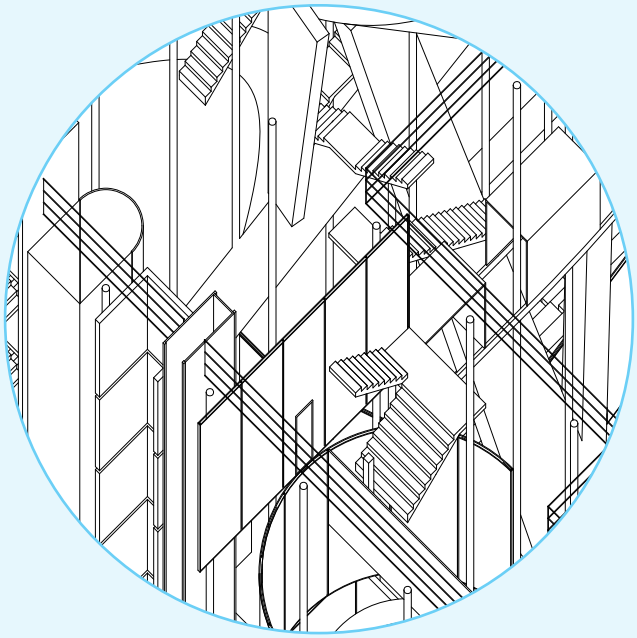


MSAAD PORTFOLIO

2023-2024 SELECTED WORK IN GSAPP

Xinying Liang

Contents

01

INHABITING THE RUINS OF EXTRACTION CAPITALISM THROUGH UNDERGROUND BREATHS

Recompositions and Geographies of Breath

FRESHKILLS Studio
Site: Freshkills, New York
Group work
Instructor: Nerea Calvillo
Collaborators: Andrea Yang
Contribution: 50% Drawing; 50% Analysis; 90% Animation
Summer 2023

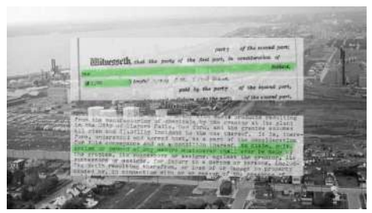
This project explores landfill transformation using methane extraction and production. Instead of following landfill-to-park strategies, it highlights methane's role as a signal just like the Golden Disc, reminiscing people to remember what has happened here during the landfill history in New York City, rather than concealing it and pretending that it never occurred. Through recommissioning the purification plant, we aim to keep the decomposition alive, and to fund the needed monitoring of water pollution in Love Canal, producing profits for justice. Occasionally, a trace amount of methane will be released into the air, signaling the underground activity: the fading breaths of microbes. This sporadic release of minimal methane serves as an indicator of the underground breaths.

LANDFILL GARBAGE
In 1948, the Fresh Kills landfill opened and received its first garbage scow from the city of New York, while Robert Mosses promised that it was only going to be 3 years of dumping. Instead, it just kept going…

LARGEST LANDFILL
By 1955, Fresh Kills was the largest landfill in the world, serving as the principal landfill for household garbage collected in New York City. By 1961, the City of New York announced that dumping at Fresh Kills would continue for 15 more years.

CLOSURE
After 50 years of empty promises from the city of New York, Fresh Kills finally closed in 2001.

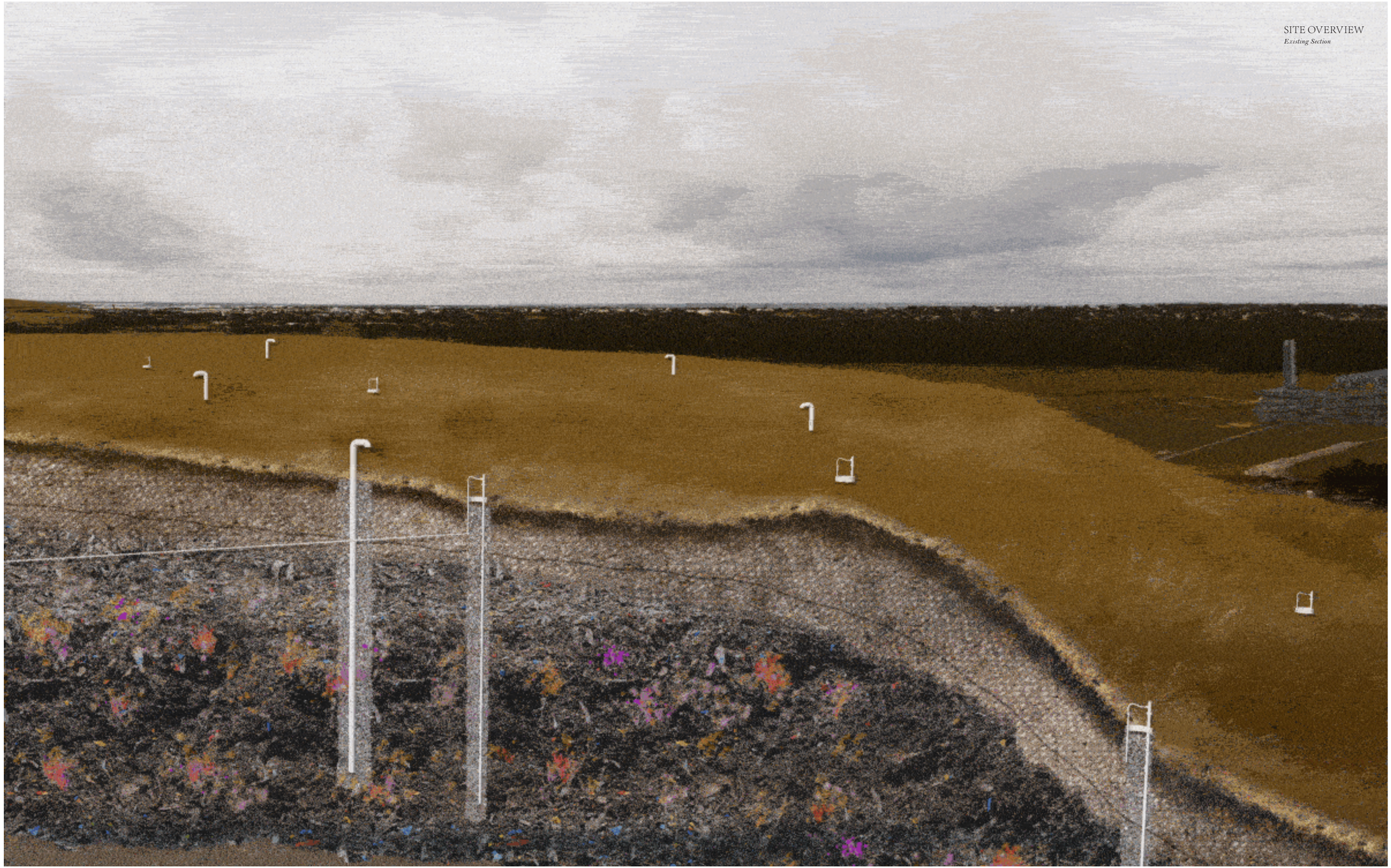
LOVE CANAL MAP
What happened to make the city of New York finally close this up? Or affect it?
We can't ignore the Love canal tragedy, in Niagara Falls, New York, about 400 miles away from Freshkills. Back in the 1950s, Love Canal was a toxic dump for chemical waste used by the Hooker Chemical Company, within 20 years, two schools and 900 homes were built on or near Love Canal. In the spring of 1978, a 27 year-old housewife named Lois Gibbs discovered that her 5-year-old son's elementary school was built on a toxic waste dump. People started noticing they are getting sick, kids played in the rain and got burned on the skin, miscarriage,etc… Later that year, she formed the Love Canal Homeowners Association.
Finally, in 1978 President Carter declared a state of emergency at Love Canal, making it the first human-caused environmental problematic site.
In 1980, the Superfund Act was signed into federal law, in the same year, DEC charged that fresh kills violate state environmental laws, Freshkills has become one of the superfund sites as well. Gibb's philosophy is that people are not apathetic, they just don't know what to do. She pointed out that 80 percent of environmental groups are led by women.She said : "It makes sense, when someone is trying to kill your kids."



CONTEXT COLLAGE

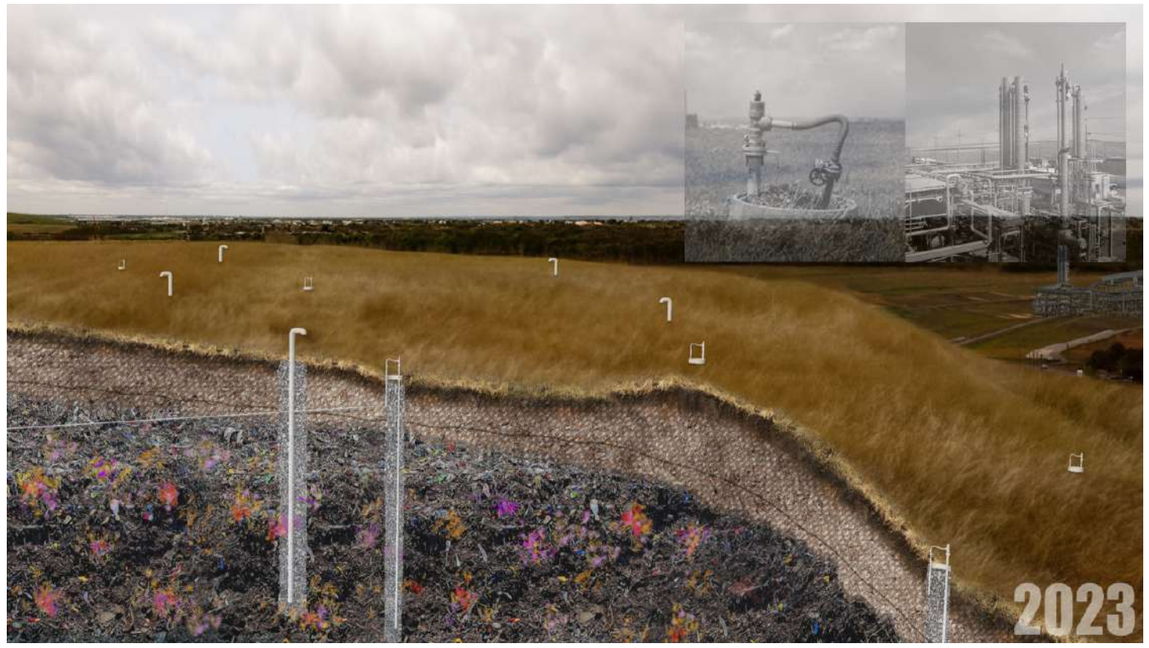
SITE OVERVIEW

Existing Section



After the government capped the landfill into parks, without letting people know what's in there. By the time they found out, the damage had already been done. The Love Canal isn't over, the current residents got sick again because of the unclear research stating it was safe, but the limit of harm exceeds the limit of the edge of the site.
Instead of relying on old technologies covering up again and again, prevention is key. Back at Freshkills, the amount of methane produced by the landfill has decreased over time, DSNY is planning to decommission all the above ground infrastructure soon.

CALCULATION
1.5 million cubic feet of methane has been collected per day in Freshkills. In prediction, it' ll produce 978 MILLION ft3 per day in the next 100~1000 years, till the concentration of methane in landfill gas decreased to the threshold of 1000 Btu/ft3 to ensure the economical viability. The minimal density of methane that can be sensed by Methane Satellite is 0.003ppm, which is far below the safety level of 1000 ppm.



Through Recommission, we keep the decomposition alive for future warning signals and profits for justice. Instead of following the path of covering up, we explore what it means to recompose by looking into the ecologies of waste. After being produced by the archaea through decomposing the waste. Methane BREATHS through the pipes, then it FLARES - turns into Carbon Dioxide, water and heat. Some of them get purified and turned into natural gas, gaining profit.Even though we can't see Methane directly, it could be captured through an infrared camera, even from space. (point at Satellite)

To prevent future harm, by making the invisible, visible. Starting with keeping the existing infrastructures and collaborating with the invisible methane. So, what if we could see it ... Differently? Through the infrared wearable and cameras···

We could see methane breathing through the existing infrastructures, and the footage could be saved as archives, as the first chapter of our golden disc. The attendees could help generate this important data while the admission cost would go towards future research for the superfund sites.
Then, what else could we recompose with Methane? Through these inflatables that are attached to the infrastructures, they become a new landscape.

To achieve this, we will be working with the park volunteers and institutions to collect trash bags, welding them into bigger pieces and finally, connecting them to the goosenecks. This process might take years, but we get to see and feel the space that we co-produce with methane, by methane.

Framing out the landfill areas is to keep the history but also work as a warning sign for the future.

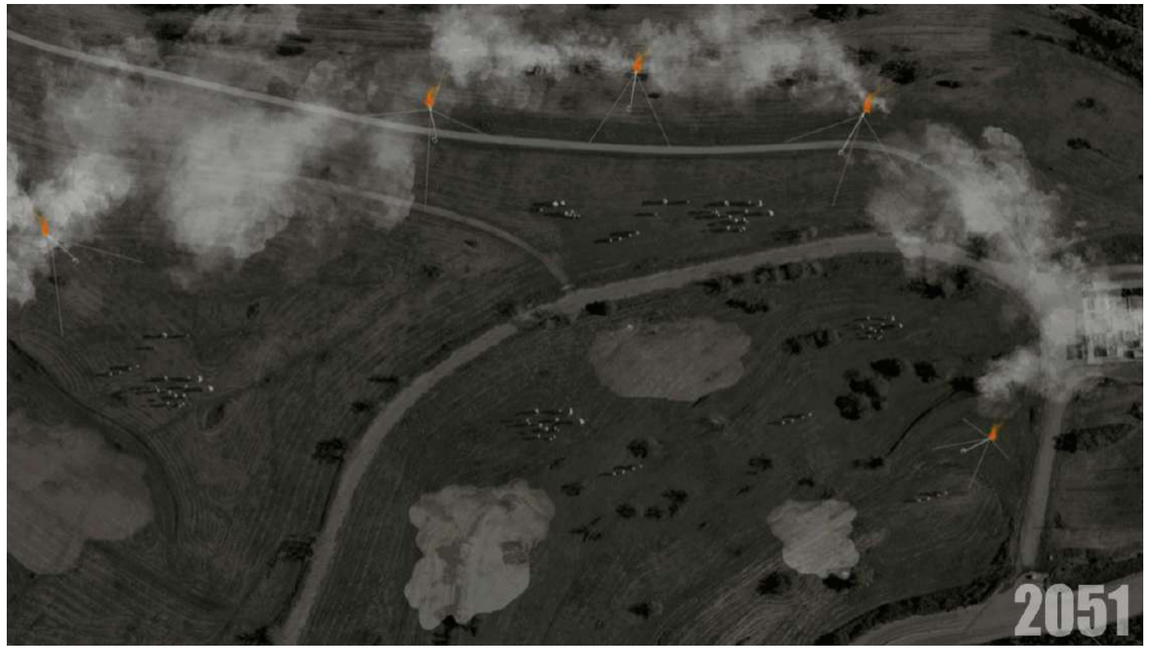
The portable flare stacks are connected to the wellheads, marking the perimeter of the mound.

Every year, we flare at the fire ceremony to celebrate the transition and the microbes living under.

To signal the transition of recommissioning, to heal, not to forget but to let go of the past, and step into the future.

This might be one of the few empty lands in Staten island.

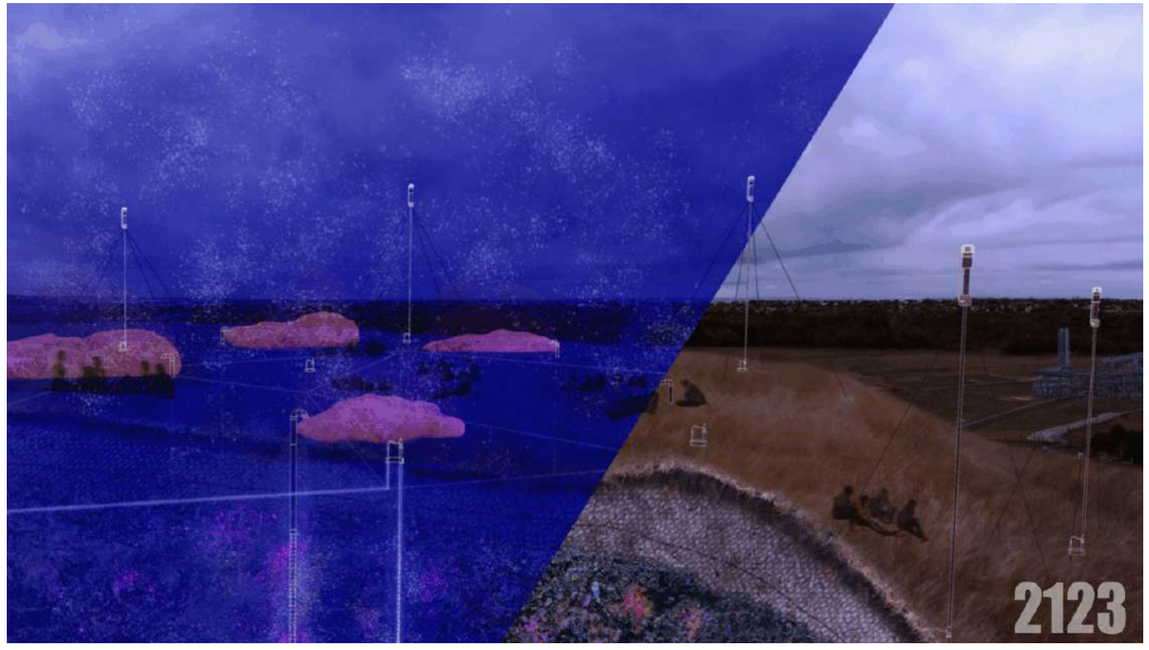
The landfill once harmed the land and people, but also because it was a landfill, there won’t be any permanent structures allowed over the freshkills.



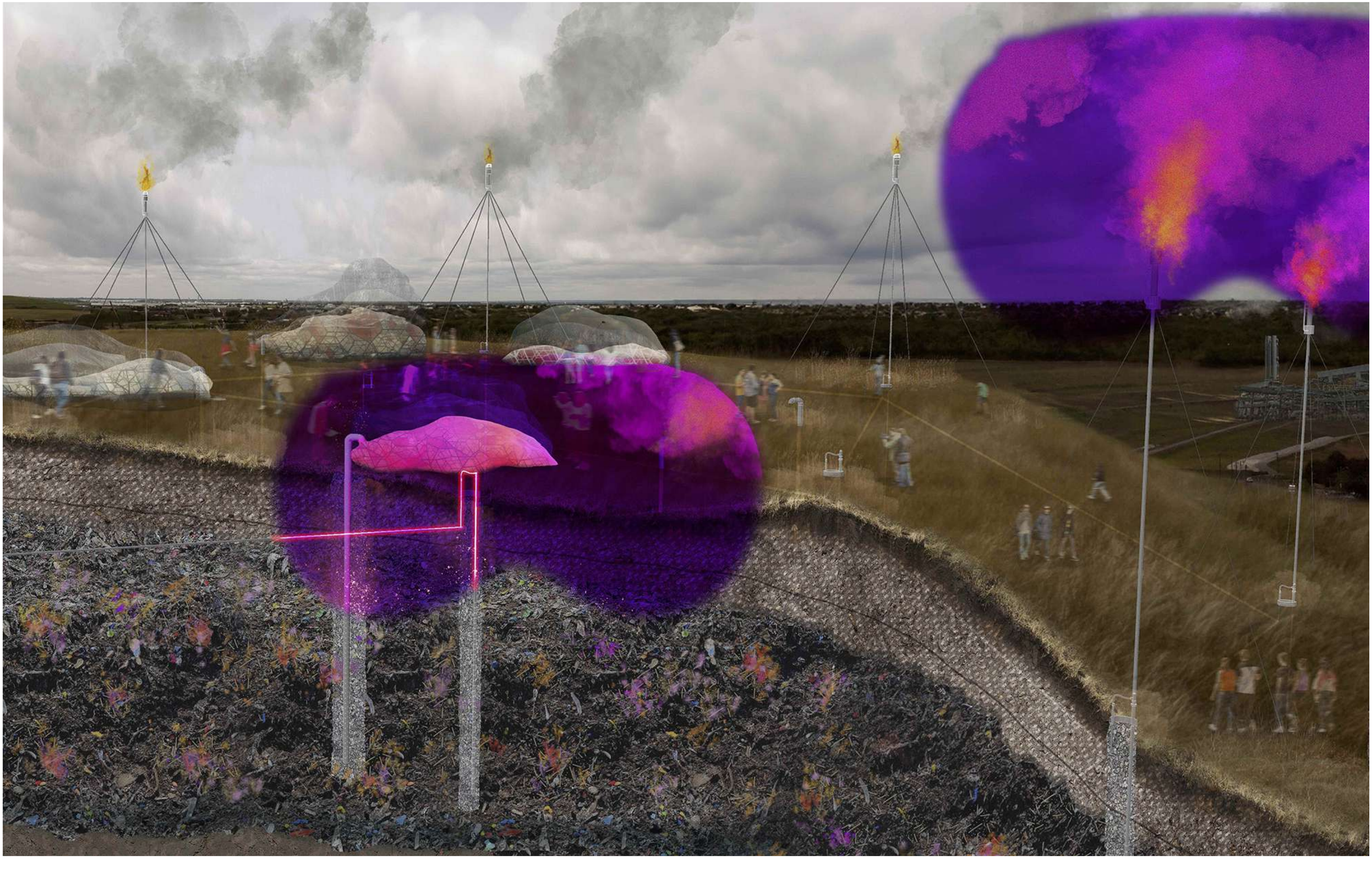
The infrastructure remains as the warning sign, and the collected footage throughout the years also keeps as a reminder of what was breathing here, will always be remembered.

Carbon Dioxide, other organic compounds and small amounts of methane will also be seen from satellites.

Time will pass, but subtle breaths coming from the underground won’t stop.



A hundred year after-
The inflatables had already broken that could no longer hold the shape, they are still attached, moving with the air.



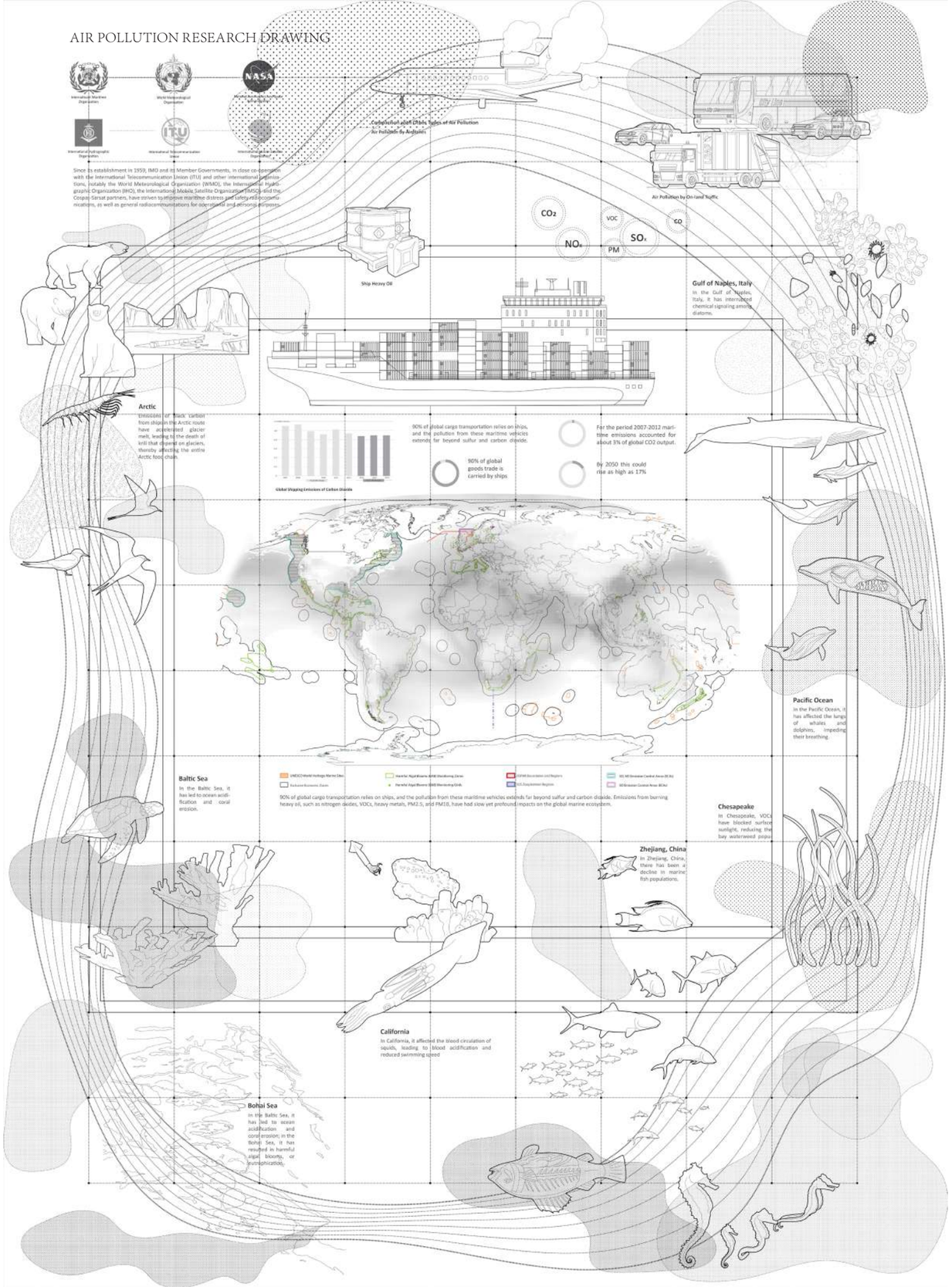
02

Arctic Bridge

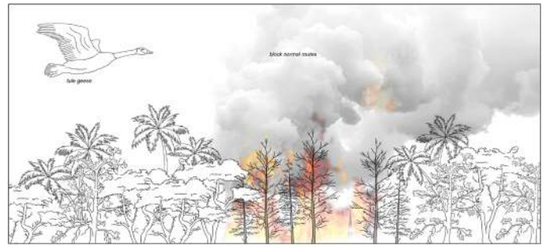
Mega-Structure as an Ice Link Guarding the Inuit Hunting Trails

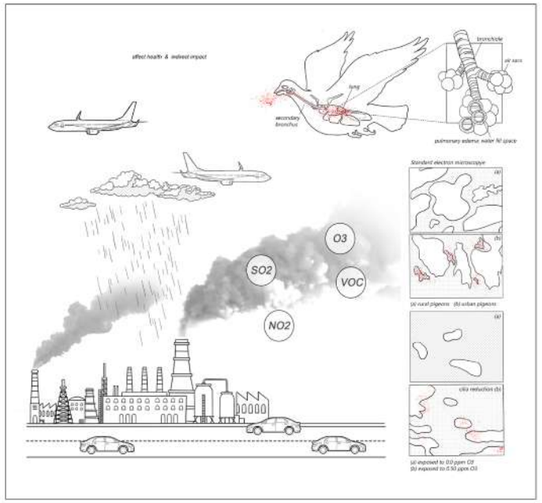
PLEIN AIR Studio
Site: Barrow Strait, Nunavut
Group work
Instructor: Nahyun Hwang
Collaborators: Yilin Huang
Contribution: 50% Drawing; 70% Anylsis
Fall 2023

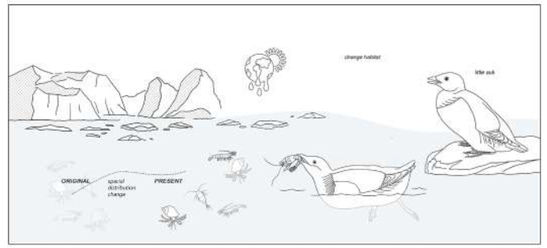
Our topics focus on the intersection of ship emission, air pollution in arctic area, and their impact on seabirds, such as arctic tern. The research starts with the global impact of on air pollution caused by ship emission. Shipping emissions and icebreakers indirectly or directly damage the Arctic ice and accelerate the melting of the ice, which changes the hunting trails that the Inuit have inherited for hundreds of years. For the proposal, we imagine a floating island as breeding platforms for arctic tern, simoutaneously serving as a connection between Inuit permanent and their hunting areas across the sea, and also a blockage in terms of fishing vessels or other ships passing through the Arctic, especially in Inuit homeland: Modular platforms of different functions provide an extension of breeding space of the Arctic Tern and other migratory birds, which can not only combined as a whole one to block the vessels but also can be split, so that the ship can pass through when it gets permission of Inuit people.

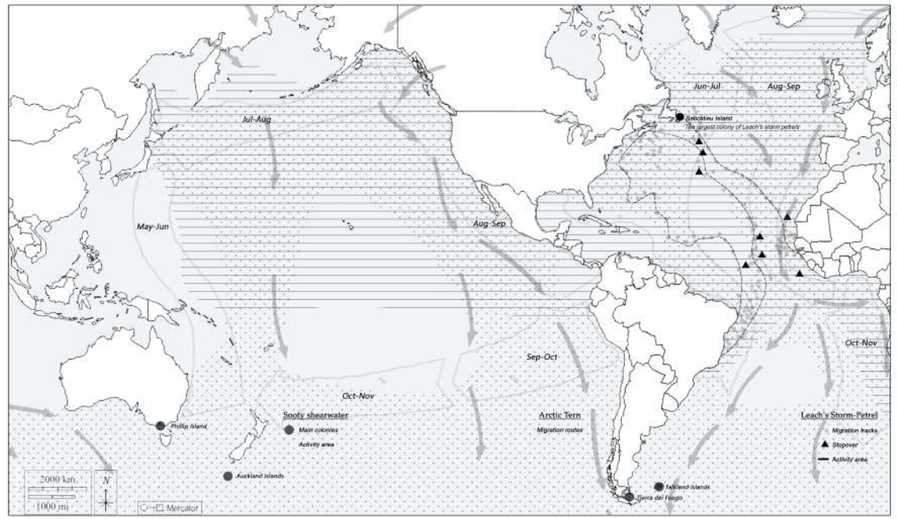


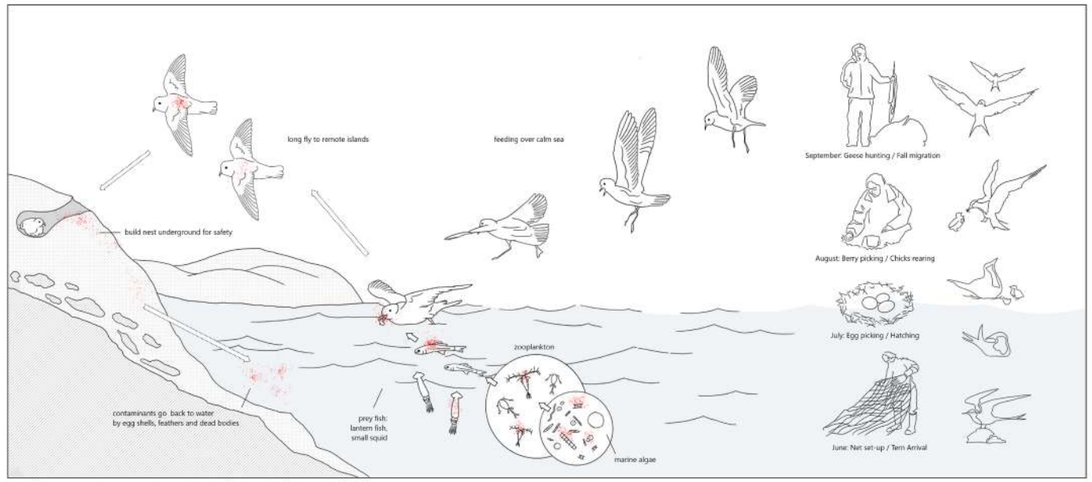
ORNITHOLOGY RESEARCH DRAWING





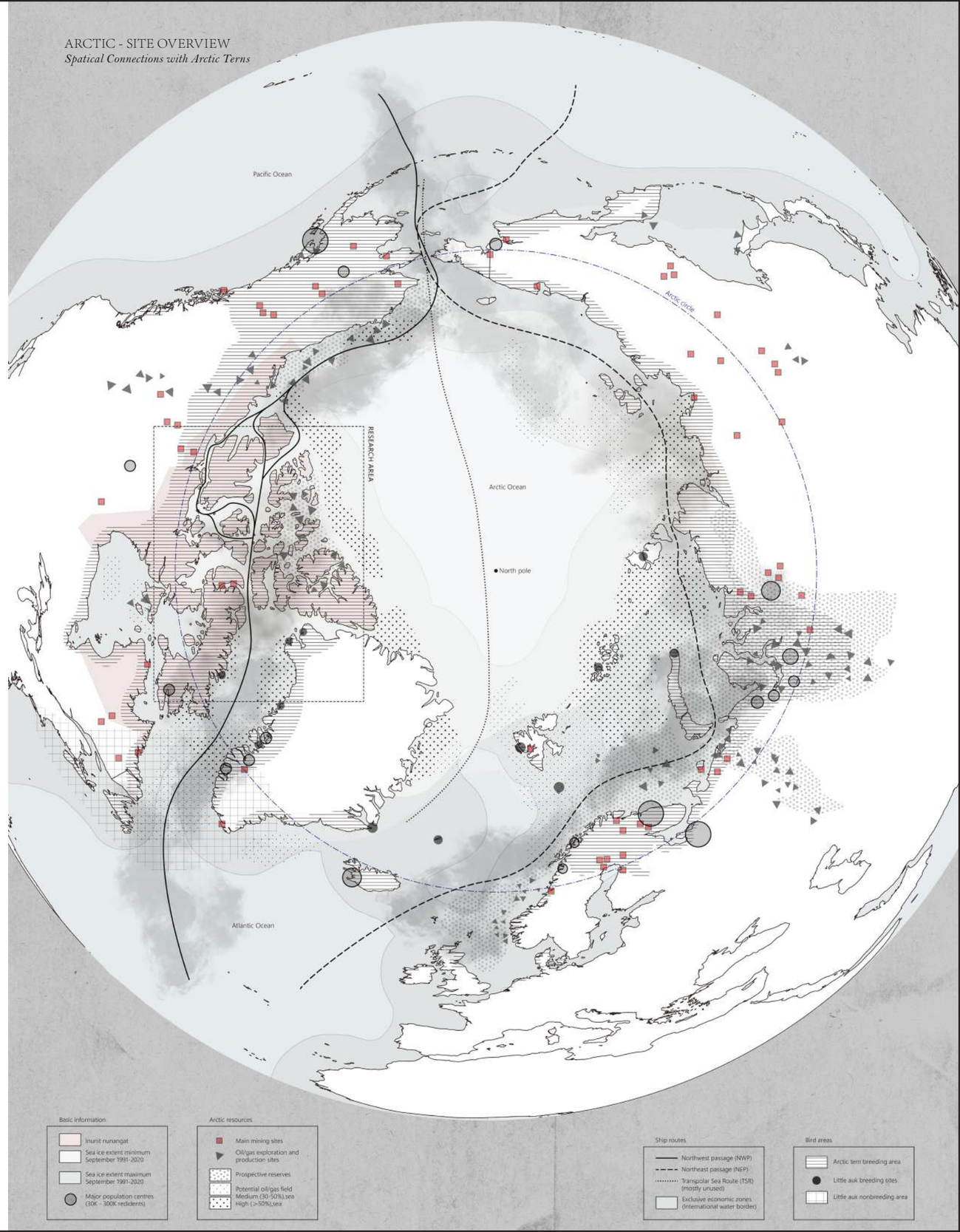


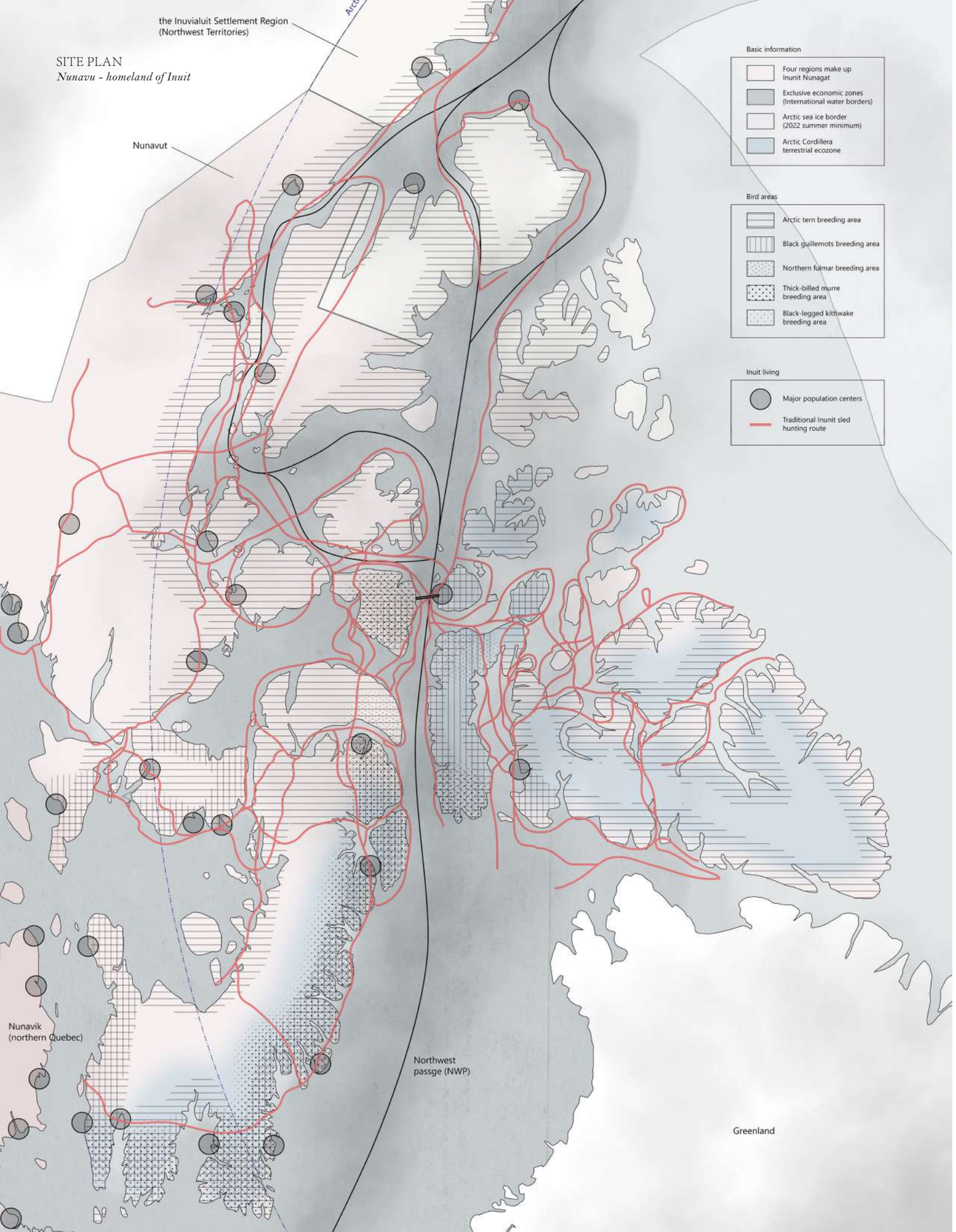


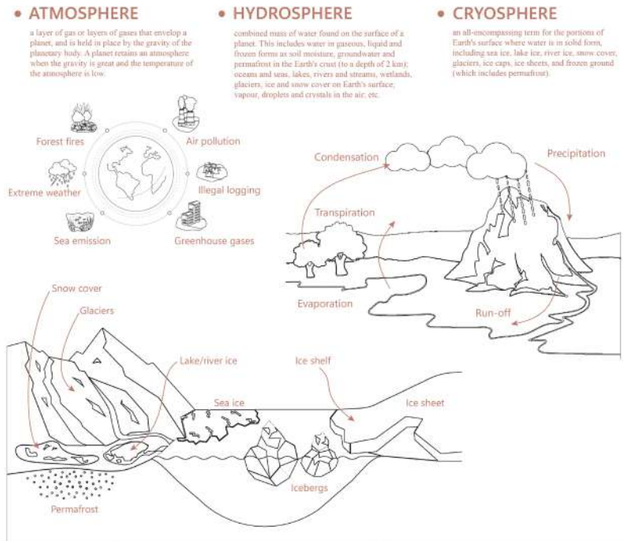


ARCTIC - SITE OVERVIEW

Spatical Connections with Arctic Terns







Our group project focus on the intersection of ship emission, air pollution in arctic area, and their impact on seabirds, such as arctic tern.

The research starts with the global impact of on air pollution caused by ship emission.

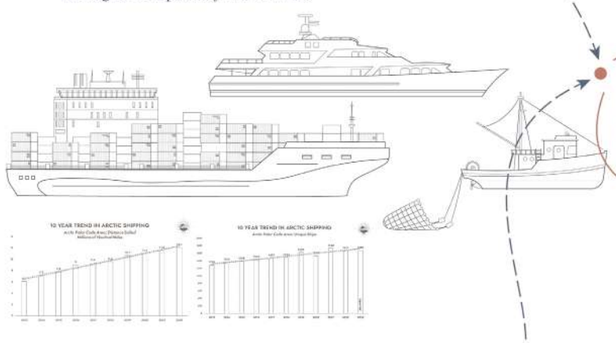
90% of global cargo transportation relies on ships, and the pollution from these maritime vehicles extends far beyond sulfur and carbon dioxide. Emissions from burning heavy oil, such as nitrogen oxides, VOCs, heavy metals, PM2.5, and PM10, have had slow yet profound impacts on the global marine ecosystem. Emissions of black carbon from ships in the Arctic route have accelerated glacier melt, leading to the death of krill that depend on glaciers, thereby affecting the entire Arctic food chain.

For the purpose of researching the impact of ship emissions on non-human and ecosystems, we chosebirds as our focus.

Nunavut, a vast territory in the far North of Canada, stands as a test to human resilience. Here, the Arctic climate shapes every aspect of life. Winter temperatures plunge below freezing, and the summer offers a brief respite where the midnight sun turns night into day. This land of extremes challenges the Inuit, but also binds them intimately to the rhythms of nature. Sea ice is crucial to the Inuit community, since it acts as a freeway for them to swiftly travel by dog sled to any part of Nunavut for hunting. It's an extension of the land since most of the Arctic archipelago floats on the ocean. In winter, it solidifies into ice; without it, the area would turn into open water, obstructing their routes while pursuing prey like polar bears and seals by dog slesd or snowmobiles.

MANAGE AND CONTROL

Set up the project at necessary points of NWP, coordinating with relevant checking procedures and regulations possibly in the future.

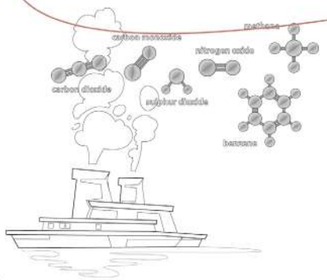


SHIP EMISSION

For 10 years the number of ships sailing in the Arctic has been increasing , and by 2022 the distance sailed in arctic polar code area was up to 12.1 millions of nautical miles.

MAJOR AIR POLLUTANTS SOx,NOx,VOC

: particulate matter (often referred to as particle pollution) that can harm human health, harm the environment, and cause property damage.

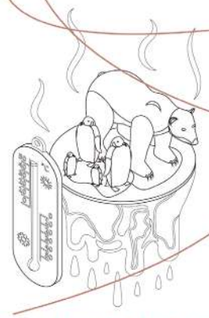


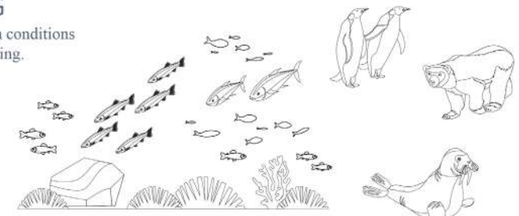
AIR MONITORING

Reflect and indicate pollution conditions through real-time air monitoring.

ACIDIFICATION POLLUTION

Acid rain is formed high up in the atmosphere when SO2 and NO2 combine with water and sunlight.



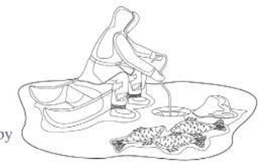


MARINE LIFE BEING HARMED

When airborne carbon dioxide (CO2) and sulfur dioxide (SO2) is absorbed by seawater, it causes chemical reactions that reduce seawater pH and may affect many marine organisms.

INDIRECTLY DECRESE

Reduce the necessity for fishing vessels and cruise ships to pass through the Arctic region by promoting traditional fishing and tourism.



Black Carbon and CO2

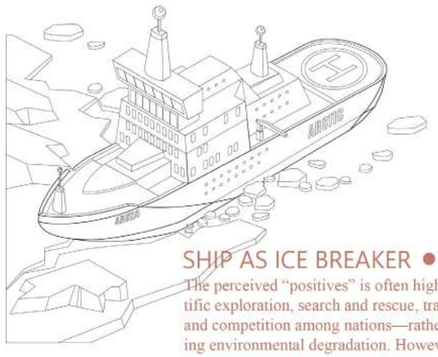
: The sooty black material emitted from gas and diesel engines, coal-fired power plants, and other sources that burn fossil fuel.

BIRD LIVING

the cilia in the lungs responsible for air filtration being affected and thus causing difficulty breathing or respiratory dysfunction

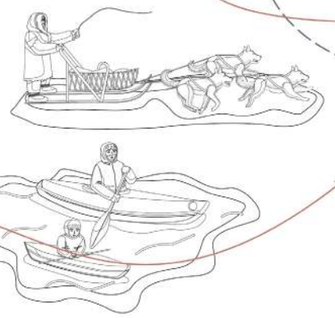
TEMPERATURE RISING

In recent decades, the warming in the Arctic has been much faster than in the rest of the world, a phenomenon known as Arctic amplification.



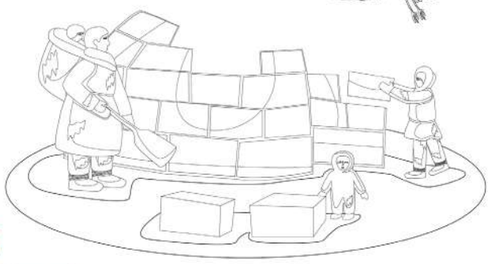
CONNECT

Use megastructure to connect both lands, compensate for the damage and melting of sea ice.



AIR PURIFYING

Clean up of air pollutants and mitigate emission impacts through different chemical and biological means.

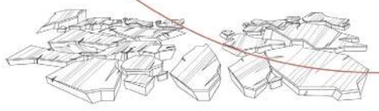


SHIP AS ICE BREAKER

The perceived "positives" is often highlighted—scientific exploration, search and rescue, trade and shipping, and competition among nations—rather than considering environmental degradation. However, any amount of ice breaking harms the environment.

ICE MELTING

As the broken ice melts, sunlight is absorbed, leading to increased temperatures, and thus more ice melting.



HUMAN LIVING

Inuit people rely on ice as hunting highway and surface of fresh water resource. Also, they rely on birds as indicators of weather and seasons.

MATERIAL MODEL

Arctic Terns and Arctic Ice

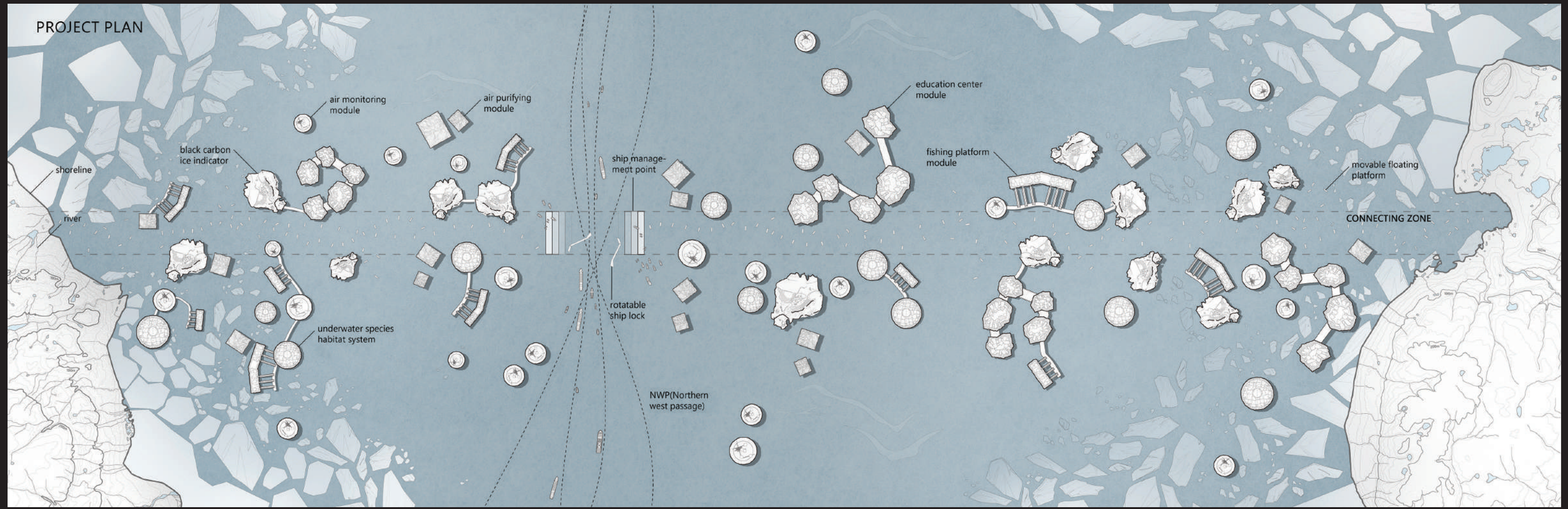
On the existing ship route, named the Northwest Passage, the depth of the water is a crucial factor. Except for this route, which has about 180 meters depth, other paths are not deep enough for a ship's draft. This route conveniently crosses through the traditional hunting trails of the Inuit people (indicated by these pink lines). Besides the black carbon and carbon dioxide released by ship emissions, which accelerate the melting of ice, the passage of icebreakers also directly damages the sea ice crucial to the Inuit.

For the Inuit, the source of food is extremely linked to fishing and hunting—indicating their deep connection with the land and sea.

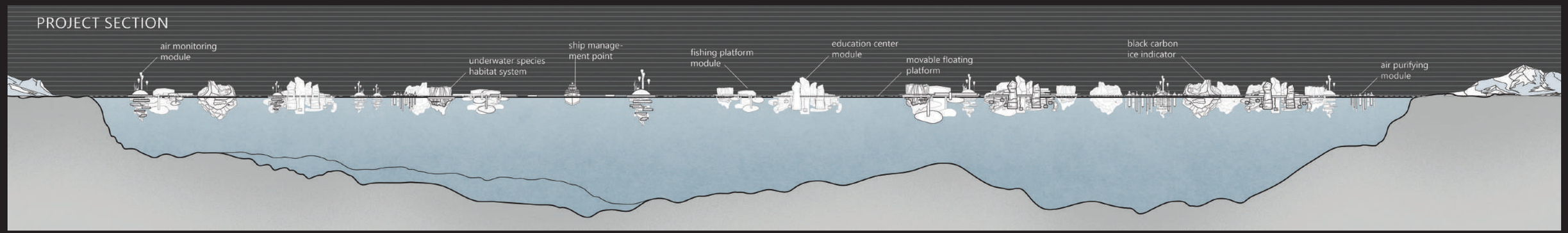
The ice and snow are not barriers but the very mediums through which life is sustained. In the realm of ice and snow, the Arctic sea ice extends like a free highway, a platform over which the Inuit have navigated for centuries. These ice fields, which swell and recede with the seasons, are the routes for hunting, the paths for community connection, and the ways of life that have persisted for generations.

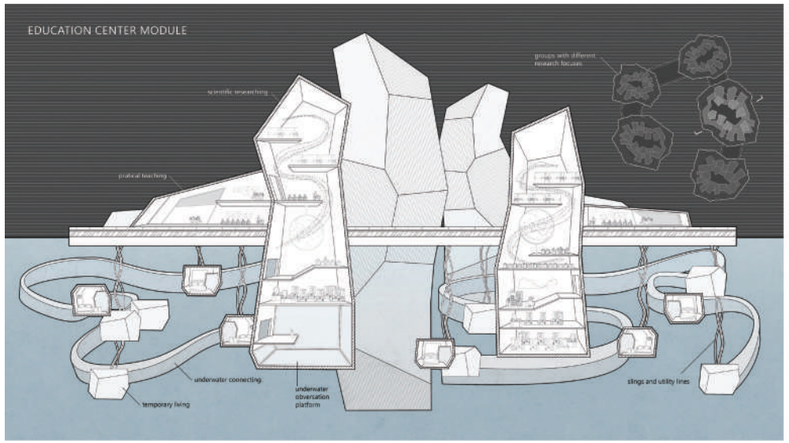
The ice evolves with the seasons: in winter, it forms a thick crust, strong enough to support the weight of snowmobiles and sledges. It' s during these months that the Inuit traverse the ice, in tune with the frozen rhythm of the Arctic. Their language weaves a rich lexicon of ice, terms that maybe have no direct translation in English, each word is a reflection of experience, safety, and survival. Their detailed classification encompasses the thickness, strength, and the complex forms ice takes, from the shores to the open sea.

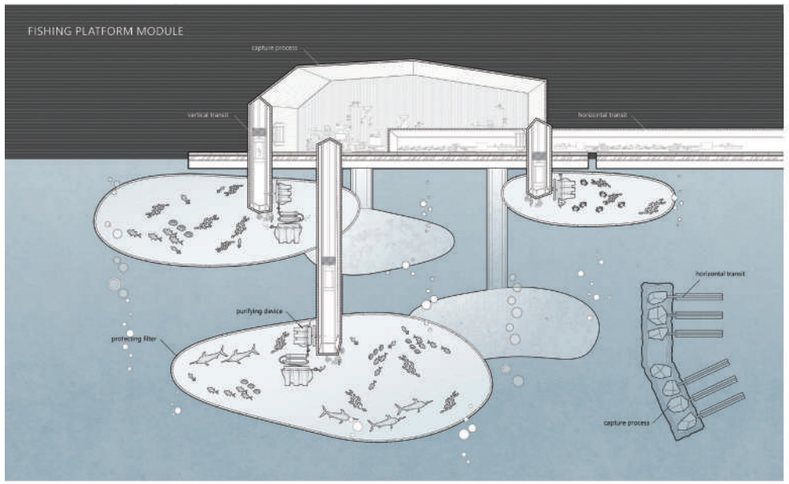
Because the main pollutant of ship emissions is black carbon, which accelerates the melting of ice, we take black carbon as an indicator of ice. When the black carbon increases, the snow and ice on this glacier will decrease; conversely, when black carbon decreases, the snow on the glacier will increase.

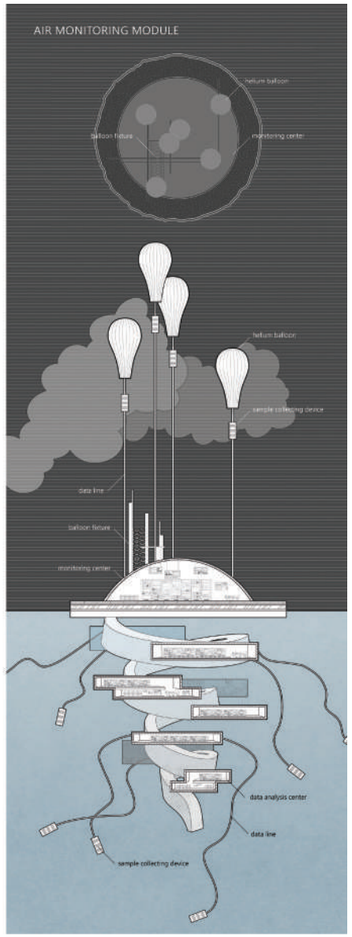


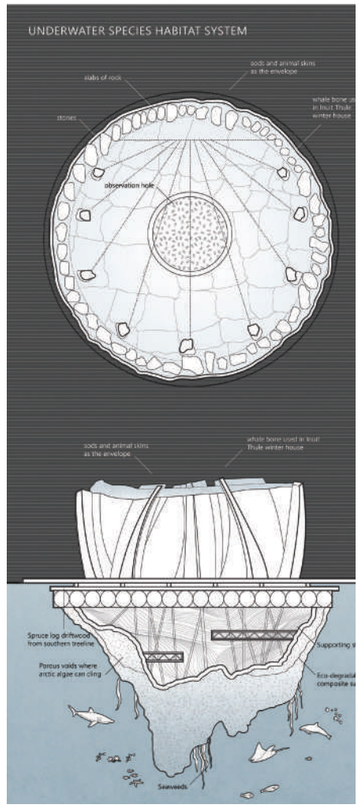
For the underwater species habitats, considering the close connection between Inuit people and marine life, we have chosen Inuit local materials to construct this module, such as traditional whale bones which are used for their winter houses. Underwater, it's a biodegradable substrate material, and algae can attach to the mountains at the bottom, just like the ecosystem in the Arctic. Despite the extreme climate conditions which make it seem like no life could survive here, there are actually large patches of ice algae attached under the sea ice, serving as primary consumers and providing primary productivity for the Arctic marine ecosystem.

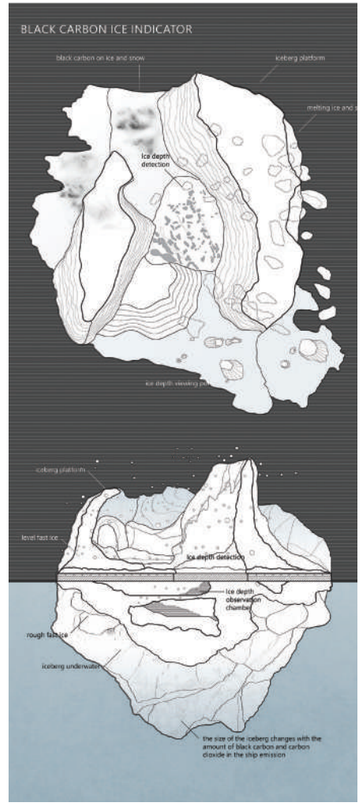


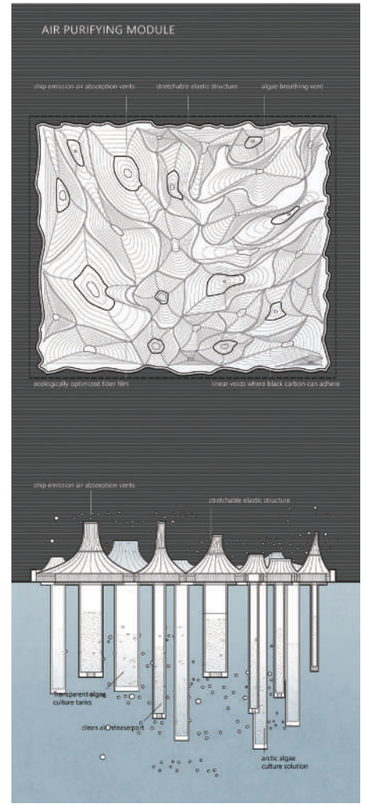






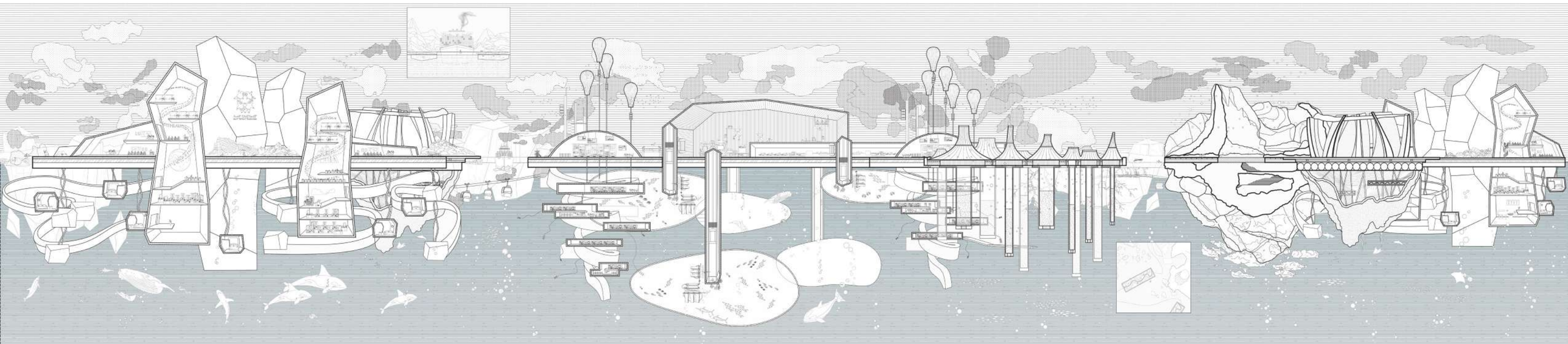


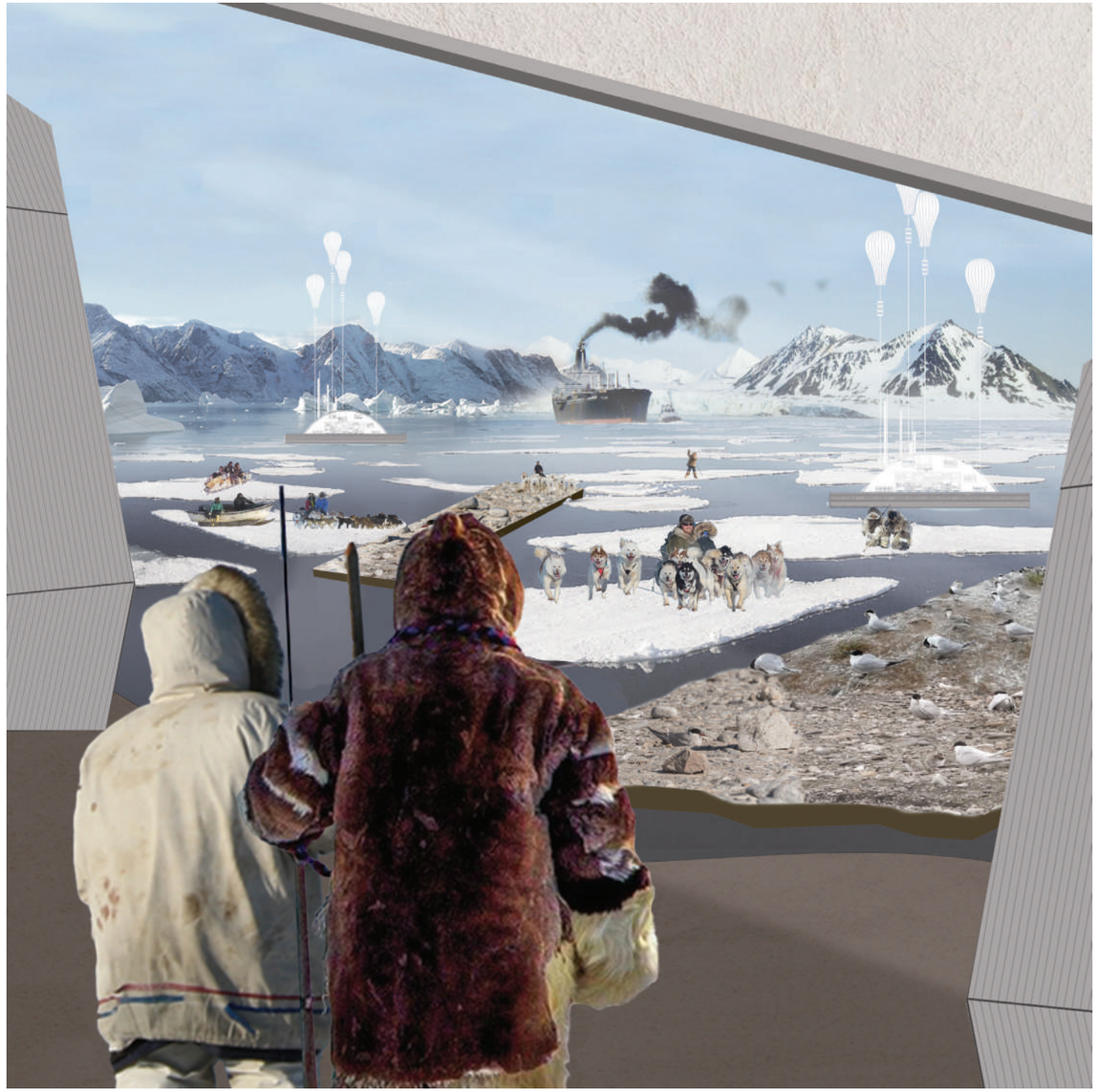




For air purification, we have chosen algal plants as the main actors of this entire ecological module, which can absorb the carbon dioxide from the ship emission exhaust gases and convert it into oxygen.
If the main floating boards are assembled into a path, there is a structure in the middle that can be controlled by rotation to open and close for ships. When opened, it allows ships to pass through. When closed, it can serve as a connection for Inuit people to travel by dog sled to the hunting areas on the opposite shore.

PARTIAL LONG SECTION (ZOOM IN)





PERSPECTIVE VIEW
From the Interior to the Sea Ice on the Northwest Passage

The proposal imagines floating archipelagos as breeding platforms for arctic tern, simoutaneously serving as a connection between Inuit permanent and their hunting areas across the sea, and also a blockage in terms of fishing vessels or other ships passing through the Arctic, especially in Inuit homeland: two floating platforms provide an extension of breeding space of the Arctic Tern and other migratory birds, which can not only combined as a whole one to block the vessels but also can be split into two parts, so that the ship can pass through when it gets permission of Inuit people.

Arctic Tern
- The land portion of the plan mimics the Arctic icebergs to create a natural ecological environment, providing breeding and foraging areas for the Arctic tern. At the same time, it protects their eggs from predators and invasions, aiming to increase the hatching rate of Arctic tern eggs and slow down decline in population.

Marine Species
- And the proposal not only benefits migratory birds in the Arctic but also slows down the melting of the ice layer to reduce the decline of primary producers like ice algae accourding to the mechanism of the ice sheet formation on Arctic sea, which are a vital food source for many marine organisms such as krill, thus protecting the marine food chain and food web.

PERSPECTIVE VIEW
Snowmobile or Dog Sleds on the Floating Platforms as Extension of Traditional Inuit Hunting Trails

- Additionally, the underwater part includes a center for monitoring the thckness of the ice layer, observing the condition of the Arctic ice. It also records and preserves knowledge related to the ice layer held by the Inuit people. When changes in parameters like ice thickness are detected, timely reports are made to nearby Inuit hunters for updates.

Ship
- The above-ground section includes a shipping emission monitoring center, focusing on air pollution in sea waters. Shipping emission and air quality monitoring center can be located within the land-based icebergs or on a separate platform.
- To eliminate the harm on the air quality causing by shipping emission, ships will only permitted to pass through this transportation system in summer (such as August to September, during this period the arctic sea has the minimal ice extent, according to the report of arctic ship data center) when sea ice in the Northwest passage is melting, instead of winter, which will break the Inuit traditional hunting trails and patterns using icebreakers.
- Meanwhile, according to different seasons of the year, ships especially fishing vessels will avoid the breeding time of the birds such as Spring.
- And lastly, The inuit people can also be the managers who are in charge of this transortation system and have the agency to protect their traditional hunting trail (sea ice) as a part of collective wise and social heritage of their culture by monitoring the shipping emission in the Northwest Passage.

03

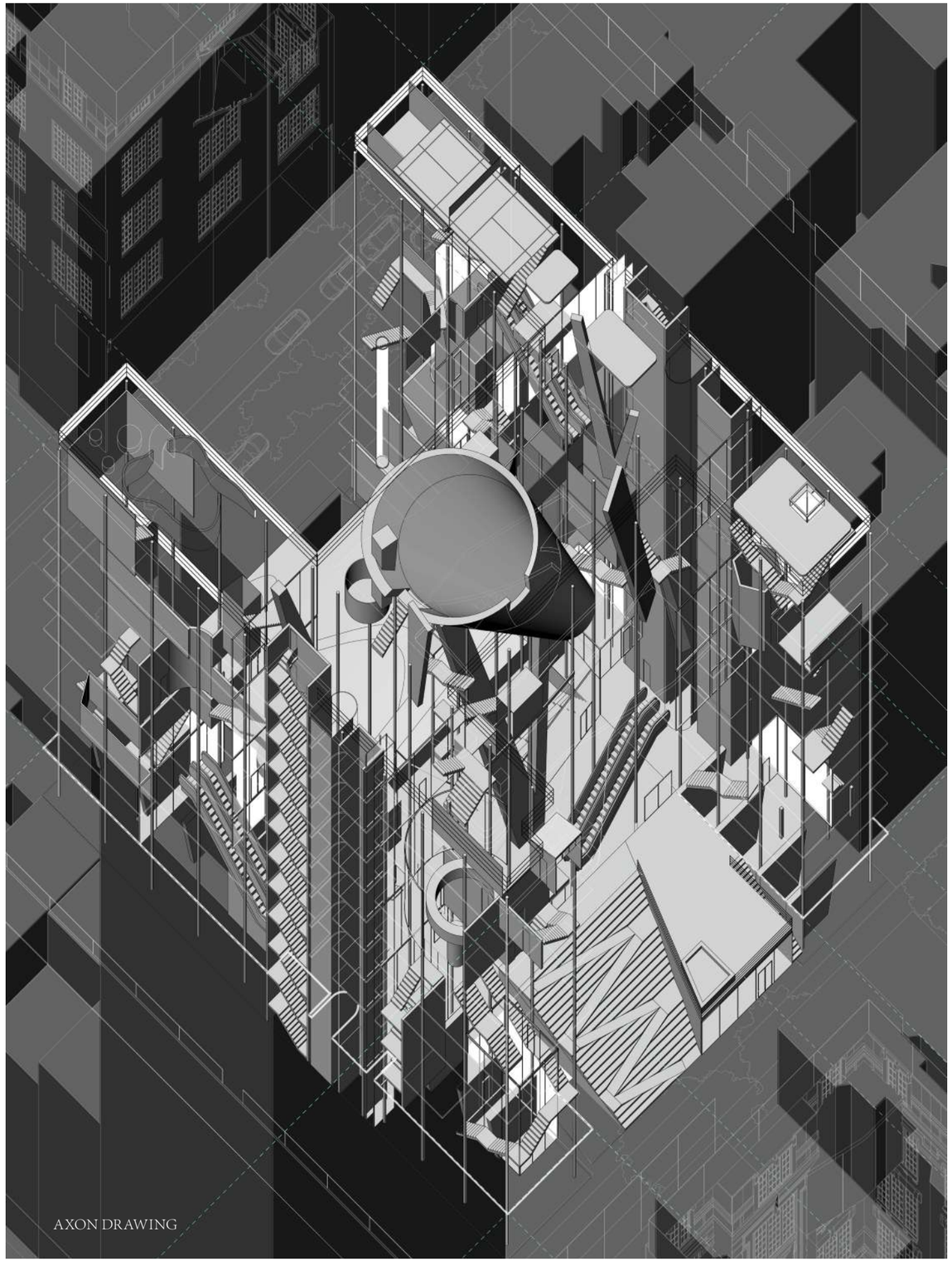
CHARAS Tech Center

Innovation Hub in Previous Public School 64 of CHARAS Community

BRIDGE Studio
Site: East Village, New York
Individual work
Instructor: Patrice Derrington; Christoph a. Kumpusch
Spring 2024

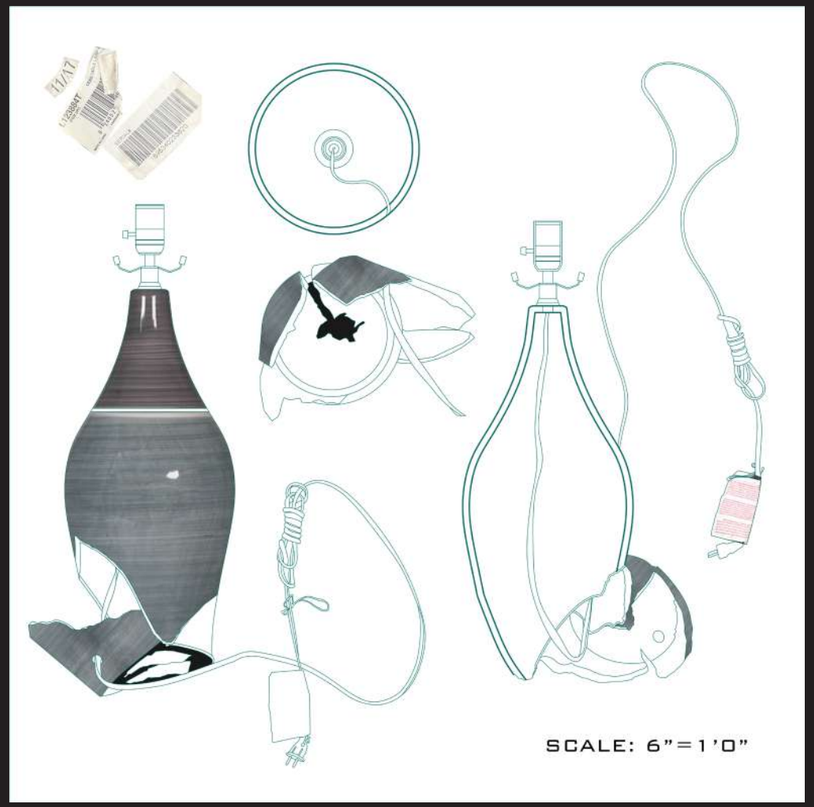
The project in the current Charas PS 64 building is not just an education center where students have a class and study. It is also an Innovation Hub preparing future generations for the Information Age, with programming that contains both science and humanity (specifically to the Charas historical context, technology and art), where kids and teens can actually build, construct and create practically something tangible with their own hands beyond merely virtually on the computer. This includes the movable parts inside the building, which allow students to assemble and disassemble, facilitating practical, active and hands-on learning.

In addition to fostering innovation and experimental research, the project also emphasizes ecological and community integration. Thus, as a historical response to the urban context of pocket parks and hundreds of secret street gardens, the living walls in the central heart of the building provide insertions of handy experimental apparatus for the biotech laboratories and the subsequent process of production and creativity on the living objects of botany, acting as interfaces of technological and scientific research with ecology, adaptability, sustainability and community future needs.
And above all, being a public interaction concentration in the Charas community, collective urban cultivation and exploration also happen around these green walls, which serves as an activity for public engagement and participation, enhancing their ownership of the PS 64.



AXON DRAWING

FOUNDATION OBJECTS

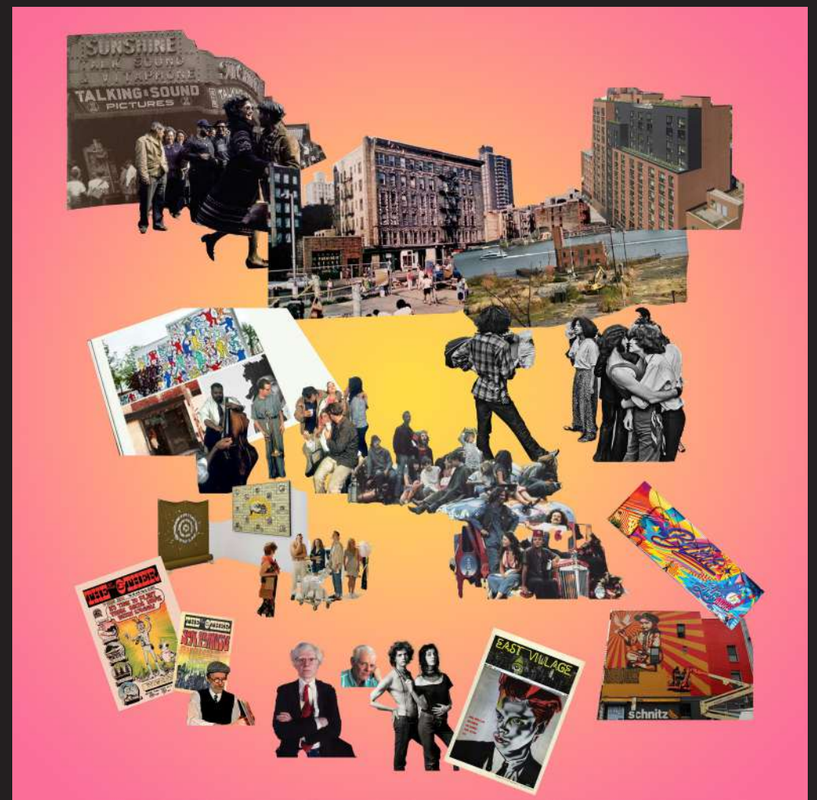


Inherited from the history of the movement of artists, musicians and poets, and the gentrification after, the East Village now becomes a counterculture hot spot and a arty, edgy tourism destination, having a lot of unusual local stores as small business and establishments catering to visitors as well as locals. And it indeed become one of the wealthiest residential neighborhood in the city, no longer a part of Lower East Side. It’s also home to some high-profile off-Broadway shows. By drawing people into the neighborhood to attend performances, they also fostered the opening of new restaurants and bars to serve these audiences, and this were critical in the economic development of the East Village.

FOUNDATION OBJECTS

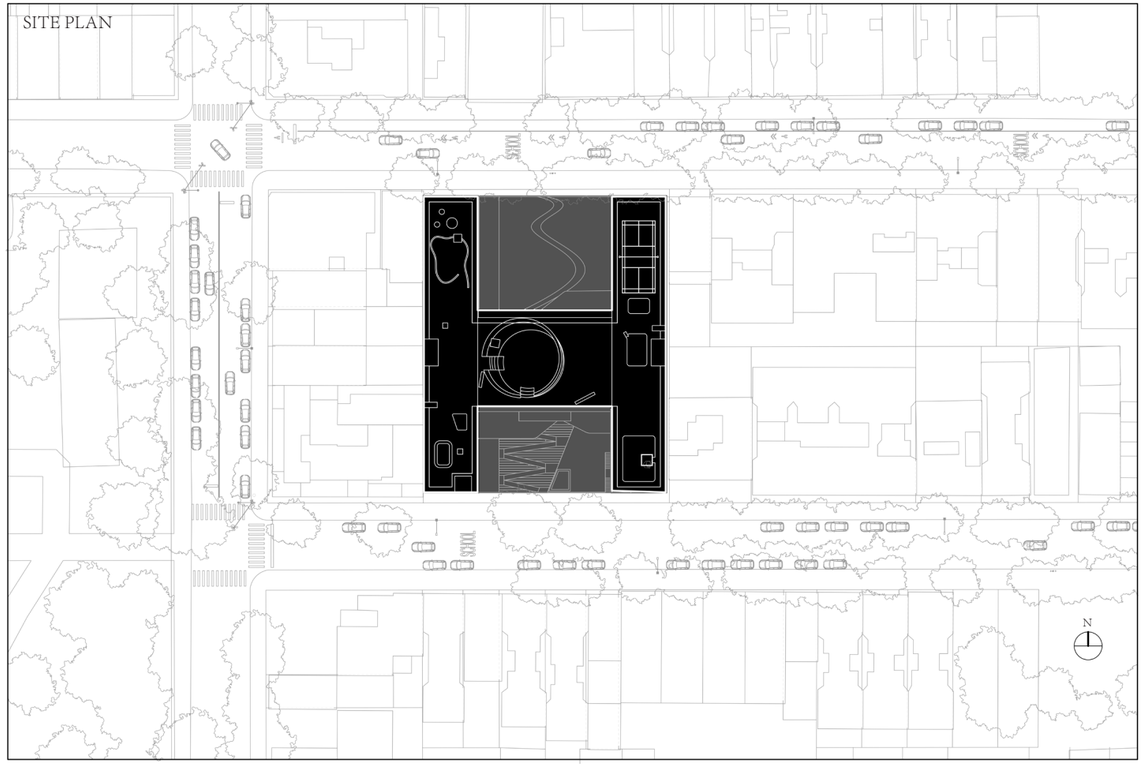
Based on these culture, I think the key words of the community identity are trendy, experimental, avant-garde, edge and young generation. They are innovative and bold and vibrant. And also eco-friendly and sustainable, in terms of hundreds of street gardens or pocket parks, and so many vintage and thrift shops, flea markets, and bike-friendly streets.
And as a result, I can find those artsy, trendy, musical, expensive objects, including 52 things band’s album, a brush, a colorful knife, a 150 dollar ceramic lamp, a fuji selfie camera, a certification of award and a CD-ROM belonging to a community member of “Lion Club”, and a creative hanger with a cross-arm gesture, a multi-thermometer, a package of seeds, a “stop 7-11” button and so on.

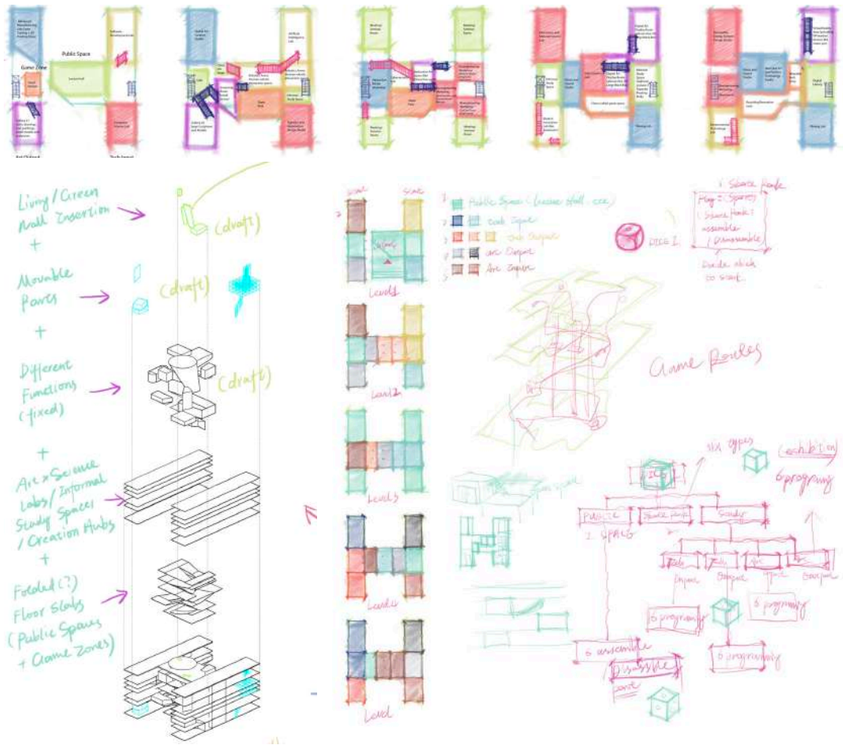
SITE HISTORY



At first, according to these culture in East Village, I was brain storming about the potential programs in the CHARAS building, including art gallery, art shops, fashion shops, vintage shops, theater, restaurants, residential buildings, But those are all existing in the community.
So, What's missing? I think it's the other of "cutting-edge, experimental and trendy culture - something about tech, science and engineering.
So my core concept is the intersection of Technology and Art in the CHARAS, which could serve as a community Tech Center, making up a deficiency of STEM subjects in current East Village.

SITE PLAN





DESIGN STRATEGIES

1. Fixed and Movable Parts - a Dynamic Environment: wings on both sides of the buildings are fixed parts in the programming - the classrooms; and the movable parts - labs and studios for tech and art programs along with public space and game zones are in the center of the building, creating a changeable and dynamic environment.

2. Cyclical Alteration of Tech and Art Programs: forming an interwoven matrix of creativity and innovation.

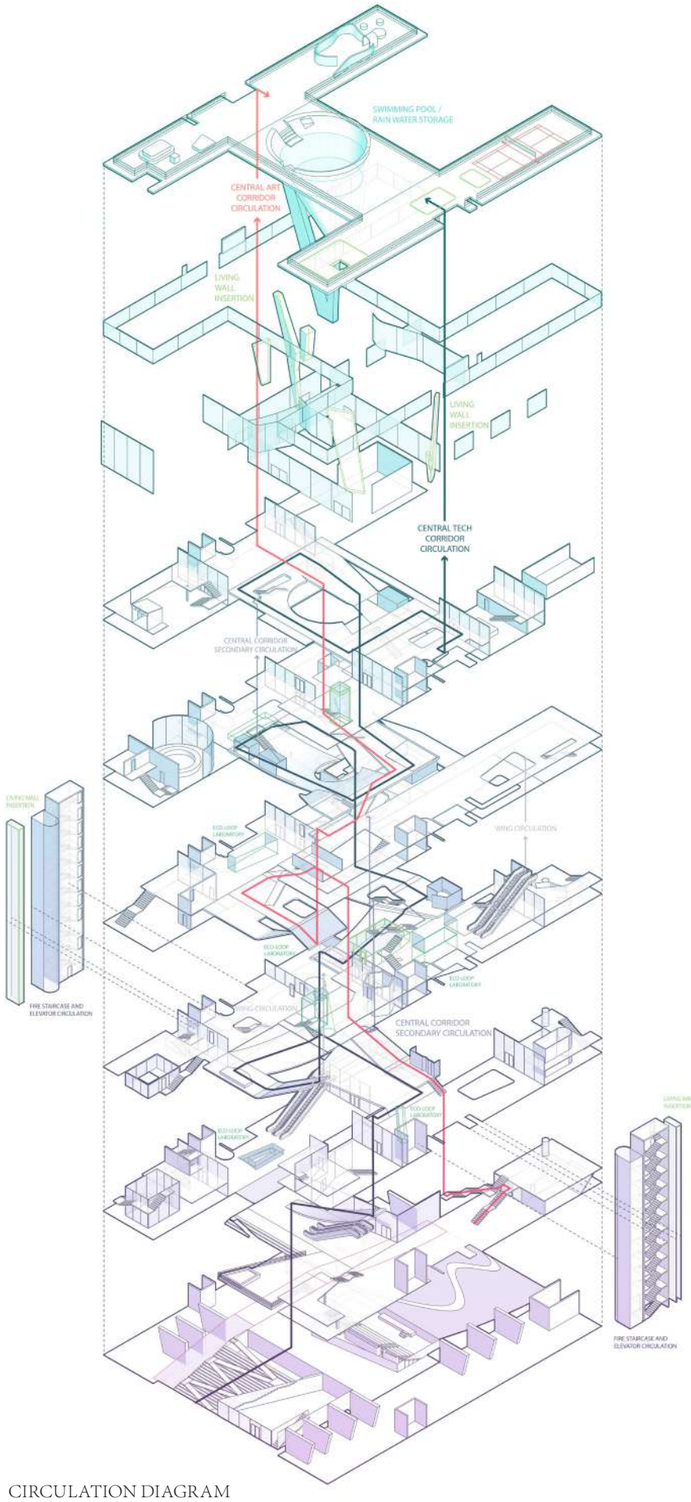
3. Intertwined Continuous Floor Slabs: Two intertwined continuous floor slabs as infinite corridors in the heart of the building, to enrich the promenade experience along a variety of the living walls, labs and classrooms, stimulating potential cross-boundary creative activities.

4. Enhancing the Learning-to-Creating Process: the general circulation of the functional spaces from fixed classrooms to movable labs and the living walls, students can experience study - grow - observation - harvest/ collect - produce and create. And their exploration could also be relevant to community identity such as foods specific to the Charas community and pigments for the artists.

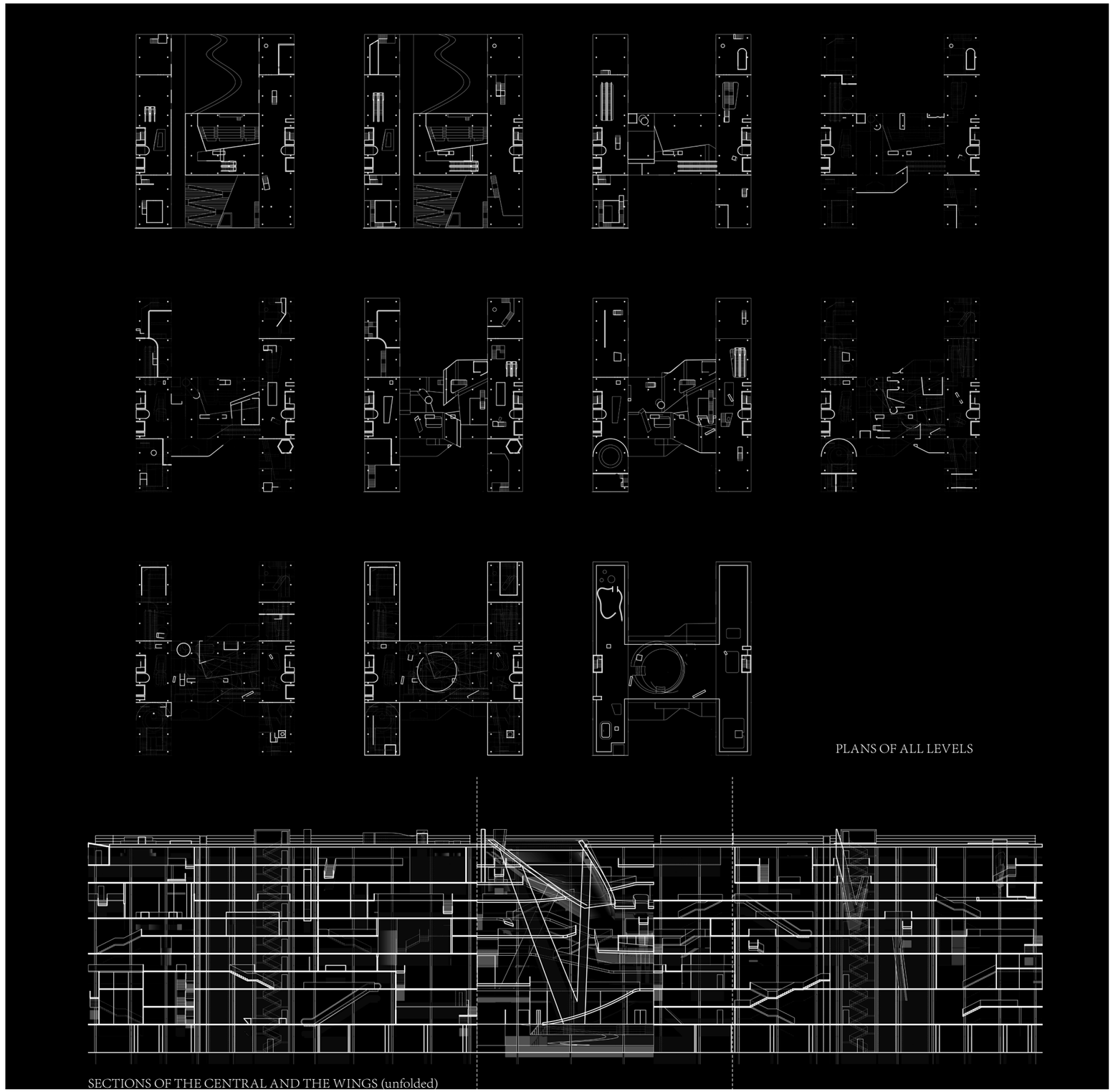
5. Living-wall Dispersed Insertions:

* providing handy experimental apparatus for the biotech laboratories as mentioned above.

* serving as photobioreactors absorbing carbon dioxide, an ecological system through air-flow tubes and water pipes connected to the rain storage tank on the roof.



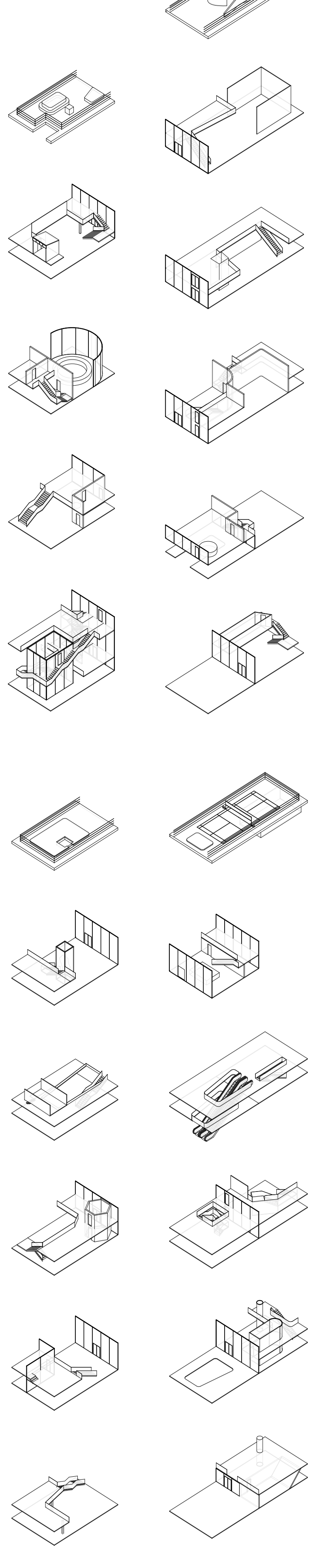
CIRCULATION DIAGRAM



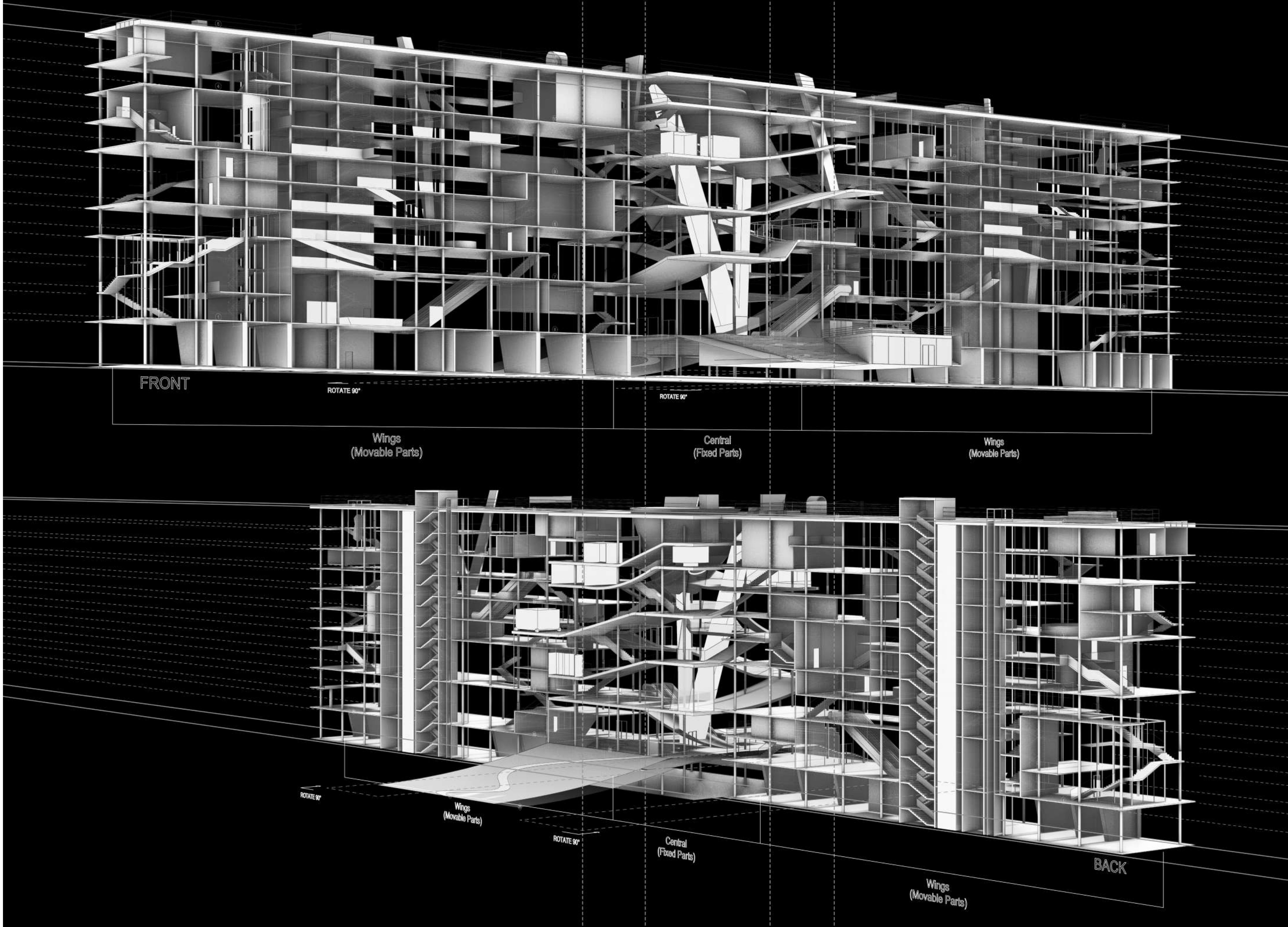
PLANS OF ALL LEVELS

SECTIONS OF THE CENTRAL AND THE WINGS (unfolded)

LAB AND STUDIO
MODULES IN THE WINGS



COMPONENT ANALYSIS (unfolded view)



WELCOME TO THE CHARAS COMMUNITY TECH CENTER!

HERE IS THE ENTRANCE -

WE HAVE WARPED FLOOR SLABS IN THE CENTRAL PART OF THE BUILDING

AS INFINITE CORRIDOR CONNECTIONS TO TECH AND ART PROGRAMS ON BOTH SIDES OF THE PREVIOUS PUBLIC SCHOOL 64 BUILDING

INTERIOR VIEW OF THE CENTRAL PART
A DYNAMIC PUBLIC SPACE OF THE OPROGRAM

CENTRAL PART WITH TRANSPARENT LIVING WALL INSERTION

INETRIOR VIEW FROM CENRTAL PART TO THE ECOLOGICAL LAB

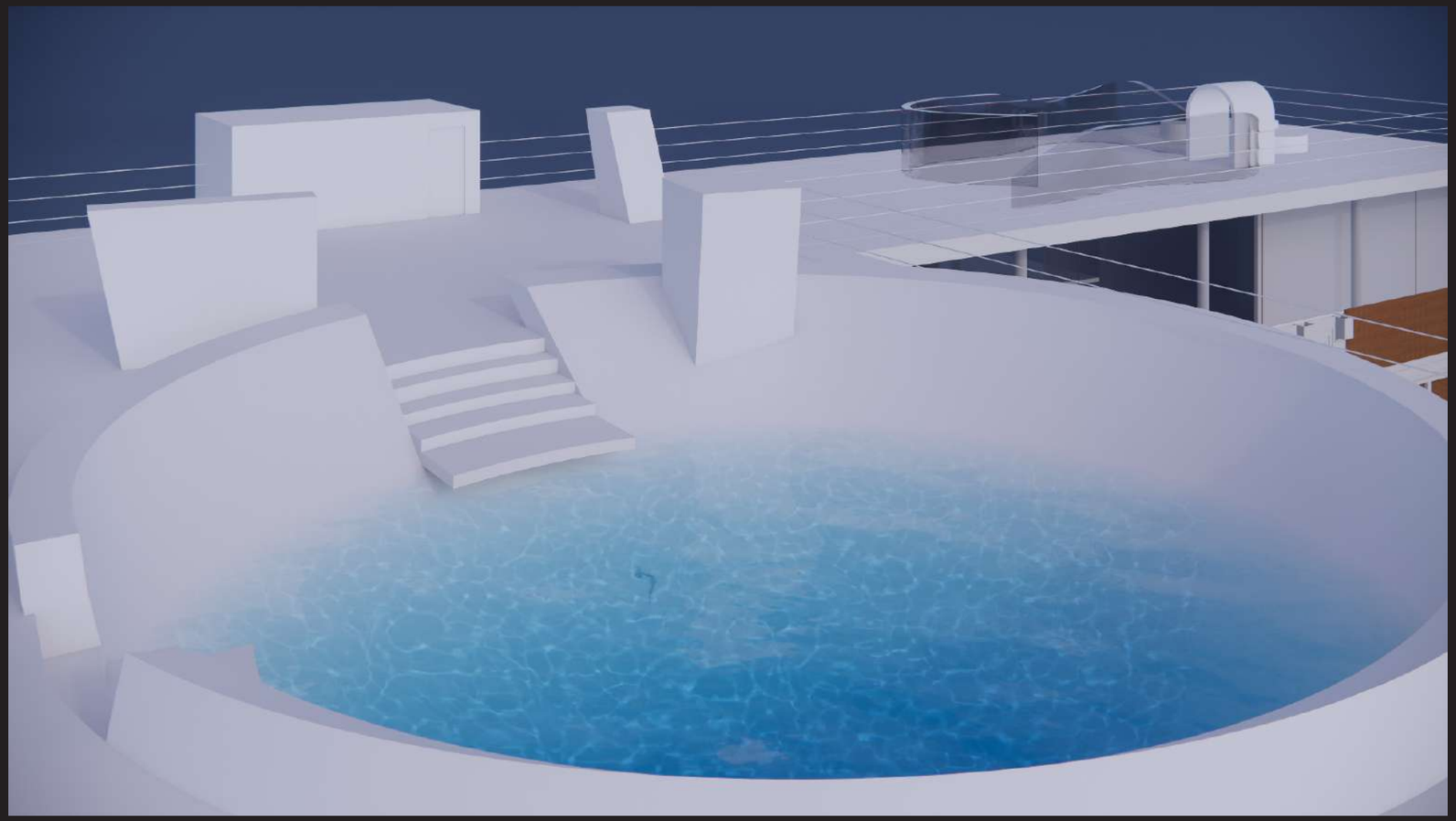
LAB INETRIOR VIEW

INETRIOR VIEW FROM SMART KITCHEN TO THE BICYCLE ROUTE AND LECTURE HALL

INETRIOR VIEW OF THE WING CORRIDOR

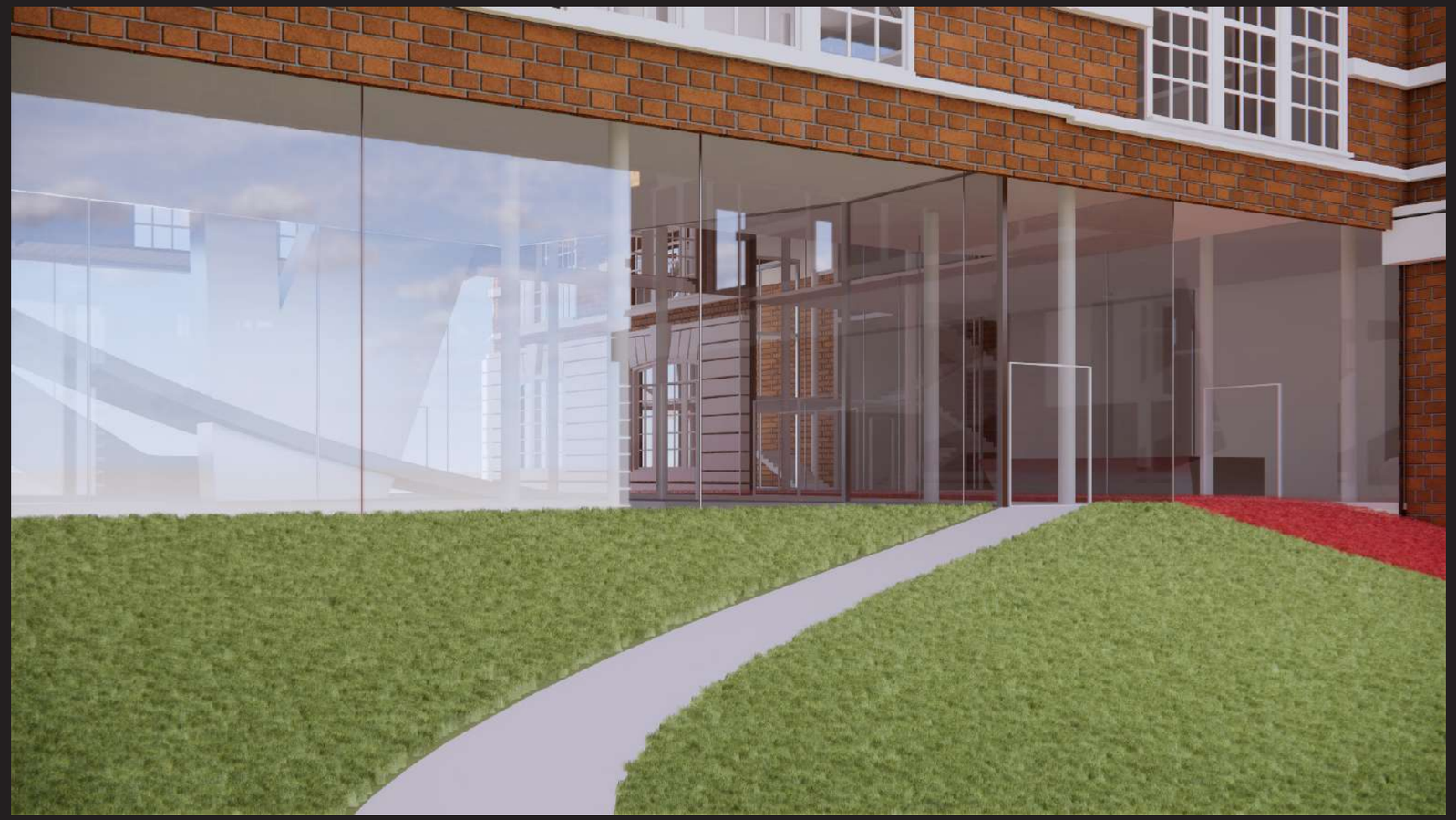
INETRIOR VIEW OF THE CENTRAL INFINITE CORRIDOR

AND WE HAVE A SWIMMING POOL ON THE ROOF



BOTE AS A RAIN WATER STORAGE TANK AND WATER SOURCE TO THE LIVING WALLS

BACKYARD LAWN ALSO AN ECHO TO HUNDREDS OF CHARAS SECRET STREET POCKET GARDENS



THANK YOU FOR VISITING!

04

Prometean Fire

Translation From Dance Movements into Architecture

Visualization Elective - Embodied Research: Speculative Methods
Individual work
Instructor: Jonathan González
Fall 2023

The body possesses spatiality. Unlike the simultaneous existence of past, present, and future in entities, the body makes a series of postures and movements. The relationship between 'self' and 'object' depends on witnessing and touching, and must occur in the present, meaning that the body also has temporality. My final project is an architectural piece that transforms dance into space. The work I have chosen is Paul Taylor's 'Promethean Fire', a captivating piece of modern dance first performed in 2002. This work is a compelling modern dance work that debuted in 2002. It serves as Taylor's response to the 9/11 terrorist attacks, using dance to convey the effects of this event on humanity's psyche and societal structures. The piece is divided into three parts, each with its unique emotional tone and movement language. For my project, I will apply the deconstructivist perspectives on movement, event, and space (such as Bernard Tschumi's 'Manhattan Transcripts', which can be compared to watching a movie. These visual templates are primarily composed of diagrams and mostly follow three key focuses: the location or building, the movement through that location, and photos representing the event and people involved in it) to translate these three parts' respective body movements and their commemorative collective memory (the 9/11 event) into corresponding spaces. I will then sequence these spaces according to the timeline of the dance movements to form a complete spatial sequence. The materials used will be virtual models and renderings.

PAUL TAYLOR
PROMETHEAN FIRE

Translation From Dance Movements Into Architecture
A Deconstructivism Experiment

Xinying Liang xl3225

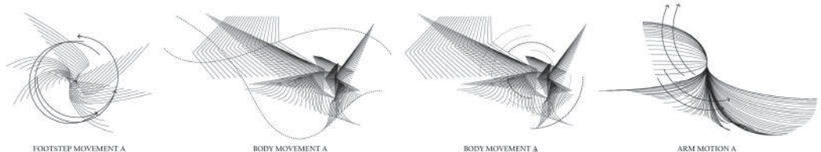
Dance Video Source: Paul Taylor Dance Company Promethean Fire edit 081611
https://vimeo.com/2779695

METHEDOLOGY
- The dancers' bodily movements will be translated into sections.
- Not just body movements; the dancer's footwork and arm motions can also be translated into architectural space drawings.
- The faster the rhythm, the tighter and larger the oscillations of the line; the slower the rhythm, the more sparse and smaller the undulations.

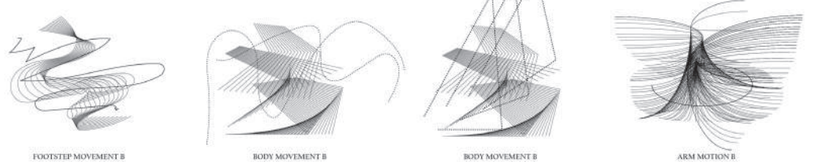
1. **Beginning Section:** The start of the piece is typically characterized by a profound and heavy atmosphere. The dancers, through tense and forceful movements, display a state of chaos and unease, symbolizing conflict, disaster, or inner turmoil. This may metaphorically represent the impact of the 9/11 events on society and individual psyche, reflecting the shock and sorrow experienced in the aftermath of 9/11.
2. **Middle Section:** As the dance progresses, the middle section might shift towards a more abstract and introspective expression. The movements here may become smoother and more coordinated, signifying recovery, hope, or the rebirth of the spirit. The interaction among the dancers might portray greater support and unity, reflecting humanity's mutual support in times of adversity.
3. **Climactic Section:** During the climax of the work, the dance could exhibit intense emotion and dynamism. This part, through complex group choreography and vigorous movements, showcases strength, determination, and revival, symbolizing the resilience of the human spirit and the persistence of hope amidst difficulties.
4. **Ending Section:** The conclusion of the piece might serve as a summation of the entire emotional journey of the dance. This section may involve a profound release of emotions, such as relieving tension, finding peace, or accepting reality. The dancers' movements could become slower, symbolizing reflection, acceptance, and inner tranquility.

00:00 - 03:00 BEGINNING SECTION





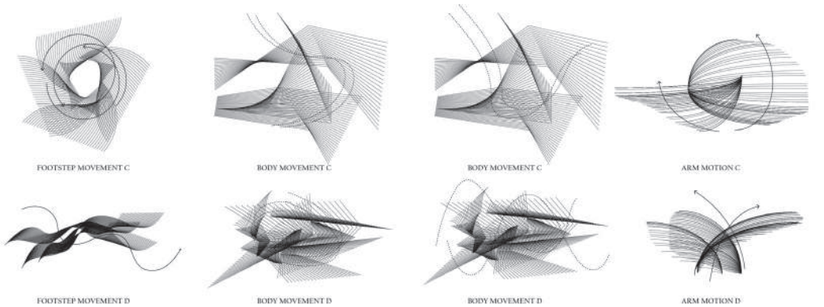
FOOTSTEP MOVEMENT A | BODY MOVEMENT A | BODY MOVEMENT A | ARM MOTION A



FOOTSTEP MOVEMENT B | BODY MOVEMENT B | BODY MOVEMENT B | ARM MOTION B

03:00 - 09:01 MIDDLE SECTION





FOOTSTEP MOVEMENT C | BODY MOVEMENT C | BODY MOVEMENT C | ARM MOTION C

FOOTSTEP MOVEMENT D | BODY MOVEMENT D | BODY MOVEMENT D | ARM MOTION D

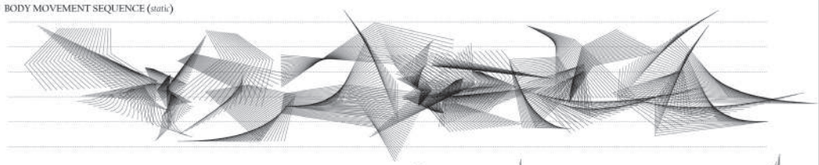
09:01 - 10:20 CLIMATIC SECTION

FOOTSTEP MOVEMENT E | BODY MOVEMENT E | BODY MOVEMENT E | ARM MOTION E

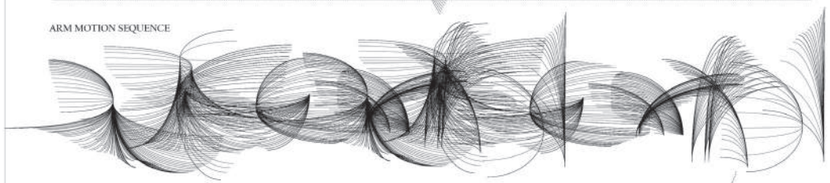
10:20 - 18:53 ENDING SECTION

FOOTSTEP MOVEMENT F | BODY MOVEMENT F | BODY MOVEMENT F | ARM MOTION F

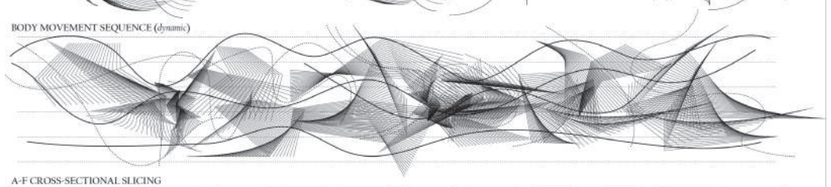
BODY MOVEMENT SEQUENCE (*static*)



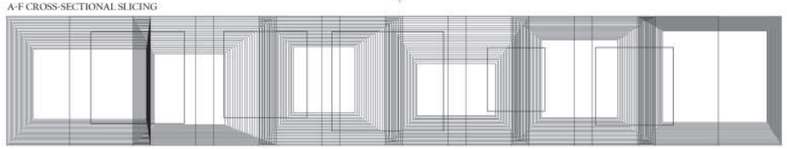
ARM MOTION SEQUENCE



BODY MOVEMENT SEQUENCE (*dynamic*)

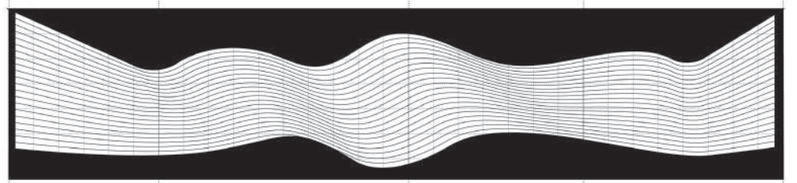


A-F CROSS-SECTIONAL SLICING

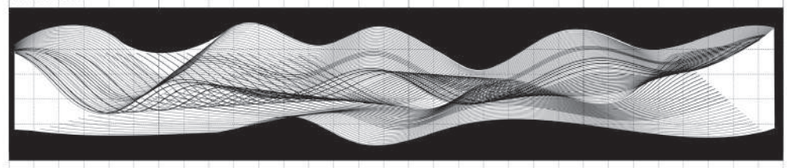


SPACE GENERATION

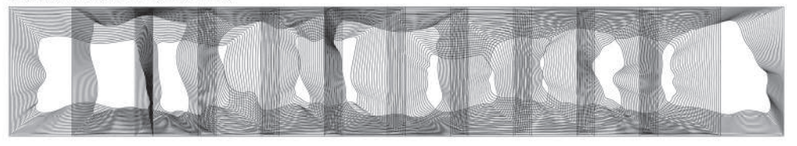
PLAN



LONG SECTION



SHORT SECTION STRUCTURES (OVERLAPPING)



MATERIAL: MEMORY FORM

SHORT SECTIONS

05

Wall of Bent Glass

Exploration of Glass Materiality

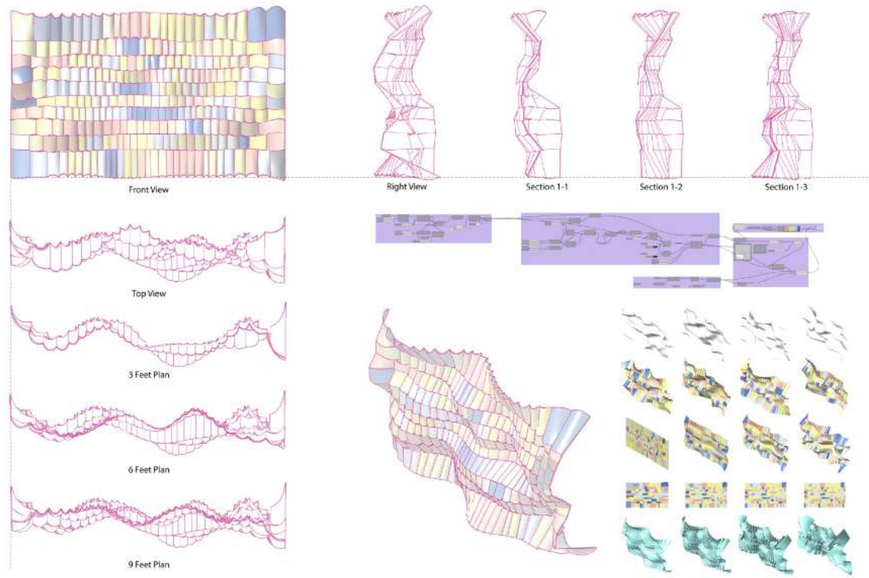
Building Tech Elective - Collective Assemblies
Individual Part of Group Assemblies
Instructor: Danniely A. Staback Rodriguez
Spring 2024

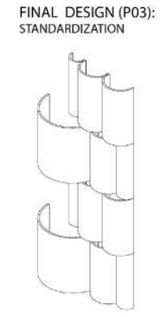
My initial design phase in P02 of the course heavily focused on the randomness of recycled bent glass. This phase was about capturing the aesthetic beauty of color and form. However, the transition to group collective assemblies necessitated a shift towards a more standardized approach—segmenting the glass into large, medium, and small modules. As factors that influence my real-world design, the "in-situ" condition is the process of bending and assembling the glass.

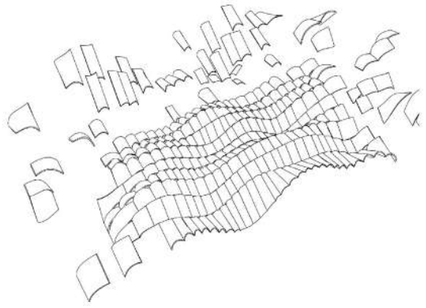
Transforming a design from a digital model in Rhino and Grasshopper into a physical manifestation presented substantial challenges. Early attempts to simulate the bending process with plastic or acrylic sheets in a vacuum former revealed the importance of material properties such as thickness and resilience to high temperatures. The first step is to set up a mold that could be bent as precisely as possible according to the designed sizes in the grasshopper, simultaneously won't melt under the high temperature in the heating process in the vacuum machine — and this step is not simple at all, due to the eligibility of the material. Clay, steel, foam, resin, paper, or even some transparent materials for 3D-printing? To the end I chose the Kraft paper as the molds, which turns out to be suitable to be bent into an semi-circle shape, with resilience to keep the forms. Material testing was crucial, as different thicknesses required varying heating times, and smaller sizes risked deformation under machine pressure. These real-world tests led me to transition from the initial randomness of bent-glass fragments to standardized modules, which allowed for more manageable and efficient assembly processes.

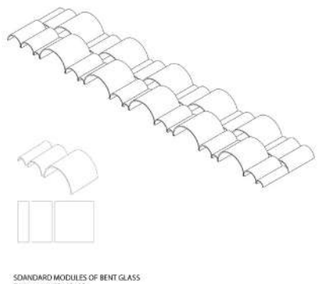
Additionally, The Cannibals Cookbook mentions some process about stone masonry of giant stones. Something about the unique material characteristics of the glass is its friability. It cannot be built up as the stone masonry unless it's composed as glass bricks. If lots of glass fragments are assembled into a wall, big as 20 feet long and 12 feet high, then they indeed need some support systems to hold it in place. So for the structure, what I came up with is a steel support system like brackets, an inspiration from the support structures of the Wavy Wall by Charles Sowers, fixed behind the steel frames that hold the bent glass on the group back wall.

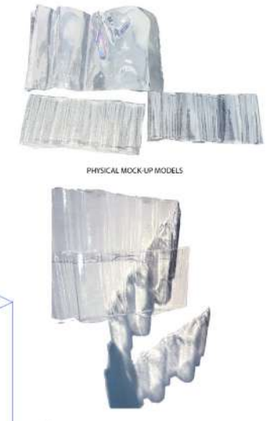
The progress of my individual project to group assemblies, deeply reflects the core issue discussed in the first three assigned readings assigned readings this semester, including The Cannibals Cookbook and Verify in Field. They all emphasize the importance of how to bridge gaps between concept and construction that enable feedback loops in reality and development of expertise and even some improvised thoughts.
There are always gaps among theories, imagination in mind, designs with computational tools such as Rhino and Grasshopper, and finally practical application in the reality. Bringing a design from the digital realm into the physical world introduced significant challenges due to the physical restrictions such as properties of the materials like hardness and thickness, and environmental factors like temperature; unavoidable forces such as gravity presented unique challenges that differed significantly from digital simulations. And that's why we have to verify in field or in-situ condition repeatedly, until we approach, or approximately close to the results we simulated in our imagination.

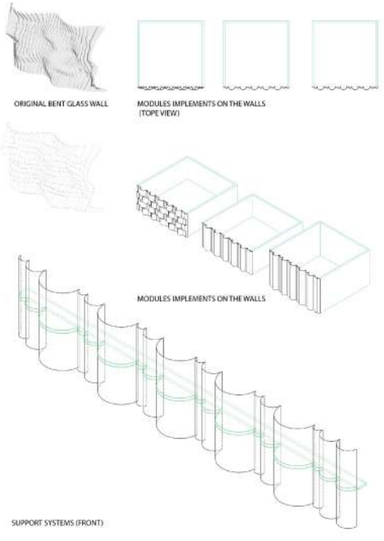


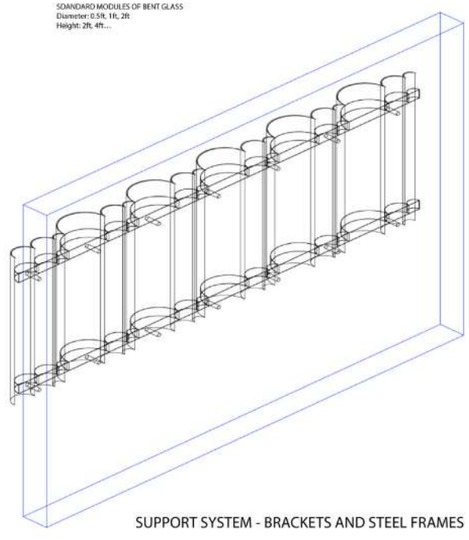


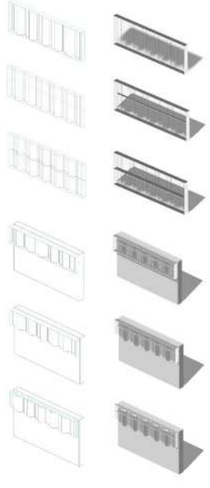


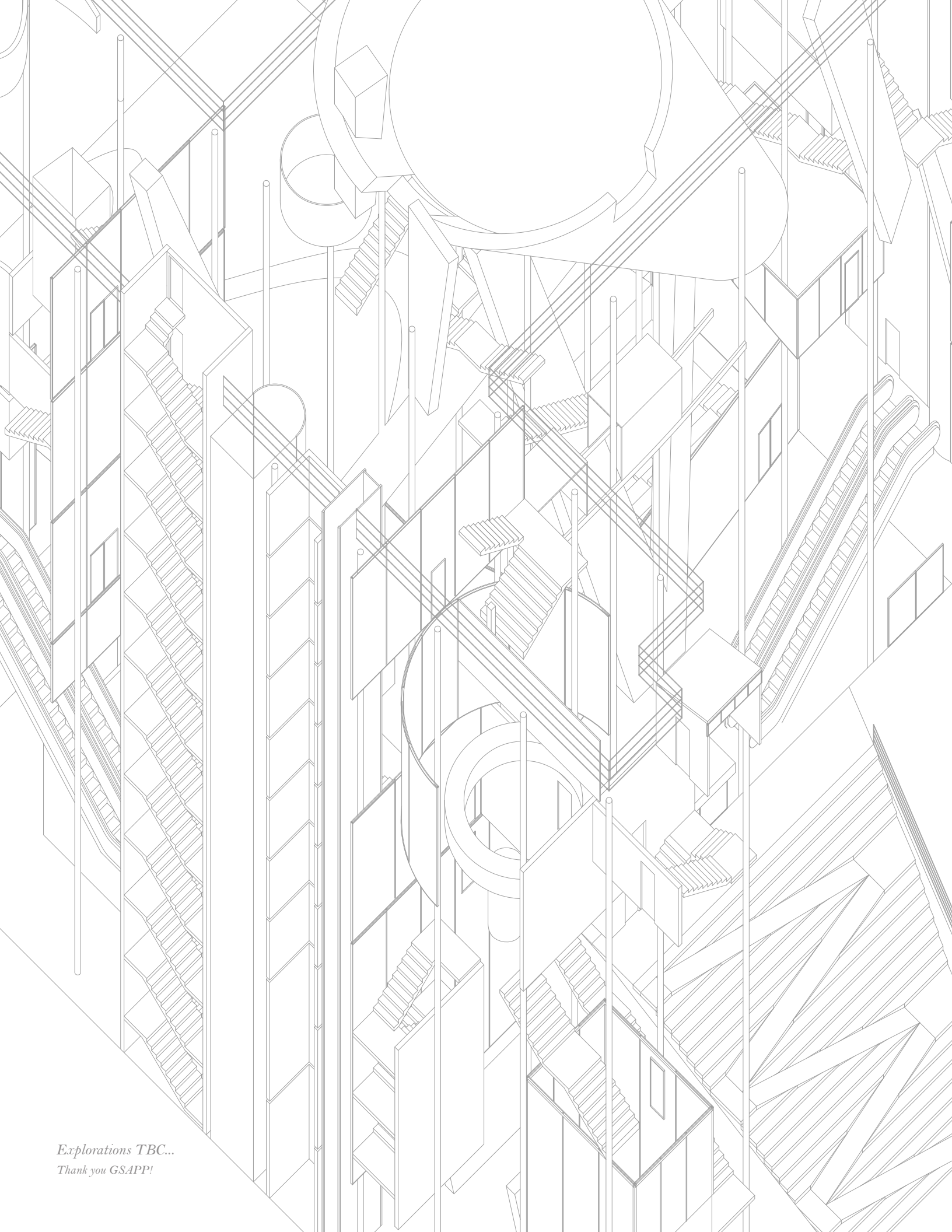












Explorations TBC...

Thank you GSAPP!