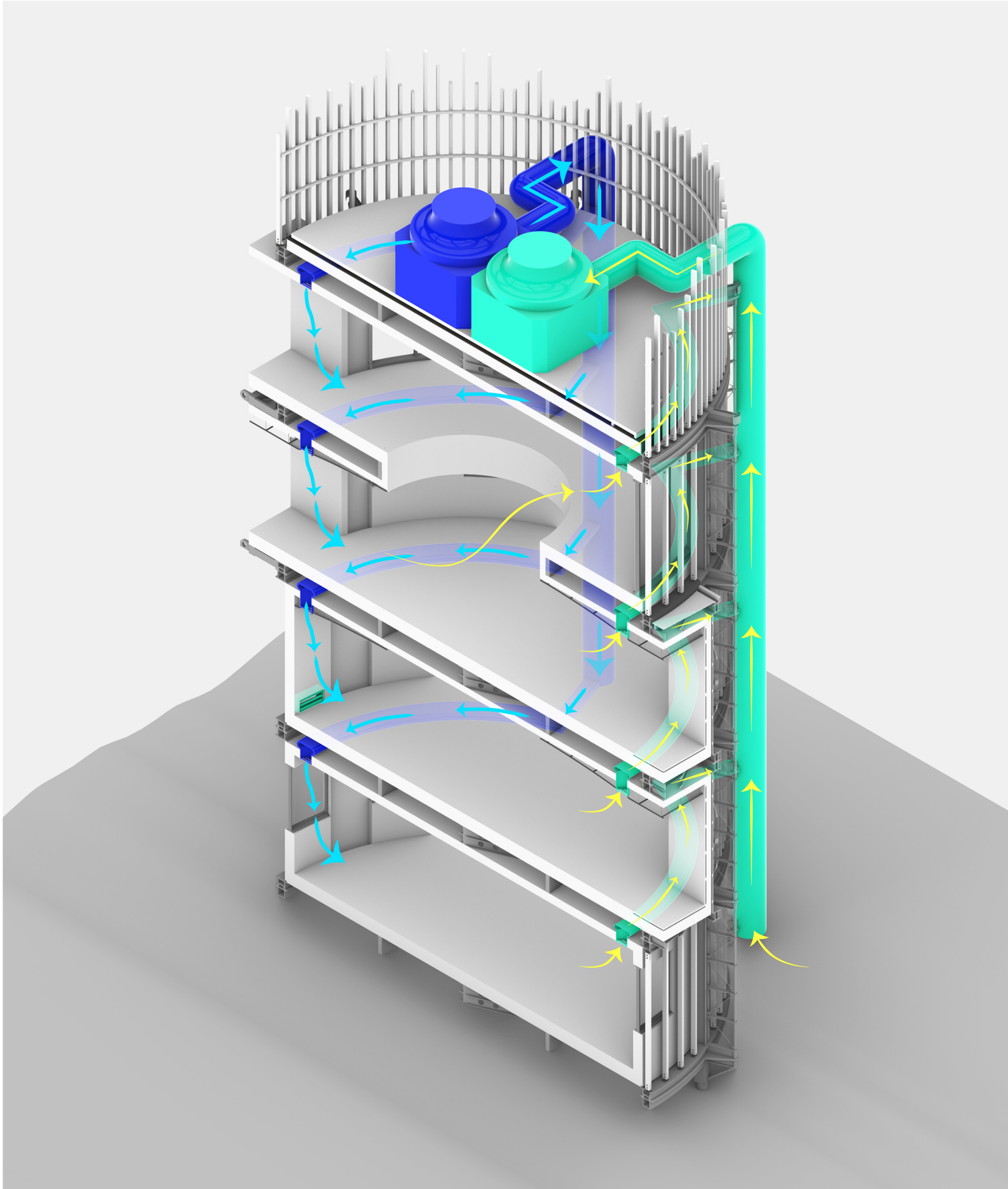
CLIMATE | Natural Ventilation



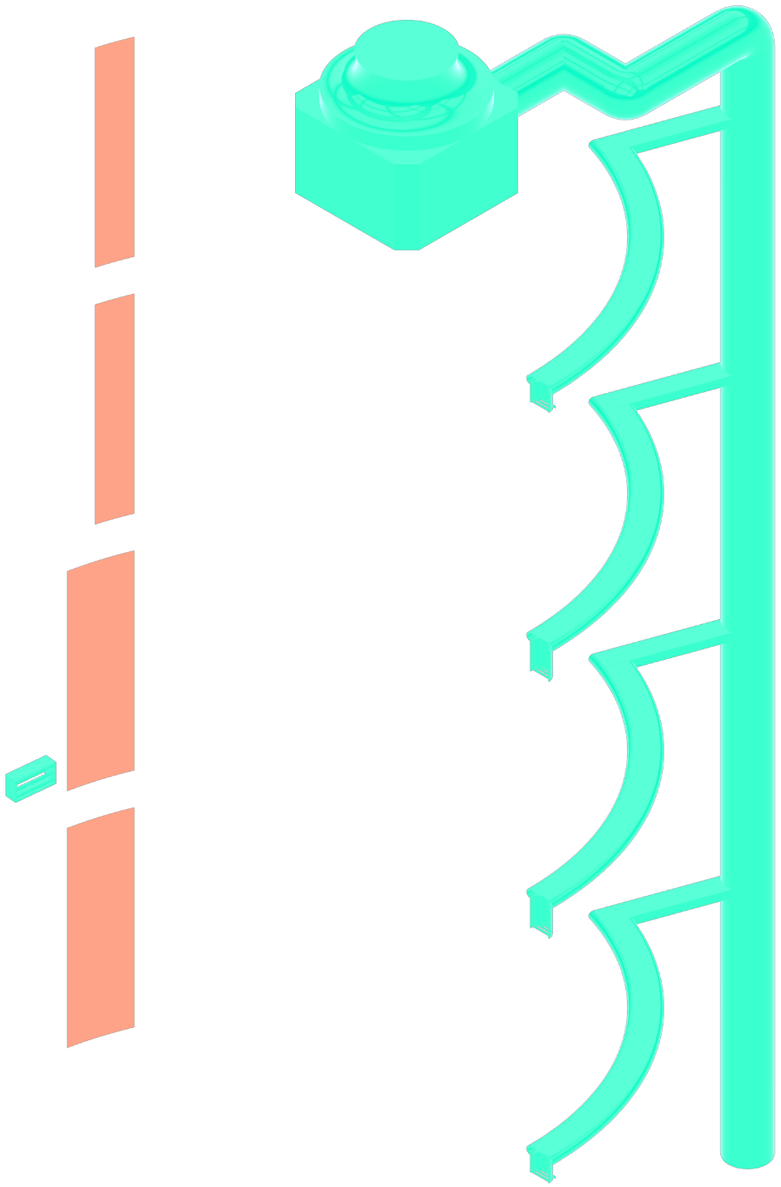


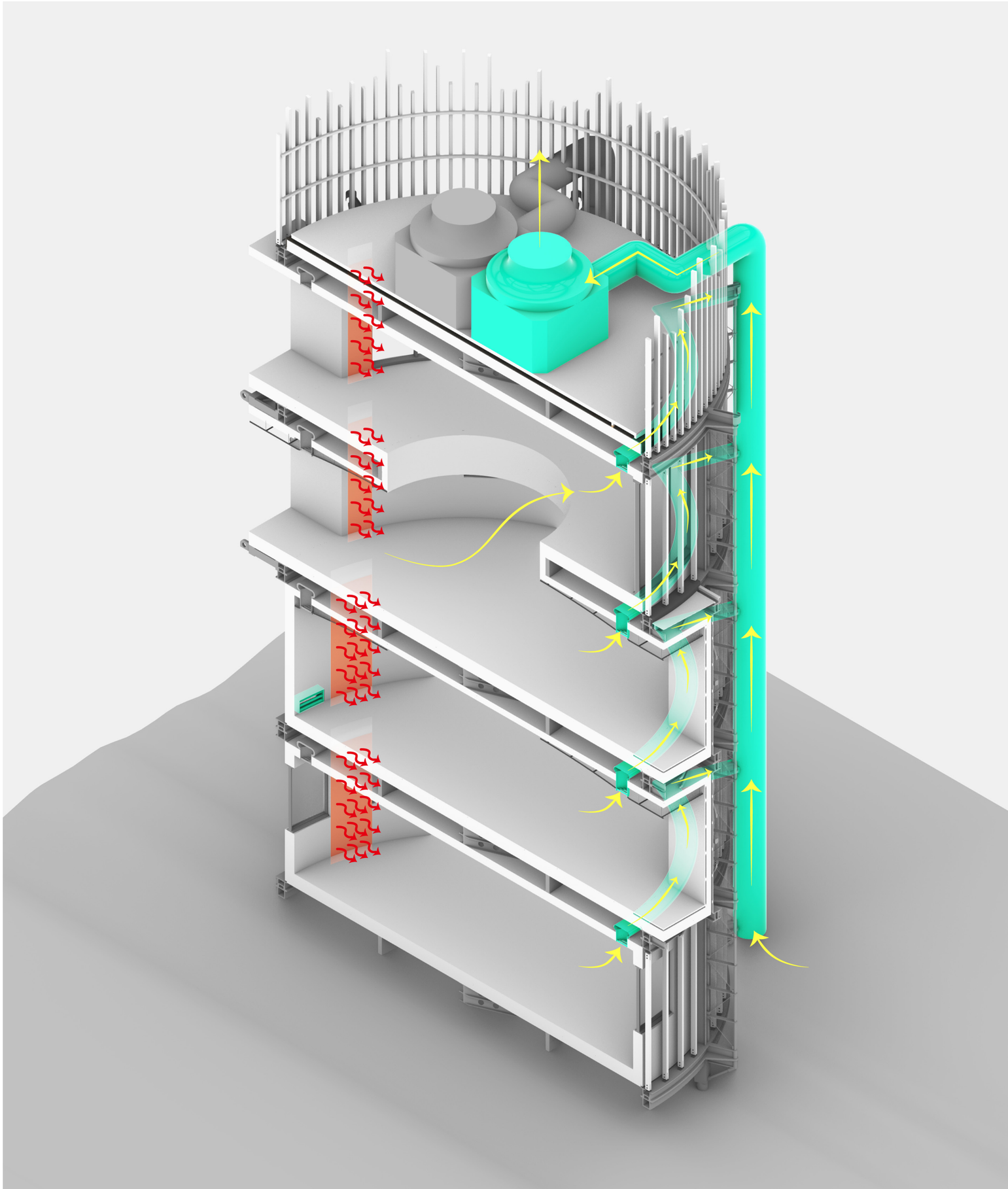
CLIMATE | Cooling System



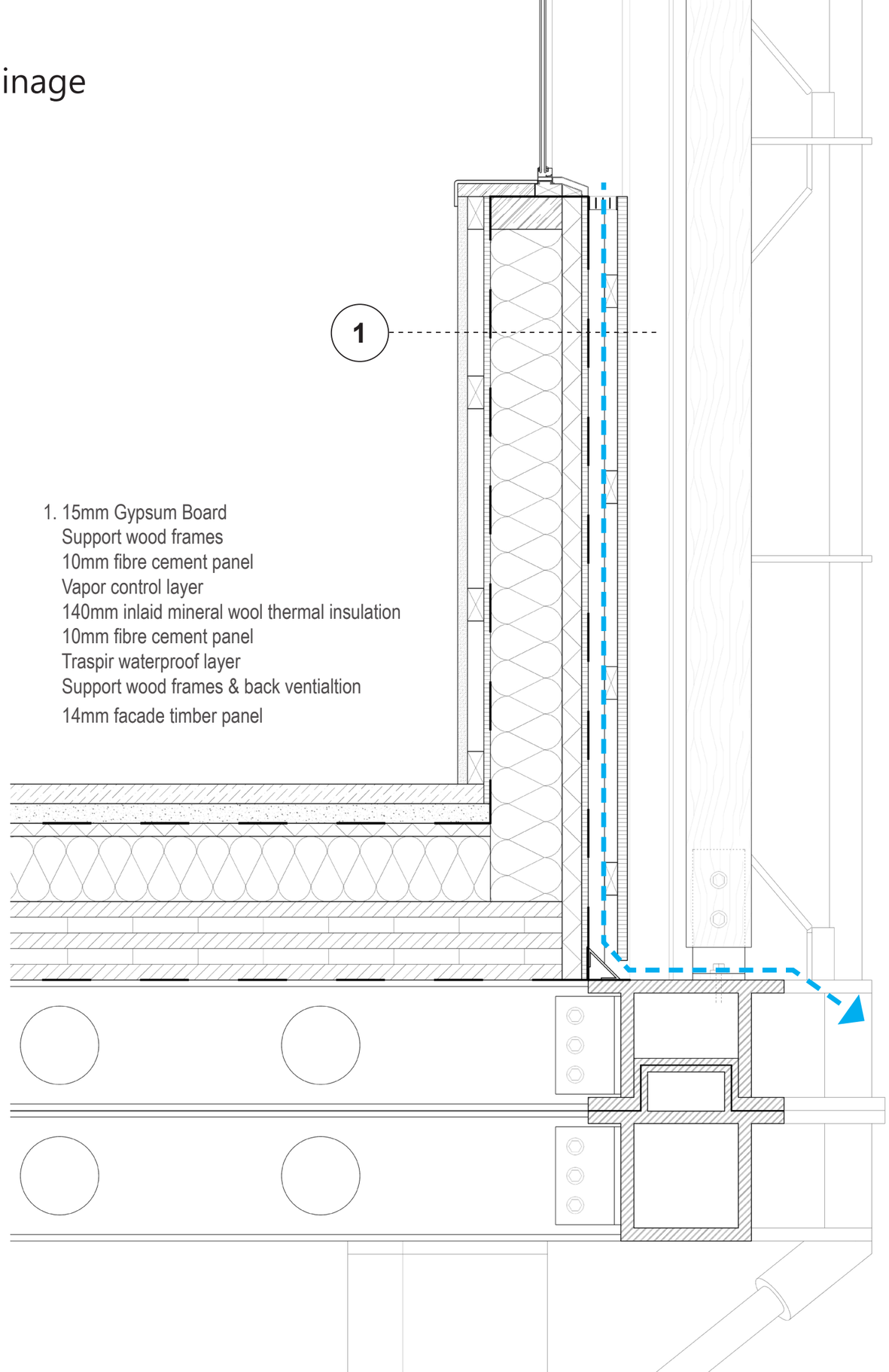


CLIMATE | Heating System

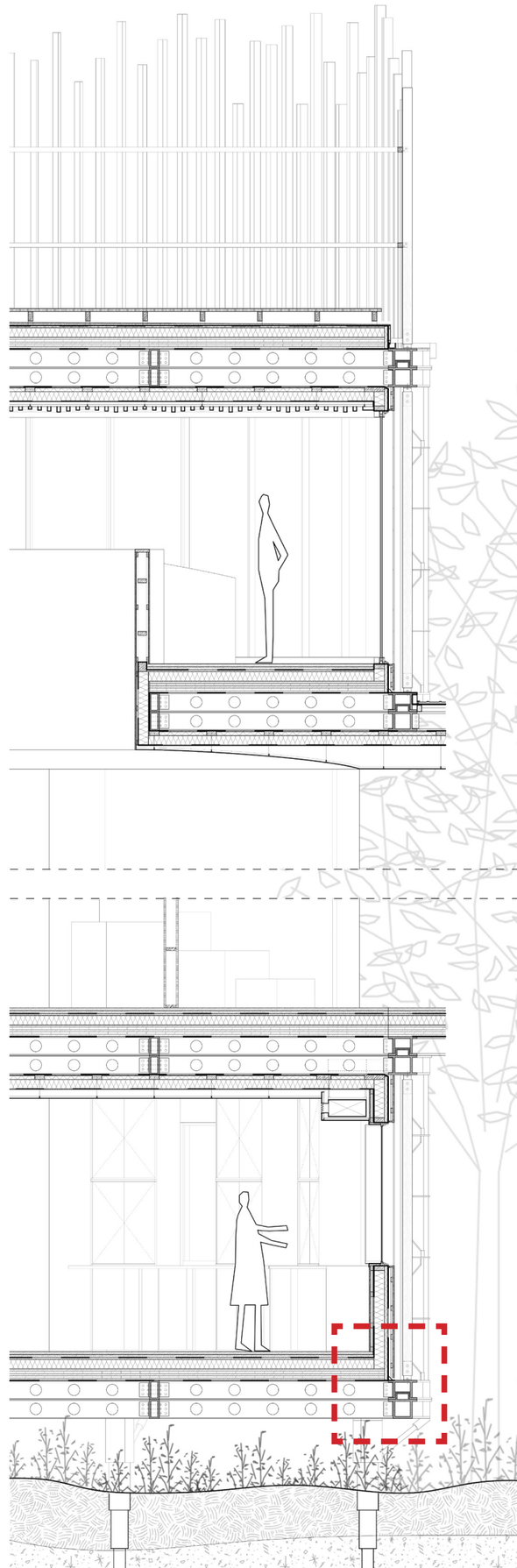




CLIMATE | Drainage

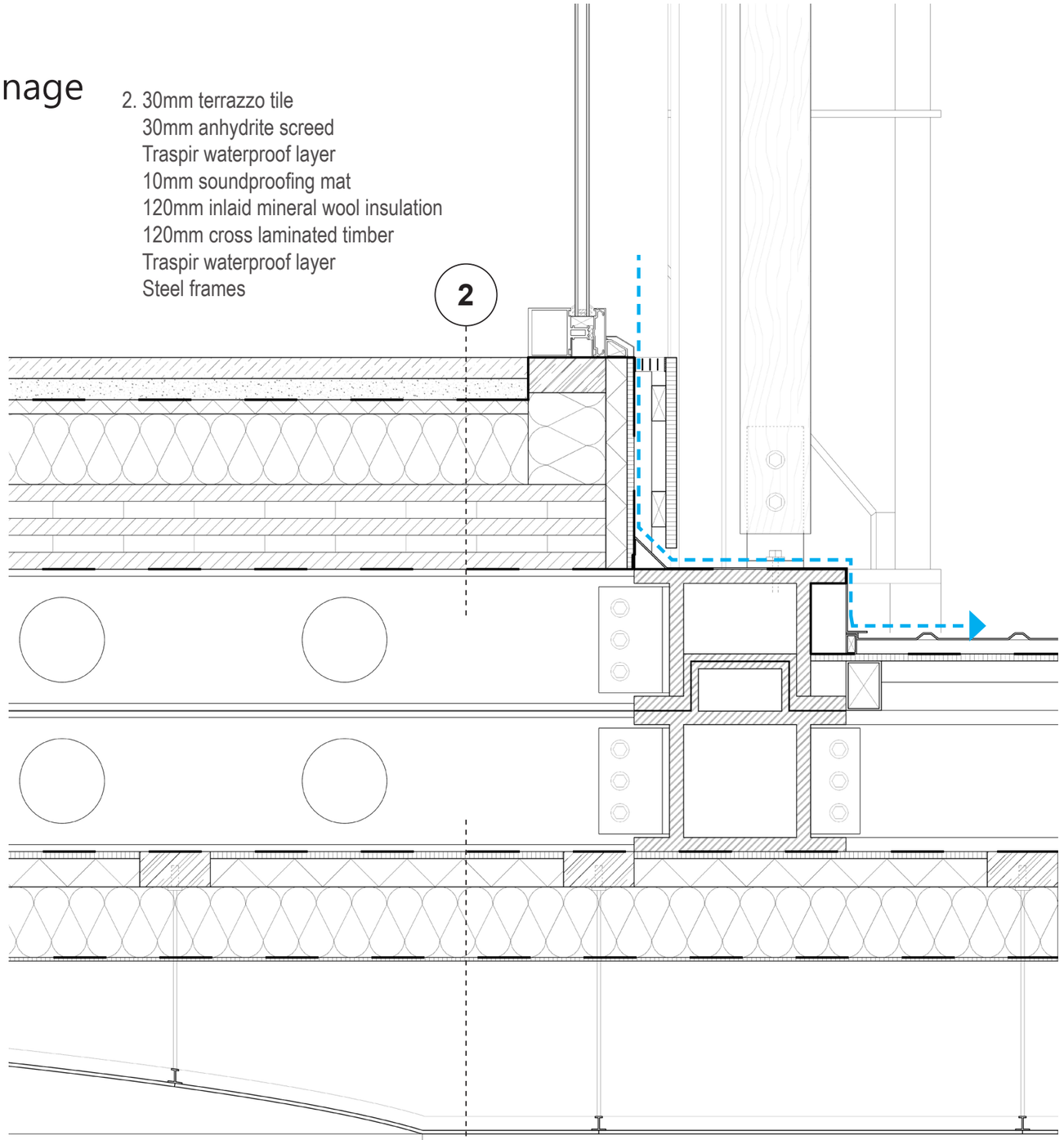


1. 15mm Gypsum Board
   Support wood frames
   10mm fibre cement panel
   Vapor control layer
   140mm inlaid mineral wool thermal insulation
   10mm fibre cement panel
   Traspir waterproof layer
   Support wood frames & back ventialtion
   14mm facade timber panel

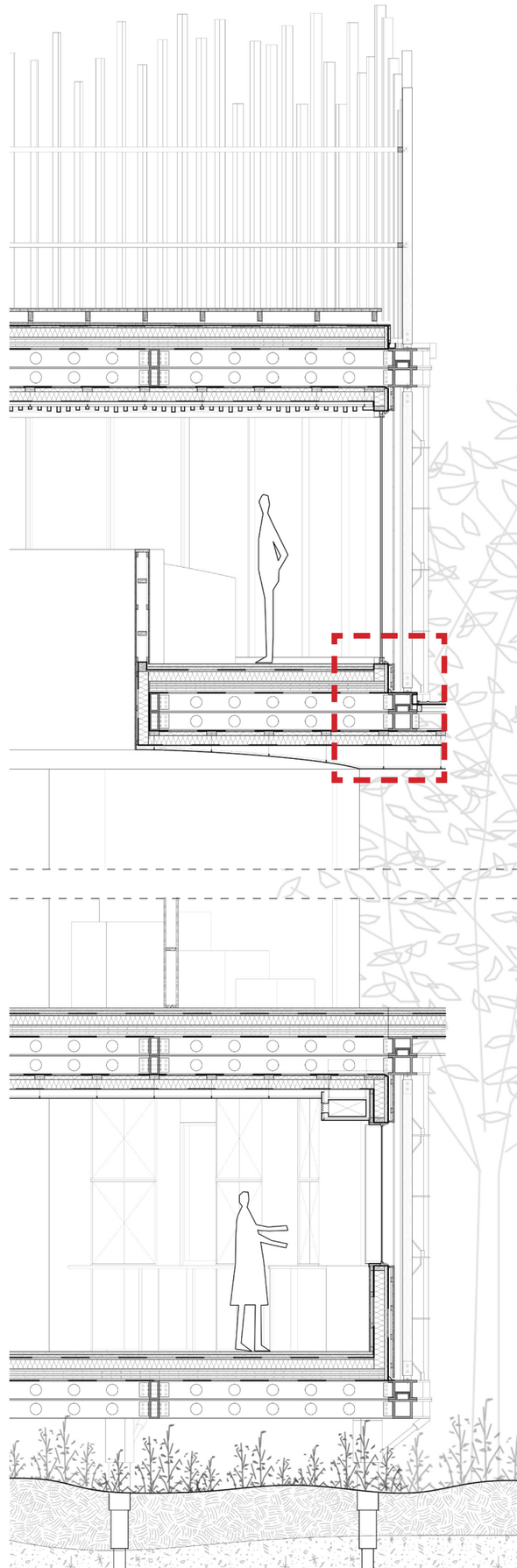


CLIMATE | Drainage

2. 30mm terrazzo tile
30mm anhydrite screed
Traspir waterproof layer
10mm soundproofing mat
120mm inlaid mineral wool insulation
120mm cross laminated timber
Traspir waterproof layer
Steel frames



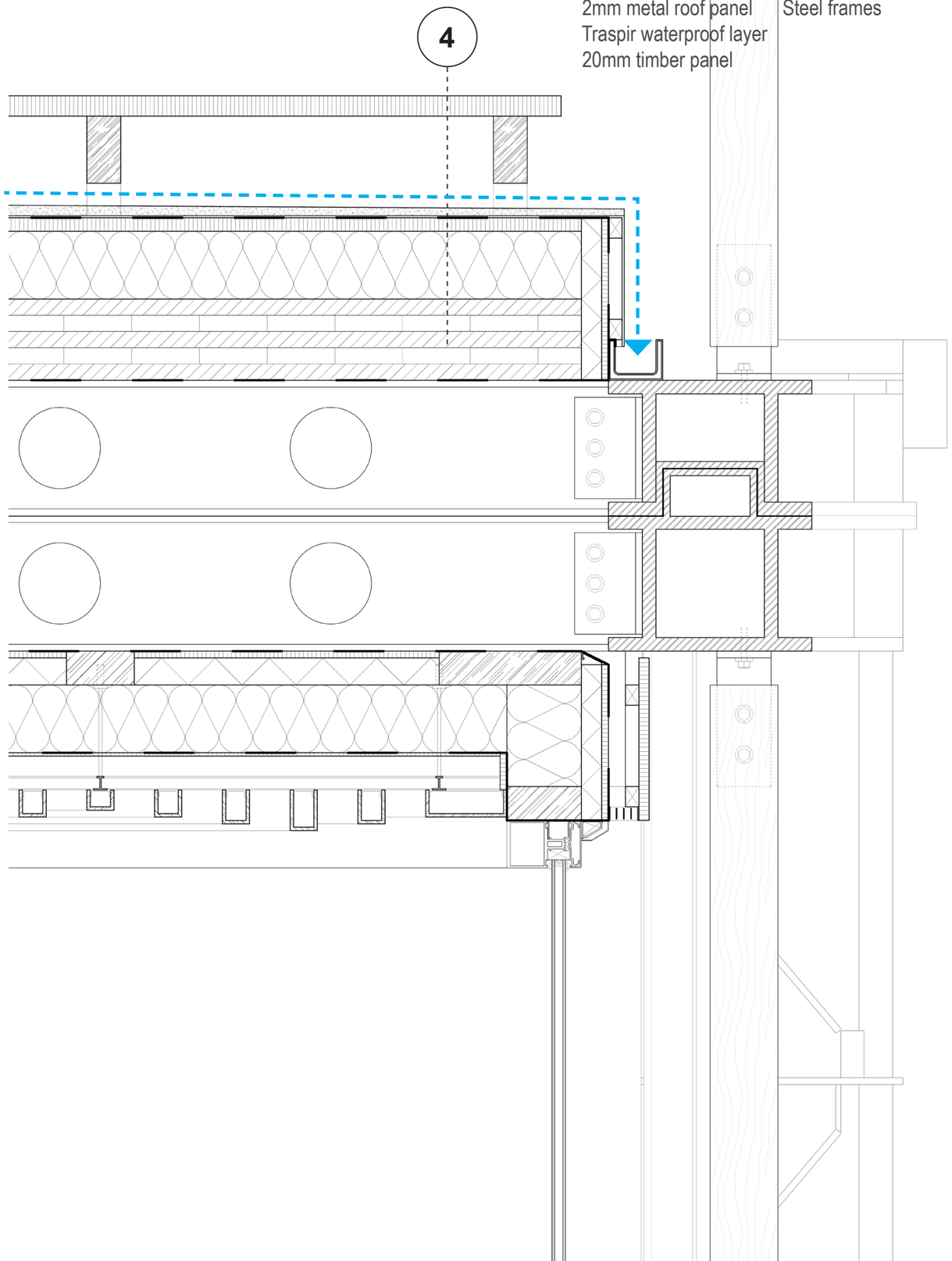
3. 5mm Gypsum ceiling board
Suspended ceiling framing system
5mm fibre cement panel
Vapor control layer
140mm inlaid mineral wool insulation
Timber framing system
10mm wood panel
Traspir waterproof layer
Steel frames

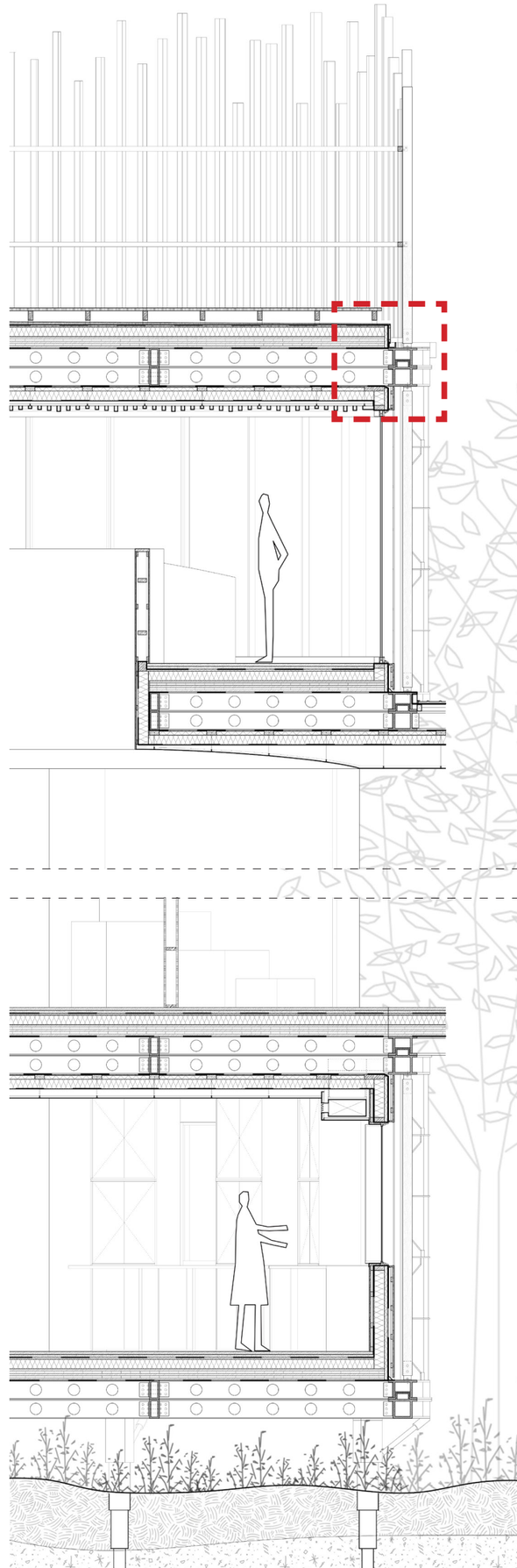


CLIMATE | Drainage

4. 30mm wood decking
Timber framing system
Slope-forming mortar
2mm metal roof panel
Traspir waterproof layer
20mm timber panel

120mm inlaid mineral wool insulation
120mm cross laminated timber
Traspir waterproof layer
Steel frames





FUTURE

10-20 years ...



10-20 years ...



Seasons ...



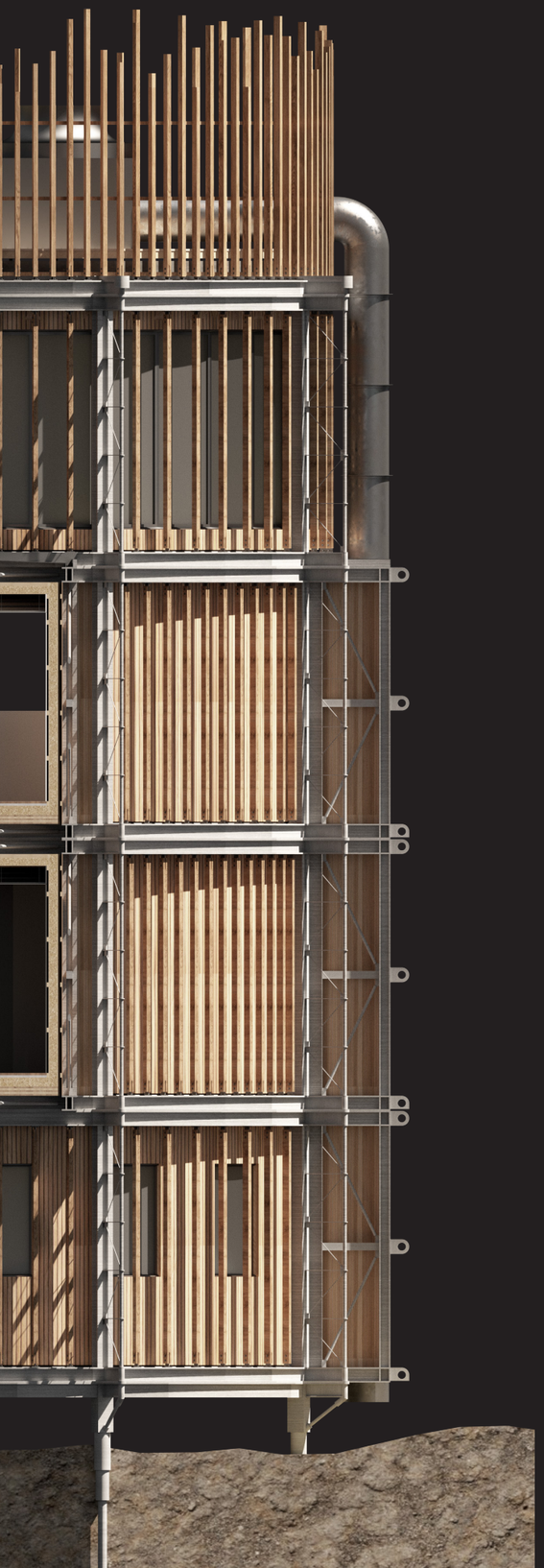






50-100 years ...





THANK YOU