

**Central Reclamation, Phase III
Environmental Monitoring & Audit
Monthly Report No. 15
October 2004**

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ACL	Atkins China Limited
CEDD	Civil Engineering and Development Department
CRIII	Central Reclamation Phase III
EIA	Environmental Impact Assessment
EIAO	Environmental Impact Assessment Ordinance
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
WMP	Waste Management Plan

Executive Summary

The Central Reclamation Phase III (CRIII) Works, Contract No. HK 12/02, was awarded to Leighton China State Van Oord Joint Venture (LCSVO-JV) by the Territory Development Department (now called the Civil Engineering and Development Department (CEDD) after the merger of the Civil Engineering Department and the Territory Development Department on 1 July 2004), Hong Kong Islands and Islands Development Office. The works under the Contract HK 12/02 commenced on 28 February 2003. Contract HK 16/03 for the CRIII Hinterland Drainage Improvement Works was awarded to Wang Kee Construction Co. Ltd. and works for this contract commenced on 17 December 2003.

Atkins China Limited (ACL) has been appointed by CEDD 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 fifteenth 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 to 31 October 2004.

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 7, 14, 21 and 28 October 2004.
- Noise monitoring was performed continuously for 24 hours.
- Water quality monitoring was undertaken on the following days:
 - 1 October 2004
 - 4 October 2004
 - 6 October 2004
 - 8 October 2004
 - 11 October 2004
 - 13 October 2004
 - 15 October 2004
 - 18 October 2004
 - 20 October 2004
 - 22 October 2004
 - 25 October 2004
 - 27 October 2004
 - 29 October 2004

Exceedance of Action and Limit Levels

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

Continuous noise monitoring was carried out during the reporting period and noise exceedances attributable to project works were recorded on 16 October 2004. An investigation into the exceedances found that the noise levels were due to the cooling water mains work in front of City Hall. One excavator-mounted breaker was used to break the concrete surfacing at the works area. The Event Action Plan for noise quality was followed and all relevant parties were informed of the exceedances. The Contractor advised that the concrete breaking work is currently substantially completed, and therefore, no significantly noisy construction activities near City Hall are expected to continue. The Contractor also advised that should breaking works need to be carried out again near City Hall, they would use a handheld breaker rather than an excavator mounted breaker to reduce noise. Further, they would install a portable noise barrier in front of the works to further mitigate noise issues. Subsequent noise monitoring found that no further exceedances were attributed to project works.

From the analysis of water quality monitoring results collected during the reporting period, exceedances of the Action and Limit Levels were found on several occasions. Although DO levels below the Action Level were observed at seawater intake and marine-based stations, investigations found that they were due to natural variation or changes in ambient conditions and not caused by the project marine works. It was noted that when the DO Action and/or Limit Levels were exceeded at the marine-based stations the control stations recorded similar DO levels.

Elevated concentrations of SS were recorded on 1, 4, 6, 11, 13, 15, 18, 20 and 25 October 2004. Investigations into these exceedances found that they were generally attributed to ambient conditions and/or influences not related to project works. The results did not show any significant gradient effects between stations located near the works and stations located farther away from the works. However, it was found that the exceedances recorded on 18, 20 and 25 October 2004 might have been attributable to project marine works. All parties were immediately notified and the Contractor responded by replacing the silt screen used for the seawater intake at M4. Further, the Contractor has installed an additional layer of non-porous geotextile around the existing silt curtain used for dredging works in order to further minimise SS dispersion.

Additional SS monitoring at the Queensway Government Offices (QGO) outfall and Culvert J were carried out during the reporting month and high SS levels were recorded at these locations on a number of occasions. As such, elevated SS levels in the surrounding area may have been significantly influenced by these discharges.

Complaint Log

No environmental complaints were received during the 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

Environmental site inspections for the CRIII project works area were undertaken on 7, 14, 21 and 28 October 2004. Increased site inspections were also performed in late October 2004. No environmental non-conformance and deficiencies were observed during the site inspections.

The Contractor filed an incident report on 27 October 2004 for the malfunction of a split hopper barge "HB1040S" on 19 October 2004, during which rockfill was dumped into the sea adjacent to the CRIII work site. An investigation found that a faulty relay in the anchor control system had short circuited, causing the barge doors to open. A repair was made but the Contractor has temporarily suspended the use of the hopper barge "HB1040S" under the valid Dumping Licences EP/MD/05-053 and EP/MP/05-069. Additionally, a joint survey of the seabed at the dumping area was carried out with the ER on 20 October 2004. The incident report and the survey results have been submitted to EPD for information and record.

Key Works for the Coming Month

Future key works are as follows:

- Placing of ballast fill for installed caisson units at IRAW;
- Placing of rock fill and installation of seawall blocks at IRAW;
- Trimming and surcharge works at IRAE;
- Substructure works for the CTB;
- Superstructure works at Pier No. 7;
- Desilting works for Culvert F;
- Cooling watermain work; and
- Maintenance and necessary repair works for seawater intake silt screens.

1. INTRODUCTION

1.1 Basic Project Information

The Territory Development Department (now called the Civil Engineering and Development Department (CEDD) after the merger of the Civil Engineering Department and the Territory Development Department on 1 July 2004) of 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. Contract HK 16/03 for the CRIII Hinterland Drainage Improvement Works was awarded to Wang Kee Construction Co. Ltd. and works for this contract commenced on 17 December 2003.

Atkins China Limited (ACL) has been commissioned by TDD (now called CEDD) 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 fifteenth monthly EM&A Report under the EIAO, which presents the results of EM&A work conducted during the period from 1 to 31 October 2004, inclusive.

2. ENVIRONMENTAL STATUS

2.1 Works Undertaken

The works undertaken during the reporting month include obstruction clearing for marine piles, installation of caisson units, placing of armour rock and levelling stone works, dredging, surcharge material works, landside cooling water mains works, substructure works for the Central Terminal Building (CTB) and maintenance and necessary repair work for seawater intake silt screens.

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 an Application for a Permit to Dump Material (Category M & H Dredged Sediment) at Sea Under the Dumping at Sea Ordinance (Ref. H2189/U2c/10219/MP/ST/ec)	21 October 2004	–
2	LCSVO-JV submitted an Application for Construction Noise Permit for Transporting and Installation of Pre-cast Caisson Units in Victoria Harbour during Night-time (IRAW Package 2, C5 to C7) (Ref. H2189/U2c/10066/MP/EY/ST/cm)	14 October 2004	–
3	LCSVO-JV submitted a Test Report for Treated Effluent (Wastewater Discharge Licence No. EP880/W10/XX0192) (Ref. H2189/U2c/10007/MP/DC/ST/ec)	12 October 2004	–
4	LCSVO-JV submitted an Application for Construction Noise Permit for Man Yiu Street and Culvert F, Central (Ref. H2189/U2c/10010/MP/DC/CKA/ST/ec)	12 October 2004	–
5	LCSVO-JV submitted an Application for Renewal of Construction Noise Permit GW-TS0288-04 (Ref. H2189/U2c/9972/MP/EY/ST/ec)	9 October 2004	–
6	LCSVO-JV submitted an Application for Construction Noise Permit (Ref. H2189/U2c/9971/MP/EY/ST/ec)	9 October 2004	–

2.3 Environmental Document Submission

A summary of the status of the submissions provided during the reporting month 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>New Construction Noise Permit GW-RS0490-04 (Ref. H2189/C1/10357/AT/ST/atm)</i>	-	30 October 2004
2	<i>Advance Notification of Overnight Construction Work of PLA (Ref. H2189/C1/10345/AT/EY/ST/atm)</i>	-	30 October 2004
3	<i>Seawall - Incident Report: Rock Dumping on 19 October 2004 (Ref. H2189/C1/10294/MP/EY/GL/atm)</i>	-	27 October 2004
4	<i>New Construction Noise Permits GW-RS0475-04 & GW-TS0476-04 (Ref. H2189/C1/10290/MP/ST/atm)</i>	-	27 October 2004
5	<i>New Construction Noise Permits GW-RS0457-04 & GW-RS0459-04 (Ref. H2189/C1/10126/MP/ST/atm)</i>	-	16 October 2004
6	<i>Advance Notification of Overnight Construction Work to PLA (Ref. H2189/C1/10071/MP/EY/ST/atm)</i>	-	14 October 2004
7	<i>New Construction Noise Permit GW-RS0453-04 (Ref. H2189/C1/10006/MP/DC/ST/ec)</i>	-	12 October 2004
8	<i>Precast Caissons - Temporary Storage (Scheme No. 3) to Mitigate the Effects of Delays due to Suspension and the Revised PLA Berth (Ref. H2189/C1/9989/MP/HF/cm)</i>	-	11 October 2004

A summary of the Environmental Certification Sheet submissions to EPD during the reporting month 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. 14 - September 2004</i>	<i>3128/M45/200/OC6505/SB/AC/al</i>	11 October 2004	-

2.4 Environmental Meetings

An environmental meeting was held on 27 October 2004 between the RE and ET to discuss the Contractor's recent proposal for temporary storage of precast caissons. The Contractor is currently preparing a revision to the proposal, which will later be submitted to the ER and ET for review.

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 Annex D.

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 has installed frame type silt curtains for rock filling works to reduce SS dispersion. Further, the Contractor carried out daily visual inspection of the silt screens for seawater intakes. Floating debris in the project area was collected at least once everyday and in the water body near cooling water intakes debris was collected at least three times a day. Bi-weekly diving inspections for the silt screens were also carried out during the reporting month.

4. MONITORING RESULTS

4.1 Impact Monitoring Schedule in October 2004

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 7, 14, 21 and 28 October 2004.

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

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

Impact water quality monitoring at all monitoring stations was undertaken during this reporting month. The water quality monitoring schedule for October 2004 is presented in **Table 4.1**.

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

Date of Sampling	Tidal State	Timing of Sampling
1 October 2004	Mid Ebb	12:32 - 15:12
	Mid Flood	07:40 - 11:00
4 October 2004	Mid Ebb	13:14 - 16:25
	Mid Flood	09:12 - 12:12
6 October 2004	Mid Ebb	07:48 - 10:41
	Mid Flood	15:15 - 17:55
8 October 2004	Mid Ebb	07:42 - 10:36
	Mid Flood	15:18 - 17:56
11 October 2004	Mid Ebb	09:10 - 13:07
	Mid Flood	15:00 - 18:12
13 October 2004	Mid Ebb	10:56 - 13:43
	Mid Flood	15:17 - 18:00
15 October 2004	Mid Ebb	12:12 - 15:07
	Mid Flood	07:42 - 10:43
18 October 2004	Mid Ebb	13:16 - 16:06
	Mid Flood	09:02 - 12:10
20 October 2004	Mid Ebb	07:10 - 10:43
	Mid Flood	15:20 - 18:04
22 October 2004	Mid Ebb	07:37 - 10:34
	Mid Flood	13:45 - 16:22
25 October 2004	Mid Ebb	08:57 - 12:04
	Mid Flood	15:17 - 17:58
27 October 2004	Mid Ebb	10:40 - 13:30

Date of Sampling	Tidal State	Timing of Sampling
29 October 2004	Mid Flood	15:13 - 17:50
	Mid Ebb	12:31 - 15:16
	Mid Flood	07:33 - 10:56

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 (SLM)	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>

4.3.4 Equipment Calibration

The calibration frequencies of the monitoring equipment are provided in **Table 4.5**.

Table 4.5 - Equipment Calibration Frequencies

Equipment	Calibration Frequency	Latest Calibration Date
Dissolved Oxygen Meter	Every 6 months	11 September 2004
Turbidimeter	Every 3 months for secondary standards; meter is calibrated prior to each measurement to the secondary standards	26 October 2004
pH Meter	Prior to each sampling day	–
Pyschrometer	Every 6 months	5 October 2004
Integrated SLM	Every year	20 August 2004

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 significantly dusty 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	3.9	3.7	60	6.6	5
	max	5.2	5.1	77	11.1	12
	avg	4.5	4.3	67	8.9	8
	sd	0.4	0.4	5	1.8	2
C2	min	4.1	4.1	61	5.8	6
	max	4.8	4.7	72	8.7	9
	avg	4.5	4.4	67	7.3	8
	sd	0.2	0.2	3	1.1	1
M7	min	3.8	3.5	55	6.5	7
	max	5.2	4.8	75	11.9	12
	avg	4.6	4.3	67	8.6	9
	sd	0.4	0.3	5	1.9	2
M8	min	4.4	4.2	65	5.9	6
	max	5.3	5.0	76	12.1	11
	avg	4.9	4.6	71	7.4	8
	sd	0.3	0.3	3	1.8	2
M9	min	4.7	4.3	67	4.9	7
	max	5.9	5.8	87	7.4	11
	avg	5.4	5.3	79	6.1	9
	sd	0.3	0.4	5	0.8	1
M10	min	4.9	4.7	70	4.9	5
	max	5.6	5.4	81	7.5	13
	avg	5.0	4.9	72	5.7	7
	sd	0.2	0.2	3	0.8	2

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 5.6 mg/L with an average value of 5.0 mg/L and DO measurements in the bottom layer ranged from 4.2 to 5.4 mg/L with an average level of 4.7 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 3.9 to 5.2 mg/L with an average value of around 4.5 mg/L; DO measurements in the bottom layer ranged between 3.7 and 5.1 mg/L with an average level of 4.3 mg/L.

SS levels during mid-ebb tide ranged from 5 to 13 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 5 to 12 mg/L with an average of 8 mg/L. Generally, 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 marine 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 generally not 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	3.9	3.8	59	6.5	6
	max	5.0	4.9	73	11.2	13
	avg	4.4	4.3	66	8.7	9
	sd	0.3	0.3	4	1.8	2
C2	min	4.0	3.9	59	5.5	6
	max	5.2	4.8	76	8.6	11
	avg	4.5	4.4	68	7.1	7
	sd	0.4	0.3	5	1.1	1
M7	min	4.2	4.1	62	6.2	7
	max	5.2	5.0	75	8.5	11
	avg	4.6	4.5	68	7.7	9
	sd	0.3	0.3	4	0.7	1
M8	min	4.2	4.0	61	5.6	7
	max	5.6	5.5	83	10.6	10
	avg	4.9	4.5	71	8.0	9
	sd	0.5	0.5	7	1.6	1
M9	min	5.0	4.8	73	3.9	5
	max	5.6	5.5	83	6.1	10
	avg	5.4	5.2	79	5.2	8
	sd	0.2	0.2	2	0.7	1
M10	min	4.6	4.5	66	4.9	6
	max	5.7	5.4	82	6.8	9
	avg	5.0	4.9	72	5.8	7
	sd	0.3	0.2	4	0.6	1

During mid-flood tide, DO levels at marine-based impact stations (M8 & M10) in the surface to middle layer ranged from 4.2 to 5.7 mg/L with an average level of 4.9 mg/L while DO values in the bottom layer ranged between 4.0 and 5.5 mg/L with an average of 4.7 mg/L. Similar DO concentrations were recorded at the control stations in the surface to middle layer during mid-flood survey ranged between 3.9 and 5.2 mg/L with an average value of 4.5 mg/L and DO results in the bottom layer ranged from 3.8 and 4.9 mg/L with an average of 4.4 mg/L.

SS content ranged between 6 and 10 mg/L (for stations M8 & M10) with an average of 8 mg/L during mid-flood tide and ranged from 6 to 13 mg/L with an average value of 8 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 reporting month 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	2.9	45	6.4	6
	max	5.3	78	12.5	12
	avg	4.2	63	8.4	9
	sd	0.7	10	1.7	2
M2	min	3.0	46	7.5	11
	max	5.0	73	12.8	17
	avg	4.1	61	9.0	13
	sd	0.7	9	1.6	2
M3	min	3.0	45	5.8	8
	max	5.2	76	11.0	18
	avg	4.1	61	7.8	11
	sd	0.7	9	1.4	3
M4	min	3.1	46	3.7	6
	max	5.1	75	10.8	16
	avg	4.1	61	6.9	9
	sd	0.7	10	2.0	3
M5	min	3.3	50	5.3	8
	max	5.2	76	11.3	18
	avg	4.0	59	8.4	11
	sd	0.7	10	1.9	3
M6	min	2.7	40	5.6	8
	max	5.2	75	10.9	17
	avg	4.1	61	8.1	12
	sd	2.7	40	5.6	8
M11	min	3.3	50	5.8	7
	max	5.1	75	11.9	14
	avg	4.2	62	8.2	9
	sd	0.6	8	1.6	2
M12	min	2.8	42	5.9	8
	max	5.0	73	10.2	16
	avg	4.1	61	8.1	11
	sd	0.6	9	1.5	2

Seawater intake results during mid-ebb tide, **Table 4.7**, show that DO levels ranged from 2.7 to 5.3 mg/L with an average of 4.1 mg/L. SS ranged between 6 and 18 mg/L with an average value of 11 mg/L. Low DO levels at the intake stations were recorded during the reporting month but investigations found that they were not due to project works. Elevated SS levels were found on 1, 4, 6, 11, 13, 15, 18, 20 and 25 October 2004. These levels were investigated and it was found that they were generally due to poor ambient conditions and/or influences not related to project works. However, the exceedances recorded on 20 October may be attributable to project marine works.

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	50	4.5	7
	max	5.3	120	10.2	11
	avg	4.4	69	8.0	9
	sd	3.3	50	4.5	7
M2	min	3.0	45	7.3	9
	max	5.1	123	11.7	19
	avg	4.0	65	9.4	13
	sd	0.7	20	1.4	3
M3	min	3.2	48	6.7	9
	max	5.2	126	11.2	17
	avg	4.1	66	8.8	12
	sd	0.7	20	1.3	2
M4	min	3.3	49	5.6	9
	max	5.1	139	20.6	30
	avg	4.2	68	9.5	14
	sd	0.7	23	3.9	7
M5	min	3.1	47	5.5	7
	max	5.2	138	14.5	19
	avg	4.0	65	8.7	11
	sd	0.7	24	2.4	3
M6	min	2.4	36	5.6	8
	max	5.0	154	14.2	17
	avg	4.0	66	8.8	12
	sd	0.8	28	2.5	3
M11	min	3.3	50	5.0	7
	max	5.0	122	11.1	15
	avg	4.3	68	8.1	10
	sd	0.6	18	1.6	2
M12	min	2.7	42	5.4	8

Station		Parameter			
		DO mg/L	DO % Sat.	Turbidity NTU	SS mg/L
	max	5.2	137	12.0	15
	avg	4.1	67	8.4	11
	sd	0.8	23	2.2	2

During mid-flood survey, **Table 4.8** shows that DO levels at seawater intake stations ranged from 2.4 to 5.3 mg/L with an average of 4.1 mg/L. SS ranged from 7 to 30 mg/L with an average SS content of 12 mg/L. The above results show that water quality during mid-flood tide was also generally good. Again, low DO levels were found but these were found to be not due to project works. The elevated SS levels found on 1, 4, 6, 11, 13, 15, 18, 20 and 25 October 2004 were investigated and were found that to be generally due to poor ambient conditions and/or influences not related to project works. However, the exceedances recorded on 18, 20 and 25 October may be attributable to project marine works.

4.4.3 Waste Management

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

4.4.4 Landscape and Visual

As the major construction activities undertaken during the reporting month were related to marine 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

Noise quality exceedances were recorded on 1, 16, 21 and 23 October 2004. The exceedances were investigated and it was found that the exceedances on 1, 21 and 23 October were not due to the project works. However, the exceedance recorded on 16 October was likely attributed to the cooling water mains work in front of City Hall. One excavator-mounted breaker was used for breaking concrete surfacing at the works area.

The Event Action Plan for noise quality was followed and all relevant parties were informed of the exceedances. The Contractor advised that the concrete breaking work is substantially complete, and therefore, no significantly noisy construction activities near City Hall are expected to continue. The Contractor also advised that should breaking works need to be carried out again near City Hall, they would use a handheld breaker instead of an excavator mounted breaker and would install a portable noise barrier in front of the works to mitigate noise. Subsequent noise monitoring found no further exceedances attributed to project works.

5.1.3 Water Quality

During the reporting period, exceedances of the water quality criteria were generally found to be not caused by the project works. The ambient water quality throughout Hong Kong waters was found to be relatively poor, with low DO levels and relatively high SS concentrations being recorded at the control stations on a few occasions. Visual observations of the harbour during the reporting month noted that the water clarity was very poor and floating debris was observed throughout Victoria Harbour, including areas well beyond the project site.

Elevated concentrations of SS were recorded on 1, 4, 6, 11, 13, 15, 18, 20 and 25 October 2004. These exceedances were investigated and were found to be attributable to poor ambient conditions and/or influences not related to project works. The investigations generally found no significant gradient effects between those stations close to the project works and those more remote to the works area. For example, station M12, which is located more than 1 km away from the works area, would record SS levels that are similar to those found at stations closer to the project works.

It was found that the exceedances recorded on 18, 20 and 25 October, however, might have been attributable to project marine works. The marine works in question include placing of underlayer armour stone works and dredging for the IRAE temporary seawall. Following the exceedances, the Contractor has replaced the damaged silt screen at station M4 and has installed an additional layer of nonporous geotextile around the existing silt curtain used for dredging works.

Additional SS monitoring was also conducted at Queensway Government Offices (QGO) outfall and Culvert J during the reporting month to observe the impacts from outfall discharges. For the exceedances recorded on 4, 6, 11, 13, 18, 20 and 25 October 2004, the additional SS monitoring results indicated that SS levels the QGO outfall were relatively high. As such, elevated SS levels in the surrounding area (e.g. stations M5 and M6) may have been significantly influenced by these discharges. Further, on 6, 13, 18 and 20 October, high SS levels were recorded at Culvert J indicating that water quality in the surrounding area (e.g. station M4) may have been significantly influenced by this discharge.

Although DO levels below the Action and Limit Levels were observed at the seawater intakes and marine-based stations, the investigations found that they were due to natural variation or changes in ambient conditions and not caused by the project marine works. It was noted that when the DO Action and/or Limit Levels were exceeded at the marine-based stations the control stations recorded similar DO levels. Further, the results generally do not show any significant gradient effect between stations close to the marine works and stations more remote to the works area.

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 inspection with the IEC was conducted on 21 October 2004, and the IEC's site inspection report is provided in **Annex K**.

A summary of the findings from the site inspections conducted during the reporting month is provided in **Table 5.1**.

Table 5.1 - Summary of Environmental Site Inspections

Date of Inspection	Observations	Action(s)
7 October 2004	Minor grease stains were found on the deck of the grab dredger.	The Contractor cleared the greased immediately during the site inspection.
14 October 2004	Rock removal works were being carried out at the former heliport.	The Contractor was reminded to maintain the silt curtains used to surround rock removal works and the Contractor assured the inspection team that this would be done.
	Sandy stockpiles at CR-1 and CR-10 not fully covered.	The Contractor was also asked to fully cover exposed sandy stockpiles and the Contractor assured the inspection team that this would be done.
	Damaged sand bags were found near catch basins at CR-10.	The Contractor was reminded that all sand bags used to protect catch basins should be in good condition and the Contractor assured the inspection team that this would be done.
21 October 2004	Exposed soil surfaces at CR-10 were dry.	The Contractor was asked to spray the area with water to avoid dusty emissions from site and the Contractor assured the inspection team that this would be done.
	Silt screen for Central Barrack's seawater intake being replaced.	The Contractor noted that the silt screen for the seawater intake had been damaged and they are in the process of replacing the entire structure.
	A slightly yellowish silty discharge was observed flowing from Culvert J.	This discharge is from off-site and is not project related.
25 October 2004	Floating scum was found discharging from Stormwater Outfall L located near station M5. The discharge dispersed around the surrounding area and scum was found near the silt screen at M5.	This discharge is from off-site and is not project related.
	Silt screen for station M5 was found slightly damaged to one side.	The Contractor was immediately notified and the damaged section was repaired by 28 October 2004
28 October 2004	No non-compliances found.	N/A
29 October 2004	No non-compliances found.	N/A

No significant sediment plumes were observed near the marine works during the site inspections.

On 27 October 2004, the Contractor filed an incident report for the malfunction of a split hopper barge "HB1040S" on 19 October 2004, during which rockfill was dumped into the sea adjacent to the CRIII work site. An investigation found that a faulty relay in the anchor control system had short circuited, causing the barge doors to open. A repair was made but the Contractor has temporarily suspended the use of the hopper barge "HB1040S" under the valid Dumping Licences EP/MD/05-053 and EP/MP/05-069. Additionally, a joint survey of the seabed at the dumping area was carried out with the ER on 20 October 2004. The incident report and the survey results have been submitted to EPD for information and record.

5.2 Environmental Complaint and Prosecution

No environmental complaints and no prosecution notices or summons were received during the reporting month.

5.3 Environmental Enquiries

No environmental enquiries were received during the reporting month.

6. FORECAST AND SCHEDULE

6.1 Key Works for the Coming Month

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

- Placing of ballast fill for installed caisson units at IRAW;
- Placing of rock fill and installation of seawall blocks at IRAW;
- Trimming and surcharge works at IRAE;
- Substructure works for the CTB;
- Superstructure works at Pier No. 7;
- Desilting works for Culvert F;
- Cooling watermain work; and
- Maintenance and necessary repair works for seawater intake silt screens.

6.2 Monitoring Schedules for the Coming Months

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 significant 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 upcoming months is provided in the following table.

Table 6.1 - Water Quality Monitoring Programme

Date of Sampling	Sampling Time	
1 November 2004	09:15	14:07
3 November 2004	07:00	15:23
5 November 2004	08:30	17:00
8 November 2004	08:48	16:01
10 November 2004	10:29	16:40
12 November 2004	11:57	17:00
15 November 2004	08:46	14:02
17 November 2004	11:05	15:33

Date of Sampling	Sampling Time	
19 November 2004	08:30	17:00
22 November 2004	08:56	15:42
24 November 2004	10:34	16:38
26 November 2004	11:52	17:00
29 November 2004	08:30	14:00
1 December 2004	09:00	14:37
3 December 2004	08:00	15:48
6 December 2004	08:30	14:21
8 December 2004	08:57	15:14
10 December 2004	10:47	16:14
13 December 2004	08:30	14:00
15 December 2004	09:51	14:45
17 December 2004	11:41	16:52
20 December 2004	08:30	14:04
22 December 2004	09:11	15:15
24 December 2004	10:52	16:08
27 December 2004	12:00	17:00
29 December 2004	09:00	14:00
31 December 2004	10:00	15:00

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, exceedances of the water quality criteria occurred and most were found not to be caused by the project works. The ambient water quality throughout Hong Kong waters was found to be relatively poor, with low DO levels and relatively high SS concentrations being recorded at the control stations on several occasions. Visual observations of the harbour during the reporting month noted that the water clarity was generally poor and floating debris was observed throughout Victoria Harbour, including areas well beyond the project site.

Due to the poor ambient conditions, low DO levels have been recorded at seawater intake and marine-based stations. Investigations into the low DO levels found that these exceedances were not due to project works as marine-based stations and control stations recorded similar levels. Near-shore influences not related to project works might have affected DO concentrations at the seawater intake stations.

Elevated SS levels were recorded on several occasions during the month of October 2004. Investigations into these exceedances found that they were attributed to ambient conditions and/or influences not related to project works. The results generally did not show any significant gradient effects between stations located near the works and stations located farther away from the works. However, the project may have contributed to exceedances on 3 occasions. These exceedances were brought to the attention of the Contractor who immediately implemented mitigation measures to further reduce SS levels.

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.