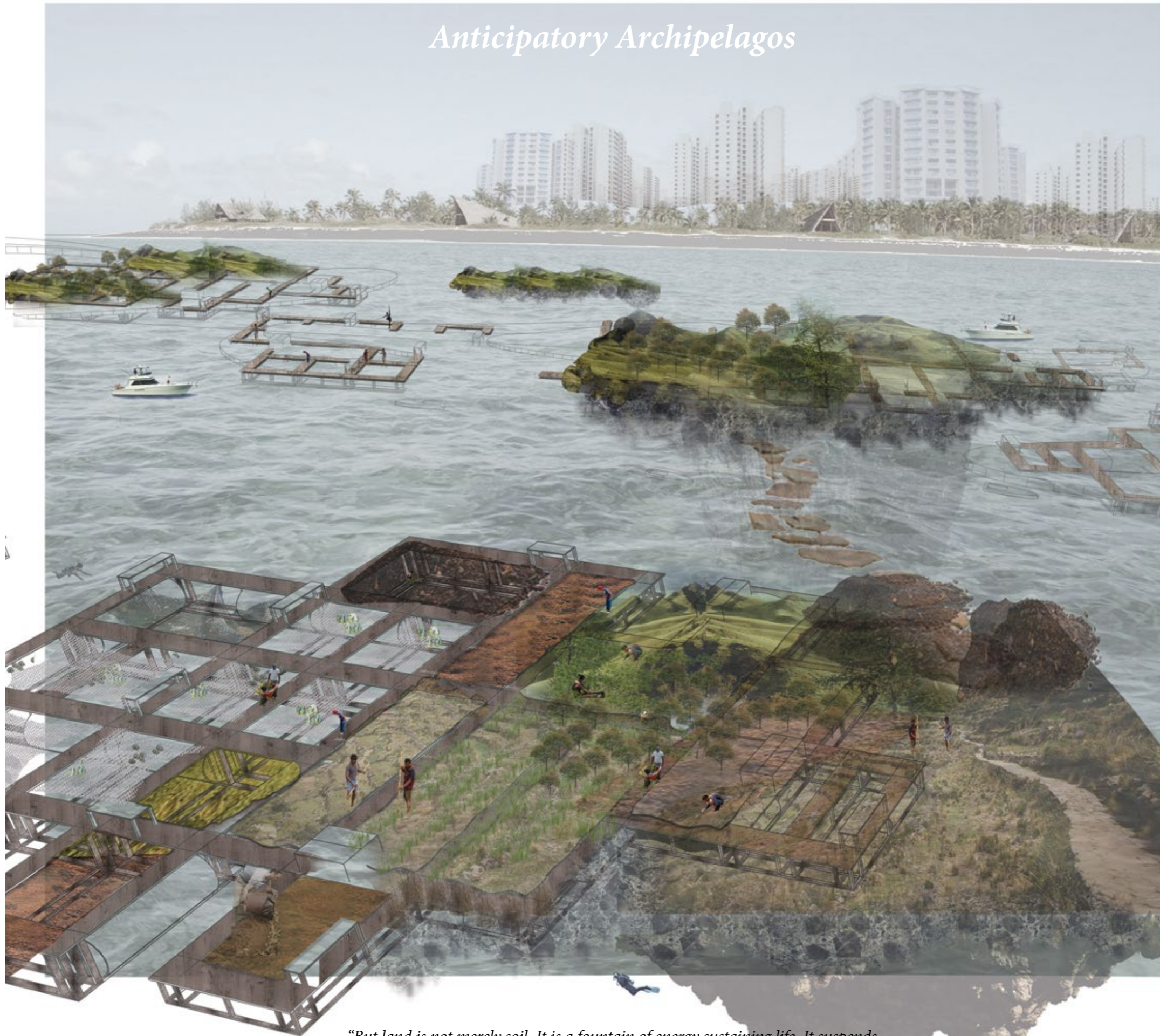


Anticipatory Archipelagos



Anticipatory Archipelagos proposes a narrative that explores the theory and geography of land sea valuation through the lens of 'islandness'.

As reflection of the present condition, it stages and frames critical issues of today's valuation of and-sea relations and aims to make aware the effects of the act of architecture to its concomitant ecological systems.

The scheme manages its environmental concerns through the design of an archipelago which not only acts as an antidote for the already ailing waters but also restores mainland, thus addressing both the physical and theoretical concerns of the land-water body. It borrows the term "Anticipatory adaptation" from climate change studies which refers to actions that are taken before impacts are felt.

The archipelagos come in anticipation of an even more polluted and destructive future - therefore the title 'anticipatory archipelagos'.

"But land is not merely soil. It is a fountain of energy sustaining life. It suspends the tension between architecture and geography. It suggests potentials of occupation and territorialisation of habitable lands and inhabitable waters."

- The Land Ethic, Aldo Leopold

RESEARCH - THE LAND PURSUIT

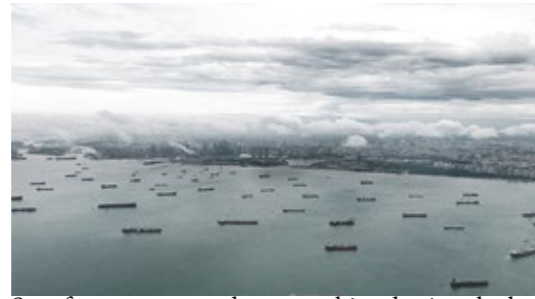
The increase in global population has spiked the demand for habitable lands. This project studies Singapore, a land scarce island state where the global issue has been amplified and is almost at its breaking point.

Land is a geographical entity, a territory marked out by political borders. But beyond the physical, land also embodies other intangible representations such as economy and culture. Essentially, land is like a base where conditions can be overlaid. Hence, it often becomes a tool through which national desires can be articulated.

In the island of Singapore, land is seen as a geomorphic entity. One that is constantly shaped to achieve her vision – essentially one that always pursues the bigger, the greater and the better. The fact that Singapore is an Island speaks of a certain isolation and detachment, and particularly in Singapore, a country without hinterlands, – reliance on its waterspace is especially more so important, for transport and for trade. The pursuit for more land has also become a norm. Land has been reclaimed, commoditised, engineered and manipulated to feed a value system where land is productive for cities and seas for entrepot trade - a system which results in pollution and a de-valued ecology.

'Habitable' coastlines are constantly expanded while 'inhabitable' sea-space gradually reduced – but all these has a limit.

Singapore is now an island that has lost its islandness. If one thinks of an island, we think of land surrounded by water on all sides and the ability to enjoy land and water. But when one thinks of Singapore, we think of a densely built city with trade and polluted waters.



Seas for entrepot trade, cargo ships dotting the horizon



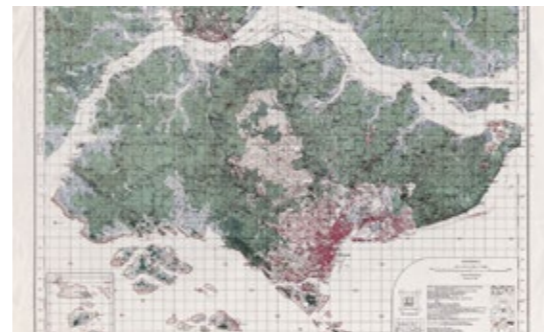
Land valued for industries and cities



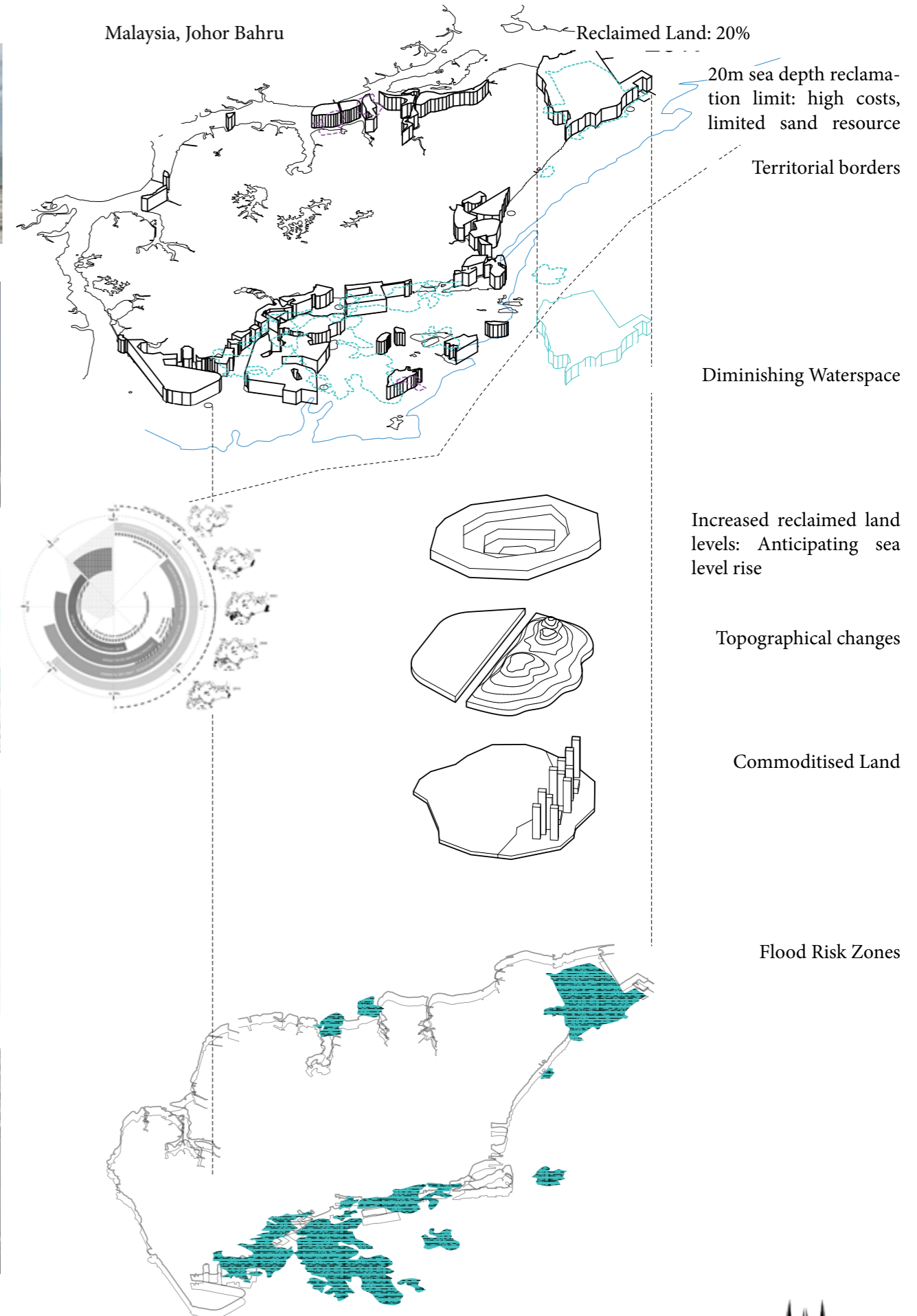
Curated nature; sinking trees on reclaimed land



Clearing of forested areas, bulldozed terrains



Sand dredging, reclaimed land left to fallow - Overtaking sea space and oceanic habitats



RESEARCH - THE DEVALUED SEA SPACE



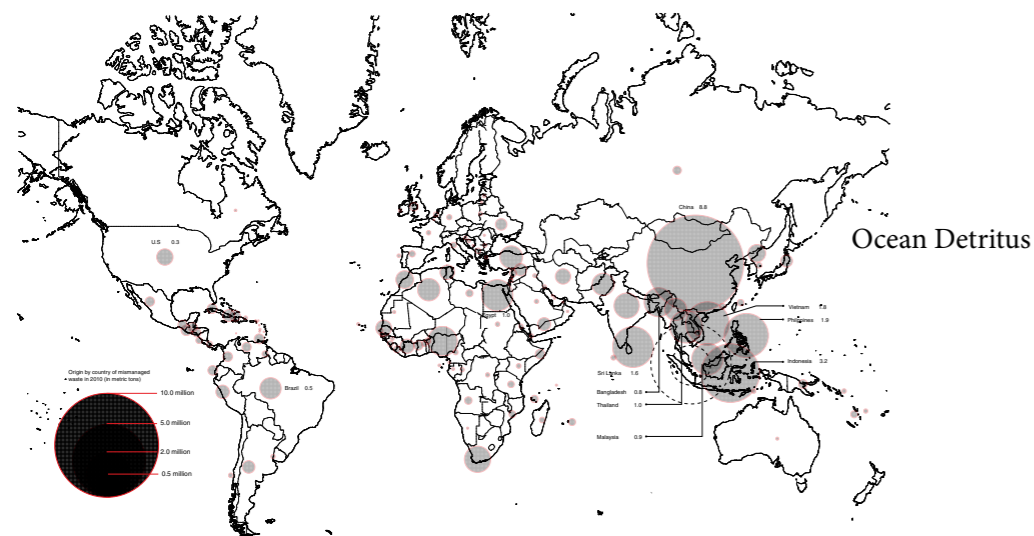
In the pursuit of habitable land, mankind has sought various means of expansion into the sea - building in, or on the sea. The detrimental effects of the act of architecture (construction and demolition) on our sea is largely shrouded in secrecy due to agendas of the state or is often unapparent.

The idea for “Anticipatory Archipelagos” is therefore driven by **two motivations** - first, to shed light on the insensitive and almost instantaneous use of wealth and technology to construct in order to fulfil ‘habitable’ territorial desires. The second - the concerns of devalued ecology within the ‘inhabitable’ sea space.

In contrary to current tensions between land and sea, this thesis embarks on an alternative, one where there will be no compromise of water in land’s pursuit, a project which begins to balance the ecology and rehabilitate nature.

“When architecture and urban design project their desire onto a vacant space, a terrain vague, they seem incapable of doing anything other than introducing violent transformations, changing estrangement into citizenship, and striving at all costs to dissolve the uncontaminated margin of the obsolete into the realism of efficacy.”

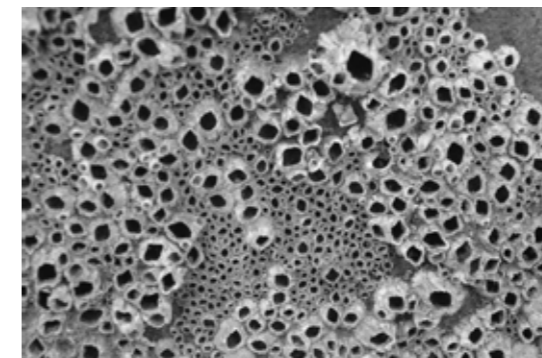
- Terrain Vague, Ignasi de sola morales



Barnacle encrusted buoy

An experiment carried out by Charles Lim, an artist from Singapore revealed that a buoy, sunk in the sea for only four weeks, achieved a level of barnacle encrustation that would have normally taken years.

“It looks like it has been left beneath the waves for decades if not centuries. ‘Another result of the ecological effect of land reclamation,’ he says.



barnacle coated surface of ships

“For water is more dynamic than land, more entropic than even the jungle. Never neutral or passive, it frustrates reification and concretization. The water in these straits lubricates trade, but the same medium - warm, brimming with nutrients - nourishes the fastest growing barnacles in the world, that slow it down...”

-Charles Lim. Buoy in progress (2015).

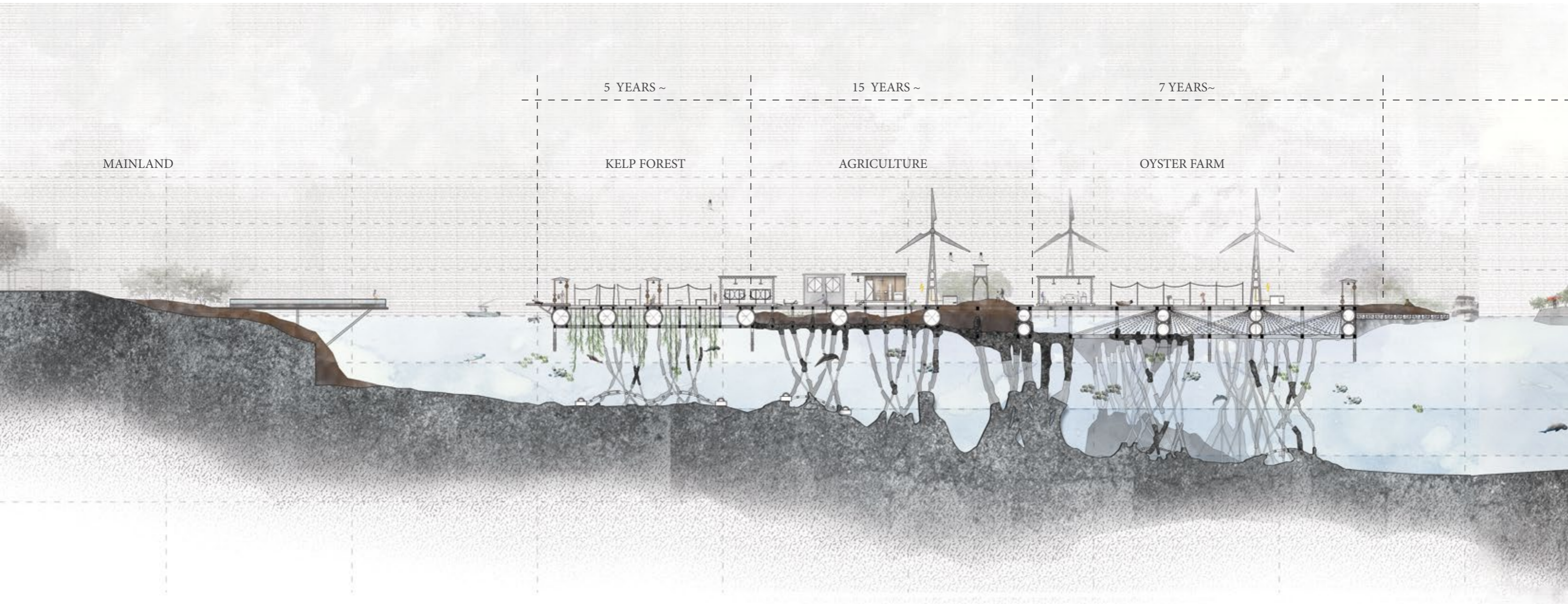


Several countries have also begun to impose sand bans on Singapore on the claim that dredging has had a devastating effect on the sea ecology.



In the larger scheme of things, the total amount of unquantifiable degradation of minute particles adds on to the already quantified oceanic detritus consisting of larger objects such as plastic etc. The total impact is far more damaging than what is perceived.

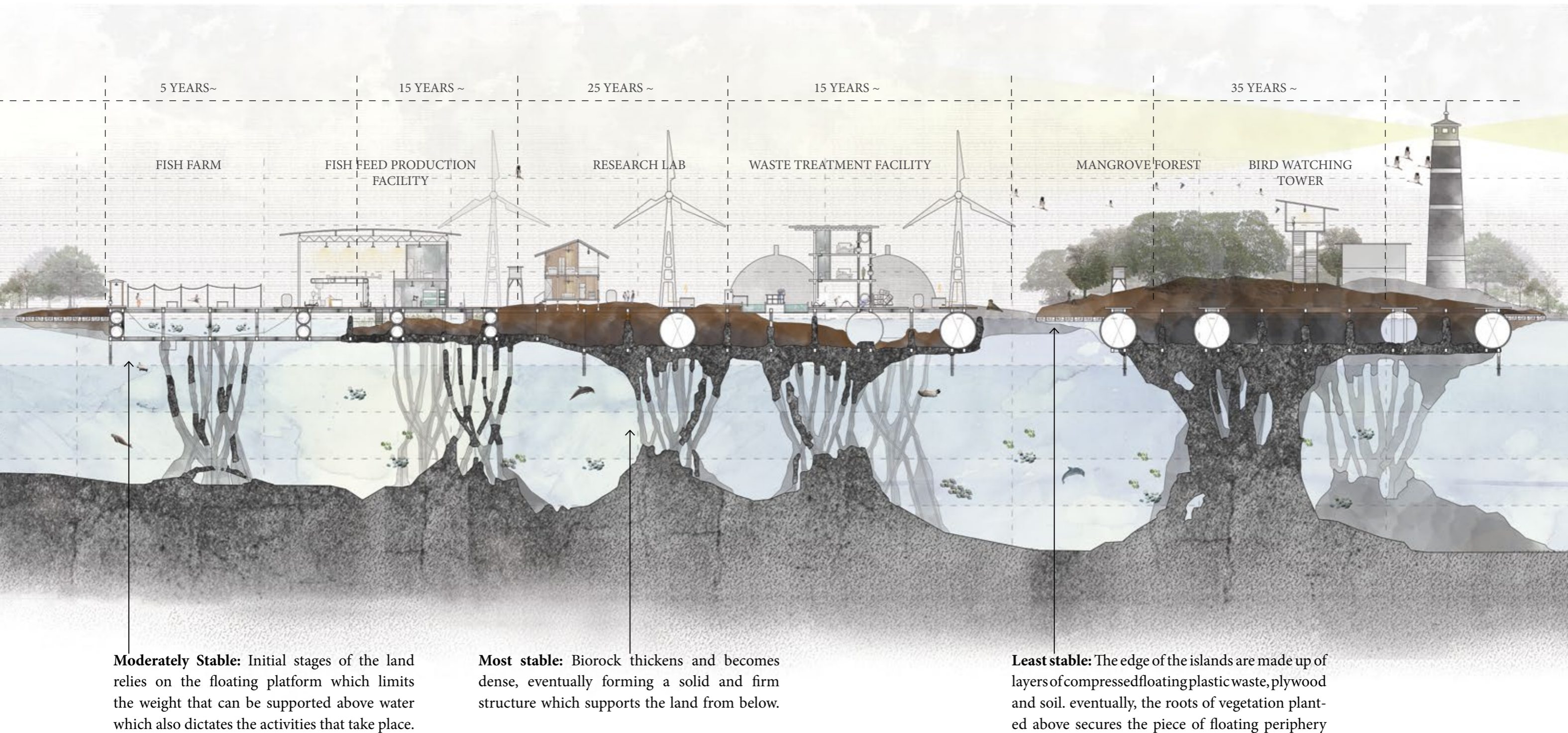
SECTION A - ARCHIPELAGO GROWTH



The time-based project looks to land as a system that blurs the boundaries of architecture and geography. It reimagines a restored archipelago where lands and waters are clean and have a new productivity which shifts away from current assigned values of land for cities and seas for trade. The islands will seek to demonstrate other valuations of land through an enduring fabrication. It will eventually evolve into a marine research and nature park and have interim programmes such as agriculture, aquaculture, waste treatment and low cost temporary housing for transiting immigrants and marine researchers – a land use which speaks of a different kind of productivity and value- one that is perhaps more rehabilitative and remedial.

This section shows the growth of the islands overtime which will gradually morph to be semi man-made, semi nature. Its structural reliance shifts from man-made floating platforms to organic biorock structures which secure the lands' permanence overtime. Biorock makes use of coral growth that thickens and hardens overtime to become structural. The technology investigates the aspect of an enduring fabrication of land as opposed to instantaneous reclamation projects on mainland with long lull periods. The project also explores how the structures beneath grow and stabilise land above, yet its elegance creates and opens new spaces of productivity beneath. Land value is experienced in its verticality where the programme informs the life below and the infrastructure above.

SECTION A'- ARCHIPELAGO GROWTH

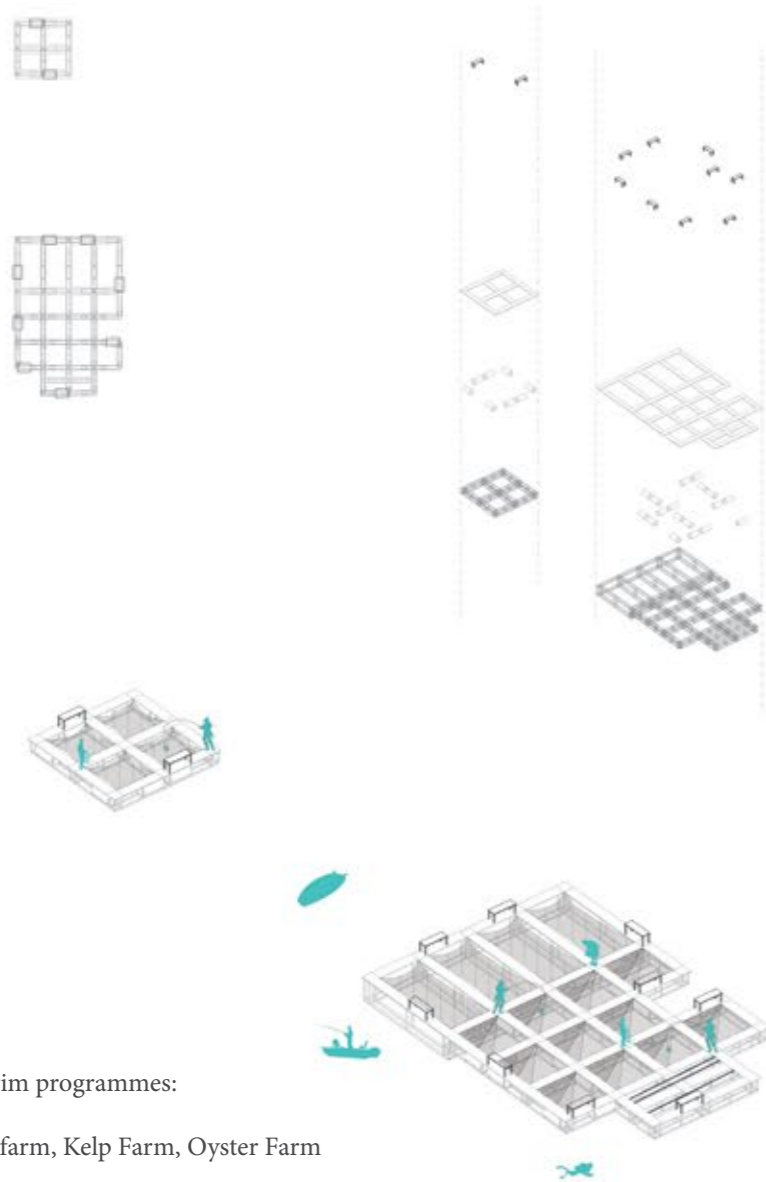


For example, the kelp forest informs the infrastructure above such as storage and research facilities, and the type of marine life that it supports beneath. Eventually, the archipelagos have various layers of stability which is informed by bio-rock growth which then also informs the architecture that can be built on it. In that sense, architecture is beholden to land. It is like going back to the first principles where architecture was designed to fit into the landscape instead of bulldozing vast terrains to make way for the city.

“ a land use which speaks of a different kind of productivity and value- one that is perhaps more rehabilitative and remedial ”

PROGRESSION OF INTERIM PROGRAMMES

5 YEARS

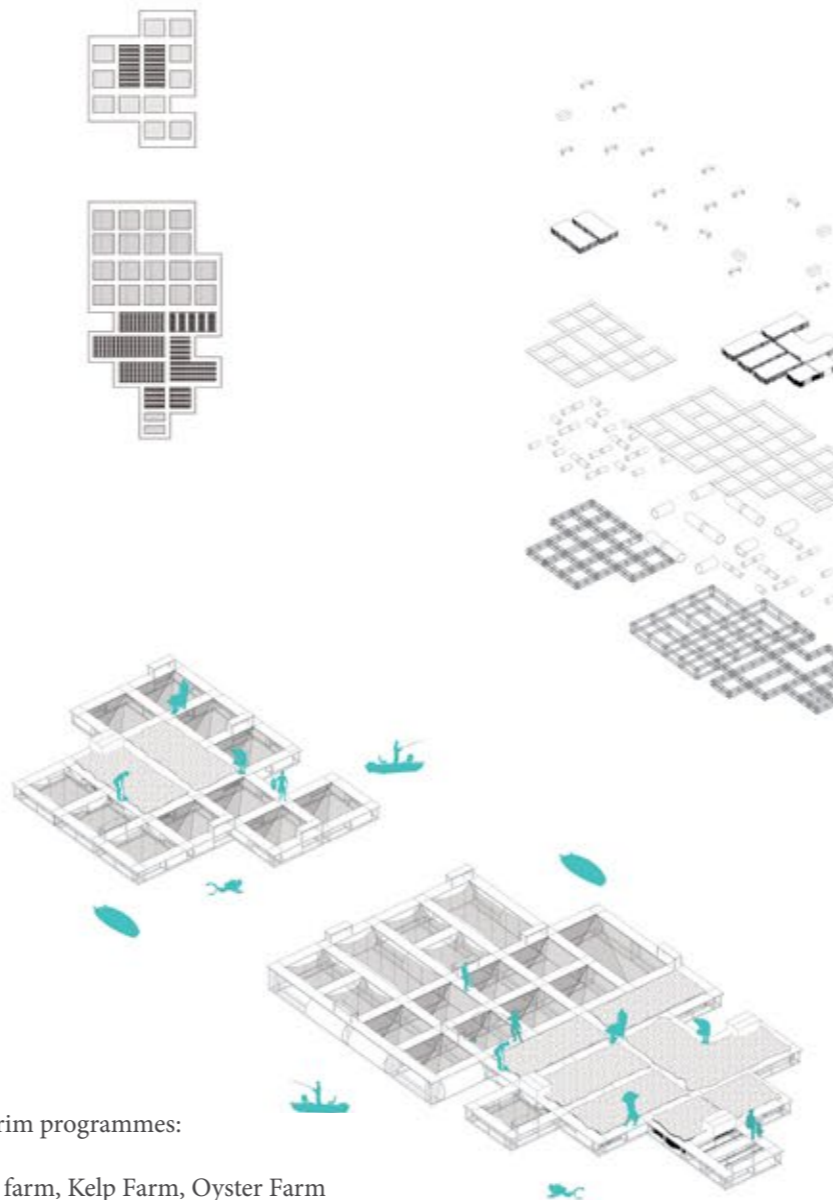


Interim programmes:

Fish farm, Kelp Farm, Oyster Farm

Temporary storage tents

10-15 YEARS

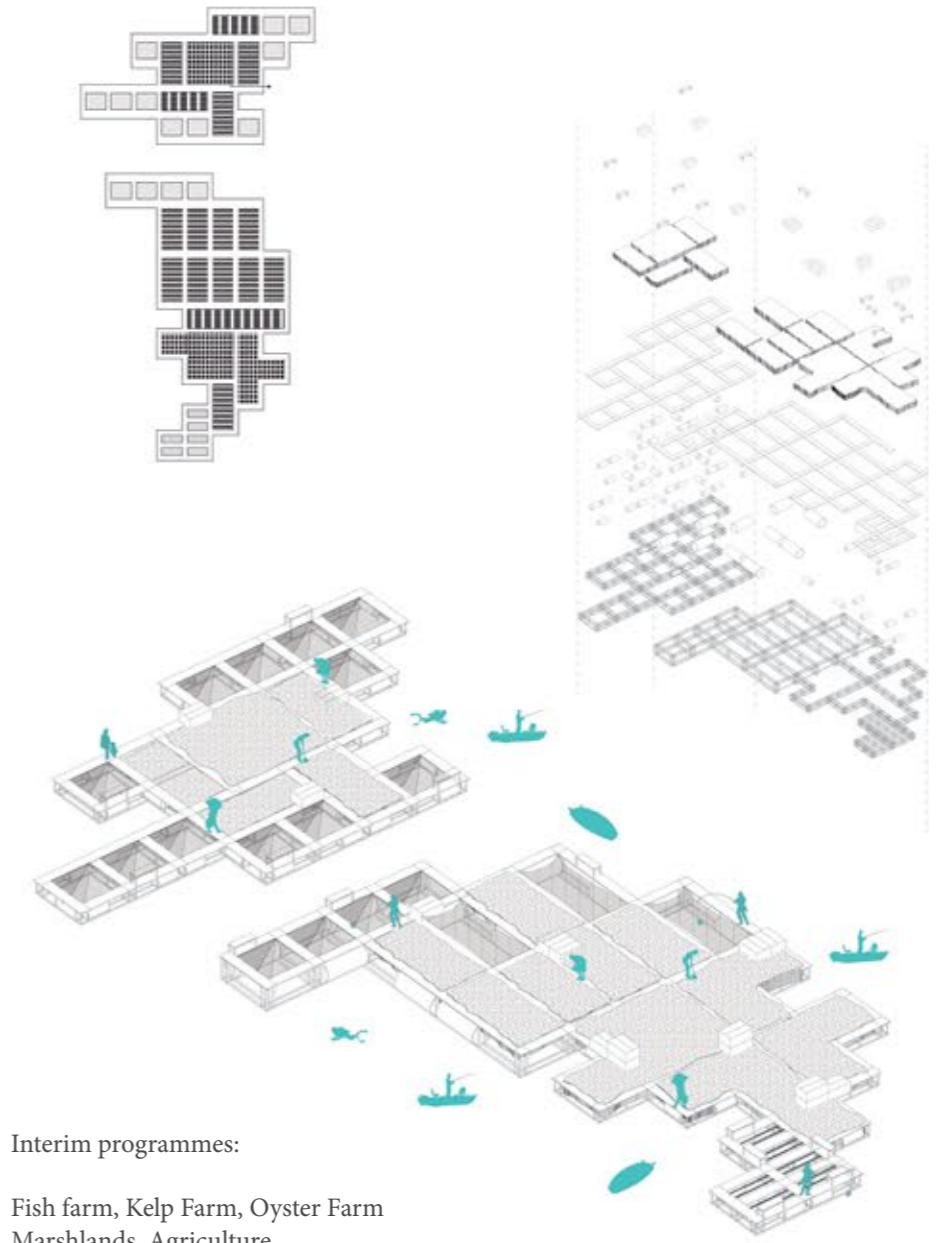


Interim programmes:

Fish farm, Kelp Farm, Oyster Farm
Marshlands, Agriculture

Research Labs, Food processing plant

20-30 YEARS



Interim programmes:

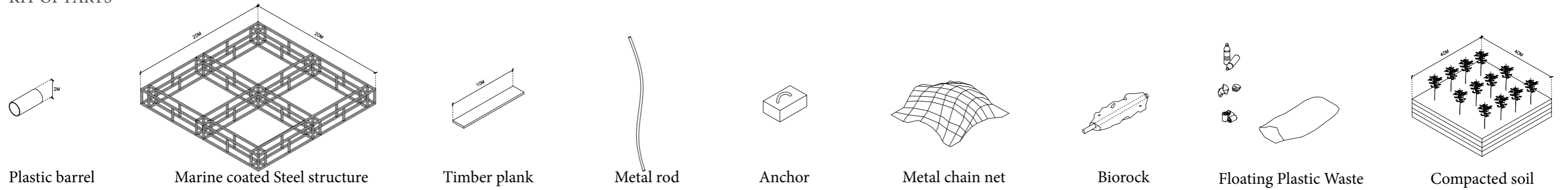
Fish farm, Kelp Farm, Oyster Farm
Marshlands, Agriculture
Mangrove forest

Storage tents, Research Labs, Waste treatment facilities

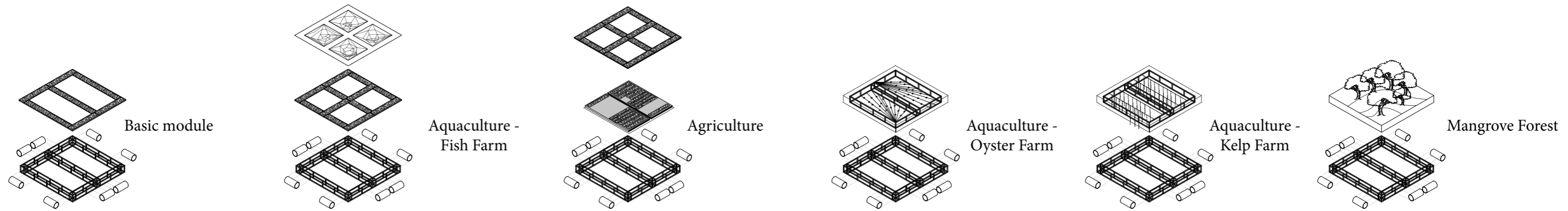
Expressing itself as an offshore landscape, the islands attempt to anchor a human presence of habitability in an intimate atmosphere. The uses of the new land are somewhat primitive, going back again to first principles where land is fertile for food, and waters clean for marine life. On top of this, the programmes help to aid in the cleansing of the water too. For example, Oyster farms help to cleanse the water of toxins and mangrove forests help to trap floating debris. This waste is then processed and part of it goes back to the land.

TECHNICALITIES

KIT OF PARTS



MODULAR DESIGN



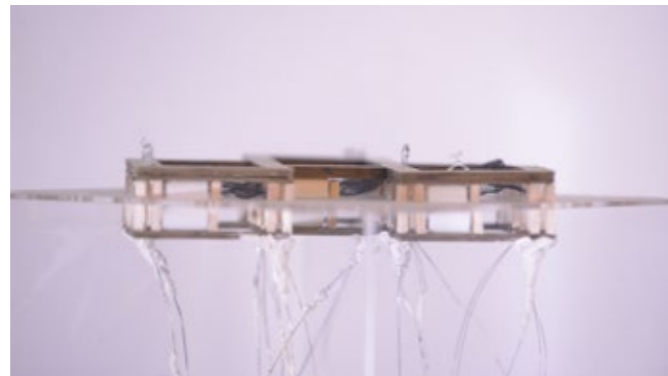
STRUCTURAL RELIANCE

Floating Platforms, similar to structural principles used in floating fish farms - will serve as primary structure in the early stages of the island. The floating base is also grid-like and porous (as the biorock is yet to form). Hence programmes occurring at the early stages would involve fish farms, oyster farms and kelp farms.

Attached to the floating structures are freely draped metal chains which are non-structural. Overtime, the structure becomes denser due to coral growth. This does two things: first, the floating platform becomes less porous which allows for other programmes to take place. Second, the biorock structure below gradually helps to support the activities on land as it starts to build up.

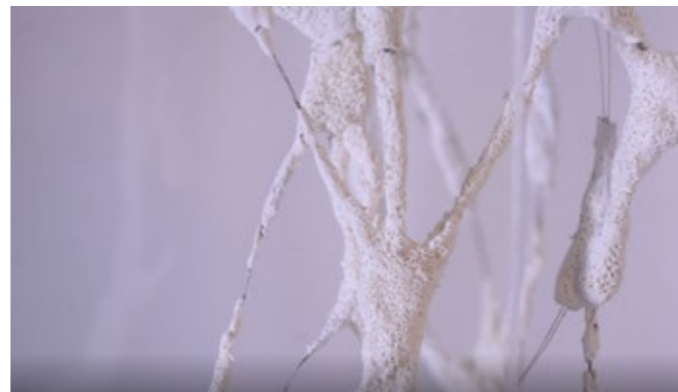
5 YEARS

Structural reliance: Floating Platforms



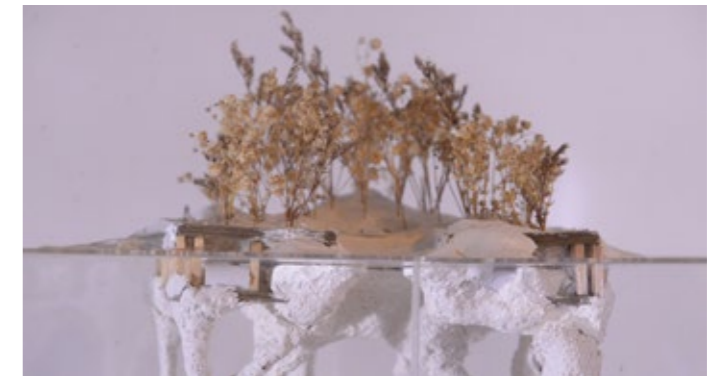
10-15 YEARS

Structural reliance: Floating Platforms + Biorock



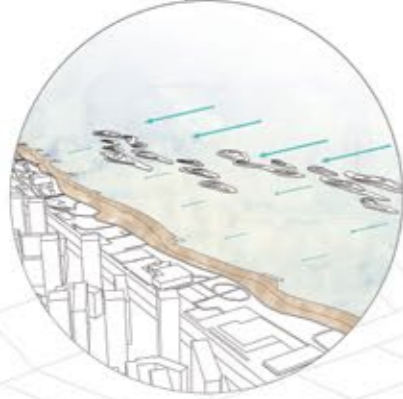
20-30 YEARS

Structural reliance: Biorock

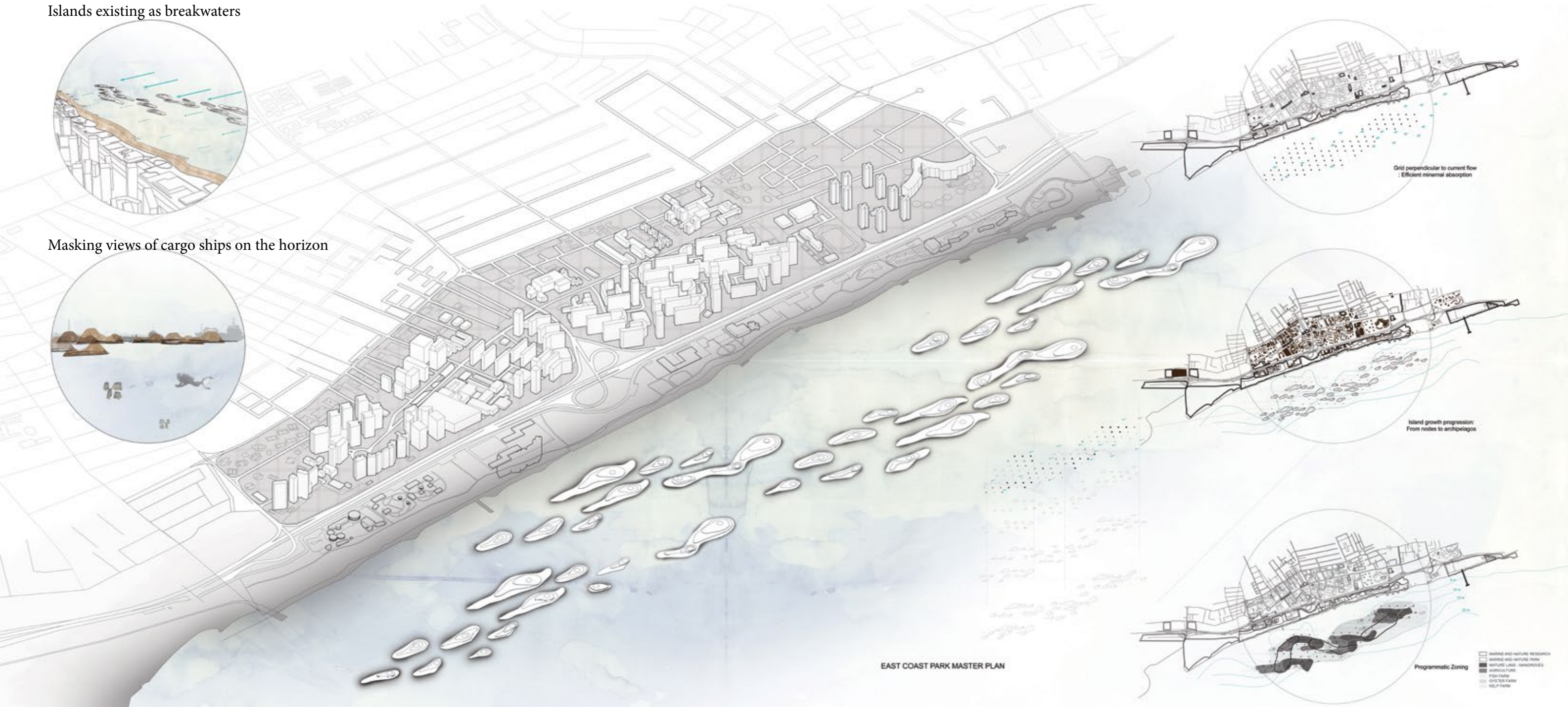


SITE CONTEXT

Islands existing as breakwaters



Masking views of cargo ships on the horizon



EAST COAST PARK MASTER PLAN

Programmatic Zoning

- WARRIAGE AND NATURE RESEARCH
- BEACHES AND NATURE PARKS
- NATURE LAND - MANGROVES
- AGRICULTURE
- FISH FARMS
- CRUSTACEAN FARMS
- HELL FARMS

The project proposes the islands as an extension of East Coast Park in Singapore - an area where land was reclaimed and now deemed as the largest urban park where one can swim and enjoy nature. But under this façade, sand is eroding fast, trees are sinking, and the horizon is dotted with cargo ships. The islands not only rehabilitate the water. They also rehabilitate the mainland by first existing as breakwaters. Secondly, the islands also shield and mask the view of the cargo ships along the horizon from mainland. Third, by cleaning the waterways, the common waterbody can be enjoyed by all.

The growing of land will be informed by a natural and gradual process as opposed to current curated and engineered means which disregard existing ecological systems - Hence, ocean currents and sea minerals will dictate the growth of the islands while sea depth and structural density will inform the programmes. The macro configurations are planned according to fairway widths and current flow, such that at any one point of time, small vessels will always be able to weave through.

Because of the way the land is formed and the water distance between islands, the architecture will be horizontally vast which is perhaps counter intuitive to the verticality of cities informed by the practices of land-sea valuation today.

The islands will serve as an entity of protected islandness, withstanding the test of time. In this thesis, land sustains the living. It becomes the life.

INTERIM PROGRAMMES



Oyster Farm



Fish Farm



Kelp Forest



Floating periphery



Marsh Lands



Agriculture



Mangrove Forest



Wind Energy



Waste Treatment Facilities

TECHNICALITIES & PRECEDENT STUDIES

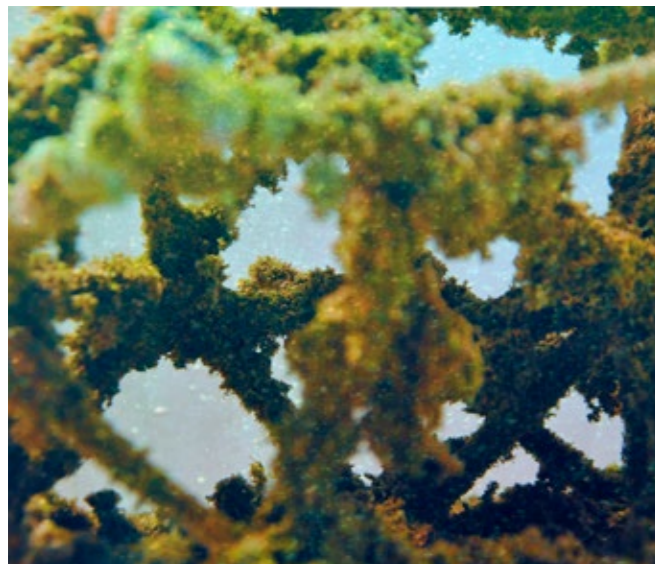
BIOROCK

Biorock refers to the an artificial product of electro-accumulation of minerals. The process of biorock formation involves the electrolysis of seawater with the aim of creating a corrosion resistant mineral layer atop a conductive material. The resulting layers of minerals such as calcium carbonate (limestone), confer strength to the Biorock structure.

Biorock and its associated process is used in creating artificial reefs, providing corrosion protection for marine structures, and architecture. Architectural applications for Biorock as a structural element stem from its high compressive strength. Several projects have explored the possibility of growing a building through electro-deposition of minerals in seawater. Biorock which grows at a rate of 10cm a year has been scientifically proven to be sufficiently structural for architectural support.



Artificial reefs



Biorock growth



Organic Biorock structures

PRECEDENT STUDIES



Mexico - Lake Texcoco



South America - Lake Titicaca



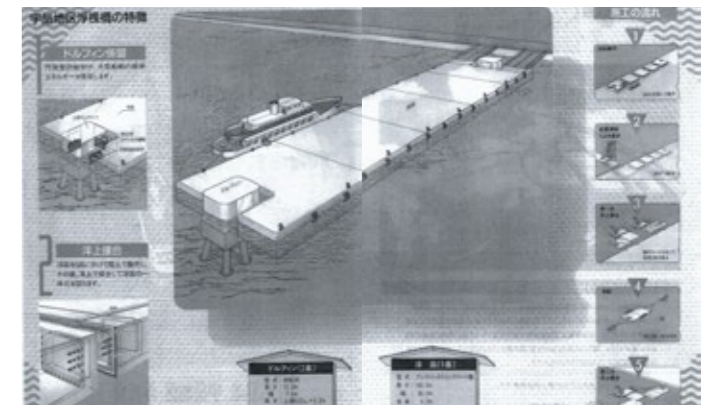
Japan - Umi-no-Mori - The Sea Forest



Okinotorishima - Coral Island



VLFS technology - Very large floating structure



VLFS airport trial in Japan