

SUSTAINABLE URBAN PROTOTYPE

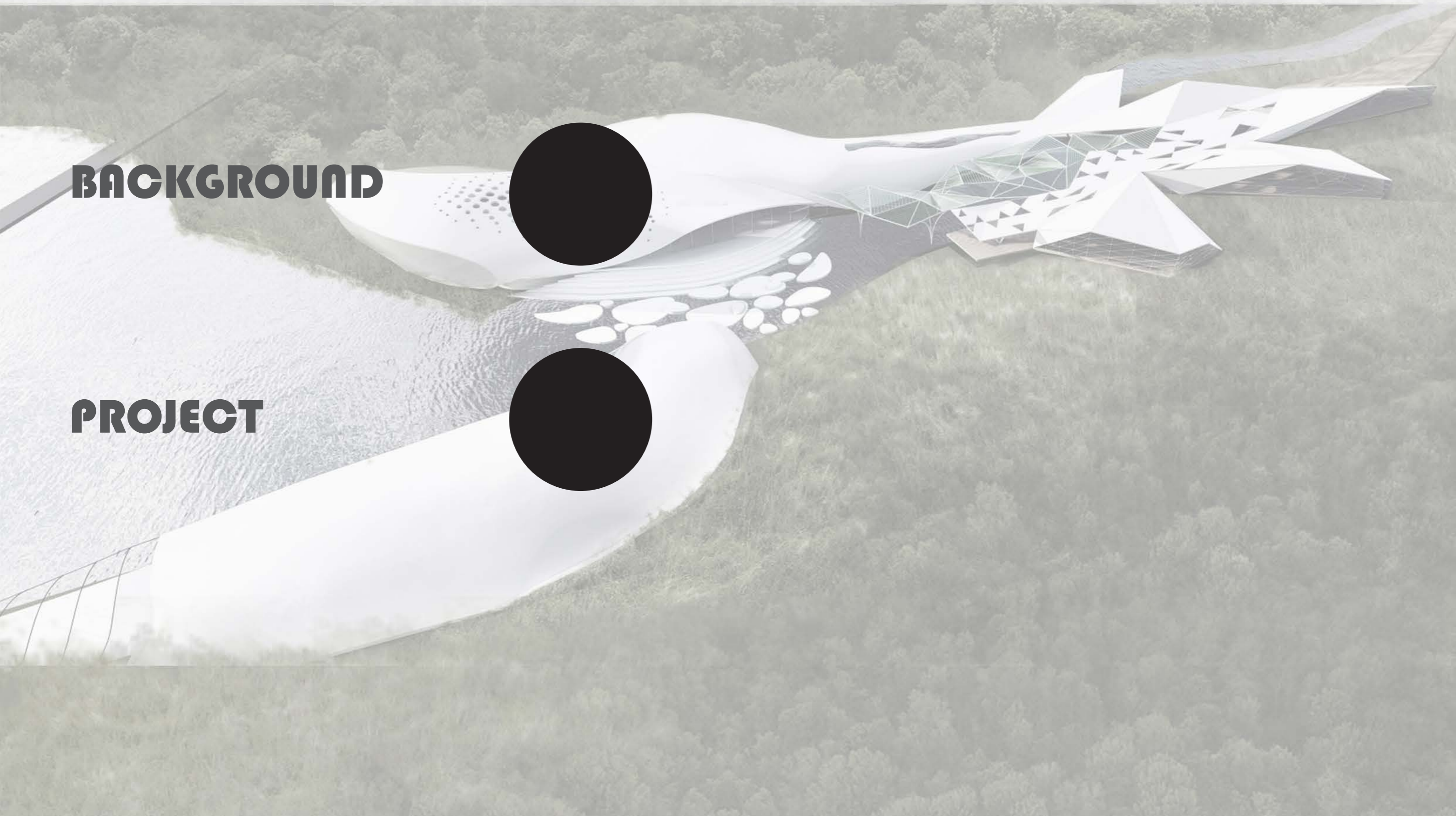
BY BUKET GÜRBÜZ



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BACKGROUND

PROJECT



BACKGROUND



CONTEXT

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PROJECT



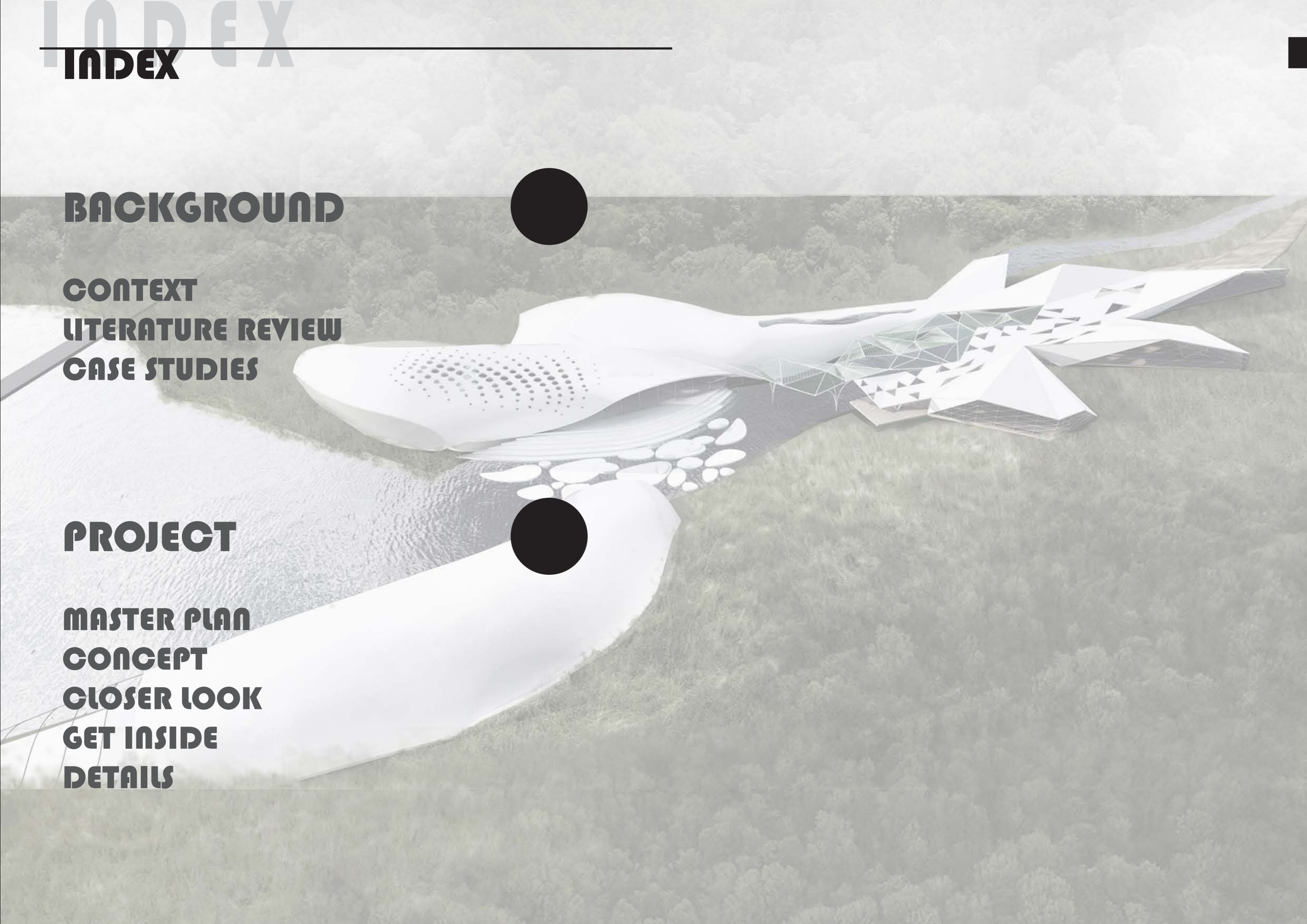
MASTER PLAN

CONCEPT

CLOSER LOOK

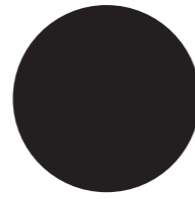
GET INSIDE

DETAILS

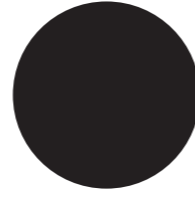


BACKGROUND

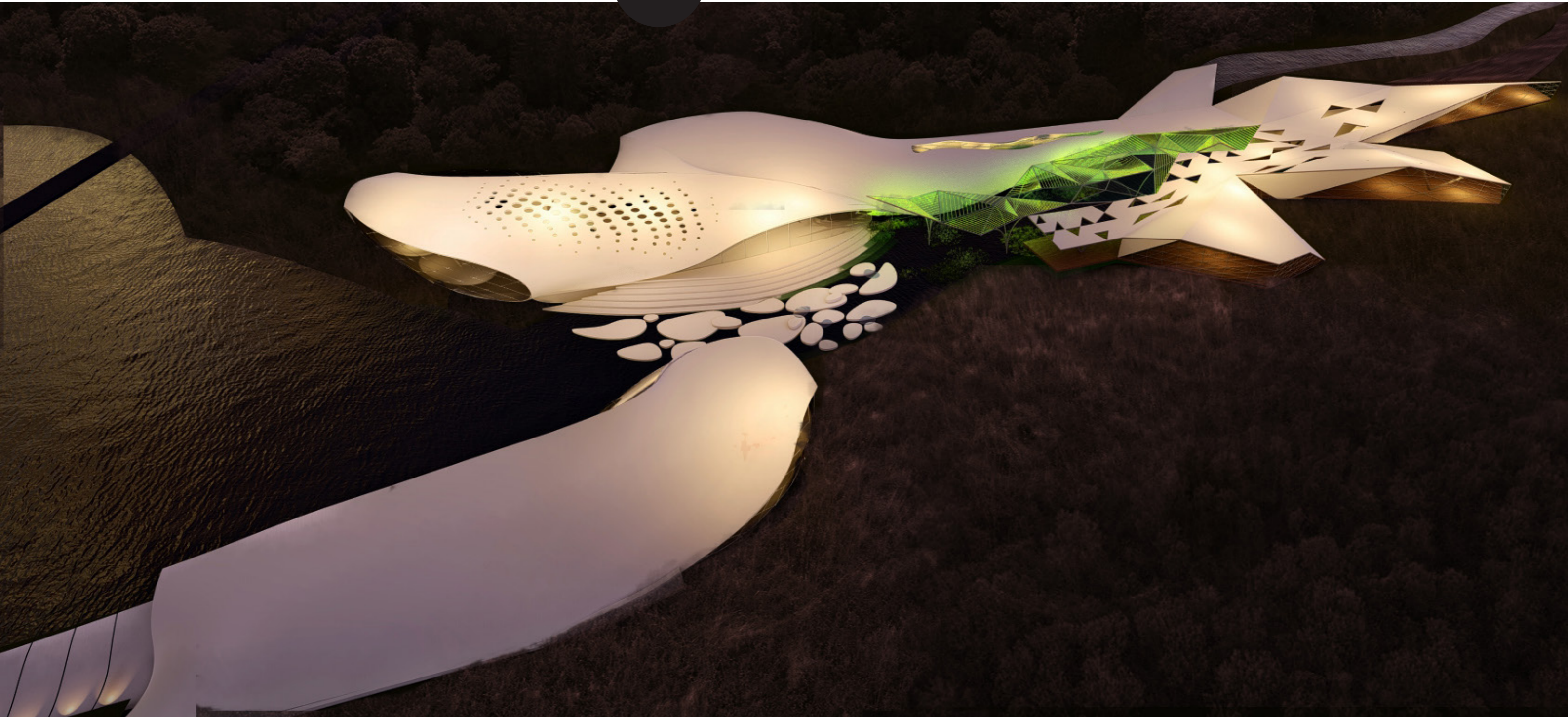
CONTEXT



LITERATURE REVIEW

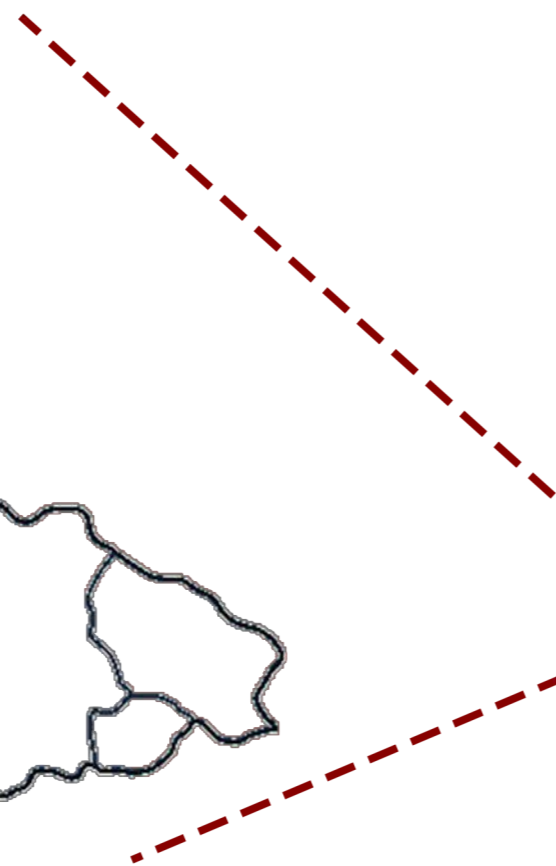


CASE STUDIES





Turkey. izmir. Bayraklı



CONTEXT

AREA

Hydrology



Water Pollution in izmir Bay

“It is necessary to treat the pollution in the streams to swim in the Izmir Bay”

“It does not smell if we don’t pollute!”



İzmir'deki koku ile ilgili açıklama: Kirletmezsek koku olmaz!

Hava sıcaklıklarının artmasıyla birlikte derelerden gelen kötü koku problemine ilişkin değerlendirmelerde bulunan Çevre Mühendisleri Odası İzmir Şubesi Başkanı Helil İnan Kınay, derelerin kirletilmemesi ve bakımlarının yapılması halinde sağlıklı bir kent yaşamına sahip olunacağını ve koku probleminin ortadan kalkacağını söyledi



“People are tired of the smell of sewage coming



Lağım kokusu İzmir'i bezdirdi

Yazın havaların iyice ısınmasıyla Körfez'den yükselen kötü kokular tüm kenti sardı. Kapı ve pencerelerini bile açamayan vatandaşlar, “Kirlilik kaynakları kurutulamıyor ve atıklar denize dökülüyor” dedi. Birçok İzmirli de sosyal medya hesaplarından pis kokuya tepki gösterdi



CONTEXT

AREA

Urbanization

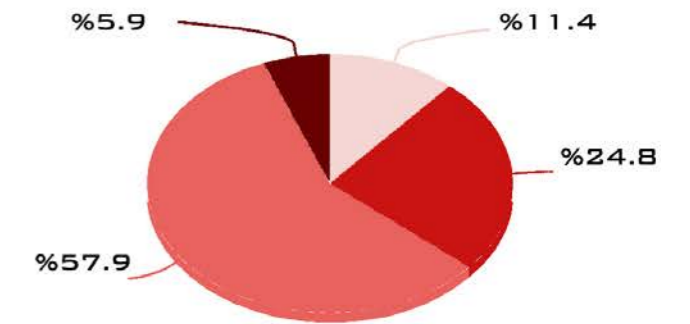


Urbanization

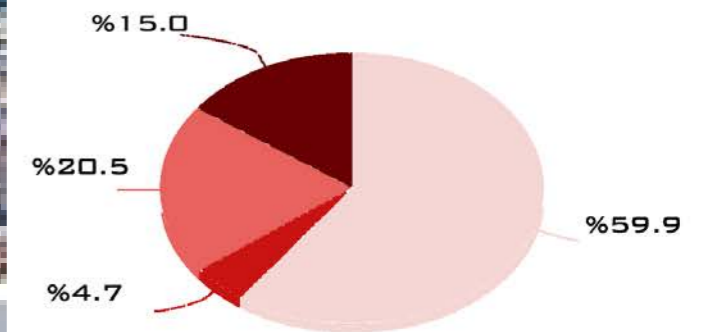


LAND USE COVERAGES BY YEARS

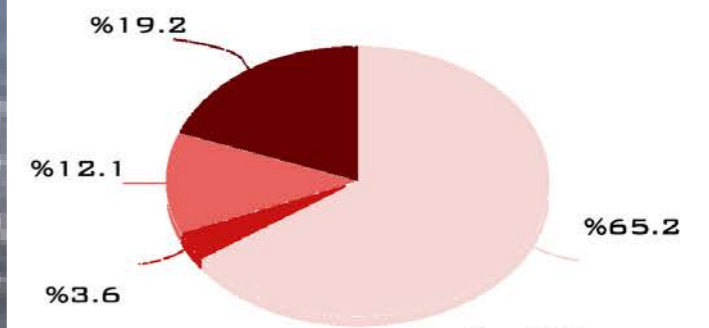
Decrease in green lands & excessive increase in urban fabrics



Year 1963



Year 1995



Year 2005

- Urban Fabrics
- Sclerophyllos Vegetation
- Agriculture Lands
- Other

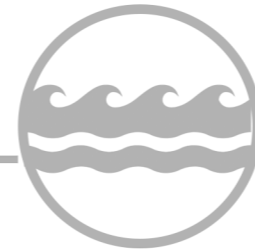
CONTEXT

THESIS IDEA

Loss of agriculture lands & green areas
(increased CO2 releases,
transportation costs,
decrease in local food consumption)



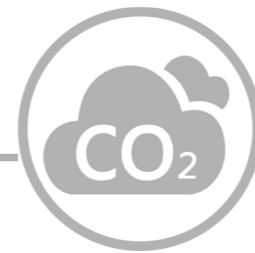
Negative impact on bay, fishery & wetlands
Increase in water pollution



Increase of vehicles & motorways



Air pollution



Urban heat island



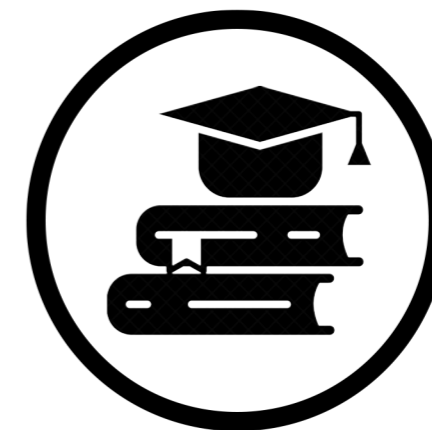
Depressed society & Gentrification



1. ADDRESS
THE RISKS
& PROBLEMS



2. CREATE
SUSTAINABLE
SOLUTIONS



3. EDUCATE
SOCIETY &
INCREASE
AWARENESS

CONTEXT

SITE VISIT



1 stream



2 unused land piece

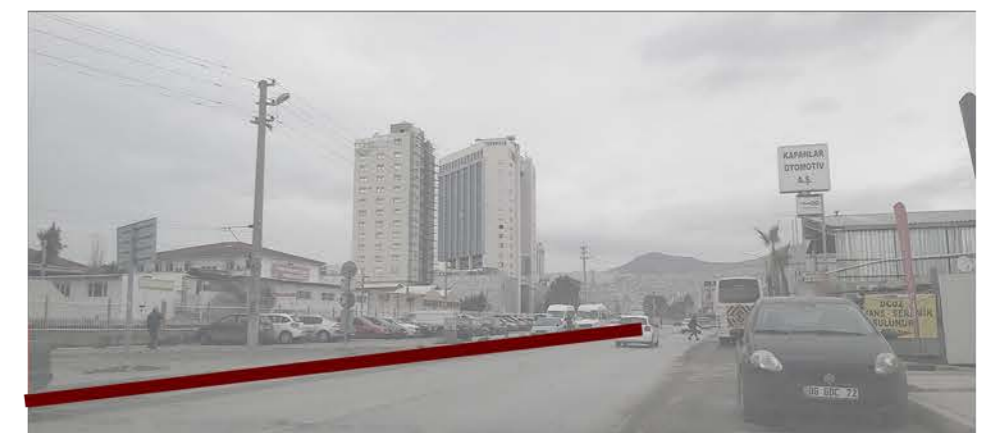


3



car road
near the
train line

4



train line

5



seaside-
car road
relation

6



CONTEXT

SITE VISIT



1 abandoned zones



2 old factory building



3



storage buildings

4



newer buildings in good condition

5



inconsistency of urban fabrics

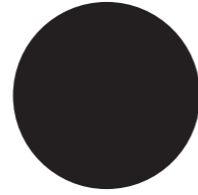
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LITERATURE REVIEW



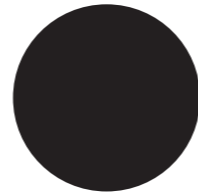
SMART GROWTH



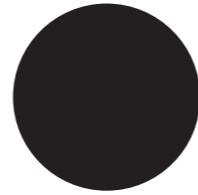
TRANSIT ORIENTED DEVELOPMENT



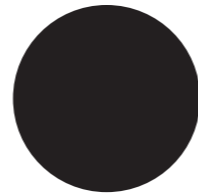
LANDSCAPE URBANISM



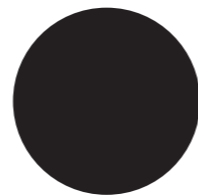
LIVING MACHINE



BIOMES



ALGAE HARVESTING



Principles of Smart Growth

1. Mix land uses
2. Create walkable neighborhoods
3. Foster distinctive, attractive communities with a strong sense of place
4. Preserve natural lands, farmland, and critical environmental areas
5. Strengthen and direct development toward existing communities
6. Provide a variety of transportation choices



Economically

Proximity, employment, livability, attracting business/industry

“industry and business regard livability as an important locational factor.”

Environmentally

Green infrastructure/watershed protection, greenways, land conservation, landscapes, open space, urban parks, transportation planning and choices

“Creating walkable neighborhoods, smart growth decreases the dependency to cars, thus decreasing the greenhouse gases emissions ”

Socially

Social interactions, integrity of different functions, importance to streets, urban spaces, walkability, accessibility, diversity

“The traditional office park model, with buildings surrounded by parking and landscaping is inward focused and does not easily create opportunities for spontaneous interaction, and even stimulate segregation and isolation of different social groups.



(TRANSIT ORIENTED DEVELOPMENT)

WALK

DEVELOPING NEIGHBORHOODS THAT PROMOTE WALKING

- OBJECTIVE A.** The pedestrian realm is safe, complete, and accessible to all.
- OBJECTIVE B.** The pedestrian realm is active and vibrant.
- OBJECTIVE C.** The pedestrian realm is temperate and comfortable.

CYCLE

PRIORITIZE NONMOTORIZED TRANSPORT NETWORKS

- OBJECTIVE A.** The cycling network is safe and complete.
- OBJECTIVE B.** Cycle parking and storage is ample and secure.

CONNECT

CREATE DENSE NETWORKS OF STREETS AND PATHS

- OBJECTIVE A.** Walking and cycling routes are short, direct, and varied.
- OBJECTIVE B.** Walking and cycling routes are shorter than motor vehicle routes.

TRANSIT

LOCATE DEVELOPMENT NEAR HIGH-QUALITY PUBLIC TRANSPORT

- OBJECTIVE A.** High-quality transit is accessible by foot. (TOD Requirement)

MIX

PLAN FOR MIXED USES, INCOME, AND DEMOGRAPHICS

- OBJECTIVE A.** Opportunities and services are within a short walking distance of where people live and work, and the public space is activated over extended hours.
- OBJECTIVE B.** Diverse demographics and income ranges are included among local residents.

DENSIFY

OPTIMIZE DENSITY AND MATCH TRANSIT CAPACITY

- OBJECTIVE A.** High residential and job densities support high-quality transit, local services, and public space activity.

COMPACT

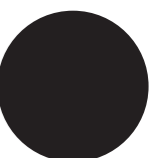
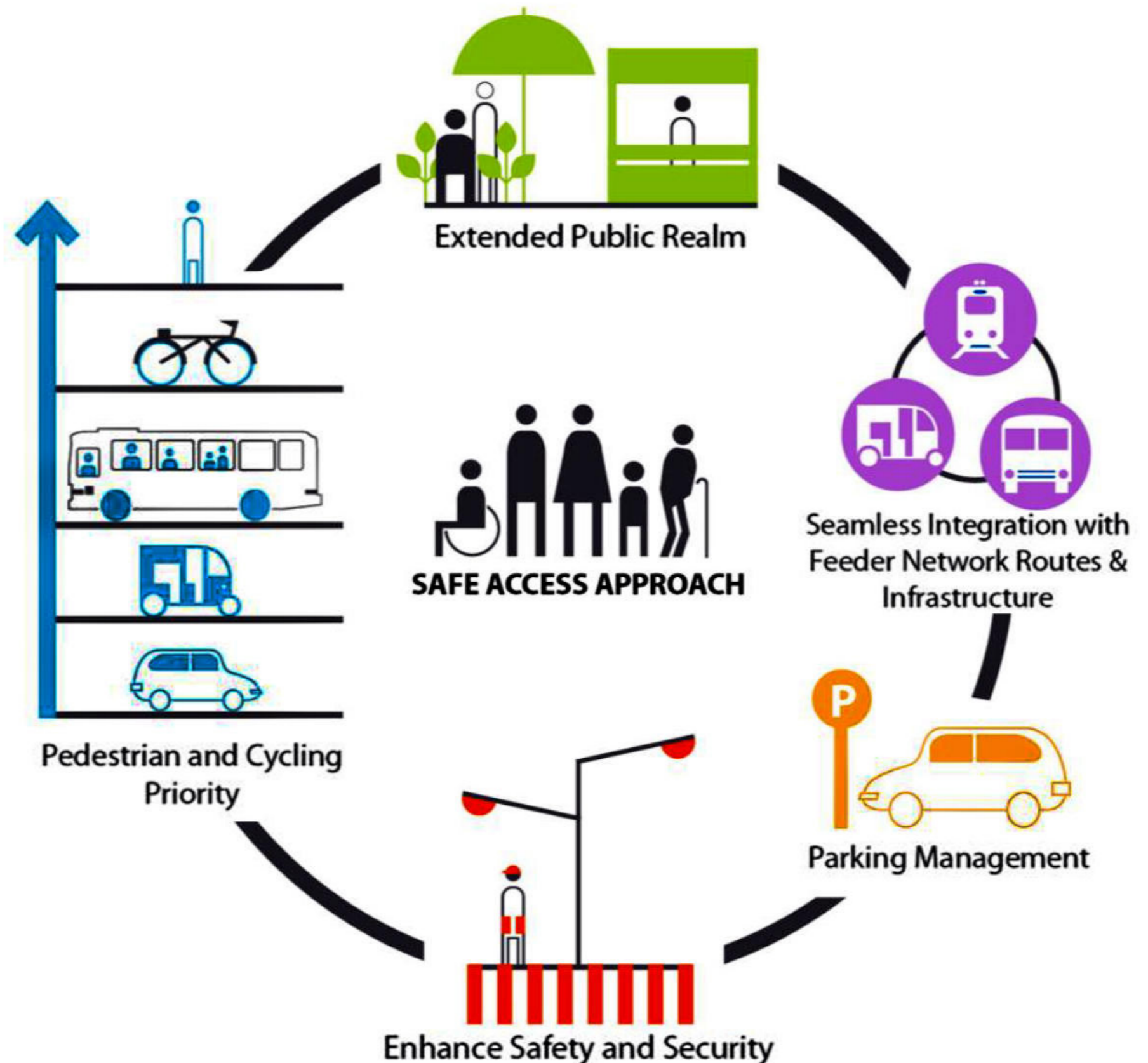
CREATE REGIONS WITH SHORT TRANSIT COMMUTES

- OBJECTIVE A.** The development is in, or next to, an existing urban area.
- OBJECTIVE B.** Traveling through the city is convenient.

SHIFT

INCREASE MOBILITY BY REGULATING PARKING AND ROAD USE

- OBJECTIVE A.** The land occupied by motor vehicle is minimized.

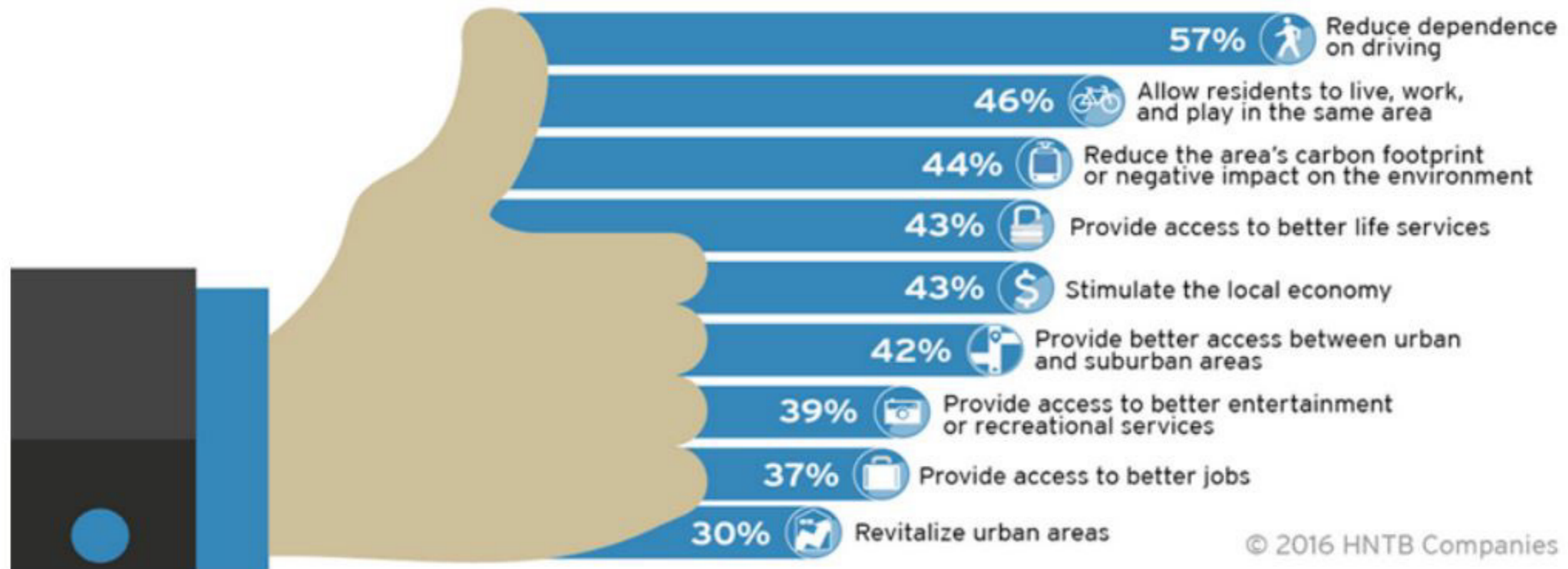


Principles of Transit Oriented Development

1. Walkable design with pedestrian as the highest priority
2. High density, walkable district within 10-minute walk circle surrounding train station
3. Train station as prominent feature of town center
4. Collector support transit systems including streetcar, light rail, and buses, etc
5. Designed to include the easy use of bicycles and scooters as daily support transport
6. Reduced and managed parking inside 10-minute walk circle around town center / train station

BENEFITS OF TRANSIT ORIENTED DEVELOPMENT

Americans believe transit oriented development provides an array of benefits ranging from lifestyle to environmental to economic.



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<http://www.tod.org/>

<https://www.itdp.org/library/standards-and-guides/tod3-0/what-is-tod/>

CIT REVIEW

LANDSCAPE URBANISM

Landscape urbanism is the approach to the design and planning of open space where landscape is the structuring medium.

Landscape urbanism considers the horizontal field over the vertical figure-ground and secondly, process is favoured over a static end form.

-Christopher Gray



CIT REVIEW

LANDSCAPE URBANISM

THE BIG U



LIT REVIEW III

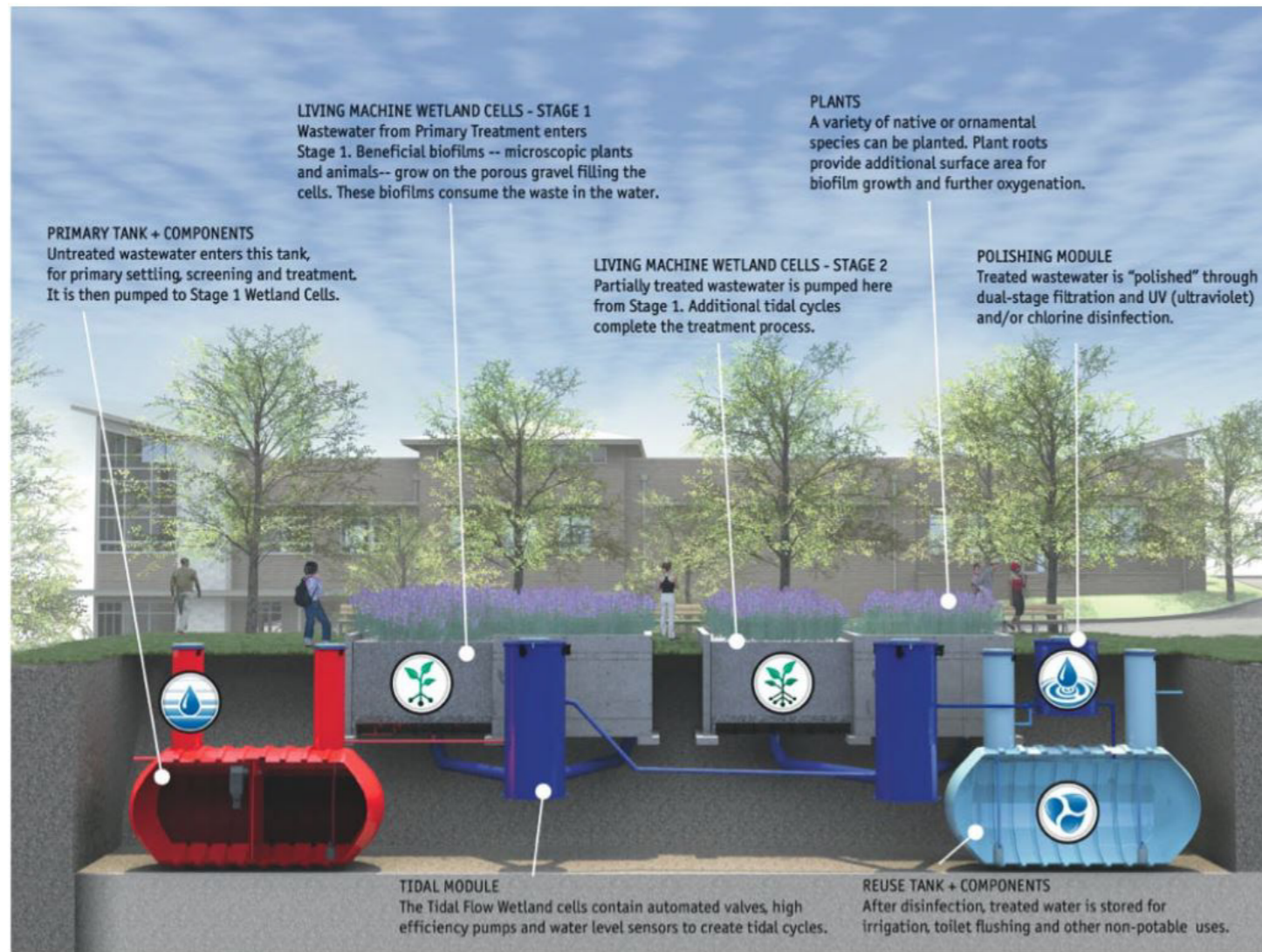
LANDSCAPE URBANISM

OLYMPIC SCULPTURE PARK



LIVING MACHINE

The Living Machine System utilizes the technology and engineering to mimic the ecology of natural coastal wetlands. The system provides lasting water solutions by effectively treating and reusing wastewater through a series of wetland cells filled with optimized gravel, which promote growth of micro-ecosystems, and a process of tidal cycles, like in a coastal wetland, resulting in a high quality of reusable water.



LIT REVIEW

BIOMES

A biome is a large community of vegetation and wildlife adapted to a specific climate. The six major types of biomes are aquatic (freshwater & marine), grassland, forest, desert, and tundra.



Forest



Desert

Wetlands & Estuaries

Estuaries are areas where freshwater streams or rivers merge with the ocean. This mixing of waters with such different salt concentrations creates a very interesting and unique ecosystem.

Wetlands are areas of standing water that support aquatic plants. Marshes, swamps, and bogs are all considered wetlands.



Grassland



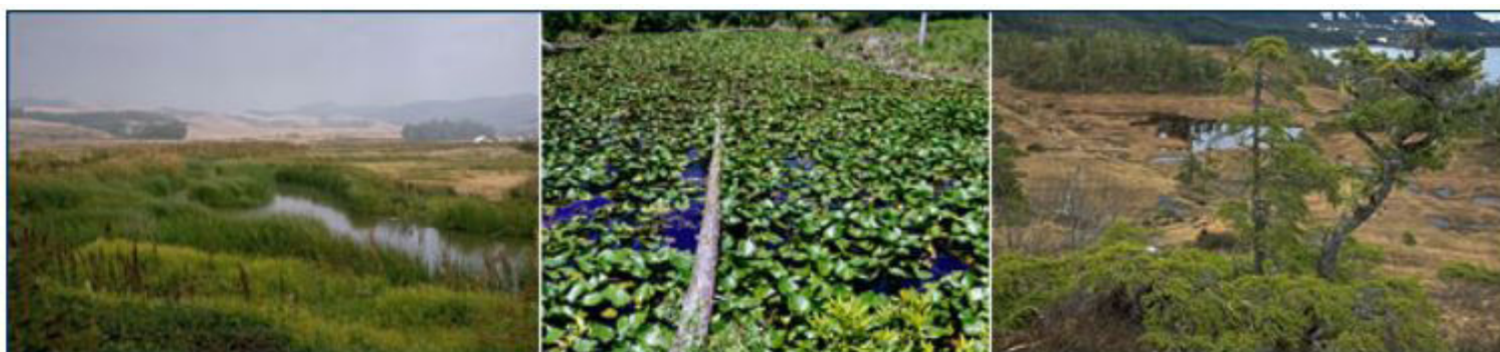
Tundra



Freshwater



Marine



<https://ucmp.berkeley.edu/exhibits/biomes/index.php>
<https://www.nationalgeographic.org/encyclopedia/biome/>

Back



ALGAE HARVESTING

Algae are emerging to be one of the most promising long-term, sustainable sources of biomass and oils for fuel, food, feed, and other co-products. What makes them so attractive are the large number and wide variety of benefits associated with how and where they grow.



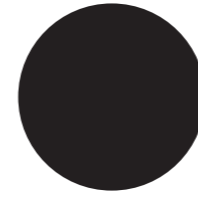
Why?

- 1) Algae Grow Fast
- 2) Algae Can Have High Biofuel Yields
- 3) Algae Consume CO₂
- 4) Algae Do Not Compete With Agriculture
- 5) Microalgal Biomass Can Be Used for Fuel, Feed and Food
- 6) Macroalgae Can Be Grown in the Sea
- 7) Algae Can Purify Wastewaters
- 8) Algal Biomass Can Be Used as an Energy Source
- 9) Algae Can Be Used to Produce Many Useful Products
- 10) The Algae Industry is a Job Creation Engine

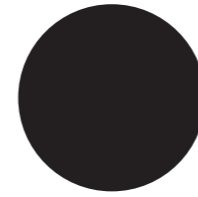


CASE STUDIES

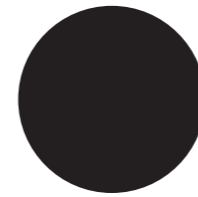
SUNQIAO URBAN AGRICULTURAL DISTRICT



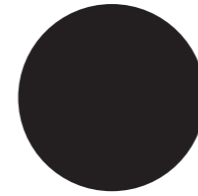
LA RIVER REVITALIZATION



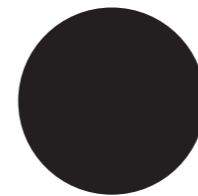
MINGHU WETLAND PARK



WASTE TO WASTE ENERGY PLANT IN SHENZHEN



SHENZHEN MARITIME MUSEUM



SUNQIAO URBAN

AGRICULTURAL DISTRICT

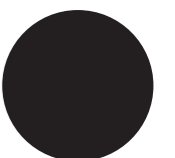
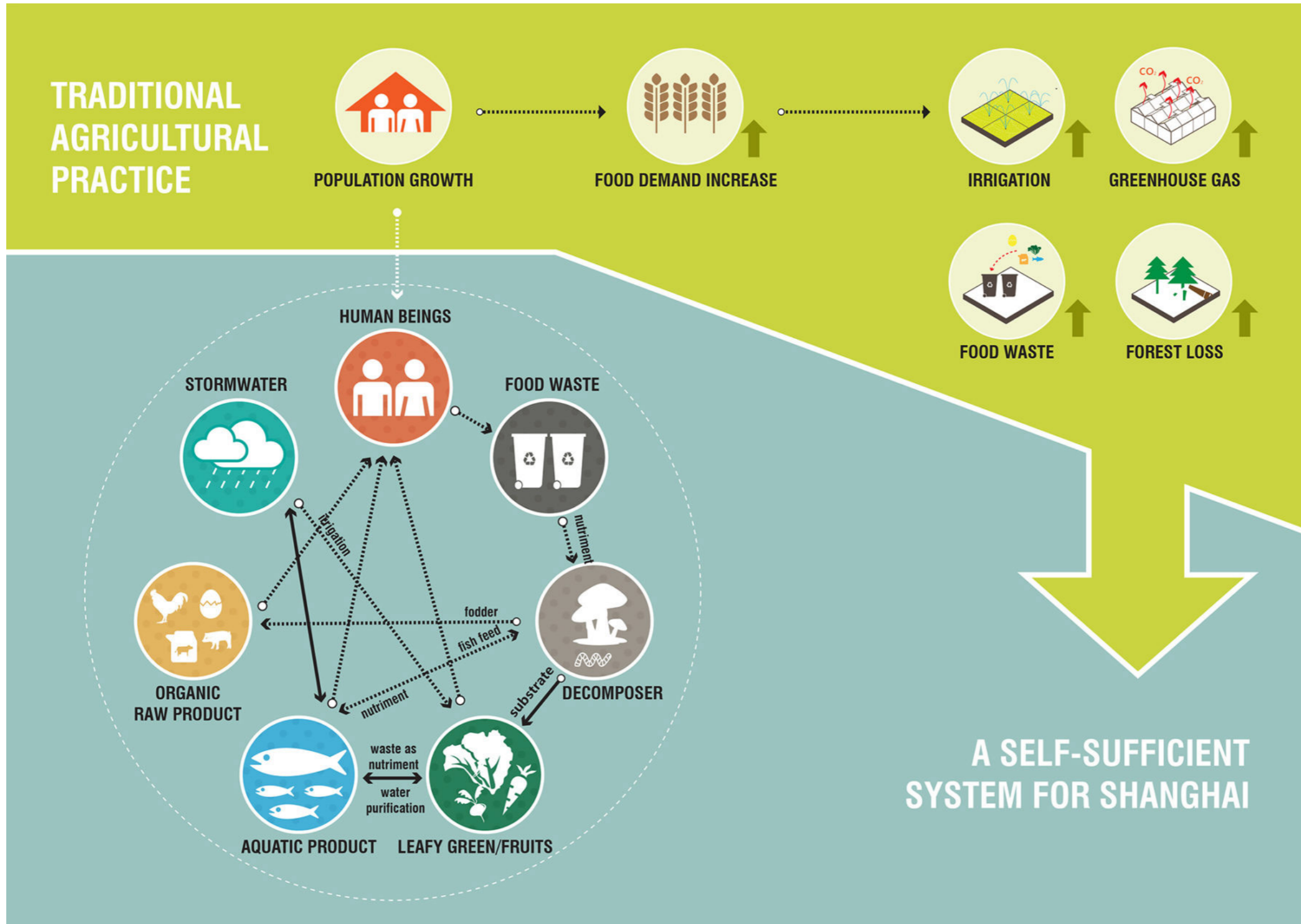
BY SASAKI

A new model for urban farming for the world's largest agricultural producer and consumer: China

Sunqiao promotes a new paradigm of urban life, integrating agricultural production with research and civic amenities to create a socially-engaged and playful experience



SUNQIAO URBAN AGRICULTURAL DISTRICT BY SASAKI



CASE STUDIES

LA RIVER REVITALIZATION

The Los Angeles River Revitalization Master Plan has achieved the revitalization of 32 miles of a concrete-lined channelized river into public green space in the heart of one of America's densest cities.

The plan outlines a framework to revitalize the river into a multi-purpose system that restores habitat, connects to park-poor neighborhoods with public greenways, and improves the river's flood capacity and water quality.



MINGHU WETLAND PARK

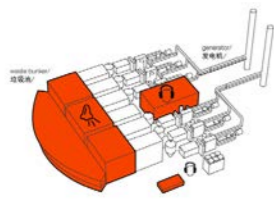
BY TURENSCAPE

A channelized concrete river and a deteriorated peri-urban site have been transformed into a nationally celebrated wetland park that functions as a major part of the city-wide ecological infrastructure planned to provide multiple ecosystem services, including storm-water management, water cleansing, and recovery of native habitats, as well as a cherished public space for gathering and aesthetic enjoyment.

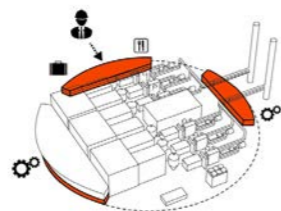


WASTE TO WASTE ENERGY PLANT IN SHENZHEN BY SCHMIDT HAMMER LASSEN ARCHITECTS

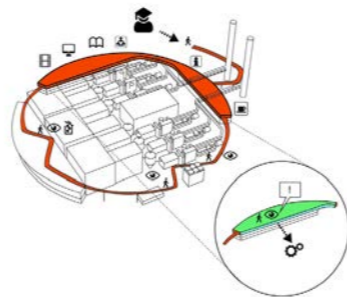
The new plant is made to handle 5000 tons of waste per day within a simple, clean, and iconic structure. It will incinerate waste and generate power while teaching residents about the waste-energy cycle. The project aims to showcase new developments in China's waste-to-energy sector and share them with the world.



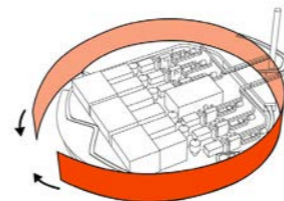
Rise and steel roof structure
提高屋顶和气候的影响



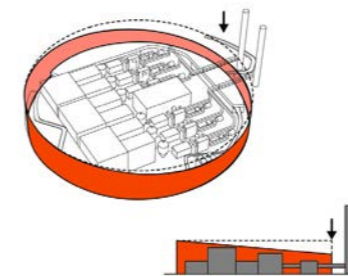
Address supporting factory functions on ground floor
在高层加入工厂配套功能



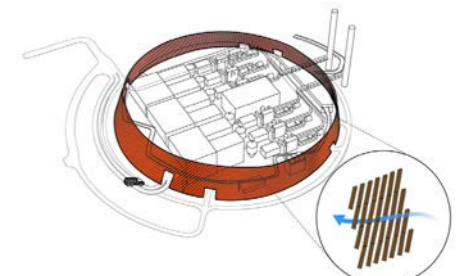
Address water experience on top
在顶层增加水处理设备



Facade wrap
幕墙包裹



Adjust height to optimize volume
根据高度优化环境



Facade openings to circulation
幕墙镂空实现环境



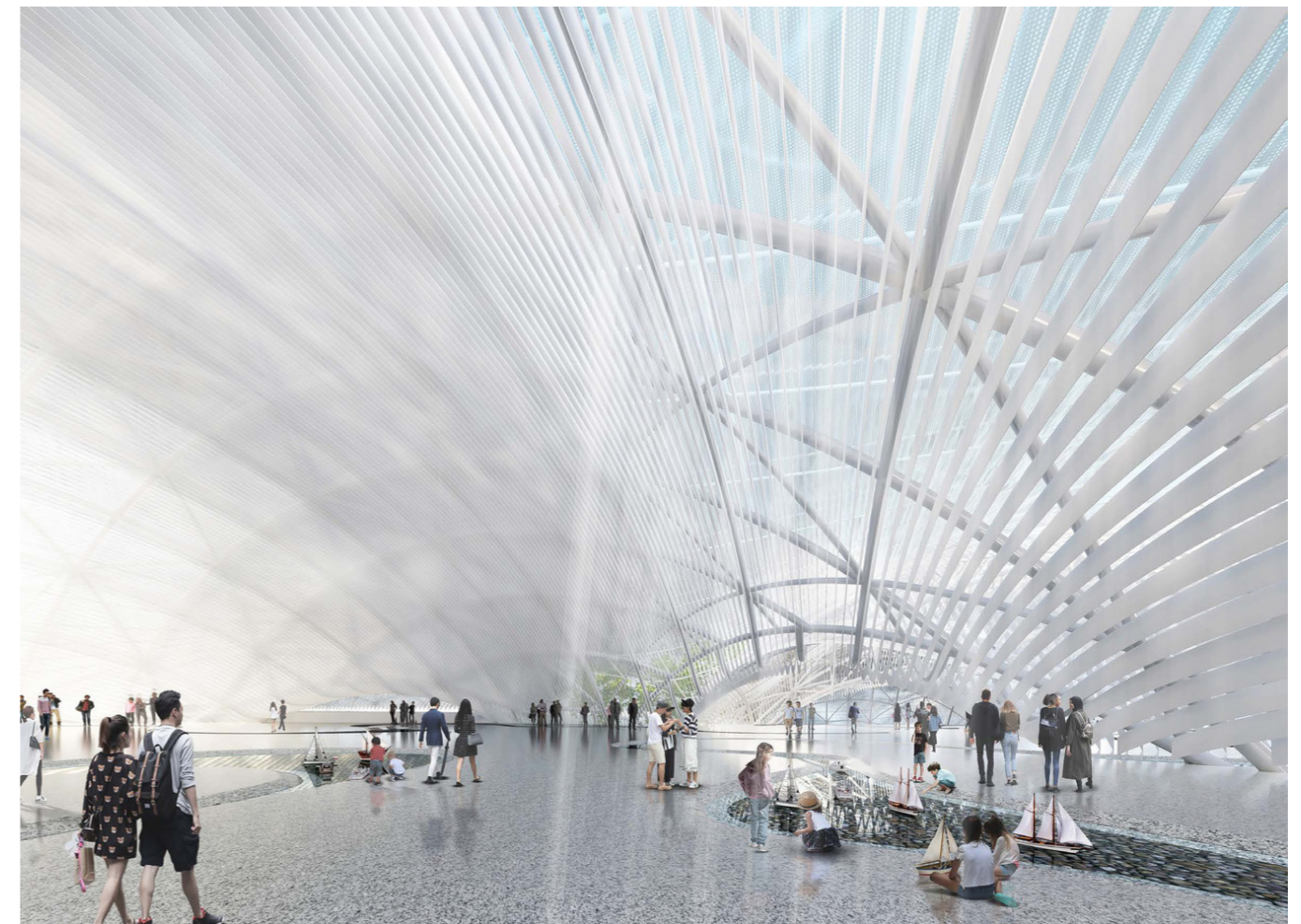
CASE STUDIES

SHEENZHEN MARITIME MUSEUM

BY SANAA

Diagrid Structure

Free-flowing curves that contribute to a light, gentle and delicate building form that integrates humbly and lightly into the mountains and sea. The spatial experience alternates between voids and solids, interior and exterior, light and shadow; while the façades, the essential key feature of the “clouds”, generate several hemispherical spaces of different sizes, serving both structures and spaces. Moreover, the continuous column-free spaces help create functions that are both interconnected and independent from each other.



Back



PROJECT

PROJECT



**MASTER
PLAN**

CONCEPT

CLOSER LOOK

GET INSIDE

DETAILS

MASTER PLAN

GREEN CONNECTION

WETLAND AREA

LOCAL COMMERCIAL ZONE

EXISTING PARC

EXISTING PARC

ARCHEOLOGICAL ZONE

GREEN CORRIDOR

GREEN CORRIDOR



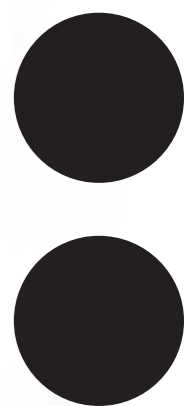
WETLAND AREA

GREEN CORRIDOR

BIOSWALES

landscape
Urbanism

Case Study
LA River
Revitalization



MASTER PLAN

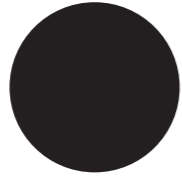
CIRCULATION



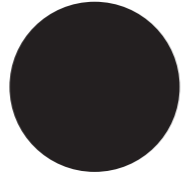
MASTER PLAN

CONNECTEDNESS

TOD

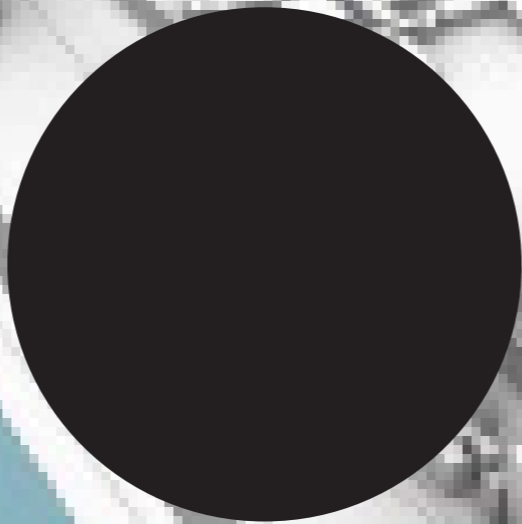
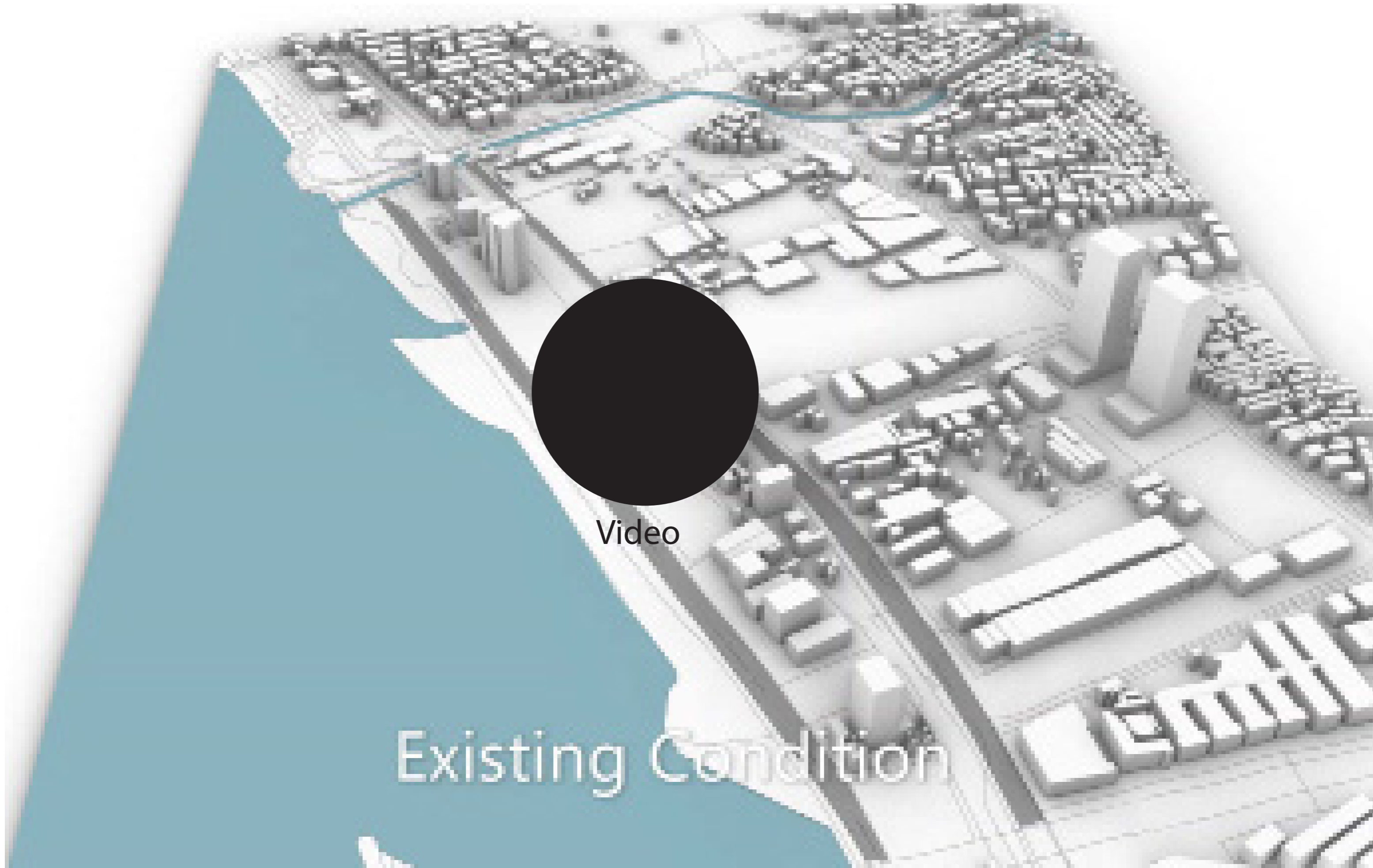


Smart Growth



MASTER PLAN

LAND FORMATION



Video

Existing Condition

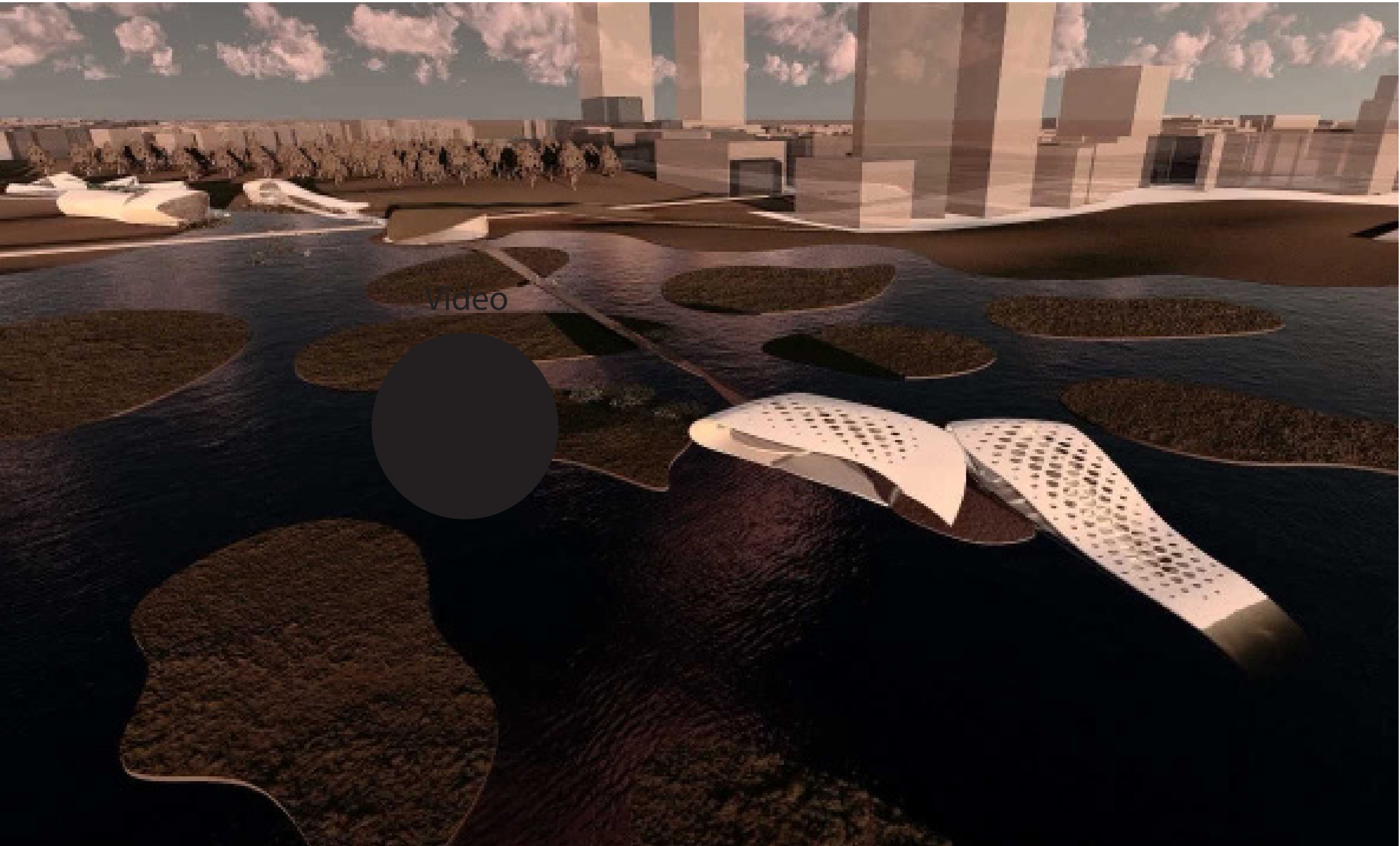
MASTER PLAN

SITE PLAN



MASTER PLAN

MOVE TOWARDS

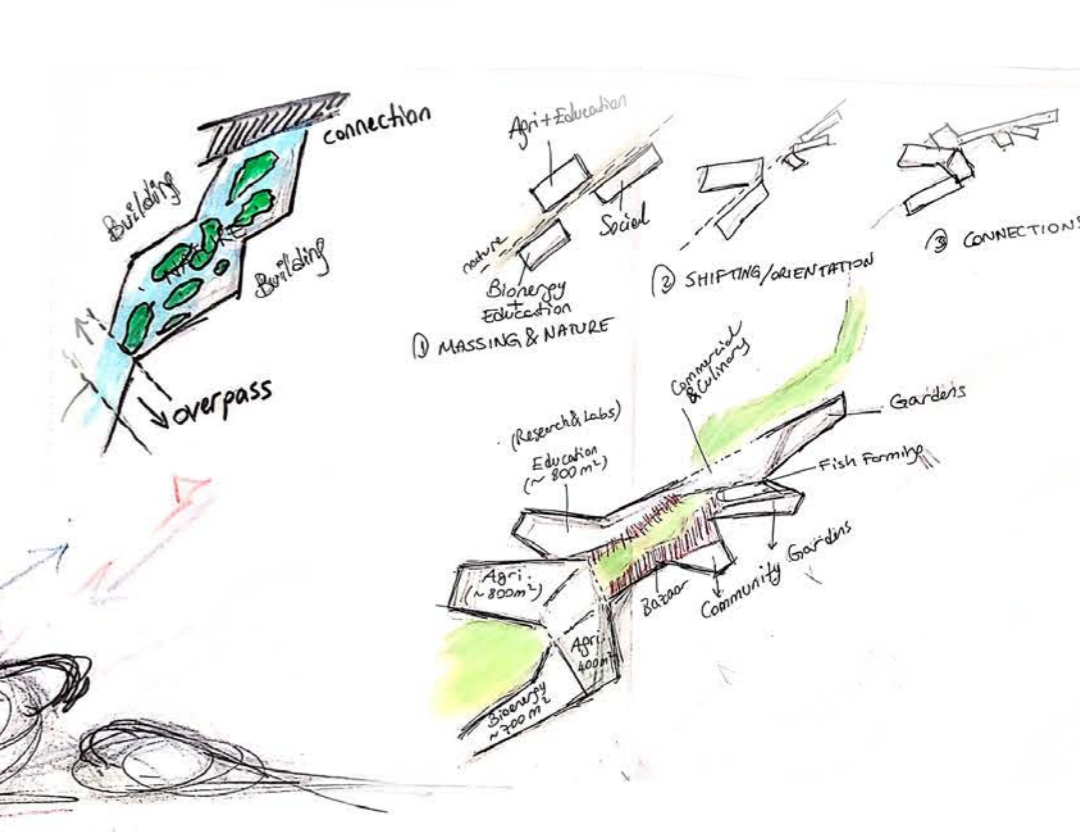
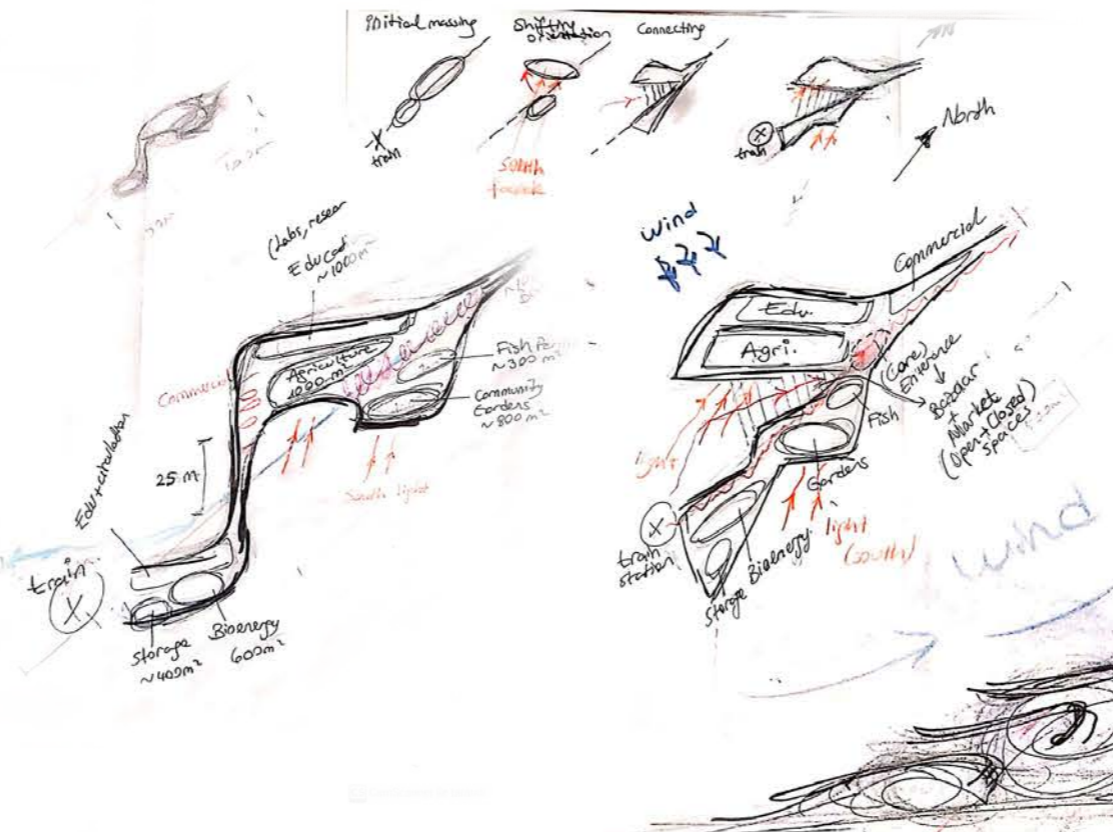
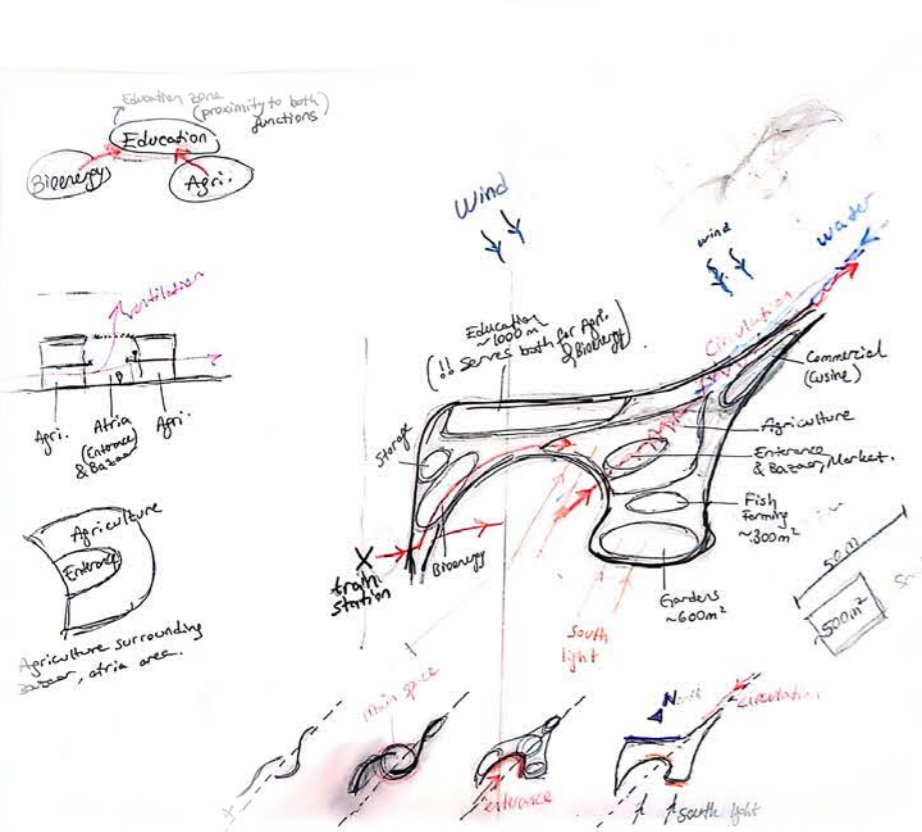
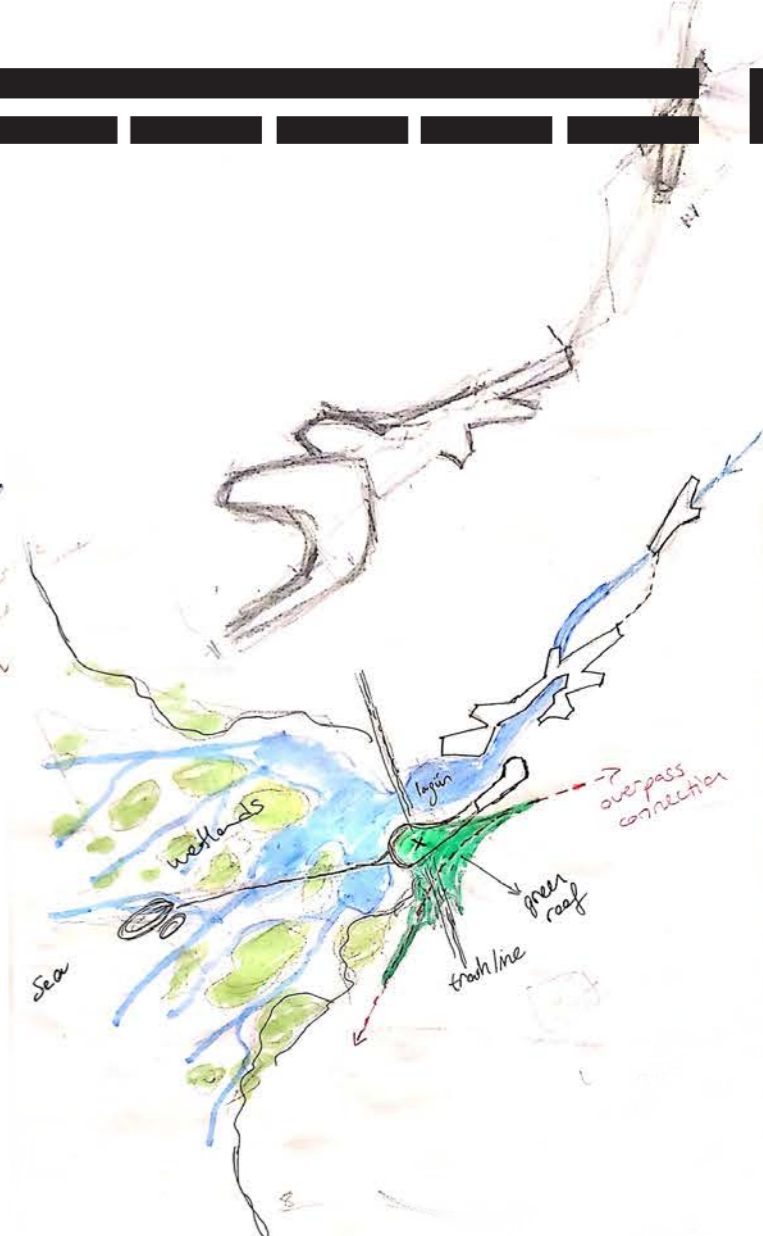
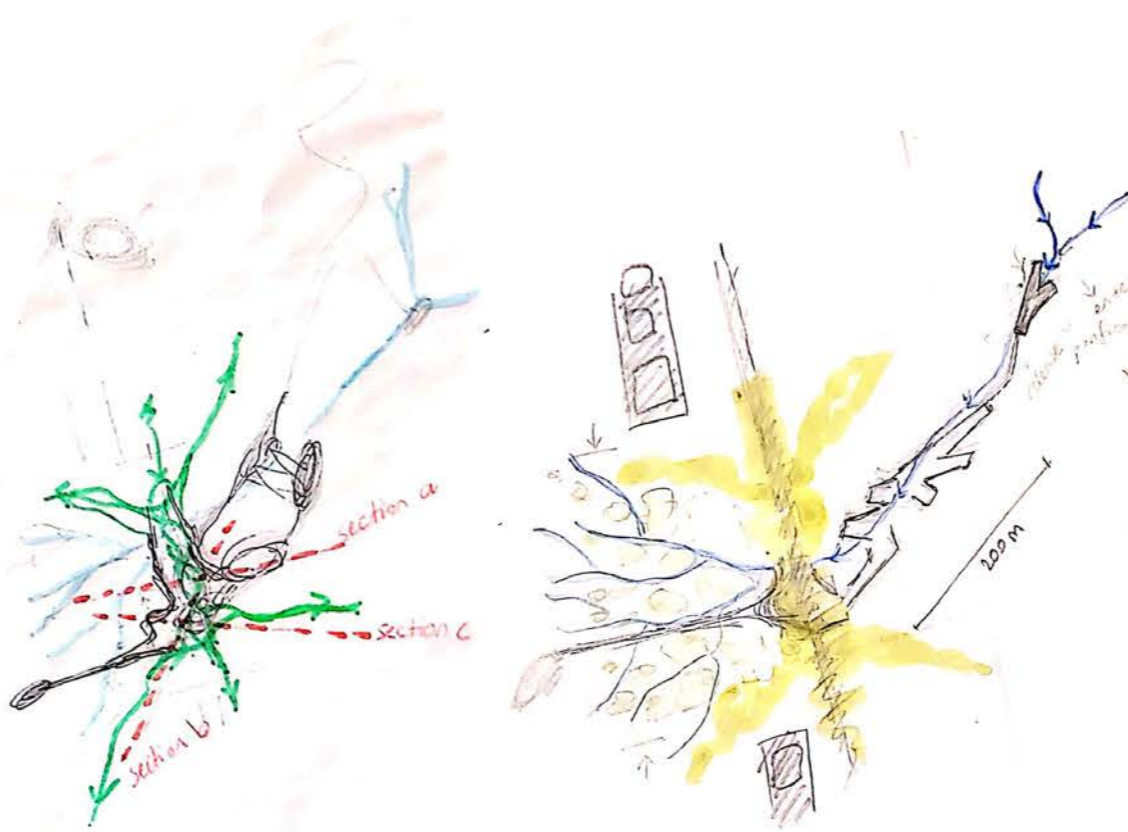
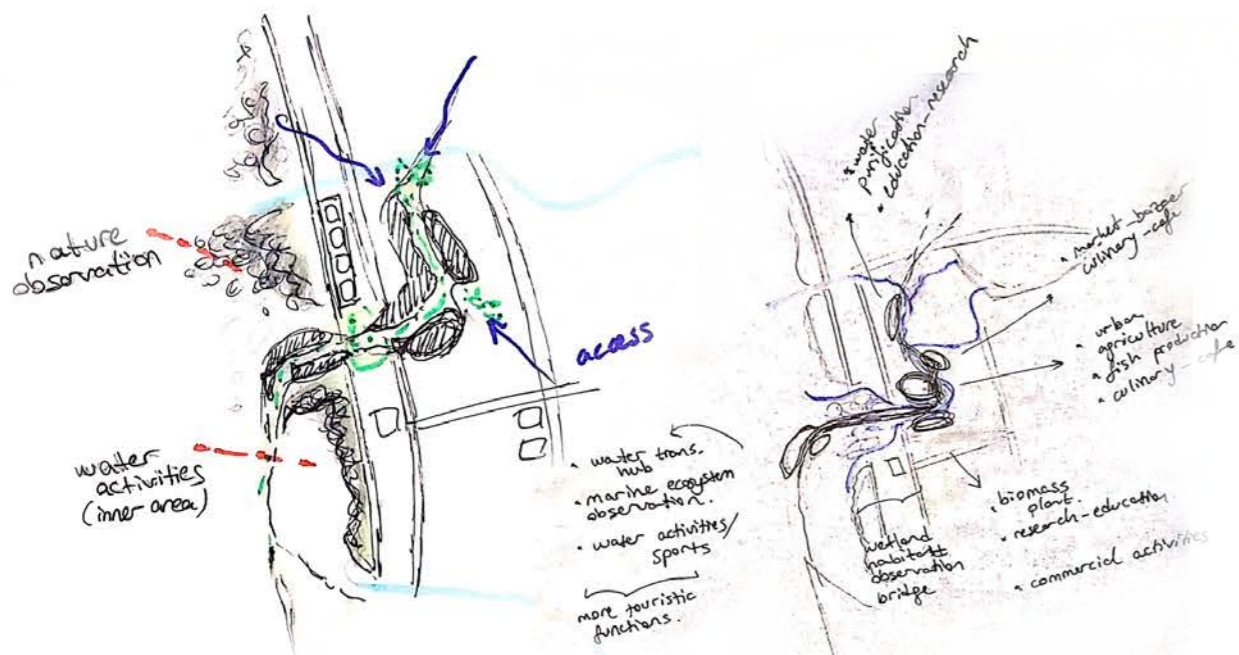


Video



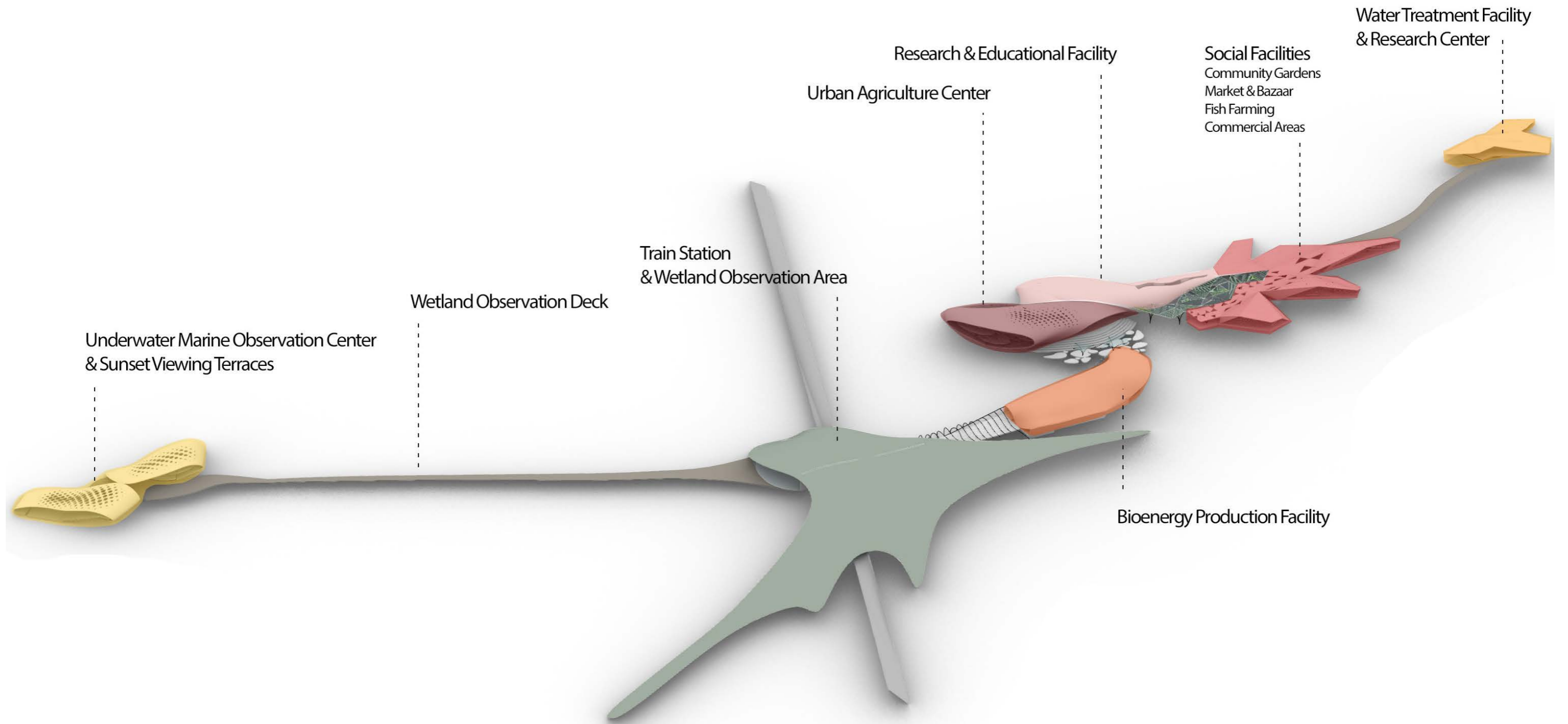
CONCEPT

DIARY



CONCEPT

FUNCTIONS



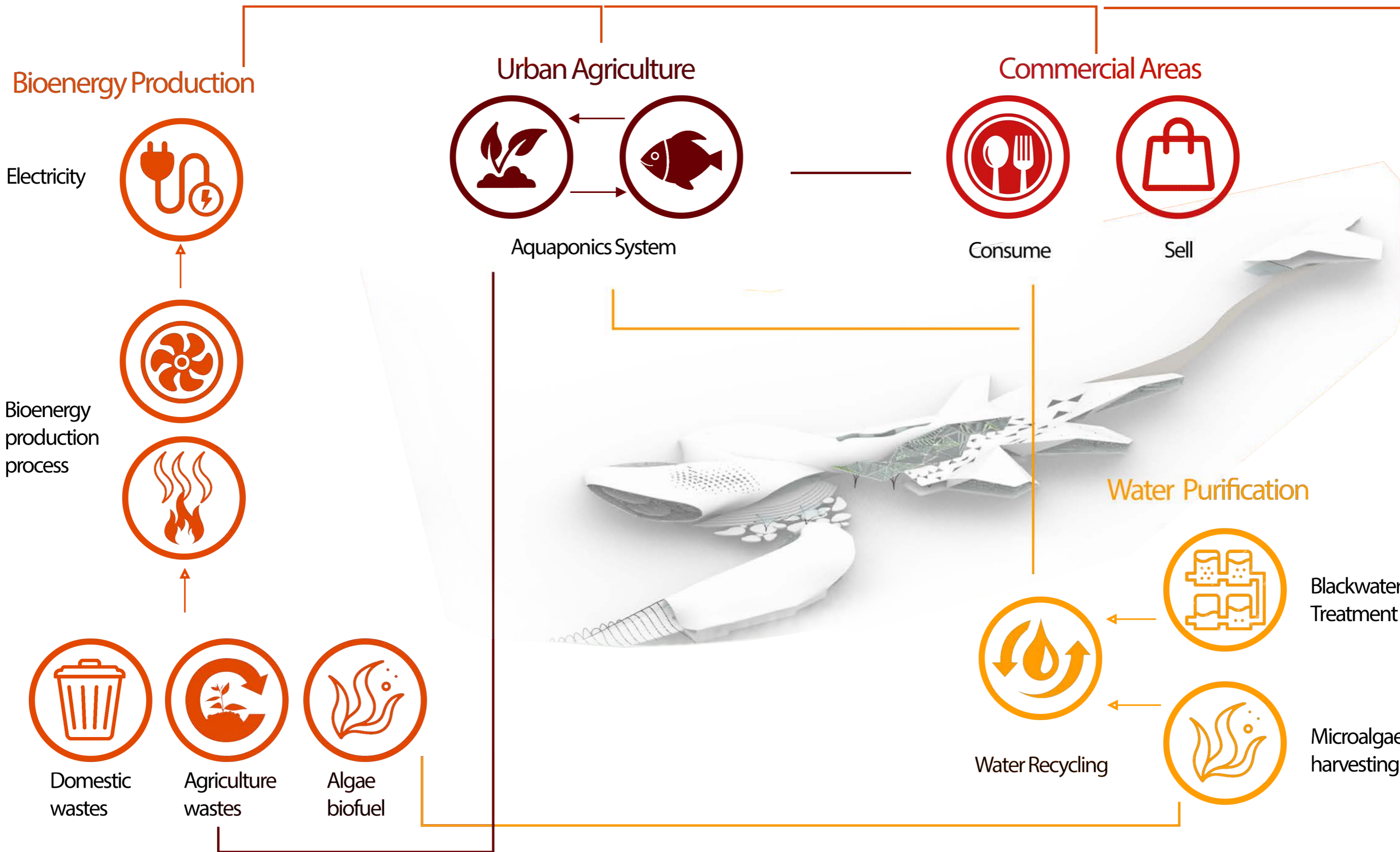
CONCEPT

SUSTAINABILITY CONCEPT

● Case Study
Bioenergy Production

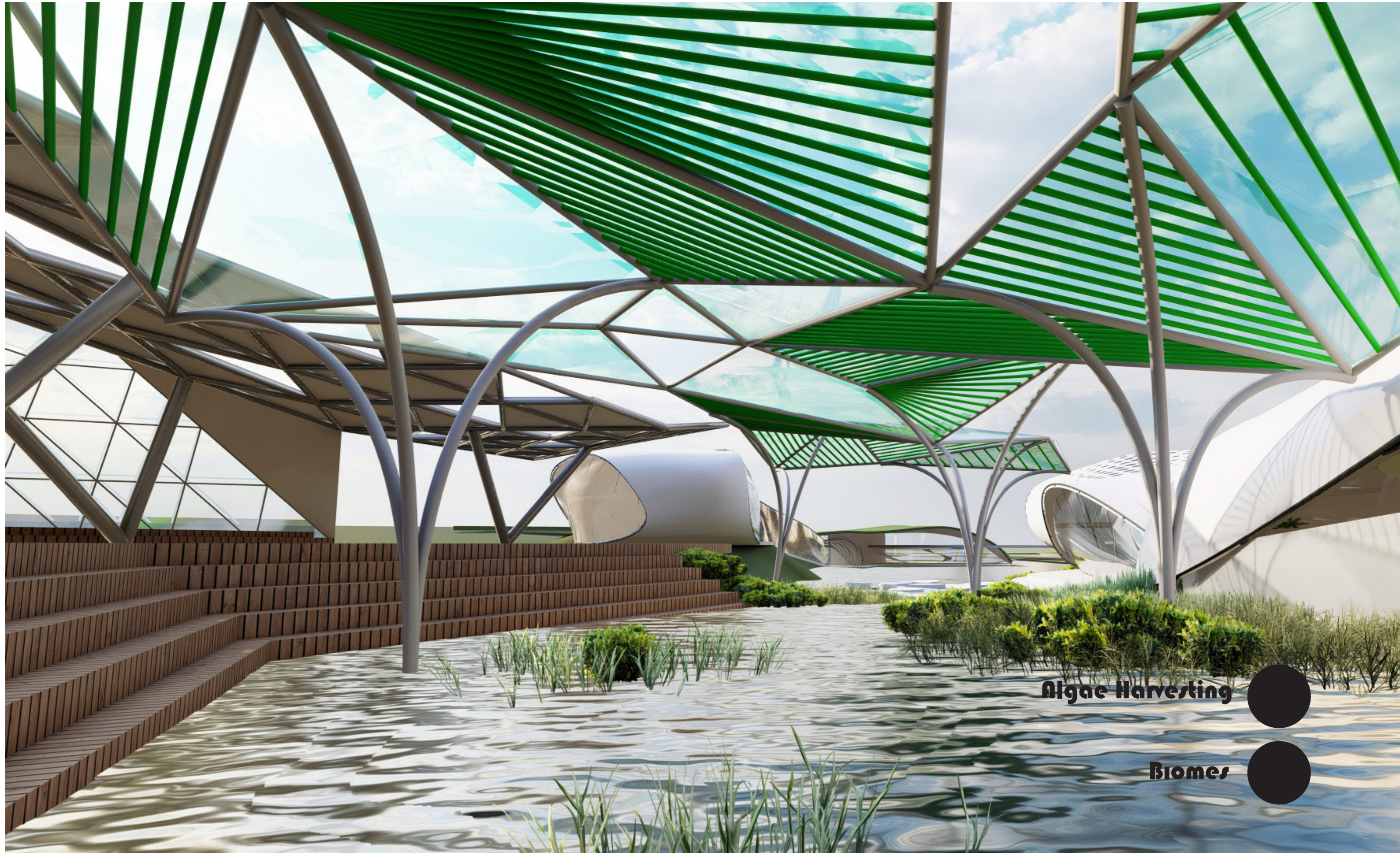
● Case Study
Urban Agriculture

● Water Purification
living Machine



CONCEPT

ENVIRONMENTALLY



Algae Harvesting

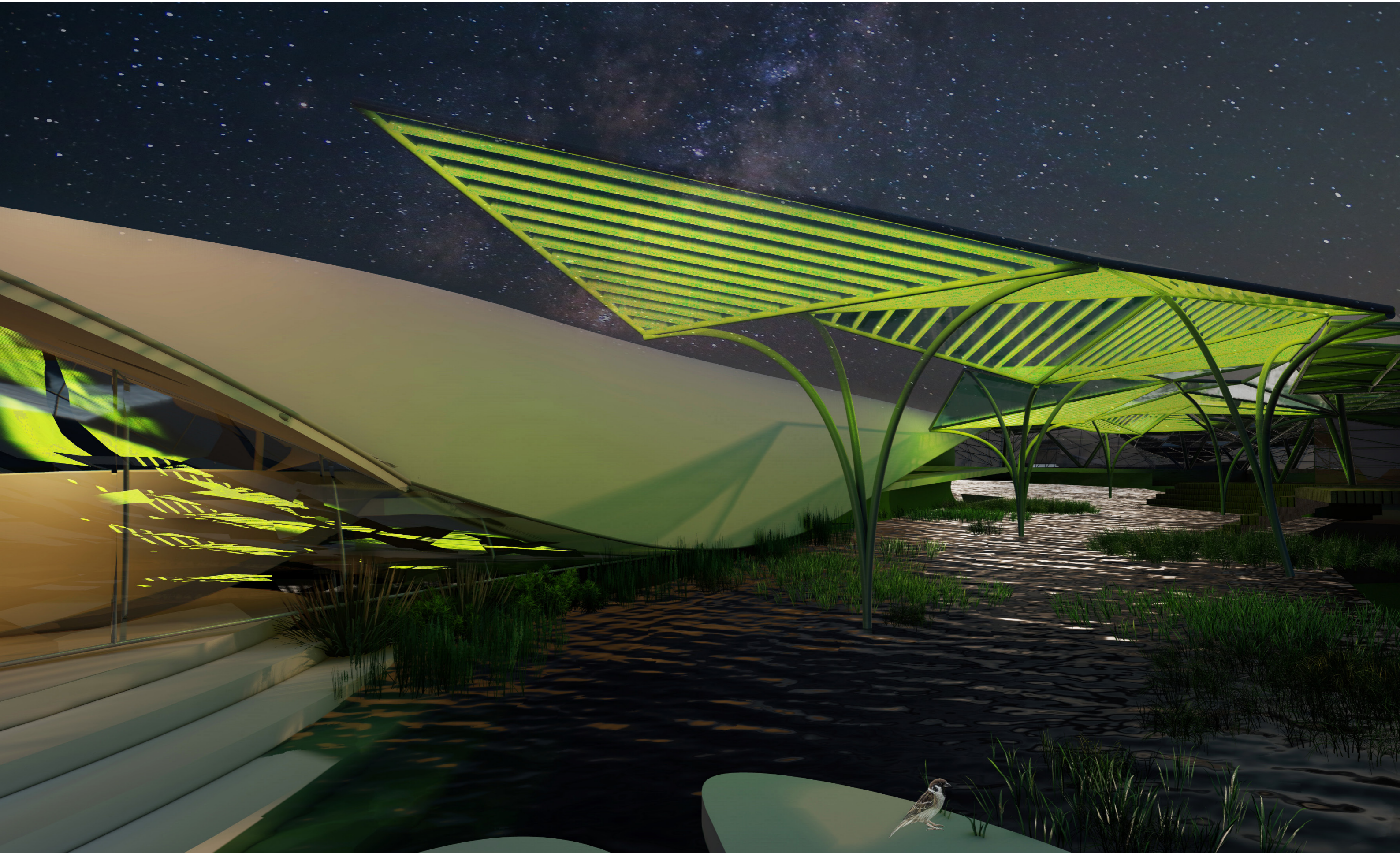


Biomes



CONCEPT

ENVIRONMENTALLY



CONCEPT ENVIRONMENTALLY



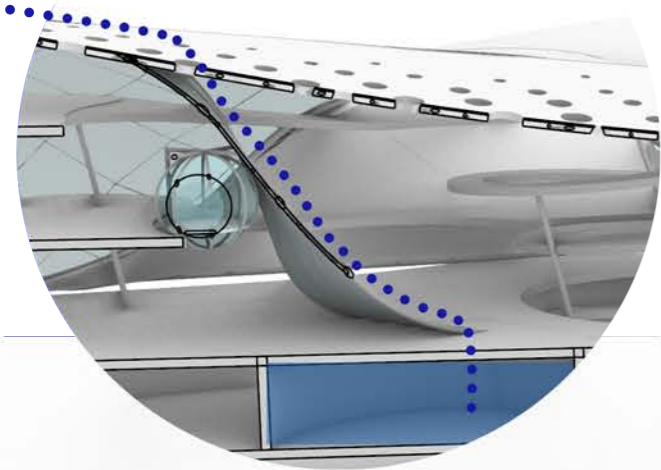
Designed by Protree

Wetlands



CONCEPT

ENVIRONMENTALLY

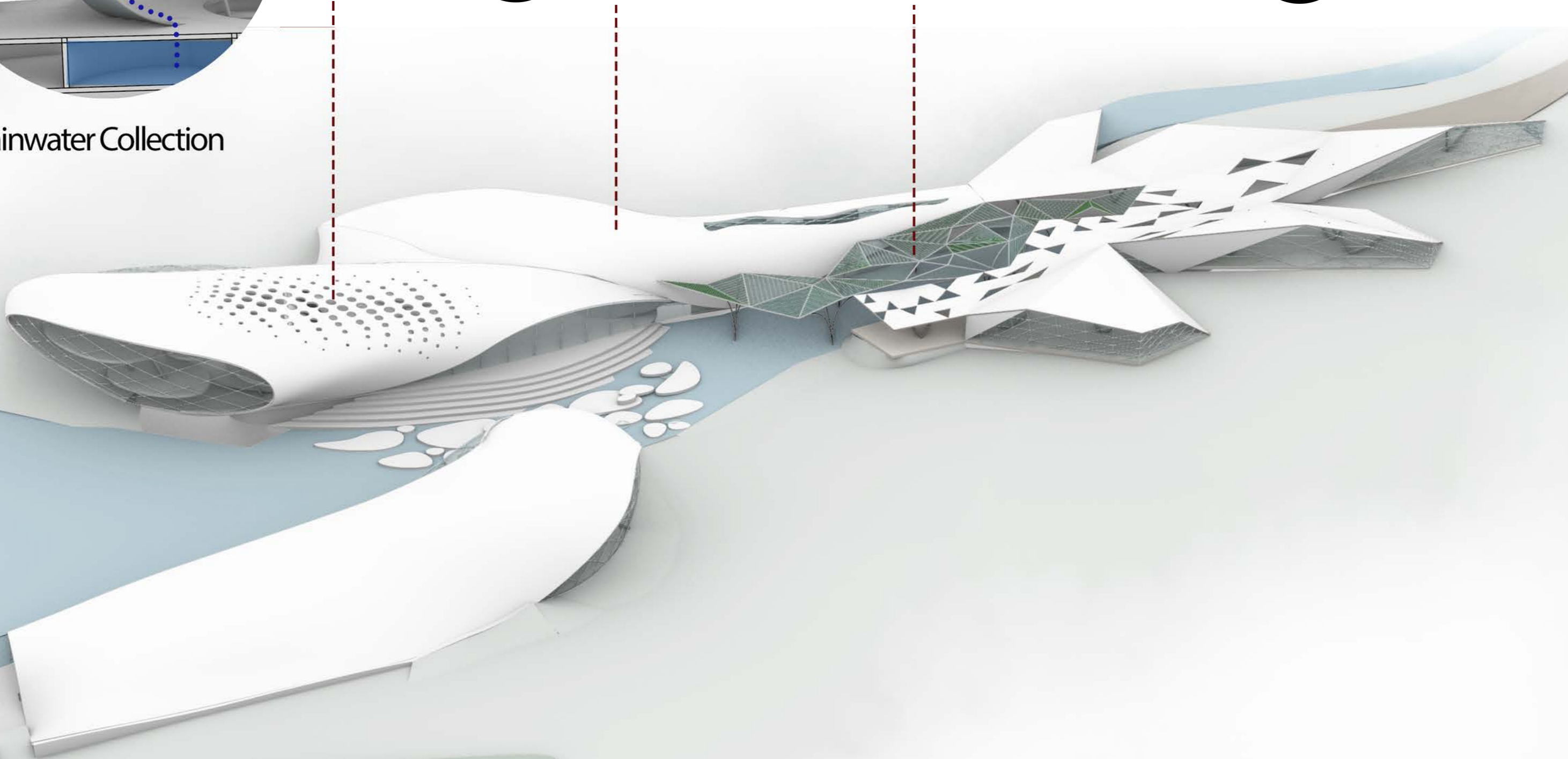


Rainwater Collection



TiO2 Roof Panels
(for air purifying)

Transparent Photovoltaics
& Algae Harvesting



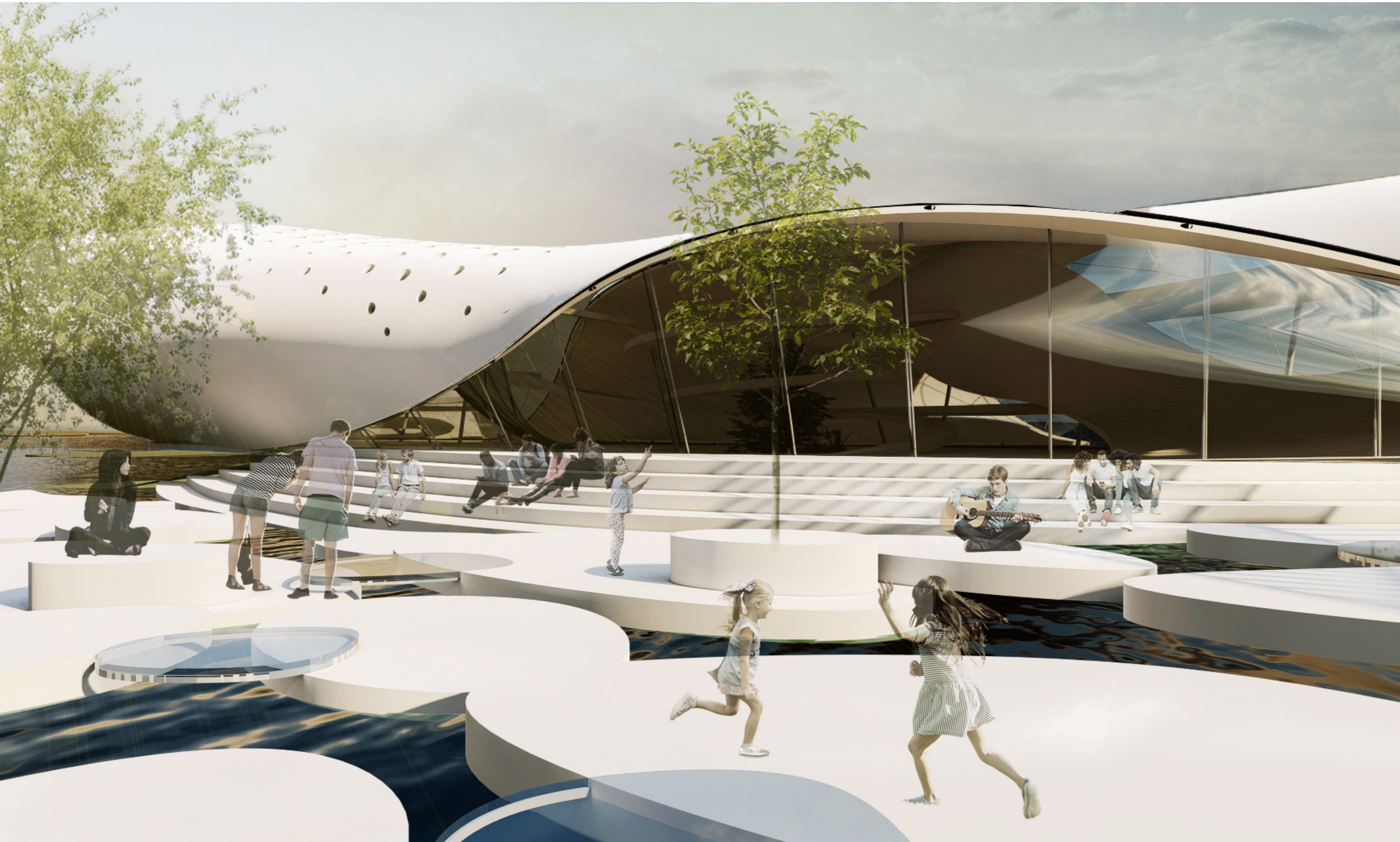
CONCEPT

ECONOMICALLY



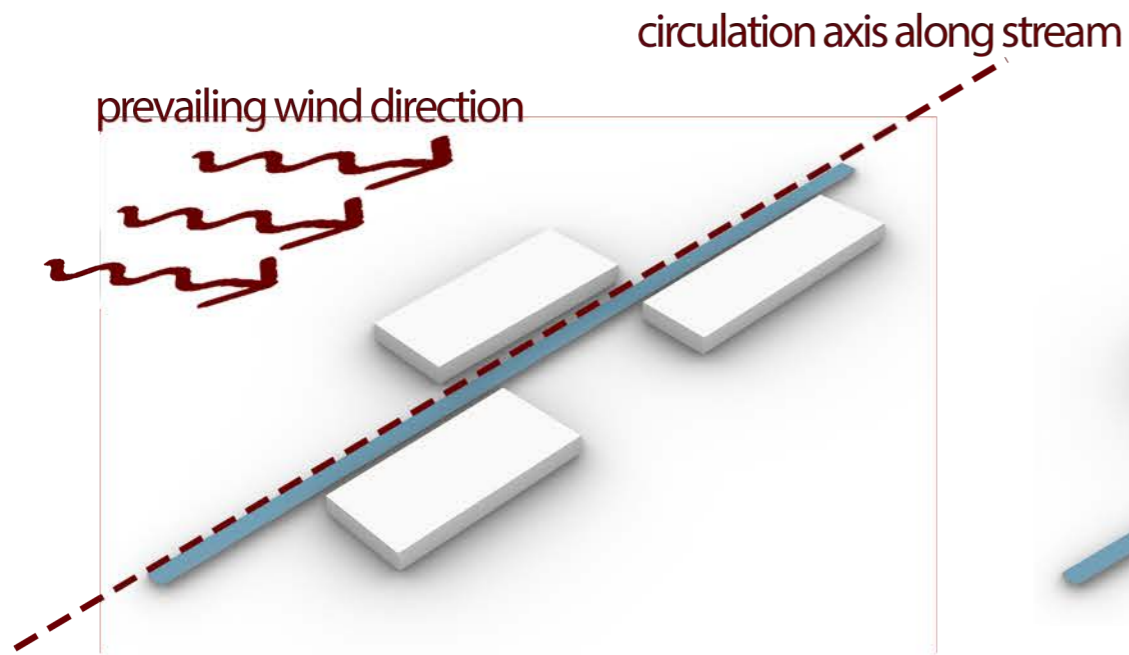
CONCEPT

SOCIO-CULTURAL

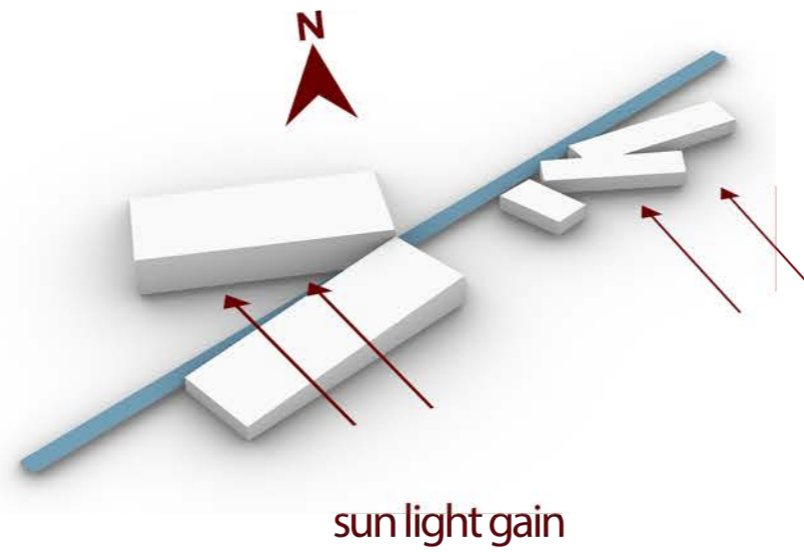


CLOSER LOOK

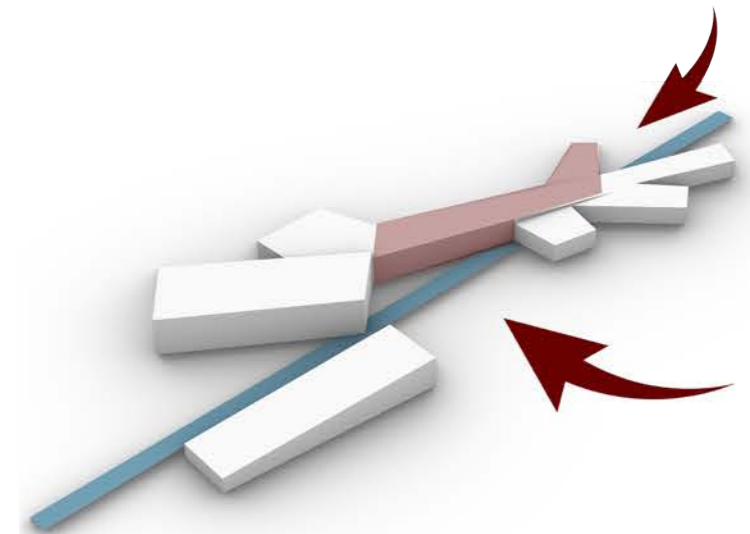
FORM DEVELOPMENT



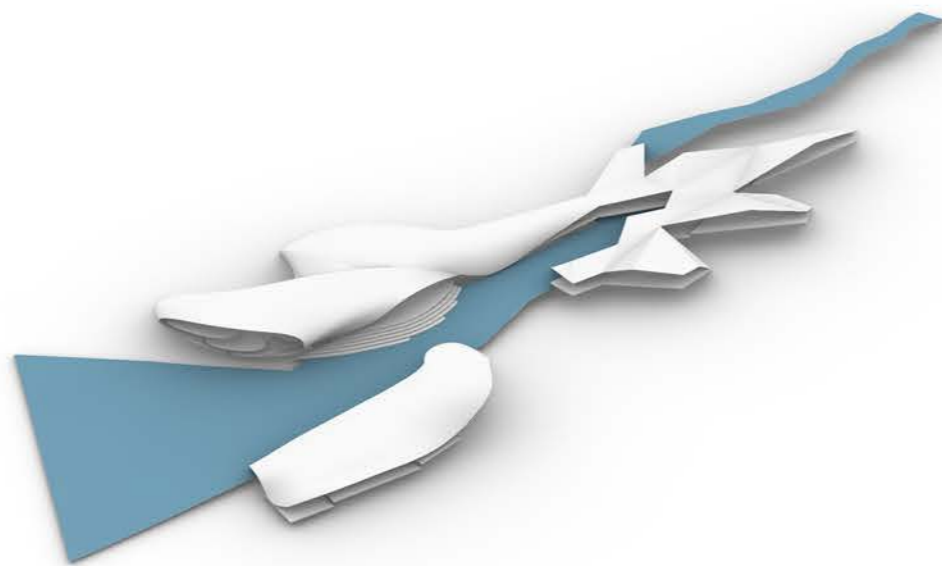
1 Main Massing



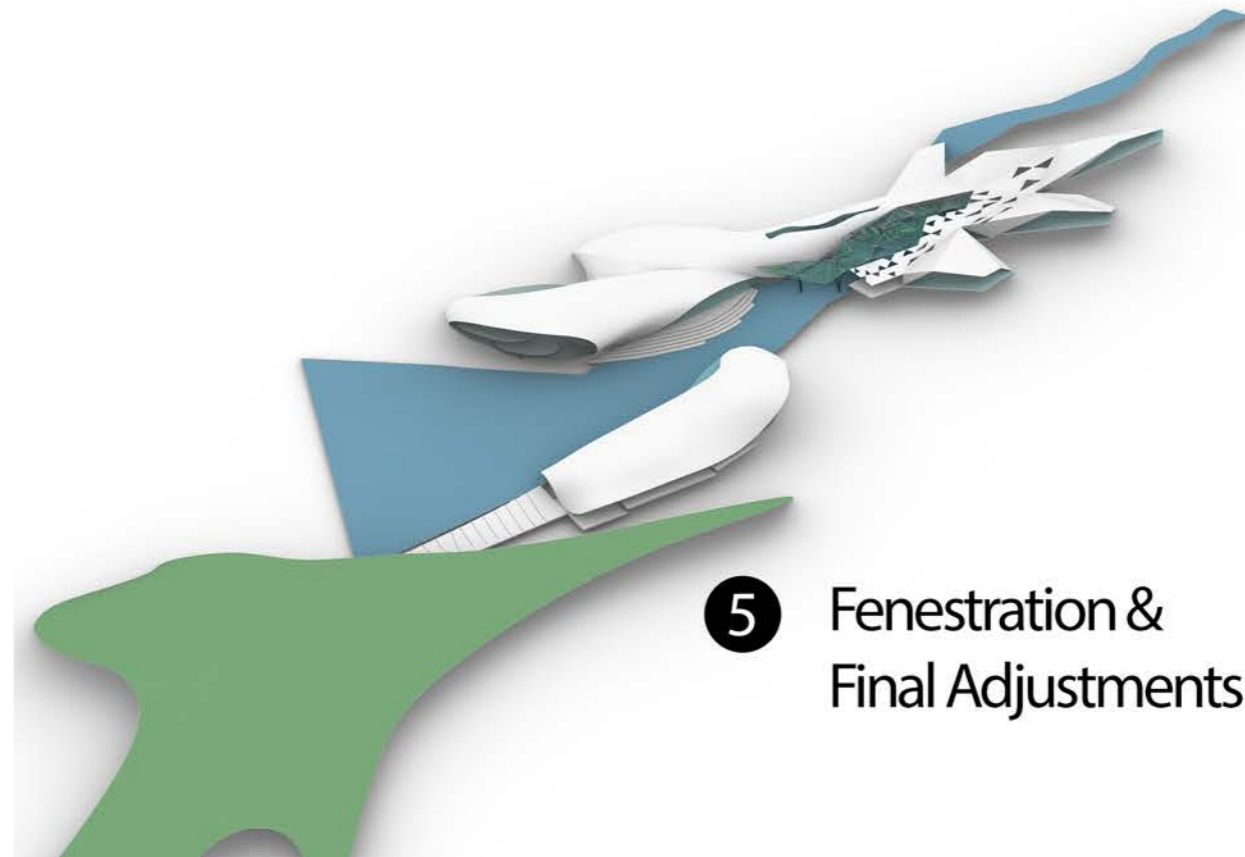
2 Articulation in Orientation & Height Differences



3 Entrances & Connections



4 Roof Forms
(Curved & Angular Forms)



5 Fenestration & Final Adjustments

CLOSER LOOK

ENTRANCES

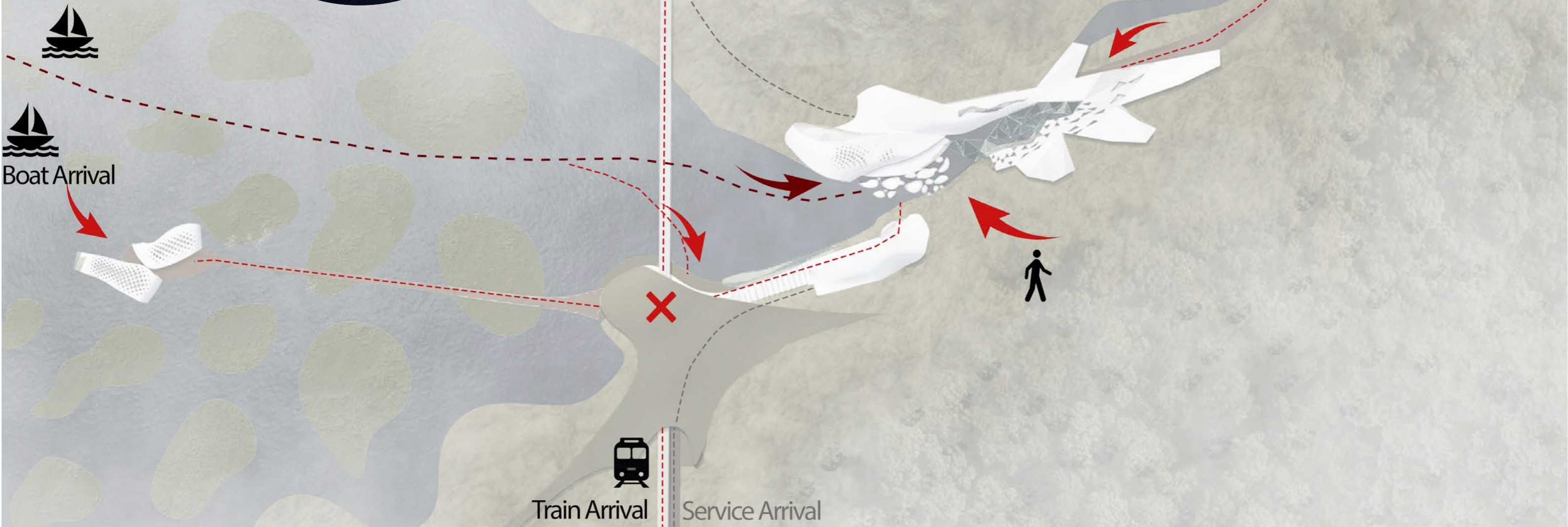
& ARRIVAL SEQUENCES



BOAT ARRIVAL
FLY-THROUGH

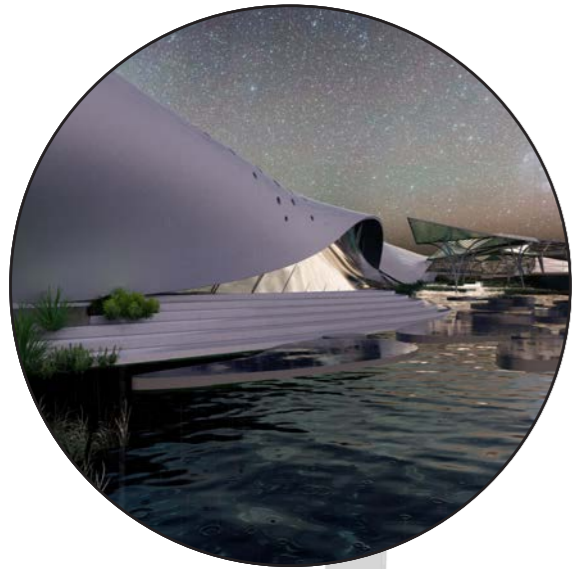
Service Arrival

Pedestrian Access
from city

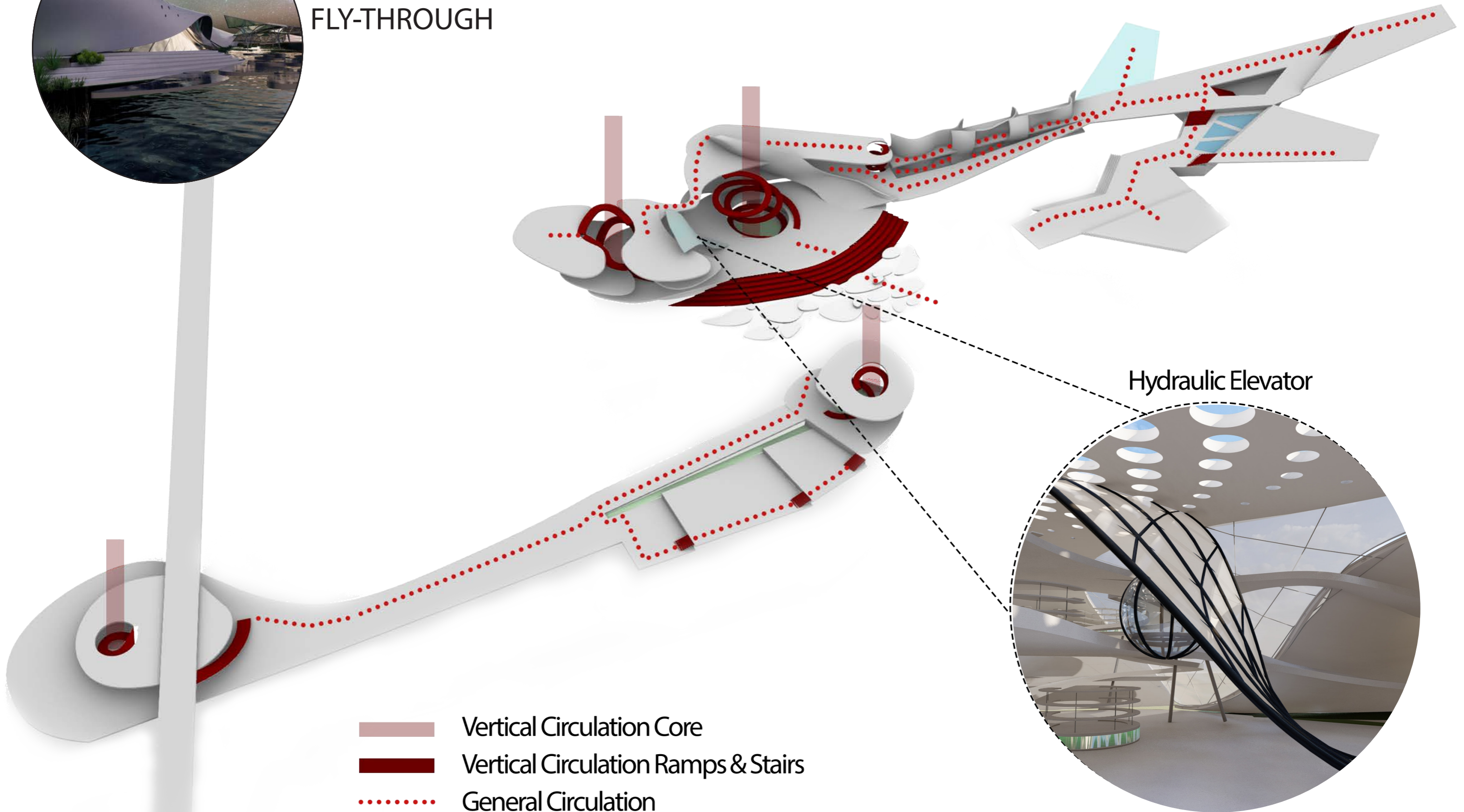


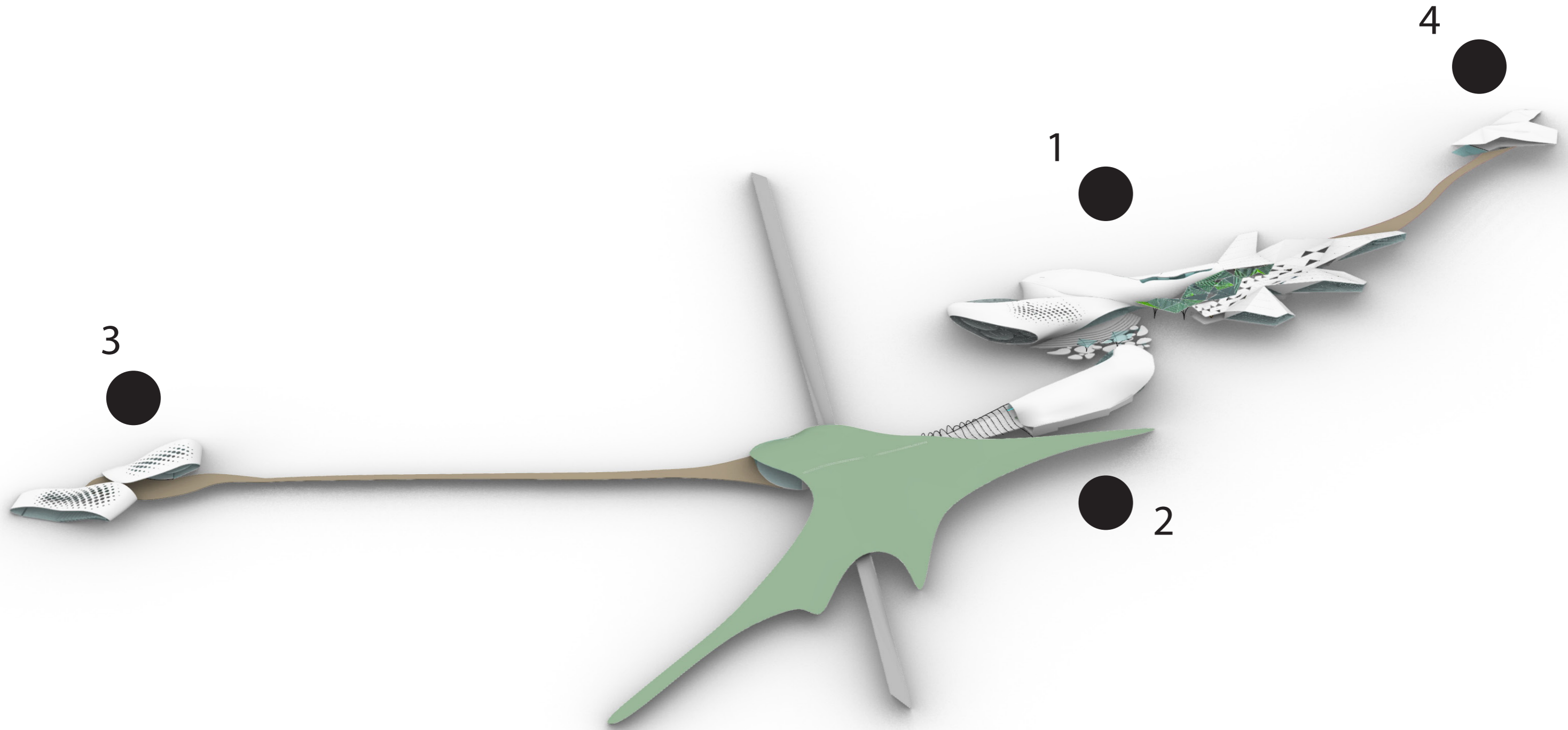
GET INSIDE

CIRCULATION



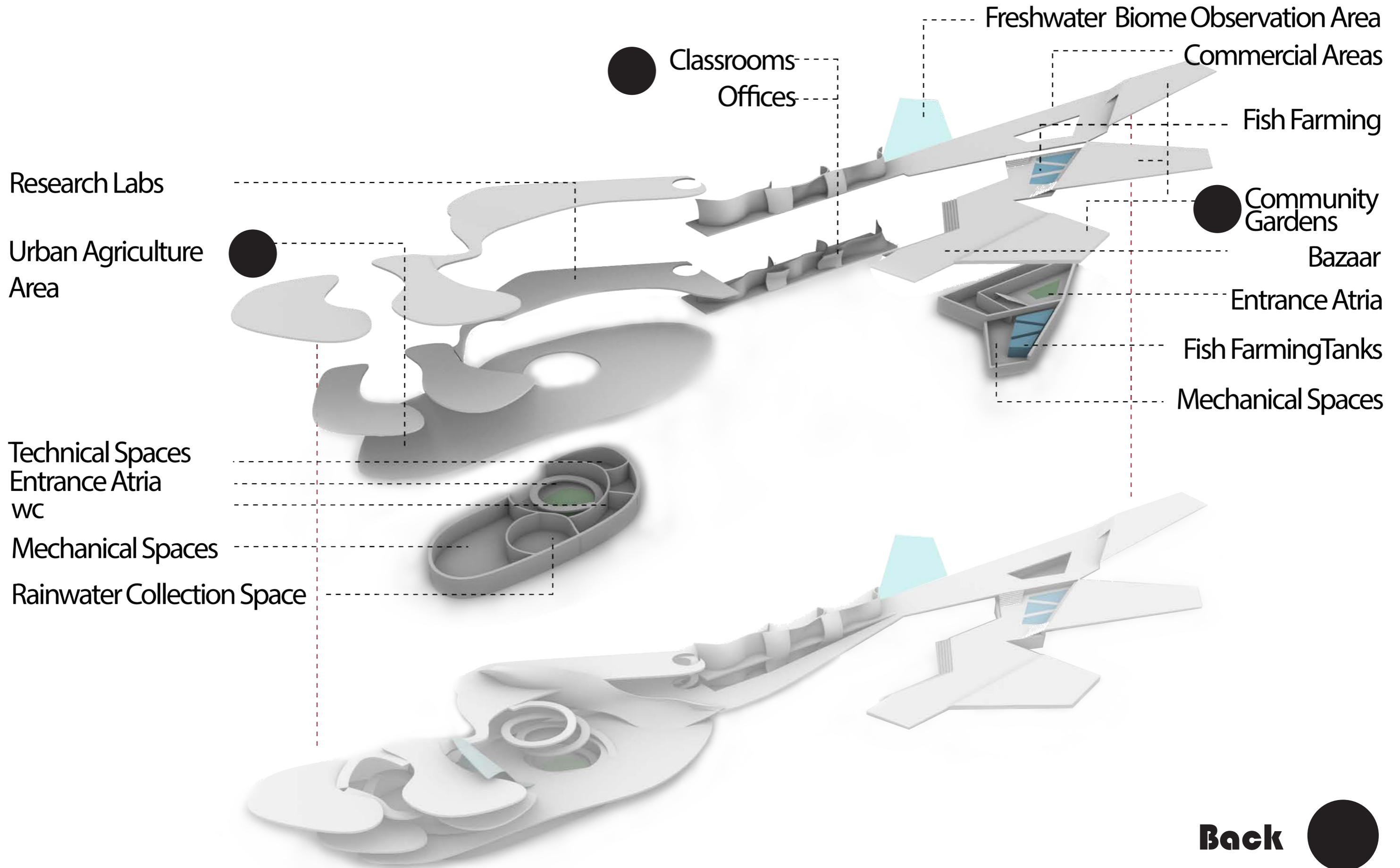
GET INSIDE
FLY-THROUGH





GET INSIDE

INTERIOR PLANNING



GET INSIDE

INTERIORS

Urban Agriculture



Back



GET INSIDE

INTERIORS

Education Facility



Back



GET INSIDE

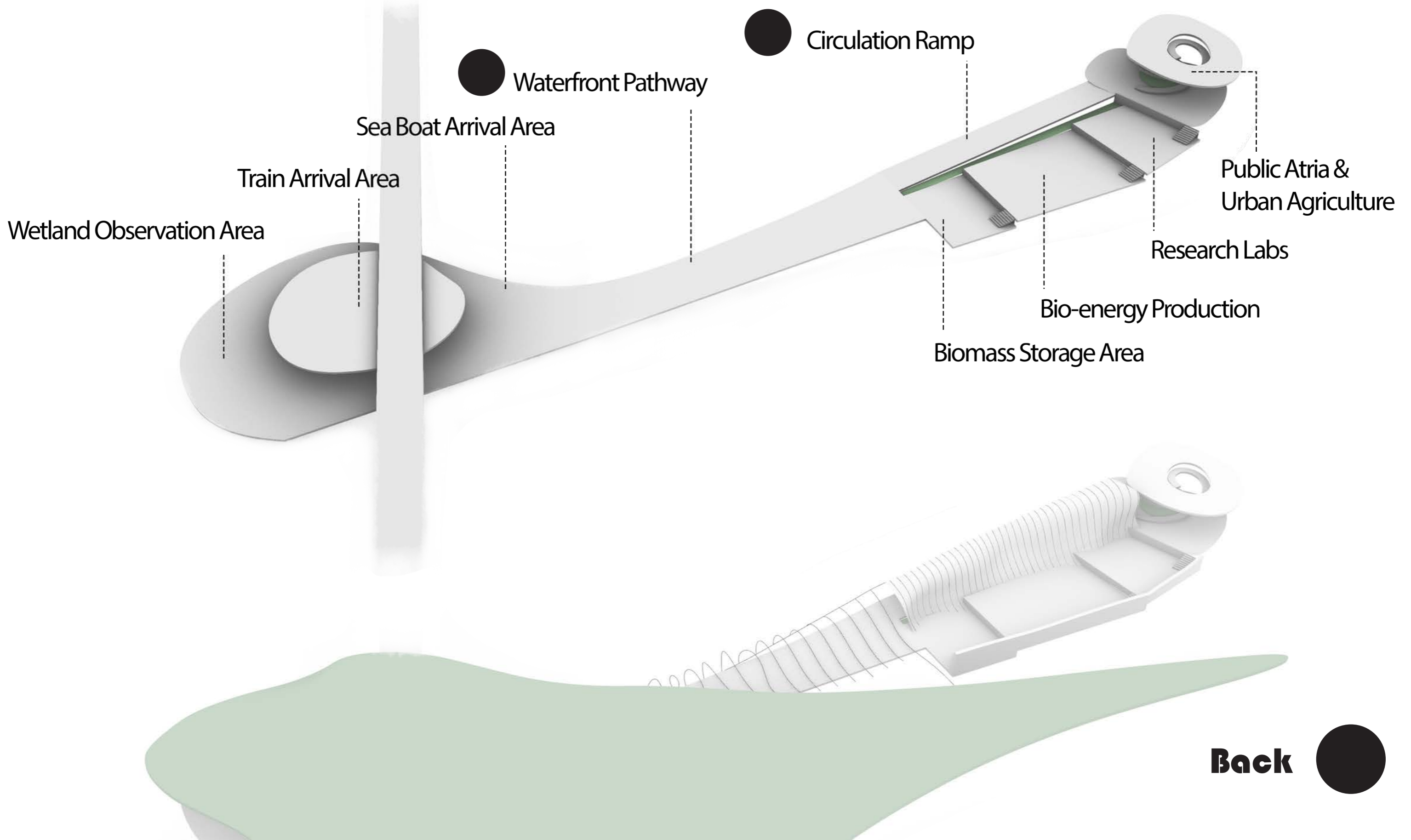
INTERIORS

Community Gardens



Back

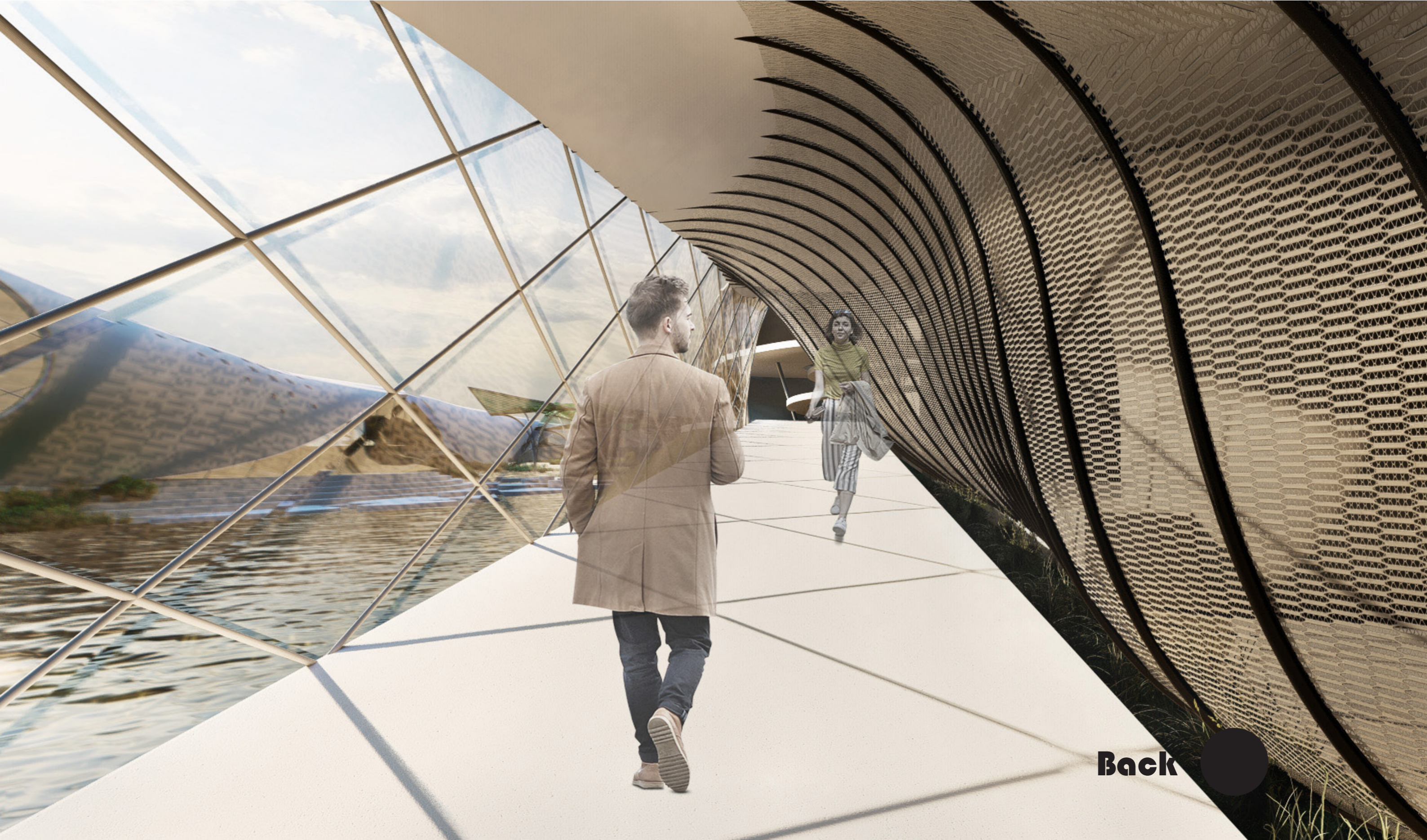




GET INSIDE

INTERIORS

Bioenergy facility



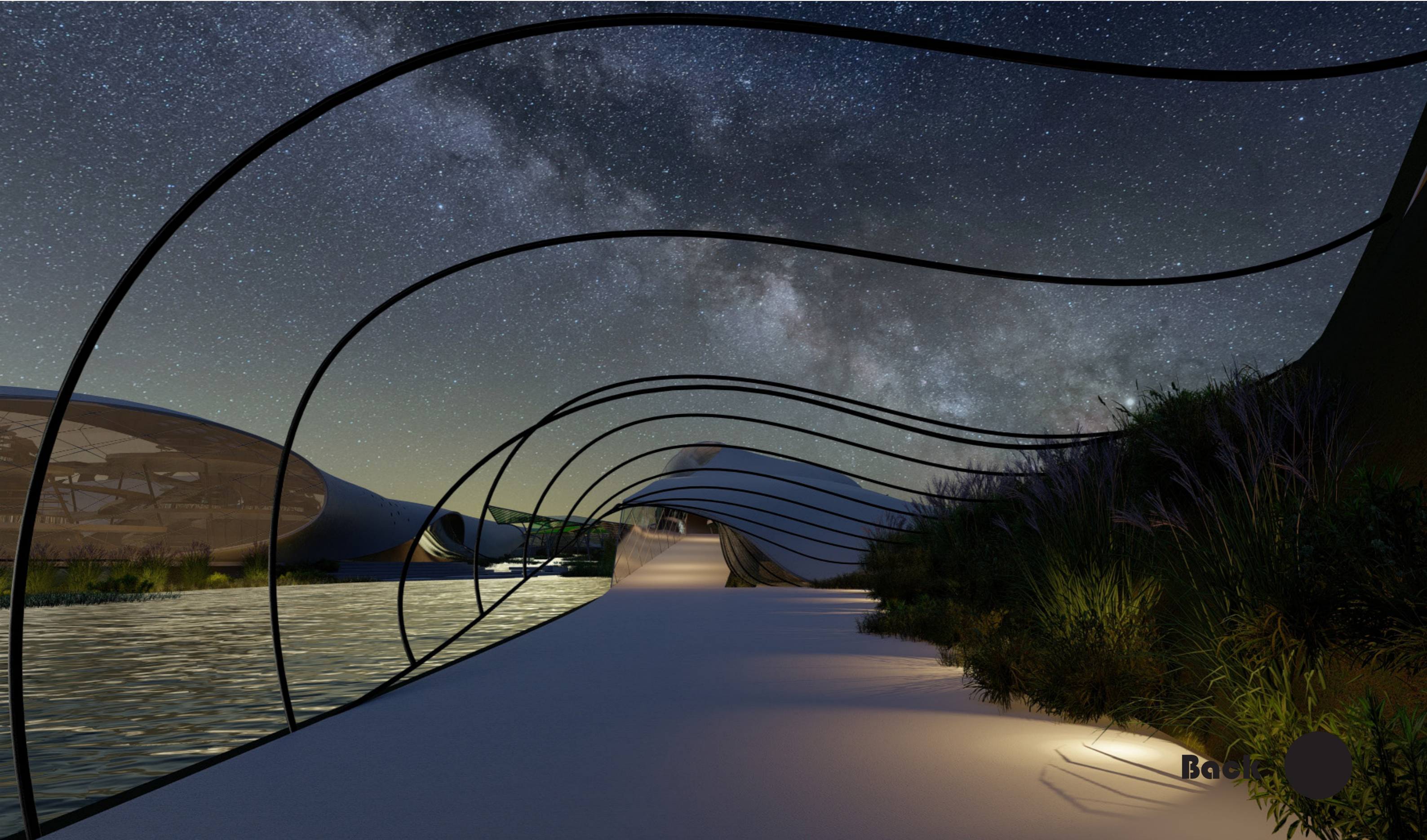
Back



GET INSIDE

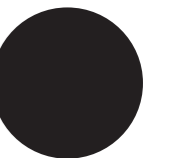
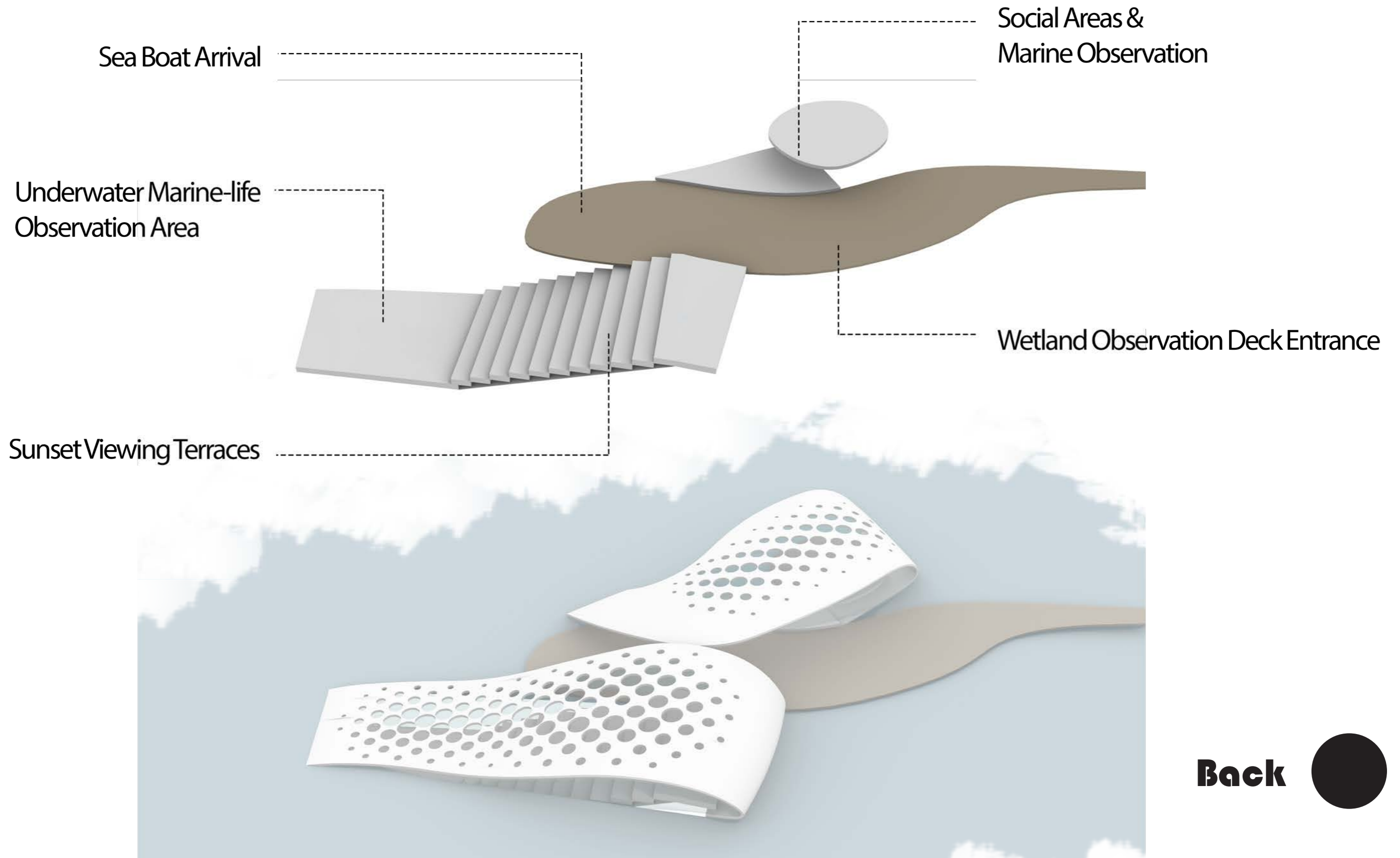
INTERIORS

Waterway



Back



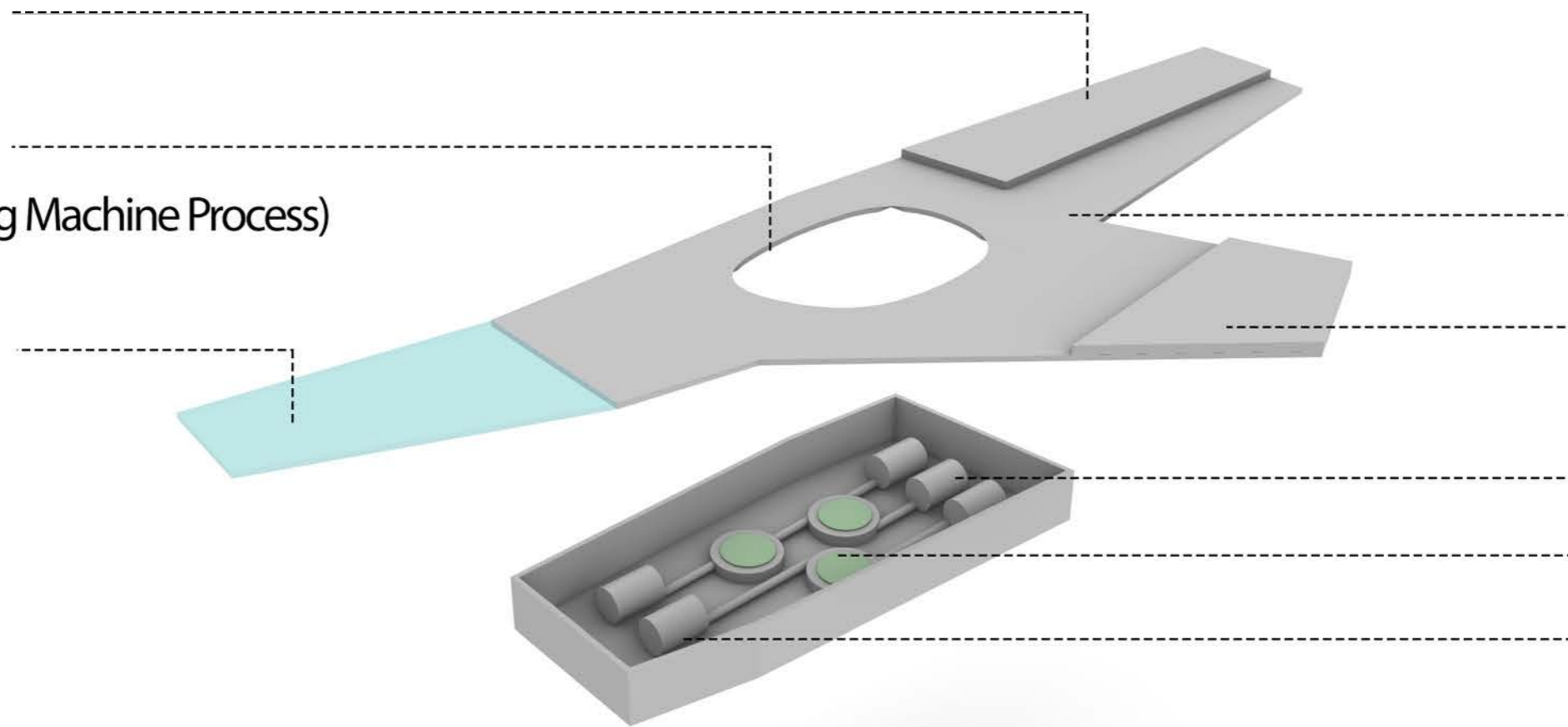




Research Facilities

Main Atria Space
(Observation of the Living Machine Process)

Clean water celebration
Observation Area



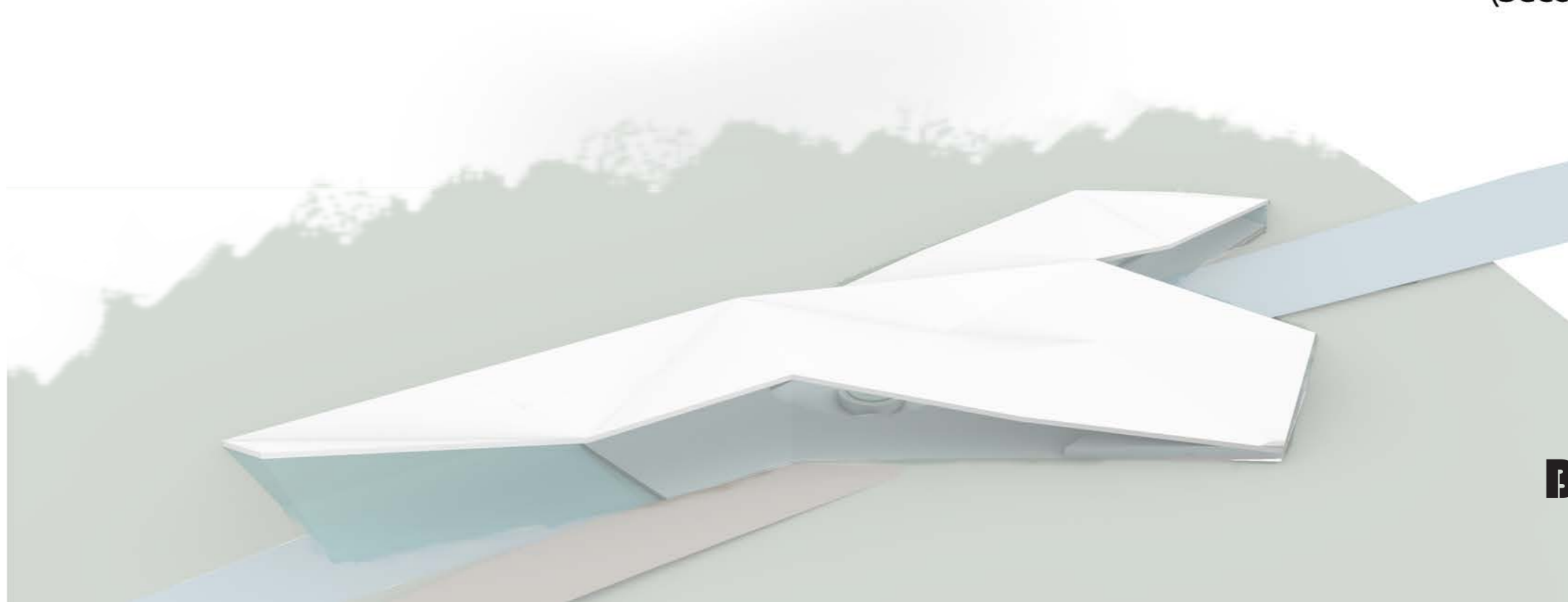
Main Entrance &
Arrival of Black-water

Research Labs

Primary Tanks

Wetland Cells

Polishing Modules
(Secondary Cleaning)



Back

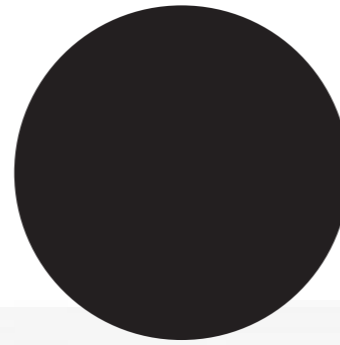


DETAILS

SECTION PERSPECTIVES

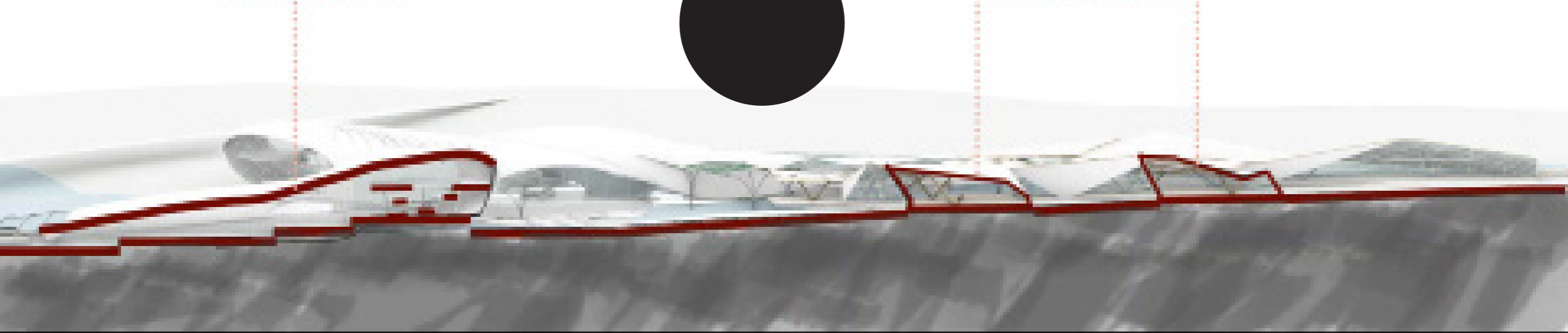


Video



Bioenergy Production

Community Gardens



DETAILS

STRUCTURE



Glass Skylight Openings

TiO₂ (Titaniumdioxide) Roof Panels

Steel Diagrid Exoskeleton

GFRP (Glassfibre Reinforced Plastic) Interior Clad-

Floor Slabs

Steel Columns

Reinforced Concrete Load-bearing Basement Walls

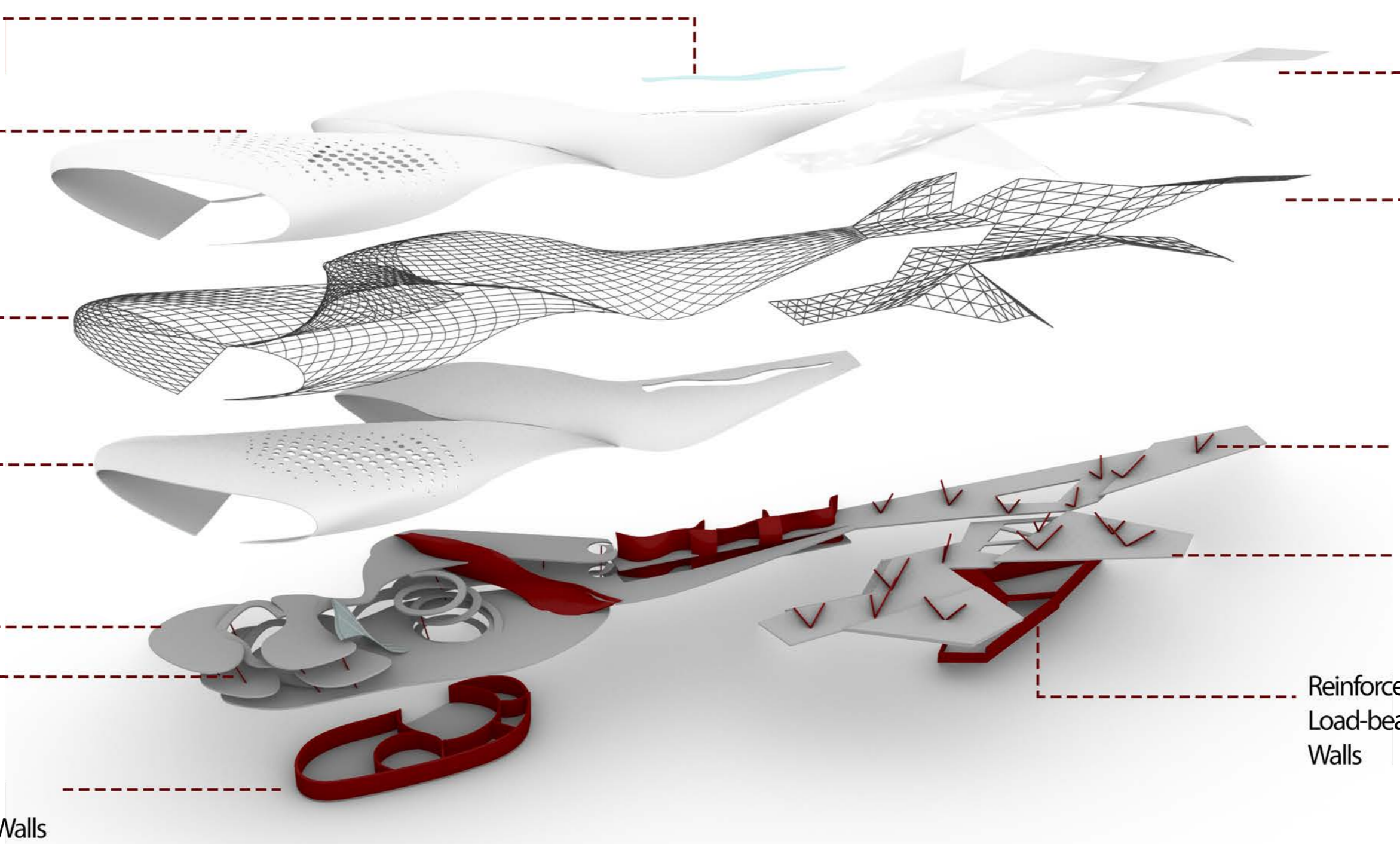
TiO₂ Folded Roof Panels

Steel Folded Roof Structure

Steel V-shaped Tilted Columns

Floor Slabs

Reinforced Concrete Load-bearing Basement Walls

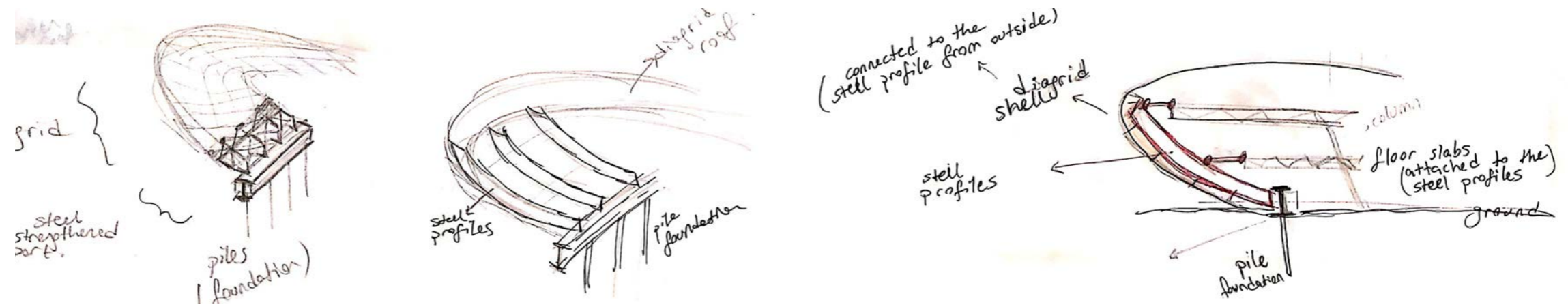


Case Study
“Diagrid Structure”



DETAILS

GROUND CONNECTION DETAIL



Diagrid Roof Structure
(Attached to the steel truss profile from outside)

Floor Slabs - Truss Structure
(Attached to the steel profile at one end & supported by columns on other side)

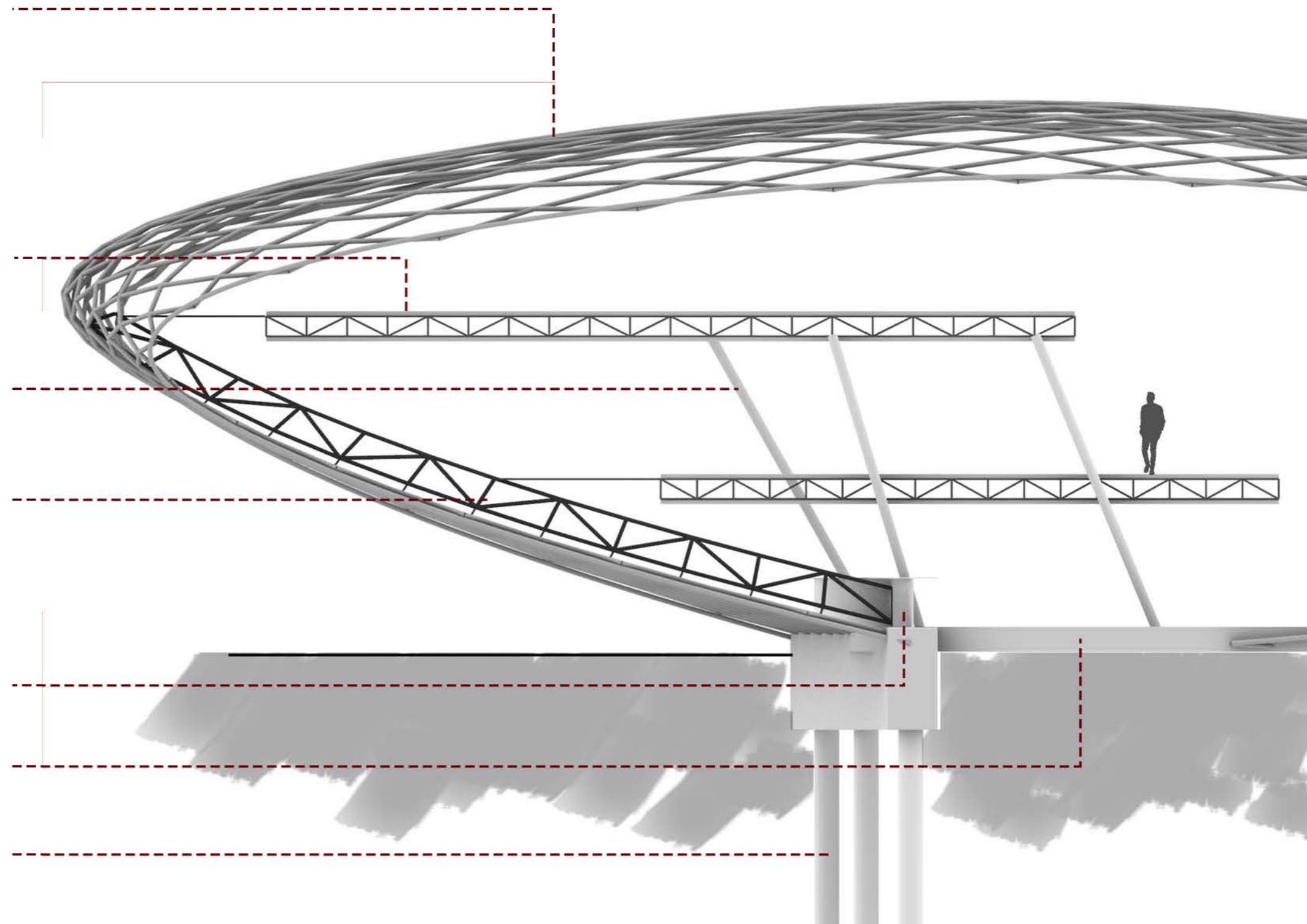
Steel Columns

Steel Truss Profiles
(Primary Load-Carrying Element for ground connection)

I-Beam Steel Profile

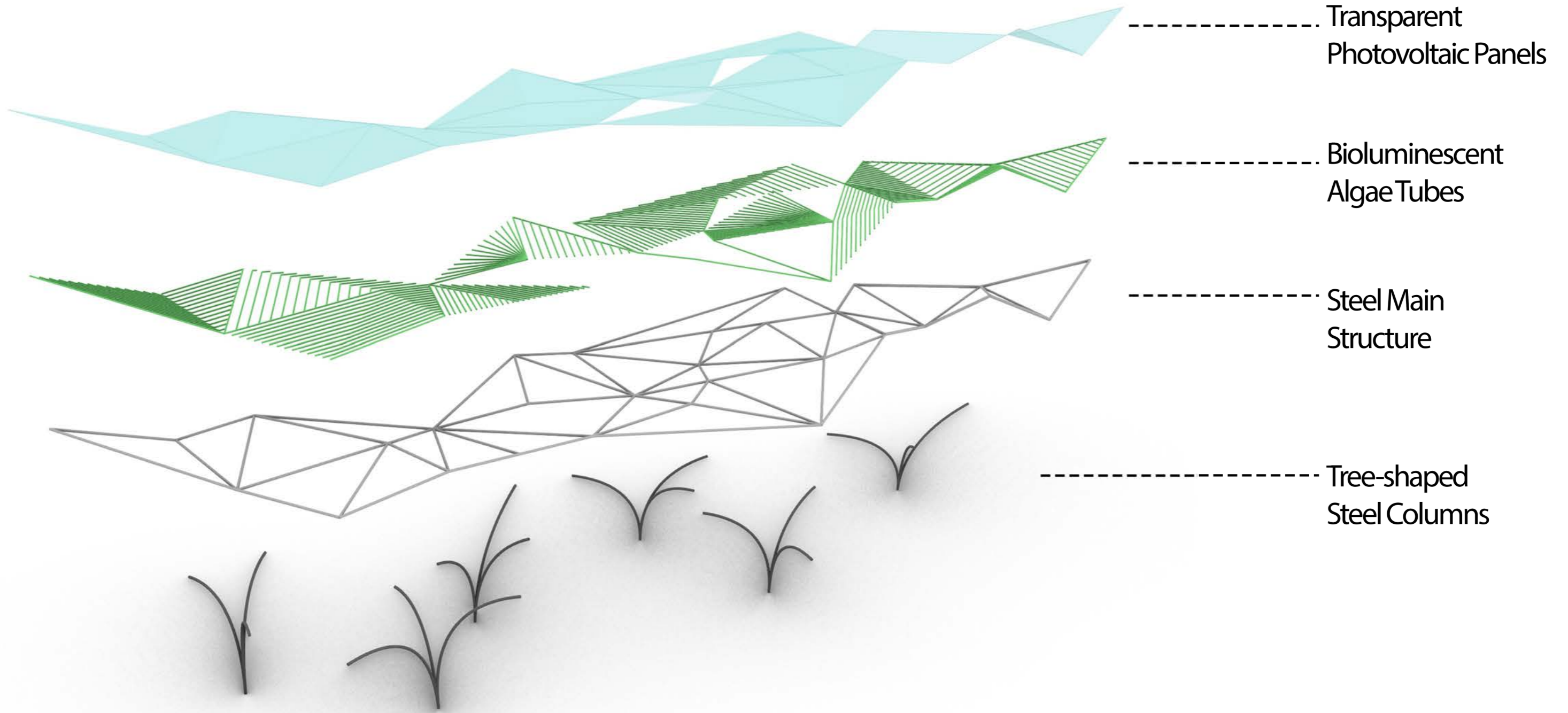
Concrete Slab

Pile Foundation

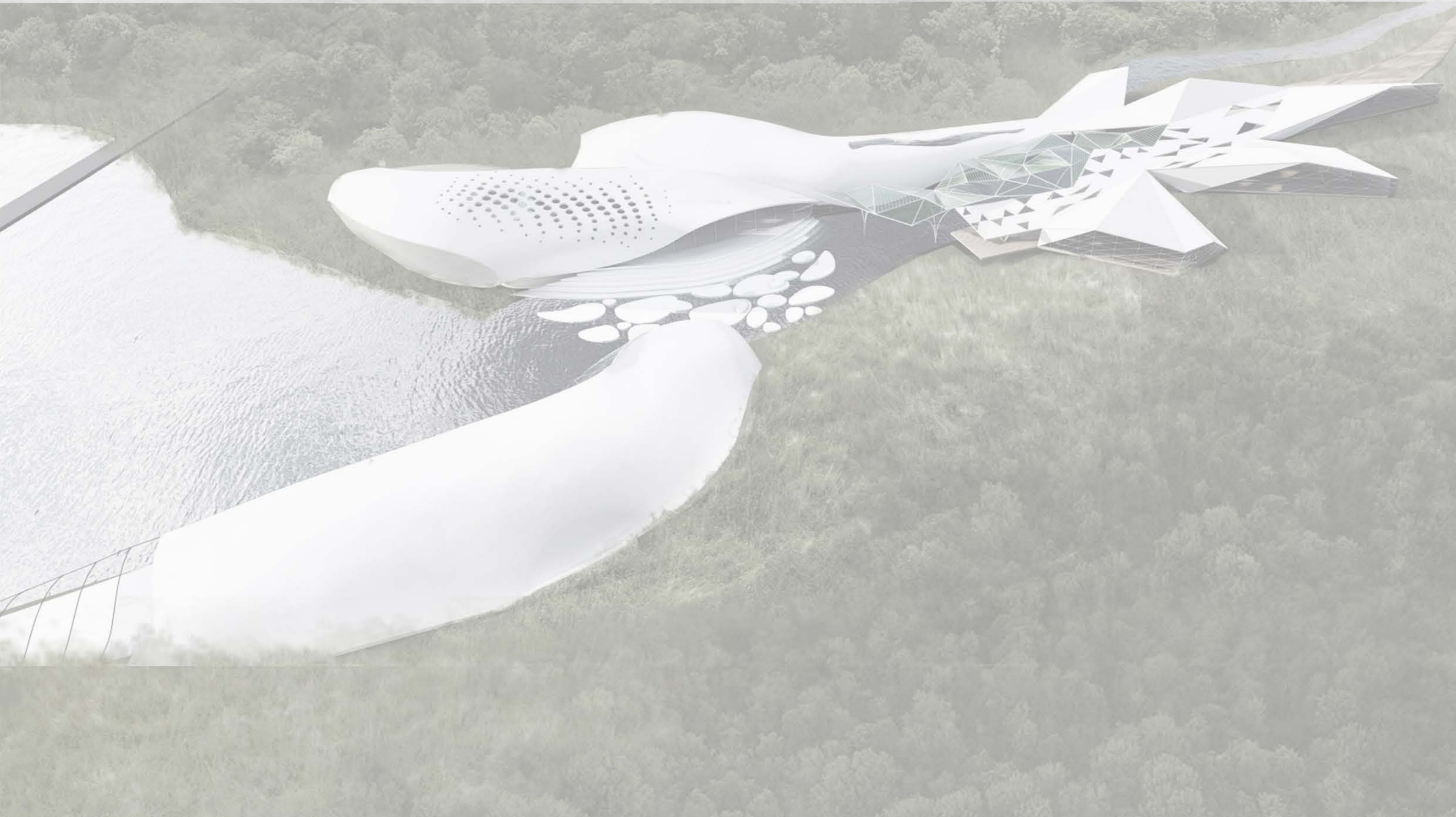


DETAILS

STRUCTURE



THANK YOU



REVIEW

An aerial photograph of a modern architectural site. A large, white, curved structure with a perforated facade is situated on a grassy bank next to a river. To the right, a more complex, angular building with a glass and metal facade is visible. The background is a dense forest of green trees.

BACKGROUND



CONTEXT



LITERATURE REVIEW



CASE STUDIES



PROJECT



MASTER PLAN



CONCEPT



CLOSER LOOK



GET INSIDE



DETAILS