


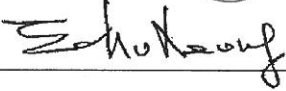
China Harbour Engineering Company Limited

Contract No. HY/2010/02

**Hong Kong – Zhuhai – Macao Bridge
Hong Kong Boundary Crossing
Facilities –
Reclamation Works**

Monthly EM&A Report for December 2012

[01/2013]

	Name	Signature
Prepared & Checked:	Y T Tang	
Reviewed, Approved and Certified:	Echo Leong (ETL)	

Version:	Rev. 0	Date:	15 January 2013
----------	--------	-------	-----------------

Disclaimer

This report is prepared for China Harbour Engineering Company Limited and is given for its sole benefit in relation to and pursuant to Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities-Reclamation Works and may not be disclosed to, quoted to or relied upon by any person other than China Harbour Engineering Company Limited without our prior written consent. No person (other than China Harbour Engineering Company Limited) into whose possession a copy of this report comes may rely on this report without our express written consent and China Harbour Engineering Company Limited may not rely on it for any purpose other than as described above.

AECOM Asia Co. Ltd.
15/F, Grand Central Plaza, Tower 1, 138 Shatin Rural Committee Road, Shatin, NT, Hong Kong
Tel: (852) 3922 9000 Fax: (852) 2317 7609 www.aecom.com

Engineer's Representative
Ove Arup & Partners
Level 5, Festival Walk
80 Tat Chee Avenue
Kowloon Tong, Kowloon
Hong Kong

By Fax (2268 3970) and By Post

Attention: Mr. Michael Lo

Dear Mr. Lo,

**Re: Agreement No. CE 48/2011 (EP)
Environmental Project Office for the
HZMB Hong Kong Link Road, HZMB Hong Kong Boundary Crossing Facilities,
and Tuen Mun-Chek Lap Kok Link – Investigation**

**Contract No. HY/2010/02
Hong Kong – Zhuhai – Macao Bridge
Hong Kong Boundary Crossing Facilities – Reclamation Work
Monthly Environmental Monitoring & Audit Report for December 2012**

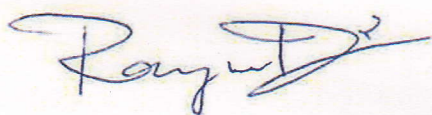
Reference is made to the Environmental Team's submission of the Monthly Environmental Monitoring & Audit Report for December 2012 (letter ref. 60249820/C/RMKY13011501 dated 15 January 2013) copied to us by E-mail on 15 January 2013.

We are pleased to inform you that we have no adverse comment on the captioned Monthly EM&A Report. We write to verify the captioned report in accordance with Condition 5.4 of EP-353/2009/E and Condition 4.4 of EP-354/2009/A (for TM-CLKL Southern Landfall Reclamation only).

In view of public attention on the dolphin monitoring, we would like to remind the Environmental Team Leader (ETL) to ensure all environmental monitoring results shall be true, valid and correct.

Thank you very much for your kind attention and please do not hesitate to contact the undersigned should you have any queries.

Yours sincerely,



Raymond Dai
Independent Environmental Checker

c.c.	HyD	Mr. Matthew Fung	(By Fax: 3188 6614)
	HyD	Mr. Wai-ping Lee	(By Fax: 3188 6614)
	AECOM	Ms. Echo Leong	(By Fax: 2317 7609)
	CHEC	Mr. C M Wong	(By Fax: 2578 0413)

Q:\Projects\HYDHZMBEEM00\02_Proj_Mgt\02_Corr\HYDHZMBEEM00_0_0625L.13.doc

TABLE OF CONTENTS

	Page
EXECUTIVE SUMMARY	1
1 INTRODUCTION	3
1.1 Background	3
1.2 Scope of Report	3
1.3 Project Organization	4
1.4 Summary of Construction Works	4
1.5 Summary of EM&A Programme Requirements	5
2 AIR QUALITY MONITORING	6
2.1 Monitoring Requirements	6
2.2 Monitoring Equipment	6
2.3 Monitoring Locations	6
2.4 Monitoring Parameters, Frequency and Duration	7
2.5 Monitoring Methodology	7
2.6 Monitoring Schedule for the Reporting Month	9
2.7 Results and Observations	9
3 NOISE MONITORING	11
3.1 Monitoring Requirements	11
3.2 Monitoring Equipment	11
3.3 Monitoring Locations	11
3.4 Monitoring Parameters, Frequency and Duration	11
3.5 Monitoring Methodology	12
3.6 Monitoring Schedule for the Reporting Month	12
3.7 Monitoring Results	12
4 WATER QUALITY MONITORING	14
4.1 Monitoring Requirements	14
4.2 Monitoring Equipment	14
4.3 Monitoring Parameters, Frequency and Duration	14
4.4 Monitoring Locations	15
4.5 Monitoring Methodology	16
4.6 Monitoring Schedule for the Reporting Month	17
4.7 Results and Observations	17
5 DOLPHIN MONITORING	23
5.1 Monitoring Requirements	23
5.2 Monitoring Equipment	23
5.3 Monitoring Frequency and Conditions	23
5.4 Monitoring Methodology and Location	23
5.5 Monitoring Procedures	25
5.6 Monitoring Schedule for the Reporting Month	25
5.7 Results and Observations	25
6 ENVIRONMENTAL SITE INSPECTION AND AUDIT	28
6.1 Site Inspection	28
6.2 Advice on the Solid and Liquid Waste Management Status	29
6.3 Environmental Licenses and Permits	30
6.4 Implementation Status of Environmental Mitigation Measures	30
6.5 Summary of Exceedances of the Environmental Quality Performance Limit	31
6.6 Summary of Complaints, Notification of Summons and Successful Prosecutions	32
7 FUTURE KEY ISSUES	34
7.1 Construction Programme for the Coming Months	34
7.2 Key Issues for the Coming Month	34
7.3 Monitoring Schedule for the Coming Month	34

8	CONCLUSIONS AND RECOMMENDATIONS	35
8.1	Conclusions	35
8.2	Recommendations	35

List of Tables

Table 1.1	Contact Information of Key Personnel
Table 2.1	Air Quality Monitoring Equipment
Table 2.2	Locations of Impact Air Quality Monitoring Stations
Table 2.3	Air Quality Monitoring Parameters, Frequency and Duration
Table 2.4	Summary of 1-hour TSP Monitoring Results in the Reporting Period
Table 2.5	Summary of 24-hour TSP Monitoring Results in the Reporting Period
Table 3.1	Noise Monitoring Equipment
Table 3.2	Locations of Impact Noise Monitoring Stations
Table 3.3	Noise Monitoring Parameters, Frequency and Duration
Table 3.4	Summary of Construction Noise Monitoring Results in the Reporting Period
Table 4.1	Water Quality Monitoring Equipment
Table 4.2	Impact Water Quality Monitoring Parameters and Frequency
Table 4.3	Impact Water Quality Monitoring Stations
Table 4.4	Laboratory Analysis for Suspended Solids
Table 5.1	Dolphin Monitoring Equipment
Table 5.2	Impact Dolphin Monitoring Line Transect Co-ordinates (Provided by AFCD)
Table 5.3	Impact Dolphin Monitoring Survey Effort Summary
Table 5.4	Impact Dolphin Monitoring Survey Details in December 2012
Table 6.1	Summary of Environmental Licensing and Permit Status

Figures

Figure 1	General Project Layout Plan
Figure 2	Impact Air Quality and Noise Monitoring Stations and Wind Station
Figure 3	Impact Water Quality Monitoring Stations
Figure 4	Impact Dolphin Monitoring Line Transect Layout Map
Figure 5	Impact Dolphin Monitoring Survey Efforts and Sightings in December 2012
Figure 6	Environmental Complaint Handling Procedure

List of Appendices

Appendix A	Project Organization for Environmental Works
Appendix B	Three Month Rolling Construction Programmes
Appendix C	Implementation Schedule of Environmental Mitigation Measures (EMIS)
Appendix D	Summary of Action and Limit Levels
Appendix E	Calibration Certificates of Monitoring Equipments
Appendix F	EM&A Monitoring Schedules
Appendix G	Impact Air Quality Monitoring Results and their Graphical Presentation
Appendix H	Meteorological Data for Monitoring Periods on Monitoring Dates in December 2012
Appendix I	Impact Construction Noise Monitoring Results and their Graphical Presentation
Appendix J	Impact Water Quality Monitoring Results and their Graphical Presentation
Appendix K	Impact Dolphin Monitoring Survey Sighting Summary
Appendix L	Event Action Plan
Appendix M	Monthly Summary of Waste Flow Table
Appendix N	Cumulative Statistics on Exceedances, Complaints, Notifications of Summons and Successful Prosecutions

EXECUTIVE SUMMARY

Contract No. HY/2010/02 – Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Work (here below, known as “the Project”) mainly comprises reclamation at the northeast of the Hong Kong International Airport of an area of about 130-hectare for the construction of an artificial island for the development of the Hong Kong Boundary Crossing Facilities (HKBCF), and about 19-hectare for the southern landfall of the Tuen Mun - Chek Lap Kok Link (TMCLKL). It is a designated project and is governed by the current permits for the Project, i.e. the amended Environmental Permits (EPs) issued on 16 Oct 2012 (EP-353/2009/E) and 8 December 2011 (EP-354/2009/A) (for TMCLKL Southern Landfall Reclamation only).

Ove Arup & Partners Hong Kong Limited (Arup) was appointed by Highways Department (HyD) as the consultants for the design and construction assignment for the Project’s reclamation works (i.e. the Engineer for the Project).

China Harbour Engineering Company Limited (CHEC) was awarded by HyD as the Contractor to undertake the construction work of the Project.

ENVIRON Hong Kong Ltd. was employed by HyD as the Independent Environmental Checker (IEC) and Environmental Project Office (ENPO) for the Project.

AECOM Asia Co. Ltd. (AECOM) was appointed by CHEC to undertake the role of Environmental Team for the Project for carrying out the environmental monitoring and audit (EM&A) works.

The construction phase of the Project under the EPs was commenced on 12 March 2012 and will be tentatively completed by early Year 2016. The EM&A programme, including air quality, noise, water quality and dolphin monitoring and environmental site inspections, was commenced on 12 March 2012.

This report documents the findings of EM&A works conducted in the period between 1 and 31 December 2012. As informed by the Contractor, major activities in the reporting period were:-

Marine-based Works

- Maintenance of Silt curtain
- Stone column installation
- Band drain installation trial

Land-based Works

- Maintenance works of Site Office at Works Area WA2
- Maintenance works of Public Works Regional Laboratory at Works Area WA3
- Sign board erection at Works Area WA2
- Geo-textile fabrication at Works Area WA2
- Stone column installation barges setup and their maintenance works at Works Area WA4
- Silt curtain fabrication at Works Area WA4

A summary of monitoring and audit activities conducted in the reporting period is listed below:

24-hour Total Suspended Particulates (TSP) monitoring	6 sessions
1-hour TSP monitoring	6 sessions
Noise monitoring	4 sessions
Impact water quality monitoring	12 sessions
Impact dolphin monitoring	2 surveys
Joint Environmental site inspection	4 sessions

Breaches of Action and Limit Levels for Air Quality

No Action/Limit Level exceedance of 1-hour TSP results was recorded in the reporting month. However, one (1) Limit Level exceedance of 24-hour TSP results was recorded in the reporting month. Investigation result show that the exceedance was not due to the Project works.

Breaches of Action and Limit Levels for Noise

No Action/Limit Level exceedance of construction noise was recorded in the reporting month.

Breaches of Action and Limit Levels for Water Quality

Ten (10) Action Level exceedances were recorded at measured suspended solids (SS) values (in mg/L) in the reporting month. Investigation result show that the exceedances were not due to the Project works.

Impact Dolphin Monitoring

A total of eighteen dolphin sightings were recorded during the two surveys, two on the 4 December 2012, two on the 6 December 2012, four on the 10 December 2012 and ten on the 11 December 2012. Of the eighteen sightings, eleven were “on effort” (which are all under favourable condition) and seven were “opportunistic”. A total of forty-seven individuals were sighted from the two impact dolphin surveys in the reporting period. Sighting details are summarised and plotted in Appendix K and Figure 5c, respectively.

Behaviour: eleven groups were feeding six of which was associated with a fishing vessel (hang trawler); one group were recorded as travelling; two groups were associated with multiple behaviour (feeding and traveling, socializing and feeding); one group were recorded as surface active; the behavior of three groups were unknown.

Complaint, Notification of Summons and Successful Prosecution

As informed by the Contractor on 30 November 12. One complaint was received on 18 October 2012 and is reported in this reporting month due to the time required for conducting investigation. No notification of summons and successful prosecution was received in the reporting month.

Reporting Change

There was no reporting change required in the reporting period.

Future Key Issues

Key issues to be considered in the coming month included:-

- Site runoff should be properly collected and treated prior to discharge;
- Minimize loss of sediment from filling works;
- Regular review and maintenance of silt curtain systems, drainage systems and desilting facilities;
- Exposed surfaces/soil stockpiles should be properly treated to avoid generation of silty surface run-off during rainstorm;
- Regular review and maintenance of wheel washing facilities provided at all site entrances/exits;
- Conduct regular inspection of various working machineries and vessels within works areas to avoid any dark smoke emission;
- Suppress dust generated from work processes with use of bagged cements, earth movements, excavation activities, exposed surfaces/soil stockpiles and haul road traffic;
- Quieter powered mechanical equipment should be used;
- Provision of proper and effective noise control measures for operating equipment and machinery on-site, such as erection of movable noise barriers or enclosure for noisy plants;
- Closely check and replace the sound insulation materials regularly;
- Better scheduling of construction works to minimize noise nuisance;
- Properly store and label oil drums and chemical containers placed on site;
- Proper chemicals, chemical wastes and wastes management;
- Maintenance works should be carried out within roofed, paved and confined areas;
- Collection and segregation of construction waste and general refuse on land and in the sea should be carried out properly and regularly; and
- Proper protection and regular inspection of existing trees, transplanted/retained trees.

1 INTRODUCTION

1.1 Background

- 1.1.1 Contract No. HY/2010/02 – Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Work (here below, known as “the Project”) mainly comprises reclamation at the northeast of the Hong Kong International Airport of an area of about 130-hectare for the construction of an artificial island for the development of the Hong Kong Boundary Crossing Facilities (HKBCF), and about 19-hectare for the southern landfall of the Tuen Mun - Chek Lap Kok Link (TMCLKL).
- 1.1.2 The environmental impact assessment (EIA) reports (Hong Kong – Zhuhai – Macao Bridge Hong Kong Boundary Crossing Facilities – EIA Report (Register No. AEIAR-145/2009) (HKBCFEIA) and Tuen Mun – Chek Lap Kok Link – EIA Report (Register No. AEIAR-146/2009) (TMCLKLEIA), and their environmental monitoring and audit (EM&A) Manuals (original EM&A Manuals), for the Project were approved by Environmental Protection Department (EPD) in October 2009.
- 1.1.3 EPD subsequently issued the Environmental Permit (EP) for HKBCF in November 2009 (EP-353/2009) and the Variation of Environmental Permit (VEP) in June 2010 (EP-353/2009/A), November 2010 (EP-353/2009/B), November 2011 (EP-353/2009/C), March 2012 (EP-353/2009/D) and October 2012 (EP-353/2009/E). Similarly, EPD issued the Environmental Permit (EP) for TMCLKL in November 2009 (EP-354/2009) and the Variation of Environmental Permit (VEP) in December 2010 (EP-354/2009/A).
- 1.1.4 The Project is a designated project and is governed by the current permits for the Project, i.e. the amended EPs issued on 16 October 2012 (EP-353/2009/E) and 8 December 2011 (EP-354/2009/A) (for TMCLKL Southern Landfall Reclamation only).
- 1.1.5 A Project Specific EM&A Manual, which included all project-relation contents from the original EM&A Manuals for the Project, was issued in May 2012.
- 1.1.6 Ove Arup & Partners Hong Kong Limited (Arup) was appointed by Highways Department (HyD) as the consultants for the design and construction assignment for the Project’s reclamation works (i.e. the Engineer for the Project).
- 1.1.7 China Harbour Engineering Company Limited (CHEC) was awarded by HyD as the Contractor to undertake the construction work of the Project.
- 1.1.8 ENVIRON Hong Kong Ltd. was employed by HyD as the Independent Environmental Checker (IEC) and Environmental Project Office (ENPO) for the Project.
- 1.1.9 AECOM Asia Co. Ltd. (AECOM) was appointed by CHEC to undertake the role of Environmental Team for the Project for carrying out the EM&A works.
- 1.1.10 The construction phase of the Project under the EPs was commenced on 12 March 2012 and will be tentatively completed by early Year 2016.
- 1.1.11 According to the Project Specific EM&A Manual, there is a need of an EM&A programme including air quality, noise, water quality and dolphin monitoring and environmental site inspections. The EM&A programme of the Project commenced on 12 March 2012.

1.2 Scope of Report

- 1.2.1 This is the tenth monthly EM&A Report under the Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. This report presents a summary of the environmental monitoring and audit works, list of activities and mitigation measures proposed by the ET for the Project in December 2012.

1.3 Project Organization

1.3.1 The project organization structure is shown in Appendix A. The key personnel contact names and numbers are summarized in Table 1.1.

Table 1.1 Contact Information of Key Personnel

Party	Position	Name	Telephone	Fax
Engineer's Representative (ER) (Ove Arup & Partners Hong Kong Limited)	Chief Resident Engineer	Michael Lo	2528 3031	2668 3970
IEC / ENPO (ENVIRON Hong Kong Limited)	Independent Environmental Checker	Raymond Dai	3743 0788	3548 6988
	Environmental Project Office Leader	Y. H. Hui	3743 0788	3548 6988
Contractor (China Harbour Engineering Company Limited)	General Manager (S&E)	Daniel Leung	3157 1086	2578 0413
	Environmental Officer	C. M. Wong	3157 1086	2578 0413
	24-hour Hotline	Alan C.C. Yeung	9448 0325	--
ET (AECOM Asia Company Limited)	ET Leader	Echo Leong	3922 9280	2317 7609

1.4 Summary of Construction Works

1.4.1 The construction phase of the Project under the EP commenced on 12 March 2012.

1.4.2 As informed by the Contractor, details of the major works carried out in this reporting period are listed below:-

Marine-based Works

- Maintenance of Silt curtain
- Stone column installation
- Band drain installation trial

Land-based Works

- Maintenance works of Site Office at Works Area WA2
- Maintenance works of Public Works Regional Laboratory at Works Area WA3
- Sign board erection at Works Area WA2
- Geo-textile fabrication at Works Area WA2
- Stone column installation barges setup and their maintenance works at Works Area WA4
- Silt curtain fabrication at Works Area WA4

- 1.4.3 The 3-month rolling construction programme of the Project is shown in Appendix B.
- 1.4.4 The general layout plan of the Project site showing the detailed works areas is shown in Figure 1.
- 1.4.5 The environmental mitigation measures implementation schedule are presented in Appendix C.

1.5 Summary of EM&A Programme Requirements

- 1.5.1 The EM&A programme required environmental monitoring for air quality, noise, water quality, marine ecology and environmental site inspections for air quality, noise, water quality, waste management, marine ecology, and landscape and visual impact. The EM&A requirements for each parameter described in the following sections include:-
- All monitoring parameters;
 - Monitoring schedules for the reporting month and forthcoming month;
 - Action and Limit levels for all environmental parameters;
 - Event / Action Plan;
 - Environmental mitigation measures, as recommended in the Project EIA reports; and
 - Environmental requirement in contract documents.

2 AIR QUALITY MONITORING

2.1 Monitoring Requirements

2.1.1 In accordance with the Project Specific EM&A Manual, baseline 1-hour and 24-hour Total Suspended Particulates (TSP) levels at 4 air quality monitoring stations were established. Impact 1-hour TSP monitoring was conducted for at least three times every 6 days, while impact 24-hour TSP monitoring was carried out for at least once every 6 days. The Action and Limit level of the air quality monitoring is provided in Appendix D.

2.2 Monitoring Equipment

2.2.1 24-hour TSP air quality monitoring was performed using High Volume Sampler (HVS) located at each designated monitoring station. The HVS meets all the requirements of the Project Specific EM&A Manual. Portable direct reading dust meters were used to carry out the 1-hour TSP monitoring. Brand and model of the equipment is given in Table 2.1.

Table 2.1 Air Quality Monitoring Equipment

Equipment	Brand and Model
Portable direct reading dust meter (1-hour TSP)	Sibata Digital Dust Monitor (Model No. LD-3 and LD-3B)
High Volume Sampler (24-hour TSP)	Tisch Environmental Mass Flow Controlled Total Suspended Particulate (TSP) High Volume Air Sampler (Model No. TE-5170)

2.3 Monitoring Locations

2.3.1 Monitoring locations AMS2 and AMS7 were set up at the proposed locations in accordance with Project Specific EM&A Manual. For AMS6 (Dragonair/CNAC (Group) Building), permission on setting up and carrying out impact monitoring works was sought, however, access to the premise has not been granted yet on this report issuing date. For monitoring location AMS3 (Ho Yu College), as proposed in the Project Specific EM&A Manual, approval for carrying out impact monitoring could not be obtained from the principal of the school. Permission on setting up and carrying out impact monitoring works at nearby sensitive receivers, like Caribbean Coast and Coastal Skyline, was also sought. However, approvals for carrying out impact monitoring works within their premises were not obtained. Impact air quality monitoring was conducted at site boundary of the site office area in Works Area WA2 (AMS3A) respectively. Same baseline and Action Level for air quality, as derived from the baseline monitoring data recorded at Ho Yu College, was adopted for this alternative air quality location.

2.3.2 Reference is made to ET's proposal of the omission of air monitoring station (AMS 6) dated on 1 November 2012 and EPD's letter dated on 19 November 2012 regarding the conditional approval of the proposed omission of air monitoring station (AMS 6) for Contract No. HY/2010/02. The aforesaid omission of Monitoring Station AMS6 will be effective since 19 November 2012.

2.3.3 Figure 2 shows the locations of monitoring stations. Table 2.2 describes the details of the monitoring stations.

Table 2.2 Locations of Impact Air Quality Monitoring Stations

Monitoring Station	Location	Description
AMS2	Tung Chung Development Pier	Rooftop of the premise
AMS3A	Site Boundary of Site Office Area at Works Area WA2	On ground at the area boundary
AMS6*	Dragonair/CNAC (Group) Building	On ground at boundary of the premise
AMS7	Hong Kong SkyCity Marriott Hotel	On ground at boundary of the premise

*Remarks: Reference is made to EPD conditional approval of the omission of air monitoring station (AMS 6) for the project. The omission will be effective on 19 November 2012.

2.4 Monitoring Parameters, Frequency and Duration

2.4.1 Table 2.3 summarizes the monitoring parameters, frequency and duration of impact TSP monitoring.

Table 2.3 Air Quality Monitoring Parameters, Frequency and Duration

Parameter	Frequency and Duration
1-hour TSP	Three times every 6 days while the highest dust impact was expected
24-hour TSP	Once every 6 days

2.5 Monitoring Methodology

2.5.1 24-hour TSP Monitoring

- (a) The HVS was installed in the vicinity of the air sensitive receivers. The following criteria were considered in the installation of the HVS.
- (i) A horizontal platform with appropriate support to secure the sampler against gusty wind was provided.
 - (ii) No two samplers should be placed less than 2 meters apart.
 - (iii) The distance between the HVS and any obstacles, such as buildings, was at least twice the height that the obstacle protrudes above the HVS.
 - (iv) A minimum of 2 meters separation from walls, parapets and penthouse for rooftop sampler.
 - (v) A minimum of 2 meters separation from any supporting structure, measured horizontally is required.
 - (vi) No furnace or incinerator flues nearby.
 - (vii) Airflow around the sampler was unrestricted.
 - (viii) Permission was obtained to set up the samplers and access to the monitoring stations.
 - (ix) A secured supply of electricity was obtained to operate the samplers.
 - (x) The sampler was located more than 20 meters from any dripline.
 - (xi) Any wire fence and gate, required to protect the sampler, did not obstruct the monitoring process.
 - (xii) Flow control accuracy was kept within $\pm 2.5\%$ deviation over 24-hour sampling period.
- (b) Preparation of Filter Papers
- (i) Glass fibre filters, G810 were labelled and sufficient filters that were clean and without pinholes were selected.
 - (ii) All filters were equilibrated in the conditioning environment for 24 hours before weighing. The conditioning environment temperature was around 25 °C and not

variable by more than ± 3 °C; the relative humidity (RH) was < 50% and not variable by more than $\pm 5\%$. A convenient working RH was 40%.

- (iii) All filter papers were prepared and analysed by ALS Technichem (HK) Pty Ltd., which is a HOKLAS accredited laboratory and has comprehensive quality assurance and quality control programmes.

(c) Field Monitoring

- (i) The power supply was checked to ensure the HVS works properly.
- (ii) The filter holder and the area surrounding the filter were cleaned.
- (iii) The filter holder was removed by loosening the four bolts and a new filter, with stamped number upward, on a supporting screen was aligned carefully.
- (iv) The filter was properly aligned on the screen so that the gasket formed an airtight seal on the outer edges of the filter.
- (v) The swing bolts were fastened to hold the filter holder down to the frame. The pressure applied was sufficient to avoid air leakage at the edges.
- (vi) Then the shelter lid was closed and was secured with the aluminum strip.
- (vii) The HVS was warmed-up for about 5 minutes to establish run-temperature conditions.
- (viii) A new flow rate record sheet was set into the flow recorder.
- (ix) On site temperature and atmospheric pressure readings were taken and the flow rate of the HVS was checked and adjusted at around 1.1 m³/min, and complied with the range specified in the updated EM&A Manual (i.e. 0.6-1.7 m³/min).
- (x) The programmable digital timer was set for a sampling period of 24 hrs, and the starting time, weather condition and the filter number were recorded.
- (xi) The initial elapsed time was recorded.
- (xii) At the end of sampling, on site temperature and atmospheric pressure readings were taken and the final flow rate of the HVS was checked and recorded.
- (xiii) The final elapsed time was recorded.
- (xiv) The sampled filter was removed carefully and folded in half length so that only surfaces with collected particulate matter were in contact.
- (xv) It was then placed in a clean plastic envelope and sealed.
- (xvi) All monitoring information was recorded on a standard data sheet.
- (xvii) Filters were then sent to ALS Technichem (HK) Pty Ltd. for analysis.

(d) Maintenance and Calibration

- (i) The HVS and its accessories were maintained in good working condition, such as replacing motor brushes routinely and checking electrical wiring to ensure a continuous power supply.
- (ii) 5-point calibration of the HVS was conducted using TE-5025A Calibration Kit prior to the commencement of baseline monitoring. Bi-monthly 5-point calibration of the HVS will be carried out during impact monitoring.
- (iii) Calibration certificate of the HVSs are provided in Appendix E.

2.5.2 1-hour TSP Monitoring

(a) Measuring Procedures

The measuring procedures of the 1-hour dust meter were in accordance with the Manufacturer's Instruction Manual as follows:-

- (i) Turn the power on.
- (ii) Close the air collecting opening cover.
- (iii) Push the "TIME SETTING" switch to [BG].
- (iv) Push "START/STOP" switch to perform background measurement for 6 seconds.
- (v) Turn the knob at SENSI ADJ position to insert the light scattering plate.
- (vi) Leave the equipment for 1 minute upon "SPAN CHECK" is indicated in the display.
- (vii) Push "START/STOP" switch to perform automatic sensitivity adjustment. This measurement takes 1 minute.
- (viii) Pull out the knob and return it to MEASURE position.
- (ix) Push the "TIME SETTING" switch the time set in the display to 3 hours.

- (x) Lower down the air collection opening cover.
 - (xi) Push “START/STOP” switch to start measurement.
- (b) Maintenance and Calibration
- (i) The 1-hour TSP meter was calibrated at 1-year intervals against a continuous particulate TEOM Monitor, Series 1400ab. Calibration certificates of the Laser Dust Monitors are provided in Appendix E.
 - (ii) 1-hour validation checking of the TSP meter against HVS is carried out on half-year basis at the air quality monitoring locations.

2.6 Monitoring Schedule for the Reporting Month

2.6.1 The schedule for air quality monitoring in December 2012 is provided in Appendix F.

2.7 Results and Observations

2.7.1 The monitoring results for 1-hour TSP and 24-hour TSP are summarized in Table 2.4 and 2.5 respectively. Detailed impact air quality monitoring results are presented in Appendix G.

Table 2.4 Summary of 1-hour TSP Monitoring Results in the Reporting Period

	Average ($\mu\text{g}/\text{m}^3$)	Range ($\mu\text{g}/\text{m}^3$)	Action Level ($\mu\text{g}/\text{m}^3$)	Limit Level ($\mu\text{g}/\text{m}^3$)
AMS2	76	66 – 87	374	500
AMS3A	78	69 – 89	368	500
AMS7	75	64 - 84	370	500

Table 2.5 Summary of 24-hour TSP Monitoring Results in the Reporting Period

	Average ($\mu\text{g}/\text{m}^3$)	Range ($\mu\text{g}/\text{m}^3$)	Action Level ($\mu\text{g}/\text{m}^3$)	Limit Level ($\mu\text{g}/\text{m}^3$)
AMS2	66	35-103	176	260
AMS3A	119	33 - 292	167	260
AMS7	73	37 – 116	183	260

- 2.7.2 The major dust source in the reporting period included construction activities from the Project, construction activities by other contacts, as well as nearby traffic emissions.
- 2.7.3 All 1-hour TSP results were below the Action and Limit Level at all monitoring locations in the reporting month.
- 2.7.4 However, one (1) 24-hour TSP result exceeded the Limit Level on 13 Dec 2012 at monitoring station AMS3A in the reporting month.
- 2.7.5 According to information provided by the Contractor and on-site observations, installing sand bags and stitching geotextile were the major land-based construction activity being undertaken at Works Area WA2 during the monitoring period.
- 2.7.6 Similar construction activities were carried out on 12 & 13 Dec 2012 and 18 & 19 Dec 12 but no exceedance was recorded on 18 & 19 Dec 12.

- 2.7.7 Functional checking on HVS at AMS3A was done. Air flow of the HVS was checked and the flow was steady during the 24-hr TSP sampling at AMS3A. The filter paper was re-weighted by the assigned HOKLAS laboratory and the result was reconfirmed.
- 2.7.8 Construction activities, like sheet piling and percussive piling, were carrying out by nearby private development project during the course of monitoring, which are close to the monitoring station AMS3A. Meanwhile, exposed soil surfaces were observed at those construction sites of nearby private development project (Please refer to the attached maps and photos for illustration).
- 2.7.9 As refer to the wind data collected at wind station at Works Area WA2 during the monitoring period on 12 Dec 2012 and 13 Dec 2012 (as attached), east-southeast wind was prevailing during the monitoring period. Construction works carried out at construction sites of nearby private development project may contribute to the measured dust levels at the monitoring station AMS3A.
- 2.7.10 The 1-hr TSP values recorded at AMS3A on 13 Dec 2012, which are within the monitoring period of the 24-hr TSP, were 76 g/m^3 , 78 g/m^3 and 80 g/m^3 respectively. All measured values are well below the Action and Limit Levels.
- 2.7.11 The measured 24-hr TSP values recorded at AMS2 and AMS7 (which are closer to the marine-based works areas) on the same monitoring date were 57 g/m^3 and 57 g/m^3 respectively, which are below the Action and Limit Levels.
- 2.7.12 The following dust mitigation measures have been implemented by the Contractor:
- 2.7.13 Main haul road in Works Area WA2 were concrete paved.
- 2.7.14 Vehicle washing facility was provided at vehicle exit points, and vehicle was washed to remove any dusty materials from its body and wheels before leaving.
- 2.7.15 Measures for preventing fugitive dust emission are provided, e.g. watering and tarpaulin covers.
- 2.7.16 The dust exceedance was therefore considered not to be due to the Project works. Nevertheless, the Contractor was recommended to continue implementing existing dust mitigation measures.
- 2.7.17 The event action plan is annexed in Appendix L.
- 2.7.18 Meteorological information collected from the wind station during the monitoring periods on the monitoring dates, as shown in Figure 2, including wind speed and wind direction, is annexed in Appendix H.

3 NOISE MONITORING

3.1 Monitoring Requirements

3.1.1 In accordance with the Project Specific EM&A Manual, impact noise monitoring was conducted for at least once per week during the construction phase of the Project. The Action and Limit level of the noise monitoring is provided in Appendix D.

3.2 Monitoring Equipment

3.2.1 Noise monitoring was performed using sound level meter at each designated monitoring station. The sound level meters deployed comply with the International Electrotechnical Commission Publications (IEC) 651:1979 (Type 1) and 804:1985 (Type 1) specifications. Acoustic calibrator was deployed to check the sound level meters at a known sound pressure level. Brand and model of the equipment is given in Table 3.1.

Table 3.1 Noise Monitoring Equipment

Equipment	Brand and Model
Integrated Sound Level Meter	Rion NL-31
Acoustic Calibrator	Rion NC-73

3.3 Monitoring Locations

3.3.1 Monitoring locations NMS2 was set up at the proposed locations in accordance with Project Specific EM&A Manual. However, for monitoring location NMS3 (Ho Yu College), as proposed in the Project Specific EM&A Manual, approval for carrying out impact monitoring could not be obtained from the principal of the school. Permission on setting up and carrying out impact monitoring works at nearby sensitive receivers, like Caribbean Coast and Coastal Skyline, was also sought. However, approvals for carrying out impact monitoring works within their premises were not obtained. Impact noise monitoring was conducted at site boundary of the site office area in Works Area WA2 (NMS3A) respectively. Same baseline noise level (as derived from the baseline monitoring data recorded at Ho Yu College) and Limit Level were adopted for this alternative noise monitoring location.

Remarks: Monitoring

3.3.2 Figure 2 shows the locations of the monitoring stations. Table 3.2 describes the details of the monitoring stations.

Table 3.2 Locations of Impact Noise Monitoring Stations

Monitoring Station	Location	Description
NMS2	Seaview Crescent Tower 1	Free-field on the rooftop of the premise
NMS3A	Site Boundary of Site Office Area at Works Area WA2	Free-field on ground at the area boundary.

3.4 Monitoring Parameters, Frequency and Duration

3.4.1 Table 3.3 summarizes the monitoring parameters, frequency and duration of impact noise monitoring.

Table 3.3 Noise Monitoring Parameters, Frequency and Duration

Parameter	Frequency and Duration
30-mins measurement at each monitoring station between 0700 and 1900 on normal weekdays (Monday to Saturday). L_{eq} , L_{10} and L_{90} would be recorded.	At least once per week

3.5 Monitoring Methodology

3.5.1 Monitoring Procedure

- (a) The sound level meter was set on a tripod at a height of 1.2 m above the ground for free-field measurements at NMS2. A correction of +3 dB(A) shall be made to the free field measurements.
- (b) All measurement at NMS3A were free field measurements in the reporting month at NMS3A. A correction of +3 dB(A) shall be made to the free field measurements.
- (c) The battery condition was checked to ensure the correct functioning of the meter.
- (d) Parameters such as frequency weighting, the time weighting and the measurement time were set as follows:-
 - (i) frequency weighting: A
 - (ii) time weighting: Fast
 - (iii) time measurement: $L_{eq(30\text{-minutes})}$ during non-restricted hours i.e. 07:00 – 1900 on normal weekdays.
- (e) Prior to and after each noise measurement, the meter was calibrated using the acoustic calibrator for 94dB(A) at 1000 Hz. If the difference in the calibration level before and after measurement was more than 1 dB(A), the measurement would be considered invalid and repeat of noise measurement would be required after re-calibration or repair of the equipment.
- (f) During the monitoring period, the L_{eq} , L_{10} and L_{90} were recorded. In addition, site conditions and noise sources were recorded on a standard record sheet.
- (g) Noise measurement was paused during periods of high intrusive noise (e.g. dog barking, helicopter noise) if possible. Observations were recorded when intrusive noise was unavoidable.
- (h) Noise monitoring was cancelled in the presence of fog, rain, wind with a steady speed exceeding 5m/s, or wind with gusts exceeding 10m/s. The wind speed shall be checked with a portable wind speed meter capable of measuring the wind speed in m/s.

3.5.2 Maintenance and Calibration

- (a) The microphone head of the sound level meter was cleaned with soft cloth at regular intervals.
- (b) The meter and calibrator were sent to the supplier or HOKLAS laboratory to check and calibrate at yearly intervals.
- (c) Calibration certificates of the sound level meters and acoustic calibrators are provided in Appendix E.

3.6 Monitoring Schedule for the Reporting Month

3.6.1 The schedule for construction noise monitoring in December 2012 is provided in Appendix F.

3.7 Monitoring Results

3.7.1 The monitoring results for construction noise are summarized in Table 3.4 and the monitoring data is provided in Appendix I.

Table 3.4 Summary of Construction Noise Monitoring Results in the Reporting Period

	Average, dB(A), L_{eq} (30 mins)	Range, dB(A), L_{eq} (30 mins)	Limit Level, dB(A), L_{eq} (30 mins)
NMS2	65*	62 – 66*	75
NMS3A	64*	61 – 66*	70^

*+3dB(A) Façade correction included

^ Daytime noise Limit Level of 70 dB(A) applies to education institutions

- 3.7.2 No noise Action Level and Limit Level exceedance was recorded at all monitoring stations in the reporting month.
- 3.7.3 Major noise sources during the noise monitoring included construction activities of the Project, construction activities by other contracts and nearby traffic noise.
- 3.7.4 The event action plan is annexed in Appendix L.

4 WATER QUALITY MONITORING

4.1 Monitoring Requirements

4.1.1 Impact water quality monitoring was carried out to ensure that any deterioration of water quality was detected, and that timely action was taken to rectify the situation. For impact water quality monitoring, measurements were taken in accordance with the Project Specific EM&A Manual. Appendix D shows the established Action/Limit Levels for the environmental monitoring works.

4.2 Monitoring Equipment

4.2.1 Table 4.1 summarises the equipment used in the impact water quality monitoring programme.

Table 4.1 Water Quality Monitoring Equipment

Equipment	Brand and Model
Dissolved Oxygen (DO) and Temperature Meter, Salinity Meter and Turbidimeter	YSI Model 6820
pH Meter	YSI Model 6820 or Thermo Orion 230A+
Positioning Equipment	JRC DGPS 224 Model JLR-4341 with J-NAV 500 Model NWZ4551
Water Depth Detector	Eagle Cuda-168
Water Sampler	Kahlsio Water Sampler (Vertical) 2.2 L with messenger

4.3 Monitoring Parameters, Frequency and Duration

4.3.1 Table 4.2 summarises the monitoring parameters, frequency and monitoring depths of impact water quality monitoring as required in the Project Specific EM&A Manual.

Table 4.2 Impact Water Quality Monitoring Parameters and Frequency

Monitoring Stations	Parameter, unit	Frequency	No. of depth
<p><i>Impact Stations:</i> IS5, IS(Mf)6, IS7, IS8, IS(Mf)9, IS10, IS(Mf)11, IS(Mf)16, IS17</p> <p><i>Control/Far Field Stations:</i> CS(Mf)3, CS(Mf)5, CS4, CS6, CSA</p> <p><i>Sensitive Receiver Stations:</i> SR3-SR7, SR10A&SR10B</p>	<ul style="list-style-type: none"> • Depth, m • Temperature, °C • Salinity, ppt • Dissolved Oxygen (DO), mg/L • DO Saturation, % • Turbidity, NTU • pH • Suspended Solids (SS), mg/L 	<p>Three times per week during mid-ebb and mid-flood tides (within ± 1.75 hour of the predicted time)</p>	<p>3 (1 m below water surface, mid-depth and 1 m above sea bed, except where the water depth is less than 6 m, in which case the mid-depth station may be omitted. Should the water depth be less than 3 m, only the mid-depth station will be monitored).</p>

4.4 Monitoring Locations

- 4.4.1 In accordance with the Project Specific EM&A Manual, twenty-one stations (9 Impact Stations, 7 Sensitive Receiver Stations and 5 Control/Far Field Stations) were designated for impact water quality monitoring. The nine Impact Stations (IS) were chosen on the basis of their proximity to the reclamation and thus the greatest potential for water quality impacts, the seven Sensitive Receiver Stations (SR) were chosen as they are close to the key sensitive receives and the five Control/ Far Field Stations (CS) were chosen to facilitate comparison of the water quality of the IS stations with less influence by the Project/ ambient water quality conditions.
- 4.4.2 Due to safety concern and topographical condition of the original locations of SR4 and SR10B, alternative impact water quality monitoring stations, naming as SR4(N) and SR10B(N), were adopted, which are situated in vicinity of the original impact water quality monitoring stations (SR4 and SR10B) and could be reachable.
- 4.4.3 Same baseline and Action Level for water quality, as derived from the baseline monitoring data recorded, were adopted for these alternative impact water quality monitoring stations.
- 4.4.4 The locations of these monitoring stations are summarized in Table 4.3 and depicted in Figure 3.

Table 4.3 Impact Water Quality Monitoring Stations

Station	Description	East	North
IS5	Impact Station (Close to HKBCF construction site)	811579	817106
IS(Mf)6	Impact Station (Close to HKBCF construction site)	812101	817873
IS7	Impact Station (Close to HKBCF construction site)	812244	818777
IS8	Impact Station (Close to HKBCF construction site)	814251	818412
IS(Mf)9	Impact Station (Close to HKBCF construction site)	813273	818850
IS10	Impact Station (Close to HKBCF construction site)	812577	820670
IS(Mf)11	Impact Station (Close to HKBCF construction site)	813562	820716
IS(Mf)16	Impact Station (Close to HKBCF construction site)	814328	819497
IS17	Impact Station (Close to HKBCF construction site)	814539	820391
SR3	Sensitive receivers (San Tau SSSI)	810525	816456
SR4(N)	Sensitive receivers (Tai Ho)	814705	817859
SR5	Sensitive receivers (Artificial Reef in NE Airport)	811489	820455
SR6	Sensitive receivers (Sha Chau and Lung Kwu Chau Marine Park)	805837	821818
SR7	Sensitive receivers (Tai Mo Do)	814293	821431
SR10A	Sensitive receivers (Ma Wan FCZ)1	823741	823495
SR10B(N)	Sensitive receivers (Ma Wan FCZ)2	823683	823187
CS(Mf)3	Control Station	809989	821117
CS(Mf)5	Control Station	817990	821129
CS4	Control Station	810025	824004
CS6	Control Station	817028	823992
CSA	Control Station	818103	823064

Remarks: The sampling location IS7 was found enclosed by silt curtain on 17-30 December 2012. Samples were taken about 60meters away from IS7. The sampling location's coordination (East 812266, North 818713) was recorded

4.5 Monitoring Methodology

4.5.1 Instrumentation

- (a) The in-situ water quality parameters, viz. dissolved oxygen, temperature, salinity, turbidity and pH, were measured by multi-parameter meters (i.e. Model YSI 6820 CE-C-M-Y) and pH meter (i.e. Thermo Orion 230A+) respectively.

4.5.2 Operating/Analytical Procedures

- (a) Digital Differential Global Positioning Systems (DGPS) were used to ensure that the correct location was selected prior to sample collection.
- (b) Portable, battery-operated echo sounders were used for the determination of water depth at each designated monitoring station.
- (c) All in-situ measurements were taken at 3 water depths, 1 m below water surface, mid-depth and 1 m above sea bed, except where the water depth was less than 6 m, in which case the mid-depth station was omitted. Should the water depth be less than 3 m, only the mid-depth station was monitored.
- (d) At each measurement/sampling depth, two consecutive in-situ monitoring (DO concentration and saturation, temperature, turbidity, pH, salinity) and water sample for SS. The probes were retrieved out of the water after the first measurement and then re-deployed for the second measurement. Where the difference in the value between the first and second readings of DO or turbidity parameters was more than 25% of the value of the first reading, the reading was discarded and further readings were taken.
- (e) Duplicate samples from each independent sampling event were collected for SS measurement. Water samples were collected using the water samplers and the samples were stored in high-density polythene bottles. Water samples collected were well-mixed in the water sampler prior to pre-rinsing and transferring to sample bottles. Sample bottles were pre-rinsed with the same water samples. The sample bottles were then be packed in cool-boxes (cooled at 4°C without being frozen), and delivered to ALS Technichem (HK) Pty Ltd. for the analysis of suspended solids concentrations. The laboratory determination work would be started within 24 hours after collection of the water samples. ALS Technichem (HK) Pty Ltd. is a HOKLAS accredited laboratory and has comprehensive quality assurance and quality control programmes. For QA/QC procedures, one duplicate samples of every batch of 20 samples was analyzed.
- (f) The analysis method and reporting and detection limit for SS is shown in Table 4.4.

Table 4.4 Laboratory Analysis for Suspended Solids

Parameters	Instrumentation	Analytical Method	Reporting Limit	Detection Limit
Suspended Solid (SS)	Weighting	APHA 2540-D	0.5mg/L	0.5mg/L

- (g) Other relevant data were recorded, including monitoring location / position, time, water depth, tidal stages, weather conditions and any special phenomena or work underway at the construction site in the field log sheet for information.

4.5.3 Maintenance and Calibration

- (a) All in situ monitoring instruments would be calibrated and calibrated by ALS Technichem (HK) Pty Ltd. before use and at 3-monthly intervals throughout all stages of the water quality monitoring programme. Calibration details are provided in Appendix E.
- (b) The dissolved oxygen probe of YSI 6820 was calibrated by wet bulb method. Before the calibration routine, the sensor for dissolved oxygen was thermally equilibrated in water-saturated air. Calibration cup is served as a calibration chamber and it was loosened from airtight condition before it is used for the calibration. Calibration at ALS Technichem (HK) Pty

Ltd. was carried out once every three months in a water sample with a known concentration of dissolved oxygen. The sensor was immersed in the water and after thermal equilibration, the known mg/L value was keyed in and the calibration was carried out automatically.

- (c) The turbidity probe of YSI 6820 is calibrated two times a month. A zero check in distilled water was performed with the turbidity probe of YSI 6820 once per monitoring day. The probe will be calibrated with a solution of known NTU at ALS Technichem (HK) Pty Ltd. once every three months.

4.6 Monitoring Schedule for the Reporting Month

- 4.6.1 The schedule for impact water quality monitoring in December 2012 is provided in Appendix F.

4.7 Results and Observations

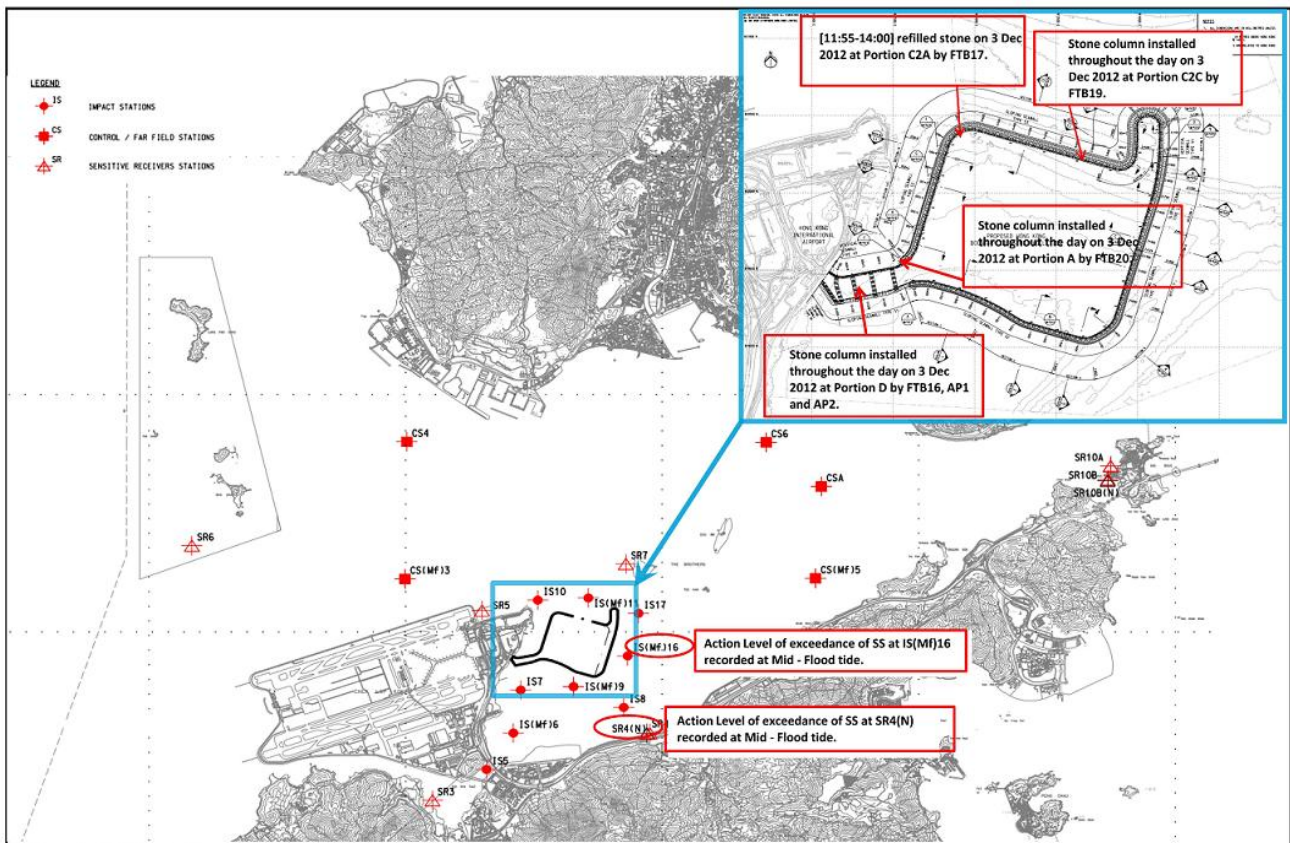
- 4.7.1 Impact water quality monitoring was conducted at all designated monitoring stations in the reporting month. Except Impact water quality monitoring at sampling location IS7. Sampling location IS7 was found enclosed by silt curtain on 17-30 December 2012. Samples were taken about 60 meters away from IS7. The sampling location's coordination (East 812266, North 818713) was recorded.
- 4.7.2 Impact water quality monitoring results and graphical presentations are provided in Appendix J.
- 4.7.3 Total of Ten (10) Action Level exceedances at measured Suspended Solids (mg/L) were recorded during the reporting month. Number of exceedances recorded in the reporting month at each impact station is summarized in Table 4.5

Table 4.5 Summary of Water Quality Exceedances

Station	Exceedance Level	DO (S&M)		DO (Bottom)		Turbidity		SS		Total	
		Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood
IS5	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
IS(Mf)6	Action	0	0	0	0	0	0	2 (5 and 10 Dec, 12)	2 (5 and 14 Dec, 12)	0	4
	Limit	0	0	0	0	0	0	0	0	0	0
IS7	Action	0	0	0	0	0	0	1 (10 Dec, 12)	0	0	1
	Limit	0	0	0	0	0	0	0	0	0	0
IS8	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
IS(Mf)9	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
IS10	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
IS(Mf)11	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
IS(Mf)16	Action	0	0	0	0	0	0	0	1 (3 Dec, 12)	0	1
	Limit	0	0	0	0	0	0	0	0	0	0
IS17	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR3	Action	0	0	0	0	0	0	0	1 (10 Dec, 12)	0	1
	Limit	0	0	0	0	0	0	0	0	0	0
SR4(N)	Action	0	0	0	0	0	0	0	1 (3 Dec, 12)	0	1
	Limit	0	0	0	0	0	0	0	0	0	0
SR5	Action	0	0	0	0	0	0	0	2 (5 and 10 Dec, 12)	0	2
	Limit	0	0	0	0	0	0	0	0	0	0
SR6	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR7	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR10A	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR10B (N)	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
Total	Action	0	0	0	0	0	0	0	0	10 (3, 5, 10 and 14 Dec 12)	
	Limit	0	0	0	0	0	0	0	0	0	

Note: S: Surface; and
M: Mid-depth.

4.7.4 Two (2) Action Level exceedances at measured Suspended Solids (mg/L) were recorded on 3 Dec 2012 during mid-flood tide at monitoring station IS(Mf)16 and SR4 (N). For Action Level exceedances at measured Suspended Solids (mg/L), 26.1 mg/L and 26.7 mg/L were recorded at Monitoring Station IS(Mf)16 and SR4 (N) respectively.



4.7.4.1 For the exceedances recorded at IS(Mf)16 and SR4 (N), it was found that Stone column installation was carried out throughout the day at Portion D by FTB 16, AP1 and AP2, at Portion A by FTB20, at Portion C2A by FTB17 and Portion C2C by FTB19 on 3 Dec 2012. Location plan showing the locations of the mentioned works is shown below:

4.7.4.2 Suspended solids values recorded at Impact Stations closer to the works are (e.g. IS(Mf)9, IS7 and IS8) all below the Action and Limit Level during the same tide on the same day.

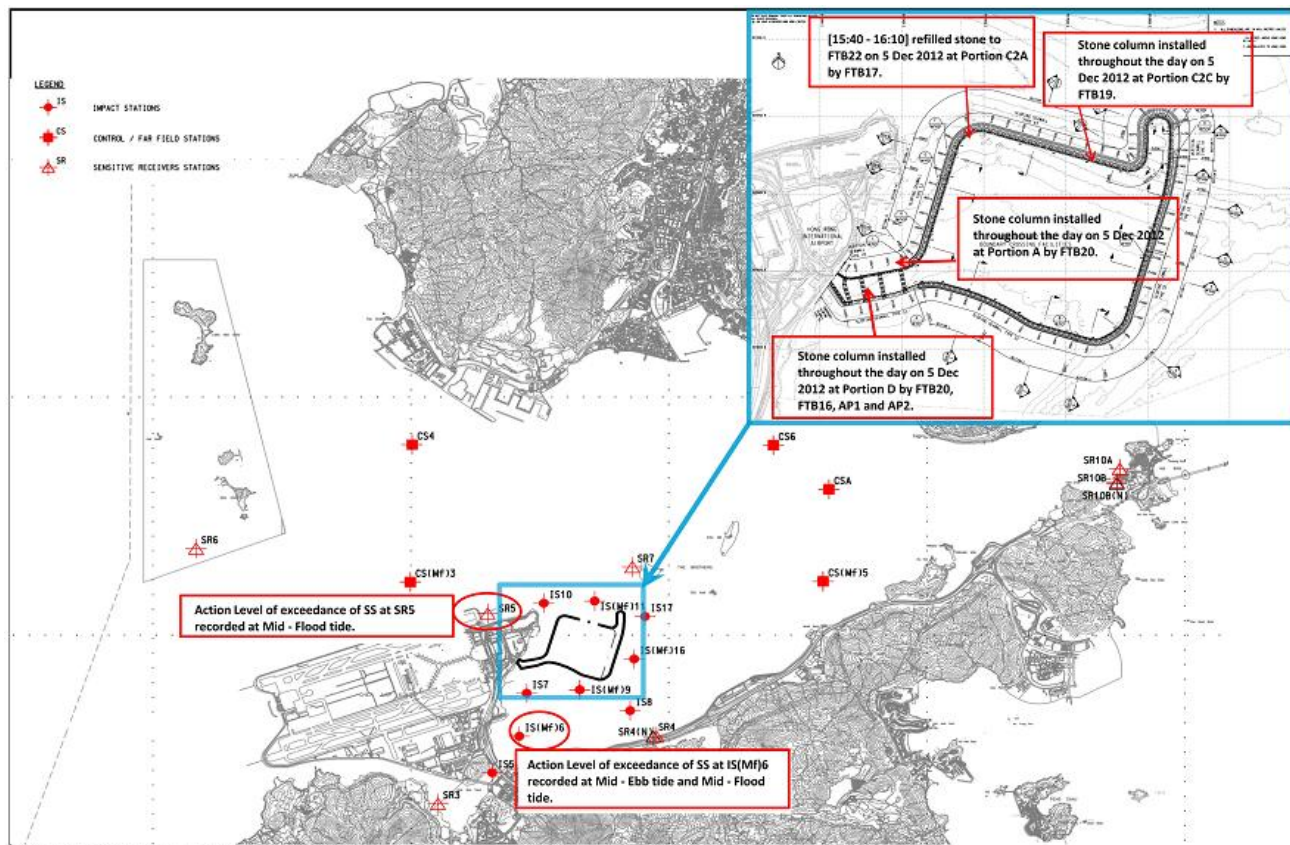
4.7.4.3 The exceedances were recorded during flood tide in which the direction of the flow was flowing from east to west and monitoring stations IS(Mf)16 and SR4(N) is located at the east side of the Project boundary, therefore it is unlikely that the exceedances recorded were contributed by Project works.

4.7.4.4 The monitoring sites IS(Mf)16 and SR4 were upstream of and far away from Partion D, C2A and C2C where works were carried out during flood tide.

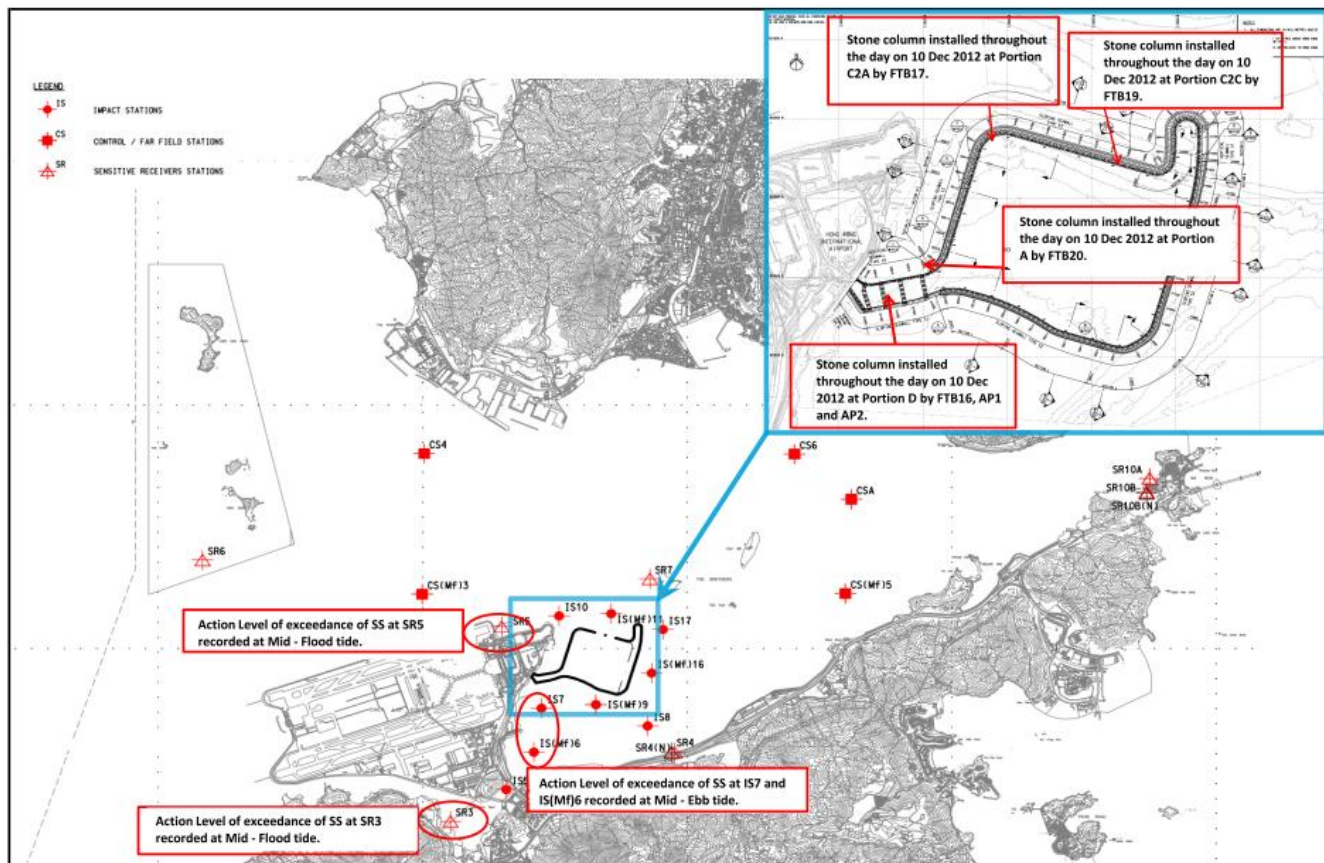
4.7.4.5 The exceedances were likely due to local effects in the vicinity of IS(Mf)16 & SR4(N).

4.7.4.6 The exceedances were considered as non-Project related.

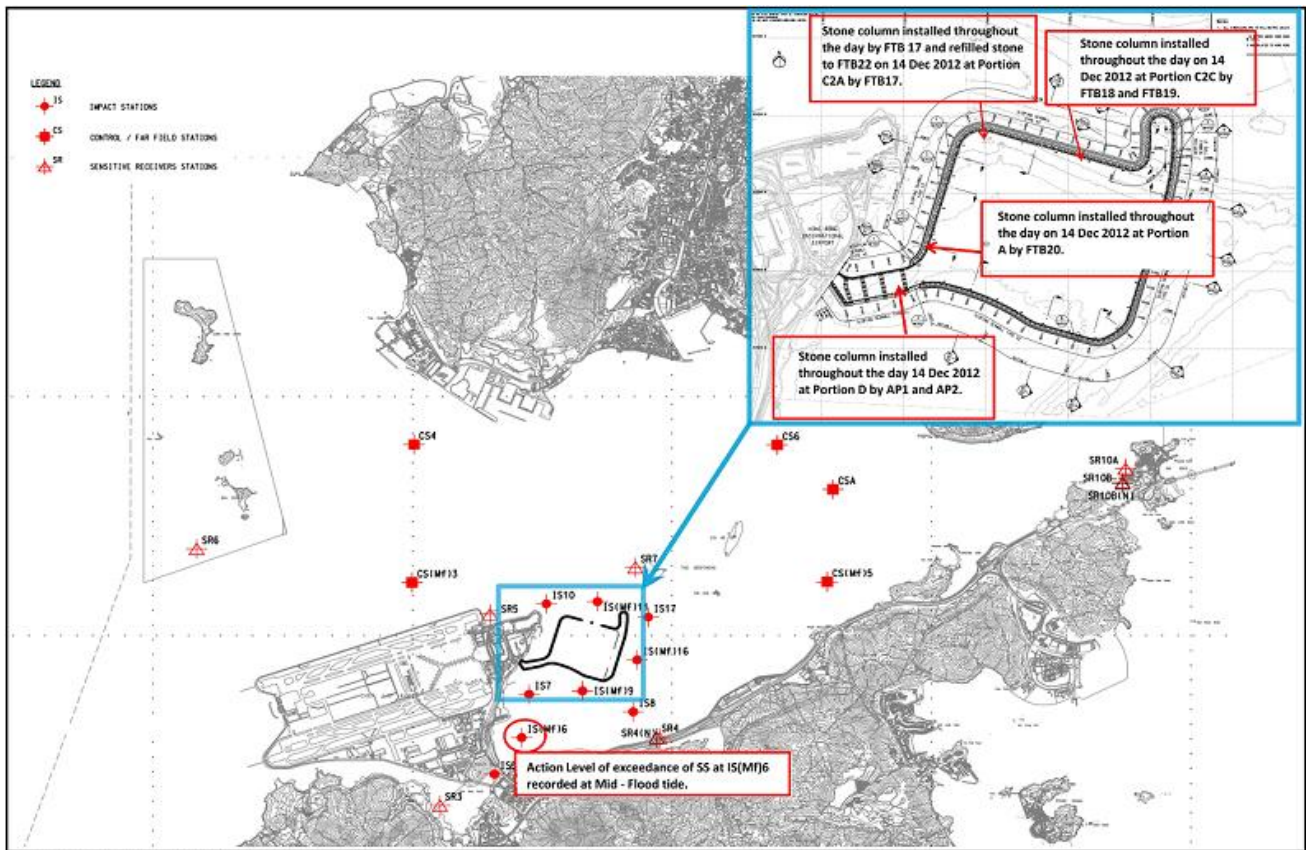
4.7.5 Three (3) were recorded on 05 Dec 2012 during mid-ebb tide at Impact Station IS(Mf)6 and during mid-flood tide at monitoring station IS(Mf)6 and SR5. For Action Level exceedances at measured Suspended Solids (mg/L), 26.6 mg/L, 25.4 mg/L and 24.3 mg/L were recorded at Impact Station IS(Mf)6 during mid-ebb tide, IS(Mf)6 during mid-flood tide and SR5 during mid-flood respectively.



- 4.7.5.1 For Action Level Exceedances recorded at Impact Station IS(Mf)6 during mid-ebb tide, IS(Mf)6 during mid-flood tide and SR5 during mid-flood on 5 Dec 2012, stone column installation was carried out throughout the day at Portion D by FTB 16, AP1 and AP2, at Portion A by FTB20, at Portion C2A by FTB17 and Portion C2C by FTB19.
- 4.7.5.2 Suspended Solids values recorded at Impact Station IS(Mf)9 and IS7 which are closer to the works than monitoring station IS(Mf)6 are all below the Action and Limit Level during the same tide on the same day.
- 4.7.5.3 Suspended Solids value recorded at Impact Station IS10 which is closer to the works than monitoring station SR5 is below the Action and Limit Level during the same tide on the same day.
- 4.7.5.4 Same type of works was carried out at the same location on 3 and 7 Dec 12 but Suspended Solids values recorded at IS(Mf)6 & SR5 on 3 and 7 Dec 12 are all below the Action and Limit Level during the same tide on the same day.
- 4.7.5.5 The exceedances were likely due to local effects in the vicinity of IS(Mf)6 & SR5.
- 4.7.5.6 The exceedances were considered as Non-Project Related.
- 4.7.6 Four (4) were recorded on 10th Dec 2012 during mid-ebb tide at Impact Station IS(Mf)6 and IS7 and during mid-flood tide at monitoring station SR3 and SR5. For Action Level exceedances at measured Suspended Solids (mg/L), 31mg/L, 31.8mg/L, 27.3mg/L and 32.2 mg/L were recorded during mid-ebb tide at Impact Station IS(Mf)6 and IS7 and during mid-flood tide at monitoring station SR3 and SR5.



- 4.7.6.1 For Action Level Exceedances of SS at during mid-ebb tide at Impact Station IS(Mf)6 and IS7 and during mid-flood tide at monitoring station SR3 and SR5 recorded on 10 Dec 2012, Stone column installation was carried out throughout the day at Portion D by FTB 16, AP1 and AP2, at Portion A by FTB20, at Portion C2A by FTB17 and Portion C2C by FTB19 .
- 4.7.6.2 Suspended solids values recorded at Impact Station IS(Mf) 9 and IS 8 located downstream of IS7 and IS(Mf)6 during Mid-Ebb tide were below the Action and Limit Level during the same tide on the same day.
- 4.7.6.3 Same type of works was carried out at the same locations on 7 and 12 Dec 12 but Suspended Solids values recorded at IS(Mf)6, IS7, SR3 and SR5 on 7 and 12 Dec 12 are all below the Action and Limit Level during the same tide on the these days.
- 4.7.6.4 Suspended Solids values recorded at Impact Station IS10 located closer to the Project site boundary than SR5 was below the Action and Limit Level during the same tide and on the same day.
- 4.7.6.5 Suspended Solids values recorded at IS7, IS(Mf)6 and IS5 located closer to the Project site boundary than SR3 were below the Action and Limit Level during the same tide and on the same day.
- 4.7.6.6 The exceedances were likely due to local effects in the vicinity of IS(Mf)6, IS7, SR3 and SR5.
- 4.7.6.7 The exceedances were considered as Non-Project Related.
- 4.7.7 One (1) where recorded on 14 Dec 2012 during mid-ebb tide at Impact Station IS(Mf) 6. For Action Level exceedances at measured Suspended Solids (mg/L), 27.7mg/L was recorded at Impact Station IS(Mf)6.



- 4.7.7.1 For Action Level Exceedance of SS at IS(Mf)6 at Mid-Flood tide on 14 December 2012 Stone column installation was carried out throughout the day at Portion D by AP1 and AP2, at Portion A by FTB20, at Portion C2A by FTB17 and Portion C2C by FTB19 and FTB18.
- 4.7.7.2 Suspended Solids values recorded at Impact Station IS(Mf)9 and IS7 which are closer to the works than monitoring station IS(Mf)6 are all below the Action and Limit Level during the same tide on the same day.
- 4.7.7.3 Same type of works were carried out at the same location on 12 and 17 Dec 12 but Suspended Solids values recorded at IS(Mf)6 on 12 and 17 Dec 12 are all below the Action and Limit Level during the same tide on the same day.
- 4.7.7.4 The exceedance was likely due to local effects in the vicinity of IS(Mf)6.
- 4.7.7.5 The exceedance was considered as Non-Project Related.
- 4.7.8 The event action plan is annexed in Appendix L.

5 DOLPHIN MONITORING

5.1 Monitoring Requirements

- 5.1.1 Vessel based surveys for the Chinese White Dolphin (CWD), *Sousa chinensis*, are to be conducted by a dedicated team comprising a qualified marine mammal ecologist and experienced marine mammal observers (MMOs). The purpose of the surveys are to evaluate the impact of the HKCBF reclamation and, if deemed detrimental, to take appropriate action as per the EM&A manual.
- 5.1.2 This ‘Impact Monitoring’ follows several months of ‘Baseline Monitoring’ so similar survey methodologies have been adopted to facilitate comparisons between datasets. Further, the data collected are compatible with, and are available for, incorporation into the data set managed by the Agriculture, Fisheries and Conservation Department (AFCD) as part of Hong Kong’s long term Marine Mammal Monitoring Programme.

5.2 Monitoring Equipment

- 5.2.1 Table 5.1 summarises the equipment used for the impact dolphin monitoring.

Table 5.1 Dolphin Monitoring Equipment

Equipment	Model
Commercially licensed motor vessel	15m in length with a 4.5m viewing platform
Global Positioning System (GPS) x2	Garmin 18X-PC Geo One Phottix
Computers (Corei7) x2	Windows /MSO 10 Logger
AIS receiver	Logger – GPS linked
Camera	Nikon D90 300m 2.8D fixed focus Nikon D90 20-300m zoom lens
Laser Rangefinder	Infinitor LRF1000/Visionking 900
Marine Binocular x3	Nexus 7 x 50 marine binocular with compass and reticules Fujinon 7 x 50 marine binocular with compass and reticules

5.3 Monitoring Frequency and Conditions

- 5.3.1 Dolphin monitoring is conducted twice per month in each survey area.
- 5.3.2 Dolphin monitoring is conducted only when visibility is good (e.g., over 1km) and the sea condition is at a Beaufort Sea State of 4 or better.
- 5.3.3 When thunder storm, black rain or typhoon warnings are in force, all survey effort is stopped.

5.4 Monitoring Methodology and Location

- 5.4.1 The impact dolphin monitoring is vessel-based and combines line-transect and photo-ID methodology. The survey follows pre-set and fixed transect lines in the two areas defined by AFCD as:
- Northeast Lantau survey area; and
- Northwest Lantau survey area.
- 5.4.2 The co-ordinates for the transect lines and layout map have been provided by AFCD and are shown in Table 5.2 and Figure 4.

Table 5.2 Impact Dolphin Monitoring Line Transect Co-ordinates (Provided by AFCD)

ID	HK Grid System		Long Lat in WGS84	
	X	Y	Long	Lat
1	804671	814577	113.870308	22.269741
1	804671	831404	113.869975	22.421696
2	805475	815457	113.878087	22.277704
2	805477	826654	113.877896	22.378814
3	806464	819435	113.887615	22.313643
3	806464	822911	113.887550	22.345030
4	807518	819771	113.897833	22.316697
4	807518	829230	113.897663	22.402113
5	808504	820220	113.907397	22.320761
5	808504	828602	113.907252	22.396462
6	809490	820466	113.916965	22.323003
6	809490	825352	113.916884	22.367128
7	810499	820690	113.926752	22.325043
7	810499	824613	113.926688	22.360464
8	811508	820847	113.936539	22.326475
8	811508	824254	113.936486	22.357241
9	812516	820892	113.946329	22.326894
9	812516	824254	113.946279	22.357255
10*	813525	818270	113.956156	22.303225
10*	813525	824657	113.956065	22.360912
11	814556	818449	113.966160	22.304858
11	814556	820992	113.966125	22.327820
12	815542	818807	113.975726	22.308109
12	815542	824882	113.975647	22.362962
13	816506	819480	113.985072	22.314192
13	816506	824859	113.985005	22.362771
14	817537	820220	113.995070	22.320883
14	817537	824613	113.995018	22.360556
15	818568	820735	114.005071	22.325550
15	818568	824433	114.005030	22.358947
16	819532	821420	114.014420	22.331747
16	819532	824209	114.014390	22.356933
17	820451	822125	114.023333	22.338117
17	820451	823671	114.023317	22.352084
18	821504	822371	114.033556	22.340353
18	821504	823761	114.033544	22.352903
19	822513	823268	114.043340	22.348458
19	822513	824321	114.043331	22.357971
20	823477	823402	114.052695	22.349680
20	823477	824613	114.052686	22.360610
21	805476	827081	113.877878	22.382668
21	805476	830562	113.877811	22.414103
22	806464	824033	113.887520	22.355164
22	806464	829598	113.887416	22.405423
23	814559	821739	113.966142	22.334574
23	814559	824768	113.966101	22.361920

*Remark: Due to the presence of deployed silt curtain systems at the site boundaries of the Project, some of the transect lines shown in Figure 5 could not be fully surveyed during the regular survey. Transect 10 is reduced from 6.4km to approximately 3.6km in length due to the HKBCF construction site. Therefore the total transect length for both NEL and NWL combined is reduced to approximately 111km.

5.5 Monitoring Procedures

- 5.5.1 The study area incorporates 23 transects which are to be surveyed twice per month. Each survey day lasts approximately 9 hours.
- 5.5.2 The survey vessel departs from Tung Chung Development Pier, Tsing Yi Public Pier or the nearest safe and convenient pier.
- 5.5.3 When the vessel reaches the start of a transect line, “on effort” survey begins. Areas between transect lines and traveling to and from the study area are defined as “off effort”.
- 5.5.4 The transect line is surveyed at a speed of 6-8 knots (11-14 km/hr). For the sake of safety, the speed was sometimes a bit slower to avoid collision with other vessels. During some periods, tide and current flow in the survey areas exceeds 7 knots which can affect survey speed. There are a minimum of four marine mammal observers (MMOs) present on each survey, rotating through four positions, observers (2), data recorder (1) and ‘rest’ (1). Rotations occur every 30 minutes or at the end of dolphin encounters. The data recorder records effort, weather and sightings data directly onto the programme Logger and is not part of the observer team. The observers search with naked eye and binoculars between 90° and 270° abeam (bow being 0°).
- 5.5.5 When a group of dolphins is sighted, position, bearing and distance data are recorded immediately onto the computer and, after a short observation, an estimate made of group size. These parameters are linked to the time-GPS-ships data which are automatically stored in the programme Logger throughout the survey period. In this manner, information on heading, position, speed, weather, effort and sightings are stored in a format suitable for use with DISTANCE software for subsequent line transect analyses.
- 5.5.6 Once the vessel leaves the transect line, it is deemed to be “off effort”. The dolphins are approached with the purpose of taking high resolution pictures for proper photo-identification of individual CWD. Attempts to photograph all dolphins in the group are made. Both the left and right hand sides of the dorsal fin area of each dolphin in the group are photographed, if possible. On finishing photographing, the vessel will return to the transect line at the point of departure and “on effort” survey is resumed.
- 5.5.7 Sightings which are made while on the transect line are referred to as “on effort sightings”, while not on the actual transect line are referred to as an “opportunistic sightings” (e.g. another group of dolphins is sighted while travelling back to the transect line). Only “on effort sightings” can be used in analyses which require effort or rate quantification, e.g., encounter rate per 100km searched. This is also how “on effort sightings” are treated in the baseline report. “Opportunistic sightings” provide additional information on individual habitat use and population distribution and they are noted accordingly.
- 5.5.8 As time and GPS data are automatically logged throughout the survey and are linked to sightings data input, start and end times of encounters and deviation from the transect lines are recorded and can be subsequently reviewed.

5.6 Monitoring Schedule for the Reporting Month

- 5.6.1 The schedule for dolphin monitoring in December 2012 is provided in Appendix F.

5.7 Results and Observations

- 5.7.1 Dolphin surveys were conducted on 4, 6, 10 and 11 December 2012. In summary, a total of 221.2km of “on effort” survey was conducted while 97% of “on effort” survey was conducted under favourable conditions (Beaufort Sea State 3 or better). The details are shown below:-

5.7.2 The effort summary and sightings data are shown in Tables 5.3 and 5.4, respectively. The survey effort conducted in December 2012 are plotted in Figure 5a-c. For Table 5.3, only on-effort information is included. Transects conducted in all Beaufort Sea State are included. Compared to previous monthly reports, the whole number Beaufort Sea State scale is used so as to ease comparison with other dolphin monitoring reports.

Table 5.3 Impact Dolphin Monitoring Survey Effort Summary

Survey	Date	Status	Sea State (on effort only)	Distance (km)
1	04-12-12	ON	1	2.5
	04-12-12	ON	2	52.9
	04-12-12	ON	3	23.6
	Total			79
	06-12-12	ON	1	15.4
	06-12-12	ON	2	16.9
	Total			32.3
2	10-12-12	ON	1	16.6
	10-12-12	ON	2	30.5
	10-12-12	ON	3	4.4
	Total			51.5
	11-12-12	ON	1	10.3
	11-12-12	ON	2	32.6
	11-12-12	ON	3	8.4
	11-12-12	ON	4	7.1
Total			58.4	
TOTAL DECEMBER 2012				221.2

*Remark: Surveys conduct under Beaufort Sea State 3 or below are considered as under favourable condition.

Table 5.4 Impact Dolphin Monitoring Survey Details in December 2012

Date	Location (transect line)	No. Sightings "ON EFFORT"	No. Sightings "OPPORTUNISTIC"
04-12-12	NW & NE Lantau (1-10,21,22)	1	1
06-12-12	NE Lantau (11-20,23)	1	1
10-12-12	NW & NE Lantau (6-20,23)	2	2
11-12-12	NW Lantau (1-5,21,22)	7	3
Total in December 2012		11	7

5.7.3 A total of eighteen dolphin sightings were recorded during the two surveys, two on the 4 December 2012, two on the 6 December 2012, four on the 10 December 2012 and ten on the 11 December 2012. Of the eighteen sightings, eleven were "on effort" (which are all under favourable condition) and seven were "opportunistic". A total of forty-seven individuals were sighted from the two impact dolphin surveys in the reporting period. Sighting details are summarised and plotted in Appendix K and Figure 5c, respectively.

5.7.4 Behaviour: eleven groups were feeding six of which was associated with a fishing vessel (hang trawler); one group were recorded as travelling; two groups were associated with multiple behaviour (feeding and traveling, socializing and feeding); one group were recorded as surface active; the behavior of three groups were unknown.

- 5.7.5 Noteworthy Observations: four mother and calf pairs were noted although two of these sightings were likely the same pair.
- 5.7.6 Noteworthy Observations: a dolphin entangled in rope was photographed on the 11th December close to line 4. The rope was caught across the dolphin in front of the dorsal fin and is clearly abrading and slowly removing the dorsal fin. This dolphin has not been seen before during HKBCF Impact Surveys and was not recorded during the baseline survey for the HKBCF. The injuries apparent on this individual indicate entanglement in, likely abandoned, fishing gear. As such it is considered that it is not project related.
- 5.7.7 Noteworthy Observations: other non-project related marine works were observed in both NWL and NEL areas, respectively; in particular in the vicinity of transect line 2, 11, 12 and 23. Dredging works were noted, in particular, on the 10th December survey at line 11 and also at line 9 which caused the survey vessel to divert off the transect line. These dredging works are not related to the Project.
- 5.7.8 The event action plan is annexed in Appendix L.

6 ENVIRONMENTAL SITE INSPECTION AND AUDIT

6.1 Site Inspection

6.1.1 Site Inspections were carried out on a weekly basis to monitor the implementation of proper environmental pollution control and mitigation measures for the Project. In the reporting month, 4 site inspections were carried out on 6, 13, 14 and 27 December 2012.

6.1.2 Particular observations during the site inspections are described below:

Air Quality

6.1.3 No adverse observation was identified in the reporting month.

Noise

6.1.4 No adverse observation was identified in the reporting month.

Water Quality

6.1.5 No adverse observation was identified in the reporting month.

Chemical and Waste Management

6.1.6 Oil drums were provided with bunding and the Contractor properly labelled the oil drum on barge Sang Hang Qi 7. (Closed). Oil drums were found without proper labelling at barge Ever Shine. The Contractor was advised to label all oil drums properly and oil drums were provided with proper labelling at barge Ever Shine within the reporting month (Closed).

6.1.7 The oil stain found near the power pack on barge Sang Hang Qi 7 and Sang Hang Bo 210 were cleared and the absorbents were treated as chemical wastes (Closed).

6.1.8 The Contractor provided mitigation measure such as tarpaulin sheet and bunding to retain potential leaked oil near the machine on barge Sun Moon Kee to power pack on Sang Hang Bo 205 to retain leaked oil respectively within the reporting month (Closed).

6.1.9 Oil drums were provided with bunding on barge Sang Hang Bo 205 to enclose the oil drums stored within works areas to retain any leaked oil within the reporting month (Closed). Bucket of waste water was found near at a location without bunding/drip tray on Sang Han Bo 209. The Contractor immediately rectified the situation by relocated the bucket of waste water inside the bunded area to prevent potential waste water run off into nearby water system. The Contractor was reminded to place buckets of waste water inside bunded area on barge (reminder).

6.1.10 Oil drum was found improperly stored at FTB24 and FTB18. The Contractor rectified the situation immediately by relocating the oil drum inside the bunded area to prevent oil leakage (Closed). The Contractor was reminded to place oil drums inside bunded area or to provide drip tray to oil drums on barge (Reminder).

6.1.11 Gap was observed between barge surface and the bunding on barge Sun Moon Kee. The Contractor was reminded to seal the gap to prevent oil leakage. Gaps between barge surface and the bunding on barge Sun Moon Kee were sealed within the reporting month (Closed).

6.1.12 Incident of oil spillage was observed on barge FTB 20. The spilled oil was immediately cleared by the Contractor using spill kit and the Contractor was reminded to dispose the absorbents as chemical waste. The Contractor was reminded to maintain proper oil spill cleanup procedure for oil spillage (Reminder).

6.1.13 Oil leakage was found on barge Sun Moon Kee leaked through a bunding. The oil stain was immediately cleared by the Contractor using absorbents and the Contractor was reminded to dispose

the absorbents as chemical waste. (Reminder).The holes of the bunding found on barge Sun Moon Kee was sealed to prevent oil leakage. (Closed)

- 6.1.14 Air compressors were found not fitted with valid noise emission labels on barge Sun Moon Kee. The Contractor was reminded to ensure all air compressors on barge Sun Moon Kee are fitted with valid noise emission labels. Air compressors were fitted with valid noise emission labels on barge Sun Moon Kee within the reporting month (Closed).

Landscape and Visual Impact

- 6.1.15 No relevant works was carried out in the reporting month.

Others

- 6.1.16 No adverse observation was identified in the reporting month.
- 6.1.17 The Contractor had rectified most of the observations as identified during environmental site inspection in the reporting month. Rectifications of remaining identified items are undergoing by the Contractor. Follow-up inspections on the status on provision of mitigation measures will be conducted to ensure all identified items are mitigated properly.

6.2 Advice on the Solid and Liquid Waste Management Status

- 6.2.1 The Contractor had registered as a chemical waste producer for this Project. Receptacles were available for general refuse collection and sorting.
- 6.2.2 As advised by the Contractor, 5,038 m³ of imported fill, and 35,8314 m³ of rock fill were imported for the Project use in the reporting period. 2,400.0 L of chemical waste (liquid) were generated and disposed of in the reporting period. 4.06 tonnes of general refuse were generated and disposed of in the reporting period. Monthly summary of waste flow table is detailed in Appendix M.
- 6.2.3 The Contractor is advised to properly maintain on site C&D materials and wastes storage, collection, sorting and recording system, dispose of C&D materials and wastes at designated ground and maximize reuse / recycle of C&D materials and wastes. The Contractor is reminded to properly maintain the site tidiness and dispose of the wastes accumulated on site regularly and properly.
- 6.2.4 The Contractor is reminded that chemical waste should be properly treated and stored temporarily in designated chemical waste storage area on site in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes.

6.3 Environmental Licenses and Permits

6.3.1 The environmental licenses and permits for the Project and valid in the reporting month is summarized in Table 6.1.

Table 6.1 Summary of Environmental Licensing and Permit Status

Statutory Reference	License/ Permit	License or Permit No.	Valid Period		License/ Permit Holder	Remarks
			From	To		
EIAO	Environmental Permit	EP-353/2009/E	16/10/2012	N/A	HyD	Hong Kong – Zhuhai – Macao Bridge Hong Kong Boundary Crossing Facilities
		EP-354/2009/A	08/12/2010	N/A		Tuen Mun – Chek Lap Kok Link (TMCLKL Southern Landfall Reclamation only)
APCO	NA notification	--	30/12/2011	--	CHEC	Works Area WA2 and WA3
APCO	NA notification	--	17/01/2012	--	CHEC	Works Area WA4
WDO	Chemical Waste Producer Registration	5213-951-C1186-21	30/3/2012	N/A	CHEC	Chemical waste produced in Contract HY/2010/02
WDO	Chemical Waste Producer Registration	5213-974-C3750-01	31/10/2012	--	CHEC	Registration as Chemical Waste Producer at To Kau Wan(WA4)
WDO	Chemical Waste Producer Registration	5213-839-C3750-02	13/09/2012	--	CHEC	Registration as Chemical Waste Producer at TKO 137(FB)
WDO	Billing Account for Disposal of Construction Waste	7014181	05/12/2011	N/A	CHEC	Waste disposal in Contract HY/2010/02
NCO	Construction Noise Permit	GW-RS1111-12	01/11/2012	30/04/2013	CHEC	Works Area WA3 in Siu Ho Wan
NCO	Construction Noise Permit	GW-RS0861-12	24/8/2012	23/2/2013	CHEC	Works Area WA2 in Tung Chung
NCO	Construction Noise Permit	GW-RS1360-12	21/12/2012	20/6/2013	CHEC	Marine-based areas in Contract HY/2010/02
NCO	Construction Noise Permit	N/A	Application in process	N/A	CHEC	Works Area WA 4 in Contract HY/2010/02

6.4 Implementation Status of Environmental Mitigation Measures

6.4.1 In response to the site audit findings, the Contractors carried out corrective actions.

- 6.4.2 A summary of the Implementation Schedule of Environmental Mitigation Measures (EMIS) is presented in Appendix C. Most of the necessary mitigation measures were implemented properly.
- 6.4.3 Training of marine travel route for marine vessels operator was given to relevant staff and relevant records were kept properly.
- 6.4.4 Regarding the implementation of dolphin monitoring and protection measures (i.e. implementation of Dolphin Watching Plan, Dolphin Exclusion Zone and Silt Curtain integrity Check), regular checking were conducted by the experienced MMOs within the works area to ensure no dolphin was trapped by the enclosed silt curtain systems. Any dolphin spotted within the enclosed silt curtain systems was reported and recorded. Relevant procedures were followed and measures were well implemented. Silt curtain systems were also inspected timely in accordance to the submitted plan. All inspection records were kept properly.
- 6.4.5 Acoustic decoupling measures on noisy plants on construction vessels were checked regularly and these measures were well implemented.
- 6.4.6 One (1) Non-Compliance dated on 31 Oct 2012 was noted, as informed by the Contractor on 30 November 2012, a noise complaint was received by EPD on the 18 Oct 2012 and on one of the two complaint follow up inspection conducted by EPD on 19 and 31 October 2012, operation of a powered mechanical equipment after 19:00 without valid CNP was observed on 31 Oct 12 at WA4. One worker was carrying out emergency maintenance for machinery with generator after 19:00, while no construction noise permit was in force, which is suspected that the Noise Control Ordinance (Cap.400) was violated. A "Pink Form" (inspection record) was subsequently issued by EPD on the 14 November 2012 regarding the suspected violation of Noise Control Ordinance (Cap.400).
- 6.4.6.1 The Contractor was recommended to implement the following noise mitigation measures in case any construction activities involving the use of Powered Mechanical Equipment (PME) is conducted in the concerned area:
- Work involves Powered Mechanical Equipment (PME) should be stopped before 7 pm
 - Review the need to increase the frequency of Construction Noise and Suppression training, provide extra training if deemed necessary.
 - Install notice sign on site to notice workers that Powered Mechanical Equipment (PME) and Prescribed Construction Work (PCW) (e.g. 1. Erection or dismantling of formwork or scaffolding. 2. Loading, unloading or handling of rubble, wooden boards, steel bars, wood or scaffolding material and 3. Hammering) are not allowed from 7pm to 7am on the next day or anytime on public holidays, including Sundays.
 - The noise mitigation measures should be maintained and the effectiveness of noise mitigation measures deployed within works area should be enforced and reviewed onsite regularly in order to provide sufficient noise screening effect properly.
- 6.4.6.2 A follow-up site inspection was conducted on 3 January 2013 by ET and with representative from the Contractor. During the inspection, follow up actions taken by the Contractor to improve the situation was observed. No Powered Mechanical Equipment (PME) was in operation and it was observed that notice signs were installed on site by the Contractor to notice workers that work involves Powered Mechanical Equipment (PME) is prohibited from 19:00 to 07:00 on all days and whole day on public holiday.
- 6.4.6.3 Prior to any confirmation of any possible summon and prosecution. ET will continue to monitor the mitigation actions carried out by the Contractor and provide appropriate assistance and advice whenever necessary.

6.5 Summary of Exceedances of the Environmental Quality Performance Limit

- 6.5.1 No Action/Limit Level exceedance of 1-hour TSP results was recorded in the reporting month. However, one (1) Limit Level exceedance of 24-hour TSP results was recorded in the reporting month. Investigation result show that the exceedance was not due to the Project works.

6.5.2 For construction noise, no Action and Limit Level exceedance was recorded at all monitoring stations in the reporting period.

6.5.3 Ten (10) Action Level exceedances were recorded at measured suspended solids (SS) values (in mg/L) in the reporting month. Investigation result show that the exceedances were not due to the Project works.

6.5.4 Cumulative statistics on exceedance is provided in Appendix N.

6.6 Summary of Complaints, Notification of Summons and Successful Prosecutions

6.6.1 The Environmental Complaint Handling Procedure is annexed in Figure 6.

6.6.2 As informed by the Contractor in the reporting month. One complaint was received by EPD on 18 October 2012 and is reported in this reporting month due to the time required for conducting investigation.

6.6.2.1 As informed by the Contractor on the 30 Nov 2012, a noise related complaint was received by EPD on 18 Oct 2012

6.6.2.2 As provided by the Contractor, the site daily of Works Area WA4 for 18 October 2012 was reviewed. In accordance with the site daily of Area WA4 for 18 October 2012, only construction work like welding was carried on at 08:00am and no construction work was being carried out in restricted hour (7 pm to 7am next day on weekdays and whole day on public holiday.)

6.6.2.3 A follow-up site inspection was conducted between 14:00 and 14:30 on 3 January 2013 by the ET and with representative from the Contractor. During the inspection, follow up actions were taken by the Contractor to improve the situation was observed. No generator was in operation and also it was observed that notice signs were installed on site by the Contractor to notice workers that work involves Powered Mechanical Equipment (PME) is prohibited after 7 pm to 7am next day on weekdays and whole day on public holiday.

6.6.2.4 As informed by the Contractor, a foreman was assigned to the working area as corrective action to ensure generator was switched off and workers have left before 7pm, who would also report to the superintendent.

6.6.2.5 The Contractor provided preventive actions such as reinforced the number of construction noise and suppression training. After the complaint, such training were given on 12, 15, 21, 23, 26, 28 and 30 Nov and 3, 7, 11, 14, 15, 17, 20 and 24 Dec among Works Area WA2 & WA4, on Vessel FTB-16, FTB-18, FTB-19 & FTB -20, site TKO, on vessel SHB 601 & SHB208 and Site office.

6.6.2.6 The Contractor was recommended to implement the following noise mitigation measures in case any construction activities involving the use of Powered Mechanical Equipment (PME) is conducted in the concerned area:

- Any PME should not be operated from 7pm to 7am on the next day or anytime on public holidays, including Sundays.
- Review the need to increase the frequency of Construction Noise and Suppression training, provide extra training if deemed necessary.
- Install notice sign on site to notice workers that PME and Prescribed Construction Work (PCW) are not allowed from 7pm to 7am on the next day or anytime on public holidays, including Sundays.
- The noise mitigation measures should be maintained and the effectiveness of noise mitigation measures deployed within works area should be enforced and reviewed onsite regularly in order to provide sufficient noise screening effect properly.
- Contractor must obtain a valid CNP for operation of PME from 7pm – 7am on weekdays and whole day on public holiday.

- 6.6.2.7 After investigation the complaint was considered to be not project related.
- 6.6.3 No notification of summons and prosecution was received in the reporting period.
- 6.6.4 Statistics on complaints, notifications of summons and successful prosecutions are summarized in Appendix N.

7 FUTURE KEY ISSUES

7.1 Construction Programme for the Coming Months

7.1.1 As informed by the Contractor, the major works for the Project in January and February 2013 will be:-

Marine-based Works

- Laying geo-textile
- Maintenance of Silt curtain
- Stone column installation
- Backfill cellular structure
- Stone blanket laying
- Band drain installation
- Cellular structure installation

Land-based Works

- Maintenance works of Site Office at Works Area WA2
- Maintenance works of Public Works Regional Laboratory at Works Area WA3
- Sign board erection at area WA2
- Geo-textile fabrication at Works Area WA2
- Stone column installation barges setup and their maintenance works at Works Area WA4
- Silt curtain fabrication at Works Area WA4

7.2 Key Issues for the Coming Month

7.2.1 Key issues to be considered in the coming months:-

- Site runoff should be properly collected and treated prior to discharge;
- Minimize loss of sediment from filling works;
- Regular review and maintenance of silt curtain systems, drainage systems and desilting facilities;
- Exposed surfaces/soil stockpiles should be properly treated to avoid generation of silty surface runoff during rainstorm;
- Regular review and maintenance of wheel washing facilities provided at all site entrances/exits;
- Conduct regular inspection of various working machineries and vessels within works areas to avoid any dark smoke emission;
- Suppress dust generated from work processes with use of bagged cements, earth movements, excavation activities, exposed surfaces/soil stockpiles and haul road traffic;
- Quieter powered mechanical equipment should be used;
- Provision of proper and effective noise control measures for operating equipment and machinery on-site, such as erection of movable noise barriers or enclosure for noisy plants;
- Closely check and replace the sound insulation materials regularly;
- Better scheduling of construction works to minimize noise nuisance;
- Properly store and label oil drums and chemical containers placed on site;
- Proper chemicals, chemical wastes and wastes management;
- Maintenance works should be carried out within roofed, paved and confined areas;
- Collection and segregation of construction waste and general refuse on land and in the sea should be carried out properly and regularly; and
- Proper protection and regular inspection of existing trees, transplanted/retained trees.

7.3 Monitoring Schedule for the Coming Month

7.3.1 The tentative schedule for environmental monitoring in December 2012 is provided in Appendix F.

8 CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusions

- 8.1.1 The construction phase and EM&A programme of the Project commenced on 12 March 2012.
- 8.1.2 All 1-hour TSP results were below the Action and Limit Level at all monitoring locations in the reporting month.
- 8.1.3 One (1) Limit Level exceedance of 24-hour TSP results was recorded in the reporting month. Investigation result show that the exceedance was not due to the Project works.
- 8.1.4 For construction noise, no Action and Limit Level exceedance was recorded at all monitoring stations in the reporting period. Investigation result show that the exceedances were not due to the Project works.
- 8.1.5 Ten (10) Action Level exceedances were recorded at measured suspended solids (SS) values (in mg/L) in the reporting month. Investigation results show that the exceedances were not due to the Project works.
- 8.1.6 A total of eighteen dolphin sightings were recorded during the two surveys, two on the 4 December 2012, two on the 6 December 2012, four on the 10 December 2012 and ten on the 11 December 2012. Of the eighteen sightings, eleven were “on effort” (which are all under favourable condition) and seven were “opportunistic”. A total of forty-seven individuals were sighted from the two impact dolphin surveys in the reporting period. Sighting details are summarised and plotted in Appendix K and Figure 5c, respectively.
- 8.1.7 Behaviour: eleven groups were feeding six of which was associated with a fishing vessel (hang trawler); one group were recorded as travelling; two groups were associated with multiple behaviour (feeding and traveling, socializing and feeding); one group were recorded as surface active; the behavior of three groups were unknown.
- 8.1.8 Environmental site inspection was carried out 4 times in December 2012. Recommendations on remedial actions were given to the Contractors for the deficiencies identified during the site audits.
- 8.1.9 As informed by the Contractor on 30 November 12. One complaint was received on 18 October 2012 and is reported in this reporting month due to the time required for conducting investigation.
- 8.1.10 No notification of summons and prosecution was received in the reporting period.

8.2 Recommendations

- 8.2.1 According to the environmental site inspections performed in the reporting month, the following recommendations were provided:-

Air Quality Impact

- All working plants and vessels on site should be regularly inspected and properly maintained to avoid dark smoke emission.
- All vehicles should be washed to remove any dusty materials before leaving the site.
- Haul roads should be sufficiently dampened to minimize fugitive dust generation.
- Wheel washing facilities should be properly maintained and reviewed to ensure properly functioning.
- Temporary exposed slopes and open stockpiles should be properly covered.
- Enclosure should be erected for cement debagging, batching and mixing operations.
- Water spraying should be provided to suppress fugitive dust for any dusty construction activity.

Construction Noise Impact

- Quieter powered mechanical equipment should be used as far as possible.
- Noisy operations should be oriented to a direction away from sensitive receivers as far as possible.
- Proper and effective noise control measures for operating equipment and machinery on-site should be provided, such as erection of movable noise barriers or enclosure for noisy plants. Closely check and replace the sound insulation materials regularly
- Vessels and equipment operating should be checked regularly and properly maintained.
- Noise Emission Label (NEL) shall be affixed to the air compressor and hand-held breaker operating within works area.
- Better scheduling of construction works to minimize noise nuisance.

Water Quality Impact

- Regular review and maintenance of silt curtain systems, drainage systems and desilting facilities in order to make sure they are functioning effectively.
- Construction of seawall should be completed as early as possible.
- Regular inspect and review the loading process from barges to avoid splashing of material.
- Silt, debris and leaves accumulated at public drains, wheel washing bays and perimeter u-channels and desilting facilities should be cleaned up regularly.
- Silty effluent should be treated/ desilted before discharged. Untreated effluent should be prevented from entering public drain channel.
- Proper drainage channels/bunds should be provided at the site boundaries to collect/intercept the surface run-off from works areas.
- Exposed slopes and stockpiles should be covered up properly during rainstorm.

Chemical and Waste Management

- All types of wastes, both on land and floating in the sea, should be collected and sorted properly and disposed of timely and properly. They should be properly stored in designated areas within works areas temporarily.
- All chemical containers, batteries and oil drums should be properly stored and labelled.
- All plants and vehicles on site should be properly maintained to prevent oil leakage. Proper measures, like drip trays and/or bundings, should be provided for retaining leaked oil/chemical from plants.
- All kinds of maintenance works should be carried out within roofed, paved and confined areas.
- All drain holes of the drip trays utilized within works areas should be properly plugged to avoid any oil and chemical waste leakage.
- Oil stains on soil surface, accumulated oil mixture and empty chemical containers should be cleared and disposed of as chemical waste.

- Regular review should be conducted for working barges and patrol boats to ensure sufficient measures and spill control kits were provided on working barges and patrol boats to avoid any spreading of leaked oil/chemicals.

Landscape and Visual Impact

- All existing, retained/transplanted trees at the works areas should be properly fenced off and regularly inspected.