

**Central Reclamation, Phase III
Environmental Monitoring & Audit
Monthly Report No. 4
November 2003**

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ACL	Atkins China Limited
CRIII	Central Reclamation Phase III
EIA	Environmental Impact Assessment
EM&A	Environmental Monitoring and Audit
EPD	Environmental Protection Department
ER	Engineer’s Representatives
ET	Environmental Team
IEC	Independent Environmental Checker
LCSD	Leisure and Cultural Services Department
LCSVO-JV	Leighton China State Van Oord Joint Venture
TDD	Territory Development Department
TSP	Total Suspended Particulates

Executive Summary

The Central Reclamation Phase III Works, Contract No. HK 12/02, was awarded to Leighton China State Van Oord Joint Venture (LCSVO-JV) by the Territory Development Department (TDD), Hong Kong Islands and Islands Development Office. The works under the Contract HK 12/02 commenced on 28 February 2003.

Atkins China Limited (ACL) has been appointed by TDD to implement the Environmental Monitoring and Audit (EM&A) programme that was identified in the EIA Report for the CRIII Project and is providing Environmental Team (ET) services during the duration of the construction works.

This is the third Monthly EM&A Report under the EIAO for the works specified in Section 1.3 of the CRIII EIA Report. This report summarises the monitoring results and audit findings of the EM&A programme during the reporting period from 1 November to 30 November 2003.

Environmental Monitoring and Audit Progress

The monthly EM&A programme was undertaken in accordance with the EM&A Manual. A summary of the monitoring activities performed in this reporting month is listed below:

- Environmental site inspections were undertaken on 6, 13, 20, and 27 November 2003.
- Noise monitoring was performed continuously for 24 hours.
- Water quality monitoring was undertaken on the following days:
 - 3 November 2003
 - 5 November 2003
 - 7 November 2003
 - 10 November 2003
 - 12 November 2003
 - 14 November 2003
 - 17 November 2003
 - 19 November 2003
 - 21 November 2003
 - 24 November 2003
 - 26 November 2003
 - 28 November 2003

Exceedance of Action and Limit Levels

There was no environmental air quality monitoring required during the reporting period.

The noise monitoring results for the reporting period did not show any exceedances.

From the analysis of water quality monitoring results collected during the reporting period, no exceedances were identified as directly attributable to the project marine works. However, on several occasions, the dissolved oxygen (DO) and suspended solids (SS) levels exceeded the Action and Limit Levels. Investigations found that they were due to natural variation in ambient conditions and/or local influencing factors. A review of the monitoring results showed that control stations located outside the project's influence had similar values as marine impact stations and seawater intake monitoring data showed variable results with localised exceedances near stormwater outfalls. These findings were similar to the conditions observed during baseline monitoring and silty discharges from outfalls within the project area were documented during the reporting month.

Complaint Log

There were no environmental complaints received during this reporting period.

Notifications of Summons and Prosecutions

There were no notifications of summons or prosecutions received with regard to the environment during this reporting period.

Site Inspection and Audit

Site inspections for the CRIII project works area were undertaken on 6, 13, 20, and 27 November 2003. Several deficiencies were recorded during site inspections carried out on 13 and 20 November 2003. The Contractor was immediately notified and subsequently rectified the deficiencies.

Future Key Issues

Future Key Issues are as follows:

- Dredging that is allowed during the daytime hours at IRAW was completed on 7 November 2003. The remaining dredging area for IRAW lies within the "Star Ferry Zone" and can only be dredged during nighttime hours. Dredging activities are now presently limited within IRAE. The Contractor has requested permission to dredge the remaining area at IRAW between the hours of 00:00 and 06:00. The ET and IEC have provided comments on the Contractor's request to the ER.
- Dredging work at IRAE is limited to an area 100 m outside the "Heliport Exclusion Zone." The delays to the relocation of the Heliport may postpone dredging in this area. Additionally, the marine site investigation within the exclusion zone will not be carried out until the Heliport is relocated.
- Dredging work at IRAE experienced further delays due to an increase in the dredging quantity, interruption of work due to protestors and suspension of rock fill above the seabed level.
- Large quantities of silty discharge, from outfalls within the project area, which were unrelated to project works, have been observed and documented during November 2003. The situation has been reported to EPD and they are currently investigating the issue.

1. INTRODUCTION

1.1 Basic Project Information

The Territory Development Department (TDD) of the Hong Kong Special Administrative Region (HKSAR) is constructing the Central Reclamation Phase III Project (CRIII).

The Main Works Contract HK 12/02 for CRIII commenced on 28th February 2003. Leighton-China State-Van Oord Joint Venture (LCSVO-JV) was awarded the Contract No. HK 12/02 for the construction of the CRIII Engineering Works. Construction works undertaken during the report month include dredging, reclamation up to the original seabed level only, ground investigation work, demolition of Pier No. 7 and temporary traffic and pedestrian diversion work.

Atkins China Limited (ACL) has been commissioned by TDD to undertake the environmental monitoring and audit work for the project in accordance with the Environmental Permit (EP No. EP-122/2002) issued to TDD on 7 March 2002. The CRIII Project Organisation is shown in **Annex A**.

This is the fourth monthly EM&A Report under the EIAO, which presents the results of EM&A work conducted during the period from 1 November to 30 November 2003, inclusive.

2. ENVIRONMENTAL STATUS

2.1 Works Undertaken

The works undertaken during the reporting month were limited to dredging, rockfilling up to the original seabed level at IRAW, marine site investigation for the Eastern Seawall, demolition of Pier No. 7, site investigation work for the Man Yiu Street Foot Bridge, demobilisation of drill rigs for the Central Terminal Building (CTB) site investigation work and preparation for demolition work of the General Post Office (GPO) Walkway.

2.2 Environmental Permits

A summary of the status of all environmental permits, license, and/or notification to EPD for this project during the reporting period are presented in **Table 2.1**.

Table 2.1 - Summary of the Environmental License / Permit Status

Item	Item Description	Date of Application	Permit Status
1	LCSVO-JV submitted a notice to terminate the employment of hopper barges ST11, ST12 and Yuk Yin 28 (Vessel Licence No. 21623V, 21537V and 21335V respectively) for the dumping operation under two valid Marine Dumping Permits (Permit No. EP/MD/04-058 and EP/MD/04-087) effective from 26 November 2003 (Ref. H2189/U2c/4102/MP/CST/EY/ST/cm)	26 November 2003	–
2	LCSVO-JV submitted a Renewal of Construction Noise Permit GW-TS0372-03 (Ref. H2189/U2c/3675/AT/CST/EY/ST/ec)	20 October 2003	Approved on 12 November 2003
3	LCSVO-JV submitted a notice to terminate the employment of hopper barge SB1 (Vessel Licence No. 21630V) for the dumping operation under two valid Marine Dumping Permits (Permit No. EP/MD/04-074) effective from 11 November 2003 (Ref. H2189/U2c/4102/MP/CST/EY/ST/cm)	11 November	–
4	LCSVO-JV submitted an Application for Construction Noise Permit for the use of power mechanical equipment (PME) for the purpose of carrying out construction work other than percussive piling at Initial Reclamation Area East (Ref. H2189/U2c/3538/MP/CST/EY/ST/cm)	14 October 2003	Approved on 3 November 2003
4	LCSVO-JV submitted an Application for Construction Noise Permit for the use of power mechanical equipment (PME) for the purpose of carrying out the demolition of Link Bridge of General Post Office (Ref. H2189/U2c/3512/MP/ATA/CKA/ST/cm)	13 October 2003	Approved on 5 November 2003

2.3 Environmental Document Submission

A summary of the status of the submissions provided during the month of November 2003 is presented in **Table 2.2**.

Table 2.2 - Summary of the Contractor's Environmental Related Document Submissions to the Engineer's Representatives (ER)

Item	Document Title	Version	Date of Submission to ER
1	<i>Photographs of Silty Discharge (12 - 15 November 2003)</i>	-	<i>15 November 2003</i>
2	<i>Photographs of Silty Discharge (3 & 5 November 2003)</i>	-	<i>5 November 2003</i>
3	<i>Proposal for Variation of Further Environmental Permit Condition 3.2(a)</i>	-	<i>3 November 2003</i>
4	<i>Photographs of Silty Discharge (30 Oct and 1 Nov 2003)</i>	-	<i>1 November 2003</i>

A summary of the Environmental Certification Sheet submissions to EPD for the Month of November 2003 is presented in **Table 2.3**.

Table 2.3 - Summary of Environmental Certification Sheet Submissions to the Environmental Protection Department (EPD)

No	Certification Subject	Letter Ref.	Date of Submission to EPD	Approved Status
1	<i>Certification of Monthly Environmental Report No. 3 - October 2003</i>	<i>3128/M45/200/OC5458/AC/al</i>	<i>14 November 2003</i>	-

2.4 Environmental Meetings

During the reporting period the following environmental meetings were held:

- 13 November 2003 – a brief meeting between ACL site staff, EPD's Local Control Officers, the IEC and the ET team was held before a joint environmental site inspection with the above parties.

2.5 Environmental Monitoring Locations

The environmental monitoring locations are provided in **Annex C**.

3. EM&A REQUIREMENTS

3.1 Summary of Impact EM&A Requirements

The EM&A programme requires environmental monitoring for air quality, noise, water quality, waste management and landscape and visual aspects as specified in the CRIII Project EIA. The EM&A requirements for each issue area are described in subsequent sections including:

- All required monitoring parameters;
- Action and Limit Levels; and
- Event-Action Plans.

A summary of impact EM&A requirements is presented in **Table 3-1**.

Table 3.1 - Summary of Impact EM&A Requirements

Parameters	Descriptions	Locations	Frequencies	Duration
TSP	24-Hour TSP	2 Locations	Once every 6 days	During dust generating construction works
	1-Hour TSP	2 Locations	Three times in every 6 days	During dust generating construction works
Noise	Leq (30 mins), L ₁₀ , L ₉₀ .	1 Location	Continuous measurements	Two weeks before Construction and During Construction
Water Quality	Dissolved Oxygen; Salinity; Temp; Suspended Solids; Turbidity.	14 Locations	3 times a week, Mid-ebb/flood tides	During Marine Works
Waste	On-Site Waste Audit	Active Work Sites	Periodically	During Construction
	On-Site Waste Inspection			
Landscape and Visual	Audits to ensure effective implementation of mitigation measures			During Construction
General Site Conditions	Environmental Site Inspection	Works areas and areas affected by works	Periodically	During Construction

3.2 Environmental Quality Performance Limits

Environmental Quality Performance Limits for air, noise and water quality as provided in the Baseline Monitoring Report (Final) are shown in the following table.

Table 3.2 - Summary of Impact EM&A Requirements

Parameter	Station	Action Level	Limit Level		
Air Quality					
1-Hour TSP Level in $\mu\text{g}/\text{m}^3$	City Hall	460 $\mu\text{g}/\text{m}^3$	500 $\mu\text{g}/\text{m}^3$		
1-Hour TSP Level in $\mu\text{g}/\text{m}^3$	PLA	432 $\mu\text{g}/\text{m}^3$	500 $\mu\text{g}/\text{m}^3$		
24-Hour TSP Level in $\mu\text{g}/\text{m}^3$	City Hall	163 $\mu\text{g}/\text{m}^3$	260 $\mu\text{g}/\text{m}^3$		
24-Hour TSP Level in $\mu\text{g}/\text{m}^3$	PLA	154 $\mu\text{g}/\text{m}^3$	260 $\mu\text{g}/\text{m}^3$		
Noise Quality					
07:00-19:00 hrs on normal weekdays	City Hall	When one documented complaint is received	75 dB(A)		
07:00-23:00 hrs on holidays; and 1900-2300 hrs on all other days	City Hall	When one documented complaint is received	60/65/70* dB(A)		
23:00-07:00 hrs of next day	City Hall	When one documented complaint is received	45/50/55* dB(A)		
Marine Water Quality - Marine Based Stations ^A					
DO (mg/L)	Surface & Middle	4.7 mg/L		4.0 mg/L	
	Bottom	Wet	Dry	Wet	Dry
		3.2	4.9	2.0	2.0
SS (mg/L)	Depth-avg	Wet	Dry	Wet	Dry
		10	11	12	14
Turbidity (NTU)	Depth-avg	Wet	Dry	Wet	Dry
		11	14	13	18
Marine Water Quality - Seawater Intakes ^B					
DO (mg/L)	All	4.6 mg/L		3 mg/L	
SS (mg/L)	M1	11 mg/L		14 mg/L	
	M2	23 mg/L		27 mg/L	
	M3	13 mg/L		16 mg/L	
	M4	10 mg/L		12 mg/L	
	M5	12 mg/L		17 mg/L	
	M6	11 mg/L		14 mg/L	
	M11	11 mg/L		13 mg/L	
	M12	11 mg/L		12 mg/L	

Notes: A - Only for Stations M8 & M10

B - Although the majority of the intake stations are located within close proximity of each other, separate Action and Limit Levels have been established due to the number of influencing factors affecting the stations (i.e. outfalls and storm drains).

3.3 Event Action Plan

The Event Action Plans for air, noise and water quality as provided in the Baseline Monitoring Report (Final) are shown in **Annex E**.

3.4 Implementation of Environmental Measures

The Contractor is required to implement mitigation measures listed in the EIA Report, EM&A Manual and Further Environmental Permit. During routine site inspections, the Contractor's implementation of mitigation measures is reviewed. With regard to mitigation measures for water quality, the Contractor carried out daily visual inspection of the silt screens for seawater intakes. Bi-weekly diving inspections for the silt screens were also carried out in November 2003. During the month of November, there were no records of the Contractor not implementing relevant mitigation measures.

4. MONITORING RESULTS

4.1 Impact Monitoring Schedule in November 2003

Regular site inspections were carried out to assess whether the project's environmental protection and pollution control measures are in compliance with the contract specifications. Inspections were conducted on 6, 13, 20, and 27 November 2003.

Air quality monitoring has not commenced yet as no work areas or construction activities with the potential to impact air quality are within range of the closest air quality sensitive receivers.

Continuous 24-hour noise monitoring was conducted during this report period.

Impact water quality monitoring at all monitoring stations was undertaken during this reporting month. Ad-hoc monitoring on a daily basis was conducted between 4 and 8 November 2003 due to an observed rise in turbidity levels on 3 November 2003. The ad-hoc monitoring later found that the rise in turbidity levels was not due to project works. The water quality monitoring schedule for November 2003 is presented in **Table 4-1**.

Table 4.1 - Water Quality Monitoring Programme (Seawater Intakes Stations)

Date of Sampling	Tidal State	Timing of Sampling
3 November 2003	Mid Ebb	07:03 - 10:59
	Mid Flood	14:06 - 17:07
4 November 2003 *	Mid Flood	14:47 - 17:40
5 November 2003 *	Mid Ebb	09:02 - 11:59
	Mid Flood	15:00 - 17:58
6 November 2003 *	Mid Ebb	09:15 - 12:06
	Mid Flood	15:37 - 18:11
7 November 2003 *	Mid Ebb	10:03 - 13:21
	Mid Flood	15:02 - 18:06
8 November 2003 *	Mid Ebb	11:30 - 14:19
	Mid Flood	06:54 - 09:35
10 November 2003	Mid Ebb	10:43 - 13:21
	Mid Flood	16:12 - 18:47
12 November 2003	Mid Ebb	12:42 - 15:19
	Mid Flood	07:24 - 10:08
14 November 2003	Mid Ebb	13:57 - 16:35
	Mid Flood	08:23 - 11:20
17 November 2003	Mid Ebb	07:08 - 10:00
	Mid Flood	15:34 - 18:25
19 November 2003	Mid Ebb	07:28 - 10:06
	Mid Flood	14:00 - 16:35
21 November 2003	Mid Ebb	08:52 - 11:58

Date of Sampling	Tidal State	Timing of Sampling
	Mid Flood	14:54 - 17:45
24 November 2003	Mid Ebb	10:38 - 13:34
	Mid Flood	15:37 - 18:21
26 November 2003	Mid Ebb	12:30 - 15:05
	Mid Flood	07:24 - 10:57
28 November 2003	Mid Ebb	13:29 - 17:28
	Mid Flood	08:36 - 12:18

Note: * Ad-hoc monitoring on a daily basis was conducted between 4 and 8 November 2003.

4.2 Monitoring Methodology

4.2.1 Air Quality Monitoring

Air quality monitoring will be performed in accordance with the methodology described in the EM&A Manual once construction activities requiring air quality monitoring commence. The locations of the monitoring stations at City Hall and PLA Headquarters are shown in **Annex C**.

4.2.2 Noise Quality Monitoring

Continuous 24-hour noise monitoring was performed in accordance with the methodology described in the EM&A Manual in the reporting period. The location of the noise monitoring station at City Hall is shown in **Annex C**.

4.2.3 Water Quality Monitoring

Water quality monitoring was performed in accordance with the methodology described in the EM&A Manual. Monitoring for the reporting month was conducted at all stations, which comprises of 6 marine-based stations and 8 seawater intake stations. The locations of the monitoring stations are shown in **Annex C**.

4.3 Monitoring Equipment

4.3.1 Air Quality

The equipment that is used for air quality monitoring is listed in **Table 4-2**.

Table 4.2 - Equipment for Air Quality Monitoring

Parameter Measured	Equipment
24-Hour Sampling	High Volume Sampler Model GS2310 by Anderson Instruments to be used for both monitoring stations.
1-Hour Sampling	MicroDust pro Aerosol Monitoring System to be used for both monitoring locations.

4.3.2 Noise Quality

The equipment used for continuous noise quality monitoring is listed in **Table 4-3**.

Table 4.3 - Noise Monitoring Equipment

Equipment	Model
Integrated Sound Level Meter	B&K 2238
Calibrator	B&K 4231, Class 1

4.3.3 Water Quality

The equipment that was used for water quality monitoring is listed in **Table 4-4**.

Table 4.4 - Equipment Used for Marine Water Quality Monitoring

Parameter Measured	Equipment
Dissolved Oxygen and Temperature Measuring Equipment	<p>A Dissolved Oxygen meter YSI model 58 was used.</p> <ul style="list-style-type: none"> This instrument was portable and weatherproof and used a DC power source. The equipment was capable of measuring: DO levels in the range of 0-20 mg/l and 0-200% saturation; and Temperature of between 0 - 45 degree Celsius. The equipment had a membrane electrode with an automatic temperature compensation complete with a cable. In addition, a Wirling Psychrometer was used as a reference thermometer during the sampling.
Turbidity Measurement Instrument	<p>A Turbidimeter, HACH model 2100P was used for determining turbidity levels. The instrument is portable and weatherproof and uses a DC power source. The instrument includes a photoelectric sensor capable of measuring turbidity between 0-1000 NTU.</p>
PH	<p>A MP125 pH Meter from Mettler Toledo was used to measure pH.</p>
Salinity / Conductivity Meter	<p>A Salinity / Conductivity meter YSI model 63 and model 30 was used for determining salinity concentrations.</p>
Sample Containers and Storage	<p>Water samples for SS analysis were stored in high density polythene bottles with no preservative added, packed in ice and delivered to the laboratory, and analysed as soon as possible after collection.</p>

4.4 Impact Monitoring Results

4.4.1 Air Quality & Noise Monitoring Results

No air quality monitoring work was undertaken during the reporting period as no work areas or construction activities with the potential to impact air quality are within range of the closest air quality sensitive receivers.

Noise quality monitoring work was undertaken during the reporting period. The noise monitoring results are provided in **Annex F**. Graphical representation of the noise monitoring data is provided in **Annex G**.

4.4.2 Water Quality Monitoring Results

Water quality monitoring was undertaken at all water quality monitoring locations during the reporting period. The water quality monitoring results from this reporting period are presented in **Annex H**. Graphical representation of the water quality data is provided in **Annex I**. Summaries of the results are provided in Tables 4.5 to 4.9.

Marine-Based Stations

Monitoring stations M8 and M10 were selected as the marine-based impact stations as they are located outside the predicted influence of the dredging and reclamation works. The detection of water quality degradation at these two stations may indicate that project marine works are adversely affecting water quality in Victoria Harbour. Stations M7 and M9 are within the expected influence of the reclamation activities and are located along the works area boundary (or extent of the predicted sediment plume). As such, M7 and M9 are used as indicator stations to note any significant elevations in SS, turbidity or reductions in DO that may affect the marine-based impact monitoring stations.

Table 4.5 is a summary of the marine-based stations monitoring results during mid-ebb tide.

Table 4.5 - Summary of Mid-Ebb Results for Marine-Based Stations

Station		Parameter				
		DO (S&M) mg/L	DO (B) mg/L	DO % Sat. (DA)	Turbidity (DA) NTU	SS (DA) mg/L
C1	min	5.1	4.7	72.4	3.0	4
	max	6.0	5.8	86.7	7.9	15
	avg	5.4	5.2	76.5	4.9	7
	sd	0.3	0.4	3.6	1.3	3
C2	min	4.5	4.9	70.0	2.4	5
	max	5.8	5.8	79.4	6.3	7
	avg	5.3	5.3	75.4	4.2	6
	sd	0.4	0.3	3.3	1.3	1
M7	min	4.0	4.0	59.5	3.5	5
	max	5.4	5.5	74.6	7.4	10
	avg	4.8	4.8	67.8	5.0	7
	sd	0.4	0.4	4.7	1.0	1
M8	min	4.2	4.1	61.8	3.5	5
	max	5.7	5.7	82.6	7.0	8
	avg	5.0	4.9	70.9	4.9	6
	sd	0.5	0.5	6.1	1.1	1

Station		Parameter				
		DO (S&M) mg/L	DO (B) mg/L	DO % Sat. (DA)	Turbidity (DA) NTU	SS (DA) mg/L
M9	min	4.1	4.2	61.3	3.6	5
	max	5.4	5.4	75.4	8.3	12
	avg	4.8	4.8	68.6	5.5	8
	sd	0.4	0.3	4.4	1.4	2
M10	min	4.4	4.3	64.0	3.4	5
	max	5.6	5.7	79.1	6.1	9
	avg	5.1	5.0	71.7	4.5	7
	sd	0.3	0.4	4.5	1.0	1

As Table 4.5 shows, DO levels at marine-based impact stations (M8 & M10) in the surface to middle layer during mid-ebb survey ranged between 4.2 and 5.7 mg/L with an average value of 5.0 mg/L and DO measurements in the bottom layer ranged from 4.1 to 5.7 mg/L with an average level of 5.0 mg/L. Similar DO levels were recorded at the control stations at which DO levels in the surface to middle layer during mid-ebb survey ranged from 4.5 to 6.0 mg/L with an average value of around 5.4 mg/L; DO measurements in the bottom layer ranged between 4.7 and 5.8 mg/L with an average level of 5.3 mg/L.

SS levels during mid-ebb tide ranged from 5 to 9 mg/L with an average value of 7 mg/L at the marine-based impact stations (M8 & M10), which is comparable to results from the control stations in which SS content ranged from 4 to 15 mg/L with an average of 7 mg/L. The results showed no clear gradient effect (high SS and low DO levels from near-field stations M7 and M9 to far-field stations M8 and M10), which indicates that dredging works are not adversely affecting marine water quality outside the work site boundary in Victoria Harbour. Marine water quality at impact monitoring stations was found to be similar to that at the control stations also indicating that project marine works were adversely affecting water quality in Victoria Harbour.

Table 4.6 is a summary of monitoring results from marine-based stations during mid-flood tide.

Table 4.6 - Summary of Mid-Flood Results for Marine-Based Stations

Station		Parameter				
		DO (S&M) mg/L	DO (B) mg/L	DO % Sat. (DA)	Turbidity (DA) NTU	SS (DA) mg/L
C1	min	5.2	4.7	70.5	2.6	5
	max	5.8	5.8	85.7	10.2	15
	avg	5.4	5.3	76.6	5.9	8
	sd	0.2	0.3	3.5	2.1	3
C2	min	4.9	5.1	72.8	2.5	4
	max	5.9	5.8	85.8	8.0	9
	avg	5.4	5.4	76.5	4.5	6
	sd	0.3	0.3	3.7	1.4	1
M7	min	3.8	3.8	56.0	4.3	5
	max	5.3	5.2	73.7	8.3	11
	avg	4.7	4.6	65.9	5.8	8
	sd	0.4	0.4	4.0	1.2	2

Station		Parameter				
		DO (S&M) mg/L	DO (B) mg/L	DO % Sat. (DA)	Turbidity (DA) NTU	SS (DA) mg/L
M8	min	4.2	4.2	62.4	3.9	6
	max	5.6	5.6	78.9	6.8	10
	avg	4.9	4.9	69.4	5.3	7
	sd	0.4	0.4	5.0	0.9	1
M9	min	3.9	3.9	57.4	3.2	4
	max	5.4	5.4	76.1	7.9	11
	avg	4.8	4.7	67.8	5.7	8
	sd	0.4	0.4	4.2	1.3	2
M10	min	4.3	4.2	63.0	3.0	5
	max	5.6	5.6	79.0	7.1	11
	avg	5.0	4.9	70.4	5.1	8
	sd	0.3	0.4	4.5	1.2	2

During mid-flood tide, DO levels at marine-based impact stations (M8 & M10) in the surface to middle layer ranged from 4.2 to 5.6 mg/L with an average level of 5.0 mg/L while DO values in the bottom layer ranged between 4.2 and 5.6 mg/L with an average of 4.9 mg/L. Similar DO concentrations were recorded at the control stations in the surface to middle layer during mid-flood survey ranged between 4.9 and 5.9 mg/L with an average value of 5.4 mg/L and DO results in the bottom layer ranged from 4.7 and 5.8 mg/L with an average of 5.4 mg/L.

SS content ranged between 5 and 11 mg/L (for stations M8 & M10) with an average of 8 mg/L during mid-flood tide and ranged from 4 to 15 mg/L with an average value of 7 mg/L at the control stations. Again, the results showed no clear gradient effect and no significant difference between control stations and marine-based impact stations. Therefore, the marine-based station results indicate that during the month of November the dredging works were not adversely affecting water quality outside the work site boundary.

Seawater Intake Stations

Table 4.7 is a summary of monitoring results from seawater intake stations during mid-ebb tide.

Table 4.7 - Summary of Mid-Ebb Results for Seawater Intake Stations

Station		Parameter			
		DO mg/L	DO % Sat.	Turbidity NTU	SS mg/L
M1	min	3.7	54.9	4.8	7
	max	5.5	82.0	8.1	10
	avg	4.5	66.4	6.6	9
	sd	0.5	7.7	0.9	1

Station		Parameter			
		DO mg/L	DO % Sat.	Turbidity NTU	SS mg/L
M2	min	3.7	53.0	4.3	8
	max	5.6	83.0	11.7	22
	avg	4.5	65.3	8.6	13
	sd	0.5	7.7	2.2	3
M3	min	2.5	37.9	4.2	8
	max	6.2	91.2	14.4	19
	avg	4.4	63.4	8.1	12
	sd	0.9	12.2	2.5	3
M4	min	3.9	56.5	5.6	5
	max	6.0	87.5	9.6	12
	avg	4.7	67.9	7.7	9
	sd	0.5	7.7	1.2	2
M5	min	3.6	54.1	4.5	5
	max	6.6	96.7	11.2	16
	avg	4.8	69.6	8.2	9
	sd	0.7	9.5	2.4	3
M6	min	3.8	56.0	3.9	6
	max	5.0	72.0	12.0	14
	avg	4.5	64.3	7.6	9
	sd	0.4	4.5	2.4	3
M11	min	3.8	56.5	4.0	6
	max	5.4	78.5	10.5	10
	avg	4.5	65.8	7.7	8
	sd	0.5	6.6	1.8	1
M12	min	3.6	53.0	4.0	5
	max	5.5	80.3	12.2	19
	avg	4.5	65.1	7.5	9
	sd	0.6	7.5	2.5	3

Seawater intake results during mid-ebb tide, Table 4.7, show that DO levels ranged from 2.5 to 6.6 mg/L with an average of 4.6 mg/L. SS ranged between 5 and 22 mg/L with an average value of 9.8 mg/L. The monitoring results show that water quality at seawater intake stations, particularly at M2 and M3, was generally poorer than that at marine-based stations. The baseline monitoring results have demonstrated similar conditions. The low DO levels are expected to be attributable to adverse influencing factors such as discharges from outfalls in proximity to the monitoring points and poor seawater flushing in the area. Localised high SS levels were also recorded at distant station M12, which is outside the influence of project marine works at the current stage, on several occasions. The poor water quality at M6 is also due to adverse impacts from outfalls located adjacent to the station. During the reporting month large quantities of silty discharges from outfalls were observed and documented near station M5 on various occasions. Observations noted that the large patches of brown silty water generally dispersed westwards after discharge from the outfall. A figure showing the location of various outfalls along the seawall within the project area is shown in **Annex C**.

Table 4.8 is a summary of monitoring results from seawater intake stations during mid-flood tide.

Table 4.8 - Summary of Mid-Flood Results for Seawater Intake Stations

Station		Parameter			
		DO mg/L	DO % Sat.	Turbidity NTU	SS mg/L
M1	min	3.3	49.7	5.1	7
	max	5.2	75.7	9.1	12
	avg	4.3	63.6	7.0	9
	sd	0.5	7.1	1.2	1
M2	min	3.6	54.7	5.7	7
	max	5.5	78.5	11.1	17
	avg	4.4	64.4	8.3	12
	sd	0.5	6.6	1.7	3
M3	min	3.5	51.9	6.7	8
	max	5.2	74.6	15.1	16
	avg	4.3	62.3	9.2	12
	sd	0.5	6.7	2.4	3
M4	min	3.8	56.7	5.7	7
	max	5.4	77.6	11.3	14
	avg	4.6	67.0	8.2	10
	sd	0.4	6.5	1.8	3
M5	min	3.9	57.7	5.1	6
	max	5.7	80.7	10.4	13
	avg	4.6	66.2	7.8	9
	sd	0.5	6.6	1.5	2
M6	min	3.5	52.1	4.1	6
	max	5.0	71.4	11.6	13
	avg	4.2	61.0	7.9	9
	sd	0.4	6.1	2.0	2
M11	min	3.9	57.6	5.4	8
	max	6.0	87.8	13.5	21
	avg	4.7	67.4	9.2	11
	sd	0.6	8.4	2.2	3
M12	min	3.5	51.7	3.7	5
	max	5.2	73.3	12.3	14
	avg	4.2	60.5	7.8	9
	sd	0.5	5.9	2.3	3

During mid-flood survey, Table 4.8 shows that DO levels at seawater intake stations ranged from 3.5 to 6.0 mg/L with an average of 4.4 mg/L. SS ranged from 5 to 21 mg/L with an average SS content of 10 mg/L. The above results show that water quality at seawater intake stations, particularly at M2 and M3, was generally poorer than that at marine-based stations. The baseline monitoring results demonstrated similar conditions. The low DO levels are attributable to adverse influencing factors such as discharges from outfalls in proximity to the monitoring points and poor seawater flushing in the area. Stations M3 and M11 recorded high SS levels on

a few occasions but investigations into the levels determined that they were not due to project works as other stations near the dredging works recorded significantly lower levels during the same sampling time. Localised high SS levels were also recorded at distant station M12, which is outside the influence of project marine works at the current stage, on several occasions. The poor water quality at several seawater intake stations is due to adverse impacts from outfalls located adjacent to the station. As mentioned previously, large quantities of silty discharges from outfalls near station M5 have been observed and documented on various occasions during the reporting month. A figure showing the location of various outfalls along the seawall within the project area is shown in **Annex C**.

4.4.3 Waste Management

No waste management audit was scheduled within this reporting period. The arrangement of waste management audit will be detailed in the Waste Management Plan.

4.4.4 Landscape and Visual

As the works undertaken during the reporting month were related to site investigation works, minor demolition works and dredging works, the landscape and visual impacts are considered to be minimal.

5. ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

5.1 Environmental Exceedances

The total number of exceedances for air, noise and water quality are presented in following sections.

5.1.1 Air Quality

No air quality monitoring work was undertaken during the reporting period.

5.1.2 Noise Quality

No exceedances of noise quality were observed during the reporting period.

5.1.3 Water Quality

DO levels were found to have exceeded the Action Level at marine-based stations during the reporting month. Investigations found that they were due to natural variation or changes in ambient conditions and not caused the project marine works. It was noted that during the reporting month, water quality at marine-based impact monitoring stations (M8 and M10) was found to be similar to the control stations and the ambient level of DO increased slightly from the previous month. However, DO concentrations of less than 4.7 mg/L were still recorded during this period, which is consistent with EPD's routine water quality monitoring results during the month of November in recent years (see **Annex K**).

The November 2003 monitoring results also showed occasional elevated concentrations of SS above the Action and/or Limit Level at seawater intake stations. Investigations into these monitoring results found that the SS levels may be attributed to discharge influences from outfalls located in proximity of seawater intake monitoring stations. All of the high SS concentrations recorded were shown to be localised conditions as no sediment plumes were detected at the marine-based impact stations and no unusual concentrations were measured at adjacent monitoring stations during the same time. High SS levels were often recorded at locations (stations M1 to M6) with outfalls and stormwater culverts that discharge into the harbour. Baseline monitoring results showed similar localised elevated concentrations of SS.

5.1.4 Waste Management

No non-compliances with regard to waste management were recorded in the reporting month.

5.1.5 Landscape and Visual

No non-compliance with regard to landscape and visual aspects were recorded in the reporting month.

5.1.6 Site Environmental Audit

No environmental non-compliances were found during environmental site inspections conducted during the reporting period. A joint site environmental inspection with EPD's Local Control Officers and the IEC was conducted on 13 November 2003.

During the inspection carried out on 13 November 2003, two deficiencies were noted. The first deficiency found was that the dust screen in the immediate area next to the demolition works at Pier No. 7 did not provide sufficient enclosure. The second deficiency was that a small chemical container at the chemical storage area was not labelled. An additional minor deficiency was found on the site inspection conducted on 20 November 2003. The deficiency was that a chemical container on the Wharf barge was not properly capped. The Contractor rectified all deficiencies after being notified.

5.2 Environmental Complaint and Prosecution

No environmental complaints were received during the reporting period. Further, no environmental prosecution notices or summons were received during the reporting period.

6. FORECAST AND SCHEDULE

6.1 Key Issues for the Coming Month

The key issues to be considered in the coming month include the following:

- The Contractor has proposed to carry out alternate dredging at IRAE and IRAW to complete the remaining part of IRAW within the Star Ferry operation zone. An additional monitoring programme for the alternate dredging trial is being proposed and discussed with the Contractor, ER, IEC and ET;
- The suspension of critical marine works and the possibility of a further protracted suspension of works is an area of concern.

6.2 Monitoring Schedules for the Next 3 Months

The construction works scheduled in December 2003 include dredging at IRAE, demolition of Pier No. 7, marine site investigation for the Eastern Seawall and site investigation works. Based on the Contractor's programme, the Environmental Monitoring Programme for the next three months is planned as follows:

TSP (24 hr and 1 hr monitoring)

Upon commencement of dust generating activities within range of the closest air quality sensitive receiver, dependent upon the Contractor's programme.

Noise (Continuous Measurements)

The noise monitoring programme throughout the entire construction period is 24-hour continuous.

Water Quality Monitoring

The water quality monitoring schedule for the next 3 months is provided in the following table.

Table 6.1 - Water Quality Monitoring Programme

Date of Sampling	Sampling Time	
1 December 2003	08:30	14:10
3 December 2003	08:30	15:18
5 December 2003	10:03	16:12
8 December 2003	11:30	17:00
10 December 2003	12:00	17:30
12 December 2003	09:00	14:30
15 December 2003	08:00	16:01
17 December 2003	12:00	17:30
19 December 2003	08:30	14:48
22 December 2003	11:23	16:38
24 December 2003	08:00	13:30

Date of Sampling	Sampling Time	
26 December 2003	09:00	14:38
29 December 2003	12:00	17:30
31 December 2003	08:30	14:00
2 January 2003	08:30	14:33
5 January 2003	10:30	16:00
7 January 2003	11:30	17:00
9 January 2003	08:30	14:00
12 January 2003	10:00	15:30
14 January 2003	11:39	17:25
16 January 2003	08:30	14:00
19 January 2003	10:00	15:30
21 January 2003	12:00	17:30
24 January 2003	09:00	14:30
26 January 2003	10:14	15:52
28 January 2003	11:25	17:00
30 January 2003	12:00	17:30
2 February 2003	10:18	17:00
4 February 2003	11:00	16:30
6 February 2003	12:00	17:30
9 February 2003	08:48	14:21
11 February 2003	09:52	15:48
13 February 2003	11:05	17:00
16 February 2003	09:15	17:00
18 February 2003	11:00	16:30
20 February 2003	12:00	17:30
23 February 2003	08:43	14:32
25 February 2003	09:30	15:40
27 February 2003	10:14	17:00

6.3 Construction Programme for the Next 3 Months

The construction programme for the next 3 months is provided in **Annex B** and will be updated by the Contractor.

The ET will follow the Contractor's proposed programme to ensure the compliance of environmental performance and proper implementation of all necessary mitigation measures.

7. CONCLUSION

During the reporting period, no exceedances of environmental performance criteria were found to be caused by the project works. For water quality monitoring, low DO levels and elevated SS concentrations recorded were investigated and have been attributed to either ambient conditions or adverse influencing factors unrelated to project marine works. Daily ad-hoc monitoring was conducted between 4 and 8 November 2003 due to an observed rise in turbidity levels on 3 November. However, the monitoring results and an investigation later found that the temporary rise in levels was not due to project works. It was found that discharges from outfalls and stormwater culverts located near seawater intake monitoring stations are major influencing factors that adversely impact water quality within the works site area.

The marine-based impact monitoring stations established to monitor the overall impact of the reclamation activities on water quality in Victoria were shown to have similar results as the control stations which are located outside the influence of project works. As such, the water quality monitoring results did not indicate that the marine works were adversely affecting water quality outside the works boundary in Victoria Harbour.

Three deficiencies were recorded on environmental site inspections during the reporting period. The Contractor subsequently rectified all the deficiencies after being notified.

The monitoring work for this reporting month has been independently verified by the Independent Environmental Checker (IEC) and has been found to be in compliance with the requirements of the EM&A programme.