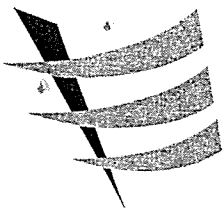


東業德勤測試顧問有限公司
ETS-TESTCONSULT LIMITED

RECONSTRUCTION OF JETTY
AT LUNG KWU CHAU

(CED CONTRACT NO.: CV/2002/11)

FIRST MONTHLY EM&A REPORT
(09 JUNE TO 08 JULY 2003)



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TEST REPORT

Wai Kee (Zens) Construction & Transportation Co., Ltd.

**RECONSTRUCTION OF JETTY
AT LUNG KWU CHAU**

(CED CONTRACT NO.: CV/2002/11)

**FIRST MONTHLY EM&A REPORT
(09 JUNE TO 08 JULY 2003)**

Prepared by: Linda Law
Linda Law
Environmental Officer

Checked by: C. L. Lau
C. L. Lau
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Approved by: Tony Wong
Tony Wong
Operations Manager

Date: 09 June to 08 July 2003

Report No.: ENA 30356

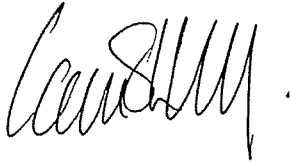
Our Ref: TCS/2003/E010/600/Cert-03

**INDEPENDENT ENGINEER
AUDIT CERTIFICATE**

**CED CONTRACT NO. CV/2002/11
CONSTRUCTION OF LUNG KWU CHAU JETTY
ENVIRONMENTAL MONITORING AND AUDIT REPORT (9 JUN – 8 JUL 2003)**

We certify that this report has been audited against Environmental Permit No. EP-150/2002 A
using reasonable skill and care.

Signed:



INDEPENDENT ENGINEER

Name: CLIFF LAM

**Action-United
Environmental Services & Consulting**

Date: 23 July 2003



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- 9.2 Construction Plan in the coming two month



EXECUTIVE SUMMARY

This first monthly EM&A report has been prepared by the Environmental Team (ET) of ETS-Testconsult Ltd for impact monitoring under the Environmental Permit No. EP-150/2002/A (the EP) for "Construction of Jetty at Lung Kwu Chau (CED Contract No. : CV/2002/11)" (The Project) during the reporting period from 09 June to 08 July 2003.

Construction Progress

The major construction works in this reporting month included dredging, rock-filling and setting precast blocks of jetty and excavation at footpath.

Environmental Monitoring Progress

The monitoring activities in this monitoring month are summarized below:

- Marine Water Monitoring: 10 Occasions at 5 designated locations;
- Weekly-site inspection: 4 Occasions.

Marine Water Monitoring

Exceedances of Turbidity and Suspended Solids level were recorded on 13 and 27 June 2003 when no construction activities were taken placed. Therefore, the exceedances at these two monitoring days were not related to the construction work but caused by local impact.

Dissolved Oxygen Level (Surface and Middle) exceedance at control station C2 was also recorded during mid-flood at 20 June 2003. Since C2 was upstream control station during mid-flood on that monitoring day, the exceedance was not related to the construction works.

Summary of Monitoring Exceedances

A summary of environmental performance in this reporting month is presented below:

Parameters	Compliance %	Investigation & Corrective Action
Dissolved Oxygen (Surface and Middle)	99	ET's investigation found that all exceedances were not work-related and hence no corrective actions and further mitigation measures should be taken.
Dissolved Oxygen (Bottom)	100	
Turbidity	94	
Suspended Solids	95	

Site Inspection

Environmental audits and inspections conducted in this reporting month are summarized as follows:

<u>Concerned Parties</u>	<u>Dates of Audit / Inspection</u>
ET	13/06, 20/06, 27/06 and 04/07
RE/IE/POC	13/06

According to the weekly site inspections, it was found that silt curtain and closed grab dredger were used during dredging activities. The daily dredging rate was kept below 500m³/day. Mitigation measures for Chinese White Dolphin and terrestrial ecology were also taken during the reporting month. No disturbance to the Chinese White Dolphin and surrounding natural habitats due to construction activities was observed.

The Contractor was recommended to maintain good waste management in order to minimize environmental impacts at the site.



Environmental Complaints and Notification of Summons and Successful Prosecutions

No environmental complaints were received and no notification of summons and prosecutions with respect to environmental issues were registered in this reporting month.

Future Key Issues and Recommendations to the Contractor

Dredging activities and rock filling for jetty foundation, which have the potential to result in a significant environmental impact, were completed on 04 July 2003. Dredging for approach channel will commence in September 2003.

The Contractor is recommended to minimize the environmental impacts through maintenance of good site practice and implementation of the required waste management.



1.0 INTRODUCTION

Wai Kee (Zens) Construction & Transportation Co., Ltd. (WKC&T) has been awarded the Contract No.: CV/2002/11, "Construction of Jetty at Lung Kwu Chau" (the Project) by the CED. ETS-Testconsult Limited (ETL) has been commissioned as Environmental Team (ET) to carry out impact marine water quality monitoring at Lung Kwu Chau.

Under the requirements of Section 4 of Environmental Permit to Construct and Operate a Designate Project (EP-150/2002/A), EM&A programme as set out in the EM&A Manual is required to be implemented. In accordance with the EM&A manual, environmental monitoring of water quality, ecology and waste management is required for the Project. The EM&A requirement is described in details in subsequent sections, including:

- Monitoring parameters;
- Action and Limit levels for all environmental parameters;
- Event-Action Plans;
- Environmental mitigation measures, as recommended in the project EIA study report;
- Environmental requirements in contract documents.

This monthly EM&A report summarizes the impact monitoring results and audit findings of the EM&A program during the reporting period from 09 June and 08 July 2003.

2.0 PROJECT INFORMATION

2.1 Background

To provide essential navigational aid for aircraft operating into and out of Hong Kong International Airport, a Doppler VHF Omni-directional Range and Distance Measuring Equipment (DVOR/DME) Station is being operated on Lung Kwu Chau. The existing jetty at Lung Kwu Chau is too small and the surrounding waters are too shallow to accommodate the vessels employed by Civil Aviation Department (CAD) for transporting equipment and personnel for servicing and maintaining the DVOR/DME. At present, the transportation relies heavily on helicopters, the operation of which is prohibited during night times and adverse weather conditions. In order that emergency repair work can be undertaken during such periods, CED has proposed to construct a proper jetty for berthing of marine vessels.

2.2 Project Location and Scope

The proposed site of the Project is located on the eastern coast of Lung Kwu Chau as shown in Figure 1. Lung Kwu Chau is situated within the gazetted Sha Chau and Lung Kwu Chau Marine Park. Due to the remoteness of the site, the island is uninhabited with no infrastructure other than the existing jetty and the DVOR/DME Station. Under the preliminary design, the scope of this Project comprises the following:

- Construction of a precast concrete blockwork jetty (10 m by 20 m) with a single berth;
- Construction of a concrete catwalk (approximately 22 m long);
- Dredging of an approach channel to a level of -2.5 mCD in front of the berth;
- Installation of miscellaneous facilities on the jetty, including lighting, navigation light, fendering, handrails, bollards, tide gauge, etc;
- Demolition of the existing jetty upon completion of the proposed jetty;
- Extension of an existing footpath.

2.3 Construction Programme

The Project is scheduled to commence in April 2003 for completion in December 2003. The Construction Programme is attached in Appendix E.



2.4 Project Organization and Management Structure

The organization chart with respect to the on-site environmental management and monitoring program are shown in Appendix A.

2.5 Contact Details of Key Personnel

The key personnel contact names and telephone numbers, and construction programme are shown in table 2.1.

Table 2.1 Contact Details of Key Personnel

Organization	Project Role	Name of Key Staff	Tel. No.	Fax No.
CED	Employer	Mr. T. S. Tsui	2762 5571	2714 2054
AUES	Independent Environmental Checker	Mr. Cliff Lam	2959 6059	2959 6079
WKC&T	Contractor	Mr. W. T. Ho	2548 3529	2548 5248
ETL	Contractor's Environmental Team	Mr C L Lau (Environmental Team Leader)	2946 7791	2695 3944

3.0 CONSTRUCTION PROGRESS IN THIS REPORTING MONTH

The site area of this project is shown in Figure 1.

A summary of the major construction activities undertaken in this monitoring month were:

- Dredging of the jetty and catwalk foundation with one hopper dredger and one grab dredger. The disposal area was Sha Chau;
- Fabrication of precast concrete blocks at Zhong Shan casting yard;
- Rock-filling for jetty foundation.

The implementation of the corresponding mitigation measures is summarized in Table 3.1.

Table 3.1 Implementation of Environmental Mitigation Measures

Construction Activities	Environmental Mitigation Measures
General construction works	<ul style="list-style-type: none">• Remove the sand/rubbish accumulated in the site regularly;• Provide good site practice (e.g. selection of quieter plant and working methods and reduction in number of plant operating in critical areas close to Dolphins' habitats) to limit noise emissions at source;• Remove the construction waste accumulated inside or outside the site regularly;• Keep good waste management.
Dredging	<ul style="list-style-type: none">• A tightly closed grab was used to restrict the loss of sediment.• Silt curtain was used to enclose the grab;• Environmental impact monitoring was undertaken.

4.0 MARINE WATER QUALITY MONITORING

4.1 Monitoring Locations

The marine water quality monitoring stations during the dredging works for the jetty and catwalk foundation and approach channel are shown in TS-2031. The co-ordinates of the marine water monitoring stations are listed in Table 4.1.



Table 4.1 Marine Water Quality Monitoring Stations

Station	Easting	Northing
M1	806244	827080
M2	806329	826408
M3	806235	826089
C1	806116	827618
C2	806034	825308

Control station C1 should be the upstream control station for all monitoring stations during mid-ebb and Control Station C2 should be the upstream control station for all monitoring stations during mid-flood.

4.2 Monitoring Parameters

Monitoring parameters listed in Table 4.2 shall be measured by the ET to ensure that any deteriorating water quality could be readily detected and timely action be taken to rectify the situation. Table 4.3 shows the other relevant water quality parameters to be recorded during the impact monitoring.

Table 4.2 Monitoring Parameters

In-situ measurement	Laboratory analysis
Dissolved Oxygen (mg/L)	Suspended solids (mg/L)
Turbidity (NTU)	

Table 4.3 Other relevant water quality parameters

Water Quality Parameters	
Tidal stages	Ambient Temperature (°C)
Water depth (m)	Marine Water Temperature (°C)
Monitoring time (hr:mm)	Dissolved Oxygen saturation (%)
Weather Condition	Salinity (ppt)

Note: pH is agreed by ET Leader, the Engineer and IE to be irrelevant to the Project.

4.3 Monitoring Frequency

The impact monitoring frequency of marine water quality during the dredging works for the jetty and catwalk foundation and approach channel is summarized in Table 4.4.

Table 4.4 Monitoring frequency of Impact Monitoring

Frequency	Monitoring Depth
3 days/week, 2 tides/day	Surface, middle and bottom .

4.4 Monitoring Methodology and Equipment Used

Positioning of the monitoring stations

A hand-held digital Global Positioning System (GPS) was used to identify the designated monitoring stations prior to water sampling.



Water Depth measurement

A portable, battery-operated echo sounder was used for the determination of water depth at each designated monitoring station.

In-situ Water Quality Monitoring Equipment

All in-situ monitoring instruments were checked, calibrated and certified by a laboratory accredited under HOKLAS or any other international accreditation scheme before use, and subsequently re-calibrated at 3 monthly intervals or sometimes longer throughout all stages of the water quality monitoring.

Dissolved Oxygen (DO) and temperature measuring equipment

Portable, weatherproof DO-measuring meter with built-in salinity compensation (YSI model 95) was used in the impact monitoring. It can be capable for measuring:

- a dissolved oxygen level in the range of 0-20 mg/L and 0-200 % saturation; and
- a temperature of 0-45 degree Celsius

This type of DO-measuring meter has a membrane electrode with automatic temperature compensation complete with a 50-foot cable. Wet bulb calibration for a DO meter was carried out before measurement at each monitoring location

Turbidity Measurement Instrument

Portable and weatherproof turbidity meter (HACH model 2100P) was used during impact monitoring. It has a photoelectric sensor capable of measuring turbidity between 0-1000 NTU. Response of the sensor was checked with certified standard Turbidity solutions before the start of measurement.

Salinity

A portable salinity meter capable of measuring salinity in the range 0-40 ppt (YSI Model 30M) was provided for measuring salinity of the water at each monitoring location. It was checked with standard 30 ppt Salinity solutions before the start of measurement.

Water Sampling and Sample Analysis

In-situ monitoring was carried out at three depths: 1 meter below water surface, at mid-depth and 1 meter above the seabed. If the water depth is less than 6 m, the mid-depth station shall be omitted and if the water depth is below 3 m, only the mid depth station shall be monitored.

A water sampler comprising a transparent PVC cylinder, with a capacity of not less than 2 litres, was lowered into the water body at the predetermined depth. The opening ends of the sampler were then closed accordingly and water samples were collected.

The sample container, made by high-density polythene, was rinsed with a portion of the water sample. The water sample was then transferred to the container, labelled with a unique sample ID and sealed with a screw cap. The water samples were stored in a cool box maintained at 4°C. The water samples were then delivered to a local HOKLAS-accredited laboratory (Environmental Laboratory, ETS-Testconsult Ltd, HOKLAS Registration No. 022) on the same day for analysis.

4.5 Quality Assurance (QA) / Quality Control (QC) results and Determination Limits

At each measurement/sampling depth, two consecutive measurements of dissolved oxygen (DO), dissolved oxygen saturation (DOS), turbidity and salinity were taken. For turbidity measurement, the sample was collected by using sampler and then transferred to the cell. The reading of turbidity of the sample was directly recorded from the Turbidimeter (HACH 2100P) after inserting the cell to the Turbidimeter. For DO, DOS and Salinity, duplicate measurements were performed by dropping the calibrated probes of the corresponding monitoring equipments to the designated depths of the water column and taking readings after stabilized. The duplicate measurements were averaged if the difference was not greater than 25%.



The summary of laboratory testing method of Total Suspended Solids analysis was shown in Table 4.5.

Table 4.5 The summary of laboratory testing method of Total Suspended Solids

Laboratory Analysis	Testing Procedure	Method Detection Limit
Total suspended solids	In house method based on APHA 19 th ed 2540D	1.0 mg/L

Environmental Laboratory of ETS-Testconsult Ltd has quality assurance and quality control programs in accordance with HOKLAS requirement. For the QA/QC procedures, one QC sample, one duplicate sample and one sample spike of every batch of 20 samples were analysed. The QA/QC results are summarized in Appendix G.

4.6 Details of site Equipment used for In-situ measurement

Table 4.6 shows the equipment used for in-situ monitoring of water quality. The calibration certificates are attached in Appendix B1.

Table 4.6 Details Impact Monitoring Equipment (In-site measurement)

Parameter	Model	Date of Calibration / Performance Check	Due Date	Equipment No.
Coordinate of Monitoring stations	MLR GPS Navigator, SP24	----	----	EW/005/01*
Dissolved Oxygen (Saturation), Temperature	YSI Dissolved Oxygen Meter, YSI 95	02-04-2003	01-07-2003	EW/003/001 *
		30-06-2003	29-09-2003	
Turbidity	HACH Model 2100P Turbid Meter	23-05-2003	22-08-2003	ET/0505/004 #
Salinity	YSI Model 30M	21-03-2003	20-06-2003	EW/004/01#
		19-06-2003	18-09-2003	
Water Depth	EAGLE Strata 128 Sonar	----	----	EW/002/02

Remark: (*) indicates the instrument should be calibrated on use.
(#) indicates the instrument should be checked with standard solution before use.

4.7 Action and Limit Level

The water quality criteria, namely Action and Limit (A/L) levels, determined according to the baseline study carried out by ET are presented in the table below.

Table 4.7 Water Quality Action and Limit Levels

Parameter	Action Level	Limit Level
Dissolved Oxygen (DO), mg/L	<u>Surface & Middle</u> 4 mg/L	<u>Surface & Middle</u> 4 mg/L
	<u>Bottom</u> 2.86 mg/L	<u>Bottom</u> 2 mg/L
Suspended Solids (SS), mg/L (Depth-averaged)	44 mg/L or 120% of the upstream control station's SS at the same tide on the same day	49 mg/L or 130% of the upstream control station's SS at the same tide on the same day
Turbidity, NTU (Depth-averaged)	37.4 NTU or 120% of the upstream control station's turbidity at the same tide on the same day	46.2 NTU or 130% of the upstream control station's turbidity at the same tide on the same day



4.8 Event-Action Plans

Event-Action Plans are presented in Appendix F.

4.9 Monitoring Duration and Period

In-situ measurement was carried out at both mid-flood and mid-ebb at each location on a sampling day. Table 4.8 shows the schedule for impact water quality monitoring at Lung Kwu Chau.

Table 4.8 – Time Schedule of Water Quality Monitoring at Lung Kwu Chau
09 June and 08 July 2003

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	9 June ▼*	10	11 ▼	12	13 ■▼	14
15	16 ▼	17	18 ▼	19	20 ■▼	21
22	23 #	24	25 #	26	27 ■▼*	28
29	30 ▼	1 July	2 #	3	4 ■▼	5
6	7 ▼	8				

▼ = Water quality monitoring, ■ = Site inspection,

* = Monitoring (mid-flood at 09 June 2003 and mid-ebb at 27 June 2003) were cancelled due to bad weather,

= These monitoring days were cancelled due to no dredging works.

4.10 Marine Water Monitoring Results

The impact water quality measurement results are presented in Appendix B2.

The summary of marine water quality exceedances is shown in Table 4.9 and Table 4.10.

Table 4.9 Summary of Marine Water Quality Exceedances in this reporting month

Station	Exceedance Level	DO		Turbidity		SS	
		Flood	Ebb	Flood	Ebb	Flood	Ebb
C1	Action	0	0	0	0	0	0
	Limit	0	0	1	0	1	0
M1	Action	0	0	0	0	0	0
	Limit	0	0	1	0	1	0
M2	Action	0	0	0	1	0	0
	Limit	0	0	1	0	1	0
M3	Action	0	0	0	0	0	0
	Limit	0	0	1	0	1	0
C2	Action	1	0	0	0	0	0
	Limit	0	0	1	0	1	0
Total	Action	1	0	0	1	0	0
	Limit	0	0	5	0	5	0



Table 4.10 Daily Exceedance summary of marine water quality

09 June to 08 July 2003						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	9 June No exceedances in all WMP ^(*)	10	11 No exceedances in all WMP ^(*)	12	13 <u>At the mid-ebb (a.m.)</u> One exceedance (AL)* in Turbidity (M2)	14
15	16 No exceedances in all WMP ^(*)	17	18 No exceedances in all WMP ^(*)	19	20 <u>At the mid-flood (a.m.)</u> One exceedance (AL)* in DO (Surface and Middle) (C2)	21
22	23	24	25	26	27 <u>At the mid-flood (p.m.)</u> Five exceedances (AL)* in Turbidity (C1, M1, M2, M3 and C2) Five exceedances (AL)* in Suspended Solids (C1, M1, M2, M3 and C2)	28
29	30 No exceedances in all WMP ^(*)	1 July	2	3	4 No exceedances in all WMP ^(*)	5
6	7 No exceedances in all WMP ^(*)	8				

Figures in Bold demote marine water monitoring taken place
(^*) indicates WMP = Water Monitoring Parameters
(*) indicates AL = Action Level and (**) indicates LL = Limit Level

According to the summary of marine water monitoring results, eleven exceedances of Dissolved Oxygen were recorded in this reporting month. The results of other monitoring parameters were within Action/Limit Level in this reporting month.

4.11 Explanation of Exceedances

Monitoring Date	Tide	Exceedance parameters	Locations	Explanation	Implementation of Event and Action Plan
13/06/03	Mid-ebb	Turbidity	M2	After ET's investigation, it was found that no construction works were carried out. No visible foam, oil, grease, litter or other objectionable matter were observed near the construction site. Therefore, it has proved that the exceedance was not related to the construction work.	After discussing with the RE, the IE and the Contractor, it was concluded that no further mitigation measures should be taken since the exceedance was not works-related.
20/06/03	Mid-flood	Dissolved Oxygen	C2	After the ET's investigation and discussion between the IE and ET, it was found that the monitoring station C2 was up-stream control station during mid-flood and so that it has no evidence to prove that the exceedance of dissolved oxygen (Surface and Middle) was caused due to the construction works.	After discussing with the RE, the IE and the Contractor, it was concluded that no further mitigation measures should be taken since the exceedance was not works-related.
27/06/03	Mid-flood	Turbidity and Suspended Solids	C1, M1, M2, M3 and C2	After ET's investigation, it was found that no construction works were carried out. No visible foam, oil, grease, litter or other objectionable matter were observed near the construction site. During the monitoring, ET found that the wave was so strong that caused the introduction of settled solids from the seabed to the water column. Therefore, it has proved that the exceedance was caused due to strong wave but not work-related.	After discussing with the RE, the IE and the Contractor, it was concluded that no further mitigation measures should be taken since the exceedance was not works-related.



5.0 ECOLOGY MONITORING

5.1 Introduction

According to the EM&A manual, there will be small loss of backshore vegetation and grass/shrubland due to the construction of footpath to the catwalk. At the same time, the construction works also cause impact on the marine dolphin habitat near the north and east coast of Lung Kwu Chau.

In order to minimize the impact to an acceptable level, the implementation schedule of the recommended ecological mitigation measures is developed and stated at the Appendix A of EM&A manual. Implementation of these recommended mitigation measures will be monitored and audited during the construction stage.

5.2 Monitoring Procedure

During the weekly site inspection, ET monitored and audited the implementation of the recommended mitigation measures for terrestrial ecology and marine ecology following the site inspection checklist.

5.3 Monitoring Frequency and Schedule

Weekly site inspection for terrestrial ecology and marine ecology was carried by ET during the construction period. Four site inspections were undertaken in this reporting month (13, 20 and 27 June, and 4 July 2003).

Monthly Site inspection at 13 June 2003 was carried out by the Engineer's Representative, the IE, WKC&T and ET.

5.4 Result and Observation

A summary of the implementation status of the mitigation measures for terrestrial ecology and marine ecology on site inspections is presented in Appendix H. Photos for the surrounding terrestrial habitat (e.g. backshore vegetation and grass/shrubland) were shown in Photo 1 to Photo 10.

No disturbance to the terrestrial habitat and dolphin habitat due to construction work was observed in this reporting month.

6.0 WASTE MANAGEMENT

6.1 Waste Management Audit

Waste management audit was carried out by the ET on a weekly basis. A summary of the implementation status of the mitigation measures on waste management is presented in Appendix H.

6.2 Records of Waste Quantities

All types of wastes arising from the construction work are classified into the following:

- General refuses;
- Chemical waste;
- Construction & demolition (C&D) material.

The quantities of waste for disposal in this month are summarized in Table 6.1.



Table 6.1 Summary of Quantities of Waste for Disposal in this reporting month

Type of Waste	Quantity	Disposal Location
C&D Material (Inert) (m ³)	0	Nil
C&D material (Non-inert) (m ³)	0	Nil
General Refuse (m ³)	5	Public Refuse Collection Point
Chemical Waste (m ³)	0	Nil

6.3 Summary of dredging volume in this reporting month

The summary of daily dredging volume in this reporting month is summarized in Table 6.2.

Table 6.2 Summary of Daily Dredging Volume in this reporting month

Date	Dredging Volume (m ³)	Disposal Volume (m ³)
09/06/2003	0	0
10/06/2003	0	0
11/06/2003	0	0
12/06/2003	300	0
13/06/2003	200	0
14/06/2003	0	500
15/06/2003	0	0
16/06/2003	350	0
17/06/2003	150	0
18/06/2003	250	500
19/06/2003	250	0
20/06/2003	0	500
21/06/2003	0	0
22/06/2003	0	0
23/06/2003	0	0
24/06/2003	0	0
25/06/2003	0	0
26/06/2003	100	0
27/06/2003	400	0
28/06/2003	0	500
29/06/2003	0	0
30/06/2003	0	0
01/07/2003	0	0
02/07/2003	0	0
03/07/2003	0	0
04/07/2003	0	0
05/07/2003	0	0
06/07/2003	0	0
07/07/2003	0	0
08/07/2003	0	0
Total Volume	2000	2000

7.0 ENVIRONMENTAL AUDIT

7.1 Site Inspection

Weekly site inspections were carried out by the ET. Five site inspections were undertaken in this reporting month (13, 20 and 27 June, and 04 July 2003). Monthly Site inspection at 13 June 2003 was carried out by the Engineer's Representative, the IE, KWC&T and ET. A summary of the implementation status of the mitigation measures on site inspections is presented in Appendix H.



7.2 Status of Environmental Licensing and Permitting

All permits/licenses obtained in this reporting month are summarized in Table 7.1.

Table 7.1 Summary of environmental licensing and permit status

Description	Permit No.	Valid Period		Section
		From	To	
Environmental Permit	EP-150/2002/A	29/04/03	---	Whole work site
Marine Dumping Permit	EP/MD/04-005	15/05/03	14/11/03	• Hopper barge and Motor tug
Construction Noise Permit	GW-TW0136-03	01/05/03	31/10/03	• One Derrick Barge (CNP 061) • One Tug boat (CNP 221)

7.3 Implementation Status of Environmental Mitigation Measures

WKC&T has been implementing the required environmental mitigation measures according to Implementation of Mitigation Measures stated in the Appendix A of EM&A manual. A summary of the implementation status of the mitigation measures is presented in Appendix H. The following observations were made during site inspection:

Water Quality

- Daily dredging rate was kept below 500m³/day during the dredging period;
- Use of a closed grab dredger was observed during dredging works. The grab was sealed tightly while being lifter and therefore no spillage was observed;
- Silt curtain was used to enclose the grab while dredging works are in progress. Silt curtain used were well maintained and no leakage of suspended matters were observed;
- All vessels were kept tidy and no oil or other substances were washed overboard;
- No litter and loose objects, e.g. tools, were left lying around.

Terrestrial Ecology and Marine Ecology

- No damage of surrounding natural habitats was observed;
- No open fires were observed within the work site boundary;
- No disturbance to the dolphin habitat was observed.

Waste Management

WKC&T has been implementing most mitigation measures on waste management. The Contractor was reminded to provide more manpower to maintain good wash management, such as recycling of waste before disposal.

7.4 Recommendations on site inspection findings

Based on the site inspection findings, the recommendations are as below:

- Use well-maintained silt curtain and closely grab dredger during dredging works;
- Use quiet or 'silenced' plant equipment;
- Avoid the use of high-speed vessels where possible, or slow the high-speed vessels to under 10 knots which is the speed restriction for all marine traffic inside the Marine Park Boundary;
- Check the work site boundaries regularly to ensure that no damage occurs to surrounding natural habitats;
- Construction activities shall not cause foam, oil, grease, scum, litter or other objectionable matter to be present on the water within the site;
- Maintain good site practices and waste management at the site;

7.5 Implementation Status of Event and Action Plan

There were exceedances in Dissolved Oxygen, Turbidity and Suspended Solids recorded in this monitoring month. Since all exceedances were not work-related, no further mitigation measures were required.



7.6 Implementation Status of Environmental Complaint Handling

No written or verbal complaints had been received during this monitoring month.

7.7 Implementation of Notification of Summons and Prosecution

There was no notification of summons respect to environmental issues registered in this reporting month. No prosecutions related to environmental issues were received.

8.0 CONCLUSION

Impact monitoring of marine water quality was carried out at designated locations in accordance with the EM&A Manual in this reporting month.

Exceedances of Turbidity and Suspended solids level were recorded on 13 and 27 June 2003 when no construction activities were taken placed. Therefore, the exceedances at these two monitoring days were not related to the construction work but caused by local impact.

Dissolved Oxygen Level (Surface and Middle) exceedance at control station C2 was also recorded during mid-flood at 20 June 2003. Since C2 was upstream control station during mid-flood on that monitoring day, the exceedance was not related to the construction works.

According to the ET weekly site inspections and IE monthly site audit carried out this month, it indicated that site practices of the WKC&T were generally undertaken in an environmentally acceptable manner and the overall site environmental performance was satisfactory.

9.0 FUTURE KEY ISSUES

9.1 Upcoming EM&A Schedule

Since dredging activities and rock filling for jetty foundation, which has the potential to result in a significant environmental impact, were completed on 04 July 2003. Dredging for approach channel will be started in September 2003. Therefore, no marine water quality monitoring will be processed in the coming reporting month. The Proposed EM&A program in coming two reporting months are presented as following table:

Table 9.1 Upcoming EM&A Schedule

Type of Monitoring	09 July to 08 Aug 2003	09 Aug to 08 Sept 2003
Marine Water Quality	---	---
Site Inspection	11/07, 18/07, 25/07, 01/08, 08/08	15/08, 22/08, 29/08, 05/09

9.2 Upcoming construction works schedule in coming two month

The major construction works planned to be carried out in next month and their possible impact is tabulated (Table 9.2) for reference.

Table 9.2 – Construction Plan in the coming two month

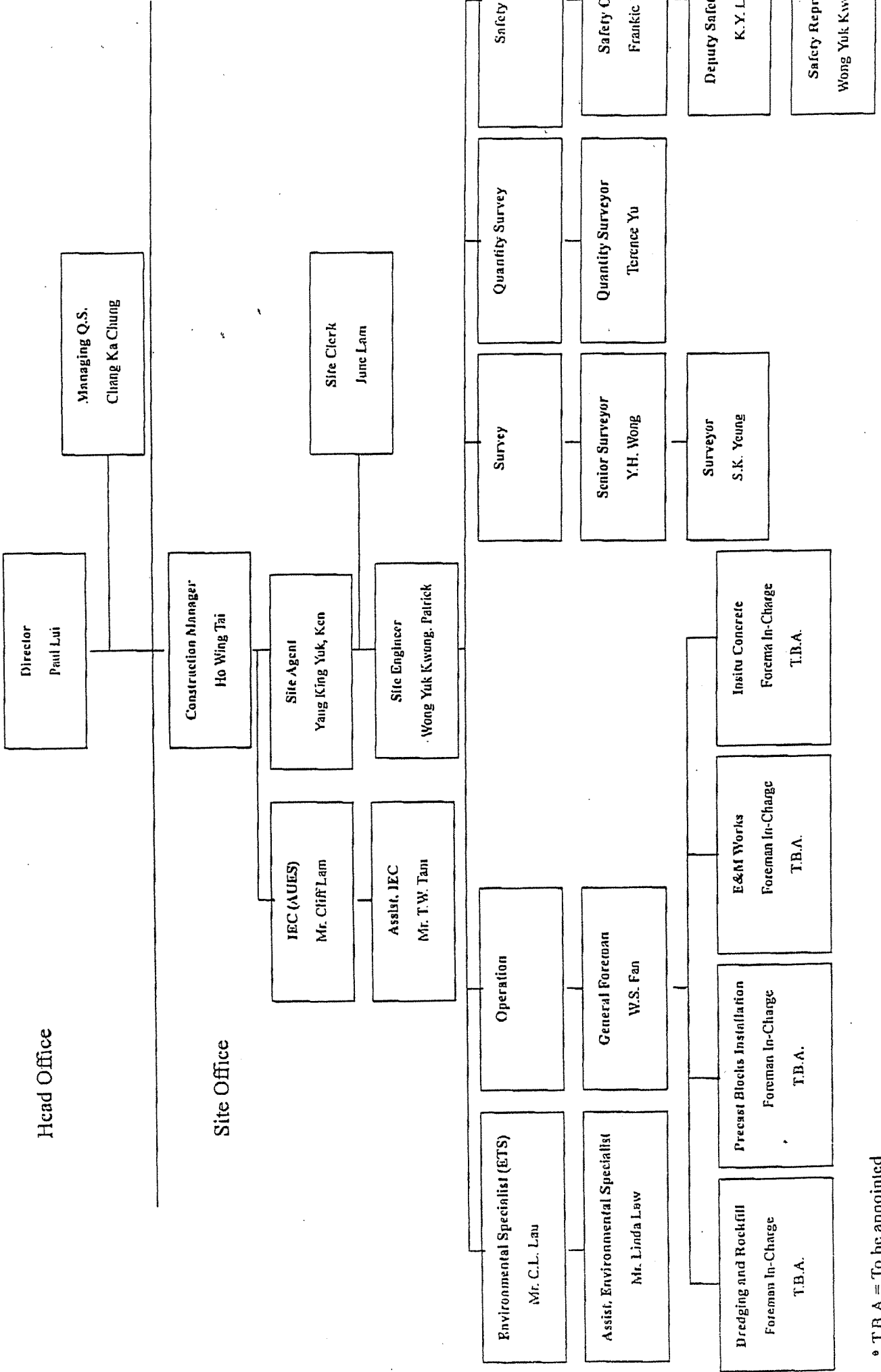
Construction Work	Activities
Jetty Construction	<ul style="list-style-type: none"> Setting pc blocks of jetty
Catwalk Construction	<ul style="list-style-type: none"> Pipe foundation Setting pc blocks of catwalk
Footpath Construction	<ul style="list-style-type: none"> Excavation Cast foundation Cast slab



Appendix A

Organization Chart

Construction of Jetty at Lung Kwu Chau
Organization Chart (Revision No.1)



* T.B.A. = To be appointed



Appendix B1

Calibration Certificates for Impact Monitoring Equipments



Performance Check of Salinity Meter

Equipment Ref. No. : EW/004/01 Manufacturer : YSI
Model No. : 30M Serial No. : 97J0300AA
Date of Calibration : 21 March 03 Due Date : 20 June 03

Ref. No. of Salinity Standard used (30ppt)

5437

Salinity Standard (ppt)	Measured Salinity (ppt)	Difference %
30	29.6	1.33

Acceptance Criteria

Difference : <10 %

The salinity meter complies * / ~~does not comply~~ * with the specified requirements and is deemed acceptable * / ~~unacceptable~~ * for use. Measurements are traceable to national standards.

Checked by : Linda Law

Approved by : [Signature]



Performance Check of Salinity Meter

Equipment Ref. No. : EW/004/01 Manufacturer : YSI
Model No. : 30 M Serial No. : 97 J 0300 AA
Date of Calibration : 19 June 2003 Due Date : 18 Sept. 2003

Ref. No. of Salinity Standard used (30ppt)

J 137

Salinity Standard (ppt)	Measured Salinity (ppt)	Difference %
30	30.2	0.67

Acceptance Criteria

Difference : <10 %

The salinity meter complies * / ~~does not comply~~ * with the specified requirements and is deemed acceptable * / ~~unacceptable~~ * for use. Measurements are traceable to national standards.

Checked by : Linda Lam

Approved by : [Signature]



Internal Calibration Report of Turbidimeter

Equipment Ref. No. : ET/0505/004 Manufacturer : HACH
Model No. : 2100P Serial No. : 951100009130
Date of Calibration : 23 May 03 Calibration Due : 27 August 03

Data

<u>4.95</u> 0 - 10 NTU Gelex Vial	<u>54.8</u> 10 - 100 NTU Gelex Vial	<u>550</u> 100 - 1000 NTU Gelex Vial
<u>4.90</u>	<u>53.6</u>	<u>548</u>

The equipment complies * / does not comply * with the specified requirements and is deemed acceptable * / ~~unacceptable~~ * for use.

* Delete as appropriate

Calibrated by : *Jin C.K. Yang* Approved by : *Ginda Law*



Internal Calibration Report of Dissolved Oxygen Meter

Equipment Ref. No. : ETW/003/001 Manufacturer : YSI
 Model No. : 95 Serial No. : 97H0407 AB
 Date of Calibration : 30 June 2003 Calibration Due Date : 29 Sept. 2003

Ref. No. of Reference Thermometer : ET/2403/01
 Ref. No. of Potassium Dichromate : ET/0520/003/02

Temperature Verification

	Temperature (°C)
Thermometer reading	20.0
Meter reading	20.1

Linearity Checking

Purging time, min	DO meter reading, mg/L			Winkler Titration result, mg/L		
	1	2	Average	1	2	Average
2	7.13	7.10	7.12	7.01	7.04	7.03
5	5.22	5.21	5.22	5.21	5.18	5.20
10	2.45	2.44	2.45	2.47	2.46	2.47
Linear regression coefficient	1.000					

Zero Point Checking

DO meter reading, mg/L	0.00
------------------------	------

Salinity Checking

Salinity (ppt)	DO meter reading, mg/L			Winkler Titration result, mg/L		
	1	2	Average	1	2	Average
10	7.12	7.08	7.10	7.06	7.03	7.05
30	6.89	6.90	6.90	6.88	6.91	6.90

Acceptance Criteria

- (1) Differenc between temperature readings from temperature sensor of DO probe and reference thermometer : < 0.5 °C
- (2) Linear regression coefficient : < 0.99
- (3) Zero checking: 0.0mg/L
- (4) Difference (%) of DO content from the meter reading and by winkler titration : ± 5%

The equipment complies * / does not comply * with the specified requirements and is deemed acceptable * / unacceptable * for use.

* Delete as appropriate

Calibrated by : Linda Lam

Approved by : [Signature]



Appendix B2
Impact Monitoring Results

Date: 13-06-03

Station	Duration	Ambient Temp (°C) / Weather Condition	Water Temp (°C)			Salinity (ppt)			Dissolved Oxygen, DO (mg/L)			Dissolved Oxygen Saturation, DOS (%)			Turbidity (NTU)			Suspended Solids, SS (mg/L)			Depth Ave. (S,M,B)																																
			S	M	B	S	M	B	S	M	B	S	M	B	S	M	B	S	M	B																																	
																						1 st	2 nd	Ave.	1 st	2 nd	Ave.	1 st	2 nd	Ave.	1 st	2 nd	Ave.	1 st	2 nd	Ave.																	
C1	16:51-19:10	26°C, Rainy	27.0	27.1	27.3	14.7	14.7	14.7	19.0	18.9	19.0	22.7	22.8	22.8	6.33	6.30	6.32	6.17	6.14	6.16	6.24	5.51	5.53	5.52	83.1	82.6	82.9	89.9	89.5	89.7	80.3	80.7	80.5	10.6	10.7	10.7	8.78	8.93	8.86	22.3	21.9	22.1	13.9	9.0	9.0	8.0	8.0	8.3	8.2	19	18	19	11.9
	19:35-19:49	26°C, Rainy	26.9	27.1	27.3	16.0	15.9	16.0	19.7	19.8	19.8	23.6	23.4	23.5	5.82	5.79	5.81	5.61	5.63	5.62	5.72	5.40	5.37	5.39	86.0	85.5	85.8	83.2	83.4	83.3	76.2	77.9	78.1	15.7	15.3	15.5	12.0	11.5	11.8	17.7	17.6	17.7	15.0	16	14	15	10	9.8	9.9	13	15	14	13.0
	18:21-18:33	26°C, Rainy	27.1	27.2	27.2	16.8	16.9	16.9	20.2	20.0	20.1	25.3	25.2	25.3	5.79	5.77	5.78	5.42	5.40	5.41	5.60	5.21	5.25	5.23	83.1	82.6	82.9	78.0	77.6	77.8	74.5	75.1	74.8	18.9	19.2	19.1	20.3	20.5	20.4	51.6	52.5	52.1	30.5	16	17	17	21	19	20	45	49	47	27.8
M3	18:09-18:20	26°C, Rainy	27.0	27.4	27.4	16.5	16.7	16.6	---	---	---	23.4	23.3	23.4	5.84	5.86	5.85	---	---	---	5.85	5.41	5.43	5.42	83.8	84.2	84.0	---	---	---	78.7	78.9	78.8	13.4	13.7	13.6	---	---	---	18.6	18.6	18.6	16.1	10	11	11	---	---	---	16	14	15	12.8
	18:00-18:08	26°C, Rainy	27.1	27.3	27.3	15.0	14.9	15.0	---	---	---	22.1	22.1	22.1	5.91	5.94	5.93	---	---	---	5.93	5.36	5.38	5.37	85.5	86.1	85.8	---	---	---	77.8	78.1	78.0	11.2	11.4	11.3	---	---	---	16.3	16.0	16.2	13.7	12	11	12	---	---	---	13	11	12	11.8

Mid-Flood

Station	Duration	Ambient Temp (°C) / Weather Condition	Water Temp (°C)			Salinity (ppt)			Dissolved Oxygen, DO (mg/L)			Dissolved Oxygen Saturation, DOS (%)			Turbidity (NTU)			Suspended Solids, SS (mg/L)			Depth Ave. (S,M,B)																																
			S	M	B	S	M	B	S	M	B	S	M	B	S	M	B	S	M	B																																	
																						1 st	2 nd	Ave.	1 st	2 nd	Ave.	1 st	2 nd	Ave.	1 st	2 nd	Ave.	1 st	2 nd	Ave.																	
C1	11:50-12:05	26°C, Drizzle	27.2	27.2	27.4	8.5	8.5	8.5	10.9	10.9	10.9	19.2	19.2	19.2	6.13	6.15	6.14	6.00	6.01	6.01	6.08	5.43	5.46	5.45	88.8	89.1	89.0	87.1	87.2	87.2	76.7	79.2	79.0	11.1	11.0	11.1	10.1	9.68	9.90	28.0	28.0	28.0	16.3	9.3	9.5	9.4	9.0	9.0	30	29	30	16.0	
	11:35-11:48	26°C, Drizzle	27.1	27.2	27.4	9.4	9.5	9.5	12.7	12.8	12.7	19.5	19.4	19.5	5.29	5.26	5.28	5.78	5.79	5.77	5.53	5.37	5.33	5.38	80.4	81.0	80.7	83.6	83.1	83.4	76.0	77.3	77.7	28.0	27.6	27.8	11.5	11.9	11.7	11.4	11.6	11.5	17.0	25	23	24	10	11	11	11	9.8	9.5	9.7
M2	11:21-11:33	26°C, Drizzle	27.0	27.1	27.3	16.1	16.0	16.1	16.8	16.9	16.9	19.0	19.0	19.0	5.49	5.46	5.48	5.45	5.48	5.46	5.47	5.06	5.10	5.08	79.3	78.8	79.1	78.8	79.0	78.9	73.4	73.9	73.7	15.4	16.0	15.7	22.1	21.4	21.8	76.3	75.5	75.9	37.8	12	13	13	16	15	16	60	64	62	30.0
	11:11-11:20	26°C, Drizzle	27.1	27.3	27.3	15.2	15.3	15.3	---	---	---	19.2	19.1	19.2	5.52	5.56	5.54	---	---	---	5.54	5.20	5.23	5.22	80.6	79.8	80.2	---	---	---	75.5	76.1	75.8	11.3	11.0	11.2	---	---	---	19.1	19.6	19.4	15.3	14	13	14	---	---	---	16	14	15	14.3
C2	11:00-11:10	26°C, Drizzle	27.2	27.3	27.3	13.1	13.1	13.1	---	---	---	19.2	19.2	19.2	5.79	5.75	5.74	---	---	---	5.74	5.23	5.27	5.25	82.6	83.1	82.9	---	---	---	75.5	76.2	75.9	9.26	9.45	9.40	---	---	---	14.5	14.3	14.4	11.9	8.5	8.8	8.7	---	---	---	10	11	11	9.6

Mid-Ebb

Remark: The bolded data (Turbidity at M2) exceeded Action Level but not work-related after ET's investigation.



Date: 04-07-03

Mid-Flood

Station	Duration	Ambient Temp (°C) / Weather Condition	Water Temp (°C)						Salinity (ppt)						Dissolved Oxygen, DO (mg/L)						Dissolved Oxygen Saturation, DOS (%)						Turbidity (NTU)						Suspended Solids, SS (mg/L)																				
			S		M		B		S		M		B		S		M		B		S		M		B		S		M		B		S		M		B																
			1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd																	
C1	09:30 - 09:34	29°C / Cloudy	15.0	29.6	28.2	27.3	4.1	4.1	21.9	21.9	25.7	25.7	25.7	25.7	5.69	5.61	5.65	4.20	4.12	4.16	4.81	3.50	3.42	3.46	76.8	76.0	76.4	60.8	60.1	60.5	51.4	50.6	51.0	14.8	14.1	14.5	9.64	9.55	9.60	39.7	39.0	39.4	21.2	12	13	13	9.0	8.8	8.9	34	36	35	19
	09:16 - 09:27	28°C / Cloudy	13.2	29.5	27.6	26.4	3.3	3.3	23.8	23.8	18.6	18.6	18.6	18.6	5.63	5.75	5.79	4.65	4.56	4.61	5.20	3.91	3.83	3.87	82.8	82.0	82.4	65.1	64.4	64.8	55.6	55.0	55.3	15.0	14.2	14.6	23.1	22.2	22.7	19.7	19.1	19.4	18.9	16	14	15	19	18	19	18			
	09:00 - 09:13	29°C / Cloudy	6.4	28.9	28.9	28.5	8.1	8.1	9.2	9.2	14.4	14.4	14.4	14.4	5.86	5.80	5.83	5.24	5.30	5.27	5.55	4.65	4.57	4.61	82.2	81.3	81.8	73.8	74.4	74.1	64.7	64.0	64.4	10.5	10.3	10.1	10.0	10.0	10.0	17.7	17.0	17.4	12.6	11	10	11	9.5	9.0	9.3	13	11	12	11
M3	09:46 - 09:57	29°C / Cloudy	6.8	28.8	28.5	28.2	7.9	7.9	14.6	14.6	17.9	17.9	17.9	17.9	5.63	5.73	5.68	4.69	4.61	4.65	5.17	4.35	4.26	4.31	78.4	79.2	78.8	65.7	65.0	65.4	60.2	59.4	59.8	10.4	11.1	10.8	19.1	18.3	18.7	16.4	15.6	16.0	15.2	10	12	11	16	15	16	18	16	17	15
	09:39 - 09:43	29°C / Cloudy	5.2	29.2	28.8	28.5	7.5	7.5	7.5	7.5	14.3	14.3	14.3	14.3	6.46	6.40	6.43	---	---	---	6.43	5.09	5.02	5.06	87.8	87.1	87.5	---	---	---	71.3	70.5	70.9	10.2	10.0	10.1	---	---	---	9.44	9.38	9.40	9.8	9.0	9.3	9.2	---	---	---	8.5	9.0	8.8	9.0

Mid-Ebb

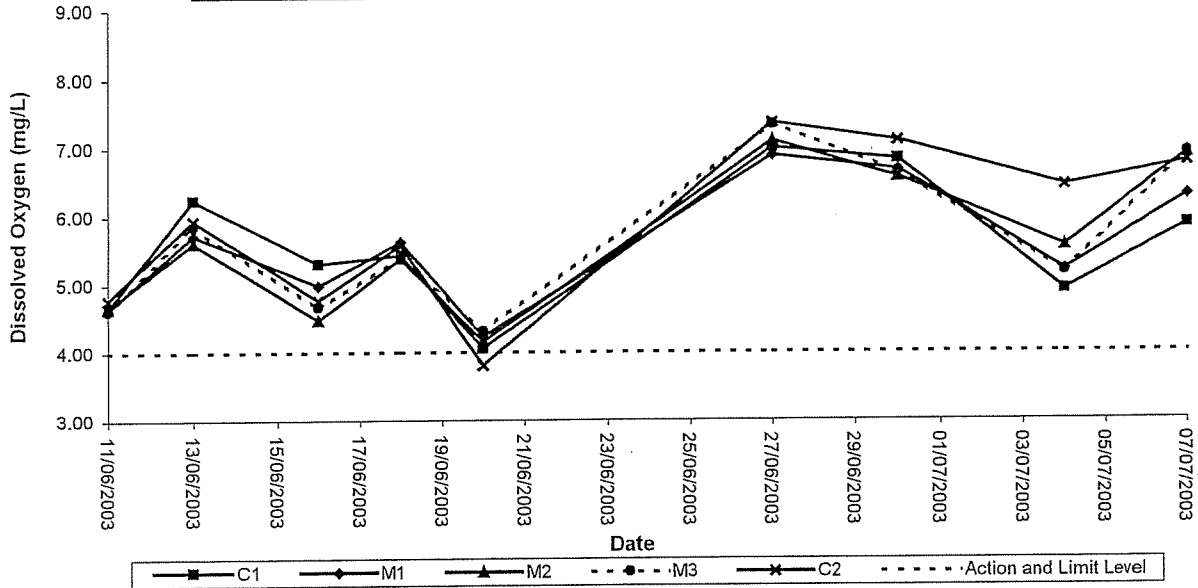
Station	Duration	Ambient Temp (°C) / Weather Condition	Water Temp (°C)						Salinity (ppt)						Dissolved Oxygen, DO (mg/L)						Dissolved Oxygen Saturation, DOS (%)						Turbidity (NTU)						Suspended Solids, SS (mg/L)																				
			S		M		B		S		M		B		S		M		B		S		M		B		S		M		B		S		M		B																
			1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd																	
C1	15:34 - 15:47	30°C / Cloudy	14.2	30.6	28.0	28.5	7.0	7.0	18.0	18.0	24.1	24.1	24.1	24.1	6.37	6.30	6.34	5.62	5.54	5.58	5.96	4.11	4.03	4.07	91.9	91.0	91.5	85.9	85.1	85.5	58.9	58.1	58.5	8.59	8.50	8.50	14.3	13.6	14.0	19.6	18.8	19.2	13.9	9.0	9.3	9.2	15	13	14	17	17	13	
	15:20 - 15:32	30°C / Cloudy	13.2	30.7	29.1	28.6	6.9	6.9	17.7	17.7	20.2	20.2	20.2	20.2	6.26	6.20	6.23	4.77	4.70	4.74	5.49	3.91	3.83	3.87	90.3	89.5	89.9	86.4	85.7	86.0	56.7	56.0	56.4	9.13	9.05	9.10	15.2	14.4	14.8	21.2	20.4	20.6	14.9	8.5	8.8	8.7	12	14	13	19	21	20	14
	15:06 - 15:18	30°C / Cloudy	7.2	30.0	29.3	28.0	14.2	14.2	16.8	16.8	23.4	23.4	23.4	23.4	5.52	5.60	5.59	5.09	5.00	5.05	5.31	4.32	4.22	4.27	80.1	81.0	80.5	72.7	72.0	72.4	61.0	60.1	60.6	12.1	11.7	11.9	23.9	23.0	23.5	28.9	28.1	28.5	21.3	9.8	10.0	9.9	24	25	24	22	23	19	
M3	14:52 - 15:05	30°C / Cloudy	5.8	30.5	29.5	29.5	13.1	13.1	13.1	13.1	16.5	16.5	16.5	16.5	5.97	5.90	5.94	---	---	---	5.94	5.16	5.10	5.13	84.8	84.1	84.5	---	---	---	73.7	73.0	73.4	6.90	6.82	6.90	---	---	---	8.62	8.54	8.60	7.80	7.0	7.3	7.2	---	---	---	8.8	8.5	8.7	8.0
	14:40 - 14:50	30°C / Cloudy	5.8	31.6	30.0	30.0	11.4	11.4	11.4	11.4	16.2	16.2	16.2	16.2	6.01	6.10	6.06	---	---	---	6.06	5.22	5.13	5.18	87.8	88.6	88.2	---	---	---	73.9	73.0	73.5	8.91	8.83	8.90	---	---	---	7.38	7.27	7.30	8.10	8.0	7.8	7.9	---	---	---	6.5	6.5	6.5	7.2



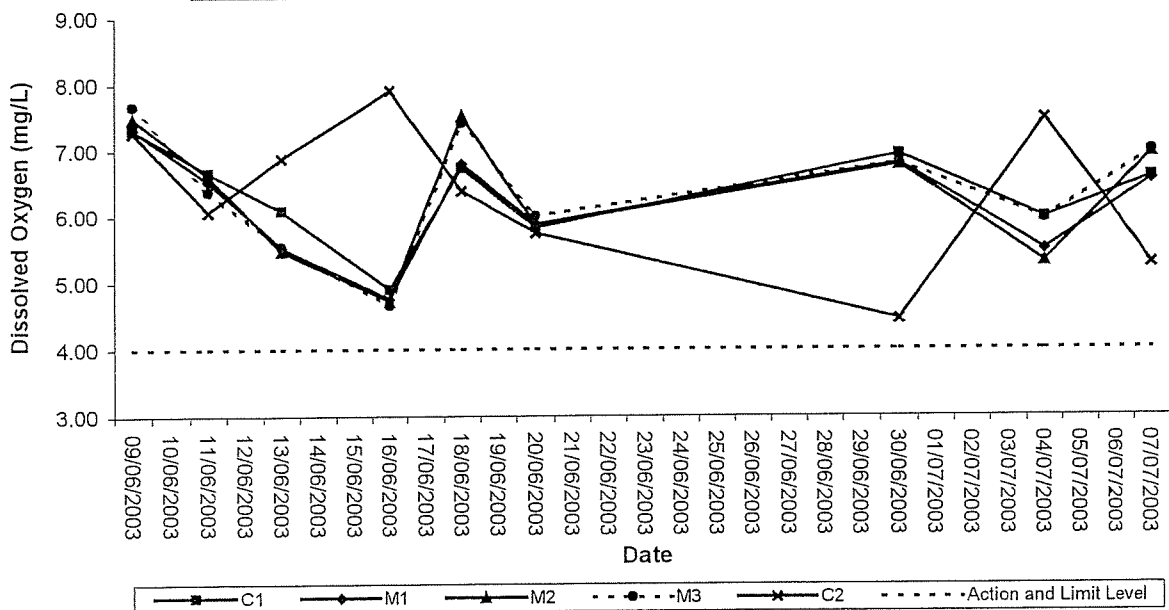
Appendix C
Graphical Plots of Impact Monitoring Data



Dissolved Oxygen Level (Surface and Middle) at Mid-Flood Tide

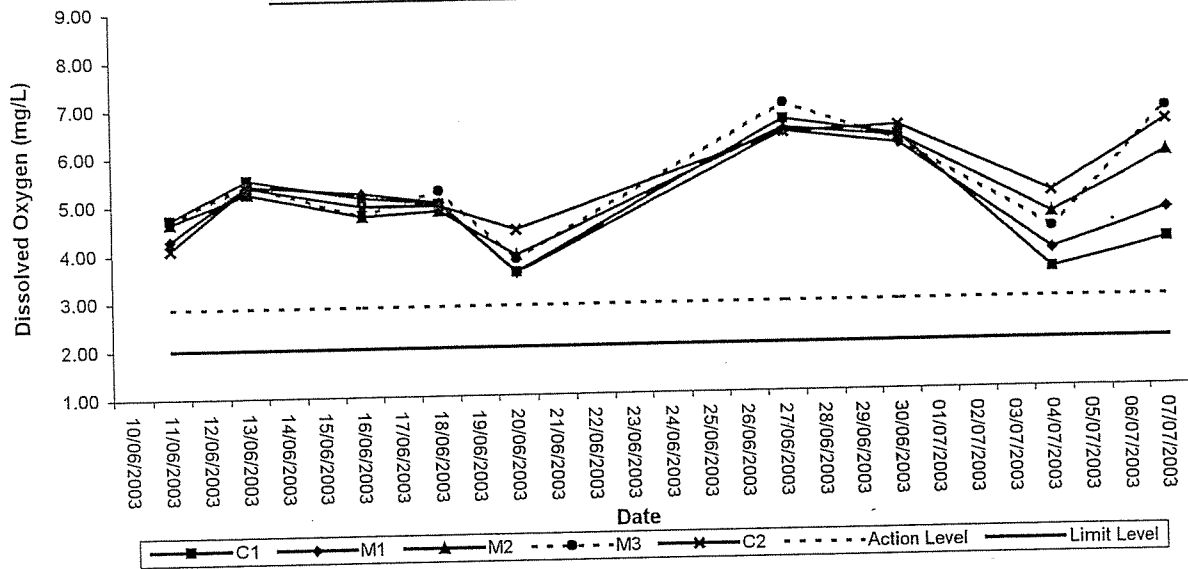


Dissolved Oxygen Level (Surface and Middle) at Mid-Ebb Tide

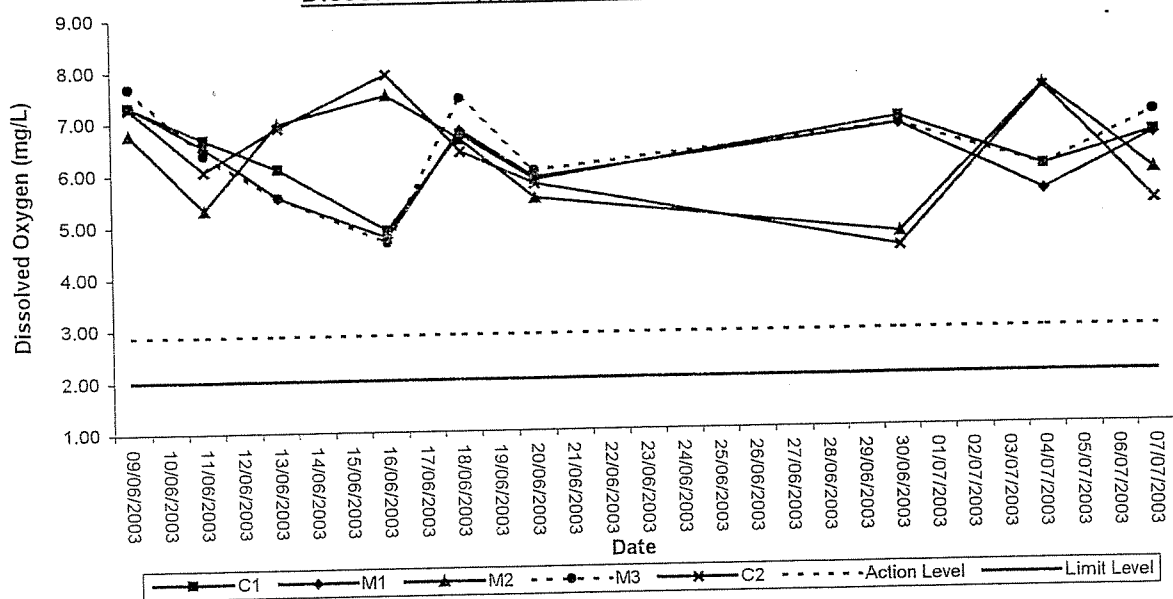




Dissolved Oxygen Level (Bottom) at Mid-Flood Tide

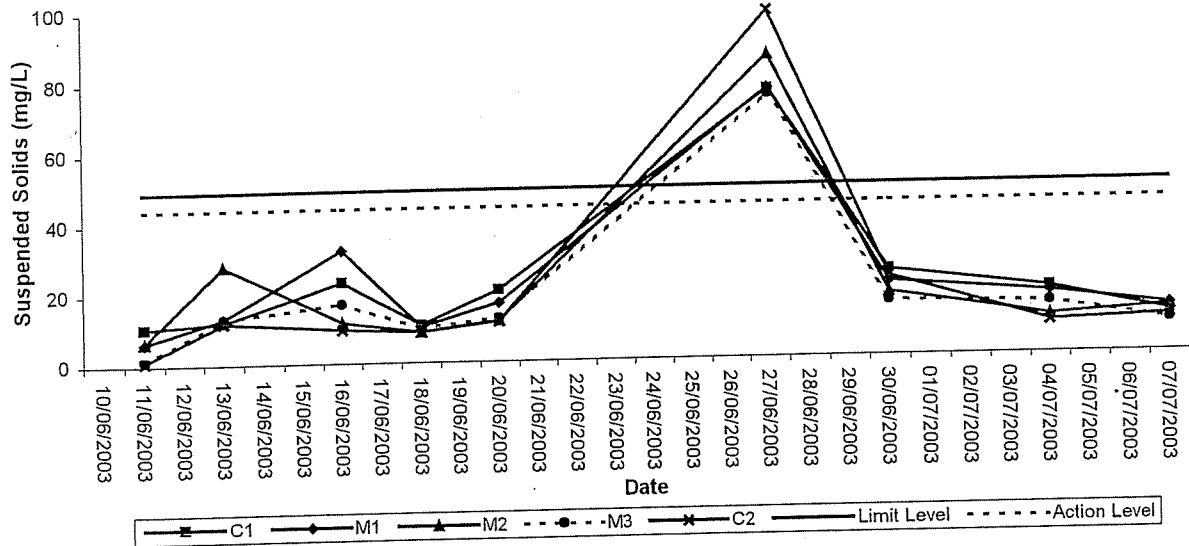


Dissolved Oxygen Level (Bottom) at Mid-Ebb Tide

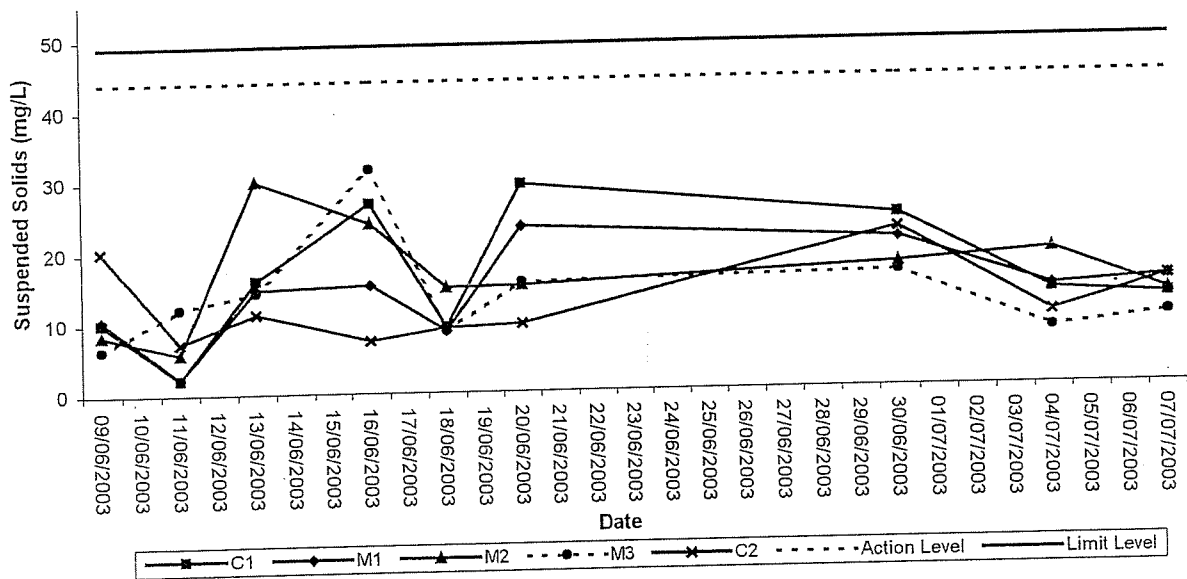




Suspended Solids (Depth-average) at Mid-Flood Tide

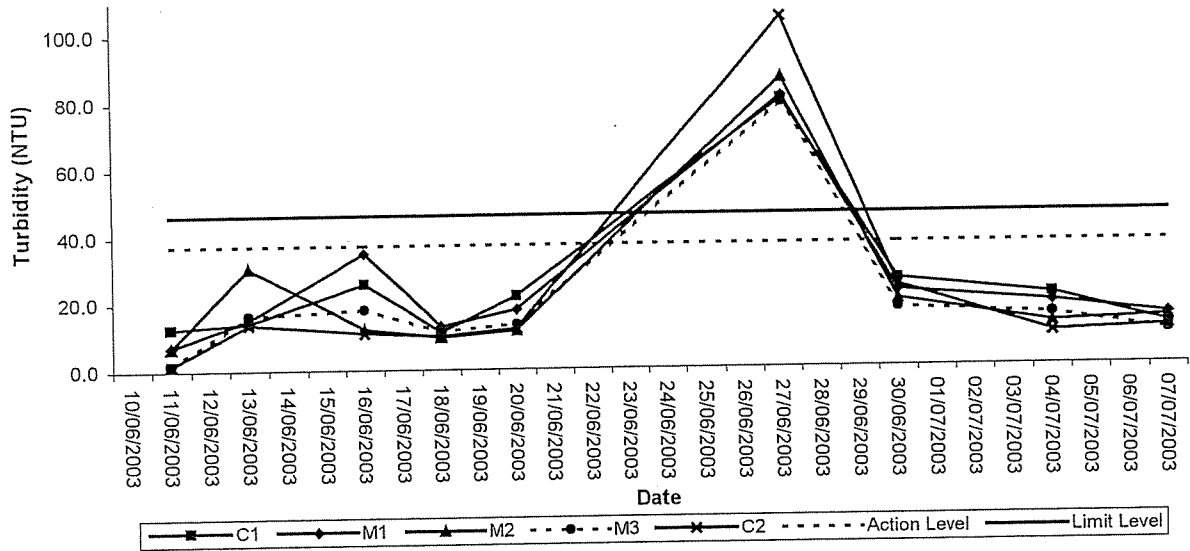


Suspended Solids (Depth-average) at Mid-Ebb Tide

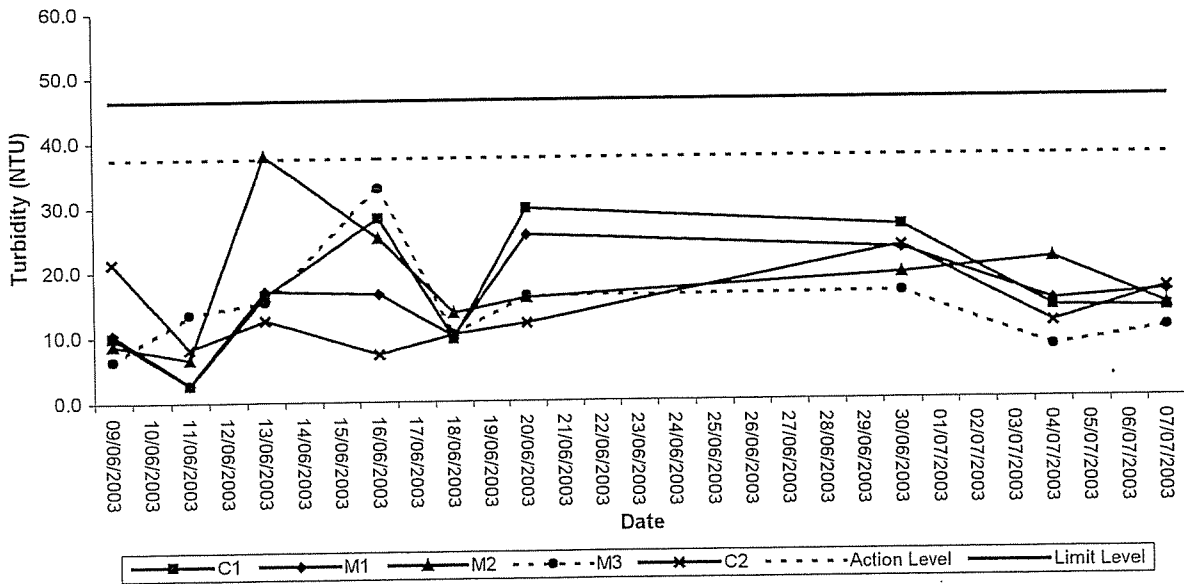




Turbidity (Depth-average) at Mid-Flood Tide



Turbidity (Depth-average) at Mid-Ebb Tide





Appendix D

Weather Condition during Impact Monitoring



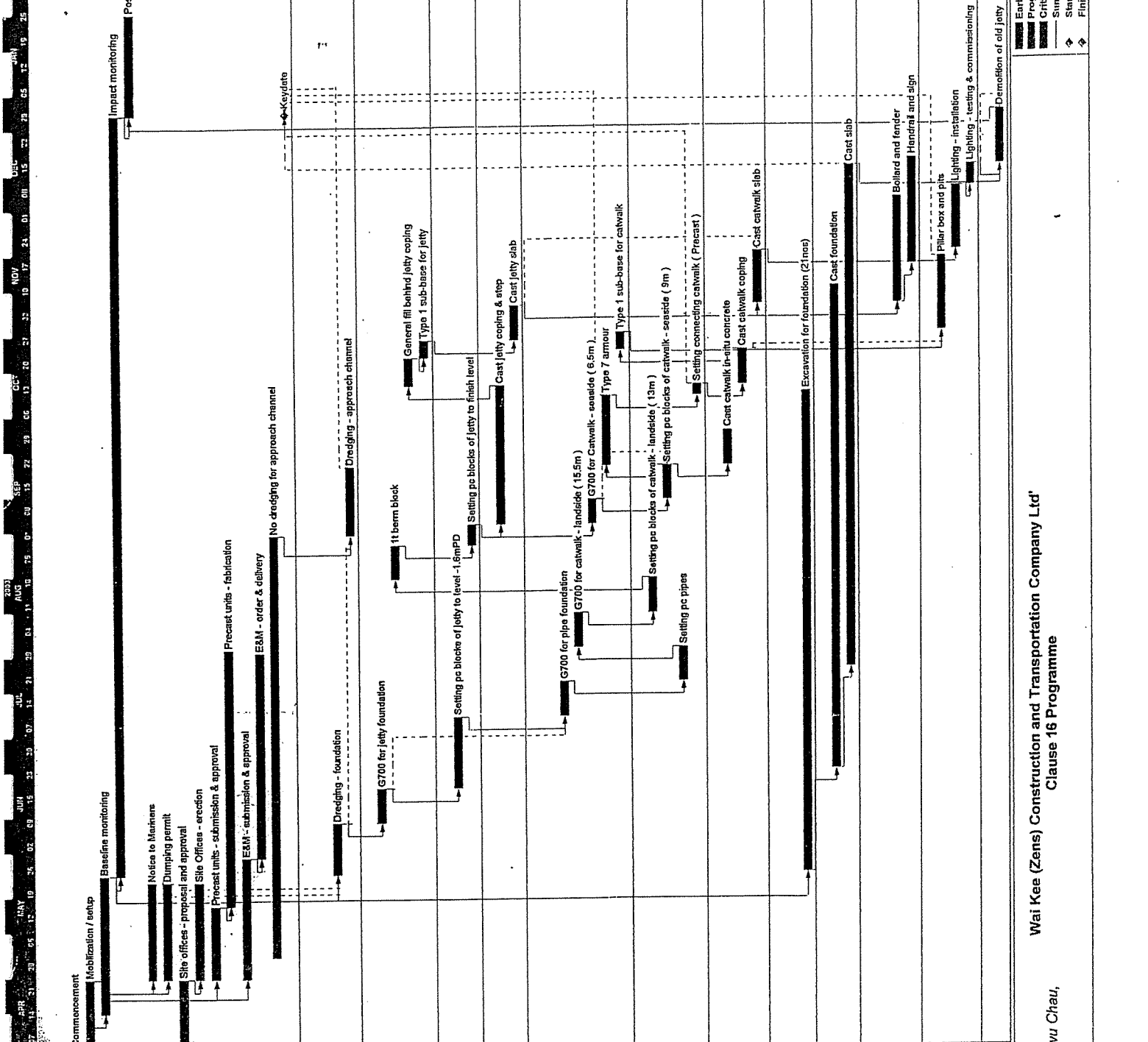
Weather Condition

Date	Rainfall (mm)	Max. Temp (°C)	Min. Temp. (°C)	Relative Humidity (%)	Weather Condition
09/06/03	128.1	27.0	24.8	94	Cloudy
10/06/03	46.7	27.9	24.2	95	Rainy
11/06/03	134.3	28.2	24.3	91	Rainy
12/06/03	6.4	29.2	25.5	89	Cloudy
13/06/03	22.7	27.3	23.9	92	Rainy
14/06/03	21.2	28.4	24.0	89	Rainy
15/06/03	14.1	27.6	25.5	92	Cloudy
16/06/03	29.1	25.8	24.6	93	Cloudy
17/06/03	-	30.3	24.3	68	Fine
18/06/03	-	31.8	26.0	75	Sunny
19/06/03	-	33.3	27.5	75	Sunny
20/06/03	0.6	29.2	27.6	86	Cloudy
21/06/03	34.6	28.4	25.1	90	Rainy
22/06/03	5.4	30.1	25.6	83	Cloudy
23/06/03	Trace	31.1	27.5	79	Cloudy
24/06/03	-	31.9	28.1	75	Cloudy
25/06/03	1.9	30.9	27.5	77	Cloudy
26/06/03	3.3	30.9	28.0	79	Cloudy
27/06/03	1.2	30.4	28.3	78	Cloudy
28/06/03	8.6	31.2	24.8	81	Cloudy
29/06/03	Trace	31.9	28.1	75	Cloudy
30/06/03	0.1	32.7	28.0	75	Cloudy
01/07/03	7.7	32.1	26.7	76	Rainy
02/07/03	-	32.7	27.8	72	Cloudy
03/07/03	-	33.6	27.8	68	Fine
04/07/03	-	33.3	28.0	70	Fine
05/07/03	-	33.1	28.2	70	Clear
06/07/03	-	32.4	28.3	73	Clear
07/07/03	Trace	33.4	28.1	72	Clear
08/07/03	1.5	33.1	26.9	75	Cloudy



Appendix E

Construction Programme of the Project



Code	Description	Start	Finish
PR.1000	Commencement	04/04/03	24/03/03
PR.1010	Mobilization / setup	21/04/03	24/03/03
PR.2000	Baseline monitoring	40/15/03	24/03/03
PR.2003	Impact monitoring	219/25/03	28/03/03
PR.2007	Post project monitoring	28/30/03	26/01/04
PR.2100	Notice to Mariners	28/25/03	22/05/03
PR.2200	Dumping permit	28/25/03	22/05/03
PR.3000	Site offices - proposal and approval	21/04/03	24/03/03
PR.4000	Site Offices - erection	28/25/03	22/05/03
PR.4100	Precast units - fabrication	75/18/03	29/07/03
PR.5000	E&M - submission & approval	35/25/03	29/05/03
PR.5000	E&M - order & delivery	60/30/03	28/07/03
PR.5000	No dredging for approach channel	123/01/03	31/01/03
PR.5000	Keydata	0	28/03/03
DEMOLITION			
JT.1000	Dredging - foundation	15/25/03	09/01/03
JT.1100	Dredging - approach channel	20/01/03	20/09/03
ROCKFILL			
JT.2000	G700 for jetty foundation	10/09/03	18/01/03
JT.2200	11 berm block	10/19/03	28/08/03
JT.2300	General fill behind jetty coping	8/14/03	21/02/03
JT.2400	Type 1 sub-base for jetty	5/22/03	26/02/03
PRECAST UNITS			
JT.3000	Setting pre blocks of jetty to level -1.6mPD	21/19/03	09/01/03
JT.3005	Setting pre blocks of jetty to finish level	6/29/03	03/09/03
R.C. WORKS			
JT.4000	Cast jetty coping & step	40/04/03	13/02/03
JT.4010	Cast jetty slab	10/27/03	05/01/03
CATWALK			
JT.2010	G700 for pipe foundation	10/10/03	19/07/03
JT.2020	G700 for catwalk - landside (15.5m)	10/30/03	08/08/03
JT.2025	G700 for Catwalk - seaside (6.5m)	7/04/03	10/09/03
JT.2100	Type 7 armour	20/21/03	10/02/03
JT.2410	Type 1 sub-base for catwalk	5/24/03	28/02/03
PRECAST UNITS			
JT.3010	Setting pre blocks of catwalk - landside (13m)	10/09/03	18/08/03
JT.3015	Setting pre blocks of catwalk - seaside (9m)	10/11/03	20/09/03
JT.3020	Setting pre pipes	10/20/03	25/07/03
JT.3030	Setting connecting catwalk (Precast)	3/11/03	13/02/03
R.C. WORKS			
JT.4015	Cast catwalk in-situ concrete	10/21/03	30/09/03
JT.4020	Cast catwalk coping	10/14/03	23/02/03
JT.4030	Cast catwalk slab	15/08/03	20/01/03
EXCAVATION			
EP.1000	Excavation for foundation (21nos)	140/25/03	11/02/03
R.C. WORKS			
EP.2000	Cast foundation	140/24/03	10/01/03
EP.3000	Cast slab	144/24/03	14/02/03
MISC			
Jetty Furniture			
JT.5000	Bollard and fender	30/08/03	05/02/03
JT.5050	Handrail and sign	30/17/03	16/02/03
E&M			
JT.6000	Pillar box and pits	21/25/03	18/01/03
JT.6100	Lighting - installation	18/21/03	08/02/03
JT.6150	Lighting - testing & commissioning	8/09/03	14/02/03
DEMOLITION			
JT.9000	Demolition of old jetty	15/15/03	28/02/03



Appendix F

Event-Action Plans

Event and Action Plan for Marine Water Quality

Event	ET Leader	ER	Contractor
Action level being exceeded by one sampling day	<ul style="list-style-type: none"> • Repeat <i>in situ</i> measurement on next day of exceedance to confirm findings; • Identify source(s) of impact; • Inform Contractor and ER; • Check monitoring data, all plant, equipment and Contractor's working methods. 	<ul style="list-style-type: none"> • Check monitoring data submitted by ET and Contractor's working methods; • Confirm receipt of notification of non-compliance in writing; • Notify Contractor. 	<ul style="list-style-type: none"> • Inform the ER and confirm notification of the non-compliance in writing; • Rectify unacceptable practice; • Amend working methods if appropriate.
Action level being exceeded by two or more consecutive sampling days	<ul style="list-style-type: none"> • Repeat measurement on next day of exceedance to confirm findings; • Identify source(s) of impact; • Inform Contractor, ER and EPD; • Check monitoring data, all plant, equipment and Contractor's working methods; • Discuss mitigation measures with ER and Contractor; • Ensure mitigation measures are implemented; • Increase the monitoring frequency to daily until no exceedance of Action level. 	<ul style="list-style-type: none"> • Check monitoring data submitted by ET and Contractor's working methods; • Discuss with ET and Contractor on the proposed mitigation measures; • Ensure mitigation measures are properly implemented; • Assess the effectiveness of the implemented mitigation measures. 	<ul style="list-style-type: none"> • Inform the Engineer and confirm notification of the non-compliance in writing; • Rectify unacceptable practice; • Check all plant and equipment and consider changes of working methods; • Submit proposal of additional mitigation measures to ER within 3 working days of notification and discuss with ET and ER; • Implement the agreed mitigation measures.

Event and Action Plan for Marine Water Quality

Event	ET Leader	ER	Contractor
Limit level being exceeded by one sampling day	<ul style="list-style-type: none"> • Repeat measurement on next day of exceedance to confirm findings; • Identify source(s) of impact; • Inform Contractor, ER and EPD; • Check monitoring data, all plant, equipment and Contractor's working methods; • Discuss mitigation measures with ER and Contractor. 	<ul style="list-style-type: none"> • Check monitoring data submitted by ET and Contractor's working method; • Confirm receipt of notification of failure in writing; • Discuss with ET and Contractor on the proposed mitigation measures; • Request Contractor to review the working methods. 	<ul style="list-style-type: none"> • Inform the ER and confirm notification of the non-compliance in writing; • Rectify unacceptable practice; • Check all plant and equipment and consider changes of working methods; • Submit proposal of mitigation measures to ER within 3 working days of notification and discuss with ET and ER.
Limit level being exceeded by two or more consecutive sampling days	<ul style="list-style-type: none"> • Repeat measurement on next day of exceedance to confirm findings; • Identify source(s) of impact; • Inform Contractor, ER and EPD; • Check monitoring data, all plant, equipment and Contractor's working methods; • Discuss mitigation measures with ER and Contractor; • Ensure mitigation measures are implemented; • Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days. 	<ul style="list-style-type: none"> • Check monitoring data submitted by ET and Contractor's working method; • Discuss with ET and Contractor on the proposed mitigation measures; • Request Contractor to critically review the working methods; • Make agreement on the mitigation measures to be implemented; • Ensure mitigation measures are properly implemented; • Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the construction activities until no exceedance of Limit level. 	<ul style="list-style-type: none"> • Take immediate action to avoid further exceedance; • Submit proposal of mitigation measures to ER within 3 working days of notification and discuss with ET and ER; • Implement the agreed mitigation measures; • Resubmit proposals of mitigation measures if problem still not under control; • As directed by the Engineer, to slow down or to stop all or part of the construction activities until no exceedance of Limit level.



Appendix G
QA/QC Results of Laboratory Analysis



QA/QC Results of Laboratory Analysis of Total Suspended Solids

Sampling Date	QC Sample Analysis	Sample Duplicate		Sample Spike	
	% Recovery *	Sample ID	% Error #	Sample ID	% Recovery @
09/06/2003	95.7	FM1S	0.0	FC1S	98.1
	103.3	FC1M	-2.1	EM2S	98.0
11/06/2003	100.0	FM1S	-4.7	FC1S	98.0
	107.2	FC1M	-8.7	EM2S	95.5
	104.7	EM2B	-5.1	EC2B	98.8
13/06/2003	94.4	FM1S	3.3	FC1S	103.8
	101.4	FC1M	-3.7	EM2S	98.1
	104.0	EM2B	-6.5	EC2B	93.9
16/06/2003	105.5	FM1S	8.0	FC1S	105.7
	95.8	FC1M	3.9	EM2S	102.0
	93.6	EM2B	0.0	EC2B	103.8
18/06/2003	104.8	FM1S	-3.1	FC1S	106.1
	103.2	FC1M	3.3	EM2S	106.9
	92.6	EM2B	2.5	EC2B	106.3
20/06/2003	102.9	FM1S	-9.5	FC1S	100.0
	101.4	FC1M	-8.7	EM2S	90.6
	97.4	EM2B	-4.7	EC2B	108.0
27/06/2003	98.1	FM1S	-3.9	FC1S	98.0
	95.9	FC1M	1.3	EM2S	87.5
30/06/2003	106.3	FM1S	0.0	FC1S	102.0
	98.6	FC1M	-3.8	EM2S	105.9
	102.2	EM2B	-5.1	EC2B	90.2
04/07/2003	98.6	FM1S	3.3	FC1S	102.0
	107.4	FC1M	2.2	EM2S	108.3
	102.0	EM2B	8.7	EC2B	106.5
07/07/2003	103.6	FM1S	0.0	FC1S	100.0
	107.9	FC1M	2.3	EM2S	92.0
	104.7	EM2B	-5.7	EC2B	94.1

Note: (*) % Recovery of QC Sample should be between 80% to 120%.
(#) % Error of Sample Duplicate should be between -10% to 10%.
(@) % Recovery of Sample Spike should be between 80% to 120%.



Appendix H
Summary of the Implementation Status
of
Mitigation Measures

SUMMARY OF IMPLEMENTATION STATE OF THE MITIGATION MEASURES

Environmental Protection Measures / Mitigation Measures	Implementation Stages*			Remark
	Yes	No	N/A	
<i>Measures to be implemented during dredging:</i>				
<ul style="list-style-type: none"> • Use of a closed grab dredger with a maximum daily production rate of 500 m³/day; • Deployment of silt curtain to enclose the grab while dredging works are in progress. The silt curtain shall be frame type and designed to enclose local pollution caused by the grab dredging. • The second layer of silt curtain shall be formed from tough, abrasion-resistant permeable membranes, supported on floated booms in such a way as to ensure that egress of turbid waters from the enclosed dredging area shall be restricted. • Use of small sized hopper barge and dredger for dredging works. The maximum draft of the dredger and hopper barge, when fully loaded, shall not exceed 2m. The hopper barge shall make more frequent trips to transport the dredged material to the allocated marine disposal ground, instead of remaining at Lung Kwu Chau until it is fully loaded, in order to avoid grounding of the barge during low tide. • Mechanical grabs shall be designed and maintained to avoid spillage and sealed tightly while being lifted. • All pipe leakages shall be repaired promptly and plant shall not be operated with leaking pipes. • The decks of all vessels shall be kept tidy and free of oil or other substances that might be accidentally or otherwise washed overboard. • Adequate freeboard (i.e. minimum of 200mm) shall be maintained on barges to ensure that decks are not washed by wave action. • All hopper barges and dredgers shall be fitted with tight fitting seals to their bottom openings to prevent leakage of material. • Construction activities shall not cause foam, oil, grease, scum, litter or other objectionable matter to be present on the water within the site or dumping grounds. • Loading of barges and hopper barges shall be controlled to prevent splashing of material into the surrounding water. Barges or hopper barges shall not be filled to a level that will cause the overflow of materials or sediment laden water during loading or transportation. 	√			
	√			
	√			
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	√			
	√			
	√			
	√			
	√			



SUMMARY OF IMPLEMENTATION STATE OF THE MITIGATION MEASURES

Environmental Protection Measures / Mitigation Measures	Implementation Stages*			Remark
	Yes	No	N/A	
<i>Measure to be implemented during Demolition and removal works</i>				
<ul style="list-style-type: none"> Demolition and removal works of the submerged portion of the existing jetty shall be carried out around low tide to minimize the duration of works taking place within the marine waters. 	✓		✓	
<i>Mitigation for terrestrial ecology</i>				
<ul style="list-style-type: none"> Check the work site boundaries regularly to ensure that no damage occurs to surrounding natural habitats. Prohibit and prevent open fires within the work site boundary during construction and provide temporary fire fighting equipment in the work areas. Reinstate temporary work sites/disturbed areas immediately after completion of the construction. 	✓			
<i>General mitigation for Chinese White Dolphin</i>				
<ul style="list-style-type: none"> The use of high-speed vessels in the construction or operation of the jetty shall be avoided where possible. If high-speed vessels must be used, they shall be required to slow to under 10 knots which is the speed restriction for all marine traffic inside the Marine Park Boundary. Furthermore, marine traffic entering the Marine Park to the proposed jetty area shall follow a regular and predictable route. All vessel operators working on the project shall be given a briefing, alerting them to the conservation significance of the Marine Park and the presence of dolphins in the area, and setting out guidelines for safe vessel operations around cetaceans. A policy of no dumping of rubbish, food, oil, or chemicals shall be strictly enforced. This shall also be covered in the contractor briefing. Before dredging, an exclusion zone of 500m radius shall be scanned around work area for at least 30 minutes prior to the start of dredging. If dolphins are observed in the exclusion zone, marine works shall be delayed until they have left the area. Furthermore, if dolphins enter the exclusion zone after dredging has commenced, marine works shall cease until they have left the area. Staff shall monitor for the presence of dolphins within the exclusion zone by scanning the sea both with and without binoculars whilst positioned at vantage point near the summit of the hill behind the jetty location. The vantage point shall enable an extensive view of the 500m exclusion zone in all directions around the jetty. Staff shall communicate with the Engineer via a dedicated telecommunications device (e.g. mobile phone or 'walkie-talkie'). 	✓			

SUMMARY OF IMPLEMENTATION STATE OF THE MITIGATION MEASURES

Environmental Protection Measures/Mitigation Measures	Implementation Stages*			Remark
	Yes	No	N/A	
<i>Mitigation for minimising possible noise impacts on dolphins</i>				
<ul style="list-style-type: none"> • Other measures recommended to mitigate noise impact on dolphins by allowing their acclimatization to noise disturbance are to, as far as practicable: <ul style="list-style-type: none"> - The number of work vessels and small craft shall be minimised during the construction phase. - Dredging and jetty construction activities shall be continuous without short breaks or unpredictable noise outbursts at random intervals. - Events shall be scheduled on a regular basis with similar activities planned for similar time period each day. - Furthermore, the Contractor shall use quiet or 'silenced' plant equipment. All site plant equipment shall be well maintained. • Removal of the existing jetty structure shall be done in a way that minimise noise impact on dolphins by following the above recommended measures. Blasting shall not be permitted. Silenced breakers shall be used and demolition and removal works of the submerged portion of the jetty shall be carried out around low tide to minimise transmittance of noise into the water. In addition, demolition of the jetty structure shall be planned so that, as far as practicable, the structure is 'cut' into large manageable sections to minimise the amount of time breakers are used. • During the operational phase, vessels moored at the jetty for extended periods shall, as far as practicable, turn off their engines to minimise unnecessary underwater noise. 	√			
Marine Sediment				
<ul style="list-style-type: none"> • The material must be dredged, transported and disposed of in a manner which minimizes the loss of contaminants either into solution or by resuspension. During transportation and disposal of the dredged marine sediments, the following measures shall be taken to minimise potential impacts on water quality. • Bottom opening of barges shall be fitted with tight fitting seals to prevent leakage of material. Excess material shall be cleaned from the decks and exposed fittings of barges and hopper dredgers before the vessel is moved. • Monitoring of the barge loading shall be conducted to ensure that loss of material does not take place during transportation. Transport barges or vessels shall be equipped with automatic self-monitoring devices as specified by the Director of Environmental Protection. 	√			√

Environmental Protection Measures/Mitigation Measures	Implementation Stages*			Remark
	Yes	No	N/A	
Good Site Practices and Waste Reduction Measures				
<i>Good site practices during the construction activities include:</i>				
<ul style="list-style-type: none"> Nomination of an approved personnel, such as a site agent, to be responsible for good site practices, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site. Training of site personnel in proper waste management procedures. High standards of waste management shall be observed on the works vessels and barges to ensure that no waste arisings or fuel/diesel oils are disposed to the surrounding marine waters. No C&D materials and machinery fuels enter the marine waters at the site; No stockpiles of construction material shall be permitted on Lung Kwu Chau Island. All wastes, unused construction materials and construction equipment shall be removed from Lung Kwu Chau Island after the works are completed. A recording system for the amount of wastes generated, recycled and disposed of (including the disposal sites). In order to monitor the disposal of C&D materials at public filling areas, and to control fly-tipping, a trip-ticket system shall be included as one of the contractual requirements. 	√			
Waste reduction				
Waste reduction is best achieved at the planning and design stage, as well as by ensuring the implementation of good site practices. Recommendations to achieve waste reduction include:				
<ul style="list-style-type: none"> Prior to disposal of C&D waste, it is recommended that wood, steel and other metals shall be separated for re-use and / or recycling to minimise the quantity of waste to be disposed of to landfill. Proper storage and site practices to minimise the potential for damage or contamination of construction materials. Plan use of construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste. 	√			No C&D Waste disposal



Figures

Construction of Lung Kwu Chau Jetty

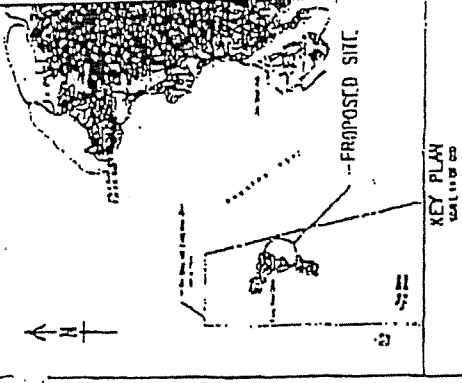
NOTES

1. All dimensions are in metres.
2. All co-ordinates refer to Hong Kong geodetic datum 1980 and are in metres.
3. All levels refer to chart datum (C.D.) and are in meters.

Environmental Permit No.:

EP-150/2002

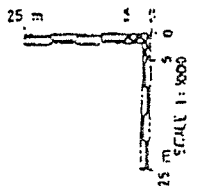
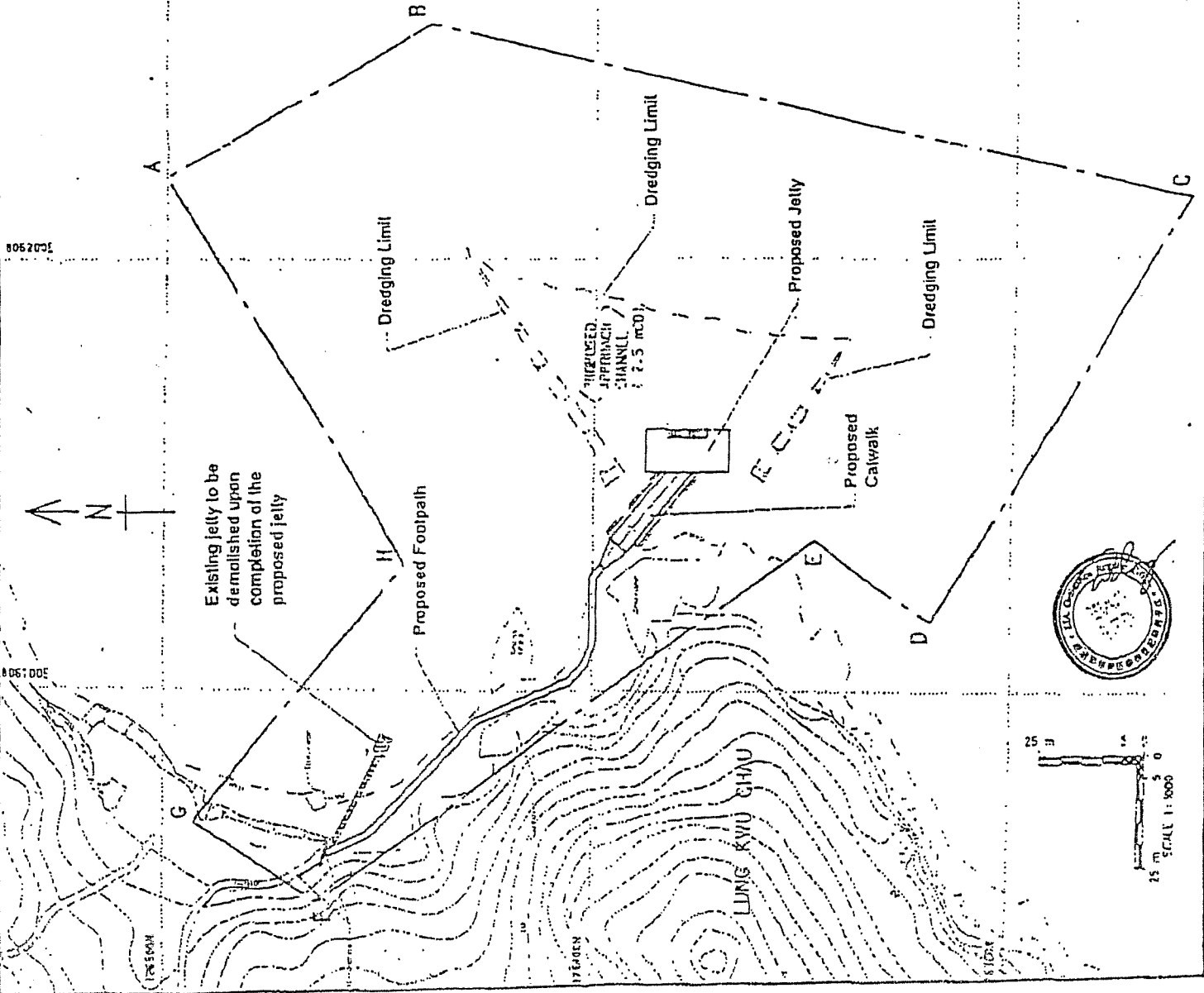
Figure 1



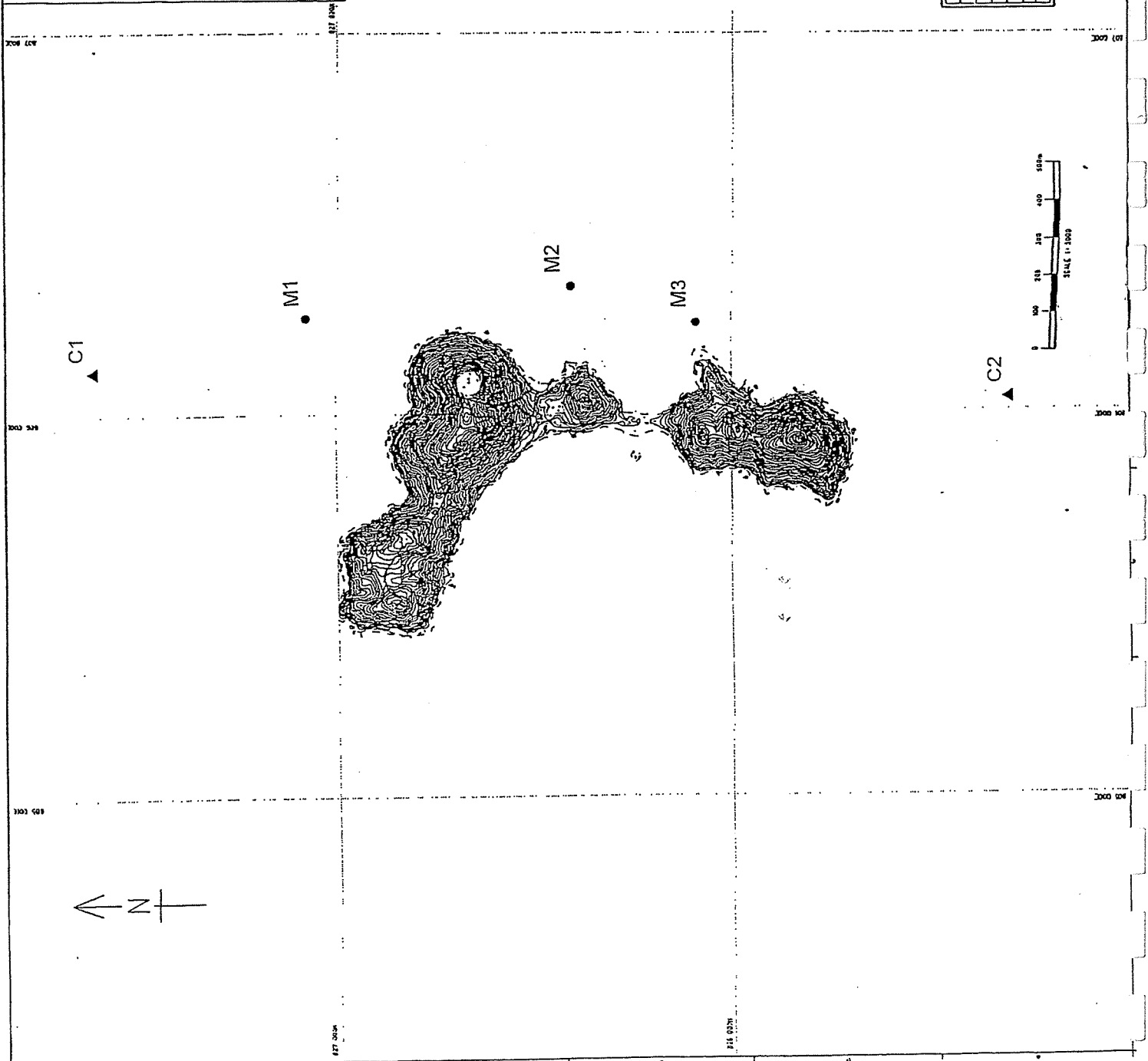
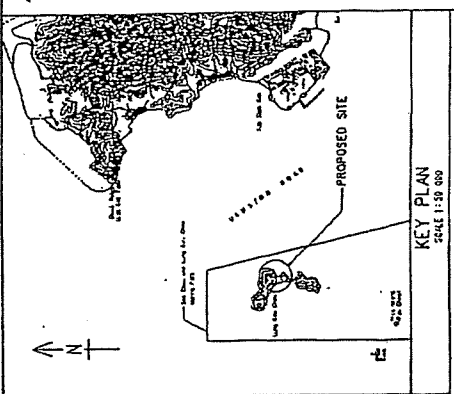
LEGEND:

- WORK SITE LIMIT
- ▨ EXISTING JETTY TO BE DEMOLISHED

POINT	CO-ORDINATES	
	EASTING (m)	NORTHING (m)
A	806 219.45	826 500.00
B	806 256.11	826 439.35
C	806 214.29	826 261.11
D	806 115.42	826 320.26
E	806 134.08	826 347.02
F	806 052.72	826 464.80
G	806 070.78	826 493.01
H	806 128.23	826 444.86

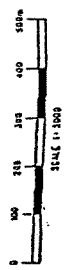


ADVERSE
 ALL DIMENSIONS ARE IN METRES.



POINT	EASTING (m)	NORTHING (m)
M1	805 244	827 080
M2	805 323	825 408
M3	805 235	825 089
C1	805 116	827 618
C2	805 034	825 308

LEGEND:
 ● CONTROL STATION
 ▲ MONITORING STATION



NO.	DATE	DESCRIPTION	BY	CHECKED
1		ISSUED FOR TENDER		
2		REVISED		
3		REVISED		
4		REVISED		
5		REVISED		
6		REVISED		

DRAWN BY: T & M
 CHECKED BY: T & M
 DATE: 15.01.2001
 SCALE: 1:1,000
 PROJECT NO.: TS 2031
 SHEET NO.: 1 OF 1

PROJECT NO.: TS 2031
 SHEET NO.: 1 OF 1

CONTRACT NO.: TS 2031/01
 PROJECT NO.: TS 2031

CONTRACT NO.: TS 2031/01
 PROJECT NO.: TS 2031

CONTRACT NO.: TS 2031/01
 PROJECT NO.: TS 2031

CONSTRUCTION OF JETTY
 AT LUNG KWU CHAU

PROPOSED MARINE WATER
 QUALITY MONITORING
 STATIONS

DRAWING NO.: TS 2031
 SCALE: 1:1,000

TECHNICAL SERVICES DIVISION
 CIVIL ENGINEERING OFFICE

CIVIL ENGINEERING
 DEPARTMENT
 HONG KONG

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Photos

Site Inspection at Lung Kwu Chau
Date: 13 June 2003

Photo 1

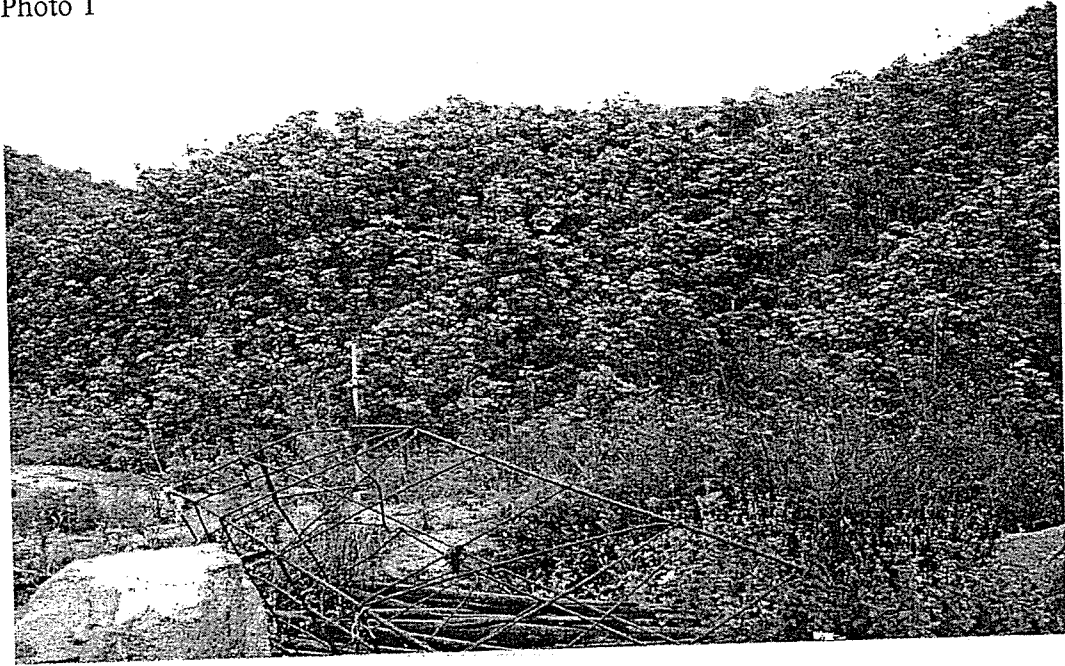
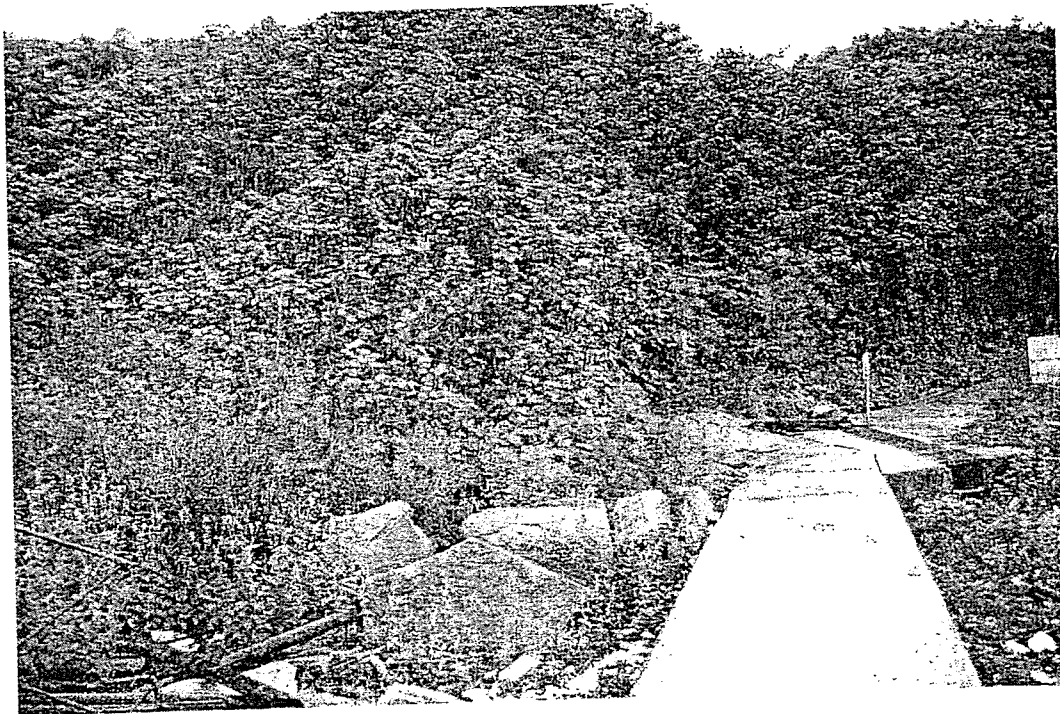


Photo 2

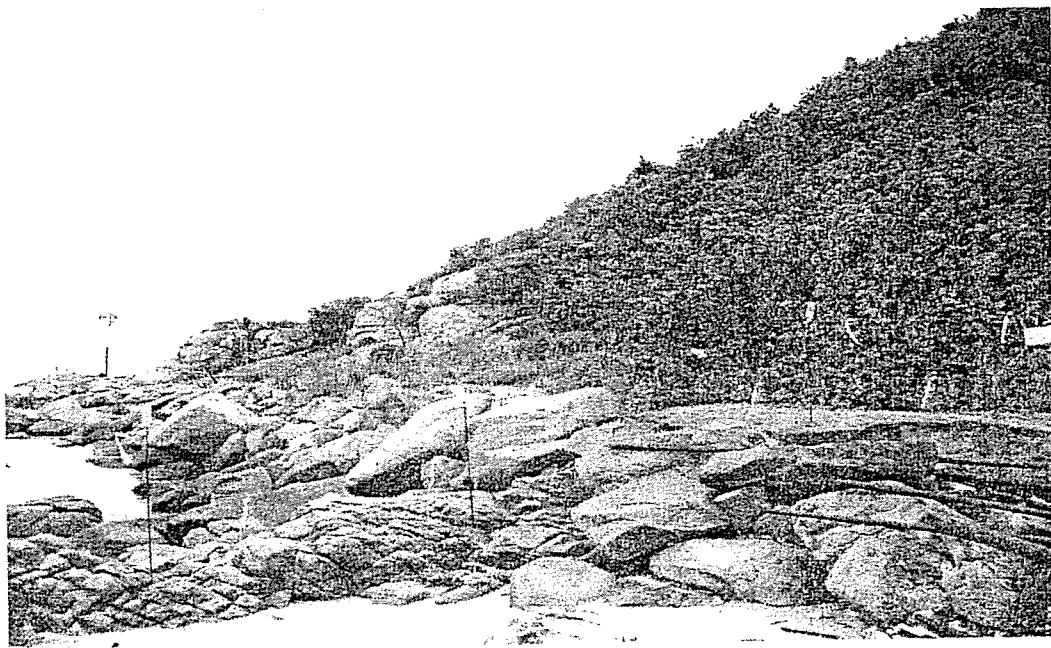


Site Inspection at Lung Kwu Chau
Date: 13 June 2003

Photo 3



Photo 4



Site Inspection at Lung Kwu Chau
Date: 13 June 2003

Photo 5

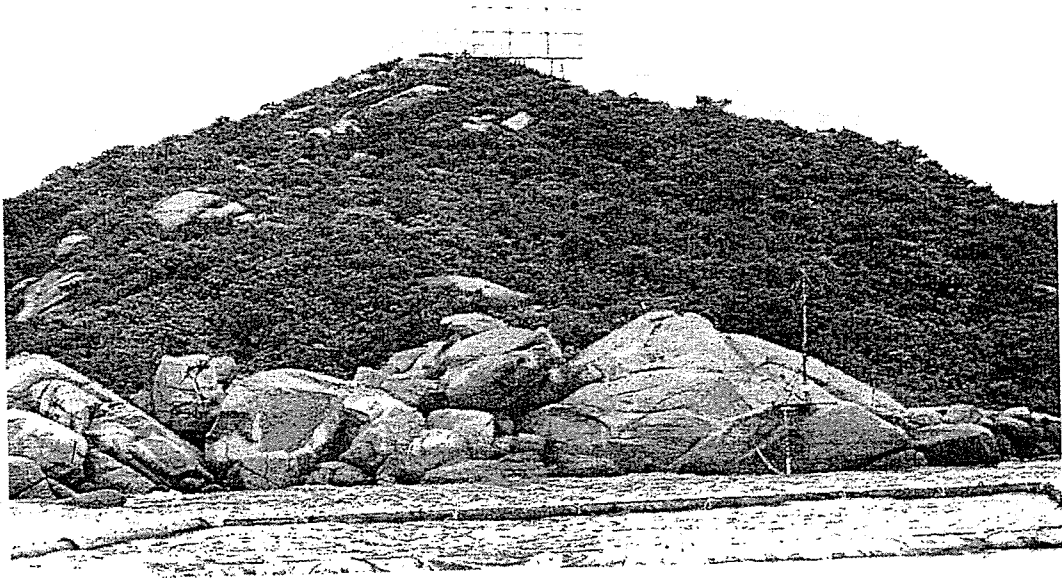


Photo 6



Site Inspection at Lung Kwu Chau
Date: 13 June 2003

Photo 7

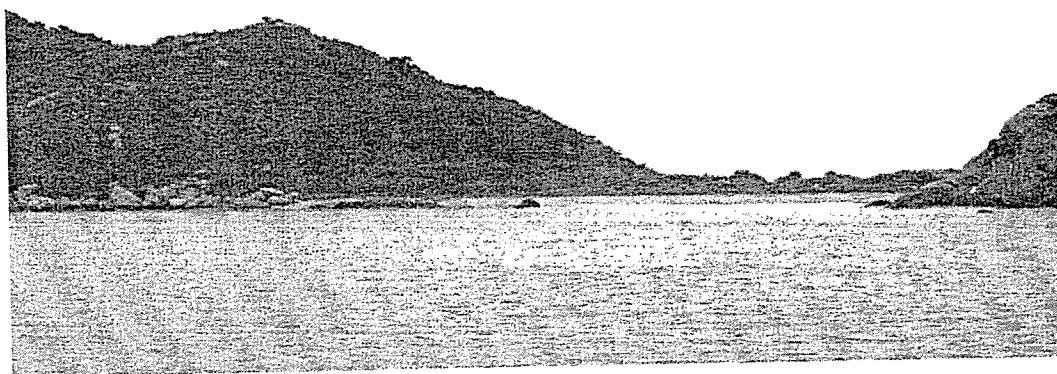
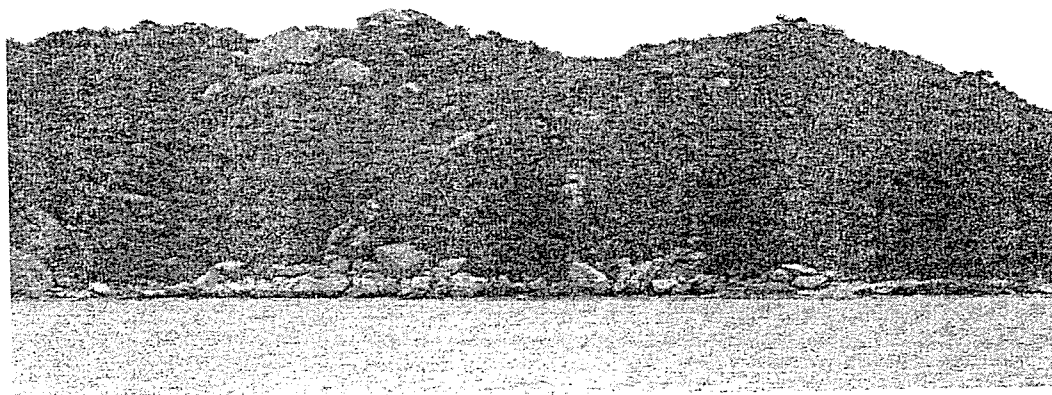


Photo 8



Site Inspection at Lung Kwu Chau
Date: 13 June 2003

Photo 9



Photo 10

