

# NEHAL PATEL

LOS ANGELES

COLLECTION OF WORKS

2019-2023

ARCHITECTURAL

ACADEMIC

# CONTACT



[arneh@p@gmail.com](mailto:arneh@p@gmail.com)

+1 (818) 649 4825

instagram: [@archi\\_lience](#)

[Linkedin: NehalPatel](#)

## NEHAL PATEL

ARCHITECTURAL DESIGNER

*Nehal Patel is a recent graduate from Southern California Institute of Architecture, Los Angeles. During her masters education she advanced her creative design thinking by exploring the realms of Generative design tools to design intricately detailed forms that addresses ecological and climate concious narratives. With her experience in diverse range of studio projects and Applied studies seminars, she developed steller understanding of innovative design thinking and its implementation techniques, by 3D modeling details along with fabrication methodologies, nurturing more pragmatic approach towards complex, radical and imaginative concepts. She is passionate about adding progressive values into architectural realms making future solutions thoughtful, functional, and beautiful.*

*Before joining SCI-Arc, her experience as a design intern and as a participator in various workshops, helped her understand the pragmatic aspects of a design, and further developed her interest in utilizing design technologies for field applications. Her professional experience involves conceptual design, working sets of construction drawings of an interior and building scale sites, client meetings, and design pitch presentations.*



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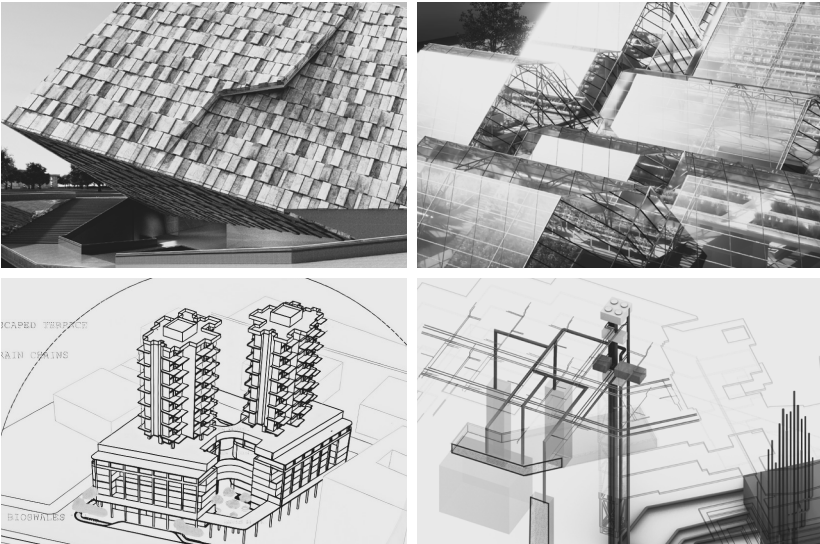
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## THE NATIONAL MUSUM OF AMERICAN LATINO

CHARACTER X

Team: Linhao Zhou



**BRIEF:** In sync with the considerable social and cultural processes taking place in America and the world at large, the studio aims to explore and question the role of **Cultural Identity** in today's architectural environment. Cultural Identity is used to describe an individual, for instance, an Architect, or an Artist, while it also applies to a particular though loosely defined collective such as the **LatinX Community** in America. Specifically, the studio aims to explore **[mute and socially engaged] forms of monumentality** supporting the construction, manifestation and evolution of a particular cultural identity: that of the American-Latino Community.

**CONCEPT:** The museum's design embodies a **monolithic scale** and materiality that brings significant contributions of Latino styles to the predominantly neoclassical heritage and political structure of the Americas. The structure utilizes limestone as a primary facade material. **Limestone** played an important role in Latino history as it was a key building material for many ancient Mesoamerican civilizations, and added on by the **art forms like murals and vibrant colors**, that evolved into its own unique style. The museum is crafted to create a welcoming and engaging environment with its diverse exhibition spaces, galleries, and theatres that can **foster discussions** on **cultural transformations** and **community identity** within America's current socio-political and cultural landscape.

■ Rhino, Grasshopper, Cinema4D, Octane Render, Adobe After Effects



The Latin American heritage is characterized by its diversity and uniqueness, resulting from the fusion of various cultures. It has been shaped over centuries of migration, colonialism, and the intermingling of peoples from different world regions. The Latin community in America has been through so many complicated political and social reforms.



Phenomenon of Migration

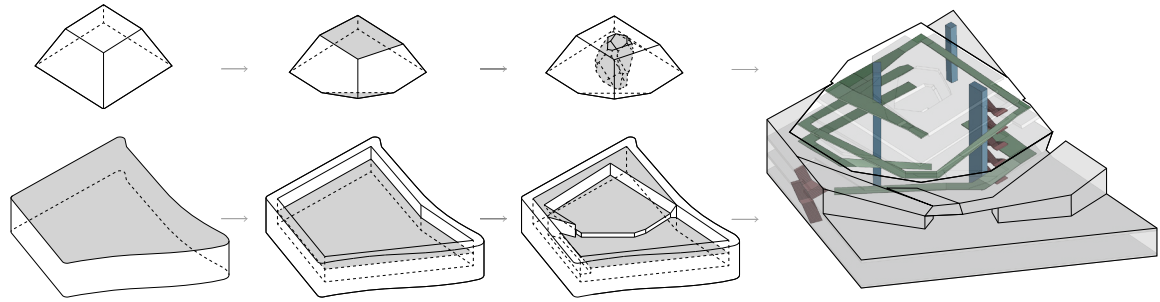
Cultural Identity in USA



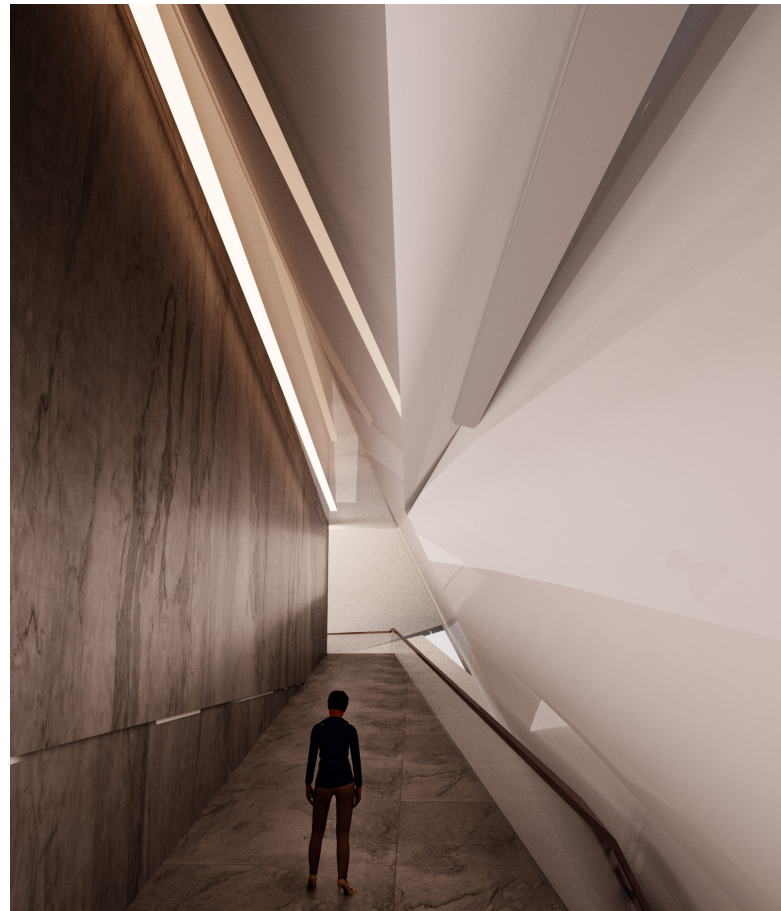
This museum becomes a mirror and a stage to showcase all the just and the unjust faced and overcome by the Latino Community that makes up 20% of the total united states population.



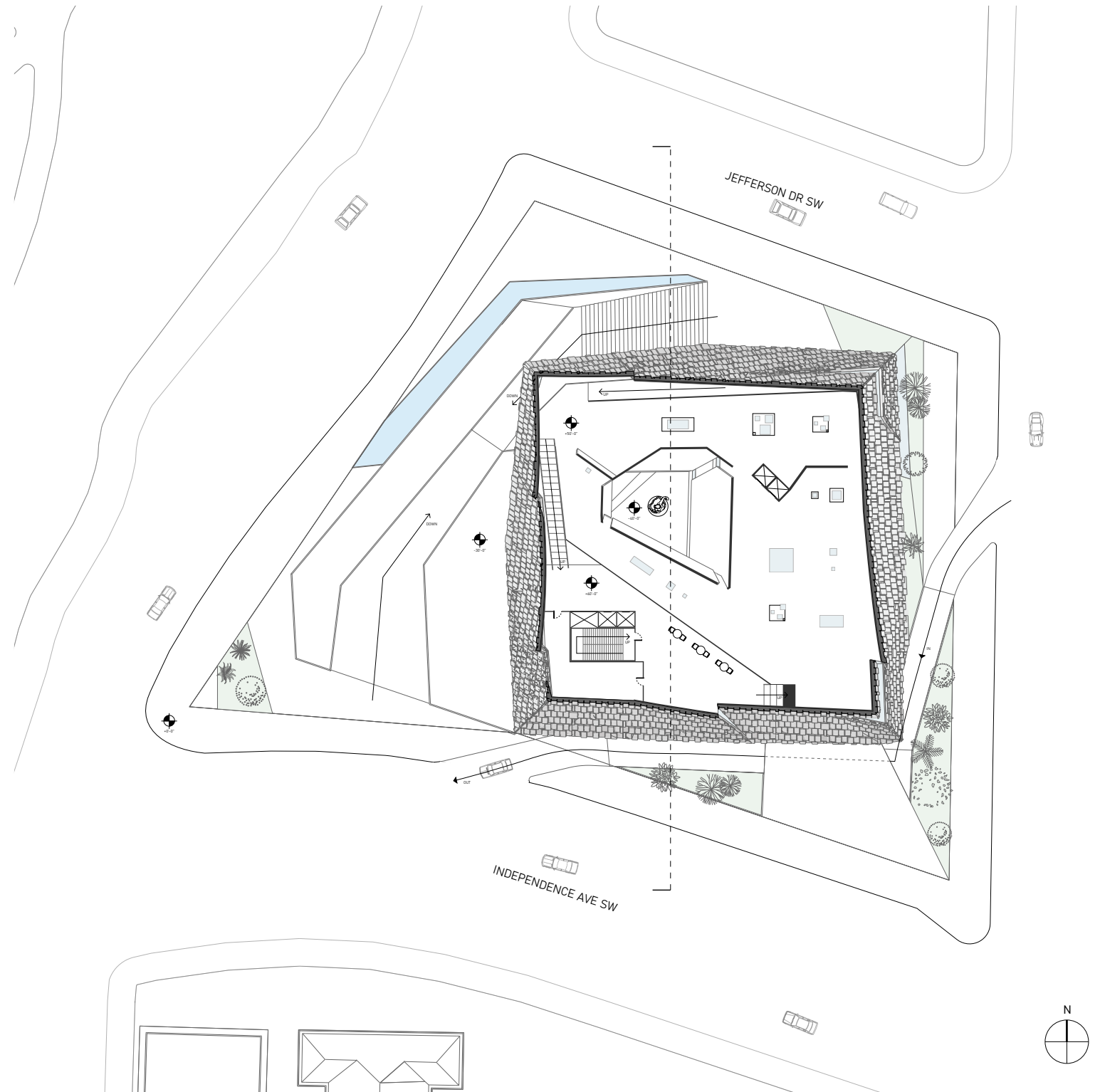




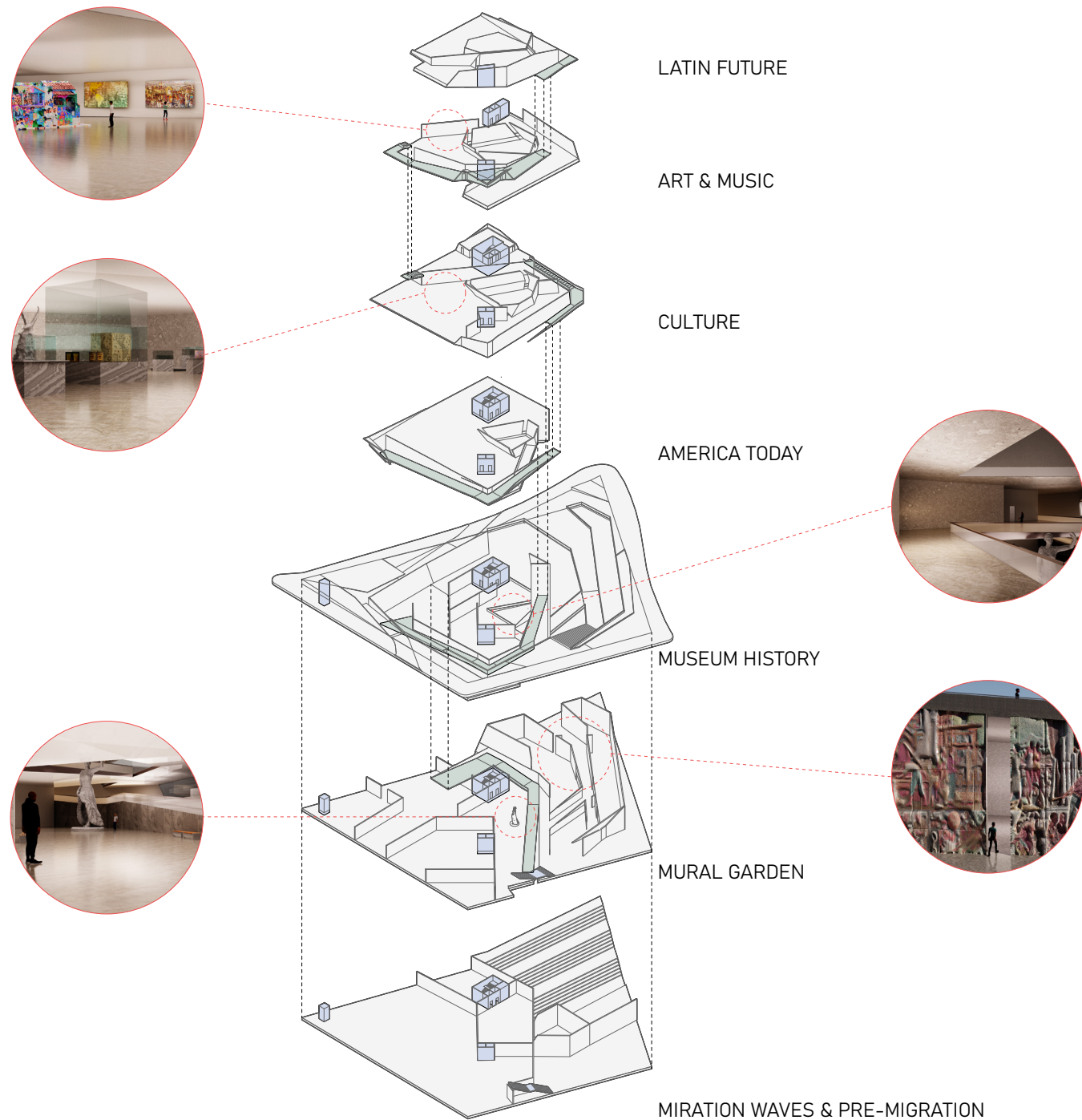
A primitive shape is chamfered on the top and bottom to create an entrance and roof. Next, the void in the central part of the mass is carved out to gain light in the interiors, creating an atrium.



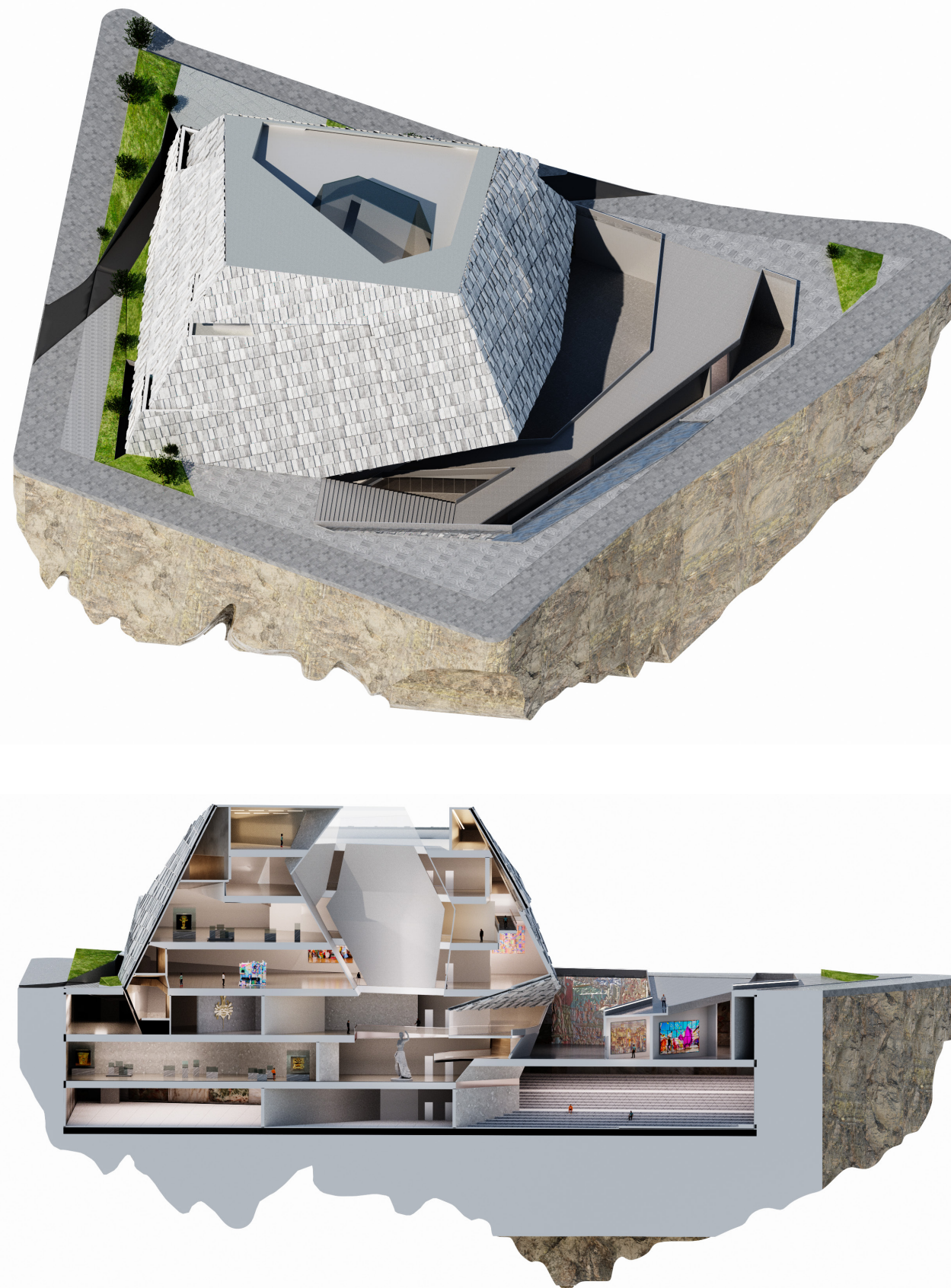
Traversing the interior spaces is made possible by the ramp that continuously follows the outer edge of the building form.

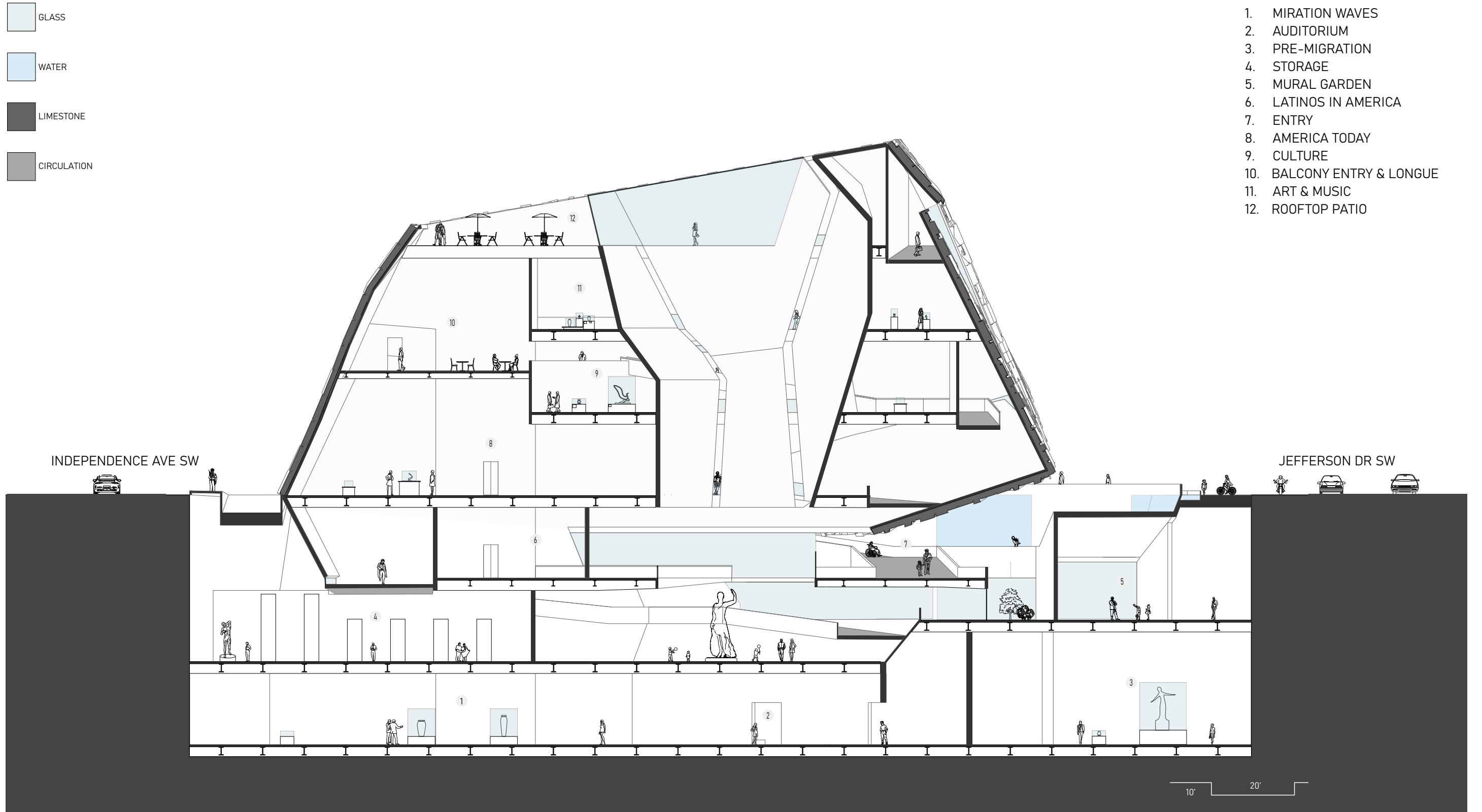






Traversing the interior spaces is made possible by the ramp that continuously follows the outer edge of the building form. Progressing through the ramp enables one to appreciate the surrounding view and vistas.

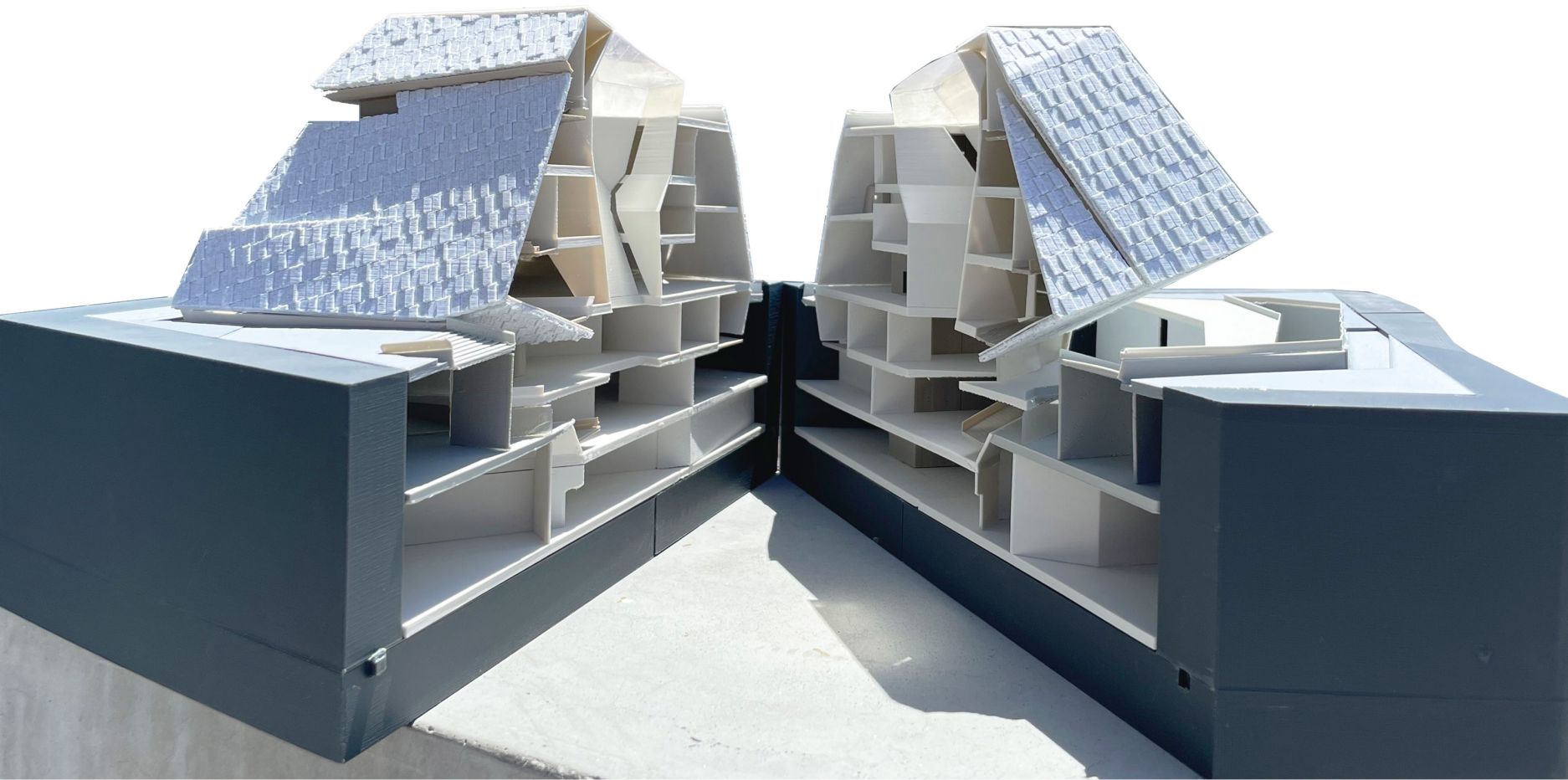




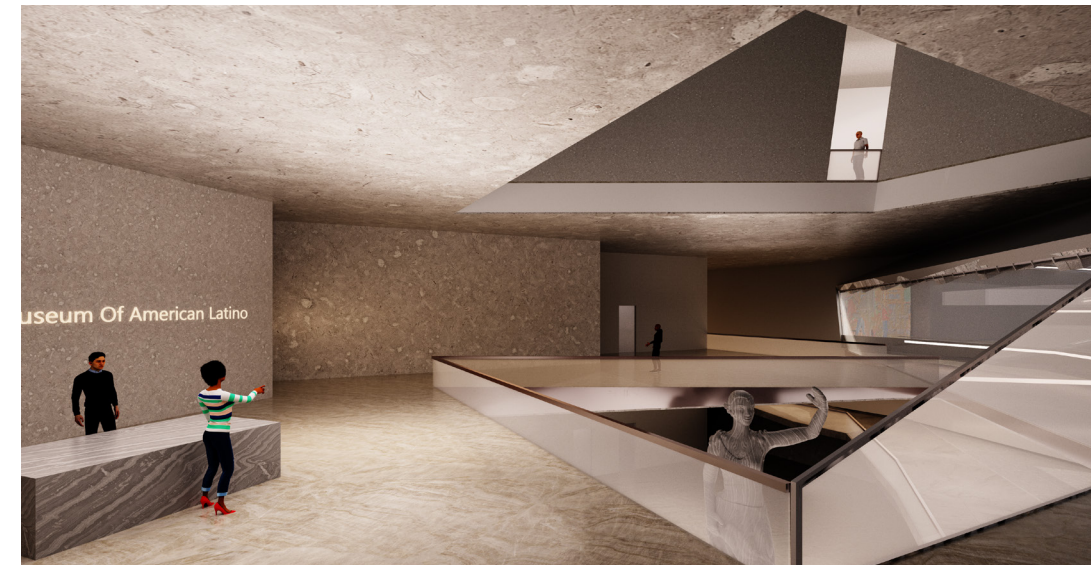


Visitors can enter 20' below the ground level through accessing the ramp and staircases connected in the plaza. They can either choose to move up in the cultural galleries or go to the mural garden.

3D Printed Sectional model





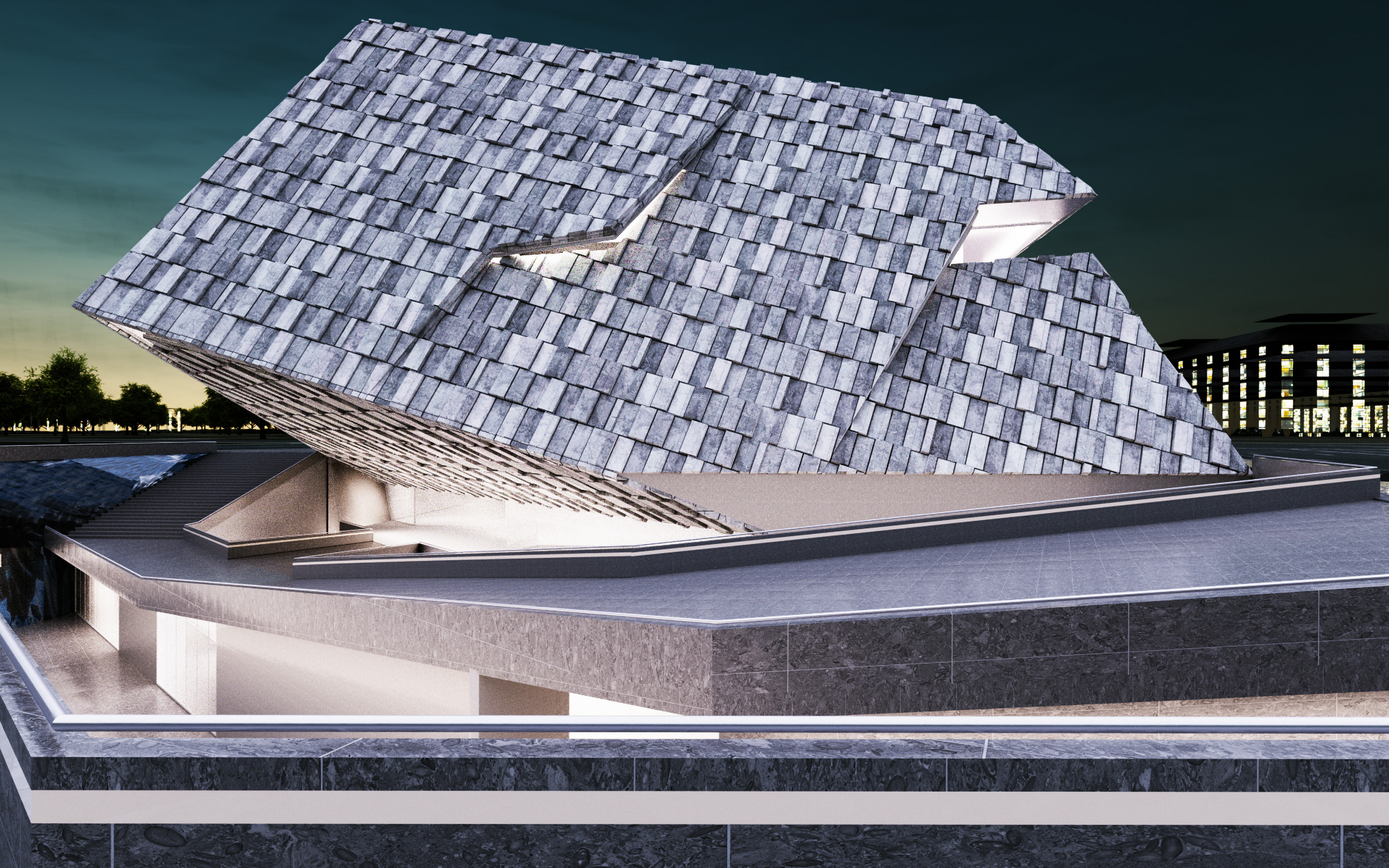


Entrance lobby



Mural wall









## GREENHOUSE

FOOD RESEARCH AND PRODUCTION FACILITY

*Individual*

**BRIEF:** The studio is a test case situated at the intersection of architecture and **productive landscapes** -the highly regulated, technologically controlled, production that shapes the land in our contemporary society. In particular, the studio will focus on **food production** in the city, intensive use of space, circular energy and water use. Contrary to conventional greenhouses, which employ fritted glass that obscures views in, this studio intends to put the interiors -and its experiments in **vertical farming-on display**, like a giant vitrine.

**CONCEPT:** Large scale commercial greenhouses behave as a machine, with each food production system placed and **sequenced in a pragmatic manner**. For efficient use of land and water resources various digital sensors are utilized to control ventilation, heating, cooling, and lighting which eventually gives opportunity for stable temperature, and food can be grown year-round.

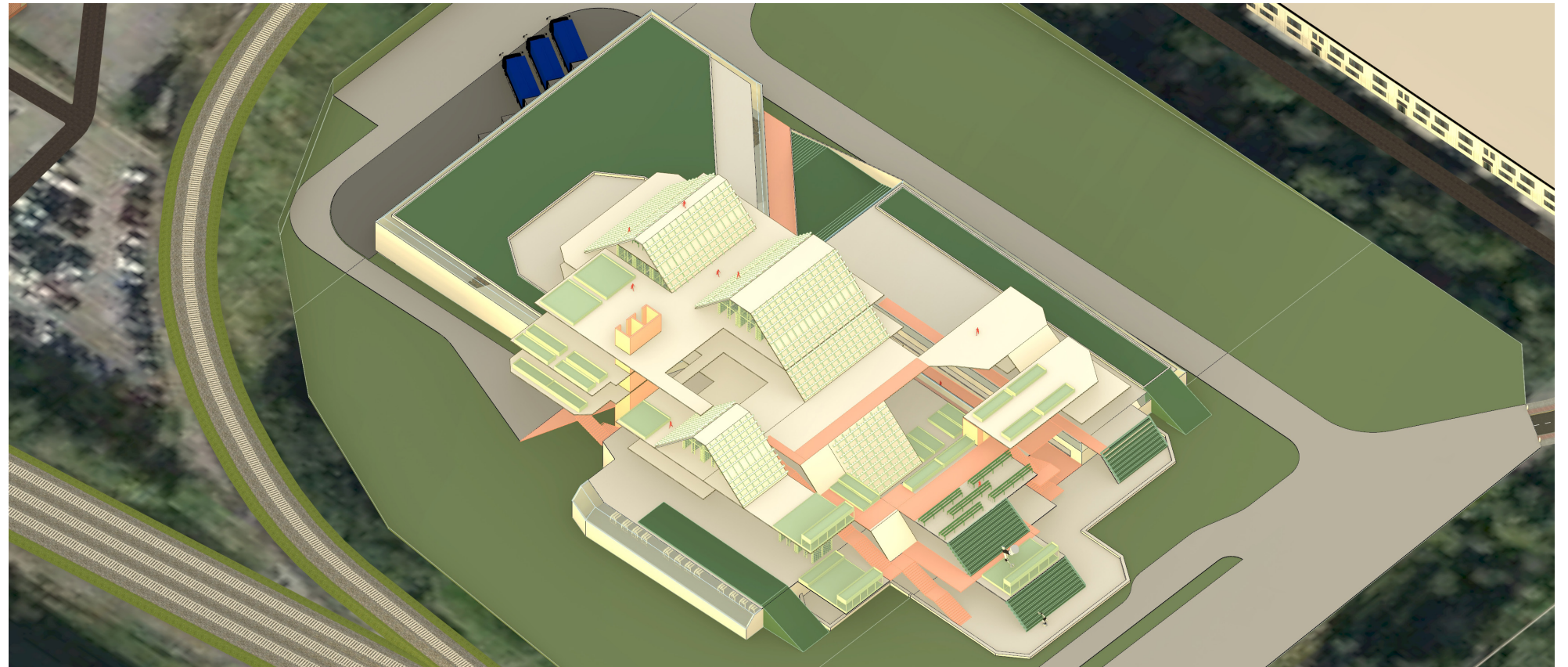
This greenhouse project in **Kent County, Washington**, explores the role that form, and spatial arrangement play in **enhancing the food production processes** alongside available technologies and speculating the relevance of the building materials used for greenhouses. Architectural decisions like building orientation, **formal repetitions**, **modular roof volumes**, and vertical stacking of slabs, are the main drivers of the project.

Rhino, Grasshopper, Unreal Engine, ZBrush, Photoshop, Adobe After Effects

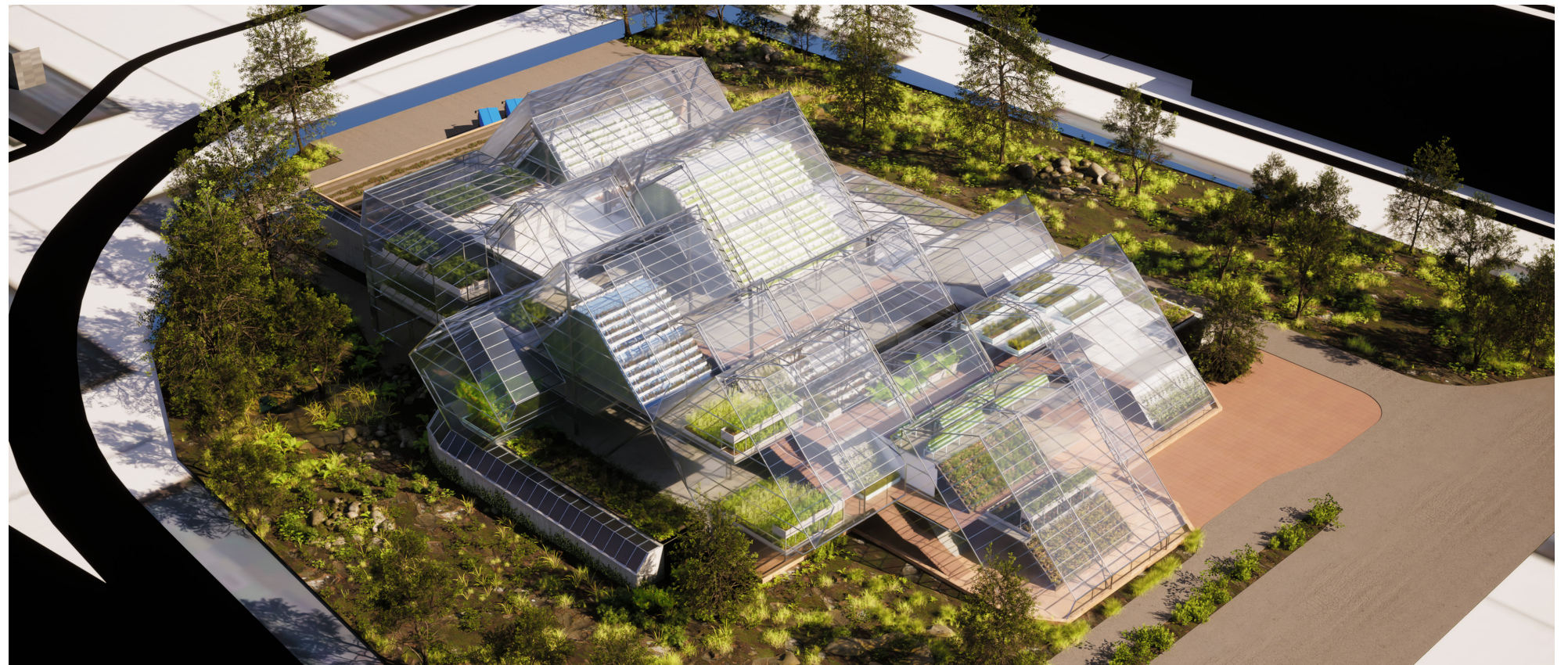


The form is derived from crystal forming found in the nature. The repetitive chamfered squared modules allow the interior space to have dynamic character, and an opportunity to have different climate zones, with different level of sunlight exposure, grow heights, and spatial volumes.

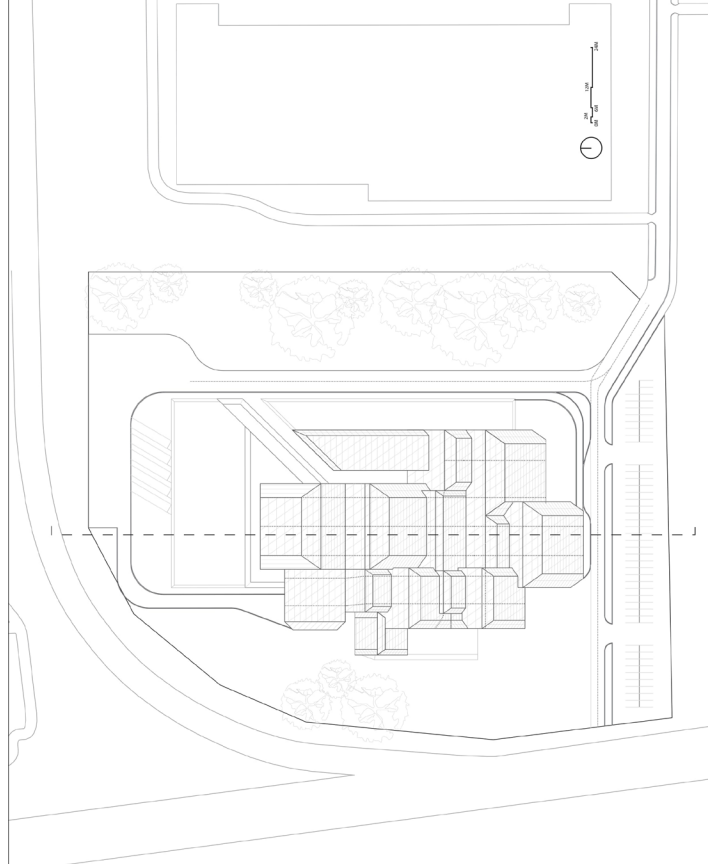
South View



South View

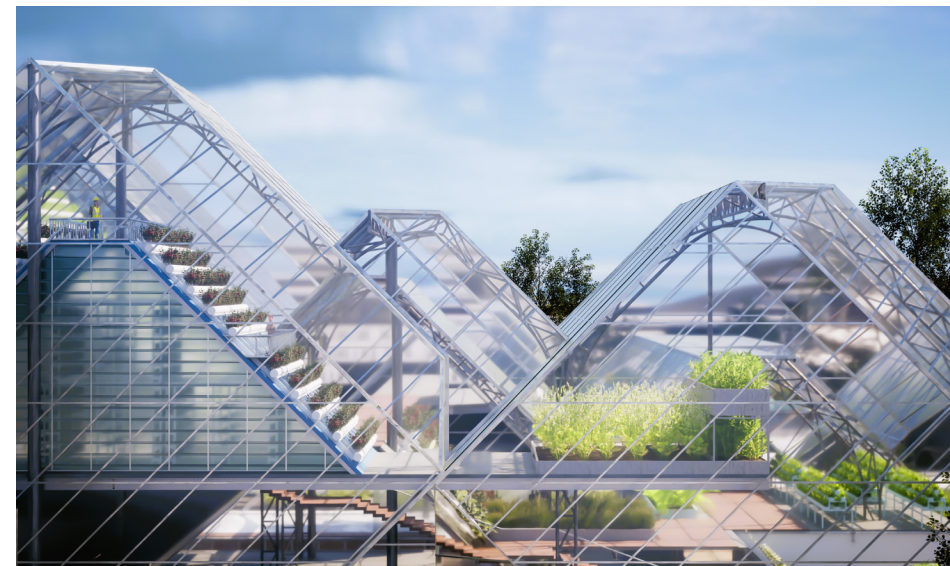
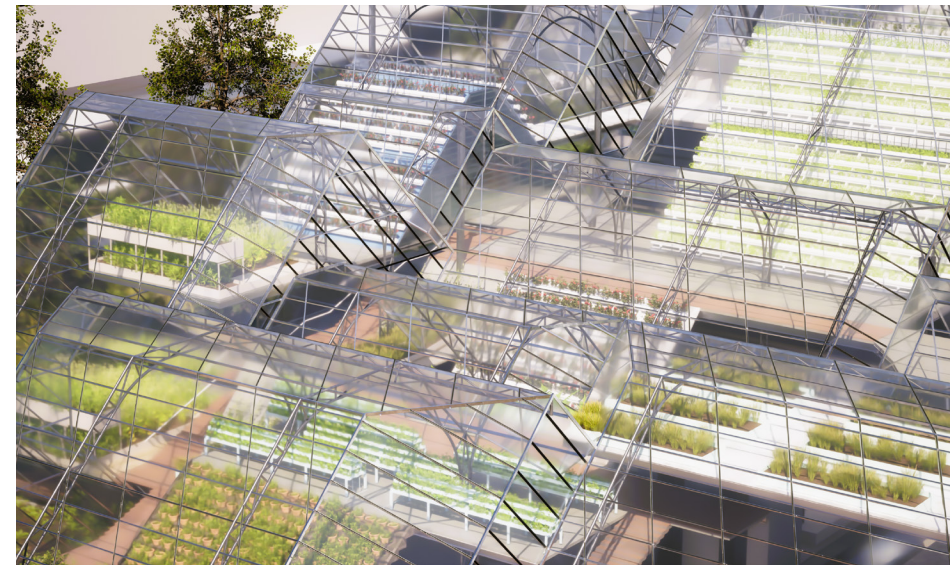
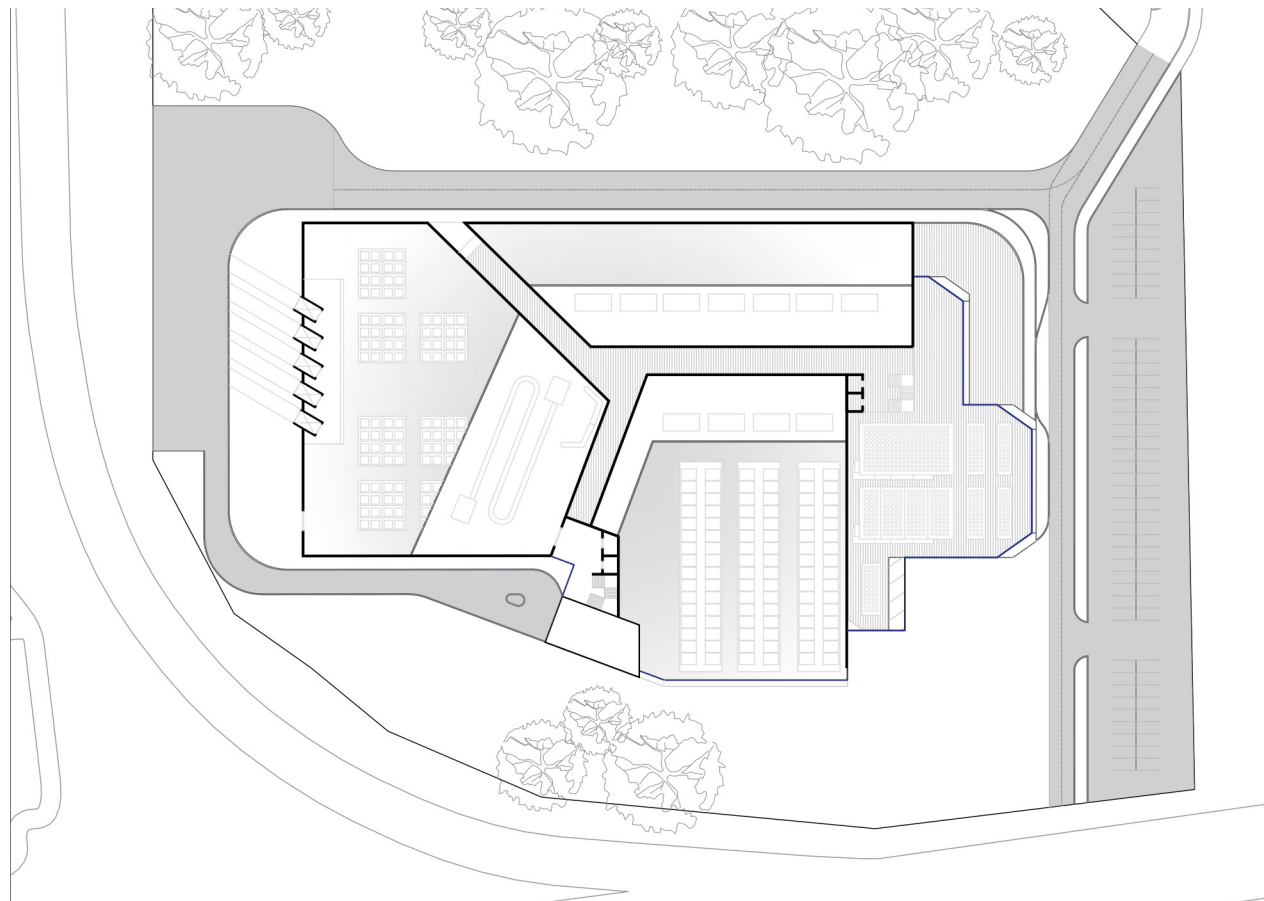






The Box Shed consists of machinery rooms, cold storage, packaging and sorting areas and loading docks. For better accessibility, these spaces are divided into 3 separate volumes, partially immersed in the ground, connected by a central street, that doubles as circulation as well as a public market.

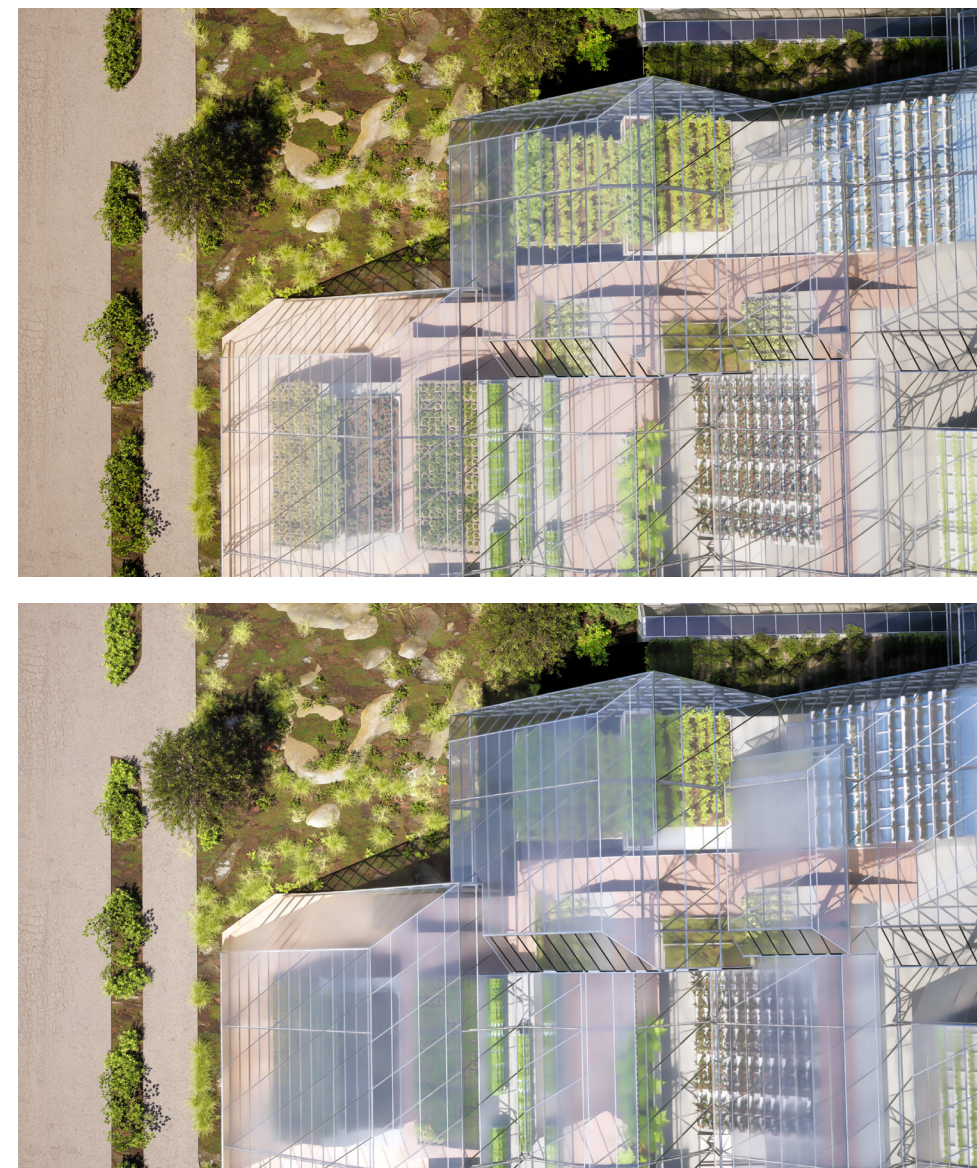
The main plantation zones are placed on the top slabs. These slabs follow the direction of the glass envelope, providing maximum surface area for sun exposure.



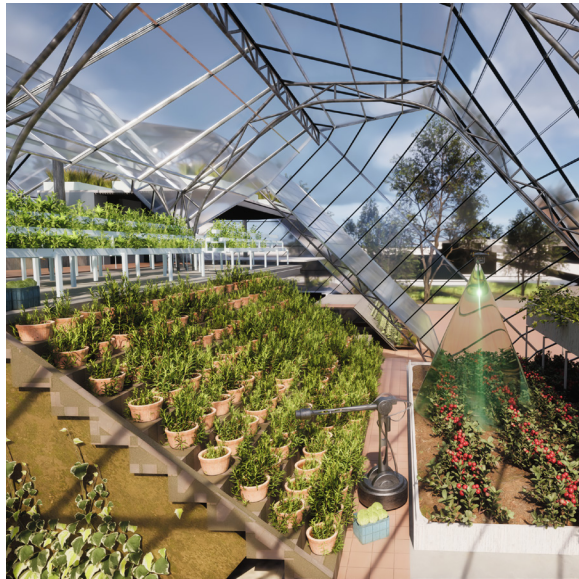


The Electro-chromatic glass on the south slops, assists in creating optimum environmental conditions for the growth by regualting the sunlight requirements, as it changes the opacity.

Production Mountain







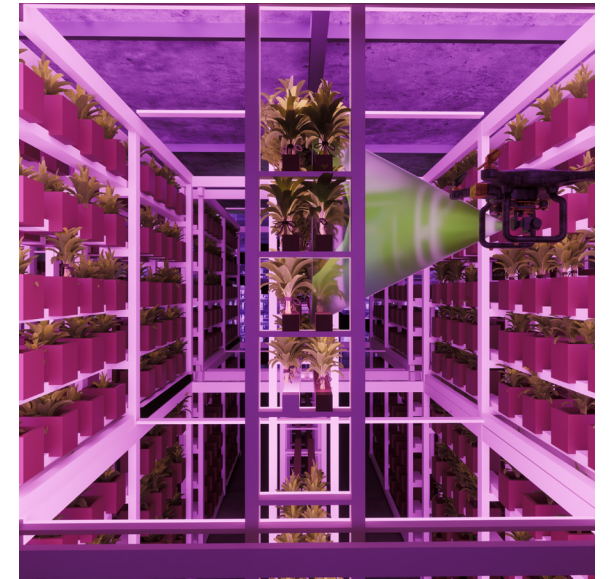
### High Light Plants

The interiors are divided into various climatic zones, suitable for fruits and vegetables that are being grown.

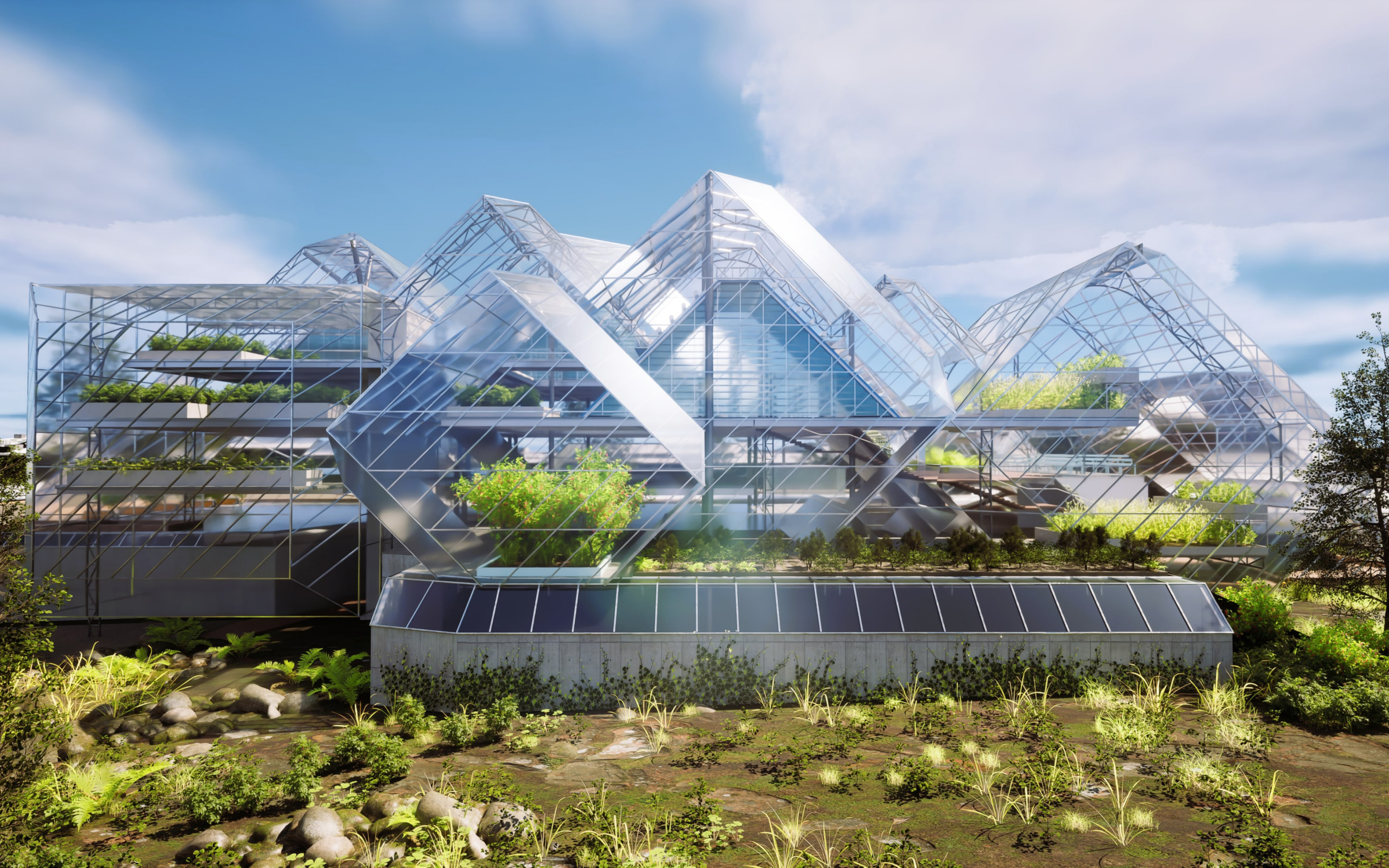


### Low Light Plants

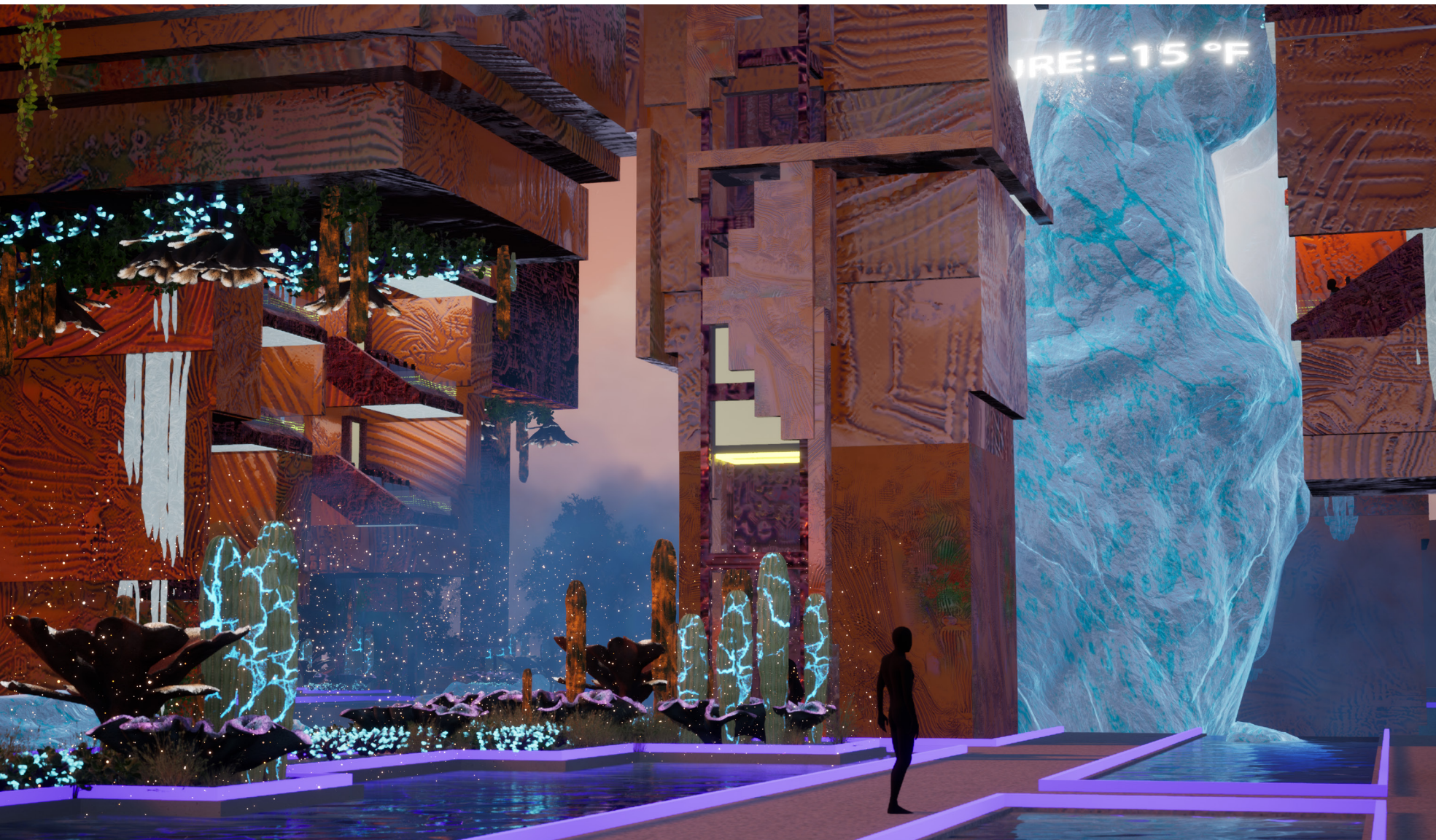
Below these mountainlike slabs, are enclosed growing rooms, that use artificial lights for vertically stacked farming. By the night these LED lit labs keeps the growth process of the plants on.











**BRIEF:** The detail development and documentation of a project called Stomata. This **biotech lab** is a building in El Segundo, California, that houses Microclimate and environmental research focusing on **water recycling** and the endurance of cacti. The central parliamentary hall centres the site houses the **iceberg** and grounds the building onto the **flooded ground** plane at the **stepwell**.

**CONCEPT:** The entire **building is lifted** from the ground, only the access cores and few other **service shafts** come all the way down, doubling as a **steel structural shafts** and water storage tanks. The flooded water on the ground floor, has planter boxes and pedestrian walkways providing access points for the upper laboratory levels. The **iceberg is artificially made** using chiller pipes systems used in the ice skating rings. My contribution to the team, is detailing of the entire **chunk 3** (flooded grounds, water drains, planter boxes, pathways and iceberg) and designing water recycling systems by **mapping the water circulation** in the entire building and its **HVAC**. Along with water and HVAC outlets in the laboratories, I was also in charge of **ceiling plans**, providing outlets and inlets for **air flow and lighting layouts**.

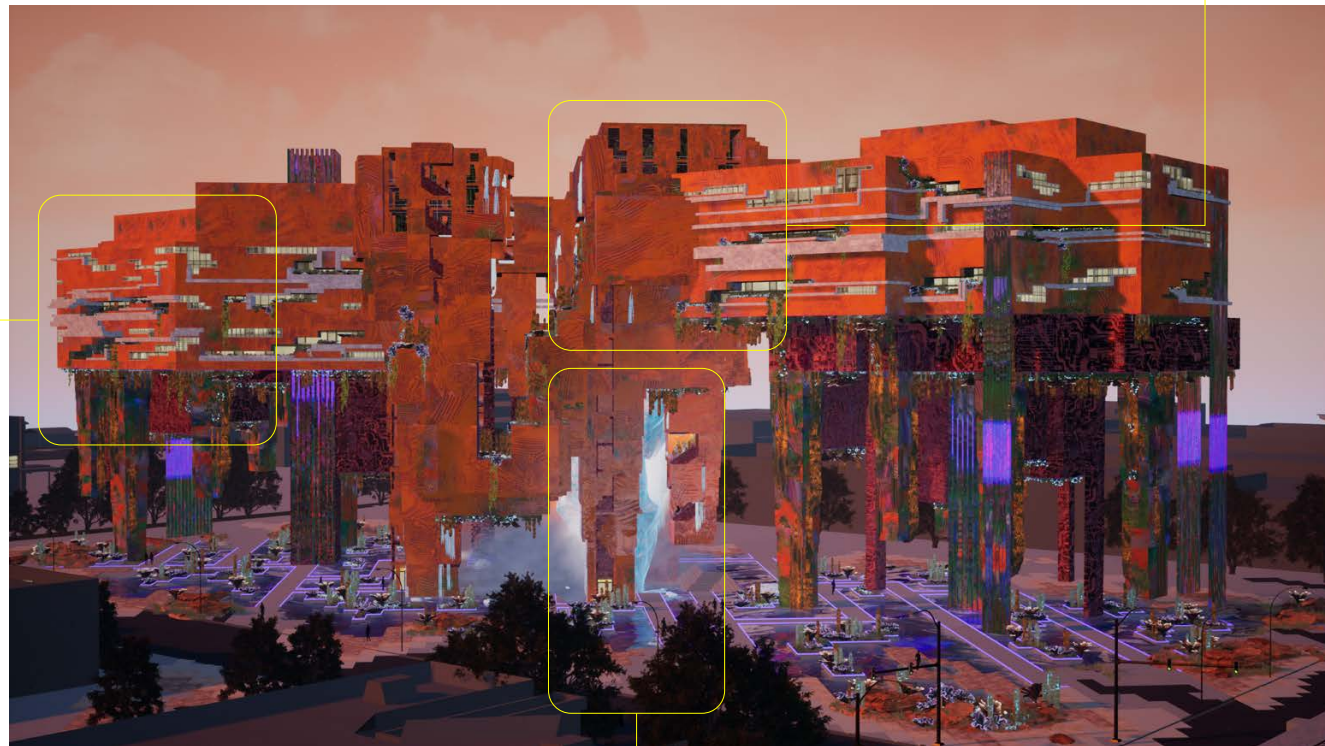
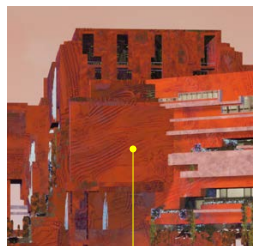
Rhino, Unreal Engine, Photoshop, AutoCAD, Illustrator



**CHUNK 01**  
LABORATORY & WATER STORAGE



**CHUNK 02**  
DATA CENTER & PARLIAMENT

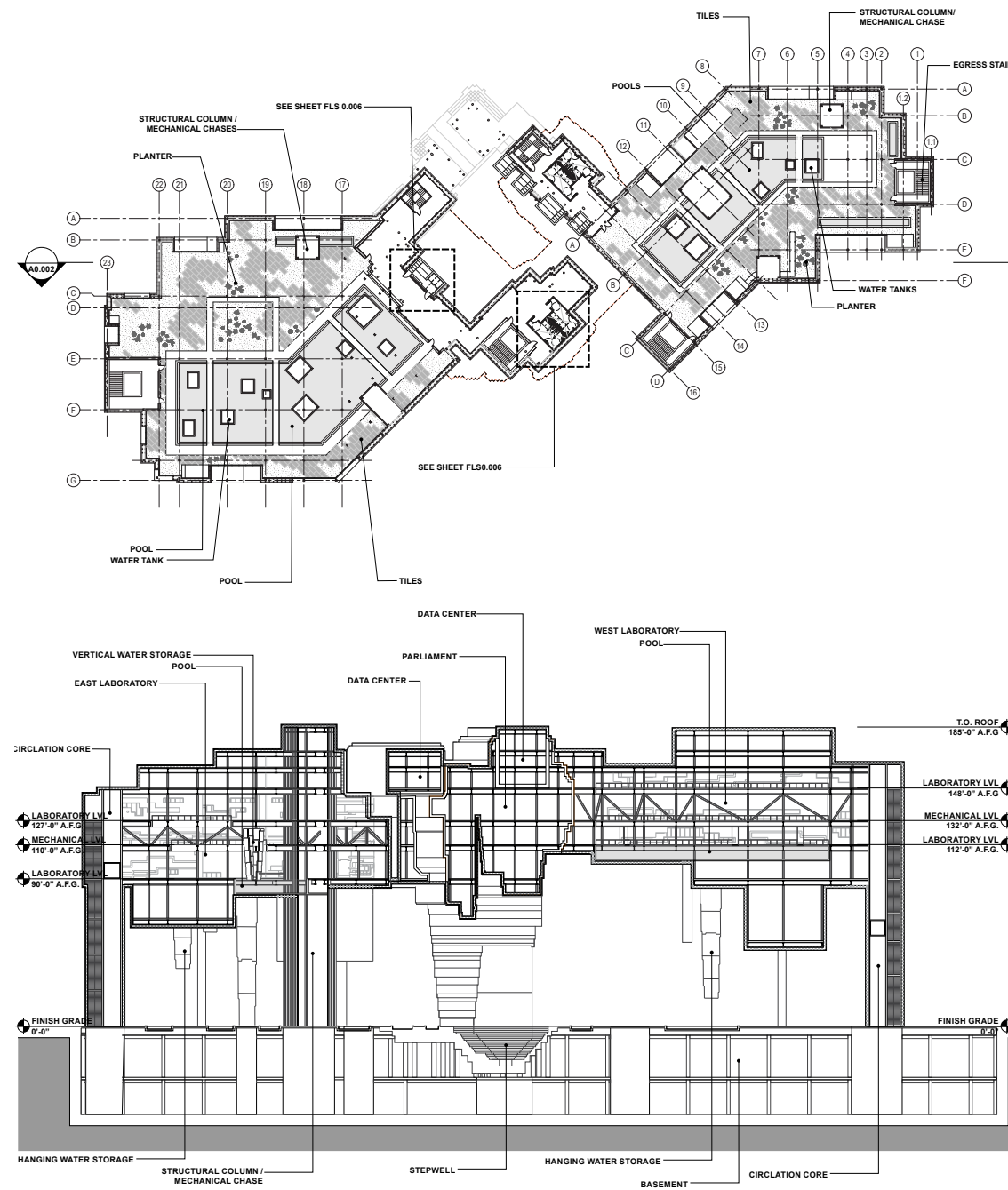


**CHUNK 03**  
EXTERIOR LANDSCAPE & ICEBERG

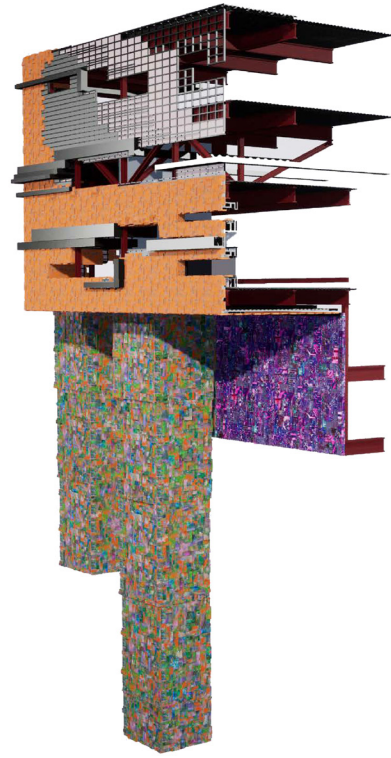


### Chunk Selection

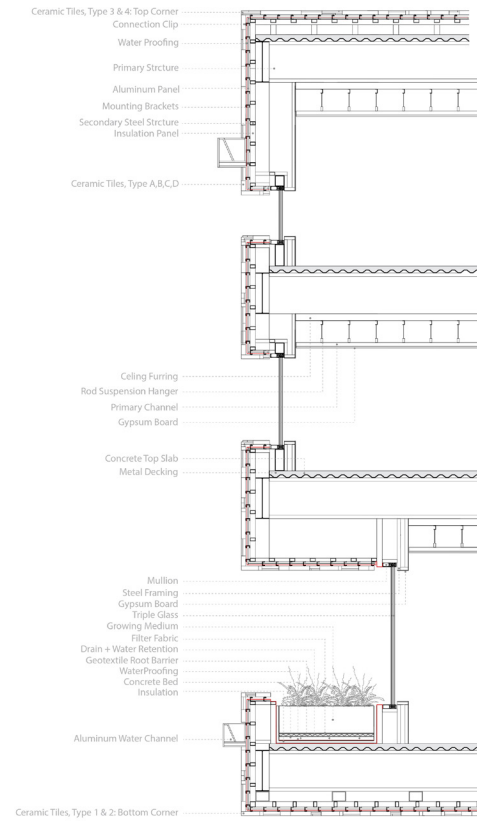
The chunk 01 and 02, understands the details of the ceramic pannels and its assembly on the building facade structure.



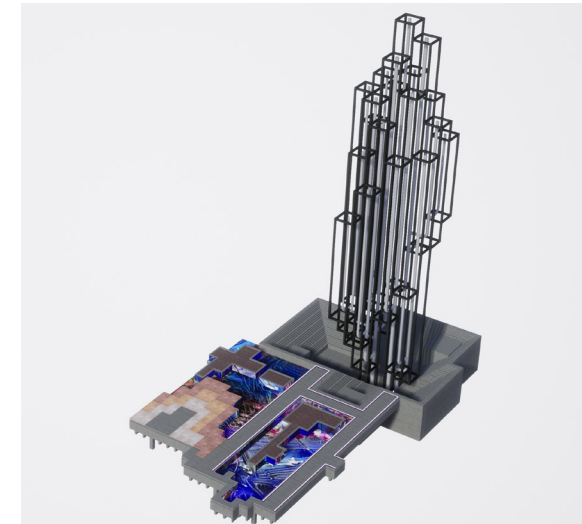
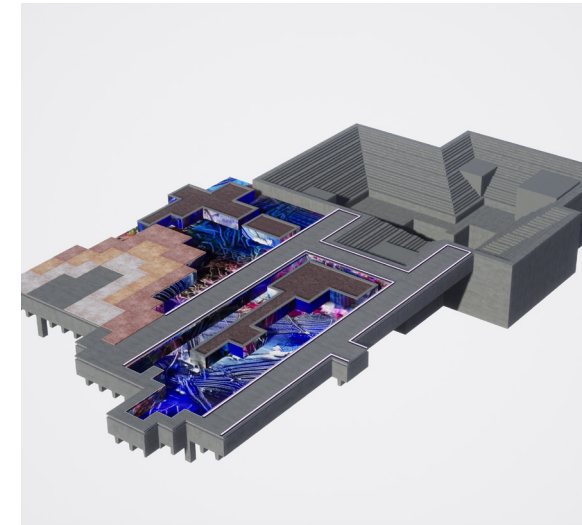
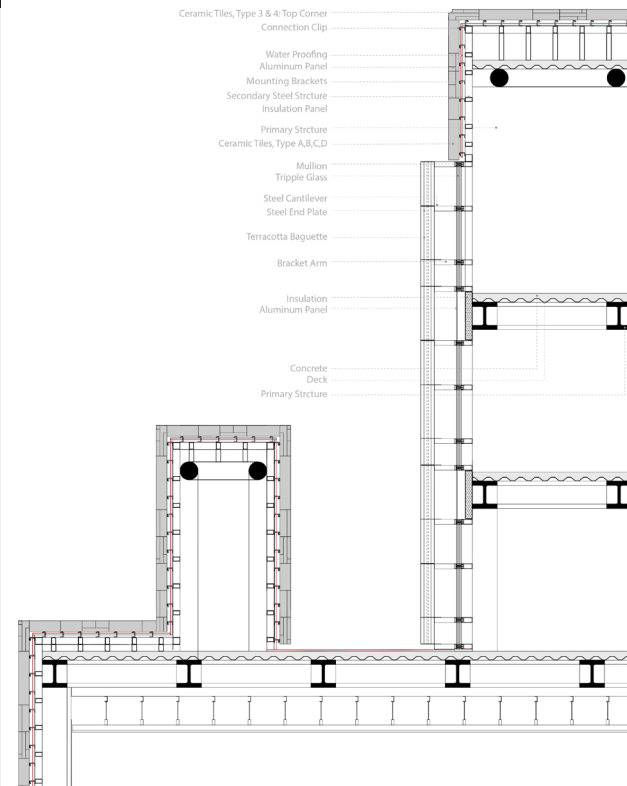
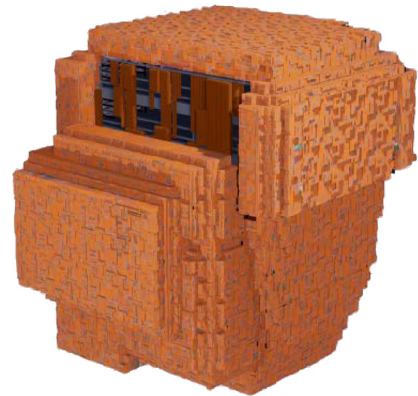




Chunk 01

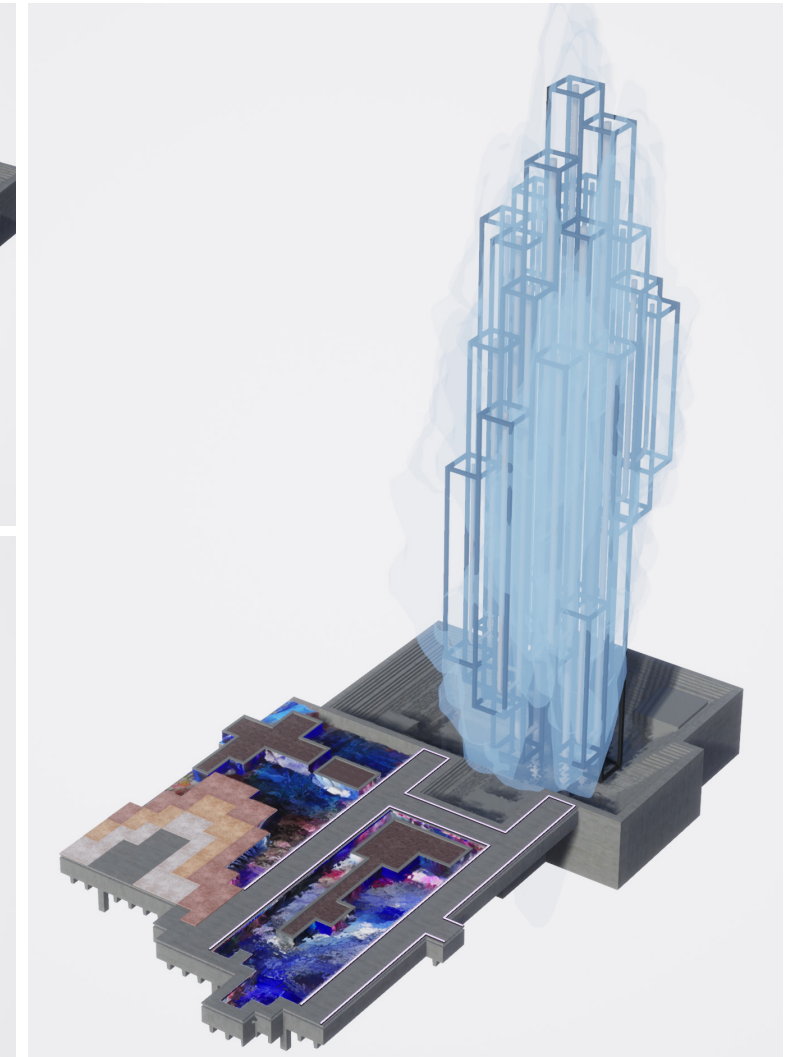


Chunk 02



Ground configuration

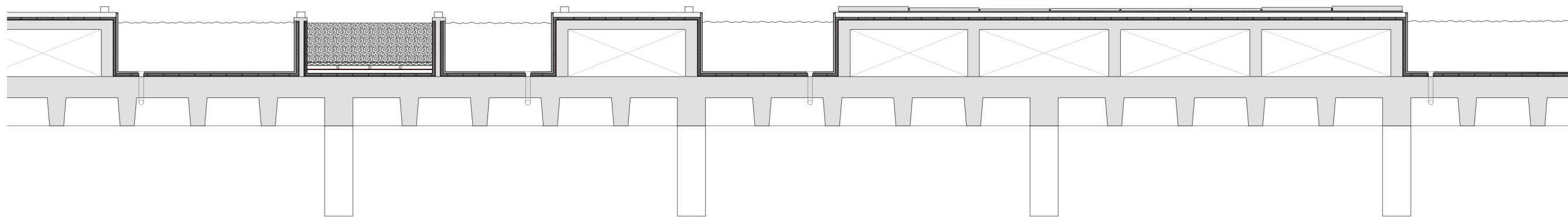
Entire groundfloor slab is flooded with water, walkways and planterboxes, which requires layers of construction systems, of waterproofing and finishes.



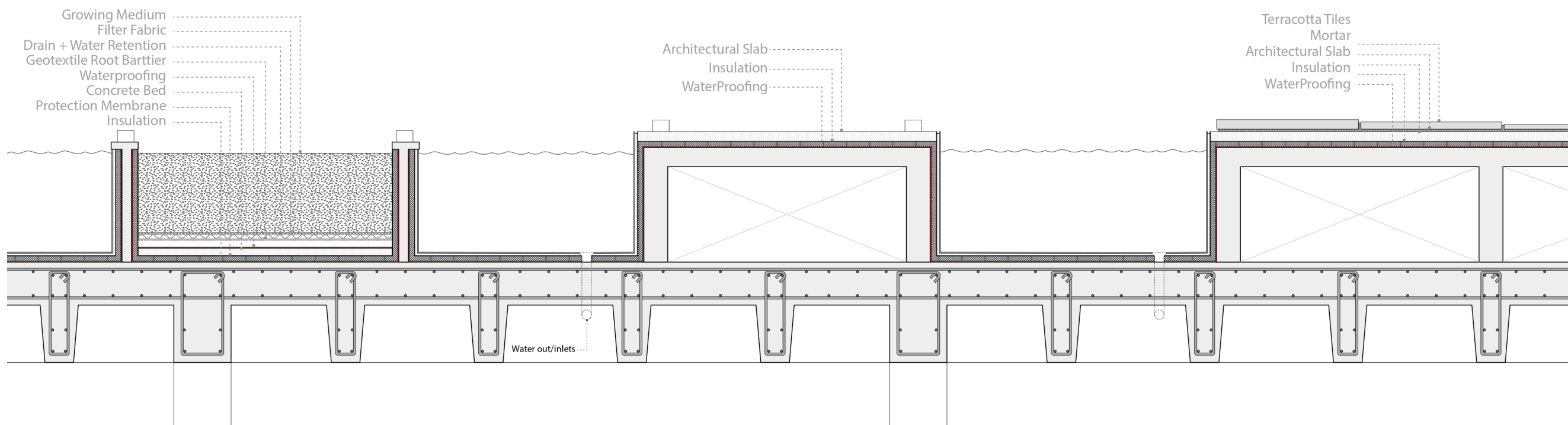
Chunk 03

The Stepwell, holds the giant Ice Berg. The water from the ice berg is collected in the stepwells, and also in the flooded pools that spreads on entire landscape of the groundfloor.



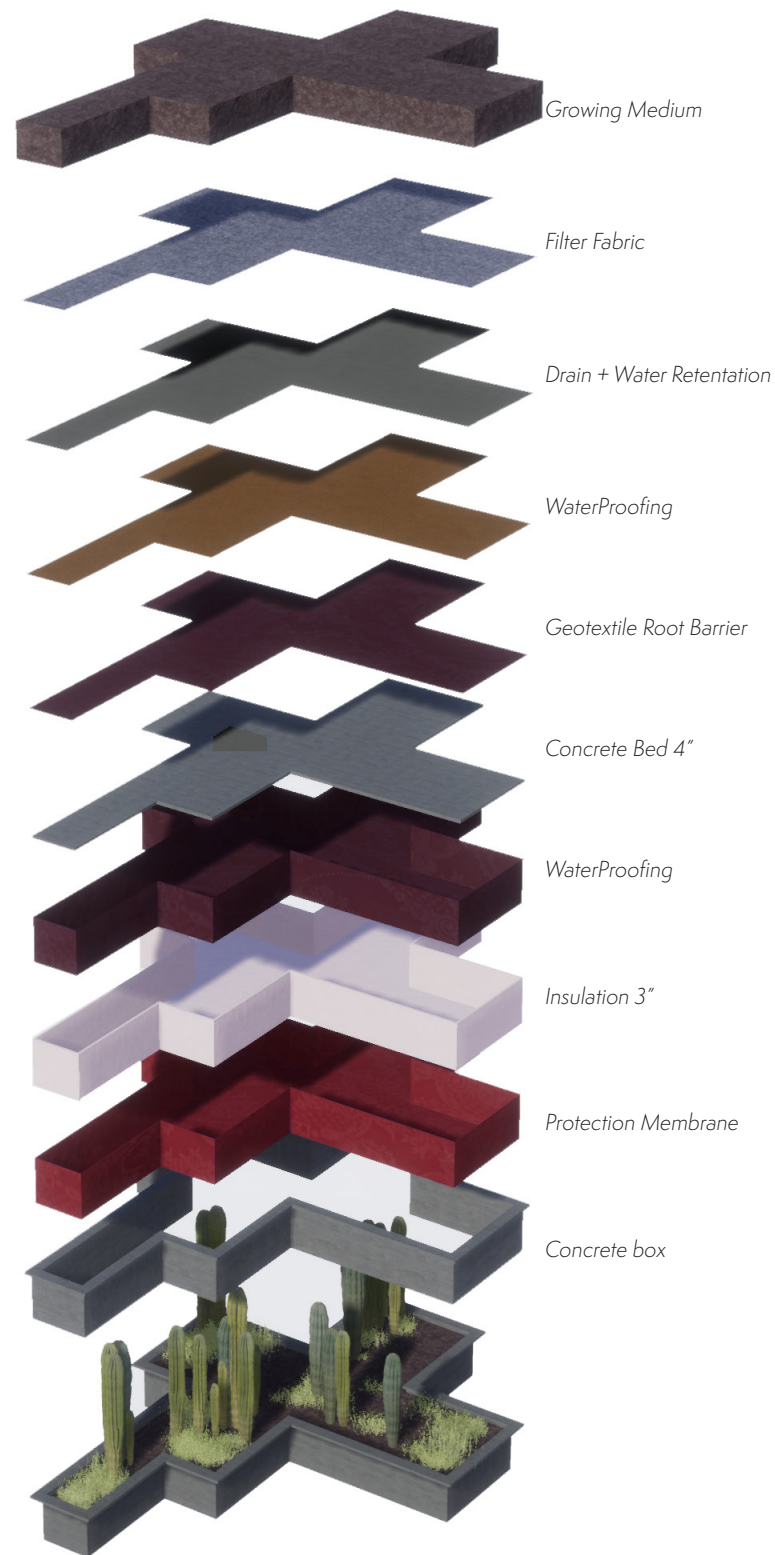


Ground Slab section

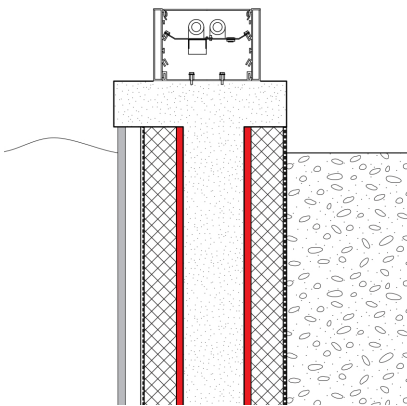
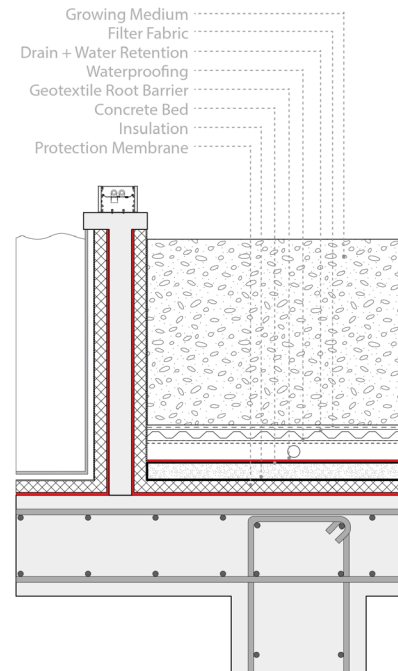


Layers on the slab



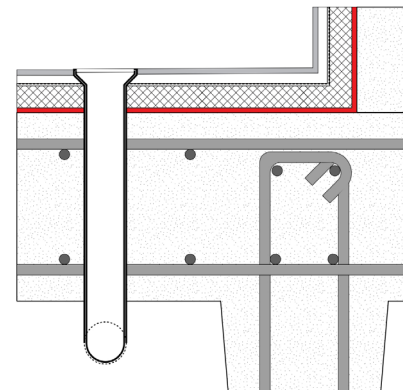
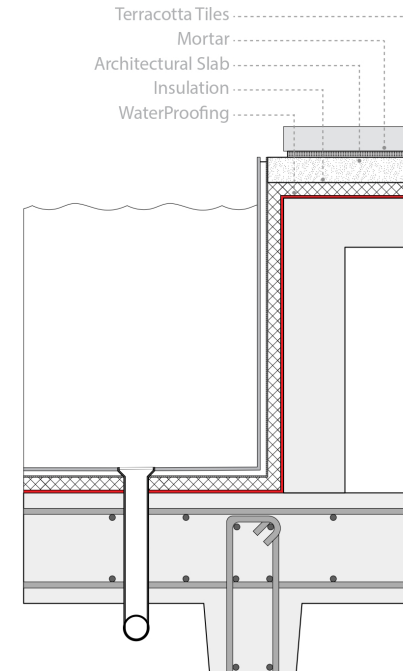


Planter Box Layers



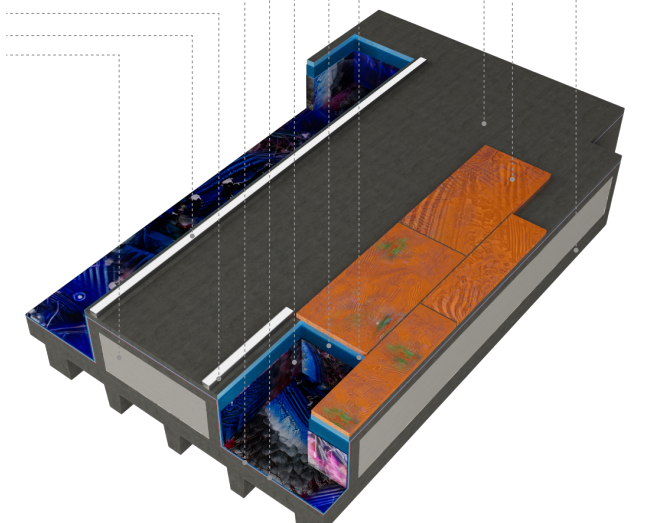
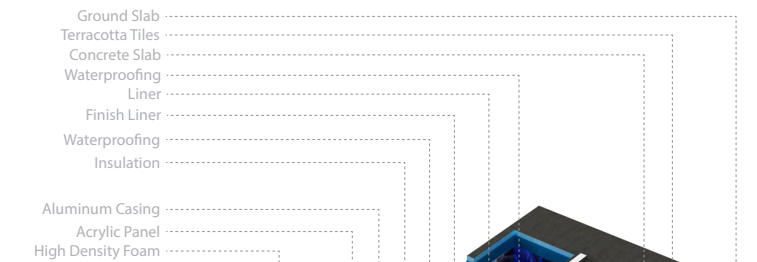
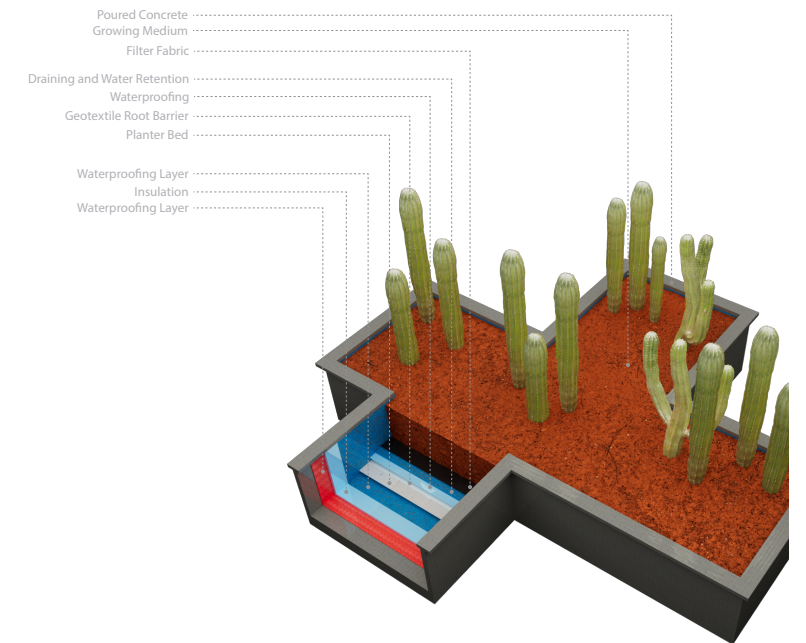
### Planter LED Lights

WaterPool details and 3d diagram showcasing layering and materiality of the hardscapes on the groundfloor.

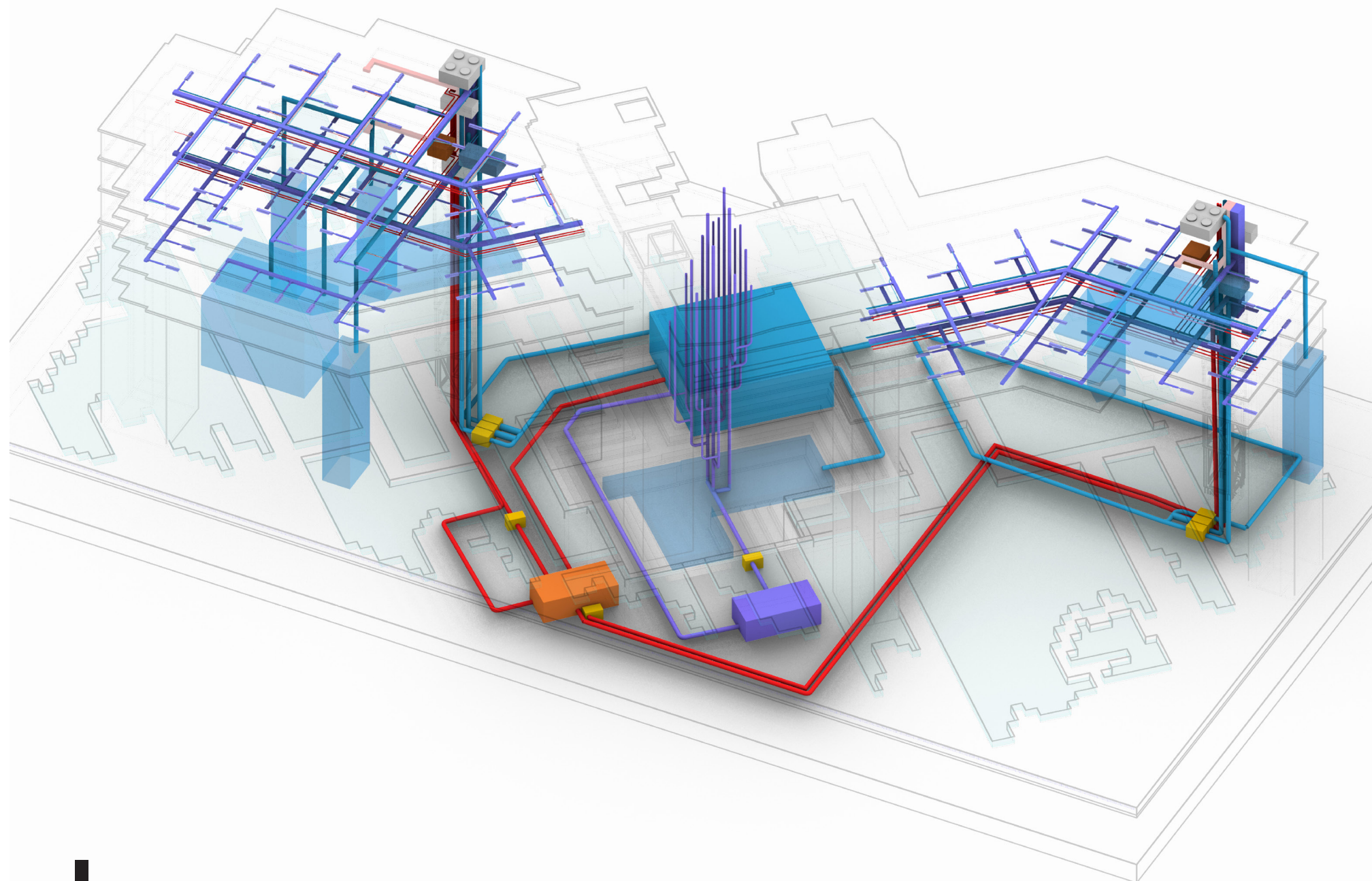


### Drain pipe in the slab

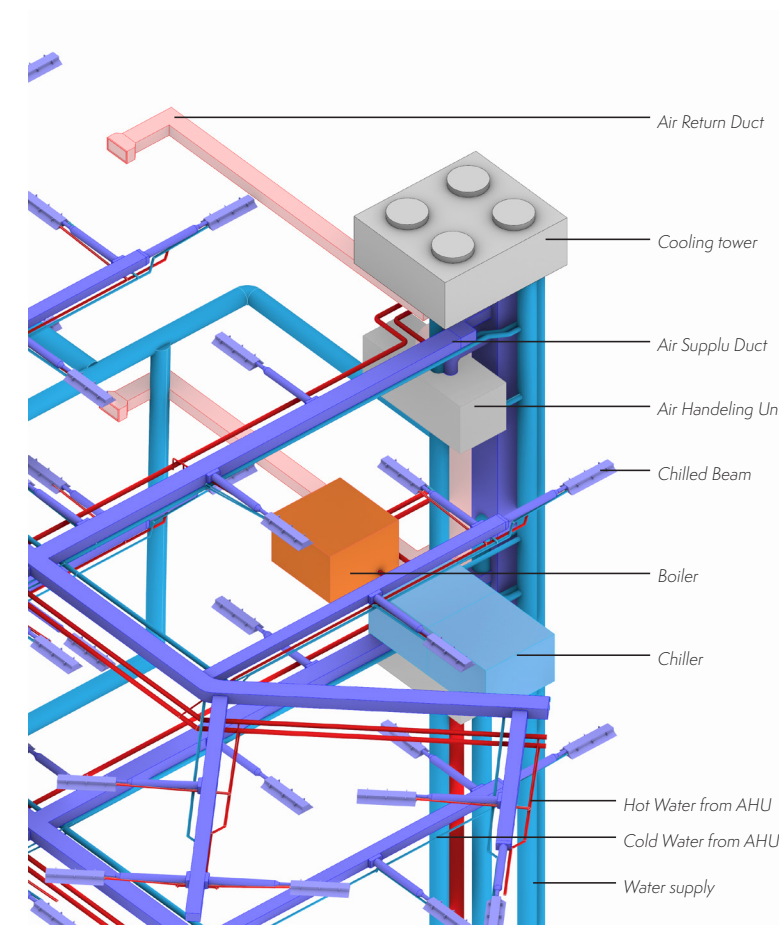
Water drain Pipes in the pools, for emptying and filling the pools with water.





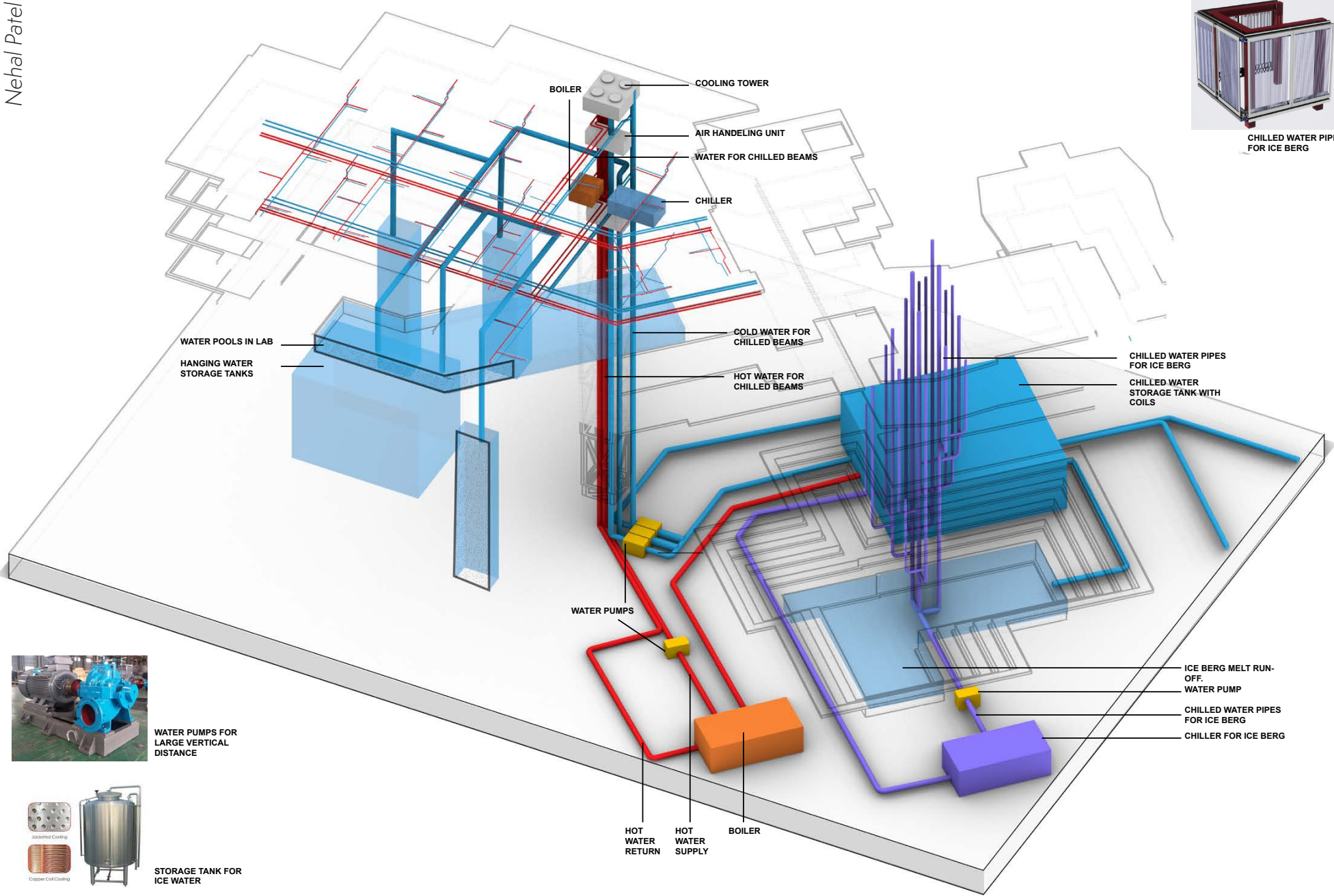


■ Building Plumbing with Iceberg System



■ HVAC System

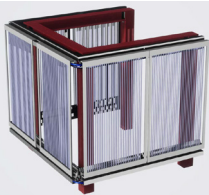




WATER PUMPS FOR LARGE VERTICAL DISTANCE



STORAGE TANK FOR ICE WATER



CHILLED WATER PIPE FOR ICE BERG

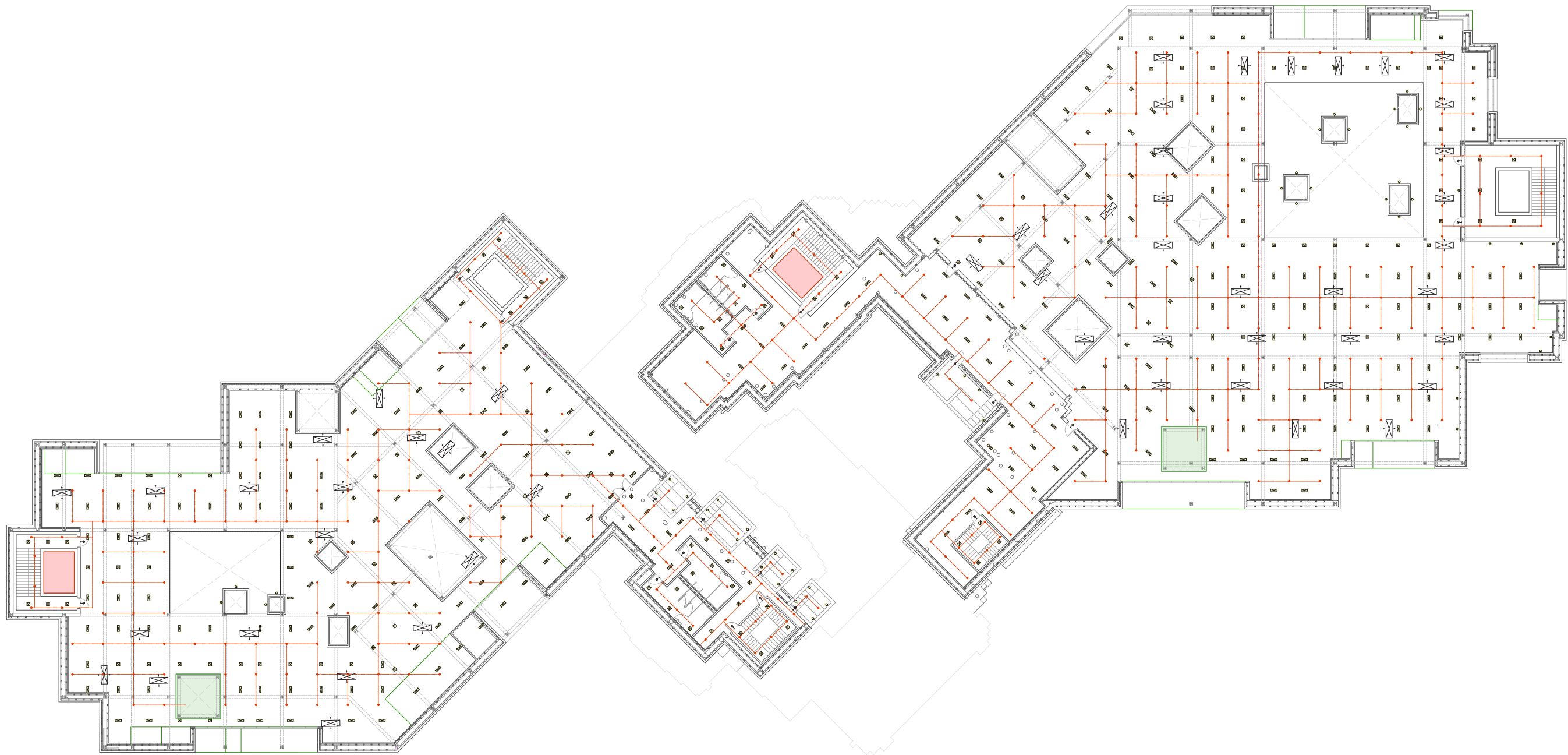
The water from the ice berg is used for the chiller and boilers, and eventually utilized in the chilled beams to cool the Lab Spaces.



Recessed spot light Location: Stairways, restrooms, Parliament	High bay tube Location: Bio-Labs, Double Height spaces	Wall Mounted light Location: Bio-Labs, Double Height spaces
Sprinkler Location: 12' x 12' apart	Exit Sign Location: Doors and fire exit path	
Chilled Beam Location: 15' x 15'		

Water Supply System





Ceiling Plan (Lighting and airflow)



**ADIDAS SPORTS ARENA**

FACADE STUDY AND TRANSFORMATION

*Team: Hiwot Zegeye, Gao Sun, Liu Zhengda*

**BRIEF:** Tectonics in architecture can be understood as “the science or art of construction, both concerning use and artistic design.” Working through in-depth **Precedent analysis** and speculative design transformations, students will document the technical, environmental, and cultural dimensions of a **building Facade**, formulating hypotheses about the interrelationship between **Envelope systems, and their related Structures**.

Every Façade represents a subset of Systems that are developed in response to the Architecture of the building and the need to create a barrier or enclosure. These subsets exist in response to the Architectural concept of the Façade where it is necessary to create barriers that **deal with water, air, temperature, and acoustics**; create Tertiary support for the **Architectural materials of the Façade** and connect the Façade to the Structural Skeleton of the building.

The process includes, **documenting the existing building structure** to understand the tectonics of the building assembly, and **then proposing the alternate idea of facade design**, and detail out ways to attach it to the primary structure.

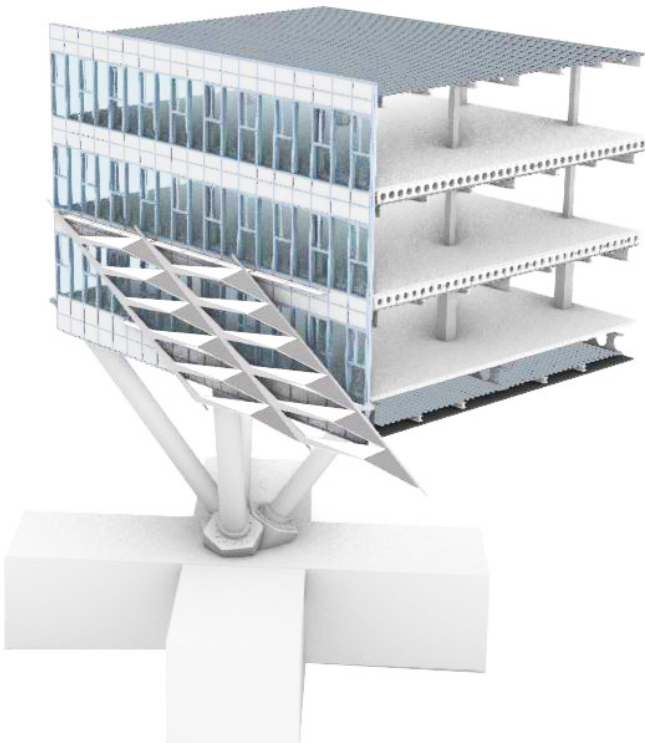
This study includes two building precedents:

1. Study Precedent: Adidas Sports Arena
2. Transformative Precedent: Solar Carve

*Rhino, AutoCAD, Illustrator**By Behnisch Architekten*

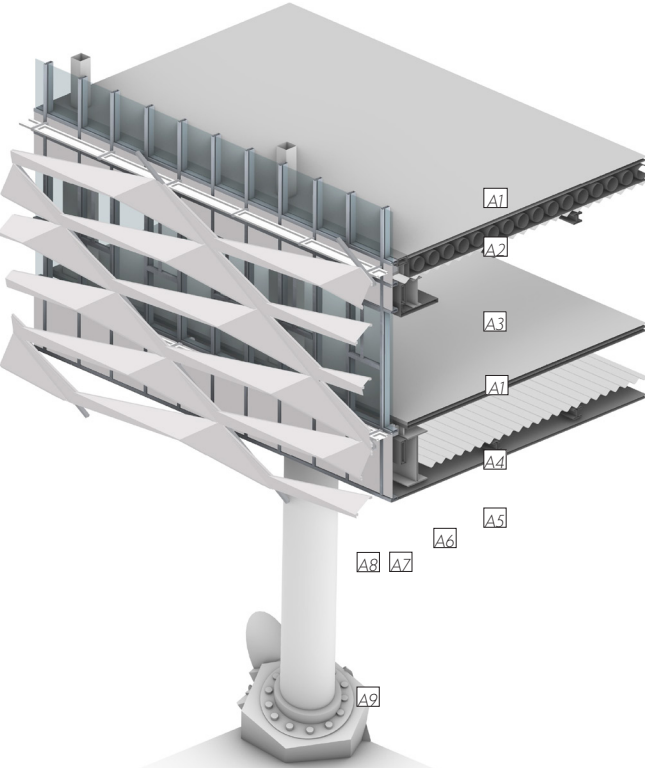


STUDY PRECEDENT: ADIDAS SPORTS ARENA



**Building chunk**

The precedent study, documentation of building chunk to identify primary structural members, secondary structural members, connections, and facade elements.

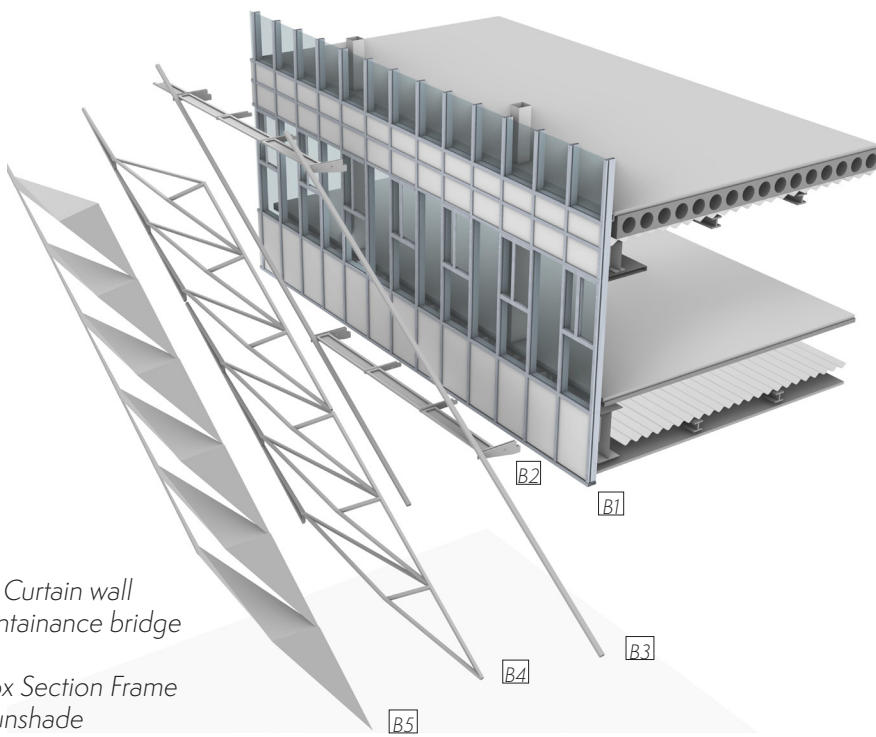


**Chunk Detail**

**Legends**

- A1 Finish floor level
- A2 Hollow concrete slab
- A3 Tie beam
- A4 Corrugated metal sheet
- A5 False ceiling
- A6 Boundarybeam
- A7 Cladding
- A8 Shading element
- A9 Shading element

Zoomed-in detailed chunk section, to identify finer elements of structure and facade. Materials and accurate sizes of structural members are also documented.



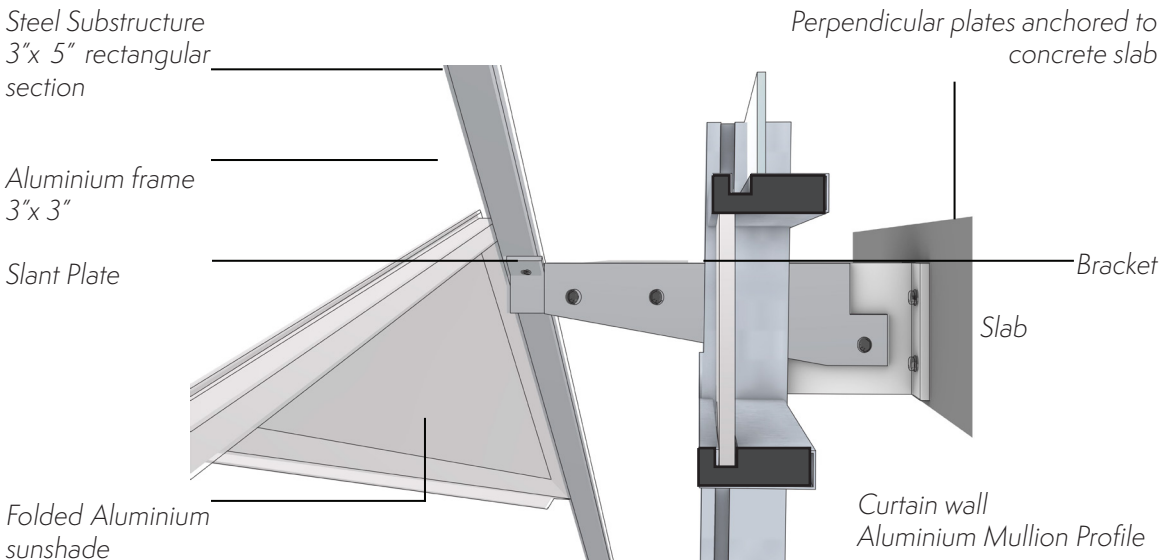
**Layers of Facade**

**Legends**

- B1 Aluminium and Glass Curtain wall
- B2 Steel Braket and Maintainance bridge
- B3 Slant Steel member
- B4 Aluminium 3"x 3" Box Section Frame
- B5 Folded Aluminium Sunshade

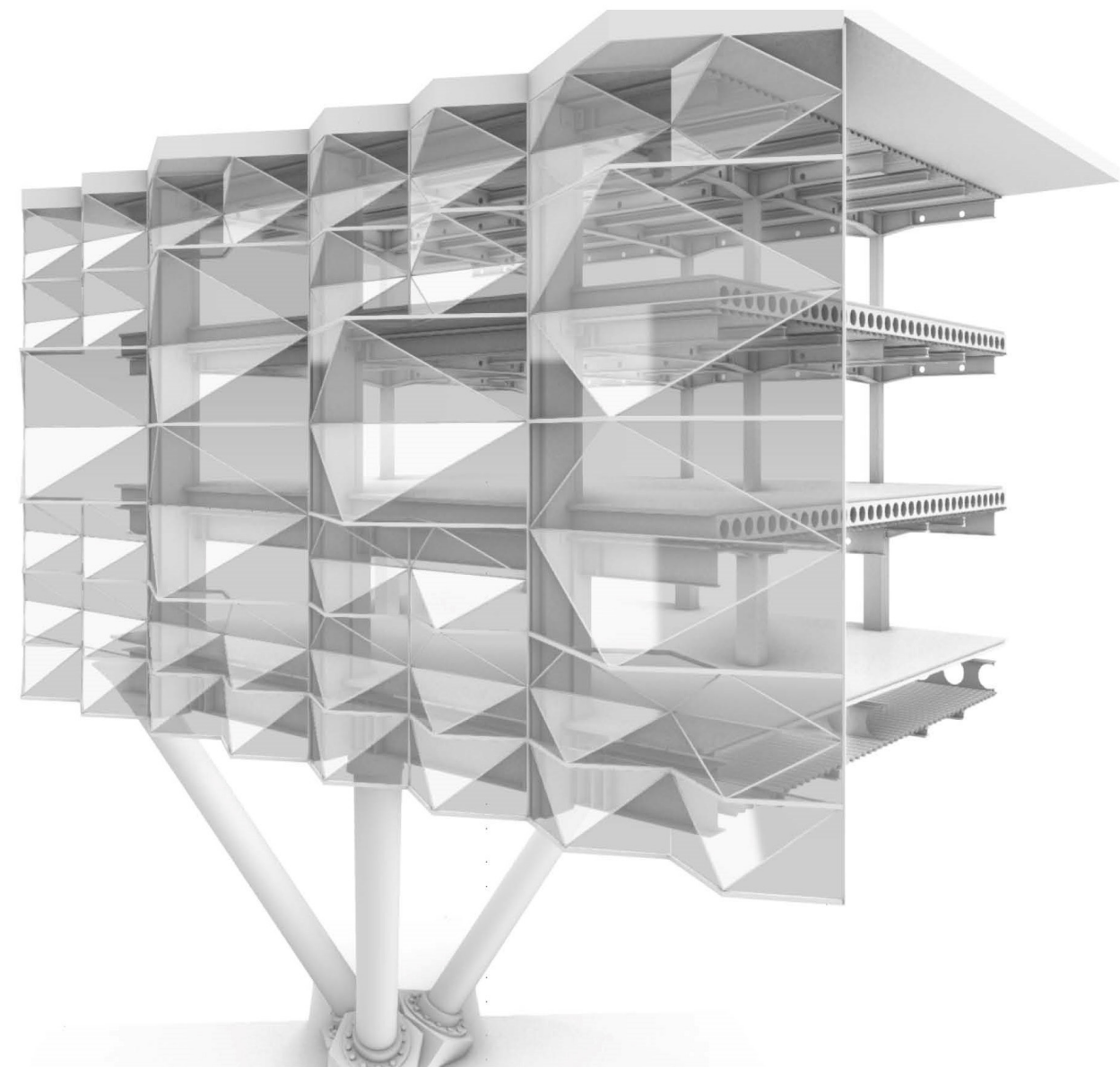
**Bracket connection**

Steel Substructure: 27" long, 3"x 5" rectangular section attached to slab via Steel brackets. Brackets also support aluminum maintenance bridges.

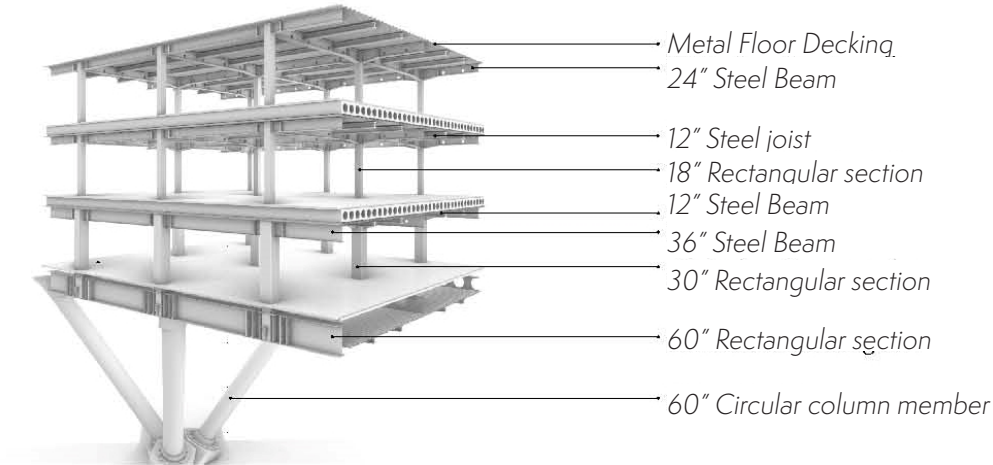




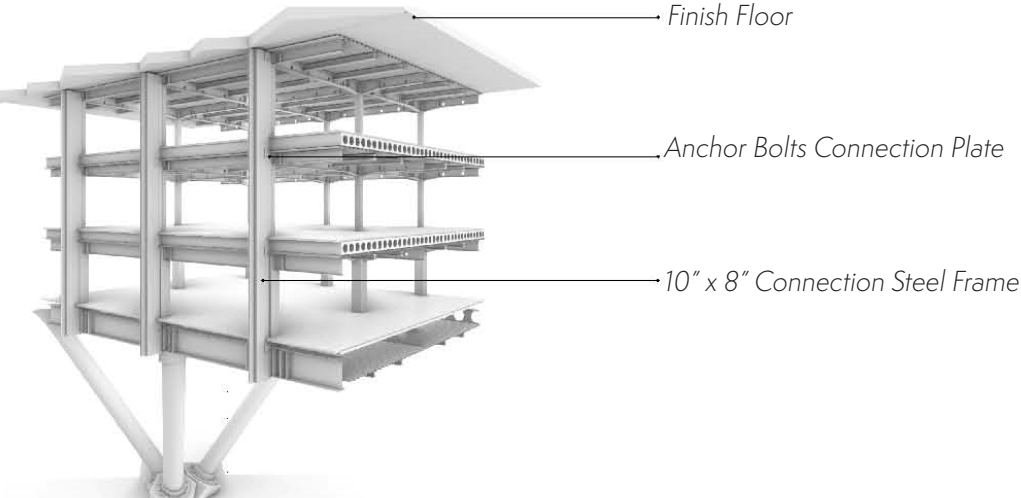
FACADE TRANSFORMATION INSPIRED BY SOLAR CARVE DESIGNED BY STUDIO GANG



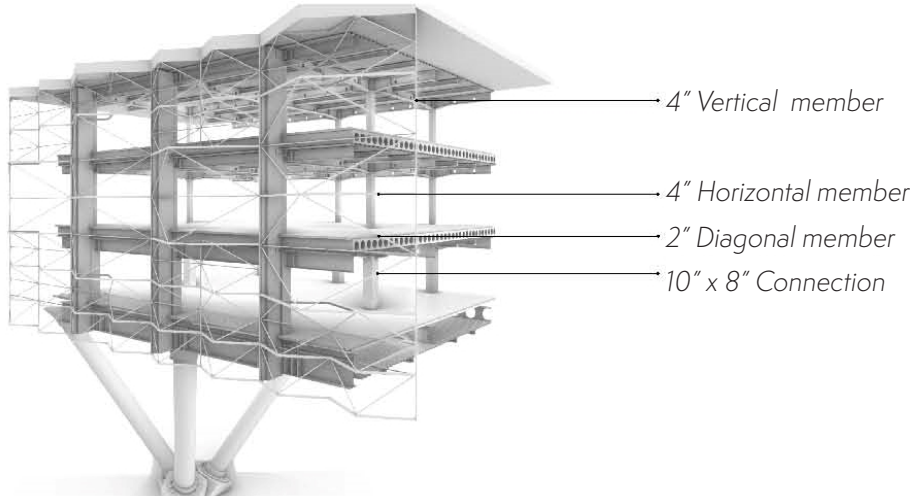
Chunk - Transformed Facade



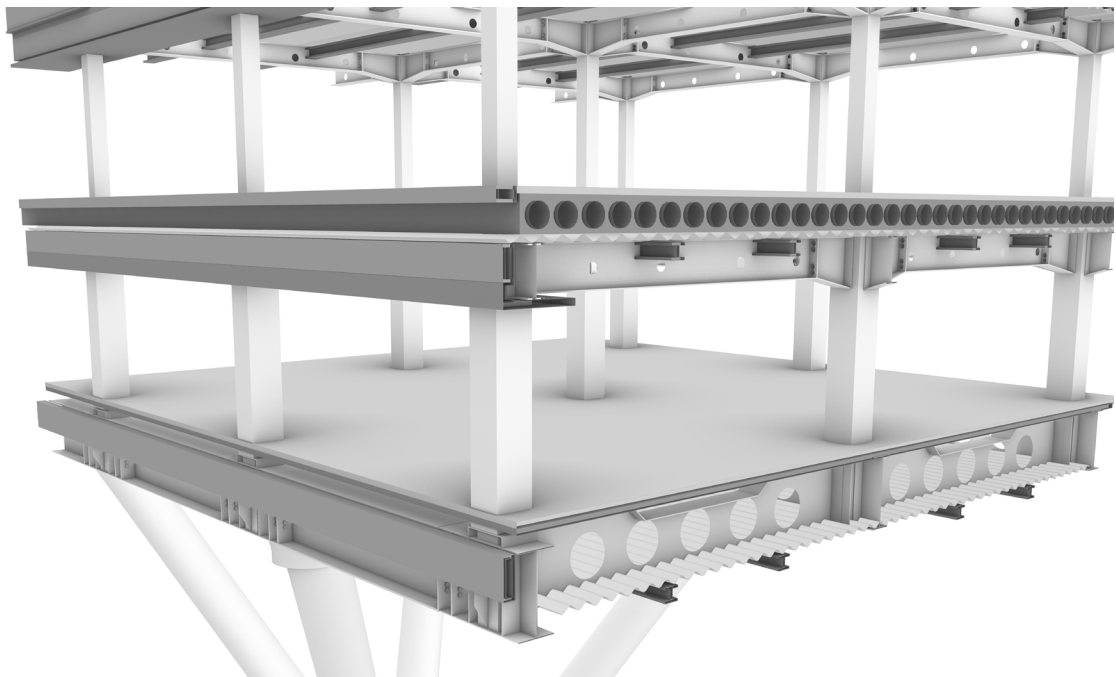
A2 ANCHOR BOLTS FOR FACADE STRUCTURE



A3 FACADE STRUCTURE SYSTEM



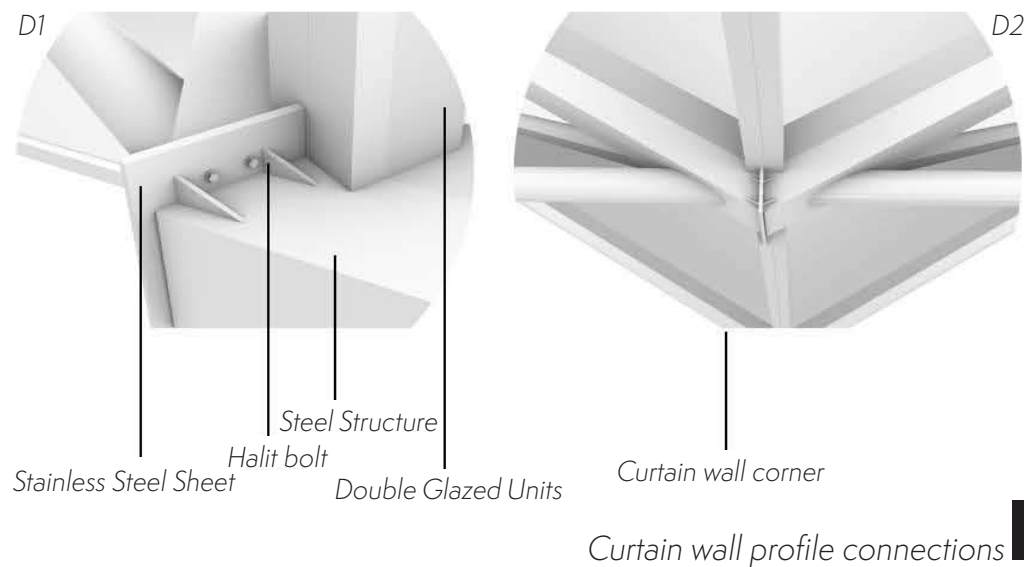




Horizontal section added to support vertical members for facade



Anchors connecting slab to vertical member of curtain wall



Anchor and slab connection





AutoCAD, Illustrator, Sketchup, Lumion

**AIM:** This thesis demonstrates the **application of biophilia** in the urban environment by designing and deriving strategies for **mixed-use development in CBD**- West Zone of Ahmedabad City.

**BACKGROUND:** It is believed that humans have a **congenital inclination towards nature** and natural processes, this phenomenon is termed **“biophilia”**. **Human health and well-being** are linked to the natural world. Man is part of a very **large ecosystem** that sustains itself by the interdependency of different living species. Harnessing each other’s strength and abilities is a way of life, where all exist harmoniously and in chaos.

Bigger cities are built at the cost of extinction of **biodiversity**, and these are just **“concrete jungles.”** Human ecosystems largely fail to meet the requirement of pure air to breathe and water to drink. **Human-nature connections** have to grow strong in man-made environments not only for health but also to **save disappearing biodiversity**.

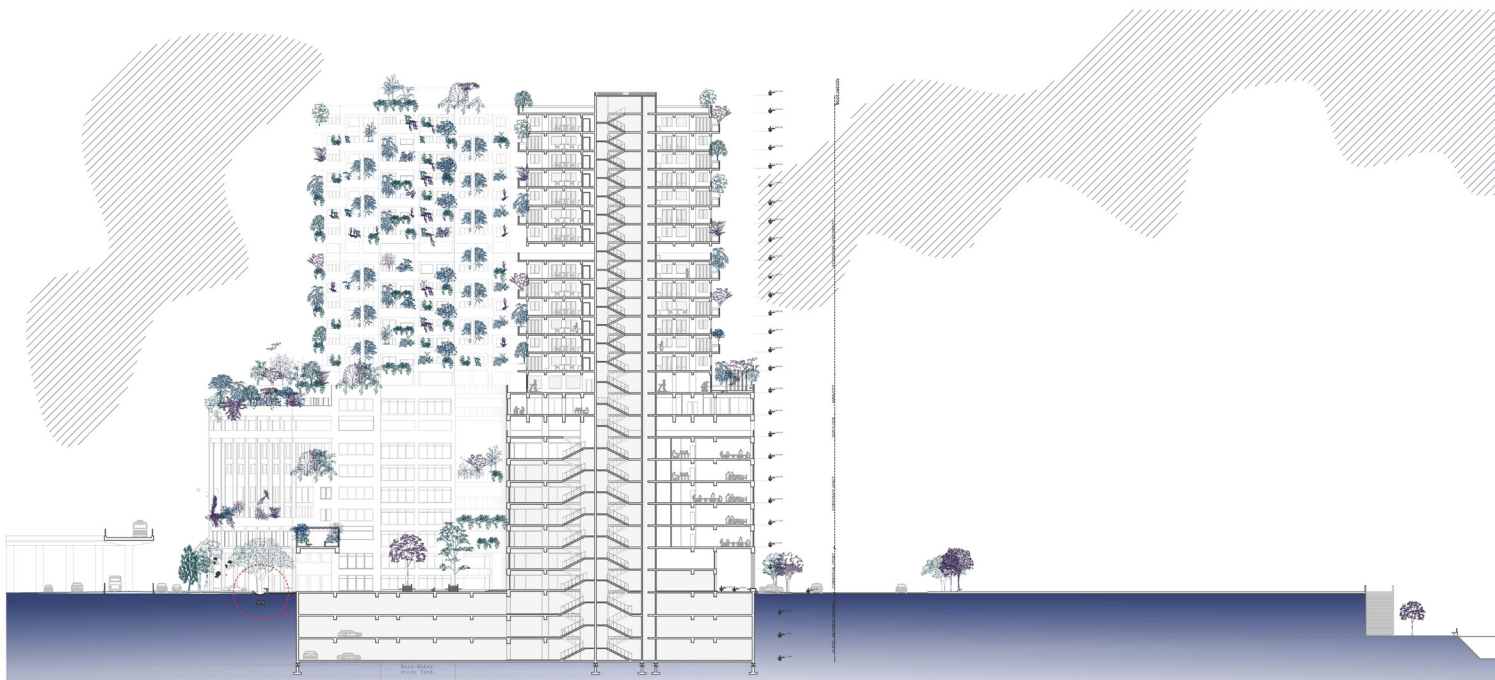
This thesis explores the **inclusion of biodiversity** into the built environment to link urban man with nature and **proposes the new typology** of the multi-functional building that is based on biophilic concepts.





### Site Plan

The majority of surface area of the site is covered in plants and shrubs. This helps in mitigating the urban heat island effect prevailing in commercial core of the city.



### 01 - 37% Live and Work units

no. of floors - 14 (10th - 23rd)  
no. of units - 168  
Total built up - 10,608 sqm  
Built up - 37%

### 02 - 09% Co-working + Recreational spaces

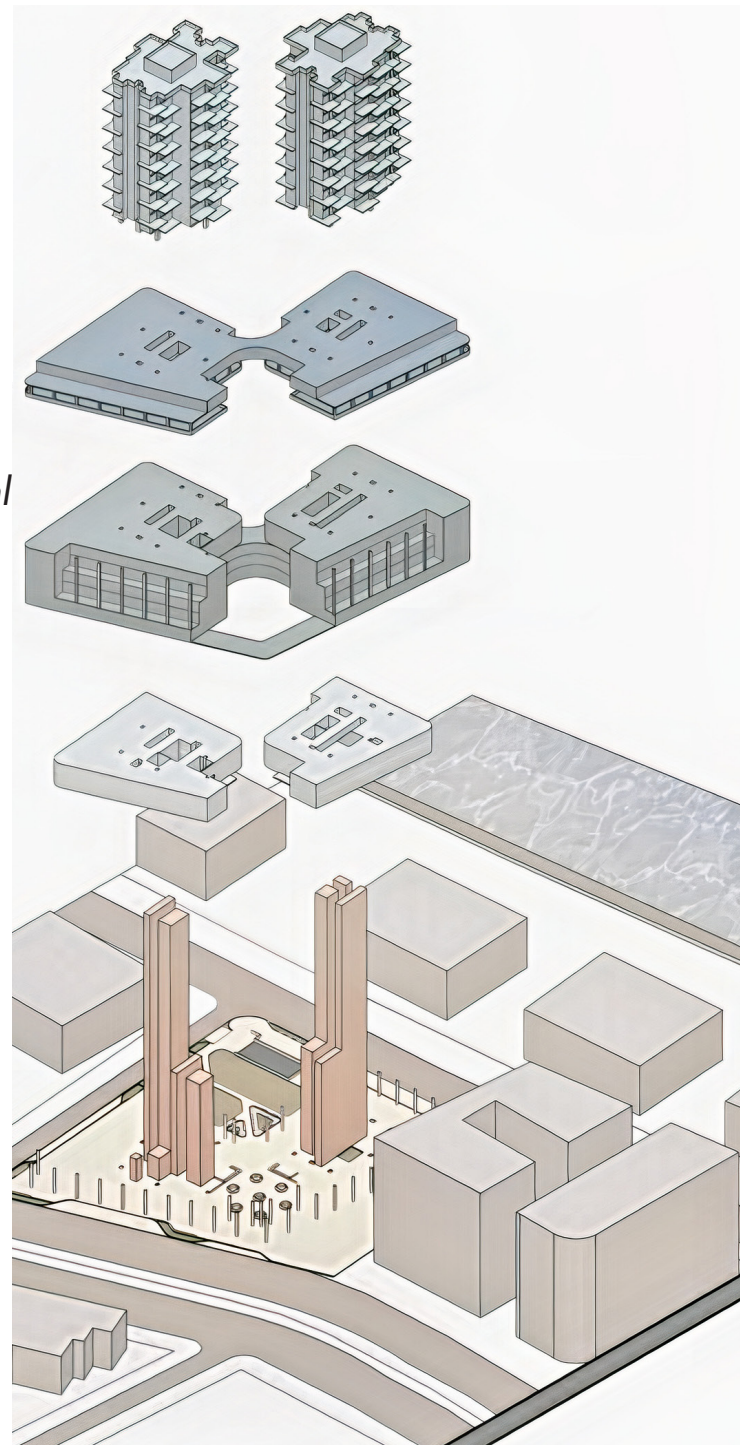
no. of floors - 2 (8th - 9th)  
8th - Co-working + Indoor game  
9th - Gym + Terrace garden  
Total built up - 2,700 sqm  
Built up - 9%

### 03 - 42% Corporate offices

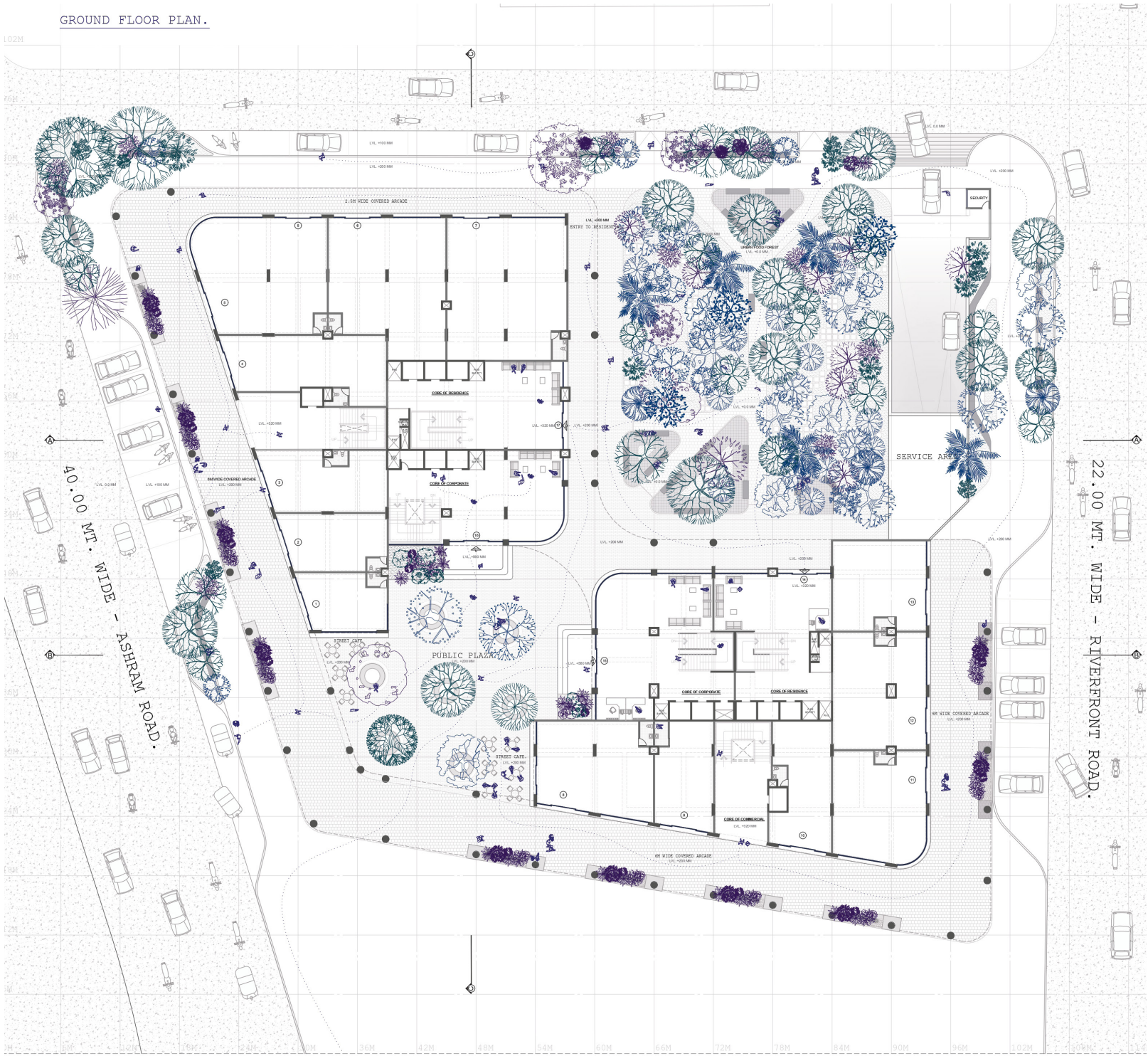
no. of floors - 5 (2nd - 6th)  
no. of units - 60 corporate offices  
Total built up - 13,550 sqm  
Built up - 42%

### 04 - 12% Commercial shops + cafes

no. of floors - 2 (G + 1st)  
no. of units - 24 Retail units  
Total built up - 3,520 sqm  
Built up - 12%







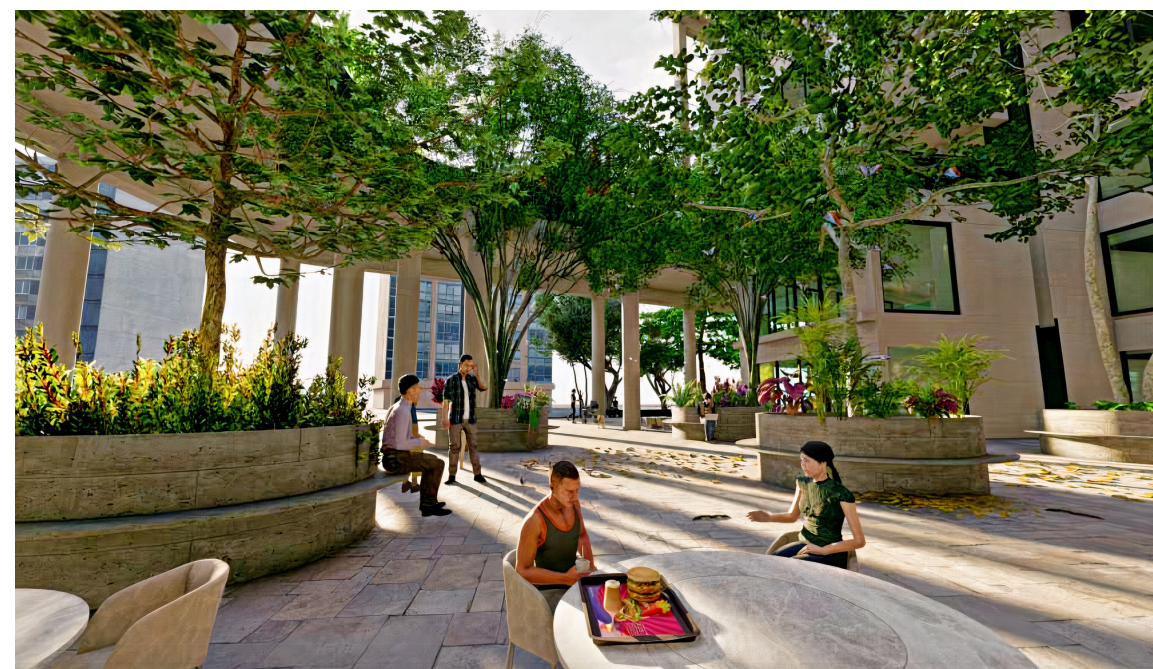
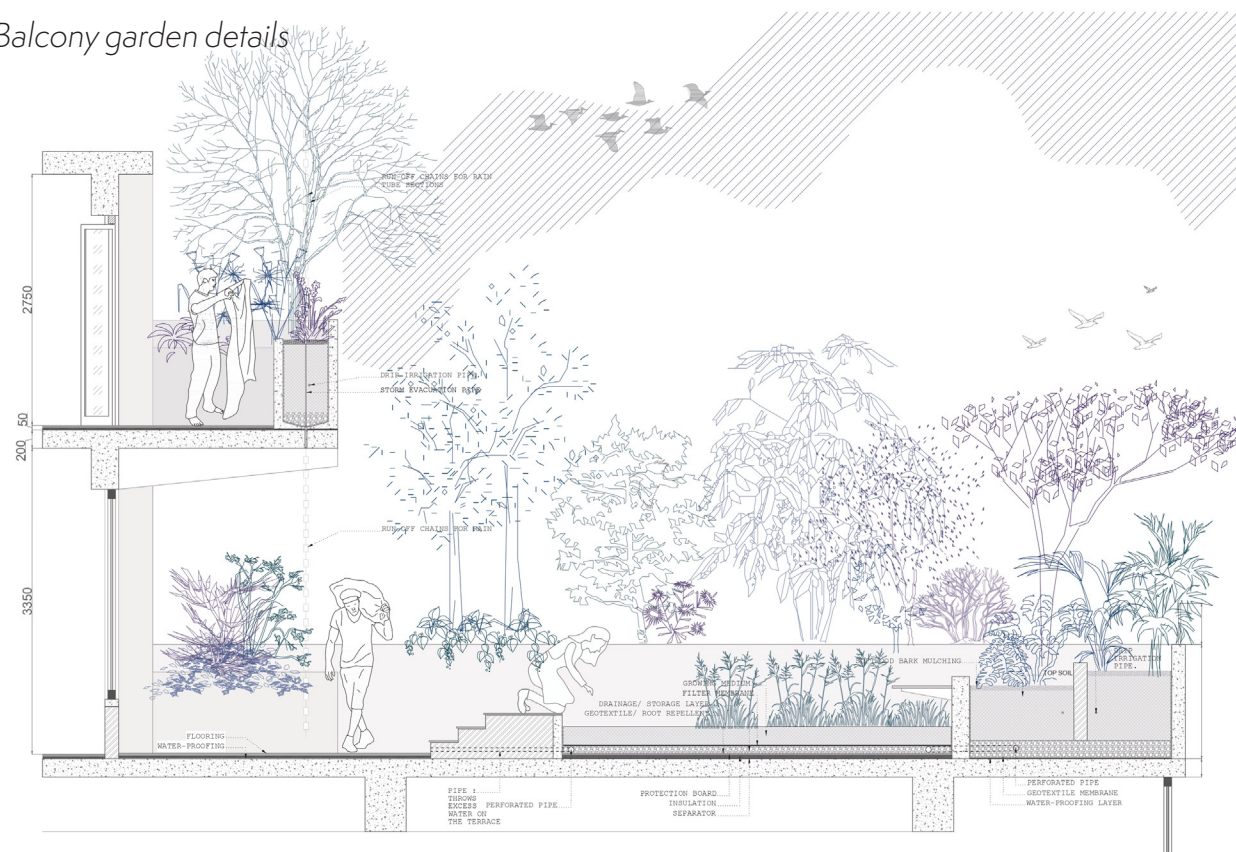
The tiny forest is set up as an edible forest or “urban food forestry”. This forest uses Miyawaki technique of urban forestation, where in 2-3 years it becomes self-sustaining.



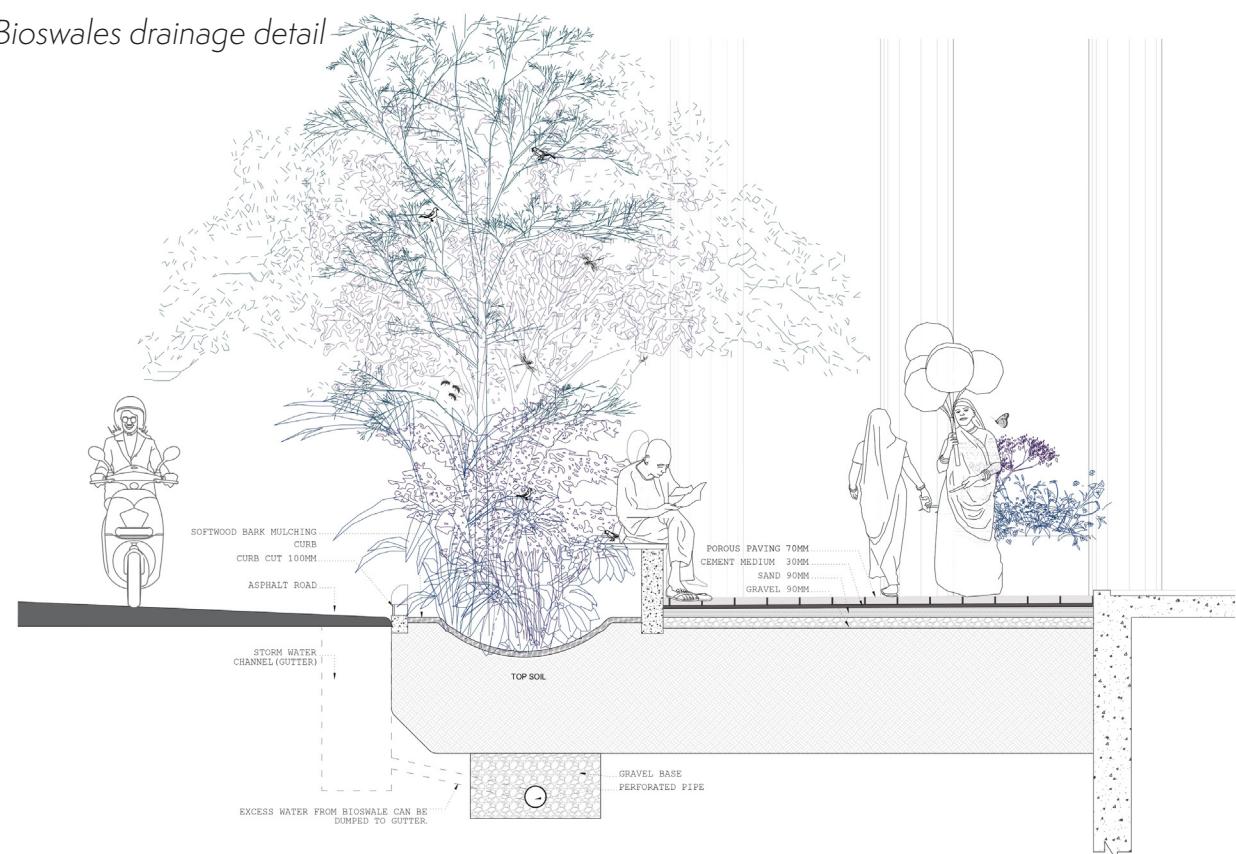
A green facade is created by growing climbing plants up and across the facade of a building, either from plants grown in garden beds at its base, or by container planting installed at different levels across the building.



Balcony garden details



Bioswales drainage detail



Terraces of the two towers are landscaped with edible variety of plants and shrubs. These would be a community edible terrace farm, maintained and harvested by the residents and for the residents of the towers. Bioswales are designed along the road, and shade giving trees are planted to ensure shade in the street and let biodiversity thrive.





**STATEMENT:** Alter\_Etics comes from the combination of alteration and **aesthetics** as project deals with experimenting with the aesthetical rearrangement as a **technique** to better understand and reimagine **collective building blocks** in the urban cityscapes and reintroducing the **requirement for beauty**, adding the value to the building beyond mere function. The process involves, study of existing buildings, identifying their **repulsive and attractive qualities**, and can add to the idea of **continuation of contextual beauty**.

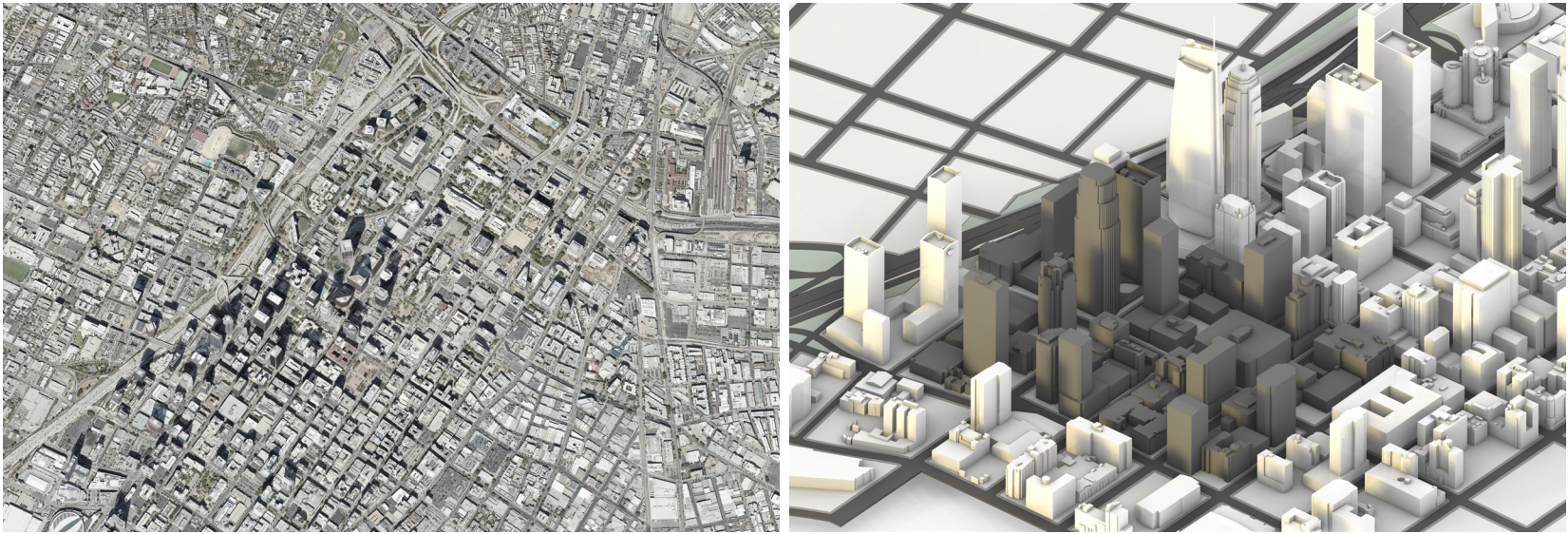
**BACKGROUND:** In recent years, there has been rise and revolt against **banal and soulless infrastructure** that has been in trend for so many years. These homogenized, **individualistic architecture** is fast and easy to build, achieving sterile, and transport driven structures, that are usually out of scale with its surroundings. In pursuit of solving modern functionality related issues, mainstream architecture has **lost liveliness**, and are simply reduced to glass boxes. **“Ugly Spaces are punishing, as mass incarceration cells announce so brazenly, they inhibit healing and rejuvenation.” Elaine Scarry.** This thesis explores the possibility and importance of **Aesthetical rearrangement** in the form of surreal collages, to envision and **achieve collective urban aesthetic qualities** that are in harmony with each other.

Rhino, Unreal Engine, Photoshop, Illustrator

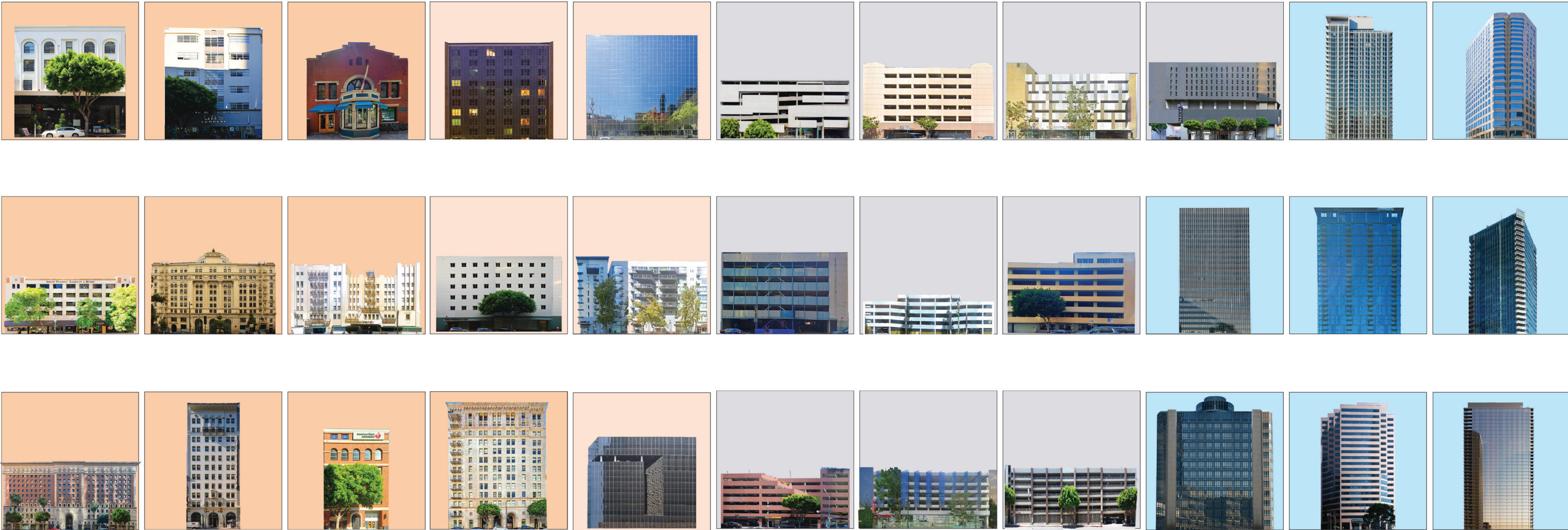


Site: Downtown Los Angeles

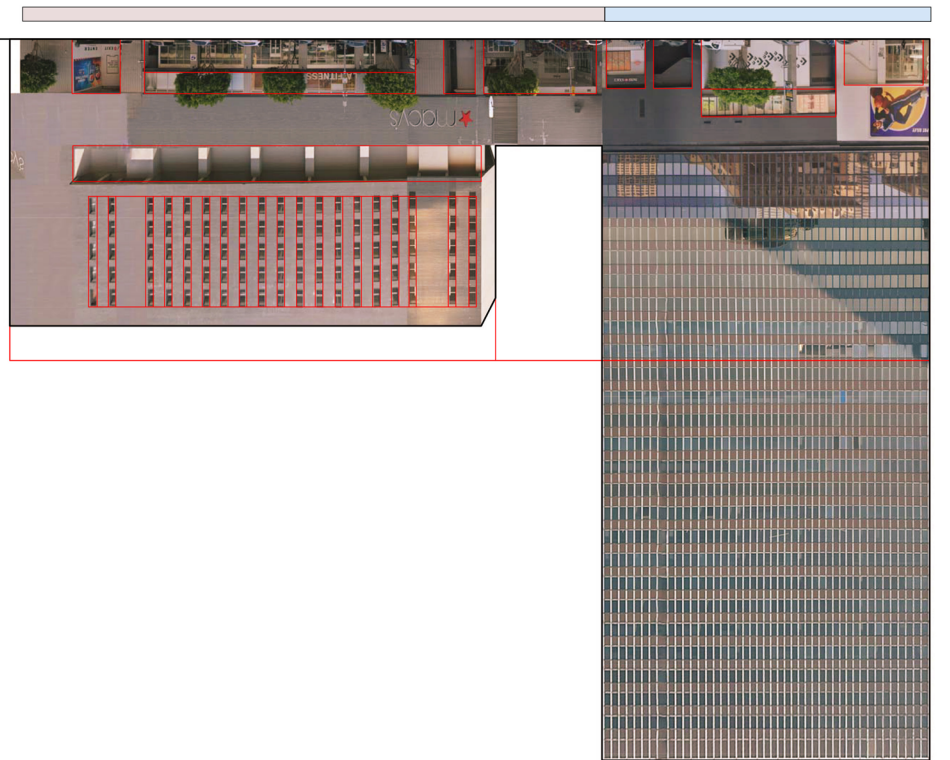
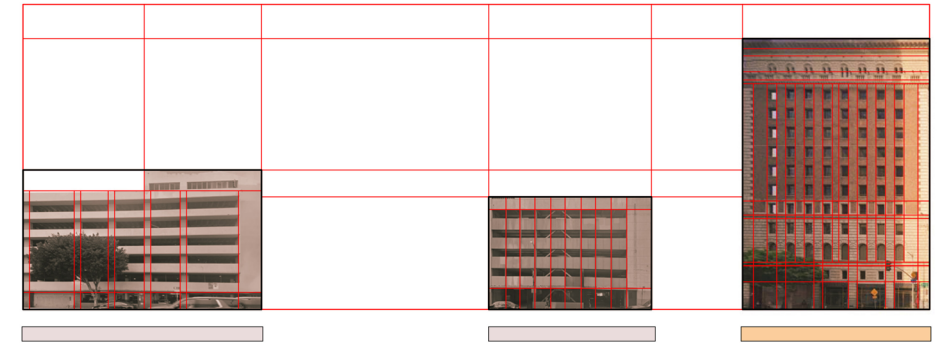
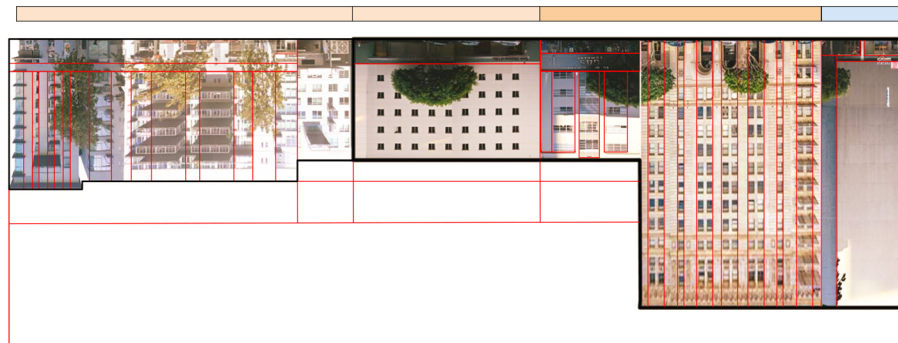
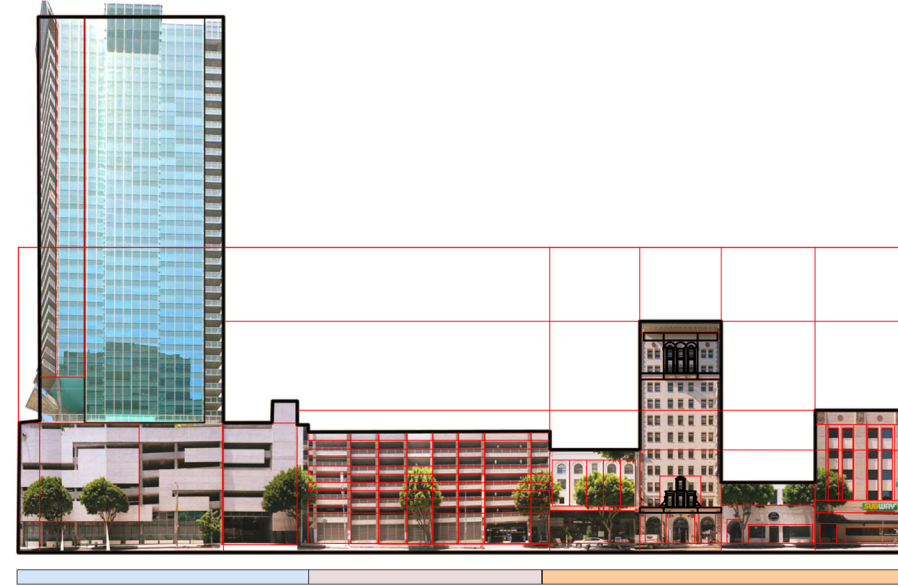
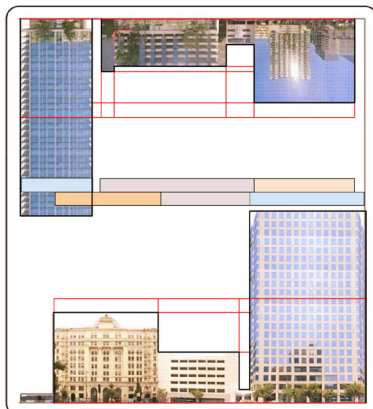
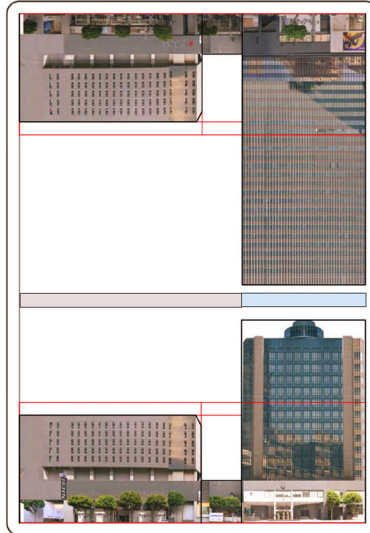
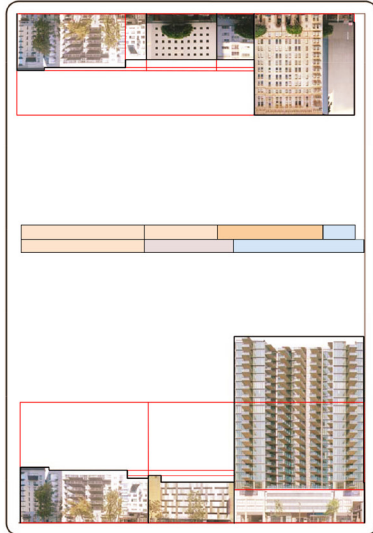
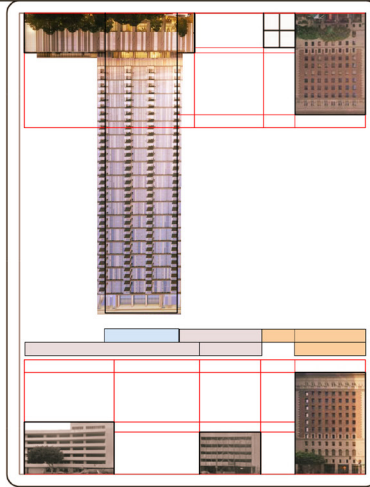
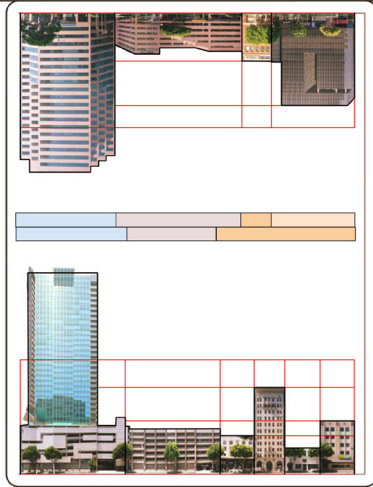
The newer construction in Downtown Los Angeles, along with existing decaying historical structures, these blocks are coming up as a chaotic pallet of unfitting facades and volumes that are largely for vehicular usages and not entirely pleasant for humane experience. The decline of aesthetical value is clearly visible in the precedent blocks.



Cataloging the Buildings according to typology. Historic, Corporate, Parking, Office, Residential





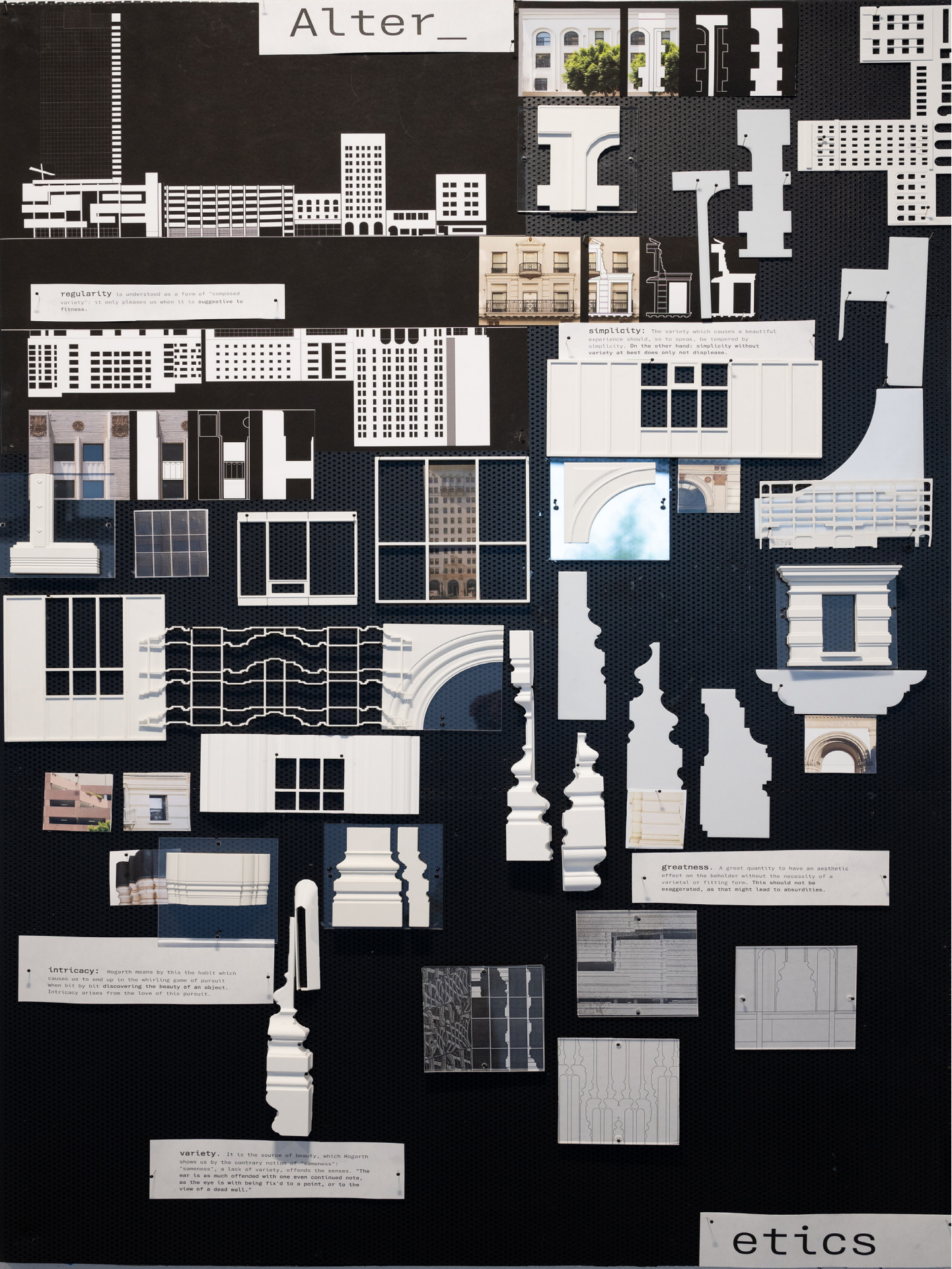


### The methodology involves 3 stages,

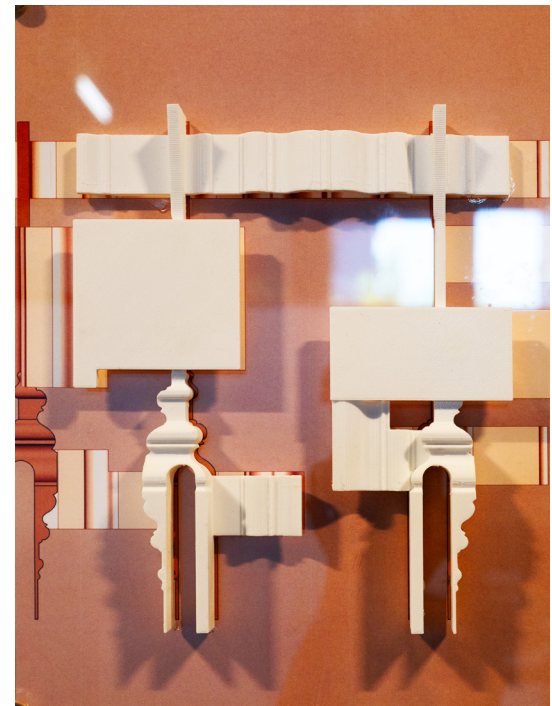
- 1) Identifying and dissecting the building aesthetic,
- 2) Delving into the strategies to stack, scale, alter, or arrange the elements, and
- 3) Relating back to the surrounding aesthetics to balance Proportions of elements.

**■** Proportional Analysis of 6 blocks





Podium Parking Detail

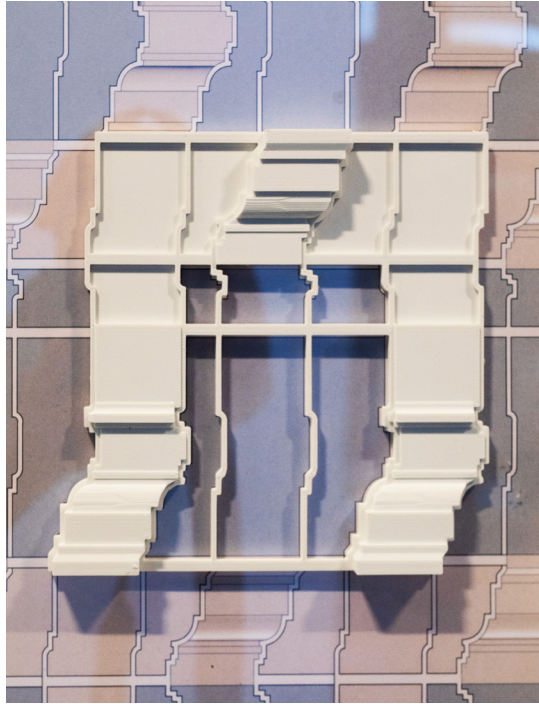


Podium Parking Detail

Elaborating the details by adding to the intercasu of the parking lot facade, to appropriate the scale of the overall composition of the streetscape.







### Element bracket Windows

The window details are elaborated by adding more geometrical intricasy and 3d surfaces to otherwise 2d facade pattern.

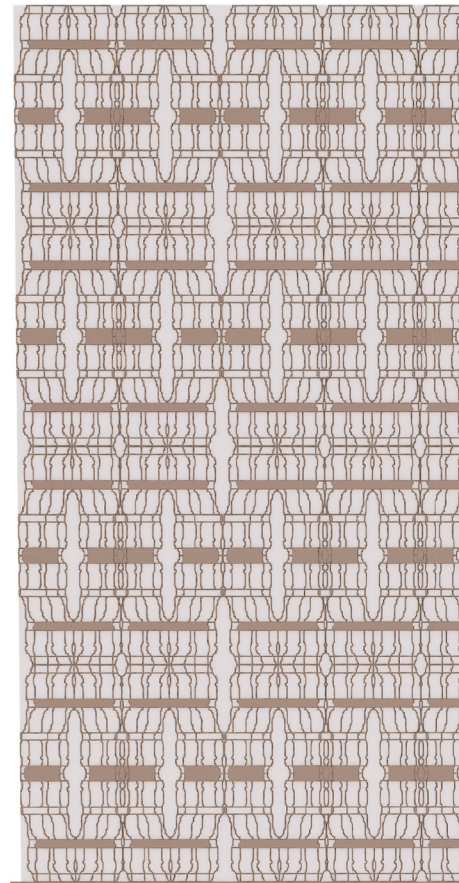
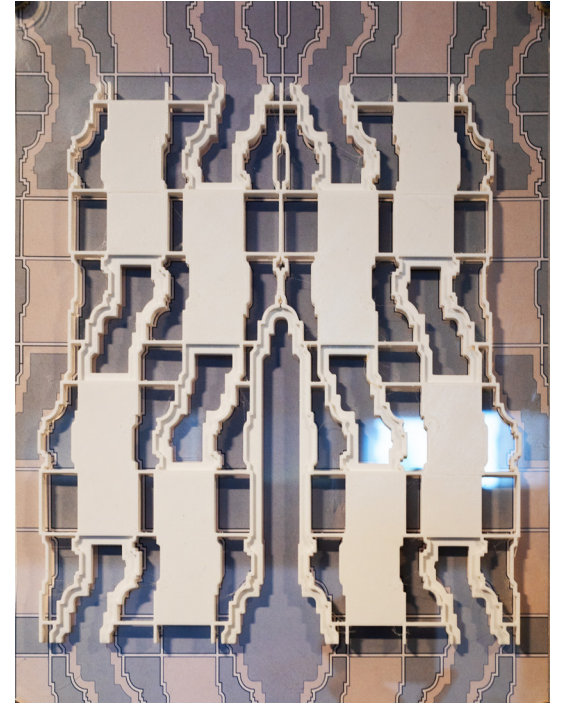
*Sheraton Hotel*



### Element Curtain Wall

This iteration is derived to breakdown rectangular grid and reintroduced sense the sense of symmetry and details.

*Macy's Plaza*

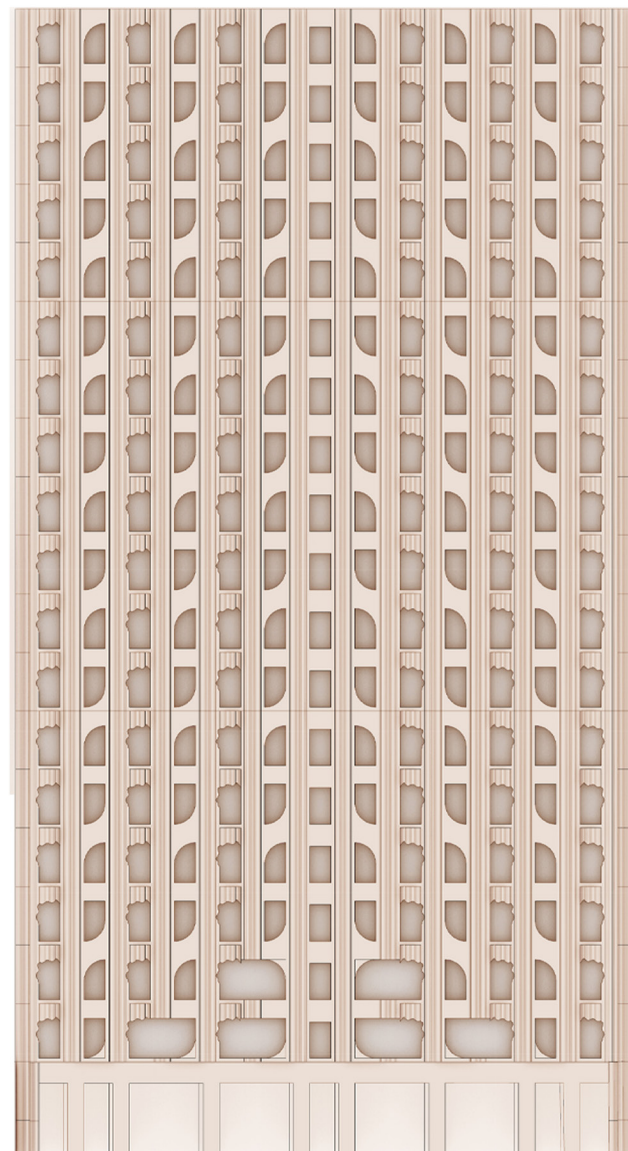






*Element Vertical Fins*

The hybrids of classical profiles are arranged as it shapes the glass wall of a skyscraper. The shapes merges with the vertical mullions.

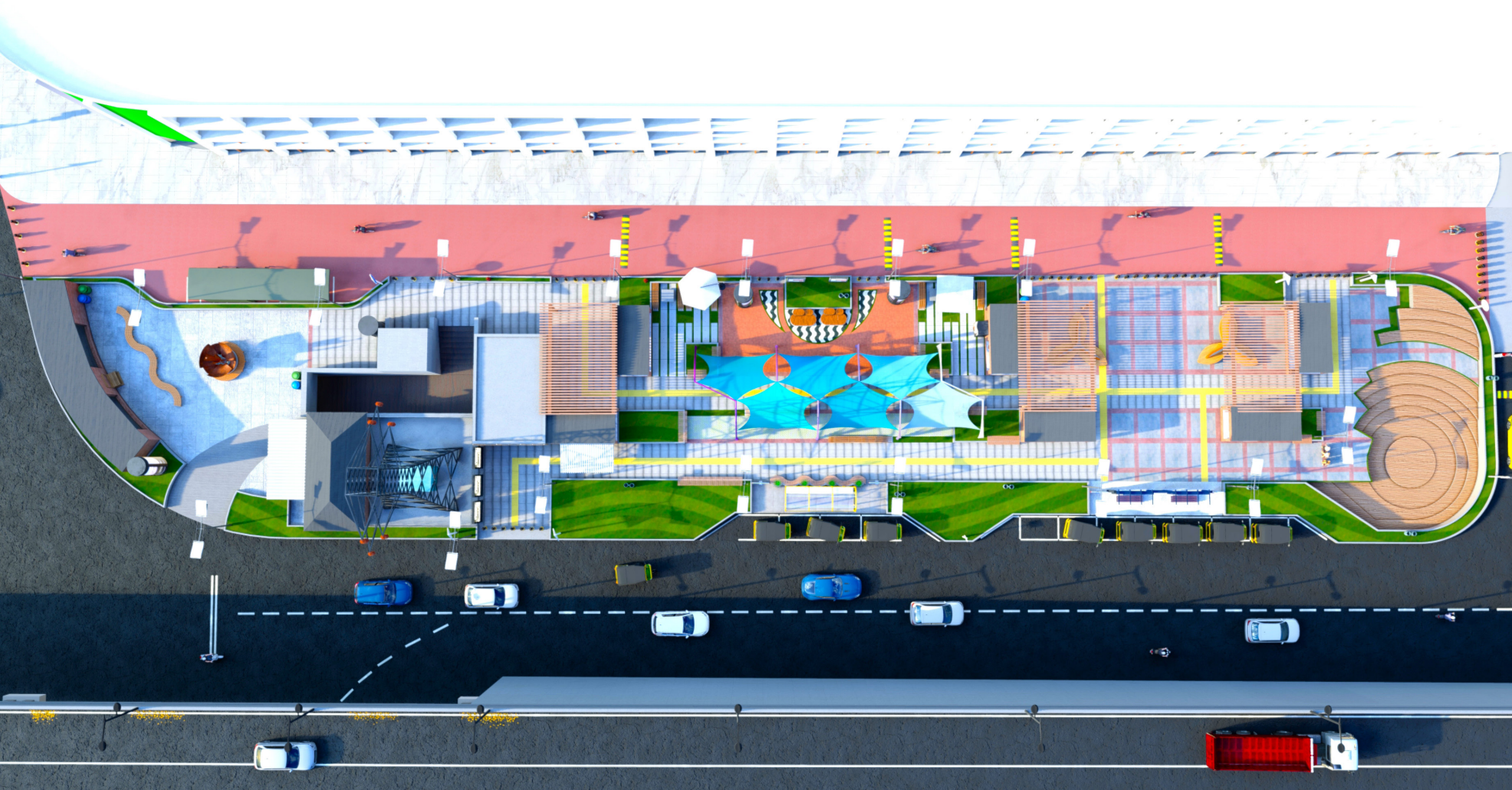


*Element surface profiles*

This facade is relatively simple, yet the surface creates interesting curtain flutes, cutting through are the window shapes that has variety, similarity and harmony.







## BOULEVARD AS PUBLIC SPACE

PEDESTRIANISATION & URBAN ELEMENTS

Team: Dhanraj Rupawala

**AIM:** This project aims for the rejuvenation of deteriorating cityscape along roadside as an **urban element**, by integration of vending activities as well as safe for pedestrian commuters, development to be done on scape **under High Tension Wire on S.G. Highway.**

**BACKGROUND:** The Sarkhej - Gandhinagar Highway, connects the city of Ahmedabad with Gandhinagar, the capital of the state of Gujarat, India. This highway corridor is a dynamic commercial road that houses not only commercial complex but as well as, recreation, theatres, corporate parks and elite clubs of Ahmedabad like Karnavati and Rajpath. This **corridor is mix-used** development and hence very varied categories of users can be seen enjoying in this **modern cultured** urban space. At night the S.G. Highway is very ambient for **social gathering or chillout spot for youth** of Ahmedabad. During New Year's Eve or Navaratri nights, the highway is a party road.

The green zoned land parcel below the High-Tension Wire (HTW) on S.G. Highway is a **5KM stretch**. Cluttered spaces and divided activities lack a proper infrastructure that a city's outdoor **social space** should have. Also, the local vendors or street hawkers are encroaching vacant land and causes **green spaces** to disappear. Hence, all these results in decaying environmental conditions.

AutoCAD, Illustrator, Sketchup, Lumion, Photoshop

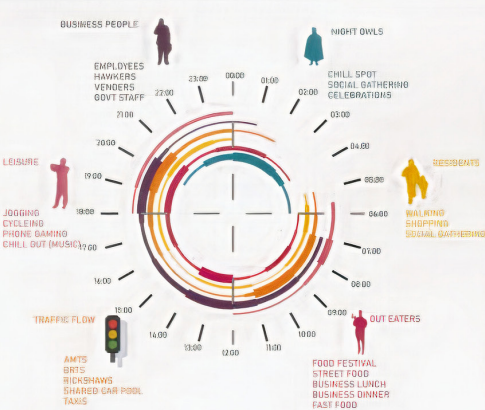


IDENTIFYING ISSUES ON SITE

1. Cluttered land parcel.
2. unsafe infrastructure for pedestrian commuters.
3. Encroachments on vacant lands by vendors, hawkers, slums, illegal parking.
4. Public utilities in worst conditions.
5. Unhygienic conditions in road-side cafes and shops. Unsafe positioning.
6. Water logging and decreased green space.



IDENTIFYING USER GROUPS

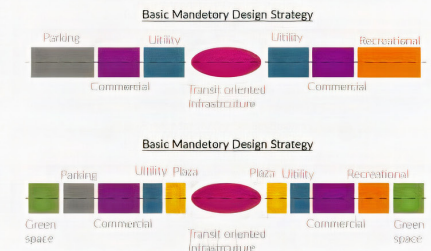


DEVISING THE STRATEGY

The strategy for land use distribution of entire stretch is formulated as per a standard node model.

At the node the first function is a buffer space, that allows pedestrians to have a break from vehicular traffic. A bus stop or a drop off is created along with plaza, to ensure safe access to public transport. Utility distribution is done adjacent to TOD, and plaza. Commercial activities, such as vending and street side cafes are arranged after the utilities.

Distribution of supporting functions are done based on immediate contextual needs and usage.



CONTEXTUAL ANALYSIS



MAPPING USAGE OF SPACES



REDISTRIBUTION OF ACTIVITIES





SITE STUDY (PART PLAN)



STRTERGY FOR PLANNING (PART PLAN)



DESIGN OUTCOME (PART PLAN)



Pedestrian access and safety

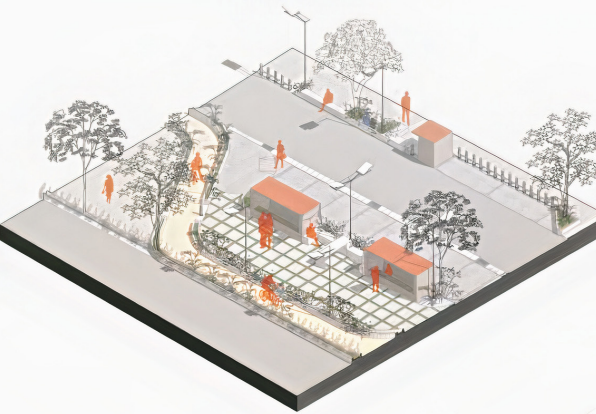
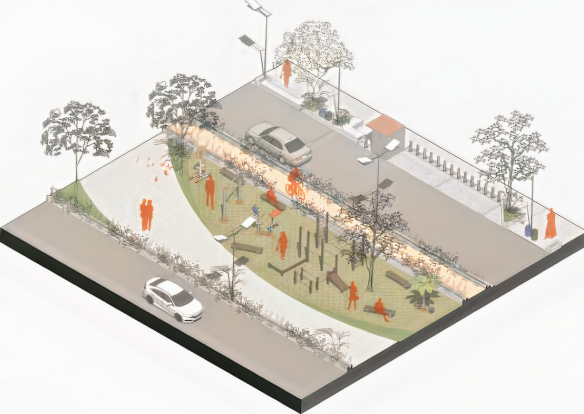
Parking

Open park Gym

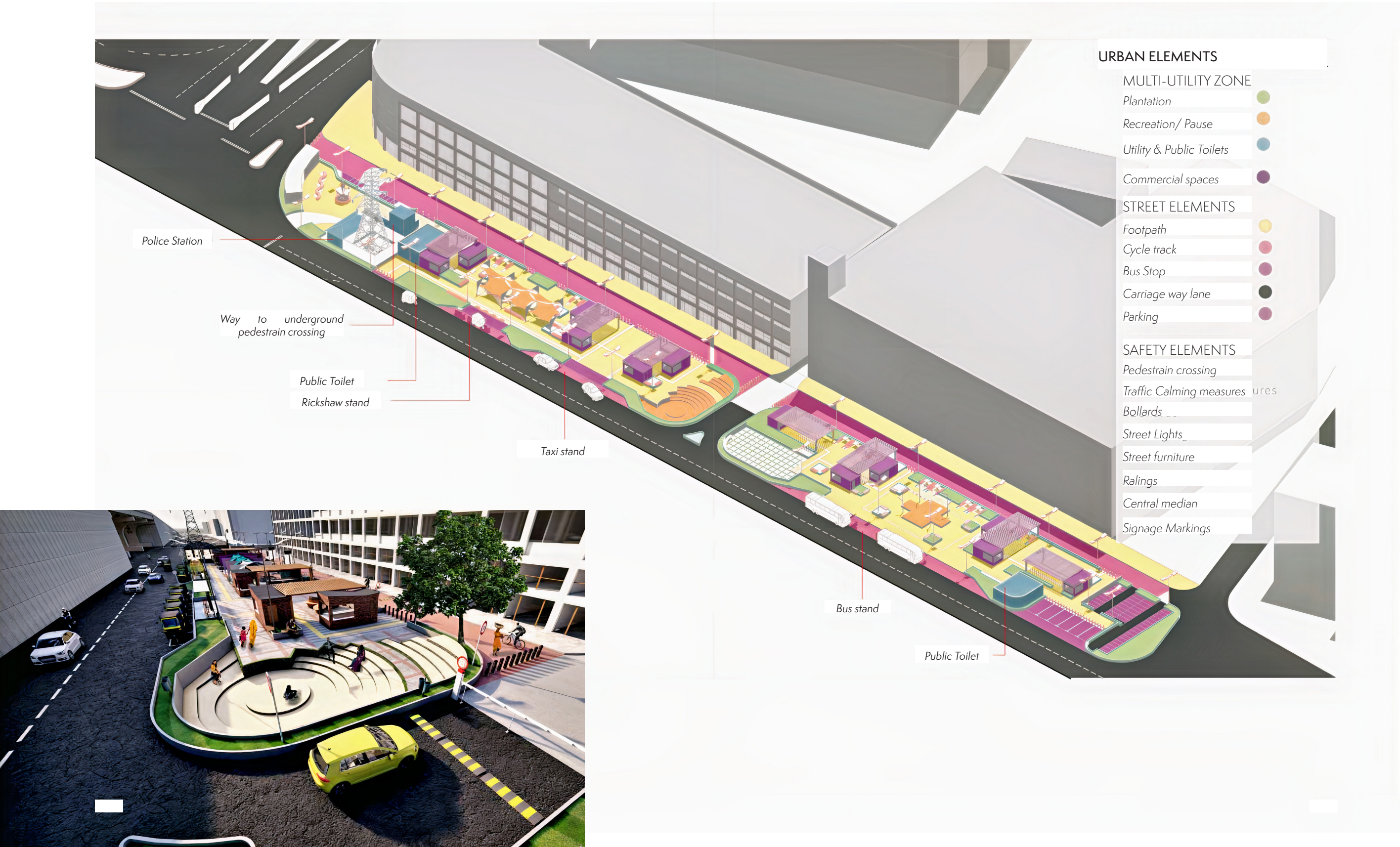
Children's play area

Food Truck

Utility Stores











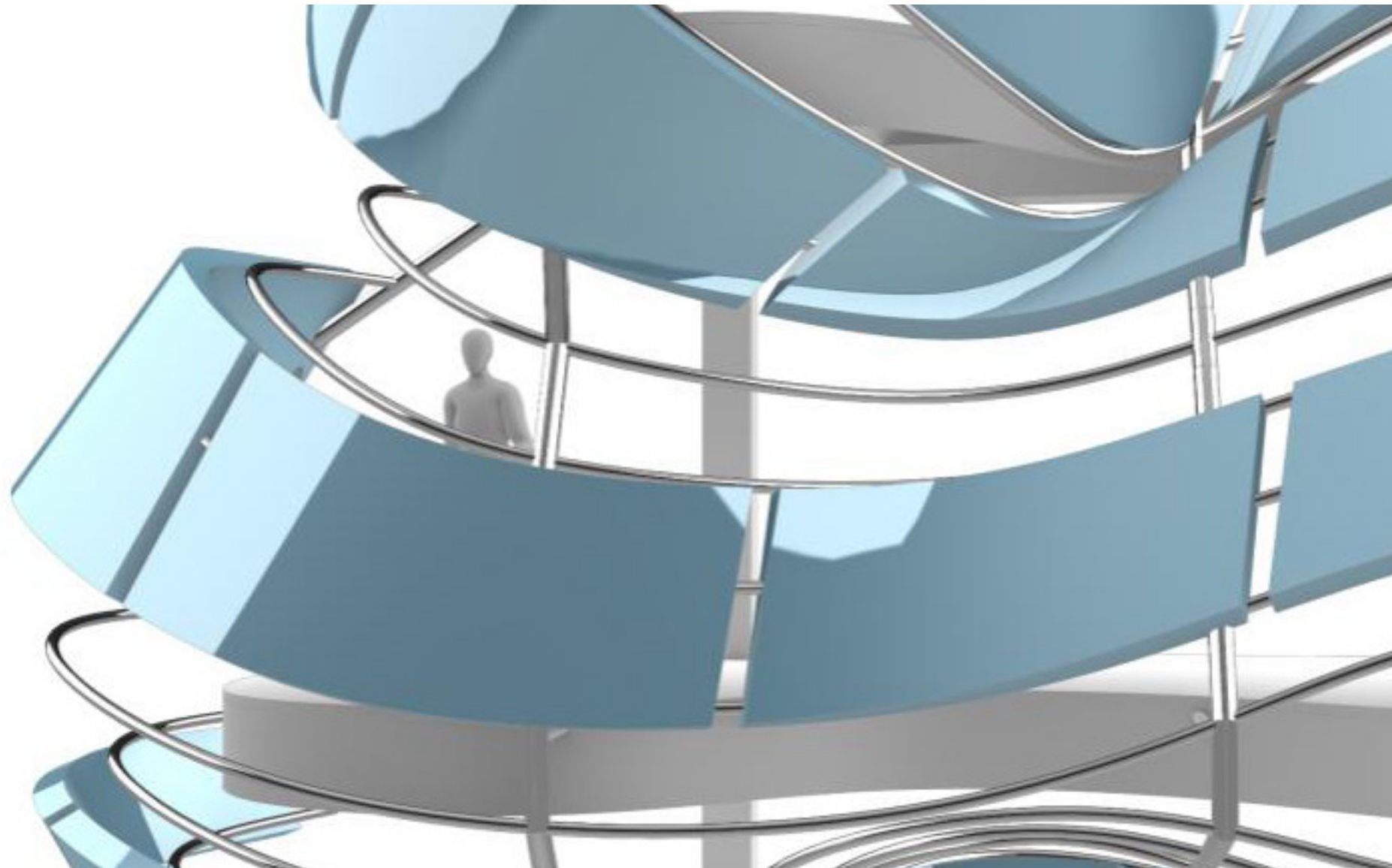
## CLAY WAVE

AUGMENTATED FABRICATION

*Team: Eric Zhou, Chen-Yeh Wang, Freeland Livingston*

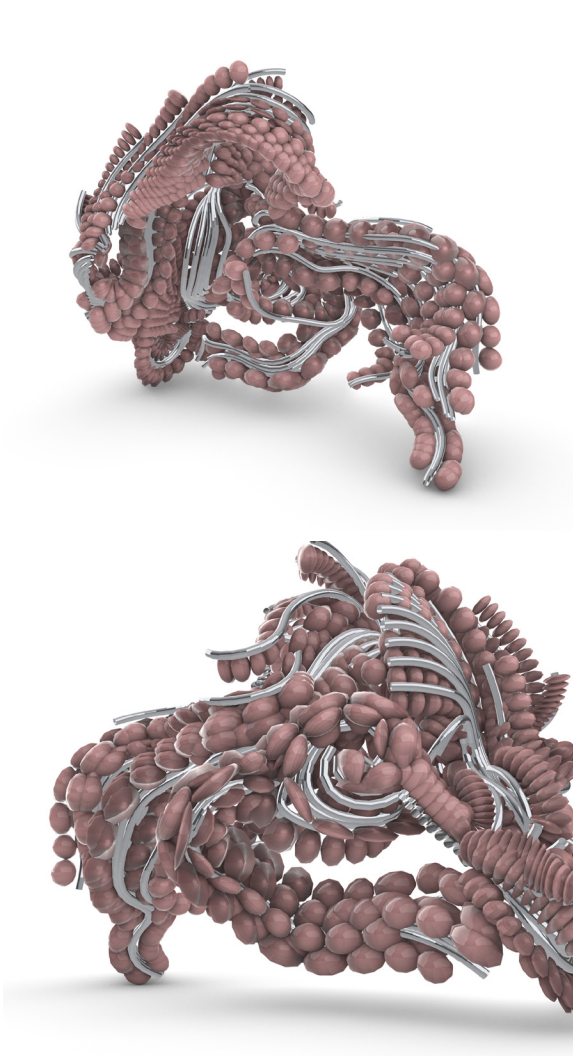
**BRIEF:** This seminar, focuses on building a steel structure using **Augmented Reality fabrication** techniques. The brief is to design a **furniture/architectural elements** using **generative design methodology** and built into 1:1 scale using steel rods and bars (other materials such as steam bent wood can be proposed optionally). Steel bending machines, metal shop, welding machines are heavily used as main fabrication tools. **Hololens** is used as the main AR device. **Unity** is used to develop custom AR application. **Rhino and Fologram** is used for AR construction.

**CONCEPT:** Our Team has selected the combination of **Steel and ceramics** as main materials, to create a geometry that can serve a purpose of a **facade**. The designs are generated using Grasshopper Nursery plugins. The parallel sets of 3 dimensional curves in the space makes the **structural skin** of the facade. Covering it occasionally with the custom shaped clay tile, that follows the natural curve of the structural rods. The play of solid and void creates the shapes of the **ceramic ribbons** and taking the overall shape of a **wave**. The structure combines, the **AR aided workflow** to achieve complicated geometry, while also bringing in the **quality of craftsmanship in moulding the clay tiles** with dexterity.



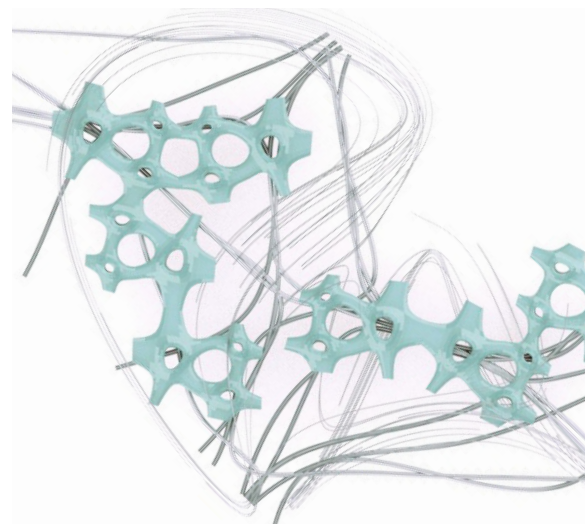
■ Rhino, Grasshopper (Fologram), After Effects, Unity, Illustrator, Welding, Clay Moulding





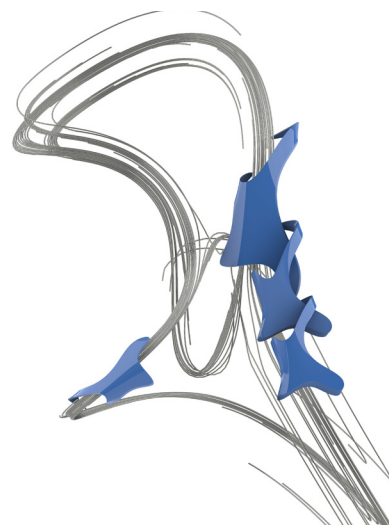
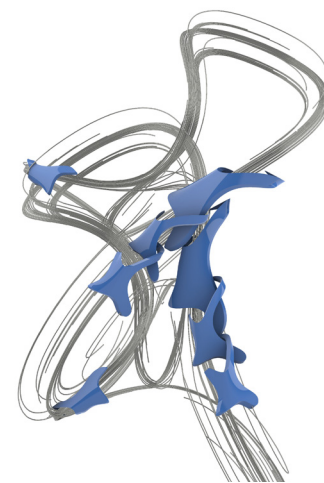
DI 01

Simple and identical ceramic objects aggregating all over the steel rod cures.



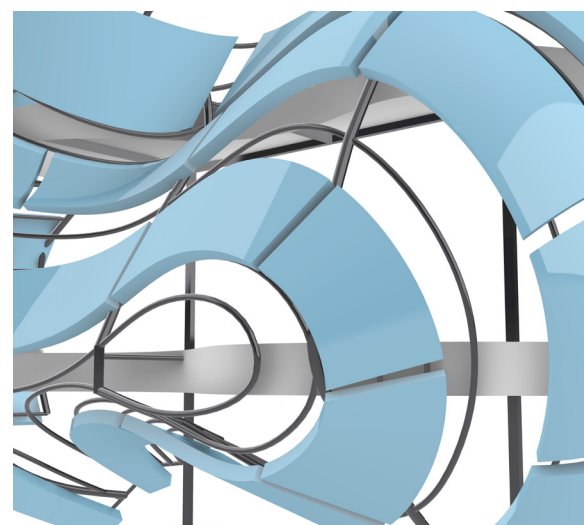
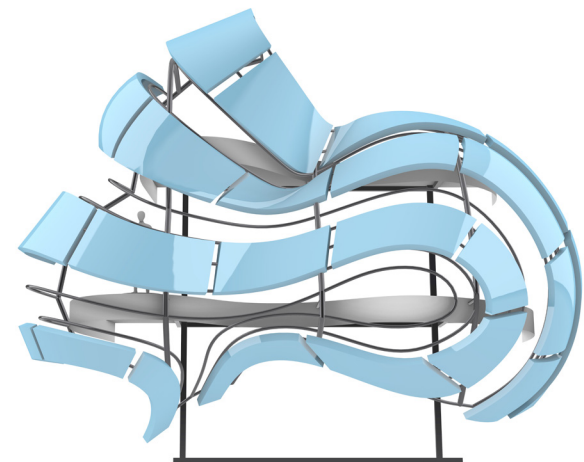
DI 02

This iteration has complex ceramic objects that can be casted using custom moulds that are 3D printed. The structure consists of 2 different rod sizes. the thicker pipes are structural and thinner ones acts as fins of the facade.



DI 03

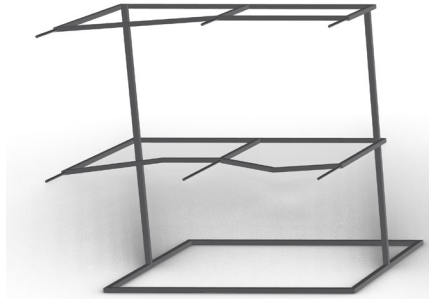
The structural rods are parallel to each other and is enclosed by different sizes of similar shaped shingles that overlap to form a continuous opaque surface.



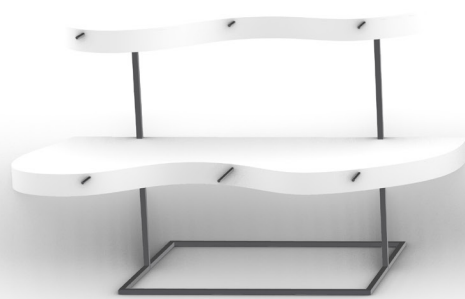
DI 04

The final iteration, consists of simple ceramic geometry but complex overall pattern, with all custom shaped pieces of clay tiles and rods.

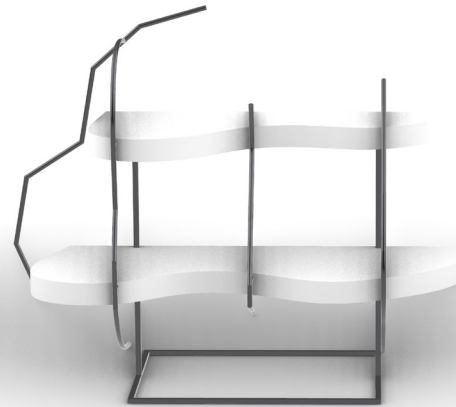




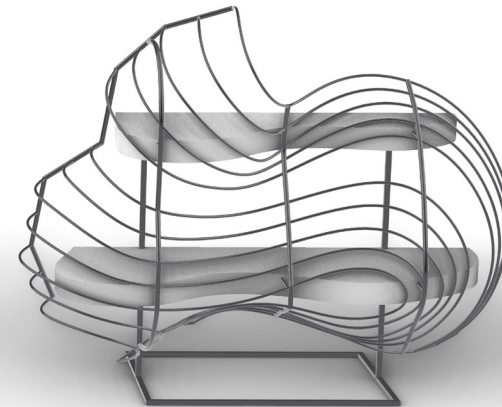
1.5" Square Metal tube  
Support structure



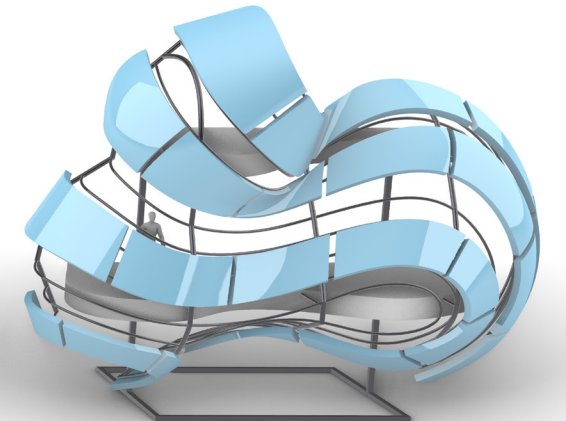
Form Slabs attached  
to support structure



4, 1" Round Tube, as vertical  
members, welded



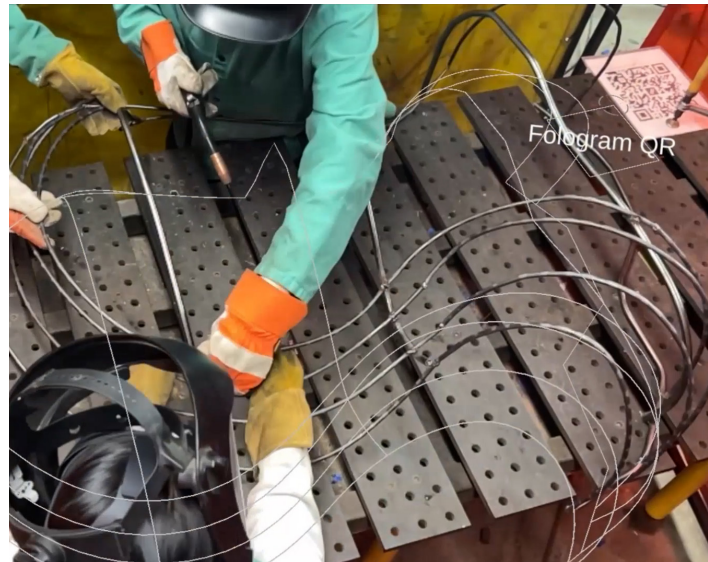
12, Metal Horizontal Rods,  
welded on vertical supports.



24, Clay pieces, welded on the  
horizontal rods with brackets.



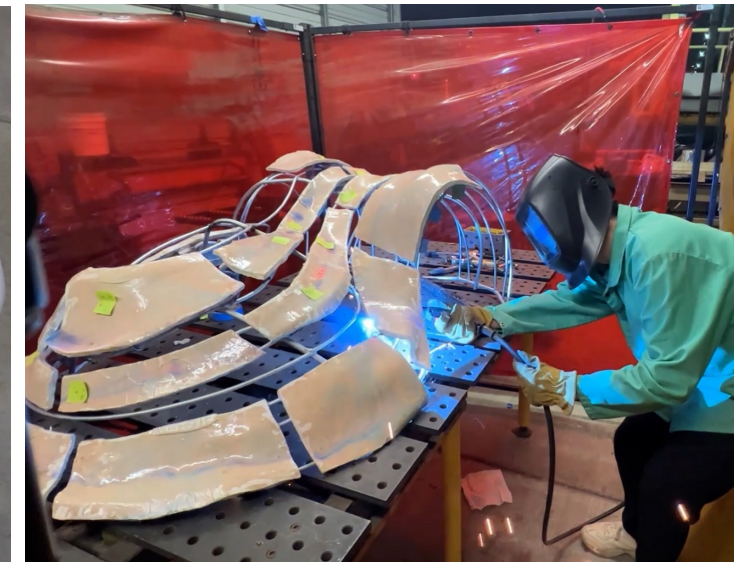
Bending Steel Rods



Welding the Steel cage



Moulding the Clay Tiles



Attaching the tiles with cage

With the combination of fologram and hololense, the tool is used to accurately bend the rods in the space, eventually tracing the digital 3d model with actual design elements.

The completely sculptural approach for making ceramics tiles adds the touch of hand-craft to the fabrication workflow that is digitally designed and AR aided.









## ARCHITECTURE FOR CLIMATE CHANGE

LIFESPAN

*Team(07): Emily D, Marbela F, Matthew H, Saumil U, Piyush P, Adam J*

**BRIEF:** LIFESPAN explores the topic of climate change by investigating the potential of design, technology, and **new materiality** in Architecture as a means of aiding the global fight against environmental warming and accelerating climate change. This course will evaluate design at the confluence of **sustainable materials (Biopolymers) and robotics** with an emphasis on emerging **fabrication techniques, synthetic ecology, and net zero Architecture**. This Applied Studies seminar combines and research the **Eco-technology** precedents and their manufacturing processes, followed by material design using **AI generated textures** created by 3D print toolpath patterns. Finally designing the **400Sq ft ADU unit** that uses the designed material as a main Building “superskin”, and prototyping elements integrating **Robotic toolpath printed by ABB IRB 6700 Robot** designed in Rhino grasshopper.

**SITE:** The proposed ADU unit is a pavilion designed to serve a short lifespan, in the **Burning Man** festival located in the middle of desert in **Black Rock city**. The idea that biopolymer applications are novel and new as an **architectural skin**, makes it a perfect material for further research and testing fabrication methods, eventually gaining expertise and finally **leaving no residue as biopolymer decomposes in the heat of desert**.

 Rhino, Grasshopper, After Effects



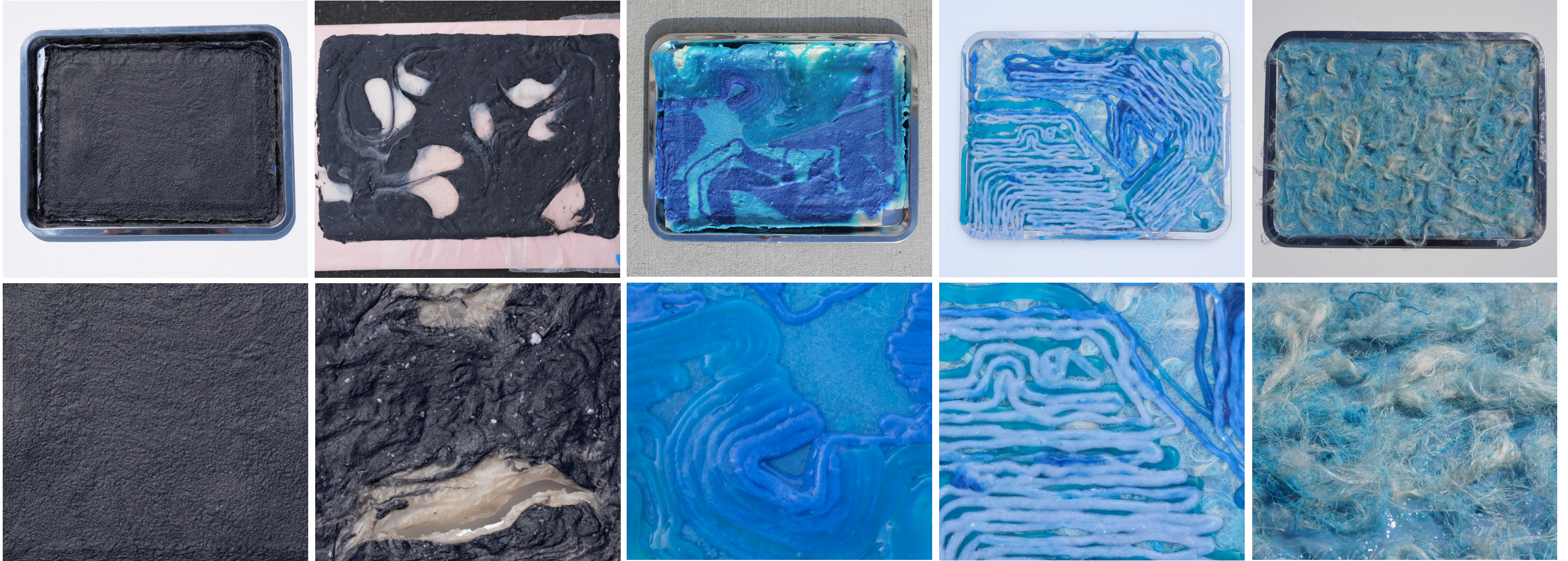
The Basic biopolymer recipe consists of 3 dry (potato starch, arrow root and zinc oxide) and 3 wet (water, vinegar and vegetable glycerine) ingredients. Natural colorants are added in calculated quantity to achieve desired color effects.



## Additives and texture tests







## Base Sheets

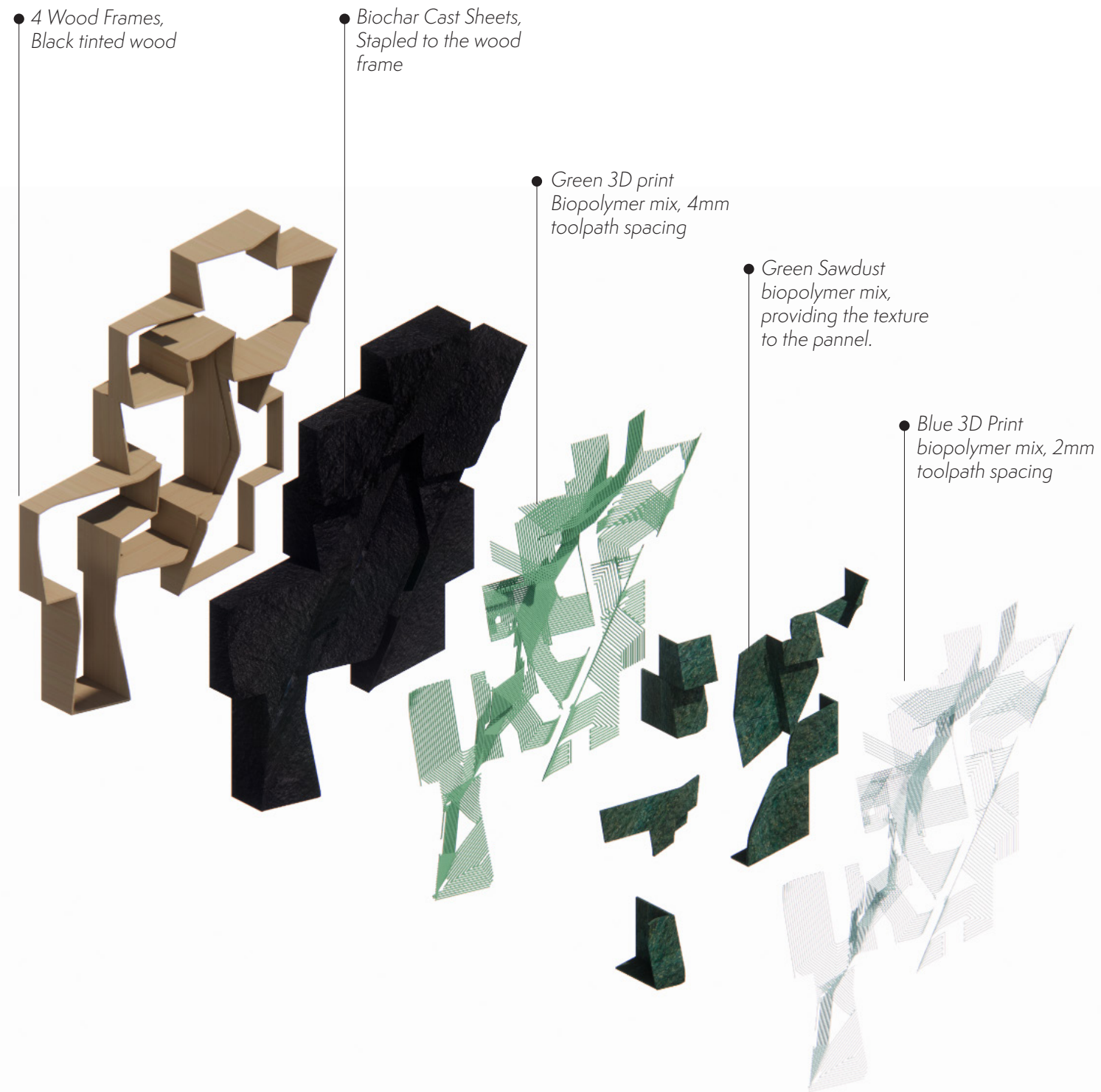
Base BioChar sheets has texture and appearance like Leather. The whole opaque black surface is added by clear biopolymer to let the light pass through.

## Texture Tests

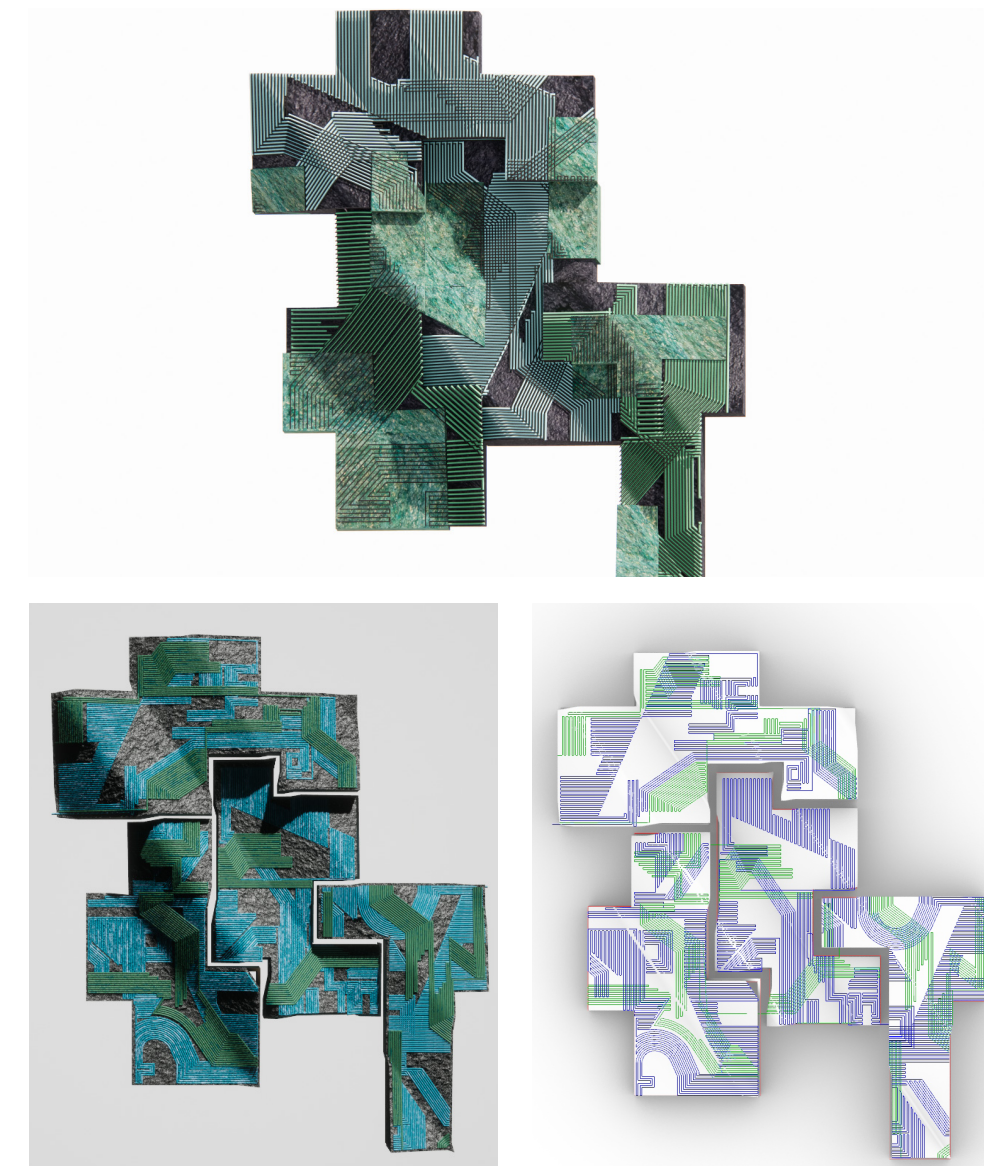
Testing different viscosities and toolpath offset to get controlled textures and effects on the surface to design the pannels with precise design intent of the surface finish.



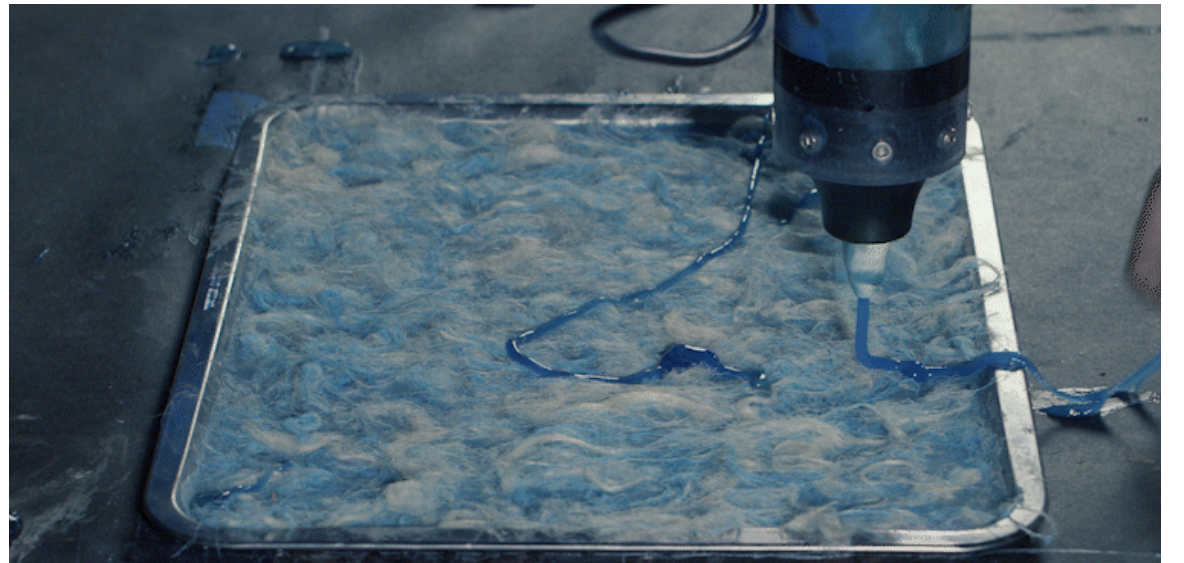
## Layers of the pannels



The Pannels are designed as it combines the robotic Biopolymer printing with the manual construction of the base of the pannels. The base involves, Casting biochar sheets and wooden frames to form rigid yet 3d embosse effect wall.











The final installation of biopolymer panels consists of 4 actual sized 24"x18" panels, proposed as an alternative way of building Burning Man Pavilions, that decomposes after its served its purpose.





