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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 TO 22 NOVEMBER 2003)**

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Date: 09 November to 22 November 2003

Report No.: ENA 30602

Our Ref: TCS/2003/E010/600/Cert-08

INDEPENDENT ENGINEER AUDIT CERTIFICATE


CED CONTRACT NO. CV/2002/11

CONSTRUCTION OF LUNG KWU CHAU JETTY

ENVIRONMENTAL MONITORING AND AUDIT REPORT (9 NOVEMBER – 22 NOVEMBER 2003)

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

Signed:



(C.P.)

INDEPENDENT ENGINEER

Name: CLIFF LAM

**Action-United
Environmental Services & Consulting**

Date: 24 December 2003



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EXECUTIVE SUMMARY

This monthly EM&A report (No.6) 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 to 22 November 2003.

Construction Progress

The major construction works in this reporting month included the E&M installation inside pillar boxes, installation of handrailings at pier and catwalk, cable ducting along footpath, demolition of the old jetty and the imprinted concrete surfacing at pier and catwalk.

Environmental Monitoring Progress

The monitoring activities in this monitoring month are summarized below:

- Marine water monitoring: 4 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	14/11 and 21/11

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.

Since the demolition of the old jetty and all marine works were completed on 22 November 2003, no impact marine water quality monitoring will be required. And post marine water quality monitoring is scheduled from 28 November to 27 December 2003. During post marine water quality monitoring, no weekly site inspection should be carried out.



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 to 22 November 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 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:

- E&M installation inside pillar boxes;
- Installation of handrailings at the pier and catwalk;
- Cable ducting along footpath;
- Demolition of the old jetty and the imprinted concrete surfacing at the pier and catwalk.

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

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

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

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

Table 4.3 Other relevant water quality parameters

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

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

<i>Frequency</i>	<i>Monitoring Depth</i>
<i>3 days/week, 2 tides/day</i>	<i>Surface, middle and bottom</i>

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 station.

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 station. 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



4.9 Monitoring Duration and Period

In-situ measurement was carried out at both mid-flood and mid-ebb at each monitoring station 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 to 22 November 2003						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
09 Nov	10	11	12	13	14	15
	▼		▼		■	
16	17	18	19	20	21	22
			▼		▼ ■	

▼ = 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	1	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	1	0	0
	Limit	0	0	0	0	0	0

Table 4.10 Daily Exceedance summary of marine water quality

09 to 22 November 2003						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
09	10	11	12	13	14	15
	No exceedances in all WMP ^a		No exceedances in all WMP ^a			
16	17	18	19	20	21	22
			No exceedances in all WMP ^a		No exceedances in all WMP ^a	

(^a) indicates WMP = Water Monitoring Parameters

(*) indicates AL = Action Level and (#) indicates LL = Limit Level

According to the summary of marine water monitoring results, no exceedance 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 H.

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 were recorded in this reporting month. Hence, no further mitigation measures were required.

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)	0	Nil
C&D Material (Inert) (m ³)	0	Nil
C&D material (Non-inert) (m ³)	50	Landfill Site
General Refuse (m ³)	15	Public Refuse Collection Point
Chemical Waste (m ³)	0	Nil

8.0 ENVIRONMENTAL AUDIT

8.1 Site Inspection

Site inspections were carried out by the ET at 14 and 21 November 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
Construction Noise Permit	GW-TW0367-03	01/11/03	30/04/03	<ul style="list-style-type: none">• 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

- 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 stations in accordance with the EM&A Manual in this reporting month.

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

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.

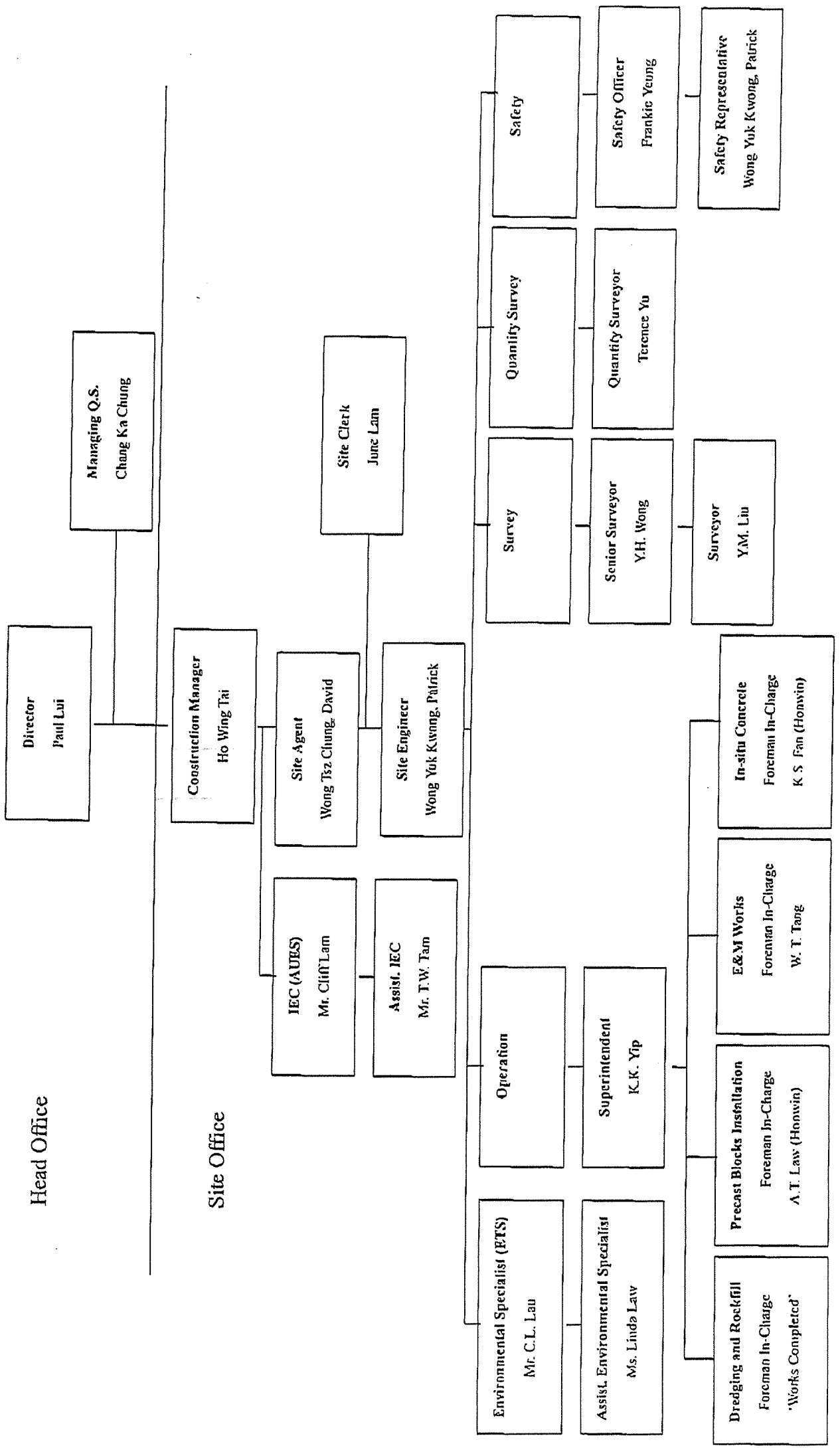
Since the demolition of the old jetty and all marine works were completed on 22 November 2003, no impact marine water quality monitoring will be required. And post marine water quality monitoring is scheduled from 28 November to 27 December 2003. During post marine water quality monitoring, no weekly site inspection should be carried out.



Appendix A

Organization Chart

Construction of Jetty at Lung Kyu Chau
Organization Chart





Appendix B1

Calibration Certificates for Impact Monitoring Equipments



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 AP</u>
Date of Calibration : <u>30 Sept 2003</u>	Calibration Due Date : <u>29 Dec 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	7.11	7.09	7.10	7.03	7.04	7.04
5	5.28	5.30	5.29	5.32	5.33	5.33
10	2.67	2.71	2.69	2.67	2.65	2.66
Linear regression coefficient	0.9995					

Zero Point Checking

DO meter reading, mg/L	0.0
------------------------	-----

Salinity Checking

Salinity (ppt)	DO meter reading, mg/L			Winkler Titration result, mg/L		
	1	2	Average	1	2	Average
10	7.00	7.02	7.01	7.07	7.09	7.08
30	6.66	6.68	6.67	6.79	6.81	6.80

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 Lau

Approved by :



Performance Check of Salinity Meter

Equipment Ref. No. : EW/004/01 Manufacturer : YSI
Model No. : 30 M Serial No. : 97 J0300AA
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 : *R.K.* Approved by : Linda Law



Internal Calibration Report of Turbidimeter

Equipment Ref. No. : ET/0505/004 Manufacturer : HACH
Model No. : 2100P Serial No. : 95110009130
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>550</u> 100 - 1000 NTU Gelex Vial
<u>4.96</u>	<u>53.9</u>	<u>541</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]



Appendix B2
Impact Monitoring Results



Date: 12-11-03

Mid-Flood

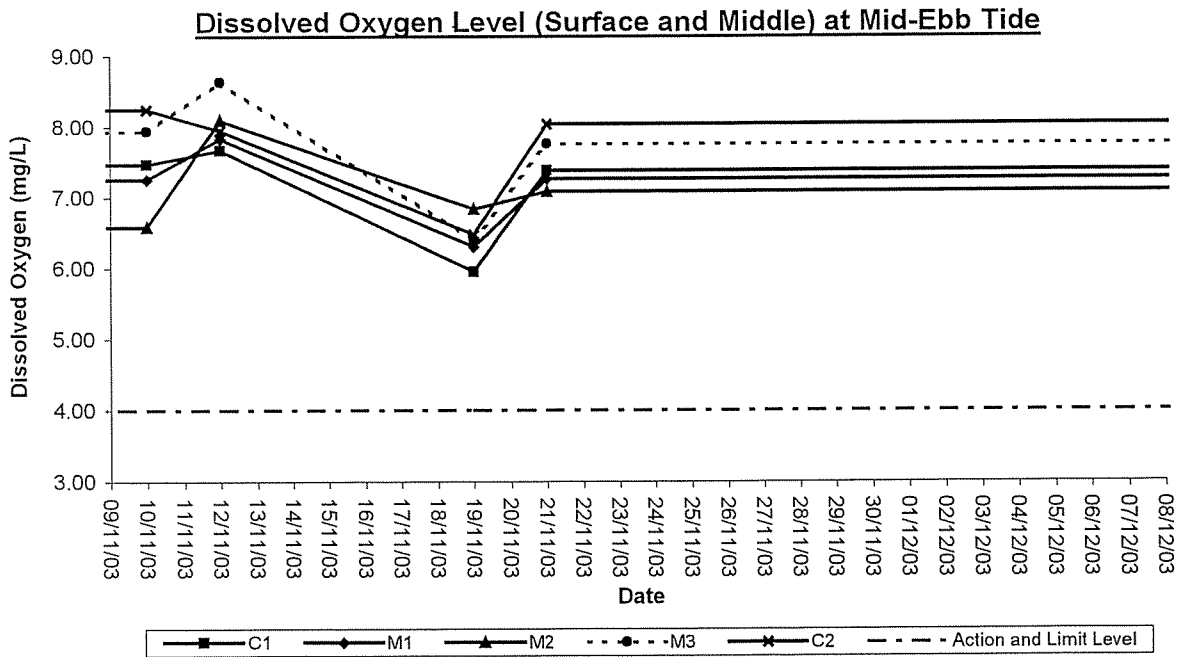
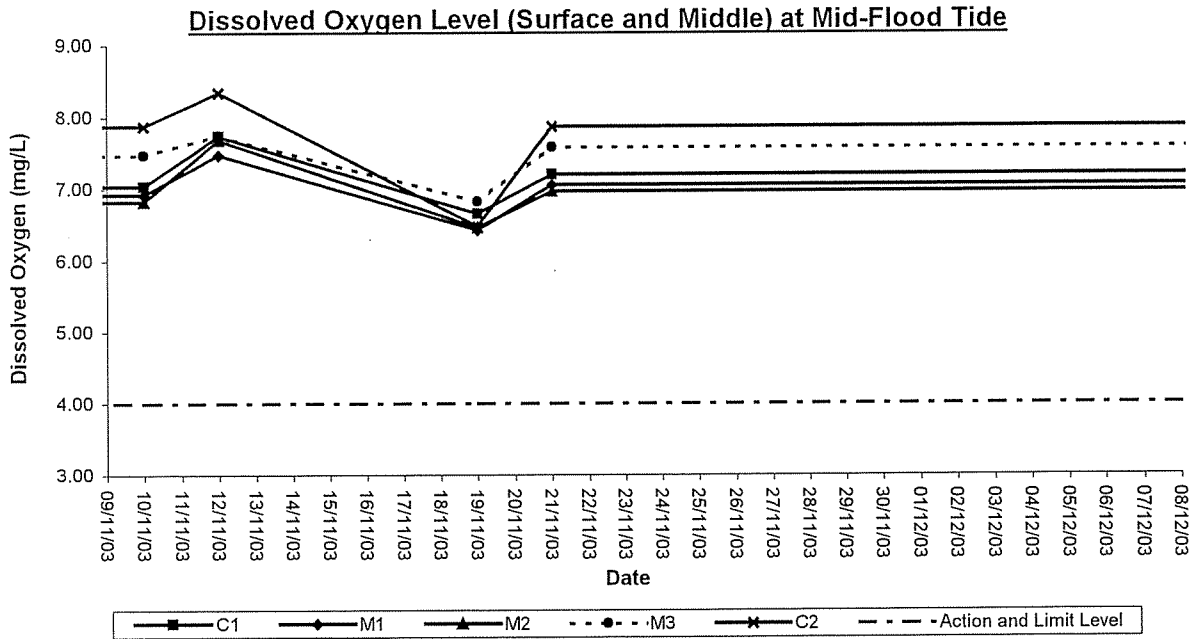
Station	Duration	Ambient Temp (°C)	Weather Condition	Water Depth (m)	Salinity (ppt)												Dissolved Oxygen, DO (mg/L)												Dissolved Oxygen Saturation, DOS (%)												Turbidity (NTU)												Suspended Solids, SS (mg/L)											
					Water Temp (°C)			S				M				B				S			M			B			S			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.	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.	1 st	2 nd	Ave.	1 st	2 nd	Ave.	1 st	2 nd	Ave.																		
					Depth Ave. (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.	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.	1 st	2 nd	Ave.	1 st	2 nd	Ave.	1 st	2 nd	Ave.	1 st	2 nd	Ave.																	
C1	10:47-11:00	14°C	Cloudy	15.6	22.7	22.8	23.0	30.0	30.0	30.2	30.2	30.1	30.1	30.1	7.81	7.74	7.78	7.71	7.63	7.67	7.73	7.63	7.55	7.59	107.9	107.0	107.5	106.5	105.8	106.2	105.3	104.4	104.9	27.1	26.4	26.8	29.1	28.4	28.8	32.4	31.6	32.0	29.2	26	25	26	28	29	29	31	32	32	29											
M1	10:33-10:45	14°C	Cloudy	14.0	22.6	22.7	23.1	29.7	29.7	30.1	30.1	30.1	30.1	7.60	7.51	7.56	7.42	7.34	7.38	7.47	6.99	6.90	6.95	104.3	103.5	103.9	102.5	101.7	102.1	99.8	95.0	95.4	19.2	18.1	18.7	25.1	24.3	24.7	27.6	26.3	27.0	23.4	19	18	19	24	25	25	27	26	27	23												
M2	10:16-10:30	14°C	Cloudy	8.0	22.5	22.6	23.0	28.2	28.2	29.3	29.3	30.1	30.1	7.92	7.83	7.88	7.5	7.4	7.48	7.68	6.90	6.81	6.86	109.5	108.7	109.1	103.9	103.0	103.5	94.6	93.7	94.2	15.9	15.0	15.5	18.4	17.6	18.0	22.1	21.3	21.7	18.4	15	16	16	18	17	18	21	22	22	18												
M3	10:03-10:15	14°C	Cloudy	5.6	22.5	---	23.0	28.0	28.0	---	---	29.6	29.6	29.6	7.78	7.74	---	---	---	7.74	7.74	7.65	7.70	107.5	106.6	107.1	---	---	---	---	107.0	106.2	106.6	13.5	14.4	14.0	---	---	---	35.7	34.6	35.2	24.5	14	14	14	---	---	---	34	35	35	24											
C2	9:50-9:59	14°C	Cloudy	4.8	22.6	---	22.7	30.3	30.3	---	---	30.2	30.2	30.2	8.37	8.30	8.34	---	---	---	8.34	7.85	7.76	7.81	115.7	114.8	115.3	---	---	---	---	108.4	107.5	108.0	31.1	30.4	30.8	---	---	---	15.1	14.4	14.8	22.8	30	29	30	---	---	---	15	14	15	22										

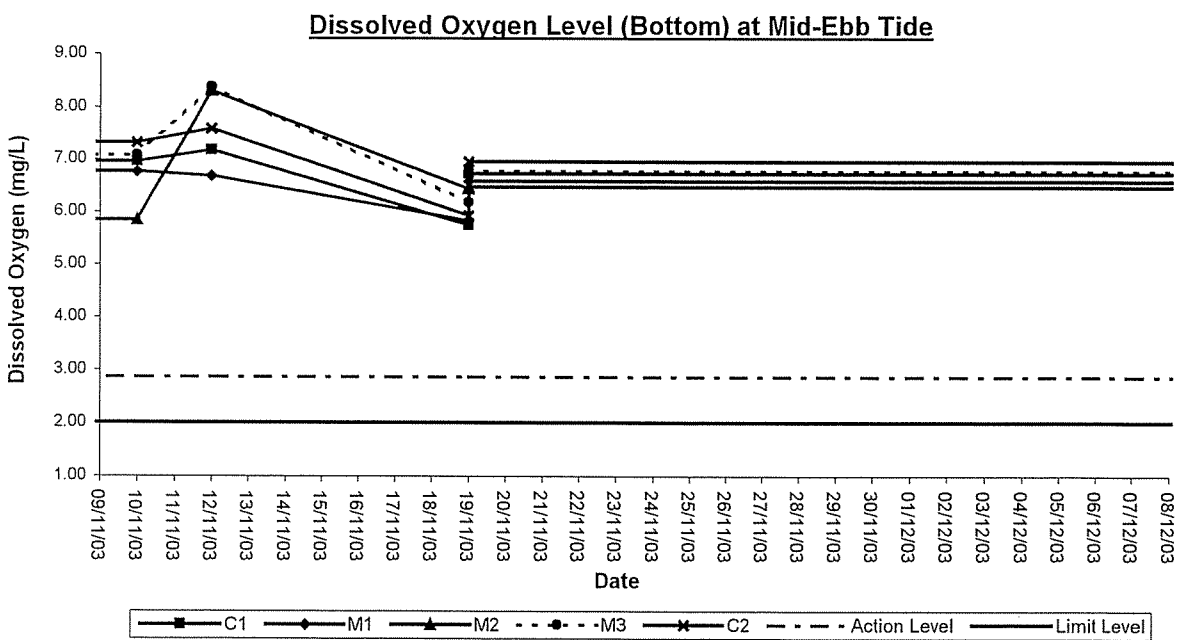
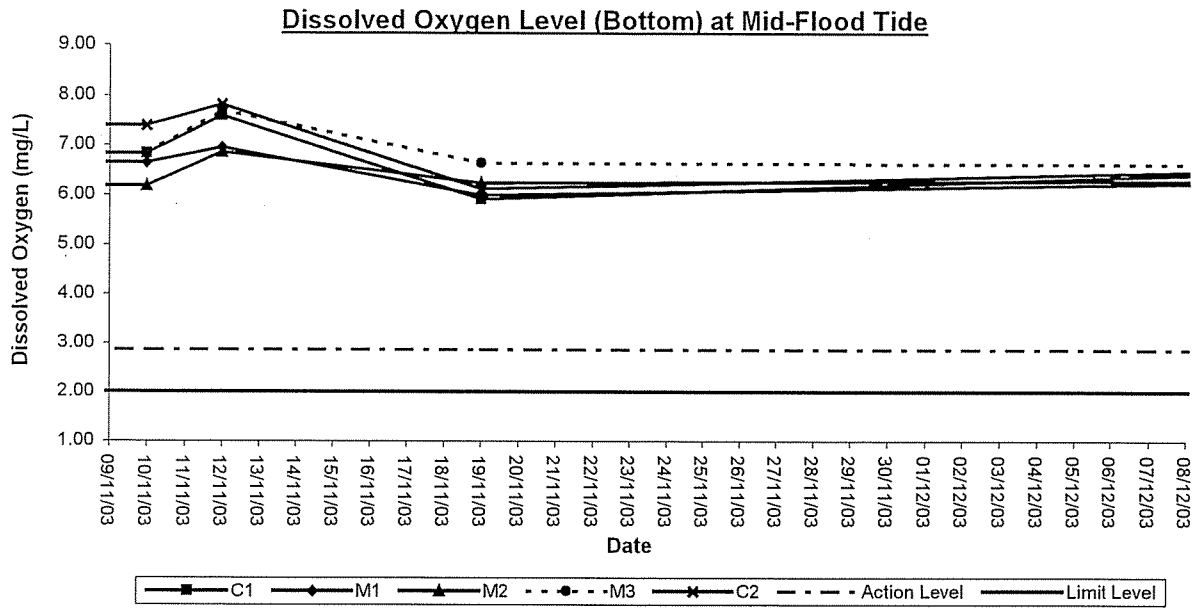
Mid-Ebb

Station	Duration	Ambient Temp (°C)	Weather Condition	Water Depth (m)	Salinity (ppt)												Dissolved Oxygen, DO (mg/L)												Dissolved Oxygen Saturation, DOS (%)												Turbidity (NTU)												Suspended Solids, SS (mg/L)											
					Water Temp (°C)			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.	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.	1 st	2 nd	Ave.	1 st	2 nd	Ave.	1 st	2 nd	Ave.	1 st	2 nd	Ave.															
					Depth Ave. (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.	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.	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	15:03-15:22	15°C	Sunny	16.0	23.7	23.8	23.8	30.9	30.9	30.9	31.1	31.1	31.1	31.1	7.93	7.84	7.89	7.47	7.40	7.44	7.67	7.21	7.13	7.17	110.4	109.5	110.0	103.2	102.3	102.8	99.6	95.7	97.7	17.6	18.4	18.0	21.1	20.4	20.8	15.9	15.0	15.5	18.1	18	18	18	20	21	21	15	15	15	18											
M1	14:55-15:07	15°C	Sunny	14.8	23.6	23.7	23.6	31.0	31.0	31.0	31.4	31.4	31.3	31.3	8.10	8.01	8.06	7.61	7.56	7.59	7.83	6.72	6.64	6.68	112.8	112.0	112.4	105.5	104.6	105.1	90.6	90.0	90.3	16.4	15.7	16.1	17.1	16.2	16.7	16.5	15.7	16.1	16.3	15	16	16	17	16	17	16	15	16	16											
M2	14:38-14:52	15°C	Sunny	7.8	23.7	23.8	23.6	30.9	30.9	30.9	31.1	31.1	---	31.4	31.4	8.54	8.44	8.49	7.7	7.7	7.69	8.09	8.34	8.25	8.30	119.7	118.6	119.2	106.7	106.0	106.4	116.1	115.4	115.8	21.0	20.2	20.6	24.7	23.6	24.2	19.5	18.4	19.0	21.3	21	20	21	24	24	24	19	19	19	21										
M3	14:28-14:37	15°C	Sunny	5.8	23.8	23.4	23.4	30.7	30.7	30.7	---	---	31.0	30.9	31.0	8.67	8.59	8.63	---	---	---	8.63	8.41	8.33	8.37	125.8	124.8	125.3	---	---	---	---	117.4	116.6	117.0	13.2	12.7	13.0	---	---	---	17.6	16.7	17.2	15.1	13	13	13	---	---	---	16	17	17	15									
C2	14:15-14:25	15°C	Sunny	5.4	23.7	---	23.7	30.2	30.2	---	---	31.1	31.1	31.1	7.99	7.90	7.95	---	---	---	7.95	7.61	7.54	7.58	110.3	109.5	109.9	---	---	---	---	105.1	104.3	104.7	16.2	15.4	15.8	---	---	---	19.1	18.4	18.8	17.3	16	15	16	---	---	---	19	18	19	17										



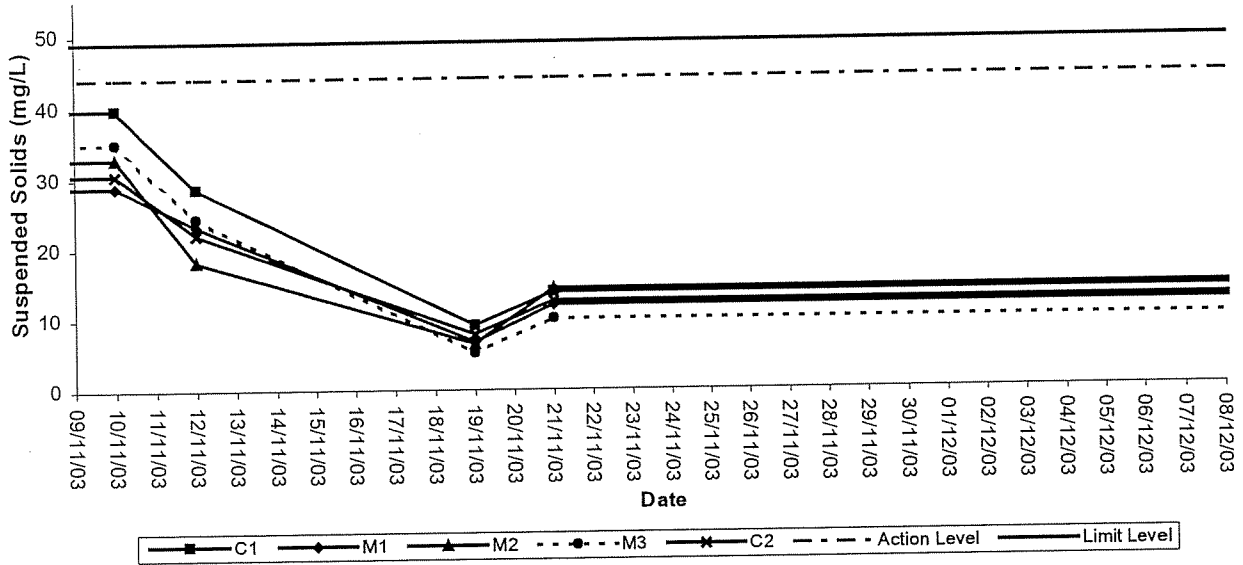
Appendix C
Graphical Plots of Impact Monitoring Data



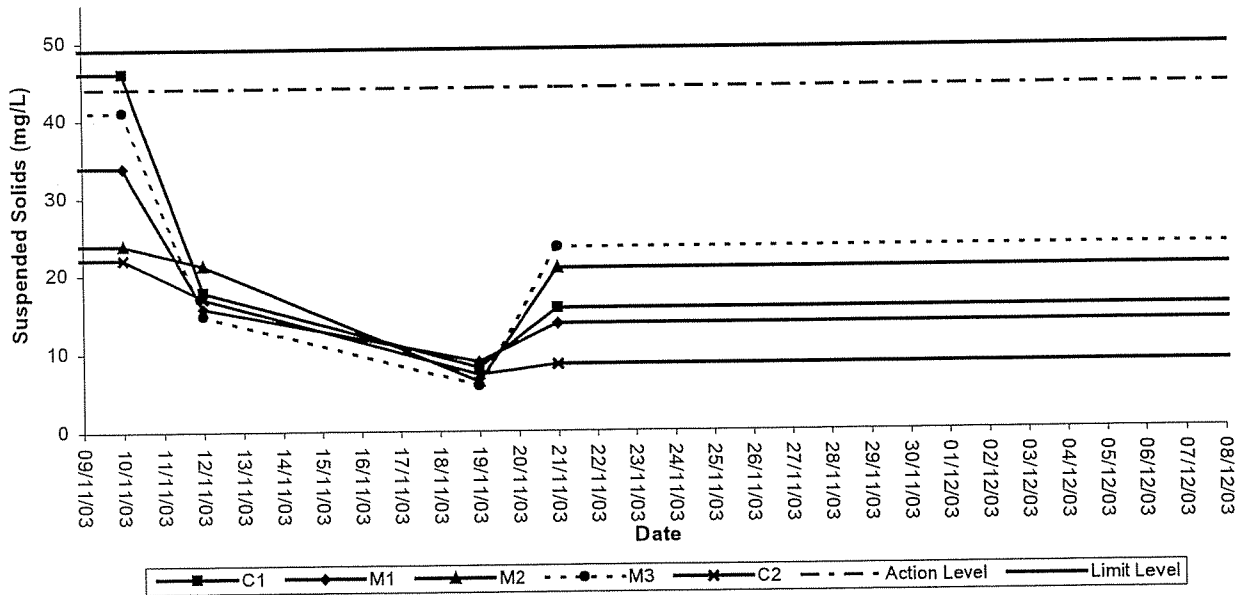




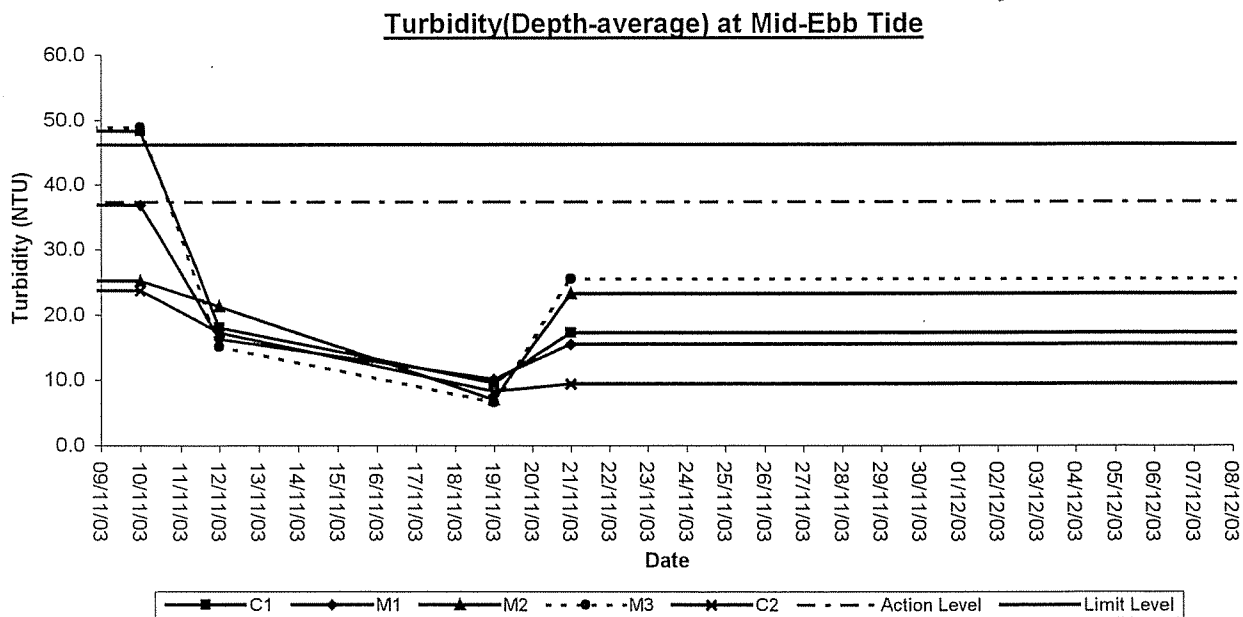
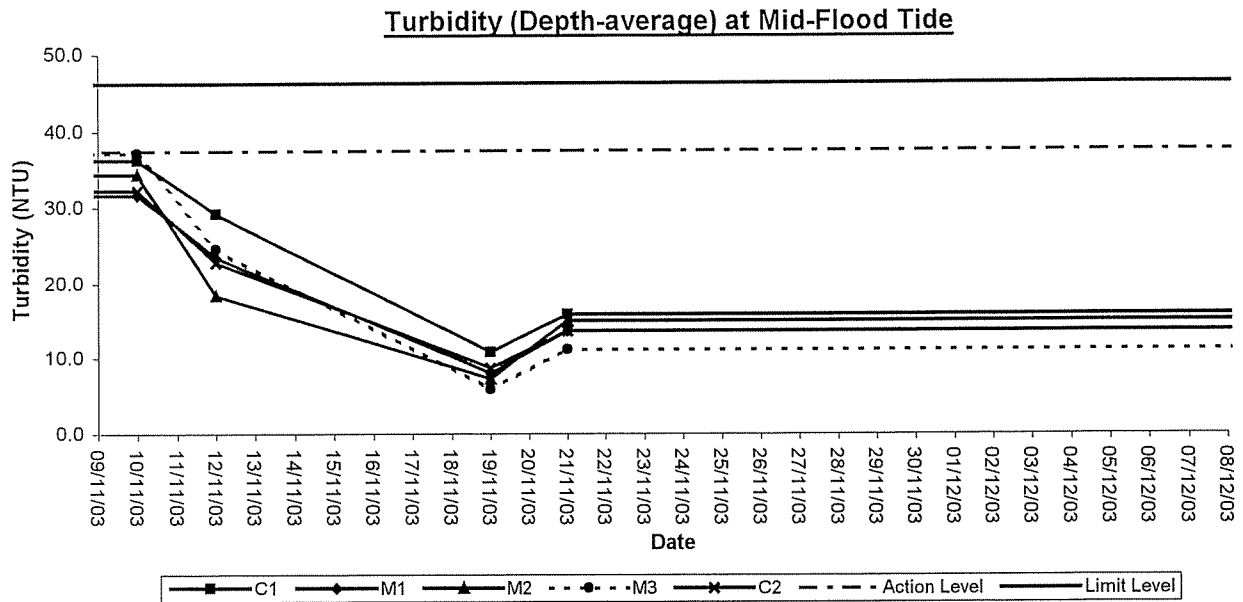
Suspended Solids (Depth-average) at Mid-Flood Tide



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



Remark: No exceedance of Action Level was found at 10/11/03 since Suspended Solids at C1 was less than 120% of Upstream Control Location M3.



Remark: No exceedance of Action Level was found at 10/11/03 since the Turbidity at C1 was less than 120% of Upstream Control Location M3.



Appendix D

Weather Condition during Impact Monitoring



Weather Condition

Date	Rainfall (mm)	Max. Temp (°C)	Min. Temp. (°C)	Relative Humidity (%)	Weather Condition
09/11/03	9.1	24.1	23.2	90	Cloudy
10/11/03	-	23.4	18.1	79	Fine
11/11/03	-	21.4	17.0	68	Fine
12/11/03	-	19.8	15.5	64	Fine
13/11/03	-	21.9	17.0	71	Sunny
14/11/03	-	23.7	20.9	75	Fine
15/11/02	-	26.1	20.8	73	Fine
16/11/03	Trace	24.9	22.8	73	Cloudy
17/11/03	Trace	23.3	21.4	77	Cloudy
18/11/03	2.6	23.3	20.7	85	Cloudy
19/11/03	5.6	23.9	22.3	92	Cloudy
20/11/03	0.1	25.3	23.5	92	Cloudy
21/11/03	-	25.4	20.3	74	Fine
22/11/03	Trace	21.0	17.8	71	Cloudy



Appendix E

Construction Programme of the Project

2004
2003

Description	Quantity	Unit	Activity	Early Start	Early Finish	2003												2004
						April	May	June	July	August	September	October	November	December	January			
PR 1000	0	4 Apr 03	21 May 2003	1 Apr 03	21 May 2003													
PR 1010	71	15 Apr 03	21 May 2003	18 Apr 03	15 May 2003													
PR 2000	219	21 May 2003	20 Dec 03	9 Jan 03	21 Sept 03													
PR 2007	23	20 Dec 03	20 Jan 04															
PR 3100	28	23 Apr 03	21 May 2003	23 Apr 03	21 May 2003													
PR 3200	28	23 Apr 03	21 May 2003	23 Apr 03	21 May 2003													
PR 3300	33	1 Apr 03	21 May 2003	4 Apr 03	31 Apr 03													
PR 3400	28	23 Apr 03	21 May 2003	18 Apr 03	15 May 2003													
PR 4000	31	10 May 2003	29 May 2003	11 Jun 03	4 Aug 03													
PR 4100	60	20 May 2003	20 Jun 2003	1 Aug 03	1 Sep 03													
PR 4200	123	1 May 2003	31 Aug 03															
PR 4300	4		20 Dec 03															
PR 4400	11	23 May 2003	4 Jun 2003	11 Jun 03	27 Jun 03													
PR 4500	20	1 Apr 03	20 Sep 03	23 Sep 03	24 Sep 03													
PR 4600	18	9 Jun 2003	18 Jun 2003	1 July 03	7 July 03													
PR 4700	10	19 Aug 03	28 Aug 03	16 Sep 03	6 Oct 03													
PR 4800	8	11 Oct 03	21 Oct 03	11 Sep 03	17 Sep 03													
PR 4900	3	27 Oct 03	28 Oct 03															
PR 5000	21	19 Jun 2003	9 July 2003	14 July 03	2 Aug 03													
PR 5100	6	28 Aug 03	3 Sept 03	1 Aug 03	3 Aug 03													
PR 5200	40	4 Sept 03	11 Oct 03	11 Aug 03														
PR 5300	10	27 Oct 03	3 Nov 03	30 July 03														
PR 5400	10	19 July 2003	19 July 2003	14 Aug 03	16 Aug 03													
PR 5500	18	20 July 2003	8 Aug 03	27 Aug 03	4 Sept 03													
PR 5600	7	4 Sept 03	10 Sept 03	27 Aug 03	4 Sept 03													
PR 5700	28	21 Sept 03	10 Oct 03															
PR 5800	3	24 Oct 03	28 Oct 03															
PR 5900	10	3 Aug 03	11 Aug 03	15 Sept 03	20 Sept 03													
PR 6000	18	11 Sept 03	20 Sept 03	15 Sept 03	20 Sept 03													
PR 6100	10	20 July 03	29 July 03	20 Aug 03	21 Aug 03													
PR 6200	3	11 Oct 03	13 Oct 03															
PR 6300	10	21 Sept 03	10 Sept 03	3 Aug 03														
PR 6400	18	11 Oct 03	20 Oct 03	30 July 03	20 Sept 03													
PR 6500	15	4 Nov 03	20 Nov 03	4 Aug 03														
PR 6600	140	21 May 03	11 Oct 03	25 Sept 03														
PR 6700	140	24 Jun 03	10 Nov 03															
PR 6800	144	24 July 03	14 Dec 03															
PR 6900	20	6 Nov 03	5 Dec 03															
PR 7000	30	11 Nov 03	10 Dec 03															
PR 7100	21	29 Oct 03	14 Nov 03															
PR 7200	18	21 Nov 03	1 Dec 03															
PR 7300	6	1 Dec 03	1 Dec 03															
PR 7400	13	18 Dec 03	28 Dec 03															

Notes: Program 20 3/04 worth completed



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 @
10/12/2003	99.4	FM1S	7.4	FC1S	100.0
	107.8	FC1M	2.2	EM2S	94.1
	98.3	EM2B	2.7	EC2B	92.3
12/12/2003	105.0	FM1S	5.4	FC1S	96.2
	106.1	FC1M	3.5	EM2S	98.0
	100.8	EM2B	0.0	EC2B	108.0
19/12/2003	98.3	FM1S	4.9	FC1S	102.7
	105.3	FC1M	0.0	EM2S	94.7
	95.8	EM2B	2.9	EC2B	98.3
21/12/2003	105.9	FM1S	2.1	FC1S	107.7
	96.5	FC1M	7.4	EM2S	106.4
	103.6	EM2B	3.2	EC2B	101.5

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>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'). 	√			√	No dredging activities.
				√	No dredging activities.

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. 	✓			
<i>Marine Sediment</i>				
<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. 	✓			No dredging activities.
	✓			No dredging activities.
	✓			No dredging activities.



SUMMARY OF IMPLEMENTATION STATE OF THE MITIGATION MEASURES

Environmental Protection Measures/Mitigation Measures	Implementation Stages*			Remark
	Yes	No	N/A	
Good Site Practices and Waste Reduction Measures				
Good site practices during the construction activities include:				
• 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:				
• 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.	√			



Figures

