Eco-shoreline in Lantau:
Nature-based coastal defence and nurturing ground

Mei Yan, Crystal, Lui

Hong Kong Institute of Environmental Impact Assessment (HKIEIA)

Hong Kong SAR, China

crystalsujeong27@gmail.com

LinkedIn: Mei Yan, Crystal Lui

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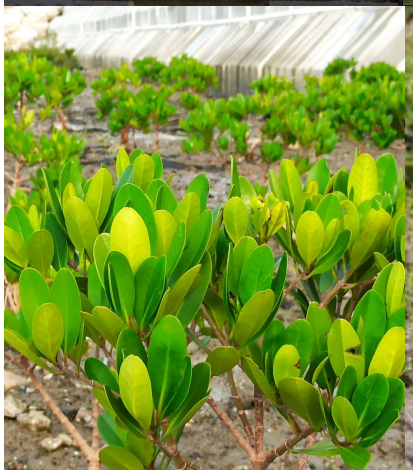
Mei Yan Lui (Crystal)






Outline

Introduction

Background of TCNTE project

Functions of Eco-shoreline

- Coastal Defence during Climate Change

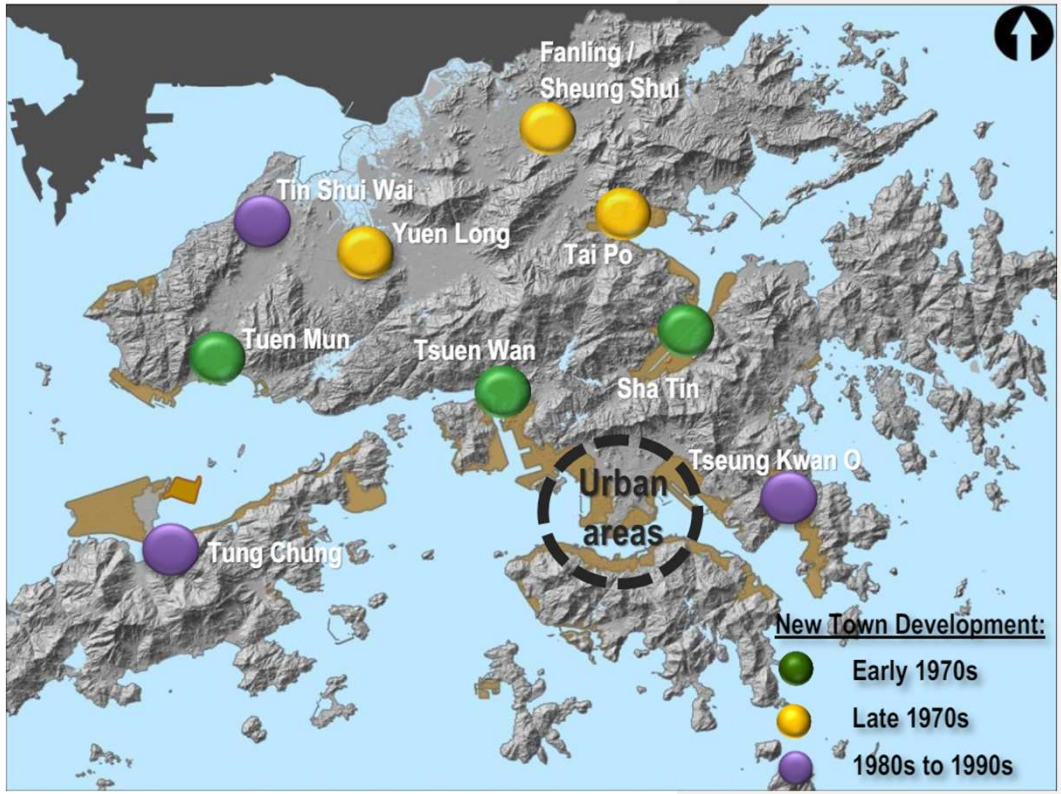
- Habitat and Biodiversity Conservation

Conclusion

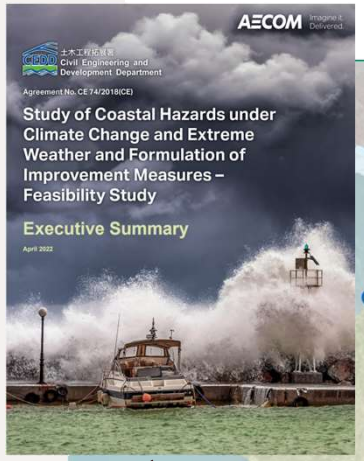
Introduction

Hong Kong

- **7.4 million** population on 1100 sq.km
- 7135 people in 1 sq.km
- The **4th** most densely populated region
- Built 9 new towns since 1970s
- 6 of 9 new towns are built on reclaimed land



Coastal Hazards under Climate Change and Extreme Weather



Damage of facilities near seaside

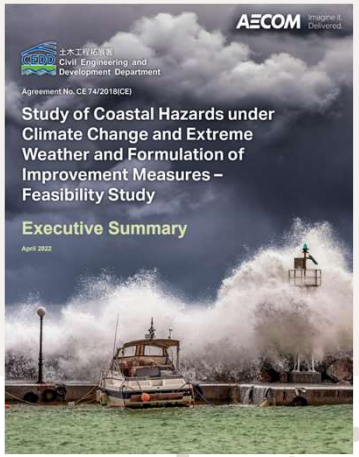
Coastal Hazards under Climate Change and Extreme Weather


Coastal flooding due to spreading of water from overtopping waves


Sea water inundation at low-lying areas


Damage of waterfront pavement due to overtopping waves

Coastal defence is crucial to mitigate all these risks and hazards brought by climate change and extreme weather.



Shortcomings of traditional seawalls

Smooth surface and simple design

1) Algae can hardly be attached onto

2) Unable to retain water during low-tide

3) Low habitat complexity

4) High temperature could kill organisms

5) pH of concrete is too high

Tung Chung New Town Extension (East) Project

Tung Chung New Town Extension Project (East)

- Reclamation: about 130 hectares
- Population: 119,000
- Residential flats: 40, 000
- 4.9km promenade and 24 hectares green area
- Construction of associated seawall and eco-shoreline

Slide 9

GU0 kris: maybe too detailed?

this part
The Eastern part of the Tung Chung New Town Extension, will cover 130 hectares and yield 40,000 flats. (forty thousand)
The east part of new town extension is expected to house a population of 119,000.(one hundred nineteen thousand)
A 4.9km promenade and 24 hectares of green area is built.
There will also be construction of associated seawall and eco-shoreline.
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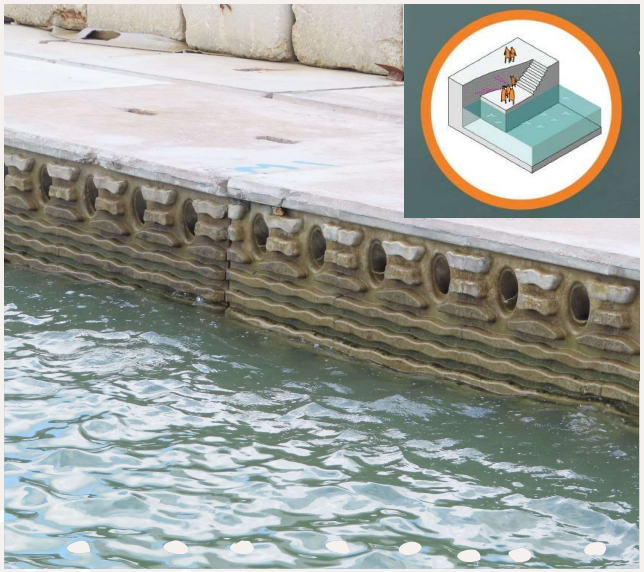
Tung Chung New Town Extension Project (East)

Eco-shoreline: Nurturing ground



Vertical eco-shoreline

1.8 km

Rocky eco-shoreline

0.8 km

Mangrove eco-shoreline

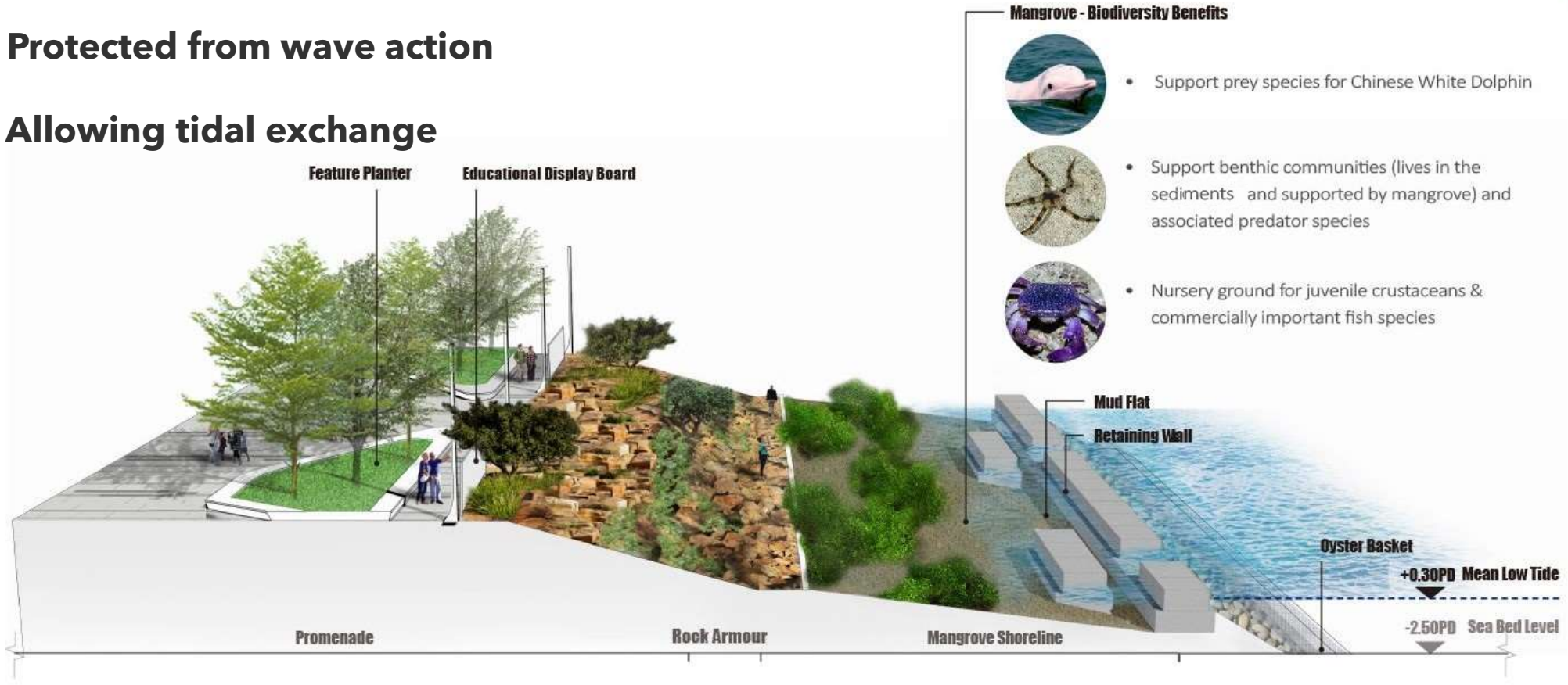
1.2 km

Design Concept of Mangrove Eco-shoreline

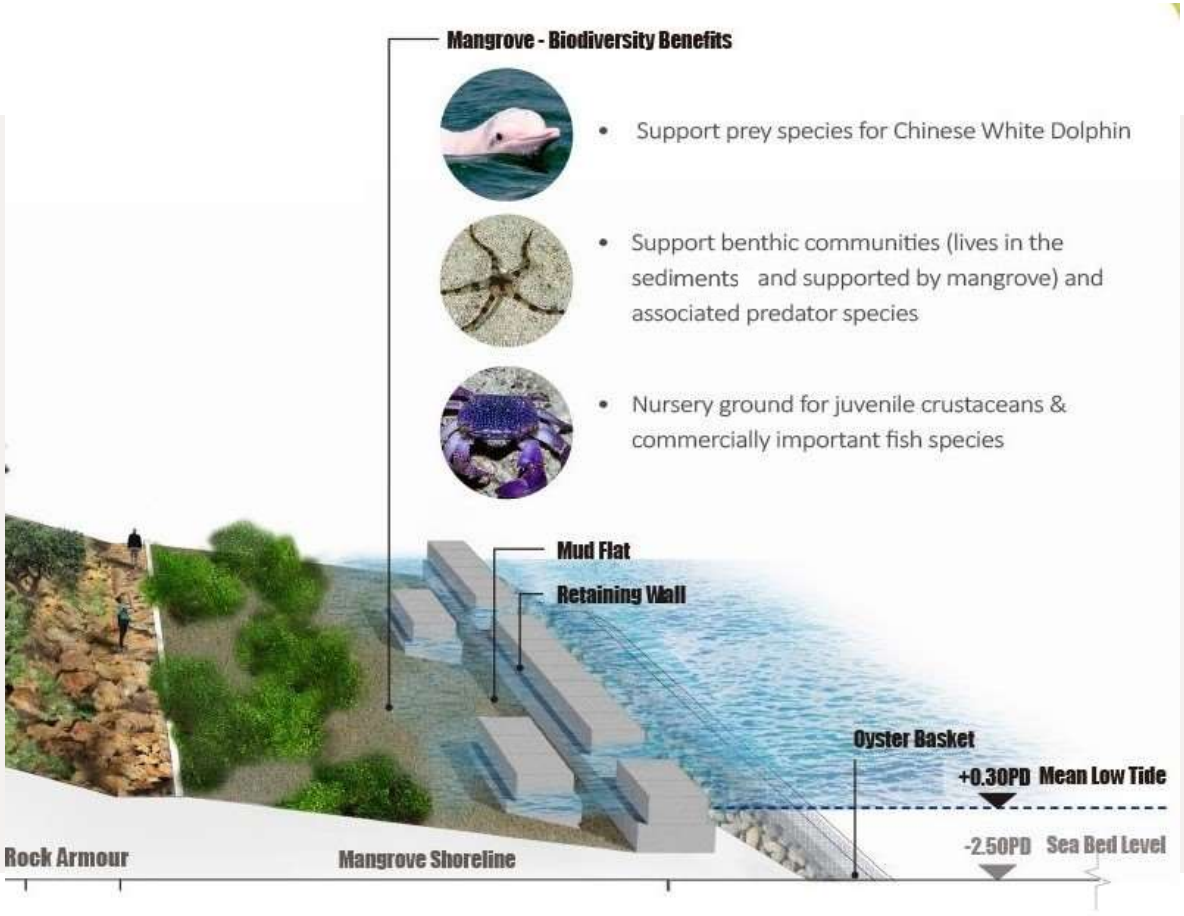
- Based on wetland sill design

- Protected from wave action

- Allowing tidal exchange



Design Concept of Mangrove Eco-shoreline



- Placing concrete blocks at seaward edge of the eco-shoreline platform

- Geotextile fabric prevent the loss of fine sediments from mudflats

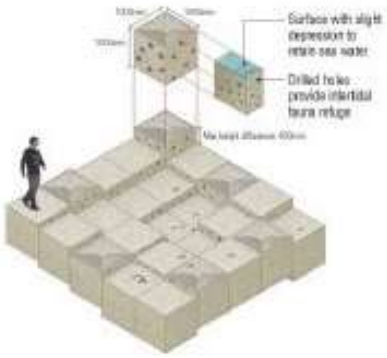
Mangrove plants in the mangrove eco-shoreline in Tung Chung.

Design Concept of Rocky Eco-shoreline

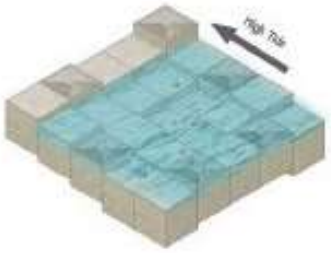
- Cast hole and ledges on modular concrete blocks to increase habitat value

- Lower pH value of bio-blocks to maximise ecologically usable surface

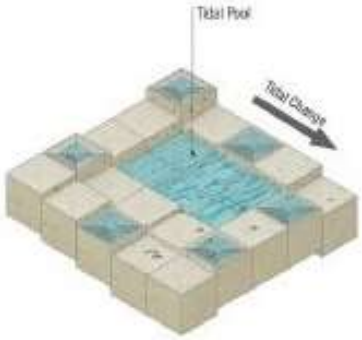
Design Concept of Rocky Eco-shoreline



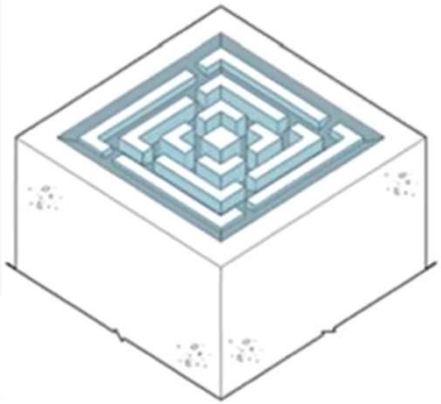
Scenario 1: Low Tide



Scenario 2: High Tide



Scenario 3: Tidal Changes
The formation of Pools



- Size of bio-blocks is about **1 m^3**

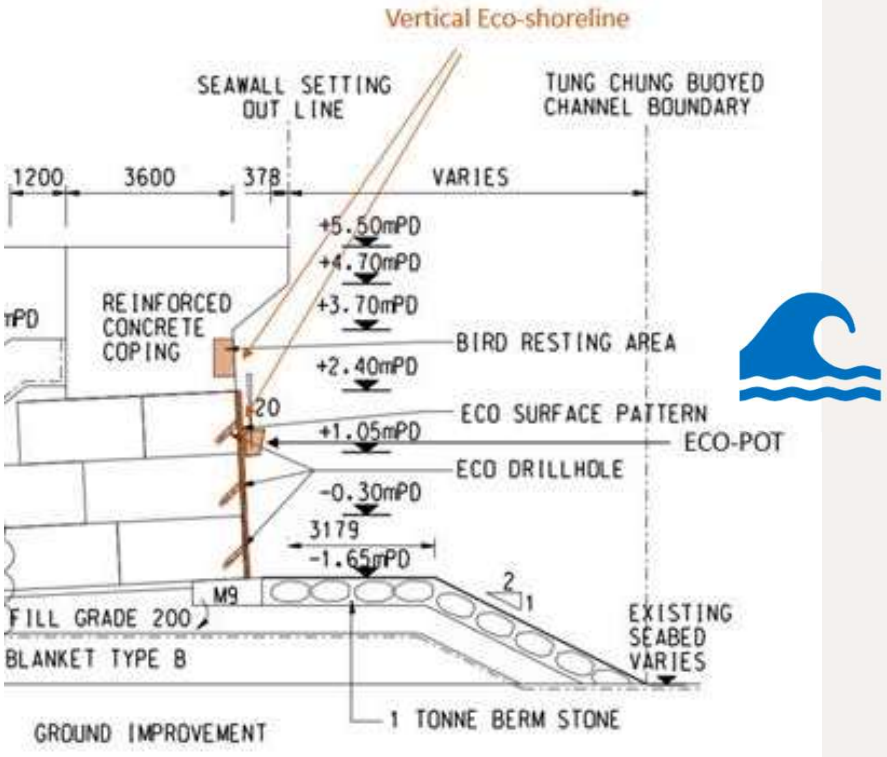
- Positioning some blocks higher than adjacent blocks to create rock pools during low-tide

Bio-blocks in the rocky eco-shoreline in Tung Chung.

Design Concept of Vertical Eco-shoreline

- Eco-pattern/Eco-tiles
- Eco-drillholes
- Bird resting area = precast large cavities
- Eco-pots

To increase surface complexity!



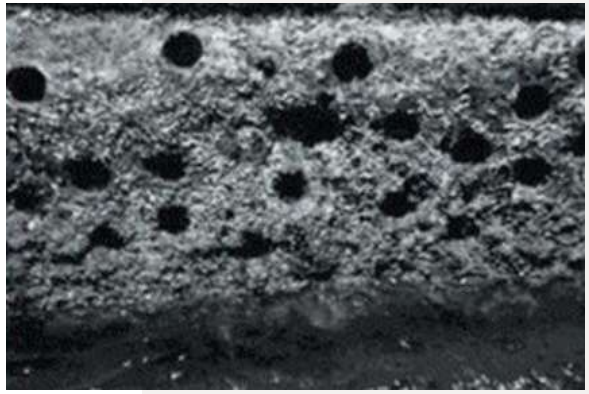
Design Concept of Vertical Eco-shoreline

- Uneven surface for easy attach and growth

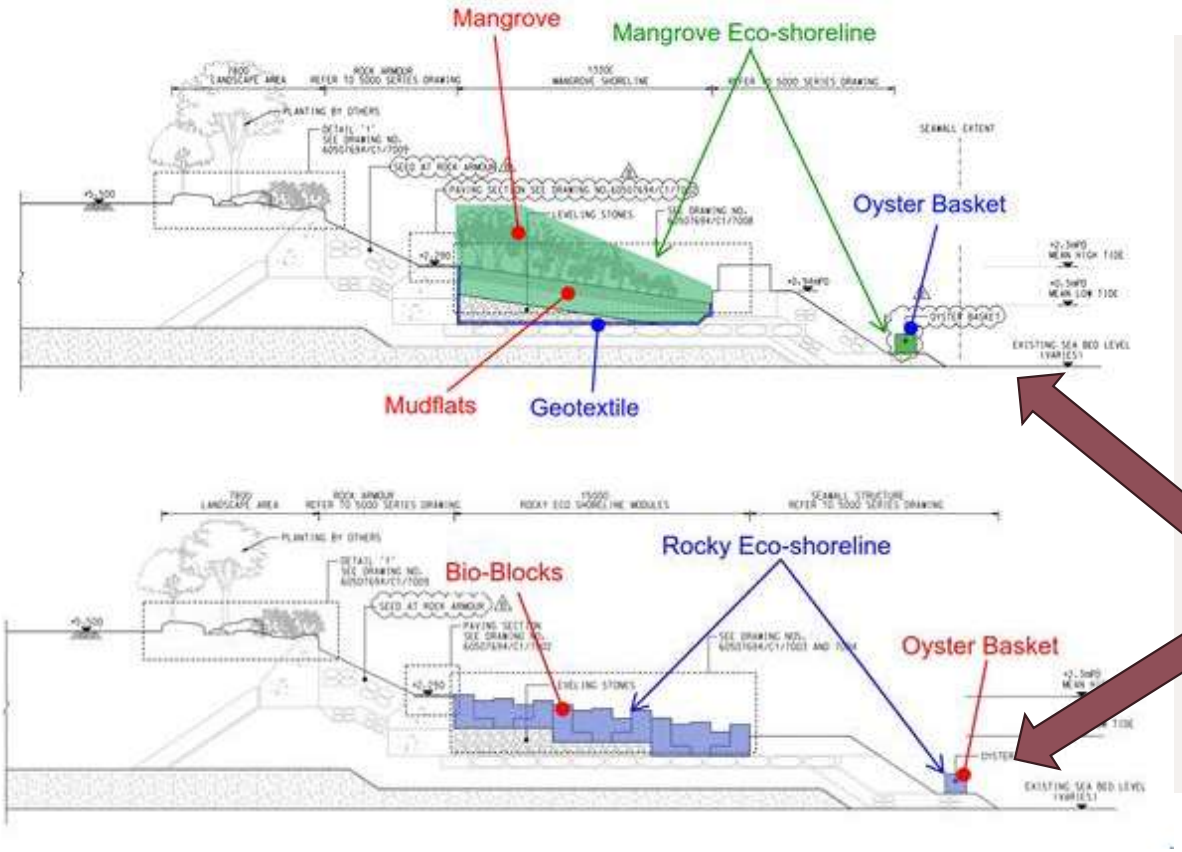
- Drill holes at 45-degree angle to retain water at low-tide

- Precast large cavities above high tide level to provide platforms for wetland birds

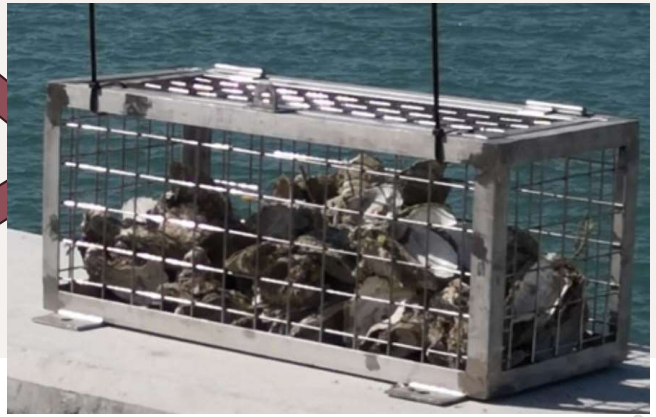
- Eco-pots provides a refuge for marine organism by retaining water during low-tide



Additional ecological enhancement work



- Oyster basket filled with oyster shells to increase habitat complexity
- Placed at the toe of the seawall/proposed eco-shorelines



Eco-shoreline: Nurturing ground

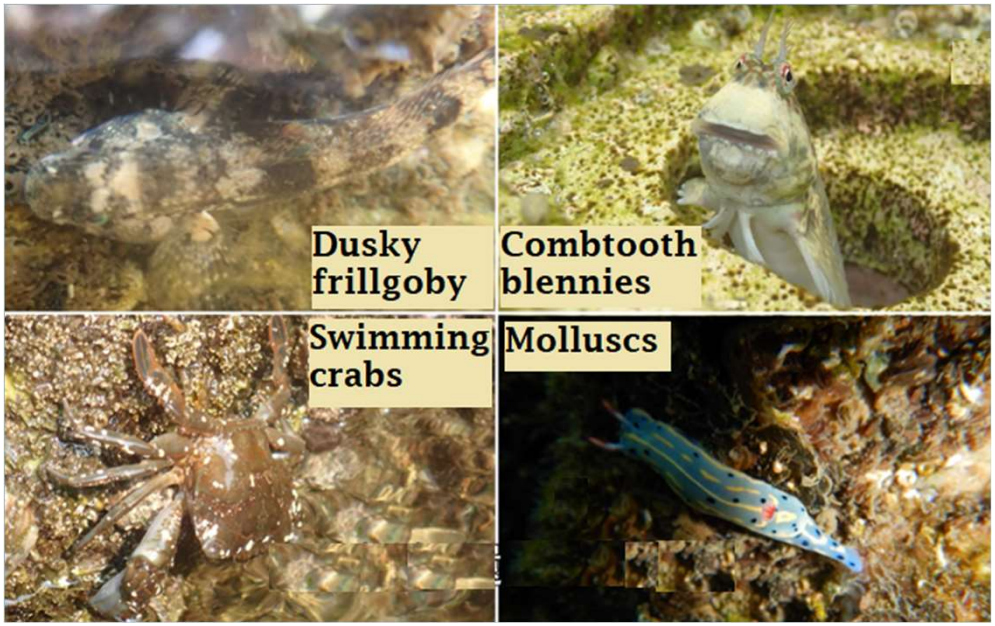
Mudskipper

Fiddler crab

Gastropod

mangrove eco-shoreline

rocky eco-shoreline



More than DOUBLE than that record from standard/traditional engineered shoreline.

Site trial: Siu Ho Wan

- Performed a site trial in Siu Ho Wan to investigate the feasibility and effectiveness of eco-shoreline features.

- Results show that eco-engineered features can successfully enhance marine biodiversity!

To conclude

Eco-shoreline will be an effective **nature-based solution** that provides **coastal defence** under climate change and extreme weather, and acts as a **nurturing ground** for marine organisms to grow and reproduce, thus, **conserving biodiversity**.

Thank you ~

Let’s continue the conversation!

Post questions and comments in the IAIA24 app.

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