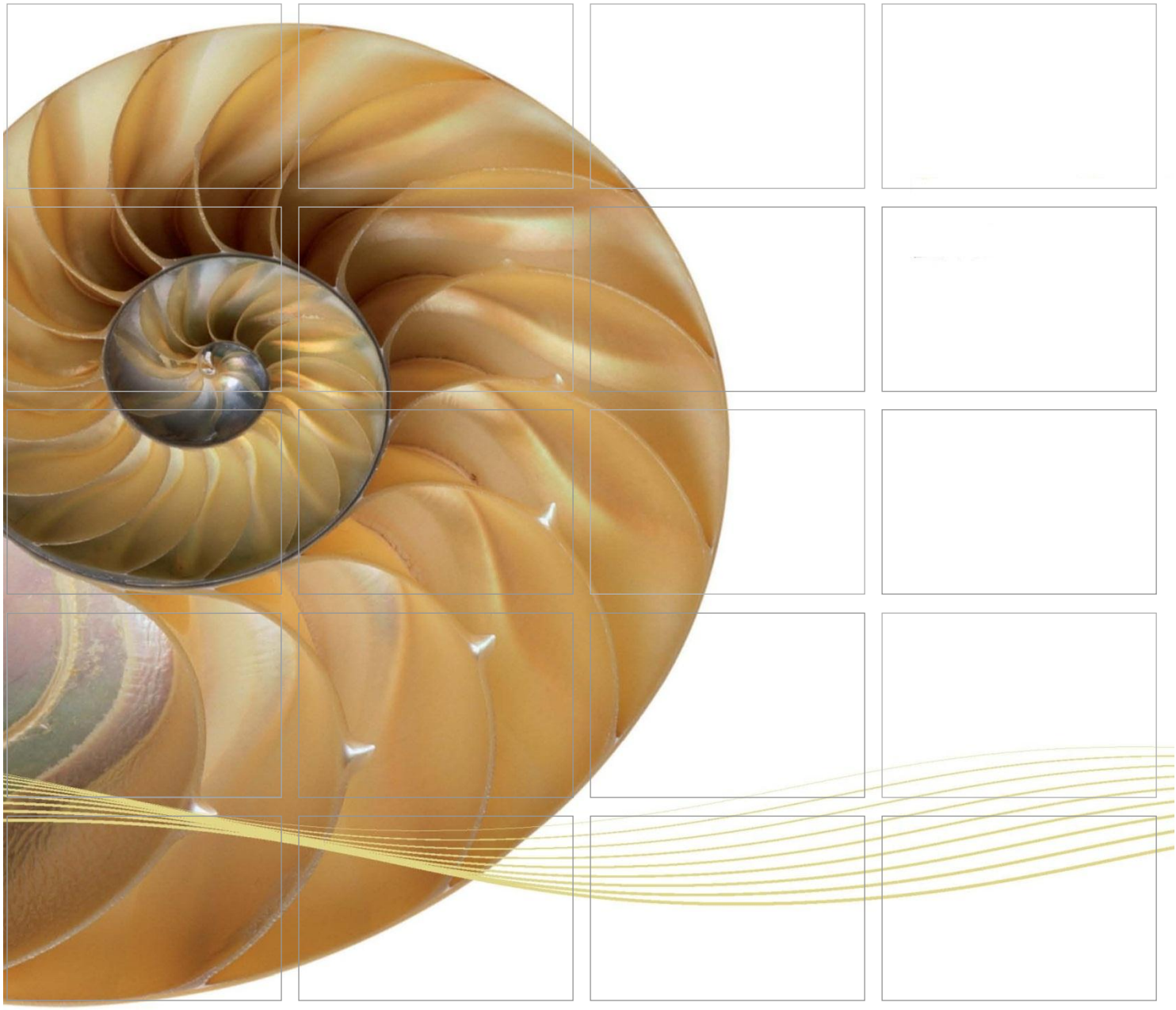
Report



Contract No. HY/2012/08
Tuen Mun – Chek Lap Kok Link – Northern Connection Sub-sea Tunnel Section

Detailed Coral Translocation Report

27 February 2014

Environmental Resources Management
16/F, DCH Commercial Centre
25 Westlands Road
Quarry Bay, Hong Kong
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Client:	Project No:
DBJV	0212330
Summary: This document presents the Detailed Coral Translocation Report for Tuen Mun – Chek Lap Kok Link Northern Connection Sub-sea Tunnel Section.	Date: 27 February 2014 Approved by:  *Mr Craig Reid* *Partner* Certified by:  *Mr Jovy Tam* *ET Leader*

Revision	Description	By	Checked	Approved	Date
	Detailed Coral Translocation Report	VAR	JT	CAR	27/02/14

Distribution

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Ref.: HYDHZMBEEM00_0_1728L.14 6 March 2014

AECOM By Fax (2450 3099) and By Post
Supervising Officer Representative's Office
Room 201, 2nd Floor,
River Trade Terminal Office Building,
201 Lung Mun Road, Tuen Mun, Hong Kong

Attention: Messrs. Edwin Ching / Andy Westmorelan

Dear Sirs,

Re: Agreement No. CE 48/2011 (EP)
Environmental Project Office for the
HZMB Hong Kong Link Road, HZMB Hong Kong Boundary Crossing Facilities, and Tuen Mun-Chek Lap Kok Link – Investigation

Contract No. HY/2012/08 TM-CLKL Northern Connection Sub-sea Tunnel Section
Detailed Coral Translocation Report

Reference is made to the submission of a Detailed Coral Translocation Report certified by the ET Leader (ERM's reference: "0212330_Detailed Coral Translocation Report_Northern_v0_20140226.doc" dated on 27 February 2014) provided to us via email on 28 February 2014.

We are pleased to inform you that we have no adverse comments on the captioned Detailed Coral Translocation Report.

Thank you for your kind attention. Please do not hesitate to contact the undersigned or the ENPO Leader Mr. Y H Hui should you have any queries.

Yours sincerely,

Tony Cheng
Independent Environmental Checker
Tuen Mun – Chek Lap Kok Link

c.c. HyD – Mr. Stephen Chan (By Fax: 3188 6614)
HyD – Mr. Matthew Fung (By Fax: 3188 6614)
AECOM – Mr. Conrad Ng (By Fax: 3922 9797)
ERM – Mr. Jovy Tam (By Fax: 2723 5660)
Dragages – Mr. C.F. Kwong (By Fax: 2670 2798)

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ENVIRON Hong Kong Limited 英環香港有限公司
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CONTENTS

1 INTRODUCTION

1.1 BACKGROUND

According to the findings of the Northwest New Territories (NWNT) Traffic and Infrastructure Review conducted by the Transport Department, Tuen Mun Road, Ting Kau Bridge, Lantau Link and North Lantau Highway would be operating beyond capacity after 2016. This forecast has been based on the estimated increase in cross boundary traffic, developments in the Northwest New Territories (NWNT), and possible developments in North Lantau, including the Airport developments, the Lantau Logistics Park (LLP) and the Hong Kong – Zhuhai – Macao Bridge (HZMB). In order to cope with the anticipated traffic demand, two new road sections between NWNT and North Lantau – Tuen Mun – Chek Lap Kok Link (TM-CLKL) and Tuen Mun Western Bypass (TMWB) are proposed.

An Environmental Impact Assessment (EIA) of TM-CLKL was prepared in accordance with the EIA Study Brief (No. ESB-175/2007) and the *Technical Memorandum of the Environmental Impact Assessment Process* (*EIAO-TM*). The EIA Report was submitted under the Environmental Impact Assessment Ordinance (EIAO) in August 2009. Subsequent to the approval of the EIA Report (EIAO Register Number AEIAR-145/2009), an Environmental Permit (EP-354/2009) for TM-CLKL was granted by the Director of Environmental Protection (DEP) on 4 November 2009, and EP variation (EP-354/2009A) was issued on 8 December 2010. Another application for variation of environmental permit (VEP) (*EP-354/2009/B*) was granted on 28 January 2014.

Pursuant to *Condition 2.6* of the EP, the *Detailed Coral Translocation Methodology* has been submitted and approved by the authorities for this Contract. In accordance with the *Updated EM&A Manual*, coral translocation should be undertaken for the coral colonies at Pillar Point prior to construction of the northern landfall in order to reduce the potential marine ecological impacts.

1.2 OBJECTIVES OF THE CORAL TRANSLOCATION

According to the approved EIA Report of the TM-CLKL, the proposed reclamation work at the northern landfall area in Pillar Point would lead to direct loss of corals of low to moderate ecological value. Coral translocation was therefore recommended to be undertaken for the coral colonies at Pillar Point prior to construction in order to reduce the potential marine ecological impacts of the northern landfall construction works.

1.3 PURPOSE OF THIS REPORT

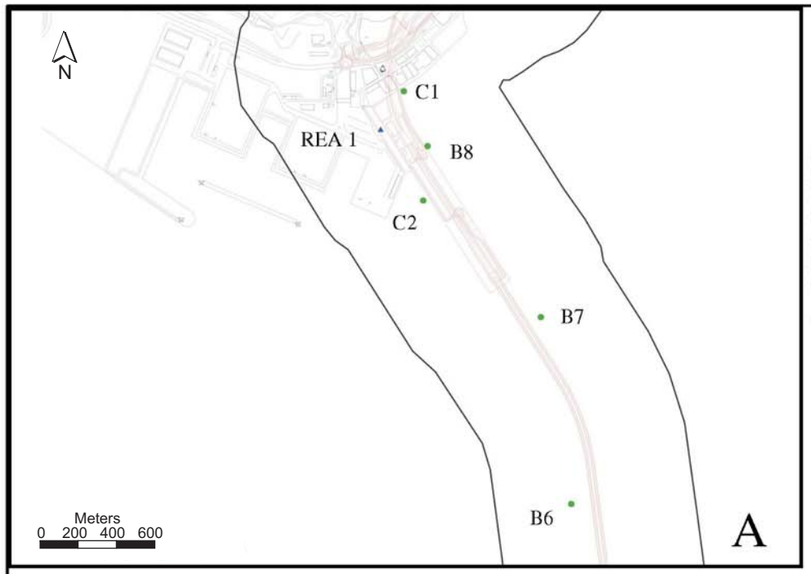
The purpose of this *Detailed Coral Translocation Report* is to report findings of the coral translocation exercise under which movable coral colonies that may be affected by the construction works of the northern landfall are translocated from the donor site at Pillar Point to the receptor site at Yam Tsai Wan (*Figure 1.1*). Findings of the pre-translocation survey undertaken at both the donor and receptor sites are also presented in this report.

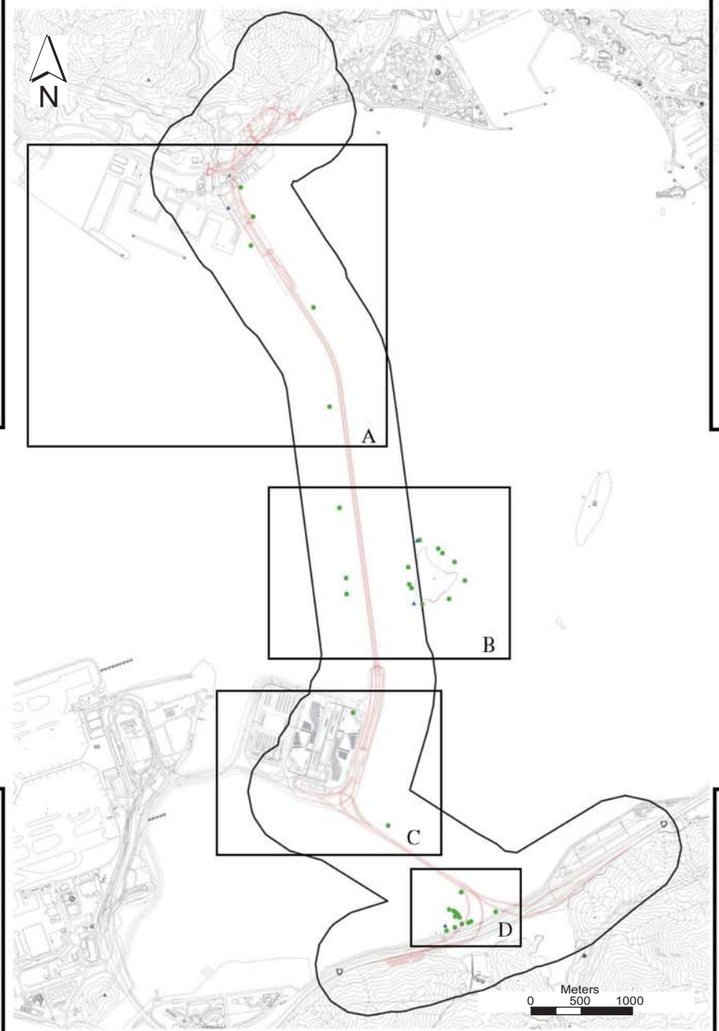
1.4 STRUCTURE OF THIS REPORT

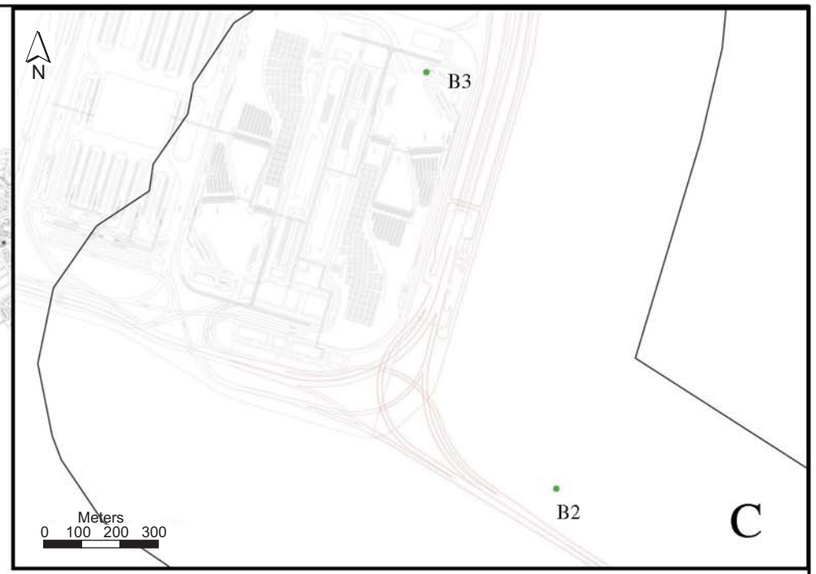
The remainder of the report is structured as follows:

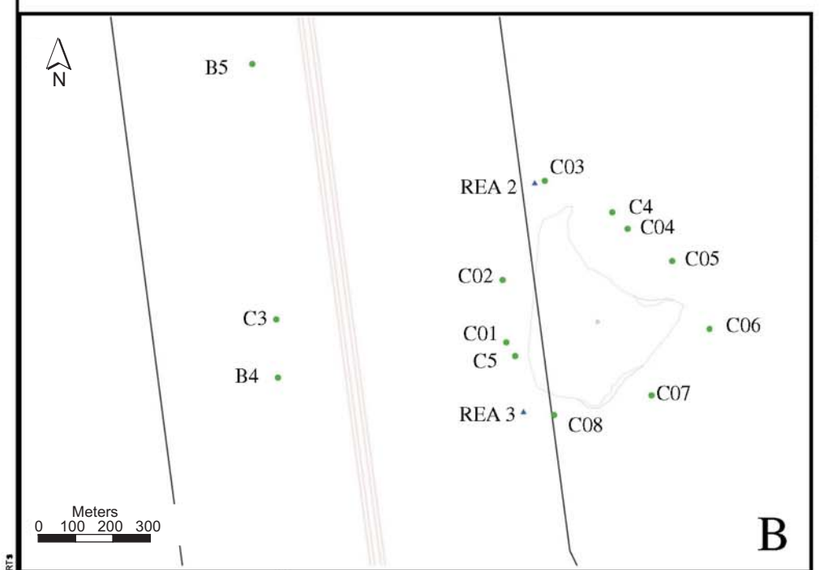
Section 2: Coral Translocation – Details the methodology and results of the pre-translocation survey and coral translocation exercise.

Section 3: Post-translocation Monitoring – Presents details of the post-translocation monitoring for this Contract.



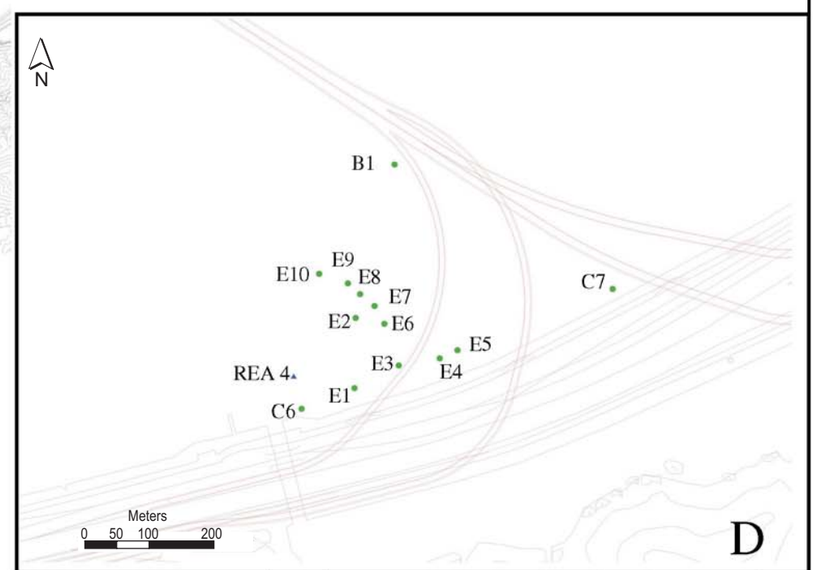






Legend

- Spot Dive Location
- REA Survey Location



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AGREEMENT NO. CE 52 / 2007 (HY)
TUEN MUN - CHEK LAP KOK LINK - INVESTIGATION

Survey Stations for Coral (Spot Dive and REA) Survey under TM-CLKL Study (2008-2009)

SCALE	--	DATE	JUN. 2009
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		REV	--

2 CORAL TRANSLOCATION

2.1 INTRODUCTION

The pre-translocation survey at receptor site, Yam Tsai Wan, was carried out on 19 October 2013. The pre-translocation survey at the donar site at Pillar Point and coral translocation were undertaken from 21 to 23 October. Audit survey at the donar site was carried out on 23 October 2013 after completion of the coral translocation. The weather conditions during the period concerned above were summarized in *Table 2.1*.

Table 2.1 Weather Conditions during the Pre-translocation Survey, Coral Translocation and Audit Survey

Date	Location	Condition	Average Underwater Visibility
19 October 2013	Receptor site: Yam Tsai Wan	Northeast force 4 to 5 Sunny periods	Less than 0.5 m
21-23 October 2013	Donor site: Pillar Point Receptor site: Yam Tsai Wan	Northeast force 4 to 5 Sunny periods	Both donor and receptor sites: Less than 0.5 m

2.2 METHODOLOGY

2.2.1 Pre-translocation Survey at Receptor Site

Pre-translocation survey was conducted at the proposed receptor site, Yam Tsai Wan (*Figure 2.1*), to ensure its suitability before the translocation of corals commenced at the donor site of Pillar Point. A spot-check dive was conducted at the proposed receptor site and its vicinity to check for the presence of healthy coral colonies including the hard coral *Balanophyllia* sp. and *Oulastrea crispata* and gorgonian *Guaiagorgia* sp. which had been observed in previous surveys and were the identified coral species for translocation from the donar site at Pillar Point.

Following the spot-check dive, the substrate type and taxonomic composition of the receptor site was assessed using REA method. The REA survey was performed along a 100 m transect parallel to the coastline (based on the preliminary results from the spot-check dives). The locations of the REA transects were recorded on-site using a handheld GPS unit. The GPS coordinates of the starting and ending points and maximum depth of the REA transects are shown in *Table 2.2*.

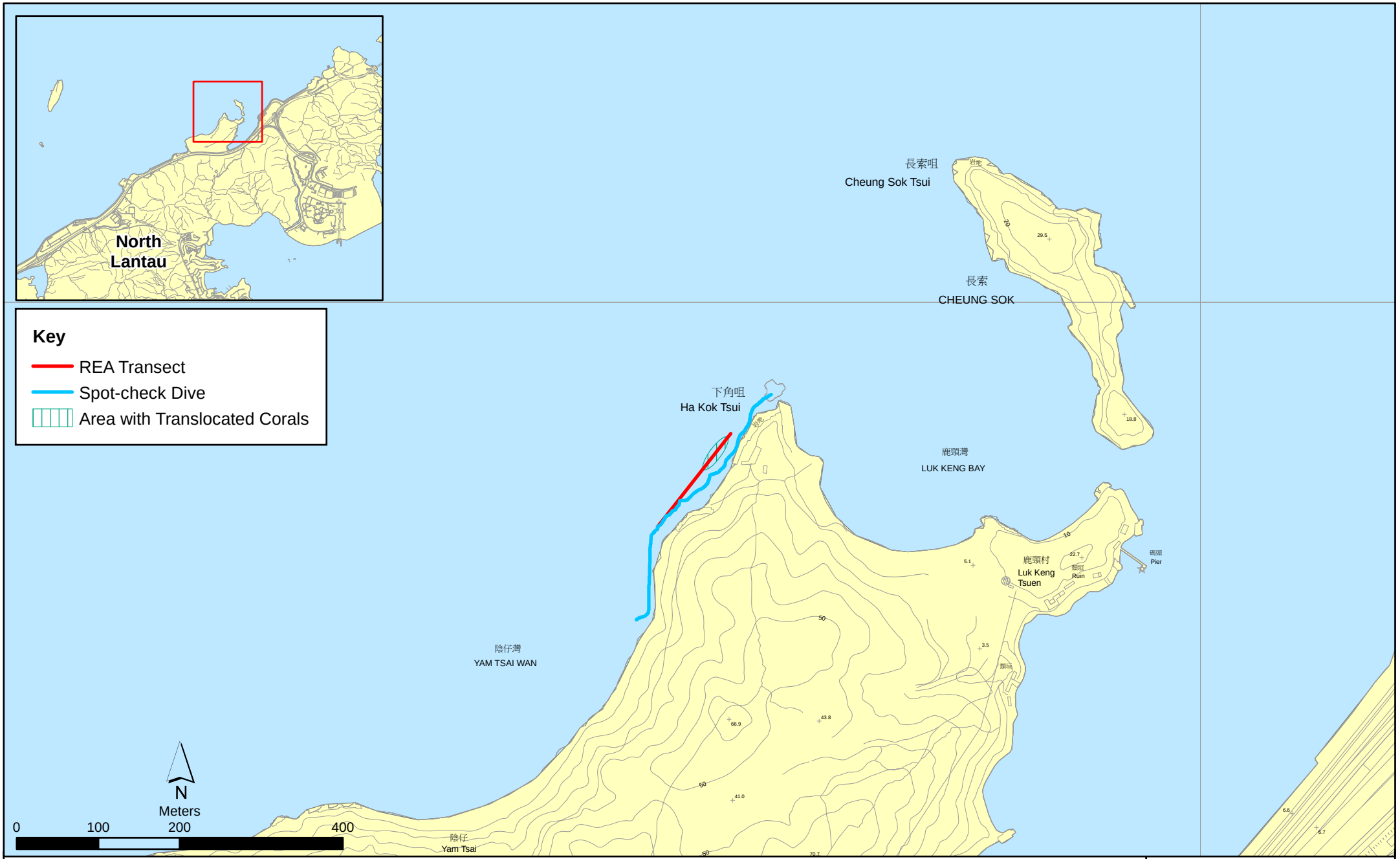

Figure 2.1

Area with Translocated Coral under both Contract No. HY/2012/07 and HY/2012/08

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Date: 14/1/2014

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Table 2.2 ***GPS Coordinates of REA Transect Starting and Ending Points and Maximum Depth of the Receptor Site, Yam Tsai Wan***

Date	GPS Location at Starting Point	GPS Location at Ending Point	Maximum Depth (-mCD)
19 October 2013	819928.99mE 821387.85mN	819979.74mE 821477.31mN	3.5 m

The substrate type along the length of the transect was recorded at 1 m intervals. The number of colonies, sizes and types of corals as well as their abundance, depth and health status were recorded. Photographs of representative taxa along the transect were also taken during the surveys.

Health status of coral will be assessed by the following criteria:

- Gorgonian coral: Percentage of branches exhibiting partial mortality and secretion of mucus.

- Hard coral: Percentage of surface area exhibiting partial mortality and blanched/ bleached area using specially designed Coral Health Monitoring Chart (*Appendix A*).

The benthic cover (Tier I) and taxon abundance (Tier II) of the transect were assessed in a swathe 2 m wide, 1 m either side of the transect. Two assessment categories (Tiers) were used in the surveys, as follows:

Tier I – Categorization of Benthic Cover

Upon the completion of each transect, ecological and substratum attributes (*Table 2.3*) were assigned to standard ranked ordinal categories (*Table 2.4*).

Table 2.3 ***Tier I Benthic Attribute Categories***

Ecological Attributes	Substratum Attributes
Hard Coral	Hard Substrata
Dead Coral	Bedrock/ Continuous Pavement
Octocoral (Soft Corals and Gorgonians)	Boulder blocks (diam. >50cm)
Anemone Beds	Boulder blocks (diam. <50cm)
Dead Standing Corals	Rubble
Other Benthos (sponges, zoanthids, ascidians and bryozoans)	Other
Macroalgae	Soft Substrata
	Sand
	Mud/Silt
	Mud

Table 2.4 Tier I Ordinal Ranks of Percentage Cover of Benthic Attributes

Rank	Percentage Cover
0	None Recorded
1	1-5%
2	6-10%
3	11-30%
4	31-50%
5	51-75%
6	76-100%

For substratum attributes, it is preferable to record actual estimates of cover. The percentage of hard substrata vs. soft substrata could be provided (eg 80% and 20% respectively). The percentage cover of the types of hard or soft substrata could also be presented (eg bedrock pavement 60%, rubble 20%, sand 15%, mud / silt 5%). Similarly, recording and presenting actual estimates of, for instance, hard and soft coral cover may be more informative (eg <1%).

Tier II – Taxonomic Inventories to Define Types of Benthic Communities

An inventory of benthic taxa along each transect was compiled during the survey. Taxa were identified in situ to the following levels:

- Hard corals to species, where possible;
- Soft corals, anemones and conspicuous macroalgae to genus level, where possible;
- Other benthos (including sponges, zoanthids, ascidians and bryozoans) to genus level, where possible.

For each transect, each taxon in the inventory was ranked in terms of abundance in the community (*Table 2.5*). The taxon categories were ranked in terms of relative abundance of individuals, rather than the contribution to benthic cover along each transect. The ranks are visual assessments of abundance, rather than quantitative counts of each taxon. Representative photos of organisms were taken.

Table 2.5 Ordinal Ranks of Taxon Abundance

Rank	Relative Abundance
0	Absent
1	Sparse
2	Uncommon
3	Common
4	Abundant
5	Dominant

In order to distinguish the natural variation in health status of corals and the effects to health status due to coral translocation, a total of 10 natural coral colonies of the same species as those translocated from the donor site within

and adjacent to the receptor site were randomly selected and tagged. Baseline information was collected for these tagged coral colonies before translocation and the type of information collected would be the same as those collected for the coral colony during the baseline survey at the donor site. The baseline information collected would be used for the purpose of post-translocation monitoring.

2.2.2 *Pre-translocation Survey and Coral Translocation at the Donor Site*

A coral mapping survey was conducted at the donor site at Pillar Point as part of the pre-translocation coral survey. The location of the donor site is shown in *Figure 2.2*. Since the underwater visibility at the donor site is very low (<0.5m), photo taking and relocating of all tagged coral colonies after coral mapping is almost impossible. Therefore, coral translocation was undertaken concurrently after locating the movable coral colonies.

The location of any hard corals and gorgonians encountered were mapped. The size and health condition (including percentage cover of bleaching, mortality, degree of sedimentation) of the corals were recorded. The feasibility of translocation of corals including but not limited to those of conservation importance were also assessed.

The following procedures were performed during coral translocation to minimize stress and prevent damage to corals, as far as possible.

- All tagged movable boulder (with diameter <50 cm) supporting coral colony which was selected for translocation would be moved entirely as a whole object, lifted from the sea bottom and loaded to ship/boat with lifting bag.

- The coral colonies transferred onto the vessel were fully submerged in seawater tanks of suitable size with continuous aeration onboard. Each seawater tank held no more than four boulders to avoid overcrowding.

- Ambient water quality parameters such as sea surface water temperature and dissolved oxygen were measured once (with at least three replicates) at the coral donor site on the day of coral translocation. The seawater quality in the tanks was checked every 10 minutes to ensure no fluctuation above 10% of ambient occurs to the seawater in which the coral colonies were submerged.

- Corals were transported to the receptor site as soon as possible on the same day following the removal. The vessel progressed in a slow and steady speed (<5 knots) when approaching close to the receptor site.

- When arriving at the coral receptor site, SCUBA divers, under the supervision of marine biologist with relevant experience, carefully placed the boulders with coral colonies one by one to the seabed in order to minimize disturbance to the seabed and/or sediment. The coral colonies were positioned to similar depths and orientations as their previous locations at the donor site as far as possible.

Setting Out Point for Transect

Point	Easting	Northing	Point	Easting	Northing
A1	812084.9188	824038.4230	A21	812886.9010	823974.0097
A2	811994.5198	824324.4790	A22	813101.5121	824102.2365
A3	812466.3268	824158.9550	A23	812947.6400	824359.7697
A4	812375.9278	824445.0110	A24	813094.7835	824282.0974
A5	812526.6690	824186.9901	A25	813224.2962	824065.3340
A6	812635.1136	824005.4881	A26	813524.7517	824244.8514
A7	812534.4218	824271.4978	A27	813545.8397	824404.5238
A8	812763.8802	824082.4241	A28	813481.0834	824512.9055
A9	812620.2663	824322.7885	A29	812910.6499	824590.2789
A10	812565.4451	824366.0878	A30	813064.5220	824332.7456
A11	812405.4159	824433.4907	A31	813622.5107	824666.1351
A12	812604.2617	824458.2468	A32	813468.6386	824923.6684
A13	812444.2325	824525.6497	A33	812756.7778	824847.8122
A14	812626.0455	824410.5995	A34	812885.0045	824633.2011
A15	812702.9815	824281.8329	A35	813185.9999	825104.2656
A16	812643.3223	824479.1671	A36	813314.2266	824889.6546
A17	812693.2633	824590.5489	A37	812613.1639	825088.1765
A18	812917.5926	824410.0596	A38	812731.1325	824890.7344
A19	812779.1077	824641.8396	A39	813117.4324	825121.5425
A20	812733.0289	824231.5430	A40	812999.4638	825318.9847

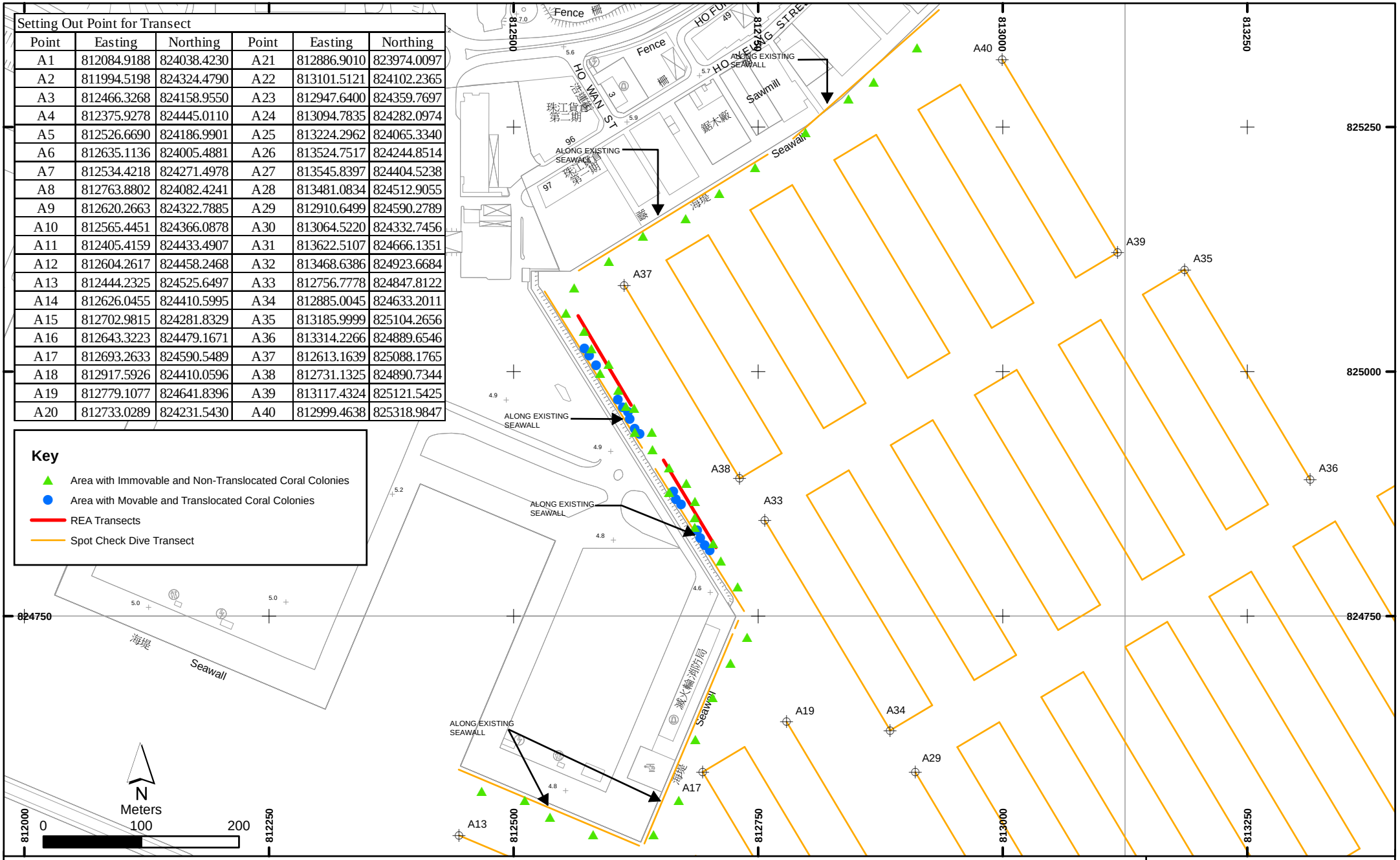

Figure 2.2

Indicative Locations of Movable and Immovable Corals at Donor Site, Pillar Point

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Date: 17/12/2013

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- Divers would tag translocated colonies at the receptor site with small plastic labels (e.g. with colony number) anchored or attached on nearby hard substratum using epoxy without touching the corals. All tags were anchored in vicinity of the coral colonies at distances not so close to interfere with the potential growth. This would allow the revisit of the coral colonies during the post-translocation monitoring.

- Divers would record the size, location, health conditions (percentage of mortality and bleaching), percentage cover of sediment of each translocated coral colony after the completion of translocation works using the same methodologies adopted in the pre-translocation coral survey. Photographs of each translocated coral upon completion of translocation would be taken and used as a baseline for future monitoring.

- After translocation was completed, an audit survey was carried out on the same day at donor site to determine if all movable corals have been translocated.

2.3 RESULTS

2.3.1 Pre-translocation Survey at Receptor Site

Results of Spot-check Dive

Result of qualitative spot-check dive confirmed that the seabed of the proposed receptor site at Yam Tsai Wan was composed of natural bedrock and boulders. The cover of hard corals and octocorals was less than 1% with three coral species (*Oulastrea crispata, Balanophyllia* sp. and *Guaiagorgia* sp.) recorded (*Table 2.6*).

Table 2.6 Coral Species Recorded during Spot-check Dive at Receptor Site, Yam Tsai Wan

Taxon	Family	Species
Hermatypic Hard Coral Species	Faviidae	*Oulastrea crispata*
Ahermatypic Coral Species	Dendrophyllidae	*Balanophyllia* sp.
Octocoral	Gorgoniidae	*Guaiagorgia* sp.

Results of REA Survey

A 100 m transect was laid at the receptor site, Yam Tsai Wan. Location of REA survey is presented in *Figure 2.1.*

The seabed at the REA survey area of Yam Tsai Wan was predominately composed of natural bedrock and boulders down to water depth of -4mCD whilst sand was the main substrate type beyond -4mCD.

Cover of hard corals and octocorals were only about 1% along the REA transect with only one hermatypic hard coral species (*Oulastrea crispata*), one

ahermatypic coral species (*Balanophyllia* sp.) and one ocotocoral species (*Guaiagorgia* sp.) recorded. Results of Tier I showing seabed attributes along the REA transect are presented in *Table 2.7*. Results of Tier II showing ordinal rank of taxon abundance are presented in *Table 2.8*. All coral species recorded are common and have a widespread distribution throughout Hong Kong's nearshore waters.

Table 2.7 Seabed Attributes along the Semi-Quantitative Survey Transect

Zone	Rank
Seabed attributes [(a)]	
Hard Substrata	
Bedrock/ Continuous Pavement	4
Boulders blocks (diam. >50cm)	3
Boulders blocks (diam. <50cm)	1
Rubble	0
Soft Substrata	
Sand	1
Mud/ Silt	0
Mud	0
Ecological attributes [(a)]	
Hard coral	1
Dead coral	0
Octocoral (Soft Corals and Gorgonians)	1
Anemone Beds	0
Dead Standing Corals	0
Other Benthos (sponges, zoanthids, ascidians and bryozoans)	0
Macroalgae	0

Notes: (a) 0=None Recorded, 1=<5% Cover, 2= 6-10% Cover, 3 = 11-30% Cover, 4 = 31-50% Cover, 5 = 51-75%
Cover, 6 = 76-100% Cover.

Table 2.8 Tier II Results - Ordinal Rank of Taxon Abundance

Type	Taxon/Family	Species	Ordinal Rank
Hermatypic Hard Coral Species	Faviidae	*Oulastrea crispata*	1
Ahermatypic Coral Species	Dendrophyllidae	*Balanophyllia* sp.	1
Octocoral	Gorgoniidae	*Guaiagorgia* sp.	1
Other Benthos	Muricidae	*Thais luteostoma*	1
	Mytillidae	*Septifer virgatus*	1
	Echinometridae	*Anthocidaris crassispina*	1

Note: (a) 0 = Absent, 1 = Sparse, 2 = Uncommon, 3 = Common, 4 = Abundant, 5 = Dominant.

A total of 69 coral colonies (16 colonies of *Oulastrea crispata,* 31 colonies of *Guaiagorgia* sp. and 22 colonies of *Balanophyllia* sp.) were recorded along the REA transect. In general, the health conditions of all coral colonies observed were in fair condition. Species, size and health conditions of coral colonies observed along the REA transect are presented in *Table 2.9*. Representative photographs taken during the pre-translocation survey at Yam Tsai Wan are

shown in *Appendix B*. The substrate type along the 100 m transect was also recorded at 1 m intervals and results are shown in *Table 2.10*.

Table 2.9 Coral Species, Size and Health Conditions of Corals along the REA Transect

Number	Coral Species[1]	Size (cm, Height /Diameter)	% Partial Mortality	% Bleaching	Coral Watch	% Mucus
1	*Oulastrea crispata*	10	0	0	4.5	0
2	*Oulastrea crispata*	5	0	0	5	0
3	*Oulastrea crispata*	15	0	0	4.5	0
4	*Oulastrea crispata*	10	0	0	4.5	0
5	*Oulastrea crispata*	7	0	0	5	0
6	*Oulastrea crispata*	10	0	0	5	0
7	*Oulastrea crispata*	9	0	0	5	0
8	*Oulastrea crispata*	6	0	0	5.5	0
9	*Oulastrea crispata*	11	0	0	5	0
10	*Oulastrea crispata*	5	0	0	5	0
11	*Oulastrea crispata*	3	0	0	5	0
12	*Oulastrea crispata*	15	0	0	5.5	0
13	*Oulastrea crispata*	10	0	0	5	0
14	*Oulastrea crispata*	9	0	0	5.5	0
15	*Oulastrea crispata*	7	0	0	5	0
16	*Oulastrea crispata*	11	0	0	5	0
17	*Guaiagorgia* sp.	15	15	N/A	N/A	5
18	*Guaiagorgia* sp.	20	20	N/A	N/A	0
19	*Guaiagorgia* sp.	22	15	N/A	N/A	0
20	*Guaiagorgia* sp.	9	0	N/A	N/A	0
21	*Guaiagorgia* sp.	10	0	N/A	N/A	0
22	*Guaiagorgia* sp.	18	35	N/A	N/A	0
23	*Guaiagorgia* sp.	22	30	N/A	N/A	5
24	*Guaiagorgia* sp.	25	10	N/A	N/A	0
25	*Guaiagorgia* sp.	17	15	N/A	N/A	0
26	*Guaiagorgia* sp.	14	10	N/A	N/A	0
27	*Guaiagorgia* sp.	23	15	N/A	N/A	0
28	*Guaiagorgia* sp.	26	25	N/A	N/A	0
29	*Guaiagorgia* sp.	32	40	N/A	N/A	5
30	*Guaiagorgia* sp.	16	10	N/A	N/A	0
31	*Guaiagorgia* sp.	23	55	N/A	N/A	10
32	*Guaiagorgia* sp.	25	15	N/A	N/A	0
33	*Guaiagorgia* sp.	18	25	N/A	N/A	0
34	*Guaiagorgia* sp.	16	30	N/A	N/A	0
35	*Guaiagorgia* sp.	23	35	N/A	N/A	5
36	*Guaiagorgia* sp.	29	40	N/A	N/A	5
37	*Guaiagorgia* sp.	16	15	N/A	N/A	0
38	*Guaiagorgia* sp.	27	25	N/A	N/A	0
39	*Guaiagorgia* sp.	19	20	N/A	N/A	0
40	*Guaiagorgia* sp.	14	5	N/A	N/A	0
41	*Guaiagorgia* sp.	21	10	N/A	N/A	0
42	*Guaiagorgia* sp.	16	0	N/A	N/A	0
43	*Guaiagorgia* sp.	15	0	N/A	N/A	0
44	*Guaiagorgia* sp.	35	25	N/A	N/A	0
45	*Guaiagorgia* sp.	32	35	N/A	N/A	10
46	*Guaiagorgia* sp.	28	50	N/A	N/A	5

(1) Size and health conditions of the solitary ahermatypic coral *Balanophyllia* sp. were not recorded for each colony during REA survey due to its high abundance. The coral colonies are noted of generally good health conditions and of smaller than 0.5 cm in size.

Number	Coral Species[1]	Size (cm, Height /Diameter)	% Partial Mortality	% Bleaching	Coral Watch	% Mucus
47	*Guaiagorgia* sp.	38	60	N/A	N/A	10
48	*Balanophyllia sp.*	0.5	0	0	5	0
49	*Balanophyllia sp.*	0.5	0	0	5	0
50	*Balanophyllia sp.*	0.5	0	0	5	0
51	*Balanophyllia sp.*	0.5	0	0	5	0
52	*Balanophyllia sp.*	0.5	0	0	5	0
53	*Balanophyllia sp.*	0.5	0	0	4.5	0
54	*Balanophyllia sp.*	0.5	0	0	5	0
55	*Balanophyllia sp.*	0.5	0	0	5	0
56	*Balanophyllia sp.*	0.5	0	0	5.5	0
57	*Balanophyllia sp.*	0.5	0	0	5	0
58	*Balanophyllia sp.*	0.5	0	0	5	0
59	*Balanophyllia sp.*	0.5	0	0	5	0
60	*Balanophyllia sp.*	0.5	0	0	4.5	0
61	*Balanophyllia sp.*	0.5	0	0	5.5	0
62	*Balanophyllia sp.*	0.5	0	0	5	0
63	*Balanophyllia sp.*	0.5	0	0	5	0
64	*Balanophyllia sp.*	0.5	0	0	5	0
65	*Balanophyllia sp.*	0.5	0	0	5	0
66	*Balanophyllia sp.*	0.5	0	0	5	0
67	*Balanophyllia sp.*	0.5	0	0	4.5	0
68	*Balanophyllia sp.*	0.5	0	0	5	0
69	*Balanophyllia sp.*	0.5	0	0	5	0

Table 2.10 Substrate Type along REA Transect at Receptor Site, Yam Tsai Wan

Meter	Substratum along REA at 1 Meter interval	Meter	Substratum along REA at 1 Meter interval	Meter	Substratum along REA at 1 Meter interval	Meter	Substratum along REA at 1 Meter interval
1	Bedrock	26	Bedrock	51	Bedrock	76	Boulder
2	Bedrock	27	Bedrock	52	Bedrock	77	Cobble
3	Bedrock	28	Cobble	53	Bedrock	78	Bedrock
4	Bedrock	29	Cobble	54	Bedrock	79	Bedrock
5	Bedrock	30	Cobble	55	Bedrock	80	Bedrock
6	Boulder	31	Cobble	56	Sand	81	Bedrock
7	Boulder	32	Boulder	57	Bedrock	82	Boulder
8	Boulder	33	Boulder	58	Bedrock	83	Bedrock
9	Bedrock	34	Boulder	59	Boulder	84	Bedrock
10	Bedrock	35	Boulder	60	Boulder	85	Bedrock
11	Boulder	36	Boulder	61	Boulder	86	Cobble
12	Boulder	37	Bedrock	62	Boulder	87	Cobble
13	Bedrock	38	Bedrock	63	Bedrock	88	Cobble
14	Bedrock	39	Boulder	64	Bedrock	89	Bedrock
15	Boulder	40	Boulder	65	Boulder	90	Bedrock
16	Bedrock	41	Boulder	66	Boulder	91	Bedrock
17	Bedrock	42	Boulder	67	Sand	92	Bedrock
18	Bedrock	43	Boulder	68	Sand	93	Bedrock
19	Boulder	44	Boulder	69	Sand	94	Bedrock
20	Boulder	45	Boulder	70	Boulder	95	Bedrock
21	Boulder	46	Bedrock	71	Boulder	96	Bedrock
22	Boulder	47	Bedrock	72	Boulder	97	Bedrock
23	Cobble	48	Bedrock	73	Boulder	98	Bedrock
24	Bedrock	49	Bedrock	74	Bedrock	99	Bedrock
25	Bedrock	50	Bedrock	75	Bedrock	100	Bedrock

Ten (10) coral colonies of *Guaiagorgia* sp., ten (10) coral colonies of *Oulastrea crispata* and six (6) boulders with more than twenty (20) *Balanophyllia* sp. colonies were tagged at the receptor site. Health conditions of the tagged colonies are summarized in *Table 2.11*. These data will be used for the purpose of post-translocation monitoring. Photos of the tagged coral colonies are shown in *Appendix C*.

Table 2.11 Sizes, Mortality, Bleaching and Sediment Cover of Tagged Coral Colonies at Receptor Site, Yam Tsai Wan (1)

Coral	Species (2)	Size (cm) – Max. Diameter/Height	Mortality (%)	Bleaching (%)	Sediment (%)
1	*Guaiagorgia* sp.	25	5	N/A	0
2	*Guaiagorgia* sp.	32	35	N/A	0
3	*Guaiagorgia* sp.	28	15	N/A	0
4	*Guaiagorgia* sp.	38	25	N/A	0
5	*Guaiagorgia* sp.	27	40	N/A	0
6	*Guaiagorgia* sp.	28	25	N/A	0
7	*Guaiagorgia* sp.	21	10	N/A	0
8	*Guaiagorgia* sp.	26	30	N/A	0
9	*Guaiagorgia* sp.	19	50	N/A	0
10	*Guaiagorgia* sp.	35	35	N/A	0
11	*Oulastrea crispata*	22	0	0	20
12	*Oulastrea crispata*	14	0	0	10
13	*Oulastrea crispata*	16	0	0	5
14	*Oulastrea crispata*	19	0	0	0
15	*Oulastrea crispata*	14	0	0	5
16	*Oulastrea crispata*	6	0	0	0
17	*Oulastrea crispata*	18	0	0	20
18	*Oulastrea crispata*	5.5	0	0	5
19	*Oulastrea crispata*	20	0	0	30
20	*Oulastrea crispata*	23	0	0	5
21	*Balanophyllia* sp.	<0.5	0	0	0
22	*Balanophyllia* sp.	<0.5	0	0	0
23	*Balanophyllia* sp.	<0.5	0	0	0
24	*Balanophyllia* sp.	<0.5	0	0	0
25	*Balanophyllia* sp.	<0.5	0	0	0
26	*Balanophyllia* sp.	<0.5	0	0	0

Overall, it is considered that the proposed receptor site, Yam Tsai Wan, would have sufficient space to receive all translocated coral colonies from donor site, Pillar Point. Therefore, Yam Tsai Wan is considered to be a suitable receptor site for coral translocation for this Contract.

2.3.2 Pre-translocation Survey and Coral Translocation at Donor Site

Twenty-four (24) *Oulastrea crispata* colonies, nine (9) boulders with *Balanophyllia* sp. colonies and twenty-two (23) *Guaiagorgia* sp. colonies in Pillar Point were successfully translocated to the receptor site at Yam Tsai Wan between 21 to 23 October 2013. Areas in the donor site with movable coral

(1) Please note that *Guaiagorgia* sp., *Balanophyllia* sp. and *Oulastrea crispata* were tagged for the coral translocation excise of HY/2012/08 and were thus presented in this coral translocation report. For Contract HY/2012/07, only *Guaiagorgia* sp.colonies were translocated. As such, only data of tagged *Guaiagorgia* sp.colonies were represented in the coral translocation report of Contract HY/2012/07.

(2) Data present for *Balanophyllia* sp. are representing all *Balanophyllia* colonies found on the boulder.

colonies were marked in *Figure 2.2* and area at the receptor site within which translocated coral colonies were placed was shown in *Figure 2.1* with relevant information (ie location, depth, substrate) presented in *Table 2.12.* The general health conditions (size, mortality, bleaching and sediment) of translocated corals from Pillar Point were recorded and summarized in *Table 2.12* while conditions of coral which were not translocated were presented in *Table 2.13*. Photos of the translocated coral colonies from donor site are shown in *Appendix C*.

An audit survey was carried out at Pillar Point on 23 October 2013 after coral translocation was completed and it is confirmed that all movable coral colonies that may potentially be affected by the construction works were translocated to Yam Tsai Wan.

Table 2.12 GPS Coordinates, Average Depth and Bottom Substrate of Translocated Corals in Receptor Site, Yam Tsai Wan

Date	GPS Location	Average Depth (-mCD)	Bottom Substrate
21-23 October 2013	819970.235 mE 821491.654 mN	2.5 m	Natural bedrock and boulders

Table 2.13 Sizes, Mortality, Bleaching and Sediment Cover of Translocated Coral Colonies from Donor Site, Pillar Point

Coral	Species [1]	Size (cm) – Max. Diameter/Height	Mortality (%)	Bleaching (%)	Sediment (%)
Pillar Point					
1	*Oulastrea crispata*	2	0	0	0
2	*Oulastrea crispata*	9	0	0	2
3	*Oulastrea crispata*	1.5	0	0	0
4	*Oulastrea crispata*	2	0	0	0
5	*Oulastrea crispata*	11	0	0	0
6	*Oulastrea crispata*	8	0	0	0
7	*Oulastrea crispata*	13	0	0	0
8	*Oulastrea crispata*	4.5	0	0	0
9	*Oulastrea crispata*	8	0	0	0
10	*Oulastrea crispata*	1.5	0	0	0
11	*Oulastrea crispata*	7.5	0	0	2
12	*Oulastrea crispata*	1.5	0	0	0
13	*Oulastrea crispata*	1.5	0	0	0
14	*Oulastrea crispata*	10	0	0	0
15	*Oulastrea crispata*	4	0	0	0
16	*Oulastrea crispata*	5	0	0	0
17	*Oulastrea crispata*	7	0	0	0
18	*Oulastrea crispata*	6	0	0	1
19	*Oulastrea crispata*	10	0	0	0
20	*Oulastrea crispata*	2.5	0	0	0
21	*Oulastrea crispata*	5.5	0	0	20
22	*Oulastrea crispata*	4	0	0	0
23	*Oulastrea crispata*	2	0	0	0
24	*Oulastrea crispata*	4	0	0	0
25	*Balanophyllia* sp.	<0.5	0	0	0
26	*Balanophyllia* sp.	<0.5	0	0	0
27	*Balanophyllia* sp.	<0.5	0	0	0
28	*Balanophyllia* sp.	<0.5	0	0	0
29	*Balanophyllia* sp.	<0.5	0	0	0
30	*Balanophyllia* sp.	<0.5	0	0	0
31	*Balanophyllia* sp.	<0.5	0	0	0
32	*Balanophyllia* sp.	<0.5	0	0	0
33	*Balanophyllia* sp.	<0.5	0	0	0
34	*Guaiagorgia* sp.	23	0	N/A	0
35	*Guaiagorgia* sp.	15	0	N/A	0
36	*Guaiagorgia* sp.	28	0	N/A	0
37	*Guaiagorgia* sp.	18	0	N/A	0
38	*Guaiagorgia* sp.	24	40	N/A	0
39	*Guaiagorgia* sp.	26	10	N/A	0
40	*Guaiagorgia* sp.	17	10	N/A	0
41	*Guaiagorgia* sp.	18	25	N/A	0
42	*Guaiagorgia* sp.	15	45	N/A	0
43	*Guaiagorgia* sp.	16	35	N/A	0
44	*Guaiagorgia* sp.	21	40	N/A	0
45	*Guaiagorgia* sp.	26	15	N/A	0
46	*Guaiagorgia* sp.	23	25	N/A	0
47	*Guaiagorgia* sp.	19	5	N/A	0
48	*Guaiagorgia* sp.	17	5	N/A	0
49	*Guaiagorgia* sp.	25	15	N/A	0
50	*Guaiagorgia* sp.	27	5	N/A	0

[1] Data present for *Balanophyllia* sp. are representing all *Balanophyllia* colonies found on the boulder.

Coral	Species [1]	Size (cm) – Max. Diameter/Height	Mortality (%)	Bleaching (%)	Sediment (%)
51	*Guaiagorgia* sp.	24	65	N/A	0
52	*Guaiagorgia* sp.	18	15	N/A	0
53	*Guaiagorgia* sp.	29	20	N/A	0
54	*Guaiagorgia* sp.	22	10	N/A	0
55	*Guaiagorgia* sp.	20	35	N/A	0
56	*Guaiagorgia* sp.	21	5	N/A	0

Table 2.14 ***Sizes, Mortality, Bleaching and Sediment Cover of Coral Colonies at Donor Site, Pillar Point, which were not Translocated under the Coral Translocation Exercise***

Coral	Species	Size (cm) – Max. Diameter/Height	Mortality (%)	Bleaching (%)	Sediment (%)
1	*Guaiagorgia* sp.	15	15	N/A	0
2	*Guaiagorgia* sp.	13	20	N/A	5
3	*Guaiagorgia* sp.	24	25	N/A	0
4	*Guaiagorgia* sp.	20	20	N/A	0
5	*Guaiagorgia* sp.	16	10	N/A	0
6	*Guaiagorgia* sp.	17	15	N/A	0
7	*Guaiagorgia* sp.	15	0	N/A	0
8	*Guaiagorgia* sp.	34	50	N/A	5
9	*Guaiagorgia* sp.	25	15	N/A	0
10	*Guaiagorgia* sp.	32	25	N/A	0
11	*Guaiagorgia* sp.	17	0	N/A	0
12	*Guaiagorgia* sp.	16	0	N/A	0
13	*Guaiagorgia* sp.	18	0	N/A	0
14	*Guaiagorgia* sp.	22	15	N/A	0
15	*Guaiagorgia* sp.	24	25	N/A	0
16	*Guaiagorgia* sp.	23	20	N/A	5
17	*Guaiagorgia* sp.	26	15	N/A	0
18	*Guaiagorgia* sp.	24	30	N/A	0
19	*Guaiagorgia* sp.	19	0	N/A	0
20	*Guaiagorgia* sp.	14	0	N/A	0
21	*Guaiagorgia* sp.	12	0	N/A	0
22	*Guaiagorgia* sp.	35	15	N/A	0
23	*Guaiagorgia* sp.	26	25	N/A	0
24	*Guaiagorgia* sp.	23	10	N/A	0
25	*Guaiagorgia* sp.	23	5	N/A	5
26	*Guaiagorgia* sp.	26	5	N/A	0
27	*Guaiagorgia* sp.	37	10	N/A	0
28	*Guaiagorgia* sp.	16	15	N/A	0
29	*Guaiagorgia* sp.	25	30	N/A	5
30	*Guaiagorgia* sp.	15	0	N/A	5
31	*Guaiagorgia* sp.	13	0	N/A	5
32	*Guaiagorgia* sp.	15	10	N/A	0
33	*Guaiagorgia* sp.	15	25	N/A	0
34	*Guaiagorgia* sp.	25	60	N/A	0
35	*Guaiagorgia* sp.	23	75	N/A	0
36	*Guaiagorgia* sp.	14	0	N/A	0
37	*Guaiagorgia* sp.	16	0	N/A	0
38	*Guaiagorgia* sp.	13	0	N/A	0
39	*Guaiagorgia* sp.	18	10	N/A	0
40	*Guaiagorgia* sp.	22	0	N/A	0
41	*Guaiagorgia* sp.	16	0	N/A	0
42	*Guaiagorgia* sp.	25	25	N/A	0
43	*Guaiagorgia* sp.	34	15	N/A	0
44	*Guaiagorgia* sp.	25	30	N/A	0

Coral	Species	Size (cm) – Max. Diameter/Height	Mortality (%)	Bleaching (%)	Sediment (%)
45	*Guaiagorgia* sp.	23	50	N/A	0
46	*Guaiagorgia* sp.	16	15	N/A	0
47	*Guaiagorgia* sp.	16	10	N/A	0
48	*Guaiagorgia* sp.	14	0	N/A	0
49	*Guaiagorgia* sp.	21	0	N/A	0
50	*Guaiagorgia* sp.	23	25	N/A	0
51	*Guaiagorgia* sp.	13	0	N/A	0
52	*Guaiagorgia* sp.	17	20	N/A	0
53	*Guaiagorgia* sp.	25	25	N/A	0
54	*Guaiagorgia* sp.	34	55	N/A	5
55	*Guaiagorgia* sp.	24	50	N/A	5
56	*Guaiagorgia* sp.	21	40	N/A	5
57	*Guaiagorgia* sp.	21	21	N/A	15
58	*Guaiagorgia* sp.	26	15	N/A	0
59	*Guaiagorgia* sp.	15	15	N/A	0
60	*Guaiagorgia* sp.	13	10	N/A	0
61	*Guaiagorgia* sp.	16	5	N/A	0
62	*Guaiagorgia* sp.	22	5	N/A	25
63	*Guaiagorgia* sp.	16	5	N/A	0
64	*Guaiagorgia* sp.	25	5	N/A	0
65	*Guaiagorgia* sp.	32	5	N/A	0
66	*Guaiagorgia* sp.	14	5	N/A	20
67	*Guaiagorgia* sp.	15	10	N/A	0
68	*Guaiagorgia* sp.	13	10	N/A	0
69	*Guaiagorgia* sp.	15	15	N/A	0
70	*Guaiagorgia* sp.	22	5	N/A	0
71	*Guaiagorgia* sp.	23	25	N/A	5
72	*Guaiagorgia* sp.	21	10	N/A	5
73	*Guaiagorgia* sp.	25	15	N/A	5
74	*Guaiagorgia* sp.	15	15	N/A	5
75	*Guaiagorgia* sp.	13	10	N/A	5
76	*Guaiagorgia* sp.	15	10	N/A	0
77	*Guaiagorgia* sp.	23	15	N/A	20
78	*Guaiagorgia* sp.	28	20	N/A	0
79	*Guaiagorgia* sp.	21	15	N/A	0
80	*Guaiagorgia* sp.	35	15	N/A	5
81	*Guaiagorgia* sp.	15	10	N/A	5
82	*Guaiagorgia* sp.	12	0	N/A	0
83	*Guaiagorgia* sp.	16	0	N/A	0
84	*Guaiagorgia* sp.	12	0	N/A	0
85	*Guaiagorgia* sp.	14	0	N/A	0
86	*Guaiagorgia* sp.	13	10	N/A	5
87	*Guaiagorgia* sp.	15	25	N/A	0
88	*Guaiagorgia* sp.	12	15	N/A	0
89	*Guaiagorgia* sp.	35	50	N/A	0
90	*Guaiagorgia* sp.	23	45	N/A	0
91	*Guaiagorgia* sp.	31	10	N/A	5
92	*Guaiagorgia* sp.	13	25	N/A	0
93	*Guaiagorgia* sp.	14	15	N/A	0
94	*Guaiagorgia* sp.	32	10	N/A	0
95	*Guaiagorgia* sp.	13	10	N/A	0
96	*Guaiagorgia* sp.	14	15	N/A	0
97	*Guaiagorgia* sp.	24	15	N/A	5
98	*Guaiagorgia* sp.	13	10	N/A	5
99	*Guaiagorgia* sp.	23	10	N/A	5
100	*Guaiagorgia* sp.	15	25	N/A	5
101	*Guaiagorgia* sp.	16	30	N/A	5
102	*Guaiagorgia* sp.	12	15	N/A	10

Coral	Species	Size (cm) – Max. Diameter/Height	Mortality (%)	Bleaching (%)	Sediment (%)
103	*Guaiagorgia* sp.	16	35	N/A	0
104	*Guaiagorgia* sp.	23	10	N/A	0
105	*Guaiagorgia* sp.	25	15	N/A	0
106	*Guaiagorgia* sp.	25	25	N/A	0
107	*Guaiagorgia* sp.	15	50	N/A	15
108	*Guaiagorgia* sp.	16	45	N/A	0
109	*Guaiagorgia* sp.	15	35	N/A	0
110	*Guaiagorgia* sp.	24	50	N/A	20
101	*Guaiagorgia* sp.	24	50	N/A	0
112	*Guaiagorgia* sp.	15	0	N/A	0
113	*Guaiagorgia* sp.	28	45	N/A	0
114	*Guaiagorgia* sp.	26	65	N/A	15
115	*Guaiagorgia* sp.	16	10	N/A	0
116	*Guaiagorgia* sp.	14	10	N/A	0
117	*Guaiagorgia* sp.	17	15	N/A	0
118	*Guaiagorgia* sp.	14	10	N/A	0
119	*Guaiagorgia* sp.	22	25	N/A	5
120	*Guaiagorgia* sp.	23	25	N/A	5
121	*Guaiagorgia* sp.	21	10	N/A	5
122	*Guaiagorgia* sp.	26	15	N/A	5
123	*Guaiagorgia* sp.	32	15	N/A	5
124	*Guaiagorgia* sp.	15	20	N/A	0
125	*Guaiagorgia* sp.	15	10	N/A	0
126	*Guaiagorgia* sp.	13	5	N/A	0
127	*Guaiagorgia* sp.	15	5	N/A	0
128	*Guaiagorgia* sp.	22	10	N/A	0
129	*Guaiagorgia* sp.	22	5	N/A	0
130	*Guaiagorgia* sp.	25	5	N/A	0
131	*Guaiagorgia* sp.	15	10	N/A	20
132	*Guaiagorgia* sp.	15	15	N/A	0
133	*Guaiagorgia* sp.	13	10	N/A	20
134	*Guaiagorgia* sp.	16	5	N/A	0
135	*Guaiagorgia* sp.	15	5	N/A	0
136	*Guaiagorgia* sp.	13	15	N/A	0
137	*Guaiagorgia* sp.	21	15	N/A	0
138	*Guaiagorgia* sp.	23	10	N/A	0
139	*Guaiagorgia* sp.	22	25	N/A	0
140	*Guaiagorgia* sp.	33	15	N/A	0
141	*Guaiagorgia* sp.	37	15	N/A	0
142	*Guaiagorgia* sp.	34	10	N/A	0
143	*Guaiagorgia* sp.	32	15	N/A	0
144	*Guaiagorgia* sp.	15	10	N/A	0
145	*Guaiagorgia* sp.	16	15	N/A	0
146	*Guaiagorgia* sp.	12	10	N/A	0
147	*Guaiagorgia* sp.	15	5	N/A	0
148	*Guaiagorgia* sp.	13	5	N/A	0
149	*Guaiagorgia* sp.	34	25	N/A	0
150	*Guaiagorgia* sp.	12	35	N/A	0
151	*Guaiagorgia* sp.	24	10	N/A	0
152	*Guaiagorgia* sp.	21	5	N/A	0
153	*Guaiagorgia* sp.	15	5	N/A	10
154	*Guaiagorgia* sp.	13	15	N/A	15
155	*Guaiagorgia* sp.	26	10	N/A	10
156	*Guaiagorgia* sp.	20	25	N/A	0
157	*Guaiagorgia* sp.	23	20	N/A	0
158	*Guaiagorgia* sp.	27	30	N/A	0
159	*Guaiagorgia* sp.	15	5	N/A	0
160	*Guaiagorgia* sp.	16	5	N/A	15

Coral	Species	Size (cm) – Max. Diameter/Height	Mortality (%)	Bleaching (%)	Sediment (%)
161	*Guaiagorgia* sp.	15	5	N/A	0
152	*Guaiagorgia* sp.	23	5	N/A	0
163	*Guaiagorgia* sp.	27	5	N/A	0
164	*Guaiagorgia* sp.	14	5	N/A	0
165	*Guaiagorgia* sp.	19	10	N/A	0
166	*Guaiagorgia* sp.	28	5	N/A	0
167	*Guaiagorgia* sp.	23	5	N/A	0
168	*Guaiagorgia* sp.	26	15	N/A	30
169	*Guaiagorgia* sp.	25	15	N/A	0
170	*Guaiagorgia* sp.	12	30	N/A	0
171	*Guaiagorgia* sp.	14	5	N/A	0
172	*Guaiagorgia* sp.	12	5	N/A	0
173	*Guaiagorgia* sp.	15	10	N/A	0
174	*Guaiagorgia* sp.	23	10	N/A	0
175	*Guaiagorgia* sp.	17	25	N/A	0
176	*Guaiagorgia* sp.	21	10	N/A	25
177	*Guaiagorgia* sp.	15	25	N/A	0
178	*Guaiagorgia* sp.	12	10	N/A	0
179	*Guaiagorgia* sp.	16	15	N/A	0
180	*Guaiagorgia* sp.	22	15	N/A	0
181	*Guaiagorgia* sp.	24	5	N/A	0
182	*Guaiagorgia* sp.	18	5	N/A	20
183	*Guaiagorgia* sp.	19	5	N/A	0
184	*Guaiagorgia* sp.	21	0	N/A	10
185	*Guaiagorgia* sp.	20	0	N/A	0
186	*Guaiagorgia* sp.	16	15	N/A	0
187	*Guaiagorgia* sp.	15	10	N/A	5
188	*Guaiagorgia* sp.	18	25	N/A	5
189	*Guaiagorgia* sp.	13	25	N/A	5
190	*Guaiagorgia* sp.	15	0	N/A	0
191	*Guaiagorgia* sp.	16	0	N/A	0
192	*Guaiagorgia* sp.	30	20	N/A	0
193	*Guaiagorgia* sp.	25	5	N/A	0
194	*Guaiagorgia* sp.	16	5	N/A	5
195	*Guaiagorgia* sp.	22	5	N/A	0
196	*Guaiagorgia* sp.	19	25	N/A	0
197	*Guaiagorgia* sp.	22	10	N/A	0
198	*Guaiagorgia* sp.	21	15	N/A	5
199	*Guaiagorgia* sp.	28	15	N/A	0
200	*Guaiagorgia* sp.	21	10	N/A	20
201	*Guaiagorgia* sp.	32	5	N/A	0
201	*Guaiagorgia* sp.	28	5	N/A	10
203	*Guaiagorgia* sp.	11	5	N/A	5
204	*Guaiagorgia* sp.	14	15	N/A	5
205	*Guaiagorgia* sp.	12	15	N/A	5
206	*Guaiagorgia* sp.	22	15	N/A	5
207	*Guaiagorgia* sp.	13	10	N/A	0
208	*Guaiagorgia* sp.	23	5	N/A	10
209	*Guaiagorgia* sp.	15	5	N/A	0
210	*Guaiagorgia* sp.	24	5	N/A	0
211	*Guaiagorgia* sp.	31	5	N/A	10
212	*Guaiagorgia* sp.	14	10	N/A	10
213	*Guaiagorgia* sp.	15	5	N/A	10
215	*Guaiagorgia* sp.	12	15	N/A	0
215	*Guaiagorgia* sp.	15	15	N/A	0
216	*Guaiagorgia* sp.	22	10	N/A	0
217	*Guaiagorgia* sp.	21	10	N/A	0
218	*Guaiagorgia* sp.	9	0	N/A	0

Coral	Species	Size (cm) – Max. Diameter/Height	Mortality (%)	Bleaching (%)	Sediment (%)
219	*Guaiagorgia* sp.	16	5	N/A	25
220	*Guaiagorgia* sp.	22	10	N/A	15
221	*Guaiagorgia* sp.	28	15	N/A	0
222	*Guaiagorgia* sp.	25	25	N/A	10
223	*Guaiagorgia* sp.	23	40	N/A	10
224	*Guaiagorgia* sp.	18	15	N/A	5
225	*Guaiagorgia* sp.	32	45	N/A	5
226	*Guaiagorgia* sp.	18	10	N/A	5
227	*Guaiagorgia* sp.	35	15	N/A	25
228	*Oulastrea crispata*	10	0	0	0
229	*Oulastrea crispata*	15	5	0	0
230	*Oulastrea crispata*	16	0	0	0
231	*Oulastrea crispata*	13	0	0	5
232	*Oulastrea crispata*	17	0	0	0
233	*Oulastrea crispata*	8	0	0	0
234	*Oulastrea crispata*	7	0	0	5
235	*Oulastrea crispata*	2	0	0	0
236	*Oulastrea crispata*	17	0	0	0
237	*Oulastrea crispata*	3	0	0	10
238	*Oulastrea crispata*	2	0	0	0
239	*Oulastrea crispata*	8	0	0	0
240	*Oulastrea crispata*	9	0	5	0
241	*Oulastrea crispata*	10	10	0	5
242	*Oulastrea crispata*	12	0	0	0
243	*Oulastrea crispata*	15	0	0	0
244	*Oulastrea crispata*	5	0	0	0
245	*Oulastrea crispata*	2	0	0	0
246	*Oulastrea crispata*	18	0	0	0
247	*Oulastrea crispata*	16	0	0	10
248	*Oulastrea crispata*	7	0	0	0
249	*Oulastrea crispata*	4	0	0	0
250	*Oulastrea crispata*	6	0	0	0
251	*Oulastrea crispata*	7	0	0	0
252	*Oulastrea crispata*	10	0	0	0
253	*Oulastrea crispata*	26	2	5	10
254	*Oulastrea crispata*	17	0	0	0
255	*Oulastrea crispata*	10	0	0	0
256	*Oulastrea crispata*	9	0	0	0
257	*Oulastrea crispata*	16	0	0	0
258	*Oulastrea crispata*	22	10	0	0
259	*Oulastrea crispata*	16	0	0	0
260	*Oulastrea crispata*	14	15	0	0
261	*Oulastrea crispata*	16	5	0	0
262	*Oulastrea crispata*	17	10	0	5
263	*Oulastrea crispata*	14	0	0	0
264	*Oulastrea crispata*	16	0	0	0
265	*Oulastrea crispata*	2	0	0	0
266	*Oulastrea crispata*	21	0	0	0
267	*Oulastrea crispata*	15	0	0	0
268	*Oulastrea crispata*	14	0	0	0
269	*Oulastrea crispata*	15	0	5	0
270	*Oulastrea crispata*	13	0	0	0
271	*Oulastrea crispata*	21	0	0	10
272	*Oulastrea crispata*	16	0	0	0
273	*Oulastrea crispata*	16	0	0	0
274	*Oulastrea crispata*	17	0	0	0
275	*Oulastrea crispata*	15	0	0	0
276	*Oulastrea crispata*	14	15	0	0

Coral	Species	Size (cm) – Max. Diameter/Height	Mortality (%)	Bleaching (%)	Sediment (%)
277	*Oulastrea crispata*	6	10	0	0
278	*Oulastrea crispata*	2	5	0	0
279	*Oulastrea crispata*	10	0	5	5
280	*Oulastrea crispata*	5	0	0	0
281	*Oulastrea crispata*	16	0	0	5
282	*Oulastrea crispata*	21	0	0	0
283	*Oulastrea crispata*	15	10	0	0
284	*Oulastrea crispata*	12	10	0	0
285	*Oulastrea crispata*	7	0	0	0
286	*Oulastrea crispata*	8	0	0	0
287	*Oulastrea crispata*	5	0	0	0
288	*Oulastrea crispata*	13	0	0	5
289	*Oulastrea crispata*	5	0	0	0
290	*Oulastrea crispata*	7	0	0	0
291	*Oulastrea crispata*	5	0	0	0
292	*Oulastrea crispata*	8	5	0	0
293	*Oulastrea crispata*	11	10	0	0
294	*Oulastrea crispata*	15	1	0	0
295	*Oulastrea crispata*	10	15	0	5
296	*Oulastrea crispata*	21	0	5	5
297	*Oulastrea crispata*	13	0	5	0
298	*Oulastrea crispata*	15	0	0	0
299	*Oulastrea crispata*	10	0	0	0
300	*Oulastrea crispata*	12	0	0	0
301	*Oulastrea crispata*	16	15	0	0
302	*Oulastrea crispata*	16	15	0	0
303	*Oulastrea crispata*	15	5	0	0
304	*Oulastrea crispata*	15	0	0	0
305	*Oulastrea crispata*	13	0	0	5
306	*Oulastrea crispata*	17	0	0	5
307	*Oulastrea crispata*	4	0	0	0
308	*Oulastrea crispata*	14	0	0	0
309	*Oulastrea crispata*	20	0	0	10
310	*Oulastrea crispata*	15	0	0	0
311	*Oulastrea crispata*	13	0	0	0
312	*Oulastrea crispata*	15	0	0	0
313	*Oulastrea crispata*	14	0	0	0
314	*Oulastrea crispata*	36	20	5	15
315	*Oulastrea crispata*	21	0	0	0
316	*Oulastrea crispata*	12	0	0	0
317	*Oulastrea crispata*	21	0	0	5
318	*Oulastrea crispata*	23	5	5	5
319	*Oulastrea crispata*	12	0	5	5
320	*Oulastrea crispata*	15	0	0	0
321	*Oulastrea crispata*	3	0	0	0
322	*Oulastrea crispata*	5	0	0	0
323	*Ballanophyllia sp.*	<0.5	0	0	0
324	*Ballanophyllia sp.*	<0.5	0	0	0
325	*Ballanophyllia sp.*	0.5	0	0	0
326	*Ballanophyllia sp.*	<0.5	0	0	0
327	*Ballanophyllia sp.*	<0.5	0	0	0
328	*Ballanophyllia sp.*	<0.5	0	0	0
329	*Ballanophyllia sp.*	<0.5	0	0	0
330	*Ballanophyllia sp.*	<0.5	0	0	0
331	*Ballanophyllia sp.*	0.5	0	0	0
332	*Ballanophyllia sp.*	0.5	0	0	0
333	*Ballanophyllia sp.*	<0.5	0	0	0
334	*Ballanophyllia sp.*	<0.5	0	0	0

Coral	Species	Size (cm) – Max. Diameter/Height	Mortality (%)	Bleaching (%)	Sediment (%)
335	*Ballanophyllia sp.*	<0.5	0	0	0
336	*Ballanophyllia sp.*	<0.5	0	0	0
337	*Ballanophyllia sp.*	<0.5	0	0	0
338	*Ballanophyllia sp.*	<0.5	0	0	0
339	*Ballanophyllia sp.*	0.5	0	0	0
340	*Ballanophyllia sp.*	0.5	0	0	0
341	*Ballanophyllia sp.*	0.5	0	0	0
342	*Ballanophyllia sp.*	0.5	0	0	0
343	*Ballanophyllia sp.*	<0.5	0	0	0
344	*Ballanophyllia sp.*	<0.5	0	0	0
345	*Ballanophyllia sp.*	<0.5	0	0	0
346	*Ballanophyllia sp.*	<0.5	0	0	0
347	*Ballanophyllia sp.*	<0.5	0	0	0
348	*Ballanophyllia sp.*	<0.5	0	0	0
349	*Ballanophyllia sp.*	<0.5	0	0	0
350	*Ballanophyllia sp.*	0.5	0	0	0
351	*Ballanophyllia sp.*	0.5	0	0	0
352	*Ballanophyllia sp.*	<0.5	0	0	0
353	*Ballanophyllia sp.*	<0.5	0	0	0
354	*Ballanophyllia sp.*	<0.5	0	0	0
355	*Ballanophyllia sp.*	<0.5	0	0	0
356	*Ballanophyllia sp.*	<0.5	0	0	0
357	*Ballanophyllia sp.*	<0.5	0	0	0
358	*Ballanophyllia sp.*	0.5	0	0	0
359	*Ballanophyllia sp.*	0.5	0	0	0
360	*Ballanophyllia sp.*	<0.5	0	0	0
361	*Ballanophyllia sp.*	<0.5	0	0	0
362	*Ballanophyllia sp.*	<0.5	0	0	0
363	*Ballanophyllia sp.*	<0.5	0	0	0
364	*Ballanophyllia sp.*	<0.5	0	0	0
365	*Ballanophyllia sp.*	<0.5	0	0	0
366	*Ballanophyllia sp.*	<0.5	0	0	0
367	*Ballanophyllia sp.*	<0.5	0	0	0
368	*Ballanophyllia sp.*	<0.5	0	0	0
369	*Ballanophyllia sp.*	<0.5	0	0	0
370	*Ballanophyllia sp.*	<0.5	0	0	0
371	*Ballanophyllia sp.*	<0.5	0	0	0
372	*Ballanophyllia sp.*	<0.5	0	0	0
373	*Ballanophyllia sp.*	<0.5	0	0	0
374	*Ballanophyllia sp.*	<0.5	0	0	0
375	*Ballanophyllia sp.*	<0.5	0	0	0
376	*Ballanophyllia sp.*	<0.5	0	0	0
377	*Ballanophyllia sp.*	0.5	0	0	0
378	*Ballanophyllia sp.*	0.5	0	0	0
379	*Ballanophyllia sp.*	0.5	0	0	0
380	*Ballanophyllia sp.*	0.5	0	0	0
381	*Ballanophyllia sp.*	<0.5	0	0	0
382	*Ballanophyllia sp.*	<0.5	0	0	0
383	*Ballanophyllia sp.*	<0.5	0	0	0
384	*Ballanophyllia sp.*	<0.5	0	0	0
385	*Ballanophyllia sp.*	<0.5	0	0	0
386	*Ballanophyllia sp.*	<0.5	0	0	0
387	*Ballanophyllia sp.*	<0.5	0	0	0
388	*Ballanophyllia sp.*	<0.5	0	0	0
389	*Ballanophyllia sp.*	<0.5	0	0	0
390	*Ballanophyllia sp.*	<0.5	0	0	0
391	*Ballanophyllia sp.*	<0.5	0	0	0
392	*Ballanophyllia sp.*	<0.5	0	0	0

Coral	Species	Size (cm) – Max. Diameter/Height	Mortality (%)	Bleaching (%)	Sediment (%)
393	*Ballanophyllia sp.*	<0.5	0	0	0
394	*Ballanophyllia sp.*	<0.5	0	0	0
395	*Ballanophyllia sp.*	<0.5	0	0	0
396	*Ballanophyllia sp.*	<0.5	0	0	0
397	*Ballanophyllia sp.*	<0.5	0	0	0
398	*Ballanophyllia sp.*	<0.5	0	0	0
399	*Ballanophyllia sp.*	<0.5	0	0	0
400	*Ballanophyllia sp.*	<0.5	0	0	0
401	*Ballanophyllia sp.*	0.5	0	0	0
402	*Ballanophyllia sp.*	0.5	0	0	0
403	*Ballanophyllia sp.*	0.5	0	0	0
404	*Ballanophyllia sp.*	<0.5	0	0	0
405	*Ballanophyllia sp.*	<0.5	0	0	0
406	*Ballanophyllia sp.*	<0.5	0	0	0
407	*Ballanophyllia sp.*	<0.5	0	0	0
408	*Ballanophyllia sp.*	<0.5	0	0	0
409	*Ballanophyllia sp.*	<0.5	0	0	0
410	*Ballanophyllia sp.*	<0.5	0	0	0
411	*Ballanophyllia sp.*	<0.5	0	0	0
412	*Ballanophyllia sp.*	<0.5	0	0	0
413	*Ballanophyllia sp.*	0.5	0	0	0
414	*Ballanophyllia sp.*	<0.5	0	0	0
415	*Ballanophyllia sp.*	<0.5	0	0	0
416	*Ballanophyllia sp.*	<0.5	0	0	0
417	*Ballanophyllia sp.*	<0.5	0	0	0
418	*Ballanophyllia sp.*	0.5	0	0	0
419	*Ballanophyllia sp.*	0.5	0	0	0
420	*Ballanophyllia sp.*	0.5	0	0	0
421	*Ballanophyllia sp.*	<0.5	0	0	0
422	*Ballanophyllia sp.*	<0.5	0	0	0
423	*Ballanophyllia sp.*	<0.5	0	0	0
424	*Ballanophyllia sp.*	<0.5	0	0	0
425	*Ballanophyllia sp.*	0.5	0	0	0
426	*Ballanophyllia sp.*	0.5	0	0	0
427	*Ballanophyllia sp.*	<0.5	0	0	0

Twenty-four (24) movable *Oulastrea crispata* colonies, nine (9) movable boulders with *Balanophyllia* sp. and twenty-two (22) movable *Guaiagorgia* sp. colonies, which may be affected by the proposed construction works of the Northern Connection Sub-sea Tunnel Section of TM-CLK Link Project, were successfully translocated from the donar site at Pillar Point to the receptor site at Yam Tsai Wan. Following the translocation, the translocated coral colonies as well as the tagged natural coral colonies at the receptor site will be monitored once every three (3) months for a period of 12 months in order to track the health status of the translocated corals.

The tentative schedule of the quarterly post-translocation monitoring is provided in *Table 3.1* below. A Post-Translocation Monitoring Report will be submitted to EPD and AFCD two weeks after completion of each quarterly survey.

Table 3.1 Schedule of Quarterly Post-Translocation Monitoring

Post-Translocation Monitoring Survey	Timing
1st Quarterly Monitoring	January 2014 3 months after the translocation works
2nd Quarterly Monitoring	April 3014 6 months after the translocation works
3rd Quarterly Monitoring	July 2014 9 months after the translocation works
4th Quarterly Monitoring	October 2014 12 months after the translocation works

Post-translocation monitoring results will be evaluated against Action and Limit Levels which will be based on recorded changes in percentage of partial mortality of the corals (*Table 3.2*). If the defined Action Level or Limit Level for coral monitoring is exceeded, the actions as set out in *Table 3.3* will be implemented.

Table 3.2 Action and Limit Levels for Post-Translocation Coral Monitoring

Parameter	Action Level Definition	Limit Level Definition
Mortality	If during Impact Monitoring a 15% increase in the percentage of partial mortality on the corals occurs at more than 20% of the translocated coral colonies that is not recorded on the original corals at the receptor site, then the Action Level is exceeded.	If during Impact Monitoring a 25% increase in the percentage of partial mortality on the corals occurs at more than 20% of the translocated coral colonies that is not recorded on the original corals at the receptor site, then the Limit Level is exceeded.

Table 3.3 Event and Action Plan for Post-Translocation Monitoring

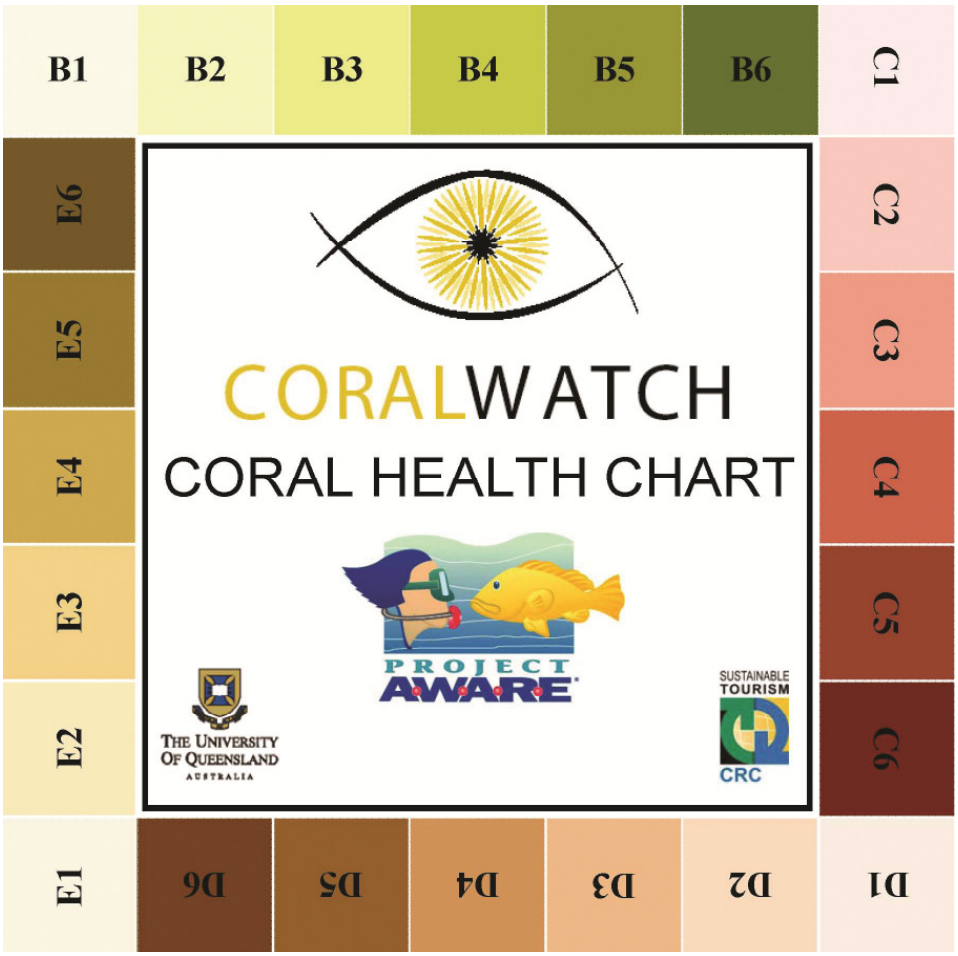
Event	Action			
	ET Leader	**IEC**	**SOR**	**Contractor**
Action Level Exceedance	1. Check monitoring data 2. Inform the IEC, SOR and Contractor of the findings; 3. Increase the monitoring to at least once a month to confirm findings; 4. Propose mitigation measures for consideration	1. Discuss monitoring with the ET and the Contractor; 2. Review proposals for additional monitoring and any other measures submitted by the Contractor and advise the SOR accordingly.	1. Discuss with the IEC additional monitoring requirements and any other measures proposed by the ET; 2. Make agreement on the measures to be implemented.	1. Inform the SOR and confirm notification of the non-compliance in writing; 2. Discuss with the ET and the IEC and propose measures to the IEC and the SOR; 3. Implement the agreed measures.
Limit Level Exceedance	1. Undertake Steps 1-4 as in the Action Level Exceedance. If further exceedance of Limit Level, propose enhancement measures for consideration.	1. Discuss monitoring with the ET and the Contractor; 2. Review proposals for additional monitoring and any other measures submitted by the Contractor and advise the SOR accordingly.	1. Discuss with the IEC additional monitoring requirements and any other measures proposed by the ET; 2. Make agreement on the measures to be implemented.	1. Inform the SOR and confirm notification of the non-compliance in writing; 2. Discuss with the ET and the IEC and propose measures to the IEC and the SOR; 3. Implement the agreed measures.

Appendix A

Coral Health Monitoring Chart

A1 CORAL HEALTH MONITORING CHART

The Coral Health Monitoring Chart has four sample colours and six degrees of darkness (Code 1 to 6) for each sample colour indicating different stages of coral health condition. Code 1 is the lightest (representing bleaching) and Code 6 has the dark colour (representing the healthiest). During the REA survey, the lightest and darkest areas of each coral will be selected, and the colour of areas will be matched to the categories on the chart.



Appendix B

Photographic Records of Pre-translocation Survey at Receptor Site, Yam Tsai Wan

B1 *Photographic Records taken during Pre-translocation Survey in Receptor Site, Yam Tsai Wan*

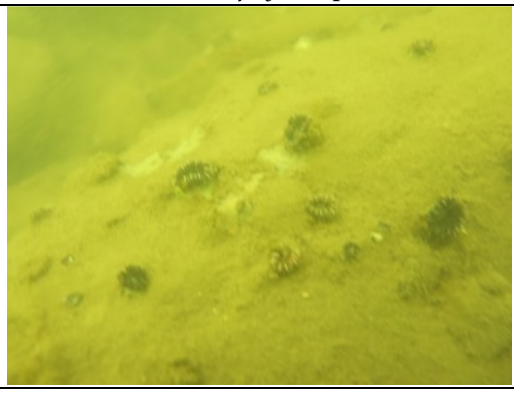
Receptor Site, Yam Tsai Wan

Substratum – Bedrock and Boulders

***Guaiagorgia* sp.**

Oulastrea crispata

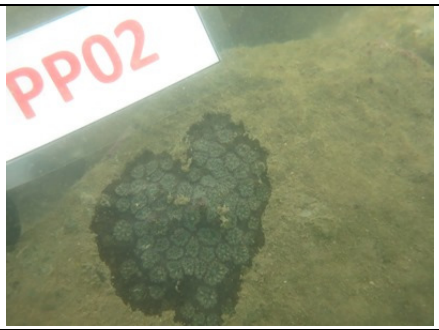
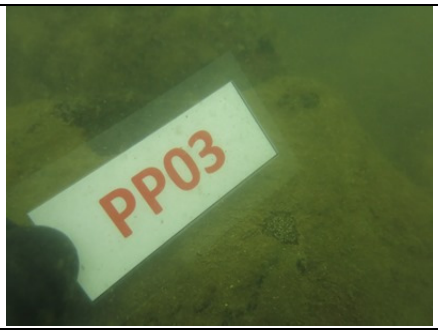
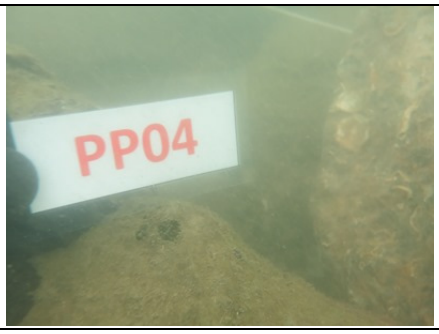
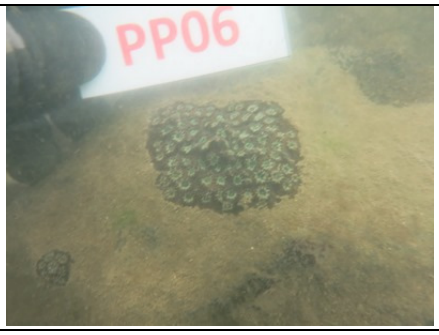
***Balanophyllia* sp.**

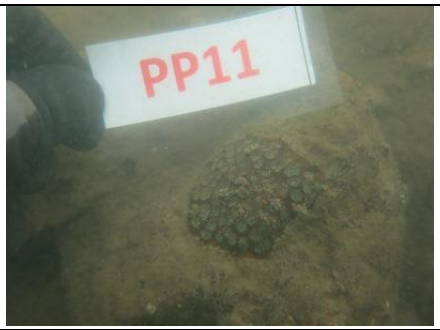
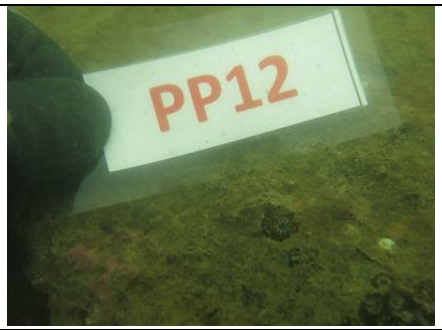
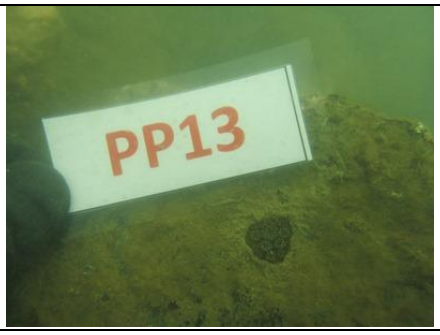
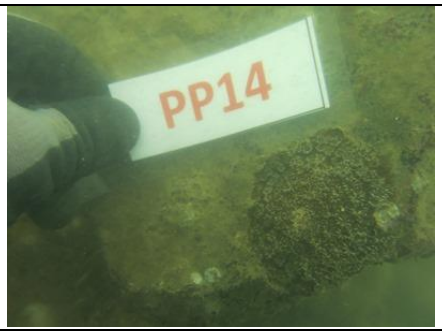


Appendix C

Photographic Records of Translocated and Tagged Natural Coral Colonies

C1 ***Photographic Records of Translocated Coral Colonies from Donor Site, Pillar Point***

1	2
	
3	**4**
	
5	**6**
	
7	**8**
	
9	**10**
	

11	12
	
13	**14**
	
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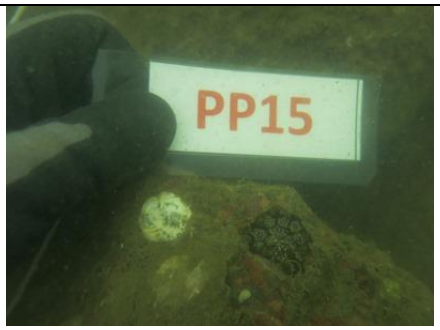	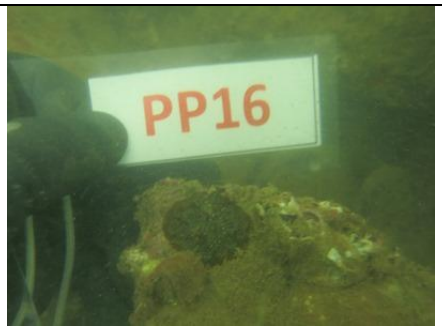
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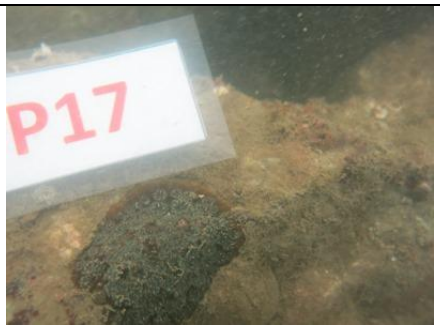	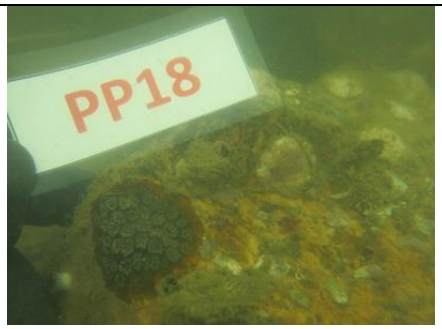
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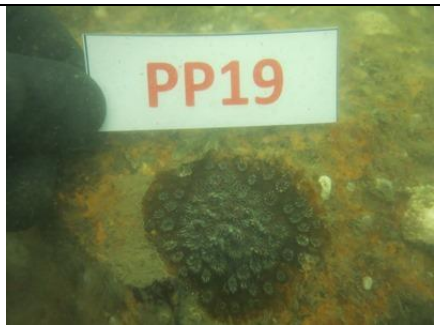	

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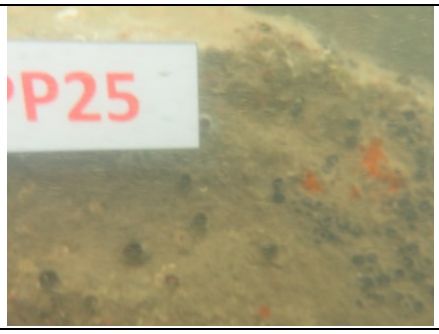	
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	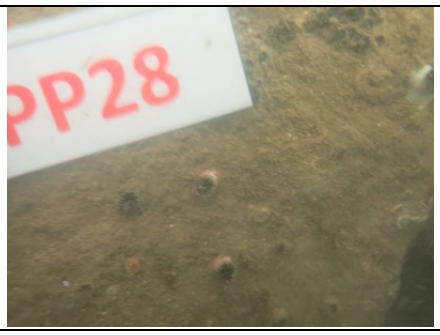
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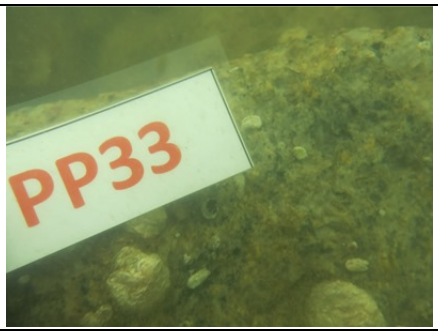	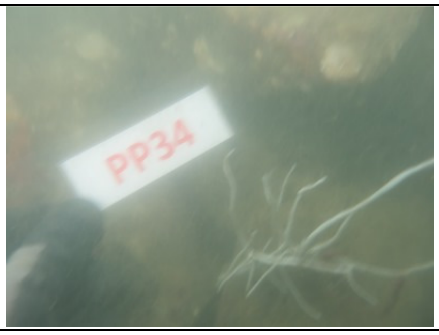
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	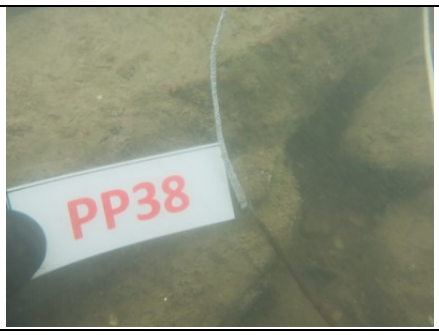
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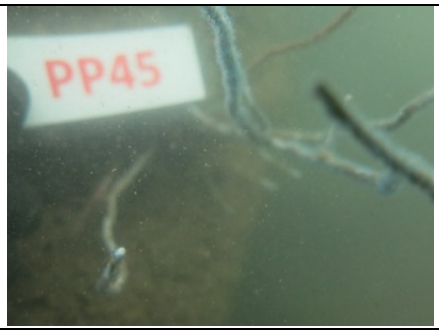	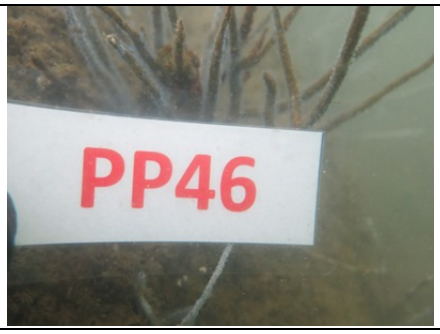
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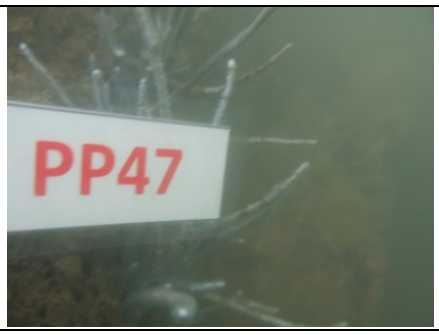	
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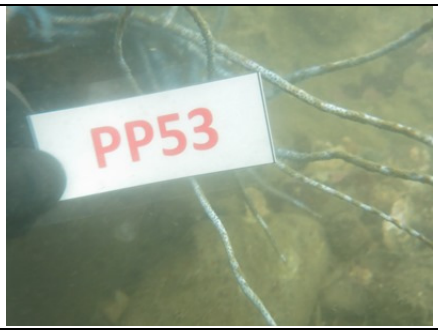	
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C2 ***Photographic Records of Tagged Natural Coral Colonies at Receptor Site, Yam Tsui Wan***

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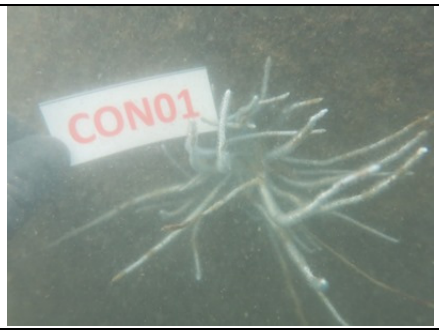	
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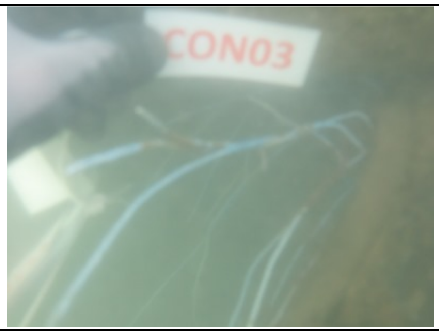	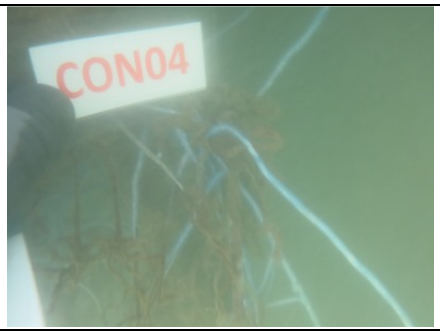
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	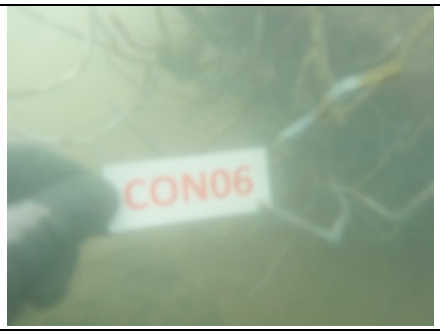
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	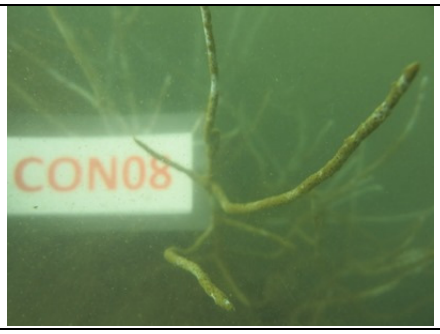
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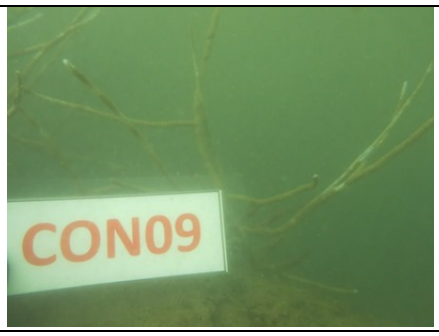	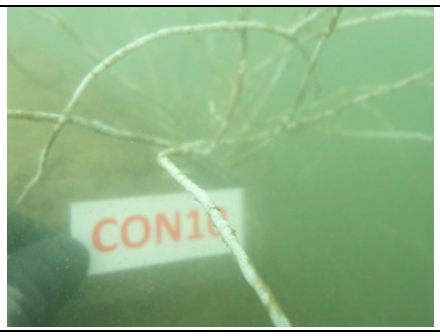

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	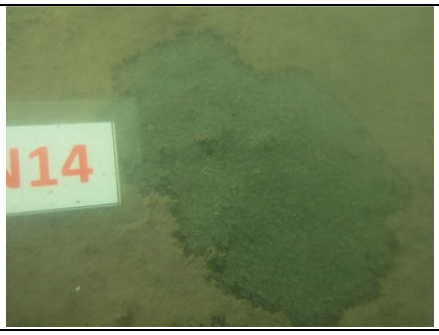
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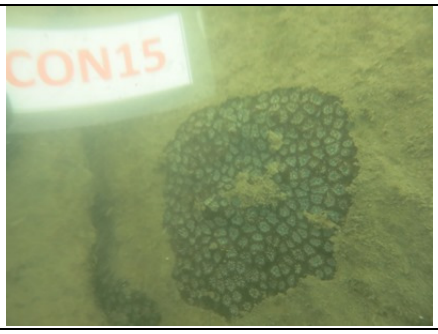	
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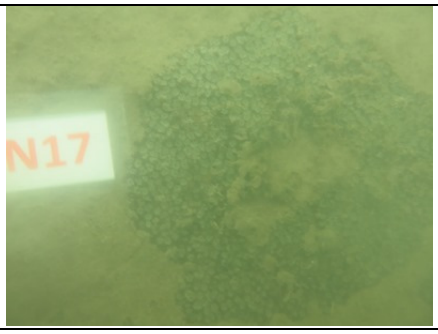	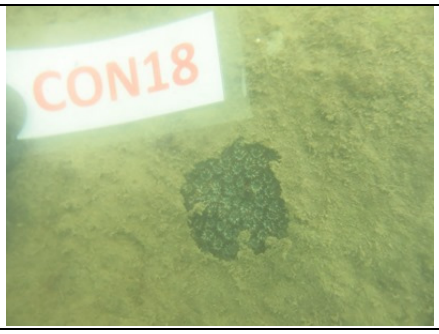
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	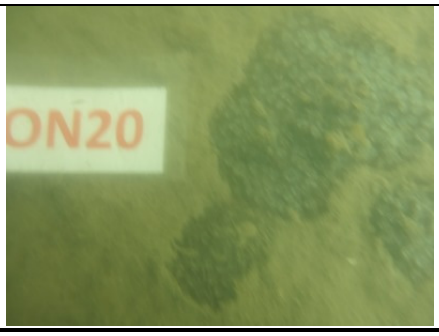

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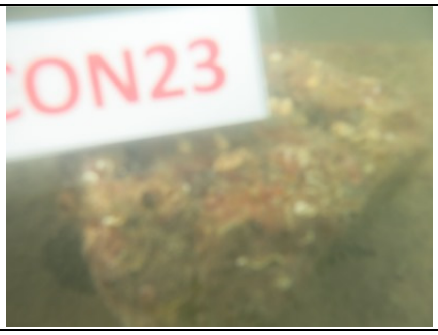	
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