Table Of Content

Fig. 1 Mediated Monstrous Situated Body
Beverly Qin

Inflating breathing machine harvesting moisture in rainforest.

.01

Abstract

This project proposes a nomadic desalination infrastructure that traverses coastal shorelines vulnerable to the intensifying impacts of climate change, particularly extreme weather events and rising sea levels. As it moves along these vulnerable coastlines, the infrastructure leaves behind salt brine residues, which are curated into aqua barrier landscapes, thereby transforming potential environmental hazards into integral elements of coastal defense. Embodying a dynamic equilibrium, this initiative serves as a bridge between disparate worlds—the human and the non-human, the living and the non-living, the mechanical and the environmental—forging a harmonious relationship between resource utilization and ecological sustainability. Through its nomadic nature, the infrastructure embodies traits of resilience, mobility, and versatility, essential for navigating the uncertain terrain of a rapidly changing climate landscape. This project represents a paradigm shift in environmental intervention, emphasizing creative solutions to address interconnected climate challenges and secure the well-being of coastal communities and ecosystems.

.02

Degree Project Essay

Fig. 2 Infrastructure Situated on the Edge of Two Worlds
Beverly Qin + Megan Ju

Nomadic Desalination Infrastructure depositing salt brine piles.

Monster Narrative

Pushed to the furthest margins of geography and hidden away at the edges of the human and natural worlds, our monsters always return. Belonged to the boundaries of two worlds, its unstable dual identities attempt to balance the resource environment. Once a static infrastructure, belonging to the human environment and harvesting from the natural environment along with humans, is now a nomadic infrastructure that haunts human and natural environments while harvesting from both.

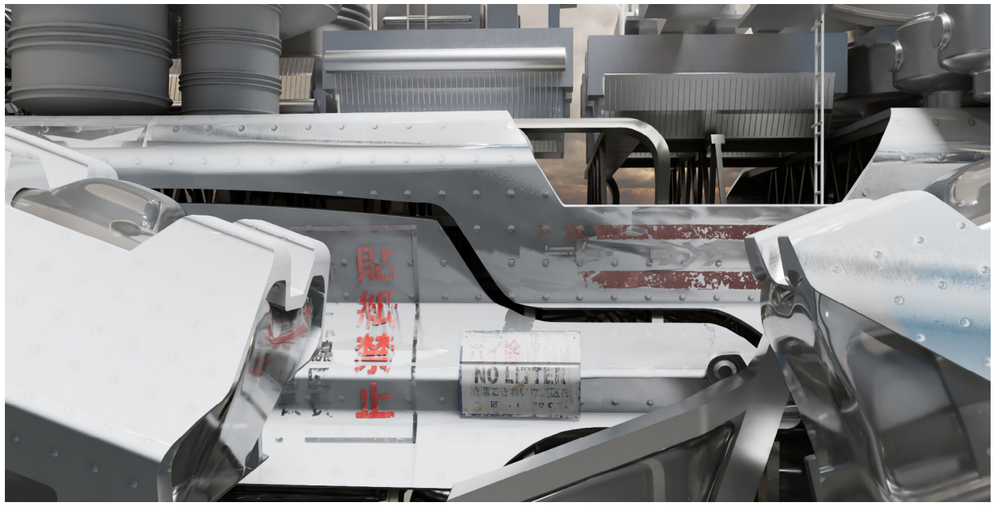


Fig. 3 Detail Render
Beverly Qin + Megan Ju

Exterior covered in graphic painted by human, showcasing its antagonist charateristics.

In contemplating the scenario of infrastructure walking away from humans, we enter a realm where the dynamics of human-constructed systems and the natural world intersect in intriguing and potentially transformative ways. This concept challenges conventional notions of infrastructure as static, fixed entities serving human needs, prompting us to consider the implications of infrastructure operating autonomously or in symbiosis with natural processes. In a realm where the boundaries between the natural and the artificial blur, and the symbiotic relationship between humans and technology takes center stage. Drawing from Haraway's Cyborg Manifesto, we perceive a world where humans embrace their joint kinship with animals and machines, navigating through fragmented identities and contradictory standpoints with resilience and adaptability.

Architecture should offer a multiplicity of views and perspectives to diverse occupants, embracing not only the well-being and experiences of humans but also fostering a symbiotic relationship with other organisms and the environment. The infrastructure responds to environmental challenges and directly acknowledges the conflict between human activities and the natural world. As a dynamic, moving force, the monster becomes an agent smudging the boundaries between the built environment and the ecological systems it interacts with. The boundaries between humans, environment, and machines are not rigid or impermeable but rather fluid, dynamic, and constantly interacting, in a way that the human body and the environment are also intimately entangled, with materials, energies, and information flowing between them.

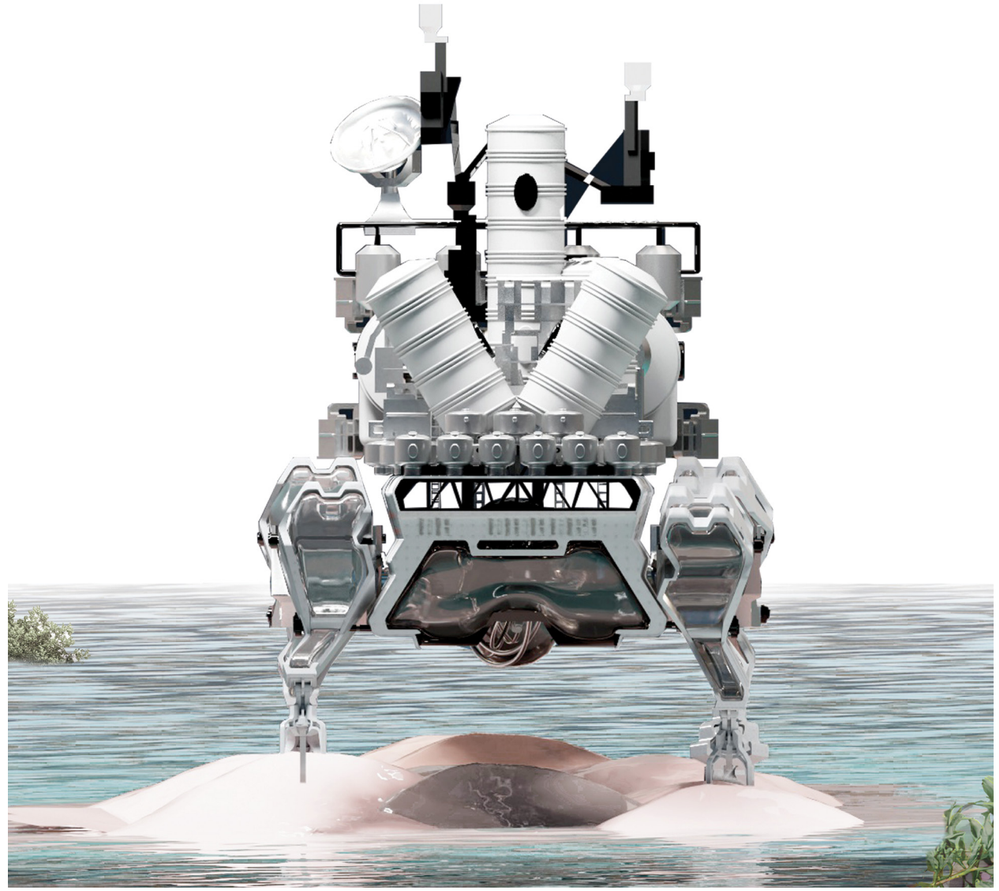


Fig. 4 Front Elevation
Beverly Qin + Megan Ju

Front view of infrastructure in salt marsh.

Organs, Peripherals, Systems

Collecting media and facilitating inter-mediary entities

To be a cyborg, one organism must be disassembled and reassembled with the incorporation of a technological element. As one undergoes the series of transformations, the embryonic identity must be altered in sync to those changes. As Haraway suggested in the Cyborg Manifesto, “A cyborg world might be about lived social and bodily realities in which people are not afraid of their joint kinship with animals and machines, not afraid of permanently partial identities and contradictory standpoints.”1 A cyborg is not only unintimidated by its permanent partial and fragmented identities, but must also possess appreciation for its joint kinships with other entities. They execute and live with their beliefs and actions in opposition to societal norms, challenging common beliefs.

Correspondly, cyborgs are lonely. Standing in defiance to established perceptions, they persevere in its being and even increase its power of existence. In the movie “Matrix”, humans are grown in a “fetus field” immediately connected by myriad umbilicals that extracts heat energy from the body to power the Machines and their city.3 The rapid expansion of the pod system overtook cities humans lived in. The energy extraction human pods, the cyborgs inside the pods, are like an invasive species. They possess the conatus quality Spinoza defines in Ethics “an innate inclination of a thing to continue to exist and enhance itself”. Cyborgs are just like any other organism when hurled into the flow of evolution - that it must hold together growth and decline, reparation and aggression, negotiating doses between one and the other. “Each thing, as far as it can by its own power, strives to persevere in its being” 2 For as long as one live, Conatus is of indefinite time, an inclination of things to increase in power; rather than just continuing to exist statically, all beings must strive towards perfection.

From the Matrix to Ex Machina, movies expose human’s deepest fear of technology and cyborgs - living beings that are both flesh and metal. However, philosopher Andy Clark sees it differently. In the book Natural-Born Cyborgs, Clark states that humans today are already shaped and employed by technologies.4 We are able to incorporate these inventions quickly as an extension of our own abilities, like typing on a keyboard or operating a crane on construction sites. Today, humans are cyborgs.

Therefore, an increasing number of beings in similar positions in our

1. Haraway, Donna Jeanne. Cyborg manifesto. Victoria, British Columbia: Camas Books, 2018.

2. Spinoza, B. de, & Spinoza, B. de. (1910). Spinoza’s ethics. Dent.

SaltSculpt

Fig. 5 Fetus field
The Matrix

Field of synthetically grown human babies which are gathered and transferred by harvester machines to the power plant as older humans die off or are ejected from there.

3. Wachowski, Lana, and Lilly Wachowski. 1999. The Matrix. United States: Warner Bros.

4. Clark, Andy. Natural-born cyborgs: Minds, Technologies, and the future of human intelligence. Oxford Univ. Press, 2010.

5. Koestler, Arthur. The ghost in the Machine. Last Century Media, 2016.

similar positions in our society can then be categorized from singular unique individuals to groups of unique individuals who share portions of their partial identities. The emergence of the holarchy system is produced organically to regulate cyborgs as a collective. “the different levels represent different stages of development, and the holons … reflect intermediary structures at these stages.” 5 The holonic network is developed as a system in which each level in hierarchy possesses a degree of autonomy and self-organization while also being integrated into the larger system. Likewise, the Conatus ability to repair itself and regenerate when sources are available.

Überorgan by Tim Hawkinson and Violence Vitale by Floryan Varennes are artworks that display qualities of rigged out body as well as Conatus manifestation. Überorgan is a physical manifestation of a

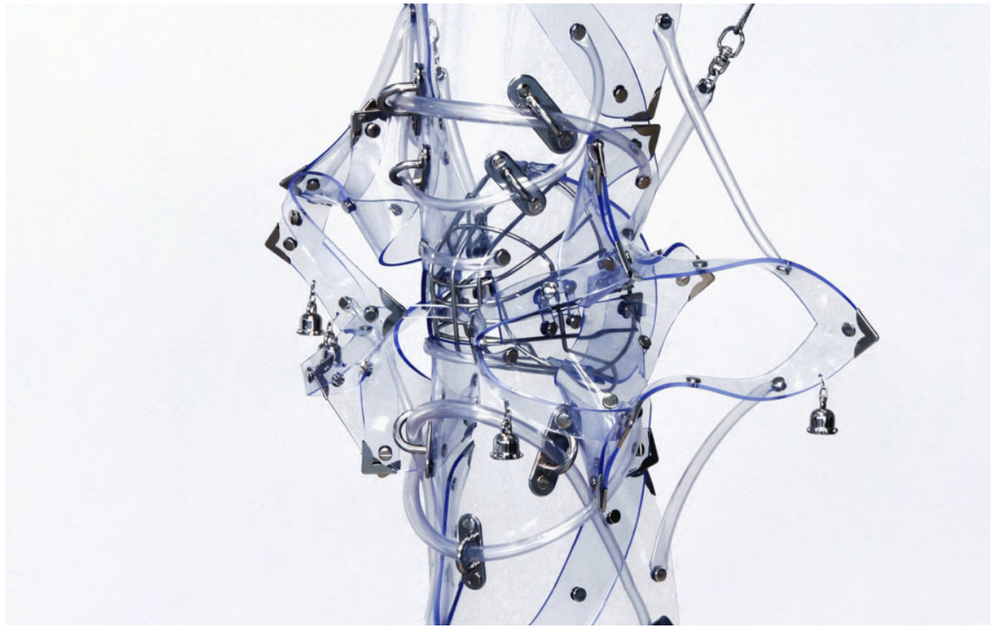
Fig. 6 Mediated Monstrous Siteless Body
Beverly Qin

Inflating breathing machine isolated portrait.

a holonic network of cyborgs. Made with flexible balloon-like skin, a giant blower fills up the skin with air as the space permits. Each balloon is connected to each other with metal tubes of corresponding sizes, creating a visual holonic network. In Violence Vitale, Floryan Varennes explores the possibilities of a rigged-out body.6 The transparent qualities of pvc tubes restrained by stainless steel fasteners represent a series of cyborgs in their habitat. Of various sizes and shapes, the notion of the Conatus instinct is explored.

The cyborg body is commonly attached to the idea of a rigged out body, it also explores the integration of renewable energy sources and sustainable technologies. Buildings may incorporate solar panels, kinetic energy harvesting systems, or other technologies that mimic natural processes to generate energy. Showcasing the autogenous qualities of self-governance or independence, cyborg bodies can develop or grow independently, without relying on external sources for nourishment. In our project, we will explore resilient infrastructure embedded with life and translation into monuments with operations that consist with a degree of autonomy.

6. Violence vitale. KUBAPARIS. (n.d.). https://kubaparis.com/archive/floryan-varennes-violence-vitale



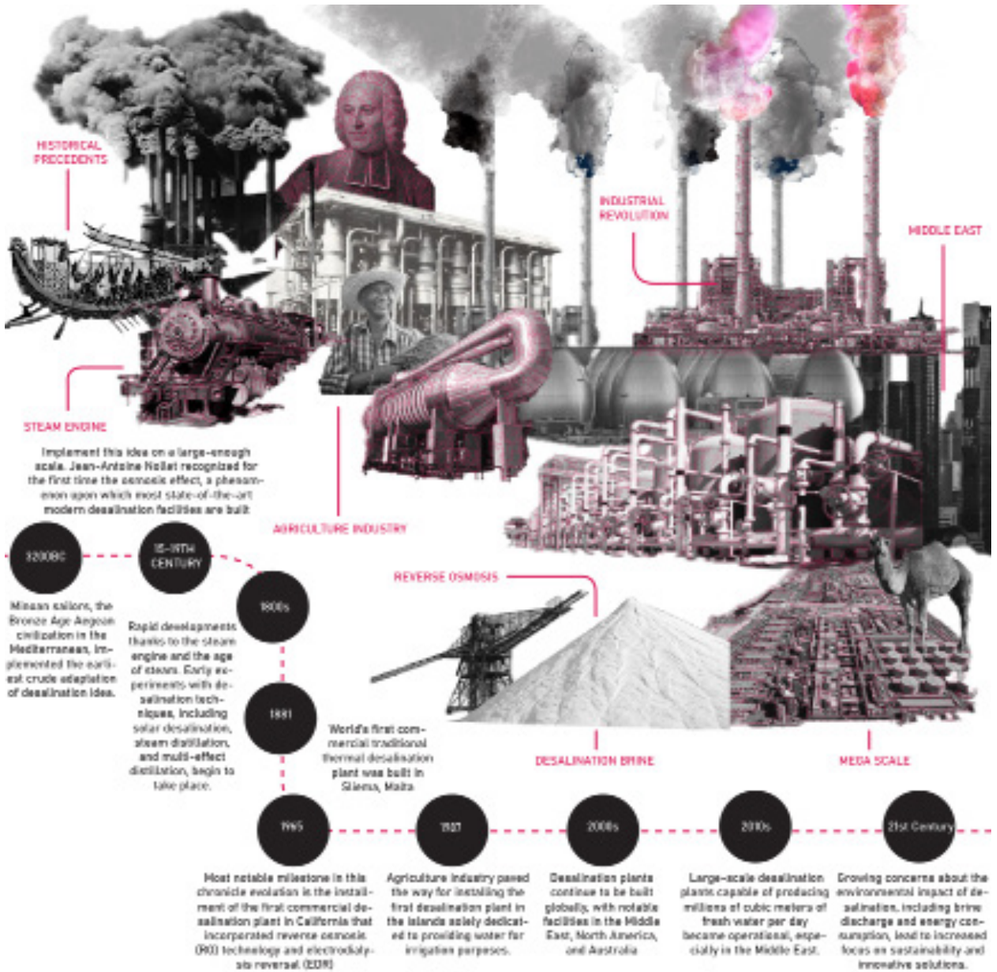


Fig. 7 Modern Infrastructural Constructed Timeline
Beverly Qin + Megan Ju

Visual Timeline that charts key points of Desalination Facility's development throughout history.

Infrastructure Study
Peripheralized Infrastructure

Extracting White Gold of Sicily

Cultivating Water: Desalination

As modern day cyborgs, humans have existed and flourished because of their Conatus nature. The ability to adapt to constantly evolving environments and the invasive nature of humans have put them at the forefront of lives on earth. One recent crisis that is posed in front of us is water scarcity. The lack of fresh water resources has been failing to meet the standard water demand. The frequency of extreme weather events and deficiency of freshwater supply has been on a constant acceleration, and humans are on a cry out for freshwater. Increasing demands for freshwater propel humans to create the monstrous Desalination Industry to extract freshwater from saline seawater. Desalination plants, as a mechanical adaptation humans have grown into built, can be considered a representative example of an extension of human's cyborgness.

Desalination industry has grown steadily and gained traction as a source of unconventional water supply.They are native to desert landscapes with connection to shorelines and remote islands. Historically, they are the freshwater supplier to sailors on voyage, and now the vital freshwater provider of population dense cities in the Middle East like Riyadh. From an environmental perspective, they are horrible for nature and consume a tremendous amount of energy to operate. However, from another angle, they are crucial to our existence.

Through many stages of filtration, saline water is extracted from the sea and is divided into giant piles of seawater brine and fresh water for human consumption or agricultural purposes. One of the inherent challenges of desalination is the effective disposal of the by-product – Brine water. It is the byproduct of the thermal and membrane based desalination process, and its

1. Technologies, Arabic. "Desalination Technologies." SWCC. Accessed November 7, 2023.

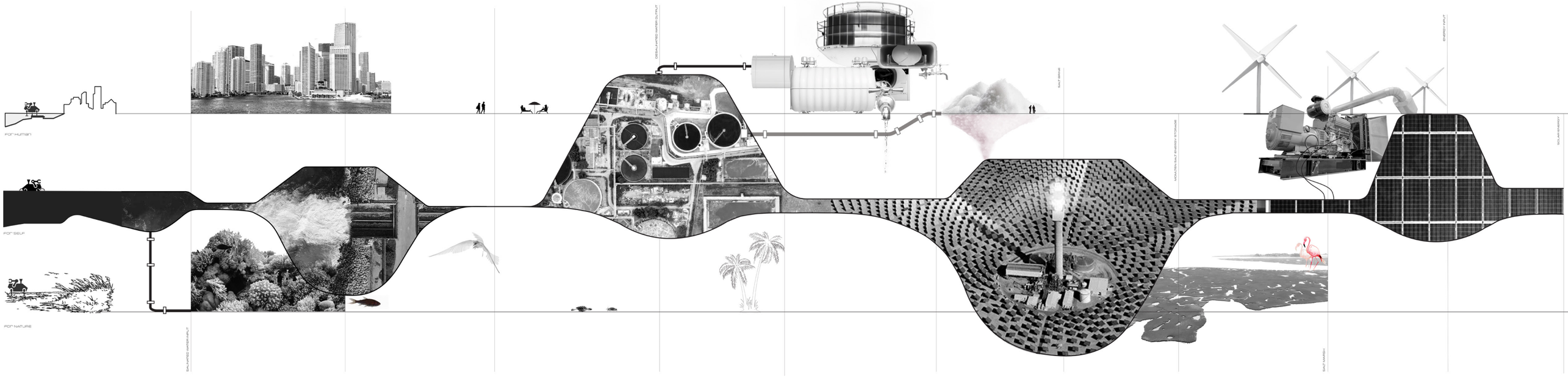
disposal methods and treatments are tricky topics. “Improper brine disposal can cause a variety of environmental issues, potentially endangering marine ecosystems such as seagrass meadows or benthic populations.[2] Another of the most notable aspects of this would be the long-term effects of this practice on the environment like the soil structures, as well as the agronomic effects, such as crop yield and quality, should the agriculture industry begin using desalinated water for irrigation. These giant monstrous facilities take in large quantities of seawater and produce enormous amounts of waste (salt brine). There is no easy way to treat this brine, if dumped back to the ocean, the salt level and temperature increases significantly and disturbs marine life in the area; if processed, there is a separate plant required(chlor alkali) and it also consumes an immense amount of energy. They are so concentrated in minerals and salt that if released back to the sea, the marine lives will be in danger, but if not back in the sea where do they go?

It is prevalent to find giant piles of salt brine lying on the sandy beaches near shallow water bodies. The liquid in slushy consistency of brine eventually evaporates, and leaves the landscape with dry sea salt (Sodium Chloride). However these sea salt particles are not safe for consumption or de-icer operations without proper treatments. The disposal methods and treatments are tricky topics. “Improper brine disposal can cause a variety of environmental issues, potentially endangering marine ecosystems such as seagrass meadows or benthic populations.2 Another of the most notable aspects of this would be the long-term effects of this practice on the environment like the soil structures, as well as the agronomic effects, such as crop yield and quality, should the agriculture industry begin using desalinated water for irrigation. These giant monstrous facilities take in large quantities of seawater and produce enormous amounts of waste (salt brine). There is no easy way to treat this brine, if dumped back to the ocean, the salt level and temperature increases significantly and disturbs marine life in the area; if processed, there is a separate plant required(chlor alkali) and it also consumes an immense amount of energy. They are so concentrated in minerals and salt that if released back to the sea, the marine lives will be in

2. A. Pistocchi a, a, b, c, d, e, f, et al. “Can Seawater Desalination Be a Win-Win Fix to Our Water Cycle?” Water Research, May 15, 2020.

Fig. 8 Allopoetic Concept Diagram
Beverly Qin + Megan Ju

Diagram demonstrating the relationship between human, infrastructure, and non human.



danger, but if not back in the sea where do they go?

It is prevalent to find giant piles of salt brine lying on the sandy beaches near shallow water bodies. The liquid in slushy consistency of brine eventually evaporates, and leaves the landscape with dry sea salt (Sodium Chloride). However these sea salt particles are not safe for consumption or de-icer operations without proper treatments. The salt industry would rather mine salt or dry sea salt directly than use a more energy consuming process to treat salt from salt brine. Overtime, untouched and glistening on the shore, these piles of slushy salt crystallizes and becomes the only rocks we eat.[3]

2. A. Pistocchi a, a, b, c, d, e, f, et al. “Can Seawater Desalination Be a Win-Win Fix to Our Water Cycle?” Water Research, May 15, 2020.

3. Kurlansky, Mark. Salt: A world history. Toronto: Vintage Canada, 2002.

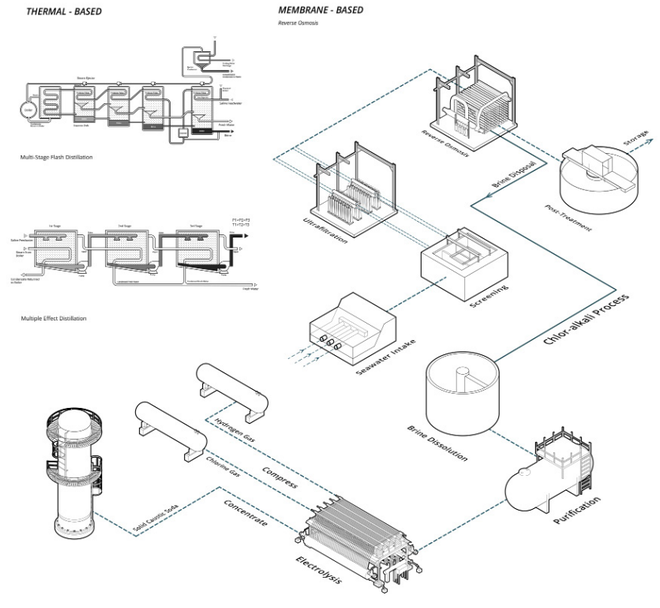


Fig. 9 Reverse Osmosis Facility Cutaway Dissection
Megan Ju

Cutaway drawings displaying the facilities’ internal anatomy in relationship to its external form.

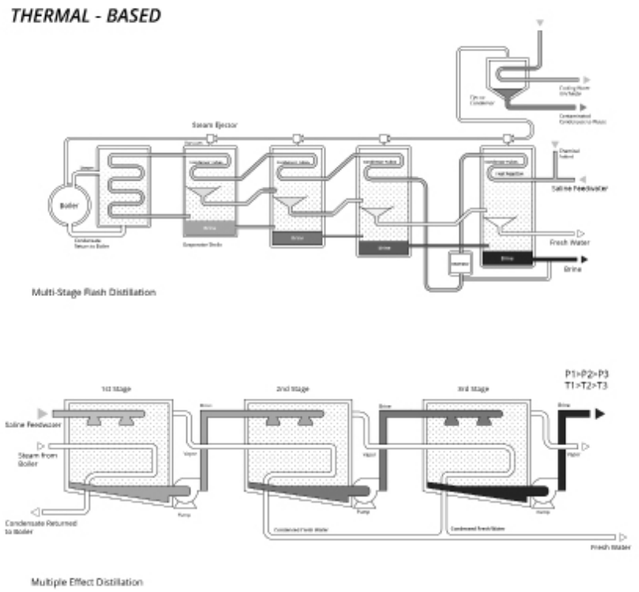


Fig. 10 Reverse Osmosis Facility Cutaway Dissection
Megan Ju

Cutaway drawings displaying the facilities’ internal anatomy in relationship to its external form.

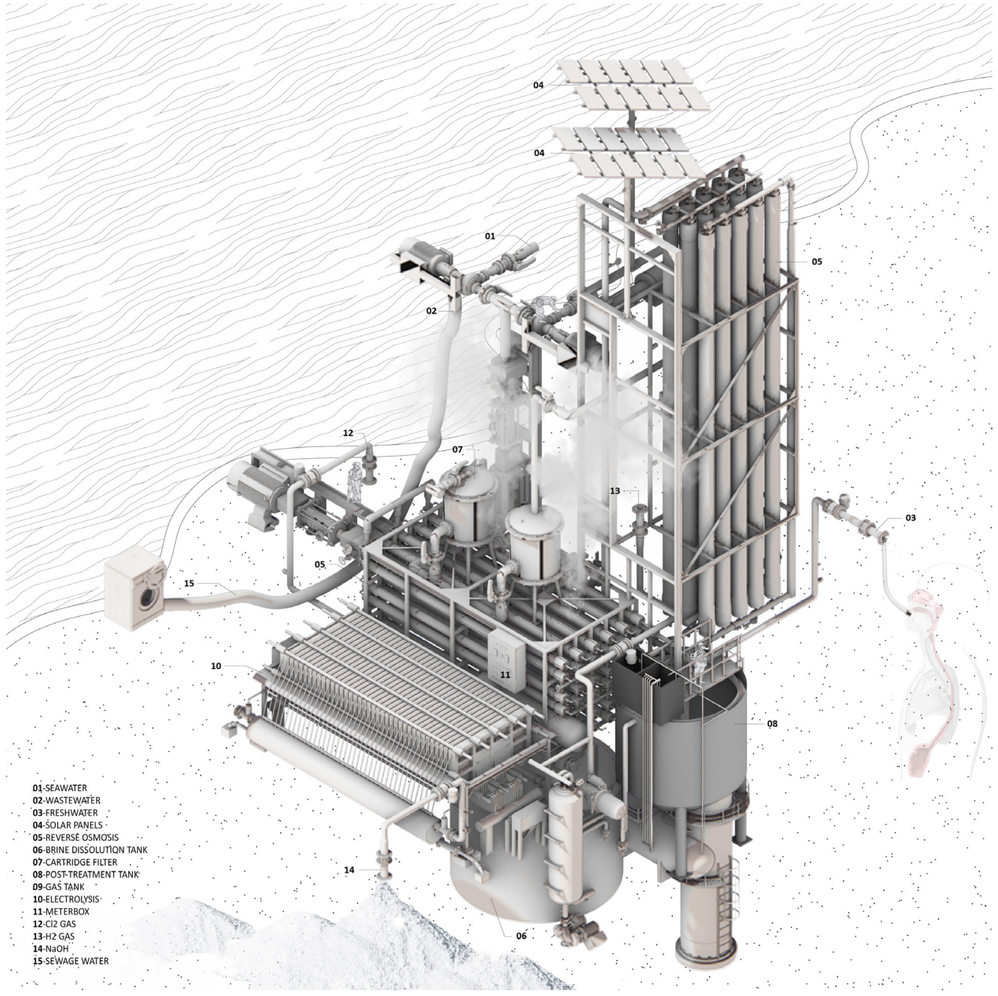


Fig. 11 Allopoesis System Spirit Clump
Beverly Qin + Megan Ju

A supermachine that mashes and collides the organ like machines and facilities required to make desalination process.

Infrastructure Study
Peripheralized Infrastructure

Allopoetic Systems in Infrastructure

Biomimetic Desalination

In the context of the desalination industry, allopoetic systems offer a compelling framework for reimagining resource utilization and waste management. Allopoesis, a term coined by systems theorist Niklas Luhmann, refers to systems that produce something other than themselves. In the case of desalination, this concept opens up new possibilities for transforming salt brine, a byproduct of the desalination process, into valuable resources.

Traditionally, the desalination industry has grappled with the challenge of disposing of salt brine in an environmentally responsible manner. The sheer volume of salt brine generated by desalination plants presents a significant logistical and environmental challenge, as the concentrated saline solution can have detrimental effects on marine ecosystems if not properly managed. However, by adopting an allopoetic approach, desalination plants can repurpose salt brine into useful products, thereby minimizing waste and maximizing resource efficiency.

One promising application of allopoesis in the desalination industry is the extraction of useful minerals from salt brine. Through advanced filtration and extraction techniques, desalination plants can recover valuable minerals such as magnesium, calcium, and lithium from salt brine, which can then be used in various industrial processes. By extracting these minerals, desalination plants not only reduce the environmental impact of salt brine disposal but also create new revenue streams and economic opportunities.

Another allopoetic system that holds promise in the desalination industry is the use of salt brine for energy production. Salt brine has the potential to serve as a renewable energy source through

1. Technologies, Arabic. “Desalination Technologies.” SWCC. Accessed November 7, 2023.

through technologies such as molten salt energy storage. By harnessing the heat energy stored in concentrated salt solutions, desalination plants can generate electricity to power their operations or contribute to the grid. This not only reduces the carbon footprint of desalination but also helps to address energy security concerns by diversifying the energy mix.

Furthermore, allopoesis can also be applied to the production of industrial materials from salt brine. For example, salt brine can be used as a feedstock for the production of chlorine and sodium hydroxide, essential chemicals used in various manufacturing processes. By repurposing salt brine into industrial materials, desalination plants can support local industries and contribute to the circular economy.

In conclusion, allopoetic systems offer a promising framework for transforming the desalination industry and addressing the environmental challenges associated with salt brine disposal. By repurposing salt brine into valuable resources such as minerals, energy, and industrial materials, desalination plants can minimize waste, reduce environmental impact, and create new economic opportunities. As the desalination industry continues to evolve, embracing allopoesis will be essential to realizing its full potential as a sustainable water solution.

2. A. Pistocchi a, a, b, c, d, e, f, et al. “Can Seawater Desalination Be a Win-Win Fix to Our Water Cycle?” Water Research, May 15, 2020.

3. Kurlansky, Mark. Salt: A world history. Toronto: Vintage Canada, 2002.

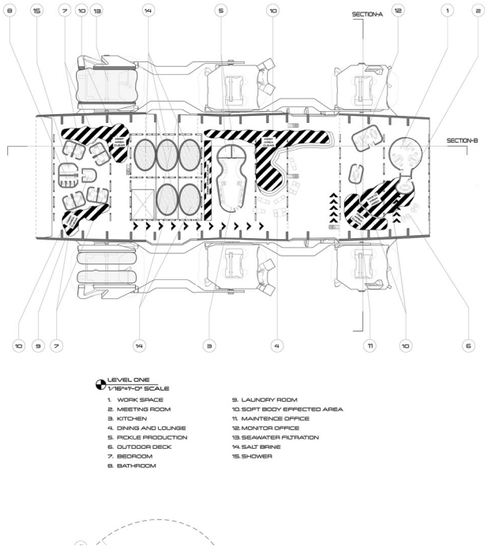


Fig. 12 Intervention Plan
Beverly Qin + Megan Ju

Plan of human’s attempting to be integrated into a machine that was not designed to include them.

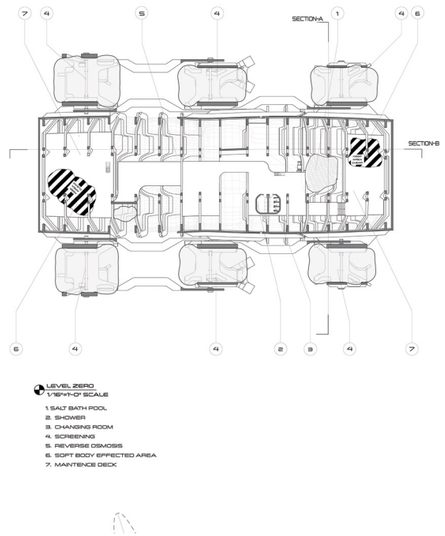
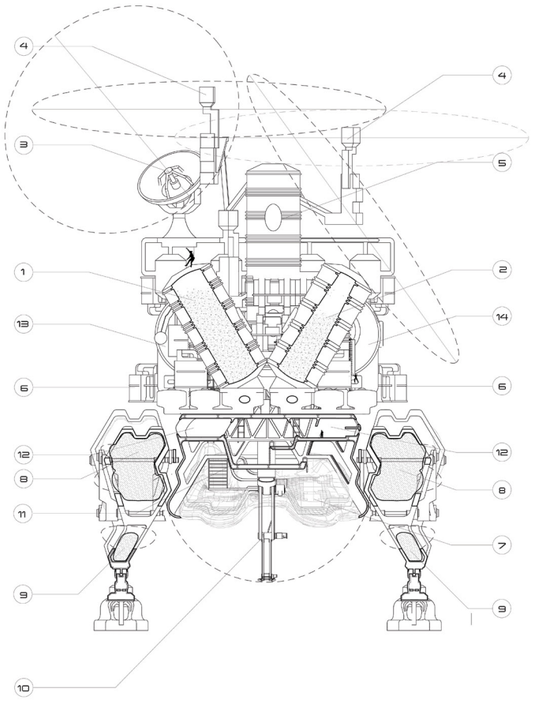


Fig. 13 Intervention Plan 2
Beverly Qin + Megan Ju

Lower pllan of human’s attempting to be integrated into a machine that was not designed to include them.

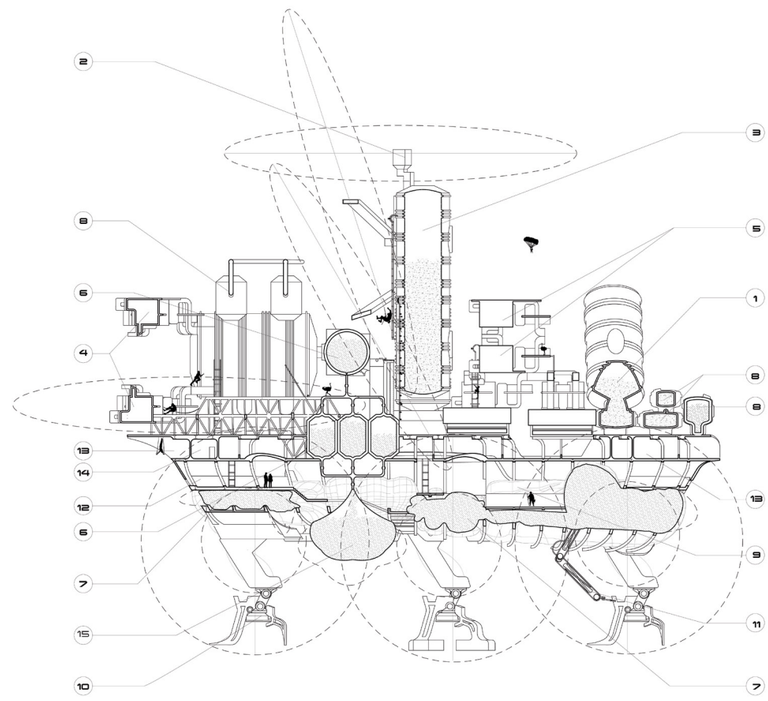


SECTION-A
1/16"=1'-0" SCALE

1. HOT SLAT TANK
2. COOLED SALT TANK
3. SATELITE
4. SOLAR POWER RECEIVER
5. THERMAL STORAGE TANK
6. STEAM TURBINE
7. REVERSE OSMOSIS
8. FILTRATION
9. SCREENING
10. SALT SCULP ARM
11. DIVING DECK
12. MONITOR ROOM
13. HIGH SALINITY WATER
14. LOW SALINITY WATER

Fig. 14 Holarchy Section
Beverly Qin + Megan Ju

Section drawing showing different levels representing different stages of development.



SECTION-A
1/16"=1'-0" SCALE

1.COOLED SALT TANK
2. SOLAR POWER RECEIVER
3. THERMAL STORAGE TANK
4. STEAM TURBINE
5. CONDENSER
6. SALT BRINE TANK
7. REVERSE OSMOSIS
8. FILTRATION
9. SCREENING
10. WATER INTAKE TOWER
11. SALT SCULP ARM
12. DIVING DECK
13. MONITOR ROOM
14. BEDROOM
15. DESLINATED WATER

Fig. 15 Allopoetic Section
Beverly Qin + Megan Ju

Systems that draw inspiration from natural processes to solve human challenges. The chain of operation is a result.

Lexicons

1. Gray, Chris Hables. The cyborg handbook. New York, NY: Routledge, 2009.

2. Bynum, Caroline Walker. Metamorphosis and identity. New York: Zone Books, 2005.

3. Koestler, Arthur. The ghost in the Machine. Last Century Media, 2016.

Partial identity:

“A Cyborg Manifesto,” by Haraway explores the idea of partial, fragmented, and multiple identities. “A cyborg world might be about lived social and bodily realities in which people are not afraid of their joint kinship with animals and machines, not afraid of permanently partial identities and contradictory standpoints” (Cyborg Manifesto, Donna Haraway. Page 386)

To be a cyborg, one organism must be disassembled and resemble a technological element. Partial identity suggests that the essence of who a person is, their sense of self, and their identity is not confined solely to their human qualities.

Holarchy:

“the different levels represent different stages of development, and the holons … reflect intermediary structures at these stages.” (Koestler, p. 61)

“A cyborg exists between self-controlled, self-governing machines (autonomous) and organisms, especially humans(modes of autonomy).” (Donna Haraway, Cyborgs and Symbionts: Living Together in the New World. Page 1.)

A system in which each level in hierarchy possesses a degree of autonomy and self-organization while also being integrated into the larger system. In this case, the ability to repair itself and regenerate when sources are available. This concept was introduced by Arthur Koestler, a Hungarian-British author and philosopher, to describe a system in which entities or elements are organized into a nested hierarchy, with each level possessing a degree of autonomy and self-organization while also being integrated into the larger system.

Inflating vs. Deflating:

Actions the monster does in response to the amount of humidity absorbed from its surroundings. Inflates when harvested sufficient water, deflates when it’s containing low levels of water.

Überorgan was an exhibition piece that inspired my monster. The action of inflating and deflating is seen as a sign of being alive, and I also reference the idea of it fills up spaces it inhabits. “Überorgan is an incredibly oversized organ of sorts that typically fills up whatever space it inhabits.” The piece uses a flexible translucent material that can fit in different spaces.

Viscous Porosity:

“The human body is radically open to its surroundings and can be composed, recomposed, decomposed by the other bodies. Whereas is a model of incorporation, the human self remains the selfsame… Viscous porosity of flesh - my flesh and the flesh of the world. This porosity is a hinge through which we are of and in the world” (Alaimo, Bodily Natures). Thick while weaved with holes. Just like a membrane, bodies are able to permeate through the porosity while the skin is tightly bonded in a viscous relationship. The boundaries between the human body and the natural environment are permeable and interconnected. It highlights the idea that these boundaries are not rigid or impermeable but rather fluid, dynamic, and constantly interacting. In essence, it suggests that the human body and the environment are intimately entangled, with materials, energies, and information flowing between them.

Conatus:

“Each thing, as far as it can by its own power,

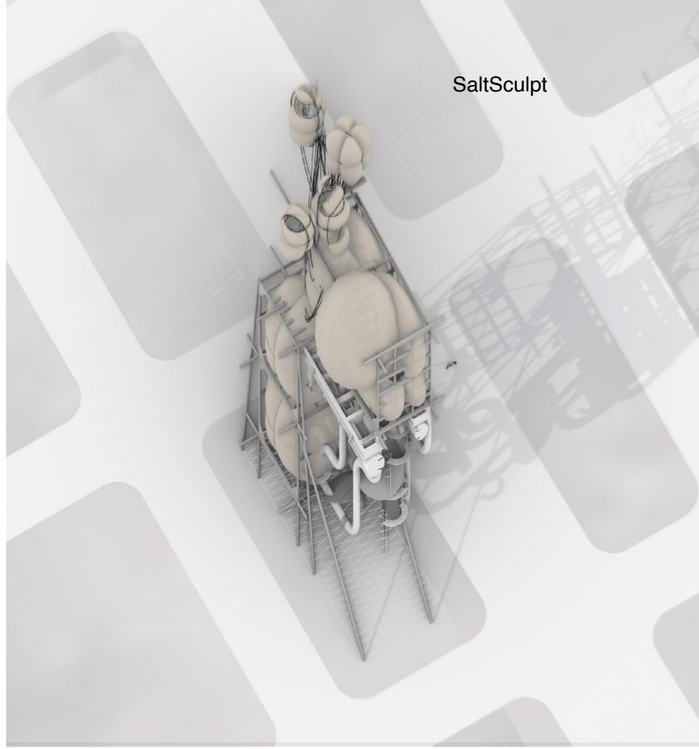


Fig. 16 Monstering Infrastructural Bodies
Beverly Qin

Isolated oblique drawing of monstrous body situated in monster parate lot.

Like any other organism when hurled into the flow of evolution - that one must hold together growth and decline, reparation and aggression, negotiating doses between one and the other.

Autogenous:

Refer to organisms that consist of qualities of self-governance or independence, can develop or grow independently, without relying on external sources for nourishment.

.03

Context Mapping

The escalating frequency of extreme weather events and the scarcity of freshwater have prompted a desperate plea for water resources from humans. In conjunction with the rising demand for freshwater are the sinking cities that are troubled by rising sea levels. These events are giving rise to the formidable Desalination Industry to extract fresh water from saline seawater. Desalination plants require massive seawater intake, consequently, comparatively even greater output/production of salt brine. Salt piles can be found in both rustic and urban landscapes. Located along coastal shores, desalination plants place its salt brine waste along the shallow water bodies as a temporary solution. In urban cities, salt piles are commonly found in the process of transportation and pouring down the backs of sanitation trucks as the go-to-de-icer. Overtime, salt piles have become a type of global coalescence legible in the urban landscape.

The salt piles that are left alone along the shores have become a phenomenological landscape. As temperature rises, the water in those piles evaporates and forms enormous structures of solid crystals. The fields of abandoned salt piles are the monsters among the landscape. Another contributing factor to this phenomenon is the deficient energy sources to power desalination plants. As most available energy is used to operate these giant infrastructures, properly treating the waste brine becomes insignificant to those in controlling positions.

To repurpose the brine, it will be used as construction material for a barrier island to combat rising sea level and storms. Project function will follow the projection of current desalination infrastructure, to treat water for usage, in conjunction with building defense to climate events across the water body. With less control over the natural environment, the infrastructure becomes the new body of environment. Humans designed the infrastructure to adapt to the uncontrollable landscape. More than just a repository of infrastructural waste, the questions of how to situate infrastructure in such monstrosity, and how humans situate in infrastructure becomes the topic this project attempts to respond to.

1. Nordlinger, Eric A. Decentralizing the city: A Study of Boston's Little City Halls. Cambridge: Mass., 1972.

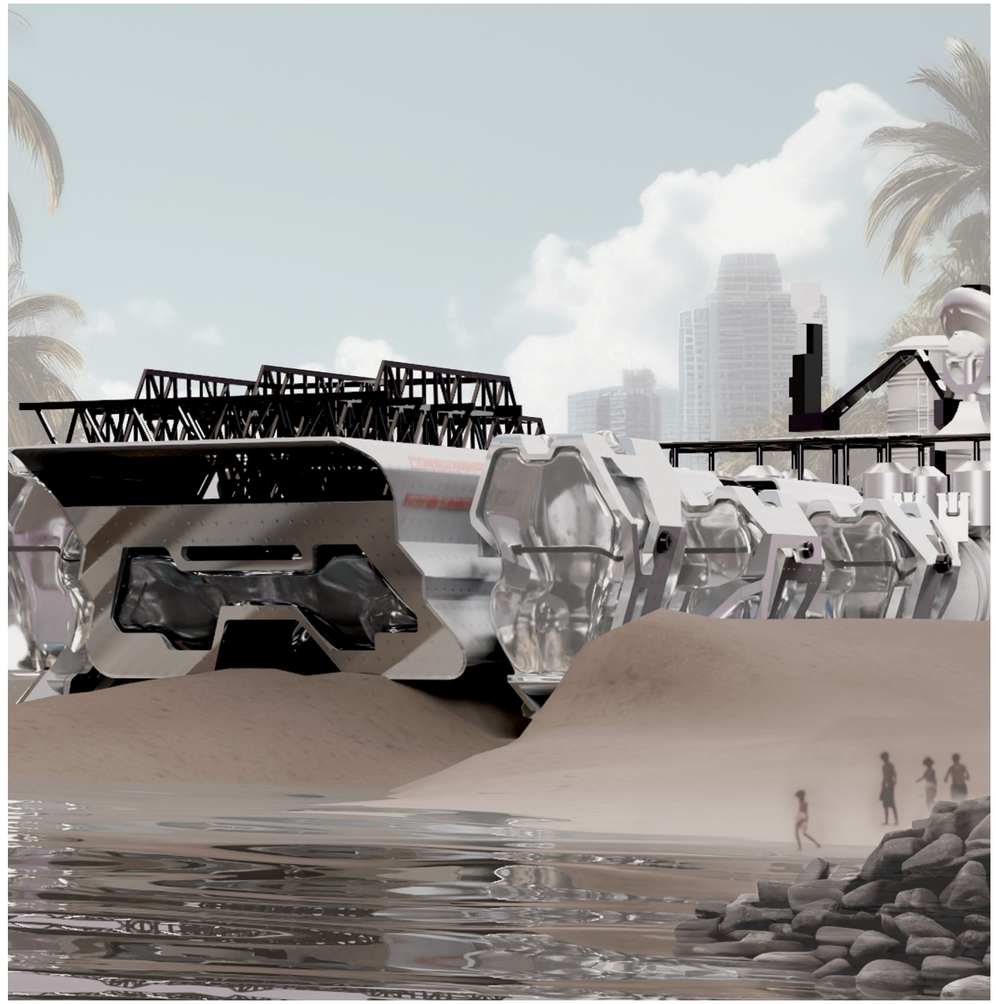


Fig. 17 Context Mapping
Beverly Qin + Megan Ju

Infrastructure resting and charging in its nest.

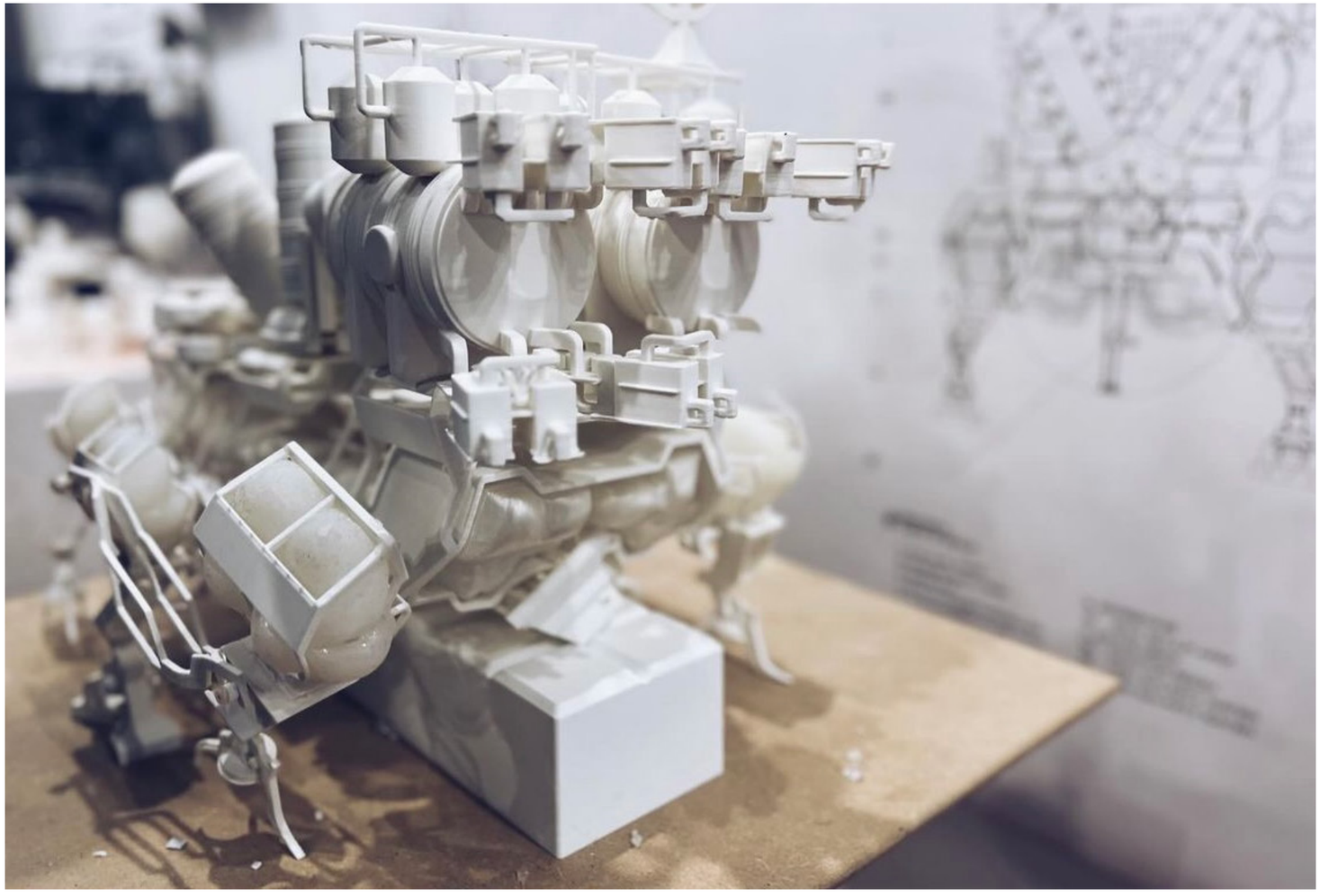


Fig. 18 Model Documentation
@synthesisdna on Instagram

A photo of the 1/16" scale physcial model at the final review.

.04

Design Method Statement

I learned digital animation using Cinema 4D and the application of 3D printing technologies to create physical models. Through research and experimentation, I have not only expanded my technical skills but also gained valuable insights into the potential of these tools to enhance the design process and communicate complex ideas.

Cinema 4D has emerged as a powerful tool in my design toolkit, allowing me to bring dynamic movement and life to architectural concepts. In the context of our project on nomadic infrastructure, I have utilized Cinema 4D to animate the walking movements of the infrastructure as it traverses coastal landscapes. By meticulously crafting each step and motion, I have been able to visualize how the infrastructure interacts with its environment and adapts to changing conditions. Through this process, I have gained a deeper understanding of the spatial and temporal aspects of design, as well as the importance of movement in shaping the user experience.

In addition to digital animation, I have explored the use of 3D printing to create physical models that embody the organic geometries of our nomadic infrastructure. Drawing inspiration from natural forms and patterns, I have employed parametric design techniques to generate complex geometries that are both visually striking and structurally sound. By leveraging the precision and flexibility of 3D printing technology, I have been able to translate these digital designs into tangible objects that serve as prototypes for further exploration and refinement. Through this hands-on approach, I have gained a

deeper appreciation for the iterative nature of design and the importance of physical prototyping in the creative process.

Moreover, by researching precedents and examples within architecture and other creative fields, I have expanded my understanding of representational and modeling practices. Studying the work of leading designers and artists, I have gained valuable insights into the diverse approaches to visualization and representation, from hand-drawn sketches to advanced digital simulations. By critically analyzing these precedents, I have been able to identify key trends and techniques that inform my own design practice, while also recognizing the importance of experimentation and innovation in pushing the boundaries of conventional design methods.

In conclusion, my exploration of design methodologies this semester has been a transformative journey of discovery and experimentation. Through the integration of Cinema 4D animation and 3D printing technologies, I have expanded my technical skills and gained valuable insights into the potential of these tools to enhance the design process. By researching precedents and examples within architecture and other creative fields, I have deepened my understanding of representational and modeling practices, while also cultivating a spirit of curiosity and exploration that will continue to inform my future work as a designer.

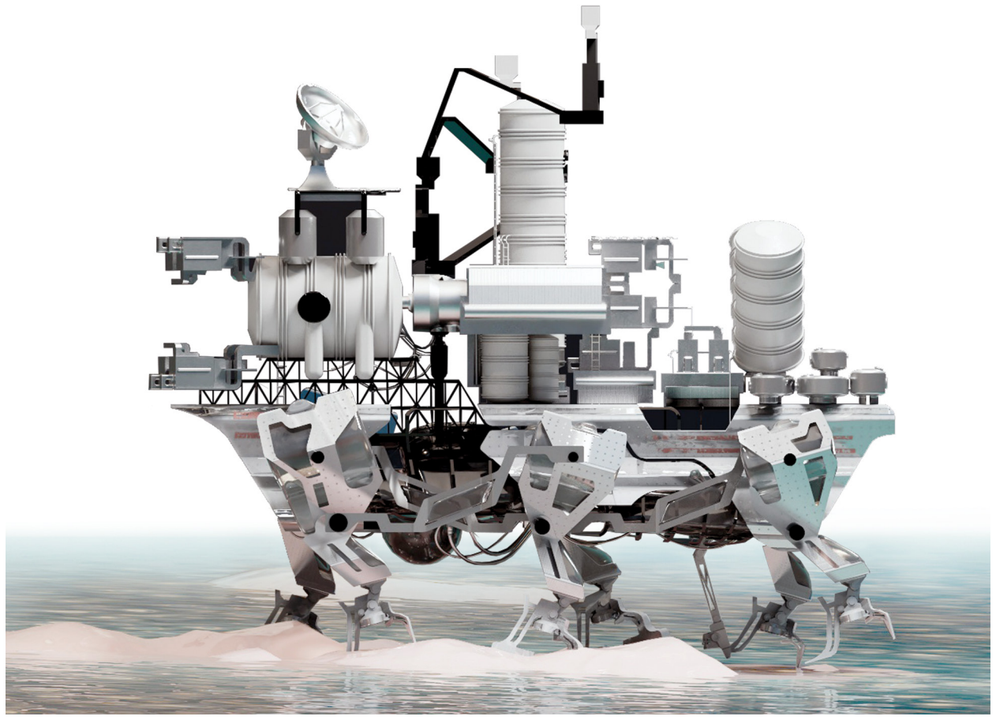


Fig. 19 Side Elevation

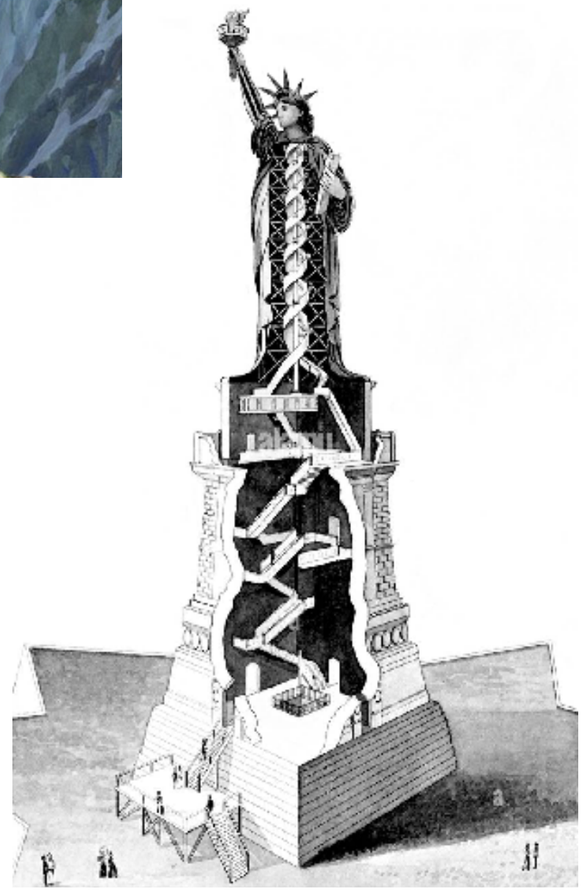
Beverly Qin + Megan Ju

Fig. 20 Howl's Moving Castle
Diana Wynne Jones

Inspiration and precedent for moving architecture.

Fig. 21 Statue of Liberty, Sectional Diagram
Science History Images

Structure inside the Statue of Liberty, example of embedded life monument.



.05

Fig. 22 Self Centered Operation Render
Beverly Qin + Megan Ju

A short animation of the infrastructure serving nature.

Project Statement

SaltBound Nomad emerges as a response to the pressing crisis of climate change-induced sea level rise and extreme weather events. It embodies a transformative approach to coastal resilience, challenging conventional models of infrastructure by proposing a nomadic desalination system that restores shorelines with salt. The nomadic infrastructure absorbs brackish water, processes into consumable water through a system of membranes, and treats byproducts of brine into constructable materials. While the treated water will be transported to neighboring dense urban areas, the residual brine will be mixed with algaes collected in the process of water intake, and be sculpted into salt marsh landscapes responding to threats of climate change, coastal erosion, sea-level rise, and flooding.This dynamic equilibrium between human intervention and natural processes redefines the boundaries between nature, technology, and human control.

The project offers a multiplicity of views and perspectives to diverse occupants. It not only prioritizes human well-being but also fosters a symbiotic relationship with other organisms and the environment. This project directly acknowledges the conflict between human activities and the natural world, embodying fluid boundaries between humans, environment, and machines.

Humans demand freshwater through the process of desalination, where it necessitates the development of new systems for energy regeneration and the management of the large amount of salt brine byproduct produced, resulting allopoietic systems which produces something other than the system itself. This project questions the disproportionate input of energy and output of salt brine in the desalination industry and delves into possible allopoietic systems generated by these operations, aiming to redefine waste management by repurposing byproducts for coastal restoration and energy generation. While humans treat salt brine as byproducts, the monster

sees the salt as a major resource of energy through molten salt energy storage. Reciprocally, the monster sees processed water as the byproduct.

As SaltBound Nomad navigates along coastal regions, it represents a departure from traditional notions of infrastructure. By adopting an adaptive approach to coastal management, it provides essential freshwater resources while also restoring shoreline habitats through salt marsh construction. This nomadic journey becomes not just a logistical necessity but a deliberate act of ecological restoration and resilience-building, guided by principles of regenerative design and environmental justice. The symbiotic relationship and biomimicry embedded within SaltBound Nomad transcend the typical human-nature dichotomy. Biomimetic design of the soft bodies enhance the adaptability to unpredictable environmental forces, blurring the boundaries between artificial and organic forms. It embodies a mutualistic connection between human activities and natural processes, actively engaging with dynamic forces such as wind, water, and ecological succession.

Integral to SaltBound Nomad is the expression of a cyborg monster, symbolizing adaptability and self-awareness within the project. This entity navigates dynamic environmental forces, communicating with the natural world through responsive design elements. The upper part focuses on infrastructure elements while the lower body takes a more biological form, expressing ambiguity between mechanical and biological realms. This ambiguity highlights the project's fluid boundaries and challenges static definitions of infrastructure.

SaltBound Nomad's saltwalk unfolds in five distinct stages, each revealing the project's dynamic interaction with its environment and the human world. Beginning in the lower tide area near the shore, the infrastructure walks into the sea, intaking seawater through specialized legs to initiate desalination. Advancing to the second stage, it utilizes an extendable print arm to sculpt salt marshes along the shoreline, contributing to habitat restoration. Transitioning to the ground area in the third stage, SaltBound Nomad accesses human-provided maintenance and energy inputs. Upon reaching charge stations, it enters a nesting phase, replenishing energy reserves for further activities. The final stage embodies the project's autonomy as it dives away into the ocean for self-exploration, showcasing its dynamic and independent role within the coastal ecosystem.

The project's stance on human presence is equally dynamic. While humans are integral to the project's development and operation, their role is relatively temporary within the project's context. The spaces created by SaltBound Nomad are not intended solely for human use; rather, they accommodate humans who choose to follow the infrastructure by creating their own temporary spaces. This approach reflects a philosophy of coexistence and adaptation rather than dominance or control.

SaltBound Nomad also presents an antagonistic relationship with human desires. While human desire is infinite and constantly evolving, the infrastructure will never fully satisfy these needs. This antagonism highlights the inherent tensions between human aspirations and environmental limitations. As humans push away and other the infrastructure, the infrastructure reciprocates by walking away and othering humans, embodying a dynamic interplay of desires, limitations, and adaptability.

Through its selfless provision of clean water for human and non-human inhabitants alike, and its selfish harnessing of energy from human infrastructural byproducts, SaltBound Nomad embodies a paradoxical duality that is essential for navigating the complexities of our rapidly changing climate landscape. By challenging traditional notions of infrastructure and embracing a nomadic ethos of adaptation and resilience, our project offers a compelling vision for the future of coastal resilience and environmental stewardship. SaltBound Nomad is not just a physical intervention; it is a manifesto for a more harmonious and sustainable relationship between humans and the natural world.

2. A. Pistocchi a, a, b, c, d, e, f, et al. "Can Seawater Desalination Be a Win-Win Fix to Our Water Cycle?" Water Research, May 15, 2020.

Fig. 23 Detail Render
Beverly Qin + Megan Ju

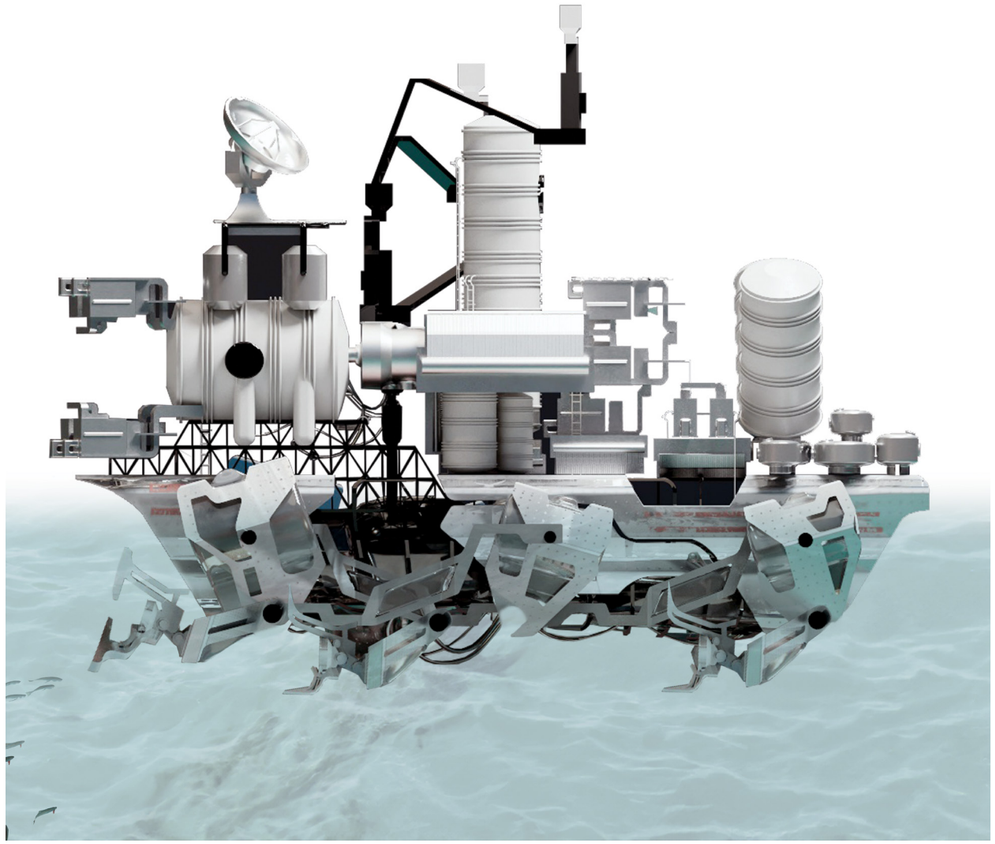


Fig. 24 Self Centered Elevation
Beverly Qin + Megan Ju

Infrastructure in deeper ocean explroing for itself.

06.

SUPPORTING MATERIALS

Original Visual Assets by Beverly Qin & Megan Ju

Including: charts, information graphics, maps, diagrams, photographs, digital collages, analytical drawings, speculative/ discursive drawing

1. A cyborg, short for cybernetic organism, is a being that combines both biological and artificial components. These technological enhancements can range from integrated implants and prosthetics to advanced neural interfaces, allowing for a seamless integration of human and machine elements. Cyborgs often blur the line between man and machine, enabling enhanced capabilities and performance, and are a fascinating intersection of biology and technology in the ongoing evolution of humanity.

1. Desalination is a vital process that addresses water scarcity by removing salt and other impurities from seawater, making it suitable for human consumption and agricultural use. The primary methods of desalination include distillation and membrane processes. In distillation, seawater is heated to produce vapor, which is then condensed back into liquid form, leaving the salt behind. Membrane processes, such as reverse osmosis, involve passing seawater through semipermeable membranes that selectively allow water molecules to pass while blocking salts. Desalination plays a crucial role in ensuring a sustainable and reliable freshwater supply, particularly in regions facing water shortages.

1. With nearly 70% of its water supply derived from desalination, Saudi Arabia is a global leader in the field. The nation predominantly utilizes the reverse osmosis method, where seawater is forced through membranes to separate salts and impurities. The massive desalination plants along the coastline, such as the notable ones in Jubail and Yanbu, contribute significantly to the country’s water security, supporting both domestic consumption and agricultural needs. This proactive approach to desalination technology underscores Saudi Arabia’s commitment to ensuring a sustainable and sufficient water supply for its growing population and diverse economic activities.

:Environmental Concerns
Intake: In the United States, cooling water intake structures in desalination facilities can have negative environmental impacts, similar to those of power plants, by sucking in and potentially harming fish and .shellfish
Alternative intake methods like beach wells exist but are more energy-.intensive and costly
Outflow: Desalination processes generate large quantities of brine and may contain chemical residues, byproducts, and heavy metals. To mitigate environmental impact, brine can be diluted with other water streams before discharge. Zero liquid discharge systems can treat brine before disposal. Some desalination plants are made movable to prevent the buildup of concentrated brine in .one location
The need for land and pipelines near the shoreline can pose environmental risks, including the potential for leaks .into aquifers
Certain types of desalination plants can generate loud noise, impacting .the environment
:Health Aspects
Iodine Deficiency: Desalination removes iodine from water, potentially increasing the risk of iodine deficiency)disorders. (Israel

Fig. 25 Drawing Field
Outpost Office

The project began by considering the material and performative implications mobility. Drawing Fields utilizes GPS-controlled field marking robots to draw site-specific, 1:1 scale drawings on the Ragdale campus.

Image Captions & Credits

Fig. 5 Fetus field
The Matrix

Field of synthetically grown human babies which are gathered and transferred by harvester machines to the power plant as older humans die off or are ejected from there.

Fig. 18 Model Documentation
@synthesisdna on Instagram

A photo of the 1/16” scale physcial model at the final review.

Fig. 20 Howl’s Moving Castle
Diana Wynne Jones

Inspiration and precedent for moving architecture.

Fig. 21 Statue of Liberty, Sectional Diagram
Science History Images

Structure inside the Statue of Liberty, example of embedded life monument.

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Citations & Bibliography

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