

**Central Reclamation, Phase III
Environmental Monitoring & Audit
Monthly Report No. 77 – December 2009**

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ACL	Atkins China Limited
AL	Action Level
CEDD	Civil Engineering and Development Department
CRIII	Central Reclamation Phase III
DO	Dissolved Oxygen
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
LL	Limit Level
PLA	People's Liberation Army Forces Hong Kong
TDD	Territory Development Department
TSP	Total Suspended Particulates
SS	Suspended Solids
WMP	Waste Management Plan

Executive Summary

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 Civil Engineering and Development Department (CEDD). (Previously called the Territory Development Department before merger with the Civil Engineering Department on 1st July 2004.)

The works under the Contract HK 12/02 commenced on 28th 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 17th December 2003.

Atkins China Limited (ACL) has been commissioned by CEDD as the Environmental Team (ET) to undertake the Environmental Monitoring and Audit (EM&A) programme described in the approved EM&A Manual for the CRIII Project.

This is the 77th Monthly EM&A Report for the works specified in Section 1.3 of the CRIII EIA Report. This report summarises the findings and results of the EM&A during the reporting month in December 2009.

Environmental Monitoring and Audit Progress

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

- Continuous 24-hour noise monitoring was conducted throughout the monitoring period.
- The noise monitoring data was not available at City Hall on 19th, 20th and 21st December 2009 due to lack of power supply at the City Hall.
- 1-hour and 24-hour TSP monitoring was carried out on 4th, 10th, 16th, 22nd and 28th December 2009.
- Water quality monitoring was conducted on 2nd, 4th, 7th, 9th, 11th, 14th, 16th, 18th, 21st, 23rd, 25th, 29th and 31st December 2009 by the ET during the mid-ebb and mid-flood tide periods.
- Additional water quality monitoring for the “the water quality of embayment area between the eastern seawall and the Hong Kong Convention and Exhibition Centre (HKCEC) upon completion of eastern seawall”, in accordance with the Environmental Permit No. EP-01/122/2003/D Condition 3.9. Water monitoring was conducted on 14th, 21st and 29th December 2009.

Exceedance of Action and Limit Levels

No exceedances in TSP level were recorded at the monitoring stations during the reporting period.

Four exceedances in noise level were recorded at the City Hall on 5th, 6th, 14th and 31st December 2009. On 5th December 2009, activities East Asian Games opening ceremony which included firework display was carried out on the floating platform of Victoria Harbour. On 6th, 14th and 31st December 2009, the noise exceedances

were considered to be attributed by the extension work on Hong Kong Planning and Infrastructure Exhibition Gallery rather than the project works.

Exceedances in marine water quality were recorded at various seawater intake stations. Details are summarised below:

Date	Tide	Parameter	Exceedance	Station
Water Quality Monitoring in Accordance with EM&A Manual				
7 th December 2009	Mid-Ebb	DO	AL	M1 and M6
9 th December 2009	Mid-Ebb	DO	AL	M1A, M4B, M5B and M6
	Mid-Flood	DO	AL	M5B
11 th December 2009	Mid-Ebb	DO	AL	M5B
	Mid-Flood	DO	AL	M1A, M4B, M5B and M6
14 th December 2009	Mid-Ebb	DO	AL	M4B and M6
	Mid-Flood	DO	AL	M4B and M5B
21 st December 2009	Mid-Ebb	DO	AL	M6
23 rd December 2009	Mid-Ebb	DO	AL	M6
	Mid-Flood	DO	AL	M1A, M4B and M5B

Exceedances of Action Level for DO were recorded on 7th, 9th, 11th, 14th, 21st and 23rd December 2009. All exceedances were not considered to be related to the project works.

No exceedances in additional DO water monitoring were recorded during the reporting period.

Complaint Log

There was no complaint received in relation to the environmental impact during the reporting period.

Notifications of Summons and Prosecutions

There were no notifications of summons or prosecutions received in relation to the environmental impact during the reporting period.

Site Inspection and Audit

Environmental site inspections for the CRIII project works area were undertaken on 3rd, 9th, 17th, 22nd and 30th December 2009. The observations and findings of the site inspection are summarised as below:

3rd December 2009

The stockpiles were found at FRAW near the site office without cover. The Contractor was reminded to cover the stockpile to prevent dust generation.

Water ponds were found at FRAE near the foreman's office. The Contractor was reminded to remove/ fill up the ponds as soon as possible.

9th December 2009

N.A.

Executive Summary

17th December 2009

N.A.

22nd December 2009

N.A.

30th December 2009

N.A.

Key Works for the Coming Month

Future key works in the coming month (January 2009) are as follows:

- Type A filling in FRAW and FRAE above +2.5mPD
- Surcharging in FRAW and FRAE
- Construction of cantilever slab at caisson
- Piling for Culvert F
- Sheet piling, excavation, structural works and backfilling for Culvert F
- General filling works above +2.5 mPD in IRAE
- Construction of storm and foul drainage and gullies in hinterlands for Road P2, Road D7, Road D8 and Road D9 and adjacent to the GPO
- Roadworks along Lung Wui Road, Tim Wa Avenue (Road D8) and Road P2
- Backfilling to Culvert K extension
- Precasting for seawall blocks and retaining wall (offsite)
- Installation of cooling water mains for Tamar Development Project at IRAE
- Installation of cooling mains discharge pipes in FRAE
- Installation of lift at Man Yiu Street footbridge
- Diaphragm walling and barrettes for CWB Works

Introduction

1. INTRODUCTION

1.1 Basic Project Information

Civil Engineering and Development Department (CEDD) is the Project Proponent of the Central Reclamation Phase III Project (CRIII).

The Main Works Contract HK 12/02 for CRIII commenced on 28th February 2003 and was awarded to Leighton-China State-Van Oord Joint Venture (LCSVO-JV) 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 17th December 2003.

Atkins China Limited (ACL) has been commissioned by CEDD as the Environmental Team (ET) to undertake the Environmental Monitoring and Audit (EM&A) programme described in the approved EM&A Manual and required under Clause 4 of the Variation of Further Environmental Permit (No. EP-01/122/2003/A) issued to Leighton-China State-Van Oord Joint Venture in December 2007 for the CRIII Project. A variation of the Further Environmental Permit for the Project (EP-01/122/2003/B) and (EP-01/122/2003/C) were granted on 26 May 2008 and 17 July 2009. This was then superseded by another variation of Further Environmental Permit for the Project (EP-01/122/2003/D) granted on 1 September 2009. The CRIII Project Organisation is shown in **Annex A**.

This is the 77th Monthly EM&A Report for the works specified in Section 1.3 of the CRIII EIA Report. This report summarises the findings and results of the EM&A during the reporting period in December 2009.

2. ENVIRONMENTAL STATUS

2.1 Works Undertaken

Details of the main works in progress are as follows:

Public Pier East (PPE) – Installation of the roof glazing is complete. Builders' works and E&M works are also in progress. See above for comments on cathodic protection system.

Man Yiu Street Footbridge – LCSVOJV submitted their final report (prepared by Maunsell) on 16 Jun 09 advising that no stiffening between the pile caps of pier H and the adjacent staircase is needed. However, the assessment report relating to the effects from the CWB Works was not included and a letter has been sent urging progress on this issue.

Installation of the structural steel frame at the PTI staircase is in progress. Lift installation next to the GPO is also in progress.

MTRC Entrusted Works - 40m Extended Overrun Tunnel – Removal of the diaphragm walls has progressed down to -18mPD and expected to be complete in early October 2009.

On top of the existing SOT, waterproofing work is complete and backfilled up to approx. +5.4mPD

Culvert F Extension – Piling work for Bays 31-32 resumed on 19 August 2009 and the remaining piles are scheduled for completion in January 2010.

Backfilling to Bays 11-15 and 19-24 is in progress.

Structure for Bays 11, 13-15 and 19-27 are completed and flow diversion to Bays 11-27 was carried out on 21 September 2009.

At Bay 33, construction of precast units is complete.

Culvert J Extension – Nothing to report this month.

Culvert K Extension – Culvert K extension is complete and water diversion into Bays 1-27 was carried out on 19 September 2009.

Installation for Bays 9 and 10 is in progress.

Drainage Works – Pipe laying for the 2100 dia. pipe between manhole (SMH6) and Culvert F (BCC2) is complete. The air test and CCTV survey are in progress.

Due to conflicts with existing HEC 132kV cables and water mains, the interceptor drains at Edinburgh Place have been relocated to nearer the P2/D7 junction (where the abandoned ESB/pump house is currently located). However this work could not commence until the HSBC interim cooling main was removed and ESB/pumphouse demolished. This demolition is now in progress.

Construction of stormwater drainage and sewers at Road P2 (from Man Yiu Street to Road D8), Road D11, Lung Wui Road (outside Citic Tower) and Portion F continue.

Water Mains – Construction of salt and fresh watermains at Portion F is complete but connection by WSD is yet to be finalized. Pipe laying at Road D9 is complete.

There is some concern about the watermain connection at Man Yiu Street where recent pipe detection survey has indicated one of the existing pipes is terminated under the road carriageway. Further investigations continue

Roadworks – Pavement construction at Lung Wui Road (outside Citic Tower) and Road D7 and Road P2 continues.

Meetings with utility undertakers continue to be held to monitor their adherence to the Contractor's programme for the critical P2 roadworks. Crossroad duct installation at Road P2 near J/O P2/D8 is complete.

Stage 3 of the TTA 76 was implemented on 17 September 2009 which allowed the removal of the covered walkway.

CWB Works – D-wall/barrette construction continues at seven locations (ie Portions 3, 4, 5, 6a, 6b, 6c & 7). Progress has been good over the past month with D-wall panel construction currently achieving 7-8 panels per week.

Phase 2 diversion / slewing of the EMSD cables between ESB 9.1 and CWPS 9.1 has been completed in late September 2009. Slewing of HSBC cables to CWPs 8.1 is scheduled for January/February 2010, and the excavation for the first phase of HEC cable slewing near the temporary ESB commenced on 23 September 2009. A joint site inspection with HEC will be held by end of September 2009 prior to cable diversion.

Predrilling for D-wall and barrette construction is substantially complete, with 270 no. holes (out of a total of 293 including the further 53 nos. for barrettes construction under Option B) completed. The 23 no. outstanding at the location of Culvert F temporary diversion channel will be carried out later following filling of the diversion channel once Culvert F is completed. The matter of revised acceptance criteria for founding D-wall and barrette panels has been resolved.

Interface coring has recently commenced at D-wall panels N104-N109 and sonic logging of concreted D-wall/barrette panels is also ongoing.

Close liaison with PLA and other cooling main owners continues concerning the CWB works at the vicinity of their installations.

The Contractor's revised Ground Settlement Report together with ICE certification has been received and is under review.

At Portion 3/Culvert F area from Ch. 2000 – 2058, guide walls are complete and further pre-treatment has been carried out within the Type A fill material. A further six D-wall panels S58, S61, N59, N61, F17 and F18 have been concreted (i.e. 14 out of 27 total) up to 28 September 2009.

Environmental Status

At Portion 4 from Ch. 2058-2222, guide walls and pre-treatment are in progress, and a further three D-wall panels S73, N72 and N85 have been concreted (i.e. 6 out of 78 total) up to 28 September 2009.

At Portion 5/Culvert J area from Ch. 2222 – 2290, guide wall construction and pre-treatment are mostly complete. A total of 21 D-wall/barrette panels have been concreted out of a total of 43 up to 28 September 2009.

Regarding the Contractor's Alternative Scheme for excavating underneath Culvert J, the method statement for the temporary works inside Culvert J has been received and commented on, and their resubmission is still awaited. Draft SA No. 7 documentation has been prepared.

Following submission of LCSVOJV's DIA report to DSD concerning the closure of Culvert J on a cell-by-cell basis this coming dry season, a meeting with DSD was held on 1 September 2009 and DSD had no particular objections except some minor modifications required to the Contingency Plan and the submission of outstanding ICE certification. The revised DIA report was submitted to DSD on 10 September 2009.

At Portion 6a/area fronting the Tamar site from Ch2290-2427, guide wall construction has been completed and a further 16 D-wall/barrette panels have been concreted (i.e. 43 out of 67 total) up to 28 September 2009.

At Portions 6b and 6c/P2/D9 area from Ch. 2427 – 2472, guide walls and pre-treatment have been completed, and a further 5 D-wall/barrette panels S123 and F48 have been concreted (i.e. 14 out of 31 total) up to 28 September 2009.

At Portion 7/FRAE area from Ch. 2472-2600, guide wall construction and pre-treatment grouting are in progress, and one D-wall/barrette panel S134 has been concreted (i.e. 1 out of 65 total) up to 28 September 2009.

Fabrication of stanchions (for casting into central barrettes at Portions 3 and 6) in PRC continues and deliveries to Site are ongoing. A further five barrettes (i.e. 8 out of 28 total) with stanchions cast in (i.e. F17, F18, F29, F33 and F37) have been completed up to 28 September 2009.

In FRAW – Type A filling continues using the material which was removed from the surcharged areas and Culvert F, with a minor quantity coming from the Tamar Development Site.

In FRAE – Placing of seawall blocks and retaining wall units at the eastern seawall is substantially complete, except for the special units. In-situ concreting for the retaining wall is in progress.

Pre-cast Works – Casting of the standard and special seawall blocks and the retaining walls is complete. Casting of special seawall blocks, non-standard size retaining wall units and parapets continues.

Road P2 Underpass – The Contractor has completed the excavation work at the lowest bay at the western ramp. Placing of the blinding layer has been affected by ground water problems.

Cooling-Water Pumping System for P8.1 (HSBC) – Dismantling of the interim pipelines AC & AD is complete. Removal of temporary gate valves for replace AD and AC was carried out on 12 and 26 September 2009 respectively.

Cooling-water Pumping System for P5.1 (HKL) – Dismantling of the interim pipeline is substantially complete. Removal of temporary gate valves was carried out on 28 September 2009.

Demolition of Former Pumping Stations – Demolition of the underground pumping station at Edinburgh Place is in progress.

Permanent Sea Water Intake System for PLA – Installation of the permanent silt screen was complete on 24 August 2009.

Seawall Caissons and Pumping Stations – Installation of the removable panels, “chopsticks”, inside the wave absorbing chamber is in progress.

Tamar Entrustment Works – Approximately 105m of Alignment 2 discharge pipe in IRAE has been laid.

The alignment of the section of Alignment 2 discharge pipe across Road D8 has been revised due to congestion of utilities. This section of pipe will be laid in three stages following the TTA schemes. The first two stages have been completed. The laying of pipe in the last stage within the slow lane of northbound carriageway and the adjacent footpath is in progress.

Pipe jacking for alignment 3 discharge pipes near to the east ramp of Road P2 Underpass is in progress.

Due to the site constraints (e.g. utilities) the sections of the two Alignment 2 intake pipes (between CH1+82 and CH1+97) and the Alignment 3 intake pipe (between CH1+68 and CH1+92) in front of the new centralised Government complex pumping station are to be constructed by pipe jacking method. The Contractor has employed a sub-contractor for the pipe jacking works and the submission/review of method statement and temporary work design are ongoing.

Environmental Status

2.2 Environmental Permits

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

Table 2.1 - Summary of the Environmental License / Permit Status

Item	Item Description	Date of Application	Permit Status
1	New Construction Noise Permit GW-RS0950-09	19 th November 2009	Issued on 14 th December 2009
2	New Construction Noise Permit GW-RS0955-09, TAM grouting, Jet grouting & pre-drilling at Culvert J	1 st December 2009	Issued on 15 th December 2009
3	New Construction Noise Permit GW-RS0959-09	2 nd December 2009	Issued on 16 th December 2009
4	Application of Construction Noise Permit for Road P2	22 nd December 2009	Pending

2.3 Environmental Document Submission

A summary of the status of the submissions provided to the ER during the reporting period 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	New Construction Noise Permit GW-RS0950-09	-	15 th December 2009
2	New Construction Noise Permit GW-RS0955-09, TAM grouting, Jet grouting & pre-drilling at Culvert J	-	16 th December 2009
3	New Construction Noise Permit GW-RS0959-09	-	17 th December 2009

A summary of Environmental Certification Sheet submissions during the reporting period is presented in **Table 2.3**.

Table 2.3 - Summary of Environmental Certification Sheet Submissions

No	Certification Subject	Letter Ref.	Date of Submission	Approved Status
1	Certification of Monthly Environmental Monitoring & Audit Report No. 76, November 2009	3128/M45/200/OC11755/S B/SC/KC/fl	14 th December 2009	Issued on 14 th December 2009
2	Certification of Additional Water Quality Monitoring Programme	-	1 st December 2009	Issued on 1 st December 2009

2.4 Environmental Meetings

No environmental meeting was held in this reporting period.

2.5 Environmental Monitoring Locations

The current environmental monitoring locations are shown 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, 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.	8 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 was reviewed. With regard to mitigation measures for water quality, the Contractor has installed floating type impervious silt curtains at the gap between the caissons at FRAW and culvert J to reduce SS dispersion. The Contractor has implemented their Drainage Management Plan and Silt Curtain Operation Plan for VEP (rev 1).

4. MONITORING RESULTS

4.1 Impact Monitoring Schedule in December 2009

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 carried out on 3rd, 9th, 17th, 22nd and 30th December 2009.

1-hour and 24-hour TSP monitoring was carried out on 4th, 10th, 16th, 22nd and 28th December 2009. The dust sampler undertaking 1-hour TSP measurement (Microdust Pro IR Dust Sampler by Casella) has been out of operation since 24th October 2008. The 1-hour TSP monitoring was since then conducted by High Volume Sampler.

Continuous 24-hour noise monitoring has been conducted during this reporting period. The noise monitoring data are not available at City Hall on 19th, 20th and 21st December 2009 due to lack of power at City Hall.

Impact water quality monitoring at all monitoring stations in accordance with the EM&A Manual has been carried out during this reporting period. The water quality monitoring programme for this reporting period is presented in **Table 4.1**.

Table 4.1 - Water Quality Monitoring Programme

Date of Sampling	Tidal State	Time of Sampling	
		Start	End
02/12/09	MID-EBB	11:10	12:16
	MID-FLOOD	16:06	17:09
04/12/09	MID-EBB	12:41	13:59
	MID-FLOOD	07:45	08:50
07/12/09	MID-EBB	15:15	16:23
	MID-FLOOD	10:08	11:30
09/12/09	MID-EBB	16:03	17:08
	MID-FLOOD	11:10	12:17
11/12/09	MID-EBB	07:49	09:00
	MID-FLOOD	13:17	14:20
14/12/09	MID-EBB	10:10	11:47
	MID-FLOOD	15:00	16:22
16/12/09	MID-EBB	11:06	12:08
	MID-FLOOD	16:02	17:03
18/12/09	MID-EBB	12:36	13:55
	MID-FLOOD	08:00	09:04
21/12/09	MID-EBB	14:42	16:27
	MID-FLOOD	09:16	10:36
23/12/09	MID-EBB	16:02	17:06
	MID-FLOOD	10:45	11:43
25/12/09	MID-EBB	16:05	17:03
	MID-FLOOD	11:10	12:15
29/12/09	MID-EBB	08:50	10:20
	MID-FLOOD	13:52	15:35
31/12/09	MID-EBB	10:54	11:53
	MID-FLOOD	15:48	16:49

Additional water quality monitoring for the “the water quality of embayment area between the eastern seawall and the Hong Kong Convention and Exhibition Centre (HKCEC) upon completion of eastern seawall”, in accordance with the Environmental Permit No. EP-01/122/2003/D Condition 3.9. Water monitoring was conducted on 14th, 21st and 29th December 2009

4.2 Monitoring Methodology

4.2.1 Air Quality Monitoring

Air quality monitoring was conducted in accordance with the methodology described in the EM&A Manual. The monitoring stations are located at the City Hall and the PLA Barracks as shown in **Annex C**.

4.2.2 Noise Monitoring

Continuous 24-hour noise monitoring was conducted in accordance with the methodology described in the EM&A Manual in the reporting period. The noise monitoring station is located at the City Hall as shown in **Annex C**. The noise monitoring data are not available at City Hall on 19th, 20th and 21st December 2009 due to lack of power at City Hall.

4.2.3 Water Quality Monitoring

Water quality monitoring was conducted in accordance with the methodology described in the EM&A Manual. Monitoring for the reporting period was conducted at all stations including 4 marine-based stations and 4 seawater intake stations. Water quality monitoring also conducted at three additional water quality monitoring station for the “the water quality of embayment area between the eastern seawall and the Hong Kong Convention and Exhibition Centre (HKCEC) upon completion of eastern seawall”, in accordance with the Environmental Permit No. EP-01/122/2003/D Condition 3.9. The locations of the monitoring stations are shown in **Annex C**.

4.3 Monitoring Equipment

4.3.1 Air Quality

The equipment 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
1-Hour Sampling	High Volume Sampler Model GS2310 by Anderson Instruments

Monitoring Results

4.3.2 Noise

The equipment used for continuous noise 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 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: <ul style="list-style-type: none"> a) DO levels in the range of 0–20 mg/l and 0–200% saturation; and b) Temperature of between 0–45 degree Celsius. • The equipment had a membrane electrode with automatic temperature compensation complete with a cable. In addition, a Wirling Psychrometer was used as a reference thermometer during the sampling.
Turbidity Measurement Instrument	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.
pH	A HM-20P pH Meter was used to measure pH.
Salinity / Conductivity Meter	A Salinity / Conductivity meter YSI model 63 and model 30 was used for determining salinity concentrations.
Sample Containers and Storage	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.

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; meter is calibrated prior to each measurement	On last field use
Turbidimeter	Every 3 months for secondary standards; meter is calibrated prior to each measurement to the secondary standards	On last field use

Equipment	Calibration Frequency	Latest Calibration Date
pH Meter	Prior to each sampling day	On last field use
Psychrometer	Every 6 months	On last field use
Integrated SLM	Every year	9 th October 2009
High Volume Sampler	Every two months	18 th December 2009

4.4 Impact Monitoring Results

4.4.1 Air Quality & Noise Monitoring Results

The air quality monitoring results at the PLA Barracks and City Hall monitoring stations are presented in **Annex F**. Graphical representation of the air quality monitoring data is provided in **Annex G**.

The noise monitoring results at the City Hall monitoring station is provided in **Annex H**. Graphical representation of the noise monitoring data is provided in **Annex I**.

4.4.2 Water Quality Monitoring Results

The water quality monitoring results at all water quality monitoring locations for this reporting period are presented in **Annex J**. Graphical representation of the water quality data is provided in **Annex K**. Summaries of the results are provided in **Tables 4.6 to 4.9**.

Marine-Based Stations

Monitoring stations M7 and M9 were selected as the marine-based impact stations. As such, M8 and M10 are used as control station to note any significant elevations in SS, turbidity or reductions in DO that may affect the marine-based impact monitoring stations.

Monitoring Results

Table 4.6 shows a summary of the results monitored at marine-based stations during mid-ebb tide.

Table 4.6 - Summary of Mid-ebb Results for Marine-based Stations

Station		Parameter				
		DO (S&M) mg/L	DO (B) mg/L	DOS %	NTU	SS mg/L
M07	min	5.1	5.0	66	3.1	3.1
	max	6.8	6.7	90	5.6	6.3
	avg	5.9	5.9	78	4.0	4.7
	sd	0.4	0.5	6	0.6	0.9
M08	min	5.2	5.2	69	2.5	3.0
	max	6.8	6.8	91	7.6	7.0
	avg	6.2	6.1	81	4.1	4.7
	sd	0.5	0.5	7	1.1	1.2
M09	min	5.1	5.1	69	2.6	3.6
	max	7.0	6.9	92	5.6	6.4
	avg	6.0	6.0	80	4.1	4.7
	sd	0.5	0.5	6	0.7	0.6
M10	min	5.4	5.3	71	2.5	3.7
	max	6.9	6.9	92	7.4	6.2
	avg	6.2	6.1	81	4.2	4.7
	sd	0.5	0.5	7	1.1	0.6

As **Table 4.6** shows, DO levels at marine-based impact stations (M7 and M9) in the surface to middle layer during mid-ebb survey ranged between 5.1 and 7.0 mg/L with mean value of about 5.9 to 6.0 mg/L and DO measurements in the bottom layer ranged from 5.0 to 6.9 mg/L with a mean value of about 5.9 to 6.0 mg/L. Similar DO levels were recorded at the control stations (M8 and M10) at which DO levels in the surface to middle layer during mid-ebb survey ranged between 5.2 and 6.9 mg/L with a mean value of about 6.2 mg/L. DO measurements in the bottom layer ranged between 5.2 and 6.9 mg/L with a mean value about 6.1 mg/L.

At M7 and M9, SS levels during mid-ebb tide ranged from 3.1 to 6.4 mg/L with mean values of about 4.7 mg/L at the marine-based impact stations. This is comparable to results from the control stations in which SS content ranged from 3.0 to 7.0 mg/L and mean values ranged about 4.7 mg/L.

Table 4.7 shows a summary of results monitored at marine-based stations during mid-flood tide.

Table 4.7 - Summary of Mid-flood Results for Marine-based Stations

Station		Parameter				
		DO (S&M) mg/L	DO (B) mg/L	DOS %	NTU	SS mg/L
M07	min	4.9	4.9	67	2.5	3.0
	max	6.7	6.5	88	5.4	6.1
	avg	5.9	5.8	77	4.0	4.7
	sd	0.5	0.5	6	0.7	0.9
M08	min	5.2	5.1	67	2.6	3.3
	max	7.0	6.8	93	6.3	5.7
	avg	6.2	6.1	81	4.1	4.7
	sd	0.5	0.5	6	1.1	0.7
M09	min	5.4	5.2	70	2.7	3.3
	max	6.8	6.6	87	5.8	6.0
	avg	6.0	5.8	78	4.2	4.7
	sd	0.4	0.4	5	0.8	0.8
M10	min	5.6	5.4	70	2.5	3.3
	max	6.7	6.7	90	6.5	6.6
	avg	6.2	6.1	81	4.1	4.6
	sd	0.3	0.4	5	1.0	0.9

During mid-flood tide, DO levels at marine-based impact stations (M7 and M9) in the surface to middle layer ranged from 4.9 to 6.8 mg/L with a mean value about 5.9 to 6.0 mg/L, while DO values in the bottom layer ranged between 4.9 and 6.6 mg/L with a mean value of about 5.8 mg/L. Similar DO concentrations were recorded at the control stations (M8 and M10) in the surface to middle layer during mid-flood survey and ranged between 5.2 and 7.0 mg/L with a mean value about 6.2 mg/L. DO results in the bottom layer ranged between 5.1 and 6.8 mg/L with a mean value which ranged from 6.1 mg/L.

At M7 and M9, SS levels during mid-flood tide ranged from 3.0 to 6.1 mg/L with mean values about 4.7 mg/L. This is comparable to results from the control stations (M8 and M10) in which SS content ranged from 3.3 to 6.6 mg/L with mean values about 4.6 to 4.7 mg/L.

Monitoring Results

Seawater Intake Stations

The locations of monitoring stations are provided in **Annex C**.

Table 4.8 shows a summary of the results monitored at the seawater intake stations during mid-ebb tide.

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

Station		Parameter			
		DO mg/L	DOS %	NTU	SS mg/L
M01A	min	4.1	56	2.1	3.8
	max	5.8	76	5.6	7.8
	avg	5.1	67	3.7	5.3
	sd	0.6	7	0.9	1.1
M04B	min	4.2	57	2.6	3.7
	max	6.2	80	6.2	8.8
	avg	5.1	67	4.4	6.0
	sd	0.6	8	1.1	1.5
M05B	min	4.1	56	2.0	3.4
	max	6.4	82	6.6	7.9
	avg	5.2	69	4.3	5.7
	sd	0.7	8	1.2	1.4
M06	min	3.9	53	2.5	3.9
	max	5.4	71	6.1	7.7
	avg	4.8	63	4.3	5.6
	sd	0.4	5	1.1	1.2

The seawater intake monitoring results during mid-ebb tide, **Table 4.8**, shows that the DO levels ranged from 3.9 to 6.4 mg/L and mean values ranged from 4.8 to 5.2 mg/L. The SS levels ranged from 3.4 to 8.8 mg/L with mean values ranging from 5.3 to 6.0 mg/L.

Table 4.9 is a summary of results monitored at seawater intake stations during mid-flood tide.

Table 4.9 - Summary of Mid-flood Results for Seawater Intake Stations

Station		Parameter			
		DO mg/L	DOS %	NTU	SS mg/L
M01A	min	4.4	57	2.6	3.5
	max	5.9	79	7.8	9.0
	avg	5.2	69	4.1	5.7
	sd	0.5	6	1.5	1.7
M04B	min	4.3	58	2.8	4.1
	max	6.3	81	5.7	8.1
	avg	5.2	69	4.3	6.1
	sd	0.6	8	0.9	1.1
M05B	min	4.2	57	2.6	4.6
	max	6.0	78	6.1	7.3
	avg	5.1	68	4.1	5.9
	sd	0.6	7	1.0	0.9
M06	min	4.1	56	3.4	4.3
	max	5.7	75	8.8	8.9
	avg	5.1	67	5.0	6.3
	sd	0.4	5	1.3	1.2

The seawater intake monitoring results during mid-flood tide, **Table 4.9**, shows that the DO levels ranged from 4.1 to 6.3 mg/L and mean values ranged from 5.1 to 5.2 mg/L. The SS levels ranged from 3.5 to 9.0 mg/L with mean values ranging from 5.7 to 6.3 mg/L.

Additional DO Water Sampling

The additional DO water monitoring results, under the “the water quality of embayment area between the eastern seawall and the Hong Kong Convention and Exhibition Centre (HKCEC) upon completion of eastern seawall”, in accordance with the Environmental Permit No. EP-01/122/2003/D Condition 3.9, are presented in **Annex L**.

Monitoring Results

4.4.3 Waste Management

Table 4.10 - Monthly Summary Waste Flow Table for December 2009

Month	Actual Quantities of Inert C&D Materials Generated Monthly				
	Total Quantity Generated	Broken Concrete (see Note 4)	Reused in the Contract	Reused in other Projects	Reused as Public Fill
	(in '000 m ³)				
December 2009	16.041	-	1.900	-	14.141
Month	Actual Quantities of C&D Materials Generated Monthly				
	Metals	Paper/cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
	(in '000 kg)	(in '000 kg)	(in '000 kg)		(in '000 m ³)
December 2009	0	0.420	-	-	0.185*

Notes:

- (1) The performance targets are given in PS Sub-clause 2(5)(c).
- (2) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.
- (3) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.
- (4) Broken concrete for recycling into aggregates.
 * Comprised of 145 m³ of non-inert C&D waste and 40 m³ of general refuse.

4.4.4 Landscape and Visual

As major construction activities undertaken during the reporting period were ground level infrastructure works and fillings works, the landscape and visual impacts are considered minimal.

5. ENVIRONMENTAL COMPLAINTS AND NON-COMPLIANCE

5.1 Environmental Exceedances

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

5.1.1 Air Quality

No exceedances in TSP level were recorded at the monitoring stations during the reporting period.

5.1.2 Noise Impact

Four exceedances in noise level were recorded at the City Hall on 5th, 6th, 14th and 31st December 2009. On 5th December 2009, activities East Asian Games opening ceremony which included firework display was carried out on the floating platform of Victoria Harbour. On 6th, 14th and 31st December 2009, the noise exceedances were considered to be attributed by the extension work on Hong Kong Planning and Infrastructure Exhibition Gallery rather than the project works.

5.1.3 Water Quality

Exceedances in marine water quality have been recorded during the reporting period as summarised in **Table 5.1**.

Table 5.1 - Summary of Water Quality Exceedances

Date	Tide	Parameter	Exceedance	Station
Water Quality Monitoring in Accordance with EM&A Manual				
7 th December 2009	Mid-Ebb	DO	AL	M1 and M6
9 th December 2009	Mid-Ebb	DO	AL	M1A, M4B, M5B and M6
	Mid-Flood	DO	AL	M5B
11 th December 2009	Mid-Ebb	DO	AL	M5B
	Mid-Flood	DO	AL	M1A, M4B, M5B and M6
14 th December 2009	Mid-Ebb	DO	AL	M4B and M6
	Mid-Flood	DO	AL	M4B and M5B
21 st December 2009	Mid-Ebb	DO	AL	M6
23 rd December 2009	Mid-Ebb	DO	AL	M6
	Mid-Flood	DO	AL	M1A, M4B and M5B

Exceedances of Action Level for DO were recorded on 7th, 9th, 11th, 14th, 21st and 23rd December 2009. All exceedances were not considered to be related to the project works.

No exceedances in additional DO water monitoring were recorded during the reporting period.

5.1.4 Waste Management

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

5.1.5 Landscape and Visual Impact

No non-compliances with regard to landscape and visual impacts were recorded in the reporting period.

5.1.6 Site Environmental Audit

No non-compliances with regard to site environmental audit were recorded for the reporting period.

A summary of findings from site inspections conducted during the reporting period is provided in **Table 5.2**.

Table 5.2 - Summary of Environmental Site Inspections

Date of Inspection	Observations	Action(s)
3 rd December 2009	<ol style="list-style-type: none"> 1. The stockpiles were found at FRAW near the site office without cover. 2. Water ponds were found at FRAE near the foreman's office. The Contractor was reminded to remove/ fill up the ponds as soon as possible. 	<ol style="list-style-type: none"> 1. The Contractor was reminded to cover the stockpile to prevent dust generation 2. The Contractor was reminded to remove/ fill up the ponds as soon as possible.
9 th December 2009	N.A.	N.A.
17 th December 2009	N.A.	N.A.
22 nd December 2009	N.A.	N.A.
30 th December 2009	N.A.	N.A.

5.2 Environmental Complaint and Prosecution

There were no complaints received in relation to environment impact during the reporting period.

5.3 Environmental Enquiries

No environmental enquiries were received during the reporting period.

5.4 Unusual Events

No unusual events were recorded during the reporting period.

6. FORECAST AND SCHEDULE

6.1 Key Engineering Works for the Coming Month

Future key works in the coming month (January 2009) are as follows:

- Type A filling in FRAW and FRAE above +2.5mPD
- Surcharging in FRAW and FRAE
- Construction of cantilever slab at caisson
- Piling for Culvert F
- Sheet piling, excavation, structural works and backfilling for Culvert F
- General filling works above +2.5 mPD in IRAE
- Construction of storm and foul drainage and gullies in hinterlands for Road P2, Road D7, Road D8 and Road D9 and adjacent to the GPO
- Roadworks along Lung Wui Road, Tim Wa Avenue (Road D8) and Road P2
- Backfilling to Culvert K extension
- Precasting for seawall blocks and retaining wall (offsite)
- Installation of cooling water mains for Tamar Development Project at IRAE
- Installation of cooling mains discharge pipes in FRAE
- Installation of lift at Man Yiu Street footbridge
- Diaphragm walling and barrettes for CWB Works

6.2 Monitoring Schedules for the Coming Months

Based on the Contractor's programme, the Environmental Monitoring Programme for the following months is planned as follows:

TSP (24-hr and 1-hr monitoring)

TSP will be sampled once every 6 days, during the entire construction period. On each of the sampling days a single continuous 24-hour sample shall be taken, together with 3 separate 1-hr samples.

Noise (Continuous Measurements)

Noise monitoring will be round the clock throughout the entire construction period.

Water Quality Monitoring

The water quality monitoring schedule for the upcoming months is provided in **Table 6.1**.

Table 6.1 - Water Quality Monitoring Programme

Date	Day	Sampling Time	
02/01/2010	Saturday	08:30	13:30
04/01/2010	Monday	09:38	15:07
06/01/2010	Wednesday	11:02	16:53
08/01/2010	Friday	08:30	13:30
11/01/2010	Monday	09:40	14:40
13/01/2010	Wednesday	11:15	16:15
15/01/2010	Friday	08:30	13:30
18/01/2010	Monday	08:59	14:26
20/01/2010	Wednesday	09:46	15:35
22/01/2010	Friday	10:47	17:00
25/01/2010	Monday	12:00	17:00
27/01/2010	Wednesday	09:54	14:27
29/01/2010	Friday	11:45	16:52
01/02/2010	Monday	08:30	13:57
03/02/2010	Wednesday	09:27	15:24
05/02/2010	Friday	10:39	17:00
08/02/2010	Monday	09:00	14:00
10/02/2010	Wednesday	10:34	15:34
12/02/2010	Friday	11:55	16:55
16/02/2010	Tuesday	08:30	13:50
18/02/2010	Thursday	08:46	14:53
20/02/2010	Saturday	09:29	16:06
22/02/2010	Monday	10:17	17:00
24/02/2010	Wednesday	10:00	15:00
26/02/2010	Friday	10:47	15:52

6.3 Construction Programme for the Next 3 Months

The Contractor's works programme for the next 3 months is provided in **Annex B**.

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

7. CONCLUSION

There were no exceedances recorded at the City Hall and the PLA air quality monitoring stations during the reporting period.

Four exceedances in noise level were recorded at the City Hall on 5th, 6th, 14th and 31st December 2009. On 5th December 2009, activities East Asian Games opening ceremony which included firework display was carried out on the floating platform of Victoria Harbour. On 6th, 14th and 31st December 2009, the noise exceedances were considered to be attributed by the extension work on Hong Kong Planning and Infrastructure Exhibition Gallery rather than the project works.

Exceedances of Action Level for DO were recorded on 7th, 9th, 11th, 14th, 21st and 23rd December 2009. All exceedances were not considered to be related to the project works.

No exceedances in additional DO water monitoring were recorded during the reporting period.

Environmental site inspections for the CRIII project works area were undertaken on 3rd, 9th, 17th, 22nd and 30th December 2009. The observations and findings of the site inspection are summarised as below:

3rd December 2009

The stockpiles were found at FRAW near the site office without cover. The Contractor was reminded to cover the stockpile to prevent dust generation.

Water ponds were found at FRAE near the foreman's office. The Contractor was reminded to remove/ fill up the ponds as soon as possible.

9th December 2009

N.A.

17th December 2009

N.A.

22nd December 2009

N.A.

30th December 2009

N.A.