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TEST REPORT

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

**CONSTRUCTION OF JETTY
AT LUNG KWU CHAU**

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

**MONTHLY EM&A REPORT
(09 SEPTEMBER TO 08 OCTOBER 2003)**

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Date: 09 September to 08 October 2003

Report No.: ENA 30495

Our Ref: TCS/2003/E010/600/Cert-06

INDEPENDENT ENGINEER AUDIT CERTIFICATE

CED CONTRACT No. CV/2002/11

CONSTRUCTION OF LUNG KWU CHAU JETTY

ENVIRONMENTAL MONITORING AND AUDIT REPORT (9 SEPTEMBER – 8 OCTOBER 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: 17 October 2003



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EXECUTIVE SUMMARY

This monthly EM&A report No.4 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 September to 08 October 2003.

Construction Progress

The major construction works in this reporting month included the backfilling of the jetty and the catwalk, concreting of the pier's coping, dredging of the approach channel, excavation of the footpath's foundation and the setting of precast concrete footings of the footpath.

Environmental Monitoring Progress

The monitoring activities in this monitoring month are summarized below:

- Marine water monitoring: 2 Occasions;
- Site inspection: 2 Occasions.

Marine Water Monitoring

No exceedances of Action and Limit Level of all monitoring parameters were recorded in this reporting month.

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>
CED / WKC&T / ET	19/09, 26/09

The Contractor was recommended to maintain good environmental 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

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 September to 08 October 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:

- Backfilling of the jetty and the catwalk;
- Concreting of the pier's coping;
- Dredging of the approach channel;
- Excavation of the footpath's foundation;
- Setting of precast concrete footings of the footpath.

The above construction activities are defined as "General Construction Activities".

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 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;• Keep good waste management.



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	30-06-2003	29-09-2003	EW/003/002 *
Turbidity	HACH Model 2100P Turbid Meter	23-08-2003	22-11-2003	ET/0505/004 #
Salinity	YSI Model 30M	18-09-2003	18-12-2003	EW/004/01#
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>Bottom</u> 2.86 mg/L	<u>Surface & Middle</u> 4 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 September and 08 October 2003						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		9 Sept	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	1 Oct	2	3	4
5	6	7	8			

▼ = Water quality monitoring, ■ = Site inspection,

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	0	0	0	0
M1	Action	0	0	0	0	0	0
	Limit	0	0	0	0	0	0
M2	Action	0	0	0	0	0	0
	Limit	0	0	0	0	0	0
M3	Action	0	0	0	0	0	0
	Limit	0	0	0	0	0	0
C2	Action	0	0	0	0	0	0
	Limit	0	0	0	0	0	0
Total	Action	0	0	0	0	0	0
	Limit	0	0	0	0	0	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 Sept	10	11	12	13
14	15	16	17	18	19	20
21	22 No exceedances in all WMP ^(*)	23	24 No exceedances in all WMP ^(*)	25	26	27
28	29	30	1 Oct	2	3	4
5	6	7	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, no exceedances of Action and Limit Level were recorded in this reporting month.

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.

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 C.

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

6.0 ENVIRONMENTAL NON-CONFORMANCE

6.1 Summary of Exceedance of Action and Limit Level

No exceedances of Action and Limit Level of marine water monitoring results were recorded during the reporting month since no impact monitoring on water quality was carried out.

6.2 Summary of Environmental Complaints

No environmental complaints were received in this monitoring month.

6.3 Summary of Notification of Summons and Prosecution

There were no notification of summons respect to environmental issues registered in this month.

7.0 WASTE MANAGEMENT

7.1 Waste Management Audit

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

7.2 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 7.1.

Table 7.1 Summary of Quantities of Waste for Disposal in this reporting month

Type of Waste	Quantity	Disposal Location
Dredged Materials (Contaminated) (m ³)	0	Nil
Dredged Materials (Uncontaminated) (m ³)	1000	East Sha Chau : Mud Pit Ivb
C&D Material (Inert) (m ³)	0	Nil
C&D material (Non-inert) (m ³)	2	Public Refuse Collection Point
General Refuse (m ³)	4	Public Refuse Collection Point
Chemical Waste (m ³)	0	Nil



7.3 Summary of dredging volume in this reporting month

The summary of daily dredging volume in this reporting month is summarized in Table 7.2.

Table 7.2 Summary of Daily Dredging Volume in this reporting month

Date	Dredging Volume (m ³)	Disposal Volume (m ³)
22/09/2003	500	0
23/09/2003	0	500
24/09/2003	500	500
Total Volume	1000	1000

8.0 ENVIRONMENTAL AUDIT

8.1 Site Inspection

Site inspections were carried out by the ET at 19 and 26 September 2003. A summary of the implementation status of the mitigation measures on site inspections is presented in Appendix H.

8.2 Status of Environmental Licensing and Permitting

All permits/licenses obtained in this reporting month are summarized in Table 8.1.

Table 8.1 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)

8.3 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.

8.4 Recommendations on site inspection findings

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

- 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;

8.5 Implementation Status of Event and Action Plan

Since no exceedances of Action and Limit Level were recorded in this reporting month, no further mitigation measures were required.

8.6 Implementation Status of Environmental Complaint Handling

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

8.7 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.

9.0 CONCLUSION

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

No exceedances of Action and Limit level were recorded in this reporting month.

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.

10.0 FUTURE KEY ISSUES

10.1 Upcoming EM&A Schedule

Dredging for approach channel were completed in the end of September 2003. Therefore, no marine water quality monitoring will be required in the coming months. Hence, only weekly site inspection should be carried out in the coming months.

10.2 Upcoming construction works schedule in the coming two months

The major construction works planned to be carried out in next month and their possible impact is tabulated (Table 10.1) for reference.



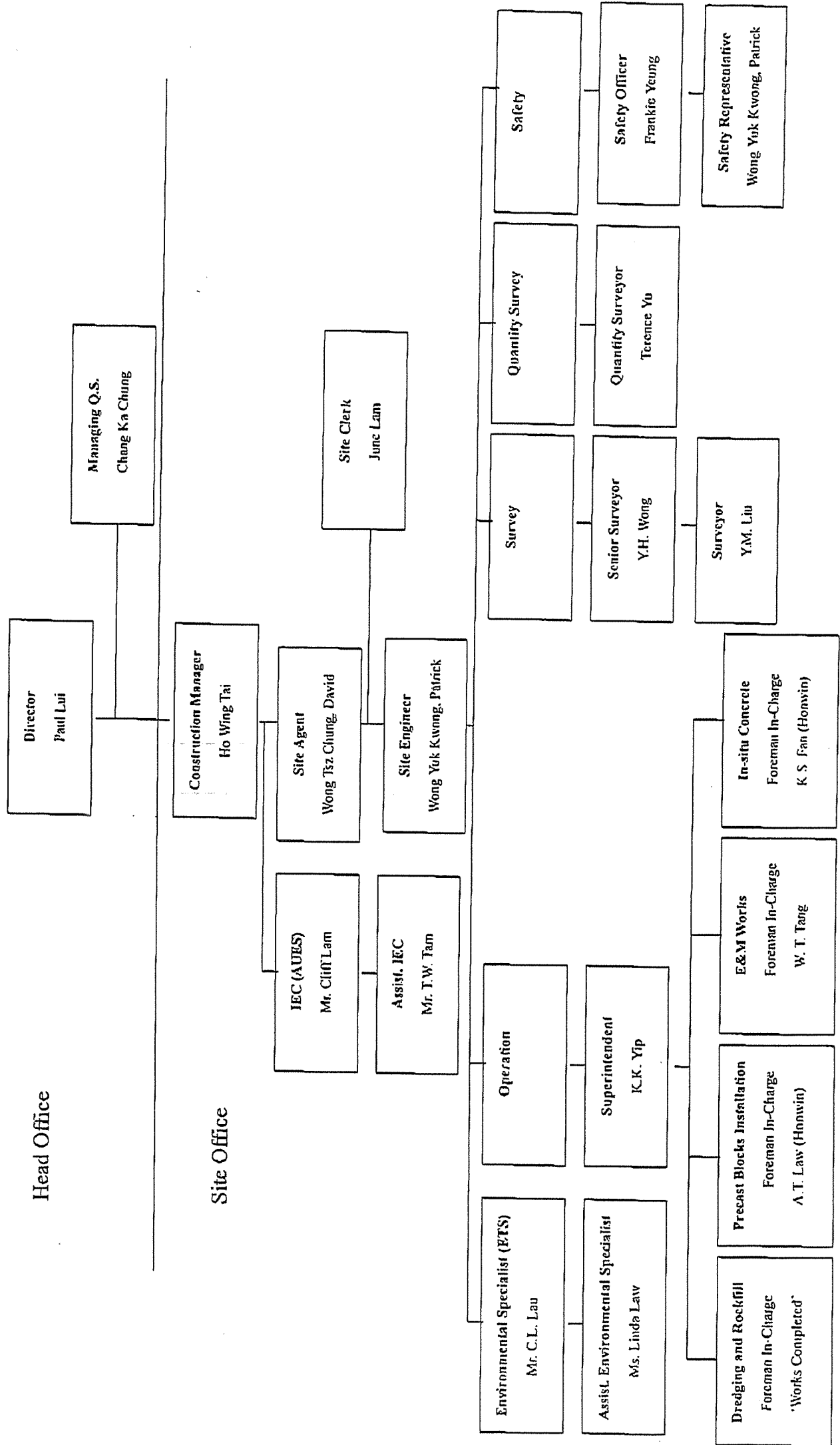
Table 10.1 – Construction Plan in the coming two month

Construction Work	Activities (proposed)
Jetty Construction	<ul style="list-style-type: none">• Concreting at staircase;• Laying GI ducting and drawpit;• Filling sub-base materials;• Installing fender;• Setting precast unit at paving;• Installing pollard light;• Concreting at paving;• Installing handrailing and furniture.
Catwalk Construction	<ul style="list-style-type: none">• Placing armour rock;• Laying GI ducting and drawpit;• Constructing pillar box;• Filling sub-base materials;• Setting precast unit at paving;• Installing bollard light;• Concreting at paving;• Installing handrailing.
Footpath Construction	<ul style="list-style-type: none">• Carrying out foundation excavation and blinding construction;• Constructing of footing and slab installation;• Concreting at slab;• Constructing buttress to over-hang boulder;• Lying E&M ducting (VO4);• Installing handrailing
Existing Pier	<ul style="list-style-type: none">• Demolishing existing pier.



Appendix A

Organization Chart





Appendix B1

Calibration Certificates for Impact Monitoring Equipments



Internal Calibration Report of Turbidimeter

Equipment Ref. No. : ET/0505/004 Manufacturer : HACH
Model No. : 2100P Serial No. : 951100009130
Date of Calibration : 23 August 2003 Calibration Due : 22 Nov. 2003

Data

<u>4.95</u> 0 - 10 NTU Gelex Vial	<u>54.8</u> 10 - 100 NTU Gelex Vial	<u>850</u> 100 - 1000 NTU Gelex Vial
<u>4.96</u>	<u>53.9</u>	<u>841</u>

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

* Delete as appropriate

Calibrated 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 J0300 AA
Date of Calibration : 18 Sept 2003 Due Date : 18 Dec. 2003

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

J137

Salinity Standard (ppt)	Measured Salinity (ppt)	Difference %
30	30.5	1.67

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 : TK Approved by : Linda Law



Internal Calibration Report of Dissolved Oxygen Meter

Equipment Ref. No. : <u>EW/003/002</u>	Manufacturer : <u>YSI</u>
Model No. : <u>95</u>	Serial No. : <u>9730182 AD</u>
Date of Calibration : <u>30 June 2003</u>	Calibration Due Date : <u>29 Sept 2003</u>

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	20.0

Linearity Checking

Purging time, min	DO meter reading, mg/L			Winkler Titration result, mg/L		
	1	2	Average	1	2	Average
2	7.04	7.07	7.06	7.01	7.04	7.03
5	5.20	5.17	5.19	5.21	5.18	5.20
10	2.53	2.56	2.55	2.47	2.46	2.47
Linear regression coefficient	0.9998					

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	7.10	7.08	7.09	7.06	7.03	7.05
30	6.89	6.87	6.88	6.88	6.91	6.90

Acceptance Criteria

- (1) Difference 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 Law

Approved by :



Appendix B2
Impact Monitoring Results



Date: 22-09-03

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)																			
			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																
			Ave.	Depth Ave. (S,M,B)	Ave.	Depth Ave. (S,M,B)	Ave.	Depth Ave. (S,M,B)	Ave.	Depth Ave. (S,M,B)	Ave.	Depth Ave. (S,M,B)	Ave.	Depth Ave. (S,M,B)	Ave.	Depth Ave. (S,M,B)	Ave.	Depth Ave. (S,M,B)	Ave.	Depth Ave. (S,M,B)	Ave.	Depth Ave. (S,M,B)	Ave.	Depth Ave. (S,M,B)	Ave.	Depth Ave. (S,M,B)	Ave.	Depth Ave. (S,M,B)	Ave.	Depth Ave. (S,M,B)	Ave.	Depth Ave. (S,M,B)	Ave.	Depth Ave. (S,M,B)	Ave.	Depth Ave. (S,M,B)																
C1	17:43-17:55	28°C, Cloudy	27.3	27.2	27.1	21.1	21.1	21.1	27.2	27.2	27.2	29.6	29.6	29.6	7.04	6.42	6.35	6.39	6.72	5.93	5.85	5.89	104.7	104.0	104.4	94.3	93.5	93.9	86.3	85.5	85.9	8.96	8.88	8.92	14.1	13.2	13.7	15.0	14.2	14.6	12.4	8.4	8.6	8.5	15	14	15	15	13			
M1	17:30-17:40	28°C, Cloudy	27.4	27.2	27.0	19.6	19.6	19.6	25.4	25.4	25.4	28.8	28.8	28.8	7.20	7.13	7.17	6.25	6.28	6.73	6.05	6.00	6.03	106.5	105.7	106.1	92.6	91.9	92.3	88.1	87.3	87.7	13.1	14.2	13.7	16.2	15.3	15.8	14.8	14.0	14.4	14.6	12	13	13	16	14	15	15	14		
M2	17:16-17:26	28°C, Cloudy	27.3	27.1	27.1	20.6	20.6	20.6	27.5	27.5	27.5	28.4	28.4	28.4	7.19	7.11	7.15	6.64	6.61	6.88	6.18	6.10	6.14	106.4	105.5	106.0	97.5	96.8	97.2	89.8	89.1	89.5	11.2	12.3	11.8	17.5	17.8	14.2	13.6	13.9	14.5	12	11	12	19	18	19	13	14	14	15	
M3	17:02-17:14	28°C, Cloudy	27.2	27.4	27.4	20.0	20.0	20.0	27.9	27.9	27.9	27.9	27.9	27.9	7.33	7.26	7.30	---	---	7.30	6.37	6.30	6.34	108.5	107.7	108.1	---	---	---	93.3	92.5	92.9	9.61	9.53	9.57	---	---	---	13.0	12.1	12.5	11.1	9.8	10	9.9	---	---	13	13	12	12	
C2	16:46-16:59	28°C, Cloudy	27.1	27.1	27.1	24.8	24.8	24.8	27.1	27.1	27.1	26.2	26.2	26.2	7.33	7.25	7.29	---	---	7.29	6.40	6.32	6.36	107.1	106.3	106.7	---	---	---	93.1	92.3	92.7	7.52	7.43	7.48	---	---	---	7.37	7.29	7.33	7.40	7.8	8.0	7.9	---	---	7.6	7.4	7.5	7.7	7.7

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																	
			Ave.	Depth Ave. (S,M,B)	Ave.	Depth Ave. (S,M,B)	Ave.	Depth Ave. (S,M,B)	Ave.	Depth Ave. (S,M,B)	Ave.	Depth Ave. (S,M,B)	Ave.	Depth Ave. (S,M,B)	Ave.	Depth Ave. (S,M,B)	Ave.	Depth Ave. (S,M,B)	Ave.	Depth Ave. (S,M,B)	Ave.	Depth Ave. (S,M,B)	Ave.	Depth Ave. (S,M,B)	Ave.	Depth Ave. (S,M,B)	Ave.	Depth Ave. (S,M,B)	Ave.	Depth Ave. (S,M,B)	Ave.	Depth Ave. (S,M,B)	Ave.	Depth Ave. (S,M,B)	Ave.	Depth Ave. (S,M,B)	Ave.	Depth Ave. (S,M,B)															
C1	11:27-11:40	28°C, Cloudy	27.3	27.0	26.9	21.6	21.7	21.7	25.1	25.1	25.1	26.7	26.7	26.7	6.32	6.24	6.28	5.92	5.84	5.88	6.08	5.46	5.38	5.42	92.0	91.1	91.6	85.7	84.8	85.3	80.3	79.4	79.9	6.14	6.05	6.10	18.7	19.3	19.0	22.1	21.5	21.8	15.6	6.4	6.4	6.4	18	19	19	21	22	22	16
M1	11:10-11:22	28°C, Cloudy	27.4	27.3	27.0	23.6	23.6	23.6	29.6	29.6	29.6	30.3	30.3	30.3	6.22	6.14	6.18	5.63	5.55	5.59	5.89	5.36	5.30	5.33	91.0	90.1	90.6	81.1	80.2	80.7	76.3	77.6	78.0	11.1	10.3	10.7	29.6	28.7	29.2	19.3	18.5	18.9	19.6	10	10	10	29	30	30	19	20	20	20
M2	10:58-11:07	28°C, Cloudy	27.4	27.2	26.9	23.0	23.1	23.1	30.1	30.1	30.1	30.0	30.0	30.0	6.31	6.23	6.27	5.33	5.25	5.29	5.78	5.20	5.11	5.16	92.5	91.7	92.1	78.3	77.5	77.9	75.1	74.3	74.7	9.89	9.80	9.80	30.4	31.1	30.8	42.3	41.1	41.7	27.4	10	9.8	9.9	30	29	30	40	39	40	26
M3	10:44-10:56	28°C, Cloudy	27.3	27.1	26.9	24.6	24.6	24.6	27.1	27.1	27.1	29.2	29.2	29.2	5.71	5.63	5.67	---	---	5.67	5.21	5.14	5.18	83.7	83.0	83.4	---	---	---	75.9	75.0	75.5	7.54	7.46	7.50	---	---	---	12.0	11.3	11.7	9.6	8.0	8.2	8.1	---	---	12	12	12	10	10	
C2	10:30-10:42	28°C, Cloudy	27.5	27.3	27.3	25.9	26.0	26.0	27.3	27.3	27.3	31.0	31.0	31.0	5.52	5.60	5.56	---	---	5.56	5.03	5.11	5.07	80.4	81.1	80.8	---	---	---	76.4	77.2	76.8	5.43	5.36	5.40	---	---	---	12.9	13.3	13.1	9.3	5.5	5.4	5.5	---	---	12	13	13	9.0		

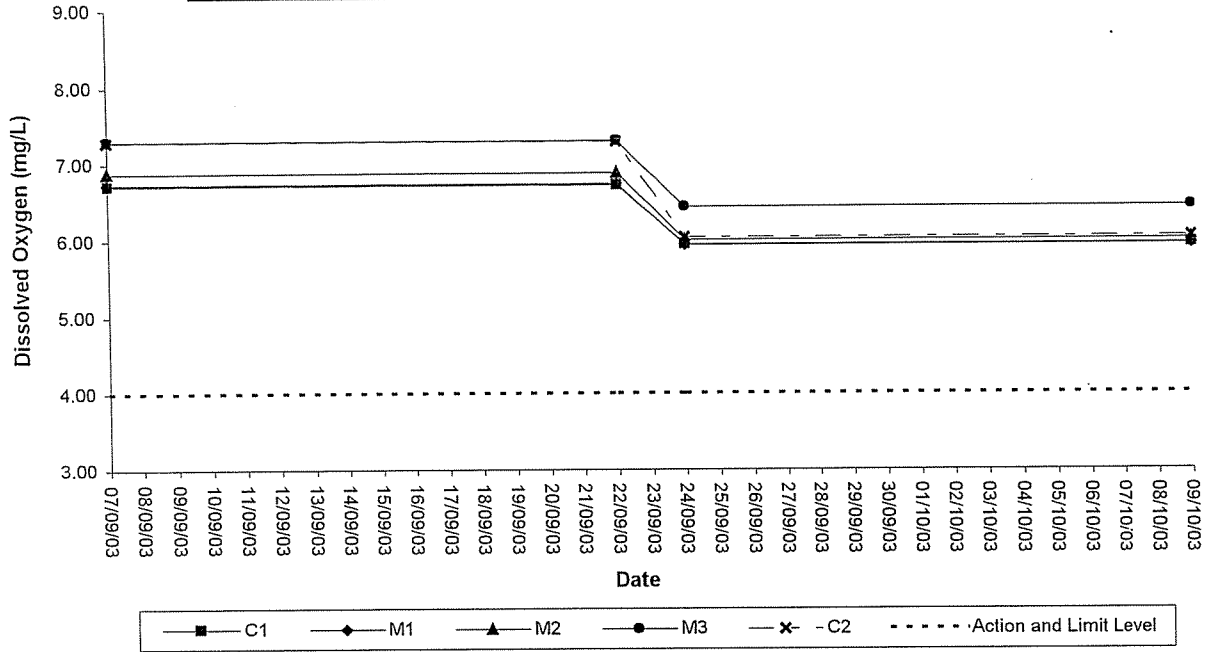


Appendix C

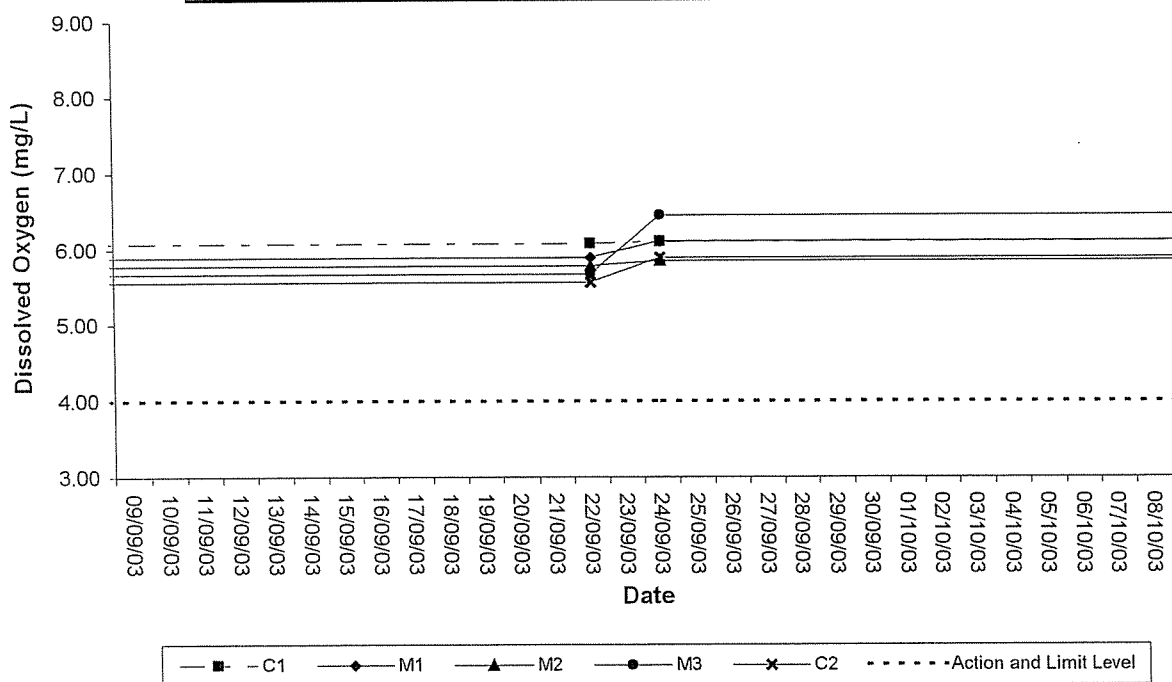
Graphical Plots of Impact Monitoring Data



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

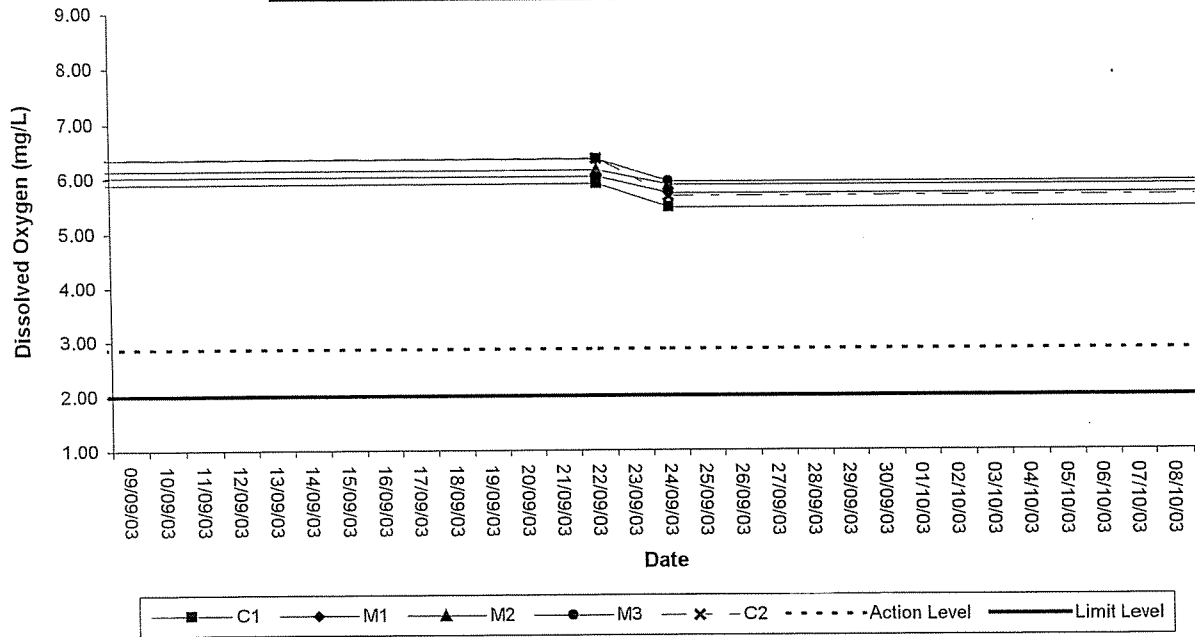


Dissolved Oxygen Level (Surface and Middle) at Mid-Ebb Tide

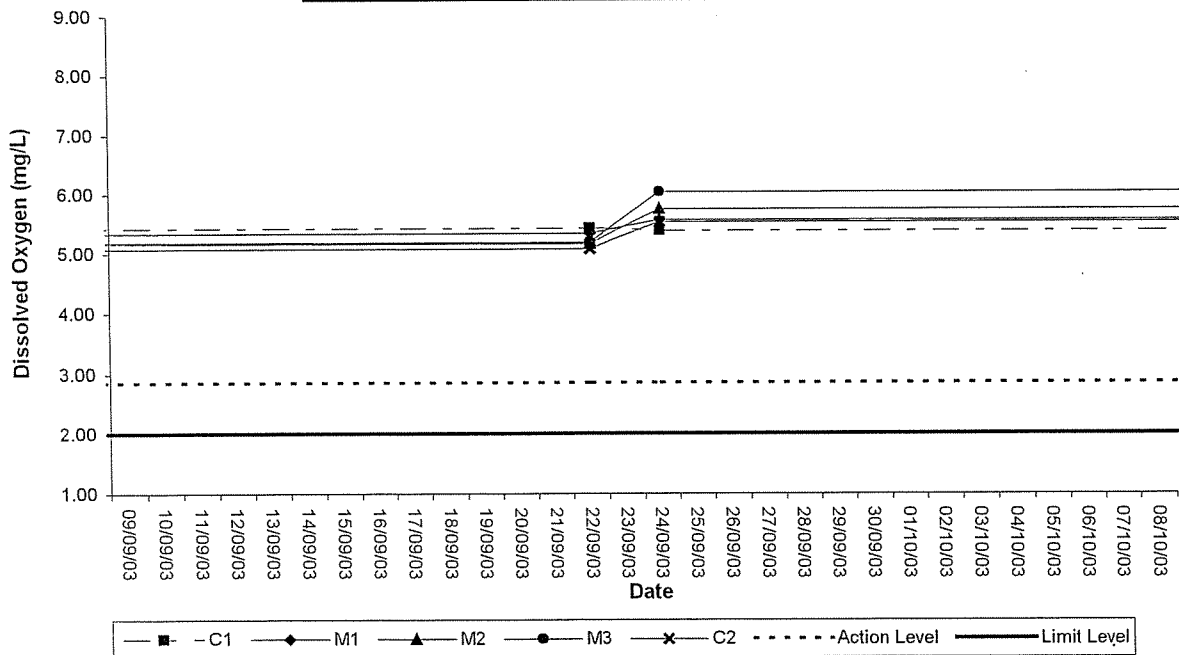




Dissolved Oxygen Level (Bottom) at Mid-Flood Tide

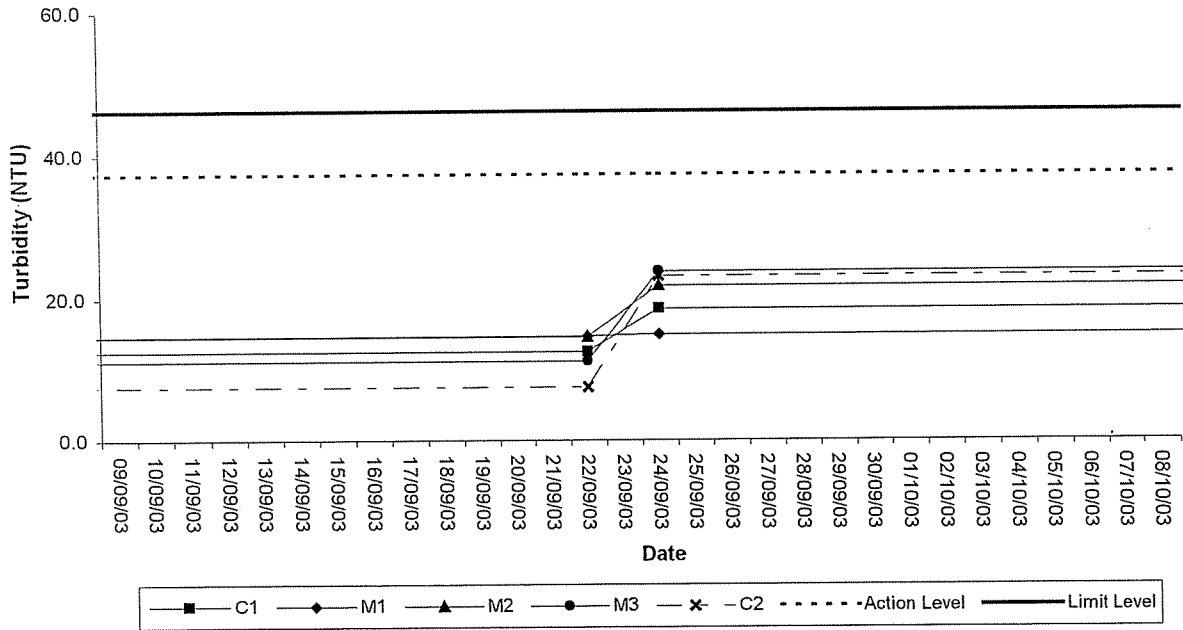


Dissolved Oxygen Level (Bottom) at Mid-Ebb Tide

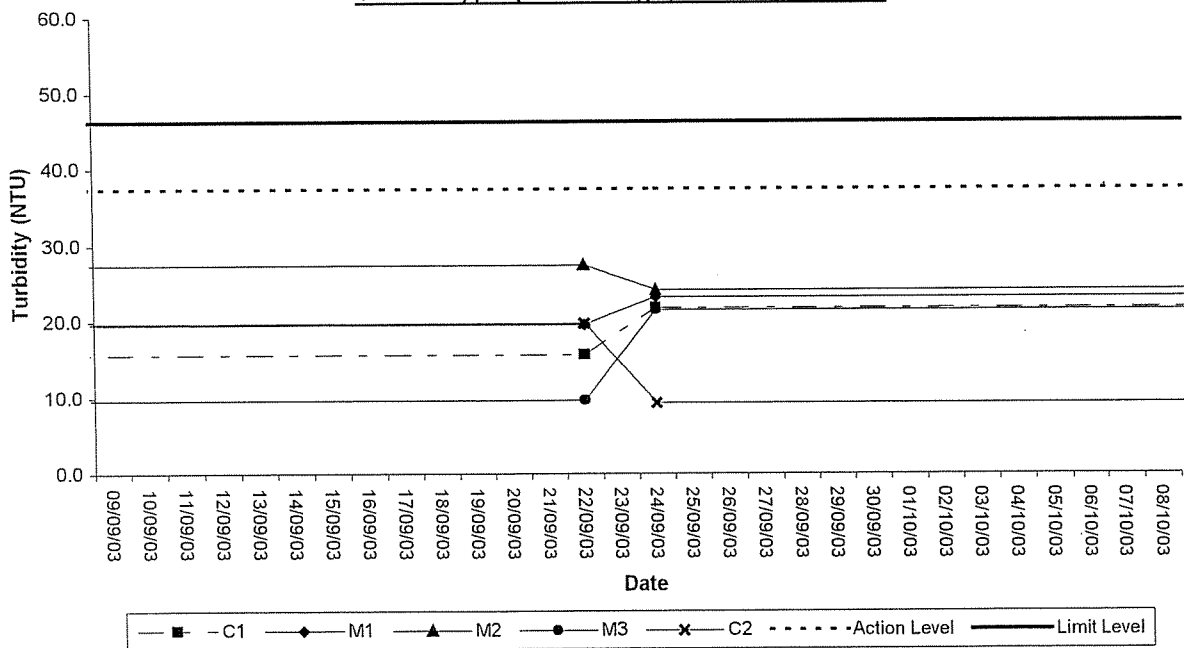




Turbidity (Depth-average) at Mid-Flood Tide

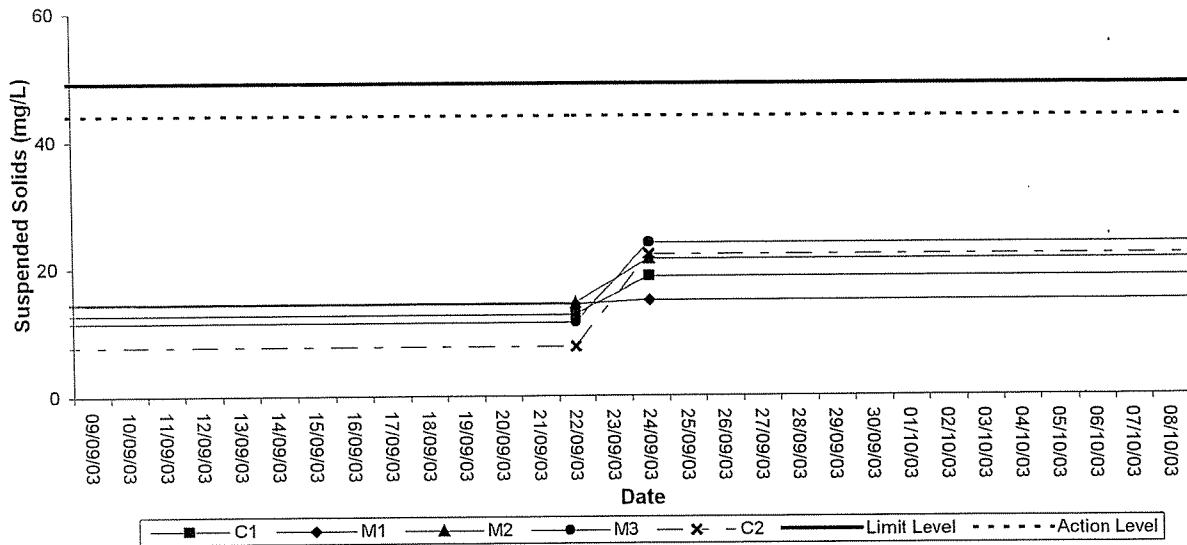


Turbidity (Depth-average) at Mid-Ebb Tide

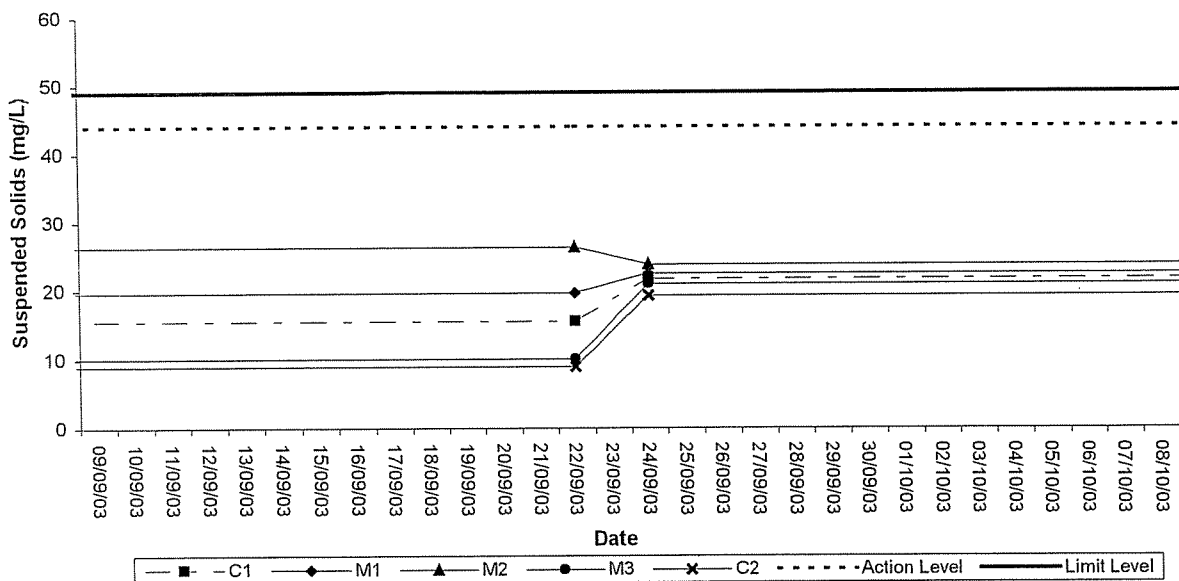




Suspended Solids (Depth-average) at Mid-Flood Tide



Suspended Solids (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
09/09/03	-	30.4	26.9	82	Sunny
10/09/03	-	31.4	26.5	81	Sunny
11/09/03	-	31.1	27.4	74	Sunny
12/09/03	-	31.3	27.0	70	Sunny
13/09/03	-	31.1	27.7	81	Sunny
14/09/03	89.0	28.5	24.7	93	Rainy
15/09/03	97.0	26.6	24.6	95	Rainy
16/09/03	23.6	29.2	25.4	91	Rainy
17/09/03	0.3	29.7	26.4	85	Rainy
18/09/03	-	31.7	26.9	75	Sunny
19/09/03	-	32.1	27.4	78	Sunny
20/09/03	Trace	32.6	28.0	78	Cloudy
21/09/03	15.2	30.6	25.9	80	Rainy
22/09/03	2.3	26.5	23.6	83	Cloudy
23/09/03	-	27.5	24.9	77	Cloudy
24/09/03	Trace	28.6	25.4	77	Cloudy
25/09/03	-	29.2	25.4	69	Sunny
26/09/03	-	29.9	26.1	73	Sunny
27/09/03	-	29.8	26.7	76	Sunny
28/09/03	-	30.3	27.0	79	Sunny
29/09/03	Trace	29.9	26.8	75	Cloudy
30/09/03	0.8	29.2	25.9	78	Rainy
01/10/03	Trace	29.3	26.5	77	Cloudy
02/10/03	-	29.8	26.3	75	Fine
03/10/03	-	29.6	26.7	73	Fine
04/10/03	Trace	28.7	25.1	70	Cloudy
05/10/03	-	28.6	24.7	68	Sunny
06/10/03	-	28.8	24.5	64	Fine
07/10/03	-	28.0	23.5	67	Fine
08/10/03	Trace	28.6	25.2	74	Cloudy



Appendix E

Construction Programme of the Project

2002
2004

Contract	Activities	Description	Early Start	Early Finish	Actual Start	Actual Finish	2003												2004
							April	May	June	July	August	September	October	November	December	January			
FR-1000	Construction	0	4 Apr 03																
FR-1010	Substructure work	21	4 Apr 03	24 May 2003	4 Apr 03	24 May 2003													
FR-1020	Structure construction	47	13 Apr 03	24 May 2003	19 Apr 03	19 Apr 03													
FR-2001	Support construction	219	21 Mar 2003	29 Dec 03	9 Jan 03	24 Sep 03													
FR-2007	Heat project installation	22	30 Dec 03	20 Jan 04															
FR-3107	Process in structure	25	23 Apr 03	21 May 2003	25 Apr 03	21 May 2003													
FR-3200	Overriding panel	23	25 Apr 03	22 May 2003	25 Apr 03	22 May 2003													
FR-3202	Sub of base - process and approval	23	4 Apr 03	21 Apr 03	4 Apr 03	21 Apr 03													
FR-3110	Sub of base - structure	22	25 Apr 03	22 May 2003	25 Apr 03	22 May 2003													
FR-4001	Process water - foundation & approval	33	10 May 2003	20 Jun 2003	11 May 2003	11 Jun 2003													
FR-4110	Process water - structure	35	10 May 2003	20 Jun 2003	11 May 2003	11 Jun 2003													
FR-5001	BAW - structure & approval	31	25 Apr 03	20 May 2003	31 Apr 03	20 May 2003													
FR-5110	EAH - water & delivery	60	30 Mar 2003	28 Feb 2003	1 Sep 03	28 Feb 2003													
FR-6000	No drawing for approval channel	123	1 May 2003	31 Aug 03															
FR-6009	Support	9		20 Dec 03															
FR-1100	Designing - foundation	11	13 May 2003	3 Jun 2003	11 Jun 03	27 Jun 03													
FR-1110	Designing - approach channel	20	1 Sep 03	20 Sep 03	21 Sep 03	20 Sep 03													
FR-2000	Designing - foundation	19	9 Jun 2003	10 Jun 2003	10 Jun 03	7 Jun 03													
FR-2001	Designing - foundation	10	19 Aug 03	20 Aug 03	30 Sep 03	6 Sep 03													
FR-2002	Designing - foundation	8	11 Oct 03	51 Oct 03	11 Sep 03	17 Sep 03													
FR-2003	Designing - foundation	5	20 Oct 03	20 Oct 03															
FR-3000	Designing - foundation	21	19 Jun 2003	9 Sep 2003	14 Jun 03	2 Aug 03													
FR-3001	Designing - foundation	6	28 Aug 03	3 Sep 03	1 Aug 03	9 Aug 03													
FR-4000	Designing - foundation	40	4 Sep 03	11 Oct 03	11 Aug 03														
FR-5010	Designing - foundation	10	21 Oct 03	9 Nov 03	30 Jun 03														
FR-6000	Designing - foundation	10	19 Jun 2003	10 Jun 2003	11 Aug 03	10 Sep 03													
FR-6001	Designing - foundation	10	30 Jun 2003	8 Aug 03	27 Aug 03	4 Sep 03													
FR-6002	Designing - foundation	1	4 Sep 03	10 Sep 03	27 Aug 03	4 Sep 03													
FR-6003	Designing - foundation	29	21 Sep 03	10 Oct 03															
FR-6004	Designing - foundation	3	24 Oct 03	28 Oct 03															
FR-6005	Designing - foundation	10	9 Aug 03	11 Aug 03	10 Sep 03	20 Sep 03													
FR-6006	Designing - foundation	19	11 Sep 03	20 Sep 03	13 Sep 03	20 Sep 03													
FR-6007	Designing - foundation	10	20 Sep 03	20 Sep 03	20 Sep 03	21 Aug 03													
FR-6008	Designing - foundation	3	11 Oct 03	13 Oct 03															
FR-6009	Designing - foundation	10	21 Sep 03	10 Sep 03	9 Aug 03														
FR-6010	Designing - foundation	10	11 Oct 03	20 Oct 03	20 Sep 03	20 Sep 03													
FR-6011	Designing - foundation	15	6 Nov 03	20 Nov 03	4 Aug 03														
FR-6012	Designing - foundation	147	21 May 03	11 Oct 03	25 Sep 03														
FR-6013	Designing - foundation	140	24 Jun 03	10 Nov 03															
FR-6014	Designing - foundation	144	24 Jun 03	14 Dec 03															
FR-6015	Designing - foundation	20	6 Nov 03	5 Dec 03															
FR-6016	Designing - foundation	30	17 Nov 03	10 Dec 03															
FR-6017	Designing - foundation	21	20 Oct 03	18 Nov 03															
FR-6018	Designing - foundation	10	21 Nov 03	1 Dec 03															
FR-6019	Designing - foundation	6	1 Dec 03	11 Dec 03															
FR-6020	Designing - foundation	13	10 Dec 03	20 Dec 03															



Appendix F
Event-Action Plans



Event and Action Plan for Marine Water Quality

Event	ET Leader	ER	Contractor
<p>Action level being exceeded by one sampling day</p>	<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.
<p>Action level being exceeded by two or more consecutive sampling days</p>	<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 @
22/09/2003	102.7	FM1S	8.3	FC1S	108.9
	102.0	FC1M	0.0	EM2S	104.0
	100.4	EM2B	2.5	EC2B	93.9
24/09/2003	108.1	FM1S	8.7	FC1S	96.2
	104.5	FC1M	4.4	EM2S	93.9
	104.0	EM2B	0.0	EC2B	105.9

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>				
• Use of a closed grab dredger with a maximum daily production rate of 500 m ³ /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.	√			



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			
Mitigation for minimising possible noise impacts on dolphins						
<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. 	✓				✓	



SUMMARY OF IMPLEMENTATION STATE OF THE MITIGATION MEASURES

Environmental Protection Measures/Mitigation Measures	Implementation Stages*			Remark			
	Yes	No	N/A				
Environmental Protection Measures/Mitigation Measures							
Good Site Practices and Waste Reduction Measures							
Good site practices during the construction activities include:							
<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 at public filling area



Figures

Construction of Lung Kwu Chau Jetty

NOTES

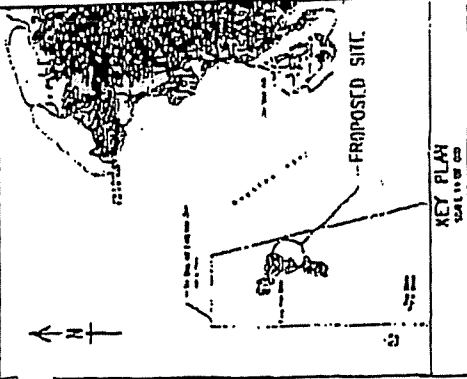
1. All dimensions are in metres.
2. All co-ordinates refer to Hong Kong geodetic datum 1980 and are in metres.
3. All levels refer to chart datum (C.D.) and are in meters.

Environmental Permit No.:

EP-150/2002

Figure 1

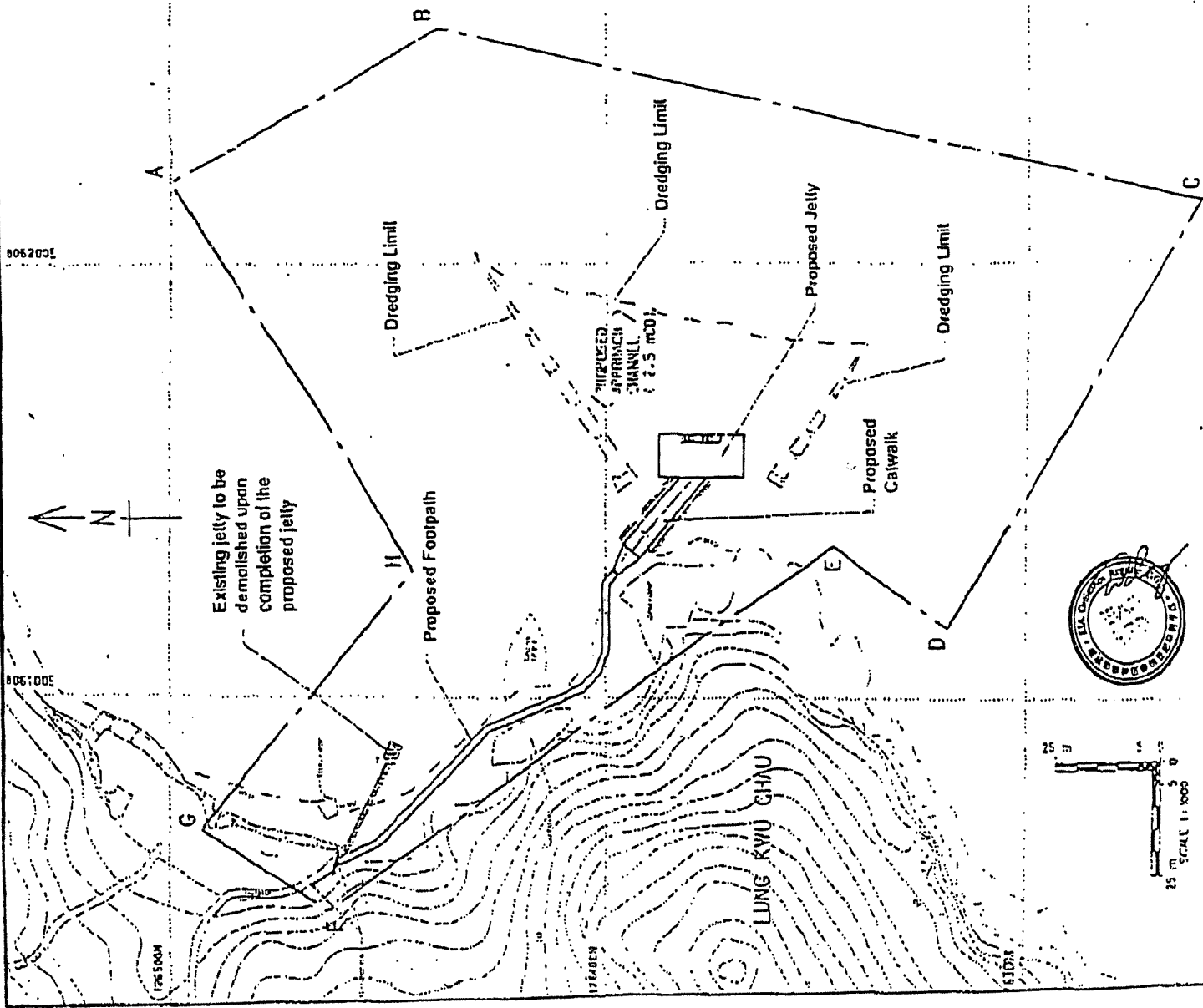
el



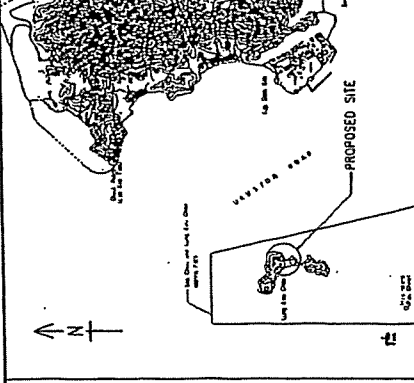
LEGEND:

- WORK SITE LIMIT
- EXISTING JETTY TO BE DEMOLISHED

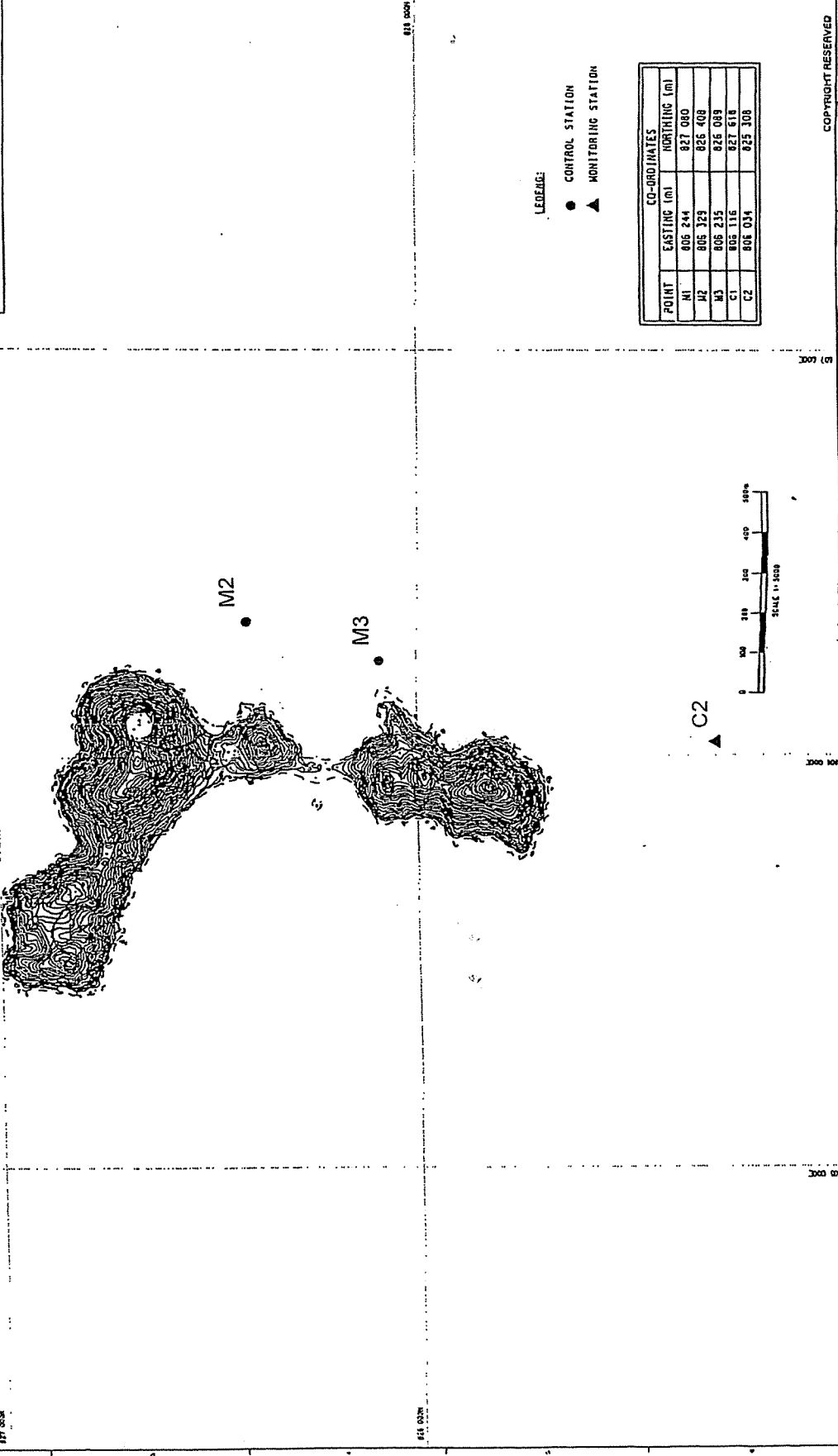
POINT	CO-ORDINATES	
	EASTING (m)	NORTHING (m)
A	806 219.45	826 500.00
B	806 256.11	826 439.35
C	806 214.29	826 261.11
D	806 115.42	826 320.26
E	806 134.08	826 347.02
F	806 052.72	826 464.80
G	806 070.78	826 493.01
H	806 128.23	826 444.86



NOTES:
1. ALL DIMENSIONS ARE IN METRES.



KEY PLAN
SCALE 1:50 000



LEGEND:
● CONTROL STATION
▲ MONITORING STATION

POINT	CO-ORDINATES	
	EASTING (m)	NORTHING (m)
M1	805 244	827 080
M2	805 323	826 408
M3	805 235	826 089
C1	805 116	827 618
C2	805 034	825 308

NO.	DATE	BY	CHKD.	REVISION
1	15.01.2003	T. K. AU	S. C. CHAN	ISSUED
2	15.01.2003	H. F. CHAN	S. C. CHAN	REVISED
3	15.01.2003	H. F. CHAN	S. C. CHAN	REVISED
4	15.01.2003	S. K. HUI	S. C. CHAN	REVISED

PROJECT NO. TS 2031
 DRAWING NO. 2031/0
 DATE 15/01/03
 DRAWN BY T. K. AU
 CHECKED BY S. C. CHAN
 APPROVED BY S. C. CHAN
 PROJECT TITLE CONSTRUCTION OF JETTY AT LUNG KWU CHAU
 DRAWING TITLE PROPOSED MARINE WATER QUALITY MONITORING STATIONS
 SCALE 1:5000
 DRAWING NO. TS 2031
 TECHNICAL SERVICES DIVISION
 CIVIL ENGINEERING OFFICE
 CIVIL ENGINEERING DEPARTMENT
 HONG KONG
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