Melting Away

Ilha Formosa

Hao-Chun Chang

Thesis Book 2020

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Melting Away
—Ilha Formosa

A thesis submitted in partial fulfillment of the requirements for the degree Master of Design in Interior Studies [Exhibitions & Narrative Environments] in the Department of Interior Architecture of the Rhode Island School of Design

By
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We only recognize what is special when we begin to lose it

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Chapter1 Introduction

Motivation

Fishing has long been an important part of Taiwan's economy, and the island is a major player in the global seafood industry despite its relatively small population of 24 million. The diversity of marine life and fishery resources is very rich, and the annual production of fisheries is up to 1.2 million tons. Seafood is also a very important part of Taiwanese food culture, but with the government's long-term disregard for the depletion of Marine Resources has led to a lack of awareness among 80% of the Taiwanese people about the Marine crisis[1].

The World Wildlife Fund (WWF) has pointed out that if the destruction of the ocean continues, then in 2048 there will be no fish to eat[2]. The sustainable utilization of marine resources is not only the responsibility of the fishermen or the government. As consumers, we can pay more attention to where the seafood comes from and eat seafood which has less impact on the environment.

1 The Council of Agriculture (ROC)

2 Documentary – The End of the Line

Abstract

Taiwan lies in warm, tropical water, and fishing has long been an important part of its economy. Both the Han Chinese from the coast of China and the Westerners in Europe brought commercial trade and cultural exchange between the East and the West through navigation over the past 500 years. For most of this period, people have assumed that our vast ocean was limitless and immune to human impact. It's only recently through the struggles of fishermen that we come to realize the devastating effects we have already had on the sea: global warming, plastic pollution, and overfishing. As Callum M. Roberts reveals in The Unnatural History of the Sea, the oceans' bounty didn't disappear overnight. While today's fishing industry is ruthlessly efficient, intense exploitation began not in the modern era, or even with the dawn of industrialization, but in the eleventh century in medieval Europe. This long and colorful history of commercial fishing may no longer continue if the government and society as a whole don't act now to save our oceans and the bounty they contain.

We must reconsider the relationship humans have with the ocean. Take the female divers of Jeju Islands, South Korea, as an example: by using only flippers and goggles — no breathing equipment — they scour the sea bottom for abalone, conch, and octopus. Of course, their productivity cannot be compared with industrial fisheries, but this is how the island people develop a unique traditional culture so that the resources of the ocean are not depleted. Taiwan must find their own way to coexist with the ocean sustainably.

This thesis will focus on cultural preservation and education of not just fishermen, but consumers of marine life. The site is located on Badouzi Fishing Port, which is ideally situated to bring awareness to the general public and revitalize communities nearby that have been abandoned due to the decline of the fishing industry. By combining the wholesale fish market with an exhibition that explains this situation in three parts, from the current crisis to how we devastated the sea in the past and ending with how to correct the current fishing environment, fisherman and residents will be moved to develop a more balanced/friendly/realistic relationship with the ocean.

Chapter2 Research

History of Fisheries

–1895

In the early days, Fisherman from Fujian and Guangdong coastal areas in mainland China, cross the dangerous “black trench” to Taiwan with rudimentary ships, Settling down and starting their new life. [1]

Fig 1

1895–1945

During the Japanese colonial period, the construction of Taiwan’s modern fishery has gradually been established by the Japanese government, and the fishermen have learned the knowledge and skills, which has laid the foundation for Taiwan’s fishery. In the wake of the Pacific War, fishing boats were requisitioned by the Japanese government, and fisheries shrank because fishing ports and facilities were destroyed, catches plummeted, and Taiwan’s fisher came to a near-complete halt.

1946–1970

After the war, the government starts restoration of the fishing industry by actively invested in small and medium-sized havens, ice factories and freezing plants[2], fishing ports and road facilities, and building new powered fishing boats to quickly restore production.

Fig 2

1971–1990

In the early stage of recovery, the rapid development of fishery has caused damage to Coastal Resources. Given the decline in coastal fisheries resources, the government began to put artificial reefs into the water and start fish farming.[3] During this period, there's a big breakthrough in aquaculture research, Tilapia become the most important farmed fish.
In 1987, the Council of Agriculture developed the "Fisheries Development Program", targeting deep-sea fishing, and the production increased rapidly.

Fig 3

1991–2011

In July 1987, the government announced the lifting of the martial law, began to expand the Marine activities, and actively promoted recreational fishing. In 1999, the Council of Agriculture promoted the "multi function fishing port" project, invested in the construction of fishing port.[4]

Fig 4

1 http://www.cmri.org.tw/contents/news/news.asp

2 http://www.cmri.org.tw/contents/news/news.asp

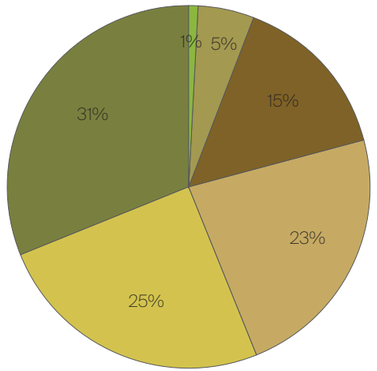
3 https://tm.ncl.edu.tw/article?u=022_004_00003312

4 https://tm.ncl.edu.tw/article?u=022_004_00003312

Analysis of Fisheries

Taiwan's fishery production can be divided into four categories, including deep-sea, offshore, coastal fisheries and aquaculture. The deep-sea fisheries production accounted for 58%, seemingly the first, but 91% of them are directly exported, providing domestic fish cargo only 5 million tons, and the second place in production is aquaculture. Due to the depletion of marine resources, the number of aquaculture fisheries directly consumed by humans has exceeded the number of capture fisheries.

Deep-Water Fisheries

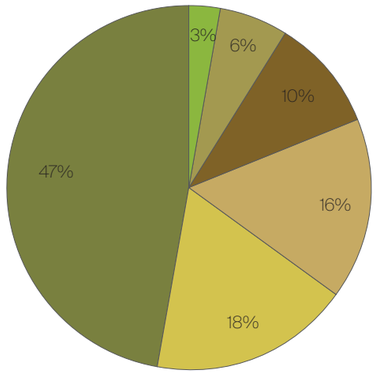


15% Squid Jigging
25% Purse Seune For Tuna
31% Tuna Long Line
23% Torch Light Net For Saury
5% Otter Trawl
1% Others

Distant water fishery refers to the fishing activities conducted in areas outside the 200-mile Exclusive Economic Zone (EEZ) of the country. The main types of fishing method used include tuna long-line fishing, tuna purse seine fishing, light inductive saury fishing, squid jigging and trawling. The average annual production in recent years is around 765 thousand tons, with a value of NT$44.6 billion. In terms of its scale, Taiwan's distant water tuna fishery can be considered as the most leading player in the world, and its saury fishery has the second largest landings among the all players. Having a fleet of more than 2,000 fishing vessels, the fishing activities of Taiwan's distant water fishery cover all three major oceans of the world. Through bilateral fishing access agreements, tuna fishing vessels fish in the EEZ of some 26 coastal countries[1].

To effectively manage the distant water fishing vessels operating in the major oceans, and in line with the measures adopted by international fisheries organizations, the government has formulated and amended relevant domestic rules and regulations with an aim to ensuring the sustainability of this fishery. Meanwhile, to achieve responsible fisheries management, the government has adopted effective measures on monitoring, control and surveillance (MCS) for compliance by fishing vessels. Measures in the MCS include establishment of list of fishing vessels authorized to fish, implementation of the statistical document scheme for tuna exports, establishment of onboard observers program, reporting of vessel positions through satellite-base vessel monitoring system(VMS), implementation of high seas boarding and inspection, and carrying out port inspections[2].

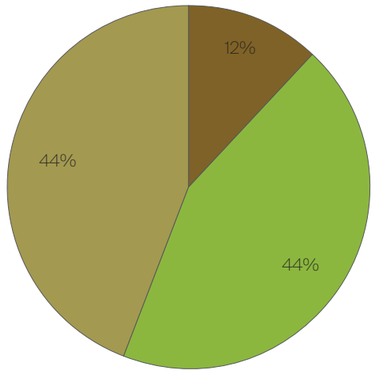
Coastal and Offshore Fisheries



10% Long Line
18% Drag Net
47% Taiwanese Seine
6% Gill Net
3% Set Net
16% Others

Coastal and offshore fisheries refer to those fishing activities conducted in Taiwan's internal waters, territorial sea and EEZ. The main types of fishing methods used include drag net fishing, small-scale trawling, long-line fishing, gill-net fishing, etc. The average annual production in recent years is about 185 thousand tons, with a value of approximately NT$ 14.6 billion. The policies and measures adopted for the management of these fisheries are based on the objectives of conservation of fisheries resources and restoration of the marine ecosystem. Measures applied to support these policies include vessels buyback program for reducing fishing capacity, promotion of fishing layoff, establishment of closed areas and marine conservation areas for the protection of habitats. In addition, hatchery- reared larvae is released for restocking of fishery resources to improve the environment of fishing grounds. Meanwhile, fishermen are encouraged to diversify their activities to recreational fishing, such as angling, and whale and dolphin watching, etc., thus giving the development of coastal and offshore fisheries a multi-faceted dimension[3].

Aquaculture



12% Marine Culture
44% Fresh Water Pond Culture
44% Brackish Water Pond Culture

Situated in the sub-tropic, Taiwan is well developed in aquaculture. With technologies and research in fish seed propagation and advanced aquaculture techniques, more than one hundred aquatic species are being farmed in Taiwan. This industry is divided into three major categories: freshwater pond aquaculture, brackish water pond aquaculture and marine culture. In recent years, the total area for aquaculture is approximately 40 thousand hectares, with an average annual production of about 316 thousand tons, and a value of approximately NT$ 35.1 billion. It is the policy objective of the government to seek rational utilization of water and land resources, improvement of the quality and sanitary standards of aquaculture products, development of specialized aquaculture areas and giving guidance for diversifying to the development of marine culture. In addition, strenuous efforts have been made in the establishment of aquaculture infrastructure, such as building of water drainage system and seawater supply system, development of sea caging, as well as providing guidance to farmers in integrating aquaculture zones with recreational industry in order to diversify their operations[4].

1 https://www.newsmarket.com.tw/blog/104163/

2 https://www.newsmarket.com.tw/blog/104163/

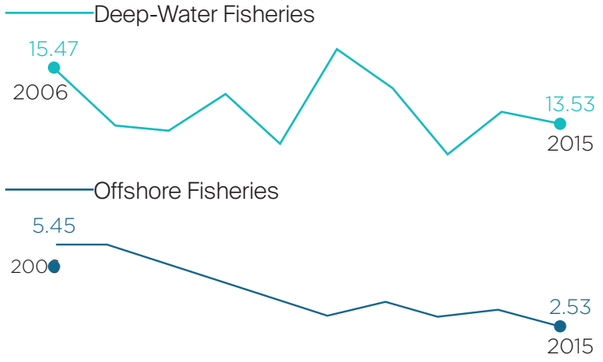
3 https://www.fa.gov.tw/cht/PublicationsFishYear/index.aspx

4 https://www.fa.gov.tw/cht/PublicationsFishYear/index.aspx

Marine Conservation

Fish Catch from 2006 – 2015

(10,000 tons)



Over the past few years, the EU has issued a “yellow card” warning to Taiwan for insufficient cooperation on combating illegal. Modern high-tech fishing technology is the main cause of the marine catastrophe, in 2016, Taiwan has spent about 2.2 million hours catching fish, ranking second on the fishing hour.

With global competition, consumers only demand low-priced seafood, but it’s also important to think about a better way of fishing so that the resources of the ocean will not be depleted.

Safety Seafood Guide

BEST CHOICES

Abalone (farmed)
Arctic Char (farmed)
Barramundi (US & Vietnam farmed)
Bass (US hooks and lines, farmed)
Catfish (US)
Clams, Cockles, Mussels
Cod: Pacific (AK)
Crab: King, Snow & Tanner (AK)
Lionfish (US)
Oysters (farmed & Canada)
Prawn (Canada & US)
Rockfish (AK, CA, OR & WA)
Sablefish/Black Cod (AK)
Salmon (New Zealand)
Sanddab (CA, OR & WA)
Scallops (farmed)
Shrimp (US farmed)
Squid (US)
Tilapia (Canada, Ecuador, Peru & US)
Trout (US farmed)
Tuna: Albacore (trolls, pole and lines)
Tuna: Skipjack (Pacific trolls, pole and lines)

GOOD ALTERNATIVES

Cod: Atlantic (handlines, pole and lines)
Cod: Pacific (Canada & US)
Lobster: Spiny (Bahamas & US)
Mahi Mahi (Ecuador & US longlines)
Monkfish (US)
Octopus (Canada, Portugal & Spain pots and traps, HI)
Oysters (US wild)
Pollock (Canada longlines, gillnets & US) Salmon: Atlantic (BC & ME farmed)
Salmon (CA, OR & WA)
Scallops: Sea (wild)
Shrimp (Canada & US wild, Ecuador & Honduras farmed)
Squid (Chile, Mexico & Peru)
Swordfish (US)
Tilapia (Colombia, Honduras, Indonesia, Mexico & Taiwan)
Trout (Canada & Chile farmed)
Tuna: Albacore (US longlines)
Tuna: Skipjack (free school, imported trolls, pole and lines, US longlines)
Tuna: Yellowfin (free school, trolls, pole and lines, US longlines)

AVOID

Basa/Pangasius/Swai
Cod: Atlantic (gillnet, longline, trawl)
Cod: Pacific (Japan & Russia)
Crab (Argentina, Asia & Russia)
Halibut: Atlantic (wild)
Lobster: Spiny (Belize, Brazil, Honduras & Nicaragua)
Mahi Mahi (imported)
Orange Roughy
Octopus (other imported sources)
Pollock (Canada trawls & Russia)
Salmon (Canada Atlantic, Chile, Norway & Scotland)
Sharks
Shrimp (other imported sources)
Squid (Argentina, China, India & Thailand)
Swordfish (imported longlines)
Tilapia (China)
Tuna: Albacore (imported except trolls, pole and lines)
Tuna: Bluefin
Tuna: Skipjack (imported purse seines)
Tuna: Yellowfin (longlines except US)

Chapter3 Site Analysis

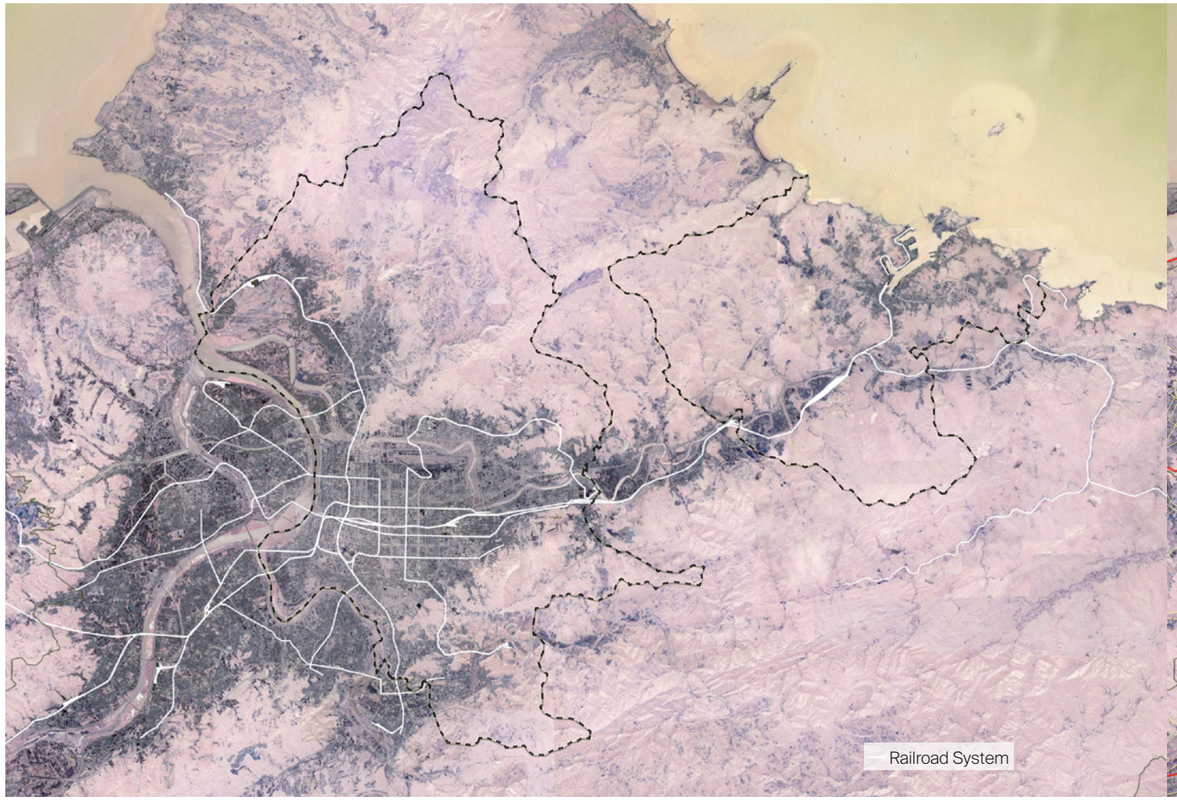
History of Keelung

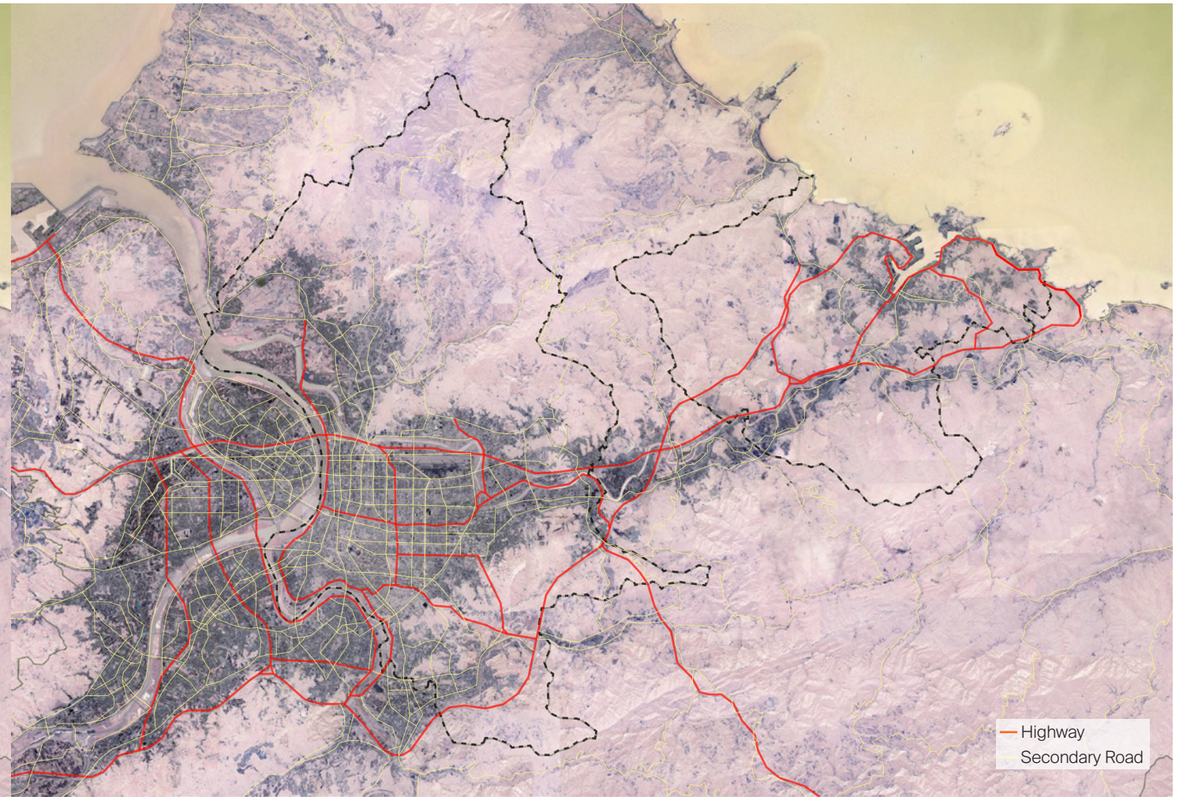
The Port of Keelung is a major seaport city on the north shores of Taiwan. It is part of the Taipei-Keelung metropolitan area and Taiwan's second-biggest port. The Port of Keelung's harbor is naturally an excellent one, free of silt and surrounded by mountains. It is Taipei's principal seaport.[1]

The Port of Keelung was expanded during the Japanese occupation of Taiwan, the Japanese used the port primarily to export raw materials to Japan. and it has continued to prosper under the Chinese Nationalist government. It has several shipbuilding yards and busy fertilizer and cement industries. Today, the Port of Keelung is Taipei's major importing center, and it has become an important international port. It is also a large fishing port with fish canning and freezing plants.[2]

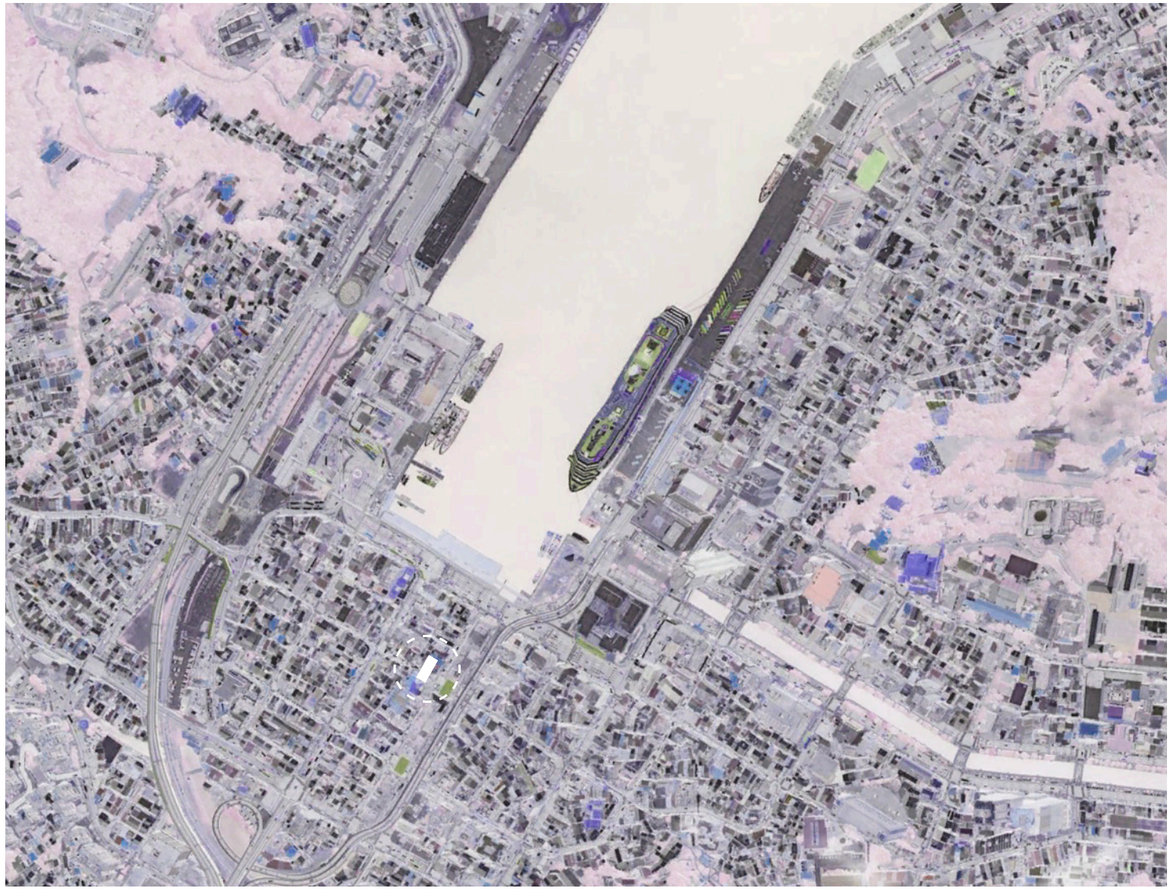
1 台灣史料基金會 http://www.twcenter.org.tw/

2 中華海運研究會 http://www.cmri.org.tw/contents/news/news.asp


Railroad System


Highway
Secondary Road

Kanziding Fish Market



Kanziding Fish Market 崁仔頂漁市場 is supposedly the longest-running operation of its kind in northern Taiwan. Back in the Japanese colonial era the market was located along the banks of the Xùchuān River 旭川河 in Keelung, formerly a navigable channel running through the downtown core into the harbour. The name of the market is derived from a Taiwanese Hokkien term for the stone stairs that once lined the riverbank; Kanziding literally means “top of the stairs”. The Japanese built a pier in the late 1920s, making it easy for fishermen to offload their catch next to the market, and convenient access to the railway network encouraged its growth.

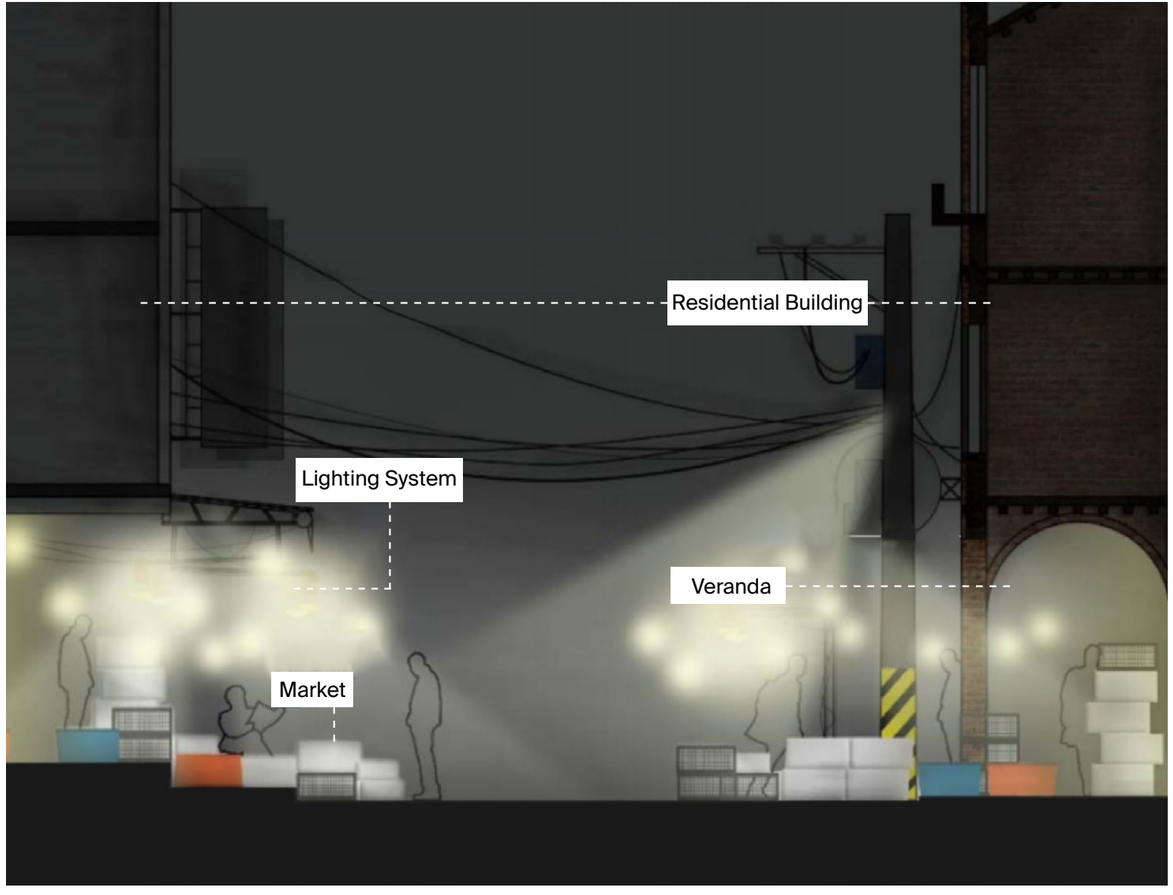
After the Chinese nationalists took over Taiwan the fish market and the rest of Keelung continued to expand—but there wasn’t much room to grow. The topography of the area around the port is very hilly and there simply isn’t any space for the city to sprawl. As such, the new government undertook several efforts to redevelop the riverside, destroying several of the piers and filling in part of the river in the late 1950s to make more room for the market, a new police station, and other buildings.

1 台灣史料基金會 http://www.twcenter.org.tw/

2 中華海運研究會 http://www.cmri.org.tw/contents/news/news.asp

The Kanziding Fish Market started off as a small operation next to the waters that allowed fishermen to offload their successful catches to the market on land conveniently, but the density in the downtown core continued to increase in subsequent years, eventually leading to a far more drastic round of urban renewal. In the mid-1970s the entire length of the river from the foot of the harbour to the back of the downtown core was covered up to create more land for development. The multi-use 三棟大樓, completed in 1978, now occupy this space, and the river flows beneath it.

Whereas Kanziding began as a simple fish market by the sandy riverbanks of Taiwan's historic northern port town its modern incarnation is more like a grim urban dystopia: all asphalt, concrete, tile, plastic, metal, and flesh. Many of the small businesses of the market operate out of the ground floor of the three Sandong Buildings now covering the unseen river—and many more can be found along buildings on the surrounding streets. Long after dark, as the day's catch arrives by truck, the streets become incredibly congested with vehicles of all kinds, wheeled carts, baskets, styrofoam containers, refrigerator units, tables, scales, and people—so many people. And to think, this place only gets going after midnight.



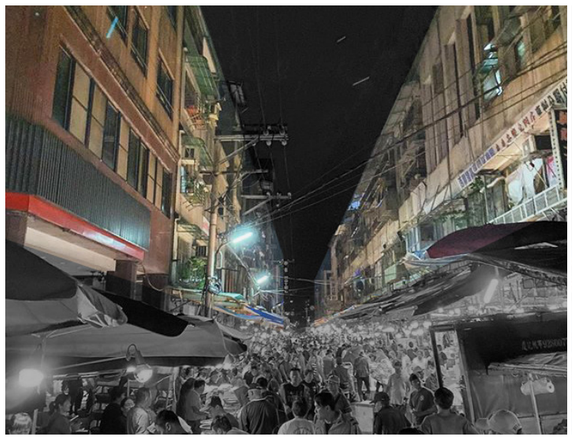
Kanziding Fish Market at half past ten.
The streets are almost completely deserted and many business owners haven't arrived yet, Early deliveries begin around 11pm. There are few signs that this will become the busiest and most crowded part of a booming fish market hours later.

Delivery trucks picking up and dropping off around 2am.
The main road running through the heart of the market is a continual traffic jam most of the night.

This is the heart of the Kanziding Fish Market.
By day there are few signs of the late night business that sprawls through the streets of the downtown core.

This is the back of the Sandong Buildings, right where the river disappears beneath the streets. The stench around here is atrocious. Those pillars support a highway offramp.

Existing Condition



Residential Area + Market

Sanitation

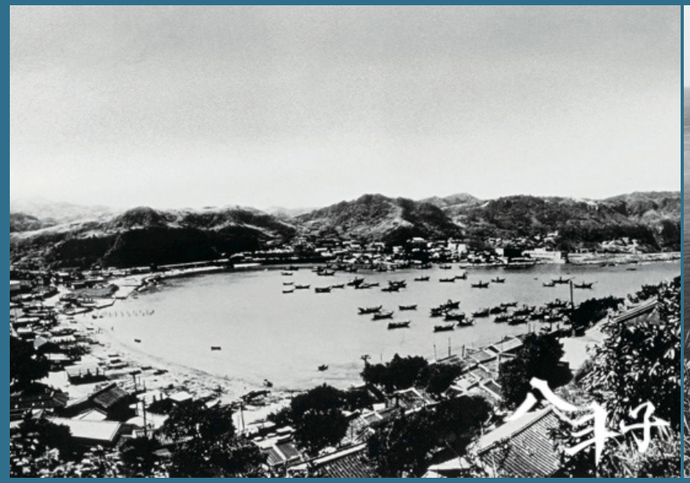
Electricity

Trash


Dalong Ice Plant
Kanziding Fish Market
5.4km (17.75ft)

Relocating the Kanziding market away from the center of the city to a smaller port nearby.

These images show how the site—Badouzi Fishing Port changes as the fishery industry continue to grow throughout the year.



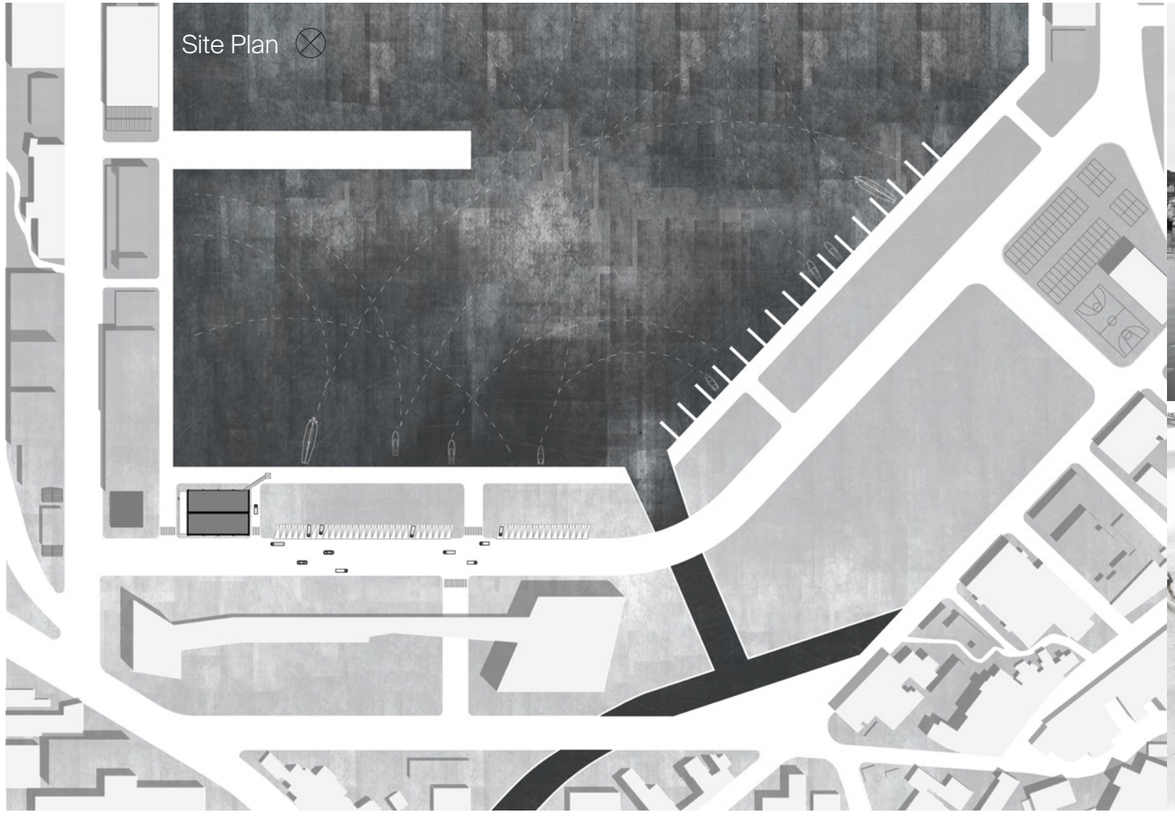
Fish Market

Storage

Chinese Petroleum Corporation

Ice Plant

National Museum of Marine Science

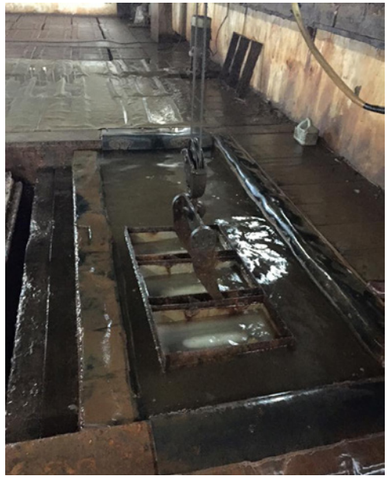


Existing Condition

Keelung has more than 600 fishing boat currently registered under the district fishing association, and two of the largest port– Zhengbin Fishing Port, Badouzi Fishing Port are the largest source that relies on ice. Badouzi fishing port has been running out of ice for 250 blocks per day (about 110 kilos each). With the increased fishing boat from other cities pulled into Keelung's port during catching season, the shortage of ice may reach 500 blocks per day. And they need to purchase from Yilan to fill the gap.

Ice Making Process

The ice tanks are removed from the floor to be thawed.

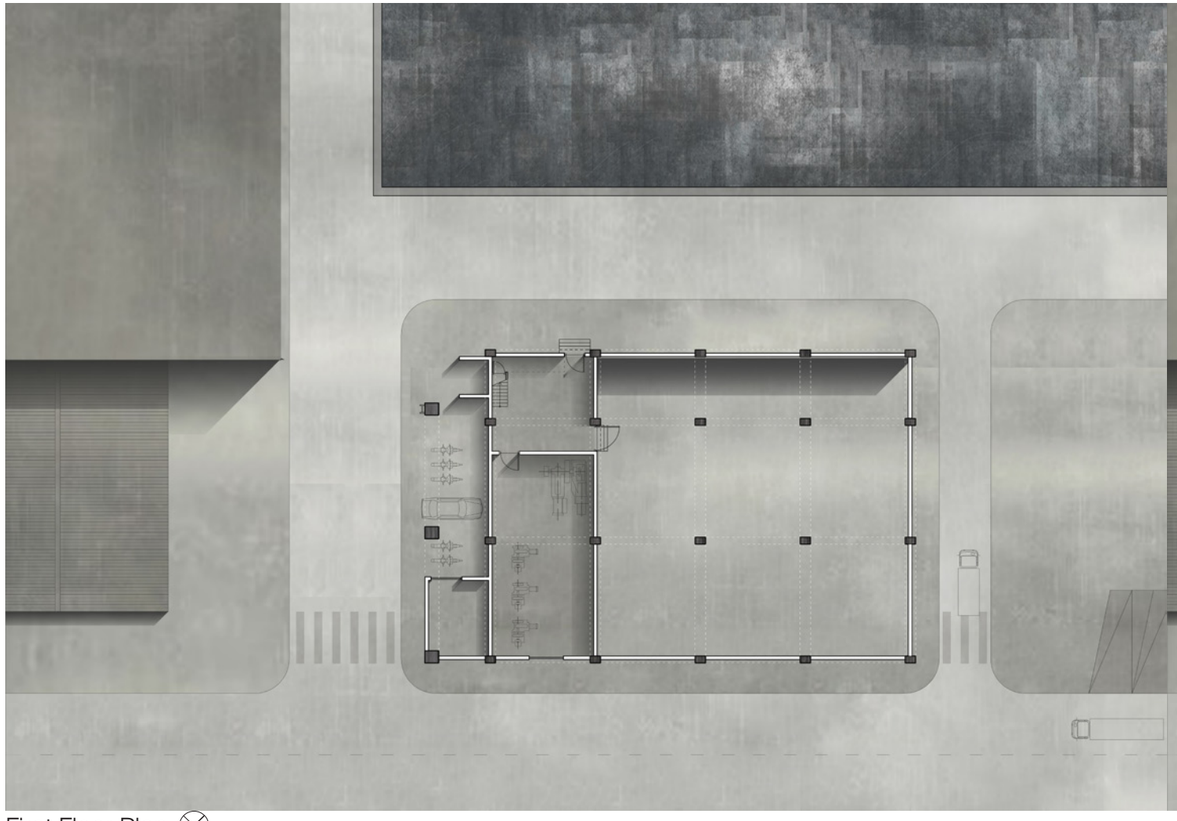


The ice tanks are thawed for a short time in seawater to release the block from the tanks.

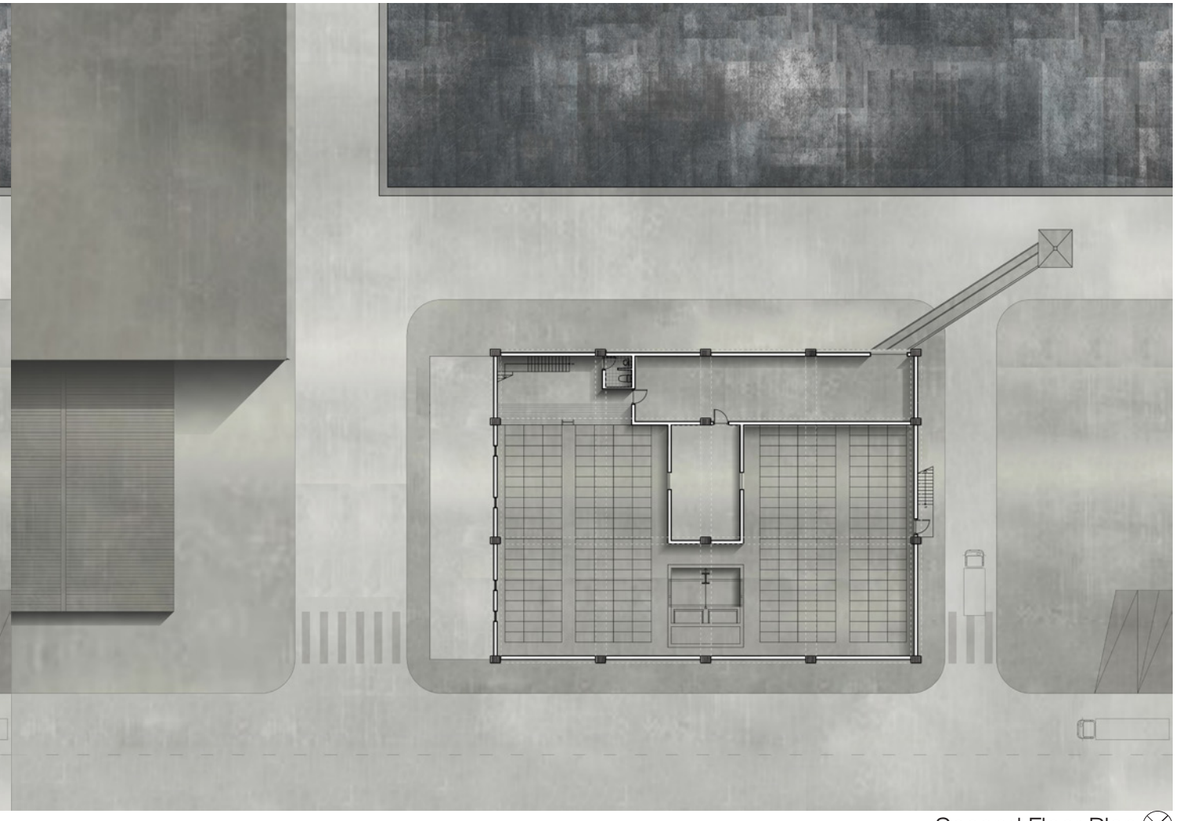
The empty ice tanks are refilled with water and put back to freeze at the temperature of 23°F (-5°C).

The ice blocks are then stored in a cold room to a temperature of 17.6°F (-8°C).

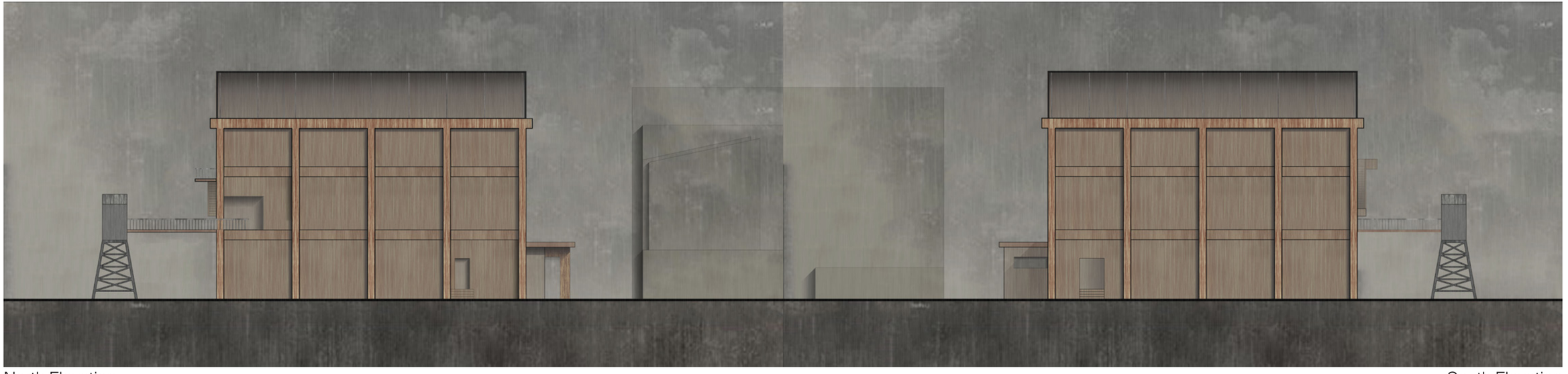
The ice blocks are transfer through a rail and can be crushed on demand.



First Floor Plan ⊗



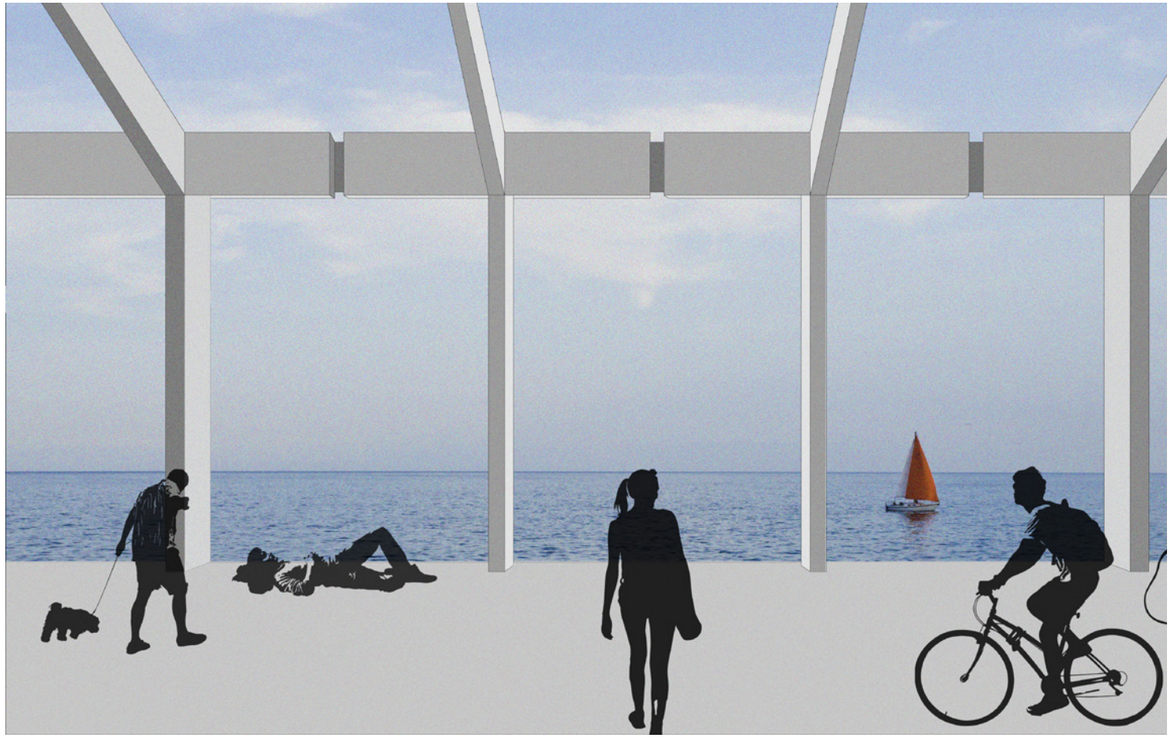
Second Floor Plan ⊗



North Elevation

South Elevation

Chapter4 Design Proposal



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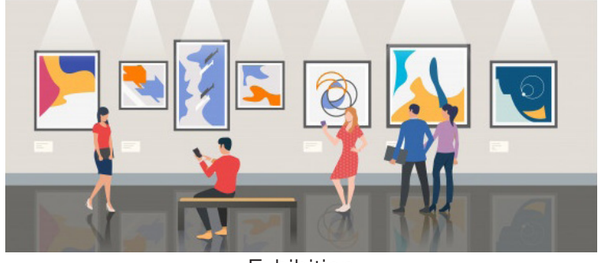


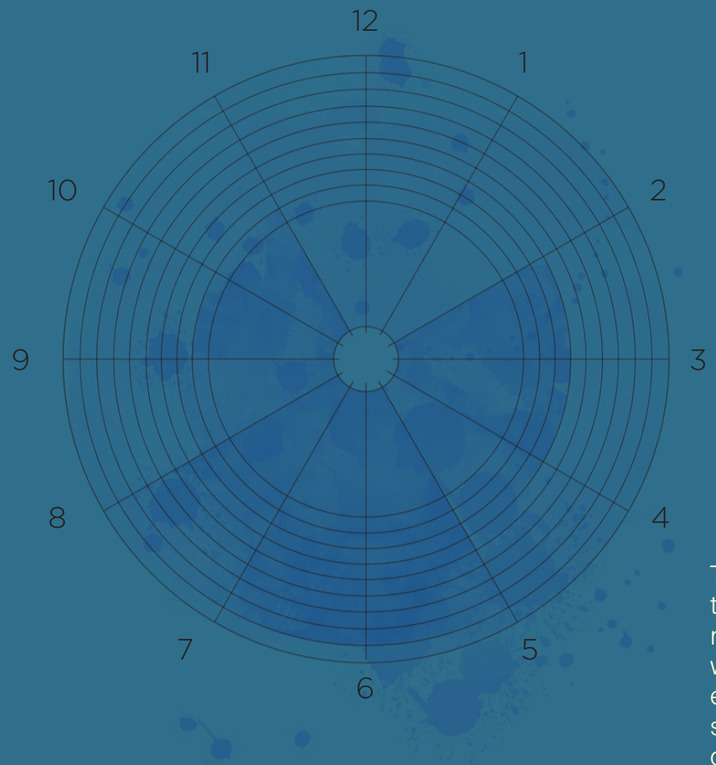
Exhibition

- History of Taiwan's fishery
- Static of fish catch during the past decade
- Fishing and Farming methods
- Sustainable Seafood Guide
- Education on the general public

+

Wholesale Fish Market

- Ocean-friendly market
- Plastic-free packaging
- Eco friendly food packaging
- Waste reduction

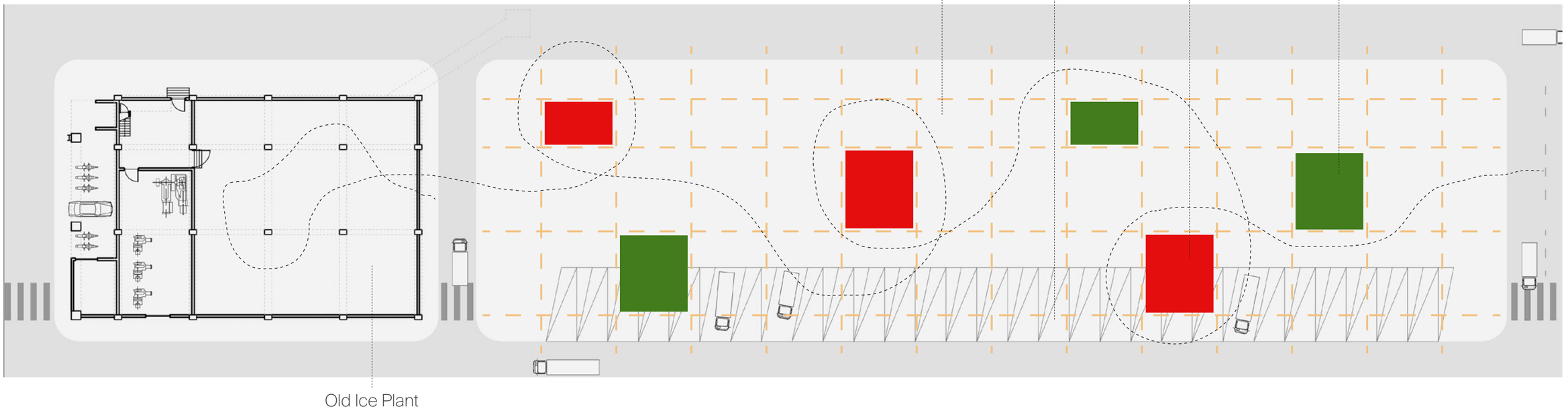


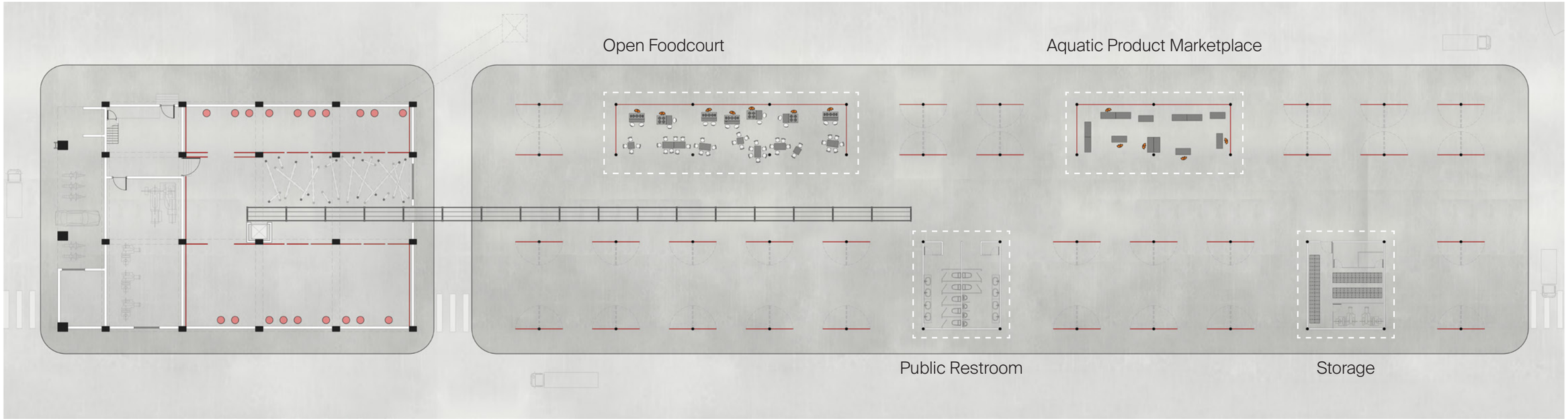
Existing Fish Market Narrative

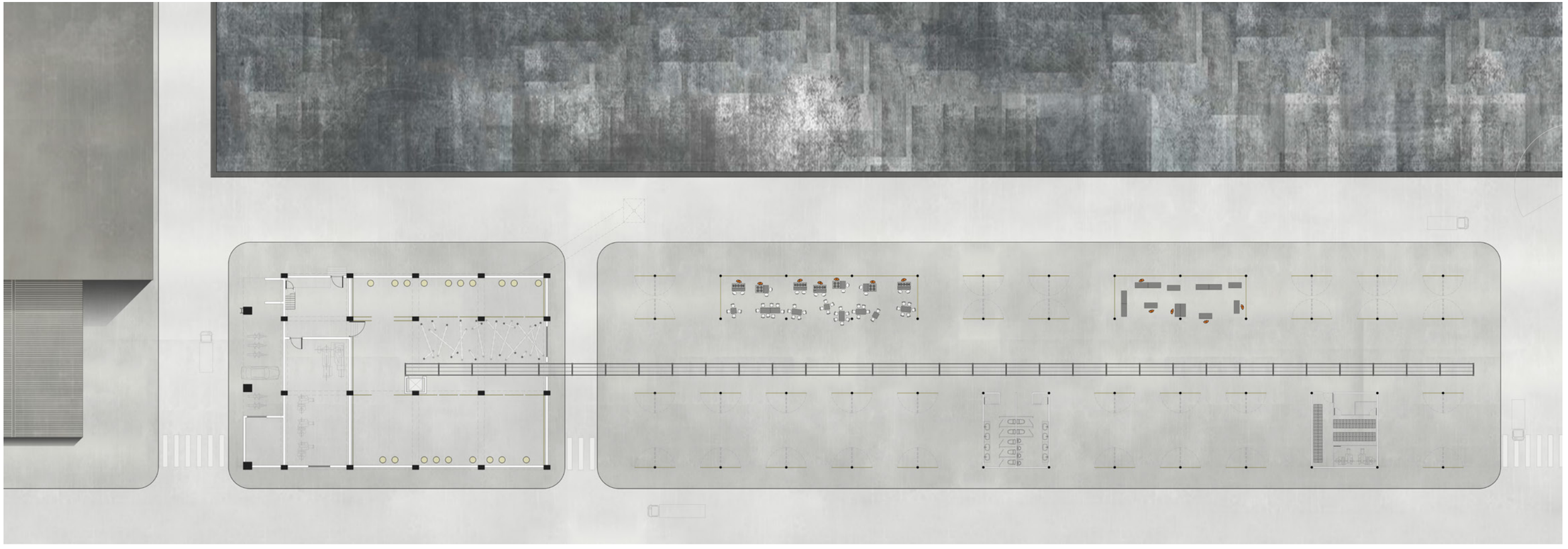
Time is a really important context in this thesis. First, ice as the material melt as time goes by. Second, the wholesale fish market that happens every night will be affected by different seasons causing changes in the crowd and fish catch. Third, the fisherman's daily narrative is different from the trader and the general public.

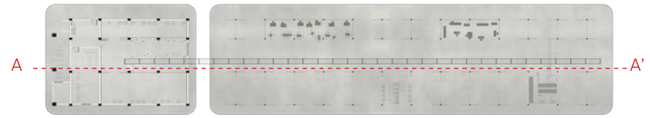
Intervention Strategy

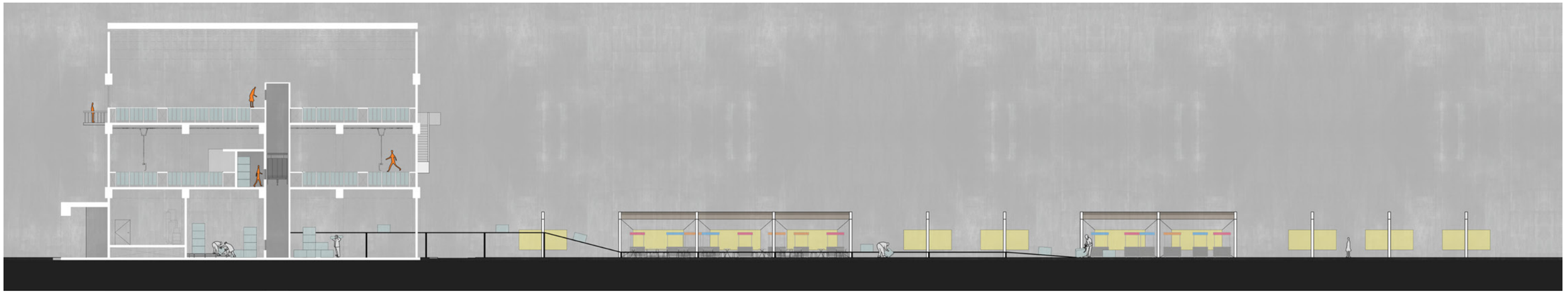
I'm going to extend the space out from the old ice plant by continuing the architectural structure and inserting different functions within the grid. Mixing the daily function of the fish market and ice plant all together, bringing not only fisherman but local resident to the exhibition.




Open Foodcourt
Aquatic Product Marketplace
Public Restroom
Storage







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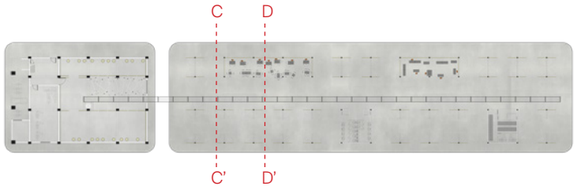

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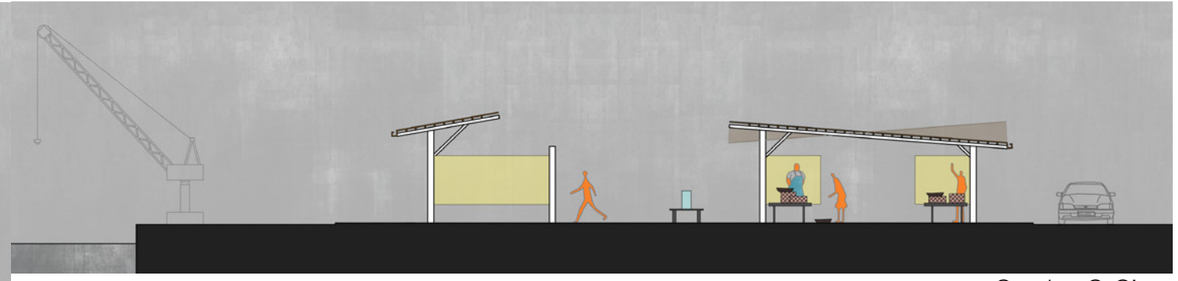

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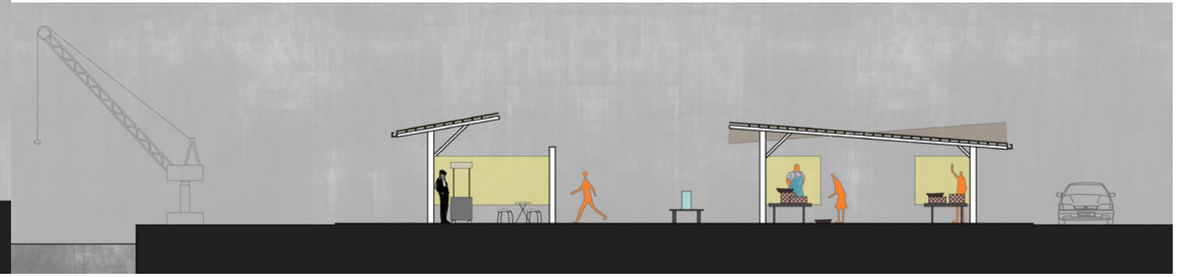
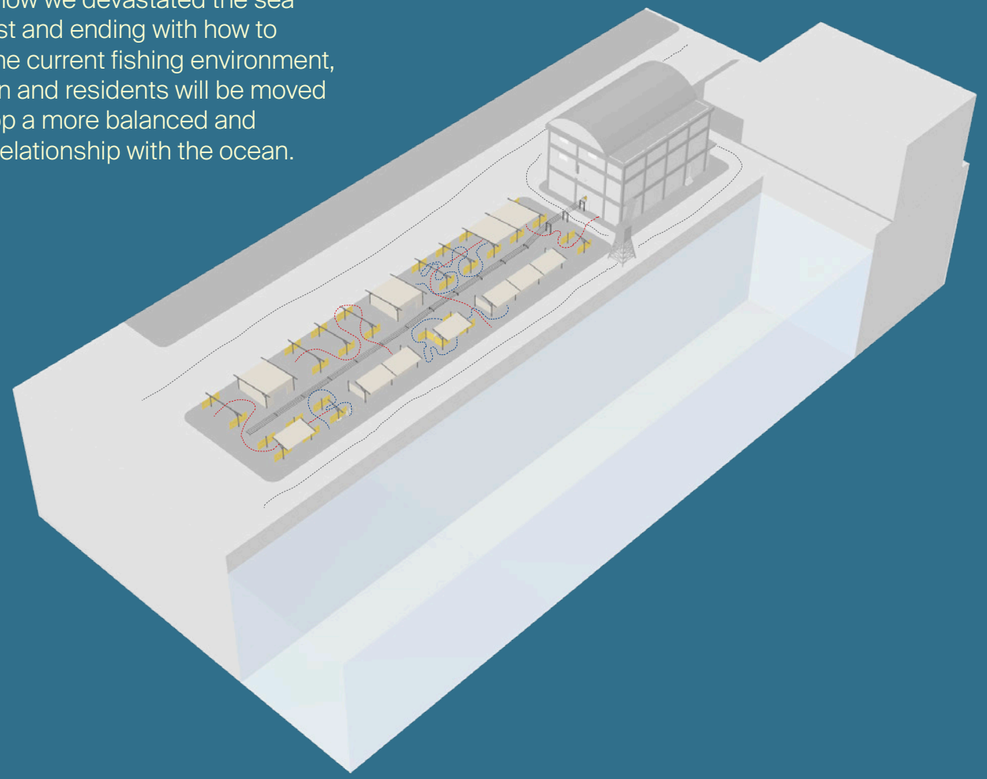


Section D-D'

Chapter5 Exhibition Details

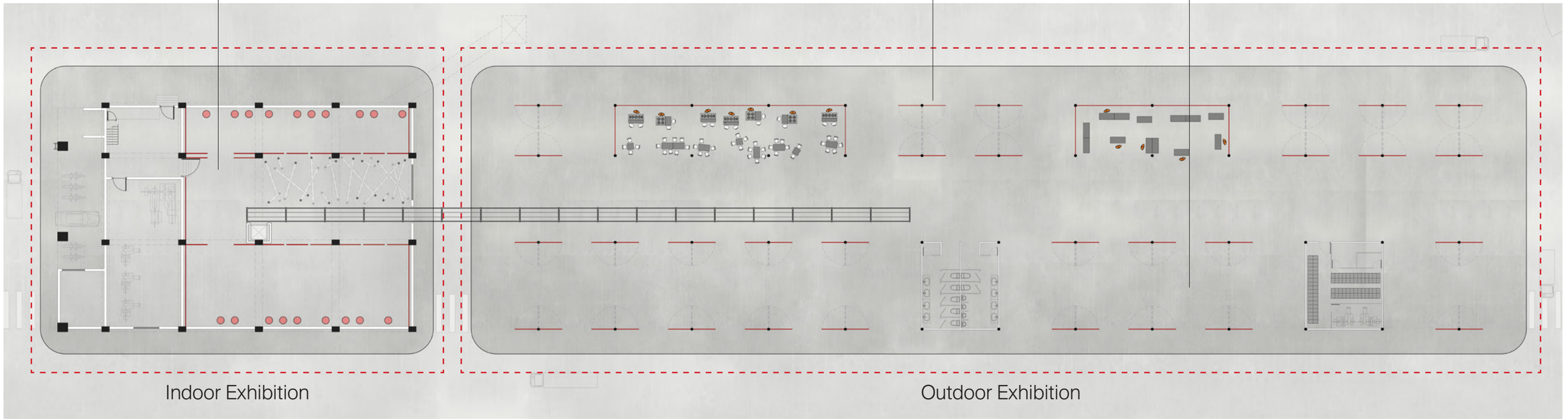
By combining the wholesale fish market with an exhibition that explains the situation in three parts, from the current crisis to how we devastated the sea in the past and ending with how to correct the current fishing environment, fisherman and residents will be moved to develop a more balanced and realistic relationship with the ocean.



Part 3 -Safety Seafood Guide

Part 2 -Marine Crisis

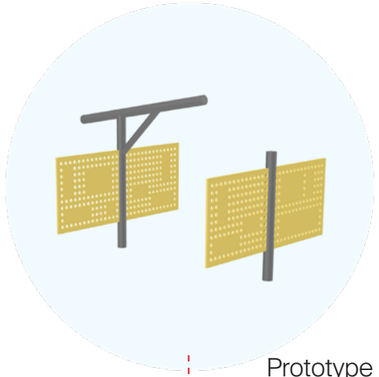
Part 1 -History of Fishery


Immersive Exhibition
Didactive Exhibition
Aesthetic Exhibition
Indoor Exhibition
Outdoor Exhibition

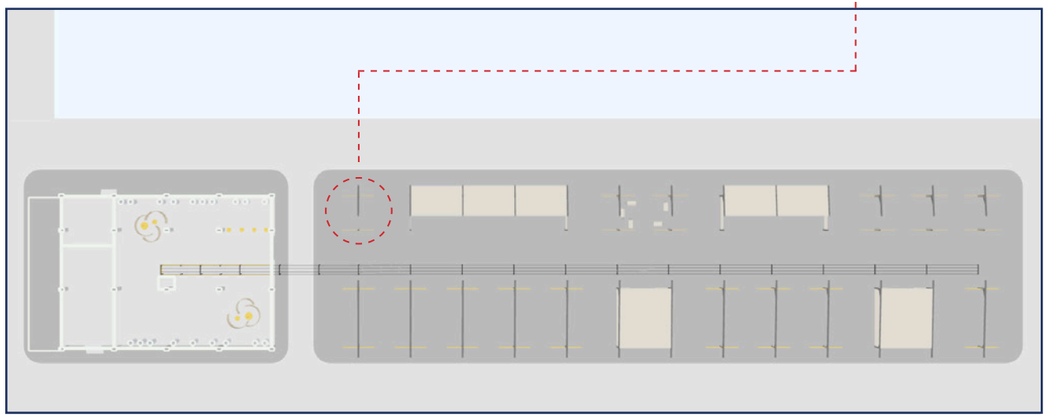
Exhibition Narrative

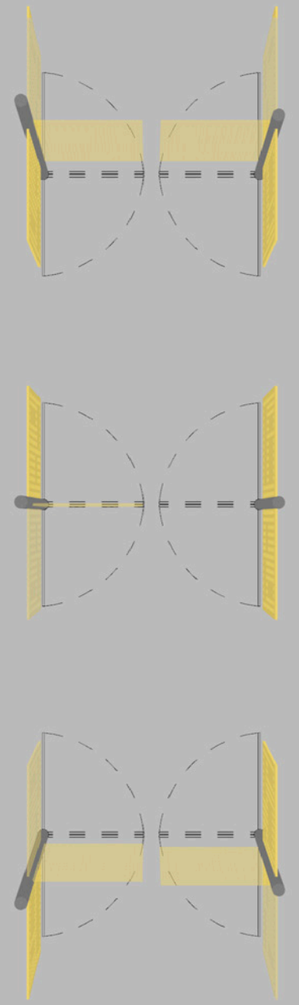
-How to coexist with the ocean
-Safety seafood guide

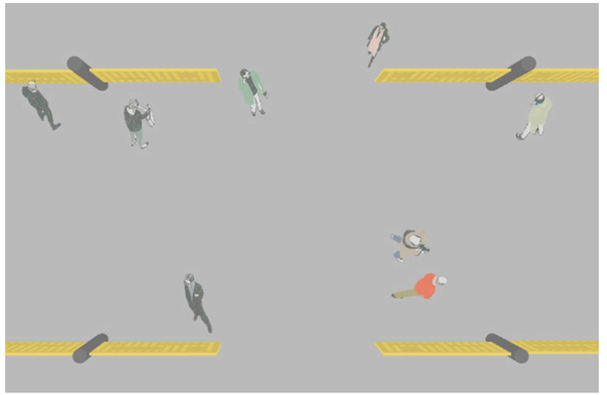
This part will be a fixed outdoor exhibition with the rotational panel, it can be adjusted to different positions during different times of the day according to the activities happen on the site.



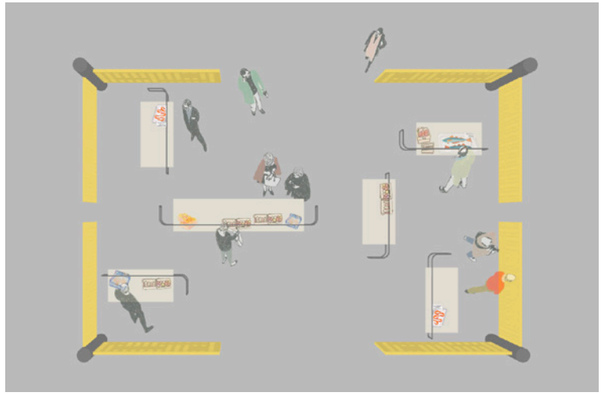
Prototype







Day-Exhibition Panel



Night-Fish Market Backdrop

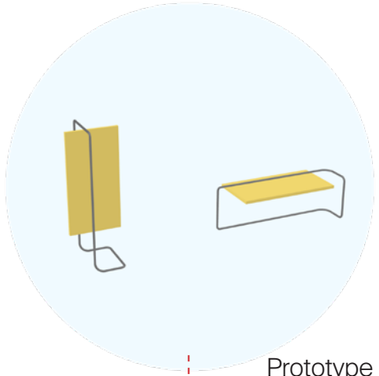
Day

Night

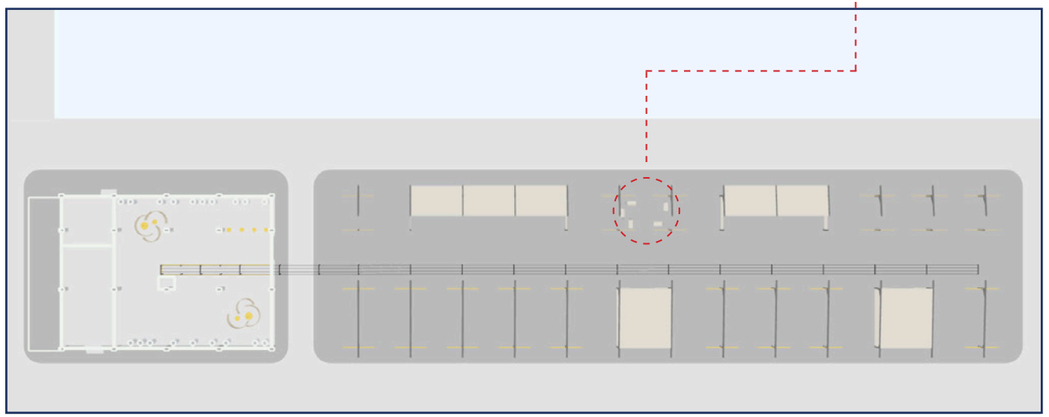
Exhibition Narrative

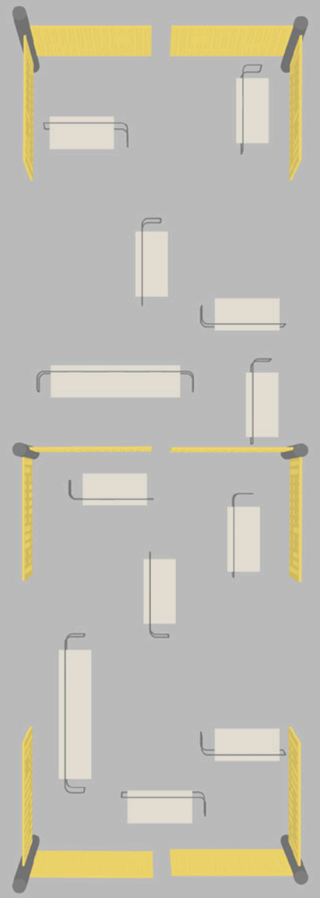
-History of Fishery and Keelung
-History of Kanziding Fish Market

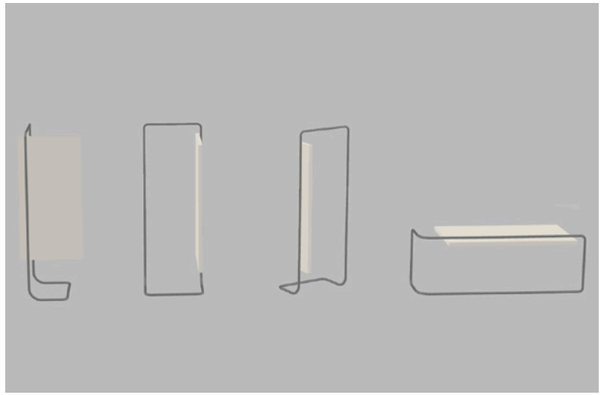
This part will be a movable outdoor exhibition with the multi-purpose panel, it can be position as a counter table or exhibition panel and is really light weighted, so it can be placed at different locations.



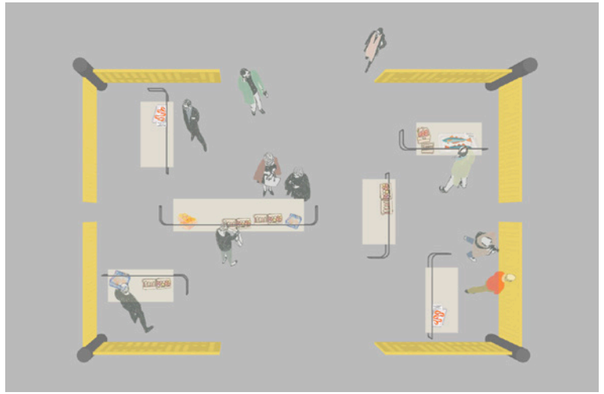
Prototype





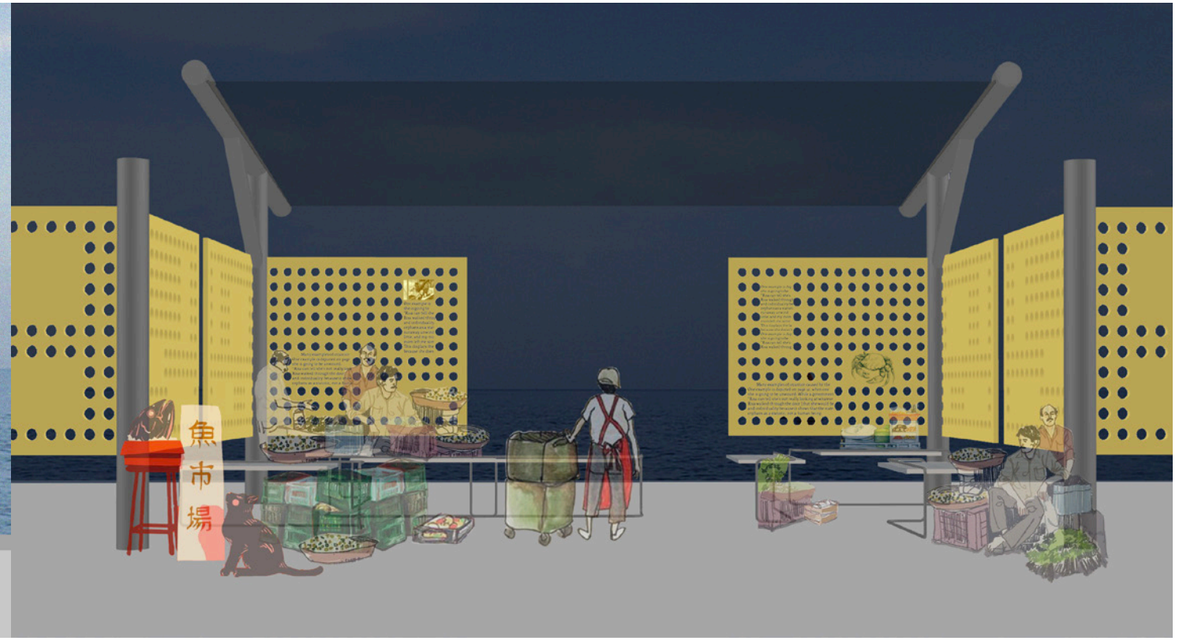


Day-Exhibition Panel



Night-Fish Market's Selling Stand

Day

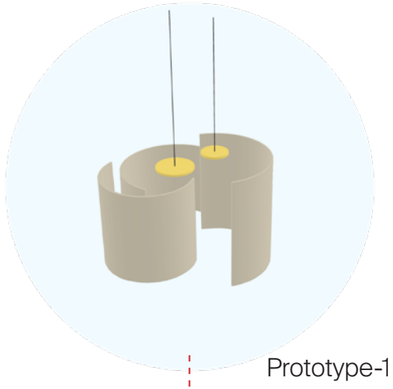


Night

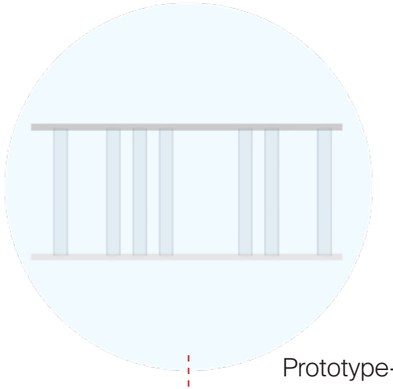
Exhibition Narrative

-How we devastated the sea
-Marine crisis

This part will be an indoor exhibition with 3 kinds of exhibition display, the whole room mimics the ocean-like environment and the natural cold air from the ice also makes the visitor immersive more in this deep-sea content.



Prototype-1



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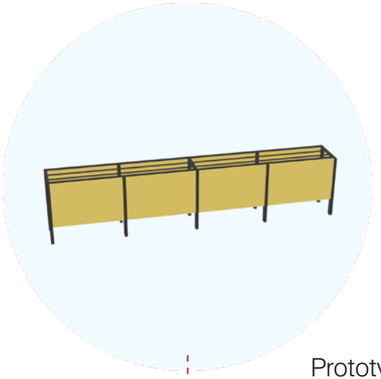
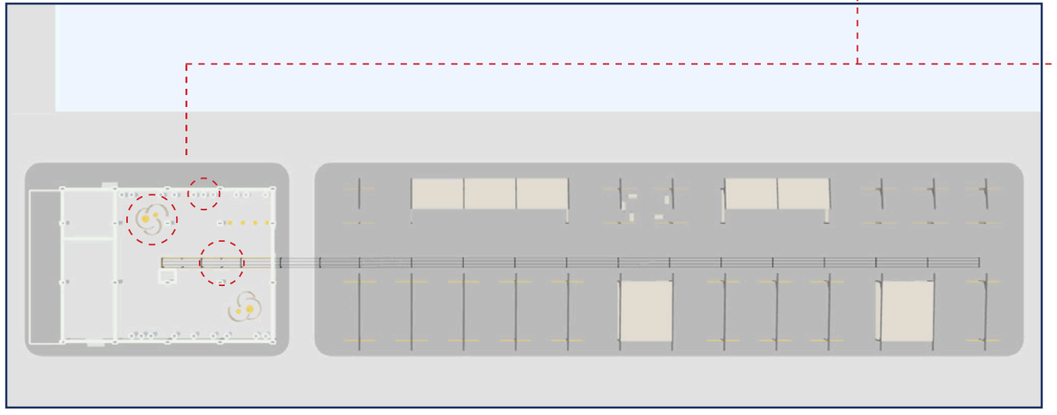
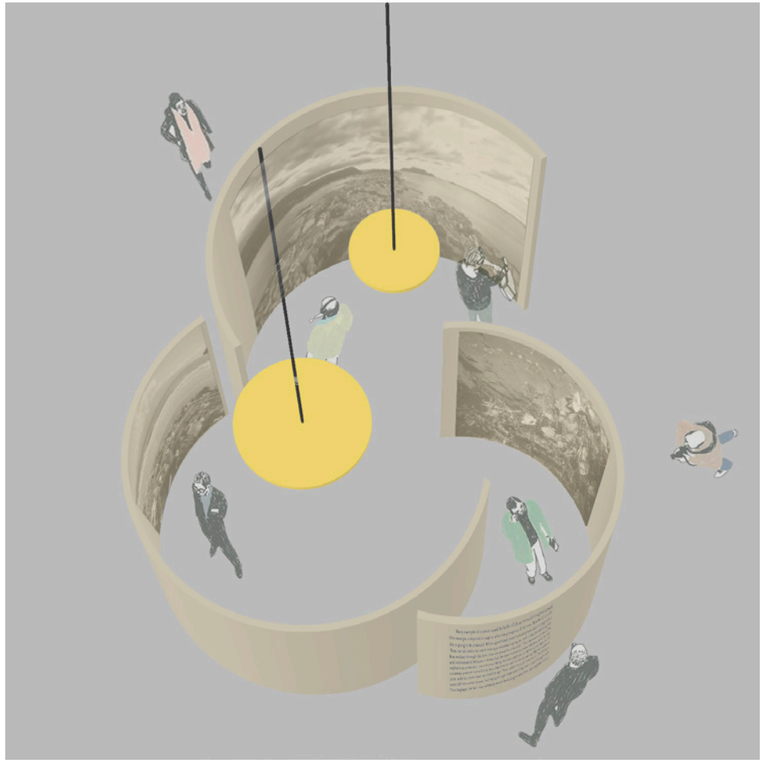


Prototype-3

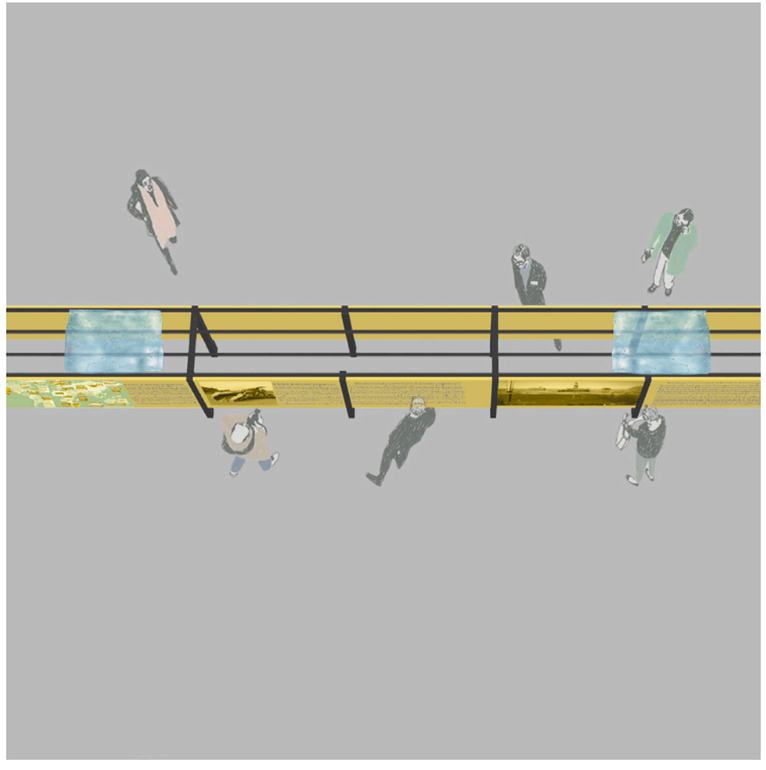


Here's 3 prototype of how I am going to display. First, it's an interactive room with touch screen and projection showing the polluted environment. Second, it's the biological specimen hanging in the acrylic case, revealing how the sea creature being affected by human waste. Third, it's the exhibition panel using the ice track as the main structure for display.



Interactive Room

Frozen Specimen



Panel Integrate with Ice Track

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Chap.3

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Image Credits

Chap.2

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Chap.3

p.47 https://spectralcodex.com/x/taiwan-keelung-kanziding-fish-market-3-900x600.jpg
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Chap.4

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