

**Central Reclamation, Phase III  
Environmental Monitoring & Audit  
Monthly Report No. 89 – December 2010**



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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 1<sup>st</sup> July 2004.)

The works under the Contract HK 12/02 commenced on 28<sup>th</sup> 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<sup>th</sup> 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 89<sup>th</sup> 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 2010.

### **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.
- 1-hour and 24-hour TSP monitoring was carried out on 1<sup>st</sup>, 7<sup>th</sup>, 13<sup>th</sup>, 17<sup>th</sup>, 23<sup>rd</sup> and 29<sup>th</sup> December 2010.
- Water quality monitoring was conducted on 1<sup>st</sup>, 3<sup>rd</sup>, 6<sup>th</sup>, 8<sup>th</sup>, 10<sup>th</sup>, 13<sup>th</sup>, 15<sup>th</sup>, 17<sup>th</sup>, 20<sup>th</sup>, 22<sup>nd</sup>, 24<sup>th</sup>, 28<sup>th</sup> and 30<sup>th</sup> December 2010 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 6<sup>th</sup>, 13<sup>th</sup>, 20<sup>th</sup> and 28<sup>th</sup> December 2010.

### **Exceedance of Action and Limit Levels**

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

Two exceedances in noise level were recorded at the City Hall during the reporting period on 3<sup>rd</sup> and 15<sup>th</sup> December 2010. Both noise exceedances are considered to be attributed to the extension work on Hong Kong Planning and Infrastructure Exhibition Gallery rather than the project works.

Exceedances in marine water quality have been recorded at various seawater intake stations during the reporting period as summarised in the following tables:

| Date   | Tide      | Parameter | Exceedance | Station     |
|--|-----------|-----------|------------|-------------|
| <b>Water Quality Monitoring in Accordance with EM&amp;A Manual</b> |           |           |            |             |
| 3 <sup>rd</sup> December 2010                                      | Mid-flood | DO        | AL         | M1A         |
| 8 <sup>th</sup> December 2010                                      | Mid-flood | SS        | AL         | M1A         |
| 20 <sup>th</sup> December 2010                                     | Mid-flood | DO        | AL         | M1A and M4B |
| 22 <sup>nd</sup> December 2010                                     | Mid-ebb   | DO        | AL         | M1A and M4B |
|  | Mid-flood | DO        | AL         | M1A and M4B |

The exceedances of Action Level for DO were recorded on 3<sup>rd</sup>, 20<sup>th</sup> and 22<sup>nd</sup> December 2010. The exceedance of Action Level for SS was recorded on 8<sup>th</sup> December 2010. All DO and SS 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 2<sup>nd</sup>, 9<sup>th</sup>, 16<sup>th</sup>, 23<sup>rd</sup> and 30<sup>th</sup> December 2010. The observations and findings of the site inspection are summarised as below:

#### **2<sup>nd</sup> December 2010**

No observations for action.

#### **9<sup>th</sup> December 2010**

Stagnant water was accumulated in the tray of air-compressor. The contractor was reminded to remove the stagnant water in the tray of air-compressor as soon as possible.

#### **16<sup>th</sup> December 2010**

No observations for action.

#### **23<sup>rd</sup> December 2010**

The leakage of muddy water was found from the temporary storage pit. The contractor had re-stretched the curtain and excavated the pit deeper immediately. The contractor is recommended to ensure the curtain in the sea should be in line and monitor the capacity of pits. Also the contractor is recommended to find out the reason of the leakage and take any necessary preventive measures against leakage of muddy water.

#### **30<sup>th</sup> December 2010**

**Executive Summary**

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No observations for action.

### ***Key Works for the Coming Month***

Future key works in the coming month (January 2011) are as follows:

- Type A filling in FRAW and FRAE above +2.5mPD
- General filling works above +2.5mPD in IRAE
- Surcharging in FRAW and FRAE
- Construction of cantilever slab at caisson
- Base slab, wall and roof construction at Culvert F
- Construction of storm and foul drainage and gullies in hinterlands for Road P2, Road D7, and Road D9
- Construction of GPO boundary wall
- Construction of PLA boundary wall
- Construction of Promenade enhancement works
- Road P2 Underpass ramp structures
- Precasting for retaining wall (offsite)
- Installation of cooling mains discharge pipes in FRAE and FRAW
- Bulk excavation to formation level at CWB works
- Construction of CWB structure
- Disposal of material off-site to Government fill banks

*Not Used*

## **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 28<sup>th</sup> 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 17<sup>th</sup> 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 89<sup>th</sup> 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 2010.

*Not Used*

## **2. ENVIRONMENTAL STATUS**

### **2.1 Works Undertaken**

Details of the main works in progress are as follows:

**Man Yiu Street Footbridge** – The Contractor has recently submitted a revised programme showing preparatory works commencing in early January 2011 with pre-bored H-piling commencing in February 2011 after the CNY holiday. The Contractor's revised monitoring plan is still awaited

**Culvert F Extension** – Flow diversion between Bay 28-30 was implemented on 9 December 2010. Construction of the base slab at Bay 28 and 30 is complete for one cell and rebar fixing for the wall is in progress. Concreting for the wall/roof for Bays 31-32 is to be carried out shortly. The programme for this work shows completion after 31 March 2011 i.e. into next wet season.

**Drainage Works** – The construction of the stormwater drains at the City Hall access road and J/O Road P2/D7 (approximately 95% complete) and sewers (approximately 45% complete) at Edinburgh Place are in progress. The construction of the stormwater drains and sewers at the junctions of Road D9 / Lung Wui Road and Road D11/Lung Wui Road, Road D11 and Man Yiu Street footbridge lift shaft are also in progress. The construction of stormwater interceptor (approximately 50% complete) at Edinburgh Place ceased in order to provide room for the HSBC cooling main discharge construction.

**Water Mains** – Nothing to report.

**Roadworks** – Roadworks in Lung Wui Road and Road D9 are in progress. The construction of root barrier along the southern footpath of Road P2 in front of City Hall continues.

The City Hall access road was completed with temporary paving and TTA Scheme 112 was implemented at J/O City Hall access road / Road D7 on 15 December 2010. The existing access road leading to City Hall was handed over to ArchSD on 15 December 2010 in order to facilitate their cladding works at the Exhibition Gallery. The construction of the northern footpath at the City Hall access road and the roadworks at J/O Road P2/D7 are in progress.

**Road P2 Advance Landscaping Works** – The proposed tree planting at Road P2 will be postponed to the next planting season, i.e. starting in March 2011 and the specification of the proposed tree "Koelreuteria Paniculata" has been revised. Preparation works are in progress.

**CWB Works** – D-wall/barrette construction has been completed with the exception of interface coring and toe grouting at Portions 2 & 3, and all plant has been demobilised. Bulk excavation and installation of struts are substantially complete at Portions 1, 6a, 6c & 7, and continue at Portions 2, 3, 4, 5 and 6b. Tunnel structure construction is nearing completion at Portion 6a and backfilling is in progress, base slab/centralwall/roof slab construction continue at Portions 6c & 7, base slab construction continues at Portion 4 and base slab construction has just commenced at Portion 1.

**Promenade Enhancement Works** – Preparation works are in progress.

**PLA Berth** – The Contractor commenced preparation works for the PLA berth construction on 24 December 2010.

**Environmental Status**

**PLA Boundary Wall** – The construction of the PLA boundary wall at the northwest corner commenced.

**GPO Wall** – The pre-drilling works for the mini-piles are scheduled to commence soon.

**In FRAW** – Cantilever slab for caisson C16 was cast. Placing of seawall blocks at the temporary channel on the east side of P6.1 is complete. Parapet installation is nearly complete.

**In FRAE** – Parapet installation is nearly complete.

**Road P2 Underpass** – Preparation work for the base slab on the east ramp is in progress. On the west ramp construction of remaining base slab continues. E&M works for the pump room commenced.

**Cooling-Water Mains for QGO** – Nothing to report.

**Permanent Sea Water Intake System for PLA** – Installation of the dosing pipe (40% complete) and desilting pipe (70% complete) is in progress. Construction of de-silting chamber in front of the PLA entrance is nearly complete. Desilting for the PLA intake pipe is in progress.

**Seawall Caissons and Pumping Stations** – Cantilever slab for C16 was cast on 22 December 2010.

**Tamar Entrustment Works** – Works are substantially completed and the pipeworks were handed over to GHHJV on 19 November 2010.

**Culvert K Extension** – Reinstatement to the opening at Bay 11 was completed and backfilled.

**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    | Application of Construction Noise Permit for Works Area at Intersection of Central Wanchai Bypass Tunnel & Culvert J (Renewal of CNP No. GW-RS0587-10)                    | 15 <sup>th</sup> December 2010 | Pending                                  |
| 2    | New Construction Noise Permits GW-RS1091-10 and GW-RS1097-10  | 15 <sup>th</sup> December 2010 | Pending                                  |
| 3    | Application of Construction Noise Permit for Works Area at Intersection of Central Wanchai Bypass Tunnel & Culvert J (Night-time Works) (Renewal of CNP No. GW-RS0588-10) | 15 <sup>th</sup> December 2010 | Pending                                  |
| 4    | New Construction Noise Permit GW-RS1125-10  | 30 <sup>th</sup> November 2010 | Issued on 24 <sup>th</sup> December 2010 |

**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    | Application of Construction Noise Permit for Works Area at Intersection of Central Wanchai Bypass Tunnel & Culvert J (Renewal of CNP No. GW-RS0587-10)                    | -       | 15 <sup>th</sup> December 2010 |
| 2    | New Construction Noise Permits GW-RS1091-10 and GW-RS1097-10  | -       | 15 <sup>th</sup> December 2010 |
| 3    | Application of Construction Noise Permit for Works Area at Intersection of Central Wanchai Bypass Tunnel & Culvert J (Night-time Works) (Renewal of CNP No. GW-RS0588-10) | -       | 15 <sup>th</sup> December 2010 |
| 4    | New Construction Noise Permit GW-RS1125-10  | -       | 24 <sup>th</sup> December 2010 |

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. 88, November 2010 | 3128/M45/200/OC12658/SB/WW/KC/f<br>I | 14 <sup>th</sup> December 2010 | Issued on 14 <sup>th</sup> December 2010 |

## 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), Leq (15 mins), L10, L90.                               | 1 Location   | Continuous measurements              | Two weeks before Construction and During Construction |
| Water Quality           | Dissolved Oxygen<br>Salinity<br>Temp<br>Suspended Solids<br>Turbidity | Since 11 <sup>th</sup> Jan 2010:<br>3 Locations <sup>(1)</sup> | 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                                   |

Note (1) Seawater Intake M01A, M04B and land based Monitoring Station "Culvert F" was monitored since 11<sup>th</sup> January 2010

### **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 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 2010**

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 2<sup>nd</sup>, 9<sup>th</sup>, 16<sup>th</sup>, 23<sup>rd</sup> and 30<sup>th</sup> December 2010.

1-hour and 24-hour TSP monitoring was carried out on 1<sup>st</sup>, 7<sup>th</sup>, 13<sup>th</sup>, 17<sup>th</sup>, 23<sup>rd</sup> and 29<sup>th</sup> December 2010. The dust sampler undertaking 1-hour TSP measurement (Microdust Pro IR Dust Sampler by Casella) has been out of operation since 24<sup>th</sup> 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.

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 |   |       |
|------------------|-------------|------------------|---|-------|
| 01/12/2010       | MID-EBB     | 08:10            | - | 08:45 |
|                  | MID-FLOOD   | 14:05            | - | 14:50 |
| 03/12/2010       | MID-EBB     | 09:52            | - | 10:27 |
|                  | MID-FLOOD   | 15:15            | - | 16:00 |
| 06/12/2010       | MID-EBB     | 11:00            | - | 11:34 |
|                  | MID-FLOOD   | 17:05            | - | 17:44 |
| 08/12/2010       | MID-EBB     | 13:55            | - | 14:27 |
|                  | MID-FLOOD   | 09:08            | - | 09:49 |
| 10/12/2010       | MID-EBB     | 15:17            | - | 15:53 |
|                  | MID-FLOOD   | 10:00            | - | 10:33 |
| 13/12/2010       | MID-EBB     | 17:00            | - | 17:48 |
|                  | MID-FLOOD   | 11:33            | - | 12:09 |
| 15/12/2010       | MID-EBB     | 16:45            | - | 17:30 |
|                  | MID-FLOOD   | 12:06            | - | 12:51 |
| 17/12/2010       | MID-EBB     | 08:45            | - | 09:24 |
|                  | MID-FLOOD   | 14:18            | - | 15:02 |
| 20/12/2010       | MID-EBB     | 10:48            | - | 11:20 |
|                  | MID-FLOOD   | 16:03            | - | 16:42 |
| 22/12/2010       | MID-EBB     | 11:02            | - | 11:31 |
|                  | MID-FLOOD   | 16:40            | - | 17:15 |
| 24/12/2010       | MID-FLOOD   | 08:41            | - | 09:24 |
|                  | MID-EBB     | 14:00            | - | 14:38 |
| 28/12/2010       | MID-FLOOD   | 11:33            | - | 12:09 |

| Date of Sampling | Tidal State | Time of Sampling |   |       |
|------------------|-------------|------------------|---|-------|
|                  | MID-EBB     | 16:37            | - | 17:09 |
| 30/12/2010       | MID-EBB     | 08:00            | - | 08:34 |
|                  | MID-FLOOD   | 13:17            | - | 13:53 |

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 6<sup>th</sup>, 13<sup>th</sup>, 20<sup>th</sup> and 28<sup>th</sup> December 2010.

## 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**.

### 4.2.3 Water Quality Monitoring

Water quality monitoring was conducted in accordance with the methodology described in the EM&A Manual. Before 11<sup>th</sup> January 2010, monitoring was conducted at all stations including 4 marine-based stations and 4 seawater intake stations. Since 11<sup>th</sup> January 2010, monitoring was conducted at 3 land-based stations (2 for seawater intake and 1 for mouth of culvert). 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 |

### 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"> <li>• This instrument was portable and weatherproof and used a DC power source. The equipment was capable of measuring:                             <ul style="list-style-type: none"> <li>a) DO levels in the range of 0–20 mg/l and 0–200% saturation; and</li> <li>b) Temperature of between 0–45 degree Celsius.</li> </ul> </li> <li>• 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.</li> </ul> |
| 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              |
| pH Meter               | Prior to each sampling day   | On last field use              |
| Psychrometer           | Every 6 months   | On last field use              |
| Integrated SLM         | Every year   | 15 <sup>th</sup> October 2010  |
| High Volume Sampler    | Every two months   | 26 <sup>th</sup> November 2010 |

#### 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 4.7**.

##### Seawater Intake Stations

Station M1A and M4B are used as the seawater intake station.

**Table 4.6** shows a summary of the results monitored at the seawater intake stations during mid-ebb tide.

**Table 4.6 - Summary of Mid-ebb Results for Seawater Intake Stations**

| Station |     | Parameter |       |      |         |
|---------|-----|-----------|-------|------|---------|
|         |     | DO mg/L   | DOS % | NTU  | SS mg/L |
| M01A    | min | 4.0       | 54    | 3.0  | 4.9     |
|         | max | 6.6       | 88    | 11.8 | 10.1    |
|         | avg | 5.5       | 73    | 5.4  | 7.7     |
|         | sd  | 0.7       | 9     | 1.8  | 1.3     |
| M04B    | min | 4.2       | 56    | 3.1  | 5.2     |
|         | max | 6.3       | 86    | 7.3  | 11.4    |
|         | avg | 5.5       | 73    | 5.0  | 7.3     |
|         | sd  | 0.6       | 8     | 1.3  | 1.6     |

The seawater intake monitoring results during mid-ebb tide, **Table 4.6**, shows that the DO levels ranged from 4.0 to 6.6 mg/L and mean values ranged about 5.5 mg/L. The SS levels ranged from 4.9 to 11.4 mg/L with mean values ranging from 7.3 to 7.7 mg/L.

**Table 4.7** is a summary of results monitored at seawater intake stations during mid-flood tide.

**Table 4.7 - Summary of Mid-flood Results for Seawater Intake Stations**

| Station |     | Parameter |       |      |         |
|---------|-----|-----------|-------|------|---------|
|         |     | DO mg/L   | DOS % | NTU  | SS mg/L |
| M01A    | min | 4.1       | 55    | 3.1  | 5.3     |
|         | max | 6.6       | 92    | 9.4  | 11.6    |
|         | avg | 5.3       | 71    | 5.8  | 8.4     |
|         | sd  | 0.7       | 10    | 1.8  | 1.9     |
| M04B    | min | 4.0       | 54    | 3.1  | 5.3     |
|         | max | 6.5       | 91    | 10.3 | 11.1    |
|         | avg | 5.4       | 72    | 6.3  | 8.5     |
|         | sd  | 0.7       | 10    | 2.2  | 1.8     |

The seawater intake monitoring results during mid-flood tide, **Table 4.7**, shows that the DO levels ranged from 4.0 to 6.6 mg/L and mean values ranged about 5.3 to 5.4 mg/L. The SS levels ranged from 5.3 to 11.6 mg/L with mean values ranging from 8.4 to 8.5 mg/L.

### **Land-Based Stations**

Monitoring stations Culvert F was selected as the land-based reference stations. As such, Culvert F is used as reference station to note any significant elevations in SS, turbidity or reductions in DO that may affect the seawater intake stations. **Table 4.8** shows a summary of the results monitored at reference stations during mid-ebb tide. **Table 4.9** shows a summary of the results monitored at reference stations during mid-flood tide.

**Monitoring Results**

**Table 4.8 - Summary of Mid-ebb Results for Reference Stations**

| Station   |     | Parameter   |       |      |         |
|-----------|-----|-------------|-------|------|---------|
|           |     | DO (M) mg/L | DOS % | NTU  | SS mg/L |
| Culvert F | min | 4.7         | 66    | 4.1  | 7.5     |
|           | max | 6.6         | 96    | 10.5 | 14.8    |
|           | avg | 5.5         | 76    | 7.5  | 11.1    |
|           | sd  | 0.5         | 7     | 1.9  | 2.3     |

The monitoring results at reference station (Culvert F) during mid-ebb tide, **Table 4.8**, shows that the DO levels at middle layer ranged from 4.7 to 6.6 mg/L and mean value was 5.5 mg/L. The SS levels ranged from 7.5 to 14.8 mg/L with mean values of 11.1 mg/L.

**Table 4.9 - Summary of Mid-flood Results for Reference Stations**

| Station   |     | Parameter   |       |      |         |
|-----------|-----|-------------|-------|------|---------|
|           |     | DO (M) mg/L | DOS % | NTU  | SS mg/L |
| Culvert F | min | 4.2         | 56    | 3.3  | 6.1     |
|           | max | 6.4         | 89    | 16.7 | 29.7    |
|           | avg | 5.4         | 75    | 8.1  | 12.0    |
|           | sd  | 0.7         | 9     | 3.3  | 6.2     |

The monitoring results at reference station (Culvert F) during mid-flood tide, **Table 4.9**, shows that the DO levels at surface layer ranged from 4.2 to 6.4 mg/L and mean value was 5.4 mg/L. The SS levels ranged from 6.1 to 29.7 mg/L with mean value of 12.0 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**.

#### 4.4.3 Waste Management

Table 4.10 - Monthly Summary Waste Flow Table for December 2010

| 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 <sup>3</sup> )                                  |                              |                        |                          |                             |
| December 2010 | 52.182   | -                            | 6.550                  | -                        | 45.632                      |
| 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 <sup>3</sup> )   |
| December 2010 | -  | 0.425                        | -                      | -                        | 0.274*                      |

**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 234 m<sup>3</sup> of non-inert C&D waste and 40 m<sup>3</sup> 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.

**Monitoring Results**

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*Not Used*

## **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**

Two exceedances in noise level were recorded at the City Hall during the reporting period on 3<sup>rd</sup> and 15<sup>th</sup> December 2010. Both noise exceedances are considered to be attributed to 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     |
|--|-----------|-----------|------------|-------------|
| <b>Water Quality Monitoring in Accordance with EM&amp;A Manual</b> |           |           |            |             |
| 3 <sup>rd</sup> December 2010                                      | Mid-flood | DO        | AL         | M1A         |
| 8 <sup>th</sup> December 2010                                      | Mid-flood | SS        | AL         | M1A         |
| 20 <sup>th</sup> December 2010                                     | Mid-flood | DO        | AL         | M1A and M4B |
| 22 <sup>nd</sup> December 2010                                     | Mid-ebb   | DO        | AL         | M1A and M4B |
|  | Mid-flood | DO        | AL         | M1A and M4B |

The exceedances of Action Level for DO were recorded on 3<sup>rd</sup>, 20<sup>th</sup> and 22<sup>nd</sup> December 2010. The exceedance of Action Level for SS was recorded on 8<sup>th</sup> December 2010. All DO and SS 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**

| <b>Date of Inspection</b>      | <b>Observations</b>  | <b>Action(s)</b>   |
|--------------------------------|--|--|
| 2 <sup>nd</sup> December 2010  | No observations for action.  | N.A  |
| 9 <sup>th</sup> December 2010  | Stagnant water was accumulated in the tray of air-compressor.        | The contractor was reminded to remove the stagnant water in the tray of air-compressor as soon as possible.  |
| 16 <sup>th</sup> December 2010 | No observations for action.  | N.A  |
| 23 <sup>rd</sup> December 2010 | The leakage of muddy water was found from the temporary storage pit. | The contractor had re-stretched the curtain and excavated the pit deeper immediately. The contractor is recommended to ensure the curtain in the sea should be in line and monitor the capacity of pits. Also the contractor is recommended to find out the reason of the leakage and take any necessary preventive measures against leakage of muddy water. |
| 30 <sup>th</sup> December 2010 | No observations for action.  | 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.

*Not Used*

## **6. FORECAST AND SCHEDULE**

### **6.1 Key Engineering Works for the Coming Month**

Future key works in the coming month (January 2011) are as follows:

- Type A filling in FRAW and FRAE above +2.5mPD
- General filling works above +2.5mPD in IRAE
- Surcharging in FRAW and FRAE
- Construction of cantilever slab at caisson
- Base slab, wall and roof construction at Culvert F
- Construction of storm and foul drainage and gullies in hinterlands for Road P2, Road D7, and Road D9
- Construction of GPO boundary wall
- Construction of PLA boundary wall
- Construction of Promenade enhancement works
- Road P2 Underpass ramp structures
- Precasting for retaining wall (offsite)
- Installation of cooling mains discharge pipes in FRAE and FRAW
- Bulk excavation to formation level at CWB works
- Construction of CWB structure
- Disposal of material off-site to Government fill banks

## 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 3 monitoring stations for the upcoming month is provided in **Table 6.1**.

**Table 6.1 - Water Quality Monitoring Programme**

| Date       | Day         | Sampling Time |       |
|------------|-------------|---------------|-------|
| 03/01/2011 | (Monday)    | 11:55         | 16:53 |
| 05/01/2011 | (Wednesday) | 08:30         | 13:30 |
| 07/01/2011 | (Friday)    | 09:07         | 14:30 |
| 10/01/2011 | (Monday)    | 10:38         | 16:30 |
| 12/01/2011 | (Wednesday) | 11:40         | 17:00 |
| 14/01/2011 | (Friday)    | 12:00         | 17:00 |
| 17/01/2011 | (Monday)    | 10:26         | 15:26 |
| 19/01/2011 | (Wednesday) | 12:00         | 17:00 |
| 21/01/2011 | (Friday)    | 08:30         | 13:30 |
| 24/01/2011 | (Monday)    | 09:50         | 15:45 |
| 26/01/2011 | (Wednesday) | 11:15         | 17:00 |
| 28/01/2011 | (Friday)    | 08:30         | 13:00 |
| 31/01/2011 | (Monday)    | 11:00         | 16:00 |
| 02/02/2011 | (Wednesday) | 12:00         | 17:00 |
| 07/02/2011 | (Monday)    | 09:00         | 15:00 |
| 09/02/2011 | (Wednesday) | 10:00         | 16:00 |
| 11/02/2011 | (Friday)    | 10:45         | 17:00 |
| 14/02/2011 | (Monday)    | 09:35         | 14:35 |
| 16/02/2011 | (Wednesday) | 11:05         | 16:10 |
| 18/02/2011 | (Friday)    | 12:00         | 17:00 |
| 21/02/2011 | (Monday)    | 08:30         | 14:30 |
| 23/02/2011 | (Wednesday) | 09:30         | 16:00 |
| 25/02/2011 | (Friday)    | 11:00         | 16:00 |
| 28/02/2011 | (Monday)    | 10:00         | 15:00 |
| 02/03/2011 | (Wednesday) | 11:30         | 16:40 |
| 04/03/2011 | (Friday)    | 12:00         | 17:00 |
| 07/03/2011 | (Monday)    | 08:30         | 14:00 |
| 09/03/2011 | (Wednesday) | 08:30         | 15:00 |
| 11/03/2011 | (Friday)    | 08:53         | 12:03 |

**Forecast and Schedule**

| Date       | Day         | Sampling Time |       |
|------------|-------------|---------------|-------|
| 14/03/2011 | (Monday)    | 09:50         | 17:00 |
| 16/03/2011 | (Wednesday) | 10:00         | 15:00 |
| 18/03/2011 | (Friday)    | 11:20         | 17:00 |
| 21/03/2011 | (Monday)    | 08:30         | 13:30 |
| 23/03/2011 | (Wednesday) | 08:30         | 14:50 |
| 25/03/2011 | (Friday)    | 09:34         | 16:48 |
| 28/03/2011 | (Monday)    | 09:40         | 14:30 |
| 30/03/2011 | (Wednesday) | 10:27         | 15:40 |

**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.

*Not Used*

## **7. CONCLUSION**

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

Two exceedances in noise level were recorded at the City Hall during the reporting period on 3<sup>rd</sup> and 15<sup>th</sup> December 2010. Both noise exceedances are considered to be attributed to the extension work on Hong Kong Planning and Infrastructure Exhibition Gallery rather than the project works.

The exceedances of Action Level for DO were recorded on 3<sup>rd</sup>, 20<sup>th</sup> and 22<sup>nd</sup> December 2010. The exceedance of Action Level for SS was recorded on 8<sup>th</sup> December 2010. All DO and SS exceedances were not considered to be related to the project works.

No exceedance in additional DO water monitoring was recorded during the reporting period.

Environmental site inspections for the CRIII project works area were undertaken on 2<sup>nd</sup>, 9<sup>th</sup>, 16<sup>th</sup>, 23<sup>rd</sup> and 30<sup>th</sup> December 2010. The observations and findings of the site inspection are summarised as below:

### **2<sup>nd</sup> December 2010**

No observations for action.

### **9<sup>th</sup> December 2010**

Stagnant water was accumulated in the tray of air-compressor. The contractor was reminded to remove the stagnant water in the tray of air-compressor as soon as possible.

### **16<sup>th</sup> December 2010**

No observations for action.

### **23<sup>rd</sup> December 2010**

The leakage of muddy water was found from the temporary storage pit. The contractor had re-stretched the curtain and excavated the pit deeper immediately. The contractor is recommended to ensure the curtain in the sea should be in line and monitor the capacity of pits. Also the contractor is recommended to find out the reason of the leakage and take any necessary preventive measures against leakage of muddy water.

### **30<sup>th</sup> December 2010**

No observations for action.

*Not Used*



