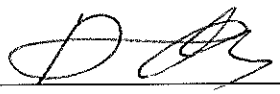
# Chung Shun Boring Eng. Co., Ltd.

Contract No. HK/2009/04
Wan Chai Development Phase II and
Central – Wan Chai Bypass –
Baseline Sampling, Field Measurement and
Testing Works

## Baseline Coral Survey Report

| | Name | Signature |
|---|---|---|
| Prepared by: | Chung Shun Boring Eng. Co. Ltd. | - |
| Certified by: | Environmental Team Leader – Mr. Andy Chung |  |

08 December 2009

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## 1. Introduction

1.1 The proposed reclamation areas in Wan Chai Development Phase II and Central-Wan Chai Bypass Project have been subjected to extensive sewage pollution in the past decades. Recent report in the Harbour Area Treatment Scheme (HATS) (Oceanway, 2003) reviewed that no coral communities were found within the Victoria Harbour area (North Point) and those community that were found were either common, i.e., *Perna viridis* dominated community, or of low ecological value, i.e., muddy bottom which support limited marine lives.

1.2 Concerning about the habitat loss due to the reclamation work, subtidal surveys were carried out in January 2007. Spot-Check dives and REA survey were conducted along the proposed reclamation work. Eighteen *Oulastrea crispata* coral colonies and one gorgonian coral *Echinomuricea* sp. were recorded during the field survey. It was recommended under the EIA study (EIA Report Register No. AEIAR – 125/2008) to translocate all the corals found in the site.

1.3 The scope of this work is to mark and tag all the coral colonies recorded during the baseline survey before the coral translocation work.

## 2. Methodology

***Baseline Survey for Coral Donor Site***

2.1 The pre-translocation surveys were in the ex-PWCDA basin (Site 13) and North Point (Site 27) (**Figures 1 and Figure 2**). The survey has mapped and confirmed the number of all coral colonies in these waters.

2.2 All the coral colonies attached on movable boulders (< 50cm in diameter) identified were mapped and tagged during this survey. The following baseline information of each of the coral colonies were collected in this phase:

- Verification of the coral species: Tagged coral colonies should be identified to the highest taxonomic resolution as far as practicable.
- Size
- Depth
- Orientation
- Health Status : Mortality/Bleaching
- Percentage of Sediment Cover
- Attached Boulder Size
- General Condition of Immediate Surrounding of the Coral Colonies

2.3 Photographic records of each coral colony tagged in the survey were collected from an angle that best represents the entire colony.

***Baseline Survey for Coral Recipient Site***

2.4 Spot-check reconnaissance dive was conducted at the proposed recipient site (**Figure 4**) and its vicinity to check for the presence of health colonies (e.g. fair health condition) of the two targeted species, *Ouslastrea crispata* and *Echinomuricea* sp., which will be translocated to the recipient site.

## 3. Result

***Baseline Survey for Coral Donor Site***

3.1 The pre-translocation survey was carried out on 28th November 2009 and the weather conditions were summarized in **Table 1**.

**Table 1 Weather Condition for the Pre-Translocation Survey on 28th November 2009**

| Date | Condition | Average Underwater Visibility |
|---|---|---|
| 28th November 2009 | - Wind Speed: East force 5 to 6<br>- Sunny period | 0.5 – 1 m |

3.2 A total of 20 hard corals and 1 gorgonian coral were tagged during the pre-translocation survey. The coral species, size, depth, attached boulder size, mortality (%), bleaching (%), sediment cover (%), surrounding condition and coral orientation were summarized in **Table 2**. Locations of each tagged coral colonies were marked in **Figure 3**

**Table 2 Coral Species, Size, Depth, Attached Boulder Size, Mortality (%), Bleaching (%), Sediment Cover (%), Surrounding Condition and Orientation**

| Coral # | Species | Size (cm) | Depth (m) | Attached Boulder Size (cm) | Mortality (%) | Bleaching (%) | Sediment (%) | Surrounding Condition | Orientation |
|---|---|---|---|---|---|---|---|---|---|
| HC 01 | *Oulastrea crispata* | 6.5 | 2.7 | 38 | <1 | 0 | <1 | Boulder/Rock | Eastern |
| HC 02 | *Oulastrea crispata* | 3.5 | 2.7 | 38 | 0 | 0 | 0 | Boulder/Rock | Eastern |
| HC 03 | *Oulastrea crispata* | 5 | 2.6 | 35 | 0 | 0 | <1 | Boulder/Rock | Eastern |
| HC 04 | *Oulastrea crispata* | 2 | 2.6 | 35 | 0 | 0 | 0 | Boulder/Rock | Eastern |
| HC 05 | *Oulastrea crispata* | 1.5 | 2.6 | 35 | 0 | 0 | 0 | Boulder/Rock | Eastern |
| HC 06 | *Oulastrea crispata* | 6 | 2.9 | 20 | 0 | 0 | 0 | Boulder/Rock | Eastern |
| HC 07 | *Oulastrea crispata* | 5 | 3.1 | 25 | 0 | 0 | <1 | Rock/Sand | Eastern |
| HC 08 | *Oulastrea crispata* | 5.5 | 2.8 | 41 | 0 | 0 | <1 | Rock/Sand | Eastern |
| HC 09 | *Oulastrea crispata* | 6 | 3.1 | 27 | 0 | 0 | 0 | Rock/Sand | Eastern |
| HC 10 | *Oulastrea crispata* | 3 | 2.9 | 21 | 0 | 0 | 0 | Boulder/Rock | Eastern |
| HC 11 | *Oulastrea crispata* | 8 | 2.7 | 30 | 0 | 0 | <1 | Boulder/Rock | Eastern |
| HC 12 | *Oulastrea crispata* | 5 | 2.9 | 17 | 0 | 0 | 0 | Rock/Sand | Eastern |
| HC 13 | *Oulastrea crispata* | 4.5 | 2.7 | 33 | 0 | 0 | 0 | Rock/Sand | Eastern |

| Coral # | Species | Size (cm) | Depth (m) | Attached Boulder Size (cm) | Mortality (%) | Bleaching (%) | Sediment (%) | Surrounding Condition | Orientation |
|---|---|---|---|---|---|---|---|---|---|
| HC 14 | *Oulastrea crispata* | 3.5 | 2.7 | 35 | 0 | 0 | <1 | Boulder/Rock | Eastern |
| HC 15 | *Oulastrea crispata* | 4 | 2.1 | 19 | 0 | 0 | 0 | Boulder/Rock | Eastern |
| HC 16 | *Oulastrea crispata* | 3 | 2.1 | 22 | 0 | 0 | 0 | Boulder/Rock | Eastern |
| HC 17 | *Oulastrea crispata* | 5 | 2.2 | 27 | 0 | 0 | <1 | Boulder/Rock | Eastern |
| HC 18 | *Oulastrea crispata* | 4.5 | 2.2 | 20 | 0 | 0 | 0 | Boulder/Rock | Eastern |
| HC 19 | *Oulastrea crispata* | 3 | 2.2 | 22 | 0 | 0 | 3 | Boulder/Rock | Eastern |
| HC 20 | *Oulastrea crispata* | 3 | 2.1 | 18 | 0 | 0 | 3 | Boulder/Rock | Eastern |
| GOR 01 | *Echinomuricea* sp. | 40* | 2.7 | N/A | 0 | 0 | 0 | Vertical Seawall | Eastern |

*Measurement in height

3.3 Two species of corals were tagged during the pre-translocation survey. There are 20 hard coral colonies belong to *Oulastrea crispata* and 1 gorgonian coral colony belongs to *Echinomuricea* sp (**Photo Plate 1**). All the tagged coral colonies are in fair conditions.

***Baseline Survey for Coral Recipient Site***

3.4 Spot-check dive was carried out at the proposed recipient site with 10 m x 10 m coastal area at Junk Bay. Three species of hard corals, one species of soft coral and four species of gorgonian corals were recorded (**Table 3**)

**Table 3 Corals Recorded at Proposed Recipient Site**

| Coral Species | Size (cm) | Health Condition | Abundance in HK |
|---|---|---|---|
| *Oulastrea crispata* | 5 | Fair | Common |
| *Goniopora stutchburyi* | 15 | Fair | Common |
| *Tubastrea* sp. | 10 | Good | Common |
| *Dendronephthya* sp. | 12* | Fair | Common |
| *Echinomuricea* sp. A | 25* | Fair | Common |
| *Echinomuricea* sp. B | 30* | Fair | Common |
| *Echinogorgia* sp. | 25* | Fair | Common |

*Measure in height

3.5 The bottom substrate of the recipient site is mainly composed of bedrocks and sand. The maximum depth is about 6 m. All *Oulastrea crispata* and *Goniopora stutchburyi* colonies were recorded at the depth from 2 m to 3.5 m while *Tubastrea* sp., soft coral and gorgonian corals were recorded at 4 m to 6 m.

3.6 The average percentage cover of hard corals, soft corals and gorgonian corals at the recipient site is less than 1%. Common invertebrates such as sea urchins, sea anonmone, green mussel, rock oyster were recorded at the recipient site. Common starfish was also recorded. They are all common species and found in very low abundance and diversity.

## 4. Discussion

4.1 Twenty-one coral colonies were marked and tagged during the pre-translocation survey and all the hard corals belong to the species *Oulastrea crispata* while same to the EIA survey, only one gorgonian coral *Echinomuricea* sp. was marked and tagged. Nine coral colonies were recorded with sediment cover (less than 1%: HC 01, HC 03, HC 07, HC 08, HC 11, HC 14, HC 17; 3%: HC 19, HC 20). The bottom substrate along the coral area in the donor site is mainly composed of boulder, rock and sand except the site for gorgonian coral in which the area is composed of artificial vertical seawall.

4.2 All the tagged corals are in fair condition only one coral colony recorded with mortality less than 1% (HC 01). No bleaching was recorded. All the photos were taken in an eastern direction.

4.3 The bottom substrate at the recipient site is mainly composed with sloping bedrocks and sand. Only a few rubbles were recorded at the deeper region (4 m to 6 m). The depth of the hard corals found in this site (2 m to 3.5 m) is similar to the depth of the hard corals found in Causeway Bay (2.1 m to 3.1 m) and they health condition is similar too (fair condition). However all the *Oulastrea crispata* recorded at the recipient site were grown on the bedrock surfaces. Healthy *Echinomuricea* sp. colonies were also recorded at the recipient site.

4.4 The recipient site is located at the outer region of Junk Bay in which it is quite exposed and facing wave action regularly especially during typhoon and monsoon. Most of the bedrock surfaces are quite smooth and with only limited marine life grow on it.

## 5. Recommendations

5.1 Similar to the EIA survey, all the tagged corals are in fair health condition and they are suitable for translocation in order to avoid total loss of them. Water quality and coral health should be carefully monitored during the translocation process.

5.2 It was found that the proposed recipient site located Junk Bay is quite exposed to wave action regularly. As a result, the bottom substrate was mainly composed of sloping bedrocks and sandy. Since all the tagged hard corals were attached rock less than 50 cm in diameter (17 cm to 41 cm), the rock will be easily turned over by wave actions especially during the time of typhoon and monsoon. This may cause very serious mortality. Although both *Oulastrea crispata* and *Echinomuricea* sp. colonies were recorded at this proposed recipient site, this site is considered not suitable for the translocation the tagged corals.

5.3 In order to prevent any mortality of the tagged corals after translocation, it is recommended translocating all the corals to a less exposed area inside Junk Bay area (**Figure 5**). According to recent surveys (Ecosystems, Planning and Site Review for the South East Kowloon Material Recovery and Transfer Station – Feasibility Study at Junk Bay, Data Not Published Yet), area located at the inner bay of Junk Bay (**Figure 4**) is less exposed and with similar substrate to the donor site (boulders and rocks were recorded). Both *Oulastrea crispata* and *Echinomuricea* sp. colonies were also recorded at this suggested new recipient site. Same to the proposed recipient site, random suite of coral colonies within and adjacent to the suggested new recipient site will be included in the monitoring programme. Since the coral recipient site is subject to approval of IEC and AFCD, it is suggested that the tagging of the random suite of coral colonies should be done during the coral translocation stage.

## 6. References

Brian Morton and John Morton. 1983. *The Sea Shore Ecology of Hong Kong*. Hong Kong University Press.

Binnie Consultants Limited. 1995. Marine Ecology of Hong Kong: Report on Underwater Dive Surveys. Volume I. Civil Engineering Department Geotechnical Engineering Office

Katharina Fabricius and Philip Alderslade 2001. *Soft Corals and Sea Fans: A comprehensive guide to the tropical shallow-water genera of the Central-West Pacific, the Indian Ocean and the Red Sea*. AIMS.

The Oceanway Corporation Ltd. 2003. *Report: Field Diving Surveys of Corals for the Environmental and Engineering Feasibility Assessment Studies (EEFS) in Relation to the way forward of The Harbour Area Treatment Scheme (HATS).*

Chan A.L.K., Choi, C.L.S., McCorry D., Chan K.K., Lee, M.W., and Put, A. Jr. 2005. *Field Guide to Hard Corals of Hong Kong*. AFCD.

# Figure

**Figure 1 Donor Site for *Oulastrea crispata* Colonies**

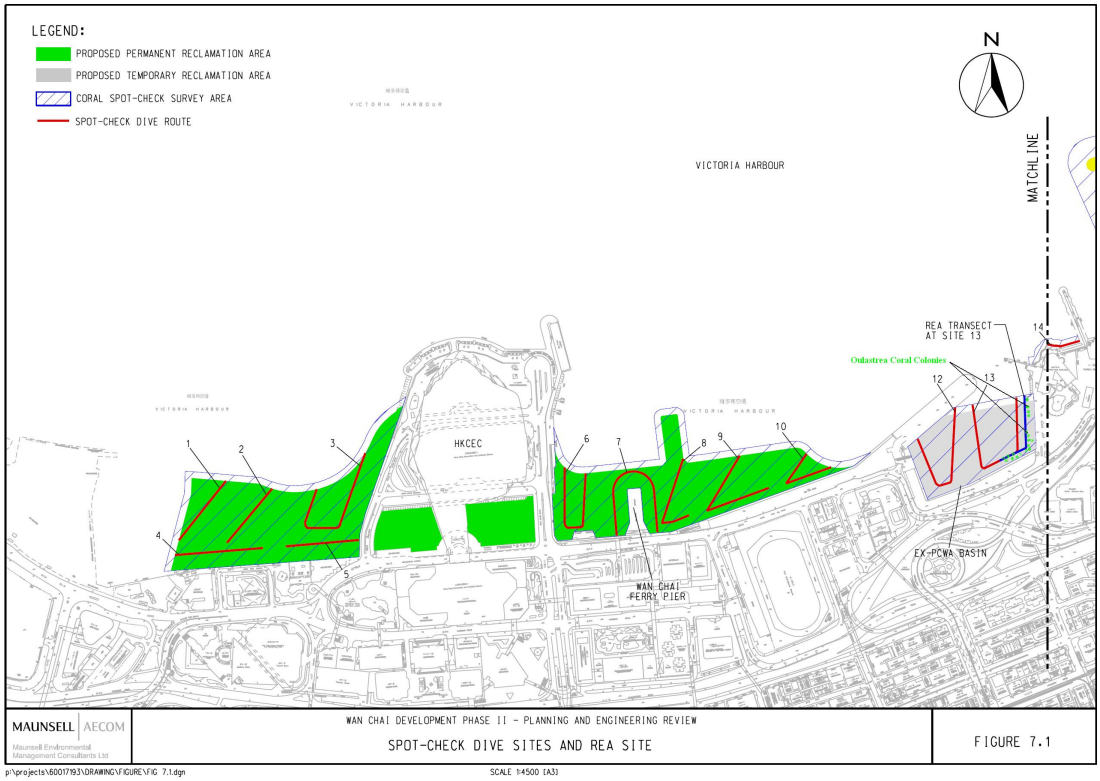



**Figure 2 Donor Site for *Echinomuricea* sp. Colony**

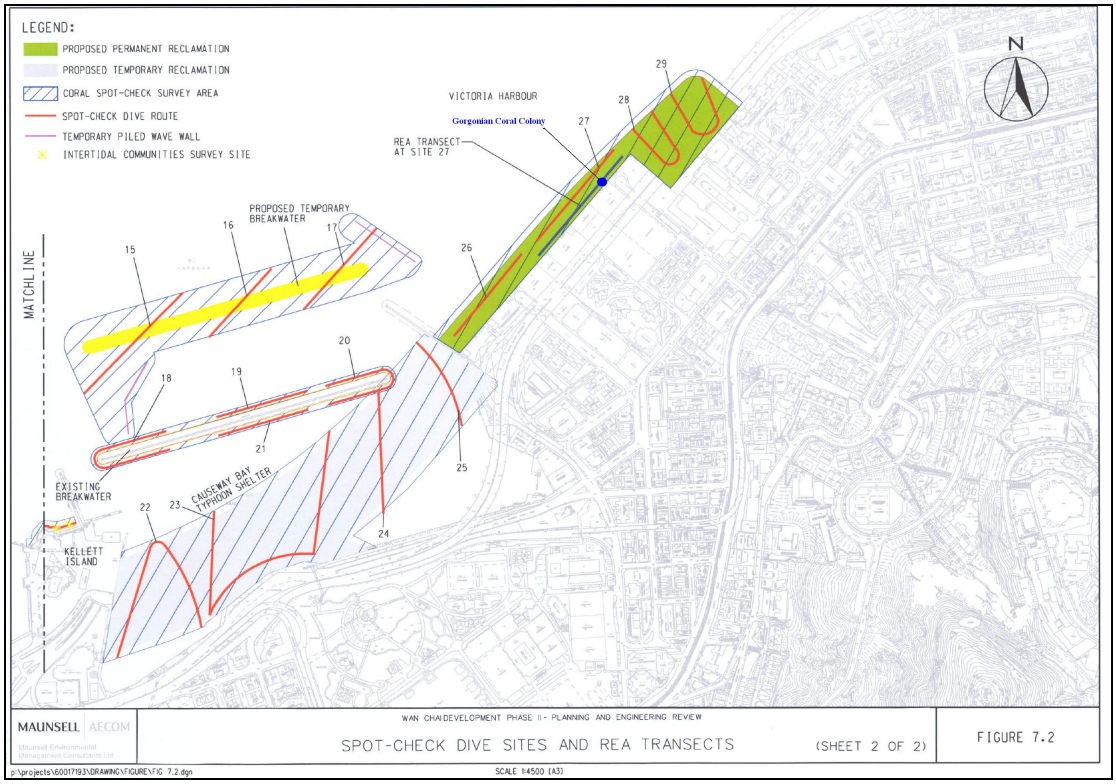


**Figure 3 Tagged Coral Colonies at Donor Sites**

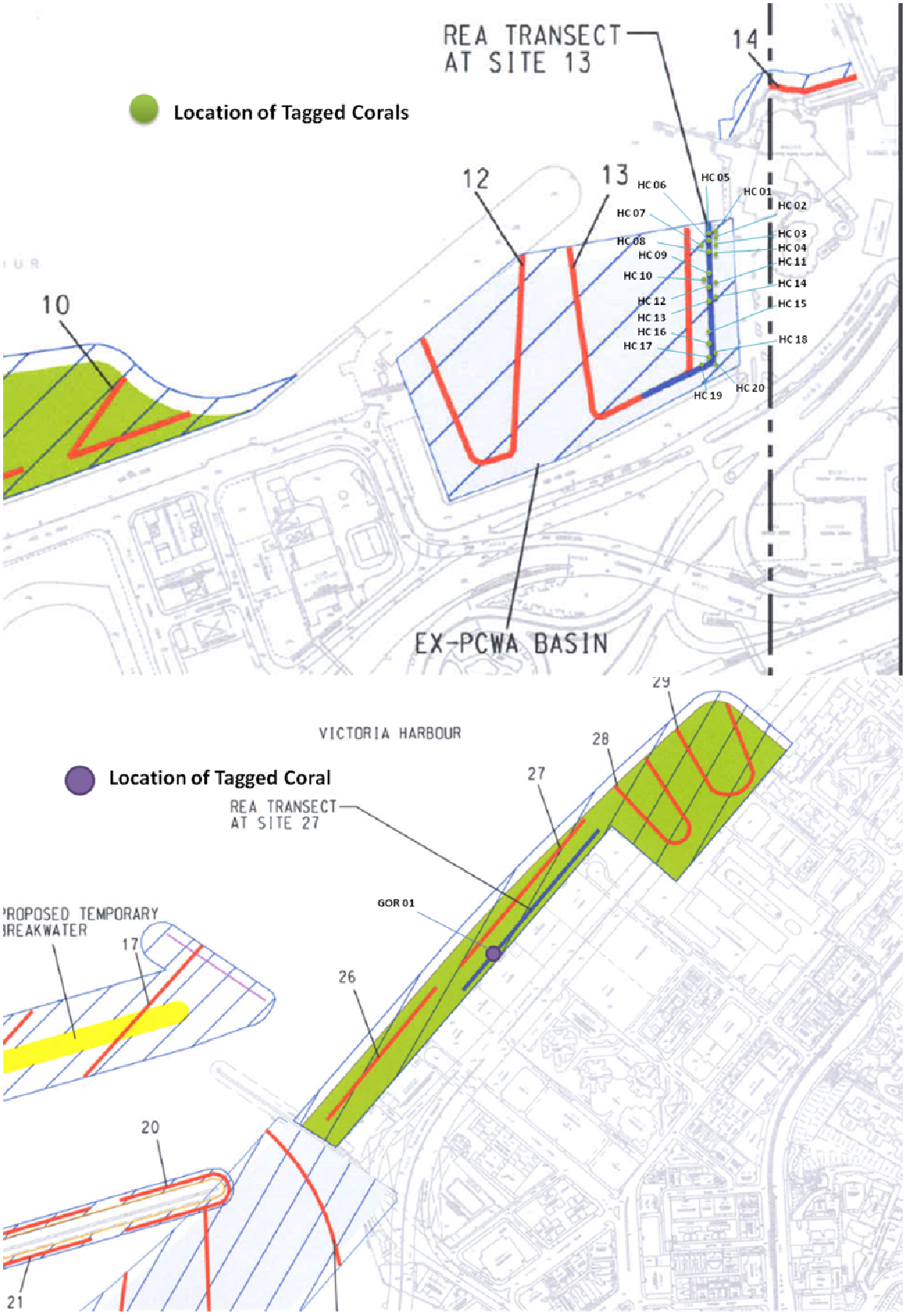


**Figure 4 Proposed Recipient Site at Junk Bay**

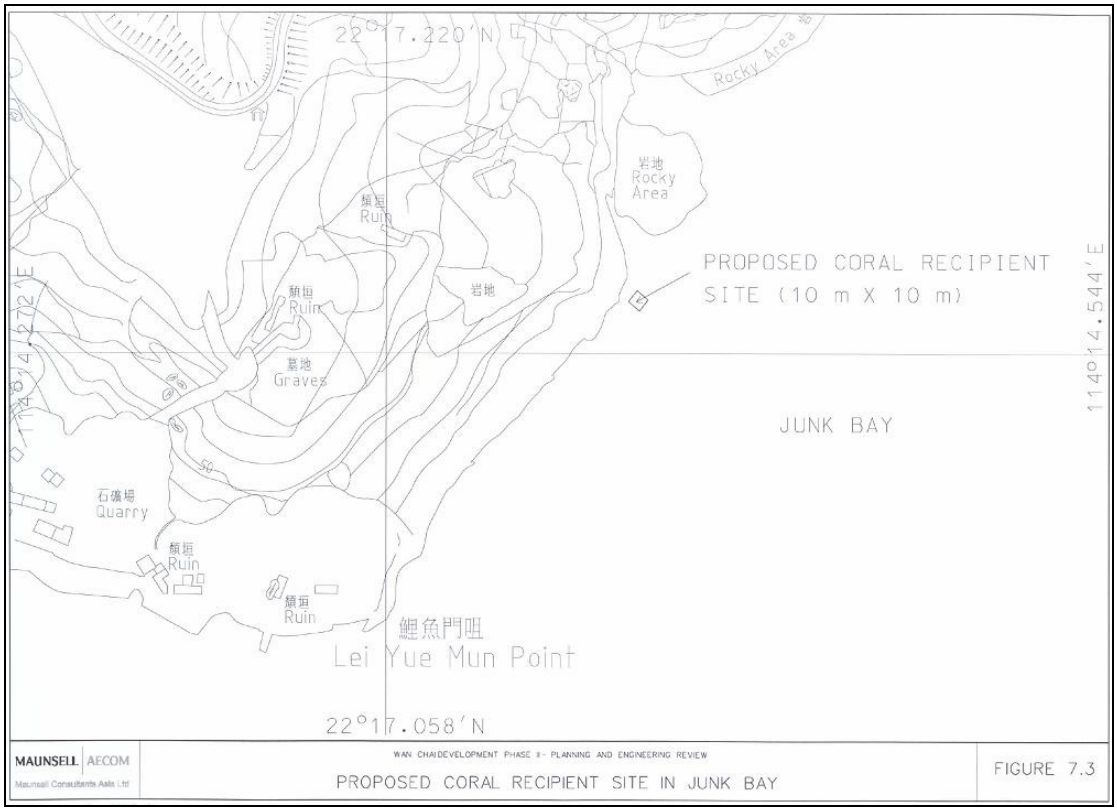
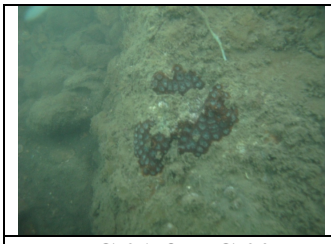
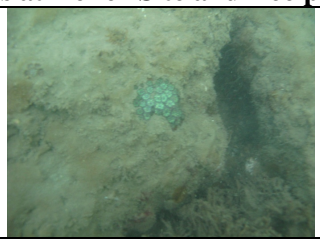
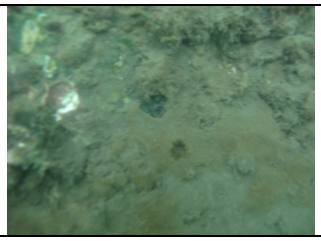
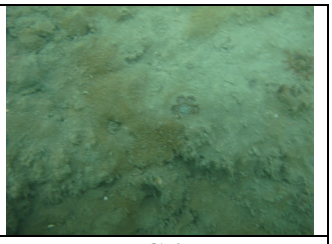



**Figure 5 Suggested New Recipient Site**

**PHOTO PLATE 1 Corals at Donor Site and Recipient Site**

| | | | |
|---|---|---|---|
|  |  |  |  |
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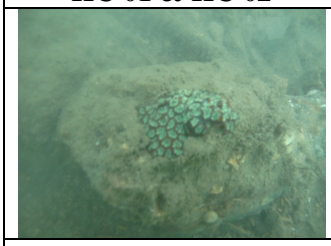
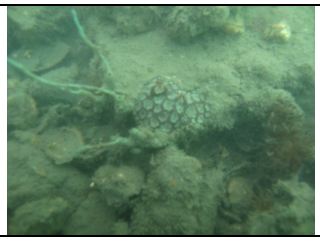
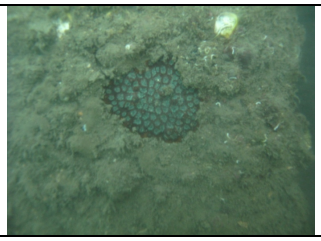
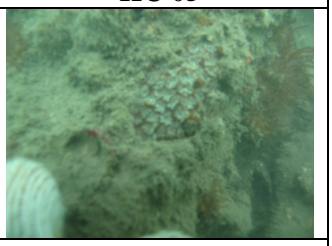
|  |  |  |  |
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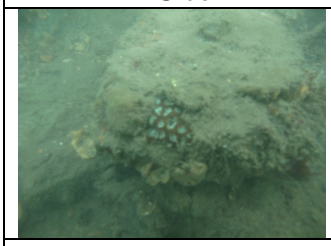
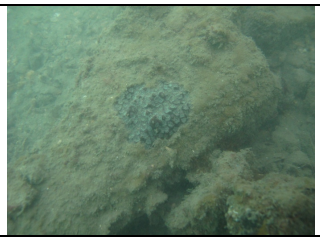
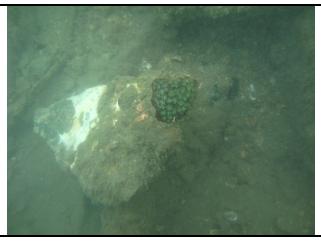
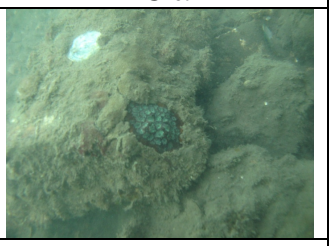
|  |  |  |  |
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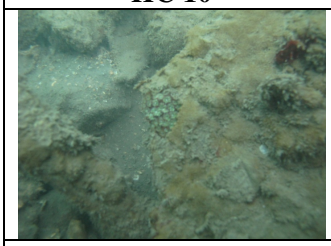
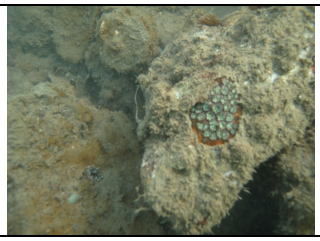
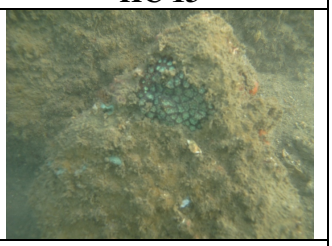
|  |  |  |  |
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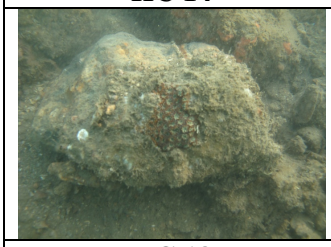
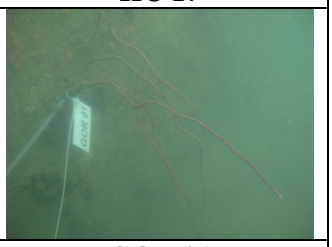
|  |  |  |  |
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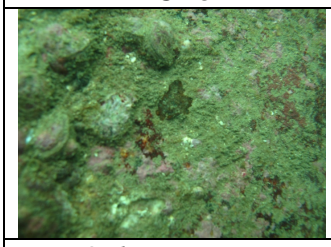
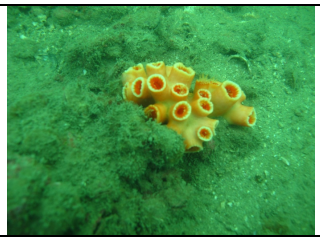
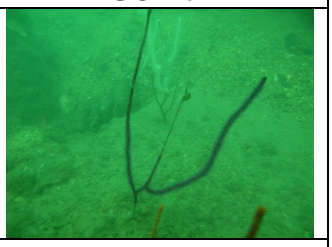
|  |  |  |  |
| ***Oulastrea* sp.at Recipient Site** | ***Tubastrea* sp. at Recipient Site** | ***Echinomuricea* sp. at Recipient Site** | |