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URBAN SNORKEL

Project Brief

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Abstract
Sea levels will rise up 8.9m when global temperatures rise 4 degree Celsius. This new tideline will transform our coastal cities and our habitation ground plane.

This thesis will explore architectural intervention for coastal cities and water to coexist in the rising sea level scenario. Apart from reconnecting the city, the project would aim to explore a new dimension to connect between land and sea.

WHY

Sea level change's impact around the globe

Rising sea level continuously poses a long-term existential danger to the coastal cities such as Boston, Miami and New York due to global warming. According to "Climate Central", if the global temperatures rise 4 degrees Celsius, the rising sea levels will raise up 8.9m. In such scenario, the water level shallow up our coastal cities including Hong Kong and other coastline cities like Shanghai.

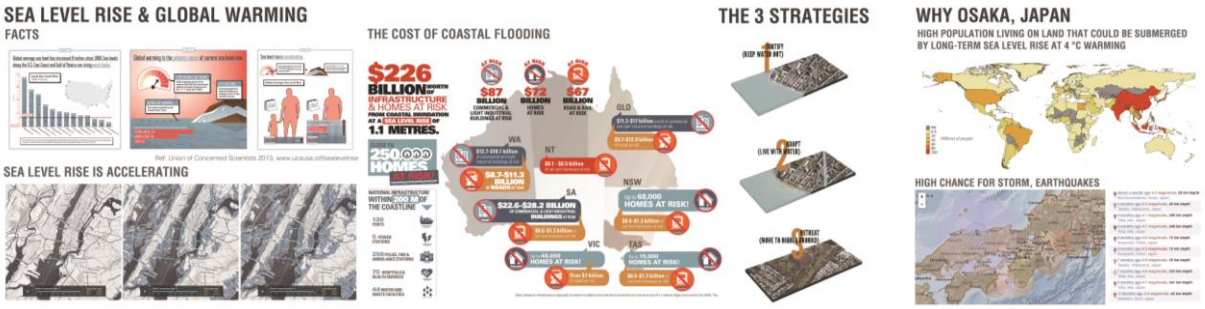
"Climate Central" further explains, due to climate change, storm events are predicted to occur more frequently and with greater intensity. When major storm hit the coastline cities during high tide, the region could experience sudden disastrous impact similar to those in New York during Hurricane Sandy in 2012.

Risk/ Change study

A group of scientist in Austrian "Climate Council" published a report " Counting the cost: Climate change and coastal flooding" which states the rising sea level affects house, roads, cultural sites, gardens, community facilities and ecosystems. Our current cities will not function when seawater flood in. Looking back at the event of Hurricane Sandy in 2012, the caused peak storm tides were more than 3 meters above sea level. The New York Stock Exchange were closed for the first time since 1888 and the storm surge flooded New York City's subway tunnels and inundated the runways at La Guardia and Kennedy airports. Hurricane Sandy killed 43 people in New York City, left thousands homeless, caused an estimated $US19 billion in public and private losses and crippled the financial district. Multiple threats would be imposed from the existing nature, like Sea grasses and mangroves provide extremely important habit for many marine species. They will be at risk due to the saltwater inundation due to the rising sea level.

Current architectural strategy study

There have been studies on how architecture can minimize the impacts of the rising sea level and storm surge to our coastal cities. In "Sea Change Boston" research, a group of US based architects introduces certain options for urban habitation based on the sea level change and storm surge to tackle the rising sea level: keep water out (i.e. water dam), move to higher ground or adaptive living on sea.



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HOW

This thesis will explore an architectural intervention between the water and our coastal cities. After precedents exploration, theories and materiality studies, the thesis could be to design a prototype habitat for coastal cities with its adaptive composition to be expanded to different scale according to the site contexts.

This thesis conducts a series of research on the risk about what would happen in rising sea level scenario. The boundary between water and land should come with a proper relationship. The design will be implementing on selected scenarios in responding to the sea level change.

WHAT

Thesis proposal

Considering the different design strategies towards sea level change, embracing the seawater in the city is the proposition in this thesis. For the goods of society and the environment, Gissan in the book "Subnature" believes that integrating subnatures, water, into architecture enables us to better understand our environment as a product of social and historical processes. We have been reclaiming lands from the sea. Yet we should learn to live with sea though our architectural intervention.

Hence, this thesis aim to retain habitation in the flooded coastal cities with the belief that adaptive living with seawater is the most effective solution to the sea level change. Co-exist living would means the design intervention will examine the possibility of superimposing a new community layer in response to the displacement of the urban ground in urban context.

Time frame:
1. Before Flood
2. At the time when global temperature rise 2 degrees Celsius (4.5m)
3. At the time when global temperature rise 4 degrees Celsius (8.9m)

Site Selection – Osaka Studies

Coastal urban area with fully developed seafront would provide a desirable testing ground for examining co-existing between city and water. Osaka has been chosen for the experiment. Osaka is one of 10 port cities most exposed to the coastal flooding and tropical cyclone. According to climate hot map, the economists project Osaka would suffer a loss of nearly U.S. $1 trillion assets due to the coastal flooding by 2070s.
Osaka currently has 8meters height sea walls along the river side but not on the coastal area. Only 20% of waterfront has been protected by sea wall. Hence, the sea wall offers little protection against the sea level rise. Osaka is not ready for the sea level rise event.

Japanese Economic Impact on Sea Level Rise Measurements

Japan has been having economic recession since 1990s which somehow affected the construction sea level rise measurements. There were a seawall proposal for Osaka seafront in 2007; however, the proposal was rejected by the state due to financial concern. Hence, we need a more flexible proposal for Osaka.

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When Osaka is in 4m Sea Level Rise

Umeda is new developed commercial area with largest underground city in Osaka. It has been chosen for the experiment.

The shown axon illustrates the situation when the sea level raise up by 4 meters. Here is the Loss in the flood:

1. The ground plane
2. Greenery + Park
3. 1st floor of the building including Office lobby and shopping area
4. The access to the underground

The metro and underground city is designed to be flood proof. So as long as we can secure the entrance of underground, we can save the underground for urban connection.

Hence, the aim of the design is;

1_PROTECTION_ Secure the entrance of underground, protect it from the flood

2_PERFORATION_ Bring sunlight into underground in order to provide a more habitation space for human and plant

3_AIR BUBBLE IN WATER_ Reserve space and provide connection to connect the city in the underwater level

The New Breathing Ground hopes to preserve the existing community, minimize the construction cost and the obstruction of flood measurements.